

# CGD SEMINAR



**DATE:** Tuesday, 13 September 2016  
**TIME:** 11 a.m.  
**LOCATION:** NCAR, 1850 Table Mesa Drive  
Mesa Lab, Main Seminar Room  
**TITLE:** Improving ENSO variability in the  
Community Earth System model by  
increasing resolution and introducing  
stochastic perturbations  
**SPEAKER:** Judith Berner, NCAR/CGD

## ABSTRACT:

The El Niño–Southern Oscillation (ENSO) is an irregularly periodical variation in winds and sea surface temperatures over the tropical eastern Pacific Ocean, affecting much of the tropics and subtropics. It is the dominant coupled mode of inter-annual variability in the tropical Pacific. Through many teleconnections it impacts on weather worldwide and a source for extended predictability, so should be well represented in global climate models. However, many climate models have large deficiencies in representing the spatial structure, temporal variability and amplitude of ENSO.

At a nominal resolution of 1 degree in the atmospheric and oceanic components, the SSTs variability in the tropical Pacific as simulated by CESM is too strong and ENSO periodicity too regular. At higher resolution, the SST variability is reduced and the power spectrum in the Niño3 region much improved, leading to a much closer match with observations. The same is seen in simulations at 1 degree, but with a stochastic parameterization in the atmospheric component.

We hypothesize that added degrees in the atmospheric component are crucial for a better representation of ENSO variability. In both, the high-resolution and stochastically parameterized simulation, the Walker circulation is strengthened and convective intermittency decreased leading to a more realistic forcing for the oceanic component. Since the mechanisms responsible for the improvement are readily controllable in the stochastically perturbed simulations, it is argued that stochastic parameterizations are a useful tool to study model sensitivity in addition to improve mean and variability.

**Live chat:** <http://www.fin.ucar.edu/it/mms/ml-live-chat1.htm>

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

For more information, contact Gaylynn Potemkin, email [potemkin@ucar.edu](mailto:potemkin@ucar.edu), phone: 303.497.1618