Mission Scientist Report (Ed Zipser, 19 August 2017)

Pre-takeoff objective was to target a region of undisturbed trade cumulus east of the Bahamas to obtain the best possible DAWN winds in pre-planned boxes, not only for DAWN testing and QC, but if possible repeat in a second box nearby with cumulus congestus and evaluate whether slight changes can be observed in low-level convergence, thermodynamic profiles, or both.

Results: Actual mission carried out almost exactly as planned. After the usual DAWN calibration run over Florida shortly after takeoff, headed east, and executed first box centered near 25.6 N 74.6 W, about 40 nm on a side, with mostly small trade cu, tops no deeper than 7-8000 ft. but mostly much less, aligned in rolls oriented from about 120°. Then did a two passes around a second box a little to the east, centered around a taller congestus first identified on VIS satellite by ground scientist. After completing second box, 4-5 passes made over the group of congestus for APR-2. Lastly, returned to location of first box, and repeated it to look for consistency or changes, if any.

Fig. 1. Flight track 1700-1800 Z, showing start of Box 1 to turn on NE corner.
Fig. 2. Flight track 18-19 Z, showing completion of first box including diagonal leg, followed by first 2.5 legs of second box. Note that the cloud patch in the VIS image is stratocumulus and not cumulus; that is most likely the small bright spot west of the stratocu patch.

Fig. 3 (left). Photo about 1753Z of typical conditions inside Box 1
Fig. 4 (right) Photo about 1758Z of typical conditions inside Box 1.

Fig. 5. Photo about 1804Z showing PBL rolls oriented about 120-130°.
Fig. 6. Flight track 19-20Z, showing completion of first track around Box 2, AND the second box. This was followed by 4-5 overpasses of the cumulus congestus group between about 1917-37Z. See APR-2 for excellent quick look data on these cumuli; heights to 4.4 km, 45 dBZ at Ku band.

Fig. 7. Looking north into second box across large stratocumulus patch at about 1901Z
Fig. 8. Flight track 20-21Z, showing the repeated execution of the box around the suppressed trade cu area.

Fig. 9. Toward ENE about 2021Z looking into center of 2\textsuperscript{nd} box during 2\textsuperscript{nd} circuit of that box.
Fig. 10: Quick Look Dropsonde plot near 2041Z, near center of second box, second circuit.