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## Sea-ice variability on the Southeast Greenland shelf during the Late Holocene

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Arctic sea ice is a critical element of the climate system by regulating the global heat budget due to the albedo effect and sensitive to changes in atmospheric and oceanic circulation. The Southeast Greenland Shelf is a climatologically sensitive area where sea ice changes are not only affected by local sea ice formation but also drift ice and cold freshwater outflow from the Arctic Ocean by East Greenland Current (EGC), which makes this area challenging for paleo-sea ice reconstruction. Here, we analyze biomarker concentrations from a sediment core located on the Southeast Greenland Shelf to reconstruct the sea-ice variability to capture the neoglacial climate change. The biomarker record shows a long-term cooling trend over last 3.5 kyr, and four centurial periods were established combined with terrigenous (glaciers) and oceanic (currents) variations. We suggest a north-south heterogeneous sea-ice variability on the East Greenland shelf from 3.5-1.2 kyr BP. Moreover, a widespread sea-ice expansion within North Atlantic regions, concurrent with the glacier advances prior to Little Ice Age, is proposed to be a pre-Little Ice Age cooling from 1.2 kyr BP. This predate cooling seemingly ascribed to a swing to the negative Arctic Oscillation might be triggered by a drop of solar irradiation and a strong latitudinal insolation gradient and maintained by internal progresses.