

16. Soils – soil structure and features

Pedosphere is the youngest part of physical sphere, individual part of a land mass. It was created by conversion of upper part of lithosphere (weathered rocks) by the influence of organisms, solar radiation, air and water.

Pedology = science studying soils and their structure.

Pedogeography = part of physical geography, science studying distribution of soils and interaction with other parts of physical sphere.

Soil = any 3D part of pedosphere from the top to parent rock. Many factors influence the soil:

- *rocks* – create the greatest part of a soil
- *climate* – temperature patterns => many soil-forming processes
- *georelief* – aspect, angle of inclination
- *flora and fauna* – revitalise the soil by humus (topsoil) formation
- *groundwater and flood waters* - seasonally
- *humans* – directly or indirectly

Soils are very important. They create the most basic production factor in *agriculture and forestry*. Soils also absorb and accumulate precipitation => they form groundwater.

Soil horizons = soil parts of different colours creating *soil profiles*.

Soil structure

A soil consists of *biotic (organisms) and abiotic (non-living) elements* = organic and anorganic parts. Anorganic elements consist of *gaseous, liquid and solid particles*.

Particles > 2 mm = *soil “skeleton”*

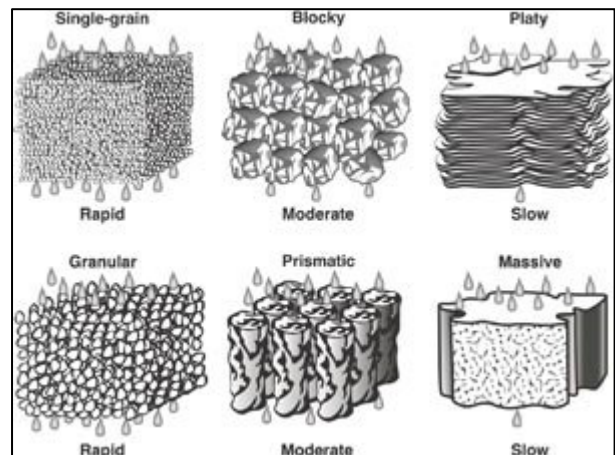
Figure 1: Soil structure (particles' appearance) vs. percolation

Particles < 2 mm = *silky soil* which is divided into:

- ❖ *clay (loam)* < 0.01 mm
- ❖ *silt* = 0.01 – 0.05 mm
- ❖ *sand* = 0.1 – 2 mm

Ratio between these particles determines the **Soil texture**:

- loamy soils (*light*) – smaller spaces between particles
- silty soils (*medium-heavy*) – risk of erosion
- sandy soils (*heavy*) – large spaces between particles, weak structure



Chemical structure

Soils contain many important nutrients for plants

- e.g. N, Ca, Mg, K, P, S

Soils can be:

- *acid* (pH < 7)
- *neutral* (pH = 7)
- *basic* (pH > 7)

Humus (topsoil) creates the uppermost part of soils => the most important part because it comprises mainly C and N => determines the soil's fertility (natural vs. cultural).

Keywords

pedology, pedogeography, conversion, parent rock, temperature patterns, soil-forming processes, inclination, humus/topsoil, production factor, organic/anorganic part of soil, soil fertility, nutrients, loamy/silty/sandy soils, soil particles, soil horizon, soil profile