Overview of the 2017-18 La Niña and El Niño Watch in mid-2018

Michelle L'Heureux (NOAA CPC)

Climate Diagnostics and Prediction Workshop

Santa Barbara, CA

ENSO Forecast team (A. Barnston, E. Becker, G. Bell, T. Di Liberto, J. Gottschalck, M. Halpert, Z. Hu, N. Johnson, W. Wang, Y. Xue), M. Tippett

But First….

At this meeting, we've heard a lot about ENSO precursors (indices based on a region or variable that is believed to significantly explain wintertime ENSO variability).

However, we know that sometimes real-time forecasting leads to sometimes surprising outcomes.

As a result, we (KVP and MLL) would like to offer a forecast challenge.

Submit your entry to: Kathy Pegion: kpegion@gmu.edu and Michelle L'Heureux: michelle.lheureux@noaa.gov
[Deadline: July 31 2019]

ENSO Precursor Forecast Challenge

Submit to us a **process/definition to compute a single index** (time series). For example, give us the regional average domain (e.g. lat/lon boundaries) and variable (e.g. 850mb winds). It can be PC/EOF based, CCA/MCA using multiple variables, but we ask for only **one index based on one variable** (e.g. MCA-SST). If you use a pattern based index, also submit the pattern to us.

This index must be based *on a period that is July or any season/month earlier* (not August or later).

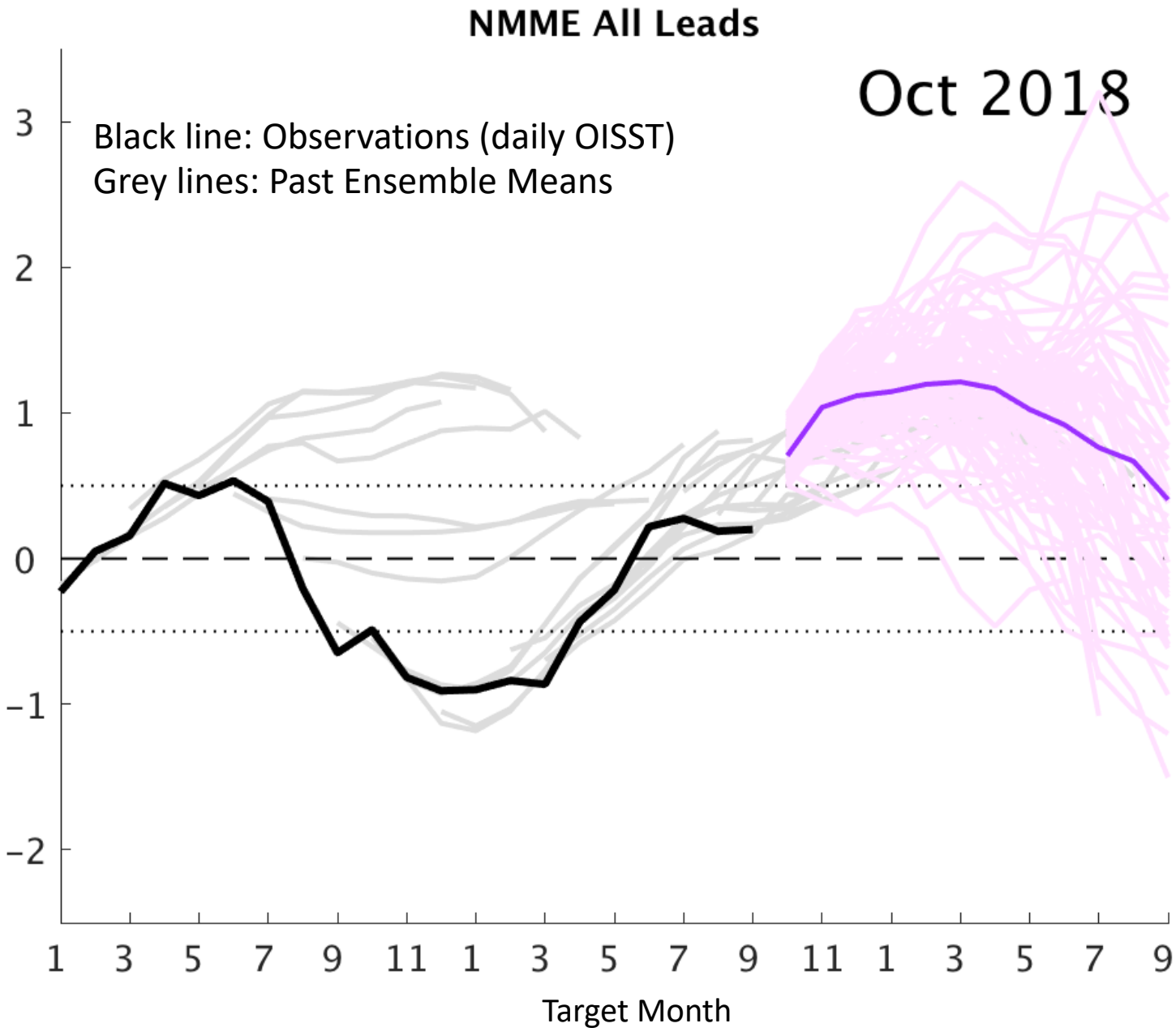
TARGET: December-February (DJF) Niño-3.4 index value (*in degrees Celsius*) using the operational ERSST index in use at the time (right now, version 5). Base period 1981-2010.

METRIC: Correlation and Mean Squared Error scores (potentially 2 winners). Will compare the precursor index against the DJF Niño-3.4 index starting with Dec. 2019 – Feb. 2020 season until Dec. 2028- Feb. 2029 (yes, we'll be older).

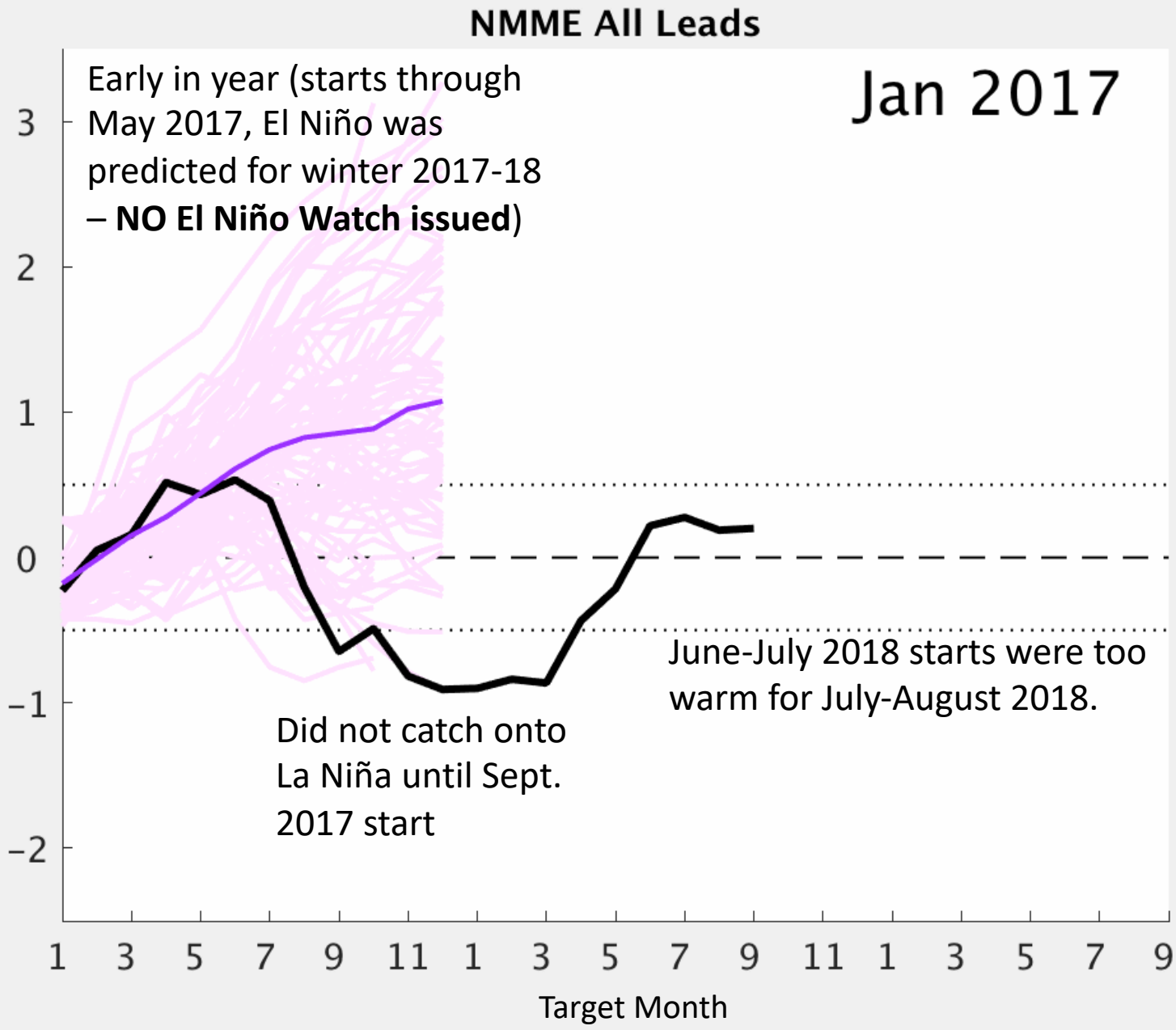
We will compute your index using NOAA/NCEP operational analyses in use at the time.

Tentative Prizes:
(1) The Prestige of Winning
(2) Signed copy of the forthcoming DelSole and Tippett text book on climate statistics
(3) Co-author on possible publication about the stability of ENSO precursors.

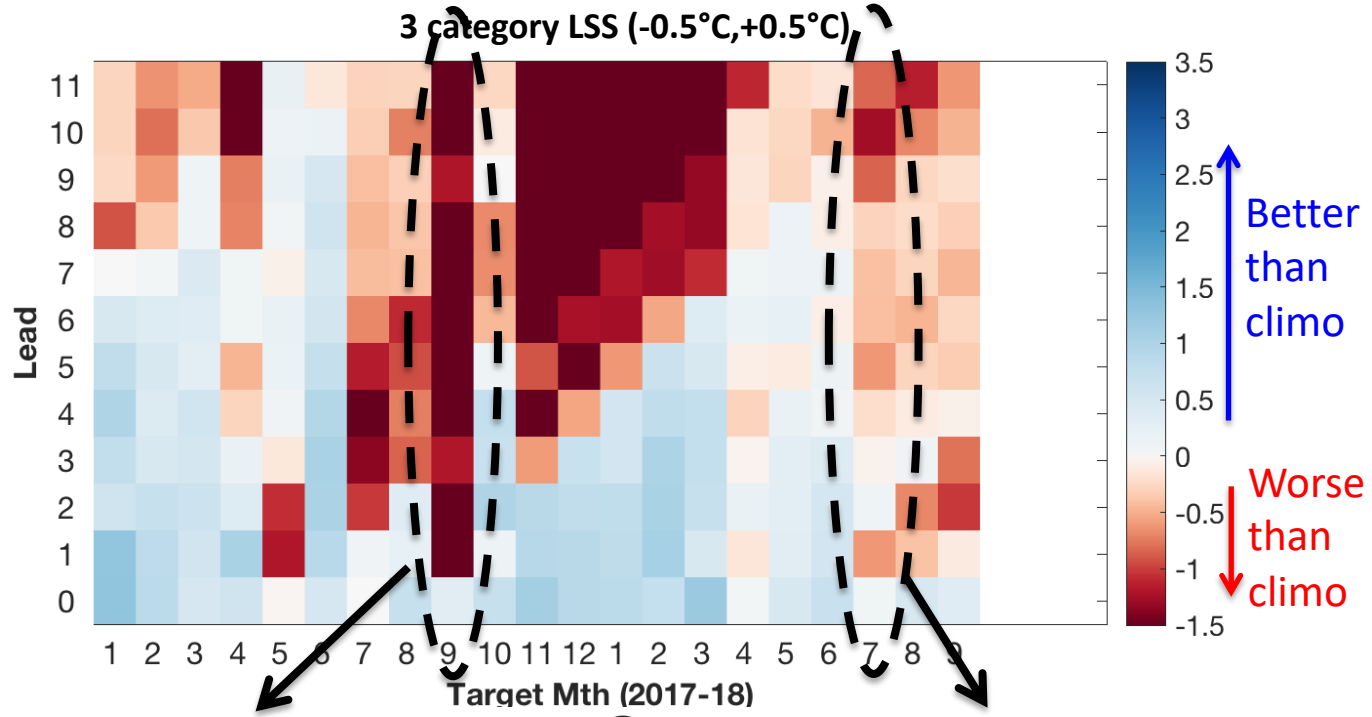
Niño-3.4 Forecasts from the NMME

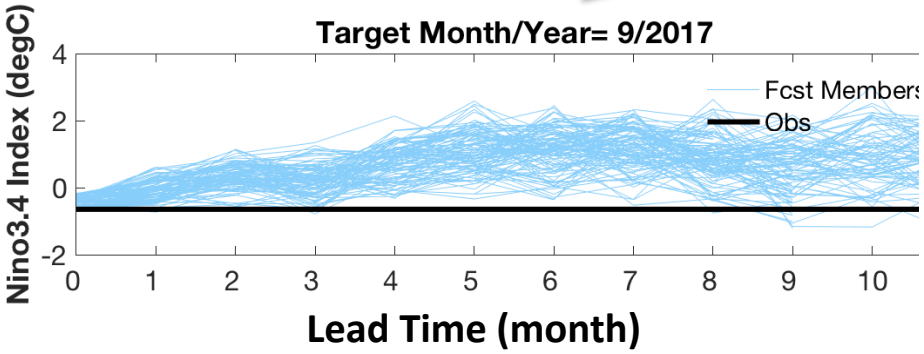


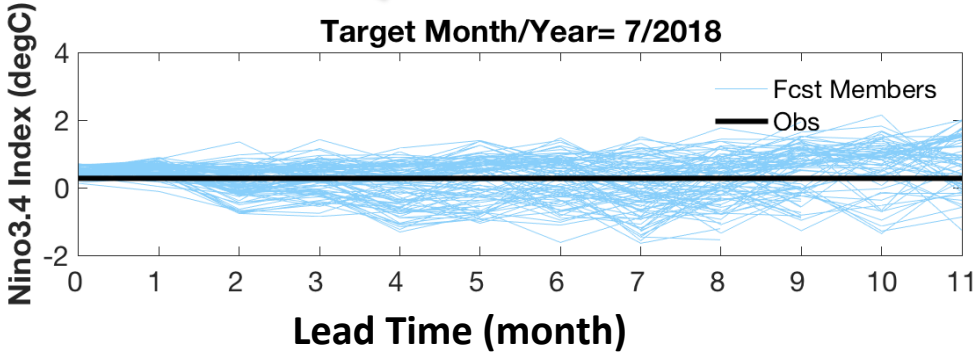
Niño-3.4 Forecasts from the NMME



NMME forecasts during 2017-18



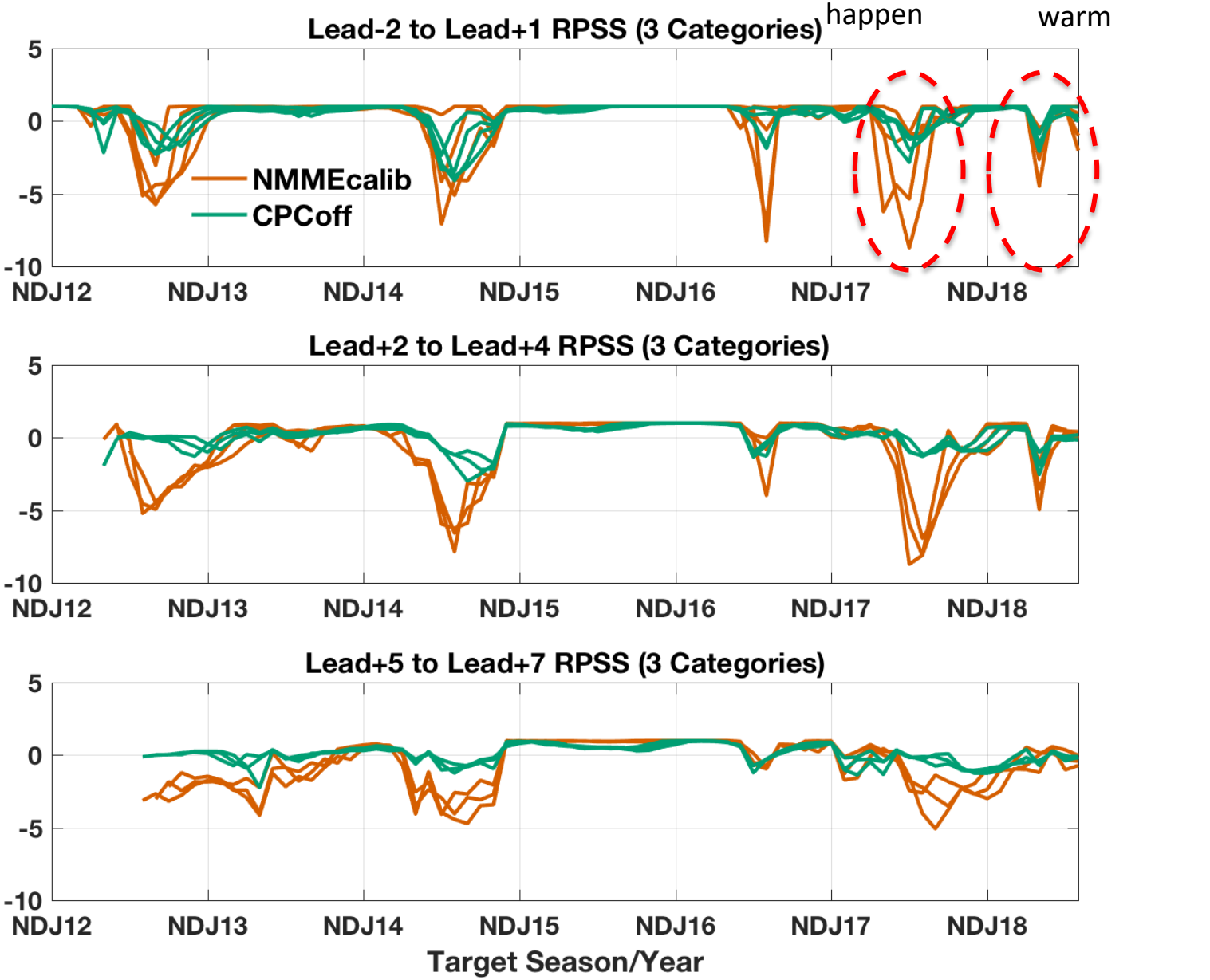




How does 2017-18 Compare to Past Scores?

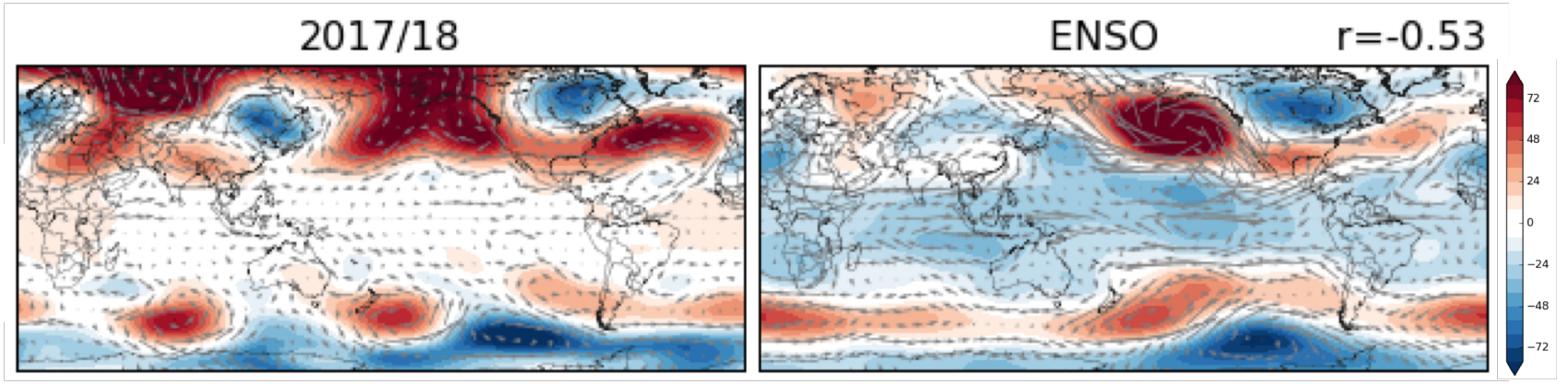
El Nino didn't happen

Forecasts too warm

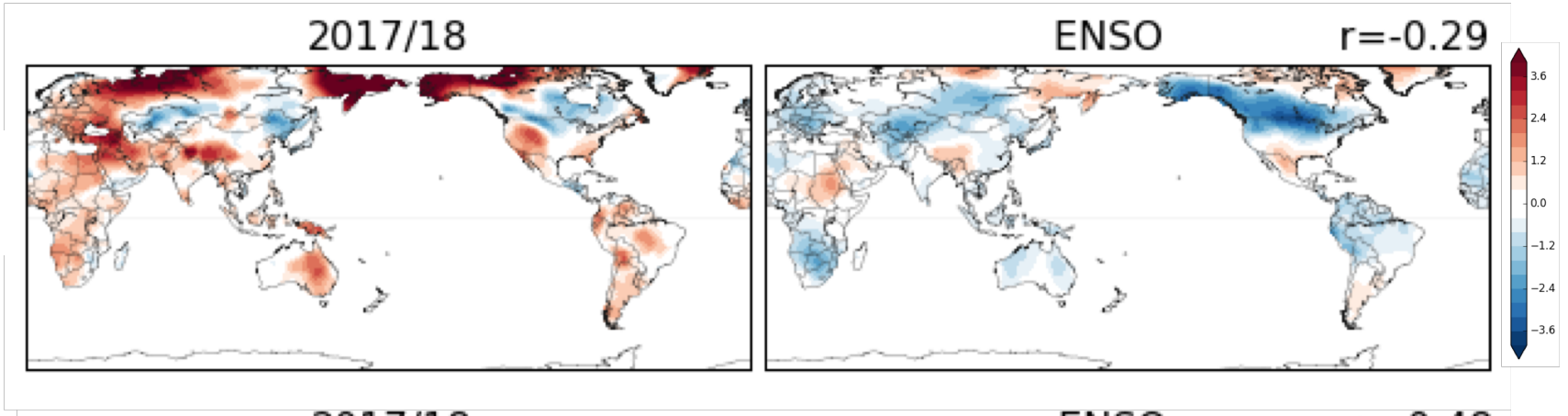


December-February Observations (left) & linear ENSO anomalies (right)

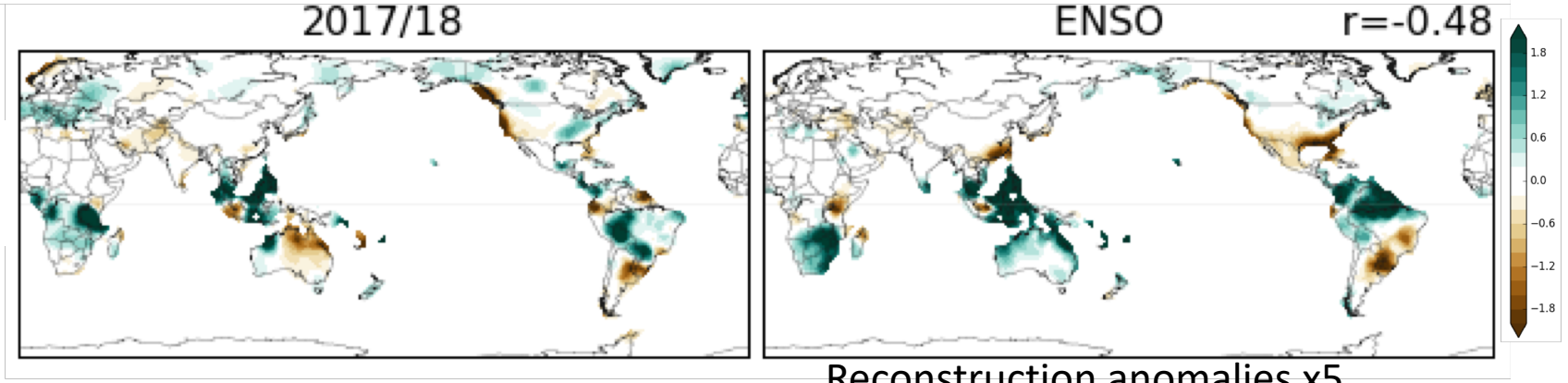
500mb GPH/winds



Temp.

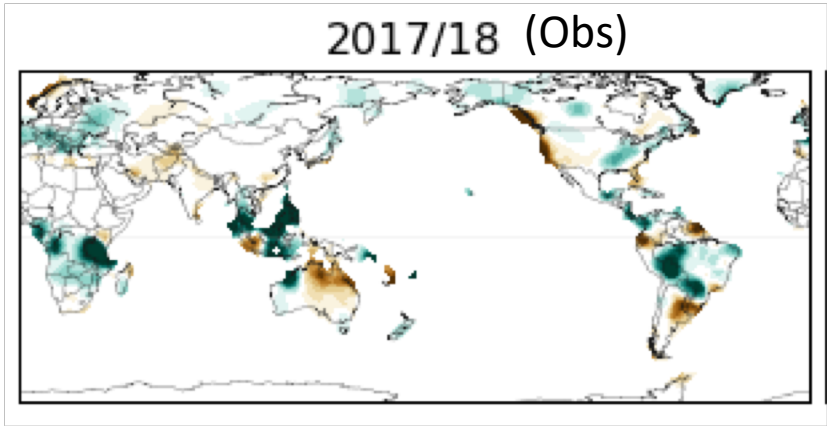


Precip.

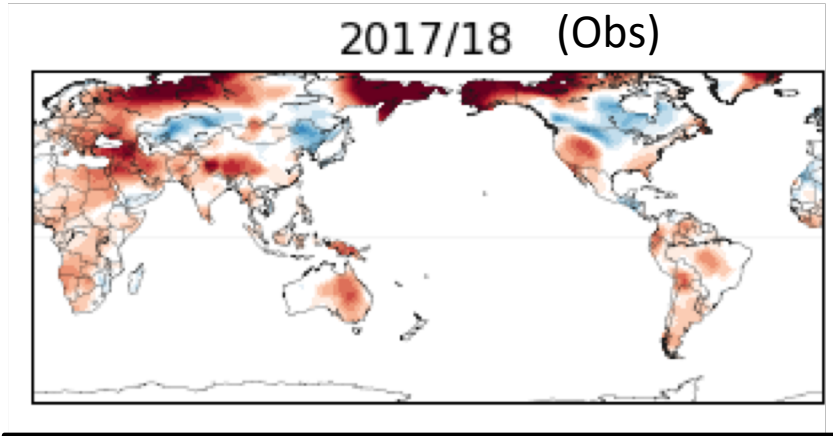


Reconstruction anomalies x5

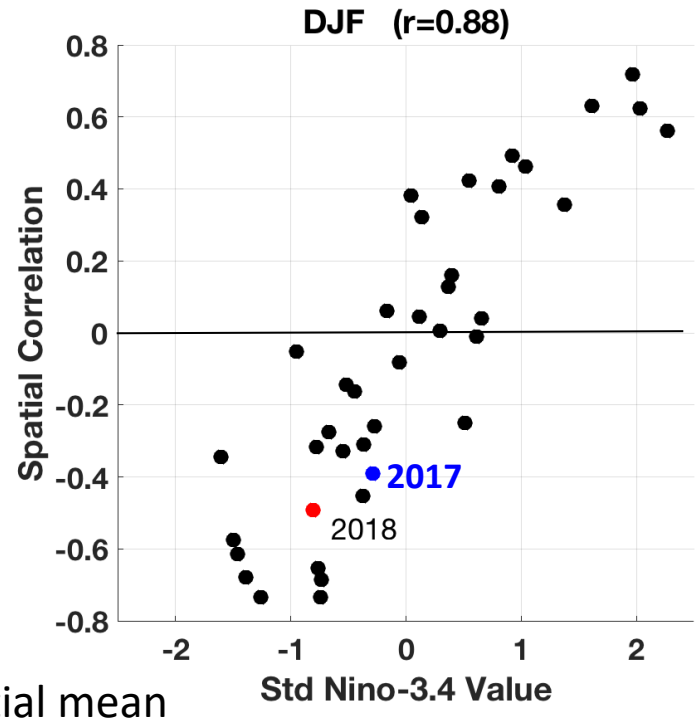
Spatial Correlation between Observations and Linear ENSO Anomalies

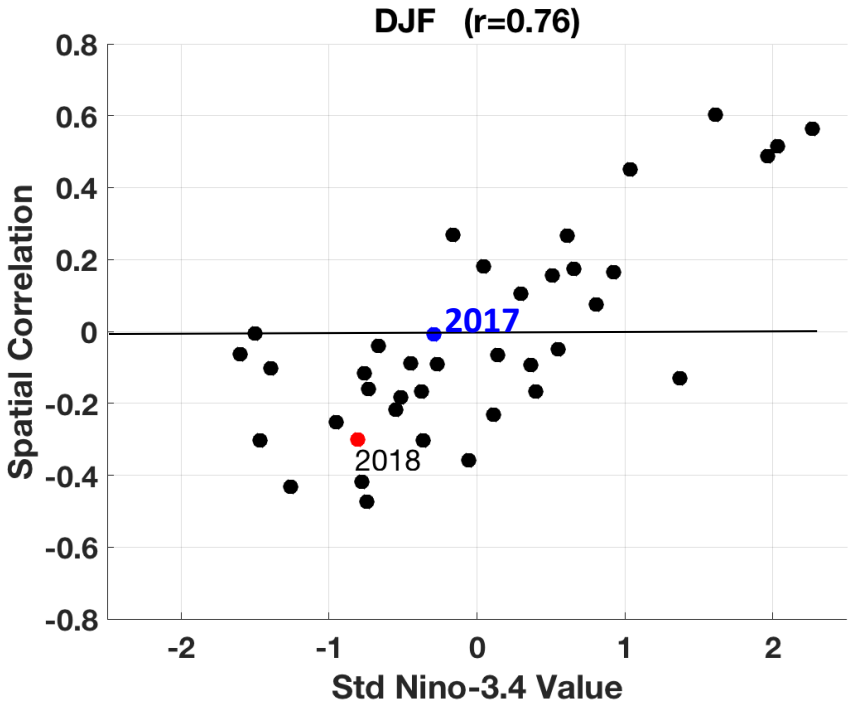


Correlation with DJF Precipitation Anom.



Correlation with DJF Temperature Anom.



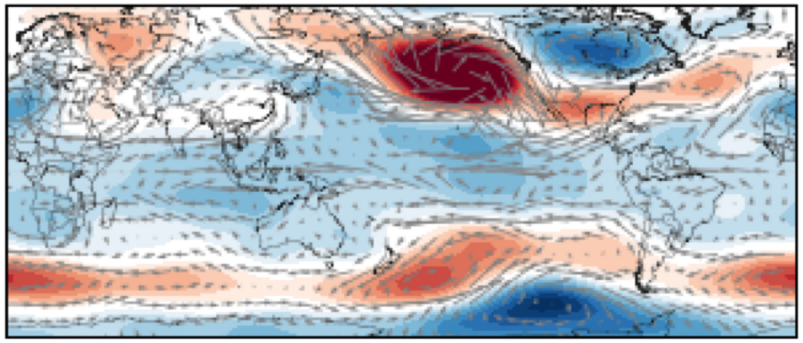


Spatial mean removed

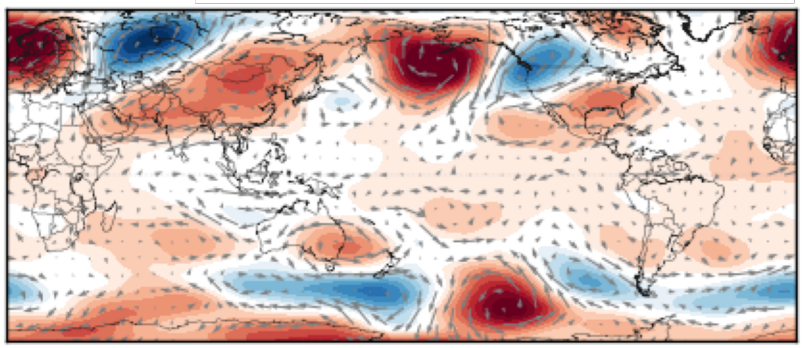
(each dot is a individual year (DJF) between 1982-2018)

Better match with La Niña regression anomalies during Winter 2017-18

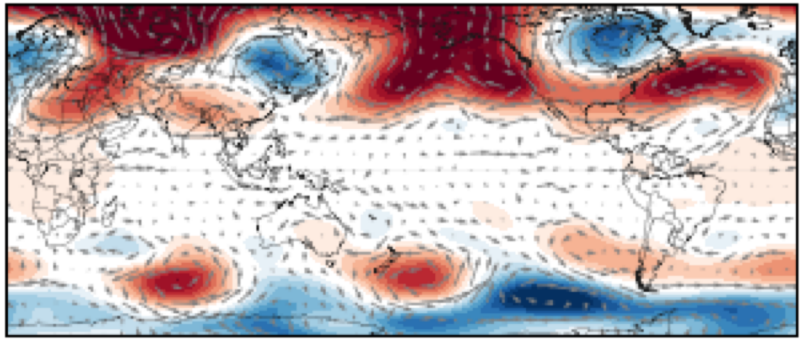
ENSO Regression



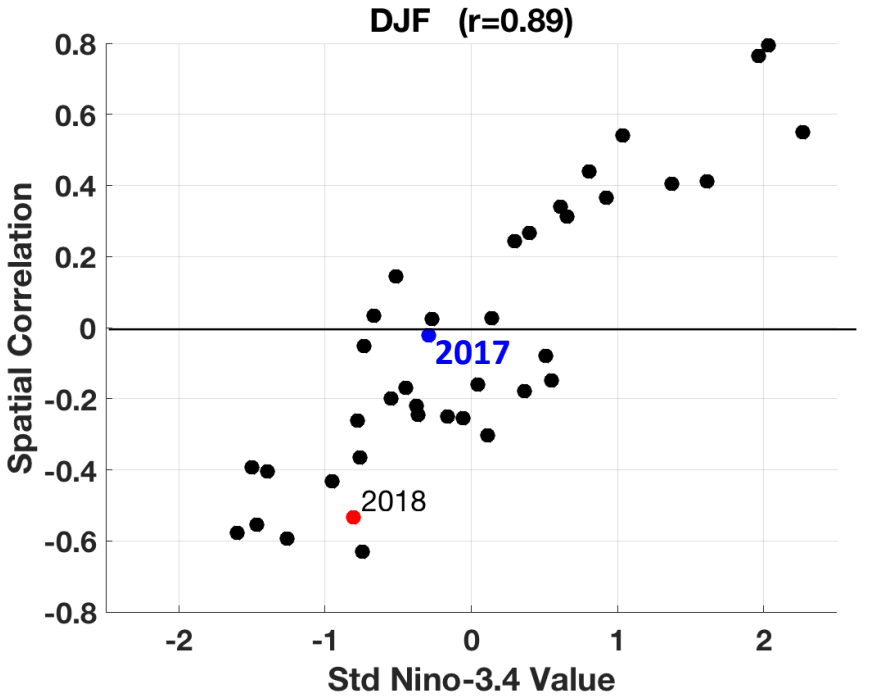
2016/17 Obs



2017/18 Obs



Correlation with DJF 500mb Height Anom.



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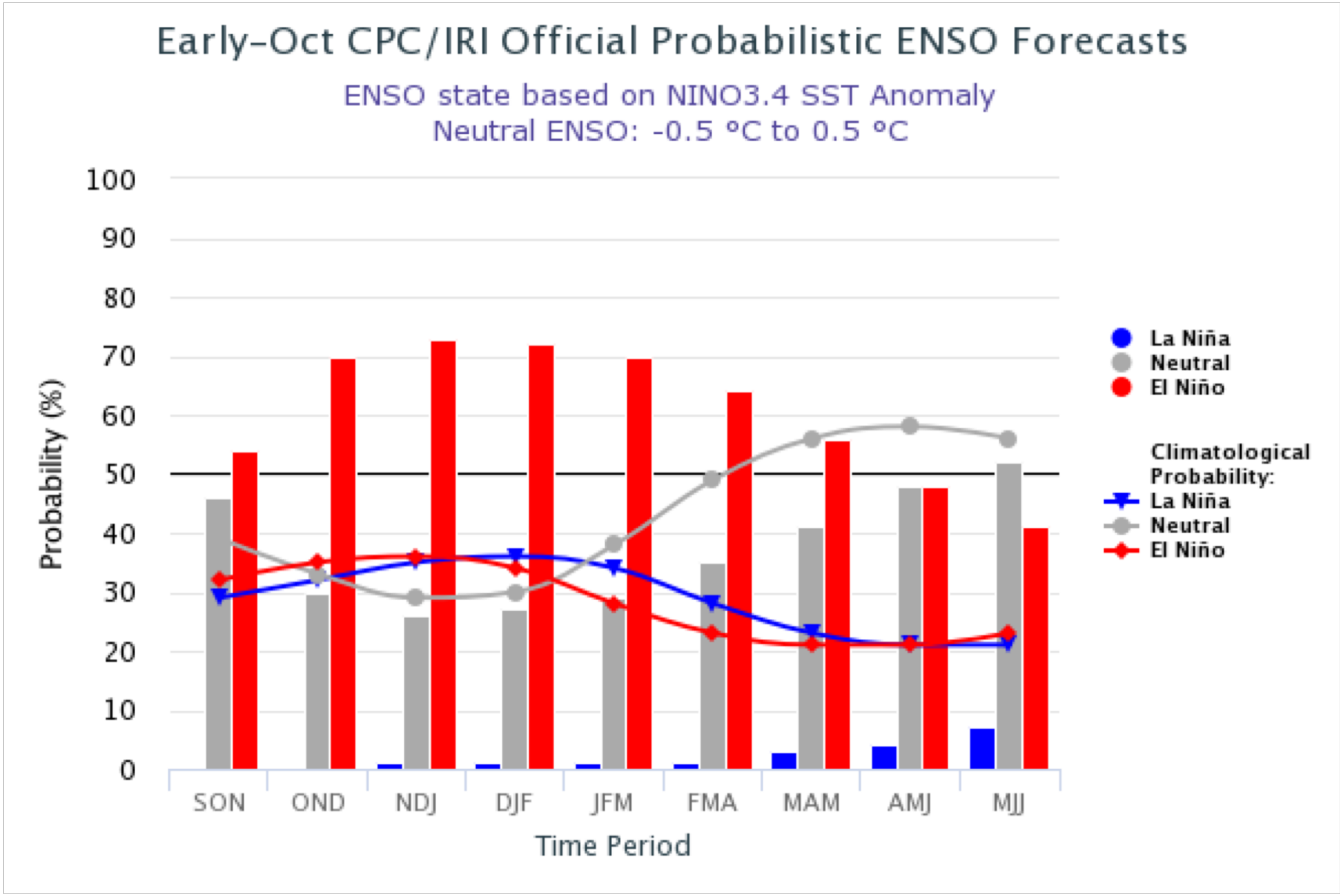
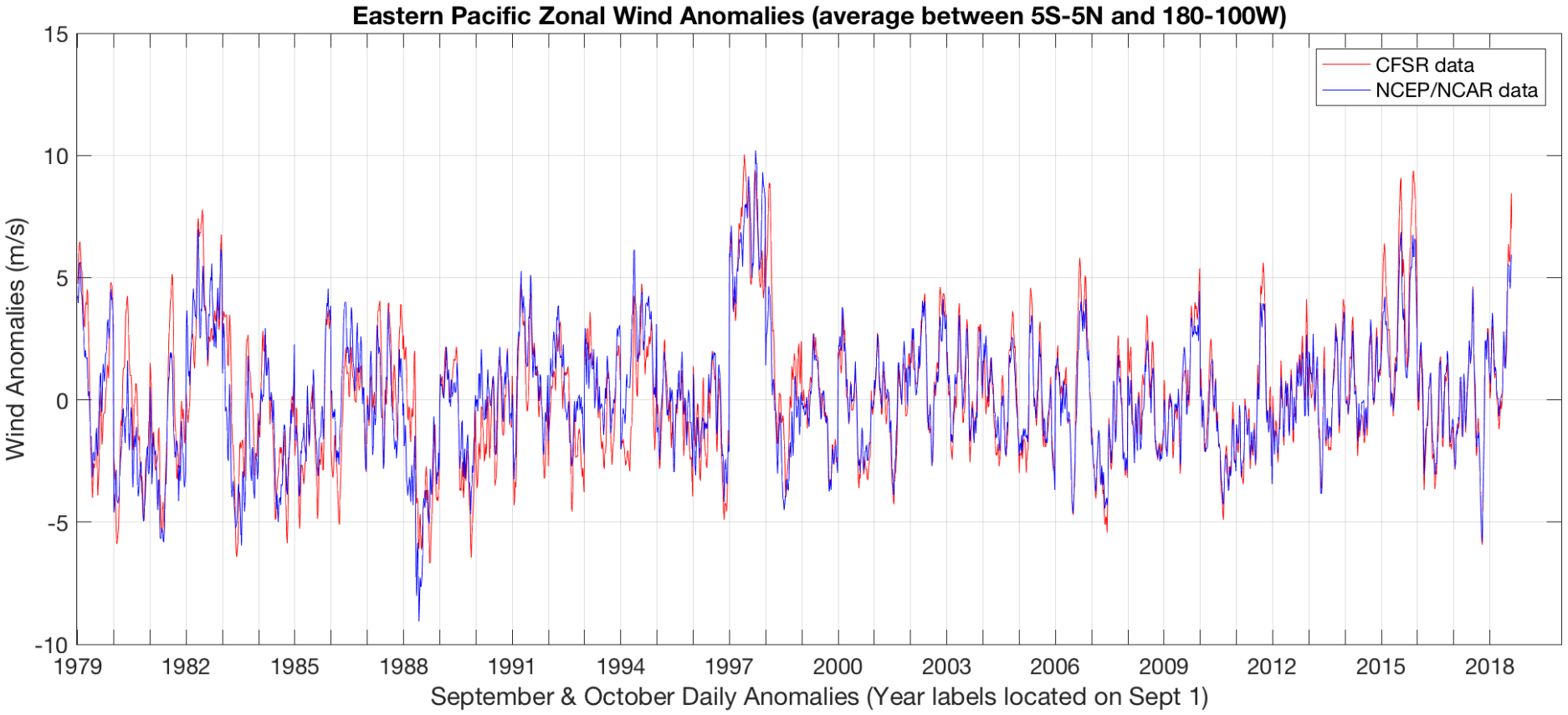
Spatial mean removed

Official ENSO Outlook (11 Oct 2018)



Implication of Strong Westerly Wind Anomalies in early October 2018?



Summary

- NMME did not predict the 2017-18 La Niña until it was initialized with colder conditions in September 2017. Large forecast errors for winter targets in 2017-18.

- Springtime Niño-3.4 tendencies tend to be positively correlated to tendency in the *future* Niño-3.4 index value (more so with the NMME ensemble mean).

- Despite late onset, La Niña of 2017-18 was associated with more stereotypical La Niña relationships in temperature and 500mb geopotential height anomalies over the globe (compared to 2016-17).

- Expected El Niño in 2018-19 perhaps aided by recent strong westerly wind anomalies. However, it's coming rather late in the ENSO cycle (and clear 2018 summer was over-forecasted), so…..

- Participate in the ENSO Forecast Precursor Challenge. Submit your entry to: Kathy Pegion: kpegion@gmu.edu and Michelle L'Heureux: michelle.lheureux@noaa.gov [Deadline: July 31 2019]