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Amsterdamøya: a key site for the post-glacial of Svalbard

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No other place on Earth is changing as fast as the Arctic in terms of climate. On average this region is warming twice as fast as the global average with a seasonal bias towards winter. A major retreat in sea ice extent accompanied by an even more massive thinning represents one of the most robust trends in the Arctic. This trend is anticipated to continue in the decades to come and, according to some models, will leave the Arctic Ocean open during summer some time between 2050-2100. Unabated reduction in the spring-snow cover represents another significant trend. The current warming is also expressed in the massive melting of the Greenland ice sheet as well as local glaciers and ice caps in the Arctic, which causes increased freshwater influx to the Arctic Ocean and adjacent seas. Climate modeling and scenarios are improving and becoming of growing importance, but without a firmer understanding of natural climate variability over longer timescale it is still hard to evaluate and best read the output from these models. In the SHIFTS project we have done an unparalleled effort to overcome this quandary, providing necessary empirical data on past climate which is critical for assessing past changes in atmospheric circulation patterns controlling Arctic hydroclimate. Our study site is located at the northwestern corner of Svalbard on the Island of Amsterdamøya, a site sensitive to changes in both oceanic and atmospheric forcing, at tail of the westward moving branch of the North Atlantic current. Here we have cored several lakes with the goal of providing quantitative data on temperature, hydrology and winter precipitation for the Holocene. Our approach has been to combine reconstruction of glaciers with lipid biomarkers and hydrogen isotopes with the goal of unravel the underlying signature of past climate in the Arctic. Chronological control is secured by radiocarbon dates on macrofossils combined with measurement of paleomagnetic secular variations. Here we synthesis the individual time series providing quantitative data on winter precipitation and summer temperature of the past.