

# Prof. Dr. Susanne Crewell | Curriculum Vitae

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## Personal Information

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## Education

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| 06/2002 | Habilitation, Meteorological Institute, University of Bonn, Germany<br><i>Ground-based remote sensing and its use for atmospheric model evaluation</i>  |
| 03/1993 | PhD, Dr. rer. nat., Institute for Environmental Physics, University of Bremen, Germany, Supervisor: Prof. Dr. Klaus Künzi<br><i>Submillimeter-radiometry using an airborne receiver to measure stratospheric trace gases</i>  |
| 01/1990 | Diploma in Meteorology, Institute for Marine Sciences, University of Kiel, Germany, Supervisor: Prof. Dr. Eberhard Ruprecht<br><i>Determination of latent heat flux over the northern Atlantic using a combination of microwave satellite measurements and ship derived wind fields</i> |

## Experience

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| since 05/2006     | Professor for Meteorology (W3), Institute for Geophysics and Meteorology, University of Cologne, Germany      |
| 02/2004 - 04/2006 | Professor for Experimental Meteorology (C3), Meteorological Institute, Ludwig-Maximilian University Munich    |
| 09/1996 - 01/2004 | Assistant Professor (C1/C2), Meteorological Institute, Rheinische Friedrich Wilhelms University Bonn, Germany |
| 05/1994 - 05/1996 | Research Associate, Department of Physics, State University of New York, Stony Brook, USA                     |
| 05/1993 - 04/1994 | Post-Doctoral Fellow, Institute of Environmental Physics, University Bremen                                   |
| 04/1990 – 04/1993 | Research Fellow, Institute of Environmental Physics, University of Bremen                                     |
| 1986 - 1990       | Student Assistant, Institute for Marine Sciences, University of Kiel, Germany                                 |

## Awards and Honors

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| 2020 | Max-Delbrück Prize, University of Cologne                      |
| 2019 | Alfred-Wegener Medaille, Deutsche Meteorologische Gesellschaft |

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2018	Astronomer temporaire, Laboratoire d'Etudes du Rayonnement et de la Matière en Astrophysique et Atmosphères (LERMA), Department de Radioastronomie Millimétrique, Observatoire de Paris, France,
04/2018	Guest NOAA Earth System Research Laboratory, Boulder, CO, USA
2015	Hans Liebe Lectureship in microwave and optical spectroscopy, U.S. National Committee of the Union of Radio Scientists Internationale (URSI)
2013	Academy of Sciences, Humanities and the Arts North Rhine Westphalia, Düsseldorf, Germany
2008	Albertus Magnus Teaching Award, University of Cologne
10/2008 – 12/2008	Visiting Scientist Atmospheric and Oceanic Sciences Department, University of Wisconsin, Madison, WI, USA

## Research

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Since nearly three decades my research is dedicated to the development and application of novel observation techniques to better understand the processes determining the atmospheric water cycle. Observations and process knowledge are used to evaluate models in order to arrive at better weather forecasts and climate predictions. Specific research interests are

- Development of novel microwave instrumentation for ground-based, airborne and satellite operation including radiative transfer studies and retrieval development and transfer to operational environment
- Use of synergetic measurements at atmospheric supersites for process understanding and model evaluation, e.g. established Jülich Observatory for Cloud Evolution (JOYCE), (co-) organized of several international field campaigns
- Understanding boundary layer processes, i.e. thermodynamic and dynamic structure, diurnal evolution, convection, and cloud physics, i.e. formation, precipitation formation
- Investigating the ability of numerical weather prediction models to correctly represent water cycle parameters, e.g. by developing and using forward simulators for fair model intercomparisons
- Detecting the climate change signal in water cycle related quantities from longterm microwave satellite observation
- Exploiting novel high-resolution analysis for investigating spatio-temporal variability of renewable energy, i.e. solar and wind energy

Since 2006 I have acquired funding for more than eleven million Euro at University of Cologne from DFG, BMBF, ESA, European Union and Deutscher Wetterdienst. I have (co-) led large coordinated projects such as a Marie Curie Initial Training network and three DFG Collaborative Research Centers. In addition, four large infrastructure proposals (\$91b) were approved by DFG, i.e. dual polarization microwave radiometer, boundary layer microwave and sodar profiler and Atmospheric Emitted Radiance Interferometer (AERI), Microwave Radar/radiometer of Arctic Clouds.

## Community Service

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### Membership in Scientific Bodies (selected)

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2023 - present	Member of Core Project Scientific Steering Group (GEWEX)
2021 - present	Member of German National Academy of Sciences Leopoldina
2021 - present	Member of Review Board Leibniz Institute of Atmospheric Physics
2021 - present	Member German-Italian Steering Programme by BMVI and DWD
2020 - present	Member of scientific committee, CPEX-Lab
2020 - present	Founding director of the Center for Earth System Observations and Computational Analysis (CESOC, cesoc.net) of the Universities Bonn and Cologne and Forschungszentrum Jülich
2016 - present	Deputy Speaker, CRC/TR 172 "Arctic Amplification"
2016 - present	Cluster Speaker, CRC 1211 "Earth at its Dry Limit"
2015 - 2020	DFG Senate Committee on Collaborative Research Centres
2014 - present	Joint ESA-EUMETSAT Microwave Imager & Ice Cloud Imager Science Advisory Group nominated by the European Space Agency (ESA)
2014 - present	Scientific Advisory Board, German Weather Service (DWD)
2012 - present	Steering Committee High Definition of Clouds and Precipitation for Climate Prediction (HD(CP) <sup>2</sup> ) funded by the German Science Ministry (BMBF)
2012 - 2016	Coordinator, Marie-Curie Initial Training Network for Atmospheric Remote Sensing (ITaRS)
2012 - 2015	Senate Commission of the Helmholtz Association of German Research Centers
2011 - 2014	Steering Committee ABC/J Geoalliance
2011 - 2014	DFG Senate Commission on Water Research
2007 - 2018	Speaker for University of Cologne, TR 32 "Patterns in Soil-Vegetation-Atmosphere Systems"
2008 - 2014	DFG Review Board for Atmospheric Science and Oceanography
2008 - 2012	Management Committee COST Action (IC0802) "Propagation Tools and Data for Integrated Telecommunication, Navigation and Earth Observation Systems"
2008 - 2010	Board Member of Atmospheric Radiation Measurement (ARM) Climate Research Facility, US Department of Energy
2006 - 2013	Post-EPS Mission Experts Team, EUMETSAT
2006 - 2012	Scientific Advisory Board, Leibniz Institute for Tropospheric Research Leipzig
2006 - 2009	European Fleet for Airborne Research Panel on Education and Training"
2005 - 2007	Scientific Director Environmental Research Station Schneesfernerhaus (UFS)

### Academic Self-government at University of Cologne

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2023 - present	Acting Director of the Institute of Geophysics and Meteorology
2021 - present	Guest participant in the Steering Committee Sustainability at University of Cologne
2018 - 2022	Vice Dean of Research at the Faculty of Mathematics and Natural Sciences
2014 - present	Member of the Steering Committee, Graduate School of Geosciences (GSGS)
2014 - 2018	Speaker of university-wide Albertus Magnus Graduate Center (AMGC)

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2014 - 2016	Head of Department of Geosciences
2014 - 2017	Guest participant in the Steering Committee of the University of Cologne Institutional Strategy
2012 - 2017	Leader of the Network Project "Women in Science, Technology, Engineering and Mathematics STEM"
2010 - 2013	Equal Opportunities Officer, Faculty of Mathematics and Natural Sciences
2009 - present	Vice head Master Examination Board, Institute of Geophysics and Meteorology
2007 - 2008	Head of Department of Geosciences
2007 - 2014	Head of Bachelor Examination Board, Institute of Geophysics and Meteorology

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### Diverse

Editorial	Geoscience Remote Sensing Letters GRSL (2005-2011), Advisory Board, Meteorologische Zeitschrift (2005-2010)
Journals	Reviews for most important journals in the field, e.g. of American Meteorological Society, American Geophysical Union, Copernicus, Springer Nature Group
Funding Agencies	Funding Agencies in more than 10 countries
Diverse	Reviewing Services for many academic positions, habilitations and prizes as well as departments, e.g. Department of Environmental System Science, ETH Zürich
Organisation	Convener of multiple sessions at international conferences; Organisation of several workshops, e.g. latest LES Modelling and Visualization, Cologne 2018, and summer schools

## Teaching Statement

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Seeing how students grow during the course of their study program, develop their research skills within their PhD work, and become independent researchers is one of the most rewarding aspects of my profession. However, it is important to say that while research-oriented teaching is at the core of my interest, I find it highly important that student education and graduate training prepare students and young researchers for a career outside academia. In summary, I

- have been involved in teaching since 1991 (lab courses for physics students) at the universities Bremen, Bonn, Munich and Cologne
- have a broad repertoire of different lectures within Bachelor and Master programs with emphasis on observational methods, including practical aspects, e.g. clouds physics, advanced remote sensing, inverse modeling, general meteorology
- have been actively involved in the transformation of the German Diploma system to the Bachelor/Master system
- initiated a series of summer schools on observation/modeling of clouds and precipitation as coordinator of the EU ITaRS in 2013, which continues since then jointly with American and European partners on both sides of the Atlantic

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### Supervision

<b>Postdocs</b>	Supervised about 15 postdocs from which three became professors, i.e. Felix Ament, Ulrich Löhnert, Nicole von Lipzig  Currently advising four postdocs
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<b>Doctoral students</b>	Supervised more than 19 doctoral students as main advisor who successfully finished at University of Cologne Currently advising 6 PhD students Examiner / Opponent for more than 15 dissertations in 8 European countries, e.g. ETH Zurich, Sorbonne, TU Delft, Stockholm, Barcelona Examiner of about 30 PhD theses at German universities
<b>Students</b>	Main Supervisor of 12 Diploma, more than 19 Master and 24 Bachelor students

## Publications

My publication record spans a wide range of topics

- with more than 150 peer-reviewed publications as of 29 January 2025  
Web of Science (Publons O-1640-2013): 169 publications, 5.500 citations, h-index=41  
Scopus: 178 publications, 5.815 citations, h-index = 42  
[Google](#): 9.605 citations, h-index = 54
- and book contributions/review reports related to observational techniques and the future development of measurement strategies.

Below, invited talks and specific reports of interest are also given. The full list of my publications, including conference contributions, talks and posters, can be found at

[https://atmos.meteo.uni-koeln.de/ag\\_crewell/doku.php?id=publications:publications](https://atmos.meteo.uni-koeln.de/ag_crewell/doku.php?id=publications:publications)

### 10 most important publications

1. Risse, N., M. Mech, C. Prigent, G. Spreen, and S. Crewell: Assessing the sea ice microwave emissivity up to submillimeter waves from airborne and satellite observations, *The Cryosphere*, 18, 4137–4163, <https://doi.org/10.5194/tc-18-4137-2024>.
2. Chatterjee, D., C. Acquistapace, H. Deneke, S. Crewell, 2023: Understanding cloud systems structure and organization using a machine's self-learning approach, *Journal of Artificial Intelligence for the Earth Systems*, <https://doi.org/10.1175/AIES-D-22-0096.1>
3. Böhm, C., J. H. Schween, M. Reyers, B. Maier, U. Löhnert, S. Crewell, 2021a: Towards a climatology of fog frequency in the Atacama Desert via multi-spectral satellite data and machine learning techniques, *Journal of Applied Meteorology and Climatology*, <https://doi.org/10.1175/JAMC-D-20-0208.1>
4. Crewell, C., K. Ebell, P. Konjari, M. Mech, T. Nomokonova, A. Radovan, D. Strack, A. M. Triana Gomez, S. Noel, R. Scarlat, G. Spreen, M. Maturilli, A. Rinke, I. Gorodetskaya, C. Viceto, T. August, and M. Schröder, 2021: A systematic assessment of water vapor products in the Arctic: from instantaneous measurements to monthly means, *Atmospheric Measurement Techniques* (14) 7, <https://doi.org/10.5194/amt-14-4829-2021>
5. Frank, C. W., B. Pospichal, S. Wahl, J. D. Keller, A. Hense, and S. Crewell, 2020: The added value of high resolution regional reanalyses for wind power applications, *Renewable Energy*, 148, 1094-1109 <https://doi.org/10.1016/j.renene.2019.09.138>,
6. Marke, T., U. Löhnert, V. Schemann, J.H. Schween, and S. Crewell, 2020: Detection of land-surface-induced atmospheric water vapor patterns, *Atmos. Chem. Phys.*, 20, 1723–1736, <https://doi.org/10.5194/acp-20-1723-2020>.
7. 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, and S. Crewell, 2015: JOYCE: Jülich Observatory

for Cloud Evolution, Bulletin of the American Meteorological Society, 96(7), 1157-1174, <https://doi:10.1175/BAMS-D-14-00105.1>.

8. Schween, J. H., A. Hirsikko, U. Löhnert, and S. Crewell, 2014: Mixing layer height retrieval with ceilometer and Doppler lidar: from case studies to long-term assessment, Atmospheric Measurement Techniques, 7, 3685-3704, <https://doi:10.5194/amt-7-3685-2014>.
9. Ebell, K., E. Orlandi, A. Hünerbein, U. Löhnert, and S. Crewell, 2013: Combining ground and satellite based measurements in the atmospheric state retrieval: Assessment of the information content, Journal of Geophysical Research, 18, 6940-6956, <https://doi:10.1002/jgrd.50548>.
10. Crewell, S., and U. Löhnert, 2007: Accuracy of boundary layer temperature profiles retrieved with multi-frequency, multi-angle microwave radiometry, IEEE Transactions on Geoscience and Remote Sensing, 45(7), 2195-2201, <https://doi:10.1109/TGRS.2006.888434>.

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### Invited Talks (last 5 years)

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| 2024 | Crewell, S., AWARES: Water vapor, clouds and precipitations: synergetic activities to zoom into the atmospheric water cycle. <i>Seminar talk</i> , 1 July 2024, Tokio University.   |
| 2023 | Crewell, S., K. Ebell, M. Mech, N. Risse, V. Schemann, Flying Microwaves, Lecture Winterschool on Clouds and Precipitation, 15 March 2023, Hyytiälä, Finland.<br><br>Crewell, S., K. Ebell, M. Mech, N. Risse, V. Schemann, I. Schirmacher, A. Walbröl, New observational strategies to understand cloud processes and improve high resolution modelling, <i>Colloquium</i> , University of Oslo, 30 November 2023.   |
| 2022 | Crewell, S., A. Ehrlich, Manfred Wendisch and the HALO-AC3 Team: An airborne campaign to assess the influence of air mass transport for Arctic Amplification, Seminar Talk, IRF Kiruna, Sweden, 24 March 2022.<br><br>Crewell, S.: Introduction to microwave remote sensing, Atmospheric Physics summer school, Bad Honnef, 4 July 2022.  |
| 2021 | Crewell, S., M. Mech, S.A. Bühler, P. Eriksson, C. Prigent: What new information on clouds and precipitation will become available from ICI? User preparation webinar on EPS-SG MWS, MWI and IC, Eumetsat, 2021.<br><br>Crewell, S., K. Ebell, P. Konjari, M. Mech, T. Nomokonova, A. Radovan, D. Strack, A. Triana Gomez, S. Noel, R. Scarlat, G. Spreen, M. Maturilli, A. Rinke, I. Gorodetskaya, C. Viceto, T. August, M. Schröder: Can current integrated water vapor products be used to investigate Arctic climate change? EUMETSAT Meteorological Satellite Conference 2021, Virtual Edition 20-24 September 2021.<br><br>Crewell, S., M. Mech, K. Ebell, V. Schemann and many more: Why is climate change most pronounced in the Arctic? Interdisciplinary forum, 20 May 2021, Cologne. |
| 2020 | Crewell, S., K. Ebell, A. von Lerber, A. Radovan, B. Kulla, L.-L. Kliesch, M. Mech, A. Rinke, V. Schemann, M. Wendisch: Arctic Amplification – what can we learn from microwave measurements? Institute seminar, Institut für Physik der Atmosphäre, ETH Zürich, 27 April 2020.<br><br>Crewell, S., K. Ebell, A. von Lerber, A. Radovan, B. Kulla, L.-L. Kliesch, M. Mech, A. Rinke, V. Schemann, M. Wendisch: Arctic Amplification – what can we learn from microwave measurements? Institute seminar, Institut für Physik der Atmosphäre, DLR Oberpfaffenhofen, 8 Januar 2020.  |