
[JJ] Evening Poster | M (Multidisciplinary and Interdisciplinary) | M-IS Intersection

[M-IS09] Electromagnetic phenomena associated with seismic and volcanic activities

convener: Tetsuya Kodama (Research Unit I, Research and Development Directorate, Japan Space Exploration Agency), Toshiyasu Nagao (Institute of Oceanic Research and development, Tokai University), Yasuhide Hobara (電気通信大学 大学院情報理工学研究科)

Tue. May 22, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

This session deals with reviews and contributions on the recent studies of electromagnetic (EM) phenomena associated with earthquakes and volcanic eruptions. One of the main targets of the session is to clarify the mechanism of seismo-EM emission and Lithosphere-Atmosphere-Ionosphere (LAI) coupling.

[MIS09-P05] Study of the stress induced current in MgO ceramics

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Keywords: TEC anomalies, peroxy linkage, MgO ceramic

Anomalies of total electron content (TEC) in the ionosphere were reported just before the 2011 off the Pacific coast of Tohoku Earthquake by Heki (2011). Such TEC anomalies before earthquakes were found more than 11 Eqs >M8 since 1994. Although, most of TEC anomalies were caused by solar activity, TEC anomalies just before earthquakes are occurred locally above the epicenter and can be distinguished by temporally and spatially.

A hypothesis of physical mechanism for this event is electromagnetic phenomena caused by tectonic stress, which affect the distribution of electrons in ionosphere. For example, hole-excitation at peroxy linkage in silicate is considered as the source of stress-induced charges in the ground (Freund, 2006). In this study, we used highly-pure MgO ceramic samples, which were known as a good electric insulator, to know the hole-excitation process in a different material.

As a result, electric current through the sample at pico-ampere level was observed at the uniaxial stress of 10 MPa under the room temperature. We will discuss the obtained results for silicate rocks and MgO ceramics and also the possible relationship to the TEC anomalies before Earthquakes.