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Preliminary results on ice characteristics from two Ice-wedges at Cape Mamontovy Klyk, Laptev Sea, Nothern Siberia

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Fabrics and preliminary results from gas analyses (total gas content, gas composition) are presented and discussed for samples of two ice-wedges from Cape Mamontovy Klyk, Laptev Sea, Northern Siberia. Ice-wedges studies are known, among others, for paleoclimatic and paleoenvironmental implications, but only a few recent studies have focused on ice-fabrics and specially on gas properties. This study undertakes multiparametric analyses of the ice wedges and is part of a larger research project entitled: “Process studies of permafrost dynamics in the Laptev Sea” that is related to the paleoenvironmental history at Cape Mamontovy Klyk. Stable isotope composition, gravimetric ice content and hydrochemical measurements have already been discussed and there is still some debate on the respective age of the two ice wedges concerned. Ice fabrics and gas composition are used as means to shed more light not only on the build-up dynamics of the ice wedges but also on how they potentially contribute to fluxes of climatically significant gases (especially CH4) to the atmosphere.

Crystal size varies between 0.1 and 2 cm. It does not show a significant variability within a given ice-wedge, but it is relatively contrasted between the two ice wedges. There is, nonetheless, some important size variations locally and crystal elongation is clearly seen in some occasions, although not fully characterized since only horizontal sample transect is available at this stage. C-axes for all samples tend to align close to the horizontal plane, with a wide maximum roughly perpendicular to the ice layering in the wedges. This trend is discussed in terms of ice wedge build-up mechanisms.

The ice, which is distinctly whitish, shows numerous spherical bubbles which con-

tribute to an average total gas content of 0.03 ml air/g ice (about 1/3 of the total gas content of normal glacier ice). The analyses of gas composition are still in progress and will also be reported.

A comparison with the results from previous studies is presented. Initial layering, potential deformation, temperature effects and re-crystallization are discussed to understand crystal properties and the gas characteristics are compared to the one measured in basal ice from large ice sheets.