

## Review of «Continuous in situ measurements of anchor ice formation, growth and release»

This is a very interesting paper addressing a topic where little data is currently available. The paper both presents a novel method of sampling data and presents new insights into anchor ice growth. The paper also provides a good overview of the current knowledge of anchor ice formation and growth through the introduction. I therefore think this manuscript should be accepted for publication with some minor clarifications.

- The substrate studied was mounted quite close to the camera and camera frame. Could the camera frame have any impact on the flow field and thereby anchor ice deposits on the substrate plate.
- How would you consider the uncertainty in manually detecting the number of crystals and crystal size given the turbid/dark nature of the example picture?
- Did you compare the anchor ice forming on the substrate plate with anchor ice deposits on the natural substrate nearby the study site?
- You see anchor ice releases when the water is still supercooled and even when temperature decreases. This is an interesting observation and different from what we have observed in our anchor ice studies. What mechanism caused this? Forces from the water flow? On page 14 from line 30 you discuss the effect of rising stage e.g. from hydropeaking so this might be an explanation why ice released when the supercooling was still quite high.
- You define four stages of formation of growth. E.g. stage 2 did not appear in all experiments. Is this because this stage is not detectable or because the formation did not pass through this stage? Can you say something more on that, and do you think these four stages appear at all anchor ice formation events?
- Did you observe any difference in water temperature between the two sensors on the submerged system? I assume the temperature used is measured with the sensor closest to the substrate?
- Page 13, line 10-25. Could the thick layers of anchor ice under the border ice be driven by a larger accumulation of drifting frazil? Was the structure of the deep depositions similar to the anchor ice detected at the study site? This accumulation of ice with a foundation on anchor ice is also often seen in steeper streams and where anchor ice dams form.
- Page 14, line 5-10: Did you try to estimate the heat flux during the experiments? Do you have any indication of heat transfer from the sediments? This is an interesting observation, see also comment above.
- Page 15, from line 5: This section is not very clear to me. Are you looking at providing better parametrization for modelling? I think this could have been made clearer. As

asked above, can you estimate the heat flux for your site based on climate data to test the assumptions made in the computation?

- Figure 5 – 8: I can see the reason for having the same scale for Water temp for all figures, but this obscures small variations in some of the graphs. Maybe this scale could vary between graphs?
- Figure 12: What causes the large scatter in the growth rates for event C? This is not discussed in the text where it seems like the growth followed the linear models, which in figure 12 is reasonable for B/D but not for C.