Raman lidar measurements of long-range transported aerosol layers in Southern Italy

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A Raman lidar system is operational at Dipartimento di Ingegneria e Fisica dell'Ambiente (DIFA) of Università degli Studi della Basilicata (Potenza, Italy). The system has the capability to perform measurements of atmospheric temperature, water vapour mixing ratio, particle backscattering at 355 and 532 nm and particle extinction at 355 nm. Lidar ratio at 355 nm and relative humidity can be determined as by-products.

The system was operational during the summer 2004. In that period intensive field campaigns were carried out in Europe and North America within the framework of ICARTT (International Consortium for Atmospheric Research on Transport and Transformation). One of the goals of this coordinated international effort was to study the long-range transport of trace gases and aerosols from industrial and biomass burning emissions. Warnings were sent by NOAA to several European lidar stations if a plume arrival was predicted over their site and measurements were performed by the lidar stations in a coordinated effort.

Aerosol measurements were carried out at DIFA on several dates in the hours following the warnings and a variety of aerosol formations were observed in the altitude region between 2 and 7 km. The attention has been primarily focused on three selected case studies: 10 July, 27 July and 5 August. Measurements of particle backscattering, extinction and lidar ratio at 355 nm were performed for these cases and will be discussed at the conference. Transport simulations are under way to estimate the back-trajectories of the involved air-masses to assess the effective geographical origin of the observed aerosol layers.