Paper Number: 498

Mineral magnetic studies of the intrabasaltic bole beds from the Deccan Volcanic Province (India): Implications to their palaeoenvironmental conditions.

Shaikh I. J.[1], Sayyed M. R. G.[1], Sangode S. J.[2], Hundekar S. M.[1] and Sayyed S. J.[1]

[1]Department of Geology, Poona College, Camp, Pune 411001, India irfansk64@gmail.com
[2]Department of Geology, Savitribai Phule Pune University, Pune 411007, India

---

Red and green coloured bole beds (intrabasaltic paleosols) along with their associated basalts of Deccan Traps from five localities in Pune and Ahmednagar districts of Maharashtra (India) were analyzed to infer their origin using mineral magnetic properties. The interrelations amongst χlf, χfd% and $Hard_{IRM}$ in the red boles depict abundance of <0.03µm antiferromagnetic oxides (α-Fe_2O_3 *i.e.* hematite) which could be the result of burning and redeposition in pigmentary form. Majority of red boles show high χfd% and high $Hard_{IRM}$ thereby indicating the presence of pigmentary hematite. At the same time the values of $B_{(0)CR}$, SIRM/χlf and S-Ratio show occurrence of detrital ferrimagnets in red boles substantiating the presence of pigmentary hematites as coatings to the detrital ferrimagnetic grains. The hematites produced from oxidative burning of pre-existing mineral occur as pigments producing the characteristic red colour for the red boles. The green boles, on the other hand, show predominance of MD, SD and SP ferrimagnets (magnetite/titanomagnetite and maghemite) truly representing the quiescent phases of volcanism. Since both the red and green boles show a complex mineralogy and if they are the products of pedogenesis, they may exist as transported and redeposited material in the studied boles. The enhanced concentrations of iron oxides in red boles (relative to parent basalts) is attributed to oxidation of non-ferromagnetic minerals producing hematites *i.e.* detrital ferrimagnets added by newly formed hematites and could also be due to additions of detrital ferrimagnets from volcanic ash/dust. The low concentration of magnetic minerals in green boles further supports this hypothesis. The green boles typically show near absence of antiferromagnetic fraction, suggesting their formation in less oxic or even gleying conditions. The hard fractions (if any) shown by the basalts do not show χfd% representing hematite of igneous origin and thus hematites found in red boles could have been produced by pedogenesis as well as baking effect. At places the lower basalts occurring below red boles show high χfd% and high $Hard_{IRM}$ suggest infiltration from the red boles above. Each variety of the bole beds thus represents a complex of the processes i.e. pedogenesis, transportation, redeposition and partial to complete oxidation and thus demands several detail attempts to establish their palaeo environmental conditions.