

Title: Does Resolution Matter? A comparative Assessment of Physically-based SWAT Model

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Abstract

In accordance with Section 303 (d) of the US Federal Water Pollution Control Act each State is required to identify all waters which do not meet the water quality standards and to calculate a total maximum daily load (TMDL) for each pollutant which exceeds the State's water quality standards. Most state in the US has a TMDL program where point and non-point sources of pollutions are concerned. A common watershed modeling approach involves use of the physically-based model Soil and Water Assessment Tool (SWAT). SWAT is capable of predicting long-term impacts of land management practices on water, sediment and agricultural chemicals in a complex watershed with diverse soils and landuses.

Watershed modeling in the digital world including SWAT is a valuable environmental management tool. Environmental models play a critical role in our society and in protecting our environment. It brings science and policy makers together. However, resolution is a sensitive issue in environmental modeling, geo-spatial analysis and risk assessment. Resolution of dataset plays a critical role in model prediction. The objective of this study was to determine the effects of varying resolutions of spatial data viz. 30 m and 250m on the model output. Data layers used with GIS were soils (NRCS-STATSGO and NRCS - SSURGO), Landuse (USGS-DLG and Landsat TM5) and Hydrologic Unit Catalogs (USGS-HUCs). Results are reflective of the internal parameters of the SWAT model and are reported through ASCII outputs. In general 250m and 30m resolution data sets consistently showed different results. The nature of spatial representation e.g. the nature of rich files also impacts the effects of resolution. This study shows that attention should be given to the selection of the resolution of data while modeling with SWAT.

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