

## **Biogeochemical kinetics under redox dynamic conditions**

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Redox dynamic conditions are the norm rather than the exception in soils and sediments. These conditions arise from external agents (e.g., regional climate forcings) as well as internal process interactions (e.g., microbial syntrophy). Here, I will present a number of case studies that illustrate the impact of redox fluctuations on biogeochemical rates and fluxes. The first set of examples will focus on the effects of variable bottom water oxygenation on benthic exchange fluxes of nitrite, a key intermediate in the nitrogen cycle, and those of dissolved phosphate and silica, two essential nutrients in aquatic ecosystems. Next, I will compare organic carbon turnover rates in soil column experiments where the water table is either forced to oscillate over a prescribed depth interval, or held at a constant depth. Finally, I will explore the implications of the experimental results for the representation of respiratory processes in biogeochemical models of soils and sediments.