

Projection of future surface temperature and precipitation over Malaysia region under the RCP4.5 and RCP8.5 scenarios

ABSTRACT

Climate change is a significant change of weather pattern over a long period of time. Since the economics of this region relies on agriculture and natural resources development and extraction, climate change has exert adverse impacts on Malaysia. This paper aims to project the future average surface temperature and total precipitation from 2010 to 2100 over Malaysia region based on IPCC Fifth Assessment Report. Initial and boundary conditions were obtained from global climate model, Bias-corrected Community Earth System Model (CESM) as input to Weather Research Forecast (WRF) modelling system. The regional climate model performed well in simulating the mean surface temperature, with a slightly cold bias less than -2°C . However, the precipitation did not perform as well as the surface temperature. The future projection showed large warming in Malaysia under the RCP8.5, with an increment of around 3.0°C during winter season and 3.1°C during summer monsoon, as relative to the baseline period. Meanwhile, the increase of mean surface temperature was found lower under RCP4.5 scenario as compared to RCP8.5 scenario due to weaker emission. The research domain was observed to experience more rainfall, with an increment around 2.4mm/day and 5.4mm/day during winter and summer seasons respectively in RCP8.5 scenario. Lower changes of precipitation were found under the RCP4.5 scenario. Our results suggest that the climate variability in the future period can potentially trigger the climate-related risk such as air pollutant.