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The influence of the Southern Hemisphere circulation on summer rainfall in china under the different decadal background

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The NCEP reanalysis data and observed rainfall data in China from 1951 to 2008 are used to analyze the interdecadal variation of the Southern Hemisphere (SH) circulation, and the influence of the Antarctic Oscillation (AAO) on summer rainfall in eastern China under the different decadal background. It is shown that there occurred an interdecadal variation of the SH circulation during the late 1970s. While the subtropical highs in the southeastern Pacific and the South Atlantic was weakened, the Mascarene high (the Indian Ocean subtropical high) was intensified. In addition, the circumpolar low-pressure belt was deepened. As a result, AAO was changed into a positive phase, and the influence of AAO on summer rainfall in China was also changed. When the AAO in boreal spring is stronger before 1976, there is more rainfall in the south of the Yangtze River and north China and less rainfall in the Yangtze-Huaihe River valley. On the other hand, there is more rainfall from south China to the Yangtze-Huaihe River valley and less rainfall in north and northeastern China after 1976. Therefore, the influence of AAO on summer rainfall in China is related to the decadal background. After 1976, the influence of AAO tended to intensify and extend more northward. When the effect of sea surface temperature as a predictor tends to be weakened at present, AAO can be used as an important predictor for summer rainfall prediction in China.