

The Regional Climate Changes in Taiwan: Past, Present, and Future

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Both stations data analyses and regional climate model simulations were performed to investigate the present and future regional climate changes in Taiwan and the surrounding areas. The NCAR/PSU MM5 was used to simulate the regional climate changes over this region. The boundary conditions of MM5 were from the output of the ECHAM global climate system model simulations under the IPCC SRES-A2 scenario. The regional model simulations were performed over three periods: 1990-2000, 2040-2050, and 2090-2100. The past 100-year temperature records of Taiwan exhibit an increase trend in both temperature and high temperature frequencies. The annual rainfall over Taiwan shows a small increase trend and this trend is mainly dominated by the top 5% of heavy rainfall events. The regional climate model simulations show that the occurrence frequencies of both high temperature and heavy rainfall over Taiwan keep increasing under SRES-A2 scenario. This trend is consistent with the past 100-year's record. The duration days of no-precipitation also increases, indicating less total rainfall and longer drought spell but stronger severe rainfall under SRES-A2 scenario. These changes are resulted from the decrease of the intensity and the frequency of tropical disturbances (TDs) over this region in 2040s and 2090s. The changes of TDs are related to the changes of Pacific subtropical high.