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## Increasing the largest stable time-step size in ice flow models

André Löfgren<sup>1</sup>, **Josefin Ahlkrona**<sup>1</sup>, Thomas Zwinger<sup>2</sup>, Christian Helanow<sup>1</sup>, and Denis Cohen<sup>3</sup>

<sup>1</sup>Department of Mathematics, Stockholm University, Stockholm, Sweden

<sup>2</sup>CSC - IT Center for Science Ltd., Espoo, Finland

<sup>3</sup>COSCI Ltd

Ice flow models often suffer from numerical instabilities that restricts time-step sizes. For higher-order models this constitutes a severe bottleneck. We present a method for increasing the largest stable time step in full Stokes models, allowing for a significant speed-up of simulations. This type of stabilisation was originally developed for mantle-convection simulations and is here extended to ice flow problems. The method is mimicking an implicit solver but the computational cost per time step is nearly as low as for an explicit solver. As it only consists of adding a stabilisation term to the gravitational force in the full Stokes equations, it is very easy to implement. We test the method using both Elmer/Ice and FEniCS on artificial glaciers with varying bedrock roughness, slip rate and surface inclination, as well as on a real world case.