

EGU23-10983, updated on 25 Apr 2024

<https://doi.org/10.5194/egusphere-egu23-10983>

EGU General Assembly 2023

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## Investigating the evolution of a tropical wave observed during JATAC/CPEX-CV using the campaign data portal

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The Joint Aeolus Tropical Atlantic Campaigns (JATAC) 2021 and 2022 deployed on the US Virgin Islands and Cabo Verde, respectively, with science objectives related to the life cycle of convective systems, the long-range transport of dust and its impact on air quality, and the satellite calibration/validation of current and the preparation of future ESA and NASA missions (Aeolus, EarthCARE, AOS, WIVERN). The NASA components of JATAC, Convective Processes Experiment-Aerosols and Winds (CPEX-AW) and CPEX-Cabo Verde (CPEX-CV), included a focus on the complex multi-scale processes and interactions that lead to convective development and its upscale growth: Understanding the environmental conditions supporting the development of tropical cyclones (TCs) remains a research and operational challenge, owing in part to limited observations of the lifecycle of convective activity that eventually become TCs. In the Atlantic basin, early stages of TC development favor the region off the west coast of Africa as African Easterly Waves move offshore and provide, at times, favorable conditions for TC development. CPEX-CV provided airborne measurements in this region, with a total of 13 research flights throughout September 2022. The payload included a triple-frequency precipitation radar, Doppler wind lidar, and dropsondes, among other remote sensing and in situ instrumentation, offering a rare 4-D look at tropical oceanic convective systems and their environment.

To support the campaign goals, we developed the JPL CPEX-AW/CV portal (<https://cpex-aw.jpl.nasa.gov>), which integrates model forecasts with multi-parameter satellite and airborne observations from a variety of instruments. The portal provides an interactive system for multi-scale visualization and on-line analysis, allowing for the interrogation of a large number of variables for flight planning and execution and for post-campaign analysis, including the large-scale context of the detailed airborne observations. In this presentation, the portal will be used to provide an initial investigation into the evolution of a tropical wave observed during CPEX-CV. The 16 September 2022 flight targeted a growing convective system associated with a broad circulation, the wave structure itself, an Aeolus validation underflight, and dust over Mindelo in

coordination with other JATAC measurements. While the wave was not forecasted to immediately develop into a TC downstream, the convection sampled on the western edge of the wave was intense with lightning, although did not grow upscale into a large organized mesoscale convective system during or immediately after the flight. A focus of this initial portal-based analysis is on gradients in environmental moisture, evolution of environmental wind shear in the vicinity of the precipitation, and the presence (or absence) of large-scale convergence as we suspect some combination of these factors limited the initial development of this convective system into a tropical cyclone. Potential later large-scale ties to the development of Hurricane Ian in the Caribbean will also be explored with the portal as it provided a useful tool for this purpose.