

# First Results from the Aeolus reference lidar eVe during the tropical campaign JATAC at Cape Verde

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eVe lidar is a combined linear/circular polarization lidar system with Raman capabilities operating at 355 nm. The emission unit consists of two lasers that are used for the interleaved emission of linearly and circularly polarized light. In the receiver unit, two polarization analyzers (linear in the first telescope and circular in the second telescope) are deployed for measuring the depolarization of the elastically backscattered linearly/circularly polarized emission with polarization sensitive channels. In the first telescope, a Raman channel is also deployed for detecting the inelastically backscattered light. As such, the aerosol optical products that are retrieved from the eVe measurements are the particle backscatter and extinction coefficients, and the lidar ratio originated from both linear and circular emission, the volume and particle linear depolarization ratio, and the volume and particle circular depolarization ratio. The dual-laser/dual-telescope configuration, along with the capability of the system to point at multiple azimuth and off-zenith angles, allows eVe to simultaneously reproduce the operation of the ALADIN lidar onboard Aeolus satellite mission, i.e. circularly polarized emission at 35° off-nadir, as well as the operation of a traditional linear polarization lidar system, i.e. with linearly polarized emission and any pointing geometry. The eVe lidar constitutes the ESA's ground reference lidar system for the validation of the Aeolus Level 2 aerosol and cloud optical products (particle backscatter and extinction coefficients, and lidar ratio). The system was deployed for the ASKOS experiment which is the ground-based component of the Joint Aeolus Tropical Atlantic Campaign (JATAC) for the validation of the Aeolus wind, aerosol and cloud products that was held in Cape Verde in July and September 2021. Targeted measurements of the eVe lidar were performed during the overflights of the deployed aircrafts with airborne in-situ and remote-sensing instrumentation in September, and every Friday evening during the nearest Aeolus overpass from site in July and September. Moreover, a lidar intercomparison was performed between eVe and PollyXT lidars during ASKOS in order to cross-validate both systems and evaluate their performance. PollyXT is an EARLINET approved multiwavelength polarization-Raman-water vapor lidar system that was recently installed in Cape Verde for long-

term lidar observations and deployed also for the ASKOS operations. This paper will present the eVe lidar and first results from the ASKOS campaign.