# VOLCANO PRECURSORS FROM SATELLITE AND GROUND MEASUREMENTS IN ASSESSING THE TRANSBOUNDARY EFFECTS

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##### **ABSTRACT:** This paper presents preliminary volcano precursors during the eruption of Mount Sinabung at North Sumatera, Indonesia in August 2010 by the synergy of space-borne remote sensing satellites and ground instrumentations. The identification of small plume and ash has been carried out by means of their optical properties measurement using MODIS data and the detection of their vertical distribution and spreading distance based on CALIPSO observations. This has followed by classification of volcanic eruption discharge through their physical and optical parameters using Ozone Monitoring Instrument (OMI) data. Synergism between these satellite data with 50 ground stations distributed in Peninsular Malaysia has improved quantitative measurement of volcano precursors. This study found that series of provisional ash trajectories and plume movements towards the western Peninsular Malaysia. This has been proven by significant signatures of optical (i.e., AOT, extinction and backscatter) and physical (i.e., PM10, SO2 and NOx) aerosol properties measured by the ground stations at good agreement with satellite data. Statistical analysis and inversion model are used to determine spatial and temporal variabilities of ash and plumes from the eruption and this has demonstrated the advantageous of remote sensing satellite with collaboration of ground instrumentations in advancing the existing early warning system for volcano event.