RC 2:

The manuscript submitted by Kost et al deals with the characterization of the atmosphere-karst vadose zone-cave system at a cave located in the Northwest Iberian Peninsula. The characterisation is based on a cave monitoring programme including measurements of cave air, bedrock chemistry, and drip water $\delta^{13}C$ DIC, $\delta^{18}O$ and δD as well as 16 trace elements with irregular measurements for about 16 months. The study finds sensitivities of drip rates to climatic seasonality but relatively low variations of the stable water isotopes which they attribute to a well-mixed reservoir in the vadose zone above the cave. $\delta^{13}C$ DIC indicates the influence of seasonal vegetation dynamics and related microbial activity. Their measurements further indicate limited the extent of the seasonal variation of degassing and prior calcite precipitation (PCP). They also indicate that stalagmite growth is limited to the summer and winter seasons.

The study is well-written and concise. The simultaneous monitoring of multiple variable permits in-depth analysis of the processes controlling cave drip water composition and stalagmite growth in the observed cave. There are only few minor points that should be addressed:

- The results section already includes a lot of interpretation and link to other references, which should be moved to the discussion section.

[We identified several parts of discussion elements in the results section and carefully tried to remove them from the results section and incorporate them into the discussion section. We have made our best effort to present results without significant interpretation, in a few gray areas the later results sections require brief explanation of the rationale (e.g. Sr/Ca-index as a PCP indicator or the principle of cave ventilation) and we retain these brief sentences for clarity.]

- Assumption of P-PET equals available water for downward percolation from the surface. I do not completely agree with this assumption as it assumes that AET equals PET, which is often not the case and which may explain why the drips are also active in summer. AET and PET depend on factors like land cover type, soil thicknesses, and rooting depth. Consequently, they affect what is left for feeding the drips below and also how fast a drip reacts to rainfall events (see for instance Berthelin and Hartmann, 2020; Carrière et al., 2020; Sarrazin et al., 2018).

[We thank the reviewer for highlighting this point. We now clarify in section 4.3:
"We note that the calculated PET may overestimate the actual evapotranspiration (AET) and therefore underestimate actual water balance. Our purpose is to illustrate the trend in seasonal variation in water balance rather than a quantitative calculation of water balance; for this purpose PET is suitable and avoids the uncertainties of assigning a single crop coefficient over a landscape of heterogeneous vegetation cover. Recharge of the water reservoir potentially only occurs when water balance is positive (Fig. 3e)."
Additionally in section 5.2:
"Recently published hydrological models from semi-arid caves suggest a recharge threshold has to be overcome (saturated soil and epikarst) to contribute to the deeper water reservoir feeding the cave drip water (Markowska et al., 2016; Baker et al., 2021). Hence, when (P-PET) is negative in summer, any rain is likely evaporated and does not recharge the water reservoir. Even with a lower actual evapotranspiration (AET) summer recharge is reduced. However, the active drips in summer suggest a large water reservoir, in line with the well-mixed reservoir discussed below, which does not dry out during summer and keeps drips active even if recharge is minimal."

Active drip sites in summer might on one hand be fed by higher recharge as suggested by using AET instead of PET, on the other hand a water reservoir doesn't need to dry out if it's large enough even if effective recharge is zero. Our findings of well-mixed water reservoirs indicates relatively large reservoirs (no response to single events), therefore supports the argumentation that the water reservoir does not empty in summer keeping drip sites active. We hope to satisfy the reviewer by extending this discussion including AET (instead of PET) as a potential driver of active drip sites in summer.]

- The authors mention the 7-day antecedent cumulative rainfall method by Baker et al (2020, 2021) did not work but did they also try the simple bucket model used in the same studies? This may help resolving the question about PET being a goof proxy for AET and allow to estimate vertical percolation in the preceding years.

[We thank the reviewer for reminding us of the simple bucket model. The main limitation in applying hydraulic models is that we have data on driprate only at discrete points in time during the monthly sampling, not continuously. For example, the temporal resolution (monthly) does not allow to investigate response time to rainfall events. Given this limitation, and that hydraulic model was not a main focus of the study, since we are asked to shorten the manuscript, we decide not to explore further modeling approaches in this paper.]

- The authors state that the spatial variability of drip waters suggest that they are not feed by the same reservoir but multiple reservoirs with varying dominance of diffuse and preferential flow routes. However, different contributions of diffuse and preferential flow would not affect the time, volume weighted averages of the drips. More preferential flow would only result in stronger visibility of the seasonal isotopic signal of the rain, which the authors did not find. The obvious differences in average $\delta^{18}O$ and δD must originate from different processes than mixing alone. Maybe, the processes found by Treble et al. (2022) can support the interpretation.

  When discussing the effect of evaporation on stable water isotopes, it is not clear whether the authors mean evaporation and/or transpiration because only the former results in fractionation.

[As we discuss in section 5.2, we do not have matched rainfall and $\delta^{18}O$ for the same monitoring period. Thus, we cannot rule out the possibility that inter site differences may reflect varying average transit times among drips, so that the amount weighted drip water $\delta^{18}O$ of different drips would converge over a suitably long time period which averaged interannual differences in amount weighted $\delta^{18}O$ of precipitation. If significant differences in mean transit times existed among drip sites, and the amount weighted average precipitation in the year prior to monitoring were more positive than that during the monitored season, then drips with slower average transit times might be offset to the previous year's value. Interannual variation of about 1.25‰ in the yearly precipitation amount weighted average $\delta^{18}O$ is seen among the available precipitation data (Fig. 9) which includes 15 years from GNIP station Santander in the period 2000-2015 (no recent data available; Iaea/Wmo, 2022) and individual rain events monitored near Oviedo from February 2015 to February 2016 (Moreno et al., 2021).

We also have expanded the citations for the statement that "Prior studies have shown that nearby drip sites can undergo very different routing in the unsaturated zone undergoing different evaporative fractionation (Treble et al., 2022; Markowska et al., 2016)."

To clarify the role of eucalyptus on evaporation, we further detail now in section 5.2: “The heterogenous coverage by deep rooted trees such as Eucalyptus may contribute to lateral variations in evaporative fractionation, because they can increase evaporation from the upper soil horizons via the hydraulic redistribution of deep groundwater to the upper soil (Brooksbank et al., 2011).”

“These effects may be more extreme now due to spatially variable vegetation and extreme evapotranspiration and hydraulic redistribution of perennially green Eucalyptus (Brooksbank et al 2011), compared to native deciduous oaks.”

- Generally, the discussion section seems to be quite long, especially when considering that it already starts in the results section (see my previous comment). It would be helpful, if the authors could tailor it a bit more to the main outcomes of the paper.

[We appreciate the suggestion. From the two reviews, we found difficult to ascertain what portions should be adjusted without disrupting the clarity of the paper. For this reason, we have not shortened the paper, but have taken the caution to add the additional requested figures to the supplement rather than the main text.]

I am convinced that these points can be implemented within the frame of minor revisions.

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