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Volcanic SO_2 flux time series from MSG-SEVIRI satellite measurements.

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Quantitative retrieval maps of SO_2 and ash columnar abundances retrieved from thermal infrared (TIR) satellite images of volcanic plumes can be converted into flux time series if the wind field is known. In a recently published work we showed how to reconstruct SO_2 and ash fluxes from a single TIR MODIS image instrument aboard TERRA and AQUA polar satellites. The results obtained were then successfully compared with the SO_2 flux measured with the FLAME ground-based network of DOAS instruments in a case study of the December, 2006 Mt. Etna (Sicily, Italy) eruption. The key point of this work was that a single multispectral image framing a volcanic cloud can be regarded as the evolution in time of physical and volcanological parameters, and effectively records many hours of volcanic activity. We highlight that the flux reconstruction obtained from satellite data with this technique offers new perspectives that are particularly valuable for the monitoring of remote volcanoes and allows some insights on the volcanic processes driving the eruptions.
Here we show how this promising approach can be easily extended to a collection of TIR MSG-SEVIRI images exploiting the high acquisition frequency achieved by an instrument on board on a geostationary platform.