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A timescale for the WACSWAIN Skytrain ice core extending to the Last Interglacial

Content

The stability of the West Antarctic Ice Sheet (WAIS) and its contribution to global sea level during the warm Last Interglacial (LIG) period has gained interest as a baseline for the sea level response to a warming climate during the next century. Global sea level during the LIG may have been 6 to 9 m higher than present, during a period when the global climate may have been around 2°C warmer, and some of the rise in sea level may have come from a collapse of the WAIS. One direct way to test this hypothesis is to drill ice cores from around the WAIS region to check for the presence of LIG ice, and to use the suite of analytical tools to understand the regional climate and glaciological setting during the LIG. Earlier ice cores from the Weddell Sea region (from the Fletcher Promontory and Berkner Island) have clearly included LIG ice close to the bed, indicating that even low-lying ice rises close to the WAIS were probably still present at the LIG. However, data from these earlier cores are equivocal about the presence of the WAIS itself, so the WACSWAIN project recovered a new ice core reaching bedrock on Skytrain Ice Rise, a site where the accumulation rate is low, and where radar indicates that the isochrones arch to shallower depths; both criteria suggest any LIG ice should be well above the bedrock. In this contribution to the project, we demonstrate an age scale for the Skytrain ice core using the PaleoChrono program, developed at IGE, which uses the stable water isotopes measured along the full core to calculate an accumulation rate through time, and then uses an ice thinning function to generate an initial age scale. This is further refined with age markers from profile matching of measured methane, ^{10}Be , $\delta^{18}\text{O}_{\text{air}}$, magnesium and calcium with similar profiles from other well-dated cores.

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Track Classification: Time scales and methods for ice dating