Effective utilization of geospatial information for intensified volcano activities

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Japan is one of the volcano-abundant countries in the world. Japan saw volcanic activities frequently occurred in Kuchino-erabujima volcano, Sakurajima volcano, Mt. Aso and Mt. Hakone, gave social influences such as evacuation in 2015. Disaster Mitigation measures such as quick and accurate evacuation, are important in order to protect people's lives and property from a volcanic disaster. Geospatial Information Authority of Japan (GSI) has contributed to mitigate volcanic disaster damages in recent years, by providing related organs and general public with necessary geospatial information. The author will highlight the effective use of three kinds of geospatial information among which GSI has provided for volcanic disaster mitigation.

The first is geospatial information about crustal deformation. Volcanic crustal deformation caused by movement of magma and vapour is so important information that it infers volcanic activity status under grand. In the case of Kuchino-erabujima and Mt. Hakone, the GSI deployed mobile GNSS observation equipment (REGMOS : Remote GNSS Monitoring System) in order to monitor crustal deformation more accurately. In addition, the result of SAR Interferometry complementarily detected ground surface deformation in an area-wide manner. Local crustal deformation detected at Owakudani, Mt.Hakone by SAR interferometry was considered to speedy volcanic alert level operated by Japan Meteorological Agency. Further crustal deformation enabled volcanic estimation source model to compare current situation with the past eruptions in the case of Sakurajima. The provision of such geospatial information through the Coordinating Committee for Prediction of Volcanic Eruption supported experts' decision making.

The second is aerial / satellite image. Aerial photo is very important because we can visually understand the damage of disaster. While manned flight just above a volcano is difficult during eruption, effort in taking oblique photo enabled to grasp the situation around crater in the case of Mt. Aso. Aerial photo taken by UAV made it possible to understand the disaster situation in detail. The GSI interpreted denuded land, pyroclastic flow and lahar using UAV images. The GSI also extracted surface change by a volcanic disaster using a pair of Landsat 8 images. Thanks to these geospatial information, we could understand the entire damage.

The third is hazard map and elevation map. They are very important to conduct volcanic disaster response operation. The GSI provided volcanic disaster response maps on which disaster prevention facility is described, relief map and 3D map on which detailed topography is draw. Land Condition Map of Volcano enabled to compare past damage of eruptions. These information is effective for efficiency disaster response.

Geospatial information is essential for effective and efficient volcanic disaster response. In tandem with disaster management organizations, GSI will continuously provide useful geospatial information in support of disaster response, rescue work and restoration activities.

Keywords: geospatial information, crustal deformation, SAR(synthetic aperture radar), grasping the damage of disaster, UAV(Unmanned Aerial Vehicle)

