

Mission Summary

Bonnie

980820I Aircraft 43RF

Scientific Crew (43RF):

Lead Project Scientist:	Sim Aberson
Radar Scientists:	Peter Dodge and John Gamache
Dropwindsonde Scientists:	Peter Dodge and John Gamache
Workstation Scientist:	Peter Dodge

Mission Briefing:

Tropical Storm Bonnie named during the flight based upon Air Force aircraft reconnaissance to the east of the northern Leeward Islands, moving westward at 22 kn toward the northern Virgin Islands. As a result, the Tropical Prediction Center tasked the Gulfstream-IV aircraft for a synoptic surveillance mission to help better determine the future track of Bonnie. Data from the two P3 aircraft were to supplement the data from the G-IV.

A tropical wave, which had previously shown signs of development, is located near 73W. The main deep-layer synoptic features (Fig. 1) are the subtropical ridge north of Bonnie extending westward toward the coast of Florida. Another anti-cyclone cell is located over the southeastern US further to the north, with a break in the ridge between the two. A strong mid- to upper-level trough is located just off the northeastern US coast to the northeast of this break. This trough had already brought unseasonably cold weather to the northeastern US, with frost reported in a number of locations the evening before.

NCEP ensemble perturbations (Fig. 2) show a large and complex area of forecast uncertainty in the north Atlantic to the west and north of Bonnie. One target corresponds to Bonnie itself, another to the deep-layer trough and jet entrance just off the US east coast, and to the subtropical ridge between these two features. The flight tracks (Fig. 3) were drawn to sample these features.

Mission synopsis:

The flight of N43RF was due to sample the westernmost regions of interest through the Bahamas, then northward along the US east coast and back south to recover in Bermuda. The first sonde was delayed due to problems with the workstation/AVAPS communication. The workstation was unable to hear dropwindsonde data started on the AVAPS. Jeff Smith, AVAPS operator, noted that the dropwindsondes could be worked up on the AVAPS computer, much in the manner of the Air Force, and sent out that way, while the workstation was examined. The remainder of the dropwindsondes were dropped, with only one wind failure later in the mission, and this dropwindsonde was replaced. The first three dropwindsondes were worked up on the AVAPS computer, which limited the ability to do quality control, though the data were carefully checked before being sent out.

A call was placed to Joe Griffin in his office at AOML, and he and Peter Dodge discussed the problem. Despite earlier tests showing that the wiring was not a problem, a wire was switched, and the problem was corrected. The remainder of the dropwindsondes were worked up on the workstation by either Peter Dodge or John Gamache.

A second, minor problem on the workstation was the time. The time on the workstation was 3 minutes and 18 seconds faster than that on the AVAPS system, which corresponded to the time on the aircraft system. We were unable to fix this problem without the system password, but this did not seem to cause a problem in working up the dropwindsondes.

The second dropwindsonde was dropped near the axis of the tropical wave preceding Bonnie, just before an area of convection. The heights were lower than reported in surrounding sondes.

The next interesting feature was passage into the dry air behind the surface front off the US east coast. The front was preceded by a large area of convection. Flight level winds shifted from south southeasterly to northeasterly, without ever getting a westward component, suggesting a narrow shear zone. Then the western ridge cell became evident.

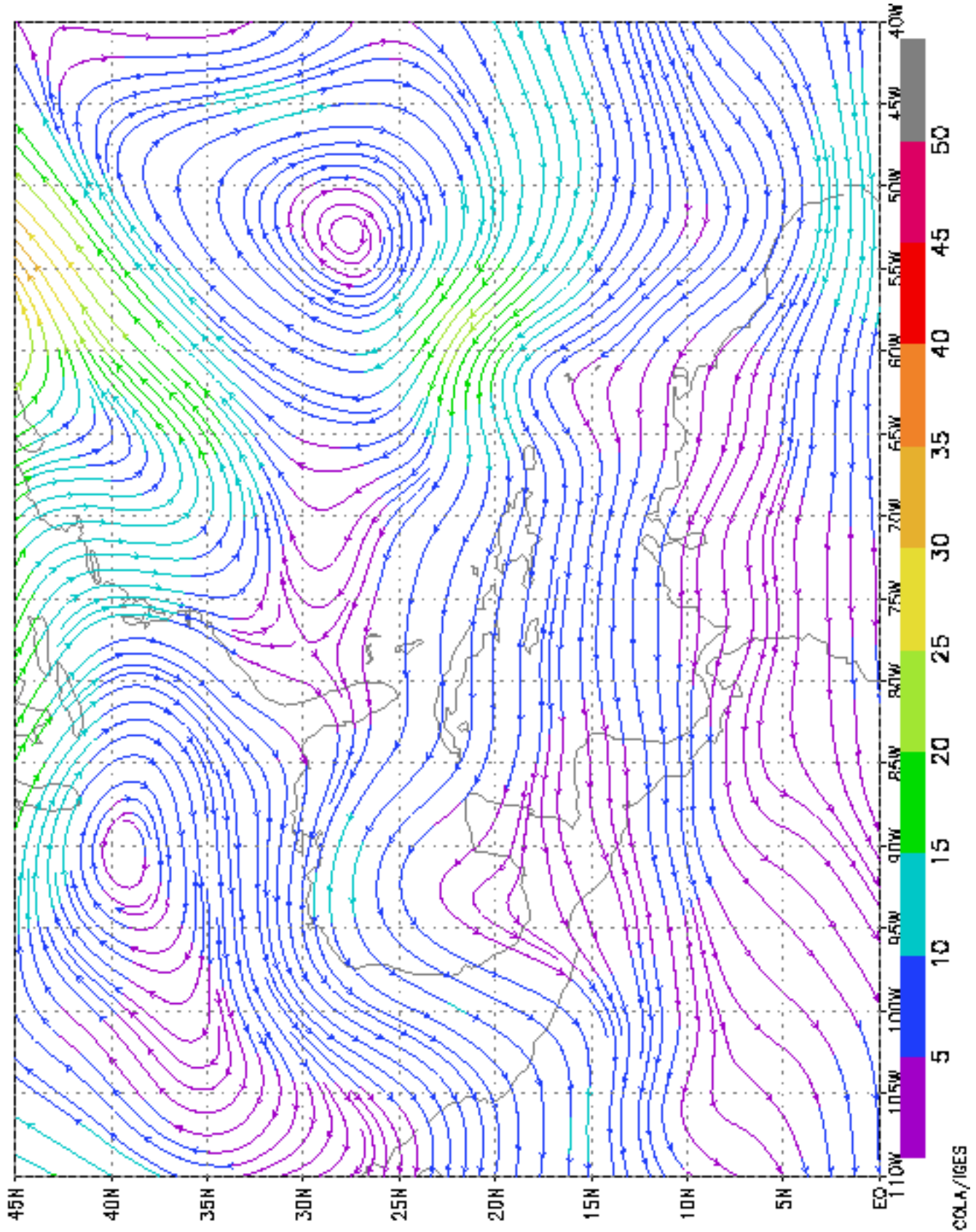
The air behind the front was very dry, with humidities as low as 0.1%. One sonde had a dewpoint at 700 hPa of -66.8, which is believable given the same sampling with both humidity sensors, and near-duplication with nearby dropwindsondes. Just below this, a stratocumulus deck was evident, due to instability from the cold air moving over the warm waters near or over the Gulf Stream. Some of the sondes reported superadiabatic lapse rates just below the inversion representing the dry, subsiding air.

The last few dropwindsondes were to be on the east side of a forecast cutoff low at 400 and 500 hPa. However, we never experienced southeasterly winds, though the data suggest more of a strong shear line than a cutoff. This may represent missing this particular target for the targeting experiment, though if the lows were truly not closed, this will not be a problem. The strong shear zone noted in the northbound legs suggest that this may be the case. Convection returned during the last leg southward into Bermuda, representing the transition back through the strong frontal zone. Strong southwesterly winds suggest a very strong trough that may in fact pick Bonnie up into the westerlies before reaching the Bahamas. The evening's model runs will tell the story.

The flight was beautified by a spectacular sunset in the very dry air above the stratocumulus deck.

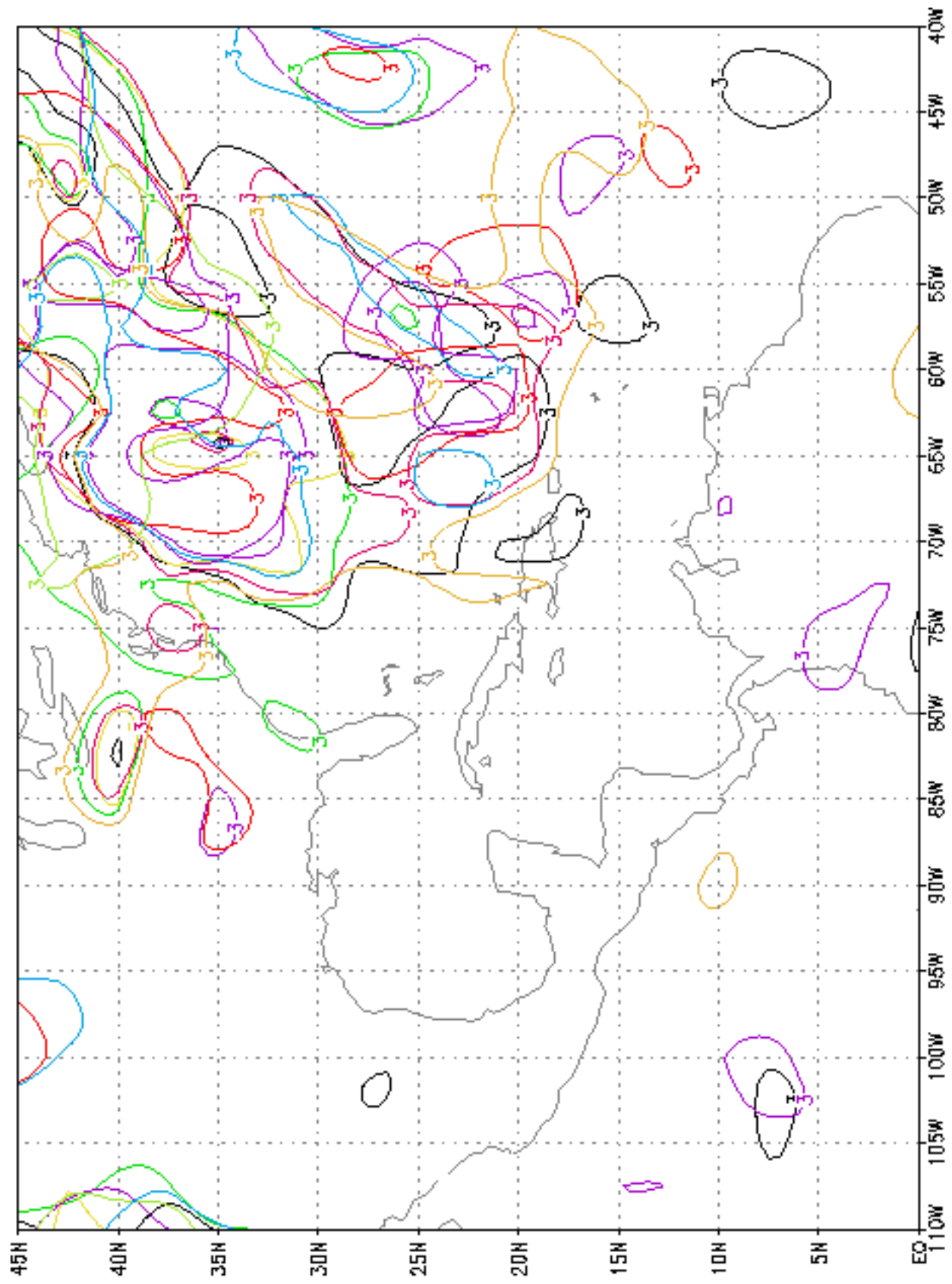
Sim Aberson
9 September 1998

DLM wind 98082100 00h T126



GrADS: COLA/IGES

DLM wind 98082000 24h



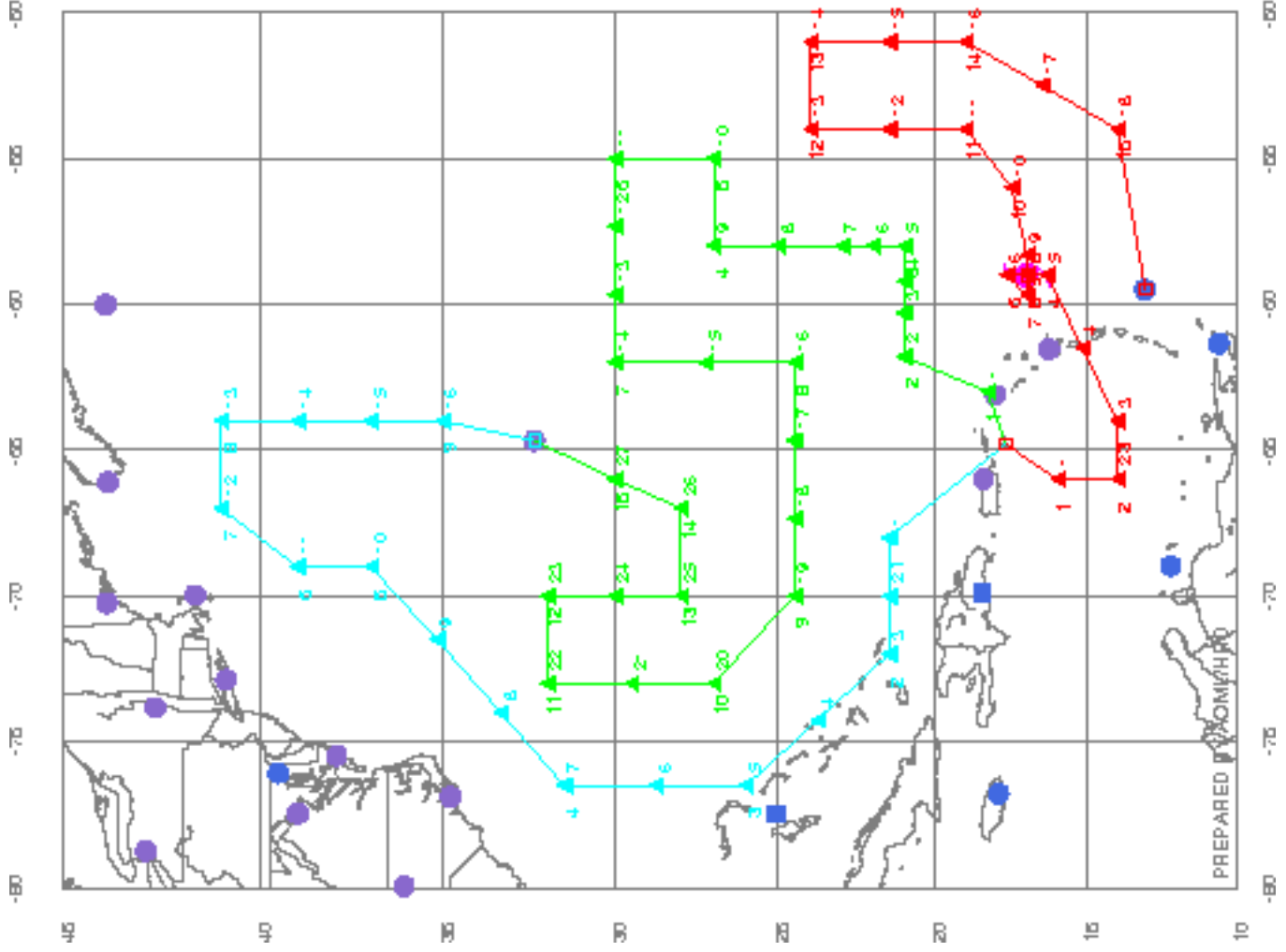
FLIGHT TRACKS BONNIE

- [se0820n.tk](#)
- [se0820p.tk](#)
- [se0820tp.tk](#)

RAWINSONDES 9807

- Regular
- 1ZZ only
- 00Z only
- Infrequent
- Infrequent -00Z
- Infrequent -1ZZ

▲ DROP LOCATIONS



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