

VOLCANOMS, a low cost and automated volcanic monitoring system for Chilean volcanoes based on Landsat ETM+ and OLI satellite images

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The use of remote sensing techniques as satellite images has become a useful and easy access tool, as a consequence of the open access policy of USGS for Land Remote Sensing Satellite (Landsat) images. Landsat images have been widely used to detect thermal anomalies, to determine heat and mass flux from active lava lakes and fumarolic fields, and to establish deep magmatic processes. The combination with other techniques has allowed use it as monitoring technique for volcanic activity and determine precursors signals. The combination of Landsat ETM+ and OLI images allow having access to images every 8 days for a same site. Consequently, we used these free access images to develop an automated system to detect thermal anomalies, monitoring volcanic behaviour and to correlate with eruptive activity. Our code called VOLCANOMS (Volcanic Anomalies Monitoring System) release diverse products and data corresponding to: 1) A set of images corresponding to individual short wave infrared (SWIR) bands (band 5 and 7 for Landsat ETM+, and bands 6 and 7 for Landsat OLI), uncorrected and corrected for atmospheric and solar effects; 2) combined images in RGB (742 and 754 for ETM+, 753 and 765 for OLI); 3) 3D image with the corrected images; 4) a data set that include thermal radiance, thermal effective temperature, heat and mass fluxes for individual images. The trial period started in 2016 and will be available for public used during the first half of 2017 in the next link: <http://volcano.ucn.cl>. The first active volcano available to be monitored will be Lascar (northern Chile), which has been used as a test volcano for our system, and is expected to expand it to volcanoes with: 1) permanent thermal anomalies (e.g. Villarrica volcano); 2) sporadic thermal anomalies, normally related to eruptive activity (e.g. Copahue, Llaima).