Geophysical Research Abstracts, Vol. 8, 03887, 2006
SRef-ID: 1607-7962/gra/EGU06-A-03887

MODIS thermal remote sensing monitoring of low-intensity anomalies at volcanoes: Oldoinyo Lengai (Tanzania) and the MODLEN algorithm

M. Kervyn (1), A.J.L. Harris (2), E. Mbede (3), P. Jacobs (1), G.G.J. Ernst (1)

(1) Mercator & Ortelius Research Center for Eruption Dynamics, Geology Dept, Ghent University, Belgium, (2) HIGP/SOEST, University of Hawaii, USA, (3) Department of Geology, University of Daar-es-Salaam, Tanzania (Matthieu.KervynDeMeerendre@UGent.be)

Active and potentially hazardous volcanoes in East Africa (Tanzania, Kenya, Ethiopia) are not currently monitored on a regular basis by local scientists or scientists anywhere. Oldoinyo Lengai, one of the most active volcanoes, has been almost continuously emitting fluid natro-carbonatite lava in its summit crater since 1983. Activity, generally confined to the summit crater, ranges from lava pool degassing to relatively intense lava outpouring ($\sim$ 5-10 $m^3.s^{-1}$) and $<$30m-high lava fountains. Historical eruptions' accounts illustrate that Oldoinyo Lengai also repeatedly displays much more explosive – violent strombolian or sub-plinian style - eruptions of silicate magma. Monitoring is needed to try and anticipate the transition to this more hazardous eruption style and gain insights into the controls on eruption intensity at Oldoinyo Lengai. A semi-automated algorithm (MODLEN) using MODIS night-time satellite images to record thermal activity and detect abnormally high-intensity eruptive events is presented. MODLEN builds upon the MODVOLC algorithm, developed by the University of Hawaii as a fully-automated global-coverage hot spot detection system. MODLEN is specifically adapted to the low-temperature and small-scale eruptive activity at Oldoinyo Lengai. Calibrated and validated against field data, MODLEN is able to detect all events described as abnormally intense. Baseline data records allow assessing the influence of limitations such as partial or total cloud coverage or data acquisition gaps. A 15-month-long data series is presented and analysed. Perspectives for analysis of the temporal distribution of eruptive events on longer time series are highlighted. Low-cost thermal IR remote sensing monitoring is an essential component of the needed monitoring programme at several volcanoes in East Africa.

Perspectives for near-real time routine implementation at Oldoinyo Lengai and other volcanoes of East Africa are also discussed.