



Eruption column height: a comparison between ground and satellite measurements

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The eruption column height estimation is an essential parameter to evaluate the total mass eruption rate, the gas and aerosol plume dispersal and retrievals. The column height may be estimated using different systems (e.g. satellite, aircraft and ground observations) which may present marked differences. In this work we use the calibrated images collected by the video-surveillance system of the Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio Etneo, from the visible camera located in Catania, 27 km from the vent. The analysis is carried out on twenty lava fountains from the New South East Crater during the recent Etna explosive activity. Firstly, we calibrated the camera to estimate its intrinsic parameters and the full camera model. Furthermore, we selected the images which recorded the maximum phase of the eruptive activity. Hence, we applied an appropriate correction to take into account the wind effect. The column height was also evaluated using SEVIRI and MODIS satellite images collected at the same time of the video camera measurements. The satellite column height retrievals is realized by comparing the 11 μm brightness temperature of the most opaque plume pixels with the atmospheric temperature profile measured at Trapani WMO Meteo station (the nearest WMO station to the Etnean area). The comparison between satellite and ground data show a good agreement and the column altitudes ranges between 7.5 and 9 km (upper limit of the camera system). For nine events we evaluated also the thickness of the volcanic plumes in the umbrella region (near the vent) which ranges between 2 and 3 km. The proposed approach help to quantitatively evaluate the column height that may be used by volcanic ash dispersal and sedimentation models for improving forecasts and reducing risks to aviation during volcanic crisis.