Geophysical Research Abstracts,
Vol. 10, EGU2008-A-03411, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-03411
EGU General Assembly 2008

Multi point magnetic field Ultra Low Frequency measurements during seismic active periods in 2004 and 2005 for joint SEGMA and DEMETER studies

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We present the results of ground based Ultra Low Frequency (ULF) magnetic field measurements prior, during and after strong seismic activity in mid- and south Europe in 2004 and 2005. Multi point magnetic field data is provided by the South European Geomagnetic Array (SEGMA) giving the opportunity to compare measurements at several distances to the earthquakes epicentres. Signal processing methods and statistics were applied to magnetic field data. As proposed by Hayakawa and Kawate (1996)[1] the studies were emphasised on the frequency range from 10 mHz to 50 mHz. The DEMETER satellite provided seismic information. Assuming that the measured intensities are due to electromagnetic waves emitted under the ground we estimate the magnetic field amplitude in the earthquake focus region taking into account an average electrical crust conductivity of 10^{-3} S/m. Changes in the ULF magnetic field intensities in association with earthquakes can be interpreted either as direct effect related to for example mickrofracture electrification (Molchanov, Hayakawa (1998)[3]) from the lithosphere or indirect effects dealing with turbulence caused in the lower Iono-

sphere before earthquakes (Molchanov, Federov (2004)[2]). Down going Alfvén waves from the Magnetosphere probably cause changes in the ULF intensity on the Earth's surface while turbulences in the Ionosphere related to earthquakes could be observed analysing DEMETER data. The temporal evolution of the ground based magnetic field intensities of the vertical and horizontal component and their ratio (polarization) acting as essential earthquake prediction parameter is evaluated considering several observatories. Geomagnetic disturbances are distinguished as suggested by Hayakawa and Kawate (1996)[1] using the geomagnetic Kp index. Results are presented from different observatories located in Castello Tesino, Ranchio, l'Aquilla (Italy) and Nagycenk (Hungary).

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