



Modelling of the present and future surface mass balance of Svalbard with the regional climate model MAR

Charlotte Lang (1,2), Xavier Fettweis (1), and Michel Erpicum (1)

(1) Laboratory of Climatology and Topoclimatology, Department of Geography, University of Liege, Liege, Belgium, (2) Fonds pour la formation à la Recherche dans l'Industrie et dans l'Agriculture, FRIA, Brussels, Belgium

We investigate here the impact of global warming on the cryosphere of Svalbard (74 to 81°lat N, with 60% of its area (about 62 000 km²) covered by glaciers and ice caps) using the regional climate model MAR (Modèle Atmosphérique Régional) fully coupled with a snow energy balance model.

Firstly, we evaluate outputs from MAR forced by the ERA-Interim reanalysis and the MIROC5 global model (from the CMIP5 database) over the current climate (1979-2012) by comparison with measurements of temperature, wind speed, precipitation and surface mass balance at several stations through the archipelago.

Afterwards, we present future projections of SMB over the period 1980-2100 using the MIROC5 based RCP 4.5 and 8.5 scenarios. Our results suggest that in warmer climates, the mass gained due to increased winter snowfall does not compensate the mass lost by the exponential increase of meltwater run-off in summer.