



Plates & Gates: Plate tectonics and polar gateways in Earth history – a lead project for the IPY 2007-2008

A. Haywood (1) and K. Gohl

(1) British Antarctic Survey, Cambridge, UK, (2) Alfred Wegener Institute for Marine and Polar Research, Bremerhaven, FRG

The world oceans are a major component of the Earth System, and changes in the complex global ocean current system are likely to cause global environmental changes. On geological time-scales, these water mass exchanges are controlled by the deepening and shallowing of areas of ocean floor during the tectonic opening and closing of strategic oceanic gateways and the formation of ocean basins. Establishing the detailed tectonic, geodynamic, sedimentary and palaeo-topographic histories of strategic oceanic basins and gateways will provide the essential framework for modelling studies that will relate these events to palaeo-climate observations collected across the globe. PLATES & GATES is adopting a multidisciplinary approach by addressing tectonic-magmatic, geodynamic, sedimentary and biostratigraphic processes, by utilising palaeo-biological and geochemical proxies as well as past and recent oceanographic conditions in the gateways, and by using state-of-the-art geophysical techniques, sediment coring, ocean drilling and accompanying land investigations. In this talk an update on the specific aims, objectives and work plan of PLATES and GATES project will be presented. The importance of this research to numerical climate modelling studies that aim to reconstruct past climates will be emphasised, and the necessity of considering low-latitude gateways in the context of an IPY programme will be demonstrated. Finally, outputs from initial modelling exercises carried out as part of PLATES & GATES using a coupled ocean atmosphere general circulation model (HadCM3) examining the impact of opening and closing high and low latitude gateways on Eocene/Oligocene and Pliocene/Pleistocene climate change will be examined.