



Evaluation of a paraglacial crise on slopes deglaciated since the Little Ice Age in South-east Iceland

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The Global Warming caused an important retreat of the Icelandic glacier margins since the end of the Little Ice Age. The Skaftafellsjökull Glacier (South-East Iceland) moved back ca. 2 km since the second part of the 19th century. On recently deglaciated slopes, important sediment transfers occurred. These transfers were investigated by studying 16 scree slopes localized on the recently deglaciated slopes. On each talus, longitudinal slope profiles were measured, sedimentological parameters were analyzed and vegetation cover was evaluated. Results confirmed that gravity is the prevailing process occurring immediately after glacier retreat and generating scree slopes. This high activity of gravity processes was linked to postglacial release. But sediment transfers generated by gravity decreased rapidly after glacier retreat. After a few decades, scree slopes were gradually modified by run-off processes, and after a period of ca. 70 (± 10) years, scree slopes were covered by vegetation or debris flow/avalanche deposits. This period of 70 years appeared to be a time threshold for the Icelandic deglaciated slopes, confirmed by further investigations. Based on local DTM, measurements of the morphometry of deglaciated rockwalls located near the glaciers Skaftafellsjökull and Morsarjökull revealed that ca. 60 (± 9) years after the glacier retreat, rockwall slopes rapidly decreased. The vegetal colonization were also studied with aerial photos and showed stabilization after a period between 57 and 72 years after glacier retreat.

These observations confirmed that glacier retreat was followed in Iceland by a paraglacial crise of high sediment transfers. But the effect of postglacial release decreased rapidly (ca. 60-70 years) after glacier retreat. Others parameters in South-East Iceland had an important role in sediment transfers:

(i) The climate is subpolar-oceanic. Frost breaking may occur all the year supplying sediments and important precipitations (> 3000 mm.y⁻¹) generate debris flows and snow avalanches.

(ii) The slopes are steep (ca. 29°) and made of fractured volcanic rocks generating important slope dynamics.

For those reasons, slope development in South-East Iceland appeared extremely rapid after glacier retreat. Post-glacial release role is important during a period of 60-70 years, but its influence decreased rapidly compared with climatic and morphostructural factors.