



Grand ensemble of climate simulations over the last Millennium with general circulation models and their future projections

Y. H. Yamazaki (1), N. Bellouin (2), A. Moberg (3), A. Hind (3), K. Yamazaki (1), D. Rowlands (1), T. Aina (1), M. Thurston (1), P. Hanappe (4), and M. R. Allen (1)

(1) University of Oxford, Department of Physics - AOPP, Oxford, UK (hiro.yamazaki@physics.ox.ac.uk, 0044 1865 272088), (2) Met Office, Exeter, UK, (3) Stockholm University, Sweden, (4) Sony Computer Science Laboratory, Paris, France

In order to test the performance of various climate simulations by full-featured general circulation models and to improve the prediction of the future climate, we have performed an ensemble of numerical simulations of the climate change over the last millennium using variants of the third generation Hadley Centre climate model. The grand ensemble of model runs are constructed by taking different initial conditions, external forcing scenarios, and internal parameters of the model itself. The model runs are then computed by volunteer computing infrastructure of ClimatePrediction.net over the internet on a variety of computing platforms.

The outputs from the model runs are numerically rated by being compared with European paleoclimate data for the pre-industrial period and global instrumental data thereafter to illustrate the usefulness of the paleoclimate data in constraining climate models. We then extend the model runs towards the end of the 21st century, and provide a future projection with a quantitative estimate of uncertainty.