Hydrol. Earth Syst. Sci. Discuss., 12, C5683–C5685, 2015
www.hydrol-earth-syst-sci-discuss.net/12/C5683/2015/

Hydrology and Earth System Sciences
Discussions

Interactive comment on "Nitrate sinks and sources as controls of spatio-temporal water quality dynamics in an agricultural headwater catchment" *by* T. Schuetz et al.

T. Schuetz et al.

tobias.schuetz@hydrology.uni-freiburg.de

Received and published: 18 December 2015

General Response

Thanks a lot for the positive review. The comments made directly within the manuscript, will be implemented accordingly.

Reviewer 1 Major comments

Comment 1

Page 8591, Line 14 There is no mention of ammonium concentrations in the drainage or stream waters. Nitrate can be produced by nitrification of ammonium, but the im-

portance of this mechanism is not mentioned. Even if it is easily dismissed as an im-portant mechanism, for completeness I think it deserves a mention. It also brings into question the constraint in the analysis at this line, that negative removal rates were avoided. As an assumption, I'd like to see it justified.

Answer

As suggested we will introduce a short paragraph into the revised version of the manuscript discussing the implications of nitrification processes (and the presence of ammonium) for our analysis.

Comment 2

In general, as we move to ever finer temporal and spatial scales of measurement of biophysical systems, it should not be surprising that we find different components behaving differently. The example provided here is a manifestation of this phenome-non. For me, an important follow-on discussion, which can be speculative to some degree, could be the causes behind these differences and possible ways to manage undesirable behaviours of systems. Once we have this more detailed knowledge, how can we potentially use it, which comes back the second last paragraph of the in-troduction 'Answering these questions is relevant for . . . ', which I'd like to see ad-dressed better in the discussion. For example, why were some parts of the drainage system delivering relatively high nitrate concentrations? Could it be different soils, e.g. with high soil total N concentrations, lower C:N ratios, or more favourable pH? Could the drainage network in these locations be better connected to surface soil ni-trate production by shallower drains or more preferential flow? What management options are available?

Answer

In order to keep the paper concise and clear we tried to restrict our analysis on processes observable within the stream itself. To elucidate and to clarify the implications of our study the reviewers' suggestion might be very helpful. Therefore, we will add some

sentences on possible risks/ preferable conditions of geogenic/pedogenic catchment characteristics for the implementation of drainage networks in agricultural headwater catchments.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 8577, 2015.