
Sea ice and sea surface temperature variability during the Holocene in the northeastern Antarctic Peninsula.

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Résumé

Recent studies in Western Antarctic Peninsula (WAP) suggest that Holocene warm and cold events resulted from increased and decreased westerly wind strength, respectively, which forced the upwelling of Circumpolar Deep Water (CDW) and subsequently the timing of spring sea ice retreat. This hypothesis is based on the specific oceanographic setting of the WAP, namely the close proximity of the Antarctic Circumpolar Current (ACC). Conversely, water masses along the Eastern Antarctic Peninsula are colder because surface circulation is dominated by the cyclonic Weddell gyre. However, studies documenting Holocene paleoceanography and paleoclimate in Northeastern Antarctic Peninsula (NEAP) are limited. With the aim of bringing light to the paleoenvironmental conditions of the North-eastern AP, we have investigated a 20 m long marine sediment core (JPC38) recovered from the James Ross Island region. Radiocarbon dates obtained on carbonate material indicate that JPC38 covers the last ~8800 years. We carried out a multiproxy study combining diatom census counts with biogeochemical analysis, such as diatom specific biomarkers (HBIs) and GDGTs (TEX86). At the Holocene scale, our data suggest that sea ice extent decreased and SST increased by ~4°C during the 8800-7000 cal. BP interval. Our record does not exhibit a pronounced Hypsithermal-Neoglacial pattern observed in other AP records. However, sea ice cover and SST demonstrate pronounced multicentennial-to-millennial scale variability. The discrepancies between the JPC38 record and other AP and East Antarctica records probably reflect important regional variations in atmospheric and ocean circulation patterns due to the presence of the Weddell Gyre.

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