The Joint Hurricane Testbed

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The Joint Hurricane Testbed is funded by the US Weather Research Program in NOAA/OAR's Office of Weather and Air Quality

2014 Interdepartmental Hurricane Conference
The Forecasters (Us)

The Researchers (Them)

How to bridge the “valley of death”?
Joint Hurricane Testbed (JHT)

- Bridge hurricane research and operations
- Began in 2001 under the USWRP
- Our Mission: successfully transfer new technology, research results & observational advances from research groups to operational centers
- Testing is done at National Hurricane Center or Environmental Modeling center
Wind Speed Probabilities
Hurricane Bill 20 Aug 2009 00 UTC

1000 Track Realizations

34 kt 0-120 h Cumulative Prob.
Wind Speed Probabilities

Wind Speed Probabilities

Wind Speed Probabilities for Selected Locations

- - - - - WIND SPEED PROBABILITIES FOR SELECTED LOCATIONS - - - - -

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<thead>
<tr>
<th>LOCATION</th>
<th>Probability</th>
<th>Probability 2</th>
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JHT: The Process

• Call for Proposals - drafted and disseminated (bi-annually)
• Principal Investigators apply for funding through NOAA
• 7 member Steering Committee rates all proposals
• Funded projects are tested during 1 or 2 hurricane seasons in conjunction with NHC/EMC points of contact
• At the project’s end, each are evaluated by NHC/EMC staff
• Implementation of successful projects are then carried out by NHC/EMC staff/PIs
JHT: The statistics

- Number of projects supported: 81
  - 74 completed
    - 46 accepted for operational implementation
    - 7 projects completed but rejected
    - 9 projects completed, deferred pending further investigation at EMC
  - 12 projects with decisions soon forthcoming
  - 7 projects started in fall 2013

- Implementation
  - 41 projects implemented:
    - 11 numerical modeling projects implemented by EMC/NCO
    - 30 projects implemented by NHC
    - 3 projects accepted but not yet fully implemented by NHC
    - 2 projects unable to be implemented after acceptance
2013-2014 Major JHT Activities - 6th round

- **June - November 2013**
  - Final season to test of projects

- **December 2013 – February 2014**
  - Final reports provided by PIs
  - Feedback obtained by points-of-contact
  - Implementation evaluation and decision

- **March-June 2014**
  - Implementation of accepted projects at NHC and EMC
Project Highlights - 6th round

Surface winds: Knaff

Rapid Intensity Forecasting: Jiang

Hurricane model upgrades: Bender

Radar-based central pressure: Lee/Bell

2010, 2011, 2012 Atlantic Average Intensity Error (knots)
Number of Cases: (539, 535, 528, 512, 489, 436, 372, 306)
Factors Considered in NHC Decisions on Operational Implementation

- **Forecast or Analysis Benefit**: expected improvement in operational forecast and/or analysis accuracy
- **Efficiency**: adherence to forecaster time constraints and ease of use needs
- **Compatibility**: IT compatibility with operational hardware, software, data, communications, etc.
- **Sustainability**: availability of resources to operate, upgrade, and/or provide support
2012-2014 JHT Activities - 7th round

- **August 2012**
  - Announcement of Opportunity released
- **October 2012**
  - 36 Letters of Intent reviewed
- **December 2012 - January 2013**
  - 22 Full proposals reviewed
- **February - April 2013**
  - Rank and select proposals for funding
  - Point-of-contacts established among NHC/EMC staff
  - Work with PIs to setup timelines for their projects
- **August – November 2013**
  - Begin real-time testing during hurricane season
- **December 2013 – March 2014**
  - PI refine their projects and interact with points-of-contact
  - Present progress at Interdepartmental Hurricane Conf.
### 7th Round JHT Projects - 2013 to 2015

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Principal Investigator(s)</th>
<th>NHC Point of Contact</th>
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<tbody>
<tr>
<td>A Visualization Application for Distributed ADCIRC-based Coastal Storm Surge, Inundation, and Wave Modeling</td>
<td>Brian Blanton, Rick Luettich (Univ. of North Carolina)</td>
<td>Feyen (NOS), Rhome, Berg, Schauer, Landsea</td>
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<td>Improving the GFDL/GFDN Operational Tropical Cyclone Models at NOAA/NCEP and Navy/FNMOC</td>
<td>Isaac Ginis (Univ. of Rhode Island), Morris Bender (NOAA/GFDL)</td>
<td>Pasch, Mattocks, Tallapragada (EMC), Landsea</td>
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<td>A Probabilistic TC Genesis Forecast Tool Utilizing an Ensemble of Global Models</td>
<td>Bob Hart, Henry Fuelberg (Florida State Univ.)</td>
<td>Pasch, Mattocks, Kimberlain, Blake, Landsea</td>
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<td>Improvement to the Satellite-based 37 GHz Ring Rapid Intensification Index</td>
<td>Haiyan Jiang (Florida Intl Univ.)</td>
<td>Stewart, Cangialosi, Landsea</td>
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<td>Guidance on Intensity Guidance</td>
<td>Dave Nolan (U of Miami/RSMAS), Andrea Schumacher (CSU/CIRA)</td>
<td>Avila, Blake, Landsea</td>
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<td>Upgrades to the Operational Monte Carlo Wind Speed Probability Program</td>
<td>Andrea Schumacher (CSU/CIRA)</td>
<td>Brown, Brennan, Mattocks, Landsea</td>
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<td>Integration of an Objective, Automated TC Center-fixing Algorithm Based on Multispectral Satellite Imagery into NHC/TAFB Operations</td>
<td>Tony Wimmers, Chris Velden (Univ. of Wisc./CIMSS)</td>
<td>Beven, Mundell, Landsea</td>
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www.nhc.noaa.gov/jht

Rappaport et. al., 2012 - BAMS

THE JOINT HURRICANE TEST BED
Its First Decade of Tropical Cyclone Research-To-Operations Activities Reviewed

by Edward N. Rappaport, Jian-Guo Jing, Christopher W. Landsea, Shirley T. Murillo, and James L. Franklin

Collaboration between researchers, forecasters and technology specialists facilitated the development and implementation of numerous projects benefitting forecast operations.