



Long term changes of East Asian Summer Monsoon: Internal variability versus external forcing

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The Asian Summer Monsoon (ASM) system exhibits considerable variability on decadal and inter-decadal time scales. For example, since the late 1970s, the East Asian Summer Monsoon circulation has exhibited a weakening tendency. Following the weakened monsoon circulation, there was a trend toward increasing drought in North China but excessive rainfall in South China along the Yangtze River valley. The drought in North China is concurrent with the declining rainfall over the northern Gangetic Plain of India, suggesting that the long-term trends of monsoon rainfall in these vast domains should be forced by same mechanisms. This weakening tendency of ASM from the late 1970s to the end of the 20th century has been of great concern to the climate research community (see Zhou et al. 2009 for a review). However, recent studies found that the ASM circulation has been recovering since the early 1990s. How to understand the earlier and recent decadal changes of ASM has been of great concern to both greater society and climate research community. Both the trends and long-term decadal variability of ASM have been attributed to increased aerosol/dust loadings, or increased greenhouse gas emissions, or internal variability such as the Pacific Decadal Oscillation (PDO) / Inter-decadal Pacific Oscillation (IPO). In this presentation, a review of our current understanding of the contributions of internal variability such as the PDO/IPO and external forcing agents such as greenhouse gases and anthropogenic aerosols will be given