Geophysical Research Abstracts
Vol. 18, EGU2016-6627, 2016
EGU General Assembly 2016

On the impact of additional spectral bands usage on RST-ASH performance in volcanic ash plume detected from space

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RST-ASH is an algorithm developed for detecting and tracking volcanic ash clouds from space based on the Robust Satellite Technique (RST) multi-temporal approach. For the identification of ash affected areas RST-ASH uses two local variation indexes in combination. They analyse the Brightness Temperature Differences (BTD) of the signal measured at 11 μm and 12 μm and at around 3.5 and 11 μm wavelengths to detect ash in both nighttime and daytime conditions. RST-ASH was tested on Advanced Very High Resolution Radiometer (AVHRR) and on Moderate Resolution Imaging Spectroradiometer (MODIS) records and was then implemented on Spinning Enhanced Visible and Infrared Imager (SEVIRI) for studying and monitoring eruptions of different volcanoes. In this study, some experimental configurations of RST-ASH, analyzing signal also in other spectral bands (e.g. VIS, SO_2) will be tested and assessed, studying recent ash plumes (e.g. Etna, Eyjafjallajökull, Grímsvötn) affecting different geographic areas. Results achieved using both polar and geostationary satellite data will be evaluated even for comparison with other state of the art methods. The work shows that when the extended spectral capabilities offered by high temporal resolution satellites are exploited an improvement of RST-ASH performance in some observational and plume conditions is achievable, making RST-ASH still more suited for identifying and monitoring ash clouds in the framework of possible operational scenarios.