

Monitoring volcanic activity from space by ALOS-2 (Daichi-2) / PALSAR-2 data

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The Geospatial Information Authority of Japan (GSI) has conducted to monitor ground surface deformation of earthquake, volcanic activity, subsidence and landslide throughout Japan by interferometric SAR (InSAR) analysis using ALOS-2 (Daichi-2) / PALSAR-2 data.

ALOS-2 is routinely observing the whole area of Japan both in ascending and descending orbits three to four times a year following basic observation schedule designed by JAXA. Every time observation data is newly acquired, GSI always conducts InSAR analysis of the data combined with the former data which have the same path and the same observation mode. In the sequence of the analysis, we also conduct tropospheric error reduction with numerical meteorological model of Japan Meteorological Agency (JMA) and reduction of long wavelength error with GNSS solutions of GNSS continuous observation system (GEONET).

Images obtained from InSAR analysis (hereinafter referred to as "SAR interferogram") are formatted into tile data, and can be browsed on a web map of GSI, "GSI Maps". GSI Maps enables us to superimpose SAR interferograms on various geospatial information provided by GSI such as topographic maps, aerial photographs, volcanic land condition maps and so on. This visualization enable us to easily compare SAR interferograms to other information like topography and geology and more robustly identify an area of ground surface deformations on the SAR interferograms.

We are monitoring 97 volcanoes in the domestic land including the Northern Territories using SAR interferograms of ALOS-2 and reporting crustal deformation detected by the interferograms to regular meetings of the government expert committee, Coordinating Committee for the Prediction of Volcanic Eruption. In addition to the regular observation, in case of significant activities of volcanos such as eruptions, urgent observation of ALOS-2 is requested to JAXA by Volcano WG (JMA for the secretariat) of the demonstration experiment for disaster prevention by Earth Observation Satellite. If the urgent observation is conducted based on this request, GSI emergently analyzes the data, provides the SAR interferograms to Coordinating Committee for the Prediction of Volcanic Eruption and open the interferograms to the public as necessary.

In this presentation, we report monitoring of ground surface deformation, especially monitoring of volcanoes, by InSAR analysis using ALOS-2 data, which the GSI is working on.

Keywords: InSAR, ALOS-2, monitoring ground surface deformation, volcanic activity