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## Mount Semeru volcanic activities monitoring using remote sensing of multi-temporal data set

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**Abstract:** Mount Semeru is Java's highest volcano and one of the most active, erupting continuously since 1967. Mount Semeru's eruptive events have been recorded since the early 1800s. The associated geohazard caused by volcanic activity can be evaluated with the emerging technology of earth observation from space. This study aims to investigate recent volcanic and eruptive activity using multi-spectral optic data and Synthetic Aperture Radar (SAR) in a multi-temporal data set for geohazard detection. The areas affected by land deformation and lava flows will be identified. The importance of lava flow mapping in assessing the volcanic threat cannot be overstated. The data from Sentinel-1's mission of Single Look Complex (SLC) data and Ground Range Detected (GRD) data will be analysed in this paper for one year, from early 2020 to the last eruption events in January to March 2021. The various bands of multi-spectral imageries from Sentinel-2's mission are used to create composite images to map the lava flow. The analysis is carried out using SNAP Desktop and Google Earth Engine (GEE), with final processing in a Geographical Information System (GIS) application. The yearly land deformation velocity of Mount Semeru's crater can be seen in this study. The lava flow mapping is compared to the lava flow map from the past. It is observed that a land subsidence velocity of 0.4 m occurred surrounding the crater of Mount Semeru, and the lava flow to the altitude of 2,900 m to 2,400 m. Using remote sensing radar data, which is not hampered by weather condition,

## PERTEMUAN PERSATUAN (MEETINGS OF THE SOCIETY)

has allowed the researcher and authority to set appropriate mitigation planning and action to minimise the volcanic hazard's impact on the surrounding settlements.

**Keywords:** Single Look Complex, ground range detected, Sentinel-1, Sentinel-2, volcanic activities, land subsidence, lava flow