

Late Weichselian and Holocene environmental history of Iceland

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Abstract — *At the Last Glacial Maximum (LGM) glaciers extended out towards the shelf break around Iceland and ice thickness over most of Iceland was 2000 m. Rapidly rising global sea level at 13.0–12.5 ka BP caused extremely fast deglaciation and collapse of the marine based part of the Icelandic ice sheet. Raised shorelines at very high altitudes, dated to about 12.6 ka BP, signify the rapid glacial retreat and transgression of relative sea level in coastal areas. A readvance of the Icelandic ice sheet culminated in Younger Dryas times, about 10.3 ka BP, when the ice margin was close to the present coastline. Following ice retreat and regression of relative sea level at the end of the Younger Dryas, the ice sheet advanced again and reached a spatial extent close to its Younger Dryas maximum at about 9.8 ka BP. Subsequently, the ice sheet retreated rapidly and at about 9.4 ka BP relative sea level fell towards and eventually below present sea level. Relative sea level had regressed to about 40 m below present sea level at about 8.9 ka BP, when the rate of isostatic rebound was slowing down and eustatic sea level rise caused the onset of a transgression. At about 8.0 ka BP Icelandic glaciers were of a similar or a little lesser extent than at present, and during the mid-Holocene thermal optimum some of the present-day ice caps may have been significantly reduced or absent. The onset of Neoglaciation occurred after 6–5 ka BP and most Icelandic glaciers reached their Holocene maximum during the Little Ice Age. The vegetation history of Iceland reflects the glacial history in that the earliest evidence of plant succession is from mid Allerød times as grass and dwarf shrub tundra developed in the wake of the initial ice retreat. The younger Dryas cooling is evident in the biostratigraphical record as discontinuous vegetation cover and tundra environments developed. At the beginning of the Holocene, dwarf shrub, and later on, shrub heath with *Salix*, Dwarf birch, and *Juniperus* became established. Birch woodland, the climax vegetation during the Holocene, most probably had its greatest extent during the Atlantic Chronozone, at about 7–6 ka BP. The woodland showed a retrogressive succession towards more open landscape during the second half of the Holocene as widespread mires, dwarf shrub heaths and grassland took over in the landscape evolution. The Norse settlement of Iceland in the 9th Century AD caused rapid vegetation changes in the wake of the settlement, where primarily intensive grazing caused woodland destruction and expansion of grass heath, dwarf shrub heath and mires.*