

ABSTRACT

The Talchir Group, which marks the beginning of Gondwana sedimentation in India, is considered to be of glacial, glacio-lacustrine and fluvio-glacial origin by many (Blandford et al, 1856 ; Niyogi, 1961, Smith, 1963a and 1963b ; Ghosh and Mitra, 1967 and others). Sedimentological studies on the Talchir Group are rather scanty considering the widespread occurrence of the Group in India.

The present work is a sedimentological study of Talchir Group from four basins in eastern India - Giridih, Sahajuri, Jayanti and Daltonganj basin. The basins occur along an east-west trending 350 km long stretch with few more smaller basins in between (Fig.1).

Despite slight local variations the lithofacies distribution of the Talchir Group in all these basins are essentially similar. The glacial origin of these sediments can be established from the presence of glaciated pavement to the south of Jayanti basin and presence of glacially modified clasts (bullet nose shaped boulder and clasts, flat iron shaped and striated pebbles and boulders etc). Sediments present in these basins are glacial, glacio-lacustrine and glacio-fluvial. The glaciogenic sediments present in these basins are termed basinal, glacio-fluvial and glacio-lacustrine

sediments are formed due to draining of broad outwash plains by meltwater streams. The glacio lacustrine deposits are mainly lake delta and distal and proximal lake sediments. Marine influence on the basis of presence of *Fenestella* sp and marine sediments have been established from the northern central part of Dalatonganj basin.

On the basis of lithofacies assemblage of their vertical and lateral relations, directional properties etc. the sedimentation pattern of each basin is suggested. In general the sediments were deposited in Proglacial lake basins. The massive diamictites present formed from base of the advancing glaciers by basal melting. The package of sediment gravity flow deposits represent mainly the transitional phase between terminoglacial and proglacial environments. The delta facies can be easily identified from both lithofacies assemblage and steeper foreset beds. Delta facies show characters of both Gilbert delta and small arcuate deltas. Gravity flow deposits are common both along the northern and southern basins boundaries. However due to the presence of post depositional boundary faults these sediments to the south are better preserved. These east-west trending basins were broadened by Precambrian high lands. The piedmont glaciers descended down the mountain slopes and deposited the Talchir sediments in the lake basins in the front. These basins

were initially localised depression possibly created by previous glacial movement mainly and then enlarged itself during sedimentation. The glacial lobes entered and retreated from each basin many a times. This phenomenon can be very well established in Giridih basin particularly.

During late palaeozoic time mountain glaciers were present over the east-west trending high lands in eastern India. From these mountains glaciers descended down as piedmont glaciers both along the northern and southern slopes and deposited glaciogenic sediments in lake basins present in the front. On a regional scale basin to the north of the high land was shallow with number of sub-basins which may, at times, have been subsiding more rapidly giving rise to localised steepes palaeoslopes. The ice which was moving over the basement rocks on the marginal part of the basin was grounded and eroded the underlying basement rocks and most of the pre-existing glacial sediments. Some lodgment tills and associated sediments present in the marginal part of the basins are possibly the remnants of early formed glacial sediments. Deposits of advancing glaciers in the basins are mainly the massive diamictites and those of retreating phases are various types of debris flow deposits, rhythmites and other fines clastics. In Daltonganj basin deposits of retreating phase at places are intermingled with both

fossil bearing and non-fossil bearing marine sediments. In Giridih basin the presence of bioturbated calcareous sediments suggest possible marine influence.

The sub-basins within the main regional basin mentioned above later developed into smaller isolated basins separated by Precambrian basement rocks. These smaller basins are now known as individual Gondwana basins. Regional palaeogeographic model as well separate models of four basins studied are diagrammatically presented.