

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
1.450

ISI
indexed



[Volumes and Issues](#) [Contents of Issue 1](#) [Special Issue](#)

Clim. Past, 3, 169-180, 2007

www.clim-past.net/3/169/2007/

© Author(s) 2007. This work is licensed under a Creative Commons License.

Simulating sub-Milankovitch climate variations associated with vegetation dynamics

E. Tüenter^{1,2}, S. L. Weber¹, F. J. Hilgen², and L. J. Lourens²

¹Royal Netherlands Meteorological Institute (KNMI), P.O. Box 201, 3730 AE De Bilt, The Netherlands

²Department of Earth Sciences, Faculty of Geosciences, Utrecht University, Budapestlaan 4, 3584 CD Utrecht, The Netherlands

Abstract. Climate variability at sub-Milankovitch periods (between 2 and 15 kyr) is studied in a set of transient simulations with a coupled atmosphere/ocean/vegetation model of intermediate complexity (CLIMBER-2). Focus is on the region influenced by the African and Asian summer monsoon. Pronounced variations at periods of about 10 kyr (Asia and Africa) and about 5 kyr (Asia) are found in the monsoonal runoff in response to the precessional forcing. In the model this is due to the following mechanism. For low summer insolation (precession maximum) precipitation is low and desert expands at the expense of grass, while for high insolation (precession minimum) precipitation is high and the tree fraction increases also reducing the grass fraction. This induces sub-Milankovitch variations in the grass fraction and associated variations in the water holding capacity of the soil. The runoff does not exhibit sub-Milankovitch variability when vegetation is kept fixed. High-latitude vegetation also exhibits sub-Milankovitch variability under both obliquity and precessional forcing. We thus hypothesize that sub-Milankovitch variability can occur due to the dynamic response of the vegetation. However, this mechanism should be further tested with more sophisticated climate/vegetation models.

[Final Revised Paper](#) (PDF, 890 KB) [Discussion Paper](#) (CPD)

Citation: Tüenter, E., Weber, S. L., Hilgen, F. J., and Lourens, L. J.: Simulating sub-Milankovitch climate variations associated with vegetation dynamics, *Clim. Past*, 3, 169-180, 2007. [Bibtex](#) [EndNote](#) [Reference Manager](#)

Copernicus Publications
The Innovative Open Access Publisher

Search CP

Library Search

Author Search

News

- [TWO editors of Climate of the Past funded by ERC](#)
- [Financial Support for Authors](#)
- [New Service Charges](#)

Recent Papers

01 | CP, 03 Nov 2008:
Forced and internal modes of variability of the East Asian summer monsoon

02 | CPD, 27 Oct 2008:
The 8.2 ka cooling event related to extensive melting of the Greenland Ice Sheet

03 | CP, 21 Oct 2008:
Anticyclonic atmospheric circulation as an analogue for the warm and dry mid-Holocene summer climate in central Scandinavia

04 | CPD, 21 Oct 2008: