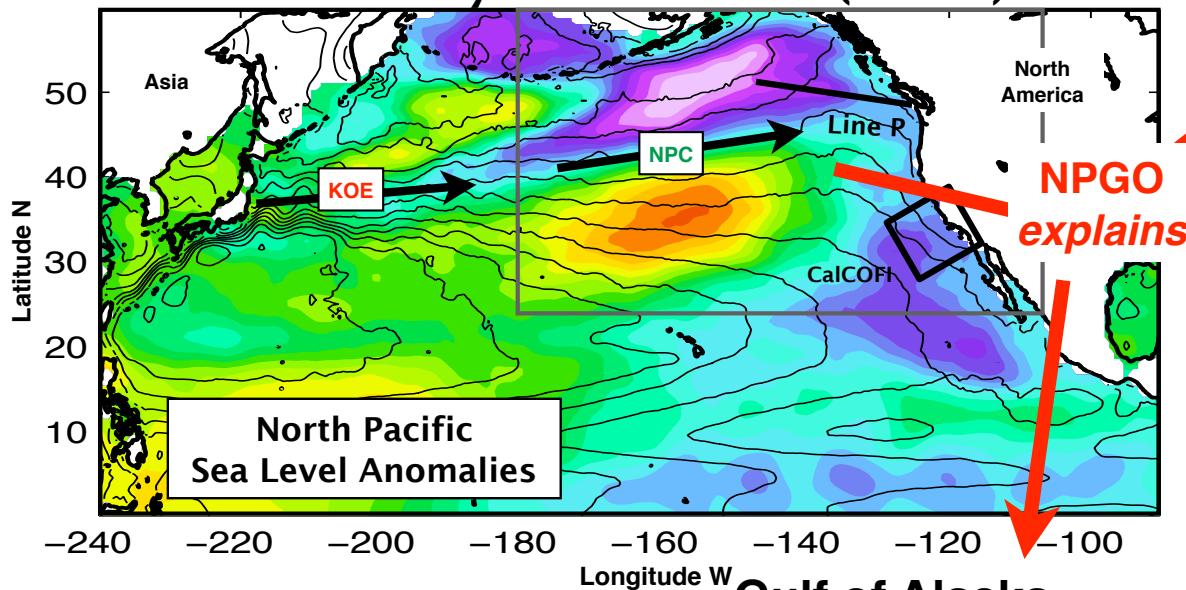
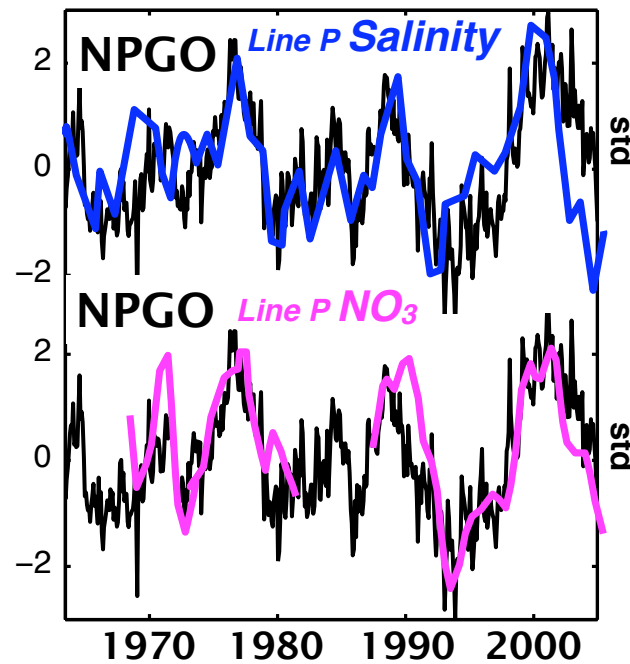


North Pacific Gyre Oscillation (NPGO)

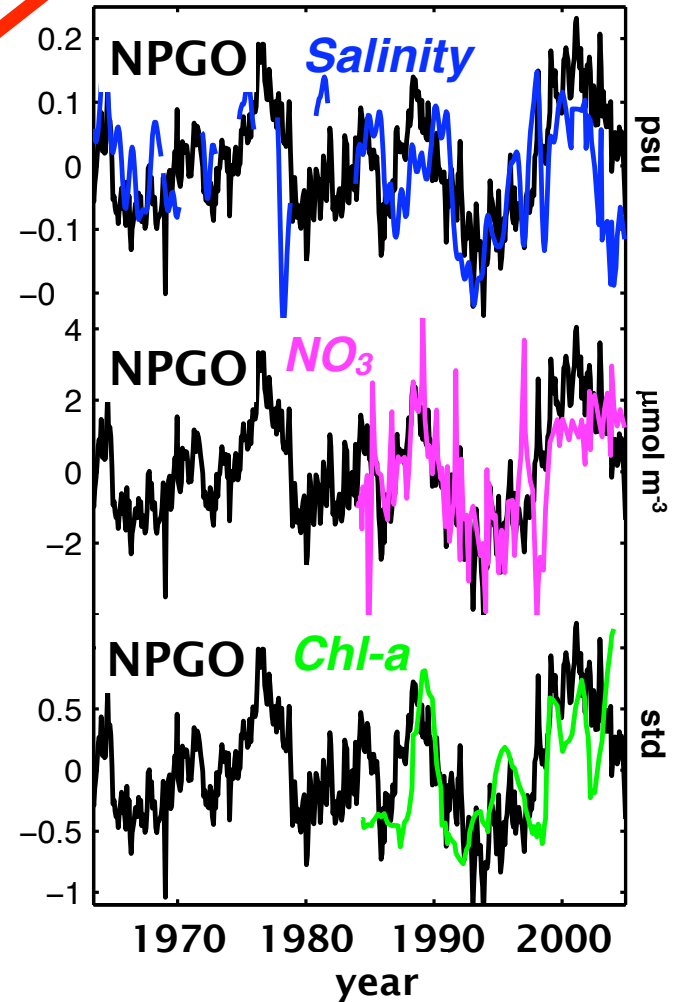


Gulf of Alaska Line P Observations

The **NPGO** index measures changes in the **North Pacific gyres circulation** and explains key physical-biological ocean variables

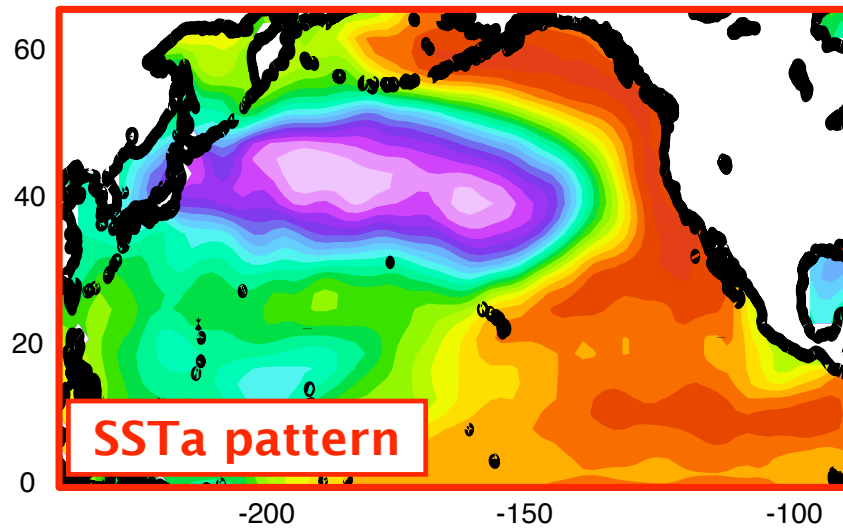


California Current CalCOFI Observations



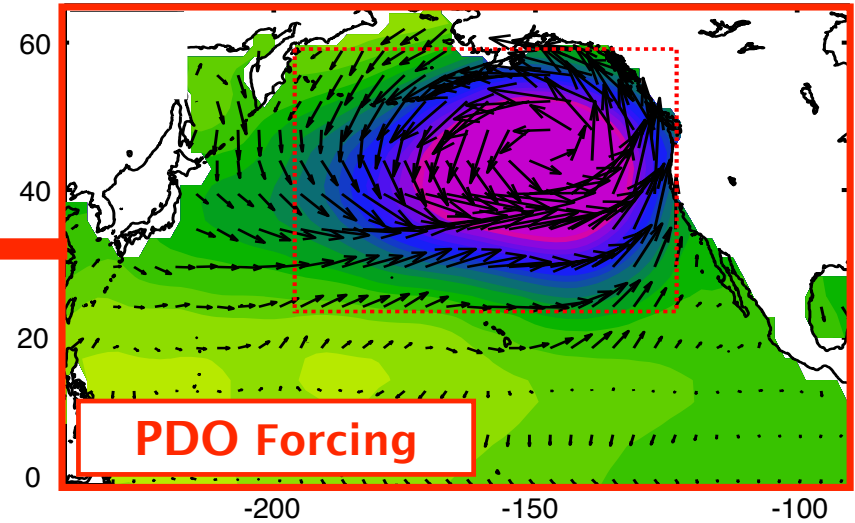
Di Lorenzo et al., 2008

PDO (EOF1 SSTa, SSHa)

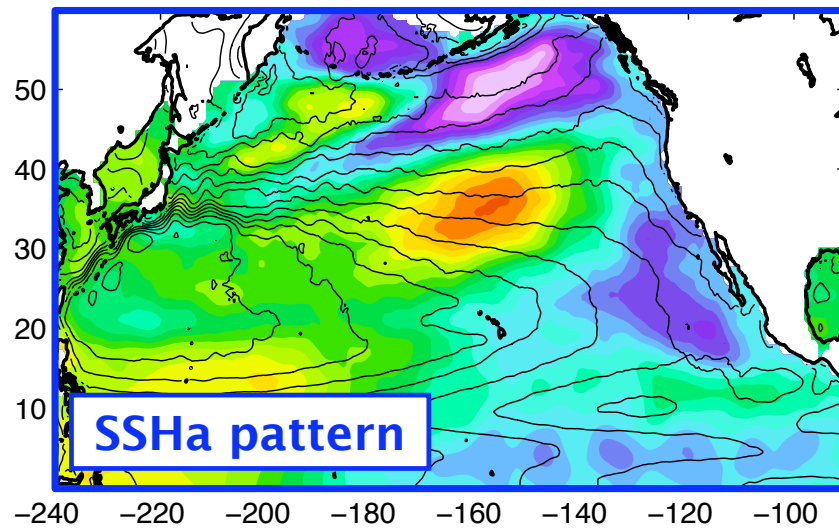


Chhak, Di Lorenzo et al., 2008

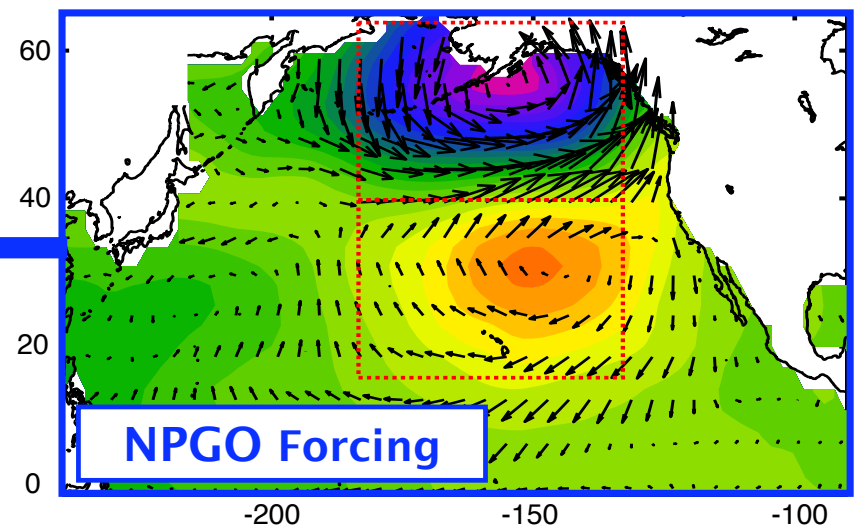
Aleutian Low (EOF1 SLPa)



NPGO (EOF2 SSTa, SSHa)



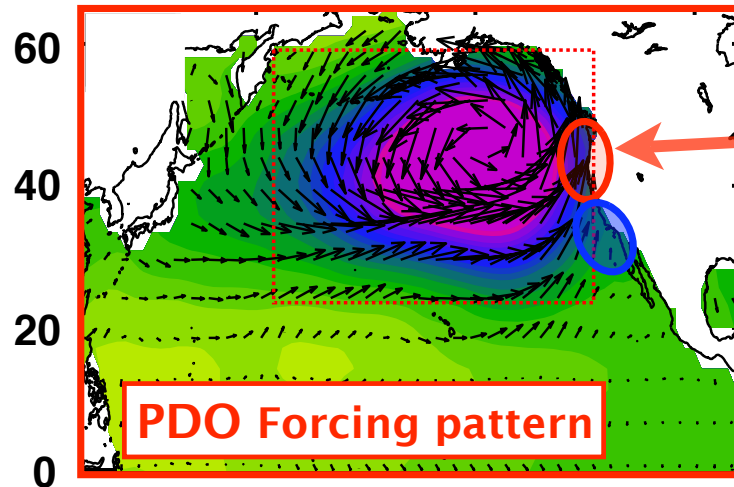
North Pacific Oscillation (EOF2 SLPa)



Walker and Bliss, 1932

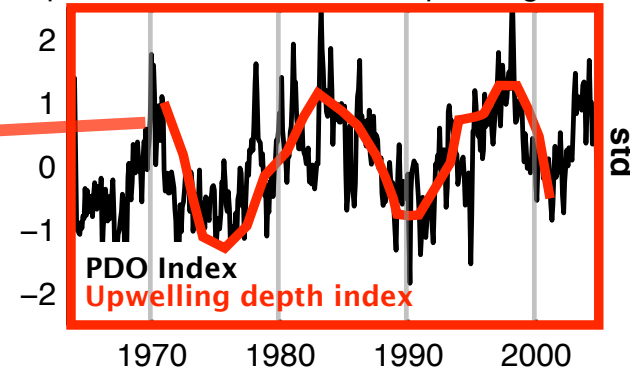
The atmospheric forcing of the PDO and NPGO drive different responses in coastal upwelling

1 Sea Level Pressure and Wind Vector Anomalies during PDO positive phase



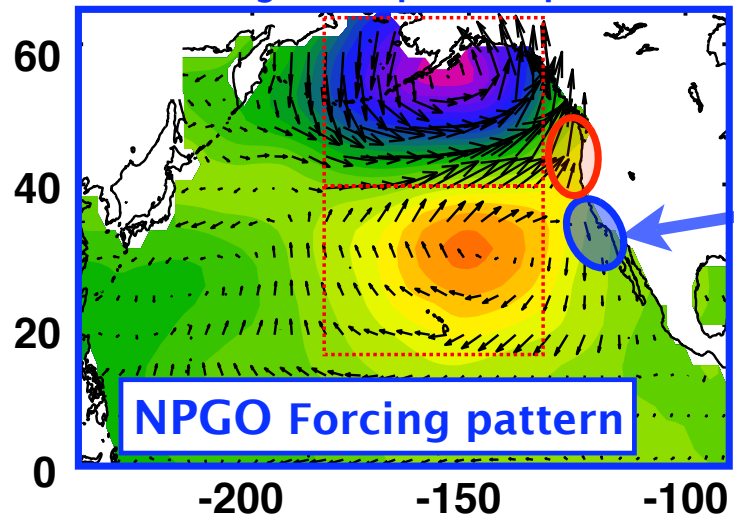
2 Upwelling depth index

positive indicates shallow upwelling cell



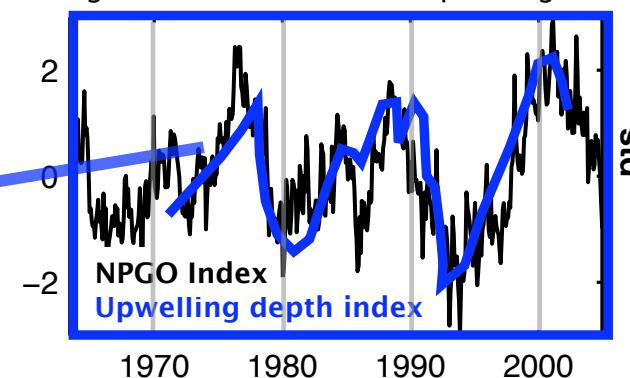
Chhak and Di Lorenzo, 2007

3 Sea Level Pressure and Wind Vector Anomaly during NPGO positive phase



4 Upwelling depth index

negative indicates shallow upwelling cell

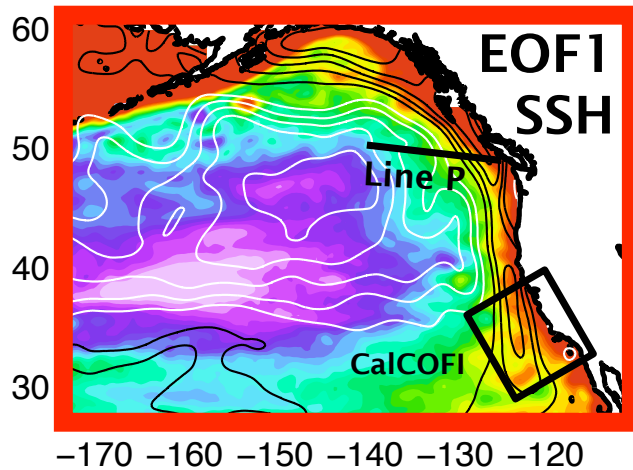


Chhak and Di Lorenzo, in prep.

1 Northeast Pacific Physical-Biological Variability

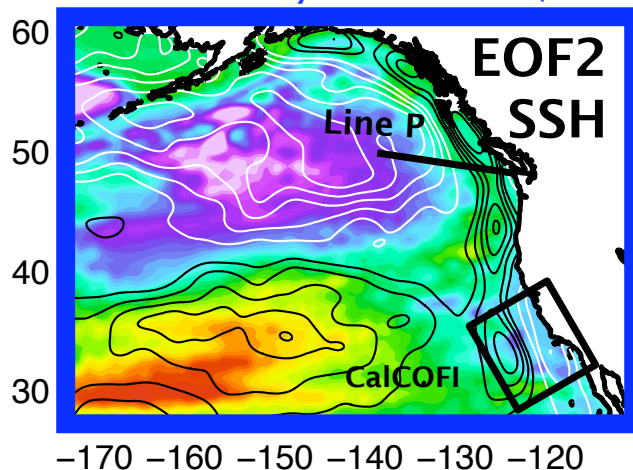
PDO mode

Pacific Decadal Oscillation (PDO)

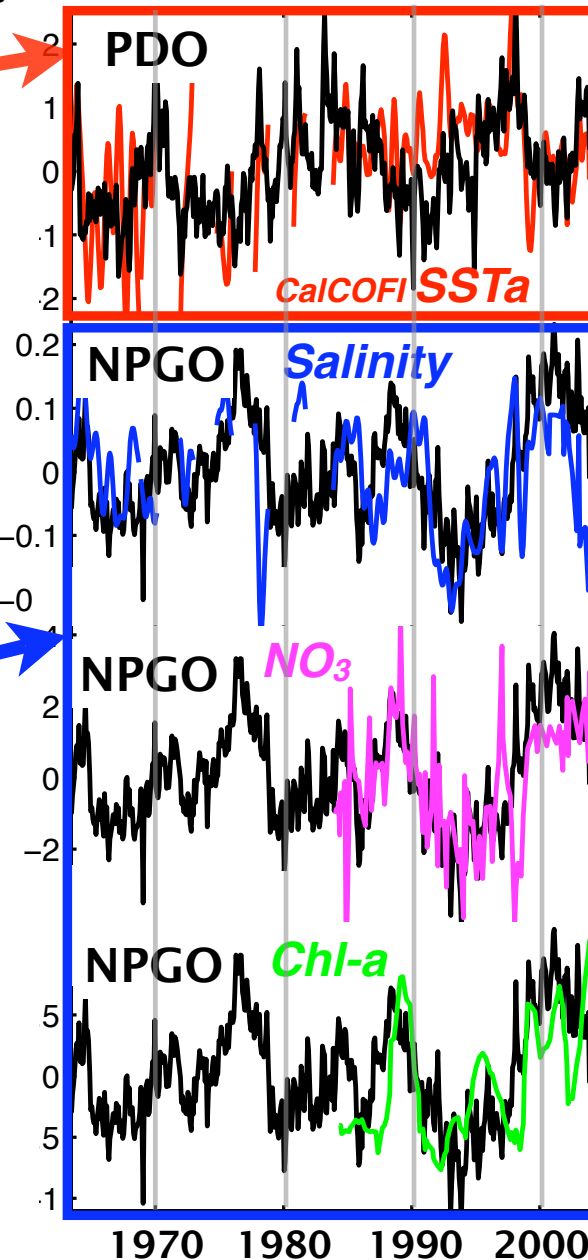


NPGO Mode

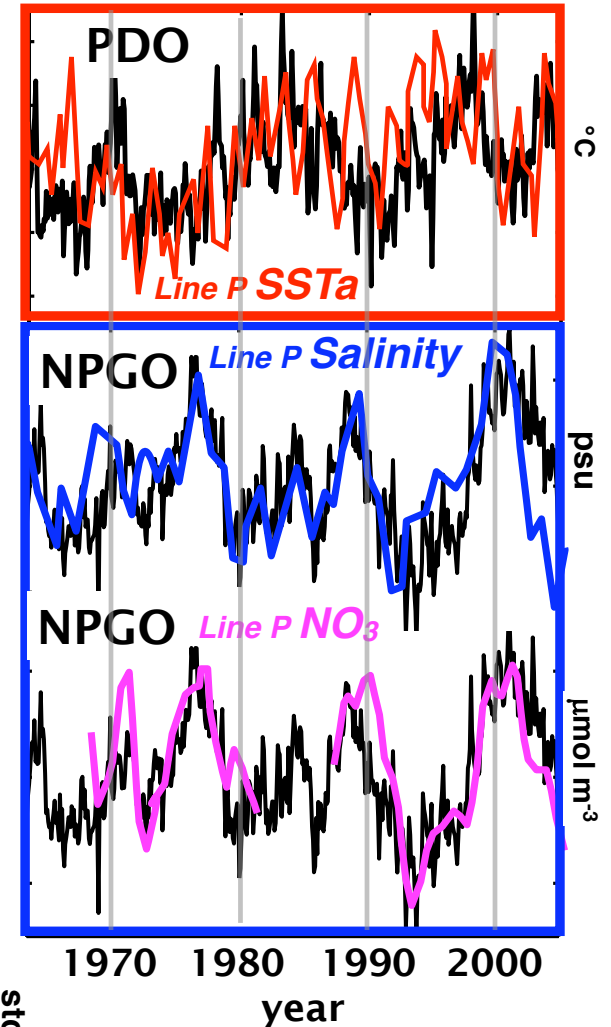
North Pacific Gyre Oscillation (NPGO)



2 California Current CalCOFI Observations



3 Gulf of Alaska Line P Observations



Di Lorenzo et al., GRL 2008.

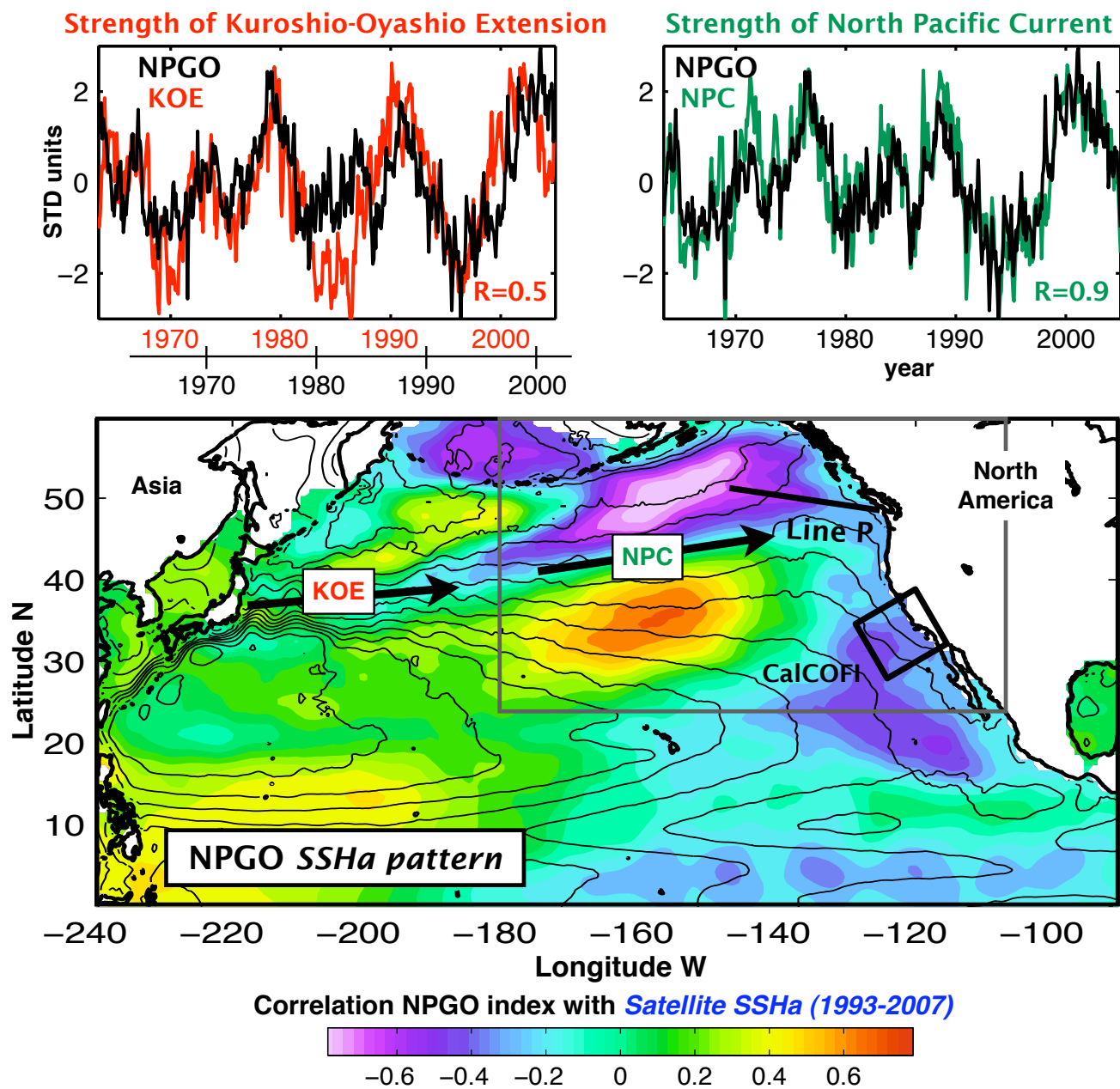


Figure 1

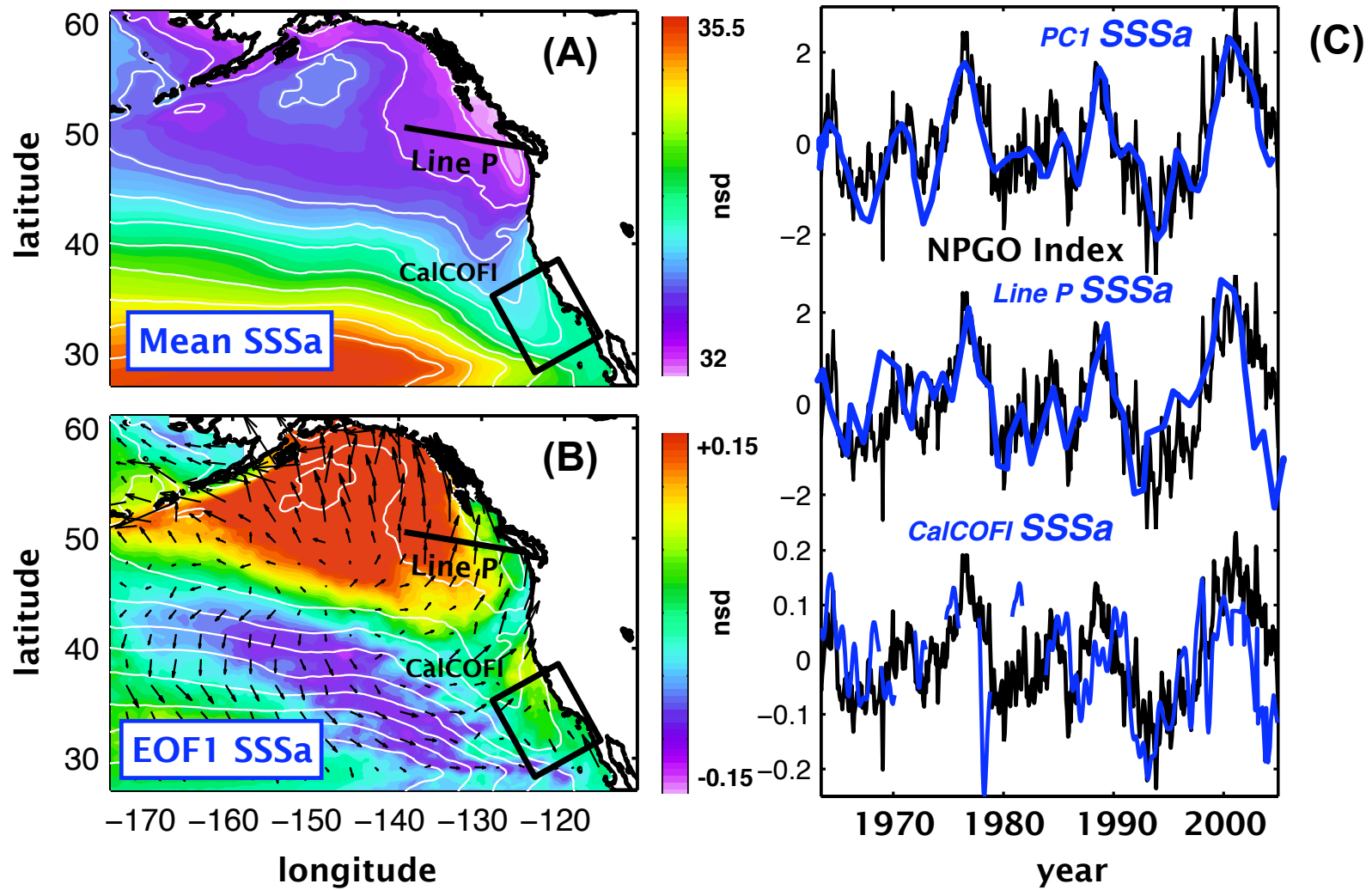


Figure 2. Temporal and spatial variability of surface salinity. (A) Mean surface salinity from ROMS ocean model over the period 1950-2004. (B) First dominant mode of variability for model surface salinity anomaly (SSSa) inferred from EOF1. (C) Timeseries of NPGO index (black) compared to PC1 of SSSa, observed SSSa at Line-P, and observed SSSa from CalCOFI program.

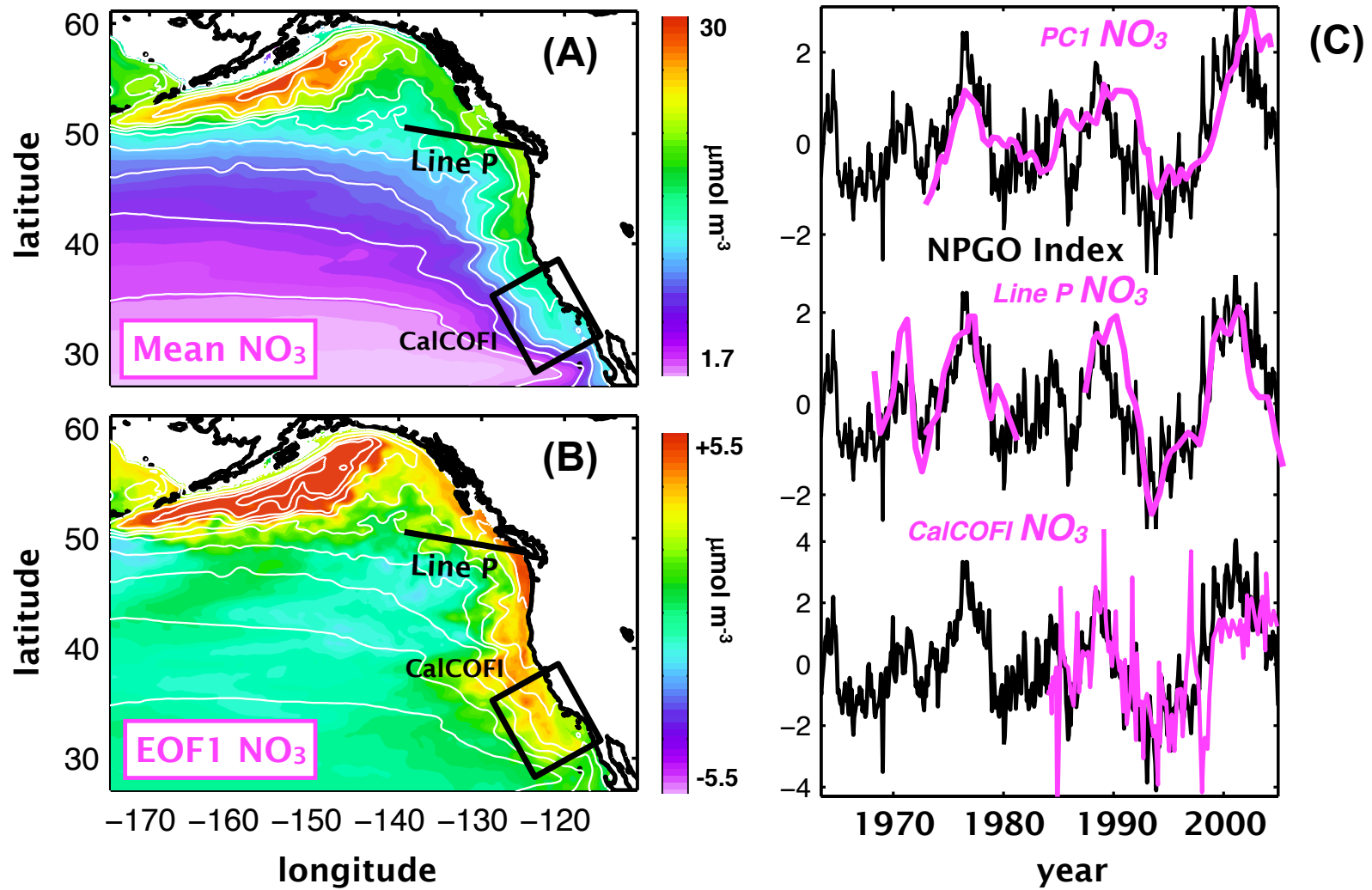
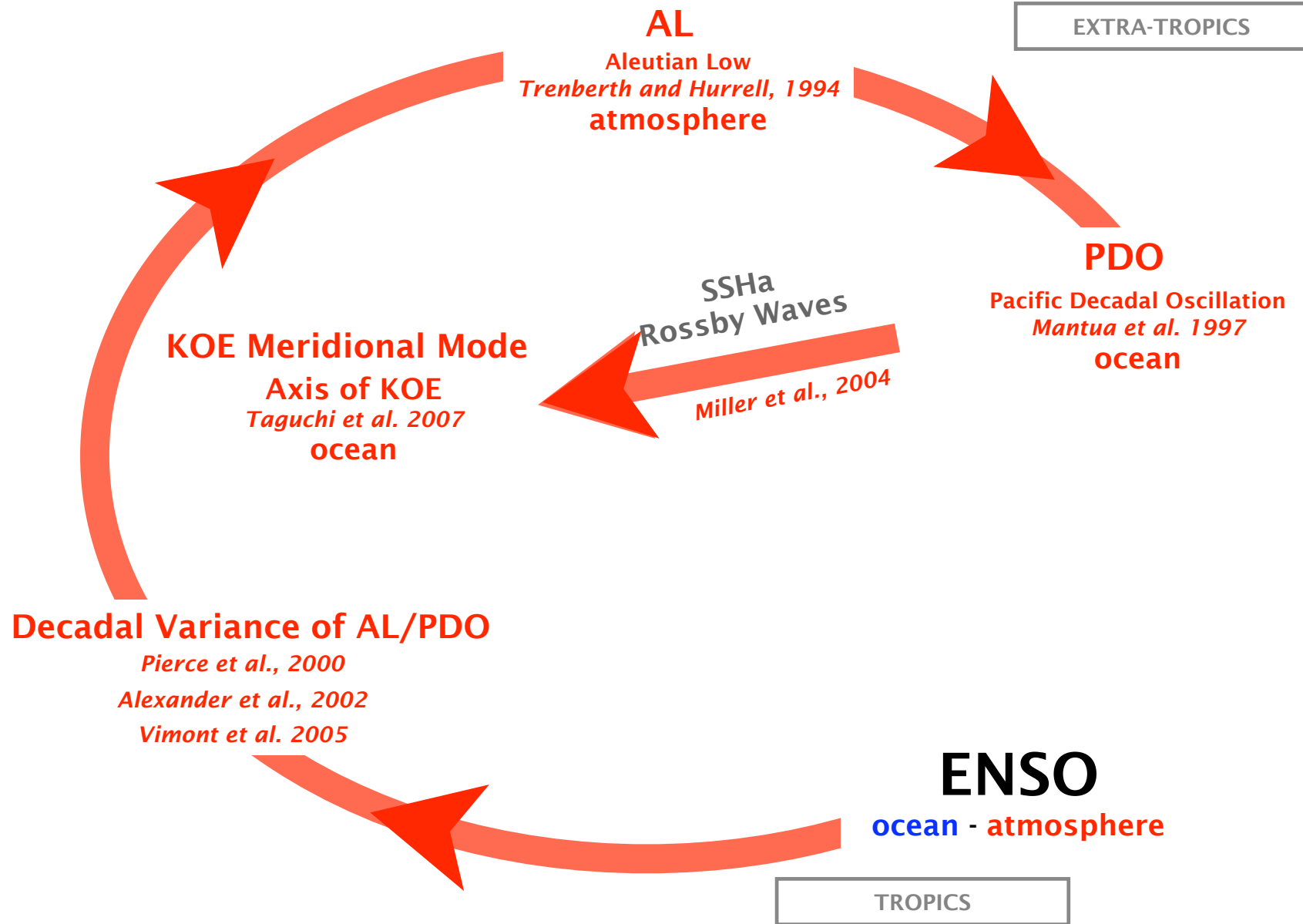


Figure 3. Temporal and spatial variability of subsurface nitrate (NO_3). (A) Mean subsurface NO_3 from ROMS ocean model over the period 1950-2004. (B) First dominant mode of variability for model subsurface NO_3 anomaly inferred from EOF1. (C) Timeseries of NPGO index (black) compared to PC1 of NO_3 , observed NO_3 at Line-P, and observed NO_3 from CalCOFI program.



NPO/NPGO dynamics

ENSO dynamics

