



Refining future climate projections using uncertain climate data of the last millennium

Y. H. Yamazaki (1), M. R. Allen (1), C. Huntingford (2), D. J. Frame (3), and D. C. Frank (4)

(1) Department of Physics, University of Oxford, Oxford, UK. (hiro.yamazaki@physics.ox.ac.uk), (2) Centre for Ecology and Hydrology, Wallingford, UK., (3) Smith School of Enterprise and the Environment, University of Oxford, Oxford, UK., (4) Swiss Federal Institute WSL, Birmensdorf, Switzerland.

We report a modelling analysis of a proxy-based climate reconstruction over the last millennium and its implication for future climate projections. A large number of simple energy balance models with different internal parameters were driven by a range of reconstructed climate forcings to produce a variety of climate change over the last millennium. For each model run, we used a proxy-based temperature reconstruction and recent instrumental observations to assign similarity scores for both pre- and post-instrumental periods. In addition, we quantitatively explored uncertainties in the models' internal parameters, external forcings, temperature reconstruction, and recent instrumental observations. The overall score was then calculated by combining the similarity score and the uncertainty scores for each simulation, and projected onto the future.

Our results suggest that the proxy-based climate reconstruction imposes a strong extra constraint on the conventional climate projection that is solely based on instrumental observations.