

# ***Interactive comment on “New gravity-derived bathymetry for the Thwaites, Crosson and Dotson ice shelves revealing two ice shelf populations” by Tom A. Jordan***

## **Anonymous Referee #1**

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Summary: The ice shelves play an important role in the stability of ice sheets through their buttressing effect. However, direct measurements could be difficult from different aspects, it is urgent to know what is happening underneath the ice shelves. So here, the authors present the improved topographic estimate underneath the Thwaites, Crosson and Dotson ice shelves (or the sub-ice-shelf cavity thickness) to help us how the warm ocean water access and interact with the glaciers' grounding lines. Overall, I have several questions about this manuscript. 1. According to Section 2.2, the author mentioned they used a similar method in An et al., 2019, which refers here as the topographic shift method. Both of these techniques could take the variations in crustal thickness, sedimentary basins or intrusions into account, so is there a conclusion to

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identify which method is better and why you choose the topographic shift method? 2. For Figure3, are the profiles across ice shelves, I am not sure this comparison makes sense. If I understand the material right, if the topographic shift method is constrained by Radar and swath observations, why the gravity shift method is not? In my opinion, both of these two methods should constrain by observations and inverted any other places where we don't have a direct measurement.

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Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2019-294>, 2020.

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