

A decorative graphic consisting of numerous thin, white, wavy lines that flow across the top half of the slide, creating a sense of movement and depth against the dark green background.

Dr. Ernst Leitgeb

**Department of Forest Ecology and
Soil**

Overview

- Soil research at BFW (Forest Ecology and Soil)
- Forests and Soils of Austria
- Implications for forest management
- Soil classification in the field
- Soil sampling demonstration

Team strength & Competences

- **Units:**

- Site and Vegetation (Dr. M. Englisch)
- Soil Ecology (Dr. B. Kitzler)
- Agricultural Soil Mapping and Geoinformatics (Dipl.-Ing. M. Wandl)
- „Climate Change“ Focal Point (Dr. R. Jandl)

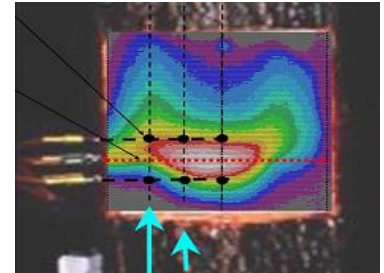
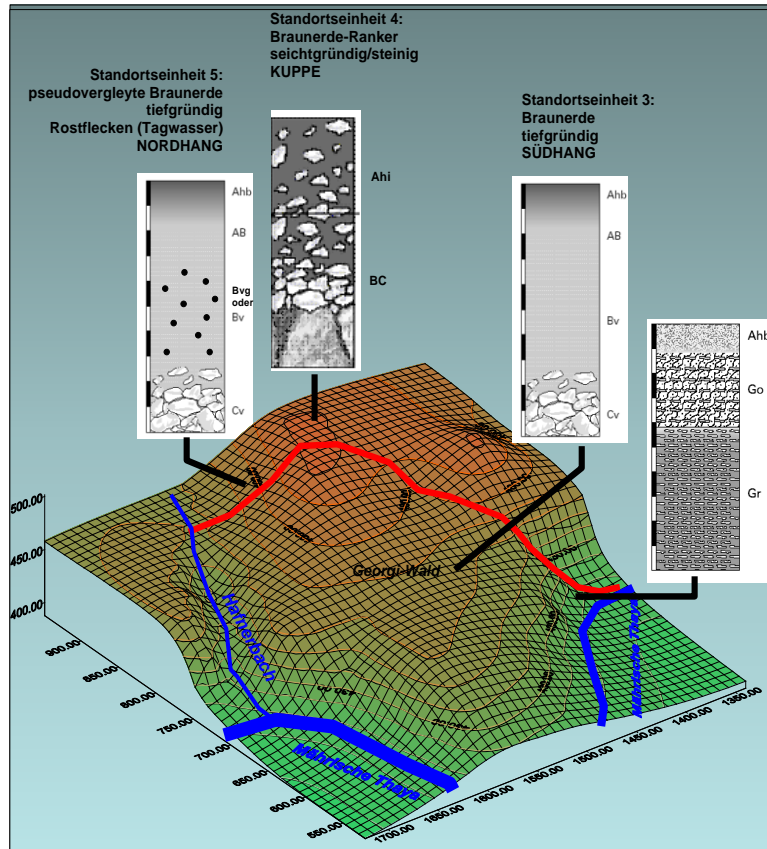
- **Competences:**

Soil - Site - Vegetation, N- and C- cycles, greenhouse gas emission, modelling, soil monitoring, analysis of spatial data (GIS)

Thematic priorities

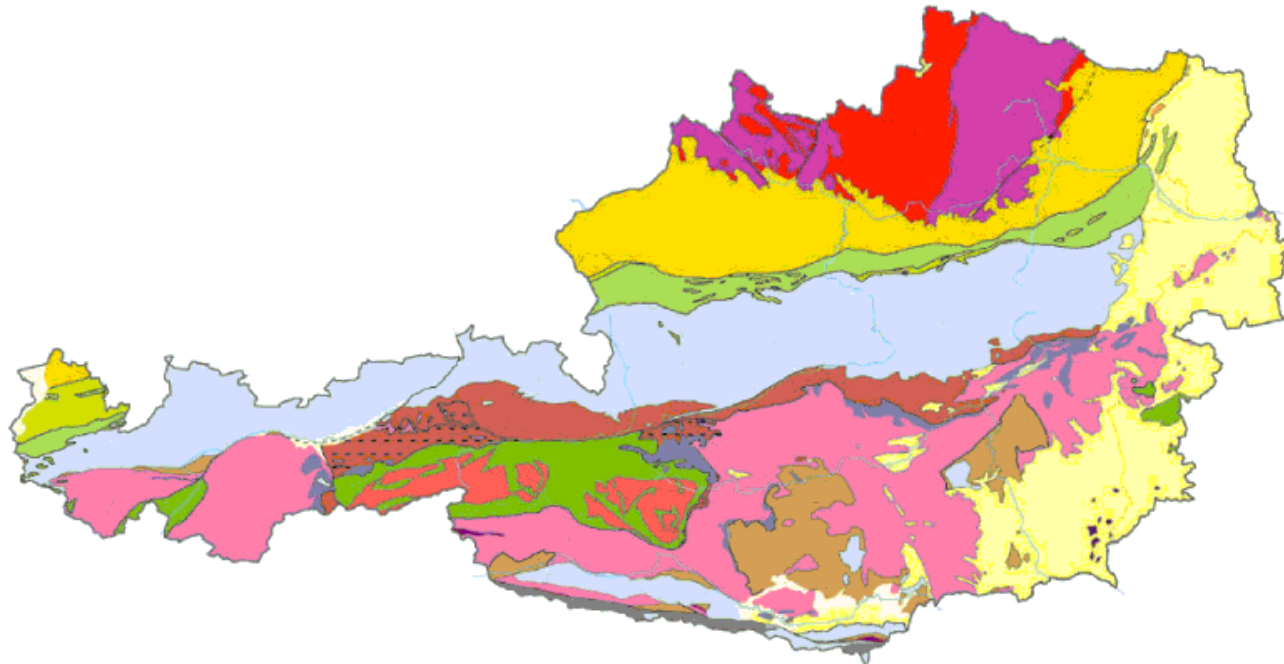
- Climate Change
 - Sites and tree species
 - Greenhouse gas emission from soils
 - Soil and carbon budget (sink, source)
- Biomass and soil fertility
- Soil Monitoring and Agricultural Soil Map

Site analysis, suitability of tree species



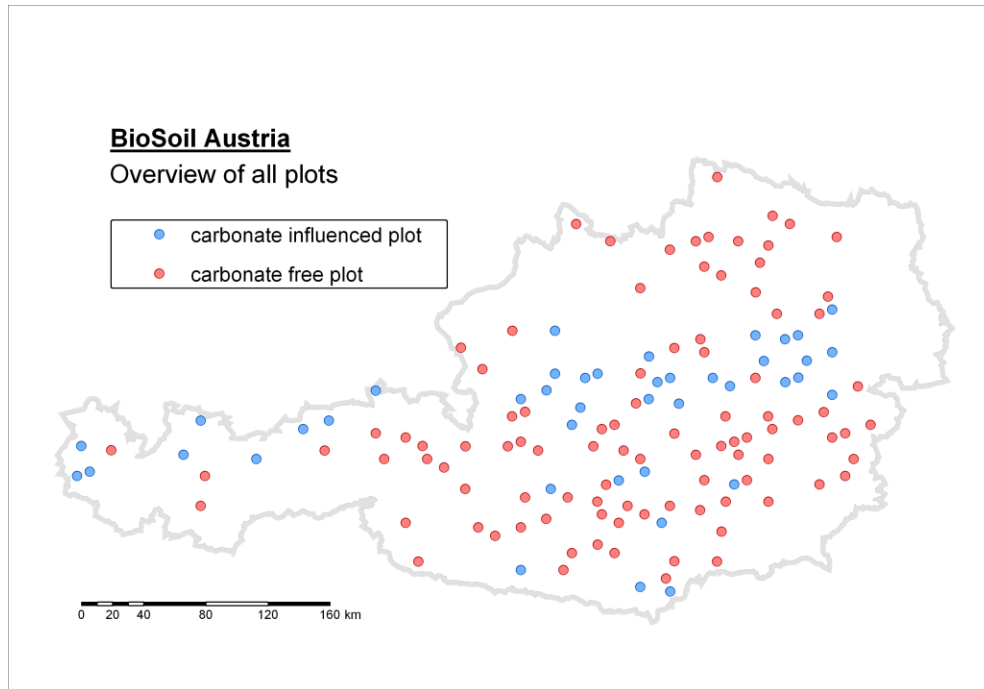
Biomass and soil fertility

- Intensity of biomass removal and ecological constraints (Site); historical landuse
- Application of wood ash



Forest Soil Monitoring

Background: UN- ECE International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests *ICP Forests* in 1985
Start survey: 1987; first repetition (BioSoil): 2007



Agricultural Digital Soil Map (ebod)



eBOD

Adresssuche PLZ/Ort Str./N: OK

Themen Legende

- Basiskarte
- Fachkarten
 - Bodenformen mit Profiltabelle
 - Bodenfoto
- Bodentypengruppe**
 - Beschriftung Typengruppe
 - Sonstige Flächen
 - Wassenerhältnisse
 - Durchlässigkeit
 - Ökogeotop

Karte neu zeichnen Karte automatisch neu zeichnen

Maßstab 1:25000

Digitale Bodenkarte von Österreich

Der Aufbau der Österreichischen digitalen Bodenkarte besteht im Wesentlichen aus der Übernahme aller graphisch und textlich vorliegenden Informationen der seit 1958 systematisch durchgeführten Bodenkartierung. Dazu gehören die geometrischen Inhalte aller nahezu flächendeckend vorhandenen Bodenarten, sowie die textlichen Inhalte sämtlicher zugehöriger Begleitbrochüren.

Sie können mit dem Knopf die Profzeichnung zur entsprechenden Bodenform laden.

Inh. Erläuterungen | Impressum | Kartenlayer | Rechtschneise | Zusatzangaben | Karteninfo gesamt

eBOD

Adresssuche PLZ/Ort Str./N: OK

Themen Legende

- Basiskarte
- Topographische Karte Österreich
- Satellitenbild Luftbild**
 - Bundeshauptstadt
 - Landeshauptstadt
 - Städte, Städtchen, Mando
 - Bezirkshauptstadt
 - OK 500
 - OK 200
 - OK 50 Farbig
 - OK 50 Situalon
 - OK 50 Induszent
 - Kartierungsareal mit Beschriftung
 - Bundesländer
 - Bezirksgrenzen
 - Ortskernschraffurung
 - Satelliten-, Luftbild
- Fachkarten

Karte neu zeichnen Karte automatisch neu zeichnen

Maßstab 1:25000

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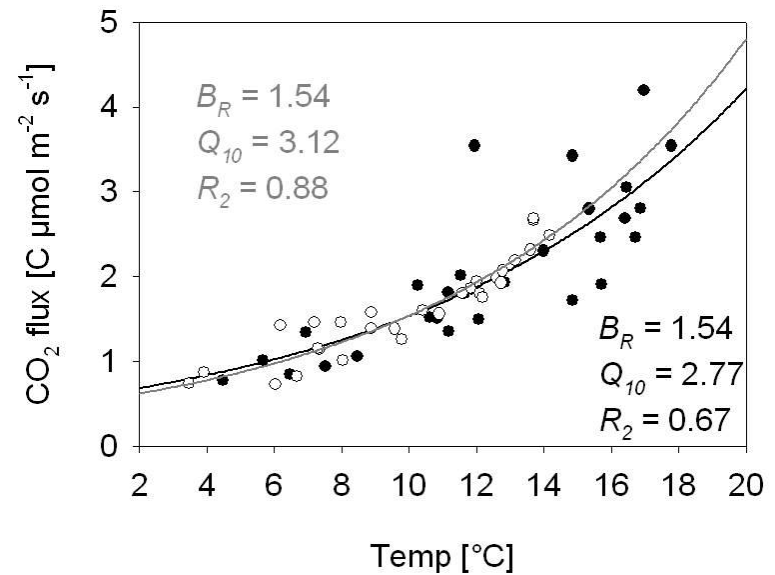
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Greenhouse gas emission, carbon budget



140 t soil C/ha

Average C-content in Austrian calcareous soils: 162 t/ha





Forest Soils and SOC



← Litter (app. 3 – 50 Mg ha⁻¹)

← Mineral soil 0-80 cm (30 – 150 Mg ha⁻¹)

0-20 cm: highest SOC content !

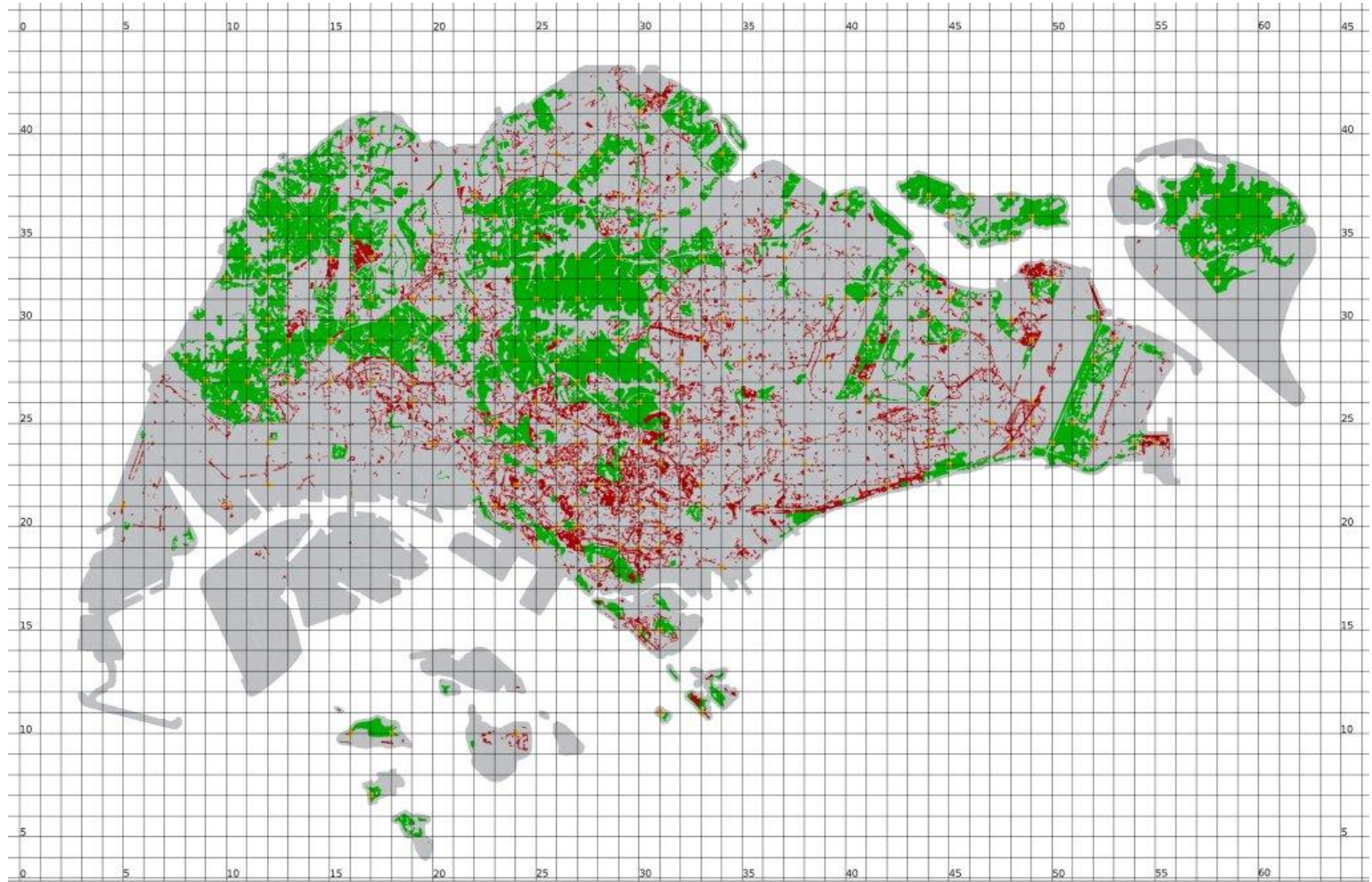
Carbon Accounting for the LULUCF Sector in Singapore

- SOC stocks in primary and secondary forests in Singapore (Bukit Timah):
 - Primary forest (1 m soil depth): 77.5 Mg ha⁻¹
 - Secondary forest (1 m soil depth): 103.9 Mg ha⁻¹

Data from: Ngo et. al. 2013



Carbon inventory Singapore





Detection of SOC Stock changes in soils


- Due to the high spatial heterogeneity of soil carbon, changes in carbon stocks **cannot be assessed** by repeated measurements within a soil monitoring programme.
- Use of soil carbon models to estimate the changes of stocks.



Soil carbon model: YASSO07

Finnish Environment Institute (http://www.syke.fi/en-US/Research_Development/Research_and_development_projects/Projects/Soil_carbon_model_Yasso www.syke.fi)

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Soil carbon model (Yasso)

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Soil carbon model (Yasso)

Soil carbon model - Yasso

Start year 2004
Stage Ongoing
Person in charge Jari Liski
Other persons Anu Akujärvi, Emmi Hilasvuori, Anna Repo, Pekka Vanhala
Partners Tampere University of Technology (TUT)

Dynamic model to calculate the amount of soil organic carbon, changes in the amount of soil organic carbon and heterotrophic soil respiration.

Current applications include Earth System Modeling, Greenhouse Gas Inventories (UNFCCC) and research on ecosystems and bioenergy.



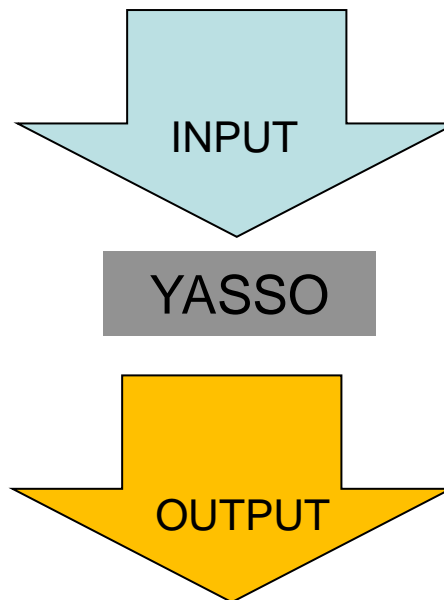
Published 2013-04-26 at 13:57, updated 2014-02-07 at 10:09

Soil carbon model: YASSO07

Climate, local data (air temperature, precipitation)

Litterfall (above and below ground C input), f (biomass)

Chemical quality (decomposition class)



Respiration

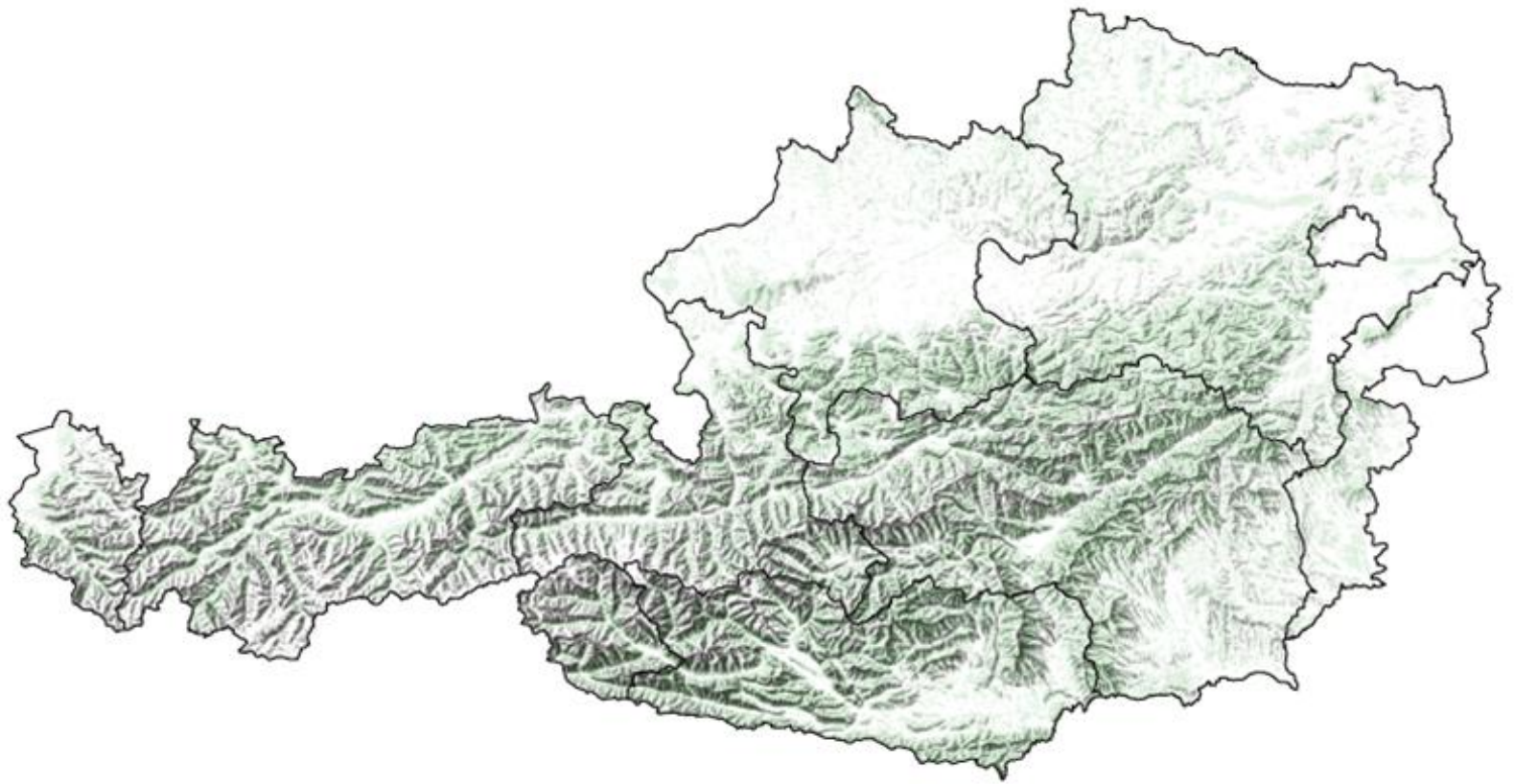
Soil C pool

Soil C - Change

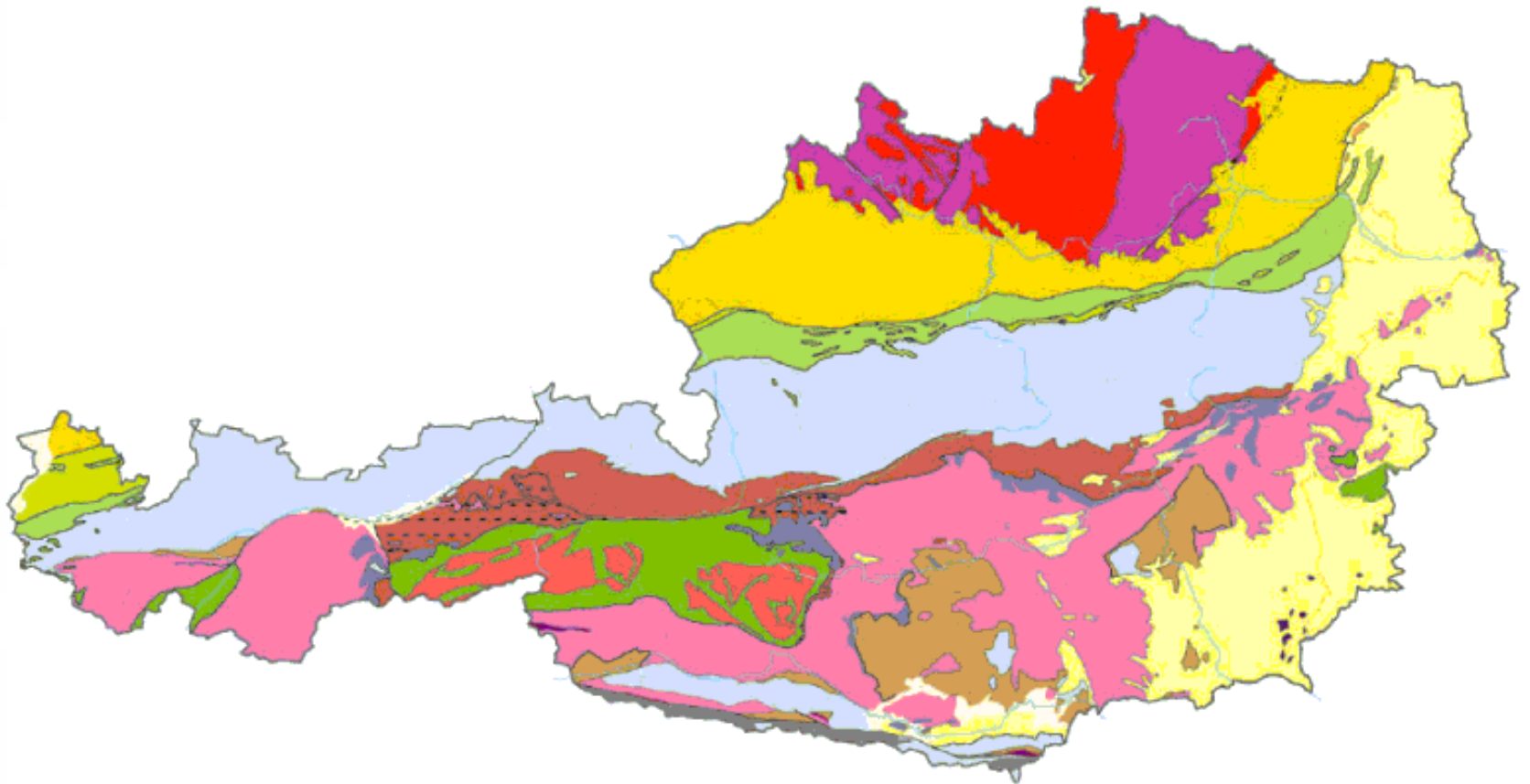


Forests and soils of Austria

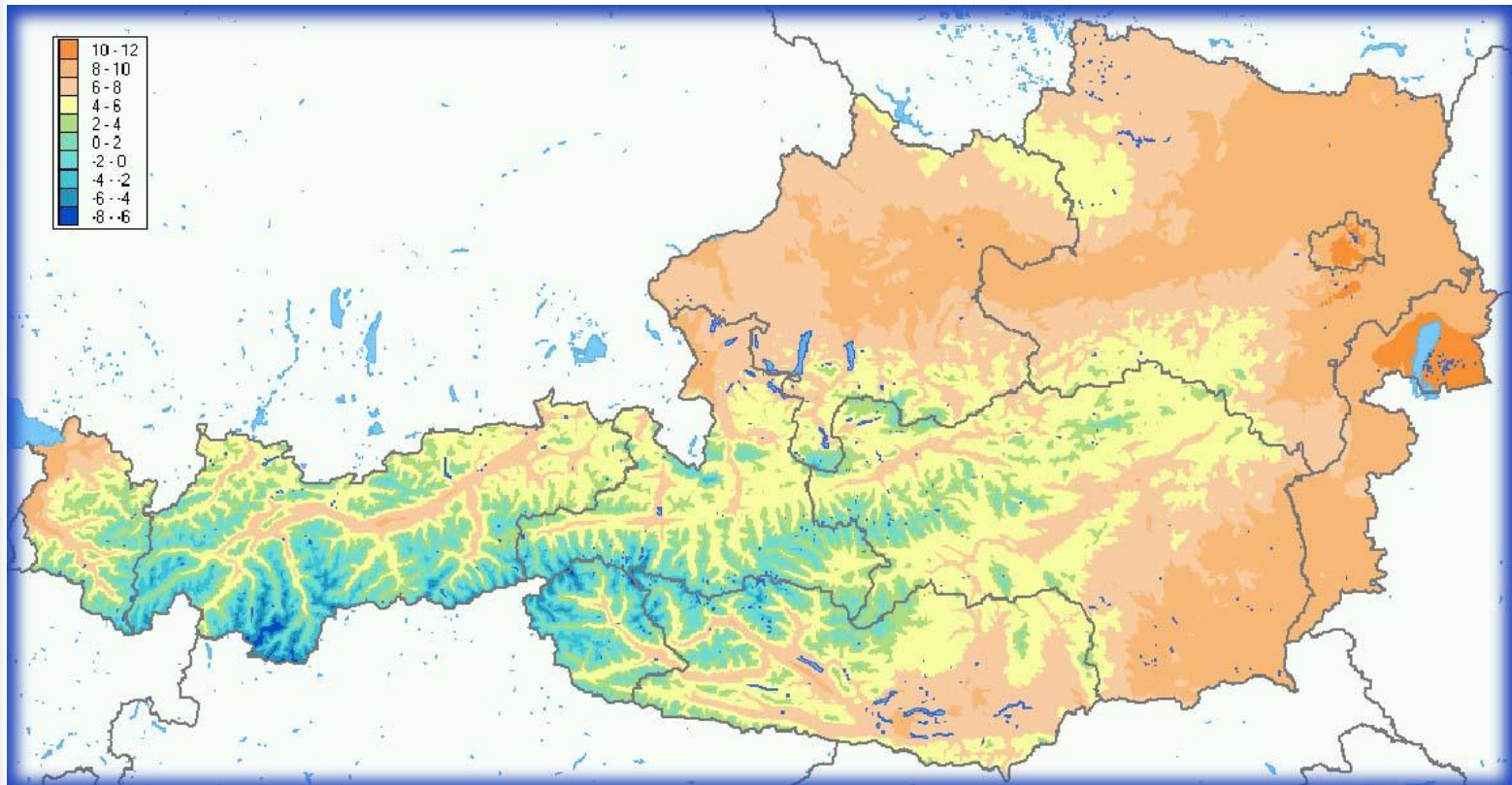
Austria: Orography



Austria: Geology

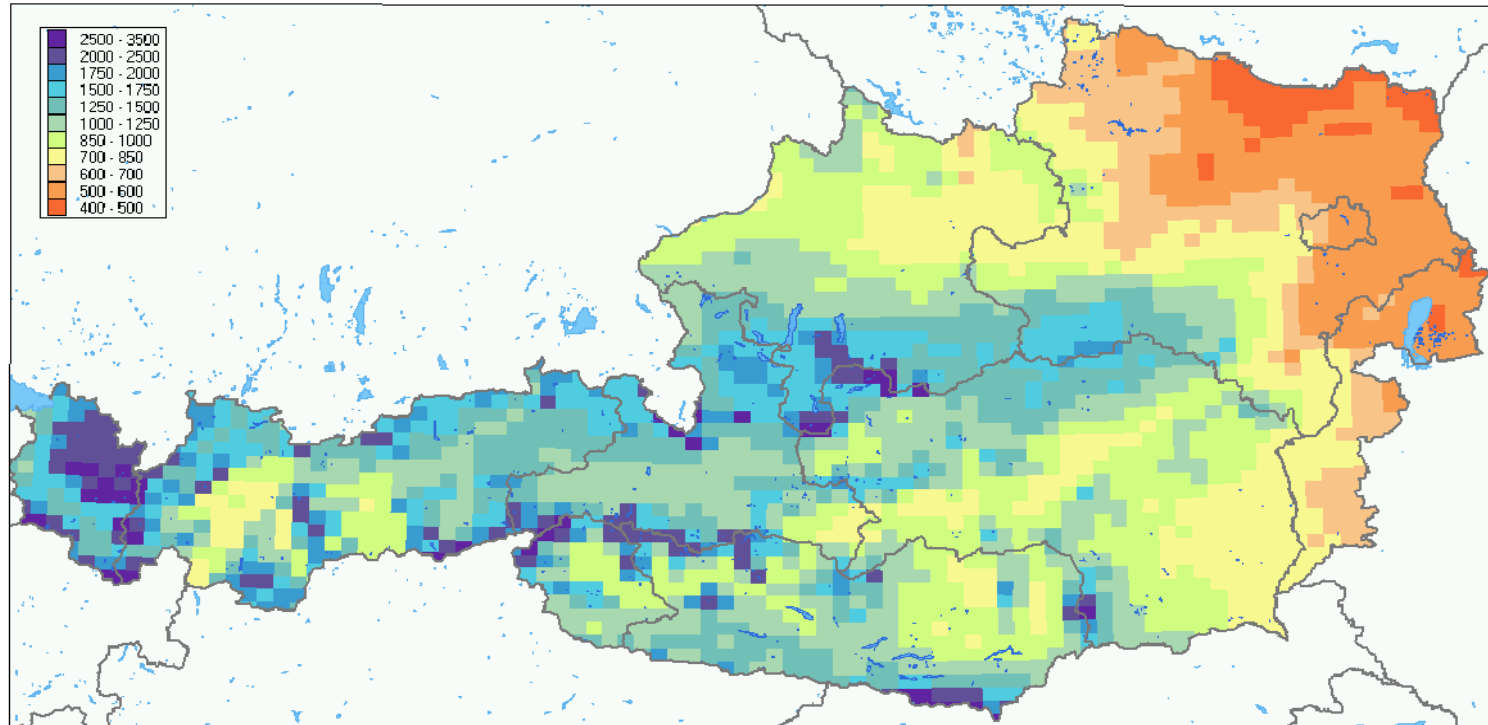


Austria: Climate - long term average of air temperature (1961-1990)



Quelle: www.zamg.ac.at

Austria: Climate - long term average of precipitation (1961-1990)

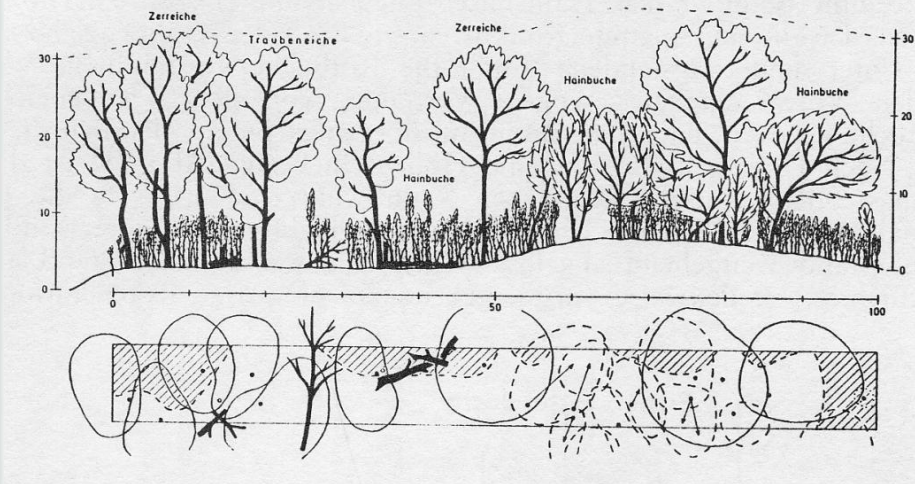


Quelle: www.zamg.ac.at

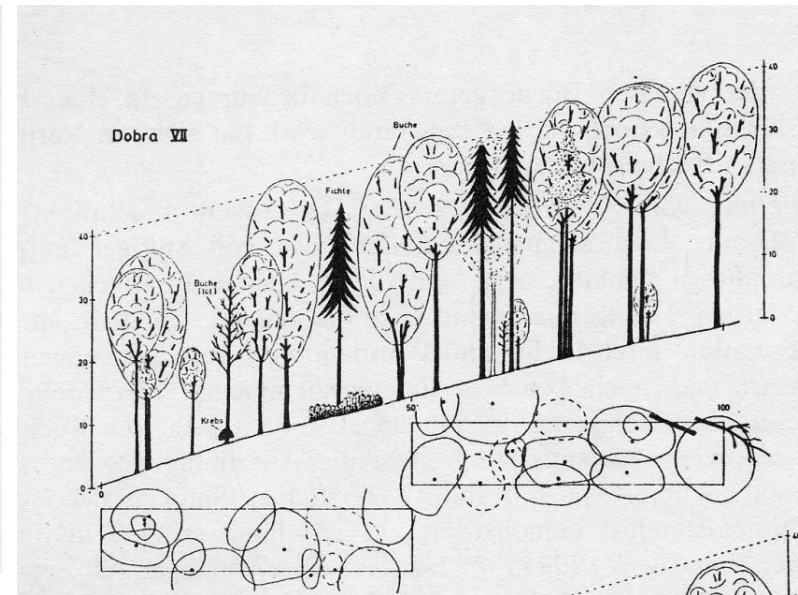
Austrian forests: Important forest communities

Oak Hornbeam

Johannser Kogel, Lainzer Tiergarten 340m SW Traubeneichen-Hainbuchenwald mit Bergschwingel



Beech

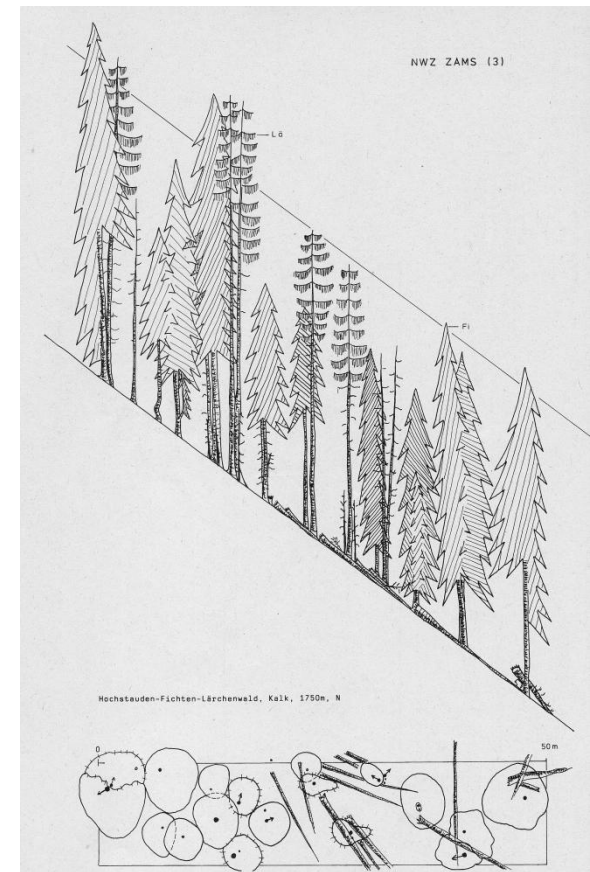
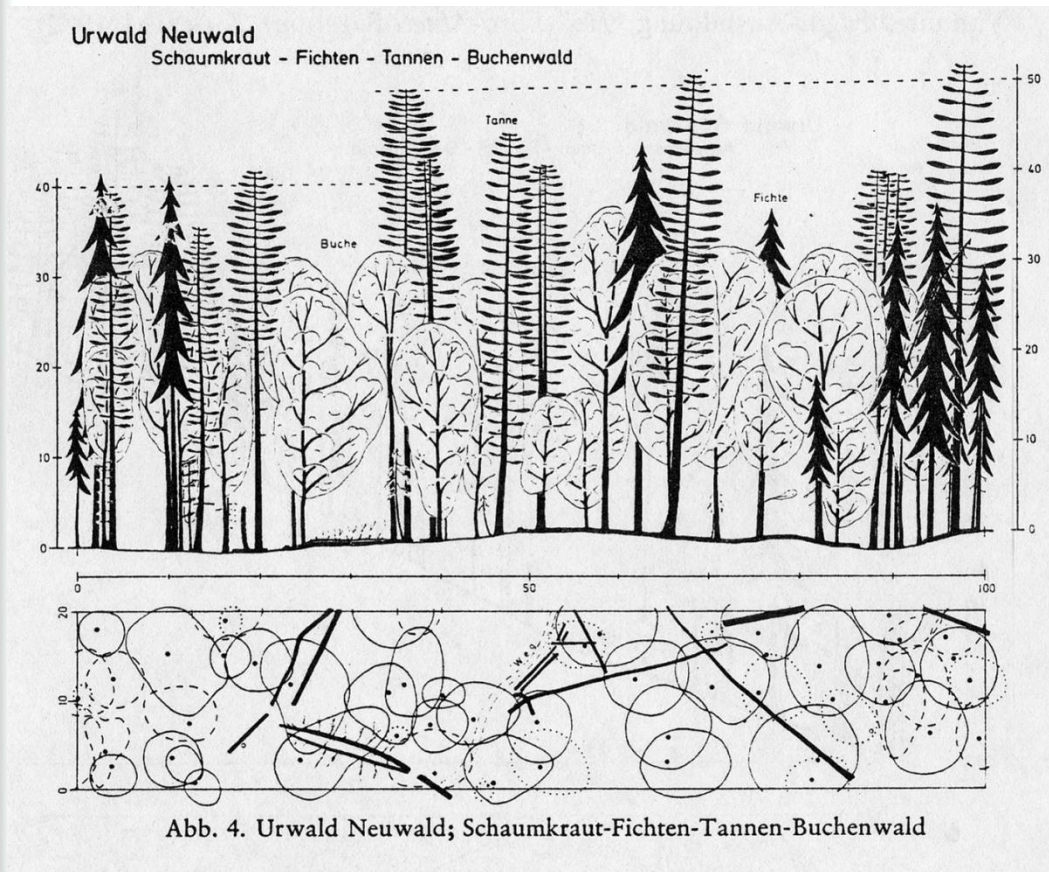


Quelle: Mayer et al., 1987

Austrian forests: Important forest communities

Spruce – Fir - Beech

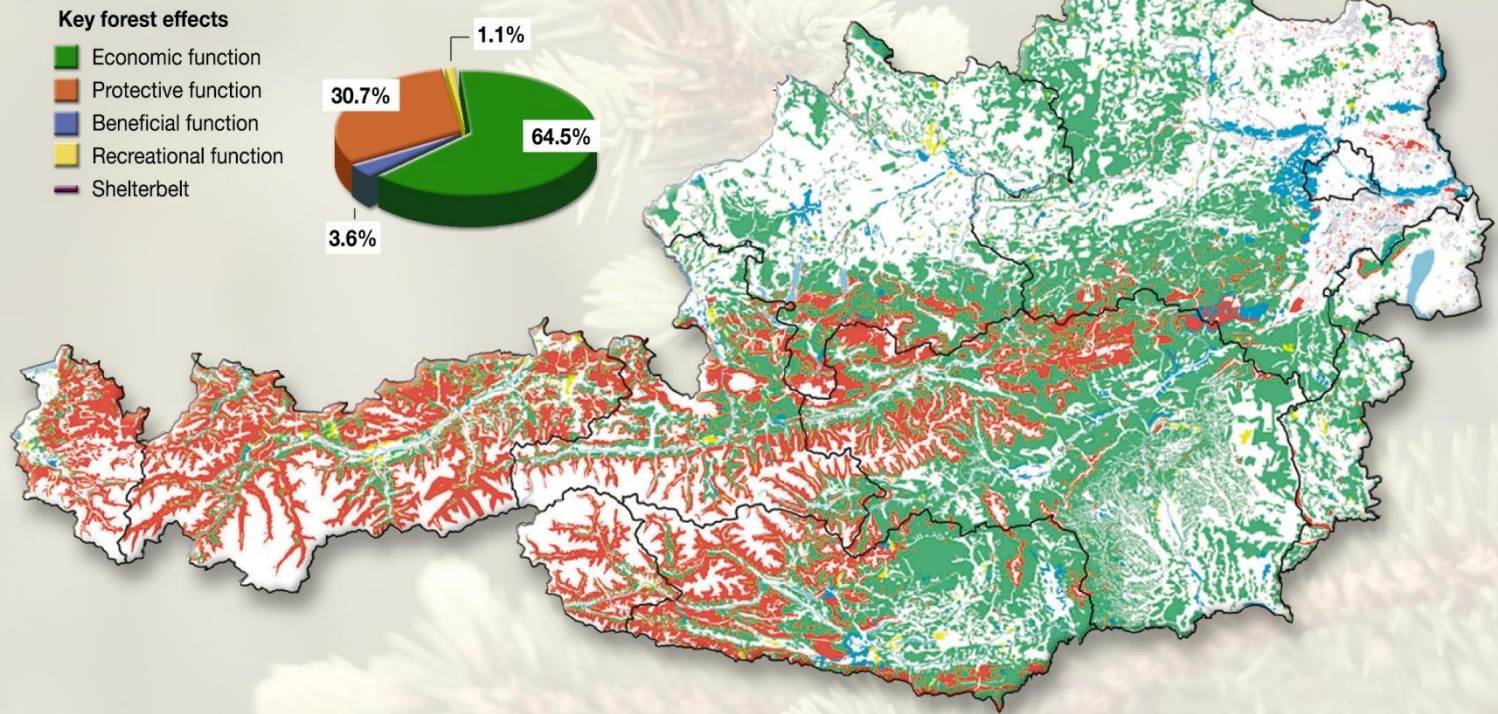
Spruce –Larch



Quellen Mayer et al. 1987, Zukrigl 1990

Austrian forests: functions

FOREST FUNCTION PLAN



Source: BMLFUW 2005

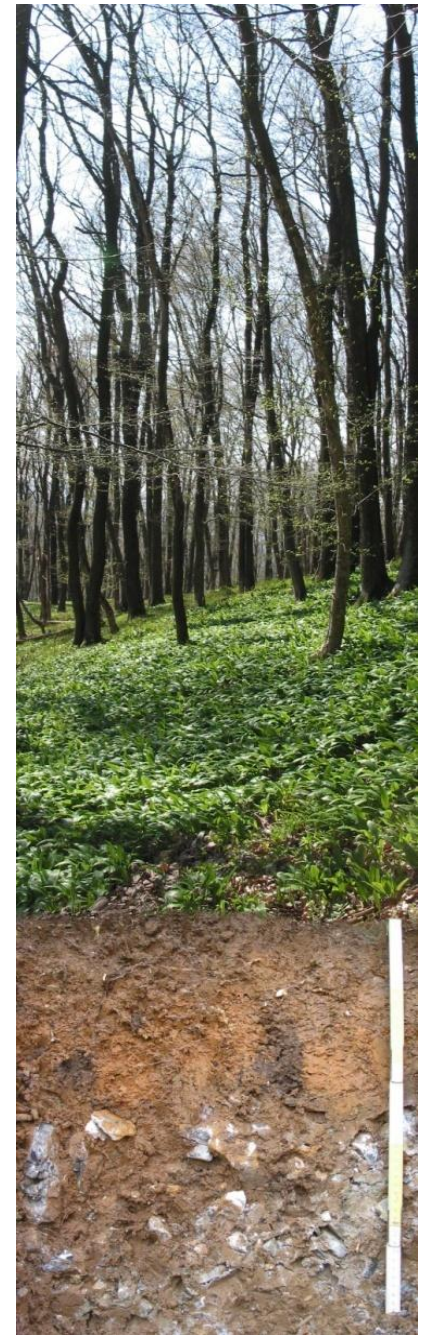
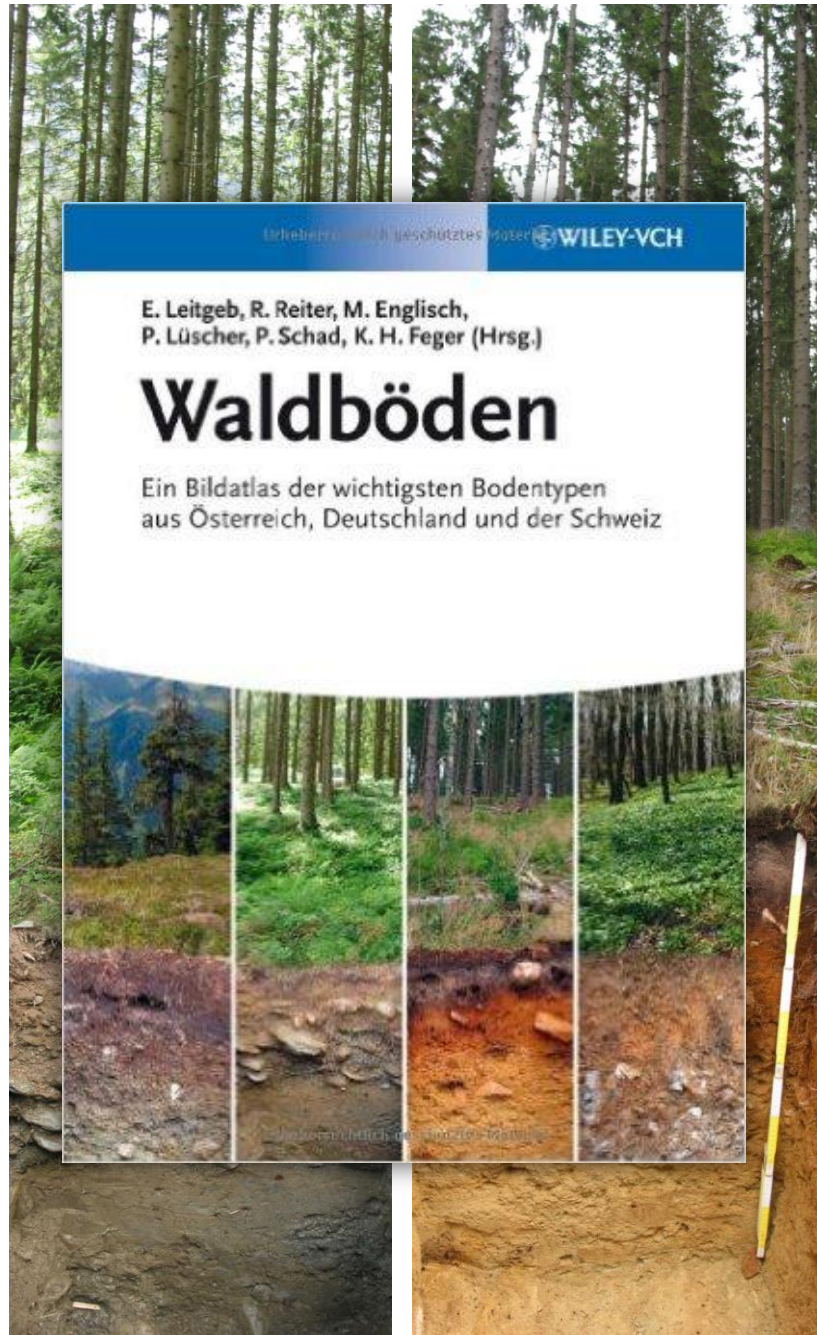
lebensministerium.at

Austria: soil types

- Calcareous soils
- Silicate (non calcareous) soils

Mean pH values (*BioSoil, Mutsch, 2013*)

	Calcareous soils	Silicate soils
Humus layer	5.3	3.9
Mineral soil: 0- 5 cm	6.4	3.8
Mineral soil: 5-10 cm	6.7	3.9
Mineral soil: 10-20 cm	6.9	4.1

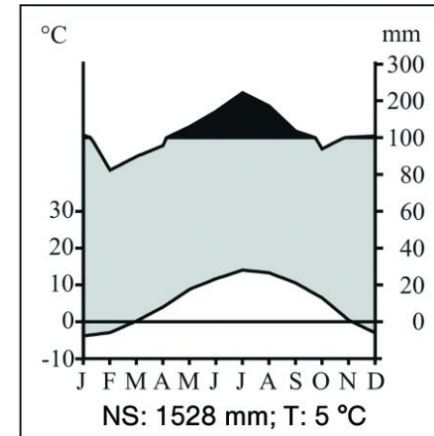


Histosol (carbonate)



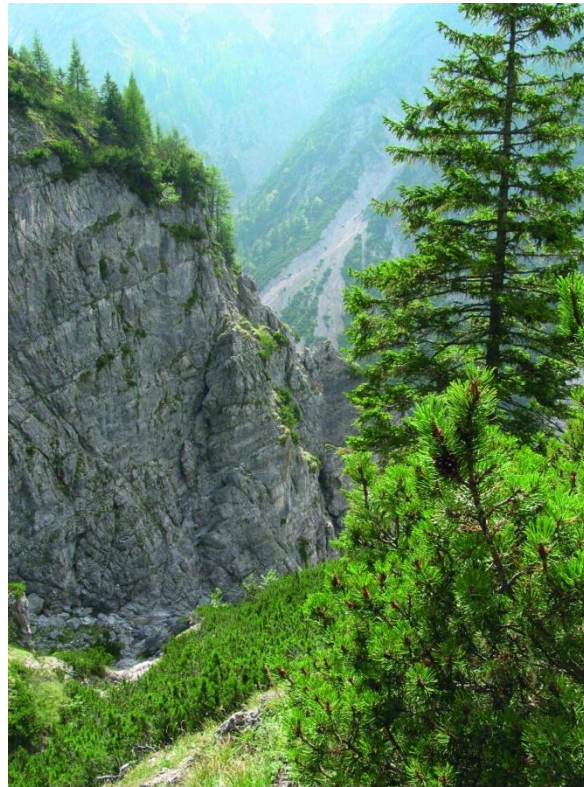
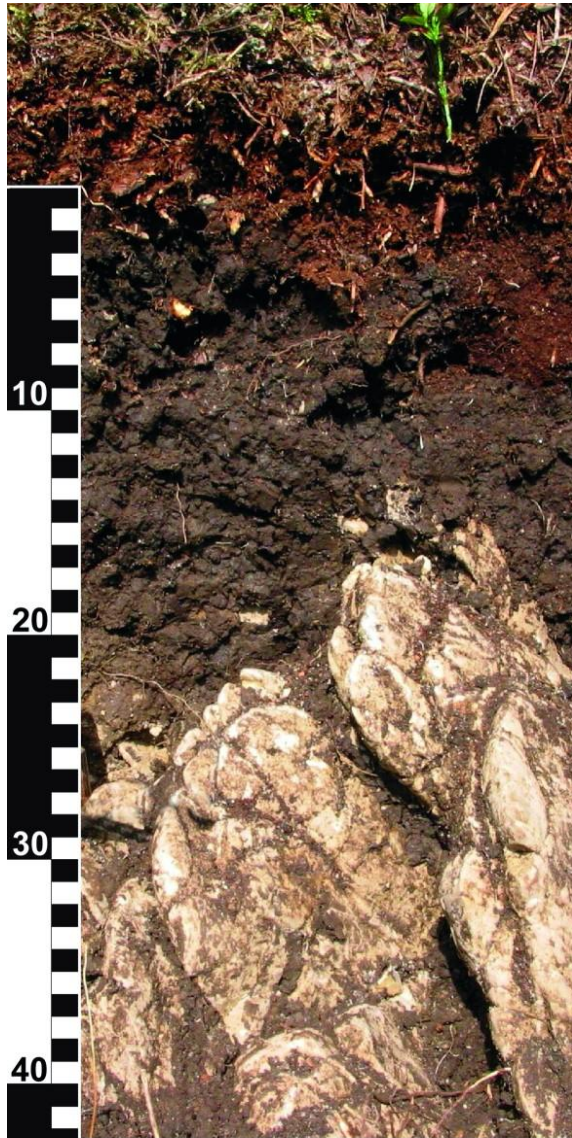
Fichten-Bestand mit Kiefer

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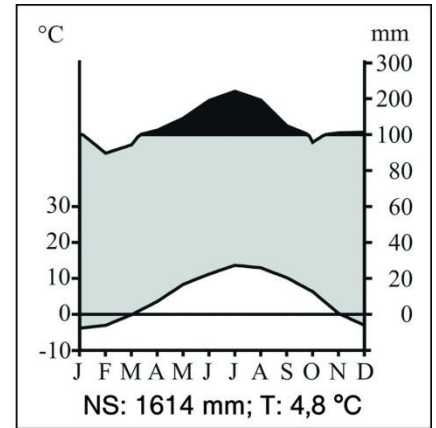
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Rendzic leptosol (carbonate)



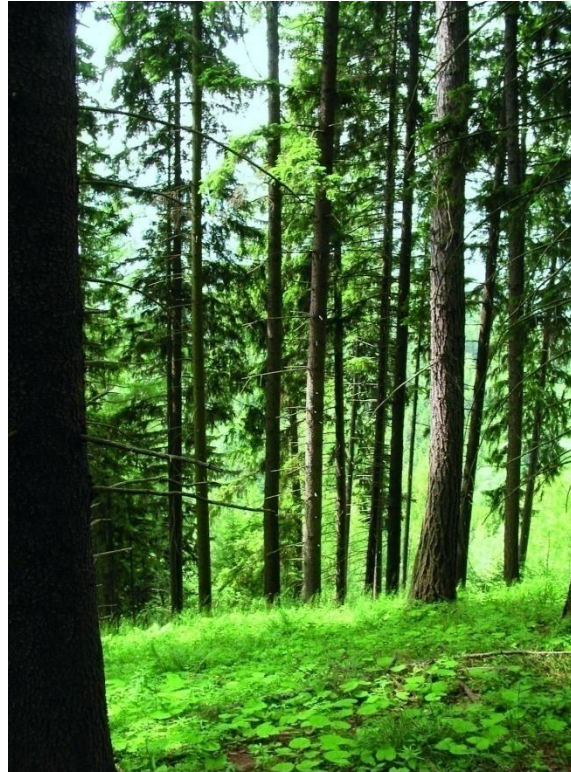
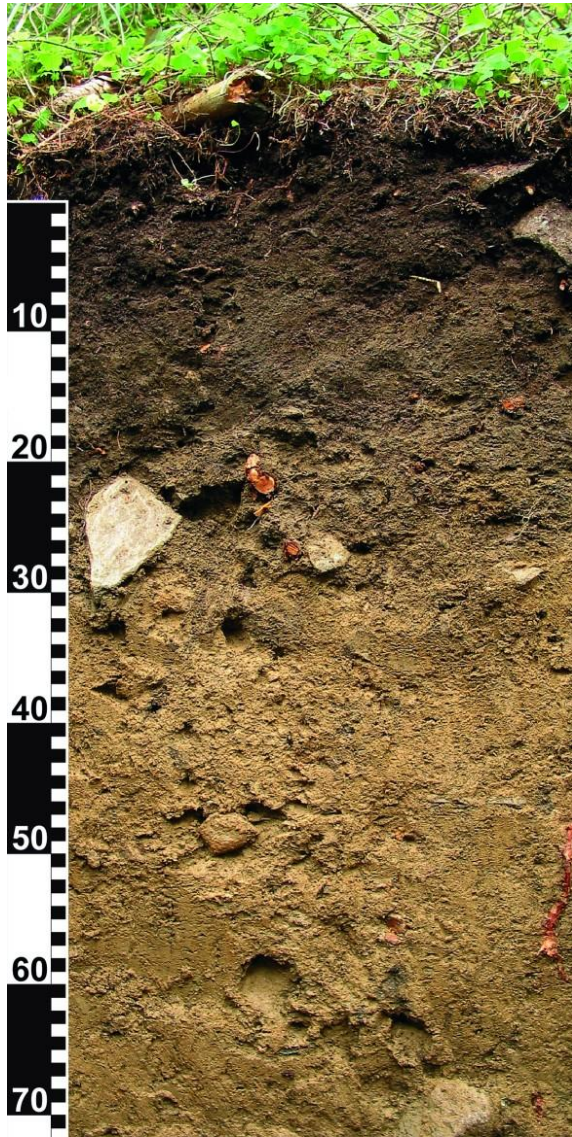
Latschen-Gebüsch mit Fichte und Lärche

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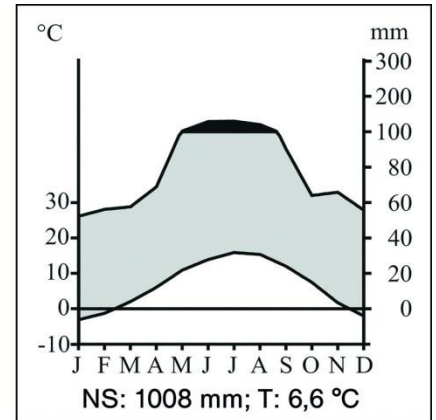


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Cambic umbrisol („brown earth“)



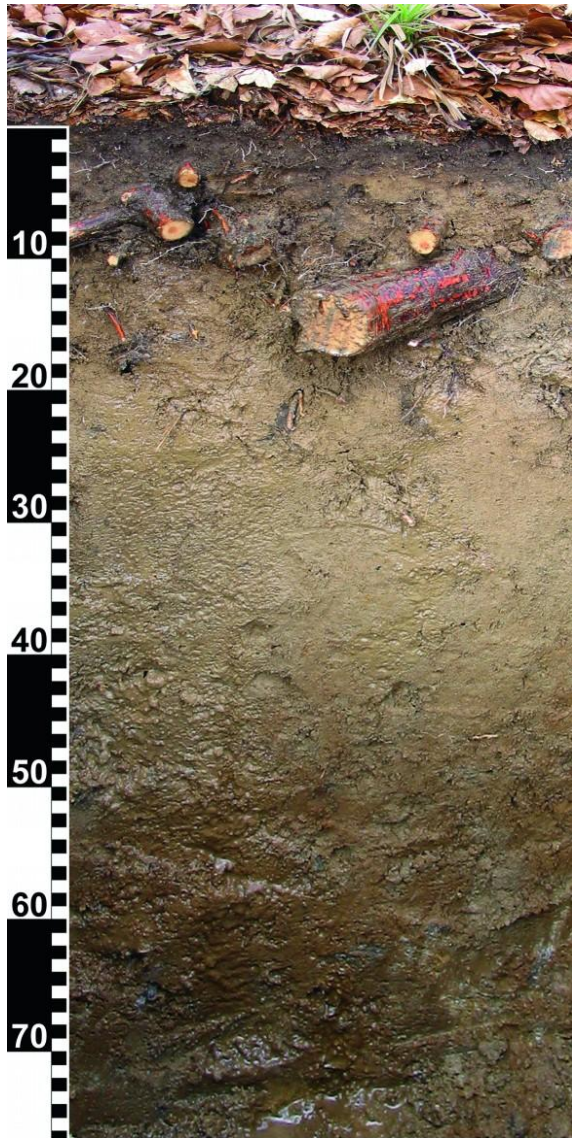
Fichten-Lärchen-Bestand



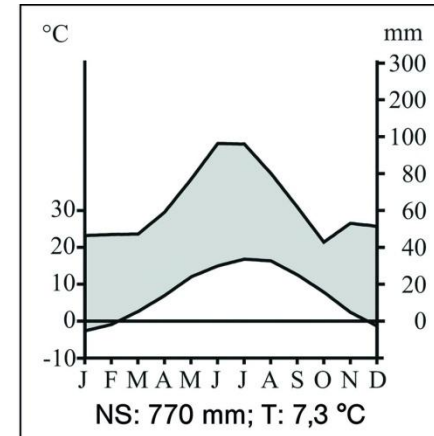
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Stagnic luvisol



Buchen-Kiefern-Bestand

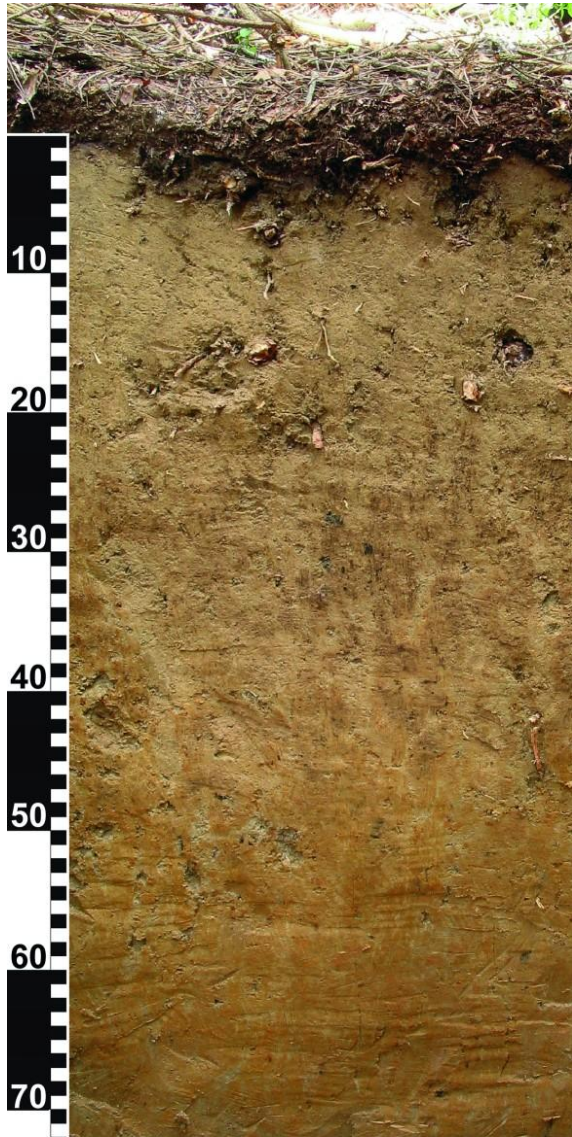


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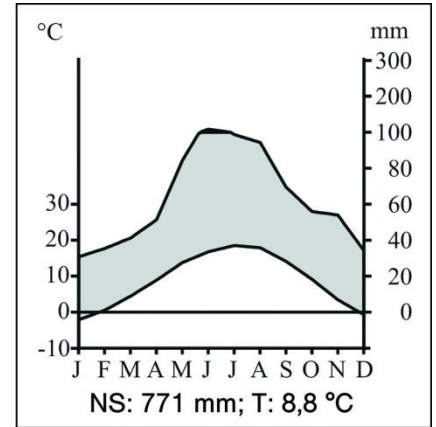
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Luvic planosol („pseudogley“)



Kiefern-Stangenholz mit Fichte und Birke

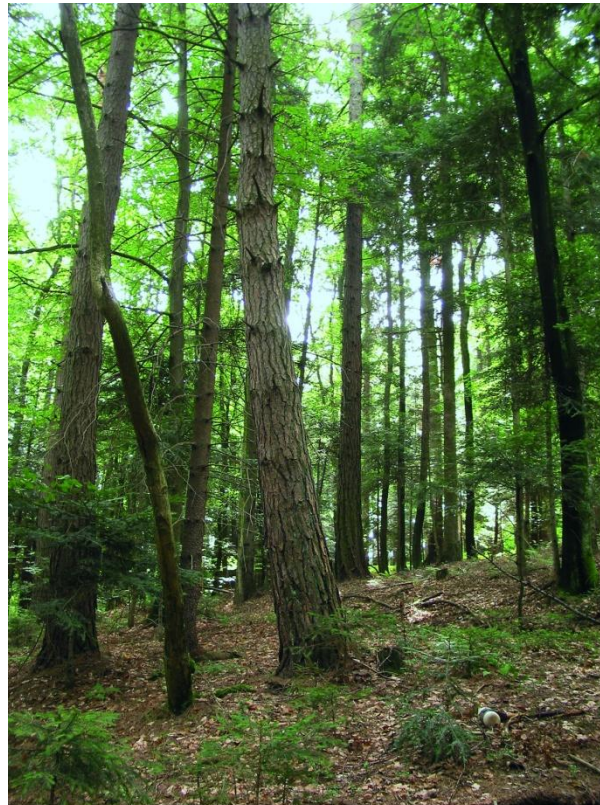
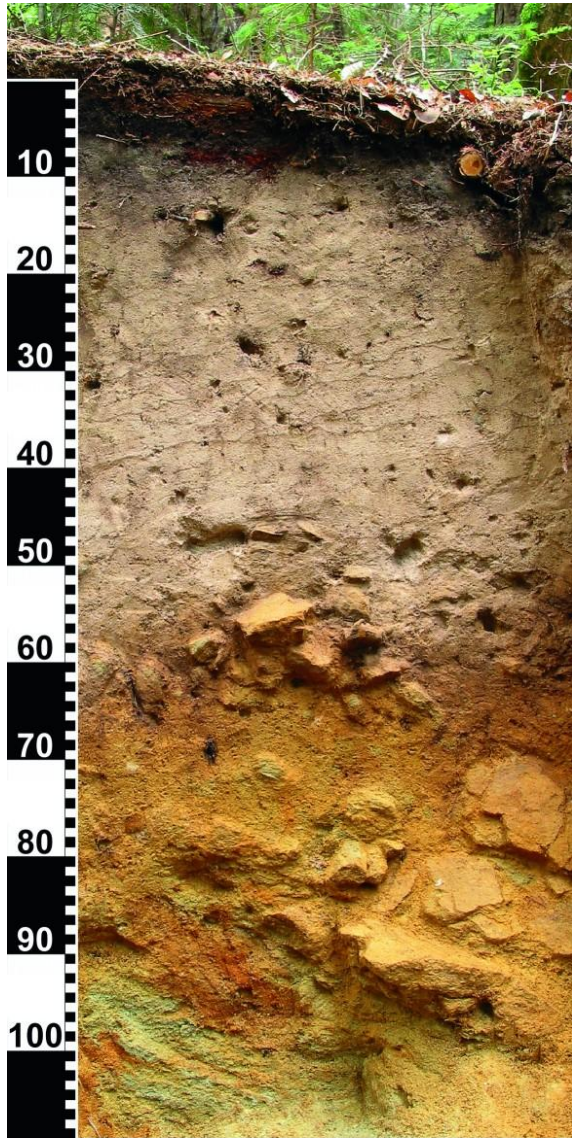


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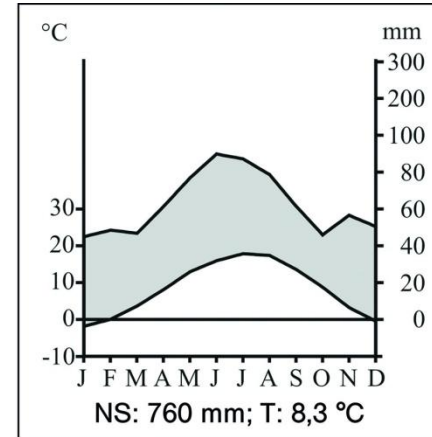
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Podzol



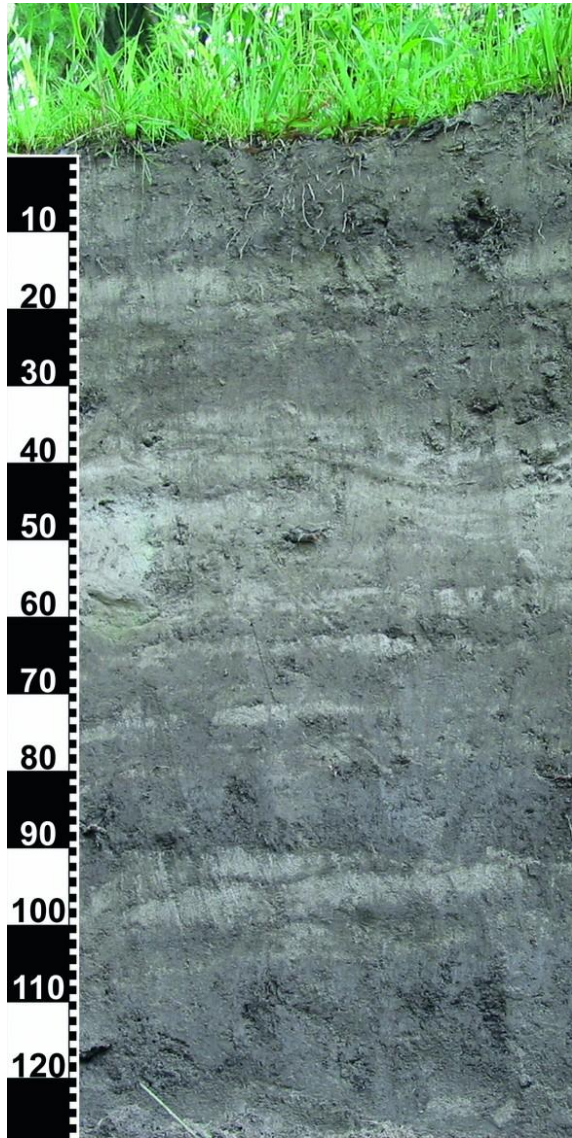
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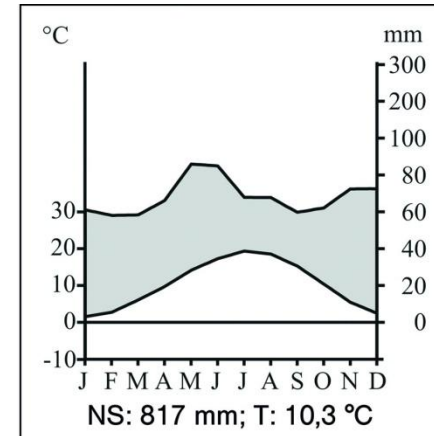
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Fluvisol (carbonate)



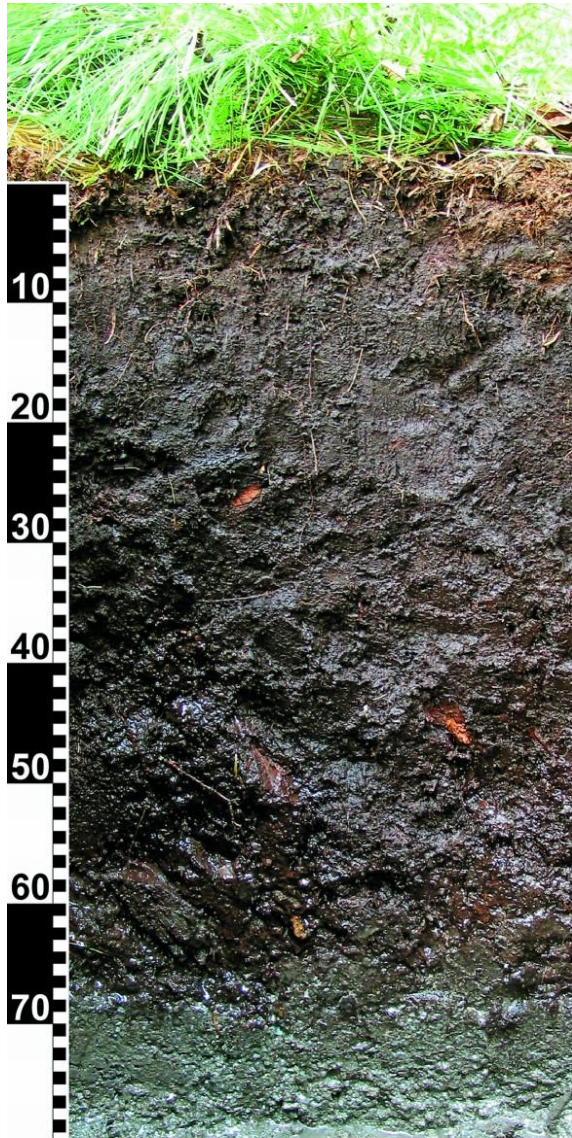
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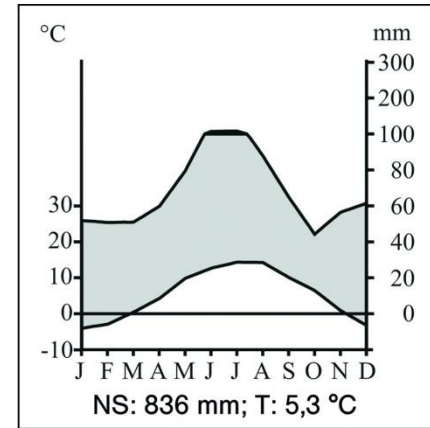


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Histosol



Schwarzerlen-Bestand



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