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Sea ice variability during the Holocene: evidence from marine and ice cores in the Ross Sea area, East Antarctica

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High latitudes are particularly interesting places to document natural climate variability. Sea ice is an important element in the climate system because it influences bottom water formation and ocean circulation and regulates the ocean-atmosphere heat exchange.
Understanding climate and environmental changes through the reconstruction of past sea ice variability, atmospheric circulation and oceanographic conditions in the Southern Ocean could represent one of the most important keys to predict with confidence future climate changes on global scale. In fact, the oceanic area surrounding Antarctica represents the main source of bottom water formation affecting the global climate through the oceanic circulation.
In this study, we present an interdisciplinary proxies analysis considering marine and ice core records, as part of the ESF PolarCLIMATE HOLOCLIP (Holocene climate variability at high-southern latitudes: an integrated perspective) project, to document sea ice variability in the Ross Sea continental shelf area.
Diatom assemblages from three sediment cores located in the north-western Ross Sea (Joides Basin, Cape Hallett and Wood Bay) have been studied and the sea salt Na+ (a potential proxy of sea ice) records from two ice core sites (Taylor Dome and Talos Dome) facing the Ross Sea area have been considered.
The significant positive correlations among the sea ice diatom Fragilariopsis curta relative abundance and sea salt Na+ records from Talos Dome and Taylor Dome ice cores, suggest that sea salt Na+ could be used as a proxy for sea ice extent and/or duration in the Ross Sea area.
These preliminary results look as a positive premise in view of integrating proxies from different realms (marine and glacial) in order to achieve a more complete view of the climate and environmental changes occurring during the Holocene. The combination of geological and glacial records will greatly improve our knowledge on paleo sea ice dynamics.