German Soil of the Year 2018 – Alpine Felshumusboden

WRB: Suprafolic Leptosol (humuslayer < 10 cm)
or Folic Histosol (humuslayer>= 10 cm)
Austria: Fels-Auflagehumusboden (auf Carbonatgestein)
Switzerland: Humus-Gesteinsboden, Humus-Karbonatgesteinsböden

In the northern Limestone Alps, carbonate and dolomitic rock types are prevalent. These rock types weather slowly, and only very little mineral substance accumulates even over a longer period of time. On top of these rocks form very thick humus layers, particularly in shadowy areas under coniferous forest and dwarf mountain-pine scrub on north-facing slopes.

Felshumusböden are most widespread in the high montane and subalpine belts. In the Bavarian Alps, the subalpine belt stretches from about 1.200 m a.s.l. to 1.900 m a.s.l. In the northern Limestone Alps, mixed beech forest, spruce-fir-beech-maple forest, spruce-larch forest, mountain-pine forest and forests of spruce and dwarf mountain-pine scrub (Krummholz) cover the most part of this belt. Man and his farm animals have considerably affected the subalpine belt. The former high pastures are almost completely abandoned. In the sequel, the now typical *Rhododendron* dwarf scrub established.

The humuslayer can be divided into several sub-horizons, according to the degree of alteration and decomposition of the organic matter induced by soil organisms. On the top is a layer of residues of dead plants and animals, which is called Ol horizon. Beneath, in the Of horizon, the organic residues are decayed and mixed with organic fine material ("f" from fermented). The former exclusively makes the Oh horizon ("h" from humous) as the layer directly above the bedrock.

The humus stock of the Felshumusböden provides the vegetation with water and nutrients. It further contributes to a high water retention capacity. Like a sponge, Felshumusböden can absorb a multiple of water with respect to their own weight. They delay rainwater drainage and prevent overland flow during extreme rainfall events, which in turn would trigger soil erosion. Thereby they essentially contribute to slope stability.

Storm events, forest fires, clear cuts or soil sealing disturb this sensitive ecosystem. Soil erosion is increased, and in the worst case debris avalanches and mudflows can be triggered and cause flooding in the valleys. Trampling by hikers and animals kept on pastures as well as touristic vehicular traffic may cause soil compaction. This may reduce water infiltration and thereby increasing soil erosion from tracks, decreasing soil water retention and finally increasing run-off.

Climate change will increase precipitation from extreme rains, so that the soil needs to absorb more water in a short time. However, summer temperatures will rise as well, which increases biological activity and finally accelerates humus decline. This reduces the water holding capacity of the soil, which in turn further exacerbates run-off generation. Furthermore, carbon dioxide is released that acts as greenhouse gas and may further accelerate climate change. Deforestation in particular affects

the ecosystem. Bare soil is exceptionally prone to erosion, and no humus layer can form due to the absence of plants. Even under undisturbed conditions, 30 cm humus layer need about 1,000 years to build up.

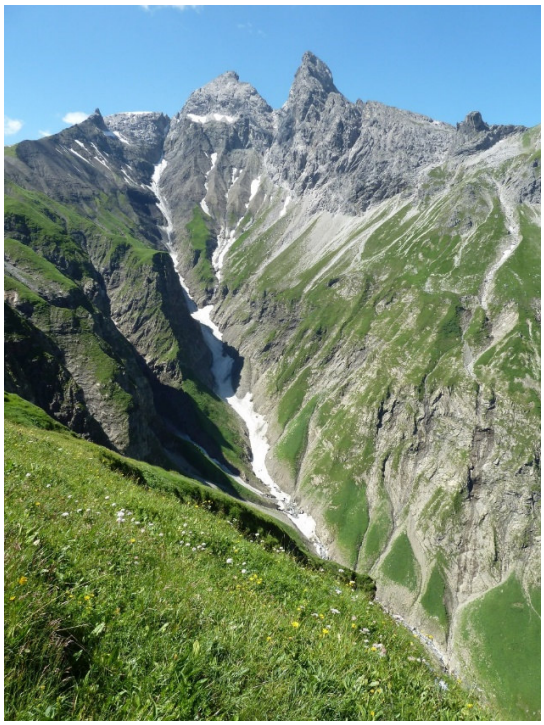
This indicates clearly that soil is a valuable and finite resource. Using the alpine soils responsibly is indispensable to preserve this sensitive ecosystem. Any of us can contribute through considered and responsible behaviour.

Editing:

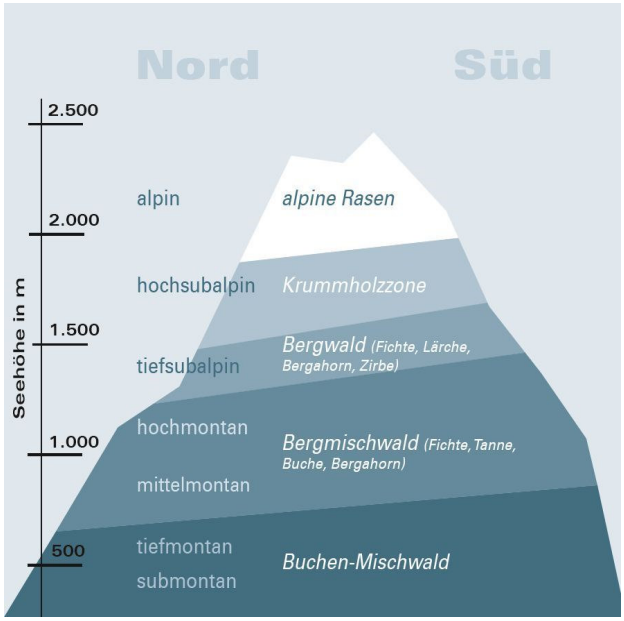
Robert Traidl, Bayerisches Landesamt für Umwelt;
Monika Frielinghaus & Gerhard Milbert, Kuratorium Boden des Jahres

Further information:
Web site Soil of the Year (www.boden-des-jahres.de)
CD-ROMs on all soils of the year 2005 to 2018: mail to >frielinghaus@zalf.de<

Felshumusboden on dolomitic rock (Foto Robert Traidl)



Bavarian Alps (Foto Robert Traidl)



Vegetation zones:

- *sub-montane: mixed beech forest,*
- *middle- montane: spruce-fir-beech-maple forest,*
- *deep-sub-alpine: spruce-larch forest,*
- *high-sub-alpine: mountain-pine forest,*
- *alpine: alpine grass land*

(Bayerisches Landesamt für Umwelt)