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Impurities effect on borehole closure rate in ice sheet

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Understanding ice sheet dynamics is of high interest to predict the future ice sheet response in times of changing climate, and is also crucial to estimate borehole closure rate during accessing ice sheet especially by deep ice core drilling. Impurities in ice is one of the most influential factors on mechanical properties of ice and causes localized enhanced deformation. High concentrations of impurities is the main driver for development of strong crystal preferred orientation, fine grain sizes and for decreasing pressure melting point, which favors the borehole closure rate significantly particularly when ice temperature is above -10°C . While the control mechanism of impurities on ice deformation rate is still remains much unclear. Thus, we propose to investigate various species and concentrations of impurities effect on ice creep rate between -15°C to -5°C using bubble free, laboratory-made polycrystalline ice obtained by isotropic freezing method, in order to figure out the critical species and concentrations of impurities on borehole closure rate.

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