An automated processing chains for surface temperature monitoring on Earth's most active volcanoes by optical data from multiple satellites

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The Geohazards Exploitation Platform, or GEP is one of six Thematic Exploitation Platforms developed by ESA to serve data user communities. As a new element of the ground segment delivering satellite results to users, these cloud-based platforms provide an online environment to access information, processing tools, computing resources for community collaboration. The aim is to enable the easy extraction of valuable knowledge from vast quantities of satellite-sensed data now being produced by Europe's Copernicus programme and other Earth observation satellites. In this context, the estimation of surface temperature on active volcanoes around the world is considered. E2E processing chains have been developed for different satellite data (ASTER, Landsat8 and Sentinel 3 missions) using thermal infrared (TIR) channels by applying specific algorithms. These chains have been implemented on the GEP platform enabling the use of EO missions and the generation of added value product such as surface temperature map, from not skilled users. This solution will enhance the use of satellite data and improve the dissemination of the results saving valuable time (no manual browsing, downloading or processing is needed) and producing time series data that can be speedily extracted from a single co-registered pixel, to highlight gradual trends within a narrow area. Moreover, thanks to the high-resolution optical imagery of Sentinel 2 (MSI), the detection of lava maps during an eruption can be automatically obtained. The proposed lava detection method is based on a contextual algorithm applied to Sentinel-2 NIR (band 8 - 0.8 micron) and SWIR (band 12 - 2.25 micron) data. Examples derived by last eruptions on active volcanoes are showed.