Oral | Symbol M (Multidisciplinary and Interdisciplinary) | M-IS Intersection

[M-IS29_29PM2]Electromagnetic phenomena associated with seismic and volcanic activities

Convener:*Tetsuya Kodama(Earth Observation Research Center, Space Applications Mission Directorate, Japan Space Exploration Agency), Jun Izutsu(College of Engineering, Chubu University), Yasuhide Hobara(Graduate School of Information and Engineering Department of Communication Engineering and Informatics, The University of Electro-Communications), Toshiyasu Nagao(Earthquake Prediction Research Center, Tokai University), Chair:Toshiyasu Nagao(Earthquake Prediction Research Center, Tokai University), Tetsuya Kodama(Earth Observation Research Center, Space Applications Mission Directorate, Japan Space Exploration Agency)

Tue. Apr 29, 2014 4:15 PM - 6:00 PM 313 (3F)

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.Recently, some scientists claim that seismic activities are the critical phenomena. These kinds of approach are also welcome.

5:45 PM - 6:00 PM

[MIS29-P01_PG]Investigation of "positive hole excitation" for stressed igneous rocks with a control of water content

3-min talk in an oral session

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Keywords:Seismic electric signals, Streaming potential, Positive hole excitation, Igneous rocks

Piezo electric effects, positive hole excitation for stressed igneous rocks and streaming potential have been considered possible mechanisms that explain pre-seismic electric signals. Especially, positive hole excitation, (Freund et al. 2006), explains long-term anomalous electromagnetic signals and telluric current signals observed for a long distance, therefore attracts a lot of attention.To clarify the mechanism of pre-seismic electric signals, we performed following experiments for stressed igneous rocks with saturated by water. Samples of granite and gabbro sized 3×3×10cm. Then, the samples were loaded from 1.08MPa to 5.45MPa, with recording of water content. Current-flows from -40pA to -20pA and around -1.5nA were observed for granite and gabbro samples respectively, while any current changes were not observed from bone-dry rocks. These results indicate that pore water is closely tied to current changes. Samples with different size were also tested. The values of current-flow agree well with results of observation of pre-seismic anomalous telluric current signals in Kozu-shima Island (Orihara et al. 2012), assuming the resistivity 10-1000Ω m.Reference1) F.T.Freund, A.Takeuchi, B.W.S.Lau, 'Electric currents streaming out of stressed igneous rock - A step towards understanding pre-earthquake low frequency EM emissions', Physics and Chemistry of the Earth 31. pp.389-396. (2006)2) Y.Orihara, M.Kamogawa, T.Nagao, S.Uyeda, 'Preseismic anomalous telluric current signals observed in Kozu-shima Island, Japan', Proceedings of the National Academy of Sciences Vol.109 No.47 pp.19125-19128. (2012)

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