

Elm–Linthal

Crossing the Richetlipass

Rocks tell us the story of the mountains



At the northern rock face of the Hausstock, the Glarus thrust is still at an altitude of 3000 m. The differences of colours help to distinguish the older Verrucano (Permian) in the summit area and the dark Flysch underneath.

In the folded Flysch rocks, the number «3» can easily be identified.

The small rest of the Alpifirn glacier is still to be seen at the bottom of the Northern rock face (Picture: D. Imper).

Martinsloch – Hausstock – Chärpf – Mättlenstock

Location : *Sernftal, Durnachtal, Switzerland*

Green Path of ViaAlpina

Stage : *C4 (whole stage of the ViaAlpina)*

Beginning : *Elm*

Destination : *Linthal*

Access : *Ziegelbrücke: by train to Schwanden, then by bus to Elm or Erbs (Stop 8); cable car until Ämpächli (Stop 6)*

Maps : *swisstopo 247T Sardona 1:50'000
swisstopo 246T Klausenpass 1:50'000
Geologische Spezialkarte 117, Geologische Karte
des Kantons Glarus 1:50'000
Geologische Karte der Schweiz 1:500'000*

Minimum elevation : *652 m (Linthal)*

Maximum elevation : *2260 m (Richetlipass)*

Maximum ascent : *2054 m*

Maximum descent : *1727 m*

Total time : *9h 50min (7h 10min from Erbs)*

Distance : *23,3 km (14,1 km from Erbs)*

Difficulty : *T2 (Stop 6 – Stop 8)
T3 ambitious mountain hiking (Richetlipass)*



Geology between Elm (Stop 6) and Linthal (Stop 10)

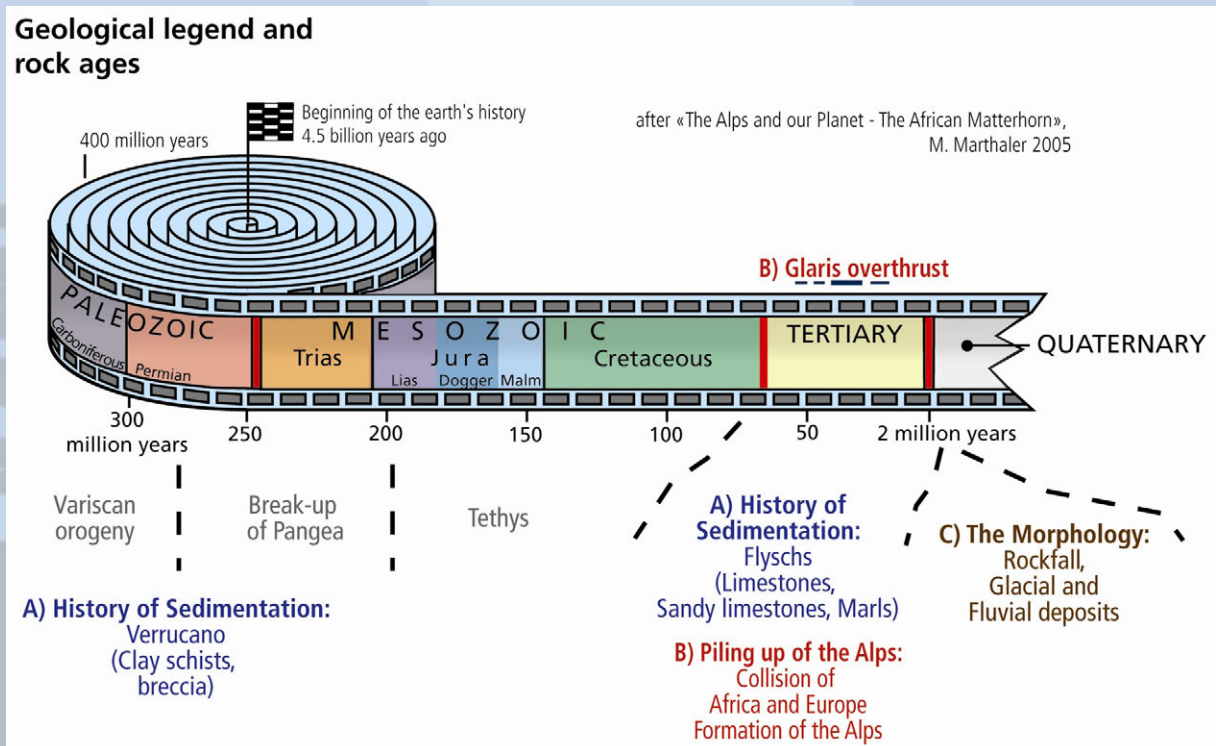
1. **Geological setting:** *Formation of Verrucano rocks during the Permian in a desert-like basin of the super continent Pangaea and of Flysch rocks during the late Cretaceous and the Tertiary at the former European continental margin of the Tethys Ocean. The tectonic setting is characterized by the Glarus thrust and a lot of folds.*

2. **Simplified geological history:** (bold text corresponds to the most important steps):

*A) The **History of Sedimentation** during two different time periods (Verrucano during Permian and Flysch during Cretaceous / Tertiary) and in two different paleogeographic realms.*

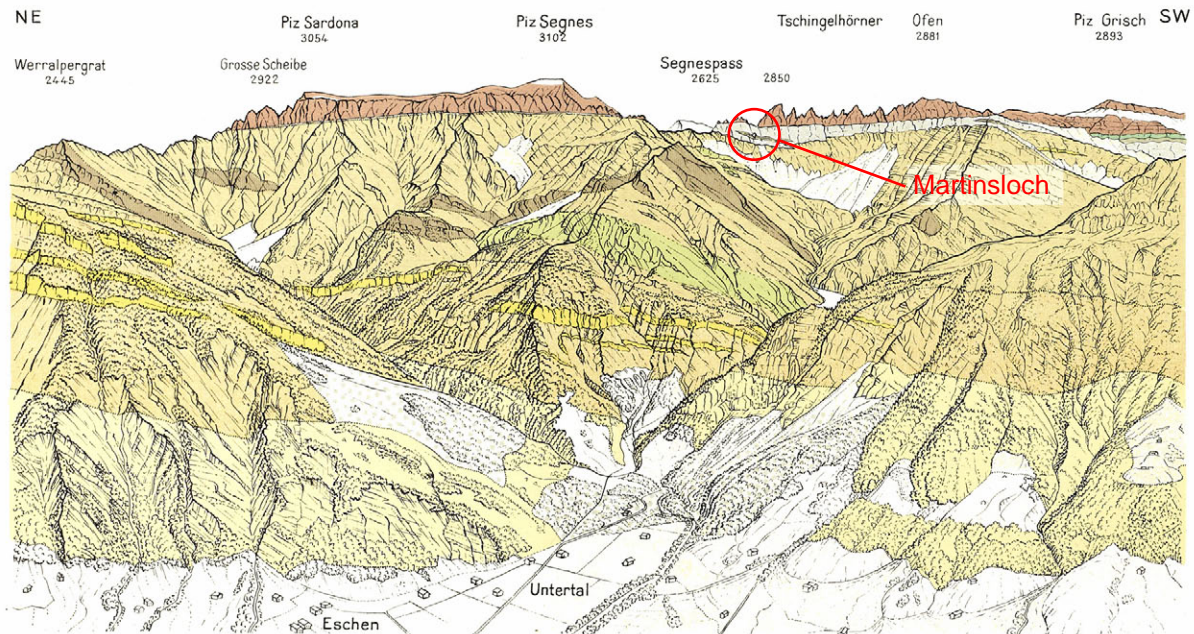
*B) Vestiges of the **Piling up of the Alps** (Glarus thrust and other thrusts and folds) indicate the compression and the deformation of the European Plate packed under the African Plate.*

*C) A **Morphology** designed by ice and water with vestiges of alteration (scree slopes), landslides, glaciers and debris fans.*



Stop 6: Ämpächli (1485 m): View on the Tschingelhörner with the Martinsloch

The terrace of the restaurant Ämpächli offers a panoramic view.

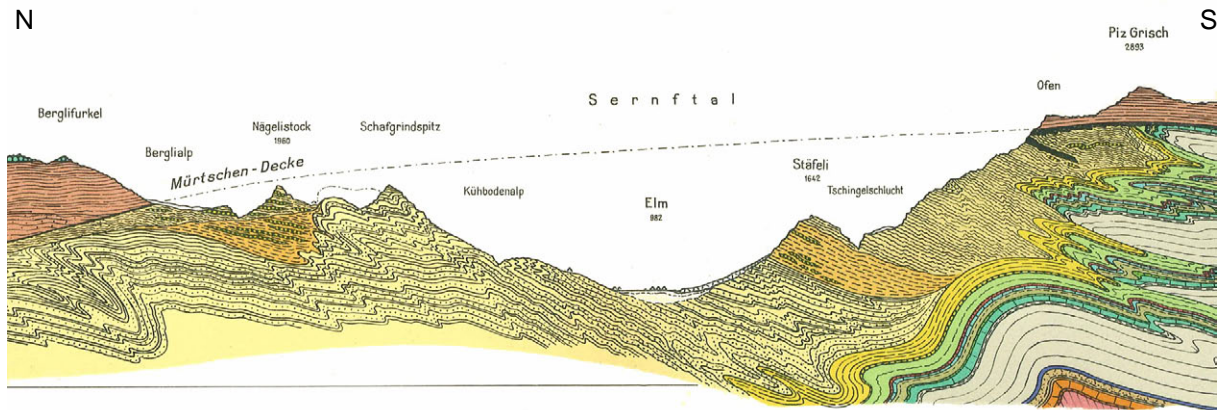


The Sardona–Vorab Group, from west northwest (Ämpächli).



Piz Sardona and Piz Segnes with Segnespass and Martinsloch (picture: P. Hayoz).

From the terrace of the Restaurant Ämpächli, the Glarus thrust can be observed Piz Vorab to the south and the Foopass to the east over 10 kilometers. The Glarus thrust is almost horizontal in the area of the Ofen then dipping more and more steeply northwards.



Geological profile of the Sernftal. Sketch J. Oberholzer (1933).



Martinsloch and Tschingelhoren. Photo: R. Homberger.

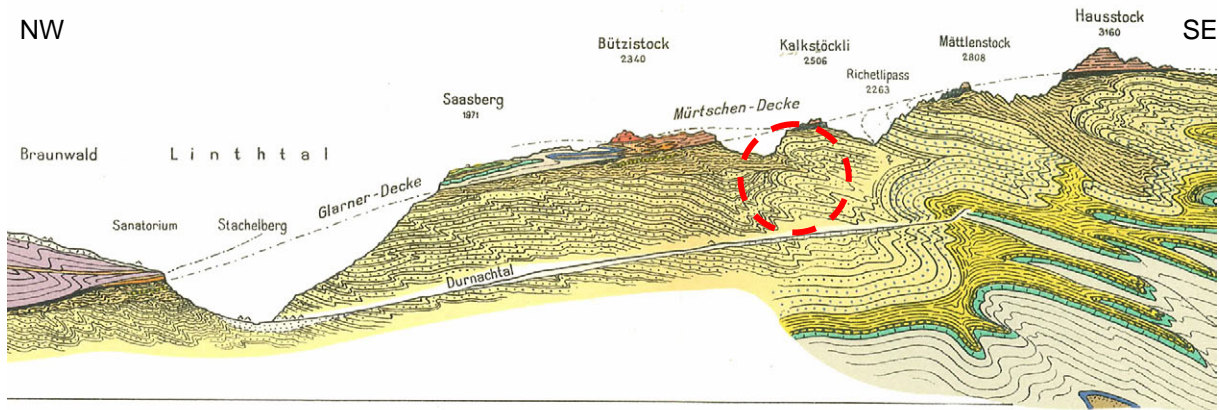
Some 20 ma ago, a rock mass was detached in a depth up to 16 km and transported along the Glarus thrust more than 40 km towards the North. Therefore nowadays, Verrucano rocks (250–300 ma) lay over brownish Flysch rocks (35–50 ma). In the region of the Tschingelhörner, a limestone level (100–150 ma) that had obviously been carried along as well can be identified in between.

Verrucano outcrops exist in the area of the Tschingelhoren and the Chärpf, but they are missing in the valley in the surroundings of Elm. In this area, Verrucano rocks had been eroded in the last million years (upper picture).

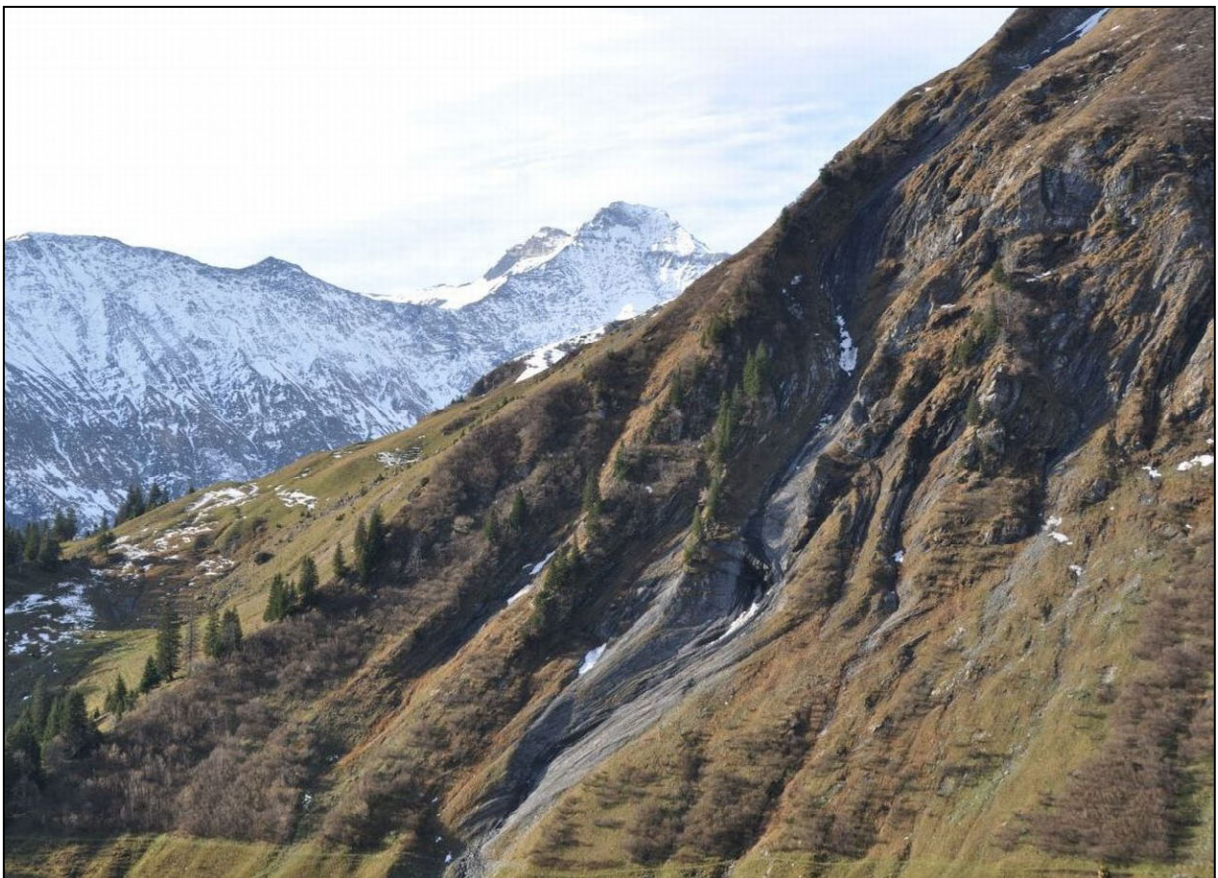
Wind and weathering created the legendary Martinsloch (diameter almost 20 m) by accelerated erosion of rock at the contact between a tender, horizontal marl layer and a steep fault plane (see also opposite page)

Stop 7: Folds at Tierbodenhorn and the Glarus thrust at the Vorab and at the Kärpf (ca. 1620 m)

The hiking trail offers the best viewpoint at the edge of the wood between Längboden and the Bischofbach.

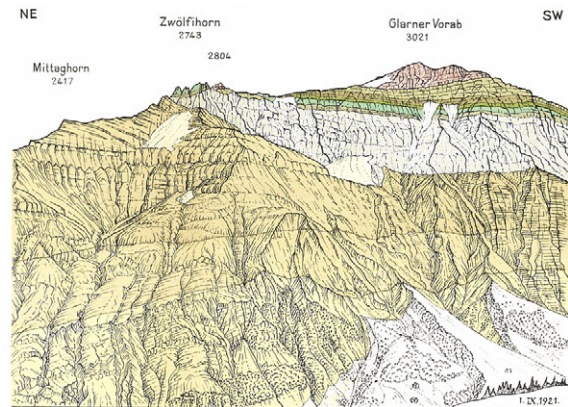
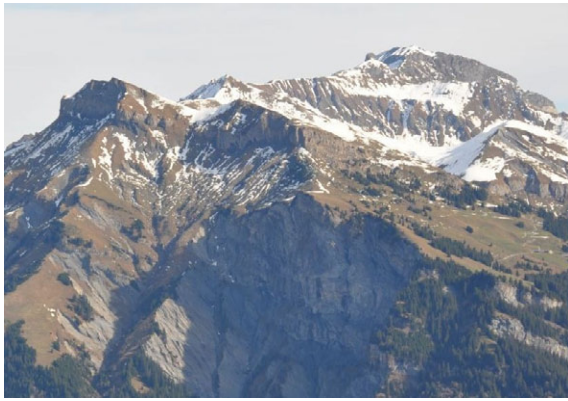


Geological profile between the Hausstock and the Linthtal. Sketch J. Oberholzer (1933).

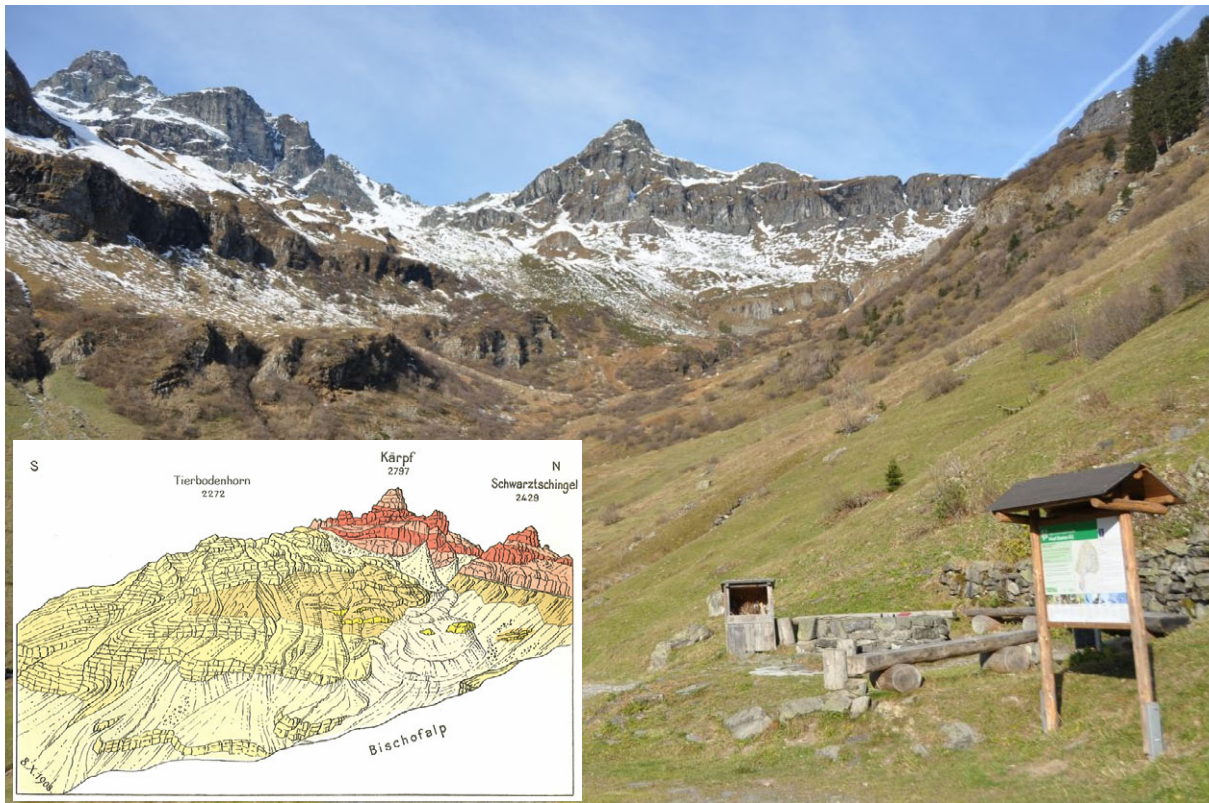


Massive sandstone layers within the tender clay and marl strata allow recognizing large scale folds within the Flysch. These folds formed parallel with the movement along the Glarus thrust some 20–40 ma ago (the folded area at the eastern side of the Tierbodenhorn lies in the circle of the upper, side inverted section).

On the background, the Hausstock with the Glarus thrust in the summit area can be seen.



View and geological interpretation of Glarner Vorab.



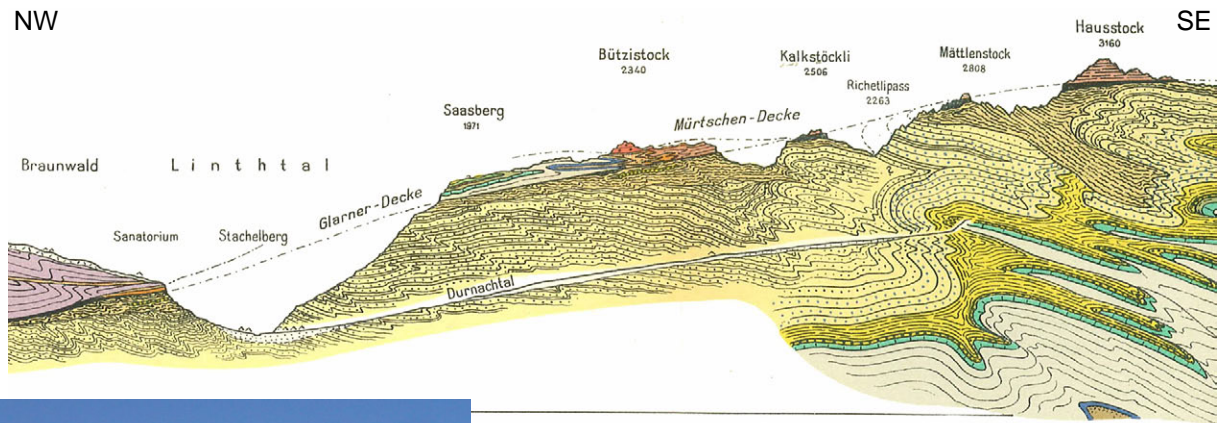
The Glarus thrust can be seen at several places: In the southwest at the Hausstock, in the southeast between Zwölfihorn and Vorab, in the northwest above the Bischofsbach at the Kärpf. All these sites give a good idea of the spatial situation of the Glarus thrust (see section on the preceding page).

At the picture with the Kärpf, the Glarus thrust is located between light grey sunny outcrops of Verrucano (above the snow-covered slopes) and the brownish shady grey slopes (especially at the right margin of the picture).

In the Kärpf area, the Verrucano contains volcanic deposits indicating an active volcanism 250–300 ma ago in an area that was located several kilometres southwards before the rocks had been transported with the Glarus thrust northwards into the actual position.

Stop 8: Panoramic view on the Hausstock of Obererbs (P. 1699 m)

Point 1699 southwest of the ski cottage Obererbs offers a nice view of the Hausstock area.



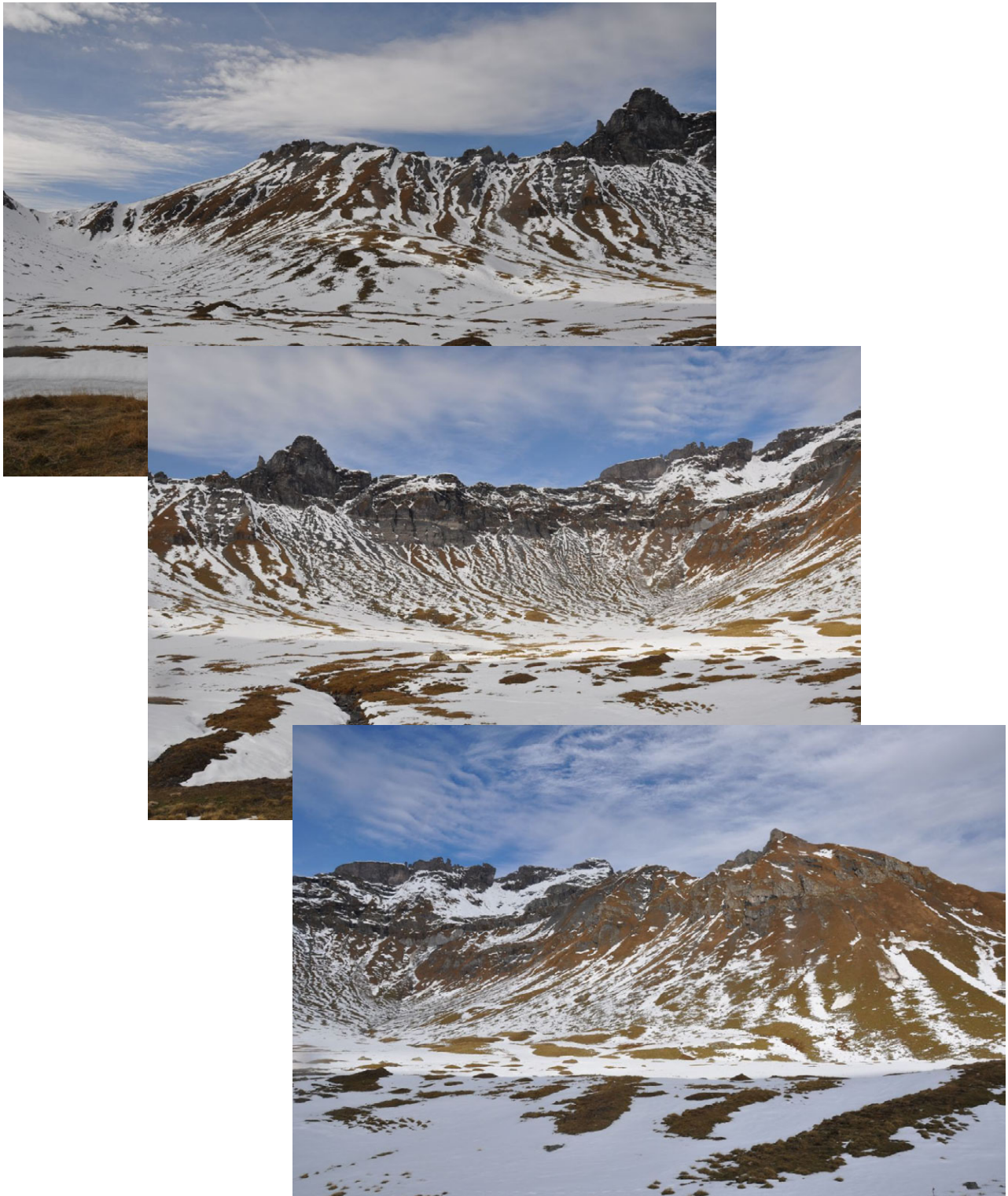
At the northern rock face of the Hausstock, the Glarus thrust is still at an altitude of 3000 m. The differences of colours help to distinguish the older Verrucano (Permian) in the summit area and the dark Flysch underneath.

In the folded Flysch rocks, the number «3» can easily be identified.

The small rest of the Alpifirn glacier is still to be seen at the bottom of the Northern rock face. Underneath, the alluvial plain has recently been affected by the military complex.

Stop 9: Wichlenmatt with a view of the Kärpf (2036 m)

The hill and the plain North of Matthütte offer nice views of the Kärpf.

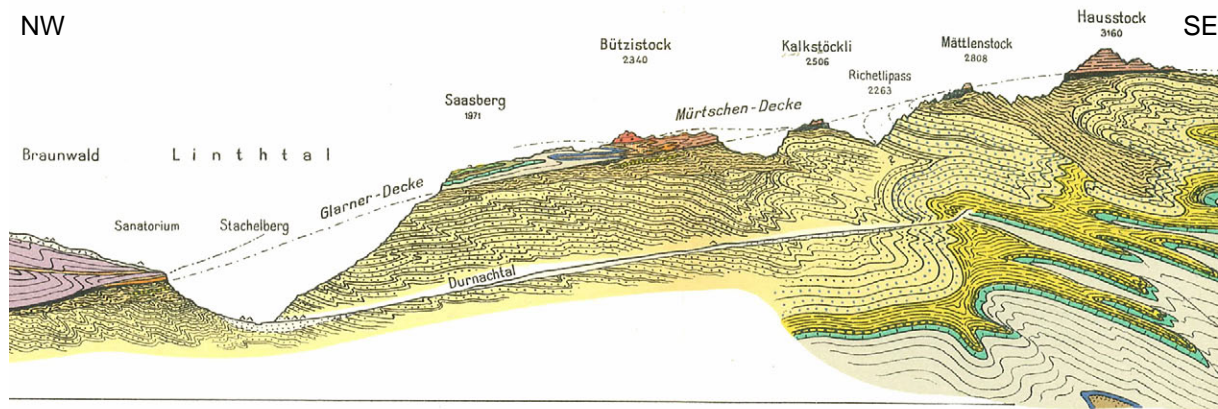


There are nice outcrops of the Glarus thrust to be seen from the Wichlenmatt between Kalkstöckli and Kärpf. Especially in the Kärpf area, the Verrucano contains a many volcanic layers.

In the Basin of Wichlenmatt shows also nice talus materials an alluvial fan structures.

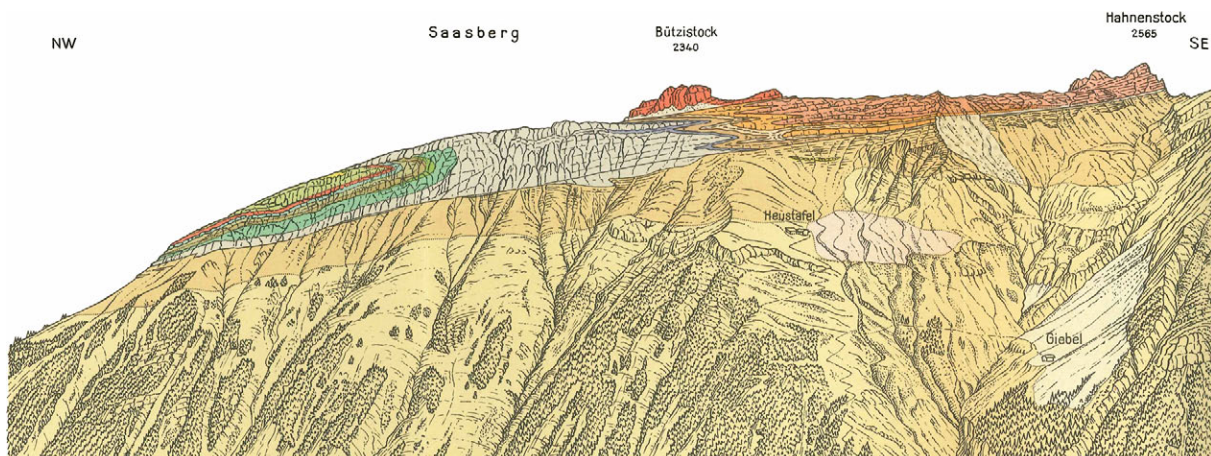
Stop 10: Folds at the bottom of the Mättlenstock (1700 m)

A nice view on the folds of the Mättlenstock is possible descending from the Richetlipass (i. e. Point 1700 m). Further down in the Durnach Valley, the Sassberg and the Bützistock West of Stäfelì can be seen at 1360 m.



The Mättlenstock contains a level of impressive folded Taveyannaz sandstone with a thickness of some 100 m. These greenish sandstones are a part of the Flysch sediments of the Northern Helvetic Zone (25 ma).

They contain volcanic elements indicating a close volcanism during the deposit of these rocks.



View from southwest (Bächikamm) on the southwest side of Saasberg and Bützistock.

The itinerary in the Durnachtal crosses outcrops of Flysch, which explains the soft morphology of the slopes in this valley. Rocky areas are limited on the summits.

Between Saasberg and Bützistock, the Glarus thrust is visible again. Northwest of the Bützistock there are no more outcrops of Verrucano rocks immediately at the fault zone but Triassic and even younger Jurassic rocks. According to modern models, these rocks had been transported under specific conditions along the Glarus thrust from the margin of the «Verrucano desert plain» to the actual emplacement.

At the background behind the end of the valley, the Ortsstock consisting of limestone is already visible. These limestone series will become even thicker in the direction of Linthal (accommodation possible).

For further information's ...

Imper D. (1996): Gesteine, Rohstoffverarbeitung und Steinverarbeitung im Sarganserland. In: Minaria Helvetica 16a/1996.

Imper-Filli D. and Imper-Filli L. (2010): Alte Schichten – neue Sichten. Den geologischen Phänomenen auf der Spur / Nouvelles perspectives sur d'anciennes roches / New Lights on Old sights. – UNESCO-Welterbe Tektonikarena Sardona, Sargans.

Marthaler, M. (2005): Das Matterhorn aus Afrika. Die Entstehung der Alpen in der Erdgeschichte. – hep Verlag, Bern.

Oberholzer, J. (1933): Geologie der Glarneralpen. – Beiträge zur Geologischen Karte der Schweiz, Liefg. Nr. 28 [N. S.]. – Schweiz. Geol. Komm.

Oberholzer, J. (1942): Geologische Karte des Kantons Glarus, 1:50 000. – Geologische Spezialkarte der Schweiz Nr. 117, swisstopo (Wabern).

Where no other reference given the hand drawn panoramas and profiles are taken from J. Oberholzer (1933) and the photos were made by D. Imper.

Practical information

Cottages and guesthouses

In Elm and Linthal, on the alp of Obererbs and in the Leglerhütte (SAC).



Tourism : Elm Tourismus

Tel : +41 (0)55 642 52 52

<http://www.elm.ch>

Tourism : Geopark Sardona

Tel : +41 (0)79 345 72 35

<http://www.geopark.ch>



Telefone : *S.O.S. 144 or 112 - Police 117*

Last review: 15 February 2011

Original Text in German by David Imper
Translation: geotourist@aol.com on behalf of swisstopo