

CPEX Mission #16    24 June 2017    Takeoff ~ 1647    Landing ~ 2245 UTC

Draft Mission Scientist Report (Ed Zipser, July 12, 2017)

Pre-takeoff objective was to target a region of scattered moderate-to-deep convection that could be boxed in as much cloud-free air as possible to enable DAWN to obtain good winds, but combined with some convective overflights to obtain good APR-2 data within convection. The specific target area shifted several times from the previous day's plan, which had targeted an area east of the Bahamas, to the northwestern Caribbean, in the vicinity of Grand Cayman.

Results: The first convective region near Grand Cayman was worked without a complete box, but with fairly good data on several quadrants and some overflights of convection. However, the target was not ideal, with considerable middle cloud obscuring DAWN's view, several different potential target clouds some distance apart, and part of the region in Cuban air space. With consensus from ground-based team members, and satellite data on board, we decided to move to a new target in the east Gulf of Mexico near 25N 85W, which proved to be a good one. Several altitude changes were made during the mission, higher for safety when targeting deep convection for APR-2, and considerably lower when in transit from first to second convective target, and lower during the final leg between the Gulf convection and Florida to obtain DAWN and dropsonde data across the loop current and approaching Florida in nearly clear conditions.

The Gulf convective target was successfully boxed, followed by many "Simone Tanelli special" patterns over a healthy but fairly isolated convective system reaching slightly above flight altitude of about FL400.

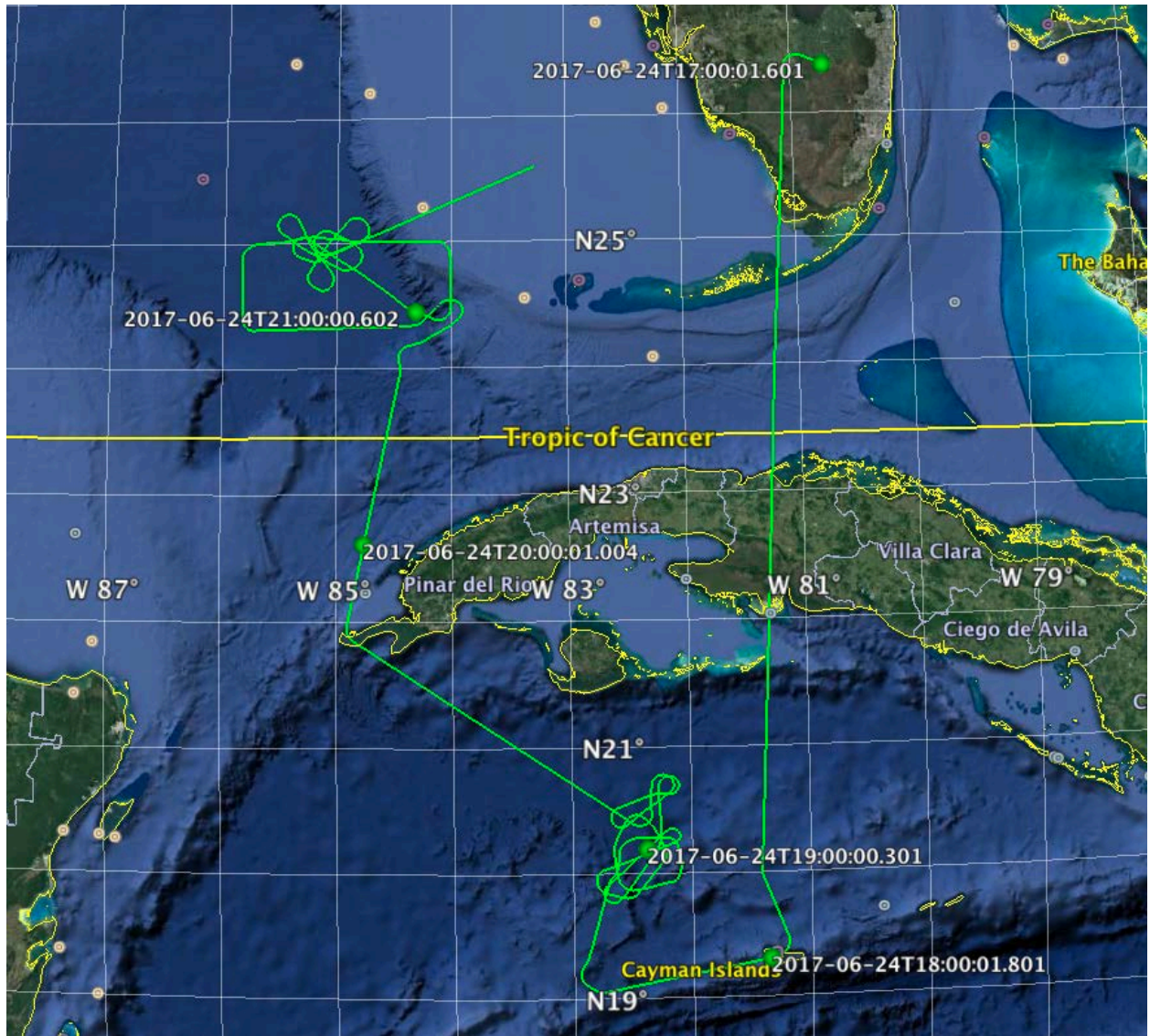


Fig. 1. Most of the flight track from 1700 – 2200 UTC.

- About  $\frac{1}{3}$  of a box made around the first convective target, with Tanelli special overpasses of the deep convection. After transit to the Gulf convective target, a complete box was executed plus a diagonal, followed by numerous Tanelli specials. It is likely that a fairly large percentage of that box has good DAWN data.

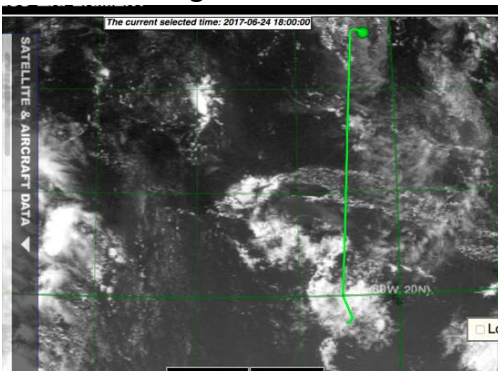


Fig. 2 17-18 UTC track, showing extensive middle clouds on GOES 13 VIS, making it difficult for DAWN. The most active CB was near the NW portion of the region, and it was difficult to single out a specific target – we opted not to go to the isolated cell to the south.

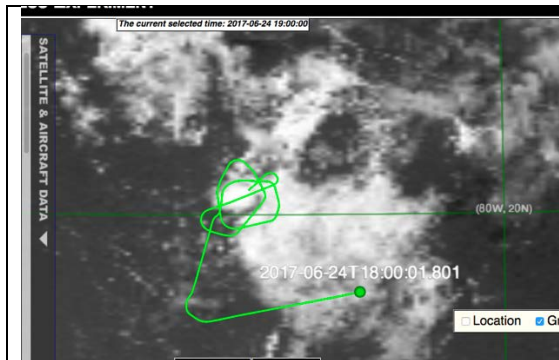


Fig. 3: Track from 18 – 19 UTC. After a partial box around the system, which was mostly middle cloud, we did several passes over the strongest convective cell near the NW edge.

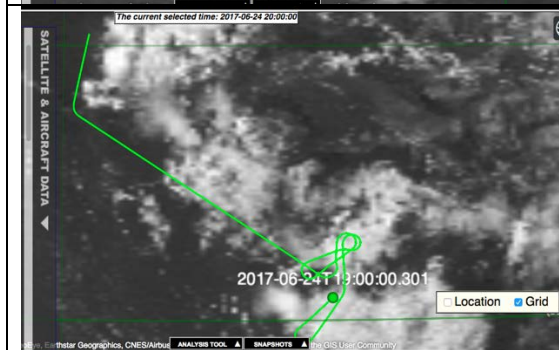


Fig. 4: 19-20 UTC. Ferry toward Gulf target after completing APR-2 passes over deep convection, which was weakening.

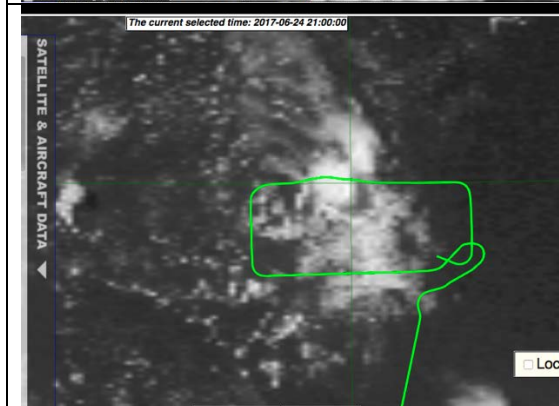


Fig. 5: 20-21 UTC. Executed box around Gulf target. Figure is misleading because strong convection was NOT encountered on northern leg but was inside the box. Perhaps incorrect registration of satellite image? This was noticed in flight as ground scientists also thought that we had penetrated that cell.

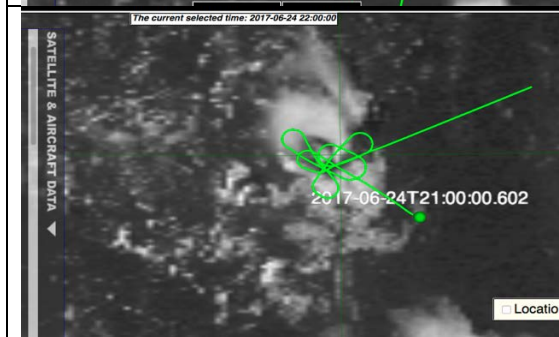


Fig. 6: 21-22 UTC. Many passes over tall CB that was moving slowly toward the north. Then descended to FL 200 for staring DAWN data over loop current enroute RTB.



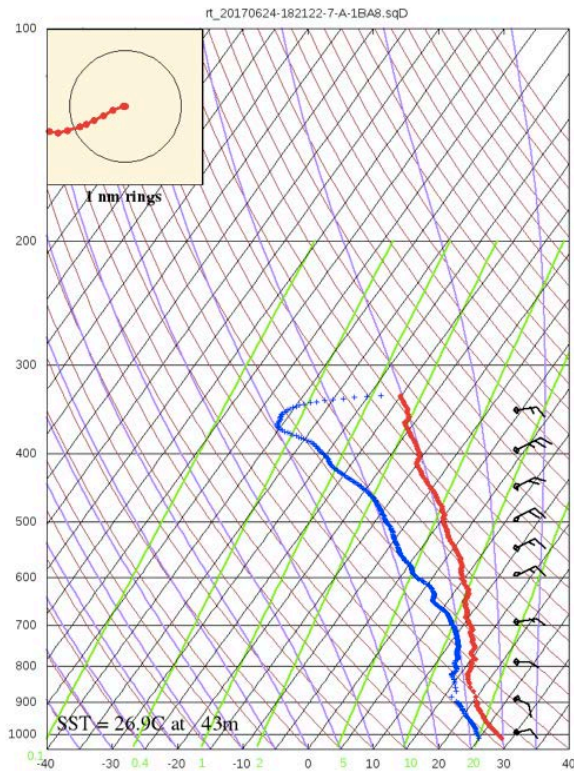


Fig. 7a (left): Dropsonde quick look at 182122 UTC, perhaps representative of the environment of the first convective system studied, but also perhaps influenced by earlier precipitation and middle clouds.

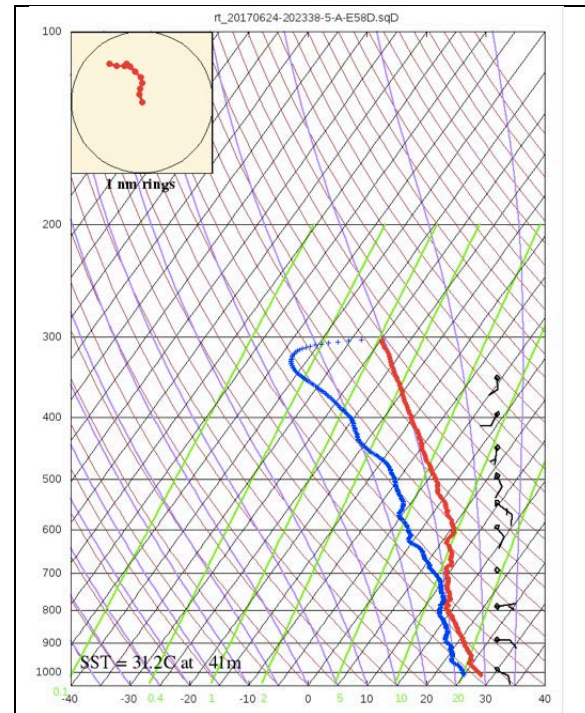


Fig. 7b (right) Dropsonde quick look at 202338 UTC, probably representative of the mostly clear air south of the Gulf convective system studied, taken on the southern leg of the box.