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Sandstone petrology and geochemistry of the kolhan basin, Eastern India: Implications for basin tectonics

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The 2.2-2.1 Ga pear shaped Kolhan basin show the development of a time transgressive group in a passive rift setting caused due to the fragmentation of the Rodinia supercontinent. The Kolhans while showing variability in the thickening/thinning of the quartzo-feldspathic, quartzolithic, and quartzose sandstones have also shown a similarity in compositional and dispersal characteristics to both underlying and overlying strata, a phenomenon termed here congruence. A combined petrologic and geochemical analysis of sandstone suites (congruence suite) can be used to track changes in the sediment supply from adjacent areas if a long-term record of the basin fill is available the source signal is preserved by "proximal" depositional conditions and diagenetic alteration of sediments is limited. Provenance-derived variations in sandstone compositions are therefore a key in unraveling regional tectonic histories. The basin axis controlled the progradation direction which was likely driven by climatically induced sediment influx, a eustatic fall, or both. In the case of the incongruent shift, increased sediment supply permitted the rivers to cross the basinal deep. The temporal association of the Kolhans with tectonic structures in the belt indicates that syntectonic thrust uplift, not isostatic uplift or climate, caused the influx of quartz. The Kolhans display increasing textural and mineralogical maturity from base to top of its lithological succession. Continued regression and peneplanation heralded the deposition of supermature sandstone in the uppermost horizons of the Kolhans.

Biography

Kasturi Bhattacharyya has completed her Masters of Science from Indian Institute of Technology, Kharagpur, with Institute Silver Medal for being the best student in MSc Geological Sciences batch. She also has one year of work experience with British Gas. Currently, she is pursuing Ph.D. under the supervision of Prof. Subhasish Das at Indian Institute of Technology, Kharagpur, India.

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