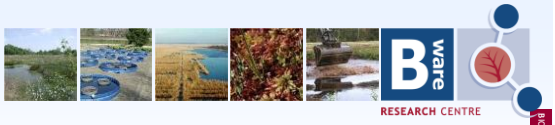

RESEARCH CENTRE

BIOGEOCHEMICAL WATER MANAGEMENT & APPLIED RESEARCH ON ECOSYSTEMS

Biochemische processen en grondwaterkwaliteit

Alfons Smolders

Onderzoekcentrum B-WARE

Radboud University Nijmegen

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Radboud University Nijmegen, the Netherlands

HYDROLOGISCH SYSTEEM MET BIJBEHORENDE VORMEN VAN DUURLIJNEN

(Bron: Van Beusekom et al., 1990).

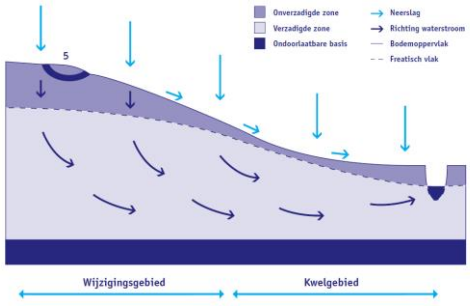


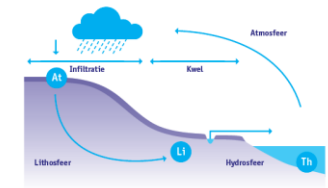
FIG 30 BEREKENING VAN DE IONEN-RATIO (IR) VOLGENS VAN WIRDUM

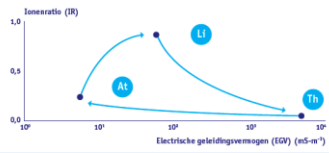
(Bron: www.natuurkennis.nl).

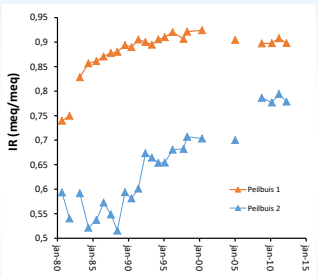
$$IR = \frac{[Ca^{2+}]}{[Ca^{2+}]+[Cl^-]} \text{ (concentratie in meq.l}^{-1}\text{)}$$

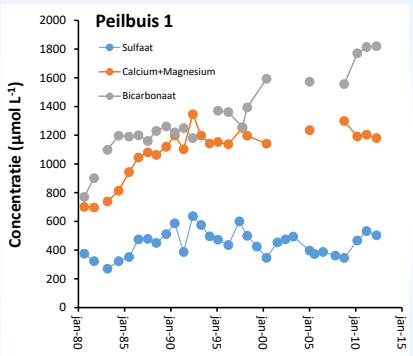
FIG 31 SAMENHANG

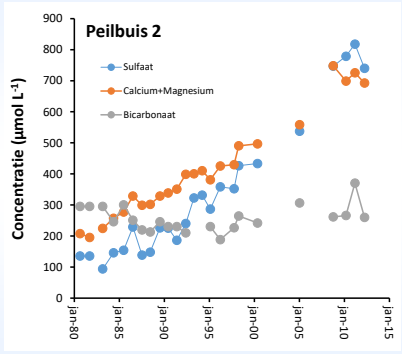
Samenhang tussen de kringloop en de chemische samenstelling van het water, weergegeven in Van Wirdum's EGV/IR-diagram (Bron: http://www.natuurkennis.nl)

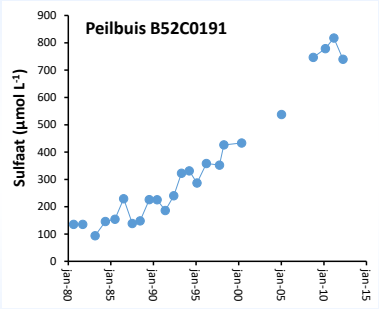




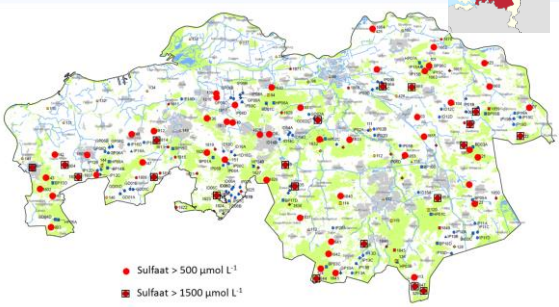


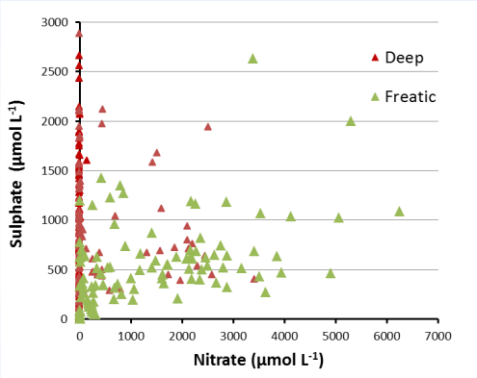


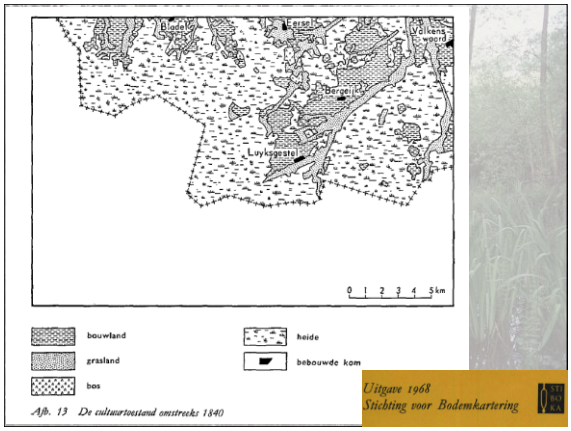


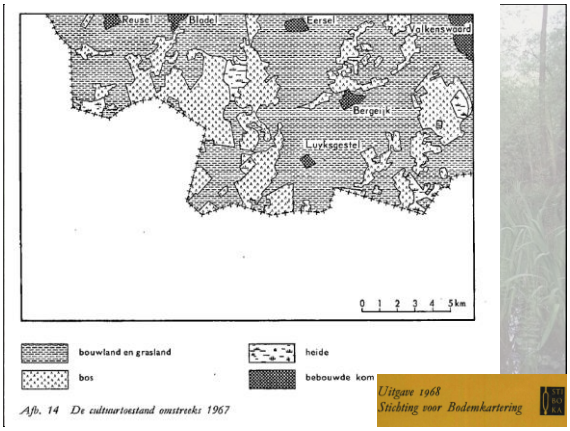


Regional scale: Sulphate concentrations in ground water (> 10 m)
in the province of Noord Brabant (The Netherlands)



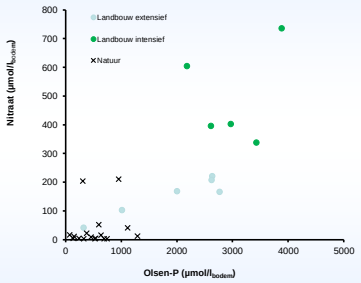




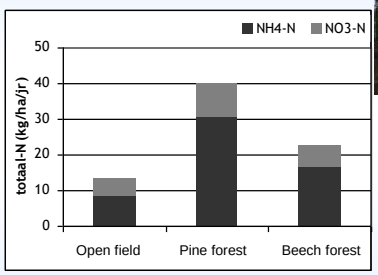


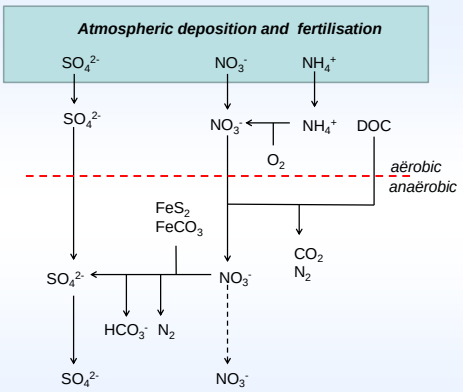
Nitraat uitspoeling uit landbouwgronden

Hazelbekke



Dense forest provokes high interception of atmospheric nitrogen and sulphur





$NH_4^+ + 2\ O_2 \rightarrow NO_3^- + H_2O + 2\ H^+$

$CaCO_{3(s)} + H^+_{(aq)} \rightarrow Ca^{2+}_{(aq)} + HCO_3^-{}_{(aq)}$

$]\text{-}Ca^{2+} + 2H^+_{(aq)} \rightarrow]\text{-}2H^+ + Ca^{2+}_{(aq)}$

$4\ NO_3^- + 4\ C_{organisch} \rightarrow 2\ N_2 + 4\ HCO_3^- + H_2CO_3 + 2\ H_2O$

$2\ NO_3^- + 10\ FeCO_3 + 14\ H_2O \rightarrow N_2 + 10\ FeOOH + 8\ H_2CO_3 + 2\ HCO_3^-$

$14\ NO_3^- + 5\ FeS_2 + 4\ H^+ \rightarrow 10\ SO_4^{2-} + 5\ Fe^{2+} + 7\ N_2 + 2\ H_2O$

$2\ NO_3^- + 10\ Fe^{2+} + 24\ H_2O \rightarrow 10\ Fe(OH)_3 + N_2 + 18\ H^+$

$SO_4^{2-} + 2\ C_{organisch} + 2\ H_2O \rightarrow HS^- + HCO_3^- + CO_2$

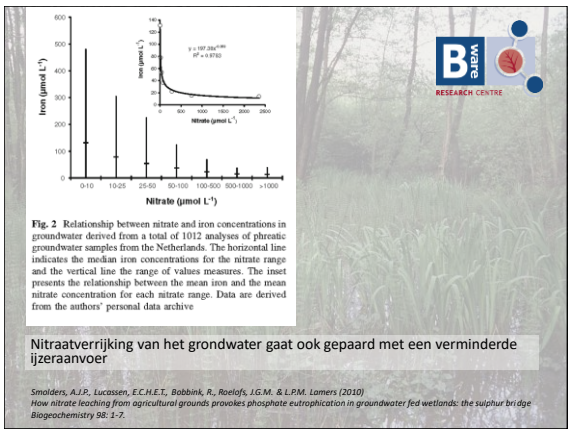


Fig. 2 Relationship between nitrate and iron concentrations in groundwater derived from a total of 1012 analyses of phreatic groundwater samples from the Netherlands. The horizontal line indicates the median iron concentrations for the nitrate range and the vertical line the range of values measures. The inset presents the relationship between the mean iron and the mean nitrate concentration for each nitrate range. Data are derived from the authors' personal data archive

Nitraatverrijking van het grondwater gaat ook gepaard met een verminderde ijzeraanvoer

Smolders, A.J.P., Lucassen, E.C.H.E.T., Bobbink, R., Roelofs, J.G.M. & L.P.M. Lamers (2010)
How nitrate leaching from agricultural grounds provokes phosphate eutrophication in groundwater fed wetlands: the sulphur bridge Biogeochemistry 98: 1-7.

Plant and Soil 196: 37–45, 1997.
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37

Nitrate induced iron deficiency chlorosis in *Juncus acutiflorus*

A.J.P. Smolders, R.J.J. Hendriks, H.M. Campschreur and J.G.M. Roelofs[1]
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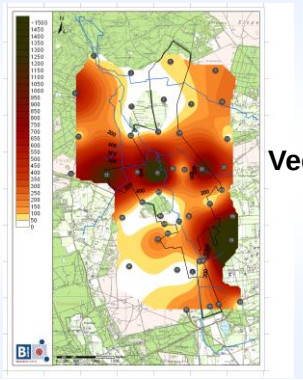
Received 8 November 1996; Accepted in revised form 6 July 1997

Key words: free amino acids, iron deficiency, *Juncus acutiflorus*, nitrate, tissue pH

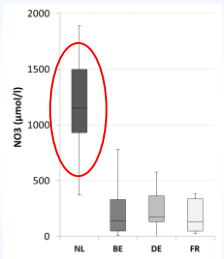
Figure 1. Typical pattern of chlorotic patches within the furthermore green vegetation of *Juncus acutiflorus* at the springs of "De Mosbeek" (The Netherlands). (Photograph courtesy of R Bobbink.)

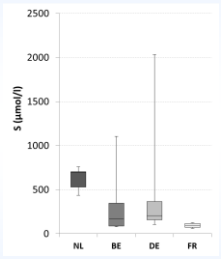
Landgoed Staverden



Veen afbraak

Vergelijking bronwaterkwaliteit Kalktufbronnen





PNAS

***Batrachochytrium salamandrivorans* sp. nov. causes lethal chytridiomycosis in amphibians**

An Martel[a,1], Annemarieke Spitzen-van der Sluijs[b], Mark Blooi[a], Wim Bert[c], Richard Ducatelle[a], Matthew C. Fisher[d], Antonius Woeltjes[b], Wilbert Bosman[b], Koen Chiers[a], Franky Bossuyt[e], and Frank Pasmans[a]

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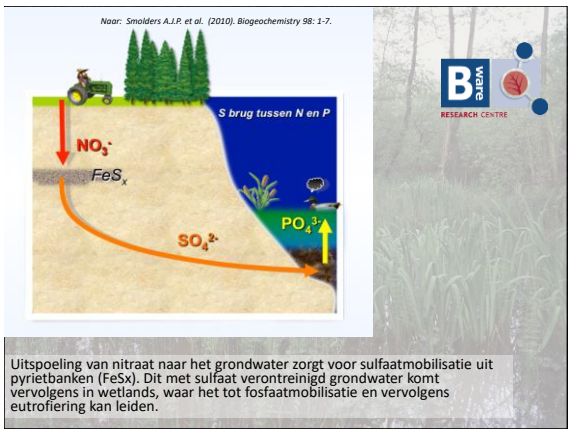
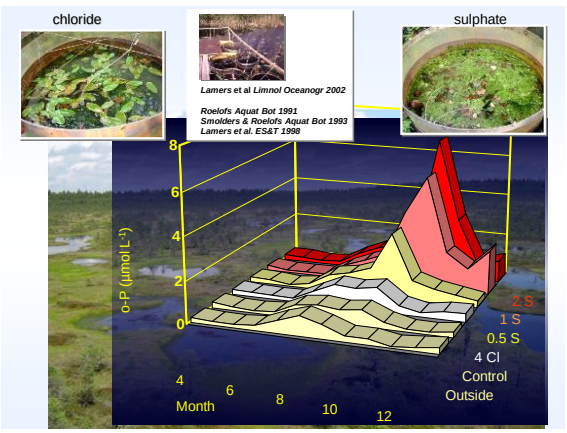
Edited by David B. Wake, University of California, Berkeley, CA, and approved August 1, 2013 (received for review April 18, 2013)

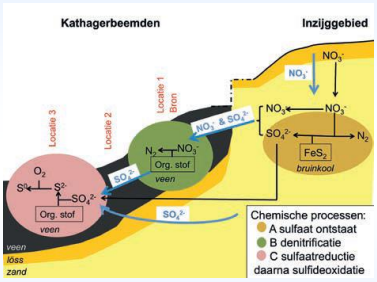
Foto's van de vuursalamander bij meetlocatie G in het Bunderbos. Links een foto van een levende Vuursalamander (25 januari). Rechts een foto van één van de 4 dode exemplaren die werden aangetroffen op 27 januari.

BIOGEOCHEMICAL WATER MANAGEMENT & APPLIED RESEARCH ON ECOSYSTEMS



Uitspoeling van nitraat naar het grondwater zorgt voor sulfaatmobilisatie uit pyrietbanken (FeSx). Dit met sulfaat verontreinigd grondwater komt vervolgens in wetlands, waar het tot fosfaatmobilisatie en vervolgens eutrofiering kan leiden.





Zwavelneerslag in het hellingveen Kathagerbeemden

Zwavelneerslag in het hellingveen Brunsummerheide

Vragen ????