Soils

Soils cover most land surfaces and are critical in supporting the biosphere and all of its exchanges.

Soil is a combination of mineral and organic matter, water and air and is considered that portion of the sediment that supports weathering.

Soil formation

The formation of soil is a function of five interacting variables – time, climate (most influential over time), biota, slope and parent material.

In its simplest form, the soil profile can be viewed as consisting of several main layers:

- The O horizon – largely organic material – very dark in color
- The A horizon – also organic but more mineral matter, dark color
- The E horizon – light colored, zone of leaching
- The B horizon – zone of accumulation
- The C horizon – parent material unaltered by the soil forming process
Soil Types

Soils cover most land surfaces and are critical in supporting the biosphere and all of its exchanges. Although there are thousands of different soil types, we will consider four general types here.

**Pedalfers** – are characterized by an accumulation of iron oxides and aluminum rich clays in the B horizon. In mid-latitude regions where the rainfall average is above 25 inches/year, the more soluble components of the soil are leached out of the soil leaving the more insoluble materials (iron and aluminum) behind and producing a brown to red color. These soils are best developed under forests where the acid content is high which encourages leaching. (Ped - al - fe - rs)

Soil Types

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**Pedocals** are characterized by an accumulation of calcium carbonate (CaCO\(_3\)). Found in drier western climates where chemical processes are less intense (due to lower precipitation rates) and carbonates build up in the B horizon.
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**Laterites** form in warm and wet environments (tropics) and are characterized by extreme leaching and chemical weathering.

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**Tundra soils** form in arctic and subarctic regions and support only such vegetation as mosses, liches, and shrubs making for bleak forestless landscapes.
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Pedocals

Soil Profile

The O horizon

The A horizon

The B horizon

The E horizon

The C horizon

Bedrock
Effects of slope on soil profiles

Figure 5-14 The effect of landscape on soil development. Soils are generally thin or nonexistent on steep slopes, because the water required for chemical weathering runs off such slopes and because any soil that does accumulate would wash away downhill. Soils tend to be thickest in lowland valleys, where water and loose material transported from upland come to rest.