SPATE

Newsletter

Space-Time Dynamics of Extreme Floods

Edition 7

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SPATE members do not let the pandemic get them down!

Dear colleagues and followers of the SPATE research unit,

The first half year of our second funding phase is already over and unfortunately, we are still affected by the consequences of the worldwide Covid-19 pandemic. But even though our meetings can still only take place online, as well as almost all scientific conferences and workshops, our members are not letting it get them down. Despite the difficult situation, a lot of research is still going on and there are currently more collaborations going on than ever before. Hopefully, we will soon be able to present our new joint paper on heavy tails in hydrological time series. We would like to take this opportunity to thank all our members who continue to work so hard despite the pandemic, work-at-home and home schooling! Our young scientists are also unstoppably hard-working and manage to advance their scientific careers despite limited opportunities. We are particularly pleased that Larisa Tarasova from sub-project 4 and Miriam Bertola from subproject 6 have successfully completed her doctorate. Congratulations, Larisa and Miriam! And we also welcome two new members since the beginning of the year. So, we are still more than optimistic that we will be able to advance our research very well and soon present it again at international conferences. A highlight will certainly be the symposium organised by the SPATE research unit at the IAHS General Assembly 2022 in Montpellier. We are already looking forward to all interested parties!

We hope you find some interesting research in this newsletter for you!

On behalf of the whole SPATE-project, with kind regards,

Svenja Fischer and Andreas Schumann

Members of the SPATE-project

Dr. Svenja Fischer, Prof. Dr. Andreas Schumann, Dominique Neukirch
Subproject 1 (Ruhr-University Bochum)

Prof. Dr. Bodo Ahrens, Mostafa Hamouda, Moritz Kirschner
Subproject 2 (Goethe-University Frankfurt)

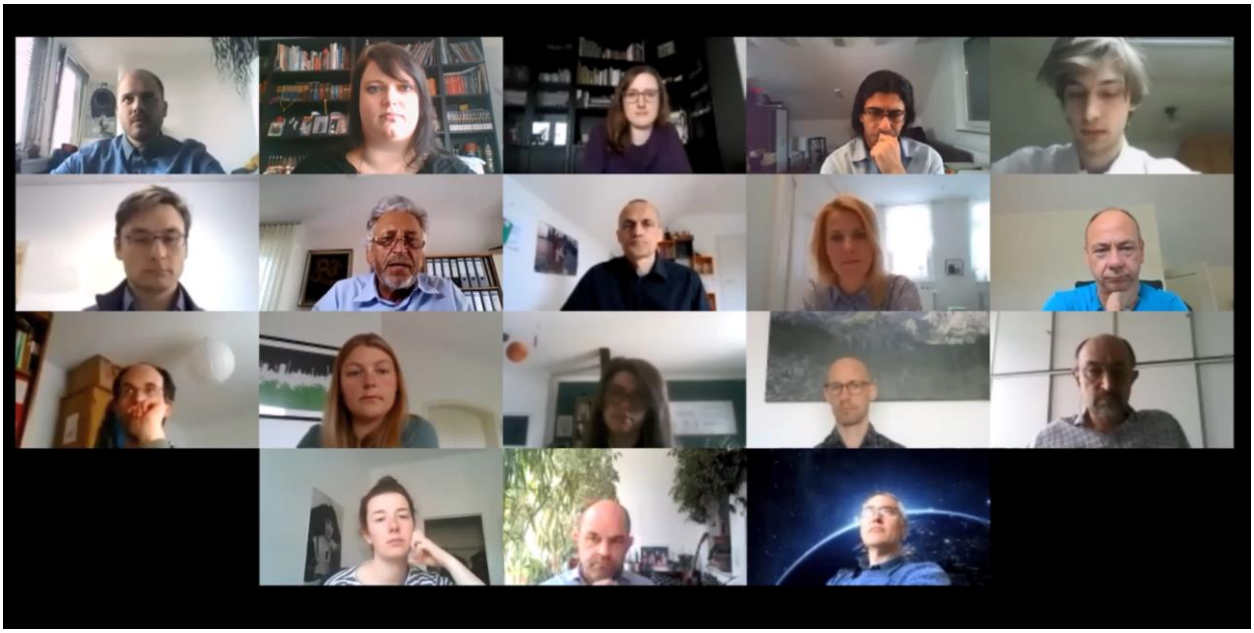
Dr. Sergiy Vorogushyn, Prof. Dr. Bruno Merz, Dr. Björn Guse, Elena Macdonald, Luzie Wietzke
Subproject 3 (GFZ Potsdam)

Prof. Dr. Ralf Merz, Dr. Larisa Tarasova
Subproject 4 (UFZ Halle/Saale)

Prof. Dr. András Bárdossy, Dr. Jochen Seidel, Faizan Anwar
Subproject 5 (University of Stuttgart)

Prof. Dr. Günter Blöschl, Dr. Miriam Bertola, David Lun
Subproject 6 (Technical University of Vienna)

Prof. Dr. Uwe Haberlandt, Dr. Anne Fangmann, Ross Pidoto, Luisa Thiele
Subproject 7 (Leibniz University Hannover)



Members of the research unit SPATE at the first online SPATE-Meeting

New Members of the SPATE Research Unit

Shortly after the start of the second phase of our research unit, two new faces joint the team.

For subproject 1, Dominique Neukirch extends the research group. Dominique has received his Master degree in Environmental Engineering and Resources Management at the Ruhr-University Bochum, Germany, where he applied machine learning techniques to obtain a drought index. In SP1, he will further develop the flood-type-specific deterministic model to allow a coupling with the stochastic generator such that extreme floods can be simulated.

For Subproject 2, Mostafa Hamouda has joined the group. Mostafa has a master degree in climate dynamics from the International Center for Theoretical Physics, ICTP, in Italy. Afterwards, he received his PhD in climate dynamics and teleconnections at the University of Milano, where he studied Atlantic and North-Atlantic Oscillation changes in a different climate focusing on stratosphere-troposphere coupling. Now, he supports SP2 to analyse impact of Vb cyclones and blocking in the generation of severe floods in Central Europe.

Again, interdisciplinarity is increased in our research unit and we are proud that international researchers which such diverse backgrounds become interested in working with us.

As always, we have provided several activities for our early careers in SPATE. To give our new members a quick and easy start and to refresh knowledge of our older members, in May to Webinars were given in the research unit. Andreas Schumann (SP1) gave a talk on flood risk and Bodo Ahrens (SP2) shared his knowledge on re-analysis data. Moreover, there have been several online meetings of the early careers to welcome our new members, to exchange in casual atmosphere and to simply meet each other – at least virtually. Hopefully, soon our new members will meet everyone in person.

A heartily welcome to our new members!

Publications

1) Publications in journals

Published since last newsletter:

Bárdossy A., Anwar F., and Seidel J. (all SP5) (2020):Hydrological Modelling in Data Sparse Environment: Inverse Modelling of a Historical Flood Event. Water. 2020; 12(11): 3242. https://doi.org/10.3390/w1211324

Basso, S. (SP4), Ghazanchaei, Z., and Tarasova, L. (SP4) (2021): Characterizing hydrograph recessions from satellite-derived soil moisture. STOTEN, 756, https://doi.org/10.1016/j.scitotenv.2020.143469

Bertola, M. (SP6), Viglione, A. (Mercator-fellow), Vorogushyn, S. (SP3), Lun, D. (SP6), Merz, B. (SP3), and Blöschl, G. (SP6) (2021): Do small and large floods have the same drivers of change? A regional attribution analysis in Europe. Hydrology and Earth System Sciences, 25, 3, 1347-1364. https://doi.org/10.5194/hess-25-1347-2021

Chen, X., Parajka, J., Széles, B., Valent, P., Viglione, A. (Mercator fellow), and Blöschl, G. (SP6) (2020). Impact of Climate and Geology on Event Runoff Characteristics at the Regional Scale, Water, 12(12), 3457, doi:10.3390/w12123457.

Fischer, S., Schumann, A. and Bühler, P. (all SP1) (2021): A statistics-based automated flood event separation. Journal of Hydrology X, 10. https://doi.org/10.1016/j.hydroa.2020.100070

Fischer, S., Bühler, P. and Schumann, A. (all SP1) (2021): Impact of flood types on superposition of flood waves and flood statistics downstream. Journal of Hydrologic Engineering 26. DOI: 10.1061/(ASCE)HE.1943-5584.0002103

Krug, A. (SP2), Pothapakula, P.K., Primo, C. (SP2), and Ahrens, B. (SP2) (2021): Heavy Vb-cyclone precipitation: a transfer entropy application showcase. MetZ. DOI: 10.1127/metz/2021/1071

Melsen, L. A., and Guse, B. (SP3) (2021): Climate change impacts model parameter sensitivity–implications for calibration strategy and model diagnostic evaluation. - Hydrology and Earth System Sciences, 25, 3, 1307-1332. https://doi.org/10.5194/hess-25-1307-2021

Merz, R. (SP4), Tarasova, L. (SP4), and Basso, S. (SP4) (2020). The flood cooking book: ingredients and regional flavors of floods across Germany. ERL, 15(11), 114024. https://doi.org/10.1088/1748-9326/abb9dd

Modiri E. and Bárdossy A. (SP5): Clustering Simultaneous Occurrences of the Extreme Floods in the Neckar Catchment. Water. 2021; 13(4):399. https://doi.org/10.3390/w13040399

Nguyen, D., Merz, B. (SP3), Hundecha, Y., Haberlandt, U. (SP7) and Vorogushyn, S. (SP3) (2021): Comprehensive evaluation of an improved large-scale multi-site weather generator for Germany. - International Journal of Climatology, joc.7107. https://doi.org/10.1002/joc.7107

Persiano, S., Salinas, J.L., Stedinger, J.R., Farmer, W.H., Lun, D. (SP6), Viglione, A. (Mercator fellow), Blöschl, G. (SP6) and Castellarin, A. (2021). A comparison between generalized least squares regression and top-kriging for homogeneous cross-correlated flood regions, Hydrological Sciences Journal, 66(4), 565-579, doi:10.1080/02626667.2021.1879389.

Tarasova, L. (SP4), Basso, S. (SP4), and Merz, R. (SP4) (2020). Transformation of Generation Processes: From Small Runoff Events to Large Floods. GRL, 47(22). https://doi.org/10.1029/2020GL090547

2) Software and Data

Krug, A. (SP2), & Ahrens, B. (SP2) (2020). Cyclone tracks from 1901 to 2010 in dynamically downscaled ERA-20C reanalysis (COSMO-CLM+NEMO) [Data set]. Zenodo. http://doi.org/10.5281/zenodo.4333258

Pothapakula, P.K., A. Krug (SP2), C. Primo (SP2), B. Ahrens (SP2) (2021) Source code for a transfer entropy application showcase (Heavy Vb-cyclone precipitation). http://doi.org/10.5281/zenodo.4568217

Talks

1) Invited talks:

Fischer, S. (SP1): Multivariate Design Flood Estimation in Large River Basins under Consideration of Tributary Impacts and Flood Types. AGU Fall Meeting, virtual, 2020.

Merz, B. (SP3): Überschwemmungsrisiken; Ringvorlesung 'Naturgefahren, Verwundbarkeit und Katastrophen: Interdisziplinäre Perspektiven', Universität Wien – 23 März 2021.

Merz, B. (SP3): Starkregen, Hochwasser und Klimawandel; Rotary-Club Potsdam, 19 Januar 2021

Tarasova L. (SP4): Discussant on Runoff Processes: Process-Based Characterization and Typology of Runoff Events. Panel H151 - Recent Advances in the Hydrologic Sciences I, AGU Fall Meeting, virtual, 2020

2) Other talks on conferences

Ahrens, B. (SP2), P.K. Pothapakula, A. Krug (SP2). Air-sea anomalies in the Mediterranean and extreme Vb-precipitation in Central Europe. Talk at WRCP MedCORDEX Flagship Pilot Study workshop, 30 Mar. 2021

Anwar, F., Bárdossy, A., and Seidel, J.(all SP5): Hydrological modeling in data sparse environments, EGU General Assembly 2021, online, 19–30 Apr 2021, EGU21-5040, https://doi.org/10.5194/egusphere-egu21-5040, 2021.

Barendrecht, M.H., Viglione, A. (Mercator fellow), Kreibich, H., and Blöschl, G. (SP6). A Budyko-like framework for exploring the controls of long-term flood risk in coupled human-flood systems, EGU General Assembly 2021, online, 19-30 April 2021, doi:10.5194/egusphere-egu21-6266.

Bertola, M. (SP6), Viglione, A. (Mercator fellow), Vorogushyn, S. (SP3), Lun, D. (SP6), Merz, B. (SP3), and Blöschl, G. (SP6): Investigating the causes of changes inn flood quintiles across Europe during the past five decades, HydroCarpath International Conference, online, 3 Dec 2020, https://tab.mta.hu/files/2816/0700/2215/abstrbook.pdf, 2020

Bertola, M. (SP6), Viglione, A. (Mercator fellow), Vorogushyn, S. (SP3), Lun, D. (SP6), Merz, B. (SP3), and Blöschl, G. (SP6): Data-based attribution of changes in flood quantiles across Europe between 1960 and 2010, EGU General Assembly 2021, online, 19–30 Apr 2021, EGU21-2604, https://doi.org/10.5194/egusphere-egu21-2604, 2021.

Fangmann, A. and Haberlandt, U. (both SP7) (2021): Flood frequency from maximum daily vs. instantaneous peak flows, EGU General Assembly 2021, online, 19 – 30 April, 2021.

Guse, B. (SP3), Anwar, F. (SP5), Merz, B. (SP3), Tarasova, L. (SP4), Merz, R. (SP4), Bárdossy, A. (SP5), and Vorogushyn, S. (SP3): Event indicator analysis using depth functions to explain the occurrence of large floods in Germany, EGU General Assembly 2021, online, 19–30 Apr 2021, EGU21-14692, https://doi.org/10.5194/egusphere-egu21-14692, 2021.

Kirschner, M. J. (SP2), Krug, A. (SP2), Lun, D. (SP6), and Ahrens, B. (SP2): Zeitliche Häufung von Rain-on-Snow Hochwasser - Zufall oder Grundlage ihrer Vorhersagbarkeit?, 12. Deutsche Klimatagung, online, 15–18 Mar 2021, DKT-12-40, https://doi.org/10.5194/dkt-12-40, 2020.

Kirschner, M. J. (SP2), Krug, A. (SP2), Lun, D. (SP6), and Ahrens, B. (SP2): Evaluating the clustering of Central European rain-on-snow events with flood-inducing potential, EGU General Assembly 2021, online, 19–30 Apr 2021, EGU21-9778, https://doi.org/10.5194/egusphere-egu21-9778, 2021.

Mehrvand, M., Bárdossy, A., and Anwar, F. (both SP5): Conditional Simulation of Precipitation Time Series Using Phase Annealing, EGU General Assembly 2021, online, 19–30 Apr 2021, EGU21-12500, https://doi.org/10.5194/egusphere-egu21-12500, 2021.

Pothapakula P.K., A. Krug (SP2), A. Obermann, T. Keber, B. Ahrens (SP2). Vb-cyclone precipitation under projected Mediterranean Sea warming. Talk at ICON/COSMO/CLM/ART User Seminar (ICCARUS). 8--19 Mar. 2021

Thiele, L., Pidoto, R. and Haberlandt, U. (all SP7) (2021): Spatial representation of stochastically generated rainfall for derived flood frequency analysis, EGU General Assembly 2021, online, 19 – 30 April, 2021.

Viglione, A. (Mercator fellow), Kiss, A: (SP6) and Blöschl, G. (SP6). Flood-rich periods in the last 500 years in Europe, AGU Fall Meeting, 1-17 December 2020, Online Everywhere.

Thesis

Tarasova, L. (SP3) (2020). Process-Based Characterization and Typology of Runoff Events in Germany, PhD Thesis, Martin-Luther-Universität Halle-Wittenberg. https://doi.org/http://dx.doi.org/10.25673/35678

Bertola, M. (SP6) (2020). From the detection to the attribution of flood changes in Europe, PhD Thesis, Technische Universität Wien, Vienna, https://repositum.tuwien.at/handle/20.500.12708/17036.

Workshops, Conferences

General Assembly of the European Geosciences Union 2021 (virtual), vEGU 2021, “Clustering in Hydrology: Methods, Applications and Challenges”, Conveners: N. Dogulu, S. Fischer (SP1) and W. Knouben.

General Assembly of the European Geosciences Union 2021 (virtual), vEGU 2021, HS2.2.1: Understanding hydrological processes across spatio-temporal scales: from data to model: Conveners: Sina Khatami, Luis Samaniego, Simon Stisen, Shervan Gharari, Björn Guse (SP3)

General Assembly of the European Geosciences Union 2021 (virtual), vEGU 2021, HS2.4.5: Space-time dynamics of floods: processes, controls, and risk: Conveners: William Farmer, Heidi Kreibich, Luis Mediero, Alberto Viglione (SP6), Sergiy Vorogushyn (SP3)

Gordon Research Seminar 2021 in New Hampshire, US (postponed to 2023) - Discussion Leader: Tarasova L. (SP4)