

**Preliminary results on Late Quaternary slip rate of the central  
Haiyuan Fault constrained by terrestrial in situ cosmogenic nuclides  
dating, UAV and LiDAR surveys**

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Kinematic parameters of active faults are essential for understanding active tectonics, and evaluation of regional tectonic and crustal deformation models. Many study focus on large active faults and acquisition of their slip rates of multiple time scales with advanced technology and methods. The Haiyuan fault is a major left-lateral active fault in the northeastern Tibetan Plateau, extending ~1000km from the Hala Lake to the west to the Liupan Shan to the east. Its eastern section ruptured to surface in 1920 with magnitude  $\geq 8$ . The slip rate of the Haiyuan fault has attracted a lot of attention due to its important role in transferring deformation from on-plateau to off-plateau. Researchers have carried out slip rate determination along the fault, but results are controversial. Gaudemer et al. (1995) estimated that strike slip rate is  $\sim 11 \pm 4$  mm/yr since the Holocene on the central segment. However, there was no reliable geochronology dating at the time, they only assigned an interglacial age as displacement accumulating age to estimate rate. We revisited Gaudemer et al. (1995) study site, Honggeda, for a more accurate slip rate of the central segment. We used terrestrial LiDAR and small Unmanned Aerial Vehicle to survey the offset terraces and their geomorphology, acquired DEM and aerial imageries with  $\sim 0.1$  m resolution. With such a fine resolution, the subtle offset features on the active river bed are clearly visible in the aerial imageries. These high resolution topography data can help us to analyze terraces deformation and subsequent degradation processes. Samples of terrestrial in situ cosmogenic nuclides were collected from three terraces, which would improve the slip rate estimates, together with topography data.

Reference:

Gaudemer, Y., Tapponnier, P., Meyer, B., Peltzer, G., Guo Shunmin, Chen Zhitai, Dai Huagang and Cifuentes, I., 1995, Partitioning of crustal slip between linked, active faults in the eastern Qilianshan, and evidence for a major seismic gap, the 'Tianzhu gap', on the western Haiyuan fault, Gansu(China). *Geophys J Int*, 120:599-645.