

Earthquake Process Reverberation Through Electromagnetic Field Variations

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Abstract—Aiming to apportion earthquake precursors the manifestations of preparation of the Azerbaijan (28.07.2010, $M = 3.6$), Georgia-Armenia border (27.09.2011, $M=4.3$) earthquakes in the time-series have been studied using the geomagnetic, ionosphere and Irreversibility of Non – stationary Processes (INP) techniques. With the purpose of earthquake forecasting, the anomaly in the ionosphere plasma are investigated by a radio-astronomical method. The time – series of geomagnetic field tension of T full vector and energy release (absorbtion) E+- index of INP method. The results of the retrospective analyses of ionosphere observation data before Georgia – Armenia border (27.09.2011, $M = 4.3$), revealed the following basic types of anomaly.

Keywords—Earthquake, ionosphere, magnetic field, electromagnetic field, precursor.

I. INTRODUCTION

The results obtained earlier allow to make out the difference between activity of ionosphere by the method of vertical reconnaissance of ionosphere. This configuration allows reception of signals from the point cosmic radio source Swan – A with nearly the same amplitudes of interference lobes.

II. THE METHOD AND TECHNIQUE OF RESEARCH

A new Methodology has been elaborated that provides o possibility to estimate the current Seismic hazard (its intensity, location and time) with a sufficiently great probability. The elaborated methodology was used for analysis of data received in the process of perpendicular ionosphere from “Swan - A”: The following time-series have been used: Shooshi (ionosphere field), Stepanavan (geomagnetic field) and Gyumri, Yeqhegnadzor (electromagnetic fields) stations.

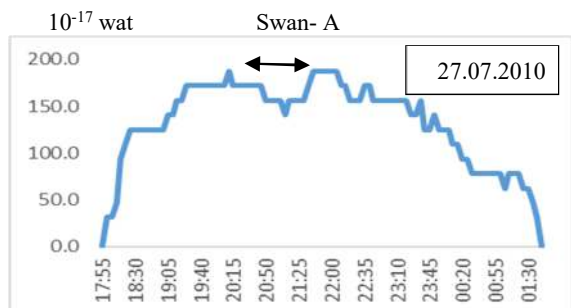


Figure 1. The time – series of the ionosphere field (Shooshi station) for the Azerbaijan (28.07.2010, $M = 3.6$) earthquake preparation.

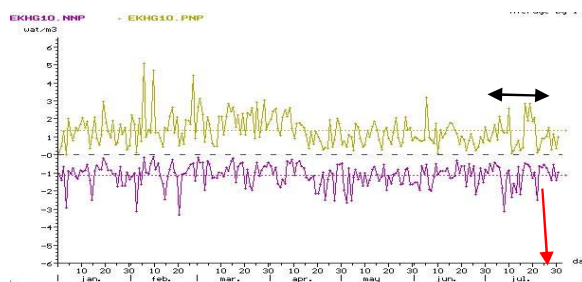


Figure 2. The time – series of the electromagnetic field (Yeqhegnadzor station) for the Azerbaijan (28.07.2010, $M = 3.6$) earthquake preparation.

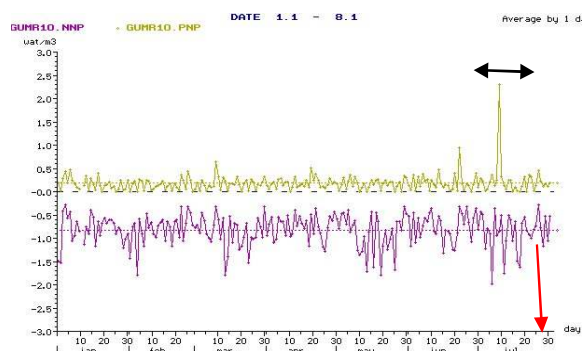


Figure 3. The time – series of the electromagnetic field (Gyumri station) for the Azerbaijan (28.07.2010, $M = 3.6$) earthquake preparation.

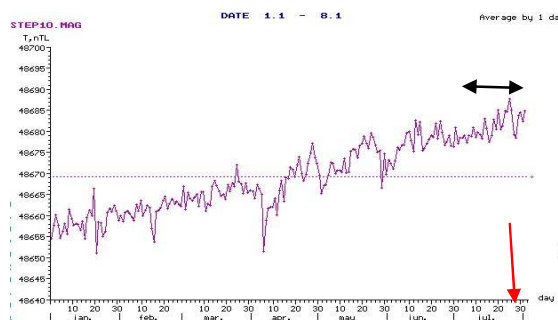


Figure 4. The time – series of the geomagnetic field (Stepanavan station) for the Azerbaijan (28.07.2010, $M = 3.6$) earthquake preparation.

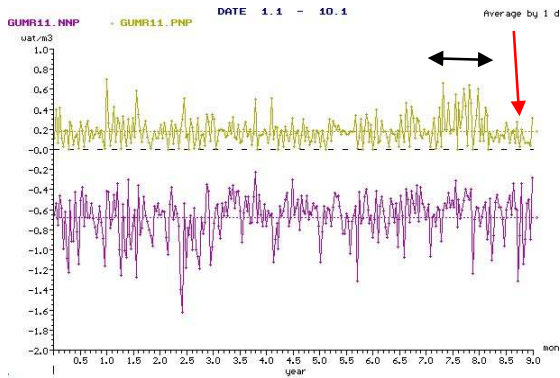


Figure 5. The time – series of the electromagnetic field (Gyumri station) for the Georgia – Armenia border (27.09.2011, $M=4.3$) earthquake preparation.

III. RESULTS

The results of the retrospective analysis of ionosphere observation data before Azerbaijan (28.07.2010, $M=3.6$) and Georgia – Armenia border (27.09.2011, $M=4.3$) revealed the following basic types of anomaly (Fig. 1- 5):

1. Blinking of ionosphere active radio-source Swan – A on the frequency of 74 MHz.
2. Anomaly of above – mentioned precursors is coming out up to 40 days before earthquake.

IV. CONCLUSION

The results of analysis by the mentioned methods (Irreversibility of Non-stationary Processes -INP, radio-astronomical), show, that the anomalies generally appear on 1-50 days before the earthquake.

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