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# The PAGES/CLIVAR PaleoClimate Reconstruction (PR) Challenge

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Detailed understanding of the full range of annual and seasonal climate variability over the past millennium forms an important basis for the interpretation of the observed record and for gauging the response of the climate system to various forcings. Using different methods and proxy networks, the available climate reconstructions show general similarity in their depiction of large-scale mean temperature evolution, particularly at the decadal to century time scale. There are however important differences in reconstructions at the interannual and also at the multi-century to millennial scale. It is unclear how much these differences result from either the selection of specific proxy networks, the potential inability of included proxies to resolve information at all time scales, or the algorithms themselves (NRC 2007). The paleoclimate community needs to establish a protocol for reassessing its methods to rebuild confidence in the reconstruction efforts.

The last millennium Paleoclimate Reconstruction (PR) Challenge, a Community Program run under the auspices of the PAGES-CLIVAR-Intersection, allows us to directly address these concerns and to establish objective reconstruction benchmarks. The basic idea is to use results from state-of-the-art coupled Atmosphere-Ocean-General Circulation Models (AOGCMs) in both open and blind-test reconstruction exercises. Individual reconstruction groups (and anyone who wants to participate) will be brought together and handed a small set of realistic pseudo-proxy series and calibration "instrumental data" drawn from the model output. They will be asked, to the best of their techniques' ability, to reconstruct the simulated climate evolution. By comparing

reconstructions with the full, “true” model climates, each group can assess their performance in great detail. A key objective of this project will be to document how much of the true climate can be described with the combined set of reconstruction results, to determine which aspects of the overall or regional climate are captured well, and whether important elements are being missed.

Beyond the main goal of improved understanding of the performance of climate reconstruction methods, the Challenge will improve the exchange among the paleoclimate reconstruction groups and provides a flexible platform for enhanced interaction with the associated disciplines in Climate Modeling and Statistics. The latter might be particularly helpful with regard to a more formal assessment and quantification of uncertainty and regional climate understanding. The results of the Challenge will support and steer the community to develop strategies for improving the reconstruction methods so that past climate variations can be better understood.