# SOIL FORMING FACTORS

1 = parent material

* the material that decomposes to form the soil
* may be residual or deposited
* may be mineral or organic
* influences texture, structure, mineralogy, pH
* clay formation is especially important
* clay particles are tiny (<2um)
* huge surface area per unit mass (1000x more than sand)
* typically platy in structure = vast additional internal surface area (800 m2/gm) (a gram of clay would be about a teaspoon!)
* typically carry vast negative charge
* control Cation Exchange Capacity (CEC)
* also influence available soil water
* parent materials weather to form layers (horizons) of soil
* A horizon is typically the most biologically active – more air, water, OM from surface

2 = climate

* temperature and precipitation
* both affect the rate of physical and chemical degradation of rock and other substrates
* both influence activity of organisms – both macro and micro
* precipitation also contributes to soil moisture
* precipitation influences erosion and leaching
* macroclimate patterns determine biomes
* microclimate is important at small scales

3 = living organisms

* both macro and micro
* plants, animals, bacteria, “protists”, fungi = all important
* micro-organisms very important – numerous, contribute to nutrient cycling, N fixation, mycorrhizae
* human impacts on soil are typically abrupt and negative

4 = topography

affects movement of water – erosion, leaching, soil moisture, open water

* affects solar incidence – soil temperature, soil moisture
* large topographic features affect precipitation patterns (orographic lifting)
* micro-topography also important in some areas and at small scales

5 = time

* length of time these factors have been operating and interacting influences soil development
* the same PM will develop different soils over time – contributes to primary succession

**All soil-forming factors interact and are interdependent and contribute to soil properties that affect water and nutrient availability for plant growth**