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Lessons from past climate simulations in PMIP3/CMIP5

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Simulations of the Last Glacial Maximum (21000 years ago), the mid-Holocene (6000 years ago) and the last millennium have been performed as part of the PMIP2/CMIP5 suite of climate simulations. These simulations provide a unique opportunity to evaluate climate models used for future climate projections outside the climate range for which these models have been developed. Model-data comparisons benefit from new data syntheses that also open the way to model benchmarking. The presentation will provide an overview of the new results, focussing on different topics directly relevant to future climate change such as climate sensitivity, hydrology and tropical variability. How the model reproduce the observed changes, the role of different feedbacks, the understanding of model spread or of the impact of model biases on the simulated climate changes will be discussed.