



The Joint Hurricane Testbed

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NOAA Testbeds and Operational Proving Ground Workshop – 14 April, 2015

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

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

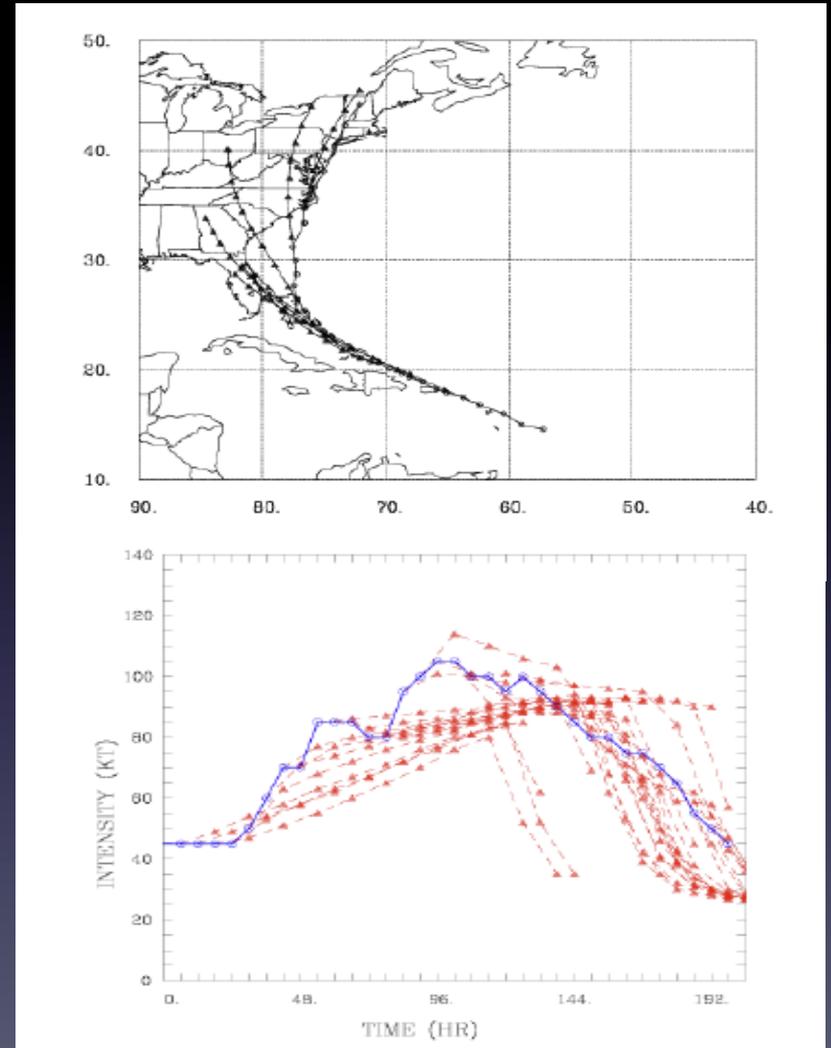
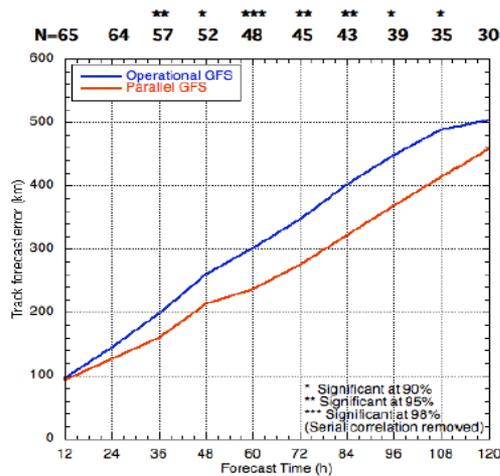
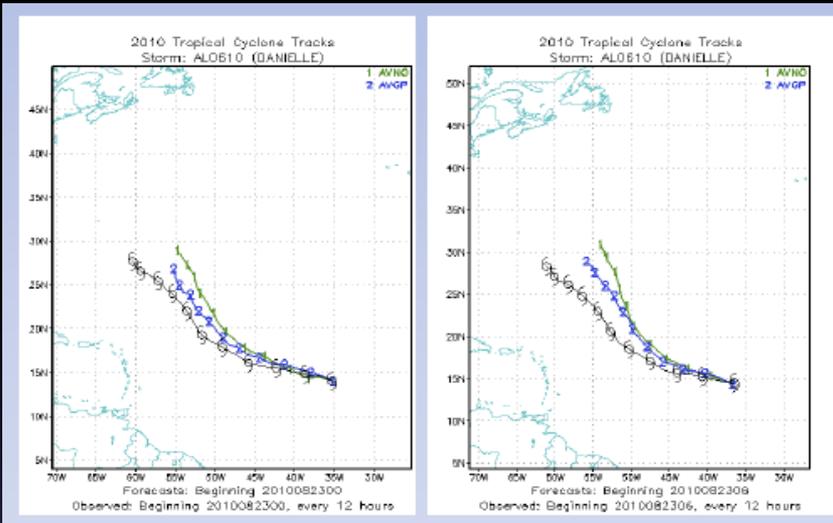
JHT: The statistics

- Number of projects supported: 81
 - 74 completed
 - 52 accepted for operational implementation
 - 18 projects completed but rejected
 - 4 projects completed, deferred pending further investigation
 - 2 projects with decisions soon forthcoming
 - 7 projects started in fall 2013
- Implementation
 - 45 projects implemented:
 - 14 numerical modeling projects implemented by EMC/NCO
 - 31 projects implemented by NHC
 - 5 projects accepted but not yet fully implemented by NHC
 - 2 projects unable to be implemented after acceptance ⁴

On-going JHT Activities

- **6th Round Projects**
 - All 12 completed after the 2013 hurricane season
 - Implementation decisions & implementation in 2014-15
- **7th Round Projects**
 - 7 projects begun September 2013
 - On-going testing during 2014/2015 hurricane seasons
 - Implementation decisions to be made in 2016
- **8th Round Projects**
 - New projects to begin September 2015

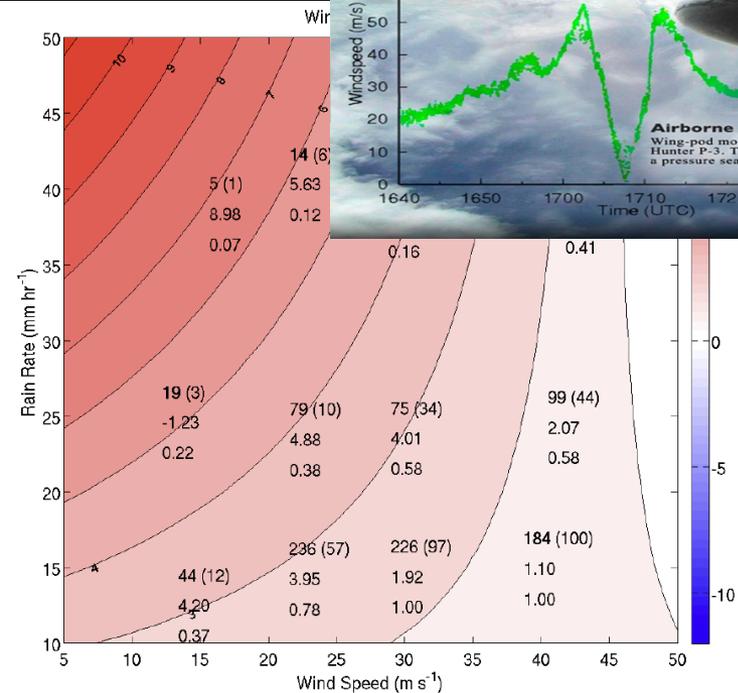
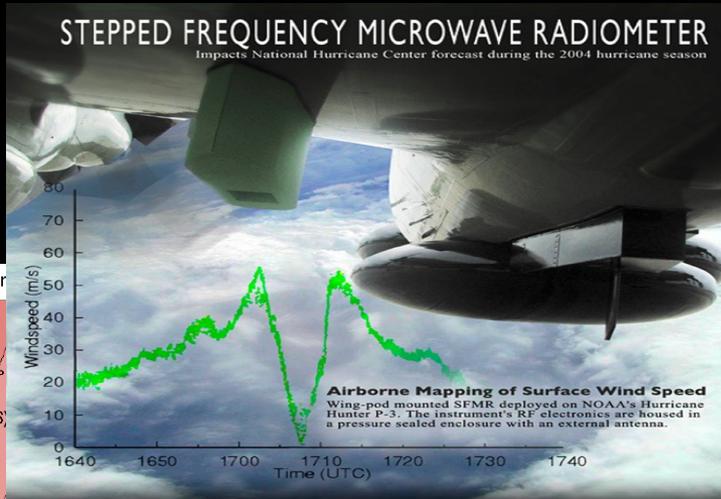
Projects Accepted for Operational Implementation - 6th round



Assimilation of Non-NOAA and Non-AF GPS Dropwindsonde Data into NOAA Numerical Models - Abernson

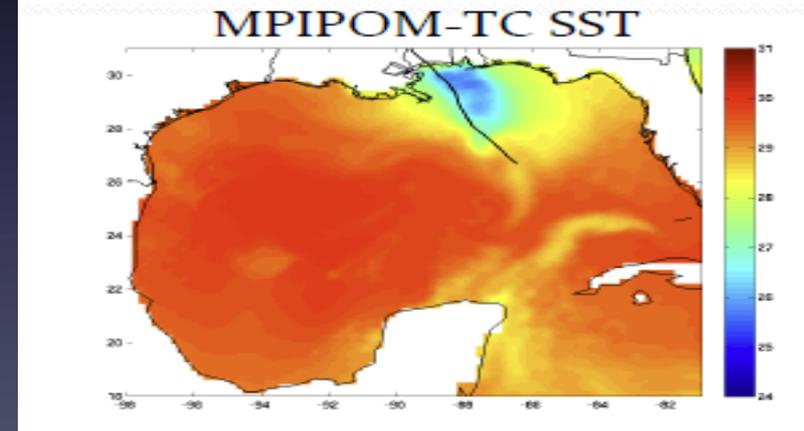
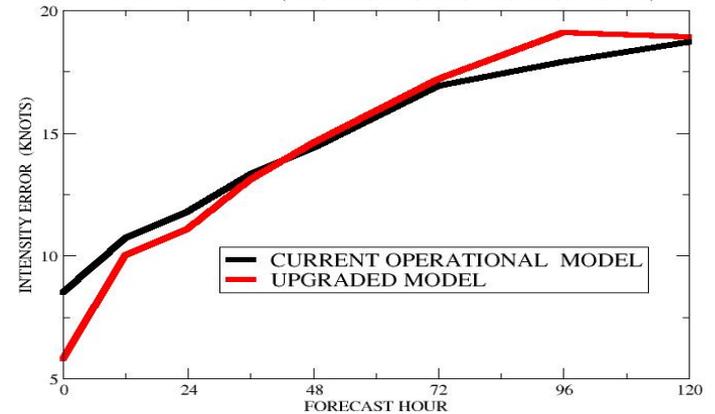
Improvements in Statistical Tropical Cyclone Forecast Models - DeMaia

Projects Accepted for Operational Implementation - 6th round



Improved Stepped Frequency Microwave Radiometer Surface Wind Measurements in Intense Rain conditions - Uhlhorn

2010, 2011, 2012 Atlantic Average Intensity Error (knots)
Number of Cases : (539, 535, 528, 512, 489, 436, 372, 306)



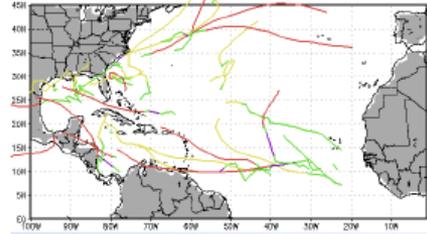
Improving the Operational Tropical Cyclone Models at NOAA/NCEP and Navy/FNMOC- Bender/Ginis

Projects Accepted for Operational Implementation - 6th round

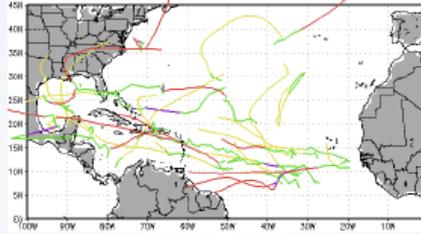
TC Genesis Index Invest Tracks (2001-2010)

- Dvorak Fixes
- Interpolation
- Best track (post-gen)
- Special BAMM

2002 JHT GEN TRACKS



2003 JHT GEN TRACKS

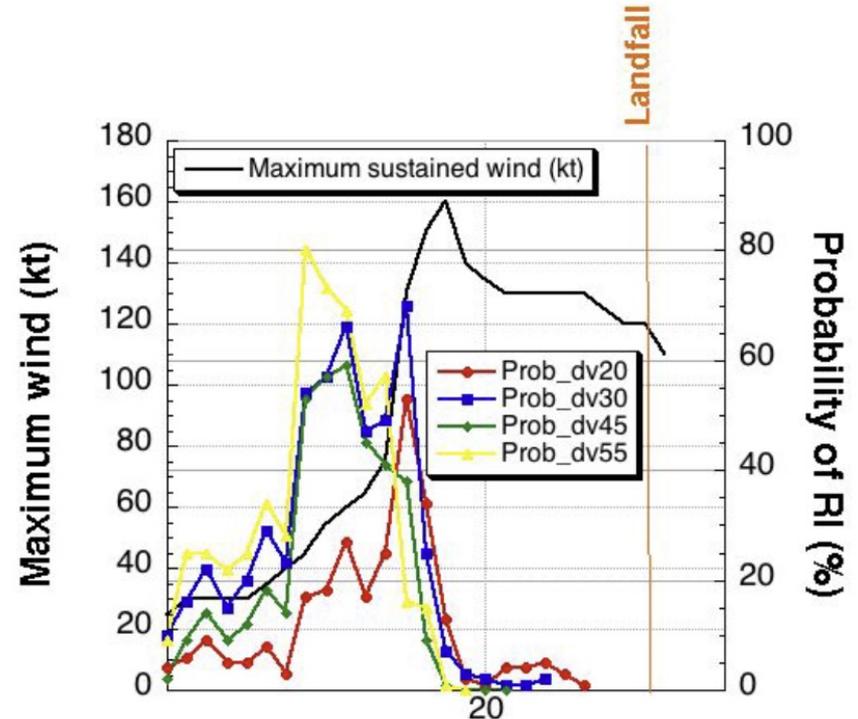


* ATLANTIC TC GENESIS INDEX *

* AL912013 07/24/13 00 UTC *

TIME (hr)	0	6	12	18	24	36	48	60	72	84	96	108	120
TCGI (%)						39.5							45.9

Development of a Probabilistic Tropical Cyclone Genesis Prediction Scheme-
Dunion



Improvement to the SHIPS Rapid Intensification Index - Kaplan

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

7th Round Timetable

- **August 2012**
 - Announcement of Opportunity released
- **October 2012**
 - 36 Letters of Intent reviewed by Steering Committee
- **December 2012 - January 2013**
 - 22 Full proposals reviewed by Steering Committee
- **February - April 2013**
 - Rank and select 7 proposals for funding
 - Point-of-contacts established among NHC/EMC staff
 - Work with PIs to setup timelines for their projects
- **September 2013 – May 2014**
 - PIs begin projects in coordination with points-of-contact
- **March 2014**
 - Present progress at Interdepartmental Hurricane Conf.

7th Round Timetable (continued)

- **April 2014**
 - Mid-year report and renewal proposal due
- **May-June 2014**
 - Steering Committee reviews progress and renewal proposals - all 7 projects are renewed for year two
- **June – November 2014**
 - Begin real-time testing during hurricane season
- **December 2014 – April 2015**
 - PI refine their projects and interact with points-of-contact
- **March 2015**
 - Present progress at Interdepartmental Hurricane Conf.
- **June – November 2015**
 - Continued real-time testing during hurricane season

7th Round Timetable (continued)

- **December 2015**
 - PI provide their final report
- **March 2016**
 - Operational implementation decisions made by NHC/EMC
- **March-August 2016**
 - Implementation of accepted projects by NHC/EMC

7th Round Timetable (continued)

- **December 2015**
 - PI provide their final report
- **March 2016**
 - Operational implementation decisions made by NHC/EMC
- **March-August 2016**
 - Implementation of accepted projects by NHC/EMC

**FOUR YEARS FROM ANNOUNCEMENT TO
IMPLEMENTATION**

7th Round JHT Projects - 2013 to 2015

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

8th Round Timetable

- August 2014
 - Announcement of Opportunity released
- October 2014
 - 35 Letters of Intent reviewed by Steering Committee
- February 2015
 - 20 Full Proposals reviewed by Steering Committee
- April 2015
 - Funding decision

Review criteria and their maximum points are:

- (1) Importance/relevance and applicability of proposal to the program goals (30 points),
- (2) Technical merit (50 points),
- (3) Overall qualifications of applicants (10 points),
- (4) Project Costs (10 points), and
- (5) Outreach and education (0 points)

Top 5 Priorities for New Funding

- NHC-1/JTWC-1. Guidance for tropical cyclone intensity change, especially for the onset, duration, and magnitude of **rapid intensification** events, as well as for over-water rapid weakening events.
- NHC-2/JTWC-2. Improved capability to **observe the tropical cyclone and its environment** to support forecaster analysis and model initialization.
- NHC-3/JTWC-8. Statistically based real-time **guidance on guidance** to assist in the determination of official track and intensity forecasts. This could include multi-model consensus approaches, provided in probabilistic and other formats.
- NHC-4/JTWC-9. Enhancements to the **operational environment** (e.g., ATCF, AWIPS-II) to increase forecaster efficiency, by expediting analysis, forecast, coordination, and/or communication activities.
- NHC-5/JTWC-11. Techniques or products to support **pre-genesis** disturbance track, intensity, size, and wind speed probability forecasts.

The Joint Hurricane Testbed

The screenshot shows the website www.nhc.noaa.gov/jht for the National Hurricane Center. The page features a blue header with the NOAA logo and navigation links for Home, News, Organization, and Search. A search bar is present with 'NWS' and 'All NOAA' buttons. The main content area includes a banner for the USWRP Joint Hurricane Testbed, followed by a 'JHT Overview' section with links to Overview, Current Projects, Past Projects, Admin Presentations, Highlights, Staff, and Committee. Below this is a 'Mission Statement' section and a 'News' section with three entries: '20 March 2012: 2012 IHC presentations posted for 2011-2013 projects', '1 November 2011: Press Release on new 2011 funded JHT projects', and '30 September 2011: New JHT projects (Round 6, FY11-13) announced'. A 'View News Archive' link is also present. The 'Main Activities' section lists several bullet points: identifying new techniques, establishing infrastructure, completing tests in a quasi-operational environment, and preparing documentation. A footer note says 'Please see the Joint Hurricane Testbed Terms of Reference (PDF) for more b...'. The left sidebar contains various links for local forecasts, alternate formats, cyclone forecasts, marine forecasts, tools & data, development, outreach & education, resources, our organization, and contact us.

Rappaport et. al., 2012 - *BAMS*

THE JOINT HURRICANE TEST BED

Its First Decade of Tropical Cyclone
Research-To-Operations Activities Reviewed

BY EDWARD N. RAPPAORT, JIANN-GWO JIING, 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.