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Projection of Climate Change over the Upper Ping River Basin Using Regional Climate Model

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Abstract : Dynamical downscaling of the ECHAM5 global climate model is applied at 20-km horizontal resolution using the WRF regional climate model (WRF-ECHAM5), to project changes from 1990–2009 to 2045–2064 of temperature and precipitation over the Upper Ping River Basin. The analysis found that monthly changes in daily temperature and precipitation over the basin for the 2045-2064 compared to the 1990-2009 are revealed over the basin all months, with the largest warmer in December and the smallest warmer in February. The future simulated precipitation is smaller than that of the baseline value in May, July and August, while increasing of precipitation is revealed during pre-monsoon (April) and late monsoon (September and October). This means that the rainy season likely becomes longer and less intensified during the rainy season. During the cool-dry season and hot-dry season, precipitation is substantial increasing over the basin. For the annual cycle of changes in daily temperature and precipitation over the upper Ping River basin, the largest warmer in the mean temperature over the basin is 1.93 °C in December and the smallest is 0.77 °C in February. Increase in nighttime temperature (minimum temperature) is larger than that of daytime temperature (maximum temperature) during the dry season, especially in wintertime (November to February), resulted in decreasing the diurnal temperature range. The annual and seasonal changes in daily temperature and precipitation averaged over the basin. The annual mean rising are 1.43, 1.54 and 1.30 °C for mean temperature, maximum temperature and minimum temperature, respectively. The increasing of maximum temperature is larger than that of minimum temperature in all months during the dry season (November to April).

Keywords : climate change, regional climate model, upper Ping River basin, WRF
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