

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**

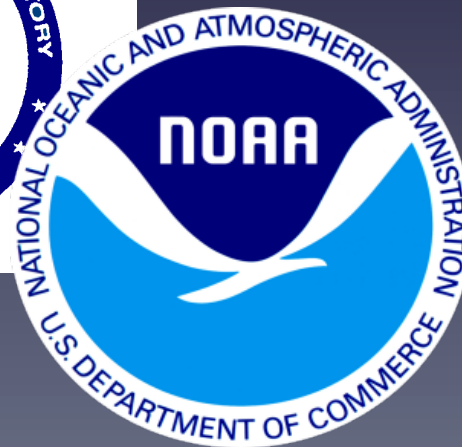
4th Conference on Transition of Research to Operations

The Forecasters (Us)



How to bridge the “valley of death”?

The Researchers (Them)



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

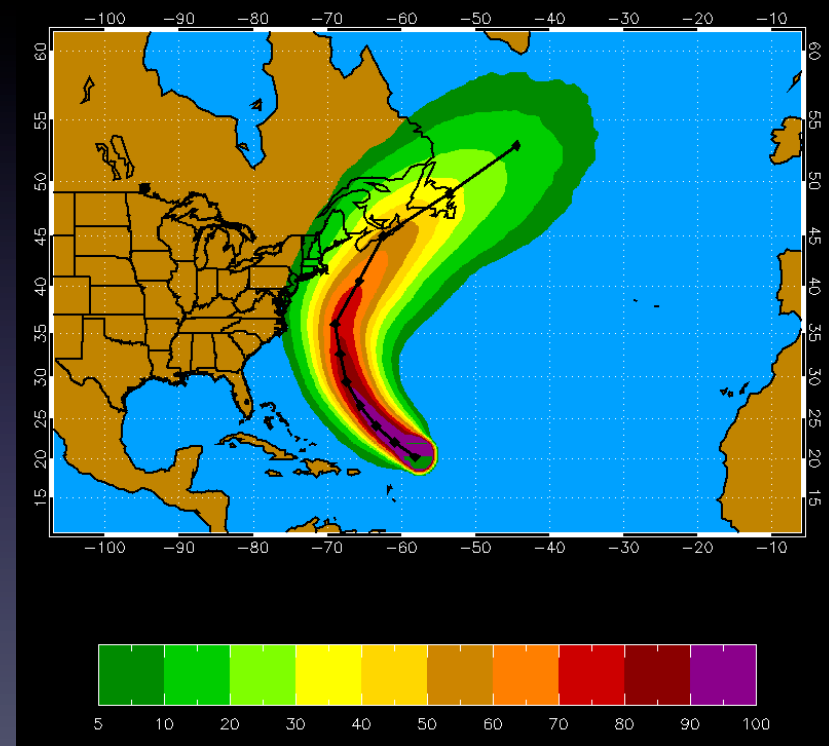
Wind Speed Probabilities

Hurricane Bill 20 Aug 2009 00 UTC

al032009 082000 BILL 34kt 1000 Realizations Cumulative 0 - 120hrs



1000 Track Realizations



34 kt 0-120 h Cumulative Prob.



Wind Speed Probabilities



ZCZC MIAPWSAT4 ALL
 TTAAOO KNHC DDHMM
 HURRICANE WILMA PROBABILITIES NUMBER 20
 NWS TPC/NATIONAL HURRICANE CENTER MIAMI FL
 0900Z THU OCT 20 2005

...THIS IS AN EXPERIMENTAL PRODUCT FOR 2005...

AT 0900Z THE CENTER OF HURRICANE
 WILMA WAS LOCATED NEAR LATITUDE 18.3 NORTH...
 LONGITUDE 85.0 WEST WITH
 MAXIMUM SUSTAINED WINDS NEAR 130 KTS...150 MPH...240 KM/HR.

CHANCES OF EXPERIENCING WIND SPEEDS OF AT LEAST

- ...34 KT (39 MPH... 63 KPH)...
- ...50 KT (58 MPH... 93 KPH)...
- ...64 KT (74 MPH...119 KPH)...

FOR LOCATIONS AND TIME PERIODS DURING THE NEXT 5 DAYS

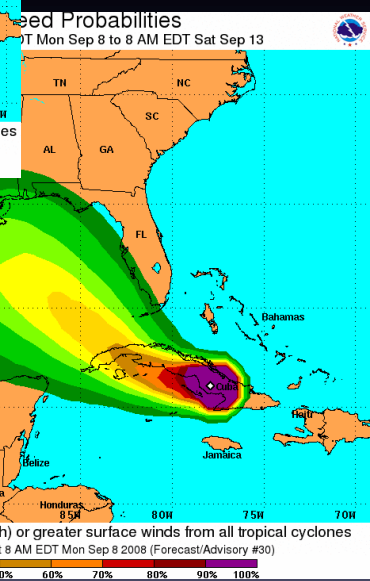
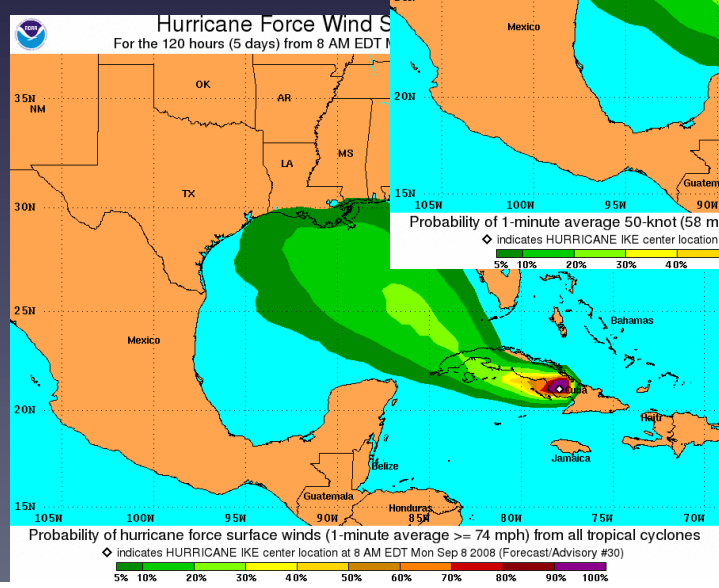
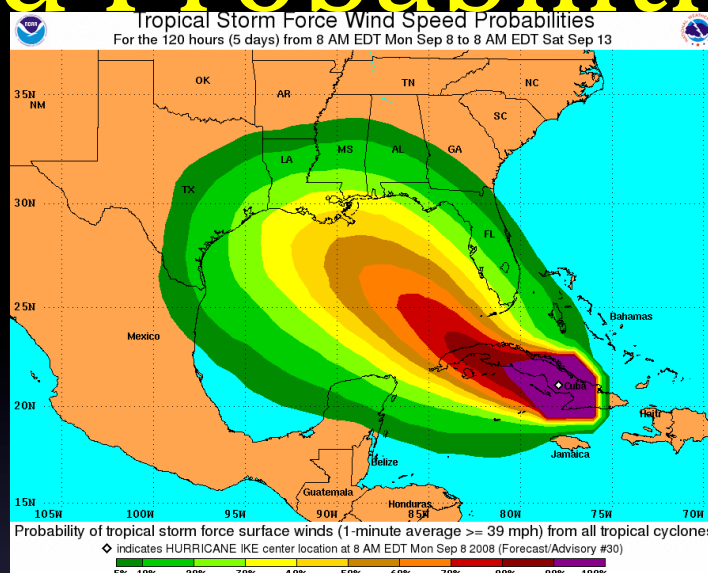
PROBABILITIES FOR LOCATIONS ARE GIVEN AS IP(CP) WHERE
 IP IS THE PROBABILITY OF THE EVENT BEGINNING DURING
 AN INDIVIDUAL TIME PERIOD (INDIVIDUAL PROBABILITY)
 (CP) IS THE PROBABILITY OF THE EVENT OCCURRING BETWEEN
 06Z THU AND THE FORECAST HOUR (CUMULATIVE PROBABILITY)

PROBABILITIES ARE GIVEN IN PERCENT
 X INDICATES PROBABILITIES LESS THAN 0.5 PERCENT
 LOCATIONS SHOWN WHEN THEIR TOTAL CUMULATED 5-DAY
 PROBABILITY IS AT LEAST 2.5 PERCENT

Z INDICATES UNIVERSAL COORDINATED TIME (GREENWICH)

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

TIME PERIODS	FROM	FROM	FROM	FROM	FROM	FROM	FROM	
		06Z THU	18Z THU	06Z FRI	18Z FRI	06Z SAT	06Z SUN	06Z MON
PERIODS	TO	TO	TO	TO	TO	TO	TO	
FORECAST HOUR	(12)	(24)	(36)	(48)	(72)	(96)	(120)	
LOCATION	KT							
MIAMI FL	34	X	X (X)	X (X)	2 (2)	16 (18)	23 (41)	5 (46)
MIAMI FL	50	X	X (X)	X (X)	X (X)	6 (6)	11 (17)	3 (20)
MIAMI FL	64	X	X (X)	X (X)	X (X)	2 (2)	5 (7)	1 (8)
KEY WEST FL	34	X	X (X)	2 (2)	7 (9)	26 (35)	18 (53)	3 (56)
KEY WEST FL	50	X	X (X)	X (X)	1 (1)	14 (15)	11 (26)	1 (27)
KEY WEST FL	64	X	X (X)	X (X)	X (X)	8 (8)	5 (13)	1 (14)
MARCO ISLAND	34	X	X (X)	X (X)	5 (5)	20 (25)	23 (48)	4 (52)
MARCO ISLAND	50	X	X (X)	X (X)	1 (1)	10 (11)	12 (23)	2 (25)
MARCO ISLAND	64	X	X (X)	X (X)	X (X)	5 (5)	6 (11)	X (11)



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

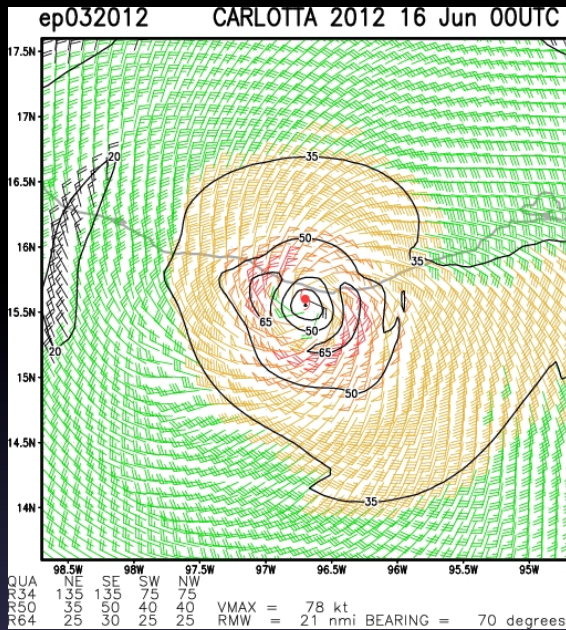
JHT: The statistics

- 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 ⁷

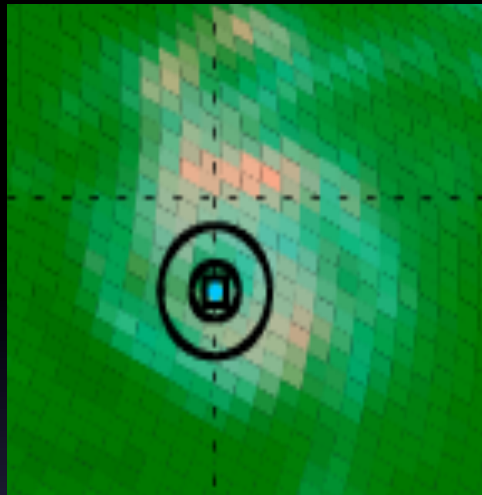
2013-2014 Major JHT Activities - 6th round

- **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

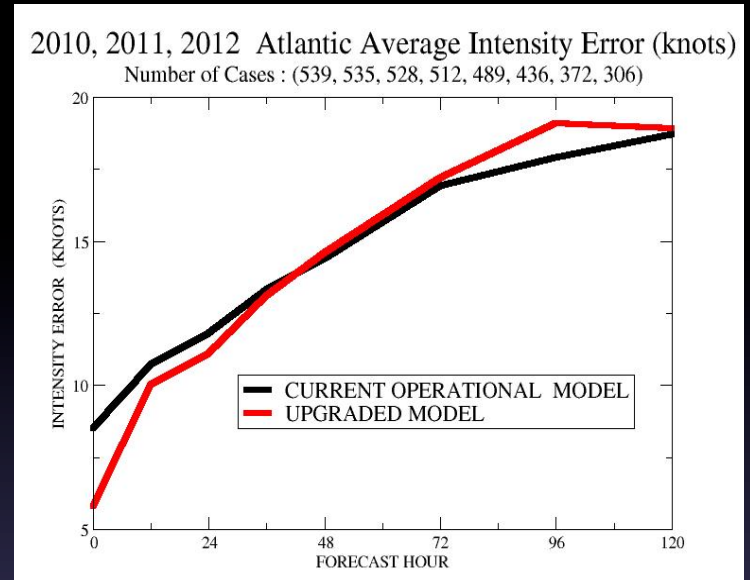
Project Highlights - 6th round



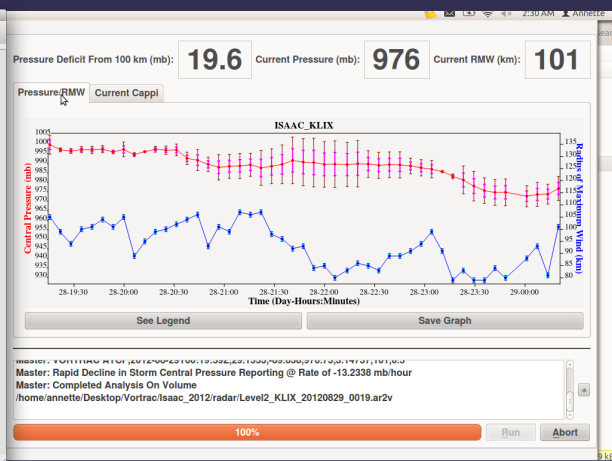
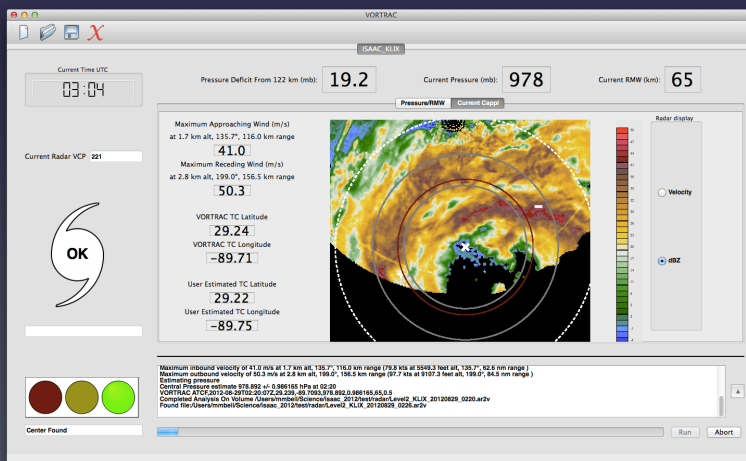
Surface winds: Knaff



Rapid Intensity Forecasting: Jiang



Hurricane model upgrades: Bender



Radar-based central pressure: Lee/Bell

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.

The Joint Hurricane Testbed

The screenshot shows the website interface with a navigation menu on the left and a main content area. The URL www.nhc.noaa.gov/jht is displayed in a large font at the top. The page title is "National Hurricane Center". The main content area features a header with the USWRP logo and the text "Joint Hurricane Testbed". Below this is a "JHT Overview" section with a navigation menu: "Overview | Current Projects | Past Projects | Admin Presentations | Highlights | Staff | Committee". The "Mission Statement" section reads: "The mission of the Joint Hurricane Testbed is to transfer more rapidly technology, research results, and observational advances of the United Program (USWRP), its sponsoring agencies, the academic community improved tropical cyclone analysis and prediction at operational centers". The "News" section lists three items: "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". The "Main Activities" section lists four bullet points: "Identify new techniques, models, observing systems, etc. with potential via an announcement of opportunity and a proposal, review, and funding", "Establish and maintain an infrastructure to facilitate the modification and integration of new tools, techniques, and data into the operational computing, communication, and display environment", "Complete tests in a quasi-operational environment of tools, techniques, and data, with metrics for scientific performance, ease-of-use, and integration", and "Prepare documentation, training, and performance evaluations of successful tools, techniques, and data to facilitate use and support in operations". A footer note says "Please see the Joint Hurricane Testbed Terms of Reference (PDF) for more details".

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, 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.