***Table S1. Apparent 10Be age information***

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Sample ID*** | ***Latitude (N)a*** | ***Longitude (W)a*** | ***Elevation (m asl)a*** | ***Sample thickness***  ***(cm)*** | ***Quartz***  ***(g)*** | ***9Be added***  ***(μg)b*** | ***10Be/9Be ratioc*** | ***10Be/9Be ratio uncertainty*** | ***Blank-corrected 10Be conc.***  ***(atoms g-1)*** | ***Blank-corrected 10Be conc. uncertainty***  ***(atoms g-1)*** | ***Apparent 10Be age***  ***(ka)d*** | ***Apparent 10Be age***  ***uncertainty***  ***(ka)*** | ***Chem. Labe*** |
| ***EASTERN TRANSECT*** | | | | | | | | | | | | | |
| *Coastal site (~100 m asl)* | | | | | | | | | | | | | |
| 22GRO-01 | 78.8041 | -69.1998 | 105 | 2.00 | 10.08 | 233 | 8.07E-14 | 6.45E-15 | 1.25E+05 | 9.99E+03 | 27.5 | 2.2 | UB |
| *Inland sites* | | | | | | | | | | | | | |
| 22GRO-03 | 78.7124 | -68.7315 | 335 | 1.75 | 5.24 | 234 | 1.69E-13 | 7.09E-15 | 5.06E+05 | 2.12E+04 | 87.9 | 3.8 | UB |
| 22GRO-05 | 78.6273 | -68.7526 | 395 | 2.25 | 4.92 | 234 | 4.01E-13 | 1.30E-14 | 1.28E+06 | 4.14E+04 | 215.8 | 7.4 | UB |
| 22GRO-08 | 78.5015 | -68.6067 | 530 | 2.5 | 12.74 | 231 | 9.62E-13 | 1.54E-14 | 1.16E+06 | 1.87E+04 | 170.3 | 2.8 | UB |
| *Ice margin site* | | | | | | | | | | | | | |
| 22GRD-CR01-SURF | 78.4389 | -68.4893 | 464 | 3.17 | 12.06 | 189 | 3.11E-13 | 5.84E-15 | 3.23E+05 | 6.11E+03 | 49.2 | 0.9 | LDEO |
| 22GRO-11 | 78.4390 | -68.4894 | 474 | 2.50 | 29.44 | 233 | 7.13E-13 | 1.32E-14 | 3.76E+05 | 6.96E+03 | 56.6 | 1.1 | UB |
| 22GRO-14 | 78.4385 | -68.4953 | 453 | 1.75 | 28.04 | 232 | 7.41E-13 | 1.38E-14 | 4.10E+05 | 7.65E+03 | 62.6 | 1.2 | UB |
| ***WESTERN TRANSECT*** | | | | | | | | | | | | | |
| *Coastal site (~100 m asl)* | | | | | | | | | | | | | |
| 22GRD-CR04-SURF | 78.5814 | -70.7378 | 104 | 1.32 | 10.06 | 189 | 9.15E-14 | 1.70E-15 | 1.136E+05 | 2.14E+03 | 24.9 | 0.5 | LDEO |
| 22GRO-48 | 78.5819 | -70.7368 | 98 | 2.25 | 10.03 | 235 | 1.05E-13 | 4.95E-15 | 1.64E+05 | 7.75E+03 | 36.5 | 1.7 | UB |
| *Coastal site (255 m asl)* | | | | | | | | | | | | | |
| 22GRO-22 | 78.5636 | -70.7194 | 255 | 2.75 | 10.13 | 232 | 2.15E-13 | 5.96E-15 | 3.29E+05 | 9.13E+03 | 62.2 | 1.8 | UB |
| *Inland sites* | | | | | | | | | | | | | |
| 22GRO-16 | 78.3716 | -69.8910 | 550 | 1.5 | 12.85 | 231 | 7.65E-13 | 1.43E-14 | 9.20E+05 | 1.72E+04 | 129.7 | 2.5 | UB |
| 22GRO-19 | 78.4246 | -69.8530 | 488 | 3.00 | 11.79 | 232 | 4.99E-13 | 1.18E-14 | 6.58E+05 | 1.55E+04 | 99 | 2.4 | UB |
| 22GRO-20 | 78.4882 | -70.4801 | 402 | 2.5 | 15.10 | 231 | 1.24E-12 | 1.94E-14 | 1.27E+06 | 1.99E+04 | 213.7 | 3.5 | UB |
| *Ice margin site* | | | | | | | | | | | | | |
| 22GRD-CR02-SURF | 78.2892 | -70.1270 | 567 | 3.04 | 10.16 | 188 | 7.70E-13 | 1.42E-14 | 9.52E+05 | 1.76E+04 | 133.7 | 2.6 | LDEO |
| 22GRO-25 | 78.2973 | -70.1258 | 551 | 5.00 | 10.00 | 235 | 3.89E-13 | 9.44E-15 | 6.10E+05 | 1.48E+04 | 87.3 | 2.2 | UB |
| 22GRO-32f | 78.2887 | -70.1273 | 566 | 1.63 | 10.07 | 188 | 2.96E-13 | 5.49E-15 | 3.69E+05 | 6.86E+03 | 50.2 | 0.9 | LDEO |
| **PROCESS BLANKS** | | | | | | | | | | | | | |
| **ID** | | ***10Be/9Be ratioc*** | | ***10Be/9Be ratio uncertainty*** | | ***Blank atoms*** | | ***Blank atoms uncertainty*** | | ***Samples applied to*** | | | ***Lab*** |
| BLK1-2023Feb10 | | 8.40E-16 | | 1.33E-16 | | 10572 | | 1674 | | - | | | LDEO |
| BLK2-2023Feb10 | | 6.22E-16 | | 1.30E-16 | | 7877 | | 1645 | | - | | | LDEO |
|  | |  | | **Mean ± 1σ (n=2)** | | 9225 | | 1906 | | 22GRD-CR01-SURF, 22GRD-CR-02-SURF, 22GRO-32, 22GRD-CR04-SURF, 22GRD-CR05-SURF | | | LDEO |
| 119-Blank-Be | | 4.54E-14 | | 3.99E-15 | | 706000 | | 62017 | | 22GRO-03, 22GRO-08, 22GRO-11, 22GRO-14, 22GRO-16, 22GRO-19, 22GRO-20 | | | UB |
| 120-Blank-Be | | 2.71E-14 | | 1.81E-15 | | 423000 | | 28200 | | 22GRO-01, 22GRO-05, 22GRO-22, 22GRO-25, 22GRO-48 | | | UB |

**a** All coordinates and elevations were recorded using GAIA GPS (horizontal and vertical uncertainty <5 m). **b**Samples prepared at Lamont-Doherty Earth Observatory (LDEO) were spiked with LDEO carrier (9Be concentration of 1038.8 ppm). Samples prepared at the University at Buffalo (UB) were spiked with PRIME Lab 2017.11.17-Be #3/#4 (9Be concentration of 1074 ± 8 ppm) 9Be carrier. **c**All 10Be/9Be were measured relative to the 07KNSTD standard. **d**Apparent 10Be exposure ages were calculated using version 3 of the online exposure age calculator from Balco et al. (2008). All samples had no topographic shielding, and we did not correct for erosion or snow cover. We assumed a sample density of 2.65 g cm-3. **e**Samples prepared at LDEO were measured at Lawrence Livermore National Laboratory, while samples from UB were measured at PRIME lab. **f**boulder sample