DUAL FIELD-OF-VIEW DEPOLARIZATION METHOD USING THE POLLY^{XT} RAMAN LIDAR OF CARO LIMASSOL NATIONAL FACILITY: PARAMETERIZATION OF AEROSOL-CLOUD INTERACTIONS

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Despite being one of the most studied fields in atmospheric research, aerosol-cloud interactions (ACI) still remain one of the most uncertain parameters in how aerosols, clouds and their interrelation affect Earth's energy balance, as well as how aerosols influence the formation, lifetime and evolution of clouds. The novel Dual-Field-of-View (DFOV) polarization lidar approach comes as a competent solution to the aforementioned challenges, since it operates only with lidar data alone and it has the ability to deliver requisite information on liquid-water, or even, mixed phase clouds' microphysical properties. Properties like the Cloud Droplet Number Concentration (N_d), their effective radius (R_e), the cloud extinction coefficient (α), and the Liquid Water Content (LWC). Additionally, by using products like the quasi backscatter coefficient and by implementing Doppler Lidar's data, the cloud condensation nuclei (CCN) concentration and the vertical wind below the cloud base can be retrieved, and therefore, the influence of certain type of aerosols and their concentration in relation also to the behaviour of the wind, can yield to an unprecedent view of aerosol-cloud interactions. For this study, measurements taken by the Cyprus Atmospheric Remote-Sensing Observatory (CARO) National Facility of the Eratosthenes Centre of Excellence in Limassol and more specifically by the Polly^{XT} Raman Lidar and the Halo Photonics (Snoopy) Doppler Lidar, are going to be utilized for the examination of liquid-water or mixed-phase cloud cases in Limassol. Using the DFOV Depolarization method on these cases for the first time in the Eastern Mediterranean, Middle East, and Northern Africa (EMMENA) region, cloud properties and aerosol's influence on them can be adequately retrieved, also adding to ACI studies.

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