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Summary

Fire has modified over ~40% of the Earth's land surface and affects ca. 4-10% of Australian land area annually. Globally, wildfire frequency is expected to increase under a warming climate. Fire can have significant impact on soil carbon (C) stock, nature and dynamics, but the feedback of fire-driven soil carbon dynamics to climate/ global warming is largely unknown. This project aims to reveal the impacts of long-term fires on soil carbon stocks and global response patterns of carbon pools to warming across different biomes and associated chemical, biological and molecular mechanisms. More specifically, this project will focus on the temperature sensitivity of soil C and fire impacts

Some laboratory and field-based experiments will be conducted to explain using generalised or linear mixed effect model to investigate how fire frequency regimes and warming impact in-situ soil, litter and root respirations and their seasonality and recovery after fire. The structure equation model will be used to partition the relative importance of different pathways (Organic C substrate availability and quality; organic matter stoichiometry; microbial community composition and enzymatic activity; and physiochemical properties) and environmental factors in determining soil C response to fire and warming impacts at the ecosystem level.

Research Expertise

- Dissolved organic carbon analysis
- Origin
- AMOS
- SPSS