

**DETEKSI SEBARAN MATERIAL PIROKLASTIK DAN
DEFORMASI TOPOGRAFI GUNUNG SINABUNG PADA
TAHUN 2010-2020 DENGAN ANALISIS MULTI TEMPORAL**

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DETECTION OF PYROCLASTIC MATERIAL AND DEFORMATION OF LAVA DOME IN MT. SINABUNG WITH MULTI-TEMPORAL ANALYSIS (2010-2020)

ABSTRACT

The eruptions of Mt. Sinabung resulted in deformation of lava dome as well as blanketed the surrounding area with pyroclastic material. This research focused on determining the changes occur in Mt. Sinabung during the prolong eruptions from 2010-2020. A total of 22 volcanic ash samples were collected following a 1x1 km grid lava spread over from the East to South of Mt. Sinabung. The area is the most affected by volcanic eruption. Digital elevation models from shuttle radar topographic mission and sentinel-1 were utilized to monitor deformations of lava dome and distribution of pyroclastic material on Mt. Sinabung. Sentinel Application Platform (SNAP) and Google Earth Engine were used as the main tools in multi-temporal digital elevation model (DEM) data processing. The eruption of Mt. Sinabung from 2010 until 2020 changed the height from 2,460 m to 2,404.3 m and created a new crater (5.35 ha). Lava dome volume from 2010 to 2020 is about 2,302,041.992 m³ has collapsed to produce pyroclastic material which deposit to the surrounding area of Mt. Sinabung during eruption. The distribution of pyroclastic material increased from 2010 to 2019 covered up an area of 103.27 ha (2010), 846.48 ha (2013), 1,029.74 ha (2016), 1,235.97 ha (2017) and 1,463.62 ha (2019). The thickness of the pyroclastic material deposit Mt. Sinabung at 2020 was varied from 13,24 cm to 219 cm. Lava flows and volcanic activity of Mount Sinabung also led the formation of a new lake covering an area of 9.84 ha at the east of Mt. Sinabung. The findings from this study can be used as a reference for observing topographic changes due to volcanic activities and to draw a mitigation and contingency plan for volcanic disaster program in active volcanic region of Indonesia.

Keywords: *deformation, interferometry, pyroclastic materials, volcano.*



