# Committed future sea-level contribution from the Greenland ice sheet

Huybrechts P., **Goelzer H.**

→ heiko.goelzer@vub.ac.be

Earth System Sciences & Departement Geografie, Vrije Universiteit Brussel, Brussels, Belgium.

It is widely recognized that anthropogenic greenhouse gases have a long residence time in the atmosphere. Even if man-made emissions were to cease totally, carbon cycle models show that $CO_2$ concentrations will revert to pre-industrial levels only after many millennia. Combined with the inertia of the coupled climate system this means that cumulated emissions up to one point in time will necessarily lead to already committed climate changes many years later. In long-term climate projections, ice sheets are the largest potential contributors to sea-level rise, one of the major threats of global warming-related climate change. Ice sheets respond to climate changes on time scales up to many thousands of years and are therefore not routinely included in coupled climate projections, mainly due to computational constraints. To overcome this problem, we use a computationally efficient Earth system model of intermediate complexity, which includes fully interactive models of the Greenland and Antarctic ice sheets. We present projections of the millennial constant composition sea-level change commitment for the Greenland ice sheet and analyse the sensitivity to a large range of warming scenarios. Parametric uncertainty of the climate model is addressed by using an ensemble of model versions that covers a wide range of climate sensitivity.