Prediction of Extreme Precipitation in East Asia Using Complex Network

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Abstract : In order to study the spatial structure and dynamical mechanism of extreme precipitation in East Asia, a corresponding climate network is constructed by employing the method of event synchronization. It is found that the area of East Asian summer extreme precipitation can be separated into two regions: one with high area weighted connectivity receiving heavy precipitation mostly during the active phase of the East Asian Summer Monsoon (EASM), and another one with low area weighted connectivity receiving heavy precipitation during both the active and the retreat phase of the EASM. Besides a way for the prediction of extreme precipitation is also developed by constructing a directed climate networks. The simulation accuracy in East Asia is 58% with a 0-day lead, and the prediction accuracy is 21% and average 12% with a 1-day and an n-day ($2 \leq n \leq 10$) lead, respectively. Compare to the normal EASM year, the prediction accuracy is lower in a weak year and higher in a strong year, which is relevant to the differences in correlations and extreme precipitation rates in different EASM situations. Recognizing and identifying these effects is good for understanding and predicting extreme precipitation in East Asia.

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