

We appreciate the comments from the editor in this round of review. Again, they are very helpful in further improving the manuscript. In the following responses, we use “**bold**” text for comments, “non-bold” text for our responses, and “*italic*” for changed text in the revised manuscript.

Comments from editor

Many thanks for updating your manuscript following the suggestions by the referees. I have carefully studied your response and believe your manuscript is now ready for acceptance, pending three minor changes (see below). Please include this in your manuscript, after which I will conduct a brief, final review myself.

Congratulations and thank your for contributing to our journal!

Bert Wouters

Line 45:Please change to “**However, high-resolution observations covering large regions are scarce and small-scale mélange textures and 3D rift dynamics cannot be captured with a necessary accuracy.**”

Response:

It is changed as suggested.

Line 357: Please change to “**For example, tie points between adjacent sub DEMs may be selected with decreased time intervals to minimize the uncertainty caused by the compensation of horizontal displacement due to ice dynamics using velocity maps**”

Response:

It is changed as suggested.

Line 62 “**While the existing methods can be used to register DEMs, there is a need to develop a strict mathematical model to improve the registration accuracy and to study 3D mélange dynamics.**”: The statement about improved registration accuracy would require an intercomparison between different methods, which is not part of your study. Please change to:

“While existing methods can be used to register DEMs, a mathematical model can help formalize the registration process and provide a consistent framework for quantifying and propagating uncertainties. Such a model-based approach may facilitate systematic comparison between different regions or time periods, and can offer clearer insight into the relationship between registration parameters and mélange dynamics.”The manuscript “**Building multi-satellite DEM time series for insight into mélange inside large**

rifts in Antarctica” by Xia et al. presents a novel approach to monitor rifts’ infill on the Filchner-Ronne ice shelf using observations from different satellites at high resolution. This is a revised version of the manuscript. I commend the authors for the time and effort spent in addressing my long list of comments. In particular, the addition of the discussion and the analysis on the second rift strongly improves the impact of this manuscript, in my opinion.

Response:

It is changed as suggested.