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Sent: Wednesday, December 4, 2024 9:45 AM

To: Delta Council ISB <DeltaCouncilISB@deltacouncil.ca.gov>

Subject: Suggested speakers for Climate Science Symposium -- Pattern Effect, climate models, & drought

[Potential Near-Term Wetting of the Southwestern United States if the Eastern and Central Pacific Cooling Trend Reverses](#)

Marc J. Alessi and Maria Rugenstein

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Abstract Near-term projections of drought in the southwestern United States (SWUS) are uncertain. The observed decrease in SWUS precipitation since the 1980s and heightened drought conditions since the 2000s have been linked to a cooling sea surface temperature (SST) trend in the Equatorial Pacific. Notably, climate models fail to reproduce these observed SST trends, and they may continue doing so in the future. Here, we assess the sensitivity of SWUS precipitation projections to future SST trends using a Green's function approach. Our findings reveal that a slight redistribution of SST leads to a wetting or drying of the SWUS. A reversal of the observed cooling trend in the Central and East Pacific over the next few decades would lead to a period of wetting in the SWUS. It is critical to consider the impact of possible SST pattern trends on SWUS precipitation trends until we fully trust SST evolution in climate models.

Key Points:

The observed Equatorial Pacific cooling trend, unpredicted by climate models, may have led to decreased precipitation in the southwestern US

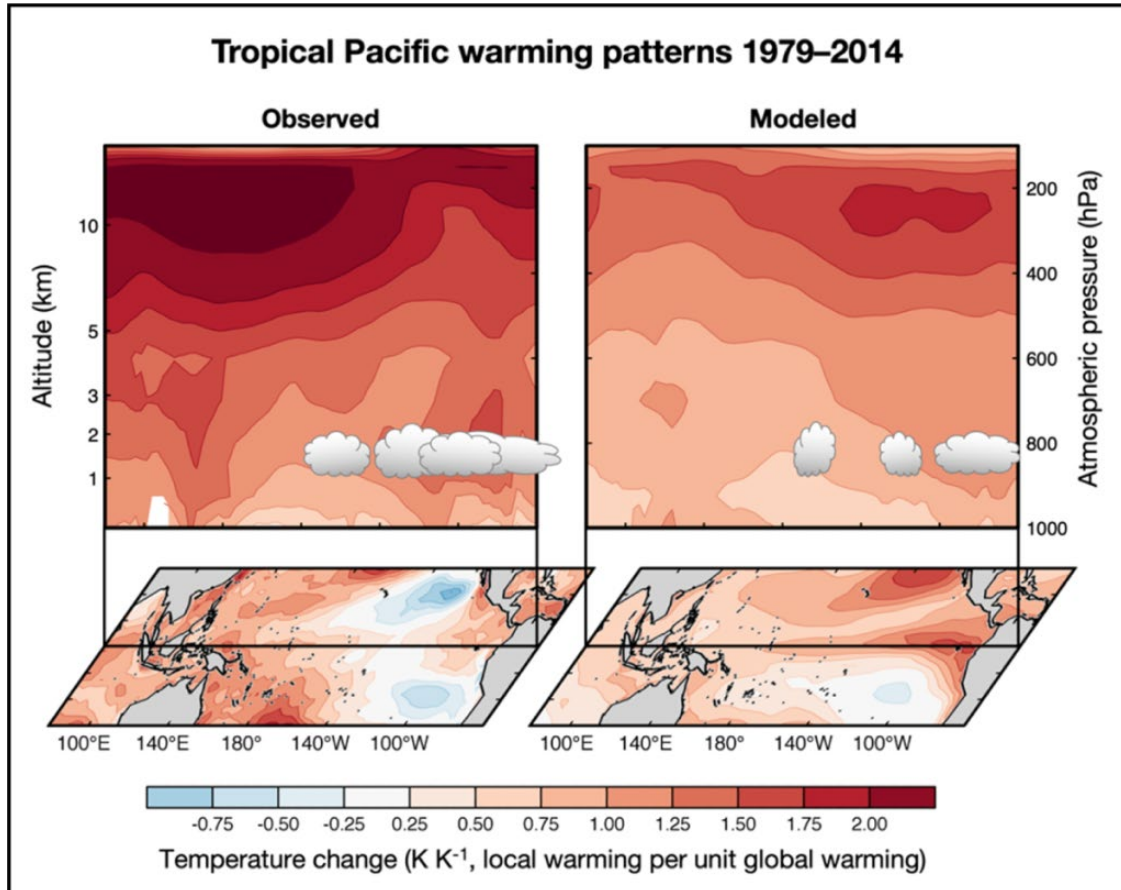
With a sea surface temperature precipitation Green's function, we find that small changes in sea surface temperature can either wet or dry the southwestern US

A reversal of the cooling trend in the Equatorial Pacific could lead to a wetting trend in the southwestern US

Maria Rugenstein was also a co-author of [Patterns of Surface Warming Matter for Climate Sensitivity](#), a synthesis of the 2022 US CLIVAR workshop on the Pattern Effect. Other co-authors were Mark Zelinka, Kristopher B. Karnauskas, Paulo Ceppi and Timothy Andrews.

Mark Zelinka (LLNL) or Kris Karnauskas (UC Boulder) would also be good speakers on the Pattern Effect.

Figure from paper:



Excerpt:

The most pressing question is whether climate model simulations will be as far off from observations in the future as they have been relative to recent past conditions (compare Figure 2, left and right). If this turns out to be the case, how will model biases in surface warming trends be reflected in radiative feedbacks and global mean warming rates? We need to quantify whether coupled models compensate for their bias in the surface warming pattern and radiative feedbacks through erroneous ocean heat uptake rates or aerosol forcings.

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California Water Research

Climate change, adaptation & western water from nonlinear dynamics & complex systems perspective

Former researcher, Santa Fe Institute, Center for Nonlinear Studies at Los Alamos National Lab, NASA Ames



"We aren't just failing to address the growing climate crisis to come; we're unprepared even for the impacts already here—in part because they keep surprising us with their intensity and in part because we can't seem to fathom our genuine vulnerability." – David Wallace Wells

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