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Quantitative analysis of clay mineral assemblages from the intrabasaltic palaeosols (bole beds) occurring in the parts of western Deccan Traps (India): Palaeoenvironmental inferences.

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Five intrabasaltic palaeosols (bole beds from Deccan Traps) showing varying colour viz. red, green yellow and chocolate were studied for their clay mineralogy using their quantitative proportions with an objective to assess variations in the clay minerals based on their geochemical parameters. The clay minerals of the red bole include montmorillonite (67%), mixed layer montmorillonite-chlorite (22%) and quartz (13%) which could be related to a Mean Annual Precipitation (MAP) of 595mm, Mean Annual Temperature (MAT) of nearly 12°C and an acidic environment. Although the green bole exhibits similar MAP as that of red bole, the MAT seems to be slightly lower (10°C) and an acidic environment, show the dominance of Ca-plagioclase (48%), vermiculite (28%), mixed layer montmorillonite-chlorite (13%) and montmorillonite (10%). The occurrence of vermiculite in green bole could probably be related (?) to K-metasomatism. The reworked bole (formed due to reworking of red and green boles) exhibiting moderate to low MAP and moving acidic water has led to the formation of montmorillonite (48%), Ca-plagioclase (25%), mixed layer montmorillonite-chlorite (17%) and quartz (12%). Moderate MAP, well drained acidic conditions for the yellow bole represents the formation of saponite (75%; which may be related to the devitrification of volcanic glass), mixed layer montmorillonite-chlorite (16%) and Quartz (10%). Contrastingly high MAP but poorly drained alkaline conditions for the chocolate bole lead in the dominance of quartz (51%), montmorillonite (35%) and mixed layer montmorillonite-chlorite (12%). These studied bole beds with considerable spatio-temporal distribution show different palaeoweathering conditions leading to different clay mineral assemblages under different geochemical environment clearly suggest quite variability in the Palaeoenvironments during the quiescent periods of Deccan volcanism.

