

Fall 2018

Mathematical Sciences

Colloquium

A Simple Stochastic Model for El Niño with Westerly Wind

The El Niño Southern Oscillation (ENSO) is the most prominent year-to-year climate variation in the tropics, with dramatical ecological and social impacts. It consists of alternating periods of anomalously warm El Niño conditions and cold La Niña conditions in the equatorial Pacific every 2 to 7 years, with considerable irregularity in amplitude, duration, temporal evolution and spatial structure of these events.

Intraseasonal atmospheric wind bursts in the tropics plays a key role in the dynamics of the ENSO. A simple stochastic dynamical model is proposed that summarizes this relationship and captures major features of the observational record. Within this simple framework, wind bursts evolves according to a stochastic Markov switching-diffusion process that depends on the strength of the western Pacific ocean warm pool, and are coupled to simple ocean-atmosphere processes that are otherwise deterministic and stable.

The present model provides further theoretical and practical insight on the relationship between wind bursts and the ENSO. The state-dependency of wind bursts allows the model to capture the ENSO diversity, including the eastern Pacific moderate and occasional super El Niño, the central Pacific El Niño as well as the La Niña. ..

Speaker: Sulian Thual

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Monday, February 26, 2018

Time: 4:00 – 5:00 PM

Location: Lally 104
