

Mission Summary
980820H Aircraft 42RF
TD#2/Bonnie Three-Aircraft Synoptic Flow

<u>Scientific Crew (42RF)</u>	
Lead Scientist	P. Black
Radar	F. Marks
Workstation	P. Leighton
GPS sonde scientist	M. Black
AXBT scientist	J. Cione
Observer	W. Bracken

Mission Briefing:

This flight was part of a 3-plane (two NOAA WP-3D Orion aircraft plus NOAA G-IVSP Gulfstream jet aircraft), synoptic-flow mission to drop GPS sondes in the environment around a developing tropical depression. In addition this mission dropped 6 GPS sonde/AXBT pairs into the inner core of the developing depression. The flight was flown at max altitude 500-450 mb, except for the Figure 4 pattern in the inner core which was flown at 550 mb. The purpose of the flight was to provide improved initial conditions for track models and to discern the inner core structure of a depression as it develops into a tropical storm.

Mission Synopsis

The flight departed St. Croix International (TISX) at 1745 UTC, 20 August and landed at Grantly Adams International in Barbados at 0300 UTC, 21 August. A total of 22 GPS sondes and 7 AXBTs were dropped during this mission, from 20 kft (15 kft in the inner core), 7 of which were coincident. Two GPS sondes were partial failures (no winds or no PTH) and 2 AXBTs failed (no signal). The Figure 4 legs were oriented N-S and E-W. Maximum flight-level wind in the inner core was 40 kt at 850 mb, making it a tropical storm technically. Minimum central pressure was 1004 mb and the eye-like diameter was 40 nm. Storm motion was 285° at 18 kt.

Little convection was observed as we approached the system from the south. Major N-S bands to the west of the center and E-W bands north of the center were observed. [The low level center was marked by a round clear feature within the rain area surrounding the center.](#) The surface center was about 40 nm south of the flight level (16 kft) center, which was imbedded in the convection on the N side of the surface center. A very interesting interlocking spiral was observed in the small scale features of the banding in the N side 'eyewall-like' feature. The flight level center was exactly at the center of the spiral, while 40 kt NE surface winds were estimated below.

Excellent tail Doppler and [lower fuselage radar data](#) were also obtained (3 radar composites were transmitted to NHC in real-time, but no EVTD wind fields were sent). We also collected some good F/AST data along an WNW-ESE line of convection 10 nm E of the center (part of the "rooster tail" along the SAL boundary), containing a strong wind maximum at flight level. We put a dropsonde down on the N side of the band. Cloud microphysics data were also (good ice data in the rainbands E of the center and rain data in the inner core).

The 5 successful AXBT launches reported SSTs between 28.8-29.3C. Estimates of ocean mixed layer depth ranged between 42-56 m. All AXBTs were launched within the Figure 4 pattern within active regions of convection.

Evaluation:

This flight is part of a landmark 3-plane synoptic flow experiment for determining the environmental flow structure of the atmosphere around a developing TC while also determining the oceanic thermal structure beneath the inner core.

Problems:

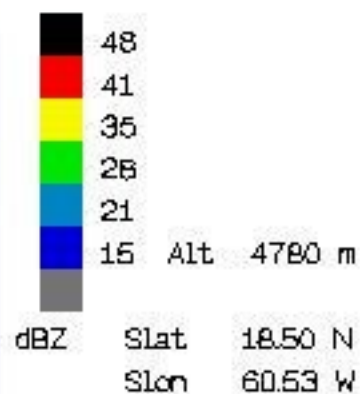
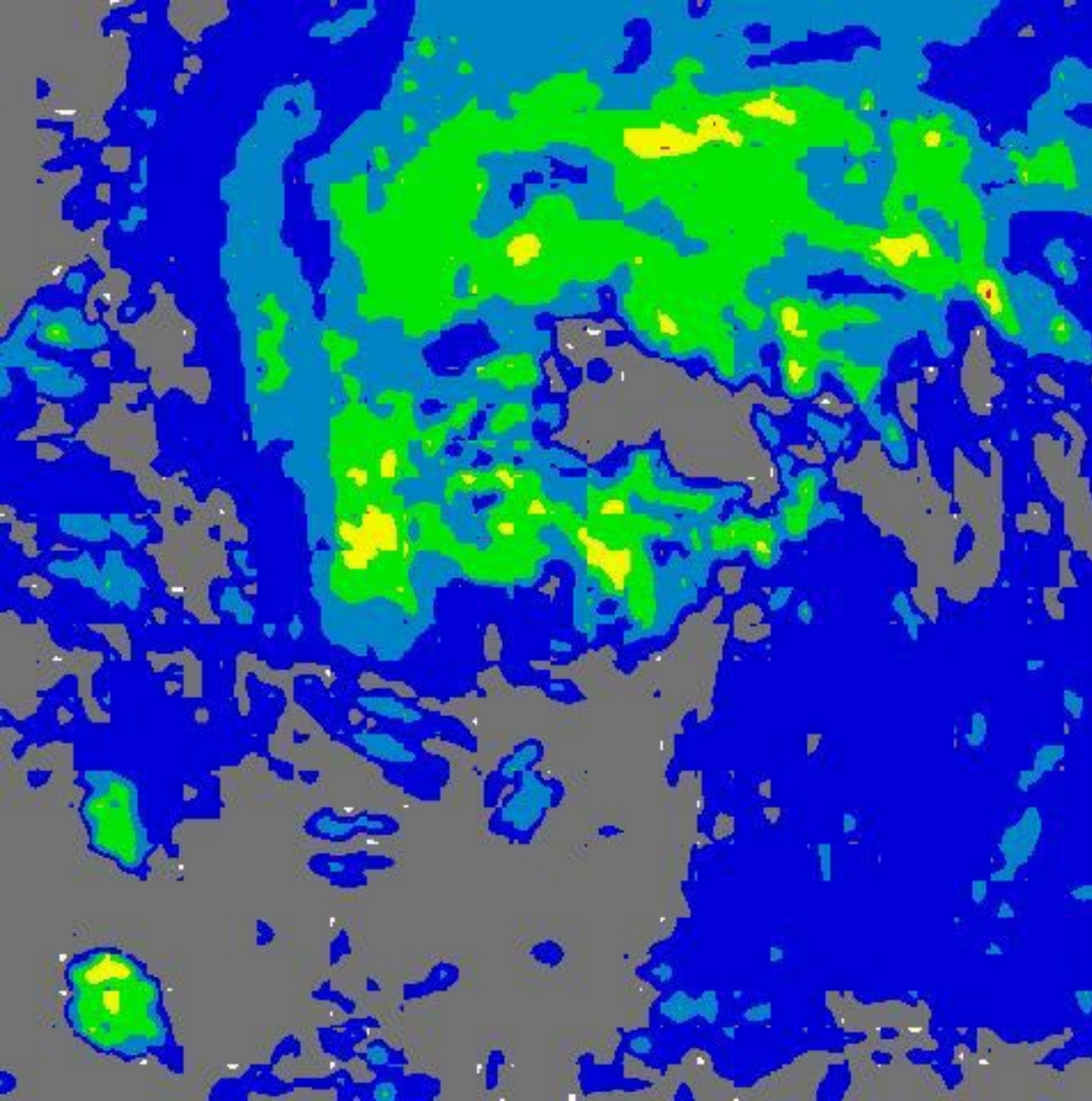
All systems functioned nominally, with the exception of the sonde and AXBT failures noted above. Occasional difficulties were encountered with the operation of the HRD workstation for transmission of GPS sonde data in real time.

Peter G. Black

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TD #2

212407 Z to
213917 Z



360 X 360 km

produced by
HRD / AOC