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RESEARCH ARTICLE

THERE WAS ONCE UNDOUBTEDLY LIVING LIFE ON ANCIENT PLANET MARS. BUT WHATEVER HAPPENED! IT LOST ITS ATMOSPHERE AND ALL ITS LIFE, AND BECAME A TERRESTRIAL, ROCKY, COLD, DRY, AND LIVING DEAD PLANET: COMPARING THE GEOLOGY OF THE EARTH AROUND ŞANLIURFA (SE TURKEY) WITH THE GEOLOGY OF GALE CRATER ON ANCIENT MARS

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Abstract

Images sent by NASA's rovers on the surface of Mars contain a wealth of geological data regarding the rock stratigraphic units on the surface of Mars,their rock type characteristics,origins, formation environments, and paleoclimatology. These have been determined for the first time to be similar to rock units on Earth and to be their allotropes on ancient Mars. Again, as a result of the analysis of some images sent by Mars geologists and accessible to the author, rock units of different ages on the ancient Martian surface were compared with their allotropic equivalents on Earth, and geographical names on Mars were given at the formation level according to the type locations where they outcrop on Mars, and possible ages were predicted.As for the question everyone is wondering about: NASA images of the Martian surface, along with studies and articles by both NASA employees and some scientists on Mars, have identified and presented new geological data, findings, and facts in multidisciplinary fields, marking a significant turning point and beginning in human history. It is the responsibility of other scientific writers to clarify, embellish, enrich, and mature these crucial geological data, findings, and facts. Because, according to the first article of the first prototype Constitution of matter (Tarhan, 2024c), which is unchanging and valid everywhere in the Universe (programmed according to Physics, Chemistry, Mathematics, and Biology), there is a tendency and obligation to act together in order to remain stable/determ ined, to share, to exist, to be sustainable, to evolve, to reproduce, to enrich, to integrate, to live, and to help others live (in Chemistry; the Octet and Doublet Rule).

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It has been thought and suggested that we, as intelligent beings, should break down our desire to own everything, our selfish, aggressive, unsharing, wild, primitive behaviors and demands, according to our innate hereditary genes, through positive education, and that we should tame them, and that we should initiate the formation of new generations that are sharing, ethical and moral values. Training to the contrary would be adding fuel to the fire. Was there microbial and macrobial life on ancient Mars? Yes, there was. Do you want proof? In images sent and obtained by NASA's rovers on the Martian surface, the author has for the first time identified the presence of thick and widespread outcrops of hardened, white chalk rocks, which, having lived and died in hot, alkaline, and deep-sea environments of varying ages, accumulated/sedimented on the seabed. It was determined for the first time that the chalk series rocks were formed from the accumulation and compaction of calcium carbonate/calcite ($CaCO_3$) shells and skeletons of eukaryotes (single-celled) group of microscopically small microorganisms such as phytoplankton (coccoliths-coccolithophores, which form suspended and floating blue-green algae/seaweeds) and zooplankton (foraminifera, diatoms, rhabdolites and stromatolites etc.) that survived in warm, alkali-rich deep-sea environments.

Chalks are biochemically formed, porous, carbonate type organic composition sediments composed of 95-99% phytoplankton and zooplankton. Furthermore, in evaporite sedimentary basins connected to warm, alkaline, and deep-sea environments, intercalations of chalk-matrix/cemented gypsum-anhydrite, gypsum, salt, and clay-sulfate minerals, as well as coquina limestone rocks composed of calcium carbonate-based shells and skeletons of macroscopic organisms, have been identified for the first time. The determination of the existence of chalk series rock units on ancient Mars is, by this alone, a definitive, clear, and concrete geological fact that microbial and macrobial life existed on ancient Mars.In this the study briefly touches upon the properties of chalk. For further explanations, please refer to relevant books and publications.

In short, ancient Mars, like our planet Earth, had similar marine microscopically small plankton-type microbial organisms (coccoliths, coccolithophores, foraminifera, diatoms, rhabdolites, stromatolites, etc.), macrobial (fish, whales, dolphins, etc.), and terrestrial microbial-macrobial organisms (vertebrate animals, reptiles, our ancient intelligent native Martian allotrope relatives, birds, forests, plants, etc.), streams, rivers, lakes, seas, and oceans. Organic (marine and terrestrial organisms, etc.) and inorganic forms (different rock types, different minerals and ores, etc.), as well as diverse allotropes of flora and fauna, existed on Mars. In other words, ancient Mars was inhabited and had similar allotropes of organic and inorganic forms, fauna and flora as those on Earth. In this article, the rock stratigraphy units of these two different planets (Earth and Mars), which are approximately 225 million km away from each other and in the same Solar System, are compared with each other. Ages have been estimated for rock units on Mars based on their Earth counterparts.I'm sorry, but whatever happened! Ancient Mars lost its atmosphere, the Gulnaz geochemical rock cycle, and all life on it, becoming a living planet in a coma.

However, despite being in a coma, Mars is alive and will continue to be so. Despite all these negativities, Mars has actively operated and continues to operate all of its physical, biological and chemical reactors by transferring heat to the upper zones of Mars's crust through the zones of weakness in order to regain its lost atmosphere and life. Because, although Mars lost its thick and modern atmosphere and rock cycle, it is thought that different fault systems have been active and frequent earthquakes have developed since then. However, because Mars cannot thicken its atmosphere due to the carbon dioxide gas (CO_2) cycle that is constantly leaking into space, it awaits external assistance from neighboring Earthlings. It is ready and waiting as a candidate to become a second world for Earthlings! I believe and I foresee that Mars will become a second world for Earthlings in time.The images and data returned by NASA's Mars geologists, the Curiosity and Perseverance rovers, along with the opinions of NASA and other scientists who evaluated the data, were taken into consideration.

The Martian images and fieldwork on Earth were compared, interpreted, and analyzed, yielding unsurprising results. Because the ancient planet Mars, like our planet Earth, once had a thick and modern atmosphere (approximately 21% oxygen gas), a developed geochemical rock cycle, abundant snow and precipitation, and different climatic and seasonal conditions prevailed in different regions (dry-hot Sahara desert, temperate-rainy Amazon-type dense forests, etc.). Seasonal climatic variations have led to different allotropic changes and transformations in physical properties in different regions. With the first prototype Constitution of matter, the laws of physics, chemistry, mathematics, and biology are proven to be valid everywhere in the universe.The fact that the magmatic view is not valid in the universe, while the metamorphic view is, is becoming clear.

Although the geological formations (types of rock stratigraphic units, structural-stratigraphic relationships, depositional environments, material deposits, tectonism, mineralogy-petrography, volcanism and volcanic rocks, etc.), geomorphological formations (surface shapes, topography, erosion, transportation, accumulation, river beds, etc.), paleoclimatology and meteorology formations on the planets Earth and Mars are on different planets, it is clearly seen that they show many similarities because they are terrestrial-rocky planets located in the habitable zone of the inner solar system of our same Solar System. Therefore, on ancient Mars, allotropes of the same substances, composed of organic and inorganic forms, have emerged, although their physical properties differ. In other words, once upon a time, the ancient Mars Planet had forms (fauna, flora), plants-trees, snow, rain, streams, lakes, seas and oceans with chemical rock cycles, which were composed of families, species and genera that were similar and had different physical properties that formed the living life, but whose chemical-organic compositions were the same as those on Earth's allotropes.It was a living planet with a thick modern atmosphere with moderate oxygen levels, a carbon cycle, abundant rainfall and water, floods, flood deposits, and inundations, and warm and cold seasons. The absence of these phenomena would violate the laws of nature, physics, chemistry, mathematics, and biology. In particular, it would be contrary to the prototypical Constitution of the first drafted article.

The existence of thick and widespread chalk and chalky rock series similar to the Arabian-African plates, deposited in warm, calm and clear deep seas on the ancient planet Mars, has been determined for the first time. It has been determined that the rock stratigraphic units on ancient Mars are very similar to the rock type characteristics and stratigraphic relationships of the Upper Maastrian-Lower Miocene Şanlıurfa chalk series on Earth. Most importantly, it has been determined that solid neo-solutions developed on the topographic surfaces of the eroded morphologies of chalky rocks that were in contact with the ancient Martian atmosphere, due to the dissolution of the solid phase due to the increasing temperatures during the Martian daytime.

The solid neo-solutions (Tarhan, 2018), which accumulated as a result of solid phase flow along different topographic slopes, were covered with a thick and widespread crustal armor consisting of caramel-reddish-brown, glassy-amorphous (non-crystalline), hard, impermeable, pseudo-bedding, solid phase flow ridges, and blocking, as a result of the sudden cooling due to the decreasing temperature during the ancient Martian nights. This striking similarity has been demonstrated for the first time. (The chalky rock unit where crustalization developed thickly is the Middle Miocene Gediz Vallis Channel Formation on ancient Mars).The Upper Maastrichtian-Lower Miocene aged Şanlıurfa Chalk Series lies at the base of the Cenozoic aged rock units outcropping around Şanlıurfa-Mardin (Southeast Turkey).

(Its equivalent in the Gale crater on ancient Mars is probably the Upper Maastrichtian-Lower Miocene aged Mount Sharp Chalk Series, which is located at the lowermost base of the Tertiary aged chalk stack, which is autochthonous and has primary relationships with each other, forming the 5.5 km high Mount Sharp mountain) The eroded morphology of the Şanlıurfa Chalk Series is overlain by the Middle Miocene Ceylanpınar Formation with an angular unconformity resulting from horizontal bedding (the eroded morphology of the uppermost Tertiary sequence that forms Mount Sharp on ancient Mars is the Middle Miocene Gediz Vallis Channel Formation, which has a thick and widespread glassy-amorphous crust on its outer surface in contact with the atmosphere, and is intercalated with chalky, evaporite, macrobial fossiliferous, coquina and calciferous limestone).

These two formations are overlain by the Upper Miocene-Pliocene Karacadağ volcanics (dark black, gas-porous aa-type blocky lava, Pahoehoe-type flowing lava, and pyroclastic rocks) with an angular unconformity. However, equivalents of these volcanics do not outcrop in Gale crater and its surroundings on ancient Mars.It has been suggested that the Karacadağ volcanic rocks may be equivalent to those of the ancient Martian volcanoes Olympus Mons and Tharsis Mountains, the highest mountain in the solar system in the northern hemisphere, which at approximately 21 km high is higher than Earth's Mount Everest (see Figure 16, etc.).

The Adıyaman Formation, composed of Middle-Upper Pliocene lacustrine units and travertines (its counterpart in Gale Crater on ancient Mars is the Kimberly Formation), overlies the older units with an angular unconformity and horizontal bedding. Quaternary aged Harran formation (equivalent to Dingo Gap formation on ancient Mars) consisting of rich arable soils deposited in the terrestrial environment, caramel reddish brown in color, fluvial alluviums (maroon colored conglomerate, sandstone, siltstone, mudstone, etc.), Quaternary aged caramel reddish brown desert storm wind alluvium (loess, regolith, aerosol), oxidized chalk dust cover are widely seen (equivalent to Quaternary aged chalk, iron-rust-iron and trace amounts of other metal-nonmetal oxide-hydrate/hydroxide dust clouds and sediment covers on Mars, etc.).

In addition, Quaternary flood waters, flood sediments, muddy waters, block flows (basalt and chalk) that local people have cleared and used as agricultural land by these blocks are common along the slopes of the topography around Şanlıurfa, alluvium, landslides and slope debris (thick and widespread Quaternary flood deposits on Mars, slope and landslide rock flows, alluvium in dried streams, old alluvium/terraces, muddy water flows and block flows/chalk blocks that have flowed down the slopes over the hard crust along the topographic slope). It is thought, predicted and suggested that the rock stratigraphic units outcropping around Şanlıurfa (Southeast Turkey) and the rock stratigraphic units known as sedimentary deposits/sedimentary mounds outcropping in and around Gale Crater on Ancient Mars are very similar to each other, constitute allotropic equivalents of each other and probably accumulated in similar time periods and age ranges. However, the youngest Quaternary volcanic magmatic Gray Wolf Peak olivine basalt lava flowing/spreading along dry riverbeds in and around Gale Crater has no outcrop in the Şanlıurfa area. However, long-distance, fluid, hot, Pahoehoe-type continental lavas of the Quaternary period flowed along stream and river beds, causing changes in river course direction (the Euphrates River between Birecik and Araban in southeastern Türkiye) and the formation of reverse-flow rivers (the Asi River in Syria).

Although the rock units around Şanlıurfa in Southeastern Turkey and the rock units exposed in and around Gale Crater on Ancient Mars are very similar in terms of rock type, stratigraphic relationships and probably age, and are allotropic equivalents of each other, some important differences have been observed. Namely, the Upper Maastrichtian-Lower Miocene aged Şanlıurfa Chalk series rock units, which are the thickest and most widespread of the Tertiary aged rock units outcropping around Şanlıurfa (SE Turkey), are very thick and widespread in the region. Their atmospheric surfaces are covered with a thick and widespread glassy-amorphous crustal armor. In contrast, the thickest and most widespread rock stratigraphic unit in and around Gale Crater on Ancient Mars is the Gediz Vallis Channel Formation, probably of Middle Miocene age, which contains chalk, evaporite deposits, and coquina-bearing limestone intercalations.

It is also clearly seen that the most widespread and thick glassy-amorphous encrustation on Ancient Mars developed on the eroded atmospheric outer surface of this formation. Although these two formations were formed on different planets and at different times and in different depositional environments, their paleoclimatologies and crustation show very similar characteristics. Another important difference is that the Cenozoic aged rock units exposed in the Gale crater and its surroundings on Ancient Mars have experienced very intense current active faulting, resulting in tectonic deformations and widespread cataclastic rock formations.

In the text, while discussing the formation of the Middle-Upper Pliocene Kimberly formation deposited in the Gale Crater/Glen Torridon/Aeolis Palus tectonic zone basin on Ancient Mars, it is stated that there are outcrops of the Kimberly formation on the basin margins but no outcrops in the basin center, and that fresh dark nephthymic cosmic upper mantle peridotites emerge from the bottom, indicating an interesting and problematic situation. On the other hand, the Zagros-Bitlis Thrust Belt, which forms the northern edge of the Arabian Plate in Southeastern Turkey around Şanlıurfa, has developed graben formation tectonics (such as the Harran plain and the Karasu River Graben basin) in places due to strike-slip fault systems, as well as some current active fault systems cutting this belt and the Arabian Plate, and the earthquake in the last two years has caused the loss of many citizens.

The similarities in the rock type characteristics, depositional environments, structural and stratigraphic relationships of the rock stratigraphic units exposed on ancient Mars and Earth give the impression and prediction that they were formed within the same time periods. It has been established, confirmed, and suggested that life once existed on the ancient planet Mars. On the other hand, the view and prediction that the extinction of life on the ancient planet Mars did not occur millions or billions of years ago (e.g. 3.5 billion), but on the contrary, a time interval between thousands and millions of years ago (between 2.4 million and 300 thousand years or between 50 and 300 thousand years) is emerging. In conclusion, it appears that there was definitely life on the ancient planet Mars. Despite some theories, it is not known for certain why and when it disappeared.

This extinction is thought to be unrelated to the planet's internal structure, but rather directly related to the intrusion into its atmosphere by extraordinary external natural disasters.It is predicted that the major intervention in the atmosphere caused the Gülnaz geochemical rock cycle and the extinction of living life. However, it is not known exactly why and when the planet's atmosphere disappeared! It is thought that ancient Mars did not lose its atmosphere and life by cooling down by consuming its internal energy. Ancient Mars is a sad, living, dead planet that was alive but lost its atmosphere and life. The beginning of the extinction of life and its atmosphere on the planet is not thought to be related to the internal structure of the planet.

Furthermore, Mars is the first known planet in our solar system within the Milky Way Galaxy to have hosted and lost life in human history. However, it is certain that it is not the first planet in the Universe to have this issue. Planets that harbored life have formed and disappeared in the Universe. Things that will come into being and disappear will continue in the future. Therefore, we are definitely not alone in the Universe. Other aliens living on various terrestrial and rocky planets and moons (moons) in various galaxies, both large and small, will not be alone either. These changes and transformations have come from eternity and will continue with changes and transformations towards eternity.Earth, which probably formed in the same time period as ancient Mars, still has life on it. Of course, under normal conditions, this will have a life cycle lasting billions of years. No organic living form or inorganic system is eternal. They have a certain life cycle. As the author of the first prototype Constitution of the mine, the redness of the ancient Mars planet seen from the earth is due to the wind alluvial dust clouds suspended in the atmosphere as a result of the harsh, dry and cold desert storms on it and the desert storm wind alluvial cover (loess, regolith, aerosol) deposited on its surface, consisting of caramel red-brown colored oxidized iron dust [(rusty iron, ferric oxide/Fe_2O_3)] and oxides and hydroxides of chalk dust components.

In addition to the desert storm wind alluvial dust clouds in the Martian atmosphere and the caramel red-brown colored desert storm wind alluvial ferric/hemetite/rust/Fe_2O_3 and ferric hydrate/hydroxide [$Fe^{3+}(OH)_3$] dust cover deposited on the Martian surface; It has been determined, suggested and proposed for the first time that the chalk series rock units with oxidized organic composition (microscopic scale plankton coccoliths-coccolithophores, foraminifera, diatoms and rhabdolites etc. formed in warm deep seas) which were thick and widespread outcrops on ancient Mars, are composed of slaked and unslaked calcium oxide (CaO) and calcium hydroxide [($Ca(OH)_2$] which are the chalk dust components.On the contrary, the red atmosphere of the ancient planet Mars, known as the Red Planet, resulted in the loss of all life on it as a result of a chain reaction of massive, destructive natural geological events that triggered each other like a series of dominoes.

It should not be considered a symbol of destruction, collapse, debris, pain, sorrow, blood, and tears, and it should be recognized. However, while ancient Mars completely lost life, it is thought that during this extinction, the simpler-bodied ancestors of the alien Martians, the Martian Homo habilis/Homo erectus and the Martian Homo sapiens, emerged. The appearance of artificial caves in NASA's videos of Mars and the presence of artificially made depressions of square-rectangular shapes, approximately 50 cm deep, around these caves have led to the idea that ancient Martians lived as hunter-gatherer-settled clan communities, from which they emerged. However, it is thought that Homo habilis/Homo erectus and the Homo sapiens disappeared before they could fully evolve, reproduce, or socialize.

These problems will be revealed in future scientific studies.It is thought and predicted that ancient Mars probably lost its atmosphere and life within a time period between 2400 million and 300 thousand years ago. If ancient Mars had not lost its thick, modern atmosphere (about 21% oxygen), life and modern Martian aliens would still be alive today. Maybe we would have been in space wars with them… Why? Why are there wars on Earth? Interplanetary wars are fought in the name of ownership, self-interest, the feeling of possession, aggression, wild primitive emotions, non-sharing, always for me-always for me and for the sake of our own interests, due to our genetic past, with wild emotions that have not yet been fully purified during the evolutionary processes that we are born with… However, according to the articles of the first prototype Constitution of matter that has gone through the maximum evolutionary process;

It is programmed according to the laws of Physics, Chemistry, Mathematics and Biology to not perish or destroy, to be sharing, to act together, to take less from less and more from more, to beautify, to enrich, to evolve, to multiply, to integrate, to repair, to exist and to sustain… For this reason, matter continues its existence forever through change and transformation.The second planet in our Solar System to host life is our Earth. I hope and pray that studies on protecting Earth's atmosphere, environmental pollution, ecosystem protection, and preventing nuclear wars will take precedence over all kinds of scientific research, taking Mars as an example. We should not go to the Red Planet with our cannons, rifles, and nuclear weapons for wars of sharing and profit [because these are inherent in the nature and the essence of the earliest hereditary genes of all organic forms (plant and animal forms) present in the Universe. However, their degree of purity increases as they evolve over billions of years.

Where were those days!…], but rather for scientific research based on love and respect, as a benevolent savior. I am confident that the Red Planet will provide you with all kinds of opportunities. Furthermore, ancient Mars needs the help of its neighboring worlds.It has been suggested and recommended that all Earthlings, especially NASA, institutions, organizations, and independent scientific researchers focus on Mars. Scientific and technical advancements are needed to break and stop the spiraling cycle of carbon dioxide gas leaking from Mars' atmosphere into space. If Mars, a comatose, dead planet, thickens with the carbon dioxide gas that makes up its atmosphere and creates a greenhouse effect, ancient Mars is thought to have all the potential to restore the Gülnaz geochemical rock cycle and life over time. Because ancient Mars does not have the power and potential to naturally repair the gas leakage from its atmosphere into space. In this way, I believe that the new planet Mars, which is recovering from a coma with external support and assistance, will become a second world for aliens from neighboring Earth and a potential host planet.

Introduction:-

The Mars rovers, which are research and exploration vehicles managed by NASA's Jet Propulsion Laboratory, are, in order of their landing dates, Sojourner (1997), Spirit (2004-2010), Opportunity (2004-2018), Curiosity (2012-present), InSight (Mars helicopter, 2018-2022), Ingenuity (Mars helicopter, 2021-2022), Ice Mapper (2021-present), and Perseverance (2021-present) are geologists. (Credit: NASA/JPL-Caltech).

NASA has achieved and continues to achieve very important successes for humanity and human history. NASA's Curiosity, InSight, and Perseverance rovers (Mars Geologists) and the Chinese Aerospace Agency's Zhurong rover are also continuing their work on the surface of Mars. Mars geologists, aboard NASA's Curiosity and Perseverance rovers, have reached significant conclusions by using images they capture from the Martian surface and transmitting the scientific data they provide to the world, where they are evaluated by both NASA's esteemed researchers and other scientists. Mars geologists have clearly observed in the images the rock stratigraphy units, dendritic river drainages/beds (Steckel & al., 2025), flash floods and inundations (NASA, 3.5 billion years ago), abrasion, erosion, large canyons, river alluvial soil and the presence of old alluvium (terraces), slopes and landslide debris around the river beds on the surface of the ancient Mars planet.

The first identified "wind alluvial dust clouds and sediment cover" of the desert storm (Tarhan et al., 2012) (iron-rich ferric/rust/hemetite and chalk dust; also known as loess, regolith, aerosol, etc.) and the wind alluvial dust deposits/deposits deposited on the land are cleaned and carried by waters formed by snow and rainfalls, and the caramel red-brown colored sediments in wide valley beds, plains, and depressions have revealed many evidences regarding fertile soils, the carbon cycle, the presence of minerals indicating traces of life (Jones et al., 2025), volcanic rocks, volcano craters, the presence of oceans and seas, river beds, snow and rain. Mars geologists are trying to collect rock and soil samples and send them back to Earth to search for evidence of Mars' geology, paleoclimate, and traces of microbial and macrobial life.

There's no doubt that when the samples taken from the rocks on the Martian surface by the Mars exploration vehicle, Perseverance Rover, are returned to Earth, much more illuminating, Earth-like, and very interesting results will be obtained. The following questions remain: Why did macrobial and microbial life on ancient Mars disappear? Why did Mars lose its thick, modern atmosphere (containing about 21% oxygen), similar to Earth's? Most importantly, when did this event take place? Because the current appearance of ancient Mars is very similar to the current appearance of our planet, Earth. We can draw lessons from the results and understand how important the modern atmosphere and ecosystem of the planet we live on, Earth, are; We will learn from the results and understand the importance of Earth's modern atmosphere and ecosystem, and we will hope that intelligent spacefarers will jointly decide on and implement the necessary precautions and measures.

The geographical locations covered in this article on the USGS's 1:20,000,000 (1 mm = 20.0 km) scale Geological Map of Mars are shown in the light yellow section (AHi) "Amazonian and Hesperian Impact Unit"; Dark yellow sections are mapped as (HNt) “Hesperian and Noachian transition unit” and (mNh) “Middle Noachian highland unit” (Tanaka et al., 2014).Burtt et al., (2024), stated that, according to NASA scientists, the atmosphere of Mars has become unsuitable for life over billions of years due to solar winds, extreme climate changes leading to intense evaporation, and cold, salty conditions.

This was based on isotopic measurements of carbonates in Gale Crater. These minerals, which formed in Mars' ancient past, provide insights into the planet's climatic evolution. Some early researchers have suggested that about 2 billion years ago, Mars had a much denser atmosphere that could have supported the existence of liquid water on its surface. They stated that this environment may have allowed rivers and lakes to form across the planet. Scientists believe that billions of years ago, the ancient Martian atmosphere was dense and hot enough to form rivers, lakes, and perhaps even oceans of water. They note that as the planet cooled and lost its global magnetic field, solar winds and solar storms eroded significant portions of the planet's atmosphere into space, turning ancient Mars into the cold, arid desert we see today.

NASA researchers have proposed two possible climate models for ancient Mars from the results of analyses of carbonates collected near Gale Crater. One theory suggests that Mars experienced wet-dry cycles, providing short-term habitability. The other theory points to extreme salinity and cryogenic conditions where life faced significant challenges. Recent findings by NASA researchers suggest there is strong evidence that solar winds (massless, high-energy particles from the sun) played a significant role in Mars' atmospheric loss. Over time, solar winds and storms destroyed the planet's atmosphere, which once protected liquid water and possibly microbial life, they noted. They note that Earth has a strong magnetic field and a thicker atmosphere to resist solar winds, while Mars' smaller size and weaker gravity reduce its ability to maintain its atmosphere. They stated that if soil and rock samples were brought from Mars to Earth, more information would emerge regarding the geological and climate evolution of the planet.

Gillespie et al., (2024), discovered traces of ancient hot water on the Red Planet, suggesting that Mars may have had a habitable past. In their analysis of the Martian meteorite "Black Beauty" (NWA 7034-UNM, Source: Curtin University/Aaron Cavosie), which fell in the Sahara Desert of Northwest Africa, they identified elements such as iron, aluminum, yttrium, and sodium in the zirconium. These elements indicate that zirconium formed 4.45 billion years ago. They suggested that water was present during magmatic activity on ancient Mars.

Jones et al., (2025), NASA's Perseverance rover has been studying Jezero Crater on the Red Planet since February 2021, collecting rock samples in the hope of finding traces of ancient microbial life. The study authors used data from the Perseverance Rover rover to find the evidence. To determine whether life once existed on Mars, the study authors, an international team of researchers, identified two generations of calcium sulfate minerals beneath the surface of Jezero Crater's Shenandoah Formation, indicating past life on Mars. However, they noted that they were unable to determine how and when these calcium sulfate minerals formed.

Steckel et al., (2025), a team of geologists from the University of Colorado Boulder (CU Boulder), notes that ancient Mars likely experienced heavy precipitation in the form of rain and snow, which could put an end to the debate about the role of water in the formation of the "Red Planet." Researchers disagree on whether ancient Mars was warm and wet, or cold, dry, and lifeless, with frozen glaciers representing the only measurable water on the planet. They note that most scientists today agree that at least some water existed on the surface of ancient Mars during the Noachian era, approximately 4.1 to 3.7 billion years ago.

The geomorphological features that shaped the ancient Martian surface are still debated between theories of ice melting and snowfall. While new models support the concept of rain and snow on ancient Mars, the team cautions that this is far from certain. For example, scientists still struggle to explain how precipitation on ancient Mars could have remained wet and warm long enough to shape its geomorphology to such an extent. Still, scientists disagree on whether ancient Mars was warm and wet with regular rainfall, which could have supported life. They note that frozen glaciers represent the only measurable water on the planet. "When running water stopped eroding Mars was virtually frozen in time and probably still very similar to what Earth was 3.5 billion years ago," Hynek, a co-author of the paper, suggested.

They suggest that heavy rainfall likely fed the many valley and stream networks that shaped the Martian surface billions of years ago. They offer new evidence for a long-standing debate in planetary science. Most scientists today agree that at least some water existed on the Martian surface during the time of Noah, approximately 4.1 to 3.7 billion years ago. They suggest that ancient Mars was an extremely temperate planet, with snow or rain falling from the sky and rivers flowing through valleys to feed hundreds of lakes. Satellite images of Mars suggest that traces of water remain on the planet even today. However, some researchers argue that ancient Mars was never hot and wet, but always cold and dry. They suggest that some water was formed by the melting of polar ice.

Wang et al., (2025), have published valuable research on "Potential health effects, treatments, and countermeasures of Martian dust on future human space exploration." They note that the low-gravity environment induces a range of physiological changes. They are investigating how substances similar to the hazardous components of Martian dust might cause disease in humans on Earth. Due to its small particle size, Martian dust is more likely to cause lung irritation, be absorbed into the bloodstream, and cause illness in astronauts. Toxic components of Martian dust include perchlorates, silica, nanophase iron oxides, and gypsum, as well as trace amounts of toxic metals (chromium, beryllium, arsenic, and cadmium, among others) whose abundance is debated. The predicted effects of dust exposure range from asymptomatic to life-threatening. Many substances are carcinogenic. Most of the damage, they report, affects the pulmonary system. They note that the average diameter of Martian dust is approximately 3 μm (microns).

Tutolo et al., (2025), suggested that carbonates detected by the Curiosity rover suggested a functioning carbon cycle on ancient Mars. In other words, evidence has emerged for an ancient Martian carbon cycle that could have sustained life. They stated that this sheds light on the carbon cycle of ancient Mars and the suitability of life on Mars in the past. They noted that although Mars is cold and dry/barren today, the presence of dry riverbeds and sedimentary rock units indicate that it once hosted lakes and flowing water. They stated that all of these features suggest that the planet once had a much thicker atmosphere rich in carbon dioxide, which may have created warmer conditions suitable for liquid water.

However, scientists had long pondered the lack of expected carbonate mineral levels in previously analyzed Martian samples. Carbonate minerals are generally formed through interactions between water, carbon dioxide, and rock. Co-author of the article, Dr. Ben Tutolo suggested that "the discovery of large carbon deposits in Gale Crater represents both a surprising and significant breakthrough in our understanding of the geological and atmospheric evolution of Mars." He noted that Mars transitioned dramatically from its warm and humid early state to its cold and dry present-day state. He stated that the planet was habitable and that habitability models were accurate. He also raised the valid and correct idea that "something happened to Mars that didn't happen to Earth".

The consensus among most scientific studies on Mars is that Mars resembles our planet Earth. It is accepted that the core and mantle of Mars formed by the slow cooling of the Martian magma ocean, fractional crystallization, and magmatic differentiation, a magmatic view known in the Geology/Earth Sciences literature. It has been suggested that the Martian lithosphere is approximately 400-6000 km thick.However, the author of this article/study has suggested and suggested in all his articles/studies that the magmatic view should be rejected and the metamorphic view should be accepted.

He created 6 articles of the first prototype Constitution of the matter (Tarhan, 2024c), and claimed that the magmatic origin granite/granitoid, gabbro/gabbroid, diorite/dioritoid, charnokite/charnokitoid, anorthosite/anorthositoid and carbonatite/carbonatoid intrusion, pluton and batholith type plutonic/ depth rocks, which develop according to the magmatic view in nature/our planet Earth and all terrestrial-rocky planets and satellites (moons) of the Universe, have not developed and will not develop (Tarhan, 1987, Tarhan, 1989, Tarhan, 2018, Tarhan, 2019a, Tarhan, 2019b, Tarhan, 2021, Tarhan, 2024a, Tarhan, 2024b, Tarhan, 2024c, Tarhan, 2024d, Tarhan, 2024e, Tarhan, 2024f, Tarhan, 2024g etc.).

It was determined for the first time and proposed that the known plutonic/plutonic rocks in question were derived in solid phase and in-situ (autochthonously in situ) from previously existing primary rock units of different origin, age and environment (cosmic upper mantle peridotites, terrestrial igneous rock sequence/oceanic crust series/ophiolite sequence rock units, volcanosedimentary rock units, different volcanic rocks and different sedimentary-carbonate rocks, etc.) within the regional dynamothermal Tarhan metamorphism cycle (Tarhan, 2018). In the physical conditions of the regional progressive dynamothermal metamorphism that developed in the first phase of the regional dynamothermal Tarhan metamorphism cycle (pressures are more effective than temperatures.

Metamorphic minerals and rocks develop in this direction), classical metamorphic rocks with different mineralogical and chemical compositions develop depending on the composition of the pre-existing primary source rock units within open thermodynamic systems. Within the regional dynamothermal Tarhan metamorphism cycle, when there is a regression and decrease (decompression) in the physical conditions (P/T) of the regional prograding dynamothermal metamorphism, the physical parameters (P/T) and activities (P>T; T>P etc.) of the regional prograding dynamothermal metamorphism overlap with the change and transformation into another reversed regional regressive dynamothermal metamorphism within the metamorphic system.

In this way, in the second and last stage of regional dynamothermal Tarhan metamorphism, which developed in reversed regional regressive dynamothermal metamorphism [(in this type of metamorphism, temperatures are more effective than pressures. In this direction, generally light-colored, anhydrous, stable, felsicoblastic, coarse granitic crystalloblastic neo-mineral rock series and their derivatives, metablastic mineral deposits, metamorphic origin, a kind of modern superionic metablastic solids/rocks/minerals/materials, which are the 5th state of matter (first defined, named and classified by Tarhan,2018, Tarhan 2024a, etc.)], a fourth new thermodynamic system is developed from previously developed different classical metamorphic rocks, in closed or transitional thermodynamic systems (Transitional/semi-open-semi-closed system; is added to the three thermodynamic systems known as isolated, closed and open, Tarhan, 2018) develop gradually in the solid phase and in situ, respectively, as anhydrous, unstable solid neosolutions with different chemical compositions (compositions of alkali aluminum silicate, calcium silicate, and ferromagnesian silicate; Tarhan, 2018). Anhydrous and unstable solid neosolutions are formed by recrystallization (first defined and named by Tarhan, 2018) developing through metablastization within closed and transitional thermodynamic systems under the physical conditions of temperature-dominated reversed regional regressive dynamothermal metamorphism.

He defined, named, and classified them as a type of modern leucocratoblastic and crystalline/crystalloblastic metamorphic rocks of metamorphic origin, rootless (Tarhan, 2018). In the physical conditions of reversed regional regressive dynamothermal metamorphism, previously formed metamorphic rocks with different mineralogical and chemical compositions in closed and transitional systems lose their stability and gradually dissolve in the solid phase and in-situ. Solid neosolutions with different chemical compositions develop through dissolution in the solid phase (the development and naming of solid neosolutions was first made by Tarhan, 2018). Temperatures are more effective than pressures in reversed regional regressive metamorphism.

It has been determined for the first time that unstable and anhydrous solid neosolutions with alkali aluminum silicate composition, developing in an environment where temperatures are effective, metablastize/metablastization and recrystallize, gradually transforming all previously existing classical metamorphic rocks with different mineralogical and chemical compositions into rocks with generally granitic mineralogical composition, and transforming them into leucocratoblastic metablastic rock series and theirderivatives/metablastites/metablastic rocks (first defined, named and classified by Tarhan,2018, Tarhan, 2019a, Tarhan, 2019b, Tarhan, 2021, Tarhan, 2024a, Tarhan, 2024b, Tarhan, 2024c, Tarhan, 2024d, Tarhan, 2024e, Tarhan, 2024e, Tarhan, 2024f etc.), which are a type of modern metamorphic rocks, both in the solid phase and in-situ, and it is thought that very important new contributions have been made to the geological literature. It is clearly intended to express the idea, foresight, and belief that the sterile cycles that have developed due to the lack of solutions in scientific studies are being broken, and that radical and revolutionary new changes are being initiated in scientific studies.

Leucocratoblastic metablastic rock series and their derivatives/metablastites/metablastic rocks, which are a type of modern metamorphic rocks of metamorphic origin (to date, in geological literature, they are known as all types of granite/granitoid, gabbro/gabbroid, diorite/dioritoid, anorthosite/anorthositoid, charnockite/charnockitoid, rarely seen in nature carbonatite/carbonoatoid intrusion, pluton and batholith type plutonic rocks of magmatic origin). Leucocratoblastic metablastic rocks also have different types depending on the primary source rock units that were previously present.

He stated, proposed, and asserted that the aforementioned metamorphic ore deposits/substances/minerals/rocks, which are a type of modern metamorphic rocks and leucocratoblastic metablastic rocks and the metamorphic-origin metablastic orel deposits/substances/minerals/rocks associated with these rocks (such ore deposits have been known in the geological literature as mineral and ore deposits of magmatic origin associated with granite/granitoid, carbonatite, and similar rocks) are, for the first time, superionic metablastic solids/substances/rocks/minerals/ores, which are a type of modern metamorphic rocks and modern mineral and ore deposits corresponding to the 5th state of matter. He argued and suggested that otherwise, any scientific studies conducted in biological and geodynamic evolution modeling, other than incidental studies related to their exploration, research, and discovery, would be economically irreversible due to material and temporal losses (Tarhan, 1987, Tarhan, 1989, Tarhan, 2018, Tarhan, 2019a, Tarhan, 2019b, Tarhan, 2021, Tarhan, 2024a, Tarhan, 2024b, Tarhan, 2024c, Tarhan, 2024d, Tarhan, 2024e, Tarhan, 2024f, Tarhan, 2024g etc.).

It was determined and proposed for the first time that the leucocratoblastic crystalline/crystalloblastic metamorphic rock types in question, which are dominated by granite mineralogical composition (quartzoblast, feldspathoblast, etc.), correspond to the 3rd generation rocks, the 2nd generation metamorphic rocks, the 5th state of matter, which corresponds to superionic metablastic solid matter / rock / mineral / ores, with crystalloblastic texture and structure, correspond to leucocratoblastic metablastic rock series and its derivatives / metablastites / metablastic rocks(Tarhan, 2024a, Tarhan, 2024c). It was determined and proposed for the first time that the metablastic rocks of the metamorphic origin, carbonatoblastite (known as carbonatites, which are rarely seen in nature with magmatic origin), which are generally composed of main-secondary-trace carbonate-silicate based crystalloblast neominerals that form rocks with granitic mineralogical composition, constitute the deposits of metallic-nonmetallic metablastic material of metamorphic origin, corresponding to the 5th state of matter, enriched in rare earth elements and radioactive elements.

The author will bring up the sixth (6th) state of the matter in his future works. For the first time, he created the prototype Constitution of matter (Tarhan, 1987, Tarhan, 1989, Tarhan, 2018, Tarhan, 2019a, Tarhan, 2019b, Tarhan, 2021, Tarhan, 2024a, Tarhan, 2024b, Tarhan, 2024c, Tarhan, 2024d, Tarhan, 2024e, Tarhan, 2024f, Tarhan, 2024g, etc.).

As a geologist experienced in geological mapping, mineralogy-petrography studies for many years in the field, the geology, geomorphology and climatology of the Earth have been compared with the geology, geomorphology and paleoclimatology of the Gale Crater of Mars and its surroundings and the similarities have been revealed and will be put forward below…

Below, the geological data from studies on the regional geology of the provinces of Şanlıurfa-Mardin-Gaziantep located in Southeastern Turkey, which form the northern edge of the Arabian plate, which is similar to the geology of the ancient Gale Crater of Mars, are briefly mentioned and examples are given (Tarhan et al., 2012; Beyazpirinç & Tarhan, 2013a, Beyazpirinç & Tarhan, 2013b, Beyazpirinç & Tarhan, 2013c, Beyazpirinç & Tarhan, 2013d, Beyazpirinç & Tarhan, 2013e; Beyazpirinç et al., 2014; Kartalkanat et al., 2020, Kartalkanat et al., 2021).

Geology Of The Surroundings Of Şanliurfa (Southeastern Turkey) In The World:-
Introduction:-

One of Curiosity's many discoveries in the Gediz Vallis channel in Gale Crater was climbing part of the 3-mile-high (about 5.5 km) Mount Sharp (Aeolis Mons) and determining that each layer of the mountain represents a different period of Martian history. If any living life ever formed on Mars, the task has been to determine where and when the nutrients needed for microbial life might have been provided.

The current physical conditions on Mars are not suitable for life. However, the planet's extensive valleys, geomorphology, and rock types of varying ages (sedimentary, chalk, carbonate, and volcanic rocks, fluvial alluvium, desert storm wind alluvial dust, etc.) indicate that the planet once possessed rock cycles and rock stratigraphy units similar to the Gülnaz geochemical rock cycle on Earth.

Very important geological concrete data has been provided and continues to be provided in the images sent by NASA's Curiosity spacecraft, which collects geological data on the surface of Mars and sends images. Looking at some images taken and transmitted from the surface of Mars, one feels as if one is working in the area around the Şanlıurfa-Mardin provinces in Southeastern Turkey, which forms the northern edge of the Arabian plate (Figure 1).

Therefore, in order to understand the rock stratigraphic units in the Mars images, it was thought to be useful to address the climate of the Arabian Plate and the types, ages, depositional environments, stratigraphic and structural relationships of the rock units outcropping in Southeastern Turkey, which forms the northern edge of the plate, and studies on phosphate exploration. For this reason, it was compared and correlated with the geology of a region similar to the rock stratigraphy units of Mars, which was studied on Earth between 2008 and 2021 (Figure 1) (Tarhan et al., 2012; Beyazpirinç & Tarhan, 2013a, Beyazpirinç & Tarhan, 2013b, Beyazpirinç & Tarhan, 2013c, Beyazpirinç & Tarhan, 2013d, Beyazpirinç & Tarhan, 2013e; Beyazpirinç et al., 2014; Kartalkanat et al., 2020, Kartalkanat et al., 2021).

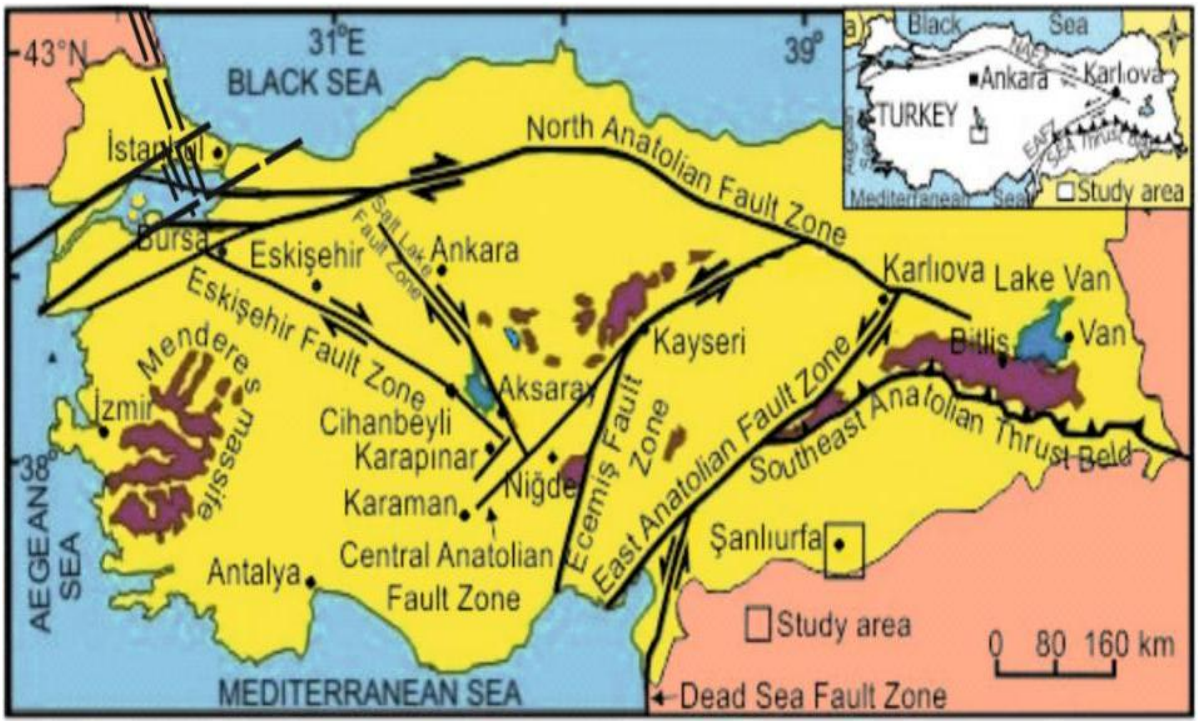


Figure 1:- Map of Türkiye and location map of the study area around Şanlıurfa (taken from Tarhan et al., 2012).

The Southeastern Turkey region, which forms the northern end of the Arabian Plate where rock stratigraphic units similar to those exposed on Mars are exposed, is in contact with the Anatolian plate overlying the Alpine-Himalayan orogenic belt through a tetnonic zone (Zagros-Bitlis Thrust Belt, Figure 1). Although these two regions share similar rock stratigraphic units, their rock types, facies, structural, and stratigraphic features are completely different (Figure 1). The rock units within the Alpine-Himalayan orogenic belt (Anatolian Plate) generally exhibit folded, thrust, and nappe structures.

It includes volcanics of widespread volcanism formed in lacustrine, marine and terrestrial environments [(Aa-type, Pahoehoe-type, pillow and columnar lavas; Pyroclastic rocks/Pyroclastics: Mud-lahar flows, agglomerated, lapilli, tuff-ash, tuff breccia, volcano bomb, pyroclastic/volcanic breccia, pyroclastic flow/conglomerate tuff, pumice, pumice/bihop tuff, perlite, vitric tuff, lithic tuff, opsidian, basaltic-rhyolitic slag, etc.)]. Although the widespread Neogene volcanism and widespread lava and pyroclastic rocks outcropping in the region in question are very widespread and thick, their thickness and prevalence are much less in Southeastern Turkey.

The Paleozoic, Mesozoic, Cenozoic/Tertiary and Neogene aged units (except Pliocene and Quaternary aged units) that form the Anatolian plate located on the Alpine-Himalayan orogenic belt are generally folded, and different orogenic phases have developed between them due to folding and erosion-erosion. The Pliocene and Quaternary aged units are horizontally bedded and not folded.

For this reason, the author proposed in his four-volume book titled “Metamorphic and Metablastic Rocks” that the “Geological Time Table/International Chronostratigraphic Table” of the International Commission on Stratigraphy should be re-arranged and revised separately according to the name and type locations of the orogenies corresponding to folding and erosion, according to interplate orogenic belts and cratonic old stable plates and shields (for a more detailed explanation, see Tarhan, 2018, Volume 4).

What would happen if not revised and changed? Nothing will happen. All rock stratigraphic units, formed in different origins, ages, and environments, and displaying different stratigraphic and structural relationships with each other, will remain where they are. However, geodynamic evolution models on a local, regional, or global scale for the planet Mars, our planet Earth, and our Earth's natural satellite, the Moon, will definitely be wrong.

Paleozoic-Mesozoic Series of the Arabian Plate:-

The Cenozoic rock stratigraphic units in the Gaziantep-Şanlıurfa-Mardin provinces (SE Turkey), which form the northern leading edge of the Arabian plate, are underlain by folded Paleozoic-Mesozoic sedimentary rock units. These units consist of Cambrian ferruginous formations, clastics, cherty limestone, ferruginous volcanosedimentary, and trilobite-bearing marl; There are highly folded and occasionally obliquely folded rock units consisting of Devonian aged carbonate, Permian-Cretaceous aged carbonate series and equivalent vertical and lateral gradual transitional clastic rock stratographic units. It is observed that the intensity of folding gradually decreases from the Bitlis-Zagros thrust belt southwards towards the inner parts of the Arabian Plate (between Derik and Mardin; Figures 1 and 2).

Tertiary Aged Şanlıurfa Chalk Series (KMiş):-

The eroded/erosional geomorphology of the Paleozoic-Mesozoic folded series of the Arabian Plate, composed of clastic/detrital sedimentary rock units and Mesozoic carbonate rocks, is overlain by the Upper Maastrichtian-Lower Miocene Şanlıurfa Chalk Series, with an angular unconformity and horizontal layering (Tarhan et al., 2012; Figure 2). Şanlıurfa chalk series generally consists of white, light yellow, thick-massive and horizontally bedded chalks. There are thick horizontally bedded chert layers and occasionally chert nodules within different levels of the chalky series in question.

Caves, settlements and ancient tomb houses were built by carving the chalk in the lower sections of the chert layers. Within the different levels of the chalky series, chalky marl (with plant fragments, traces and grooves of organisms are seen, etc.), chalky claystone, chalky siltstone intercalations and levels are seen. In some regions, due to facies change, burgundy colored terrestrial coarse clasts (burgundy colored conglomerate, sandstone, siltstone, mudstone, etc.) and chalky fine clasts (chalky marl, chalky claystone, chalky sandstone, chalky scree, chalky calcarenite, etc.) were observed to make gradual transitions in vertical and lateral directions.

The formations of different ages that form the Upper Maastrichtian-Lower Miocene Şanlıurfa Chalk Series are gradually transitional to each other in vertical and lateral directions and consist of horizontally bedded and unfolded rock stratigraphy units (Figure 2).Chalk is mineralogically composed primarily of calcite (calcium carbonate/$CaCO_3$).

They contain trace amounts of kaolinite, dolomite, silt, clay, quartz and salt. Chalk consists mostly of small fragments of calcite shells or skeletons of plankton such as foraminifera, coccolithophores, diatoms, stromatolites and rhabdolites, which are microscopically small and live in warm and deep seas. They are chemically reactive and may foam when in contact with acids. Chalk and coal are both organic sedimentary rocks. Both chalk, coal and hydrocarbons are formed from the remains of living organisms.

Chalk is composed of microscopically small calcite shells (coccoliths) and skeletons that lived in warm, clear waters under very deep marine conditions. Plankton (plant/phytoplankton and animal/zooplankton) form biochemical sedimentary carbonate rocks with a calcium carbonate composition, composed of organic shells and skeletons that accumulate and compact with the gradual and continuous sedimentation of micro-organisms to the sea bottom.

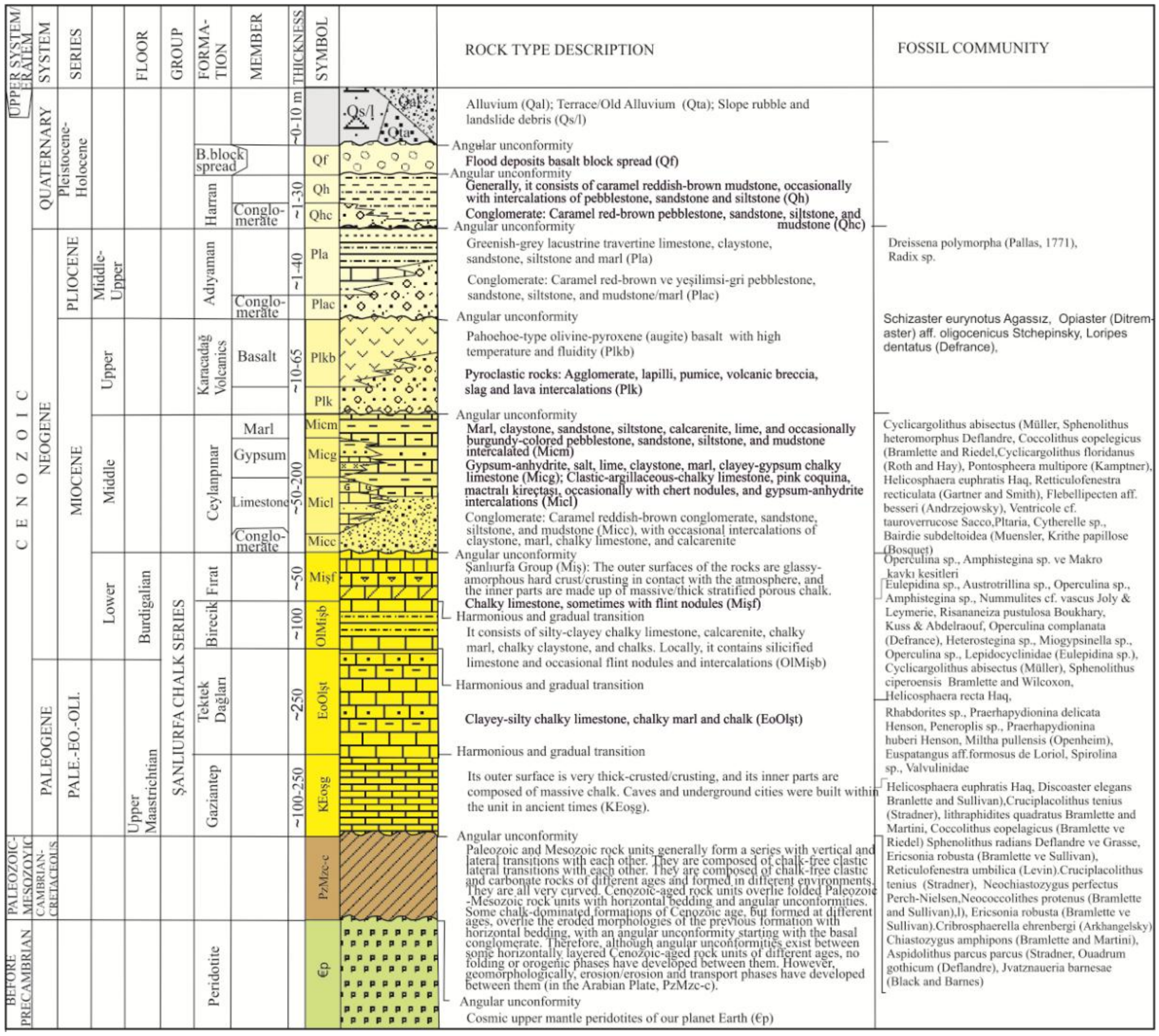


Figure 2:- Generalized columnar section around Şanlıurfa (SE Türkiye) (modified from Tarhan et al., 2012).

The reason for the importance of chalk is its "virtual absence of terrestrial material." This is because it is so far removed from the mainland's depositional environment (Chatwin, 1960). It was deposited on continental shelves between 100 and 600 meters deep. Chalk consists primarily of low-magnesium calcite skeletons. Chalk is widespread in Cretaceous marine deposits. However, in Southeastern Turkey, around the Gaziantep-Şanlıurfa-Mardin provinces and in the Arabian Plate, the Middle Eocene-Lower Miocene Şanlıurfa Group (Tarhan et al., 2012) was first defined and named as the Upper Maastrichtian-Lower Miocene Şanlıurfa Chalk Series (Kartalkanat et al., 2020, Kartalkanat et al., 2021) in the author's later studies. The eroded morphology of the horizontally bedded Şanlıurfa Chalk Series rock units is overlain by the Middle Miocene Ceylanpınar formation with angular unconformity and horizontal bedding (Tarhan et al., 2012).

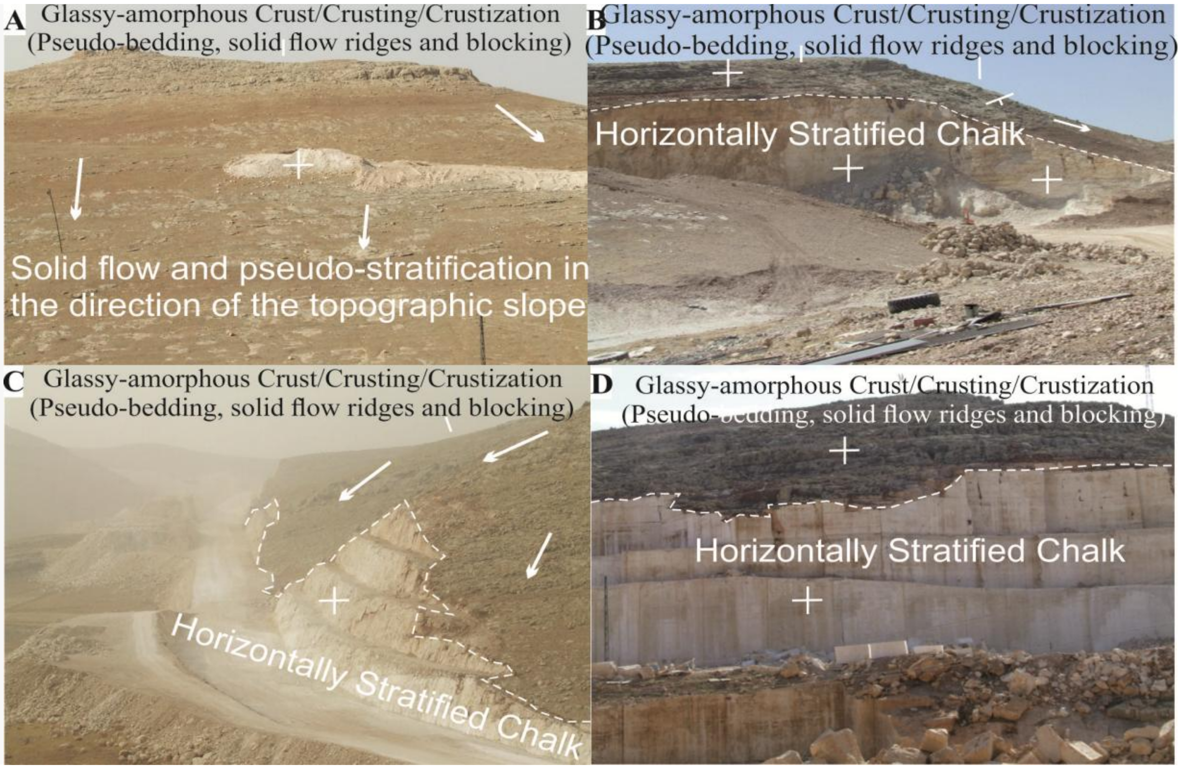


Figure 3a, b, c, d: - An impermeable, hard-armored crust/encrustation, developed in the form of pseudo-bedding, blocking and solid flow protrusions, solidified as a glassy amorphous solidification at night as a result of sudden cooling, resulting from the flow and accumulation of solid neo-solutions on top of each other, resulting from day-night temperature differences, and developed depending on the slope of the topographic surface of the eroded geomorphological outer surface of the chalk series in contact with the atmosphere.

However, the fresh inner parts of the rock units consist of white, horizontally bedded, thick/solid/massive, loosely textured, brittle, porous and permeable chalks (A, B, C, D). In the atmosphere, there are chalk dust clouds of oxidized organic composition from desert storm-blown alluvium (loess, aerosol, regolith) (C). Crust/Crustification: A fertile, caramel-reddish-brown soil formed by the interaction of chalk dust with water, which has an organic composition and has settled on the hard, amorphous, fine-grained glassy crust of the chalk series (A). Similar formations are also seen in images of Mars (Figure 23, 26, 28, 35) (Source: Author).

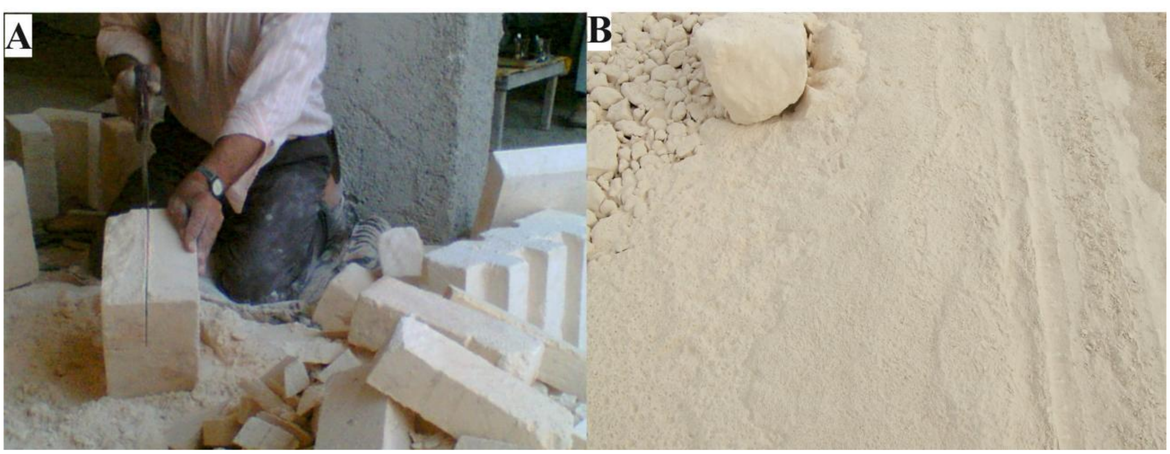


Figure 4a, b:- Chalk, which can be easily processed and pulverized. A) A stonemason cuts the chalk with a saw to create building blocks. All the old structures and ancient artifacts of the region are made of chalk. B) Chalk that turns into micron-sized powder on roads created by construction vehicles on chalky rocks. The chalk series rocks, which have very thick and widespread outcrops in the region, form chalk dust clouds and blanket/debris deposits composed of oxidized organic matter of the alluvium (loess, regolith, aerosol) carried by desert storms (Source: Author).

Chalk:-

Coccoliths-Coccolithophores:-

Coccoliths are microscopically small algae that form chalk. They are made by one of the most important eukaryotic (single-celled) phytoplankton. Their spherical skeletons are known as the coccosphere. These are single-celled protists, the full names of which are coccolithophorids or coccolithophores. Chalk forms most of the marine layers of the Upper Cretaceous period. It consists of 95% to 99% coccoliths, plates of calcium carbonate ($CaCO_3$) produced by coccolithophorids. Coccolithophores contribute less than 70-80% of the total carbonate in warm and deep-sea sediments. Eukaryotes are a group of living things that contain a nucleus and usually organelles in their cells, and are one of the three main groups that include all living things in scientific classification, along with archaea and bacteria. Eukaryotes are generally divided into four groups: plants, animals, fungi, and protists. The formation of the eukaryotic cell was a significant turning point in the evolution of living organisms. Krnoll (1992) suggests that eukaryotic cells emerged approximately 1.6-2.1 billion years ago. There is also the view that red algae fossils, thought to belong to modern living groups, date back approximately 1,200 billion years.

Plankton are organisms that live in fresh and salt water and are too small to be seen with the naked eye. There are two types of plankton: animal plankton and plant plankton. Biologists have given separate names to plankton divided into species. For this reason, plankton with plant characteristics are called phytoplankton, and those with animal characteristics are called zooplankton. Zooplankton live in warm, deep seas. Plant phytoplankton live suspended and floating in warm and shallow marine waters. Phytoplankton carry out photosynthesis using sunlight, carbon dioxide and water. They consume carbon dioxide and produce oxygen. Phytoplankton produces 20% of the 50-70% of oxygen produced by the sea. Zooplankton (animal plankton/microorganisms/are evidence and indicators of microbial life, etc.) are organically fed by the breaking up of phytoplankton (plant plankton/are evidence and indicators of microbial life, etc.) by waves and their dispersion into the water.

Phytoplankton are defined as single-celled plant organisms, mostly microscopic, that live suspended in seas and inland waters. There are approximately 5000 phytoplankton species in the seas. The organic matter they produce using inorganic nutrients forms the food of animal zooplankton organisms. Phytoplanktonic organisms, generally single-celled algae/seaweed, have a plant structure and exist both individually and in colonies. They live suspended in water because they utilize sunlight to convert carbon dioxide from the air and water into the sugars necessary for growth, while also releasing oxygen gas. For this reason, they cannot survive deep under water without seeing the sun. Neritic plankton are abundant plankton species in coastal waters (they are generally common in evaporite environments) where temperature and salinity vary greatly in the pelagic zone from the coast to a depth of approximately 200 meters.

Red Algae:-

Mucilage/Sea Saliva/Red Tide:

Unnatural red algae/seaweeds are formed as a result of environmental and marine pollution, which is not unique to the ancient planet Mars, but is unique to the planets of Earthlings. These phytoalgae are typically covered by a layer of red-brown and white sticky mud and foam on the surface of the water surface near the shores of closed inland seas. This layer or chalky coating of pollution is known as "mucilage/sea saliva/red tide." It is known that many parameters are effective in the formation of mucilage. However, the most important of these is the pollution of rivers, seas and the environment, and the pollution caused by deep sea discharges into the seas. There are many factors such as warming of sea water, evaporation and increase in salinity due to global warming.

It is known that forests and plants provide the primary source of oxygen. Of course, forests and plants contribute significantly to carbon dioxide emissions, photosynthesis, and the formation of the glucose and oxygen cycles. However, the largest portion of oxygen production (50-70%) comes from the oceans. Twenty percent of the total oxygen produced in seawater is produced by floating and suspended blue-green algae/moss/phytoplankton, which thrive in clean, warm seas. In case of pollution of rivers, seas and the environment, the red-red phytoplankton, which is a type of plant plankton/phytoplankton in the seas, multiply rapidly and excessively and spread and cover the sea surface in the form of a brown-red and white colored, sticky mud layer. This white, brown-red, sticky layer, composed of microscopically small red-red algae/moss, is known as mucilage/sea slobber/red tide.

While nature cleans the pollution in the sea by creating red phytoplankton to protect living things, the chain ecosystem is disrupted accordingly. Climate change, global warming, floods, wars, atmospheric pollution, industrial and factory waste from unfiltered systems—all while Mars is being destroyed by natural events-humans are destroying their planet with their own hands. What a terrible contradiction this is, it is impossible to understand. It's been thought and proposed that this can only be resolved through positive science and evolution…

As for the dangers and risks of the mucilage created by red phytoplankton/algae/moss, red algae secrete a poisonous toxic substance due to the pollution they clean. Because the mucilage is broken down by the waves and dispersed into the sea, the marine instruments that feed on it die. Due to the decay of the organs that come to the surface of the water, foul odors and undesirable appearances develop. Because the red algae covering the mucilage prevents sunlight from reaching the seabed, photosynthesis prevents the formation of bottom-dwelling organisms, resulting in the death of bottom-dwelling organisms.

In addition, when the mucilage cover layer is broken by waves and deposited on the sea bottom, they cause the oxygen in the environment to be consumed and reduced. Who pollutes the atmosphere, the environment and water, causes climate change, global warming, heat trapping and therefore ecosystem degradation? It is a phenomenon that has emerged as a result of our incompetent and irresponsible harmful activities that skim the cream of the planet. In short, mucilage/sea saliva/red tide is not a natural phenomenon. Why don't red phytoplankton appear in clean seas? They appear in polluted waters and seas. On the contrary, it is thought that there is a chain of events that develops as a result of pollution of the atmosphere, seas and the environment, causing ecosystem degradation, climatic changes and global warming.

Globigerinida:-
They are the most widespread group of foraminifera found as marine plankton. They have hyaline calcareous shell structures. They have survived from the Jurassic period to the present day. The group includes more than 100 genera and over 400 species, of which 30 are extant. One of the most important genera is Globigerina (named by Murray and Renard in 1873).
Microbial life: A microorganism (from the Greek mikrós, "small," and ὀργανισμός, organismós, "living organism") or microbe (usually meaning too small to be seen with the naked eye) is a microscopic plant fragment or organism.
Macrobial life traces: Plant fragments and organisms that can be seen with the naked eye.

Formation of Chalk Rock:-
Marine Origin: Chalk rock is primarily associated with marine environments. It occurs in areas where microscopic marine organisms, especially coccolithophores, are abundant.
Accumulation of Microscopic Organisms: The fundamental process behind chalk rock formation involves the gradual accumulation of coccolithophore remains. These are tiny, single-celled algae that secrete calcium carbonate plates known as coccoliths around their cell membranes. These coccoliths are extremely small, often less than 1/100th of a millimeter in size.
Sedimentation: As these coccolithophores live and die, their coccoliths are deposited on the ocean floor. These residues accumulate over time and form thick layers.
Compaction and Cementation: As more and more layers of coccolith-rich sediments are deposited, they undergo compression due to the weight of the overlying sediments (known as rock pressure). Due to this pressure and heat, the calcium carbonate in the coccoliths dissolves in the solid phase and recrystallizes from the solid neo-solution, forming a natural cement/matrix that binds the sediments together.
Lithification: Ultimately, the processes of compression and cementation cause these sediments to lithify, transforming them into solid rock. Chalk rock and chalk series are formed by going through these processes.

Composition of Chalk Rock:-
Chalk rock is composed of calcium carbonate ($CaCO_3$) in calcite composition and is of biochemically formed sedimentary and organic origin. Inorganic calcium carbonate ($CaCO_3$) is formed differently from sedimentary rocks in chemical composition. The main components of chalk rocks or chalk series rock units are;
a) **Coccoliths:** Chalk rock is predominantly composed of microscopic calcium carbonate plates of coccolithophores, or coccoliths. These microscopically small organisms contribute to chalk's characteristic white color and fine-grained, mudlike texture,

b) **Calcite Matrix/Cement:** In addition to coccoliths, chalk rock contains a calcite matrix/cement that binds them together. This matrix is a cohesive cement formed by the dissolution and recrystallization of calcium carbonate from coccoliths in the solid phase,
c) **Small Clastics:** Chalk may contain foreign terrigenous solids transported from land and suspended in water, including clay-sulfate minerals, silica, and organic matter. However, these are present in trace amounts relative to the dominant calcite content.

Chalk's high calcium carbonate content and fine-grained texture make it soft and relatively porous compared to many other carbonate rocks. It is a sedimentary rock type with biochemical carbonate composition. It is also characterized by its white or light gray color and its soft structure allows it to be easily scratched or pulverized (Figures 3, 4), which makes it different from other types of limestone and sedimentary rocks of inorganic origin. Chalk is soft, brittle, crumbly, and easily pulverized. It is a type of limestone/carbonate rock of organic origin, composed of calcite minerals, of biochemical sedimentary/sedimentary origin, with a white, porous, unique white color, nonclastic-fine-grained-dusty texture, massive-solid-thick structure (Figures 3 and 4). Its chemical formula is $CaCO_3$ and it is an ionic salt called calcium carbonate/calcite. Calcium carbonate is formed from the calcium cation (Ca^{2+}) and the radical carbonate anion $[(CO_3)^{2-}]$.

Because the ionic chemical bond that creates the push-pull force between the calcium cation and the radical carbonate anion is weak, it breaks easily, becoming soft, brittle, and crumbly. It reacts with HCl. It reacts with HCl. Chalk's chemical and physical properties vary. Its composition is $CaCO_3$, its Mohs hardness is 3.0, its density is 1.8-2.7 g/ml, its refractive index is e=1.486, and w=1.64-1.66. It reacts with acids (HCl) to release carbon dioxide. It exhibits high birefringence with strong interference colors. Coccoliths, which are microscopically small, can be found at approximately 500x the rate in natural chalk.

Chalk is a soft white limestone of organic origin, composed of microscopic skeletons of marine plankton. Chalk is a solid material. Insoluble in water and brittleness are characteristics of chalk. If pressure is applied, the chalk breaks down into fine particles and dust (Figure 4). Sandstone and chalk are porous, allowing water to pass through. Chalk is composed of pure calcium carbonate. Its foreign mineral content is 2-4%. Chalk is formed by the accumulation over millions of years of the shells and skeletons of small (microscopic) deep-sea plankton organisms such as foraminifera, coccoliths, diatoms, stratomatolites and rhabdolites. They are biochemical sedimentary rocks composed of 99% calcium carbonate. When microscopically small plankton organisms, composed of calcium carbonate, die, they settle to the sea floor as a rain of fine white mud, which accumulates and compacts to form chalk.

Chalk is associated with warm, clear, and deep-sea environments. They are alkaline in nature (they are basic at pH 7.1 and above). They use it to neutralize the acidity of the soil. They are very slightly soluble in water. Because it is porous, it can be thought of as a sponge absorbing rainwater. In fact, the coccolithophores that form the chalk are small even by planktonic standards. Therefore, they are called nanno-fossils. Pure calcium carbonate ($CaCO_3$), which forms chalk, is a compound containing 10% calcium, 3% carbon and 12% oxygen. Chalk is considered non-toxic when ingested in small amounts, usually without symptoms.

Acute health effects caused by calcium carbonate and calcium sulfate found in chalk dust include eye irritation, skin irritation, respiratory tract irritation, mucous membrane irritation, and chronic exposure can lead to lung and liver damage (Lin et al., 2025). Pneumonoultramicroscopicsilicovolcanoconiosis is a term for a lung disease caused by inhaling silica dust. Naturally occurring chalk has been used for drawing and writing since prehistoric times. Chalk has been used as an antiseptic since ancient times. According to archaeologists, it was also used in the creation of the first cave paintings.

Widespread Crusting/Crustization Developing in the Şanlıurfa Chalk Series Rock Units:-

The differences between day and night temperature changes of the region have developed different changes and formations in the chalk rocks. At the beginning of such changes, chalk rocks melt on the topographic surface due to increasing daytime temperatures and develop slow solid flow down the slope. At night, due to the sudden drop in temperature, they solidify and accumulate thick pseudostratification on the topographic surface (Figures 3, 5, and 7). In the eroded geomorphology where the chalk series rocks are exposed and on the outer surfaces of the chalk rocks that are exposed to the atmosphere, the slow solid flow develops downslope in different directions of the topography, creating pseudostratification, flow ridges, and block formations of varying thicknesses. These flow structures solidify as glassy amorphous structures as a result of the sudden cooling at night. As a result of the continuous repetition of dissolution and recrystallization events in the solid phase for thousands and millions of years, the outer surface of the chalky rocks, which are approximately 02cm-3m thick, is covered with a caramel red-brown colored, hard, impermeable, compact, glass-amorphous crust/crusting/crustization armor.

During the daytime, chalks develop solid neosolution (solid neosolution was first described and named by Tarhan, 2018) by dissolving in the solid phase due to increasing daytime temperatures. Chalk, a biochemical carbonate sedimentary rock, has naturally weak chemical bonds in the calcium carbonate mineral that makes up it. For this reason, it is soft, porous, brittle, easily powdered and processed (Figure 4). The increasing temperature during the daytime causes the chemical bonds (pushing-pulling force) between the atomic building blocks (atoms, ions, molecules) that make up the calcium carbonate ($CaCO_3$) mineral that forms chalk to weaken, loosen and dissolve. It causes the diffusion rates of atomic building blocks to increase (atomic vibration/movement) due to the weakening of chemical bonds.

Due to increased diffusion rates of atomic building blocks, they undergo geochemical displacement within mineral crystal structures. Ions with large ionic radii, small electrical charges, light weight, and alkaline charge migrate toward the edges of the mineral crystal structures through atomic diffusion. Light-colored, acidic, and entropy-disordered bands, laminations, and zoning of varying chemical compositions develop. Conversely, ions with small ionic radii, large electrical charges, heavy weight, and basic charge migrate toward the center of the mineral crystal structures, accumulating in bands, zoning, and zones based on chemical composition (ionic differentiation, metamorphic differentiation; for further explanation, see Tarhan, 2018).

With increasing temperature, chemical bonds are further loosened and dissolved. The atomic building blocks with large ionic radii at the mineral crystal walls, where entropy increases, dissolve the mineral crystal structures in situ and in the solid phase. In this way, electrically charged, light-colored, anhydrous, irregularly structured and unstable solid neo-solutions consisting of free ions are developed by dissolving in the solid phase from the walls of the mineral crystals towards the center (Tarhan, 1987, Tarhan, 1989, Tarhan, 2018, Tarhan, 2019a, Tarhan, 2019b, Tarhan, 2021, Tarhan, 2024a, Tarhan, 2024b, Tarhan, 2024c, Tarhan, 2024d, Tarhan, 2024e, Tarhan, 2024f, Tarhan, 2024g etc.).

However, because calcium carbonate crystals are not mixed crystalline solid neosolution minerals, the mineral dissolves completely in the solid phase, dissolving into atomic building blocks composed of calcium (Ca^{2+}) and the radical/root carbonate anion $(CO_3)^{2-}$. Light-colored, unstable solid neosolutions composed of calcium carbonate develop. These unstable solid neosolutions, due to increasing temperatures, cause slow solid flows along the slope of the topography during the day. Due to sudden temperature drops at night, solid neosolutions composed of unstable calcium carbonate composed of electrically charged ions suddenly solidify into glassy amorphous solids.

These events occur for years and millions of years, with the continuous and alternating changes in day-night temperature differences, and on the one hand, the chalk breaks, breaks down, and disintegrates, resulting in chalk dust, and on the other hand, the abrasion and erosion events that develop with wind and rainfall. On the other hand, solid neosolutions composed of calcium carbonate and calcium silicate, which develop gradually in the solid phase due to increasing daytime temperatures of the calcium carbonate and calcium silicate minerals that make up chalk (chalks may contain silicon, chert, silt, clay, kaolin grains, etc.), and the chert nodules and layers within the chalk (organisms with silica skeletons; silica minerals become mobile even at low temperatures, etc.), develop as solid flows down the slopes of the topography.

Over thousands and millions of years, such solid flow structures accumulate and thicken along the slopes of the chalk topography, resulting in the development of pseudo-stratification, pseudo-solid rock outcrops, blocking, and structures on the outer surfaces of chalky rocks that are exposed to the atmosphere. On the other hand, the unstable solid neo-solutions composed of calcium carbonate and calcium silicate, which form on the outer surfaces of chalky rocks that are in contact with the atmosphere due to increasing temperatures during the day, solidify with sudden cooling due to decreasing temperatures at night, and a glassy, amorphous (non-crystalline), caramel reddish-brown colored, solid, hard, impermeable, compact, crust/crusting/crustization phenomenon develops.

As a result of the continuous and successive events of this kind, in addition to the thick pseudo-bedding, solid flow outcrops, blocking and section appearances that develop as a result of the solid flow accumulation in the direction of the different slopes of the topography of the chalky rocks, the pseudo-bedding, outcrops, blocking and rock sections gradually change and transform into a glassy amorphous substance and become covered with a hard, impermeable solid armor that is impermeable to heat-cold changes and radiation (Figures 3, 5 and 7).

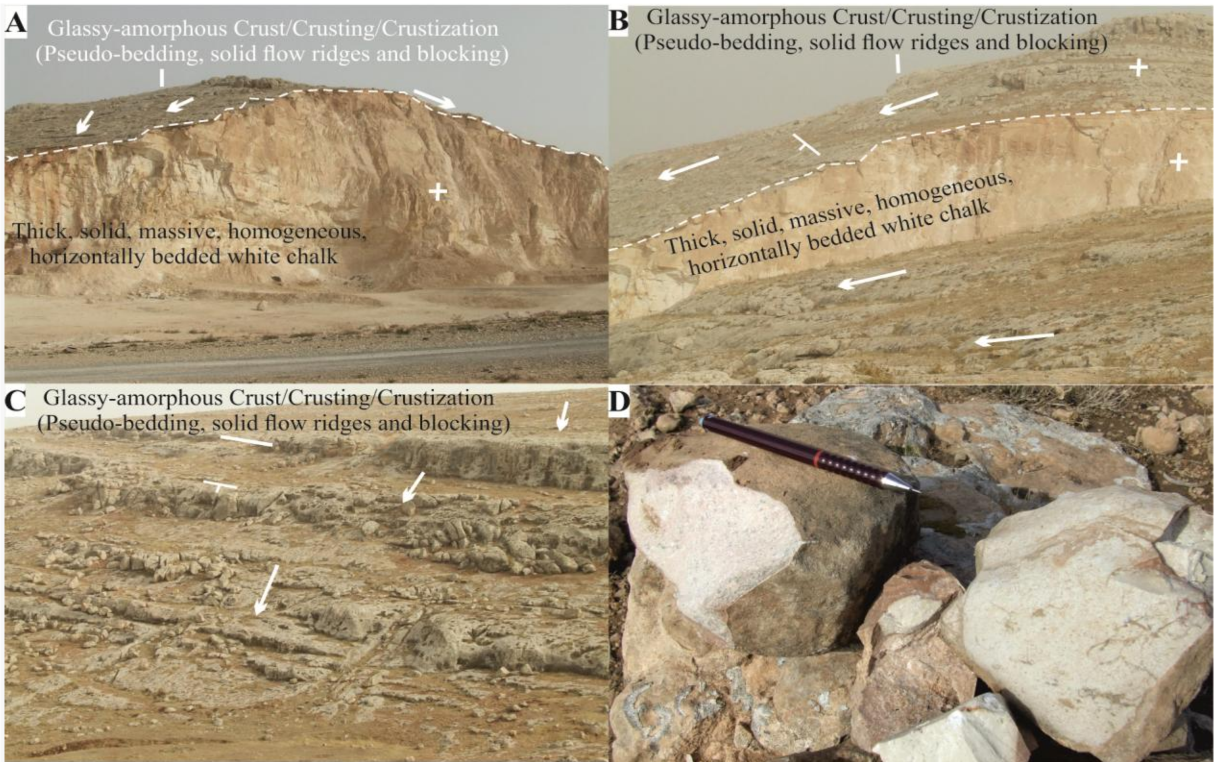


Figure 5a, b, c, d:- Glassy, amorphous, hard, impermeable crust/encrusting/crustization developed on the atmospheric outer surfaces of the chalk series rock units and pseudo-thick bedding, solid flow ridges and blocking developed on top of each other down the topographic slope.

Similar crustal formations to those seen in Figure (5a, b, c, d) are also seen very thick and widespread in the chalk series rock units of ancient Mars. However, since they show some different physical features in ancient Mars, they have been seen to point to very important geological facts. A and B) Caramel reddish-brown, glassy amorphous, solid, hard, impermeable armored crust/crusting/crustization that develops on the atmospheric outer surfaces of horizontally bedded, massive/thick/solid chalks. C) Pseudo-bedding, solid flow protrusions, and blocking developed as a result of solid neosolutions formed by dissolution in the solid phase due to increasing temperature during the day on the atmospheric outer surfaces of the chalks, flowing in the topographic slope in the direction of the topographic slope and solidifying as glassy amorphous with sudden cooling at night.

On the ancient planet Mars, these blocks were cleaned from the topographic surfaces of the chalk due to heavy rainfall and deposited as flood sediments/deposits in depressions, plains and stream beds. Due to the titanium-ilmenite containing pseudo-bedding, solid flow protrusions and blockings formed by dissolution and recrystallization in the solid phase on the outer surface of the chalk series rock units on ancient Mars, titanium (found widely in plant/phytoplankton and animal/zooplankton together with phosphate, fluorite and apatite) was transformed into anatase/anatase (TiO_2) allotrope mineral in the glassy amorphous crust by dissolution and recrystallization in the solid phase.

Anatase minerals exhibit very high photocatalytic activity under ultraviolet rays, resulting in a false blue fluorescence color. Therefore, it has been demonstrated for the first time that the blue color of the pseudo-bedding, solid flow ridges and randomly developed blocks that form the glassy amorphous solid crust formed on the atmospheric outer surfaces of the chalk series rock units on ancient Mars is due to the anatase/anatase mineral they contain, which is an allotrope of titanium. This blue fluorescence color is another evidence and indicator that the Martian atmosphere is thin and cannot filter ultraviolet (UV) rays from the sun. D) The hard, compact, impermeable, hornfels-like crust is broken, revealing the internal structure of the glassy amorphous, cryptocrystalline, hemicrystalline, microcrystalline, and brecciated microcrystalline crust.

Slow flow structures (pseudo-thick layering, high solid flow rock outcrop, randomly developed solid flow blocking and sections) of solid neo-solutions with unstable/unstable calcium carbonate/calcite and calcium silicate composition that develop by dissolution in the solid phase on the outer surfaces of chalky rocks during the day, and the caramel reddish-brown crust/crusting/crustization/encrustation that develops as a result of solid neo-solutions solidifying into glassy amorphous matter due to sudden decreases in temperature at night, gradually change and transform from fine-grained to coarse-grained from the surface to the depths, gradually transitioning to chalk.

Encrustation gradually develops glassy amorphous material, cryptocrystalline-hemicrystalline, microcrystalline encrustation, and brecciated rock sections towards the depths (Figures 3, 5, and 7). Similar to the chalk series rocks in Şanlıurfa, the presence of chalk series rock units has been identified for the first time in NASA images of Gale Crater and its surroundings on ancient Mars. The presence of thick and widespread crust/encrustation/crustization formations, developed along different slopes of the topography on the outer surfaces of the eroded geomorphology of these chalk series rock units in contact with the ancient Martian atmosphere, has also been demonstrated for the first time. Therefore, this paper demonstrates and compares the similarities between the chalk series rock units of Earth and ancient Mars for the first time (Figures 2, 3, 5, 7, 17, 23 and 28).

Chalks are composed of sticky white mud and compacted white-grey residues of silica and generally calcium carbonate skeletons and shells accumulated in the depositional environment as a result of the death of microscopic organisms (foraminifera, coccoliths, diatoms, stromatolites and rhabdolites formed by cyanobacteria, etc.) that lived in warm, clean, calm and deep seas. Silicon and calcium carbonate minerals become mobile even at the lowest temperatures. For this reason, the chalk rock series of different ages develop pseudo-stratification with solid flows that have gradually flowed on top of each other down the topographic slope of the solid neosolutions that developed by dissolution in the solid phase at increasing temperatures during the day in the hot-dry desert climate, and due to the sudden decrease in temperature at night, they recrystallize from the solid neosolutions in the solid phase from the surface to the depths, forming fine-grained, compact and hard glassy amorphous material, hemicystline, crytoptocrystalline, microcrystalline and crystalline brecciation types in caramel red-brown color.

As a result of the continuous repetition of these events, a thick and widespread, glassy, amorphous and caramel reddish-brown colored crustal armour is observed to have developed on the outer surface of the chalky rocks and in the direction of the different slopes of the topography, consisting of pseudo-stratification, solid flow outcrops and randomly developed blocks of different sizes. However, it is clearly seen that the chalks are thick, solid and massive, and the white chalks are horizontal in the road cuts passing through the places where the solid, caramel-reddish-brown colored armored crust/crustization formed by pseudo-thin-medium-thick bedding, solid flow outcrops and different blocking structures developed in the direction of the slope of the topography (Figures 3, 5 and 7).

Similar crust formation is observed on the outer surfaces of dark black, gas-porous, blocky lavas with low temperature and fluidity (aa-type lavas) and dark black, platy/rope-like/rope-like lavas with high temperature and fluidity (Pahoehoe-type lavas) where a blackish-grey, reddish-brown, hard armored crust/encrustation of 0.1-2 cm thickness develops. It has been determined and described for the first time that the rock units that constitute the chalk series of different ages, which have very thick and widespread outcrops on ancient Mars, have developed on the outer surfaces of the chalks developed in the region in contact with the atmosphere, in the direction of the topographic slope, caramel reddish-brown colored, hard, compact, impermeable and very thick pseudo-bedding, solid flow outcrops and pseudo-blockings.

These are very similar to the thin crust/encrustation seen in crust/encrustation and lava. The first-ever identification of chalk series rock units on Mars, as well as the extensive crustal development of some lavas on the outer surfaces of the ancient Martian atmosphere, are observed in NASA images (Figures 19, 20, 21d, 23, 24, 28, and 29, etc.). The identification and demonstration of the existence of such formations on ancient Mars for the first time demonstrates that ancient Mars once possessed a gravitational and magnetic field, and that thick and widespread chalk series rock stratigraphic units of varying ages and organic compositions, biochemically formed, were deposited in warm, deep seas. This suggests that Mars once possessed Earth-like paleoclimatology, similar microbial and macrobial life, geomorphological formations, weathering and erosion patterns, the Gülnaz geochemical rock cycle (redefined and named by Tarhan, 2018), a thick, modern atmosphere similar to Earth (approximately 21% oxygen), and an atmospheric pressure close to Earth's.

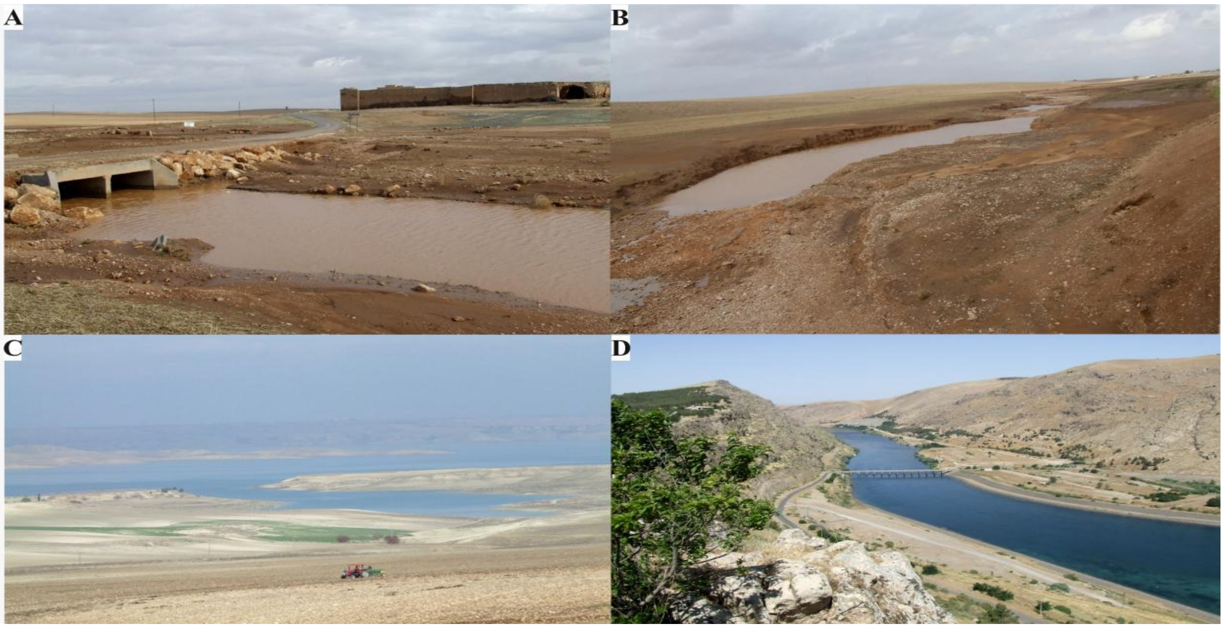


Figure 6a, b, c, d:- A and B) Caramel reddish-brown colored chalky muddy flash floods, overflow deposits and floods that started from ancient times and continue to the present in Southeastern Turkey. An ancient caravanserai made of chalky rocks. Rainwater that does not infiltrate underground due to the craggy reddish-brown colored glassy amorphous, hard and impermeable armored crust/encrustation on the outer surfaces of the chalk series rock units causes flash floods and overflow deposits. C and D) Rivers with wide valleys developed in the region. Similar river and canyon formations developed on ancient Mars (Valles Marineris, the largest canyon on Mars; Violet Vally, Moonlight Valley, Marethon Valley, Neretva Vallis, Sawa Vallis and Pliva Vallis, etc.).

However, the crustal formation in the Middle Miocene Gediz Valliz Channel Formation on ancient Mars is observed to be much thicker and more widespread than the Upper Maastrichtian-Lower Miocene units. This concrete geological phenomenon likely provides insight into the paleoclimatology of ancient Mars during the Middle Miocene. This phenomenon indicates that ancient Mars also had temperature differences between Martian nights and Martian days. NASA images clearly demonstrate that the glassy, amorphous, hard, impermeable armored crust that developed in southeastern Turkey (Figure 1) caused similar problems (flash floods, widespread overflow deposits, floods and overflows, downslope debris flows and landslides, rock flows, etc.) on ancient Mars, and similar (Figure 6) conditions were much more widespread.

Causes and Effects of Crustification:-

1. Glassy-amorphous, hard, and impermeable armored crust/encrustation, varying in thickness from 0.15 to 3 m, has developed in the Upper Maastrichtian-Lower Miocene chalk series rock units around Şanlıurfa. Annual rainfall in Şanlıurfa is 473 mm/year per square meter,
2. Surface protection (prevents erosion, acts as a roof and armor),
3. Prevents precipitation from infiltrating underground,
4. Thick and widespread formation occurs in chalky rock series. It does not develop in claystone and chalky marls,
5. Chalk/calcium carbonate/calcite and gypsum encrustations are present,
6. Encrustation is limited to areas with annual rainfall exceeding 200 mm/year. Another view suggests 150-300 mm/year,
7. Encrustation has developed in the Ajloun Mountains of Jordan. In this section, the annual rainfall decreases to 400-500 mm/year per 1 m^2 (Wolfart, 1966, 1967).

Prerequisites for Crustization:-

1. There must be sufficiently thick and widespread chalk series rock units,
2. There must be the possibility of water circulation. Chalky rocks are porous and absorb water,
3. Evaporation must exceed precipitation,
4. Consequently, the climate must be hot and dry. In other words, it is a desert climate, with hot days and cool nights. Therefore, dissolution, recrystallization, solid flow, and desegregation are widespread in the solid phase,
5. Carbonate solution formation: $CaCO_3 + CO_2 + H_2O = Ca^{+2} + 2HCO_3^-$ (bicarbonate).

Effects of Crustization:-

Crusting has caused some natural destructions and disasters in the study area and region, starting from ancient times to the present day (Tarhan et al., 2012).

1. Glassy, amorphous and impermeable crust/encrustation/scab formation causes falling snow and rain water not to infiltrate underground,
2. Due to crustation/encrustation, rainfall has caused flash floods and inundations. Floods and inundations have caused and continue to cause natural disasters by overflowing flood sediments from their beds. In ancient times, settlements and palaces built in wide stream beds were destroyed by floods. The existence of mosaics in structures buried beneath the thick and widespread alluvium has been brought to light. Weirs, aqueducts, ponds, and more recently, dams and reservoirs have been constructed to prevent flooding.There must be sufficiently thick and widespread chalk series rock units,
3. The organic composition of wind alluvium (loess, regolith, aerosol, etc.) that is developed due to desert storms and carried in the atmosphere, oxidized chalk dust clouds are deposited on the land and on the surface of the crusted chalk series rock units and accumulated covers/deposits are developed. Floodwaters resulting from snow and rainfalls have caused and are still causing the development of caramel reddish-brown colored fertile agricultural soils (caramel reddish-brown colored conglomerate, sandstone, siltstone, mudstone, etc.) by occasionally sweeping away and cleaning the oxidized chalk dust covers of wind alluvium deposited/accumulated on the surfaces of the slippery and impermeable crusted chalk series rock units, and by carrying and depositing the caramel reddish-brown colored chalk muddy sudden floods to the low-level plains and depressions and lowlands in wide valleys via streams, rivers and rivers (Figures 9 and 10).

   The atmospheric outer surfaces of the chalk series rock units are covered with a hard, glassy, amorphous, impermeable, dense armor that was formed as a result of the crust/encrustation process consisting of pseudo-bedding, blocking, thickening, blocking and solid flow protrusive structures formed by solid flows down the topographic slope. Oxidized chalk dust blankets/deposits of organic-composed wind alluvium were deposited on this crustal/crustification armor cover. These chalk covers have developed widely as a result of the chalk muddy flood waters formed by snow and rain waters, together with crusted/crusting chalk pebbles and blocks, which are dragged and flowed in the direction of the slope of the topography and accumulated and spread as flood sediments in depressions, plains and plains (Figures 9 and 10).

   Similarly, pyroclastic clastics unconformably overlying the crustal chalky rock series, wind alluvial chalk dust sedimentary covers/deposits deposited on the pyroclastic rocks, and gas-porous blocky lavas flow in the form of watery-muddy-stone-block flows along the topographic slope and accumulate as flood deposits in stream beds, depressions, and plains (Figures 9 and 10). The blocks within the chalky-muddy-blocky flood sediment accumulations, which include stone blocks (chalk and basalt blocks, etc.), were collected by local people with construction equipment or were ground into soil by construction equipment, thus creating and planting fertile agricultural lands. Similar slurry-blocky-mudflows and flood-flood deposits (chalk clasts, gravels, and blocks, often with crustal outer walls, exhibiting blue fluorescence under ultraviolet light due to the anatase mineral they contain; Figures 21d, 27, 28, 35b,c) have been observed to be very thick and widespread on ancient Mars in NASA images (Figures 21d, 27, 28, 35b,c),

4. Rainfall has accumulated the thick and widespread crust/encrustation developed on the atmospherically exposed surfaces of the topography that forms the morphology of the high and sloped chalk series rock units, the caramel red-brown colored chalk dust wind alluvial deposit covers with oxidized organic composition of the desert storms (Figure 9, 10, 11), together with the chalky muddy waters formed as a result of the interaction with the rainwater, and the false stratification and crusted chalk blocks and pebbles have been dragged and cleaned in the form of flood water sediments/deposits in the pit areas, wide plains and plains (Figures 9, 10 and 11). Caramel, reddish-brown colored fluvial alluvial deposits, which are thick fertile agricultural soils, have

developed in the pits, wide valleys, wide plains and plains (Figures 9, 10 and 11). This type of stream alluvial sedimentary soil, alluvium, old alluvium (terrace) and slope-landslide debris is Quaternary in age and covers all rock stratigraphy units in the region with separate unconformities (Figure 2).

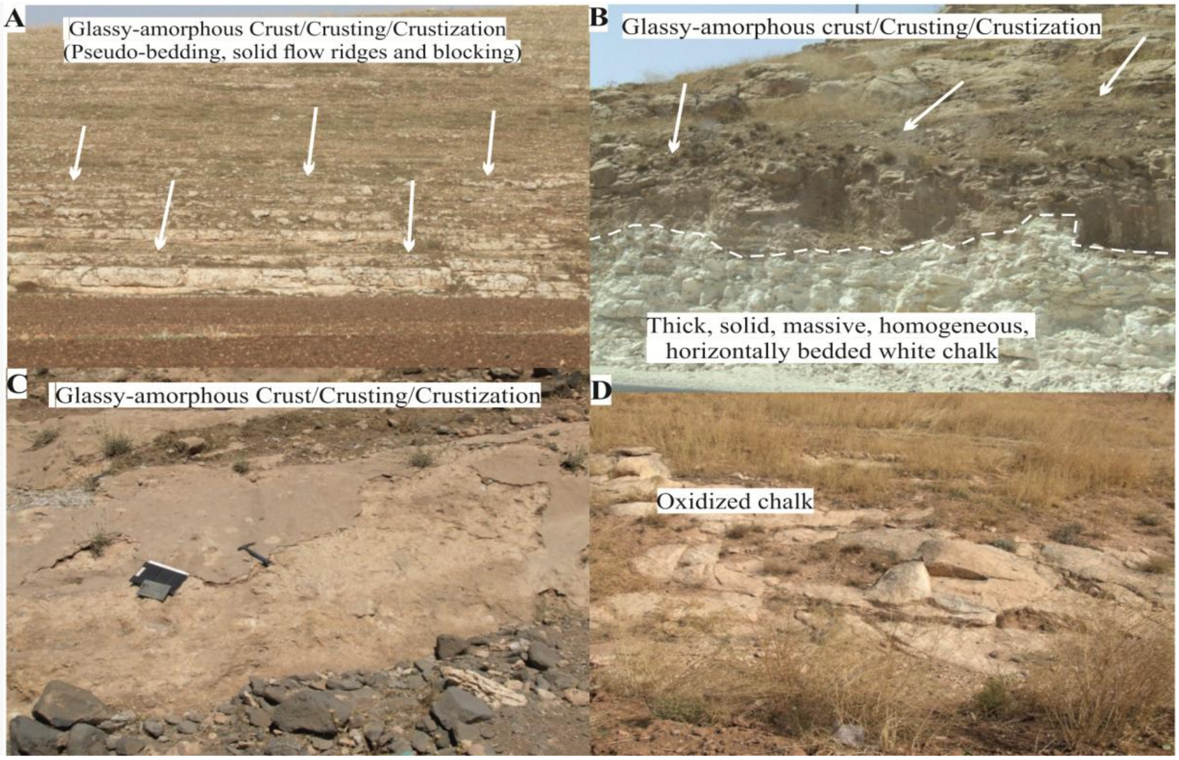


Figure 7a, b, c, d:- Caramel-reddish-brown colored crust/encrustation developing on the atmospheric outer surfaces of the Şanlıurfa chalk series rock units, pseudo-bedding developed by solid flow as a result of the topographic slope (A, B). Similar formations are also seen in ancient images of Mars. B) White-colored, solid-thick-massive, horizontally bedded white chalk rock emerging from beneath the glassy amorphous crust/encrustation in the road cut/road section. Chalks are broken down and crumbled due to day-night temperature differences, forming the organic-composed biochemical oxidized wind alluvium of the desert storm. Over time, the outer surfaces of the white chalk oxidize, lose moisture and harden, and the outer surface is covered with a hard, caramel-reddish-brown layer (D). This layer thickens in later stages and turns into a glassy, amorphous, hard, compact, impermeable armored thick shell (A, B, C).

Therefore, in the region in question, the rock stratigraphic units, starting from the Upper Maastrichtian and ending in the Quaternary, are horizontally bedded. They have been identified and mapped as having been horizontally bedded on the eroded topography/morphology of the chalky rock units of different ages, which they overlie with an angular unconformity (Tarhan et al., 2012; Figure 2). In other words, this is evidence that, apart from earthquakes and fault systems, no horizontal tectonic forces that caused folding in the Cenozoic era developed in the region. Therefore, in addition to issues such as the Cambrian and Upper Cretaceous, it has been suggested that the International Commission on Stratigraphy's accepted Geological Time Table / International Chronostratigraphic Table (2018) should be revised and the orogenic phases that cause folding and erosion should be revised separately for interplate orogenic belts, stable craton plates, and shields (Tarhan, 2018, Volume 4).

This is because, while folding and erosional phases develop in interplate orogenic belts at the same time scale, folding does not develop in stable cratonic plates and shields, only geomorphic erosional phases develop. Over these erosional phases, other formations develop with horizontal bedding and angular unconformities (Figure 2). It seems that there are probably no geologists who have worked in the field in the International Commission on Stratigraphy (2018). It is impossible to definitively assess these processes based solely on paleontological data. It is possible to definitively determine the real problem with the structural and stratigraphic solutions put forward by field geologists. There are significant discrepancies between theoretical studies at the desk and practical fieldwork! This being the case, unfortunately, the mistakes and problems on Earth are being carried into space as well…

Neogene Rock Units:-

Ceylanpınar Formation (Mic):-

The Ceylanpınar formation consists of chalk-dominated evaporite (gypsum-anhydrite, salt, gypsum, slaked-quick lime, clay and sulphate minerals, etc.), chalk-cemented/matrix coquina, calcite carbonate rock stratigraphy units (Figure 8). They are composed of chalky, coccine and calciferous carbonate rocks, which are formed by the accumulation of abundant macro fossil molds, shells and skeletons, especially within the rock units. In places, evaporite deposits (gypsum-anhydrite, salt, gypsum, slaked-quick lime and clay-sulphate minerals, etc.) and in places burgundy colored pebble, sandstone, siltstone and mudstone are intercalated. Chalky coquina rocks were deposited in shallow, high-energy coastal and warm, shallow marine environments spread over a wide geography. It consists of macro calcium carbonate/calcite shell and skeletal accumulations of various fossils. Their matrix generally consists of recrystallized fine-grained chalky calcium carbonate/calcite. The chalk ratio gradually decreases within the Neogene aged rock stratigraphy units in the region and is gradually transitional in vertical and lateral directions with clastic facies rock units.

In other words, chalky limestones/calcite, a sedimentary carbonate rock type formed biochemically with organic origin, are not the only Cretaceous age in the region. It is observed that in all Cenozoic aged rock stratigraphic units, they gradually decrease upwards and pass into clastic eveporite sediments. Therefore, the chalky rocks known as Cretaceous in the world should be re-evaluated and their exact formation ages should be determined. Because the chalks known as Cretaceous aged were transferred to the inland seas together with their founa and flora due to the closure of the Mesozoic seas. It is natural that Jurassic-Cratean fossils were transferred to marine environments at the beginning of the Cenozoic. The fossils in question maintained their vertical and lateral continuity for a while in the initial stages of the Cenozoic sediments.

It would be incorrect to say that the rock units containing these fossils were deposited in the Cretaceous. Because the Cretaceous fossils appeared in the Cretaceous (they are not remnant fossils transported from land), but as a result of their transfer to the initial inland seas of the Cenozoic era, it was thought that it would not be correct to give the Cretaceous age to the sediments in question, because they were also seen in the Paleogene sediments in which they were found, and it was suggested. Because field studies have determined that the units in which the Cretaceous fossils are found overlie Paleozoic-Mesozoic rock units with an angular unconformity and have a gradual vertical and lateral transition with Paleocene-Eocene rock units (Relationship of the Armonic Massif and the Paris Tertiary Basin rock units, Tarhan, 2018, Volume 4. see).

Conglomerate/Pebblestone Member (Micc):

The Ceylanpınar Formation begins with the conglomerate/pebblestone member, composed of pebblestone, sandstone, siltstone, and mudstone rock units corresponding to the caramel-red-brown basal conglomerate. The pebblestone member consists of greenish gray conglomerate, sandstone, siltstone and claystone. The pebblestone member passes upwards into chalk-cemented coquina and orange-colored calciferous limestone and calcarenites, which are composed of abundant macro fossils, shells and skeletons (Figures 2 and 8). In these units, it passes upwards into evaporite deposits, chalk, claystone, marl and, in places, into quenched white-colored calcareous sections. The Ceylanpınar Formation is composed of an angular unconformity with a conglomerate/pebblestone member, which begins with a basal conglomerate and is also horizontally bedded, overlying the unfolded, horizontally bedded but eroded morphology of the Upper Maastrichtian-Lower Miocene Şanlıurfa Chalk Series rock units.

The Ceylanpinar formation consists of thick-layered chalks, generally white in color. It consists of caramel reddish-brown chalky coarse fragments deposited in an environment where terrestrial conditions prevail, and greenish-grey chalky fine fragments reflecting deeper environmental conditions. The Ceylanpınar formation contains chalky gypsum-anhydrite, salt, slaked-quicklime, clay-sulfate minerals formed in evaporite environments. The gypsum levels are used in cement plants. The Ceylanpınar formation was given a Middle Miocene age due to nano fossils (Figure 2). The unit is overlain by Upper Miocene Karacadağ volcanics and Middle-Upper Pliocene Adıyaman formation with an angular unconformity. It is thought that the rich hydrocarbons of the Middle East were probably formed at shallow depths under clayey formations as a result of the weathering-separation of chalky, coquina, macro chalky biochemical carbonate rocks under constant pressure and temperature. This formation has thick and widespread outcrops in Southeastern Turkey, and its outcrops have been influenced by atmospheric and water conditions, resulting in the development of asphaltic formations.

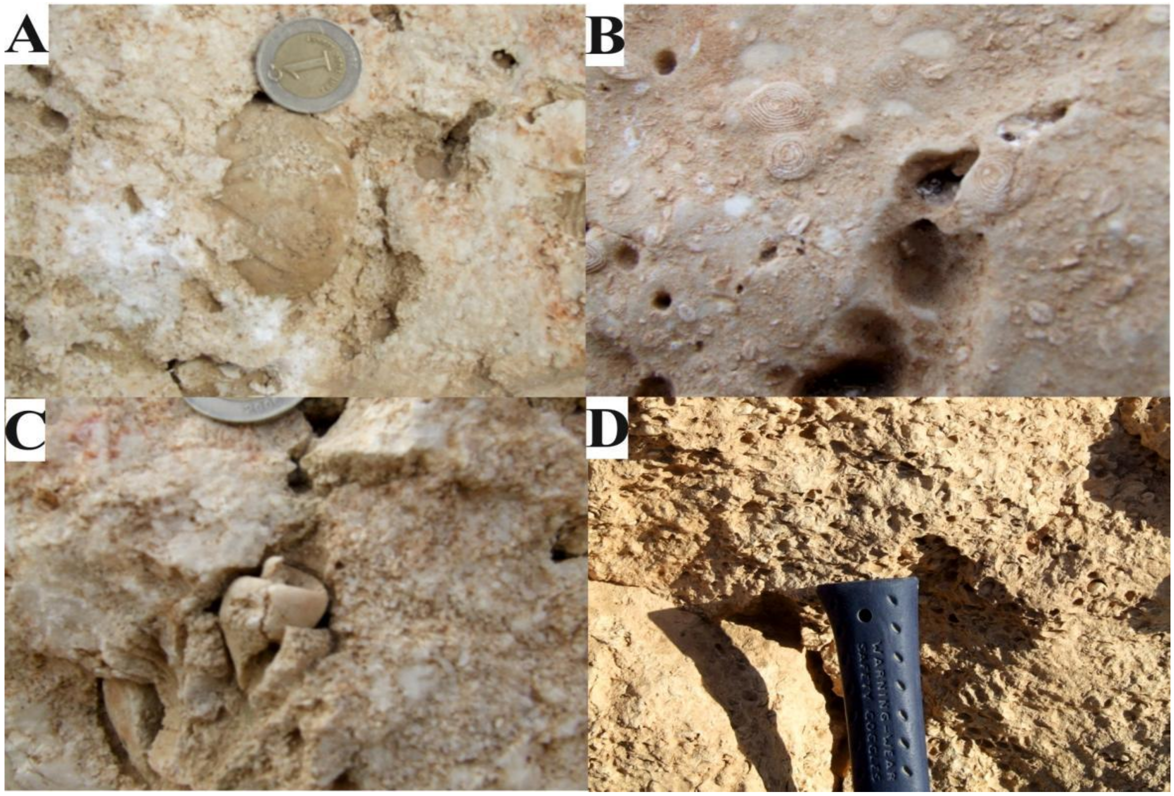


Figure 8a, b, c, d:- Middle Miocene Ceylanpınar Formation. A, B and C) Coquina with abundant macrofossils, shells and plant fragments. Its cement/matrix consists of chalky calcium carbonate. D) Coquina limestone with a chalky calcium carbonate matrix/cement, composed of the skeletons and shells of marine organisms such as foraminifera, corals, and mollusks. This limestone is also seen on ancient Mars, which contains foreign rock fragments and fragments similar to it. The rich hydrocarbons of the Middle East probably originate from the shallow Ceylanpınar Formation (Source: Author).

Karacadağ Volcanics (Mik):-

Along the extensional cracks and fracture systems cutting the Middle Miocene Ceylanpınarı formation and older rock units (Figures 2, 9 and 10), spreads of different lava types (Aa-type blocky lava and Pahoehoe-type tabular olivine-nepheline basalt lava) and pyroclastic rocks (mud-lahar flows, agglomerate, lapilli, tuff-ash, pyroclastic-volcanic and basaltic slag, etc.) are observed. There have been lava and pyroclastic rock outflows from the Karacadağ volcano and smaller volcanic cones (south of Derik district). Low-fluidity, gas-porous Aa-type blocky lavas and high-temperature and fluidity nepheline-olivine tabular (tight-walled, platy) Pahoehoe-type lavas have also erupted from the volcanic cones.

In addition to lava outflows, there have been widespread outflows of pyroclastic rocks/pyroclasts (agglomerated, lapilli, tuff-ash, pyroclastic/volcanic breccia, pumice, pumice/byhop tuff, opsidian, black basaltic slag, etc.). In the immediate vicinity of volcanic cones, the prevalence and thickness of dark-black blocky basalt lavas (Aa-type lavas) and pyroclastic rocks with low fluidity and gas porosity are observed. On the other hand, the Pahoehoe-type tabular dark black olivine-nepheline basalt lavas in the region have emerged from volcanic cones and along fracture and fissure systems, and due to their heat and fluidity, they have flowed for kilometers and along streams, causing the clogging of stream and river beds. In other words, they caused the development of streams and rivers that changed direction and flowed backwards.

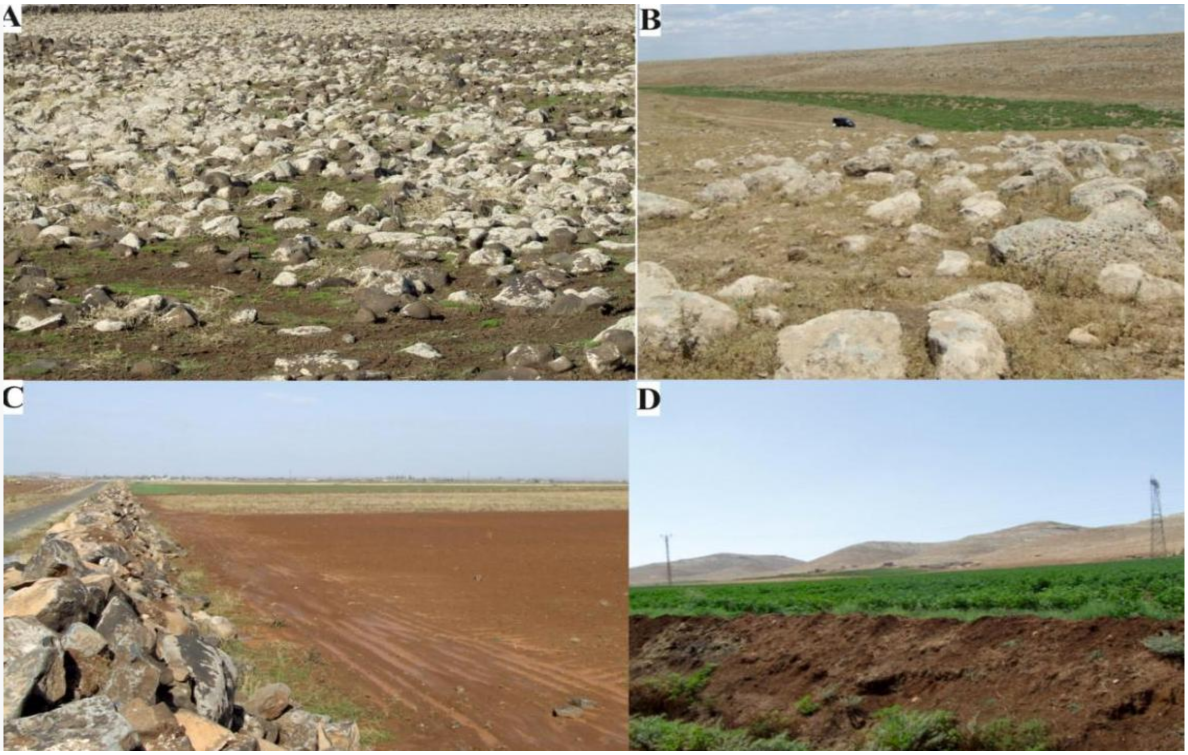


Figure 9a, b, c, d:- A, B) The outer walls of the Aa-type blocky basalt lavas and chalky blocks have crusted. Flood sediments have developed extensively on the blocks in question as a result of the deposition of oxidized chalky dust from the wind alluvium (loess, regolith, aerosol) of the desert storm, and their accumulation on the flat areas in the form of mud and block flows with flood waters resulting from rainfall. C) By the local people, the basalt and chalk blocks in these flooded sediments in the flat areas were collected with heavy machinery or by pulverizing the chalk blocks with heavy machinery to create fertile arable lands. D) The fertile soils of the Quaternary Harran Formation.

Soils composed of caramel-reddish brown river sediments suitable for agriculture, where the sedimentary cover accumulations/deposits of oxidized chalk dust from the wind alluvium of desert storms on the ground surface are cleaned by heavy rainwater and deposited on wide valley floors, plains and plains with the muddy waters of streams, rivers and streams. The Dingo Gab formation on ancient Mars is of the same age (Figure 35a,b,c) and was formed by a similar mechanism. Such caramel-reddish-brown colored fertile agricultural soils are seen to have developed in similar ways and probably in the same age range in flat crater tectonic zone basins (probably graben basins?), wide valley floors, canyons and flat plains, which are 10-30 km wide and extend for kilometers, and are limited and controlled by fault systems on the ancient planet Mars (Source: Author).

Thick and widespread outcrops of plateau-type nepheline-olivine black tabular lavas (Pahoehoe-type lavas) are observed. Red-colored firing zones and contact metamorphism walls have developed along the contacts with the Middle Miocene and earlier aged rock units over which such tabular hot-fluid lavas flow. Plateau-type black tabular basalt lavas are more common in the region. Deep erosion of the beds of streams developed within these lavas, leaving them as horizontal covers suspended over the rock units on both sides of the stream. These tabular lavas in the region are Lower Pliocene in age and are overlain by horizontally bedded Middle-Upper Pliocene Adıyaman Formation with an angular unconformity.

Adıyaman Formation (Pla):-

The formation consists of thin- to medium-bedded horizontal layers of burgundy-colored terrestrial coarse clasts (burgundy-colored conglomerate, sandstone, siltstone, mudstone, etc.) and greenish-grey fine-grained rock units (sandstone, siltstone, marl, claystone, calcarenite, lacustrine travertine limestone, etc.). These units are composed of Middle-Upper Pliocene lacustrine units. They overlie the basaltic lava and pyroclastic rocks that form the Upper Miocene-Lower Pliocene Karacadağ volcanics, and older rock units, with angular unconformity and horizontal layering (Figure 2).

Quaternary:-

Harran Formation (Qh):-

The formation generally consists of caramel reddish-brown colored conglomerate/pabblestone, sandstone, siltstone and mudstone rock units. The caramel-reddish-brown dust cover forms as a result of wind alluvium carrying organically oxidized chalk dust generated by desert storms in the region, depositing it on the surface (Figure 11). Snow and rainfall in the region washed away the wind alluvium and organically oxidized chalk dust deposits from the land. Floodwater and flood sediments were carried along streams and riverbeds by caramel-reddish-brown muddy waters, depositing them in the Harran Plain, broad plains, and wide streambeds (Figures 2, 10, 11, and 14d).

This resulted in the formation of fertile, thick, and widespread soil suitable for agriculture. These caramel-reddish-brown soils are horizontally layered and are Quaternary in age. They overlie Pliocene and earlier aged rock units with horizontal bedding and angular unconformity (Tarhan et al., 2012; Beyazpirinç & Tarhan, 2013a, Beyazpirinç & Tarhan, 2013b, Beyazpirinç & Tarhan, 2013c, Beyazpirinç & Tarhan, 2013d, Beyazpirinç & Tarhan, 2013e; Beyazpirinç et al., 2014). Similar rock units have been suggested to have formed in a similar manner and in the same age range as the Dingo Gap formation in NASA's Mars images and in the Mars Gale crater (Figure 35).

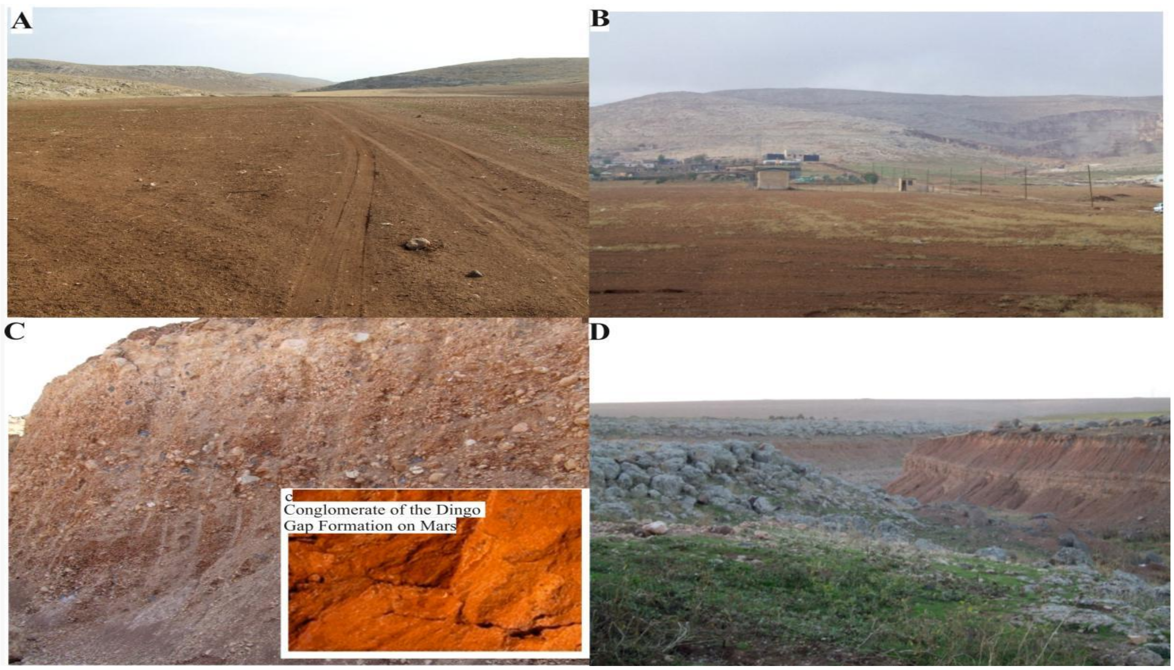


Figure 10 a, b, c, d:- A and B) Caramel reddish-brown colored fertile agricultural soils where the cover/debris formed as a result of the deposition of oxidized organic biochemical wind alluvium (loess, aerosol, regolith) chalk dust by desert storms in the region is cleaned by heavy rain and snow waters and interacts with water and is carried by streams and rivers with caramel reddish-brown colored mud walls and deposited in wide stream beds and plains. C) Caramel reddish-brown colored pebblestone, corresponding to the base conglomerate of caramel reddish-brown colored agricultural lands, and similar fertile agricultural soils are seen in images of ancient Mars (c, NASA images). D) Quaternary basalt flow as a result of the stream digging its bed deep within the basalt lava that flowed along the stream bed on the Quaternary aged fertile soils. Remnants of the suspended lava flow on both sides of the stream bed (Source: Author).

Slope and Landslide Debris (Qs/l):-

In the region, the eroded geomorphological outer surfaces of the thick and widespread chalk series in contact with the atmosphere have developed fractures, fragmentation, crumbling, blocking, and organic biochemical oxidized chalk dust due to desegregation due to day-night temperature differences. In addition, due to the day-night temperature difference, deceptive layering, blocking, solid flow protrusions and caramel red-brown colored impermeable, glassy amorphous, compact and hard armored crust/encrustation structures have developed on the atmospheric outer surfaces of the chalky rock series due to dissolution and recrystallization in the solid phase and solid flow in different slope directions of the topography (Figures 3, 5, 7). The chalk dust with organic composition, which is desert storm wind alluvium (loess, regolith, aerosol) deposited on these structures, together with the muddy waters formed by rainfall, moved towards the flat areas along the slope of the slope on the crustal armor on the outer surface of the chalky rocks that became worried with the chalk and basalt blocks, and accumulated in the plains and wide valleys, resulting in the development of slope and landslide debris, rock flows and flood deposits (Figures 6 and 9). These slope and landslide debris, rock flows, and flood deposits are Quaternary in age. Similar formations are also common on ancient Mars (Figures 32, 33, 34, 39).

Desert Storm Wind Alluvium (Qw):

The region experiences a hot, dry desert climate. Daytime temperatures range from 45 to 53 degrees Celsius (NASA satellites measured 71 degrees Celsius in the Lut Desert in Iran), with temperatures dropping and cooling at night. The daytime and nighttime temperature differences cause the chalk rocks in the region to heat up and cool down, leading to desegregation, fragmentation, and crumbling, resulting in widespread formation of organic chalk dust. Desert storm alluvium (loess, regolith, aerosol) dust clouds and the caramel-reddish-brown sedimentary cover on the ground surface are predominantly composed of chalk dust (Figure 11).

Desert storm dust was first identified and named as desert storm alluvial dust (Tarhan et al., 2012). Chalk is a biochemical, organic carbonate-type sediment formed by the sedimentation and compaction of white, sticky muds formed by microscopically small plankton-type microorganisms (coccoliths, coccolithoforms, foraminifera, diatoms, cyanobacteria-formed stromatolites, rhabdolites, etc.) and calcium carbonate/calcite shells and skeletons deposited on the seabed in hot, deep-sea environments. Oxidized/burnt/quicklime/calcium powder/chalk dust, which is calcium oxide (CaO), is widely formed due to the disintegration, breaking, and crumbling of chalk ($CaCO_3 \rightleftharpoons CaO + CO_2$) caused by the day-night temperature differences. Carbon dioxide gas (CO_2) is released. Furthermore, when calcium carbonate/calcite, carbon dioxide, and water react together, bicarbonate acid is formed ($CaCO_3 + CO_2 + H_2O \rightleftharpoons Ca^{2+} + 2HCO_3$).

Therefore, the wind-borne alluvial dust of desert storms generally consists of small and light solid particles, averaging 3 microns (1 micron = 0.001 mm) in size. Strong acids (HNO_3, HCl, H_2SO_4, etc.) and strong bases (NaOH, $Ca(OH)_2$, etc.) are formed by dissolving and ionizing in water. Therefore, desert storm wind alluvial chalk dust clouds and wind deposits formed as a result of its deposition on the ground surface consist of calcium oxide (CaO), which is burnt lime/quicklime/calcium dust/chalk dust (Figure 11). Wind alluvial chalk dust deposits are washed and cleaned by rainfall, carried by the muddy waters of streams and rivers, and deposited on plains and savannas, resulting in the development of caramel-reddish-brown soil suitable for agriculture (Figures 2, 8, 11, 14d). As a result of the interaction of chalk dust covers/sediments, which are wind alluvium of desert storms, with heavy rain (snow, rain) waters, changes and transformations occur into slaked lime/calcium hydroxide/hydrated lime [$Ca(OH)_2$]; [($CaO + H_2O \rightleftharpoons Ca(OH)_2$].

Seasonal warming and cooling of the air in the region, occasionally very active, lasting for days, and resulting from atmospheric events, desert storms develop wind alluvial dust clouds composed of suspended solid particles averaging approximately 3 microns (0.003 mm). The field of view is reduced to 5-6m. Dry chalk dust with organic composition carried by wind alluviums of desert storms deposits on all existing rock units outcropping in the region and develops the sediment cover/accumulation of autochthonous wind alluvium (loess, regolith and aerosol dust) (Figure 11). Such atmospheric events recur frequently and intermittently in the region. It was observed that approximately 5 mm (0.5 cm) thick wind alluvium was deposited in the region within 12 hours (Figure-11).

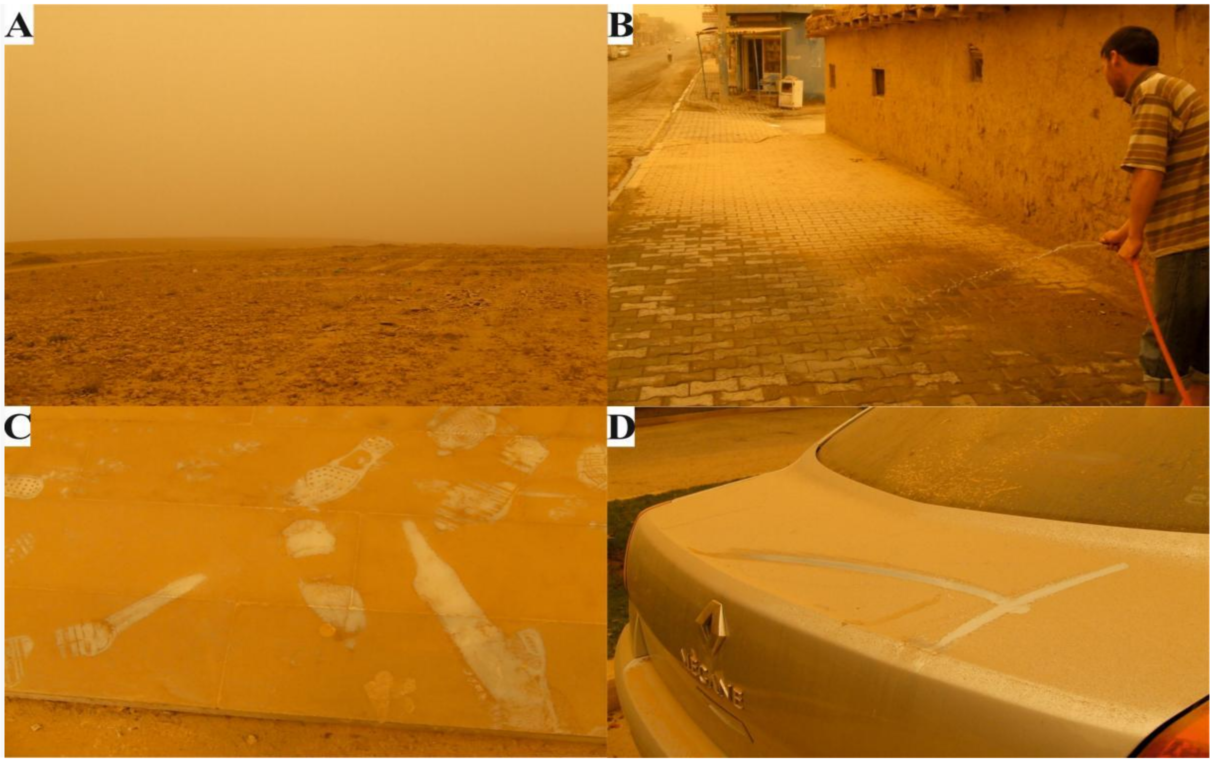


Figure 11a, b, c, d:- These images are not of ancient Mars. Nor are they the dust deposited by the desert storm wind alluvial clouds (loess, aerosol, regolith) of ancient Mars, the oxidized calcium/chalk dust and nanophase iron oxide compounds (hematite/rust/ferric) that settled on the Martian surface. Chalk dust clouds and sedimentation of oxidized-hydroxide organic composition of alluvium (loess, regolith, aerosol) accumulated in approximately 12 hours by a desert storm in Şanlıurfa-Ceylanpınarı/SE Turkey/World. A) Appearance of the desert storm wind alluvial clouds on land. B) Cleaning of the ground cover of the desert storm wind alluvium with water. C) Footprints on the ground wind alluvial chalk dust deposited by the desert storm. D) The thickness of the sediment cover on the car in approximately 12 hours due to the caramel reddish-brown colored, biochemical organic composition and oxidized chalk dust deposition that forms the wind alluvium of the desert storm (Source: Author).

In the Southeastern Anatolia Region, where the dry and hot desert/Saharan climate prevails due to day-night temperature differences during certain seasons and months of the year, desert storms are observed to form oxidized organic chalk dust clouds (loess, regolith, aerosol, etc.) and deposited on rock units carried by wind clouds (Figure 11). Desert storms' organic biochemical oxide-hydroxide wind alluvium dust clouds and sedimentary cover are generally composed of oxidized and hydroxide chalk dust. Desert storm alluvial dust clouds and sedimentary covers are generally dominated by oxide-hydroxide chalk dust (calcite/$CaCO_3$), which is biochemically formed and has an organic composition. Chalk powder generally consists of slaked-quicklime/calcium oxide (CaO), calcium hydroxide [$Ca(OH)_2$], as well as trace amounts of geothite [α-$Fe^{3+}O(OH)$], nanophase iron oxide/hematite/ferric oxide/Fe_2O_3, ferric hydroxide/hydrate/[$Fe^{3+}(OH)_3$], limonite, gypsum-anhydrite-gypsum and quartz-chert-chalcedony (SiO_2) fine powder (average 3µm, micron size; 1 micron/µm = 0.001 mm) (Figure 11).

The caramel reddish-brown colored wind alluvium (loess, regolith, aerosol) of the current desert storm in Southeastern Turkey forms repeated depositional and accumulation covers on all Quaternary and earlier aged rock units in the region in certain seasons of the year (Figure 11). The chalk dust that forms the wind alluvium is occasionally carried by snow and rain waters and is deposited in wide valley plains, plains and flatlands by the caramel red-brown colored muddy waters of streams, rivers and streams, resulting in the development of fertile caramel red-brown colored agricultural soils (Figures 6, 9, 10 and 11). Similarly, on Mars, caramel-reddish-brown chalk dust of varying chemical compositions, carried by desert storm alluvial dust clouds, and dust blankets and sand dunes made of caramel-brown, iron-rich nanophase iron oxide compounds (hemetite/rust/ferric) are very common. These ferrous and chalky dust blankets, carried by the abundant rainfall of ancient Mars and the reddish muddy waters of streams, rivers, and creeks, were deposited on vast valley floors, plains, and valleys. These deposits, which formed fertile caramel-reddish-brown soils for agriculture, are clearly visible in NASA images of Mars (Figure 2, 17, 18, 35, 36, 39). It has been predicted and proposed that similar rock stratigraphic units, microbial and macrobial life, and stratigraphic and structural relationships likely developed in marine-terrestrial environments on Earth and ancient Mars during similar time periods, with similar age ranges, and as a result of similar geological and paleoclimatological events.

Flood water, Flood sediments, Water-muddy blocky chalk and blocky basalt flows (Qf):-

In the region, thick and widespread outcrops of chalk, evaporite, chalk cemented/matrix coquina (formed by macrofossil and microfossil shells, clast accumulations) and macrotic limestone rocks of the Upper Maastrichtian-Lower Miocene aged Şanlıurfa Chalk Series and Middle Miocene aged Ceylanpınar formation are observed (Figure 8). The outer surfaces of the chalk formations in contact with the atmosphere are covered with a caramel red-brown, hard, glassy amorphous crustal armor that does not leak water to depth (Figures 3, 5, 6, 7). There are blocky basalt lavas, pyroclastic rocks and organic composition oxidized-hydroxide biochemical wind alluvial chalk dust deposits and accumulations of desert storms deposited on these rocks (Figures 9, 10, 11)

. Lava and pyroclastic rocks flowed onto the crusted outer surfaces of the chalk series rock units, and the chalk dust covers deposited on them, along with the wind alluvium of the desert storm and the muddy waters formed by snowfall water, slowly slid and cleared in the direction of the topography slope on the slick and impermeable crust. Flood deposits developed as a result of their accumulation and flowing slowly over the years in the form of muddy blocks onto the flat areas and plains on the wide valley floors with less slopes (Figure 9). The basalt blocks between these dry, muddy blocky lava flows were collected by local people with heavy equipment, creating fertile arable lands. The desert wind alluvium and chalk dust blankets, which met with water, muddied upon contact with water, resulting in the development of caramel, reddish-brown agricultural soils (Figures 9, 10, 11, 14d). b

Very thick and widespread outcrops of such muddy, crusted outer walls, composed of chalk blocks that fluoresce blue, bluish-black, and gray under ultraviolet light, are observed on ancient Mars (Figure). Red-brown colored floodwater and flood sediments, formed by chalky dust from aeolian alluvium carried by the caramel-red-brown muddy waters of streams, rivers, and rivers, accumulated and deposited on wide plains, plains, and wide stream beds, forming thick and widespread caramel-red-brown colored terrestrial sediments (gravel, sandstone, siltstone, mudstone, etc.) that are very fertile for agriculture (Figures 8, 11, and 12).

The fertile reddish-brown soils observed on ancient Mars developed in a similar manner (Figures 35, 36, 39). On the surface of the rock units of Mars, the dominant organic composition of biochemical oxidized-hydroxide chalk and nanophase iron oxide powders, which are desert storm wind alluvium (loess, regolith, aerosol), were carried by snow-rain waters, similar to muddy caramel red-brown colored streams, rivers and streams, and precipitated on wide plains, plains and wide stream beds, thus developing caramel red-brown colored fertile soils (Figures 2, 17, 33, 35, 36, 39). Martian fluvial alluviums, like the Quaternary caramel-reddish-brown alluvial soils of Earth, are highly fertile for agriculture, allowing all kinds of plants to grow and thrive.

On the other hand, plants cannot grow in the regolith dust and soil of the Moon, our planet's natural satellite (for dust to become soil, it must meet/interact with water, undergo bacterial activity and chemical decomposition and decomposition to become clay). Even if plants grow for a short time, they die after a while. Why? Can patients with silicosis survive? Therefore, there has never been, and never will be, water on the Moon. Regolith dust has never met water, and the caramel-reddish-brown soil has never developed, and will never develop. There are no dendritic river drainage systems on the Moon. Regolith dust is risky and unsuitable for colonization. There will be no economic return on the work, expense and time lost in this direction. Due to the effects of the Earth's gravity/gravitational tidal forces, the Moon has undergone sufficient tectonic deformations and has become a risky situation. It is recommended not to tamper with the moon too much. Its geological problems remain unresolved. Scientific research should be conducted on it. However, it has been suggested that the Moon is not suitable for settlement and colonization. It should be used as a station/pilot site for space exploration.

Streams and Alluvial Soils (Qh):-

Ancient flash floods have developed and will continue to develop in the region due to the crusting of the outer surfaces of the chalk rock series during rainfall, preventing water from seeping underground. Water seeping deep into the cracks and fissures of the chalk rocks opened by deep road cuts has resulted in the development of dissolution cavities and caves of varying sizes within the chalk rocks. Precipitation (snow and rain), desert storm alluvium deposited and accumulated on the surface, and the organic chalk dust of the outer surfaces of the chalky rocks oxidize with the oxygen in the air, turning them into a tan, caramel orange, or caramel reddish-brown color. Being microns (1 micron = 0.001 mm), they are easily transported by the water and transported by dendritic drainage systems, producing caramel reddish-brown muddy water currents. Muddy waters have developed the rock units of the Harran formation (Qh) suitable for agriculture and the blocky flood sedimentary deposits (Qf) suitable for agriculture by sliding the gravel, blocky rocks and especially the blocky basalt blocks on the outer surface of the caramel reddish-brown colored, hard, slippery, smooth crusted chalk rock series along the sloping topography with muddy waters and by depositing them in flatter areas, depressions, wide valley beds and plains with streams, rivers and rivers (Figures 5, 6, 7, 10, 11, 14).

Alluvium (Qal):-

Younger units of unconsolidated, uncemented conglomerate/pebblestone, sandstone, siltstone, mudstone, and claystone are found along stream, river, and riverbeds in the region. Hanging terraces (old alluvium) composed of consolidated and cemented burgundy-grey colored conglomerate, sandstone, siltstone, mudstone and claystone are seen around the stream beds. Similarly, ancient alluvium is present on ancient Mars (Figures 3, 6, 9, 10, 11).

Settlement Areas in the Region in Ancient Times:-

The thick and widespread rock stratigraphic units that form the Upper Maastrichtian-Lower Miocene Şanlıurfa Chalk Series in Southeastern Turkey are generally covered with armor formed by a hard, impermeable, glassy amorphous crust/encrustation/encrustation with a caramel-reddish-brown colored outer surface in contact with the atmosphere (Figures 3, 5 and 7). However, the chalk series rock units beneath this armored crust consist of thick, massive, and homogeneous, horizontally bedded white chalk rock units (Figures 3, 5, and 7). The Eocene chalk rock units in the region are particularly thick and widespread, consisting of massive, homogeneous chalk.

The caves formed by carving the chalk in the lower sections of the horizontally layered thick chert layers seen at different levels of the rock units in question were used as ancient settlements and ancient tomb houses (Figure 14). Because chalk is thick and solid and easily processed, people in ancient times built caves and lived in them. Similarly, underground settlements have been built within chalky rocks (Figure 13). These sites are mostly protected. However, some are available to local residents. Ancient burial chambers have been built into the chalk rocks. Since the outer surfaces of chalk rocks are covered with hard armored crust, they are protected against deep water leakage of permeable-porous chalks. Furthermore, because the crust consists of a very hard, thick, glassy amorphous material, settlements carved into the interior of the chalk rocks prevent the transmission of heat and cold waves. These underground cities provided protection against floods, heat, and cold caused by atmospheric conditions. Because they offered habitats with normal temperatures, they lived in underground cities, areas, and caves built within the chalk rocks

.

Similarly, it has not yet been determined whether ancient Martians carved underground settlements and caves into the chalk series rock units with very thick and widespread outcrops on the ancient planet Mars. However, some NASA images reveal unnatural and artificial caves and caverns. Artifacts and traces of ancient Martians may be found buried beneath the dust deposits and accumulations of wind alluvium (loess, regolith, aerosol) composed of organic, caramel-brown-red oxidized-hydroxide chalk and nanophase iron dust from the desert storms of ancient Mars. It is certain that Martians did not evolve to the extent of social, technical, and cultural developments like Earthlings. Traces and artifacts of extinct ancient Martians may remain. If no traces or artifacts of ancient Martians are found, it can be assumed that life on ancient Mars vanished thousands of years before the emergence of ancient Martians. However, the present-day frozen geology of ancient Mars shows that it overlaps with the present-day geology of Earth. When these geological data are considered together, the prediction that ancient Martians (Martian Homo habilis or Homo erectus) appeared but disappeared before fully evolving becomes more prevalent.

Göbeklitepe:-

A site known as Göbeklitepe, located approximately 18 km northeast of Şanlıurfa Province in Southeastern Turkey, which forms the northern edge of the Arabian Plate, was excavated after a statue was unearthed by a local farmer plowing his field, covered by desert storm alluvium (loess, regolith, aerosol) and organically composed caramel-brown-red chalk dust (Figure 12). Following identification of the excavations, it was determined that Göbeklitepe, dating back to 9600–9500 BC, is the world's oldest known historical structure (Klaus Schmidt, 2010). It is also referred to as "the ground zero of history" in some popular sources. The structure consists of "T"-shaped standing stone pillars, the world's oldest known megaliths, and a series of large circular "T"-shaped standing stone pillars made of chalk. Ancient history; People who lived between 3000 BC and 500 AD are called "homo habilis" or "homo erectus".

A Temple/Temple [a structure in which a God or gods (in polytheistic religions) were worshipped] was unearthed at a place known as Göbeklitepe, which was established in a depression area with a history of 11.5 thousand years in the region, by ancient humans/earthlings who had recently transitioned to the hunter-gatherer-settled life (Figures 12, 13). Some ancient settlement units established in depression areas corresponding to the Neolithic period have been covered by desert storm wind alluvium (loess, regolith, aerosol) and chalk dust. Similarly, an ancient settlement covered by desert storm wind alluvial dust at a place close to Göbeklitepe was unearthed by chance during highway construction. During the Göbeklitepe excavations;

A temple/shrine site was unearthed, which was used for religious ceremonies and was arranged in a circular pattern, with 2-3 m high ‘T’ shaped columns, freshly cut from white chalk, whose outer surfaces had hardened and oxidized to a caramel-brown color due to loss of moisture in contact with the air, and which were carved with animal motifs and figures, extracted from nearby chalk series rocks. This area was used for religious ceremonies. At the site of the upright columns, the stone with boar figures and motifs on the sheltered stones was used as a place for animal sacrifices. It is thought that meals were eaten collectively (adults and children) by placing sacrificial food/meat in large and small holes carved into the oxidized hills of rocks, which were positioned almost horizontally, right in front of the temple (Figure 13).

At the same location, there is a hearth carved into the chalky rocks where meals were cooked. However, while it is unknown what kind of gods the steep, T-shaped chalk rock stalagmites/pillars symbolized, it is certain that they represented the gods they believed in and served as temples. It is certain that they collectively fulfilled their beliefs by sacrificing and slaughtering animals, such as pigs, to their gods, and that they cooked and ate the sacrificial meat in the same place. Göbeklitepe, unearthed during excavations conducted 18 km northeast of present-day Şanlıurfa province by the late German archaeologist Klaus Schmidt (2010) in 1995, has been dated to around 9600 BC. Göbeklitepe is not a picnic or archaeological site; it is a temple site representing the gods that ancient people believed in. It is considered one of the world's oldest known examples of monumental architecture and has been considered the world's first temple.

Artifacts dating to the hunter-gatherer, pre-pottery Neolithic period have been unearthed (Figures 12, 13). The T-shaped chalk columns/stalagmites, dating back 11,500 years, have become one of the world's oldest known megalithic sites. The social and communal lives of people 11,500 years ago, including the slaughtering of animals for their beliefs/gods, and their communal rituals and coexistence, are crucial. However, the Maya emerged in Central America around 500 AD, the Aztecs in the 15th and 16th centuries, and the Incas in Peru between 1400 and 1533 AD. The polytheistic Maya, Aztecs, and Incas embraced sun cults. The Maya, in particular, sacrificed themselves, humans, and animals to their gods by drugging their beautiful children. When these are taken into consideration, it is certain that the ancient people of Göbeklitepe, who lived in Göbeklitepe during the world's oldest ancient times, were artistically minded and creative communities, as they beautifully depicted animal motifs and figure reliefs on the pillar stones and carved and embroidered the chalk rocks.

Today, locals inhabit old stone houses made of chalk, with exterior surfaces oxidized and dehydrated, a caramel-reddish-brown color. Similarly, an ancient settlement was uncovered near Göbeklitepe, a hollow area exposed during highway construction and covered by the wind alluvium of a dense desert storm. The mosaics and mosaic paintings on the floors of palaces and buildings from ancient times, which were destroyed by floods and covered by alluvial deposits from rivers and winds carrying chalk dust, are exhibited in the Şanlıurfa and Gaziantep Museums (Figure 12).

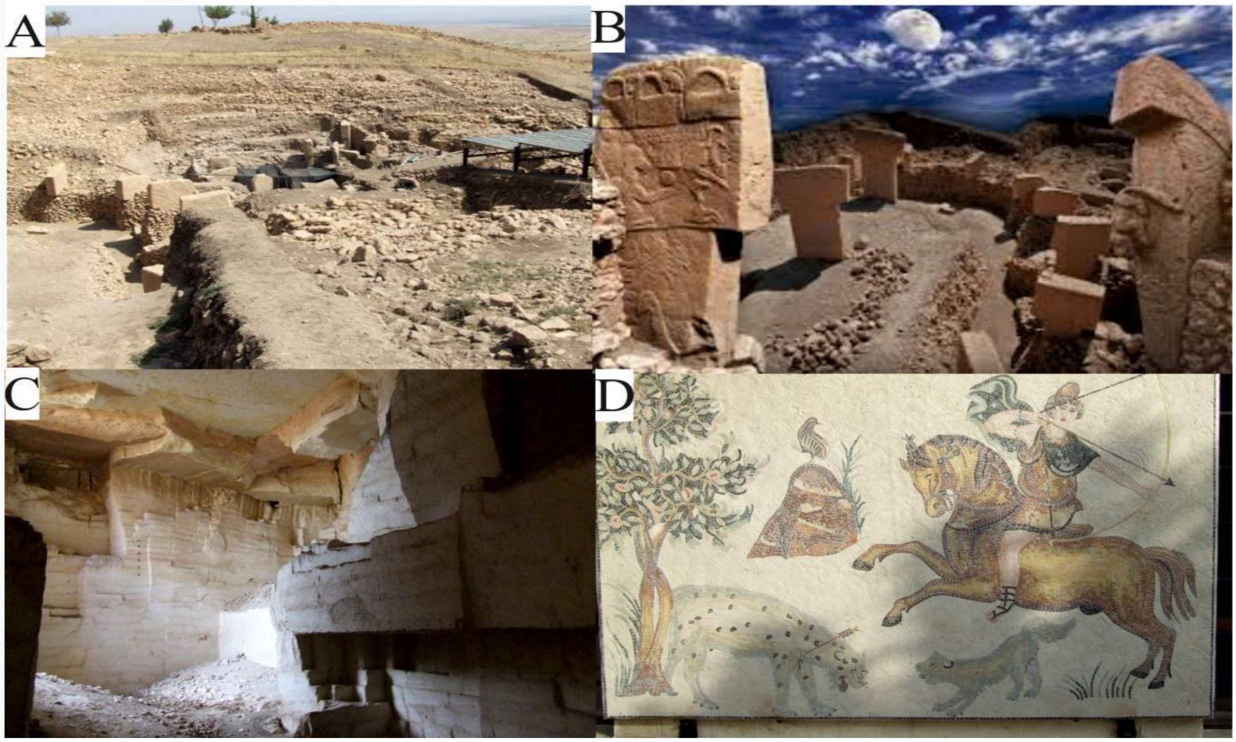


Figure 12a, b, c, d:- A, B) The first and last archaeological excavations at Göbeklitepe. The outer walls of the pillars standing at Göbeklitepe are composed of oxidized chalk with a caramel-reddish brown color. Similar rocks are seen in ancient Martian images. C) A frame from an ancient underground city within the white chalky series. D) A mosaic of a warrior and hunter Amazon woman from archaeological excavations in the region (Şanlıurfa Museum). According to this concrete historical mosaic, it is certain that the ancient natives were much more modern and forward-thinking than the natives of today. There were olive trees in the region that were over 1,000 years old. Now these trees are gone. Why? What happened? (Source: Author).

Figure 13a, b, c, d:- A) Standing stones used by ancient people as temples 11,500 years ago at a site called Göbeklitepe. B) The gathering and eating area in the crusted chalk rocks in front of the temple. C) The hearth where meals were cooked. D) Pits where meat was cooked and eaten in the large and small holes opened in the chalky rocks, and seating benches built around them (Source: Author).

Figure 14a, b, c, d:- A and B) People in ancient times lived in caves made in the chalk rocks of the thick chalk series. C) Trees were planted in the fertile soil of the Harran formation on chalky rocks. It would likely be possible to grow plants and trees in the fertile soil of the Dingo Gap formation on the chalk series rock units of similarly dry and cold ancient Mars. D) All kinds of agricultural products are grown on the fertile lands where the author stands, where the desert storm wind, alluvial chalk dust cover sediments, snow and rain water, and caramel red-brown muddy water carried by streams and rivers are deposited in wide stream beds, plains and plains. I will hold out hope that similar agricultural products can be cultivated in the fertile, caramel-reddish-brown soils of the Dingo Gap Formation, which formed by the same mechanism and is the equivalent of the Quaternary Harran Formation on ancient Mars/the Red Planet, a dry, cold, and desert-storm-infested planet. It has been considered, envisioned, and proposed that Mars/the Red Planet has a tremendous potential for new life on its fertile soil, suitable for future colonization and agriculture (Source: Author).

Economic Geology:-

The Upper Maastrichtian-Lower Miocene Şanlıurfa Chalk Series, with its thick and widespread outcrops in the region, comprises crusted and silicified caramel-reddish-brown, hard, glassy amorphous rocks that form the outermost part. These rocks are mined for asphalt road construction and for gravel and sand for construction materials. Phosphate deposits are locally mined and explored within these rock units (Kartalkanat et al., 2020, Kartalkanat et al., 2021). Rare earth elements are monitored.

The Middle Miocene Ceylanpınar Formation consists of chalky, abundant macro-microfossil shells and clast accumulations, coquina-bearing and macroscopic chalky rocks, and mineral contents and intercalations of gypsum-anhydrite, gypsum, salt, hydrated and quicklime, clay-sulfate. It is believed that the rich hydrocarbon deposits in the Middle East were likely extracted from this unit. Gypsum, anhydrite, gypsum, chalky marl, and calcium carbonate/calcite rocks are used in cement factories. There are quarry operations for building stones from solid, thick, massive and homogeneous chalky rocks. The chalk rocks are used to make tourist items, stone sculptures, and decorative items and ornaments for the interior design of buildings.

It has been determined during drilling studies that there are rich phosphate deposits in glauconitic, titanium-bearing brown sandstones within the Mesozoic Jurassic-Cretaceous inorganic limestones. However, phosphate deposits within the Tertiary-aged, organic-derived, biochemically formed chalk series are richer and are being exploited (Kartalkanat et al., 2020, Kartalkanat et al., 2021).

Important Artifacts in the Region: -

The 4,000-year-old Harran University and its astronomy tower, located in the Harran plain; the Gaziantep-Şanlıurfa-Harran castles; Bilecik, a breeding ground for the nearly extinct bald ibises that feed on chalk rocks; underground cities, rock cemeteries, a caravanserai, ancient Harran houses, historic mosaics, numerous mounds, and ancient structures; and the ancient and historical structures of Şanlıurfa, known as the City of the Prophets; underground cities and caves, all demonstrate the region's social and cultural richness from ancient and ancient periods. All these artifacts owe their existence to the presence of chalk rocks, which are abundant in the region and easily extracted and processed.

However, some negative effects have been observed in the region:-

The world's oldest ancient university, the Ancient University of Harran, is approximately 4,000 years old, and houses an astronomical observation tower. Astronomer Abu 'Abdullah Muhammad ibn Jabir ibn Sinan al-Rekkī al-ṣ-Ṣābi al-Battani, also from Harran, taught at this ancient university. A crater on the Moon, a natural satellite of our planet, is named after this esteemed astronomer (Albategnius/al-Battani crater on the Moon). Battani was an astronomer, astrologer, and mathematician. He was born in Harran, a district of Şanlıurfa Province in Türkiye (he lived there between 858 and 929). Taking into account the dates of birth and death, this esteemed astronomer lived approximately 1,095 years ago. However, the birth and spread of Islam occurred in the 7th century, between 622-750 AD. This belief emerged and spread approximately 1300-1400 years ago.

Historical records from the Harran district claim that the Mongols, who invaded in 1260, destroyed the ancient Haran University, the astronomical observation tower within the campus, the historic "Harran Grand Mosque" and its city walls in 1271. However, this historical site has a history of approximately 4,000 years. Islam was born and spread approximately 1,300-1,400 years ago. It is impossible for a mosque or minaret to have been present in the destruction and destruction of the historic city of Harran and its university in 1271. It is unacceptable to organize, adapt, and disseminate the past, history, and world heritage according to today's mindsets, backward, primitive ideas, and incompetent views.

I strongly condemn these primitive, reactionary, and bigoted beings. I believe they have no right to silently and insidiously erase the history and traces of the past, to use them as tools for their simplistic and primitive ideas, and to distort them. These concrete historical structures are precious treasures and cultural heritages inherited from ancient times. They will be preserved and survive in the places where they were built. I believe they should not be allowed to tear them from their historical ties and use them as tools for their mystical ideas. If everyone who comes in establishes a haphazard system not for the benefit of society but according to their own whims, the consequences will not only damage the future ecosystem but will also extend to destroying and erasing history.

Therefore, I am saddened. If I were to make a prediction, Earthlings, Martians, and other aliens living in other galaxies constitute different organic allotropes of each other, all sharing similar feelings and emotions in a spiritual sense. Take one, hit the other. However, considering the similarities in rock units, geographical locations, and paleoclimatologies between the Gale Crater region on Ancient Mars and the region of Southeastern Türkiye, which forms the northern edge of the Arabian Plate, it has been predicted that ancient Martians may exhibit physical characteristics similar to Arabs and, in particular, Kurds.

This is because rock units of the same geological age and rock type exhibit similar characteristics, regardless of their location on Earth, exhibit similar fauna and flora. Furthermore, as seen in science fiction films, ancient Martians were certainly not large-headed, large-eyed, short, or green-skinned. They were not plants, so they could not photosynthesize. Considering the width and height of the entrances to artificial caves on Mars, ancient Martians are predicted to be quite robust and tall. The physical characteristics of ancient Martians are not a scientific reality; they are merely a utopian notion based on speculation. However, we also need to understand the immutability of the laws of matter, physics, chemistry, mathematics, and biology.

Astronomer Battani of Harran lived approximately 200 years before this date. How could the Astronomy Tower, a historic observation tower located on the campus of Harran University, the world's oldest ancient university, dating back approximately 4,000 years, be the so-called "minaret of the Harran Grand Mosque"? I believe this is distorting historical facts and providing the world with misinformation. Recent studies have suggested that revising this Astronomy Tower, removing it from its historical setting and reality and recreating it elsewhere under the name of an Astronomy Tower, would be another misleading, distorting, and misleading attempt. Why isn't revising it in its historical setting and based on its remains? However, Arab scientists achieved significant achievements before Islam. Unfortunately, these achievements were doomed to disappear after Islam.

Another problem is that these primitive creatures consider Göbektepe, the world's oldest temple site located approximately 18 km northeast of Şanlıurfa province and dating back 11,500 years, to be the "Göbektepe Archaeological Site". I think they have disconnected it from its true purpose and history. Göbeklitepe is not a picnic area. Although it is seen that 11,500 years ago, ancient people worshipped their gods together, slaughtered pigs as an offering, cooked pork on hearths they carved into the chalk rocks in front of the temple, which no one ever mentions, and ate pork collectively by placing the cooked sacrificial meat in small holes of varying sizes arranged from large to small, there was a large and small hierarchical order in place, these historical facts have not been mentioned. Why? Also, the ancient historical mosaics in the region show that the local ancient people, especially the women, were hunters and warriors, and that despite their modern attire and forward-thinking nature; It's clear that they lived a much more advanced natural life than modern-day natives. Why are today's natives lagging far behind the ancient natives, even though they should have a more advanced life? This reversal and regression contradicts the development and evolution of nature. Why?

Results:-

The geology of Southeastern Turkey (Gaziantep-Şanlıurfa-Mardin provinces), which forms the northern edge of the Arabian Plate, shows very clear and distinct differences when compared with the types, fauna-flora, stratigraphy and structural relationships of rock stratigraphic units formed in different ages and environments and the rock units of the same age outcropping in the Anatolian Plate, which forms the Alpine-Himalayan orogenic belt between the Arabian-African and Eurasian Plates (Figure 2). The thick and widespread chalk series rock units of the Arabian Plate are deposited on the unconformable inter-rock surface by erosion and horizontal layering (Figure 2) of chalky wind alluvial dust (loess, regolith, aerosol) from desert storms. Folding phases have not developed. There are no intercalations of volcanic rocks within the chalk rock units, which are Cenozoic clastic sedimentary and biochemically formed carbonate type sedimentary rocks (except for the Cambrian aged units).

However, within the Anatolian Plate of the Alpine-Orogenic Belt, there are no chalk rocks within the same-aged rock units. There are no dust blankets or deposits of desert-storm alluvium on the surface. Intercalations of marine, lacustrine, and terrestrial lava and pyroclastic rock are commonly observed within different rock series and rock units of different ages. There are sedimentary rock units formed in different facies and volcanic cones that were active in the Neogene and Quaternary ages and later became extinct. Lava and pyroclastic rocks, which have emerged from volcanoes and formed in terrestrial and lacustrine environments, and lacustrine volcanosedimentary rock units are common.

It is possible to distinguish it clearly from the Arabian plate rock units by the cosmic upper mantle peridotites, metamorphic belts, the prevalence of rocks of magmatic origin (volcanic, oceanic crust series/ophiolite series and ophiolitic melange, etc.), the presence of imbricate, napped and thrust structures, different fault systems, the prevalence of reefal carbonate rocks, unconformities developed between different rock series and units, as well as the folding of the units, different depositional environments, and the presence of different fauna and flora. For this reason, it has been suggested that the orogeny types, type localities and names in the "Geological Time Table/International Chronostratigraphic Table 2018" prepared by the International Commission on Stratigraphy should be revised and the table in question should be arranged as two separate tables for orogenic belts, stable cratonic plates and shields.

Suggestions were made regarding the Upper Cretaceous and Cambrian problems (Tarhan, 2018, Volume 4). For example, although the Upper Maastrichtian was rightly considered the lower Paleocene by pioneer researchers in Germany, it has been placed within the Upper Cretaceous. International Commission on Stratigraphy: Do they know what kind of geological events occurred in the Upper Cretaceous? It is thought that not only paleontological ages should be taken into consideration, but also structural and stratigraphic relationships in the field will be taken into account to ensure accuracy. It is recommended that the relationships between the Armonic Massif in France and the Tertiary units in the Paris Basin be revised (Tarhan, 2018, Volume 4).

In some of NASA's images of Mars, features similar to the rock units, stratigraphy and structural relationships exposed in the Arabian Plate, not to the Alpine-Himalayan orogenic belt, are seen. No images have been seen relating to other parts of ancient Mars. It was thought that it would be useful to correlate/compare the rock units of ancient Mars with the rock units of Earth mentioned above, using the images taken from the surface of Mars by NASA's Curiosity and Perseverance Rover spacecraft and the data they provided. Even though our planets Earth and Mars (the Red Planet), which are located together in our Solar System in the Milky Way Galaxy,

are different in terms of their distance from each other, their distance from their star, the Sun, their masses, sizes, gravitational/magnetic fields, atmospheres and planetary ages, they show very similar characteristics due to the abundance of water, sea, ocean, dendritic stream drainage/erosion, cones, paleoclimates, microbial-macrobial life on them, their co-existence within the terrestrial-rocky inner planet system of the Sun, their being the 3rd and 4th largest ringless planets of the Solar System, the presence of organic composition biochemical oxidized-hydroxide chalk and nanophase iron wind alluvium dust (loess, regolith, aerosol, etc.) deposits and sand dunes formed by desert/Sahara storms. They probably became planets in the same time period and have sedimentary/sedimentary origins that are of the same age and show similar structural and stratigraphic relationships. Biochemical chalky series, reefal-cherty carbonate series, coarse-fine clastic sedimentary rocks, thick and widespread outcrops of volcanic (lava, pyroclastic rocks) rocks show great similarities.

These similarities suggest that our planet Earth and ancient Mars, planets within our Solar System, formed simultaneously during the same time period. Under similar paleoclimatic conditions, similar rock stratigraphy units, similar plant and animal organic forms, and inorganic rock, mineral, and ore deposits developed. If no traces or artifacts of Martian space creatures were detected/seen, it was thought, predicted and suggested that "Martian Homo habilis/Homo erectus", the primitive ancestors of ancient Martians, appeared on ancient Mars. However, it has been thought, predicted and suggested that ancient Mars lost its thick modern atmosphere, the Gülnaz geochemical rock cycle and microbial-macrobial life very soon after these primitive Martians had fully evolved, socialized and transformed into the first modern Martians, the "Martian Homo sapiens/Homonids".

It has been thought, predicted and suggested that ancient Mars may have lost its atmosphere, geochemical rock cycle and terrestrial-marine macrobial-microbial life within a relatively short period of time, probably between 2400 million and 300 thousand years ago. These conclusions have been reached from comparisons and analyses of geological rock units on our planet Earth and ancient Mars. I have faith that permanent explanations and solutions will be provided as a result of chemical analyses, mineralogical-petrographic properties and dating of rock samples from Mars. According to the results I have reached as a result of my studies and research, the destruction, collapse, wreckage, pain and sadness of Ancient Mars as a result of natural geological events in recent history have touched and deeply saddened me as a geologist, environmentalist and nature lover. According to concrete geological data, facts and analyses; It has been thought, predicted and suggested that there was a definite tendency for the ancient Mars atmosphere, geochemical rock cycle, all life and flood deposits to disappear not millions and billions of years ago, but thousands of years ago within the Quaternary time period.

The extinction of life on ancient Mars is thought to have occurred spontaneously, likely as a result of external influences. Under normal conditions and circumstances, organic forms and inorganic systems formed by matter have a specific life cycle. These life cycles evolve slowly and gradually under normal conditions (without experiencing extraordinary circumstances) and come to an end within their life cycle duration. According to the provisions of the first-formed prototype Constitution of matter (Tarhan, 2024c), matter creates and evolves every inorganic system and organic form it forms as a prototype from scratch.

The first prototype Constitution of matter, the laws of Physics, Chemistry, Mathematics and Biology, are valid unchanged and unchanged everywhere in the universe. Depending on the geochemical environment, thermodynamic systems, and physical conditions (P/T) on the surface of a terrestrial-rocky planet and its satellites (Moons), their physical properties (texture, structure, color, mineralogical, plant-animal cells) develop differently. However, by evolving from the simplest to the most perfect, it develops different generations and develops similar organic forms with different allotropes and inorganic structures with the same mechanisms. Therefore, under the same physical conditions, similar allotropic organic forms (plant and animal cells) develop on terrestrial and rocky planets and moons with thick modern oxygen-rich atmospheres. Nothing could be more natural for matter than this.

Because matter is programmed according to the laws of Chemistry, Physics, Mathematics and Biology. Matter is programmed neither to destroy nor to be destroyed. In other words, it is programmed to create, create, evolve, enrich, diversify, regulate and repair the correct functioning of the system, renew, balance the system, create the ecosystem, beautify and integrate it, etc. With these characteristics, it is thought to be different from the unhappy Noble/Mortal gases, which are self-seeking, think of no one but themselves, and wander alone in the void. Therefore, the extinction of life on ancient Mars was not caused by the internal structure of the planet itself.

A planet protects and preserves the life on it until it dies. It never wishes them harm. Do parents wish their children harm? They love, protect and look after them until they die. He would have done the same on ancient Mars. Therefore, it has been thought, predicted and suggested that the ancient planet Mars lost its atmosphere, geochemical rock cycle and all life on its surface, probably as a result of the intervention of sudden extraordinary natural events directed at it from outside. But ancient Mars is not dead… Therefore, it is just a very sad, shocked, and comatose living corpse…

Geology Of Gale Crater On Ancient Mars:-

Introduction:-

Mars, also known as Merih (Turkish) or the Red Planet, is the fourth planet from the Sun in our Solar System within the Milky Way Galaxy and the seventh in size. It is a ringless, rocky, terrestrial planet (Figure 15-1). It has two natural satellites, Phobos and Deimos (Figure 15-2). Mars is the smallest planet in the Solar System after Mercury. Its average diameter is 6,780 km. Its average distance from the Sun is 1.5 AU (1 AU is the distance between Earth and the Sun. AU = 150 million km). Visible to the naked eye from Earth, Mars and its other name, the Red Planet, have both giant asteroid craters (impact craters) like those on the Moon and volcanoes, valleys, deserts, and polar regions like those on Earth. Mars's North and South Poles are high, like Earth's.

It has icy belts, like the Antarctic continent, which is 98% ice-covered in the southern part of the Southern Hemisphere and the rest is covered with land. It is unknown whether the paleomagnetic properties of its poles change over time. However, they should normally vary within the galactic system. Mars completes one rotation on its axis in 24.6 hours and its orbit in 687 days. Its surface temperature ranges from -143°C to 35°C, with an average temperature of -56°C and -62°C. It has four seasons, each lasting six months. Mars's mass is about one-tenth of Earth's. Its gravitational pull is not strong enough to support a dense atmosphere. Mars' continental crust gradually thickens from the northern to the southern hemisphere, with Gale Crater appearing in the southern hemisphere (NASA data).

The Solar System consists of four small, terrestrial, rocky inner planets (Mercury, Venus, Earth, and Mars) and four large, gaseous outer planets (Jupiter, Saturn, Uranus, and Neptune) (Figure 15-1, 15-2). However, Pluto was demoted from planet status and reclassified as a dwarf planet at the 2006 International Astronomical Union meeting in Prague (Stern et al., 2015). Researchers are also trying to determine how many Neptune-sized planets exist.
Milliken et al., (2010), reported that the kilometers-thick sedimentary sequence at Gale Crater exhibits stratigraphic changes in lithology consistent with transitions in aqueous and climatic conditions claimed to be global in scale.

The sequence is divided into two formations, with the lower formation exhibiting a clear transition in mineralogy from clay/sulfate to sulfate/oxide assemblages and separated from the overlying formation by an erosional unconformity. Overburden and crater counts indicate that the beds in the lower formation lie along the Noachian-Hesperian time-stratigraphic boundary. In contrast, the beds in the upper formation, which lack signatures of clay minerals or sulfates, are thinner, more regularly spaced, and clearly younger. The observed stratigraphic trends suggest that the rocks at Gale Crater underwent a global transition from a climate conducive to clay mineral formation to one more conducive to the formation of sulfates and other salts.

Buz et al., (2017), used high-resolution imagery and infrared spectra to investigate the mineralogy and geology of the rim and basement rocks of Gale crater to determine the origin of rock units of different lithologies detected by the Curiosity rover. While no significant differences were observed in the basement/floor rock spectral properties, some CRISM images of the crater's rim and wall rocks showed olivine-bearing basement/floor rock accompanied by

Fe/Mg phyllosilicates. Hydrated materials with 2.48 µm (micron) absorption on the eastern walls of Gale crater are spectrally similar to the sulfate unit at Mount Sharp (Aeolis Mons).

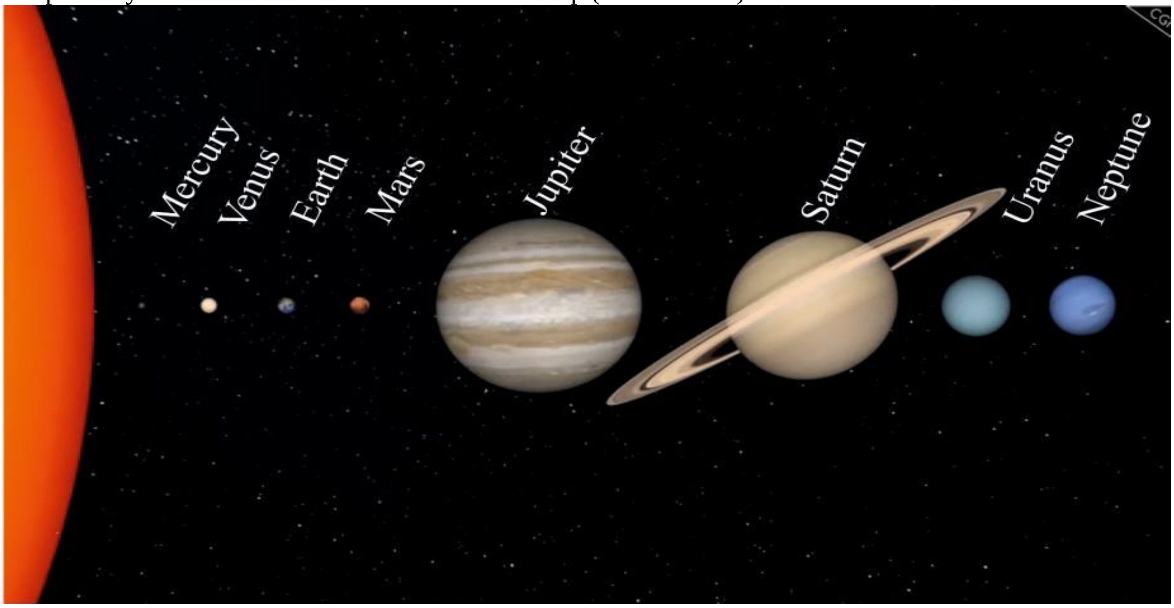


Figure 15-1:- Relative sizes, distances, and positions relative to their star, the Sun, of the four terrestrial, rocky inner planets (Mercury, Venus, Earth, and Mars) and the four gaseous outer planets (Jupiter, Saturn, Uranus, and Neptune) within our Solar System (Image credit: NASA/JPL/Caltech; https://youtu.be/EXYiUh6AKFw, retrieved from https://youtu.be/EXYiUh6AKFw?t=29).

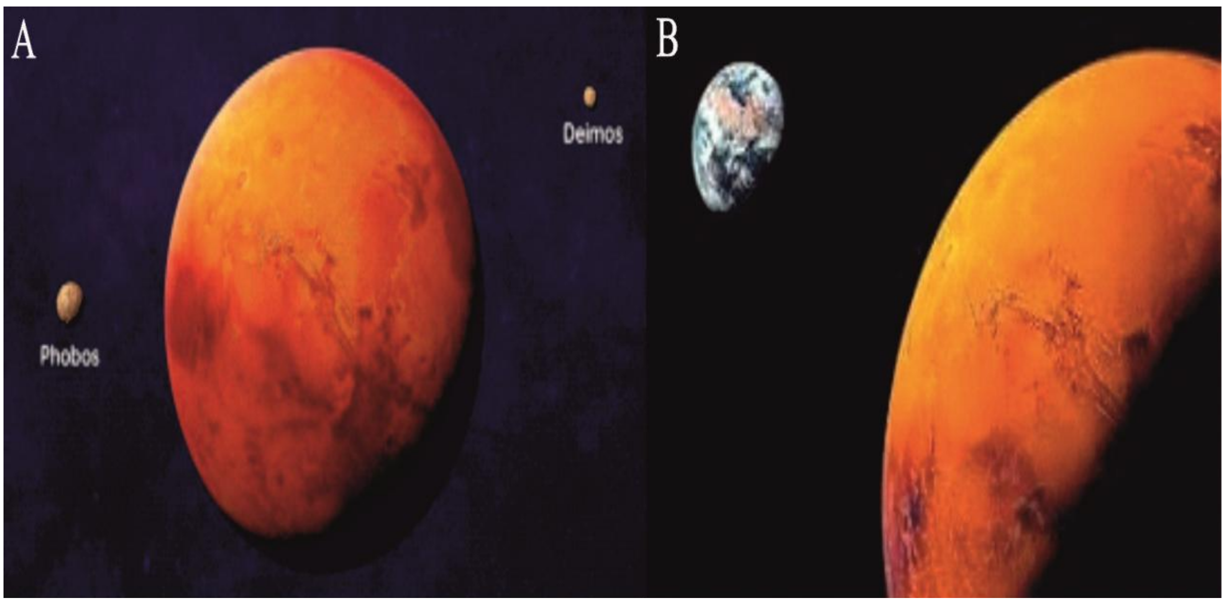


Figure 15-2:- A) Mars/Red planet and its moons. B) Mars/Red planet and our planet Earth (Image credit: NASA/JPL/Caltech).

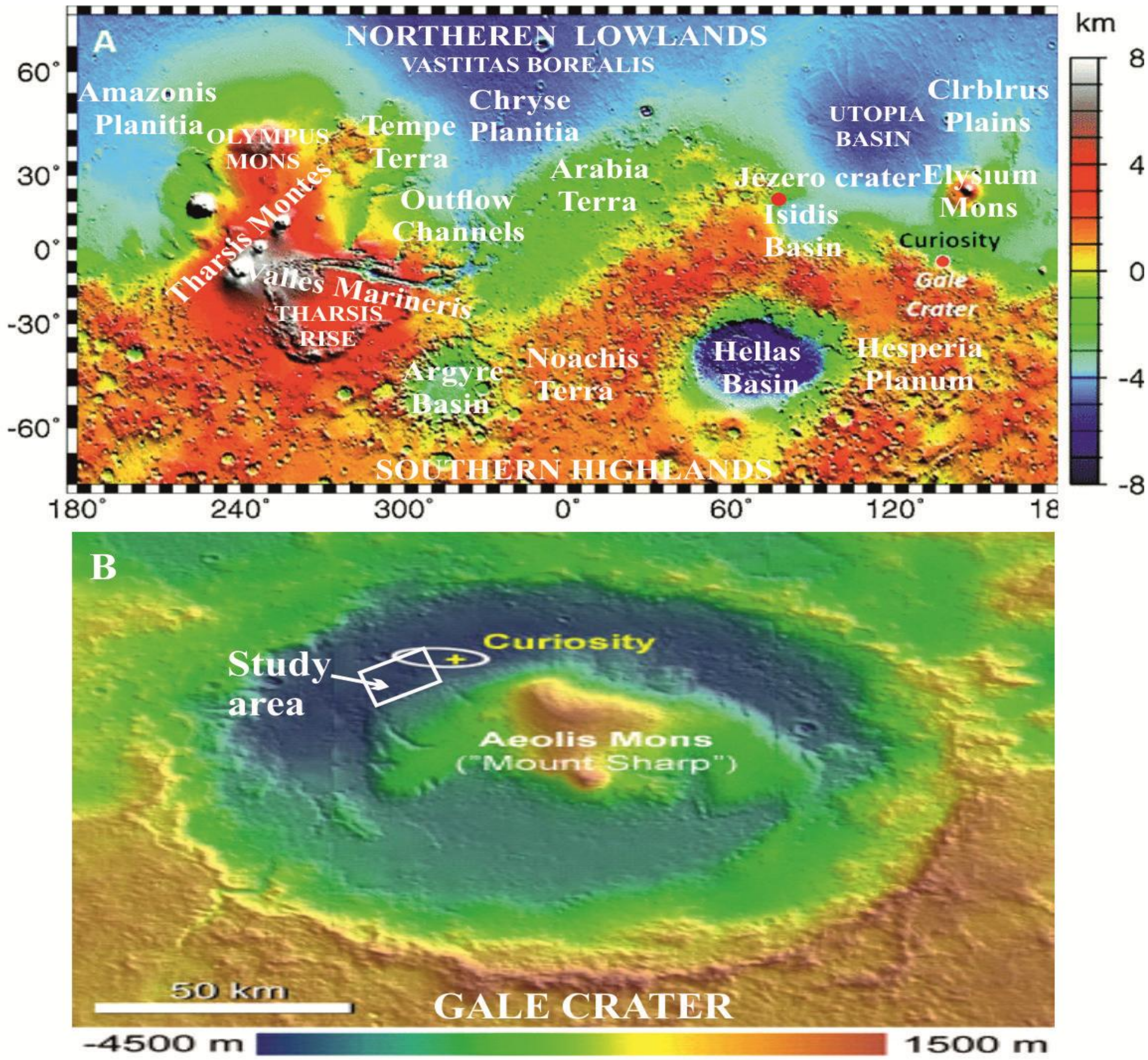


Figure 16a, b:- A) Locations of Gale and Jezero craters on the Mars Orbital Laser Altimeter (MOLA) elevation map (Image source: NASA/JPL/GSFC); B) As seen on the topographic map, Mount Sharp (Aeolis Mons), composed of sedimentary rocks, is located within Gale crater, approximately 5.5 km above the crater's northern rim. The yellow circle within the white circle indicates the landing site of NASA's Curiosity rover, and the white rectangle indicates the approximate study area. (Image source: NASA/MOLA team; Retrieved from https://skyandtelescope.org/astronomy-news/mount-sharp-or-aeolis-mons/).

Sedimentary layers on the floor of Gale, southwest of the landing site, are likely the same age as the Bradbury units discovered by Curiosity and are also hydrated and/or contain Fe/Mg phyllosilicates. The spectral properties of these phyllosilicates differ from the Al-substituted nontronite detected by CRISM at Mount Sharp, suggesting formation by fluids of different compositions. Geological mapping of the crater floor shows that hydrated or hydroxylated materials are typically overlain by spectrally indistinguishable, erosion-resistant, cliff-forming units. The authors also highlight important points.

They note that olivine and Fe/Mg phyllosilicates are common in the Gale rim/wall rocks, while feldspar-rich units were sought but not detected; multiple units of hydrated and hydroxylated materials are present in the ground materials southwest of the MSL landing site; and a >90 m thin-bedded sedimentary sequence on the northwestern Gale crater floor exhibits variations between lacustrine and eolian environments.

Ewing et al., (2017), compared Martian and terrestrial eolian dune sedimentary processes in the Bagnold Dune field, which was blown by two active winds within Gale Crater on Mars by the Mars Science Laboratory Curiosity (MSL). They noted that the presence of grain fall, grain flow, and impact waves is similar to terrestrial dunes, with impact waves present on all dune slopes and similar in size and shape to their terrestrial counterparts. They suggested that, as on Earth, dune field pattern dynamics and basin-scale boundary conditions determine the style and distribution of sedimentary processes in the Bagnold Dune field.

Grant & Wilson (2019), reported that several fan-shaped deposits formed by the deposition of waterborne sediments on the walls/wall rocks and floor of Gale Crater are remarkably well preserved. They note that they are much younger (~2 billion years or less) than the older, more widespread water-related deposits within the crater, which formed 3 billion years ago. They suggest that the late periods of water-related activity within Gale Crater may be related to late chemical precipitation and/or cementation of older rocks within the crater, and that habitable conditions persisted within the crater later than previously thought. Local alluvial deposits in Gale crater indicate emplacement probably less than 2 Ga ago.

Lewis et al., (2019), measured how the local gravity field changed as the Curiosity (MSL) rover passed through Gale Crater and began its ascent to Aeolis Mons (Mount Sharp). The density of the material beneath Gale Crater disproved the theory that the crater floor was once buried beneath several kilometers of rock, indicating that the crater is relativistically porous. They reported that the sedimentary rocks in Gale Crater have a density of 1680 ± 180 kilograms per cubic meter. This value is lower than expected, indicating high porosity. They pointed out and raised the crucial point that the porosity phenomenon suggests that the rocks have not been subjected to maximum burial depths throughout their history.

Thomson et al., (2019), state that the origin of the sedimentary mound in Gale crater, the landing site of the Mars Science Laboratory rover Curiosity, remains a mystery. They calculated the total potential contribution of river material by conducting a volume-based analysis. Based on these results, they divided the sedimentary mound in Gale Crater into three regions. Based on these results, they divided the sedimentary mound within Gale Crater into three zones: lower, middle, and upper zones. The upper limit of the lower zone is formed by a maximum contribution of submerged sediments, which constitutes ~13% to 20% of the mound volume. The upper zone is defined by the elevation of the northern unbroken rim (-2.46 km).

Sediments above this height indicate that they were not deposited by flowing water. These volume balance calculations indicate that mechanisms other than flowing water are required to explain the overwhelming majority of sediment transported into Gale crater. They suggest that the most likely candidate process is collapse from eolian suspension. The authors also noted that fluvial processes account for less than 20% of the volume of the central mound of Gale crater, Aeolis Mons; They noted that the majority of sediments transported to Gale Crater were transported by mechanisms other than flowing water, and that most sediments on Aeolis Mons were probably deposited as eolian airfall deposits.

Rampe et al., (2020), reported that the Mars Science Laboratory Curiosity rover was sent to Mars in August 2012 to investigate the habitability of ancient and modern environments. Curiosity was sent to Gale Crater to examine a sedimentary rock sequence approximately 3.5 Ga old, containing secondary minerals that suggest accumulation and/or alteration in liquid water, based on orbital visible and shortwave infrared reflectance spectra. The sedimentary sequence on the lower slopes of Mount Sharp in Gale Crater indicates a dramatic shift from a relatively warm and humid climate to a cold and dry climate on early/ancient Mars, based on a transition from smectite-bearing to sulfate-bearing layers.

They suggest that diagenetic processes led to the alteration of olivine, the release of Fe2+/Fe(II), and the precipitation of magnetite. They note that fracture-related halos in the Stimson and Murray formations provide evidence of complex aqueous processes long after streams and lakes disappeared from Gale Crater. The sedimentology and composition of rocks analyzed by Curiosity indicate that habitable environments persisted intermittently at the surface or subsurface of Gale Crater for perhaps more than a billion years.

Bristow et al., (2021), state that sedimentary rocks exposed in Gale crater on Mars contain extensive clay minerals. They found evidence of past reactions with liquid water and sulfate brines, which may have percolated through the clay from an overlying sulfate bed. They note that similar sulfate beds are widespread throughout the planet. They note that the Martian sedimentary rock record contains information about geological processes that occurred on the planet billions of years ago. They note that a traverse route from Vera Rubin Ridge to Glen Torridon allowed Curiosity to examine a lateral cross-section of rock layers deposited in a Martian lake approximately 3.5 billion years ago. They note that there are spatial differences in the mineralogy of the sedimentary rocks. These differences suggest local infiltration of silica-poor brines formed during the deposition of magnesium sulfate-bearing layers of the overlying sedimentary rocks. They indicate that destabilization of silicate minerals caused by silica-poor brines (rare on Earth) was common on ancient Mars because sulfate deposits were globally distributed.

Eng et al., (2024), report results on the change in the clay-sulfate transition from Sharp to Vera Rubin Ridge, indicating significant compositional changes along the transition, supporting the hypothesis of wet-dry cycles in the clay-sulfate transition. It has long been assumed that the clay-sulfate transition at Gale Crater records an environmental change from "warm and wet" to "cold and dry." The paleolake that once filled Gale Crater allowed the formation of phyllosilicates. As Mars became colder and drier, sulfates were able to precipitate on the phyllosilicates.

This mineralogical transition has also been observed elsewhere on Mars and indicates a global environmental change. Different hydrated Mg-sulfates can reveal the characteristics of the paleoenvironment at the time of deposition and thus elucidate the geological history. The objectives of this study are (a) to characterize potential sulfate-bearing rocks using the Curiosity rover's multi-spectral imaging instrument, Mastcam; (b) limiting the detection threshold of Mastcam for Mg-sulfate using laboratory techniques. We identified three new rock spectral classes specific to the clay-sulfate transition and one new class associated with the Greeneheugh pediment. Our laboratory results indicate that Mg-sulfate will be difficult to detect by Mastcam unless it is near purity.

There are valuable studies on the crucial images and data collected by NASA's geologists and rovers on Mars, as well as the valuable work of NASA personnel who have evaluated these images and data, and scientists from many other disciplines. All of these are invaluable and valuable. It's only natural that there are some differences between them. It's possible to reach accurate conclusions by colliding the thesis and antithesis.

Both ancient Mars and our planet Earth are two distinct terrestrial-rocky planets within our Solar System, having completed the planetization phase at the same timescale (Figure 15-2). As mentioned above, it is quite natural that similar rock units formed at the same timescale on these two different planets and exhibited similar paleoclimatological features and ecosystems. Therefore, the rock stratigraphic units present on ancient Mars were compared with rock units on Earth. In this study, the formations identified, defined and named for the first time on ancient Mars were compared with the formations that could be equivalent on our planet Earth, and the ages of the formations that are equivalent on Earth, with similar rock type characteristics, depositional environments and stratigraphic relationships, were given and predicted.

When the generalized columnar sections of the studied locations on both planets are compared (Figures 2 and 17), it will be seen that there are surprising and astonishingly extraordinary similarities in terms of the rock type characteristics, depositional environments, paleoclimatic conditions, ecosystems and stratigraphic relationships of the rock units in the Gale crater on Mars. Therefore, due to the current impossibility of dating the rock stratigraphic units in Gale Crater and its surroundings on ancient Mars (the Red Planet), as an experienced field geologist and an experienced mineralogist-petrographer, I have dated, predicted, and proposed equivalents of the rock stratigraphic units in Gale Crater on Earth, which share similar rock type characteristics, physical, biochemical, and stratigraphic relationships. Otherwise, it will be impossible to decipher the geology and geodynamic evolution of ancient Mars. Just as the articles of the first prototype Constitution of matter (Tarhan, 2024c), the laws of Physics, Chemistry, Mathematics and Biology are valid everywhere in the Universe and in different time dimensions and do not change, similarly, the fact that ages in the same time dimension do not change is taken as the starting point.

Furthermore, viewing images of ancient Mars has always felt like I were on Earth. Of course, Mars will have its own unique differences and characteristics. However, these do not affect the overall planetization and coexistence. The rock units on both planets have many common aspects such as rock type characteristics, depositional environments, stratigraphic features and relationships, paleoclimates, Gülnaz geochemical rock cycle characteristics (Tarhan, 2018), similar eolian processes, traces of terrestrial-marine macrobial-microbial life, mineralogical properties, etc. The only difference is that the images I have access to do not reveal any Paleozoic-Mesozoic rock units on ancient Mars. The presence of intense, active tectonics is evident. The question arises: Did the ancient planet Mars achieve planetary formation much later than our planet Earth? However, even if the complete existence of Cenozoic-aged rock stratigraphic units is thin, the Cenozoic period and life continued to exist on Ancient Mars during this time period. Evidence of chalk series rock units has been identified for the first time on this planet and in this study. I regret to state that it lost its thick modern atmosphere, geochemical rock cycle (precipitation and erosion, etc.) and living life during the Quaternary period. After losing its biota, geochemical rock cycle, and thick modern atmosphere (containing approximately 21% O_2; today, this ratio is approximately 0.13-0.17), it has survived to the present day in a frozen state, except for cold, dry, desert storms, and eolian processes.

Because it has been observed in NASA images that the continental crust is much thinner than the continental crust of the Earth. "The Conrad unconformity" is near the surface, but in some places, it is at a depth close to the surface. Another question is what happened to ancient Mars that caused it to lose its atmosphere, geochemical rock cycle, and marine-terrestrial macrobial-microbial life early? Because what the ancient planet Mars experienced does not correspond to the normal life cycle (meaning without any extraordinary events) of a planet formed by matter. It has been suggested that there is a connection to another extraordinary natural event. It is thought that there is a connection with another extraordinary natural event.

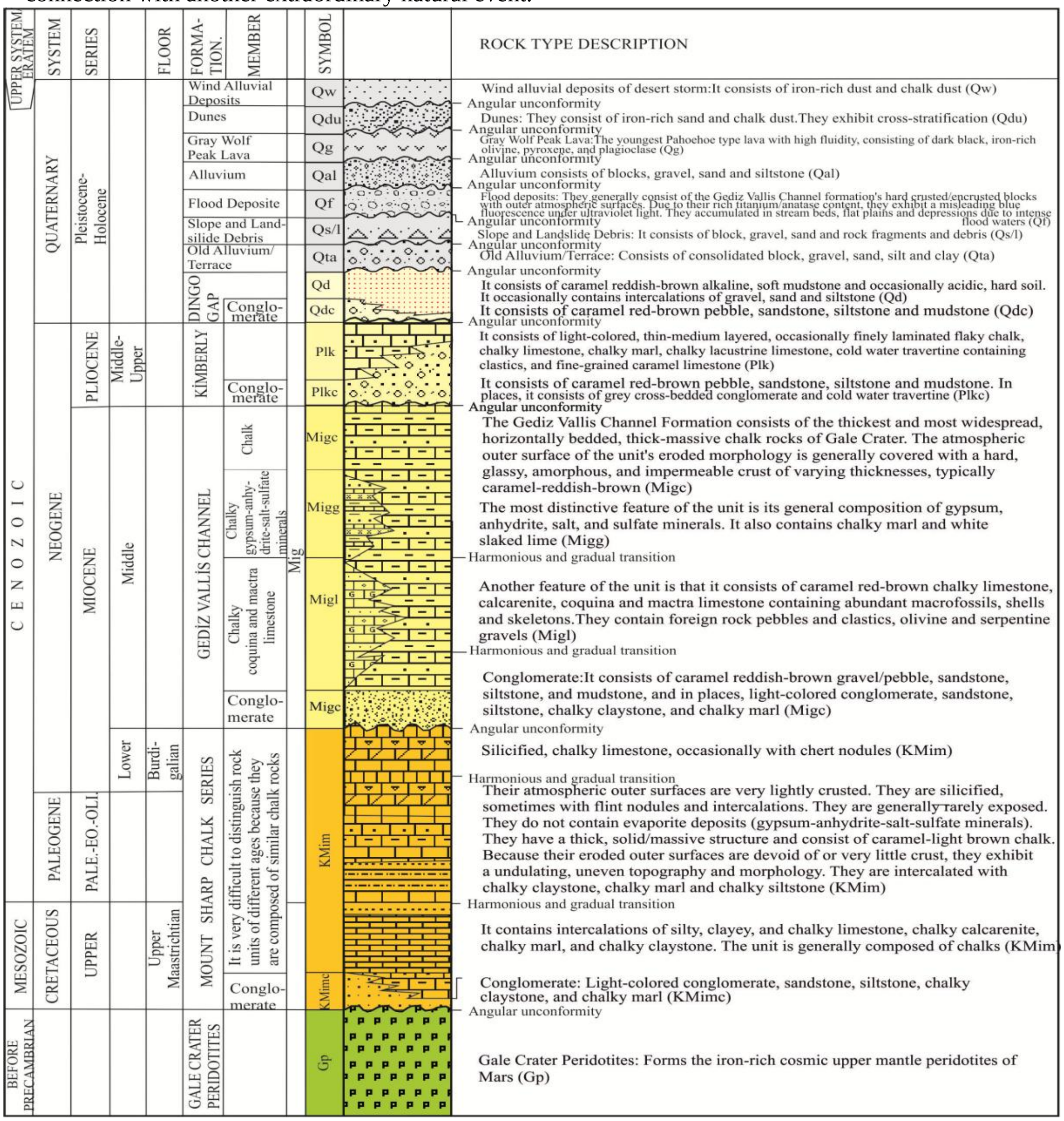


Figure 17:- Generalized sketch/pillar section of Gale crater and surrounding area on ancient Mars.

It's possible to write volumes about every single frame of NASA's Mars imagery, and the entirety of it. For independent researchers like me, who receive no funding, this is impossible. However, Gale Crater on Mars, where NASA's geological rovers are concentrated, is a key point. An attempt has been made to concretize the geology and geodynamic evolution of the region by comparing it with similar and equivalent formations in the world and giving the same ages. Ancient rock stratigraphic units formed on Mars, like rock stratigraphic units on Earth, were defined and named at the formation level for the first time, based on the geographic names assigned by NASA for Mars. For the first time, the relative and probable geological ages of the formations in question, according to the "International Chronostratigraphic Table 2018" in the world, were predicted and given according to the similar and possible equivalent formations in the world (Figures 2 and 17).

It is thought, predicted and suggested that after the chemical analyses, mineralogy-petrographic determinations, paleontological determinations, radioactive dating and other similar methods of the rock samples to be brought back from Mars by NASA, it will be definitively revealed that the rock stratigraphic units on Ancient Mars will have surprisingly similar stratigraphic and structural relationships, depositional environments, rock type characteristics, paleoclimatological features, traces of terrestrial and marine microbial and macrobial life, ore/mine deposites and petrographic features, mineral formations and paleontological ages.

Below, the relative stratigraphic relationships, rock types, traces of microbial life, depositional environments, and paleoclimatological features of rock stratigraphic units within the Gale Crater/Aeolis Palus tectonic basin and its surroundings on ancient Mars/the Red Planet are briefly discussed. They have been correlated/correlated with their counterparts on our planet Earth and have been likely dated according to the relative ages of their counterpart formations on Earth. For the first time, formation-level descriptions and nomenclatures are made and proposed based on NASA's geographical designations of type localities on ancient Mars.

Cosmic Upper Mantle Peridotites of Mars:-

Gale Crater Peridotites (Gp):-

Gale peridotites, which are dark naphtha-greenish in color, are bounded by the fault systems of the Gale crater tectonic zone developed in the Gale impact crater basin. They are seen to outcrop in places along the currently active faults cutting the Quaternary Dingo Gap Formation within this tectonic zone (Figure 18). The fact that Gale crater peridotites outcrop in many places along the currently active faults in the Gale impact crater basin is clearly observed in the publicly released EDL, Elder Fox Documentaries, Marsoğlu and Cronicas Marcianas YouTube videos by NASA at NASA/JPL/Caltech; https://mars.nasa.gov/mars2020/multimedia/videos/?v=461. Gale crater peridotites; They crop out along the Gale Crater tectonic zone basin developed in front of Glen Torridon, Pillinger Point, and Vera Rubin Ridge (Figure 18); they crop out along the Pahrum Hills, along the Gediz Vallis Channel, in front of Mount Sharp, and around Rocknest. Therefore, the unit was first described, named, and proposed as the.

Gale Crater Peridotites (Gp):-

Gale crater peridotites are known to be rocks of igneous origin that developed from the magmatic view by slow cooling from the magma ocean, fractional crystallization, and magmatic differentiation. However, in all of the author's articles and studies, he put forward and proposed a revolutionary view in positive sciences that peridotite, granite/granitoid, gabbro/gabbroid, diorite/dioritoid, charnockite/charnockitoid, anorthosite/anorthositoid and carbonatite/carbonatoid intrusion, pluton and batholith type plutonic/depth rocks (except terrestrial igneous rock sequence/oceanic crust sequence/regular-irregular ophiolites, carbonatite volcanites and different volcanics) have not undergone and will not undergo magma ocean processes in the terrestrial-rocky planets and satellites (Moons) of all galaxies present in the Universe according to the magmatic view (Tarhan, 1987, Tarhan, 1989, Tarhan, 2018, Tarhan, 2019a, Tarhan, 2019b, Tarhan, 2021, Tarhan, 2024a, Tarhan, 2024b, Tarhan, 2024c, Tarhan, 2024d, Tarhan, 2024e, Tarhan, 2024f, Tarhan, 2024g, etc.).

In his publications, he mentioned concrete geological data regarding these issues and brought them to the agenda. Whether primary or anatexitic magmas, they are unstable magmas that develop as a result of extraordinary natural disasters. The atomic building blocks that make up unstable magmas (atoms, ions, molecules) become electrically charged due to high temperatures, increasing the kinetic energy levels in their outer orbits and the atomic diffusion rates (atomic motion/vibration) and transitioning to the ionic state, becoming unstable. In primary and anatexitic magma, the atomic building blocks, whose atomic diffusion rates increase due to rising temperatures, transition into electrically charged, unstable ions (cations, anions), and therefore do not have the time to wait for thousands, millions, or even billions of years due to slow cooling. On the contrary, the atomic building blocks of the unstable elements (atoms, ions, molecules) have the necessity and tendency to become stable by exchanging electrons with each other in the shortest possible time and period, thus solidifying the entire magma together.

As the first author of the first Prototype Constitution of Matter (Tarhan, 2024c), according to the first article of this Constitution, which cannot be changed and is not even proposed to be changed, the atomic building blocks of the elements that make up the unstable matter have the necessity and tendency to move together and as quickly as possible in order to become stable (except for the Noble/Inert gases, because the number of electrons in their outermost orbits is completed to eight). Why? Because the atomic building blocks of different elements that make up matter (atoms, ions, molecules) have the tendency and necessity to act collectively by exchanging or sharing electrons with each other in order to complete the missing electrons in their outermost orbitals to eight.

They do not have the chance or choice to behave independently and separately like noble gases (Oclette and Doublet Rule, etc.). For this reason, the fact that the magmatic view is not correct and that the terrestrial-rocky planets and their satellites (Moons) formed from magma oceans according to the magmatic view is not correct has been brought to the agenda and suggested in many studies and articles regarding the rejection of the magmatic view and the acceptance of the metamorphic view (Tarhan, 1987, Tarhan, 1989, Tarhan, 2018, Tarhan, 2019a, Tarhan, 2019b, Tarhan, 2021, Tarhan, 2024a, Tarhan, 2024b, Tarhan, 2024c, Tarhan, 2024d, Tarhan, 2024e, Tarhan, 2024f, Tarhan, 2024g etc.). Otherwise, the galaxies, solar systems, planets and moons, and aliens in the Universe would not have formed. In short, this would mean ignoring yourself. If you ignore your existence, if this is a correct view, you can continue your work!...

It has been claimed and suggested that the terrestrial-rocky planets and satellites that form all the galaxies in the Universe were not formed from a primary ocean magma according to the magmatic view, but on the contrary, they were formed by the condensation of solid dust and gas clouds present in the Universe along a spiral rotating around an axis, passing through different physicochemical and different thermodynamic systems, through solid-solid chemical reactions and over a period of billions of years according to the metamorphic view. Therefore, lower and upper mantle peridotites of terrestrial and rocky planets and satellites (Moons) were excluded from the igneous rock classification by the author.

He classified the mantle-derived peridotites of all large and small galaxies present in the Universe, terrestrial and rocky planets and moons (Moons), as "cosmic rocks" formed in the solid phase from solid dust and gas clouds present in the Universe through solid-solid chemical reactions. Therefore, the Gale Crater peridotites of ancient Mars (Figures 18 and 23) are not rocks of magmatic origin, having formed from a magma ocean according to the magmatic view. On the contrary, they were formed according to the metamorphic view and were accepted, interpreted and proposed as cosmic rocks. In other words, the peridotites, which were determined to have thick and widespread outcrops for the first time on ancient Mars (Figures 17, 18, 19, 20, 23, 32), were thought, interpreted, predicted and proposed to correspond to the Gale crater cosmic peridotites.

The Gale Crater cosmic peridotites are not rocks of continental crust or magmatic origin on Mars. However, iron-olivine rich basaltic lavas and pyroclastic rocks formed by partial melting of iron-ilmenite rich peridotites along weakness zones (strike-slip fault systems, extensional fractures, rift systems, etc.) are rocks of magmatic origin. The Gale Crater peridotites are cosmic rocks directly related to the terrestrial-rocky planetary formation phase and process of ancient Mars. Each terrestrial-rocky planet and its moons has its own unique inner core (consisting of solid metals), outer core (consisting of hot and liquid metals at temperatures above approximately 5,000 degrees Celsius), and cosmic solid peridotite rocks that form the inner and outer mantles. Such cosmic peridotites contain a series of events that were formed from different thermodynamic systems and thermochemical conditions, according to the metamorphic view, as a result of solid-solid chemical reactions in a process that is directly related to the solid particles/grains and gas clouds in the universe during the terrestrial-rocky planetation and satellite formation phase.

It has been thought and proposed that they have no connection to magmatic oceans or magmatic phenomena. For example, as an organic form of matter, would you want to remain in an unstable environment and unstable state (unstable and unstable; unstable/indecisive) in your home for an extended period (10 seconds to 2 minutes!) during an earthquake caused by a natural disaster? Your first reaction will be to escape and protect yourself from an unstable environment and unstable situation as quickly as possible. Naturally, an unstable/unstable inorganic antatexitic magma or a primary magma that developed as a result of extraordinary natural disasters has the tendency and necessity to solidify as a whole (all together involved; except for the noble/inert gases) in order to become stable in the shortest time period by exchanging electrons, using them together, and to be preserved and stabilized in the current physical-chemical conditions and different thermodynamic systems (Tarhan, 2024c)…

The various elements/substances that make up a primary or anatexitic magma do not have the luxury or choice of remaining in an unstable state for billions of years, such as through slow cooling, fractional crystallization, or magmatic differentiation. The first six articles of the first prototype Constitution of the matter (Tarhan 2024c) and other articles to be written were considered important. The magmatic view was considered a simplistic view/hypothesis that emerged due to the unresolved nature of scientific problems, was constructed based on logical imagination, and has numerous magmatic versions, persisting from the past to the present. The igneous view was considered to be in conflict with scientific parameters (Physics, Chemistry, Mathematics, Biology, etc.) and geological facts. If positive science is to evolve, the incorrect cycles that have been formed due to scientific unresolvable problems must be broken.

In the Gale impact crater tectonic zone basin, which is bounded by strike-slip fault systems and dip-slip normal graben fault systems with thrust components, Gale crater peridotites of cosmic origin, which are exposed along the edge current active faults of the basin, volcanic rock units (lava and pyroclastic rock units) of magmatic origin and sedimentary rock units of thin continental crust origin of ancient Mars planet, are brecciated, milionitized, crumbled, weathered and disintegrated along an extremely crushed zone along the edge faults of the basin (Figures 18, 20). The peridotites are serpentinized, locally magnesitized, and have developed magnesite, white-soft and kaolinized Meerschaum/Sepiolite/Eskişehir stone/(Turkey) ($MgCO_3$). Many fault systems have developed parallel to the tectonic crushed zone within the sedimentary rock units (Figure 20). Along these fault systems, cataclastic rock types such as fracture, fragmentation, and disintegration have developed in the chalk-derived and clastic units. Gale crater peridotites (Gp), the cosmic upper mantle peridotites of Mars, constitute the oldest cosmic peridotite rocks that form the base of the planet's thin continental lithosphere, which consists of thin, widely developed chalk series rock units (Figures 19, 23, 32).

The iron-olivine-pyroxene-ilmenite-titanium and plagioclase-rich rocks that make up cosmic upper mantle peridotites are excluded from the scope of the igneous rock sequence units formed in terrestrial environments, the oceanic crustal sequence rock units formed at mid-ocean ridges formed in oceanic environments, and the igneous rocks that form the ophiolite sequence of allochthonous emplacement of oceanic crust. In other words, Gale crater peridotites (Gp) are very old cosmic rocks that are billions of years old and are not included in the rocks of magmatic origin. Because I think that in many studies on our planet, the cosmic upper mantle peridotites or peridotites have been included, intentionally or unintentionally, in the scope of oceanic crust and ophiolite sequence rocks of magmatic origin. Therefore, peridotites or upper mantle peridotites have been excluded from the igneous rock classification. They have been included in the class of cosmic rocks, interpreted and proposed (Tarhan, 1987, Tarhan, 1989, Tarhan, 2018, Tarhan, 2019a, Tarhan, 2019b, Tarhan, 2021, Tarhan, 2024a, Tarhan, 2024b, Tarhan, 2024c, Tarhan, 2024d, Tarhan, 2024e, Tarhan, 2024f, Tarhan, 2024g, etc.).

However, in the images of the planet Mars obtained by NASA, the presence of magmatic origin terrestrial magmatic rock sequence, oceanic crust sequence rock units (layered ultramafic rocks, layered gabbro, isotropic gabbro, sheet dyke complex, volcanosedimentary rock units related to them, etc.) and rock units of rift systems were not observed.

Paleozoic-Mesozoic Rock Units of Ancient Mars:-

In the video images of NASA's accessible geological rovers on Mars, no rock units that could be Paleozoic-Mesozoic in age were observed. In ancient Mars, it is generally assumed that they are composed of thin continental crust rocks consisting of chalk series, clastic/detrital/terrigenous sedimentary and volcanic rocks of magmatic origin, which may be of Cenozoic age. Volcanic rocks likely predominate in the northern hemisphere of Mars. It is observed that volcanic rocks decrease towards the southern hemisphere, whereas chalk series, chalky evaporite deposits and clastic sedimentary rock units become dominant. This situation can also be observed in NASA's elevation and topographic maps (Figure 16).

In the eastern regions where Jezero and Gale craters are visible, an oceanic basin likely developed on the cosmic upper mantle peridotite of Mars in the Quaternary, in the region where the Etopia basin is located, and was in direct contact with Cenozoic, thin continental crustal rock units that were in direct contact with this basin (Figure 16). The Neretva and Sawa Vallis rivers, which flow into Jezero crater from the west and approximately north, are thought to converge in the central part of Jezero crater and then flow eastward, possibly into the Pliva Vallis River, this oceanic basin to the east. However, in Gale and Endeavour craters, where the Cenozoic rock units are thin, widespread outcrops of Martian upper mantle peridotite rich in cosmic iron, ilmenite, olivine, pyroxene, and plagioclase are observed at the base.

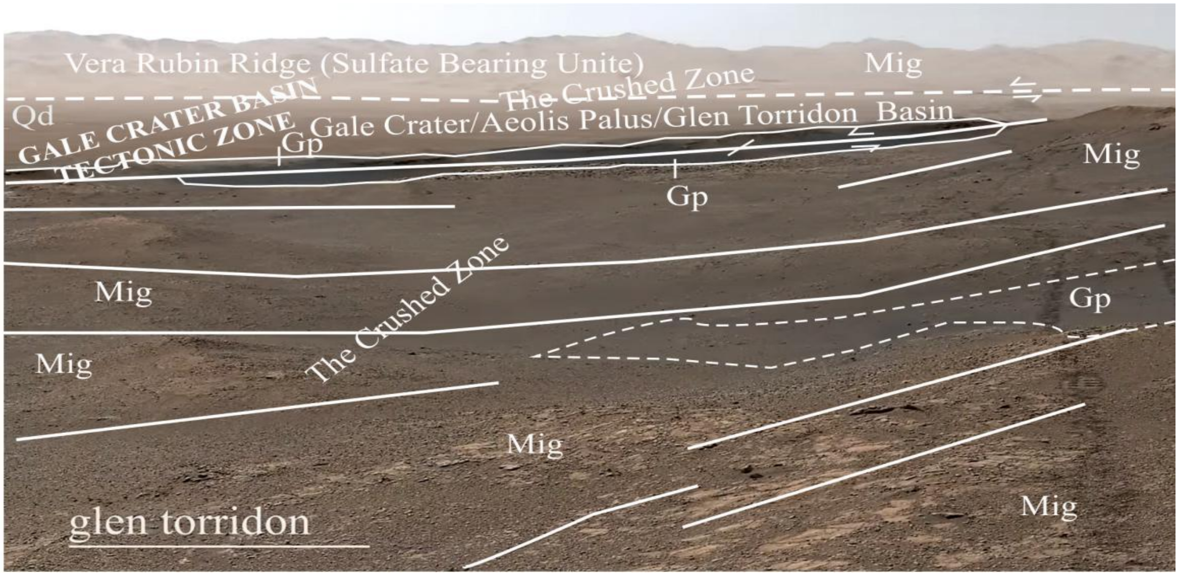


Figure 18:- The Gale Crater/Aeolis Palus basin is bounded by fault systems and crushed zones. It was shaped under the control of current active fault systems. Gp; Gale crater peridotites that form the cosmic upper mantle peridotites of the planet Mars; Mig, the Gediz Vallis Channel formation of middle Miocene age, composed of chalk and evaporite deposits (containing gypsum-anhydrite, gypsum, salt, slaked and quicklime, and clay-sulfate minerals); Qd, the caramel red-brown Dingo Gap formation of Mars, which is suitable for agriculture (Image credit: NASA/JPL/Caltech; https://mars.nasa.gov/mars2020/multimedia/videos/).

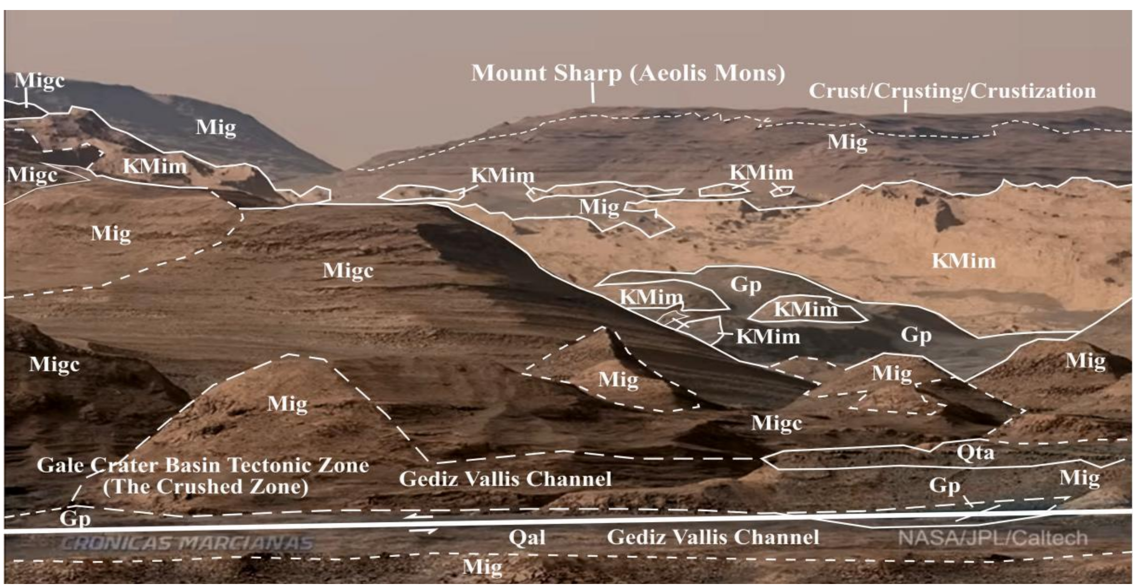


Figure 19:- Stratigraphic relationships between rock units exposed around Mount Sharp (Aeolis Mons) and Gediz Vallis Chanel in Gale Crater on ancient Mars. Gp, Gale crater peridotites; KMim, Upper Maastrichtian-Lower Miocene Mount Sharp chalk series; Mig, Middle Miocene Gediz Vallis Channel formation; Migc, conglomerate/pebblestone member of the Gediz Vallis Channel formation; Qta, Terrace/Old alluvium; Qal, Alluvium (Image credit: NASA/JPL/Caltech; https://mars.nasa.gov/mars2020/multimedia/videos/).

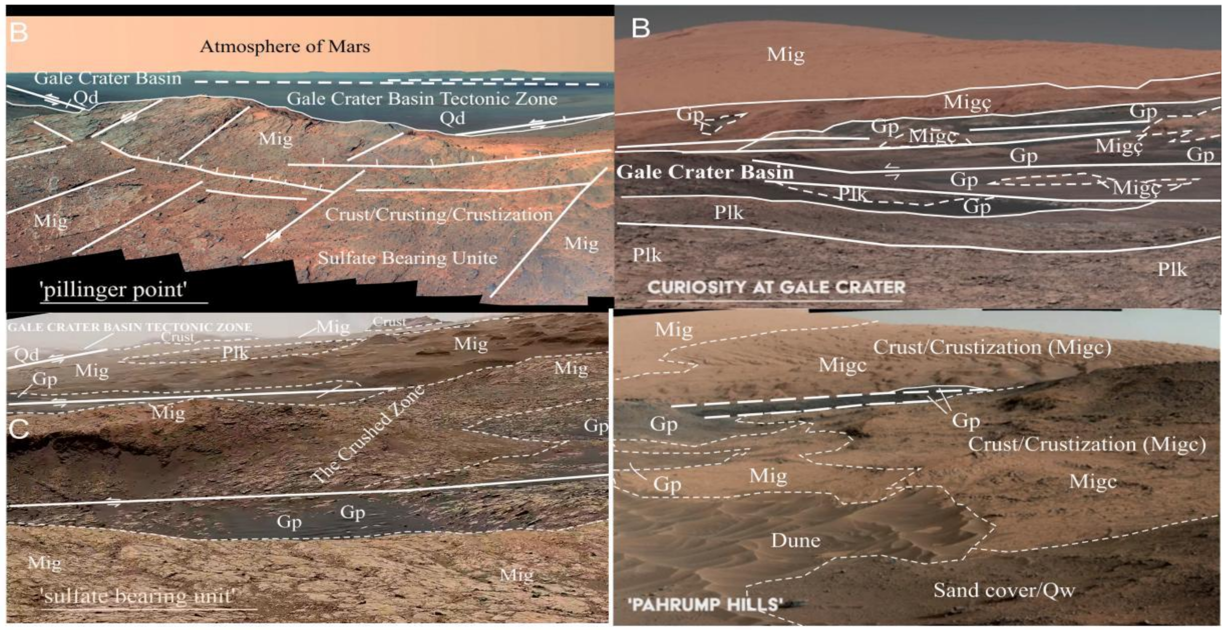


Figure 20a, b, c, d:- A) The Gele crater tectonic basin shaped by active fault systems and the Middle Miocene aged Gediz Vallis Channel formation (Mig) consisting of hard, glassy amorphous, impermeable crust/encrusted, evaporite, chalky rocks with a caramel-reddish-brown atmospheric outer surface cut by different graben fault systems within the crushed zone at the edge of the basin. B, C, D) Gale crater peridotites (Gp) composed of dark naphtha colored cosmic upper mantle peridotites at the bottom; Middle Miocene aged Gediz Vallis Channel Formation (Migc, Mig) consisting of basal conglomerate/pabblestone member (Migc) over the peridotites and containing evaporite and clay-sulfate minerals and locally crusted at the atmospheric outer surface. Chalk rocks of thin continental crust origin overlying cosmic upper mantle peridotites. Active fault systems have cut all rock units. Gp; Gale crater peridotites, which are cosmic upper mantle peridotites of Mars; Mig, Middle Miocene Gediz Vallis Channel formation; Migc, conglomerate/pebblestone member; Plk, Middle-Upper Pliocene Kimberly formation; Qd; Quaternary Dingo Gap formation suitable for agriculture; Dune/Qdu, sand dune; Qw, wind alluvial cover (Image credit: NASA/JPL/Caltech; https://mars.nasa.gov/mars2020/multimedia/videos/).

No inorganic carbonate and clastic sedimentary units that are not composed of Paleozoic-Mesozoic chalk have been observed at the base. In the initial processes of the planetary evolution of terrestrial and rocky planets and their satellites (Moons), some geological phenomena unknown in the geological literature and Paleozoic-Mesozoic rock stratigraphic units and probably the geological rock units of the southwestern and western regions where the continental crust of Mars thickened should be known and monitored. It is thought that ancient Mars had rock units and some other geological phenomena older than the Cenozoic age rock units. It is thought that the organic and inorganic rock formations, microbial and macrobial life of ancient Mars did not start and emerge in the Cenozoic time, but before. Many reasons are thought to exist for this. In addition, the present-day frozen state of ancient Mars is not the frozen state of our Earth 3.5 billion years ago; On the contrary, it has been thought, predicted and suggested that our world probably resembles the frozen state of our world thousands of years ago in Quaternary time…

In addition, when the generalized columnar section of rock units in a region of the world given in this study (Figure 2) is compared/compared with the generalized columnar section of geological rock units in Gale Crater on Mars (Figure 17), it is seen that they have very similar rock type properties, similar paleoclimatologies, stratigraphic relationships, thick, widespread, impermeable, hard, armored crust/encrustation developed on the atmospheric outer surfaces of chalky rocks; flood deposits, wind alluvial sedimentary covers (loess, aerosol, regolith) and the fact that arable soils, developed by being cleaned by rainfall and deposited by streams and rivers in wide stream beds, plains and rivers, developed by similar mechanisms and other common features. Based on these concrete geological facts;

1. 1- It is thought that ancient Mars and our planet Earth went through planetization phases at the same time, likely undergoing approximately similar paleoclimatological and eolian processes, exhibiting similar stratigraphic relationships, and consisting of similar rock units,

2. Ancient Mars has lost its thick modern atmosphere (containing approximately 21% O2), the Gülnaz geochemical rock cycle, and marine-terrestrial macrobial-microbial life. However, Mars is still thought to be alive and vibrant, harboring all kinds of potential and hope for the future,
3. According to current positive science, Mars is considered the most suitable planet in our Milky Way Galaxy, with the most suitable potential to be a backup and second world for Earthly space exploration,
4. It has been considered and recommended that scientists from all walks of life, individually and through private and public institutions and organizations, and especially through the technological contributions of Mr. Elon Musk, contribute to NASA's efforts to make Mars a habitable planet,
5. Most importantly, it is recommended that NASA's budget be significantly increased to ensure the continued and ongoing conduct of these valuable studies for Earth-based aliens,
6. If the goal is to have a planet half the size of Earth, these efforts should be taken seriously,
7. It is recommended that we avoid wasting time and financial resources on the Moon, our planet's natural satellite, and other planets and satellites. Establishing and sustaining colonies on the Moon is considered impossible,
8. It is recommended that all Earth aliens focus on Mars.

However, a limestone block, probably found within flood deposits, shows different properties (Figure 21c). This limestone is a sedimentary inorganic carbonate rock of calcitic-siderite dolomitic limestone, probably Jurassic-Cretaceous or possibly Upper Maastrichtian in age, and is a shallow marine reefal limestone. It is not composed of chalk, which is a sedimentary carbonate rock type with biochemical composition. This limestone rock sample in question has karst lapia formations developed on its surface due to the rainfall of ancient Mars. Calcium carbonate/calcite rock sections were dissolved by rainwater and lapia cavities were formed on the rock surface. Because dolomitic rock sections are resistant to dissolution, they appear as elevated, undissolved sections. If the rock were composed of biochemical chalks, karst lapias would not have formed on its surface due to rainfall-induced dissolution, as chalks are composed of calcium carbonate/calcite accumulations of microscopically small plankton-like microorganisms (99% $CaCO_3$/calcite) (Figure 21a,b).

However, due to the temperature differences between Martian nights and days on the atmospheric outer surfaces of biochemical chalky rocks, solid neosolutions develop by dissolution in the solid phase due to the high temperatures occurring during the Martian day. Solid neosolutions accumulate on top of each other along the topographic slope by solid flow, forming pseudo-bedding, solid flow protrusions and random large and small blocks, solidifying into a glassy amorphous material due to sudden temperature drops during Martian nights, and as a result of the continuous repetition of these events, a thick and widespread crust/crusting with a caramel reddish-brown color develops on the atmospheric outer surfaces of the eroded surfaces of the chalky rock series (Figures 21d, 23, 27, 28, 29).

Titanium is also commonly found in the solid phase within the chalky rock series. When titanium is dissolved in the solid phase, the solid neosolutions formed suddenly cool down, resulting in a change and transformation into the anatase/anatase polymorphic allotrope in a solid, compact, hard and impermeable, glassy amorphous shell. The glassy amorphous crust/shell blocks of such encrusted blocks exhibit pseudo-blue-blackish fluorescence colors of the anatase mineral, an allotrope of titanium, under ultraviolet rays. The misleading blue color fluorescence on the outer surfaces of such chalky rock blocks and layers indicates the abundance of anatase allotrope minerals. Chalk blocks with crusted outer walls showing blue fluorescence colors are very commonly observed in flood sediments of chalk rock blocks whose atmospheric outer walls are covered with glassy amorphous crust/encrustation armor, in alluvial deposits in dried stream, river and river beds, and in flat and flood sediments deposited by intense flood waters in depression areas (Figures 21d, 27).

The widespread blocks exhibiting a pseudo-bluish-blackish gray fluorescent color on ancient Mars generally belong to the caramel-red-brown, thick, hard, impermeable, pseudo-bedding, solid flow ridges, and randomly blocky armored crustal cover, which has developed extensively on the atmospheric outer surfaces of the Middle Miocene-aged Gediz Vallis Channel Formation. These crusted chalk blocks, which developed along the topographic slope of the atmospheric outer surfaces of the Gediz Vallis Channel Formation, were dislodged and scoured from the caramel-red-brown armored crust by recent active tectonics, earthquakes, and intense floodwaters generated by heavy rainfall. The fresh chalky caramel-reddish-brown colored sections of the blocks, which were broken off from the thick, hard, impermeable, armored cover crust, were oxidized [(11d, 36a (1-2)]. Why do we know that the chalk blocks with crusted/encrusted atmospheric outer walls belong to the Middle Miocene Gediz Vallis Channel Formation? Because the Upper Maastrichtian-Lower Miocene Mount Sharp chalk series exposed on ancient Mars has no crust/crusting/crustization on its eroded outer surface, but only oxidized caramel-reddish-brown. The formation and paleoclimatology of the formation during the erosion phase do not have suitable physical (P/T) and atmospheric conditions for crustation on the morphological outer surface. Its thickness and extent are low. Since it consists of animal/zooplankton rather than plant/phytoplankton, its titanium content is low. However, the Middle Miocene Gediz Vallis Channel Formation, composed of shallow marine chalk and chalky evaporite deposits, chalky coquina-macra limestones, contains higher proportions of plant/phytoplankton with high titanium content. The eroded surface of the Upper Maastrichtian-Lower Miocene Mount Sharp chalk series is overlain by the Gediz Vallis Channel Formation, composed of thick and widespread chalky evaporite deposits (gypsum-anhydrite, gypsum, salt, hydrated-quicklime, clay-sulfate minerals) and chalks, with an angular unconformity (Figures 17, 19, and 23) .

However, this formation overlies the Upper Maastrichtian-Lower Miocene Mount Sharp chalk series with an angular unconformity and horizontal bedding, and following the erosional phase of this second formation, very important changes in paleoclimatology occurred during the Middle Miocene and later. It has been observed in NASA's videos about Mars that the Middle Miocene aged Gediz Vallis Channel Formation is covered with an armored crust/crusting/crustization in which very thick and widespread, caramel red-brown colored, hard, impermeable, glassy-amorphous pseudo-layer, solid flow protrusions and different blocks have developed in the direction of different topographic slopes in the eroded atmospheric outer morphology, and that atmospheric structures similar to the crusting on Earth have developed in this respect (Figures 3, 5, 7, 19, 20, 23, 27, 28 etc.). Therefore, the glassy amorphous solid Crust/Crusting/Crustization in the outer part of the blocks showing blue misleading colored fluorescence accumulated in flood sediments and alluvial deposits and depressions are not halos developed by groundwater, but as mentioned above, the dry, hot, It shows signs and evidence that a desert climate prevails, with low rainfall, high evaporation, and a large temperature difference between day and night (Figure 21d).

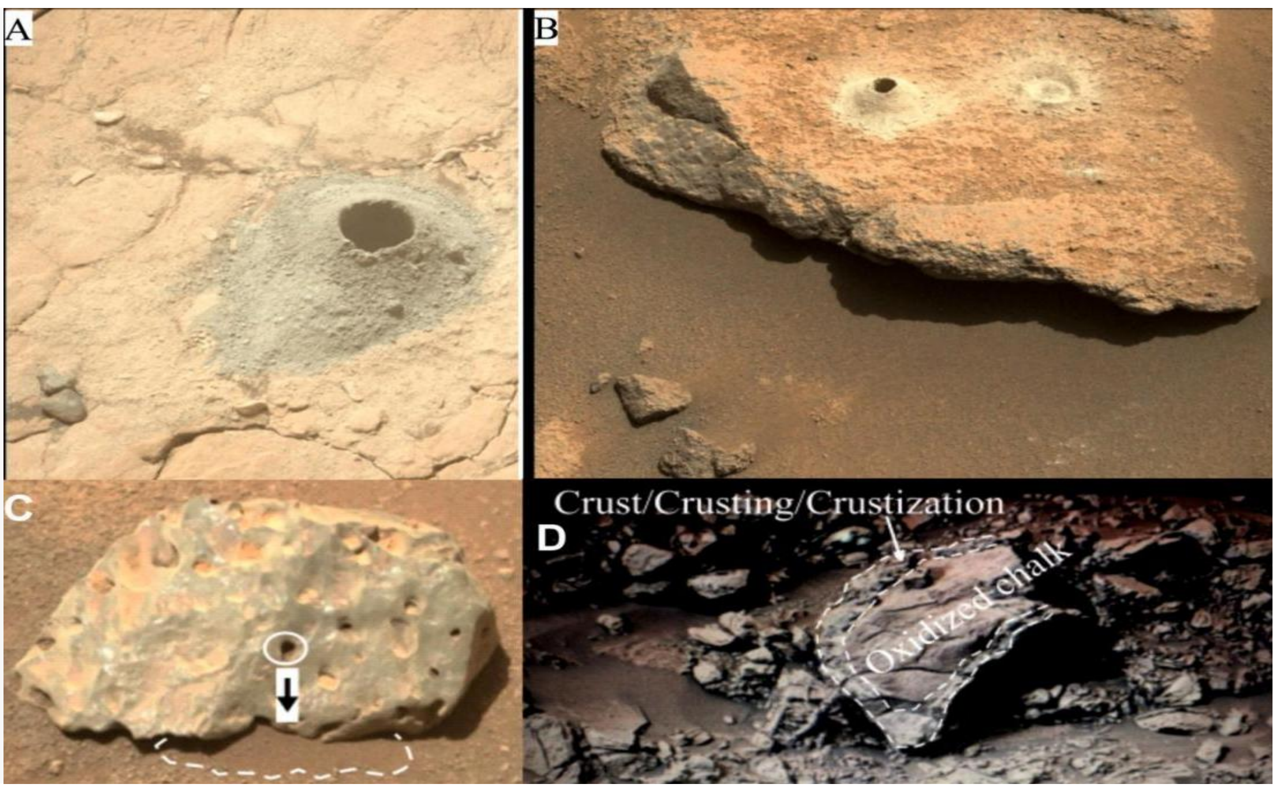


Figure 21a, b, c, d:- Physical properties of different rock samples from ancient Mars (Image credit: NASA/JPL/Caltech; https://mars.nasa.gov/mars2020/multimedia/videos/).

There is also much other evidence. NASA's Mars rovers have taken core rock samples (Figure 21a, b, c). Among these samples, the dust of the rock samples taken by drill drilling is caramel-brown in color (Figure 21c), and the outer surface has not developed any crust, and may be of dolomite-calcite-siderite composition. However, samples A and B) may belong to the Upper Maastrichtian-Lower Miocene Mount Sharp chalk series, which has oxidized, uncrusted, and slightly metamorphosed tooth surfaces. No karst lapsia has developed on their outer surfaces. The dust extracted by the drill bit belongs to white chalk. The drill bit dust may contain water molecules. Their most important feature is that the dust accumulates around and at the bottom of the core hole without dispersing or scattering into the environment and atmosphere. These facts suggest that the gravitational/magnetic field of Mars is not as low as previously thought (Figure 21a, b, c). As seen in Figures (21a, b, c, and d), some rock samples found on ancient Mars exhibit different physical properties. A and B) Core samples taken from low-grade metamorphic rocks of organic origin and biochemically formed chalk series with oxidized, slightly crusted outer surface (Kukaklek, Sample No. 16, NASA/JPL-Caltech; Robine, Sample No. 6, NASA/JPL-Caltech). C) Gray-grey colored reef inorganic limestone, probably Jurassic-Cretaceous in age. It is composed of calcium carbonate/calcite, dolomite, and siderite.

Rainwater dissolved the carbonate/calcite sections on the rock surface, forming cavities and pits. The calcite sections dissolved, forming karstic lapia cavities containing chalk dust residues. The rock did not develop crust because it is an inorganic limestone. This phenomenon indicates that the rock sample is not biochemical chalk, but rather an inorganic type of carbonate rock. This rock sample also suggests that Paleozoic-Mesozoic and other unknown geological phenomena may have existed on ancient Mars. (Image credit:NASA/JPL/Caltech;NASA-118667314_mars_perseverance_zr0_0037_0670226030_228eby_n0031392zcam03108_1100luj.jpg(1). D) Crust has developed on the atmospheric outer wall of the blocky rock.

. The fresh section consists of oxidized chalk. NASA’s Curiosity rover captured this image of pale rocks near the edge of the Gediz Vallis Channel while exploring it. These rings, also called halos, are thought to be formed when groundwater seeps into rocks through cracks, causing chemical reactions that change color. It has been suggested that this study examines where and when the nutrient needed for microbial life might have been provided. However, the microscopically small natural and organic phytoplankton that form chalk for microbial life-the blue-green algae/moss suspended and floating in warm, deep ocean waters, drifting and dispersed/disintegrated by wavesform the organic nutrients of microscopically small zooplankton/zooplankton organisms. It has been determined and proposed for the first time that phytoplankton and zooplankton biochemically form the chalk and chalk series rocks that constitute 99% of carbonate (calcium carbonate/calcite) sedimentary rocks.

CENOZOIC:

Tertiary Rock Units:

Mount Sharp Chalk Series (KMim):-

Rock stratigraphy units that form the sedimentary chalk series, which is the oldest biochemical type of carbonate (calcium carbonate/calcite) rock type, are located in the base sections of Mount Sharp (Aeolis Mons), which is composed of sedimentary rock units located in the center of Gale crater (Figures 16 and 17). The atmospheric outer surface of the eroded morphology of this chalk series rock stratigraphy units is oxidized, presenting a caramel red-brown colored oxidized, indented and protruding eroded morphological structure. It consists of light-colored to caramel pink, massive-thick-solid-homogeneous, horizontally bedded chalk series rock stratigraphy units (Figures 19 and 23). The oldest carbonate sedimentary rock units, which form the base of the biochemically formed calcium carbonate/calcite carbonate sedimentary rock stratigraphic units that form Mount Sharp, were first identified and named as the Mount Sharp Chalk Series (Figures 19 and 23). The type locality is first identified and proposed as the Mount Sharp Chalk Series. These units are observed in the Pahrump Hills and the surrounding area. However, the type outcrops are composed of the calcium carbonate/calcite biochemical chalks that form Mount Sharp. The chalk series consists of autochthonous sedimentary rock stratigraphic units of different ages (known as the Mount Sharp sedimentary deposit/mound in previous studies).

The oldest biochemical chalk series rock units form the base of the Mount Sharp biochemical sedimentary units. In the publications of previous researchers (Milliken et al., 2010; Buz et al., 2017; Lewis et al., 2019; Rampe et al., 2020; Bristow et al., 2021; Eng et al., 2024)), it is known that the units are porous, have low density, are not buried, and contain smectite clay minerals. Where the type outcrops of the rock stratigraphic units forming the chalk series are seen (Figures 19 and 23), they overlie the eroded morphology of the Gale crater peridotites, corresponding to the cosmic upper mantle peridotites of Mars at the base, with an angular unconformity and horizontal bedding, autochthonously. The Gediz Vallis Channel Formation overlies the eroded morphology of the Mount Sharp chalk series, with an angular unconformity beginning with the basal conglomerate (Pebble member, Migc) and horizontal bedding, autochthonously (Figures 17, 19 and 23). The unit generally consists of light-colored, thick-solid-massive-homogenous, horizontally layered/stratified rock units of similar chalk series of different ages.

Generally, no thick crust/encrustation is observed on the atmospheric outer surface of the unit. However, it exhibits a very thin, hardened, caramel-pink crust that has lost its water and moisture due to oxidation. The chalk series of ancient Mars was probably thick and sparsely distributed in the eastern regions of the planet. It is generally composed of chalky rock stratigraphic units with a thick glassy-amorphous, hard-compact, impermeable crus/crusting/crustization armor on the atmospheric outer surface of its eroded outer morphology, coquina and macrophage pink limestones containing microbial-macrobial fossils, and is unconformably and autochthonously overlain by the Middle Miocene Gediz Vallis Channel Formation, which is thick and sparse in the study area and its surroundings and contains evaporite deposits (containing gypsum-anhydrite, gypsum, hydrated-quicklime and sulfate minerals).

Mount Sharp chalk series rock stratigraphic units, which form the northern edge of the Arabian Plate in our planet Earth, in Southeastern Turkey (around Gaziantep-Şanlıurfa-Mardin provinces, Figures 2 and 17), have thick and widespread outcrops, and belong to the Upper Maastrichtian-Lower Miocene Şanlıurfa Chalk Series (Tarhan et al., 2012; Beyazpirinç & Tarhan, 1013a, Beyazpirinç & Tarhan, 1013b, Beyazpirinç & Tarhan, 1013c, Beyazpirinç & Tarhan, 1013d, Beyazpirinç & Tarhan, 1013e; Beyazpirinç et al., 2014; Kartalkanat et al., 2020, Kartalkanat et al., 2021) units (Figures 3, 5, 7, 19 and 23). For this reason, it was considered and predicted that the chalk rock stratigraphic units forming the Mount Sharp chalk series should be given an Upper Maastrichtian-Lower Miocene age, which is the age of the Şanlıurfa chalk series, which is the equivalent age in the world.

However, unlike the chalky rock stratigraphic units that make up the Şanlıurfa chalk series, which is considered the equivalent of the Mount Sharp chalk series on Earth, its outcrops on ancient Mars are rare. Furthermore, unlike its equivalent on Earth, the Şanlıurfa chalk series, the crusting rate on ancient Mars is minimal or nonexistent. Only its surface, which has lost its moisture as a result of oxidation, has hardened to a caramel-pink color. The Mount Sharp chalk series rock units were formed as a result of the death of microscopically small phytoplankton/plant plankton (blue/green algae/seaweeds, coccoliths-coccolithophores, stromatolites, etc.) and zooplankton/animal-organism plankton (foraminifera, diatoms, rhabdolites, etc.) that lived in a warm deep-sea environment, and their sedimentation and hardening as white mud on the seabed. Chalks are biochemical sedimentary types composed of 99% plankton and have a calcium carbonate composition. They may also contain clay minerals in places. In areas where facies changes occur, they can transition into chalk-dominated fine and coarse clastic units (chalky silty marl, chalky claystone, etc.).

The Mount Sharp chalk series rock stratigraphic units were first identified and proposed to be biochemical carbonate-type (calcium carbonate/calcium) deposits composed of microscopic plankton that lived in a generally warm deep-sea environment. Zooplankton (animal microorganism plankton) lived in warm, deep and clean seas and lived suspended in a floating position, and were fed organically by eating phytoplankton/plant plankton that were broken and dispersed by sea waves. It has been confirmed that ancient Mars probably had microbial life between the Upper Maastrichtian and Lower Miocene time period, as it was first formed from chalk series rock units and 99% of the chalks are composed of microscopically small phytoplankton and zooplankton type plant and animal organisms. However, it was thought that the rock sample identified by NASA geological rovers and exploration vehicles within these chalk series rock units probably contained a benthonic Upper Cretaceous Hippurites radiosus fossil (Figure 22). However, since Hippurites radiosus is seen as dots in NASA's videos of the planet Mars, it is not clear exactly which type of rock unit it was taken from. However, abundant chalk is evident within and around the rock.

Hippurites are generally seen in Upper Cretaceous rock units around the world. Hippurites are known to have lived in benthic environments in shallow marine environments. Chalk series rocks are widespread in England's Salisbury Plain and Highlands. Furthermore, England's famous white chalk cliffs were formed 80 million years ago at the bottom of a tropical ocean from the tiny shells of millions of marine organisms and formed into chalk layers (Dover White Cliffs, Beachy Head). It is thought that these chalk series white rocks do not belong to the Upper Cretaceous of Mesozoic age. Because of these relationships, many researchers have shown Mesozoic-Cenozoic aged rock units as transitional in their articles due to this uncertainty and misperception between Mesozoic and Cenozoic times. However, significant orogenies and geological events occurred between the Mesozoic and Cenozoic eras. It is not possible for them to be transitive. It is thought that these thick chalky rocks in England are horizontally bedded and gradually transitional with Paleocene-Eocene aged rock stratigraphic units, but that they overlie Upper Cretaceous aged non-chalky folded rock units at their base with an angular unconformity for some reasons mentioned above and below. This relationship is also evident in SE Turkey and ancient Mars. It is suggested that the thick-solid-massive-homogeneous horizontally bedded white chalky rocks in England and other countries should be re-studied and revised, taking into account the reasons mentioned above and the reasons put forward by Tarhan (2018, volume 4), and that these possibly incorrect views should be corrected.

The ancient Martian chalk series, whose existence on ancient Mars has been determined for the first time, identified and named at the formation level, and whose equivalent chalk formations worldwide are dated, are discussed in this article. These series correspond to a type of sedimentary carbonate/calcite rock of organic origin. The Upper Maastrichtian-Lower Miocene aged Şanlıurfa chalk series and Middle Miocene aged Ceylanpınar formation in Southeastern Turkey and the thick and widespread chalks in the Salisbury plain and plateaus, Dover White Cliffs and Beachy Head in England have similar physical, depositional environments and paleoclimatologies. They correspond to a type of sedimentary carbonate/calcite type rocks of organic origin, biochemically formed from microscopically small phytoplankton and zooplankton living in warm, deep and clean waters. When crushed and broken, they become micron-sized (~3µm) chalk dust (Figures 4 and 25).

Therefore, the chalk series in England and other countries are definitely not Upper Cretaceous in age. It has been thought, predicted, and suggested that they are probably composed of Upper Maastrichtian-Lower Miocene chalk series. The thick-massive-solid-homogeneous, horizontally bedded, white-colored chalk series in question are gradually transitional with the Tertiary units in vertical and lateral directions, and it is thought, predicted and suggested that they developed with horizontal bedding with an angular unconformity starting with the basal conglomerate on the Mesozoic-Paleozoic, non-chalky, folded rock units at the base. It is predicted and suggested that similar relationships can be seen in the contact relations between the non-folded horizontally bedded Tertiary rock units and the Paleozoic-Mesozoic, metamorphic and folded Armonic massif in the Paris basin in France (Tarhan, 2018).

Similarly, Hippurites and nanofossils with an Upper Maastrichtian age have been identified in the basal rock stratigraphic units of the Şanlıurfa chalk series in SE-Turkey (Tarhan et al., 2012), which is the Earth equivalent of the Mount Sharp chalk series in Gale Crater on ancient Mars (Figures 2 and 22). It has been mentioned in all the studies of the author in SE Turkey and other orogenic regions that the chalky rocks of Upper Cretaceous (Upper Maastrichtian) age located at the base of the Şanlıurfa chalk series rock stratigraphic units are gradually transitional in vertical and lateral directions to the overlying Paleocene chalky rock units, and that they also overlie the conglomerate member forming the base conglomerate of the Upper Maastrichtian-Lower Miocene age chalky series and the Upper Cretaceous (Upper Maastrichtian and older non-chalky rock stratigraphic units) rock stratigraphic units at the base with an autochthonous and stratigraphic angular unconformity.

In addition, in the fourth volume of the author's four-volume book titled "Metamorphic and Metablastic Rocks" (Tarhan, 2018), he explained that this is not a contradiction, that it is natural, and the reason is explained with scientific parameters. He suggested that the Upper Maastrichtian stage should be considered the lowest stage of the Paleocene (before the Danian), and that similarly, many stages and orogenic phases related to the Cenozoic time should be replaced. For this reason, it was suggested that the “International Chronostratigraphic Table, 2018” be revised and changed. This is because it is inaccurate to construct a chronological stratigraphic table solely based on paleontological dating. Paleontologically, the vertical and lateral continuity of fossils does not end with definite boundaries. However, stratigraphic relationships are definite.

Therefore, chronological stratigraphic relationships should be prepared according to the definitive stratigraphic relationships that are definitive worldwide and form a unified whole. For example, in waters flowing into a new phase after a definitive orogenic phase, some fossils (fauna and flora) that existed before the orogenic phase will persist for a time in the new phase waters. Based on these fossils, it is incorrect to say that the rock units containing these fossils belong to rock units of pre-orogenic age, based on the autochthonous fossils that survived after this phase change. Geodynamic evolution models have often yielded inaccurate results and have been shown to cause intractable confusion. Therefore, it is recommended that definitive stratigraphic relationships in the field take precedence over paleontological dating data. These types of stratigraphic relationships are particularly important in stable cratons and shields.

The author suggested creating separate chronostratigraphic tables for stable plates and shields and orogenic zones. Because the facies and ecosystems of the environments in stable plates and shields do not change over long periods, the vertical and lateral distribution of fauna and flora occurs over extensive time periods. However, because these conditions change frequently in orogenic belts, the vertical and lateral spread of fauna and flora occurs over a shorter period of time. In particular, it has been observed in field studies that orogenic phases were controlled by very important and frequently changing orogenic phases in the Cenozoic era. For this reason, a holism cannot be created. It is certain that there was microbial-macrobial life in the Cenozoic seas of Gale Crater on ancient Mars, and there is also undoubtedly microbial-macrobial life in terrestrial environments and areas.

In addition, the Upper Maastrichtian-Burdigalian (Lower Miocene) Mont Sharp chalk series rock stratigraphic units, where they are exposed, have lost moisture and hardened their atmospheric outer parts to a caramel-pink color due to oxidation or have formed a very thin crust, and the atmospheric outer surface is covered by the very thick crusted Middle Miocene Gediz Vallis Channel Formation, indicating that paleoclimatology did not show significant temperature differences between the days and nights of ancient Mars during the Upper Maastrichtian-Lower Miocene time interval. A humid and rainy paleoclimate is likely to have developed on ancient Mars during the Upper Maastrichtian-Lower Miocene (Figures 2 and 17). However, on the contrary, a very thick armoured crust (crust/crusting/crustization) covering of glassy, amorphous, compact, hard, impermeable, caramel reddish-brown coloured material is observed on the eroded atmospheric outer surfaces of the chalk rocks forming the Upper Maastrichtian-Lower Miocene (Burdigalian) Şanlıurfa chalk series, which is the world equivalent series of the Upper Maastrichtian-Lower Miocene Mount Sharp chalk series (Figures 3, 5, 7, 18 and 23).

The only formation in the world that has thick and widespread outcrops and whose eroded atmospheric surface is covered with caramel reddish-brown colored glassy amorphous thick armor, like the Upper Maastrichtian-Lower Miocene (Burdigalian) aged Şanlıurfa chalky series; On ancient Mars, the development of a thick and widespread armored crust on the atmospheric outer surfaces of the eroded morphology of the Middle Miocene Gediz Vallis Channel Formation, which is a caramel-red-brown colored, glassy, amorphous, impermeable, hard, thick and widespread crust (crust/crustization) is the only similar formation covered with armor.

The formation is chalky, contains macrofossils, and consists of coquina and evaporite deposits (including gypsum-anhydrite, gypsum, salt, slaked-quicklime and clay-sulfate minerals). It has been clearly and explicitly demonstrated for the first time (Figures 3, 5, 7, 19, 20, 23, 24, 26, 27, 28 and 29 etc.). These geological data indicate that similar paloclimatological and atmospheric natural events occurred in the Upper Maastrichtian-Lower Miocene interval on Earth and in the Middle Miocene on ancient Mars. In other words, it was thought that there was evidence and indication that it was dry, hot, that evaporation was greater than precipitation, and that large temperature differences developed between Martian nights and days, meaning that Martian days were very hot and the temperature dropped significantly during Martian nights. In contrast, the fact that a thick, glassy amorphous crust did not develop on the eroded atmospheric outer surfaces of chalk rocks formed during the Middle Miocene on Earth, and between the Upper Maastrichtian and Lower Miocene on ancient Mars, is thought and proposed to indicate that similar paleoclimatological and atmospheric events, characterized by mild and wet weather, were experienced, and that evaporation was low and precipitation was abundant.

It has been determined that solid neosolutions formed extensively on the atmospheric outer surfaces of the eroded morphological surfaces of the chalky rock units of the Middle Miocene Gediz Vallis Channel Formation due to increasing temperatures during Martian daytimes. These solid neosolutions formed pseudo-bedding, solid flow ridges, and distinct blocks along different topographic slopes. It has been determined that during ancient Martian nights, due to cooling and sudden drops in temperature, the solid neosolutions that formed these solid flows solidified into a hard, impermeable, armored shell in a glassy amorphous form. As a result of the continuous repetition of these events, it was determined and demonstrated for the first time that it was covered with a very thick and widespread glassy amorphous, hard, impermeable armored crust (crust/crusting/crustization).

However, on the contrary, on the eroded morphological atmospheric outer surfaces of the rock units that form the Middle Miocene Ceylanpınar Formation (Tarhan et al., 2012), which is the equivalent of the Middle Miocene Gediz Vallis Channel Formation with thick and widespread outcrops on ancient Mars, a thin crust and a hardened caramel pink crust are observed, as seen on the eroded atmospheric outer surfaces of the rock units that form the Upper Maastrichtian-Lower Miocene Mount Sharp chalk series on ancient Mars, losing their moisture as a result of oxidation. All these geological phenomena; Although similar rock types and traces of terrestrial-marine microbial-macrobial life are observed at certain time intervals on Earth and ancient Mars, it is clearly seen that there have been differences and changes in their paleoclimatologies (Figures 3 and 17). Glassy, amorphous, hard, impermeable, caramel reddish-brown colored, armored thick crust (crust/crusting/crustization) covering/covering, which was determined for the first time on both the Earth and ancient Mars, has been determined and suggested for the first time that it played very important roles in the development and prevention of naturally developed flood sediments/deposit and sudden floods-destructions regarding the paleoclimatology of the two planets and other similar important geological events.

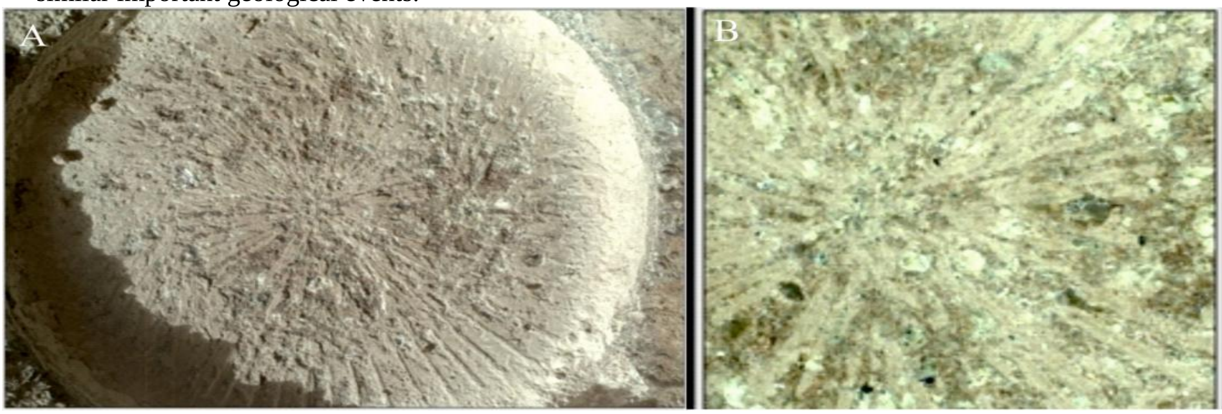


Figure 22a, b:- A) Hippurites radiosus fossil, probably with a radial structure. B) X-ray image (Image credit: NASA/JPL/Caltech; https://mars.nasa.gov/mars2020/multimedia/videos/).

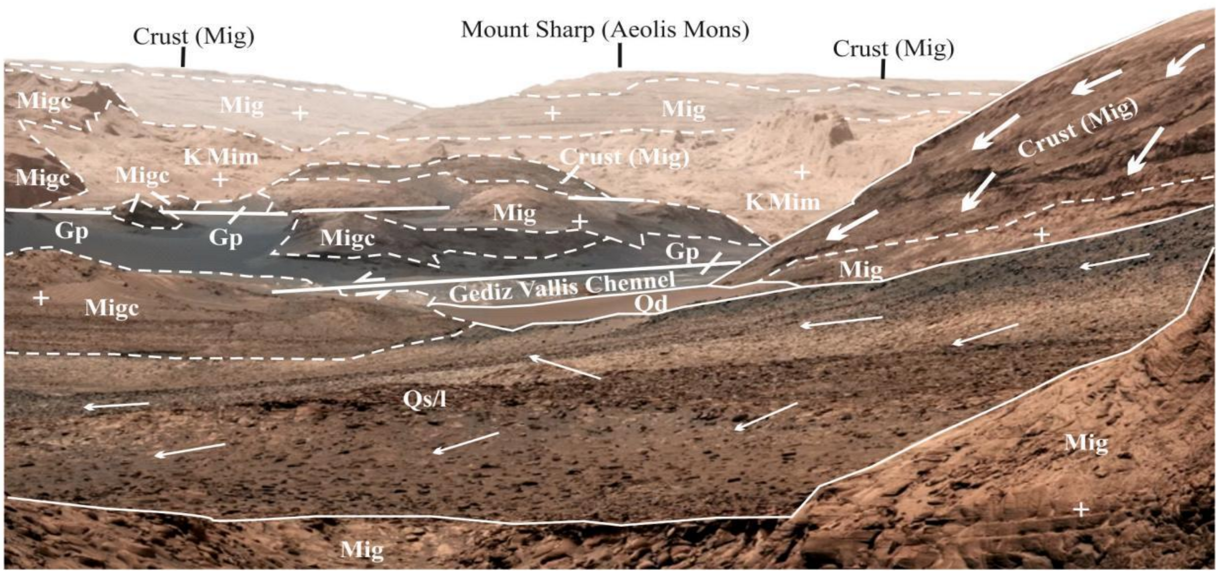


Figure 23:- Stratigraphic relationships between rock stratigraphic units of different ages outcropping around Mount Shap(Aeolis Mons) in Gale crater on ancient Mars(Image credit:NASA/JPL/Caltech;https://mars.nasa.gov/mars2020 /multimedia/videos/).

The stratigraphic relationships between the rock units seen in Figure (23) are clearly visible. Close relationships between chalky rock stratigraphic units of different ages forming a type of sedimentary carbanates with biochemical calcium carbonate/calcite composition in Mount Sharp and Gediz Vallis Channel located in the center of Gale crater. At the bottom are the dark-naphthalene colored Gale crater peridotites (Gp), which form the cosmic upper mantle peridotites of Mars, rich in iron-ilmenite-pyroxene-olivine. The Upper Maastrichtian-Lower Miocene Mount Sharp chalk series (KMim) with a thick, solid, massive, homogeneous structure, horizontally bedded, oxidized caramel pink to light brown color is located on the eroded surface of the peridotites with an angular unconformity.

The eroded morphology of this chalk series is unconformably overlain by the Middle Miocene aged Gediz Vallis Channel Formation (Mig), which is composed of chalky coquina-matriculated limestone and evaporite deposits (containing gypsum-anhydrite, gypsum, salt, clay-sulphate minerals and hydrated-quicklime) with an angular unconformity, starting with the basal conglomerate (Pebblestone member; Migc). The eroded morphology developed on the contact surfaces with the atmosphere, depending on the slope of the topography, and is covered with a glassy, amorphous, compact, hard and impermeable caramel-reddish-brown crust (crust/crusting/crustization) armor. These units are also overlain by younger rock units with separate unconformities (Figure 17). Gp, Cosmic upper mantle peridotites; KMim, Upper Maastrichtian-Lower Miocene Mount Sharp Chalk Series; Mig, Middle Miocene Gediz Vallis Channel formation; Migc, Conglomerate member; Qd, Quaternary Dingo Gap formation; Qs/l, Quaternary slope and landslide debris.

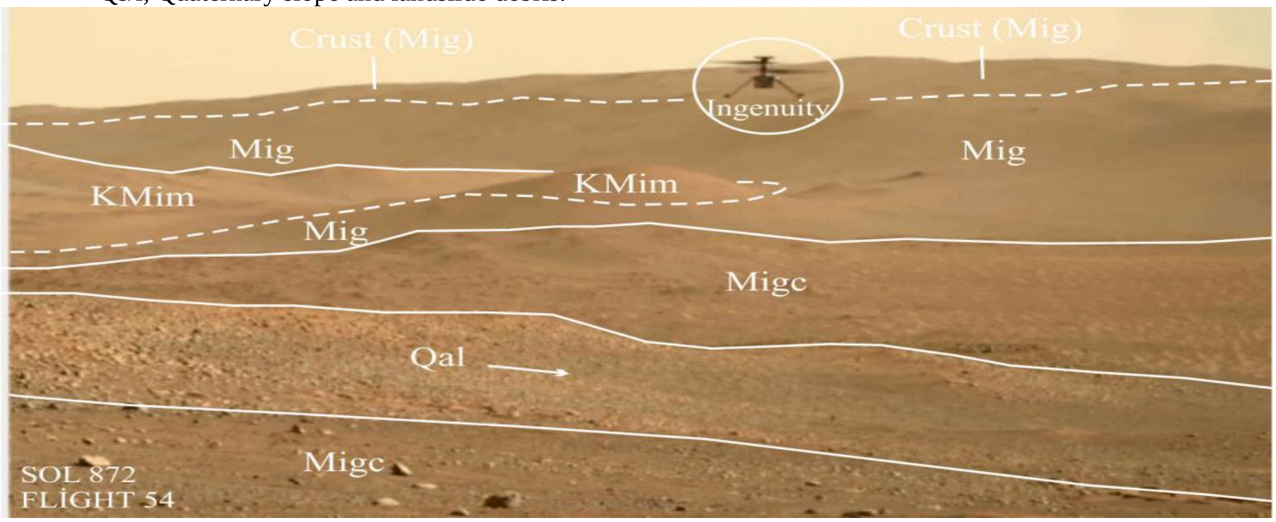


Figure 24:- At the bottom, there are Upper Maastrichtian-Lower Miocene Mount Sharp chalk series rock units (KMim). The eroded morphology of this series is overlain by the Gediz Vallis Channel Formation (Mig), which is Middle Miocene aged, consisting of chalk, chalk-cemented/matrix coquina-macrated limestone and evaporite deposits (containing gypsum-anhydrite, gypsum, salt, slaked-quicklime and clay-sulphate minerals) with a thick glassy amorphous crust (mig) on its atmospheric outer surface, with an angular unconformity starting with the basal conglomerate (Pebblestone member, Migc). All units are overlain by Quaternary dry fluvial alluviums (Qal). KMim, Upper Maastrichtian-Lower Miocene Mount Sharp Chalk Series; Mig, Middle Miocene Gediz Vallis Channel Formation, Migc, Conglomerate/Pebblestone member; Qal, Quaternary dry fluvial alluvium and Martian helicopter (Ingenuity) (Image credit: NASA/JPL/Caltech; https://mars.nasa.gov/mars2020/multimedia/videos/).

Figure 25a, b:- A) A type of carbonate sedimentary rock with a horizontal layering, thick-solid-massive-homogenous structure, broken and fragmented by tectonism, and composed of organic calcium carbonate/calcite. B) Soft, brittle, white chalk rock crushed under the wheels of a Martian geologist into micron-sized (~3μm) chalk dust (Image credit: NASA/JPL/Caltech; https://mars.nasa.gov/mars2020/multimedia/videos/).

Neogene Rock Units

Gediz Vallis Channel Formation (Mig):-

In ancient Mars, the rock units consisting of thick and widespread outcrops of chalk, chalky conglomerate/pebblestone, chalky marl, chalky coquina-macrat limestone, chalky evaporite deposits (gypsum-anhydrite, gypsum, salt, slaked and quicklime) and containing/bearing clay-sulfate minerals (sulfate bearing unit) in the Gale crater and the Gale crater basin forming the Aeolis Palus plain area and the Glen Torridon basins forming the southwestern extension, along Vera Rubin Ridge and Gediz Vallis Channel, and on Mount Sharp (Aeolis Mons) Mountain, were first defined, named and proposed as the Gediz Vallis Channel formation (Mig) (Figures 17, 18, 19, 20, 23, 24, 26, 27, 28, 29, 30, 33, 34 and 38).

The formation is observed in thick and widespread outcrops in the areas of Pahrump Hills, Pilinger Point, McMurdo, Marias Paas and Hiners Point, Greeley Haven, Yellowknife Bay, Bonneville, the Base of Mount Sharp, Marathon Valley Entrance, Logon Pass, Gray Wolf Peak, and Vera Rubin Ridge. The formation generally begins with conglomerates/pebblestones (Migc) at the base and grades upward into solid, massive, thick, and horizontally bedded chalks. The conglomerates gradually grade upward into caramel, reddish-brown chalk-cemented, medium- to thick-bedded, macrofossil-rich cochineal and macrofossil-bearing chalky limes (Figure 31). The formation contains extensive intercalations of chalky evaporite deposits (gypsum-anhydrite, gypsum, salt, slaked and quicklime, and clay-sulfate minerals). It is clearly seen that it contains green-naphtha colored peridotite and olivine crystals along with these macrofossils and shells in some places (Figure 31). The rock units comprising the formation are generally horizontally bedded.

However, its eroded outer surface has developed a denticulated morphology. The eroded morphology of the horizontally bedded Upper Maastrichtian-Lower Miocene Mount Sharp chalk series at the base of the formation overlies the horizontally bedded rock stratigraphic units, beginning with the basal conglomerate, with an angular unconformity (Figures 19, 23, and 24). Although an eroded geomorphological surface exists between these two formations, no folding/orogenic phase has developed between the two formations. In some places, the oxidized chalk dust, which is quicklime/calcium oxide (CaO) and slaked lime [Ca(OH)2], is covered by desert storm wind alluvium (loess, aerosol, regolith) chalk dust deposits. Slaked lime/calcium hydroxide [Ca(OH)2] intercalations and random white traces are observed in the topography. The Gediz Vallis Channel Formation overlies the Gale crater peridotites at the bottom of the Gale crater tectonic basin-Glen Torridon tectonic basin margins with an angular unconformity beginning with the basal conglomerate (pebblestone/Pebblestone member/Migc).

In some places, they overlie the Upper Maastrichtian-Lower Miocene Mount Sharp chalk series at the base with an angular unconformity starting with the basal conglomerate (Pebble member/Migç). When compared with equivalent rock units in the world at different locations, the Quaternary aged Gray Wolf Peak olivine basalt lava (Qg; Pahoehoe-type basalt lava) and the Middle-Upper Pliocene aged Kimberly formation (Plk) overlie the Gediz Vallis Channel formation with an angular unconformity (Figures 17, 18, 19, 20, 23, 24, 26, 29, 30, 32, 33, 34, 36 and 38). The Gediz Vallis Channel Formation is covered with a very thick, glassy-amorphous, hard, rigid, and impermeable crustal armor, developed in the direction of the slope of the topography, due to caramel-red-brown crustation on the atmospheric surfaces of the eroded surface morphology (Figures 3, 5, 7, 20, 23, 24, 26, 27, 28, 29).

However, the Gediz Vallis Channel Formation is covered with a much thicker and more extensive glassy-amorphous armored crust on its atmospheric outer surface than its equivalent formation, the Middle Miocene Ceylanpınar Formation (Tarhan et al., 2012), which is the Middle Miocene Ceylanpınar Formation (Tarhan et al., 2012). Similar to its equivalent in the world, the Middle Miocene Ceylanpınat Formation, it is composed of chalks and intercalations of coquina and evaporite sediments (including gyp-anhydrite, gypsum, salt, hydrated-quicklime, clay-sulphate minerals) containing abundant macro shells and skeletal fossils (Figures 8d, 31). The Homestake deposit is believed to be gypsum.

The formation is predicted to be probably Middle Miocene in age, as it shows similarities to the Middle Miocene Ceylanpınar Formation, which crops out around Şanlıurfa in Southeastern Turkey, which forms the northern edge of the Arabian plate in the world, in terms of fossil content, evaporite content and rock unit types (Figures 3, 8, 17 and 31). This is due to the similarities in rock types and the coquina and macrofossil limestones it contains, as well as the evaporite deposits it contains (Figures 3, 8, 17 and 31). The Gediz Vallis Channel formation, which outcrops on ancient Mars, is a chalk rock type consisting of microscopically small phytoplankton and zooplankton microorganisms to the Middle Miocene Ceylanpınar Formation on Earth. Its biochemical characteristics and its similarity to the macrofossilized coccinea and macrofossil limestone it contains, along with its foreign rock fragments and mineral contents, have led to the first determination of macrobial life in both marine and terrestrial environments on ancient Mars. The rich hydrocarbon potential of the Middle East probably originated from the Middle Miocene Ceylanpınar Formation, which is the world equivalent formation of the Gediz Vallis Channel Formation and is composed of coquina, macrofossil limestone, evaporite deposits (gypsum, anhydrite, gypsum, salt, slaked lime/calcium hydroxide, sulfate minerals, etc.).

The crustation/crustification on the atmospheric outer surface of the eroded surface of the Middle Miocene Ceylanpınar formation, which is the world equivalent of the Gediz Vallis Channel formation, is very thin and almost non-existent. However, it is observed that very thick and widespread crustation has generally developed on the atmospheric outer surface of the eroded surface of the Gediz Vallis Channel formation, which is the ancient Mars equivalent of the Middle Miocene Ceylanpınar formation. It is possible to distinguish the Gediz Valis Channel formation in the Gale crater on ancient Mars due to its caramel reddish-brown colored, glassy-amorphous, impermeable, armored thick crust/amorf and thick conglomerate/pebblestone member from the oxidized, thick, massive, horizontally bedded Mount Sharp chalk series, which is very thin or almost absent on the atmospheric surface of the light colored and eroded outer surface at the bottom. It is clearly seen that the rock units of the previously eroded geomorphological topography of the Mount Sharp chalk series emerge from the bottom of the Gediz Vallis Channel formation in places (Figures 19 and 23).

The presence of a glassy, amorphous, thick, hard, impermeable crust/crust/crustization armor/cover formed due to pseudo-bedding, solid flow outcrop and blocking structures developed on the outer atmospherically eroded surface of the Gediz Vallis Channel Formation and developed widely in the direction of the topography slope gives an idea about the paleoclimatology of the Middle Miocene period on ancient Mars. It shows that solid phase neosolutions formed on the atmospheric outer surfaces of biochemical organic sediments with chalky calcium carbonate composition due to increasing temperatures since temperatures were quite high during the Martian daytime during the Middle Miocene period on ancient Mars.

It is clearly seen that solid neosolutions flowed in solid phase in the direction of the topographic slope during the Martian days and formed pseudo-bedding, solid flow protrusions and blocks, and that solid neosolutions flowed down the slope due to sudden drops in temperature during the ancient Martian nights and solidified as glassy amorphous matter and formed crusts (Figures 3, 5, 7, 19, 20, 21d, 23, 24, 26, 27, 28, 29 and 30 etc.). In the continuous repetition of these events, it is clearly seen that the pseudo-bedding, solid flow ledges and randomly developed large and small flow blocks developed in the direction of the topographic slope on the atmospheric outer surface of the eroded morphology of the Gediz Vallis Channel Formation in the Middle Miocene have widely developed on the glassy crustal armor/coating (Figures 27, 28 and 29 etc.).

However, the pseudo-bedding, solid flow ledges and flow blocks are widely formed from the chalk-dominated calcium carbonate biochemical organic sediments, solid-massive structure and thick-bedded horizontal rock stratigraphy units under the glassy amorphous, solid, hard and impermeable armored crust/encrustation of the Gediz Vallis Channel Formation. Due to the calcium oxide (CaO) reactors, which are quicklime in the Komence region of the formation, there has been extensive alteration and transformation to calcium hydroxide [$Ca(OH)_2$], which is quicklime, as a result of interaction with water with minimal water. The Gediz Vallis Channel Formation is thought to have been deposited in a warm, shallow-marine, semi-enclosed/transitional evaporite basin or gulf, possibly connected to warm, deep seas. The basal sections of the Gediz Vallis Channel Formation consist of a thick and widespread conglomerate/pebblestone member (Migc).

Conglomerate/Pebblestone Member (Migc):-
The Gediz Vallis Channel Formation overlies the basal conglomerate and older eroded morphological rock units with an angular unconformity and horizontal bedding. This basal conglomerate/pebblestone was first identified, named, and proposed as the PebblestoneMember/Migc. The Pebblestone member contains clasts, gravels and minerals of different foreign rock units (cosmic peridotites of the upper mantle of the Mars planet/Gp and clasts, gravels, blocks and minerals/olivine, clay of the Upper Maastrichtian-Lower Miocene Mount Sharp chalk series/KMim) (Figure 31a,c). The Conglomerate/Pebblestone Member, in some areas, consists of caramel-reddish-brown conglomerate, sandstone, siltstone, and mudstone rock units. It generally consists of light-colored, coarse clasts cemented by chalk (chalk/calcium carbonate/calcite/$CaCO_3$). The bluish-blackish, misleading fluorescent colors of ancient Mars, seen in Figures (27a, b, c, d), correspond to very important geological concrete facts. A) The

pseudo-bedding, solid flow ridges and randomly developed large and small blocks on the surface of the thick and widespread caramel-reddish-brown colored glassy amorphous, hard, impermeable crustal armor/coating on the atmospheric outer surface of the eroded topography of the Gediz Valis Channel Formation are seen to have been detached as a result of sudden powerful floods and earthquakes caused by heavy rainfall and deposited widely as overflow sediments on the lower plains, depressions, wide valley floors and plains in the direction of the topographic slope (Figures 35c, 38 and 39).

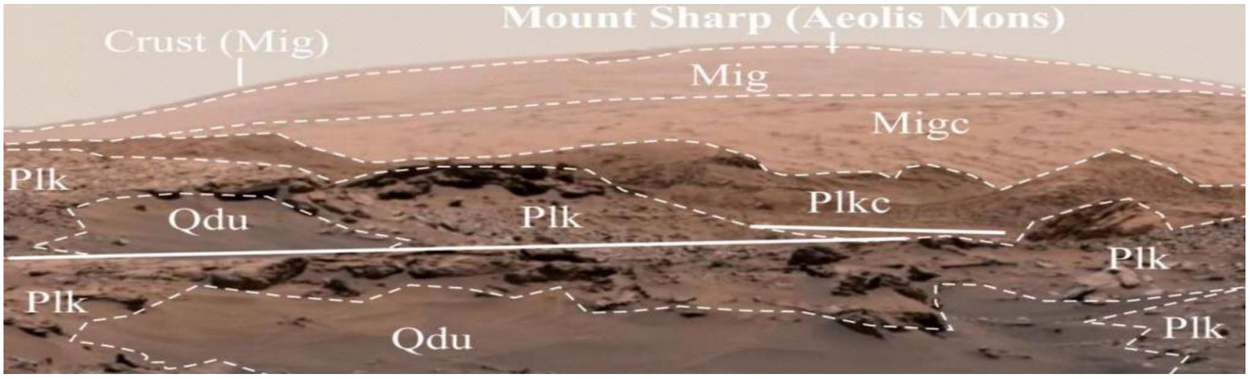


Figure 26:- Around Mount Sharp, Middle Miocene aged Gediz Vallis Channel formation (Mig) and basal conglomerate/pebblestone member (Migc) are observed at the bottom. The atmospheric upper part of the formation is covered with a glassy amorphous armored crust (crust/crusting/crustization) at the summit of Mount Sharp. Middle-Upper Pliocene aged Kimberly formation (Plk) and caramel-brown colored iron-copper conglomerate (Pebblestone member, Plkc) are overlain on the formation with an angular unconformity. The units are cut by current active faults and tectonic deformations have developed. Ferruginous dunes cover the units. It seems likely that the faults have also cut the ferruginous brown sand dunes. Mig, Gediz Vallis Channel formation, Migc, conglomerate/pebblestone member; Plk, Kimberly formation, Plkc, conglomerate/pebblestone member; Qdu, Quaternary ferruginous dune(Image credit:NASA/JPL/Caltech;https://mars.nasa.gov/mars2020/multimedia/videos/).

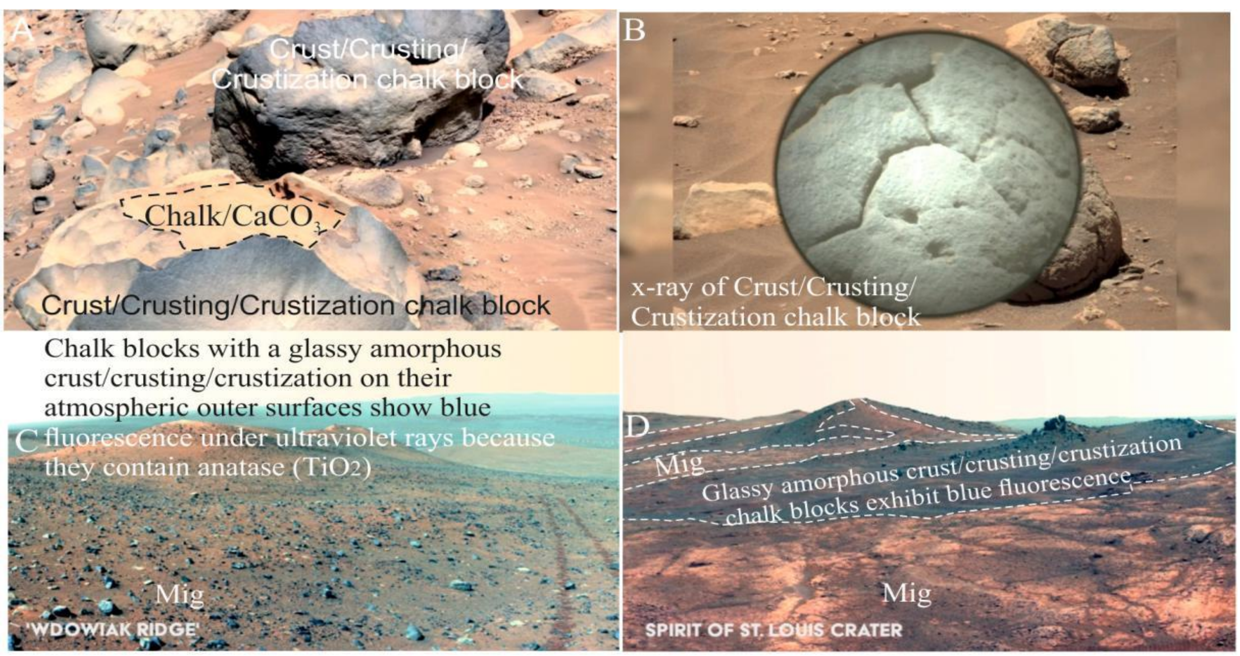


Figure 27a, b, c, d:- Characteristics of the bluish-blackish-gray colored blocks that are very common on ancient Mars (Image credit: NASA/JPL/Caltech; https://mars.nasa.gov/mars2020/multimedia/videos/).

Chalk blocks and gravels, which are very common in floodplain deposits, have glassy amorphous crusts on their atmospheric surfaces and show pseudo-bluish-blackish fluorescence properties under ultraviolet/ultraviolet rays due to the anatase polymorphic allotrope mineral content of titanium. Because anatase/anatase mineral shows high photocatalytic radioactive decay under ultraviolet (UV) rays (electrically charged, massless particles/photons) coming from the Sun. Therefore, the pseudo-bedding on the surface of the thick glassy amorphous armored crust of the Gediz Vallis Channel Formation within the flood sediments, the solid flow outcrops and the chalk blocks broken off from the solid blocks by flood waters and the thick and widespread glassy amorphous armored crust of the Gediz Vallis Channel Formation show bluish-black-caramel red-brown fluorescent colors.

However, it is very clear that the surfaces of the thick and widespread armored crust from which the outer walls of the chalk blocks with glassy amorphous crust seen in the flood sediments were broken off are composed of oxidized chalk (Figures 20, 21d, 27, 28, 29, 35a (1) and (2), 35c and 37 etc.). Due to the dissolution of the fresh chalk surface by rainwater, a smooth surface homogeneous karst palya pit has developed. In addition, karst formations have not developed on the surfaces where the glassy amorphous solid hard crust formation in blackish-blue tones had previously developed on the atmospheric outer surfaces. In the areas where the crustation has developed, it exhibits misleading bluish-blackish gray-caramel reddish brown fluorescence colors due to the ultraviolet (UV) rays coming from the sun and the anatase/anatase polymorph allotrope minerals, which are rich in titanium allotropes.

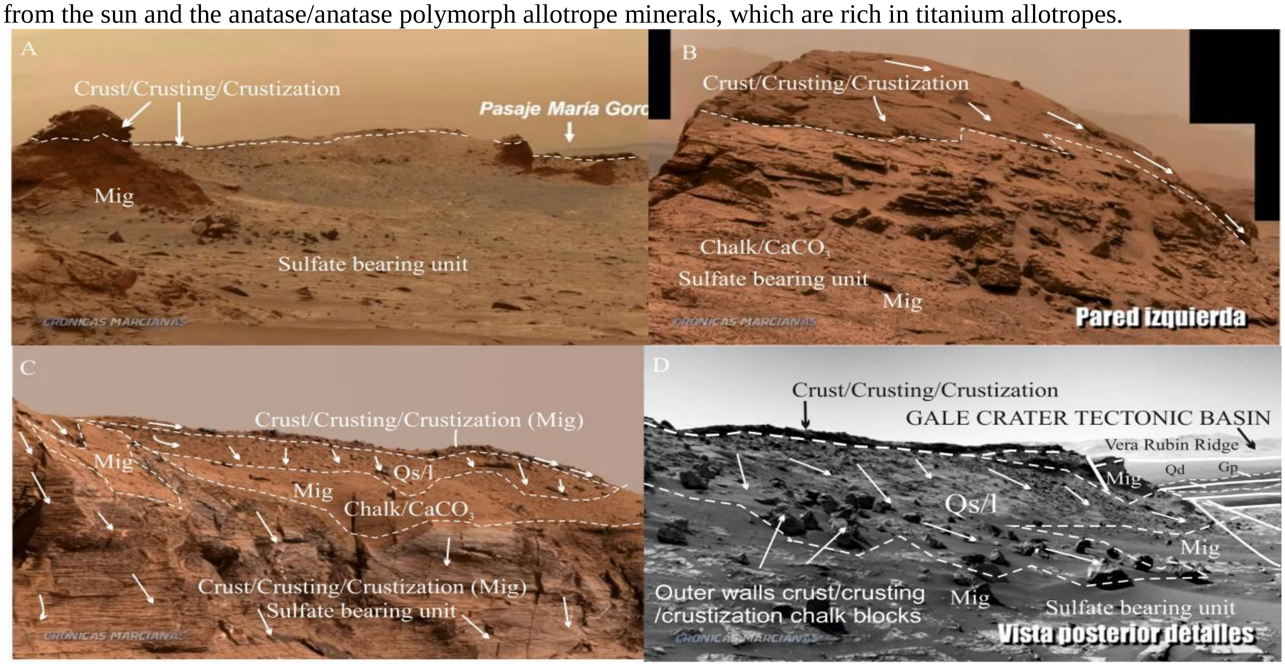


Figure 28a, b, c, d:- the eroded morphology of the Middle Miocene Gediz Vallis Channel Formation, which has thick and widespread outcrops containing chalk, eveporite deposits (including gypsum-anhydrite, salt, gypsum, slaked and quicklime, clay-sulfate minerals) and microbial-macrobial fossils, outcrops at various locations on Ancient Mars, is covered with a caramel-red-brown, thick, hard, impermeable, glassy amorphous crust/crustization armor on its outer surface. The chalk blocks, which broke off from this crust and whose outer sections are glassy amorphous, have developed debris down the slope. It is clearly seen that the glassy amorphous, hard and impermeable crust/crustization developed depending on the topographic slope and covered the formation like an armor (see Figures 3, 5, 7, and 23).

In contrast, the chalk in the inner parts of the crust/encrustation, which dips in different directions, is solid, massive, thick, homogeneous, and horizontally bedded. Mig, the Gediz Vallis Channel formation, middle Miocene in age, bearing sulfate minerals; Qs/l, Quaternary slope and landslide debris (Image credit: NASA/JPL/Caltech; https://mars.nasa.gov/mars2020/multimedia/videos/). Because anatase (TiO2) shows high photocatalytic activity under ultraviolet light. Oxidized chalk dust cover/deposition of desert storm wind alluvium is observed in and around karst cavities. B) Internal x-ray of the crusted chalk block on the atmospheric outer surface of the Gediz Vallis Channel Formation (from the block just behind the x-ray), taken by NASA's Mars geologist (rover), showing that the internal structure is composed of fractured, fragmented, karst palings (cavities, grooves, holes, etc.) and white colored chalk. C and D) Ground view of the Gediz Vallis Channel Formation near Duck Bay "Victoria Crater.

" The solid neosolutions, developed due to daytime and nighttime temperature differences on the eroded atmospheric outer surface of the formation, formed pseudo-layers along the slope of the topography. The solid flow ridges and solid flow blocks solidified as a glassy amorphous solid due to the sudden drop in temperature during the Martian night, forming a thick crust/encrustation armor coating on the outer surface of the formation. The encrusted chalk blocks, detached from this crust, contain rich anatase (TiO2) and exhibit high photocatalytic activity/decomposition under ultraviolet light from the Sun, exhibiting blue-black-gray fluorescence.

All these geological phenomena indicate that the Martian atmosphere is thin, unable to filter ultraviolet rays (electromagnetically charged, massless particles) from the Sun, and that the Martian surface is vulnerable to ultraviolet radiation. This is clearly dangerous for astronauts. These blocks were broken off from the glassy amorphous thick crust on the outer surface of the Gediz Vallis Channel formation by heavy rainfall and cleaned, and were dragged along the slope of the topography with muddy flood waters to depressions and flat areas, or were deposited as overflow sediments in pits, plains, stream beds and flat areas (Figures 33, 34, 35c, 37, 38 and 39a,b).

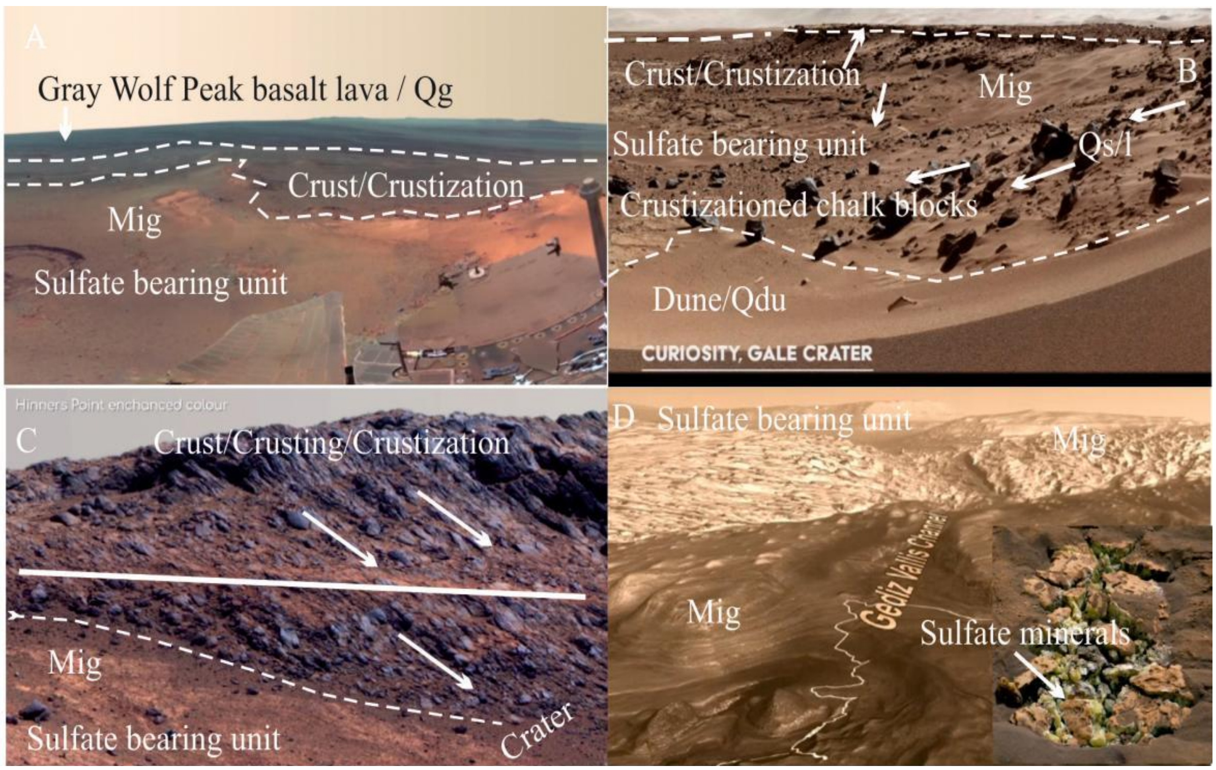


Figure 29a, b, c, d:- A) The Gediz Vallis Channel Formation (Mig), which is of Middle Miocene age and contains chalk and evaporite deposits (including gypsum-anhydrite, gypsum, salt, slaked and quicklime) and clay-sulfate minerals with thick crust on its atmospheric outer surface, is overlain by the hot, fluid (Pahoehoe-type basalt lava) Gray Wolf Peak basalt lava. B) Debris of chalk blocks with glassy amorphous crust on their outer walls (Qs/l) and chalk sand (Qdu) detached from the glassy amorphous armored crust of the Middle Miocene Gediz Vallis Channel Formation, whose atmospheric outer surface is thickly crusted. C) Caramel-reddish-brown and glassy amorphous crust, sloping towards the crater, developed within the Gediz Vallis Channel Formation (Mig). D) General view of the Gediz Vallis Channel Formation, which is Middle Miocene in age and composed of chalk and chalky evaporites (including gypsum-anhydrite, gypsum, salt, hydrated-quicklime, and clay-sulfate minerals). Sulfate minerals are very common in this formation(Image credit:NASA/JPL/Caltech;https://mars.nasa.gov/mars2020/multimedia/videos/).

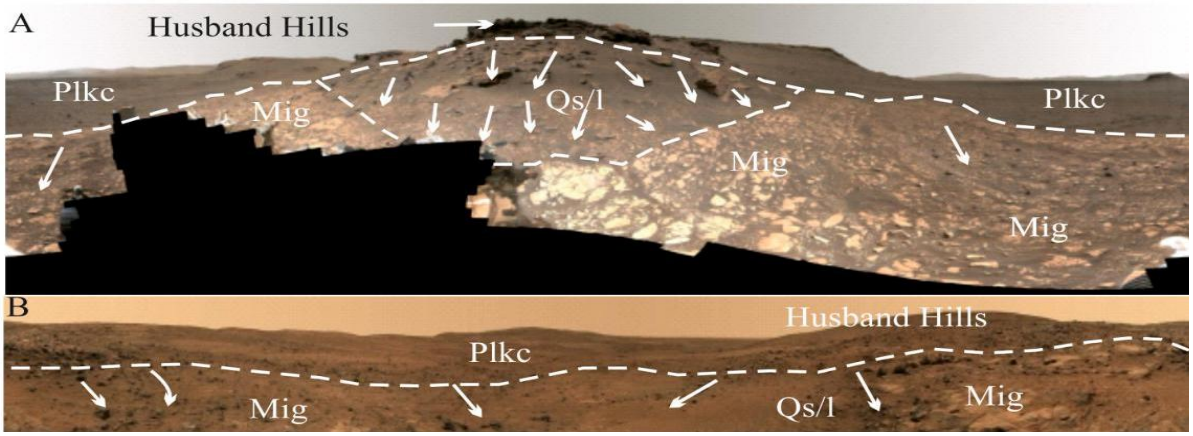


Figure 30a, b:- A and B) In the images taken of the Husband Hills from the Van Zyl Overlook, the Middle Miocene Gediz Vallis Channel Formation, which contains evaporite deposits and clay-sulfate minerals, is overlain with an angular unconformity by the iron and copper-rich conglomerate/pebblestone member (Plkc) of the Kimberly Formation, probably of Middle-Upper Pliocene age. Pebbles and blocks detached from this member have developed into slope and landslide debris in the direction of the topographic slope (Qs/l) (Image credit: NASA/JPL/Caltech; https://mars.nasa.gov/mars2020/multimedia/videos/).

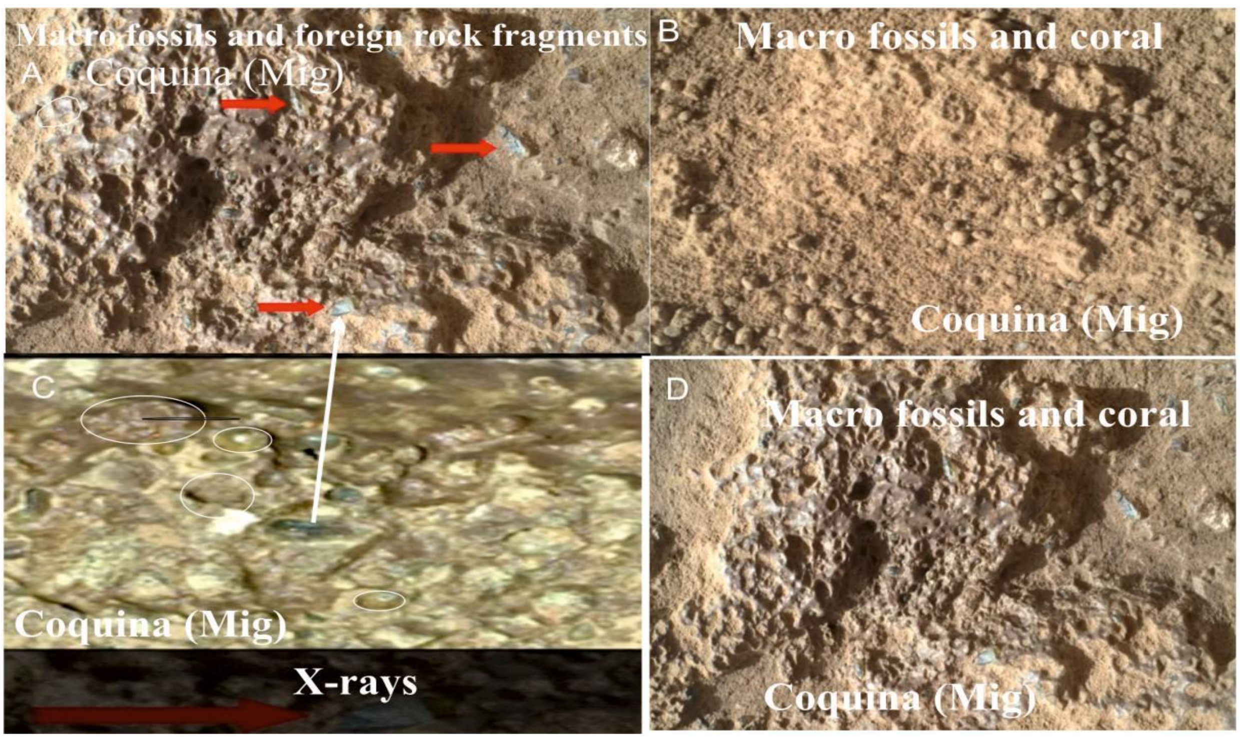


Figure 31a, b, c, d:- Images containing fossil shell traces and foreign rock fragments showing abundant traces of marine microbial-macrobial life taken from the chalky coquina and maktalı limestone of the Gediz Formation, which is a glassy amorphous chalk with a glassy amorphous outer surface and a caramel-reddish-brown colored Middle Miocene aged chalky, coquina, maktalı limestone, evaporite sedimentary intercalations (containing gypsum-anhydrite, gypsum, salt, quicklime-alkali, sulfate minerals). A) X-ray showing macrofossil shell traces, green colored rock fragments and glassy amorphous chalk matrix. C) X-ray showing rock fragments and shell fossils in A. B and D) accumulations of macro-rounded fossil shells within a glassy amorphous cement of chalk origin, detrital foreign rock fragments transported from land, and possibly coral colonies. These coquina-bearing and macra-bearing limestones of the Gediz Vallis Channel Formation, which crops out on ancient Mars, are very similar to its equivalent on Earth, the Middle Miocene Ceylanpınar Formation, in terms of lithological characteristics, evaporite deposits (containing gypsum-anhydrite, gypsum, salt, hydrated-quicklime, and clay-sulfate minerals), and chalky-macra-bearing and coquina-bearing pinkish limestones (see Figure 8d). All these geological data have been considered and suggested as evidence and indicators of microbial and macrobial life traces on ancient Mars, including microscopic-scale phytoplankton, zooplankton, and macrofossil shells (Image credit: NASA/JPL/Caltech; https://mars.nasa.gov/mars2020/multimedia/videos/).

Based on the concrete geological data in these images of Mars, the following conclusions have been made:

1. 1) It is very clear that once upon a time (after the Middle Miocene) there was very heavy rainfall on ancient Mars, sudden and powerful floods occurred, and dense flood deposits developed, causing natural disasters and destruction (Figures 32, 33, 34, 37 and 38, etc.),
2. The Middle Miocene Gediz Vallis Channel formation was formed in an evaporite basin or gulf connected to a shallow, warm, clean deep sea, where plant phytoplanktons lived densely and chalks were formed from animal zooplanktons,
3. These minerals, taken from seawater in an environment rich in titanium and iron (ilmenite) together with plant phytoplankton, indicate that the cosmic upper mantle peidotites of Mars are rich in iron (ilmenite) and titanium,
4. 4) Ancient Mars was rich in titanium and nanophase iron oxide compounds and organic chalks, so it was named the Red Planet because of its red color due to its atmosphere rich in ferric and calcium hydroxides and oxides,
5. Desert storm aeolian dust clouds of alluvium (loess, aerosol, regolith), sedimentary blankets, and sand dunes composed of organic biochemical chalk and iron were common on ancient Mars,
6. Hydrated [Ca(OH)2] and quicklime (CaO), Hemetite/rust/ferric and trace amounts of other metal and non-metal oxides and hydroxides were common on ancient Mars,
7. After the Middle Miocene, ancient Mars was hot, dry, had little rainfall and a lot of evaporation. Following the development of thick and widespread crust due to the large temperature differences between Martian days and Martian nights, major changes in paleoclimatology occurred, and a period of mild and very wet conditions was observed, with flash floods and flood deposits developing,
8. Following these events, probably in the Quaternary period, it lost its thick modern atmosphere, the Gulnaz geochemical rock cycle and marine-terrestrial macrobial-microbial life, probably some time after the first Martian Homo habilis or Martian Homo erectus, the ancestors of modern Martians, emerged, and after their change and transformation into the first modern Martian Homo sapiens/Homonids, they lost all of these before they could fully evolve, reproduce, socialize and enrich; This indicates that the planet became a living, dead planet with a dry, cold, desert climate, and desert storms.

Kimberly Formation (Plk):-

Curiosity reports that the clastic Kimberly Formation encounters sedimentary rocks in the Yellowknife Bay formation (Sols 53–340) and, after a few kilometers, reaches the potassium- and iron-rich sandstone zone, indicating a high Cu concentration in the sandstones of the Kimberly Formation (Palucis et al., 2014; Grotzinger et al., 2015; Le Deit et al., 2016; Goetz et al., 2017; Payré et al., 2019). They state that the clastic sandstone identified by previous researchers belongs to the Kimberly Formation. Furthermore, Payré et al. (2019) noted that unusually high Cu concentrations were measured in potash sandstones and Mn oxide-bearing fracture fillings in the Kimberly formation of Gale crater. They indicate that copper phases occurring in sedimentary rocks are often associated with detrital silicates, including feldspars, pyroxenes, and K-phyllosilicates, likely originating from a potash-bearing magmatic source near the northern crater rim. These two distinct mineralogical relationships imply at least two distinct processes: Cu enrichment in the basement rock, likely during crystallization of the magmatic silicates at the source, and Cu adsorption on Mn oxides precipitated from groundwater encountering oxidizing conditions within fractures in the basement rock. The copper-enriched potash-bearing deposits are considered evidence of a porphyry copper deposit or impact-generated hydrothermal deposit in the source region.

Buz et al., (2017), pointed out very important points. Olivine and Fe/Mg phyllosilicates are common in the Gale rim/wall rocks; feldspar-rich units were sought but not detected; multiple units of hydrated and hydroxylated materials are present in the ground materials southwest of the MSL landing site; and the >90 m thin-bedded sedimentary sequence on the northwest Gale crater floor exhibits variations between lacustrine and eolian environments. Considering these findings, we can make these inferences. The sedimentary rock units in Gale crater do not contain plagioclase minerals but consist of similar rocks, and the presence of hydrated and/or Fe/Mg phyllosilicates in the Gale crater/Aeolis Palus/Glen Torridon flat basins are clear evidence and indicators that they are compatible and overlap with the Dingo Gap formation (Qd), which was brought and deposited by the most productive caramel red-brown flood waters of Mars in this flat basin. Previous researchers stated that the sandstone, which is rich in potassium and iron and has a very rich concentration of MnO and Cu within these sandstones, belongs to the Kimberly formation. This is how they interpreted and defined the Kimberly Formation. However, it is thought that the region where the Kimberly formation is exposed and the Yellowknif regions can be seen very clearly in NASA's publicly available Mars image videos.

1. 1. The Kimberly Formation was deposited in the margins of the tectonically active basin named Gale Crater/Aeolis Palus/Glen Toridon. Gale Crater has been severely deformed, fractured, and fragmented by strike-slip and occasionally graben faults that traverse the margins of the tectonic basin (Figures 17, 18, 20, 26, 32, and 33),
2. The Kimberly Formation overlies Middle Miocene and earlier rock units, generally consisting of caramel-brown conglomerates, sandstones, siltstones, and mudstones, and in some places, a light-colored basal conglomerate (Conglomerate/Pebblestone Member/Plkç) with an angular unconformity (Figures 26 and 33).
3. Towards the top, it grades into lacustrine chalky cold-water travertines, thin- to medium-bedded, occasionally flaked chalky limestones, The type locality of the Kimberly formation is in the Kimberly region in the Gale crater basin (Figure 32),
4. Most importantly, in the region exposed in Yellowknif Bay, thin- to medium-bedded horizontal layers of the Kimberly formation overlie the Middle Miocene Gediz Vallis Channel Formation with an angular unconformity. However, the close contact and relationship of the dark-colored potassium- and iron-rich sandstones, known to be rich in Cu, observed in this region with the thin- to medium-bedded chalky units of the Kimberly Formation has not been closely observed. Only a dark-colored ridge is observed from a distance. Whether it overlies or underlies the Kimberly Formation has not been observed. Whether it corresponds to another unit is unknown. However, it is thought to be similar to the thick conglomerate/pebblestone member (Plkc) of the thick and widespread Kimberly Formation on the Husband Hills (Figure 30).

Therefore, the unit in the Kimberly region of the Gale Crater Basin was again defined and named as the "Kimberly Formation" based on its rock type, depositional environment, age, and relationships with other chalky units. The Kimberly Formation's type outcrops occur in the Kimberly region of the Gale Crater Basin (also known as the Aeolis Palus and Glen Torridon Basins; the name Gale Crater Tectonic Basin is preferred in this paper) on Mars. It has been revised as the Kimberly Formation.

On Mars, the Kimberly formation (Plk) and its basal conglomerate/pebblestone member (Plkc) occur in Whale Rock, Pahrump Hills, Marias Pass, Emerald Lake, Logan Pass (Pebblestone member), Butte M9A, Murray Buttes, John Klein, Underneath "Greenheugh Pediment", Yellowknife Bay, Murray and Stimson formations, Ireson Hill, Buttes, and Rocknest.

Widespread outcrops of the Kimberly Formation occur in the Gale Crater tectonic zone basin and its margins. Due to the presence of anatase, an allotrope polymorphic mineral of titanium, in the horizontally bedded chalky thin- to medium-bedded rocks, the atmospheric outer edges exhibit blue-blackish fluorescent and misleading coloration due to ultraviolet radiation from the Sun (due to Mars' thin atmosphere) due to crusting. It is composed of thin- to medium-bedded chalk. It is thought to be composed of shale, slate and white-colored flaking, bending chalk rock that separates into very thin flakes in places and/or white-colored calcium hydroxide/slaked lime/$Ca(OH)_2$, caramel red-brown colored ferric hydrate/hydroxide/$Fe^{3+}(OH)_3$.

It is very interesting that Gale crater peridotites (Gp) are widespread in the Gale crater tectonic zone basin and its southwestern extension, Glen Torridon basins and their margins, forming the cosmic upper mantle peridotites of Mars at the bottom. The Gale Crater peridotites, which occur within and at the center of the Gale Crater tectonic zone basin, are not overlain by rock units belonging to the Kimberly formation; they are only seen in the crushed zones along the basin's margins. Only a thin, caramel-reddish-brown overlay of the Dingo Gap formation is visible above the peridotites in the basin. It is very interesting that peridotites are seen along the current active fault systems beneath this thin cover, that they also cut the Dingo Gap formation, that the Kimberly formation deposited in this basin does not have outcrops in the basin center, but is only found in the marginal regions of the basin, and that the rock units of the Kimberly formation located on both sides of the basin are not connected to each other. The fact that the basin exhibits a pull-apart or sideways expanding, graben-like feature and that extreme tectonic deformations are observed on the basin edges creates a very interesting situation (Figures 18, 20, 32, 33 and 34). It is anticipated that such problems will be resolved in the future.

No interesting features resembling contraction tectonics have been identified, as Mars cools and loses its internal energy. On the contrary, it is thought that they are traces of extension and opening tectonics. Another characteristic is the frequent landslides and rock flows occurring within the Kimberly Formation, which crops out along the margins of the Gale Crater tectonic zone basin and into the basin interior (Figures 18, 20, 32, 33, and 34). It is unknown whether these landslides and rock flows on the crushed zone at the basin margin are caused by graben formation or by active strike-slip fault systems.

The Kimberly formation overlies the Upper Maastrichtian-Lower Miocene Mount Sharp chalk series rock units (KMim), which have widespread and thick exposures on the margin of the Gale crater tectonic zone basin, and the eroded surface morphologies of the Gediz Vallis Channel formation (Mig), which is composed of chalk and evaporite sediments (containing gypsum-anhydrite, gypsum, salt, hydrated-quicklime, clay-sulfate minerals); The cross-bedded basal conglomerate (Conglomerate/Pubblestone Member/Plkç) overlies the eroded morphologies of these formations with an angular unconformity (Figures 26, 30, 32, 33 and 34). The Conglomerate/Pebblestone Member (Plkc) generally consists of caramel red-brown colored conglomerate/pebblestone, sandstone, siltstone and mudstone rock units. In some sections, they consist of light and/or gray-toned cross-conglomerates.

Towards the top, it gradually transitions vertically and laterally to thin-medium layered chalky and horizontally bedded, porous and porous cold water travertines deposited in a lacustrine environment (Figures 33, 39). The unit is composed of thinly bedded shale, slate, and foliated, folded gypsum rock units. It generally consists of thin- to medium-bedded chalk and chalky limestone. It has taken detrital rock fragments and minerals from all the units it unconformably overlies.

Detrital clasts and gravels are especially common in the base conglomerate/pebblestone. The Kimberly Formation, in the Gale Crater tectonic zone basin, consists of various clay minerals composed of hydrates of various elements [(calcium hydrate/hydroxide/slaked lime/$Ca(OH)_2$ originating from chalk dust; hemetite/rust/ferric iron (III)/ferric hydrate/hydroxide $Fe^{3+}(OH)_3$, etc., which form sand dune grains and dust originating from Mars' iron-rich cosmic upper mantle peridotites (iron-rich olivine, pyroxene, ilmenite, plagioclase, etc.)]; and fertile, caramel-reddish-brown agricultural soils. It is overlain by the Quaternary Dingo Gap Formation (Qd), which is thin in thickness and wide in extent, with an angular unconformity (Figure 17).

Because the Kimberly Formation formed on fault zones traversing the Gale Crater tectonic zone basin margins, it has been fractured, crushed, and subjected to tectonic deformation due to active faults. It is generally horizontally bedded. Its internal structure has been disrupted by tectonic deformations. It is fractured and fragmented. It is observed that the flood/flood waters flowed/dragged towards the Glen Torridon basin, which is the continuation of the Galen crater basin, and probably flowed towards the flat plain with intense floods in the form of landslides and rock flows (Figures 26, 30, 32, 33, 34, 39). The Kimberly formation is estimated to be equivalent to the Middle-Upper Pliocene Adıyaman formation in the world, and its age is Middle-Upper Pliocene due to its similar rock stratigraphic units and similar stratigraphic relationships. The Kimberly formation, deposited in a lacustrine environment, is distinguished as a conglomerate/pebblestone member (Plkc) due to its thick and widespread basal conglomerate.

Conglomerate/Pebblestone Member (Plkc):
In some places, it is very thick and widespread. It is caramel-reddish-brown in color and rich in iron, and consists of pebblestone, sandstone, siltstone, and mudstone rock units. In other places, it consists of gray-brown cross-bedded chalk pebblestone, sandstone, marl, and shale. As seen in the image photograph (Figure 32), the Kimberly formation (Plk) was deposited autochthonously in a lacustrine environment developed in the Gale Crater tectonic zone basin, which was probably developed under the control of fault systems and is bounded by strike-slip fault systems and crushed zones. There are no connections between the rock units of the Kimberly Formation (Plk) on either side of the basin.

Furthermore, in the center of the basin, extensive outcrops of Gale Crater peridotites (Gp), corresponding to the cosmic upper mantle peridotites of Mars, are observed, indicated by the dark Gp symbol. There are no remnants of the rock units of the Kimberly formation in the area where peridotites are observed. Additionally, there are no outcrops of the Quaternary Dingo Gap formation above the peridotites. It is observed only as a thin cover on the peridotite's margins. Another problem is that among the autochthonous remains of the Kimberly formation seen in the foreground of the photograph, it is clear that the rock units of the formation were formed as a result of landslides or rock flows towards the peridotites with flood waters. This rock flow or landslide also spread over the thin cover of the Quaternary Dingo Gap Formation. The caramel reddish-brown thin cover of the Dingo Gap formation and the Kimberly formation (Plk) rock units, which were transported to the basin and deposited by Quaternary rainfall and flood waters, are not present on the cosmic upper mantle peridotites of Mars that outcrop in the center of the Gale crater tectonic zone basin. In addition, there are no floodwater flows/landslides and flood sediment deposits (Of) of the Kimberly formation on the peridotites.

Did ancient Mars come to the present day by freezing after losing its atmosphere and life? Or is it possible that the geochemical rock cycle was frozen, but the current activities of different active fault systems continue to the present, and the basin gradually opened/expanded/grabenized towards the margins, and the peridotites on the basin floor emerged continuously and regularly, and since there was no geochemical rock cycle, no sedimentation occurred on it (except for sand dunes formed by eolian processes) and the basin margins moved away from each other? There is a problem that arises. This situation was considered a debatable problem because similar relationships were observed in many places. Gp, Gale crater peridotites corresponding to the cosmic upper mantle peridotites of Mars; Mig, Middle Miocene Gediz Vallis Channel formation; Plk, Middle-Upper Pliocene Kimberly formation; Qd, Quaternary Dingo Gap formation and Qs/l, Quaternary slope and landslide debris, Qf, flood deposits.

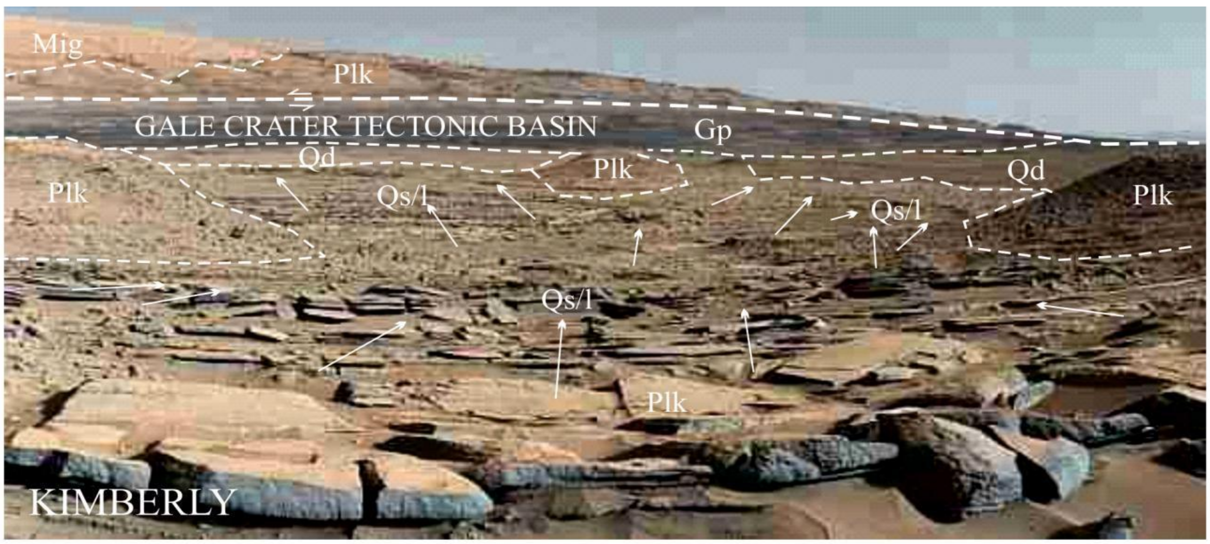


Figure 32:- This image taken by NASA's Curiosity rover reveals important details about the Kimberly formation and geological phenomena (Image credit: NASA/JPL/Caltech;https://mars.nasa.gov/mars2020/multimedia/videos/).

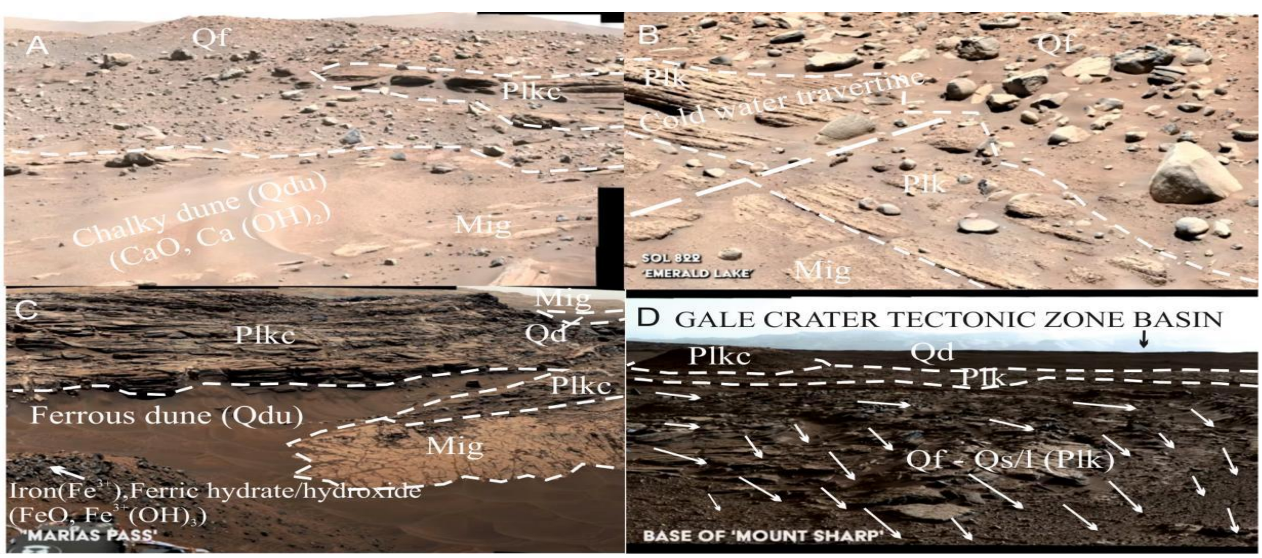


Figure 33a, b, c, d:- A) The Middle Miocene aged Gediz Vallis Channel formation (Mig) is overlain by the basal conglomerate (Pebble member; Plkc) of the Middle-Upper Pliocene aged Kimberly formation (Plk) with an angular unconformity. All formations are covered by Quaternary flood deposits/beds (Qf) and chalky sand dunes (Qdu); B) Probably in the Wdowiak ridge or Bonneville formations, the basal conglomerate (Pebble member, Plkc) and cold water travertine of the Middle-Upper Pliocene Kimberly formation (Plk) overlie the Middle Miocene Gediz Vallis Channel formation (Mig) with an angular unconformity.

The units are overlain by Quaternary flood deposits/beds (Qf) and chalky sand dunes (Qdu); C) Probably, chalky, evaporite deposits (containing gypsum-anhydrite, gypsum, salt, hydrated-quicklime and clay-sulphate minerals, etc.) of the Middle Miocene Gediz Vallis Channel formation (Mig) are located at the bottom of the Belva crater. These are overlain by the Middle-Upper Pliocene iron and copper rich Kimberly formation (Plk) and the iron and copper rich conglomerate/pebnlestone member (Plkc) with an angular unconformity. All units are overlain by the Quaternary Dingo Gap formation (Qd) and iron-rich sand dunes (Qdu); D) Rock flows in the form of flood deposits, slope and landslide debris are observed on the thin cover of the Middle-Upper Pliocene Kimberly formation (Plk, Plkc) and the Quaternary Dingo Gap formation in the Gale crater tectonic zone basin (Image credit: NASA/JPL/Caltech; https://mars.nasa.gov/mars2020/multimedia/videos/).

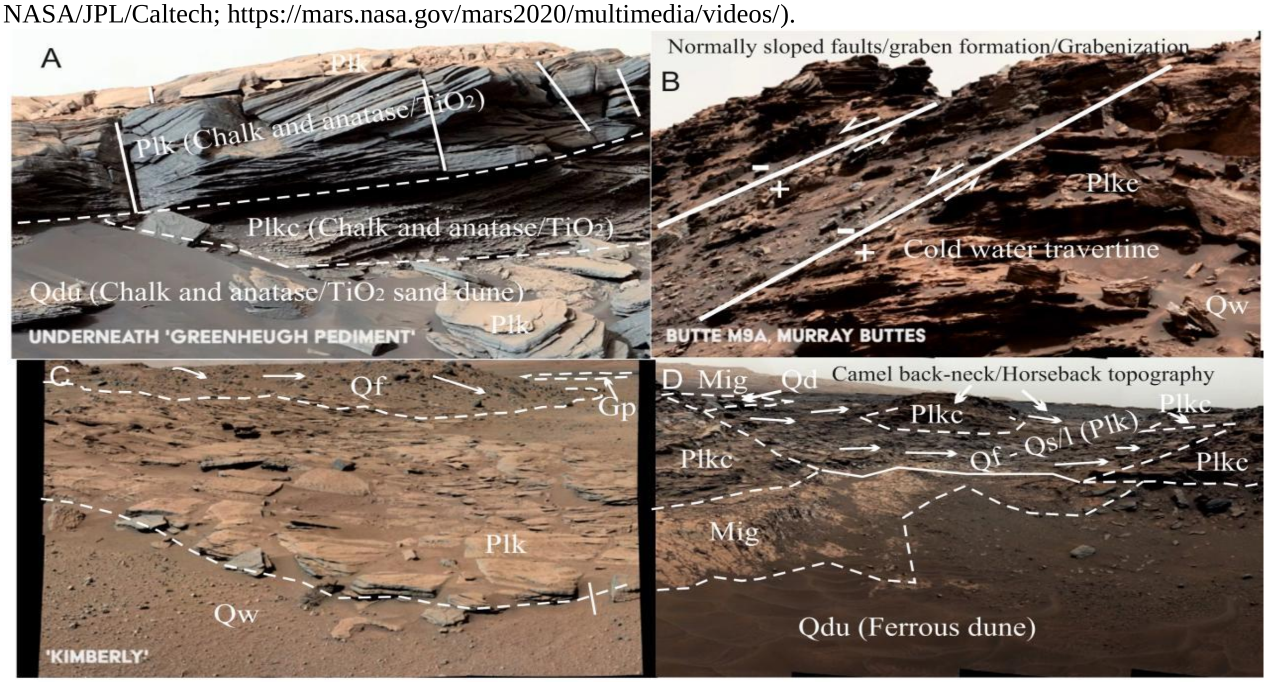


Figure 34a, b, c, d:- A) The Kimberly Formation (Plk) is heavily fractured and cross-bedded due to its deposition on the marginal fault systems of the Gale Crater tectonic zone basin. The bottom sections of the formation are rich in titanium allotrope anatase (TiO2) content, and show a misleading bluish-grey fluorescent color, exhibiting high photocatalytic properties under ultraviolet rays. An anatase-bearing and chalky sand dune is visible. B) Dip-slip normal faults developed within the iron-copper rich basal conglomerate (Pebble member, Plkc) of the Kimberly formation and the cold water traverine rock units containing porous, voided, detrital clasts. C) Quaternary flood deposits (Qf) overlying the Kimberly formation (Plk) and the alluvial dust sediment cover of the desert storm (loess, aerosol, regolith; Qw). D)

The Middle Miocene aged Gediz Vallis Channel formation (Mig), which contains eveporite and sulfate minerals at the bottom, is overlain by the basal conglomerate of the Middle-Upper Pliocene aged Kimberly formation (Plk), which was deposited in a lacustrine environment, with an angular unconformity. The rock units of the Kimberly formation are observed to spread over the Quaternary Dingo Gap formation (Qd) and iron-rich sand dunes (Qdu) in the form of overflow deposits, slope and landslide rock flows (Image credit: NASA/JPL/Caltech; https://mars.nasa.gov/mars2020/multimedia/videos/).

Quaternary Rock Units:-

Dingo Gap Formation (Qd):-

This unit consists of oxidized chalk and ferrous dust-rust (loess, aerosol, regolith) deposited on the ancient Martian surface by wind alluvial clouds from desert storms on Mars. This dust, deposited on the ancient Martian surface, was deposited in streams, rivers, and streambeds, along with heavy rainfall and floodwaters, and in flat crater basins formed along fault systems, valley beds, and broad plains. It consists of unconsolidated, soft, alkaline, and caramel-reddish-brown arable soils with low thickness and extensive extent. Because its type locality is located in the Dingo Gap region, it was first identified, named, and proposed as the Dingo Gap formation (Figure 35). The Dingo Gap formation is widespread in the Valles Marineris canyon, the valley channels of the Gediz Vallis Channel and other rivers, the broad plains of the Jezero crater, the rim of Meridian Planum, Bonneville, the base of Mount Sharp, and around Cape Verde-Duck Bay Victoria Crater.

The formation consists of caramel-reddish-brown conglomerate/pebblestone, sandstone, siltstone, and mudstone rock units (Figure 35). However, it varies depending on the rock type characteristics of the previously existing rock units in the region where the unit was formed. In the region where the chalk series rock units are widespread, chalk dust, which develops due to temperature differences during Martian nights and Martian days, is deposited on the Martian surface by dust clouds of desert storm winds and alluvium (loess, regolith, aerosol). These dust blankets, which are mainly chalk, are cleaned by precipitation (snow, rain). They are carried by streams, rivers and creeks with caramel-red muddy water and deposited on wide valley floors, wide plains and plains, resulting in the development of caramel-red-brown soils suitable for agriculture (Figure 6).

However, in places where iron-rich cosmic upper mantle peridotites of the ancient Mars planet are exposed in crater tectonic zone basins of approximately 10-30 km width formed along fault systems and bounded by crushed zones and where the thick and widespread iron and copper rich basal conglomerate/pebblestone of the Kimberly formation deposited in the said basins and on the basin margins is the conglomerate/pebblestone member (Plkç; caramel reddish-brown colored conglomerate/pebblestone, sandstone, siltstone and mudstone, lacustrine cold water travertine with clastic content, etc.), iron-rich caramel reddish-brown colored soils and sand dunes are widely developed (Figures 18, 20, 26, 30, 33, 34, 36 etc.). However, in the areas where the chalk series is widespread, chalky sand dunes are very little developed, whereas the soils that have met with water, are transported and deposited, are caramel reddish-brown in color, suitable for agriculture, alkaline, soft and containing water molecules, forming the Dingo gap formation, are thick and widely developed (Figure 35).

Whatever happened to the ancient planet Mars! When it lost its atmosphere and the Gülnaz geochemical rock cycle (precipitation/snow-rain, water, transportation, erosion, deposition, etc.), it is seen that there are very thin caramel oxidized chalk dust covers/deposits formed on the surfaces of the existing rocks as a result of the deposition of the wind alluvial dust clouds of the desert storm, and since there is no precipitation, these chalk dust sediment covers/deposits carried by the wind dust clouds form a very widespread thin blanket on the planet Mars. Iron-rich sand covers and iron-rich reddish-brown thick and widespread dunes are seen to have developed. However, after the geochemical rock cycle of ancient Mars ended, the caramel-reddish-brown, soft, alkaline, and fertile soils of the Dingo Gab Formation, composed of chalk dust, were deposited on the later desert storm-induced wind-alluvial chalk dust deposits/accumulations, interacting with water molecules contained in the Dingo Gab Formation at its base and incorporating them into the Dingo Gap Formation (Figure 35). Because the wind-alluvial chalk dust deposits on the dry, hard soils of other formations lack the opportunity to interact with water, they are clearly preserved on the morphological surfaces of their rocks, within fractures, cracks, and karst formations, as dry, oxidized, fine chalk dust deposits or iron dust deposits.

The absence or absence of chalk covers on the surface of the Dingo Gap formation (Figure 35), formed by the deposition of wind-alluvial dust clouds formed after the cessation of the Gülnaz geochemical rock cycle (Tarhan, 2018), is thought to be a geological phenomenon proving the presence of water molecules in the Dingo Gap formation, suggesting that the Dingo Gap formation contains water molecules, and that the oxidized and subsequently deposited chalk cover dust interacting with water molecules was added to the Dingo Gap formation and disappeared. The sediments of the Dingo Gap formation, formed by the deposition of chalk dust wind-alluvial dust clouds, are loose, soft, and alkali-rich (Figure 35). However, while chalk dusts have diminished, the Dingo Gap formation, dominated by iron-rich sandstones of the Kimberly formation and iron-rich sands originating from cosmic upper mantle peridotite, consists of acidic and hard soils (Figure 36).

Therefore, the Dingo Gap formation likely overlies the Middle-Upper Pliocene Kimberly formation and earlier rock units with an angular unconformity (Figure 17). The Quaternary-aged Harran formation, which has an equivalent structure in the world and was formed in a similar way, is predicted to be Quaternary (Pleistocene-Holocene) in age (Figures 2, 10, 11, 14, 17). Today, agriculture is carried out on the Harran Formation, which forms the rich and fertile agricultural soils of the region. Olive, almond and pistachio trees are widely grown on the chalk series rock units in the region (Figure 14d). Phosphate of economic value is produced within the chalk series rock units (Kartalkanat et al., 2020, Kartalkanat et al., 2021).

Important conclusions emerge from the images shown in Figures (35a, b, c, d). A) The Dingo Gap formation consists of caramel-reddish-brown conglomerate/pebblestone, sandstone, siltstone, and mudstone. It constitutes the most fertile soil for agriculture on ancient Mars. It is soft, alkaline, and contains water molecules, so it is soft, and when NASA's geologist rover passes over it, it sinks because it is so soft, and its wheel tracks can be seen very clearly. Similarly, the Dingo Gap formation in the wide plains of the Jezero crater is much harder because it is ferrous and acidic (Figure 36a). When the geologist returns through the Dingo Gap formation (Qd) (Figure 35a), the outer atmospheric surface of the Gediz Vallis Channel formation (Mig) is covered with a glassy, amorphous, hard and impermeable crust, so the geologist's wheels do not sink, but only leave a faint trace in the thin dust cover of the wind alluvium, and also leave behind the soft soils of the Dingo Gap formation, which are trapped between his wheels on the hard ground.

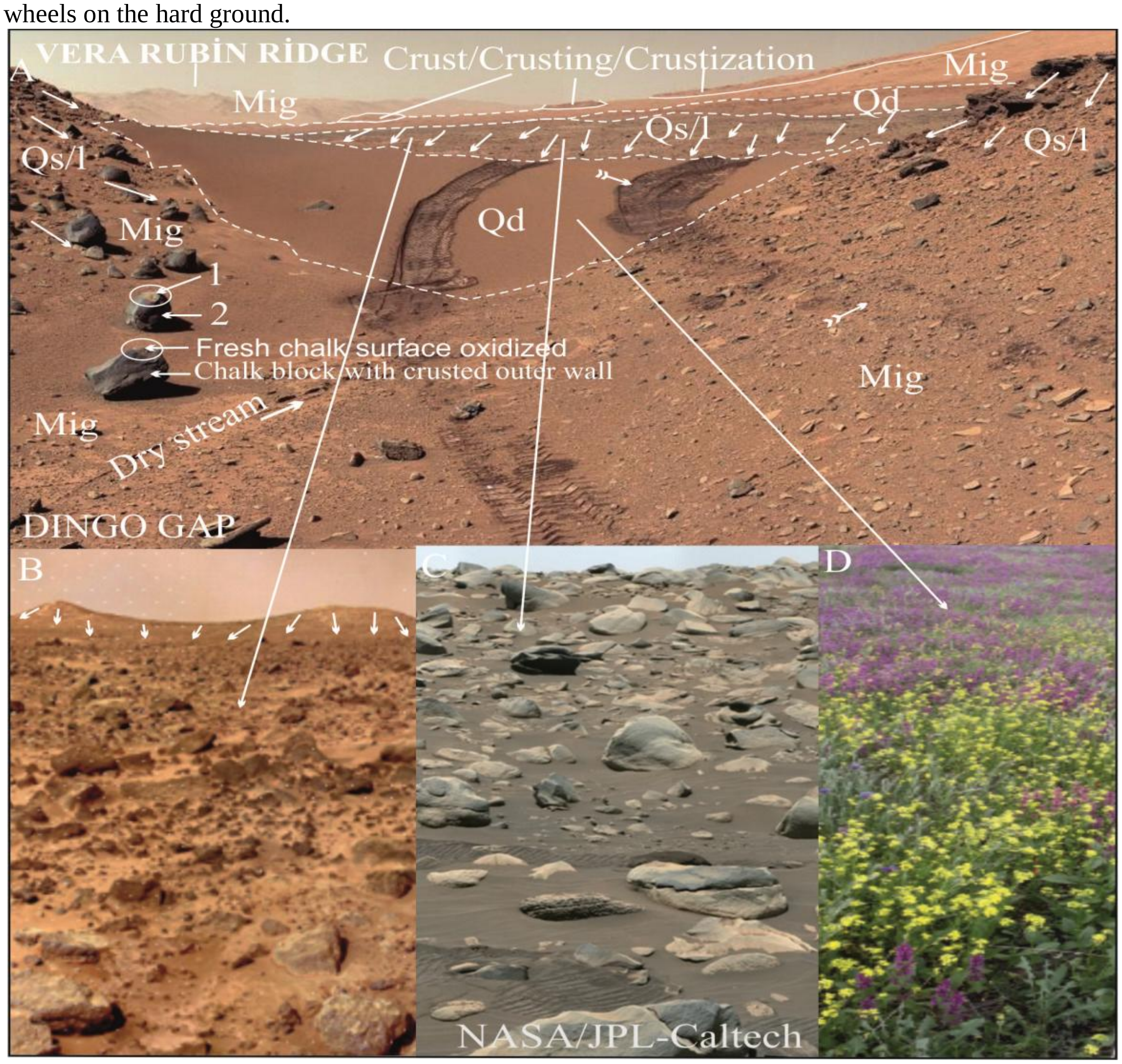


Figure 35a, b, c, d:-Some important geological inferences and facts from the Dingo Gap formation (Qd) (Image credit: NASA/JPL/Caltech; https://mars.nasa.gov/mars2020/multimedia/videos/).

We draw two conclusions from this: When the Gulnaz geochemical rock cycle of ancient Mars ended, there was no precipitation. When the Gulnaz geochemical rock cycle of ancient Mars ended, there was no rain, and the dust-chalk sedimentary cover/debris of the desert storm wind alluvium that settled on the hard and crusted ground was preserved in the form of a faint and oxidized chalk dust cover in the geologist's wheel tracks; However, the oxidized chalk deposits of the wind alluvium on the contemporaneous Dingo Gap formation are not visible. Why? Because the soft and alkaline soil of the Dingo Gap formation, containing water molecules, reacts with the chalk deposits above it, incorporating it as slaked lime, and transforming it into soil by likening it to itself.

For this reason, since there is no water in the hard ground, the oxidized chalk sediment cover of the wind alluvium continues to exist in its dry state. The geologist's wheel tracks on both formations are evidence of this. As the geologist travels through the soft soil of the Dingo Gap formation, he realizes at some point that he cannot go any further and is forced to return the way he came. Why? Because when the geologist realizes that there is a rocky area in front of him, made up of large chalk blocks with crusted outer walls, and that there is soft soil between these rocky blocks, and that he is going to sink, and that there is no one to save him from there, he does the right thing by turning back. He behaves in a manner appropriate for field geologists. According to field geologists, "The shortest and best way is the way you know," he says, returning the way he came.

The area that the geologist, a Mars rover, could not pass was an area of hillside debris and overflow sediment accumulation. These flood sedimentary deposits; The Middle Miocene aged Gediz Vallis Channel Formation is the thickest and most widespread formation on ancient Mars (in Gale crater and its surroundings), and contains chalk, evaporite deposits (containing gypsum-anhydrite, salt, gypsum, slaked and quicklime, bearing traces of microbial-macrobial life) and clay-sulphate minerals. It belongs to the crust covered with a thick and widespread, caramel-reddish-brown, glassy amorphous, hard, impermeable armor on the eroded atmospheric surface. The outer walls of the pseudo-blocks of this armored crust (solid phase dissolution, pseudo-bedding formed by solid flow and sudden cooling along the topographic slope of solid neo-solutions, solid flow protrusions and different block formations, etc.) are crusted (crust/crusting/crustization) chalk blocks, and they are slope debris and flood sediment accumulations that were torn from the crust/crustization surface by intense flood waters and carried/dragged to the lower plains in the direction of the topographic slope (Qs/l, Qf; B, C).

The glassy-amorphous, hard, impermeable, thick, and widespread crustation (crustin/crustin) on the topographic surfaces of the Middle Miocene Gediz Vallis Channel Formation's eroded morphology, which were in contact with the ancient Martian atmosphere, indicates that solid neosolutions developed by dissolution in the solid phase due to the temperature difference between Martian night and Martian day in the post-Middle Miocene paleoclimatology of ancient Mars (Figures 3, 5, 7, 9, 23, 27, 28, 29, 38, etc.). The solid neosolutions, due to the slope of the different topographical slopes during the Martian daytime when temperatures increased, formed pseudo-bedding, solid flow ridges, and solid blocking. Due to the sudden drop in temperature during the Martian nighttime, the solid material solidified into a hard, impermeable, caramel-reddish-brown, thick, and widespread armored crust/crust cover/coating.

I want to make it clear: glassy-amorphous, hard, impermeable encrustation develops only in chalk and chalk series rocks, a type of carbonate sedimentary rock (calcium carbonate/calcite) of organic origin, biochemically formed, and composed of microscopically small plankton. It has been determined that it does not develop in inorganic carbonate or limestone. This is the first time that the type of carbonate sediments in which encrustation develops has been introduced to the geological literature. The intense rainfall of ancient Mars has accumulated pseudo-bedding, solid flow outcrops and large and small crusted blocks, which have developed thick and widespread crustation on the surface of the formation with the winds of desert storms, alluvial chalk dust sediment covers and muddy waters, and has been removed from the surface and accumulated as slope and landslide debris/debris (Qs/l) and flood sediment deposits (Qf) on the Dingo Gab formation, where the slope has decreased, creating a stony and blocky area (A, B, C).

For example, in the image in A, the blocks falling onto the flat area down the slope due to earthquakes and flood waters along the topographic slope are not basalt blocks. It is clearly seen from the fallen blocks that the fresh surface of the broken block (1) is oxidized chalk. Number (2) is the same block whose atmospheric outer wall is completely covered with a hard, impermeable armored shell. In the image in C, the encrusted chalk blocks show a misleading bluish-gray fluorescence due to their content of anatase, an allotrope of titanium, which decomposes under ultraviolet light.

To better understand the large chalky blocky area and to see it up close, see images B and C. I'm sure you'll agree with the Martian geologist. Similar formations exist on our planet Earth (Figures 6, 9, 10, and 14). These chalk blocks don't fluoresce because the Earth's thick atmosphere filters out ultraviolet rays from the Sun. Local people created scoured areas by clearing these blocks with heavy equipment and breaking the chalky blocks with heavy equipment to reclaim the fertile soil between them (see Figure 9). It's also possible to reclaim fertile agricultural land on Mars in this way. D) The Dingo Gap formation of ancient Mars and the rocky area to which the geologist returned once had such beautiful natural plants. It's been thought, envisioned, and proposed that it might be possible to restore ancient Mars' extinct life and transform it into a habitable planet.

In this way, by sharing the suffering of ancient Mars, it would be happy to provide a second world for the aliens from Earth. Because in the nature of matter are to act together, to create, to beautify, to reproduce, to enrich, to evolve, to share, to protect, to repair, to sustain and to protect. Negativity and destruction are never in its nature. Unfortunately, negativities, not sharing, not acting together, destroying, damaging the environment-nature-water-forests-living beings-atmosphere, polluting and owning things are thought to be the faults of intelligent earthly creatures that have not yet completed their evolution. It is as if our planet Earth was thought of as a place created solely for the intelligent beings of Earth. It is the intelligent earthly creatures that benefit from all the beauties of the planet. However, it has been thought that they do the most harm to the planet and disrupt the natural ecosystem the most. It has been thought that they are in a sleep as if if these intelligent beings did not exist, these terrestrial rocky planets and their satellites (Moons) would not have formed. I would like to express my discomfort about this! This phenomenon also; However, it was thought, envisaged and suggested that the problem would be solved not by theological views, but by the dissemination and application of positive sciences.

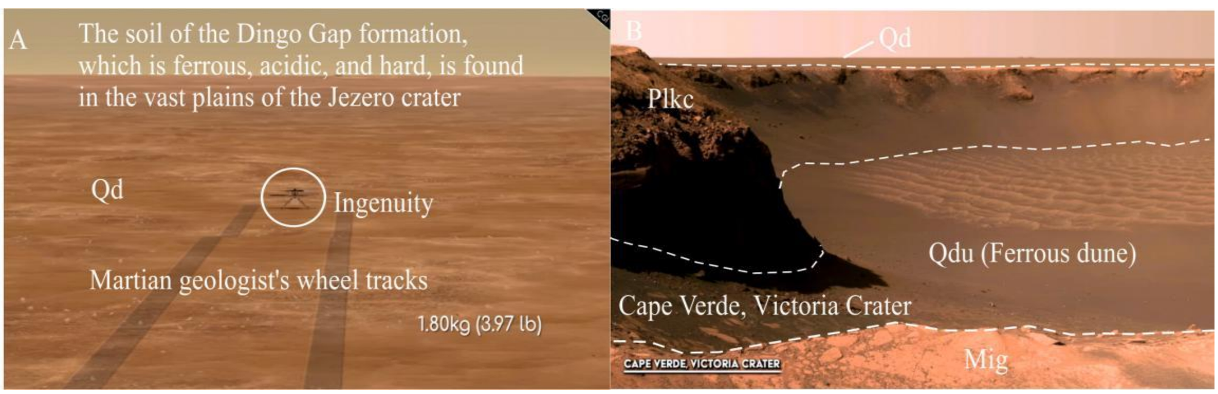


Figure 36a, b:- A) The Dingo Gap Formation (Qd), formed in the broad plains of the Jeero crater basin, has a hard, iron-rich and acidic soil. The geologist's wheel tracks are faint. The Mars geologist's guide and assistant, the Ingenuity helicopter, greets him. B) At the bottom of Victoria crater lies the Middle Miocene-aged Gediz Vallis Channel Formation, whose atmospheric outer surface has been crusted (crustification). The iron- and copper-rich basal conglomerate (Pebblestone Member, Plkc) of the Kimberly Formation (Plk) overlies this formation with horizontal bedding and an angular unconformity. The Dingo Gap Formation (Qd) overlies this member as a thin cover with angular unconformity and horizontal bedding. Iron-rich sand dune (Qdu) is present within the crater (Image credit: NASA/JPL/Caltech; https://mars.nasa.gov/mars2020/multimedia/videos/).

Old Alluvium/Terrace (Qta):-

This is the consolidated, cemented old alluvium composed of pebblestone, sandstone, siltstone, and claystone, generally found high on the banks of large river beds (Figure 37).

Slope and Landslide Debris (Qs/l):

Dust blankets form when alluvial dust (loess, aerosols, regolith) from desert storms settles on rock surfaces, typically in areas with steep topographic slopes. They form when heavy precipitation (snow and rain), along with muddy water generated by these dust blankets, washes away the debris from the rock surfaces and transports it to and deposits it in depressions, plains, and other areas where the slope decreases in the direction of the topography. Landslide debris develops when rock and landslides slide downslope (Figures 17, 23, 28, 30, 32, 33, 34, 35, 38, 39).

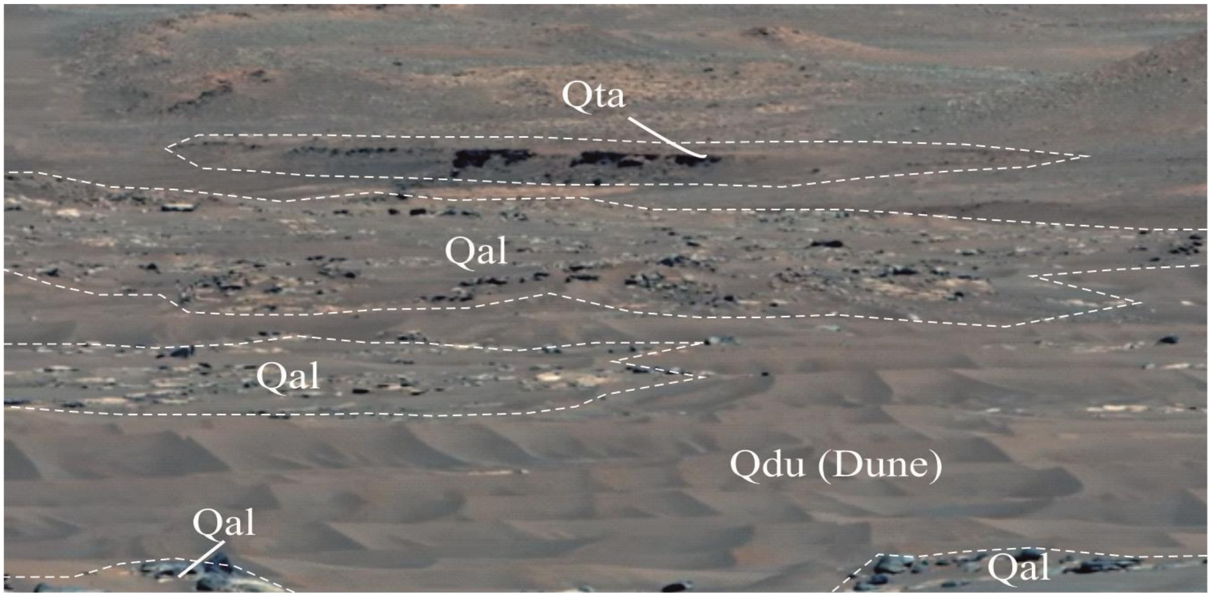


Figure 37:- Horizontally bedded, suspended old alluvium/terrace on the margin of the dried-out Neretva Vallis riverbed in the western delta of Jezero crater. Qta, Terrace/Old alluvium; Qal; Alluvium (chalk gravels and blocks with bluish-blackish fluorescence); Qdu, Dune (probably rich in titanium-anatase) (Image credit: NASA/JPL/Caltech; https://mars.nasa.gov/mars2020/multimedia/videos/).

Flood Deposits (Qf):-

Flood deposits are observed to have developed extensively in floodplains, streams, and riverbeds due to heavy rainfall on ancient Mars. They are most common in the low-sloping areas around Wharton Ridge, Wodowiak Ridge, Snowdrift Peak, Mozaic, Bonnevile, St. Louis Crater, and Kodiak Hill in the western delta of Jezero Crater (Figures 17, 27, 33, 34, 35b,c, 37, 38a,b, 39).

Alluvial (Qal):-

These deposits are very common in the form of unconsolidated gravel, sand, silt, and clay in dried stream, river, and river beds. They are found in the Marathon Valley. Although often covered by alluvial deposits from desert storm winds, the alluvial deposits are clearly visible (Figures 17, 37, 39).

Gray Wolf Peak Basalt Lava (Qg):-

The typical outcrops of this unit are observed in images taken by the NASA geologist Opportunity rover in the Greeley Haven region of Gray Wolf Peak and Endeavor Crater. It was first identified, named, and proposed as **the Gray Wolf Peak basalt lava**. This basalt lava also occurs near Ireson Hill, Vera Rubin Ridge, Green Heugh Pediment, Logon Pass, and Garden City (Mount Sharp).

The unit consists of olivine basalt lavas of the "Pahoehoe" type, which are generally dark-black in color, have high fluidity and temperature, and are rich in iron-olivine-pyroxene-ilmenite, plagioclase-titanium/titanium (TiO_2). These lavas have emerged from the fracture-extension cracks of an anatexitic magma formed from the partial melting of the iron-rich cosmic upper mantle peridotites of Mars, flowing in plateau-type stream beds. These lavas may exhibit a slightly misleading blue-black-grey fluorescence due to the presence of the allotrope mineral anatase, due to the thin atmosphere of Mars and the ultraviolet/ultraviolet radiation from the Sun.

However, there are other chalky pebbles and blocks that exhibit bluish-black-grey fluorescent properties, which are common in the depressions, floodplains, and dried-out river alluvial beds that were very common on ancient Mars. These blocks are not olivine-bearing basalt blocks. In order to separate these two blocks from each other, glassy, amorphous, hard and impermeable armored crust/encrustation has not developed on the atmospheric outer surfaces of the basalt blocks and lavas. Fractured and fragmented surfaces appear dark black. However, because the chalk-formed pebbles and blocks are composed of phytoplankton, they contain abundant titanium. Solid neosolutions develop on the atmospheric surfaces of such blocks due to the temperature differences between Martian night and Martian day. Solid neosolutions solidify as a glassy-amorphous solid crust due to the decreasing temperatures during

Martian nights. When titanium dissolves in the solid phase, it solidifies as the polymorphic anatase allotrope during sudden temperature drops. As a result of these repeated events, the atmospheric outer walls of chalky rocks and gravels become coated with a hard, impermeable, caramel-reddish-brown, glassy-amorphous shell. Since the anatase/anatase mineral within the glassy-amorphous outer wall armor of such gravels and blocks cannot filter the ultraviolet rays coming from the Sun due to the thin atmosphere of Mars, the anatase mineral, which is widespread within the glassy-amorphous outer wall armor of chalky gravels and blocks under ultraviolet rays, shows high photocatalytic activity under ultraviolet light and thus fluorescent colors in flammable blue-black-grey tones (Figures 17, 20, 27, 28, 29, 32, 34, 35a,c, 37, 38, 39).

Why? Because I have clearly mentioned, at high temperatures, in temperature changes between day and night, solid phase dissolution and solid neosolutions develop on the surfaces of chalk and chalk series rock units that are in contact with the atmosphere, which are a type of sedimentary rock with only organic composition, biochemically formed, and composed of microscopic small plankton. These solid neosolutions solidify as a glassy, amorphous (non-crystalline) solid due to the sudden drop in temperature at night, forming a hard, impermeable, compact armored shell. This crust/crusting/crustization phenomenon develops only in chalk rocks and chalk series rocks that are of organic origin and biochemically formed during day and night temperature differences.

Basalt, volcanic, sedimentary, and carbonate origins do not develop on the atmospheric surface of any inorganic rocks; even if they do, they are very thin, at the millimeter or centimeter level. In other words, crustation does not develop on the outer walls of basalt lavas and blocks. The presence of this crustal armor, which we have identified for the first time on Mars, in ancient Martian rocks provides further geological evidence and indicators proving that the rocks on ancient Mars were composed of thick and widespread chalk or chalk series rocks, providing precise and accurate results regarding their paleoclimatology. Therefore, the crusting (crusting/crustization) that developed on the atmospheric surfaces of chalk series rocks is a new discovery in the geological literature, providing clear and conclusive evidence and indicators of macrobial and microbial life. It should be noted that if thick crusting developed on the atmospheric surfaces of rocks exposed on other rocky and terrestrial planets and moons, biochemically formed organic-origin chalk series rocks formed, and macrobial and microbial life existed or could have existed.

Even though ilmenite and titanium are common in olivine basalt lavas or basalt blocks, they generally do not fluoresce under ultraviolet light because they are not allotopic anatase minerals. Because anatase mineral (TiO_2) shows high photocatalytic activity (radioactive decomposition) under ultraviolet light. Another piece of evidence is that no crustal formation has developed on the atmospheric outer walls of basalt lavas. Why? Because these young basalts indicate that the ancient paleoclimatology changed during the period when they developed, and dry, cold and desert winds were blowing. However, similarly, because phytoplankton and zooplankton type microorganisms and plants contain titanium widely, the chalk series rocks formed by these plankton type microorganisms had a different paleoclimatology than the ancient Mars after the Middle Miocene.

Mars had hot days, cool nights, a large temperature difference between them, and a hot and dry desert climate where evaporation was greater than precipitation. For this reason, the solid phase developed on the outer surfaces of the chalky rocks in contact with the atmosphere due to the increasing heat of the Martian days, and the hard crust/encrustation developed in contact with the atmospheric surface due to the sudden solidification of the glassy amorphous (non-crystalline) substance into anatase, the allotrope of titanium, due to the decreasing temperature during the Martian nights.

The pseudo-bedding developed on the surface of the chalk rocks, the solid flow protrusions and the glassy-amorphous, hard, impermeable crust/crustation on the outer walls of the blocks are clearly observed in NASA video images (NASA/JPL-Caltech) where they show blue, false fluorescent colors due to ultraviolet rays. The gravel, blocks, dust and debris of chalk rocks exhibit deceptive blue-blackish-grey fluorescent colors as a result of their highly photocatalytic radioactive decay under ultraviolet rays; It indicates that the chalks are composed of microscopically small phytoplankton and zooplankton containing rich titanium and phosphate (Figure 27). This is another piece of evidence that shows that there was microbial and macrobial life on ancient Mars, and the fluorescent properties of these different rocks are traces of life. In short, there is no end to writing down the evidence for microbial and macrobial life on ancient Mars. So many… The important thing is, how and in what way can we bring this living life back? It has been thought, envisioned and suggested that restoring ancient Mars to its former state and making it a habitable planet should be among our priorities…

In particular, images taken by Perseverance in the Greeley Haven area of Endeavour Crater show olivine basalt lava(s) spreading and flowing along dried streambeds. Dust devils are commonly seen in that location. This olivine basalt lava, which flowed and spread along the stream, and the olivine basalt lavas of the same age elsewhere (Figures 17, 29a, 38) are thought to correspond to very important geological concrete phenomena on the planet Mars. It has been determined that the rock stratigraphic units outcropping on the ancient planet Mars are very similar to the rock units outcropping in Southeastern Turkey on our planet Earth, both in terms of stratigraphic relationships and rock type characteristics (Figures 2 and 17).

Therefore, the rock stratigraphic units outcropping on ancient Mars are dated according to the rock stratigraphic units with which they are compared on Earth. Inferring this, the flow and occasional erosion of dark black olivine basalts, rich in iron, olivine, pyroxene, plagioclase, and titanium-ilmenite, in streams and on ancient Mars, contributed to the sand dunes.

The Middle Miocene aged Gediz Vallis Channel formation (Mig), which contains chalk and evaporite deposits (gypsum-anhydrite, salt, gypsum, hydrated-quicklime, clay-sulphate minerals, etc.), has very thick and widespread outcrops in the region, the Middle-Upper Pliocene aged Kimberly formation (Plk), and the Quaternary aged Dingo Gap formation (Qd) which unconformably overlies the eroded morphologies of these formations, and the fact that it flows over the fluvial alluviums in the streams (Qal) are thought to mean that this olivine basalt lava is the youngest magmatic rocks of volcanic origin in the Gale crater and its surroundings (Figures 2 and 17).

The erosion of Gray Wolf Peak basalt lava and the formation of dunes from it (Figures 29, 38) are older than dunes on Mars. However, it constitutes the youngest volcanic-origin magmatic rock unit among all rock units on Mars (Figures 2 and 17). Therefore, the age of the Gray Wolf Peak olivine basalt lava is of importance. Radiometric dating from this lava will provide an approximate relative age for when ancient Mars lost its atmosphere, the Gülnaz geochemical rock cycle, and microbial and macrobial life. There are lavas that exhibit properties similar to the Gray Wolf Peak basalt lava. Therefore, the Gray Wolf Peak basalt lava is assigned a Quaternary age due to both stratigraphic relationships on Mars (Figures 2 and 17) and Quaternary Pahoehoe-type, hot, long-distance fluid tabular/sheety/cohesive lavas that have flowed along streams on Earth.

The Gray Wolf Peak basalt lava is very young, and is thought to have formed between 50,000 and 300,000 years ago. The Gray Wolf Peak basalt lava(s) likely developed after ancient Mars lost its atmosphere, geochemical rock cycle, and biota. It flowed over the Quaternary Dingo Gap Formation and along the dry stream. Because if there had been water in the stream, it would have changed direction and left an alluvial mark in the thin cover of the caramel-reddish-brown Dingo Gap formation, suitable for agriculture at the edge of the lava.

In the interaction of basalt lava with water at a temperature of about 1200 °C, some chemical reactions and geological phenomena would develop. No evidence of these reactions has been observed. However, it is thought that in the regions where it flows over chalky rocks, firing zones have developed under the chalk rocks at the base and their encrusted armored covers (Figure 29a). Therefore, Gray Wolf Peak provides very important concrete geological data regarding the paleoclimatology of ancient Mars at the time when the olivine basalt lava developed.

Quaternary aged olivine basalt lavas are present in Gale Cretaceous and its surroundings on ancient Mars, forming the youngest magmatic rocks of Quaternary volcanic origin, and are the equivalent of the hot, fluid, tabular-tight Pahoehoe-type Gray Wolf Peak olivine basalt lava in southeastern Turkey, which flowed along dry stream and riverbeds. The Euphrates River, which flowed into the Mediterranean Sea along the Karasu River basin, filled the Arban basin (Gaziantep) and the graben formation along the Araban basin-Nurdağ-Hatay-Amik plain, changed direction around Araban and began to flow into Syria via Birecik (Şanlıurfa).

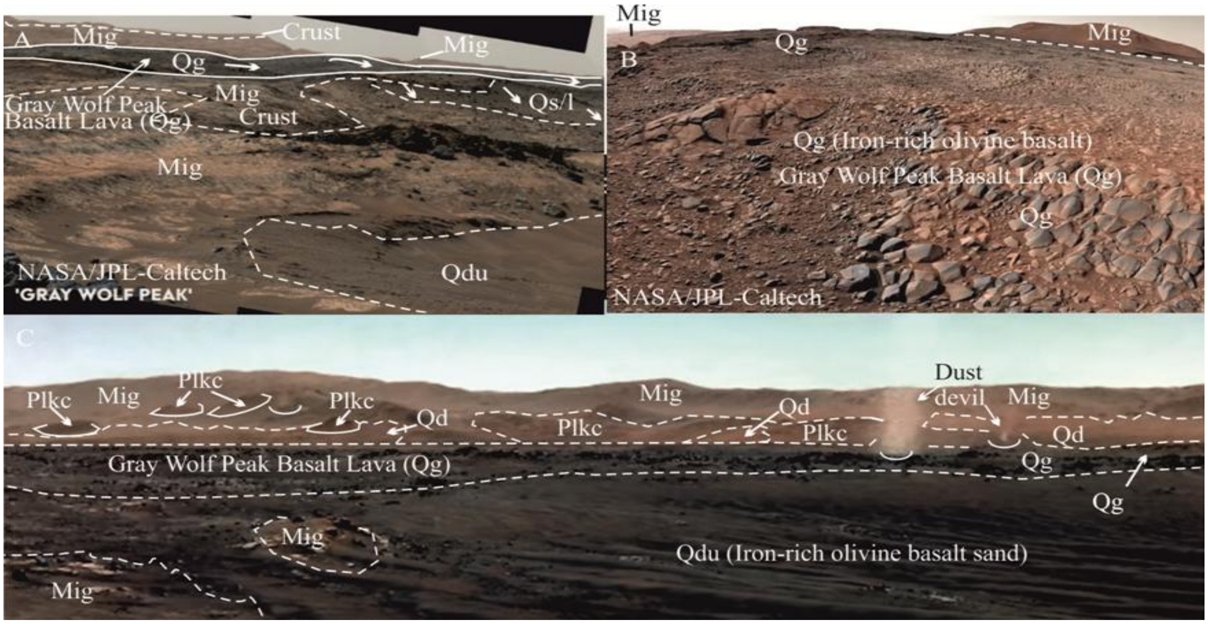


Figure 38a, b, c:- Appearances of the Gray Wolf Peak ferruginous-olivine, dark black, tabular, cord-like, hot and fluid olivine basalt lava at different locations (Qg). A) Flow over the Middle Miocene aged Gediz Valis Channel formation in the direction of the topography slope where the type is seen. B) Blocky and eroded outcrop of iron-rich Gray Wolf Peak olivine basalt lava on the Middle Miocene Gediz Valis Channel formation due to sudden cooling. C) Pahoehoe-type, dark black iron-rich olivine basalt lava flow and dust devils flowing along the streambed in the Greeley Haven area of Endeavour Crater, captured by Perseverance. Dark black, uncrusted, olivine and iron-rich Gray Wolf Peak basalt lava flowed along the dry riverbed over the Middle Miocene Gediz Vallis Channel Formation, the iron and copper-rich conglomerate/pebblestone member (Plkc) of the Middle-Upper Pliocene Kimberly Formation, and the Quaternary Dingo Gap Formations. Qg, Gray Wolf Peak olivine basalt lava; Qal, Alluvium, Mig, Middle Miocene Gediz Vallis Channel formation; Plkc, conglomerate/pebblestone member of the Kimberly Formation; Qd, Quaternary Dingo Gap formation; Qdu, dune (composed of basalt dust and sands) (Image credit: NASA/JPL/Caltech; https://mars.nasa.gov/mars2020/multimedia/videos/).

Similarly, in Syria, Quaternary-aged lava flows fill the riverbed and the Syrian river flows backwards, flowing into the Mediterranean as the Orontes River in Turkish territory. These youngest volcanic, hot, and fluid Pahoehoe-type olivine basalt lavas, which filled and diverted Quaternary stream and riverbeds in southeastern Turkey, are thought, predicted, and proposed to be equivalents of the volcanic, magmatic Gray Wolf Peak olivine basalt lavas that filled dry riverbeds in Gale Crater on ancient Mars, and to have developed through a similar mechanism. It is thought, predicted and suggested that if the ages of these youngest Quaternary continental basalt/plateau type lavas developed in the Karasu Çay graben basin in Southeastern Turkey and the ages of the streams they change direction are determined, the age of the Gray Wolf Peak olivine basalt lava, the youngest and last volcanic lava of Ancient Mars, will make significant contributions to the geodynamic evolution of Ancient Mars. It has been thought, predicted and suggested that the Quaternary-aged, youngest and most recently developed olivine basalt lavas on both planets are most likely allotropic equivalents of each other, formed within similar time periods (probably developed thousands of years ago) and by similar mechanisms.

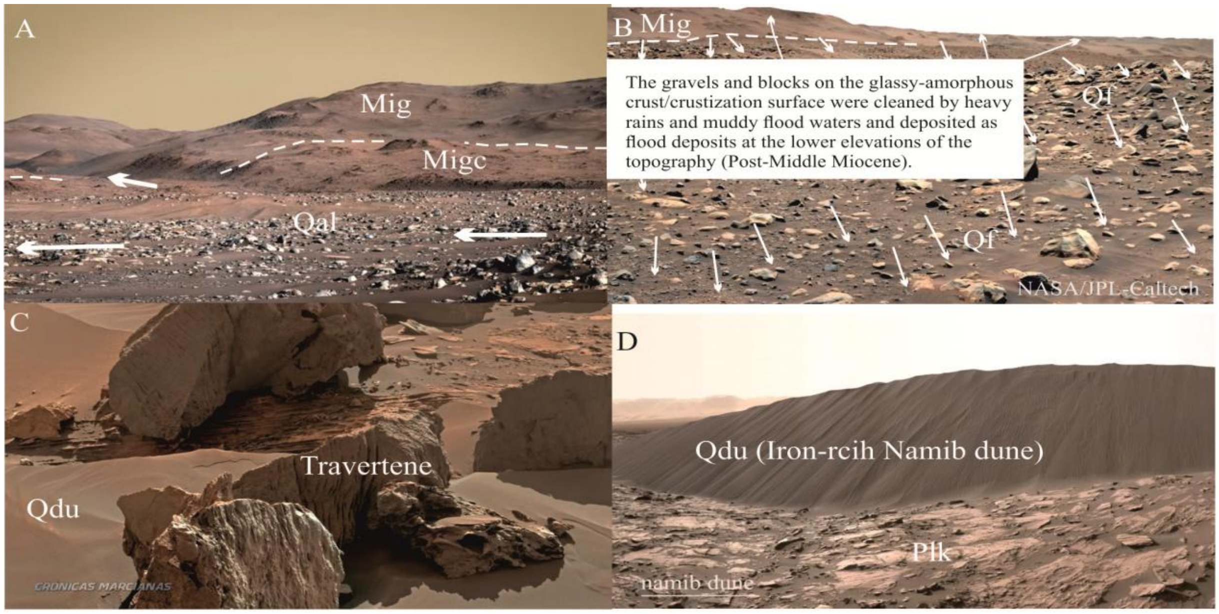


Figure 39a, b, c, d:- A) Alluvium in a dry riverbed developed over the Middle Miocene Gediz Vallis Channel formation (Mig) and conglomerate/pebblestone member (Migc). B) The Middle Miocene aged Gediz Vallis Channel Formation (Mig), composed of chalk, evaporite deposits (containing gypsum-anhydrite, salt, gypsum, slaked-quicklime and clay-sulphate minerals), coquina and macrolide limestones, forms solid neosolutions by dissolution in the solid phase due to day-night temperature differences in the direction of the topographic slope on its eroded atmospheric outer surface. Solid neosolutions develop thick and very widespread pseudo-bedding, solid flow protrusions (cone hills/elevations in the morphology of the Middle Miocene units (Mig, Migc) in the photograph in A) and blocking in the direction of the topographic slope during the Martian days.

During Martian nights, when temperatures drop suddenly, these solid flow structures that develop on top of each other solidify into a glassy amorphous material. In the continuation of such processes, the surface of the formation is covered with glassy amorphous pseudo-bedding, solid flow protrusions and blocky armored crust. These types of blocks, flow ridges and pseudo-bedded structures that have flowed on top of each other develop on the surface of the formation and are dragged and accumulated as flood sediments to the downhill plains over the impermeable crust by muddy waters together with wind alluvial dust deposited on them during heavy rainfall and by accumulation of flood sediments. The surface of the crusted formation is also seen in a shaved and cleaned form. C) Cold water lacustrine travertine. D) Generally, iron-rich sand dune structures have developed along the fault systems within and on the edge of the Gale crater tectonic zone basin. Mig, Middle Miocene Gediz Vallis Channel formation; Migc, conglomerate/pebblestone member; Qf, Flood deposits; Qta, Travertine; Qal, Alluvium, Qdu, dune (Image credit:NASA/JPL/Caltech; https://mars.nasa.gov/mars2020/multimedia/videos/).

Dunes (Qdu):-

Extensive sand dunes were formed on Mars by the desegregation of chalk rocks, iron-rich basalt lavas, iron-rich cosmic Upper Mantle peridotites, and the iron- and copper-rich, caramel-reddish-brown basal conglomerate (Pebblestone/Plkç) of the Kimberly Formation, resulting from the cracking, fragmentation, and disintegration of the rocks caused by the temperature difference between Martian day and night. These sand and dust were blown by very strong desert storms. Sand dunes are generally widely developed in crater tectonic zone basins and margins. For example, the Rub Al Khalli, Bagnold, and Namib dunes (Figures 17, 20d, 26, 29b, 33, 34, 39c,d).

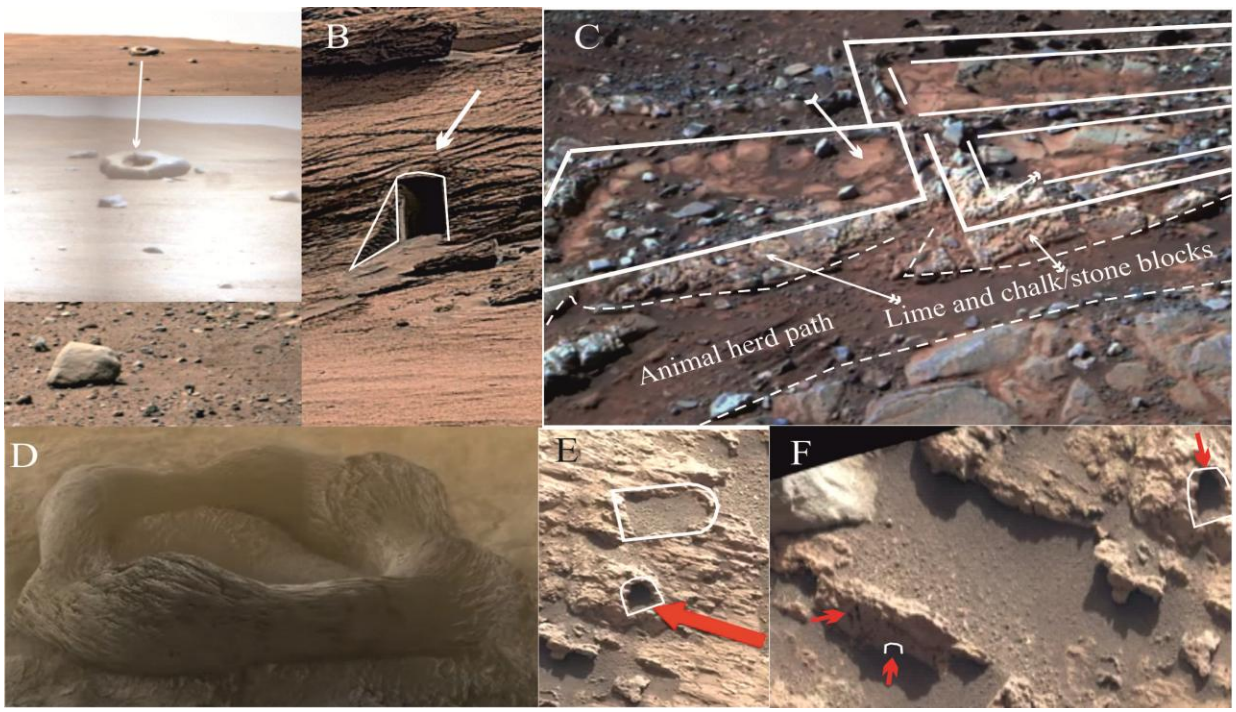
Wind Alluvial Deposits of Desert Storm (Qw):-

When the atmosphere of ancient Mars disappeared, the Gülnaz geochemical rock cycle (Tarhan, 2018) (snow, rain, erosion, transport and deposition, etc.) stopped/froze. Existing water evaporated at low atmospheric pressure, ending the geochemical rock cycle. However, on ancient Mars, dust (chalk, ferric, metal-nonmetal oxide, hydroxide/hydrate compounds, etc.) carried by wind alluvium (loess, aerosol, regolith) clouds resulting from harsh and cold desert storms deposited on the Martian surface, developing and continuing to develop the final thin wind alluvium cover (Figures 17, 33a,b, 35a,b,c). Because there is no rain, this dust blanket continues to remain where it was deposited.

Traces of Settlement on Ancient Mars:-

Some images captured by NASA's geological rovers clearly demonstrate the existence of macrobial and microbial life on ancient Mars. It is certain that some of the traces seen in the photographs in Figures (40a, b, c, d, e, f) did not develop spontaneously under natural conditions, but were artificially created by someone. A) A chalky rock is flattened, with a circular hole in the middle and a geometric shape with protrusions outwards. It is not known for what purpose it was made. B) A smooth, artificially constructed cave entrance in a massive, solid, thick, homogeneous, probably low-grade metachalk rock derived from chalk. Considering the height and width of the cave entrances, it becomes clear that the large-eyed, large-headed, short, and green-skinned Martians depicted in the films are not real. Martians are our organic allotropes.

Their physical characteristics may differ, but their emotions and thoughts are similar, like those of Earthly aliens. They do not have green skin. These are not photosynthetic plants. Their average height is estimated to range between 170 and 190 cm. Considering the paleoclimatology of ancient Mars during the Quaternary, it is predicted that they could have had white, dark, or blackish skin tones. However, their physical appearance may have varied depending on different regions of ancient Mars. However, they are definitely not short, green-skinned Martian aliens like those in science fiction films. Because in the rocky-terrestrial planets and satellites (Moons) where there are alien intelligent creatures in the Universe, they form allotropes of each other's organic forms, with different physical properties, similar to the alien intelligent creatures from Earth. Because matter follows the same immutable laws no matter where it is in the Universe and in any time dimension (Tarhan, 2024c).



Figures 40a,b,c,d,e,f:- Based on the concrete facts seen in these images, it is clear that these were not naturally developed but were made by indigenous Martians. It is certain that Martian space creatures were intelligent and intelligent enough to paint, live comfortably, use mathematics and geometry, and measure and cut (Image credit: NASA/JPL/Caltech; https://mars.nasa.gov/mars2020/multimedia/videos/).

C) A rectangular shelter surrounded by stone walls made of chalk blocks, probably a temporary highland site where small herds of cattle (their species are unknown) were kept, and shelters surrounded by chalk blocks. Some sections of these stone walls were probably built using lime and chalk stone blocks. The outer atmospheric walls of chalk gravels and blocks exhibit bluish fluorescence under ultraviolet light due to the rich content of anatase (TiO_2), a polymorphic allotrope of titanium, forming a glassy amorphous crust. The floors of these communal animal shelters were likely paved with smooth-surfaced chalk blocks. The chalk blocks on the wide herd road adjacent to the animal shelters have been cleared. In addition, considering the bluish fluorescence properties of the atmospheric outer walls of the crusted chalky blocks of the Middle Miocene Gediz Vallis Channel Formation and the Middle-Upper Pliocene

Kimberly Formations used in this construction and the paleoclimatology of ancient Mars at this time, it is thought, predicted and suggested that the construction of these animal shelters and the formation of caves probably took place after the Upper Pliocene, in the Quaternary period (probably 50-300 thousand years before present). These animal shelters on ancient Mars exist in places used as plateaus in many countries on Earth today. However, the shelters built for small cattle in the world were built with thick, 1.5 m high stone walls in areas where there were no forests.

However, in areas where there are forests, the lower parts are supported by a row of stone blocks, as on Mars, and the rest is covered with hedge trees lined up side by side and planted at a height of about 1.5 m. A similar relationship is likely observed on Mars. It is thought that forests were common in the region where these animal shelters on Mars were located. The aim was to protect the small ruminants they had domesticated (possibly pigs, llamas, deer, chamois, sheep, goats and lambs, etc.) against wild and predatory animals. They may even have used them for large livestock as well. It is thought that ancient people probably protected their small livestock in this way. This phenomenon means that there were predatory and wild natural animals on ancient Mars, that is, macrobial life. There is a lot of evidence similar to this in NASA images... D) Again, a ringed, regularly geometrically shaped torus shape made of chalk rock. It is unknown for what purpose it was made.

E) A smooth cave entrance in the shape of an arch, which is impossible to develop by natural means, but was artificially created. Next to it, there is a shallow pit carved into the metachalk rock, rectangular in shape, neatly cut, with an arch-shaped 'Ո' entrance like a cave entrance, and ~40-50 cm. It is predicted that the base surface is flattened on a sloping chalky rock topography and is ~40-50cm deep, and that the ancient Martians sat on the ground they flattened in this pit and used it as a pillow, leaning their backs on the cut surface of the chalk rock. It could possibly be a summer settlement covered with trees and plants, like primitive tribes around the world. It is thought that they used the caves as permanent shelters during rainy and hot and cold weather. It has been observed that there are similar collectively constructed sites in the Yellowknife Bay region. F)

Various cave entrances built into the metachalk rocks, indicating a collective and settled settlement. These impressions suggest that ancient Martians emerged from caves, settled near caves, and advanced in their evolution. Homo habalis, the oldest known human species on Earth, first appeared in East Africa approximately 2.4 million years ago. We know from scientific sources that they left Africa approximately 70,000-100,000 years ago. Therefore, according to evolutionary theory, the Martian Homo habilis/Homo erectus, which likely developed 2.4 million years ago on ancient Mars, whose lithological features, peleoclimatology, and ecosystem are very similar to those of today's world, are thought to have evolved from early hominid ancestors 200,000-300,000 years ago, transitioning to Martian Homo sapiens. Furthermore, according to scientific data from around the world, they developed the ability to speak language 50,000 years ago. These remains and traces of mass settlements on ancient Mars must be a result of this language ability. Similarly, excavations in underground cities, caves and widespread mounds in Southeastern Turkey have revealed that they emerge onto the ground surface and into open areas in settlements on, around and near them.

Discussion:-

The findings of Buz et al., (2017), and Bristow et al., (2021), revealed by NASA's Mars Science Laboratory Curiosity rover (MSL) in the sedimentary rock stack in Gale crater, the rocks on the crater wall, and the Gale Crater/Aeolis Palus/Glen Torridon tectonic zone flat basin, in their analysis of high-resolution images and infrared spectra, are consistent with our geological facts regarding the geology of Gale crater. It appears that the sedimentary stack in Gale Crater contains cosmic upper mantle peridotites (Gp) of Mars, which are resistant rocks, at the bottom (Figure 17). They indicate that the rock units of the Monunt Sharp chalk series (KMim) and the Gale crater wall/rim rocks, which are among the chalk series rock units overlying the mantle peridotites, show similar characteristics of basement/base rock containing olivine accompanied by Fe/Mg phyllosilicates.

It is very true that they stated that although they searched for feldspar minerals in the rock units in question, they did not find them. Because the Chalk series rock units overlie the eroded morphologies of iron-rich olivine upper mantle peridotites with angular unconformity and horizontal bedding. They have inherited clasts and minerals from the peridotites at the base. They do not contain feldspar. Because they form a type of calcium carbonate/calcite type sedimentary rock of biochemical origin, consisting of white sticky mud and organism remains formed by the death of phytoplankton/plant plankton and zooplankton/animal plankton on a microscopic scale. They naturally contain magnesium/iron and smectite clay minerals. The rock units forming the chalk series contain clay, marl and silt, and have been weathered and disintegrated by precipitation after their deposition. It is clearly seen that the uppermost sedimentary units in Mount Sharp (Aeolis Mons) in Gale crater contain chalk, evaporite deposits (they contain gypsum-anhydrite, gypsum, salt, hydrated-quicklime) and clay-sulphate minerals, and that in our study, the Upper Maastrichtian-Lower Miocene Mount Sharp chalk series (KMim), which is a biochemically derived sedimentary carbonate type, is the Middle Miocene Gediz Vallis Channel Formation (Mig) composed of chalk, sulphate minerals and evaporite deposits that overlay the eroded surfaces of the rock units with angular unconformity and horizontal bedding (no folded orogenic phase developed between the rock units) (Figures 17, 19, 23, 24, 26 etc.).

Buz et al., (2017), note that the sedimentary layers at the bottom of Gale crater (Mount Sharp chalk series) are likely the same age as the Bradbury units discovered by Curiosity and are also hydrated and/or contain Fe/Mg phyllosilicates. The authors also pointed out very important points. They note that olivine and Fe/Mg phyllosilicates are common in the Gale rim/wall rocks, that feldspar-rich units were sought but not detected; They noted that multiple units of hydrated and hydroxylated materials were present in the ground materials southwest of the MSL landing site, and that a >90 m thin-bedded sedimentary sequence (probably Middle-Upper Pliocene Kimberly Formation) on the northwest Gale crater floor exhibited changes between lacustrine and eolian environments. These important findings are clear evidence and indicators that the sedimentary rock units in Gale Crater do not contain plagioclase minerals but are composed of similar rocks (i.e. chalks).

The prevalence of hydrated and/or Fe/Mg phyllosilicates in the Gale Crater/Aeolis Palus/Gelen Torridon flat tectonic basins (Dingo Gap formation/Qd) consisting of Quaternary arable soils) is compatible with and overlaps the soft and alkaline soils of the Dingo Gap Formation (Qd), which was brought and deposited by the most fertile caramel-red-brown floodwaters of Mars.

Because the Dingo Gap formation is formed as a result of the deposition of dust clouds consisting of desert storm wind alluvium (loess, aerosol, regolith), organic chalk, inorganic iron and non-metallic oxide compounds (trace amounts) of metal-metal elements onto the ancient Martian surface, resulting in dust cover deposits/deposits with different chemical compositions. It is very clear that these dust blankets, which have different origins, were formed as a result of the washing and cleaning of mud, gravel, and blocks on the surface of the Martian rocks by intense rainfall waters that developed in the post-Upper Pliocene paleochylomatology of Mars.

They were transported by streams, rivers, and rivers to troughs, wide valleys, canyons, and flat plains. Chalk [(calcium hydroxide/hydrate/$Ca(OH)_2$)], hemetite [(ferric hydrate/hydroxide/$Fe^{3+}(OH)_3$)] and/or metal-nonmetal hydrate/hydroxides. In addition, as mentioned in the text, it is very clear that these basins generally contain dunes composed of Fe/Mg-rich sand, chalk sand, Fe/Mg-rich clays, and anatase dust and sand, which were formed from the desegregation of upper mantle peridotites rich in iron, ilmenite-titanium-olivine.

The views of these researchers are absolutely correct in that the rocks forming the sedimentary rock stack in Gale Crater are porous, have low densities, and have not gone through a maximum burial phase since their formation. It has been determined and suggested for the first time that the rock units that constitute the continental crust of ancient Mars, both in Gale crater and along the routes passed by Mars geological rovers in the region, are generally composed of chalk series rock stratigraphy units of organic origin, consisting of porous, biochemically formed, microscopically small plant/phytoplankton and animal/zooplankton of different ages (95-99%). Chalk series rock units of different ages were deposited with angular unconformity on the hard Gale Crater peridotites (Gp), which form the iron-ilmenite-olivine rich cosmic upper mantle peridotites (iron-rich olivine, pyroxene, ilmenite, etc.) of ancient Mars (Figures 17, 18, 19, 20b, c, d, 23, 24, 26, 32, etc.).

They received clasts, minerals, and materials from them. Gale Crater peridotites (Gp), which form the cosmic upper mantle peridotites of ancient Mars, are widely exposed along the active fault zones and are clearly and distinctly seen in NASA's publicly available video images, beneath the Quaternary Dingo Gap formation (Qd), which consists of caramel reddish-brown colored deposits/sediments of flooded river sediments in the wide stream and valley beds, and in the wide plains and plains first defined and named as the Gale Crater/Aeolis Palus/Glen Torridon tectonic zone basin and developed under the control of tectonic forces, both in the center of Gale crater and in the region, as stated, and delimited by different fault systems (Figures 17, 18, 19, 20b, c, d, 23, 24, 26, 32 etc.).Milliken et al., (2010), Perspective view of Gale Crater looking southeast from the HiRISE DTM (Figure 41). Analysis of this profile supports our generalized geological columnar section of Gale Crater and its surroundings (Figures 17, 19, 23, 26).

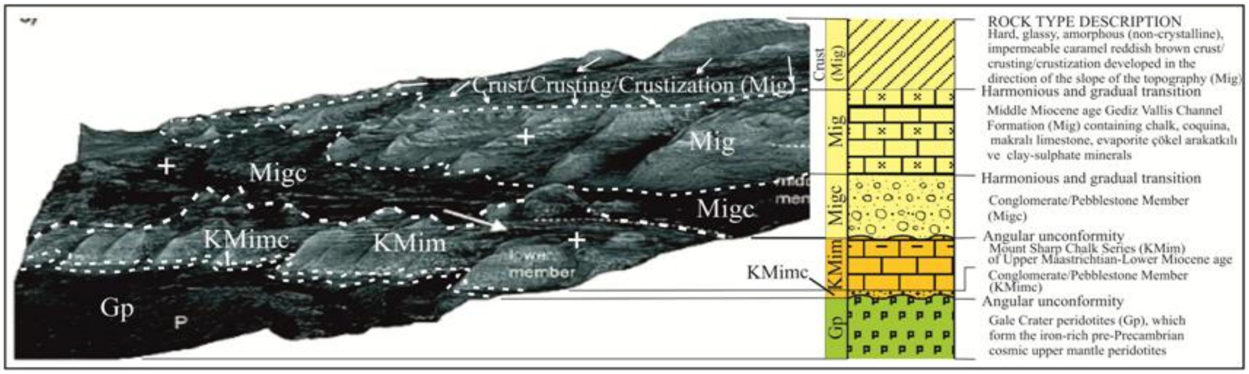


Figure 41:- Perspective view of Gale Crater looking southeast from HiRISE DTM (modified from Milliken et al., 2010).

The authors indicate that the pyroxene-bearing basement rocks, which they indicate with the symbol (P), are morphological differences from the overlying sedimentary units. The pyroxene-bearing basement rock unit shown with the symbol (P) corresponds to the Gale Crater peridots (Gp) formation, which corresponds to the cosmic upper mantle peridotites (iron-rich olivine, pyroxene, plagioclase and ilmenite, etc.) of Mars (Figures 17, 19, 23, 26). The unit indicated by the lower member corresponds to the Mount Sharp chalk series (KMim) rock units, which are composed of chalk series rock units that we predict to be Upper Maastrichtian-Lower Miocene in our columnar section, and contain silicon-free smectite clay minerals.

The middle member in the figure; Mount Sharp corresponds to the conglomerate member (Migc) of the horizontally bedded Gediz Vallis Channel formation (Mig), which we estimate to be of Middle Miocene age, containing evaporite-clay-sulfate minerals and not containing quartz, with an angular unconformity starting with the basal conglomerate (Pebblestone member/Migc) on the eroded morphological surfaces of the chalk series rock units (no folding orogeny phase developed between the horizontally bedded different formations, only weathering/erosion processes developed). The pebblestone member in question (Migc) passes vertically and laterally upwards into the Middle Miocene aged Gediz Vallis Channel formation (Mig), which contains chalky evaporite-clay-sulphate minerals and foreign rock fragments (olivine, serpentine), chalk-cemented macro-micro fossils, orange-colored coquina and makari limestone, evaporite sediments (gypsum-anhydrite, salt, gypsum, slaked-quicklime, clay-sulphate minerals, etc.) and chalky clay-sulphate minerals, corresponding to the upper unit in the authors' profile.

At the summit of Mount Sarp (Aeolis Mons), due to the temperature difference between Martian days and nights of ancient Mars, the eroded atmospheric outer surface of the Gediz Vallis Channel Formation (Mig) is covered with a hard, impermeable armor-forming crust (~ 0.25-4 m) of glassy amorphous material. Although there is an angular unconformity between the rock units that form the lowermost Upper Maastrichtian-Lower Miocene Mount Sharp chalk series, which has different ages and autochthonously overlies the basic cosmic upper mantle peridotites at the base of Gale crater, and the Middle Miocene Gediz Vallis Channel formations, which contain chalk, evaporite and sulfate minerals, due to erosion-induced erosional surfaces, the rock stratigraphic units that form both formations are horizontally bedded and not folded. In other words, no folded orogenic phase developed between these two chalky formations.

However, the units forming the previous chalky series have a morphological surface formed by erosion. Although there is an unconformity between the two different formations forming the sedimentary stack, the folding phase has not developed. The stratigraphic rock units forming the two formations are horizontally layered (Figures 2, 2, 5, 7, 17, 19, 20, 23, 24, 26, 32 etc.). The authors' southeast-looking perspective profile analysis results from this HiRISE DTM taken from Gale Crater on ancient Mars are consistent with our study and research, and are consistent with our geological data at Gale Crater.

Results:-

According to my first impressions while watching some of NASA's publicly available videos about Mars;

1. Due to the presence of chalk series rocks on ancient Mars, whose outer surfaces have been eroded from the Cenozoic era, with thick glassy, amorphous, hard and impermeable armored crusts on their atmospheric outer surfaces, the presence of chalk series rocks with a high thickness and widespread crust/curstization gives the

impression that they are very similar to the rocks known as carbonate platform rocks of the stable Arabian-African plates on Earth and that they display very similar stratigraphic relationships due to their horizontal bedding. Therefore, drawing on my professional knowledge and experience in different projects related to the geology of the region where I have previously worked with my colleagues in the Gaziantep-Şanlıurfa-Mardin provinces in Southeastern Turkey, which constitutes the northern edge of the Arabian plate, my aim is to contribute to the positive science of comparing and correlating the geology of ancient Mars and to facilitate a broader evaluation and interpretation of the geological data obtained from ancient Mars by scientists and researchers who have made efforts;

To contribute to supporting the just causes, struggles, solidarities and organizations of activists and world social communities who struggle against injustice and injustice on behalf of nature-animal-human lovers, environmentalists, climate/paleoclimatologists; on behalf of those who struggle against natural and artificial disasters (earthquakes, floods, forest fires, invaders, those who start wars for their selfish egos, the so-called rulers who disregard the olive trees that provide organic olives and oil for humanity that bear the traces of a thousand years of history and harm nature, the environment and the ecosystem under the pretext of mining, the savage, self-interested religious merchants, administrators and leaders who sell imaginary religious views/theologies for the sake of their own interests;

heat, thirst, lack of food, the killing of women and innocent children, leaving them hungry, thirsty and without food, who see and know everyone as a threat under the guise of threat, who hide/conceal their true aspirations and egos, who fall captive to their wild emotions that have no share of humanity, that come from nature and have not fully evolved, who call themselves leaders and make others believe so; the insensitive ones who see these injustices and injustices on the planet but remain silent, etc.) to give the example of ancient Mars and the ancient Martians, which once had life on it but later lost it dramatically, and to the administrators who claim that there were no casualties in the forest fires due to the painful and dramatic process that ancient Mars went through, yet do not know that the trees, plants, all the insects, animals, flora and fungi in the burned forests were living; they also have children, grandchildren, families, relatives, and neighbors; who love their children and families like intelligent creatures on Earth, that they contribute to the ecosystem, that they exist and live thanks to them; who live and think that they exist only for their own selfish thoughts and egos;

against these so-called authorities-administrators who have no share of humanity, are brainwashed, tainted and have spider-heads; against the poor, incompetent little creatures who file lawsuits for inciting the public to grudge and hatred against those who say these things when it does not suit them; who struggle and fight against darkness, reactionism, poverty, servitude and destitution; As a science writer and soldier of our great leader, leader and visionary Gazi Mustafa Kemal Atatürk and his comrades, the founder and leader of the secular, democratic and social Republic of Turkey, who 100 years ago said “Peace at home/in the country, peace in the world”, who said “Unless necessary, war is a murder”, who if he were alive today would say “Peace on the planet, peace between the planets”, I thought and wrote about the necessity of expressing and bringing to the agenda our virtuous, ethical and moral feelings that have only been acquired in the light of positive sciences after being human; as neighbors who love the living life of ancient Mars and the ancient Martians, which dramatically lost all life on it, I thought and wrote about sharing their pain with our sensitive Earthly alien friends,

2. Due to the abundance of chalk rocks, I thought that macrobial and microbial life formed and lived in terrestrial and marine environments on ancient Mars, that it had a thick modern atmosphere with an oxygen content of approximately 21%, that the Gülnaz geochemical rock cycle existed, and that there could have been precipitation (snow, rain), water, rivers, streams, lakes, seas, oceans, and living life,

3. It has been observed that the Gülnaz geochemical rock cycle of ancient Mars (Tarhan, 2018) has frozen and survived to the present day, but intense active tectonism has continued from the past to the present. Among the strike-slip fault systems, flat basins (approximately 10-30 km wide and hundreds of km long) and plains have developed parallel to the fault systems. A very intense cataclastic tectonic deformation has developed in the chalk rock units at the edges of the basins. Double and triple intersection points have developed between different oriented fault systems. In addition to the strike-slip fault systems, downslope normal faults that cause graben formation at the basin edges have developed intensely,

4. Interestingly, cosmic upper mantle peridotites have emerged along active fault systems beneath the thin, caramel-reddish-brown, arable-suitable cover of the Quaternary Dingo Gap Formation, which accumulated in tectonic zone basins (Gale Crater/Glen Torridon/Aeolis Palus, Jezero Crater, and Endeavour Crater basins, etc.) consisting of kilometers-long plains, 10-30 km wide. Similarly, the dark-naphtha colored iron-rich cosmic upper mantle peridotites of Mars (iron-rich olivine, pyroxene, ilmenite-titanium, plagioclase, etc.) emerged from the bases of the chalk series rock units that crop out on the basin margins. It is thought that the cosmic upper mantle peridotites were extremely eroded before the geochemical rock cycle froze, formed a geomorphological surface, were exposed, and thus froze and survived to the present day,

5. The deposits/covers of the dust clouds of the desert storm wind alluvium (loess, regolith, aerosol) chalk [(oxidized quicklime/CaO, slaked lime/$Ca(OH_2)$] and iron rust [(hemetite, Fe^{3+}, ferric hydrate/hydroxides/$Fe^{3+}(OH)_3$] and trace amounts of other metal-non-metal oxides and hydroxides etc.) that have settled on the ancient Martian surface, are the equivalent of the Quaternary Dingo gap formation on Mars, which is the equivalent of the Quaternary aged Harran formation (Tarhan et al, 2012) which was formed by a similar mechanism on Earth and is suitable for agriculture. It has been observed that soils and delta sediments were formed, iron and calcium rich sand and dunes were formed,

6. According to NASA data, the atmosphere consists of 95-96% carbon dioxide (CO_2), 0.13-0.17% oxygen (O_2) and other gases, the leakage of carbon dioxide gas (CO_2) from the Martian atmosphere into space and its continuing, after the end of the Gülnaz geochemical rock cycle, the oxidized chalk and ferrous covers/deposits of the desert storm wind alluvium deposited on the Martian surface were not washed away by water, but remained as a thin cover, their waters evaporated, and the microbial-macrobial life in the terrestrial-marine environment ended with a painful and tragic process in which it was completely destroyed,

7. While everything was going well, the question of what happened to ancient Mars and the pain of ancient Mars losing its life so dramatically, the images of its memories and traces of the past, and its sadness remain in our minds.

Ancient Mars/Red Planet, the fourth-largest inner, ringless, terrestrial planet in our Solar System within the Milky Way Galaxy, is approximately half the size of our planet Earth (Figures 15-1, 15-2). As ancient Mars transitioned through the planetization phase, it undoubtedly experienced many painful experiences, losing its modern atmosphere (~21% O_2), the Gulnaz geochemical rock cycle (precipitation, erosion, transport, and deposition), its waters, and its macrobial and microbial life, likely as a result of natural events. Ancient Mars certainly had many problems. It has been suggested and envisioned that solving and overcoming Mars's problems might be possible with today's advanced scientific and technological advancements. It has been envisioned and proposed that finding a solution to Mars's suffering, restoring lost marine, terrestrial, microbial, and macrobial life, and making Mars a second world for Earthlings might be possible. It has been thought, predicted, and suggested that Mars has the potential to revive its lost microbial and macrobial life with the help and contribution of aliens from neighboring Earth. Because it is thought that matter has the ability and tendency to protect, preserve, evolve, reproduce, enrich and repair the living life it creates (Tarhan, 2024c).

We know only so much about ancient Mars as we can understand and evaluate the data and images sent by NASA's geological rovers operating on the surface of Mars, which are publicly available and accessible. However, when compared to the present-day Earth, when Mars likely underwent a process of terrestrial-rocky planetation, we see data from the Cenozoic era. The rock type characteristics of the Cenozoic era must also be the predecessors and ancestors of marine-terrestrial macrobial-microbial life. However, matter creates inorganic matter and organic living life forms as prototypes of the organic forms and inorganic systems it creates, and evolves, enriches and diversifies them towards perfection over time, evolving from generation to generation.

e evolved from marine-terrestrial macrobial life and must have had ancestors who lived in the past. We cannot see or know of their existence. In other words, we do not know of certain geologically concrete phenomena that developed, or are likely to have developed, on ancient Mars during Paleozoic-Mesozoic times and pre-Precambrian times. These must certainly exist on a terrestrial-rocky planet as it goes through the planetization process. These problems were thought to be most likely in the Southwest and West regions of Mars, where the continental crust of ancient Mars would have been much thicker. It is thought that the Paleozoic-Mesozoic rock units may have been folded, suggesting areas where both paleoclimatology and ancient Martian habitats could have been more widespread.

Prioritizing Mars rovers, including robotic rovers and their programs, and prioritizing their geological resources should be directed to these regions.

Analyzing some NASA data on ancient Mars, it is thought and proposed that ancient Mars/the Red Planet once hosted seas, oceans, lakes, dendritic drainage systems, the geochemical rock cycle (precipitation and erosion), a modern atmosphere (~ 21% O_2), and terrestrial-marine macrobial-microbial life (i.e., terrestrial-marine plants, algae, and other organisms). However, it is now certain that this resulted in an extinction whose cause is currently unknown. Efforts have been made to identify and understand this macrobial-microbial life within the ancient native Martians. An attempt was made to benefit from some evidence and traces that could not have developed under natural conditions and environments on the ancient Mars/Red Planet surface and were subsequently made by artificial means (Figure 40). Cave entrances carved into chalk rocks and pits and shapes carved into them with regular geometric shapes reveal the emergence of ancient Mars.

Because as the author of the first prototype Constitution of the first created matter (Tarhan, 2018), matter is naturally programmed according to the laws of Physics, Chemistry, Mathematics, Biology and the first prototype Constitution of matter (Tarhan, 2024c) such as not being destroyed, not being destroyed, creating, creating as a prototype, evolving, organizing, repairing, adapting, balancing, enriching, multiplying, etc. These laws are applied unchangingly, uncompromisingly and precisely everywhere in the Universe and in different time dimensions. Therefore, the loss of life on ancient Mars, the freezing of the geochemical rock cycle, the evaporation of water, the terrestrial-marine macrobial-microbial life, and the modern atmosphere probably did not originate in the planet's interior. It was thought and suggested that it was lost as a result of major natural events, probably from outside. Ancient Mars certainly had rivers, lakes, seas, and oceans on its surface. There were creatures and plants living on land and in water. It had a thick, modern atmosphere, abundant in oxygen. Whatever happened to it remains unknown. It is thought that it lost its atmosphere, its living creatures and all its waters as a result of natural chains and triggers affecting it from outside.

It has been thought, predicted and suggested that this extinction apocalypse/disaster on ancient Mars occurred not millions or billions of years ago, but on the contrary, thousands of years ago (probably between 50,000 and 300,000 years ago). However, whether Martian aliens evolved from simpler-structured prototypical ancestors (Martian Homo sapiens, hominids) prior to this extinction will depend on data on their traces and artifacts on Mars. However, it is thought that they evolved into modern creatures, Martian Homo sapiens, from traces and remains of artificially constructed, regular geometric shapes and objects on ancient Mars, but disappeared in the initial stages of full socialization, proliferation and dispersal. If ancient Mars's thick modern atmosphere, and the resulting geochemical rock cycle and life, had not been lost, modern intelligent Martian aliens, having evolved and proliferated, would certainly still be living on Mars today.

Considering the traces and artifacts of modern, intelligent, and fully evolved Martians on Mars, compared to the earliest ancestors of humans—organic allotropes of Earthlings with different physical characteristics but similar spiritual, emotional, behavioral, and historical structures—the oldest named human species is Homo habilis or Homo erectus, which first appeared in East Africa approximately 2.4 million years ago. According to evolutionary theory, the first modern humans, Homo sapiens/Homonids, evolved from their ancestors approximately 300,000 years ago. Therefore, it is estimated that ancient Mars, with its thick, oxygen-rich modern atmosphere, geochemical rock cycle, and macrobial-microbial life, may have existed between approximately 2.4 million and 0.003 million years ago.

During this timeframe, the first Martian Homo habilis or Martian Homo erectus emerged. However, it has been thought, proposed, and suggested that they likely disappeared between 50,000 and 300,000 years ago, evolving into the first modern Martians, Martian Homo sapiens/Homonids. Ancient Martian aliens (Martian humans), Martian Homo habilis or Martian Homo erectus, emerged much earlier than the ancient indigenous people of Göneklitepe, who lived 11,500,000 years ago (Figures 12, 13). They knew how to build caves, process rocks, likely raise and feed on small livestock, and construct geometric objects with smooth surfaces and shapes. It is thought and predicted that they likely hunted, settled, raised livestock, and lived individually and in groups as primitive clans/tribes. It is also noteworthy that they established settlements on sloping rocky terrain, rather than on flat lands and plains, to protect themselves from floods and sediment accumulations. It is thought that this phenomenon probably gives an idea about the paleoclimatology of that day and that they made their living by hunting. However, they did not know how to cultivate or harvest agriculture. However, it was thought that they knew how to feed animals and how to benefit from them.

By analyzing the images and scientific data of NASA's Mars geology rovers related to ancient Mars and the studies of scientists researching this subject, it has been determined for the first time by the author that the chalk series rock units (coccoliths-coccolithoforms, foraminifera, diatoms, blue-green algae/moss, stromatolites and rhabdolites formed by cyonobacteria and rhodolites etc.), which are a type of carbonate sedimentary type rocks (calcium carbonate/calcite/$CaCO_3$) of organic origin formed biochemically by microscopically small plankton type microorganisms (phytoplankton/plant plankton and zooplankton/animal plankton etc.), are composed of chalky evaporite deposits (gypsum-anhydrite, gypsum, salt, hydrated-quicklime and clay-sulfate minerals etc.).

All these geological data indicate that ancient Mars was once a blue planet, like our own planet, Earth. It had oceans, seas, lakes, and streams, rivers, and streams with dendritic drainage systems (all of which have evaporated and dried up today). It had a thick atmosphere and atmospheric pressure similar to modern Earth, with an oxygen content of approximately 21%. There was a geochemical rock and carbonate cycle. It had rich soil suitable for agriculture. Most importantly, it had a truly/definitely vibrant and beautiful world, full of life that lived, reproduced, grew, spread, and evolved.

Today, scientists, private and public institutions and organizations, and independent researchers like myself, along with NASA's geological rovers that have studied and are working on the Martian surface, are investigating traces and evidence of microbial and macrobial life on Mars. However, in this text, the existence of thick and widespread outcrops of the chalk series and chalky evaporite sedimentary rock units on Mars was mentioned and revealed for the first time among NASA's images of Mars. This study has brought to the forefront and demonstrated for the first time that the eroded morphologies of the chalk series rock units on Mars, like their equivalents on Earth, are covered with a caramel-reddish-brown, glassy amorphous (non-crystalline), impermeable, hard and thick (approximately 1-5m thick and more) armored crust (crust/crustin/crustization) that developed on different directions of the topographic slopes on the surfaces exposed to the ancient Martian atmosphere.

It is thought that this glassy, amorphous (non crystalline), hard, impermeable, thick crust (crust/crusting/crustization) , which has developed by solid flow in the direction of the topographic slope and is composed of pseudo-bedding, solid flow outcrops, and various large and small blocks, develops in chalk rocks of organic origin, whereas it does not develop or is almost nonexistent in rocks of inorganic origin (inorganic carbonate/limestone, volcanic, lava, sedimentary rocks, etc.), thus contributing to both geological literature and planetary science. For the first time, formations were defined and named at the formation level according to the geographical place names named by NASA on Mars and the places where they surface as types.

The probable ages of the organic origin chalky series and chalky evaporites equivalent to those on Earth are given. Chalk series rock units consist of 95-99% of microscopic living microorganisms such as phytoplankton/phytoplankton (coccolith-coccolithophore blue-green algae) and zooplankton/zooplankton (foraminifera, diatomites and rhabdolites, etc.). Marine zooplankton, on the other hand, were organically nourished by wave-disintegration of phytoplankton (blue-green algae/algae) suspended and floating in the seas.

These geological concrete data have been determined, presented and suggested for the first time by the author that all microscopic and macroscopic zooplankton species living in the streams, lakes, seas and oceans of ancient Mars naturally and organically fed, reproduced, evolved and enriched themselves from the phytoplankton/phytoplankton type blue-green algae/seaweeds that were suspended and floating in the warm, clean and deep seas on a microscopic scale, and from the debris broken down and dispersed by the waves. These blue-green algae/algae are the largest oxygen-producing plants in the waters, and approximately 20% of the total 50-70% of oxygen produced in the seas is produced by microscopic phytoplankton.

Let us not forget how important it is to keep our seas, environment, waters and atmosphere clean and not polluted! Today, we are battling mucilages/sea snot/red tides in our seas and closed basins due to pollution. It is certain that microscopic phytoplankton (vegetal blue/green algae/moss, etc.) that lived suspended and floating in the warm, clean, deep seas of ancient Mars were broken up by the waves and dispersed into the waters, and that they continued to live, multiplied, and evolved to feed microbial and macrobial zooplankton-type living animal organisms. It is also certain that microbial life (tiny microbes, bacteria, etc., on a microscopic scale) and macrobial life (every living vertebrate animal, bird, reptile, plant, and forest species organic allotropes, etc., existed on Mars, as did everything on Earth) lived, multiplied, diversified, reproduced, and evolved on the lands of ancient Mars. This is because Earth and Mars are located together within our Solar System within the Milky Way Galaxy (Figures 15-1, 15-2). The orbits of the planets Earth and Mars are elliptical. They are located in a middle habitable zone relative to their star (the Sun). It is also thought and predicted that the planet Mars does not lose its internal energy and magnetic field as much as thought. However, it was thought and predicted that due to the spiral carbon dioxide gas (CO_2) leaking from its atmosphere into space, its atmospheric pressure had dropped significantly and the abundant water on its surface had evaporated.

It was thought and predicted that as it lost its internal energy and cooled down accordingly, its surface would have contracted, its density would have increased, it would have shrunk in volume and it would have lost its orbit, and that it would not have been in a position where it would have approached or moved away from its star, the Sun. These data need to be determined precisely. It is certain that there are no wrinkling fractures on its surface. It is thought that it has not developed deviations from its normal speed and orbit around its axis or star. It is thought that terrestrial-rocky planets and satellites (moons) within the galactic system could naturally develop deviations in their orbits and rotational speeds as their internal energy is consumed, they cool, they contract, their volume changes (shrinks), and their density increases.

It is thought that it is natural for terrestrial-rocky planets and moons within the global galactic system to deviate from their orbits by perhaps 2-10 meters per year. However, deviations above this rate are thought to be evidence that terrestrial-rocky planets and moons are losing their internal energy and cooling down. It should be determined whether Mars/Red Planet loses/deviates its orbit relative to its star (Sun) by an average of 10 meters or more per year. Therefore, the similarities between the rock stratigraphy, paleoclimatology, and biota on Earth and ancient Mars cannot be more natural than the very similarities. It is not correct to compare the current state of Mars to the frozen state of our planet Earth 3.5 billion years ago. On the contrary, the geological rock units, paleoclimatology, fauna and flora, flood sediments, flood waters, and microbial and macrobial life that inhabited the marine and terrestrial environments of ancient Mars are thought and predicted to have resembled Earth approximately 2.4 billion to 300 thousand years ago.

It has been thought and predicted that ancient Mars may have lost its atmosphere, geochemical rock cycle and microbial-macrobial life as a result of natural disasters in a very recent time period, approximately 2.4 billion to 300 thousand years, compared to the age of the Universe. Because of its modern atmosphere and pressure close to Earth's, geochemical and carbon cycles, abundant water, snow and rainfall, and the presence of carbonate and chalk-dominated rock series constitute the fundamental building blocks of life. As is known, oxygen is a strong oxidant. It has the reactivity to easily enter into chemical reactions with many elements and form oxide compounds. It has oxidizing and caustic properties. Oxygen, which makes up 60% of the human body, is the primary component of respiration, providing energy to cells. Oxygen is also known as a gas that supports combustion. Oxygen supports life and makes combustion possible. It is the most abundant element found on our planet. 85% of the oceans, 46% of rocks and minerals, and 60% of the human body are oxygen. Oxygen is not flammable, it enables combustion.

The oceans top the list of the world's oxygen sources. Primitive prototype life also begins in the seas. Oceans and seas, which cover 71% of our planet Earth, support the life of all living things on Earth by meeting 50-70% of the oxygen need. Contrary to popular belief, forests and plants are not the main source of oxygen in the world. On the contrary, it creates oceans. Seaweeds/algae living in the oceans and seas that cover two-thirds of the Earth's surface produce approximately 80 percent of the world's oxygen. The first of these is phytoplankton. Phytoplankton species, the most important oxygen producers in the seas, are abundant in surface waters. Macroalgae and seaweeds, especially found in coastal areas and shallow waters, also play a major role in oxygen production. All of these phenomena existed on ancient Mars. The first identification of thick and widespread outcrops of chalk and chalk series rocks on ancient Mars indicates the existence of a carbon loop. The element carbon forms the basic building block of living things. Hydrogen, composed of simple atoms, is flammable and lightweight, and, together with helium, forms the ancestors and fundamental building blocks of the universe's organic and inorganic elements (Tarhan, 2024a, Tarhan, 2024b, Tarhan, 2024c, Tarhan 2024d, Tarhan, 2024e, Tarhan, 2024f, etc.).

The ancestors of all the strong structural elements in the universe are the evolution of the simple hydrogen and helium elemental gases, which are abundant in the universe, and the formation of different allotropes of these gases, which led to the diversification and proliferation of heavier and more complex elements, and the formation, change and transformation of different organic forms, inorganic substances and systems. Under normal conditions, natural organic-inorganic forms and systems maintain their existence by balancing, enriching, multiplying and evolving each other in an orderly manner, through change and transformation. However, within these cycles of change and transformation, the development of natural disasters that affect and destroy these regular forms and systems is inevitable. Unfortunately, extinctions are inevitable, just as the thick and modern atmosphere of ancient Mars, a blue planet, and the natural disasters that caused the extinction of life on it. Natural disasters do not develop of their own volition. They develop as a result of other natural parameters that also affect and trigger them. Such natural disasters occur in the Universe and will continue to occur. The occurrence of these disasters is also natural and should be met naturally…

As a result, ancient Mars needs external intervention to create its thick modern atmosphere (about 21% oxygen and other gases etc.) and to restore the lost Gülnaz geochemical rock cycle and life. The most important of these interventions is the spiraling of the atmosphere into space and the continued leakage of carbon dioxide gas. In fact, the physical, biological and chemical reactors of the planet Mars are actively working. However, the heat and total carbon dioxide (CO_2) gas produced by these reactors are less than the total gas constantly leaking from the atmosphere into space. Because of the carbon dioxide gas leaking from its atmosphere into space, more gas than it produces cannot thicken its atmosphere. For example, just as a hand-knitted fabric unravels from one point to the next, the spiraling cycle of carbon dioxide gas leaking from the Martian atmosphere into space (the Martian atmosphere is 95-96% CO_2, 0.13-0.17% O_2, and other gases) must be broken or minimized.

In this way, it can thicken its thin atmosphere and repair its heat-trapping, greenhouse effect. The second major problem is increasing the oxygen content in the atmosphere (according to NASA data, oxygen is 0.13-0.17%). To reach approximately 21%, plants and trees that emit carbon dioxide but still release abundant oxygen into the atmosphere must be cultivated. In this way, Mars will be able to repair itself over time, and it has been thought and proposed that it will host a second world for the aliens from neighboring Earth as a token of gratitude. Therefore, Mars/the Red Planet needs the help of the aliens from Earth. It has been thought and proposed that Mars' magnetic field and gravity are not as weak as previously thought, nor is it a dead planet with depleted internal energy. However, due to its sadness and the excessive effort it has expended to bring back life, it is considered a comatose, dead planet.

There has been life on our planet Earth and ancient Mars in our Solar System. Life has formed on two of the eight planets in our Solar System (Earth and ancient Mars). This is a very high probability and probability. It is not known for sure yet whether ancient Mars can be rehabilitated by scientists! However, I have no doubt that ancient Mars will go down in human history as the first known planet to lose life as a result of major natural events. There are trillions of small and large galaxies in the infinite depths of the Universe. These galaxies also contain trillions of solar systems. Within these solar systems, there are numerous terrestrial and rocky planets and satellites (Moons) located in the habitable zone relative to their star (the Sun), with thick, modern atmospheres.

It is certain that most of these will contain living life and alien intelligent beings. However, the problem is the distance between them, thousands and millions of light-years. Therefore, it has been suggested, predicted, and proposed that we are not alone in the Universe. However, organic forms and inorganic systems have specific life cycles. These are certainly not eternal. As a result of accidents occurring in the Universe or during the normal life cycle, they gradually lose their internal energy and disappear through transformations into other forms and systems. They are born and evolve through the development of new forms and systems, and this transformation and change will continue into eternity. Therefore, living life and intelligent space exist alone in the Universe. These life cycles last for millions and billions of years, as they die, are reborn/formed, and evolve. Organic forms and inorganic systems will continue to change and transform into infinity within their normal life cycles, except for natural accidents in the Universe.

In short, until now, scientists knew that the sedimentary rocks on ancient Mars were carbonate rocks of inorganic origin. However, in this article, on the contrary, it was determined for the first time that the sedimentary rocks with thick and widespread outcrops on ancient Mars were composed of chalk series and that they were biochemically formed sedimentary carbonate type (calcium carbonate/calcite/$CaCO_3$) chalks. In other words, these rocks are not inorganic carbonate rocks formed by the interactions of water, carbon dioxide (CO_2), and rock. On the contrary, it has been determined, demonstrated and suggested that they were first formed from 95-99% eukaryotes (single-celled) of microscopically small plant/phytoplankton and animal/zooplankton species, which are of organic origin and prove that microbial life once existed in marine environments on ancient Mars. Macrobial and microbial life certainly existed in terrestrial and marine environments on ancient Mars. However, I regret to say that it is not known exactly why ancient Mars lost its thick and modern atmosphere, the "Gülnaz Geochemical Rock Cycle" (Tarhan, 2018) and all life (..even if there are some opinions on this matter.)!…

Therefore, ancient Mars certainly once had life. It's likely that life was lost as a result of major external natural events. Because even if Mars is in a coma, it's still alive!... To bring life back to Mars, it needs Earthly aliens working to thicken and restructure its atmosphere. The Martian atmosphere consists of 95-96% CO_2 gas, the remainder other gases. According to NASA data, it has been determined that gas leaks from the Martian atmosphere into space continue. Mars's once normal modern atmosphere and atmospheric pressure have been destroyed and thinned as a result. If this cycle of gas leakage in the Martian atmosphere is broken or minimized, Mars will thicken its atmosphere through the carbon cycle, and the greenhouse effect of carbon dioxide will warm the planet's surface and thicken its atmosphere. Some of the ice in the polar ice caps will begin to melt. The Gülnaz Geochemical Rock Cycle will occur. As this cycle continues, life gradually returns. It begins to form new prototypes under the current physical and chemical conditions.

If the atmosphere of Mars is restored and reconstructed, it could become a second Earth for Earthlings, a planet called Mars. This will depend on the efforts, unity, solidarity, success, and positive scientific and technical advancements of Earthlings. We are certainly not alone in the Universe. I have no doubt that we have relatives formed from allotropes of the same or similar organic forms on some of the terrestrial-rocky planets and satellites (Moons) of other galaxies with thick, modern atmospheres. This is because we are in the same family, composed of the same organic form of matter. Although our physical characteristics differ, because we are composed of similar organic-biological allotropes, our worst common traits are the similarities of our temperaments, emotions, feelings, desires for self-interest, and egos. Just as the rock units of Mars and Earth exhibit similar properties, why? Because we are composed of the same organic and inorganic forms of matter. Only our physical properties differ. We are certainly not alone in the universe and in space. However, our priority should not be conflicts and nuclear wars for the sake of ego, profit, sharing, exploitation, and self-interest on Earth and Mars.

On the contrary, according to the first article of the first prototype Constitution of the Constitution, which cannot be changed and cannot even be proposed (Tarhan, 2024c), there should be an inclination and obligation to act together and be cooperative, to share, and to live together in happiness!… No one should see anyone as a threat to themselves, nor should they threaten others. No one has the right or right to be captive to their innate and hereditary primitive and savage emotions, to ruthlessly kill innocent, innocent women and children, to leave them hungry and thirsty. The "United Nations" watches as if they were supporting a team, like a spectator watching a match. They stand by, thinking, "This terrorist is yours, that terrorist is mine." I'm sorry that if your countries, your future, your planet, and interplanetary justice, law, democracy, unity, togetherness, solidarity, love, and happiness are left to the mercy of the powers that be, as if to say, "Let the worst be done with." This will turn into the law of the jungle and the fires of the wild. Such behavior will depend not on theology, but on the dissemination of positive education, on the development and evolutionary processes of new generations who think with their minds, whose consciences are free, who think freely, analyze, and share life without being influenced by anything.

It is thought and foreseen that any scientific study to be conducted on the Red Planet/Mars will definitely not be in vain, and that the scientific data to be obtained from there will make great contributions to the future of space exploration and their expansion into space. Therefore, it has been suggested that all researchers and scientists from different professional disciplines should contribute to the rehabilitation of Mars. Everyone should work not to conquer Mars, but to find out how? and in what way? to rehabilitate it with a thick, modern atmosphere and atmospheric pressure that will bring back life. It has been thought, envisioned and suggested that Mars, the planet most suitable for colonization and settlement of Earthlings in our Solar System, has all kinds of solution possibilities and potentials for the future. The soil of Mars is very fertile and it is possible to grow all kinds of plants.

Martian soil is moist and contains water molecules. It is believed that water exists deep within. It has been thought and envisioned that it is possible to revive the planet Mars and bring back life. Mars is not a dead planet. It has been suggested that all Earthlings and scientists should work for the painful and sad planet Mars. It is recommended that time and resources not be wasted elsewhere. Living things have a specific life cycle. Within this timeframe, space can be dominated by the discovery of spacecraft traveling at the speed of light and antimatter for their fuel. Since this is not possible at this stage, it is suggested that you use all your scientific and technical strength for the planet

Mars for the future of the earthlings. However, conquering Mars with cannons, rifles, and nuclear weapons should not be allowed! Mars is an innocent planet, in need of help and revival, and a painful and sad planet that lost all life on it as a result of an unknown natural disaster. It is certain that it needs all the contributions, assistance, and support of its neighboring aliens…

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Symbols Used:-

Gp = Gale Crater Peridotites
KMim = Mount Sharp Chalk Series
Mig = Gediz Vallis Channel Formation
Migc = Conglomerate/Pebblestone Member
Plk = Kimberly Formation
Plkc = Conglomerate/Pebblestone Member
Gd = Dingo Gap Formation
Qta = Old Alluvium/Terrace
Qs/l = Slope and Landslide Debris
Qf = Flood Deposits
Qal = Alluvium
Qg = Gray Wolf Peak Basalt Lava
Qdu = Sand Dune
Qw = Wind Alluvial Deposits

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Author contributions:-

The author is the sole author of the article and has read and approved the published version of the article.

Conflict of Interest:-

The author declares that he has no conflict of interest.

Letter from the Author: -

I would like to offer some advice to scientists and researchers… Do not go to Mars and make comments based on assumptions and images created by logical imaginations, unrelated to scientific parameters. Priority should be given to protecting the Earth's atmosphere from harm, given the painful and dire situation Mars is in. I believe no one and no country has, and should not have, the right to say, "I can do whatever I want" regarding matters that harm the atmosphere. I don't believe, and should not believe, that anyone or any country has the right to say, "I can do whatever I want" on matters that harm the atmosphere. It's not right for the United Nations to make statements like "this was done, that wasn't done" in the face of bad events, like watching a football match.

If it gives the impression that this terrorist is mine, the other is yours, I believe the United Nations' actions and sanctions will lead to a change and transformation into the law of the jungle. Decisions should be clear and unambiguous. I believe everyone is responsible for the natural and artificial harms that may befall the planet and all living things (plants, animals, etc.) on its surface. If those who harm the planet and living things fail to act despite being warned, there should be an obligation and inclination to take the necessary action, rather than remaining silent. Everyone should be obligated and inclined to comply with all shared decisions. No person or country has, and should not have, the freedom to harm the planet, its atmosphere, climate, environmental pollution, or the life on it. Otherwise, how will the planet's rights to freedom, democracy, justice, and law, which allow all living beings to live together on our planet-our shared habitat-be secured and protected? It is not, and should not be, a place for anyone who harms the living beings on our planet—free, arbitrary, and powerful. It should be a planet where good and bad, beautiful and ugly, weak and strong, can live freely in unity.

On this issue, environmentalists, nature and animal lovers, individual activists fighting against climate change and pollution, and resilient members of society around the world must organize under one roof. They must wage a fierce and uncompromising struggle on this issue! I believe these facts are their most natural rights… Our planet doesn't belong solely to human beings, who are intelligent beings. Humans benefit from all the beauty of the planet. But I think they are the ones who cause the most harm to the planet. Our planet doesn't belong to humans alone. It is a shared habitat for all living things on the planet (plants, forests, animals, etc.). This should be recognized. This is how ecosystems are balanced. For example, pollution of the environment and seas shouldn't lead to the extinction of oxygen-producing plants and forests, and the algae and seaweed that produce 20% of the atmosphere's oxygen. In this regard, future generations should be given positive science education and given the opportunity to increase the number of resilient individuals.

I think and recommend that the intelligent beings that rule the world give up their innate, savage, primitive, and incompletely evolved egos, such as possessiveness, individualism, expansionism, occupancy, classism, primitive tribalism, and communalism, as well as killing people and living beings for their own interests and profits, and damaging the atmosphere with nuclear weapons. I believe that dictators and their regimes are the best examples of this. These savage, primitive feelings and thoughts can be prevented through positive sciences and social socialization, by increasing, acquiring, and imparting the inclinations for sharing and cooperation. I believe that in order to acquire individual and social mutual love, respect, sharing, ethical, and moral values that must be acquired/acquired after birth, one must and will undergo a positive science education process.

No one has, and should not have, the right to kill innocent and innocent women, children, and babies, or to leave them hungry and thirsty. If those who put everyone forward under the guise of threat only become threatening for the sake of their interests, benefits, invasive and expansionist ambitions, and say that leaving innocent and blameless women, children and babies hungry and thirsty, turning a deaf eye to their murders, is done in the name of democracy, rights, law, justice and freedom, and if the necessary things are not done, then let your democracy, freedom, rights and understanding of law collapse... Do you believe that you can ensure such democracy, rights, law and justice in your countries, on the planet and between planets? Seat lovers! Those who harm the planet and its creatures are not limited to the interests and profits of certain groups. Look! The planet Mars is in a coma due to grief after losing its living beings as a result of natural events and is making efforts to bring them back… No one and no country has the right and freedom to say, “I am strong, I can do what I want”, to think, to have justice and law, and they should not have it.

All living beings have the right to live, behave, and fulfill their normal natural life cycles on this planet without harming others. The fate and future of this normal life cycle of a living being cannot be limited or determined by anyone, and they do not and should not have the right, rights, or freedom to abolish it. Sorry, is this planet a "Dingo's Barn?" Let everyone do what they want. A serious, resolute, and collective Earth/Planetary/Interplanetary Constitution, which must be adhered to both on our planet and interplanetary levels, should be established and implemented under the umbrella of the United Nations, based on global and planetary citizenship, equal democracy for all, and human rights, and a just, fair, and legal framework for coexistence, freedom, peace, security, and a sense of belonging. It should be constantly updated according to evolving and emerging problems and conditions. These facts cannot and should not be limited according to anyone's interests and benefits.

They must be implemented with equality, unity, and solidarity. Otherwise, there will be no end to these events. They will swing back and forth like a pendulum. It goes on like this: today it's you, tomorrow it's the other one. It shouldn't be transformed into a feeling of revenge. This false feeling, this kind of wild will exists in the very essence of nature itself. If you want to maintain your existence, like matter, you must be programmed according to the laws of physics, chemistry, mathematics, and biology. By applying and responding to these laws with its rich and highly functional geochemical behaviors, you must have the obligation and inclination to act together, to share, integrate, reproduce, enrich, not destroy but create, to live and sustain, to beautify, to evolve from simplicity to perfection. Aliens far away from us are also our different allotropes. We may have different physical characteristics, but we share similar emotions, spirituality, and thoughts.

If Martians existed today, we would be engaged in space wars with them. These are primitive inherited behaviors and thoughts inherent in nature, such as possessiveness, selfishness, aggression, strength, and non-sharing. Therefore, matter never disappears. Matter persists forever, restructuring itself through change and transformation, exhibiting different geochemical behaviors under challenging conditions, environments, and circumstances. Because matter has been steadily evolving for billions of years. On the other hand, how much evolutionary degree and purity can intelligent beings, whose average life cycle is 70-90 years, have? Let us not forget that all living things are composed of different allotropic organic forms of matter.

With love and respect, Author

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