

## ***Interactive comment on “Spatialized N budgets in a large agricultural Mediterranean watershed: high loading and low transfer” by L. Lassaletta et al.***

**Anonymous Referee #2**

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This paper details on N budgets in a large Mediterranean watershed. The final conclusions are relevant and intriguing; the watershed is retaining much more than other temperate systems, and this indicates that potential eutrophication at the mouth could be of low profile. Therefore the paper makes a nice contribution to the understanding of N dynamics at the watershed scale. However, there are a number of details and technical questions that need to be addressed well before the paper can be acceptable for publication.

The Mediterranean character of the river is invoked many times but its potentiality in affecting N budgets is not sufficiently addressed. The language needs improvement; many sentences are too long, or not sufficiently self-explicative; the text can be thoroughly improved. And finally, there is a lack of clarity on the approaches used that

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need to be clarified.

Specific comments -“During the last few decades, Nr inputs in Spain have evolved differently than in other European countries”. Please provide a reference.

-“... Spain they have increased by 22% and 18%, respectively. “Please provide a reference.

-“... despite a slight decline in the surface of land devoted to agriculture.” Please provide a reference.

-Catchment, fluvial catchment or basin. These terms are used all over without distinction.

- “have been polluted by nitrate and have been declared as Nitrate Vulnerable Zones according to the Nitrates Directive (<http://www.chebro.es>)”. A more specific site should be given.

- To say that “Mediterranean-type ecosystems are present in many parts of the world” is unprecise, and untrue.

- “ecological processes in Mediterranean-type ecosystems differ greatly from those in other ecosystem types, such as temperate ecosystems”. On what do they differ? You should provide more details on your assertions.

- “many climatic models...” You provide here a superficial detail on the provisions being made for the area; expand on this.

-“a high number of channels” You mean irrigation channels

- “The selection of adequate measures is a crucial item, since their efficacy is frequently much lower than expected”. Please provide a reason for this, or delete the sentence.

- “Therefore, a detailed study of N budgets, its dynamics, and its transfers within the catchment may be a useful basis to evaluate the potential effectiveness of corrective

C3433

measures" Why this can be true? You need to be more convincing here.

- In this context, the present study aims to expand the knowledge on the N cycle in the large European Mediterranean catchment of the Ebro River" This is a rather poor objective. Please provide a hypothesis that considers the relevance of Med rivers.

- The Ebro is a seventh-order river.

- The way you describe the approach to different data sources is somehow confusing. Though is clear that you use several sources to complement the data, is no clear how do you transfer data between provinces (I guess administrative provinces) subcatchments and TUs. This needs to be addressed in a convincing manner, in particular how did the subcatchments combine with the TUs.

- What is the equation to calculate N<sub>2</sub> fixation? Please describe or provide a reference.

- How did you obtained the TU classification? Which criteria and procedure did you use? How the boundaries between the classes were established? Provide beforehand labels for the TUs; this might help to follow your reasoning throughout.

-The selection of the 21 stream monitoring stations is not explained. Which are these sites? You need to provide a table to show them, with indication of whether they were located in the main axis of the river, in a tributary or at the junction with the main axis. Please define CHEBRO.

- Why is the relationship between P and Si relevant to your goal in the paper? This sentence is far too lengthy.

- Was the retention part of a consistent pattern? As a Mediterranean watershed, the Ebro is highly irregular in rainfall, water flow, and water abstraction. Please consider this point in the discussion.

- You describe TU2a as one of the most retentive and this related to the irrigation channels. Why the existence of the irrigation channels should contribute to the retention?

C3434

The residence time of water in these channels is short (because of their use); we need a rationale here.

- Fig. 5a and b. Is not explained in the text how the curves were constructed, since they do not derive from the data. Please provide an explanation. Labels are misplaced.

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Interactive comment on Biogeosciences Discuss., 8, 8723, 2011.

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