The Cryosphere Discussions

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Comment on tc-2020-376

Anonymous Referee #1

Referee comment on "High-resolution inventory to capture glacier disintegration in the Austrian Silvretta" by Andrea Fischer et al., The Cryosphere Discuss., https://doi.org/10.5194/tc-2020-376-RC1, 2021

This is well written and interesting paper that describes glacier disintegration in a region in Austria based on an extensive data set of DEMs and orthophotos. The glaciers in question are all rather small (a few km² or smaller) and some have disintegrated into partly or fully debris-covered patches. The authers point out the need for a scientific discussion about the proper aim and suitable methodology for monitoring small, totally debris-covered cryogenic geomorphological structures that are remnants of recently active glaciers. At some spatial scale and degree of debris-cover, monitoring of such remnants might not be within the proper scope of glacier monitoring as such but should be considered as a task for monitoring and studies of rock glaciers and permafrost. Setting a hard threshold in terms of the size of very small glaciers for including them in glacier inventories and considering then glacier monitoring is, however, not straightforward.

Comments:
p. 14, l. 246: The authors use the area at the first point in time A(t_1) to compute the area-averaged specific mass balance b_geo. I would have thought that the average of the areas at the beginning and end of the period (A(t_1)+A(t_2)/2 would be more suitable? This would be consistent with the description on p. 92 in the IACS glossary of glacier mass balance (Cogley et al., 2011).
p. 22, l. 340-353: It might be worthwhile to add the IACS (Cogley et al., 2011, p. 45) and GLIMS (Raup and Khalsa, 2010, p. 4) definitions of glaciers in this list of definitions of the term "glacier" since these have and "official" status in the glaciological community. Regarding the definition of "glacier" on p. 22 and 23, it might be mentioned that definition (1), that includes dead and buried glacier ice, would also include ice-cored morains, even with deeply buried ice that may last centuries, which would presumably greatly complicate the creation and management of glacier inventories.

Minor and editorial comments:
The superscipted power of 2 in "km²" is missing in the pdf I am reading (many places).
The "-" hyphen in negative numbers and number ranges should be changed to en-dash or a minus sign ("--" in LaTeX), for example "2002-2004" should be "2002--2004"

p. 12, l. 197: "between 1000 to-2000 m" --> "between 1000 to 2000 m"
p. 15, l. 269: "lower than" --> "lower in magnitude than"
p. 19, l. 305: "... if there is any ice left." --> "... whether there is any ice left."
p. 20, l. 315: "Without keeping them in inventories, we lose track of these transient states." --> "We lose track of these transient states by dropping these glaciers from the inventories."
p. 24: "The annual change rates of area and volume change indicate ..." --> "The annual rates of change of area and volume indicate ..."
p. 26: "The glacier inventory data in https://doi.org/10.1594/PANGAEA.844988" --> "The glacier inventory data are available at https://doi.org/10.1594/PANGAEA.844988"