

Dynamics of Nitrogen loads in surface water of an agricultural watershed by modelling approach, the Save, Southwest France.

S. FERRANT (1,2), C. OEURNG (1), S. SAUVAGE (1,2), P. DURAND (3), J.L. PROBST (1,2), J.M. SANCHEZ-PEREZ (1,2)

(1) University of Toulouse; INPT; UPS; ENSAT; Laboratoire d'Ecologie Fonctionnelle, Castanet-Tolosan, France., (2) CNRS; Castanet-Tolosan, France., (3) INRA; Sol Agro et Hydrosystèmes Spatialisation (SAS), Rennes, France.

Agriculture is known to have a great impact of nutrients enrichment on continental water resources. In south-West of France (Gascogne region), water resource are essentially surface water and shallow aquifer. Nitrogen dynamic in river is complex and highly variable throughout season and year, depending on hydrology, landuse, removal in stream. In this context, agricultural impacts on nitrogen concentration are a matter of concern for agricultural decision-maker. In order to introduce sustainable land use concepts in this hilly, clayey and agricultural shallow soil context, the hydrological simulation model SWAT2005 has been tested as a valuable tool to evaluate the consequences of such land use changes on water and nutrient balance components. This semi-distributed hydrological model coupled with agronomical model EPIC is able to simulate the impact of each agricultural landuse at the outlet of the Save catchment (1100 km²). Hydrological parameters model are calibrated based on 14-year historical record (1994–2008). Nitrogen losses have been measured during 2 years (2006-2008) at the outlet and are used to validate the model calibration. Agricultural data at communal scale coupled with Spot image analyses have been used to evaluate agricultural distribution and pressure in SWAT. The aim of this modelling exercise is to simulate nitrogen cycle in whole agricultural Hydrological Response Units (HRU), depending on plant growth and culture rotation, to simulate accurately nitrate load in river. The ability of SWAT to reproduce nitrogen transfert and transformation at this scale and in this agricultural context will be evaluated by a discussion of importance of each nitrogen cycle process in nitrogen losses. SWAT could be a useful tool to test agricultural scenario to improve the nitrogen management in river.