

AUTHOR'S CONTRIBUTION

- 1.** Detailed geological mapping on a scale 1:50,000 (2cm = 1 km) covering an area of about 140 km² of a part of Gondwana sequence located along the southern margin of the Talchir basin, was done. Five lithostratigraphic units, three in the Talchir Group and two in the Damuda Group were recognized and mapped. The validity of the three-fold informal lithostratigraphic classification of the Talchir Group (Pandya, 1990) and inclusion of the boulder gravel bed in the Karharbari formation as its upward continuation (Casshyap and Tewari, 1984) has been confirmed.
- 2.** A detailed sedimentation history of the sequence with respect to provenance history, palaeoflow pattern, depositional environments and tectonic setting of the source area and depositional basin has been worked out for the first time with the help of nature of lithic fill, lithofacies associations, sedimentary cycles, petrography of the sandstones, heavy mineral and palaeocurrent analysis and vertical variation of grain size of the clastic sediments.
- 3.** Glacial tillite and rafted boulders in the lake rhythmites have been reported for the first time from the basal part (Unit-A) of the Talchir succession. This suggested a glacial climatic condition at the initial stage of Talchir sedimentation, which was later replaced by warmer climatic phase in the upper part of the succession.
- 4.** The depositional environment of the basal part of the succession (Unit-A) has been interpreted for the first time to be a fan delta, i.e., an alluvial fan building up in a glacial lake.
- 5.** The coarsening and thickening upward sequence of the middle part of Unit-B which was considered to be the second phase of delta advance in a lacustrine setting (Pandya, 1990) has been regarded as a sublacustrine fan built up on the base of the lake slope.
- 6.** A sequential change of depositional environments in the Talchir Group from lacustrine fan delta to two phases of delta advance in a lake basin followed by sedimentation from suspension and chemical precipitation in a deep lake basin has been related to gradual deepening of the lacustrine regime as a consequence of rapid climatic warming which led to recession and disappearance of glaciers.

7. The depositional environments of the Karharbari and Barakar Formation of Damuda Group have been worked out in greater detail. The depositional environment of the Karharbari Formation has been considered to be alluvial fan fed by a network of braided streams while that of Barakar Formation has been interpreted as meandering stream depositional environment. The possible cause of metamorphosis of the braided stream alluvial fan environment to a meandering stream depositional environment has been suggested.
8. A sharp contrast in the geometry of the coal seams of the Karharbari and Barakar Formation has been explained in the light of contrast in the depositional environments of these two formations.
9. A detailed regional palaeoflow pattern of the Gondwana sequence has been worked out for the first time. A remarkable sinistral swing in the palaeoflow pattern from northeast in the basal part of the succession to a dominant northwesterly palaeoflow in the upper part has been interpreted in the light of change in palaeoslope in response to gradual deepening of the basin during Talchir period and syn- and post-tectonic drainage deflection during Damuda period.
10. The observed vertical variation in grain size, heavy mineral assemblage, palaeoflow pattern and depositional environments have been for the first time, interpreted as the basic sedimentary response to source area denudation and tectonism and changing palaeoslope of the basin.
11. The Easternghat Group has been inferred to be the source area which supplied sediments to the depositional site. The Talchir Group has been interpreted to represent denudation phase of the source area with a declining relief while the Damuda Group has been interpreted as a syn- and post-tectonic phase of sedimentation marked by source area uplift, basin subsidence and steepening of the alluvial surface.