Estimation of sediment yield in a small urban ungauged watershed based on the schaffernak approach at sugutamu watershed, Ciliwung, West Java

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Abstrak

The sediment yield is defined as the amount of sediment discharged by an area for a given period of time. Schaffernak proposed to estimate sediment yield in a watershed based on a sediment duration curve. The research objective is to test the applicability of a modified Schaffernak approach in estimating annual sediment yield in Sugutamu, a small urban watershed subsystem of the Ciliwung River where hardly any necessary data is available. The discharge-duration curve is developed based on daily runoff simulation using a hydrological model WinTR-55, while the sediment rating curve is derived based on field surveys and is developed only for a total suspended solid. The results of field surveys conducted in January 2015 were used for calibrating the physiographical parameters of the watershed as input data for WinTR-55, and the simulation was for the year 2014. Both calibration and simulation processes utilized the rainfall data from a nearby automatic rainfall recorder. The quantification of sediment yield resulted in 108.5 tons/km2/year, which is acceptable when compared to the results of similar studies. The results showed that sediment yield from ungauged watershed are possible to be quantified using modified Schaffernak approach in combination with WinTR-55 application. Further study is needed in order to validate the applicability of the approach in similar conditions.