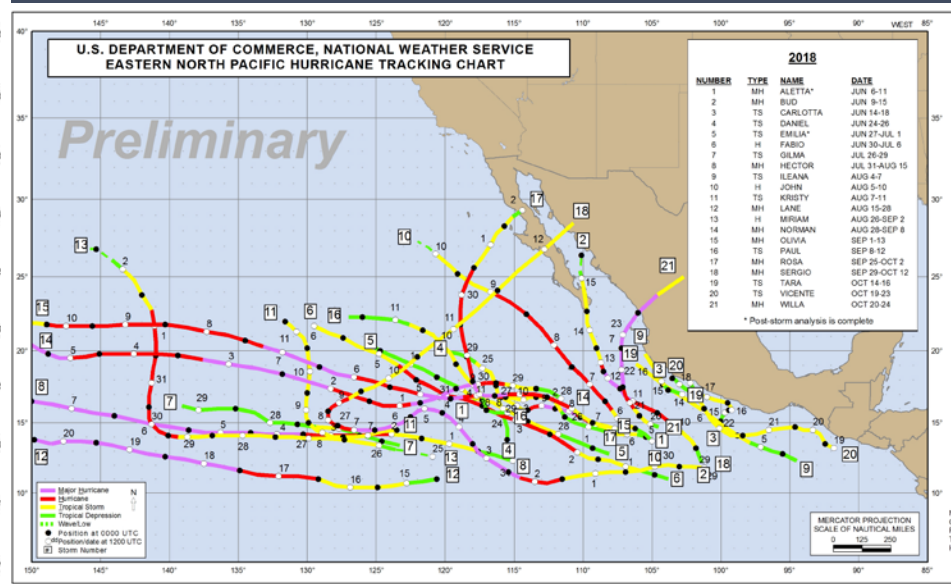
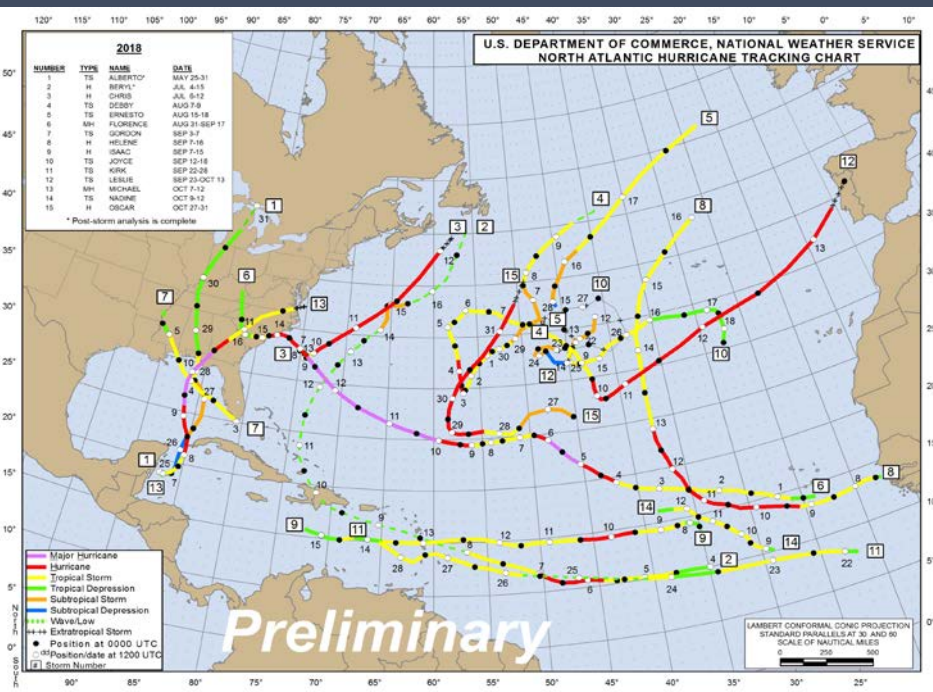
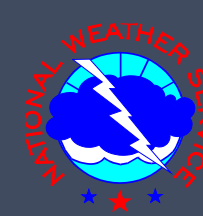




National Hurricane Center 2018 Forecast Verification (Preliminary)



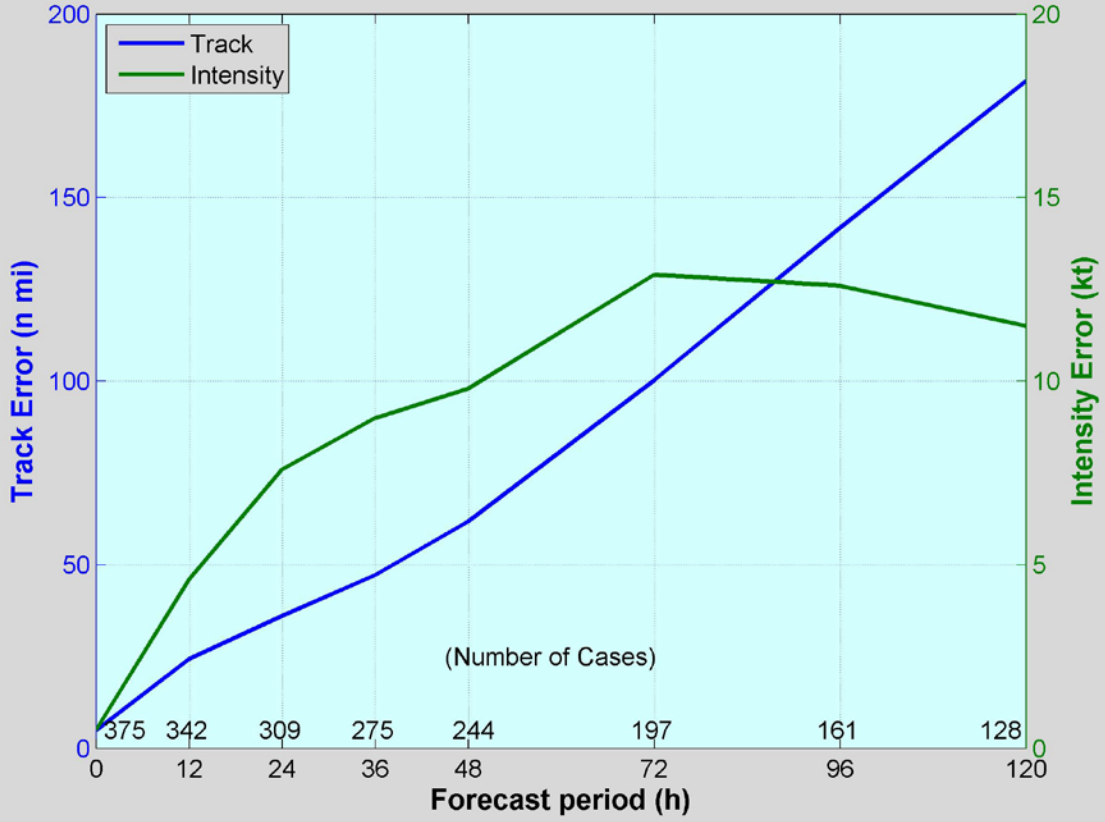
**John P. Cangialosi
National Hurricane Center**



2018 Atlantic Verification



NHC Official Forecasts - 2018 Atlantic Basin



| VT (h) | NT | TRACK (n mi) | INT (kt) |
|-----------|-----|-----------------|-------------|
| 000 | 375 | 5.0 | 0.5 |
| 012 | 342 | 24.4 | 4.6 |
| 024 | 309 | 36.1 | 7.6 |
| 036 | 275 | 47.2 | 9.0 |
| 048 | 244 | 61.8 | 9.8 |
| 072 | 197 | 100.3 | 12.9 |
| 096 | 161 | 141.8 | 12.6 |
| 120 | 128 | 181.8 | 11.5 |

Values in green exceed all-time records.

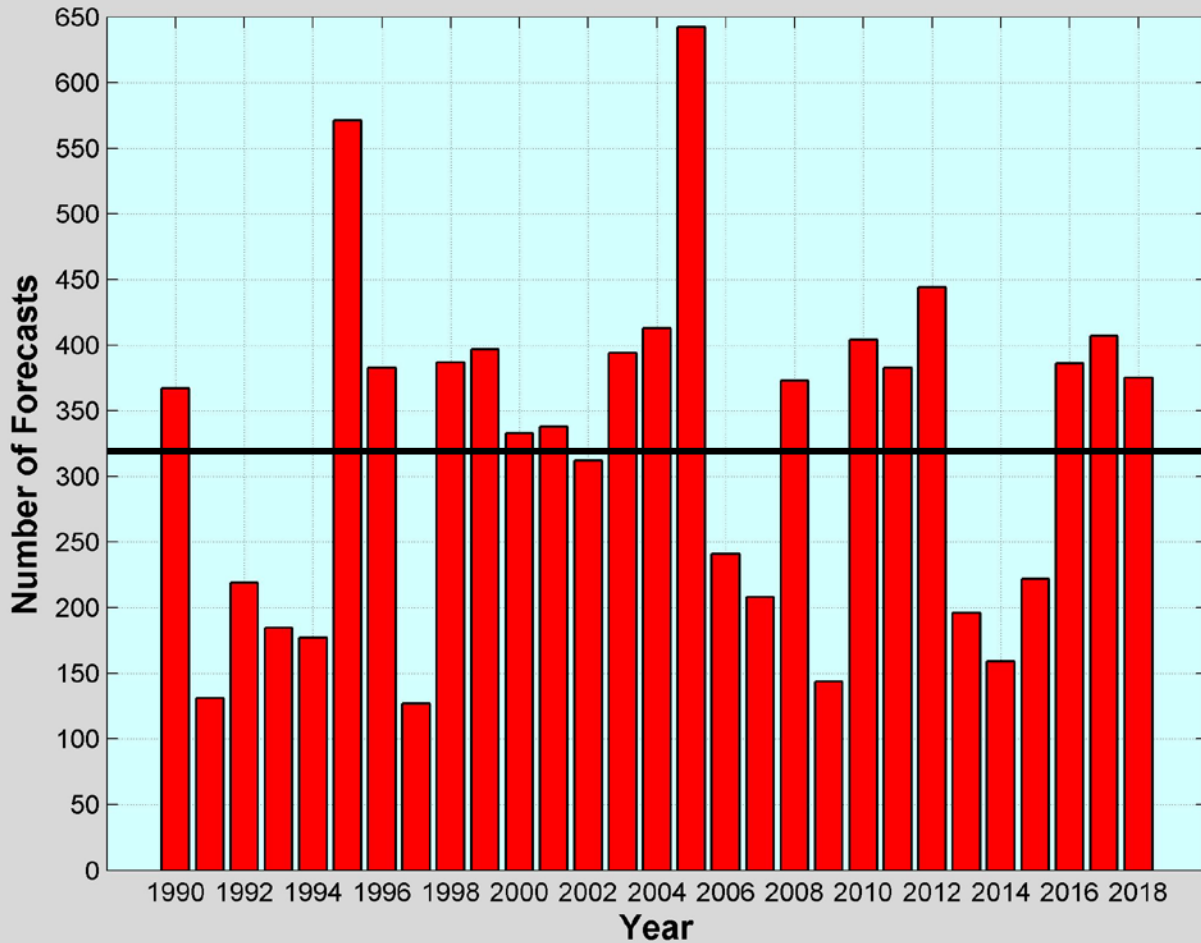
Verification stats do not include Oscar



Sample Size since 1990



Number of NHC Official Forecasts By Year
Atlantic Basin

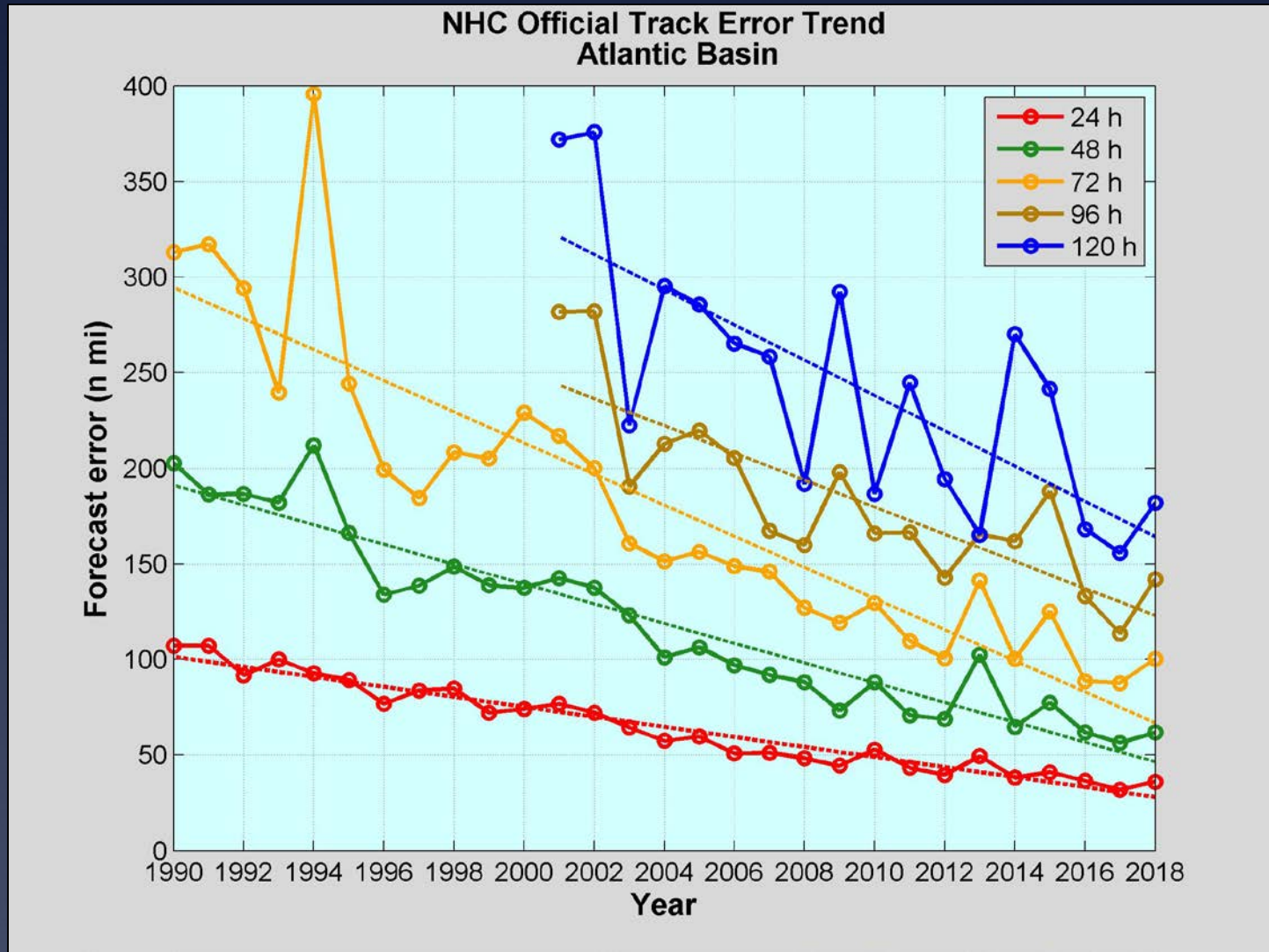


2018 was another busy Atlantic hurricane season with 375 forecasts issued.

Not far from 2016 and 2017 values and above the long term mean (321).



Atlantic Track Error Trends

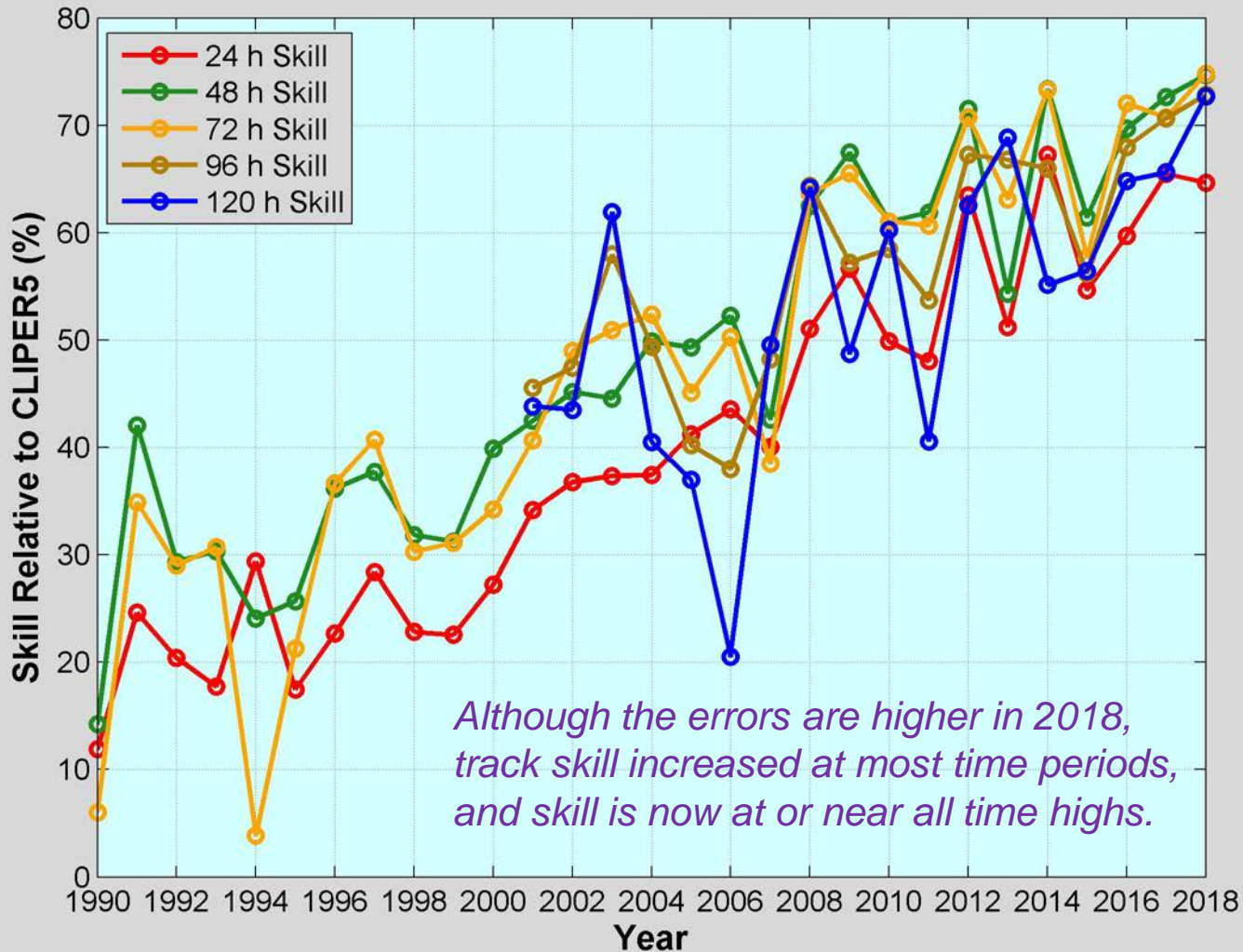


Track errors increased off the record lows set last year, but the long term trends show significant improvements. The short term trend could indicate that errors are levelling off?



Atlantic Track Skill Trends

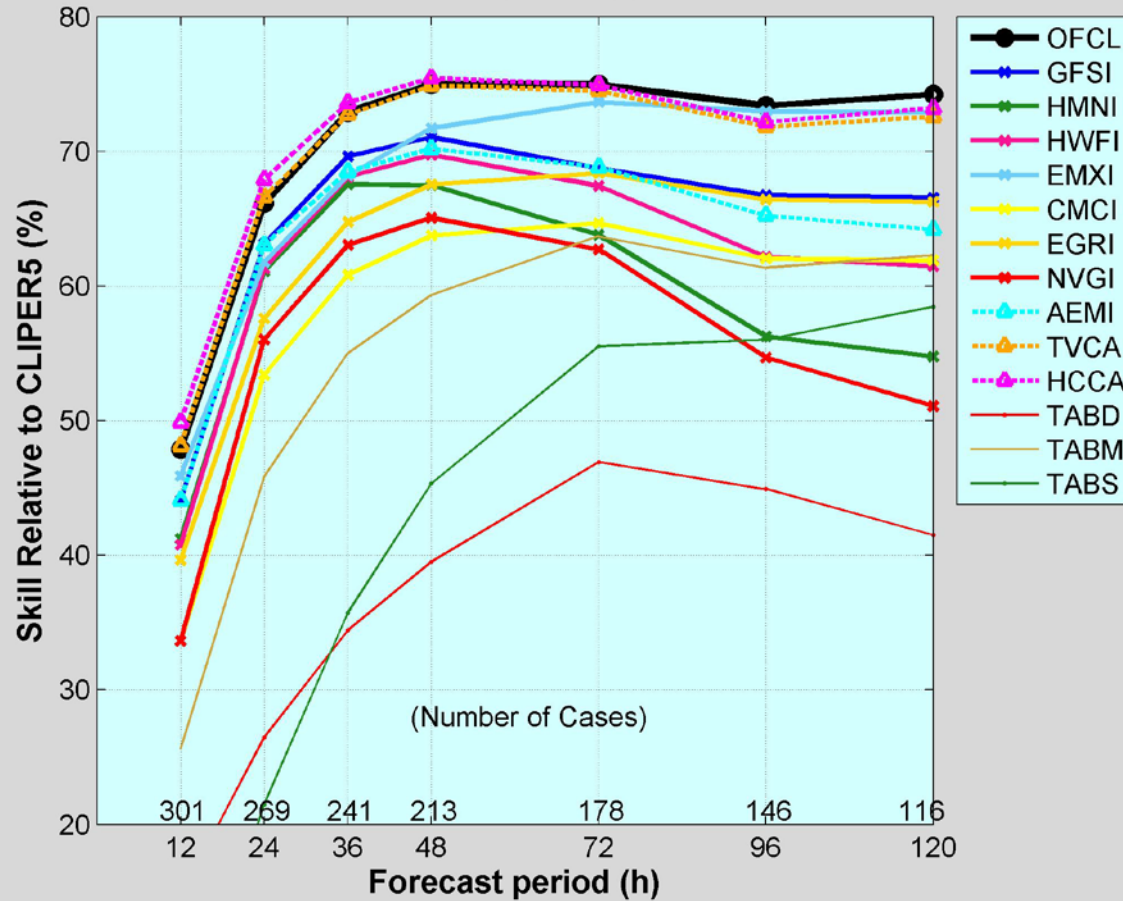
NHC Official Track Skill Trend
Atlantic Basin





2018 Track Guidance

Track Forecast Skill (Early Models)
2018 - Atlantic Basin



Official forecasts were very skillful and near or better than the best performing models (HCCA and TVCA).

EMXI best individual model at 48 h and beyond and near the skill of the consensus aids at those times.

GFSI best individual model at 24 and 36 h, but not as good after that.

AEMI, EGRI, HWFI were fair performers.

HMNI competitive early, but skill dropped off after 48 h.

NVGI and CMCI less competitive.



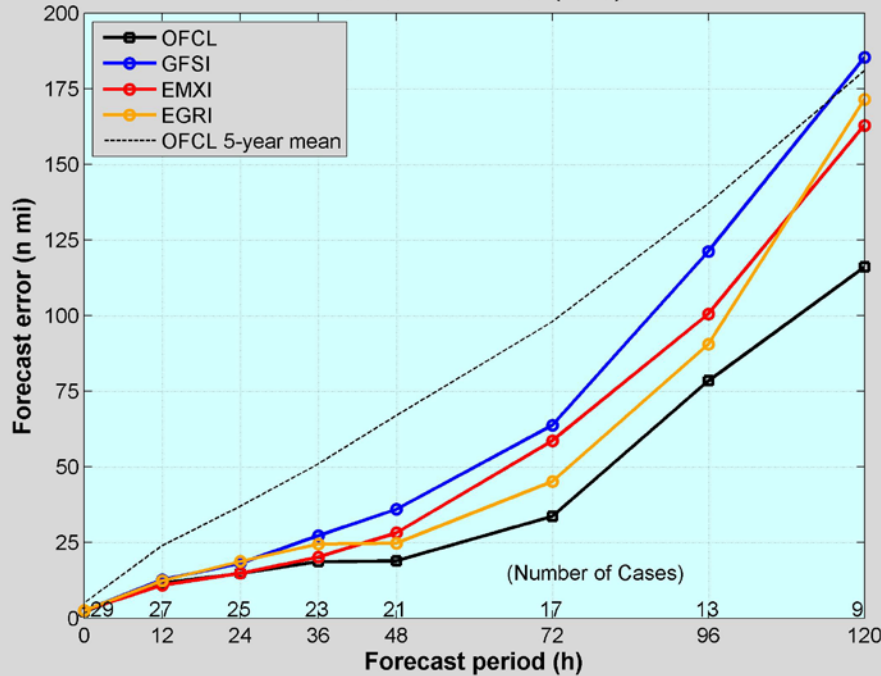
Florence and Michael



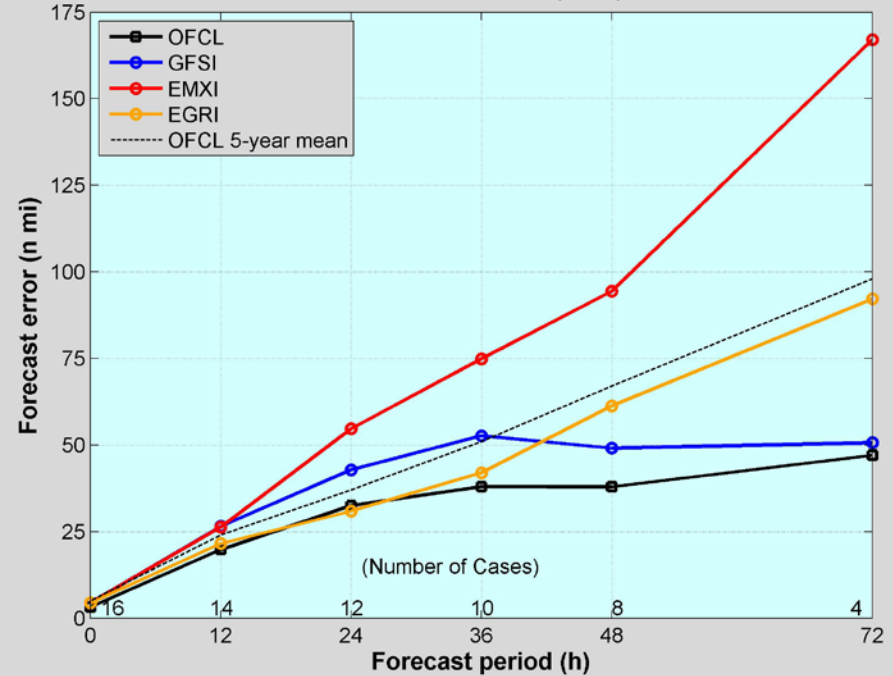
Florence (W of 55W)

Michael

NHC and Model Track Errors
Hurricane Florence (2018)



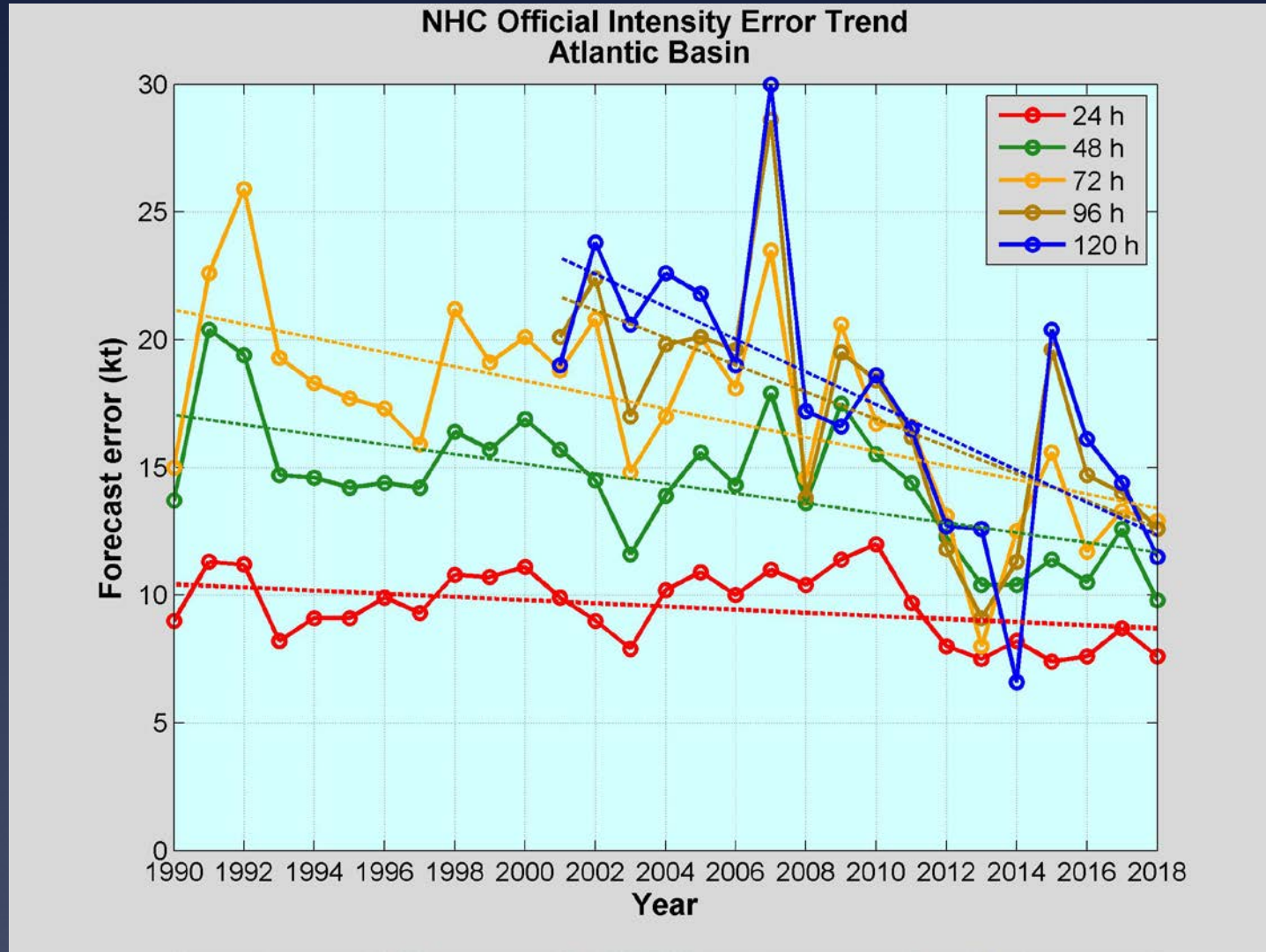
NHC and Model Track Errors
Hurricane Michael (2018)



OFCL track errors were lower than the mean for both of these hurricanes and NHC performed as good as or better than the best global models.



Atlantic Intensity Error Trends

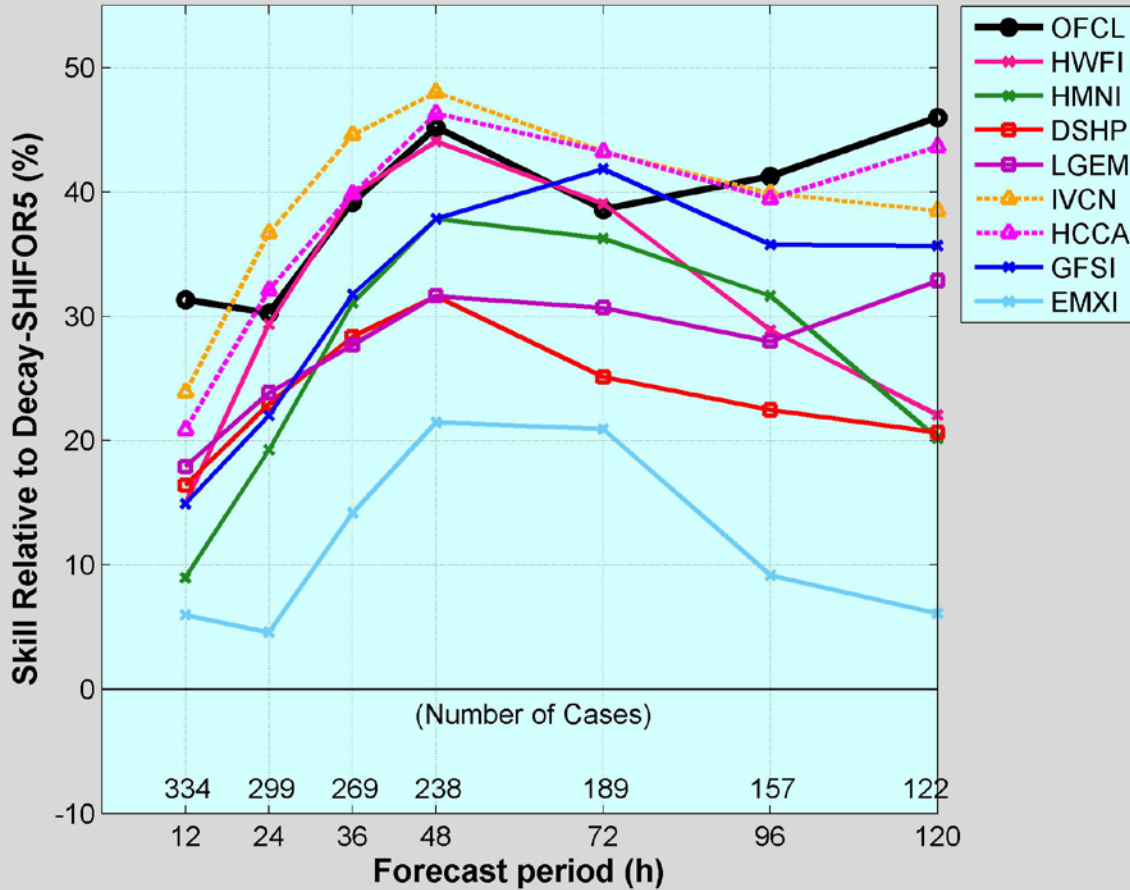


Intensity errors decreased at all time periods in 2018. Notable improvements have been made since the start of the decade.



2018 Intensity Guidance

Intensity Forecast Skill (Early Models)
2018 - Atlantic Basin



Official forecasts better than all of the guidance at 12 h, 96 and 120 h.

IVCN and HCCA were the best models. IVCN best from 12 to 48 h. HCCA was best at 120 h.

HWFI best individual model through 48 h. GFSI best individual model after that!

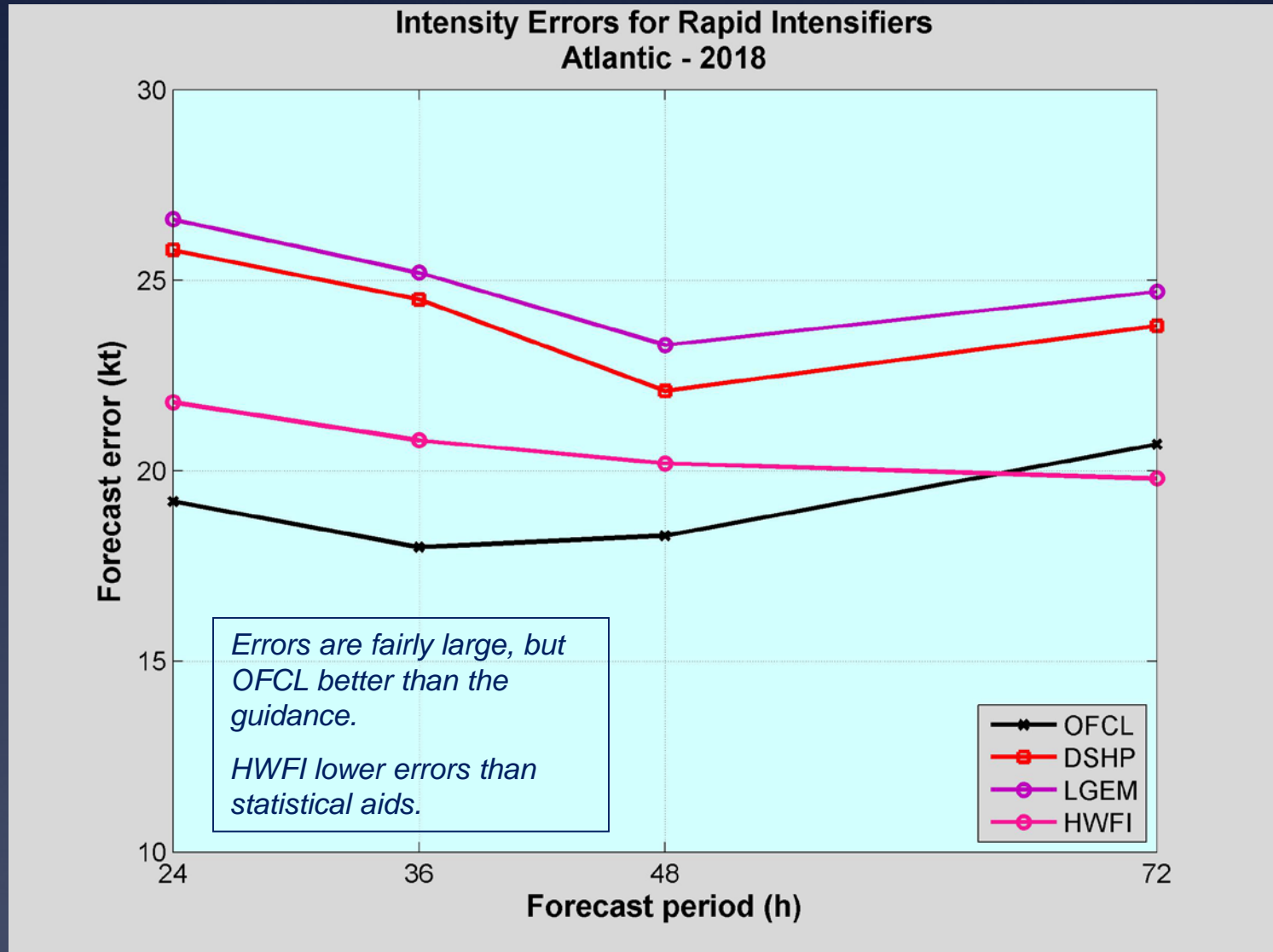
HMNI not as good as HWFI or GFSI, but beat statistical aids.

DSHP and LGEM were skillful, but had less skill than dynamical models at most time periods.

EMXI had some skill, but not competitive

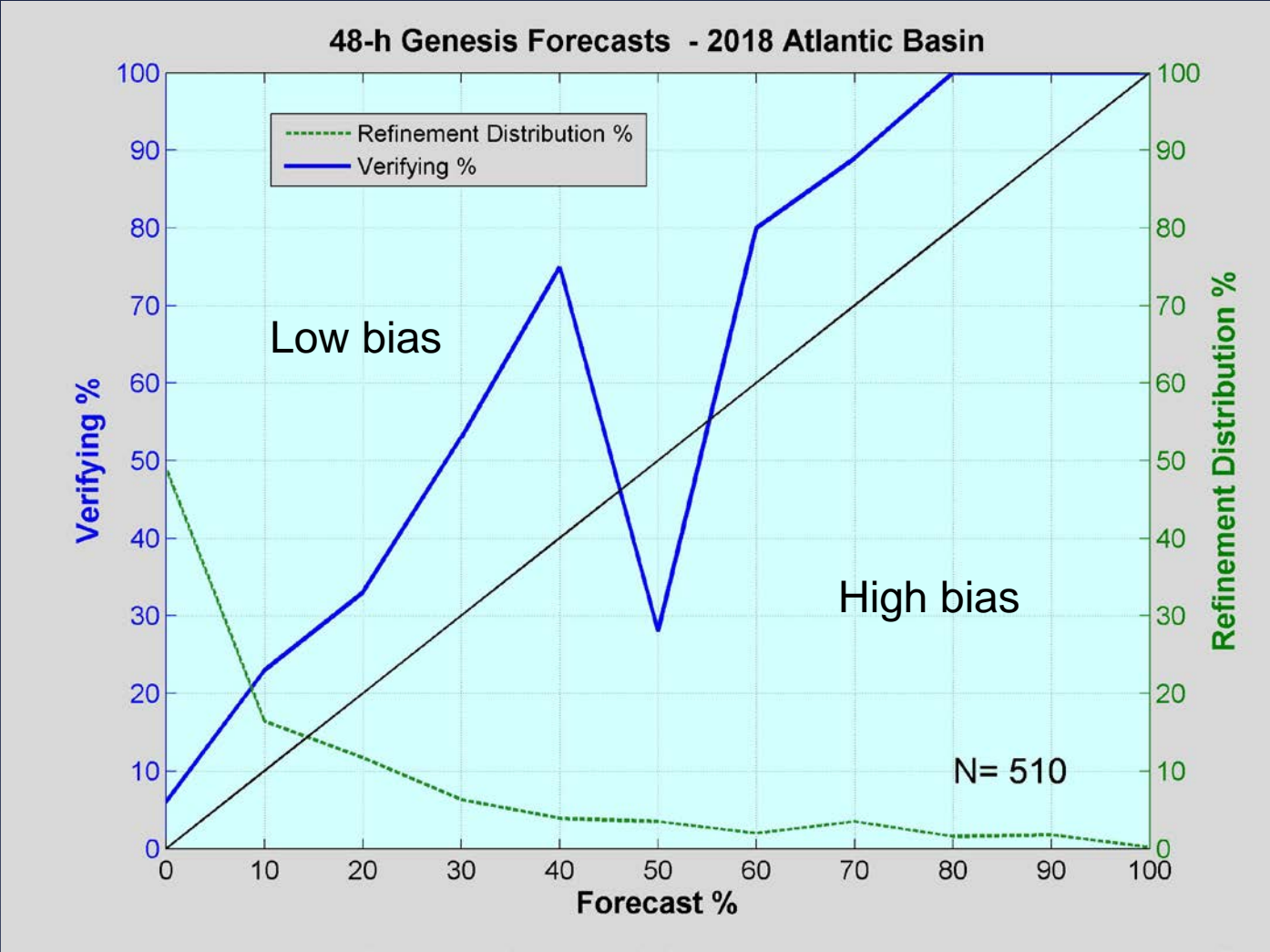


2018 Intensity – RI cases only





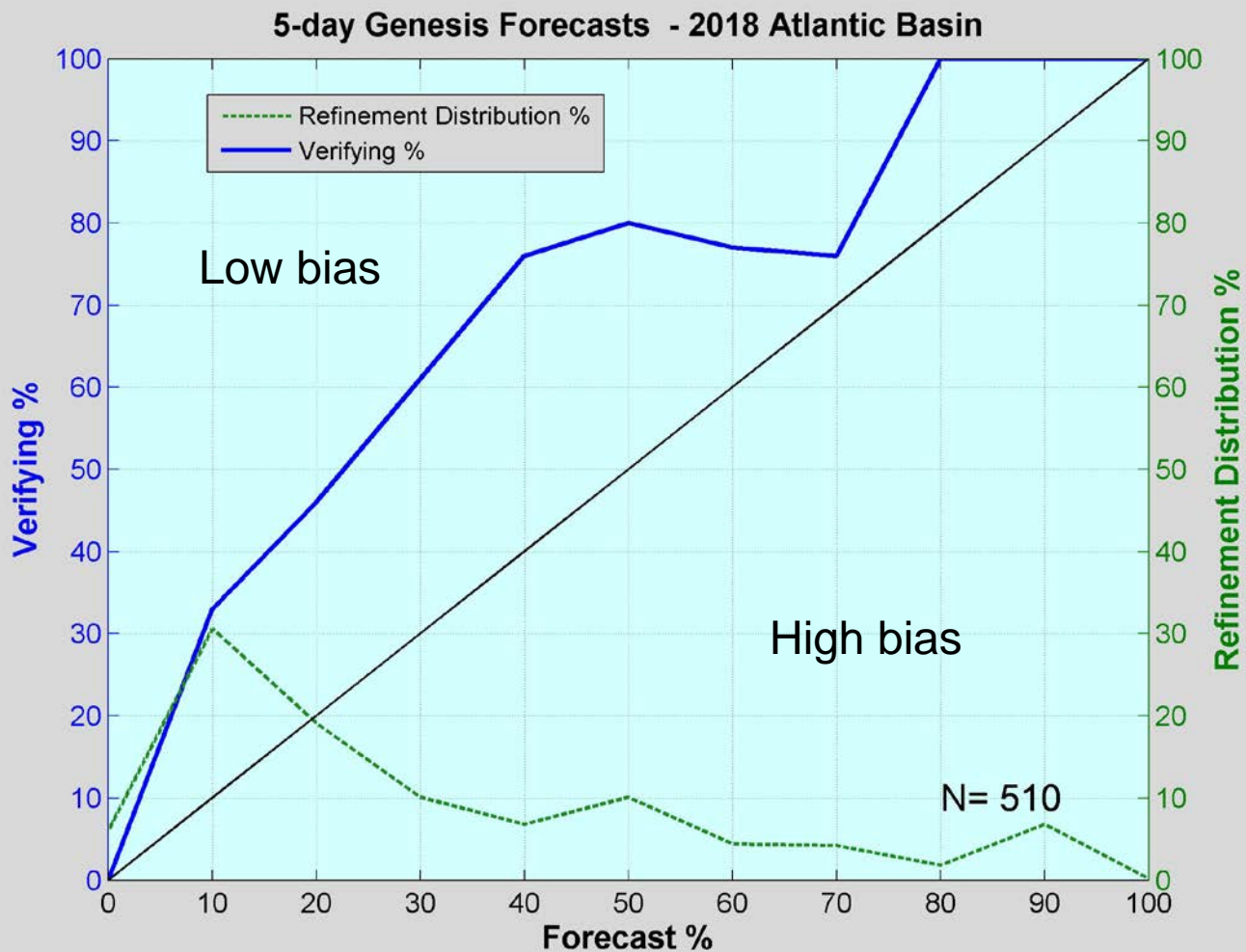
2-day Genesis Forecast Verification



48-h genesis forecasts had a low bias at most forecast times in 2018. Not as reliable as they were in 2017.



5-day Genesis Forecast Verification



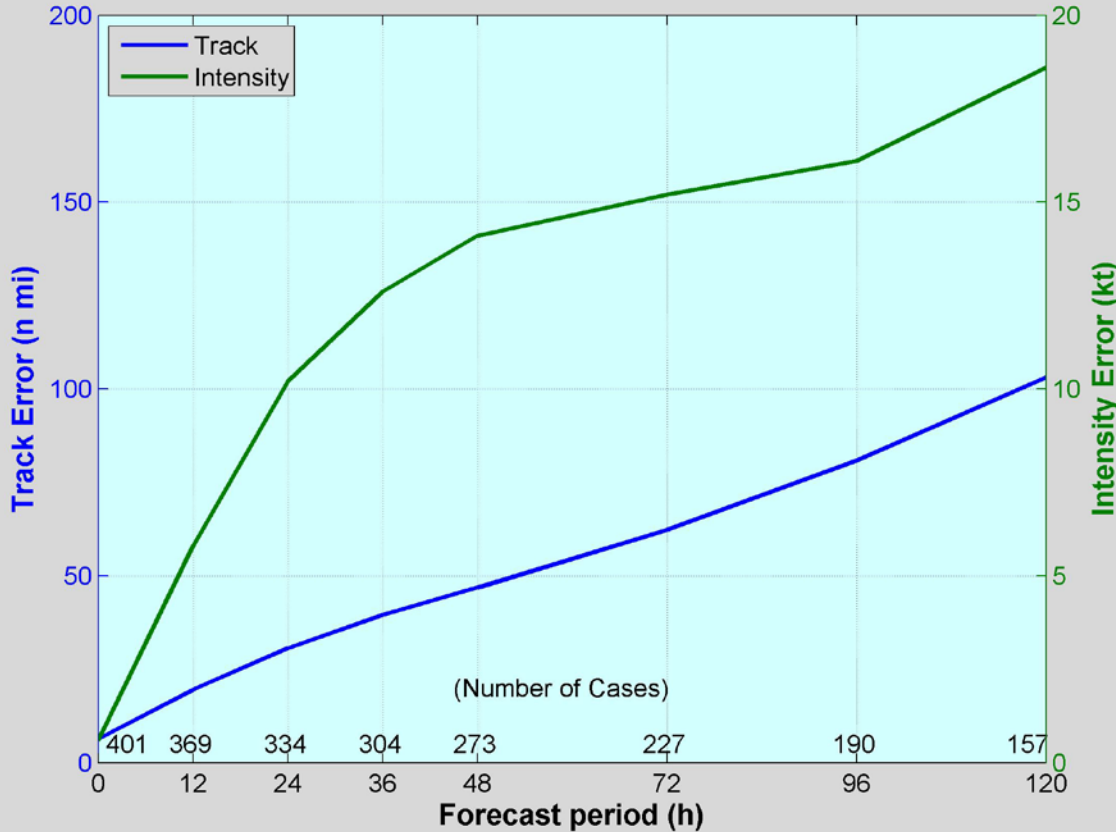
Similar to the 2-day predictions, the 5-day genesis forecasts showed a low bias at all ranges in 2018.



2018 East Pacific Verification



NHC Official Forecasts - 2018 East Pacific Basin



| VT (h) | NT | TRACK (n mi) | IN (kt) |
|-----------|-----|-----------------|------------|
| 000 | 401 | 6.3 | 0.6 |
| 012 | 369 | 19.5 | 5.8 |
| 024 | 334 | 30.6 | 10.2 |
| 036 | 304 | 39.5 | 12.6 |
| 048 | 273 | 46.8 | 14.1 |
| 072 | 227 | 62.3 | 15.2 |
| 096 | 190 | 80.8 | 16.1 |
| 120 | 157 | 103.0 | 18.6 |

Value in green exceeded all-time record.

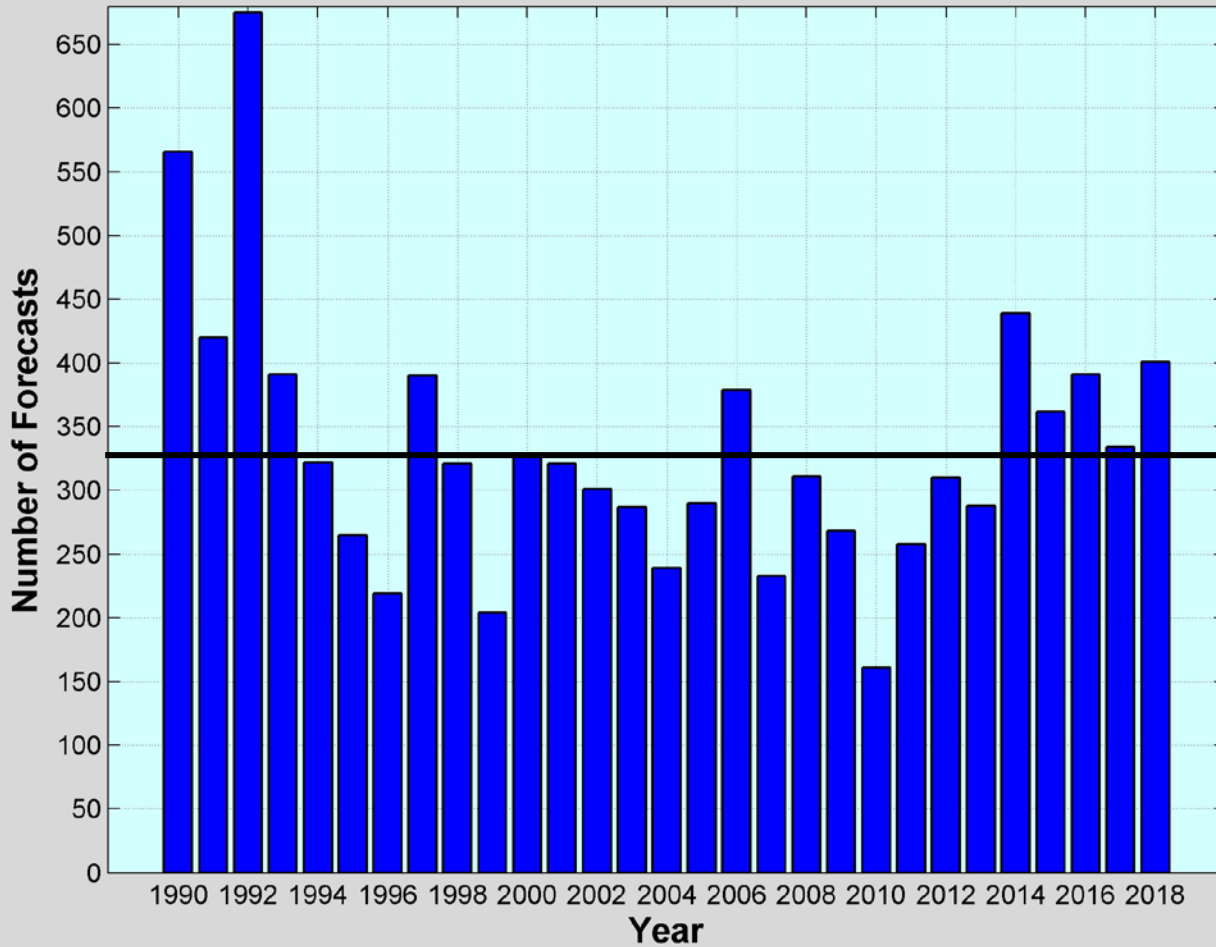
Verification stats do not include Vicente, Willa, or Xavier



Sample Size since 1990



Number of NHC Official Forecasts By Year
East Pacific Basin



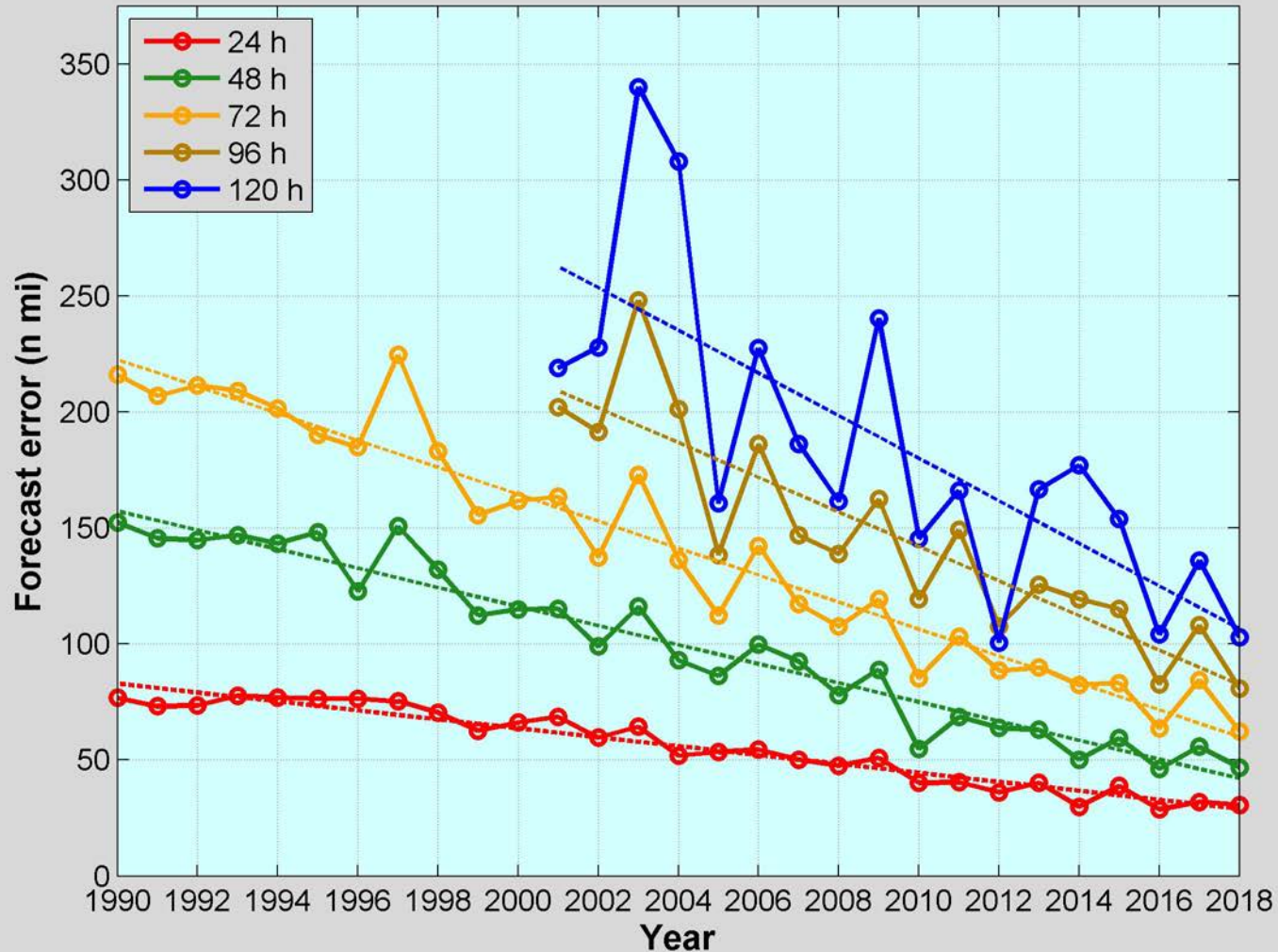
Busy year in the East Pacific too, with more than 400 NHC forecasts issued. This is well above the mean (333).



East Pacific Track Error Trends



NHC Official Track Error Trend
Eastern North Pacific Basin Tropical Cyclones

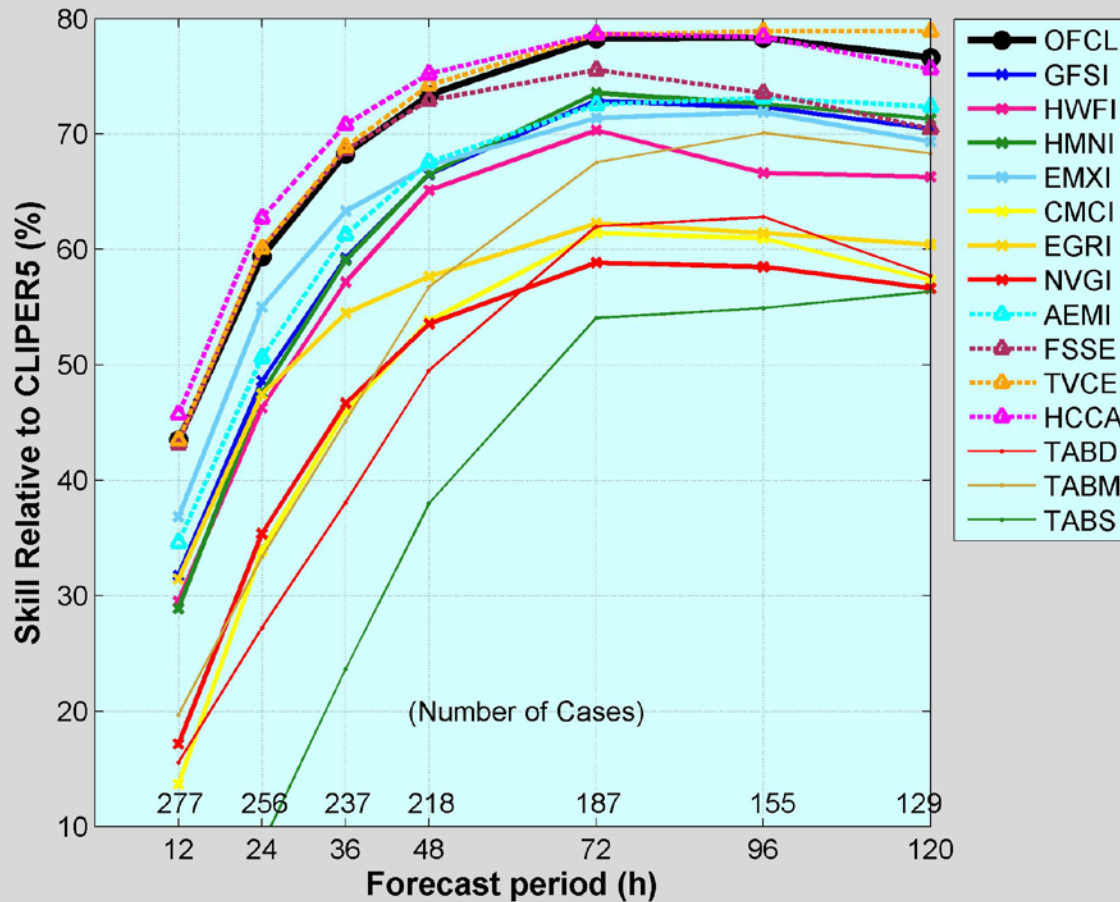


In 2018 there was a slight decrease in errors at all lead times, and track errors have decreased substantially over the long term.



2018 Track Guidance

Track Forecast Skill (Early Models)
2018 - East Pacific Basin



Official forecasts very skillful, near the best models – TVCE, HCCA.

FSSE close to best aids in the short term, but trailed slightly at longer leads.

EMXI best individual model through 36 h, but GFSI, AEMI, and HMNI best models after that.

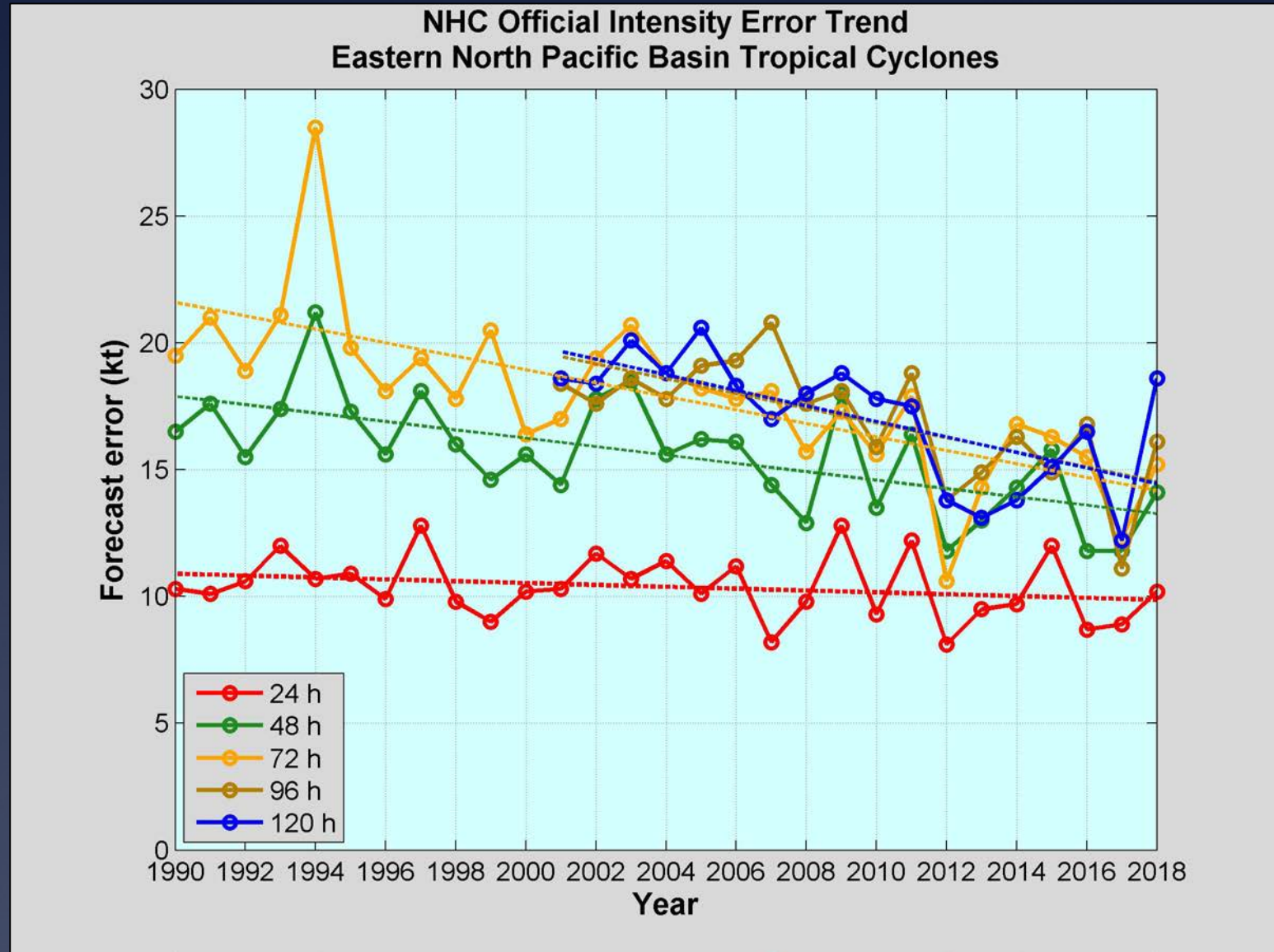
HWFI just behind the best individual models.

EGRI competitive early, but trailed beyond 36 h.

CMCI and NVGI not competitive.



East Pacific Intensity Error Trends

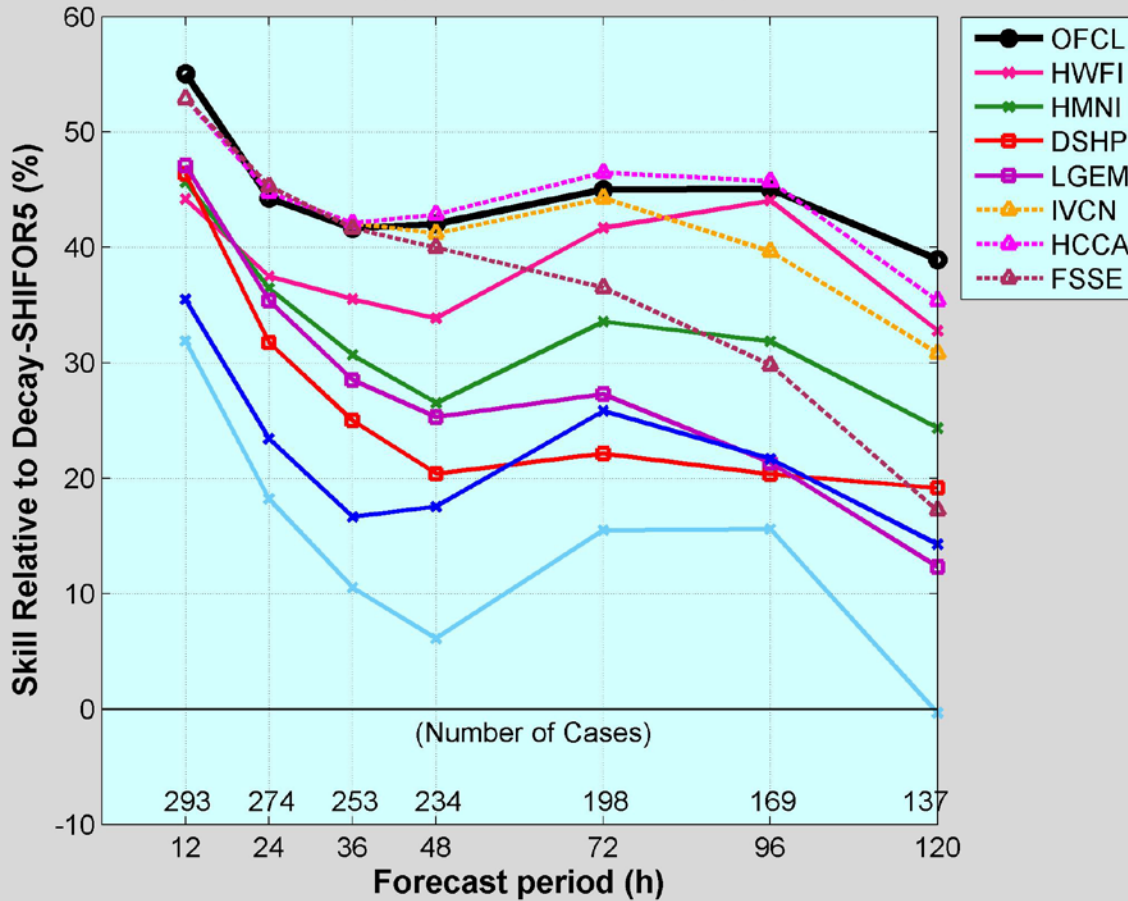


Errors went up in 2018, but a slow downward long-term trend exists at most periods.



2018 Intensity Guidance

Intensity Forecast Skill (Early Models)
2018 - Eastern North Pacific Basin



Official forecasts performed as good as or better than the best models (IVCN, HCCA).

FSSE was one of the best aids early, but it trailed after 48 h.

HWFI was best individual model at 24 h and beyond.

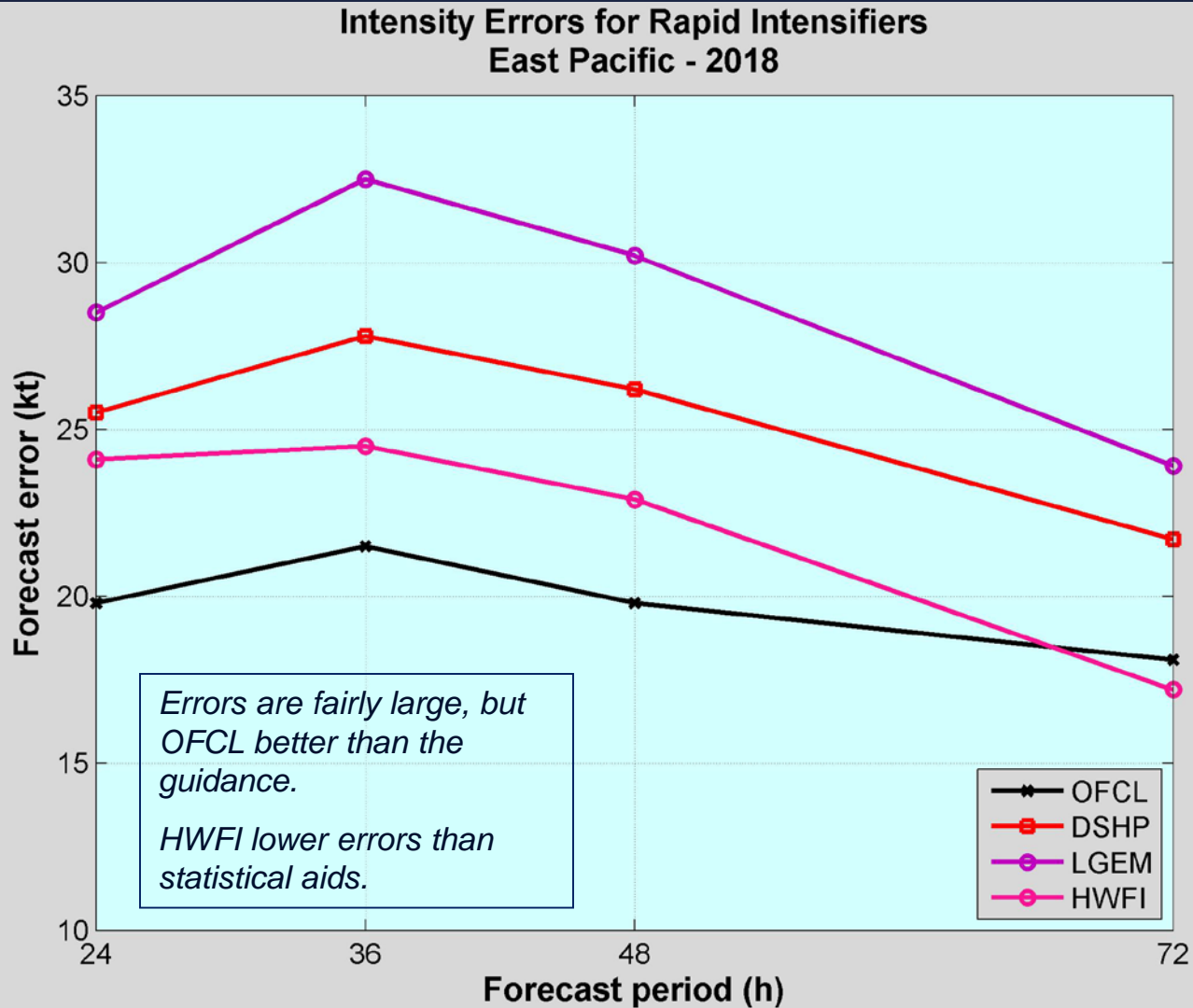
HMNI not as good as HWFI, but it did beat the statistical aids.

DSHP and LGEM skillful, but not competitive with the best aids.

GFSI close to DSHP/LGEM at longer leads. EMXI had less skill.



2018 Intensity – RI cases only

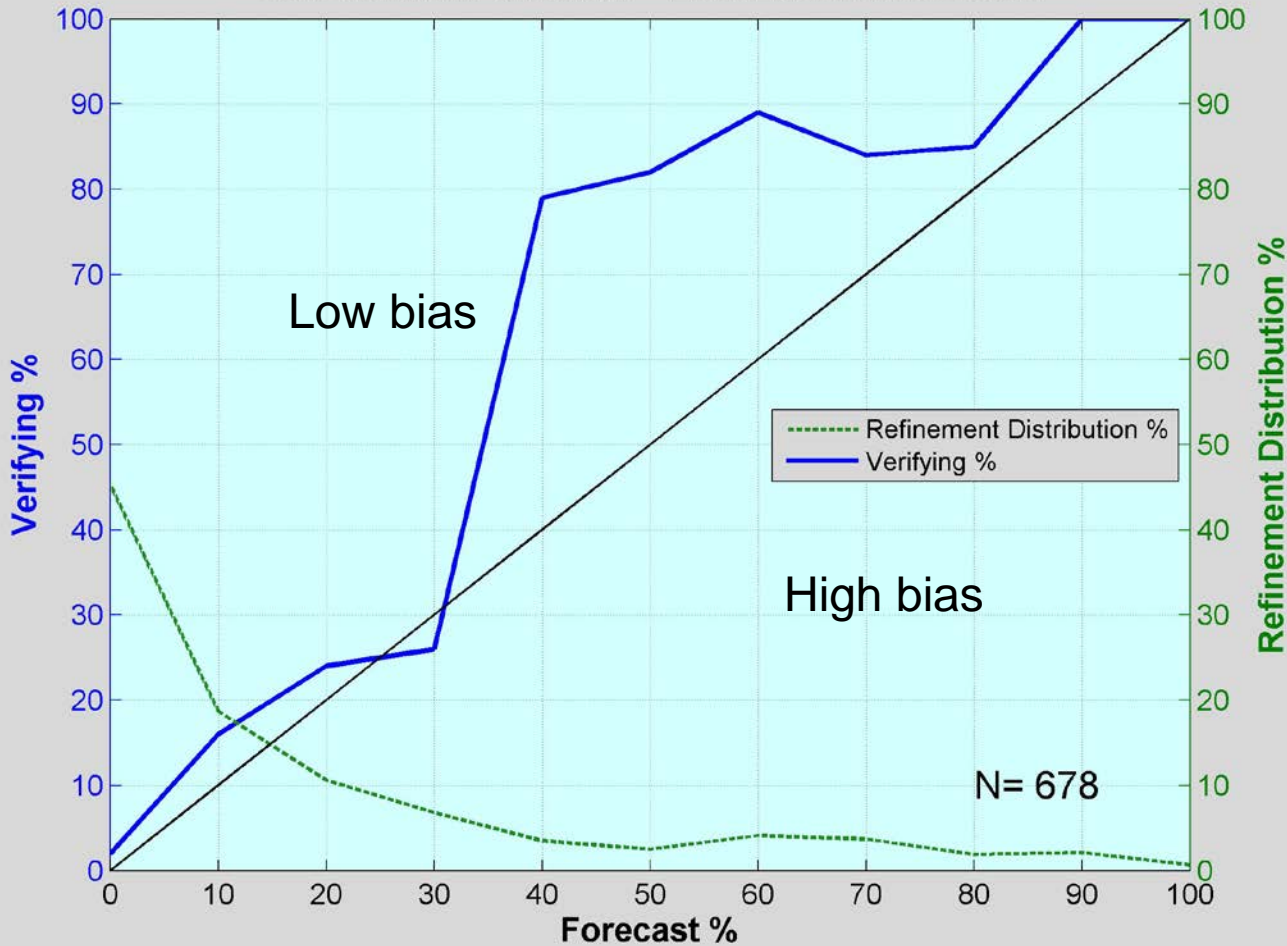




2-day Genesis Forecast Verification



48-h Genesis Forecasts - 2018 East Pacific Basin



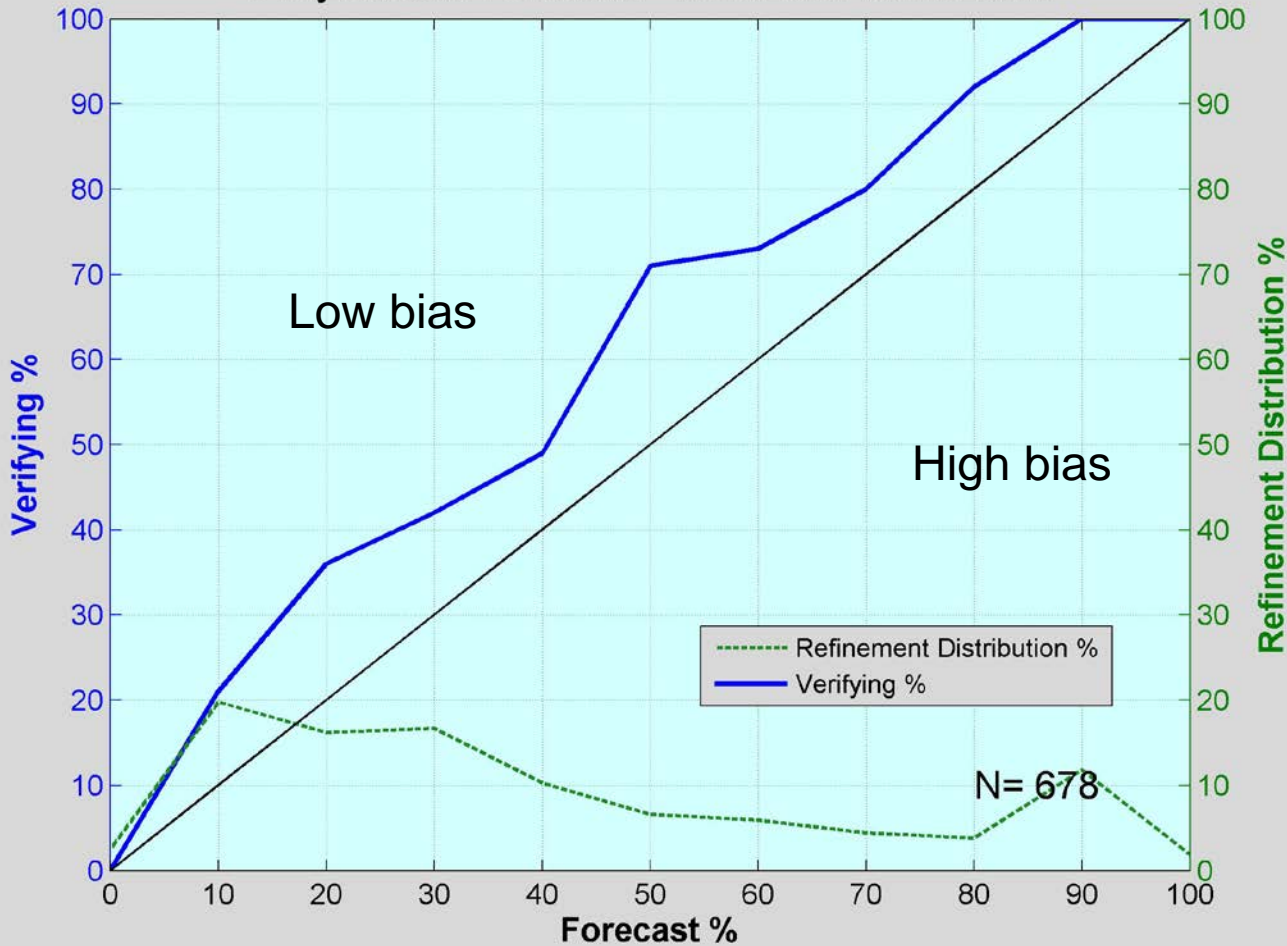
Well calibrated at the low probabilities, but a low bias exists at the medium and high categories.



5-day Genesis Forecast Verification



5-day Genesis Forecasts - 2018 East Pacific Basin



Slight low bias at nearly all ranges.



Highlights

- * Atlantic – no records set for track prediction, but a few records for intensity forecasts.
- * Very accurate track forecasts for Hurricanes Florence and Michael
- * East Pacific – a couple of records for track, but no records for intensity.
- * Consensus models performed best for track and intensity in both basins.
- * EMXI best individual model for track in the Atlantic, especially at longer leads. HWFI good model for intensity in both basins.
- * Genesis forecasts had a low bias in both basins.