Comment on egusphere-2025-311 - Round 2

Damien Ringeisen

I thank the authors for their answers to my comments and questions. I am quite satisfied with the answers and do not have additional major comments.

For two of my comments, the authors say they will publish additional papers with the results, I understand the authors choice to keep this paper focused on a single result.

Specific comments

- **1.1** *I have tried to apply a simple MCC method on sea ice radar images during an expedition prior to MOSAiC, without luck. I am happy to see advancement in the treatment of these images, but I am wondering what is the estimation of the error on the deformation rates, and then what would be the error on the scaling exponents. I have searched the method paper to try to find some pointers but did not find a clear idea. In any case, a description of errors would strengthen this paper, maybe the authors can make an analysis inspired or similar as the one shown in Bouchat and Tremblay (2020).*
    - We initially shared the reviewer's concerns about uncertainty in the deformation estimates. To address this, we incorporated an error assessment approach similar to the one proposed in [2]. In the methods paper [1] and its Supporting Information, we show the end-point errors (EPE) computed using synthetic ice motion fields, where we know ground-truth displacements at each pixel. We also quantify signal-to-noise ratios for the real radar-derived strain rates. Even at the highest spatiotemporal resolutions, these ratios remain consistently high in areas undergoing deformation, implying that the extracted signals are not buried by radar noise. We have added further clarifications in the revised manuscript on how these uncertainties translate into error in the strain estimates (L215).
        - **Thanks for this addition, it addresses by comment, I would only recommend writing *" [...] and presented in Uusinoka et al. (2025, Supp. S2) –demonstrate that localized [...]"* to help the reader find the information, using `\citet[][Supp. S2]{bibkey}`**
- Following comment 2.3 of reviewer 1, I also wondered about the units consistency of Equation A2 with the Einstein notation. After careful reading, I think the notation and units are correct because $\vec{u}$ is not the *velocity* (as one would expect from the u usual convention) but the *displacement* vector in $[m]$, hence $\frac{\partial u_i}{\partial x_j}$ is unitless, and so is $\frac{\partial u_k}{\partial x_i}\frac{\partial u_k}{\partial x_j}$. I am not sure your answer points this out. However I am not sure how one would do to compute directly the strain rate by using the velocity instead of displacement.