

## ***Interactive comment on “Stable isotope investigation of groundwater recharge in the Carpathian Mountains, East-Central Europe” by Carmen-Andreea Bădăluță et al.***

### **Anonymous Referee #2**

Received and published: 9 March 2018

**General comments** The present manuscript is bringing new data for a major catchment area of the northern Moldavia, Romania. The data includes: local meteoric water lines, well distribution and isotopic compositions of groundwaters, seasonal river isotopic compositions, seasonal variations in humidity and temperature, amount of precipitation as well as circulation patterns. Such investigations are largely missing for the region and is important for the region to see such an impressive compilation of data and seasonal temperature distribution and moisture circulation models.

**Specific comments** Before publication, specific issues should be improved:

As the manuscript address regional circulation patterns, this should be also reflected

C1

in the title.

For Table 1 the abbreviations used for columns should be explained in the caption of the Table.

Mention if the calculated mean yearly isotopic compositions are amount weighted or not.

For the Figure 3 Legend and Plot: In the Legend, below the figure, left column, there is a red filled point explained as representing GMWL. The red point is not GMWL, please explain the meaning of the red point correctly. Avoid using each time “linear” for explanations in the Legend. There are two abbreviations within the plot, SVMWL and RMWL, but just one blue line is displayed. Also these two abbreviations are not mentioned in the Legend. For river waters, I admit that there is mainly a linear regression trend. For well waters there is not a single regression, the pattern is more complicated, probably you was sampling several aquifers situated at various depths. This should be insert in the discussions as well. The blue line indicating local meteoric water line is not reflecting the regression for the blue filled points (local precipitations), check data. After checking once more the position of the local meteoric water line (LMWL), discuss the data plotting left of the local meteoric water line. Which should be the reason(s) for this?

In the Introduction you mention that “The links between the stable isotope distribution of O and H in water and climate are well understood in general principles and these can be locally applied to distinguish between different moisture sources and tracks, seasonal contribution to river and groundwater recharge (ref), post-precipitation processes (e.g., evaporation) etc. However, so far, no such studies have been performed in our study area, and, as a matter of fact, in Romania, except for a few studies aimed at understanding the stable isotope composition of precipitation in Western Romania (Bojar et al., 2009; Bojar et al., 2017; Drăguțin et al., 2017).” This is not correct; please look once more at the papers of Bojar et al., 2017 and Drăguțin et al., 2017.

C2

Both papers are investigating and discussing the relationship between precipitations and groundwaters for clastic and karstic aquifers, respectively. The investigated area in your manuscript is situated like 600 km away from those areas and according to your data show a different moisture circulation pattern. Please remodel the paragraph in the light of these facts.

You have the data necessary in order to insert in the text, for precipitation, the Dansgaard equations between temperature and isotopic compositions. In the reference list Dansgaard paper is included but a reference to that paper is missing from the manuscript text.

The statement in the Conclusion “the main precipitation sources are located eastwards from the sampling site (in the East-European Plain and the Black Sea)” is not supported by the data shown in Table 3. Also the role of local recycling is missing, I suggest Table 3 should be interpreted in a more moderate style.

In Table 3 caption, please include a short statement about the method you used in the calculation of the precipitation source percentages. Also add an explicit paragraph in the Methods about this topic.

---

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2018-6>, 2018.