

Lukas Brunner

curriculum vitae

✉ l.brunner@univie.ac.at
🌐 <https://lukasbrunner.github.io/>
🐙 [lukasbrunner](#)
🐦 [@luki_brunner](#)



Research

I am passionate about understanding changes in global and regional climate as well as their drivers. My research includes work on the evolution of atmospheric blocking and its impacts, on the analysis of multi-model ensemble projections, and on aspects of model heritage and inter-dependence. I have published several Python packages and I am enthusiastic about all aspects of open science. My work also includes teaching, supervision, project coordination, and public outreach.

Professional Experience

- 01/2022 - present **Senior scientist**, Department of Meteorology and Geophysics, University of Vienna
 - Research on atmospheric blocking and temperature extremes
 - Research on climate model weighting and evolution of climate models
 - Work with climate data in Python and Bash using statistical learning methods
 - Development and maintenance of various code repositories using Git
 - Presentation of results at international conferences and in scientific journals
 - Teaching, supervision of students, and public outreach
- 05/2018 - 12/2021 **Senior scientist**, Institute for Atmospheric and Climate Science, ETH Zurich
 - Research on the future evolution of global and European climate
 - Project coordination and cooperation with partner universities in Europe
 - Statistical analysis and visualisation of climate data with Python and Bash
 - Development and maintenance of various code repositories using Git
 - Presentation of results at international conferences and in scientific journals
 - Teaching, supervision of students, and public outreach
- 10/2014 - 03/2018 **Predoctoral scientist**, Wegener Center, University of Graz, Austria
 - Research with focus on satellite remote sensing using radio occultation
 - Research on atmospheric blocking and temperature extremes
 - Post-processing and statistical analysis of satellite data with Python
 - Presentation of results at international conferences and in scientific journals
 - Teaching, interdisciplinary cooperation, and public outreach

Research stays

- 04/2017 - **Center for International Climate Research (CICERO)**, Norway
09/2017 ○ Collaboration with Dr. J. Sillmann and publication of a scientific paper
- 10/2015 - **School of Geosciences, University of Edinburgh**, United Kingdom
03/2016 ○ Collaboration with Prof. G. C. Hegerl and publication of a scientific paper

Internships

- 06/2014 **Intern**, Abteilung für Luftreinhaltung, Umweltinstitut Bregenz, Austria
○ Statistical analysis and visualization of air pollution data with R.

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

Volunteering and Committee Work

- 2022-present **Member of the ÖKS Steering Committee**, Austrian Climate Scenarios 2026
- 2018 - 2021 **Board member (president in 2021)**, Club Alpbach Vorarlberg, Austria
○ Fundraising and organisation of scholarships for the European Forum Alpbach
○ Organisation of events, management of the Club Alpbach Vorarlberg, and collaboration with the Alpbach Foundation and other clubs
- 2018 - 2021 **Mittelbau representative**, Institute for Atmosphere and Climate, ETH Zurich
○ Organisation of events and contact person for internal issues
- 2018 - present **Reviewer for scientific journals**
<https://www.webofscience.com/wos/author/record/AAP-7583-2020>
- 2016 - 2018 **Volunteer**, Caritas Graz, Austria
○ Support of clients in an Open Learning Center
- 2016-2017 **Volunteer**, University of Graz historical meteorological station, Austria
○ Station upkeep and measurement of meteorological parameters
- 2012 - 2018 **Student representative**, University of Graz, Austria
○ Representation in several committees; Speaker of my doctoral programme

Awards and scholarships

- 2018 Performance scholarship for my PhD project, University of Graz, Austria

- 2018 Scholarship as seminar assistant for the European Forum Alpbach 2018, European Forum Alpbach Foundation, Austria
- 2017 - 2018 Member PRO SCIENTIA, Österreichisches Studienförderungswerk, Austria
- 2016 - 2017 Scholarship for the European Forum Alpbach 2016 & 2017, Club Alpbach Vorarlberg
- 2016 Marietta Blau Scholarship, Austrian Exchange Service
- 2009 - 2013 Performance scholarships (3 times), University of Graz, Austria

Invited talks

- 11/2021 **Keynote**, EC-Earth Consortium General Assembly 2021 (virtual)
Uncertainties in multi-model assessments of future climate
- 10/2021 **Invited talk**, Wegener Center Common Space (virtual), University of Graz, Austria
Weighting models by performance and independence: effects on projections of future climate

Interests and Skills

- Languages German (native), English (fluent in speaking, reading, writing)
- Systems Advanced: Linux, Microsoft Windows
- Coding Advanced: Python, Bash; Proficient: C++, R, SQL
- Software L^AT_EX, Git, SVN, CDO, Office applications
- Hobbies Holder of the 2. Dan in Shotokan Karate; Hiking and Skiing enthusiast

Supervision and Courses

- 2022 **Numerische Methoden**
Bachelor course, University of Vienna (full course)
- 2022 **Modelling and Data Analysis**
Master course, University of Vienna (part of the course)
- 2022 **Exercises in Introduction to Computational Meteorology**
Master course, University of Vienna (full course)
- 2019 - present **Supervision of Bachelor and Master students**
 - Master's Thesis: Interannual to decadal precipitation variability in a warming climate: spatial structure and underlying mechanisms (co-supervision)
 - Bachelor Thesis: Assessing climate model uncertainties – an encounter with CMIP6
 - Bachelor Thesis: Changes in northern hemisphere blocking occurrence under 2×CO₂ based on CESM
- 2020 - 2021 **Exercises in Systemanalyse**, Bachelor course, ETH Zurich
 - Organisation of courses for over 200 students
 - Generation of exercises and preparation of the course instructors
- 2016 - 2018 **Exercises in Methods of Modeling and Simulation with Python**
Master course, University of Graz, Austria (part of the course)
- 2016 - 2018 **Exercises Introduction to Meteorology and Climate Physics**
Bachelor course, University of Graz, Austria (full course)

2016 **Seminar Selected Topics in Atmosphere and Climate Physics**
Master course, University of Graz, Austria (part of the course)

Published Code and Data

- 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>

Media Coverage and Public Outreach

- 11.2020 **Ars Technica**: Newest climate models shouldn't raise future warming projections (<https://arstechnica.com/science/2020/11/newest-climate-models-shouldnt-raise-future-warming-projections>)
- 02/2017 **Der Standard** (German): Atmosphärische Blockaden führen zu Kälteeinbrüchen im Frühjahr (<https://www.derstandard.at/story/2000051806269/atmosphaerische-blockaden-fuehren-zu-kaelteeinbruechen-im-fruehjahr>)

Publications

Peer-Reviewed

- 06/2022 Befort D. J., **L. Brunner**, L. F. Borchert, C. H. O'Reilly, J. Mignot., A. P. Ballinger, G. C. Hegerl, J. M. Murphy (2022): Combination of decadal predictions and climate projections in time: Challenges and potential solutions, *Geophys. Res. Lett.*, DOI: <https://doi.org/10.1029/2022GL098568>
- 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. Bafort, 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. Lett.* DOI: <https://doi.org/10.1088/1748-9326/ab492f>
- 06/2018 Unterberger, C., **L. Brunner**, S. Nabernegg, K. Steininger, A. K. Steiner, E. Staben-theiner, 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 atmospheric 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