Subsurface Biosphere Initiative
Research and education focused on life below Earth's surface.

Are There Predictable Soil Microbial Community Responses to Climate Change?

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Microbial communities consisting of many thousands of diverse species are typically represented by a single “black box” in current models that forecast climate change impacts on ecosystems. Accurately predicting the response of soil microbial communities to climate change is crucial because soil microorganisms are dominant mediators of carbon and nutrient transformations that ultimately shape biological productivity and environmental chemistry across the globe. Despite this global importance, the factors that determine the distribution of microbial species in soil are unclear. Prediction of bacterial and archaeal responses to climate change is crippled by the sobering reality that nearly all microbial diversity remains uncultivated, meaning the fundamental physiological and ecological roles of most soil microbial species are not defined. A critical first step towards predicting the impacts of climate change on terrestrial ecosystems involves determining the fundamental controllers of soil microbial community composition and structure, and subsequently evaluating climate change scenarios that alter these controllers.

In this presentation I will discuss how despite this enormous phylogenetic and physiological complexity, soil bacteria and archaea community structure could be predicted from a limited number of environmental factors. I will also present data from greenhouse experiments where we test predictions about the impact of changing precipitation patterns on soil microbial community structure.

Eoin Brodie, Ph.D., is a research scientist in the Earth Sciences Division, Lawrence Berkeley National Lab. As a microbial ecologist , his major research interests lie in determining and better understanding the factors that structure and control microbial communities and the functional implications of alterations in community composition.

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