Geophysical Research Abstracts, Vol. 9, 00803, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-00803
© European Geosciences Union 2007

Compression experiments on marine ice from Nansen Ice Shelf, Antarctica: implications for ice-shelf/continent interactions

D. Samyn (1), **J.-P. Remy** (1), P. Duval (2), M. Montagnat (2) and J.-L. Tison (1)

(1) Laboratoire de glaciologie, DSTE, University of Brussels, Belgium, (2) LGGE, Grenoble, France (jremy1@ulb.ac.be / Fax: +32 2 650 22 26 / Phone: +32 2 650 22 18)

Antarctic ice shelves are important components of continental ice dynamics, in that they control grounded ice flow towards the ocean. As such, Antarctic ice shelves are a key parameter to the stability of the Antarctic ice sheet in the context of global change. An important by-product of ice-shelf/ocean interactions consists of marine ice, which forms by sea water accretion beneath some ice shelves. It is known that marine ice displays distinct physical (grain textures, bubble content, ...) and chemical (salinity, isotopic composition, ...) characteristics as compared to glacier ice and sea ice. Little is known, however, about the effect of these characteristics on the rheology of marine ice. With the purpose of including realistic mechanical data of marine ice in global ice flow models, and hence of improving these models, we show here the results of uniaxial compression experiments conducted in laboratory on marine ice samples from the Nansen Ice Shelf (NIS), Terra Nova Bay, Antarctica. Mean sample salinity was about 3.5E-2 g/l. The samples were strained at T $\sim$ -10.8 $^{\circ}$C and at stresses of 5 bars, with extra loads ranging between 7 and 9 bars. At any stress, minimum strain rates were two to four times lower than reported for isotropic ice strained under similar conditions. Glen's flow exponent varied between 2.2 (lower stress) and 3.8 (higher stress). The potential effects of grain characteristics, porosity and salinity on the rheology of marine ice are discussed in relation with ice shelf and continental ice flow dynamics. The most important conclusion at this stage of work is that, at conditions given here, marine ice from NIS deforms significantly less faster than isotropic ice under pure shear deformation, emphasizing thereby the postulated stabilizing effect of marine ice on continental flow.