



Large ensemble climate simulations with a high-resolution AGCM

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High-resolution climate models have enabled us to evaluate the changes due to global warming in phenomena having small-scale features, such as heavy rainfall and tropical cyclones. However, uncertainties of the change becomes larger for the events of small spatial scale, as well as for those of low frequency, although such events can have the most significant impacts on human activity. In this study, large ensemble simulations for more than 5,000 years with a high-resolution AGCM is applied to the evaluation of the uncertainty arising mainly from internal variability.

The MRI-AGCM3.2, which is participating HighResMIP, is used, with 60km horizontal resolution. Probabilistic future changes in extreme events are available directly without using any statistical models. For example, the results show that the extreme precipitation increase is larger for heavier rainfall events, and that significant increase in intense tropical cyclones is found over a broader area including the south of Japan and south of Madagascar. A large part of the results are also downscaled with a 20-km regional climate model over Japan region, showing topographic effect on heavy snowfall. The simulation results are open to the public, as a database named 'd4PDF'.