

## Relative terrestrial exposure ages inferred from meteoric-10Be and NO<sub>3</sub> concentrations in soils from the Shackleton Glacier region, Antarctica

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During the Last Glacial Maximum (LGM, approximately 25 ka), the East Antarctic Ice Sheet (EAIS) was larger and thicker than today. Modeling studies and field mapping data have shown that the increase in glacier height was not uniform across the continent, and the outlet glaciers which flow through the Transantarctic Mountains experienced the largest increases in thickness. As a result, ice-free areas which are currently exposed may have been inundated during the LGM, though the timing of glacial retreat is still unknown. We collected depth profiles of soils every 5 cm (up to 30 cm) from seven ice-free areas along the Shackleton Glacier, a major outlet glacier of the EAIS, and measured meteoric-10Be and NO<sub>3</sub> concentrations to calculate relative surface exposure ages. We used 10Be inventories and published delivery rates to calculate maximum exposure ages, which ranged from 1.67 Myr at Roberts Massif near the Polar Plateau to 495 kyr at Thanksgiving Valley closer to the Ross Ice Shelf. Meteoric-10Be concentrations were measured for three depth profiles of the seven profiles and there is a strong, linear correlation between 10Be and NO<sub>3</sub>. NO<sub>3</sub> concentrations were used to estimate meteoric-10Be inventories for the four other locations. Percent error between the estimated and calculated inventories ranged from ~1-41%. The NO<sub>3</sub> derived 10Be inventories were then used to estimate exposure ages. These results show that NO<sub>3</sub> concentrations can be used in conjunction with meteoric-10Be to help interpret EAIS dynamics over time.