Hurricane WRF: Testing Activities and Community Support by the DTC

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Goal: Increase Tech Transfer to Operations
Current focus in HWRF

1. **Code Management**
   - Create a framework for NCEP and the research community to collaborate

2. **Testing and Evaluation**
   - Perform tests to assure integrity of community code and evaluate new developments for potential operational implementation

3. **User Support**
   - Support the community in using an operational hurricane model

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Community HWRF Overview
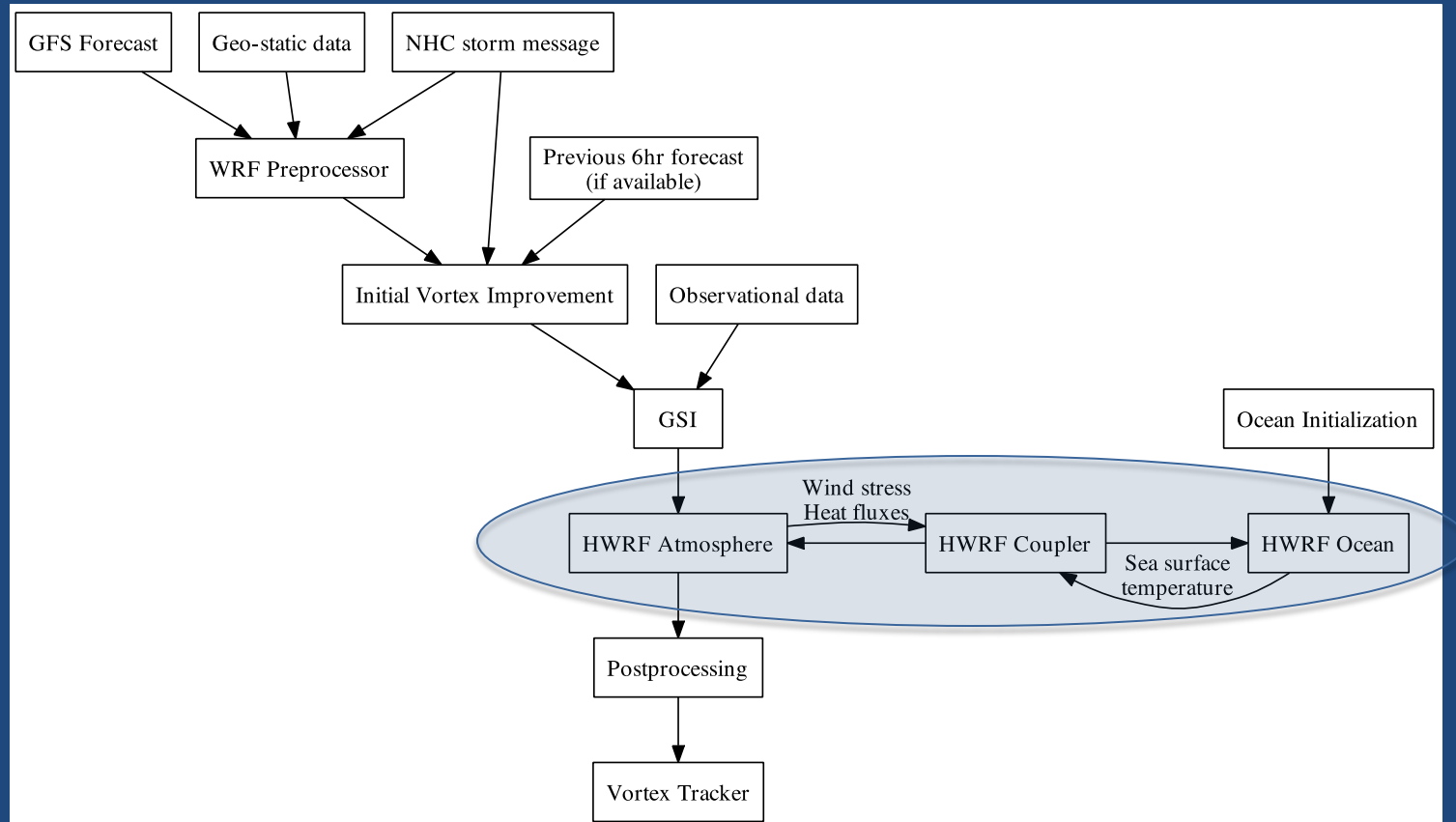
HWRF Domains

- Atmos outer Domain
  - 75x75º
  - ~27 km
  - 42 levels
- Atmos nest
  - 6x6º
  - ~9 km
  - 42 levels
- Ocean United domain
  - 1/6º

HWRF Code Management

Goal: maintain a single code base for research and operation

Components with existing community code repository in 2009	Components without existing community code repository in 2009
WRF, WPS, GSI, WPP	Vortex, POM, coupler, tracker
DTC established operational capability in community repository	DTC created community code repositories
DTC keeps community code updated with operational developments	
Code for 2011 operations taken from community repository	

Functionally-Similar T&E Suite

- Pre-processing (including ability to read binary GFS in spectral coordinates)
- Cycled HWRF vortex initialization and relocation
- GSI Data Assimilation
- Coupled (POM + WRF) model
- Post-processing
- Tracking
- NHC Verification, confidence intervals
- Display
- Archival

The Developmental Testbed Center
HWRF 2011 Baseline Test Plan
Point of Contact: Ligia Bernardet
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Introduction
The DTC will be performing testing and evaluation for the Hurricane WRF system, known as HWRF (Gopalakrishnan et al. 2010). HWRF will be configured as close as possible to the operational HWRF model, employing the same domains, physics, coupling, and initialization procedures as the model used at the NOAA NCEP Central Operations and by the model developers at NCEP EMC. The configuration to be tested matches the 2011 HWRF Baseline, which is the configuration that served as control for all developments at EMC geared towards the 2011 operational implementation.

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DTC HWRF Project

HWRF R2 Final Model Runs

2008

HWRF R2 Final Atlantic | HWRF R2 Final East Pacific
FAY (06L) | ELIDA (06E)
GUSTAV (07L) | FAUSTO (07E)
HANNA (08L) | GENEVIEVE (08E)
IKE (09L) | MARIE (14E)
 | NORBERT (15E)

2009

HWRF R2 Final Atlantic | HWRF R2 Final East Pacific
BILL (03L) | FELICIA (08E)
CLAUDETTE (04L) | GUILLERMO (10E)
DANNY (05L) | HILDA (11E)
ERIKA (06L) | IGNACIO (12E)
FRED (07L) | JIMENA (13E)
HENRI (10L) | LINDA (15E)
IDA (11L) | OLAF (18E)

http://verif.rap.ucar.edu/eval/hwrf_hnr2_hr20/

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HWRF 2011 Operational Baseline

- Goals
  - Benchmark the community code (DTC Reference Configuration)
  - Compare average skill against similar test done by EMC to qualify DTC's testing suite (exact match not expected)

DTC (HNR2)	EMC (HR20)
Linux (HFIP machine)	IBM (NCEP)
Community tracker	Operational Tracker
NetCDF I/O format	Binary I/O format

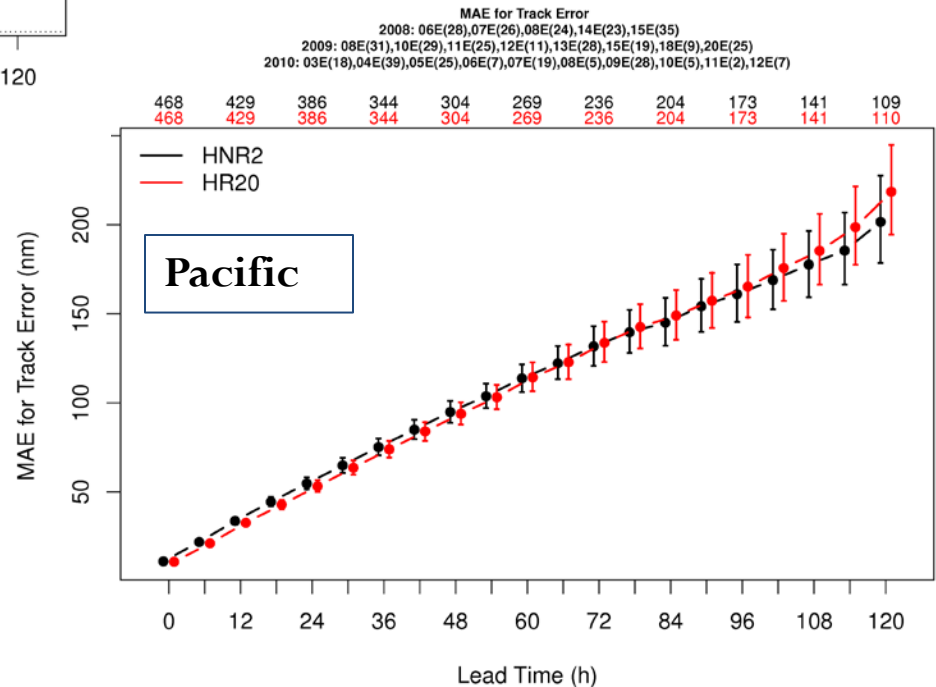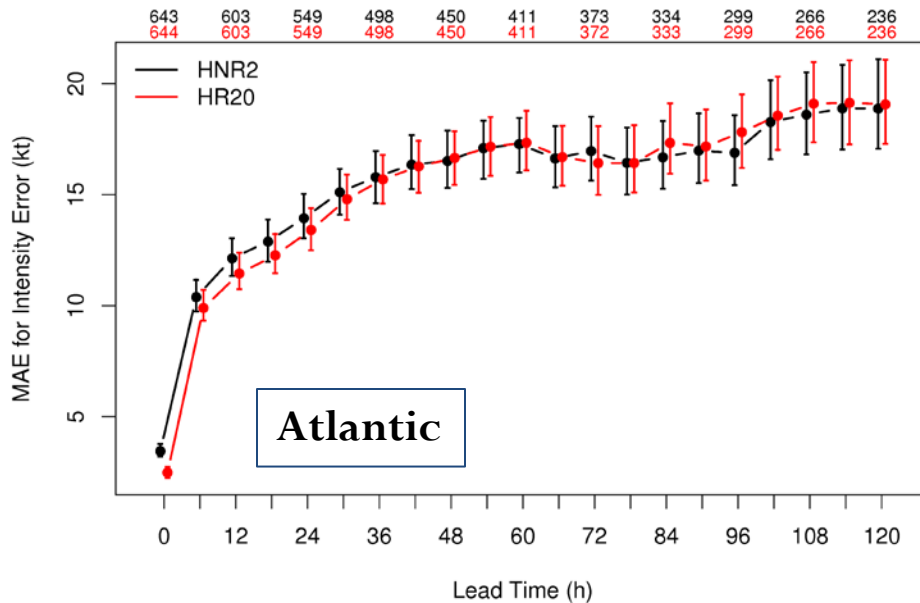DTC ran 1190 cases, 53 storms, over 3 seasons, Atl and EP

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Track Errors – 2011 Baseline

Atlantic
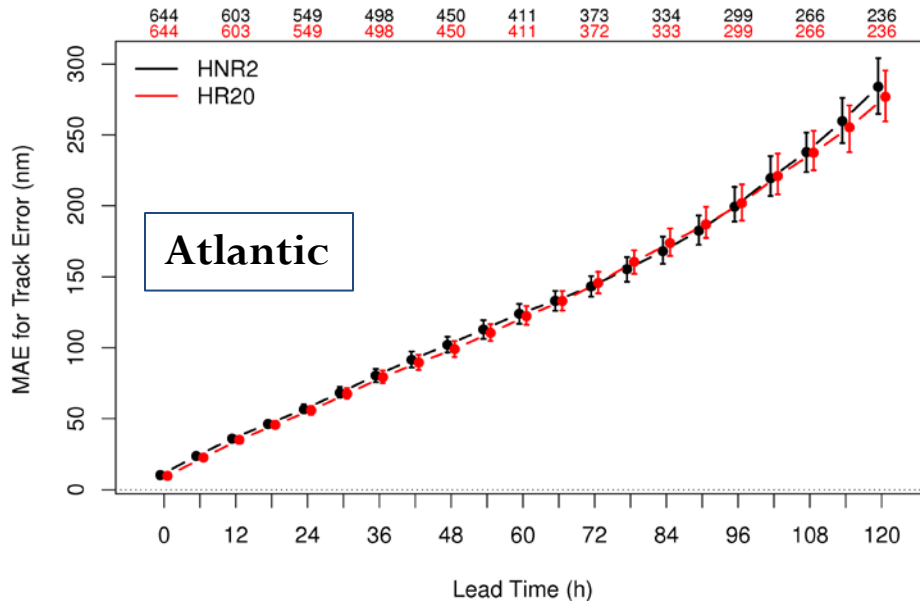
DTC Reference Configuration
EMC run

- Community code benchmarked
- Errors similar to equivalent runs performed at EMC
- DTC testing suite qualified

Pacific

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Intensity Errors – 2011 Baseline

DTC Reference Configuration
EMC run

- Errors similar to equivalent runs performed at EMC
- Only statistical significant difference is at initial time

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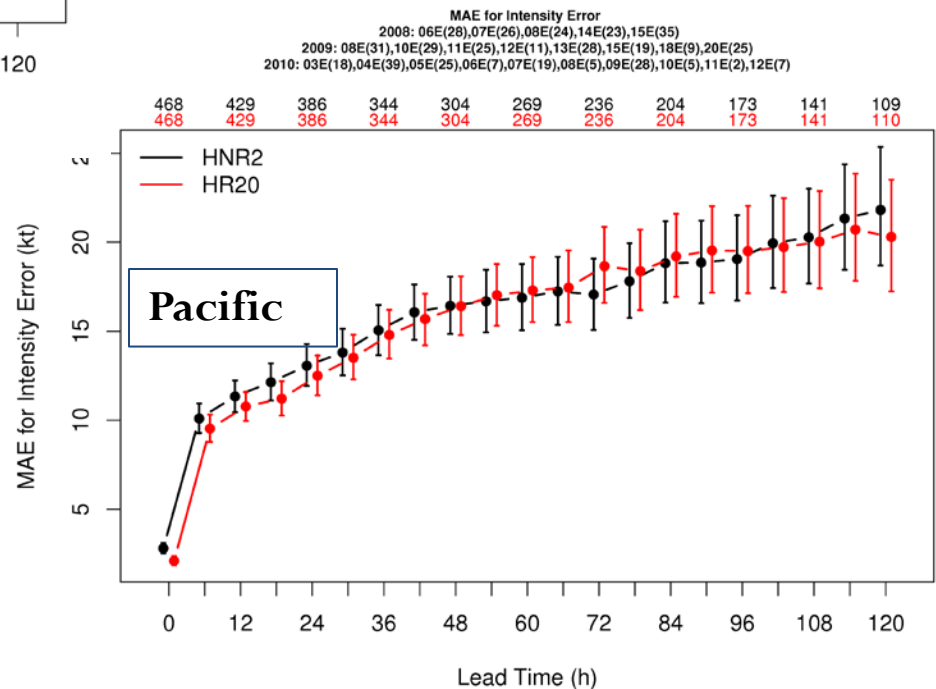
WRF for Hurricanes User Support

www.dtcenter.org/HurrWRF/users

Code downloads, datasets, documentation, email helpdesk

170 registered users

Current release is Beta based on V3.2

Upcoming release July 2011 based on V3.3

Future Work: Code Management

- Work with research and operational communities to maintain a single code base
- Interface with community members to transition new capabilities onto HWRF system
  - 2011 operational capability
  - Idealized simulation capability
  - Three-nest capability
  - Ocean model choice (POM and HYCOM)
  - HFIP Announcement of Opportunity projects
  - Others! Keep DTC involved if you are working in developments for HWRF.
- Ascertain that non-HWRF changes to the community code do not affect operational HWRF answer

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Future Work: Testing and Evaluation

- Test plan for 2011
  - Reference Configuration for the 2011 operational model
  - Higher resolution
  - Enhanced computational performance
  - Additional physics interoperability and testing of alternate physics configurations

- Enhanced diagnostic activities
  - EMC's HPLOT for forecast interrogation
  - Large scale comparison of model forecasts and observations/analyses