

Understanding El Niño Dynamics and its Variability

Fei-Fei Jin

University of Hawaii at Manoa

Abstract

El Niño refers to major climate events that recur every few years, with ocean surface temperatures often reaching a few degrees Celsius warmer than normal over a vast area of the Tropical Pacific. These events reorganize the Earth's weather and climate patterns, causing global environmental and socio-economic impacts. It was first recognized 50 years ago that El Niño results from an instability involving basin-scale dynamic interaction between two geophysical fluids, namely the atmosphere and oceans. In the last 30 years, advances in El Niño theory have led to deeper understandings of basic mechanisms for many key aspects of El Niño, including the nature of the instability that causes it, its complexity with different flavors, and its frequency cascade via interaction with the annual cycle. I will present a brief review of the progress of El Niño dynamics and discuss remaining challenges.