Lukas Brunner

curriculum vitae

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Research Interests

I am passionate about understanding how modern climate models represent the climate system. My research ranges from investigating synoptic-scale atmospheric blocking and associated extreme events in climate models and observations, to assessing global climate model performance, and addressing questions of climate model dependence and its implications. I work with the latest climate models and I am an expert in processing and analysing climate model data from projects such as CMIP. I have published several code repositories and I am enthusiastic about all aspects of open science. My work also includes teaching, supervision, project coordination, and public outreach.

Current Position

01/2022 - present	**Senior scientist** Group for Climate Dynamics and Modeling, Department of Meteorology and Geophysics, University of Vienna

Previous Positions

05/2023 - 06/2023	**Visiting scientist** Institute of Meteorology, Freie Universiät Berlin
10/2020 - 12/2021	**Senior scientist** Climate Physics group, Institute for Atmospheric and Climate Science, ETH Zurich
05/2018 - 09/2020	**Postdoctoral scientist**, Climate Physics group, Institute for Atmospheric and Climate Science, ETH Zurich
04/2017 - 09/2017	**Visiting scientist** Center for International Climate Research Oslo (CICERO), Norway
10/2015 - 03/2016	**Visiting scientist** Chair of Climate System Science, School of Geosciences, University of Edinburgh
10/2014 - 03/2018	**Predoctoral scientist** Research group ARSCliSys, Wegener Center, University of Graz

Education

03/2018	**Dr. rer. nat. in Climate physics**, University of Graz, Austria
Thesis	A new perspective on atmospheric blocking – detection, analysis, and impacts
07/2014	**MSc. in Geophysics**, University of Graz, Austria
Thesis	Stratospheric ozone and temperature evolution over the past decades
10/2012	**BSc. in Physics**, University of Graz, Austria
06/2008	School leaving examination

Committee Work and Volunteering

2023 - present	**Member in the University of Vienna sustainability advisory board** University of Vienna
2023 - present	**Member of the Environment and Climate Research Hub** University of Vienna
2022 - present	**Member of the steering committee of the Austrian Climate Scenarios** Klimaszenarien.AT
2021 - 2022	**Climate expert and participant at the Future of the Earth performance** The Future of the Earth interactive theatre performance
2019 - 2021	**Board member (president in 2021)** Club Alpbach Vorarlberg, European Forum Alpbach
2018 - 2021	**Mittelbau representative** Insitute for Atmosphere and Climate, ETH Zurich
2018 - present	**Reviewer for scientific journals** 40+ verified reviews on WoS, including for J. Climate, Nature, and Science Advances

Awards and Scholarships

2023	**Wissenschaftspreis des Landes Vorarlberg for young researchers** Vorarlberger Landesregierung
2022	**Scholarhip as youth representative of the European Forum Alpbach at COP27** European Forum Alpbach Foundation and Forum Alpbach Network
2018	**Performance scholarship for my PhD project** University of Graz
2017 - 2018	**Member PRO SCIENTIA** Österreichisches Studienförderungswerk
2016 - 2018	**Scholarships for the European Forum Alpbach** Club Alpbach Vorarlberg: 2016 & 2017; European Forum Alpbach Foundation: 2018
2016	**Marietta Blau scholarship** Austrian Exchange Service

Key Presentations

07/2023	IUGG General Assembly, Berlin (oral presentation)
05/2023	Colloquium Leipzig Institute for Meteorology, Leipzig University (invited)
05/2023	Institute for Meteorology colloquium, FU Berlin (invited)
05/2023	Climate statistics and extremes group, Universität Hamburg (invited)
03/2023	Global Carbon Budget workshop (invited keynote)
05/2022	EGU General Assembly (oral presentation)
01/2022	Colloquium Department of Meteorology and Geophysics, University of Vienna (invited)
11/2021	EC-Earth Consortium General Assembly 2021 (invited keynote)
10/2021	Wegener Center Common Space, University of Graz, Austria (invited)
04/2017	EGU General Assembly (oral presentation)
12/2015	AGU Fall Meeting (oral presentation)

Supervision and Courses

2022 - present	**Numerische Methoden** Bachelor course, University of Vienna (full course)
2022 - present	**Modelling and Data Analysis** Master course, University of Vienna (part of the course)
2022 - present	**Exercises in Introduction to Computational Meteorology** Master course, University of Vienna (full course)
2019 - present	**Supervision of Bachelor and Master students** Bachelor thesis: 2 finished, 1 ongoing; Master thesis: 1 finished, 1 ongoing

Published Code and Data

Code	**L. Brunner** (2023): Data and code for "Identifying climate models based on their daily output using machine learning" (v1.0), `https://doi.org/10.5281/zenodo.7998437`
Dataset	Liu, Y, P. Kalverla, F. Alidoost, S. Verhoeven, B. Vreede, B. Booth, E. Coppola, R. Nogherotto, **L. Brunner**, G. Harris, S. Qasmi, A. Ballinger, G. Hegerl, C. McSweeney, C. O'Reilly, T. Palmer, A. Ribes, and H. de Vries (2021): Pre-processed data of atlas in EUCP-WP2 (1.0.1). `https://doi.org/10.5281/zenodo.5679560`
Code	**Climate Model Weighting by Independence and Performance (ClimWIP)** `https://github.com/lukasbrunner/ClimWIP` (collaborative project) `https://docs.esmvaltool.org/en/latest/recipes/recipe_climwip.html`
Code	**A global blocking detection algorithm** `https://github.com/lukasbrunner/blocking`
Dataset	**Brunner L.**, M. Hauser, R. Lorenz, and U. Beyerle (2020): The ETH Zurich CMIP6 next generation archive: technical documentation. DOI: `http://doi.org/10.5281/zenodo.3734128`
Dataset	**Gridded radio occultation satellite data** ○ Geopotential Height: `https://hdl.handle.net/20.500.11756/e4f48220` ○ Temperature: `https://hdl.handle.net/20.500.11756/8245c63e` ○ Specific Humidity: `https://hdl.handle.net/20.500.11756/8245c63e`

Selected Outreach activities

01/2023	Keynote: Green Finance Seminar, Faculty of Law
10/2022	Public lecture: Inspirationstag der Katholischen Kirche Wien
10/2022	Interview: Ö1 Kinderuni `https://oe1.orf.at/programm/20221027/695314/Wie-entstehen-Wolken`
11/2022	Article: Rudolphina `https://rudolphina.univie.ac.at/klimakonferenz-cop27-hitze-duerre-flut-extremwetter-katastrophen`
11.2020	Mentioned in media: Ars Technica `https://arstechnica.com/science/2020/11/newest-climate-models-shouldnt-raise-future-warming-projections`

Publications

So far, I have published 16 peer-reviewed articles, which have been cited more than 900 times according to Google Scholar. My current h-index is 12.

08/2023   Merrifield A. L., **L. Brunner**, R. Lorenz, v. Humphrey, and R. Knutti (2023): Climate model Selection by Independence, Performance, and Spread (ClimSIPS v1.0.1) for regional applications, *Geosci. Model Dev. Diss.*, DOI: `https://doi.org/10.5194/gmd-16-4715-2023`

07/2023   **Brunner L.** and S. Sippel (2023): Identifying climate models based on their daily output using machine learning, *Env. Data Sci.*, DOI: `https://doi.org/10.1017/eds.2023.23`

04/2023   Palmer T. E., C. F. McSweeney, B. B. B. Booth, M. D. K. Priestley, P. Davini, **L. Brunner**, L. Borchert, and M. B. Menary (2023): Performance based sub-selection of CMIP6 models for impact assessments in Europe, *Earth Syst. Dynam.*, DOI: `https://doi.org/10.5194/esd-14-457-2023`

10/2022   Gründemann G. J, N. van de Giesen, **L. Brunner**, and R. van der Ent (2022): Rarest rainfall events will see the greatest relative increase in magnitude under future climate change, *communications earth & environment*, DOI: `https://doi.org/10.1038/s43247-022-00558-8`

06/2021   Hegerl, G., A. P. Ballinger, B. Booth, L. F. Borchert, **L. Brunner**, M. Donat, F. Doblas-Reyes, G. Harris, J. Lowe, R. Mahmood, J. Mignot, J. Murphy, D. Swingedouw, and A. Weisheimer (2021): Toward Consistent Observational Constraints in Climate Predictions and Projections, *Front. Clim.*, 3, DOI: `https://doi.org/10.3389/fclim.2021.678109`

11/2021   Sperna Weiland, F. C., R. D. Visser, P. Greve, B. Bisselink, **L. Brunner**, and A. H. Weerts (2021): Estimating Regionalized Hydrological Impacts of Climate Change Over Europe by Performance-Based Weighting of CORDEX Projections. *Front. Water*, 3, DOI: `https://doi.org/10.3389/frwa.2021.713537`

11/2020   **Brunner, L.**, A. G. Pendergrass, F. Lehner, A. L. Merrifield, R. Lorenz, and R. Knutti: Reduced global warming from CMIP6 projections when weighting models by performance and independence. *Earth Syst. Dynam.*, 11(4), 995–1012, DOI: `https://doi.org/10.5194/esd-11-995-2020`

09/2020   **Brunner, L.**, C. McSweeney, A. P. Ballinger, D. J. Befort, M. Benassi, B. B. B. Booth, E. Coppola, H. de Vries, G. Harris, G. C. Hegerl, R. Knutti, G. Lenderink, J. Lowe, R. Nogherotto, C. O'Reilly, S. Qasmi, A. Ribes, P. Stocchi, and S. Undorf: Comparing Methods to Constrain Future European Climate Projections Using a Consistent Framework. *J. Climate*, 33(20), 8671–8692, DOI: `https://doi.org/10.1175/jcli-d-19-0953.1`

09/2020   Merrifield, A. L., **L. Brunner**, R. Lorenz, and R. Knutti: An investigation of weighting schemes suitable for incorporating large ensembles into multi-model ensembles. *Earth Syst. Dynam.*, 11, 807-834, DOI: `https://doi.org/10.5194/esd-11-807-2020`

05/2020   Lehner, F., C. Deser, N. Maher, J. Marotzke, E. Fischer, **L. Brunner**, R. Knutti, and E. Hawkins: Partitioning climate projection uncertainty with multiple Large Ensembles and CMIP5/6. *Earth Syst. Dynam.*, 11, 491-508, DOI: `https://doi.org/10.5194/esd-11-491-2020`

09/2019   **Brunner, L.**, R. Lorenz, M. Zumwald, and R. Knutti: Quantifying uncertainty in European climate projections using combined performance-independence weighting. *Env. Res. Let.* DOI: `https://doi.org/10.1088/1748-9326/ab492f`

06/2018   Unterberger, C., **L. Brunner**, S. Nabernegg, K. Steininger, A. K. Steiner, E. Stabentheiner, S. Monschein and H. Truhetz: Spring frost risk for regional apple production under a warmer climate. *PLoS ONE*, 13, DOI: `https://doi.org/10.1371/journal.pone.0200201`

01/2018   **Brunner, L.**, N. Schaller, J. Anstey, J. Sillmann and A. K. Steiner: Dependence of present and future European temperature extremes on the location of atmospheric blocking. *Geophys. Res. Lett.*, 45, DOI: `https://doi.org/10.1029/2018GL077837`

01/2017   **Brunner, L.** and A. K. Steiner: A global perspective on atmospheric blocking using GPS radio occultation – one decade of observations. *Atmos. Meas. Tech.*, 10, DOI: `https://doi.org/10.5194/amt-10-4727-2017`

11/2016   **Brunner, L.**, G. C. Hegerl and A. K. Steiner: Connecting atmospheric blocking to European temperature extremes in spring, *J. Climate*, 30.2, DOI: `https://doi.org/10.1175/JCLI-D-16-0518.1`

04/2016   **Brunner, L.**, A. K. Steiner, B. Scherllin-Pirscher and M. W. Jury: Exploring atmospheric blocking with GPS radio occultation observations, *Atmos. Chem. Phys.* 16, DOI: `https://doi.org/10.5194/acp-16-4593-2016`

Other publications

03/2020   **Brunner, L.**, M. Hauser, R. Lorenz, and U. Beyerle: The ETH Zurich CMIP6 next generation archive: technical documentation. DOI: `http://doi.org/10.5281/zenodo.3734128`

06/2018   Mohankumar, S. E. P., K. Mintz-Woo, M. Damert, **L. Brunner** and J. Eise: Blogging Climate Change: A Case Study, In: Addressing the Challenges in Communication Climate Change Across Various Audiences. DOI: `https://doi.org/10.1007/978-3-319-98294-6`

04/2018   **Brunner, L.**: A new perspective on atmopsheric blocking from observations – detection, analysis, and impacts (Dissertation). Wegener Center Verlag Graz, Scientific Report Nr. 76-2018, URL: `https://wegcwww.uni-graz.at/publ/wegcreports/2018/WCV-SciRep-No76-LBrunner-Jun2018.pdf`

06/2014   **Brunner, L.**: Stratospheric ozone and temperature evolution over the past decades (Master's thesis). Wegener Center Verlag Graz, Scientific Report Nr. 59-2014, DOI: `http://wegcwww.uni-graz.at/publ/wegcreports/2014/WCV-SciRep-No59-LBrunner-Aug2014_1.pdf`