Soil development

1. Origins of soil science
2. General characteristics of soils
3. Jenny’s state factor equation \( s = f(C_l, o, r, p, t) \)
4. Soil description and classification

Figures: 3.10 3.13 Allaby; 3.14 Allaby; 4.14 Schlesinger

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**The 11 soil orders of the US soil taxonomy**

**Alfisols** Soils of climates with 510–1270 mm annual rainfall; most develop under forests; clay accumulates in the B horizon.

**Andisols** Volcanic soils, deep and light in texture; contain iron and aluminium compounds.

**Aridisols** Desert soils with accumulations of lime or gypsum; often with salt layers; little organic matter.

**Entisols** Little or no horizon development; often found in recent flood plains, under recent volcanic ash, as wind-blown sand.

**Histosols** Organic soils; found in bogs and swamps.

**Inceptisols** Young soils; horizons starting to develop; often wet conditions.

**Mollisols** Very dark soils; upper layers rich in organic matter; form mainly under grassland.

**Oxisols** Deeply weathered soils; acid; low fertility; contain clays of iron and aluminium oxides.

**Spodosols** Sandy soils found in forests, mainly coniferous; organic matter, iron and aluminium oxides accumulated in B horizon; strongly acid.

**Ultisols** Deeply weathered tropical and subtropical soils; strongly acid; clay accumulated in B horizon.

**Vertisols** Clay soils that swell when wet; develop in climates with pronounced wet and dry seasons; deep cracks appear when dry.
Figure 3.14  World distribution of soil orders

Figure 4.14  Annual sediment flux from major drainage basins to the world’s oceans. Data are millions of tons ($10^{12}$ g) per year, and arrows are drawn proportional to the flux. From Milliman and Meade (1983).