

# 报告

利用地球系统模式预测厄尔尼诺对东亚地区气候的影响

## Impacts of El Niño on East Asian Climate-Evaluating Earth System Models and Their Predictions

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### 讲者介绍 Biography

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Prof. TAM obtained his Ph.D. in Atmospheric and Oceanic Sciences from Princeton University. His research interests cover the areas of climate predictions, dynamics of the tropical and monsoon circulation, simulations of extreme weather and climate events (tropical cyclones, heavy rainstorms, El Nino-Southern Oscillations), as well as impacts of global warming and urbanization, using Earth System Models.

### 报告摘要 Abstract

厄尔尼诺-南方涛动 ( ENSO ) 能够通过遥相关影响赤道太平洋地区以及远处地区的大气和海洋环流。 ENSO 是气候年际变化可预测性的主要来源。利用最先进的地球系统模式 ( ESMs ) 对 ENSO 和其对区域气候的影响进行预估及长期预测仍具有挑战性。

在本报告中, 我们首先介绍 ENSO 的多样性及其遥相关, 以及评估 ESMs 对其模拟的表现。接下来我们利用 CMIP5/CMIP6 模式, 以东亚地区为研究对象, 研究这些气候变化要素在未来全球变暖条件下的表现。我们将特别强调模式中所谓的东太平洋“冷舌”偏差所起的作用。最后, 我们将介绍通过检验 ECMWF 的季节预报结果, 证明了即便正确预测了异常的海洋状态, 平均冷舌偏差也会削弱东亚地区的气候预报能力。

El Niño–Southern Oscillation (ENSO) can affect the atmospheric and oceanic circulations in the tropical Pacific as well as remote regions, through the teleconnection effect. ENSO is also the major source of interannual climate predictability. Prediction/long-term projection of ENSO and its regional climate impacts, using state-of-the-art Earth System Models (ESMs), are still challenging. In this talk, we first introduce the natural diversity of ENSO and its teleconnection, and evaluate ESMs' performance in their simulations. How these elements of climate variations might behave in the future under global warming will then be examined,

using CMIP5/CMIP6 models, with a focus on the region of East Asia (EA). The role of the so-called eastern Pacific “cold tongue” bias in models will be particularly highlighted. Lastly, we demonstrate that the mean cold tongue bias can erode EA climate forecast skills, even if the anomalous ocean state is correctly predicted, by examining the ECMWF seasonal forecasting results.

### **有兴趣合作之项目 Interested topics for future collaboration**

全球变暖对大气环流、极端天气和气候、ENSO 和印度-太平洋气候模态、亚洲季风及其变率的影响

Global warming impacts on the general circulation, extreme weather and climate, ENSO and Indo-Pacific climate modes, Asian monsoon and its variability