

An assessment of Water and Nutrient dynamics in a large agricultural watershed in Brazil using SWAT model

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The objective of this study was to assess the water and nutrient dynamics in Tiete River watershed, Brazil. Tiete River watershed has area of 150000km² with length of 3000km. Most of the part of the watershed has been mainly covered by agricultural land use that cultivates sugarcane, soybean, etc. It lays under unique situation that large nutrient flux comes from its headwater because Sao Paulo city, is the largest mega city in south hemisphere, is located on the origin of the river. Thus, the watershed is highly affected by human activities with both of agricultural and domestic wastewater. Soil and Water Assessment Tool which is one of the most popular hydrological models has been employed to estimate water and nutrient dynamics in the watershed for revealing the impact of the human activities. We focused on the year of 2014 as a major evaluation target in this study because the documents which could verify the model efficiency are available. Elevation, soil map, and land-use map as required datasets for building the model were obtained from NASA, FAO/UNESCO, and Brazilian national agency, respectively. The parameters were calibrated at the several stream gauges which are located along the main stream using data from 2008 to 2010 and validated using data from 2011 to 2013. Estimated mean flow rate was judged as mostly reproduced compared to the observation records. Significant seasonal changes in flow rate due to climatic characteristic of its area was found from the results; flow rate during period from August to September was almost zero flow. Estimated specific nutrient yield from Sao Paulo was very larger than that from agricultural area. Most of the nutrient, however, could not reach to the outlet of Tiete River due to trapped in streams or reservoirs. Further steps to improve the model efficiency are necessary to lead the conclusion of this study.

Acknowledgement: This study has supported by JSPS KAKENHI Grant Number 16KT0033.

Keywords: Soil and Water Assessment Tool (SWAT), water cycle, nutrient cycle, Tiete River, Sao Paulo, Brazil