Wave Charasterictics of Global Pi2 Pulsations Extracted by ICA(Independent Component Analysis)

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ICA is one of the multivariate analysis techniques. It is a method of discriminating mixed signals. With ICA, it is presumed that the observed signal was formed by either linear mixing or non-linear mixing, and the mixing system is unkown. The original signals are assumed to be nongaussian and statistically independent of each other.

In this study, ICA is used to analyze Pi2 magnetic pulsations observed at a portion of CPMN (a network of magnetometers maintained by Kyushu University, called the 'Circum-pan Pacific Magnetometer Network').This portion includes the 210 deg.MM chain and the South America chain.

We assumed that the Pi2 pulsation observed at the CPMN stations are linear mixtures of several independent components. We applied ICA to analyze that. Five independent components of the Pi2 are assumed. Two of them are global mode Pi2 pulsations and the other three components are the pulsations relate to auroal electrojet.

The following two findings are presented:
1. Although it was previously believed that the global mode Pi2 pulsations occurred because of cavity resonance of the plasmasphere, it now appears that the pulsations occur because of cavity resonance of the magnetosphere.

2. The Pi2 pulsations related to auroral electrojet are enhanced at the dayside equatorial ionosphere. It strongly appears that the electric field variations occurring in the nightside polar ionosphere seep to the dayside equatorial ionosphere.