

Reply to Editor comments on

# “Bias in modeled Greenland ice sheet melt revealed by ASCAT”

by Anna Puggaard, Nicolaj Hansen, Ruth Mottram, Thomas Nagler, Stefan Scheiblaue, Sebastian B. Simonsen, Louise S. Sørensen, Jan Wuite, and Anne M. Solgaard

Thank you for your feedback. We will review and update the figures as needed to improve colorblind accessibility, as indicated by the Copernicus system. Based on the **Coblis – Color Blindness Simulator**, we found that it might have been **Figure 5** that was flagged by the Copernicus system. We have updated the figure accordingly.

Regarding terminology, our co-author **Thomas Nagler**, who is responsible for generating the maps, has emphasized that "**surface melt extent**" has been the standard term in remote sensing, glaciology, and polar climate research for over 40 years. This terminology is widely used in the literature and is formally recognized in key reference

reports such as the **IGOS 2007 Cryosphere report**:

[https://www.wgms.ch/downloads/IGOS\\_2007.pdf](https://www.wgms.ch/downloads/IGOS_2007.pdf), page 99

and **NSIDC resources**:

<https://nsidc.org/ice-sheets-today/melt-data-tools>.

Furthermore, this point is also **stated in the current manuscript** (L57-60):

“This sensitivity to meltwater has enabled several studies to estimate melt over both ice sheets using passive and active microwave measurement with a threshold method to detect the onset of melt and its extent (Long and Drinkwater, 1994; Wismann, 2000; Ashcraft and Long, 2006; Fettweis et al., 2011; Colosio et al., 2021; Husman et al., 2023).”

Our **surface melt extent maps** detect the presence of **liquid water within the snow and ice surface layer**, where the medium consists of ice particles with a small fraction of liquid water from melt processes. Some liquid water may persist in deeper layers even after surface refreezing. However, the product does **not** detect the extent of surface lakes or drainage channels, which have distinct microwave signatures. For this reason, referring to it as "**liquid water extent**" is also misleading, as it could be confused with open water features. Therefore, we prefer to keep the legacy naming convention of the product **ASCAT surface melt extent maps**. In the updated manuscript, **ASCAT surface melt extent maps** now appear 9 times: L6, L72, L74, L75, L81, L83, L151, L417, and Figure 5 caption.

The previous change from "**melt maps**" to "**liquid water maps**" was not the best compromise, as it introduced ambiguity. We are very sorry, but we did not think of the possible confusion with open water features in the first round of revisions to accommodate your suggestions. Given the long-standing and well-accepted use of "surface melt extent" in the scientific community, we hope to maintain this terminology.

To directly address your comment, we will revise the sentence as follows:

**“Again, this ensures a better classification of melt signal compared to previous melt extent products from both active and passive microwave measurements over the Greenland Ice Sheet, such as Abdalati and Steffen (1995); Wismann (2000); Nghiem et al. (2001); Tedesco (2007); Fettweis et al. (2011); Colosio et al. (2021).”**

This ensures clarity and consistency with established terminology while maintaining the intended comparison to previous studies.

All references are included in the updated MS.

**On behalf of all co-authors, we are sorry for our oversight and too fast compromise of the implementation of the thermology: “liquid water maps”.**

**Anna Puggaard**