

Lateglacial to Early Holocene deglaciation of central North Iceland

Hreggviður Norðdahl^a, Halldór G. Pétursson^b and Skafti Brynjólfsson^b

^aInstitute of Earth Sciences, University of Iceland, Reykjavík, Iceland, hreggi@hi.is; ^bIcelandic Institute of Natural History, Akureyri, Iceland, Skafti.Brynjolfsson@ni.is and hgp@ni.is

Following rapid wasting and subsequent early Bølling collapse of the Icelandic Ice Sheet (IIS) coastal North Iceland and outer Eyjafjörður fjord became ice-free. At this time, the earliest ice-lakes were formed in northern part of the Fnjóskadalur valley collecting considerable amount of sediments. Later, and due to a significant but yet unknown extent of deglaciation, outlet glaciers from the IIS advanced into the outer parts of Eyjafjörður and Skjáfandi bay. This resulted in the formation of the about 38 km long Austari-Krókar ice-lake in Fnjóskadalur. Deltas, formed at the shoreline of this ice-lake and containing large quantities of the Skógar/Vedde tephra, produced in an explosive eruption of the Katla Volcano (¹⁴C dated to 12.1 cal. ka BP). Stratigraphical studies of glacio-lacustrine sediments have revealed that the Austari-Krókar Ice-lake was drained before the formation of the Fnjóskadalur ice-lake, that subsequently also drained following the retreat of the Eyjafjörður outlet glacier.

Succeeding this extensive deglaciation, glaciers in central North Iceland readvanced and the Eyjafjörður outlet glacier terminated at Espihóll and Melgerði some 56 and 63 km, respectively, south of the island of Hrísey. There, ice-contact deltas and sandar were formed when relative sea level was at about 40 and 30 m a.s.l., respectively. On the west side of Eyjafjörður, outlet glaciers in Hörgárdalur and Svarfaðardalur valleys terminated at two separate occasions with relative sea level at successively lower positions. Associated relative sea level was at about 20 and 10 m a.s.l. at the mouth of Hörgárdalur and at about 10 and 5 m a.s.l. at the mouth of Svarfaðardalur. Furthermore, raised shoreline features are found along the west side of Eyjafjörður at altitudes increasing towards the south.

Changes in shoreline gradient over time, due to non-uniform glacio-isostatic uplift is best expressed with an exponential equation. Applying such a glacio-isostatic age-model for tilted ice-lake shorelines in Fnjóskadalur and marine shorelines along Eyjafjörður has returned Younger Dryas ages for ice margin located in the outer parts of Eyjafjörður. Additionally, the glacio-isostatic age-model suggests Preboreal ages for glaciers terminating in the outer parts of Svarfaðardalur and Hörgárdalur as well as in the inner parts of Eyjafjörður. Interestingly an even younger position of the Eyjafjörður outlet glacier is found about 14 km south of its Melgerði position.