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Glacial and climatic evolution from the Little Ice Age last Maximum to the present in Tröllaskagi Peninsula (North Iceland): the case of Gljúlfurárjökull

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This paper presents the evolution of the Gljúlfurárjökull glacier (65º42'48" N, 18º39'13" W; 980 m), located at the headwall of the Skiðadalur valley, on the Tröllaskagi peninsula (N. Iceland). This is one of many small glaciers situated on the bottom of the Tröllaskagi valleys. This glacier is one of the few "clean" glaciers, i.e. not covered with boulders, as is the case with most of the glaciers on this peninsula. This makes the glacier especially sensitive to climate change, and it has retreated and advanced many times since its last maximum during the Little Ice Age (LIA) maximum in the mid- 19th century (Caseldine and Stötter, 1993), leaving a large number of moraine ridges. This paper analyses the change in this glacier from the LIA up to the present day, with reference to the variations in the surface, ELA and volume. Lichenometry and geomorphological field analysis were used to establish the exact limits of the glacier during the LIA last maximum. An aerial photo from 1946 and two orthophotos from 2000 and 2013 were also used. Using photointerpretation and Geographical Information Systems (GIS), the aerial photos were georeferenced to delimit the glacier in different years, analyse the surface and volume variations, and calculate the ELA for each date. The ELA analysis was carried out using the method: Accumulation Area Ratio (AAR 0.67).
The results obtained with this method are:
Little Ice Age Maximum: 945 m a.s.l. (almost the same ELA proposed by Caseldine and Stötter, 1993)
1946: 970 m a.s.l.
2000: 980 m a.s.l.
2013: 990 m a.s.l.
The ice volume lost from LIA to 2000 was: 111.68 hm3

Reference
Caseldine, C., Stötter, J., 1993. "Little Ice Age" glaciation of Tröllaskagi Peninsula, northern Iceland: Climatic implications for reconstructed equilibrium line altitudes (ELAs). Holocene 3: 357-366.

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