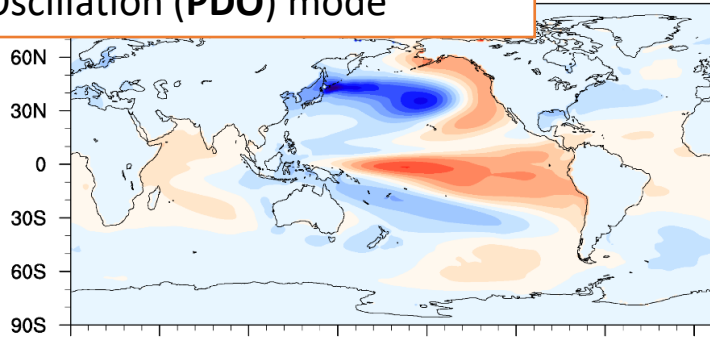


# Do GHG and aerosol forcings influence Pacific decadal variability?

*CESM2 full-forcing large ensemble*

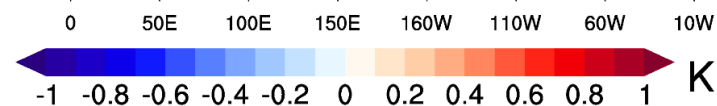
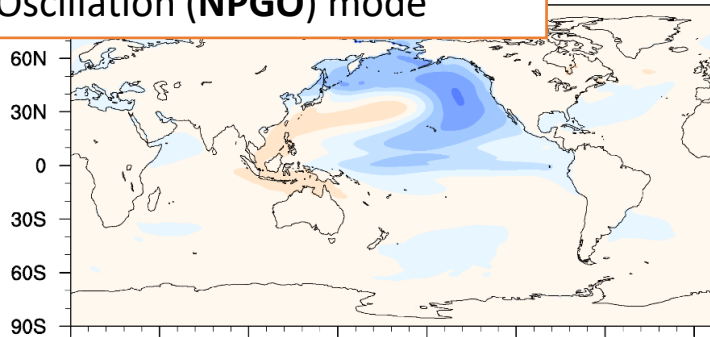
EOF1: the Pacific Decadal Oscillation (**PDO**) mode

SST



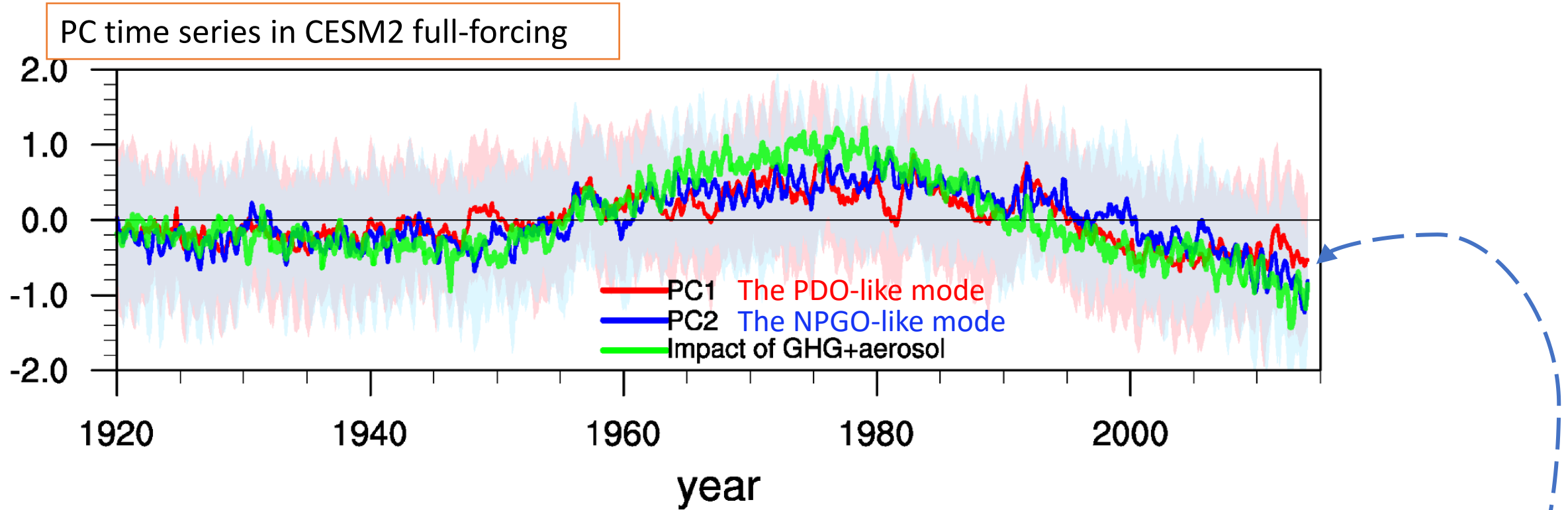
EOF2: the North Pacific Gyre Oscillation (**NPGO**) mode

SST



**Chen Xing**, Samantha Stevenson, Emanuele Di Lorenzo, Matthew Newman, Antonietta Capotondi, John Fasullo, Nicola Maher

Do GHG and aerosol forcings influence Pacific decadal variability?  
Are there long-term responses in PDV?

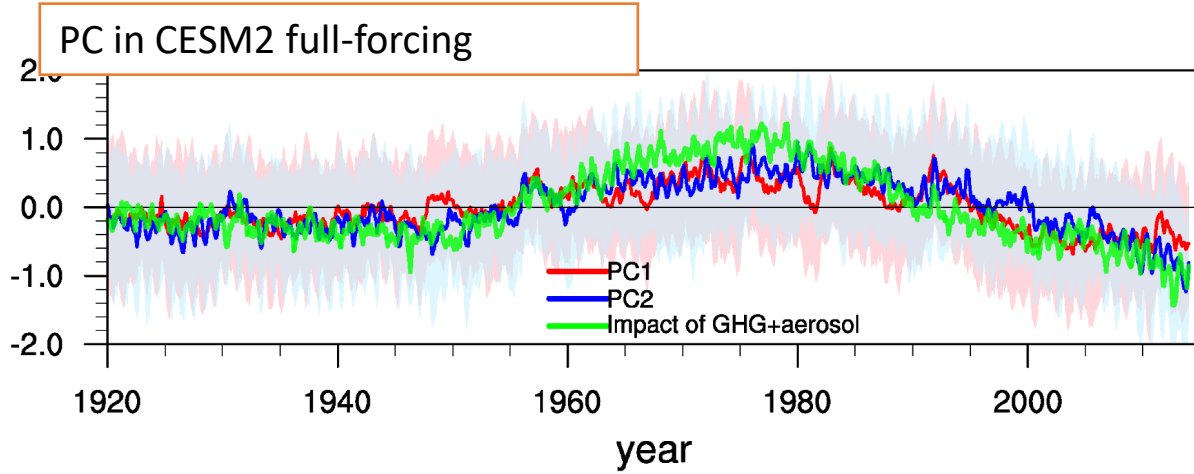


*The PDV definition: Removing global mean SST before applying the EOF*

Long-term responses represented by the ensemble mean

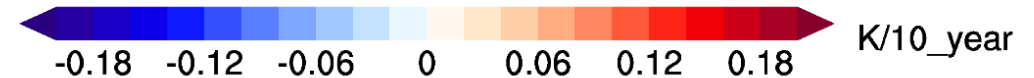
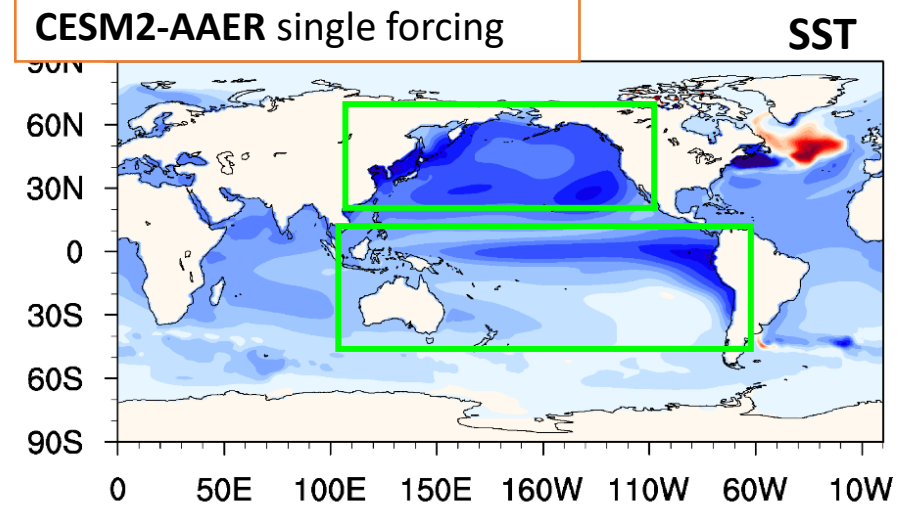
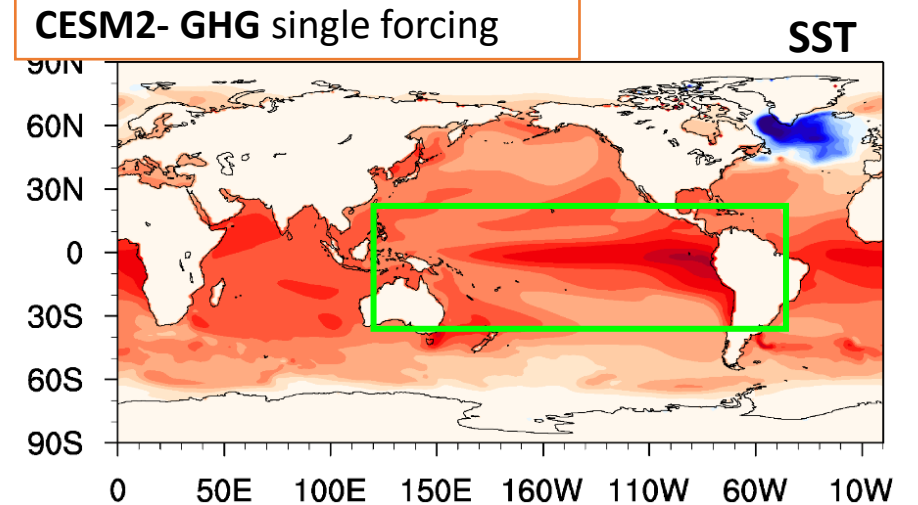
Do GHG and aerosol forcings influence Pacific decadal variability?

Are there long-term responses in PDV?



Mean state changes from GHG or aerosol forcing could explain the long-term response changes in PDV

The leading EOF of each single forcing ensemble mean SST to represent the mean state change



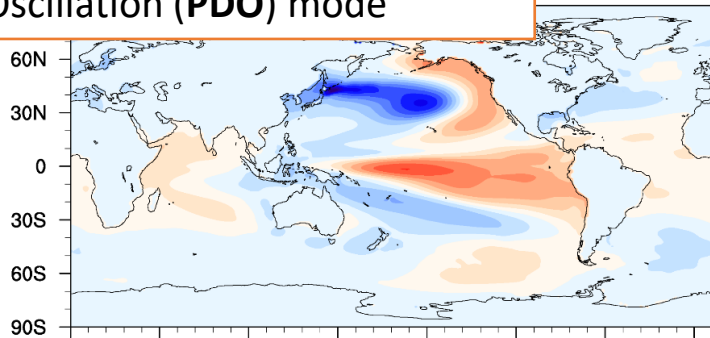
Do GHG and aerosol forcings influence Pacific decadal variability?

Is variability changed?

*CESM2 full-forcing large ensemble*

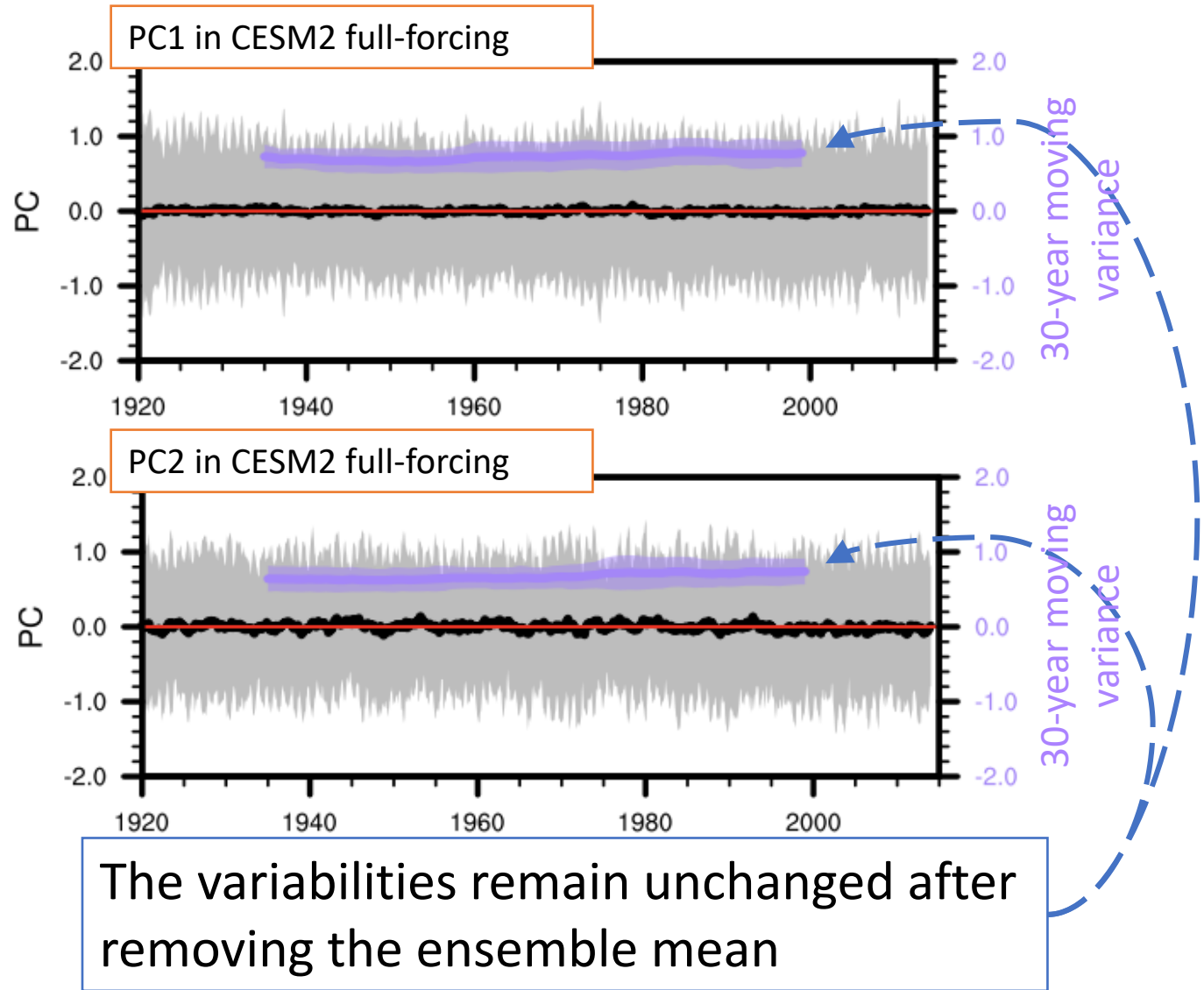
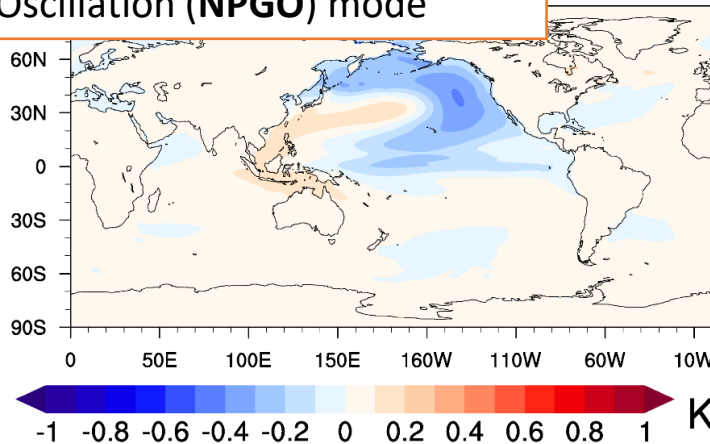
EOF1: the Pacific Decadal Oscillation (**PDO**) mode

SST

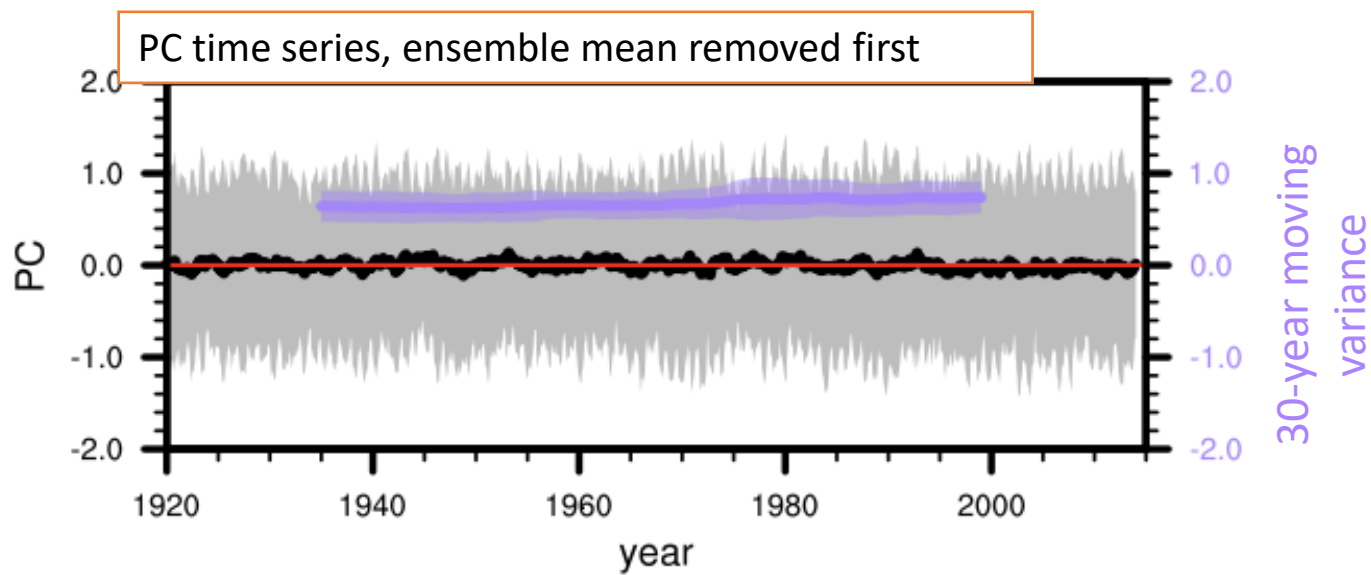
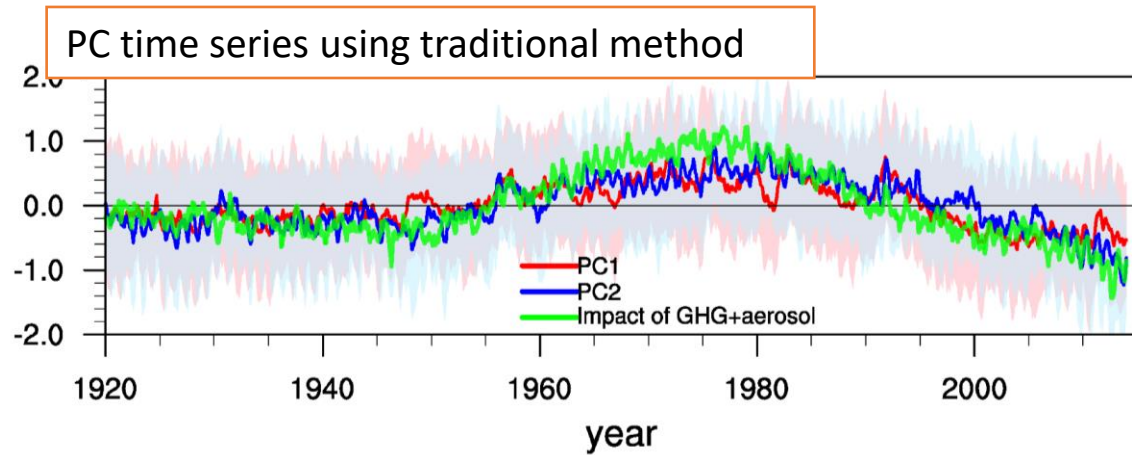


EOF2: the North Pacific Gyre Oscillation (**NPGO**) mode

SST



*Ensemble mean is removed before applying the EOF*  
*Solid line: ensemble mean; Shading: one STD across ensembles*



## Take home message:

- Long-term responses of PDV are related to mean state changes from anthropogenic forcings.
- While the variability of Pacific decadal variability is not changing from anthropogenic forcings.
- Forced mean-state trends is critical for capturing the historical behavior of PDV in model simulations.