Geophysical Research Abstracts, Vol. 9, 03490, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-03490

High resolution stratigraphic sequences within the inner Larsen B embayment: seismic imaging within the Crane Glacier (Spillane) Fjord and Hektoria Basin, former Larsen B area, Antarctica

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The recent retreat of the Larsen B ice shelf, culminated in the catastophic breakup of 2002, provided an unprecedented opportunity to the geophysical and geological exploration of the area previously covered by the ice shelf. Here we present the preliminary results of a high-resolution single channel seismic survey carried out by the RVIB NB Palmer during the cruise NBP0603 (April 2006) and the RVIB LM Gould during cruise LMG0502 (February 2005). During NBP0603 the seismic source, consisting in two GI-guns of 40 cu.in. capacity pressured at 1850 psi, guaranted a good trade off between resolution and penetration; two single channel streamers, 9.5 m and 30 m long respectively, simultaneously and indipendently collected the data. We also utilized the Palmer's hull mounted 3.5 kHz Chirp (BATHY2000W) system for even higher (decimeter scale) resolution. During LMG05-02 only a hull mounted 3.5 kHz Chirp (Knudsen) system was available. As a whole, three main themes have been addressed by the survey: 1) the general structural setting of Larsen B area; 2) the characterization of a cold seep basin where a chemotrophic ecosystem was firstly discovered during a 2005 USAP cruise; 3) the setting and infill history of two inner shelf deposystems that contain a thick, expanded section of unconsolidated sediment: within the Crane Glacier Spillane fjord and Hektoria (Glacier) Basin. In these lattest areas, four ponded basins were imaged and resolved in detail. The Crane fjord basin shows a recent filling divided in two layered units subparallel, laterally continuous and with a typical filling geometry onlapping the flanks of the basin. The filling (nearly 40 ms thick in the lower basin) was interpreted as the result of the accelerated ice discharge from the

Crane Glacier following the collapse of Larsen B ice shelf. The Hektoria Basin infill is much more complex also exceeds 50 ms in thickness but exhibits cyclical alternations of parallel continuous reflections and chaotic discontinuous reflections, representing up to 5 cycles and suggestive of glacial interglacial oscillations, as supported by five initial radiocarbon ages.

This research, funded by the Italian Antarctic Research Program (PNRA), was included in the frame of the project "Paleohistory of the Larsen Ice Shelf: Evidence from the Marine Record", funded by NSF.