Hurricane Science and Support for Deepwater Horizon

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National Hurricane Center
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

Tonight

National Weather Service

Forecasts via WFO New Orleans, LA, WFO Lake Charles, LA, WFO Mobile, AL, and WFO Tallahassee, FL

Tides will run 1 to 2 feet above normal
Track Forecast information

Tropical Depression One
Friday, June 25, 2010
6 PM EDT/Advisory 1
NWS TPC/National Hurricane Center

Potential Track Area:
- Day 1-3
- Day 4-5

Current Information:
- Center Location: 16.5 N, 83.5 W
- Max Sustained Wind: 35 mph
- Movement: NNE at 10 mph

Forecast Positions:
- Tropical Cyclone
- Post-Tropical

Watches:
- Hurricane
- Trop. Storm

Warnings:
- Hurricane
- Trop. Storm
Key graphic for DWH

Tropical Storm Force Wind Speed Probabilities
For the 120 hours (5 days) from 2 PM EDT Fri Jun 25 to 2 PM EDT Wed Jun 30

Probability of tropical storm force surface winds (1-minute average >= 39 mph) from all tropical cyclones

indicates TROPICAL DEPRESSION ONE center location at 2 PM EDT Fri Jun 25 2010 (Forecast/Advisory #1)
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 Accumulated Cyclone Energy (ACE).

For 2010 the probabilities of each season type are:

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<thead>
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<th></th>
<th>Atlantic</th>
<th>Eastern Pacific</th>
<th>Central Pacific</th>
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<tr>
<td>Below Normal</td>
<td>5%</td>
<td>75%</td>
<td>75%</td>
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Backup Slides
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/Cross Biases

Along- and cross-track errors about equal

Mean forward speed = 10 kt

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

NHC Official Intensity Error Trend
Atlantic Basin

No progress with intensity in last 15-20 years

24-48 h intensity forecasts likely off by one SSHS category
Off by two SSHS categories perhaps 5-10% of the time
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
Ike Final Best Track Inundation
Ike 48 h forecast
Left 20 mi & +15 kts