## Crustal Shortening and Exhumation of the Gangpur Terrane, Eastern India

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The Proterozoic Gangpur Terrane (GT) occupies an important place in the Precambrian geology of India. This metasedimentary terrane occupies the western flank of the North Singhbhum Fold Belt (NSFB) in the eastern Indian Precambrian complex. Although several authors (Krishnan, 1937; Banerjee, 1967; Kanungo and Mahalik, 1967; Chaudhuri and Pal, 1980; Sahoo, 2001) have discussed the structure of the area in detail, this contribution is possibly the first to discuss the tectonics of this important crustal province. GT describes an easterly plunging and easterly closing megascopic scale fold. This structure is named as the Gangpur Fold (GF) here. The southern limb of this fold is steeply overturned towards south. The Singhbhum Plate (SP) appears to have subducted beneath the North Indian plate (NIP) along a northdipping subduction zone. Outcrop scale D<sub>1</sub> isoclinal recumbent to reclined folds resulted during this episode. Axial planar schistosity accompanying the  $D_1$  folds suggests penetrative ductile deformation at deeper crustal level  $(S_1)$ . Open upright  $D_2$  folds can be correlated to collision between the SP and NIP. The vertical to subvertical axial planar schistosity (S2) that accompany D2 folds also shows penetrative ductile deformation signifying deformation at deeper crustal levels.  $S_{2a}$  schistosity marked by prominent crenulations of  $S_0$  and  $S_1$  planes define  $\mathsf{D}_{2a}$  deformation episode. The vertical to subvertical fracture cleavages are planes of discontinuity disrupting the  $S_0$  bedding planes and  $S_1$  schistosity. The fracture cleavage is interpreted as  $S_{2b}$  cleavages. There is noticeable movement along the fracture cleavage accompanied by occasional quartz vein intrusion. Based on the similarity in their orientation pattern ( $\hat{S}_{2a}$ ) and  $S_{2b}$ ) it can be said that fracture cleavages may have resulted due to the same stress environment that gave rise to S2a crenulation schistosity. S2a crenulations and S2b fracture cleavage planes may possibly belong to a single progressive phase of deformation related to  $D_2$  deformation. Further work is needed to establish the relationship between the  $S_{2a}$  and  $S_{2b}$  cleavages. Crustal shortening during  $D_2$  deformation has caused extreme flattening of the F<sub>1</sub> folds leading to formation of rootless folds. Severe crustal shortening during D<sub>2</sub> episode was accommodated by south directed overthrusting of the terrane over its basement. The southern limb of the GF was overturned towards south giving a foreland-ward vergence of the megascopic scale fold structure. Ductile deformation during  $D_1$  and  $D_2$  gave way to brittle deformation as GT exhumed to shallower crustal levels during the later part of the D2 deformation. Late brittle fractures overprinting the earlier structures of  $D_1$  and  $D_2$  generations indicate exhumation of Gangpur Terrane to shallower crustal levels.

## References

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