



A graphic element for the Hurricane Forecast Improvement Project (HFIP), consisting of several concentric, slightly tilted grey ellipses. A red, stylized hurricane symbol is positioned in the center of these ellipses.

NOAA
HURRICANE FORECAST IMPROVEMENT PROJECT

HWRF Tutorial

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Purpose of Briefing



- HFIP Overview
- Role of HWRF in HFIP
- HWRF Goals



HFIP Motivation

Reduced Evacuation Costs



- Executive Office of President, Statement of Administration Policy, Oct 5, 2008:
 - “... the administration urges the Congress ... to support accelerated improvement of hurricane track and intensity forecasts, which will help to prevent unnecessary and costly evacuations.”
- Improved forecasts
 - Increased forecast accuracy at longer lead times, especially during periods of rapid intensity changes; raise confidence levels for all forecast periods
 - Reduced over-warning
- More effective emergency management response
 - Reduced Evacuations
 - Overall reduction in preventable economic losses
 - Hundreds of millions of dollars saved annually



The HFIP Project Vision/Goals



- **Vision**

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

- **Goals**

- Reduce numerical forecast errors in track and intensity by 20% in 5 years, 50% in 10 years
- Extend forecast guidance to 7 days with skill comparable to 5 days at project inception
- Increase probability of predicting rapid intensification at day 1 to 90% and 60% at day 5



HFIP Scope



- Improve **hurricane forecast system/global forecast system** to reduce error in intensity and track
- Make better use of existing observing systems; define requirements for future systems to enhance research and operations capabilities and impacts
 - Does not include acquisition or operation of operational observing systems
- Expand and improve forecaster tools and applications to add value to model guidance



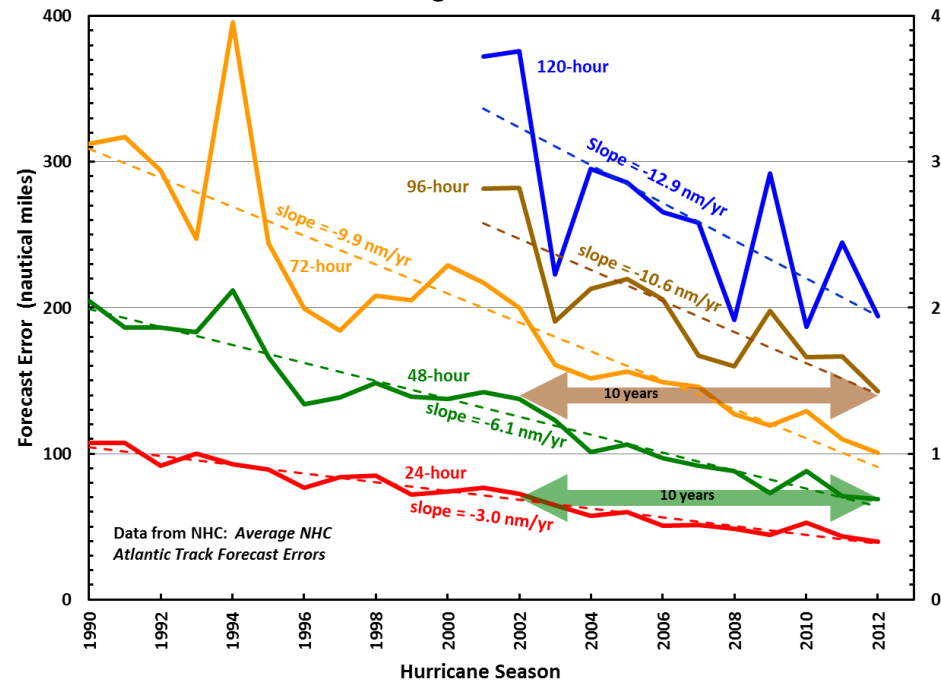
Operational Forecast Performance



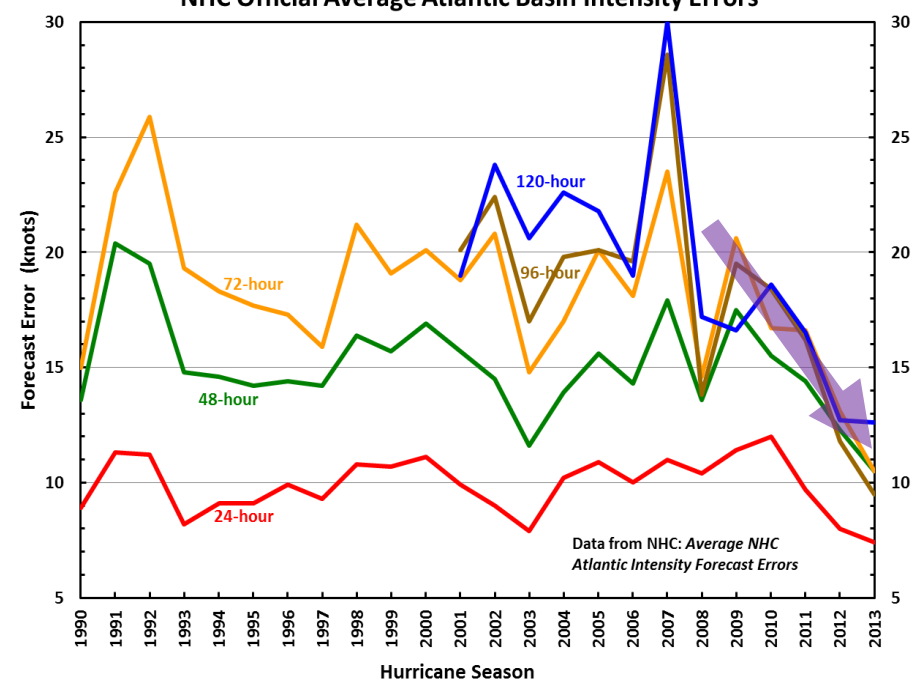
Good – track forecast improvements

Not so Good – however, recent trend hopefully persists

NHC Official Average Atlantic Basin Track Errors



NHC Official Average Atlantic Basin Intensity Errors



- Errors cut in half over past 15 yrs
- 10-yr improvement - As accurate at 48 hrs as we were at 24 hrs in 2000

- 24-48h intensity forecast historically off by 1 category (2 categories perhaps 5-10% of time)



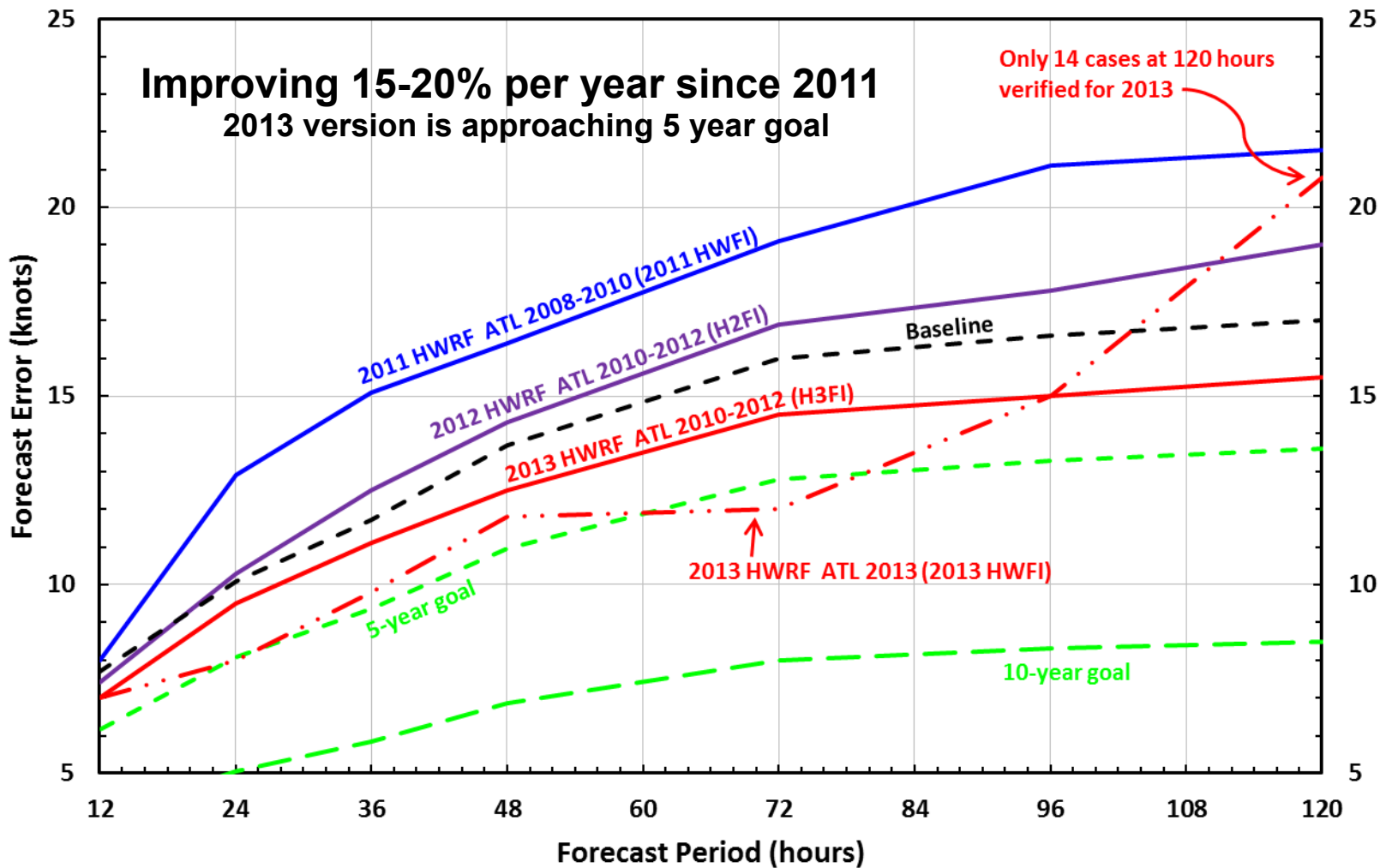
NOAA Hurricane Forecast System



- NOAA HFS is the coupled ocean, global atmosphere, wave, ***hurricane***, surge modeling system being developed to support NHC Warning and Forecast operations
- NWS runs the HWRF operationally as part of its operational Hurricane Forecast System (HFS)
 - Looking for reliable simulations of growth and decay of a tropical systems within it's environment
 - Improved overall accuracy



HWRF Intensity ATL Basin Cumulative Forecast Improvements





HWRF

- HWRF is our flagship operational modeling system for predicting hurricane lifecycle
- HWRF is baseline system for modeling hurricane parameters in impact models – e.g. Storm Surge.
- **Needed** evolution requires the engagement of broader community – operational and research



HFIP Goals for HFIP

- HWRF will be the best tropical cyclone model for any global oceanic basin (including Southern Hemisphere)
- HWRF will be model of choice internationally
- NCEP makes the operational modeling suite (including HWRF through DTC) available to the community; and
- DTC is providing support for community to run this model with needed flexibility, e.g.
 - idealized hurricane simulation capability,
 - extensive physics options
 - ocean coupling).

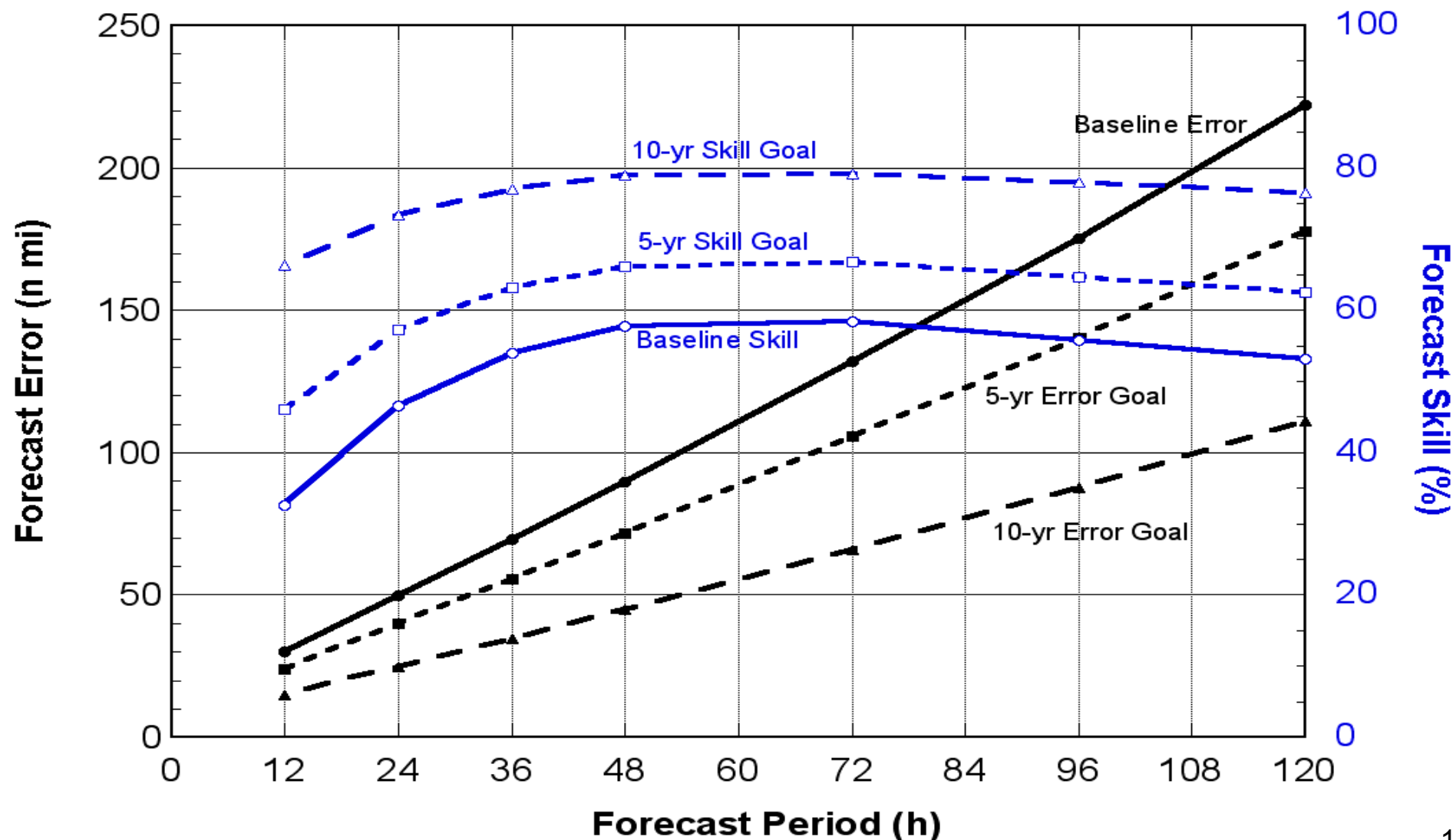


Questions



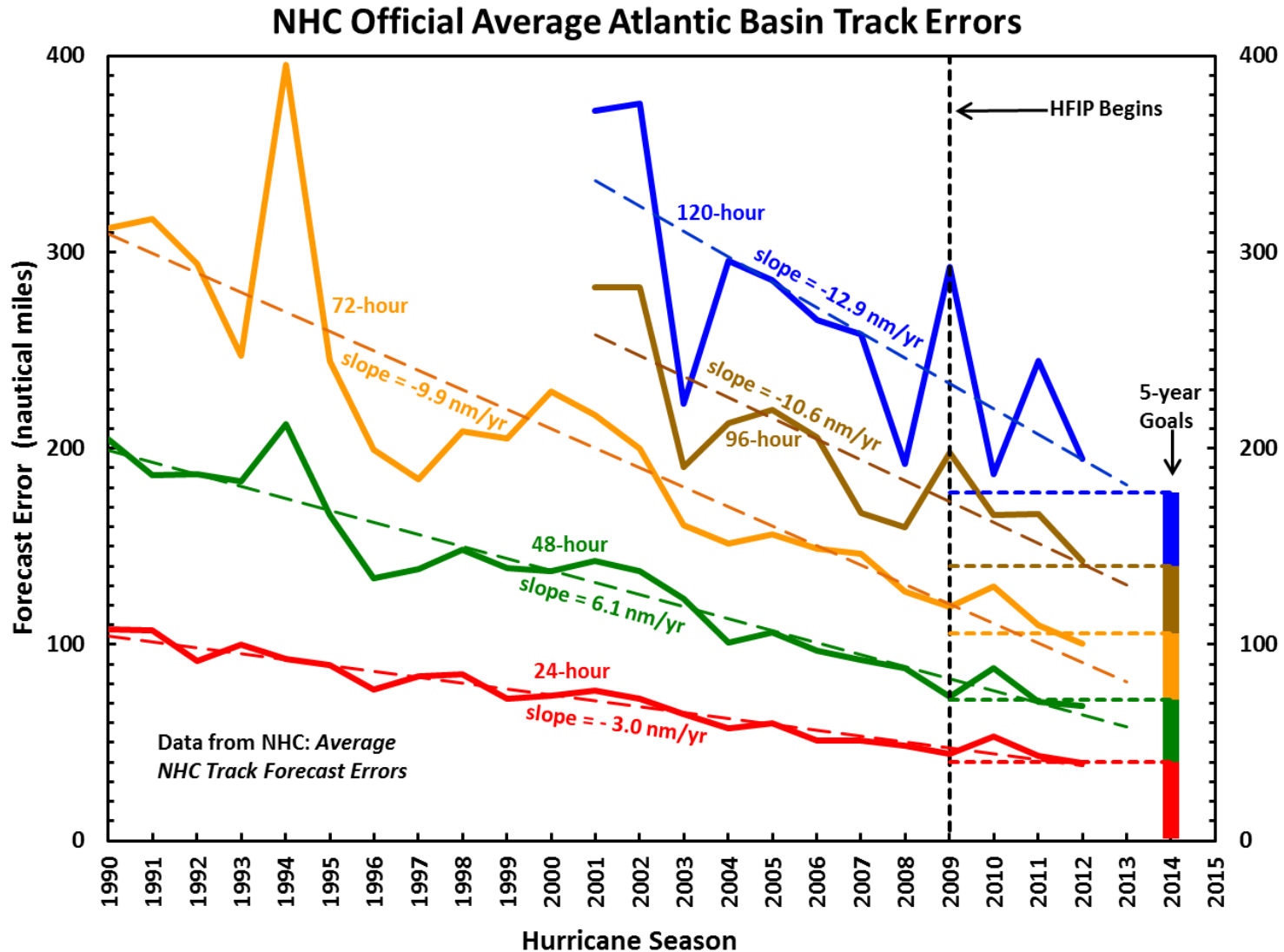


HFIP Baselines and Goals: Track



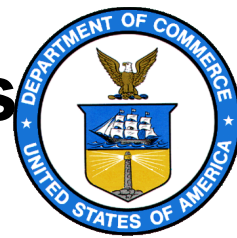


Operational Track Forecast Trends and HFIP Goals

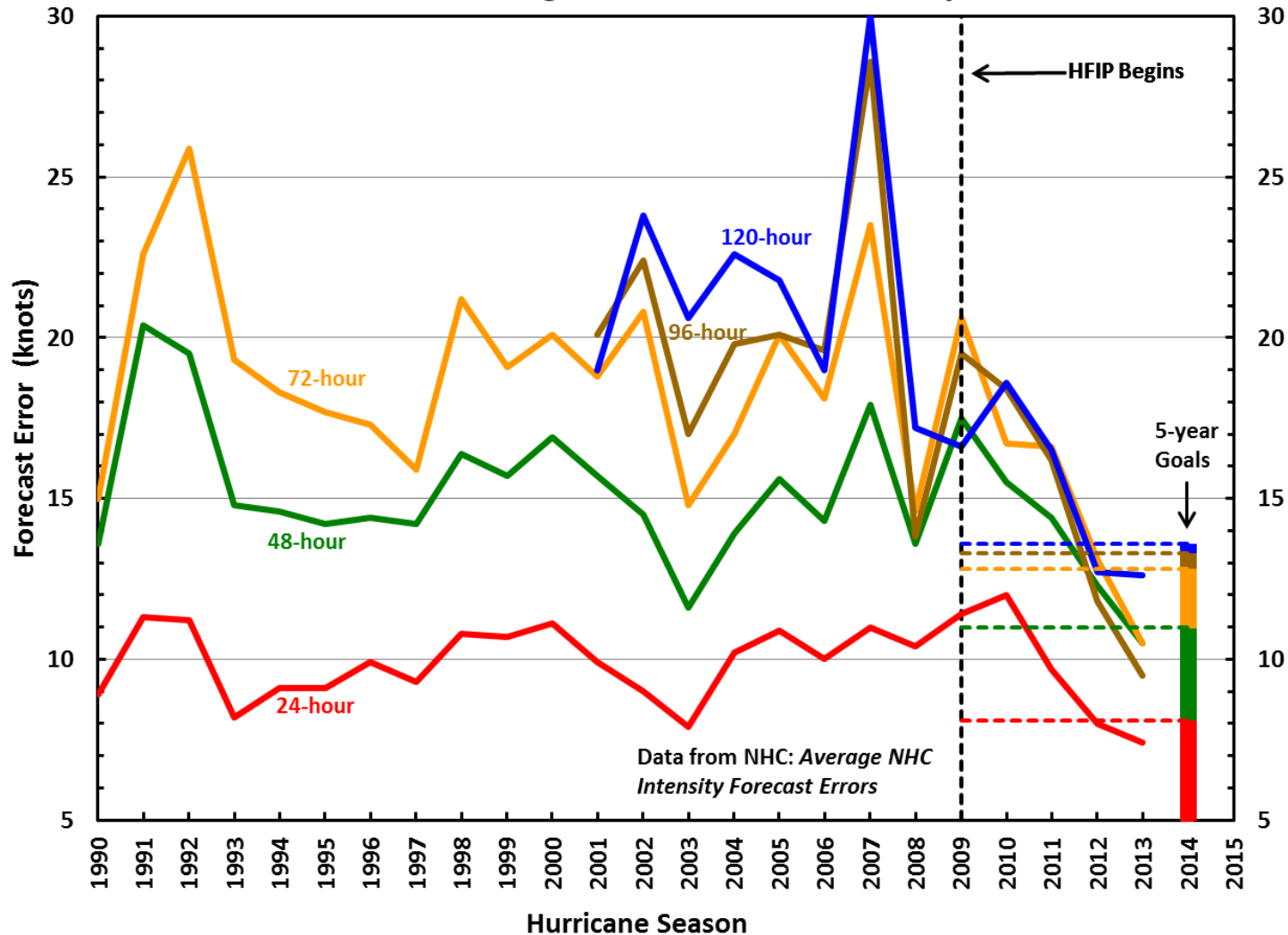




Operational Intensity Forecast Trends and HFIP Goals

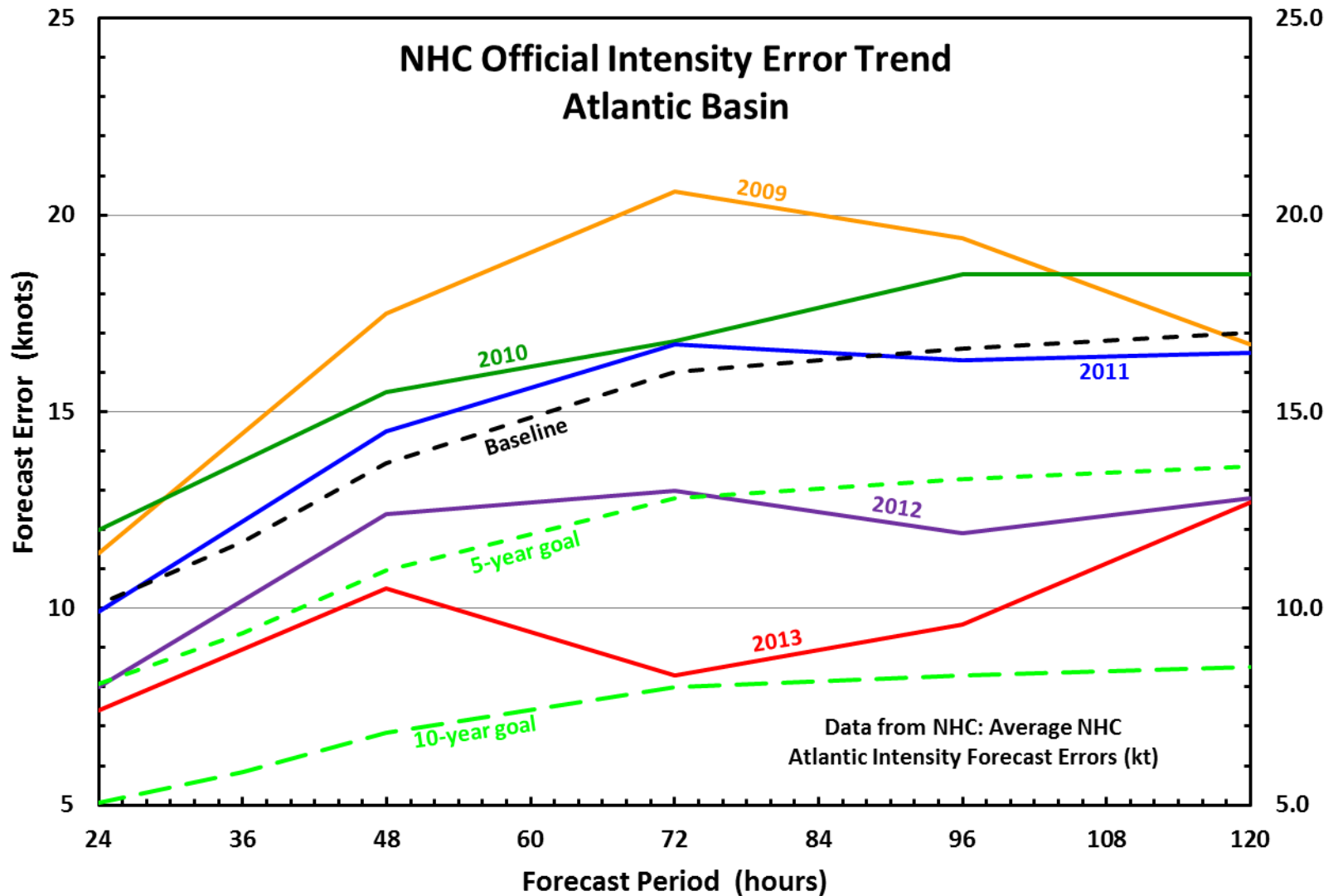


NHC Official Average Atlantic Basin Intensity Errors





Recent (2009-2013) Trend in Operational Intensity Forecast



Increase Forecast Lead Times



Increase forecast accuracy at longer lead times, especially during periods of rapid intensity changes; raise confidence levels for all forecast periods