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Identification and tracking of ash clouds from recent explosive eruptions by using multispectral satellite infrared data

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RSTASH is a specific algorithm, based on the general Robust Satellite Techniques (RST) approach, developed to identify and track ash clouds using satellite infrared data. An updated and optimized version of this algorithm, which analyzes even signal measured in the visible spectral band, has recently been developed and implemented on geostationary satellites data, for a better discrimination of ash and weather clouds in daytime. This advanced configuration was firstly tested during the Eyjafjallajökull (Iceland) eruption of April 2010 (by using Spinning Enhanced Visible and Infrared Imager sensor aboard Meteosat Second Generation), showing further improvements in terms of false positives reduction in comparison with standard RSTASH technique. Another experimental configuration of this method, analyzing signal measured in the SEVIRI sulphur dioxide absorption band (at 8.6μm), was also successfully used to qualitatively characterize volcanic plumes emitted by the same volcano in May 2010 in terms of SO_2 concentration. Results of these studies are presented and discussed here, together with main achievements obtained monitoring ash cloud emitted during Shinmoedake (Japan) explosive eruption of 26-27 January 2011, exploiting the high temporal resolution of MTSAT Japanese geostationary satellites. Moreover, for both test cases, plume height estimations, obtained by applying two different literature methods, are compared with indipendent both ground- and satellite-based observations.
In this work, RSTASH performances in detecting, tracking and characterizing ash clouds are discussed, focusing on main open issues and future perspectives.