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Overview of the High Altitude Lidar Observatory (HALO) water vapor DIAL and High Spectral Resolution Lidar observations during the summer 2022 CPEX-CV Campaign

Amin Nehrir[1], Rich Ferrare[1], James Collins[2], Rory-Barton Grimley[1], Ewan Crosbie[2], and Eleni Marinou[3]

[1]NASA Langley Research Center, Hampton VA, USA
[2]Science Systems and Applications, NASA Langley, Hampton VA, USA
[3]IAASARS, National Observatory of Athens, Athens, Greece

The 2022 Convective Processes Experiment – Cabo Verde (CPEX-CV) collected observations using the NASA DC-8 to study dynamics and microphysics related to the Saharan Air Layer (SAL), African easterly waves and jets, and deep convection within the Intertropical Convergence Zone (ITCZ) in the tropical East Atlantic. CPEX-CV measurements also collected data to help calibrate and validate ESA's Aeolus Doppler wind lidar. CPEX-CV is part of combined effort with the European Space Agency (ESA) and their partner laboratories and universities called the Joint Aeolus Tropical Atlantic Campaign (JATAC) to validate ESA's Aeolus satellite. As part of the CPEX-CV – JATAC collaboration from Cabo Verde in September 2022, the NASA DC-8, outfitted with a comprehensive suite of remote and in-situ sensors, coordinated with the ASKOS ground site at Mindelo and the Slovenian WT-10 aircraft to validate AEOLUS wind and aerosol products as well as to link quantitatve aerosol observations from multiple vantage points to better understand the role of the SAL in toprical dynamics.

During CPEX-CV the NASA DC-8 was outfitted with the Advanced Vertical Atmospheric Profiling System (AVAPS) dropsondes, Doppler Aerosol Wind Lidar (DAWN), High-Altitude Lidar Observatory (HALO), third generation Airborne Precipitation Radar (APR-3), High-Altitude Monolithic Microwave Integrated Circuit Sounding Radiometer (HAMSR), and the Cloud Aerosol and Precipitation Spectrometer. This presentation will highlight the HALO water vapor DIAL and aerosol/cloud HSRL observations collected during CPEX-CV and discuss the synergies with the JATAC campaign. HALO HSRL observations are compared and contrasted with those taken from the ground site at Mindelo to better understand the influence of orographic island effects on the transport of aerosols and better constrain aerosol processes such as aerosol electrification being studied by ASKOS. Additionally, HALO aerosol backscatter, depolarization, and extinction products at 532 nm and 1064 nm are used to evaluate Cloud-Aerosol Lidar with Orthogonal Polarization (CALIOP) aerosol retrievals at those same wavelengths and, after adjustment to 355 nm, are compared against Aeolus backscatter and extinction products. Areas for future collaborative efforts will also be discussed including Aeolus and Earthcare validation.