Hydroclimate response patterns of TOA radiation cover trends. SW and in regional temperature radiation trends.

- Divergent tropical SST trends dictate global temperature and radiation patterns through cloud forcing.
- Regional precipitation trends show varying degrees of sensitivity to either Niño 3.4 trends or the general forced response (GHGs, aerosols).
- CAM6 simulations with synthetic but realistic SSTs generated by a Linear Inverse Model (LIM-LE) trained on observations (ERSSTv5).

**Approach:**
- We can study the pattern effect using AMIP simulations with observed SSTs, but this represents just one of many possible historical SST realizations.
- Large ensembles (LEs) with coupled models offer many realizations but can contain SST biases in trend and variability.

**Results:**
- We chose end members in terms of long-term trends in Nino3.4 from the LIM-LE and conduct 10-member CAM6 ensembles with a TOGA setup.
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**Synopsis**

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**Temperature and radiation patterns**

We ran 3 10-member CAM6-TOGA ensembles with:
1. La Niña-like trend
2. Observations (3)
3. El Niño-like trend

**Hydroclimate response patterns**

Despite the very different tropical SST forcing, all TOGA ensembles show a similar North Pacific SLP response, overall promoting a precipitation decline over the Western US (atmospheric circulation forced response not as sensitive to SST trend pattern?).

**Benchmarking of synthetic SSTs**

LIM tends to have smaller biases than CESM2 (and other models) and a more realistic ENSO.

**Data / References / Seeking postdoc**

Model output from all 3 TOGA ensembles is on Cheyenne – let us know if you would like to use it.

Kuo et al., in prep., on hydroclimate response pattern

We are looking for a 2-year postdoc to work on related topics (broadly: hydroclimate projections, model evaluation, emergent constraints). Get in touch with Flavio Lehner if interested.