

Prediction Skill of Winter Precipitation in Coupled Models



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ICTP-IITM-COLA Targeted Training Activity (TTA): Challenge in Monsoon Prediction
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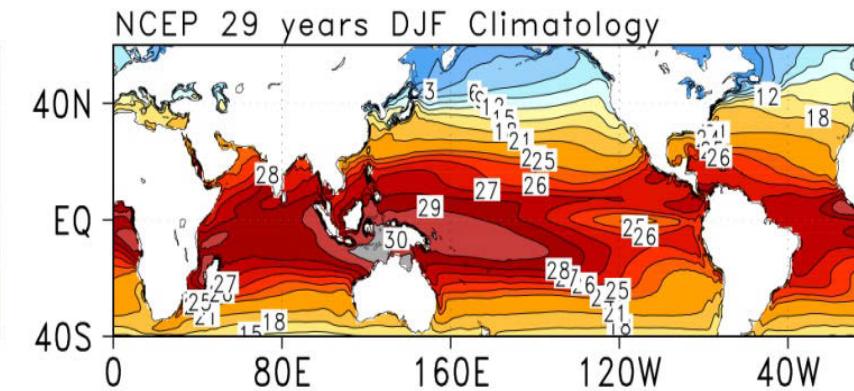
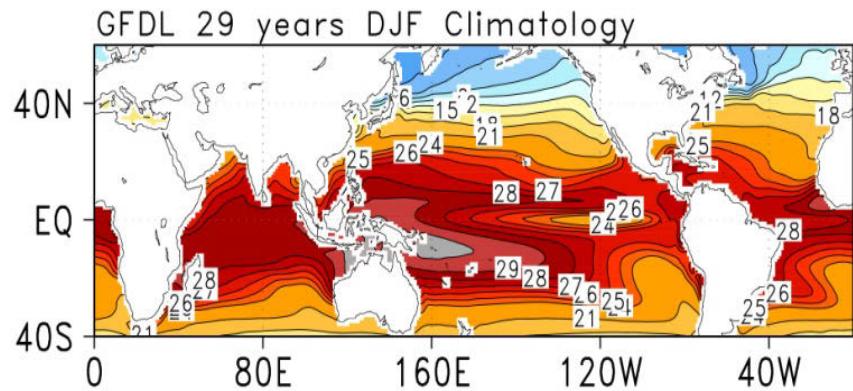
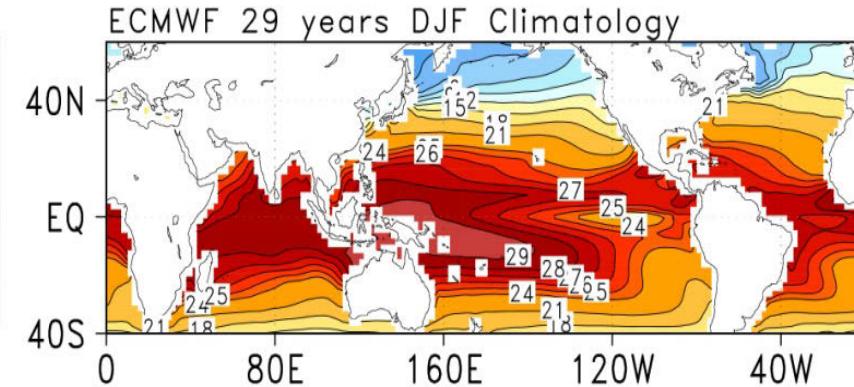
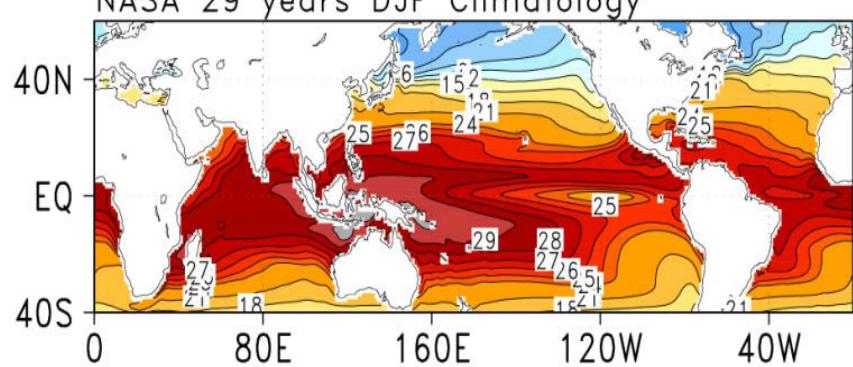
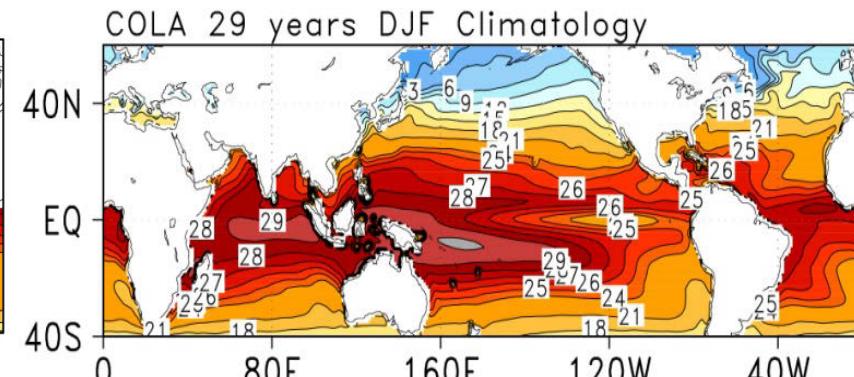
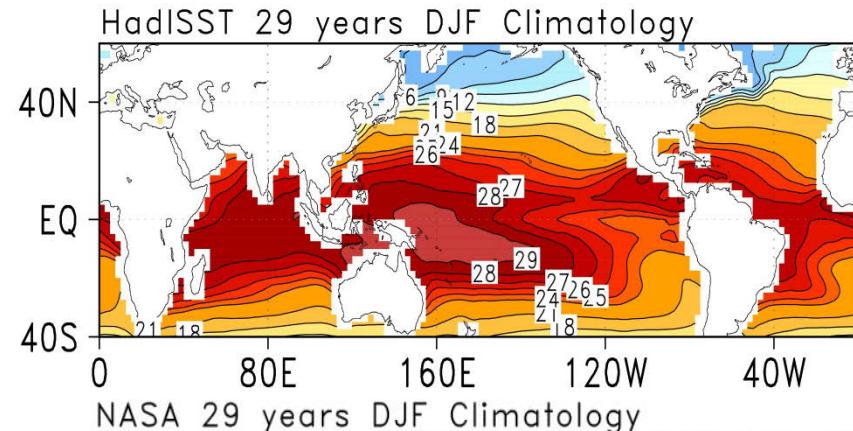
Outline

- Validation of National Multi-Model Ensemble (NMME) and ECMWF prediction system for winter (DJF) Rainfall
- Rainfall relation with Nino3.4, North Tropical Atlantic (NTA) and Indian Ocean Dipole (IOD) index
- Predictability of Coupled Models
 - Predictability is assessed as Signal to Noise ratio.
- Conclusion

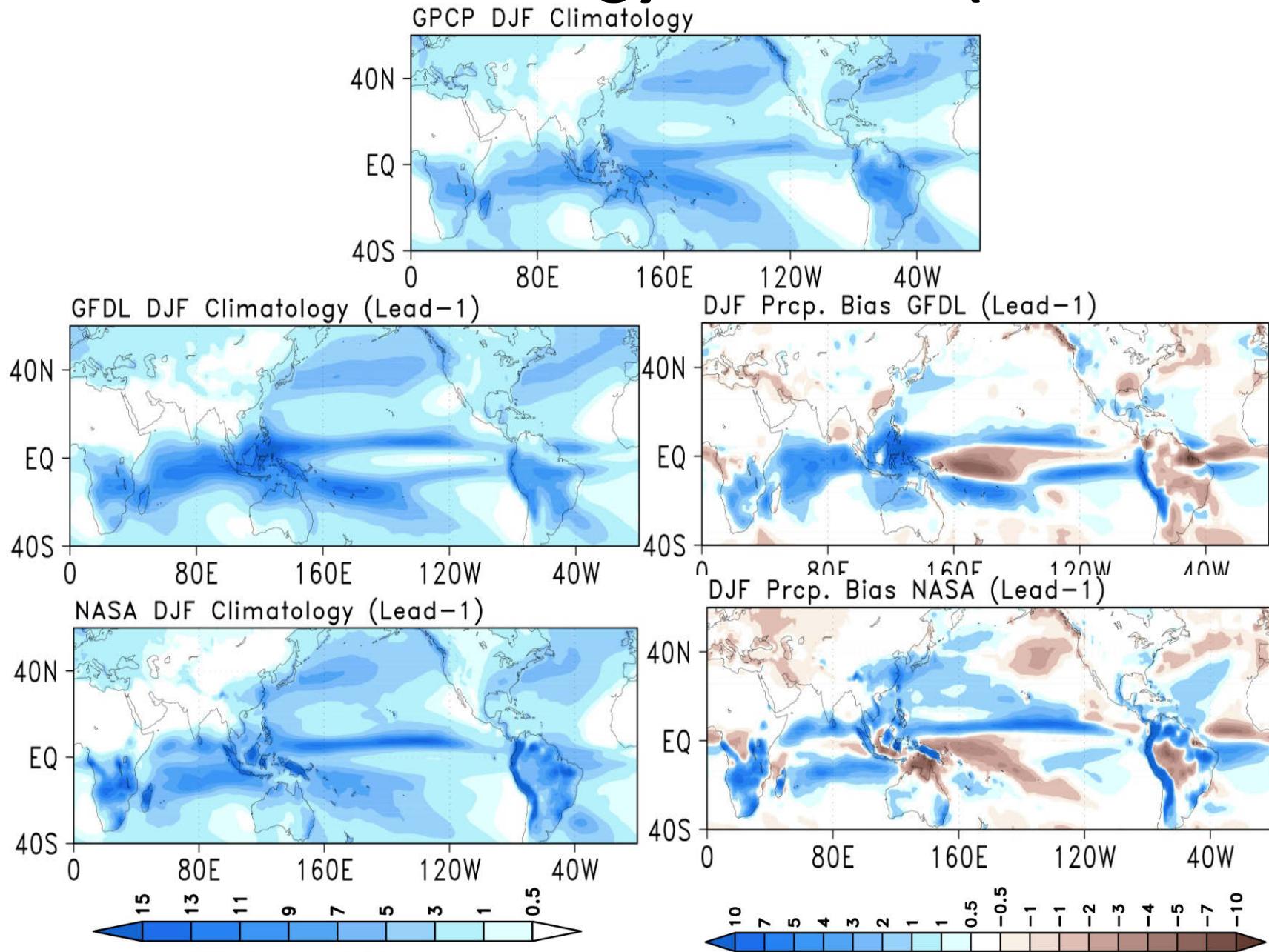
NMME and ECMWF Coupled Models

- NMME Coupled Global Climate Model (CGCM) Seasonal Forecast Models
 - NCEP CFSv2 (24)
 - GFDL CM2p1 (10)
 - NASA GMAO (10)
 - COLA RSMAS CCSM3 (6)
- ECMWF CGCM Seasonal Forecast Model
 - ECMWF-System-4 (15)
- OBSERVED DATASET
 - GPCP (Rainfall)
 - HadISST (SST)
- Period: 1982-2010 (29 years) forecasts
 - **Initialized:** 1 Nov. of each year

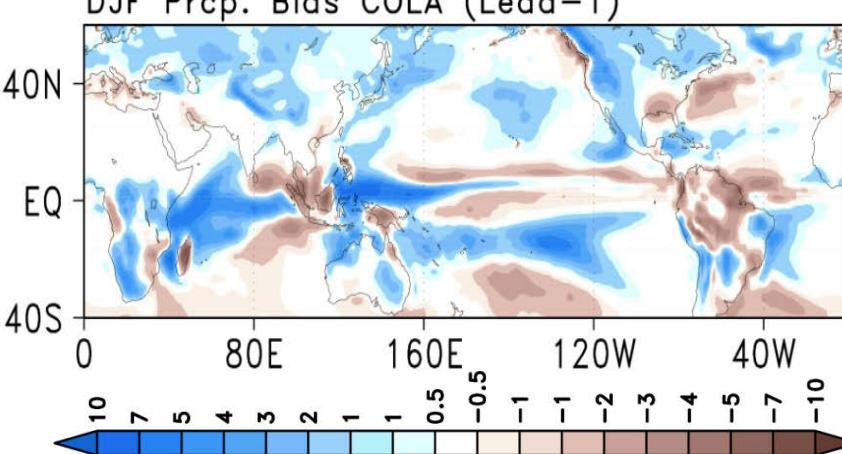
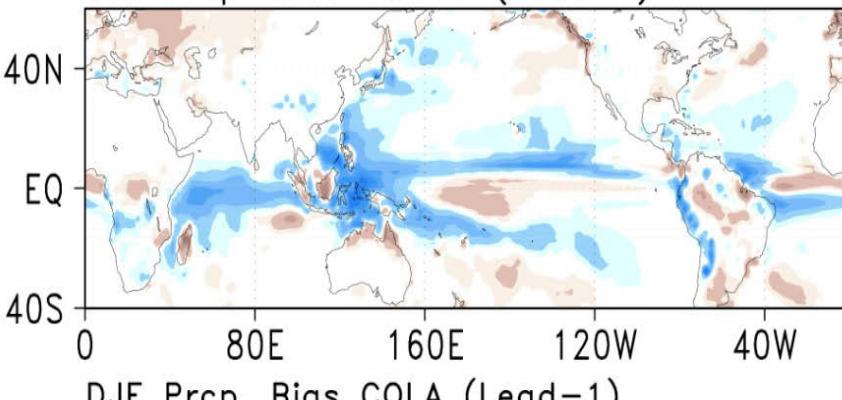
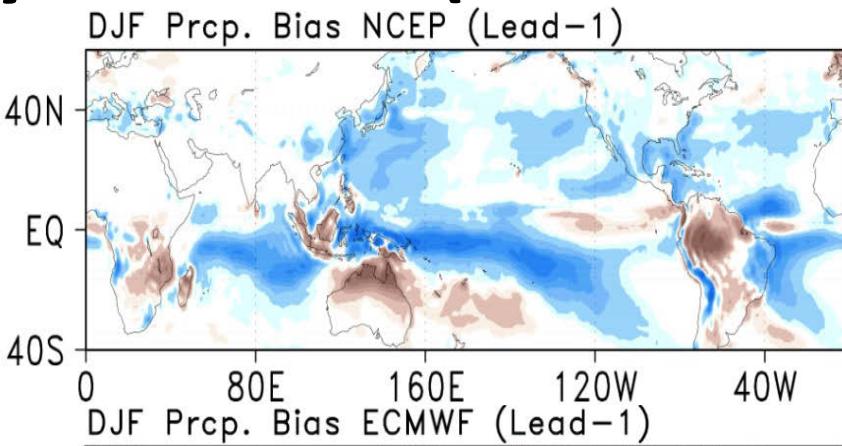
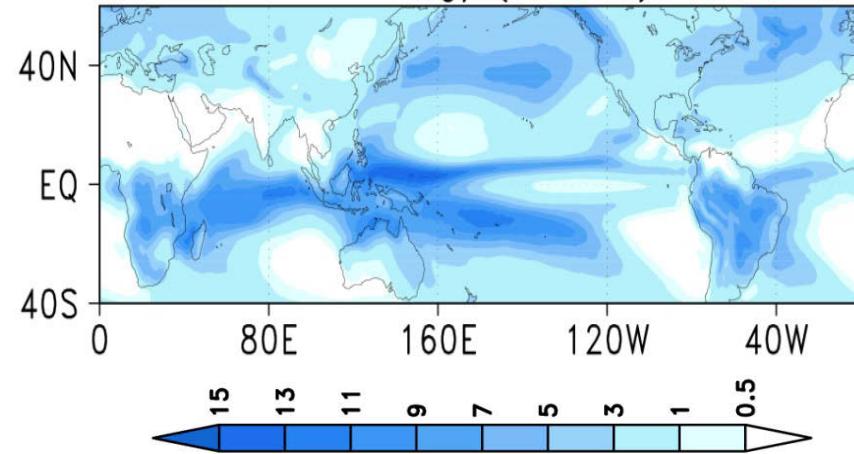
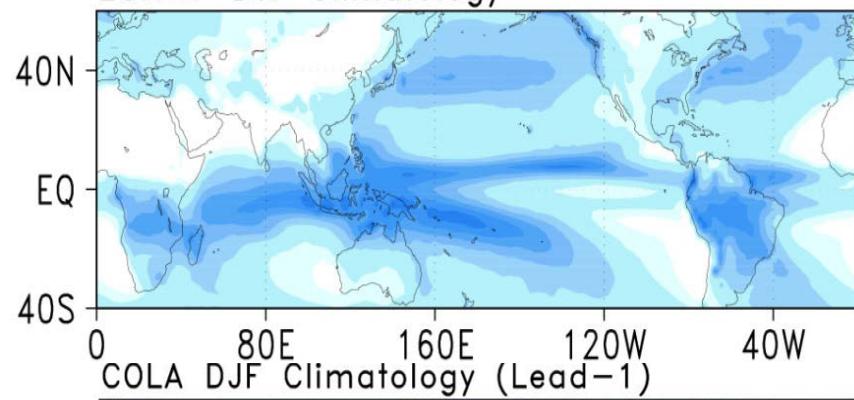
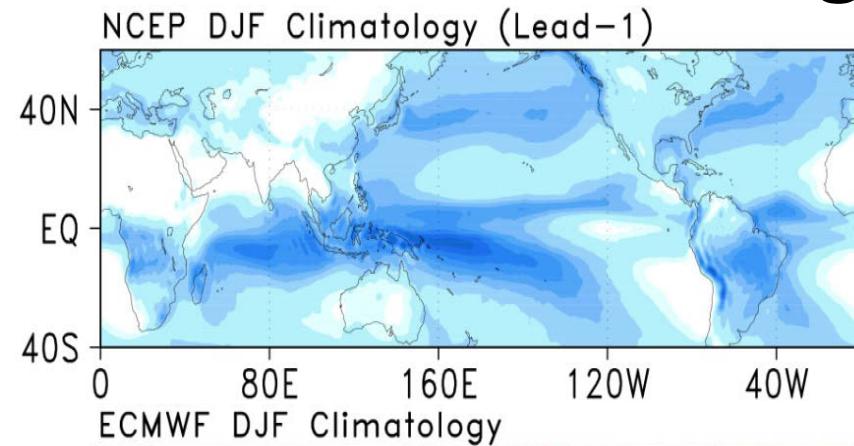
SST – DJF Climatology (1982-2010)



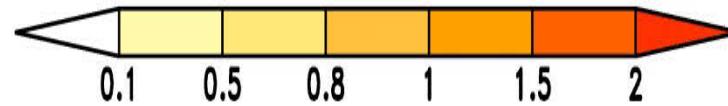
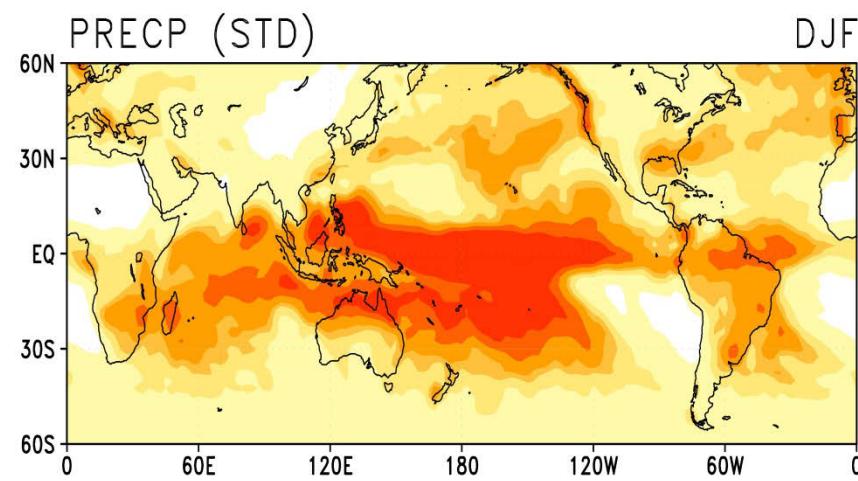
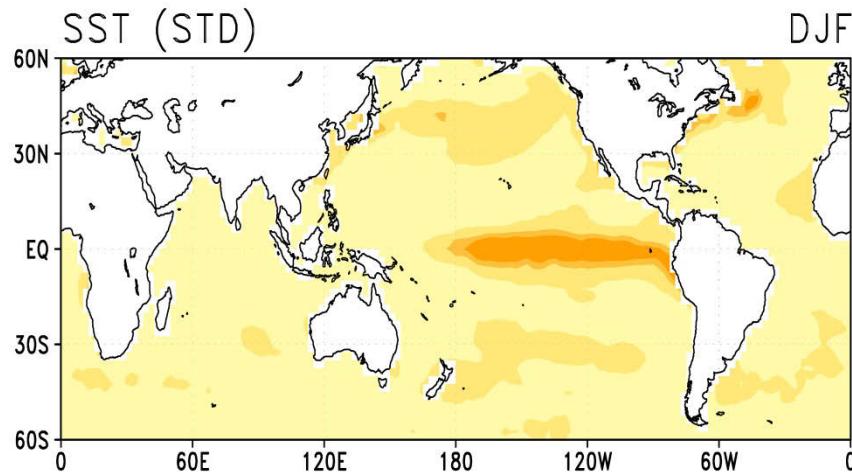
PRCP – DJF Climatology and BIAS (1982-2010)



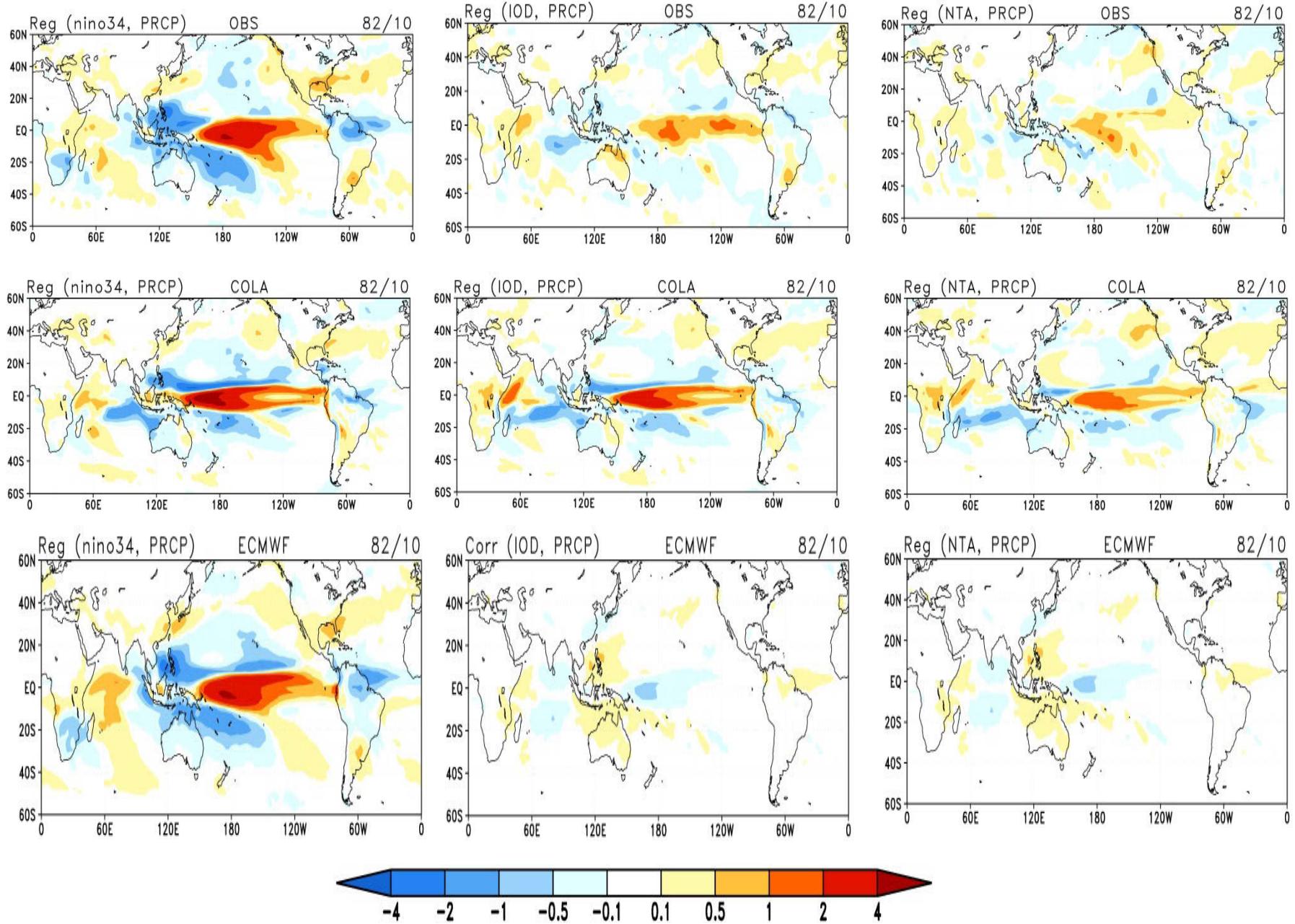
PRCP – DJF Climatology and BIAS (1982-2010)

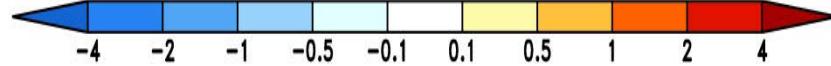
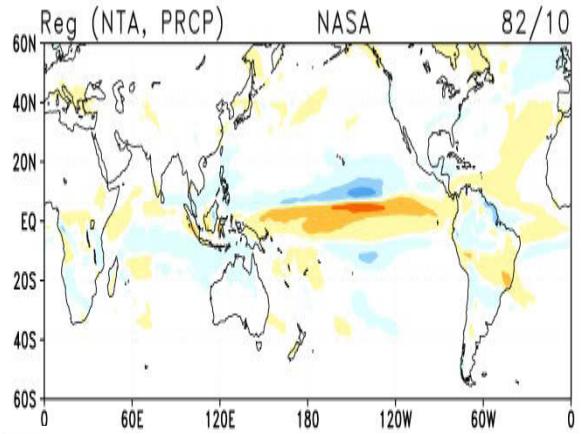
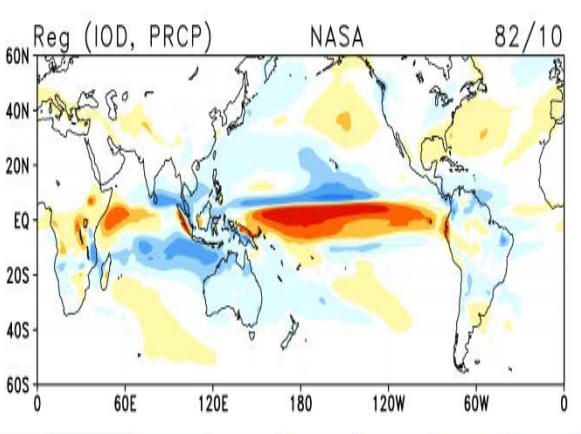
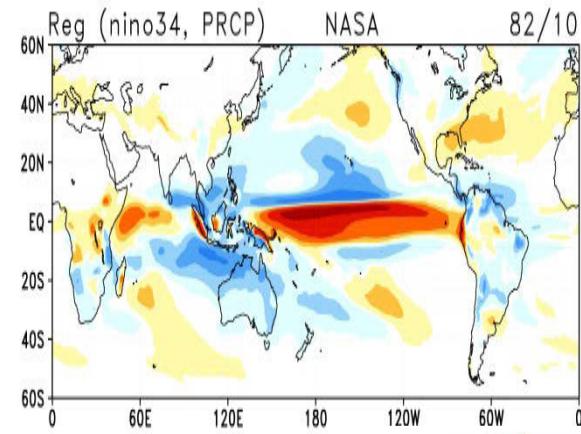
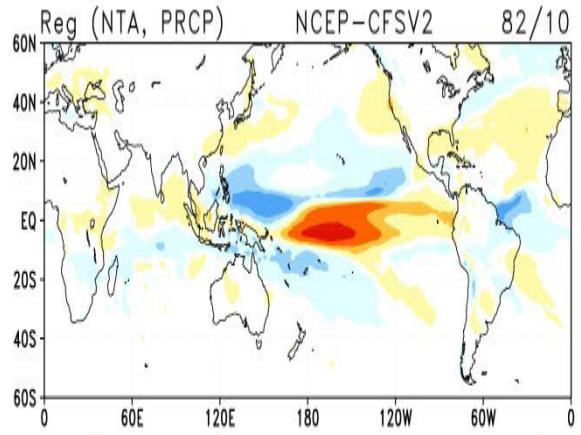
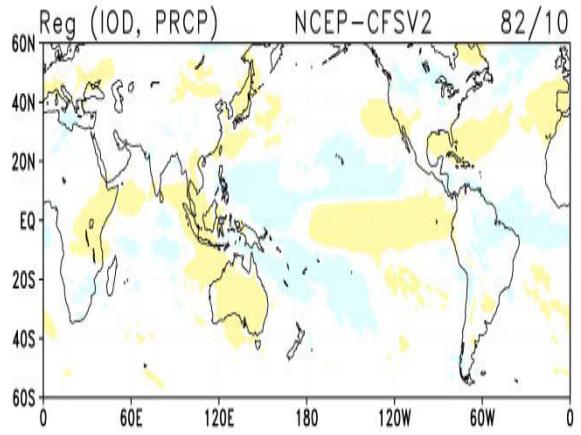
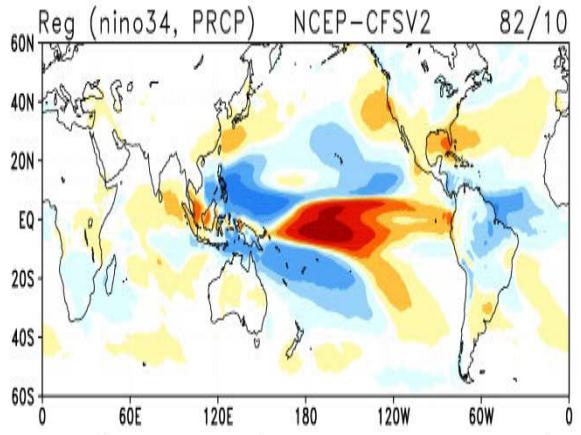
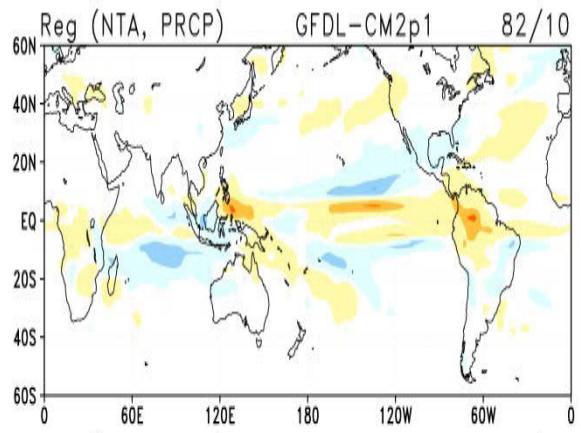
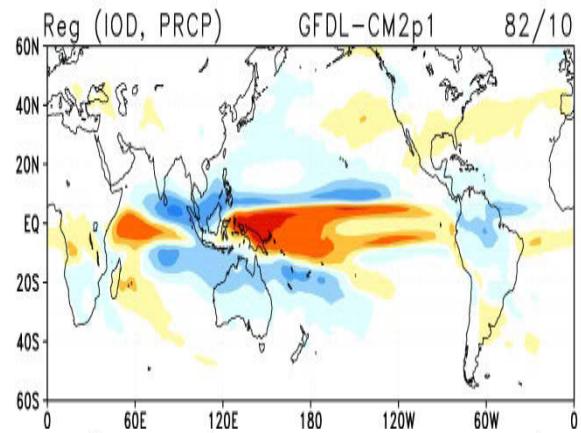
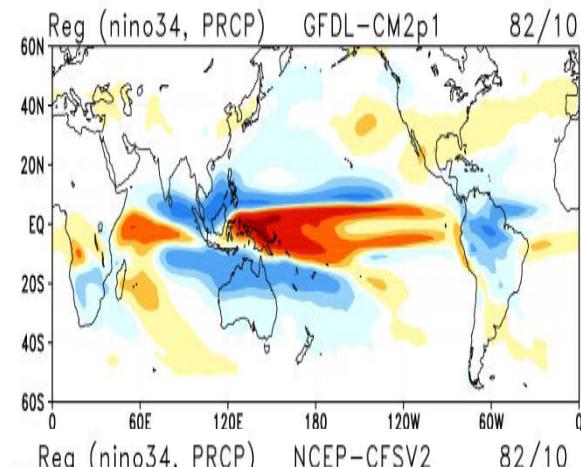


Inter-annual Variability of SST and Precipitation

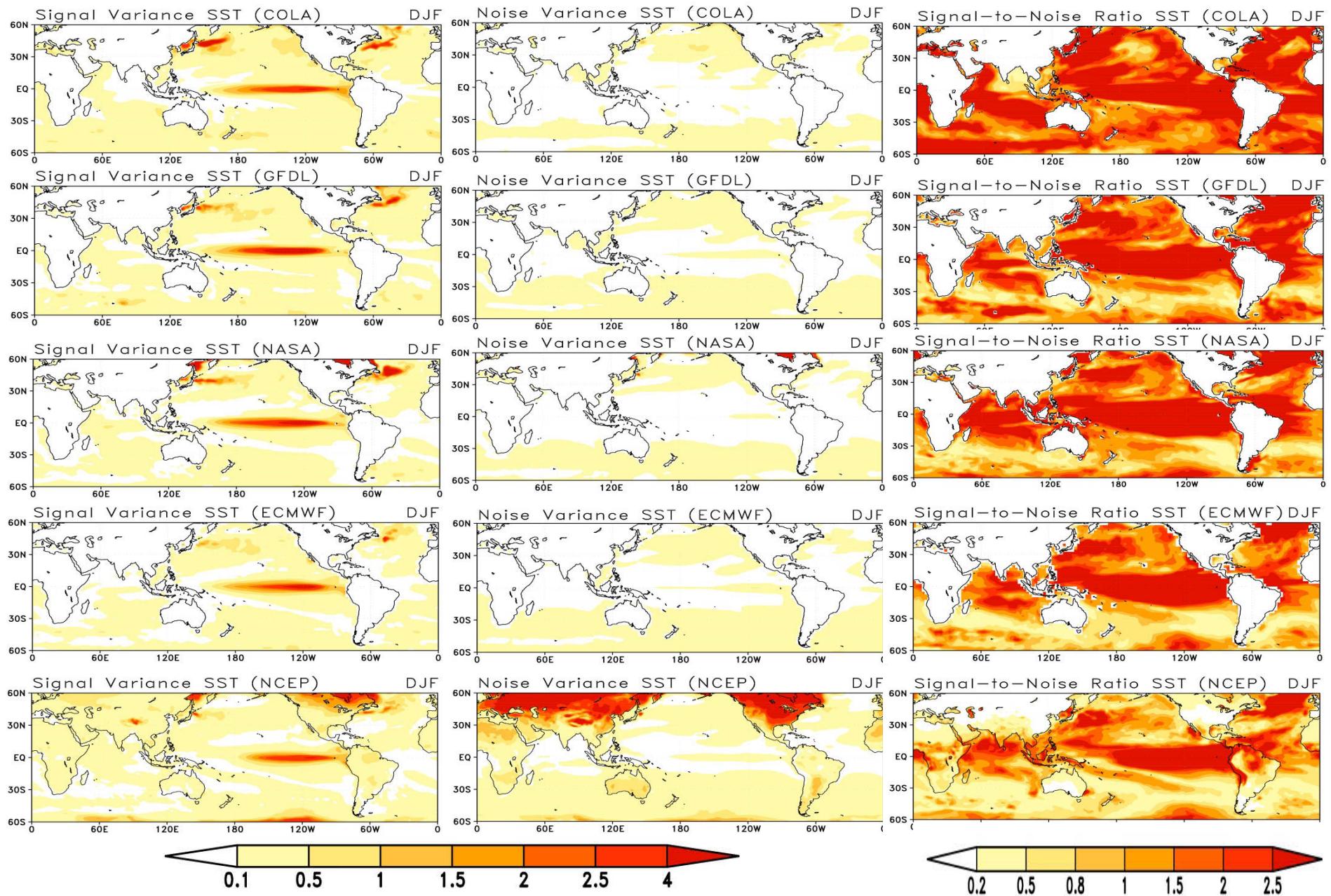


Precipitation and SST Regression

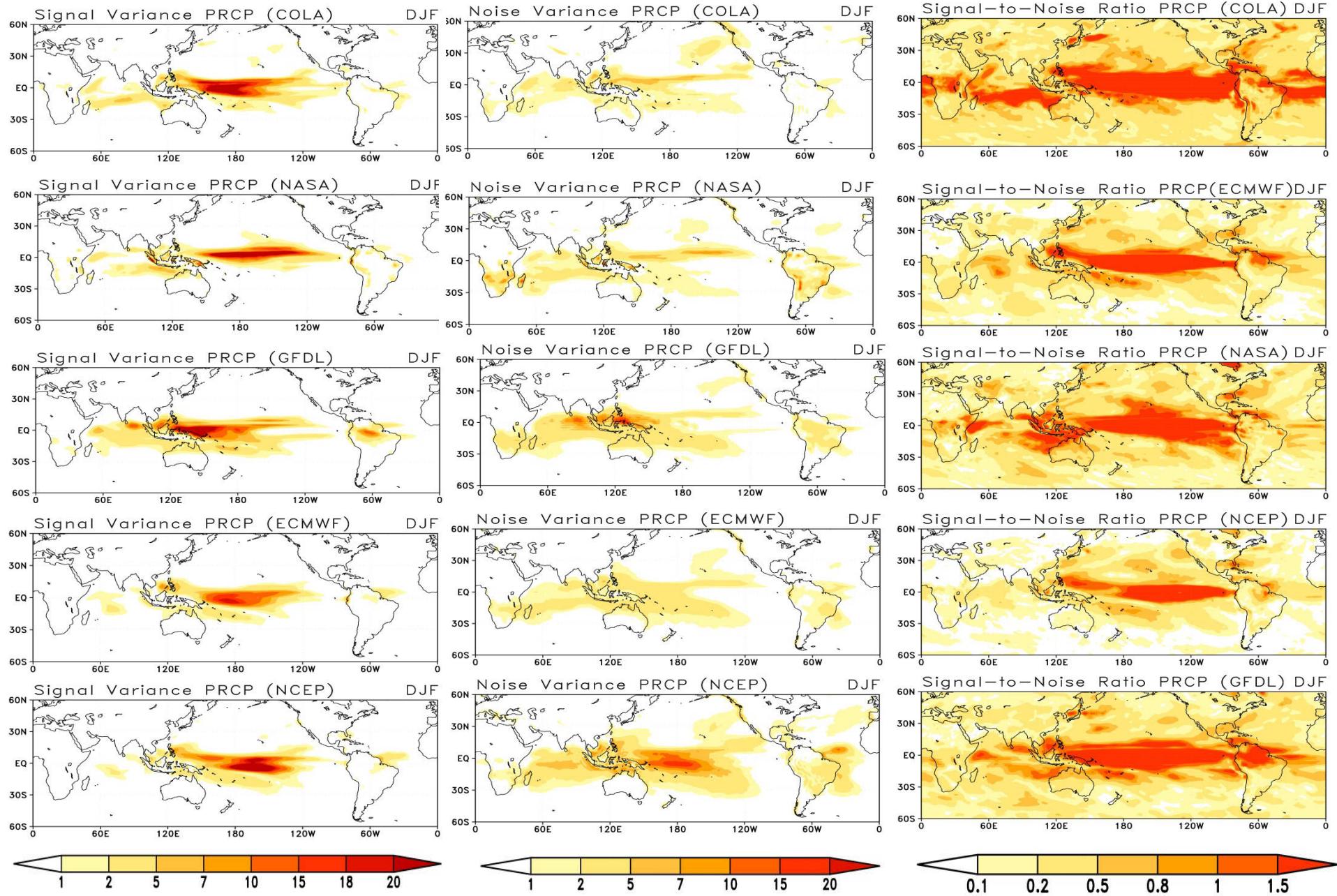




SST: Signal, Noise and S/N Ratio

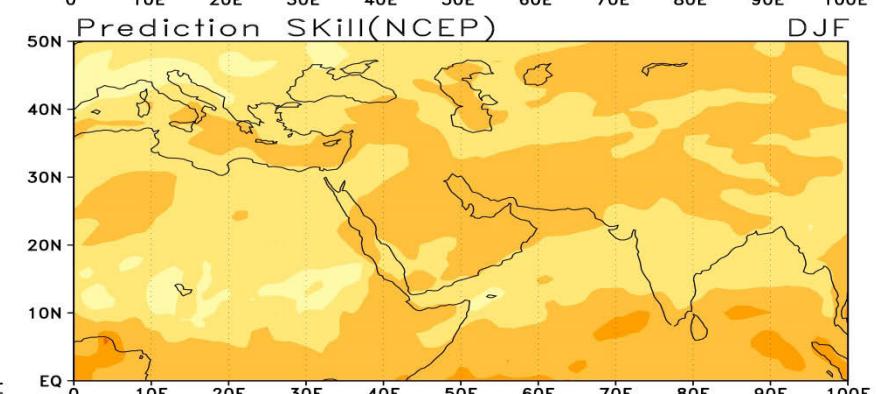
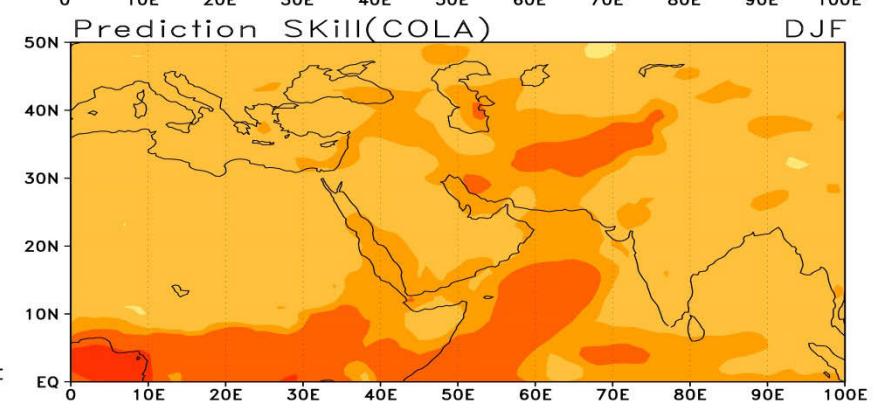
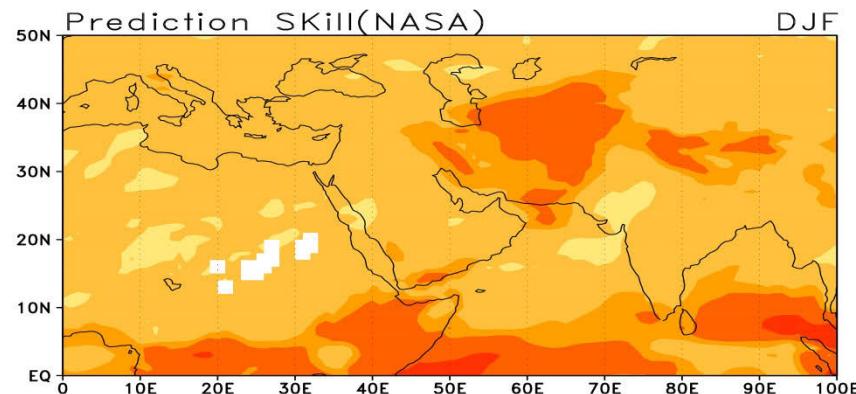
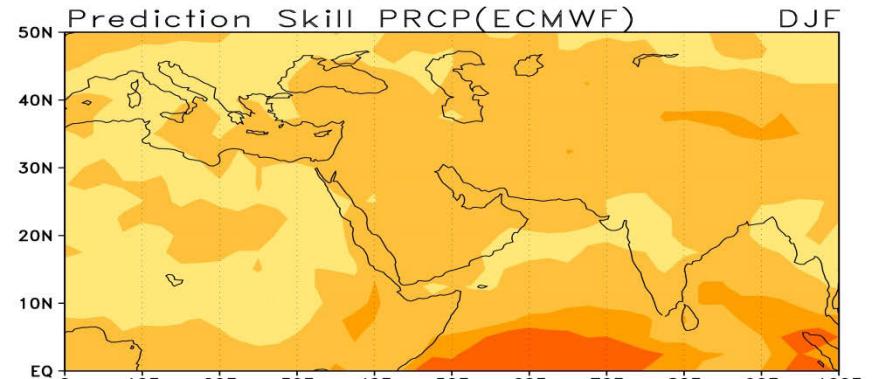
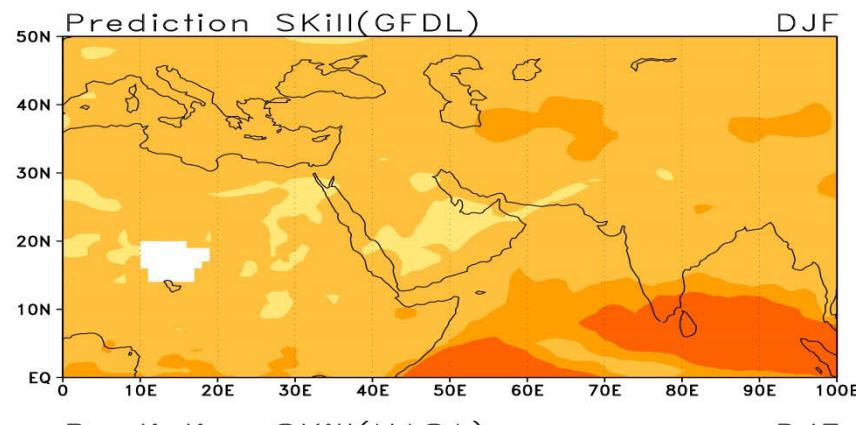


PRCP: Signal, Noise and S/N Ratio

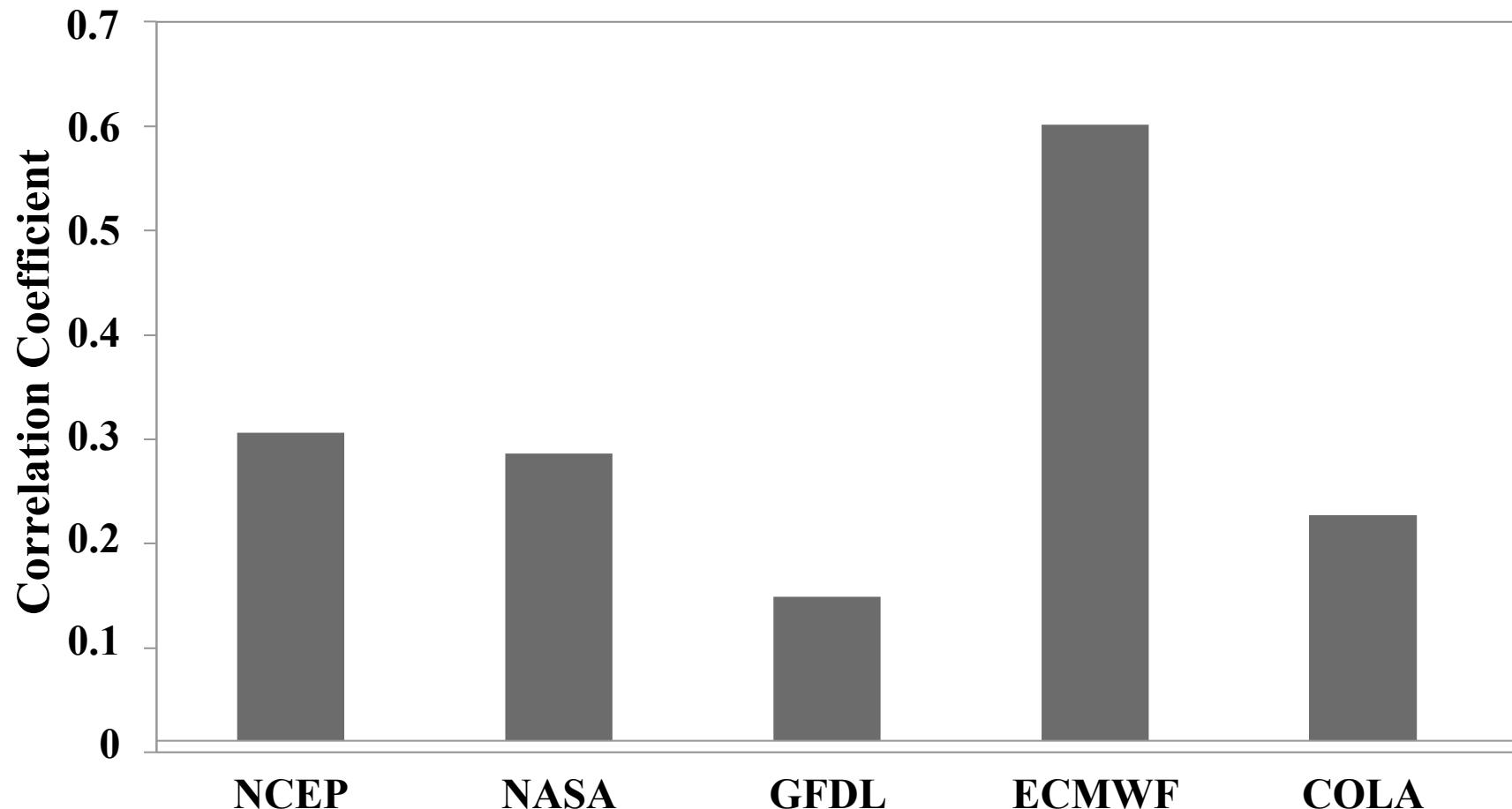


Predictability Limit

$\sqrt{\text{signal} / \text{total}}$



Anomaly Correlation of Rainfall (observed and Model) over Arabian Peninsula (AP) Region [12:32 N; 30:60 E]

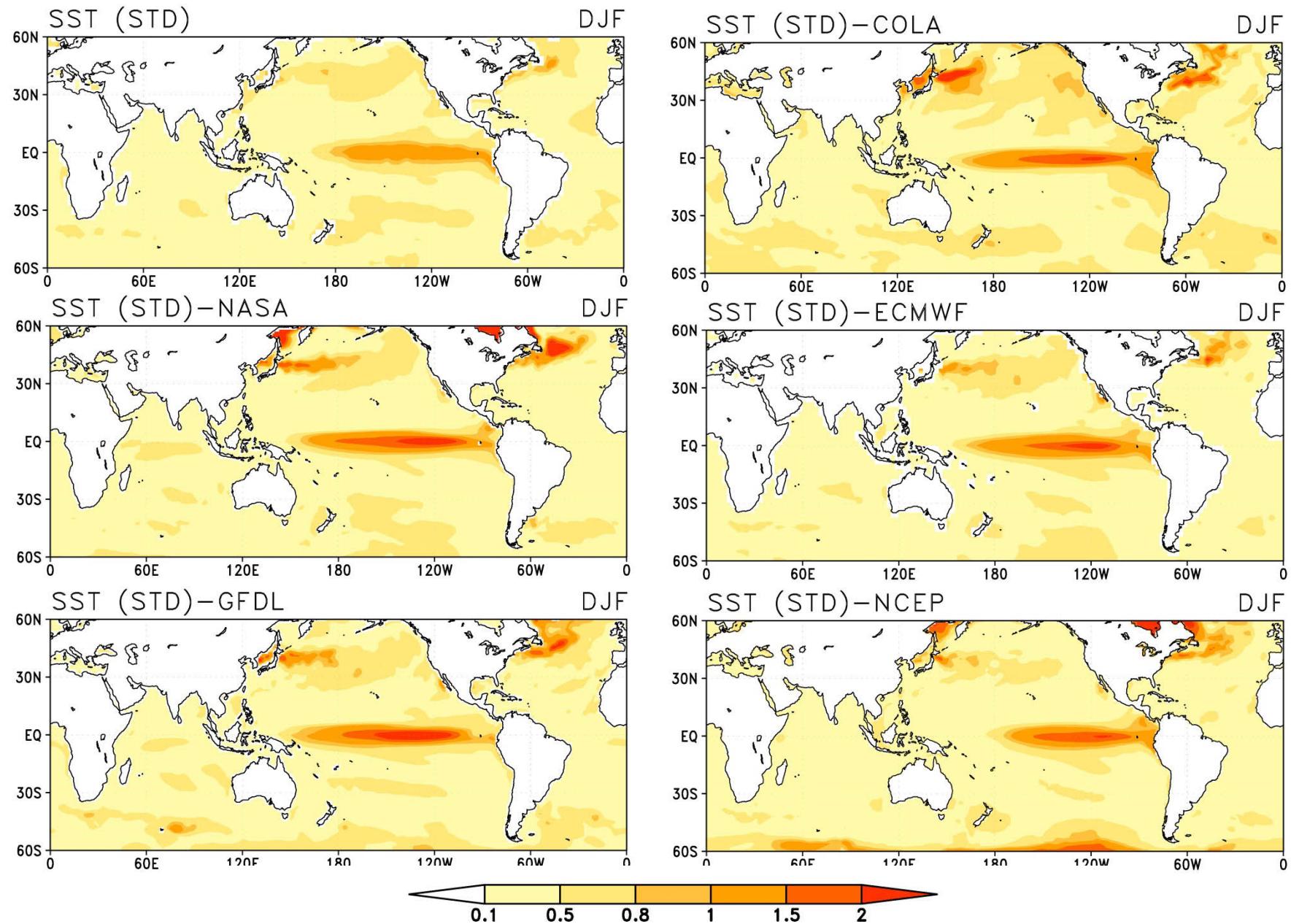


Conclusion

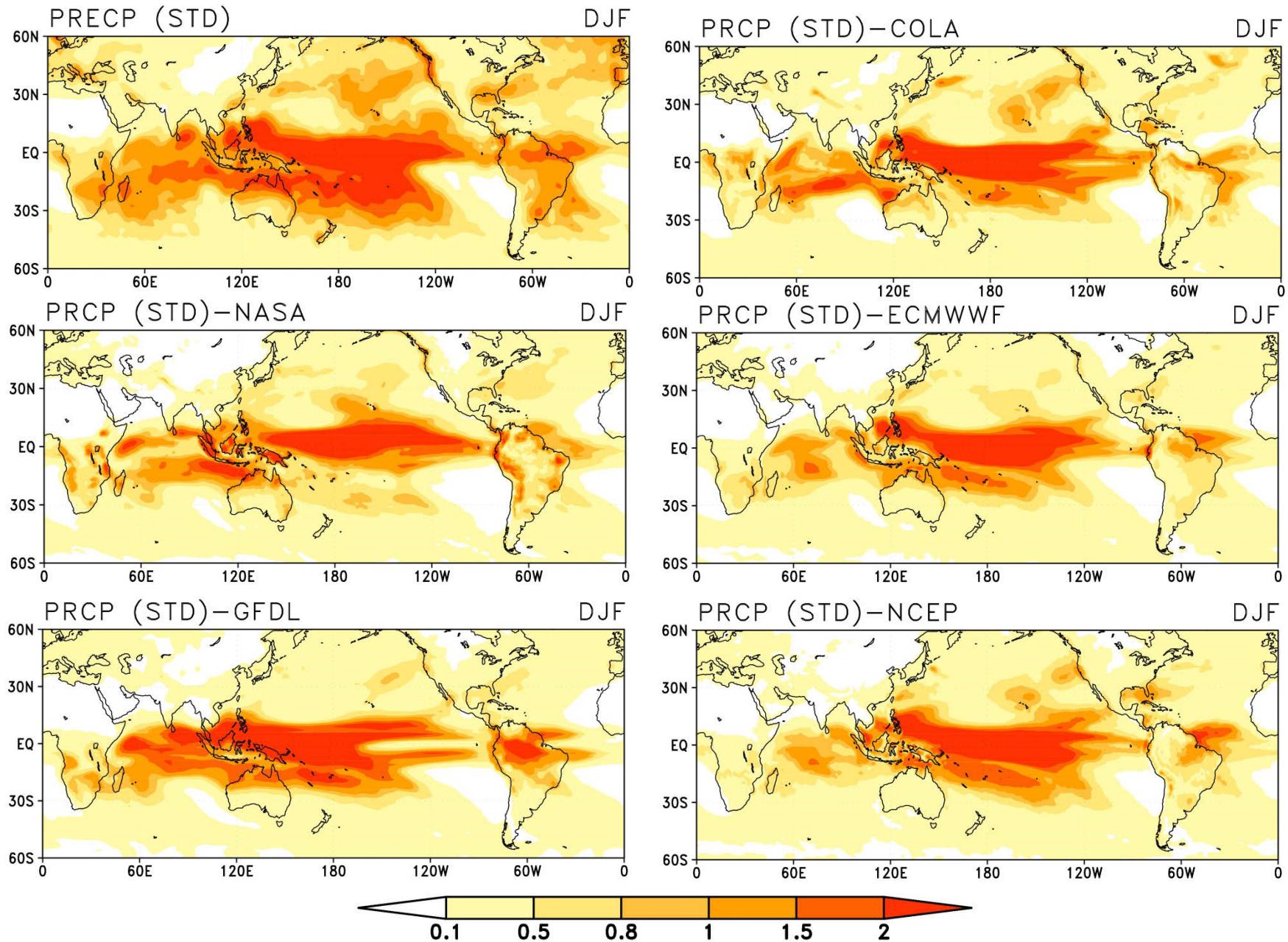
- Prediction skill over the global as well as AP is mostly related Nino3.4 region
- It is noted that ECMWF has the better prediction skill over AP region compared to other regions.
- More investigation is needed to understand the teleconnection mechanism of Precipitation over AP region.

Thanks!

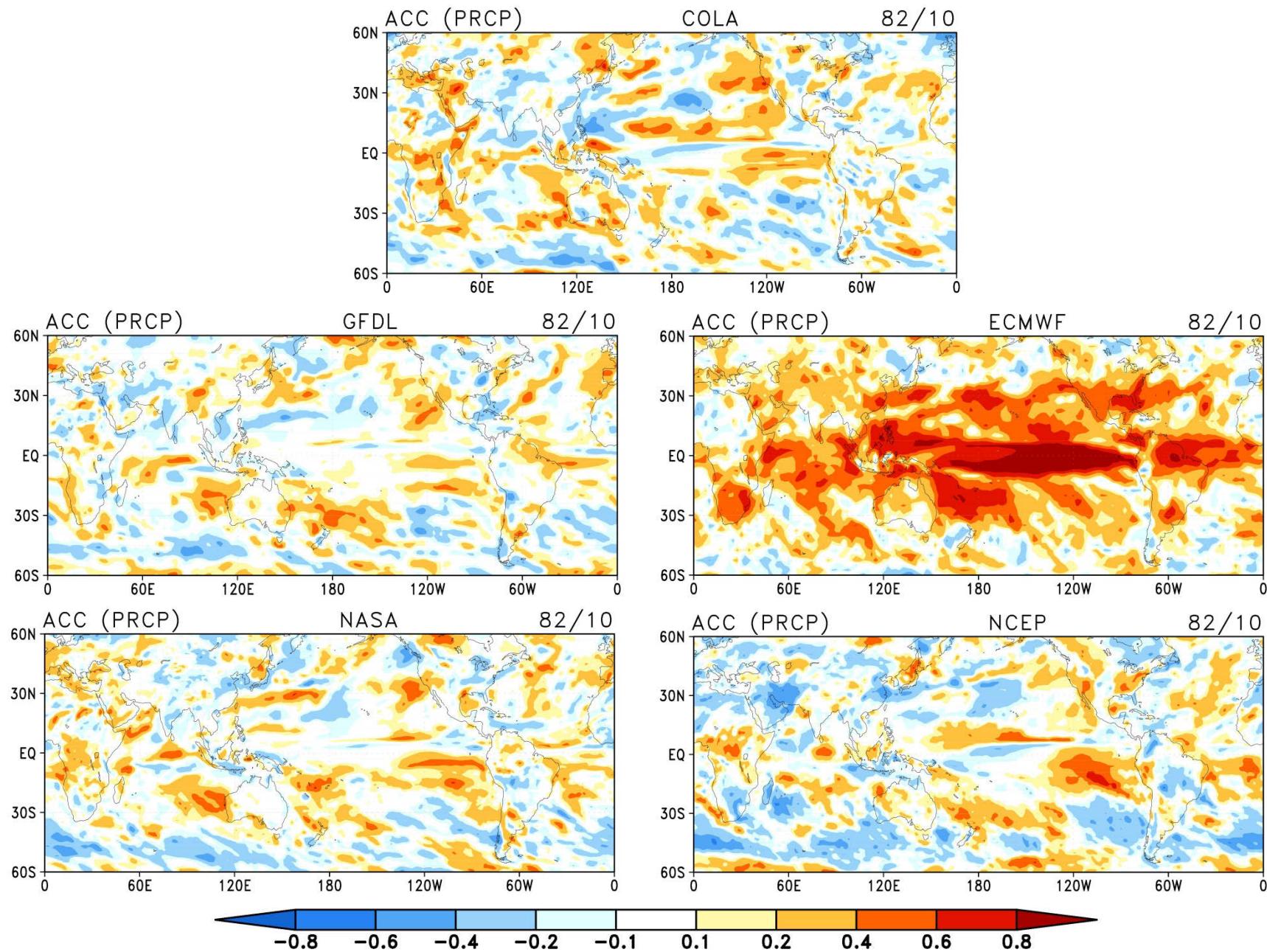
SST: Standard Deviation



PRCP: Standard Deviation



ACC – PRCP



Correlation Maps

