

The Effect of SW Drought on Precipitation of Evapotranspired Origin

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Evapotranspiration accounts for the majority of the water budget in arid and semiarid regions such as the southwestern U.S. In this region evapotranspiration dynamics are particularly important during the monsoon season, when the combination of increased soil moisture, energy availability and atmospheric demand promotes the transference of water to the atmosphere via direct evaporation from the soil or transpiration by vegetation. Our work shows that moisture evapotranspired in the Southwestern US contributes to precipitation throughout North America, particularly the Central Plains and the Midwestern US. Moisture evapotranspired in the four corners region of the Southwest contributes to an average 15% of the total summer precipitation in regions of Wyoming, Nebraska and Kansas. We find that during the 2000-2003 drought period, the decrease in precipitation and evapotranspiration within the four corners region significantly decreased the amount of recycled precipitation of downwind regions. Our study illustrates the importance of moisture transport through atmospheric pathways, a process that enhances ecosystem connectivity in much the same way as the widely recognized surface and subsurface transport of moisture.

HYDROMETEOROLOGY INTEGRATION