Dr. Julia Kukulies

Research positions

Oct 2023-May 2026 **ASP Postdoctoral Fellow**, *Mesoscale and Microscale Meteorology Lab*, *NSF National Center for Atmospheric Research, Boulder, Colorado*.

Mar 2023-Sep 2023 **Research Assistant in Mesoscale Meteorology**, *Regional Climate Group*, *Department of Earth Sciences, University of Gothenburg, Sweden*.

Education

2018–2023 **Doctor of Philosophy (Ph.D.) in *Natural Sciences***,
Regional Climate group, Department of Earth Sciences, University of Gothenburg, Sweden,
Thesis project: Observing and Modeling Precipitation in the Tibetan Plateau region.
Advisor: Prof. Deliang Chen

2017–2018 **Master of Science in *Atmospheric Sciences***, *Final grade: VG (Excellent)*,
Department of Earth Sciences, University of Gothenburg, Sweden,
Thesis project: Temporal and spatial variability of convection, clouds and precipitation over the Tibetan Plateau derived from recent satellite retrievals.
Advisor: Prof. Deliang Chen

2013–2016 **Bachelor of Science in *Earth Sciences with Major in Climatology***, *Final grade: VG (Excellent)*,
Department of Earth Sciences, University of Gothenburg, Sweden,
Thesis project: Major ion deposition in the accumulated winter snowpack in northern Sweden.
Advisor: Prof. Hans Linderholm

Research visits and Invited talks

Oct 2025 **Brookhaven National Laboratory, New York, USA**,
Host: Dr. Dié Wang, Environmental Science and Technologies Department,
Invited talk: Precipitation Efficiency of Convective Storms - a missing puzzle bit in future changes? .

Apr 2025 **Duke University, Durham, USA.**,
Host: Prof. Wenhong Li, Nicholas School of the Environment,
Invited talk: Mesoscale convective systems and Precipitation in a Changing Climate.

Mar 2024 **Pacific Northwest Laboratory, Washington, USA**,
Host: Dr. Zhe Feng, Atmospheric Sciences and Global Change Division,
Invited talk: Mesoscale convective systems and their Impact on Precipitation.

Apr-Sep 2023 **National Center for Atmospheric Research, Boulder, Colorado, USA**,
Visitor in the Climate Extremes Section, Host: Prof. Andreas Franz Prein and Dr. James Done,
Project: Evaluation of convective storms in kilometer-scale climate simulations.

Oct 2021-May 2022 **National Center for Atmospheric Research, Boulder, Colorado, USA**,
ASP Graduate visitor program, Host: Prof. Andreas Franz Prein,
Project: Ensemble-based convection-permitting simulations in the Third Pole region.

Oct-Dec 2017 **School of Atmospheric Sciences, Nanjing University, China**,
Research visit in Aerosol-cloud research group, Host: Prof. Minghuai Wang,
Project: Satellite observations of convective clouds over the Tibetan Plateau.

Jun-Aug 2016 **Max Planck Institute for Meteorology, Hamburg, Germany**,
Internship in Hydrological group, Host: Dr. Tobias Stacke,
Project: Validation of a global dynamical wetland scheme in land-atmosphere coupled simulations.

Jun-Aug 2014 **Helmholtz Centre for Ocean Research, Kiel, Germany**,
Internship in Paleoclimatology and Natural Resources, Host: Dr. rer. nat. Warner Brückmann.

Fellowships and Grants

2025-2026 **Strategic Funding Grant for NCAR's Mesoscale & Microscale Meterology Laboratory**,
Project: Feature-Based Assessment of Extreme Precipitation in global and regional MPAS simulations,
Colorado, USA.

2024-2026 **ASP Postdoctoral Fellowship**,
Project: How well do km-scale climate models represent organized convection beyond surface precipitation?,
Colorado, USA.

2021 **NCAR Advanced Study Program for graduate visitors**,
Colorado, USA.

2019 **Travel fund to International Conference on Regional Climate-CORDEX 2019**,
Beijing, China.

2018 **Research Fund Adlerbertska Stiftelse**,
Sweden.

2018 **Sven Lindqvists forskningsstiftelse för doktorandstudier vid Geovetarcentrum**,
Gothenburg, Sweden.

2018-2023 **Swedish National Space Agency (SNSA) Grant**,
Project: The role of convection for precipitation in the Third Pole region - Satellite and ground-based observation vs model simulations, Grant nr. 188/18 4).

Awards and Honors

2023 **Faculty of Science Doctoral Thesis Award at the University of Gothenburg**,
Gothenburg, Sweden.

2021 **Wiley Top downloaded article**,
Title: The Role of Mesoscale Convective Systems in Precipitation in the Tibetan Plateau region.

Outreach and Engagement

2018–2021 **Coordinator and Steering Board member of the Gothenburg Air and Climate Network (GAC)**.

2018–2021 **Executive Secretary of the Association of Polar and Alpine Early Career Scientists (APECS)**.

2024–present **Group member of the NCAR Water system program (including CONUS404 and the South America Affinity Group)**.

2024–present **Steering board member of the NCAR Early Career Scientist Assembly (ECSA)**.

2025–present **Member of the WCRP Global Precipitation Experiment (GPEX), Working group 3 (Prediction and Modeling)**.

Contributions to research community

Reviewer for the following scientific journals,
JGR Atmosphere, Journal of Climate, Journal of Applied Meteorology and Climatology, International Journal of Climatology, Geoscientific Model Development, Geoscience Data Journal, Climatic Change.

Co-convener for sessions at the following scientific conferences,
European Geoscience Union: Advancing understanding of the circulation-coupling and Lagrangian evolution of clouds
American Meteorological Society: Climate Impacts of Tropical Ice Clouds .

Pedagogical courses

2025 **Early Career Leadership Program**,
NSF NCAR, Boulder, Colorado.

2019 **Teaching and Learning in Higher Education as a Scientific Field**,
University of Gothenburg, Sweden.

Supervision and Mentoring

2025 **Shanna Chamhitt (Summer internship within NCAR's SOARS program)**,
Project: Using satellite observations to measure non-propagating gravity waves in tropical cyclones,
NSF NCAR, Boulder, Colorado.

2022 **Benjamin Odenman Holmberg (Master thesis)**,
Project: Analysis of mesoscale weather systems in the Tibetan plateau region at different resolution using ERA5, HAR and WRF,
University of Gothenburg, Sweden.

2022 **Anna Dugoul (Master thesis)**,
Project: Characterisation of extreme precipitation events in the Sichuan Basin based on in-situ observations and their connection to mesoscale convective systems and other mesoscale disturbances,
University of Gothenburg, Sweden.

2021 **Devashree Niraula (Master thesis)**,
Project: Assessing the role of extreme precipitation on the Babai river basin and its impact on the Bhari Babai Mulidiversion Project,
University of Gothenburg, Sweden.

2019 **Raquel Flügel (Bachelor thesis)**,
Project: Evaluating Modelled Precipitation against ground-based Observation and Satellite Data above the Tibetan Plateau,
University of Gothenburg, Sweden.

Technical skills

Computer	Python (*Advanced*), Linux and Bash scripting (*Good*), NCO/CDO (*Good*), R (*Basic*), Matlab (*Basic*)
Utilities	Anaconda, Git, Jupyter Notebook, Slurm
Numerical Models	Weather Research and Forecasting (WRF) Model, Model Prediction Across Scales (MPAS)
Languages	German (*Mothertongue*), English (*Fluent*), Swedish (*Fluent*), French (*Good*), Spanish (*Basic*)

Research Interests

- Convection-permitting climate modeling
- Dynamics of atmospheric convection
- Climate change effects on precipitation
- Process-oriented model evaluation

Peer-reviewed Publications

2025

Feng, Z., Prein, A., **Kukulies**, J., Fiolleau, T., Jones, W., Maybee, B., Moon, Z. L., Núñez Ocasio, K. M., Dong, W., Molina, M. J., Albright, M. J., Feng, R., Song, J., Song, F., Leung, R., Varble, A. C., Klein, C., and Roca, R (2024). Mesoscale Convective Systems tracking Method Intercomparison (MCSMIP): Application to DYAMOND Global km-scale Simulations.

Pfreundschuh, S., **Kukulies**, J., Amell, A., Hallborn, H., May, E., & Eriksson, P. (2025). The Chalmers Cloud Ice Climatology: A novel robust climate record of frozen cloud hydrometeor concentrations. Journal of Geophysical Research: Atmospheres, 130(6), e2024JD042618.

2024

Kukulies, J., Prein, A. F., and H. Morrison (2024). Simulating precipitation efficiency across the deep convective gray zone. Journal of Geophysical Research: Atmospheres, 129(24), e2024JD041924.

Kukulies, J., Li, W., and Chen, D. (2024). Mean flow and eddy summer moisture transport over East Asia in reanalysis data and a regional climate simulation. Climate Dynamics, 1-25.

Prein, A. F., Feng, Z., Fiolleau, T., Moon, Z. L., Núñez Ocasio, K. M., Roca, R., Varble, A., Rehbein, A., Liu, C., Ikeda, K., Mu, Y., **Kukulies, J.**, and Rasmussen, R. M. (2024). Km-scale simulations of mesoscale convective systems over South America—A feature tracker intercomparison. Journal of Geophysical Research: Atmospheres, 129(8), e2023JD040254.

Sokolowsky, G. A., Freeman, S. W., Jones, W. K., **Kukulies, J.**, Senf, F., Marinescu, P. J., Heikenfeld, M., Brunner, K., Bruning, E., Collis, S., Jackson, R.,Leung, G., Pfeifer,N., Raut, B., Saleeby, S., Stier, P and van den Heever, S. C. (2023). tobac v1. 5: Introducing Fast 3D Tracking, Splits and Mergers, and Other Enhancements for Identifying and Analysing Meteorological Phenomena. EGUsphere, 2023, 1-37.

2023

Prein, A., Feng, Z., Fiolleau, T., Moon, Z., Nunez Ocasio, K., **Kukulies**, J., Roca, R., Varble, A., Rehbein, A., Liu, C., Ikeda, K., Mu, Y. and Rasmussen, R (2023). Km-Scale Simulations of Mesoscale Convective Systems (MCSs) Over South America - A Feature Tracker Intercomparison. *JGR Atmosphere*, 129(8), e2023JD040254.

Minola, L., Zhang, G., Ou, T., **Kukulies, J.**, Curio, J., Guijarro, J. A. and Chen, D. (2023). Climatology of near-surface wind speed from observational, reanalysis and high-resolution regional climate model data over the Tibetan Plateau. *Climate Dynamics*, 1-21.

Freeman, S. W., Brunner, K., Jones, W. K., **Kukulies, J.**, Senf, F., Stier, P. and van den Heever, S. C., (2023). Advancing our Understanding of Cloud Processes and Their Role in the Earth System through Cloud Object Tracking. *Bulletin of the AMS*.

Kukulies, J., Prein, A. F., Curio, J., Yu, H. and Chen, D. (2023). Kilometer-scale multi-model and multi-physics ensemble simulations of a mesoscale convective system in the lee of the Tibetan Plateau: Implications for climate simulations. *Journal of Climate*, 1-56.

Kukulies, J., Lai, H. W., Curio, J., Feng, Z., Lin, C., Li, P., Sugimoto, S., and Chen, D. Mesoscale convective systems in the Third Pole region: Characteristics, mechanisms and impact on precipitation (2023). *Frontiers in Earth Science*, 11, 469.

Ou, T., Chen, D., Tang, J., Lin, C., Wang X., **Kukulies, J.** and Lai, H (2023). Wet bias of summer precipitation in the northwestern Tibetan Plateau in ERA5 is linked to weakened lower-level southerly wind over the plateau. *Climate Dynamics*, 1-1

2022

Prein, A. F., Ban, N., Ou, T., Tang, J., Sakaguchi, K., Collier, E., Jayanarayanan, S., Sobolowski, S., Li, L., Chen, X., Zhou, X., Lai, H., Sugimoto, S., Zhou, L., Hasson, S., Ekstrom, M., Pothapakula, P.,

Ahrens, B., Stuart, R., Steen-Larsen, H. C., Leung, R. Belusic, D., **Kukulies, J.** , Curio, J. and Chen, D. (2022). Towards Ensemble-Based Kilometer-Scale Climate Simulations over the Third Pole region. *Climate Dynamics*, 1-27.

2021

Kukulies, J., Chen, D. and Curio, J. (2021). The Role of Mesoscale Convective Systems in Precipitation in the Tibetan Plateau Region.*Journal of Geophysical Research: Atmospheres*, 126(23), e2021JD035279.

Zhang, X., Yin, Y., **Kukulies, J.**, Li, Y., Kuang, X., He, C., and Chen, J. (2021). Revisiting Lightning Activity and Parameterization Using Geostationary Satellite Observations. *Remote Sensing*, 13(19).

2020

Lai, H. W., Chen, H. W., **Kukulies, J.**, Ou, T. and Chen, D. (2020). Regionalization of seasonal precipitation over the Tibetan Plateau and associated large-scale atmospheric systems. *Journal of Climate*, 1-45.

Kukulies, J., Chen, D. and Wang, M. (2020). Temporal and spatial variations of convection and precipitation over the Tibetan Plateau based on recent satellite observations. Part II: Precipitation climatology derived from GPM. *International Journal of Climatology.*

2019

Kukulies, J., Chen, D. and Wang, M. (2019). Temporal and spatial variations of convection and precipitation over the Tibetan Plateau based on recent satellite observations. Part I: Cloud climatology derived from CloudSat and CALIPSO. *International Journal of Climatology.*