



Climate response to CO₂ forcing at the Permo–Triassic boundary

Daniel Hill, Despina Zoura, Stephen Hunter, Alan Haywood, and Paul Wignall

University of Leeds, School of Earth and Environment, Leeds, United Kingdom (eardjh@leeds.ac.uk)

The Permo–Triassic boundary marks an era of intense climatic, tectonic and geochemical change. According to palaeoclimatic data, the Earth underwent a massive warming event close to the Permo-Triassic boundary, which seems to be closely associated with the mass extinction. Biogeographical information suggests that the tropical regions lost a lot of biodiversity. Specifically, fish and larger vertebrates are not found in low latitude sites and it has been suggested that temperatures there became too hot for them to survive. In this study, we are using UK Met Office fully coupled HadCM3L General Circulation Model (GCM) to carry out simulations using Permo-Triassic boundary conditions with varying atmospheric CO₂ concentrations, to encompass a range of plausible greenhouse gas forcing scenarios. Although available data provides little constraint on atmospheric carbon dioxide concentrations, large carbon isotope changes suggest significant inputs of carbon in to the climate system, probably associated with the Siberian Traps Large Igneous Province. Our simulations produce a range of different scenarios of climate warming that are compared with reconstructed regional and global ecosystem changes, as well as reconstructed temperatures in order to test the efficacy of greenhouse gas forcing as a climate driver during this period of Earth history.