Neotectonic activity and its geomorphic response in the Tangtse valley, Ladakh Himalaya

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The~800 km long dextral Karakorum fault bounding the southwestern margin of Tibet is commonly considered to be a discrete narrow fault zone. However, this fault is bifurcated between 33.5° N and 34.5° N into two parallel strands namely: the Pangong Tso and the Tangtse (Rutter et al. 2007). Slip rates inferred on the Karakorum fault ranges from 30-35 mm/yr to 3-4 mm/yr (Molnar and Lyon-Caen 1989, Avouac and Tapponnier 1993, Liu et al. 1992, Liu, 1993, Searle et al. 1998 Tapponeir et al. 2001, Banerjee and Bürgmann 2002, Brown et al. 2002, Jade et al. 2004). Rutter et al. (2007) have shown evidences of shallow brittle deformation (such as clay-bearing gouges, cataclasite) along the Pangong strand but could not find comparable evidences along the Tangtse strand. Based on this observation, most recent slip is suggested to have been recorded only along the Pangong strand. However, preliminary data collected in this study from deformed fluvio-lacustrine Quaternary deposits cut by Tangtse strand suggest recent earthquake displacement to have occurred after ~ 13 ka.

In Tangtse valley, fluvio-lacustrine Quaternary deposits are exposed for a length of ~ 30 km along the Tangtse River. This thick sediment sequence, formed possibly due to damming of Tangste River, attains a thickness of up to 70 m. Recent activity in Tangtse strand is expressed in the form of changed river course, deformed and displaced sediments, and development of fault gouge. Optically stimulated luminescence age of ~13 ka obtained from deformed lake sediments provides a firm lower bound, on the tectonic activity of Tangtse strand to after ~13 ka. Tectonic activity at ~ 50 ka, ~ 35 ka, and ~ 25 ka has already been inferred from deformation seen at different levels in these type of deposits in adjacent valleys (Shyok Valley and Indus Valley near Leh) (Phartiyal et al. 2005). In the light of these new data, it is inferred that the Tangtse strand has been active during the past ~15 ka.

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