Preface

As authors of the manuscript egusphere-2022-1375, titled: "A DOM continuum from the roof of the world – Tibetan molecular dissolved organic matter characteristics track sources, land use effects, and processing along the fluvial-limnic pathway", we wish to express our gratitude to the anonymous reviewer No.II for thorough check and productive comments.

Major point:

First: Falsifiability of Hypothesis 2: Indeed, it is likely that different systems or endmembers have different compositions, but there is no general reason to believe that they are always so. We are convinced that the hypothesis could be falsified. Since there is no knowledge about the degree of this difference that we elucidate and hypothesize here, this first observational study is justified and for us there was no sound scientific basis to infer more in-depth hypothesis a priori.

To answer your comment: We will revise all hypothesis so that they can be clearly answered with a "yes" or "no". The hypothesis will also imply a clear statistical evidence for the answer, we will clearly present this evidence in the MS.

Second: Single samples (N=1) of course are a problem but are here given by the wish not to conduct pseudo-replication and the fact that the catchments did not allow for a higher sample size. Jurisdictional limitations further prevented us from prolonged travels to other systems. We think that the current data scarcity of the TP is also reflected by this and is an inherent problem to address but also to bear. Here we present a first approach that of course can and should be expanded. We like to draw the attention to some of the view other studies of the TP and the sample sizes used therein (e.g.: https://doi.org/10.1016/j.gca.2014.08.006 N = 6; https://doi.org/10.1016/j.scitotenv.2021.148376 N = 6)

Statistical exclusion of N=1 groups: We will make sure that these flaws will be removed.

Generally: "Careful reassessment of the claims and/or the storyline" We will review the manuscript, given the limitations that we took care to name we.

Hypothesis 3 and 4: Taking a lake sample unfortunately requires a massive logistical effort. This is why we cannot present more – and also why other haven't done so before. A second lake surface sample didn't meet our strict data quality criteria. The question of misrepresentation is a statistical one that future research will have to address. Hypothesis 3 focuses on DOM transformation in the stream, while H 4 focuses on Lake DOM. We will condense the hypothesis to prevent redundancy.

For in stream transformation we excluded all other samples and just analysed stream samples, so we conducted a within-group comparison also with respect to the distance from the source, but there was no significant effect. Residence times are not well reflected by our study, because we do not have flow metering or gauging data to build on. We will take care to make sure to the readership that we have excluded non-stream samples for the analysis of H3, you are right that this is blurred by the unclear hypothesis formulation and the mix-up with H4.

Selective proxy: We will rephrase the selective proxy formulation. In the DOM samples, we found a strong interconnection of the riparian zone that makes a clear indication that the DOM of the degraded Zhagu system is tremendously differing from the other two systems which have more intact pastures. We found sound ground to believe that these changes are not just by chance but driven by the ecological condition. But we agree that the use of words, like: "proxy" or "marker" is not proper in this case. We will omit using these terms.

L213: We will rephrase it to "local peak intensity sum"

L242: We will remove the percentage expression

L264: we will add the statistical linear limits that we used. Pearson correlation coefficient: $|r| > 0.75$

L279: We wanted to re-state this expression here, in case a reader will skip the "Materials&Methods section". We will review whether this is necessary and then limit it to the M&Ms

L310: We will take care to harmonize the notation

L321: We will express it in "percent-loss"

Table1: We will add sampling sizes here, but we would like to keep them in the figures also for transparency

Figure5: We will add axis denominations but axis labels would be limited to the top-right element

L534-Figure 6: We propose an additional van-Krevelen loss plot where we mark changes in formulae intensity between the brackish sample and the lake samples in greater detail and resolution. We will further zoom into the nominal mass range more deeply and also show single sum formulae. By this we will show the overall difference between the samples and also an in-depth detail of the same thing.

Figure 7: Pasture degradation will be changed to make clear that this is an environmental process. While the other three arrows indicate DOM processes found in our study. We will revise this.

L616: Correct, unfortunately we could not measure flow rates or gauge streams. Initial data were presented by Keil et al. (10.1016/j.quaint.2009.02.022): indicating large discharge rates in Qugaqie, especially due to glacial melt. We currently investigate CO_2 emission from stream water of Qugaqie and found a net uptake of CO_2 due to abiotic weathering in the stream water, indicating low microbial in-stream activity (under review). We would hypothesize that sorption and desorption, or sorptive fractionation will be limited due to confined availability of exchange sites and substrates. We found overall low DOC (https://doi.org/10.1016/j.scitotenv.2022.156542), unlike in other more active systems (https://doi.org/10.4319/lo.2001.46.8.1921). However, this topic is open to investigation and interesting to tackle for future research.

L570: We will rephrase this and also restrict this expression with regard to the limited data we operate with.

L605: We found a high number of molecular formulae in wetland DOM with (broad range of terr. DOM), high IoS and high percentage of number of N compounds and P compounds (indicating high-productivity – also verified by Maurischat et al. (2022) (Figure 1) and stated in the text in L 495). Water logging further is a necessity to have a wetland and can be tracked by biota at this site (Maurischat et al. 2022) while the basin topography can be inferred from Figure 1. The claims made in this line are not really revolutionary, we will try to rephrase this sentence to make it more understandable.