Hydrology and Earth System Sciences Discussions

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2
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Comment on hess-2021-401

Anonymous Referee #2

Referee comment on "Hydrology and riparian forests drive carbon and nitrogen supply and DOC□:□NO_3^- stoichiometry along a headwater Mediterranean stream" by José L. J. Ledesma et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2021-401-RC2, 2022

General comments:

This manuscript explores hydrological and riparian controls on DOC and NO_3^- stream chemistry in an oligotrophic Mediterranean stream. Their rationale was to understand how these dynamics may impact in-stream heterotrophic activity. To do this, the authors use data collected at three sites within the catchment collected over a period 2 years (2010-2012). Their results suggest that spatial (upstream to downstream) patterns are explained by riparian geomorphology and forest coverage and that temporal variability results from hydrological variability. The manuscript is well written, figures are clear, and conclusions are straightforward and supported by data. I particularly enjoyed the use of the hydrological metrics to understand controls on lateral exchanges of DOC and NO_3^- between the riparian zone. That said, the contributions to the literature are modest. I wonder if the authors could strengthen the manuscript by adding data beyond 2010-2012 and include more (smaller) storm events in their PLSR analysis. Large storms are relatively rare and DOC and NO_3^- transport during smaller, and likely more frequent, storms may influence stream metabolism more than the larger events. Also, I suspect antecedent conditions are even more important for DOC and NO_3^- transport dynamics during these smaller events. I also wonder if the authors have NH_4^+ and/or DON concentrations and might consider looking at the DOC:DIN or DOC:TDN ratios. Perhaps NO_3^- is the dominant form of N and these other N forms won't impact the story much?

Minor concerns:

Lines 25-26: The authors state "These results suggest that (i) increased supply of limited resources during storms can promote in-stream heterotrophic activity during high flows . . ." They don't actually measure this process, instead they infer it from DOC:NO_3^- ratios. Perhaps reword this result to be more accurate.

Lines 108-110: “All data and analyses were integrated and carried out for daily resolutions, which were determined by the availability of the stream chemical data.” This line is confusing, please reword.

Line 114: Please avoid use of “fortnightly” as most readers will not know what this means. Instead state the actual frequency (i.e., every two weeks).

Lines 122-125: Could you explain the key finding(s) from Ledesma et al. 2021 that convinces you that the groundwater level dynamics at the monitoring site are representative of the larger riparian network in the catchment?

Lines 197+: To differentiate between pre-event metrics and event metrics, consider including “event” in phrases such as “average event stream flow” and “average event groundwater table.”

Line 334: Please explicitly state which section you mean by “in this section” as it is not defined here.

Line 339: Typo. Should read “might not have been enough . . .”

Line 426: Consider changing “increment” to “increase”.