

Preliminary Fault Slip-Rate Estimate for the Right-Lateral Beng Co Strike-Slip Fault, based on Quaternary Dating of Displaced Paleo-Lake Shorelines

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GPS data indicate that eastward extrusion of material across the Tibetan Plateau accommodates some of the northward motion of India, with respect to Eurasia (Zhang and others, 2004). The Beng Co fault is a major right-lateral strike-slip fault, which strikes ESE for a distance of 150+ km across the eastern Central Tibetan plateau. Armijo and others (1989) suggested the Beng Co fault is one of a small number of important strike-slip faults in Central Tibet which accommodate the eastward extrusion of material. However, such a kinematic model requires the Beng Co fault slip-rate to be relatively high (~10 mm/yr), compared to the relatively slow rate (~1 mm/yr) expected if eastward motion is accommodated in a more distributed way across many active structures throughout the region.

Unfortunately, existing GPS data or measurements from Satellite Radar Interferometry (InSAR) collected over the decadal timescales are not currently able to resolve the slip-rate for the Beng Co fault with enough precision to resolve this issue (e.g. Zhang and others, 2004; Taylor and Peltzer, 2006). In this study, we use a variety of Quaternary dating techniques to determine the age of geomorphic markers which are displaced across the Beng Co fault. From this we calculate a slip-rate for this fault, averaged over the late Quaternary period, which allows us to test if a distributed or block model approach is more appropriate for describing active deformation in Central Tibet.

The Beng Co fault cuts across a number of paleo-lake shorelines around the southern margin of the Peng Co Lake, Central Tibet. Three main sequences of beach berms are present around the present lake shoreline (1 being the oldest, 3 being the youngest), with each sequence comprising as many as 5 individual beach berms. At 31.389°N 90.426°E, the fault displaces sequence 2 beach berms in a pure right-lateral sense by ~15 m. These beach berms can be clearly traced 6 km eastwards around the lake, where they become incised and exposed by a river which drains into the Peng Co Lake. We collected shells for radiocarbon dating, and fine sand samples for OSL dating from beach berms within shoreline sequences 1, 2 and 3, as well as samples for ³⁶Cl exposure dating from profiles through each beach berm. Dating of these samples is ongoing. However, we present the initial results from carbon dating of snail shells found within each berm, thereby allowing us to bracket the age of the 15 m displacement on the Beng Co fault, and calculate a preliminary fault slip-rate for this section of the fault.

References

- Armijo, R., Tapponnier, P. and Tonglin, H., 1989, Late Cenozoic right-lateral strike-slip faulting in southern Tibet, *J. Geophys. Res.*, 94, 2787 – 2838.
- Taylor, M. and G. Peltzer, 2006, Current slip rates of conjugate strike slip faults in central Tibet using Synthetic Aperture Radar Interferometry, *Journal of Geophysical Research*, 111, B12402, doi:10.1029/2005JB004014
- Zhang, P.Z., and others, 2004, Continuous deformation of the Tibetan plateau from global positioning system data, *Geology*, 32, 809-812.