Hydrol. Earth Syst. Sci. Discuss., 6, C3085–C3087, 2010
www.hydrol-earth-syst-sci-discuss.net/6/C3085/2010/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Modelling the inorganic nitrogen behaviour in a small Mediterranean forested catchment, Fuirosos (Catalonia)" *by* C. Medici et al.

C. Medici et al.

chme1@doctor.upv.es

Received and published: 12 January 2010

Page 5657 Line 13 Figure 5. Figure 5, 8 and 10 have been modified to improve clarity. Namely, denitrification is now represented by a red line on each.

Page 5676 Line 14. Figures 4a and 4b have been provided with a zoom in of the peak as suggested by the referee.

Page 5678 Line 19 and Page 5682 Line 23. The observed stream daily ammonium concentration presents an erratic behaviour and extremely low values, which do not increase even during precipitation events. In annual terms, the relative contribution of

nitrogen forms to the total catchment annual export is 57%, 35% and 8% as NO3-N, DON and NH4-N respectively (Bernal et al., 2005). Moreover, the observed ammonium concentration ranges between 0 and 0.05 mg N/l for most the time period over which the observations were made and the standard deviation of the chemical water analysis procedure adopted is approximately 0.02 mg N/l (Hach Company, 1992. Water Analysis Handbook, 2nd ed. Hach Company, Loveland, Co.). Thus, low ammonium concentrations which are not linked to flow as strongly as for nitrate are difficult to simulate satisfactorily This has been added to the manuscript (Paragraph 5). Nevertheless, as stated in the manuscript (page 5682, lines 25 to 29) the models simulate the ammonium general trend and order of magnitude. Further work is needed to develop better simulations of ammonium storage and transport in the catchment and the link between organic-N and ammonium. In particular, a better understanding of the forms and quantities of organic-N is required. The three models described in the paper take into account the mineralization process in a very simplified way, considering the organic matter as unlimited and without distinguish among different kind of organic matter, which may have certain influence on the ammonium simulation results. It is known that the mass of ammonium is influenced by organic matter temporal variability and availability. However, a more complex description of this key process might increase dramatically the parameters to be calibrated introducing more uncertainty into the model. This discussion has been added to the manuscript (Paragraph 6). Finally, it has been noted in the manuscript (Paragraph 6) that the models developed do not include any in-stream processes yet, which are important in controlling the instream ammonium concentrations (von Schiller D., et al. 2008).

Section 4.2, 5 and 6 have been reconsidered and changed to improve their clarity.

References:

Bernal S., Butturini A., and Sabater F., 2005. Seasonal variations of dissolved nitrogen and DOC:DON ratios in an intermittent Mediterranean stream. Biogeochemistry, 75:351-372.

HESSD

6, C3085–C3087, 2010

Von Schiller D., Martí E., Riera J.L., Ribot M., Argerich A., Fonollá P. & Sabater F., 2008. Inter-annual, annual and seasonal variation of P and N retention in a perennial and an intermmittent stream. Ecosystems. Vol. 11, N. 5, 670-678. DOI: 10.1007/s10021-008-9150-3.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 5665, 2009.