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Statistical downscaling of daily mean temperature, pan evaporation and precipitation for climate change scenarios in Haihe River of China

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The applicability of the Statistical DownScaling Method (SDSM) in the Haihe River basin of China was evaluated, and its strengths and weaknesses in simultaneously downscaling air temperature, evaporation and precipitation were discussed. The used large scale atmospheric data were daily NCEP/NCAR reanalysis data and the daily emissions scenarios A2 and B2 of the HadCM3 model. Measured daily mean air temperature, pan evaporation and precipitation data (1961-2000) from 11 weather stations in the Haihe River basin were selected as climate variables to be downscaled. The results showed that: (1) the amount and change pattern of the climate variables could be reasonably simulated; the determination coefficients between observed and downscaled mean temperature, pan evaporation and precipitation were 99%, 93% and 73%, respectively; (2) there were some systematic errors in simulating extreme events, but the results were considered to be acceptable for practical use; and (3) in the future 2011̃2040, the mean air temperature would increase about 0.6°C; there were no obvious changes in pan evaporation, and the total annual precipitation would decrease by about 4 [U+FF05]. It was concluded that in the future 30 years, the climate would be warmer and drier, extreme events could be more intense, and the autumn might be the most distinct season for all of these changes.