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Ice shelve flexures due to ocean swells obtained by 2D flowline models

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Ice shelve flexures was obtained for the flowline which crosses downstream one of the four fast flowing ice streams of the Academy of Sciences Ice Cap [Dowdeswell et. al., 2002]. Ice shelve flexures modeling was performed by two 2D models: (i) elastic model and (ii) full 2D ice flow model [Pattyn, 2000; 2002] (viscosity model with Glen's rheology) coupled with elastic model for the ice shelve. The reason of the coupling is in possible effect of stress distributions in the grounding line vicinity, that are different in the two models, to the amplitude of ice shelve terminus oscillation. Under glacier sea water flow was described by 1D wave equation for the under glacier pressure perturbations [Holdsworth and Glynn, 1978]. Both periodical (diurnal) ocean swells (tidal swells) and non-periodical ocean swells [MacAyeal et.al., 2006] impact to the ice shelve flexures were considered. Ice shelve flexures for characteristic vibrations in the ice shelve and under glacier water system were obtained.

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