

Home

Online Library HESS

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

Online Library HESSD

Alerts & RSS Feeds

General Information

Submission

Review

Production

Subscription

Comment on a Paper

Impact
Factor
2.270

ISI
indexed



[Volumes and Issues](#) [Contents of Issue 4](#) [Special Issue](#)

Hydrol. Earth Syst. Sci., 8, 803-812, 2004

www.hydrol-earth-syst-sci.net/8/803/2004/

© Author(s) 2004. This work is licensed under a Creative Commons License.

WANDA, a regional dynamic nitrogen model (With Aggregated Nitrogen DynAmics) for nitrate leaching from forests

A. Tietema

Centre for Geo-ecological Research (ICG), Institute for Biodiversity and Ecosystem Dynamics (IBED)-Physical Geography, University of Amsterdam, Nieuwe Achtergracht 166, 1018 WV Amsterdam, The Netherlands
Email: a.tietema@science.uva.nl

Abstract. Nitrate concentrations in recently infiltrated groundwater in forested areas in the Netherlands are slowly increasing towards the EU limit of 50 mg NO₃ l⁻¹. The origin of this nitrate is thought to be leaching from nitrogen (N) saturated semi-natural ecosystems in these areas. To simulate nitrate leaching on a regional scale, the empirical model WANDA (a regional nitrogen model With Aggregated Nitrogen DynAmics) is introduced. The model is built around the concept that in forests the C:N ratio of the organic layer is indicative of the amount of nitrate leaving the system in drainage. WANDA was tested on a regional dataset of an infiltration area of 10 km². This infiltration area consisted of 350 forest stands draining to the catchment "Edese Bos" used by a drinking water company. In 75 of the 350 forest stands the C:N ratio of the organic layer was measured. In 30 of these 75 stands, the nitrate concentrations below the rooting zone were measured. A hydrological model calculated water fluxes. The C:N ratio of the 75 stands ranged from 15.7 to 31.3 g C g⁻¹ N. Scots pine stands had the highest C:N ratios in the organic layer. Nitrate concentrations varied in the 30 stands from 0.6 to 70 mg NO₃ l⁻¹. The nitrate concentrations in the Douglas fir stands were higher, and in the beech stands lower, than those observed in the locations with other tree species. WANDA predicted nitrate concentrations well, but improvements are required to simulate nitrate fluxes. The simulation of the water fluxes in WANDA is probably where more focussed modelling effort is now required.

Keywords: nitrogen, nitrate, forest, model, WANDA, C:N ratio, organic layer

[Final Revised Paper](#) (PDF, 716 KB)

Citation: Tietema, A.: WANDA, a regional dynamic nitrogen model (With Aggregated Nitrogen DynAmics) for nitrate leaching from forests, Hydrol. Earth Syst. Sci., 8, 803-812, 2004. [Bibtex](#) [EndNote](#) [Reference Manager](#)

Search HESS

Library Search

Author Search

News

- New Service Charges
- Financial Support for Authors
- ISI Impact Factor: 2.270

Recent Papers

01 | HESS, 06 Mar 2009: Uncertainty analysis of hydrological ensemble forecasts in a distributed model utilising short-range rainfall prediction

02 | HESSD, 06 Mar 2009: EAGLE 2006 – multi-purpose, multi-angle and multi-sensor in-situ, airborne and space borne campaigns over grassland and forest

03 | HESSD, 06 Mar 2009: Evaluation of a probabilistic hydrometeorological forecast system