Dr. Claudia Acquistapace

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Education

2022 - 2023 **Post BA professional master degree in Communication of Science and Innovation**, University of Trento, *Advisor; Dr. Cristina Rigutto* **Trento**

2013 – 2017 **PhD in Meteorology**, within Marie Curie Initial Training Network (FP7 -PEOPLE - 2011 - ITN) Institute for Geophysics and Meteorology (IGMK), *Advisor: U. Löhnert* **Cologne**

2009 – 2012 **M.Sc. in Physics**, University of Bologna, Institute of Atmospheric Sciences and Climate (CNR-ISAC), *Advisors: V. Levizzani, E. Cattani* **Bologna**

2003 – 2009 **B.S. in Physics,** University of Pisa*, Advisor: S. Shore* **Pisa**

Professional Summary

2023 – curr **EXPATS Junior research group leader,** University of Cologne

2020 – 2023 **DFG - funded principal investigator (PI),** University of Cologne, Institute for Geophysics and Meteorology

J/F - 2020 **PI over the RV Maria S. Merian,** EUREC4A measurement campaign

2019 – 2024 **Science communication manager of CA18235 -** PROfiling the atmospheric Boundary layer at European scale (PROBE)

2019 – 2020 **PI of the video project:** " Wetoo: what they don't tell you", University of Cologne

2017 – 2019 **Post-Doctoral researcher and teaching assistant,** HDCP^2 , University of Cologne

Research interests and expertise

Precipitation processes, cloud formation, cloud evolution, cloud microphysical processes, boundary layer meteorology, drizzle, cloud radar remote sensing, cloud radar Doppler spectrum, water vapor, radiation, satellite remote sensing, profiling observations, extreme precipitation.

Deep learning for image processing, deep learning architectures, representation learning, embeddings, convolutional neural networks, transformers, self-supervision, U-net, generative networks.

Fellowships, grants, and awards

Research grants

- In preparation: DFG proposal for 1 PhD in collaboration with Dr. Annika Oertel "Precipitation variability over the Alpine orography"
- DWD junior research group "Exploiting spatiotemporal cloud patterns to advance severe storms process understanding and detection (EXPATS)" (PI, 2PhD), 48 months, 2023-2027, (1.111.119,63 €))
- DWD, Funding C line for promoting scientific and teaching periods exchange of lecturers between the University of Bologna and University of Cologne, 2023 - 2027 (20.674€)
- DFG "Eigene Stelle" PI: " Precipitation life cycle in trade wind cumuli", 36 months, 2020-2023 (245.711€)
- ARM-DOE "ARM field campaign to deploy stabilization platform on the RV Maria S. Merian", 20/01/2020, 20/02/2020 (approx 0.5M€)
- Gleichstellungskommission University of Cologne, Film Project: "Wetoo: What they don't tell you", 24.08.2020 - 05/08/2022, (18.300 €)

Fellowships and awards

- Research award Reinhard-Süring-Stiftung 2019 for the PhD dissertation 'Investigation of drizzle onset in liquid clouds using ground-based active and passive remote sensing instruments', Garmisch-Partenkirchen, Germany (DE), DACH Conference, 2019
- Best poster price, International Symposium on Tropospheric Profiling (ISTP), Toulouse, France, 2019
- Award for excellent teaching conferred by the students of the Institute for Geophysics and Meteorology for the winter term 2018/2019
- Outstanding paper award of 2020, Journal of Meteorological Society of Japan, 2020 (Stevens et al., 2020)
- Award for best science communication video for the video "Atmospheric boundary layer: the Layer where we live", Italian Meteorological Association (AISAM), 2022.

Teaching experience

Lecturer

- Visiting lecturer at the University of Trento, offering a lecture module on "Introduction to satellite remote sensing and machine learning methods to analyze satellite data" (10h lectures, M.Sc.), 2024
- Visiting lecturer at the University of Bologna offering a lecture module on "featuring AI methods applied to cloud satellite observations" (10 hours, M.Sc.), 2023.
- Substitute of Prof. Dr. Susanne Crewell for lectures in the cloud physics course (METCLOUD) (6h lectures, M.Sc.), 2022

Training and courses

- Observations and modeling over complex terrains, elective module of 6 ECTS points, summer semester 2025
- EXPATS Summer School, main organizer, 15-20 September 2024
- Machine learning mentoring program, main organizers, 30 April 2024 - 30 September 2024
- Exercise leader in cloud physics course (METCLOUD), 2017-2018 and 2018-2019.
- Training course on PAMTRA Forward simulator, Leipzig, 2017

Student projects supervision (M.Sc. and B.Sc. Theses)

- In progress, "Associations between PV Production and Cloud Classes Generated by a Neural Network: An Analysis & Communication Strategy for the Results" (Michelle Porth, 2024, M. Env. University of Cologne, co-supervised with Prof. Dr. Stephani)
- In progress "Pattern recognition of convection in the Atlantic Intertropical Convergence Zone" (Lennea Hayo, 2024, M. Sc. co-supervised with Prof. Dr. Susanne Crewell and Dr. Julia Windmiller)
- In progress, "Understanding the role of green infrastructure in urban microclimate." (Xenia Lorentz, Bs. c. 2024, co-supervised with Prof. Dr. Susanne Crewell, Prof. Dr. Federico Porcù, and Prof. Dr. Laura Sandra Leo.)
- "Cloud remote sensing observations for insights on heavy precipitation over the Alps" (Amanda Montanaro, 01/03/2024 - 01/06/2024, Erasmus traineeship, co-supervised with Prof. Dr. Federico Porcù)
- Mesoscale air-sea interactions during the EUREC4A campaign: case studies analysis, (Giacomo Labbri, 2019-2020, M.Sc. University of Bologna, Erasmus thesis, Co-supervised with Prof. Dr. Susanne Crewell, Prof. Dr. Nadia Pinardi)
- "Evaluating self-supervised classification with ground-based observations" (Nina Raabe, 2024, Student project work, co-supervised with Dwaipayan Chatterjee)
- "Investigating evaporation rate in the trades from ground-based profiling observations" (Sybille Krause, 2023-2024, Student project work)
- "New ground-based dataset input for developing a new machine learning self-supervised classification approach to identify cloud regimes, (Linnea Buhler, 2023, Student project work, co-supervised with Dr. Sabrina Schnitt)

PhD students' supervision

PhD students

Paula Bigalke (2023-2026)

Daniele Corradini (2023-2026)

Visiting students:

Federico Vermi (3 months visit planned in 2024-2025)

Iman Goudarzi (18 February 2025 - 31 March 2025)

Professional activities and involvement

Editorial and reviewer appointments

Topical editor: GMD topical editor in the special issue “Profiling the atmospheric boundary layer at a European scale" (AMT/GMD inter-journal Special Issue)

Early Career Researcher (ECR) Editorial Board: Meteorological Applications, Wiley

Reviewer - Journals: Atmospheric Measurement Techniques, Atmospheric Chemistry and Physics, Atmospheric Research, Bulletin of Atmospheric Science and Technology, Journal of Applied Meteorology and Climatology, Journal of Advances in Modelling Earth System, Journal of Geophysical Research: Atmosphere, Geophysical Research Letters, Journal of Geophysical Research, Journal of Atmospheric Sciences

Reviewer funding institutions: JPI Fellowship Program from RTWH Aachen University

Faculty and academic involvement

GPEX WG1 member

Graduate School of Geoscience (GSGS), University of Cologne, advisor

Center for Earth System Observation and Computational Analysis (CESOC), research partnership between University of Bonn, University of Cologne and Forschungszentrum Jülich, member

Conference session involvement

Co-convener of the session " Advancing understanding of the circulation-coupling and Lagrangian evolution of clouds" at the EGU General Assembly, Wien 2024.

Co-convener of the session " Advancing understanding of the coupling between clouds, convection and circulation" at the EGU General Assembly, Wien 2023.

Convener of the session "Boundary layer (ABL): from harmonised measurement networks to multidisciplinary applications" at the EGU General Assembly, Wien 2022.

Co-convener of the session "Advancing understanding of the coupling between clouds, convection and circulation" at the EGU General Assembly, Wien 2021

Co-convener "Advancing understanding of the coupling between clouds, convection and circulation" at the EGU General Assembly, Wien 2020.

Co-convener "Current Challenges and Future Missions for Cloud Observations" at 15th Conference on Cloud Physics/15th Conference on Atmospheric Radiation, Vancouver, 2018

Outreach or alternative teaching involvement

Organizer of Machine Learning and Observations Open Day, Juelich, 21 June 2024

Creator of outreach videos for PROBE COST action, 2020 to present

Creator of outreach video for the Maria S. Merian research vessel during the EUREC4A campaign, June 2021, Cologne

Collaborator of Prof. Dr. Heike Kalesse Los in the event "Soap Box Science" Berlin, 2019

Actor player and organizer of the event Science at the pub, Cologne, 2018

Group leader in the video production "Climate Change", Cologne, 2015

Experiment leader in the event "Schnupperuni 2015" for school girls, Cologne, 2015

Experiment leader of the event "Taste Natural Science" for school girls, Cologne, 2014

Computer skills

IDL, Python, Shell, Fortran, Matlab, latex, MS Word, MS Excel, MS PowerPoint, Joomla, YooTheme, Canva, Adobe Suite (Premiere, Photoshop, Lightroom)

Remote sensing expertise

W-band cloud radar, Ka-band cloud radar, Micro rain radar, Microwave radiometer, Radiosondes, Ceilometer, Doppler lidars, corrections for interference patterns and ship motions in Doppler observations, MSG satellite, Microwave passive satellite sensors, MTG, OPERA radar network

Languages

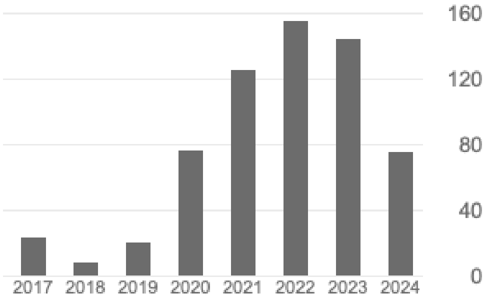
Italian (native)
English (fluent (C2))
Spanish (fluent (C1))
German (intermediate (B2))
French (basic (A1))

2) PUBLICATION LIST

Overview (as of 15 July 2024)

ORCID: 0000-0002-1144-4753

# Publications	13
h-index	12 (google)
citations	652 (google scholar)



Peer reviewed journal articles

1. Chatterjee, D., S. Schnitt., P. Bigalke, C. Acquistapace, and S. Crewell., 2024: Capturing the diversity of mesoscale trade wind cumuli using complementary approaches from self-supervised deep learning. *Geophysical Research Letters*, 51, e2024GL108889. https://doi.org/10.1029/2024GL108889

2. Schnitt, S., Foth, A., Kalesse-Los, H., Mech, M., Acquistapace, C., Jansen, F., Löhnert, U., Pospichal, B., Röttenbacher, J., Crewell, S., and Stevens, B., 2024: Ground- and ship-based microwave radiometer measurements during EUREC^{4}A, *Earth Syst. Sci. Data*, 16, 681–700, https://doi.org/10.5194/essd-16-681-2024

3. Chatterjee, D., C. Acquistapace, H. Deneke, and S. Crewell, 2023: Understanding Cloud Systems' Structure and Organization Using a Machine's Self-Learning Approach.c*Artif. Intell. Earth Syst.*,c2, e220096, https://doi.org/10.1175/AIES-D-22-0096.1.

4. Bailey, A., Aemisegger, F., Villiger, L., Los, S. A., Reverdin, G., Quiñones Meléndez, E., Acquistapace, C., Baranowski, D. B., Böck, T., Bony, S., Bordsdorff, T., Coffman, D., de Szoeke, S. P., Diekmann, C. J., Dütsch, M., Ertl, B., Galewsky, J., Henze, D., Makuch, P., Noone, D., Quinn, P. K., Rösch, M., Schneider, A., Schneider, M., Speich, S., Stevens, B., and Thompson, E. J., 2023: Isotopic measurements in water vapor, precipitation, and seawater during EUREC^{4}A, *Earth Syst. Sci. Data*, 15, 465–495, https://doi.org/10.5194/essd-15-465-2023.

5. Acquistapace, C., A. N. Meroni, G. Labbri, D. Lange, F. Späth, S. Abbas, and H. Bellenger. 2022. Fast atmospheric response to a cold oceanic mesoscale patch in the north-western tropical Atlantic. *Journal of Geophysical Research: Atmospheres*, 127, e2022JD036799., https://doi.org/10.1029/2022JD036799

6. Acquistapace, C., R. Coulter, S. Crewell, A. Garcia-Benadi, R. Gierens, G. Labbri, A. Myagkov, N. Risse, and J. H. Schween, 2022. EUREC4A's Maria S. Merian ship-based cloud and micro rain radar observations of clouds and precipitation. *Earth System Science Data*, 15(1), 465–495., https://essd.copernicus.org/articles/14/33/2022/

7. Stevens, B., S. Bony, D. Farrell, F. Ament, A. Blyth, C. Fairall, J. Karstensen, P.K. Quinn, S. Speich, C. Acquistapace, F. Aemisegger, A.L. Albright, H. Bellenger, E. Bodenschatz, K-A. Caesar, R. Chewitt- Lucas, G. de Boer, J. Delanoë, L. Denby, F. Ewald, B. Fildier, M. Forde, G. George, G., S. Gross, M. Hagen, et al.., 2021. EUREC4A. *Earth Syst. Sci. Data*, 13, 4067–4119, https://doi.org/10.5194/essd-13-4067-2021.

8. Stephan, C. C., S. Schnitt, H. Schulz, H. Bellenger, S.P. de Szoeke, C. Acquistapace, K. Baier, T. Dauhut, R. Laxenaire, Y. Morfa-Avalos, R. Person, E. Quiñones Meléndez, G. Bagheri, T. Böck, A. Daley, J. Güttler, K.C. Helfer, S.A. Los, A. Neuberger, J. Röttenbacher, A. Raeke, M. Ringel, M. Ritschel, P. Sadoulet, I. Schirmacher, M.K. Stolla, E. Wright, B. Charpentier, A. Doerenbecher, R. Wilson, F. Jansen, S. Kinne, G. Reverdin, S. Speich, S. Bony, and B. Stevens., 2021. Ship- and island-based atmospheric soundings from the 2020 EUREC4A field campaign. *Earth Syst. Sci. Data*, 13, 491–514, https://doi.org/10.5194/essd-13-491-2021.

9. Costa-Surós, M., O. Sourdeval, C. Acquistapace, H. Baars, C. Carbajal Henken, C. Genz, J. Hesemann, C. Jimenez, M. König, J. Kretzschmar, N. Madenach, C. I. Meyer, R. Schrödner, P. Seifert, F. Senf, M. Brueck, G. Cioni, J.F. Engels, K. Fieg, K. Gorges, R. Heinze, P.K.

Siligam, U. Burkhardt, S. Crewell, S., Hoose, C., Seifert, A., I. Tegen, and J. Quaas., 2020. Detection and attribution of aerosol–cloud interactions in large-domain large eddy simulations with the ICOsahedral Non-hydrostatic model. *Atmos. Chem. Phys.*, 20, 5657–5678, https://doi.org/10.5194/acp-20-5657-2020.

10. Stevens B., C. Acquistapace, A. Hansen, R. Heinze, C. Klinger, D. Klocke, H. Rybka, W. Schubotz, J. Windmiller, P. Adamidis, I. Arka, V. Barkalas et al., 2020. The Added Value of Large-eddy and Storm Resolving Models for Simulating Clouds and Precipitation. *Journal of the Meteorological Society of Japan*. Ser. II. 98(2), 395-435, https://doi.org/10.2151/jmsj.2020-021

11. Acquistapace, C., U. Löhnert, M. Maahn, and P. Kollias, 2019. A New Criterion to Improve Operational Drizzle Detection with Ground-Based Remote Sensing. *Journal of Atmospheric and Oceanic Technology*, 36(5), 781-801, https://journals.ametsoc.org/view/journals/atot/36/5/jtech-d-18-0158.1.xml

12. Acquistapace, C., S. Kneifel, U. Löhnert, P. Kollias, M. Maahn, and M. Bauer-Pfundstein, 2017. Optimizing observations of drizzle onset with millimeter-wavelength radars. *Atmos. Meas. Tech.*, 10, 1783–1802, https://doi.org/10.5194/amt-10-1783-2017.

13. Löhnert, U., J. H. Schween, C. Acquistapace, K. Ebell, M. Maahn, M. Barrera-Verdejo, A. Hirsikko, B. Bohn, A. Knaps, E. O'Connor, C. Simmer, A. Wahner, A., and S. Crewell. 2015. JOYCE: Jülich Observatory for Cloud Evolution. *Bulletin of the American Meteorological Society*, 96(7), 1157-1174. https://journals.ametsoc.org/view/journals/bams/96/7/bams-d-14-00105.1.xml

Articles in preparation

Acquistapace C., Schnitt S., Risse N., Ori D., Chatterjee D., Lange D., Späth F., Mc Coy I., Characterization of precipitation life cycle in the trades across different regimes of shallow convection, (in preparation for the Quarterly Journal of the Royal Meteorological Society)

Theses

- PhD Thesis: Investigation of drizzle onset in liquid clouds using ground based active and passive remote sensing instruments. Doctoral thesis. University of Cologne, Germany, [pdf]
- M.Sc. Thesis: Identificazione delle nubi precipitanti mediante l'uso dei canali spettrali del Meteosat Second Generation, 2012 [pdf]

Lecture notes

- Introduction to satellite remote sensing and machine learning methods to analyze satellite data, 2024 [webpage]
- Featuring AI methods applied to cloud satellite observations, 2023 [webpage]

Miscellaneous

- Acquistapace, C., Pospichal, B., Pfitzenmaier, L., & Löhnert, U. (2024). Report on cloud radar survey at a European level (version 1.0). Zenodo. https://doi.org/10.5281/zenodo.10828827
- Acquistapace, C., & Kotthaus, S. (2024, March 25). Instrument in pills: Automatic lidars and ceilometers (ALC). Zenodo. https://doi.org/10.5281/zenodo.10870395
- Creator and web administrator of the website of the PROBE Cost Action
- Creator and administrator of the website of the EXPATS research group
- Creator of the EXPATS project communication plan
- Acquistapace Claudia, Agostino Niyonkuru Meroni, & Giacomo Labbri. (2022). Dataset for the ``Fast atmospheric response to a cold oceanic mesoscale patch in the north-western tropical Atlantic'' publication (version 1.0.0) [Data set]. Zenodo. https://doi.org/10.5281/zenodo.6365636

- Data provider and administrator of the cloud radar data and micro rain data page on the How to Eurec4a data catalog
- Acquistapace, C. (2021). python3/matlab code for correction for ship motions, data analysis and plots related to data publication ESSD https://essd.copernicus.org/preprints/essd-2021-265/ (Version V1). Zenodo. https://doi.org/10.5281/zenodo.5714474
- Curator and contributor of the PROBE COST Action zenodo repository
- Contributor in the document Dupont, J.-C., Knist, C., & Pfitzenmaier, L. (2024). JND European networks observing the atmospheric boundary layer: Overview, access and impacts - Chapter 2b: Doppler Cloud Radar (DCR). Zenodo. https://doi.org/10.5281/zenodo.11566494

Invited oral presentations

- 9 July 2024, Invited Talk, 4th Workshop on cloud organization ICTP, Trieste (Italy): "Exploiting AI methods to get the most out of multiscale observations" [presentation]
- 2 July 2024, Invited Talk, ECMWF, Bonn, Germany: "From the Tropics to the Alps to observe precipitation" [presentation]
- 7 March 2024, Invited Talk, University of Trento (Italy): Exploiting machine learning to improve understanding of severe storms over the Alps [presentation]
- 26 September 2024, invited talk, ICCP Journal Presentation, online: Observing precipitation in the trades across different regimes of shallow convection.
- 11 October 2023, Invited Talk, EUMETSAT, Darmstadt (Germany) : Improving the understanding of thunderstorms over the Alps using deep learning methods [presentation]
- 25 May 2023, Invited Talk, University of Trento (Italy): What did we learn with the EUREC4A dataset? A look at clouds and precipitation in the Tropics [presentation]
- 12 May 2023, Invited Talk, GSGS conference, University of Cologne (Germany): What makes a weather event become extreme? Chatting about how extreme events form and the challenges we face in modelling and forecasting [presentation]
- 26 April 2022, Invited Talk, University of Pisa (Italy): Diverse application of ground-based remote sensing with cloud radars: from investigating impact of cold SST patches on the atmosphere to detecting onset of precipitation in the clouds.
- June 2017, Invited talk, Colloquium - University of Leipzig, Leipzig (Germany): Boundary layer cloud life-cycle in ICON-LEM and ground-based observations
- May 2017, Talk, National Oceanographic Atmospheric Agency (NOAA), Boulder (US): Evaluation of boundary layer types using a new boundary layer classification developed at JOYCE.