

Interactive comment on “Transfer of environmental signals from surface to the underground at Ascunsă Cave, Romania” by Virgil Drăgușin et al.

Anonymous Referee #1

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In the submitted manuscript Dragusin et al present the results and analysis of an extensive data set of climatic, hydrological and hydrochemical variables they collected at a karstic cave in Romania. For their measurement, campaign the authors installed soil moisture and temperature probes at various locations inside the cave including a small stream that was passing the cave. Rainfall and drip water were analyzed for the oxygen 18 (O-18) and deuterium (H-2) composition. Cave air and drip waters were monitored for their CO₂ compositions. For the sampling of drip water CO₂, the authors used a newly developed sampling technique to obtain continuous measurements of the CO₂ composition of the drip water. Finally, drip waters and “farmed” drip calcite were analyzed for their calcite and carbon isotopic (C-13) composition. By the water iso-

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topes, the authors find some indication for evaporative processes. The observed CO₂ dynamics indicate that there is a continuous source of CO₂ feeding the drip waters, which they attribute to organic matter stored in the epikarst. In general, the observed drip rates and chemical composition of the different stalactites shows similar reaction, indicating that they are all fed by the same source.

The paper is well written and the intensive field campaign provides insights into water movement and transport from the surface through the hydrological system into the stalactite. Therefore, I think that the paper is, in general, a good fit for Hydrology and Earth System Sciences.

However, in its present state the authors do not take full advantage in presenting the data set they collected. This is due to various structural and methodological reasons:

1. The methods and the monitoring program are well described but a subsection addressing the analysis of the data and respective aims (which processes are investigated?) is missing. Please provide some information about how the data is processed and analyzed.

2. In general the Results section is too unorganized:

a. A quantification of the many relations between the observed variables is missing (drip rate variability vs climate, cave air CO₂ vs outside temperature, etc.). Please provide the strength and respective p-values of the correlations shown in the results

b. The authors do not distinguish between results and discussion section. For that reason the results section is quite long as it includes already a lot of interpretations. For the sake of a better structure and more focus I recommend splitting this large section into separate results and discussion sections.

c. Generally, more focus and less unnecessary information are necessary. In some paragraphs, the authors just explain that they derive anything from the observed data. Such parts could be completely omitted.

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3. Discussion should relate results and interpretations to other studies in the field more intensely. Even though the present results section is meant to include the discussion, I could not find much comparison between the results and interpretations of this study and the outcomes of the work of others. Please add this comparison to the newly created discussion section.

In order to provide a combined interpretation of the results, I strongly recommend providing a conceptual model of the identified water flow dynamics and the hydrochemical dynamics.

4. Finally, the conclusions need to be more than a summary. Please provide some directions.

Overall, I think these issues can be solved within the frame of major revisions. Please find attached a commented version of the manuscript with some more specific remarks.

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/hess-2016-625/hess-2016-625-RC1-supplement.pdf>

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., doi:10.5194/hess-2016-625, 2017.

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