



Satellite thermal monitoring of the 2010 – 2013 eruption of Kizimen volcano (Kamchatka) using MIROVA hot-spot detection system

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After 81 years of rest, the Holocene stratovolcano of Kizimen (Kamchatka, Russia) began a new eruptive phase on December 2010. The eruption was preceded by a year-long seismic unrest and fumarole activity, and persisted for 3 years showing a transition from explosive to effusive style. The initial explosive phase caused the partial disruption of the volcano summit and was followed by the effusion of andesitic lava flow along the eastern side of the edifice. Here we used an automatic hot-spot detection system named MIROVA (Middle InfraRed Observation of Volcanic Activity), in order to track the thermal evolution of the eruption and to understand the eruptive dynamic. MIROVA is based on the analysis IR images acquired by the MODIS sensor (Moderate Resolution Imaging Spectroradiometer) and is able to provide thermal maps (1 km resolution) and Volcanic Radiative Power (VRP, in Watt) time series in near real time (1-4 hours from satellite overpass). Each image with a thermal alert has been classified, distinguishing different quality level of the data based on cloud cover, viewing geometry and coherence with the VRP trend. The analysis of VRP variation show different thermal phases that have been correlated with independent observations of KVERT (Kamchatka Volcanic Eruption Response Team). Finally, we show that the relation between total thermal energy radiated (VRE, in Joule) and erupted lava volume is consistent with the typical radiant density of an intermediate-silicic lava flow (Coppola et al., 2013).