We first want to thank the two anonymous reviewers for having taken time to review our manuscript and their feedback that requires minor revisions of our document. Hereafter is our point by point reply to those suggestions.

1 Reply to RC1's comments

Line 63

(ii) instead of (iii)

Done

Line 86

mHm is more an hydrological, rathe than LSM, better cite CLM, used by Kollet who is cited before.

OK, we cited CLM with reference to the latest publication of Lawrence et al. 2019, as well as O'Neill et al 2021 that was already referenced in our bibliography. We also added an explicit quotation for hydrological models of various complexity with mHM and GR.

Line 161

Please add "The following" before expression (2) because I was looking for a previous expression.

There was indeed a syntaxe issue. Lines 160-164 were reworded

Figure 2 and lines around 156

I wonder what velocity is for almost 200 km (between Auxerre and Paris) in about 5 hours, 40 km/h? I think that a more detailed discussion is necessary regarding the concept of travel, transfer and concentration time in light of the many works in the last years. Especially if we also deal with matter and quality issues. Between the de Marsily blueprint of 1978 and now, a lot of work has been done.

The thesis of Golaz-Cavazzi and the paper in WRR of the first author is a bit too short basis.

The reviewer may have misread the legend of Fig. 2, where the blue labels are expressed in days not hours. Therefore the travel time between Auxerre and Paris is around 5 days. The velocity is then in the order of magnitude of a few decimeters per second, which is correct for such a lowland river. To the authors opinion and to keep the paper as concise as it can be, the calculation is correct and does not require more explanation. No change done.

Line 178

No words are spent for explaining how AET is computed.

Muchlater from figure 5 I guess AET is estimated as a fitting parameter with MCMC, but it has to be described much before, when main fluxes are described.

The paper is a method paper for assessment of models, not a model description paper. The highlight is on the stepwise fitting procedure, what it brings in terms of insights into a regional system inner fluxes estimation, which leads to a better understanding of hydrological functioning, especially the importance of groundwater. Finally the discussion opens door to a generalisation to other

types of models. We believe that describing CaWaQS in more details will lose the readership. References are proposed to refer to.

Line 184

Also regarding vadose zone, inherently nonlinear, the use of the Nash model has to be discussed more in detail with the relevant literature. The two parameters can adjust even a wrong model...

We agree that the use of a reservoir cascade for representing the vadose zone may be surprising at first glance, but its usage was validated and adjusted for river discharge gauging station by Schuite et al. (2019) (see lines 236-238), which is a proof of work of this simple concept that is adapted to the regional scale modelling that is performed here.

Line 225

The interpretation of hydrological time series how is dealt with Fourier transforms? There are citations, but some description inside the paper could be helpful.

An entire subsection (2.3 Minimalist reduction of frequency domain hydrological data with HYMIT, lines 215-254) summaries HYMIT and the method. This full page of crucial explanations seems well balanced to us. Readers who want to dive further in HYMIT concepts and theoretical fundations are warmly invited to refer to Schuite et al. (2019).

Line 239

Beside rainfall, is there any snowfall?

SAFRAN data provides both daily rainfall and snowfall rates separately. Here, they are both summed up and integrated as rainfall CaWaQS inputs. To be more explicit, line 180 and Fig8a now mention 'total rainfall'. Meaning has been added in caption of figure 8, with a comment that explicitly states that the Seine basin is not submitted to significant snowfall. At most there is a few mm on the Morvan ridge, which melt in few days/hours.

Line 249

Streamflow gauging, better specify it

OK, replaced by discharge gauging station

Line 364

Total instead of total

done, also pointed out by RC2

Line 520

The comparison with papers not belonging to the group is restricted to paragraph 5.2, More comparisons are needed.

We thank RC1 to point this very important discussion subsection on the difficulty of estimating hydrosystem inner fluxes across scales, and the potential of hydrological models or models potential improvment if using our stepwise fitting procedure. We are nevertheless not sure to understand RC1's comment properly. The bibliography is already 8 page long, meaning that our group is referring many papers of other groups.

Concluding my review I should like to see also some more description of the technique of frequency domain reduction, I rad all the paper waiting to have some more info.

The paper is already long. The frequency domain reduction is based on the usage of HYMIT to retrieve key paramaters of watersheds that control water inner fluxes. Our method paper is focused on the stepwise fitting procedure, not on the technical aspects of frequency domain reduction, which is the topic of an already published paper of Schuite et al. (2019), to which the interested reader is invited to refer to all along the paper.

2 Reply to RC2's comments

225. A pictorial description containing the input, model(function or equation) and output relation (like Figure 3.) to describe the

HYdrological MInimalist Transfer function method would be really helpful for readers to get a solid overview of this method.

230. As said earlier, it will be really helpful to get link between paremters that control the shape of the transfer function as decribed on line 230

with the transfer fucntion. You can state the equation and explain the paramaters clearly.

Those two comments are related to HYMIT which is, as fully understood by both reviewers, the core of the stepwise fitting procedure on which the paper is dedicated. As already replied to RC1, the description of HYMIT is one page long, and the full description of the frequency reduction would divert the reader to technicalities that are out of the scope of this paper and also, it would be repeating most information that may be found in Schuite et al. 2019. For more technicalities, the reader should refer to the published paper of Schuite et al. 2019

249. Change gauging stations to streamflow gauging stations. (change all other lines with only gauging stations too).

OK, replaced by discharge gauging station everywhere

364. Correct "totla" to total.

Done, also requested by RC1