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Development of a numerical ice-sheet model for simulation of summit migration and dating

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Ice divides are important locations for deep drilling on ice-sheets. Precise computation around a divide requires spatially very high resolution due to the characteristics of ice-flow around the divide. In addition, ice flow pattern is significantly different between an ice divide and the other areas: the flow around the divide requires more stress terms to compute than the other area. Moreover, age computation around the summit is typical application of ice sheet models. Performances of several numerical schemes, such as a higher-order upwind scheme or a semi-Lagrangian scheme, have been compared, however there are still some schemes not yet implemented and examined for this issue.

This study presents a recent development of Ice sheet model for Integrated Earth system Studies (ICES) in particular, for improvement of dating scheme and inclusion of higher-order mechanics.