

Late Quaternary reactivation of the South Tibet Detachment System (STDS) in Central Himalaya, India: implications towards hinterland tectonics

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In the Central Himalaya the north-south extension that defines the lithological and tectonic boundary between Higher Himalayan Crystalline (HHC) and the Tethyan Sedimentary Sequences (TSS) in the Trans-Himalaya is well demarcated by the South Tibetan Detachment System (STDS). There is reasonable agreement that initiation of STDS started along with the formation of MCT in Miocene [1,2], however, its subsequent activation remains poorly understood. Recent evidences from Nepal suggest that movement along the STDS persisted either episodically or continuously during the Quaternary [3].

Our study based on the (i) raised strath and fill terraces (ii) abrupt termination of moraines (iii) perched glacial valleys (iv) deflection in river profile and (v) soft sedimentary deformation structures preserved in the relict lake sediments supported by the optical dating suggests that STDS was active during the last 20 ka in the Central Himalaya (Fig. 1). The statistical probability distribution analysis of the chronologically constrained major deformation structures preserved in the relict lake deposits and their spatial distribution pattern plotted on the global data curve of Ambraseys [4] indicates that they were caused by an earthquake of magnitude >6.5 between 17 ka and 13.5 ka having an epicentre in the vicinity of the STDS (Fig. 2).

Considering that the MCT and STDS are the coupled structures [1,2], our observation supports the hypothesis that the STDS is providing accommodation space to the strain gradient arising due to the north-south compression in the Himalaya during the late Quaternary [3]. In this presentation implications of the above evidences towards understanding the geodynamic evolution of the Trans-Himalayan terrain during the late Quaternary will be discussed.

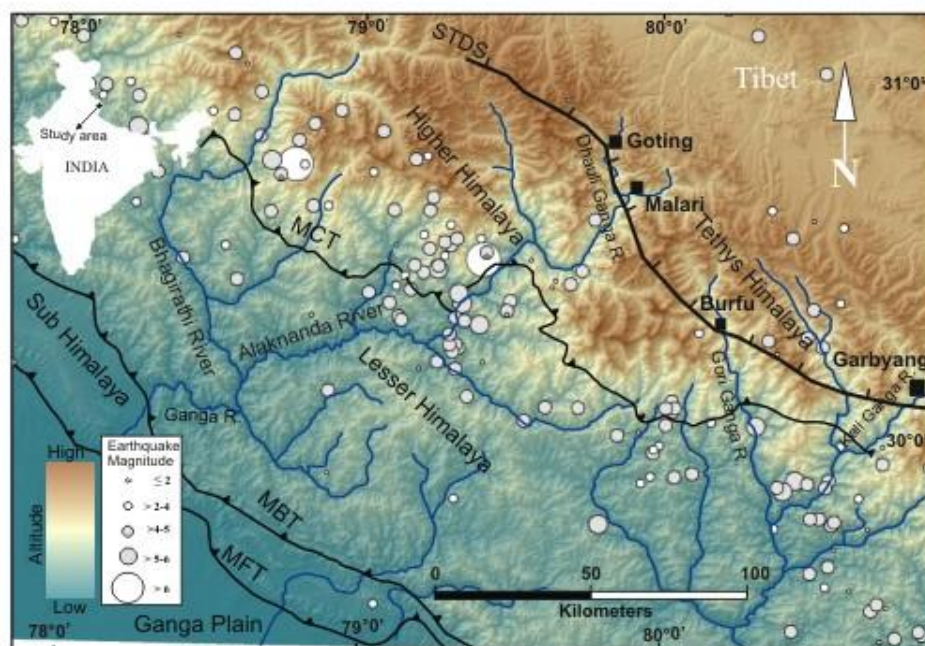


Fig. 1: Seismotectonic map of study area

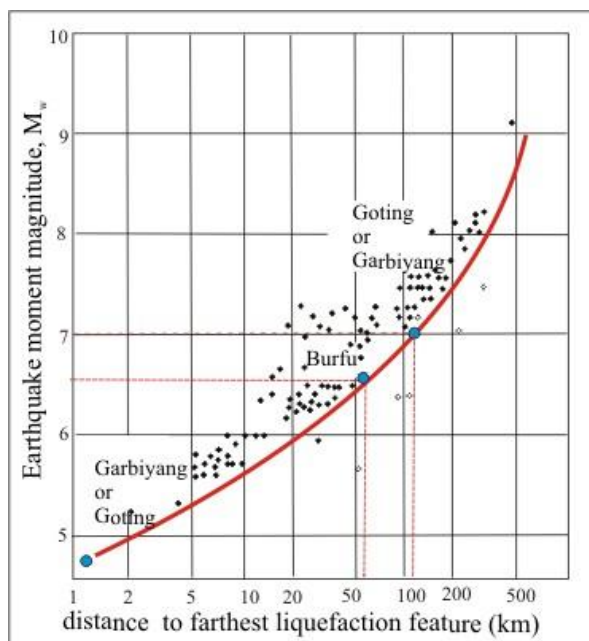


Fig. 2: Reconstruction of the paleoearthquake Magnitude between 17 and 13.5 ka based on the relationship between earthquake magnitude and the farthest liquefaction features from epicenters [4]

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 Key words: STDS, Soft sediment deformation structure, Tethys Himalaya, Late Quaternary