



## Development of a new Earth system model “MIROC-ES2” for CMIP6

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In order to make long-term climate and carbon cycle projections, especially for those assuming strong mitigation targets, a new Earth system model has been developed in a project “Program for Risk Information on Climate Change (FY2012–2016, MEXT)”. In the model, global nitrogen cycle is newly incorporated into the component model of land ecosystem, because it was recognized as one of the emergent processes to be included into the model because of its limitation on plant growth, which usually leads land carbon cycle less sensitive to future CO<sub>2</sub> increase and climate change. Here, we present the basic structure of the new ESM, which is based on the latest version of MIROC, and the configuration toward CMIP6 exercises will be described. The basic performance of the model and results on sensitivity analyses, particularly focusing on the carbon–nitrogen interactions, will be also displayed: land ecosystem displays almost comparable magnitude for the “CO<sub>2</sub>-fertilization effect” compared with our previous model, and its magnitude can be slightly changed by directly applying inorganic nitrogen to soils. When comparing the results with a study on observation–constraints, the new ESM is likely to display a reasonable magnitude for the CO<sub>2</sub> fertilization effect.