

## ***Interactive comment on “Assessment of hydrological and seasonal controls over the nitrate flushing from a forested watershed using a data mining technique” by S. Rusjan and M. Mikoš***

### **Anonymous Referee #2**

Received and published: 14 January 2008

### DESCRIPTION

In the above paper, a regression tree algorithm is used to assess the relationship between the nitrate concentrations observed in a forested catchment of 42 km<sup>2</sup> (Slovenia) and some other (measured) hydrologic and climatic variables. The data set employed is based on continuous, high frequency measurements of stream nitrate concentrations, rainfall, streamflows and temperature, and comprises a sequence of 16 rainfall events. The paper represents an attempt to provide a linkage between eco-hydrology and biogeochemistry, which is an important and appealing issue. The experimental

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



setting used seems quite robust, and this seems per se a remarkable fact.

## GENERAL COMMENT

The paper is generally clearly written and well organized. However, a question arises: what kind of general knowledge is provided by this contribution? My impression is that most of the conclusions of this experimental study are already known from literature. Indeed, it is well established that soil moisture and temperature affect dramatically the nitrogen cycle and the nitrate losses through runoff. Conversely, in the manuscript not enough reference is made to other past (theoretical and numerical) modelling studies explicitly aimed at investigating the connection between hydrological and bio-geochemical processes from a more physically-based perspective. The methodology used in this paper is appealing as it allows a simple non parametric representation of extremely complex dynamics. However, in a different perspective, the use of a regression tree technique poses some general problems concerning the choice of the representative variables. The authors chose a pre-defined set of variables (nitrate concentration, air and water temperature, rainfall and fraction of event water), but the choice of other input and output variables may be equally plausible (daily nitrate loads, solar radiation, presence of decomposing litter, soil moisture, soil pH). Hence, more effort should be spent to discuss the choice of the relevant variables (also in relation to the findings of previous study) - because this choice may have important consequences on the results. For instance, in my view it is not that surprising that nitrate concentrations do not correlate with stream temperature. Another important point concerns possible effects related to anthropogenic disturbances (20% of the catchment area is dedicated to cultivation, and there are several small villages along the drainage network): the author should discuss if the background concentration observed in the area is related only to biogeochemistry or not (and why they can exclude other effects, such as nitrogen inputs from agriculture or wet deposition).

## SPECIFIC POINTS

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



Page 4215, Lines 27-29: maybe some information provided here are redundant (see lines 5-7)

Page 4217, Lines 8-9 and page 4219 line 18: some more details should be provided on the experimental setting and the calculation of EW (the reference to a submitted paper is not useful in this context)

Page 4220, lines 1-10: Figure 2 shows pronounced periodic fluctuations in the NO<sub>3</sub> signal. Any explanation for this strange behaviour? Maybe this can be a signature of some anthropogenic disturbances.

Table 2: I found this table rather unclear: maybe a graphical representation would help the reader

Figure 1: maybe a soil use map would be useful here.

Figure 2: why are there discontinuities in the lines? Why different months have a different length in the x-axis?

Figure 5: please improve the visibility of this figure

Figure 7: the predicted N concentrations during the last rainfall event are extremely unrealistic. Any explanation for this?

---

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 4, 4211, 2007.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

