



Statistical Analysis of earthquake-related ULF phenomena at Kakioka, Japan, during 2001-2010

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In order to verify and clarify the ULF seismo-magnetic phenomena, a statistical investigation of the relation between magnetic anomalies and local seismicity has been performed. Geomagnetic data observed during 2001-2010 at the Kakioka station has been analyzed. Energy of ULF geomagnetic signals at the frequency around 0.01Hz has been investigated using wavelet transform analysis. To identify anomalous changes induced by Ionospheric disturbances, the Kanoya station has been chosen as a reference station. Statistical studies based on the superposed epoch analysis have indicated that before a sizeable earthquake there are clear higher probabilities of ULF anomalies than that after the earthquake: statistical results of daily counts were found significant at about 30 days before, 2 weeks before, 5-7 days before and 2 days after the event. These results are somehow consistent with previous studies in Izu and Boso Peninsulas, which suggests a correlation between ULF geomagnetic anomalies and local seismicity. Further investigations on the Molchan error diagram indicate that local ULF geomagnetic anomaly do contain precursory information of sizeable earthquakes, with a probability gain around 1.5 against a Poisson model. These results show that the ULF seismo-magnetic phenomena at Kakioka clearly contain precursory information and have a possibility of forecasting of large earthquake.