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ASKOS Campaign 2021/2022: Overview of measurements and applications

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In the framework of the Joint Aeolus Tropical Atlantic Campaign (JATAC), the ASKOS experiment was implemented in Cabo Verde during summer and autumn of 2021 and 2022. The main objective of ASKOS was the collection of an unprecedented dataset of synergistic measurements in the region, to be used to address a wide range of scientific objectives, namely the support of the validation of Aeolus mission's products, the study of the processes affecting desert dust transport (water vapor, giant particles, mixing with boundary layer dynamics), the characterization of the cloud microphysics, the effect of dust particles in the cloud formation over the region, the effect of the large dust particles on radiation and others.

During the ASKOS experiment, intense ground-based remote sensing and airborne in situ measurements took place on and above Mindelo on the island of São Vicente, Cabo Verde. At the Ocean Science Center in Mindelo (OSCM), a full ACTRIS remote sensing super site was set up in 2021, including a multiwavelength-Raman-polarization lidar PollyXT, an AERONET sun photometer, a Scanning Doppler wind lidar, a microwave radiometer and a cloud radar belonging to ESA fiducial reference network (FRM4Radar). Additionally, the ESA's reference lidar system eVe, a combined linear/circular polarization lidar with Raman capabilities, was deployed. In 2022, the operations were enhanced with the deployment of airborne in-situ aerosol measurements on-board UAVs deployed by the Cyprus Institute, solar radiation measurements supported by

PMOD/WRC, dust particle orientation measurements from the WALL-E lidar of National Observatory of Athens, and radiosonde releases equipped with additional electric field and electric charge measurements. The campaign was supported by dedicated numerical weather and dust simulations from CAMS and ECMWF, and tailored WRF simulations with nested domains above the campaign site.

From the ASKOS dataset, three cases have been selected as "golden cases" where multiple JATAC airborne platforms and Aeolus satellite performed collocated measurements alongside with the ground-based instrumentation around the ASKOS operations site. Furthermore, multiple synergistic measurements with the JATAC airborne platforms were performed in the broader Cabo Verde region. Here, we quickly introduce ASKOS measurements and present first results.

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