Calibration and Uncertainty Analysis for modeling Runoff of the Tambo River Basin, Perú, using Sequential Uncertainty Fitting (SUFI-2) algorithm.

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July 6, 2020

Abstract

Basin-scale simulation is fundamental to understand the hydrological cycle, specify essential information for water management, accordingly, the applicability of the Soil and Water Assessment Tool (SWAT) model is evaluated to simulate runoff in the semi-arid Tambo River basin (Peru), due to economic activities are driven by available water. The SWAT model was calibrated using the SUFI-2 algorithm for the periods from 1994 to 2001, with 3 years of warming and validated from 2002 to 2016 using daily river discharges. The results during the daily and monthly calibration period had Nash-Sutcliffe Simulation Efficiency (NSE) of 0.69 and 0.86, Determination Coefficient (R2) of 0.70 and 0.87, Percent bias (PBIAS) of -14.4 and Ratio of standard deviation of the observation of the root mean square error (RSR) of the root of 0.55 and 0.37, respectively. For the daily and monthly validation period, they had (NSE) of 0.52 and 0.70, (R2) of 0.67 and 0.87, (PBIAS) of -6.1 and (RSR) of 0.69 and 0.55, respectively. These results show that SWAT model can predict runoff within the Tambo River basin, in southern Peru. Also, it may serve as guideline for hydrology modellers, being a useful tool to detail change of land.

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b)

Basin

Soils
- I-Bh-Tv-c-5518
- I-Re-c-5540
- I-Tv-c-5542
- Je7-3a-5561
- Tv4-a-5681
- Tv6-b-5683
- GLACIER-6998

20 0 20 40 km

c)

Basin

Slope
- 0 - 5
- 5 - 10
- 10 - 15
- 15 - 25
- 25 - 99.9

20 0 20 40 km

3

$y = 1.253x - 8.0997$
$R^2 = 0.8686$