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Land-use change impacts on storm-runoff generation: scenarios of land use change and simulation of hydrological response in urban, agricultural and forested catchment of Peninsular Malaysia

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Population growth and urban expansion in Peninsular Malaysia have increased exploitation of natural resources and have changed land use and land cover patterns significantly. The uncontrolled growth of land use changes and development processes could bring adverse effects to the natural environment and on storm runoff generation. To study the impact of land use change on storm runoff generation in the Peninsular Malaysia we simulate the storm runoff contributions from different land-use class areas using LSM-A , a land surface model which provide opportunity to simulate the relevant hydrological and eco-system processes. The focus of the present paper will be on the first steps towards model development. Three different catchments that represent different land use patterns and soil composition in Peninsular Malaysia have been selected, namely an urbanized, an agricultural and natural forest catchment. For each catchment, a variety of collected ground observations are available. With these data, it will be possible to identify the direct runoff from which area is dominant for a flood event compared with runoff from other land-use areas and the interflow from which land-use contributes to recession flow. Based on the model simulation, the important runoff processes that contribute to the storm runoff will be identified and the factors which influence storm runoff partitioning from different land-use areas will also be discussed.