Ground deformation preceding to the explosive eruption eruptions of Aso Volcano, Japan, October 8, 2016.

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On October 8, 2016, an explosive eruption occurred at the first crater of Nakadake, Aso volcano. This eruption produced ash plumes up to a height of 11000 m asl.that drifted ESE. Prior to the eruption, remarkable ground deformation was detected by super invar-rod extensometers and water-tube tilt meters and which were installed in a 30m observation tunnel, 1km southwest from the first crater. In this presentation, we report time series of the deformation and deformation sources which could be closely related to a preparatory process of a phreatic explosion.

The first crater of Nakadake erupted at 21:52 on October 7, 2016, and was followed by an explosive eruption at 01:46 on October 8. Prior to this volcanic activity, the radial component of the extensometers at observation tunnel showed dilatation from Sep.20. This deformation accelerated on Oct. 1 and was accompanied by swarm of volcanic earthquakes and tilt change showing subsidence of the crater.
Since 1990s, observations using broadband seismometers have revealed that the source of long period tremors (LPT) or very long period (VLP) events is a crack-like conduit located at depths of 1-1.5 km beneath Nakadake, with a length of 1km and width of 2.5km. It is also revealed that at this depth a pressure source was located and caused long-period displacements a few minutes before phreatic eruption in 1993 and 1994.
Furthermore, remarkable ground deformations were detected by extensometers and tiltmeters in Sep.2013, Jan. 2014 and July 2014, which corresponded to an expansion of the crack, especially shallower than 1km below the crater.

However, it is found that observed deformation in 2016 could be attributed to the expansion of the deeper portion of the crack-like conduit. Although this expansion accelerated on Oct.1,propagation of expansion to the shallower portion was not observed although this propagation was observed in Sep. 2013 event.

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