

**Review of Kost et al. "Relationship of seasonal variations in drip water  $\delta^{13}\text{CDIC}$ ,  $\delta^{18}\text{O}$  and trace elements with surface and physical cave conditions of La Vallina Cave, NW Spain" submitted to Hydrology and Earth System Sciences – hess-2022-386**

The manuscript by Kost et al. presents cave monitoring data of air and drip water including element concentrations and isotope data of La Vallina Cave, NW Spain. The data are very well presented and their interpretation is concise. I just have a few suggestions for improving the manuscript and thus, recommend minor revisions.

**General comments:**

In my opinion, the statement that speleothem precipitation is restricted to summer AND winter seems a bit contradicting. For example,  $\delta^{13}\text{CDIC}$  values and  $\text{pCO}_2$  cave air concentrations (thus, cave ventilation pattern) hint at preferred precipitation in winter. How valid are the model data for this? Or do you mean at some locations in the cave, there is summer precipitation and in other cave locations, there is winter precipitation? Especially in the abstract, this is quite confusing. Probably needs a more detailed explanation in the abstract or a rewriting, cause in the conclusions, it is far better explained.

Methods: Please provide the information on which instrumentation was used for measuring Cave air temperature and relative humidity as well as the precision of the device(s). What is the measurement uncertainty of the Picarro for  $\text{pCO}_2$  and  $\delta^{13}\text{C}_{\text{CO}_2}$ ?

Results section: There are already some interpretations /discussions occurring here: Cave air  $\text{CO}_2$ , hydrological conditions, 4.4 Isotopic composition of the drip water. Please go through that section and thoroughly separate what is a result and what is interpretation/discussion and move those parts to the discussion section.

For results section on PCP: I suggest to use also  $\text{Mg/Ca}$  and  $\text{Ba/Ca}$  ratios to help determine variations in PCP. The PCA shows that  $\text{Mg}$ ,  $\text{Ca}$ ,  $\text{Sr}$  and  $\text{Ba}$  seem to be influenced by the same environmental factor (PC1). Thus, I suggest including those ratios in the PCP part at least for Gloria, Skyscraper, Playground and Gravel drip water sites, which seem less influenced by seawater aerosol input. Also, what about a Sinclair plot?

Lines 545-570: I miss correlations between  $\delta^{13}\text{CDIC}$  and cave air  $\text{CO}_2$  concentrations in this section. In figure 2,  $\delta^{13}\text{CDIC}$  and  $\text{pCO}_2$  concentrations seem to show anti-correlations for the different sites. Please check, if that is the case. Thus, this will highly strengthen your argumentation that the degree of degassing (which depends on  $\text{CO}_2$  concentrations of cave air) has an influence on  $\delta^{13}\text{CDIC}$  values. Revise text here and elsewhere.

I think you use “epikarst” when you mean the karst zone. Epikarst is just the uppermost zone of the karst, which is in contact with the soil. You cannot use it to describe the whole bedrock above the cave. Please clarify this. See for example Fairchild and Baker (2012) and Bakalowicz (2012).

**Further comments:**

Lines 19-20: This is a bit misleading. Please write instead: The carbon isotope signature of dissolved inorganic carbon of drip water...

Line 23: What kind of cave air measurements? Be more precise.

Line 124: What does the abbreviation DEM stand for?

Lines 154 and 203: ConFlo IV

Line 296, 316 and elsewhere: Please write hydrogen isotopic composition. When speaking of deuterium, only the hydrogen isotope with the mass 2 is meant.

Line 411: Also due to the good ventilation in winter diluting and removing the CO<sub>2</sub> degassed from drip water in winter. I suggest adding that factor a bit more in the discussion in this part.