Calibration of SWAT Model in a Small Watershed by Means of Measured Streamflow and Suspended Sediment Data

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OBJECTIVE

- This research focused on the analysis of SWAT model calibration in terms of flow and sediment in a small watershed (32.78 km²) located at Goiânia, Brazil
- SWAT and SWAT-CUP softwares
GOIÂNIA, STATE OF GOIÁS, BRAZIL

- Central-Western Region
- Population: 1,300,000 (2010)
- Metropolitan area: 2,100,000 (2010)
Samambaia River Basin
Samambaia River Basin

Slope map:
Land use:

USO E OCUPAÇÃO DO SOLO DA BACIA HIDROGRÁFICA DO CÓRREGO SAMAMBAIA.

Legend:
- Córrego_Samambaia
- Curso d’água (represa, açude)
- Mata ciliar
- Milho
- Pastagem
- Urbanização
- Vegetacao remanescente
Soil types:
Digital Terrain Model:
Samambaia River Basin

Gauging stations:

Daily Measurements 2013
Samambaia River Basin

Streamflow discharge: ADCP Argonaut
Samambaia River Basin

Water level sensor:
Samambaia River Basin

Automatic water sampler: ISCO
SWAT Modeling

- SWAT autocalibration
- SWAT-CUP → GLUE, ParaSol, SUFI-2
- Start with streamflow, than move to sediment
Nash-Sutcliffe efficiency: COE = 0.80
The CN parameter, which is related to soil type, land use, and infiltration, showed the highest sensitivity in the calibration. After that, the alpha factor of base flow was another which showed higher sensitivity.

- Time of concentration → 24 hours approximately
- Permeable rocks → rapid infiltration and little overland flow → damping on rising limb of hydrograph
Simulated suspended sediment concentration versus measured suspended sediment concentration

Nash-Sutcliffe efficiency: COE = 0.88
With regard to sediment calibration, parameters of sediment from landscape (USLE_P and USLE_C) as well as parameters of sediment from channel (SPCON and SPEXP) have shown higher sensibility.
CONCLUSIONS AND FUTURE WORKS

- First analysis of calibration: expected parameters
- Improvements:
  - Data series extension
  - Water quality analyses
  - Other optimisation methods
  - Accuracy of each land use category prediction → UAV (seasonal variability?)
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