

Evaluating Methods of Parameterizing Model Error in the HWRF Ensemble Prediction System

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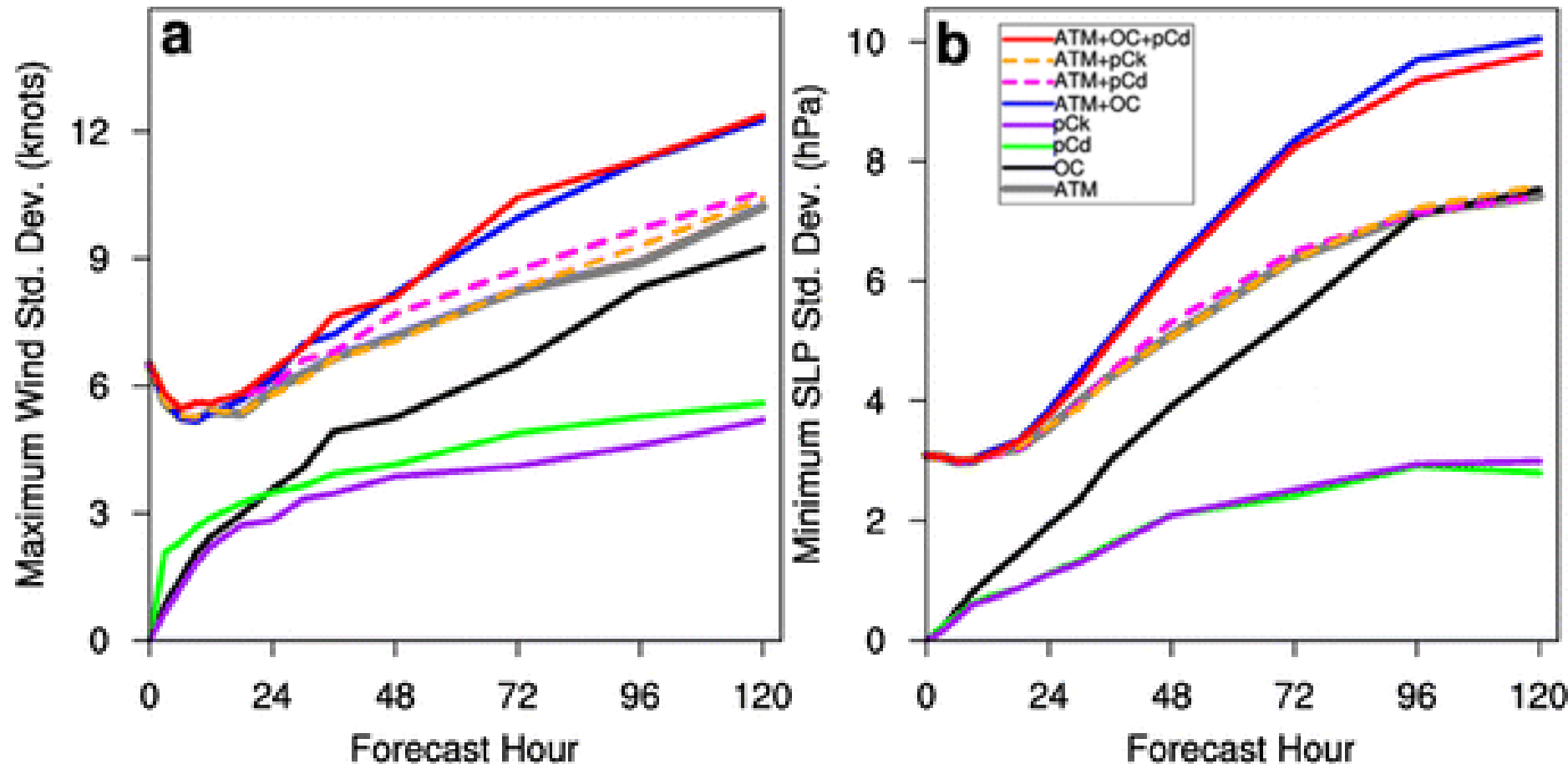
Overview

- One purpose of ensemble prediction systems is to provide information about possible solutions
- Often have situations where observation falls outside of the ensemble
- One hypothesis for this is that ensemble design do not account for all sources of errors (i.e., initial condition and model)
- Goal of this project is to evaluate additional methods of incorporating model uncertainty into HWRF EPS

Overview

- Specifically, will incorporate new methods of addressing model uncertainty that include:
 - variability to the ocean initial conditions
 - Stochastic Perturbed Physics Tendencies (SPPT) to the boundary layer scheme and microphysics tendency

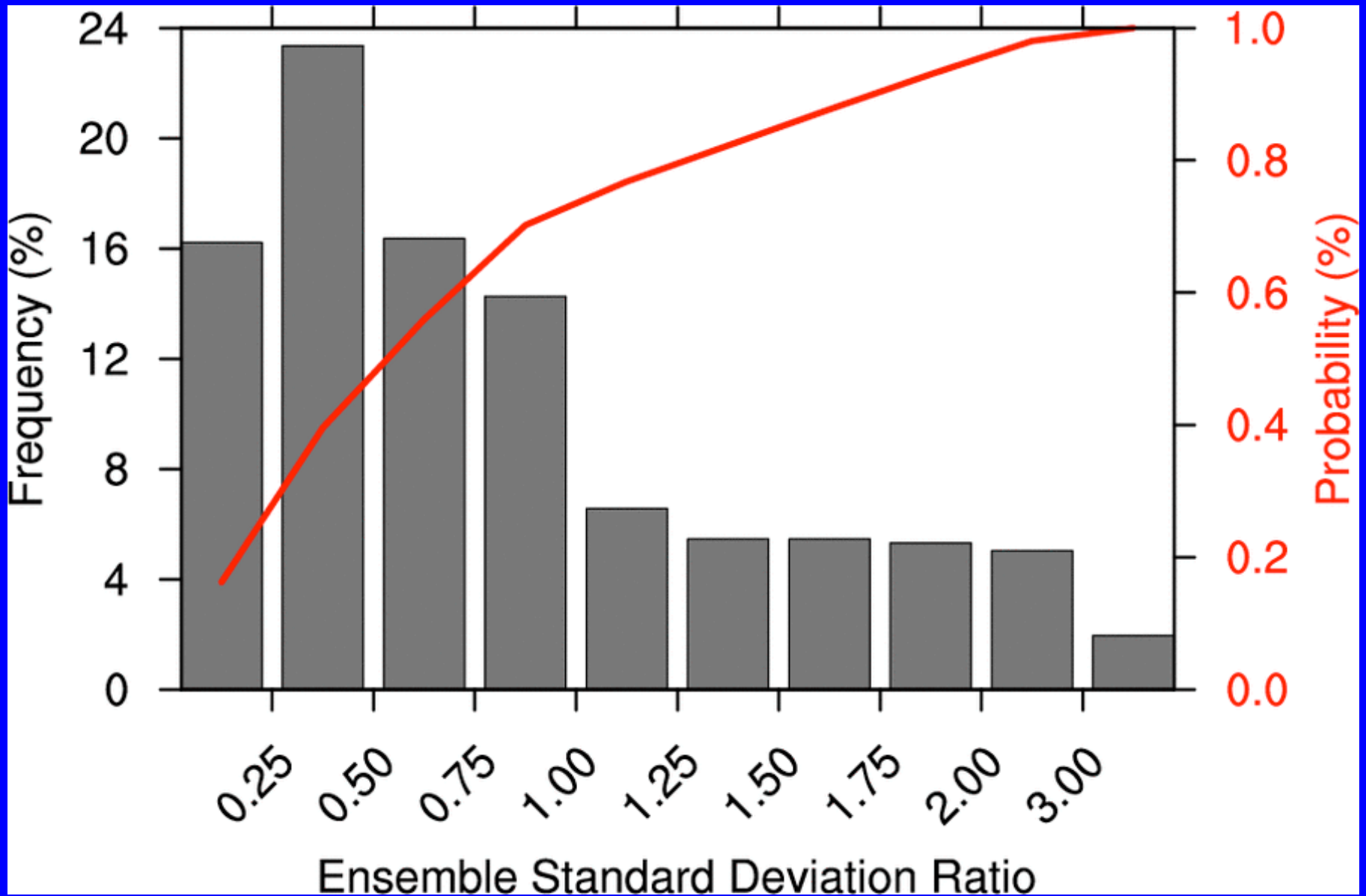
Ensemble Spread Experiments



Accomplishments

- Compiled HWRF ensemble cases from 2014-2016 and verified intensity forecasts
- Identified cases that are particularly spread deficient
- Compare to cases with similar intensity traces, but have ensemble spread that is consistent with ensemble-mean errors

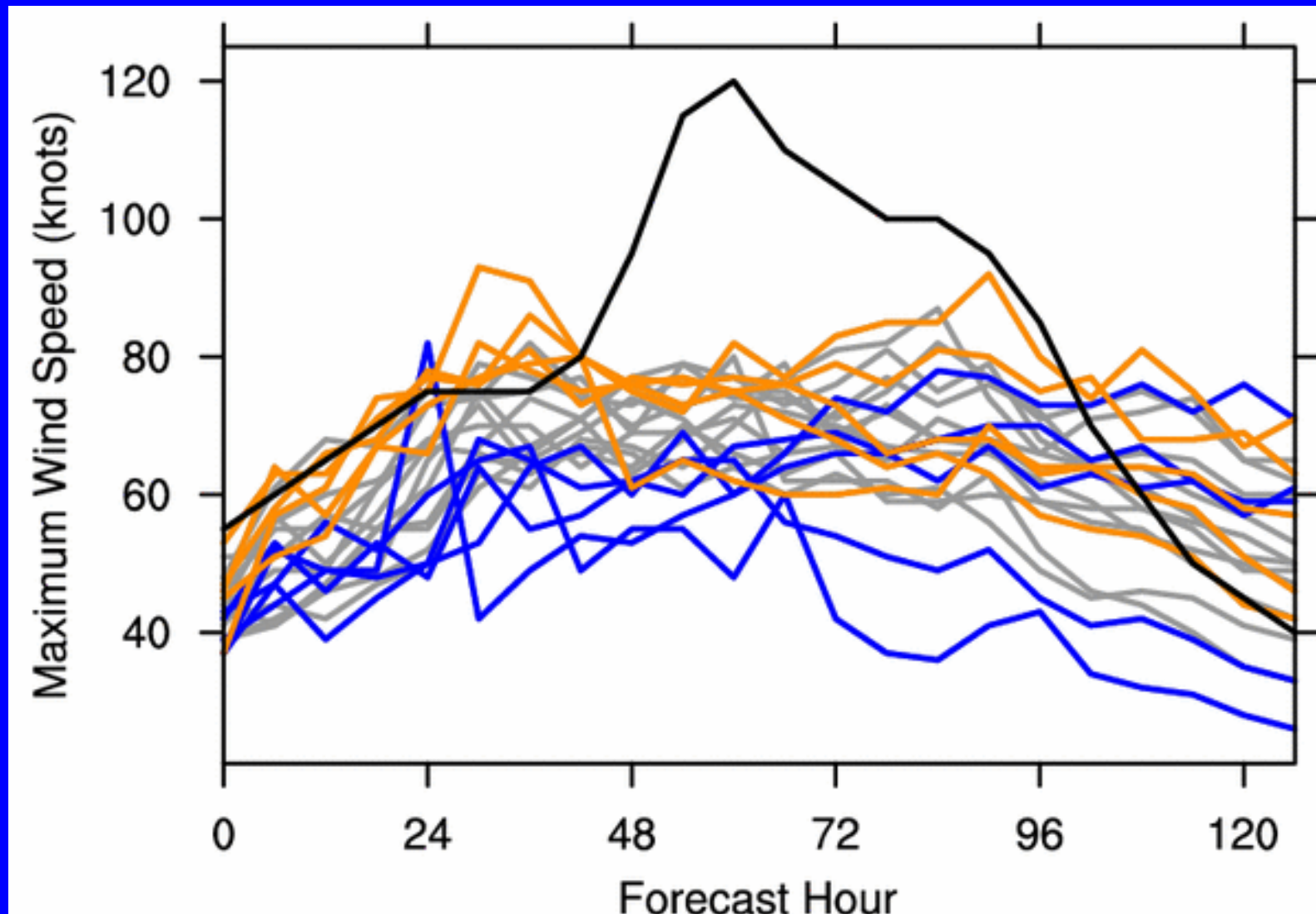
24-48 h Ensemble Performance



Accomplishments

- Most low-spread cases characterized by intensification. Examples:
 - Gonzalo (al082014)
 - Dolores (ep052015)
 - Hilda (ep102015)
 - Matthew (al142016)

Dolores 0000 UTC 13 July



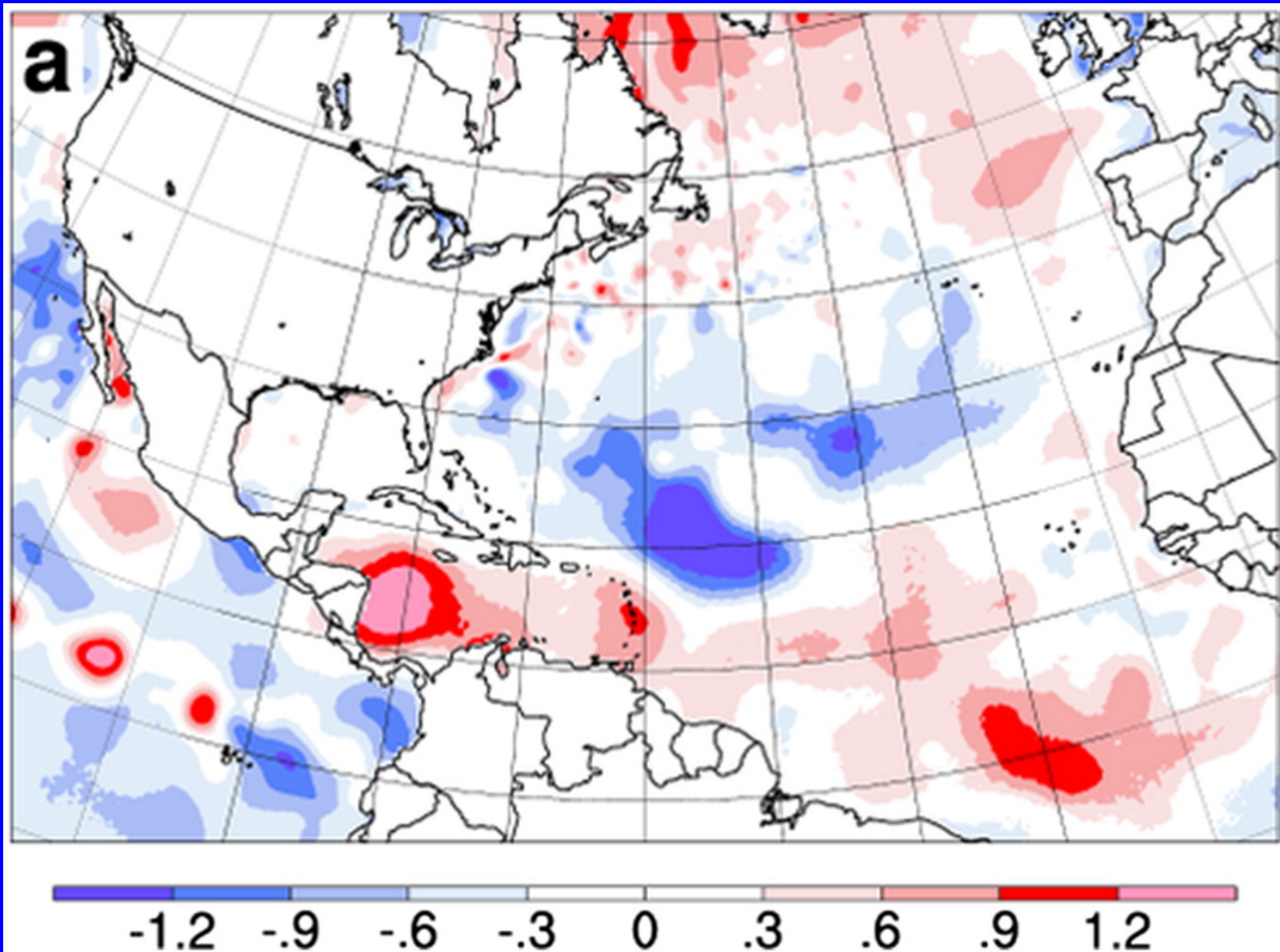
Accomplishments

- Most low-spread cases characterized by intensification. Examples:
 - Gonzalo (al082014)
 - Dolores (ep052015)
 - Hilda (ep102015)
 - Matthew (al142016)
- Comparison with analog cases suggest no systematic large-scale environmental or vortex differences

Work Plan

- Identify subset of low variance cases (roughly 10-15 cases)
- Run control with current ensemble configuration (ongoing)
- Add ocean perturbations taken from climatological samples

Example Ocean Perturbation



Work Plan

- Identify subset of low variance cases (roughly 10-15 cases)
- Run control with current ensemble configuration (ongoing)
- Add ocean perturbations from climatological sampling method
- Add stochastic perturbations to the physics tendencies