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Deglacial dynamics of Scandinavian Ice Sheet (SIS) and changes in atmospheric ocean circulation in North Atlantic region

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Anholt Loch is a sedimentary basin located in Kattegat, which is a fjord-like embayment connecting the Baltic Sea Basin and North Atlantic. Anholt Loch (water depth 31 m) was drilled in 2013 as a part of the Integrated Ocean Drilling Program Expedition 347: “Baltic Sea Palaeoenvironment”, Site M0060 [1]. Two holes were drilled: M0060A was 200 meters deep, and M0060B 80 meters deep. In total, sediment from seven different units was recovered. Here an age-depth model for topmost ca. 80 meters is presented.

The studied sediment sequence consists of three units [1]. On top, there is a shallow near-shore marine sand unit (0-6 mbsf), in the middle there are prograding marine delta deposits (6-24 mbsf) and on the bottom, there are fine-grained sediments deposited in a marine environment with glacier melt-water influence (24-80 mbsf). In the top and middle units, there are indications of erosion and redeposition [1]. A total of 30 samples have been radiocarbon (14C) dated at laboratories in Lund, Poznan and Zurich. 14 shell samples came from the upper unit, 8 shell samples from the middle unit, 2 shell samples and 6 samples of foraminifera from the bottom unit. 17 out of 30 samples were accepted into the age model. Sample selection was based on sedimentological and environmental indications from the sediment and from the analysed species.

The topmost 80 meters of the Anholt Loch sediments form a Late Glacial-Holocene sequence, starting from ca. 17.8 thousands years before present (kyr BP) ago. There is a hiatus between the Late Glacial and Holocene sediments. Sedimentation rates derived from the age model are in the range of 0.4-0.5 cm/yr for the top unit, 0.8 cm/yr for the middle unit and from 1cm/yr even to 1.7 cm/yr for the bottom unit. The studied sediment series may have potential to help estimate the effect which the meltwater outflow from the Baltic Sea Basin may have in the modifying North Atlantic Deep Water (NADW) formation during the late Pleistocene [2] and constrain the deglacial chronology and history of the SIS.

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References:

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