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**RESEARCH ARTICLE**

# GEOLOGY AND PETROGRAPHY OF APLITES AND GRANITES OCCURRED IN AND AROUND KOTTAGUDAM AND TOOPRANPET VILLAGES OF HYDERABAD GRANITE REGION, PENINSULAR INDIA.

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## *Abstract*

One of Largest granitic pluton of Indian subcontinent is Hyderabad Granitic Region (HGR) consists 2.5 billion years aged wide variety of intrusive felsic rocks. This region was apparently formed due to extensive lower crustal remelting of permobile phases of older (3.3-2.9Ga) gneisses (Divakara Rao, 1996). Several studies on these granites revealed that the pink granite is derivative of metasomatism of potash feldspar from grey granite (Balakrishna 1964 and Kanungo et al., 1975). Study area in and around Kottagudam and Toopranpet cropped out by pink granites, aplites formed as cap rocks on it. This paper is an attempt to understand the relations between aplites and pink granites.

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## INTRODUCTION:

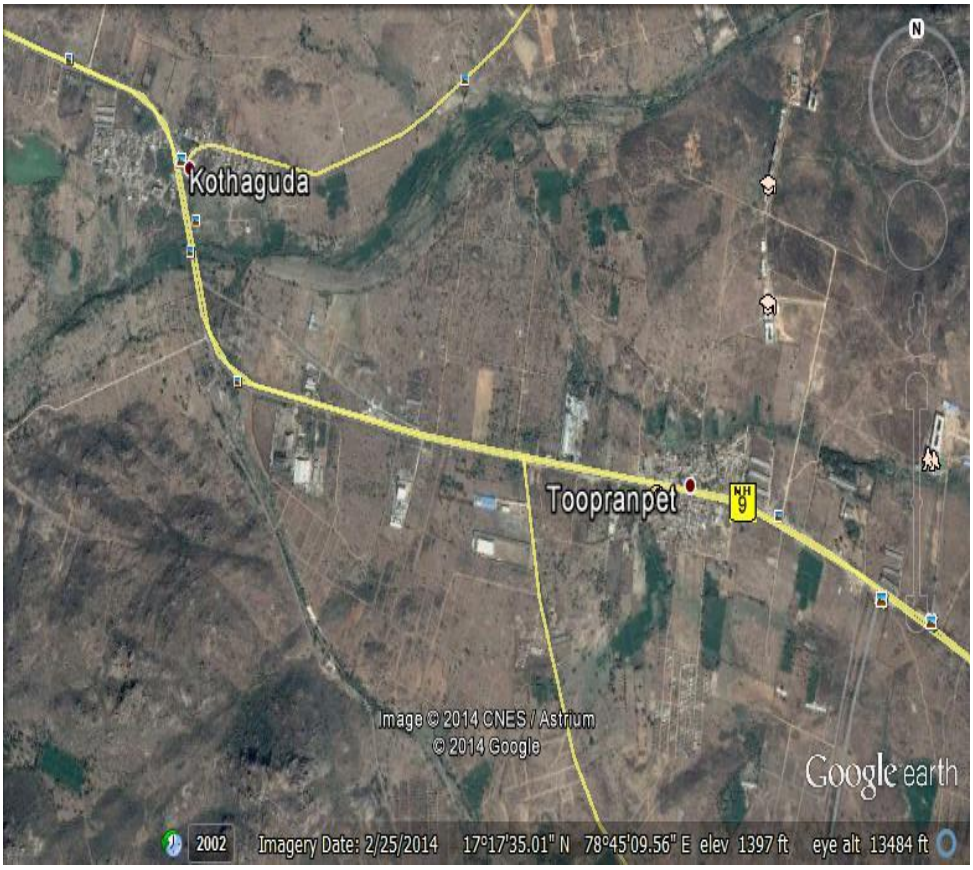
Aplites are intrusive rocks poses Quartz and Feldspar as essential minerals. They are very fine granied, white, grey, or pinkish in color. Aplites usually have a genetic affinity to the rocks they intersect. In the granitic region aplites formed due to last part of the magma to crystalize and correspond in composition to the quartzo-feldspathic aggregates that fill up the interspaces between the early minerals in the main body of the rock. The essential components of Aplites are quartz and alkali feldspar microcline and albite Crystallization has been apparently rapid and the ingredients have solidified almost at the same time. The accessory minerals of these rocks are principally oligoclase, muscovite, apatite and zircon. Biotite and all ferromagnesian minerals rarely appear in them, and never in considerable amounts. Riebeckite-granites have close affinities to aplites, shown especially in the prevalence of alkali feldspars. Tourmaline also occurs in some aplites. Aplites formed as dykes and irregular veins with various diameters few inches to many feet. They are very frequent in all areas where masses of granitic rocks are known.

## MATERIALS AND METHODS:

### Geology of the area

The area of the study is part of the Hyderabad Granitic Region (HGR) where the aplitic rocks are formed as cap rocks on the Precambrian granitic region in and around Kothaguda and Toopranpet villages. Aplites and granites are cropped out to the east of Hyderabad city, Andhra Pradesh, India. Two types of granites Pink and Gray are

cropped out without clear contact boundary hence aplitic rocks identified as cap rocks having fractures with different directions.




**Google image of Kothaguda and Toopranpet areas of Hyderabad Granite region show out crops of granite and aplites. Co-ordinates of the study area are $17^0$17'35.01'' N, $78^0$45'09.56'' E**

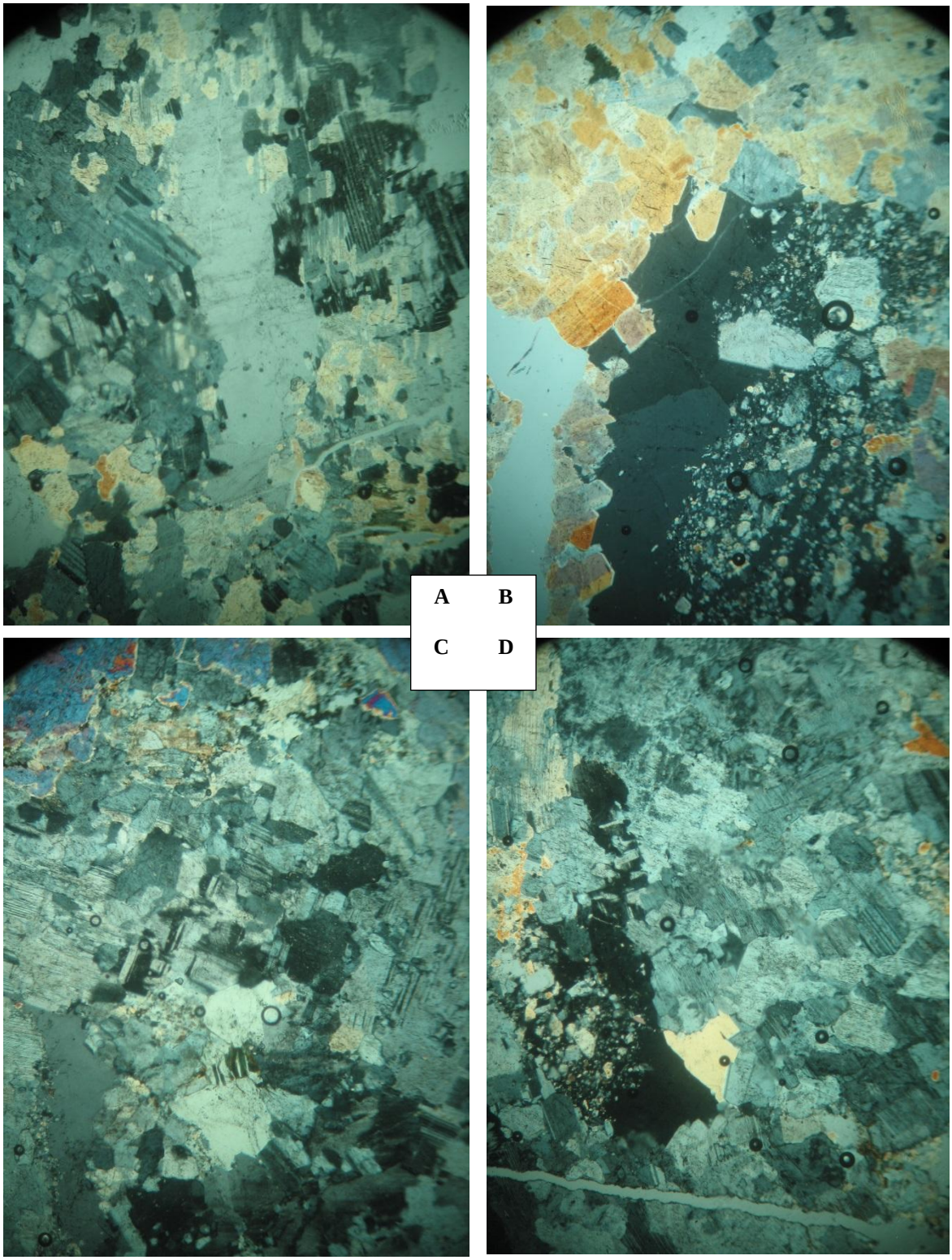
**Field Photographs taken from the study ($17^0$17'35.01'' N, $78^0$45'09.56'' E) area show out crops of Aplites and Granites. Pink granite covered by Aplites. Fractures in many directions can see.**

Achaean Hyderabad granites rocks are formed as part of Eastern Dharwar Craton aged 2.5 billion years has great importance in the process of crustal formation and evolution. Several investigators studied the Hyderabad granitic region as part of Eastern Dharwar Craton and revealed that the granite has originated due to crustal re melting process. The gray and pink granites were cropped out around the study area. They are courser in grain size. Sitaramayya (1971) classified the rocks of the Hyderabad area into three main varieties like pink, grey and leuco-granites besides the presence of pyroxene bearing granodiorites and charnockite assemblages at places. The gray and pink granites were dominated by Plagioclase feldspar and K-feldspar respectively. Pink granites show relatively low magnetic response compared to grey granite indicating the presence of more ferromagnesian minerals in grey granite (Madhusudhan Rao et al. 2002). Within the grey variety the color ranges from grey to grayish pink. According to Balakrishna (1964) pink granite is derivative of metasomatism of potash feldspar from grey granite. Similar conclusion was drawn by Kanungo et al., (1975) stating that the pink granite has formed due to feldspathization of the grey granite. The grain size ranges from medium to coarse grained and at places fine grained nature observed in grey granite and display, in general, equigranular to porphyritic texture. The boundary between grey and pink granite is transitory and gradational in both lateral and in vertical directions, the origin being the same for both the rock types (Madhusudhan Rao et al., 2002).

**Petrography and discussion:**

Sample collected during the field work for petrographic studies. Thin sections (0.03mm) were made for detailed petrography. Megascopically the aplitic rocks show similar characteristic, they are leucocratic and fine grained. Quartz, Feldspar (Orthoclase and Plagioclase) minerals occurred as essential minerals. Most of the Quartz crystals show enhydral shape with different crystal size. Plagioclase crystals are euhydral to subhydral in shape. All the plagioclase grains are almost equigranular in size. Orthoclase grains are enhydral present as essential minerals. Fluorite minerals found as accessory. Quartz crystals are found as very fine grained to medium grained in size. Mirmakitic structures found due to intergrowth of quartz and plagioclase feldspars.

Aplites and pink granites are rock types present in study area, where the aplitic rocks are overlaid on pink granites. The outcrops of these rocks show highly weathered expression. There is no clear contact between pink granite and aplitic rocks hence the grain size are differ from each other. The out crops of aplitic rocks show fractures with different directions. Widths of fractures are varying in dimensions. The fractures show NE-SW, NNE-SSW, N-S, and SE-NW in directions. Possible reasons behind the fractures may be tectonically forces. The forces which are cause to fractures are derived from eastern side of the Hyderabad granitic region. The fractures present in study area is not occurred in at one time, that means forces acted episodically on the Hyderabad granite region rocks are.




**Microphotographs: all the four photographs show lamellar twining of plagioclase feldspars. Intergrowth textures can see in B and D microphotographs. Quartz, Orthoclase and Plagioclase present in all microphotographs.**

## Conclusion:

The Hyderabad granite regions (HGR) possess different rock types, the Hyderabad granite classified into gray and pink granites. Both the granites have different characteristics hence the origin is same. Basic dykes are common in this region. Gray and pink granites are cropped out in study area, where the aplites are formed as cap rocks on it. Aplitic rocks have fractures with different directions and different fractural dimensions. The fractures in aplitic rock may occurred due to tectonic forces. The directions of fractures NE-SW, NNE-SSW, and N-S, indicates the forces occurred from the eastern side of the Hyderabad granitic region. The petrographical studies reveal that the aplites may have formed due to late stage crystallization of low density felsic magma.

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