



New constraints on Quaternary slip partitioning near the eastern termination of the Altyn Tagh fault in NW China

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The Altyn Tagh Fault (ATF) is a >1600 km long sinistral fault that marks the northern boundary of the Tibetan Plateau. Previous studies suggest that late Quaternary slip rates along the eastern edge of the ATF diminish towards the east, where the deformation is assumed to be accommodated by a set of thrust faults that splits from the ATF. Here, we examine the possibility that sinistral deformation near the eastern termination of the ATF may also be accommodated along the NE striking ~200-km-long Sanwei Shan fault (SSF) located ~60 km north of the ATF. To characterize the sense and magnitude of slip accommodated along the SSF, we mapped beheaded channels and alluvial fans, and measured indicators for slip orientation on outcrops. At a site located ~30 km east of the city Dunhuang, we found a well-preserved sub-vertical fault surface dipping 83 degrees to the SE with horizontal striations that indicate lateral shear. Fault zone of only several meters and core width of dozens of centimeters suggests that this fault may be fairly juvenile. A beheaded channel mapped ~400 m west of the active channel as well as ~100 m of left-lateral shift of the active channel both indicate left-lateral sense of slip. At another site located ~40 km east of the first site we found a sequence of laterally translocated Quaternary alluvial fans that record up to 600 m of sinistral offset along the SSF since their deposition. Luminescence dating of alluvial sediments from these two sites indicates 1-2 mm/yr of slip across the Sanwei Shan fault during the last ~100 ka. Our results provide new constraints on possible Quaternary slip partitioning at the eastern edge of the Altyn Tagh fault system.