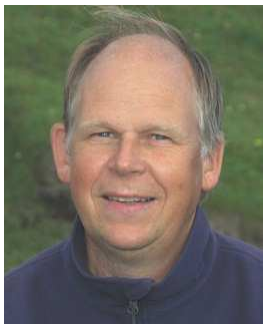
Curriculum Vitae

Personal information



Name(s):	Hans Peter Broers
Date of birth:	16 juni 1963, Naarden, The Netherlands
Gender	Male
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E-mail	hans-peter.broers@tno.nl
marital status:	married, 2 daughters

Research interests

- Groundwater-surface water interaction
- Tracer hydrogeology and groundwater age dating
- Diffuse groundwater pollution
- Monitoring strategies for surface water and groundwater
- Groundwater Protection

Profile

Hans Peter Broers (PhD) holds part-time positions as Associate Professor at VU University Amsterdam specialising in groundwater-surface water interaction and tracer hydrogeology and as senior expert Groundwater Quality and Groundwater Monitoring at TNO Geological Survey of the Netherlands. He is fascinated in connecting fundamental and applied hydrological science and strongly believes that understanding of system behaviour is key to find effective solutions for societal problems related to groundwater and surface water resources management and protection. His research interests include the combined water quality and quantity aspects of groundwater-surface water interaction and the use of tracers and isotopes in understanding of flow and diffuse pollution patterns in groundwater and surface waters. He believes in the strength of well-designed monitoring networks and dedicated field measurements and promotes the mutual feedback between modelling and monitoring in hydrological studies. Recently initiated work comprises the assessment of travel time distributions of drinking water well fields using age tracers, the evaluation of ecosystem services of groundwater, the delineation of National Groundwater Reserves and field scale studies on the water quality aspects of groundwater-surface water interaction.

Hans Peter has an effective international network in science and policy, which includes convening sessions at international scientific conferences, chairing EU activities on groundwater and advising EU policy officers, cooperating in EU FP7consortia, and chairing the Eurogeosurveys Water Expert Group. Hans Peter (co-)authored about 200 publications, over 40 of which appeared in international peer reviewed journals (H-index = 15 Scopus, 18 Scholar). He supervises PhD students on subjects such as ‘age dating of groundwater’, ‘statistical trend analysis’, ‘groundwater-surface water interaction’, ‘catchment hydrology’ and ‘hydrogeochemistry of diffuse contaminants in groundwater’ Hans Peter aspires research projects that aim for a better understanding of water quality patterns in order to contribute to robust, sustainable and climate proof management of groundwater and surface water resources, preferably connecting universities and research institutes in Europe, the US and China.

Education and training

1975-1981	atheneum Chr. College Stad en Lande, Huizen
1981-1984	physical geography, Institute of Earth Sciences, Vrije Universiteit Amsterdam
Oct. 1984	BSc physical geography (met veel genoegen)
1984-1988	geohydrology, Institute of Earth Sciences, Vrije Universiteit Amsterdam • major: geographical hydrology (groundwater hydrology, hydrogeology, surface water hydrology, hydrochemistry, statistics) • minor: hydrogeochemistry (Institute of Earth Science, Universiteit Utrecht)
Aug. 1988	MSc geohydrology 'old style' (met veel genoegen)
Oct. 2002	PhD, thesis: 'Strategies for regional groundwater quality monitoring', Universiteit Utrecht

Courses

Nov. 1991	course 'Applied modelling of groundwater chemistry' IGWMC/IHE
Nov. 1994	course 'Diagnosis & Remediation of DNAPL sites', University of Waterloo, Centre for Groundwater Research, Canada
Dec. 1995	course 'Project Management', Leeuwendaal Advies
Nov. 1997	course 'Personal management', Intermediair Management Training
2009-2012	courses Chinese Language, Vereniging Nederland-China, Chinese College Nederland

Work experience

1990-present	**Project manager/ senior researcher hydrogeology/ hydrogeochemistry, TNO Geological Survey of the Netherlands**
2008-present	senior groundwater quality expert, TNO Geological Survey of the Netherlands, department Geo-modelling
2002-2007	senior researcher/thematic coordinator Regional Water Quality and River Basin Management, TNO department Groundwater Management
1999-2002	senior researcher /thematic coordinator Monitoring TNO Department Groundwater Monitoring
1997-1999	project leader/researcher, TNO department Regional Groundwater Systems
1994-1997	project leader/researcher, TNO department Contaminant Hydrogeology
1992-1994	project leader/researcher, TNO department Research and Development
1989-1991	junior project leader/researcher, TNO department Regional Studies
2010-2015	**Associate Professor Tracer Hydrogeology and Groundwater-Surface water Interaction, VU University, Department of Hydrology and Geo-Environmental Sciences(part-time)**
2008-2014	**Project manager/researcher groundwater-surface water interaction, Deltares (part-time)** senior researcher, Deltares department Soil and Groundwater Quality (part time)
1997-2002	**Assistant Professor, Interfacultair Centrum Hydrologie, Universiteit Utrecht (part-time)** - contributions in setting up the MSc study Hydrology - teaching hydrogeology and contaminant hydrology - research on groundwater flow and groundwater hydrogeochemistry
1988-1989	**Civil service Dienst Grondwater Verkenning TNO**
1987-1988	**External traineeships: Dienst Grondwaterverkenning TNO and Kiwa**
1986-1987	**MSc research provincie Friesland, Limnological Institute**

External assignments

2014-present	Convenor of the 2014 and 2015 EGU session on "Shale Gas Extraction and Groundwater Resources"
2014-present	Member of the Scientific Advisory Forum of the International Conference on Land Use and Water Quality, Vienna, September 2015
2014-present	Editor of HESS special issue on "High resolution monitoring strategies for nutrients in groundwater and surface waters: big data jump in the future to assist EU Directives"
2013	Member Panel of the International Conference: S-Bridge: Shale Gas as an intermediate energy carrier. Warsaw, 12-13 Nov 2013
2013-present	Co-convenor of the 2013 and 2014 AGU sessions "Agricultural impacts on water resources".
2011-present	Convenor of the 2012 , 2013, 2014 and 2015 EGU sessions on "Monitoring Strategies: temporal trends in groundwater and surface water quality and quantity"
2010-present	Chair of the EU activity on "Climate Change Impacts on Groundwater", chair of 2 workshops (Warsaw Oct. 2011, Cyprus 2012)
2003-present	Chair of Eurogeosurveys Water Expert Group
2003-present	member EU CIS Working Group C on Groundwater, representing Eurogeosurveys, advise of European Commission on the implementation of the EU Water Framework Directive and the negotiation and implementation phases of the Groundwater Directive (2006)
2003-present	member advisory board 'National Monitoring Network for Evaluation of the Nitrates Directive' (LMM)
2006-2008	Co-chair of the EU CIS drafting group of the EU Guidance on 'Status and Trends Assessment' for the Groundwater Directive
2005-2007	member of the EU CIS drafting group of the EU Guidance on 'Groundwater Monitoring' for the Groundwater Directive
2003-2011	member working group 'Groundwater' for the Dutch national implementation of the EU Water Framework Directive
2004-2010	member advisory board Alterra project 'Monitoring River Basins', Ministry of Agriculture, Nature and Food Quality (LNV)
2003-2007	member advisory board Research Programme Manure and Fertilizer Policy, Ministry of Agriculture, Nature and Food Quality (LNV)
2002-2004	member SKB platform 'Systems approach to groundwater management"
1995-1998	programme manager 'Monitoring en Characterization' Netherlands Research Programme Biotechnological In-Situ Remediation (NOBIS).
1994-1998	member evaluation committee Netherlands Research Programme Biotechnological In-Situ Remediation (NOBIS). Projects evaluation and supervision.
1997-2002	co-founder 'ad hoc working group Pyrite'.
1995-2001	member editorial board of 'Stromingen', journal of the Association of Dutch Hydrologists (NHV)
1989-1992	member board of the Dutch national working group on Ecohydrology, Working Community Landscape Ecology (WLO)

Main activities and responsibilities

Project management

Initiating, leading, executing and reporting research and consultancy projects, supervising and coaching of junior and medior colleagues, budget control, quality assurance of research results, contributing to recruitment of hydrology and geochemistry candidates

2010-present Project leader of projects on:

- the use of modern age dating tools for management of drinking water well fields for Vitens (2010-2012) and Brabant Water (2013-2015) cumulative turnover appr. 375 kEUR.)
- Assessment of candidate National Groundwater Reserves as part of the Dutch national srinking water management strategy (STRONG) (Deltares: turnover kE 40)
- Field study on the mobilisation of H_2S gas from groundwater water in relation to

reported health problems (Province of Brabant, TNO, turnover kE50)

- setting up a new monitoring network for nutrients in Dutch agricultural headwaters as input for the evaluation of the Dutch Manure Law and the EU Nitrates Directive (Deltares, , turnover appr. 300 kEUR.)
- Assessment of the water quality effects of controlled tile drainage (Deltares, , turnover appr. 200 kEUR.)
- National scale assessment of groundwater-surface water interaction for the Netherlands (TNO, turnover appr. 80 kEUR.)
- Pilot for the regional mapping of groundwater quality in relation to the subsurface geology and hydrogeochemistry (TNO. 100 kEUR)
- Strategic framework for decision support on groundwater and subsubsurface uses in relation to ecosystems services (Afwegingskader Grondwater), performed for the Ministry of Infrastucture and Environment (Deltares KPP, kE 200 2013/2014)
- Assessment of the effects of controlled drainage on adjacent nature reserves (kE 20)

2004-2009	Initiative and coordination of the work package 'Trends in Groundwater' of the EU FP VI Integrated Project Aquaterra. Aim: development of statistical and deterministic trend analysis tools dedicated to implementation of the WFD and Groundwater Directive. Co-operation with partners from Poland, France, Belgium and Austria. Turnover appr. kEUR 1000.
2007-2009	Project management of research projects dealing with 'age dating of groundwater', 'tools for trend detection', 'the groundwater contribution to surface water quality' and 'the Dutch implementation of the EU WFD and Groundwater Directive' and 'surface water quality impact of tile drain control measures on agricultural fields'
2003-2008	Initiative and coordination of the 'Stromon' project (Integrated monitoring of surface water and groundwater in river basins). Project was linked to the EU FPVI project Aquaterra and co-financed by the province of Noord-Brabant and three water boards. Turnover appr. 500 kEUR.
1990-present	Project management of large number of applied research and advisory projects for Dutch ministries, provincial authorities, water boards, water supply companies and industries. See under caption 'applied research and specialist advice'.

Project acquisition and market development

Approaching potential customers and funding agencies, organizing workshops, initiating and writing research proposals, financial planning, setting middle and long term research and turnover targets

2014-present	Preparation of call texts on the 2015/2016 ERANET on Earth Science and Groundwater
2013-present	Project proposal for the assessment of the age distribution of 41 water works in the South of the Netherlands using noble gases and water and carbon isotopes revealing paleoclimate patterns (Brabant Water , granted, turnover kE130, granted)
2012-present	Contribution as task leader to the FPVII MARS proposal (Management of Aquatic Ecosystems and Water Resources under Multiple Stress; kE10.000 EU budget). EU funding Deltares ~kE 900, including PhD work (granted)
2012-present	Initiating and coordinating workshop between USGS and Deltares in order to promote future collaboration related to groundwater science
2011-present	Initiatives for groundwater related topics within FPVII consortia (under construction) and getting groundwater mentioned within the FPVII calls
2010-2012	Presentation of a Eurogeosurveys position paper for new topics within the EU FPVII programme, organizing workshops with policy and R&D officers from DG-ENV and DG-Research to influence the EU research agenda.
2010-2012	Initiative for a new monitoring network for nutrients in agricultural headwaters as a contribution to the Dutch evaluation of the Nitrates Directive and the Dutch Manure Law (turnover appr.kE 300, granted)
2007-2009	Contributions to the market and research strategies of Deltares, participating in the 'working group European Research Arena' (2007-2008) and the 'Marktteam Klimaat' (2009)
2009	Preparation of a research proposal for the application of modern age dating techniques ($^{3}H/^{3}He$, ^{39}Ar, ^{85}Kr) for predicting water quality at well fields for drinking water supply.(period 2009-2011: turnover kE 220, granted)
2009	Preparation of a research proposal for the water board Rijn en Ijssel which aims to study the water quality effects of 'water level-controlled artificial drainage' of agricultural fields in the Hupsel catchment, using the experimental field site of two PhD students (period 2009-2010: turnover kE 150, granted)

2009	Building consortia and writing research proposals for the Dutch Innovation Programme on the implementation of the EU water Framework Directive (turnover appr. kE 600) • water quality based operational management of Meuse river water inlet in regional brook systems (consortium of 10 partners, including water boards, provinces, STOWA, CSN and Royal Haskoning). Expected turnover period 2009-2011: kE700 • catchment-scale efficiency of curative measures for artificial drainage of agricultural fields (extension of th Rijn en Ijssel project)
2009	Preparation of a new monitoring and hydrogeochemical data acquisition programme for deeper monitoring of groundwater for the Nitrates Directive, following the Koopmans-motie of the Dutch Parliament. Cooperation with RIVM and Alterra.
2008-2009	Building a new proposal for a joint Alterra/Deltares continuation of the 'Monitoring River Basins' project, combining modelling and monitoring of surface water quality response to measures taken in the Nitrates Action Programme
2007-2008	Initiative and scientific coordination of a FP VII Integrated Project for the Groundwater Systems topic 'Groundwater Assessment and Management for Europe, GAME'. Appr. Turnover kE 10.000, 25 international partners, appr. 20 PhD students planned. Project scored 14 out of 15 points, second in rank, no funding.
2006-2007	Preparation of a Eurogeosurveys position paper for new topics within the EU FPVII programme, organizing workshops with policy and R&D officers from DG-ENV and DG-Research. Eventual topic in FPVII call was primarily based on our position paper.
2004-2007	Leading the 'market team river basin management' and coordination of the marketing and R&D strategy of the TNO on the implementation of the EU Water Framework Directive
2002-2004	Writing proposal for a work package TREND2 under the FP VI Integrated Project Aquaterra, turnover UU and TNO kEUR 500 (granted)
2002-2004	Contributions to the proposal of the FP VI Policy Support Project BRIDGE, turnover for TNO kE 250 (granted)
2001-2004	Leading the market team soil and groundwater monitoring' and coordination of the marketing and R&D strategy on soil and water quality monitoring, coordination of project acquisition, and promoting co-operation between and within the teams
1995-1998	Writing project proposals, building consortia and approaching potential customers for the ICES programme NOBIS (Netherlands Research Programme In-Situ Remediation) and SKB (Knowledge Platform Soil).
1992-1994	Writing project proposal for the building of the Dutch Regional Geohydrological Information System (REGIS) in close co-operation with 12 provinces and the Ministry of Water.

Initiating R&D programmes

Initiating new developments in research themes for the TNO applied research program (KIP) and the Deltares Strategic Research Program, including promoting scientific co-operation with universities through joint PhD projects, organizing funding and co-funding from EU Framework Programmes, EU Marie Curie Training Networks, the Dutch Organization for Scientific Research (NWO) and external parties such as water boards and provincial and national authorities.

2014-present	Contribution to the EU Marie Curie Initial Training Network proposal MITEAM on the multidisciplinary study of paleoclimate archives, focusing on the groundwater archive. In cooperation with VU and UU (under evaluation)
2013-2014	Initiative to include groundwater components in the FPVII MARS proposal (Management of Aquatic Ecosystems and Water Resources under Multiple Stress) and consortium building (granted)
2011-2012	Contribution to the EU Marie Curie Initial Training Network proposal WATERFALL on catchment hydrology, targeting for a total of 12 new PhD students, in cooperation with UFZ and 13 other institutes and enterprises (failed)
2011-2012	Contribution to the Deltares Self Evaluation of Disciplines (Knowledge Position Audit) on the topic of Chemistry and Microbiology within the Environmental Sciences Cluster, including recommendations for future research directions
2008-present	Contributions to the Deltares/Waterdienst Applied Research (KPP) and Strategic Research (SO) programmes. Preparation of KPP proposals for 'Monitoring and Measures for the European Water Frame Work Directive '(2008), and for surface water quality monitoring strategies for ex-post assessment of the effects of the Nitrates Directive and WFD under 'BOA Landbouw' (2010)
2006-2008	Initiative for research on the effects of climate change on water quality development for a

	case study of the Dommel river brook system, including downscaling of global and regional climate models (co-operation University of Newcastle) and modelling transport of Zn and Cd (co-operation Alterra/WUR)
2007-2008	Initiative and scientific coordination and consortium building of a FP VII Integrated Project for the Groundwater Systems topic 'Groundwater Assessment and Management for Europe, GAME'.
2005-present	Initiative for tests with the Hydrogeosphere fully-coupled surface water-unsaturated-saturated zone model in catchment studies. Co-operation through PhD project Rozemeijer with University of Liège and Waterloo
2006-present	Supervision of TNO financed PhD projects of Joachim Rozemeijer and Ype van der Velde on the subject of 'dynamics in surface water and groundwater quality DYNAQUAL), continuing earlier R&D work at TNO (2002-2006). Co-operation with University of Utrecht (Bierkens) and WUR (van der Zee, de Rooij).
2004-present	Initiative for NWO-Water proposal for PhD on 'Coupled biogeochemical dynamics of nitrogen and ulphur in aquifer systems and implications for groundwater quality threatened by agricultural nitrogen pollution'.
2004-2009	Initiative for PhD research on 'Trends in Groundwater' using modern age dating techniques within the Aquaterra work package Trend 2. Co-operation Universiteit Utrecht (Bierkens).
2002-2006	Set-up of a project to develop integrated monitoring systems for soil, surface water and groundwater in river basins and catchments (KIP project Integrative monitoring). Was later extended in a EU and water authorities co-funded project aiming at quantifying the groundwater contribution to surface water quality deterioration using 3D transport models and novel streamtube modelling approaches (Stromon-Aquaterra).
1999-present	Set-up of projects to explore the application of modern age dating methods ($^{3}H/^{3}He$, CFCs, SF^{6}) for trend analysis applications and characterisation of groundwater flow. Became part of Aquaterra Trend 2 and PhD work Ate Visser.
1998-2001	Set-up of KIP project BODGROND, which aimed to integrate regional soil and groundwater monitoring networks
1997-1999	Writing of NWO proposal for PhD work on 'Characterisation of the physical and chemical heterogeneity of unconsolidated sediments' Co-operation with Universiteit Utrecht (Burrough).
1997-2001	Set-up of KIP project KWALMEET, which aimed at developing methods for design, installation, exploitation, data analysis and optimisation of regional groundwater quality monitoring networks.
1994-1998	Preparation of a joint R&D programme for NOBIS (Netherlands Research Programme Biotechnological In-Situ Remediation) on the field characterisation of DNAPL contaminated sites. DNAPLKAR: characterisation of Dense Non Aqueous Phase Liquids for delineation of plume and sources areas. HYDRAKAR: characterisation of hydraulic heterogeneity at soil remediation sites.
1993-1997	Set-up of research on the reactivity of subsurface sediments (KIP projects GWMAN and Integrated Transport Model). Hydrogeochemical and hydrological research focusing on relations between groundwater quality and reactivity. Included new techniques for undisturbed anoxic sampling, development of laboratory extraction techniques and methods for representative sampling

Supervision of PhD research

2014-present	Supervision FPVII MARS project PhD student Kaandorp on groundwater base flow regimes and groundwater-surface water interaction in relation to aquatic ecosystems
2013-present	Supervision of CSC scholarship PhD student Liang Yu on water quality in urban environments (started autumn 2013) in cooperation with Waternet
2011-present	Co-supervision of Marie Curie ITN PhD Stefanie Lutz, Vrije Universiteit (main supervisor Boris van Breukelen). Coupled groundwater-surface water modelling of isotope fractionation in pesticides.
2006-present	Supervision of NWO PhD student Yanchun Zhang. Co-operation with Geochemistry, Universiteit Utrecht (Van Cappellen, Slomp). 'Coupled biogeochemical dynamics of nitrogen and sulfur in aquifer systems and implications for groundwater quality threatened by agricultural nitrogen pollution'.
2006-2011	Supervision of two TNO/Deltares funded PhD students (Joachim Rozemeijer and Ype van der Velde) on the subject of 'dynamics in surface water and groundwater quality DYNAQUAL focusing on groundwater –surface water interaction. Co-operation with Universiteit Utrecht

(Bierkens, van Geer) and WUR (van der Zee, de Rooij).

2004-2009 Supervision of EU Aquaterra-funded PhD student Ate Visser on the subject of 'Trends in groundwater in relation to groundwater age'. Co-operation Universiteit Utrecht (Bierkens). Ate received Cum Laude Judicium May 15th 2009.

1999-2003 Supervision of NWO funded PhD Pieter-Jan van Helvoort on 'Characterisation of the physical and chemical heterogeneity of unconsolidated sediments' Co-operation with Universiteit Utrecht (Burrough, van Gaans). Member of examination committee.

Teaching and courses

2012-present Teacher of MSc course Isotope Hydrology, Vrije Universiteit Amsterdam, focusing on groundwater aspects

2012-present Trainer/coach of young sailors in Optimist Class.

1997-2001 Set-up of the MSc education programme Hydrology at the IHCU, Universiteit Utrecht (with Boogaard, Hendriks, Griffioen, Oude Essink, Verweij, Karssenberg)

1997-2001 Preparation of Courses:

- Hydrological Transport Processes (topics Transport of diffuse contaminants in groundwater, multi-phase flow)
- One week course Hydrogeological and Hydrogeochemical Field Techniques
- Groundwater modelling II: advective and reactive transport
- Six week course 'Hydrogeological and hydrogeochemical Fieldwork' , Southern France; karstic area and adjacent basin

1994-present Supervision of MSc research on topics hydrology, hydrogeochemistry and transport modelling of students doing interns at TNO and Deltares

1993 On the job training of the staff of the Meteorological Institute, Poznan, Poland

1984-1990 Trainer/coach of young sailors in International Vaurien and Optimist Classes. Coach at junior world championships.

Knowledge dissemination

1990-present Presenting research results at international conferences (IAHS, IAH, EGU, AGU, Modelcare, Water Rock Interaction), international workshops (COST), EU Working Groups, national conferences (NHV, Geochemische Kring BodemBreed, Lassa, KNCV, platform Systeemgericht Grondwaterbeheer), guest lectures (TU Delft).

1990-present Keynotes and invited lectures at AGU, EGU, EU conferences and COST, KNCV, NHV meetings etc.

1990-present Publications in international peer-reviewed journals, conference proceedings, book chapters, and national journals (see attached List of Publications)

Applied research and specialist advice (selection)

Applied studies and research for national and provincial authorities, water supply companies and private companies

2014-present Delineation of National Groundwater Reserves in the Netherlands as basic information to be used in the STRONG Plan MER

2014-present Assessing the age distributions of pumped groundwater at 41 water works in the South of the Netherlands (Brabant Water)

2014-present Assessing the spatial distribution of high H_2S concentrations in groundwater that may lead to health problems after degassing during and after pumping (air and water measurements, Province of Brabant)

2014-present Contributions to the delineation of Strategic Groundwater Resources in cooperation with RIVM as basic information to be used in the STRONG Plan MER

2013-present Strategic framework for decision support on groundwater and subsurface uses in relation to ecosystems services (Afwegingskader Grondwater), performed for the Ministry of Infrastucture and Environment

2012-present Pilot for the regional mapping of groundwater quality in relation to the subsurface geology and hydrogeochemistry (TNO Geo_Information program)

2012-2013 Assessment of the effects of controlled drainage on adjacent nature reserves (Natuurmonumenten en Staatsbosbeheer)

2010-2012r Assessing travel time distributions of drinking water well fields using ^{3}H, ^{3}He, ^{39}Ar and ^{85}Kr age tracersin order to support improved water quality prognosis (Vitens)

2011-2012 Setting up a new monitoring network for nutrients in Dutch agricultural headwaters as input

	for the evaluation of the Dutch Manure Law and the EU Nitrates Directive (Ministry of Infrastructure and Environment)
2011-2012	National scale assessment of groundwater-surface water interaction for the Netherlands (TNO Geo-Information program)
2010-2001	Assessment of the water quality effects of controlled tile drainage (Waterschap Rijn en Ijssel)
2009	Setting up a field test site for assessing the surface water quality impacts (N and P) of tile drain control measures (peilgestuurde drainage) on agricultural fields'in the Hupsel catchment (Waterboard Rijn en IJssel).
2008-2009	National study on the representativeness of the WFD monitoring programmes for groundwater quality (customer VROM, co-operation RIVM)
2007-2009	Contributions to the EU Guidances for the implementation of the WFD and Groundwater Directives
2007-2008	Study on the groundwater contribution to surface water quality deterioration in the province of Limburg (customers: province of Limburg, water boards Peel en Maasvallei and Roer en Overmaas)
2006-2009	Preparation of the Dutch Guidance on Monitoring for the EU Water Framework Directive (customer VROM, co-operation Royal Haskoning)
2005-2006	Research on the effectiveness of quality monitoring networks around drinking water well fields, transport modelling, Monte Carlo simulations heterogeneous solute inputs and flow fields (customer Vitens)
2005-2006	Design of the WFD monitoring programme for the Dutch river basin district Meuse (customers: provinces of Limburg and Noord-Brabant, co-operation Grontmij)
2004-2008	Advice on the Dutch test depths for compliance with the EU Nitrates Directive (customer: Ministries of VROM/LNV, co-operation RIVM,Alterra)
2000-2006	Exploitation and annual data analysis and reporting of chemical status and trends in the provincial groundwater quality monitoring networks-Brabant. (customer: province of Noord-Brabant)
2002-2003	Advice on area specific background and threshold concentrations for the deep groundwater in western part of the Netherlands (customers: provinces of Noord en Zuid-Holland)
2002-2004	Advice on the monitoring of the uppermost groundwater at the groundwater protection zones in Noord-Brabant (province of Noord-Brabant)
2002-2003	Advice on the design of the nitrates monitoring network of Flanders (customer: Flemish Ministry of the Environment)
2001-2003	Advice about leaching of pesticides to groundwater and monitoring (customers: BASF, Agrichem, VEWIN)
2000-2001	Advice on the integration of soil and groundwater quality monitoring networks (customers: 8 provinces)
1997-1999	Development of a sampling strategy for characterizing subsurface geochemistry in groundwater protection areas around drinking water well fields (customer: water supply companies, co-operation Kiwa)
1995-1997	Study on the origin of heavy metals and arsenic concentrations at the drinking water well field Oostrum (customer: WML)
1994-1999	Reports on trends and status of groundwater quality for provinces Drenthe, Zuid-Holland en Noord-Brabant
1990-1994	Design of groundwater quality monitoring networks for the provinces of Zuid-Holland, Noord-Brabant, Drenthe, Flevoland en Friesland.

List of reports and publications

Publications

Peer-reviewed publications

Rozemeijer, JC; Visser, A; Borren, W; Winegram, M; van der Velde, Y; Klein, J; Broers, HP (2015) High frequency monitoring of water fluxes and nutrient loads to assess the effects of controlled drainage on water storage and nutrient transport, Hydrology and Earth System Sciences Discussions,12,,6275-6304,2015,

van der Grift, B; Broers, HP; Berendrecht, WL; Rozemeijer, JC; Osté, LA; Griffioen, J (2015) High-frequency monitoring reveals nutrient sources and transport processes in an agriculture-dominated lowland water system, Hydrology and Earth System Sciences Discussions,12,,8337-8380,2015,

European Commission (2015). Nutrient pollution in Dutch streams is falling, but further reductions needed. In: ***Science for Environment Policy***; European Commission DG Environment News Alert Service. Ed: Univ. of West England, Bristol.

Rozemeijer, J.C., Klein, J., Broers, H.P., Van Tol-Leenders, T.P., Van Der Grift, B.(2014) Water quality status and trends in agriculture-dominated headwaters; a national monitoring network for assessing the effectiveness of national and European manure legislation in The Netherlands ***Environmental Monitoring and Assessment*** 186:8981–8995, DOI 10.1007/s10661-014-4059-0

Visser A., H.P. Broers, R. Purtschert, J. Sültenfuss and M.de Jonge (2013). Groundwater travel time distributions at a public drinking water supply well field derived from multiple age tracers (85Kr, 3H, noble gases and 39Ar). ***Water Resources Research*** 49(11):7778-7796

Massoudieh, A., Visser A., Sharifi S. and H.P. Broers (2014) A Bayesian modeling approach for estimation of a shape-free groundwater age distribution using multiple tracers. Accepted for publication ***Applied Geochemistry*** 50:252-264.

Lutz S.R., H.J. Van Meerveld, M. J. Waterloo, H. P. Broers, B. M. Van Breukelen (2013). A model-based assessment of the potential use of compound specific stable isotope analysis in river monitoring of diffuse pesticide pollution . ***Hydrology and Earth System Science*** 17:4505-4524.

Zhang, Y.C., Prommer, H., Slomp, C.P., H.P. Broers, B. van der Grift, Passier, H.F., Greskowiak J., Boettcher M.E. and van Cappellen, Ph. (2013). Model based analysis of the biogeochemical and isotope dynamics in a nitrate-polluted pyritic aquifer. ***Environmental Science and Technology*** 47:10415-10422.

Hendriks, D, Broers, H.P. Broers, van Ek, R.,Hoogewoud, J, Becker, B (2013). Spatial and Temporal Distribution of Surface-Subsurface Water Interaction in the Netherlands. ***Wasserwirtschaft*** 103:29-36

Visser, A., J. Kroes, M. van Vliet, S. Blenkinsop and H.P. Broers (2012). Climate change impact on the hydrology and the leaching of a heavy metal contamination of a small lowland catchment. ***Journal of Contaminant Hydrology*** 127:47-64

Zhang Y.C., C.P. Slomp, H.P. Broers, H.F. Passier, M.E. Boettcher, E.O. Omoregie, J.R. Lloyd, D.A. Polya and Ph. van Cappellen. (2012). Isotopic and microbiological signatures of pyrite-driven denitrification in a sandy aquifer. ***Chemical Geology*** 300-301:123-130

Van Vliet, M.T.H., S. Blenkinsop, A. Burton, C. Harpham, H.P. Broers and H.J. Fowler (2012) A Multi-model ensemble of downscaled spatial climate change scenarios for the Dommel catchment, western Europe. ***Climatic Change*** 111:249-277. DOI 10.1007/s10584-011-0131-8

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