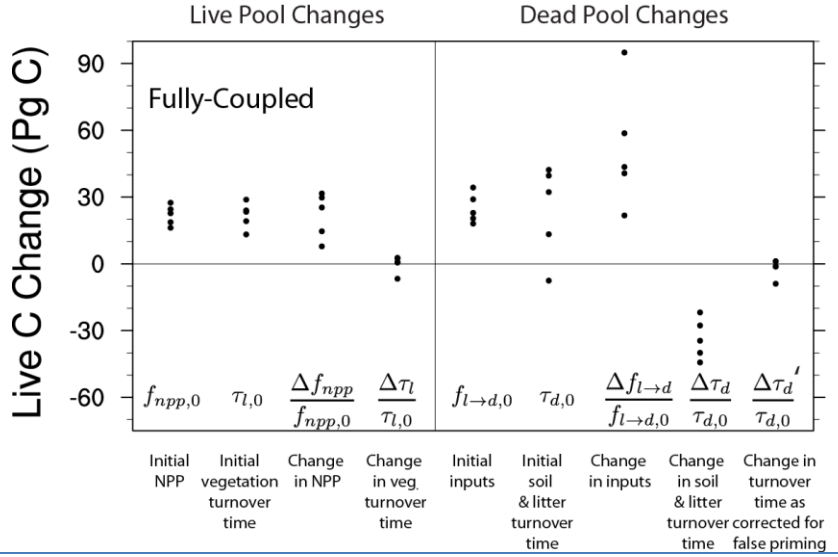
What processes most strongly govern terrestrial carbon cycle feedbacks in Earth system models?

Objective:

Better understand what processes control terrestrial carbon cycle feedbacks by separating carbon changes driven by changing inputs from those driven by changing outputs.



Research:

We developed a theoretical framework for separating inputs and outputs, and applied it to CMIP5 ESMs. We identified key areas where these terms interact, in particular identifying a process that we call “false priming” that is an apparent interaction between productivity and soil decomposition, and quantified processes that most strongly govern uncertainty in carbon cycle feedbacks.

Impact:

This research identified the key carbon cycle processes governing model uncertainty and the processes on which models agree. This allows us to focus efforts on reducing uncertainty in processes responsible for the largest spread, as well as to assess whether model agreement is due to well founded process representations or due to a shared lack of realism.

Reference: C. D. Koven, J. Q. Chambers, K. Georgiou, R. Knox, R. I. Negron-Juarez, W. J. Riley, V. Arora, V. Brovkin, P. Friedlingstein, and C. D. Jones (2015), Controls on terrestrial carbon feedbacks by productivity versus turnover in the CMIP5 Earth System Models, *Biogeosci.*, 12(17):5211–5228, doi:10.5194/bg-12-5211-2015.