

JAYANARAYANAN KUTTIPPURATH (Dr. rer. nat.-habil.)

Associate Professor,
Centre for Oceans, Rivers, Atmosphere and Land Sciences,
Indian Institute of Technology Kharagpur.
Kharagpur--721302, India.

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RESEARCH INTERESTS

- Polar Ozone and Polar Chemistry-Climate Interactions
- Atmospheric Chemistry and Air Pollution/Air Quality Monitoring and Modelling
- Climate Change and Climate Modelling

EDUCATION

- **Habilitation/ HdR (D. Sc. Equivalent) in Atmospheric Chemistry**, March 2013.
University of Pierre and Marie Curie Paris 6, Paris, **France**.
- **Dr. rer. nat. (Ph.D.) in / Atmospheric Chemistry**, April 2005.
Physics International Postgraduate Programme (PIP), University of Bremen, Bremen, **Germany**.
- **M. Sc. Physical Oceanography**, 2000, Cochin University of Science and Technology, Kochi, **India**.

RESEARCH EXPERIENCE

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|-----------------------------------|--|
| • June 2023 – to date | : Associate Professor, IIT Kharagpur, India. |
| • April 2015 – June 2023 | : Assistant Professor, IIT Kharagpur, India. |
| • August 2012 – March 2015 | : CNRS Scientist (Permanent), LATMOS/CNRS, Paris, France. |
| • October 2007 – July 2012 | : CNRS Research Scientist, LATMOS/CNRS, Paris, France. |
| • October 2005 – September 2007 | : CNRS post-doctoral fellow, LMD/CNRS, Paris, France. |
| • April 2005 – September 2005 | : Research Associate, University of Bremen, Germany. |
| • November 2001 – March 2005 | : Ph.D. student, University of Bremen, Bremen, Germany . |
| • May 2001 – July 2001 | : Research Assistant, Kochi University (CUSAT), India. |

AWARDS/RECOGNITIONS

- Institute of Physics **Top Cited Paper Award 2022** in Environmental Science, 2022.
- **Faculty Excellence Award**, Indian Institute of Technology Kharagpur, 2022.
- **Fellow**, Royal Meteorological Society, UK.
- Bharat Vikas Award in Climate Science, Institute of Self Reliance, Bhubaneswar, 2019.
- **NASA Post-doctoral fellowship**: JPL/NASA, Caltech, California, USA, 2007 (declined).
- **CNRS Post-doctoral fellowship**: National Centre for Scientific Research (CNRS) France, 2005—2007. A fellowship for non-French citizens **for their first post-doctoral study**.
- **Ph.D. grant**: Graduate School - Physics International Postgraduate Programme, Department of Physics, University of Bremen, Bremen, Germany, 2001.
- **Ph.D. scholarship/selection**: International Max-Planck Research School for Earth System Modelling (**IMPRS**), Hamburg, Germany, 2001.

- Selection for **M. Tech in Atmospheric Science** and **appeared for** a semester, Cochin University of Science and Technology, Kochi, India, 2000—2001.
- **CSIR-Junior Research Fellowship:** Council of Scientific and Industrial Research (**CSIR**), University Grants Commission (**UGC**), India, 2001.
- **UGC-National Eligibility Test Lectureship:** Awarded by CSIR—UGC, India, 2001.
- **Jawaharlal Nehru Foundation award for outstanding university student**, Jawaharlal Nehru Foundation, New Delhi, 2001.
- **Prof. C. V. Kurian Endowment prize** for the **First Rank** in **M. Sc. Physical Oceanography**, 2000.
- **Krishnankutty Nair Memorial prize** and **Edapatta Panchayath Award:** for the second place in School for the Secondary School Leaving Certificate examination, A. S.M. High School Velliyanchery, Malappuram, India, 1992.

NUMERICAL MODELLING EXPERIENCE

- Working experience with the **Chemistry Climate Model (CCM) LMDz-repro, REPROBUS** Chemical Transport Model (**CTM**), **MIMOSA-CHIM CTM, BREMEN CTM** and **MIMOSA** dynamical model, for several studies for the interpretation of atmospheric chemistry, dynamics, and climate processes.
- **First simulation and validation** (of stratospheric ozone and N₂O profiles) of the Bremen CTM (a part of my Ph.D. work).
- **Retrieval/Inversion of stratospheric trace gases** from sub-millimetre wave measurements.

EXPERTISE WITH SPECIFIC SCIENTIFIC INSTRUMENTS

- **The airborne sub-millimetre radiometer (ASUR):** A passive heterodyne microwave sensor for stratospheric and mesospheric sounding, University of Bremen, Bremen, Germany (2001—2005).
- **The Automatic Sediment Analyser:** An instrument to analyse grain size of sediments. Calibration and validation of the instrument were performed as a part of my post-graduate (M. Sc.) project, Department of Physical Oceanography, CUSAT, Kochi (1998—2000).

FIELD CAMPAIGN EXPERIENCE

- **SCIAVALUE (2002—2003):** Operated ASUR on-board the Falcon-20 research aircraft to measure stratospheric and mesospheric trace gases (during September 2002 and February—March 2003).
- **EuPLEx (2003):** Operated ASUR on-board the Falcon-20 research aircraft to measure stratospheric and mesospheric trace gases (polar vortex measurements in January 2003).
- **OFFSHORE and BACKWATER cruise** for **sediment** sampling to calibrate and validate the Automatic Sediment Analyser (a part of the M. Sc. project).

PROFESSIONAL MEMBERSHIPS

- Member: European Geophysical Union / EGU,
- Life Member: Association of Agriculture Meteorologists India (LM-1827)
- Life Member: Ocean Society of India / OSI (LM-339),
- Life Member: Indian Society of Geomatics /ISG
- Life member: Indian Meteorological Society /IMS (LM-3521)
- Life Member: Association of Agro-meteorologists India /AAM (LM-1827)
- Member: Association of Polar Early Career Scientists /APECS

PEER RECOGNITION

- **Editor:** Atmospheric Chemistry and Physics (European Geophysical Union, IF – 7.197)
- **Editor:** Frontiers in Environmental Science (Nature-Frontiers, IF – 5.411)
- **Editor:** Frontiers in Marine Science (Nature-Frontiers, IF – 5.247)

REFEREE FOR MANY JOURNALS INCLUDING

- Atmospheric Chemistry physics, Science of Total Environment, Remote sensing of Environment,
- Journal of Climate, Geophysical Research Letters, Journal of Geophysical Research,
- Environmental Research Letters

Other recent records can be found on:

<https://publons.com/researcher/1736098/jayanarayanan-kuttiapurath/peer-review/>

PERSONAL DETAILS

Name	: JAYANARAYANAN
Family name	: KUTTIPPURATH
Nationality	: Indian
Languages known	: Malayalam, English, Tamil, German and French

TEACHING: AVERAGE FEEDBACK (4.3/5.0)

CL60012: Climate Risk in Agriculture (Launched)

CL60201: Physical Oceanography and Climate (Launched)

CL60015: Modelling of Extreme Events (Redesigned)

CL60004: Global Tectonic and Climate

EV20001: Environmental Science

CL60020: Modelling of Air-sea Interactions

CL69003: Laboratory-I (Atmospheric and Hydrological Modelling)

POST-DOC/RESEARCH ASSOCIATES

1. Dr. Oindrila Nath (26 December 2021 – 7 April 2023)
2. Dr. Sarath Raj (2021-2022)

PHD STUDENTS

Ph.D. Joint Guidance: **completed**

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|---------------------|-----------|--------------|-------------------------|
| 1. Joint Supervisor | 13CL90J02 | Anandh T S | (Completed) |
| 2. Supervisor | 17CL91R07 | Pankaj Kumar | (Completed, 04/08/2022) |
| 3. Supervisor | 17CL91R04 | K. Abhishek | (Completed, 27/12/2022) |
| 4. Supervisor | 15CL91R01 | S. Murasingh | (Completed, 21/04/2023) |

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|---------------------|-----------|---------------|--------------------------------|
| 5. Joint Supervisor | 17AT91P02 | Sanhita Ghosh | (Completed, 05/06/2023) |
| 6. Joint Supervisor | 17AG91R01 | Ajay Singh | (Thesis submitted, 17/05/2023) |

Ph.D. **GUIDANCE** (on-going)

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|---------------|-----------|--------------------|-----------------------------------|
| 1. Supervisor | 18CL92R03 | Subhadip Sarkar | |
| 2. Supervisor | 18CL92R05 | Utpal Mukhopadhyay | |
| 3. Supervisor | 20CL91R09 | Vikas Kumar Patel | |
| 4. Supervisor | 20CL92R02 | Mansi Pathak | |
| 5. Supervisor | 20CL92R04 | Rahul Kumar | |
| 6. Supervisor | 21CL91R06 | Rahul Kashyap | (PMRF) |
| 7. Supervisor | 21CL92P01 | Gopikrishnan G S | (PMRF) |
| 8. Supervisor | 18CL92P03 | Rony Peter | (with Dr. K. Chakraborty, INCOIS) |

Ph.D. students through **Project** (on-going)

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|----------------------|-----------|-------------------|--------------------------------------|
| 9. Supervisor | 17CL92P01 | Akhila R S | (with Prof. A. Chakraborty, IIT KGP) |
| 10. Supervisor | 18CL92P04 | Sunanda N | (with Prof. A. Chakraborty, IIT KGP) |
| 11. Supervisor | 20CL91P02 | Subhadeep Maishal | |
| 12. Supervisor | 21CL91P01 | Anjaneyan P | |
| 13. Joint Supervisor | 19CL91P01 | Rahul Raghudhas | (with Prof. A. Chakraborty, IIT KGP) |

Ph.D. Guidance: **Working Professionals** (on-going)

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|----------------|-----------|----------------|---|
| 14. Supervisor | 19CL91W03 | Syed Moosa Ali | (SAC/ISRO, Ahmedabad) |
| 15. Supervisor | 19CL92W01 | Arpita Rastogi | (India Meteorological Dept., New Delhi) |

Ph.D. Guidance: **International** Research Programme (on-going)

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|----------------|-----------|-----------------|--------------|
| 16. Supervisor | 20CL91A01 | Babu Ram Sharma | (from NEPAL) |
|----------------|-----------|-----------------|--------------|

M. Tech /M. Sc. THESIS

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|----------------------|--------------------|---|
| 1. 15CL60R13 | Rohit Sharma | (CL67101, CL67102) |
| 2. 15CL60R21 | Pankaj Kumar | (CL67101, CL67102) |
| 3. 15CL60R22 | Abhishek Kumar | (CL67101, CL67102) |
| 4. 16CL60R10 | Jaivardhan Kashyap | (CL67101, CL67102) |
| 5. 16CL60R18 | Chetan S Naik | (CL67101, CL67102) |
| 6. 16CL60R20 | Tanya Patel | (CL67101, CL67102) |
| 7. 16CL60R19 | Vivek Gupta | (CL67101, CL67102) |
| 8. 17CL60R04 | Akshay Kumar Sagar | (CL67101, CL67102) |
| 9. 17CL60R03 | Vishal Chauhan | (CL67101, CL67102) |
| 10. 17AG64R14 | Santhosh Ram G S | (AG67401, AG67402) with N. Mallick of AGFE |
| 11. 18CL60R10 | Bhuvnesh Kumar | (CL67101, CL67102) |
| 12. 19CL60R03 | Abhishek Wasnik | (CL67101, CL67102) |
| 13. 19PH40013 | Fawaz Noor K | (CL67101, CL67102) with Prof. Krishna Kumar (Physics) |
| 14. Aakash Joshi | | (CORAL, IIT KGP) |
| 15. Abhishek Rathore | | (CORAL, IIT KGP) |
| 16. Gopikrishnan, | | KUFOS, Kochi, 2019 |
| 17. Ardra, D | | CUSAT, Kochi, 2019 |
| 18. Raina Roy | | CUSAT, 2020 |
| 19. Krishnaja PB, | | CUSAT, 2021 |
| 20. Athul S | | CUSAT, 2022 |

PROJECT Fellows/students

- Anjali Sathyanath (WVM)
- Anagha K S (AON)
- Gopikrishnan GS (WVM)
- Anjaneyan P (WBA)
- Sunanda N, and Rony Peter, Ardra D (IME)
- S. Maishal (BMI)
- Akhila R (TLU)
- Rahul Reghudhas (CBU)
- Sarath Raj (Research Associate, BMI/IME)

EXTERNAL STUDENTS FOR INTERN

1. Sreepriya, CUSAT, Kochi, 2016
2. Rahul Kumar, NIT Trichi, 2017
3. Gayathry Das, IISER Thiruvananthapuram, 2023

HONORS FOR STUDNETS

1. **Gopikrishnan GS** (Inspire Fellowship, Prime Minister's Research Fellowship)
2. **Rahul Kashyap** (Prime Minister's Research Fellowship)
3. **Rony Peter**: Best Poster Award, MARICON 2019, CUSAT, Kochi.
4. **Sunanda, N**: Best Paper Award, OSICON 2021, NCPOR, Goa
5. **Anjaneyan P, Gopikrishnan GS, Sunanda N and Rony Peter**: First Prize in Hackathon, OCEANS -22.
6. **Gopikrishnan GS**: Best PG Dissertation Award by Ocean Society of India, 2019-2020
7. **Ardra D**: Best PG Dissertation Award by Ocean Society of India, 2019-2020

PROFESSIONAL REFERENCES

- Dr. Justus Notholt (Uni Bremen, Germany) jnotholt@uni-bremen.de
- V. Chandrasekar (CSU Colorado, USA) chandra@colostate.edu

RESEARCH PROJECTS

CONSULTANCY

TOTAL FUNDING (9.97 Lakhs as PI, 9.75 Lakhs as CO-I)

- Implementation of a high-resolution regional modelling system for the Bay of Bengal, with fresh water input from adjacent Rivers (NORB), Client: NPOL, DRDO, KOCHI: Co-consultant. (COMPLETED), 9.75 Lakhs, 2012—2016
- Implementation of NUCLEUS FOR EUROPEAN MODELLING OF OCEAN at NPOL (NEMO), Client: NPOL, DRDO, KOCHI: Consultant. 9.97 Lakhs, 2021—2022, NO CO-CONSULTANT

SPONSORED RESEARCH

TOTAL FUNDING (164.032 Lakhs as PI, 38.99 Lakhs as CO-I)

- Development of a New Ocean - Atmosphere Coupled Model for Improved Air-Sea Interaction Studies over the Bay of Bengal, ISIRD, SRIC, IIT Kharagpur, 2016-2018, 22.5 Lakhs (COMPLETED, PI) – NO CO-INVESTIGATOR
- The Impact of Atmospheric Aerosols and Pollution on the Bay of Bengal Marine Ecosystem, INCOIS, MoES, Hyderabad, 2018—2021, 36.5 Lakhs (COMPLETED, PI), ONE CO-INVESTIGATOR

- Tropical Cyclones: Geneses, Track and Land Fall Prediction Using a Regional Atmosphere - Ocean Coupled Model, **Department of Science & Technology (DST)**, 2017—2022, **21.7 Lakhs (RUNNING, CO-I)**
- Study of Cyclone Activity and Air-Sea Interaction Over Bay of Bengal Region Using Data and Numerical Model, **Department of Science & Technology (DST)**, 2018—2022, **17.29 Lakhs (RUNNING, CO-I)**
- A coupled atmospheric –Ocean biogeochemistry model for north Indian Ocean, **Naval Research Board, DRDO, New Delhi**, 2019-2022, **35.62 Lakhs (RUNNING, PI), NO CO-INVESTIGATOR**
- Long-term Changes in Winter Blooms in the Arabian Sea: Characteristics and Physical forcing, **Space Application Centre, Ahmedabad**, 2020-2023, **25.752 Lakhs (RUNNING, PI), NO COINVESTIGATOR**
- Accuracy estimation of INSAT 3D/3DR ozone, temperature, and water vapour measurements: application for Air-Sea interaction studies, **ISRO RESPOND programme, KCSTC**, 2021-2024, **24.7 Lakhs (RUNNING, PI), NO COINVESTIGATOR**
- A comprehensive assessment of the impact of atmospheric pollutants O₃, NO₂ and SO₂ on climate and agriculture, **CRG Science and Engineering Research Board, New Delhi**, 2022-2024, **18.96 Lakhs (RUNNING, PI), NO COINVESTIGATOR**

INTERNATIONAL PROJECTS

1. NASA Venus Climate Sounder, NASA/JPL, USA. 2019 (initiated)
2. UNEP – global atmospheric observations, 2019 (Initiated)
3. WMO - Total Column Carbon network (TCOON), 2018 (Initiated)

CO-INVESTIGATOR - CONTRIBUTOR TO 11 European projects (2001-2015)

EU-RECONCILE: European Project, 2010—2013, LATMOS/CNRS, Paris, France.

- Climate model simulations/analyses of polar ozone evolution: past and future (1958—2100).
- Testing of a new micro-physical scheme and analysis of its impact on the ozone recovery.

VALIDATION OF CHEMISTRY CLIMATE MODELS: 2011—2012, LATMOS/CNRS, Paris, France.

- Climate model run/analyses of stratospheric weather in the past and future (1958—2100).
- Bias estimation of the simulated results with measurements and reanalysis data sets.

ESA/MULTI-TASTE: 2009—2011, European Space Agency, LATMOS/CNRS, Paris, France.

- Analysis of ozone trends in the Antarctic using statistical regression methods.
- Validation of space-based measurements with ground-based measurements (1989—2010).

ORACLE—O3: French-ANR Project, 2008—2010, LATMOS/CNRS, Paris, France.

- Development of a method to derive ozone loss from ground-based measurements.
- Simulation of polar ozone loss using the models MIMOSA-CHIM and REPROBUS.

SCOUT—O3: European Project: 2007—2009, LATMOS/CNRS, Paris, France.

- Analysis of ozone loss in the polar spring using measurements and model simulations.
- Development of a long-term climatology (1989—2010) of ozone loss for the Antarctic.

STRATOSPHERIC DYNAMICS AND CLIMATE: French-ANR, 2005—2007, Paris, France.

- Development of a method to extract equatorial waves from measurements/model output.
- Construction of a climatology of equatorial waves.

ACCENT BIAFLUX: European project, 2005—2007, LMD/CNRS/Univ. Bremen, Germany.

- Conducting measurement campaigns for indoor and outdoor air-quality measurements.
- Indoor and outdoor air-quality assessment and impact on human health.

PAVE: US-European project, 2004—2005, University of Bremen, Bremen, Germany.

- Study of denitrification, chlorine activation and ozone loss in the Arctic winter 2004/2005.
- Validation of satellite observations with airborne measurements.

EuPLEx: European project, 2003—2005, University of Bremen, Bremen, Germany.

- Conducting measurement campaigns and study of ozone loss in the winter 2002/2003.
- Validation of the Bremen CTM with the airborne and satellite observations.

SCIAVALUE: European project, 2001—2005, University of Bremen, Bremen, Germany.

- Conducting measurement campaigns and retrieval of trace gases from measurements.
- Validation of space-borne sensors with airborne, ground-based and satellite observations.

C-IMCOZ: 2001, CUSAT- Technical University Delft, the Netherlands.

- Study of hydrodynamics and stability of the structures along the west coast of India.
- Supervise a M. Tech. student for her thesis preparation.

PEER-REVIEWED PUBLICATIONS.

S. No	Journal Name	Impact Factor	Number of Publications	Total Impact factor	Citations
	Remote Sensing of Environment	13.50	2	27.00	
	Environmental Science and Technology	11.40	1	11.40	
	Science of the Total Environment	9.80	2	19.60	
	npj Clim and Atmos Science (Nature Group)	9.00	2	18.00	
	Environmental Pollution	8.90	1	8.90	
	Chemosphere	8.80	1	8.80	
	Journal of Environmental Management	8.70	4	34.80	
	IEEE Trans on Geosci and Remote Sens	8.20	1	8.20	
	Environmental Technology & Innovation	7.10	1	7.10	
	Journal of Water Process Engineering	7.00	1	7.00	
	Environmental Research Letters	6.70	1	6.70	
	Atmospheric Chemistry and Physics	6.30	18	113.4	
	Environ. Science and Pollution Research	5.80	1	5.80	
	iScience	5.80	1	5.80	
	Atmospheric Research	5.50	2	11.00	
	Environmental Science: Processes & Impacts	5.50	1	5.50	
	Applied Geography	5.41	1	5.41	
	Geophysical Research Letters	5.20	2	10.40	
	Atmospheric Environment	5.00	5	25.00	
	Climate Dynamics	4.60	3	13.8	

	Scientific Reports (Nature Group)	4.60	3	13.8	
	Environmental Processes	4.40	1	4.40	
	Current Research in Environ. Sustainability	4.40	1	4.40	
	Journal of Geophysical Research: Atmos.	4.40	5	22.00	
	Heliyon	4.00	1	4.00	-
	International Journal of Climatology	3.90	3	11.7	
	Journal of Soil Science and Plant Nutrition	3.90	1	3.90	
	Geocarto International	3.80	1	3.80	
	Atmospheric Measurement Techniques	3.80	1	3.80	
	Natural Hazards	3.70	1	3.70	
	Frontiers in Marine Science	3.70	1	3.70	
	Indoor Built Environment	3.60	1	3.60	
	Journal of Geophysical Research: Oceans	3.60	1	3.60	
	Journal of Physical Oceanography	3.50	1	3.50	
	International Journal of Remote sensing	3.40	1	3.40	
	Theoretical and Applied Climatology	3.40	1	3.40	
	Environmental Science: Atmospheres	3.40	3	10.2	
	ACS Earth and Space Chemistry	3.40	1	3.40	
	Journal of Atmospheric Sciences	3.10	1	3.10	
	Journal of Operational Oceanography	3.10	1	3.10	
	Frontiers in Climate	2.90	1	2.90	
	Journal of Water and Climate	2.80	1	2.80	
	Innovative Energy and Research	2.49	1	2.49	
	Ocean Dynamics	2.30	3	6.90	
	Asia-Pacific Journal of Atmospheric Sciences	2.30	1	2.30	
	Agronomy Journal	2.10	1	2.10	
	Regional Studies in Marine Science	2.10	2	4.20	
	Journal of Atmospheric Chemistry	2.00	1	2.00	
	Pure and Applied Geophysics	2.00	1	2.00	
	Annals of Geophysicae	1.90	1	1.90	
	Polar Science	1.80	1	1.80	
	Environmental Challenges		1		
	Air		1		-
	spj Ocean-Land-Atmosphere-Res (Science Group)	-	1		-
	SN Applied Sciences (Nature Group)		1		
	Citations: Total				2430
	Citations: from reviewed (non peer-reviewed)				21
Total Cumulative Impact factor				500.50	
Average impact factor per article				5.23	
H-Index				28	

1. **Pathak, M.**, V. K. Patel., **J. Kuttippurath**: Spatial heterogeneity in global atmospheric CO during the COVID–19 lockdown: implications for global and regional air quality policies, *Environmental Pollution*, <https://doi.org/10.1016/j.envpol.2023.122269>, 25 July 2023.
2. **Rathore, A.**, G. S. Gopikrishnan, and **J. Kuttippurath**: Changes in tropospheric ozone over India: Variability, long-term trends and climate forcing, *Atmospheric Environment*, <https://doi.org/10.1016/j.atmosenv.2023.119959>, 14 July 2023.
3. **Nath, O.**, **J. Kuttippurath**, S. Sreedharan, and W. Feng: Seasonal, interannual and long-term changes in the middle atmospheric Carbon Monoxide in the tropics, *Atmospheric Environment*, <https://doi.org/10.1016/j.atmosenv.2023.119958>, 14 July 2023.
4. **Kuttippurath, J.**, S. Maishal, P. Anjaneyan, N. Sunanda, and Kunal Chakraborty: Recent changes in atmospheric input and primary productivity in the north Indian Ocean, *Heliyon*, doi: 10.1016/j.heliyon.2023.e17940, 03 July 2023.
5. **Roy, R.**, Kumar, P., **Kuttippurath, J.**, and Lefevre, F.: Chemical ozone loss and chlorine activation in the Antarctic winters 2013–2020, *EGUsphere*, <https://doi.org/10.5194/egusphere-2023-1189>, 2023.
6. **Joshi, A.**, M. Pathak., **J. Kuttippurath.**, and V. K. Patel: Adoption of cleaner technologies and reduction in fire events in the hotspots lead to global decline in carbon monoxide, *Chemosphere*, <https://doi.org/10.1016/j.chemosphere.2023.139259>, 16 June 2023.
7. **Kuttippurath, J.**, K. Abhishek, Chander, G., Dixit, S, Singh, A. Das, D., and Dey, S.: Biochar-based nutrient management as a futuristic scalable strategy for C-sequestration in Semi-arid-Tropics, *Agronomy Journal*, doi: 10.1002/agj2.21424, 12 June 2023.
8. Das, B. K., T. S. Anandh, A. Chakraborty and **J. Kuttippurath**: Summertime discontinuity of Western Boundary Current in the Bay of Bengal during contrasting Indian Ocean Dipole events of 2008 and 2010, *Regional Studies in Marine Science*, <https://doi.org/10.1016/j.rsma.2023.103049>, 10 June 2023.
9. **Patel, V.** and **J. Kuttippurath**: Increase in tropospheric water vapour triggers enhanced global warming and climate change, *spj Ocean-Land-Atmosphere-Research*, doi: 10.34133/olar.0015, Accepted, 23 April 2023.
10. **Kuttippurath, J.**, V K Patel, G S Gopikrishnan and H. Varikoden: Changes in air quality, meteorology and energy consumption during the COVID–19 lockdown and unlock periods in India, *Air*, 07 April 2023.
11. **Sharma, B.R.**, **J. Kuttippurath**, G S Gopikrishnan, and M. Pathak: Trends in atmospheric pollution in the Third Pole: Analyses of tropospheric NO₂ for the period 2005–2020, doi: 10.1039/D2EA00075J, 19 March 2023.
12. **Peter, R.**, **J. Kuttippurath**, N. Sunanda and K. Chakraborty: A high CO₂ concentration pool over the Indo-Pacific Warm Pool, *Scientific Reports*, doi: 10.1038/s41598-023-31468-0, 13 March 2023.
13. **Kashyap, R.**, **J. Kuttippurath**, and P. Kumar: Browning of vegetation in efficient carbon sink regions of India during the past two decades is driven by climate change and anthropogenic intrusions, *Journal of Environmental Management*, 336, <https://doi.org/10.1016/j.jenvman.2023.117655>, 1 March 2023.
14. **Kuttippurath, J.**, BR Sharma, GS Gopikrishnan: Trends and variability of Total Column Ozone in the Third Pole, *Frontiers in Climate*, doi:10.3389/fclim.2023.1129660, 22 February 2023.
15. **Sarkar, S.**, **J. Kuttippurath**, and V. Patel: Long-term changes in precipitable water vapour over India derived from satellite and reanalyses data for the past four decades (1980–2020), *Environmental Science: Atmospheres*, doi: 10.1039/D2EA00139J, 06 February 2023.
16. **Anjaneyan, P.**, **J. Kuttippurath**, Hareesh Kumar P. V., S. M. Ali and M. Raman: Spatio-temporal changes of winter and spring phytoplankton blooms in Arabian Sea during the period 1997–2020, *Journal of Environmental Management*, <https://doi.org/10.1016/j.jenvman.2023.117435>, 31 January 2023.
17. **Kashyap, R.**, **J. Kuttippurath**, and V K Patel: Improved air quality leads to enhanced vegetation growth during the COVID–19 lockdown in India, *Applied Geography*, <https://doi.org/10.1016/j.apgeog.2022.102869>, 2022.

18. **Kuttippurath, J.**, Ardra D., S. Raj and W. Feng: A seasonal OH minimum region over the Indian Ocean? Atmospheric Environment, <https://doi.org/10.1016/j.atmosenv.2022.119536>, 2022.
19. **Pathak, M.** and **J. Kuttippurath**: Air quality trends in rural India: analysis of NO₂ pollution using satellite measurements, Environmental Science: Processes and Impacts, <https://doi.org/10.1039/D2EM00293K>, 2022.
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105. Bremer, H., A. Kleinboehl, M. Palm, H. Kuellmann, **J. Kuttippurath**, M. Sinnhuber, and J. Notholt: Observations of stratospheric trace gases during the PAVE mission by ASUR, *EOS Aura Validation Workshop*, Lanham-Seabrook, MD, USA, 19—23 September 2005.
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115. Kuellmann, H., H. Bremer, J. Burrows, A. Kleinboehl, K. Kuenzi and **J. Kuttippurath**: Validation of SCIAMACHY Ozone Profiles and other Gases with the ASUR Airborne Sensor: Instrument Status and Method, *6th European symposium on stratospheric ozone*, Goteborg, Sweden, 2—6 September 2002.
116. Fix, A., H. Flentje, G. Ehret, H. Küllmann, H. Bremer, A. Kleinböhl, **Jayanarayanan. K.**, J. Notholt, K. Künzi, M. Bruns, P. Wang, A. Richter, W. Gurlit, K. Gerilowski, J. Burrows, K. Heue, U. Platt, I. Pundt, T. Wagner: SCIAMACHY and MIPAS Validation with the DLR Falcon Aircraft, *Envisat Validation Workshop*, ESRIN, Frascati, Italy, 9—13 December 2002.

RESEARCH PROJECT REPORTS

1. von Hobe et al. (**J. Kuttippurath**, Contributor): Reconciliation of essential process parameters for an enhanced predictability of Arctic stratospheric ozone loss and its climate interactions, ***The RECONCILE final project report***, 28 April 2013.
2. David, C. and Godin-Beekmann, S. (**J. Kuttippurath**, Contributor)): Ozone layer and UV radiation in a changing climate Evaluated during the IPY: French Contribution (***ORACLE—FRANCE***), final report, PROJECT ANR-06-BLAN-0246, 24 June 2011.
3. Solomon, S., **J. Kuttippurath**, A. Ladstaetter-Wissenmayer, and J. Burrows: Surface-atmosphere flux measurements of soil methanol and NO_x from a managed crop-land ecosystem: comparison with EC and chamber methods, ***ACCENT BIAFLUX exchange research staff—project report***, 2009.
4. Harris, N. R. P. et al.: The Northern Hemisphere Stratosphere in the 2004/05 Winter, Report for 2005, ***SCOUT-O₃ Integrated Project***, IUP, University of Bremen (**J. Kuttippurath**, Contributor), 2006.
5. Küllmann, H., **J. Kuttippurath**, H. Bremer, A. Kleinböhl, M. Sinnhuber, J. Notholt, K. Künzi and J. Burrows: Validation von SCIAMACHY LEVEL-2 Datenprodukten mit Hilfe des ASUR-Sensors von Bord des FALCON-Flugzeugs", ***Schlussbericht zu FKZ 50EE0022 (Project Completion Report)***, University of Bremen, 2005.

OUTREACH / DEPARTMENT/ INSTITUTE RESPONSIBILITIES

1. CONFERENCES Organized

- Chair, and Key note Speaker: Nature based solutions, Biodiversity and Climate Change, International Conference, BDCC-2023, IIT Kharagpur, **15-17 February 2023**.
- Co-Convener, and Steering Committee Member of **IRAD-2022**, conducted at IIT Bhubaneswar, India (and chaired a session), **9—11 January 2022**

- Technical Committee Member and Chaired a session in **TROPMET-21**, CUSAT, India, **23—26 November 2021**.
- Steering Committee member of **IRAD-2020**, conducted at IIT Madras, India, **6—8 February 2020**
- Steering Committee Member of **IARD-2019**, conducted at IITM Pune, India (and chaired a session), **9—12 January 2019**
- Steering Committee Member of **IARD-2018**, conducted at Tirupati, India (and chaired a session), **8—11 January 2018**
- The **First** (International) Radar Conference in India at IITKGP, **iRAD-2017**, **8—11 January 2017** (with Prof. Arun Chakraborty)
- The **international** conference on Ocean Modelling, **RAROM-2016** (with Prof. Arun Chakraborty)

2. Institute Duty

- **Assistant Warden**, R P Hall of Residence, IIT Kharagpur (since 2015)
- **JEE** Institute Representative (IR), Bhilai, 2016.
- **GATE** Institute Representative (IR), Kharagpur, 2016.
- **GATE** Institute Representative (IR), Bhilai, 2017

3. Technical / Lab. / Instrumentation / Facility Creation

- **Developed** a numerical modelling Lab for Chemistry and Climate simulations
- **Assisted the INSTALLATION** of an Automatic Weather Station at IITKGP
- Assisted to make a **Library** in CORAL

4. Department (CORAL) Responsibilities

- Prepared a **DST/FIST** proposal for CORAL in **2016**
- Prepared a **DST/FIST** proposal for CORAL in **2017**
- Prepared a **DST/FIST** proposal for CORAL in **2018**
- **Initiated CORAL Seminar Series** and Organized 18 Lectures by eminent scientists from India/abroad
- **Updated CORAL** 2008-2013 activity **report** to 2015
- Researcher Coordinator, Seminar In Charge, Lab in Charge, CORAL Website in Charge
- CDC-in-Charge, Library in Charge, Dept. UG committee Chair, etc.

BRAINSOTRMING

- International Climate Research Conclave, vision 2037: Indian Institute of Technology Bombay, 26-27 May 2023
- Brainstorming Workshop Technology vision 2047 and Climate Change, Indian Institute Technology Kharagpur, 1-2 June 2023

ORAL PRESENTATIONS/INVITED TALKS/OUTREACH

- Keynote address: A sustainable and nature-based solution for the reduction of atmospheric pollution in India, Biodiversity and Climate Change (**BDCC-2023**) Conference, IIT Kharagpur, 16-19 February 2023.
- Invited talk: Atmospheric Pollution India as observed from space-based measurements, **Indo-Belgium workshop** on Column Observations of Atmospheric Trace gases, IISER Kolkata, India, 20

January 2023.

- Ozone Day Talk: Temporal Evolution of Ozone layer recovery process”, **Malavya National Institute of Technology Jaipur**, 19 September 2022.
- Ozone Day Talk: Stratospheric Ozone, Ramanujan College, **Delhi University**, New Delhi, 19 September 2022.
- Ozone Day Talk, on “Ozone and Climate”, **Zoological Survey of India, Kolkata**, 16 September 2022.
- Ozone day Key Talk, “Ozone and Climate Change” organised by **Climate Action Plan**, 07 September 2022.
- Montreal Protocol keeps our food and Vaccines cool, World ozone day talk, **Zoological Survey of India, Kolkata**, 16 September 2021.
- Stratospheric Ozone and Montreal Protocol, World ozone day talk, Atmaram Sanathana Dharma College, **Delhi University, Delhi**, 16 September 2021.
- Natural disasters and Ecosystem: Tropical cyclones, Expert Talk, **ENVIS Centre, Zoological Survey of India, Kolkata**, 3 February 2021.
- The Arctic Ozone hole of 2020, World ozone day talk, **Zoological Survey of India, Kolkata**, 16 September 2020.
- Evolution of Ozone hole, World ozone day talk, **Forest Research Institute Dehradun**, 16 September 2020.
- Temporal evolution of Antarctic ozone hole, World ozone day talk, **Zoological Survey of India, Port Blair**, 16 September 2020.
- Ozone hole, discovery to recovery, World ozone day talk, **Zoological Survey of India, Kolkata**, 16 September 2019.
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- Stratospheric ozone recovery analyses, **NARL, India**, 18-19 December 2018.
- Chemistry and Physics of Air Pollution, **IIT Bombay**, India, 26 August 2014.
- Ozone and climate, **IIT Kanpur**, India, 28 March 2014.
- Climate connections of ozone, **IISER Pune**, India, 25 March 2014.
- Stratospheric ozone and its interactions with climate, **IISc. Bangalore**, India, 13 March 2014.
- Climate change and ozone, **IIT Kharagpur**, India, 10 March 2014.
- Stratospheric ozone and climate Change, **IIT Bombay**, India, 27 February 2014.
- Ozone and Climate Change, **IISER Mohali**, India, 21 November 2013.
- Stratospheric ozone and interactions with climate change, **IISER Pune**, India, 13 August 2013.
- HDR colloquium, UPMC University of Paris 06, 21 March 2013.

- **Physics and chemistry of stratospheric ozone and interactions with climate change.**
- Reconcile project workshop, IPSL, Paris, 20—21 December 2011.
- **Chemistry and climate modelling with the improved LMDz-REPROBUS CCM.**
- Halogen Emissions from Volcanoes and their impact on Atmospheric chemistry, Science meeting, December 2011, LMD/IPSL Jussieu, Paris: **CCM modelling to study the impact of volcanic emissions on the climate change.**
- The 20th Anniversary Symposium of NDACC, Ile de Reunion, 6—10 November 2011: **Probing the Antarctic ozone loss using 20 years of NDACC ground-based total ozone observations.**
- MIMOSA dynamical model workshop, IPSL, Paris, 4 October 2011: **The MIMOSA-CHIM CTM: A combined version of the MIMOSA dynamical model and the REPROBUS chemical transport model: A decade of unparalleled service.**
- LATMOS/CNRS Seminar, UPMC/IPSL, 17 December 2009: **Recent trends in polar ozone loss.**
- The 5th German SCIAMACHY validation Team meeting, Bremen, Germany, 6-8 December 2004: **SCIAMACHY validation using ASUR observations.**
- The Quadrennial Ozone Symposium, Kos, Greece, 1—8 June 2004: **Seasonal and latitudinal distribution of stratospheric ozone.**
- The 4th German SCIAMACHY validation Team meeting, Heidelberg, Germany, 25 November 2003: **The potential use of ASUR data for scientific studies.**
- The 3rd German SCIAMACHY validation Team meeting, Bremen, Germany, 7—8 July 2003: **Stratospheric trace gas observations by ASUR.**
- The Oxford/RAL Spring School on Quantitative EO in Earth radiation and climate studies, Oxford, 17—28 March 2003: **Retrieval of HO₂ from submillimeter wave measurements.**

PROFESSIONAL TRAINING

- Climate modelling training, IPSL, CNRS/IDRIS, Le Guichet, France, 21—22 May 2014.
 - Climate modelling workshop, IPSL, Paris, France, 14—16 January 2013.
 - Climate modelling workshop, LMD UPMC, Paris, France, 26—28 December 2012.
 - The climate-biosphere Interactions workshop, ENS, Paris, France, 26—27 September 2006.
 - The STRATEOLE/VORCORE workshop on Stratospheric Dynamics, CNES, France, 18—19 April 2006.
 - Atmospheric Chemistry validation workshop, ESA ESRIN, Frascati, Italy, 3—7 May 2004.
 - Training on Retrieval of stratospheric trace gases from remote sounding observations, University of Oxford, UK, 17—28 March 2003.
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MEDIA REPORTS ON OUR RESEARCH

All media reports are available on our Lab website : <https://www.atmoslabiitkgp.com/media>

Emergence of ozone recovery evidenced by reduction in the occurrence of Antarctic ozone loss saturation

J. Kuttippurath, P. Kumar, P. J. Nair and P. C. Pandey(2018)

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<https://doi.org/10.1038/s41612-018-0052-6>



IndiaToday

Antarctic ozone hole is healing, confirms IIT Kharagpur study



Amar Ujala

आईआईटी खड़गपुर के अध्ययन में दावा, अंटार्कटिक में ओजोन क्षरण में आई कमी



Economic Times

Antarctic Ozone hole is healing: IIT Kharagpur study



JagranJosh

Study by scientists of IIT Kharagpur confirms healing of Antarctic Ozone Hole

FINANCIAL EXPRESS

Financial Express

IIT Kharagpur study claims Antarctic Ozone hole on healing path

Business Standard

Business Standard

Antarctic Ozone hole is healing: IIT Kharagpur study

MYSURU TODAY

CityToday

Antarctic Ozone hole is healing: IIT Kharagpur study



IndianExpress

সেই উঠছে ওজোন স্তরের হিঁদ্র

The signs of Antarctic ozone hole recovery

J. Kuttippurath and P. J. Nair

Scientific Reports, April 2017

<https://doi.org/10.1038/s41598-017-00722-7>



Researchmatters

Good news! The Ozone hole is healing, shows data from Maitri



Indian Science Journal

The Ozone hole is healing, shows data from Maitri

Quora

Quora

Is the hole in ozone layer shrinking?

Tekniikka & Talous

Tekniikkatalous

Jotain hyvääkin maailmalla: Etelämantereen otsonikerros paksunee 99 % varmuudella

N+1

nplus1

Мхи восточной Антарктиды высохли из-за изменения климата

POLAR OZONE RECOVERY

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Rahul Kashyap, J. Kuttippurath, V.K. Patel

Applied Geography Volume 151, February 2023, 102869



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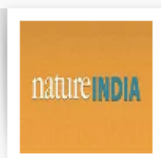
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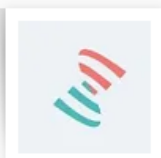
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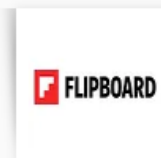
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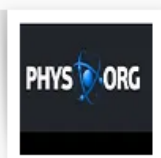
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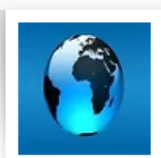
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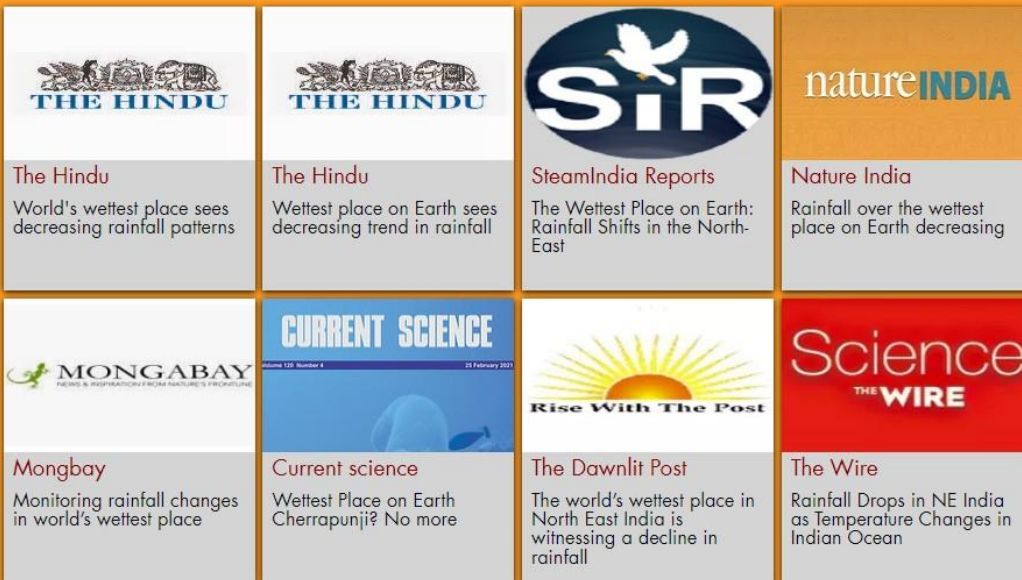
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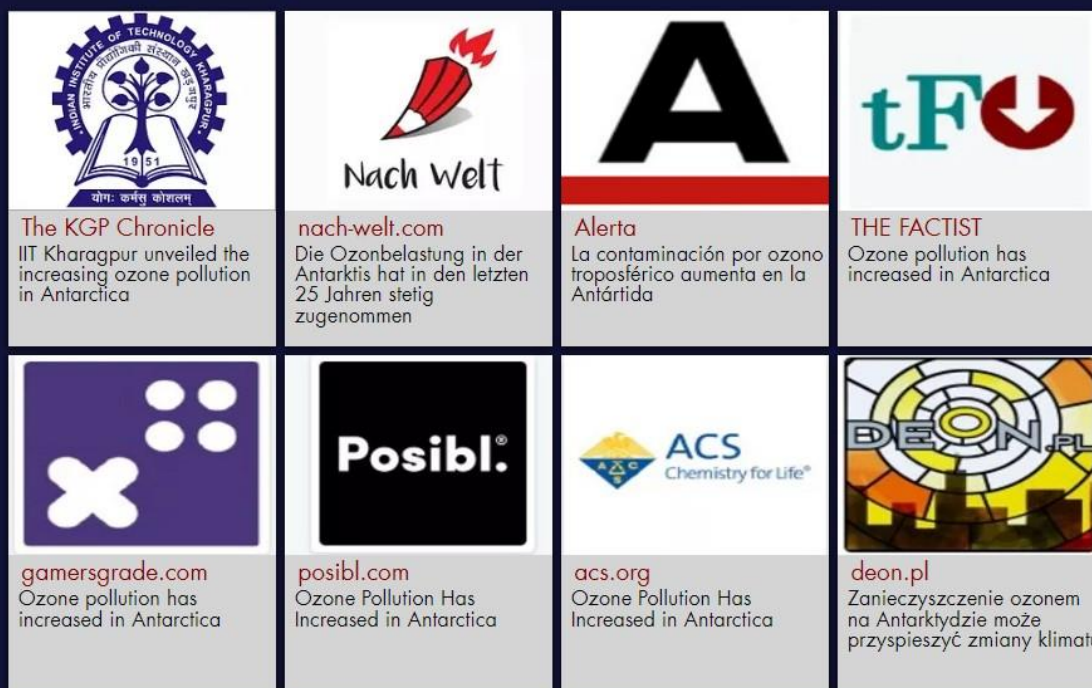
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