

**Speaker:**

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**Location:**

National Center for Weather and  
Climate Prediction  
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**Remote Access:**

<https://global.gotomeeting.com/join/621184917>  
Meeting ID: 621-184-917  
Conference call: 1-877-680-3341  
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# Spring Land Surface and Subsurface Temperature Anomalies and Subsequent Downstream Late Spring-Summer Droughts/Floods in North America and East Asia

**Abstract:**

Extreme climate events, such as droughts and floods, are important features of Earth's climate and have large impacts on society. While studies have shown connections between sea surface temperature (SST) variability and land precipitation, they also suggest that SSTs are unable to fully predict these extreme events. The remote effects of large-scale land surface temperature (LST) and subsurface temperature (SUBT) anomalies in geographical areas upstream and closer to the areas of drought and flood have largely been ignored. Here, evidence from climate observations and model simulations addresses these effects. Evaluation of observational data using Maximum Covariance Analysis identifies significant correlations between springtime LST cold (warm) anomalies in both the northwest U.S. and the Tibetan Plateau and downstream drought (flood) events in late spring/summer. To support these observational findings, climate models are used to demonstrate a causal relationship for two important cases: between spring warm LST/SUBT anomalies in northwest U.S. and the extraordinary 2015 flood in Southern Great Plains and adjacent regions; and between spring cold LST/SUBT anomalies in the Tibetan Plateau and the severe 2003 drought south of the Yangtze River. The LST/SUBT downstream effects are associated with a large-scale atmospheric stationary wave extending eastward from the LST/SUBT anomaly region. The effects of SST in these cases are also tested and compared with the LST/SUBT effects. These results suggest that consideration of LST/SUBT anomalies have the potential to add value to intraseasonal prediction of dry and wet conditions, in particular extreme drought and flood events.

