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Further analysis of the 2008 Chaiten eruption torward early warning method for volcanic activity using microwave radiometer

Takashi Maeda (1) and Tadashi Takano (2)

(1) Japan Aerospace Exploration Agency (JAXA), Earth Observation Research Center (EORC), Tsukuba, Ibaraki, Japan (maeda.takashi@jaxa.jp), (2) Nihon University

We have investigated an analysis method to detect local and faint changes from the data of microwave radiometer. Our investigation stemmed from laboratory experiments which confirmed that rocks emit microwave energy when fractured. This analysis method was originally developed to detect microwave signals generated by rock failures in association with an earthquake. Using our analysis method, we have already detected characteristic microwave signals emitted from the land surface in association with some large earthquakes. We believe that these detection cases strongly indicate that our analysis method has the capability to detect local and faint microwave signals emitted from the land surface.

We expect that our analysis method can detect volcanic themal anomalies as well because thermal anomalies on volcanoes should be reflected in microwave signals. Additionally, considering the advantage that microwave radiometer is less affected by clouds, anomalies of land surface temperatures (LST) around a volcano before eruption is likely to be detected. Therefore, we modified our analysis method for volcanic monitoring, and applied it to a volcanic eruption case of Chaiten, Chile in 2008.

As a result, it was detected that microwave energy was emitted from the ground surface around the volcano from several months before the eruption. We consider that these microwave signals was caused by the increase of LST due to the volcanic activity, and it was presented at the EGU General Assembly 2010 (Abstract ID: 11394). We keep verifying the obtained analysis results, and further analysis results reinforces our conviction that our analysis method is applicable to monitor volcanic activity. This paper presents these further analysis results.