



The PALEOLINK working project: The missing link in the Past – Downscaling paleoclimatic Earth System Models

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The comparison of climate model simulations of past climates with proxy-based climate reconstructions allows assessing the validity of climate models under the impact of different boundary conditions (particularly when considering glacial climates). However, this comparison is burdened by the fact that most climate reconstructions are based on local or regional data, whereas the Earth System Models' paleoclimate simulations have a rather coarse spatial resolution that leads to large biases over extensive regions and inhibits a realistic representation of the small scale features that affect proxy records.

To overcome this scale gap, different techniques are applied, ranging from a 'naive' approach based on selecting the closest grid point of the climate model to complex approaches that refine the simulated large-scale fields with the help of statistical or dynamical methods, i.e. Regional Climate Models. Although the latter has proven to be a valuable tool, the computational resources involved in long climate simulations normally addressed by climate reconstructions are large. The associated cost has limited the number of studies based on this approach. Currently, few regions have been subject to dynamical downscaling efforts, with a negligible number of high-resolution simulations compared to the number of coarse, global-scale simulations.

The PALEOLINK working group, hosted within the PAGES 2k network, aims at evaluating and developing new downscaling strategies that allows linking coarse Earth System Model simulations with climate reconstructions. It promotes reviewing, coordinating and stimulating future efforts trying to bridge the scale gap between the coarse resolution of state-of-the-art Earth System Models used in paleoclimate simulations and local and regional climate reconstructions. Both dynamical and statistical approaches to downscaling are considered, as well as novel combinations of both, including the use of forward models driven by downscaled climate model data reproducing the local climate and its variability. This group will run between early 2018 until the end of 2019, and is open to anyone who is interested.