Geophysical Research Abstracts, Vol. 8, 09894, 2006
SRef-ID: 1607-7962/gra/EGU06-A-09894

Investigating the Cryospheric Evolution of the Central Antarctic Plate (ICECAP): Internationally coordinated long-range aerogeophysics over Dome A, Dome C and the Aurora Subglacial Basin of East Antarctica

D. Blankenship(1), J. Brozena(2), M. Siegert(3) and the ICECAP team

(1) Institute for Geophysics, John A. and Katherine G. Jackson School of Geosciences, The University of Texas at Austin, United States (blank@ig.utexas.edu),(2) Naval Research Laboratory, Washington, D.C, United States, (3) Bristol Glacialogical Center, University of Bristol, United Kingdom

The subsurface character and boundary conditions for much of the East Antarctic Ice Sheet (EAIS) remain largely unknown although they are critical to ice sheet modeling and, therefore, our understanding of the EAIS's role in global climate and sea level change. The lack of existing information in key regions of the EAIS is a consequence of its remoteness and inaccessibility. The acquisition of these essential data can only be accomplished by long-range airborne surveys requiring a level of international collaboration and commitment of resources that has been unavailable to the scientific community for over 25 years. We propose to coordinate an internationally collaborative program deploying a multi-instrumented long-range aerogeophysical aircraft, during the period of the IPY, over the historically inaccessible subglacial highlands and lowlands of East Antarctica. Our proposed survey will be managed collaboratively by scientists from the US, UK, Germany and Australia with the advice of an International Steering Committee (ISC) implemented via SCAR's scientific research program named Antarctic Climate Evolution. Funding targets for this project include the US National Science Foundation and the UK National Environmental Research Council. The aerogeophysical surveys will be accomplished over two field seasons using a US Naval Research Laboratory P-3 Orion aircraft operating out of McMurdo Station. The survey targets will be focused on regions critical to understanding contemporary and previous ice sheet dynamics and change and include subglacial high-

lands and lowlands of Domes A and C beneath the central EAIS. The region of our proposed ice penetrating radar, lidar, gravity and magnetics survey include the enigmatic Aurora Subglacial Basin as well as the majority of the Gamburtsev, Vostok and Belgica subglacial highlands. The highlands of the central Antarctic Plate beneath Domes A and C of the EAIS currently support an extensive network of subglacial lakes and have been the nursery for paleo ice sheets at least since the early Oligocene separation of Australia and East Antarctica. It is possible that the Gamburtsev Mountains have been the most intensely and continuously glaciated crustal elements on Earth. The specific objectives of these internationally coordinated surveys will be: 1) to provide bedrock elevation, ice sheet thickness, surface elevation, surface accumulation, englacial structure, basal melt rates and thermal structure necessary for modeling ice sheet (and subglacial lake) evolution and future change; 2) to constrain geothermal flux and determine the location, properties and connectivity of the subglacial sedimentary and hydrological units critical to understanding ice sheet evolution (and subglacial habitats); 3) to characterize subglacial lithology, identify crustal boundaries and estimate crustal rebound for the central Antarctic Plate; and 4) to identify any 'preserved' glacial geomorphology and map fault scarps indicative of Cenozoic (or older) tectonic processes.