



Changes in the flow of Atlantic water into Kongsfjorden, Svalbard, through the Holocene

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Large quantities of heat are carried into the Arctic Ocean by the West Spitsbergen Current (WSC) flowing along the continental shelf of western Svalbard. Therefore, Svalbard's western and northern margin is especially sensitive to changes in the intensity of the flow of Atlantic water through the geological history. Paleooceanographic studies from the western and northern margin reveal synchronous oceanographic changes that are closely tied to changes in the flow of Atlantic water recorded further south in the Nordic Seas (Koç et al., 2002; Rasmussen et al., 2007; Ślubowska et al., 2005; Ślubowska-Woldengen et al., 2007). These records show that during the early Holocene 10,800-6800 cal yr BP, the flow of Atlantic water into the Arctic Ocean was strong. A distinct cooling and freshening of the bottom waters occurred during the mid- and late Holocene 6800-1000 cal yr BP, and was accompanied by glacier re-advances leading to the present-day conditions.

Kongsfjorden is an open fjord, without sill, and therefore largely influenced by the processes on the adjacent shelf. In order to constrain the flow of Atlantic water into Kongsfjorden through the Holocene, we studied sediment core NP05-11-21GC from the mouth of Kongsfjorden. The chronology of the core is based on 9 AMS ¹⁴C dates. Based on changes in the distribution pattern of the benthic foraminifera species, the flux of ice-rafted debris and benthic and planktonic foraminifera and the grain size distributions we conclude that the flow of Atlantic water into Kongsfjorden through the Holocene by large has followed the changes of the WSC. In more detail we find that the early Holocene was characterized by stronger influence of Atlantic water than

compared to the mid- and late Holocene. These findings follow conclusions from previous studies in the region.

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