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New isotopic records from the TALDICE ice core reveal past events of East Antarctic ice sheet retreat

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The response of the East Antarctic Ice Sheet to past intervals of oceanic and atmospheric warming is still not well constrained but critical for understanding both past and future sea-level change. The ice sheet in the Wilkes Subglacial Basin, which is characterized by a reverse-sloping bed, appears to have undergone thinning and ice discharge events during recent decades, but its past dynamics are still under debate. The aim of our study is to investigate past ice margin retreat of the Wilkes Subglacial Basin ice sheet during late Pleistocene interglacials with the help of new high-resolution isotopic records from the TALDICE ice core.

The $\delta^{18}\text{O}_{\text{ice}}$ signal spanning the late Pleistocene interglacials MIS 7.5 and 9.3 reveal that those periods are characterized by a unique double-peak feature, previously observed for MIS 5.5 (Masson-Delmotte et al., 2011), that is not seen in other Antarctic ice cores. Through an hypothesis testing approach and a combination of glaciological evidence, an offshore Wilkes Subglacial Basin sediment core record (Wilson et al., 2018) and GRISLI ice sheet modelling experiments (Quiquet et al., 2018), we provide an interpretation of this peculiar record. Our results indicate that the interglacial double-peak $\delta^{18}\text{O}_{\text{ice}}$ signal could reflect Talos Dome site elevation decrease during the late stages of interglacials due to Wilkes Subglacial Basin retreat events. These changes coincided with warmer Southern Ocean temperatures and elevated global mean sea level, confirming the sensitivity of the Wilkes Subglacial Basin ice sheet to ocean warming and its potential role in sea-level change.

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