Supplement to:

Thickness of the divide and flank of the West Antarctic Ice Sheet through the last deglaciation

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1 Field photographs

Figure 1. Glacial debris mantling the central buttress of Mt. Tidd at the depositional limit ∼340 m above the present ice surface. The debris is gray and lightly weathered in contrast with the more oxidized bedrock seen in the background. Sample 16-PRT-033-TID is visible in the foreground behind the sample bag. Here at the depositional limit, the density of debris is much higher than lower on the ridge (compare to Figure S2), suggesting that the ice surface persisted at this level during for longer than at lower altitudes. No samples from the depositional limit here have been analyzed.

Figure 2. View of the outer ridge of Mt. Tidd. In contrast to depositional limit shown in Figure S1, which is at an altitude ∼200 m higher, there is a much lower density of glacial debris here. A lightly-weathered glacial deposit is visible in the foreground near the rock hammer and sample bag resting on more oxidized bedrock.

Figure 3. Photograph of sample 13-NTK-022-PRT, which rests on the crest of the NE ridge of Mt. Tidd. The summit of Mt. Tidd is in the background. The overall form of 13-NTK-022-PRT is angular, but the corners display minor blunting, which is characteristic of englacial transport. The boulder is minimally weathered, in contrast to the bedrock on which it sits, which is more heavily oxidized.

Figure 4. Photo of till from Mt. Seelig in the Whitmore Mountains. This patch of till has an area of a few square meters and was the only glacial deposit we found at Mt. Seelig. It is located $\sim$150 m above the modern ice surface. The center-left of the photo shows granite clasts embedded in a fine-grained matrix. Below and to the right of this area are rounded to sub-rounded cobbles that have weathered out of the till. Many cobbles show light iron staining but are much less oxidized than the nearby granite bedrock. Sparse metasedimentary clasts are present, some of which are striated. Metasedimentary rocks are reported to outcrop in the Whitmore Mountains (Webers et al., 1982), but we did not encounter any on the NW ridge of Mt. Seelig.

Figure 5. Photograph of the NE buttress of Mt. Axtell taken from the NE buttress of Mt. Tidd. Circles show approximate sample locations.

Figure 6. Photo showing glacial deposits on the ridge located northeast of Mt. Turcotte (refer to Figures 2a and 3b for location). The small, light-colored boulder in the center-left of the image is sample 16-PRT-007-TCR, and the large boulder on the right is sample 16-PRT-008-TCR. Both are labeled with sample bags bearing their names. 16-PRT-007-TCR is minimally weathered and oxidation is only visible in small patches surrounding biotite crystals. In contrast, all sides (especially the right-hand side) of boulder 16-PRT-008-TCR are more heavily oxidized than 16-PRT-007-TCR; however, some corners of 16-PRT-008-TCR have been broken off revealing relatively fresh surfaces, for example on the top-left. Beryllium-10 exposure ages establish that these boulders experienced very different histories. 16-PRT-007-TCR has an age of 13.7 $\pm$ 0.3 kyr while 16-PRT-008-TCR has an age of 1.05 $\pm$ 0.01 Myr. Combined with the weathering observations, these ages imply that, although both samples were likely deposited during the last deglaciation, 16-PRT-008-TCR experienced prolonged exposure at the surface, either as bedrock or in an earlier glacial deposit, prior to englacial transport and deposition. Note that 16-PRT-007-TCR is $\sim$7 kyr older than sample 13-NTK-022-PRT from Mt. Tidd (Figure S3), which is located at a similar height above the modern ice surface. This indicates that 16-PRT-007-TCR was also exposed prior to deposition, but for a much more brief duration than 16-PRT-008-TCR.