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The friction coefficient definition based on the 2D ice flowline modeling and ice surface velocities derived from synthetic aperture radar interferometry performed at the Academy of Sciences Ice Cap

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Resent investigations of the Academy of Science Ice Cap reveled that the ice surface velocities varies in the wide range from about 5 m/yr to 140 m/yr [Dowdeswell et. al., 2002]. The slow velocities were observed at the regions where bottom elevations are higher than sea level and bottom ice is frozen. On the south side of the ice cap four drainage basins were found. Bedrock elevations at these areas are lower than sea level and ice flow velocities increase significantly and achieve the values about 100 m/yr. Such fast flowline features are typical for outlet glaciers and ice streams in both the Arctic and Antarctic. These ice streams are the major locations of iceberg calving from the Academy of Sciences Ice Cap.

Ice flow modeling in the areas of fast ice flow was performed by 2D full Stokes flowline finite-difference model. Basal sliding was considered according to the linear and non-linear (power) friction laws. The compound approximation of the boundary condition based on the extended of the mechanical equilibrium equation to ice surface points was applied as at free ice surface as at ice margin taking into account ice and sea water interaction.

The minimum of discrepancy between experimental and calculated flowline surface velocities ca be achieved at the linear set of the friction coefficient from flowline length dependence. Small scale surface velocity variability requires the extension of set of the friction coefficient functions.