

Pre-Himalayan uplift event and deformation of recumbent folds in Tethyan sedimentary succession of Manang area, Nepal Himalaya

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During the implementation of a research project on the stratigraphic analysis of a Triassic sequence in the Yakkharka-Manang area, Nepal, precise measured sections were indispensable. Consequently, a detailed structural analysis was carried out in the Cambrian to early Cretaceous sedimentary rocks constituting the Tibetan-Tethyan zone. The study area comprises the Permian Thini Chu Formation, the Triassic Tamba Kurkur Formation, Mukut Limestone, Tarap Shale, and Quartzite Series in an ascending order.

Distribution of these successions is important to analyze folded and faulted structures. Especially the P/T boundary is a distinct key to trace deformed successions. In addition, slaty cleavages associated with folded structure were also analyzed. The investigation revealed three stages of folding (i.e., F1, F2 and F3).

F1-folds constitute tight recumbent folds. In the study area, a large syncline with an almost horizontal axial plane was formed. Slaty cleavage (S1) which is formed sub-parallel to the axial plane of F1-folds was associated. The S1 penetrated the whole succession of the study area and is defined by recrystallized illites. A large outcrop of the recumbent F1-fold is observed at the slope of Ghyanchan. The younging directions of the F1-folds indicate northerly vergence.

F2-folds are characterized by tight overturned folds. The succession in the northeastern part of the study area was deformed by F2-folding. The axial plane of the F2-folds trends NW-SE and dips due north. The slaty cleavage (S2) which is subparallel to the axial plane was associated with these folds. Under the microscope, S2 is defined by weakly recrystallized incipient illite that cuts S1 cleavage. The younging direction of the F2-folds reveals southward vergence.

F3-folds are characterized by gentle to open vertical folds with NW-SE trending axis. The F3-folding has weakly deformed previous F1 and F2 structures.

The southerly vergence of F2-folds fits with the top-to-the-south movement of the Himalaya tectonics. However, F1-folds had opposite (i.e., northerly) vergence. Hence it is suggested that the F1-folds were formed before the Himalaya uplift.

