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3D velocity structure and precise location of the seismic swarm along the Emeelt fault using double-difference tomography

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This study focused on the area of newly discovered fault, Emeelt, located around 15 km from the capital of Mongolia. In April 2005, we started to observe a high seismic activity in this region. We installed 10 temporary stations with continuous recording in December 2008.Most of the 3591 events localized during the last 44 years at less than 140 km from this fault, occurred between 2005 and 2013 along the Emeelt fault (77.7%).

For precise study of this seismic activity region, we had installed a number of temporary seismic stations since December of 2008. This paper discusses some results of the analysis of this high seismic activity recorded by permanent and temporary networks. We show that relative earthquake location using double-difference methods requires an accurate knowledge of the velocity structure throughout the study region to prevent artifacts in the relative position of hypocenters. The distribution of focal depths indicates that the seismogenic layer in and around Emeelt fault is located in the upper-mid crust with its thickness no deeper than 20 km. We observe a velocity variance with, at the northeast part and below the seismicity, a high velocity. But south part of seismicity has low velocity.