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The Cryosphere Discussions

Interactive comment on "The effect of the north-east ice stream on the Greenland ice sheet in changing climates" *by* R. Greve and S. Otsu

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In section 3.2 you note that the linear sliding law yields poor results. It is also noted that in your model the linear sliding law would represent a case where.. "This law relates the basal sliding velocity linearly to the shear traction, which can be justified by assuming shear deformation of a linear-viscous sediment layer of constant thickness 20 between ice and bedrock as the cause for rapid sliding (e.g. Greve et al., 2006)." You are suggesting then that the cause of the enhanced sliding velocity of this ice stream is not due to a deformable sediment layer it would seem. Joughin et al., (2001) that you cite noted.. " Our results reveal that flow in a section of the downstream end has much in common with the streaming flow of the Ross Ice Streams of West Antarctica (e.g., a weak bed and fast flow in the presence of low driving stresses). For several hundred

kilometers along the middle of the ice stream, the basal shear stress balances the driving stress. In the upstream area, where the ice stream is first visible in the velocity data, the bed appears to be weak, which may contribute to the initiation of the ice stream." What can you tell us from your modelling results about the weakness of the bed, and how a weak sediment basal layer does not seem appropriate.

Interactive comment on The Cryosphere Discuss., 1, 41, 2007.