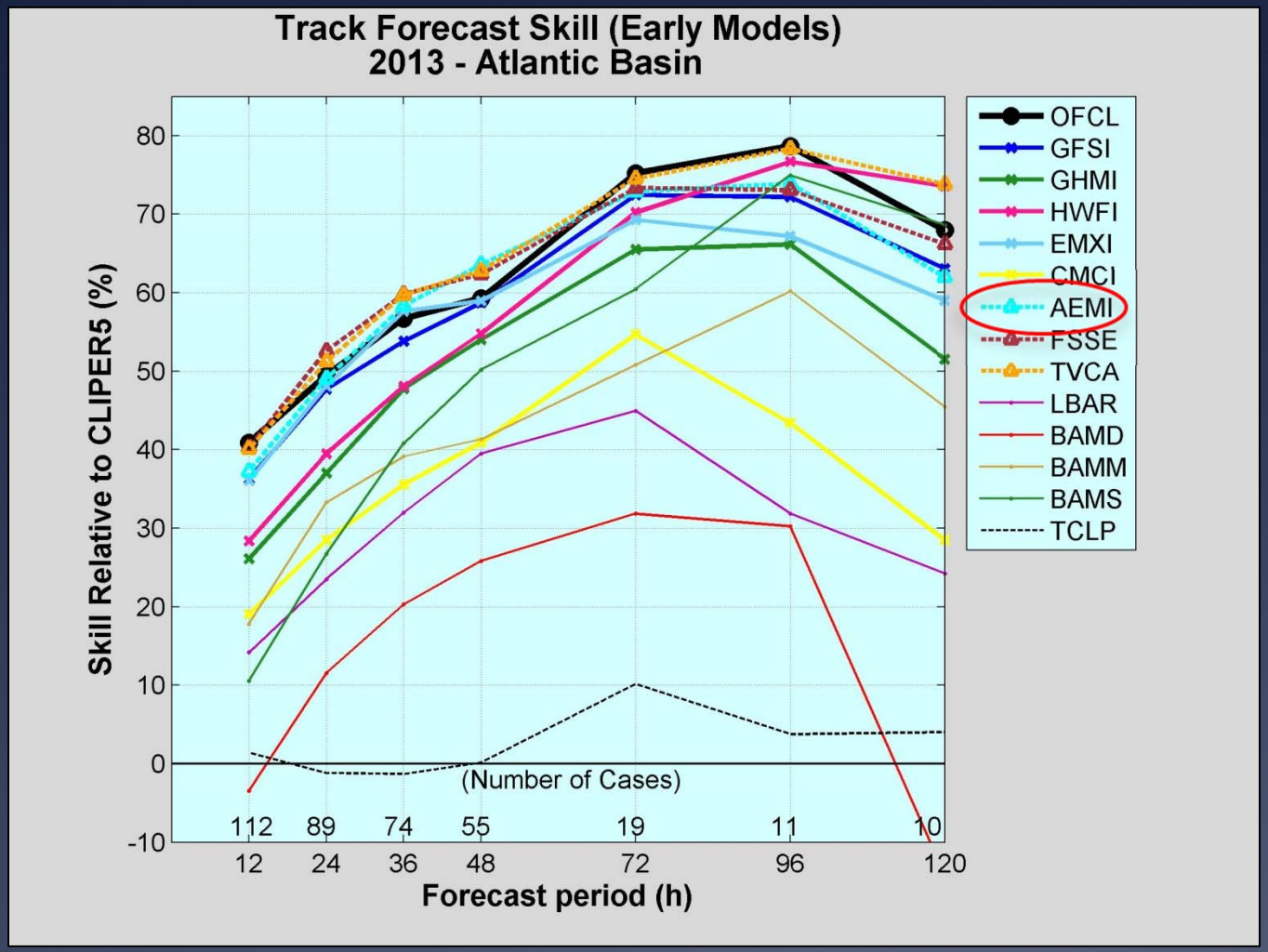
Performance of ensembles for TC forecasting at the National Hurricane Center

With acknowledgements to
John Cangialosi and James Franklin

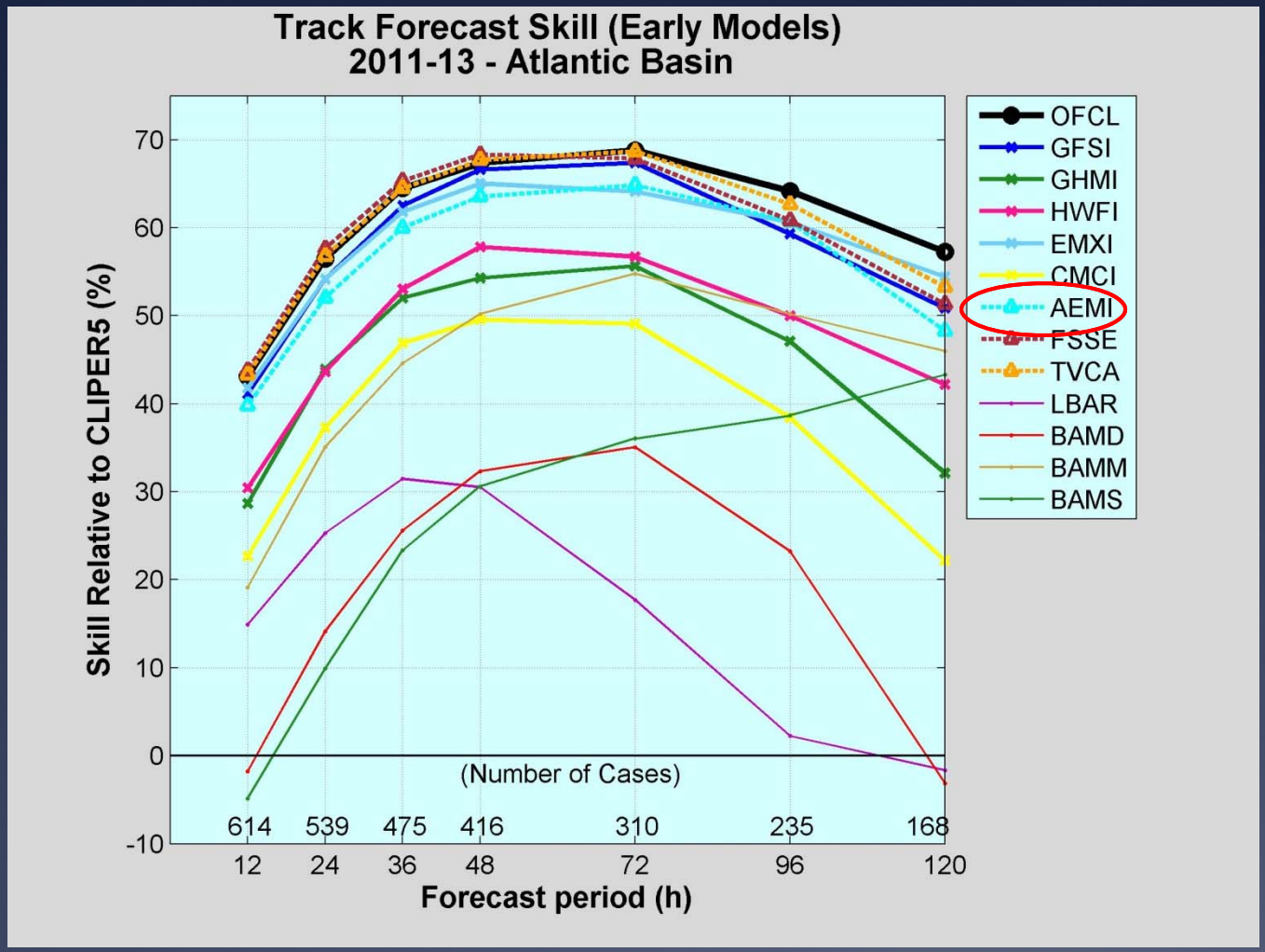
Hurricane Specialist Unit
National Hurricane Center

2013 Track Guidance



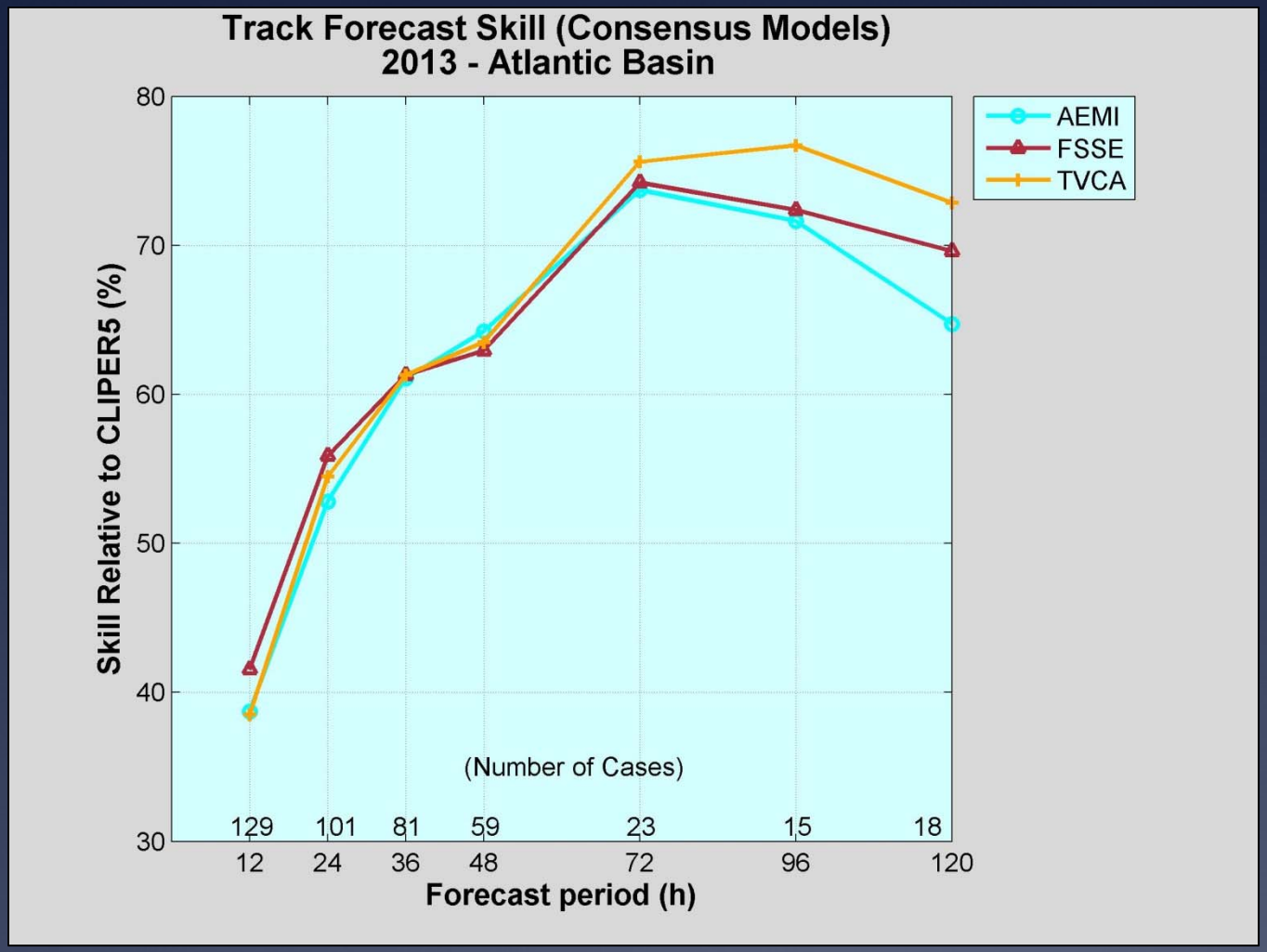
GFS ensemble mean (AEMI) excellent performer in 2013, better than the GFS.

2011-13 Track Guidance (3-yr average)



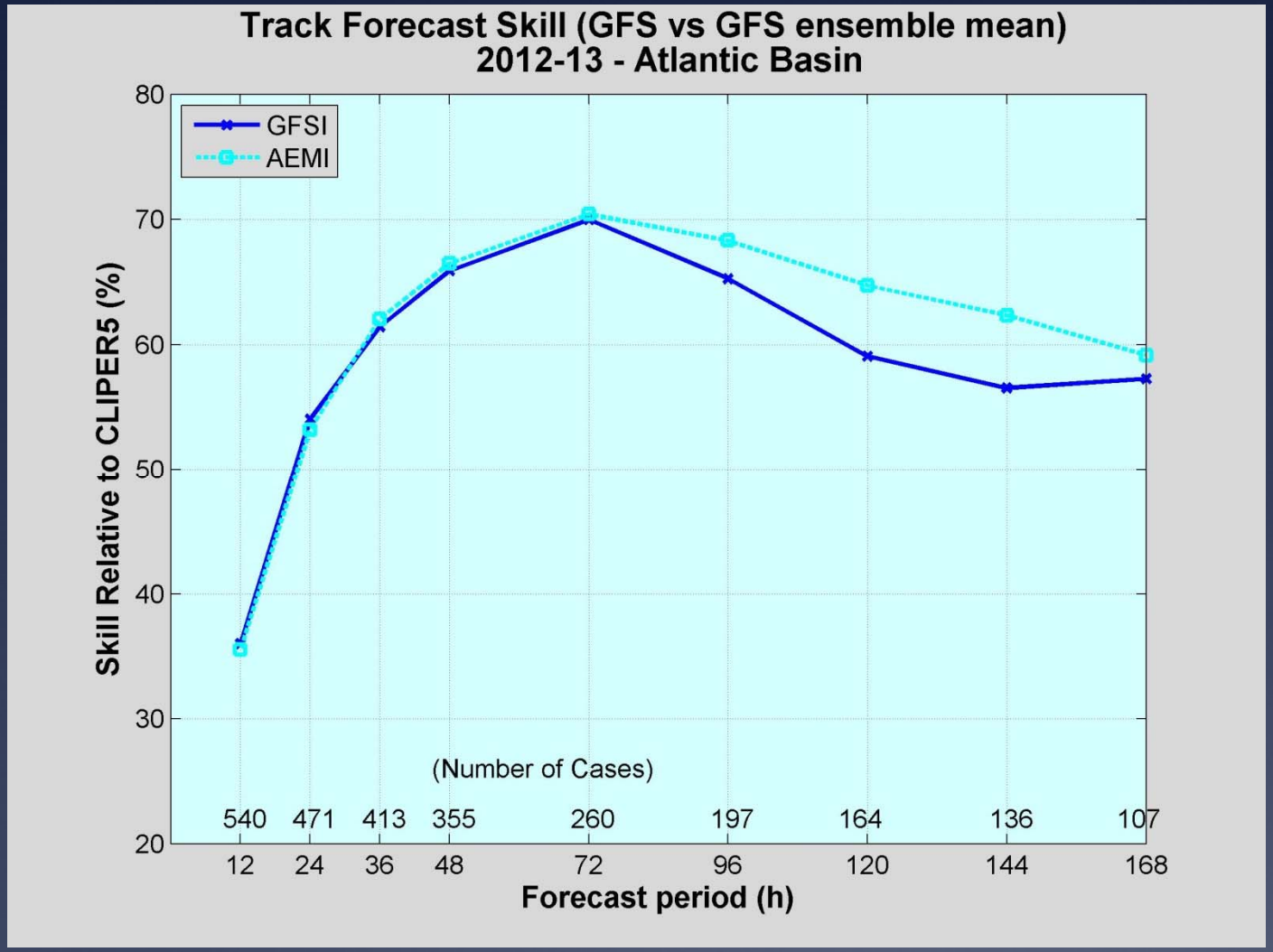
GFS ensemble mean (AEMI) excellent performer, close to GFS and EMX.

2013 Consensus Guidance



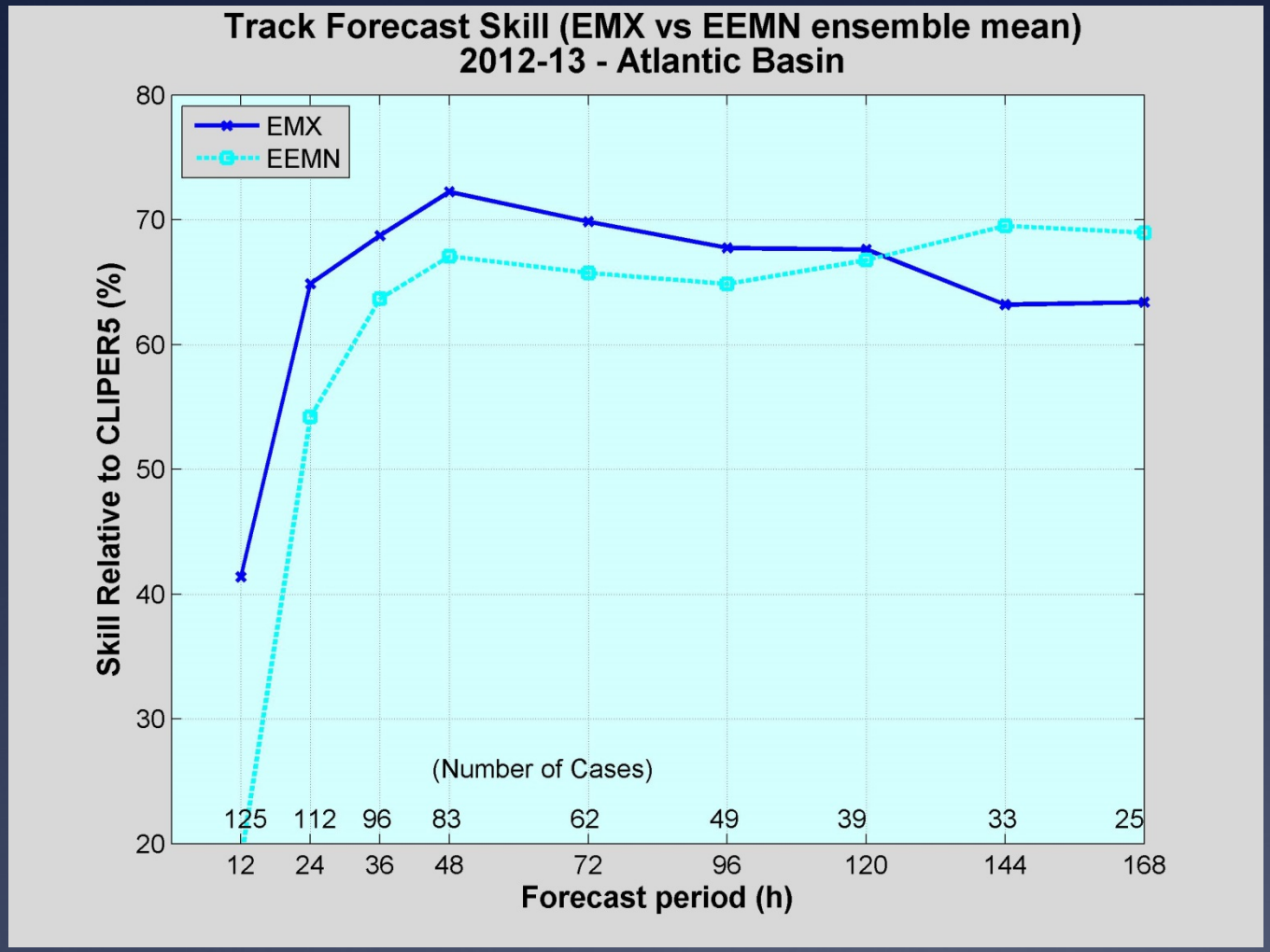
Consensus models were close to each other through 48 h. After that, TVCA more skillful than FSSE and the GFS ensemble mean, AEMI.

GFS vs. GFS ensemble mean



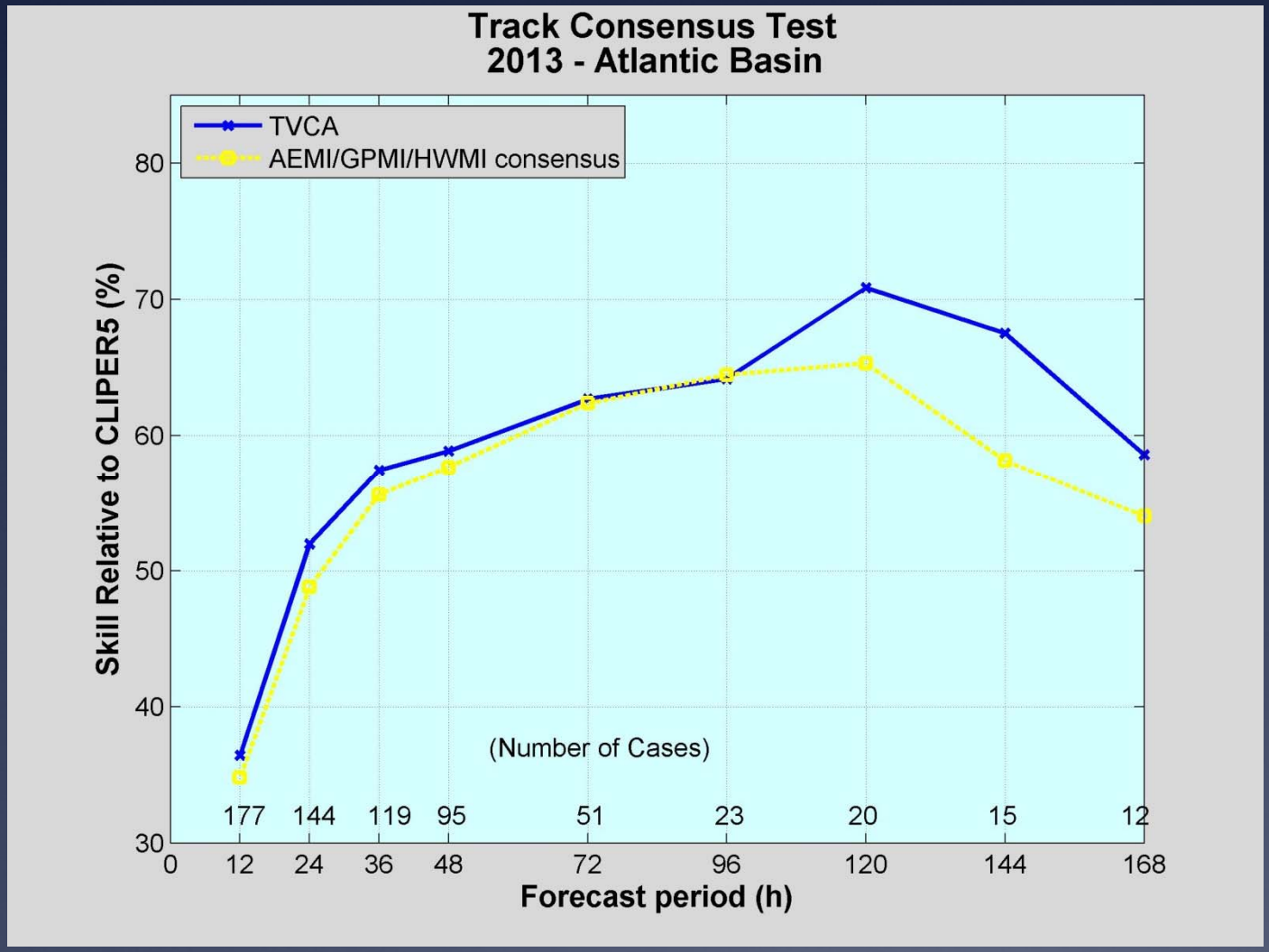
- *This is a 2-yr sample (2012-13)*
- *The skill of GFS and AEMI are very similar through 72 h. After that, AEMI is more skillful.*

EMX vs. EEMN (ensemble mean)



- *This is a 2-yr sample (2012-13)*
- *EMX is more skillful through 120 h. After that EEMN has more skill.*

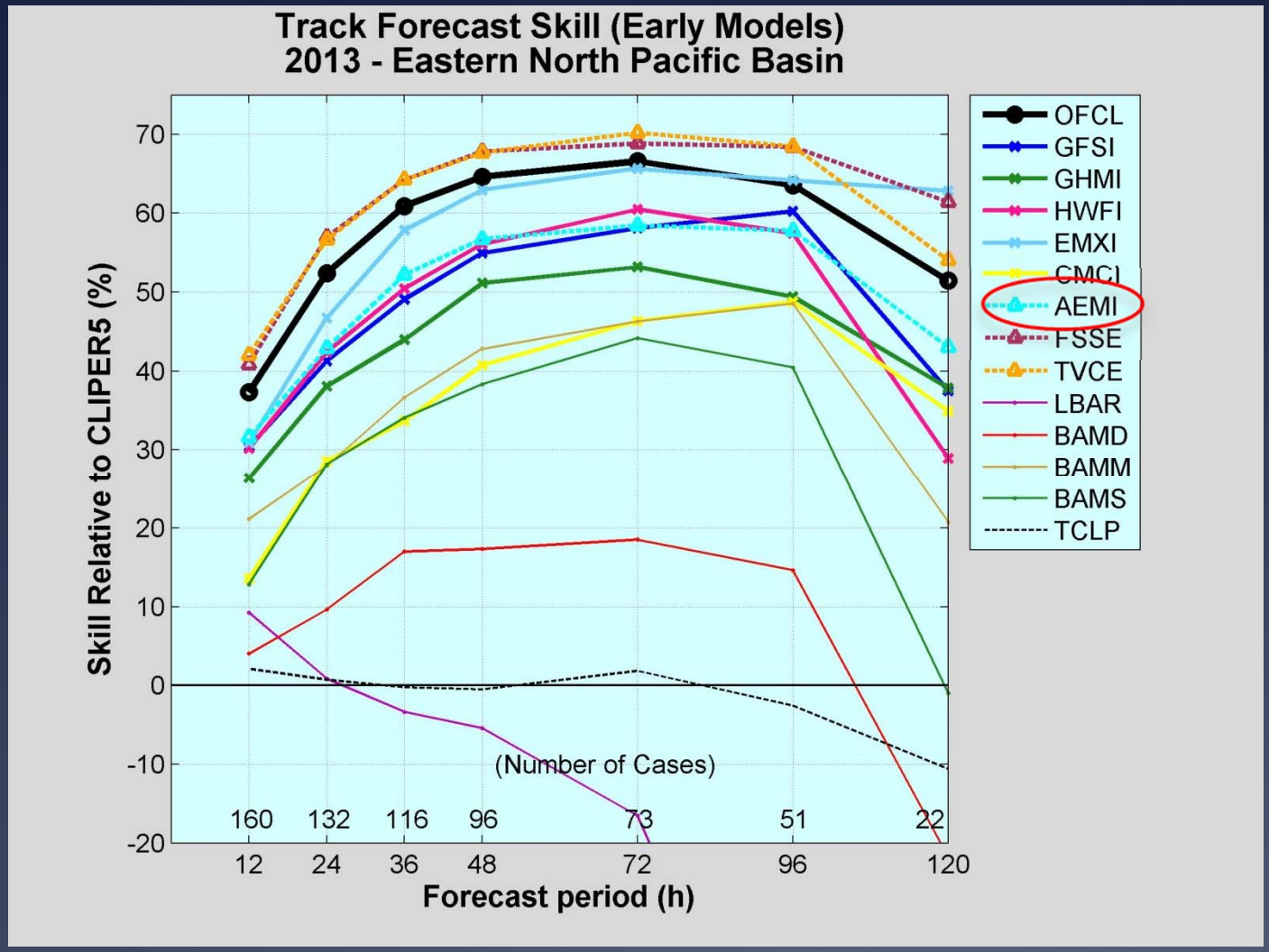
TVCA vs. Ensemble Mean Consensus (AEMI/GPMI/HWFI)



A consensus of the ensemble means is very skillful, but not better than TVCA.

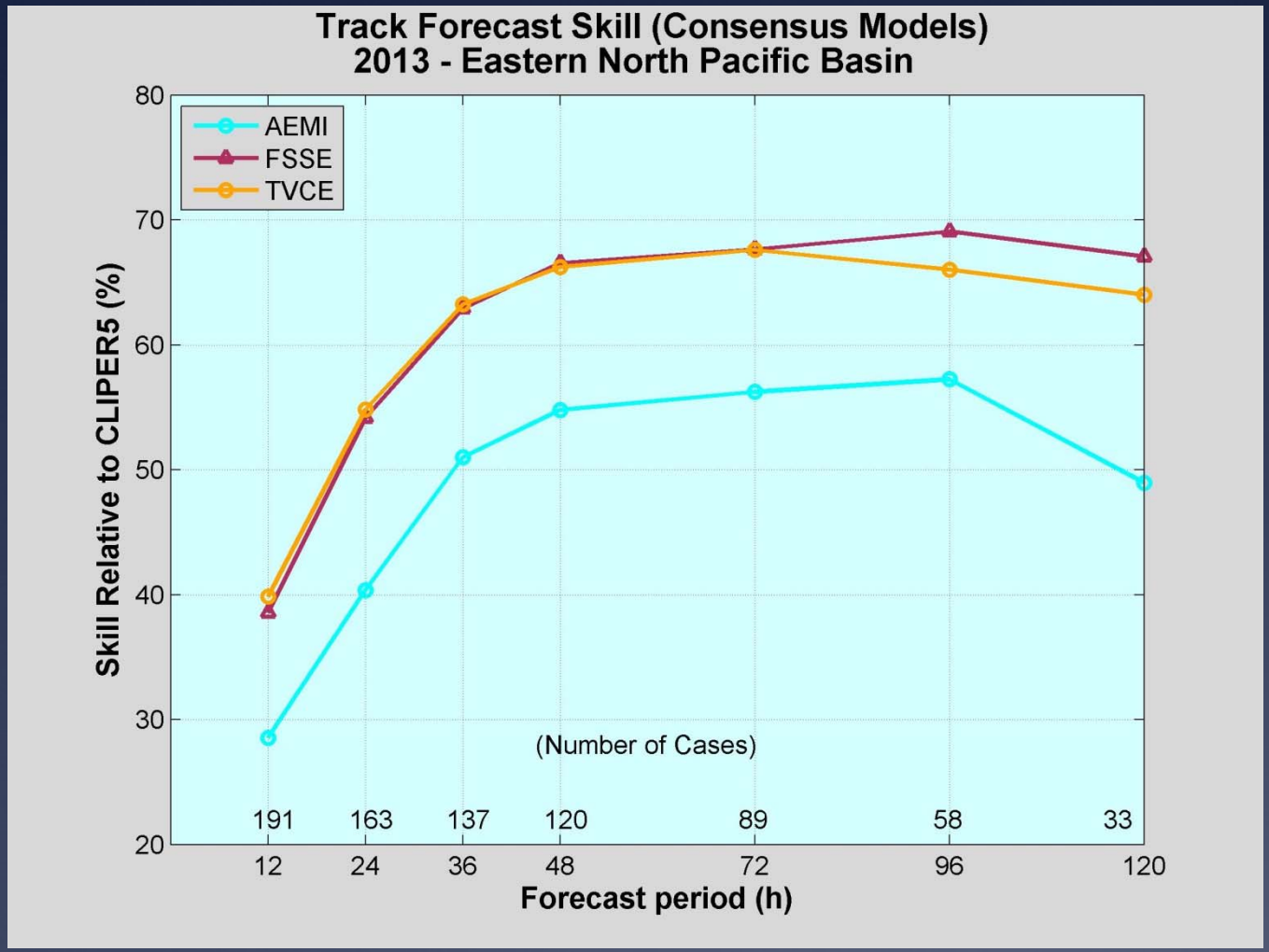
Note that beyond day 5, this is simply the GFS ensemble.

2013 Track Guidance



GFS and its ensemble were fair to good performers.

2013 Consensus Guidance



TVCE and FSSE very close. FSSE slightly better at 96 and 120 h.

AEMI not as good; similar results found over the past few years.

Concluding Remarks

- The GFS ensemble is becoming increasingly useful for TC track forecasting in the Atlantic basin, particularly beyond day 3, although it is still not quite as good as the multi-model consensus or a “smart” consensus (such as the FSU Superensemble

- The performance of the GFS ensemble is not as good relative to the other track guidance in the eastern North Pacific basin.

- Currently the GFS ensemble has limited utility for forecasting TC genesis (e.g. as seen on the NCEP/EMC cyclogenesis tracking page, which has a large high bias).

- NHC would very much like to see the resolution of the GFS ensemble increased to T574 in the near future, which should improve predictions of both track and genesis.