

Predictions of returning La Niña for next winter using CESM1

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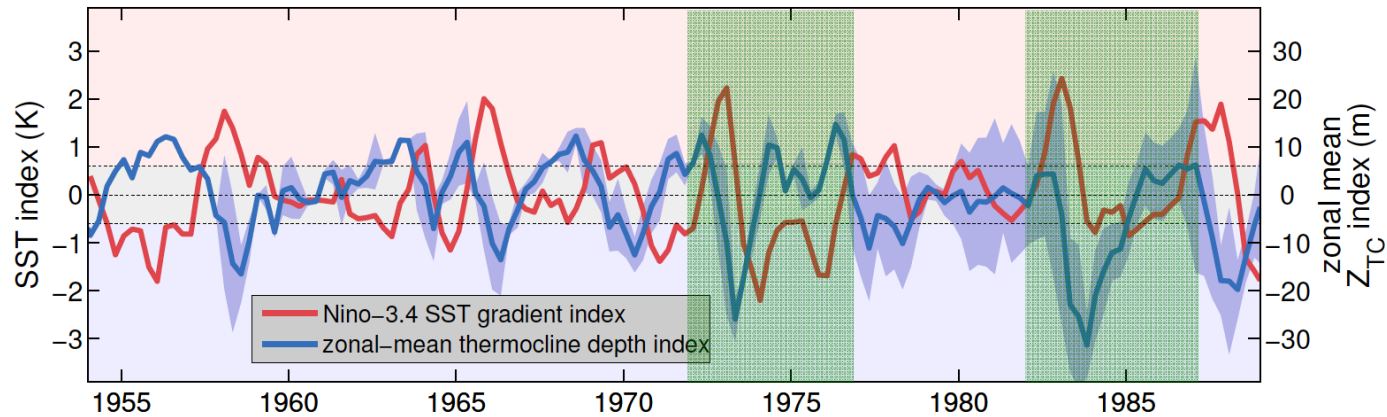


NCAR



MAPP
Modeling, Analysis,
Predictions, and Projections

The strongest El Niño on record were followed by: strong thermocline discharge and 2-year La Niña



Will La Niña return next winter?

CESM simulations (LENS version)

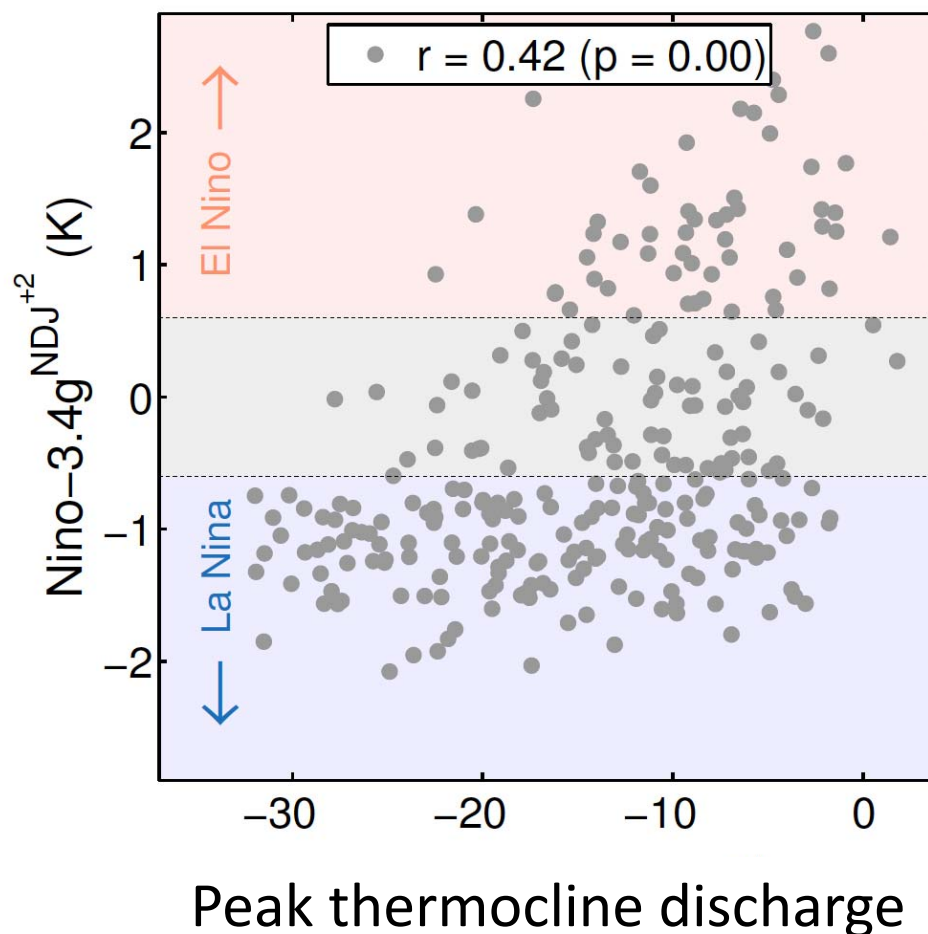
1. Long control

- Statistical analysis of predictors of 2-yr La Niña.

2. Decadal Prediction Large Ensemble (CESM-DP-LE)

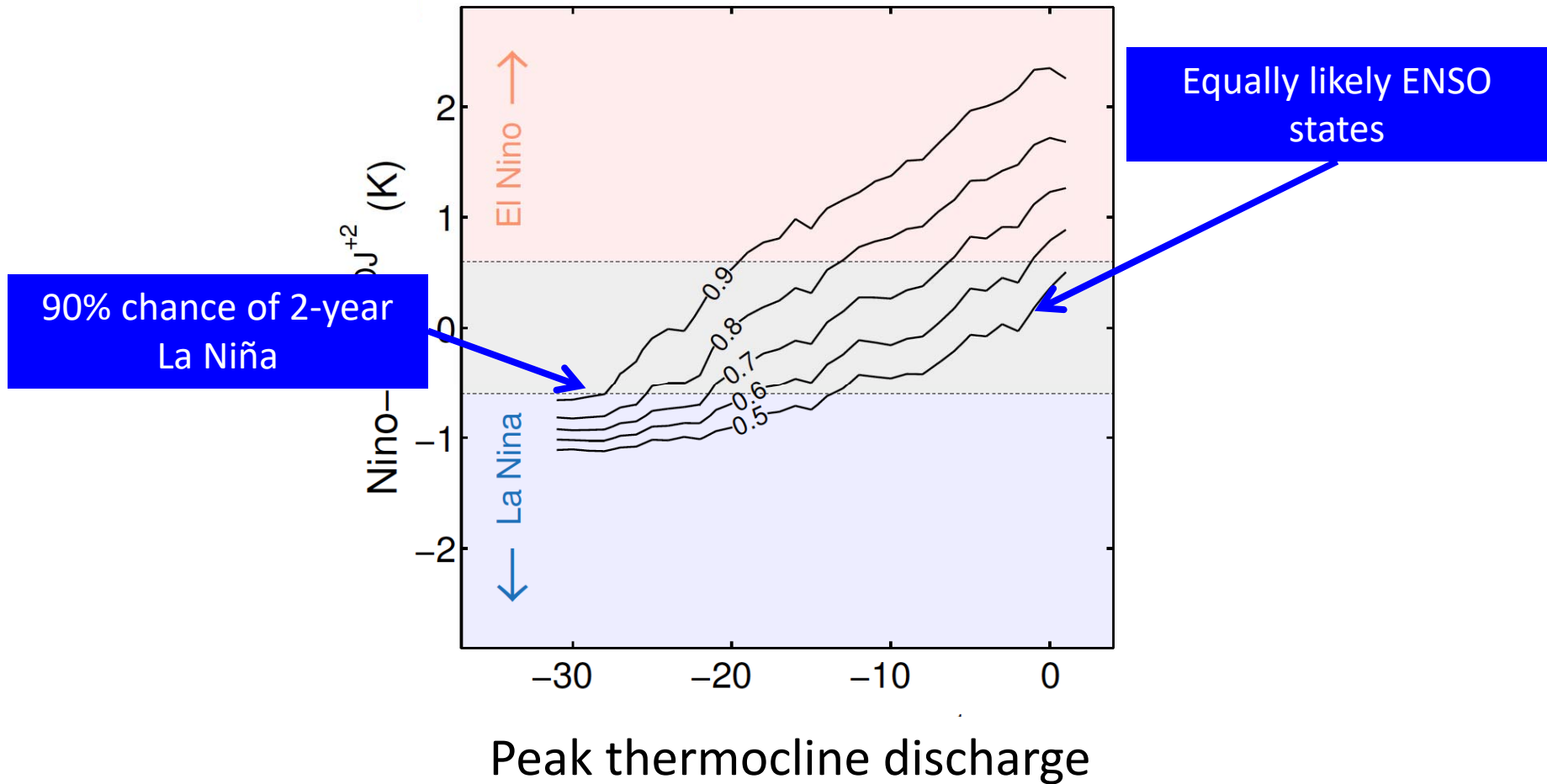
- 40 member ensembles initialized on **November** of each year since 1954.
 - Includes forecast initialized on Nov 2015 used to predict current event.
- Drift corrections applied.
- Retrospective skill verified against AR1 process.

2-year La Niña are related to thermocline discharge in the CESM control

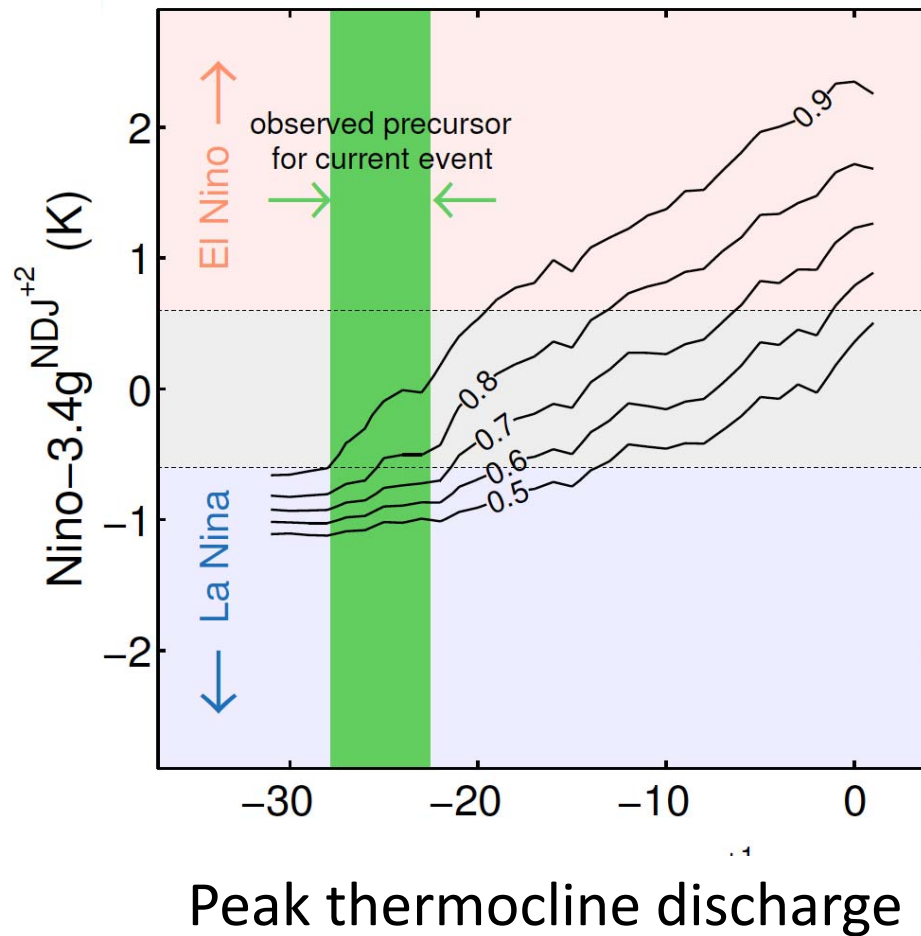


Each dot corresponds to an ENSO event from the long control

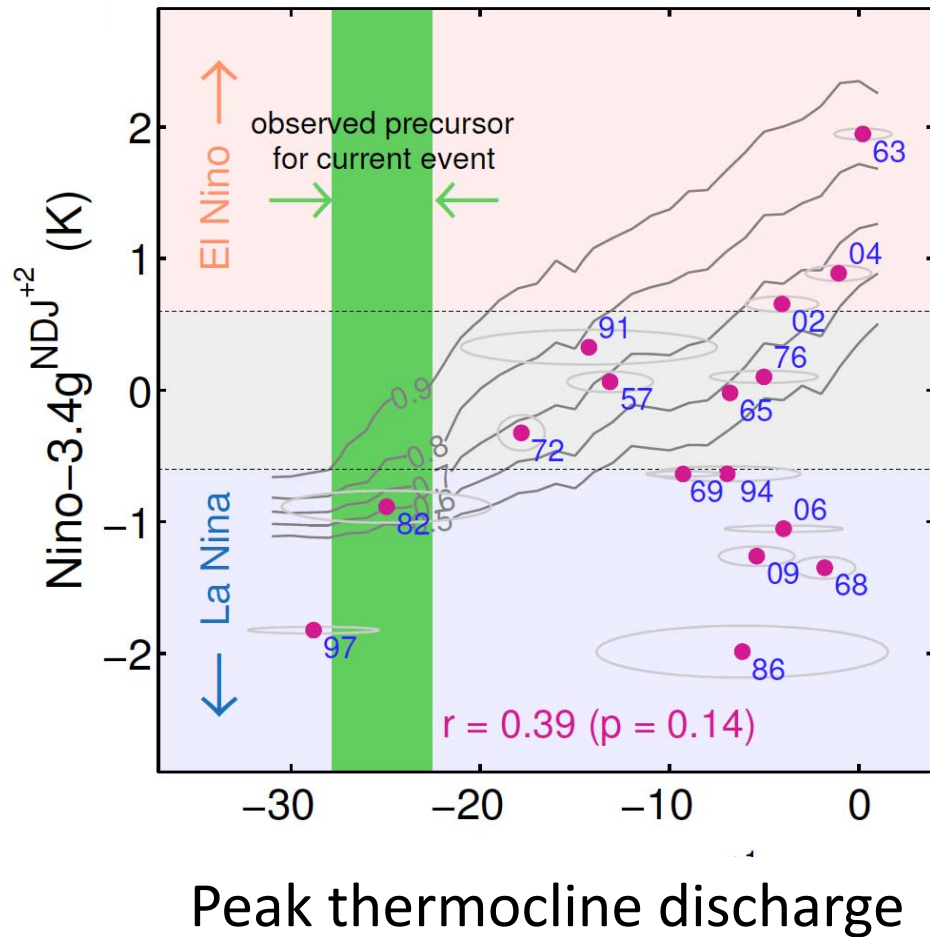
Highly likely 2-year La Nina after strong thermocline discharge



80% chance of 2-year La Niña according to observed precursors



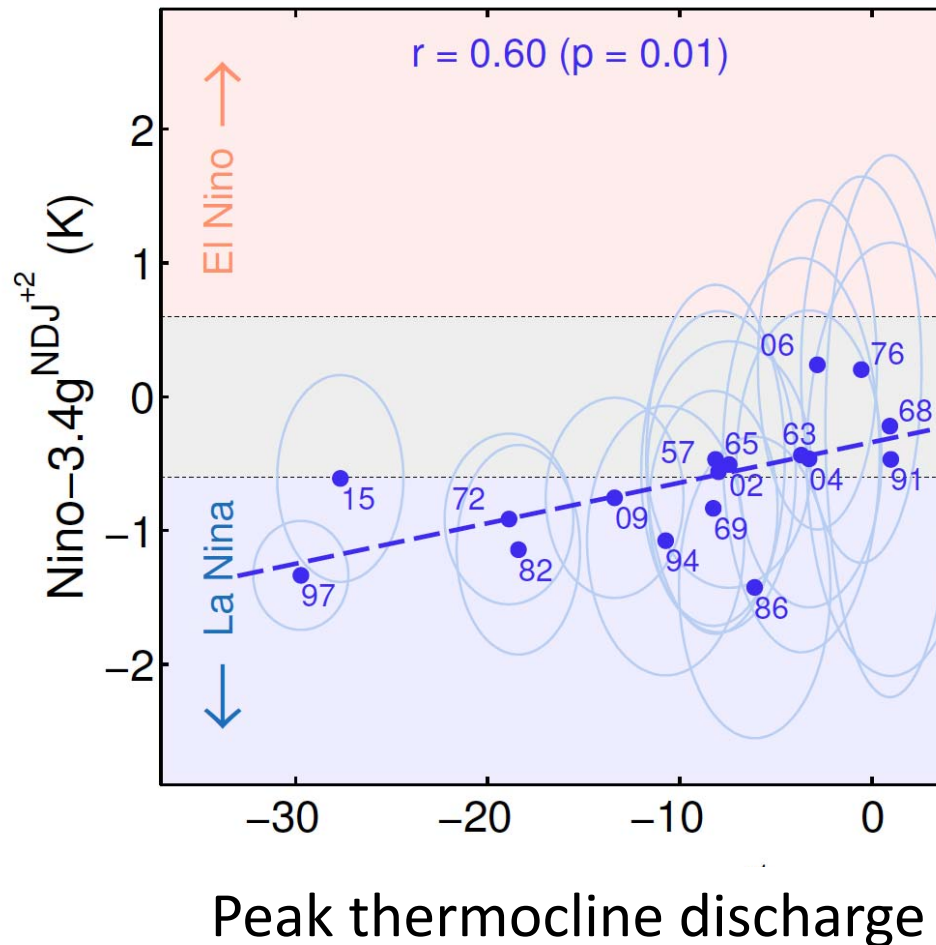
Consistent with previous 2-year La Niña preceded by strong El Niño



Each dot corresponds to an observed La Niña

Ellipses indicate observational uncertainty

CESM-DP-LE predicts 2-year La Nina when preceded by strong thermocline discharge

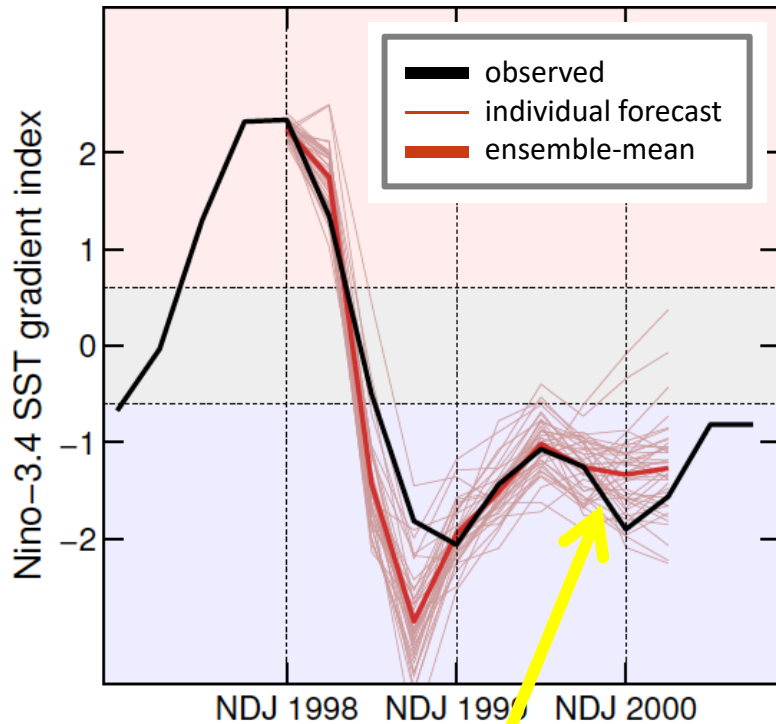


Each dot corresponds to a predicted La Nina

Ellipses indicate forecast spread

The current event is not a repeat of 1997/98 according to the CESM-DP-LE

hindcasts initialized on
Nov 1997



95% of the members
predict 2-year La Nina

Conclusions

- **La Nina conditions for next winter more likely than not**
 - 80% based on the magnitude of the observed thermocline discharge.
 - 60% chance based on initialized forecasts.
 - 50% likelihood based on historical observations.
 - Could have been predicted 18 to 24 months in advance.