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Title: *Old Red sandstone clasts's modification in subglacial and proglacial environments of Høerbyebreen and Bertilbreen polythermal glaciers, Svalbard*

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Høerbyebreen and Bertilbreen are valley glaciers with polythermal base. Old Red sandstone clasts are commonly present in sediments of both glaciers originating from the erosion of advancing glaciers both from valley floors and sides. Clasts were modified by an active traction processes in subglacial environments and deposited during the Little Ice Age (LIA) in forms of subglacial tills and frontal moraine diamictites and remained partly in forms of moraine hummocks and ice-cored moraine ridges. Sandstone clasts are recently reworked by glaciofluvial processes and modified by fluvial transport on braided outwash fans, which evolved in the forefield of the LIA moraines.

The active traction subglacial transport modified Old Red sandstone clasts predominantly by striations of their surfaces. Approximately 40–70% of clast is striated in subglacial tills of till plains, ice-cored moraine sediments contain ~80% of striated clasts and hummocky moraine ~50 % of the clasts. In the frontal moraine accumulation of Bertilbreen ~25–45% of the clasts is striated, this share is slightly lower in Høerbyebreen, where striated clasts make ~15–20%. The differences are most probably affected by an important proportion of the clasts with diverse transport history than the active subglacial traction. All roundness categories have been found in the studied clasts, however subangular or subrounded clasts predominate. We failed to found any relation between clast shape and striation.

The modification of sandstone clasts in proglacial glaciofluvial environment could be well traced in the Høerbyebreen glacier system, where a flat braiding outwash fan develops in front of the LIA frontal moraine and continues down to the bay of Petuniabukta. The effect of fluvial traction on the sandstone clasts' shapes could be found after 1 km from the frontal moraine of Høerbyebreen. Clasts became more isometrical and subrounded to subangular shapes predominate (~80–90%).

Interesting is the fact, that the striation does not wipe out of clast surfaces in the downstream direction of the studied sediments. We can conclude that fluvial traction produce isometric clasts due to their disintegration along primary discontinuities (fracturing, stratification) and by rounding of clast corners and apices. Flat clast sides bearing striae are not importantly affected by the fluvial transport.

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