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Ice core biomarker constraints on past sea ice and marine primary production change in the Ross Sea region

Content

Ice core biomarkers show great promise for reconstructing marine primary production and sea ice change in Antarctic waters. Novel ice core biomarkers based on fluorescent organic matter (fOM) and fatty acid concentrations offer new information on changes in the habitat (sea ice, coastal, open ocean) and diversity (bacteria, diatom, dinoflagellate) of marine microbiota through time. Here we provide the first results of fOM and fatty acid concentrations from the Roosevelt Island Climate Evolution (RICE) ice core site located in the eastern Ross Sea region. Fatty acid concentrations and fOM in a high-resolution 10 m firn core capture variability of marine microbiota growing in sea ice and open water habitats over the satellite era. We outline our plans to extend the biomarker record to other ice core sites in the Ross Sea Marine Protected Area region providing baseline constraints on marine primary production and sea ice change. Application of the novel biomarkers to longer ice cores and integration with marine sediment biomarker records will progress our goal towards multi-archive reconstructions of circum-Antarctic sea ice and primary production conditions. This is important for extending the relatively short observational record and improving our understanding of regional climate variability.

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