

ISI-MIPにおける複数RCP, GCM, 生態系モデルによる陸域生態系炭素収支の将来予測不確か性評価 The assessments of projection uncertainties of global C budget in ISI-MIP study

仁科 一哉^{1*}; 伊藤 昭彦¹; 加藤 悦史¹; 横島 徳太¹; ISI-MIP team²
NISHINA, Kazuya^{1*}; ITO, Akihiko¹; KATO, Etsushi¹; YOKOHATA, Tokuta¹; ISI-MIP, Team²

¹ 国立環境研究所, ²ISI-MIP team

¹National Institute for Environmental Studies, ²ISI-MIP team

Global net primary production (NPP), vegetation biomass carbon (VegC), and soil organic carbon (SOC) changes estimated by six global vegetation models (GVMs) obtained from an Inter-Sectoral Impact Model Intercomparison Project study were examined. Simulation results were obtained using five global climate models (GCMs) forced with four Representative Concentration Pathway (RCP) scenarios. To clarify which component (emission scenarios, climate projections, or global vegetation models) contributes the most to uncertainties in projected global terrestrial C cycling by 2100, we applied analysis of variance (ANOVA) and wavelet clustering to 70 projected simulation sets. ANOVA revealed that the main sources of uncertainty are different among variables and depend on the projection period. We determined that in the global SOC and VegC projections, GVMs dominate uncertainties (90% and 60%, respectively) rather than climate driving scenarios, i.e., RCPs and GCMs. The clustering wavelet spectra of VegC and SOC time series data could identify more specific characterization of simulations in each GVM. Our study suggests that the improvement of GVMs is a priority concern for reduction of total uncertainties in projected C cycling for climate impact assessments.

Keywords: Model inter-comparison, Global carbon cycle, Uncertainties, RCP, GCM