

Curriculum Vitae



Anna-Neva Visser

Birth date: 20.11.1988

Nationality: German

Research Interests

My main research interests are focused on biodegradation processes in (ground-)waters as well as the associated impact on the predominant microbial community. During the past years, especially N-bearing species caught my attention as well as the utilization of naturally occurring denitrification as a bioremediation technique in order to decontaminate waters in the deep subsurface. A high quality of groundwater is essential as it is considered to be our main drinking water supply. Hence, its protection and remediation are major issues which I wish to further investigate. I am convinced that one major attempt to protect our drinking water supplies is to focus on the impact pollutants have on microbial communities and how these communities respond. If we are able to understand and even stimulate the mechanisms used by microorganisms to e.g. cope with these pollutants, we might even be able to pre-treat our waste waters accordingly and to adapt our “fertilization habits”.

Career goals: Although it is a very competitive and tough path, I wish to stay in academia and science. Lab work, experiment planning and also gaining all the necessary background knowledge (and even more) as well as teaching students either in a lecture or directly in the lab, was most fulfilling and I hope I will be able to stay and continue in this path.

Education

04/2015 – 06/2018 **PhD in Environmental Sciences (Dr. rer. nat.).** Eberhard Karls University, Tübingen, DE

Focus: Geomicrobiology/ Isotope Biogeochemistry (*cum laude*)

Supervisors: Prof. Dr. Andreas Kappler, Prof. Dr. Moritz Lehmann

Topic: „*Unravelling denitrification mechanisms in laboratory batch cultures & a karst aquifer microbial community – a stable isotope approach supported study.* “

- Method development for the isolation of novel nitrate-dependent Fe(II)-oxidizing and denitrifying bacteria from a German karst aquifer
- Nitrogen and oxygen stable isotope measurements (CF-IRMS, azide method, denitrifier method)
- Investigation of abiotic reactions between Fe(II) and nitrite
- Investigating the mechanism of mixotrophic nitrate-dependent Fe(II)-oxidizing bacteria grown under anoxic conditions
- Presenting results at international conferences
- Interfaculty and international work experience

Special activities: Organization and facilitation of the ZAG seminar (SS 2015)

Responsible person and maintenance of an anoxic glove bench (MBraun)

10/2012 – 03/2015 **Master of Science.** Eberhard Karls University, Tübingen, DE

Main field: Geoecology
Focus: Biogeochemistry/ Geomicrobiology

Master of Science Geoecology (1.4)

Thesis: *“Application of N/O isotopes for identification of Fe(II) oxidation mechanisms in nitrate-reducing Fe(II)-oxidizers”* (1.3)

Center for Applied Geosciences (ZAG); Geomicrobiology
Supervisors: Prof. Dr. Andreas Kappler, Dr. Scott Wankel (WHOI, USA)

10/2009 – 10/2012 **Bachelor of Science.** Friedrich-Schiller University, Jena, DE

Main field: Biogeosciences

Bachelor of Science Biogeosciences (2.4)

Thesis: *“The effect of land use on the stoichiometry of fine roots”* (1.6)

Biogeochemical Processes
Supervisor: Dr. Angelika Thuille

09/2005– 03/2009 **Abitur.** Helmholtz Gymnasium, Zweibrücken, DE

Scientific Career

06/2018 – today **Postdoc.** Department of Environmental Sciences, Biogeochemistry Group, University of Basel, CH

- N and O stable isotopes in denitrifying bacteria
-

06/2014 – 08/2014 **Research stay.** Woods Hole, USA

Woods Hole Oceanographic Institute
Supervisor: Dr. Scott Wankel

Lab Experience

11/2013 – 06/2014 **Student Research Assistant.** Eberhard Karls University, Tübingen, DE

Research group: Geomicrobiology (Prof. Dr. Kappler)

- Cultivation of denitrifying bacteria

01/2013 – 10/2013 **Student Research Assistant.** Eberhard Karls University, Tübingen, DE

Research Group: Environmental Mineralogy (Prof. Dr. Haderlein)

- Investigating redox potentials of humic acids (sorption experiments)
- Utilization and adaption of electrochemical methods; DOC analysis, UV-VIS spectrophotometry, MEO/MER
- Development and miniaturization of Ag/AgCl reference electrodes for MEO/MER method

08/2011 **Student Research Assistant.** Max-Planck Institute for Biogeochemistry,
Jena, DE

10/2011 – 12/2011

06/2012 – 07/2012

- Preparation of sample material for isotope measurements; especially reagents for radiocarbon methods
 - Preparation and planting for experiments in open land field sites („Freiland-Versuchsflächen“)
 - Preparation and maintenance of plants for VOC collection experiments
-

Teaching

In general: Preparation/ organization of experiments, supervision of students, colloquia, project supervision, experimental design

Lectures

WS 15/16 Lecture for AEG Master students: Introduction to Geomicrobiology

WS 16/17 Lecture for AEG Master students: Introduction to Geomicrobiology

WS 17/18 Lecture for AEG Master students: Introduction to Geomicrobiology

Supervisions

05/2017 - 07/2017 Scientific Practice Johannes Schorr/ Project supervision

11/2016 - 03/2017	Scientific Practice Joseph D. Martin/ Project supervision
04/2017 - 12/2017	Supervision Master student Joseph D. Martin, Scientific Practice / Master thesis

Lab Courses

09/2015	Geomicrobiology Lab course 2015; Lab course supervision
09/2016	Geomicrobiology Lab course 2016; Lab course supervision

Moderation/Organization

02/2019	Organization and moderation of the group event (presentation schedule, organization of the accommodation and scientific presentation event, moderation)
04/2015 – 08/2015	Facilitation, organization and moderation of the interfaculty ZAG-seminar
02/2019	Facilitation, organization and moderation of the winter group event (incl. planning schedule of the talks)

Publications

Visser et al., *Utilizing N and O isotope fractionation dynamics to evaluate the impact on reactive surfaces on the proposed abiotic reaction between nitrite and ferrous iron.* (status: finalization, last corrections)

Visser et al., *Testing the influence of different carbon sources on the nitrate and nitrite isotope fractionation during bacterial denitrification and possible interference by iron.* (status: addition results of one additional control experiment; revise discussion)

Visser et al., *Hydraulic response and sensitivity of a German karst aquifer with special focus on the fate of NO_x species.* (status: initial stage – modeling/data correction)

Visser et al., *Microbial Trapping Devices (MTDs) – a novel technique to stimulate and enrich the microbial community in a groundwater system.* (status: initial stage – writing)

Lab Skills

<i>Methods and Skills</i>	<i>Level</i>	<i>Hands-On</i>
Isotope Ratio Mass Spectrometry		
• Azide method (Nitrite)	Advanced	✓
• Denitrifier method (Nitrate)	Advanced	
• N ₂ O measurements (hand injections)	Advances	
• N ₂ measurements	Improvable	
• Instrument maintenance	Improvable	

<ul style="list-style-type: none">Data correction	Advanced	
<hr/>		
Working and maintenance of an anaerobic chamber (Glove Box, MBraun, 100% N₂)	Advanced	✓
<hr/>		
Continuous flow analysis (measurement, maintenance, reagent preparation, data analysis)	Advanced	✓
<hr/>		
HPLC	Improvable	
<hr/>		
Spectrophotometry		
<ul style="list-style-type: none">Ferrozine assay (Stookey, 1976)	Advanced	✓
<ul style="list-style-type: none">Nitrite/Nitrite assay (Griess reaction, 96 well plate)	Advanced	
<ul style="list-style-type: none">OD measurements	Advanced	
<ul style="list-style-type: none">DPC assay (Cr(IV))	Advanced	
<hr/>		
Voltammetry/Amperometry		
<ul style="list-style-type: none">MEO/MER (measurement, building setup/electrodes)	Improvable	✓
<hr/>		
GC-MS (Nitrobenzene, Aniline)		
<ul style="list-style-type: none">Sample preparation (extraction with ethyl acetate)	Advanced	
<ul style="list-style-type: none">Measurement and data analysis	Improvable	
<hr/>		
SEM		
<ul style="list-style-type: none">Sample preparation	Improvable	
<ul style="list-style-type: none">Sample coating	Improvable	
<ul style="list-style-type: none">Sample analysis	Advanced	
<hr/>		
General microscopy		
<ul style="list-style-type: none">Fluorescent (DAPI, Dead Live staining)	Advanced	
<ul style="list-style-type: none">Stereomicroscopy	Advanced	
<ul style="list-style-type: none">Reflected light microscopy (ore thin sections)	Improvable	
<hr/>		
Mössbauer		
<ul style="list-style-type: none">Sample preparation	Advanced	
<ul style="list-style-type: none">Measurement	Improvable	
<ul style="list-style-type: none">Data fitting	Basic	
<hr/>		
Magnetic Susceptibility		
<ul style="list-style-type: none">Temperature-dependent measurements with Kappabride KLY-3	Improvable	
<hr/>		
Mineral Synthesis		

<ul style="list-style-type: none"> • Magnetite • Ferrihydrite • Goethite • Siderite 	<p>Advanced</p> <p>Advanced</p> <p>Advanced</p> <p>Improvable</p>	
Chemiluminescence		
<ul style="list-style-type: none"> • NO_xBox (NO_x species) reagent preparation and measurement 	Improvable	
Molecular Biology		
<ul style="list-style-type: none"> • DNA extraction (Ultra clean kit, Power soil kit) • PCR, gel electrophoresis • DGGE 	<p>Advanced</p> <p>Advanced</p> <p>Improvable</p>	
Preparation of anoxic solutions		
	Advanced	
Medium preparation (anoxic and oxic)		
<ul style="list-style-type: none"> • Liquid • Agar plates 	<p>Advanced</p> <p>Advanced</p>	
Preparation of gradient tubes and agar shakes		
	Improvable	✓
Cultivation of microbes (S1)		
<ul style="list-style-type: none"> • Anaerobic (<i>Acidovorax</i> sp. strain BoFeN1 and 2AN, enrichment culture KS, <i>Pseudogulbenkiania</i> sp. strain 2002, <i>Paracoccus denitrificans</i> strain 1222 and 19367) • Aerobic (<i>Acidovorax</i> sp. strain BoFeN1, <i>Pseudomonas aureofaciens</i>, <i>Shewanella oneidensis</i> strain MR-1, <i>E. coli</i>) 	Advanced	✓
Microbial Trapping Devices (isolation technique for aquifers)		
<ul style="list-style-type: none"> • Design and setup 	Advanced	✓
Field work		
<ul style="list-style-type: none"> • Electric contact gauge (water level in aquifer) • Secchi disc (lake) • Flow rate determination (river) • Standard determination of chemical parameters (pH, Eh, O₂ – on field site) • Standard determination of chemical parameters (Nitrate, Ammonia, Sulfate, Phosphate etc.) • Coring (lake sediment) and core sectioning 	Advanced	

Work Experience

- 07/2012 – 08/2012** **Internship.** Environmental Protection Agency Germany, Homburg/Saar, DE
- Protection and conservation
 - Land use management
 - Application of the European FHH policy
 - Setup a management plan of a former goods station
 - Application of different European protection programs (LEADER, climate protection)
-

Conferences/ Work shops

- 22. – 25.09/2015** EuChem ICCE, Leipzig; Poster: *“Determination and quantification of the extent of abiotic vs. microbial reduction of nitrate/nitrite by Fe(II) using $\delta^{15}N$ isotope analysis”*
- 12/2015** GRK 1708 DFG Review Meeting, Tübingen;
Poster: *“Microbial survival strategies of nitrate-reducing Fe(II)-oxidizing bacteria in habitats with low substrate concentrations”*
- 25.06.2016** New stable isotope techniques and applications to early Earth and life studies (ELSI), Work shop
- 26.06 – 01.07/2016** Goldschmidt Conference, Yokohama, Japan; Oral Presentation: *“Identification of Mechanisms of Microbial Nitrate-Dependent Fe(II) Oxidation by N-Isotope Analysis”*
- 26.06.2016** Early Career Events: Isotope Geochemistry (JAMSTEC), Work shop
- 13.09/2016** SFB CAMPOS 1253, DFG examination, Method presentation: *“Development of Microbial Trapping Devices (MTDs) as a cost-effective, in situ technique to isolate bacteria from aquifers”*
-

Other Skills

Languages German (native), English (fluent), Japanese (beginner)

Computer skills MS Office Programs (Word, Excel, PPT), Sigma Plot, Mendeley and EndNote (Reference managers), Rstudio (improvable), MEGA7 (Phylogeny, DNA Sequences), Isodat (Isotope software), Origin (improvable), GIS (improvable), PreeqC (improvable), Coral Painter Essential 3.

Scientific communication	Poster presentations and oral presentations at international and national conferences, Supervision of students and classes, Lab cooperation and -management
---------------------------------	---

Other	Attended additional classes with focus on energy- and environmental policies (Germany)
--------------	--

Proposal writing (Fundraising)

Memberships

- VAAM (Vereinigung für Allgemeine und Angewandte Mikrobiologie)

Referees

Prof. Dr. Moritz F. Lehmann, Aquatic Biogeochemistry, Basel University, Bernoullistrasse 30, R144, CH-4056 Basel, Tel. +41(0)61/207 05 12, moritz.lehmann@unibas.ch

Dr. Karsten Osenbrück, Hydrogeochemistry, Tübingen University, Hölderlinstrasse 12, DE-72076 Tübingen, Tel. +49-(0)7071-29-73123, karsten.osenbrueck@uni-tuebingen.de

Dr. Scott Wankel, Marine Chemistry & Geochemistry, Woods Hole Oceanographic Institution, 266 Woods Hole Rd., MS# 25, Woods Hole, MA 02543-1050, USA, sdwankel@whoi.edu

Prof. Dr. Andreas Kappler, Geomicrobiology, Tübingen University, Hölderlinstrasse 12, DE-72074 Tübingen, andreas.kappler@uni-tuebingen.de