

# Evaluation of carbon cycles in a suite of CMIP6-C<sup>4</sup>MIP experiments by Meteorological Research Institute Earth System Model version 2.0 (MRI-ESM2.0)

\*Hiroyuki Tsujino<sup>1</sup>, Atsushi Obata<sup>1</sup>, Seiji Yukimoto<sup>1</sup>, Masahiro Hosaka<sup>1</sup>, Taichu Y Tanaka<sup>1</sup>, Toyama Katsuya<sup>1</sup>, Tsuyoshi Koshiro<sup>1</sup>, Shogo Urakawa<sup>1</sup>, Hideyuki Nakano<sup>1</sup>

1. Japan Meteorological Agency / Meteorological Research Institute

Meteorological Research Institute of Japan Meteorological Agency conducted a suite of climate projection experiments to understand response of the coupled climate-carbon cycle system to increasing anthropogenic CO<sub>2</sub> emissions and concentrations by following protocols of the Coupled Climate-Carbon Cycle Model Intercomparison Project (C<sup>4</sup>MIP) endorsed by the phase 6 of Couple Model Intercomparison Project (CMIP6). This poster will present overall evaluation of the experiments in terms of their carbon cycle by comparing with observations and similar experiments conducted by other climate modeling centers. This gives in effect an evaluation of the biogeochemical components of MRI-ESM2.0. Although the qualitative behaviors of the climate-carbon cycle system are reasonable, the carbon uptake by the land component tends to be larger than other models. This results in the atmospheric CO<sub>2</sub> concentrations in emission-driven experiments lower than those of the corresponding CO<sub>2</sub> concentration scenarios, requiring improvements for the terrestrial carbon-cycle component in a future version of MRI-ESM2.0. The poster will also present comprehensive evaluation of carbon cycle in the ocean component.

Keywords: CMIP6, C4MIP, carbon cycle, earth system model