2016 Forecast Challenges
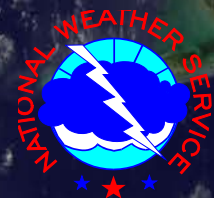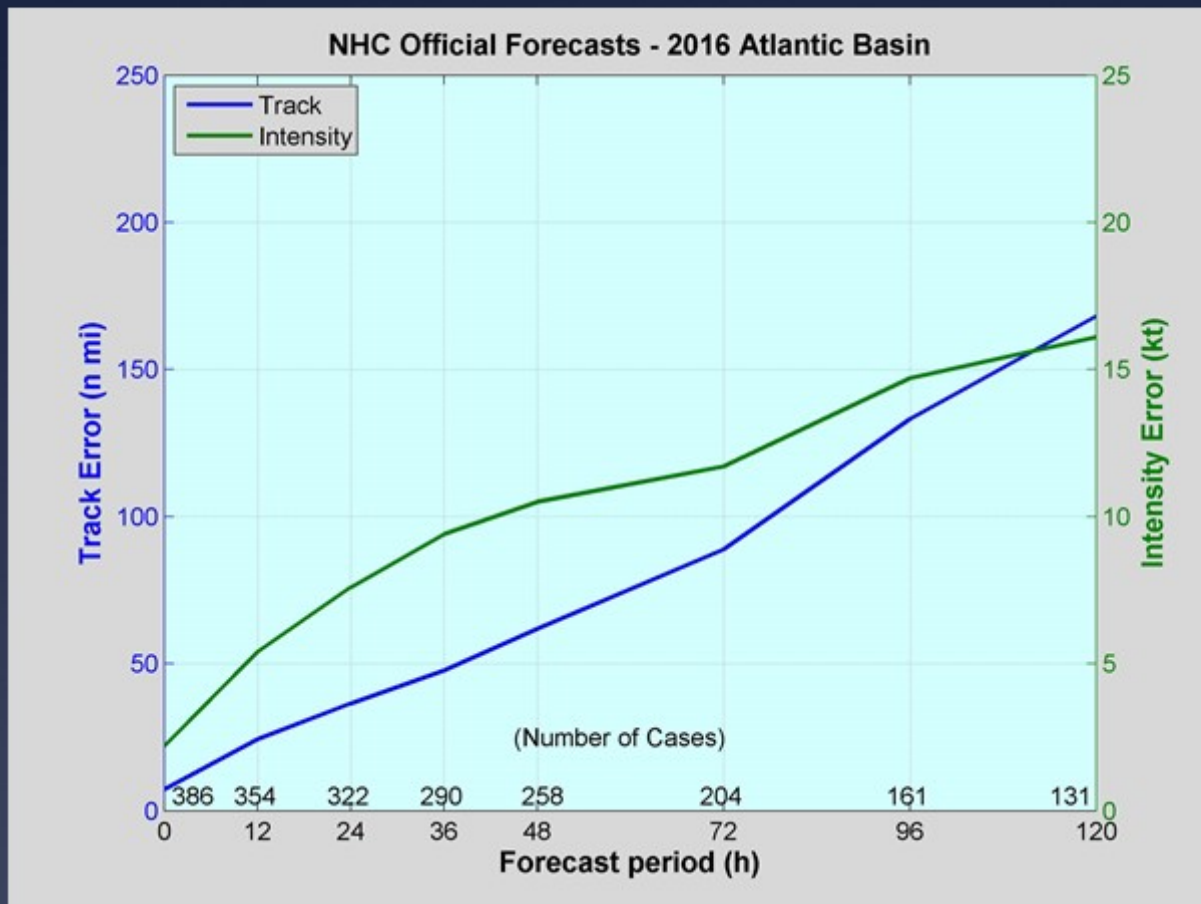
Eric S. Blake, Richard J. Pasch, Andrew Penny

IHC Miami

3/14/2017

2016 Atlantic Verification
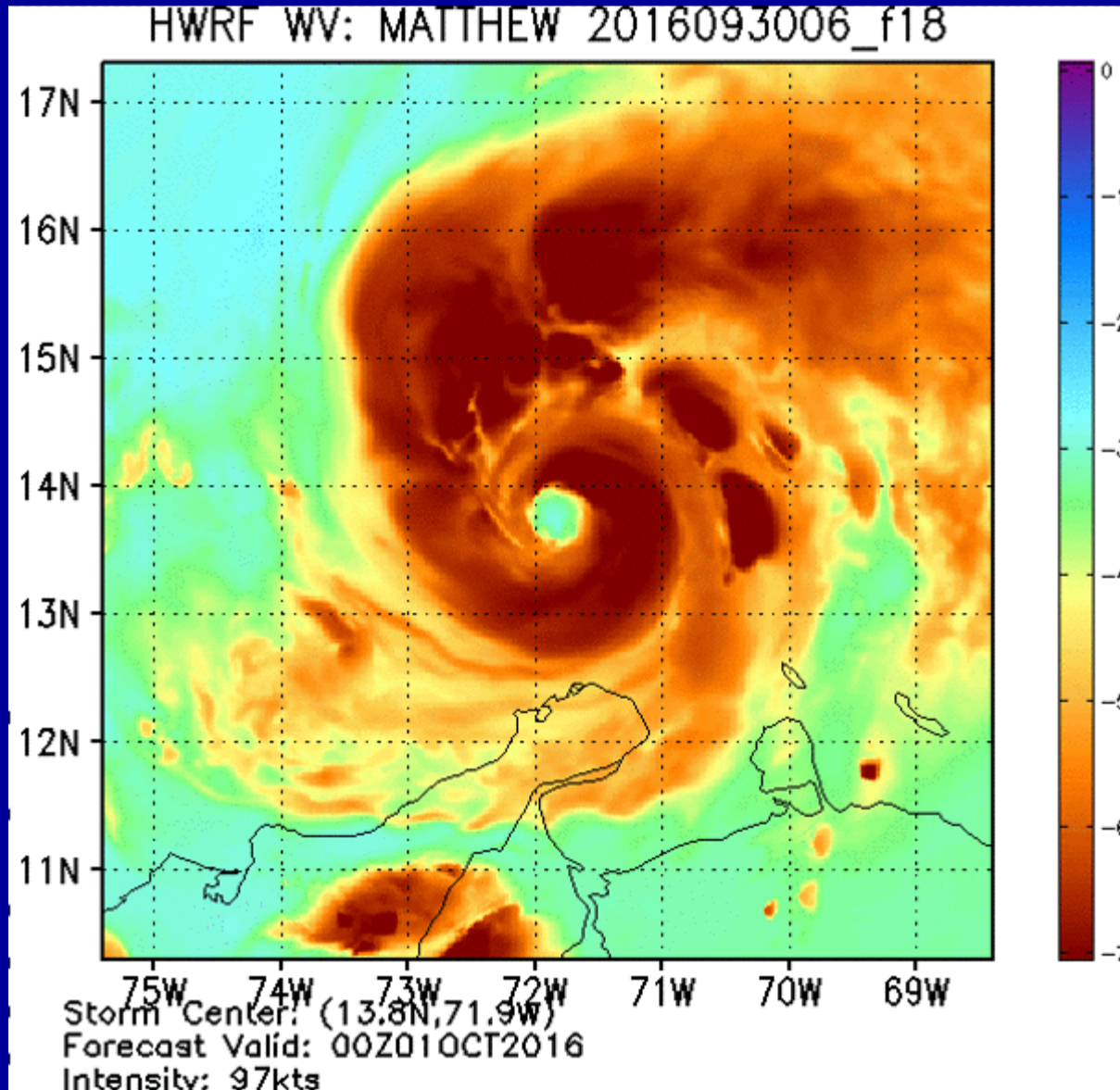
NHC Official Forecasts - 2016 Atlantic Basin

| VT (h)	NT	TRACK (n mi)	INT (kt)
000	386	7.3	2.2
012	354	24.3	5.4
024	322	36.5	7.6
036	290	47.7	9.4
048	258	61.8	10.6
072	204	88.8	11.7
096	161	133.1	14.7
120	131	168.2	16.1

Values in green exceed all-time records.

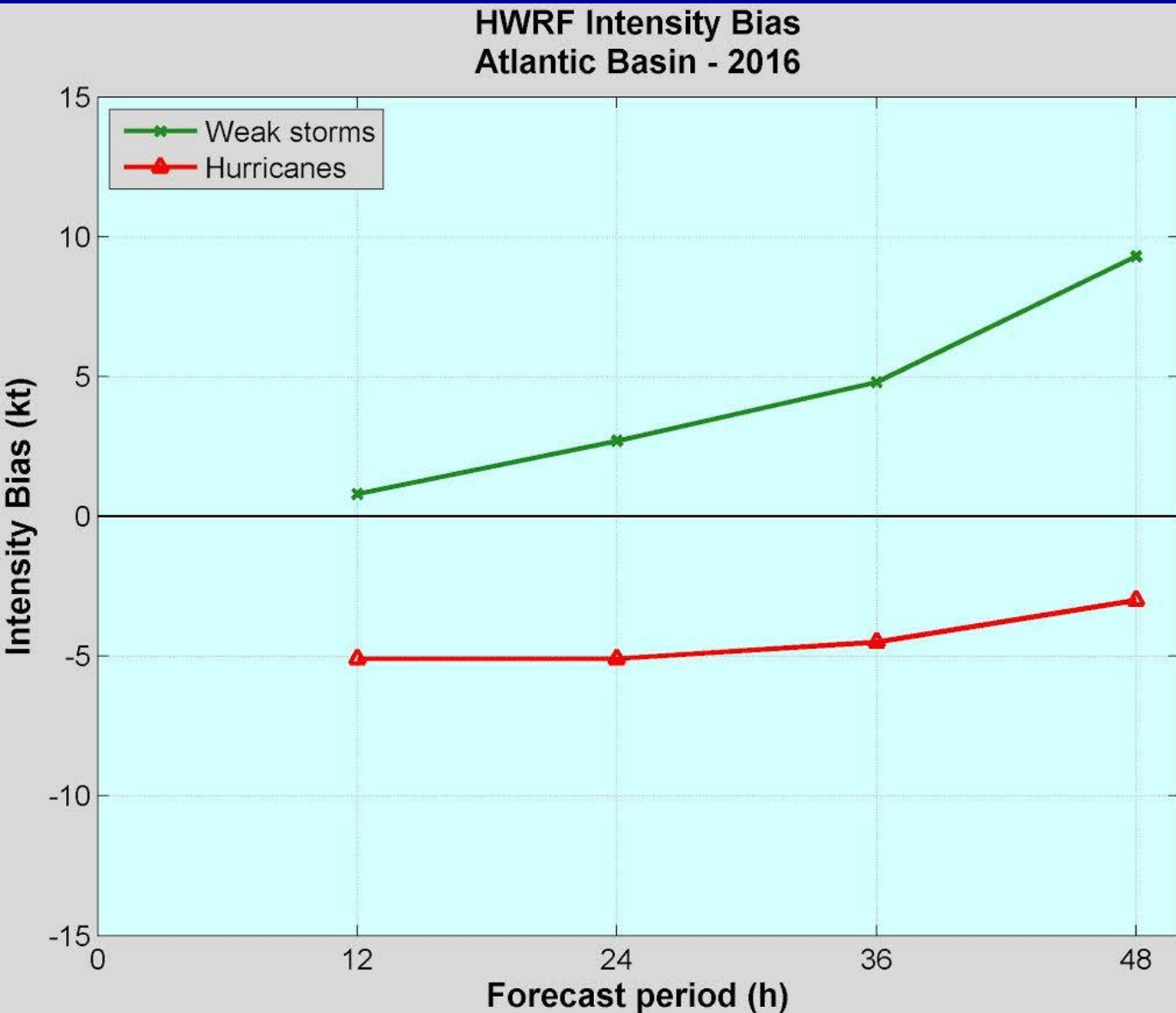*GPRA 48-h track (71 n mi) and intensity (12 kt) goals were met.*

Collapse of inner core of Matthew in HWRF

For some HWRF forecasts of Matthew when it was over the Caribbean, the eyewall unrealistically collapsed. This had a noted effect on the model-predicted intensity.
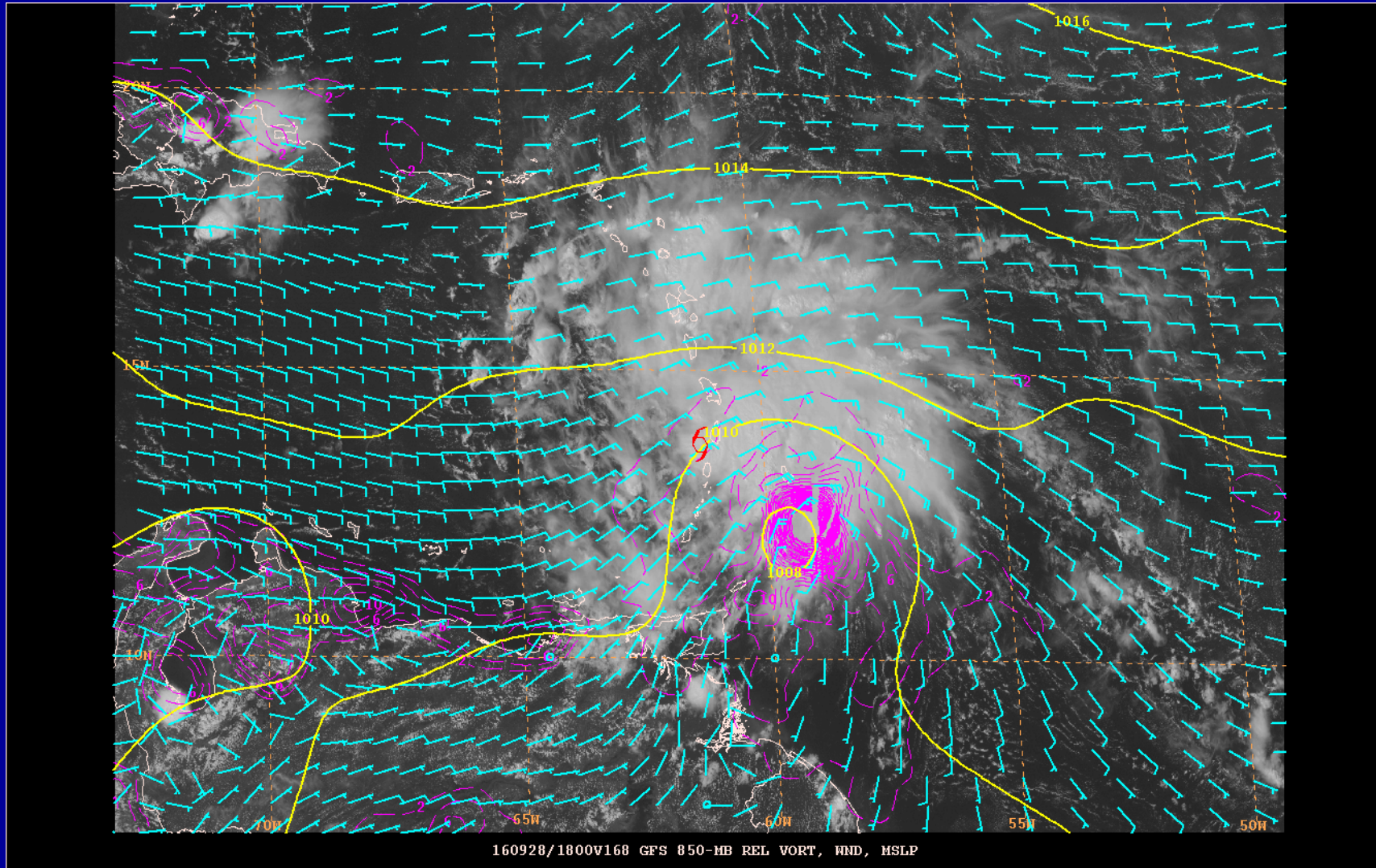
HWRF bias

HWRF Intensity Bias
Atlantic Basin - 2016
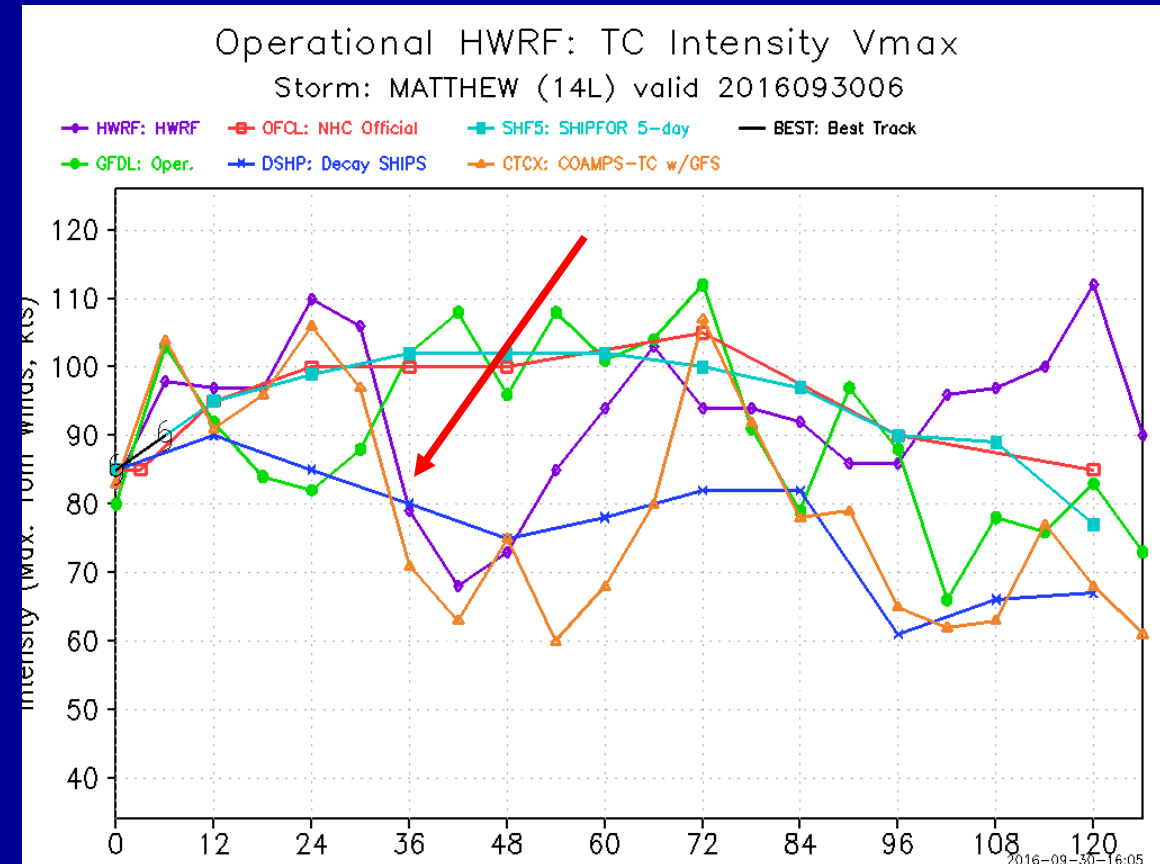
We noticed that early in a tropical cyclone (<50 kt), HWRF was too high and then as a hurricane, HWRF consistently too low

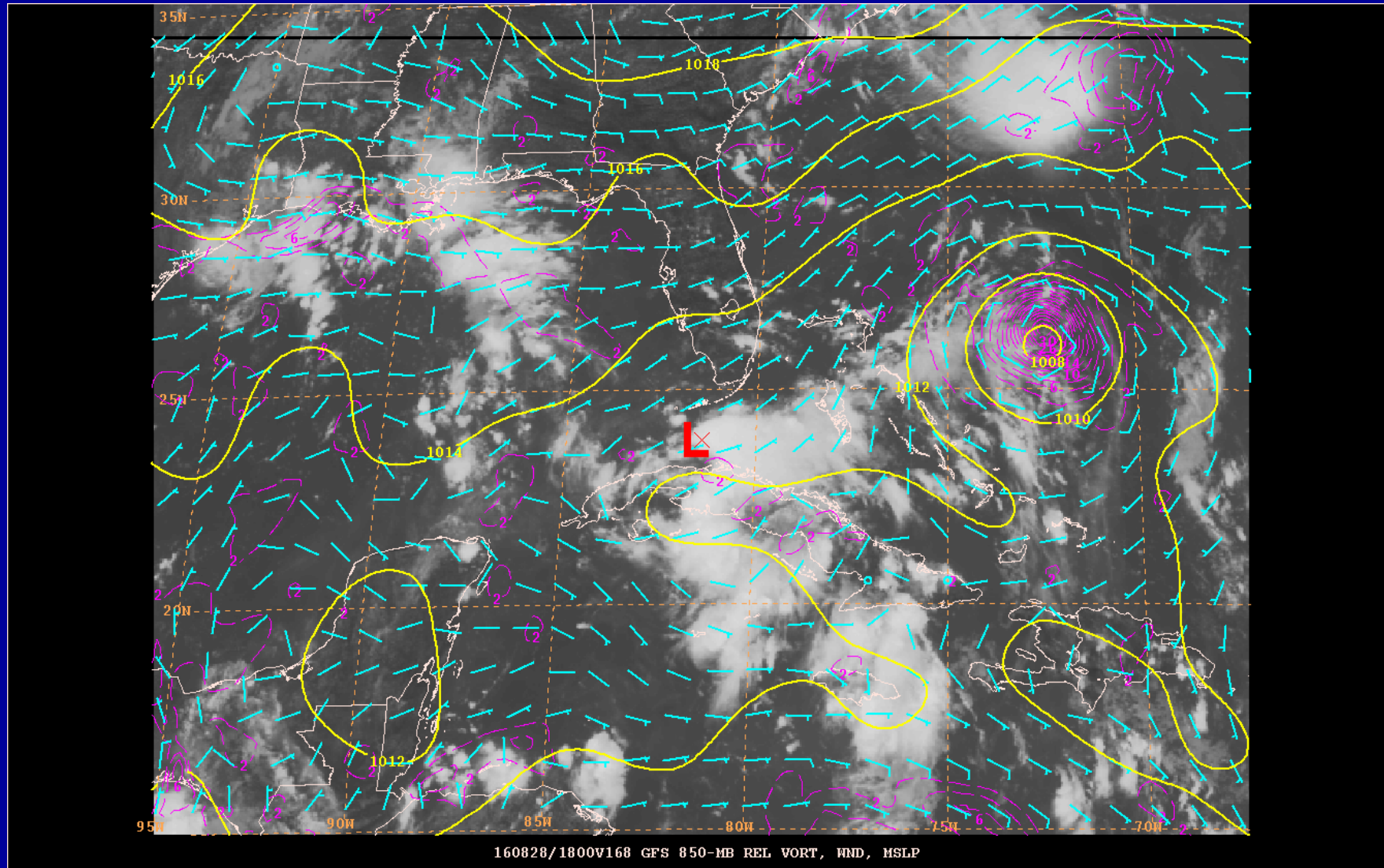This type of changing bias is challenging for forecasters

GFS genesis forecasts for Matthew

160928/1800V168 GFS 850-MB REL VORT, WND, MSLP

One of the best performances of the year, particularly in a geographic region where the GFS has historically struggled
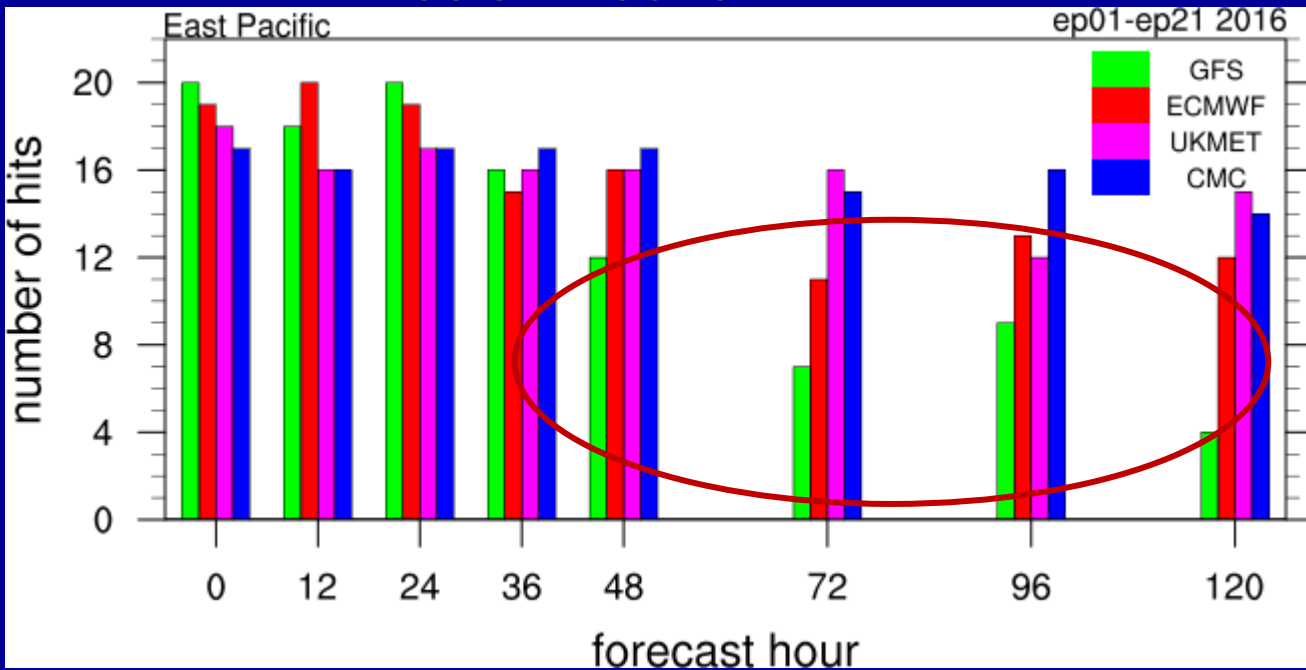
GFS genesis forecasts for Hermine

160828/1800V168 GFS 850-MB REL VORT, WND, MSLP

Mixed performance, wrong location at first, then only signal < 2 days from formation

GFS genesis forecasts for Nicole

161004/0600V168 GFS 850-MB REL VORT, WND, MSLP
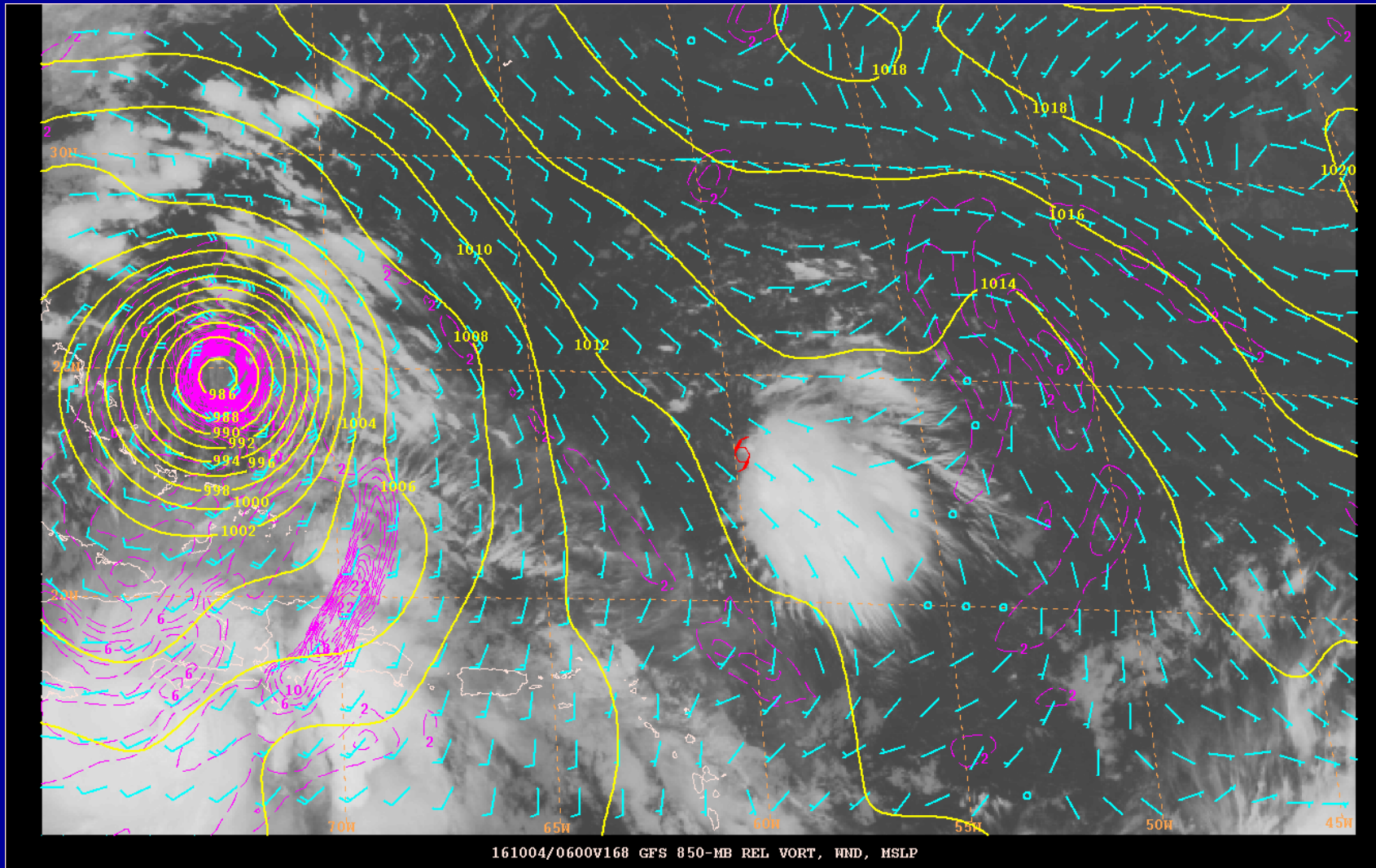
Probably the worst performance of the year, virtually no signal

GFS genesis problems

Eastern Pacific

Atlantic

- 2016 GFS underpredicted genesis in both basins

- Eastern Pacific continued trend from 2015 of very few hits at long-range compared to other models.

- Resulted in objective guidance having a low bias from the GFS, with other models better calibrated (not shown)

- Atlantic did better at long-range, but underforecast bias persists through day 3.

- For example, GFS forecasted only about half of the Atlantic TC formations 48 hours in advance.
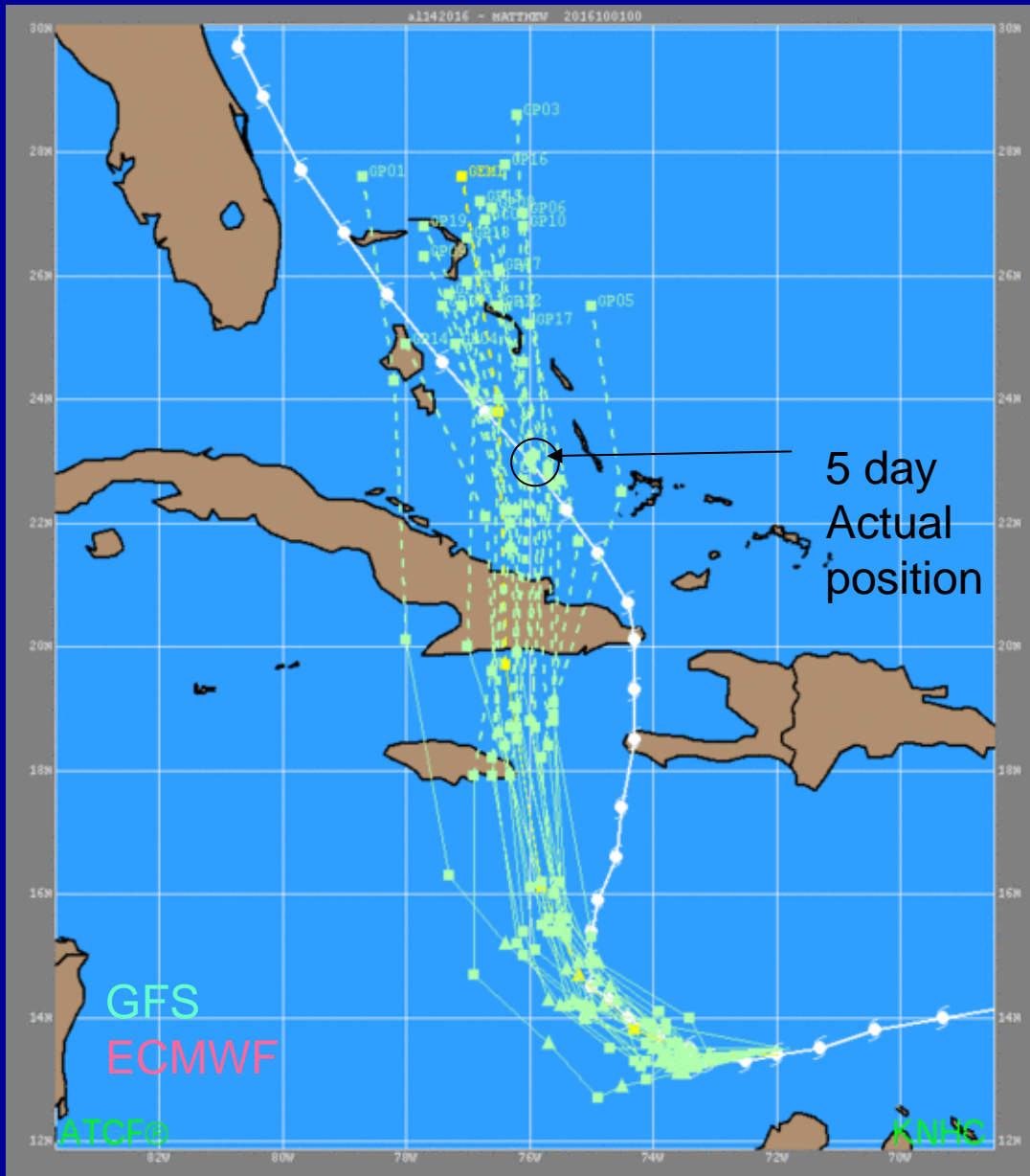
8
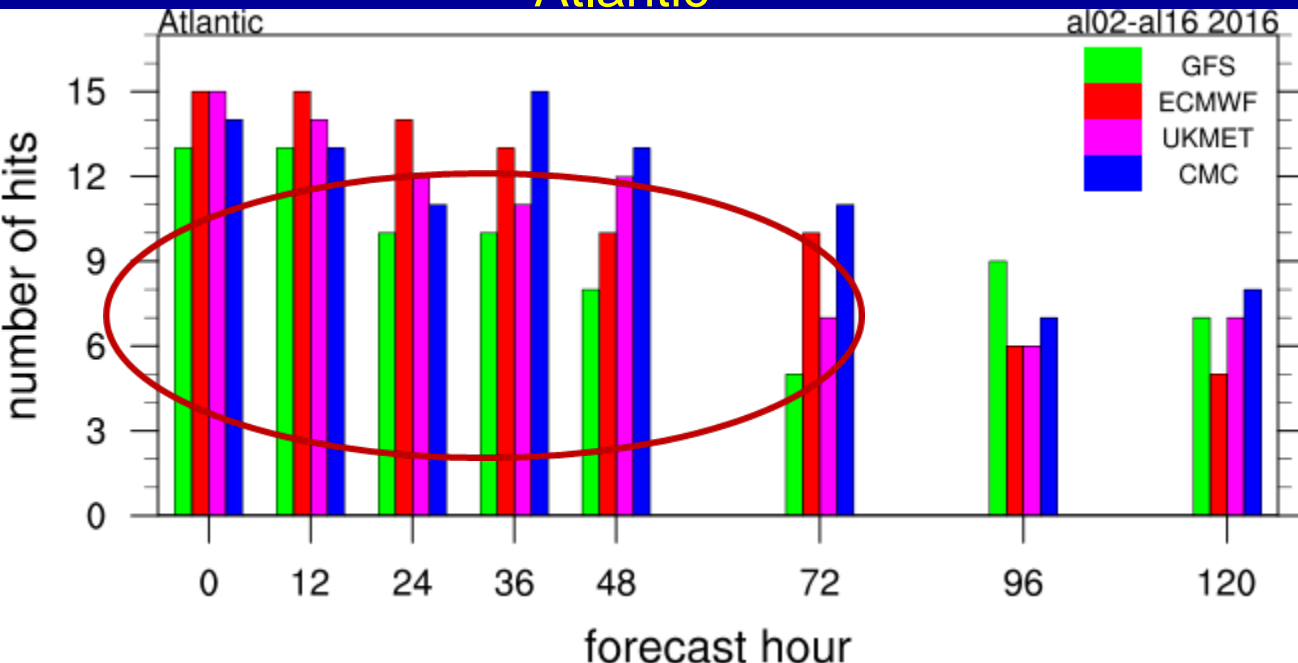
Atlantic genesis forecasts
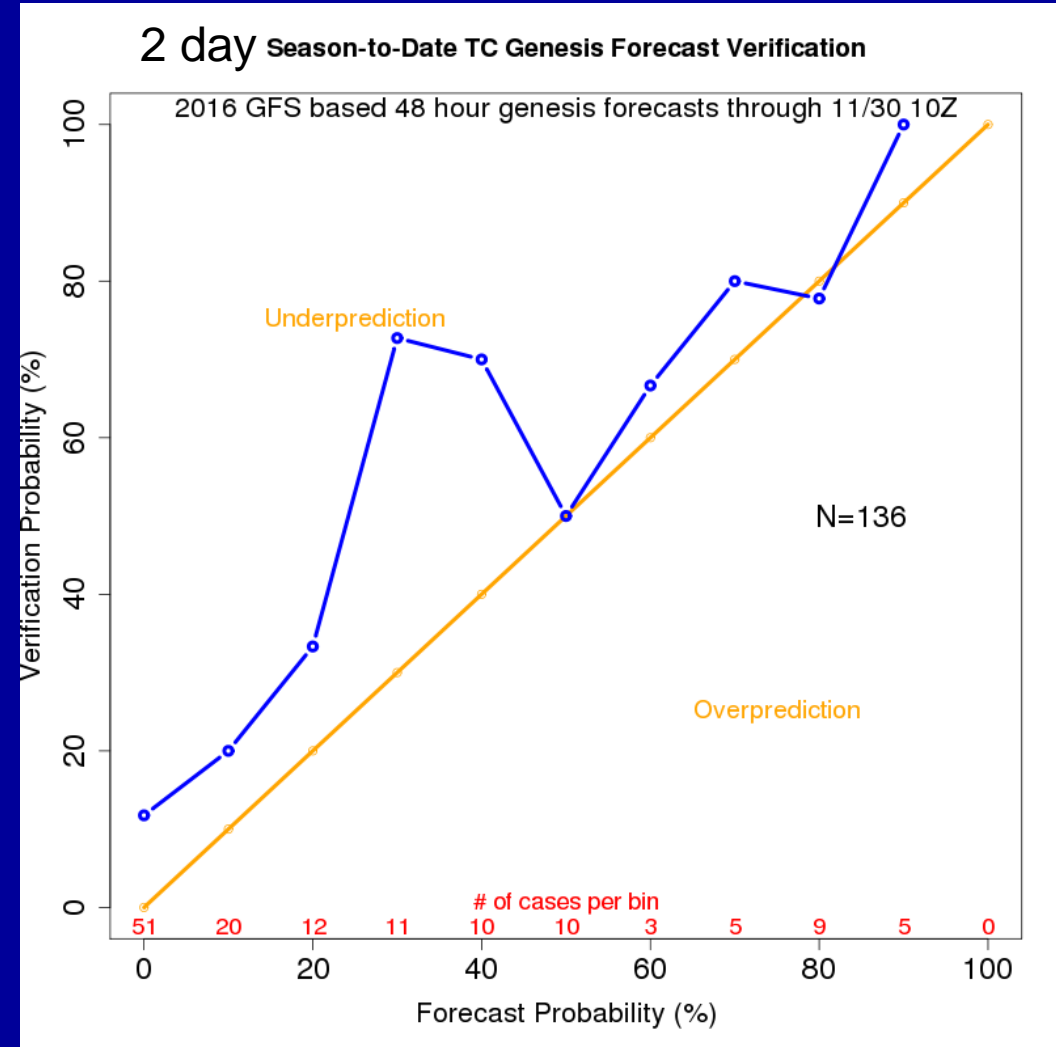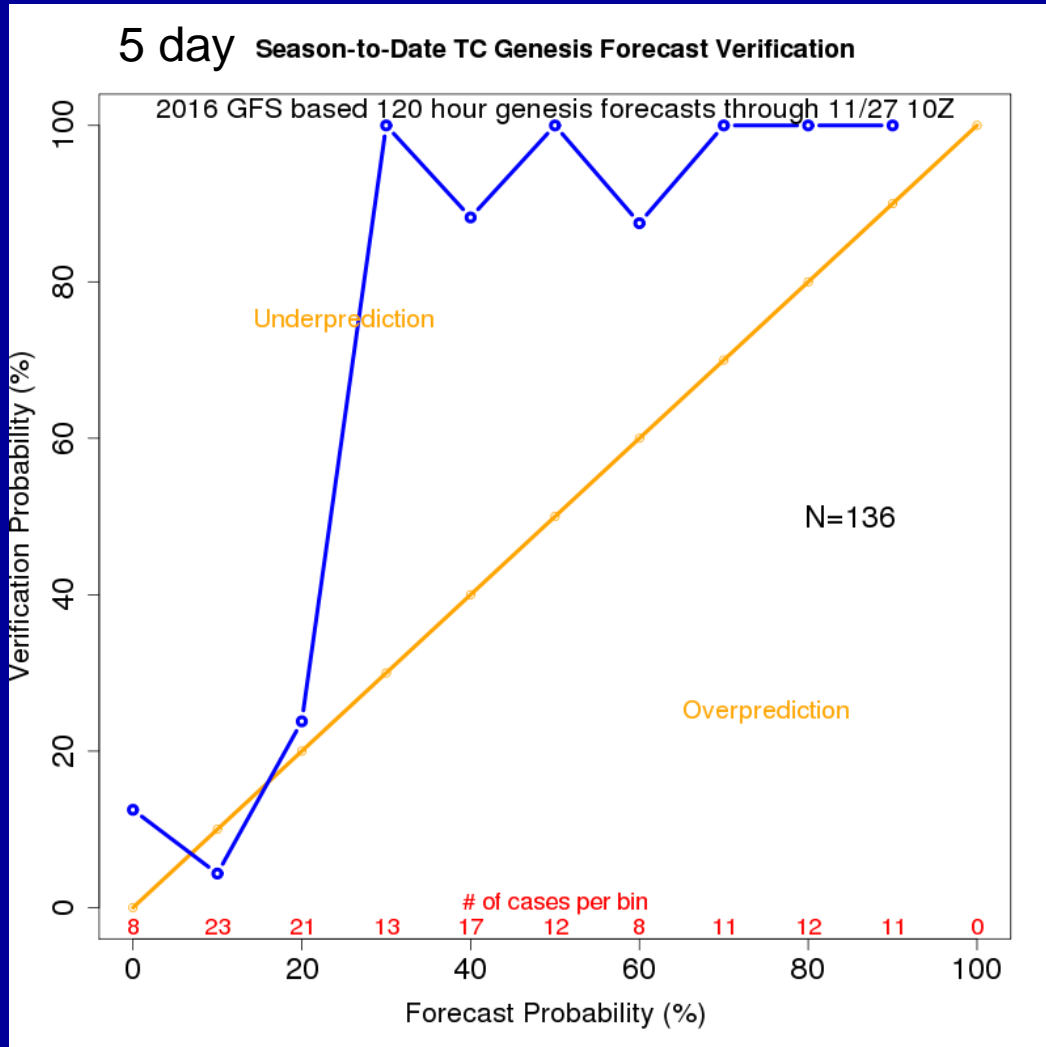
- 5 day forecasts had a huge underprediction bias
- 2 day is better, but only 20 forecasts all year in the high category from the model (NHC issued ~50 based on all guidance including non-NCEP models)

Matthew ensemble guidance 1 Oct 00 UTC
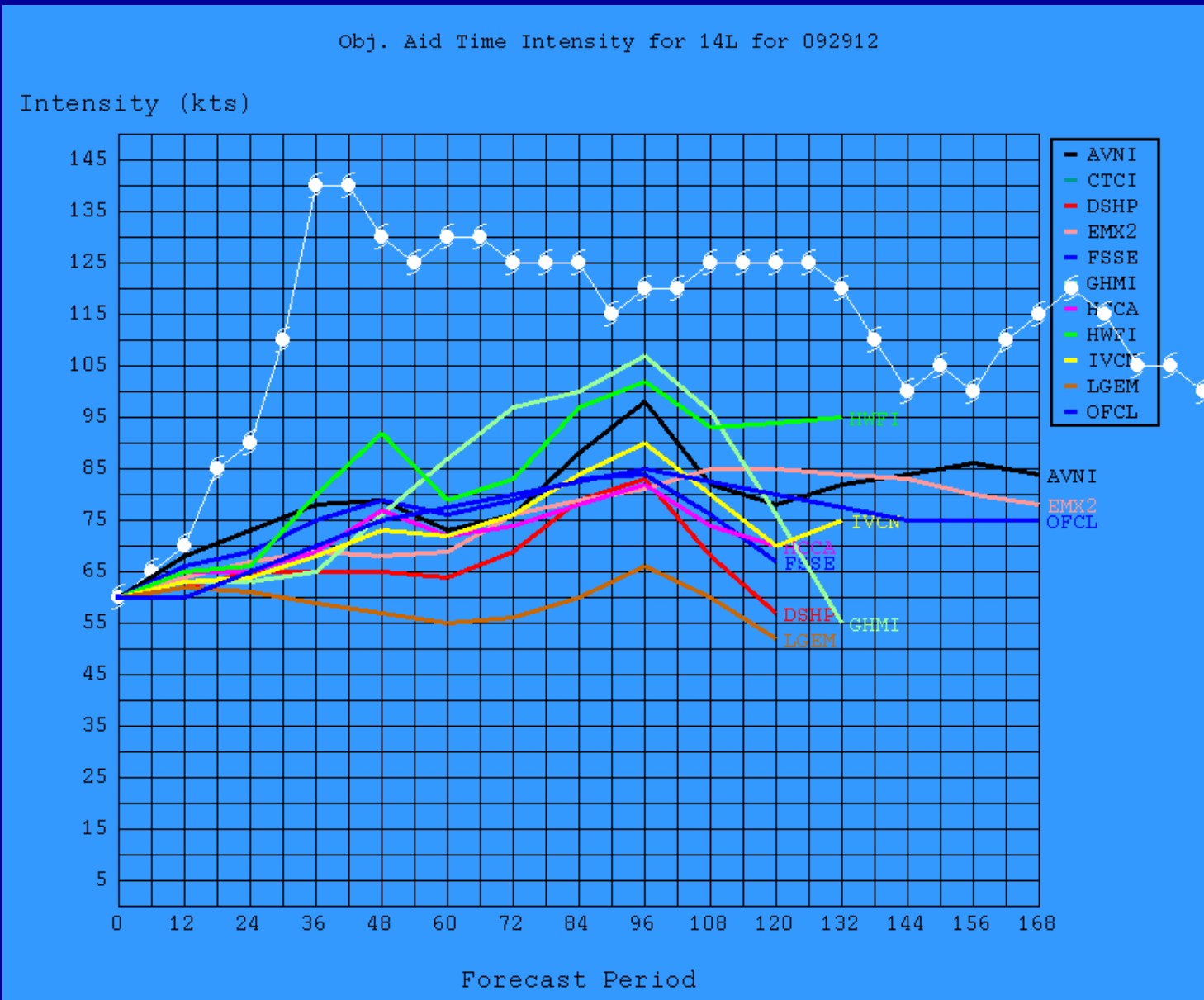

5 day
Actual
position

GEFS (blue) too underdispersive, especially in Caribbean

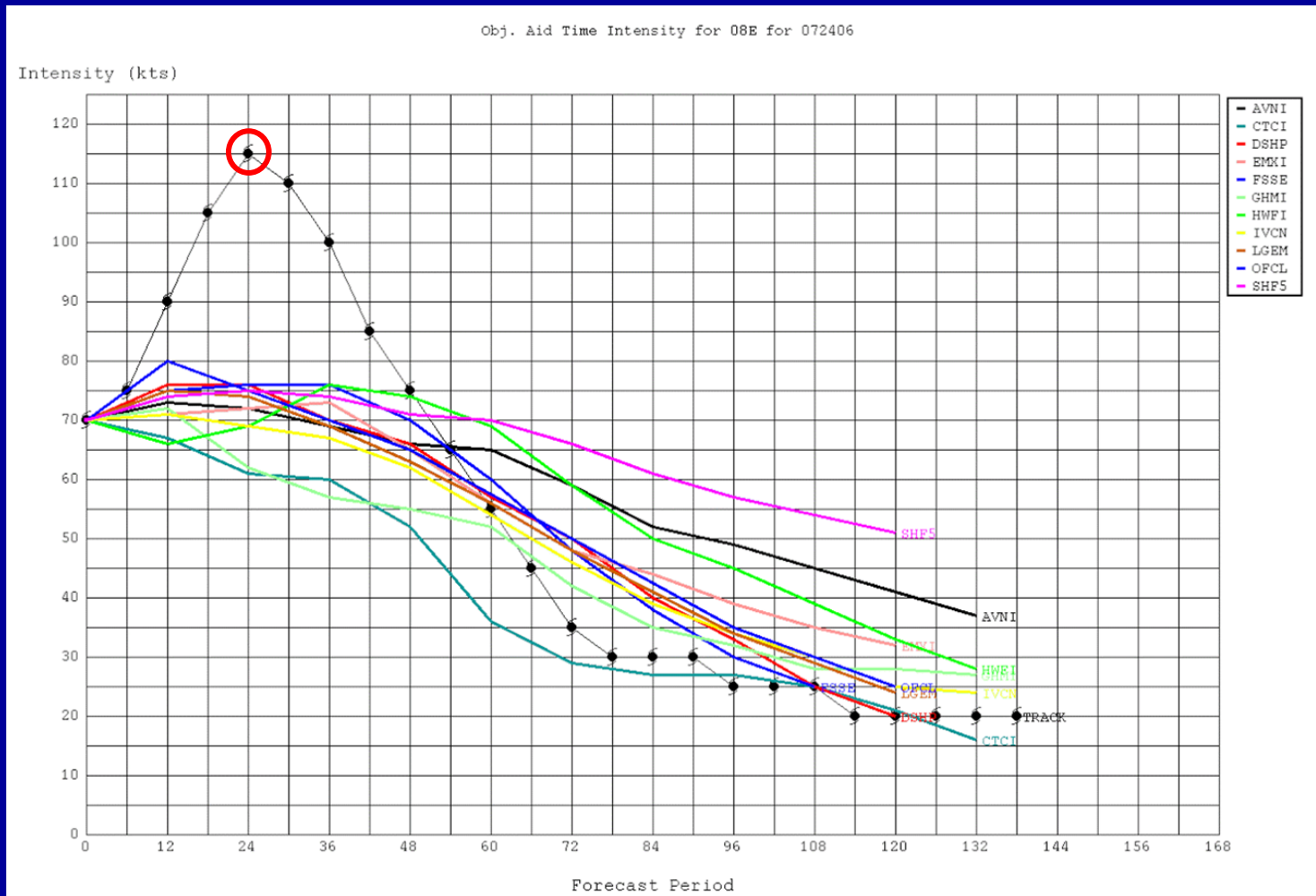Every single GEFS member also too fast at 5 days

ECMWF (red) has more realistic spreads, albeit potentially too large

Matthew intensity models before rapid intensification

Model performance was terrible

Georgette intensity guidance 24 Jul 0600 UTC

Obj. Aid Time Intensity for 08E for 072406

All guidance showed little change or weakening, when in reality it intensified 45 kt in the next 24 hours!

Questions?