



## **Eearthquake precursors in the electric field variations at the Northern Tien-Shan area**

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Almaty is surrounded by a number of potential sources of strong earthquakes. Therefore the problem of a forecast of earthquakes always will be actual for this megapolis. We present results of the quasistatic electric field monitoring at the high-altitude Tien-Shan station (43.02 N, 76.56 E, 3340 m above sea level, 20 km from Almaty) before and during the activation of seismic processes in the vicinity of Almaty since 2007 till 2011. During this period the most considerable seismic activity was observed on May 1-2, 2011. At this time eight events with magnitude more than 4.0 has occurred for two days. The main shock of magnitude 5.4 occurred on May 1st at 02:31 UT, 76 km North East of Almaty.

Unusual variations of the electric field with amplitude achieving the values of 6-7 kV/m were recorded as during series of earthquakes, and before them (April 28, 30). The duration of the electric field disturbance was 5-12 hours (5 hours on 28.04.2011 and 13 hours on 30.04.2011). The analysis of meteorological and cosmophysical conditions was carried out for the purpose of identification of disturbance sources. It is established that characteristics of the anomalous variations of the electric field does not correspond to these sources of disturbances. It was concluded that the cause of anomalous variations can be sources of the lithospheric origin only.

We found the similar electric field variations before earthquakes of 08.04.2009 and 27.09.2010. Apparently, they can be considered as precursors of earthquakes. The characteristic features of the anomalous variations of the electric field before and during earthquakes for three events are: positive polarity of deviations of the electric field, long duration, extremely high values of the amplitude of variations under good weather conditions (up to 6 kV/m).