

Interactive comment on “Unprecedented loss of surface and cave ice in SE Europe related to record summer rains in 2019” by Aurel Persoiu et al.

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Dear Authors, Dear Editor,

The manuscript reports enormous mass loss in five cave ice deposits and two small glaciers from SE Europe. Following the detailed evaluation of the meteorological conditions the Authors conclude that extreme precipitation events occurring in summer of 2019 led to catastrophic loss of ice. The study is well-structured and easy to follow; however, some revision can be recommended. I encourage the authors for the revision because the paper has the potential to become a key reference in the field of ice cave science.

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best wishes, Zoltan Kern

General comments:

-I've found a bit confusing the usage of the term “glacier” in the paper. sometimes it seems that the Authors include both surface and cave glaciers in this term sometimes only surface glaciers. I suggest using the term “glacieret” when speaking about Snezhnika and Sudohol. It might help to avoid confusion.

-I missed two highly relevant references from the discussion (Colucci et al., 2016, Colucci and Guglielmin 2019), and suggested additional references or replacing the currently cited reference with a more pertinent one at a couple of places. Colucci RR, Fontana D, Forte E, et al. (2016) Response of ice caves to weather extremes in the Southeastern Alps, Europe. *Geomorphology* 261: 1–11. Colucci, R.R., Guglielmin, M. 2019 Climate change and rapid ice melt: Suggestions from abrupt permafrost degradation and ice melting in an alpine ice cave. *Progress in Physical Geography* 43: 561-573 <https://doi.org/10.1177/0309133319846056>

-The name of one of the studied ice bodies is frequently written with a spelling mistake. “Basnki” should be corrected to “Banski” e.g. in line 114, 262, 266 or Fig4. I've marked this spelling mistake where I realized in the annotated PDF. I will not list them among the specific comments.

Although I marked few potential typos in the PDF, I note that I cannot provide a detailed linguistic review since I'm not a native English speaker.

specific comments:

line52: Citing this book chapter is not really relevant here, maybe the Authors wish to cite from the same year from the same author this paper: DOI:10.1017/RDC.2018.96

line62: A recent evaluation of CMIP5 simulations for this region (<https://doi.org/10.1007/s00704-020-03361-7>) confirmed the increase in winter precipitation, however showed that the models which reproduced better the decadal

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hydroclimate variability of the 1850-2005 period show less reduction in summer precipitation (instead increase). This suggests that it is more likely that summer precipitation will not decrease so highlight the importance of the topic of the study. It might be a relevant info here.

line68: I think Kern and Thomas 2014 is a more pertinent citation for this statement than Kern et al., 2013

line76: Eisreisenwelt is not counted among the top5? If so then please, revise this statement.

line85: Is it really 'equilibrium' or just a moderately negative mass balance?

line98: Geographical coordinates are lacking for Crna Ledenica.

lines187-188: Are the described changes (retreat at the lower end of the two glacierets, increase in the width of the rimaye separating them from the cirque headwall) visible in Fig4? If yes, please refer to the figure.

line238: Which zero isotherm do you mean? MAAT, Summer meant, July mean T? Please, be more specific. line238-241: I think a supporting reference for this statement is needed.

lines276-278: for instance, this is a place where Colucci et al., 2016, Colucci and Gugliemlin 2019 could be incorporated to the discussion.

Some additional minor comments are marked in the annotated PDF.

Figures

Fig2: decimal places in the y-axis values can be omitted.

Fig3: The caption says that the changes are illustrated "since 2016", however the date of the first photo is 10.08.2014. Please, clarify this.

Fig6: I cannot see the panel codes in the figure. In addition, please, increase the

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characters in the title of the maps and use uniform character size for the titles.

Fig7: I cannot see the panel codes in the figure. In addition, please, increase the characters in the title of the maps and use uniform character size for the titles.

Fig8: Comment1: Could you add a color scale to help a better interpretation of the illustration. For instance, I guess reddish colors show warmer temp and bluish colors show colder temp, however it should be indicated in the caption. Comment2: Why the global temperature? European or SE European temperature changes could be much more relevant.

Please also note the supplement to this comment:

<https://tc.copernicus.org/preprints/tc-2020-287/tc-2020-287-RC3-supplement.pdf>

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2020-287>, 2020.

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