PROJECT INFORMATION

Project title:	***A simple scheme to represent the effects of litter stoichiometry and soil mineral N availability on microbial decomposition process***
Project ID:	136
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PROJECT DESCRIPTION

Microbial decomposition of plant litter is closely related to the formation of soil organic matter and the land-atmosphere carbon balance (Bonan et al., 2013; Cotrufo et a., 2015), thus needs to be well represented in land surface models. Recent studies have greatly advanced our understanding on the effects of litter stoichiometry and soil mineral N availability on microbial decomposition process. For example, study of Manzoni et al. (2017) indicated that the optimal carbon use efficiency (CUE), i.e. the efficiency with which C from the substrate is incorporated into the microbial biomass, trends to decrease with increasing substrate C-to-nutrient (e.g. N) ratio, and increase with soil nutrient availability. Many studies also revealed the limits of low soil nutrient concentration on litter decomposition rate (Guenet et al., 2010; Averill and Waring, 2018). However, these new understandings have rarely been implemented into land surface models. Moreover, although some more complex and process-based litter decomposition models have already been developed (Allison, 2012; Campbell et al., 2016), in our project, we aim to developed a simple and universal litter decay model to represent the effects of litter stoichiometry and soil mineral N availability on microbial CUE, as well as the constraints of soil mineral N availability on litter decomposition rate. Then we will implement the new litter decay model into the land surface model (e.g. ORCHIDEE) to do some long-term and large-scale simulation and validation. The ICP Forests dataset provides long-term and

widespread observations on litter biomass, litter chemical properties, and also the SOC and meteorological data which will be used for the validation of our model.

References

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