

Cosmogenic Beryllium isotope to Understanding Antarctic Ice and Ocean Dynamics

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An Accelerator Mass Spectrometry is a technique that is allowed to measure nuclides existing in extremely small amounts in nature. Recent developments including preparation methods (Sproson et al., 2021a; Yokoyama et al., 2019) enabled us to measure cosmogenic nuclides, such as ^{10}Be , expanding the applications of Beryllium in the field of Earth sciences. To understand the relationship between ice sheets and changes in the global sea level, long-term records of ice mass loss dating from before the beginning of the historical record are needed. One method is surface exposure dating, which uses the accumulation of ^{10}Be on rock surfaces after ice melts to determine the age of glacial deposits. However, this method only provides data on the most recent deglacial events, and the records are often incomplete. To overcome these limitations and gain additional insight, we studied the history of ice sheet and ice shelf melting using meteoric ^{10}Be (von Blanckenburg, F. et al. 2012; Yokoyama & Sproson, 2026). We applied this technique to reconstruct the melting history of the East and West Antarctic ice sheets (Sproson et al., 2021b, 2022) and ice shelves (Yokoyama et al., 2016) during the Holocene. In this presentation, we will introduce our finding the connections with low-latitude climates, such as the El Niño–Southern Oscillation (ENSO).

Behrens et al., 2022, *Quat. Sci. Adv.* 7:100054

von Blanckenburg, F. et al. 2012, *Earth Planet. Sci. Lett.* 351:295–305

Sproson et al., 2021a, *Rapid Commun Mass Spectrom.* 35:e9059.

Sproson et al., 2021b, *Quat. Sci. Rev.* 256:106841

Sproson et al., 2022, *Nat. Commun.* 13:2434

Yokoyama et al., 2016, *PNAS* 113:2354–59

Yokoyama & Sproson, 2026, *Annu. Rev. Mar. Sci.* 2026. 18:121–39

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