Luis Eduardo Samaniego Eguiguren

Personal Details	Date of birth	10.03.1966
	Place of birth	Loja, Ecuador
	Personal status	Married, two children
	Citizenship	German, Ecuadorian

Contact Information

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Education

1977 – 1983 — Colegio Bernardo Valdivieso, Ecuador
High school (bachiller)

Studies

1983 – 1989 — Escuela Politécnica Nacional, Ecuador
Studies of Civil Engineering
Specialization: Structural analysis
Final grade: *summa cum laude*

1995 – 1997 — Universität Stuttgart, Germany
Master of Infrastructure Planning
Master thesis: Watershed Management – A Case Study in Ecuador
Final grade: 1.5 (very good)

2003 — Universität Stuttgart, Germany
Promotion to Dr.-Ing. Institute for Water and Environmental Systems Modeling
PhD thesis: Hydrological Consequences of Land Use/Land Cover and Climatic Changes in Mesoscale Catchments
Final grade: *summa cum laude*

2021 — Universität Potsdam, Germany
Habilitation to Dr. rer. nat. habil. at the Faculty of Science
Habilitation thesis: Drought Modeling and Forecasting from Local to Global Scales
Venia legendi: Hydrology

Professional Activity

1989 – 1995 — Consulting company E&S, Ecuador
Structural engineer

1990 – 1992 — Uni. Técnica Particular de Loja, Ecuador
Lecturer

1996 – 1997 — Universität Stuttgart, Germany
Research assistant at the Center for Infrastructure Planning

	1997 – 1998 Structural/Hydraulic engineer	TAMS Consultants Ltd., Ecuador
	1998 – 2005 Research associate at the Institute for Regional Development and Planning and at the Institute of Hydraulic Engineering	Universität Stuttgart, Germany
	2005 – 2008 Research assistant	UFZ, Germany
	since 2008 Head of the Working Group Stochastic and Land Surface Hydrology at the Department of Computational Hydrosystems	UFZ, Germany
	since 2013 Deputy Head of the Department of Computational Hydrosystems	UFZ, Germany
	2022 Joint appointment to a W2 professorship for Data Science and Hydrology	Universität Potsdam & UFZ, Germany
Honors	**1983** Best grade point average in the year 1983	Colegio Bernardo Valdivieso, Ecuador
	1991 Best grade point average in the year 1991	Escuela Politécnica Nacional, Ecuador
	1995 – 1997 Scholarship of the Ministry of Science, Research and the Arts Baden-Württemberg	MWK, Germany
	2010 Water Resources Research Editor's Choice Award, bestowed on the top 5 papers published in WRR in a given calendar year.	American Geophysical Union, USA
	2017 UFZ-Research Award 2017	Helmholtz-Centre - UFZ, Germany
	2018 STAHY Best Paper Award 2018	Int. Association of Hydrological Sciences
International Scientific Associations	**since 2004**	European Geosciences Union
	since 2004	Int. Association of Hydrological Sciences
	since 2005	American Geophysical Union

Editorial Work	**2008-2012**	Associate Editor	JoH
	since 2011	Associate Editor	WRR
	since 2012	Editor	HESS
	since 2010	Reviewer	Nature, Science, ERL, JHM, JGR-A, GRL, HP, WRR, DFG

Scientific Career	**26 Research projects until November 2026** PI or coordinator Disciplines: Hydrology, Hydroclimatology, Data Science.	Appendix 1

Publications	**136 ISI-listed publications until November 2026** h-index 66, Citations 15320 in Google Scholar h-index 55, Citations 9771 in Web of Science	Appendix 2
Books	**10 ISBN registered books until November 2026**	Appendix 3
Software	**8 Open source code packages until November 2026**	Appendix 4
Conference Presentations	**100 invited lectures until November 2026** Scientific conferences at EGU, AGU, among others	Appendix 5
Third-party Funds	**6.39 million EUR until November 2026** 26 Research projects funded by C3S(EU), ECMWF, BMBF, HGF, EU Horizon and UFZ	Appendix 6
Teaching Experience	**36.75 SWH, 203 course-hours,** **12 MSc, 9 PhDs until November 2026** Regular lectures and block courses at the universities Potsdam, Stuttgart, Jena, Valencia (ES), EPN (Quito-EC) und UTPL (Loja-EC)	Appendix 7

Administrative Experience

- Since September 2010 deputy head of the department Computational Hydrosystems at the UFZ (approx. 20 scientists and two technicians)
- Representation of the department at national and international scientific events
- Preparation of research proposals
- Coordination of ongoing research projects
- Supervision of PostDocs and PhD students
- Technical coordination of the MOSES project Modular Observation Solutions for Earth Systems and implementation of a sub-seasonal-seasonal (S2S) prediction system.
- Coordinator of three major research proposals for ENV FP7 and "Horizon-2020". Since 2017, Principal Investigator of two Copernicus Climate Change Service" projects, two ECMWF projects, several Helmholtz initiatives, and one ESA research project on hyperresolution Earth observations and land-surface modeling.

Research Focus

- Hydrological modeling.
- Parameterization of land surface-hydrology models.
- Drought monitoring and sub-seasonal/seasonal forecasting.
- Prediction of hydrological extremes including uncertainties.
- Operational Research and optimization.
- Geostatistics and data science impact modeling.

Skills

- Spanish: Mother tongue. English: Fluent in spoken and written. German: Good in spoken and written.
- Expert knowledge in programming languages: Fortran, NCL, Bash, R, Python, C.
- Advanced knowledge of Unix- (HPC) und Mac OS Systems.
- In-depth knowledge of professional typesetting software LaTeX.

Hobies

- Analog photography with medium and large format cameras and darkroom printing. Instants: `https://www.luis-samaniego.eu/` @luis.e.samaniego.e

Updated: November 2026

Appendix 1

Scientific Career

2025 – 2028
ULYSSES-III: Global multi-model hydrological seasonal predictions **(WP-Leader, Contract Coordinator) UFZ**
The ULYSSES C3S service has been developed for providing a seamless multi-model hydrological seasonal forecasting system using state-of-the-art hydrological models at 0.05° globally. This is the follow up of ULYSSES II and deals with model improvements, skill assessment and GloFas integration. In this phase the system should go online.
URL: `https://www.ufz.de/index.php?en=47367`

2024 – 2026
DTE-Next: ESA **(PI) UFZ**
Development of a Proof of Concept (PoC) for a high-resolution soil moisture drought monitoring system in quasi-real-time for Europe, with a spatial resolution of 1 km. The system leverages Earth Observation (EO) forcings to complement existing EMO forcings. Additionally, it incorporates an irrigation module for the mesoscale Hydrologic Model (mHM).

2023 – 2025
HI-CAM-2: Helmholtz Climate Initiative **(WP-Leader, PI) UFZ**
Development of a PoC for a fash-flood, inundation and damage impact forecast system for Germany

2023 – 2027
PLANET4Health: Translating Science into Policy: A Multisectoral Approach to Adaptation and Mitigation of Adverse Effects of Vector-Borne Diseases, Environmental Pollution and Climate Change on Planetary Health **(PI) UFZ**
HORIZON-HLTH funded project aiming at enhancing planetary health through interdisciplinary collaboration, research, technological innovation, and tailored outreach. It focuses on developing operational measures, including data and environmental research, innovative digital tools, and customized knowledge. The project fosters collaborations across diverse fields to conduct case studies addressing OneHealth issues like vector-borne diseases, air and food contamination, and mental well-being, seeking universal conclusions and replicable solutions for public health preparedness. We contribute with global hydroclimatic simulations of streamflow and soil moisture and ML impact models.
URL: `https:/PLANET4Health.eu`

2023 – 2025
4DHYDRO: Hyper-resolution Earth observations and land-surface modeling for a better understanding of the water cycle **(Coordinator, PI) UFZ**
ESA funded project aiming at bringing together the EO water cycle community developing novel high-resolution EO data products, and the land surface and hydrological modelling community engaged in advancing hyper-resolution modelling of the hydrological cycle at regional and continental scales to assess the uncertainty of existing EO and LSM/HM data sets related to key terrestrial ECVs and generate improved datasets at 1 km spatial resolution in the selected study areas and science cases in Europe.

URL: https://4dhydro.eu

2022 – 2023

EC-CAL: MPR based calibration of the ECLAND model **(WP Lead, PI) UFZ**

This ECMWF funded project aims to calibrate their new EC-LAND model (the HTESSEL-retrofitted code, see HT-CAL project) using the built in Multiscale Parameter Regionalization (MPR) tool and generating mprin files for the IFS-2 system at 0.1 deg global.

2022 – 2024

ULYSSES-II: Global multi-model hydrological seasonal predictions **(WP-Leader, PI) UFZ**

The ULYSSES C3S service has been developed for providing a seamless multi-model hydrological seasonal forecasting system using state-of-the-art hydrological models at 0.1° globally. This is the follow up of ULYSSES I and deals with model improvements, skill assesment and GloFas integration.
URL: https://www.ufz.de/index.php?en=47367

2022 – 2025

CLIMOS: Climate Monitoring and Decision Support Framework for Sand Fly-borne Diseases Detection and Mitigation with COst-benefit and Climate-policy MeasureS **(PI) UFZ**

Horizon Europe funded project aiming at providing climate and hydrological data for forecast of Fly-borne Diseases. Modeling soil moisture fior south Europe to develop a early warning system. Develop machine learning algorithms for estimating human health risks based on hydroclimatic and socio-economic predictors
URL: https://climos-project.eu

2020 – 2021

HI-CAM-1: Helmholtz Climate Initiative-Drivers **(WP-Leader, PI) UFZ**

Generation of a super-ensemble for hydroclimatic key terrestrial climate variables (e.g., streamflow, soil moisture) for Europe and Germany at high resolution (3 km and 1 km, respectively) from 1950 to 2100 based on the EURO-CORDEX ensemble and three hydrological models.
URL: https://www.helmholtz-klima.de/adaptation/projekt-drivers

2019 – 2021

Seasonal Hydroclimatic Forecasting System for Germany **(Coordinator, PI) UFZ**

Development of a real-time subseasonal-to-seasonal hydroclimatic (HS2S) ensemble forecasting system for Germany. HS2S uses ECMWF ENS extended meteorologic forecasts on subseasonal time scales which are disseminated each Monday and Thursday over entire Germany under the MOSES homepage. The climatology over Germany is based on DWD data.
URL: https://www.ufz.de/moses/index.php?en=47304

2020 – 2021

ULYSSES-1: Global multi-model hydrological seasonal predictions) **(Coordinator, PI) UFZ**

The ULYSSES C3S service has been developed for providing a seamless multi-model hydrological seasonal forecasting system using state-of-the-art hydrological models at 0.1° globally. The ULYSSES system uses four hydrologic models (HTESSEL, JULES, mHM, PCR-GLOBWB) driven by bias-corrected ECMWF S5 forecasts. ULYSSES runs an operational service each month and reforecasts from 1993 to present.

URL: https://www.ufz.de/index.php?en=47367

2019 – 2021

HT-CAL: Retrofitting HTESSEL for Parsimonious and Transferable Parameter Estimation at Global Scale **(Coordinator, PI) UFZ**

This ECMWF funded project aims to retrofitting their HTESSEL land surface model with the Multiscale Parameter Regionalization (MPR) technique so that it can be used in the next generation IFSv6 system. The final ecFlow suite will allow able evaluate the parameter sensitivity of the MPR parameters as well as their optimum values.
URL: https://www.ufz.de/index.php?en=47368

2017 – 2021

ESM: Advanced Earth System Modelling Capacity. Global Frontier Simulations. **(Coordinator) UFZ**

Development of an efficient parallelization technique for streamflow routing in massively parallel super computers (e.g., JUWELS) including a hybrid parallelization (MPI+openMP) of the mHM model to allow frontier simulations at global scale. Perform Frontier simulations with a MPR-enabled LSM in Europe. Carry out and analyze a set of cutting-edge simulations, using the latest Earth system modeling technology, for global and European hydrometeorological extremes.
URL: https://www.esm-project.net

2017 – 2020

SaWaM: Seasonal Water Resources Management Regionalized Global Data and Transfer to Practice **(PI) UFZ**

The aim of the SaWaM project (BMBF-GROW) was the development of methods and tools for the practice transfer of regionalized global data for water resources management. The developed products were evaluated in selected semi-arid regions around the globe (Brazil, Ecuador, Sudan, West-Africa, Iran). mHM was used for the seasonal forecasts. Special focus was on the seasonal prediction of water availability, the state of the eco-system, and the modeling of sediment flow. (1 PostDoc position.)
URL: https://www.ufz.de/index.php?en=43217

2017 – 2019

HOKLIM: High-resolution Climate Indicators for 1.5 Degree Global Warming **(Co-PI) UFZ**

The aim of the HOKLIM (BMBF) project was to investigate the biophysical effects of a 1.5 K, 2 K and 3 K global warming on the water cycle in Europe. This project was based on the modeling chain and data setting developed in the EDgE project. (1 PostDoc position.)
URL: https://www.ufz.de/index.php?en=42489

2016 – 2018

Model verification with CRNS proximal sensing in semi-arid regions **(PI) UFZ**

A PhD project aiming to improve the ET estimates of the hydrological model mHM in semi-arid regions. The novel non-invasive method "cosmic ray neutron sensing" was setup in the Iberian Peninsula to estimate soil moisture. Eddy-covariance measurements were used to evaluate the mHM model with several evapotranspiration schemes that consider the interaction of vegetation and soil water dynamics. (1 PhD position.)

2015 – 2017

EDgE: End to End Demonstrator for Improved Decision Making in Europe **(WP-Leader, PI) UFZ**

EDgE contributed to the Copernicus Climate Change Service (C3S) by developing a Demonstrator Sectoral Information Service (SIS) based on appropriately tiered dissemination mechanisms of existing and new Sectoral Climate Impacts Indicators (SCIIs). These indicators were designed with Focus Group stakeholders from across Europe to translate climate information into knowledge that is relevant to the water sector. Using an end-to-end modeling chain (mHM, VIC, Noah-MP, PCR-GLOBWB), including a multi-model ensemble of state-of-the-art climate model outputs and hydrological impact models, it will deliver selected WMO/ GCOS terrestrial Essential Climate Variables (tECVs) specific to the water sector for past, current and future time horizons. (2 PostDoc positions.)
https://climate.copernicus.eu/decision-making-water-sector-europe
https://cds.climate.copernicus.eu/cdsapp#!/dataset/10.24381/cds.ccf781

2012 – 2017

Helmholtz Alliance for Remote Sensing and Earth System Dynamics **(PI) UFZ**

A PhD project within this Alliance aimed at developing scaling and data assimilation techniques to minimize the parametric uncertainty of hydrological models by taking into account the subgrid variability of soil moisture and snow water content. Results included also techniques to better parametrize effective parameters at larger scales. (1 PostDoc position.)
URL: https://hgf-eda.de/?page_id=430

Seit 2014

Development of the German Drought Monitoring System **(PI) UFZ**

Conception and development of the German Drought Monitor (GDM) system based on daily mHM simulations. The GDM is updated daily and has a latency of 4 days. Forcings are provided by the DWD. The GMD reached over 3.9 millon visits since its inception in 2014 (1 PostDoc position.)
http://www.ufz.de/droughtmonitor

2011 – 2015

WESS: Water and Earth System Science Competence Cluster **(PI) UFZ**

The first PhD project aimed to develop a robust grid-based multi-variable daily weather generator forced by RCM outputs for whole Germany at spatial resolution of 4×4 km^2. The second PhD project aimed to develop and evaluate multi-scale parameter regionalization techniques for a simplified Land Surface Scheme (energy balance) into a grid based hydrologic model (mHM). (2 PhD positions.)
URL: https://www.ufz.de/index.php?en=40123

Seit 2008

TERENO **(Co-PI) UFZ**

My team and I conduct research on modeling driven monitoring aiming at improving model deficiencies and parameterization across scales. We cooperate with CHS colleagues that maintain three eddy covariance stations that are part of ICOS network.

Seit 2011

Helmholtz Climate Initiative REKLIM **(PI) UFZ**

We conducted research on the spatio-temporal variability of hydrological extremes in Germany. For this purpose the mHM model was set up in all major river basins in Germany with a spatial resolution of 4×4 km^2. Development of a nonparametric soil moisture index, and reconstruction of the daily soil moisture in Germany since 1950 based on existing meteorological data. This setting constituted the

basis for the German Drought Monitor.

Seit 2005
Development of the mesoscale Hydrologic Model (mHM) **(Main Developer, Creator) UFZ**
Development and multiscale evaluation of an efficient multi-scale parameter regionalization technique for process based mesoscale hydrological model (mHM). Development of various external drift Kriging algorithms for the interpolation of meteorological data. This model is open source, modular, and has over three hundred users around the globe. A global version of the model is currently operational at the ECMWF C3S project ULYSSES.
`http://www.ufz.de/mhm`

2002 – 2003
Stochastic Optimization **(Scientific staff) Universität Stuttgart**
Development of a stochastic budget allocation algorithm used in a Monte Carlo simulation for the Xuzhou Integrated Settlement and Transportation Planning Project (China). This interdisciplinary research project involved an combinatorial optimization problem aimed at finding which, where and when funds for key infrastructure projects should be allocated in order to achieve the highest GDP for the region by the year 2020 under given environmental and budget constraints. Implementing heuristic optimization techniques such as simulated annealing; assembling all sub-models written in Fortran; coordinating the digitalization and preparation of the project's database in GIS, including programming in ArcView's macro language, Avenue; and preparation of the final publication.

2002 – 2003
Optimization of Key Infrastructure Investments **(Scientific staff) Universität Stuttgart**
Advised postgraduate students in developing a Fortran code for the Stochastic Optimization of Key Infrastructure Investments in the Metropolitan Municipality of Izmir until the year 2023. The code was able to optimize key infrastructure investments under various budget, land cover/use, and environmental constraints for Project. This project also included lecturing on simulated annealing used as an optimization algorithm, learning how to programm Fortran, and the coordination of a field trip to Izmir (Turkey).

2000 – 2001
Optimization of Land Use Models **(Scientific staff) Universität Stuttgart**
Advised postgraduate students in developing a GIS database and to write a Fortran code aimed at finding an optimum distribution of land use types for an urban district of Izmir (Turkey). This project also included the coordination of the field trip to Izmir.

Appendix 2

Publications

(In chronological order.)

136. Najafi, H., F. Boeing, S. Thober, O. Rakovec, P. Kumar Shrestha, M. Kelbling, U. Weber, T. Harzendorf, and L. Samaniego (2026), High-resolution soil moisture forecasts for drought early warning in Germany, *Environmental Research Letters*, *21*(21), 214,035, doi: 10.1088/1748-9326/aeb369

135. Chandrasekar, A., F. Boeing, S. Thober, L. Samaniego, O. Rakovec, and A. Marx (2026), Increased high flows in Germany under 1.5 K, 2.0 K and 3.0 K warming based on a large regional climate model ensemble, *Climatic Change*, *179*(5), 94, doi: 10.1007/s10584-026-04165-w

134. Su, J., C. Miao, F. Zwiers, H. Beck, P. Jones, Q. Sun, L. J. Slater, W. R. Berghuijs, Y. Wada, D. Rosenfeld, J. Gou, Y. Wu, P. Tarolli, P. Borrelli, P. Panagos, L. V. Alexander, Q. Zhang, J. Hu, S.-K. Min, L. Samaniego, Q. Duan, G. Destouni, J. A. Marengo, R. Modarres, and S. Sorooshian (2026), Precipitation observing network gaps limit climate change impact assessment, *Nature*, *652*(8108), 119–125, doi: 10.1038/s41586-026-10300-5

133. Kettaren, R., A. Sánchez-Benítez, H. Goessling, M. Athanase, R. Kumar, L. Samaniego, and O. Rakovec (2026), Storyline-Based Climate Attribution Reveals Strong Intensification of 2018–2022 Multi-Year Droughts in Europe, *Earth's Future*, *14*(3), e2025EF007,547, doi: 10.1029/2025EF007547

132. Nagpal, M., J. Heilemann, C. Klassert, E. Bevacqua, O. Rakovec, L. Samaniego, B. Klauer, and E. Gawel (2026), Attribution of extreme weather event impacts on crop yields and economic damages to climate change, *Environmental Research: Climate*, *5*(2), 021,001, doi: 10.1088/2752-5295/ae541a

131. Pohl, F., M. Schrön, C. Rebmann, L. Samaniego, S. Zacharias, and A. Hildebrandt (2026), From Points to Field Scale: A Decade of Soil-Moisture Monitoring in a German Deciduous Forest (2014–2024), *Geoscience Data Journal*, *13*(1), e70,053, doi: 10.1002/gdj3.70053

130. García-García, A., P. Stradiotti, F. Di Paolo, P. Filippucci, M. Fischer, M. Orság, L. Brocca, J. Peng, W. Dorigo, A. Gruber, B. Droppers, N. Wanders, A. Haag, A. Weerts, E. Modiri, O. Rakovec, F. Francés, M. Dall'Amico, M. Anderson, C. Hain, and L. Samaniego (2026), Intercomparison of Earth Observation products for hyper-resolution hydrological modelling over Europe, *Remote Sensing of Environment*, *333*, 115,131, doi: 10.1016/j.rse.2025.115131

129. Fatima, E., R. Kumar, D. Altdorff, S. Attinger, F. Boeing, S. E. Oswald, O. Rakovec, L. Samaniego, S. Zacharias, and M. Schrön (2025), On the value of mobile cosmic-ray neutron measurements for spatio-temporal soil moisture simulations, *Frontiers in Water*, *7*, 1630,051, doi: 10.3389/frwa.2025.1630051

128. Handwerker, J., C. Barthlott, M. Bauckholt, A. Belleflamme, A. Böhmländer, E. Borg, G. Dick, P. Dietrich, B. Fichtelmann, G. Geppert, K. Goergen, A. Güntner, S. Hammoudeh, M. Hervo, E. Hühn, M. Kaniyodical Sebastian, J. Keller, M. Kohler, P. Knippertz, M. Kunz, S. Landmark, Y. Li, M. Mohannazadeh, O. Möhler, M. Morsy, H. Najafi, N. D. Nallasamy, A. Oertel, O. Rakovec, H. Reich, M. Reich, H. Saathoff, L. Samaniego, M. Schrön, C. Schütze, T. Steinert, F. Vogel, S. Vorogushyn, U. Weber, A. Wieser, and H. Zhang (2025), From initiation of convective storms to their impact — the Swabian MOSES 2023 campaign in southwestern Germany, *Frontiers in Earth Science*, *13*, 1555,755, doi: 10.3389/feart.2025.1555755

127. Han, L., B. Merz, V. D. Nguyen, B. Guse, L. Samaniego, K. Schröter, and S. Vorogushyn (2025), Recombining past event precipitation and antecedent catchment states generates unprecedented floods, *Communications Earth & Environment*, *6*(1), 692, doi: 10.1038/s43247-025-02691-6

126. Kholis, A., T. Kalbacher, O. Rakovec, F. Boeing, M. Cuntz, and L. Samaniego (2025), Evaluating Richards Equation and Infiltration Capacity Approaches in Mesoscale Hydrologic Modeling, *Water Resources Research*, *61*(8), e2024WR039,625, doi: 10.1029/2024WR039625

125. Řehoř, J., R. Brázdil, O. Rakovec, M. Hanel, M. Fischer, R. Kumar, J. Balek, M. Poděbradská, V. Moravec, L. Samaniego, and M. Trnka (2025), Global catalog of soil moisture droughts over the past four decades, *Hydrology and Earth System Sciences*, *29*(14), 3341–3358, doi: 10.5194/hess-29-3341-2025

124. Vorogushyn, S., L. Han, H. Apel, V. D. Nguyen, B. Guse, X. Guan, O. Rakovec, H. Najafi, L. Samaniego, and B. Merz (2025), It could have been much worse: Spatial counterfactuals of the July 2021 flood in the Ahr valley, Germany, *Natural Hazards and Earth System Sciences*, *25*(6), 2007–2029, doi: 10.5194/nhess-25-2007-2025

123. Nagpal, M., J. Heilemann, L. Samaniego, B. Klauer, E. Gawel, and C. Klassert (2025), Measuring extremes-driven direct biophysical impacts in agricultural drought damages, *Natural Hazards and Earth System Sciences*, *25*(6), 2115–2135, doi: 10.5194/nhess-25-2115-2025

122. Shrestha, P. K., L. Samaniego, O. Rakovec, R. Kumar, and S. Thober (2025), A Novel Stream Network Upscaling Scheme for Accurate Local Streamflow Simulations in Gridded Global Hydrological Models, *Water Resources Research*, *61*(6), e2024WR038,183, doi: 10.1029/2024WR038183

121. Boeing, F., S. Attinger, T. Wagener, O. Rakovec, L. E. Samaniego, S. Thober, J. Schlaak, S. Müller, C. Teichmann, R. Kumar, and A. Marx (2025), Spatially and seasonally differentiated response of soil moisture droughts to climate change in Germany, *Earth's Future*, *13*(5), e2024EF005,495, doi: 10.1029/2024EF005495

120. Müller Schmied, H., M. Garnsworthy, L. Müller, C.-E. Telteu, A. K. Ahmed, L. S. Andersen, J. Boulange, P. Burek, J. Chang, H. Chen, M. Grillakis, L. Guillaumot, N. Hanasaki, A. Koutroulis, R. Kumar, G. Leng, J. Liu, X. Liu, I. Menke, V. Mishra, Y. Pokhrel, O. Rakovec, L. Samaniego, Y. Satoh, H. L. Shah, M. Smilovic, T. Stacke, E. Sutanudjaja, W. Thiery, A. Tsilimigkras, Y. Wada, N. Wanders, and T. Yokohata (2025), Graphical representation of global water models, *Geoscientific Model Development*, *18*, doi: 10.5194/gmd-18-2409-2025

119. Samaniego, L. (2025), Permanent shifts in the global water cycle, *Science*, *387*(6741), 1348–1350, doi: 10.1126/science.adw5851

118. Reichmuth, A., O. Rakovec, F. Boeing, S. Müller, L. Samaniego, A. Marx, H. Komischke, A. Schmidt, and D. Doktor (2025), BioVars - A bioclimatic dataset for Europe based on a large regional climate ensemble for periods in 1971–2098, *Scientific Data*, *12*(1), 217, doi: 10.1038/s41597-025-04507-w

117. Kumar, R., L. Samaniego, S. Thober, O. Rakovec, A. Marx, N. Wanders, M. Pan, F. Hesse, and S. Attinger (2025), Multi-model assessment of groundwater recharge across europe under warming climate, *Earth's Future*, *13*(1), e2024EF005,020, doi: https://doi.org/10.1029/2024EF005020

116. Fan, D., T. Zhao, X. Jiang, A. García-García, T. Schmidt, L. Samaniego, S. Attinger, H. Wu, Y. Jiang, J. Shi, L. Fan, B.-H. Tang, W. Wagner, W. Dorigo, A. Gruber, F. Mattia, A. Balenzano, L. Brocca, T. Jagdhuber, J.-P. Wigneron, C. Montzka, and J. Peng (2025), A sentinel-1 sar-based global 1-km resolution soil moisture data product: Algorithm and preliminary assessment, *Remote Sensing of Environment*, *318*, 114,579, doi: https://doi.org/10.1016/j.rse.2024.114579

115. Fatima, E., R. Kumar, S. Attinger, M. Kaluza, O. Rakovec, C. Rebmann, R. Rosolem, S. E. Oswald, L. Samaniego, S. Zacharias, and M. Schrön (2024), Improved representation of soil moisture processes through incorporation of cosmic-ray neutron count measurements in a large-scale hydrologic model, *Hydrology and Earth System Sciences*, *28*(24), 5419–5441, doi: 10.5194/hess-28-5419-2024

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Appendix 4

Software Publications

(In chronological order.)

8. **Samaniego, L.**, Kumar, R., Zink, M., Cuntz, M., Mai, J., Thober, S., Schneider, C., Dalmasso, G., Musuuza, J., Rakovec, O., Craven, J., Schäfer, D., Prykhodko, V., Schrön, M., Spieler, D., Brenner, J., Langenberg, B., Schüler, L., Stisen, S., Demirel, M.C., Jing, M., Kaluza, M., Schweppe, R., Shrestha, P.K., Döring, N., Müller, S. (2023): mesoscale Hydrologic Model (mhm-ufz/mHM). Zenodo Version: v5.13.0-v5.13.1 10.5281/zenodo.1069202

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6. Pohl, F., Rakovec, O., Rebmann, C., Hildebrandt, A., Boeing, F., Hermanns, F., **Samaniego, L.**, Attinger, S., Kumar, R. (2022): Long-term daily hydrometeorological drought indices, soil moisture, and evapotranspiration for ICOS sites. Zenodo Version: 10.5281/zenodo.7561854

5. **Samaniego, L.**, Kumar, R., Zink, M., Mai, J., Boeing, F., Shrestha, P.K., Kaluza, M., Schäfer, D., Thober, S. (2022): The Soil Moisture Index - SMI program (2.0.5). Zenodo Version: 2.0.5 10.5281/zenodo.5842486

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3. Thober, S., Cuntz, M., Kelbling, M., Kumar, R., Mai, J., & **Samaniego, L.** (2019). The multiscale Routing Model mRM v1.0 (1.0). Zenodo. https://doi.org/10.5281/zenodo.3229680

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1. **Luis Samaniego**, Rohini Kumar, Juliane Mai, Matthias Zink, Stephan Thober, Matthias Cuntz, Oldrich Rakovec, David Schäfer, Martin Schrön, Johannes Brenner, Cüneyd M. Demirel, Maren Kaluza, Ben Langenberg, Simon Stisen, & Sabine Attinger. (2017). mesoscale Hydrologic Model (v5.8). Zenodo. https://doi.org/10.5281/zenodo.1069203

Appendix 3

Books

(In chronological order.)

10. **Samaniego, Luis**. (2021). *DROUGHT MODELING AND FORECASTING from Local to Global Scales*. Cumulative habilitation thesis for the award of the academic degree doctor rerum naturalium habilitatus (Dr. rer. nat. habil.) venia legendi: Hydrology. Defended on the 23rd February 2021 at the Faculty of Mathematics and Natural Sciences of the University of Potsdam. Published online by the Helmholtz Centre for Environmental Research - UFZ on June 2021. https://www.ufz.de/export/data/2/254693_L.Samaniego_Habilitation_20210610_small.pdf

9. Marx, A., Erhard, M., Thober, S., Kumar, R., Schäfer, D., **Samaniego, L.**, Zink, M., (2019): *Climate change as driver for ecosystem services risk and opportunities* In: Schröter, M., Bonn, A., Klotz, S., Seppelt, R., Baessler, C., (eds.) Atlas of ecosystem services : drivers, risks, and societal responses Springer International Publishing, Cham, p. 173 - 178

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6. **Samaniego, L.**, Rode, M. (2011): *Wasser und Modellierung*. UFZ-Experten: In Sachen Wasser / Helmholtz-Zentrum für Umweltforschung, UFZ. Vol. Nov. ISSN 1868-7512, p.8-11. Leipzig.

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3. **Samaniego, L.** (2003): *The Optimization Sub-model*, in the final report of Xuzhou Integrated Settlement and Transportation Development Project (C. Gee, Ed.). University of Stuttgart, IREUS, Vol. 24., p. 140-145. ISBN 3-921882-23-0.

2. Herrmann S., **Samaniego, L.**, Shinde B., Roy M. (2003): *Tools for Integrated Land Use Planning in Tropical Countries*, in Geoinformatics for Tropical Ecosystems, P.S. Roy (ed.), Dehra-Dun. ISBN: 81-211-0370-3.

1. **Samaniego, L.** (2003): *Hydrological Consequences of Land Use/ Land Cover Change in Mesoscale Catchments*. Transactions / Institute of Hydraulic Engineering, University of Stuttgart. Vol. 118. ISBN 3-9337 61-21-2. URL: http://dx.doi.org/10.18419/opus-174

Appendix 5

Conference Presentations

(In chronological order.)

100. *Can Deep Learning Revolutionize Hydrology?*. EGU General Assembly 2025. Vienna. **Invited speaker**.

99. *Suitable Model Structure and Parameterization for Soil Infiltration in Global Hydrologic Models*. AGU Fall Meeting 2024, Washington.

98. *Desarrollo e Implementación de un Sistema de Vigilancia y Gestión de la Sequía para la Provincia de Loja*. Investiga XII, Universidad Tecnica Particular de Loja. Ecuador. Octobe 2024. **Invited speaker**.

97. *Pronósticos Hidrológicos e Hidrodinámicos para Sistemas de Alerta Temprana*. Escuela Politécnica Nacional. Quito-Ecuador. Octobe 2024. **Invited speaker**.

96. *The Quest of Developing the German Drought Monitor – from scratch –*. Mini-conference on Soil moisture and Droughts. GEUS, Copenhagen. November 2024.

95. *On the predictability of the seasonal soil moisture droughts at global scale*. EGU General Assembly 2024. Vienna, 25th April 2024.

94. *On the predictability of the seasonal soil moisture droughts at global scale*. AGU Fall Meeting 2023. San Francisco.

93. *On advances and opportunities in estimating effective parameters for land surface models*. EGU General Assembly 2023. Vienna, 25th April 2023.

92. *Exploring Advances and Opportunities in Estimating Effective Parameters for Land Surface Models*. ECMWF Workshop. Aug. 2023

91. *Global Multi-model Hydrological Seasonal predictions ULYSSES*. Global Water Resources Meeting, WMO, Geneva. 12th Jan. 2023

90. *Multivariate evaluation of four high-resolution hydrological models at global scale.* EGU General Assembly 2022. Vienna, 25th May 2022.

89. *From the REA Concept to a High Resolution Digital Twin of the Earth's Water Cycle. Session: Eric Wood's contributions to Hydrological Sciences* . EGU General Assembly 2022. Vienna, 23rd May 2022. **Invited speaker**.

88. *The Co-Evolution of Droughts and Heatwaves in Europe* . Water Research Horizon Conference, Online, 16th Jun 2021. **Invited speaker**.

87. ULYSSES: *Operationalizing Global Multi-model Hydrological Predictions.* Copernicus Climate Change General Assembly, Online, 20th May 2021. **Invited speaker**.

86. ULYSSES: *A global multi-model high-resolution hydrological seasonal predictions system.* AGU Fall Meeting, Online, 15th Dec 2020.

85. *Falling Walls Circle Table: Breakthroughs in Water Diagnosis*, Berlin, 8th Nov 2020 `https://falling-walls.com/event/circle-tables-breakthroughs-in-water-diagnosis/` **Invited speaker**.

84. *Multi-scale global reconstruction of water fluxes and states with mHM.* EGU General Assembly 2020. Vienna, 6th May 2020.

83. *Towards a global multiscale model chain for prediction of hydrological extremes*. Seminar at the University of Seatle, 13th February 2020. **Invited speaker**.

82. *Towards a global multiscale model chain for prediction of hydrological extremes*. Annual Meeting of the Global Water Futures. Canmore, 10th February 2020. **Invited speaker**.

81. *MParameter Inference for a Massively Parallel Global Hydrologic*. SIAM Mini Simposium-17 HPC Simulation of the Hydrological Cycle. Seattle, 10th February 2020 Model. **Invited speaker**.

80. *The coevolution of heatwaves and soil moisture droughts: past, present, future*. TERENO Workshop Potsdam, 11th September 2019. **Invited speaker**.

79. *Towards a global multiscale model chain for prediction of hydrological extremes*. Sino-German International Workshop Shenzhen, 2nd September 2019. **Invited speaker**.

78. *Anthropogenic warming exacerbates European soil moisture droughts.* MISTRALS workshop on droughts Montpellier, 24th April 2019. **Invited speaker**.

77. *Heatwaves and droughts in Europe: Past, present, and future*. European Forum for Science, Research and Innovation Dresden, 25th June 2019. **Invited speaker**.

76. *Evaluation of the coevolution of heatwaves and soil moisture droughts* . EGU General Assembly. Viena, 8th April 2019.

75. *mHM – A multi-scale hydrological model drought monitoring and seasonal forecast –*. BfG Colloquium. Koblenz, 23rd September 2019. **Invited speaker**.

74. *Seamless reconstruction of global hydrological fluxes and states at high resolution*. AGU Fall Meeting (Poster). San Francisco, 12th December 2019.

73. *Conditioning a Hydrological Model Using Patterns of Remotely Sensed Land Surface Temperature*. AGU Fall Meeting, WRR Editors Session. Washington, 13th December 2018 **Invited speaker**.

72. *Lessons learnt from the EDgE seasonal hindcast experiment*. 2018 HEPEX Workshop. Melbourne, 7th February 2018 **Invited speaker**.

71. *Drought and heatwaves in Europe: historical reconstruction and future projections*. EGU General Assembly. Vienna, 26th April 2017. **Invited speaker**.

70. *EDgE multi-model hydrometeorological seasonal hindcast experiments over Europe*. EGU General Assembly. Vienna, 28th April 2017.

69. *Seamless hydrologic predictions across scales – the role of the land surface heterogeneity and model complexity –*. GEWEX-SoilWat workshop. Leipzig, 28th June 2016. **Invited speaker**.

68. *Towards seamless multi-model prediction of water fluxes in Europe and USA*. 2016 CUAHSI Biennial Colloquium Shepherdstown, 25th July 2016. **Invited speaker**

67. *Introduction and applications of the Multiscale Parameterization Technique in Hydrologic Models*. Seminar at the University of Bristol, Bristol, 8th August 2016

66. *Exploring the mutual enhancement between droughts and heatwaves in Europe*. AGU Fall Meeting. San Francisco, 12th Dec 2016

65. *Progress towards seamless hydrologic predictions across scales – the role of the land surface heterogeneity –*. Eric Wood Symposium Princeton, 2th June 2016. **Keynote speaker**.

64. *Multi-variate constraining of a large-domain hydrological model*. EGU General Assembly Vienna, 19 Apr 2016.

63. *Representing multi-scale behavior in models - Seamless or not seamless hydrologic simulations? -*. 1st Workshop on Improving the Theoretical Underpinnings of Hydrologic Models. Bertinoro, 26th Apr 2016. **Invited speaker**.

62. *Towards a seamless regional eco-hydrologic model*. EAWAG Seminars Dübendorf, 20th Nov 2015. **Invited speaker**.

61. *Seamless prediction of water fluxes across scales*. SPACE workshop Copenhagen, 17 Aug 2015. **Invited speaker**.

60. *Robust predictions of water fluxes – from small catchments to continental scales*. 12. Doktorandenworkshop AG HydMod TU München, 29 May 2015.

59. *Seamless prediction of water fluxes across scales*. AGU Joint Assembly Montreal, 4 May 2015. **Invited speaker**.

58. *Searching for a robust parameter estimation strategy for large river basins*. EGU General Assembly Vienna, 14 Apr 2015.

57. *Robust predictions of water fluxes – from small catchments to continental scales –*. Viennese Seminars in Hydrology Vienna, 17 Mar 2015.

56. *The quest for representing Nature in hydrologic models*. AGU Town Hall Meeting San Francisco, 14th December 2015. **Invited speaker**.

55. *Propagation of model and forcing uncertainty into hydrological drought characteristics in a multi-model century-long experiment in continental river basins*. AGU Fall Meeting. San Francisco, 14th Dec 2015

54. *Robust predictions of water fluxes – from small catchments to continental scales –*. Viennese Seminars in Hydrology Vienna, 17 Mar 2015. **Invited speaker**.

53. *Multiscale prediction and verification of water fluxes and states over large river basins*. AGU Fall Meeting, San Francisco, Dec 2014.

52. *Calibration in hydrology - Parameter estimation and multiscale verification in the Pan-EU -*. H-SAF and HEPEX Workshops on Coupled Hydrology Reading, 6 Nov 2014. **Invited speaker**.

51. *Lessons learnt on drought monitoring and early warning systems in Germany*. International Expert Symposium "Coping with Droughts" Santiago de Chile, 20 Nov 2014.

50. *An open-source distributed multiscale hydrologic model mHM 5.0*. EGU General Assembly, Vienna, 29 Apr 2014.

49. *Multiscale verification of water fluxes and states over Pan European river basins*. EGU General Assembly, Vienna, 28 April 2014.

48. *Towards robust and computationally efficient large-scale hydrologic predictions.* Hyper-resolution workshop Utrecht, 13 February 2014.

47. *Challenges of model transferability to data-scarce regions*. AGU Fall Meeting, San Francisco, Dec 2013. **Invited Speaker**.

46. *Understanding the Generation Process of High Impact Floods in Germany*. AGU Fall Meeting, San Francisco, Dec 2013

45. *Towards robust predictions of water fluxes and states on large scales*. Seminar at the National Center for Atmospheric Research. Boulder, 24 Sep 2013.

44. *Detecting causation mechanisms of soil moisture patterns in Germany*. EGU General Assembly, Vienna, Apr 2013.

43. *Verification of High Resolution Soil Moisture and Latent Heat in Germany*. AGU Fall Meeting, San Francisco, Dec 2012.

42. *Robust predictions of water fluxes on large scales*. IAHS PUB Symposium, Delft, Oct 2012. **Invited Speaker**.

41. *Auswirkungen des Klimawandels auf den Wasserhaushalt in Deutschland: am Beispiel der Entwicklung von Extreme Dürren*. KliWES Workshop, Dresden, Jun, 2012. Invited Speaker.

40. *The role of soil moisture missions in mesoscale hydrological models: limitations and opportunities*. SMOS Workshop, Paris, Jun 2012. **Invited Speaker**.

39. *Assessment of soil moisture drought uncertainty using mHM and TERRA-ML simulations in German*. EGU General Assembly, Vienna, Apr 2012.

38. *Regional stochastic estimation of the groundwater catchment for distributed hydrological modelling*. EGU General Assembly, Vienna, Apr 2012.

37. *Evaluation of Regional Climate Models: Extremes important for Hydrology* . EGU General Assembly, Vienna, Apr 2012.

36. *Application of copula-based dissimilarity measures for catchment classification and streamflow prediction*. 58th ISI World Statistics Congress, Dublin, 2011. **Invited Speaker**.

35. *Sensitivity analysis of a mesoscale Hydrological Model (mHM) in major river basins in Germany*. AGU Fall Meeting, San Francisco, Dec 2011. **Invited Speaker**.

34. *Extreme drought events in Germany during the last 60 yrs*. AGU Fall Meeting, San Francisco, Dec 2011.

33. *A regional calibration scheme for a distributed hydrologic model based on a copula dissimilarity measure*. AGU Fall Meeting, San Francisco, Dec 2011.

32. *Retrospective Drought Analysis over Germany during the last 60 yr*. EGU General Assembly, Vienna, Apr 2011.

31. *Robust estimation of water fluxes at the regional scale - drought monitoring* -. 2nd Water Research Horizon Conference, Berlin, Jun 2011. **Invited Speaker**.

30. *Evaluation of Different Performance Criteria for Calibrating a Conceptual Hydrological Model*. EGU General Assembly, Vienna, Apr 2011.

29. *Weather Generators: Reviewing the State of the Art*. EGU General Assembly, Vienna, Apr 2011.

28. *Hydrological Simulations in Major German River Basins for Water Balance Dynamics*. EGU General Assembly, Vienna, Apr 2011.

27. *Trends and characteristics of extreme hydrological events in major German river basins during the last 60 yrs*. EGU General Assembly, Vienna, Apr 2011.

26. *Spatio-temporal variability of extreme hydrometeorological events over Germany*. AGU Fall Meeting, San Francisco, Dec 2010.

25. *A proposal to reduce streamflow predictive uncertainty in ungauged basins*. EGU General Assembly, Vienna, Apr 2010.

24. *The investigation on the effects of model parametrization on daily water flux simulations at various spatial resolutions*. EGU General Assembly, Vienna, Apr 2010.

23. *Conditioning of a mesoscale hydrologic model with proxy soil moisture Fields*. AGU Fall Meeting. San Francisco, Dic 2009.

22. *The role of the subgrid variability on parameter regionalization*. 8th IAHS Scientific Assembly 37th IAH Congress, Hyderabad, India Sep 2009.

21. *Enhancing model predictability through the subgrid variability of model parameters*. 8th IAHS Scientific Assembly 37th IAH Congress, Hyderabad, India Sep 2009. **Invited Speaker**.

20. *Multiscale parameter regionalization of a grid-based hydrologic model at the mesoscale*. EGU General Assembly, Vienna Apr 2009. **Invited Speaker**.

19. *Multiscale Parameter Regionalization of a Grid-based Hydrologic Model*. AGU Fall Meeting. San Francisco, Dec 2008.

18. *Characterizing the Spatial Variability: examples from the Earth and Mars*. GI Days, Münster Jun 2008.

17. *Soil moisture parameter regionalization in a mesoscale hydrologic model* . EGU General Assembly, Vienna Apr 2008.

16. *Stream ow prediction in ungauged catchments using a copula-based similarity measure*. EGU General Assembly, Vienna Apr 2008.

15. *Adaptive parameter optimization of a grid-based conceptual hydrological model*. AGU Fall Meeting. San Francisco, Dic 2007.

14. *Manejo Integral de los Recursos Hídricos: una Propuesta Analítica*. Congreso de Hidráulica y I de Manejo Integral de Recursos Hídricos, Quito Nov 2007. **Keynote Speaker**.

13. *Catchment Characterization based on Runoff Copulas*. EGU General Assembly, Vienna Apr 2006. **Invited Speaker**.

12. *Fundamental principles controlling flow, pattern and structure formation* . Technical University of Vienna, Apr 14-15, 2007.

11. *Finding an Appropriate Similarity Measure for Catchment Characterization*. AGU Fall Meeting. San Francisco Dic 2006.

10. *Exploratory Modelling applied to Integrated Water Resources Management*. 3rd International Symposium on Integrated Water Resources Management, Bochum Sep 2006.

9. *Simulation of the Impacts of Land Use/Cover and Climatic Changes on Low Flow Characteristics at the Mesoscale*. EGU General Assembly, Vienna Apr 2006.

8. *A Generalization of the Local Estimator Technique*. AGU Fall Meeting. San Francisco Dic 2005.

7. *A Two-Step Optimization Procedure for Integrating Transportation and Other Infrastructure Investment Planning*. 2nd International Symposium Networks for Mobility. Stuttgart, Germany Sep 29 - Oct 1, 2004.

6. *Mathematical Models Applied to Integrated Catchment Management and Infrastructure Planning in General*. Workshop on Integrated Catchment Management, Escuela Politécnica Nacional, Quito, Ecuador Sep 2004.

5. *Optimization of Infrastructure Location*. 44th European Congress of the European Regional Science Association, Porto, Portugal 25-29 Aug 2004.

4. *Hydrological Consequences of Land Use/ Land Cover Change in Mesoscale Catchments*. Public Lecture. University of Stuttgart, Feb 2003.

3. *An Application of Simulated Annealing in Land Use Planning*. Research Seminar at the Institute of Regional Development Planning. University of Stuttgart, Jan 2000.

2. *Coupling GIS with Hydrological and Erosion Models*. Research Research Seminar at the Institute for Landscape Planning and Ecology, University of Stuttgart. Jul 1997.

1. *Interaction Diagrams between Axial Load and Biaxial Bending Moments in Steel Columns*. VI Symposium of Structural Engineering, Quito, Ecuador, Jan 1991.

Appendix 6

Overview of third-party funds acquired

Feb. 2025 – Feb. 2028
ULYSSES-III — **Copernicus Climate Change Service (ECMWF)**

Functions: Contract coordinator and WP lead.
Budget: EUR 1,200,000
Funded position: 1 Postdoc
URL: www.ufz.de/index.php?en=47367

Nov. 2024 – Nov. 2026
DTE-Next — **European Space Agency (ESA)**
Functions: PI
Budget: 150,000 EUR
Funded position: 1 Postdoc
URL: https://dtehydrology.org/

Nov. 2023 – Nov. 2026
Helmholts Climate Inititive - 2 — **Helmholtz-Gemeinschaft**
Functions: PI
Budget: 292,500 EUR
Funded position: 1 Postdoc

Jul. 2023 – Jun. 2025
PLANET4Health — **HORIZON-HLTH**
Functions: PI
Budget: 365,664 EUR
Funded position: 1 Postdoc

Jul. 2023 – Jun. 2025
4DHYDRO — **European Space Agency (ESA)**
Functions: Coordinator
Budget: 999,960 EUR
Funded position: 1 Postdoc
URL: https://4dhydro.eu

Dec. 2022 – Nov. 2023
EC-CAL — **European Centre for Medium-Range Weather Forecast (ECMWF)**

Functions: WP lead
Budget: 160,000 EUR
Funded position: 1 Postdoc

Mai. 2022 – Apr. 2024
ULYSSES-II — **Copernicus Climate Change Service (ECMWF)**

Functions: WP-Lead and Service-Manager

Budget: EUR 299,836
Funded position: 1 Postdoc
URL: www.ufz.de/index.php?en=47367

Sep. 2022 – Sep. 2024
CLIMOS **Horizon Europe Framework Programme (HORIZON)**

Functions: PI
Budget: EUR 260,000
Funded position: 1 Postdoc
URL: https://climos-project.eu

Nov. 2019 – Nov. 2021
Helmholts Climate Inititive - 1 **Helmholtz-Gemeinschaft**
Functions: WP-Leader and PI
Budget: EUR 195,000
Funded position: 1 Postdoc
URL: www.helmholtz-klima.de

Nov. 2019 – Nov. 2021
Seasonal Forecast Germany **Helmholtz Innovation Pool**
Functions: WP-Leader and PI
Budget: EUR 195,000
Funded position: 1 Postdoc
URL: www.ufz.de/moses/index.php?en=47304

Mar. 2020 – Nov. 2021
ULYSSES-1 **Copernicus Climate Change Service (ECMWF)**

Functions: Coordinator and PI
Budget: EUR 339,807
Funded positions: 1 Postdoc und 1 Programmierer
URL: www.ufz.de/index.php?en=47367

May 2019 – May 2021
Retrofitting HTESSEL (HT-CAL) **European Centre for Medium-Range Weather Forecast (ECMWF)**

Functions: Coordinator and PI
Budget: EUR 218,908
Funded position: 1 Postdoc
URL: www.ufz.de/index.php?en=47368

Nov. 2019 – Nov. 2022
Pilot Lab Exascale Earth System Modelling **Helmholtz-Gemeinschaft (HGF-Incubator)**

Functions: WP-Leader and PI
Budget: EUR 195,000
Funded position: 1 Postdoc
URL: www.exaesm.de/topics/topic5

Mar. 2017 – Sep. 2020
SaWaM **BMBF -GROW**

Function: PI
Budget: EUR 257,000
Funded position: 1 PhD
URL: www.ufz.de/index.php?en=43217

Mar. 2017 – Feb. 2019
HOKLIM **BMBF**
Function: Co-PI Budget: EUR 235,000
Funded position: 1 Postdoc
URL: www.ufz.de/index.php?en=42489

2017 – 2021
Global Frontier Simulations **HGF - Advanced Earth System Modelling Capacity**

Functions: WP-1,3 Leader and PI
Budget: EUR 195,000
Funded position: 1 Postdoc
URL: www.esm-project.net

Jan. 2016 – Dec. 2019
Model verification with CRNS proximal sensing in semi-arid regions **UFZ, IP-Projekt**
Function: PI
Budget: EUR 65,000
Funded position: 1 PhD

Nov. 2015 – Dec. 2017
EDgE **Copernicus Climate Change Service (ECMWF)**

Functions: WP-2 Leader and PI
Budget: EUR 355,000
Funded positions: 2 Postdocs
URL: climate.copernicus.eu
cds.climate.copernicus.eu

Jan. 2014 – Dec. 2018
Soil Moisture Data Assimilation **Helmholtz Alliance for Remote Sensing**
Function: WP-9 Leader
Budget: EUR 90,000
Funded position: 1 Postdoc
URL: hgf-eda.de/?page_id=430

Jan. 2011 – Dec. 2013
Stochastic Downscalling, Regionalization **WESS, UFZ, BMBF**
Function: WP-1 PI
Budget: EUR 110,000
Funded positions: 2 PhDs
URL: www.ufz.de/index.php?en=40123

Jan. 2008 – Dec. 2010
LUCC in Semiarid Regions **IPSWat, BMBF**
Function: PI

Budget: EUR 50,000
Funded position: 1 PhD

Jan. 2008 – Dec. 2010
Jena Experiment **DFG**
Function: Co-PI, Hydrology subproject (DFG)
Budget: EUR 250,000
Geförderte Stellen: 2 Postdocs

Mar. 2010 – Jul. 2010
GUI for mHM **UFZ**
Function: PI
Budget: EUR 10,000
Funded position: 1 Programmer

Okt. 2006 – Feb. 2007
Integrated Risk-based Catchment Management **BMBF**
Function: PI
Budget: EUR 35,000
Funded position: 1 Scientist

Apr 2006 – Dec 2006
Einflussfaktoren der Neuinanspruchnahme von Flächen **BBR**
Function: PI
Budget: EUR 85,000
Funded position: 1 Scientist

Appendix 8

Teaching Experience

SS 2022-2025, total 2 SWS
Lecture "Hydrological Modeling at different Scales – Principles and Examples" – **University of Potsdam**
Lecturer
Contents: This lecture aims to introducing to: 1) Regional to global climatological water balance, seasonality and trends of hydrological variables, derivation and interpretation of the Budyko curve, estimation of the runoff coefficient. 2) Spatial variability of hydrological variables at catchment-scale. 3) Scaling hydrological processes. 4) introduction to anthropogenic impact analysis.

WS 2019, 2025, total 2 SWS
Lecture "Mathematical Methods in GeoSciences" **University of Potsdam**
Lecturer
Contents: Tutorial on differential and integral calculus, differential equations equations, matrices and systems of linear equations, vector spaces and eigenvalues eigenvalues and eigenvectors of matrices. Use of Jupiter Notebooks. (Held in German.)

SS 2017 – SS 2025, total 2.0 SWS
Lecture "Environmental Statistics for GeoSciences" **University of Potsdam**
Lecturer
Content: Lectures on probability distributions, sampling distributions, estimators, confidence intervals, hypothesis tests, ANOVA, rank correlations, time series analysis. R will be used during the used for demonstrations and exercises during the lecture. (Held in German.)

WS 2018, Block course 2 days
Block course "Modelación Hidrológica en múltiples escalas y sus aplicaciones" **Universidad Politécnica de Valencia**
Lecturer
Content: (M1, 4h) Challenges in hydrological modeling, (M2, 4h) regionalization (Kriging) and regularization, (M3, 4h) Hydrological modeling at multiple scales, seamless predictions, (M4, 4h) Applications on: drought monitoring, seasonal forecasting, climate projections (Held in Spanish).

SS 2018, Excursion 1 week, 7 hours/day
Landscape practicum **University of Potsdam**
Lecturer
Content: The main concept of this excursion is to explore different landscape types (moors, peatlands, forest, grassland, arable land) in northern northern Germany and to analyse together with students some of the effects of a developing drought event together with students. event. Our aim is also to collect a series of CRNS measurements and measurements and evaluate the possibility of modelling a drought area based based on the anomalies of the German Drought Monitor.

SS 2016, total 0.5 SWS

Sommer School Hydro-meteo data and processes: From observation to modeling" **University of Potsdam**
Lecturer
Content: Meso- and large-scale hydrological modeling with the mHM-model. Exercises on parameter estimation and uncertainty in hydrological Modelling using mHM.

WS 2015, SS 2016, SS 2017, total 1 SWS
Seminar "Hydrology, Dryland Water Resources" **University of Potsdam**
Lecturer
Content: Seminar on selected topic on hydrology: the water cycle, run-off generation mechanisms, lake systems, oceans, snow and glaciers, anthropogenic influences. Demand management, droughts, water stress.

Jun. 2011, May 2012, Block course, 40 hours in total
Block Course "Learning Fortran" **UFZ-HIGRADE**
Lecturer
Content: Introduction. Form and Types. Operators. Intrinsic functions. Arrays. Procedures and modules. Input/Output. Libraries. Odds and ends. Practical applications (tutorial).

Mar. 2011, Block course, 40 hours in total
Block Course "Applied Geostatistics in Earth Sciences" **UFZ-HIGRADE**
Lecturer
Content: 1. Introduction to the Regionalized Variable Theory: Statistical hypothesis. 2. The Variogram: theoretical, empirical. 3. Stationary Methods: e.g. Ordinary Kriging, Kriging with uncertain data. 4. Non-stationary Methods: e.g. External Drift Kriging. 5. Practical applications (Tutorial).

Apr. 2010, Block course, 3 hours in total
Spring school "Regionalization and Scaling in Hydrology" **HyMeDas**
Lecturer
Content: Introduction to the Regionalized Variable Theory. Empirical and theoretical variorums. External Drift Kriging. Kriging with uncertain data. Simulation techniques. Spatial Copula. Regionalization with transfer functions. Multiscale parameter regionalization.

Oct. 2009, Block course total 12 hours
Sommer school "Applied Statistics in Environmental Sciences" **University of Jena**
Lecturer
Content: M1: Introduction and Descriptive Statistics (2h). M2: Probability and Distributions (2h). M3: Statistical Estimation (2h) M4: Testing Methods (2h). M5: Regression and Correlation Analysis (2h). M6: Resampling Methods (2h).

Oct. 2007, Block course, 52 hours in total
Block course "Modelos matemáticos aplicados a la planificación integrada de recursos hídricos" **Escuela Politécnica Nacional Quito**
Lecturer
Content: M1: Fundament and methods (4h). M2: Spatiotemporal Information, evaluation, introduction to geostatistics (12h). M3: Introduction to the modelling of socio-economic, environmental and hydrologic processes (12h). M4: Multiobjective optimisation (12h). M5: Stochastic Simulations (12h). (Held in

Spanish.)

Apr. 2001 – Mar. 2005, 2 SWS
Lecture "Environmental Statistics" **University of Stuttgart**
Lecturer
Descriptive statistics, empirical distributions and their parameters, Overview of probability and expectation theory, basic discrete and continuous theoretical probability probability distributions, sampling distributions, confidence intervals, parametric hypothesis tests, introduction to regression and correlation regression and correlation analysis and sampling distributions of regression coefficients. regression coefficients. Setting and marking of exams and exercises. Updating scripts and individual support for students. of the students. (Held in German.)

Apr. 2001 – Mar. 2005, 1 SWS
Lecture "Spatial Analysis and Forecasting" **WAREM, Universität Stuttgart**
Lecturer
Content: Evaluation of spatial indicators (GIS tutorials); forecasting techniques; input/output and shift share analyses; point processes; grid and cluster analysis; linear and nonlinear multiple regression, robust estimators, cross validation, factor and principal component analyses. Setting and grading exams and exercises. Preparing course notes.

Oct. 2001 – Feb. 2005, 1 SWS
Lecture "Applied Statistics I" **ZIP, University of Stuttgart**
Lecturer
Content: Descriptive statistics, empirical distributions and their parameters, review of probability and expectation theory, fundamental discrete and continuous theoretical probability distributions, sampling distributions, confidence intervals, parametric tests of hypothesis, introduction to regression and correlation analysis, and sampling distributions of the regression coefficients. Setting and grading exams and exercises. Upgrading course notes and assisted students.

Apr. 2002 – Feb. 2005, 1 SWS
Lecture "Applied Statistics II" **ZIP, University of Stuttgart**
Lecturer
Content: More theoretical distributions and applications, parameter fitting using maximum likelihood, nonparametric tests, random number generators, simulations and bootstrap estimates, linear and non-linear multiple regression, and introduction to time series analysis.

Apr. 1998 – Feb. 2005, 2 SWS
"Large Case Study" **ZIP, University of Stuttgart**
Lecturer
Setting research topics. Lecturing on optimization algorithms (e.g. simulated annealing), Fortran and Avenue programming, GIS, shortest path algorithms, and gravity type models. Grading of final reports. Assisted students individually.

Apr. 1998 – Mar. 2005, 1 SWS
Lecture "Introduction to Operational Research" **ZIP, University of Stuttgart**
Lehrassistent
Preparing teaching materials and keeping complete and accurate course notes. Setting and grading exams. Assisted students individually with material they found difficult to understand.

Apr. 1998 – Mar. 2005, 1 SWS
Lecture "Development, Policy, and Planning" **ZIP, University of Stuttgart**

Lehrassistent
Prepared seminar material, chairing sections, assisting students and evaluating final papers.

Sep. 1990 – Jul. 1992, 1 SWS
Lecture "Análisis dinámico de estructuras" **Universidad Tecnica Particular de Loja**
Lecturer
Content: Estimation of dynamic forces; degrees of freedom, damping and stiffness matrices, D'Alembert's dynamic equilibrium, equations of motion, resonance, modal and spectral matrices. Response analysis by mode superposition. Setting and grading exams. (Held in Spanish.)

Supervision of Master Theses

1999 – 2005
Water resources and planning **ZIP, University of Stuttgart**

Apostol (1999): Transportation planning in Romania
Shah (1999): Regional Planning in Pakistan
Alarcon (2000): Integrated land use planning
Guerrero (2001): Integrated Optimization Land Use Model
Brand (2001): Multi-objective decision for dam location
Eshetu (2003): Stochastic Optimization of Infrastructure Investments
Hannemann (2006): Testing Classification Algorithms with Remote Sensing Data (Germany)

2007
Optimisation **UFZ and HTWK, Leipzig**

Petruske (2007): Parallelization of a land cover classification algorithm

2005 – 2012
Hydrological modelling **UFZ, Uni. Potsdam and Uni. Stuttgart**
Water management

Jackisch (2007): Towards Applied Modeling of the Human-Eco-System: an approach of hydrology based integrated modeling of a semi-arid subcatchment in rural north-west India
Yao (2008): Comparison of Methods to Model Water Flow in the Unsaturated Zone: Richards Model and Storage Model
Avila (2010): Evaluation of TRIM Rainfall over Germany
Craven (2012): Incorporation of a dynamic leaf development model into the mHM

Supervision of Dissertations

2007 – 2016
Hydrology **UFZ, University of Jena**

Kumar (2009): Parameterization of a Distributed Hydrologic Model: Application in a Mesoscale Catchment.
Thober (2015): Evaluation and Disaggregation of Climate Model Outputs for European Drought Prediction
Zink (2016): Soil Moisture Droughts in Germany: Retrospective Analysis, Parametric Uncertainty, and Monitoring
Pohl (2024): Towards unified drought analysis: Detecting direct and legacy effects on forest carbon

cycling in eddy covariance data

2007 – 2016
Hydrology **UFZ, University of Halle**

Peichel (2020): Climate Change Impacts on Crop Yield Development and evaluation of fundamental models as a basis for economic assessment
Boeing (2025): Further improvements and validation of the German drought monitoring system

Since 2017
Hydrology **UFZ, University of Potsdam**

Schrön (2016): Application of Cosmic Ray sensors in hydrology
Shrestha (2025): From Flash Flood to seasonal flood forecasting in antropogenically managed river basins
Kholis (ongoing): Improving the parameteriztion of the hydrological process at the interphase between unsaturated and saturated soiuls
Kaluza (ongoing): MPI-openMP parallelization scheme for streamflow routing at global scale