Geophysical Research Abstracts
Vol. 14, EGU2012-13241, 2012
EGU General Assembly 2012


# Interior flow re-organization along the great Byrd-Totten ice divide of East Antarctica: evidence from radar layer disruptions

M.G.P. Cavitte (1), D.D Blankenship (1), D.A. Young (1), M.J. Siegert (2), E. Le Meur (3), and J.A. Chappellaz (3)

(1) University of Texas at Austin, Institute of Geophysics, Austin, United States (mariecavitte@gmail.com), (2) School of GeoSciences, University of Edinburgh, Edinburgh, United Kingdom. , (3) LGGE, Grenoble, France.

Interior flow re-organization is an essential component in our understanding of the temporality and magnitude of sea-level variations, especially in non-marine portions of the East Antarctic ice sheet where most of the "sea-level rise potential" is stored. Internal structure in these regions can be evaluated using internal layers from radar sounding, which can be traced over hundreds of kilometers using airborne surveys. The exceptional acuity of phase-coherent radar surveys gives both vertical resolution and horizontal continuity to radar layers that makes them extremely useful for constraining glaciological models and contributing to ice core site selection as well as understanding transient ice sheet behavior. Specifically, when well dated, these ice layers can give us high resolution snapshots into temporal and spatial ice evolution including tributary penetration of ice divides.

Present areas of tributary flow reaching into the interior are well constrained through remote sensing techniques, while evidence of such transient behavior in previous glacial cycles has long since been buried by subsequent accumulation. In these cases, radar imaging is the only technique useful for identifying buried episodes of transient ice flow as anomalous yet depth consistent layer disruptions.

We focus on the great Byrd-Totten ice divide in the East Antarctic interior, between the Vostok and EPICA Dome C ice core sites, to identify periods of tributary encroachment. Several layers tracked between the two sites are used to correlate their chronologies and accurately date the horizons (M. Cavitte et al, in prep.).

A strong advantage in using radar for the dating of these events is its negligible contribution to age uncertainties: radar uncertainties are of the order of hundreds of years, a factor of ten smaller than traditional ice core dating techniques. Combining the age-depth stratigraphy obtained for the area and visual identifications of tributary intrusions gives a constraint on the initiation/termination of such transients. We focus on a period between the Eemian interglacial back to the previous interglacial, and an assessment of the duration of such transients is attempted.