Full-Stokes on a whole ice-sheet?

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As High Performance Computing (HPC) in disciplines such as Climatology and Oceanography has been established already decades ago, ice sheet modeling often is restricted to small scale single CPU workstations. The main reason might be that - applied to continental scales - the shallow ice approximation (SIA) still is the common approach (and perhaps will remain to be for some while). With higher order models (HOM) or even full-Stokes (FS) models being developed, the demand for high resolution simulations on large scale topography is an emerging issue. Consequently, HPC has to be introduced into the field of Glaciology in order to meet the upcoming challenges. Along the lines of the ongoing development of the FS finite element ice sheet code Elmer/Ice we want to show what challenges in terms of numerics, parallel computing, data storage and handling had and still have to be met in order to apply a full-Stokes simulation to a complete continental scale ice-body.