Nans Addor

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Positions

Environment Agency, Exeter, UK, 03.2021 - present, Hydrologist.

University of Exeter, Exeter, UK, 10.2019 - present, Research fellow.

University of East Anglia, Norwich, UK, 06.2017 - 09.2019, Honorary research fellow.

National Center for Atmospheric Research, Boulder, USA, 09.2015 - 05.2017, Postdoctoral researcher.

University of Zurich, Zurich, Switzerland, 06.2011 - 08.2015, PhD student.

Education

PhD: University of Zurich, Switzerland, 06.2011 - 08.2015.

PhD thesis within the Hydrology and Climate Unit, H2K, Department of Geography: 'Impacts of climate change on discharge in Switzerland: Cascading uncertainties and robustness in models'.

Courtesy research assistant at the University of Oregon, USA, 08.2013 - 08.2015.

MSc: ETH Zürich, Switzerland, 09.2007 - 12.2009.

ETH Master's degree in Environmental Sciences, Major in Atmosphere and Climate.

Master's thesis at the Swiss Federal Institute for Forest, Snow and Landscape Research: 'Towards flood mitigation in the Sihl catchment using operational ensemble hydro-meteorological forecasts'.

BSc: École polytechnique fédérale de Lausanne, EPFL, Switzerland, 10.2003 - 07.2006.

EPFL Bachelor's degree in Environmental Sciences and Engineering.

Erasmus exchange year at the Polytechnic University of Madrid, 09.2005 - 07.2006.

Peer-reviewed articles published or in press

Uhe, P., D. Mitchell, P. Bates, N. Addor, J. Neal and H. Beck: Model cascade from meteorological drivers to river flood hazard: flood-cascade v1.0, Geoscientific Model Development, DOI: 10.5194/gmd-2020-280, in press.

Musselman, K. N., N. Addor, J. A. Vano, and N. P. Molotch (2021): Winter melt trends portend widespread declines in snow water resources, Nature Climate Change, DOI: 10.1038/s41558-021-01014-9 - News & Views article

Konapala, G., S. Kao, and N. Addor (2020): Exploring hydrologic model process connectivity at the continental scale through an information theory approach, Water Resources Research, DOI: 10.1029/2020WR027340

Coxon, G., N. Addor, J. Bloomfield, J. Freer, M. Fry, J. Hannaford, N. Howden, C. Jackson, E. Robinson, T. Wagener, and R. Woods (2020): CAMELS-GB: Hydrometeorological time series and landscape attributes for 671 catchments in Great Britain, Earth System Science Data, DOI: 10.5194/essd-12-2459-2020

Chagas, V., P. Chaffe, N. Addor, F. Fan, A. Fleischmann, R. Paiva, and V. Siqueira (2020): CAMELS-BR: Hydrometeorological time series and landscape attributes for 897 catchments in Brazil, Earth System Science Data 12, 2075–2096, DOI: 10.5194/essd-12-2075-2020

Hakala, K., N. Addor, T. Gobbe, J. Ruffieux, and J. Seibert (2020): Risks and opportunities for a Swiss hydropower company in a changing climate, Hydrology and Earth System Sciences 24, 3815–3833, DOI: 10.5194/hess-24-3815-2020

Addor, N., H. X. Do, C. Alvarez-Garreton, G. Coxon, K. Fowler, and P. A. Mendoza (2019): Large-sample hydrology: recent progress, guidelines for new datasets and grand challenges, Hydrological Sciences Journal 65.5, 712–725, DOI: 10.1080/02626667.2019.1683182

Addor, N. and L. A. Melsen (2019): Legacy, rather than adequacy, drives the selection of hydrological models, Water Resource Research 55, 378–390, DOI: 10.1029/2018WR022958

Alvarez-Garreton, C. et al. (2018): The CAMELS-CL dataset: catchment attributes and meteorology for large sample studies – Chile dataset, Hydrology and Earth System Sciences 22.11, 5817–5846, DOI: 10.5194/hess-22-5817-2018

Addor, N., G. Nearing, C. Prieto, A. J. Newman, N. Le Vine, and M. P. Clark (2018): A ranking of hydrological signatures based on their predictability in space, Water Resources Research 54.11, 8792–8812, DOI: 10.1029/2018WR022606

Vano, J. A., J. R. Arnold, B. Nijssen, M. P. Clark, A. W. Wood, E. D. Gutmann, N. Addor, J. Hamman, and F. Lehner (2018): DOs and DON'Ts for using climate change information for water resource planning and management: guidelines for study design, Climate Services 12, 1–13, DOI: 10.1016/j.cliser.2018.07.002

Hakala, K., N. Addor, and J. Seibert (2018): Hydrological modeling to evaluate climate model simulations and their bias correction, Journal of Hydrometeorology 19, 1321–1337, DOI: 10.1175/JHM-D-17-0189.1

Melsen, L. A., N. Addor, N. Mizukami, A. Newman, P. Torfs, M. P. Clark, R. Uijlenhoet, and R. Teuling (2018): Mapping (dis)agreement in hydrologic projections, Hydrology and Earth System Sciences 22.3, 1775–1791, DOI: 10.5194/hess-22-1775-2018

Addor, N., A. J. Newman, N. Mizukami, and M. P. Clark (2017): The CAMELS data set: catchment attributes and meteorology for large-sample studies, Hydrology and Earth System Sciences 21.10, 5293–5313, DOI: 10.5194/hess-21-5293-2017

Etter, S., N. Addor, M. Huss, and D. Finger (2017): Climate change impacts on future snow, ice and rain runoff in a Swiss mountain catchment using multi-dataset calibration, Journal of Hydrology: Regional Studies 13, 222–239, DOI: 10.1016/j.ejrh.2017.08.005

Addor, N., M. Rohrer, R. Furrer, and J. Seibert (2016): Propagation of biases in climate models from the synoptic to the regional scale: Implications for bias adjustment, Journal of Geophysical Research: Atmospheres 121.5, 2075–2089, DOI: 10.1002/2015JD024040

Addor, N. and E. M. Fischer (2015): The influence of natural variability and interpolation errors on bias characterization in RCM simulations, Journal of Geophysical Research: Atmospheres 120.10, 10180–10195, DOI: 10.1002/2014JD022824

Addor, N., T. Ewen, L. Johnson, A. Çöltekin, C. Derungs, and V. Muccione (2015): From products to processes: Academic events to foster interdisciplinary and iterative dialogue in a changing climate, Earth's Future 3.8, 289– 297, DOI: 10.1002/2015EF000303

Addor, N., O. Rössler, N. Köplin, M. Huss, R. Weingartner, and J. Seibert (2014): Robust changes and sources of uncertainty in the projected hydrological regimes of Swiss catchments, Water Resources Research 50.10, 7541–7562, DOI: 10.1002/2014WR015549

Addor, N. and J. Seibert (2014): Bias-correction for hydrological impact studies - beyond the daily perspective, Hydrological Processes 28, 4823–4828, DOI: 10.1002/hyp.10238

Addor, N., S. Jaun, F. Fundel, and M. Zappa (2011): An operational hydrological ensemble prediction system for the city of Zurich (Switzerland): skill, case studies and scenarios, Hydrology and Earth System Sciences 15.7, 2327–2347, DOI: 10.5194/hess-15-2327-2011

Lombardot, T., R. Kottmann, G. Giuliani, A. de Bono, N. Addor, and F. O. Glöckner (2007): MetaLook: a 3D visualisation software for marine ecological genomics, BMC Bioinformatics 8, 406, DOI: 10.1186/1471-2105-8-406

Articles in preparation or in review

Fowler, K. J. A., S. C. Acharya, N. Addor, C. Chou and M. C. Peel: CAMELS-AUS: Hydro-meteorological time series and landscape attributes for 222 catchments in Australia, Earth System Science Data, DOI: 10.5194/essd-2020-228, in review.

La Follette P., R. Teuling, N. Addor, M. Clark, K. Jansen and L. Melsen: Numerical daemons of hydrological models are summoned by extreme precipitation, Hydrology and Earth Systems Sciences, DOI: 10.5194/hess-2021-28, in review.

Newman A., J, A. G. Stone, M. Saharia, K. D. Holman, N. Addor, and M. P. Clark: Identifying Sensitivities in Flood Frequency Analyses using a Stochastic Hydrologic Modeling System, Hydrology and Earth Systems Sciences, DOI: 10.5194/hess-2021-49, in review.

Bloomfield J. P., M. Gong, B. P. Marchant, G. Coxon, and N. Addor: How is Baseflow Index (BFI) impacted by water resource management practices?, Hydrology and Earth Systems Sciences, DOI: 10.5194/hess-2021-259, in review.

Addor, N., M. P. Clark, E. Gutmann and B. Henn: FUSE2: a modular framework for controlled multi-model hydrological experiments, in preparation for Geoscientific Model Development.

Teaching experience

Lectures and practicals at the University of East Anglia, 10.2018 - 09.2019:

- 'Flooding hazard', Global Environmental Challenges module, first year, 1 lecture, 160 students
- 'Rainfall-runoff modelling', Hydrology and Hydrogeology module, second year, 2 lectures and 1 practical
- 'Flood forecasting and management', Catchment Water Resources module, third year, 4 lectures and 1 practical
- Assistant for the field course 'Techniques for streamflow measurement'.

PhD and Master student supervision

Co-supervisor of Nele Reyniers' PhD, 'Drought risk and its management in a changing climate - A partnership with Anglian Water', University of East Anglia, 10.2019 - present.

Co-supervisor of Kirsti Hakala's PhD, 'Climate Change Impacts on Hydrology - Informing the design of the modeling chain and supporting adaptation', University of Zurich, 06.2015 - 12.2019.

Main supervisor of Silviya Nikolova's Master's thesis, 'Robustness of hydrological simulations under contrasted climate conditions', University of Zurich, 03.2013 - 01.2014.

Main supervisor of two Bachelor's theses at the University of Zurich, 09.2011 - 06.2013.

Funding acquired

PI of the project 'WADE: Water Demand forecasting using smart water meter data' funded by the water company South West Water, 07.2020 - 12.2020, £50k.

Co-I of the project 'SWARM: impact assessment to Support WAter Resources Management and climate change adaptation for China' funded by the UK Met Office, Climate Science for Service Partnership for China, 04.2020 - 03.2021, £400k (£86k to the University of Exeter).

Secured funding with Tim Osborn (University of East Anglia) from the water company Anglian Water for a PhD student (Nele Reyniers) to work on drought risk under climate change and on strategies to increase drought resilience, University of East Anglia, 09.2020 - 08.2023, £45k.

Postdoc.Mobility fellowship from the Swiss National Science Foundation for a postdoc at the University of East Anglia on 'Exploring and constraining uncertainties in climate change impacts on hydrology', 12.2018 - 05.2020, \sim £56k.

Early Postdoc.Mobility fellowship from the Swiss National Science Foundation for a postdoc at NCAR on 'A systematic comparison of hydrological model structures for use in climate impact studies', 06.2017 - 11.2018, \sim £57k.

Secured funding with Jan Seibert (University of Zurich) from the Swiss National Science Foundation for a PhD student (Kirsti Hakala) to explore climate change impacts on streamflow in Switzerland, University of Zurich, 06.2015 - 05.2019.

Doc.Mobility fellowship from the Swiss National Science Foundation for a research stay at the University of Oregon focused on 'Hydrological modeling for climate change impact assessment based on regional climate model results', July 2013, ~£8k.

Distinctions

Winner of a hackathon organised by the UK water company South West Water to develop innovative water management solutions using data from smart water meters, November 2020.

EGU article highlight for Addor et al. (2017): The CAMELS data set: catchment attributes and meteorology for large-sample studies, September 2017.

Nominated by the Faculty of Science of the University of Zurich for the 'Mercator Award 2016 for Junior Researchers of the University of Zurich', January 2016.

Academic services

Co-creator of the freely available CAMELS data set providing hydrological data for 671 catchments in the United States. CAMELS opens new opportunities to understand how landscape attributes interact to shape hydrological behaviour, and it paved the way for CAMELS data sets in Chile, Brazil, Great Britain and Australia - data sets for other countries are in production. 01.2016 - present.

Primary developer of FUSE2, a modular modelling framework for hydrological simulations and projections. FUSE2 can be run from the catchment to the continental scale, it allows for controlled modelling experiments, it is computationally efficient and open source. 09.2015 - present.

Chair of the Large-sample Hydrology working group of the Panta Rhei Research Initiative of the International Association of Hydrological Sciences involving hundreds of water scientists researching changes in hydrology and society. 06.2018 - present.

Co-convener of the session and splinter meeting 'Large-sample hydrology: characterising and understanding hydrological diversity' at the General Assembly of the European Geosciences Union. EGU2018 - present.

Co-organiser of the seminar 'Uncertainty in decision making in a changing climate' funded by the Department of Geography of University of Zurich, attended by 50 participants and described in Addor et al., (2015), 20-21 March, 2013.

Co-organiser of the '2nd Workshop on Improving the Theoretical Underpinnings of Hydrologic Models' which brought together 33 hydrologic modellers and data providers with a passion for a more structured and theoretically grounded approach to model development and testing, Sopron, Hungary, April 15-18, 2018.

Co-lead author of the chapter 'Hydrological responses to climate change: river runoff and groundwater' of the CH2014-Impacts report 'Toward quantitative scenarios of climate change impacts in Switzerland'.

Reviewer for: Climatic Change, Earth's Future, Earth and Space Science, Environmental Modelling and Software, Hydrological Processes, Hydrology and Earth System Sciences, International Journal of Climatology, Journal of the American Water Resources Association, Journal of Hydrology, Journal of Hydrometeorology, Scientific Data, Theoretical and Applied Climatology, Water, Water Resources Research, WIREs Water.

Invited presentations

CAMELS - community data sets for large-sample hydrology. Google Flood Forecasting Meets Machine Learning Workshop, Tel Aviv, Israel, 12-13 February 2020.

Improving water security by combining large-sample hydrology with modular modelling frameworks. University of Aberdeen, UK, 6 June 2019.

On the selection of hydrological models and signatures. University of Bristol, UK, 29 November 2018.

The predictive power of combining large-sample hydrology with modular modelling frameworks. University of Bern, Switzerland, 29 May 2018.

Ensemble simulations in hydrology to anticipate future changes in streamflow. Tyndall Centre for Climate Change Research, Norwich, UK, 31 January 2018.

Two ways to overcome boundaries in hydrology. Keynote at the Swiss Geoscience Meeting, Davos, Switzerland, 18 November 2017.

Uncertainties in hydrological simulations and projections: The interplay between data and models. Imperial College London, UK, 30 November 2016.

Bias-adjustment of RCM simulations: from the synoptic to the catchment scale. Climate and Global Dynamics seminar series, NCAR, Boulder, USA, 12 April 2016.

Bias-correction for climate impact studies, robust features and uncertainty sources in hydrological projections. Oregon State University, Corvallis, USA, 7 May 2014.

Robust changes and sources of uncertainty in the projected regimes of Swiss catchments. University of Oregon, Eugene, USA, 16 April 2014.

Robustness and uncertainties in future hydrological regimes of Swiss catchments. ETH Zurich, Switzerland, 1 July 2013.

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