

Abstract

The presentation will focus on precipitation variability over North America, in context of long-term droughts and wet periods. After a quick review of seasonal variability, especially, the atmospheric water cycle over the Great Plains, the structure of two prominent droughts in the 20th century (Dust Bowl and the 1950s drought) will be described. The potential of current climate models in simulating these droughts will then be reviewed. It will be argued that models are rapidly improving but not quite ready for making projections for regional extreme events (e.g., droughts). A case is made for using the 20th Century observational record itself to gain insights on drought projection. The SST record is analyzed to separate natural variability and the secular (but non-stationary) trend, using spatio-temporal sampling. The obtained variability patterns (and their seasonal rainfall regressions) are then used to reconstruct rainfall distributions during major drought and wet periods; with some accuracy, albeit not in all cases; amplitude discrepancies remain, not surprisingly. The reconstruction confirms the importance of SSTs, but more importantly, allows assessment of the relative role of Pacific and Atlantic basin SST anomalies. Atlantic SSTs are found to be important, perhaps, more than hitherto thought. The summer rainfall distribution over the Gangetic Plain is also partially reconstructed, attesting to the considerable influence of SSTs and the power of the new spatio-temporal analysis.

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