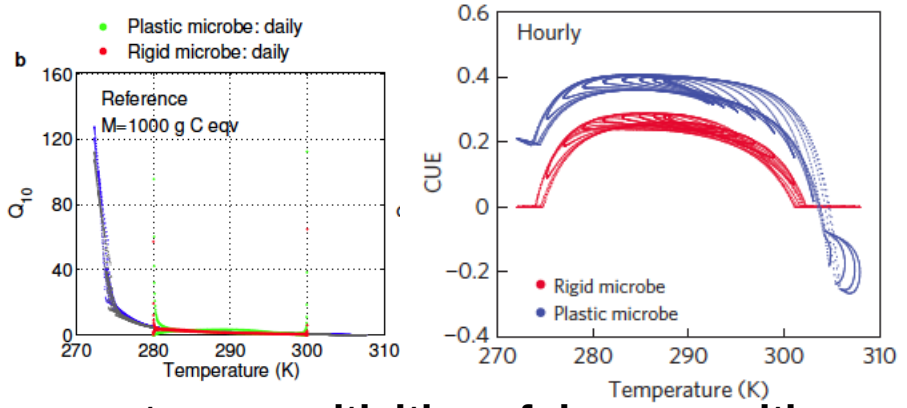
Weaker Soil Carbon-Climate Feedbacks Resulting from Microbial and Abiotic Interactions

Objectives

- Improve predictions of soil carbon-climate feedbacks
- Develop, test, and apply a mechanistic model of decomposition to predict centennial-scale interactions between terrestrial carbon cycling and climate



Temperature sensitivities of decomposition (Q_{10}) and Carbon Use Efficiency (CUE)

Research

We developed a thermodynamically-based microbe-explicit soil carbon decomposition model and analyzed the:

- Temperature sensitivity of bulk soil carbon decomposition and microbial carbon use efficiency (CUE)
- Standard methods to characterize substrate 'recalcitrance'

Impacts

- Our study challenges the concepts of static Q_{10} and CUE, and the 'labile vs. recalcitrant' substrate characterization used in most soil biogeochemical models
- We predict more variable but weaker soil carbon-climate feedbacks than current approaches
- Model will be integrated in ACME-CLM

Reference: Tang, J. Y., and W. J. Riley (2015), Weaker soil carbon–climate feedbacks resulting from microbial and abiotic interactions, *Nature Clim. Change*, 5(1):56–60, doi:10.1038/nclimate2438.