

## Combination Mogi and Yokoyama models for ground deformation in 2011-2013 at Merapi volcano

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Merapi is a strato volcano located at the border of central Java Provinces and Yogyakarta Special Region, Indonesia. After a big eruption in 2010, eruptions with VEI I occurred on 15 July 2012, 22 July 2013 and 18 November 2013. Characteristic of eruption is one of the indicators of volcano hazard mitigation; therefore this research has a purpose to estimate locations of pressure source and magma supply volume during the period from 2011 to 2013, based on ground deformation obtained by 3 GPS (Global Positioning System) stations installed in December 2010 and 5 additional stations in June 2013. The baselines beyond the summit crater show extension. This means that Merapi has already entered into inflation process immediately after the 2010 eruption. The amounts of extension of the baselines from the summit area to the navigation stations range from 5 mm to 15 mm and the displacements of GPS point varied in 2 mm to 50 mm.

Locations and volume increase of the pressure source were estimated by using Mogi and Yokoyama models. The depth of pressure source before eruption on 15 July 2012 is 9.8 km and the increase volume is 45 million m<sup>3</sup>. Ground deformation related to the eruptions on 22 July and 18 November in 2013 is modeled by two pressure sources; a deep source of Mogi type and a shallow one of Yokoyama type. The pressure sources are located at depths of 10.9 km and 4.5 km for the eruption in July and are 8.1 km and 2.9 km for November eruption. Increase in volume of the pressure sources for these eruptions is 10 million m<sup>3</sup>.

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