Geophysical Research Abstracts
Vol. 14, EGU2012-5829-1, 2012
EGU General Assembly 2012

The 1911 Chon-Kemin (M 8.3) earthquake in the Tien-Shan region*: preliminary investigation results by means of historical data.

G. Kulikova and F. Krüger
Institute of Earth and Environmental Science, University of Potsdam, Potsdam, Germany (kulikova@geo.uni-potsdam.de)

For many years the Tien-Shan region* attracts attention of geophysicists and geologists due to complexity and uniqueness of its tectonics. At the turn of the XIX. to the XX. century several destructive earthquakes have occurred in the region with estimated magnitudes between 7 and 8 and two of them even exceeding the magnitude of 8. Our main goal is to investigate the deformation processes responsible for this significant earthquake sequence and the possible interrelation between the single events. Here we present preliminary results of the Chon-Kemin earthquake as an example.
On 3rd January 1911 the M 8.3 Chon-Kemin earthquake hit the Tien-Shan region. It is the strongest event in the history of Tien-Shan region for which instrumental recordings are available and one of the strongest intracontinental earthquakes in XX. century. Historical analog data were collected from different seismic archives in European and non-European countries. The data from 20 seismic station were collected, mostly stations at that time had only horizontal components although there are some vertical recordings as well. Preprocessing the analog data brings several difficulties, e.g. limited information on instrument characteristics. Digitization is the most time-consuming part among preprocessing. The quality of seismograms is not always good enough this is why it was necessary to combine different methods of data processing.
Since at that time localizations have been done on the base of intensity distributions, the epicenter is poorly determined. Several localizations, differed in the value of up to 80 km, are available. The surface rupture was also estimated in previous studies (about 200 km) and the deformation on the surface can be still observed nowadays, which gives opportunity to calibrate new localization comparing it to the geological data. Thus, we located the earthquake epicenter and determined the magnitude again based on the digitized seismograms. From first motion body wave polarities and amplitude ratios we determine a focal mechanism solution. Preliminary results will be presented here.

* Tien-Shan region: For this study we consider the Tien-Shan region not to be exactly the Tien-Shan mountain belt but the rectangular area from 38°N to 45°N and from 68°E to 90°E.