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Changes in Climate over the South China Sea and Adjacent Regions: Response to and Feedback on Global Climate Change

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El Niño-Southern Oscillation and the Asian monsoon have experienced significant long-term changes in the past decades. These changes, together with other factors, have in turn led to large climate change signals over the South China Sea and adjacent regions including Southeast Asia, the western Pacific, and the tropical Indian Ocean. An attribution analysis of the feedback processes of these signals indicate the predominant importance of water vapor and cloud radiative feedbacks. Experiments with multiple earth system models also show that these regional climate change signals exert significant influences on global climate. The increases in atmospheric heating over Southeast Asia and sea surface temperature in the adjacent oceans in the past decades have weakened the Indian and African monsoons, led to a drying effect over East Asia, and generated wave-train patterns in both the northern and southern hemispheres, explaining several prominent climate features in and outside Southeast Asia.