

In Review of Kappelsberger et al: EGU sphere-2025-5745: New insights in uncertainties in Antarctic elevation change estimates ..

This is a major effort highlighting the problems of getting precise volume change of Antarctica from laser and radar altimetry. The paper highlights the large difference between IceSat-2 and CryoSat results in the central region of Antarctica, during the common overlap period 2019-24, and finds significant lower values for CryoSat for a range of retracers and slope correction parameters for CryoSat. The paper also highlights for the same reason that error estimates of current compilations of Antarctic mass changes, especially IMBIE, has too optimistic error estimates.

The computations of the paper are all based on known methodology, with very detailed statistical and intercomparison analysis (at times too detailed, making it hard to read and get an overview through the results section). The paper includes comparisons to expected elevation changes from a single SMB firn model (GEMB), which highlight regions of major elevations changes that have a better fit to IceSat-2 than CryoSat, illustrated by useful figures. The paper is therefore an important contribution to improving the determination of Antarctic elevation changes by satellites, and definitely should be published.

With this said, obviously some remarks could be added in text: First of all, the volume changes are based on samples averaged over large footprints from tracks of various spacing, and further interpolated into various grids. In terms of resolution, IceSat-2 have an important advantage over CryoSat, which furthermore needs a challenging retracking and slope correction, both prone to errors. It is also important to note that the two satellite missions are not measuring the same surfaces: CryoSat radar penetrates deep into firn, and attempts to "recover" the actual snow surface through retracking, a near-impossible task requiring knowledge of firn properties (this situation will be improved with the upcoming ESA Cristal mission). In the paper IceSat-2 is used as "ground truth", but even IceSat-2 could miss sampling of large areas of Antarctica due to the repeat orbit, and the snow surface measurement might be affected by sastrugi and windblown snow. So the paper could be a good catalyst for more validation efforts in special areas of Antarctica, e.g. megadune areas.

A few technical comments: I would suggest to add the word "Interior" to the title. The paper only treats the Interior Antarctic (CryoSat LRM zone). It would be really interesting to do a similar comparison including the coastal zones with SARiN data, I guess then the altimetry methods would agree better. On page 2: CryoSat has an approximative repeat period of 369 days, but note the orbit was changed in the period due to the IceSat-CryoSat orbit alignment. On page 5: The CryoSat resolution is quoted at 1.65 km. This could be misunderstood, the effective beam-limited footprint resolution used in the computations is much larger.

Overall figures and plots are very informative. It would be really useful to add a plot with all basin names before the expensive use of the basin names A, A', B ..(page 14 onward), and not just refer to an earlier paper. It would also be useful to add the statement in the conclusions on the OCOG10D retracker in the abstract, coming in as the second-best fit (since this retracker is widely used by many groups).