

Abstract for NGWM2024 – session nr. 19 Marine geological records of Quaternary to late Holocene changes in North Atlantic Ocean circulation with special reference to Arctic and North European climate

ABRUPT Arctic Climate Change: Stadial to interstadial climate change in the Fram Strait and connections to the eastern Nordic Seas

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At unprecedented resolution we investigate the nature of the cold Greenland Stadial (GS) 9 and warmer Interstadial (GI) 8 in the Fram Strait, the gateway between the Nordic Seas and the Arctic Ocean. Sea ice was present throughout GS9, however, polynyas occurred regularly. During the interstadial, seasonal sea ice prevailed. Proxies of ice transport reflects the changes in sea ice, with higher productivity and more ice rafted material deposited at times with less sea ice. The transitions between stadial and interstadial conditions are characterised by cold, fresh water and a maximum sea ice extent.

The new reconstructions of ice, ocean and climate are seen in context of ice, ocean and climate of an eastern Nordic Seas transect as seen in multi-model output from three transient glacial GCM simulations (NorESM, CESM, MPI-ESM) and high-resolution reconstructions. There is consistence between the reconstructions and NorESM model results with respect to sea ice extent, subsurface ocean temperatures and ocean atmosphere heat release during the stadial to interstadial transition. The combined results show that ocean-atmosphere-sea ice processes and dynamics are strongly coupled during GS9 and GI8.