

Biogeosciences Discuss., referee comment RC1  
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## Comment on bg-2022-159

Anonymous Referee #1

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Referee comment on "Influence of subterranean refugiolclimate on the clustering of the western barbastelle during hibernation" by Grzegorz Kłys et al., Biogeosciences Discuss., <https://doi.org/10.5194/bg-2022-159-RC1>, 2022

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In my opinion this paper is not well written and sometimes confuse: manuscript contains a lot of methodological errors; moreover, particular parts, for example, the Introduction does not connect to the Methodology or Results. These types of results have been published many times before, but using much more accurate methods, and with unobjectionable sampling.

Title

- i) title does not link to manuscript content
- ii) title and keywords repeat the same words;

Introduction: this is more a review of existing research on bat wintering, but at a local level and without recent literature (a lot of self-citation!) than outlining hypotheses, for example:

- "The grouping of individuals during wintering is variable both within the species and between species (Kłys, 2013)." – in fact this publication not contain any data about grouping;

- " ... optimal values defining the so-called thermal comfort of selected species (Kłys,

2004; KÅłys and WoÅłoszyn, 2005; KÅłys, 2008; KÅłys, 2013)" - whether this is a thermoneutral zone or a thermopreferendum (in fact bats do not predict what the temperature will be in future, but rather choose their preferred parameters at exactly time, and change location when conditions change).

on the other hand basic literature is missing: BoratynÅłski, J. S., Willis, C. K. R., Jefimow, M., Wojciechowski, M.S. 2015. Huddling reduces evaporative water loss in torpid Natterer's bats, *Myotis nattereri*. *Comp. Biochem. Physiol. Part A Mol. Integr. Physiol.* 179, 125-132. doi:10.1016/j.cbpa.2014.09.035

Martínková N., Baird S.J.E., Kána V., Zima J. 2020. Bat population recoveries give insight into clustering strategies during hibernation. *Frontiers in Zoology* 17:26  
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In addition, text contain some misunderstandings: "In particular, the bats can decrease their body temperature almost to the ambient one (McNab, 1982) or in a short time increase it significantly above this value (even up to 40°C at the air temperature of only a few degrees) (Davydow, 2004)." In fact, arousal from hibernation even takes more than 30 minutes, which cannot be called a slow process "in a short time". See also: Bachorec E., Bartonicka T., Heger T., Pikula J., Zúkal J. 2021. Cold arousal - A mechanism used by hibernating bats to reduce the energetic costs of disturbance. *Journal of Thermal Biology*, 101: 103-107.

iii) the chosen model species is probably the worst for testing cluster size effect: the western barbastelle *Barbastella barbastellus* (Schreber, 1774) are: 1) psychrophilic/cryophilic bat species – hibernating mostly in transition zone in undergrounds (highly variable conditions); 2) its range extends from the large Mediterranean islands to southern Sweden and the southern British Isles (a very wide temperature range). Therefore, each visit can give different results.

- iv) no scientific hypothesis being tested here, only "evaluation" of microclimate parameters

## Methods

- i) each of selected hibernation places have been described in scientific paper – more

- properly than give sheet of protection (old data, without any additional information).
- ii) no data about number of visits in each hibernaculum, each year, etc. It's important because they are belonged to different climatic regions (see: Gottfried et al. 2019). Therefore, the results is completely questionable: if the species prefers a dynamic microclimate, then the choice of region determines the microclimate but not the bat itself. In addition, different winters can produce year effect and not preference.

iii) what does 180 observations mean - is it measurements in all hibernation locations? No n observations is given for individual and for groups.

- iv) "devices from SENSOTRON (KÅÅys 2013)" – it sounds like it is equipment created by the Author, which is not the case; also, neither the accuracy nor the resolution of the instrument is given;
- v) "... model describing an influence of the air physical parameters on bats' grouping " – in this type of methodology, Authors can only describe preference of wintering places, but only at a given time (transition zone, dynamic microclimate);
- vi) the use of PCA is incorrect here – are only 3 variables whose interactions can (and for sure, have) strong biological significance. Hence it will be correct to use one of a linear or linearized model (GLM/GLZ). It makes no sense to calculate quantile regression, because its only two groups (if I properly understood this paper).

## Results

- i) very chaotic, in fact there is no results: first paragraph repeats data from tables below. Results are required descriptive statistics first (e.g.: a box-plot diagram), followed by a statistical test to test the hypothesis - here both parts are missing;
- ii) for PCA – only the percentage of variance is given, but no real value, the effect of a variable on loadings also is needed, no test of co-linearity (highly correlated factors).

iii) equation - contributes absolutely nothing. Why is there no graph of the obtained regression? Why was PCA used if the variables analyzed partially?

## Discussion:

This part is even more chaotic than the results; whole Discussion is rather speculation, not interpretation of obtained results. Many of cited articles reports completely different

phenomena.

- i) "...participation of individual heat transport mechanisms between the bat's body and the air (convection) or between the body and the ground (conduction) (KÅ□ys, 2013)" – in this paper there are no results on these parameters.
- ii) thermal preferences was study many times, but most of this research are giving only approximated temperatures – mainly temperature somewhere around the bat, not directly, except research with thermal imaging cameras (see: Boyles et al. 2008).

iii) "... which simultaneously increases energy loss (Wermundsen and Siivonen, 2010)" – those Authors not described this parameter, only ambient temperature (Ta).

- iv) "... the higher the degree of air saturation with water vapor, the more difficult it becomes to collect heat by evaporation (Thomas and Cloutier, 1992; Thomas, 1995; Paksuz et al., 2007)" – Paksuz et al., 2007 not writing in any part of article about water vapour!

## References

- i) a lot of self-citation of papers that are unavailable or very difficult to access;
- ii) some papers should not be cited, e.g.: ĀiĀ¼Ā, Ń□Ā½Ā¾Ā² et al. 1999; ĀĀ¾Ā¼ĀĀ, Ā»ĀµĀ½Ā°Ā¾, 2002 - it's faunistic not ecology/ecophysiology research; Janicki et al., 2006 - is a handbook for vets;

iii) the lack, in turn, of citation of fundamental/essential papers: International Hibernation Symposium, Heldmaier, G., & Klingenspor, M. (2000). Life in the cold: Eleventh International Hibernation Symposium; Gottfried I., Gottfried T., LesiÅ□ski G., Hebda G., Ignaczak M., Wojtaszyn G., Jurczyszyn M., Fuszara M., Fuszara E., GrzywiÅ□ski W., BÅ□achowski G., Hejduk J., Jaros R., Kowalski M. 2019. Long-term changes in winter abundance of the barbastelle *Barbastella barbastellus* in Poland and the climate change – Are current monitoring schemes still reliable for cryophilic bat species? PLoS ONE 15(2): e0227912. <https://doi.org/10.1371/journal.pone.0227912>

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