Hurricane Katrina Coupled Model Forecast
Aug 29 19:00 UTC (67h)

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Isaac Ginis, Biju Thomas, Il-Ju Moon (URI)
Aleksandr Falkovich (EMC/NCEP)
GFDL MODEL PROVIDED THE MOST RELIABLE TRACK GUIDANCE OVER THE PAST 3 YEARS IN BOTH THE ATLANTIC AND EAST PACIFIC
GFDL Model Provided Excellent Track and Intensity Prediction for Hurricane Katrina
CHANGES PLANNED FOR 2006

• Upgrade with Ferrier Micro-physics
• Dissipative Heating Effect Added
• Improved Surface Momentum Fluxes
• Improved Initialization of Loop Current
• Improved Ocean Initialization
• Possible Coupling with WAVEWATCH III
TO EVALUATE THE NEW MODEL PROPER SELECTION OF CASES WAS REQUIRED. 
SAMPLE SHOULD BE A GOOD BLEND OF BOTH INTENSE AND WEAK STORMS OVER THE PAST 2 SEASONS.

<table>
<thead>
<tr>
<th>Cases Selected From 2004</th>
<th>Cases From 2005</th>
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<tbody>
<tr>
<td>FRANCES (16 Forecasts)</td>
<td>Dennis (11 Forecasts)</td>
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<tr>
<td>IVAN (20 Forecasts)</td>
<td>Katrina (11 Forecasts)</td>
</tr>
<tr>
<td>LISA (20 Forecasts)</td>
<td>Nate (7 Forecasts)</td>
</tr>
<tr>
<td></td>
<td>OPHELIA (16 Forecasts)</td>
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<tr>
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<td>PHILIPPE (9 Forecasts)</td>
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<tr>
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<td>Rita (9 Forecasts)</td>
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<td>Wilma (14 Forecasts)</td>
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</tbody>
</table>

TOTAL SAMPLE: 133 Forecasts
2006 UPGRADE SHOULD PROVIDE REDUCED ERRORS IN TRACK PREDICTION
AVERAGE 48hr TRACK ERROR WAS REDUCED ABOUT 10% FOR ENTIRE SAMPLE
MOST STORMS EXHIBITED REDUCED TRACK ERROR AT 3-5 DAYS EXCEPT FOR HURRICANE WILMA

72H TRACK ERROR (NAUTICAL MILES)
2005 (RED) VS. 2006 (BLUE) GFDL MODEL

120H TRACK ERROR (NAUTICAL MILES)
2005 (RED) VS. 2006 (BLUE) GFDL MODEL

FRANCES IVAN LISA DENNIS KATRINA NATE OPHELIA PHILIPPE RITA WILMA

2005 GFDL
2006 GFDL

AVERAGE 72H TRACK ERROR (NM)
AVERAGE 120H TRACK ERROR (NM)
NEW PHYSICS UPGRADES MEAN MORE RELIABLE INTENSITY PREDICTIONS
2006 UPGRADES SHOULD PROVIDE OVERALL BETTER INTENSITY PREDICTION
MUCH IMPROVED INTENSITY PREDICTION FOR WEAKER AND SHEARED STORMS SUCH AS LISA AND PHILIPPE

48H INTENSITY ERROR (KNOTS)

2005(RED) VS. 2006 (BLUE) GFDL MODEL

AVERAGE 48h INTENSITY ERROR (KNOTS)

FRANCES  16
IVAN      20
LISA      20
DENNIS    11
KATRINA   11
NATE      6
OPHELIA   16
PHILIPPE  8
RITA      9
WILMA     14

2005 GFDL
2006 GFDL
IMPROVED INTENSITY PREDICTION IN SHEARED ENVIRONMENTS WITH BETTER PREDICTION OF INTERACTION OF STORM STRUCTURE WITH SHEAR

CROSS-SECTION OF WIND FOR HURRICANE PHILPPE AT HOUR 18
MIXED RESULTS AT 4 AND 5 DAYS BUT MOST STORMS HAD REDUCED INTENSITY ERRORS

72H INTENSITY ERROR (KNOTS)
2005 (RED) VS. 2006 (BLUE) GFDL MODEL

120H INTENSITY ERROR (KNOTS)
2005 (RED) VS. 2006 (BLUE) GFDL MODEL
REDUCED INTENSITY AND TRACK ERRORS
HURRICANES KATRINA & RITA
IMPROVED INTENSITY PREDICTION WHEN THE STORM WAS WEAK

HURRICANE KATRINA (AL12)
INITIAL TIME: (0000 UTC 24 AUGUST)

- OPERATIONAL GFDL
- 2006 UPGRADED GFDL
- OBSERVED SURFACE WINDS

FLORIDA LANDFALL

HURRICANE KATRINA (AL12)
INITIAL TIME: (1200 UTC 24 AUGUST)

- OPERATIONAL GFDL
- 2006 UPGRADED GFDL
- OBSERVED SURFACE WINDS

FLORIDA LANDFALL
IMPROVED FORECAST OF RAPID INTENSIFICATION
MORE ACCURATE TRACK PREDICTION OF HURRICANE KATRINA

2005 Tropical Cyclone Tracks
Storm: AL1205 (KATRINA)

Observed: Beginning 2005082412, every 12 hours

1 OPERATIONAL GFDL
2 2006 GFDL

2005 Tropical Cyclone Tracks
Storm: AL1205 (KATRINA)

Observed: Beginning 2005082600, every 12 hours

1 OPERATIONAL GFDL
2 2006 GFDL
REDUCED WEST BIAS IN TRACKS FOR HURRICANE RITA
SUMMARY

• MAJOR UPGRADES TO PHYSICS PACKAGES IN GFDL MODEL FOR 2006 HURRICANE SEASON.

• NEW PHYSICS UPGRADES LEAD TO BOTH IMPROVED TRACK AND INTENSITY PREDICTION.

• MUCH BETTER PREDICTION OF INTENSITY FOR WEAKER SYSTEMS, PARTICULARLY IN SHEARED ENVIRONMENTS.

• SOME FURTHER IMPROVEMENTS IN TRACK ERROR IN 5 DAYS POSSIBLE WITH INTRODUCTION OF FULL WAVE COUPLING.