

# **HFIP Data Assimilation Team**

## **FY09 plans**

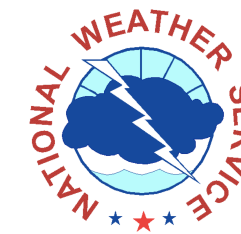
Implement upgraded global Gridpoint Statistical Interpolation (GSI) with Infrared Atmospheric Sounding Interferometer data and improved background error variances

Develop GSI for the global model and HWRF using pseudo observations and dropwindsonde data where available using Situation-dependent Background Errors; determine configuration of multi-scale GSI assimilation

Add airborne Doppler radar data to experimental GSI

Decide on an Ensemble-based Data Assimilation algorithm, import onto NOAA Research & Development computer and develop using HWRF operational system. Interface forward operators with those from GSI.





# Hurricane Forecast System: 2009 Season

Operational Model	Demonstration System
<ul style="list-style-type: none"><li>•<b>Global model:</b> GFS T382 (35km), 64 layers</li><li>•<b>Global ensemble:</b> GFS T126 (100km), 28 layers, 20 members (40 with NAEFS)</li><li>•<b>Regional model:</b> HWRF 9km, 42 levels, coupled ocean</li><li>•<b>Consensus configurations for track to include:</b> GFSI, EGRI (U.K. MET), NGPI, GHMI, and HWFI; <b>for intensity to include:</b> DSHP, LGEM, GHMI, HWFI, GFNI</li><li>•<b>Data assimilation, Global:</b> GSI</li><li>•<b>Data assimilation regional:</b> GSI</li></ul>	<ul style="list-style-type: none"><li>•<b>Global Model:</b> FIM 10km, 64 layers</li><li>•<b>Global ensemble:</b> FIM 30km, 64 layers, 20+ members</li><li>•<b>Regional Model:</b> ARW 1km, 34 layers, 1-D ocean</li><li>•<b>Regional Ensemble:</b> 5-10km, up to 43 layers, multi-member ensemble (ARW, HWRF, COAMPS-TC, GFDL, MM5), 5 members</li><li>•<b>Data assimilation global:</b> EnKF</li><li>•<b>Data assimilation regional:</b> EnKF</li></ul>



# Hurricane Inner-core Data Assimilation Test Case

15 'groups': AOML/HRD, COAPS-FSU, EMC, ESRL/GSD (2), ESRL/PSD (2), Oklahoma (2), PSU, SUNY-Albany, Utah (2)

Case: Hurricane Rita  
0000 UTC  
20 September 2005  
(and onward)

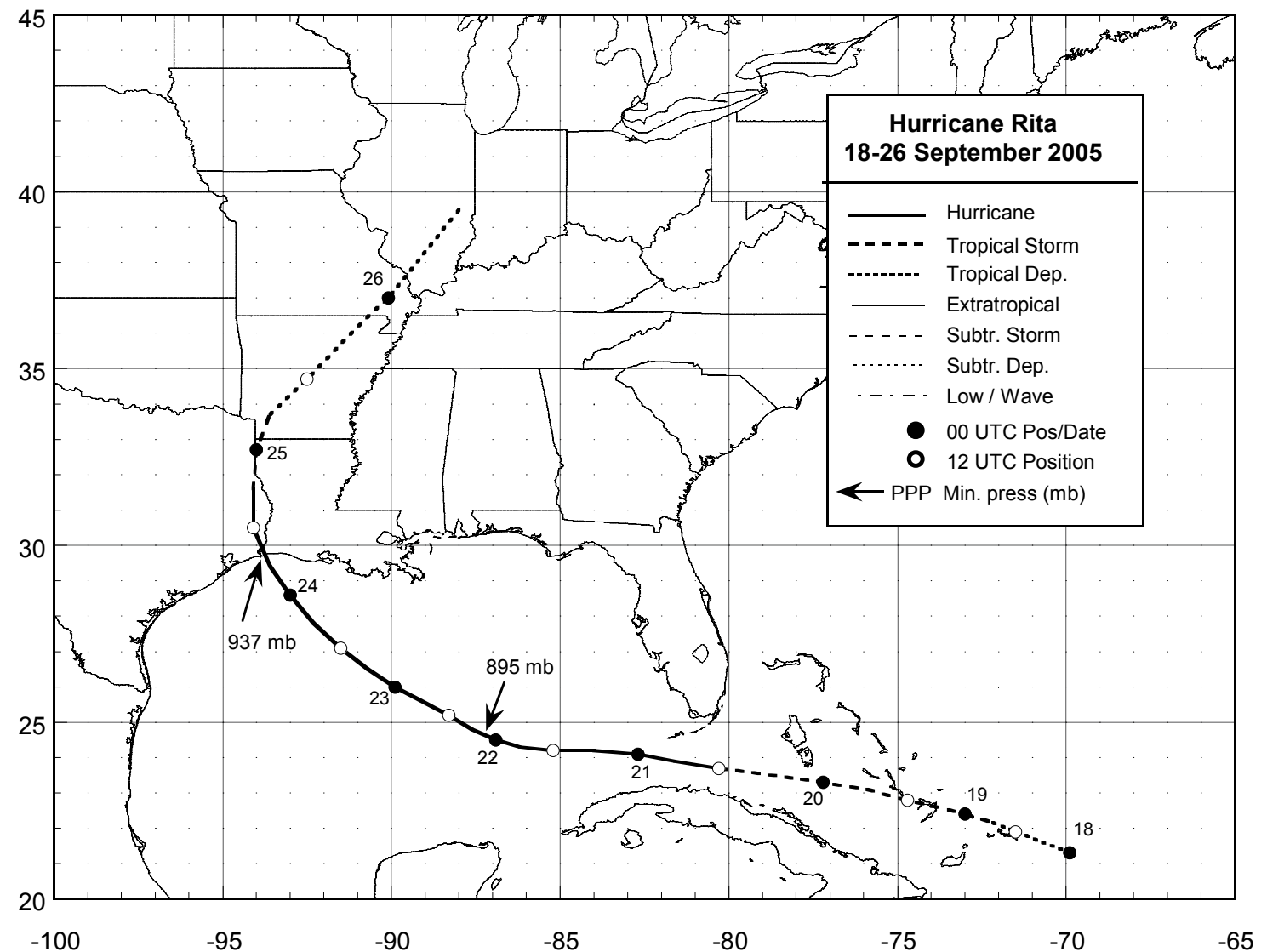


Figure 1. Best track positions for Hurricane Rita, 18-26 September 2005.

# Aircraft data available

2005091800 HFIP case

2005091900 HFIP case

*19 September around 1200 UTC (NOAA G-IV)*

**19 September around 1800 UTC (one NOAA P-3, G-IV)**

2005092000 HFIP case

*20 September around 1200 UTC (NOAA G-IV)*

**20 September around 1800 UTC (one NOAA P-3)**

2005092100 HFIP case

**21 September around 1800 UTC (one NOAA P-3, G-IV, NRL P-3)**

2005092200 HFIP case

*22 September around 1200 UTC (NOAA G-IV)*

**22 September around 1800 UTC (both NOAA P-3s, G-IV, NRL P-3)**

2005092300 HFIP case

*23 September around 1200 UTC (NOAA G-IV)*

**23 September around 2100 UTC (both NOAA P-3s, G-IV, NRL P-3)**

2005092400 HFIP case

In addition, nearly constant Air Force C-130 data from 18th

# Data

ESRL is beginning to populate the data at  
<http://laps.noaa.gov/aoml/aoml.html>

Other conventional data available from NOMADS

HFIP GFS rerun using recent version of model (GSI), and GFDL initial conditions

Aircraft data:

1. Airborne Doppler radar data - quality-controlled radial wind data  
[http://www.aoml.noaa.gov/hrd/Storm\\_pages/rita2005/radar.html](http://www.aoml.noaa.gov/hrd/Storm_pages/rita2005/radar.html)  
[http://www.aoml.noaa.gov/hrd/Storm\\_pages/Doppler.html](http://www.aoml.noaa.gov/hrd/Storm_pages/Doppler.html)
2. Flight-level (ten second) data  
[http://www.aoml.noaa.gov/hrd/Storm\\_pages/rita2005/mission.html](http://www.aoml.noaa.gov/hrd/Storm_pages/rita2005/mission.html)
3. Dropwindsonde data  
[http://www.aoml.noaa.gov/hrd/Storm\\_pages/rita2005/sonde.html](http://www.aoml.noaa.gov/hrd/Storm_pages/rita2005/sonde.html)
4. SFMR surface wind speed data  
[http://www.aoml.noaa.gov/hrd/Storm\\_pages/rita2005/sfmr.html](http://www.aoml.noaa.gov/hrd/Storm_pages/rita2005/sfmr.html)

# Considerations

Users must make sure they understand limitations and characteristics of aircraft datasets, especially Doppler radar and dropwindsondes.

1. Airborne Doppler radar data - quality-controlled radial wind data  
[http://www.aoml.noaa.gov/hrd/Storm\\_pages/Doppler.html](http://www.aoml.noaa.gov/hrd/Storm_pages/Doppler.html)
2. Dropwindsonde data  
[http://www.aoml.noaa.gov/hrd/Storm\\_pages/sondeformat.html](http://www.aoml.noaa.gov/hrd/Storm_pages/sondeformat.html)

HRD is working on code to account for dropwindsonde drift (akin to code for rawinsonde drift), and will make it available once it is tested.

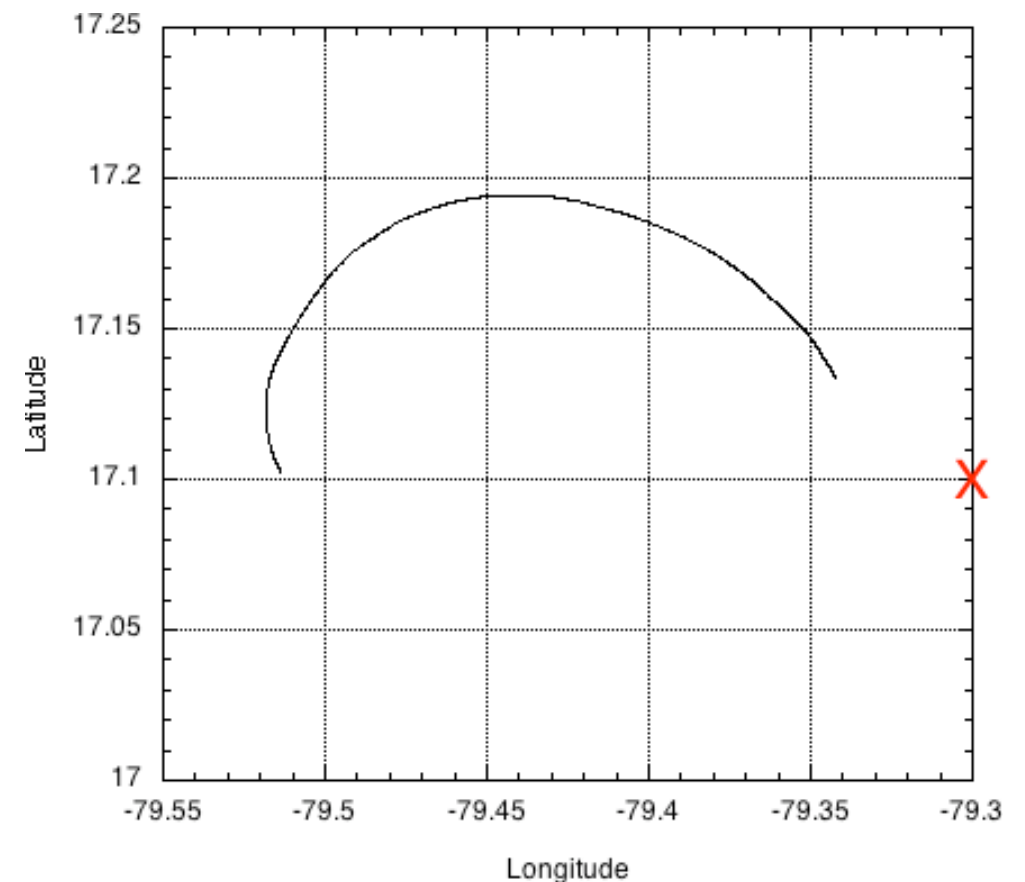


Figure 5. Trajectory of a dropwindsonde released in the eyewall of Hurricane Emily 16 July 2005. The 'X' marks the location provided on the TEMPDROP message and represents the only location available for assimilation of the dropwindsonde data.