



Decadal Variability of the Tropical Climate and Its Impacts on Missouri River Basin Water Resources and Agriculture: The Roles of Precipitation as Cause and Effect

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Experiments with ocean general circulation models show that some of the observed decadal variability of the tropical climate, such as that of the Indo-Pacific Warm Pool, the tropical Atlantic, and the so-called Pacific Decadal Oscillation, can be generated by slow oceanic adjustments to changes in density gradients in the tropical oceans forced by intraseasonal and interannual variability in atmospheric freshwater flux (evaporation minus precipitation). These tropical decadal climate variability patterns then excite variability in extratropical atmospheric circulation, especially in the boreal summer. These atmospheric circulation changes impact the hydro-meteorology (precipitation, temperature, humidity) of the Missouri River Basin (MRB) in the U.S. significantly, resulting in impacts on water resources and agricultural production. Precipitation thus seems to play important roles both in the cause of the tropical decadal variability as well as in the effect on society in the MRB. Results of analyses of observations and simulations with an ocean general circulation model, a hydrology model, and a crop model will be described and discussed in this presentation.