

DTC Contribution to Hurricane R20

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HFIP Meeting, Miami, FL

External collaborators:

NOAA Environmental Modeling Center

NOAA Geophysical Fluid Dynamics Laboratory

NOAA Atlantic Oceanographic and Meteorological Laboratory

NCAR Mesoscale and Microscale Meteorology Division

University of Rhode Island



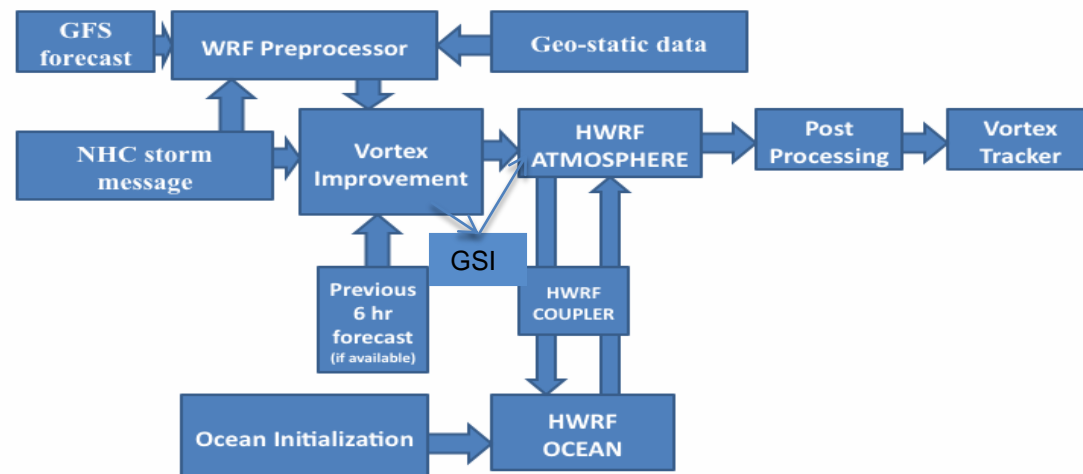
Hurricane Task of DTC

- Goal
 - Facilitate transfer of hurricane NWP research to operations
- Methods
 - Create a framework for NCEP and the research community to collaborate: share single code base
 - Support the community in using operational hurricane models
 - Develop and maintain a hurricane testing and evaluation infrastructure at DTC
 - Perform tests to assure integrity of community code and evaluate new developments for potential operational implementation

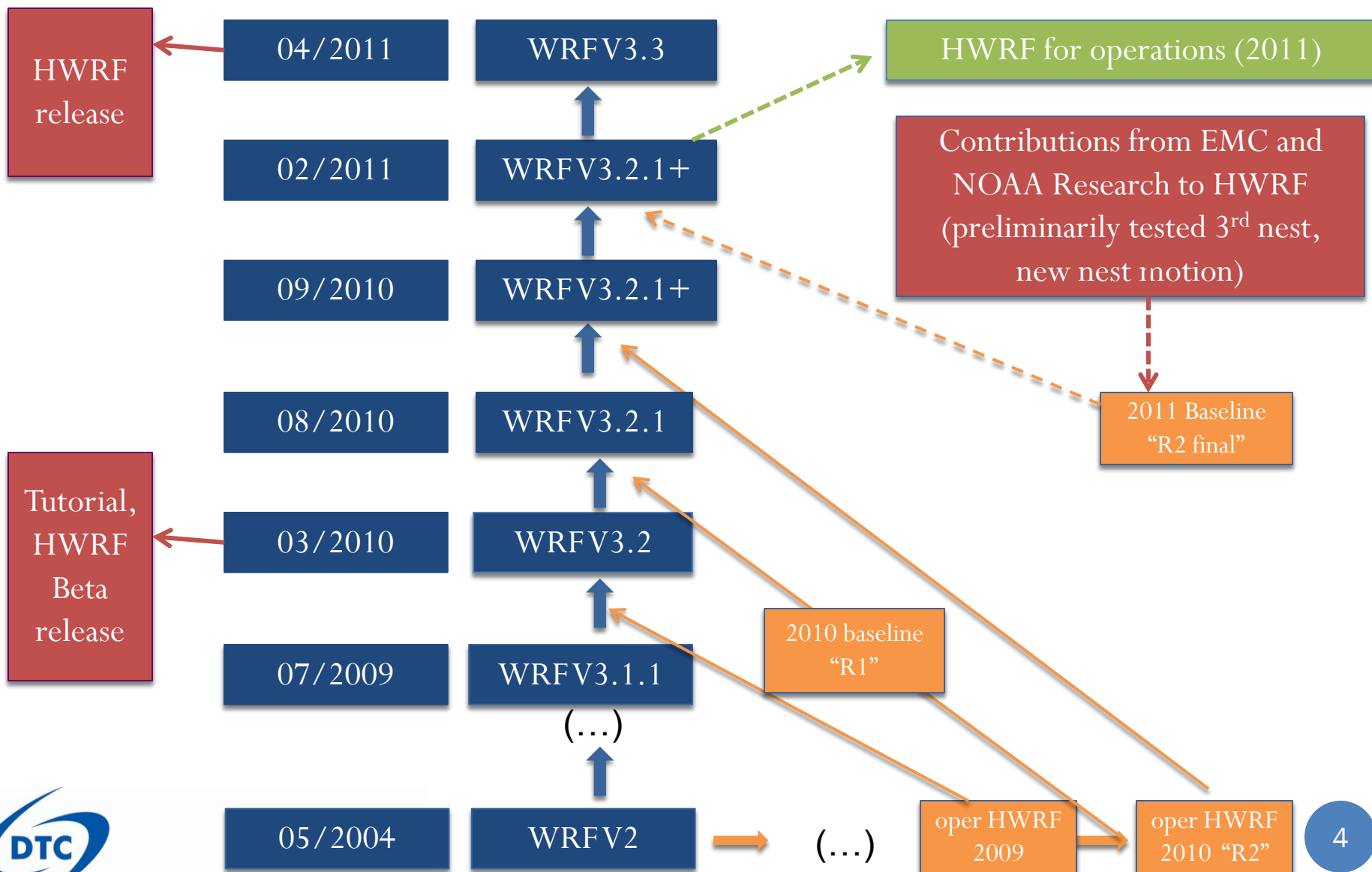
HWRF Components using V3

- WRF atmospheric model*
- WPS (preprocessor)*
- Prep_hybrid (preprocessor)
- Vortex Initialization
- GSI data assimilation*
- Ocean initialization
- Princeton Ocean Model
- Coupler
- WPP (postprocessor)*
- Vortex Tracker
- Graphics
- Libraries and utilities

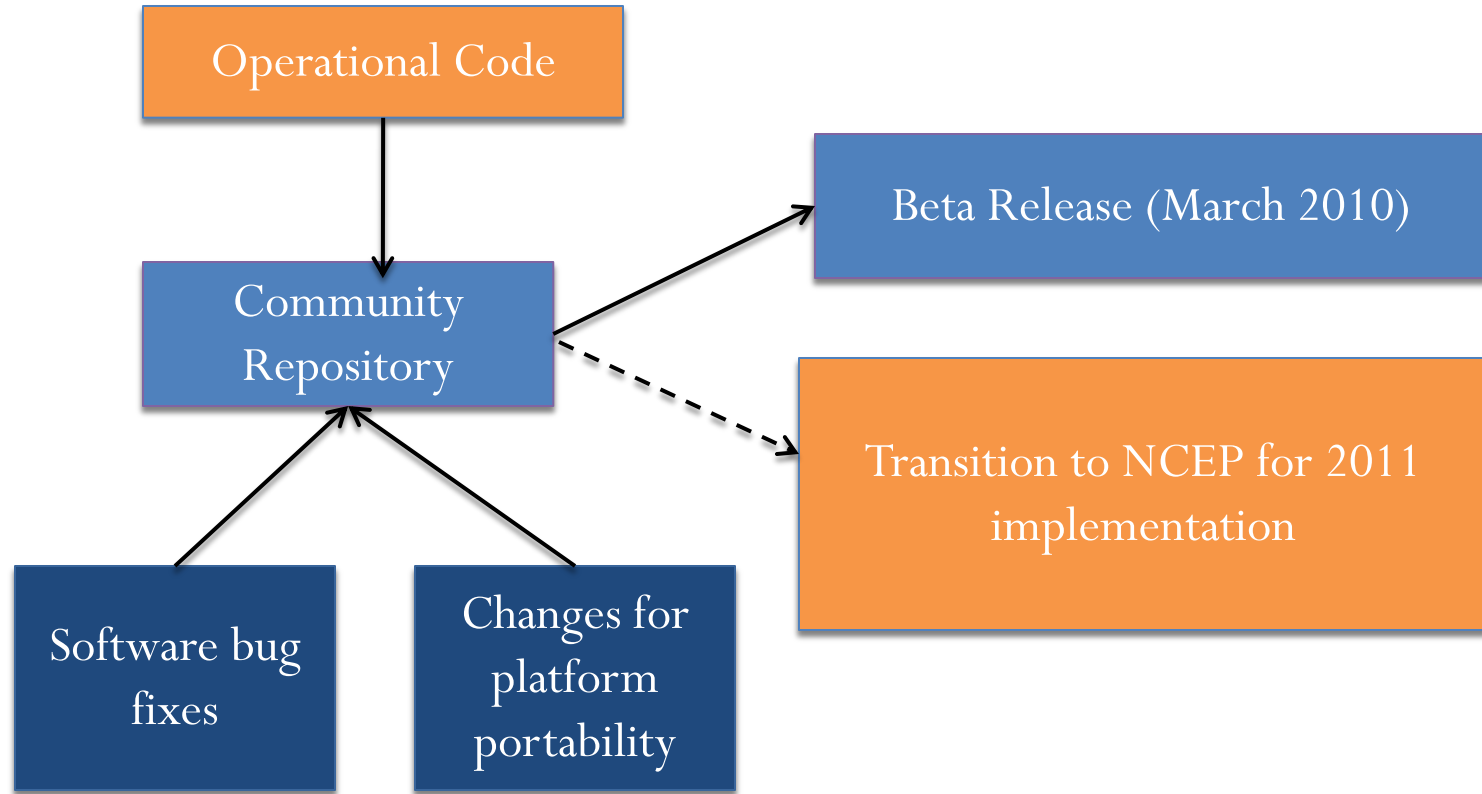
*Code repositories existed before DTC/EMC started this project



HWRF code management: atmospheric model



HWRF code management. Part 2: Vortex initialization, POM, POM initialization, coupler, tracker

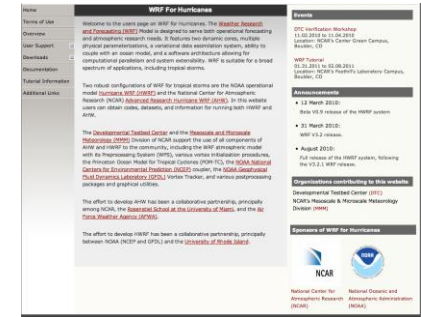


HWRF code management. Part 3: WPS, WPP, GSI

- Use existing community repositories. Not many changes.

HWRF Community Code Support

- <http://www.dtcenter.org/HurrWRF/users/HWRF> code
 - Datasets
 - Documentation
 - Resident tutorial
 - Helpdesk
- Currently 120 registered users and 30 questions per month
- Upcoming: HWRF Reference Configuration (code benchmark for community)
- Note: delay between code getting ready and public release.



Testing for 2011 HWRF implementation

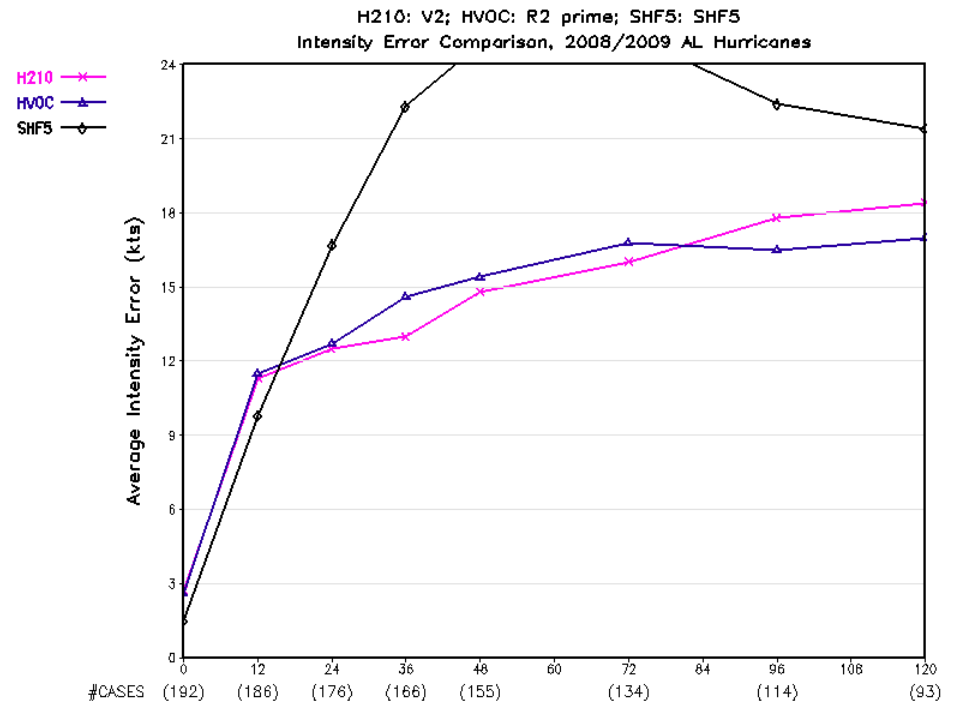
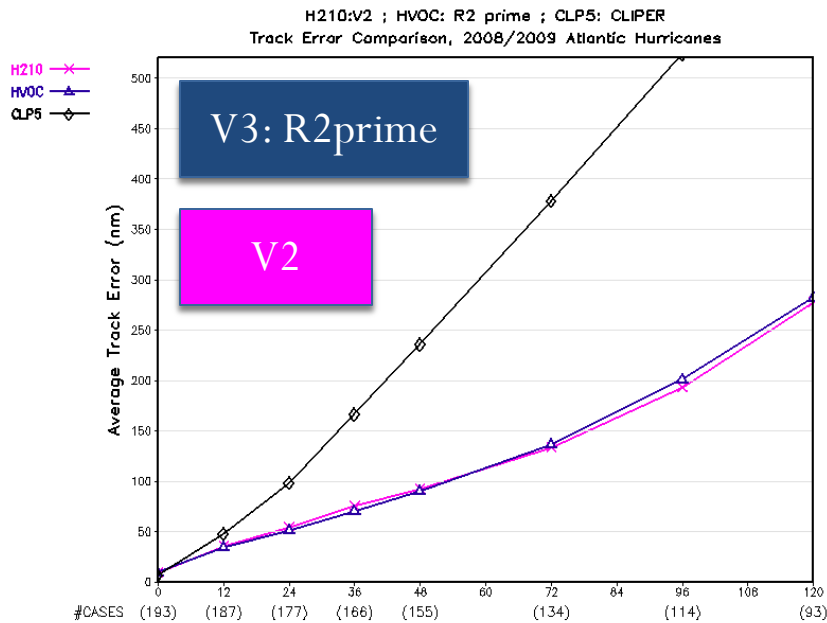
- With EMC, conducted several tests towards acceptance of community code for operations:
 - **Sanity Check:** Community HWRF against 2008/2009 model
 - **R1:** Community WRF code comparison against 2010 baseline (H050)
 - **R2:** Community WRF code comparison against 2010 operational configuration
 - **R2prime:** Community WRF code and vortex initialization code comparison against 2010 operational configuration
 - **R2-final:** 2011 Baseline (on NCEP computer)
- Upcoming:
 - 2011 Baseline (on jet)
 - 2011 Baseline + HYCOM

DTC exposed and/or fixed several bugs in this process



Testing ↗ Several tests completed (with EMC) on vapor
 ↘ HWRF suite on njet is complete

Sample results of R2prime



Foundation is near completion

- Operations and community using the same code base for testing. Community code will be operational in 2011.
- Challenge: do not let codes diverge in future
 - DTC to keep putting HWRF-related enhancements in community code and making it available to users.
- Ongoing Community support and code management

Next Tutorial: last week of April 2011

Upcoming HWRF T&E at DTC

- **Done:** Development of functionally equivalent testing infrastructure on jet. Work will continue to match system evolution at EMC.
- Qualify DTC HWRF Testing Suite on jet.
- Transition HYCOM to DTC and test.
- Perform additional tests TBD. Explore tests of AHW or other community contributions features in HWRF (physics and initialization).
- Evaluate HWRF model performance through sensitivity experiments and model diagnostics to understand weaknesses and sources of error. New hire at DTC to help with this.