Geochemistry and Significance of Deccan Continental Flood Basalt Sequences of Belgaum - Kolhapur Regions in Southern Deccan Volcanic Province, SW India

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Deccan flood basalts occupy a major part of the northern districts of Karnataka with an areal extent of of 28,000 sq kms in south-western Deccan Volcanic Province (SDVP). The Deccan basalts of this area have not been well studied in detail in terms of their petrology, geochemistry and petrogenesis. This study presents petrological and geochemical characteristics of these basalts with emphasis on the nature of Cretaceous volcanic activity in the south-western part of the DVP.The Deccan basalts occurring in Belgaum-Yellur-Chandgod-Nippani and Kolhapur areas have been investigated and the constituent lava flow sequences are considered to belong to the upper most Wai sub-group having the Poladpur, Ambaneli, Mahabaleshwar and Panhala formations in an ascending order. They show the characteristic columnar structures, red boles and intertrappean beds at some places as well as microporphyritic and sub-ophitic textures with abundant plagioclase phenocrysts set in a fine-grained groundmass comprising of clinopyroxene, plagioclase and opaques. The other minerals present are chlorophaeite, ilmenite and epidote. Geochemically these basalts exhibit extreme enrichment of TiO_2 (4.1 wt%), Fe_2O_3 (17.1 wt%) and P_2O_5 (0.45 wt%). MgO varies from (4.6% - 6.2 wt %) while K_2O is low and varies from (0.2 - 0.57 wt%). The chondrite normalized REE plots exhibit nearly flat patterns and the absence of Eu anomalies. PM normalized multi-element plot shows both LILE and HFSE depletion and a flat HREE distribution. Preliminary data indicates that these basalts are high titanium flood basalts, representing melts of an upwelling asthenosphere. It is also suggested that these continental flood basalts are not products of primary magmas and may have interacted extensively with the continental crust after differentiation and that these lava flows may have been generated from enriched sub-lithosperic sources.

Keywords: Geochemistry, Deccan basalts, CFB, Belgaum-Kolhapur