



Late Quaternary right-lateral slip rates of active faults adjacent to lake Qinghai, northeastern margin of the Tibetan Plateau

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Combining the terrace riser offsets with terrace ages dated by ^{14}C , OSL and ^{10}Be techniques, we determine average strike slip rates of Elashan and Riyueshan faults, two north-northwest-trending strike-slip faults along the western and eastern sides of the lake Qinghai, northeastern margin of the Tibetan plateau, to be about 1.0 ± 0.2 mm/yr and 1.2 ± 0.2 mm/yr, respectively.

Between them, the Qinghainanshan fault consists of three secondary thrust faults, whose total vertical slip rate and shortening rate are $0.4\text{--}1.0$ mm/yr and $0.2\text{--}1.2$ mm/yr, respectively.

The relatively low slip rates in this region reflect distributed deformation. The total right-lateral offsets of the geological contacts, which were interpreted from 1:200,000-scale Qinghai regional geological maps of the region, are about 8.8–11.9 km along the Elashan fault and 10.9–11.6 km for the northern segment of Riyueshan fault. If long-term slip rates were constant during late Cenozoic time, initiation of dextral movement would be 10.3 ± 3.6 Ma and 9.4 ± 2.3 Ma for the two strike-slip faults, consistent with records of tectonic deformation in Cenozoic basins nearby.

Our study highlights a stage of tectonic deformation in the northeastern margin the Tibetan plateau beginning near 10 Ma, long after the collision between India and Eurasia began.