



Precipitation Relationships between the Great Plains, U.S. Southwest, and Mexican Monsoons

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While considerable research has documented the Mexican monsoons and their influence on the U.S. Southwest, not much has been done to date to investigate possible connections between these two monsoons and the U.S. Great Plains. Previous research has suggested an out-of-phase relationship between the decay of significant moisture in the Great Plains and the onset of the Mexican monsoons. However, the focus is mainly on the Low Level Jet patterns and is limited to 1979-91. Using data from 1979-2005, our focus is on determining (a) if there is a predictable relationship between the onset and decay of the Great Plains precipitation and that of the Mexican monsoons, (b) if one Mexican monsoon is more important in determining the relationship, and (c) if cold season snow cover patterns will aid in predicting warm season precipitation in the Great Plains and Southwest. Previous research was used to determine the specific regions of interest for the Great Plains and U.S. Southwest, based on correlation values made using the 1979-91 results. We then constructed time series for both regions for precipitation. The seasonal cycle and variability on time scales less than one year are removed from these time series to examine year-to-year anomalies. Contour plots of correlation values between snow cover and each region are made to determine highly correlated areas. The data hint at an out-of-phase relationship between May in the Great Plains and July in the southwest from 1979-91. This possible connection is then shifted to June in the Great Plains and August in the southwest for 1992-2005. A strong negative correlation, within the 95% CI, is found between snow cover and the southwest for 1979-91; however, for 1992-2005, there is a strong positive correlation between the two regions. The highly correlated regions of snow

cover to each region shifts from 1979-91 to 1992-2005, with intriguing suggestions of a relationship between March snow cover in the central and southern Great Plains and summertime precipitation in the Southwest during the latter period. These results could be indicative of changes taking place in the global circulation between these two time periods.