

Palaeoweathering chemistry of some flood basalt hosted fossil soils and their palaeoclimatic significance

M. R. G. SAYYED

mrgsayyed@yahoo.com

Ancient soils have been largely used to understand the palaeoclimates because the chemical weathering was in response to the contemporaneous reactions between the meteoric water equilibrated with the atmospheric gases and the protoliths. The present paper attempts to compare chemical weathering patterns of the fossil interbasaltic soils (from the published geochemical data) from some flood basalt provinces. These include from Late Triassic Ischigualasto basin (NW Argentina), end-Cretaceous Deccan Traps (India), British Tertiary Basaltic Province and Tertiary lavas of Northern Ireland. The published geochemical data of the basalts and modern soils (Mumbai) developed upon them from Deccan Traps have been used for comparison. In general the CIA values do not show many variations from the Deccan boles but if studied from two spatially separated areas they have appreciable differences; the Ischiguasto palaeosols, however, show a wide range of CIA values. The higher CIA values in the Skye and Mull boles from British Tertiary basaltic province, than the Deccan boles, indicate their quite intensive weathering conditions while tertiary interbasaltic formation of Northern Ireland conspicuously shows very high CIA values, indicating highly intense and/or prolonged chemical weathering. Hydrolysis shows good correlation with MAP and CIA but the Tertiary interbasaltic formation shows exceptionally higher hydrolysis. When plotted on the triangular diagrams the Deccan boles and the Tertiary interbasaltic formation show distinctive fields. The Skye and Mull boles, Ischigualasto palaeosols and Mumbai modern soils plot close together. Thus from the fossil interbasaltic soil geochemistry it is evident that the palaeoweathering characteristics are different in different flood basalt provinces and the different chemical weathering characteristics should be correlated with the time gap (quiescence periods) between the successive lava flow eruptions and the palaeolatitudinal positions influencing the palaeoclimates.