Characteristics of negative anomalies of quasistatic electric field and superimposed on it atmospheric noise in the near-earth atmosphere of Kamchatka

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Anomalies in diurnal variations of quasistatic electric field (QEF) in the near-Earth atmosphere were observed as bay-like decreases of Ez component before an earthquake (EQ) in different seismically active regions of the globe. In Kamchatka regular ground observations of QEF were initiated in 1991 at the Institute of Cosmophysical Researches and Radio Wave propagation FEB RAS, Paratunka (φ = 52˚58,3′N; λ = 158˚14,9′E), and are carried out at the present. Statistical analysis of 103 events of single anomalies, observed within the period 1997-2002, showed that the most probable time length of a bay is 40-60 minutes, and the most probable decrease value of Ez is minus 106-300 V/m. The possibility of EQ prediction by Ez anomaly within 24 hours is 36%. It means that Ez anomaly in QEF diurnal variation is not enough for short-term EQ prediction. The authors made an attempt to find additional conditions in spectrum variations of Ez component power. Preliminary results of the analysis showed that there are stable oscillations in the spectrum which coincide with regular solar-diurnal heat tidal waves in the atmosphere with the periods Ò = 24, 16, 12, 8,4 hours and also highly unstable oscillations with the periods less than 4 hours, which coincide with internal gravitational waves (IGW). In time domain IGW are random noise, superimposed on diurnal variations of Ez component of QEF. This noise intensity as well as their spectrum density before an EQ increase by one order and more in comparison with background level during normal meteorological conditions.

Analysis of strong EQ, occurred in Kamchatka within December 1997 – August 2004, showed the following: extreme background values of noise in time variations for normal meteorological conditions are the most probable value of order $\pm$20 V/m; during field Ez component anomaly, accompanied by earthquakes in normal meteorological conditions, the extreme noise values reach the value $\pm$200 V/m; in the conditions of precipitations (rain, snow) Ez component anomaly has the form either of alternating quantity changes of field strength or bay-like decrease (more frequent) similar to the anomaly, accompanied by earthquake (in this case the values of field strength decrease may be equal to minus 1000-1500 V/m, and extreme noise values, superimposed on these anomalies, may changed within a wide range $\pm$1000 V/m); spectrum density of atmosphere noise power in field anomaly, accompanied by earthquake, exceeds by

one - one and a half times the corresponding background values, but it is one order less in the conditions of precipitations.