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Formation of a potentially large glacier dammed lake on the tongue of the Unterer Grindelwaldgletscher, Bernese Alps, Switzerland

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The surface level of Unterer Grindelwaldgletscher glacier tongue has subsided by more than 200 m in the last 150 years. The ice pressure on the now exposed s valley flanks has ceased due to this drastic retreat of the glacier, and as a consequence, at the so-called "Schlossplatte" an approx. 2 million m^3 large rock mass on the left side and the moraine on the right side near the glacier terminus have become unstable.

In the near future, the lower ablation zone of Unterer Grindelwaldgletscher will continue to lose mass and become thinner. At present, the heavily debris covered glacier tongue terminates in a narrow gorge. Melting will not occur at a uniform rate due to variations in the debris layer thickness. There will be barely any melting near the terminus of the glacier tongue due to the thick layer of debris originating from "Schlossplatte" and the moraine. But upstream, where there is less debris cover, the glacier will become thinner at a rate of ca. 10 m/a due to ablation, as recently observed. Thus a depression is developing which may fill with water. This gives rise to a glacier dammed lake which will experience an accelerate growth because the water enhances the ice ablation. Thus it must be expected that the volume of the lake will increase from currently 100'000 m^3 to approx. 12 million m^3 within a few years from now. Dangerous glacier lake outburst floods must then be expected due to its sudden emptying.

The unstable rock creates a lateral stress on the glacier, which can cause the ice to press down vertically on to the subglacial drainage system. Thus it is likely that the increased pressure applied by the basal ice can hinder the proper formation of the

subglacial drainage system in the area around the unstable rock face. This will favour the formation of the lake. We will present results from a hazard assessment study related to the expected floods from Unterer Grindelwaldgletscher.