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Prognostic experiments for fast flowing ice streams from the Academy of Sciences Ice Cap: overall sea ice flux changes modeled by 2D flow line thermo-coupled model

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The prognostic experiments were carried out for fast flowing ice streams on the south side of the Academy of Sciences Ice Cap in the Komsomolets Island, Severnaya Zemlya archipelago. The prognostic experiments are based on the inversions for basal friction coefficients that were performed by 2D flow line thermo-coupled model (Pattyn, 2000) and by the Tikhonov's regularization method. Modeled ice temperature distributions in the cross-sections have been obtained using the ice surface temperature histories that were inverted previously from the bore hole temperature profiles derived at the Academy of Sciences Ice Cap (Nagornov et. al., 2006). The input data for the performance of both the forward and the inverse problems included InSAR ice surface velocities, ice surface elevations and ice thicknesses obtained from airborne measurements, all were taken from Dowdeswell et al. (2002). The prognostic experiments provide the data for assessment of the overall sea ice flux changes in time (changes of the total flux from the glacier ice streams) for different climatic scenarios in the future. The prognostic experiments have been carried out on the assumption of unchanged friction coefficient distributions obtained in the inverse problem for 2002 surface ice flow and ice thickness distribution data.

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