



The Arctic Mountain Glacier, Austre Okstindbreen in Northern Norway, survived the “Holocene Thermal Optimum”

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Arctic glaciers are currently undergoing major changes, but accurate knowledge about how they have varied continuously during the Holocene (<11 700 years) is still scarce. Here we present a new glacier record from Austre Okstindbreen in Nordland, northern Norway. This continuous reconstruction is based on a number of short and long cores collected from several downstream basins, which have been analyzed by a suit of methods including geochemical elements (XRF), rock magnetic properties, dry bulk density (DBD) and Loss-on-ignition (LOI). Lake sediment distribution was surveyed and mapped by the use of ground penetrating radar (GPR), securing optimal coring sites. Independently lichen-dated marginal moraines and historical information from old photographs and maps have ensured that the moraine sequence can be closely linked to the lake sediment chronology. This new glacier reconstruction reveals that Austre Okstindbreen is the first known glacier in Scandinavia to have survived the “Holocene Thermal Optimum”. It also brackets the four largest glacier advances to c 7000, 1300, 800 and 250 b2k. In contrast to most glaciers in Scandinavia, the largest glacier advance was not associated with the “Little Ice Age”, but rather to an earlier period centred at 1300 b2k. Both the moraine chronology and the lacustrine records document this foremost Neoglacial advance. Compared to other glacier reconstructions from the Northern Hemisphere we identify near-synchronous glacier advances occurring roughly at 4ka, 1.3ka and during the “Little Ice Age”. These shared advances across the Northern Hemisphere suggest that these centennial-scale events are a shared feature regardless of the large geographical distances separating them. Some of the events are not synchronous between the different records, which are probably due to lack of precise dating as well as the potential influence of local climatic conditions.