

## Crustal deformation and volcanic earthquakes associated with the 2008-2011 Shinmoe-dake eruption

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Kirishima volcanic chain is one of the active volcanoes in southern Kyushu, Japan and is categorized into a composite volcano whose active vents are Shinmoe-dake and Ohachi. The latest eruptive activity of Shinmoe-dake started on August 22, 2008. Subsequently, it erupted on March 30, April 17, May 27, June 27 and 28, and July 5 and 10, 2010. In 2011, the eruption started on January 19 included subplinian and vulcanian explosions, and was followed by sub-Pulian eruption on 27 January. Eruptive activity gradually ceased since February 2, and moved to Vulcanian activities.

Hypocenter distributions around Kirishima volcano group indicates intense seismic activity under Shinmoe-dake, Ohachi, western and northern area of Karakuni-dake. Figure shows daily number of earthquakes from July, 2008 to January, 2011 around Shinmoe-dake (a), western and northern area of Karakuni-dake (b). Figure (c) indicates the crustal deformation around the western area of Karakuni-dake. Before the 2011 eruption, an inflated crustal deformation around the western area of Karakuni-dake started after the end of 2009. By GPS observation, the inflation source is found at the depth of 8-9km beneath the point of about 5 km WNW-ward from the summit crater of Shinmoe-dake (Nakao, S., et. al., 2013). The total volume charged at the source is estimated 21 million cubic meters under the assumption of Mogi's model. The seismic activity around Shinmoe-dake became high at the same time the crustal deformation started, we interpret that the pressure change at the magma reservoir caused both ground deformation and elevated seismic activity.

Keywords: volcanic earthquake, expansion of magma reservoir, magma process lead to volcanic eruption

