

**ATS/CIRA Colloquium**

**Ulla Heede**

**from [C]Worthy in Boulder**

**Hosted by Maria Rugenstein**

**3 p.m. Thursday, April 4**

**ATS 101 and Zoom**

## **Tropical Pacific Warming Patterns Influence Future Hydroclimate Extremes in the Americas**

The tropical Pacific has an uncertain future. The issue of how the tropical Pacific will respond to global warming is vigorously debated, yet, unfortunately, we still have no clear answer whether the eastern Pacific will experience enhanced warming in the 21<sup>st</sup> century as global climate models predict, or whether current multi-decadal trends of relative cooling will continue, or perhaps plateau. It is possible that the uncertainty with regards to the tropical Pacific flows into our societal climate change risk assessments, but due to the strong agreement among IPCC-class global climate models on the decrease of the east-west sea-surface temperature trend in the tropical Pacific (yet disagreement with the observed increase of this gradient), it is not clear from a conventional multi-model assessment how and to what extent the tropical Pacific warming patterns plays a role in terrestrial climate change impacts in adjacent continents.

In this talk, I present a study in which my co-authors and I address this issue head on by designing a novel set of A-GCM experiments where everything is held constant *except* the pattern of warming in the tropical Pacific. Furthermore, an idealized ENSO cycle is superimposed to isolate how a changing mean state affects ENSO teleconnections while assuming no change in ENSO itself. This way, we can pinpoint the effects of long-term tropical Pacific warming patterns on regional terrestrial hydroclimates in the Americas. We find that the eastern Pacific warming has a significant effect in several regions across the Americas manifesting in as both modulation of long-term trends, and changes in ENSO-related extreme events.

Colloquia page: [atmos.colostate.edu/colloquia](https://atmos.colostate.edu/colloquia)