GlacierMIP3 global glacier mass change equilibration experiments - rationale and experimental design

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Glaciers outside the ice sheets are major contributors to today's sea-level rise and are projected to remain so in the coming century. With the goal to better assess the future sea-level contribution from glaciers and to quantify related uncertainties, the Glacier Model Intercomparison Project (GlacierMIP) has set out to develop a series of coordinated experiments to be run as a community-wide effort.

The first two phases of the GlacierMIP have focused on the evolution of glaciers throughout the 21st century (Hock et al., 2019; Marzeion et al., 2020). In the third phase of GlacierMIP (GlacierMIP3 – equilibration), a new set of experiments has been designed to investigate the equilibration of glaciers under constant climate conditions. These experiments will allow us to answer the following fundamental questions:

1. What would be the equilibrium volume and area of all glaciers outside the ice sheets if global mean temperatures were to stabilize at present-day levels?
2. What would be the equilibrium volume and area of all glaciers outside the ice sheets if global mean temperatures were to stabilize at different temperature levels (e.g. +1.5, +2, relative to pre-industrial)?
3. For each of these global mean temperature stabilization scenarios, how much time would the glaciers need to reach their new equilibrium?

In this contribution, we present the experimental design of GlacierMIP3 and open up the floor for ideas and discussions about possible processing of these experiments. We also invite interested individuals and groups to join us to discuss the possibility of their model to be included in the newest phase of GlacierMIP.
References


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