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Slope stability, triggering factors and threshold conditions. Study of debris flow activity in the Reyðarfjörður fjord, eastern Iceland.

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Precipitation is one of the main triggering factor for debris flow activity in Eastern Iceland, but the amount needed, duration and the rainfall and its intensity to trigger the flow (e.g. the threshold condition) can vary considerably between areas. There are a few factors that have to be taken into account to determine the threshold condition and slope stability between areas, such as the slope angle and aspect, type and thickness of loose material, vegetation cover and gully distribution. Weather factors such as air and soil temperature, wind speed and wind direction is also crucial.
The study area is located in the Reyðarfjörður fjord, one of the longest fjords on the east coast of Iceland. It is a 30 km long glacially eroded fjord, cut into the Tertiary bedrock. The bedrock is mostly made up of jointed basaltic lava flows, individual flows can vary in thickness from 2-30 m and usually separated by lithified sedimentary horizons often red in color. The slopes of the fjord are steep up to 900 m high, often consisting of nearly vertical cliffs, 60°-90°, in the upper parts of the slopes. The lower parts are covered with various glaciogenic landforms and consist of sediments and talus material. Several small hanging valleys and numerous small gullies and streams occur along the both sides of the fjord.
The debris flow activity in the Reyðafjörður fjord is mostly constrained to the gullies and streams. Some activity has also been observed on the slopes between the gullies, but such activity is usually connected to extreme conditions, during or following heavy rain storms or a rainfall, especially of long duration.
The aim of the study is to map the distribution of loose slope sediments in two areas inside the fjord, collect data about the known debris flow history, analyze various weather patterns which have contributed to these debris flows and understand how variables between the slopes react differently to different factors.