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Oceanic forcings of the interdecadal variability in East Asian summer rainfall

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Data

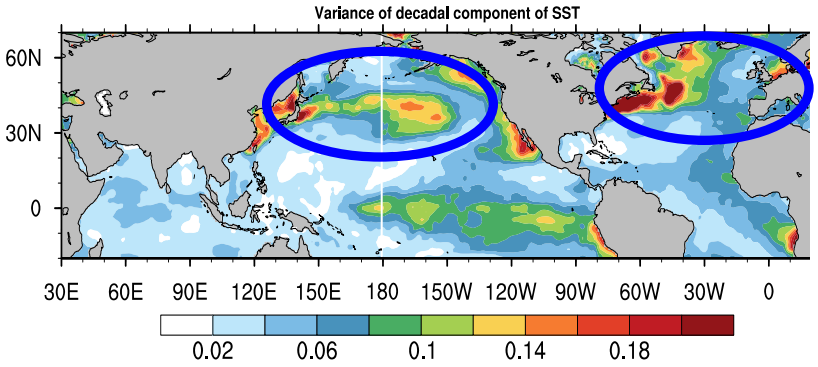
SST : HadISST, 1871-2011;

Rainfall : Combined instrumental measurements and historical record from China , 1880-2011 (Wang et al. 2002);

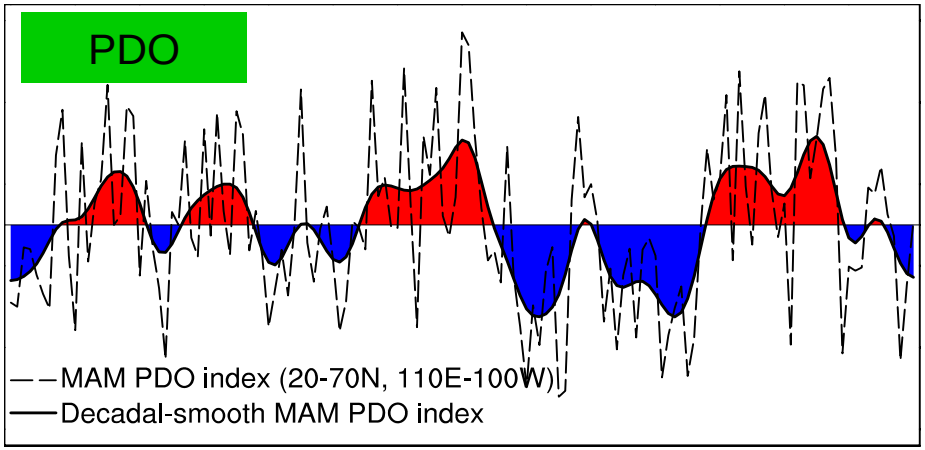
Geopotential Height, Wind: NOAA 20th-century reanalysis (V2), 1871-2011.

Motivation

Variance of interdecadal component of SST



PDO

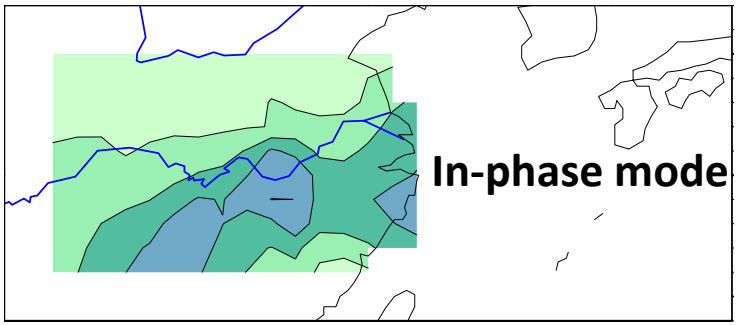


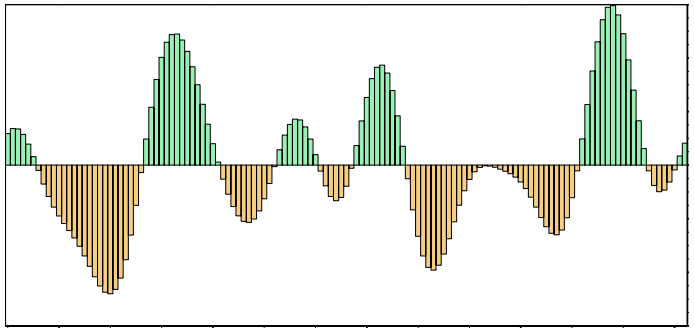
AMO

th MAM AMO index

Trenberth and Shea, 2006

The leading two EOF modes of decadal-filtered summer (JJA) rainfall in East China for 1880-2011.

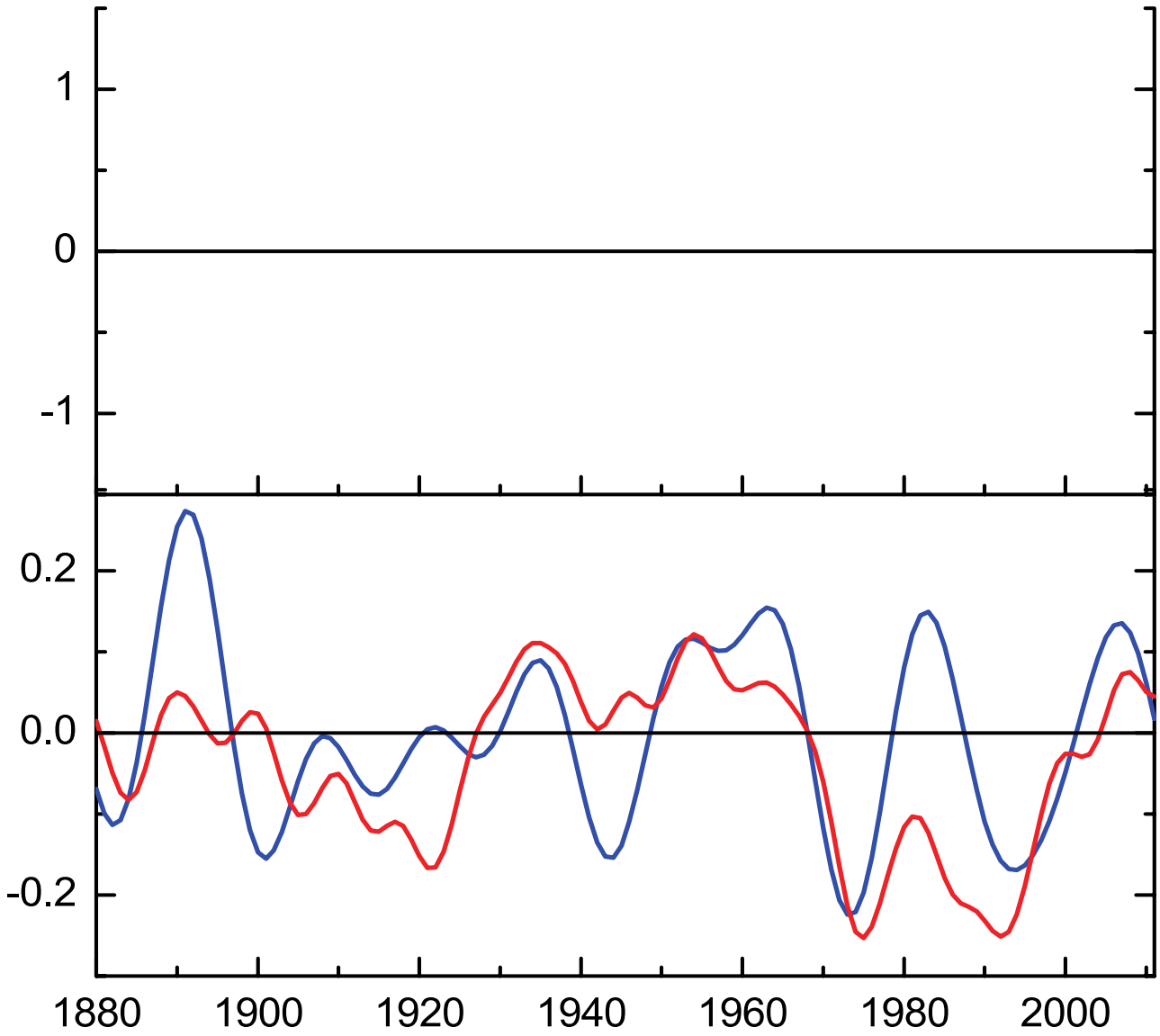




Dipole mode

04 0.04 0.12 0.2

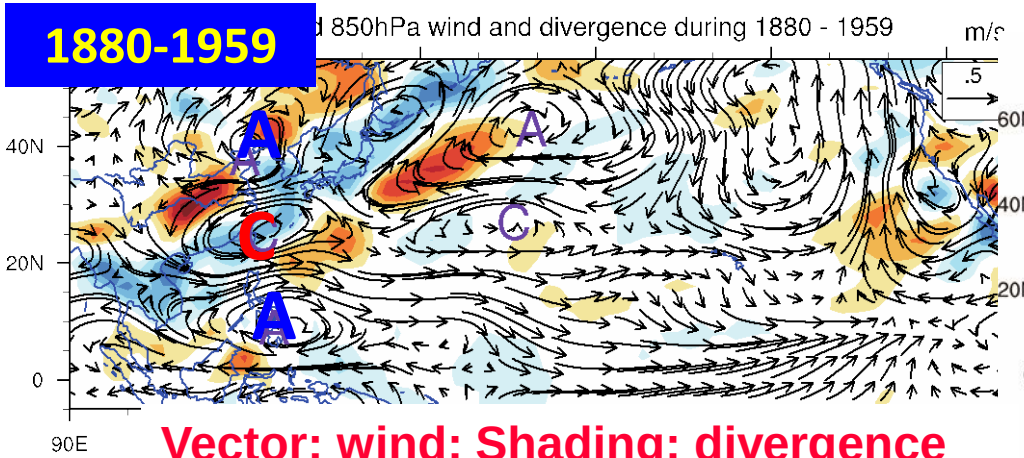
The relationship between the PC1, PC2 and PDO, AMO



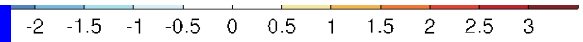
850hPa circulation regressed on PDO

SST regressed on PDO

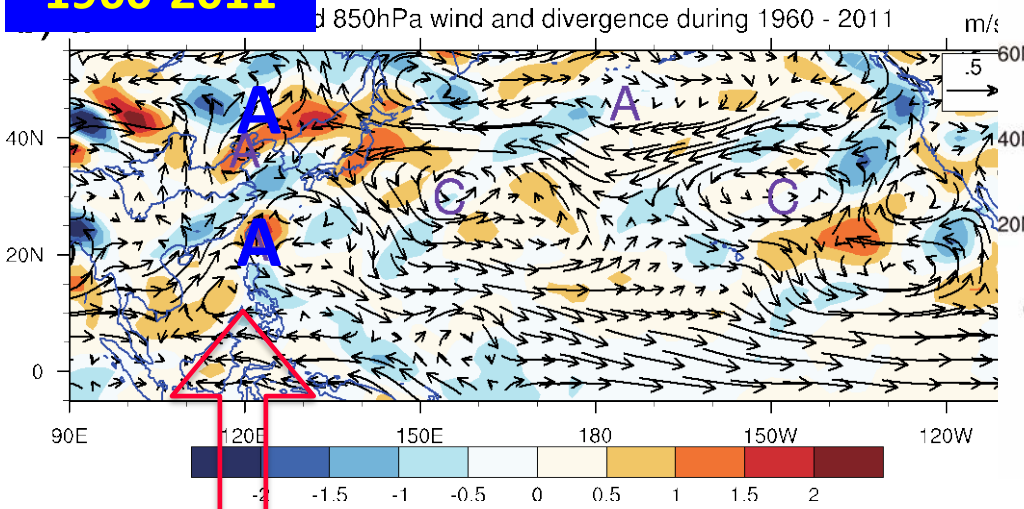
1880-1959



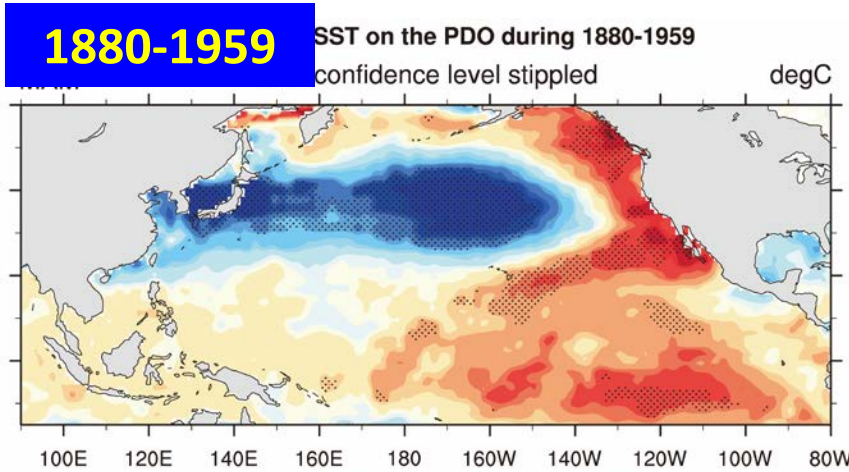
Vector: wind; Shading: divergence



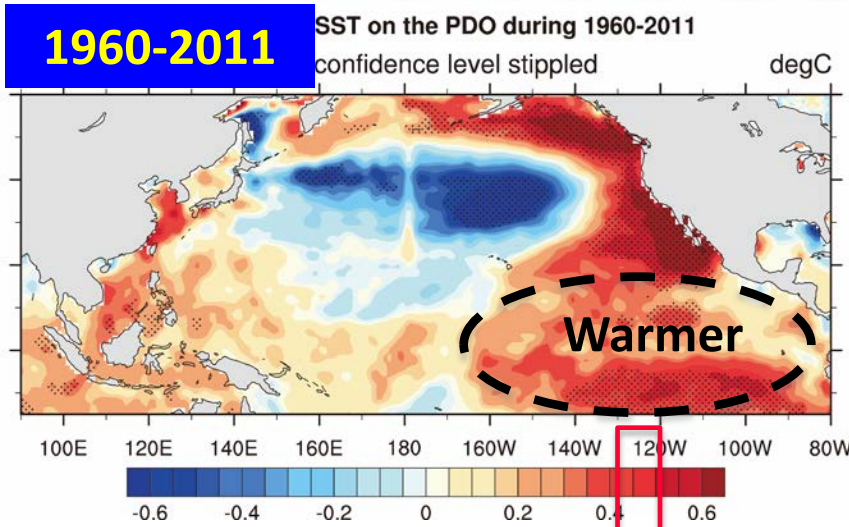
1960-2011



1880-1959

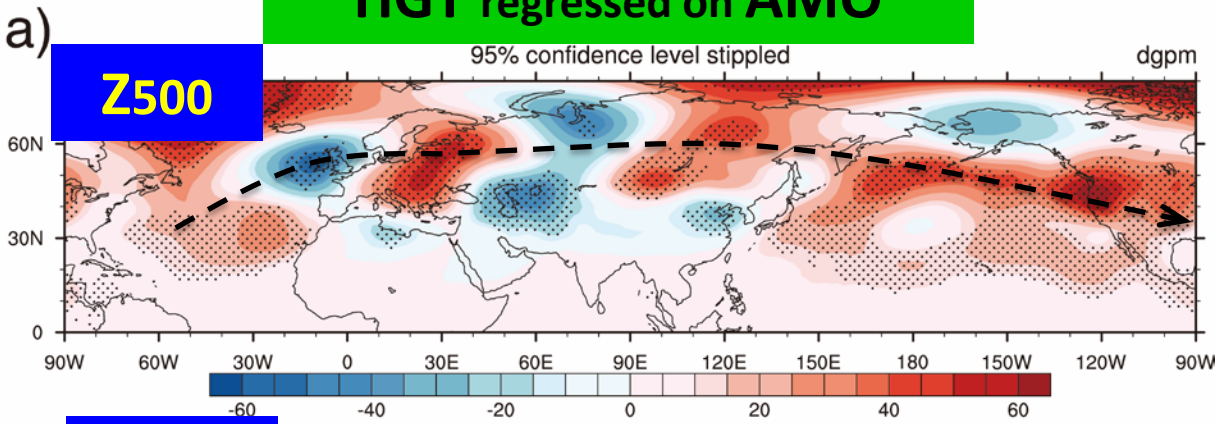


1960-2011

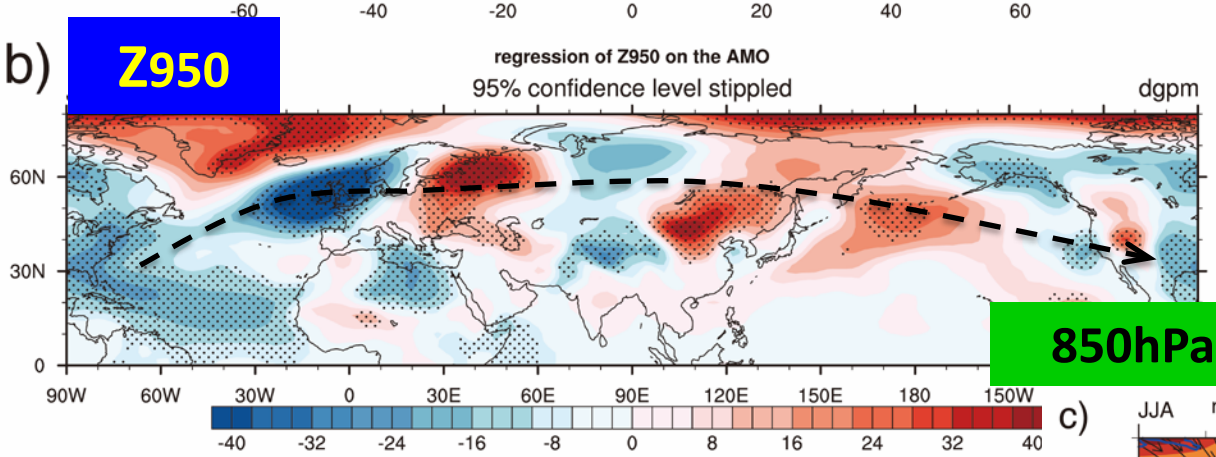


1. **Weaker Walker Cell**
2. **Pacific-East Asian teleconnection (Wang and Zhang, 2002)**

HGT regressed on AMO

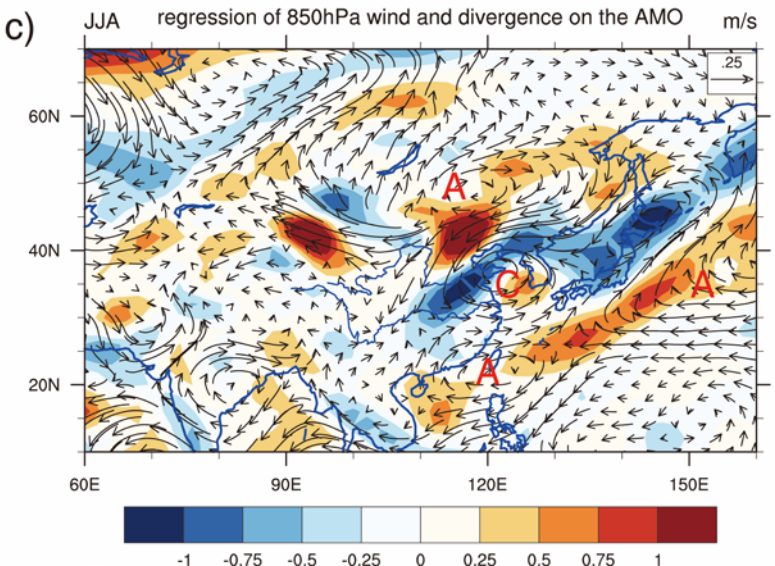


Atlantic-Northern Hemisphere teleconnection



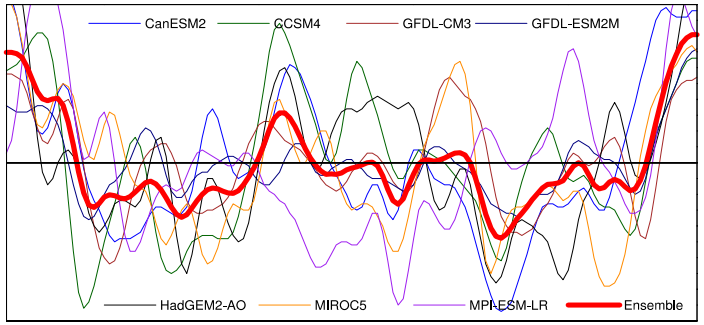
Baroclinic structure; slightly westward with height.

850hPa circulation regressed on AMO

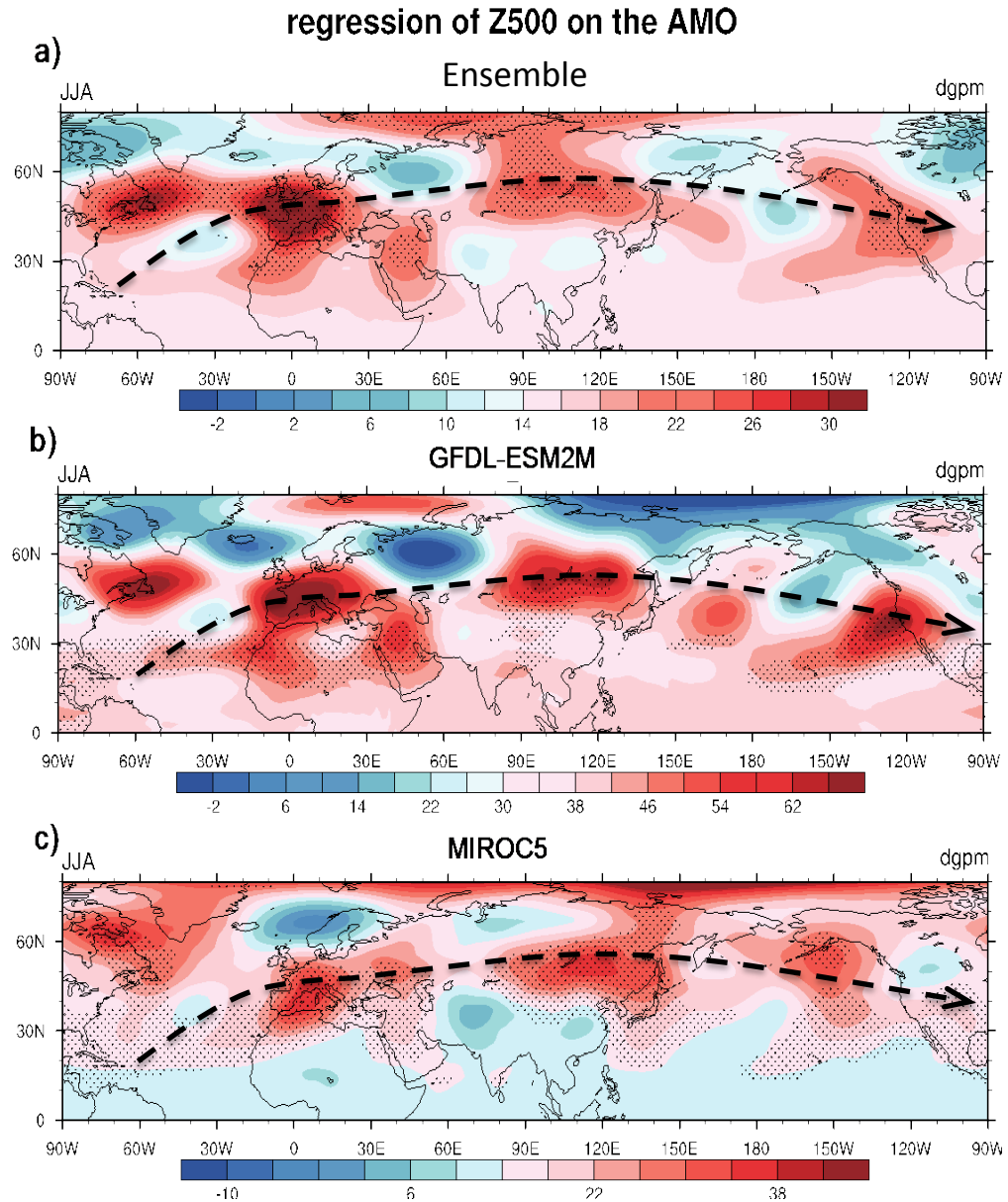


Atlantic-Northern Hemisphere teleconnection simulated by historical CMIP5 run

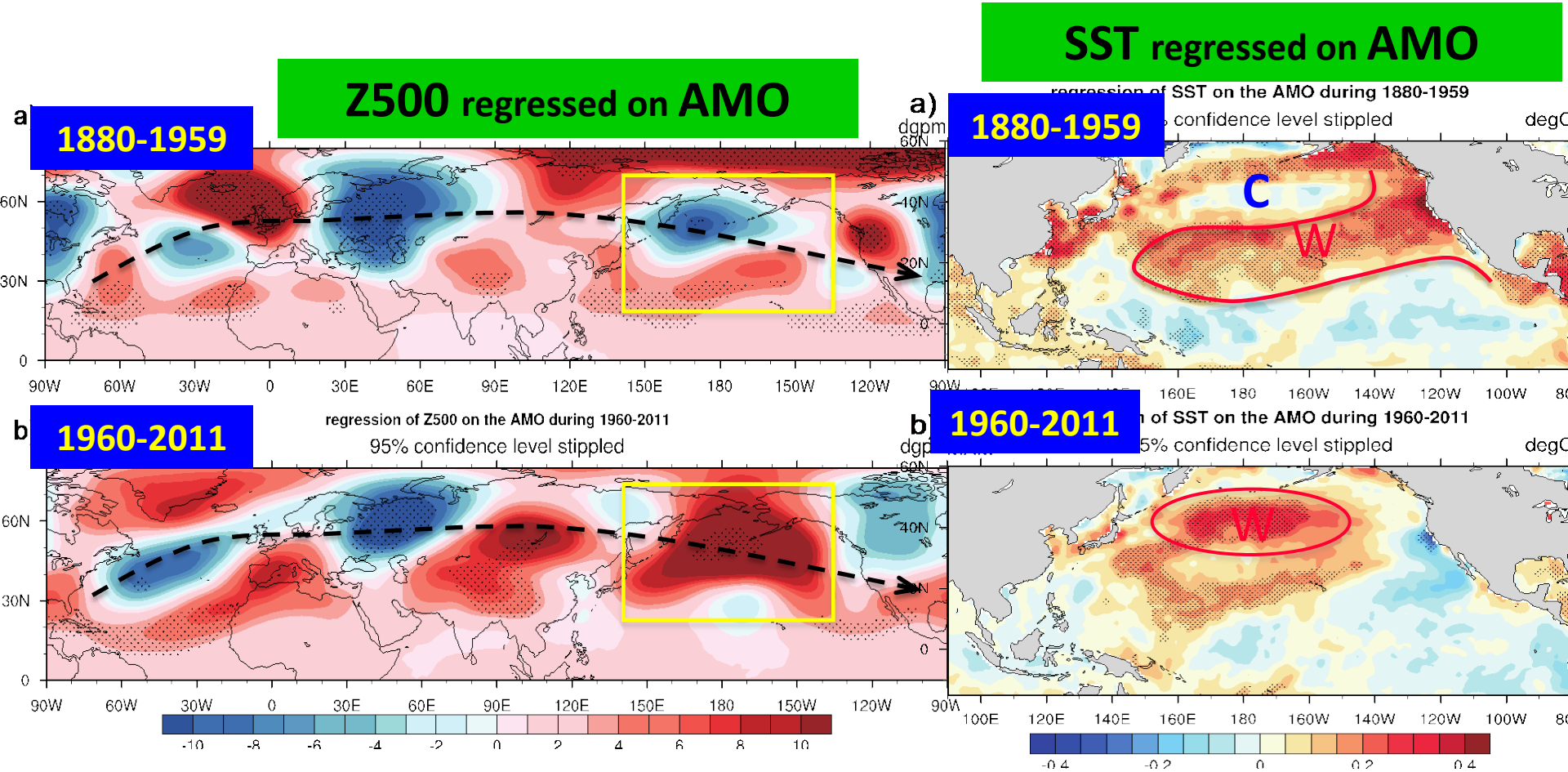
AMO



CanESM2
CCSM4
GFDL-CM3
GFDL-ESM2M
HadGEM2-AO
MIROC5
MPI-ESM-LR



Influence of AMO on PDO



Summary

1. **The AMO teleconnects its influence to the East Asian region, and beyond, through a circumglobal stationary baroclinic wave train extending from the Atlantic Ocean, through the Eurasian continent, and extending to North America.**

2. **The AMO also altered the nature of the PDO through this atmospheric teleconnection, resulting in the occurrence of different PDO pattern ("Pseudo-PDO") between 1960s and 2010s.**

3. **The Pseudo-PDO causes a distinct atmospheric response in East Asia leading to an opposite relationship with the PC1 compared to the conventional PDO, thus leading to a change in the direction of the influence of the PDO on PC1 between 1880s-1950s and 1960s-2010s.**

Thank you!