

Earth Syst. Sci. Data Discuss., author comment AC1  
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## Reply on RC1

Bin Cheng et al.

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Author comment on "Inter-annual variation in lake ice composition in the European Arctic: observations based on high-resolution thermistor strings" by Bin Cheng et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-135-AC1>, 2021

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Thank you for your positive comment on this work, we appreciate your great effort making this novel compact and costcuting instrument, which allow us to carry out sustainable field campaigns.

Specific comments on the text are as follows.

1. The SIMBA sensors are calibrated at a single point to remove large offsets in a very accurately controlled bath. The sensors have been shown to be very linear and so the largest source of error becomes the resolution of the sensors. The absolute accuracy is therefore in the region of the resolution plus the error in the water bath accuracy which is very small. The quoted  $\pm 0.01\text{C}$  is not possible and the accuracy more like  $\pm 0.0625\text{C}$ . The sensor drift over time is small and can largely be ignored.

Thank you to point out this error. We made correction accordingly. The new text read: The accuracy of the SIMBA thermistor sensor is  $\pm 0.1\text{ }^{\circ}\text{C}$ , which is comparable with other type of thermistor string based IMBs (Richter-Menge et al. 2006).

2. Diffusivity is a transient measure of how heat is conducted away when a temperature change occurs (i.e. how cold to the touch something is). The SIMBA heating cycle is usually long enough for the temperature rise at the sensor to reach a steady state so is it not the thermal conductivity which dominates?

We modified the text to: The SIMBA heating cycle is usually long enough, often 60 or 90 s, for the temperature rise at the sensor to reach a steady state. Thermal diffusivity determined how the heat is conducted away of the heated sensors placed in air, snow, ice and lake water. As a result, the SIMBA-HT profiles can greatly enhance the detection of the interfaces between air, snow, ice and water.

3. Really impressive plots!

Thanks,