# Late Quaternary horizontal slip rates of active faults in the Yanqi basin, southeastern Tian Shan, northwest China

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We present a analysis of satellite images and field study on active faults in the Yanqi Basin, which locted on the southeastern frank of the Chinese Tian Shan. Detailed analysis of satellite imageries (5-30 m ground resolution) and field study reveal that the active faults are mainly distributed in the south edge of the basin extending for >300 km. 1-25 m high fault scarps and 3 m to 250 m dextral offsets drainages are well-developed in late Pleistocene fluvial fans. Based on the offsets of drainages and 14C date of the fluvial fan deposits, we infer that the slip rates are 10-25 mm/year in horizontal and 1-3 mm/year in vertical, respectively, and the average recurrence of strong seismic event (M>7) interval is about 500 year in the fault zone in the Yanqi basin.

Cenozoic deformation within the Tian Shan range occurred dominantly on fold structures and thrusts as a result of the India-Eurasia collision has generated several elongate, east-west trending intermontane and foreland basins on the both franks of the range. Studies on active faults and folding structures in these basins, therefore, are important for reconstruction of the effects of the India-Eurasia collision on active tectonic deformation within the Tian Shan. Here we present an interpretation result of satellite imageries and field study on active faults in an intermontane basin, Yanqi Basin, which located on the southeastern frank of the Chinese Tian Shan. Detailed stereographic analysis of high-quality satellite images (5 m ground resolution) and field study reveal that the active faults (Kaidu River fault zone) are mainly distributed in the southern edge of the basin extending for >300 km, which show typical tectonic characteristics of strike-slip faults. 1-25 m high fault scarps are well-developed in late Pleistocene alluvial fan, which immediately adjacent to the fault trace alternate along strike from northeast-facing to southwest-facing and form a left-stepping en echelon pattern. The drainage system across the fault scarps incising the late Pleistocene alluvial fans and flowing northeastward is systematically offset or deflected dextrally from 3 m to 250 m along the faults. The amounts of offset measured in field and on 1:10,000 scale satellite imageries show that progressive offsets are marked by abandoned downstream channels that probably recorded at least four offsetting events in a duration of 20-40 m-offset and that offset produced by an individual event is 3-10 m. A minimum 14C date of 2.5 kyr B.P. from a deformed root involved in fault gouge zone shows that the youngest seismic faulting event occurred during the recent 2.5 kyr. 14C date of the fan deposits and geological evidence show that the fluvial fan formed during 10-20 kyr B.P. Based on the offsets of rivers and valleys and 14C date of the fluvial fan deposits, we infer that the slip rates are 10-25 mm/year in horizontal and 1-3 mm/year in vertical, respectively, and the average recurrence of strong seismic event (M>7) interval is ~500 year in the Kaiduhe fault zone. This study shows that the horizontal slip partitioning of active faults occurred in the intermontane basin formed by thrusting and shortening related with the India-Eurasia collision within the Tian Shan during the late Quaternary.