



Development of sustainable catchment management strategies from sediment monitoring in urban tropics.

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Suspended Sediment Concentrations (SSCs) were collected from two small urban residential catchments namely, Jurong West (JW – 68.7 ha) and Ang Mo Kio (AMK – 34.9 ha) in Singapore for 17 months under tropical storm conditions. The objective of the study is to assess urban landuse effects on sediment flux in the tropics. Impervious cover accounts for 84% and 60% and Effective Impervious Area are 0.7148 and 0.5635 for JW and AMK respectively. A total of 54 and 33 storm events were sampled in JW and AMK respectively. Average SSCs during initial 20 minutes is 500 mg/L and 175 mg/L. The number of rain events showing various sediment hysteresis patterns are as follows: (JW – Clockwise 34; Eight-shaped 13; Random 6 and Anti-clockwise 1) and (AMK – Clockwise 14; Eight-shaped 12; Random 6 and Anti-clockwise 1). It is believed that JW's high imperviousness accounts for all 4 types of hysteresis in varying rain magnitude and intensities. In contrast, lower imperviousness but higher pervious cover and smaller size AMK produces mainly clockwise sediment hysteresis and lower SSCs. The other hysteresis patterns appear only when upon introduction of construction activities. These results suggest that impervious, pervious cover dynamics and construction activities have strong linkages with sediment temporal loadings in the urban environment. Several sustainable catchment management techniques could be conjured. Irresponsible sediment discharge from construction sites should be curbed with stricter legal laws or more efficient technologies. Smaller urban catchments with more pervious cover should be designed to promote clockwise sediment hysteresis and lower SSCs. The knowledge and ability to control sediment entry timings would be able to promote strategic sediment removal techniques. This further entails better and more efficient rainwater collection strategies to reduce costs and increase the water availability for water treatment for domestic and commercial use.