

Future projections of extreme precipitation using Advanced Weather Generator (AWE-GEN) over Peninsular Malaysia

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Abstract A stochastic downscaling methodology known as the Advanced Weather Generator, AWE-GEN, has been tested at four stations in Peninsular Malaysia using observations available from 1975 to 2005. The methodology involves a stochastic downscaling procedure based on a Bayesian approach. Climate statistics from a multi-model ensemble of General Circulation Model (GCM) outputs were calculated and factors of change were derived to produce the probability distribution functions (PDF). New parameters were obtained to project future climate time series. A multi-model ensemble was used in this study. The projections of extreme precipitation were based on the RCP 6.0 scenario (2081–2100). The model was able to simulate both hourly and 24-h extreme precipitation, as well as wet spell durations quite well for almost all regions. However, the performance of GCM models varies significantly in all regions showing high variability of monthly precipitation for both observed and future periods. The extreme precipitation for both hourly and 24-h seems to increase in future, while extreme of wet spells remain unchanged, up to the return periods of 10–40 years.

Key words stochastic downscaling, General Circulation Model; multi-model; weather generator; extreme precipitation