Geophysical Research Abstracts
Vol. 19, EGU2017-12227, 2017
EGU General Assembly 2017

Distributed modeling of glacier ice thickness at the global scale

Fabien Maussion (1), Daniel Thorlaksson (1), and Ben Marzeion (2)

(1) Institute of Atmospheric and Cryospheric Sciences, University of Innsbruck, Austria (fabien.maussion@uibk.ac.at), (2) Institute of Geography, University of Bremen, Germany

There are about 200.000 glaciers worldwide, and we have an observation-based volume estimate for a very small fraction of them. To date, most estimates of global glacier volume rely on scaling laws, and only one single model is capable of providing maps of distributed ice thickness for all glaciers over the globe. The challenges faced by numerical models are the lack of input and validation data, the size of the problem at hand, as well as basic (but non-trivial) issues related to inconsistencies between the various data sources (glacier inventories, ice thickness observations, topography, climate). In this contribution, we present a new open source glacier model capable of simulating the ice thickness of any glacier with limited data input. Based on an automated centerline delineation algorithm and a mass-balance module, the Open Global Glacier Model (www.oggm.org) uses a mass-conservation approach and the physics of ice flow to compute the thickness of ice along the glacier flowlines. On the basis of the recently published Glacier Thickness Database (GlaThiDa V2), we discuss the issue of model calibration and validation in this challenging context and propose new axes of research required to improve future modeling endeavors.