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Comparison between volcanic SO2 retrieved from satellite infrared data and ground based DOAS network data on Mt. Etna.

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Volcanic SO2 total amount and flux retrieved from satellite IR and ground based UV remote sensing data collected on Mt Etna are presented and compared . The Etna FLAME network was deployed in 2003 and consists of 5 scanning ultraviolet spectrometers used to automatically measure the amount of SO2 emitted from Mt. Etna. Each station consists of an Ocean Optics S2000 spectrometer, a scanning mirror and a PC. Data are collected and analyzed in real-time, with results sent via GSM modem to the observatory. The spectrometer measures in the UV range between 295 and 380nm, with a resolution of 1.1 nm. Data analysis is performed using a custom-built DOAS-style retrieval with artificial clear-sky background spectrum, and provides the SO2 amount measured along the transect defined by the scanning plane of each FLAME station.
The SO2 and ash are retrieved from infrared multispectral data collected by satellite borne sensors by means of well known techniques that can be applied when both SO2 and ash absorption bands are present.
These retrievals depend on the choices made before the computation of the atmospheric corrections, including the independent knowledge of atmospheric profiles, plume geometry (height, thickness, and shape), and ash composition. The parameters retrieved are the SO2 columnar abundance, and the ash total mass, effective radius (Reff) and aerosol optical thickness (AOT) in the form of image maps. In particular the SO2 and ash total amounts on the whole map or on any transect intersecting the volcanic plume can be computed. When wind speed and direction are given also the SO2 flux emitted by the volcano can be evaluated and compared from both satellite and ground based retrievals.
The results of this kind of comparisons will be presented for two case studies representative of an SO2 plume and a plume of SO2 mixed with ash in order to explore also the ash interference on the SO2 retrieval.