

READING GUIDE*

Processes of Soil Formation I: The Soil-Forming Environment

see Buol et al. (2011), Chapter 5, p. 163-169

OBJECTIVE: To understand the general nature of the biogeochemical reactions that occur in soil environments, particularly the various matter and energy exchanges, and recognize the factors that influence these processes.

1. What is *static pedology*? How is this approach implemented in the study of soil development? What is *dynamic pedology*? How is this approach implemented in the study of soil development? How do these approaches differ? What are the advantages and disadvantages of each?
2. Soil properties are the products of the combination of soil forming reactions that occur in the soil. Why must currently observed soil properties be compatible with the existing environment within the soil?
3. What is the source of the energy that drives soil-forming processes? What factors regulate this input of energy? What factors influence soil temperature, particularly the additions and losses of heat energy?
4. **Why are daily and seasonal temperature fluctuations most pronounced at the soil surface and least pronounced at deeper depths?**
5. What are the different ways in which water enters the soil? What are the different ways water is lost from the soil? **What factors regulate these additions and losses?**
6. How does water movement through the soil change as water entry into the soil ceases? Be specific. What other processes can occur as this water moves through the soil?
7. Under what conditions will deeper leaching occur within the soil?
8. Under what conditions will lateral flow occur within the soil?
9. What is *biocycling*? What effect does biocycling have on the distribution of C in the soil? **How does this change under different vegetation types (e.g., trees vs. grasses)? Explain your answer.** What effect does biocycling have on the distribution of plant nutrient elements?
10. What is the difference between leaching and eluviation?
11. What soil constituents are most commonly translocated within the soil profile? Which are relatively immobile?
12. How does rainfall lead to the lateral redistribution of soil materials?
13. What is *cumulization*? Where and how does it occur?
14. What is *throughflow* or *interflow*? How does throughflow contribute to the redistribution of soil material?

SYNTHESIS:

15. Consider the various processes of soil formation that may occur in soils (Table 3.1). Which are most important in West Virginia soils? In what environments across the state are each of these processes most likely to occur?

* 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.