The Tropical and North Pacific Ocean (TPO and NPO, respectively) host significant climate variability modes, namely the El Niño–Southern Oscillation (ENSO) and Pacific Decadal Oscillation (PDO). The climatic variabilities in the NPO and TPO are integrated. Consequently, separating the variability of SSTAs over the TPO and NPO into interannual and decadal components is a rather complex process, as these signals are integrated. These climate variabilities over the TPO and NPO have global impacts through both oceanic pathways and atmospheric bridges.

Possible Driving processes over the Oceanic Pathway

- Upper-layered LST:
  - Ekman transport ↑
  - Insignificant NECB migration
  - Upper-layered LST ↑

- Deep-layered LST:
  - The detrending ASLA between the two sides of the Luzon Strait moderately correlates (r = 0.48) with the ΔOBP, implying remote modulation from upper-layer processes.
  - During the warm PDO and EP El Niño-like phase, ASLA increases due to the influence of southwesterly wind stress anomaly, and its time series moderately correlates with that of PCl.

Possible Driving processes over the Atmospheric Bridge

-strong Ekman transport ↓
- northerly NECB
- Upper-layered LST ↑

Conclusion

- Our study reconstructed the SSTAs variability of TPO and NPO into three coherent modes, and indicate that the teleconnection of the TPO and NPO greatly contribute to the formation of different climate variabilities.
- We highlighted evidence of how these variabilities are impacting the potential temperature variability of the deep SCS.
- These results have important implications for depicting the variability of marginal seas in response to global climate variability.
- There is still a very long way to go in unraveling the dynamic processes.

Reference

