Development of Microbial-ENzyme-mediated Decomposition Model Parameters through Steady-state and Dynamic Analyses

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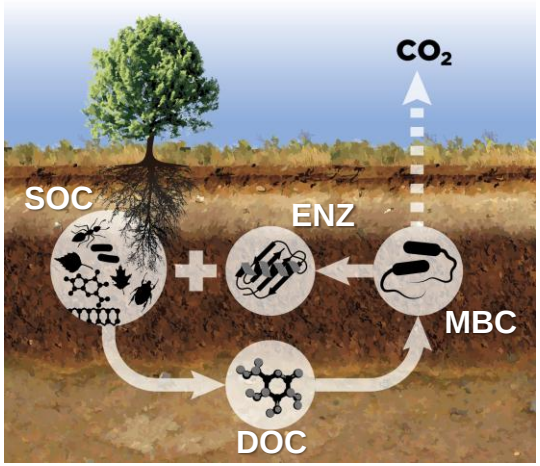


Objective

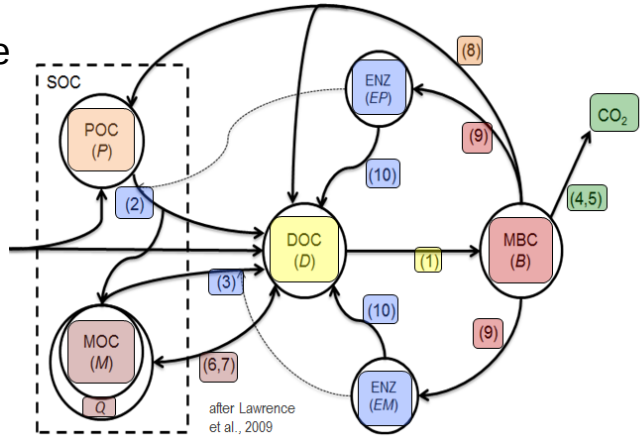
- Develop a microbial-enzyme-mediated soil organic carbon (SOC) decomposition model and estimate parameters through steady-state and dynamic analyses.

New Science

- We developed a Microbial-ENzyme-mediated Decomposition (MEND) model that describes the dynamics of physically-defined pools of SOC.
- Ranges/distributions of parameters were determined by steady-state and dynamic analyses with SOC data from the literature.
- The most important parameters are maintenance factor of microbial biomass, turnover and synthesis rates of enzymes, and carbon use efficiency (CUE).

Significance

- The parameter values/distributions and the multi-objective parameter sensitivity analysis (MOPSA) can parameterize SOC decomposition models incorporating microbial-enzyme kinetics.



SOC is particulate organic carbon (**POC**)-Lignin and **POC**-Cellulose and **MOC**: mineral-associated organic carbon; **Q**: adsorbed **DOC** (dissolved organic carbon); **MBC**: microbial biomass carbon; **EP**, and **EM**: enzyme for POC and MOC, respectively.