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Quality assessment of Aeolus L2A products at Cabo Verde during JATAC and beyond - validation with ground-based lidar observations

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In the framework of the Joint Aeolus Tropical Atlantic Campaign (JATAC), a temporary ground-based ACTRIS aerosol remote sensing station has been setup by TROPOS at the Ocean Science Center Mindelo (OSCM) in June 2021. The instrumental capabilities for aerosol profiling at the OSCM comprise a multiwavelength-Raman-polarization lidar Polly XT and an AERONET sun photometer. Furthermore, a scanning HALO photonics Doppler lidar is utilized to study the dynamics near the observational site. Continuous 24/7 observations have been performed since June 2021, thus covering the four intensive observational periods of JATAC (July 2021, September 2021, June 2022, September 2022).

In this presentation, we want to discuss the capabilities of Aeolus to observe the aerosol conditions including the Saharan dust layer (SAL) above the Cabo Verdean islands. The time series of the ground-based PollyXT lidar from June 2021 until today has shown, that dust is omnipresent above the local boundary layer in the summer months. The maximum dust layer top height has been observed in July with 7 km. The SAL top height has then decreased to 3 km in November. Some rainy periods were observed in September/October, especially in the year 2022 for the fourth intensive JATAC campaign.

We will utilize the direct Aeolus overpasses over Mindelo each Friday during these four periods (and for other seasons) to make a long(er)-term assessment of the Aeolus aerosol capabilities (L2A) involving also products from the most recent algorithm versions (Baselines). Due to the capabilities of the ground-based PollyXT lidar, we can directly compare the 2 main products of Aeolus: The extinction coefficient and the co-polar backscatter coefficient. Doing so, we can also quantify the influence of the missing polarization component in the Aeolus aerosol products which is important for the planning of the potential Aeolus follow-on mission, for which the polarization capabilities are still under discussion.

Finally, the lessons learnt from the current Aeolus Cal/Val on Cabo Verde can be also used for the upcoming EarthCARE mission as TROPOS has started to setup a permanent ACTRIS aerosol and cloud remote sensing supersite at Mindelo.