

Anthropogenic footprints on ENSO and its precursor

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Motivation & Objectives

- El Niño and Southern Oscillation (ENSO) is the most important natural climate variability,
- Understanding how this is affected by Anthropogenic forcings is an active area of research.
- We use ENSO's precursor, which occurs in advance of El Niño or La Niña event, to diagnose how ENSO can be affected by the anthropogenic forcings.

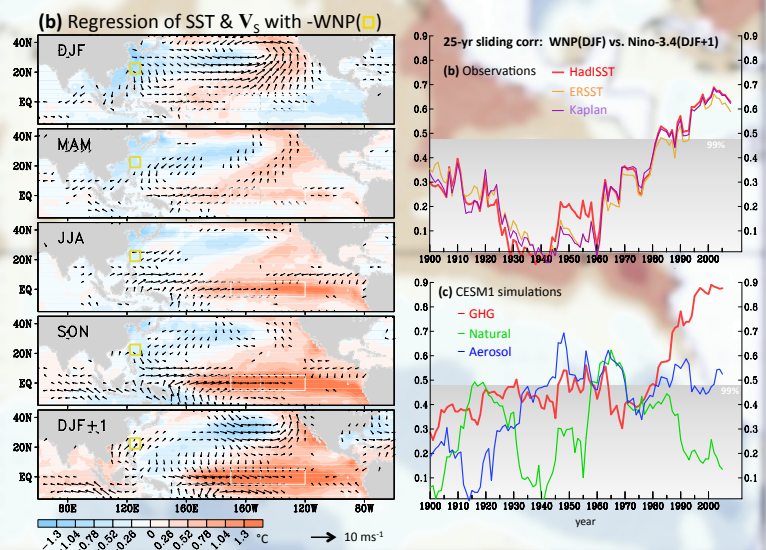
Scientific questions & Tools

- A particular precursor of interest is Sea Surface Temperature (SST) over the Western North Pacific (WNP) Ocean.

1. Has the relationship between ENSO and WNP changed in the last century?
2. Can the coupled climate model, Community Earth System Model (CESM), reproduce this relationship?
3. What is the underlying mechanism for such a change?

Various historical observational datasets (Hadley SST, ERSST, Kaplan SST, and 20CR) and historical & single forcing experiments of CESM1.

Results



- Based on observational dataset, colder SST over the WNP leads warming of the equatorial central Pacific by one year. And this relationship has been **strengthening in the last 50 years**.
- Historical simulation of CESM1 is capable of capturing this relationship and its change.
- Sensitivity experiments indicates **Greenhouse Gases (GHGs) as the major cause** for such a change.
- This particular ENSO precursor is linked to **2013-14 California drought**. → A poster tomorrow

Wang S-Y, M. L'Heureux, and J.-H. Yoon, 2013: Are greenhouse gases changing ENSO precursors in the Western North Pacific? J. Climate, 26, 6409-6322



Acknowledgements: Funding from Earths System Modeling Program and computational resources from NERSC. For more information, please contact Jin-Ho Yoon: Jin-Ho.Yoon@pnnl.gov

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