Seasonal Forecast Skill in the California Current System and its Connection to Climate Variability

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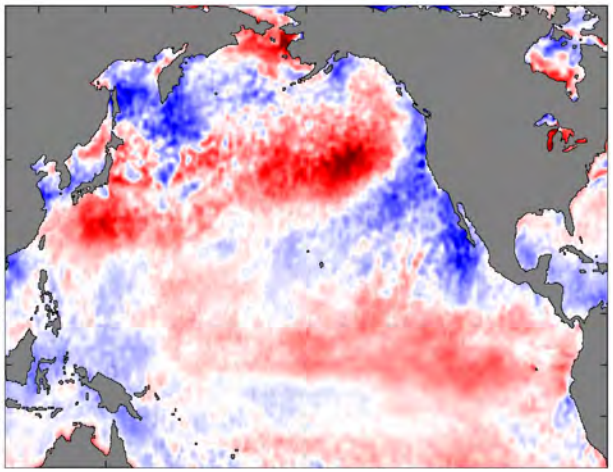
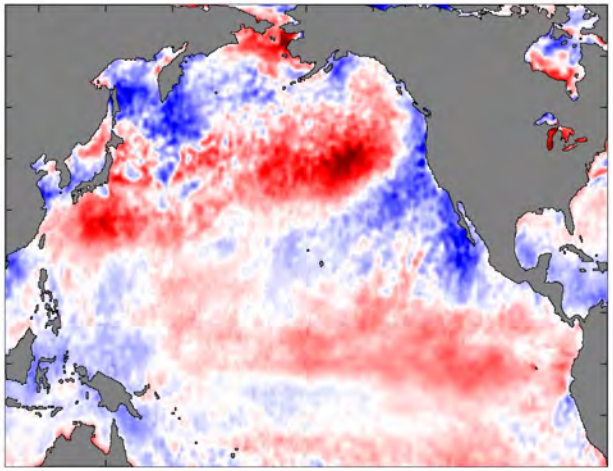
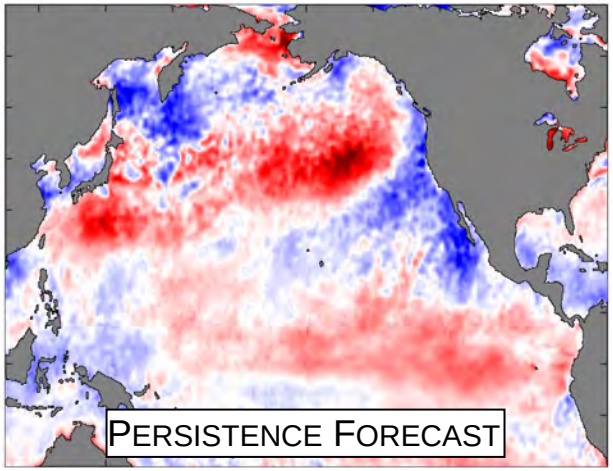
August 1991 SST Anomaly



AUGUST 1991 FORECAST OF NOVEMBER 1991



August 1991 Forecast of November 1991



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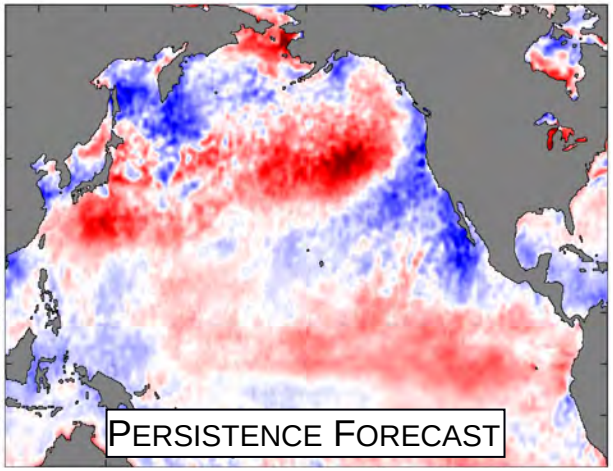

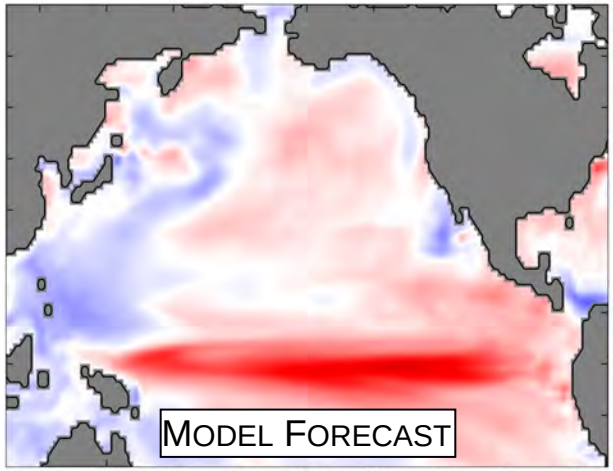

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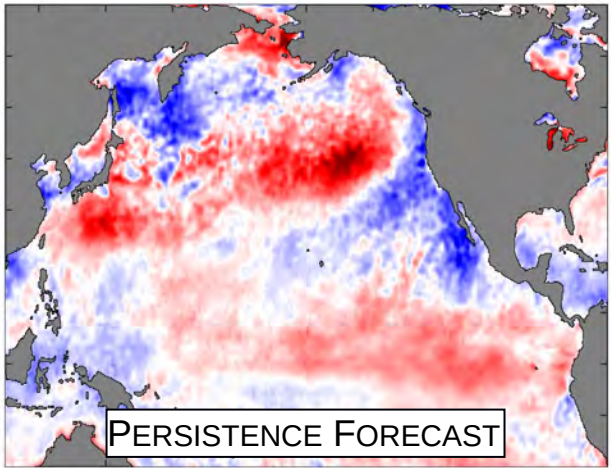

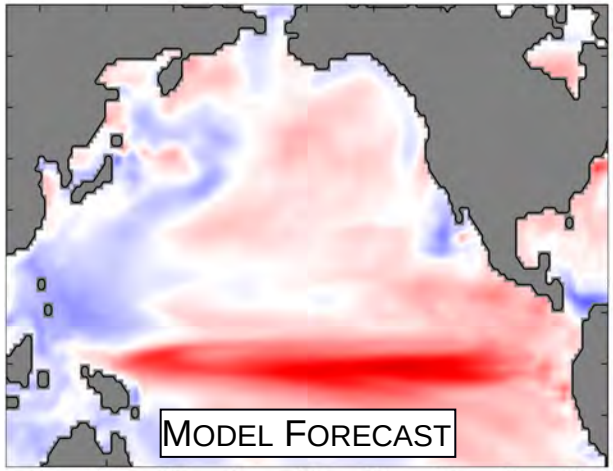

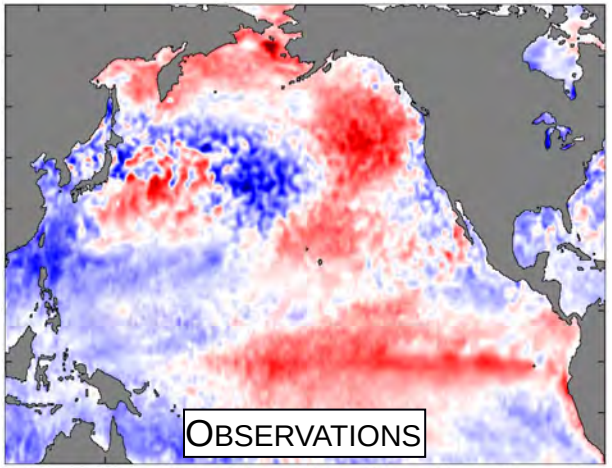

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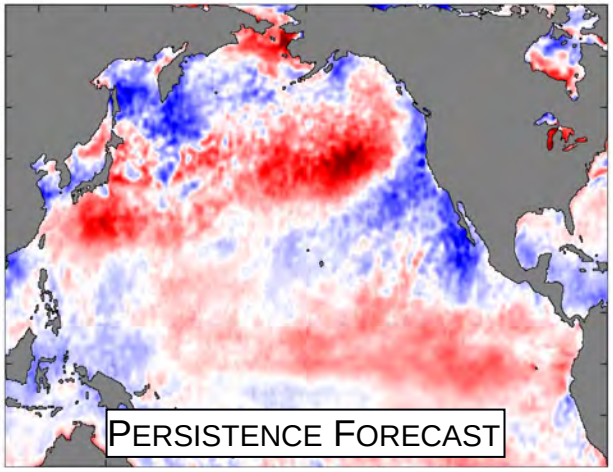
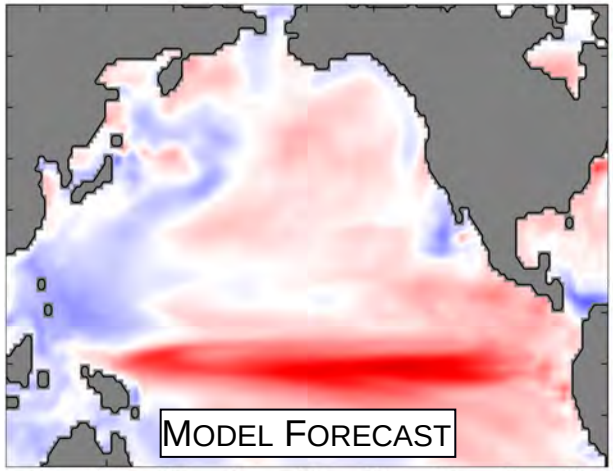
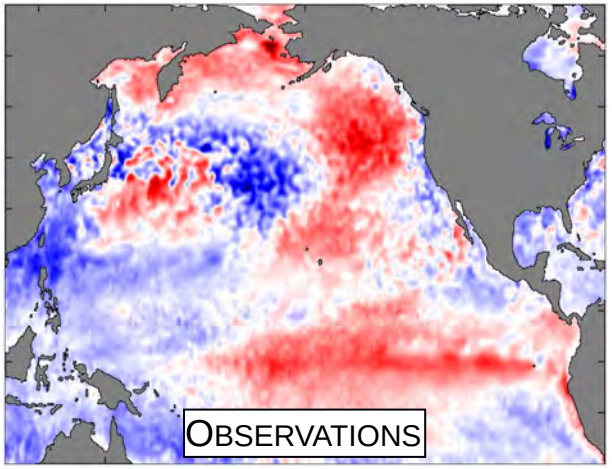
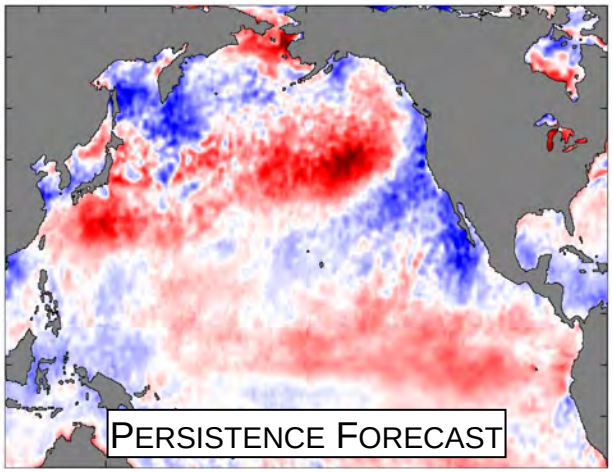






August 1991 Forecast of May 1992



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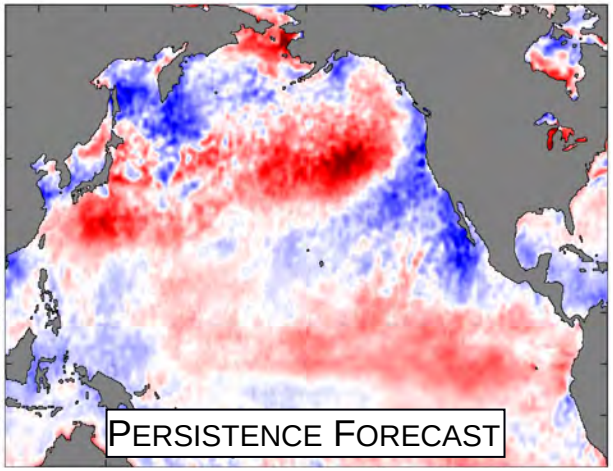

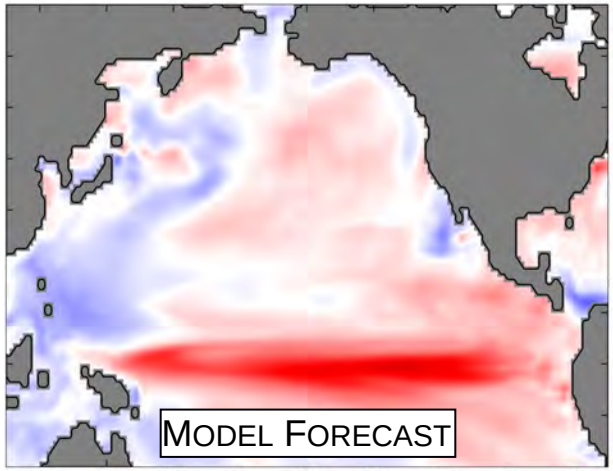

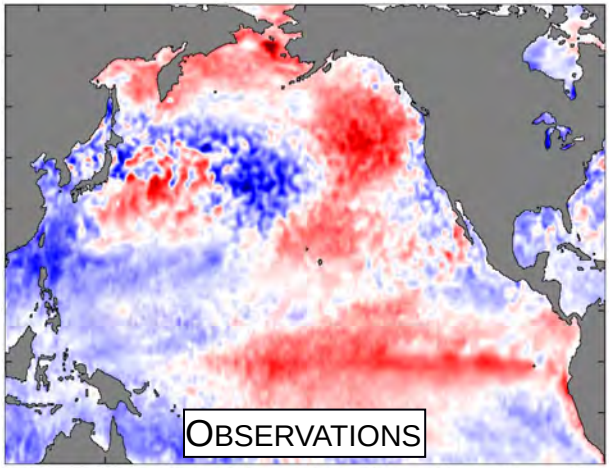

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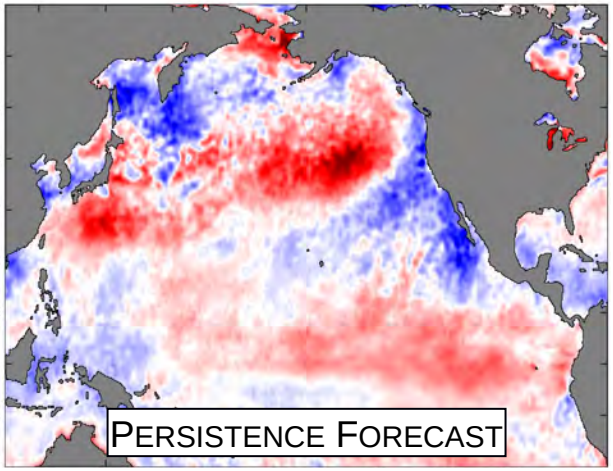

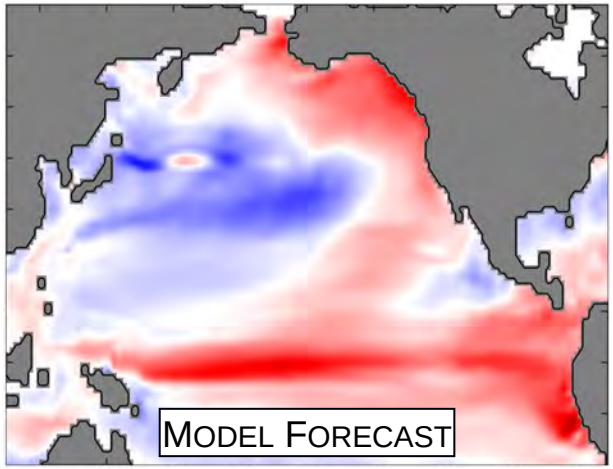

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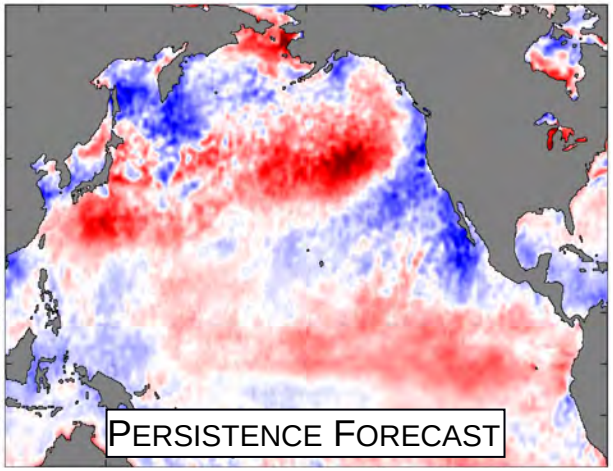

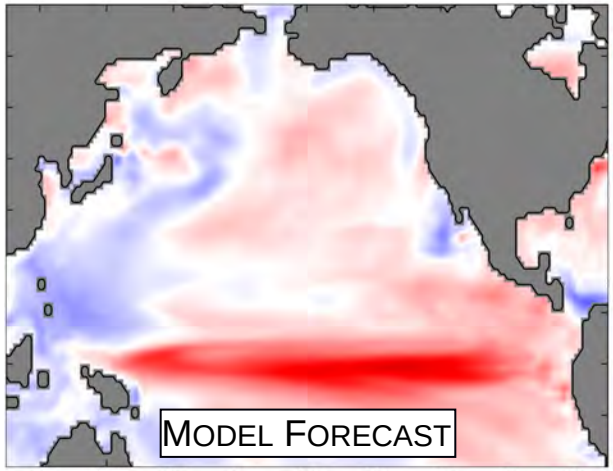

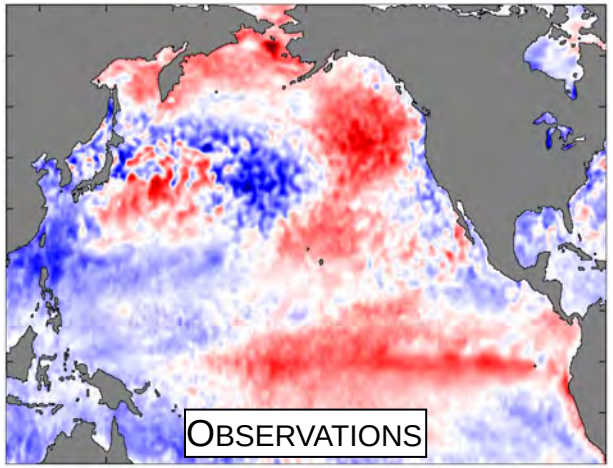

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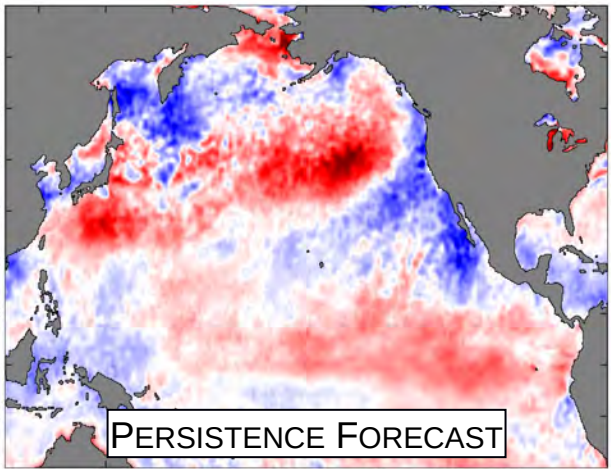
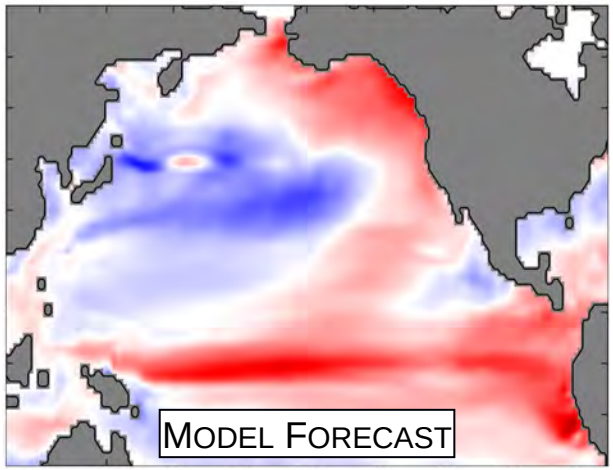
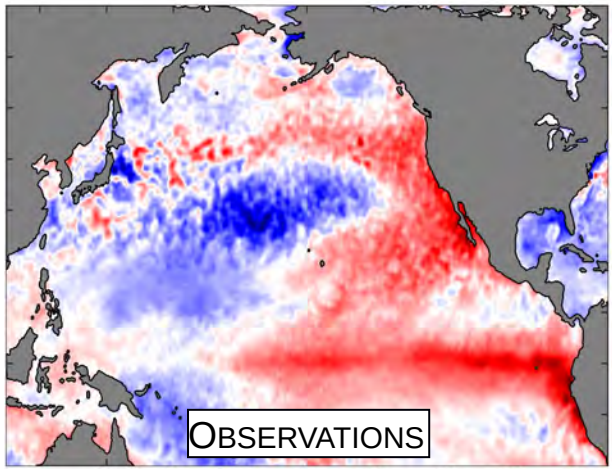
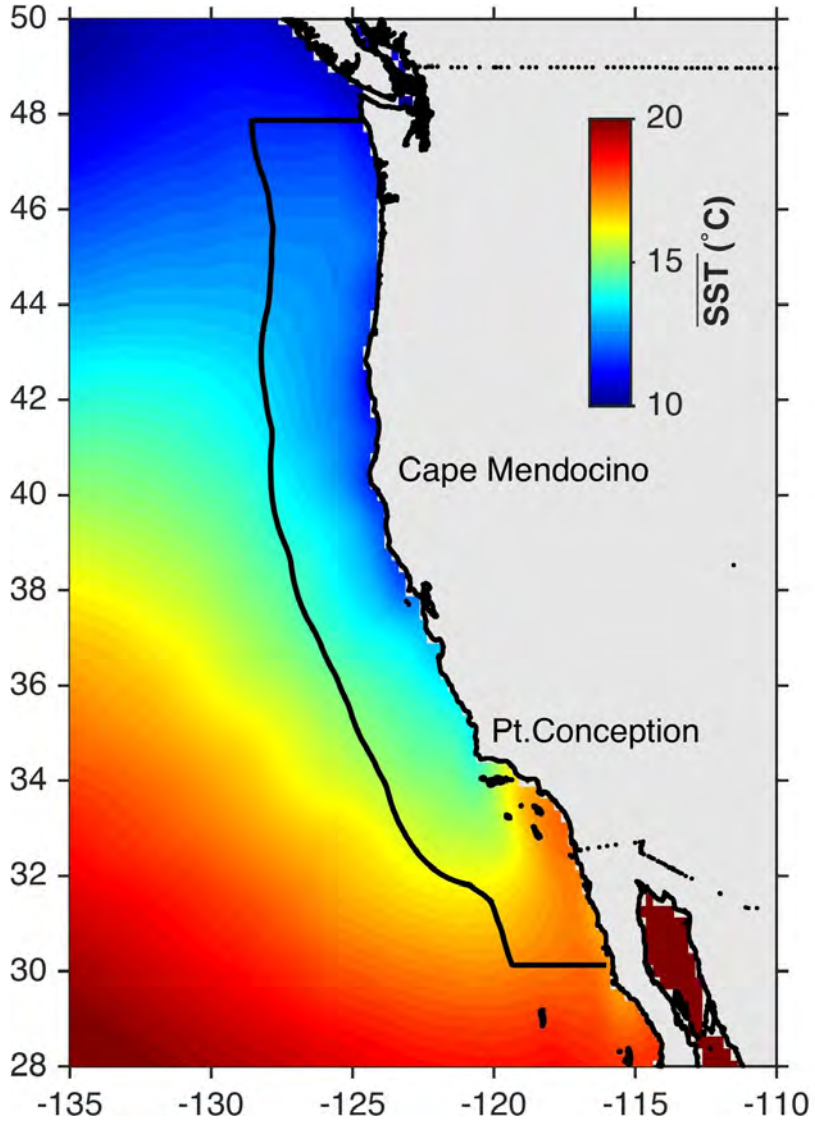
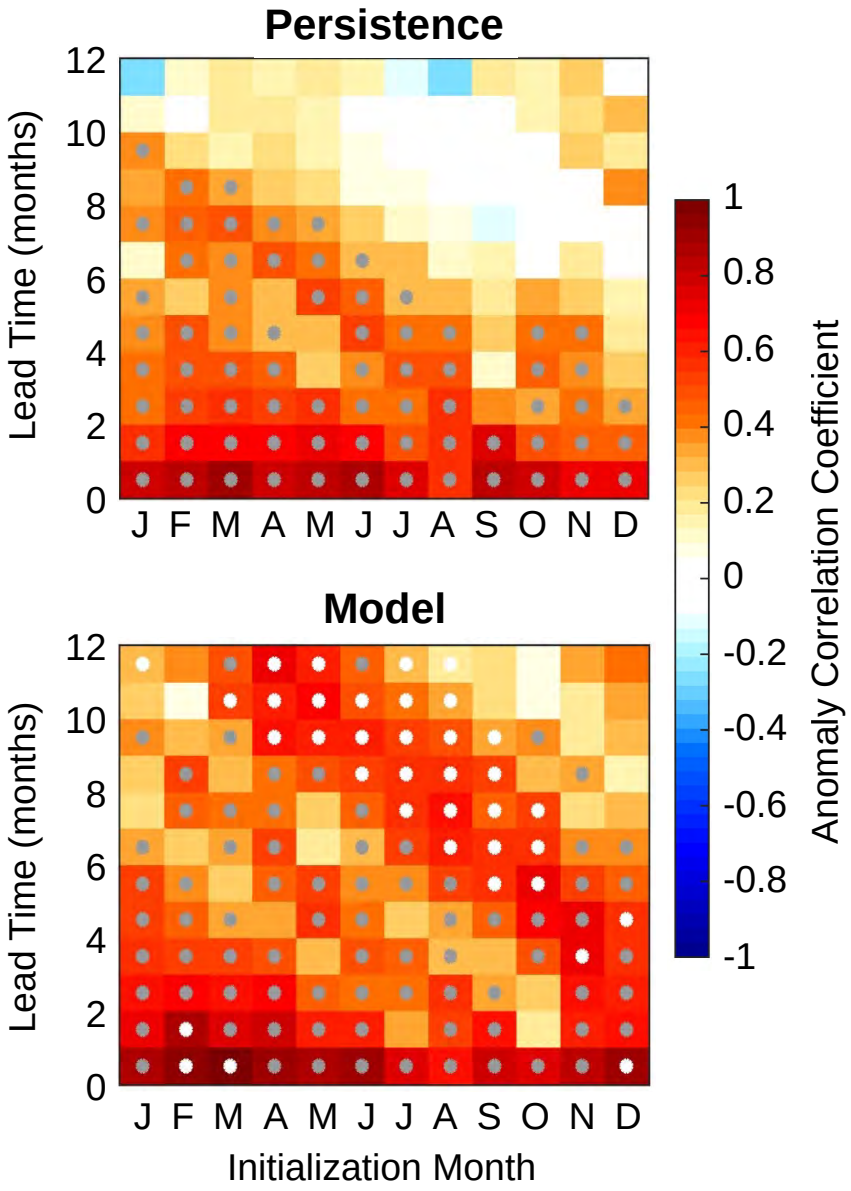




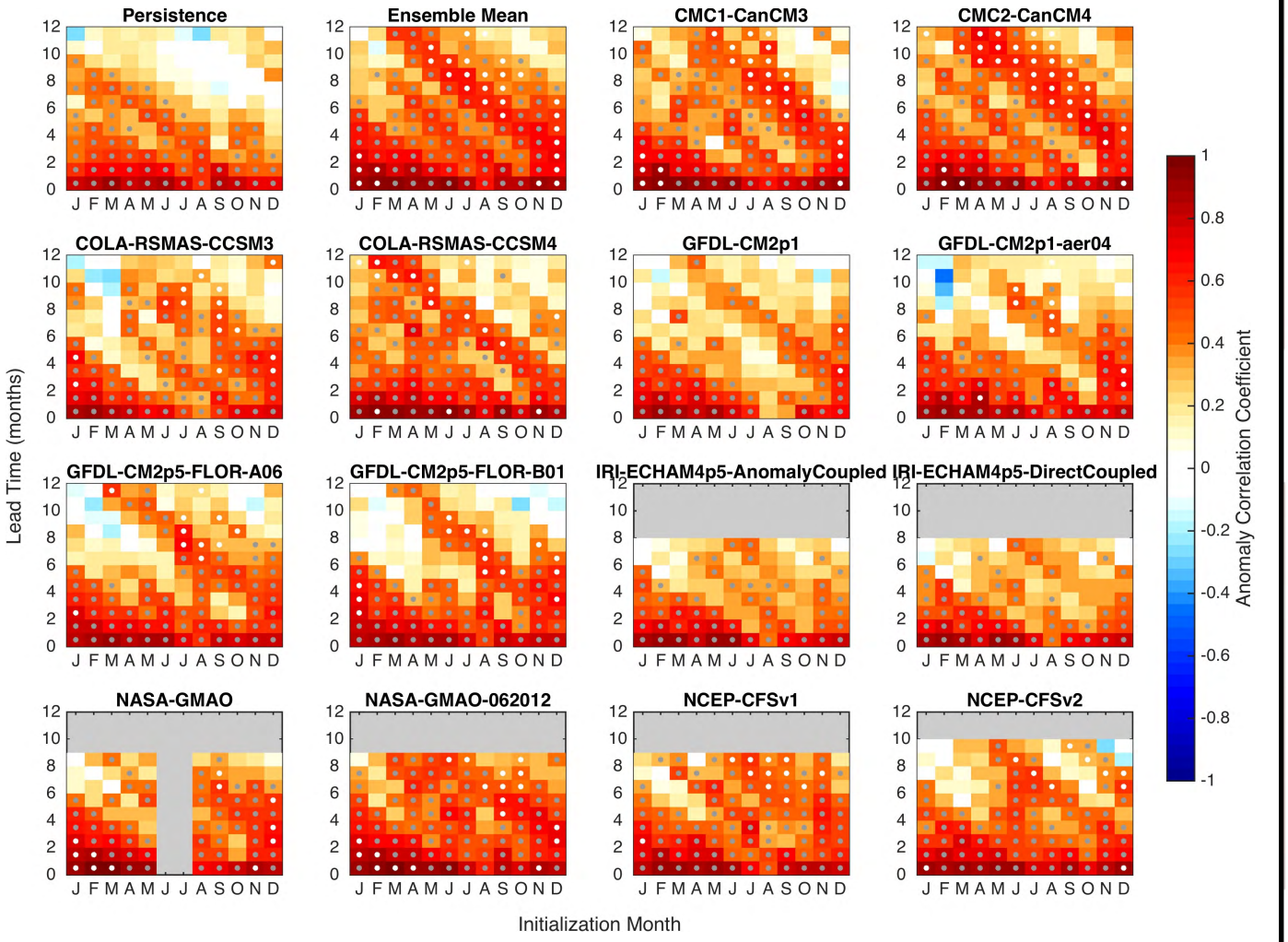






Jacox et al., Climate Dynamics (2017)

North American Multi-Model Ensemble Forecasts



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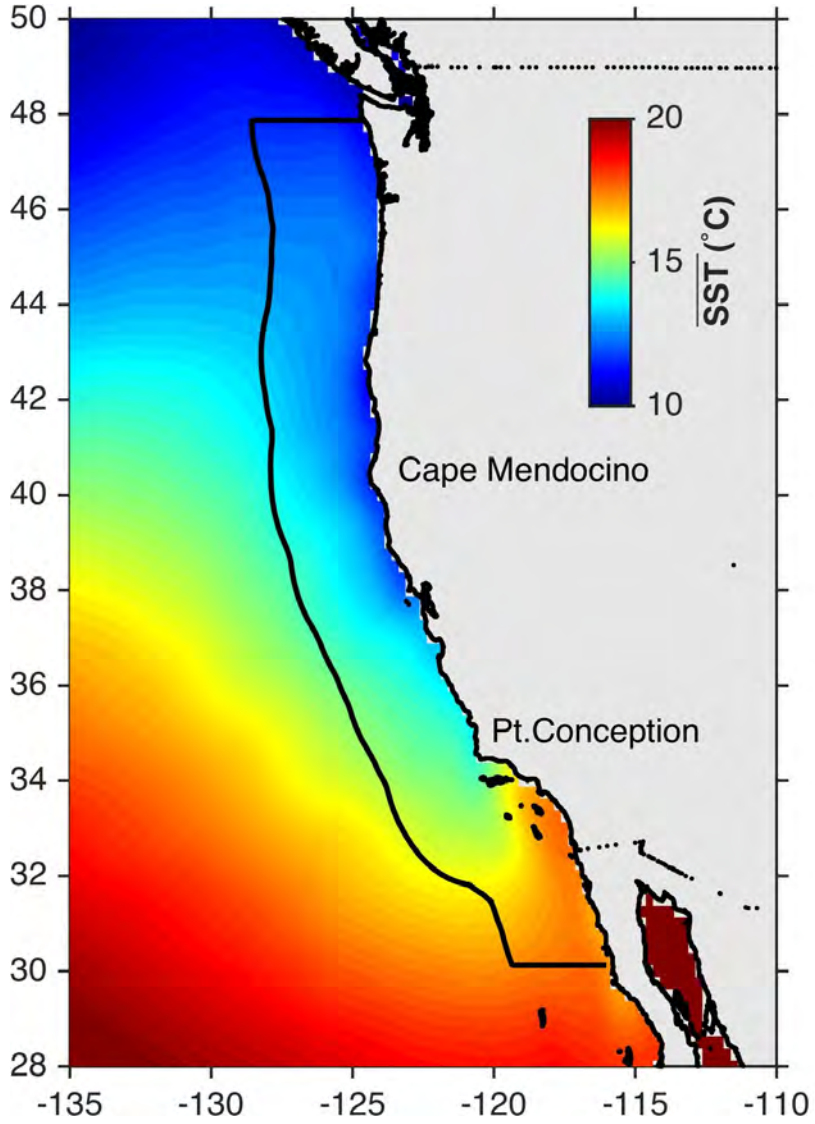

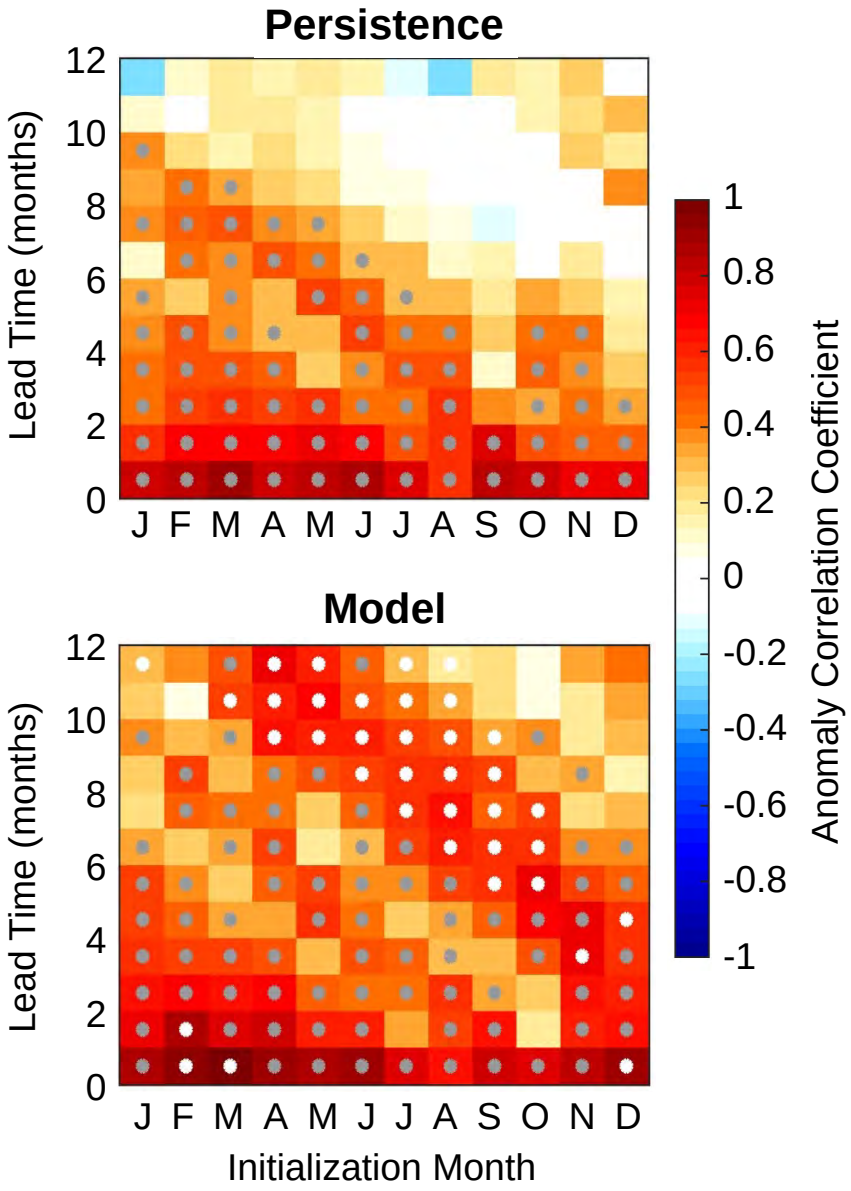

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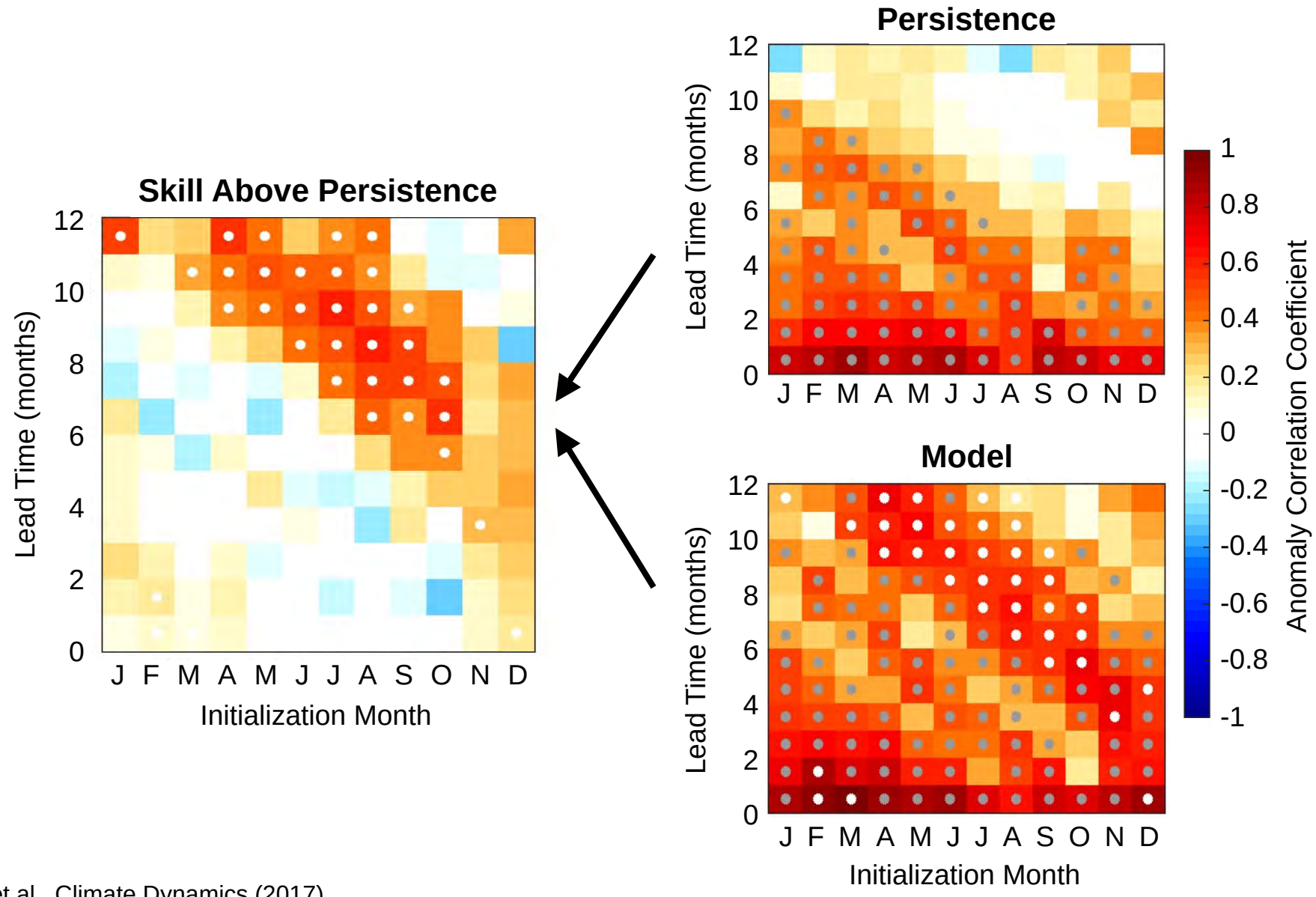
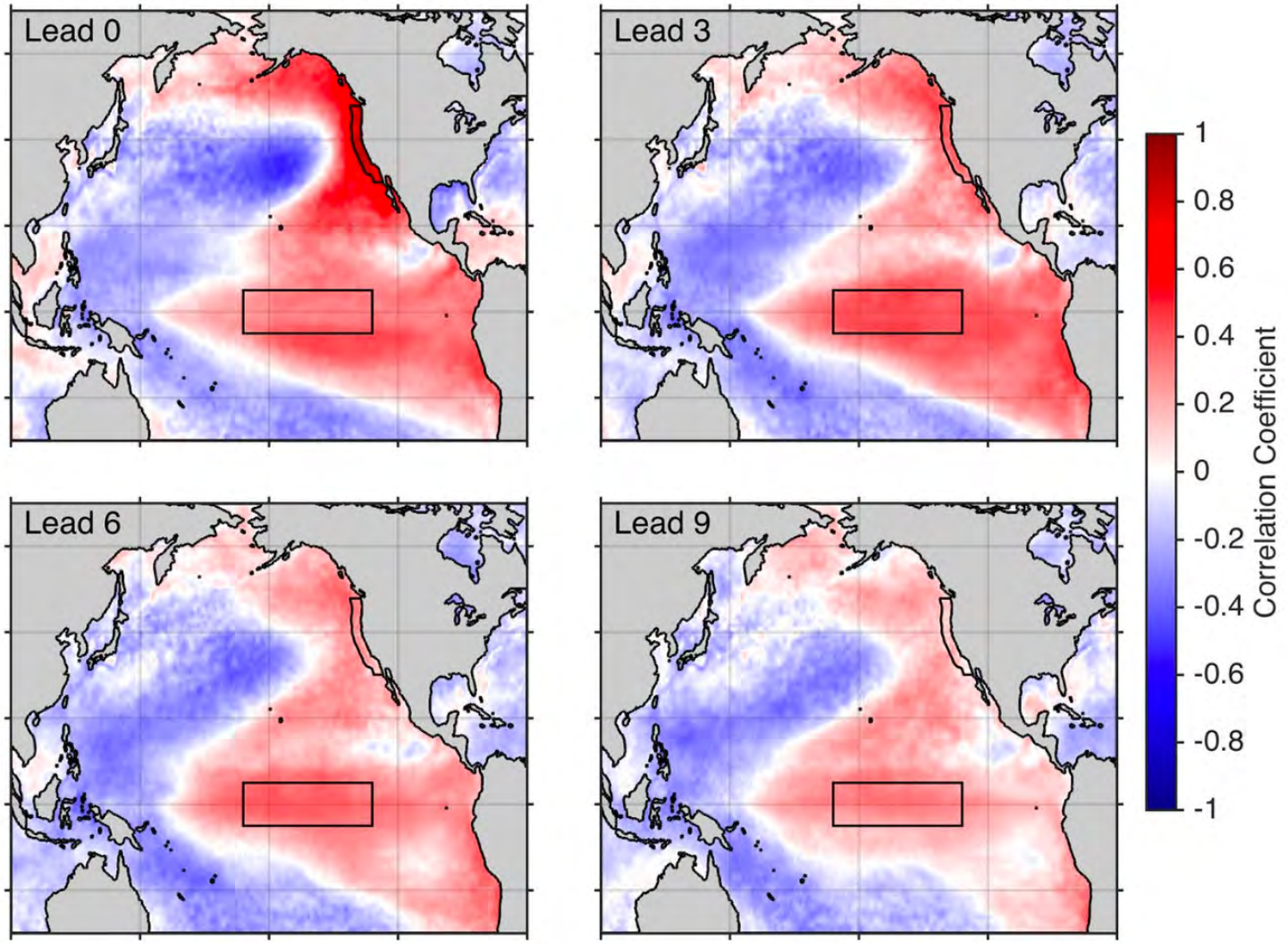


Jacox et al., Climate Dynamics (2017)

Correlation of North Pacific and CCS SST Anomalies



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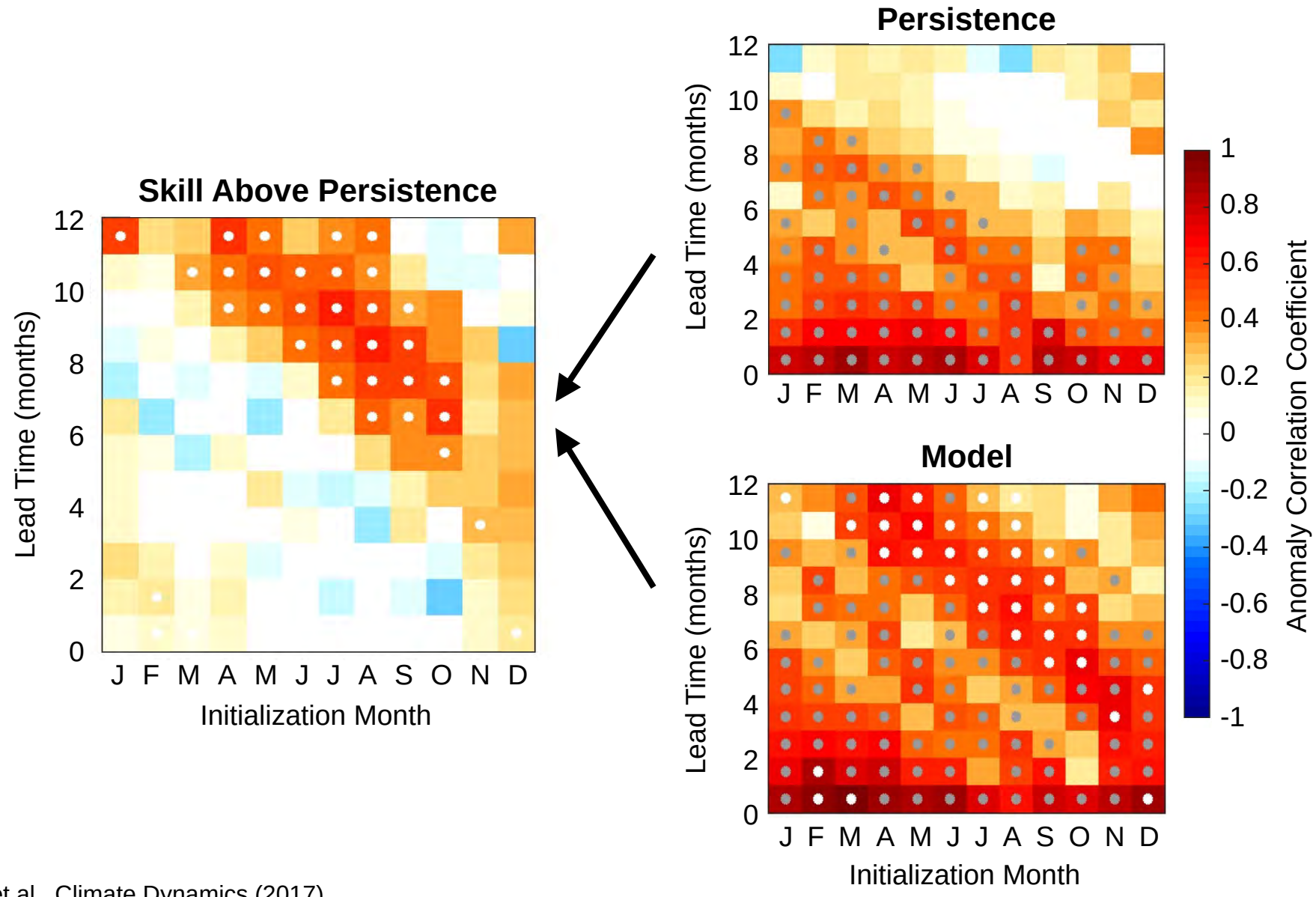

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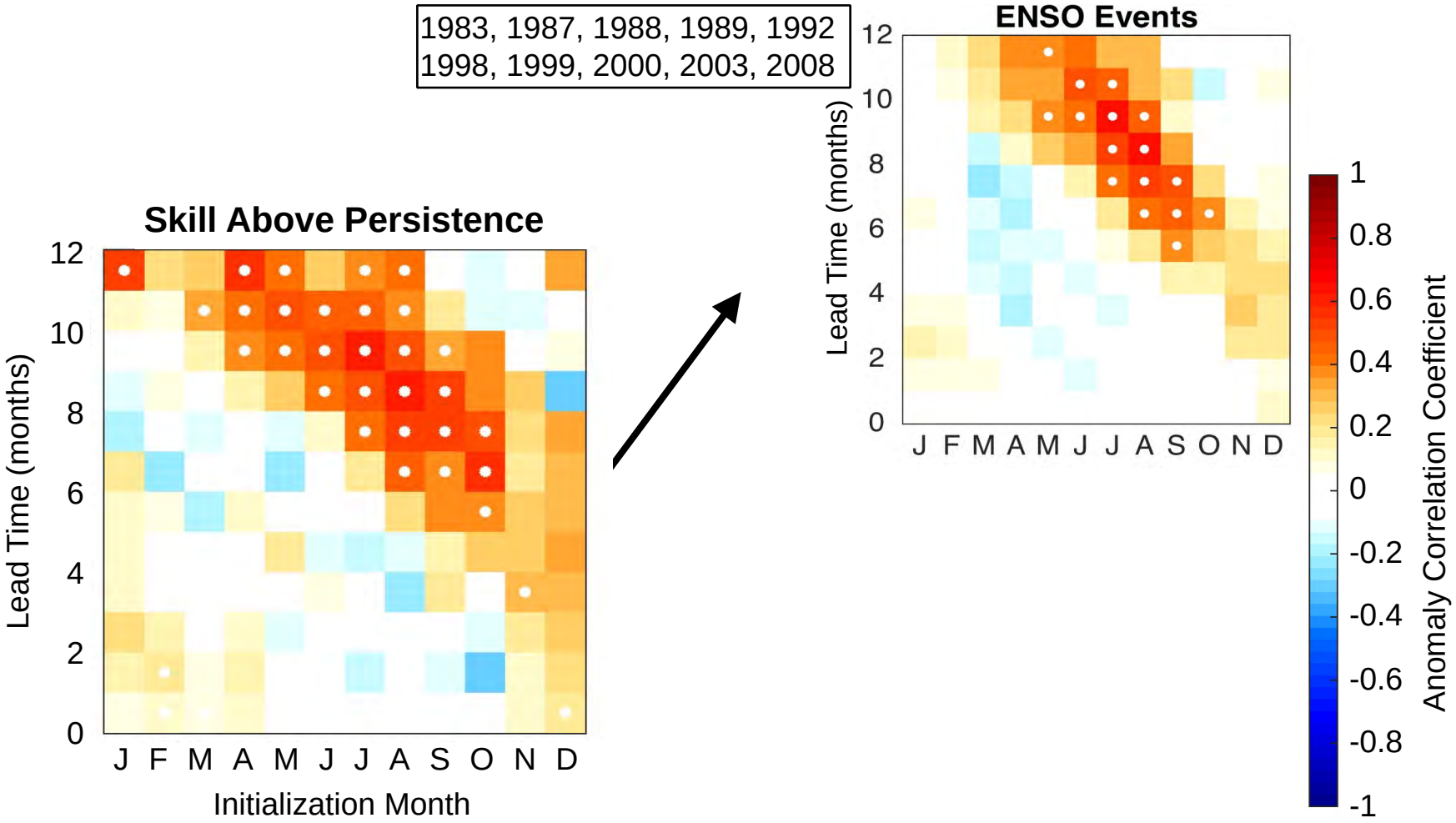

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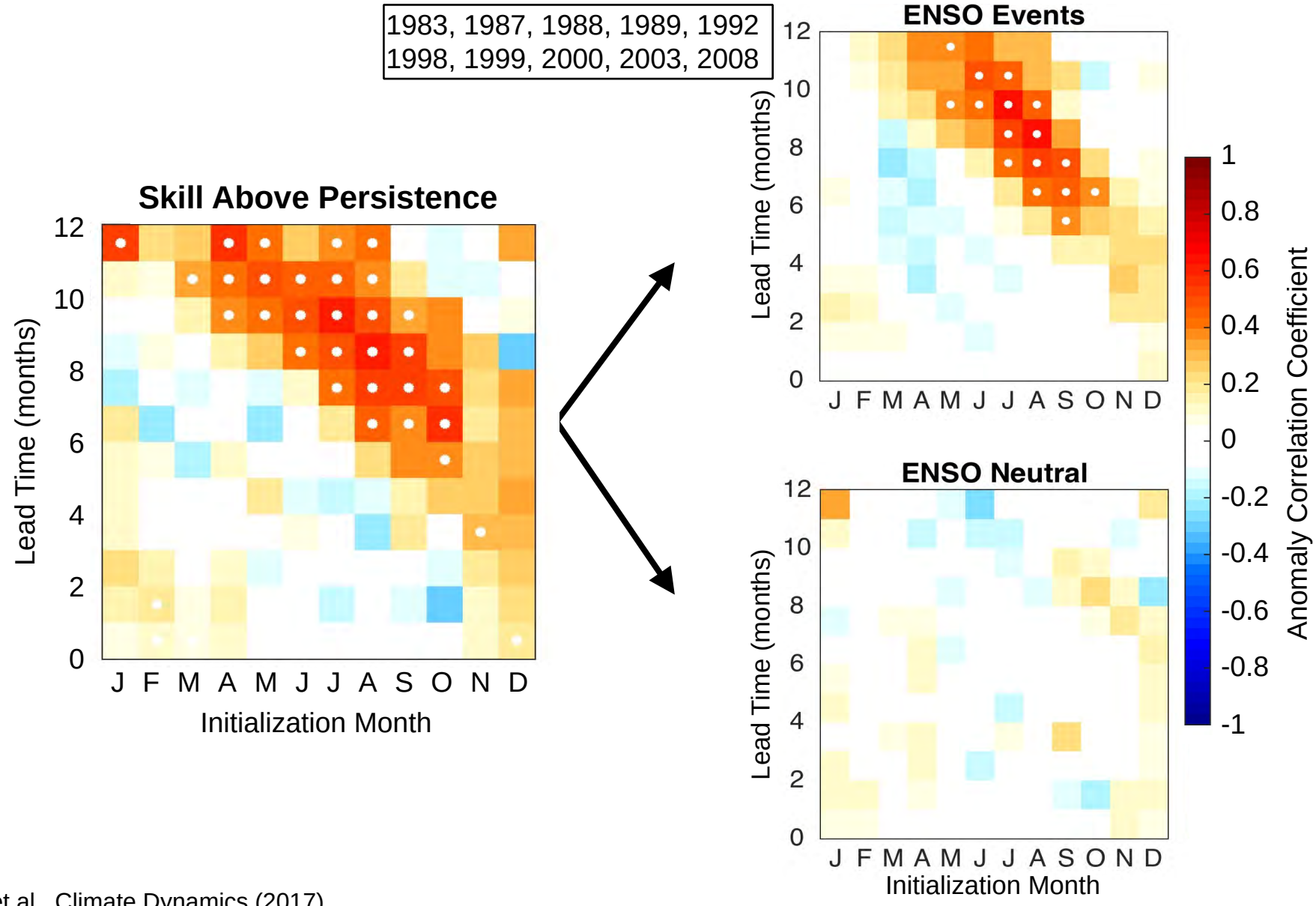

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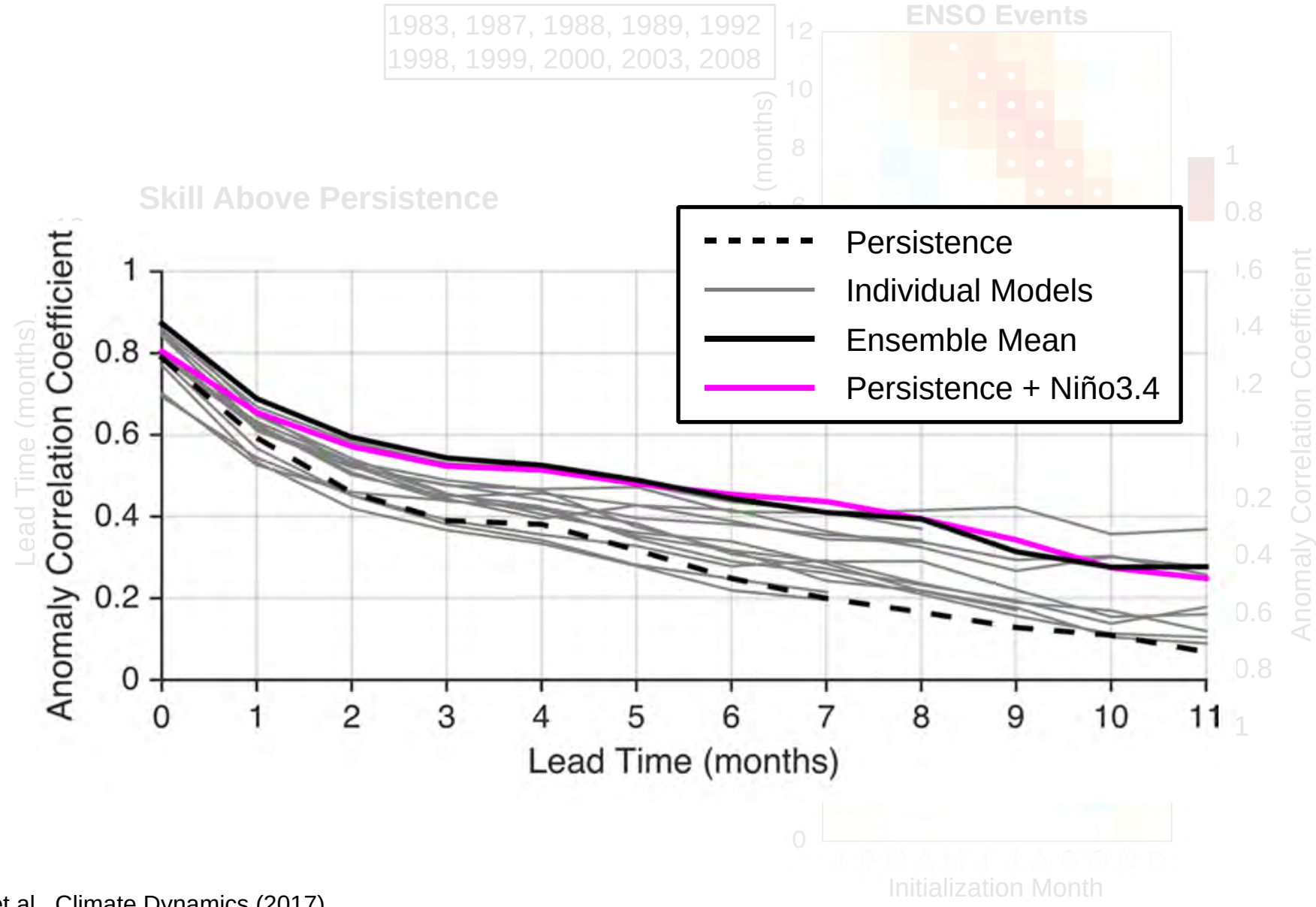

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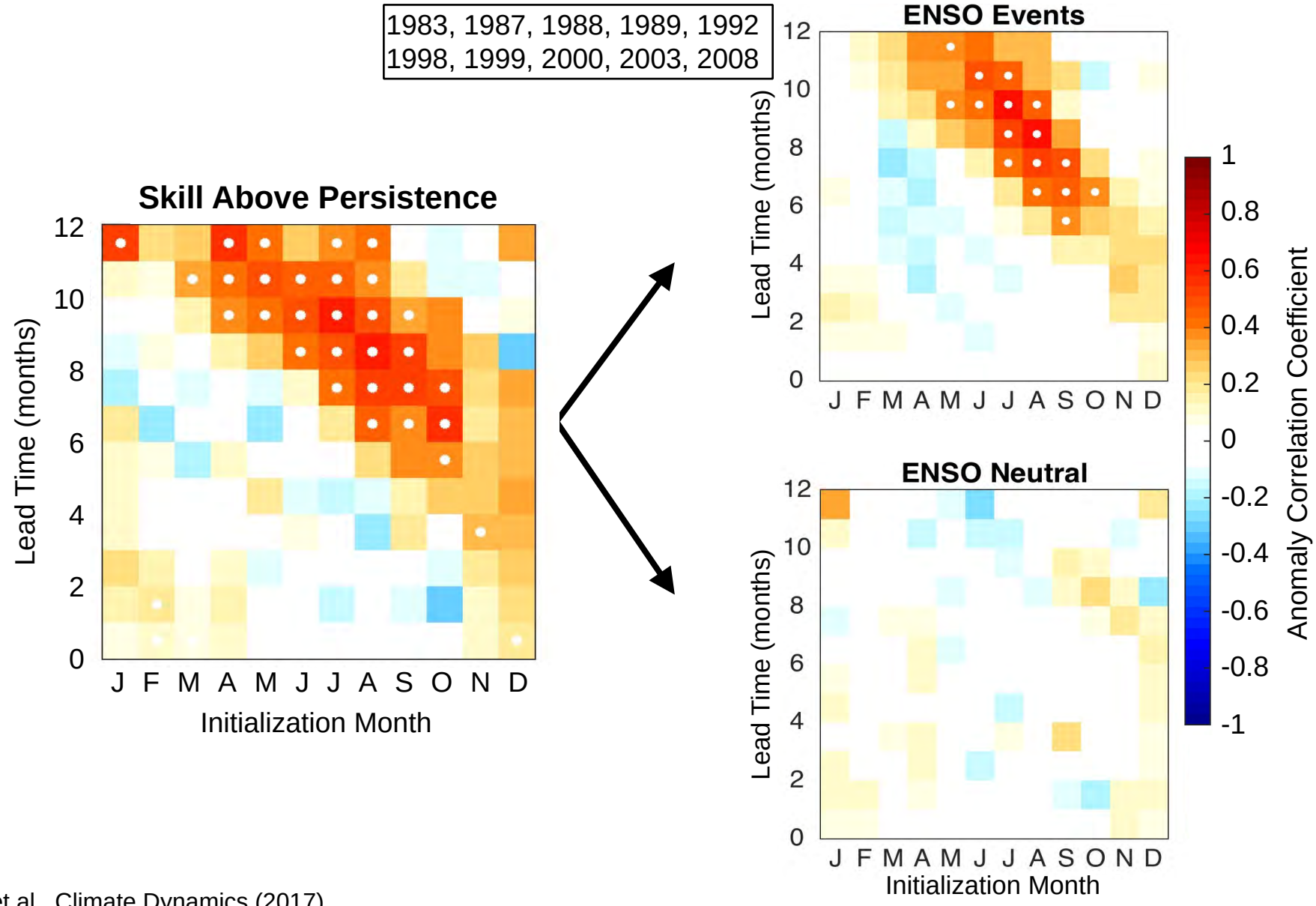


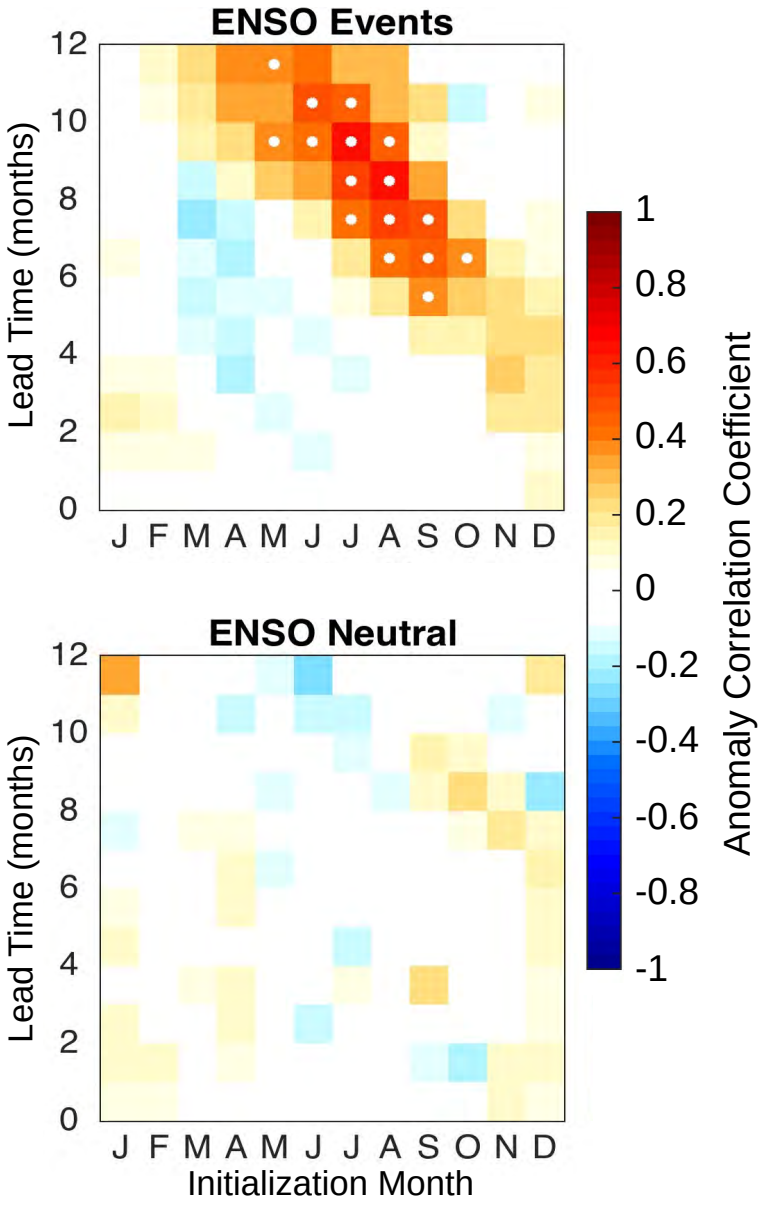
Jacox et al., Climate Dynamics (2017)

Possible forcing mechanisms

Surface heat flux

Wind stress

Coastal trapped waves



Jacox et al., Climate Dynamics (2017)

Possible forcing mechanisms

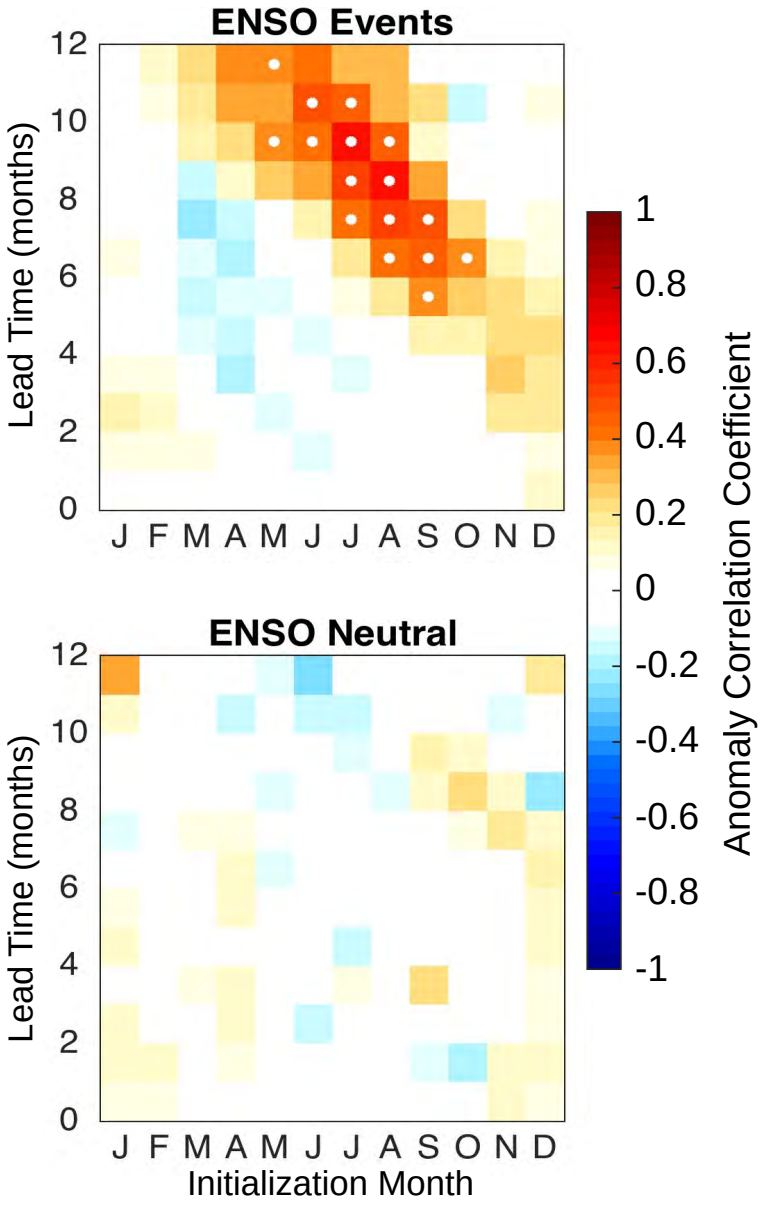
Surface heat flux

Wind stress

Coastal trapped waves

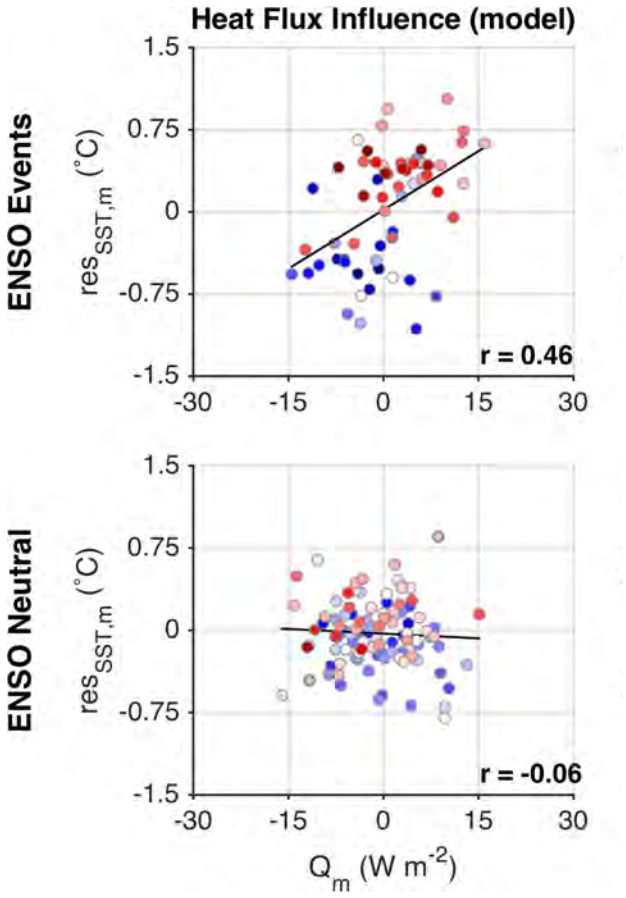
To generate SST predictability, forcing must:

1. Exert influence over SST in the model
2. Exert similar influence over SST in nature
3. Be predictable



Jacox et al., Climate Dynamics (2017)

HEAT FLUX



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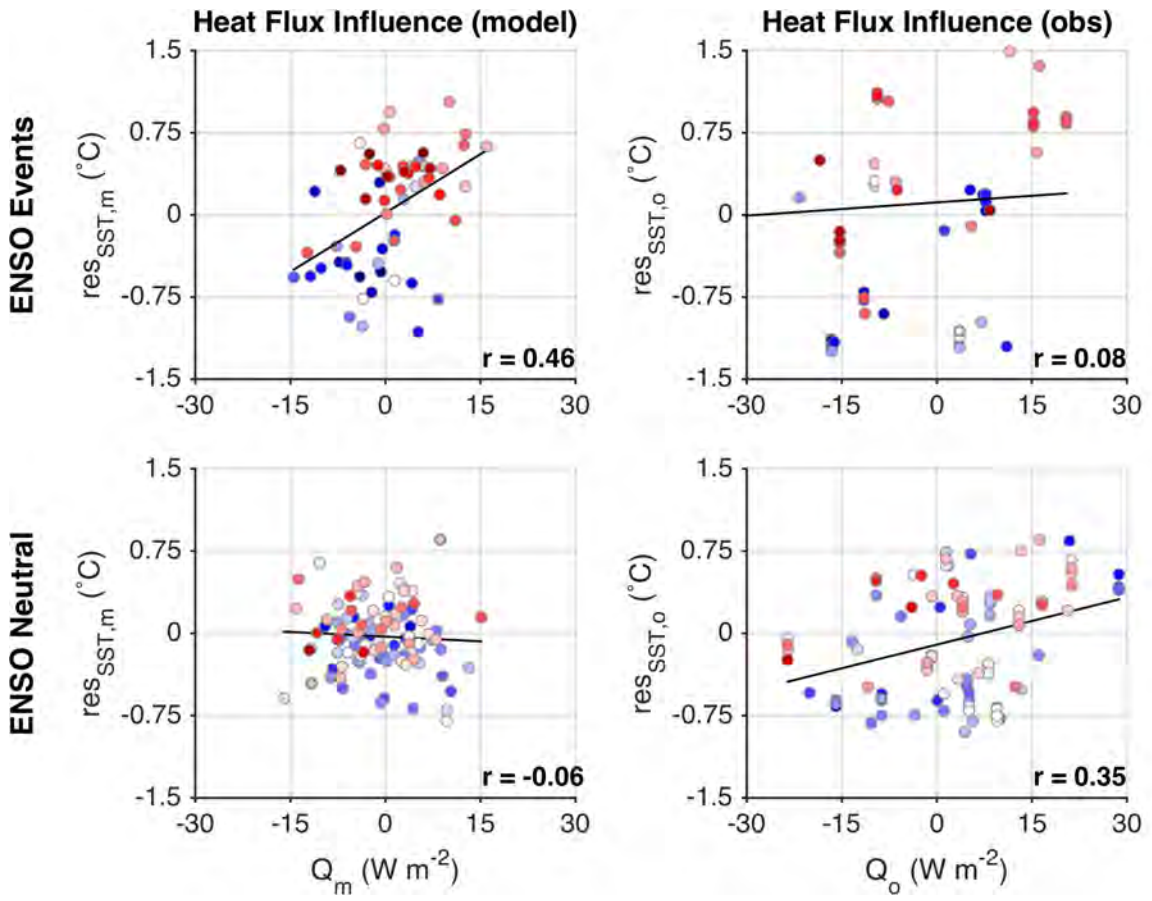

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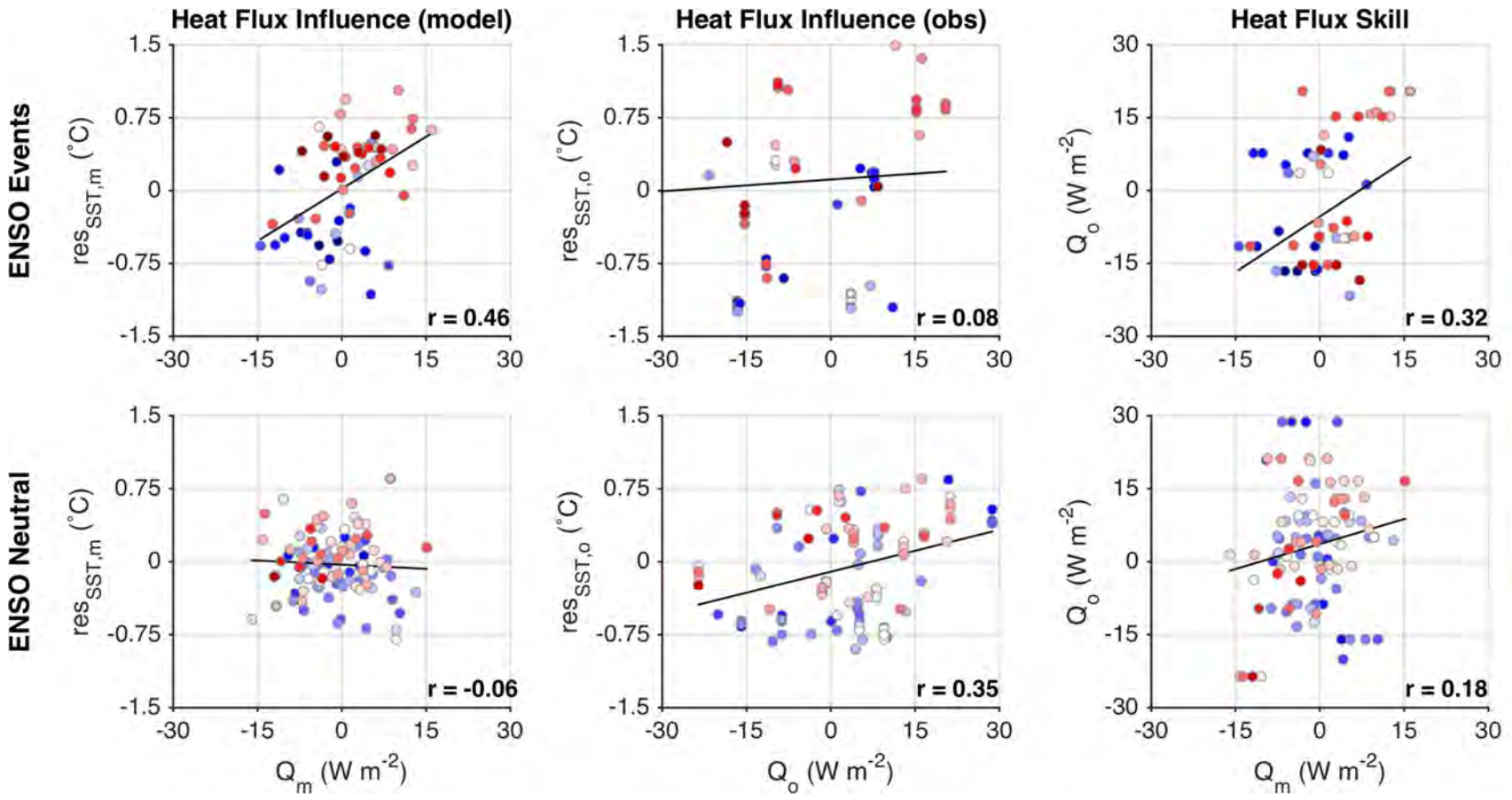
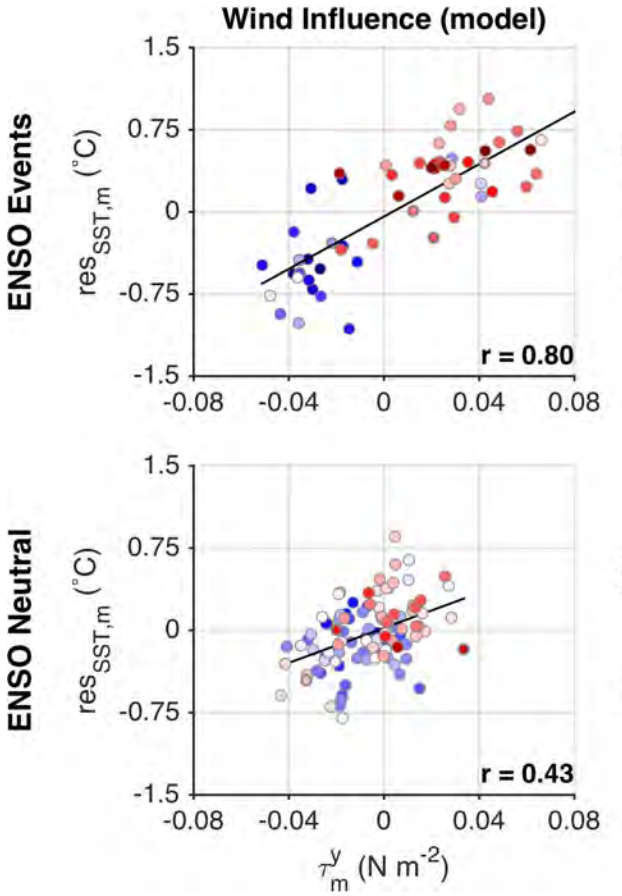


Jacox et al., Climate Dynamics (2017)

WIND STRESS



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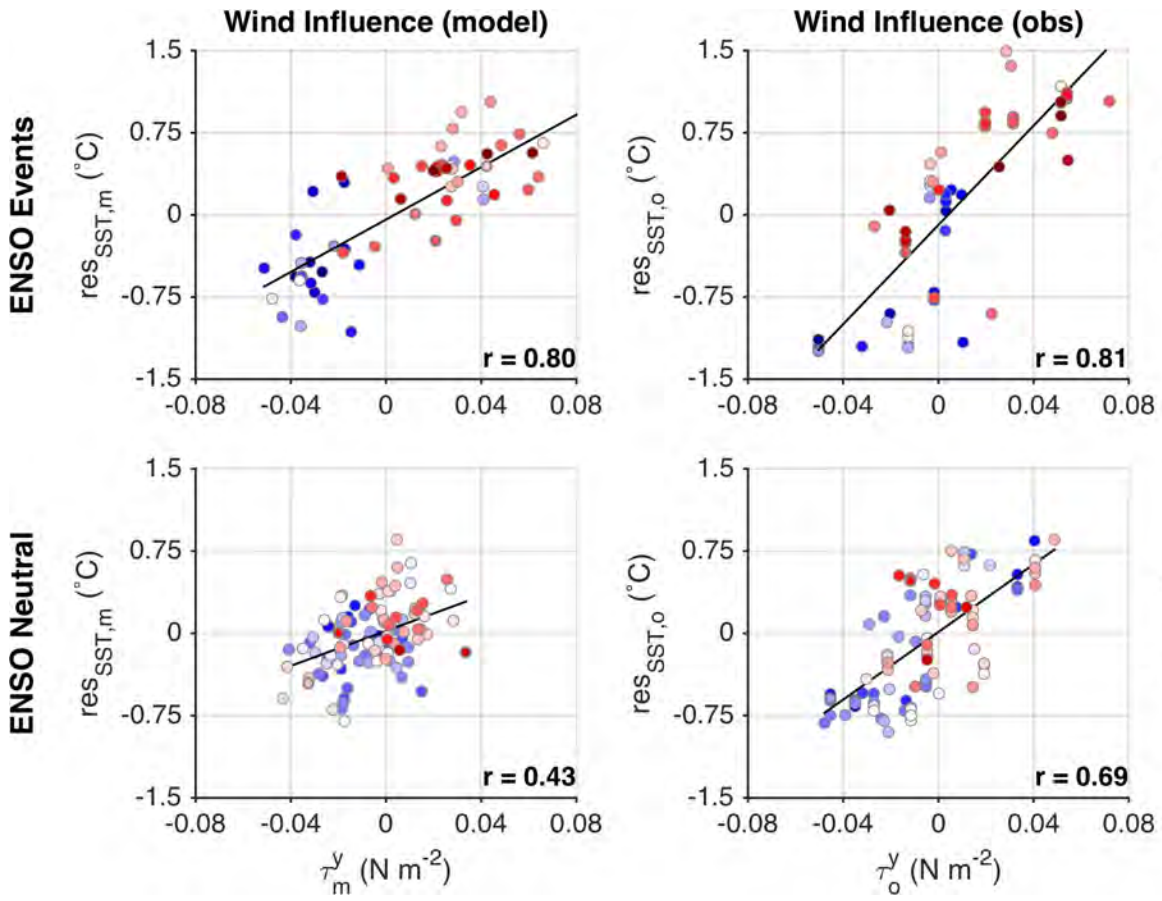

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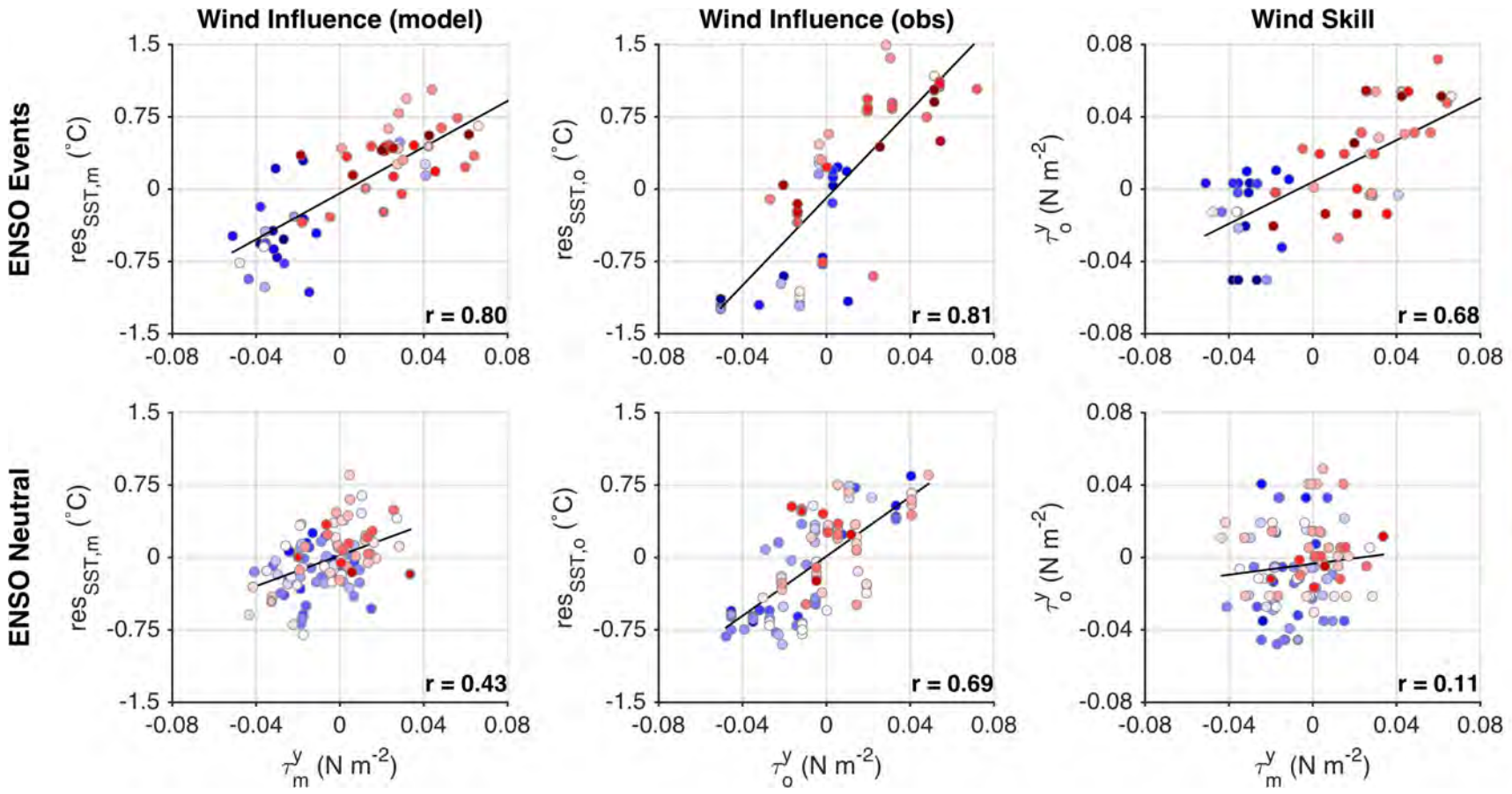

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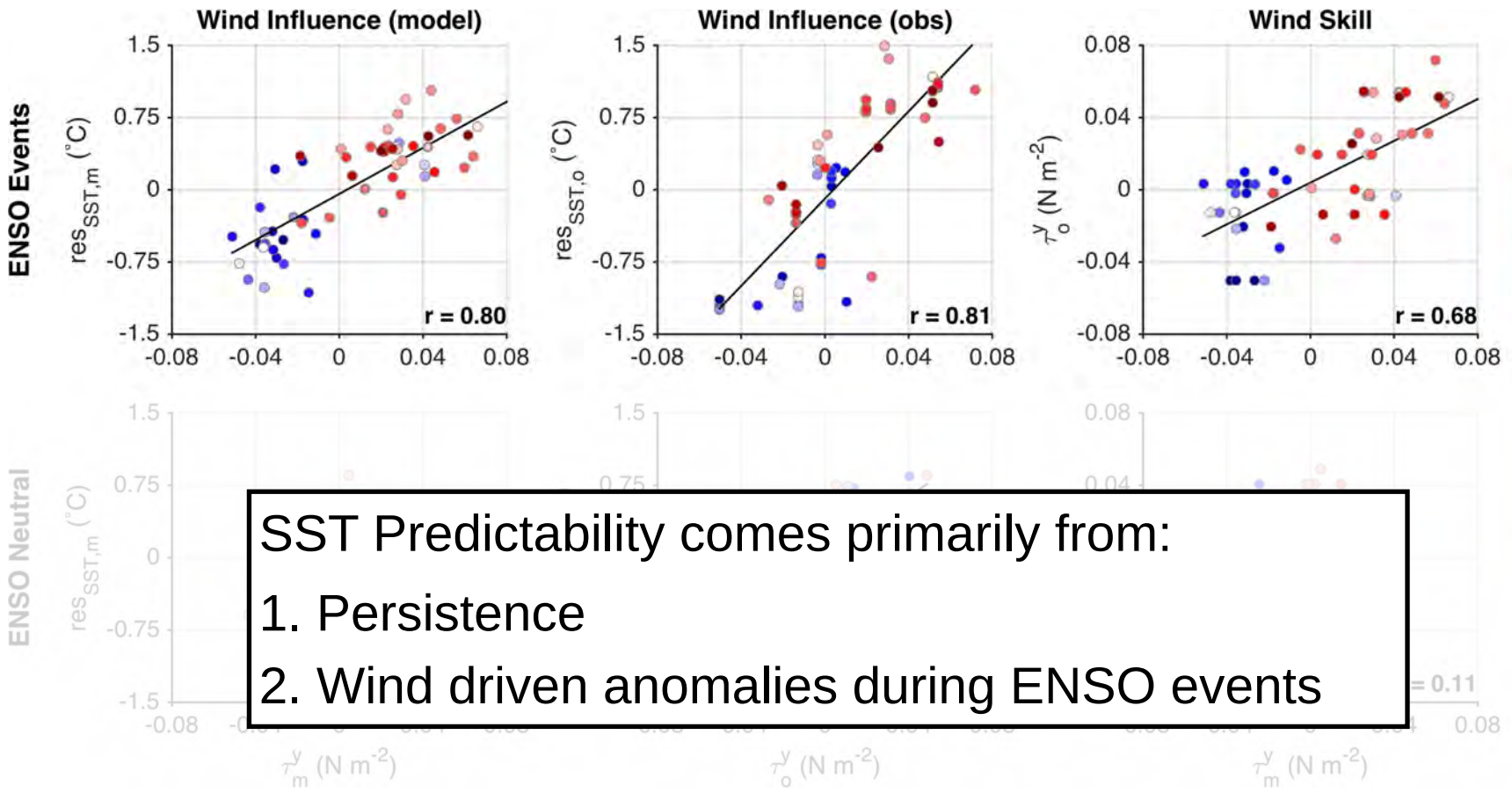
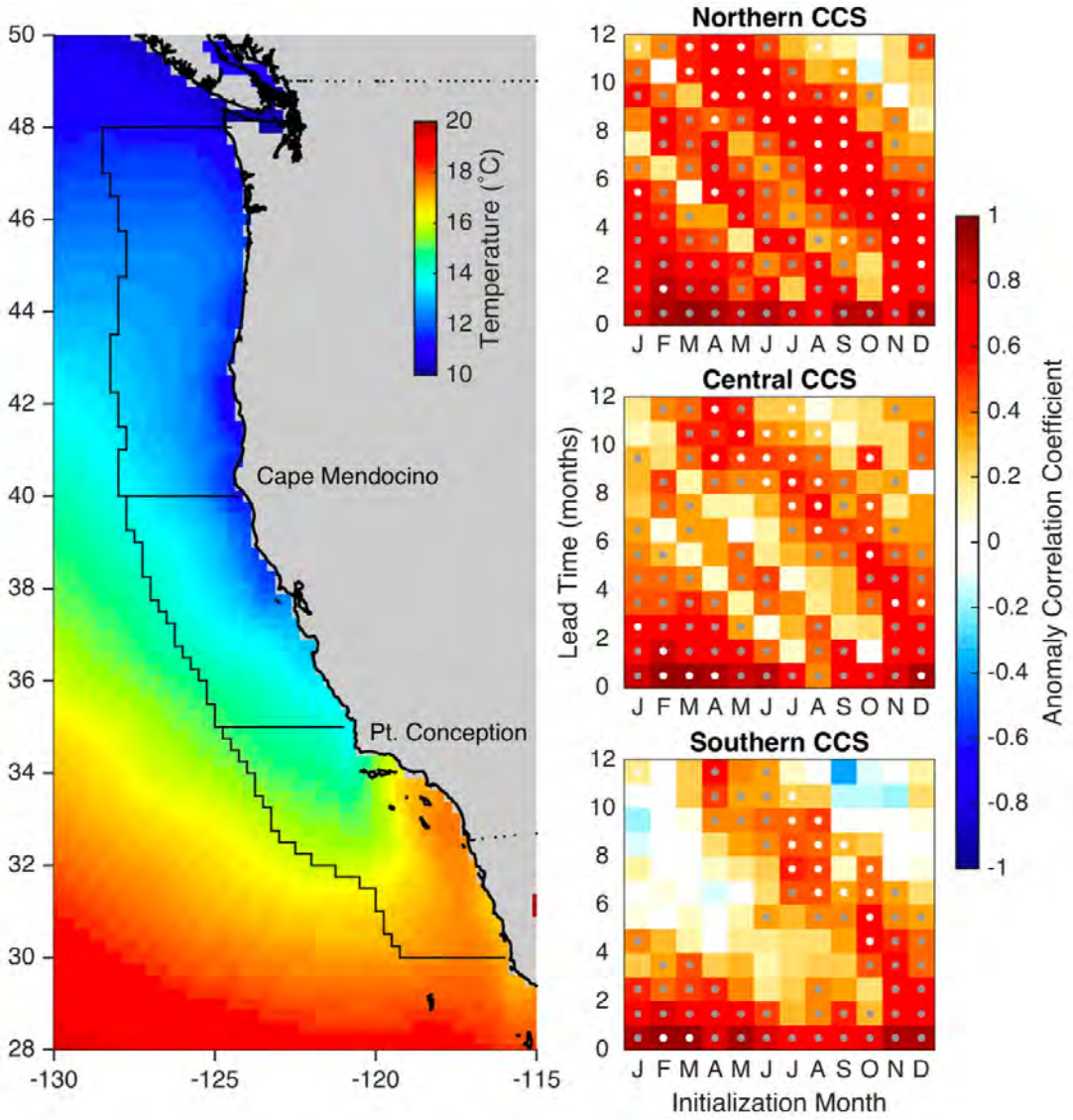


SST Predictability comes primarily from:

1. Persistence
2. Wind driven anomalies during ENSO events

Jacox et al., Climate Dynamics (2017)



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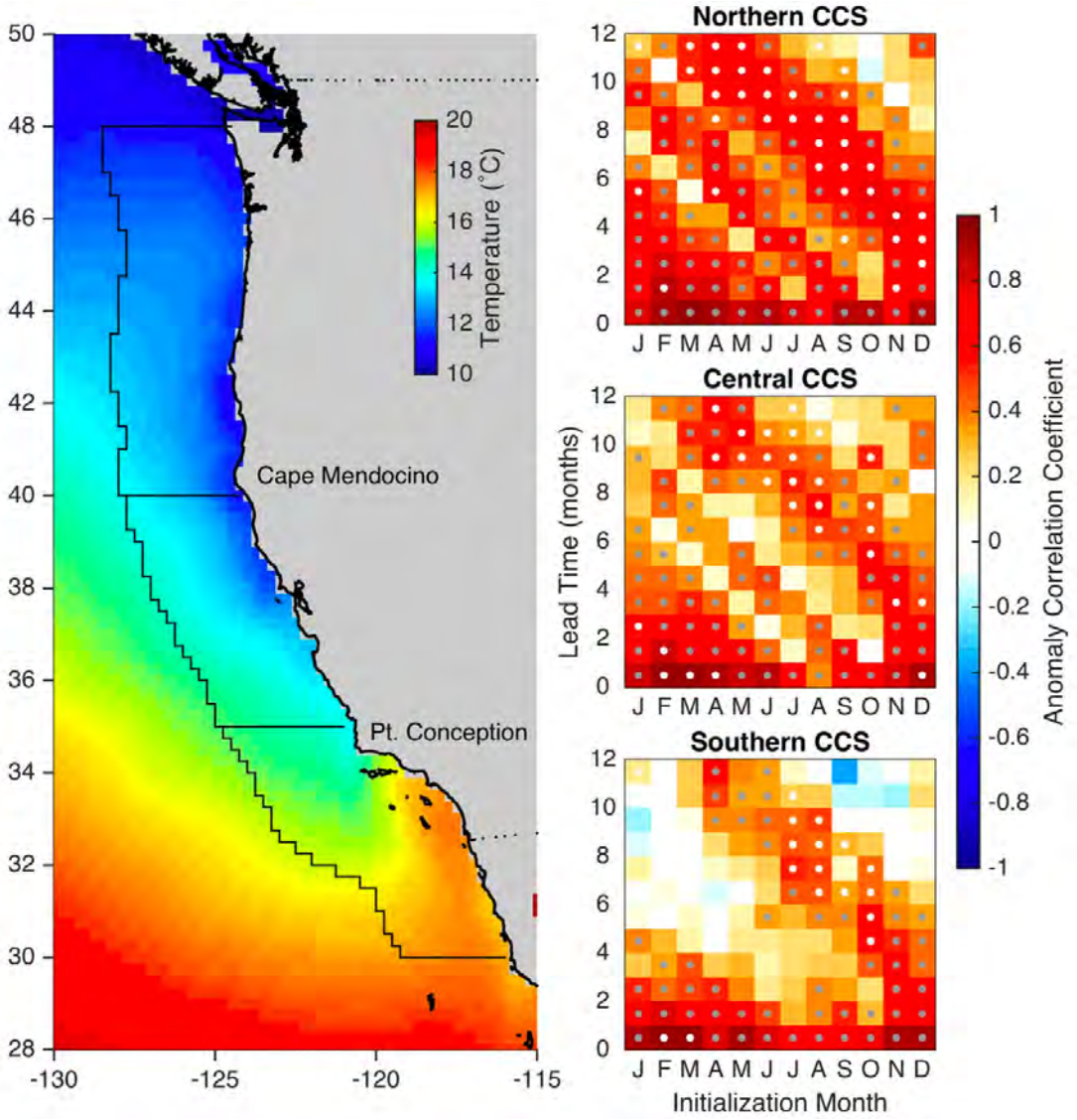
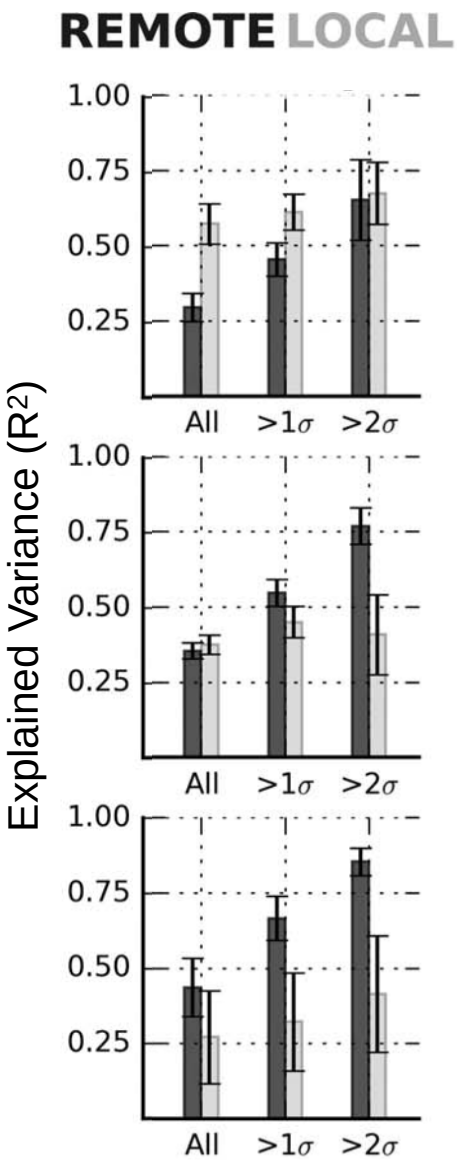


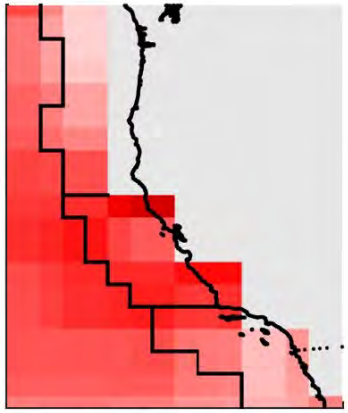


Jacox et al., Climate Dynamics (2017)

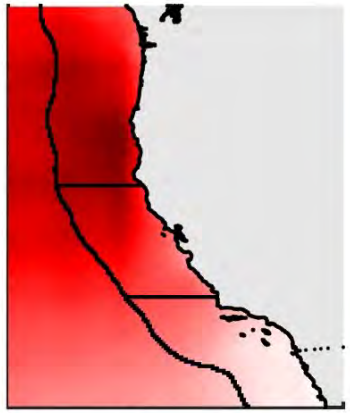
Frischknecht et al., JGR (2015)

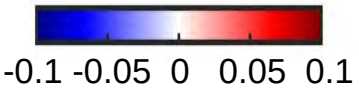
El Niño Composite

Global Forecast (CanCM4)



Regional Model (ROMS)





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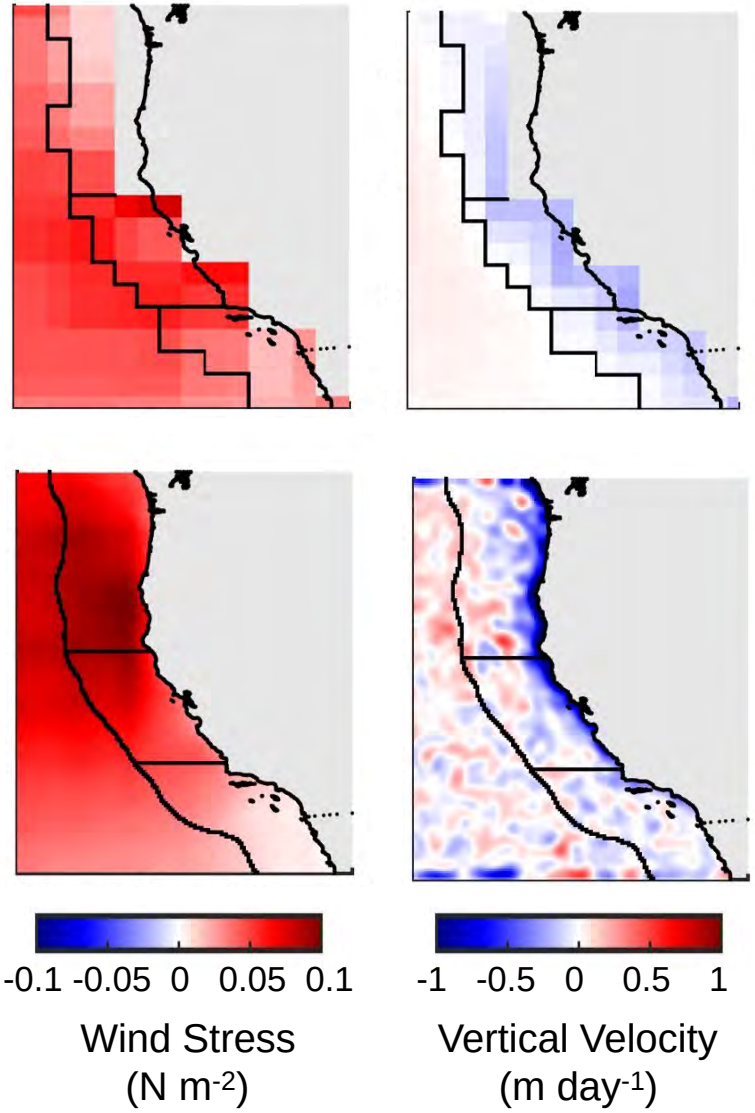

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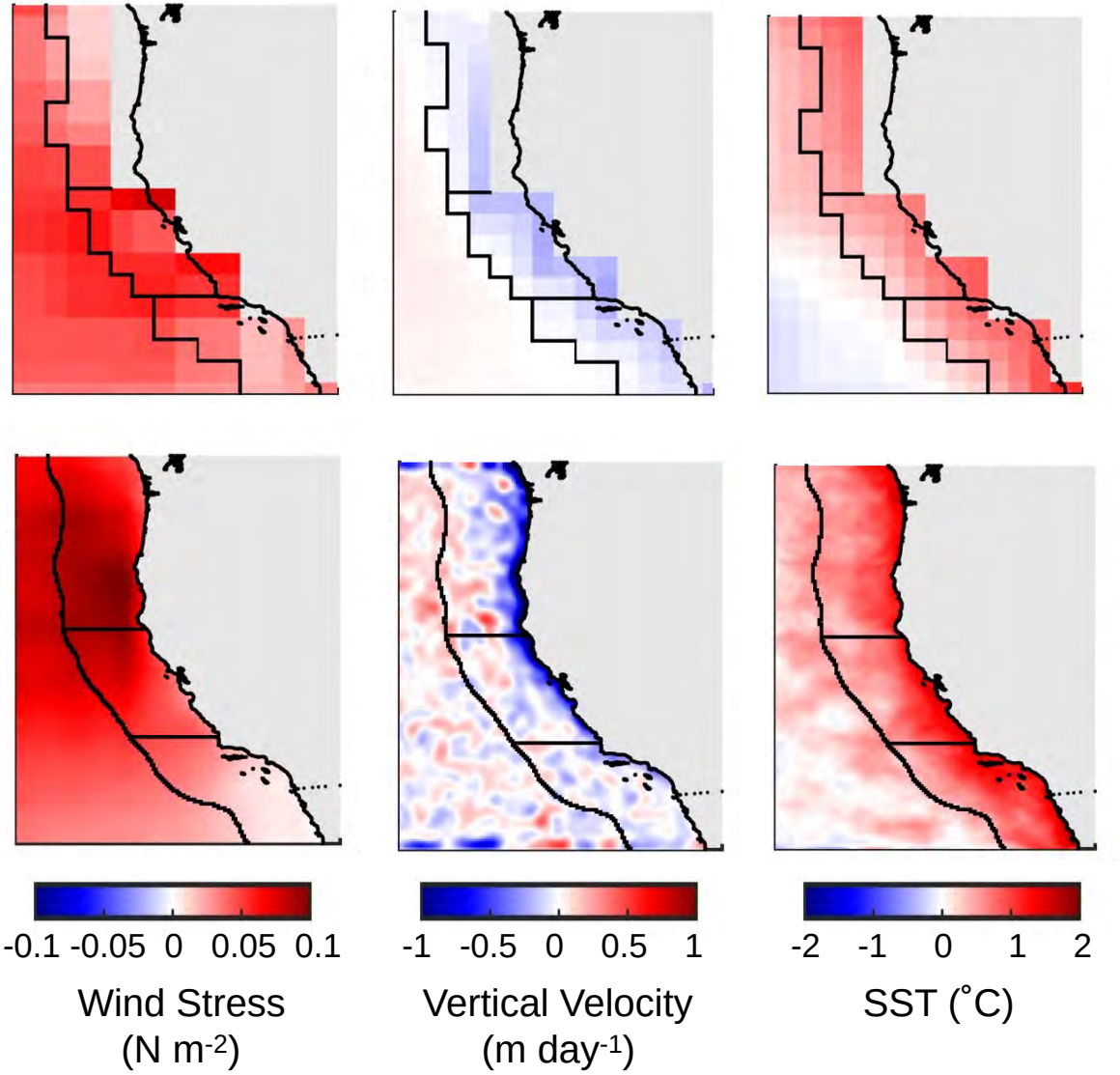

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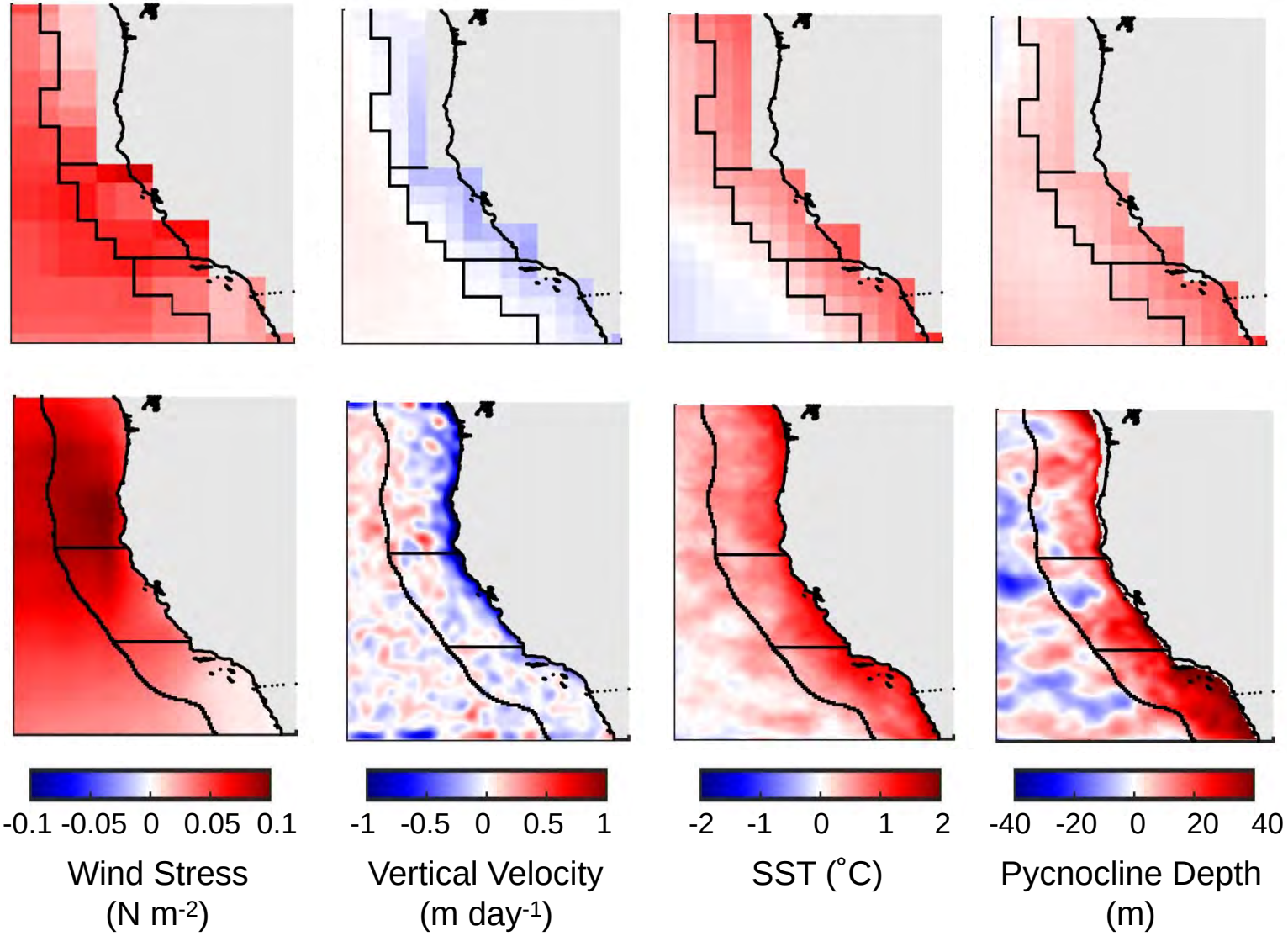
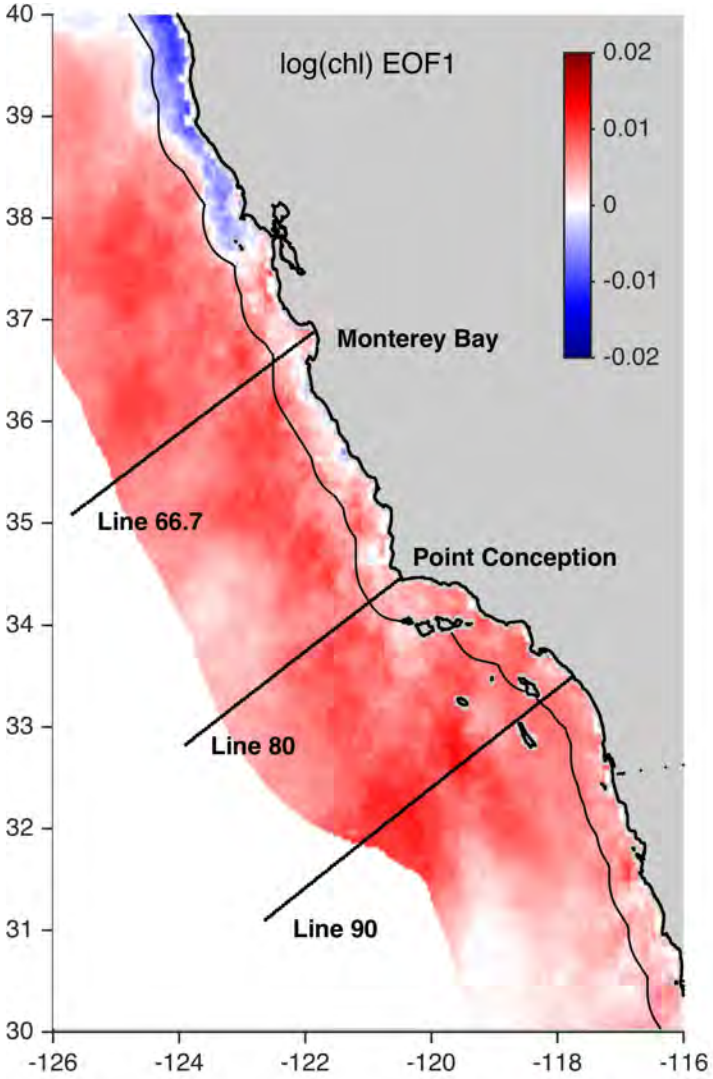
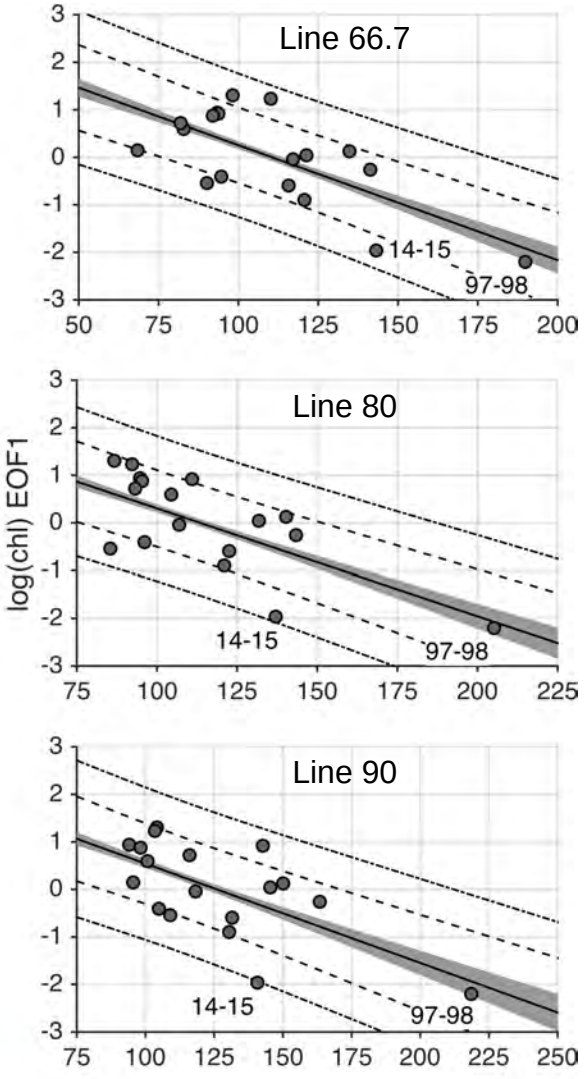


Jacox et al., Climate Dynamics (2017)

Advance Warning of Upwelling Season (April-July) Chlorophyll Anomalies





Jacox et al., GRL (2016)

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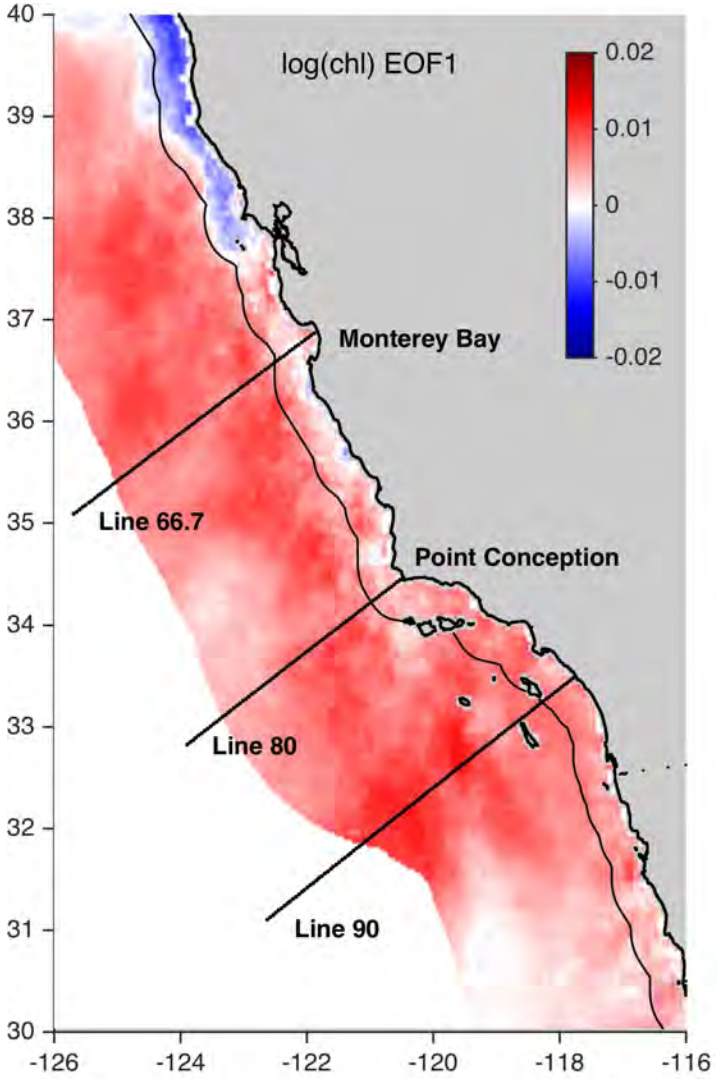
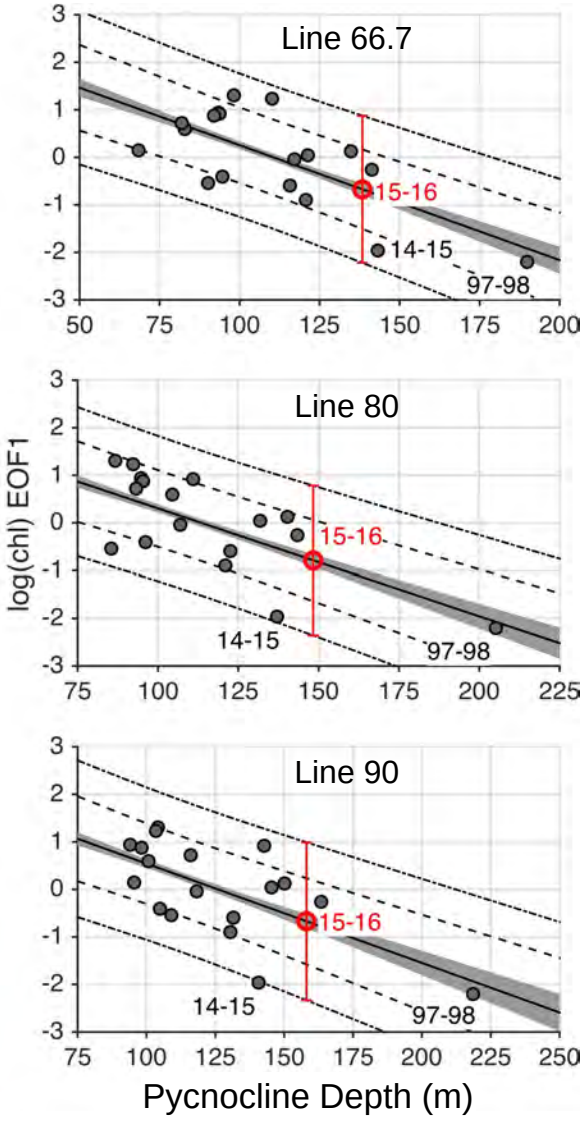


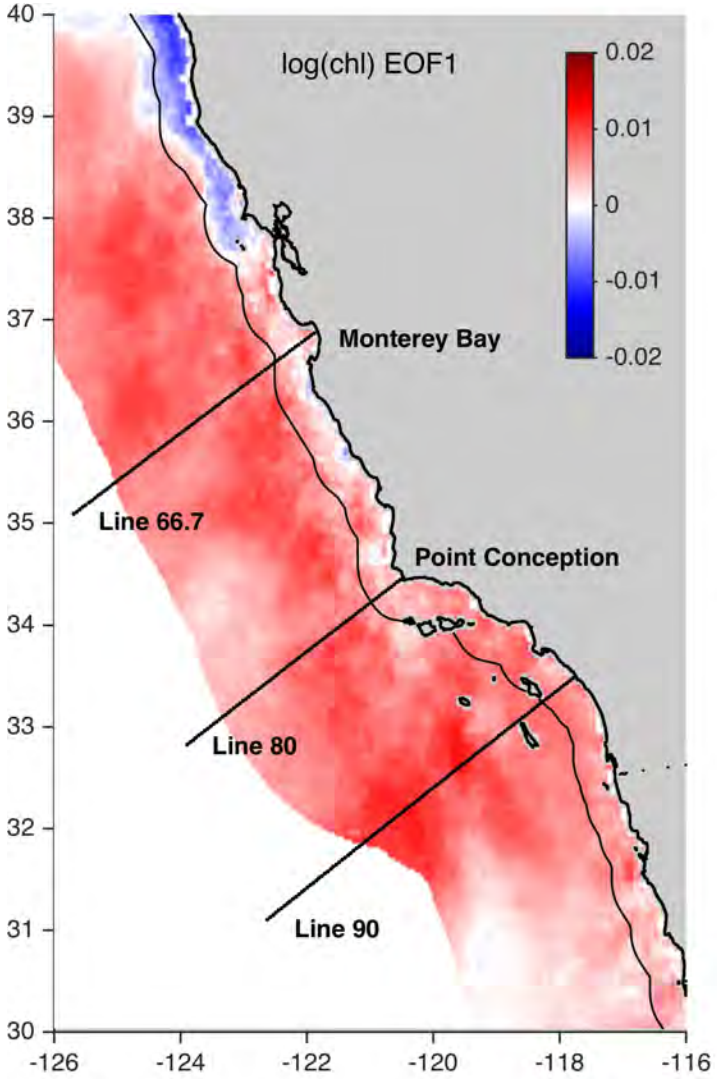


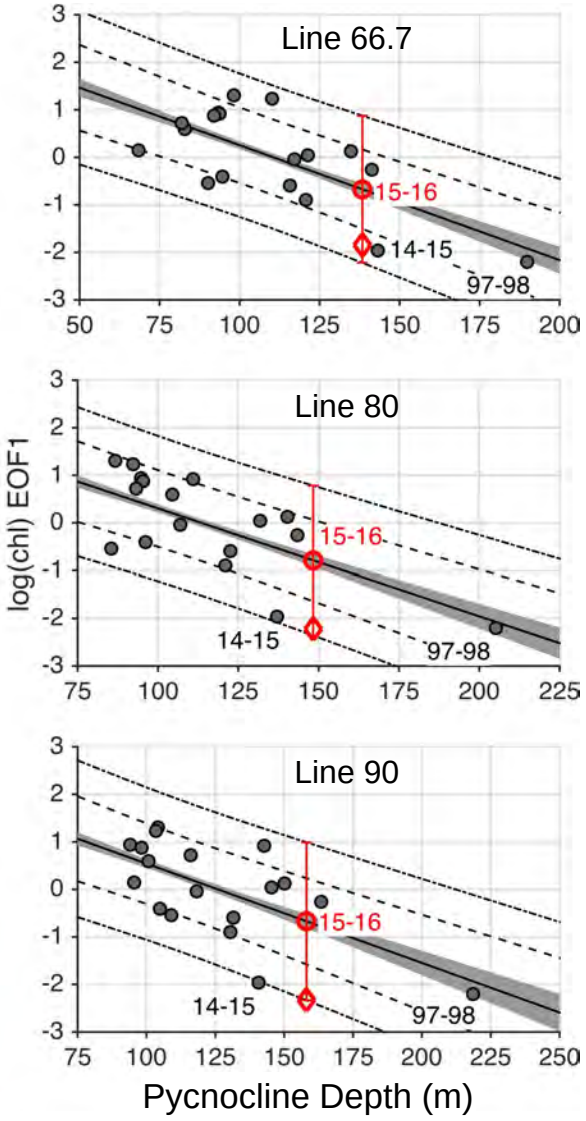
PREDICTIONS

- Linear regression

Jacox et al., GRL (2016)

Advance Warning of Upwelling Season (April-July) Chlorophyll Anomalies





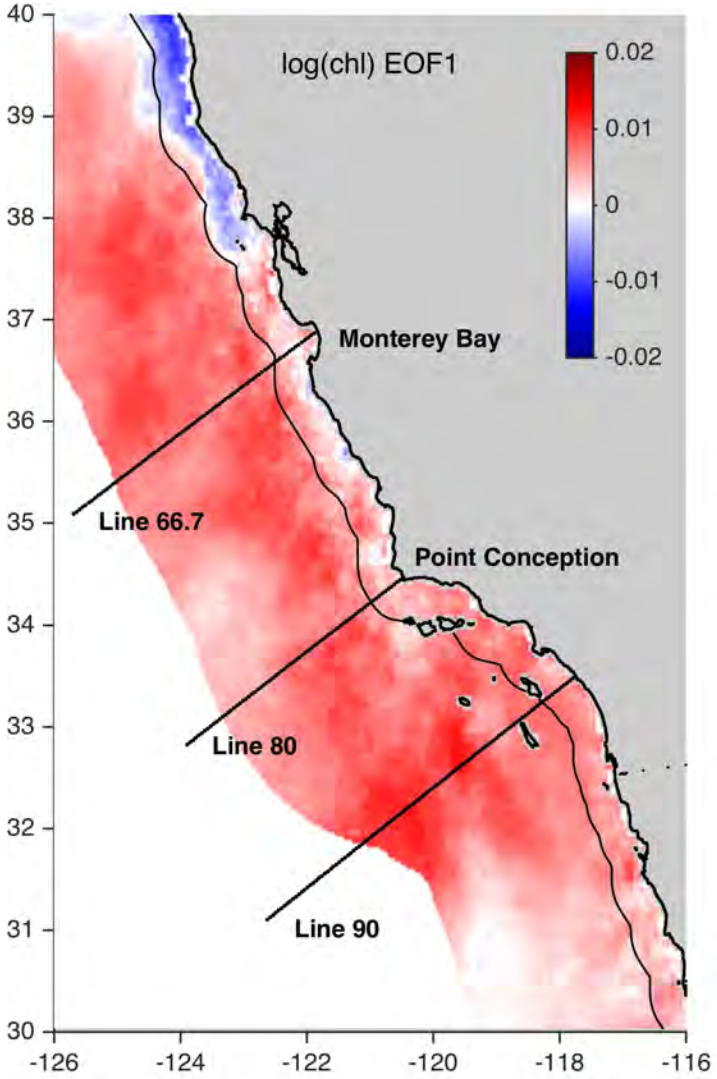
PREDICTIONS

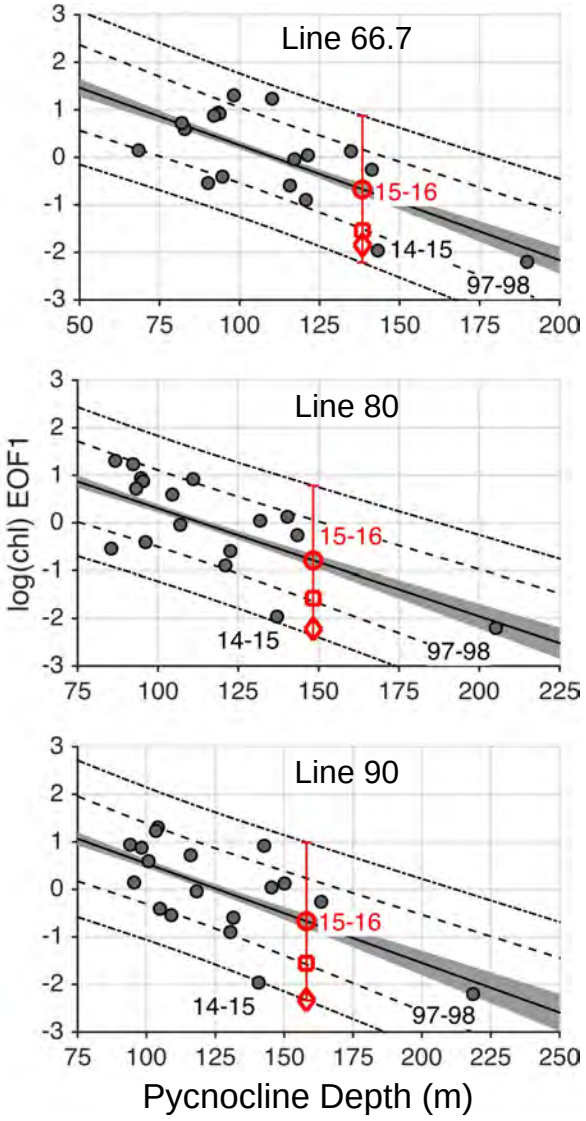
○ Linear regression

◊ Linear regression + Apr-Jul 2015 Chl

Jacox et al., GRL (2016)

Advance Warning of Upwelling Season (April-July) Chlorophyll Anomalies



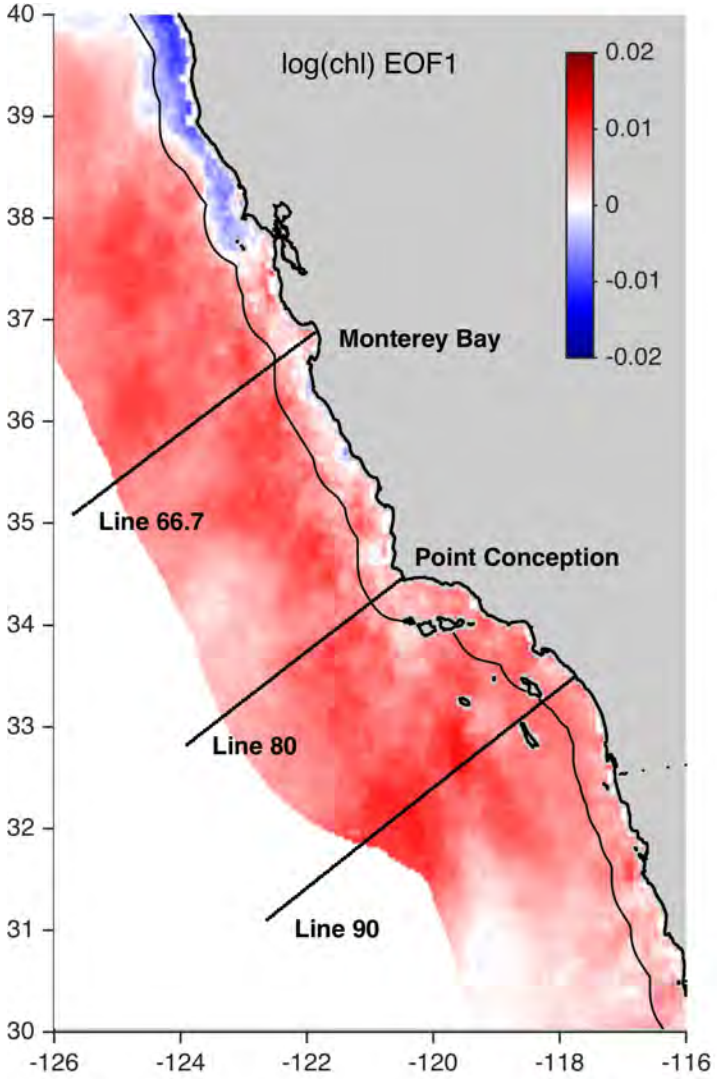


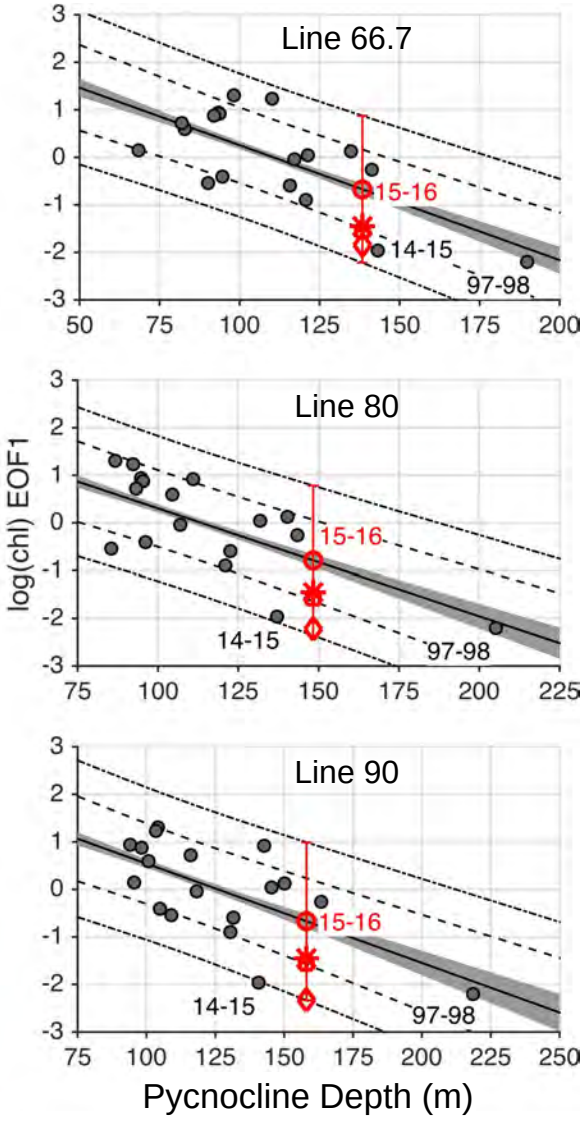
PREDICTIONS

- ○ Linear regression
- ◇ Linear regression + Apr-Jul 2015 Chl
- □ Linear regression + March 2016 Chl

Jacox et al., GRL (2016)

Advance Warning of Upwelling Season (April-July) Chlorophyll Anomalies





PREDICTIONS

○ Linear regression

◇ Linear regression + Apr-Jul 2015 Chl

□ Linear regression + March 2016 Chl

* OBSERVATIONS

Jacox et al., GRL (2016)