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The role of large strike-slip faults in a convergent continental setting - first results from the Dzhungarian Fault in Eastern Kazakhstan

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The Tien Shan and the Dzhungarian Ala-tau mountain ranges in Eastern Kazakhstan and China take up a significant portion of the total convergence between India and Eurasia, despite the fact that they are more than 1000 km away from the actual plate boundary. Shortening is accommodated by large thrust faults that strike more or less perpendicular to the convergence vector, and by a set of conjugate strike-slip faults. Some of these strike-slip faults are major features of several hundred kilometres length and have produced great historical earthquakes. In most cases, little is known about their slip-rates and earthquake history, and thus, about their role in the regional tectonic setting. This study deals with the NW-SE trending Dzhungarian Fault, a more than 350 km-long, right-lateral strike slip feature. It borders the Dzhungarian Ala-tau range and forms one edge of the so-called Dzhungarian Gate. The fault curves from a $\sim$305° strike at its NW tip in Kazakhstan to a $\sim$328° strike in China. No historical ruptures are known from the Kazakh part of the fault. A possible rupture in 1944 in the Chinese part remains discussed. We used remote sensing, Structure-from-Motion (SfM), differential GPS, field mapping, and Quaternary dating of offset geological markers in order to map the fault-related morphology and to measure the slip rate of the fault at several locations along strike. We also aimed to find out the age of the last surface rupturing earthquake and to determine earthquake recurrence intervals and magnitudes. We were further interested in the relation between horizontal and vertical motion along the fault and possible fault segmentation. Here we present first results from our 2015 survey. High-resolution digital elevation models of offset river terraces allowed us to determine the slip vector of the most recent earthquake. Preliminary dating results from abandoned fluvial terraces allow us to speculate on a late Holocene surface rupturing event. Morphological data indicate that more than one fault strand was activated in the Holocene. Folded river terraces testify to the amplitude of long-term deformation associated with the Dzhungarian Fault, but no dating results are available yet.