

Source parameters of the major historical earthquakes in the Tien-Shan region from the late 19th to the early 20th century.

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The Tien-Shan is one of the largest mountain belts in the world. Its deformation is dominated by intermontane basins bounded by active thrust and reverse faulting. The Tien-Shan mountain belt is characterized by a very high rate of seismicity along its margins as well as within the Tien-Shan interior. The study area of the here presented work, the western part of the Tien-Shan region, is currently seismically active with small and moderate sized earthquakes. However, at the end of 19th beginning of 20th century, this region was struck by a remarkable series of large magnitude ($M>7$) earthquakes, two of them reached magnitude 8.

These large earthquakes occurred before the global digital seismic network was installed and therefore were recorded only by analog seismic instruments. The processing of the analog is complicated especially due to the digitization of the records - a very time-consuming and delicate part. Therefore a special set of techniques is developed and modern methods are adapted for the digitized instrumental data analysis.

Here presented study evaluates the impact of large magnitude $M>7.0$ earthquakes, in the Tien-Shan region, on the overall regional tectonics. It also investigates the accuracy of previously estimated source parameters for those earthquakes, which were mainly based on macroseismic observations, and re-estimate them based on the instrumental data.

Ten strongest and most interesting historical earthquakes in Tien-Shan region are analyzed with in presented work. With the developed techniques, the source parameters of these major earthquakes are determined and their impact on the regional tectonics was investigated. The large magnitudes of the earthquakes are confirmed by instrumental data. The focal mechanisms of these earthquakes were determined providing evidence for responsible faults or fault systems.