Polrization lidar for monitoring dust particle orientation: first measurements

Alexandra Tsekeri[1], Vassilis Amiridis[1], Spiros Metallinos[1], Alexandros Louridas[2], George Georgoussis[2], Nikolaos Siomos[3,1], Peristera Paschou[1,5], Thanasis Georgiou[1], Ioannis Binietoglou[1]

[(1)] *Institute for Astronomy, Astrophysics, Space Applications and Remote Sensing, National Observatory of Athens, Athens, Greece, E-mail: atsekeri@noa.gr*

[(2)] *Raymetrics S.A., Athens, Greece*

[(3)] *Fakultät für Physik, Meteorologisches Institut, Ludwig-Maximilians-Universität, Munich, Germany*

[(4)] *Faculty of Physics, University of Vienna, Vienna, Austria*

[(5)] *Laboratory of Atmospheric Physics, Physics Department, Aristotle University of Thessaloniki, Thessaloniki, Greece*

Dust orientation is an ongoing investigation in recent years. Its potential proof will be a paradigm shift for dust remote sensing, invalidating the currently used simplifications of randomly-oriented particles. Vertically-resolved measurements of dust orientation can be acquired with a polarization lidar designed to target the off-diagonal elements of the backscatter matrix which are non-zero only when the particles are oriented.

We constructed the "Wall-e„ lidar system emitting linear and elliptical polarized light and detecting various states of polarization of the backscattered light. The system also employs the capability to acquire measurements at off-zenith viewing angles. Moreover, in order to achieve good SNR in short measurement times the system is equipped with two laser sources emitting interleaved linear and elliptical polarized light and two telescopes for the detection.

Herein we present measurements of rain and dust particles acquired in Athens, Greece, during the preparation of the system for the ESA Aeolus Cal/Val Campaign "ASKOS„ at Cape Verde (June 2022).

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