[EJ] Evening Poster | S (Solid Earth Sciences) | S-TT Technology & Techniques

[S-TT48]Synthetic Aperture Radar

convener:Yu Morishita(Geospatial Information Authority of Japan), Shoko Kobayashi(Tamagawa University), Youhei Kinoshita(一般財団法人リモート・センシング技術センター, 共同), Takahiro Abe(Earth Observation Research Center, Japan Aerospace Exploration Agency)
Mon. May 21, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

ALOS-2 and Sentinel-1, which have highly enhanced capacity compared to previous SAR satellites, were launched in 2014, and their utilization has been widely expanding as the data has accumulated. Now we are facing a new and abundant era of the satellite SAR, along with a worldwide trend to an open and free data policy of satellite data, and with next-generation advanced SAR satellite plans by several countries. In addition, SAR technologies with other platforms, such as ground-based SAR with high temporal resolution and UAV (Unmanned Aerial Vehicle) SAR with flexible operability, have also been developed and used for various targets. These facts indicate that the SAR utilization data has become widespread in both basic researches (e.g., earth science) and diverse applications (e.g., disaster prevention and forest monitoring). In this session, we would like to share a broad knowledge and information regarding SAR. A wide range of research topics from basic researches to advanced applications will be welcomed.

[STT48-P06]Surface displacements around Mt. Aso associated with the 2016 Kumamoto earthquake using interferometric SAR analysis

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The 2016 Kumamoto earthquake sequence began on April 14th, 2016 with M_{JMA} 6.5 along the Hinagu fault in Kyushu island, and the largest earthquake with M_{JMA} 7.3 occurred on April 16th, 2016 along the Futagawa fault. The fault rupture terminated in the northwest of the Aso volcano, and the surface displacement up to about 90 cm in horizontal direction and about 20 cm in vertical direction has been observed during the 2016 Kumamoto earthquake.
It has been widely known that earthquake motions and stress variations of the crust influence volcanic activities and groundwater flow. And, previous studies have shown that the 2016 Kumamoto earthquake may have influenced the volcanic activity of Mt. Aso. Therefore, we estimated surface displacements before and after the 2016 Kumamoto earthquake using Interferometric synthetic aperture radar (InSAR) analysis. The method has an advantage that it does not need observation points on the ground and detailed spatial pattern of surface displacement can be clarified. The data used in this study are 20 PALSAR-2 data observed between February 9th, 2015 and June 12th, 2017.
As a result of the analysis, surface displacement of about 8 cm in the direction away from the satellite was observed within about 3km radius at the northwestern part of Aso Caldera between April 18th, 2016 (two days after the main shock of Kumamoto earthquake) and June 12th, 2017. Since this displacement has not been found by the InSAR analysis using data acquired before the 2016 Kumamoto earthquake and other previous researches, we interpreted that the displacement was associated with the 2016 Kumamoto earthquake. Furthermore, to estimate the source depth of the surface displacement, we applied the Markov chain monte carlo method to the spherical source model proposed by Mogi (1958), and estimated that the source depth is about 6.4 km. This depth and position almost agree with the upper end of the low resistivity area in Hata et al. (2016), which is expected to be a magma chamber or hydrothermal reservoir. Therefore, we inferred that the displacement is due to the migration of magma or other pore fluids. These results

suggest that the volcanic activity of Mt. Aso was influenced by the 2016 Kumamoto earthquake.