Dr. Chinmay Kumar Jena
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India Meteorological Department (IMD),
Ministry of Earth Science,
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Curriculum Vitae

Education

- Ph.D. in *Atmospheric Science*, Indian Institute of Tropical Meteorology, Pune, India. Thesis tile: **High resolution NO_X emission estimates for India based on satellite measurements and regional chemistry transport model**.
- M. Tech. in *Earth Science System and Technology*, Indian Institute of Technology Kharagpur, India.
- M.Sc. in *Mathematics*, Utkal University, Odisha, India.
- B. Sc. (Hons) in *Mathematics*, Fakir Mohan University, Odisha, India.

Research Interest

- Atmospheric chemistry and air quality modeling with data assimilation.
- Tropospheric ozone and aerosols.
- Development of top-down emission inventory using Inverse method.
- Impact of air quality on human health and agricultural productivity.
- Intercontinental transport of air pollutions.
- Air Quality from Urban to Global Pollution and vice versa.
- Air quality forecasting and climate change.
- Urban Meteorological and Air Quality Services.

Research Experience

- Scientist-C, India Meteorological Department, Ministry of Earth Science, New Delhi, Feb. 2021-Present.
- Project Scientist-D, Indian Institute of Tropical Meteorology, Pune, Feb 2019 – Feb, 2021.
- Post-Doc Research Scholar, North Carolina State University, NC, USA, October 2015 – Jan. 2019.
- Senior Research Scholar, Indian Institute of Tropical Meteorology, Pune, India, June 2012 – September 2015.
- Research Scholar, Indian Institute of Tropical Meteorology, Pune, India, June 2010 – May 2012.

Awards and Honors

- Best paper for the Indian Meteorological Society (IMS) Biennial award (2023) on Modelling Study on Atmospheric and Oceanic Sciences (Formerly A. D. Vernekar Award) from a National Conference on Tropical Meteorology (TROPMET-2023).
- Best PhD Thesis Award (2015) from Indian institute of Tropical Meteorology, IITM, Pune, India.
- Best Paper Award (2013) from International workshop on Change in Chemistry in Change in Climate (C4): Monsoon 2013.

Technical Skills:

Programming Languages**:**	C/C++, Data structures, Fortran and Shell Scripting in Linux/Unix
Software Packages/Tools:	Python,NCL, Grads, MATLAB, Origin, ERDAS, ARCGIS, IDL
Global/Regional Models:	MM5, WRF, WRF/Chem, WRF/Chem-ROMS, WRF/CAM5, CHIMERE, CESM, Mozart-4
Parallel Programming Libraries:	MPI and OpenMPI
Operating Systems**:**	LINUX, WINDOWS, UNIX, IBM AIX.

International Collaborators:

- Air Quality Forecasting Lab, Marine, Earth and Atmospheric Science, North Carolina State University, NC, USA.
- Atmospheric Chemistry Division, NCAR, Boulder, Colorado, USA.
- Climate Observations, Royal Netherlands Meteorological Institute (KNMI), The Netherlands
- Laboratoire image ville environnement, Faculté de géographie et d'aménageme, Strasbourg, France
- Energy Systems Division, Argonne National Laboratory, Argonne, IL, USA.
- Dept. Environ. Health & Engin., The Johns Hopkins University, Baltimore, Maryland, USA.

List of Publication:

1. Rajmal Jat, **Chinmay Jena**, Prafull P. Yadav, Gaurav Govardhan, Gayatri Kalita, Sreyashi Debnath, Preeti Gunwani, Prodip Acharja, Pooja Pawar, Pratul Sharma, Santosh Kulkarni, Akshay R. Kulkarni, Akshara J. Kaginalkar, Dilip M. Chate, Rajesh Kumar, Vijay Kumar Soni, Sachin D. Ghude, Evaluating the sensitivity of fine particulate matter (PM2.5) simulations to chemical mechanism in WRF-Chem over Delhi, **Atmospheric Environment**, doi: https://doi.org/10.1016/j.atmosenv.2024.120410, **2024**.

2. Gaurav Govardhan, Sachin D. Ghude, Rajesh Kumar , Sumit Sharma , Preeti Gunwani , **Chinmay Jena** , Shubhangi Ingle , Prafull Yadav , Sreyashi Debnath, Pooja Pawar , Prodip Acharja, Rajmal Jat , Gayatry Kalita , Rupal Ambulkar , Santosh Kulkarni , Akshara Kaginalkar , Vijay K Soni , Ravi S. Nanjundiah, and M. Rajeevan, Decision Support System (v 1.0) for Air Quality Management in New Delhi, India, **Geosci. Model Dev.**, **2024 (Accepted)**

3. Sreyashi Debnath, Gaurav Govardhan, Subodh Kumar Saha, Anupam Hazra, Samir Pohkrel, **Chinmay Jena**, Rajesh Kumar, Sachin D Ghude, Impact of dust aerosols on the Indian Summer Monsoon Rainfall on intra-seasonal time-scale, **Atmospheric Environment**, 305, **2023**.

4. Sreyashi Debnat, Rama Krishna Karumuri, Gaurav Govardhan, Rajmal Jat, Himadri Saini, Akash Vispute, Santosh H. Kulkarni, **Chinmay Jena**, Rajesh Kumar, D.M. Chate, Sachin D. Ghude, Implications of implementing promulgated and prospective emission regulations on air quality and health in India during 2030, **Aerosol and Air Quality Research, 2023**.

5. Preeti Gunwani, Gaurav Govardhan, **Chinmay Jena**, Prafull Yadav, Santosh Kulkarni, Sreyashi Debnath, Pooja V Pawar, Manoj Khare, Akshara Kaginalkar, Rajesh Kumar, Sandeep Wagh, Dilip

Chate, Sachin D Ghude, Sensitivity of WRF/Chem simulated PM2. 5 to initial/boundary conditions and planetary boundary layer parameterization schemes over the Indo-Gangetic Plain, **Environmental Monitoring and Assessment**, 195(5), 560, **2023**.

6. Sachin D Ghude, RK Jenamani, Rachana Kulkarni, Sandeep Wagh, Narendra G Dhangar, Avinash N Parde, Prodip Acharja, Prasanna Lonkar, Gaurav Govardhan, Prafull Yadav, Akash Vispute, Sreyashi Debnath, DM Lal, DS Bisht, **Chinmay Jena**, Pooja V Pawar, Surendra S Dhankhar, V Sinha, DM Chate, PD Safai, N Nigam, Mahen Konwar, Anupam Hazra, T Dharmaraj, V Gopalkrishnan, B Padmakumari, Ismail Gultepe, Mrinal Biswas, AK Karipot, Thara Prabhakaran, Ravi S Nanjundiah, M Rajeevan, WiFEX: Walk into the Warm Fog over Indo-Gangetic Plain Region, **Bulletin of the American Meteorological Society**, 104(5), **2023**.

7. **Chinmay Jena**, Yang Zhang, Kai Wang, Patrick C Campbell, Decadal Application of WRF/Chem under Future Climate and Emission Scenarios: Impacts of Technology-Driven Climate and Emission Changes on Regional Meteorology and Air Quality, **Atmosphere**, 14(2), 225, **2023**.

8. Pooja V Pawar, Sachin D Ghude, Gaurav Govardhan, Prodip Acharja, Rachana Kulkarni, Rajesh Kumar, Baerbel Sinha, Vinayak Sinha, **Chinmay Jena**, Preeti Gunwani, Tapan Kumar Adhya, Eiko Nemitz, Mark A Sutton, Chloride (HCl⁄Cl−) dominates inorganic aerosol formation from ammonia in the Indo-Gangetic Plain during winter: modeling and comparison with observations, **Atmospheric Chemistry and Physics**, 23(1), 41-59, **2023**.

9. Sandisp Nivdange, **Chinmay Jena**, Pooja Pawar, Gaurav Govardhan, Sreyashi Debnath, Santosh Kulkarni, Prasanna Lonkar, Akash Vispute, Narendra Dhangar, Avinash Parde, Prodip Acharja, Vinod Kumar, Prafull Yadav, Rachana Kulkarni, Manoj Khare, N. R. Karmalkar, Nationwide CoViD-19 lockdown impact on air quality in India, **MAUSAM,** 73 (1), 115-128, **2022**.

10. Sachin D Ghude, Rajesh Kumar, Gaurav Govardhan, **Chinmay Jena**, Ravi S Nanjundiah, M Rajeevan, New Delhi: air-quality warning system cuts peak pollution, **Nature**, 602 (7896), 211-211, **2022**.

11. Sreyashi Debnath, **Chinmay Jena**, Sachin D Ghude, Rajesh Kumar, Gaurav Govardhan, Preeti Gunwani, Subodh Kumar Saha, Anupam Hazra, Samir Pokhrel, Simulation of Indian Summer Monsoon Rainfall (ISMR) with fully coupled regional chemistry transport model: A case study for 2017, **Atmospheric Environment**, 268, 118785, **2022**.

12. Avinash N Parde, Narendra G Dhangar, Sandip Nivdange, Sachin D Ghude, Prakash Pithani, **Chinmay Jena**, DM Lal, V Gopalakrishnan, The analysis of pre-monsoon dust storm over Delhi using ground-based observations, **Natural Hazards**, 1-16, **2022**.

13. Akshara Kaginalkar, Sachin D Ghude, UC Mohanty, Pradeep Mujumdar, Sudheer Bhakare, Hemant Darbari, Arun K Dwivedi, Pallavi Gavali, Srujan Gavhale, Sahidul Islam, Gouri Kadam, Sumita Kedia, Manoj Khare, Neelesh Kharkar, Santosh H Kulkarni, Sri Sai Meher, AK Nath, Mohamed Niyaz, Sagar Pokale, Vineeth Krishnan Valappil, Sreyashi Debnath, **Chinmay Jena**, Raghu Nadimpalli, Madhusmita Swain, Saimy Davis, Shubha Avinash, C Kishtawal, Prashant Gargava, SD Attri, Dev Niyogi, Integrated urban environmental system of systems for weather ready cities in India, **Bulletin of the American Meteorological Society** 103 (1), E54-E76, **2022**.

14. Narendra G Dhangar, DM Lal, Sachin D Ghude, Rachana Kulkarni, Avinash N Parde, Prakash Pithani, K Niranjan, Dasari SVVD Prasad, **Chinmay Jena**, Veeresh S Sajjan, Thara Prabhakaran, AK Karipot, RK Jenamani, Surender Singh, M Rajeevan, On the conditions for onset and

development of fog over New Delhi: An observational study from the WiFEX, **Pure and Applied Geophysics,** 178 (9), 3727-3746, **2021**.

15. MIR Tinmaker, **Chinmay K Jena**, Sachin D Ghude, Arun Kumar Dwivedi, Sahidul Islam, Santosh H Kulkarni, Manoj K Khare, DM Chate, Relationship of lightning with different weather parameters during transition period of dry to wet season over Indian region, **Journal of Atmospheric and Solar-Terrestrial Physics**, 220, 105673, **2021**.

16. Pooja V Pawar, Sachin D Ghude, **Chinmay Jena**, Andrea Móring, Mark A Sutton, Santosh Kulkarni, Deen Mani Lal, Divya Surendran, Martin Van Damme, Lieven Clarisse, Pierre-François Coheur, Xuejun Liu, Gaurav Govardhan, Wen Xu, Jize Jiang, Tapan Kumar Adhya, Analysis of atmospheric ammonia over South and East Asia based on the MOZART-4 model and its comparison with satellite and surface observations, **Atmospheric Chemistry and Physics**, 21 (8), 6389-6409,**2021**.

17. **Chinmay Jena**, Sachin D Ghude, Rajesh Kumar, Sreyashi Debnath, Gaurav Govardhan, Vijay K Soni, Santosh H Kulkarni, G Beig, Ravi S Nanjundiah, M Rajeevan, Performance of high resolution (400 m) PM2. 5 forecast over Delhi, **Scientific reports,** 11 (1), 1-9, **2021**.

18. Rajesh Kumar, Sachin D. Ghude , Mrinal Biswas, **Chinmay Jena**, Stefano Alessandrini, Sreyashi Debnath, Santosh Kulkarni, Simone Sperati, Vijay K. Soni, Ravi S. Nanjundiah, and M. Rajeevan, Enhancing Accuracy of Air Quality and Temperature Forecasts During Paddy Crop Residue Burning Season in Delhi Via Chemical Data Assimilation, **Journal of Geophysical Research: Atmospheres**, 125, e2020JD033019. https://doi.org/10.1029/2020JD033019, **2020**.

19. Subrata Mukherjee, Vyoma Singla, Guman Singh Meena , Mohammad Yusuf Aslam , Pramod Digambar Safai , Pallavi Buchunde , Anil Kumar Vasudevan , **Chinmay Kumar Jena** , Sachin Dinkar Ghude , Kundan Dani , Govindan Pandithurai, Sub micron aerosol variability and its ageing process at a high altitude site in India: Impact of meteorological conditions, **Environmental Pollution,** 265, 115019, **2020**.

20. Avinash N Parde, Sachin D Ghude, Prakash Pithani, Narendra G Dhangar, Sandip Nivdange, Gopal Krishna, DM Lal, R Jenamani, Pankaj Singh, **Chinmay Jena**, Ramakrishna Karumuri, PD Safai, DM Chate, Estimation of surface particulate matter ($PM_{2.5}$ and PM_{10}) mass concentrations from ceilometer backscattered profiles, **Aerosol and Air Quality Research**, 20 (7), 1640-1650, **2020**.

21. Sachin D. Ghude, Rajesh Kumar, **Chinmay Jena**, Sreyashi Debnath, Rachana G. Kulkarni, Stefano Alessandrini, Mrinal Biswas, Santosh Kulkrani, Prakash Pithani, Saurab Kelkar, Veeresh Sajjan, D. M. Chate, V. K. Soni, Siddhartha Singh, Ravi S. Nanjundiah and M. Rajeevan, Evaluation of PM2.5 forecast using chemical data assimilation in the WRF-Chem model: a novel initiative under the Ministry of Earth Sciences Air Quality Early Warning System for Delhi, India, **CURRENT SCIENCE**, 118 (11), 1803, **2020**.

22. Prakash Pithani, Sachin D. Ghude, R. K. Jenamani, Mrinal Biswas, C. V. Naidu, Sreyashi Debnath, Rachana Kulkarni, Narendra G. Dhangar; **Chinmay Jena**, Anupam Hazra, R. Phani, P. Mukhopadhyay, Thara Prabhakaran, Ravi S. Nanjundiah, M. Rajeevan, Real-Time Forecast of Dense Fog Events over Delhi: The Performance of the WRF Model during the WiFEX Field Campaign, **Weather and Forecasting**, 35 (2), 739-756, **2020**.

23. Santosh H. Kulkarni, Sachin D. Ghude, **Chinmay Jena**, Rama K. Karumuri, Baerbel Sinha, V. Sinha, Rajesh Kumar, V. K. Soni, and Manoj Khare, How Much Does Large-Scale Crop Residue

Burning Affect the Air Quality in Delhi? **Environmental Science & Technology**, 54 (8), 4790-4799, https://dx.doi.org/10.1021/acs.est.0c00329, **2020**.

24. Sachin D. Ghude, Rama Krishna Karumuri, **Chinmay Jena**, Rachana Kulkarni, G. G. Pfister, Veeresh S. Sajjan, Prakash Pithani, Sreyashi Debnath, Rajesh Kumar, B. Upendra, Santosh H. Kulkarni, D.M. Lal, R.J. Vander A , Anoop S. Mahajan, What is driving the diurnal variation in tropospheric NO2 columns over a cluster of high emission thermal power plants in India? **ATMOSPHERIC ENVIRONMENT: X**, 5, 100058, **2020**.

25. Avinash N. Parde, Sachin D. Ghude, Prakash Pithani , Narendra G. Dhangar , Sandip Nivdange , Gopal Krishna, D.M. Lal , R. Jenamani , Pankaj Singh , **Chinmay Jena** , Ramakrishna Karumuri , P.D. Safai , D.M. Chate, Estimation of Surface Particulate Matter (PM2.5 and PM10) Mass Concentrations from Ceilometer Backscattered Profiles, **Aerosol and Air Quality Research**, 20: 1640–1650, **2020**.

26. Yang Zhang, **Chinmay Jena**, Kai Wang, Clare Paton-Walsh, Élise-Andrée Guérette, Steven Utembe, Jeremy David Silver, and Melita Keywood, Multiscale Applications of Two Online-Coupled Meteorology-Chemistry Models during Recent Field Campaigns in Australia, Part I: Model Description and WRF/Chem-ROMS Evaluation Using Surface and Satellite Data and Sensitivity to Spatial Grid Resolutions, **Atmosphere**, 10, 189; doi:10.3390/atmos10040189, **2019**.

27. Yang Zhang, Kai Wang, **Chinmay Jena**, Clare Paton-Walsh, Élise-Andrée Guérette, Steven Utembe, Jeremy David Silver and Melita Keywood, Multiscale Applications of Two Online-Coupled Meteorology-Chemistry Models During Recent Field Campaigns in Australia, Part II: Comparison of WRF/Chem and WRF/Chem-ROMS and Impacts of Air-Sea Interactions and Boundary Conditions, **Atmosphere**, 10, 210; doi:10.3390/atmos10040210, **2019**.

28. Daniel L. Goldberg, Pawan Gupta, Kai Wang, **Chinmay Jena**, Yang Zhang, Zifeng Lu, David G. Streets, Using gap-filled MAIAC AOD and WRF-Chem to estimate daily PM2.5concentrations at 1 km resolution in the Eastern United States, Atmospheric Environment 199, 443–452, 2019.

29. Chate D.M., Waghmare R.T., **Jena C.K**., Gopalkrishnan V., Murugavel P., Ghude S.D., Kulkarni Rachana, and Devara P.C.S., Cloud Condensation Nuclei over the Bay of Bengal during the Indian Summer Monsoon, **Advances in Atmospheric Sciences**, 35, 211-223, **2018**.

30. Yang Zhang, Kai Wang, and **Chinmay Jena**, Impact of Projected Emission and Climate Changes on Air Quality in the U.S.: from National to State Level, **Procedia Computer Science**,110,167–173, **2017**.
31. Surendran D.E., Ghude S.D., Beig G., **Jena C.**, Chate D.M., Quantifying the sectoral contribution of pollution transport from South Asia during summer and winter monsoon seasons in support of HTAP-2 experiment, **Atmospheric Environment**, 145, DOI:10.1016/j.atmosenv.2016.09.011, 60-71, 2016.

32. Ghude, S. D., Chate D. M., **Jena C.**, Beig G., R. Kumar, Barth M. C., Pfister G. G., Fadnavis S., Pithani P., Premature mortality in India due to PM2.5 and ozone exposure, **Geophysical Research Letters**, 43, DOI:10.1002/2016GL068949, 4650-4658, **2016**.

33. Ghude S.D., **Jena C.K.,** Kumar R., Kulkarni S.H., Chate D.M., Impact of emission mitigation on ozone-induced wheat and rice damage in India, **Current Science**, 110, DOI:10.18520/cs/v110/i8/1452-1458, 1452-1458, **2016**.

34. Surendran D.E., Ghude S.D., Beig G., Emmons L.K., **Jena C**., Rajesh Kumar, Pfister G.G., Chate D.M., Air quality simulation over South Asia using Hemispheric Transport of Air Pollution version-2 (HTAP-v2) emission inventory and Model for Ozone and Related chemical Tracers (MOZART-4), **Atmospheric Environment**, 122, DOI:10.1016/j.atmosenv.2015.08.023, 357-372, **2015.**

35. **Jena C.,** Ghude S.D., Beig G., Chate D.M., Kumar Rajesh, Pfister G.G., Lal D.M., Surendran D.E., Fadnavis S., Van der A R.J., Inter-comparison of different NOx emission inventories and associated variation in simulated surface ozone (O3) in Indian region, **Atmospheric Environment**, doi:10.1016/j.atmosenv.2015.06.057, 61-73, **2015**.

36. **Jena C.,** Ghude S. D, Pfister G. G, Beig G., Chate D. M., Kumar R., Surendran D. E., Fadnavis S. and D. M. Lal, Influence of springtime biomass burning emissions in South Asia on regional ozone: A model based case study, **Atmospheric Environment**, doi:10.1016/j.atmosenv.2014.10.027,1-11, **2014**.

37. **Jena C**., Ghude S. D., G. Beig, Kulkarni S. H. , Blond N., S.L. Jain, D.M. Chate and R J Vander A, Estimation of nitrogen oxides lifetime over India using SCIAMACHY observations on board ENVISAT, **International Journal of Remote Sensing**, doi.org/10.1080/01431161.2013.873146, **2014**.

38. Ghude S.D, **C. Jena**, D. M. Chate, G. Beig, G. G. Pfister, V. Ramanathan, Reductions in India's crop yield due to ozone, **Geophysical Research Lettters**, doi:10.1002/2014GL060930, **2014**.

39. D. M. Chate, Ghude, S.D., G. Beig, Mahajan, A. S., **C. Jena**, Srinivas,R., Dahiya, A., Kumar, A., Deviations from the O3-NO-NO2 photo-stationary state in Delhi, India, **Atmospheric Environment**, doi:10.1016/j.atmosenv.2014.07.054, 353-358, **2014**.

40. Ghude, S.D., G. G. Pfister, **C. Jena**, R.J. van der A, L. K. Emmons, R. Kumar, 2013, Satellite constraints of nitrogen oxide (NOx) emissions from India based on OMI observations and WRF_Chem simulations, **Geophysical Research Lettters**, doi:10.1029/2012GL053926, **2013**.

41. D. M. Lal, Ghude S. D., S. D. Patil, S. H. Kulkarni, **C. Jena**, S. Tiwari and M. K. Srivastava, 2012, Tropospheric ozone and aerosol long-term trends over the Indo-Gangetic Plain (IGP) region, India, **Atmospheric Research**, DOI: doi: 10.1016/j.atmosres.2012.02.014, **2012**.

42. D. M. Lal, Ghude S. D., S. D. Patil, S. H. Kulkarni, **C. Jena**, S. Tiwari and M. K. Srivastava, 2012, Tropospheric ozone and aerosol long-term trends over the Indo-Gangetic Plain (IGP) region, India, **Atmospheric Research**, DOI: doi: 10.1016/j.atmosres.2012.02.014, **2012**.

43. Ghude S.D., Kulkarni S.H., Kulkarni P.S., Kanawade V.P., Fadnavis S., Pokhrel S., **C. Jena,** Beig G., Bortoli D., Anomalous low tropospheric column ozone over Eastern India during the severe drought event of monsoon 2002: a case study, **Environmental Science and Pollution Research**, 18, September 2011, DOI 10.1007/s11356-011-0506-4, 1442-1455, **2011**.

Conferences/Workshops Proceedings:

1. Participated TROPMET-2023, a National Symposium on "Changing Dynamics of Arid Region and Impact on Weather and Climate over Indian Subcontinent" at Birla Auditorium, Jaipur, Rajasthan during 22-24 November 2023.

2. Participated RA II - Kick-off Expert Team meeting - Working Group on Services organized by World Meteorological Organization (WMO) on 21 Feb 2023.

3. Participated Urban Air Quality Management and Training on UrbAirIndia, Pune organized by C-DAC, Pune November 07-08, 2022.

4. Participated Joint Expert Team on Environmental Observations and Services (JET-EOS) Meeting organized by WMO on 23 Nov 2022.

5. Participated RA II - Kick-off Expert Team meeting - Working Group on Services organized by World Meteorological Organization (WMO) on 14 Sep 2022.

6. Participated in the SEARCH Center: Solutions for Energy, AiR, Climate and Health held at JHU University, Baltimore, Maryland, USA during 22rd – 23th March 2018 and Presented a poster (research paper) entitled "Projected Emissions from Energy-Related Sectors and Their Impacts on Future Air Quality".

7. Participated in the 18th Annual WRF Users' Workshop held at NCAR Center Green Campus, Boulder, Colorado, USA during 12th – 16th June 2017 and presented an oral (research paper) entitled "Individual and Combined Impacts of Projected Climate and Emission Changes on Future Air Quality over the U.S." and also Presented a poster (research paper) entitled "Air Quality Modeling over the U.S.: Multi-Model Evaluation and Intercomparison".
8. Participated in the Air, Climate & Energy (ACE) Centers hosted by Harvard/MIT ACE Center at Le Meridien Hotel, 20 Sidney Street, Cambridge, MA, USA during 1st – 2nd June 2017 and Presented a poster (research paper) entitled "Global and Regional Air Quality and Climate Modeling: Evaluation, Intercomparison, and Improvement".
9. Participated in the SEARCH Center: Solutions for Energy, AiR, Climate and Health held at Yale University, New Haven, Ct, USA during 23rd – 24th March 2017 and Presented a poster (research paper) entitled "Air Quality Modeling over the U.S.: Model Evaluation and Intercomparison".
10. Participated in the AGU Fall Meeting held at San Francisco, CA, USA during 12th – 16th December 2016 and Presented a poster (research paper) entitled "Multi-Year Application and Evaluation over U.S. using the Weather Research and Forecasting model with Chemistry and the Physics/Aerosol Packages from the Community Atmosphere Model version 5 (WRF-CAM5)".
11. Participated in the University Global Partnership Network (UGPN) Workshop on Air Quality, Climate, and Health held at North Carolina State University, NC, USA on November 2016 and Presented a poster (research paper) entitled "Global Modeling of Climate and Air Quality: Some Preliminary Results".
12. Participated in the 15th Annual CMAS Conference held at Chapel Hill, NC, USA during 24th – 26th October, 2016 and Presented a poster (research paper) entitled "Decadal Application of WRF/Chem under Current and Future Climate/Emission Scenarios: Part II. Impact of Projected Climate and Emission Changes on Future Air Quality over the U.S.".
13. Participated in the University Global Partnership Network (UGPN) Workshop on Air Quality, Climate, and Health held at North Carolina State University, NC, USA on 8th April, 2016 and Presented a poster (research paper) entitled "Decadal Application of WRF/Chem under Current and

Future Climate/Emission Scenarios, Part II: Preliminary Assessment of Impact of Projected Climate and Emission Changes on Future Air Quality".

14. Participated in the Young Scientist Summer School on Integrated Modelling of Meteorological and Chemical Transport Processes (YSSS) held at University of Aveiro, Portugal during 6^{th} - 11^{th} July, 2014 and given an oral presentation (based on the training topic) "Changing the vertically integrated aerosol optical thickness and studying the effect with three different radiation schemes in two cases".

15. Participated in the Second Annual Regional Atmospheric Science (SARAS) workshop held at Kathmandu, Nepal during 7^{th} to 9^{th} Jun, 2014 and presented an oral (research paper) entitled "Seasonal and Annual NO_x emission inventory for India Using Inverse Technique".

16. Participated in the MOZAIC-IAGOS Scientific symposium held at the Toulouse, France during 12^{th}-15^{th} May, 2014 and presented an oral (research paper) entitled "Monitoring and Estimating of NOx emission from space using WRF-Chem Model for Air quality study over south Asia".

17. Attended the Users Workshop on "Sixth Annual Users Fog Workshop" held at the Auditorium, New Udan Bhavan, IGI Airport, New Delhi on 16^{th} January 2014.

18. Participated in the User Workshop on "GlobEmission" held at the ESA-ESRIN Frascati, Italy on 5^{th} December 2013 and presented an oral (research paper) entitled "Development of OMI based Top_down monthly NOx emission Inventory for India Using WRF-Chem".

19. Participated in the international workshop on "Atmospheric Composition and the Asian Summer Monsoon (ACAM) held at Kathmandu, Nepal during 9 -13 June, 2013 and presented an oral (research paper) entitled "The Impact of fires on air quality in South Asia".

20. Participated in the international conference on "Changing Chemistry in Changing Climate: Monsoon 2013" held at IITM, Pune during May 1^{st}-3^{rd}, 2013 and presented a poster (research paper) entitled "Impact of fire emissions in south Asia on air quality in the region".

21. Participated in the User Workshop "GlobEmission" held at the KNMI, De Bilt, the Netherlands during 12-13 November 2012 and presented a research paper "Satellite constraints of nitrogen oxide (NOx) emissions from India based on OMI observations and WRF-Chem simulations".

22. Participated in the National Workshop cum Training on 'Data Assimilation for Atmospheric and Ocean models', held at the Indian Institute of Tropical Meteorology (IITM), Pune, India,3-10 October 2012.

23. Participated in the workshop on "Challenges and Opportunities for Air Pollution and Climate Change"(CHOP-C) held at the Indian Institute of Tropical Meteorology (IITM), Pune, India, 16-18 January 2012.

24. Participated in the international conference on "Opportunities and Challenges in Monsoon Prediction and Predictability" held at IITM, Pune during February 2012 and presented a poster (research paper) entitled "NO_x source category inferred from the OMI observations and inter-comparison of SCIAMACHY and OMI tropospheric NO_2 columns over the India Region".

Participated in different events:

- Participated in the CTCZ program over ORG SAGAR NIDHI Cruise 65 during 21 July to 20 August 2012.

- Undergone a training on Regional Chemistry Transport Model, CHIMERE, Image City Environment Laboratory; CNRS, ERL 7230; STRASBOURG, France for getting familiarize with the model and to set up and tune the model for Indian Region during 28 June 2011 to 28 July 2011.