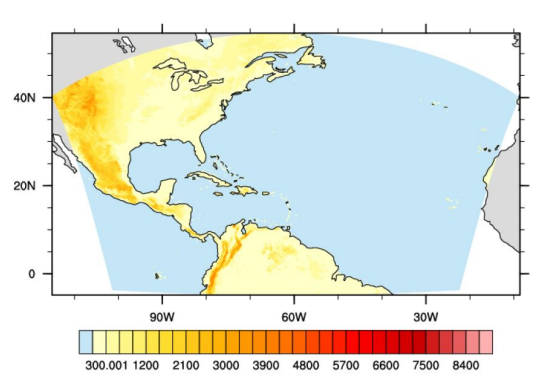
HAFS-SAR based Ensemble(HAFSvo.1E) Configuration for 2020 HFIP Real-time Demo

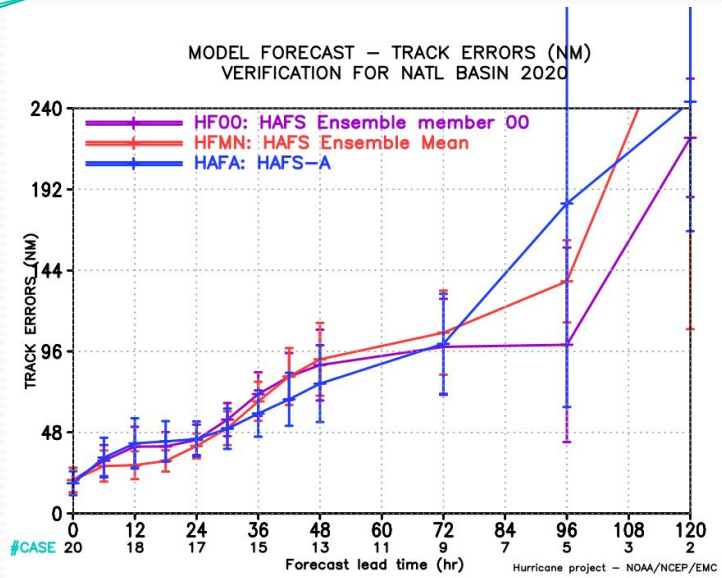
- Basic configuration, based on HAFSv0.1A
  - One control member plus 17 perturbed ensemble members
  - Lower horizontal resolution: refine ratio=2, ~6km vs. 3km
  - Lower vertical resolution: L64 vs. L91
  - Cumulus parameterization on
  - No Ocean coupling
  - Twice a day (00Z and 12Z), Atlantic basin only

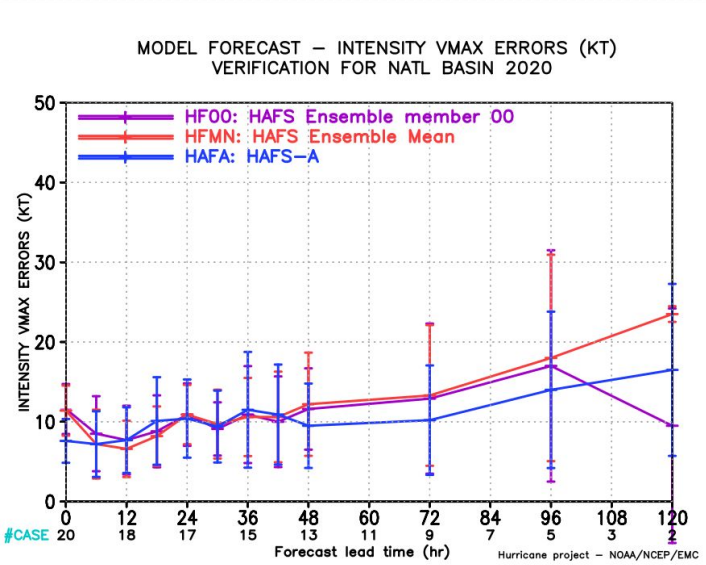


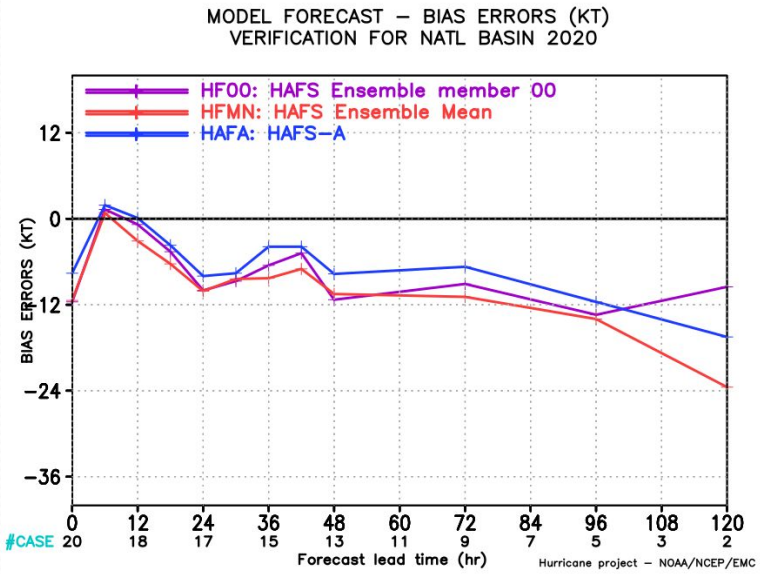
- IC/BC Perturbation:
  - IC/BC: GEFS grib2 (0.5x0.5)
- Model Physics:
  - Stochastic kinetic energy backscatter (SKEB)
    - ✔ Counteract excessive energy dissipation from numerical diffusion and interpolation, mountain and gravity wave drag, and deep convection
    - ✔ Stream function is randomly perturbed to represent upscale kinetic energy transfer
  - Stochastically perturbed physics tendencies (SPPT)
    - ✔ Represents uncertainties in physical parameterizations
    - ✔ Multiplicative noise modifies total parameterized tendency
  - Stochastically perturbed PBL humidity (SHUM)
    - ✔ Represents variability in the sub-grid humidity field
    - ✔ Similar to SPPT, but directly modifies low-level humidity field instead of tendency

Track/Intensity Verification

HFMN runs every 12h

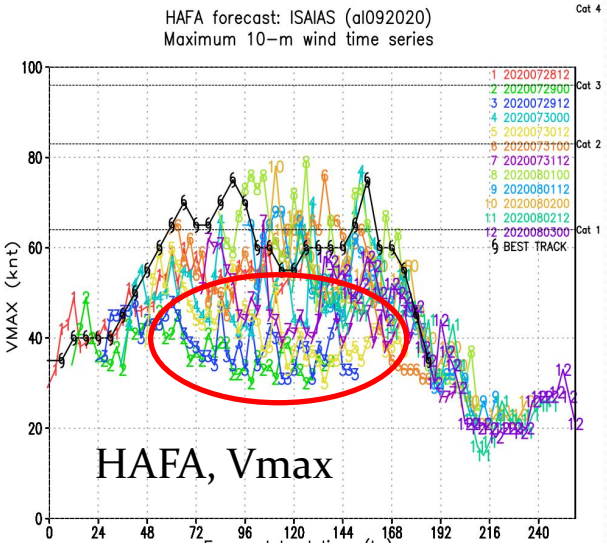


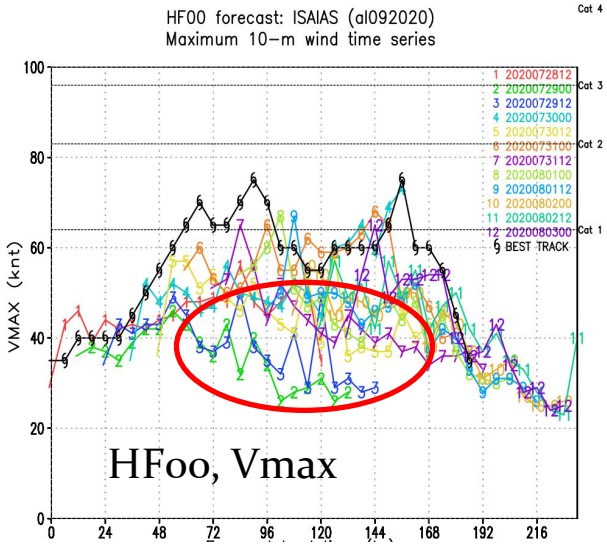


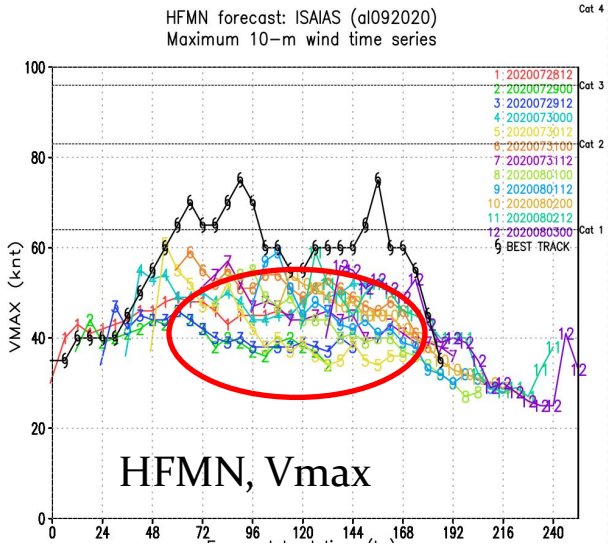


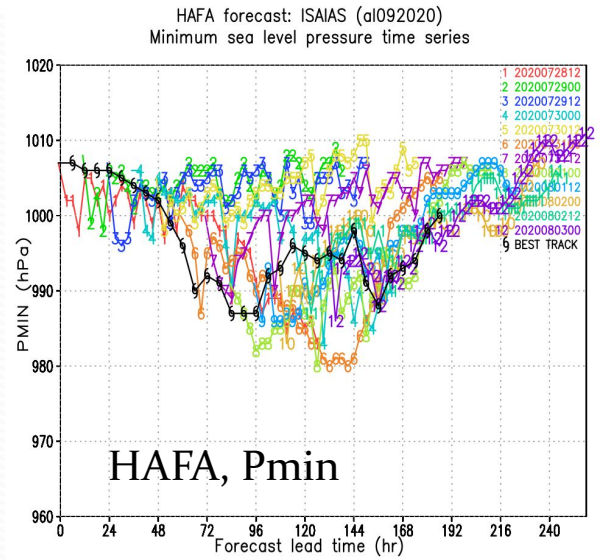
- HFMN is not as good as both of its control runs, HFoo (unperturbed member) and HAFA (high res. baseline) in terms of track/intensity;
- The sample size is very low.

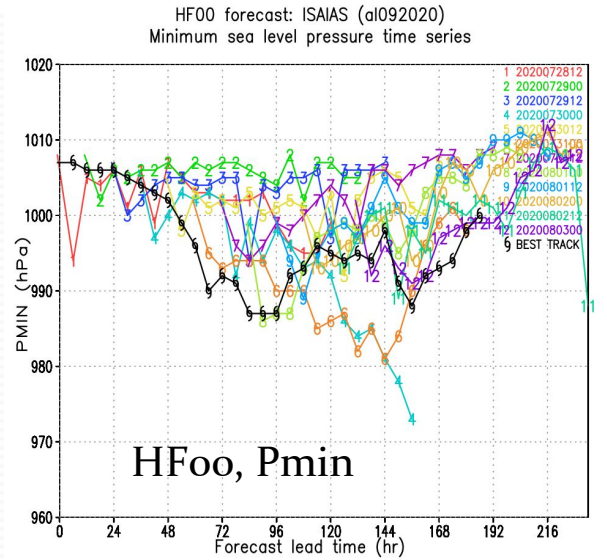
Intensity Composite Comparisons

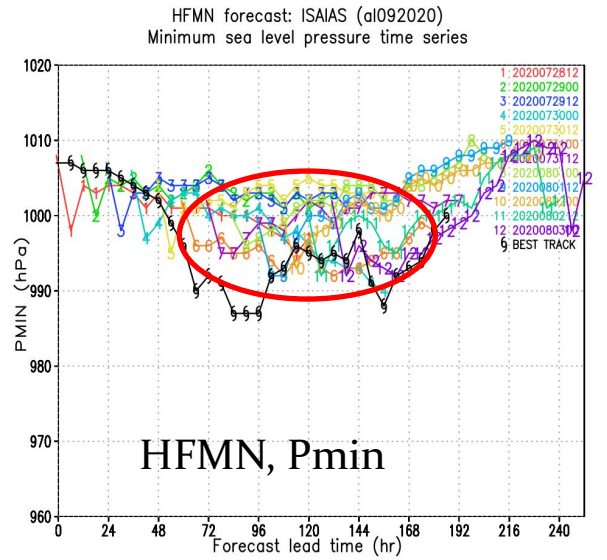






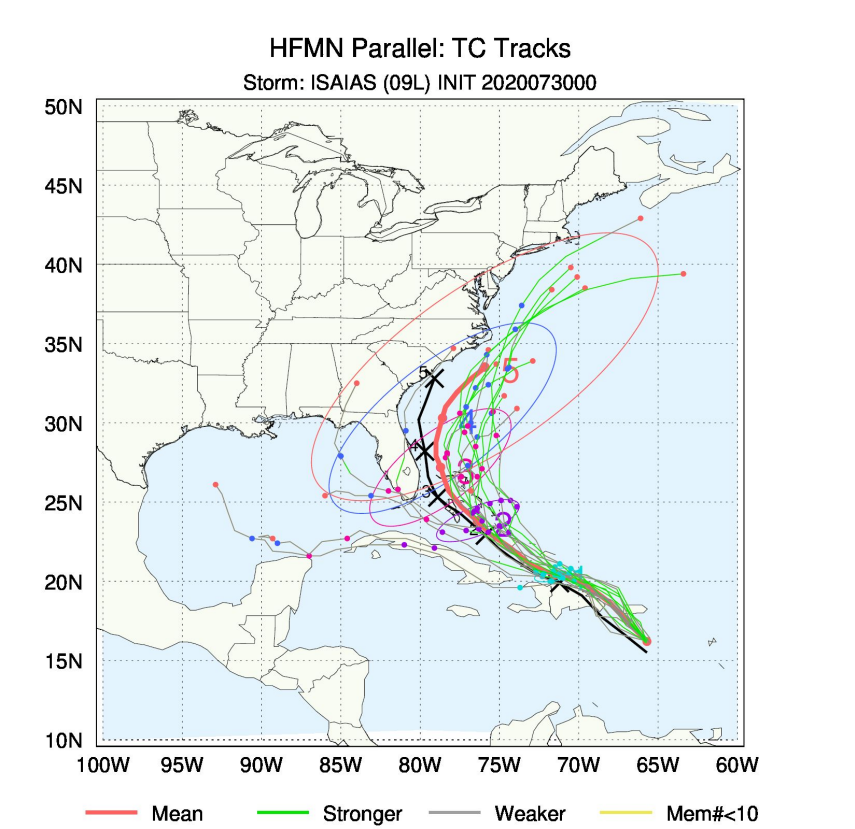


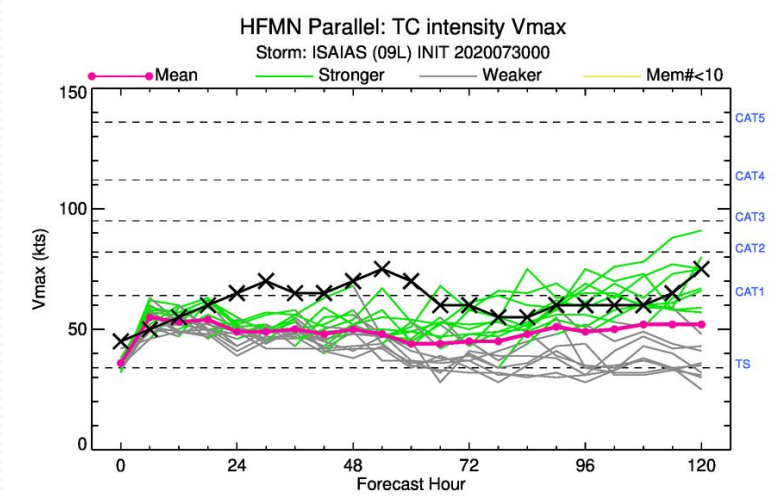


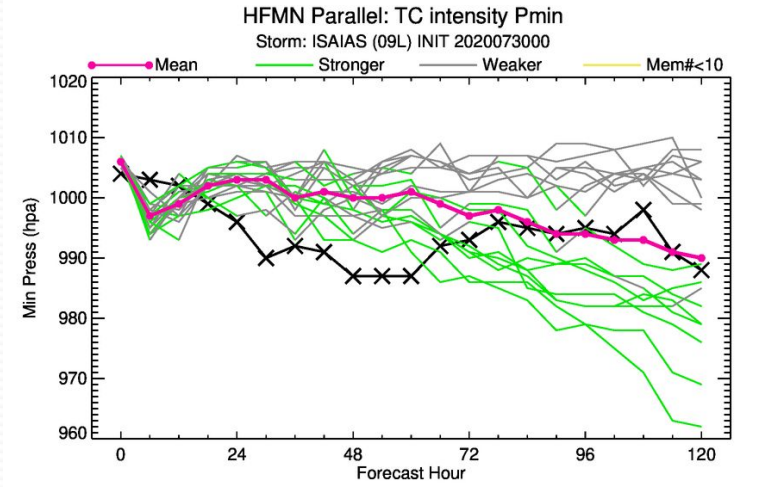


HFMN intensity forecasts have less small-scale temporal variations

HAFSv0.1E Sample Products



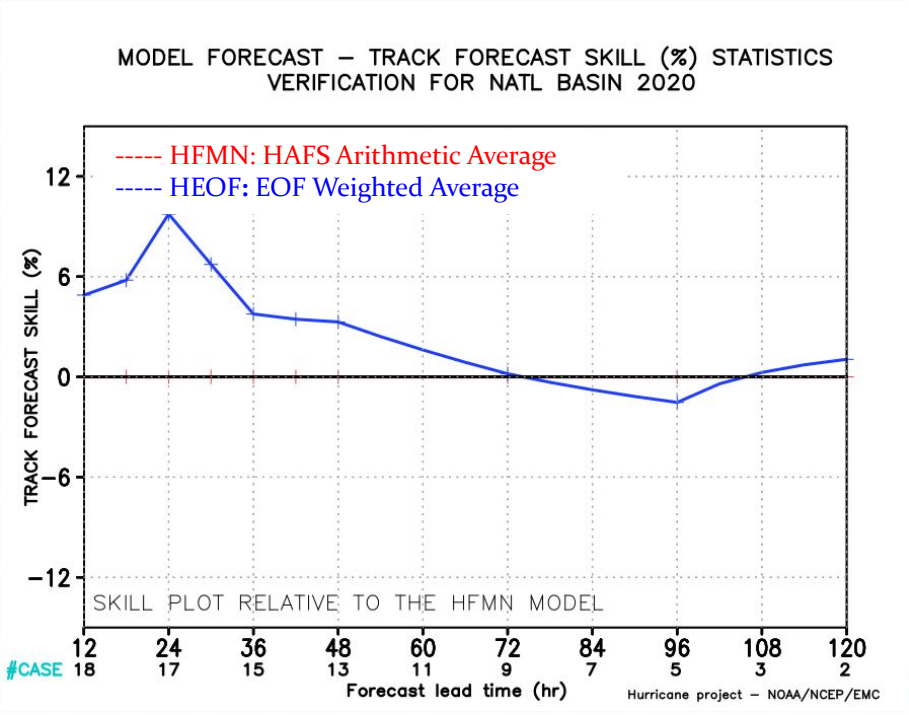


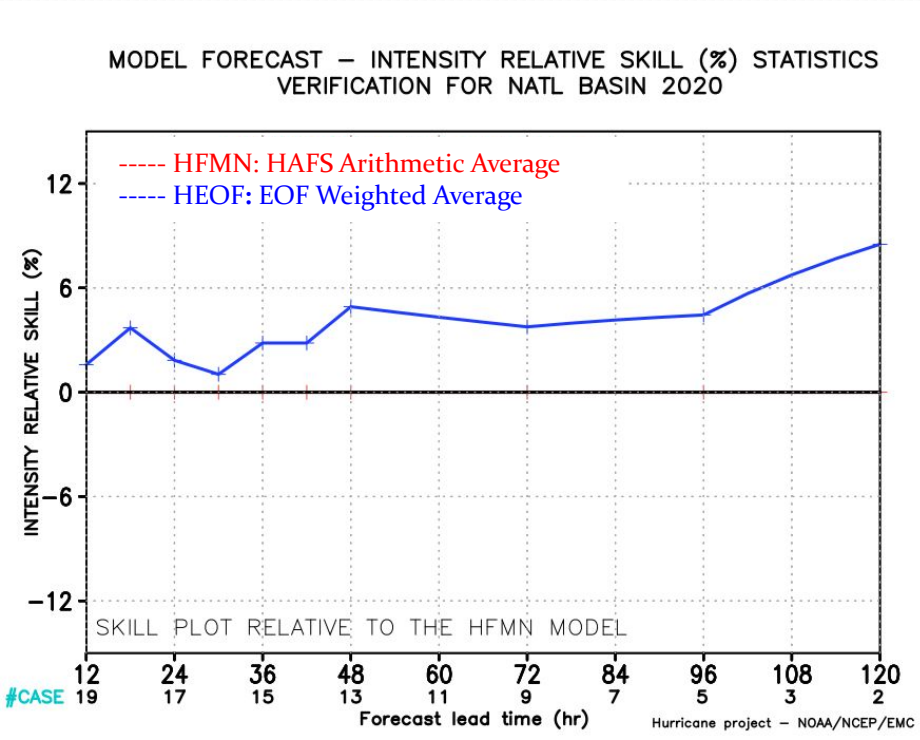


https://www.emc.ncep.noaa.gov/HAFS/HAFSEPS/tcall.php

Track/Intensity Verification

Arithmetic average vs. EOF weighted Average





Development of a new EOF based ensemble average is in progress to better represent ensemble track and intensity in deterministic way