

Re-Review on Tracer based analysis of spatial and temporal variation of water sources in a glacierized catchment by Penna et al. (hess-2014-153)

The authors present an interesting case study about the spatio-temporal variation of the most important water sources contributing to runoff and groundwater recharge in a high alpine catchment in the southern European Alps. The study presents a unique and extensive dataset of stable isotopes and EC measurements in the study area.

The study nicely characterizes the important runoff generation processes in the study area using classical hydrological tracer methods. The study presents no new methods or the identification of unknown processes. The tracer data nicely confirm fundamental process knowledge in alpine environments. The scientific value of the study lie therefore in the characterization of the hydrological runoff generation processes in an insufficient investigated study environment using environmental tracers. The presented sampling approach and the methods used are valid. However, the authors present lot of speculations to explain the hydrological processes from the collected data.

I recommend this manuscript for publication in HESS, after revising the paper according to following aspects/points.

Title: I am not sure if „in glacierized catchment“ is appropriate since only 10% of the area are covered by glacier. Since the study is a typical case study it would be more appropriate to consider this in the title too. For example: „in a high alpine catchment in the southern European Alps“

The citation style in this manuscript is still very poor (maybe it was an Endnote problem...). However, I think this is an important aspect of scientific work and should be considered very carefully!!! For example, Line 72: correct is „(Uhlmann, 2013)“ or Line 219: „(Shanley and Kendall, 2002)“, Line 283, Line 316, Line 340, Line 379. Line 455, Line 618, ...???

Section 4.7.3: I would expect highest EC values during the time with the highest contribution of glacier water (due to a lot of fine sediment coming with the glacier milk). The presented data did not reflect this typical characteristic. Can you please include a discussion about this aspect in your manuscript.

Table 4: You describe the slopes of the streamwater (tributaries) and groundwater of the deuterium-oxygen18 relationship, but please comment on the negative intercept too. I think this is crucial since those intercepts did not fit to the general picture.

Figures 7,9,10: I would suggest to remove the interpolation lines between the points. Those points are discrete measurements and we do not know the values between those points.

Figure 7: The mentioned pattern are noticeable, but can you please comment on the deuterium values in panel a) in year 2011. They look more similar without the dynamic visible in the two subsequent years. Furthermore, the dynamic of the spring samples in 2013 differ from the pattern in the two previous years and SPR4 does not follow the trend of the other springs in 2013. This could potentially explain the snowmelt contribution in June 2013 (Figure 10).

Section 5: I would change the title to „Concluding remarks and limitations of the research“ or add a new section for describing the limitations (and outlook?)...

Another point here is the structure of this section in terms of conclusions, problems during the field campaign and limitations (or include subsections...)

Line 87-96: There are passages that would better fit into the study area section.

Line 143, 144 and 146: m^3/s (the 3 was missing in the downloaded manuscript...)

Line 161 and 162: I do not know if this info is needed...

Line 180: Eighty-two or 82

Line 194: Just a short comment, there is an ongoing discussion if paraffin oil influences the measurements of stable water isotopes with PICARRO device. I don't know if this is the same for the used Los Gatos model ...?

Line 313: The used significance test reveals a statistical difference. However, on Figure 2 the signatures look very similar. Please comment on that.

Line 373: For consistency, I would suggest to use „rainfall“ here.

Line 382: cf. Could be replaced by: „....., a process shown by Peng et al. (2004).“

Line 431: Is the melt rate expected to be reduced? Lower albedo and thermal radiation from the debris may also increase melt rates. Please provide a relevant reference at this point.

Line 472-474: Then you could think about removing the snowpack from Figure 5.

Line 477: I would suggest to revise this sentence for more clarity: „The observational periods in the three study years showed...“.

Line 531+532 and Line 543-545: You could include an outlook section at the end for example.

Just a final comment: It would be nice for future sampling campaigns to include winter time sampling (at least in the lower parts of the catchment) to learn more about the storage characteristics of this type of environment. This would further improve process representation for the hydrological modelling of this environment.