

We want to thank the anonymous reviewer #3 for the constructive review. The comments are a great help to improve the manuscript. Below you can find our detailed responses (in red) to the comments (black):

The contribution by Y. Schindler Wildhaber et al. adds to the literature database with respect to organic matter and sediment tracers. In general, the data results are believable in terms of their dependence on stage and upstream to downstream change.

Some questions/concerns:

1. Was grain size correction or sieving a subset of sediments used to compare source and suspended sediments? This will be important as particle size can control signatures when fingerprinting.

Author reply: Yes, we measure the grain size distribution of the suspended sediment, but not of the potential sources. We found lower $\delta^{15}\text{N}$ and higher $\delta^{13}\text{C}_{\text{tot}}$ with increasing mean grain size of the suspended sediment. We believe, that these findings are connected with the fact that the mean sediment size varied in dependence of the water level (Fig.4).

Furthermore we do not think that measuring the grain size distribution of the potential sources would help us with additional information, since the grain size distribution of measured soil samples would not necessarily correspond to the grain size distribution of the eroded soil ending up in the river.

2. My primary concern is with the treatment of riverbed sediment. The watershed appears rather steep. How this impacted in-stream deposition of riverbed sediment? Is it expected that riverbed sediments are flushed during one or two or more events? If flow through of sediment is very high and deposition is low, addition of riverbed sediment may not be needed because their signature will not change with time and should reflect their source. Longer residence will require assessment of physical changes, which can be corrected with grain size corrections, as well as biotic additions.

Author reply: Yes, the watershed as whole is rather steep, but not in the sampled area. Also, terraces have been inserted to prevent scouring of the bed. Sediment flow though is high, but we do not expect that riverbed sediments are flushed during one event only. We know, that sediment deposition during high flow events is rather high (Schindler et al., 2011), but we do not know the residence time of the sediment. Since we only measured during winter time when biological activity is low, we assumed that $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$ would not significantly change during the temporary storage in the river. With biotic fractionation, we would expect higher isotope values with less organic concentration and with physical fractionation we would expect higher isotope values with smaller grain sizes. The former is

not the case (with less organic matter in the sediment, we measured lower $\delta^{15}\text{N}$ values), the latter was the case for $\delta^{15}\text{N}$, but we think this is not due to physical fractionation (see previous answer). We will discuss this in the manuscript.

3. Also, as the authors state, “5 riverbed sediment samples from the upper most accessible reach of the river”. How were these samples collected? What was the grain size distribution of the samples? Why only 5 samples were taken at the top of the stream? Was this the only deposition zone? Are the riverbed sediments just a subset of the forest soil fraction? What about riverbed sediments lower in the system? Were these considered?

Author reply: Yes, we took only riverbed sediment in the upper most accessible reach of the river. There is no surface water flow at this reach during dry periods. Consequently, sampling the riverbed sediment could be done with a simple corer. We assumed that this sediment represents mainly the original bedrock molasse.

We did not sample riverbed sediment downstream as those samples would represent a mixture of the other four end members. For modeling purpose, samples from the sources (end members) should remain independent so as not to complicate the results. For this reason we did not include riverbed sediment from downstream locations.

We will discuss these points in the section 2.1.1.

4. The nitrogen isotope value of the riverbed sediments are really low. Is this value reflective of the organic matter or the carbonates? 5. The questions are important because the riverbed end-member puts quite a bit of leverage on the source apportionment results.

Author reply: We are not sure if you refer to nitrogen or carbon isotopes. Carbon is low because of carbonates. Nitrogen isotope values are also very low. We do not know the reason for that. Nitrogen was measured on non acidified samples since we have noticed in the past, that acidifying soil/sediment samples for measuring nitrogen have falsified the results.

6. Table 3 and Fig 6, “sediment” should be “riverbed s” or clearly defined otherwise.

Author reply: Yes, done.

7. Discussion of the significance of results with respect to trout spawning habitat is lacking. The authors state that carbon tracers “indicate an allochthonous source of the organic matter in the SS during the brown trout spawning season.” Then why perform the sediment source apportionment? How the source distribution could further impact spawning?

Author reply: Yes, you are right. We will discuss this point in the abstract and the conclusion. Our data indicate an increase of soil erosion processes on snow free pasture and arable land during the anticipated warmer winter with more frequently torrential rain events

(IPPC, 2007). An increase of SS and of organic matter during the brown trout spawning season would be a consequent. Both affect brown trout eggs negatively (Greig et al., 2005).

We do not totally understand the second part of your question. Yes, we did indicate an allochthonous (=external source) source of the organic matter in the SS. This is the reason, why we performed the sediment source apportionment.