

Simulation of river discharges in major watersheds of Northwestern Java from 1901 to 2006

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Abstrak

This study is intended to simulate the river discharges in major watersheds of northwestern Java, Indonesia. The five largest watersheds are considered: Ciujung, Cisadane, Ciliwung, Citarum, and Cimanuk. The simulation period covers the 20th century and early 21st century, from January 1901 to June 2006, at a monthly time step. Discharge simulation was carried out using STREAM (Spatial Tools for River Basins and Environmental and Analysis of Management Option). The input data for the simulation are climate (precipitation and temperature), land cover and topographic data. Setup and analysis of input data are also part of this study. The Mann-Kendall test and linear regression were used to detect trends. Temperature datasets show statistically significant increasing trends for all periods and areas. Significant increasing trends of precipitation occurred in the latest 16-year period (1990-2006) in hilly and middle areas. A positive trend of simulated discharge is seen in all watersheds and periods. They are only significant for Ciujung (periods of 1950-2006 and 1975-2006), Cisadane (periods of 1950-2006 and 1990-2006), and Ciliwung (periods of 1950-2006, 1975-2006, and 1990-2006). The most noteworthy trend is seen in the 1990-2006 period. Over the course of the 20th and early decade of the 21st century, monthly discharges have increased by 3% to 9%.