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Impacts of the duration of El Niño decaying phases on the western North Pacific anticyclone anomalies

W. Chen
China (chenwei@mail.iap.ac.cn)

This study investigates the impacts of duration of El Niño decaying phases on the western North Pacific anticyclone (WNPAC) anomalies in the subsequent summer in a 1000-year pre-industrial integration with a coupled GCM. The modeling results suggest that the El Niño events with short decaying phases lead to the significant WNPAC anomalies in the following summer. In contrast, the long decaying cases are associated with the disappearance of WNPAC anomalies in the decaying summer. These differences in the WNP circulation anomalies can be explained by the different configurations of simultaneous SST anomalies in the Indian Ocean and in the central and eastern tropical Pacific: positive SSTs in the former region and negative ones in the latter region constructively induce significant WNPAC anomalies for the short decaying cases, while the roles of positive SSTs in both regions for the long decaying cases work destructively and lead to weak WNP circulation anomalies.
The strength of Indian Ocean SST anomalies in the mature winter is a precursor to the different lengths of El Niño decaying phases. The warmer wintertime Indian Ocean SSTs favor the anomalous easterly over the western and central equatorial Pacific in the subsequent spring and summer, which leads to a short decaying of El Niño. Thus, the Indian Ocean SST anomalies in the mature winter are one of the important factors which affect the length of El Niño decaying phase and resultant WNPAC anomalies in the decaying summer.