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Overview of NASA's Convective Processes Experiment – Cabo Verde (CPEX-CV) in the East Atlantic in September 2022 and Collaboration with the Joint Aeolus Tropical Atlantic Campaign (JATAC)

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A continuation of the National Aeronautics and Space Administration's (NASA) truncated Convective Processes Experiment – Aerosols and Winds (CPEX-AW) field program flown out of St. Croix, USVI, in the summer of 2021, CPEX – Cabo Verde (CPEX-CV) deployed NASA's DC-8 from Sal Island, Cabo Verde in September 2022, equipped with a unique and comprehensive suite of active and passive remote sensing and in-situ capabilities that, in combination with the availability of similar spaceborne observations, allowed for the measurements of tropospheric aerosols, winds, temperature, water vapor, and clouds and precipitation. The tropical northern East Atlantic Ocean is a data sparse region that, in boreal summer, offers a unique location to study convective lifecycles and processes in a variety of thermodynamic, dynamic, and aerosol environments, such as within persistent (e.g., Intertropical Convergence Zone, ITCZ) and periodic (e.g., African easterly waves and tropical cyclones) large-scale forcing, local terrain effects (e.g., land-ocean transition off western Africa), and aerosol-cloud interactions (e.g., Saharan air layer). In addition to observing the interaction between large-scale environmental forcing and convective systems, the payload is uniquely capable of observing the smaller-scale processes within the near-environment of convection, including those within the marine boundary layer (e.g., cold pools), the inflow/outflow of the storm, and dust-cloud interactions, that affect convective initiation and lifecycle, as well as other poorly resolved/understood properties of these systems.

CPEX-AW and -CV were a part of a joint observing effort with the European Space Agency (ESA) and their partner laboratories and universities called the Joint Aeolus Tropical Atlantic Campaign (JATAC) out of Cabo Verde to validate ESA's Aeolus satellite. As part of the CPEX-CV – JATAC collaboration in September 2022, the NASA DC-8 carried out coincident underpasses of the Aeolus satellite on four of the thirteen CPEX-CV research flights, performed four overpasses of the ASKOS ground site at Mindelo, and two coordinated flights with the Slovenian WT-10 in situ aircraft that also encompassed a coincident flight under Aeolus and over the Mindelo ground site. Here, we summarize the CPEX-CV science objectives, mission architecture, scientific targets observed on flights flown during the September 2022 campaign, and highlights of the data collected planned to

be released to the community in early April 2023 with a focus on collaborative efforts between CPEX-CV and JATAC.

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