The Cryosphere
Discussions

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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.

Anonymous Referee #2

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Overview and general comments: I have read the manuscript entitled "Unprecedented loss of surface and cave ice in SE Europe related to record summer rains in 2019". In the manuscript, the authors investigate the ice changes in 5 subsurface glaciers (ice-caves) and 2 of the southernmost European glaciers during 2018-2019 year. Ice measurements in caves were performed using usual methods for ice body changes in ice caves by fixed marks/points in walls and photogrammetry, while glacier changes were evaluated using a drone. The weather during 2018-2019 period was evaluated using E-OBS dataset. The authors conclude that the observed ice loss during 2018-2019 was caused by extreme rainfalls during spring-summer. This ice melt event was an unprecedented event, not recorded during the last century. The manuscript is inter-

esting to understand the response of ice caves and glaciers to extreme rainfall events. Some minor observations and suggestions must be solved before publication.

Line 1: Title. The term "unprecedented" should be accompanied by a temporal term e.g ("Unprecedented loss of surface and cave ice in SE Europe since the last century. . ..or 100-years")

Lines 87 and 94: appear two times "Chionotrypa cave", I guess the caves have the same name, but maybe the authors could write directly the second name attributed "Chionotrypa (Falakro)" and "Chionotrypa (Olympus)" or, to shorten it, "Chionortypa-F" "Chionotrypa-O" to avoid repeating the name, as it appears along the text. An acronym for "Velika ledena jama v Paradani" is also recommended or for short like "Velika" or "Paradini"

Line 104: change "metamorphosed" by "transformation"

Line 126: The authors indicate that photogrammetry was carried out. In which caves was performed? Maybe the authors should add some additional information about the methods of photogrammetry, given that at the moment is not a usual method applied on ice caves, however, it is a powerful technique to know ice volume changes in caves.

Line 136-142: A table could be helpful showing the resolution, error of MDT generation, and the accumulated error when comparing both models.

Line 144: I have asked an expert colleague in meteorology and he suggests some changes and modifications in relation to the use of the E-OBS dataset.

- One of the main problems of this dataset is related to the extreme events. The resolution of E-OBS is 0.25x0.25, which for mountain areas and rainfall events is too low. The following database has been intensively tested:

https://www.ecmwf.int/en/forecasts/datasets/reanalysis-datasets/era5

Line 167: Is it possible to indicate the drop or change in cm or m? Following a similar

descriptions of the rest of ice caves where authors describe the drop of ice in cm or m, and then the corresponding volume.

Line 198: Why did the authors use the 1971-2000 period instead of the last one (1980-2010)?

Line 307 "generate (semi)quantitative" add space.

Figures

Figure 1: Add legend, Red stars: ice caves. Blue stars: glaciers

Figure 2: It would be nice to show all ice changes from the caves of the study in the graph maybe in a zoomed area.

Figure 4: The photos should be labelled as a). b) etc

Figure 5: The photos should be labelled with a code for a quick identification. Maybe left= 1 and corresponding photos 1a, 1b, 1c, Middle= 2a, 2b, 2c. . .etc. and similar for Figure 7.

Figure 8: indicate the meaning of background colors (warm, cold...).

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