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Proglacial channel change in Breiðamerkurjökull, South Iceland

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The propagation of glacial meltwater through catchments influences terrestrial ecosystems and plays an important role in landscape evolution. At larger scales, meltwater and sediment delivery to the world's oceans influences both ocean dynamics and biogeochemical cycling. Glacier retreat leads to major changes in this meltwater and sediment delivery downstream. Breiðamerkurjökull is a composite glacier with four outlets which feed into one of the largest forelands in Iceland (78.3 km2 in 2007). High-resolution aerial photographs of the Breiðamerkurjökull foreland from 1945 to 2012 were used to map proglacial channel and lake extent. Channels were analysed on the basis of length, width, and planform. Lakes were assessed by lake perimeter as well as inflow and outflow position. Results were compared with local topography and historical glacier front positions to elucidate controls on the proglacical hydrological system. Whilst we observe a complex suite of interactions, glacier front recession emerged as the most important forcing of system evolution during this time period.