



复旦大学数学科学学院 数学综合报告会

报告题目: **A Simple Stochastic Model for El Niño with Westerly Wind Bursts**

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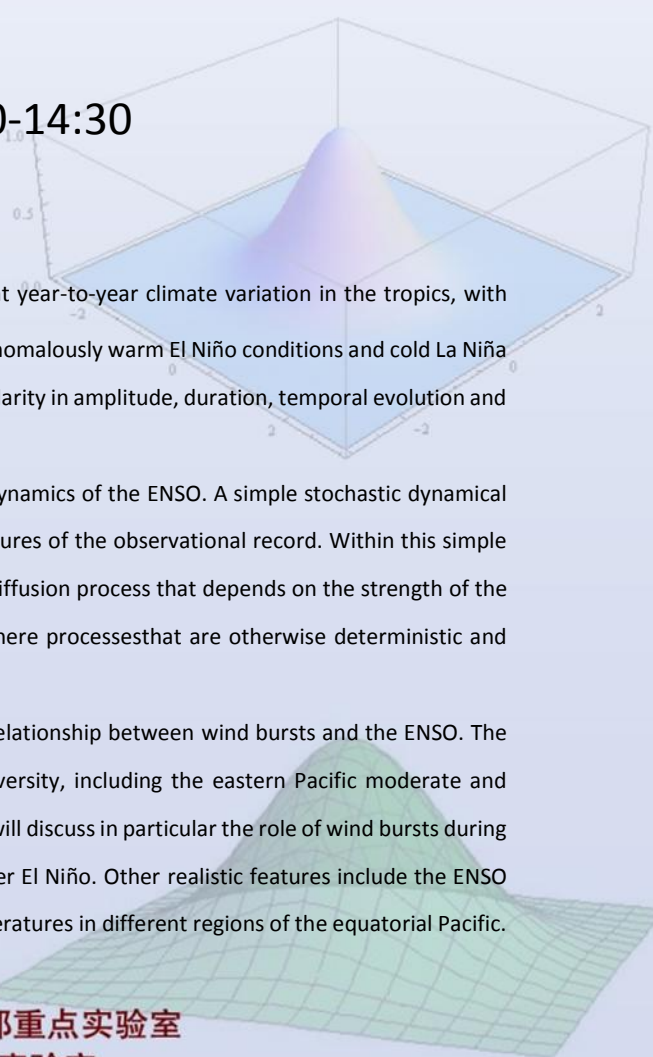
报告时间: 2018-03-14 星期三 13:30-14:30

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摘要: 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. We will discuss in particular the role of wind bursts during the 2014-2016 period marked by a stalled El Niño favoring a subsequent super El Niño. Other realistic features include the ENSO intermittency, non-Gaussian statistics and power spectra of sea surface temperatures in different regions of the equatorial Pacific.



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