

Reconstructing Antarctic winter sea-ice extent during Marine Isotope Stage (MIS) 5e

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MIS 5e (130-116 ka) is an important ‘process analogue’ for understanding the high latitude climatic feedbacks and forcings active under future anthropogenic warming. Antarctic sea-ice extent is a critical component of the Earth’s climate system through its impact on global albedo and Southern Hemisphere atmospheric and ocean circulation. Published marine sediment core records are located too far north to accurately constrain the timing and extent of the winter sea-ice (WSI) minimum during MIS 5e (Chadwick et al., 2020) and researchers/models have therefore assumed that this minimum occurs synchronously with peak warming in Antarctic ice core records (Holloway et al., 2017).

This study presents new reconstructions of Southern Ocean (SO) WSI extent for MIS 5e based on the diatom assemblage records in marine sediment cores. These records have robust age models, which allow for the different timings and patterns of WSI retreat throughout the SO to be examined. In particular, the difference between the relatively stable WSI extent in the Pacific sector of the SO and the more dynamic WSI extent in the Atlantic sector of the SO. Using sediment cores located south of 55 °S creates a novel synthesis for assessing the evidence for the considerable MIS 5e WSI reduction predicted by model simulations (Holloway et al., 2017).

References:

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