

## Seminar: The Biogeochemistry of Drought

### Presenter:

Josh Schimel, Professor, Department of Ecology, Evolution, and Marine Biology, University of California, Santa Barbara

### Time of Event:

Wednesday, April 1, 2015 - 12:30

### Location:

National Socio-Environmental Synthesis Center (SESYNC)  
1 Park Place, Suite 300  
Annapolis, MD 21401

### Seminar abstract:

Soil microbiologists have long focused on carbon and nitrogen as the essential resources regulating microbial function in soil; ultimately, water is the critical resource. It is essential for cellular function, is the essential solvent, and is the primary transport medium for solutes and microbial predators. Despite the complex ways in which water affects soil microbes, we have generally collapsed them to the simple pattern: microbial activity increases with moisture to an optimum, beyond which soils become anaerobic and activity declines. Physiological theory has also argued that as soils dry, microorganisms must accumulate solutes to remain hydrated—when soils are rewet, these osmolytes would have to be released instantly—either through controlled physiological mechanisms or when cells rupture as water floods into them; either mechanism could explain the respiration pulse observed on rewetting (the “Birch Effect”). Yet, “bacteria don’t read textbooks”: processes occurring when soils are dry and are then rewet can be surprising and counterintuitive. Microbial biomass can increase under drought, microbes may not accumulate osmolytes, and rewetting may do more to fuel microbial activity than to stress cells. This talk will explore work we have been doing to develop a new perspective on how soil moisture regulates microbes and soil biogeochemistry under drought and rewetting and how they regulate the fate of carbon in soil.

*This seminar is based on a presentation given at the Soil Science Society of America conference in 2014.*

### Speaker bio:

Josh Schimel is a Professor of Soil and Ecosystem Ecology at the University of California, Santa Barbara. He studies how bacteria and fungi in the soil control how whole ecosystems work, including plant growth, carbon storage, and greenhouse gas emissions. A major focus of his work is on how environmental stresses, particularly drought and freezing, affect soil systems. Most of his research focuses on Arctic ecosystems in Alaska and Greenland and on the dry grasslands and shrublands of California. Dr. Schimel has been involved in planning major National Science Foundation initiatives in Arctic science and has served as an editor for several scientific journals, including as Chief Editor for *Soil Biology & Biochemistry*. At UCSB, he serves as Chair of the Environmental Studies Program,

drawing together scholars from fields as disparate as Ecology and English to address the question: How do we understand and perceive environmental change and challenges? He teaches classes on ecosystem science, ecology, and science writing. Science communication has become a major interest; he is the author of *Writing Science: how to write papers that get cited and proposals that get funded*, which emphasizes how to highlight the story in the science and how to express it clearly.

**Event type:**

Seminar

**Event Attendance:**

Open to the Public

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