Geophysical Research Abstracts
Vol. 12, EGU2010-3529, 2010
EGU General Assembly 2010

Glacial wetland distribution and methane emissions estimated from PMIP2 climate simulations

Nanne Weber (1), AnnaJoy Drury (1), Willem Toonen (2), and Michiel van Weele (1)

(1) Royal Netherlands Meteorological Institute (KNMI), De Bilt, Netherlands (weber@knmi.nl), (2) Faculty of Geosciences, Utrecht University, The Netherlands

It is an open question to what extent wetlands contributed to the interglacial-glacial decrease in atmospheric methane concentration. Here we estimate methane emissions from glacial wetlands, using newly available PMIP2 simulations of the Last Glacial Maximum (LGM) climate from coupled atmosphere-ocean and atmosphere-ocean-vegetation models. Emissions are computed from the dominant controls of water table depth, soil temperature and plant productivity and we analyse the relative role of each factor in the glacial decline. It is found that latitudinal changes in soil moisture, in combination with ice-sheet expansion, cause boreal wetlands to shift southward in all simulations. This southward migration is instrumental in maintaining the boreal wetland source at a significant level. The temperature effect is found to be moderate, while reduced plant productivity contributes equally to the total reduction. Model results indicate a relatively small boreal and large tropical source during the LGM, consistent with the low interpolar difference in glacial methane concentrations derived from ice-core data.