Geophysical Research Abstracts
Vol. 18, EGU2016-8624, 2016
EGU General Assembly 2016

Instrumental magnitude constraints for the 1889 Chilik and the 1887 Verny earthquake, Central Asia

Frank Krueger, Galina Kulikova, and Angela Landgraf
Institute of Earth and Environmental Sciences, University of Potsdam, Germany (kruegerf@geo.uni-potsdam.de)

A series of four large earthquakes hit the continental collision region north of Lake Issyk Kul in the years 1885, 1887, 1889 and 1911 with magnitudes above 6.9.

The largest event was the Chilik earthquake on July 11, 1889 with M 8.3 based on macroseismic intensities, recently confirmed by Bindi et al. (2013). Despite the existence of several juvenile fault scarps in the epicentral region no on scale through-going surface rupture has been located. Rupture length of ∼200 km and slip of ∼10 m are expected for M 8.3 (Blaser et al., 2010). The lack of high concentrated epicentral intensities require a hypocenter depth of 40 km located in the lower crust.

Late coda envelope amplitude comparison of modern events in Central Asia recorded at stations in Northern Germany with the reproduction of a Rebeur-Paschwitz pendulum seismogram recorded at Wilhelmshaven results in a magnitude estimate of Mw 8.0-8.5. Amplitude comparison of longperiod surface waves measured on magnetograms at two british geomagnetic observatories favors a magnitude of Mw 8.0. Both can be made consistent if a station site factor of 2-4 for the Wilhelmshaven station is applied (for which indications exist).

A truly deep centroid depth (h>40 km) is unlikely (from coda amplitude scaling), a shallow rupture of appropriate length is till now not discovered. Both arguments point to a possible lower crust contribution to the seismic moment.

Magnetogram amplitudes for the Jun 8, 1887, Verny earthquake point to a magnitude of M ∼7.5-7.6 (preliminary).