Supplement of The Cryosphere, 14, 1399–1408, 2020
https://doi.org/10.5194/tc-14-1399-2020-supplement
© Author(s) 2020. This work is distributed under
the Creative Commons Attribution 4.0 License.

The Cryosphere Open Access EGU

Supplement of

Getz Ice Shelf melt enhanced by freshwater discharge from beneath the West Antarctic Ice Sheet

Wei Wei et al.

Correspondence to: Wei Wei (wwei@utexas.edu)

The copyright of individual parts of the supplement might differ from the CC BY 4.0 License.

This material consists of 7 supplementary figures to the main text.

Figure 1. The helicopter gravity acquisition from RVIB Araon, 2015 - 2016. The photos from left to right are icebreaker RVIB Araon; Helicopter AS350 on board Araon loaded with gravimeter GT1A, the red box indicates the gravimeter; the GT1A gravimeter; GT1A's power electronics and GPS receiver.

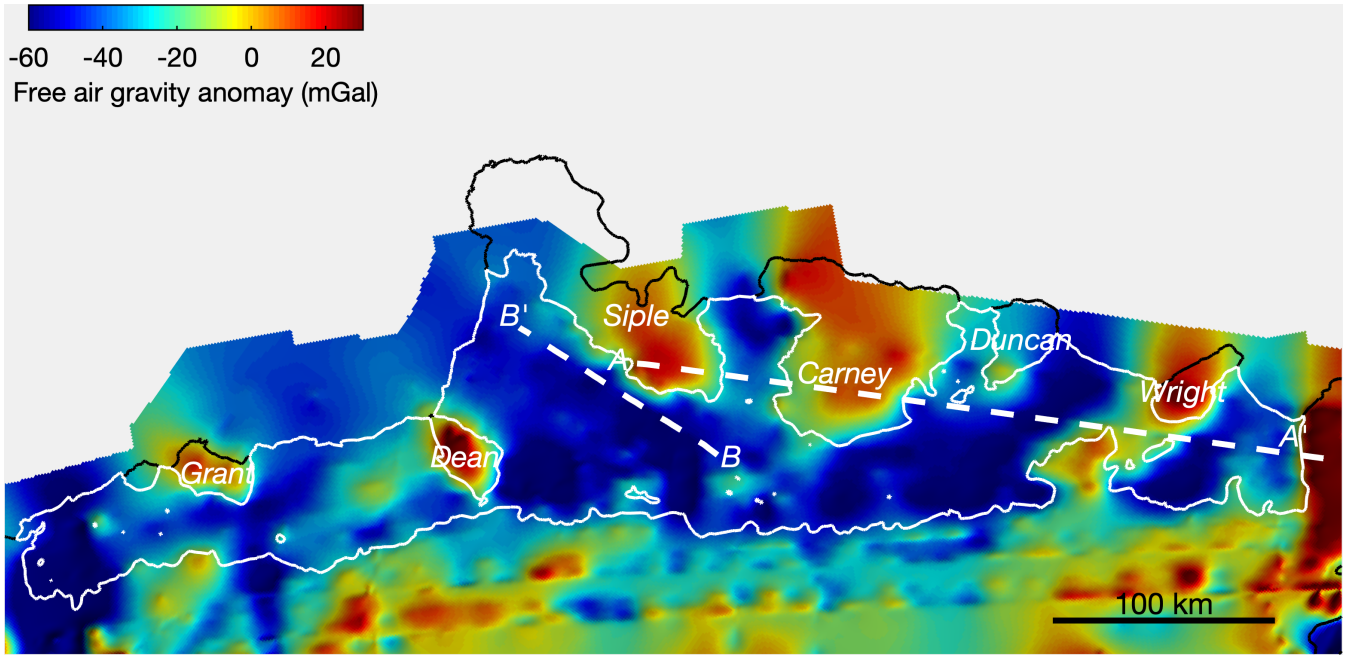

Figure 2. The free air gravity anomalies over Getz Ice Shelf. Lines of gravity data is shown in Figure 1 of the main text. The white dash lines are locations of AA′ and BB′, which are shown in Fig. S6. The background image is MODIS-derived Mosaic of Antarctica (Scambos et al., 2007).

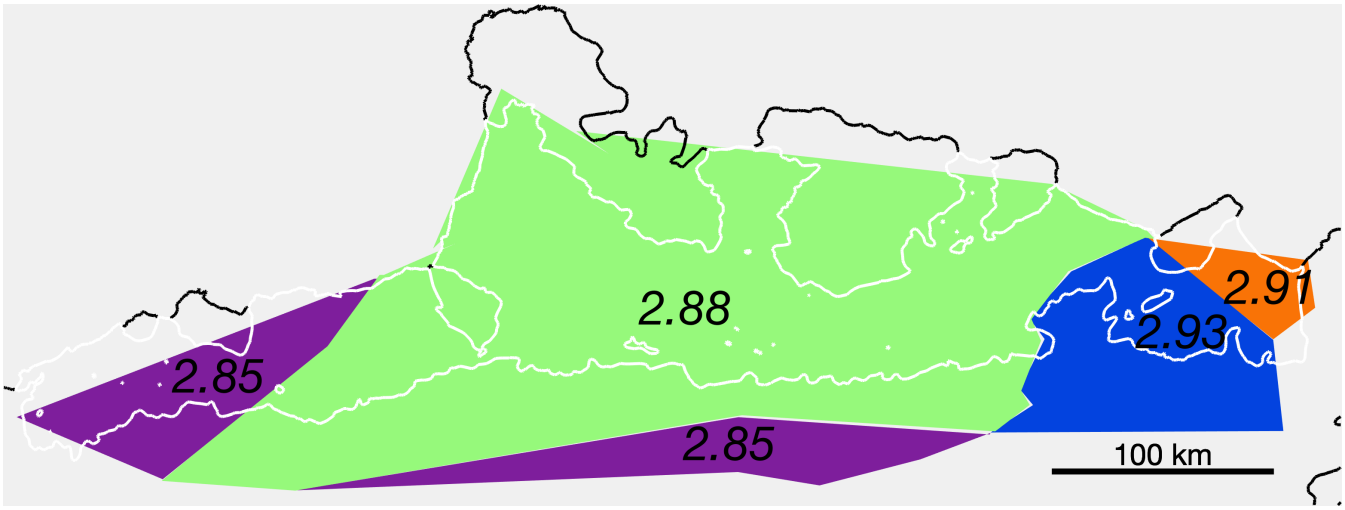

Figure 3. The selected bulk density values used in the final bathymetry inversion. The unit of the label number is $\mathrm{kg \cdot m^{-3}}$.

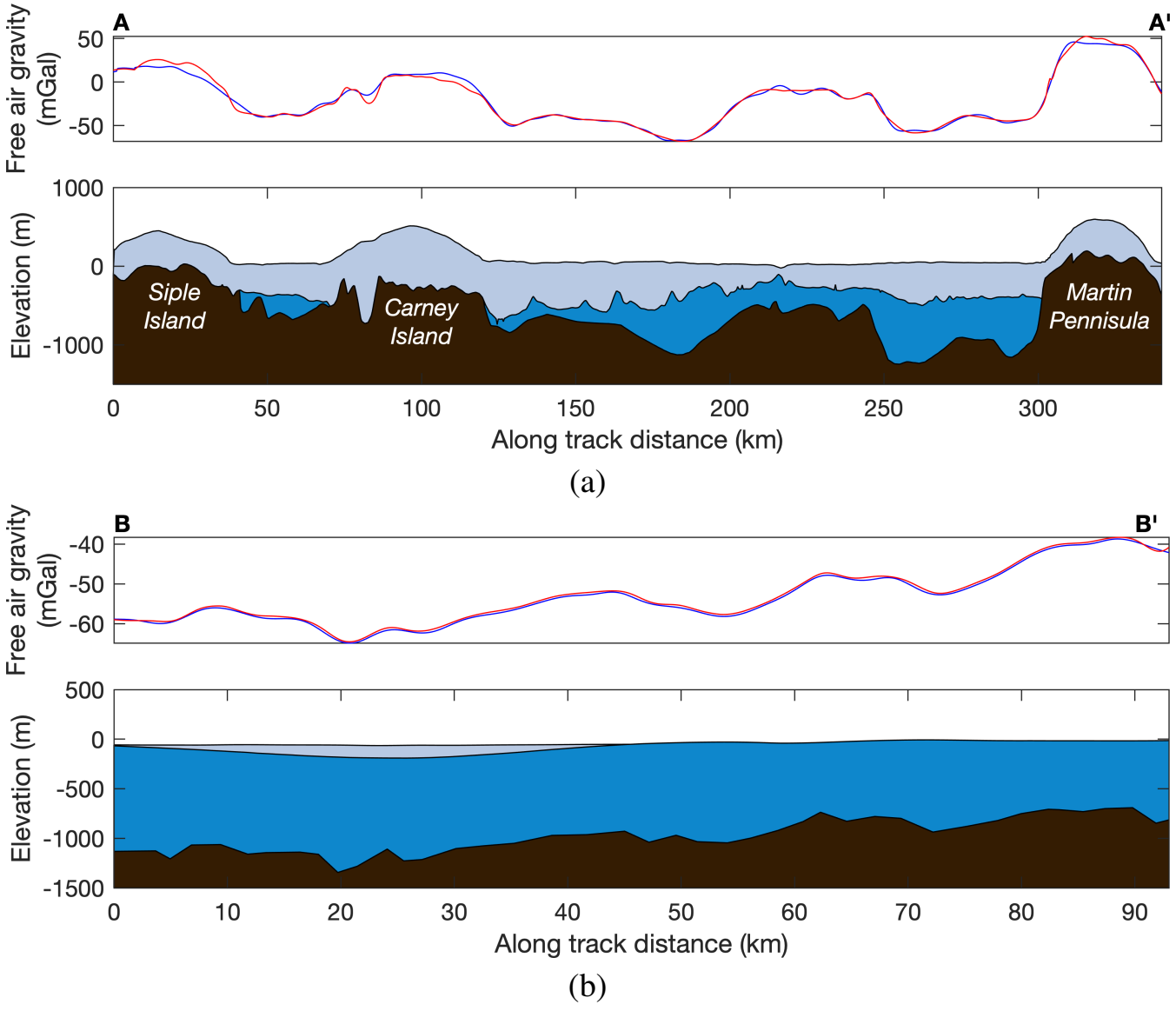

Figure 4. (a) Upper panel shows the input and modeled gravity field along OIB line AA′. Input gravity is blue, and resulting modeled gravity field is red. The lower panel shows the elevation profile. Ocean is blue, ice is light blue, and the bedrock is brown. (b) Upper panel shows the input and modeled gravity field along helicopter line BB′. Location of AA′ and BB′ can be found in Fig. S2.

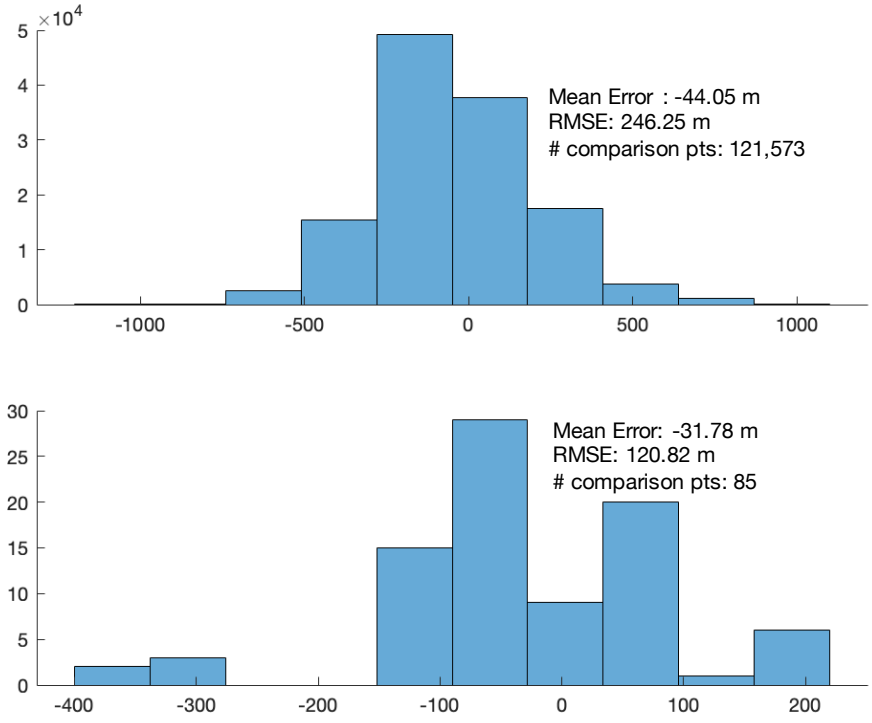

Figure 5. Uncertainty estimation using known ice bottom elevations. The top panel is the histograms with the Mean Error and Root Mean Square Error between inverted and measured ice bottom elevation over grounded ice survey lines. The bottom panel shows the histogram with the Mean and Root Mean Square Error between inverted bathymetry and known ship measured bathymetry from ship track (Nitsche et al., 2007). The two vertical red lines are RMSE = $\pm$ 246.25 m.

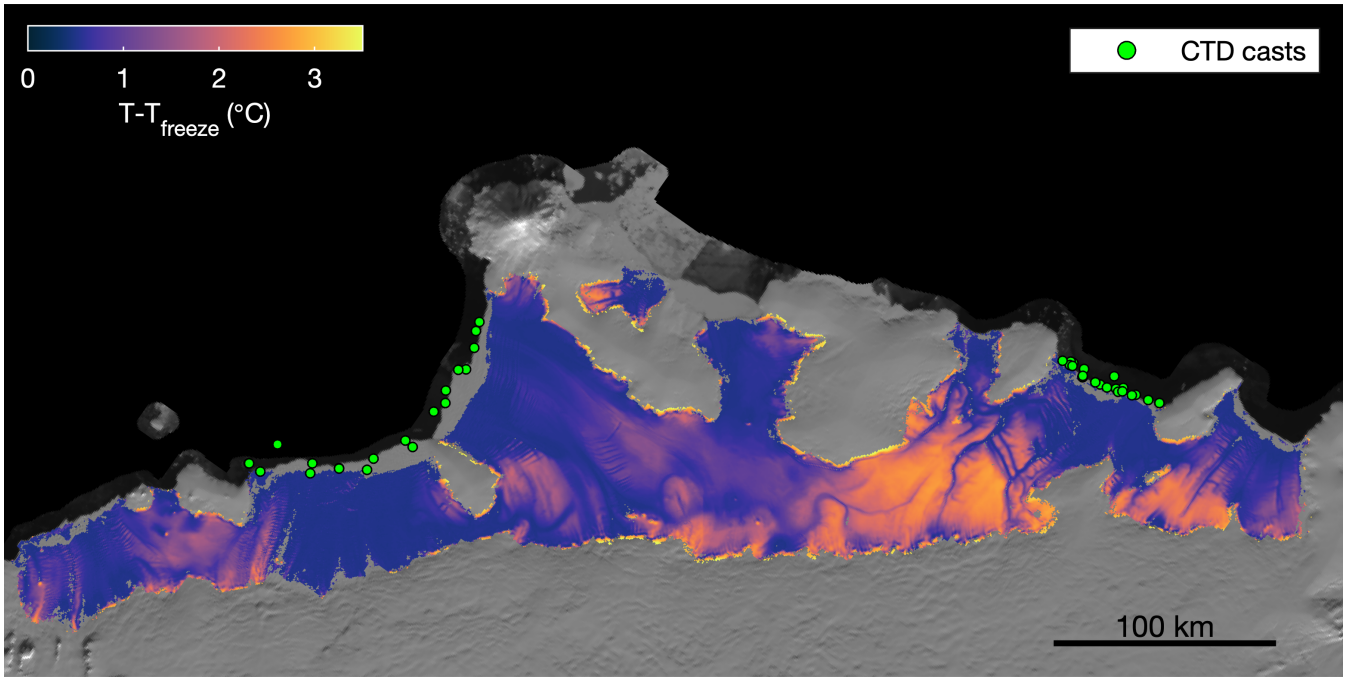

Figure 6. Local temperatures above freezing at depths corresponding to the ice shelf base. Temperatures are interpolated from the mean profile of 25 CTD casts (Locarnini et al., 2013) acquired at the Getz Ice Shelf front.

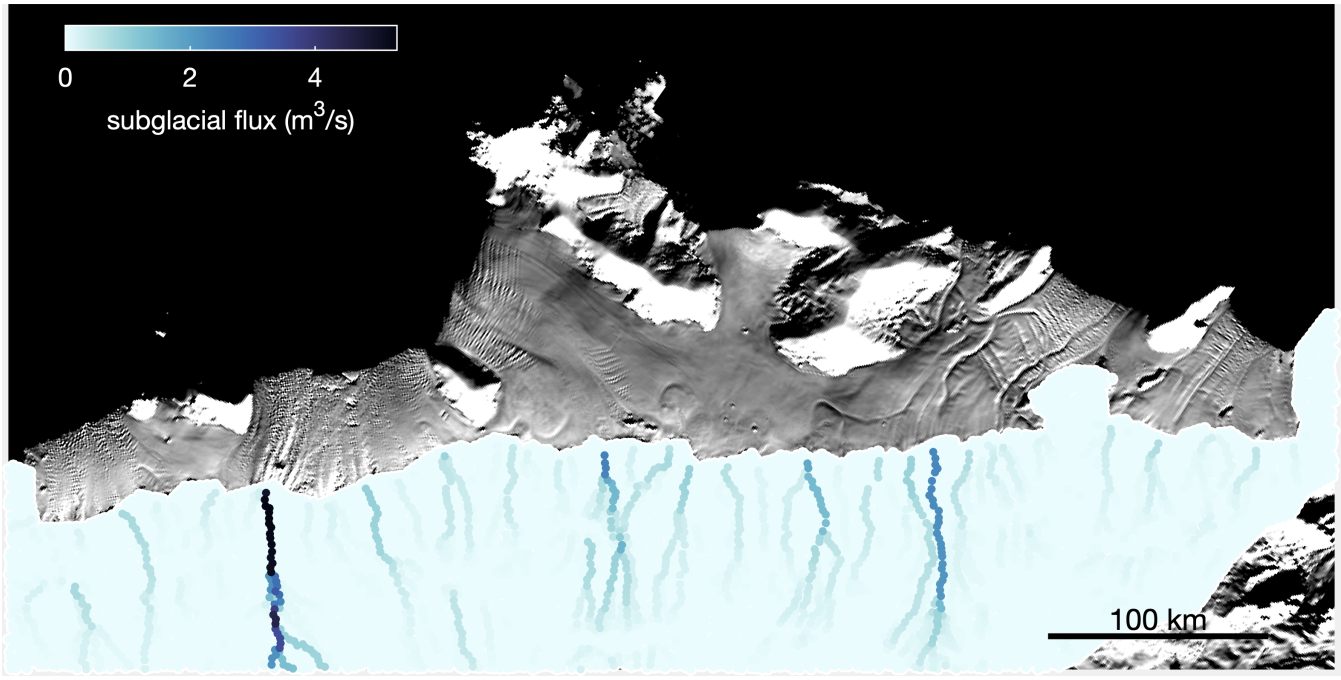

Figure 7. Surface channels over Getz Ice Shelf line up with the channel outlets. The background image is MODIS-derived Mosaic of Antarctica (Scambos et al., 2007).

References

Locarnini, R., Mishonov, A., Antonov, J., Boyer, T., Garcia, H., Baranova, O., Zweng, M., Paver, C., Reagan, J., and Johnson, D.: World Ocean Atlas 2013, Volume 1: Temperature, edited by: Levitus, S, A. Mishonov Technical Ed.; NOAA Atlas NESDIS, 73, 40 pp, 2013.

Nitsche, F., Jacobs, S., Larter, R., and Gohl, K.: Bathymetry of the Amundsen Sea continental shelf: Implications for geology, oceanography, and glaciology, Geochemistry, Geophysics, Geosystems, 8, https://doi.org/10.1029/2007GC001694, 2007.

Scambos, T., Haran, T., Fahnestock, M., Painter, T., and Bohlander, J.: MODIS-based Mosaic of Antarctica (MOA) data sets: Continent-wide surface morphology and snow grain size, Remote Sensing of Environment, 111, 242–257, 2007.