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Set-up of the PMIP3 paleoclimate experiments conducted using an Earth system model, MIROC-ESM

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Abstract. Paleoclimate experiments using contemporary climate models are an effective measure to evaluate climate models. In recent years, Earth system models (ESMs) were developed to investigate carbon cycle climate feedbacks, as well as to project the future climate. Paleoclimate events can be suitable benchmarks to evaluate ESMs. The variation in aerosols associated with the volcanic eruptions provide a clear signal in forcing, which can be a good test to check the response of a climate model to the radiation changes. The variations in atmospheric CO_2 level or changes in ice sheet extent can be used for evaluation as well. Here we present implementations of the paleoclimate experiments proposed by the Coupled Model Intercomparison Project phase 5/Paleoclimate Modelling Intercomparison Project phase 3 (CMIP5/PMIP3) using MIROC-ESM, an ESM based on the global climate model MIROC (Model for Interdisciplinary Research on Climate). In this paper, experimental settings and spin-up procedures of the mid-Holocene, the Last Glacial Maximum, and the Last Millennium experiments are explained. The first two experiments are time slice experiments and the last one is a transient experiment. The complexity of the model requires various steps to correctly configure the experiments. Several basic outputs are also shown.

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