

Latest Developments in NOAA's Hurricane Research - HFIP

Hurricane
Sandy



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Vision

- Organize hurricane community to dramatically improve numerical forecast guidance to NHC in 5-10 years

Goals

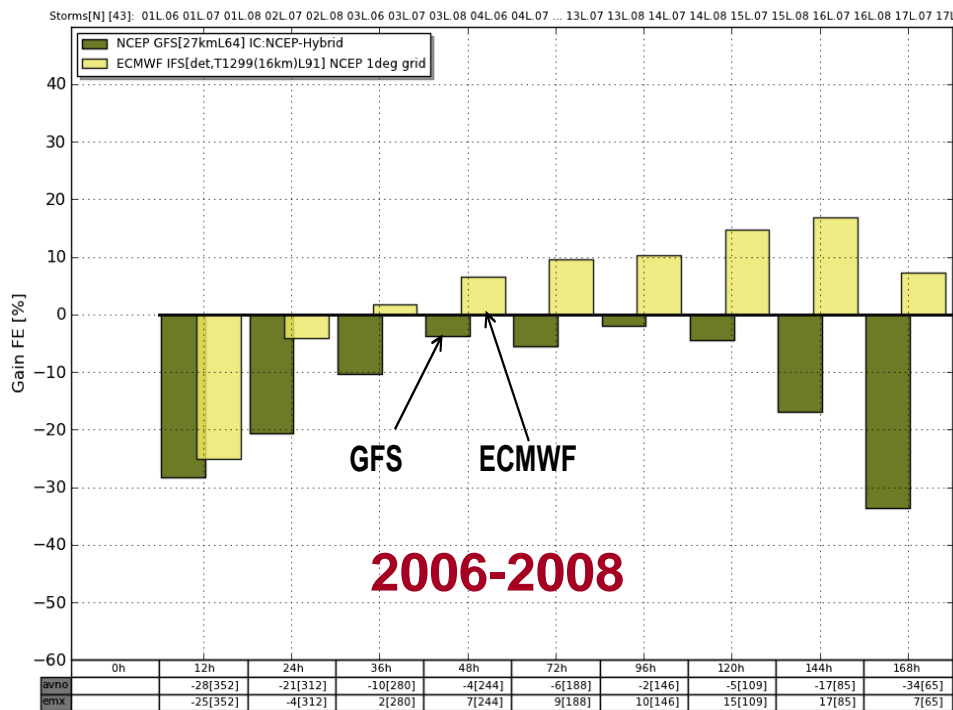
- **Improve** forecast accuracy for track & intensity by 20% in 5 years, 50% in 10 years
- **Extend** forecast guidance to 7 days with skill comparable to current 5 day forecasts
- **Increase** probability of predicting Rapid intensification at Day 1 to 90% and 60% at Day 5

HFIP Successes to date: GFS Track Forecast Improvements

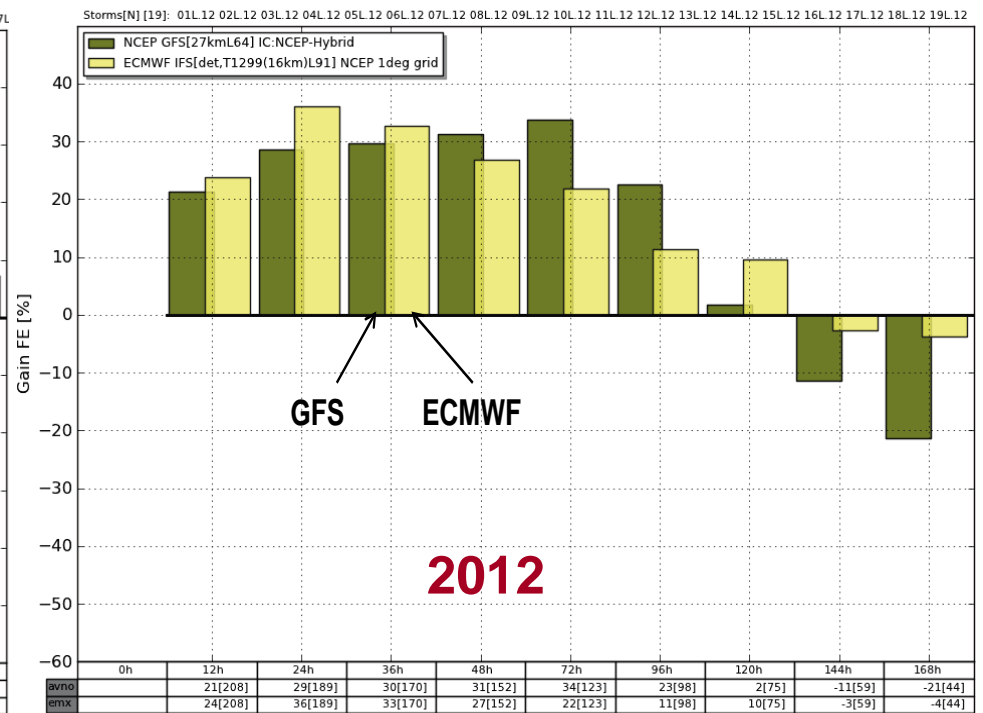


(% Improvement over HFIP baseline)

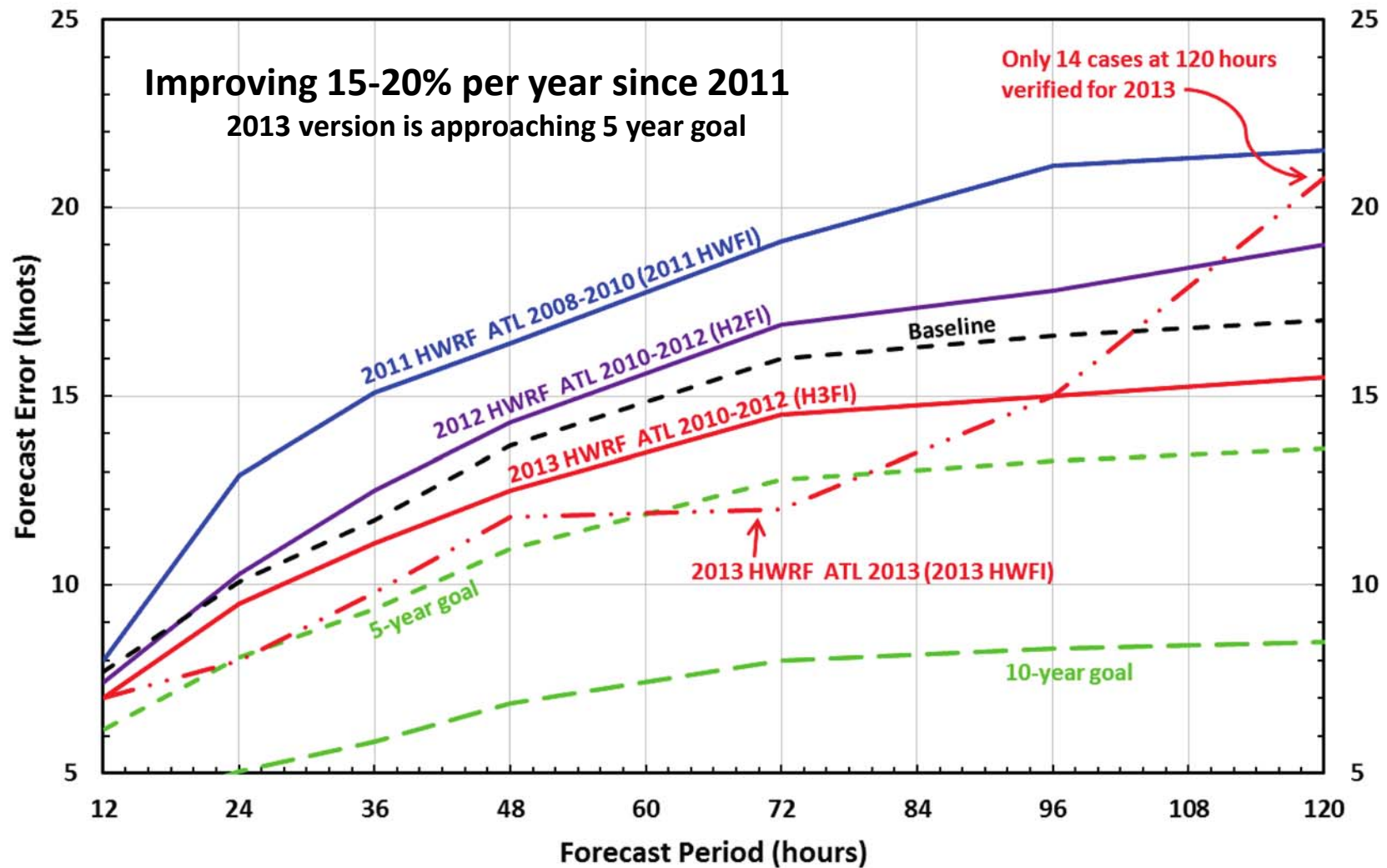
LANT GFS v ECMWF %improve over HFIP baseline d+7 track error
pre-HFIP period 2006-2008



LANT GFS v ECMWF %improve over HFIP baseline d+7 track error
HFIP year 4 2012



HFIP Successes to date: HWRF Intensity Forecast Improvements



NOAA Hurricane Forecast Improvement Project

Meeting the Nation's Needs

http://www.emc.ncep.noaa.gov/gc_wmb/vxt/

HFIP Successes to date:

Other Areas



- Demonstrated HWRF ensemble - **shows great promise**
- JTWC evaluating HWRF guidance in WPAC, NIO, SIO using HFIP Demonstration System on Jets – **very successful**
- Demonstrated prototype product for genesis using HFIP global ensembles – **brief NWS leadership during demo**
- Demonstrated next generation storm surge model - forecast for Sandy 36 h before landfall **showed surprising skill** for NYC and NJ coast.
- Demonstrated performance gain of increased operational resolution in Hybrid DA
- Grants to Academia
- Scientific Review Committee established



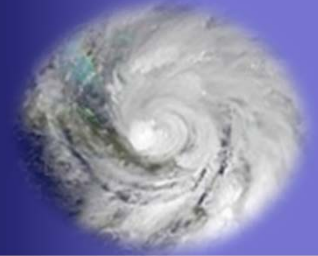
HFIP Lesson Learned



- Make better use of inner core observations to evaluate more than track and intensity:
 - Structure – drives damage and coastal inundation (surge)
 - Rainfall – drives inland inundation (floods)
- Make better use of inner core observations (in-situ & satellite) to initialize models
- Develop strategies to use ensembles to address uncertainty in intensity, structure, surge, and rain
- Future model architecture must include environmental changes on times scales to 10 days (best represented in global model), and to resolve rapidly changing inner core structure (best handled by moving nests)



HFIP Priorities 2014-2016



Operational Impact

- Continue demonstration of real-time Experimental Numerical Forecast System on HFIP Boulder Jet System during hurricane season
- Determine benefit of reconnaissance data & Doppler Radar (TDR)
- Demonstrate multi- & single-model ensembles for Track & Intensity

Research & Development

- Improve use of TDR flights operationally
- Improve use of Satellite data in TC DA (**Sandy Supplemental - QOSAP**)
- Develop HWRF GSI hybrid DA - Focus on high resolution inner domains
- Develop Global Physics for higher resolution (**Sandy Supplemental HIWPP**)
- Continue to improve HWRF Physics (**Sandy Supplemental - OAR**)

Technical Advancements

- Convert HWRF to NMMB (under NEMS) & transition to operations (**HIWPP**)



Questions?

Hurricane
Sandy

