

The author presents a comprehensive study on the Southeast Greenland (SEG) fjord systems, focusing on surface ice conditions and freshwater flux, especially differentiating the glacier-derived and Landfast ice from Landsat-8 and MODIS. The manuscript is well-structured, providing a significant reference for understanding the possible dynamic habitats in the context of ongoing climate change. But, I do have some concerns about the satellite algorithm, uncertainty quantification, and interpretation of the data in the following:

- (1) When I saw the title, I thought the authors would include sections connecting the surface ice and freshwater flux with the biological system. But I didn't find that part, only some future implications, which made the title a little disconnected without hitting the main point of the paper.
- (2) Line 88-93. I don't know why you chose Skioldungen and Kangerluluk since, from Figure 1, those don't have the glacier location upstream, which also compromises the robustness of the characteristics of the SEG fjord. (I knew they are heavily occupied by polar bears, but since you want to link the physical and biological fjord system, doesn't it make sense to consider the glacier and polar bear activities as well?)
- (3) Line 157: Can I have more details on why you chose 15% as your threshold? Does it make a large difference in differentiating the transition period in Figure 6?
- (4) Line 163-170: After reading the paper, I hardly found an explanation for why you also analyze the SST and sea ice coverage in Figure 9 (e) since you didn't mention their changes and connection with the Fjord system. If you want to show the MAR performance in those parameters, I would suggest you put them in the Appendix.
- (5) Section 3.4. I have the same concerns as Reviewer 1 since Landsat-8 and MODIS are primarily limited and impeded by clouds and water vapour. How many of the images are really affected by the cloud? The visual classification doesn't consider the cloud, right? Then, how much real MODIS and Landsat-8 data are used in the visual classification compared to the full-sky MODIS and Landsat-8 before cloud filtering? Can we take the filtered data as well-representation? Does it make the results have a systematic bias?
- (6) Line 205-209. I know visual classification is quite time-consuming work, and you've analyzed a lot of MODIS and Landsat-8 data, but can I know the satellite passing by date between two satellites? Further questions on how to clarify the potential limitations or biases introduced by manual digitization and how they were mitigated would add to the methodological rigour. How can the uncertainties from MODIS and Landsat-8 be quantified since Table 2 seems quite dependent on individual experiences?
- (7) Figure 10. What's the spatial resolution of frequencies in fast ice presence and glacial ice presence?
- (8) I am slightly lost when you show solid ice discharge, landfast ice, and Glacier ice values. Can you explain their possible implications? Since, for me, they are just shown here without any inner interpretation or further analysis. The integration of diverse datasets is a strength of this study. However, discussing the challenges and uncertainties involved in combining different data types (e.g., remote

sensing data with climate model outputs) and how these might affect the interpretation of results would be beneficial. Moreover, a more detailed analysis of the variability observed across the fjords and its potential biological implications would add depth to the study.

- (9) As I mentioned in the first point. The manuscript misses a deeper discussion on the specific biological applications of the physical environment characterization provided. For instance, detailing potential impacts on the habitat preferences, migration patterns, or population dynamics of key species would directly link the physical and biological aspects of the fjord systems.