Geochemistry, Sr-Nd Isotope Abundances and Magnetic Studies in Some Deccan

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The Deccan Volcanic Province predominantly consists of tholeiitic flows and dykes. The flows attain a thickness of about 1.2 km in the western part but the thickness decreases towards east. The mafic dyke swarms occur in abundance in the western, central and northern parts of the volcanic province. The dykes are medium to coarse grained, porphyritic with phenocrysts of clinopyroxene (Wo_{31-39} Fs_{14-25} En_{42-46}), plagioclase (An_{43-78}) set in a groundmass of clinopyroxene ($Wo_{28-39}Fs21\text{-}54En_{17-39}$), plagioclase ($An_{63-65}$), olivine and opaque minerals.

We present new isotope data (Nd, Sr) and other geochemical data on some mafic dykes from the easternmost part of Deccan Volcanic Province (DVP).The mafic dykes have a restricted composition in the basaltic field. Because of restricted composition, it is difficult to relate the flows to the dykes. The rare earth element abundances of the dykes are similar to some important dyke swarms of the western part and the eastern dykes. The elemental abundances of some incompatible elements and a weak Eu anomaly suggest fractionation-induced effects. Initial $^{87}Sr/^{86}Sr$ ratios in the mafic dykes vary from 0.704625 to 0.806359 and $^{143}Nd/^{144}Nd$ varies from 0.512629 to 0.513382. The εNd values of the dykes are positive varying from +1.46 to +16.1. The Sr, Nd isotopic data do not conform to any of the fields established for the Deccan stratigraphic formations of the Western Ghats, but form a flat array in a $^{87}Sr/^{86}Sr$ vs εNd plot. The high Sr and Nd isotopic ratios of the dykes, perhaps accentuated during long distance magma migration, require complex contamination of a depleted source with an unusual enriched crustal component. Magnetic susceptibility and IRM measurements revealed that titano-magnetite was the major magnetic mineral in the samples. Detailed AF and thermal demagnetizations on oriented samples yielded ChRM directions which were similar to those of the Deccan super Pole.