GEOPREVENT

# GLACIAL LAKE MONITORING PLAINE MORTE


PART OF HEXAGON

Every summer, glacial lakes are formed by meltwater on the glacier plateau Plaine Morte. Since a sudden major outburst flood, Geoprevent monitors the lake and runoff levels and alerts the village of Lenk in case of an event.

GEOPREVENT
Räffelstrasse 28
8045 Zurich
Switzerland

Tel. +41 44 419 91 10
info@geoprevent.com

Title Page: Glacial lake Faverges.

Figure 1: The glacial lake Faverges forms every year by melting snow and threatens to suddenly empty. Geoprevent monitors the lake and its discharge with pressure probes, a gauge radar and several webcams.

## CHALLENGE

Plaine Morte is a glacier plateau close to the mountain Wildstrubel in the Bernese Alps, Switzerland. The flat glacier drains mainly on the Northern side via the river Trüebbach and through the touristic village of Lenk. Several glacial lakes form every year in the same places: Faverges, Vatseret and Strubel lakes. During spring and summer, the snow melts rapidly filling up the lakes. Eventually, the lakes drain through a subglacial system that is still not fully understood. Lake drainage can occurr rapidly with a flood-like discharge or the lake drains over several days at elevated water levels of the river Trüebbach. In 2011, a major glacial lake outburst flood occurred. Subsequently, local authorties decided to monitor the lakes and the discharge river Trüebbach.

## SOLUTION

In 2012, we installed four monitoring stations: three lake stations to measure lake levels and a river station to measure discharge rates of Trüebbach river. We apply pressure probes to measure the water level of the lakes at the lake ground and radar gauges mounted across the river to measure its level. Since 2018, monitoring has been focussed on Faverges lake and Trüebbach river because the other lakes (Vatseret and Strubel) have remained much smaller and only are no longer regarded as problematic. At the end of July 2018, however, the Faverges lake ran out within a very short time and led to flooding causing damage to several buildings in the valley. Subsequently, further monitoring measures were taken including an additional pressure probe in Faverges lake and four partly mobile camera stations. These camera systems are used, besides other purposes, to monitor the drainage channel built in the glacier ice in spring 2019. Since then, a remotely controllable camera station has been located on the ridge Les Faverges at the southern end of the Plaine Morte plateau and covers practically the entire monitoring area with its tilt, pan and zoom functions. The camera scans pre-defined positions several times a day and is online for glacier experts a few hours every day (due to energy saving reasons) for visual monitoring.

Webcams record lake images several times a day and transmit images and level data continuously to the Geoprevent online data portal. Authorized users can observe the lake and river status remotely anytime via PC, smartphone or tablet. Exceeding of a certain lake sink rate or river discharge level automatically triggers an alarm and immediately notifies the municipality of Lenk as well as the responsible person at the Canton of Berne.

Figure 2:The gauge radar monitors the discharge of the glacier plateau at Trübbach river; a tributar to the Simme, flowing to the valley village Lenk.

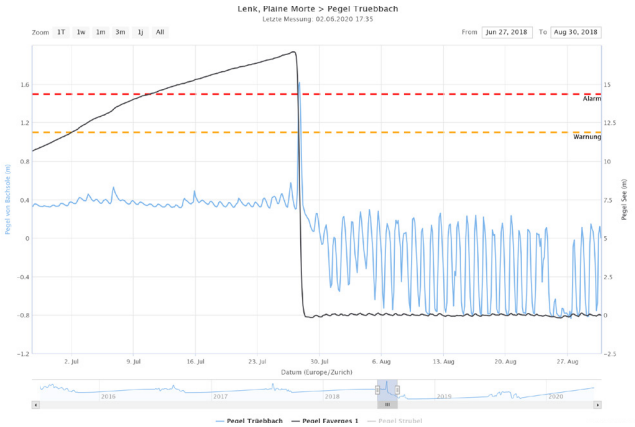


Figure 3: Glacial lake outburst flood in July 2018 as shown in the online data portal (black: lake level Faverges; blue: gauge radar Trüebbach river).