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## RESEARCH ARTICLE

# PETROGRAPHY OF A DOLERITE DYKE, ANISETTI DUPPALAPALLY, NALGONDA -INDIA.

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### Abstract

Hyderabad granite region (HGR), is part of Eastern Darwar Craton (EDC) which has 2.5 billion years age and it covers an area of ~ 150 x 150 kms. HGR is considered as largest granitic pluton of Indian subcontinent. (S.B. Singh, et.al). Dolerite dyke formed in this Region of batholithic craton is composed mainly with granitic gneisses and unclassified granites. This region was apparently formed due to extensive lower crustal remelting of permobile phases of older (3.3-2.9Ga) gneisses (Divakara Rao, 1996). Dyke is crouped out to the west of Anisetti Duppapally (A.D.P) village as boulders from various sizes and they are weathered. Few samples were picked during the field work for petrographical studies. The present study is aimed to understand the crystallization history of basic magma.

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## Introduction

Magma tries to escape towards surroundings where temperature is low. Cracks in pre-exited rock bodies are suitable place to enter and solidification of magma or lava. Dyke is a vertical form of an Igneous rocks. Dikes which are formed in the Hyderabad region are Magmatic dykes with different mineralogical compositions. Hyderabad Granite Region (HGR) has a wide variety of granitic rocks and they are widely distributed. The granitic outcrops denudational hills, dome shaped mounds, and boulders has higher topographical levels. Dyke of ADP show N-S direction. Basic dykes of various compositions (dolerite, gabbro and pyroxenes) cut across granites of Nalgonda area. Most of these dykes occurred in Nalgonda surrounding areas are oriented, NE-SW and N-S with widths of 7 to 50m and length up to several kilometers. Very less attention paid on dykes in this region to understand the of crustal evolution processes,

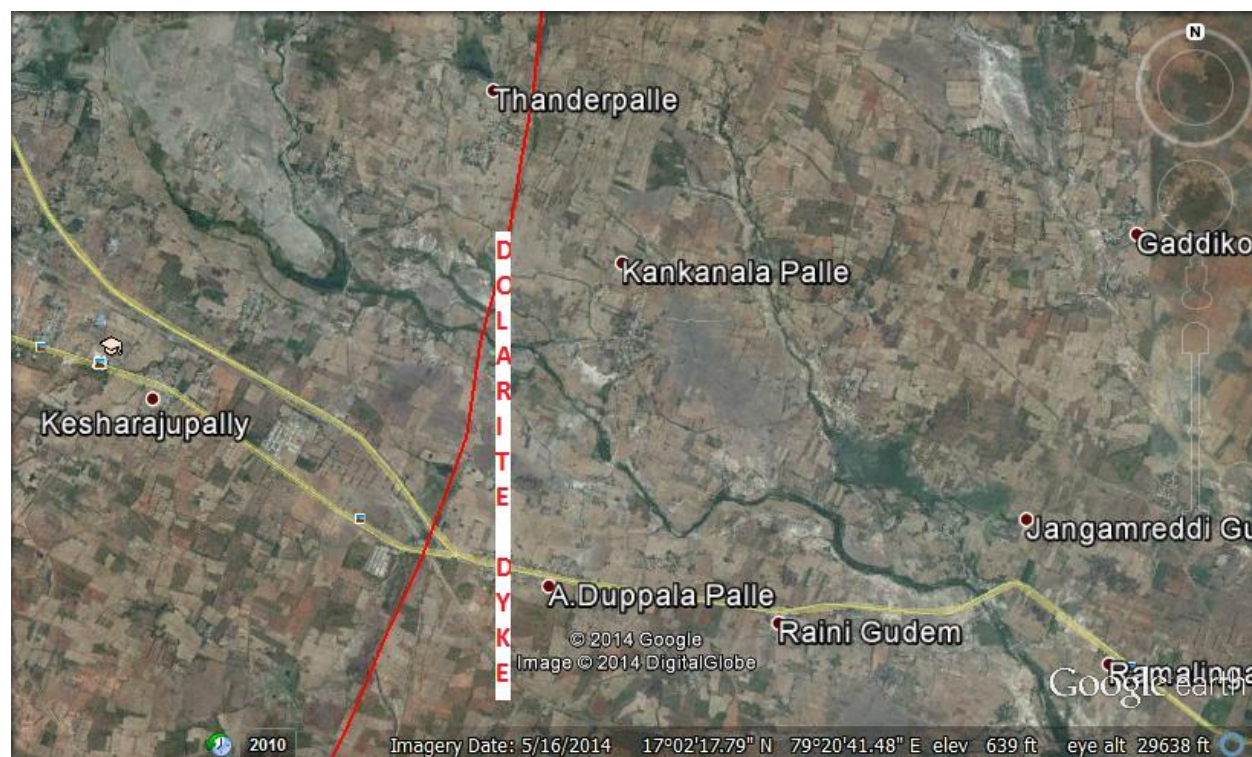
## MATERIALS AND METHODS:

### Geology of the study area:

Anisetti Duppapally is a village near to Nalgonda town towards eastern side where the Dolerite dyke occurred in N-S direction. The dyke has 20-50meters width and more than 20 km lenth extended from A.Duppapally

Leucocratic granites were cropped out around the study area. They are holocrystalline, coarser in grain size. Quartz, feldspars and biotite can be seen by naked eye. The study area considered as part of Eastern Dharwar Craton, The rocks of HGR classified by Sitaramayya (1971) pink, grey and leuco-granites besides the presence of pyroxene bearing granodiorites and charnockite assemblages at places. Leucogranite is dominant rock type in this area. Soil types in study area are gray and red which are useful to agriculture purpose. Block and gray soils formed due to weathering process of the basic rocks and red derives from the pink granites. 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 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). The ADP dyke has studied to know the crystallization history.

## RESULTS AND DISCUSSION

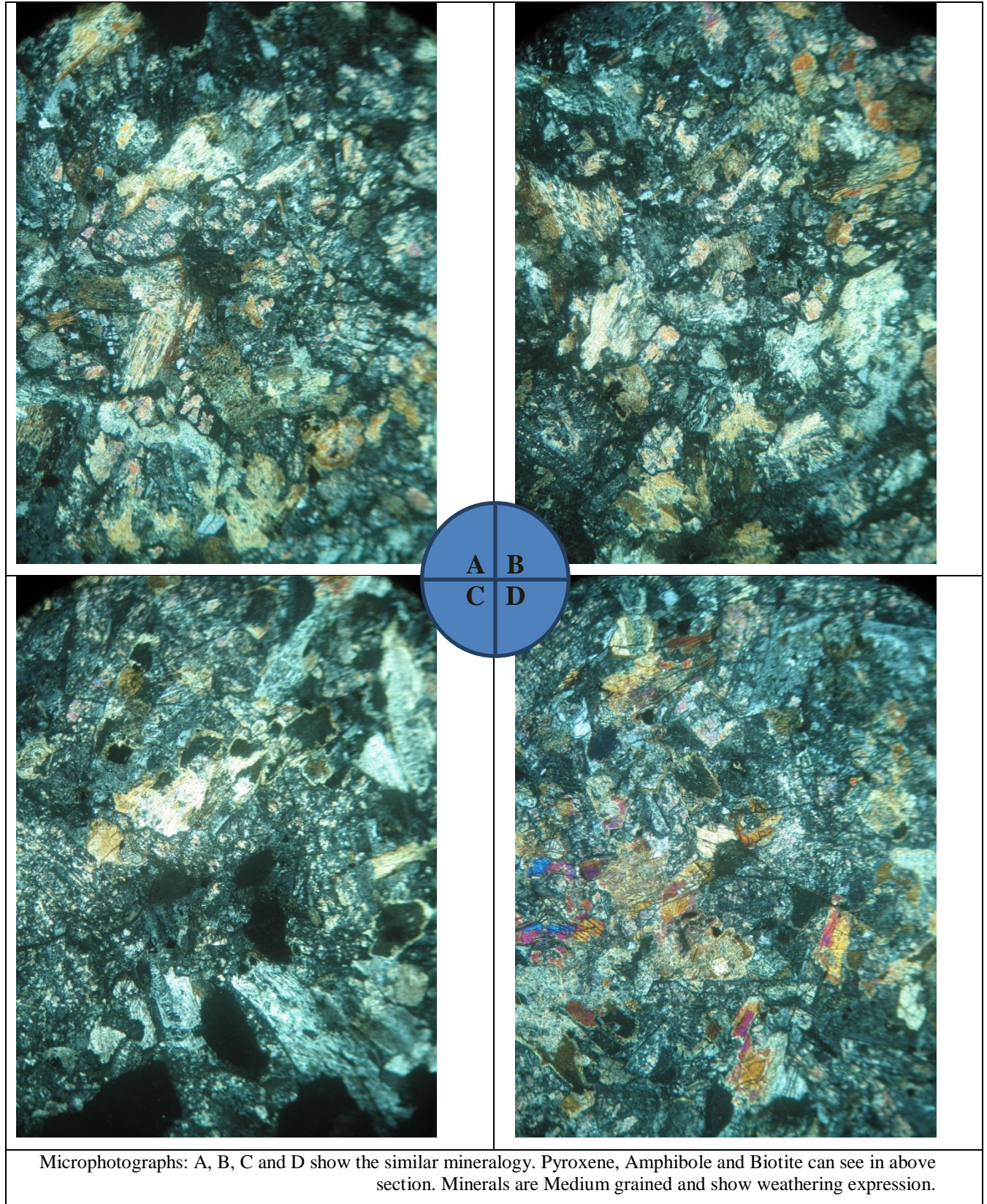


Co-ordinates of the sample area N17°02'79 E 79°20'41.48

Fig.1: Google image of the study area shows direction of the Dyke, surrounding fields, ponds and village settlements etc. the dyke has 20 meters width and shows N-S trend.

### Petrography:

Four samples were collected from the study area. During the fieldwork, all of them were picked up from the outcrop for petrographic studies. All the samples show similar characteristics and alteration. They are medium grained, melanocratic, phaneritic, equigranular. Plagioclase crystallinity is holocrystalline and contains plagioclase and amphiboles orthopyroxene, opaque minerals. Plagioclase, pyroxene, amphiboles are found as essential minerals. The plagioclase, pyroxene, amphiboles, shows approximate modal composition 45+30+13 respectively. The remaining volume percentages are of other accessories. Mineralogically, the dyke has no variation from sample to sample. It has sharp contact with the country rocks and no evidence of chilled margins. It displays hypidiomorphic texture. Plagioclase and pyroxene identified as essential minerals, magnetite, amphiboles, sphene, and very lesser amount of olivine present as accessory minerals.



Microphotographs: A, B, C and D show the similar mineralogy. Pyroxene, Amphibole and Biotite can see in above section. Minerals are Medium grained and show weathering expression.

Coarse to medium grained plagioclase crystals are subhedral in shape and size approximate 3cms in dimension. Laths of Plagioclase grains can see in hand specimen. In most of the specimens plagioclase crystals show

weathering expression and it has contact with pyroxene however the grain boundaries are well developed. Magma may have crystallized slight slow process which gives time to nucleation and improve growth rate of the crystal. They are in different shapes and sizes. Orthopyroxene grains has clear boundary, moderately medium to high relief. The grains of orthopyroxene are subhydral in shape and size is similar to the plagioclase and distributed through the dyke. Very few grains of olivine observed with high relief. The grains of plagioclase and pyroxene show irregular contact and alteration.

## CONCLUSION

The present study of petrography of ADP dyke and the geology of the study area reveals that the mafic magma intruded in to crust where the leucocratic granitic rocks were dominated in continental crust. Upper crust has a brittle nature whenever it has any pressure from any direction it express brittle nature. The continental crust made up of granitic rocks they are low dense rocks where the melts can easily injects. Mafic magma not only produces in mantle even lower crust can produce mafic magmas. Beneath the crust, at high T & P conditions mafic magma generates and tries always to escape where low T & P conditions available. Here in this case the ADP dyke has mafic to ultramafic nature that may be formed due crystallization of mantle source magma.

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