READING GUIDE*

Soil as a Natural Body III: Climate

see Buol et al. (2011), Chapter 3, p. 102-113

OBJECTIVE: *To understand climate as a factor of soil formation and to recognize the influence of various macroclimatic and microclimatic factors on soil development, soil properties, and soil management.*

1. What macroclimatic attributes have an influence on soil forming processes and resulting soil properties? What microclimatic attributes have an influence on soil forming processes and resulting soil properties?
2. What soil forming processes are driven by water movement and storage within the soil?
3. What factors influence whether rainfall enters the soil or runs off? **Explain the influence of each of these factors.**
4. What general relationships between soil properties are associated with an increase in annual precipitation? **Explain why these trends occur.**
5. Why are evaporation and transpiration also important processes? **How can evapotranspiration influence soil forming processes and resulting soil properties?**
6. What materials can be added to the soil via precipitation? Provide several examples.
7. Explain how temperature influences each of the following: (i) reactions within the soil, (ii) soil moisture availability, (iii) vegetation type and quantity, (iv) soil organic matter content.
8. What is Van't Hoff's temperature rule?
9. What is the predominant source of heat energy in the soil? Explain how each of the following influences the amount of heat energy received by the soil: (i) soil color, (ii) slope aspect, (iii) vegetative cover, (iv) **mulch or crop residues**.
10. Why are diurnal temperature changes absent below a depth of approximately 50 cm?
11. **Why are redder soil colors associated with higher soil temperatures? Why are lower nitrogen and organic matter contents associated with higher soil temperatures?**
12. Explain how topography, soil color, soil moisture content, and vegetation influence microclimate. How do soil properties respond to these differences in microclimate?
13. What is a *climosequence*? **How can climosequences be used to study soil genesis?**

SYNTHESIS:

14. How does climate influence or interact with other soil forming factors (organisms, relief)? Explain your answer.
15. How does climate (macro- or micro-) influence land use management decisions? Provide several specific examples.

* *Questions in plain type represent basic facts and concepts. Questions in **bold** type are those that are answered in the text but require more careful consideration. The Synthesis questions at the end help you apply the facts and concepts to a relevant issue.*