
Integration of Sentinel data into volcano monitoring devices: example of Merapi volcano, Indonesia.

Virginie Pinel^{*†1}, François Beauducel², Raditya Putra³, Agus Budi Santoso⁴, Raphael Grandin⁵, Marie-Pierre Doin⁶, and Pascale Bascou⁷

¹Pinel (ISTerre) – Institut de recherche pour le développement [IRD] : UR219 – ISTerre, IRD, CNRS, Université Savoie Mont-Blanc, Chambéry, France

²Beauducel (IPGP) – IPG PARIS – IPGP, Paris, France

³Putra (BPPTKG) – Yogyakarta, Indonésie

⁴Santoso (BPPTKG) – Yogyakarta, Indonésie

⁵Grandin (IPGP) – IPG PARIS – Paris, France

⁶Doin (ISTerre) – CNRS : UMR5275 – Grenoble, France

⁷Bascou (ISTerre) – Institut de recherche pour le développement [IRD] : UR219 – ISTerre, IRD, CNRS, Université Savoie Mont-Blanc, Chambéry, France

Résumé

Despite the well-established interest of Synthetic Aperture Radar data for volcanoes study and monitoring, their integration to operational monitoring activities in volcanoes observatories has been limited so far. There might be several historical reasons for this lack of use: the latency and difficulty to access the data, the complexity of the data set, the reduced temporal sampling. However, with the launch of a new satellite generation (Sentinel provided by ESA), the availability of SAR data is no longer a problem and processing chains are currently developed in order to provide end-users useful and robust derived products. We here describe the effort in progress to integrate in near real time this useful remote sensing information into the monitoring devices at BPPTKG in charge of Merapi volcano survey. Merapi (7°32.5' S and 110°26.5' E) located in the densely populated Province of Yogyakarta in Central Java is one of the most active volcanoes in Indonesia. The volcano is characterized by a succession of dome growth and collapse generating pyroclastic density current. Sentinel-1 data (descending track 76 and ascending track 127) are acquired over the volcano every 12 days. This revisit time has been reduced on the ascending track to 6 days since August 2017 for a test period lasting three months. Besides Merapi volcano has been selected as a specific target for the V0-2 Trial Case on volcanoes by ESA such that geocoded amplitude change images, coherence images as well as interferograms with a spatial resolution of 50 m are automatically produced by DLR since April 2017 and available at BPPTKG through the Geohazards Thematic Exploitation Platform. In order to guaranty an independent and sustainable access to SAR derived products, we also develop in parallel a processing chain on a local server. Sentinel-1 data are automatically downloaded, interferograms are manually produced using the NSBAS processing chain modified by R. Grandin to handle Sentinel-1 data (Grandin, 2015). Then products are integrated to WebObs, an integrated web-based system for monitoring and networks management installed at BPPTKG by F. Beauducel.

*Intervenant

†Auteur correspondant: Virginie.Pinel@univ-savoie.fr

Next step will be to fully automatize the processing chain and to optimize it for rapid ingestion of incoming data. Meanwhile we also integrated Sentinel 2 products (True Color Image as well as thermal band) into WebObs to follow the dome temperature evolution when the summit part appears free of clouds.