

# **Provenance history from petrological studies of the Proterozoic Kolhans, Jharkhand, India: Implications on basinal tectonics**

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The 2.2-2.1 Ga Kolhan Group is a time transgressive unit developed in a passive rift setting and caused due to the fragmentation of the Rodinia supercontinent (?). The Kolhans developed in an intracratonic basin with a westward slope and was subsequently deformed into a synclinal structure. Elongated domes and basins and dome-in-dome structures dominate the eastern part of the basin, while the western margin is thrust against the Iron Ore Group. The petrography, geochemistry and CIA values of Kolhan siliciclastics, suggest an intensely weathered low-relief dual provenances and a warm and humid palaeoclimate. The size-roundness relationship, the mineralogy, the bimodal distribution, textural inversion and palaeocurrent studies are suggestive of complex lithologies and multiprovenance - presumably a granitic to the east and northeast and an Iron Ore Group to the southwest and northwest of the basin. Repeated fault-controlled subsidence generated multiple sediment cyclicity that led to the development of fluvio-lacustrine fan-delta sedimentation patterns.

The Kolhan shales with an average chemical index of alteration (CIA) of 71.8 are indicative of a granitic source. High  $\text{TiO}_2/\text{Al}_2\text{O}_3$  and  $\text{K}_2\text{O}/\text{Na}_2\text{O}$  ratios reflect a derivation of coarser sediments from a stable craton during tectonic quiescences with a paleo-arid-semiarid climate and low chemical weathering, whereas the shales are indicative of a modest amount of chemical weathering. This discrepancy is due to transport segregation that accounts for the high percentage of shale in the basin.