

Impacts of climate and land surface changes on urban catchment hydrology

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Abstract Climate change and land-use changes have imposed a significant impact on the hydrological behaviour of catchments. Assessment of hydrological responses to these climate and land surface changes is very important in urban areas. Numerical modelling is one of the best ways to evaluate such hydrological responses against land-use and climate changes. In this study, the XPSWMM urban hydrological model has been used to model an urban catchment in Western Australia, taking its land-use changes and climate variation into account. Impacts of land-use changes on peak runoff of several major and minor rainfall events have been evaluated with reference to present and future land developments in the catchment. It has been identified that land-use change triggered surface roughness changes can increase the post-development peak runoff by up to 10.3% and 15.5% in 1-year and 100-year ARI events, respectively. Changing infiltration parameters due to urban land cover change increased peak runoff by up to 8.8%. The results of the study concluded that the overall runoff generation is more sensitive to land-use change in the catchment.

Key words land use; climate change; urban hydrology; catchment
