



Volcanic activity in Melanesia shown by MODIS thermal alerts

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The MODIS (Moderate Resolution Imaging Spectrometer) Thermal Alerts website (<http://modis.higp.hawaii.edu/>) developed and maintained by the Hawaii Institute of Geophysics and Planetology's MODIS Thermal Alert Team hosts the first truly global high temperature thermal monitoring system designed to serve volcanologists. Thermal alerts are calculated using the MODVOLC (MODIS Volcano alert) algorithm to determine 'Normalized Thermal Index' (NTI) by calculating $(4.0 \mu\text{m radiance} - 12 \mu\text{m radiance}) / (4.0 \mu\text{m radiance} + 12 \mu\text{m radiance})$. MODVOLC triggers an alert whenever NTI exceeds an empirically-determined threshold that is applied uniformly across the globe.

Here we demonstrate insights into volcanic activity gained using MODVOLC data for volcanoes in Melanesia, and use these to show the capabilities and limitations of the data for distinguishing types and patterns of activity.

Consideration of NTI, total $4 \mu\text{m}$ radiance, and the spatial distribution of alert-pixels makes most active lava flows readily identifiable, and time-series data offer insights into the eruptive mechanism. Active lava lakes, lava domes and incandescent explosive vents can be detected, and distinguished using rudimentary contextual information. The location of any thermal alert caused by fires near a volcano summit tends to be more variable than that of any genuine volcanic thermal alert.

MODVOLC data are simple to use, and there is now a several-year-long archive (beginning in 2000) whose potential has barely begun to be tapped. We show examples

where MODVOLC data are the main or sole documentary evidence for a volcano's activity (most notably Ambrym, Bagana, and Langila) and others (such as Manam, Pago and Lopevi) where MODIS data allow confirmation or refinement of the timing and nature of independently-documented events.