

Dear Florian Ferchiche,

Thank you for submitting the revised version of your manuscript, which was re-evaluated by the original referees.

Both reviewers acknowledged the substantial effort you have invested and the significant improvements you made. One of the reviewers, however, provided additional suggestions for further strengthening the manuscript.

I agree with these comments and encourage you to incorporate the suggested changes in your next revision.

Best regards,  
Yuan Shen  
Associate Editor

We want to thank editor Yuan Shen for moving the manuscript forward to the minor revisions stage, in light of our improvements. You will read below how we took into account the suggestions of R1 to improve the manuscript even more.

Comments:

It remains few concerns before a final acceptance. This new version was greatly improved, I thank the authors for that. However, I have comments which can make the ms less confuse.

We want to thank R1 for appreciating our modifications, taking the time to review them, and for giving us new and precious insights to improve the manuscript.

My concern still focuses on: sampling period, metrics and title:

1-Previous point 2: sampling period

I thank the authors for their thoroughly reply and changes which help the understanding of this part. However, this is not clearly explicated at the end of the introduction section, notably for the goal n°4: “determining a typology of river dynamics according to their POM composition and dynamics” (L110-111). Notably the fact that, for a river and depending of the year, the considered river may change the type.

Thanks to this comment, we improved the explanation around the scope of the river dynamics typology. Unfortunately, we did not manage to add this information within the sentence dedicated to the aims (end of section Introduction) but we add this information on l.333-334 in section 2.6, where we found it the most relevant.

2- title: I suggest to change the title, by introducing French rivers since only French rivers are tested. R1 is right, writing that the 23 studied rivers all have their mouths in France. However, we do not consider that our study is dedicated to French rivers but rather that we considered these 23 French rivers as good representatives of temperate rivers. Indeed, they encompass a large gradient of temperate conditions, from continental to oceanic and Mediterranean climate, size and basin characteristics. Thus, we think that adding ‘French’ in the title would narrow the scope of the study that also aims to set example for studies accounting other climates.

### 3- Previous point 4: metrics

Sections 2.5 and 4.2 have been significantly improved in this revised version. However, there is a lack of details making the understanding a bit confuse and unclear - among them:

L313: river flow is not only climatic dependent but also geomorphological dependent. Latitude and longitude are not climatic dependent

You are right, river flow has been added as a geomorphological dependent I.313. Latitude and longitude are not climate-dependent, but latitude and longitude may be correlated to spatial climatic gradients.

L315: change hydromorphology by geomorphology, precise which slopes (channel, catchment ?)

Done and specified in manuscript I.313 and 509.

L316: what is artificial land use: urban others?

Yes, artificial coverage includes the urban areas, but also industrial and commercial areas. We use now precisely the official nomenclature of Corine Land Cover (first level) to avoid any misunderstanding.

L317: add water to useful reserves + soil type: there is a mix between soil classification WRB (podzol) and others (brown etc)

Done. The four major types of soil according to the WRB classification have been better named and are gathered accordingly:

- Acidic = Podzol, podzoluviol, regosol, arenosol and ranker;
- Brown = Cambisol, luvisol, phaeozem, chernozems, greyzem, vertisol, kastanozema and andosol;
- Hydromorphic = gleysol and all gleyic soils (e.g. gleyic cambisol);
- Organic and others = Histosol, rendzina, solonetz, planosol, xerosol, solonchalk, glacier, plaggensol and rock outcrop.

L318: geological type: there is a mix between surficial formations, lithology, granulometry, I suggest to reorganise this part. Loamy is rather used for soil than rocks.

You are right, the dataset providers described it more as bedrock origin or parent material types than geological type, names, and presentation have been modified accordingly.

Table A2: add the unit of parameters – I also suggest to add a reference for each of these parameters and to give a better description of these parameters in the table that deserved to be in the text and not in annexe (for example what is the useful reserve of water). This section 2.5 needs to be improved since these parameters will be used for the classification river dynamics.

Units added to table A2 and figure A6.

We understand that the nature of the “useful water reserve” parameter is not intuitive. We defined it specifically in a footnote in I.316.

We understand that introducing each parameter by a description and referenced links with biogeochemical processes would be complete. We agree but think that this will too much increase the length of the section and finally the manuscript. Nonetheless, these parameters are categorized depending on the processes they are involved in (Section 2.5, l. 305-322) and are discussed when correlated with POM sources dynamics in Section 4.2.

L606-607: why the refractory OM are negatively correlated to useful reserve of water in soils? authors should give more information, this is not intuitive.

Added l.612