



ACE: Antarctic Climate Evolution

M. Siegert (1), R. Dunbar (2) and the ACE Steering Committee

(1) Bristol Glaciology Centre, University of Bristol, UK, (2) Department of Geological and Environmental Sciences, Stanford University, USA

ACE is a new international 'scientific research programme' of the Scientific Committee on Antarctic Science (SCAR), that will study the climate and glacial history of Antarctica through palaeoclimate and ice-sheet modelling investigations, purposefully integrated with geological evidence for past changes. The Antarctic ice sheet has existed, according to many researchers, for approximately 35 million years, but it has fluctuated considerably and has been one of the major driving forces for changes in global sea level and climate throughout the Cenozoic Era. The spatial scale and temporal pattern of these fluctuations has, however, been the subject of considerable debate. Determination of the scale and rapidity of the response of large ice masses to climatic forcing is of vital importance, because ice-volume variations lead to changing global sea levels on a scale of tens of metres or more. It is thus important to assess the stability of the cryosphere under a warming climate, particularly as ice-core records have yielded evidence of a strong correlation between carbon dioxide in the atmosphere and palaeotemperatures. This concern is justified when carbon dioxide levels are compared with those of the past. Since Antarctica is a major driver of Earth's climate and sea level, much effort has been expended in deriving models of its behaviour. Some of these models have been successfully validated against modern conditions. Modelling the past record of ice-sheet behaviour in response to changes in climate (inferred from sedimentary facies and seismic data), palaeoceanographic conditions (inferred from palaeoecology and proxy ocean climate indicators) and palaeogeography (as recorded in landscape evolution) is the next step. The ACE programme aims to facilitate research in the broad area of Antarctic climate evolution. The programme will link geophysical surveys and geological studies on and around the Antarctic continent with ice-sheet and climate modelling studies. These studies are designed to investigate climate and ice sheet behaviour in both the recent and distant geologic past, including times when global temperature was several degrees warmer than today. The goal of

ACE is to advance the study of Antarctic climate and glacial history, by: (1) encouraging and facilitating communication and collaboration between research scientists working on any aspect of the evolution of Antarctic climate and ice sheets. This will be achieved by organizing workshops and symposia to present new results, exchange ideas, share/compile information and plan modelling and field operations; (2) providing advice for the research community on the types of geoscience data required and available for ice-sheet and palaeoclimate models, and the likely sampling locations to acquire such data; (3) providing assistance as needed on technical issues related to field and laboratory programs and to ice-sheet and palaeoclimate modelling studies; (4) promoting data access and data sharing via data-contributions to the SDLS and Antarctic data centres to facilitate and expedite data syntheses needed for developing new field programs and enhancing palaeoclimate models; and (5) summarising and reporting the results of these efforts to the scientific and wider community on an ongoing basis at workshops, symposia, and in the primary literature.