Hurricane Science and Support for Deepwater Horizon

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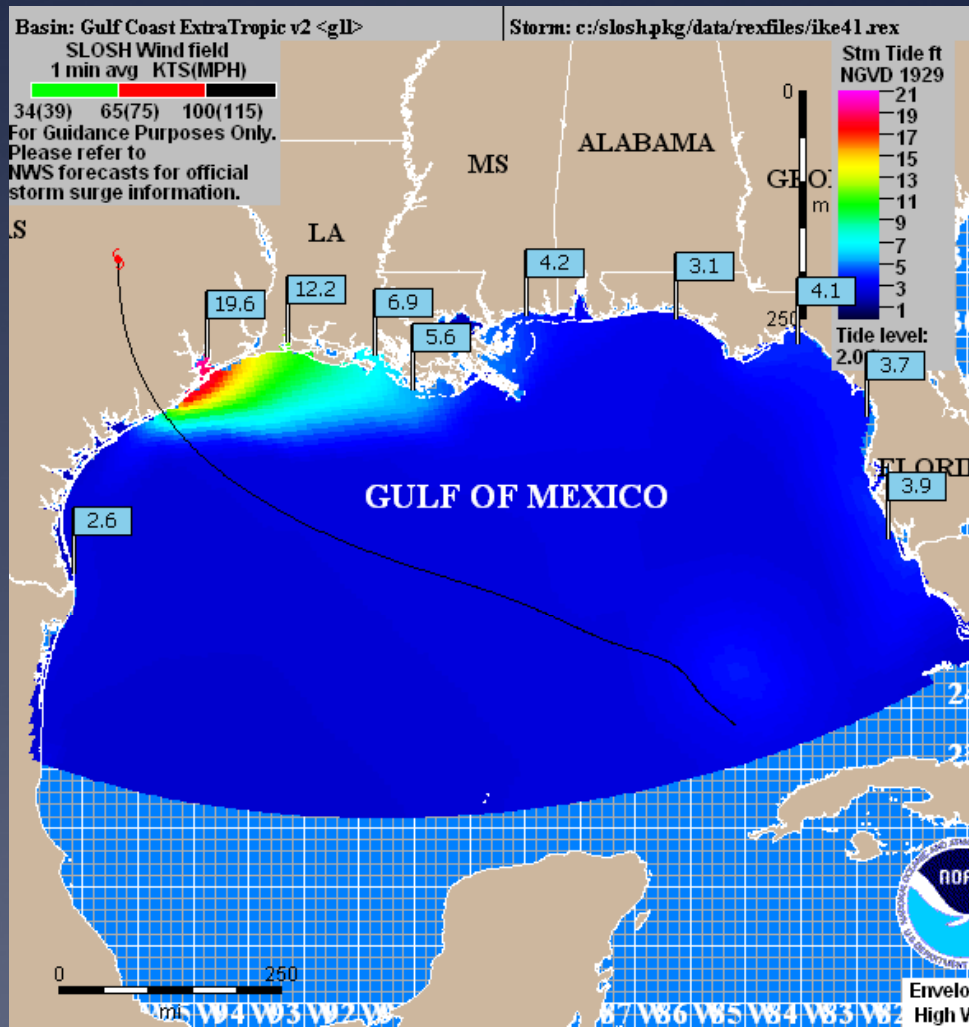
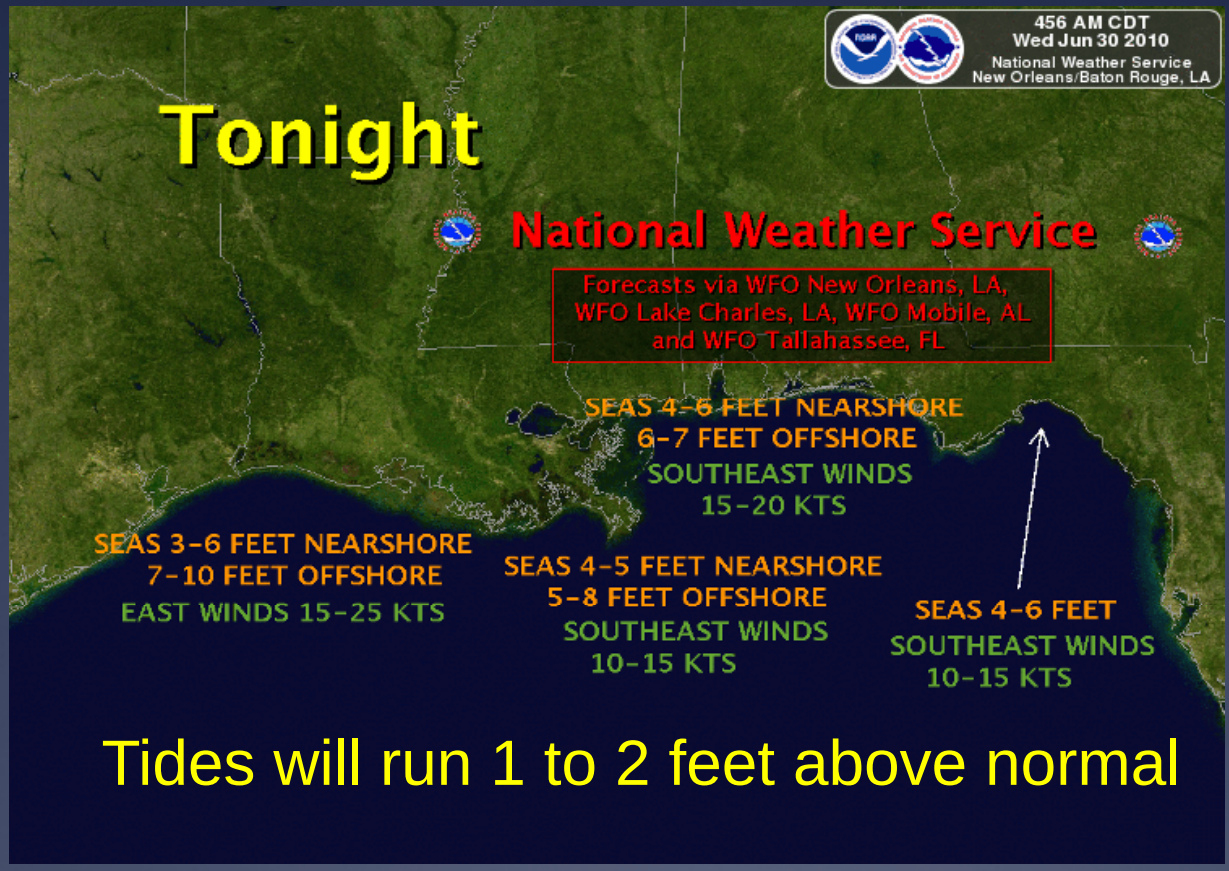
Oil spill and Gulf Storms

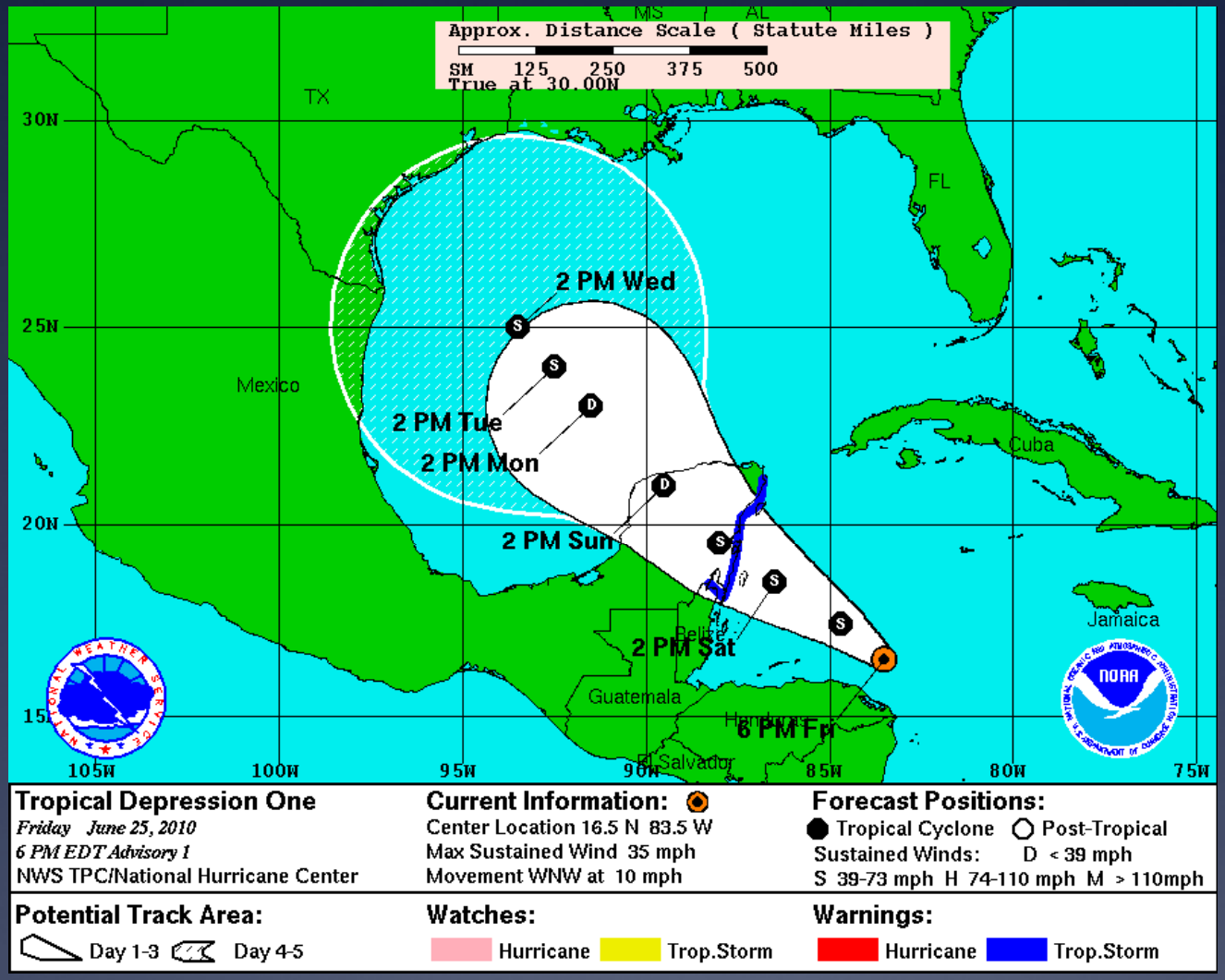
- Direct hit of major storm – big surge more damaging than oil (life threatening and mix of toxic material from damage caused by surge)
- Weak storm or large storm passing well to south raises water levels 2 to 5 feet bringing oil to places previously untouched.



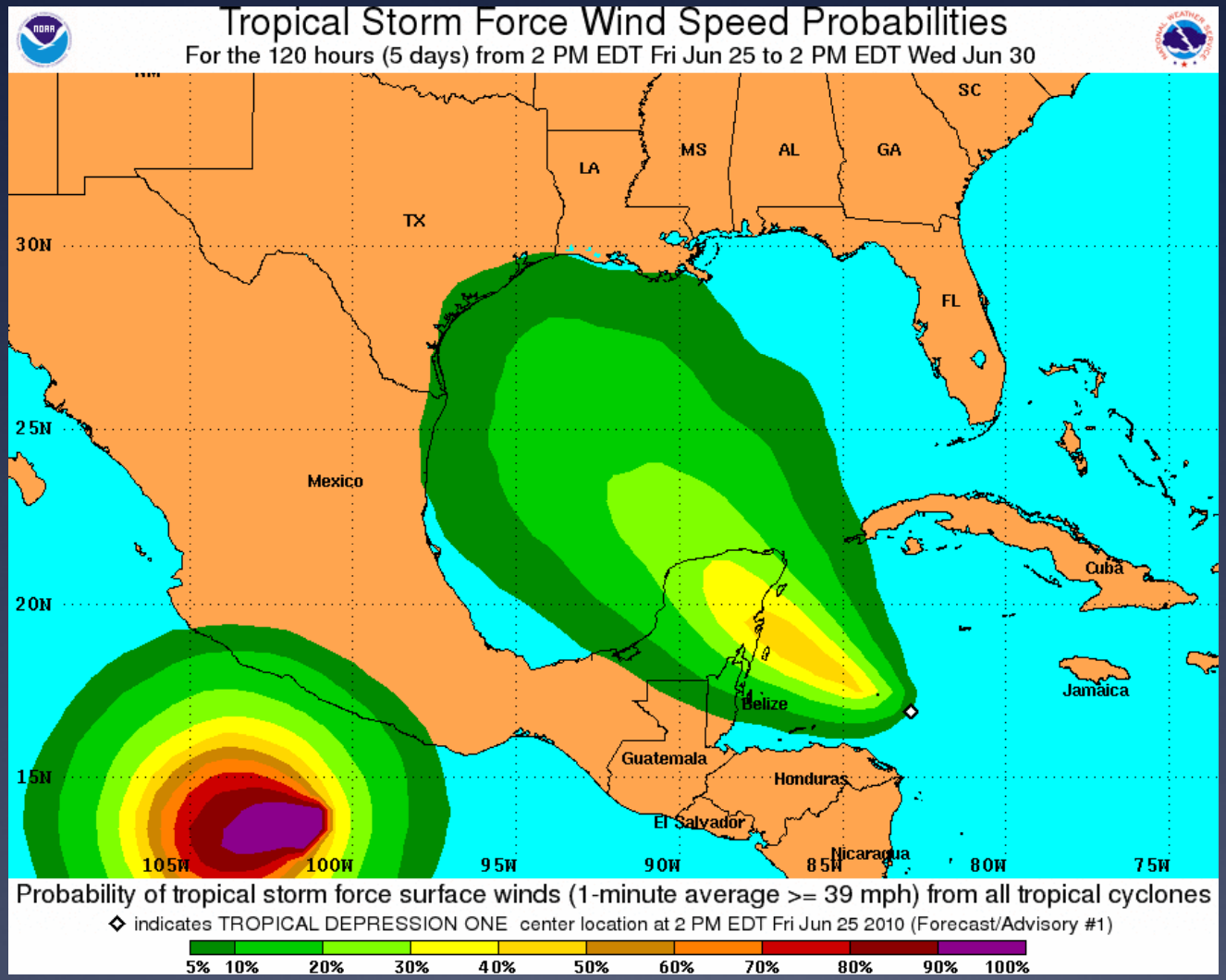
Impacts of Alex over 1000 miles from center



Track Forecast information



Key graphic for DWH



NHC Product and Service Enhancements for DWH

- Special briefings/coordination calls to state and federal officials, BP, etc.
- 34, 50 and 64 knot wind speed probabilities out to five days at DWH for existing **tropical cyclones** (began last week)
- 5-day tropical cyclone genesis probabilities for tropical disturbances
- 34, 50 and 64 knot wind speed probabilities for 5 days at DWH for **tropical disturbances/waves** (i.e., potential tropical cyclones) of note (began today)
- Gridded forecast wind speed and waves at 12.5 km resolution for Gulf of Mexico (planned for next week)
- Integrated OR&R/NHC graphic products (ERMA)

Unified Area Command (UAC)

- UAC is located in New Orleans has responsibility for decisions on curtailment of activities in containment and drilling and coordinated evacuation.
- Decisions to evacuate focus on 10% probability of 34kt winds.
- BP needs up to 116 hours lead time for the onset of tropical storm force winds (34 knots) for evacuation
  - First 3 days are typically needed to shut down operations
  - The next ~2 days are to evacuate the area
  - Evacuation for relief wells may require up to 140 hours
- There is an understanding they may not get 116 hours if a storm develops in the Gulf. In that case, safety of people is a priority.
- Decision to initiate NHC briefings based on 2% probability of 34Kt winds.

Hurricane Alignment Calls

- Purpose
  - Status of current tropical systems between NHC, USCG, and BP to support decision making
  - Develop coordinated responses to questions re tropical events
  - Email used to inform of any significant changes between calls

- Schedule
  - 5:30AM EDT/4:30AM CDT - email to determine AM call status
  - 7:40AM EDT/ 6:40AM CDT - Morning Hurricane Alignment Call
  - 5:30PM EDT/4:30PM CDT – email to determine PM call status
  - 7:00PM EDT/ 6:00PM CDT - Evening Hurricane Alignment Call

Hurricane Alignment Calls

- Participants ("Bang List" approved by NOAA, USCG and BP)
  - NHC Director, Deputy Director, HSU Branch Chief, and/or Hurricane Specialists
  - BP Meteorologist (Dr. Ed Bracken) and/or Deputy BP Meteorologist
  - Incident Command Centers (Miami, Mobile, Houma)
  - NWS Coastal WFOs supporting ICCs
  - National Incident Command
  - Unified Area Command (USCG)
  - FEMA Liaison
  - Roger Parsons (Chief of Staff, NIC)
  - Ahsha Tribble

NHC Briefing Process for DWH (EDT)

5:30AM: Email from NHC to Hurricane Alignment Team to determine the need for the AM call

7:40AM: AM Hurricane Alignment Call

8:00 AM: NOAA Leadership Deepwater Horizon AM Call

8:30AM: FEMA daily briefing, as requested

9:00 AM: WH Intergovernmental Governors' Call - NHC provide the hurricane briefing to the Governors

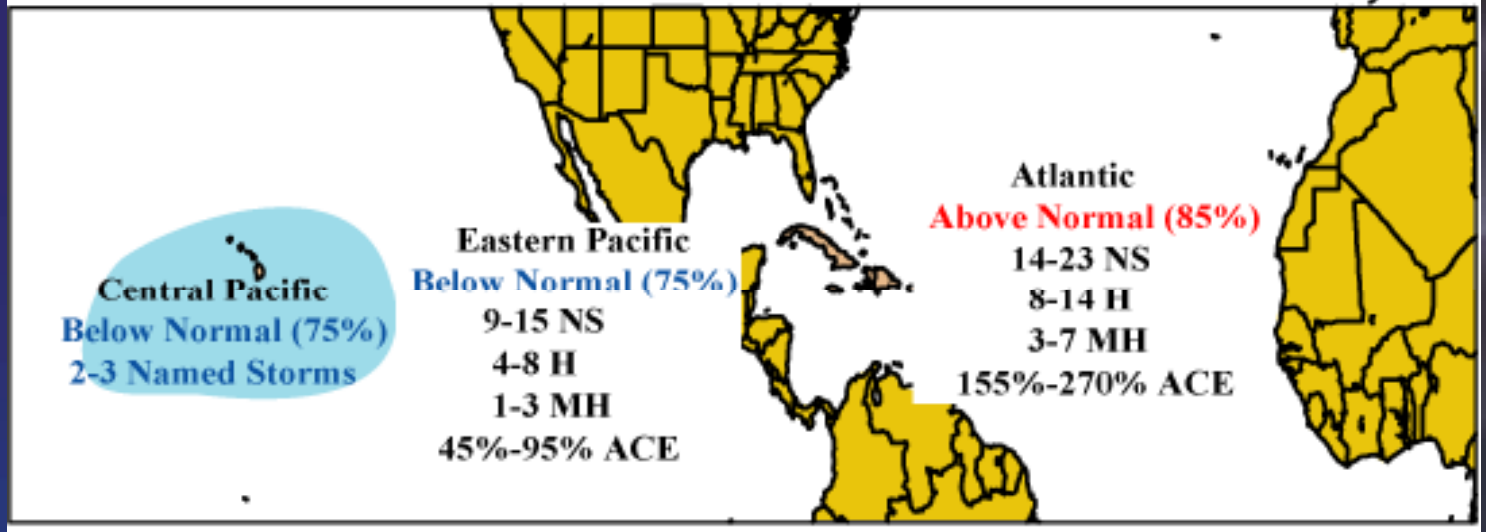
NOON: Hurricane Liaison Team VTC when activated by FEMA

4:30PM: NOAA Leadership Deepwater Horizon PM Call

5:30PM: Email from NHC to Hurricane Alignment Team to determine to need for the PM call

7:00PM: Hurricane Alignment Call

NOAA's 2010 Hurricane Season Outlooks Issued in May



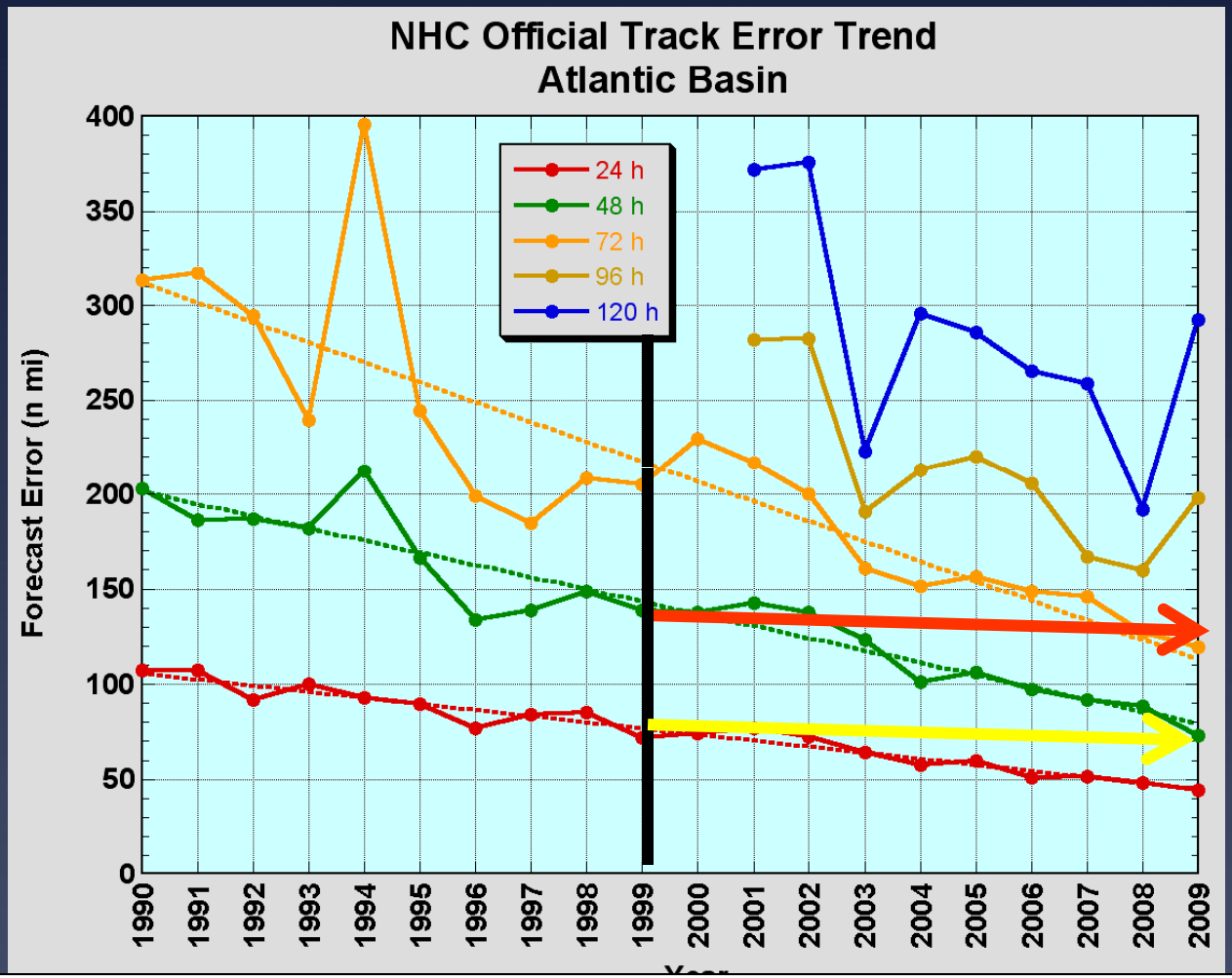
NOAA's 2010 seasonal hurricane outlooks indicate the likely ranges (each with a 70% chance) of Named Storms (NS), Hurricanes (H), Major Hurricanes (MH), and percentage of the median Acccumulated Cyclone Energy (ACE).

For 2010 the probabilities of each season type are:

	Atlantic	Eastern Pacific	Central Pacific
Above Normal	85%	5%	5%
Near Normal	10%	20%	20%
Below Normal	5%	75%	75%

Backup Slides

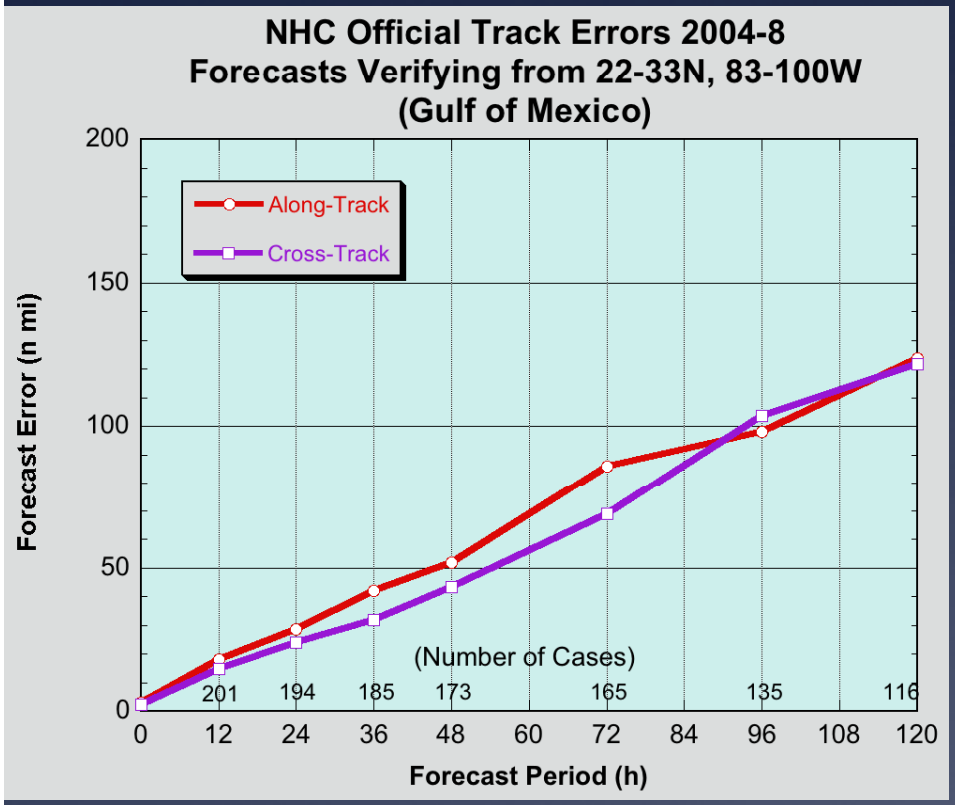
The Good – track forecast improvements



- Errors have been cut in half over the past 15 years
- Ten year improvement - As accurate at 48 hours as we were at 24 hours in 1999
- Trends more erratic at days 4 and 5 due to smaller samples

Gulf of Mexico

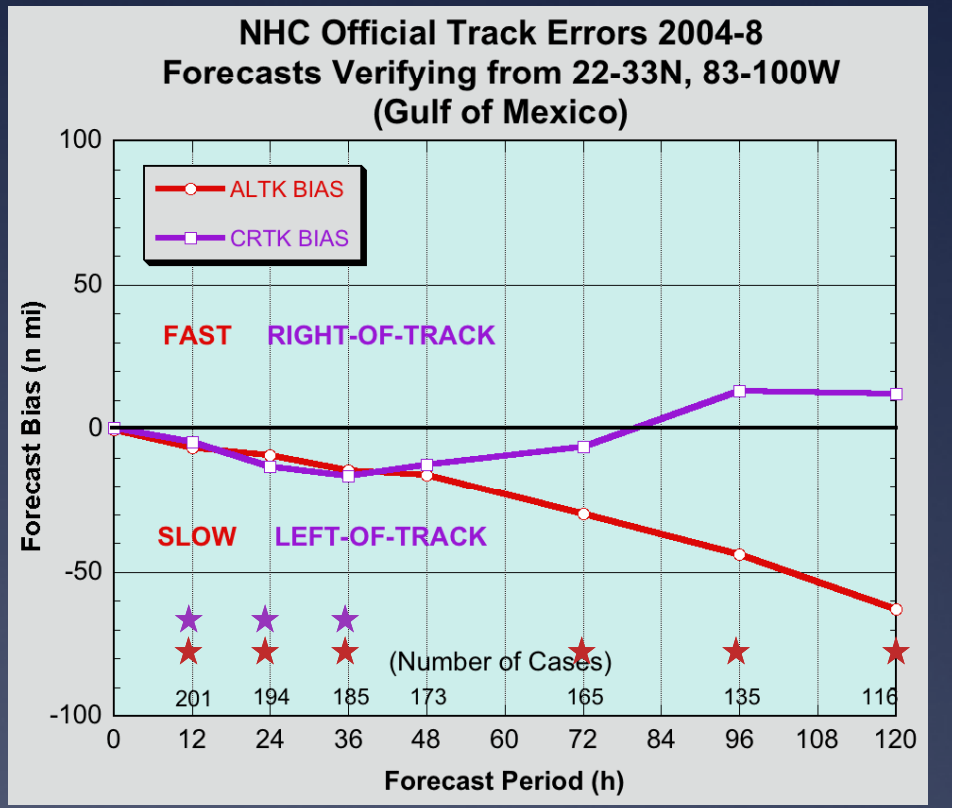
Along/Cross Errors



Along- and cross-track errors about equal

Mean forward speed = 10 kt

Along/Cross Biases

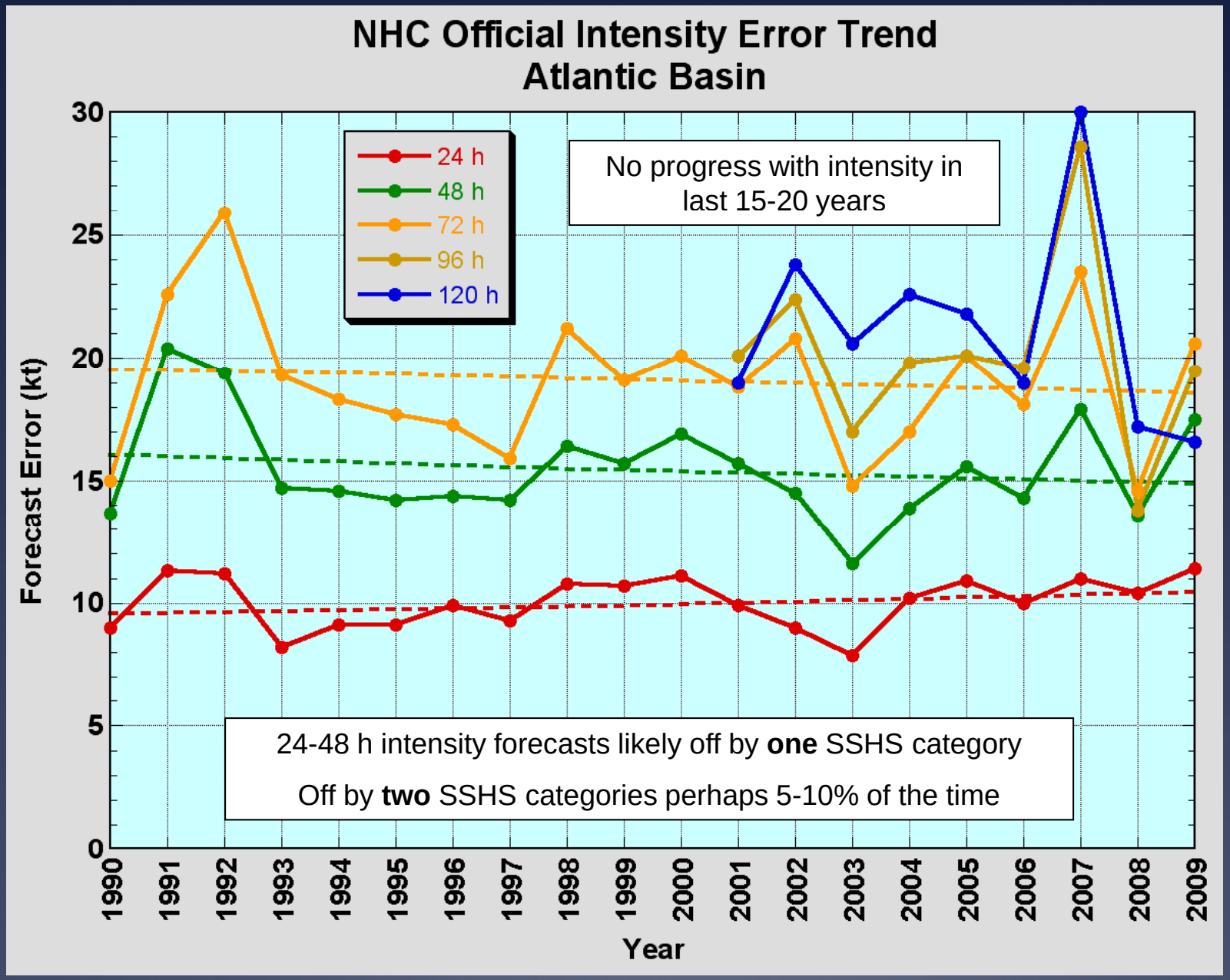


Left biases through 48 h, while (mostly) significant, still less than ~ 15 n mi

Slow bias in W/W phase is 1-2 h

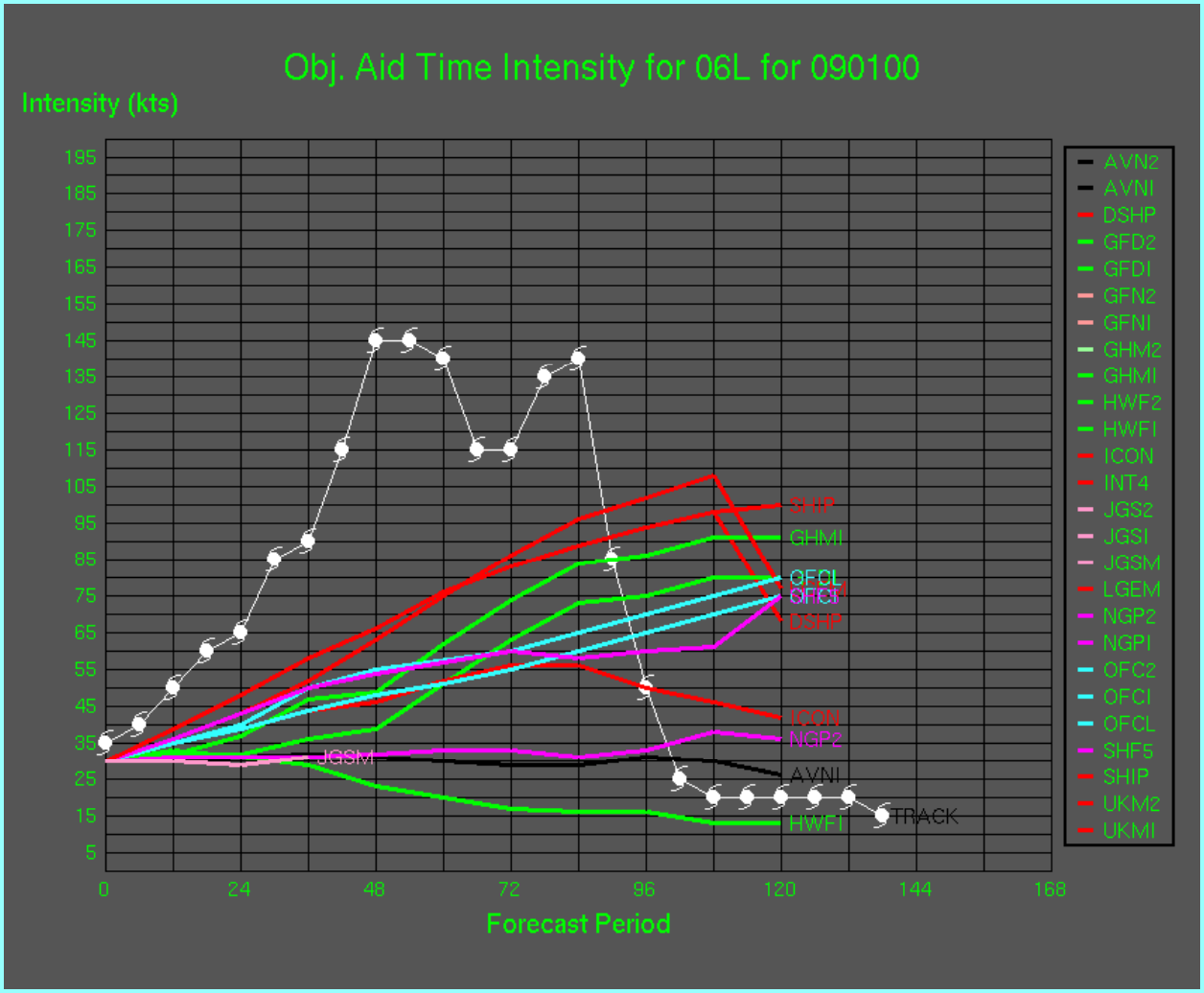
★ = Statistically significant biases (95%)

The Bad - Intensity no real gains



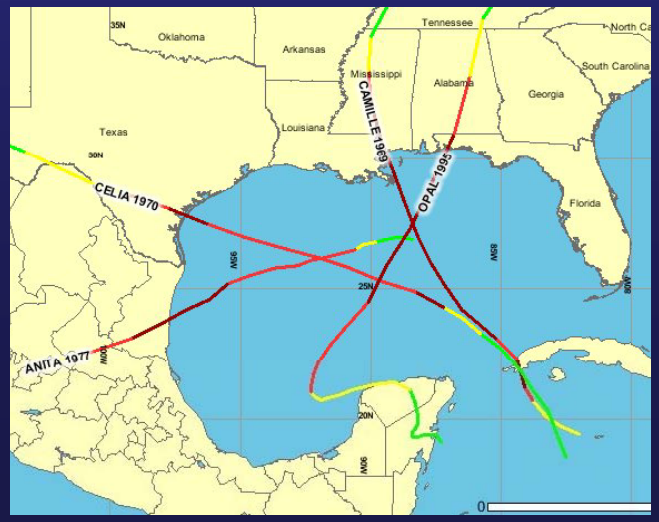
The Ugly - Rapid intensity change

Current models have little or no skill



Gulf of Mexico Rapid Intensifiers

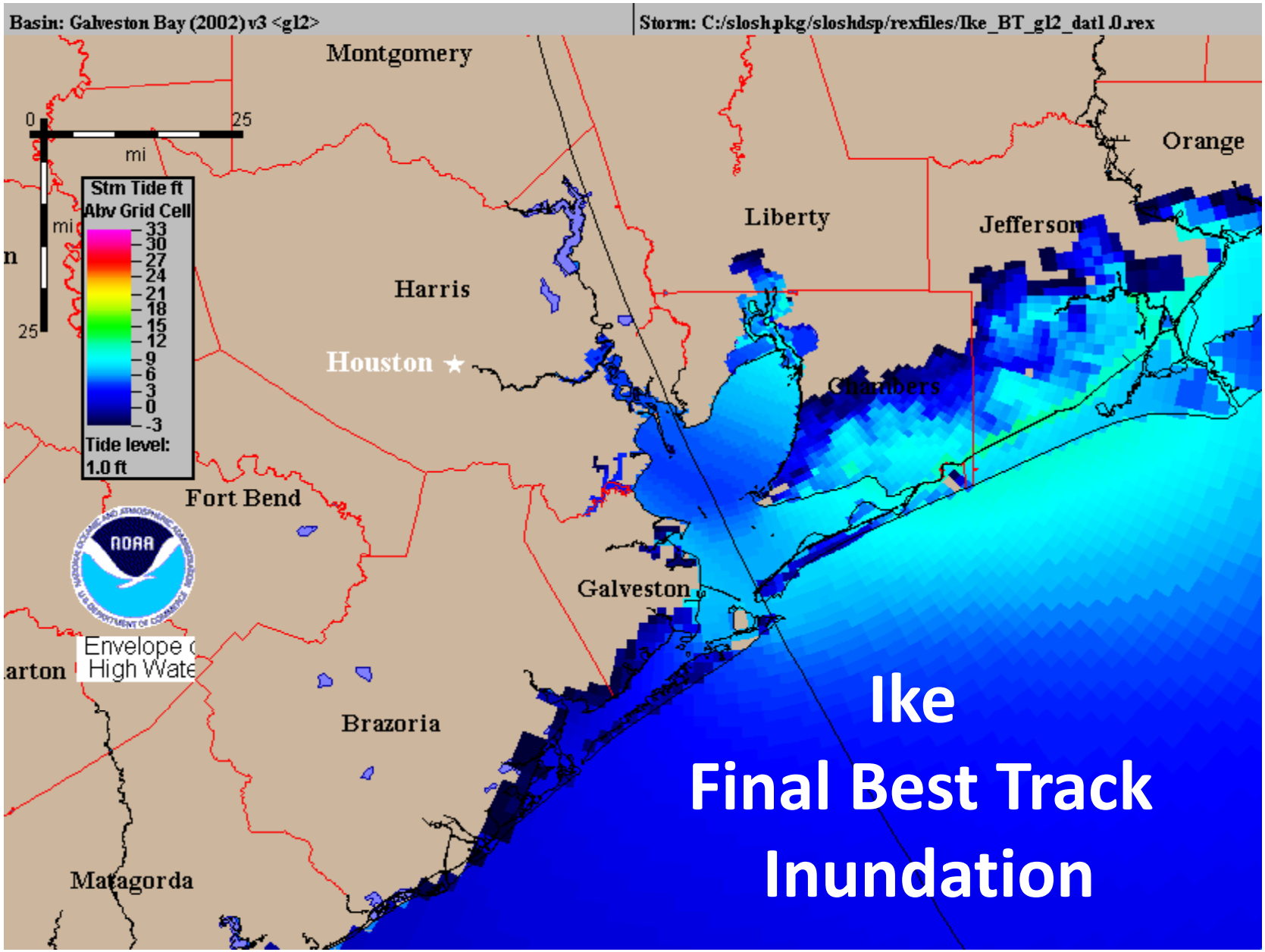
- 1932 – TS 180 miles south of GLS – Cat 4 at landfall less than 36h
- 1943 , Alicia – both formed south of NOLA landfall less than 72h
- Audrey June 1957 – Cat 4 less then 72h after forming
- Anita (5), Celia (4), Camille (5) and Opal (4) all less then 96h



Storm surge uncertainty

- Extremely sensitive to errors in track, size, structure of wind field, angle of approach, and forward speed

- Improvement in meteorological forecast over next decade will not negate the error function for surge forecast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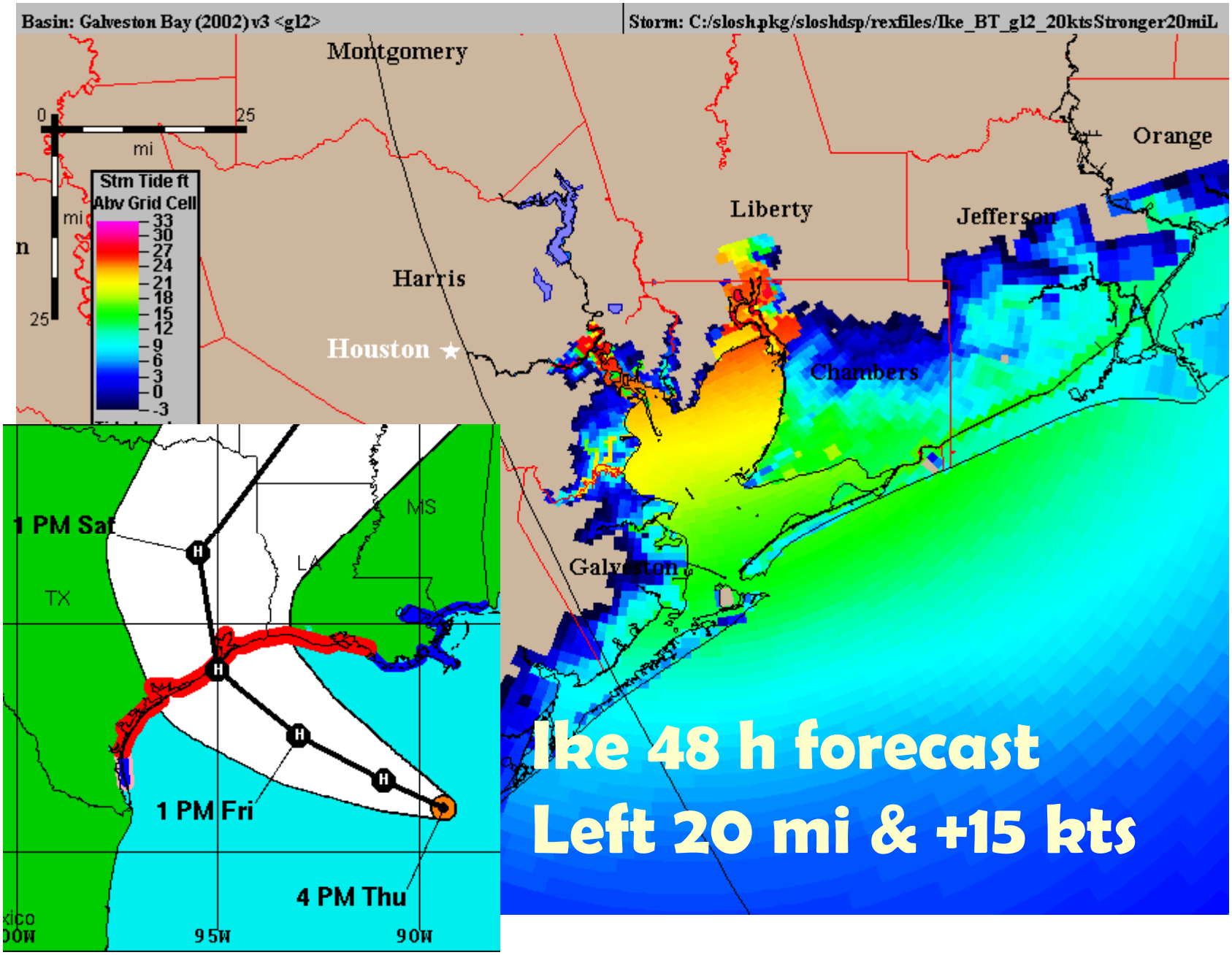
Final Best Track
Inundation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Ike 48 h forecast
Left 20 mi & +15 kts