

Ground-based radar interferometer observation system for monitoring of surface deformation around the volcanic crater

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Ground-based radar interferometer (GBRI) transmits a microwave from an antenna installed on the ground and receives its backscatter from the target. Then change of distance between an antenna and a target is obtained from temporal phase change at each pixel. In previous researches using spaceborne SAR and GNSS, local deformations around craters had been detected in many volcanoes. For researches on volcanic mechanism and on eruption prediction, monitoring of such deformation is important. Then we started the research on GBRI to monitor surface deformation around a volcanic crater and are installing GBRI observation system around the Asama volcano now.

This system is composed by two GBRI sensors; the synthetic aperture radar type (LiSA mobile k09 of LiSALab) and the real aperture radar type (GPRI2 of Gamma Remote Sensing). These GBRI use the 17GHz microwave with 200-300MHz bandwidth, and then resolution of the range direction is better than 1 meter. LiSA mobile k09 transmits a microwave while the antenna moves on the rail of 3m, and high resolution for the cross-range direction can be obtained by synthetic aperture processing. On the other hand, GPRI2 uses the antenna with 2.5m width for cross-range direction, and comparable resolution for cross-range direction with LiSA mobile k09 can be obtained.

GPRI2 was already installed in the Asama volcano observatory of the Earthquake Research Institute, the University of Tokyo, and we started test observation. At February 2016, observation area is covered by snow. In such situation, coherence during 1-hour was stable in most time. However, non-deformation component such as tropospheric delay has often reached to 2cm in 1-hour, and then reduction of such component is one of big issues in this research. In the presentation, we will show investigation results for longer observation data. Furthermore installation of the LiSA mobile k09 will be finished in March. We will also show its initial observation result in the presentation.

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