Geochemical study of cliff sediments from the Central Ganga plain: Implications on paleoclimate and depositional history

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The Ganga plain is formed subsequent to the collision of Asian and Eurasian plate during mid Miocene. Faults lying above and beneath the alluvium indicate that the region was tectonically active and as a result cliff of variable height were developed in different parts of the Ganga plain. Variation in grain size, colour, thickness of lithounits and formation of calcrete layer reflects major control of chemical processes in the sediments. The selected trace elements (Th/Sc, La/Sc, Co/Th) ratios suggest most of the sediments originate from the felsic source that lie in the HHCS series. The REE patterns indicate LREE enriched and almost flat HREE patter along with negative Eu anomaly support origin of the sediments from the felsic source as well. The chemical index of alteration (Avg CIA 77.503), high value of MgO (Avg MgO 8.74) and Cao (Avg Cao 12.32) with selected ratios like Na/Al (Avg 0.097), K/Al (Avg 0.165) included trace element ratios Rb/Sr(Avg 0.66) and U/Th(Avg 0.23) suggest variable degree of weathering from source to the plainer region. Our study also supports two relatively wet and warm climatic phases (~59-46 ka and 39-26 ka), intervened with drier interval (~46-39 ka), which favours formation of calcrets, 2-4 m of cliff height.

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