

# CGD SEMINAR



**DATE:** Tuesday, 19 December 2017

**TIME:** 11 a.m.

**LOCATION:** NCAR, 1850 Table Mesa Drive  
Mesa Lab, Main Seminar Room

**TITLE:** Role of perturbed frequency and damping  
for El Niño-Southern Oscillation  
irregularity

**SPEAKER:** Judith Berner, NCAR

## ABSTRACT:

In this talk I will investigate the mechanisms by which perturbations to atmospheric processes with fluctuation timescales of a few hours can affect the regularity of the El Niño-Southern Oscillation (ENSO).

Two integrations of the NCAR Community Climate System Model are considered: a control simulation is compared to a simulation in which the Stochastically Perturbed Parameterization Tendencies (SPPT) scheme is applied to the atmospheric model component. Compared to the control simulation, the SPPT simulation displays an improved representation of ENSO, including reduced inter-annual sea-surface temperature variability, shorter temporal memory and more irregular oscillation between El Niño and La Niña states.

It is shown that a linear inverse model (LIM) fitted to the model simulations yields good predictions of tropical interannual variability. In particular, characteristic features of ENSO can be well described by the least-damped oscillatory eigenmode. The change in this ENSO mode through SPPT is consistent with perturbations to the frequency of a linear oscillator, resulting in a noise-induced stabilization.

While in this study, the increase in ENSO irregularity was achieved through a stochastic parameterization scheme, such an improvement may also be realized through changes in the deterministic parameterization schemes or increased numerical resolution. Here, we propose LIM techniques as a general tool to gain insights on differences in model simulations and nature, allowing for investigation of questions surrounding model sensitivity, uncertainty, and bias.

**Live webcast:** <http://www.fin.ucar.edu/it/mms/ml-live.htm>

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