Yun Zhao Master of Engineering

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Dissertation topic: From the fire to the soil: Pyrogenic organic matter sequestration in forest soils affected by climate change

Brief description of the dissertation: Forest wildfires generate chemically altered biomass residues known as pyrogenic organic matter (pyOM), which has long been considered highly resistant and an important contributor to soil organic carbon (SOC) sequestration. However, a portion of pyOM can be utilized by soil biota and may therefore be fragmented, digested, and released as carbon dioxide into the atmosphere or further stabilized within the soil matrix. In addition, post-fire soil succession and climate change may significantly influence these biotic processes. In this study, we will examine successional changes in soil properties along a 100-year post-fire chronosequence in pine forests across Mediterranean, temperate, and boreal regions, as well as along soil profiles. Our focus will be on assessing how warming affect the transformation and stabilization of pyOM by soil faunal and microbial communities. Combined with controlled incubation experiments, the potential fate of pyOM under global change and the mechanisms underlying its responses will be further explored.

Date of commencement of studies: 2024

Profile photo: