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Speaker：Chen-Che Hung

Advisor：Prof. Jia-Yuh Yu, Prof. Li-Chiao Wang

# Simulating Eastern- and Central-Pacific Type ENSO Using a Simple Coupled Model


## Abstract

Current general circulation models (GCMs) have serious problems in accurately showing the structure of central-Pacific (CP) El Niño. Observational studies suggest that thermocline (TH) feedback is key for eastern-Pacific (EP) El Niño, while zonal advective (ZA) feedback is more important for CP El Niño. This study uses a simple linear air-sea coupled model to study these two types of El Niño. The model is good at showing the role of TH and ZA feedbacks in the equatorial Pacific. Results show that if TH feedback is turned off and only ZA feedback is active, the model can recreate the main features of CP ENSO, proving that ZA feedback plays a major role in its development.

Additional tests show that the model, using a basic nonlinear control method, can capture key ENSO features, such as both CP and EP El Niño types and the differences between El Niño and La Niña. This highlights the importance of correctly showing sea surface temperature patterns and related ZA feedback, which GCMs often struggle with, for simulating CP El Niño accurately.



## Keyword

El Niño-Southern Oscillation diversity


## Reference


Fang, X. H., and F. Zheng, 2018: Simulating eastern- and central-Pacific type ENSO using a simple coupled model. *Adv. Atmos. Sci.*, **35**(6), 671–681, https://doi.org/10.1007/s00376-017-7209-9.