



Evidences for a more restricted Icelandic Ice cap re-advance after the Bølling warming period

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Moraines dated north of Vatnajökull by cosmogenic surface exposure dating show that the Icelandic Ice cap (IIS) was less extended during the Younger Dryas than previously suggested. The data imply that this glacial advance was more complex and restricted in some glacial valleys in NE Iceland. While the IIS margins are relatively well constrained offshore by marine or coastal evidences, little is known about their onshore characteristics and rates of recession during the warmer Holocene periods. This is especially the case in the NE of Iceland where volcanic activity and major outburst floods (jökulhlaups) have removed a large amount of morphological evidences of past ice margins. Our study aimed at filling this chronological gap of the IIS inland during the late Quaternary deglaciation by dating past preserved ice margins using ^{36}Cl and ^{3}He cosmogenic nuclides. We studied moraines and outwash located 44 km, 48 km and 60 km north of Vatnajökull, between the Jökulsà à Fjöllum and Jökulsà à Brú, the main northern glacial river systems draining the icecap. Preliminary ^{36}Cl ages of the northernmost moraine at Skessugarður, 60 km north of present-day IIS and 65 km away from the coastline, indicate that the minimum exposure ages derived from Ca-rich plagioclases range from 11.0 ± 1.2 ka to 13.4 ± 1.4 ka with an average at 12.2 ± 1.0 ka ($\pm 1\sigma$, $n=6$), using the local Icelandic production rates for Ca spallation of Licciardi et al. (2008). These ages are close to the Younger Dryas at a time when the Icelandic Ice Sheet is thought to have re-advanced further north toward the coastline. Overall, our results call for a revision of our understanding of the IIS deglaciation history and provide new tie-points for the calibration of the IIS models.

References: Licciardi et al., EPSL 267 (2008) 365–377.