

[Home](#)[Online Library CP](#)

- ▣ Recent Final Revised Papers
- ▣ [Volumes and Issues](#)
- ▣ Special Issues
- ▣ Library Search
- ▣ Title and Author Search

[Online Library CPD](#)[Alerts & RSS Feeds](#)[General Information](#)[Submission](#)[Review](#)[Production](#)[Subscription](#)[Comment on a Paper](#)

Impact
Factor
2.542

ISI
indexed



▣ [Volumes and Issues](#) ▣ [Contents of Issue 3](#)

Clim. Past, 5, 361-373, 2009
www.clim-past.net/5/361/2009/

© Author(s) 2009. This work is distributed
under the Creative Commons Attribution 3.0 License.

Uncertainties in modelling CH₄ emissions from northern wetlands in glacial climates: effect of hydrological model and CH₄ model structure

C. Berrittella and J. van Huissteden

Vrije Universiteit, VU-Amsterdam, Faculty of Earth and Life Sciences, Department of Hydrology and Geo-Environmental Sciences, De Boelelaan 1085, 1081 HV, Amsterdam, The Netherlands

Abstract. Methane (CH₄) fluxes from northern wetlands may have influenced atmospheric CH₄ concentrations at climate warming phases during the last 800 000 years and during the present global warming. Including these CH₄ fluxes in earth system models is essential to understand feedbacks between climate and atmospheric composition.

Attempts to model CH₄ fluxes from wetlands have previously been undertaken using various approaches. Here, we test a process-based wetland CH₄ flux model (PEATLAND-VU) which includes details of soil-atmosphere CH₄ transport. The model has been used to simulate CH₄ emissions from continental Europe in previous glacial climates and the current climate.

This paper presents results regarding the sensitivity of modeling glacial terrestrial CH₄ fluxes to (a) basic tuning parameters of the model, (b) different approaches in modeling of the water table, and (c) model structure. In order to test the model structure, PEATLAND-VU was compared to a simpler modeling approach based on wetland primary production estimated from a vegetation model (BIOME 3.5). The tuning parameters are the CH₄ production rate from labile organic carbon and its temperature sensitivity.

The modelled fluxes prove comparatively insensitive to hydrology representation, while sensitive to microbial parameters and model structure. Glacial climate emissions are also highly sensitive to assumptions about the extent of ice cover and exposed seafloor. Wetland expansion over low relief exposed seafloor areas have compensated for a decrease of wetland area due to continental ice cover.

▣ [Final Revised Paper](#) (PDF, 1193 KB) ▣ [Discussion Paper](#) (CPD)

Citation: Berrittella, C. and van Huissteden, J.: Uncertainties in modelling CH₄ emissions from northern wetlands in glacial climates: effect of hydrological model and CH₄ model structure, *Clim. Past*, 5, 361-373, 2009. ▣ [Bibtex](#) ▣ [EndNote](#) ▣ [Reference Manager](#)

[Search CP](#)

Library Search

Author Search

[News](#)

- ▣ Two Editors of Climate of the Past among EGU 2009 medalists
- ▣ Publications by EGU Medalists
- ▣ Online textbook in climatology available
- ▣ TWO editors of Climate of the Past funded by ERC

[Recent Papers](#)

01 | CP, 01 Dec 2009:
Pollen-based biome reconstructions for Latin America at 0, 6000 and 18 000 radiocarbon years ago

02 | CP, 27 Nov 2009:
Corrigendum to Preface "Climate change: from the geological past to the uncertain future – a symposium honouring André Berger" published in *Clim. Past*, 5, 707–711, 2009

03 | CPD, 27 Nov 2009:
Mountain uplift and the threshold for sustained Northern Hemisphere

