



STUDY OF COLUMNAR JOINTS FROM JYOTIBA AND TUMJAI AREA OF KOLHAPUR DISTRICT, MAHARASHTRA

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Abstract-

The study area is hilly and is situated in Kolhapur district, Maharashtra. The area is covered by basaltic lava flows of Upper Cretaceous to Lower Eocene age. Deccan basalts are made up of several lava flows. The thickness of an individual flow ranging from 7m to as much as 40 m. columnar jointing is seen in some compact basalt flow in study area ("aa" type). Hexagonal or polygonal nearly vertical or slightly inclined columns are developed. Some of the basaltic flows exhibit cooling fractures due to shrinkage. At the height of 879 m. from MSL columnar joints in Basalt are observed at Jyotiba area while at the height of 881 m. from MSL at Tumjai area. The geological field work is carried out and the study of columnar joints developed in basaltic flows in above area is done.

Keywords- Deccan basalts, columnar joints, cooling fractures, shrinkage

Introduction-

The columnar joints are seen in various parts of the Jyotiba and Tumjai area. The area is made up of various lava flows. Columnar jointing is seen in compact basalt flow in study area. They are mainly developed in basalts. These are closely spaced polygonal or hexagonal fractures called as joints. The fractures occur along a cooling surface of lava forming long columns. The basalt cools rapidly from outside towards center, causing shrinkage cracks to form, commonly in a hexagonal pattern. The cooling centers are developed in the cooling lava and due to shrinkage columnar joints are formed as a result of tensional forces.[1] [5]

Study area-

The Jyotiba hill ranges falls in Survey of India toposheet number 47 L/1 The coordinates are 16 42 15 N. latitudes and 74 20 42 E. Longitudes. While the Tumjai area comes under Survey of India toposheet number and 47 H/15. The area is bounded by Latitude 16 19'

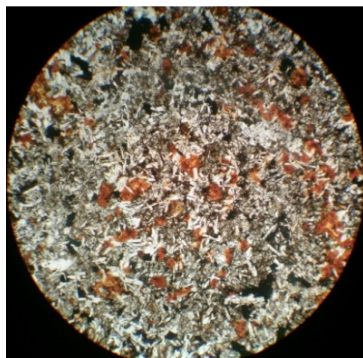
45° N. and Longitude 73° 50'15". The coordinates are 16 42 15 N. latitudes and 74 20 42 E. Longitudes. [2]

Geology of the area-

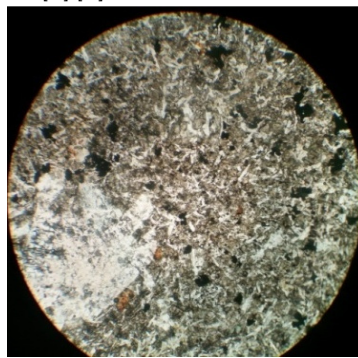
The area is covered by several lava flows which are at places separated by red bole. Two types of flows are observed, one is compact basalt i.e. 'aa' type and another is vesicular-amygdaloidal basalt (compound pahoe-hoe type). The compact basalt shows columnar joints. The jointing pattern is mainly vertical or horizontal. Spheroidal weathering is also seen.[2]

Methodology-

The geological field work is carried out and the samples of columnar joints from the study area are collected from different flows. The thin sections of the samples are then got prepared and the composition of the samples is analyzed and compared. Thin sections are studied under petrological microscope under Plane Polarized Light and Between Crossed Nicols. [3] [4].

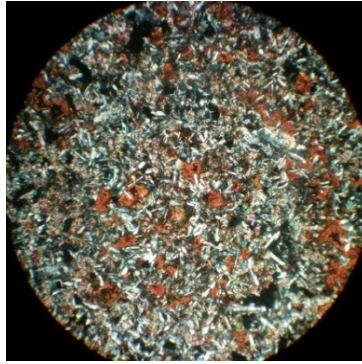


Tumjai hill columnar basalt in PPL

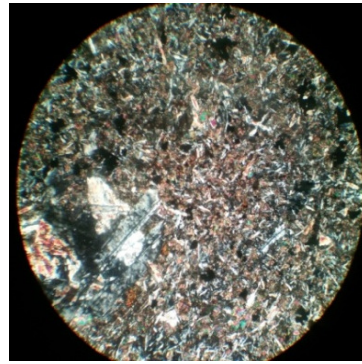


Tumjai hill columnar basalt in BCN

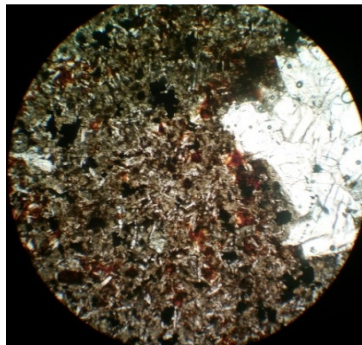
sample 1



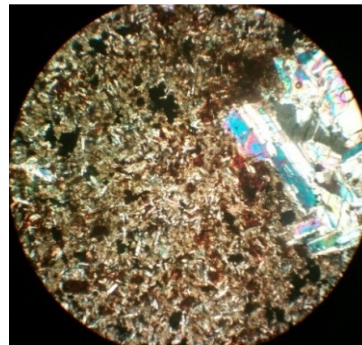
Tumjai hill columnar basalt inPPL



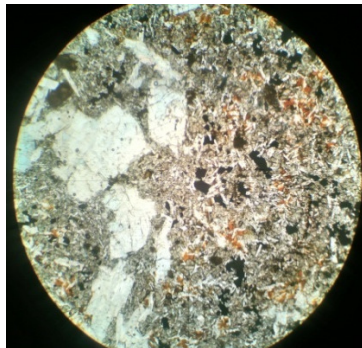
sample 2 Tumjai hill columnar basalt in BCN 2



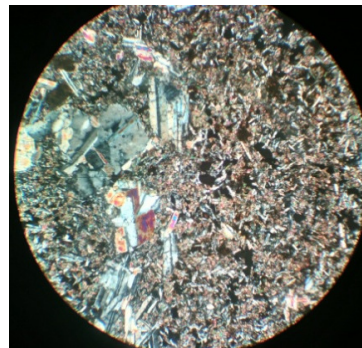
Jyotiba hill columnar basalt PPL



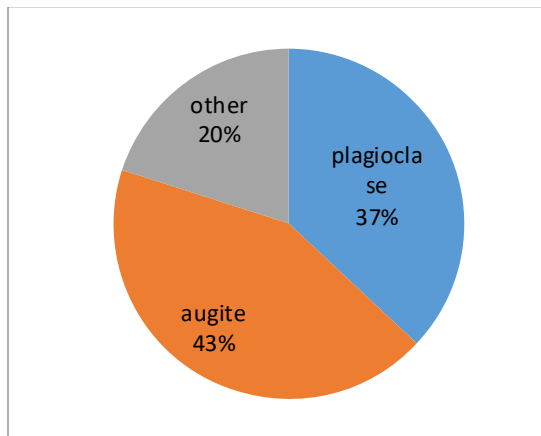
sample 3 Jyotiba hill columnar basalt BCN



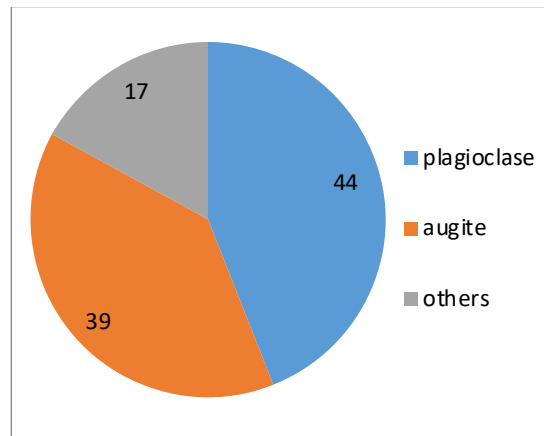
Jyotiba hill spot 2 columnar basalt PPL sample 4



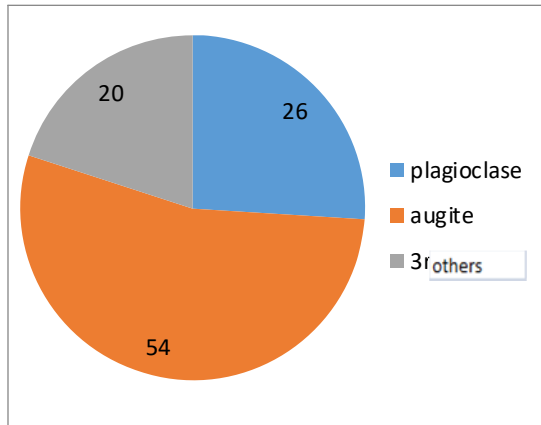
Jyotiba hill spot 2 columnar basalt BCN



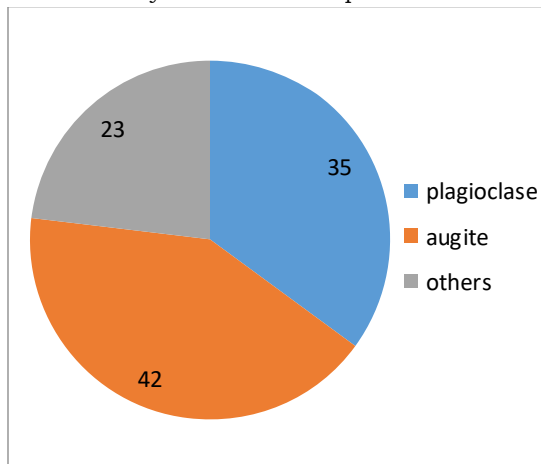
Tumjai basalt sample 1



Tumjai basalt sample 2



Jyotiba basalt sample 3



Jyotiba basalt sample 4

Modal analysis of thin sections

Conclusion-

From the modal analysis of the thin sections of columnar joint basalt samples of Tumjai and Jyotiba area it is seen that percentage of plagioclase is higher in the samples from Tumjai area than in samples from Jyotiba Hills. The percentage of augite is higher in samples from Jyotiba Hills than in Tumjai area while percentage of iron oxides and other minor elements is fairly constant in all the samples. Thus it can be concluded that the felsic component is more in the columnar basalt of Tumjai area and mafic component is more in the columnar basalt of Jyotiba Hills. The texture of columnar basalt is, fine to medium grained, and inequigranular.

References-

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