



Geological Characterization of the Buchberg field site

Summary

In this report we present and discuss first results from the GEOLEP excursion to the Buchberg field site. On the 9th of Mai 2008 we (Laurent and Daniel) went for a first sight of the new field site located in the vicinity of Tössegg. Thanks to the map and the indications on the field provided by IGT the site was found without difficulties. After climbing up and down the whole slope, sampling the different bedrock types and mapping some hydrogeological features we come up with the following characterization.

1. General Characterization

The new test site is located in a quite steep forested slope dipping east towards the Rhine River (fig 1). The whole slope is creeping and several old landslides have been mapped, often starting in humid zones (small sources indicated by blue points in fig. 2) and sliding on the steep bedrock. Also the new test site is located on an old slide (fig. 2) which is the reason why the slope is less steep and less forested in this zone. This fact has a positive and a negative aspect: The slope slit already which increases the possibility to make it slide again due to weakening of the material, but on the other side the slope is less steep than it was before, which decreases sliding possibility. The sediments on the slope are all fine grained as it is the case for the bedrock. Two interesting features could be observed on the field (fig. 3): First, the street was rebuilt with a geotextile which now makes a sliding surface, another indication for landslide-problems in the area. Second, behind some trees we observed a deposition of debris flow like material. This is an indication of the flow behaviour once the slide is triggered as it happened 100 meters south into the buildings.

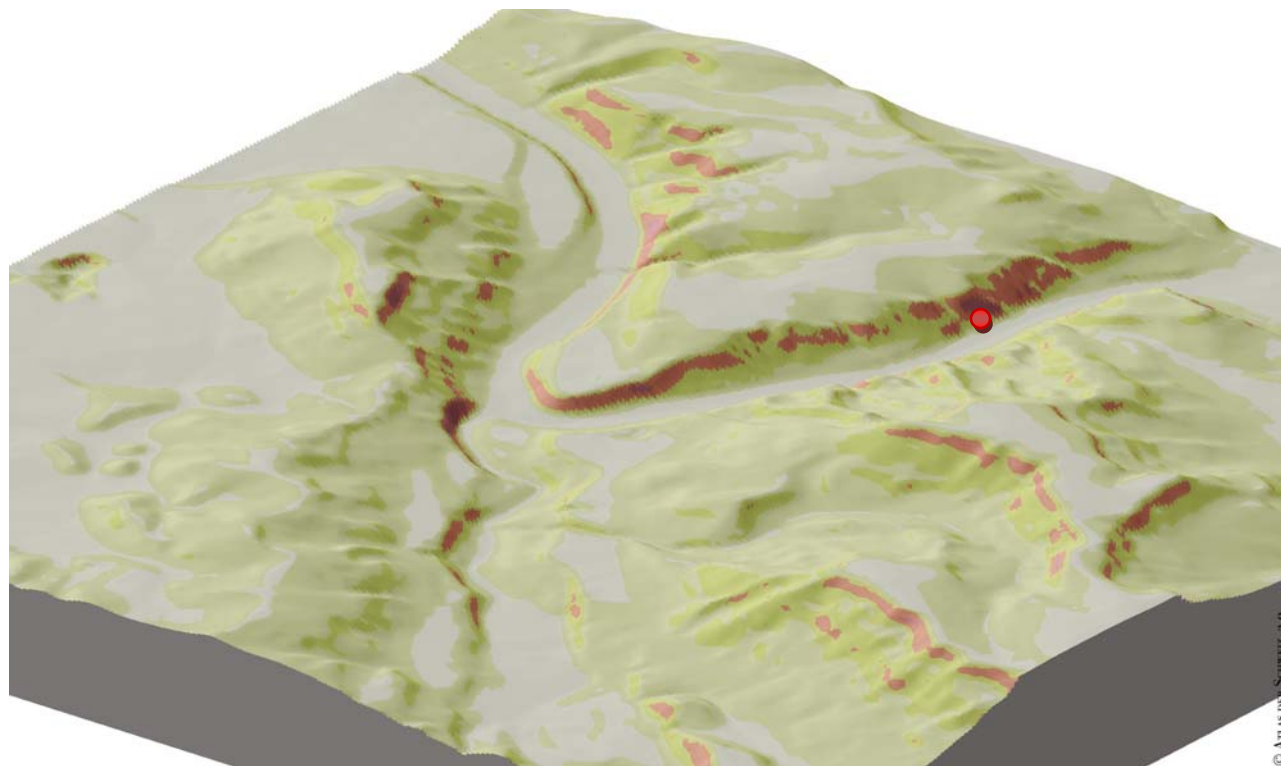


Figure 1: Slope inclination (red= steep) for the whole area, red dot represents the test site.

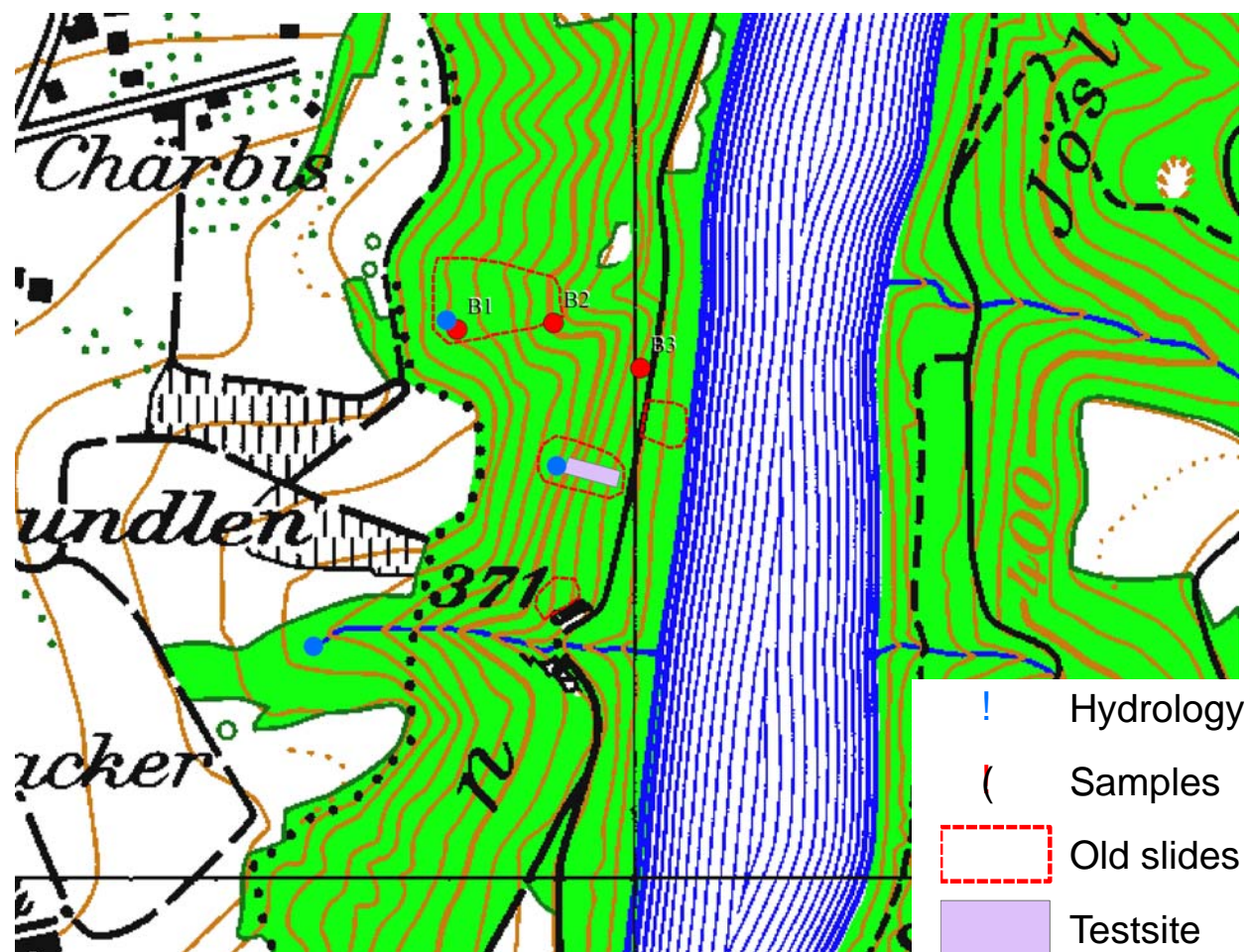


Figure 2: Overview



Figure 3: Slide near street, debris flow deposition on tree, debris flow destroyed fence

2. Geology

2.1 Geological overview

Buchberg is located in the Swiss midland and therefore consists mainly of molasse which is the sediment that was deposited in the foreland basin of the Alps. The molasse is build of alternations from sea deposits (Seawater Molasse) and land deposits (Freshwater Molasse) which both decrease in grain size from south near the Alps (sediment source) to the north. As Buchberg is quite far from the Alps the sediments should be quite fine grained (sand- and marlstone).

Additionally the molasse is often over-posed by moraine and/ or fluvio-glacial gravels from the last glaciations. However this is not the case for the study site.

2.2. Site geology

On the concerned slope the following serie of bedrock can be found:

Tortonien, Upper Freshwater Molasse
 Helvetien, Upper Seawater Molasse
 Burdigalien, Upper Seawater Molasse
 Aquitanien, Lower Freshwater Molasse

The test site is located very close to the limit between Aquitanien and Burdigalien. We suppose that the limit between the Burdigalien and the Aquitanien is a bit lower than the test site and the site itself still in Burdigalien (fig. 4). Both lithologies are composed of sandstone, the Aquitanien sandstone is finer grained and can tend to marlstone and is colourful, often red. In contrary, the Burdigalien with Seawater Molasse is coarser grained and gray often making thick bands (fig 5).

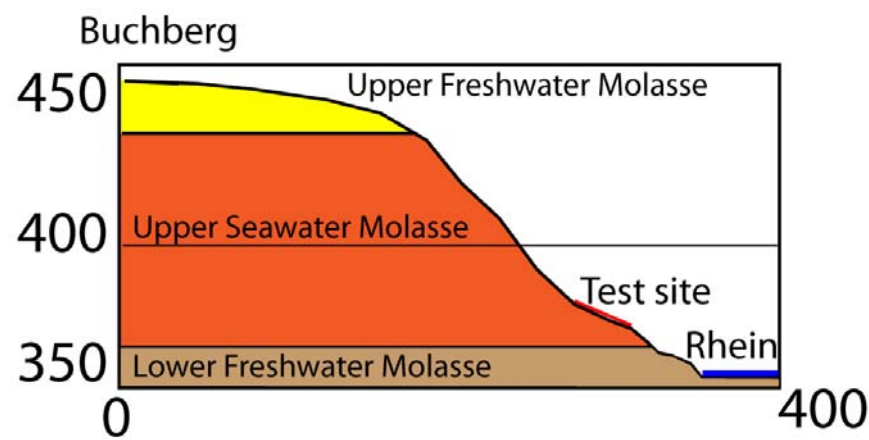


Figure 4: Cross section through the test site, distances in meter.



Figure 5: Lithology of the bedrock near the test site; Picture on the left is Burdigalien (B2) on the right Aquitanien (B3)

- ! Hydrology
- (Samples
- ⬜ Old slides
- Testsite

2.3. Hydrogeology

Hydrogeology played certainly an important role for the Landslides that happened till now in this area. As mentioned before the slides often start in an area which is clearly more humid than the rest of the slope caused by small sources (fig. 2 and 6). Together with intensive rains this small sources can increase the water amount in the slope and determine the triggering point. However in the experimental site the bedrock is supposed to act as aquiclude and may therefore be the most important water ponding strata.



Figure 6: Humid zone in one of the slide niche.