

MIS001-P02

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Signal Discrimination of ULF Electromagnetic Data with using Singular Spectrum Analysis and Principal Component Analysis

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Several electromagnetic phenomena associated with the crustal activity have been reported in a wide frequency range (DC-HF). In particular, ULF electromagnetic phenomena are the most promising among them because of the deeper skin depth.

But sometimes ULF electromagnetic data contains spontaneous or impulsive variations of geomagnetic fields caused by interactions between the geomagnetic field and the solar wind, leak current originated from DC-driven train (train noise), and precipitation. In generally, intensity of electromagnetic signals associated with the crustal activity is smaller than above variations. Therefore, it is important that how to identify and remove the other intense and spontaneous changes.

In this paper, Singular Spectrum Analysis (SSA) and Principal Component Analysis (PCA) to detect the signals of spontaneous variation (especially train noise and precipitation) automatically have been applied to the ULF electromagnetic data observed at Kiyosumi station, located in southern part of Boso peninsula, Japan. As a result, it is showed that we can detect these variations automatically. The results will be given in presentation.

Keywords: signal discrimination, ULF, electromagnetic, principal component analysis, singular spectrum analysis