Building an Extensible, Open Toolkit for Validation and Verification of Polar Ice-sheet Models

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Polar ice-sheets play an important role in the global climate system and including their effects into global climate models is essential (IPCC AR5 report). Large, dynamic parallel ice-sheet models are increasingly being incorporated into global climate models in order to include the many feedbacks between ice-sheets, oceans, the atmosphere, and the land surface. However, there is no current framework available to comprehensively test and evaluate the performance of these ice-sheet models. We are developing a Land Ice Verification and Validation toolkit (LIVV) in order to provide confidence estimations and performance evaluations to ice-sheet model developers and users. The toolkit is written in python which is widely used throughout the scientific community and should be easily accessible to a large number of users. The toolkit provides resources for data assimilation, verification testing, validation testing, and performance evaluations. A website is created automatically which presents the testing results in a comprehensive and user-friendly way. Currently, the development is primarily focused on evaluating the Community Ice Sheet Model (CISM), but has been designed to be easily extensible to other ice-sheet models with minor changes to the python code base and the website templates.