Climate Forecasting Unit

Drift, bias, variability and skill in the Tropical Atlantic
IC3 contribution to PREFACE

C. Prodhomme, E. Exarchou, D. Volpi, V. Guemas, F. Doblas-Reyes

Preface General Assembly, Cape Town, 27/08/2015

PREFACE

EC EARTH

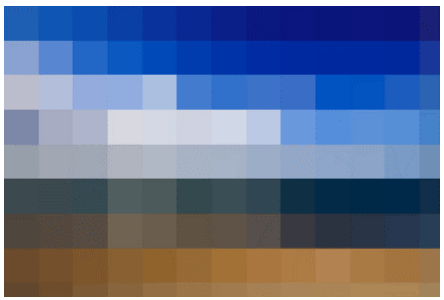
How is the SST drifting in seasonal hindcasts?

E. Exarchou, V. Guemas, C. Prodhomme, F. Doblas-Reyes

EC-Earth seasonal hindcasts

Seasonal retrospective hindcasts performed with **EC-Earth 3.0.1**

SRes (T255/ORCA1)

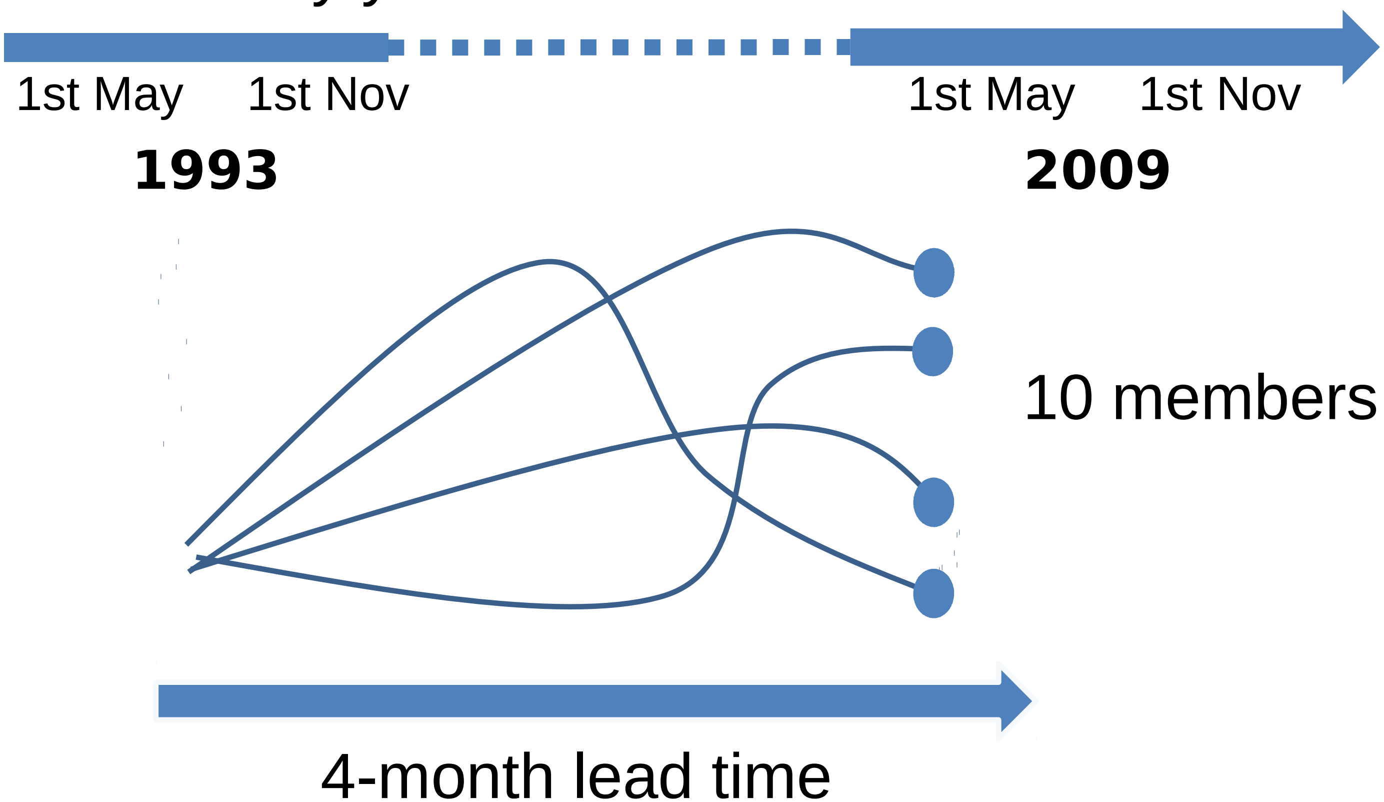


Oceanic ICs:
- GLORYS
- ORAS4

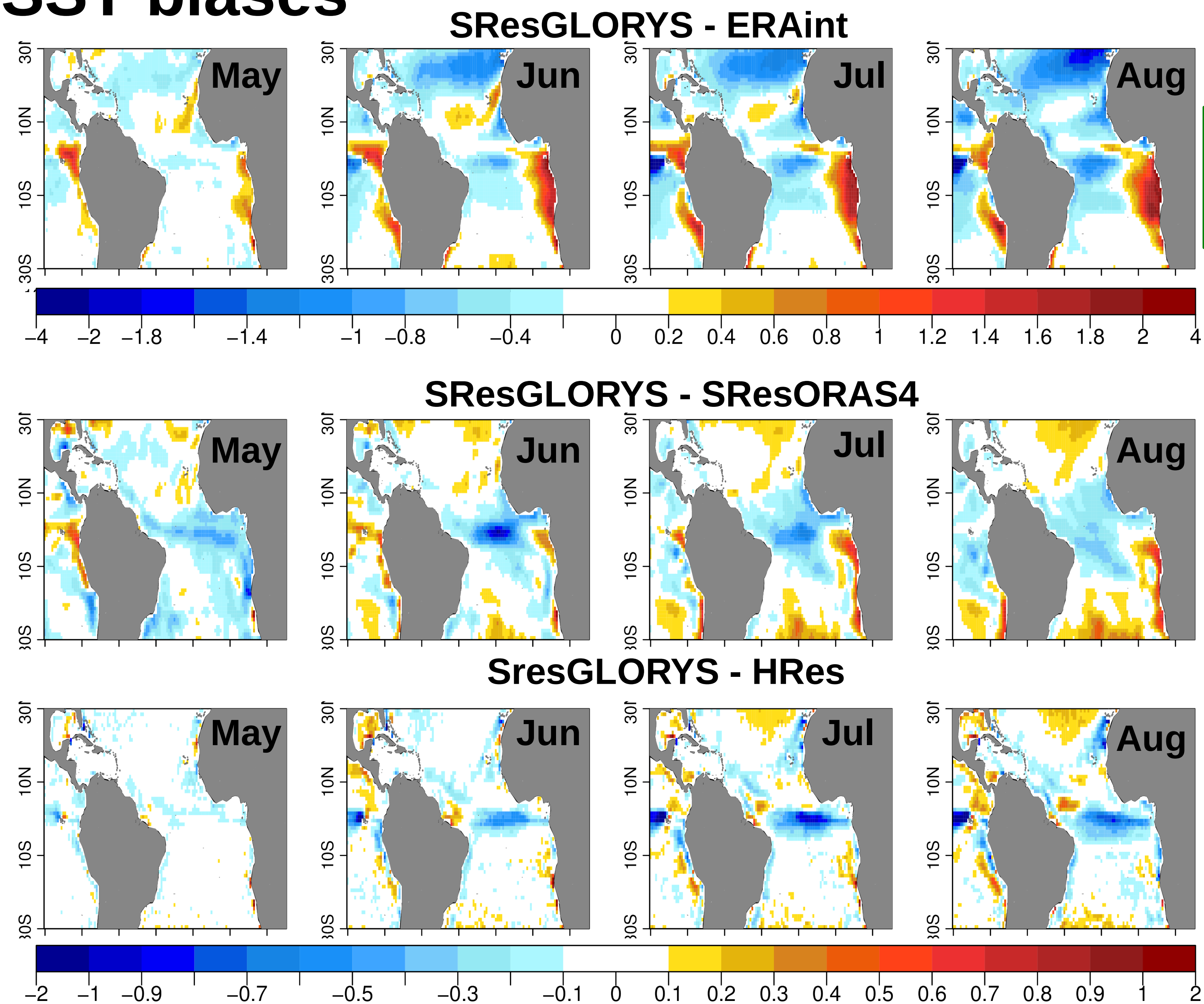
HRes (T511/ORCA025)

Oceanic IC: GLORYS

32 start dates: May and November every year between 1993 and 2009



SST biases



- The bias remains similar in all experiments

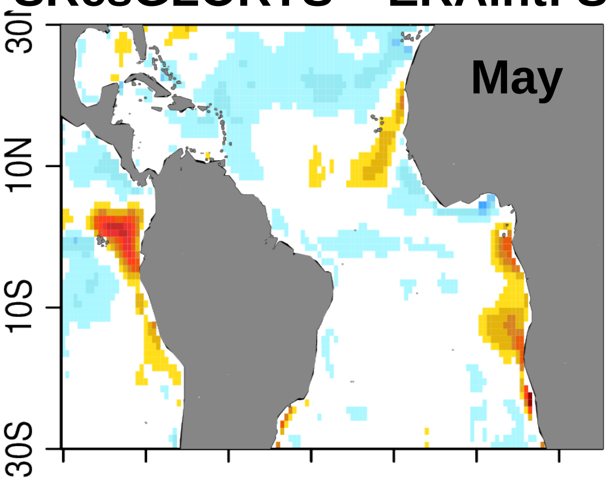
- The bias is slightly reduced when using ORAS4 IC
- Error growing faster with ORAS4

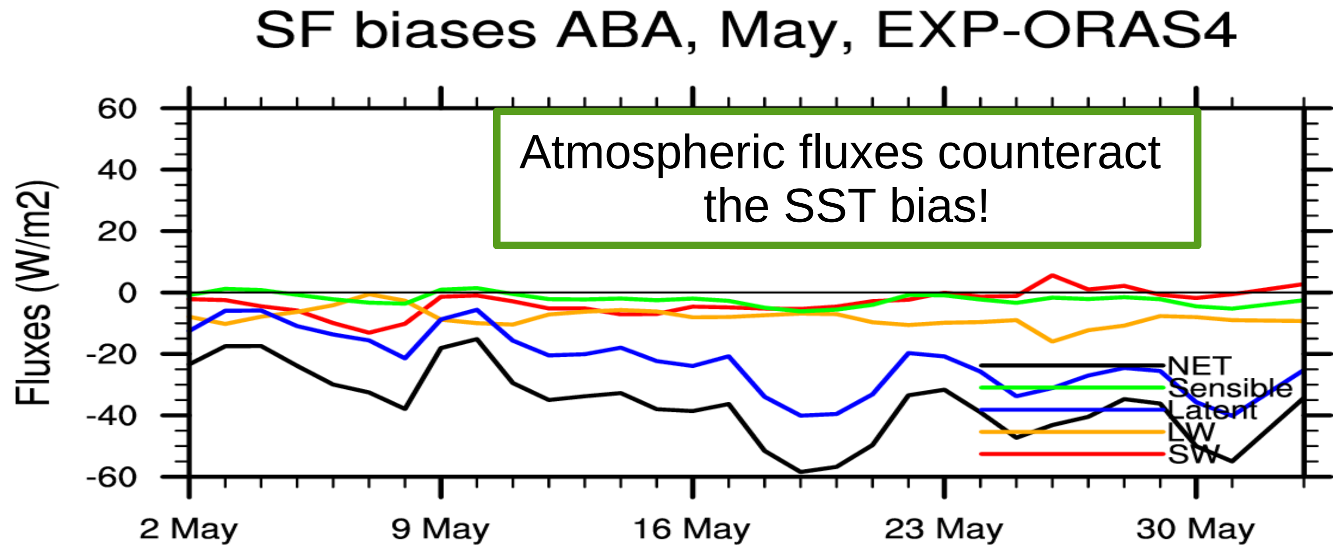
- The bias is reduced In the equatorial region in high resolution forecast

E. Exarchou (IC3)

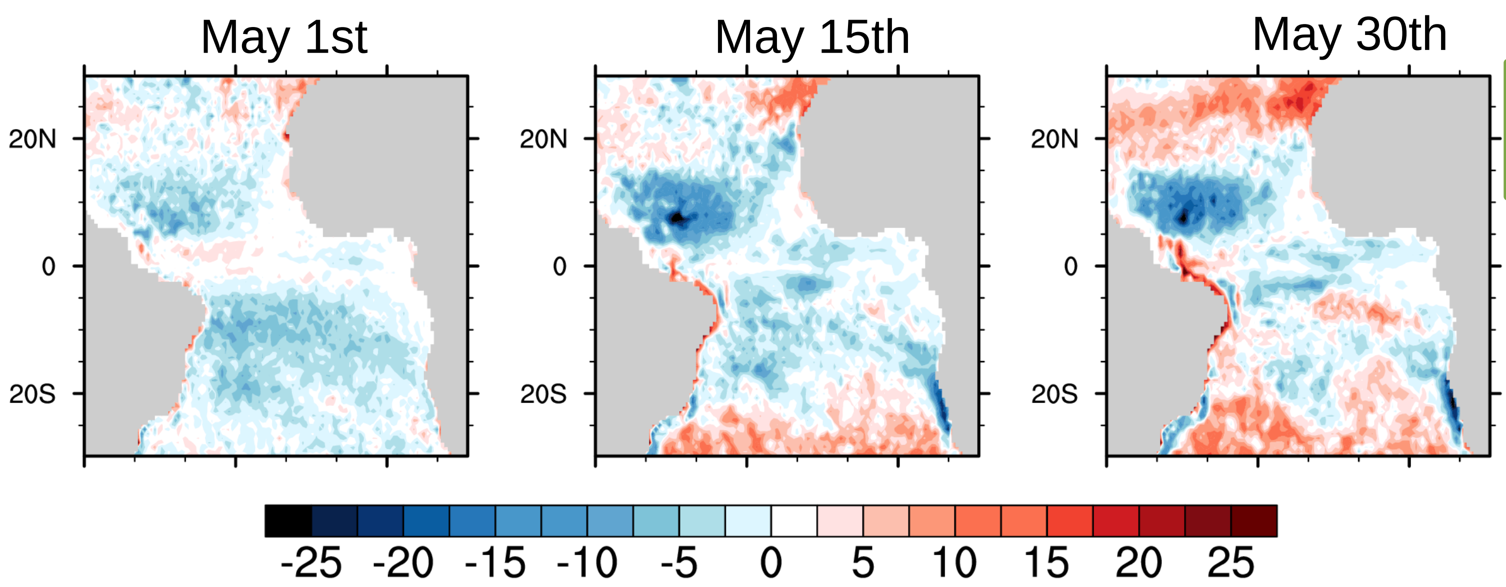
Fast development of the error in ABA

SResGLORYS – ERAint: SST





SResGLORYS – ERAint: Mix Layer Depth

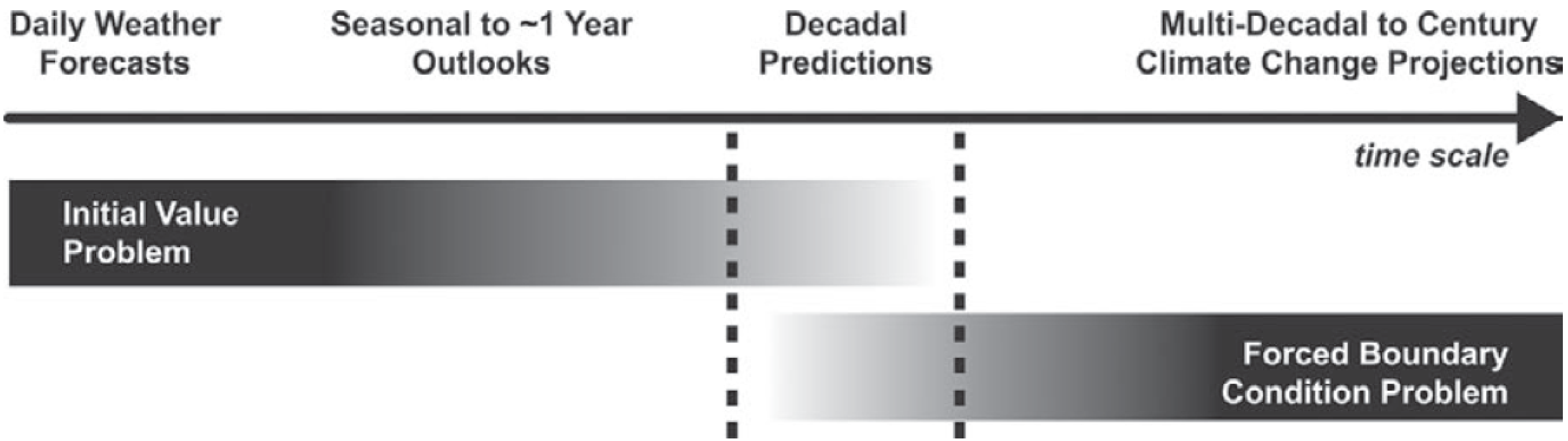


The mix layer is too thin
→ not enough mixing

E. Exarchou (IC3)

CMIP5 decadal hindcasts skill and bias in the tropical Atlantic

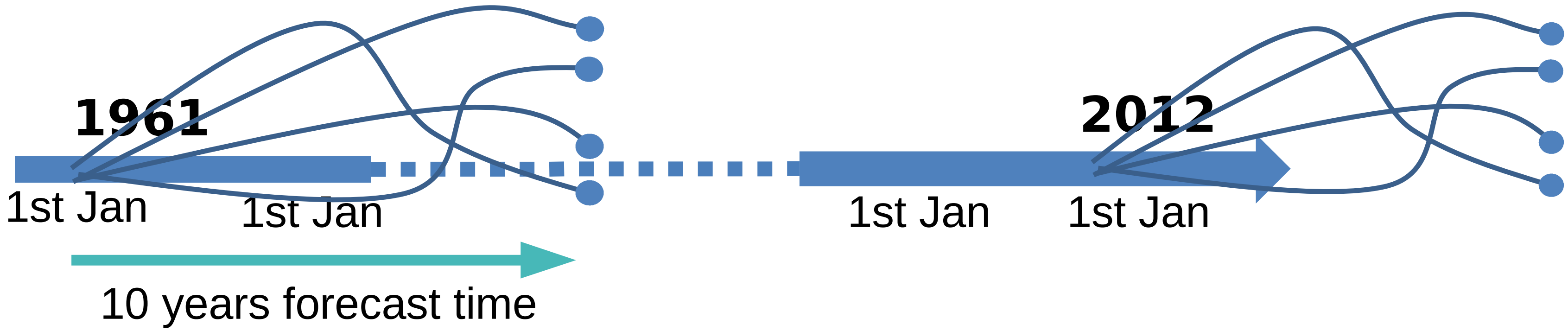
D. Volpi, E. Exarchou, C. Prodhomme, V. Guemas, F. Doblas-Reyes



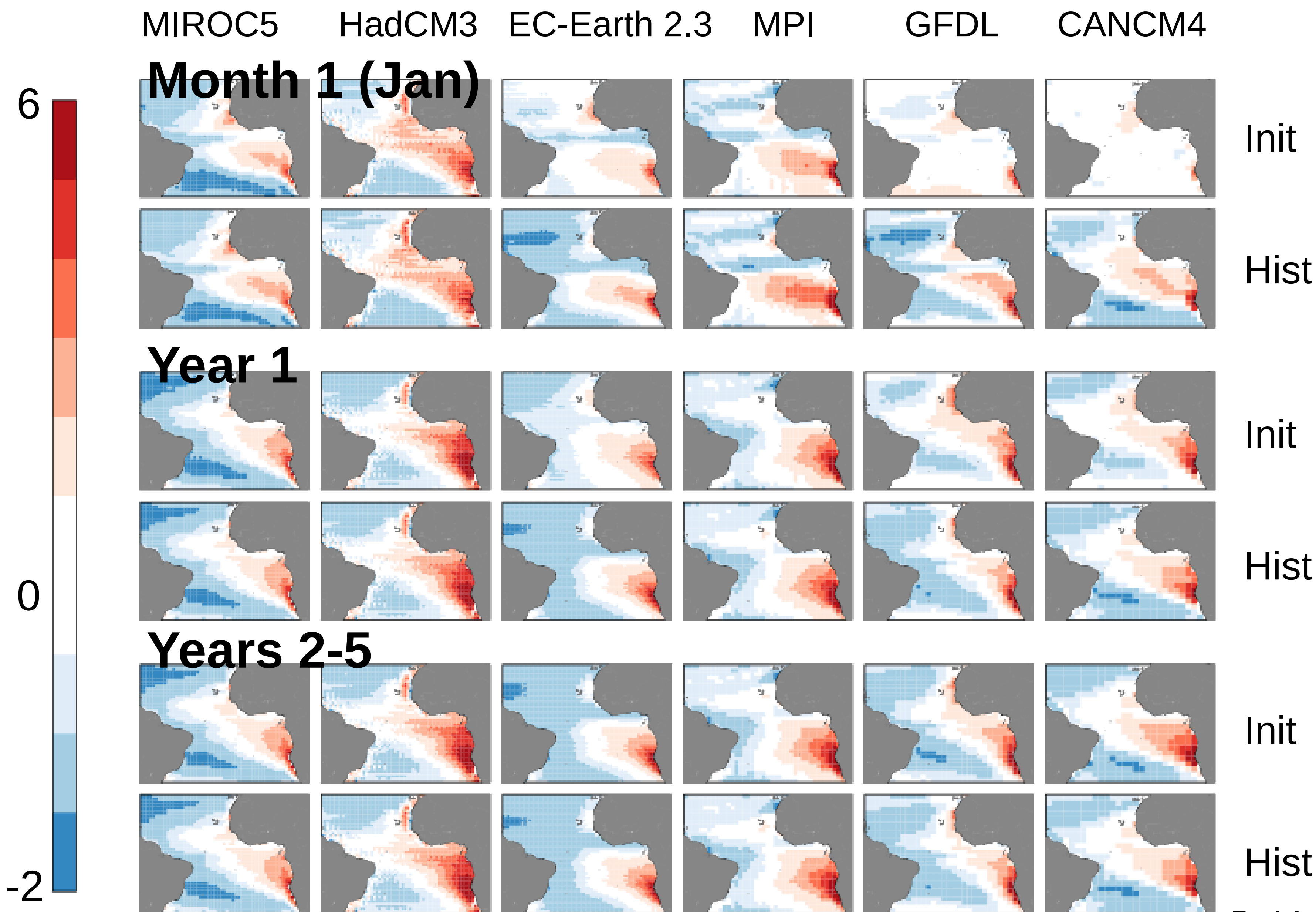
CMIP5 decadal/historical experiments

	Member prediction	Members historical	Period
MIROC5	6	1	1961-2011
HadCM3	10	10	1961-2010
EC-Earth v2.3	10	10	1961-2006
MPI	5	3	1961-2012
GFDL-CM2	10	10	1961-2012
CANCM4	10	10	1961-2012

Between 46 and 52 stardate:
1st of January of every years

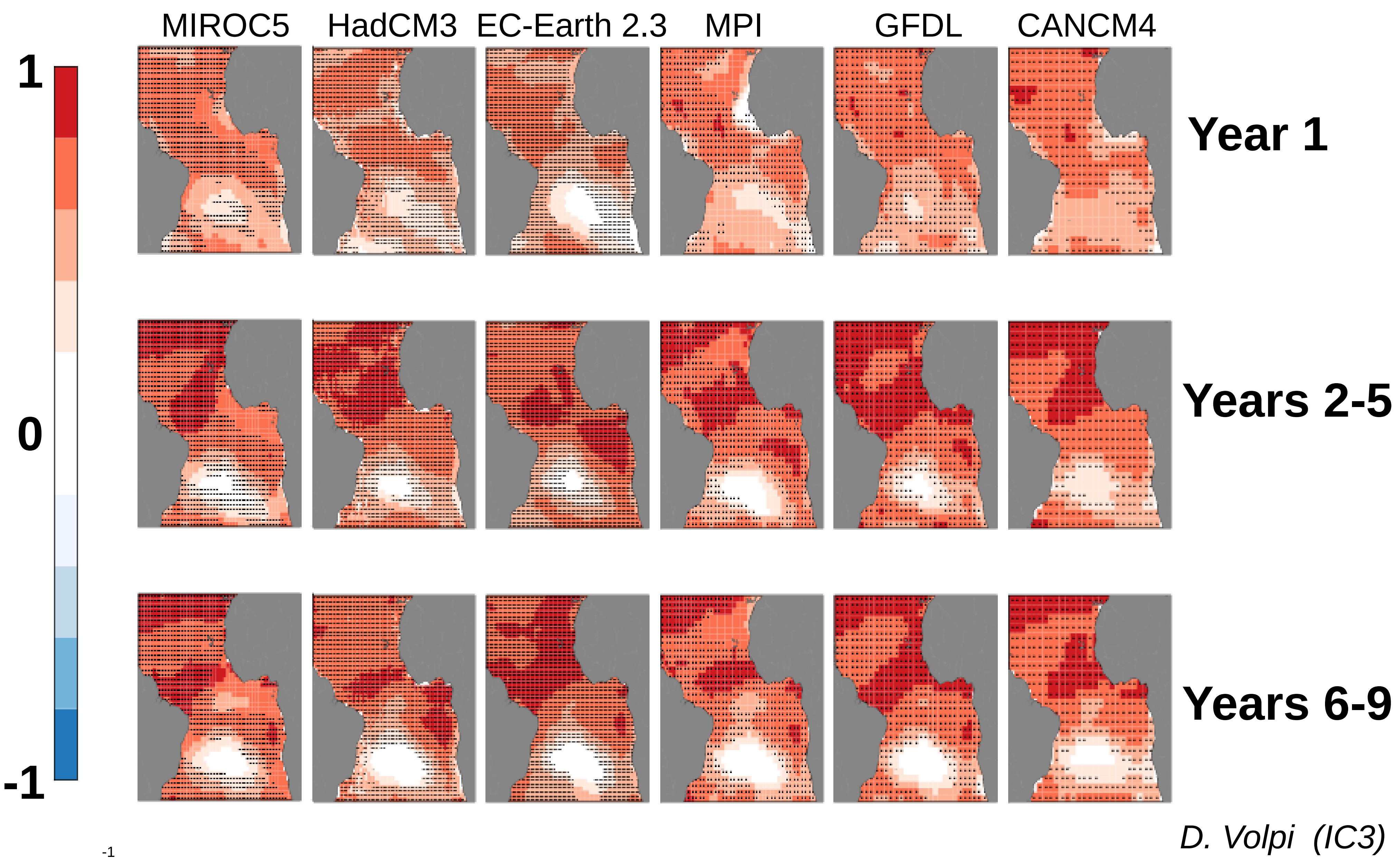


CMIP5 decadal/historical experiments



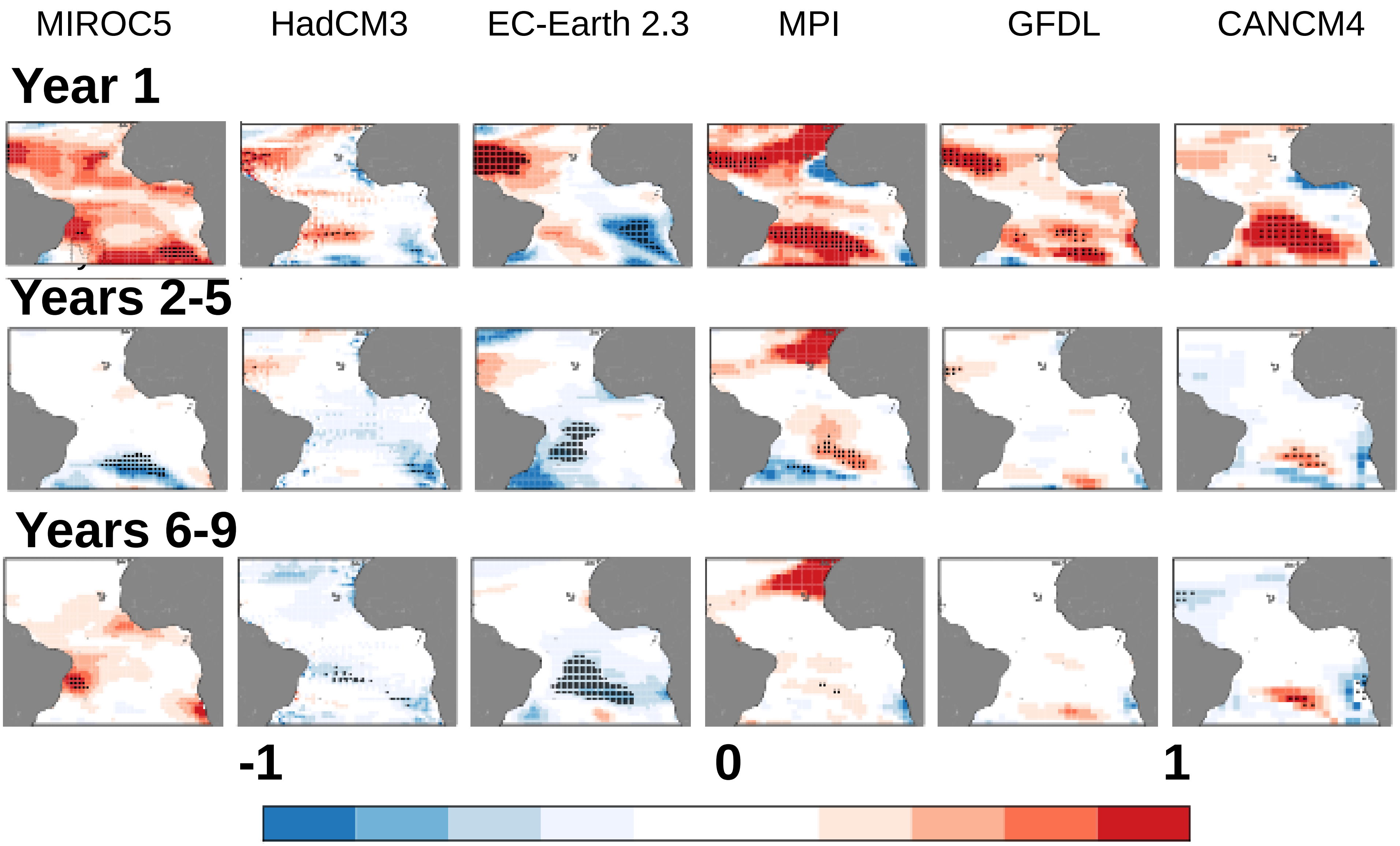
D. Volpi (IC3)

SST correlation in the decadal hindcasts

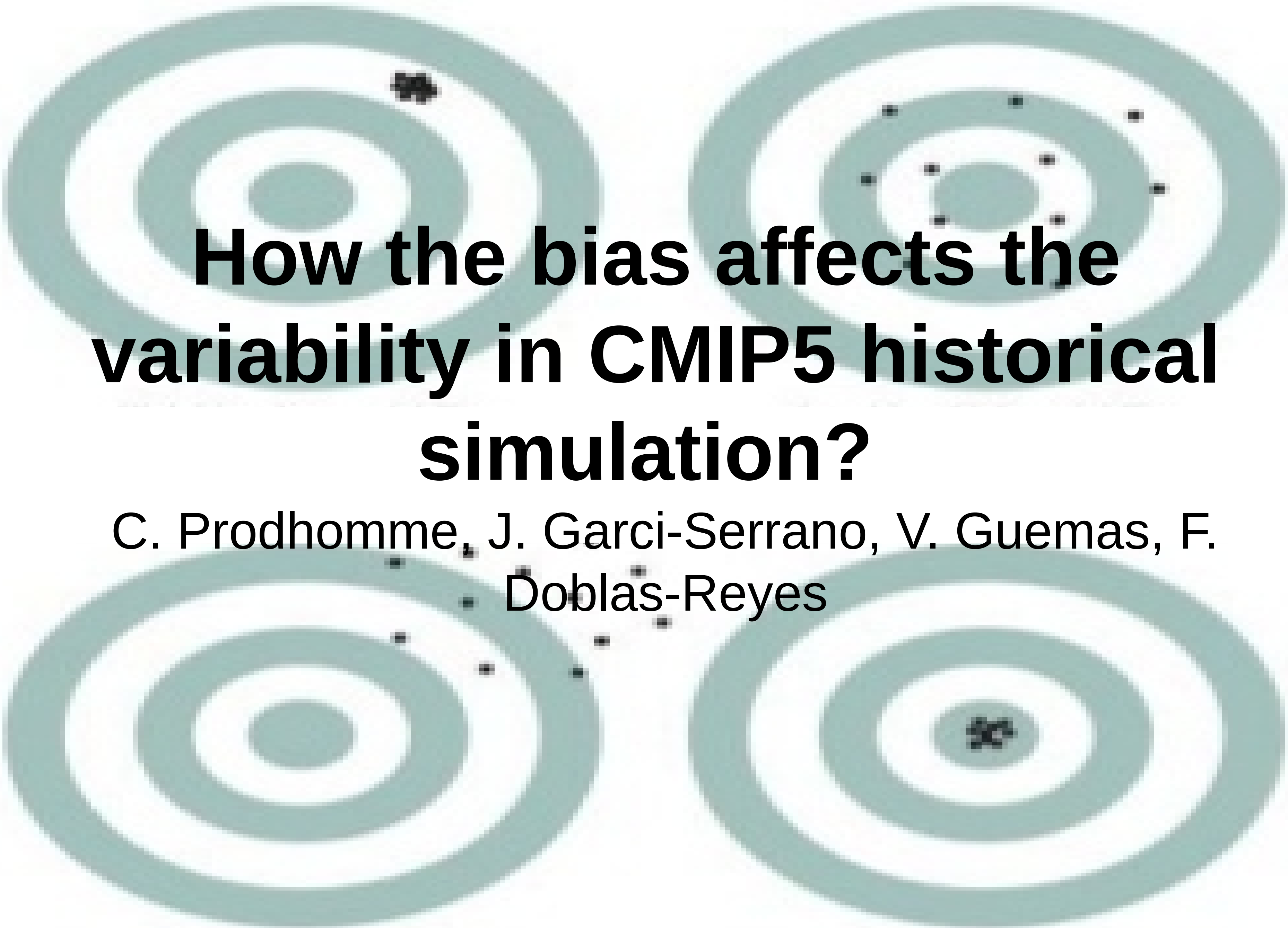


D. Volpi (IC3)

SST skill decadal hindcasts vs historical



D. Volpi (IC3)



How the bias affects the variability in CMIP5 historical simulation?

C. Prodhomme, J. Garci-Serrano, V. Guemas, F. Doblas-Reyes

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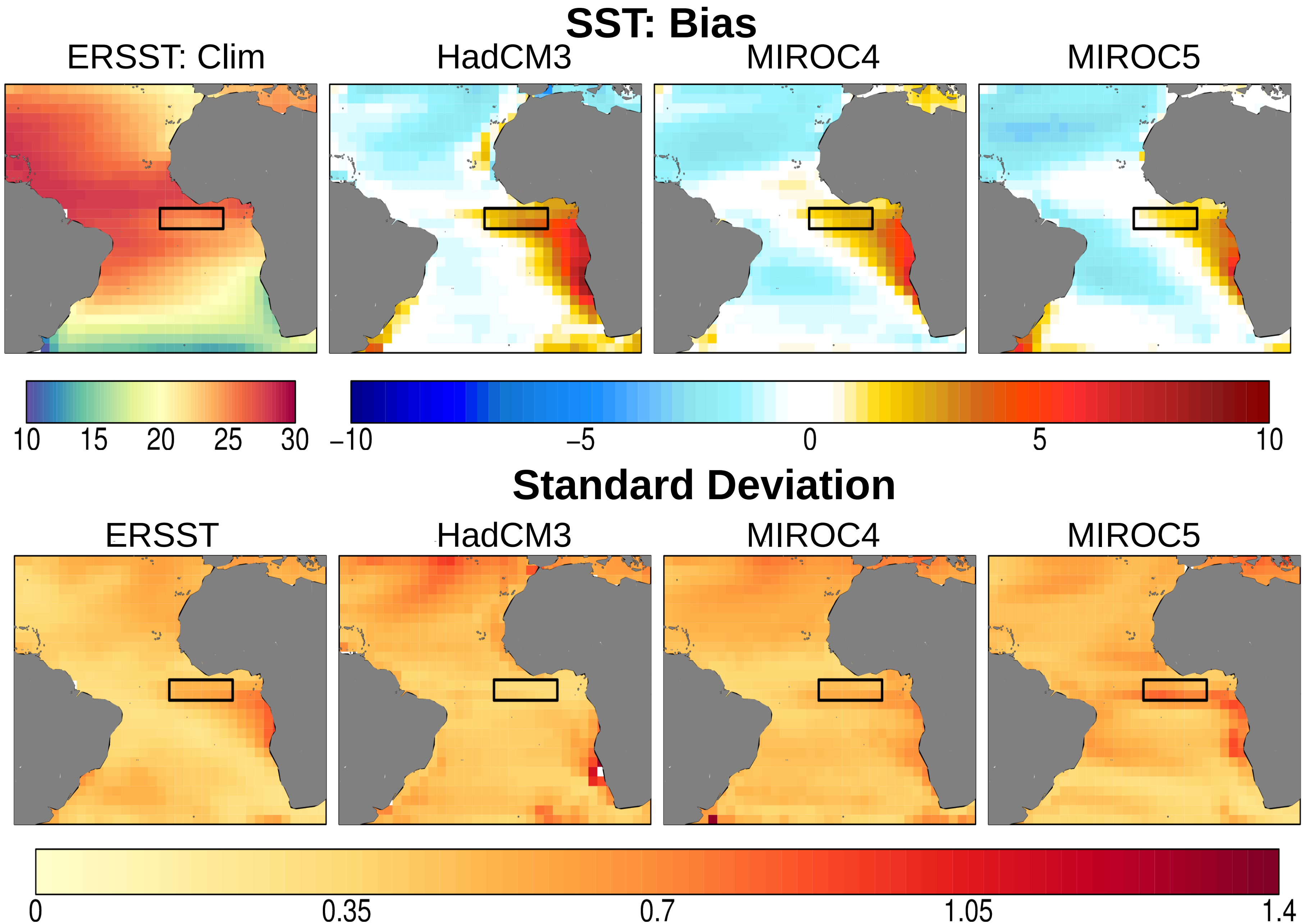
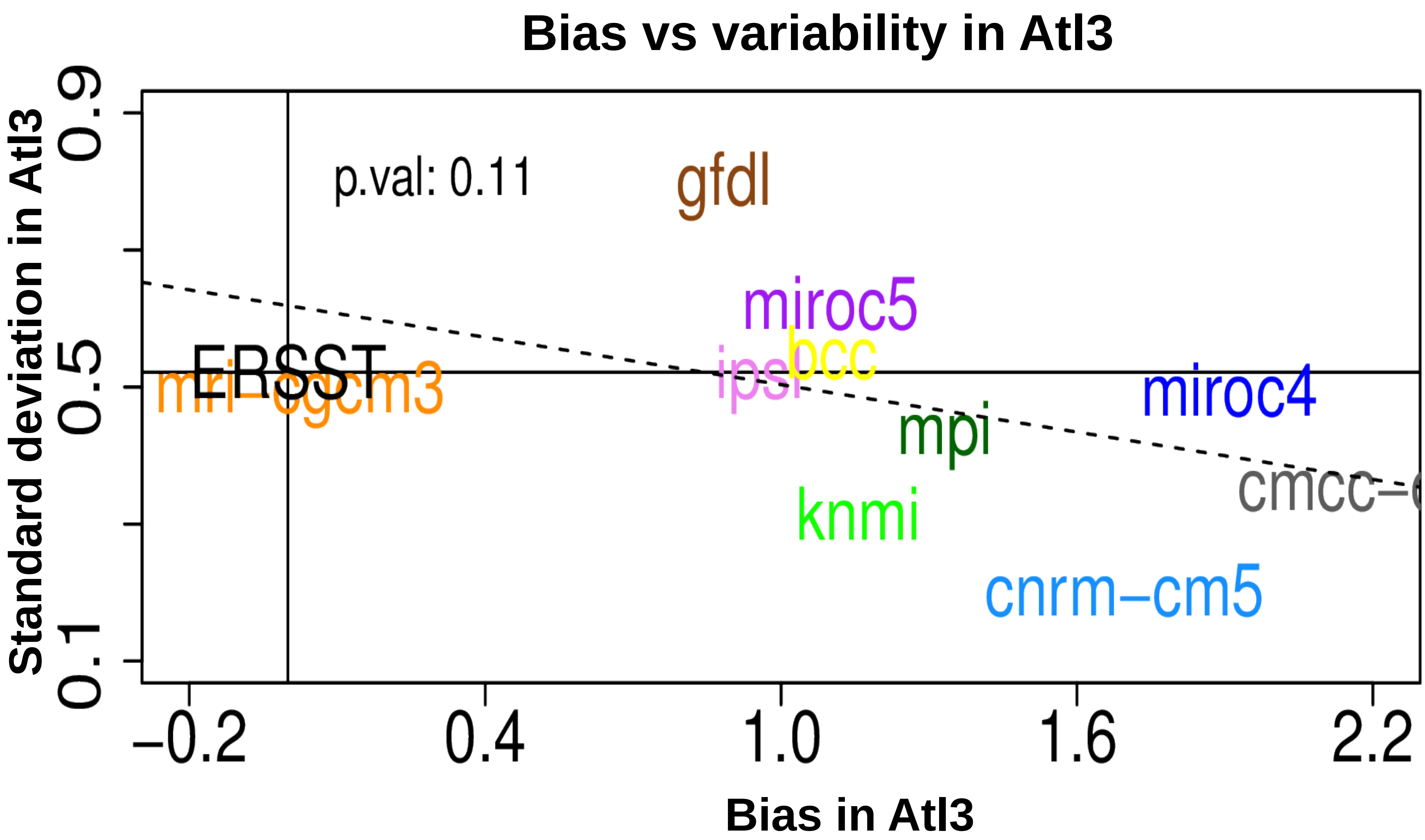
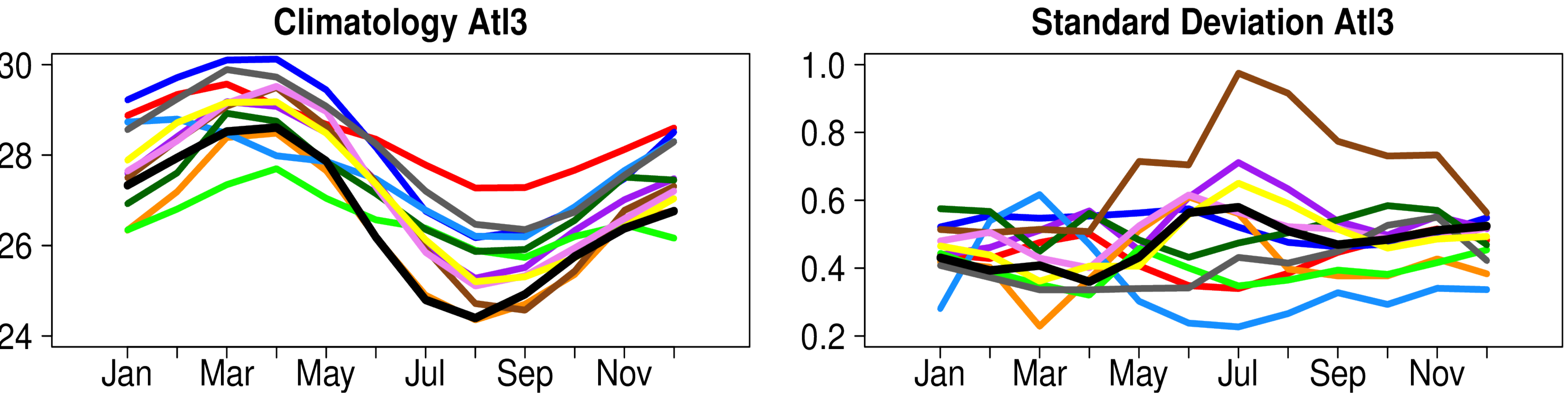
Bias and variability in Summer (JJA)



Bias and variability in Summer (JJA)



Bias and variability seasonal cycle



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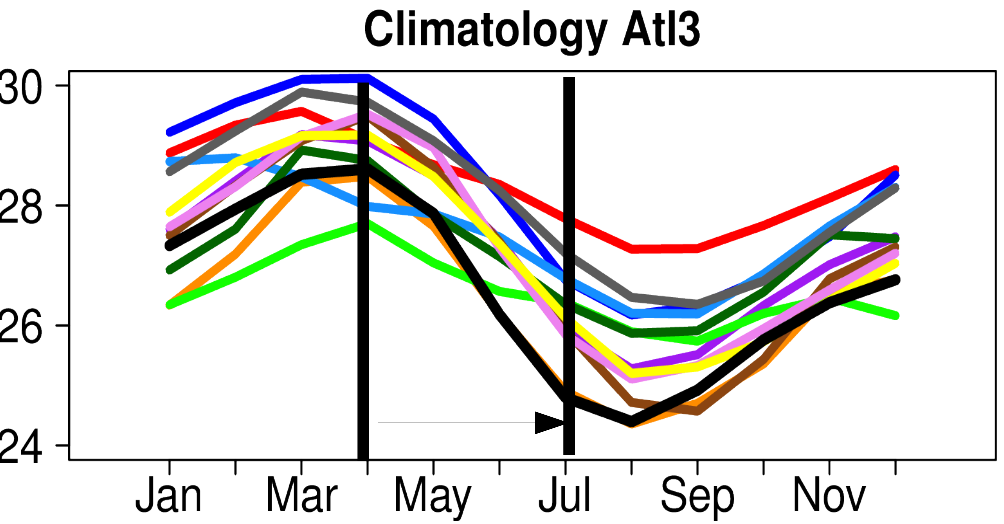
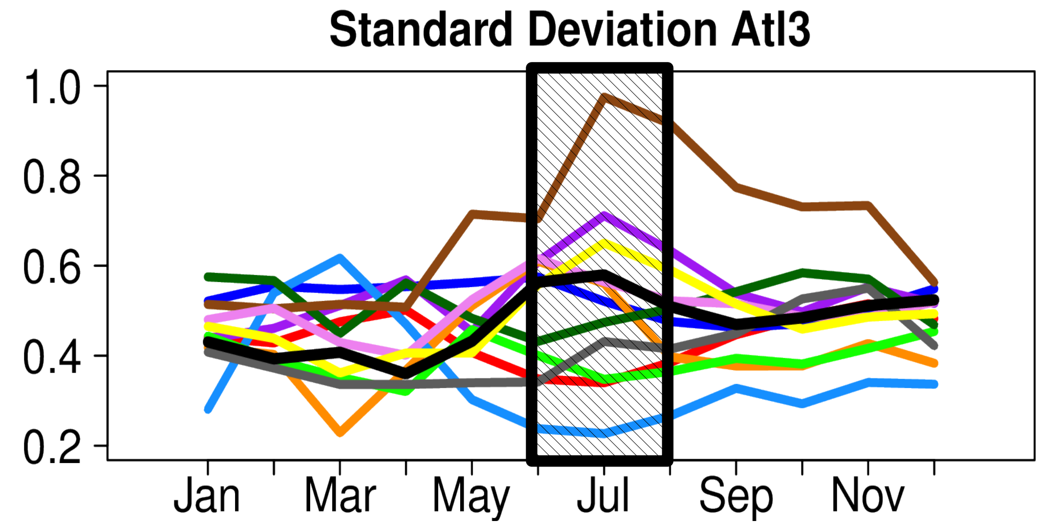
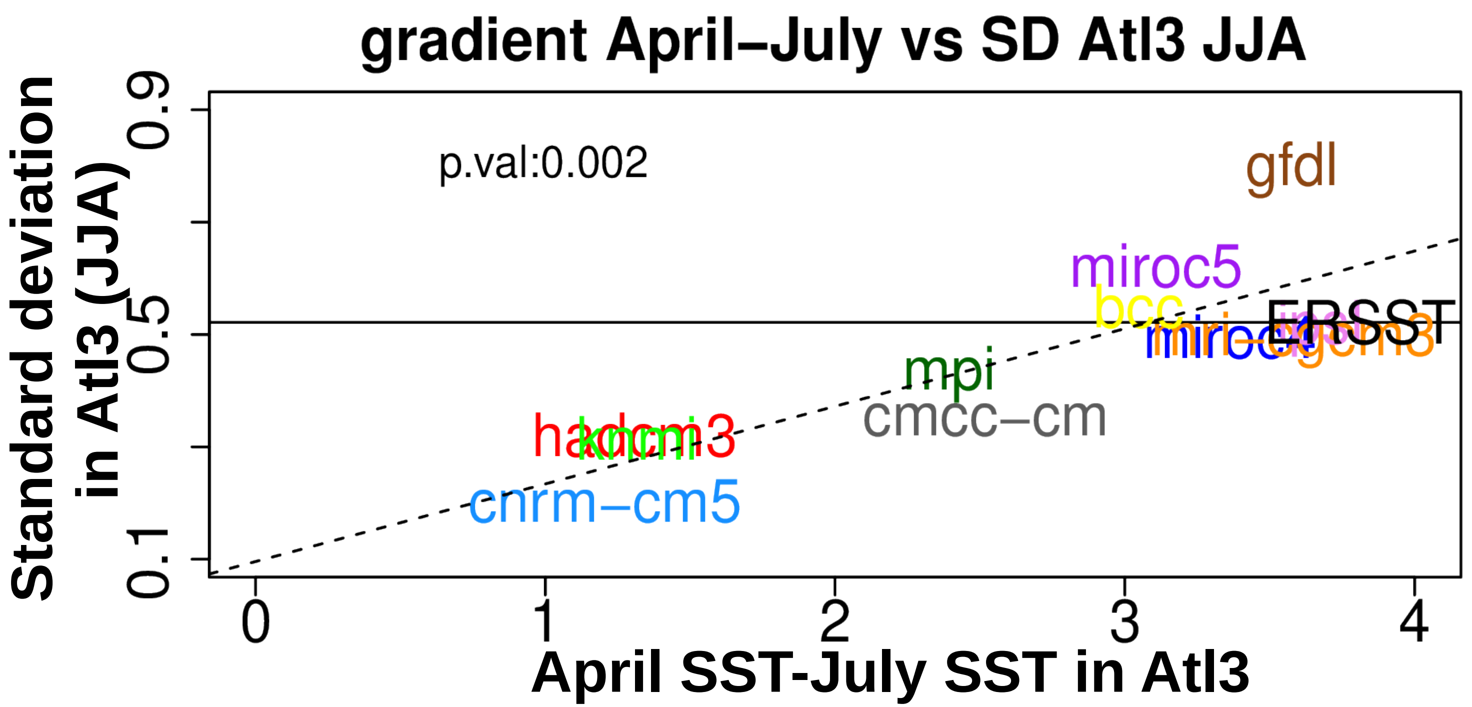
Bias and variability seasonal cycle







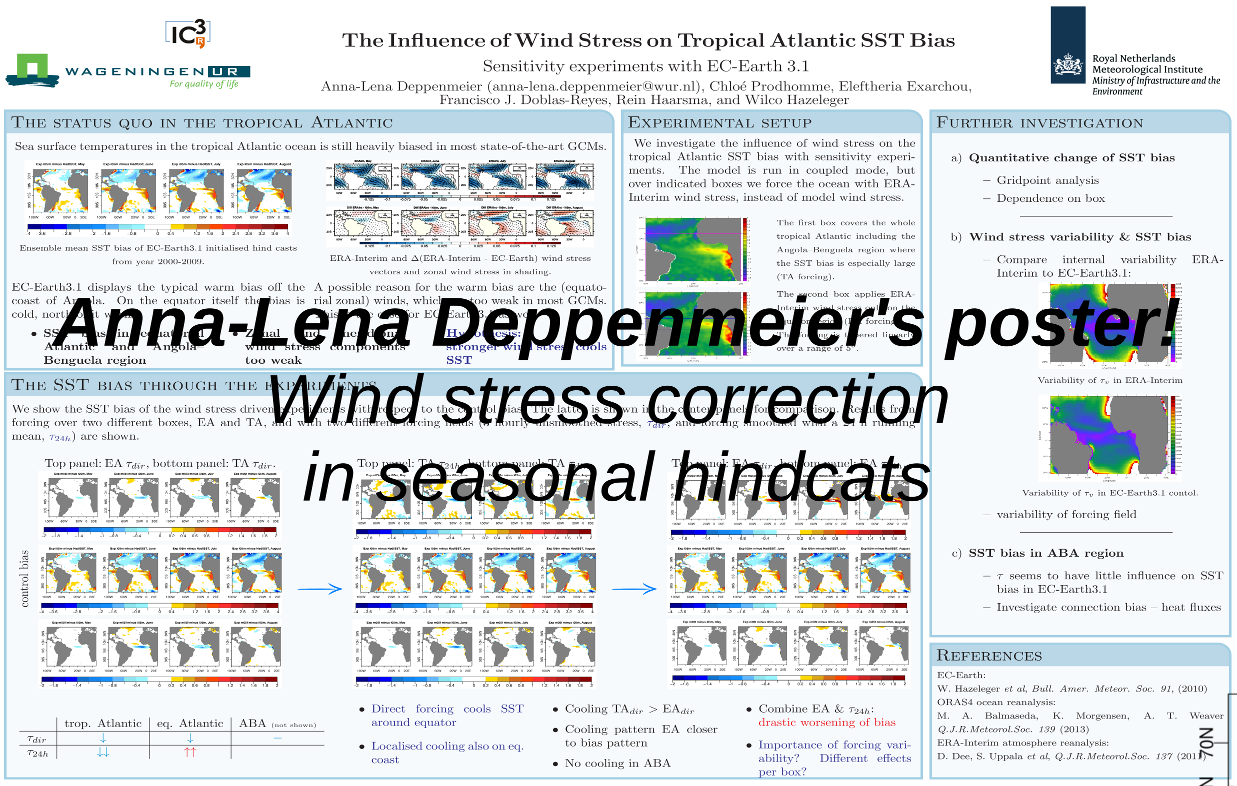
Conclusions

- The bias in tropical Atlantic (TA) is developing **very fast** (during the first year).
- Results suggest an **oceanic origin** of the bias.
- Both decadal hindcasts and historical simulation have **skill up to 10 years** in the TA.
- The initialization does not affects much the skill in the TA after the first year.
- The **interannual variability** in the equatorial Atlantic is linked with the ability of the model to reproduce a **correct seasonal cycle** in the TA.

Prospects

- Investigate the daily time series of oceanic variables in the seasonal hindcasts (temperature and density profiles, MLD...).
- Investigate the robustness and the processes underlying the relationship between interannual variability and seasonal cycle representation.

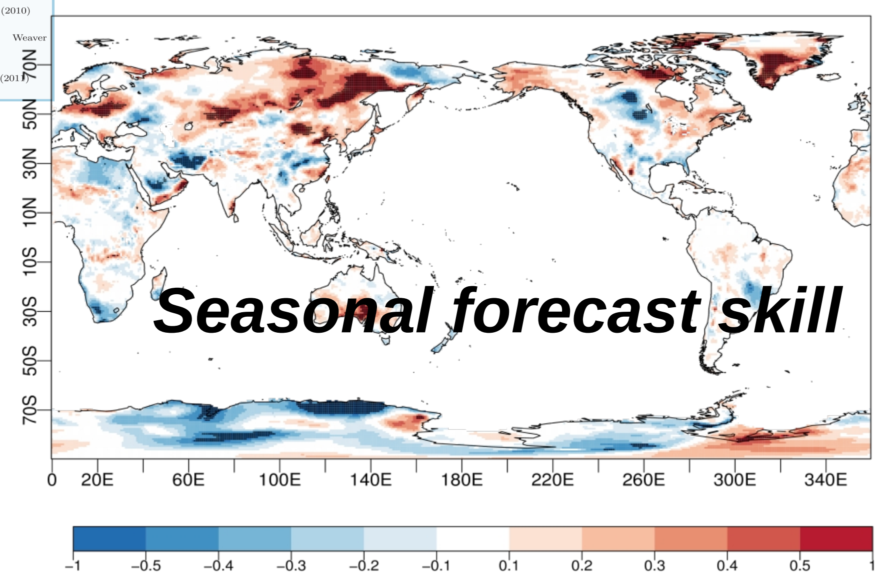
Not shown...



Anna-Lena Deppenmeier's poster!

Wind stress correction in seasonal hindcats

And lot of details......



Seasonal forecast skill

So questions....?

Thanks for your attention!