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Supplement of

Representing life in the Earth system with soil microbial functional traits in the MIMICS model

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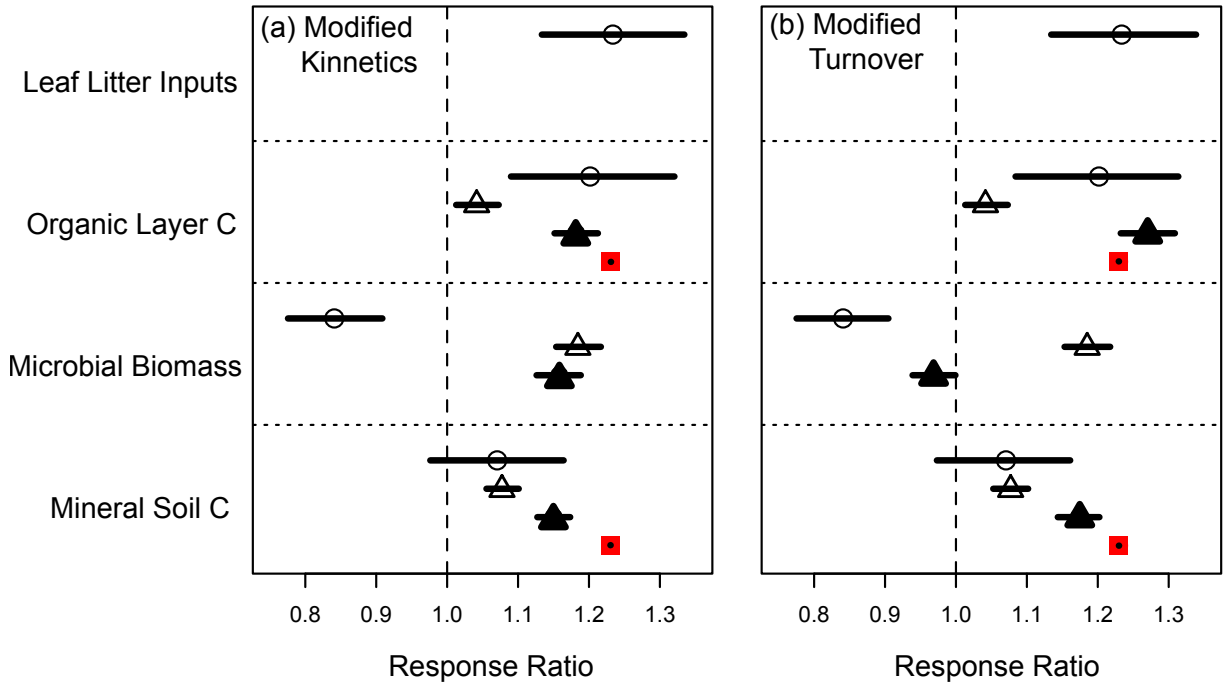
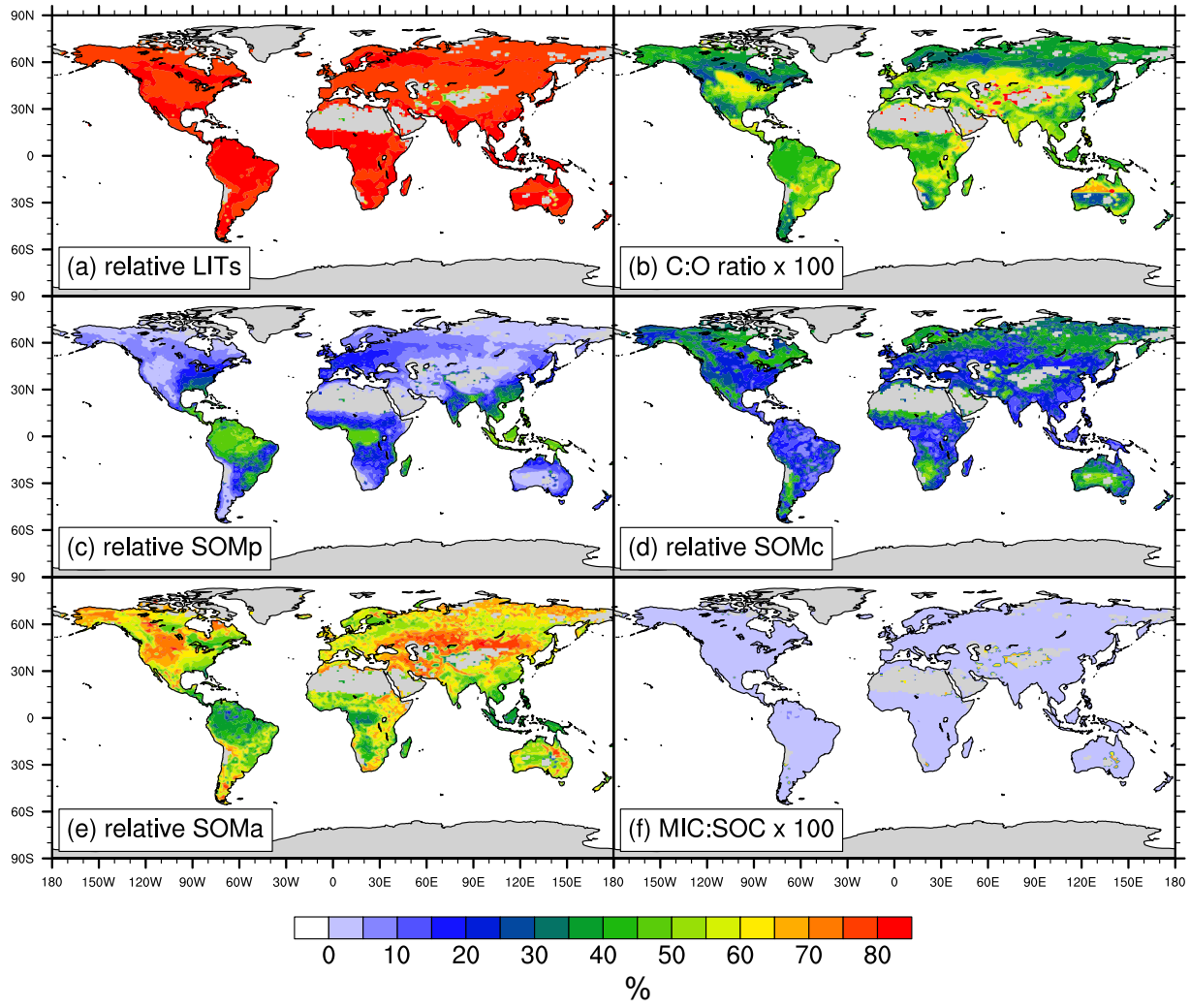
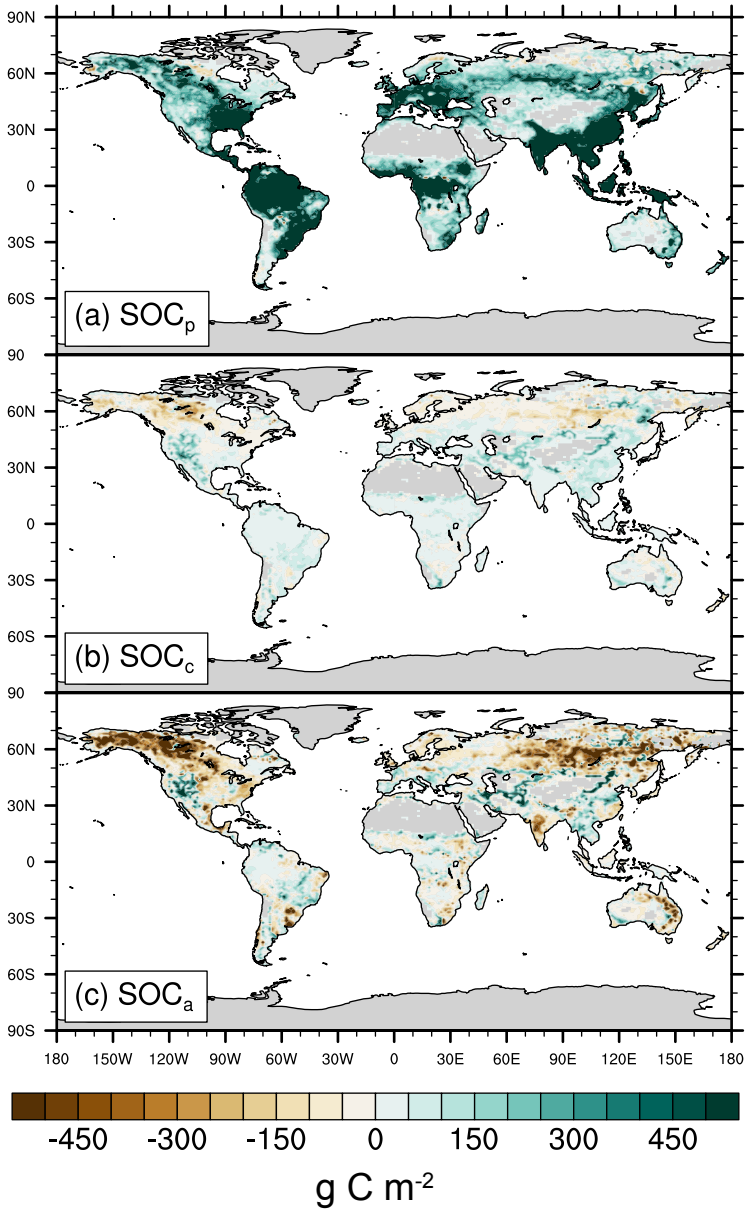


Supplementary Figure 1. Observed and modeled C response ratio (treatment / control) to experimental N enrichment with modifications to (a) V_{max} and (b) τ (described in Appendix A2). As in Fig. 3, open circles show observational mean and 95% confidence interval reported by (Liu & Greaver, 2010). Modeled results show the steady-state changes in soil C projected by MIMICS (open triangles), modified MIMICS (filled triangles) and DAYCENT (filled squares).



Supplementary Figure 2. Spatial distribution of relative (a) litter, (b,f) microbial biomass, and (c-e) SOM pools sizes from steady-state MIMICS simulations. Results calculated by dividing individual pool sizes by the total pool size in each grid cell and multiplying by 100 (e.g., in Fig S2a structural litter / total litter * 100). The C:O ratio (b) represents the copiotrophic pool size divided by the oligotrophic pool size (MIC_r / MIC_K * 100).



Supplementary Figure 3. Change in individual SOC pools simulated by MIMICS by the end of the 21st century following increases in NPP from elevated [CO_2]. Most of the soil C gains in MIMICS (Figs. 5 & 6) are driven by C accumulation in the (a) physically protected pool (53 Pg globally). Changes in the (b) chemically protected pool are much smaller (accumulating 2.3 Pg C globally), and show more spatial heterogeneity. Finally, increasing NPP builds more microbial biomass, which accelerates the decomposition of (c) microbial available SOC, especially at high latitudes, producing a net C loss from SOM_a pools to the atmosphere (totaling 5 Pg C globally).