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## **Crustal Xenolith in Deccan Traps of Saurashtra Region, Gujarat: Their Nature, Chemistry and Evolution**

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The crustal and mantle xenoliths in Deccan Traps rock are always of great importance to know the nature of the basement hidden under the thick voluminous lava piles (500,000 km<sup>2</sup>). The existing knowledge on the configuration and nature of basement covered by the tholeiitic flood basalts of Deccan Trap has been inferred based on the geophysical studies such as Deep Seismic Sounding (DSS), Gravity, magnetic etc, while xenoliths provides the direct evidence on the nature and composition of basement [1]. A number of crustal xenoliths have been reported in basic dykes from the region to the south of Narmada lineament especially from central part of the Deccan Trap varying in composition from granite, gneisses, quartzite, granite mylonite, carbonate, tuff, rhyolite, granulites (mafic and felsic), websterite and pyroxenite. Based on the nature, composition, geochemistry and isotopic ratio (<sup>87</sup>Sr/<sup>86</sup>Sr) of these xenoliths it is suggested that the Dharwar craton might have been extended upto 350-400 km further north of the present position [2]. Here we report the crustal xenolith of granite recorded in basalt flow of northwestern Deccan Trap (NWDT) of Saurashtra region in Rajkot district of Gujarat, India. The occurrence of crustal xenolith in the Saurashtra region of NWDT is of utmost importance. Till date no xenoliths have been reported and mentioned from the west of Narmada lineament. As a result the workers could suggest extension of the Dharwarian basement upto Narmada rift only. Moreover such xenoliths are being reported for the first time from flows. The size of the reported xenolith is 20 cm x 5 cm. The xenolithic rock is medium grained, leucocratic, deformed and altered. It is composed of unequal proportions of quartz, albitic plagioclase (Ab<sub>98</sub>-An<sub>02</sub>) and orthoclase (Or<sub>99</sub>-Ab<sub>01</sub>). The in-situ "chemical" Th-U-Pb dating of monazite by electron microprobe (EMP) analysis was applied to crustal xenolith of granite recorded in basalt flow of NWDT of Saurashtra region in Rajkot district of Gujarat, India. The EMP Th-U-Pb dating of monazite from the granite xenolith has been carried out on thin section at Geological Survey of India, EMP laboratory, Faridabad. The xenolith contains monazite of 10-150 µm size and also grains of zircon and xenotime. The chemistry of monazite reveals that it contains total light (La+Ce+Sm+Nd) Rare Earth Elements (REEs) varies from 35% to 50% with Y, La, Ce and Th ranges from 0.2% to 4%, 8.5% to 12%, 17.5% to 25%, 3.5% to 12% respectively. The chondrite normalized REE plot of

monazite show enriched light REE pattern. The age data reveals that the crustal xenolith occurring in basaltic flows vary in age from  $912\pm 66$  Ma to  $307\pm 39$  Ma (n=80 point analysis) with majority of age data range from 700-800 Ma while some of the grains also show age range between 502-580 Ma. The preliminary age data indicate the time heterogeneity of basement in this part of the Deccan Trap Volcanic Province. The data also suggest the basement is not of Dharwarian age but has some similarity with Aravalli Supergroup or more specifically with South-Delhi fold belt. It therefore appears that the Narmada Lineament delimits the boundary of the Dharwar Craton.

*References:*

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