



## **Soil biotic interactions and climate change: consequences for carbon cycle feedbacks**

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There is currently much interest in understanding the biological mechanisms that regulate carbon exchanges between land and atmosphere, and how these exchanges respond to climate change. Climate change impacts on biogeochemical cycles via a variety of mechanisms; but there is now mounting evidence that biotic interactions between plants and diverse soil communities play a major role in determining carbon cycle responses to climate change across a range of spatial and temporal scales. Over seasonal and annual timescales, climate change impacts the growth and physiology of plants and their roots, with knock on effects for the activity of soil biota and carbon transformations; in the longer term, over tens to hundreds of years, climate change can cause shifts in community composition, and species range expansions and contractions, with cascading impacts on belowground communities and carbon cycling in soil. These responses have local and, potentially, global scale implications for carbon cycle feedbacks. In this talk, I will draw on recent research to illustrate this hierarchy of plant-soil feedback responses to climate change, the mechanisms involved, and consequences for the carbon cycle at local and global scales. I will also discuss how such knowledge on plant-soil interactions might be harnessed to inform management strategies for soil carbon sequestration and mitigation of climate change, and identify some major research challenges for the future.