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Double-difference relocation of earthquakes in central-western Mongolia, 1964-2017

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During the last century, four large earthquakes with magnitude M $\geq$ 8 occurred in western Mongolian, respectively the 1905 Bulnay and Tsetserleg events, the 1931 Fuyun event, and the 1957 Gobi-Altay earthquakes. In addition, several earthquakes with magnitude M $\geq$ 7 also occurred in western Mongolian and boundary territories. These earthquakes are characterized by surface ruptured several hundred kilometers long [M. Ulziibat et al., 2003], which have been the topic of numerous morphotectonic analyses [e.g. Rizza et al., 2015; Choi et al., 2018; Kurtz et al., 2018]. These large earthquakes are classically interpreted as representing the northernmost tectonic activity related to the continental collision between India and Eurasia. The large faults in western Mongolia are characterized by some significant high-level of microseismicity, which origin is not yet well known. This microseismicity could actually be related to some long-term aftershock activity associated to the large earthquakes of the last century. Here, we used the full catalog including 53 years of seismic data collected by permanent and temporary seismic networks of Mongolian National Data Center. Locations of earthquakes are computed by manually picked arrival times of P and S phases using regional velocity model for Mongolia. Special focus is put on analyzing locations of hypocenters for the selected region, which are associated with the last century major strike-slip earthquakes fault zones (Bolnay-Tsetserleg 1905 and Gobi-Altay 1957). There most earthquakes were located at shallow depths, between 2 and 10 kilometers. One of the goals of our work is to improve exact depths and locations for these micro-earthquakes, to be able in the second step to see how they are related to fault structure seen at the ground surface. We used different relocation technique (Lienert and Havskov, 1995) for relocation: cluster analysis of the micro-seismicity using the double difference algorithm [Waldhauser et al., 2000]. In those two seismic active zones, microseismicity distribution presents lineation features, cluster is highlighting the geometry of faults depth.