Drought and Heat waves: The Role of SST and Land Surface Feedbacks

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Abstract

Drought occurs on a wide range of time scales, and within a variety of different types of regional climates. At the shortest time scales it is often associated with heat waves that last only several weeks to a few months but nevertheless can have profound detrimental impacts on society (e.g., heat-related impacts on human health, desiccation of croplands, increased fire hazard), while at the longest time scales it can extend over decades and can lead to long term structural changes in many aspects of society (e.g., agriculture, water resources, wetlands, tourism, population shifts).

There is now considerable evidence that sea surface temperatures (SSTs) play a leading role in the development of drought world-wide, especially at seasonal and longer time scales, though land-atmosphere feedbacks can also play an important role. At shorter (subseasonal) time scales, SSTs are less important, but land feedbacks can play a critical role in maintaining and amplifying the atmospheric conditions associated with heat waves and short-term droughts. This talk reviews our current understanding of the physical mechanisms that drive precipitation and temperature variations on subseasonal to centennial time scales. This includes an assessment of predictability, prediction skill, and user needs at all time scales.