



Case study on the role of NAO and ENSO in the anomalous precipitation in the southern part of China

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Their economic and social importance emphasized by the survey of Department of Disaster Relief, Ministry of Civil Affairs of the People's Republic of China, two different typical patterns of precipitation anomaly in the southern part of China during the 1982/1983 and 2009/2010 cold seasons coincided with the canonical El Niño and positive North Atlantic Oscillation (NAO) and with the El Niño Modoki and negative NAO, respectively. A better understanding of how a particular type of El Niño and a specific phase of NAO worked together to cause the relevant anomalous atmospheric circulation over the East Asia in the two high impact weather and climate cases was an interesting issue and could improve the prediction skill of natural hazards to a certain extent. In conclusion, superimposing on the remote and local Rossby wave responses in the atmosphere induced by the El Niño Modoki-related condensational heat sink over the South China Sea, the downstream extension of the negative NAO was well established by a NAO-induced stationary Rossby wave train along the Asian subtropical jet and played a major role in the persistent dry conditions in the Southwest China for the 2009/2010 boreal winter. On the contrary, for the 1982/1983 boreal winter, the canonical El Niño weakened the downstream extension of the positive NAO, and induced by the canonical El Niño-related condensational heat sink over the western equatorial Pacific Ocean, the remote and local Rossby wave responses in the atmosphere played a leading role in the sustained wet conditions in the South China.