June 7, 2021

Maik Neukirch

Personal Details

Home Address				
Pg. Joan Moreira 6, 1º, 2ª	Phone:	+34-644-719.761	Day of Birth:	03.09.1982
43500 Tortosa	Email:	maik.neukirch@gmx.de	Place of Birth:	Rudolstadt
Spain	ORCID:	0000-0001-9558-0260	Nationality:	german
			Gender:	male

Working Experience

06/2021– **Centre for Earth Evolution and Dynamics, University of Oslo, Norway** I am primarily responsible for the Magnetotelluric data in a project about geothermal exploration in the Baia Mare region in Romania.

04/2018–04/2021 **Geociencias Barcelona, CSIC, and Barcelona-Center for Subsurface Imaging, ICM, CSIC, Spain**
As second postdoctoral appointment, I wrote software for non-stationary data processing for the Horizontal-To-Vertical Spectral Ratio technique from passive seismic data. Further, I am involved in the algorithm development for deep learning prediction of shear wave velocity profiles from surface wave velocity dispersion curves.

09/2016–03/2018 **Independent Researcher and Barcelona-Center for Subsurface Imaging, ICM, CSIC, Spain**
I developed and published software for galvanic electric distortion analysis for Magnetotelluric (MT) data that is free for academic use.

11/2009–08/2016 **Barcelona-Center for Subsurface Imaging, ICM, CSIC, Spain**
I developed the theory for EM spectral analysis of non-stationary time series and formulated a new, innovative matrix decomposition for algebraic data analysis for MT data that allows to correct 3D MT data for galvanic distortion. My responsibilities included planning, executing and interpreting MT field surveys.

01/2009–10/2009 **Master thesis: RWTH Aachen University, Germany**
The topic of the thesis was to improve processing capabilities of the capacitively coupled electrical resistivity tomography.

10/2007–12/2008 **Research assistant: Inst. for Atmospheric and Climate Science, ETH Zurich, Switz.**
I digitised climate data archives. The monthly work varied based on demand to up to 20 h.

07/2008 **Internship in Geophysical Department: DMT GmbH & Co. KG, Essen, Germany**
The internship trained my seismic data processing skills. I assisted to acquire seismic data and chemical degassing compositions of wells, too.

10/2005–05/2008 **Student supervisor of practical training:**

University of Jena, Germany

University of Zurich, Switzerland
My tasks included supervision, teaching and examination of students for their practical training in physics. The average workload was 15 h per month.

07/2005–05/2006 **Research assistant: Institute of Applied Physics, Jena, Germany**
I assisted in high power fibre optics experiments. My monthly workload was about 40 h.

07/2001–05/2002 **Civil service: Public hospital, Rudolstadt, Germany**
Refusing military service, I compensated with civil service and a voluntary extension to the maximum period.

Education

04/2011–07/2014 **Doctorate in Geophysics: University of Barcelona, Spain**
I studied limitations and possibilities of the non-stationary time series analysis tool Hilbert-Huang Transform with regard to electromagnetic data.

11/2011 **Visiting Researcher at Woods Hole Oceanographic Institution, U.S.A.**
The opportunity provided direct contact with Dr. Alan Chave (senior researcher and MT data processing specialist) to benefit from his experience in robust MT data processing.

09/2007–08/2009 **Joint Master in Applied Geophysics: IDEA League - european university network**
The lectures took place at Delft University of Technology, Swiss Federal Institute of Technology Zurich and RWTH Aachen University. My final thesis contains modelling of a capacitive resistivity method realisation and the improvement of its data processing strategy.

10/2006–08/2007 **Exchange year: Swiss Federal Institute of Technology Zurich**
Studies focused on Earth and Computational Science.

10/2002–08/2007 **Physics Diploma: Friedrich Schiller University of Jena, Germany**
Good grades in pre diploma exam allowed me to join the master program without graduation.

09/1993–06/2001 **School leaving certificate: Friedrich Fröbel Gymnasium, Bad Blankenburg, Germany** I specialised in maths and physics.

Awards

Outstanding Student Poster Award, EGU 2013:
"On the Effect of Non Stationary (Synthetic) Sources in the Magnetotelluric Method"

Language Knowledge

German	Native
English	Proficient in speaking and writing
Spanish	Fair level in speaking and writing (B1 - common european reference frame)
Catalan	Basic oral communication
Latin	Basic knowledge obtained in school

IT Skills

Word processing:	Proficient in LaTeX, MS Office and OpenOffice
Operating systems:	Proficient with Mac OS X, familiar with Linux and MS Windows
Computing languages:	Proficient in MATLAB, Fortran, Python, and basic JAVA and SQL knowledge
High Performance Computing:	Familiar with Intel MPI, Open MPI and openMP
Web development:	Familiar with GIT, Django and Docker images
Other programmes:	Familiar with GIS, COMSOL Multiphysics and WinGLink Software

Other

I hold a European driving licence (classes A and B) since 2001 without endorsement but with regular practice.

Publications

Maik Neukirch, Antonio García-Jerez, Antonio Villaseñor, Francisco Luzón, Mario Ruiz, Luis Molina Sánchez
"Horizontal-to-Vertical Spectral Ratio of Ambient Vibration Obtained with Hilbert–Huang Transform",
in Sensors, May 2021, v. 21:, no. 9, p 3292

Maik Neukirch, Xavier Garcia and Savitri Galiana:
"Appraisal of Magnetotelluric Galvanic Electric Distortion by Optimizing Amplitude and Phase Tensor Relations",
in Geophysics, May 2020, v. 85, no. 3, p 1MJ-Z13

Maik Neukirch, Daniel Rudolf, Xavier Garcia and Savitri Galiana:
"The Amplitude-Phase Decomposition for the Magnetotelluric Impedance Tensor"
in Geophysics, September 2019, v. 84, no. 5, p 1SO-Z28

Xavier Garcia, Jordi Julià, Ana M. Nemocón, **Maik Neukirch**:
"Lithospheric thinning under the Araripe Basin (NE Brazil) from a long-period magnetotelluric survey: Constraints for tectonic inversion"
in Gondwana Research, April 2019, v. 68, p. 174-184

Maik Neukirch and Xavier Garcia:
"Non Stationary Magnetotelluric Data Processing With Instantaneous Parameter"
in Journal of Geophysical Research: Solid Earth, February 2014; no. 119

Maik Neukirch and Xavier Garcia:
"Non Stationary Time Series Convolution: On the Relation Between the Hilbert-Huang and Fourier Transform"
in Advances in Adaptive Data Analysis, April 2013; v. 5, no. 1, pp. 1350004

Maik Neukirch and Norbert Klitzsch:
"Inverting Capacitive Resistivity (Line Electrode) Measurements With Direct Current Inversion Programs"
in Vadose Zone Journal, November 2010; v. 9, no. 4, p. 882-892

Conference Contributions

Maik Neukirch, Antonio García-Jerez, Antonio Villaseñor, Laurent Stehly, Pierre Boué, Sébastien Chevrot, Matthieu Sylvander, Jordi Díaz, Mario Ruiz, Francisco Luzón, Magali Collin, Sylvain Calassou, Katerina Polychronopoulou, Nikos Martakis, and Adnand Bitri:
"Statistics on the Performance of Instrument Types and the Significance of HVSR data for Shallow Vs HVSR/DC Joint Inversions - A Result from the Large-N Maupasacq Experiment (Southern France)"
Poster at European Geosciences Union – General Assembly, Online, May 2020

Maik Neukirch, Antonio García-Jerez, Antonio Villaseñor, Laurent Stehly, Pierre Boué, Sébastien Chevrot, Matthieu Sylvander, Jordi Díaz, Mario Ruiz, Francisco Luzón, Magali Collin, Sylvain Calassou, Katerina Polychronopoulou, Nikos Martakis, and Adnand Bitri:
"Shallow Vs Structure of the Mauleon Basin (Western Pyrenees) by Joint Inversion of Horizontal-to-Vertical Spectral Ratios and Rayleigh Wave Group Velocities from the large-N Maupasacq Experiment"
Poster at European Geosciences Union – General Assembly, Vienna, Austria, April 2019

Antonio García-Jerez, Francisco Luzón, Francisco J. Sánchez-Sesma, Helena Seivane, **Maik Neukirch**, Luis Molina, Manuel Navarro, Antonio Villaseñor, Francisco Navarro, Antonio M. Posadas, and José Piña-Flores:
"3D seismic-velocity structure of Campo de Dalías basin (SE Spain) from diffuse-field modelling of the ambient noise wavefield and estimation of its seismic response"
Poster for 78$^{\text{th}}$ EAGE Conference & Exhibition, Vienna, Austria, June 2016

Maik Neukirch, Daniel Rudolf and Xavier Garcia:
"The Magnetotelluric Amplitude Tensor as Compliment to the Phase Tensor for Mapping, Inversion and Distortion Analysis"
Poster for 78$^{\text{th}}$ EAGE Conference & Exhibition, Vienna, Austria, June 2016

Maik Neukirch, Daniel Rudolf and Xavier Garcia:
"The Amplitude Phase Decomposition for the Magnetotelluric Impedance Tensor and Galvanic Electric Distortion"
Poster at European Geosciences Union – General Assembly, Vienna, Austria, April 2016

Maik Neukirch and Xavier Garcia:
"On non stationary CSEM source waveform design to reduce bias due to streamed transmitters"
Poster for 77$^{\text{th}}$ EAGE Conference & Exhibition, Madrid, Spain, June 2015

Maik Neukirch and Xavier Garcia:
"Non Stationary, Broad-Band Waveforms for CSEM — An Analysis With Synthetic Data"
Poster for 76$^{\text{th}}$ EAGE Conference & Exhibition, Amsterdam, The Netherlands, June 2014 and
at the 22$^{\text{nd}}$ Electromagnetic International Workshop, Weimar, Germany, August 2014

Maik Neukirch and Xavier Garcia:
"On the Effect of Non Stationary (Synthetic) Sources in the Magnetotelluric Method"
Poster at European Geosciences Union – General Assembly, Vienna, Austria, April 2013

Maik Neukirch and Xavier Garcia:
"EMT - Empirical mode decomposition based Magneto-Telluric processing: Using a Non Stationary Method to Compute Instantaneous Spectral Data"
Oral at 21$^{\text{st}}$ Electromagnetic International Workshop, Darwin, Australia, July 2012

Maik Neukirch and Xavier Garcia:
"On the Estimation of MT Transfer Functions with Discontinuous Data Sets"
Poster at 21$^{\text{st}}$ Electromagnetic International Workshop, Darwin, Australia, July 2012

Maik Neukirch and Xavier Garcia:
"Frequency Shift in the Convolution of Non Stationary Time Series"
Poster at International Workshop on Recent Advances in Time Series Analysis, Protaras, Cyprus June 2012

Maik Neukirch and Xavier Garcia:
"EMT – Empirical mode decomposition-based Magneto-Telluric processing"
Oral at European Geosciences Union – General Assembly, Vienna, Austria, April 2012

Maik Neukirch, Savitri Galiana, Estelle Roux and Xavier Garcia:
"GarField – A MT Survey of the Crustal Structure of the Intraplate Volcanic Region La Garrotxa, Northwestern Spain"
Poster at European Geosciences Union – General Assembly, Vienna, Austria, April 2012

Maik Neukirch and Xavier Garcia:
"Non Stationary Estimation of (A)MT Transfer Functions"
Poster at 1$^{\text{st}}$ Schmucker-Weidelt-Kolloquium, Neustadt an der Weinstraße, Germany, September 2011

Maik Neukirch and Norbert Klitzsch:
"How to Invert Capacitive Resistivity (Line Electrode) Measurements with DC Inversion Programs"
Oral at Annual Meeting of German Society of Geophysicists (DGG), Bochum, Germany, March 2010

References

Dr. Xavier Garcia (PhD and 1st postdoc)
Institut de Ciències del Mar, CSIC
Barcelona Center for Subsurface Imaging
Phone: +34-932-309-500; Fax: +34-932-309-555
Email: xgarcia@cmima.csic.es

Dr. Norbert Klitzsch (MSc thesis)
E.ON Energy Research Center, RWTH Aachen University
Applied Geophysics and Geothermal Energy
Phone: +49-241-809-67-73; Fax: +49-241-809-21-32
Email: nklitzsch@eonerc.rwth-aachen.de