



Holocene episodes of warm conditions in the eastern Fram Strait – a multiproxy perspective on the variability of Atlantic Water inflow

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The current interglacial has gone through a variety of warmer and colder periods. Consistent with the decreasing solar insolation during the Holocene, warmest conditions have occurred particularly within its earliest phase. We studied high-resolution sediment sequences from the Western Svalbard margin covering the last ca 10,000 years in order to reconstruct the variations of Atlantic Water advection to the Arctic, the sea ice extent, and the structure of the water column on the Westspitsbergen continental margin. The Fram Strait, often referred to as the Arctic Gateway, is the only deep-water passage for Atlantic-derived water masses to enter the Arctic Ocean. Northward advection of relatively warm and saline Atlantic Water masses keeps the eastern part of the Fram Strait ice-free all year. It therefore plays a crucial role for the heat budget of the Arctic. A multiproxy data set including geochemical, micropaleontological, and sedimentological parameters was established with centennial to multidecadal time resolution. Records of foraminiferal oxygen and carbon isotopes, planktic foraminifer assemblages, and the amount of ice rafted debris clearly reveal distinct variations between climatically warmer and colder intervals throughout this period. Planktic foraminifer assemblages reveal warmest conditions for the early Holocene period (ca 10-8 ka). A second warming pulse is detected between 5 and 6 ka. In the second half of the Holocene, increased IRD contents are indicative of a significant cooling trend. Despite of the decreasing solar insolation planktic foraminiferal assemblages suggest a return of slightly strengthened Atlantic Water advection around 3 to 2 ka and a strong warming event in the present, anthropogenically influenced period.