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Chance for glacially-conditioned sediment to persist within glacial overdeepenings through multiple glacial cycles

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Glaciers are major agents of landscape erosion. By their erosive power, glaciers are also considered as a sediment production "factory". During glacial cycles, glacially-conditioned sediment is either transported by the flowing ice and the meltwaters towards terminal distal sinks (e.g. oceans), or stored for shorter or longer periods of time inland. In terms of the long-term disposal of radioactive waste (at timescales of 1 Ma) in areas affected by glaciations, scenarios for the potential of excavation of repositories by glaciers have to be calculated, so as the chance for dispersion of contaminated sediment into the environment. The question as to whether glacially-conditioned sediment contaminated by radioactive waste will be stored inland or dispersed across larger scales towards terminal sinks is therefore of great importance, and glacial overdeepenings are considered as one of the best candidates to store sediment through multiple glacial cycles.

This question of persistence of glacially-conditioned sediment within glacial overdeepenings through multiple phases of glacier advance and retreat has been investigated through a literature review. The study focuses on the Plateau of Northern Switzerland, an area that has been subject to glaciations and which is characterized by many glacial overdeepenings. Results of the literature review show that under some circumstances, glacially-conditioned sediment could persist within glacial overdeepenings across the Plateau of Northern Switzerland during multiple glacial cycles. In the meantime, the conditions required for persistence, as well as the proportions of sediment stored as compared to the sediment transferred to terminal sinks, are much less clear.