**The Importance of Rust in Arctic Soils**

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Abstract:

Arctic and boreal regions are warming twice as fast as the rest of the planet, and rising ground temperatures are thawing permafrost, accelerating decomposition of soil organic matter, and releasing greenhouse gases to the atmosphere. Future carbon storage in these ecosystems depends on the balance between decomposition of soil organic matter and plant growth, both of which are influenced by geochemical processes in the soil. For example, iron redox cycling influences terrestrial carbon storage by facilitating anaerobic decomposition of organic matter, physically sequestering organic matter and preventing decomposition, and/or regulating nutrient availability to plants and microorganisms. Therefore, it is critical to understand iron biogeochemistry in northern ecosystems in order to better predict ecosystem response to climate change. Here, we explore how iron cycling varies across redox gradients and influences carbon and nutrient dynamics in arctic and boreal soils.