Crustal deformation and crater depth change before and after the 2015 dyke intrusion event of Sakurajima volcano investigated by SAR analysis

*Taku Ozawa¹, Yosuke Miyagi¹

1. National Research Institute for Earth Science and Disasters Resilience

The number of volcanic tremors increased under the Minami-dake of Sakurajima volcano on 15 Aug. 2015, and inflation was observed by tiltemeters and extensometers in Sakurajima volcano. Furthermore, InSAR analysis using ALOS-2/PALSAR-2 data indicated crustal deformation associated with this volcanic event (e.g., Ozawa *et al.*, 2016; Morishita *et al.*, 2016). Obtained crustal deformations were well explained by tensile fault model (volume change was approximately 1.6 million m³) that its southwest corner was located just under the Syowa crater. These facts indicate that dyke intrusion has occurred under Sakurajima volcano.

We investigated crustal deformation and depth change of Syowa crater before and after the dyke intrusion event by SAR analysis. In crustal deformation detection by InSAR analysis, we used the atmospheric delay noise reduction method using numerical weather model (e.g., Ozawa and Shimizu, 2010) and the ionospheric delay noise reduction method by the split-spectrum method (e.g., Gomba *et al.*, 2015). Crustal deformations obtained from descending right-looking PALSAR-2 data indicate slant-range contraction exceeding 5cm in the west area of Sakurajima just before the dyke intrusion event. Although this might have been precursor of the dyke intrusion event, more investigation about significance of this signal is necessary. On the other hand, slant-range extension was obtained in east of Syowa crater after the dyke intrusion event. This crustal deformation started just after the dyke intrusion event and decayed over time. Then it must have related to the dyke intrusion event. However its spatial pattern is obviously different to that for the dyke intrusion. Then it is necessary to consider a mechanism different from the tensile fault for dyke intrusion. Additionally, slant-range contraction was obtained in northwest of the Kita-dake. It seems that this deformation has started from the 2016 summer.

We estimated depth change of the Syowa crater from feature of SAR Layover. Although slight depth changes were estimated in periods that explosions had occurred actively, it did not exceed several tens of meters. It suggests that pressure condition under the Syowa crater has not changed significantly.

Keywords: SAR, Crustal deformation, Sakurajima