



## **Significant Impact of Persistent Spring-Summertime Soil Moisture Anomalies on Summer and Autumn Precipitation in China**

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Previous studies have investigated a possible influence of springtime soil moisture (SM) anomalies on the subsequent summertime precipitation in China. To examine whether significant impact of the preceding East Asia soil moisture (SM) on precipitation over China in other seasons can also be detected, a lagged maximum covariance analysis (MCA) is applied as a function of time lag and season to monthly SM and precipitation data. Three SM datasets from the NOAA CPC, ERA-40 and ERA-Interim reanalysis are used in the MCA to counter the limitation of the model dependence of computational estimates. Autumn precipitation signals are also found significantly correlated with SM anomalies from the preceding late spring to summer in the first MCA mode in the ERA-40 and CPC SM datasets at the 10% significant level and the ERA-Interim SM data at the 20% significant level. The associated MCA patterns from these three SM datasets all indicate that persistently positive SM anomalies over north and south China, and negative SM anomalies over the Yangtze River Basin from late spring to summer tend to cause an autumn-time negative precipitation anomaly over the entire south China, which is almost identical to the first EOF mode of autumn precipitation. Such across-season air-land interaction can be detected mainly due to long memory of depth-averaged soil moisture over China. This lagged SM-precipitation relationship may present a significant potential for autumn drought predictability in China.