



Earthquakes appearance in VLF magnetic field variations at regional and global scales

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We continue study of relations between earthquakes and variations of magnetic field in very low frequency (VLF) range recorded in several sites in Ukraine during 2002-2006. Magnetic field is observed with VLF receiver "Tezey" which is composed of three orthogonal coil sensors oriented in the geomagnetic north-south, east-west and vertical directions. Output signals from these sensors after processing procedure were recorded as a pulse repetition rate.

Magnetic field was observed in Kharkov region (Ukraine) in the seismically quite area and in Crimea (Ukraine) where the site of observations was close to regional fault at the border of the Mediterranean seismically active region. We used also magnetic field variation data recorded with the same system at the Vernadsky station (Ukraine) in Antarctica.

Magnetic field observations have been statistically studied through the comparison with seismic records and world wide earthquakes data. Seismic events were separated according their magnitude and distance from the sites of observations to be representative of regional and global seismic activity. Statistical analysis of data was made at the base of different time intervals: from days to hours.

Strong earthquakes have well pronounced effect on distant VLF variations of the magnetic field. Analysis of VLF data obtained in the Kharkov region allowed recognizing of magnetic precursors for the strongest earthquakes independently from the earthquakes location. In particular, for Indonesia earthquake (26.12.2004, = 9.0) anomalous increasing of the magnetic field variability was observed 14 days before the earthquakes commencement. At the same time the increase of VLF variations was recorded at the Vernadsky station (Ukraine) in Antarctica. We found that strongest earthquakes

observed in the Mediterranean seismically active region ($M \sim 4.4$) were characterized by anomalous increasing of the variability of the magnetic field (1.5 - 4.0 times higher than usual level) about two days before the earthquakes commencement.