

Summary of Ensemble Workshop

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Workshop Goals

- Overview of current dynamical ensemble prediction systems (EPS)
- Description of NHC interests and needs
- Statistical probabilistic products
- Methods of introducing variability into dynamical EPS
- Applications of EPS data

NHC Interest

- Better deterministic track and intensity forecast (i.e., ensemble mean)
- “guidance on guidance” or ways to discriminate which members of an ensemble are more likely
- Reliable uncertainty information
- Better ways to display ensemble information
- Better probabilistic genesis forecasts
- Most exposure is with global ensembles

Dynamical EPS

- HWRF Ensemble
 - Environment & Vortex IC perturbations
 - Model error via stochastic methods
- GFDL Ensemble
 - Vortex perturbations in specific members
 - Model error in specific members
- COAMPS TC Ensemble
 - Environment & Vortex IC perturbations
 - No model error representation

Dynamical EPS

- Most of these systems are spread deficient in both track and intensity
- Two methods that could alleviate this:
 - Reduce ensemble mean error
 - Increase ensemble spread through various methods, including model error

Model Error Methods

- Stochastic Kinetic Energy Backscatter
- Stochastic Perturbed Physics Tendency
- Stochastic Parameters
- Need to be done in an intelligent way, can accentuate biases if model biases are large contribution to ensemble error
- Multi-model, multi-physics
 - create a lot of spread
 - work best when biases cancel out
 - large long-term maintenance cost

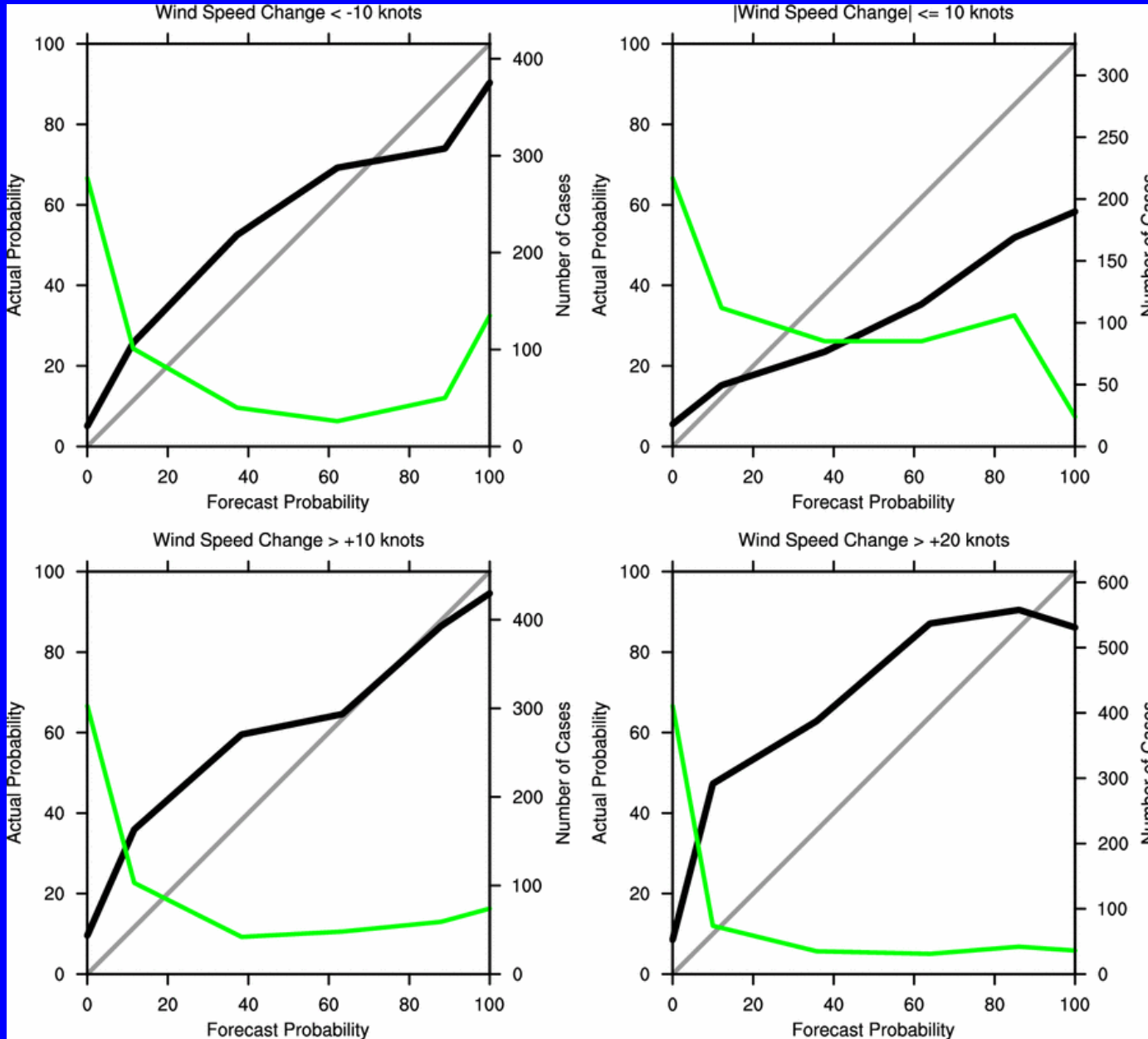
Statistical Methods

- Generally inexpensive method of creating an ensemble forecasts of intensity, wind speed probability
- Benchmark for justifying cost of dynamical EPS??

Recommendations & Actions

- Provide NHC with probabilistic intensity changes based on EPS guidance during 2016 season

HWRF EPS 00-48 h Maximum Wind Speed Reliability



Recommendations & Actions

- Provide NHC with probabilistic intensity changes based on EPS guidance during 2016
- Ensemble member subsetting for TC track based on OBEST
- More direct discussions between NHC forecasters on EPS developers on products and visualizations
- Additional use of EPS output to diagnose deficiencies in model physics

Recommendations & Actions

- More investigations on how to improve spread deficiency
 - Best ways to introduce model errors
 - Little work on how to introduce SST uncertainty
- Determine whether spread deficiency is conditional (i.e., only for hurricanes)
- Focus was mostly on track, intensity. What is value of dynamical EPS for other hazards, including storm surge, rainfall?