

## Recent eruptive activity at Sinabung Volcano, Northern Sumatra, Indonesia

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Sinabung in the Northern Sumatra of Indonesia began its eruptive activity with phreatic events in August and September 2010. It resumed its activity in September 2013 with phreatic events. In November 2013, eruption columns stood about 5 km above the volcano. Volcanic ash issued since the middle November contained juvenile particles, and pumice fragments were ejected on to the NE flank of the volcano by the vulcanian event on 23 November 2013. Small-scale pyroclastic flows descended during the events. Though the eruptive activity had declined since early December, occurrence of low-frequency earthquakes replaced high-frequency events common during explosive events. Following partial collapse of the summit crater outer-slope repeated, lava appearance was confirmed in late December. Lava appeared in the summit crater grew as a dome and started its partial collapse on 30 December, generating pyroclastic flows which descended on the SE slope of the volcano. The lava dome grew into a lava flow moving to the SE, repeating its partial collapse. The horizontal length of the lava flow exceeded 1 km in late January 2014.

Several tens collapses occurred everyday in January 2014. Relatively large collapse (pyroclastic flows) generated on 7, 11 and 21 January and 1 February. Pyroclastic flows on 1 February traveled about 4.5 km, according to newspapers, and 15 local people who invaded into the danger zone, 5 km from the summit, were involved in the flows.

The present eruption at Sinabung is close to the eruption of 9 to 10th Century of this volcano in terms of both eruption site and scale. It is also similar to lava-dome eruptions at Unzen, Japan, in 1991-95 and at Soufriere Hills, Montserrat, West Indies, in 1995-present, where lava dome/flow growth associated with pyroclastic-flow events continued for several years.

Based on the chemical analyses of pumice of the Vulcanian event on 23 November 2013 and pebbles included in pyroclastic flow event on 11 January 2014, magma of this eruption (hornblende andesite) is similar to but a little poorer in SiO<sub>2</sub> (58-59%) than the magma of the 9 to 10th Century (59-60%).

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