Weather In-Situ Deployment Optimization Method

WISDOM 2008 Test

WISDOM System Description and Initial Test Results

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WISDOM (**W**eather **I**n- **S**itu **D**eployment **O**ptimization **M**ethod): Deploying horizontal balloon sondes in an optimum manner around weather disturbances.

Objective: Improve hurricane track prediction in the 3 to 6 day period prior to landfall.

Students launching a WISDOM balloon/payload during the October 6, 2008 training session in Miami.

ETC's GPS RF Tag:

- Deployed with the Tetroon balloons to collect location, wind data (.3 watts)

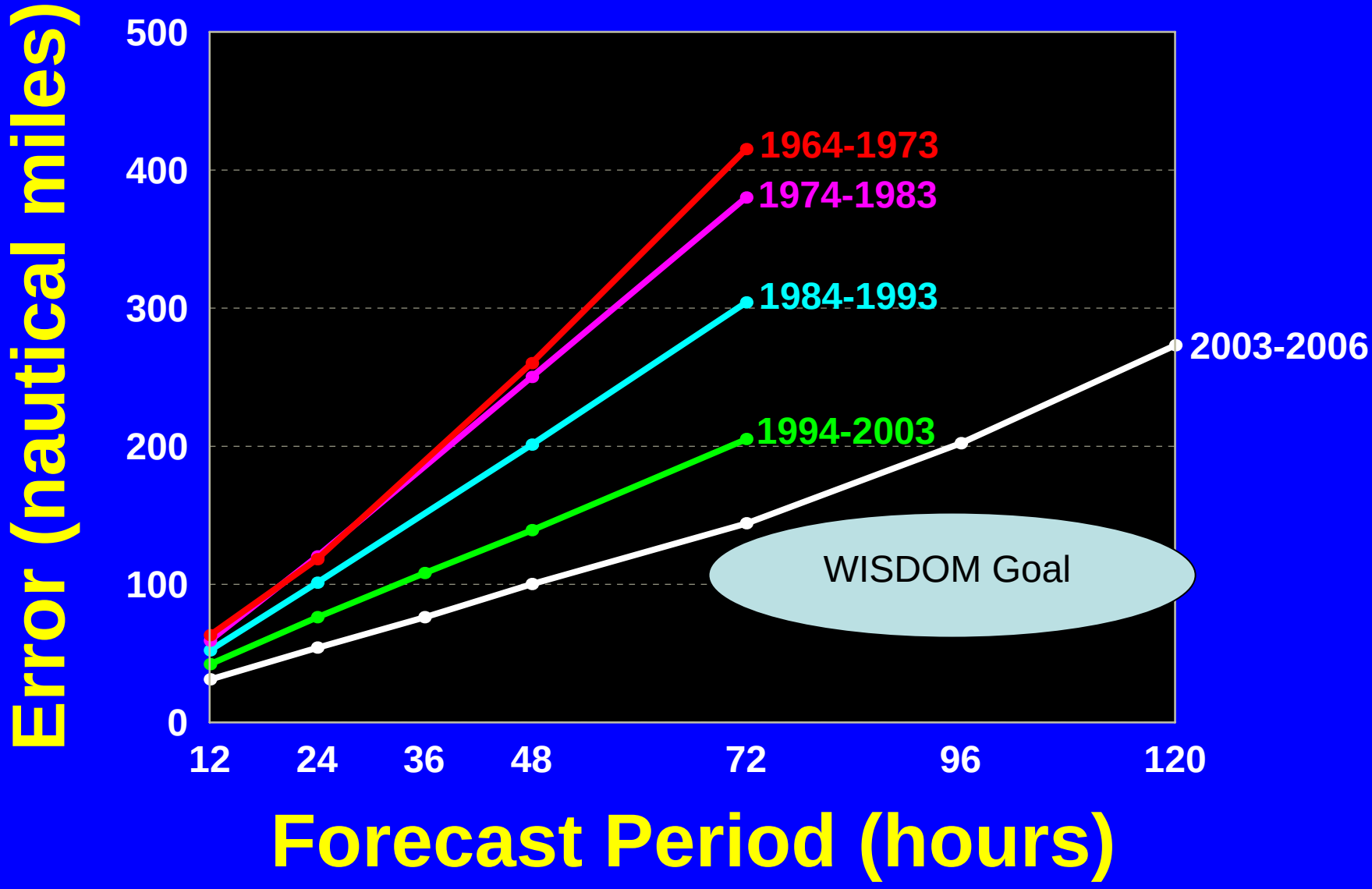
- Data transmitted real time via ETC's ground station to NOAA/ESRL.

WISDOM Partners:

- NOAA (Office of Oceanic and Atmospheric Research)
- DHS S&T: 3/26/08 $1 Million support for 08 Test
- DoD
- NASA
- Engenium Technologies Corporation
- Near Space Corporation
- Raytheon
- University of Miami
- Mississippi State University.
- Caribbean Institute for Meteorology and Hydrography

- The problem: Data poor region in the far Atlantic.
- Hurricane Tracks: Slow but steady improvement.
- **WISDOM**: Discretionary flood of data using balloons.
- Example: Hurricane Rita.
- NOAA Schedule: Develop 2008 – 2014.
- Deploy in 2009 into high-impact hurricane with several hundred balloons.

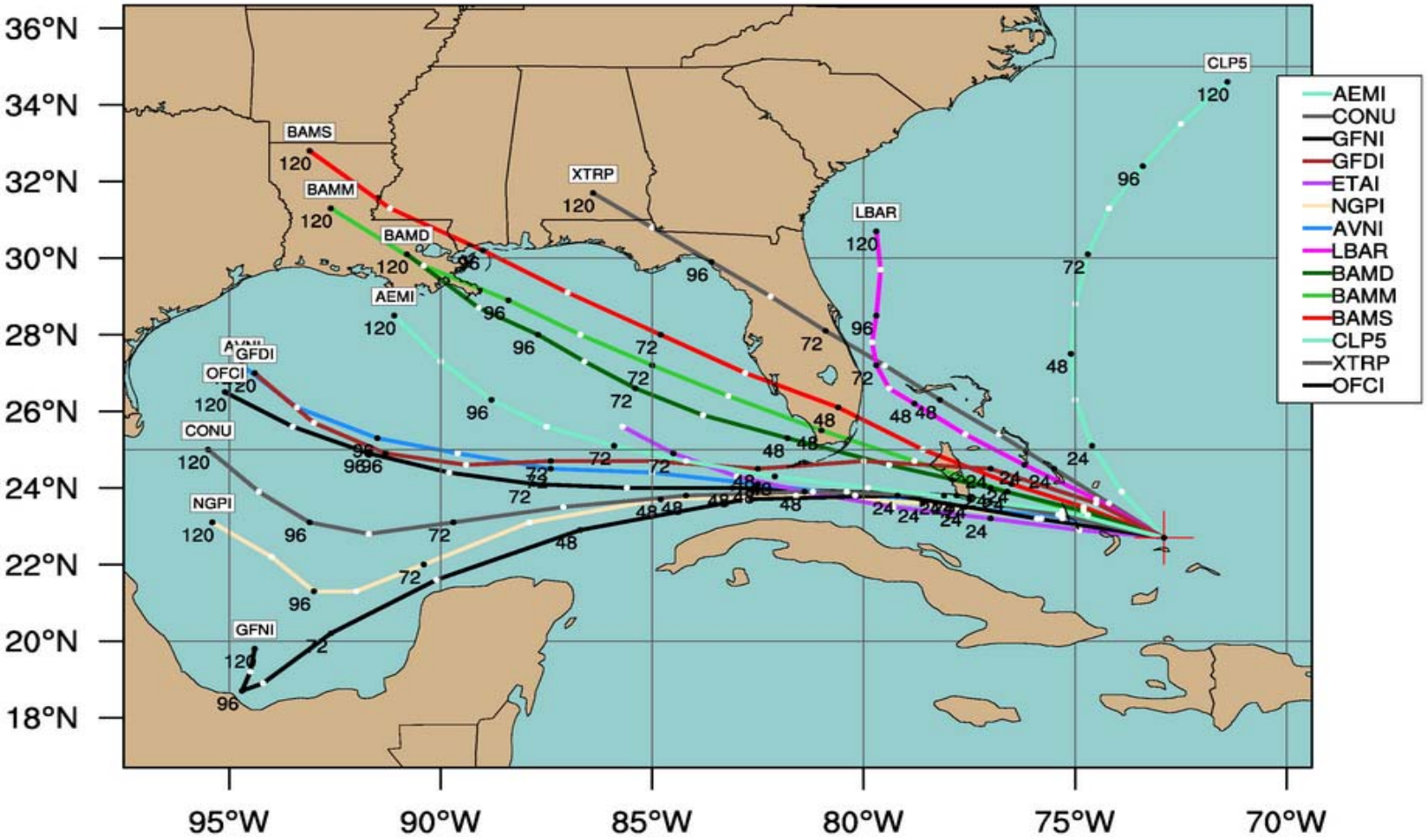
NATIONAL HURRICANE CENTER ATLANTIC TRACK FORECAST ERRORS

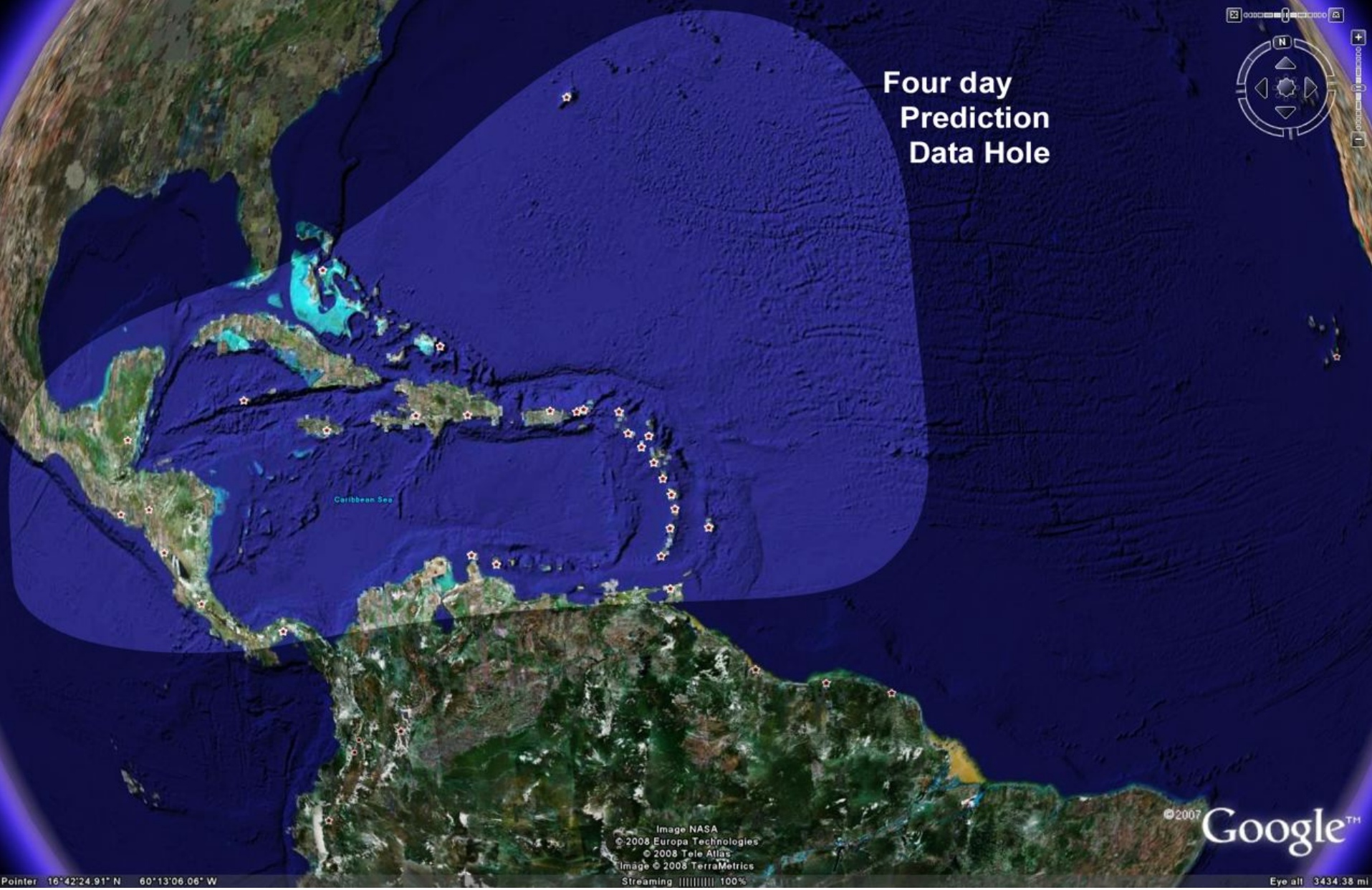


17 May 2007

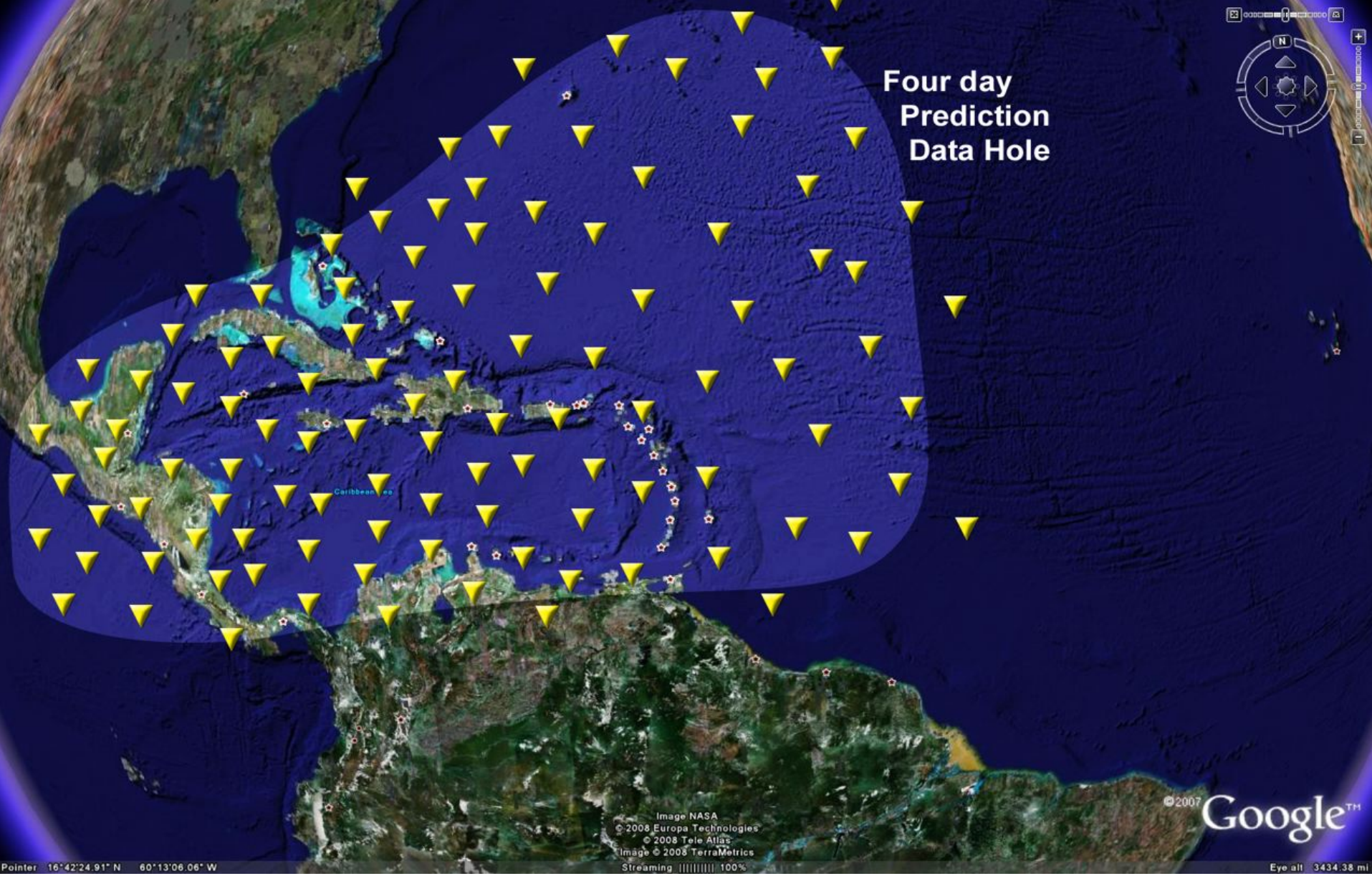
AL18

Early-cycle track guidance valid 0000 UTC, 19 September 2005





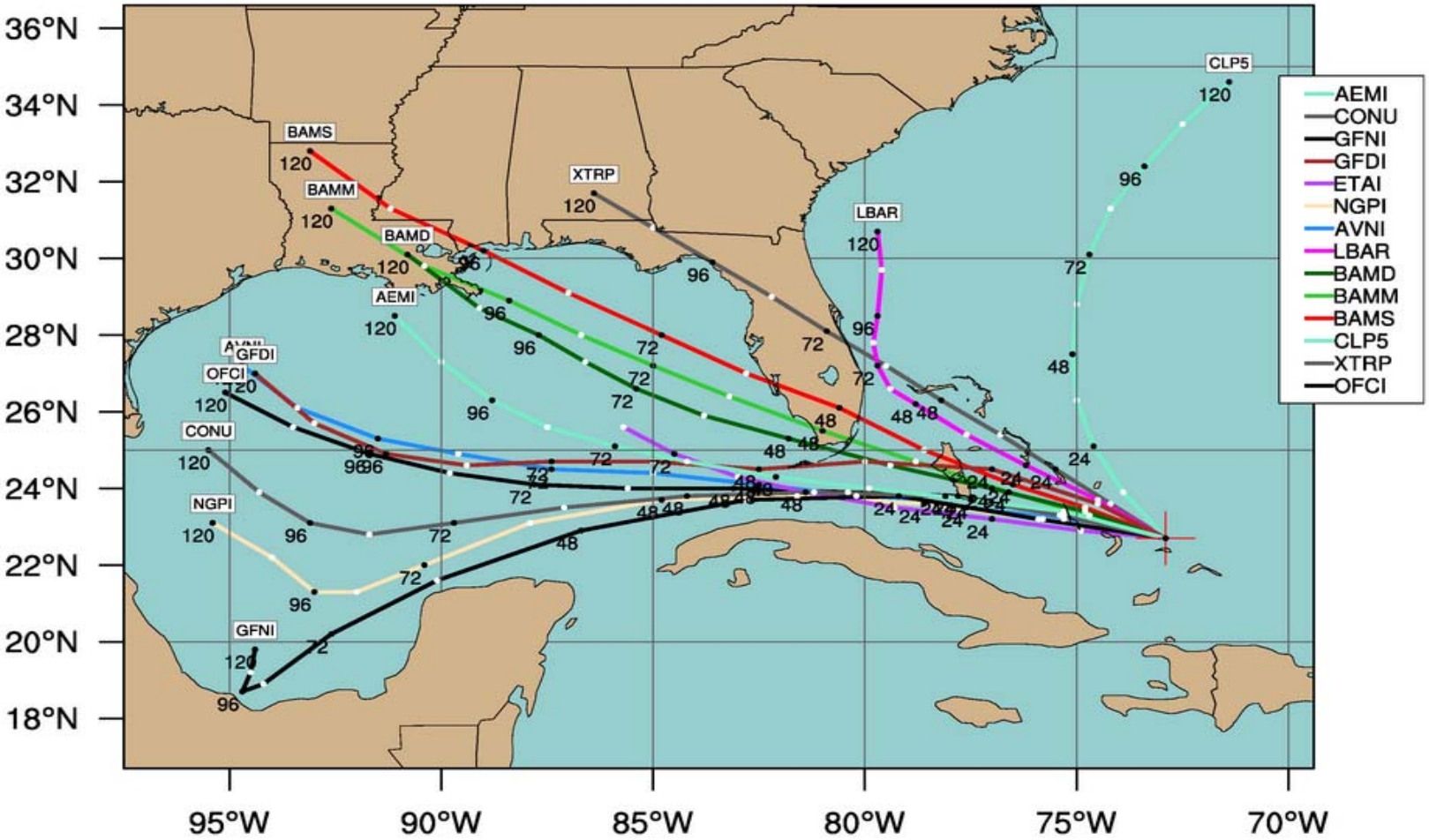
The hurricane prediction can be improved by getting enough observations in the data void.



Flood the data poor region with enough balloons to improve forecast by one day.

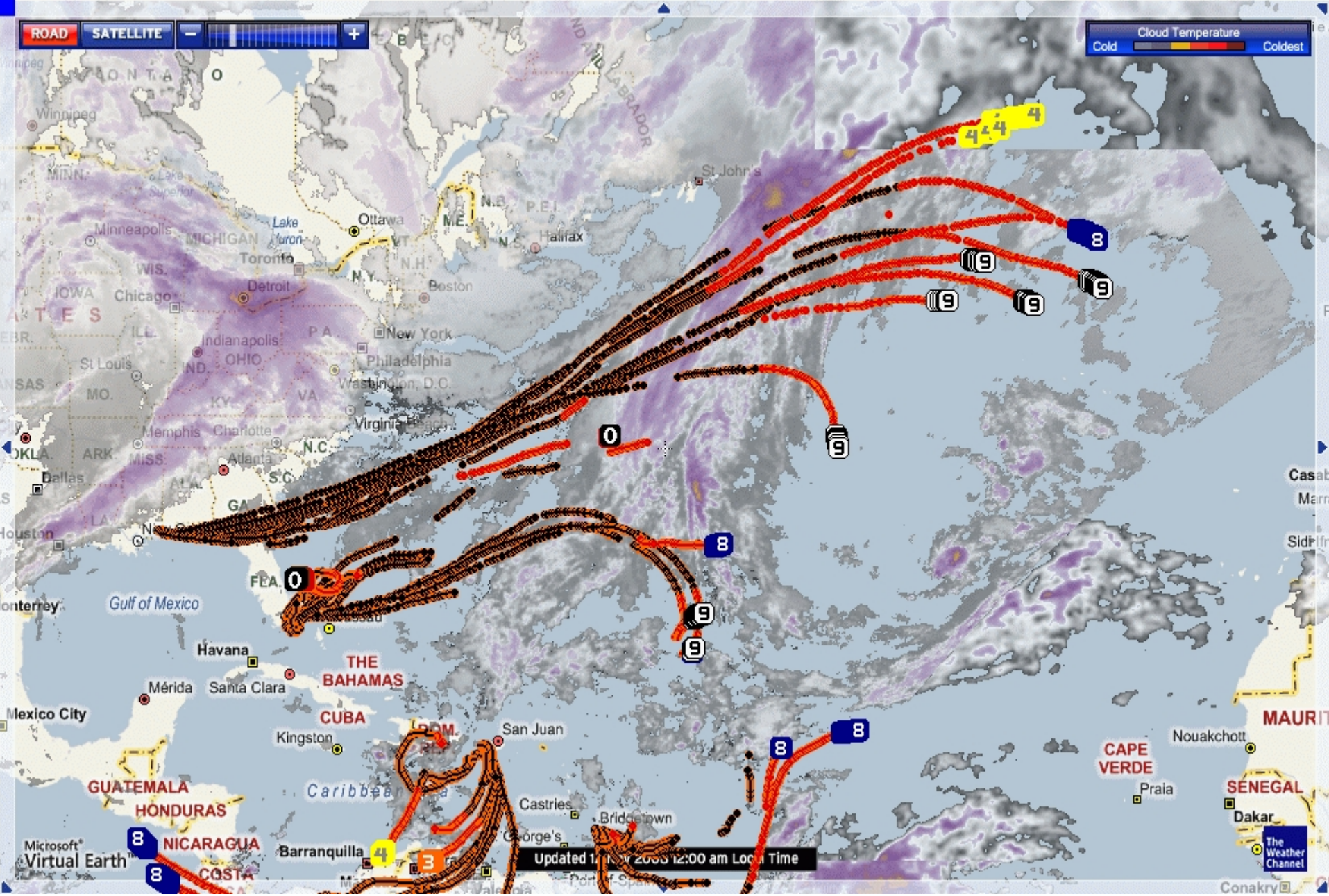
AL18

Early-cycle track guidance valid 0000 UTC, 19 September 2005



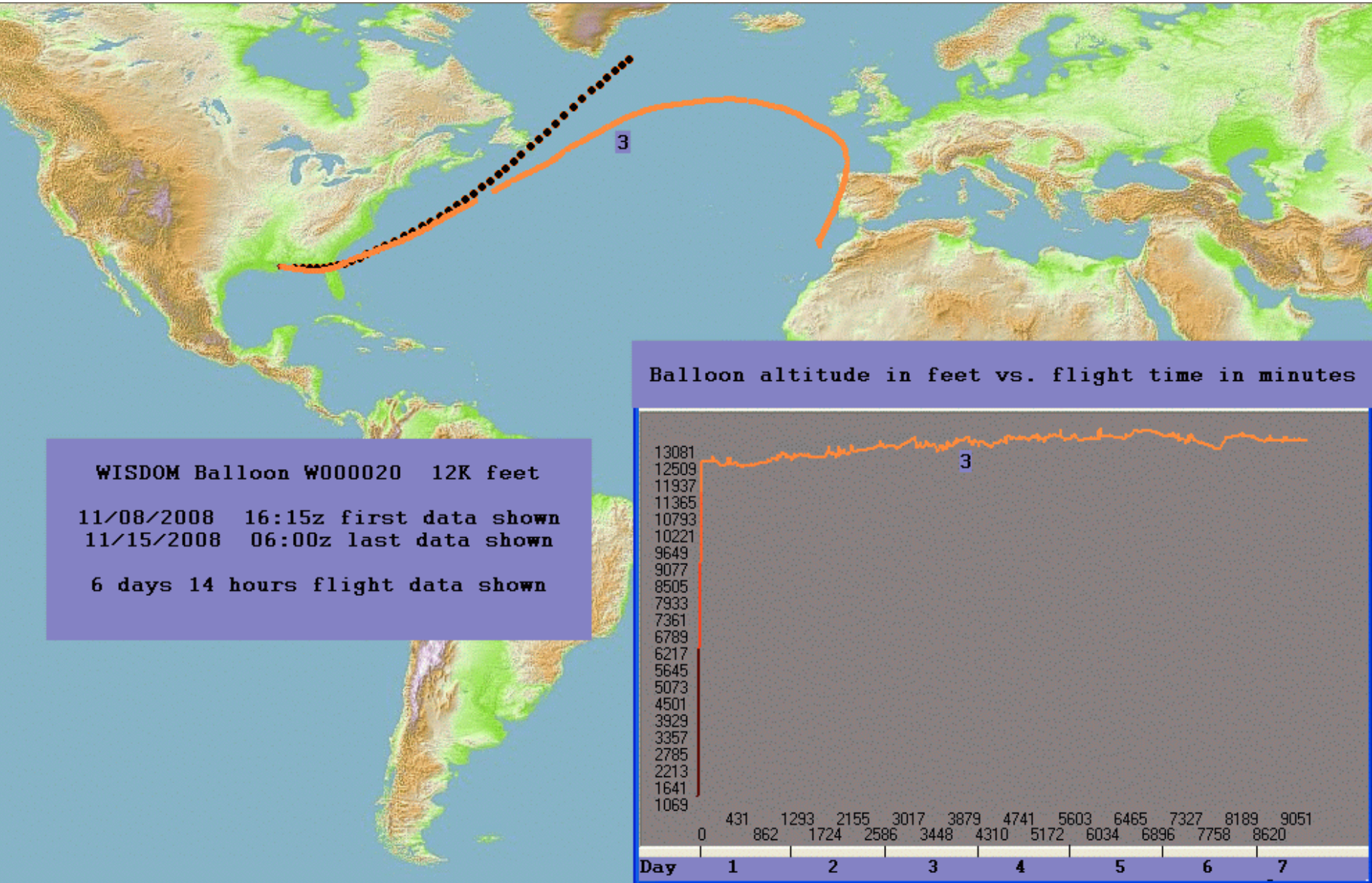
Tests conducted 2008:

- 10 Prototypes launched from Hawaii in August
- First Field Test w/ 19 balloons in October
- Hurricane Paloma Launch - 57 balloons in November
- Successful data transmission to ESRL via DoD Satellite

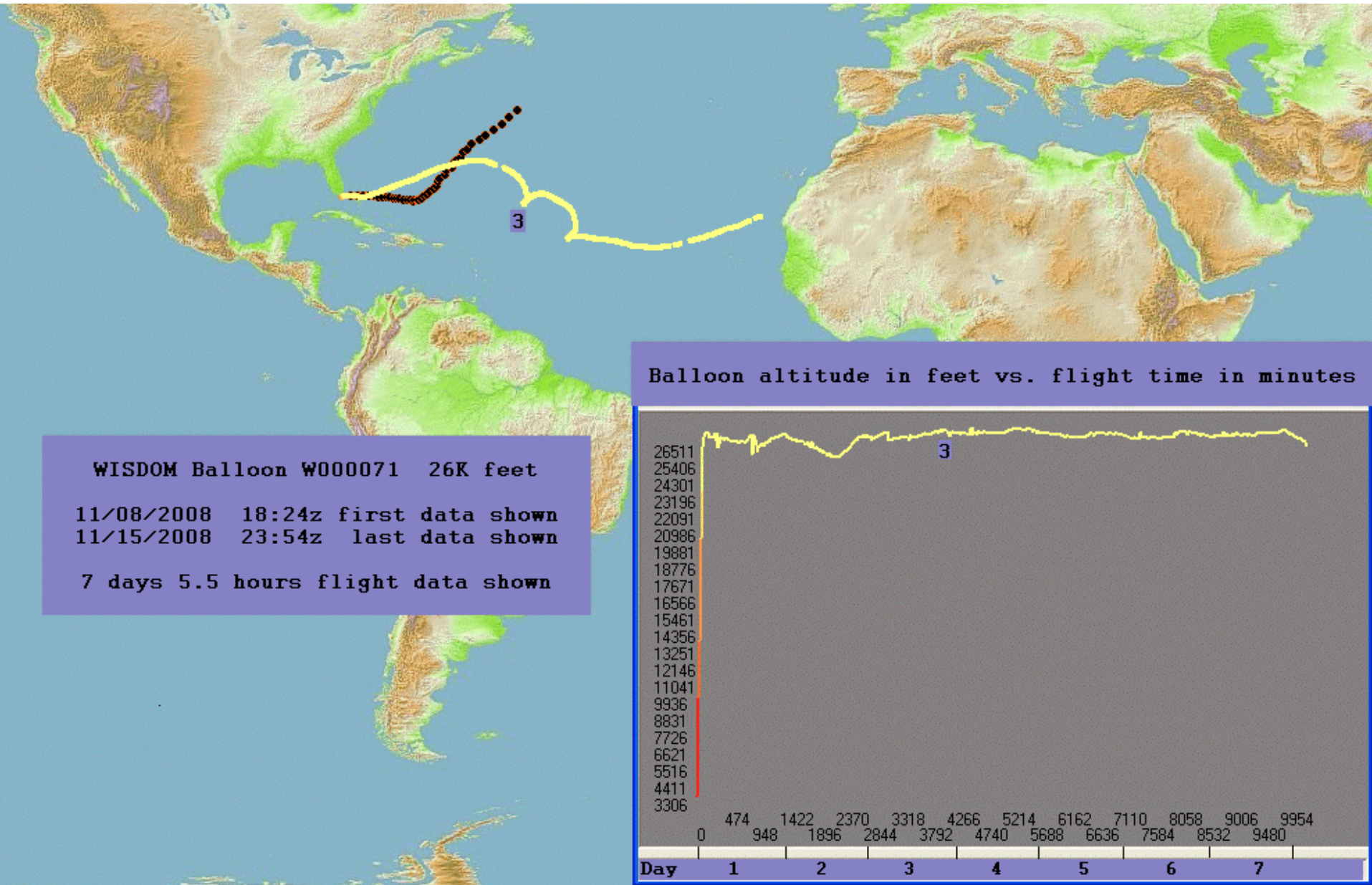


WISDOM balloon trajectories deployed around Hurricane Paloma, as located on Nov 12.

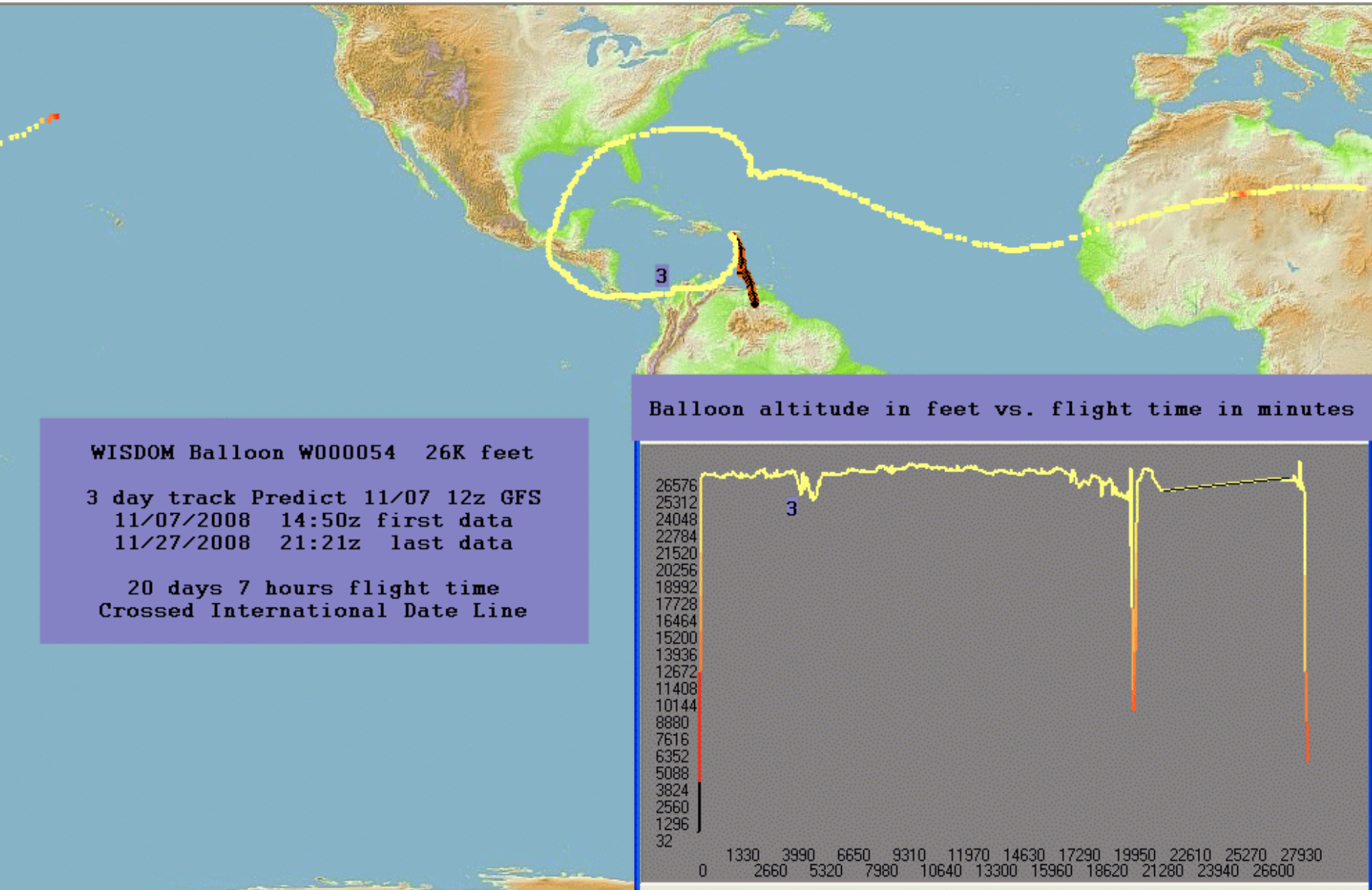
WISDOM Hurricane Paloma Launch November 7-9, 2008



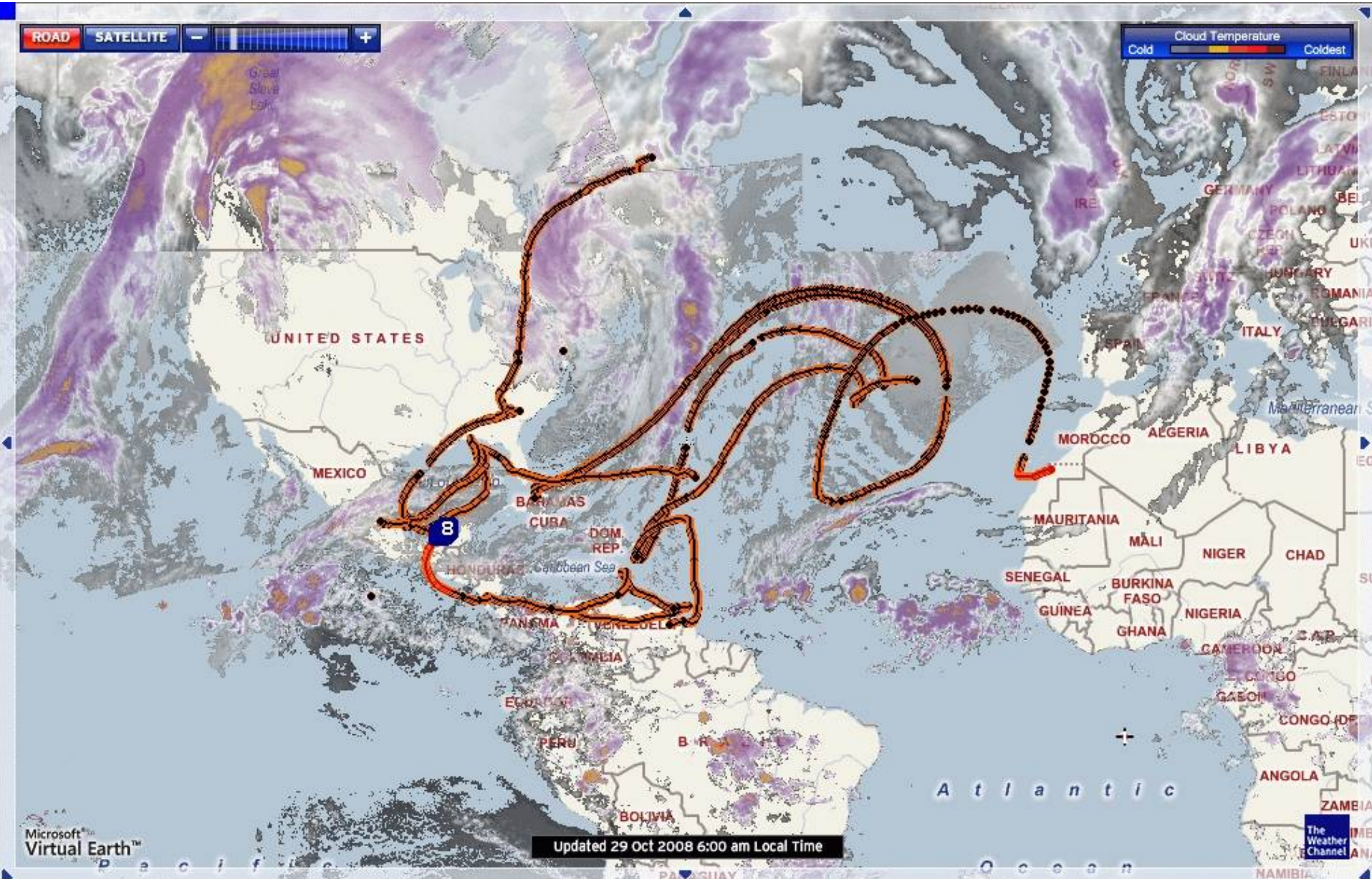
WISDOM Hurricane Paloma Launch November 7-9, 2008



WISDOM Hurricane Paloma Launch November 7-9, 2008



WISDOM First Test Deployment Trajectories as of 10/29/08
Balloons were launched on 10/18/08



http://wisdom.noaa.gov

Resource Links

Operations status

Main WISDOM site provides updated project operation status and access to resources.

WISDOM 2008 Conclusions

- WISDOM balloons work well, and could deliver large amounts of data in critical storm-steering areas.

- The balloons will require cut-down switch to terminate flights at our discretion.

- Balloon costs can be reduced from several thousand $ per balloon (includes one time engineering costs) to several hundred $.

- If the program can find funds in 2009, we would:
  - (1) Simulate balloon releases to determine how many balloons would deliver significant (12 to 24 hour) hurricane track improvements 3 to 6 days before landfall.

  - (2) Do a proof of concept experiment in major hurricanes to see what improvements would be actually realized (assimilated into GFS and FIM).