



How sea ice conditions in Nares Strait triggered the establishment of the NOW polynya ca. 7 ka BP

Eleanor Georgiadis (1,2), Jacques Giraudeau (1), Guillaume Massé (2), Philippe Martinez (1), Audrey Limoges (3), and Sofia Ribeiro (4)

(1) Takuvik, University Laval, Québec City, Canada (eleanor.georgiadis@u-bordeaux.fr), (2) EPOC, Université de Bordeaux, Bordeaux, France (eleanor.georgiadis.1@ulaval.ca), (3) University of New Brunswick, New Brunswick, Canada (Audrey.Limoges@unb.ca), (4) Geological Survey of Denmark and Greenland, Aarhus, Denmark (sri@geus.dk)

The North Open Water polynya (NOW) in northern Baffin Bay is an area of open water sustained by an ice arch that forms in Nares Strait from winter through to July. This ice arch acts as a barrier for drift ice, while winds and ocean currents sweep away any newly formed sea ice in the NOW. In addition to sustaining the existence of the polynya, Nares Strait also supplies its autotrophic communities with nutrient-rich Pacific water, making the NOW one of the most productive areas of the Arctic. For the first time, Holocene biomarker records derived from two sediment cores—one from Central Nares Strait, the other from the NOW—show that sea ice conditions in Nares Strait played a vital role in the inception of the polynya ca. 7,000 years ago. Other preliminary data from the cores, such as semi-quantitative elemental composition and benthic foraminiferal assemblages, trace the evolution of productivity in the area during the Holocene. These data, combined with reconstructions from archives collected in adjacent locations, reveal a possible migration of the NOW's northern limit over the course of the last ~4,000 years. During this period, we observe decaying productivity rates in the polynya concurrent with decreasing IP25 in Nares Strait. We ultimately discuss the potential role of solar activity changes on the recorded secular- to millennial-scale Holocene variations of sea-ice occurrence in Nares Strait.