

Aerosol layer observation of 2015 Calbuco volcanic eruption over the LALINET São Paulo station

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Abstract: On the 22nd of April 2015, the Calbuco volcano sited at the South region of Chile had its first eruption since 1972, injecting a huge plume of volcanic aerosol particles and gases up to 21 km into the atmosphere. As part of the Latin America Lidar Network's (LALINET) aim to monitor any atmospheric event the LALINET São Paulo station (SPU) started continuous observation in order to monitor the dispersion of volcanic aerosol layer and their altitude and optical properties. After 5 days, on 27 April 2015, some volcanic plumes arrived over the Metropolitan area of São Paulo (MASP) and were detected by the SPU system within the altitude range of 18-19 km. The timing and altitude of SPU observations coincide with transport and dispersion simulations of the volcanic cloud's arrival at São Paulo, from the Goddard Earth Observing System Model, version 5 (GEOS-5) and Goddard Chemistry Aerosol Radiation and Transport (GOCART) model from NASA Goddard Space Flight Center. The models simulate the volcanic eruption's injection of SO₂, SO₄, and ash into the atmosphere and the advection of the volcanic plume away from the volcano. The purpose of this study is to determine the optical properties of the volcanic plume such as AOD and Lidar ratio. Applying the transmittance method used previously for cirrus clouds it was possible to retrieve the AOD value of 0.16 ± 0.21 and a lidar ratio of 64 ± 4 sr.

Keywords: Lidar, satellite, Calbuco; volcanic eruption.

IXWLMLA Topic: Synergy between lidar and others instruments