Preliminary Results of MAGDAS II Data from 96 MM Stations in Africa

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Space Environment Research Centre of Kyushu University is conducting MAGDAS (MAGnetic Data Acquisition Systems) project, and has been installed 13 magnetometers along the magnetic dip equator and the 96-degree magnetic meridian in Africa during the International Heliophysical Year (IHY). This project intends to get the MAGDAS network fully operational and provide data for studies on space and lithosphere weather.

There are three types of ULF wave anomalies associated with the great earthquakes (see Yumoto et al., 2008). The first two types are the so-called ULF emissions, which are driven by microfracturing and electrokinetic effects in the seismic focus region. The third one is ULF polarization (and power) change caused by the formation of a conductive region in the lithosphere. On the other hand, ULF wave amplitudes observed on the ground show seasonal, local time, and latitudinal variations (cf. Yumoto, 1986), which are a function of parameters in the solar wind, magnetosphere, ionosphere, and lithosphere.

In order to examine if there was a ULF magnetic anomaly associated with the great earthquake (larger than M=6.0), we newly develop a ULF spectrum analysis method to monitor longterm electromagnetic changes. In this method, we will compare H- and Z-component powers of Pc 3-4 magnetic pulsations observed at two separated stations; one is located near the epicenter, and the other is used as the remote reference station.

For identification of the anomalies and/or forecast changes in the lithosphere environment by the electromagnetic technique, it is necessary to understand the role of the space environment, because ground-based magnetometers are more affected by space events than by lithospheric events. Moreover, lithospheric signal changes are small in comparison to signal changes caused by the space environment.

In the present study, we will clarify characteristics of Pc 3-4 pulsations observed at MAGDAS stations in Africa, to establish the new method for selection of ULF anomalies associated with great earthquakes.