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Ash Volcanic Measurements by Lidar near the Mount Etna

Volcanic emissions represent a well-known hazard mainly for aviation safety that can be reduced with real time observations and characterization of eruptive activity. Lidar observations allow to perform immediate and accurate detection of volcanic plumes, quantify volcanic ash concentration in atmosphere and characterize optical and microphysical properties of volcanic particles. From 18 to 21 February 2019, Etna's activity was characterized by abundant ash emissions from the North-East Crater (NEC), accompanied by ordinary degassing activity of variable intensity from the other summit craters. LiDAR measurements of Volcanic plume were performed in Catania, in 21/02/2019. Real-time Lidar observations captured the complex dynamics of the volcanic plume and allowed to analyse the geometrical, optical and microphysical properties of the volcanic ash. The aerosol backscattering (β) profiles at 355 nm and 532 nm and the depolarization ratio (δ) were measured near the volcanic source using an Elastic Lidar system. The aerosol optical properties were used to estimate the ash concentration (γ) profiles in the volcanic plume. This is the study of optical properties of volcanic particles through Elastic measurements near volcanic summit craters and one of few studies which quantify the impact of abundant ash emissions and degassing activity in atmosphere.

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