

## ***Interactive comment on “Monitoring the seasonal changes of an englacial conduit network using repeated ground penetrating radar measurements” by Gregory Church et al.***

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The study of Church and colleagues provides unique observations on the annual and seasonal evolution of an englacial drainage system geometry. With the use of repeated GPR measurements they are capable to estimate both size and spatial of an englacial conduit and monitor its evolution through time. I find the observations presented in this study of great importance for the glacial hydrology community. However, I find that the study focus much on the methodological aspect and on the observation with a limited discussion of the possible implications for englacial hydrology and glacier dynamics processes. I found the structure of the paper sometime confusing, with methodology

C1

description in the Results section, and results being discussed in the Results section. I suggest to rearrange the concerned sections (see below and in-text comments).

Detailed comments can be found in the attached pdf and here are my general comments.

**Introduction:** The section present general aspects of GPR measurements and glacial hydrology observations, but I found that it is difficult to understand which problem the authors aims to tackle. The problematics of the study and the limitations of previous ones are not well defined. In my opinion, the introduction should be re-worked with that in mind. I suggest the authors to consider widening their Introduction on glacial hydrology and including recent works on such environment for temperate glaciers.

**Methodology:** I am not familiar with GPR measurements, but I find difficult to know is this study propose an innovative GPR analysis or not. I would like to have more information on what are the current limitations of GPR measurements. The authors devote large part of the manuscript to their approaches and I found difficult to follow such descriptions if we do not know why it is important beyond their study. In the results section you present several new methodologies. That renders the sections very difficult to follow. I suggest to move the methodological description in the Methodology section when possible, and try to reduce the description when possible.

**Results:** There is a general lack of quantitative uncertainties when presenting the results and the conduits geometry. Some of the results are quite speculative and I suggest to be more precise on this particular aspect and better describe the observations without jumping to your own interpretation. Care should be taken to do not already discuss your results in this section.

**Discussion:** This section contains numerous very short-sub-sections that I suggest to collapse. The discussion on englacial hydrology mechanism and spatial extent is very short and I do not find enough evidences for the author to propose such mechanism. I suggest to add more details on these section. The discussion on the methodolog-

C2

ical aspect lacks of a wider context and on how their approach really improve their observations. As previously said, I find that the authors do not discuss enough the measurements uncertainties.

Figures/Tables: There are a lot of figure and Tables and I suggest to try reduce the number of tables as it renders the reading difficult.

I find the observation of particular importance but I find a general confusion throughout the manuscript that impeach the reader to capture the importance of such observations and the proposed methodology. I support the publication of this manuscript with the above suggested modifications.

Please also note the supplement to this comment:

<https://www.the-cryosphere-discuss.net/tc-2020-94/tc-2020-94-RC1-supplement.pdf>

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Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2020-94>, 2020.