Geophysical Research Abstracts,
Vol. 10, EGU2008-A-06992, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-06992
EGU General Assembly 2008

Can a new methane model help to fill the gaps in methane emissions data from permafrost areas?

R. Wania, I. Ross, I. C. Prentice
University of Bristol, United Kingdom (rita@wania.net / Phone: +44-117-3315158)

The widely-used dynamic global vegetation model LPJ was enhanced to represent land surface processes, vegetation dynamics and methane emissions of northern ombrotrophic peatlands, which represent about half of all peatlands above 45°N. The new model version, LPJ-WHyMe, requires very little site-specific input data compared to previous methane models – required inputs are restricted to climate data and soil type. Climate and soil data are readily available on a global scale and LPJ-WHyMe can therefore be run for any site or region. This versatility offers the potential to fill some of the gaps in methane emissions data from areas which have not previously be studied because of their remoteness or inaccessability, such as large areas of Eurasia.

Evaluation of LPJ-WHyMe output shows excellent agreement of soil temperature and water table position at some sites, but reveals problems at other sites, most likely caused by inadequate representation of snow thermal properties. LPJ-WHyMe simulates water table positions in the range of lawns, the wetter sites of peatlands; the model does not yet represent peatland micro-topography. The simulated permafrost area for the year 2000 for the circumpolar area north of $45°$N is $17 \times 10^6\,\mathrm{km}^2$. The modelled active layer depths agree well with observations, although problems occur where the soil map shows a different soil type than observed or where soil depths are very shallow. Simulated methane emissions were evaluated against seven sites, of which five showed good agreement with observations. One of the problematic sites is the Stordalen site near Abisko in northern Sweden where LPJ-WHyMe models permafrost for the relevant gridcell, although observations show the permafrost there to be only sporadic. The implications of this mismatch will be discussed with respect to the extent to which a model such as LPJ-WHyMe can be used to fill data gaps in

permafrost regions and where its current limitations lie.