

Cosmogenic nuclide dating of buried ice reveals two stacked ice masses dated to Early and Late Pliocene Epoch; Ong Valley, Antarctica.

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We have collected a 10-meter-long ice core from a large debris-rich, buried ice mass in Ong Valley, Transantarctic Mountains, Antarctica. We measured cosmogenic nuclide concentrations from the englacial debris to determine the age of the ice, understand its overall geologic history, and evaluate its potential use as a paleoclimatic archive.

Downcore increase in measured cosmogenic nuclide concentrations suggests that the englacial debris in various sections of the core have variable exposure histories prior to entrainment in the ice. We find that the upper section of the ice core to be part of a glacial ice mass deposited 2.95 Myrs ago. However, the lower section is significantly older > 4 Myrs, suggesting it is part of an older ice mass. The ages of these two stacked, separate ice masses can be directly related to glacial advances of the Antarctic ice sheet into Ong valley. Further, glacial ice that has been preserved for millions of years and accessible near the shallow subsurface, such as that of the buried ice mass in Ong Valley, has the potential to provide new records of paleoclimate from periods older than those presented by conventional ice cores.