

A.01.06 Aerosol, clouds, their interactions and the radiation budget

Study of Aerosol Cloud Interaction in the Eastern Mediterranean: Long-term lidar Observations over Cyprus

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A promising approach to studying cloud evolution, with a focus on heterogeneous ice nucleation, is the use of ground-based remote sensing. Continuous vertical profiling of aerosols, altocumulus, and cirrus layers using lidars and radars provides a detailed and coherent means of examining these processes.

Located in the heart of the eastern Mediterranean, Cyprus provides an ideal setting for atmospheric and climate research, particularly in studying cloud and precipitation formation. This research focuses on the impact of both natural aerosols, such as desert dust, soil dust, marine particles, and anthropogenic aerosols, including urban haze and biomass burning smoke, on these processes.

In this study, we discuss four years of continuous observations with the PollyXT lidar of the Cyprus Atmospheric Remote Sensing Observatory (CARO). CARO is a key research infrastructure for atmospheric studies in Cyprus hosted by the ERATOSTHENES Centre of Excellence. This facility features two advanced containers equipped with a multiwavelength lidar, a Doppler lidar, a cloud radar, and radiometric instruments, which used to monitor air quality, dust transport, and cloud properties over Cyprus. Long-range aerosol transport events observed over Limassol will be utilized to investigate the role of aerosol particles in cirrus formation in the upper troposphere. The simultaneous occurrence of aerosol layers together with intense cirrus features is a strong sign that particles were serving as the dominant INPs.

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