

# Internal ocean-atmosphere variability plays a primary role in influencing future projections of ENSO changes in response to anthropogenic forcing

## Objective

Analyze effect of coupled internal variability on ENSO using the Community Earth System Model (CESM).

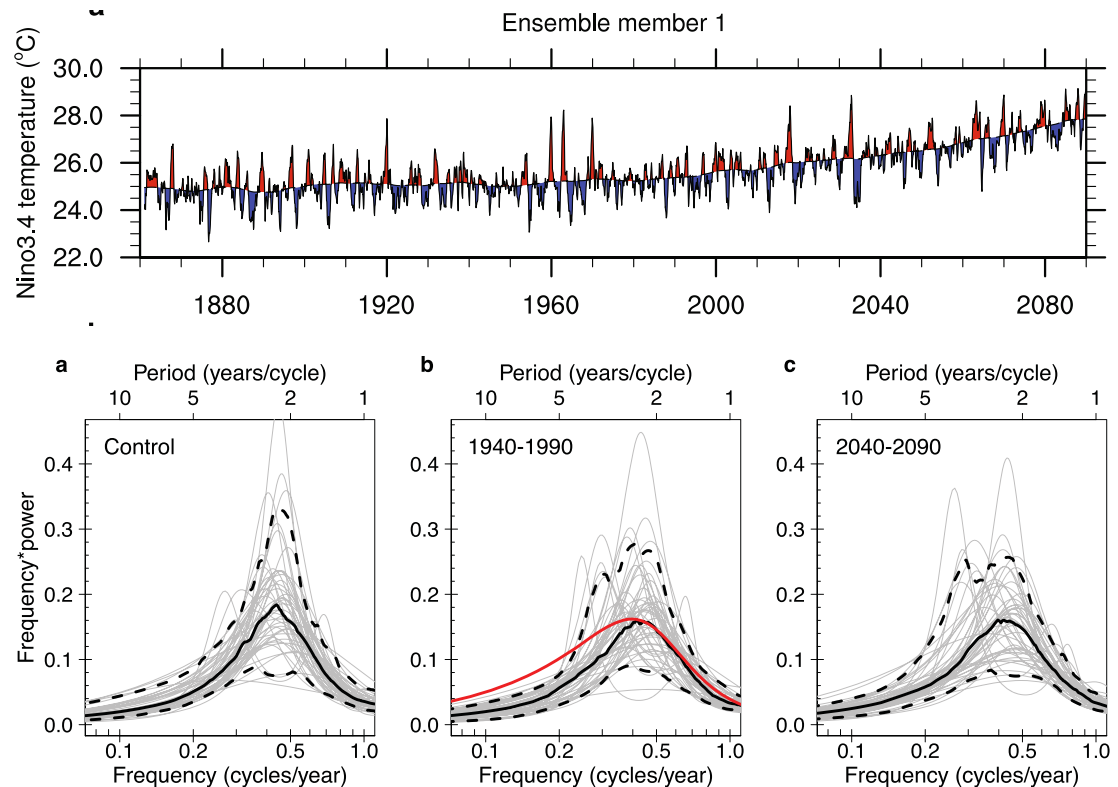
## Approach

Results are presented from a ~5000 year pre-industrial control run combined with a 50-member climate change ensemble experiment, including handcuts (1850-2005) and projections (2006-2100) using RCP8.5

## Impact

Internal variability contributes substantially to key ENSO projections, though ensemble statistics are relatively stable between different forcing conditions.

The primary role of natural modulations in this ensemble highlights the importance of careful assessment of ocean-atmosphere internal variability in ENSO projections.



**Top:** Sample Nino3.4 SST time series from the low-res coupled CESM initial conditions ensemble (Srver et al., 2015). **Bottom:** Maximum entropy power spectra of CESM Nino3.4 SST under different forcing regimes: (a) pre-industrial; (b) 1940-1990; and (c) 2040-2090. Individual members are shown in grey, dashed curves are the 5th and 95th percentiles, and the solid black curve is the median. Red curve is observations

Vega-Westhoff, B., Srver, R. L. (2017), Analysis of ENSO's response to unforced variability and anthropogenic forcing using CESM, Nature Scientific Reports, 7, 18047, doi:10.1038/s41598-017-18459-8.



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