

Mission Summary

Bonnie

980823i Aircraft 43RF

Scientific Crew

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

Mission Briefing:

Hurricane Bonnie on the verge of becoming a major hurricane just to the east of the central Bahama Islands, almost stationary at takeoff (Fig. 1). A very weak ridge to the north separates Bonnie from the strong westerly winds in the jet stream, and the forecast models have an uncertainty whether the hurricane will make landfall in the Carolinas or remain offshore. Further, a disturbance approaching the Windward Islands threatens to becoming a tropical depression, presenting a second forecast problem.

Ensemble perturbations (Fig. 2) suggest that the main areas of uncertainty in this forecast coincide with Bonnie itself. This includes the outer edges of the very large wind field, and also includes the strength of the weak ridge to the northeast of the storm center. Another area of uncertainty coincides with the upper cold low over Georgia, which could steer the storm further to the north. Targeting figures from the ensemble transform technique made by Sharan Majumdar using both the UV and the TRACK norms (Figs. 3 and 4) confirm that the uncertainty is mainly local.

A hybrid three-plane synoptic flow/inner-core mission (Fig. 5) was therefore called, with NOAA43 flying a pattern from Bermuda southward and eastward to take some observations for the disturbance, entering Bonnie from the south to do a figure 4 in the core, to recover in Tampa.

Mission synopsis:

Twenty-six dropwindsondes were available, and the flight pattern called for 25 drops. However, two sondes had a large pressure differential, and were not used. A further five sondes did not transmit data to the AVAPS system, and also were not used. No major changes were made to the flight plan, though drops were spaced more sparsely, and four of the six planned eyewall drops were not done.

Otherwise, dropwindsondes were mainly successful. Upon turning northwestward back toward Bonnie, we suddenly encountered northwesterly winds in a thin cloud layer. Ice crystals were evident on the cloud physics monitor, and it seemed that we were in the outflow layer of either Bonnie or some of the outer thunderstorms associated with the storm, about 750 km east of the center. The dropwindsonde that would have confirmed this was a fast faller and never got wind measurements. However, upon leaving the cloud at the same height, winds subsequently quickly changed to an eastward component where they remained, with the thin layer of clouds just above us. The next dropwindsonde had good winds, but they failed about halfway down to the sea surface.

We then descended below the freezing level to reduce p-static in the central soundings. The four soundings 40 nmi out from the center showed remarkable symmetry given the strong asymmetry in the convection. The southern and eastern dropwindsondes had 91 kt mean boundary layer winds, and the northern dropwindsonde had 93 kt. The western dropwindsonde showed slightly weaker winds. The strongest winds were in the northern dropwindsonde, with winds approaching 120 kt at 850 mb.

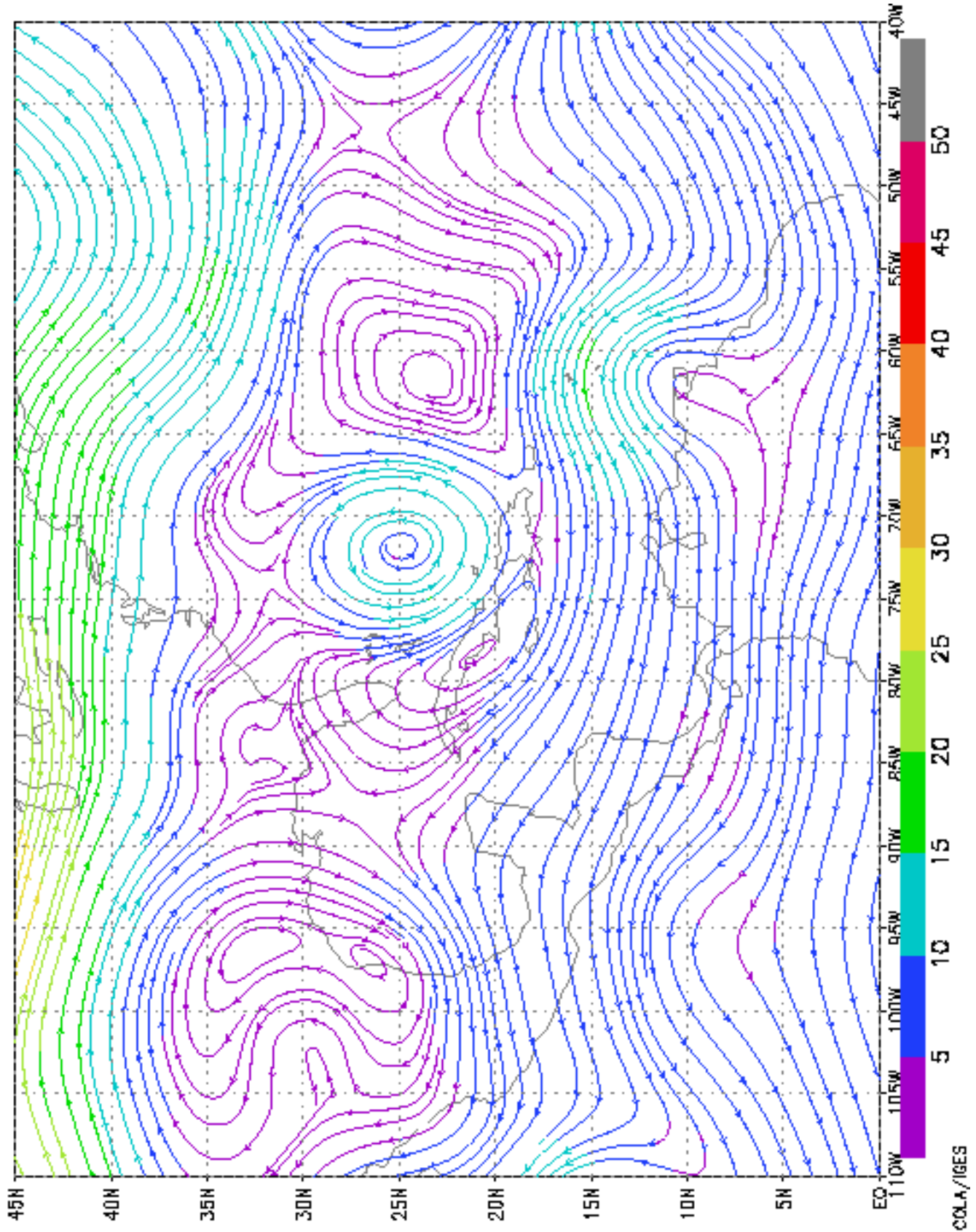
The convection was mainly on the eastern and northern sides with strongest bumps in the eastern approach. Eyewall passage was much smoother. Three other dropwindsondes were deployed, one in the eye (960 hPa), and one each in the inner edge of the eastern and northern eyewalls. The dropwindsonde in the eastern eyewall failed. The northern eyewall was difficult to find, since it appeared that an eyewall cycle was occurring. A protuberance could be seen in the reflectivity extending southward into the eye. When we flew into this feature, winds were westerly, though they may have been northerly

further down. The northern eyewall dropwindsonde was deployed further to the north along this feature, and showed winds barely of hurricane force, perhaps a collapsing eyewall.

All dropwindsondes were sent through ASDL. A radar composite was also sent through ASDL. The EVTDS did not look good enough to send.

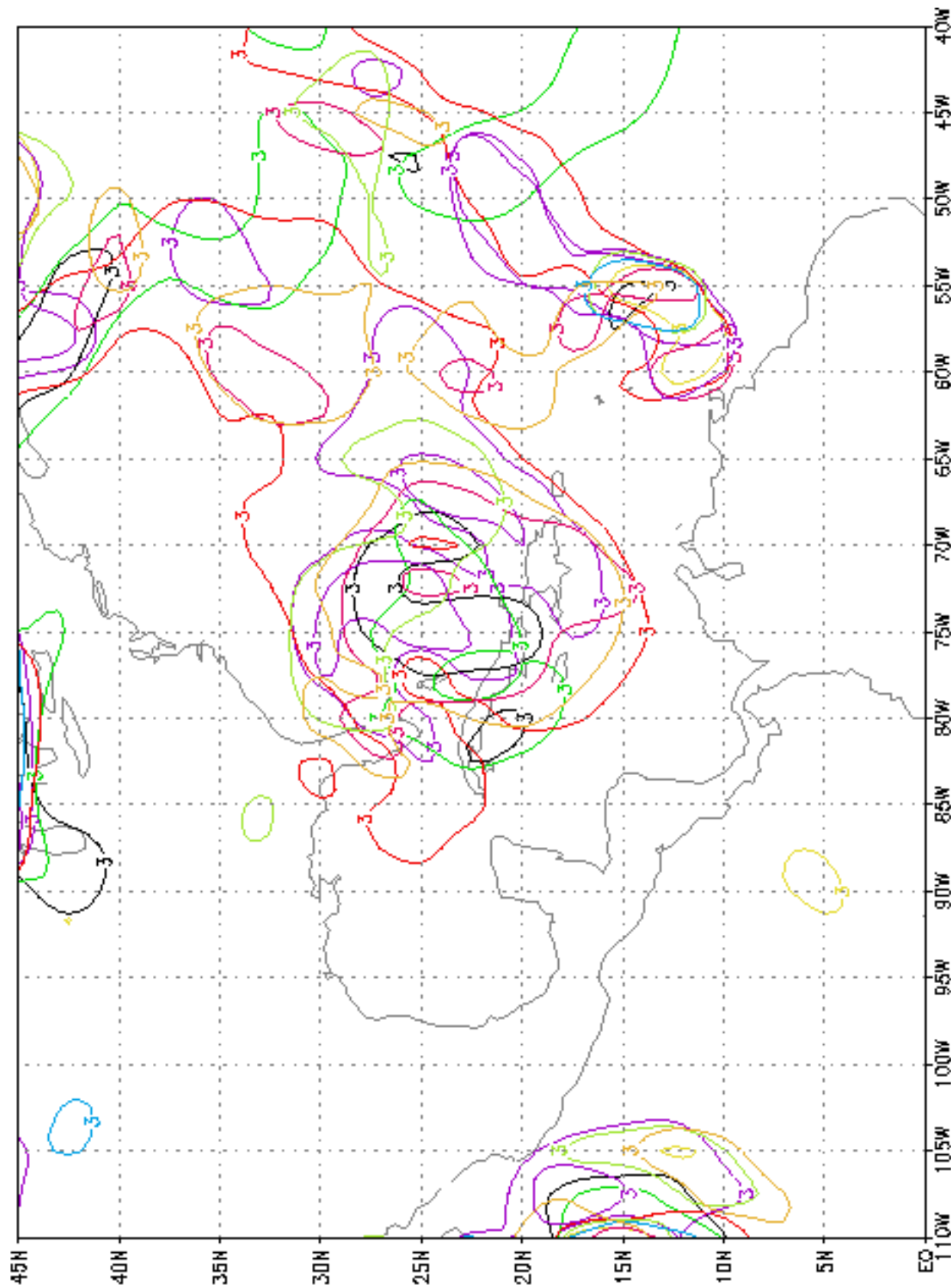
Sim Aberson
9 September 1998

DLM wind 98082400 00h T126

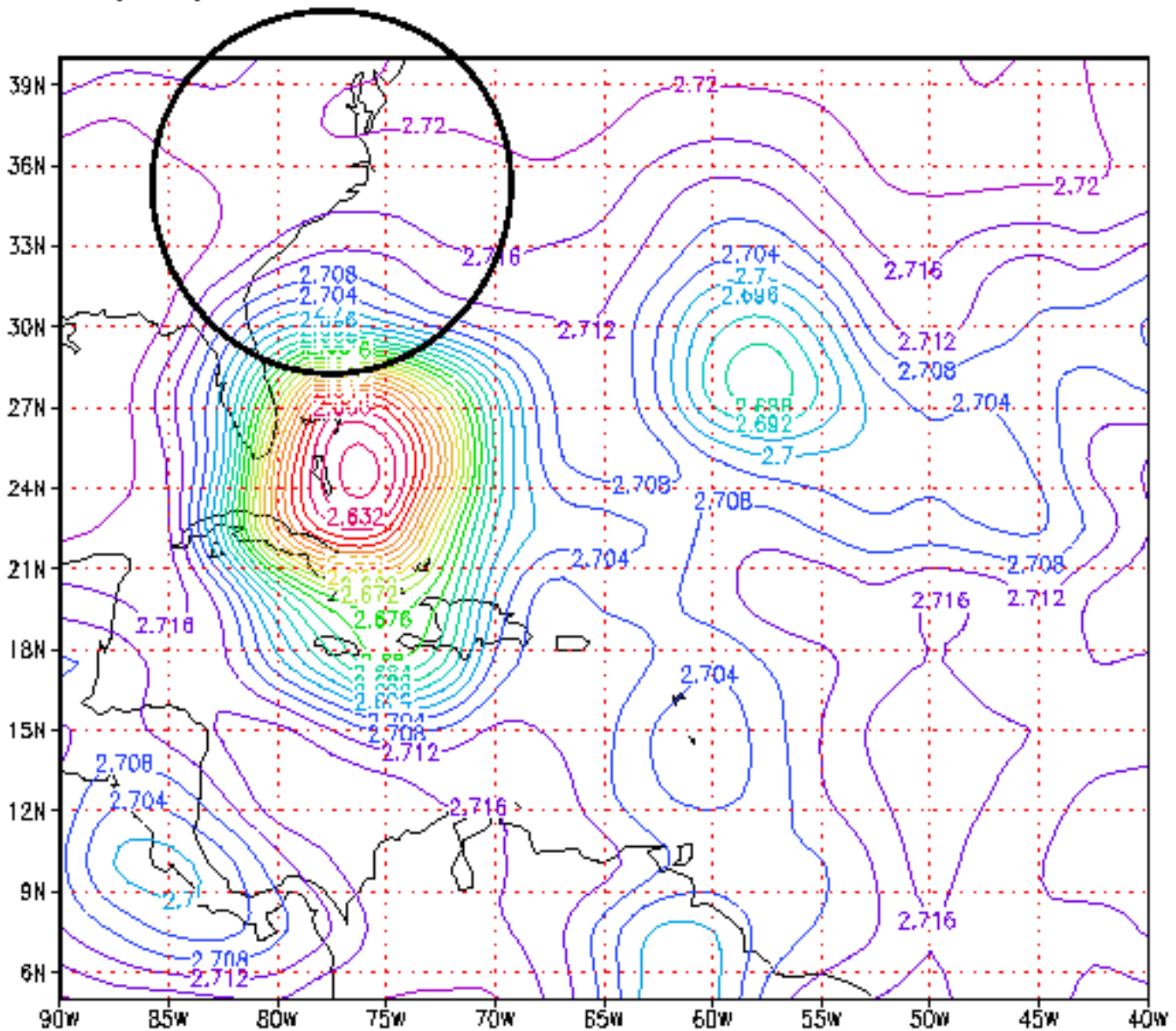


GrADS: COLA/IGES

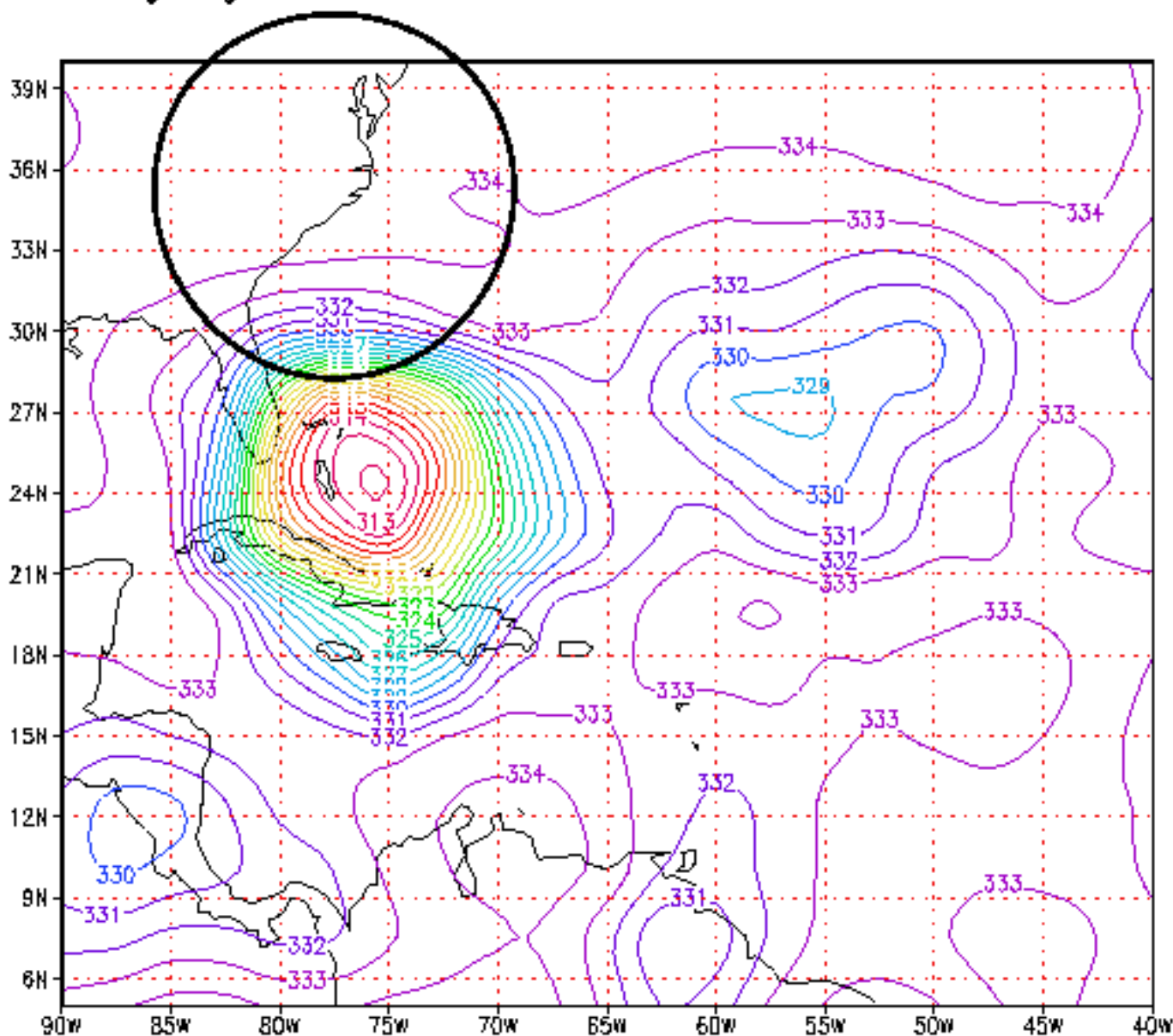
DLM wind 98082300 24h



Hurricane Bonnie. Prediction error variance as a function of target region location based on the 98082300 NCEP ensemble of 14 members. Targeting time +24h. Verification time +72h. ALPHA. TRACK Norm.



Hurricane Bonnie. Prediction error variance as a function of target region location based on the 98082300 NCEP ensemble of 14 members. Targeting time +24h. Verification time +72h. ALPHA. UV Norm.



FLIGHT TRACKS
BONNIE

- se08az3n.tk
- se08az3p.tk
- se08az3tp.tk

RAWINSONDES 9807

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

▲ DROP LOCATIONS

