Geophysical Research Abstracts,
Vol. 10, EGU2008-A-06644, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-06644
EGU General Assembly 2008

REMO in high latitudes - extending a regional climate model's soil scheme for permafrost purposes

T. Blome, S. Hagemann
Max-Planck-Institute for Meteorology

Permafrost is a globally relevant carbon reservoir. Widespread melting of permafrost may enhance global warming through emissions of additional greenhouse gases to the atmosphere, forming a positive feedback. The affected regions are situated mainly in the high northern latitudes, zones that are strongly sensitive to climate warming, as both observations and modelling studies indicate. Hence, there is less doubt if, but when, to what depth, and how fast near-surface arctic and sub-arctic permafrost will melt under further warming. Questions that arise are, e.g., to what extend would this influence the regional climate, in particular the hydrological cycle and the energy fluxes between land and atmosphere? Will greenhouse gas emissions from melting permafrost areas significantly contribute to global warming, and to what amount?

To answer these questions, a climate model is required that adequately describes the cold regions' processes relevant in climate studies. These include, e.g., freezing and melting of soil moisture, and the interdependency of several soil properties. As in many global and regional climate models, these processes are not included in the current climate models of the Max-Planck-Institute for Meteorology. The implementation is currently in progress with the regional climate model REMO. As a test region Alaska was chosen, since here many observations are available. Since REMO has not been applied in this region before, the performance of the current model version has to be evaluated, especially with respect to water and energy fluxes that are important in arctic and sub-arctic regions. For model development it is decisive to recognize if the implemented changes improve the performance. We will show first results of this evaluation.