#25 Topic: The special case of predictability for eastern United Stated hot days on subseasonal timescales.

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Abstract:

A number of studies have shown the presence of subseasonal predictability for eastern United States, particularly strong when using Sea Surface Temperature Anomalies (SSTA) as predictor. In this work, we have written an algorithm which can automatically retrieve the important SSTA for ('Hot day') events, given a (near) global SST field. We obtained improved predictability up to 60 days in advance. Since the algorithm is generic, we also tested the predictability for Western U.S. hot day events, and found none. We investigated the influence of circulation that favors the occurrence of 'hot day events' and conclude that western U.S. shows an equal (or stronger) relationship compared to eastern U.S. between 'hot day events' and the circulation.

So why are eastern U.S. hot days predictable up to 60 days in advance, while western U.S. shows no predictability at all? Although this is work in progress, we are offering the following explanation. We note that a dominant circulation pattern in summer, i.e. a Rossby wave of wavenumber 5 showing a preferred phase, is influenced by the land-ocean placement, the surface orography (Rocky Mountains and Himalaya) and the Indian summer monsoon system. We hypothesize that eastern U.S. is unique because of a phase alignment between the preferred phase of wavenumber 5 in the atmospheric circulation and a specific SSTA pattern concomitant to dominant modes of ocean circulation (ostensibly an alignment of the positive phase of the Indian Ocean Dipole and the la Nina phase of ENSO), which appears non-existent for Western U.S.. This alignment leads to the predominant presence of a high pressure system over the eastern U.S., which results in desiccation of the soil. Both the dryer soils and the presence of a stalling high pressure system explains the increased probability of a hot day event.