[JJ] Evening Poster | S (Solid Earth Sciences) | S-EM Earth's Electromagnetism

[S-EM16]Electromagnetic Induction in the Earth and Planetary Interiors, and Tectono-Electromagnetism

convener:Ken'ichi Yamazaki(Disaster Prevention Research Institute, Kyoto University), Koki Aizawa(Institute of Seismology and Volcanology, Faculty of Sciences, Kyushu University)
Thu. May 24, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)
This session welcomes papers on electromagnetism in the Earth and planetary interiors. The topics include but not limited to electromagnetic phenomena associated with earthquakes and volcanism, electrical conductivity structure, laboratory experiments, results of simulations, new equipment for observation, and methods of data analysis.

[SEM16-P03]On separation of *Sq* field and MT response estimation using seafloor MT array data and independent component analysis

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Keywords:marine magnetotelluric array, independent component analysis, geomagnetic solar quiet daily variations

For estimation of electromagnetic (EM) response functions at the periods between 10^4 and 10^5 seconds from seafloor magnetotelluric data, the effects of complex external source fields (e.g., geomagnetic solar quiet daily variations (*Sq*) and tides) are necessary to consider. One of the ways to deal with this problem is to determine the amplitude and phase of time variation of observed field for known periods of *Sq* and tides and to subtract them from the data. However, the reduction of the effects seems not enough to obtain reliable EM responses (Shimizu et al., 2011). In this study, I applied independent component analysis (ICA) to separate *Sq* field from the observed magnetic data. *Sq* field is based on the current in the ionosphere, which is excited by heating of neutral atmosphere by Sun. Then, I may suppose that the simplest instantaneous mixing model can be applied by treating the data with local time of each station. I applied the ICA to the seafloor MT data collected from the Philippine Sea for about one year from November 2005. I detected the independent components that the mixture of the components explains the observed magnetic data in the period of quiet days qualitatively well by investigating the detailed time variation and power spectrum of each independent component and correlations of mixing coefficients to longitude and latitude. Further, the EM responses were estimated by using the horizontal magnetic field components that the detected components were subtracted. I will demonstrate the detail of the analysis and discuss the feasibility of the source separation and better EM response estimation.