



Phranezoic climate change

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Knowledge of how global temperature has changed across the whole of Earth history is one of the biggest challenges of paleoclimate research. Estimates from data only are always hampered by the geographical coverage of proxy records, particularly for older time periods when there is relatively little oceanic crust remaining. We will present results from a unique set of more than 20 climate model simulations for the last 440 million years. The model we use is HadCM3L which is a fully coupled dynamic atmosphere-ocean-vegetation model. Each simulation has been run for at least 10,000 years in order to ensure that the whole ocean is fully spun-up. Each time slice has been extensively evaluated against terrestrial and marine data with more than 200 localities for each time slice. The result is a data constrained model estimate of climate change through the last 440 million years. The results are broadly consistent with previous estimates. However, they clearly show that for some time intervals data alone has insufficient coverage. The simulations also show that benthic temperature estimates are not always correlated with surface global means.