
PALAEOLIMNOLOGICAL RECONSTRUCTION OF HOLOCENE CLIMATE VARIABILITY IN LÜTZOW HOLM BAY, EAST ANTARCTICA

[Ines Tavernier](#)¹, Elie Verleyen¹, Dominic A. Hodgson², Katrien Heirman³, Annelies Jacques¹, Satoshi Imura⁴, Sakae Kudoh⁴, Koen Sabbe¹, Marc De Batist³ & Wim Vyverman¹

¹Laboratory of Protistology and Aquatic Ecology, Department of Biology, Ghent University

²British Antarctic Survey

Centre of Marine Geology

⁴National Institute of Polar Research - Kaga - 1-chome

To date, little is known about past and regional Holocene climate variability in the Southern Hemisphere, despite this information being critical for an improved prediction of the impact of future climate anomalies on the cryosphere and the diversity and functioning of ecosystems. Here, we provide insights in the Holocene climate history of two ice-free regions in Lützow Holm Bay, a largely understudied sector in East Antarctica. Diatoms, fossil pigments and sedimentological proxies were analysed in radiocarbon-dated sediment cores from glacial and isolation lakes from West Ongul Island and Skarvsnes in Lützow Holm Bay. Changes in the moisture balance were quantitatively reconstructed using a diatom-based transfer function for specific conductance. The dominant diatom species in the regional calibration dataset were *Amphora veneta*, *Diadesmis australis*, and *Navicula gregaria*. Deglaciation occurred around c. 11.2 and 7.6 cal. ka BP, in West Ongul Island and Skarvsnes respectively, which is in contrast with previous estimates based on raised beach data, but in agreement with cosmogenic isotope dates. Between c. 2.2 and 1.5 cal. ka BP, a slightly higher specific conductance and increased accumulation of total chlorophylls, carotenoids, carbon, nitrogen and the absolute abundance of diatoms point to an increase in primary production, which is possibly related to the Mid to Late Holocene Hypsithermal detected in ice, terrestrial and marine records elsewhere from Antarctica. Between c. 699 and 476 cal. yr BP, a period of slightly increased primary production and diatom concentration in Skarvsnes can be cautiously linked to warmer conditions. This period clearly postdates the Medieval Climate Anomaly that is detected in records from the Northern Hemisphere. There is no evidence for a Little Ice Age-like event. Proxy data in the upper centimeters of the lake sediment cores point to only very small changes in the diatom communities, the moisture balance and primary production during the past decades. This agrees well with a relatively modest or no recent warming trend recorded in instrumental records from East Antarctica.