



Single debris flow event is insufficient for considerable modification of sedimentological properties in proglacial environment

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Gravitational mass movements are one of the most important agents causing redistribution of sediments in glacial environments – mainly due to unstable topography and abundance of debris and (often) meltwater. Investigations on modern subaerial debris flows and associated deposits provided a description of modification of macro- and micro-scale sedimentological properties resultant from single debris flow event. We studied several active debris flows located within forelands of Ragnarbreen and Ebbabreen, central part of the Spitsbergen Island, Svalbard and selected samples from: (1) parent material (in situ older debris flow deposits); (2) active debris flows; (3) freshly deposited debris flow deposits; and applied several techniques to determine if single debris flow event can significantly influence particle size, shape and/or morphology and if it is possible to differentiate between this three sedimentary environments. Investigations on particle size suggested some changes in grain size distribution related depletion of fines from fresh debris flow deposits. Similarly, distribution of heavy mineral fail to reliably differentiate samples from each environments, indicating very high heterogeneity of studied samples. This lack of apparent difference indicates that single debris flow event is not sufficient to significantly modify sediment signature; It brings important implications for interpretation of past glacial deposits, suggesting that to modify significantly direct glacial sedimentary signature, the sediments had to undergo intensive and repeatable cycles of mass movement reworking, i.e. processes not directly related to glacial sedimentation, but rather to paraglacial landscape modification.

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