Geophysical Research Abstracts
Vol. 15, EGU2013-6168, 2013
EGU General Assembly 2013


# The Pingding segment of the Altyn Tagh Fault (91°E): Slip rate determination from cosmogenic radionuclide dating of offset fluvial terraces

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Morphochronologic slip-rates on the Altyn Tagh Fault (ATF) along the southern front of the Pingding Shan at 90.5E are determined by cosmogenic radionuclide (CRN) dating of seven offset terraces at two sites. The terraces are defined based upon morphology, elevation and dating, together with fieldwork and high-resolution satellite analysis. The majority of the CRN model ages fall within narrow ranges (<2 ka) on the four main terraces (T1, T2, T3 and T3'), and allow a detailed terrace chronology. Bounds on the terrace ages and offsets of 7 independent terraces yield consistent slip-rate estimates. The long-term slip-rate of 14.7 +/-1.5 mm/yr is defined at the 95% confidence level, as the combined rate probability distribution of the rates obtained from each terrace. It falls within the bounds of all the rates defined on the central Altyn Tagh Fault between the Cherchen He (86.4E) and Akato Tagh (88E) sites. This rate is ∼10 mm/yr less than the upper rate determined near Tura at 87E, in keeping with the inference of an eastward decreasing rate due to progressive loss of slip to thrusts branching off the fault southwards but it is greater than the 9 +/- 4 mm/yr rate determined at 90E by GPS surveys and other geodetic short-term rates defined elsewhere along the ATF. We discuss the rate variations along the fault by analyzing faults geometries and junctions along strike. Whether such disparate rates will ultimately be reconciled by a better understanding of fault mechanics, resolved transient deformations during the seismic cycle or by more accurate measurements made with either approach remains an important issue.