

# PS44A-1502: Shelf-interior ocean transport of terrestrial waters and other factors determining sea surface salinity variability in the coastal transition zone (CTZ) of the Northeastern Pacific region

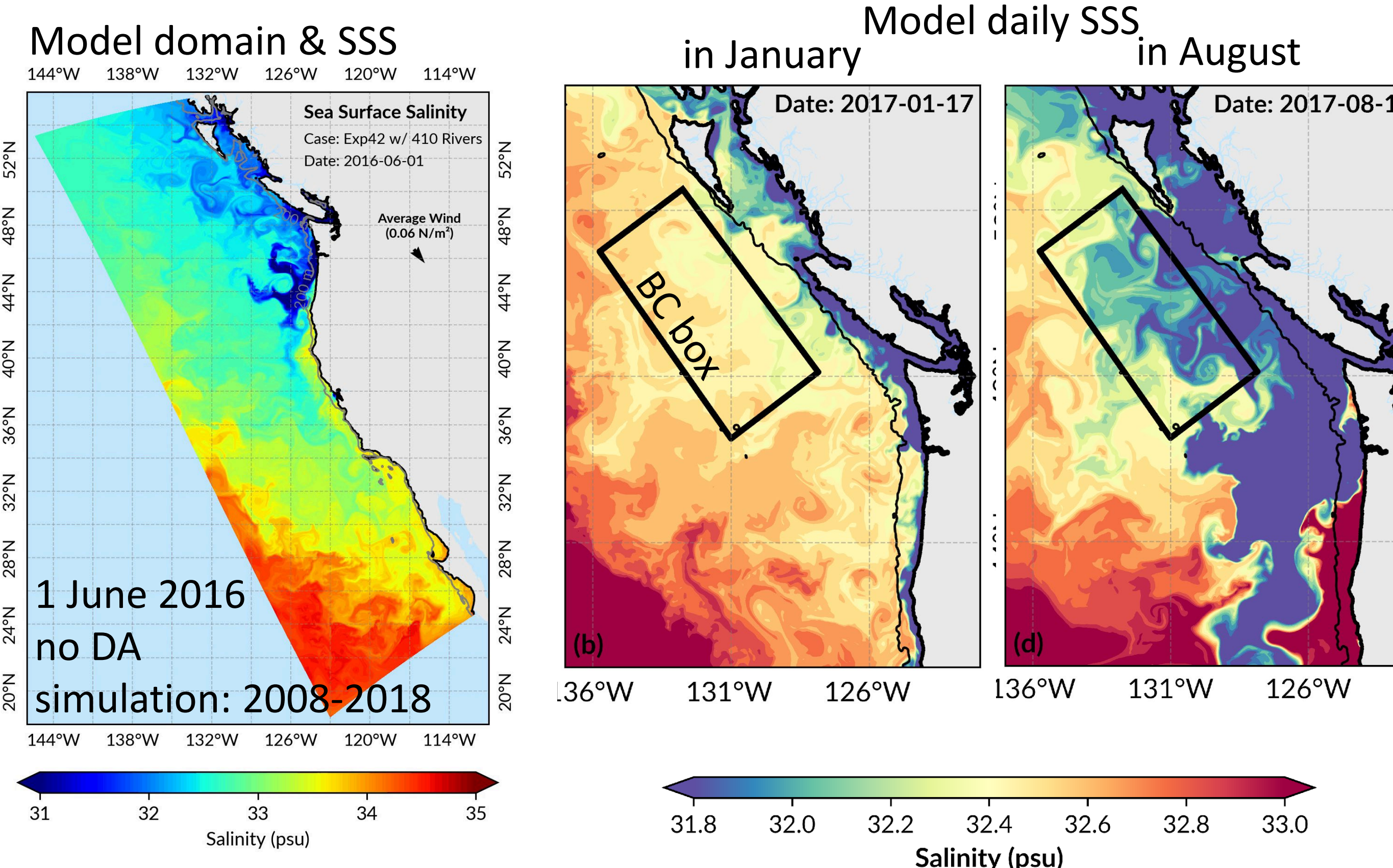


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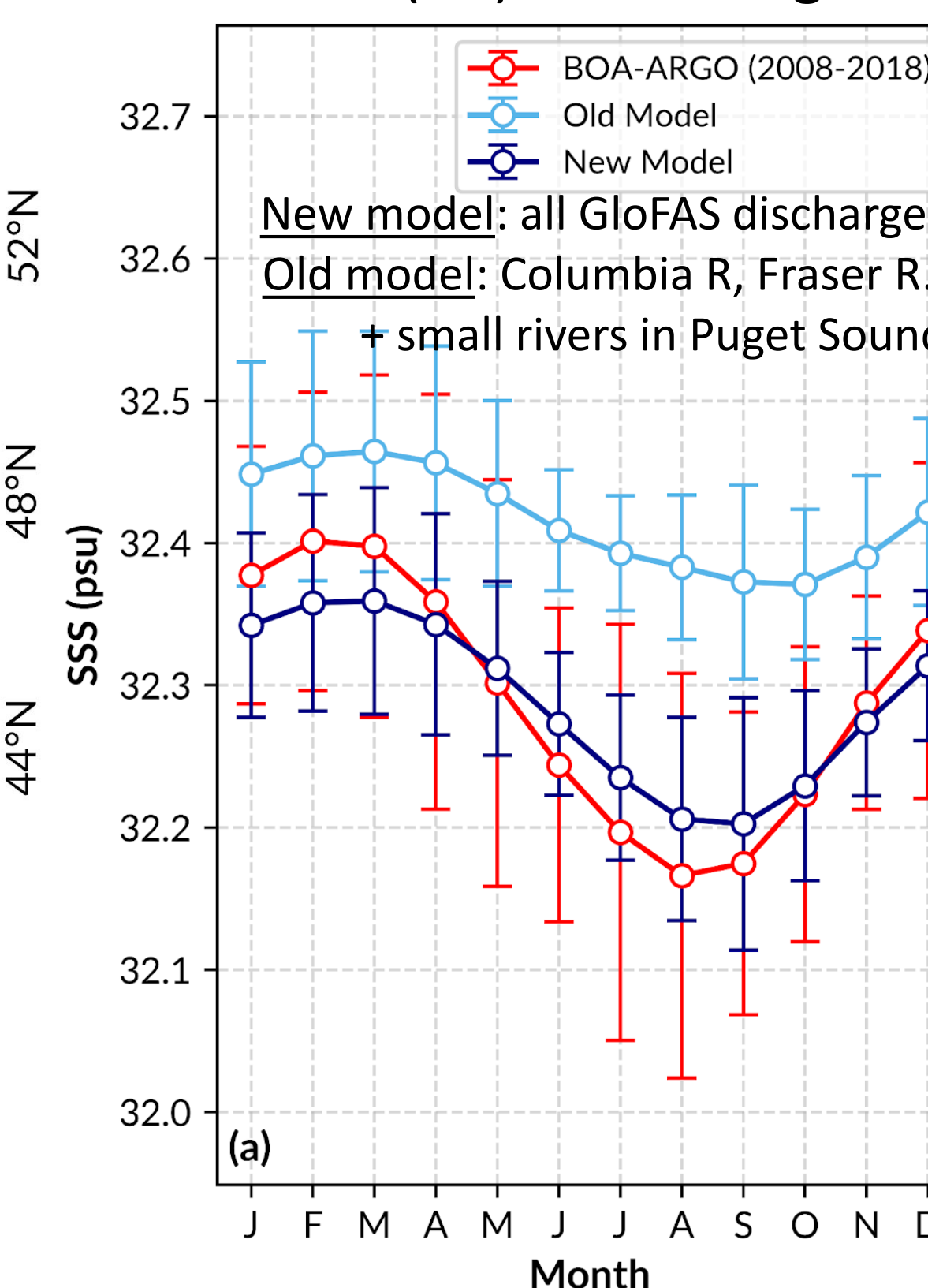
## Seasonal variability:

ROMS 2-km resolution model simulation using a full suite of terrestrial discharges from GloFAS (“the new model”) reproduces seasonal variability in SSS over the shelf and in the CTZ in agreement with Argo and satellite salinity data.

Offshore transport of freshened waters of terrestrial origin lowers near surface salinity in the CTZ in summers. Vertical mixing increases SSS in winter. Precipitation is an important contributor to the top layer salinity balance (Khazaei et al., Oce Dyn., submitted, see QR code above)



SSS annual cycle, British Columbia (BC) box averaged:



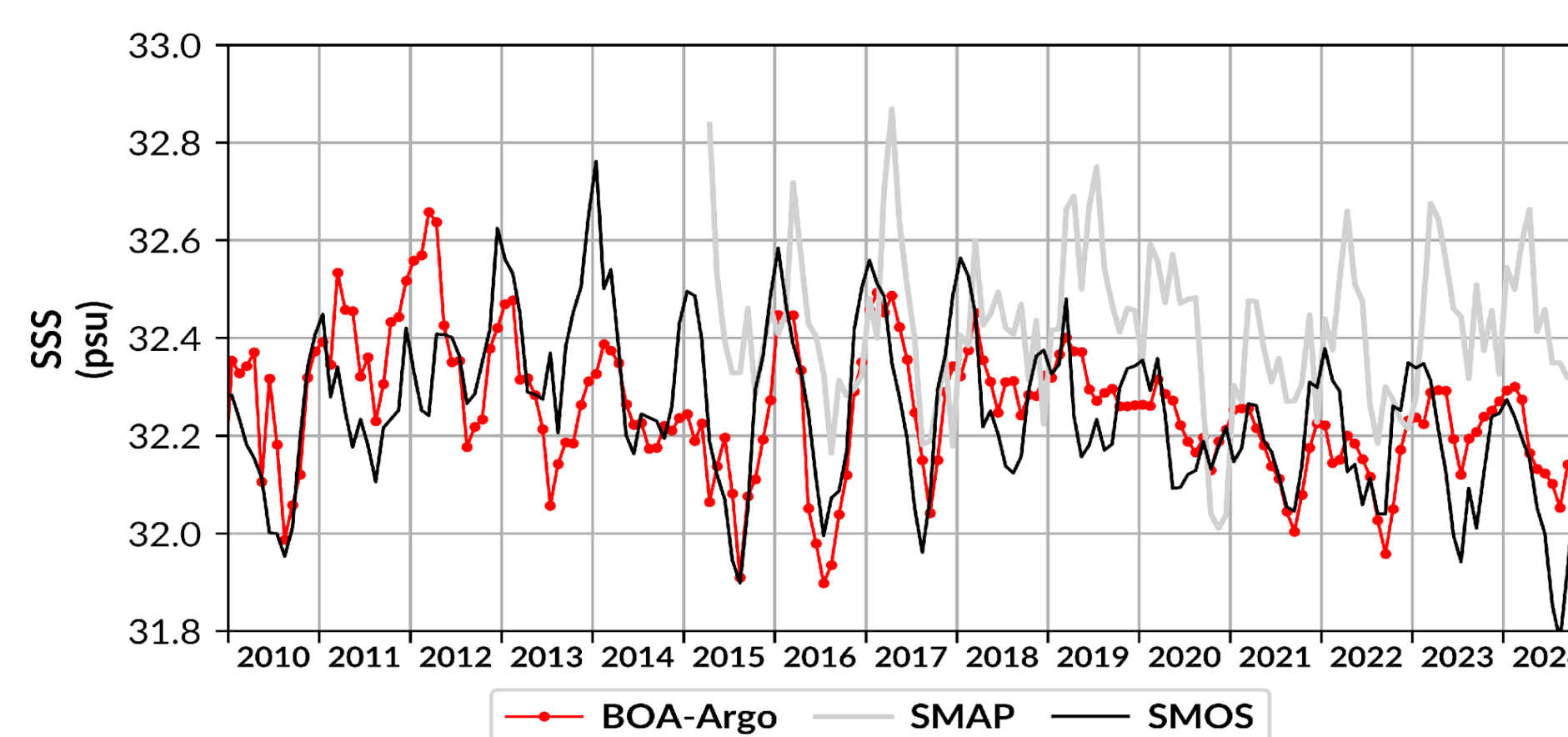
## Longer period variability:

SSS interannual variability may be stronger than the annual cycle magnitude. In particular, a steady, large scale decline in SSS is found in satellite and Argo data from 2018 to 2024.

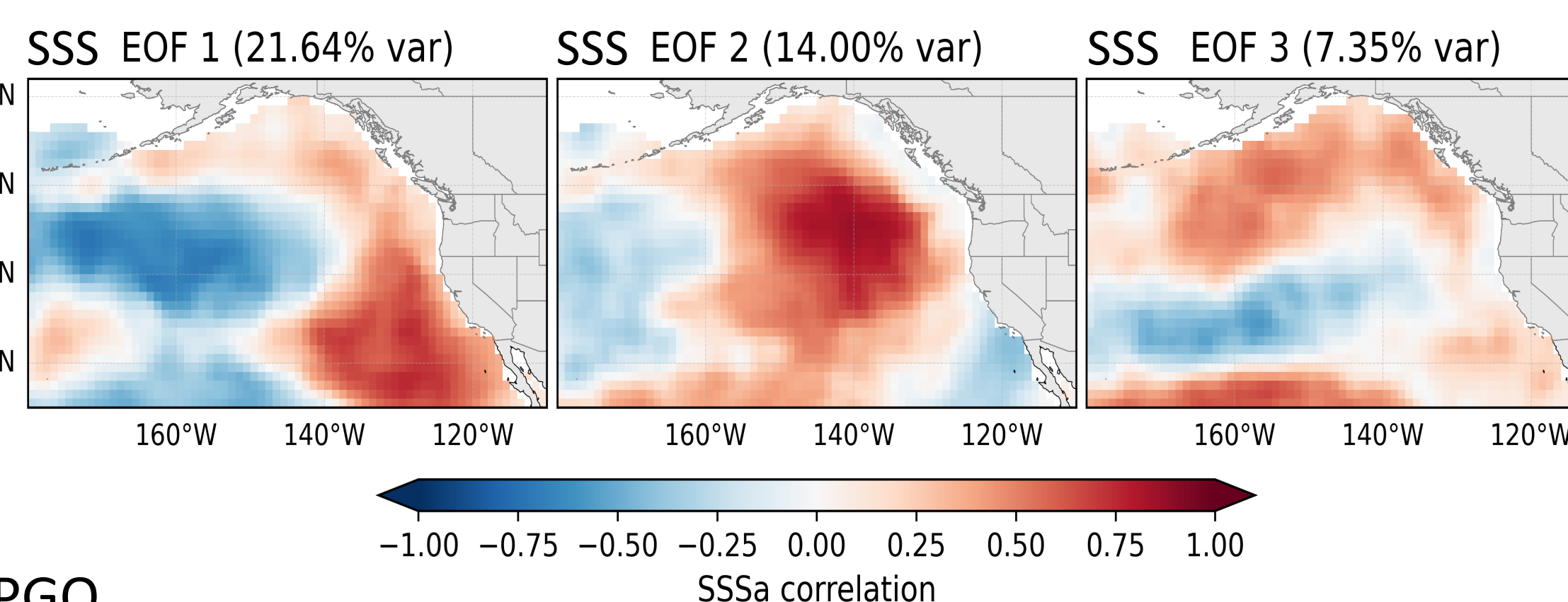
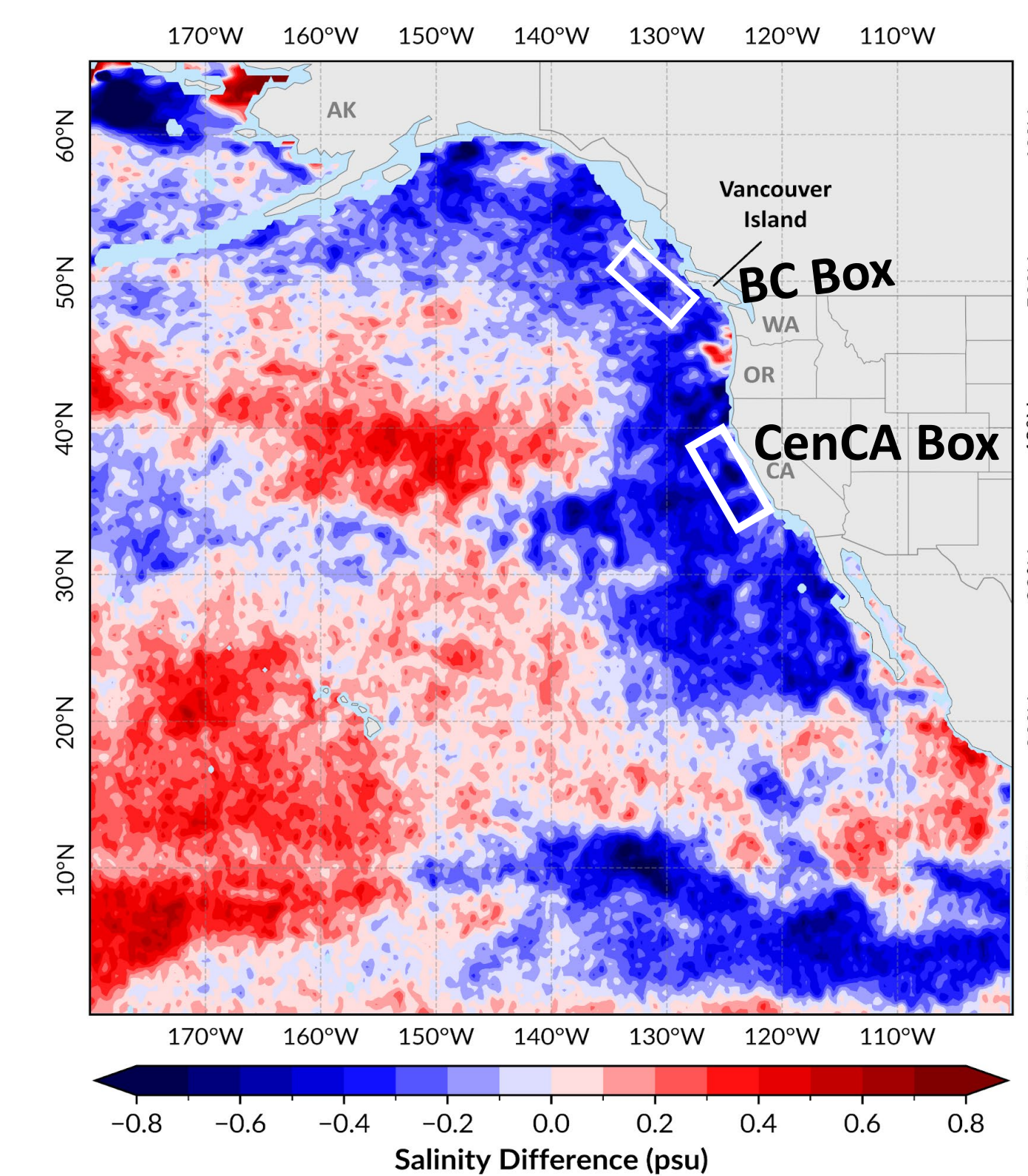
EOF analysis of monthly SSS maps (Argo-BOA, 2004-2024, in the same domain as PDO-NPGO analysis by DiLorenzo et al.(2008) ):

- SSS EOF1 is correlated with PDO (alongshore water mass displacement).
- SSS EOF2 and EOF3 are correlated with NPGO (the double gyre circulation strength).
- SSS EOF2: explained as the transport of the mean zonal SSS gradient by the North Pacific Current.
- SSS EOF3: more like NPGO (entrainment of SSS anomalies into the gyres).

BC box averaged, monthly averaged SSS (Argo, SMOS CEC L3, SMAP RSS )

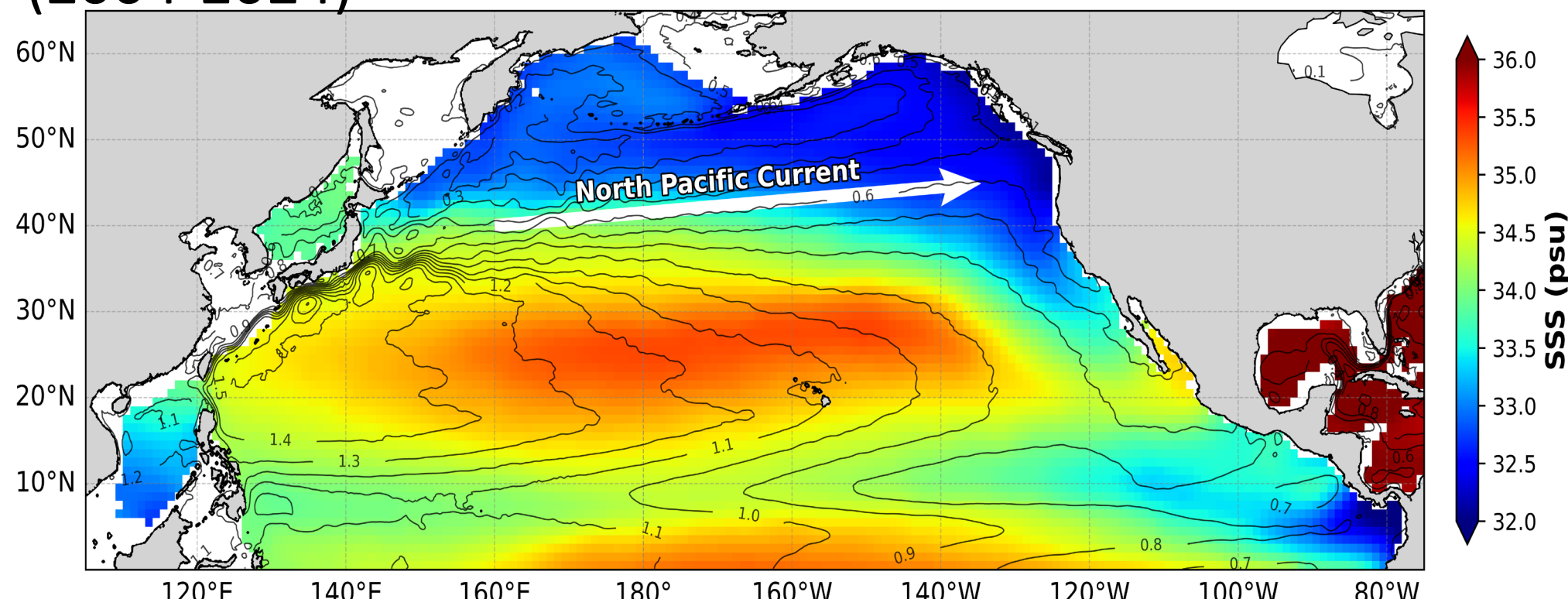


SMOS summer 2024 minus summer 2018 SSS

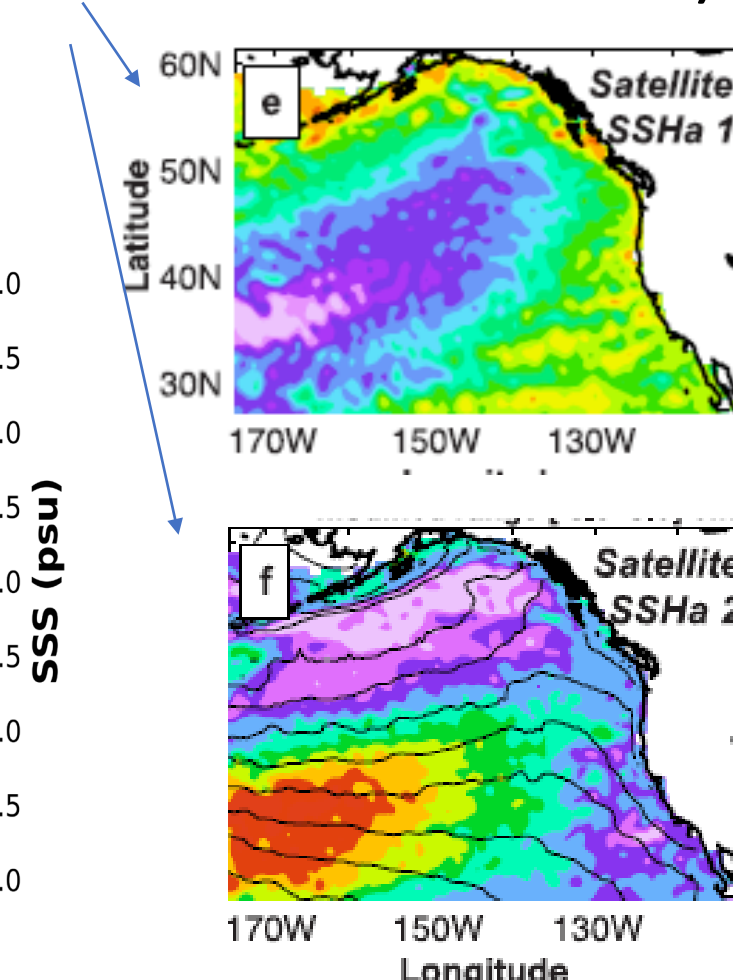


The 2018-2024 freshening in the NEP CTZ reaches depths below 300 m

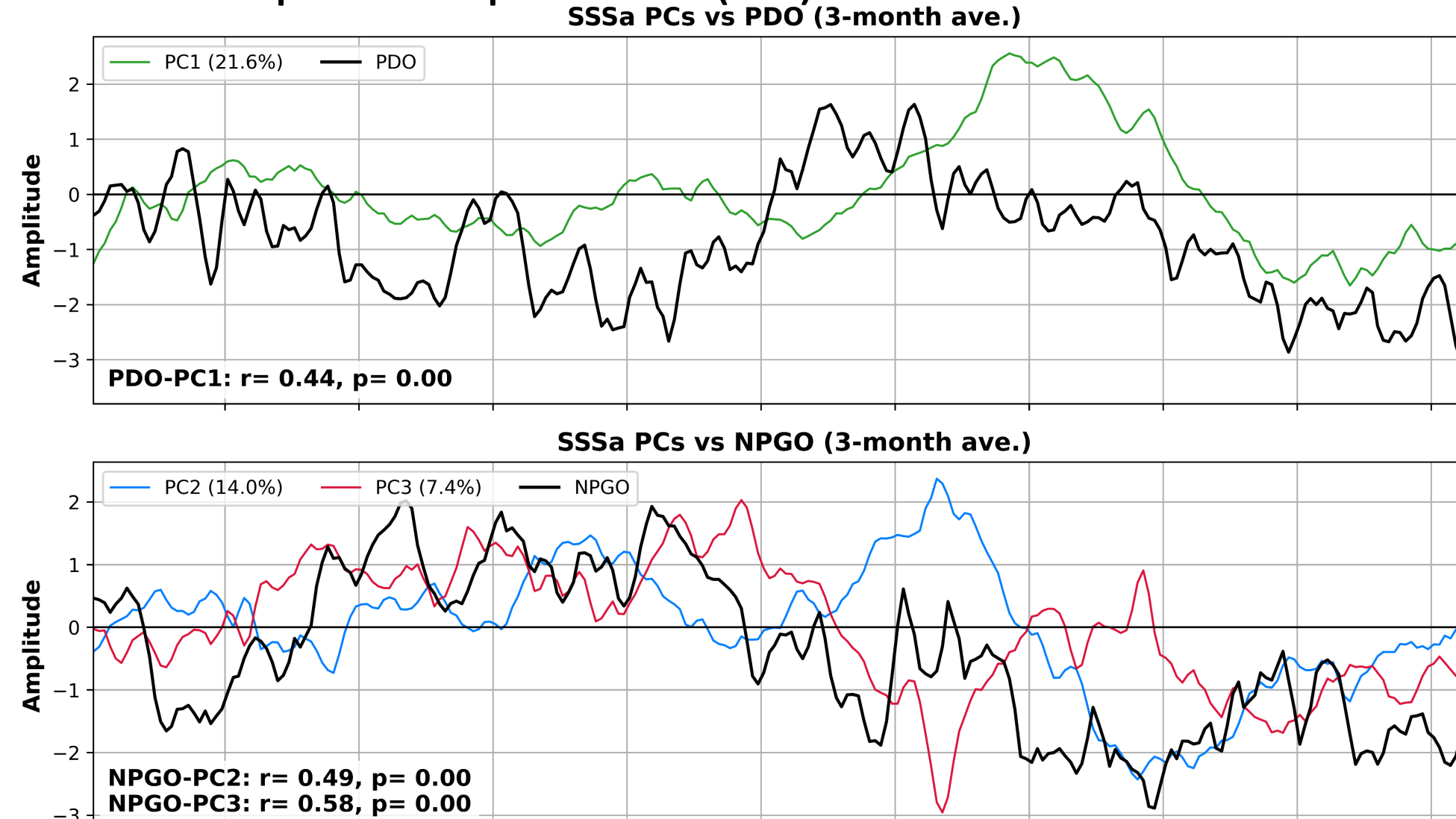
Mean SSS (BOA-Argo) with ADT (CMEMS) contours (2004-2024)



PDO and NPGO patterns (from Di Lorenzo et al. 2008)



SSS Principal Components (PC) vs PDO and NPGO PC



Summer mean of Argo profiles found in the BC and CenCA boxes minus the 2018 summer mean

