

RESUME

SUBIMAL GHOSH

**Institute Chair Professor, Department of Civil Engineering
Convener, Interdisciplinary Program in Climate Studies
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EMPLOYMENT

Institute Chair Professor, IIT Bombay from March, 2021.
Convener (Head) of Interdisciplinary Program in Climate Studies, IIT Bombay from January, 2021.
Professor at Department of Civil Engineering, IIT Bombay from December, 2018
Associate Professor at Department of Civil Engineering, IIT Bombay from September, 2014 to November, 2018.
Assistant Professor at Department of Civil Engineering, IIT Bombay during November 2007 to August 2014.

EDUCATION

Doctor of Philosophy (Ph. D) August 2004 to October 2007
Indian Institute of Science, Bangalore, India, Water Resources and Environmental Engineering, Department of Civil Engineering.
Thesis title: Hydrologic Impacts of Climate Change: Uncertainty Modelling

Master of Engineering (M. E.) August 2002 to July 2004
Indian Institute of Science, Bangalore, India Hydromechanics and Water Resources Engineering Department of Civil Engineering.
Thesis title: Risk Minimization Models for River Water Quality Control.

Bachelor of Engineering (B. E.) August 1998 to July 2002
Jadavpur University, Kolkata, India
Department of Civil Engineering.

RESEARCH INTERESTS

Hydro-climatology

- Assessing Hydrologic Impacts of Climate Change
- Regional Climate Modelling
- Land-Atmosphere Interactions Urban Climate
- Understanding Indian Monsoon
- Extremes

- Seasonal Prediction and Weather Forecast

Hydrology

- Meso-scale hydrologic modelling
- Land-Vegetation interactions
- Water management for Human-Natural Systems

RESEARCH GUIDANCE

Post-doctoral fellows mentored

S.no.	Name	From	To	Research area
1	Ram Ratan Lohiya	2017	2019	Indian Monsoon and Extremes
2	Rishma C	2018	2019	Agricultural Water management in

Doctoral research guidance

S.no	Name	Complete d/o ongoing	Other Supervisors, if any	Thesis topic	Remarks
1	S Kannan	Completed in 2013	None	Statistical Downscaling for Fine Resolution Rainfall Projections and Assessing Uncertainty	Best Thesis Award. Present Position: Senior Manager at IBM India Pvt. Limited
2	Kamal Murari	Completed in 2015	Prof. Edoardo Daly (Monash University)	An assessment of climate variability and climate change on heat wave characteristics in India	Present Position: Faculty Member at Tata Institute of Social Science
3	Kaustubh Salvi	Completed in 2015	-	Fine Resolution Projections of Climate Variables and Meteorological Extremes	Best Thesis Award. Present Position: Faculty Member at College of Engineering, Pune
4	K Shashikanth	Completed in 2016	-	Statistical Downscaling and Assessing Uncertainty	Present Position: Faculty Member at

				Regional Projections of Indian Monsoon	Osmania University, Hyderabad
5	Amey Pathak	Completed in 2017	Prof. Praveen Kumar (External Supervisor, from UIUC)	Role of Precipitation Recycling and Moisture Transport during Summer Monsoon over Indian sub-continent	Present Position: Faculty Member at Indian Institute of Technology Kharagpur
6	Hiteshri Shastri	Completed in 2017	Prof. Subhankar Karmakar (Co-Supervisor)	Urbanization Signature in Climate: Characteristics, Forecasting and Projections	Present Position: Faculty Member at Charotar Institute of Science and Technology, Baroda
7	Vittal H	Completed in 2017	Prof. Subhankar Karmakar (Main-Supervisor)	Understanding the Spatio-temporal Variation and Mapping the Risk to Hydro-climatic Extremes: An Insight into Indian Summer Monsoon Rainfall	Present Position: Post-Doctoral Researcher at University of Iowa
8	Sumeet Kulkarni	Completed in 2017	Prof. M C Deo (Main-Supervisor)	Climate Change Impact on Offshore Wind Characteristics and Wind Potential in India	Present Position: Scientist at RMSI, India
9	Narendra Hengade	Completed in 2018	Prof. T I Eldho (Main-Supervisor)	Assessment of Land Use Land Cover and Climate Change on Hydrology and Water Resources in Godavari River Basin, India	Present Position: MD at WetInfra
10	Nitin Patil	Completed in 2018	Prof. Chandra Venkataraman (Main-Supervisor)	Aerosol influence on rainfall processes in the Indian region	Present Position: Scientist at Hewlett-Packard, India
11	Sahana A S	Completed in 2018	-	Indian Summer Monsoon Rainfall and its Onset: An Improved Prediction with Moisture Transport	Present Position: Post-doctoral fellow at New York University (Abudhabi), Excellence in Thesis Award
12	Supantha Paul	Completed in 2018	Prof. Y S Rao (Co-Supervisor)	Role of Land Atmosphere Interactions in Indian Summer Monsoon Rainfall	Present Position: Faculty member at the Tripura Institute of Technology

13	Tarul Sharma	Completed in 2019	Prof. Subhankar Karmakar (Main-Supervisor)	Uncertainty modeling in agricultural impacts assessment of climate change	Present Position: Research fellow at IWMI
14	Swati Singh	Completed in 2019	Prof. Subhankar Karmakar (Co-Supervisor)	Evaluating Dynamic Regional Models for Simulations of Indian Monsoon and their Improvements	Completed in 2019
15	Anamitra Saha	Completed in 2020	Prof. E P Rao (Co-Supervisor)	Evaluating State of Art Climate Models and Use of their Simulations for Hydrologic Impacts Assessment	Completed in 2020
16	Rakesh Kumar Sinha	Completed in 2020	Prof. T I Eldho (Main supervisor)	Climate Change Impacts assessment on River Basins of the Western Ghats	Completed in 2020
17	Anjana Devanand	Completed in 2020	Prof. Subhankar Karmakar (Co-Supervisor)	Improving the Operational Monsoon Model CFSv2 with Improved Representation of Land Processes	Presently working as a post-doc in University of Adelaide
18	Dawn Emil Sebastian	Ongoing	Prof. Jagdish Krishnaswami (External Supervisor from ATREE, Bangalore)	Dynamic Vegetation Characteristics in Indian Forests and their feedback to the Hydrologic Processes	PhD Started in July 2016
19	Jisha Joseph	Ongoing	Dr A K Sahai (External Supervisor from IITM,	Uncertainty Estimation in Indian Monsoon Simulations	PhD Started in July 2016
20	Rishi Sahastrabudhe	Ongoing	-	Improved Monsoon Simulations with Physics Guided Data Driven Model	PhD Started in July 2017

21	Shrabani Tripathy	Ongoing	Prof. Subhankar Karmakar (Co-Supervisor)	Improved Weather Forecasts for Agricultural Water Management	PhD Started in July 2018
22	Ankur Srivastava	Ongoing	External Supervisor: Dr Surya Chandra Rao, IITM Pune)	Impacts of Runoff to Ocean on Indian Summer Monsoon Rainfall	PhD Started in July 2017
23	Mayank Gupta	Ongoing		Understanding Urban Water and Energy Cycle	PhD Started in July 2018
24	Adrija Roy	Ongoing		Managing Agro-ecosystem with weather and extended range forecasts of monsoon	PhD Started in July 2018
25	Sachin Budakoti	Ongoing	Prof. Subhankar Karmakar (Co-Supervisor)	Feedback from Vegetation to Monsoon	PhD Started in July 2018
26	Aditi Modi	Ongoing	External Supervisor: Dr Roxy Mathew Koll, IITM Pune)	Yet to be decided	PhD Started in July 2018
27	Tejasvi Chauhan	Ongoing		Process Network to Understand Eco-hydrology of Himalayan Ecosystem	Received prestigious Prime Minister Research Fellowship for pursuing PhD, PhD

28	Vikram Chandel	Ongoing	Prof. Subhankar Karmakar	Predictability of Coupled non-linear dynamic earth processes	Started in 2020
29	Leena Khadke	Ongoing		TBD	Started in 2020
30	Nivedita Dubey	Ongoing		TBD	Started in 2020
31	Elizabeth Eldhose	Ongoing		TBD	Started in 2021
32	Akash Verma	Ongoing		TBD	Started in 2021
33	Ruparati Chakraborti	Ongoing		Water-food-energy Nexus	Started in 2020
34	Ajinkya Khandare	Ongoing		TBD	Started in 2021
35	Pratiman Patel	Ongoing	Prof. Subhankar Karmakar (Main-Supervisor)	Improving Urban Weather Forecast with WRF	Completed in 2021
36	Thiruvengadam P	Ongoing	Prof. J Indu (Main-Supervisor)	Improving weather forecast with 3DVAR and 4DVAR Radar Data Assimilation	PhD Started in July 2016

37	Jayasankar Pillai	Completed	Prof. T I Eldho (Main-Supervisor)	Evaluating Oceanic reanalysis based on regional characteristics of Indian Ocean	Completed in 2020
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Masters' research guidance

S.no	Type MTech MSc etc	Name	Completed/ ongoing	Other guides, if any	Thesis topic	Remarks
1	MS in Statistics	Monika Arora	Completed in 2009	-	Regionalization of Summer Monsoon in India	-
2	M Tech	Munir Ahmad Nayak	Completed in 2009	-	Weather Pattern Recognition towards an improved forecast for extremes	Present Position: Faculty member at Indian
3	M Tech	Sudhir Katkar	Completed in 2010	-	Modeling Downscaling Uncertainty for Climate Change Impacts Assessment	-
4	M Tech	Ankita Agarwal	Completed in 2013	-	Improving Weather Forecasts with Statistical Downscaling	-
5	M Tech	Dawn Emil Sebastian	Completed	-	Atmospheric Water Budget over South Asia	Presently pursuing PhD at IIT Bombay
6	M Tech	Sundar Niroula	Completed	-	Hydrologic Simulations of Large River Basin: Impacts of Initial Condition	Presently pursuing PhD at University of Illinois Urbana-
7	M Tech	Vikram Chandel	Ongoing	-	Representation of Glacier Melt in Hydrologic Models	-
8	M Tech	C Sankeerthana	Ongoing	-	System Dynamics Approach for Understand Human- Natural Hydrologic System	-

9	M Tech	Saroosh Alam	Completed	-	Extreme Precipitation and Streamflow scaling to increased Temperature	PhD in Max-Planck Institute of Biogeochemistry
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SPONSORED RESEARCH PROJECTS

S.no	Project title	From	To	Sponsoring agency	Whether PI/co-PI
1	Assessing Impact of Climate Change on Indian Subdivisional Rainfall	2007	2010	IRCC, IITB	PI
2	Multi-site statistical downscaling using copula for climate change impact assessment on hydrology.	2008	2011	DST	PI
3	Assessing Impacts of Global & Local changes on River basin scale hydrology.	2010	2013	STC, IITB (ISRO)	PI
4	Occurrence and impacts of climate-related natural hazards	2009	2010	MOEF	Co-PI
5	Downscaling for projections of indian rainfall and temperature at high spatial resolution.	2011	2012	ISRO	PI
6	Hydrological Impact of Global and Local changes in a Metro City.	2012	2015	MOWR	PI
7	Coupled Land Surface Climate Modelling to understand feedback of Hydrologic Processes in Atmosphere.	2012	2015	IRCC, IITB	PI
8	Seasonal Hydrologic Predictions based on Regional Forecasts of Monsoon Rainfall with WRF and Statistical Downscaling	2014	2017	Ministry of Earth Science (MoES)	PI
9	Near-Real-Time Urban Flood Forecasting System	2014	2017	MoES	PI
10	Coupled Human And Natural Systems Environment (CHANSE) for water management under uncertainty in the Indo-Gangetic Plain	2016	2019	MoES (India) –NERC (UK)	PI
11	Design of an Expert System for Flood Forecasting and Management for the city of Chennai	2017	2018	Office of Principal Scientific Advisor to the	PI

				Government of India.	
12	Climate Change Impacts Assessment at fine resolution (0.25 spatial resolution) for West Bengal with Downscaling	2017	2018	Department of Environment, Govt of West Bengal	PI
13	Extended Range Hydro-meteorological Forecasts for West Bengal at a District Level	2017	2019	Department of Environment, Govt of West Bengal	PI
14	Perturbation Dynamics and Resilience of Human-Natural Hydroclimatic System	2020	2025	Swarnajayanti Fellowship	PI
15	Pine-Oak Ecosystem: Interactions with Water-Climate	2020	2023	Ministry of Environment, Forest and Climate Change	Co-PI

TEACHING

Undergraduate Courses

Fluid Mechanics, Hydraulics, Fluid Mechanics Laboratory, Probability and Statistics for Civil Engineers

Postgraduate and Advanced Courses

Eco-hydro-climatology, Applied Statistics, Watershed Management, Water Resources Systems

PUBLICATIONS

Patents

1. Ghosh, S and Roy A (2019), Method and electronic device for irrigation water management [Indian Patent Filed, Application no: E-137/5285/2019/MUM]
2. Ghosh, S, Tripathy, S and Karmakar S (2019), Method for real time forecasting of Flood Risk considering Hazard, Exposure and Vulnerability [Indian Patent Filed,

Application no: 202021000003]

Edited Volume

3. Climate Change Signals and Response: A Strategic Knowledge Compendium for India (2018), Ed by Venkataran, C., Mishra, T, Ghosh, S and Karmakar, S. (Pub: Springer, In Press)

Book Chapters:

4. Pathak, A, Paul, S, and Ghosh S (2018), Land-Surface Feedback and Impacts of Land-Use Change to Indian Monsoon Rainfall. In Climate Change Signals and Response: A Strategic Knowledge Compendium for India, Springer.
5. Shastri H and Ghosh, S (2018), Urbanization and Surface Heat island Intensity, In Climate Change Signals and Response: A Strategic Knowledge Compendium for India, Springer.
6. Murari K and Ghosh S (2018), Future Heat Wave Projections and Impacts. In Climate Change Signals and Response: A Strategic Knowledge Compendium for India, Springer.
7. Niyogi, D., Subramanian, S., Mohanty, U.C., Kishtawal, C.M., Ghosh, S., Nair, U.S., Ek, M. and Rajeevan, M. (2018) The Impact of Land Cover and Land Use Change on the Indian Monsoon Region Hydroclimate. In Land-Atmospheric Research Applications in South and Southeast Asia (pp. 553-575). Springer.
8. Saha, A., Shashikanth, K and Ghosh S (2018), Changing Monsoon Behaviour with the Evaluation of CMIP5 Climate Models, Sustainable Holistic Water Resources Management in a Changing Climate (Pub: Jain Brothers)
9. Mujumdar, P., P., and S. Ghosh (2008), Fuzzy Logic Based Approaches in Water Resources Systems Modeling, Practical Hydroinformatics, (Eds) R.J. Abrahart, Linda See and D. P. Solomatine, Water Science and Technology Library (Pub : Springer) ISBN : 978-3-540-79980-4, pp. 165-176.
10. Raje, D., Ghosh, S. and Mujumdar, P. P. (2012) Hydrologic impacts of climate change: Quantification of Uncertainties, Climate Change Modeling Mitigation and Adaptation, (Eds) Rao Y. Surampalli, Tian C. Zhang, C. S. P. Ojha, B. Gurjar, R.D.Tyagi and C.M.Kao, (Pub : American Soc. Civil Engrs (ASCE)) (<http://ascelibrary.org/doi/abs/10.1061/9780784412718>)

Journals:

11. Sahastrabuddhe, R. and Ghosh, S., 2021. Does statistical model perform at par with computationally expensive General Circulation Model for decadal prediction?. *Environmental Research Letters.*, **16** 064028, <https://doi.org/10.1088/1748-9326/abfeed>

12. Budakoti, S., Chauhan, T., Murtugudde, R., Karmakar, S., & Ghosh, S. (2021). Feedback from Vegetation to Interannual variations of Indian Summer Monsoon Rainfall. *Water Resources Research*, 57, e2020WR028750. <https://doi.org/10.1029/2020WR028750>
13. Roy, A., Narvekrar, P., Murtugudde R, Shindhe, V and Ghosh S (2021), Short and Medium Range Irrigation Scheduling using Stochastic Simulation-Optimization Framework with farm-scale Ecohydrological Model and Weather Forecasts, *Water Resources Research*, 57, e2020WR029004. <https://doi.org/10.1029/2020WR029004>
14. Thuruvengadam, P, Indu, J and Ghosh S (2021), Radar reflectivity and radial velocity assimilation in a Hybrid ETKF-3DVAR System for Prediction of a Heavy Convective Rainfall, *Quarterly Journal of Royal Meteorological Society*, <https://doi.org/10.1002/qj.4021>.
15. Tripathi S, Bhatia U, Mohanty M, Karmakar S and Ghosh S (2021), Flood evacuation during pandemic: a multi-objective framework to handle compound hazard. *Environmental Research Letters*, <https://doi.org/10.1088/1748-9326/abda70>
16. Chandel, V. S., & Ghosh, S. (2021) Components of Himalayan River Flows in a Changing Climate. *Water Resources Research*, 57, e2020WR027589. <https://doi.org/10.1029/2020WR027589>
17. Gupta, M., Chauhan, T., Murtugudde, R., and Ghosh, S. (2020). Pollutants control the process networks of urban environmental-meteorology. *Environ. Res. Lett.* Available at: <http://iopscience.iop.org/article/10.1088/1748-9326/abce28>
18. Tripathy, S.S., Vittal, H., Karmakar, S. and Ghosh, S., 2020. Flood risk forecasting at weather to medium range incorporating weather model, topography, socio-economic information and land use exposure. *Advances in Water Resources*, 146, p.103785.
19. Mohanty, M.P., Nithya, S., Nair, A.S., Indu, J., Ghosh, S., Bhatt, C.M., Rao, G.S. and Karmakar, S., 2020. Sensitivity of various topographic data in flood management: Implications on inundation mapping over large data-scarce regions. *Journal of Hydrology*, p.125523.
20. Raghav, P., Borkotoky, S.S., Joseph, J., Chattopadhyay, R., Sahai, A.K. and Ghosh, S., 2020. Revamping extended range forecast of Indian summer monsoon. *Climate Dynamics*, <https://doi.org/10.1007/s00382-020-05454-5>
21. Chauhan, T. and Ghosh, S 2020, Partitioning of Memory and Real-time Connections between Variables in Himalayan Ecohydrological Process Networks, *Journal of Hydrology*, <https://doi.org/10.1016/j.jhydrol.2020.125434>
22. Ghausi, S. A., & Ghosh, S. (2020). Diametrically Opposite Scaling of Extreme Precipitation and Streamflow to Temperature in South and Central Asia. *Geophysical Research Letters*, 47, e2020GL089386. <https://doi.org/10.1029/2020GL089386>
23. Singh, R., Mishra, V., Narasimhan, B., Ghosh, S., Sharma, A., Dutta, S. and Mujumdar, P., 2020, March. Hydrological Modeling in India. In *Proc Indian Natn Sci Acad* (Vol. 86, No. 1, pp. 479-494).
24. Rehana, S., Rajulapati, C.R., Ghosh, S., Karmakar, S. and Mujumdar, P., 2020. Uncertainty Quantification in Water Resource Systems Modeling: Case Studies from India. *Water*, 12(6), p.1793.

25. Sinha, R.K., Eldho, T.I. and Subimal, G., 2020. Assessing the impacts of land cover and climate on runoff and sediment yield of a river basin. *Hydrological Sciences Journal*, <https://doi.org/10.1080/02626667.2020.1791336>
26. Chug, D., Pathak, A., Indu, J., Jain, S.K., Jain, S.K., Dimri, A.P., Niyogi, D. and Ghosh, S., Observed Evidence for Steep Rise in the Extreme Flow of Western Himalayan Rivers. *Geophysical Research Letters*, p.e2020GL087815.
27. Thiruvengadam, P., Indu, J. and Ghosh, S., 2020. Significance of 4DVAR Radar Data Assimilation in Weather Research and Forecast Model-Based Nowcasting System. *Journal of Geophysical Research: Atmospheres*, 125(11), p.e2019JD031369.
28. Saha, A., Joseph, J. and Ghosh, S., 2020. Climate controls on the terrestrial water balance: Influence of aridity on the basin characteristics parameter in the Budyko framework. *Science of The Total Environment*, p.139863.
29. Zachariah, M., Mondal, A., Das, M., AchutaRao, K.M. and Ghosh, S., 2020. On the role of rainfall deficits and cropping choices in loss of agricultural yield in Marathwada, India. *Environmental Research Letters*, <https://doi.org/10.1088/1748-9326/ab93fc>
30. Saha, A. and Ghosh, S., 2020. Relative Impacts of Projected Climate and Land Use Changes on Terrestrial Water Balance: A Case Study on Ganga River Basin. *Frontiers in Water*, 2, p.12.
31. Thiruvengadam, P., Indu, J. and Ghosh, S., 2020. Improving Convective Precipitation Forecasts Using Ensemble-Based Background Error Covariance in 3DVAR Radar Assimilation System. *Earth and Space Science*, 7(4), p.e2019EA000667.
32. Singh, J, Karmakar, S, Paimazumder, D, Ghosh, S and Niyogi, D, 2020, Urbanization alters rainfall extremes over the contiguous United States, *Environmental Research Letters*, <https://doi.org/10.1088/1748-9326/ab8980>
33. Gusain, A., Mohanty, M.P., Ghosh, S., Chatterjee, C. and Karmakar, S., 2020. Capturing transformation of flood hazard over a large River Basin under changing climate using a top-down approach. *Science of The Total Environment*, 726, 138600. <https://doi.org/10.1016/j.scitotenv.2020.138600>
34. Mohanty, M.P., Sherly, M.A., Ghosh, S. and Karmakar, S., 2020. Tide-Rainfall Flood Quotient: An incisive measure of comprehending a region's response to storm-tide and pluvial flooding. *Environmental Research Letters*, <https://doi.org/10.1088/1748-9326/ab8092>.
35. Patel, P., Karmakar, S., Ghosh, S. and Niyogi, D., 2020. Improved simulation of very heavy rainfall events by incorporating WUDAPT urban land use/land cover in WRF. *Urban Climate*, 32, p.100616.
36. Chun K P, He Q, Fok, H S, Ghosh, S, Yetemen, O, Chen, Q, Mijic, A (2020), Gravimetry-based water storage shifting over the China-India border area controlled by regional climate variability, *Science of Total Environment*, 714, 136360, <https://doi.org/10.1016/j.scitotenv.2019.136360>
37. Sharma T, Vittal, H, Karmkar S and Ghosh S (2019), Increasing agricultural risk to hydro-climatic extremes in India, *Environmental Research Letters*, <https://doi.org/10.1088/1748-9326/ab63e1>
38. Vittal H, Karmakar S, Ghosh, S and Murtugudde R (2019), A comprehensive

India-wide social vulnerability analysis: highlighting its influence on hydro-climatic risk, *Environmental Research Letters*, <https://doi.org/10.1088/1748-9326/ab6499>

39. Sebastian, D.E., Ganguly, S., Krishnaswamy, J., Duffy, K., Nemani, R. and Ghosh, S., 2019. Multi-Scale Association between Vegetation Growth and Climate in India: A Wavelet Analysis Approach. *Remote Sensing*, 11(22), p.2703.

40. Mohanty, M.P., Vittal, H., Yadav, V., Ghosh, S., Rao, G.S. and Karmakar, S., 2020. A new bivariate risk classifier for flood management considering hazard and socio-economic dimensions. *Journal of Environmental Management*, 255, p.109733.

41. Salvi, K. and Ghosh, S., (2019). A kaleidoscopic research memoir on Indian summer monsoon rainfall. *MAUSAM*, 70(2), pp.293-298.

42. Saha, A. and Ghosh, S., (2019). Can the weakening of Indian Monsoon be attributed to anthropogenic aerosols?. *Environmental Research Communications*, 1(6), p.061006.

43. Patel, P., Ghosh, S., Kaginalkar, A., Islam, S. and Karmakar, S., (2019). Performance evaluation of WRF for extreme flood forecasts in a coastal urban environment. *Atmospheric Research*, 223, pp.39-48.

44. Devanand A, Huang, M. Moetasim, A, Barik, B and Ghosh S. (2019), Choice of Irrigation Water Management Practice affects Indian Summer Monsoon Rainfall and its Extremes, *Geophysical Research Letters*, 46, 9126-9135. <https://doi.org/10.1029/2019GL083875>

45. Jayasankar, T., Eldho, T.I., Ghosh, S. and Murtugudde, R. (2019) Assessment of the interannual variability of local atmospheric and ITF contribution to the subsurface heat content of southern tropical Indian Ocean in GECCO2 and ORAS4 using ROMS, *Global and Planetary Change*, <https://doi.org/10.1016/j.gloplacha.2019.05.014>

46. Patel, P, Ghosh, S., Kaginalkar, A, Islam, S. and Karmakar, S (2019) Performance evaluation of WRF for extreme flood forecasts in a coastal urban environment, *Atmospheric Research*, 223, 39-48, ISSN 0169-8095, <https://doi.org/10.1016/j.atmosres.2019.03.005>.

47. Sahana A.S., Pathak, A, Roxy, M K and Ghosh S (2019), Understanding the role of moisture transport on the dry bias in Indian monsoon simulations by CFSv2, *Climate Dynamics*, 52, 637-651 <https://doi.org/10.1007/s00382-018-4154-y>

48. Thiruvengadam, P, Indu J and Ghosh, S, 2018. Assimilation of Doppler Weather Radar Data with a Regional WRF-3DVAR System: Impact of Control Variables on Forecasts of a Heavy Rainfall Case, *Advances in Water Resources*, <https://doi.org/10.1016/j.advwatres.2019.02.004>

49. Singh, D, Ghosh, S, Roxy, M K, McDermid S, 2018. Indian Summer Monsoon: Extreme Events, Historical Changes and Role of Anthropogenic Forcings , *WIREs Climate Change* 2019;e571. <https://doi.org/10.1002/wcc.571>

50. Shastri, H., Ghosh, S., Paul, S., Shafizadeh-Moghadam, H., Helbich, M. and Karmakar, S., 2018. Future urban rainfall projections considering the impacts of climate change and urbanization with statistical-dynamical integrated approach. *Climate Dynamics*, <https://doi.org/10.1007/s00382-018-4493-8>

51. Mohanty, M.P., Sherly, M.A., Karmakar, S. and Ghosh, S., 2018. Regionalized

Design Rainfall Estimation: an Appraisal of Inundation Mapping for Flood Management Under Data-Scarce Situations. *Water Resources Management*, Volume 32, Issue 14, pp 4725–4746.

52. Gusain, A., Vittal, H., Kulkarni, S., Ghosh, S. and Karmakar, S., 2018. Role of vertical velocity in improving finer scale statistical downscaling for projection of extreme precipitation. *Theoretical and Applied Climatology*, <https://doi.org/10.1007/s00704-018-2615-1>

53. Joseph, J., Ghosh, S., Pathak, A. and Sahai, A.K., 2018. Hydrologic Impacts of Climate Change: Comparisons between Hydrological Parameter Uncertainty and Climate Model Uncertainty. *Journal of Hydrology*, DOI: 10.1016/j.jhydrol.2018.08.080 .

54. Sahana, A. S., & Ghosh, S. (2018). An improved prediction of Indian summer monsoon onset from state-of-the-art dynamic model using physics-guided data-driven approach. *Geophysical Research Letters*, 45, 8510–8518. <https://doi.org/10.1029/2018GL078319>

55. Sahastrabudde, R, Ghosh, S and Murtugudde R (2018), A Minimalistic Seasonal Prediction Model for Indian Monsoon based on Spatial Patterns of Rainfall Anomalies, *Climate Dynamics*, <https://doi.org/10.1007/s00382-018-4349-2> (In Press)

56. Rastogi, D., Ashfaq, M., Leung, L. R., Ghosh, S., Saha, A., Hodges, K., & Evans, K. (2018). Characteristics of Bay of Bengal monsoon depressions in the 21st century. *Geophysical Research Letters*, 45. <https://doi.org/10.1029/2018GL078756>

57. Patil, N., Venkataraman, C., Muduchuru, K., Ghosh, S. and Mondal, A., (2018). Disentangling sea-surface temperature and anthropogenic aerosol influences on recent trends in South Asian monsoon rainfall. *Climate Dynamics*, <https://doi.org/10.1007/s00382-018-4251-y> (In Press).

58. Paul, S., Ghosh, S., Rajendran, K., & Murtugudde, R. (2018). Moisture supply from the Western Ghats forests to water deficit East Coast of India. *Geophysical Research Letters*, 45, 4337–4344. <https://doi.org/10.1029/2018GL078198>

59. Niroula, S, Halder S and Ghosh, S (2018), Perturbations in the Initial Soil Moisture Conditions: Impacts on Hydrologic Simulation in a Large River Basin, *Journal of Hydrology*, 561, pp 509-522, <https://doi.org/10.1016/j.jhydrol.2018.04.029>

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172. Ghosh, S (2009), "SVM for Statistical Downscaling with Proper Selection of Parameters", Workshop on Advanced Soft Computing Techniques (WAST2009), 15-16 October, 2009, Kanpur, India.
173. Mujumdar, P. P., Ghosh, S, and Raje, D. (2009), "Hydro-meteorological predictions from GCM simulations: downscaling techniques and uncertainty modelling", IAHS Publ. 333 (Proceedings of HS.2 at the Joint IAHS & IAH Convention a symposium held in Hyderabad, India, September 2009, pp 165-175.
174. A K Agrawal, K Sree Ram Reddy, A S Dsouza, S S More, S Shrikrishna Kolwankar, A Sirohi and Ghosh, S (2008), "Changes in Monsoon Rainfall Pattern in Indian Meteorological Subdivisions", HYDRO 2008, Jaipur.
175. Ghosh, S (2008), "Modeling Hydrologic Impacts of Climate Change", National Conference on Sustainable Water Resources Development and Management, Govt. Engg. College, Aurangabad (Invited Key Note Paper), June 13-14, 2008
176. Ghosh, S and P. P. Mujumdar (2008), "Correction for Bias in Downscaling GCM Simulations for Hydrologic Impact Assessment", Water Down Under 2008, Adelaide, Australia, April 14-17, 2008.
177. Ghosh, S and P. P. Mujumdar (2007), "Modeling GCM and Scenario Uncertainty: An Imprecise Probability Approach", 3rd Indian International Conference on Artificial Intelligence 2007 (IICAI 07), Pune, India.
178. Ghosh, S, Sashank M, and P. P. Mujumdar (2007), "Waste Load Allocation: An Imprecise Fuzzy Risk Approach", International Conference on Civil Engineering in the

New Millennium: Opportunities and Challenges (CENeM-2007), Bengal Engineering and Science University, Shibpur, Howrah, West Bengal, India. (Invited Key Note Paper), January 11-14, 2007.

179. Ghosh,S and P.P. Mujumdar (2006), “Minimization of Constraint Violation in Fuzzy Multiobjective Programming”, 7th International Conference on Hydroinformatics HIC 2006, Acropolis, Nice, France, 4 - 8 September 2006.

180. Ghosh,S, H. R. Suresh and P. P. Mujumdar (2005), “Fuzzy Water Quality Management Model: Application to a Case Study”, Proceedings of the 2nd Indian International Conference on Artificial Intelligence 2005 (IICAI 05), Pune, India, 20-22 Dec, 2005. pp. 2006-2015.

181. Ghosh,S, and P.P. Mujumdar, (2005), “A Fuzzy Waste Load Allocation Model Integrating Skewness of Distributions”, National Conference on Advances in Water Engineering for Sustainable Development (NCAWESD-2005), Department of Civil Engineering, I.I.T. Madras, May 16 & 17, 2005.

182. Ghosh,S, and P.P. Mujumdar, (2005), “Risk Minimization Model for River water Quality management”, Proceedings of International Conference on Hydrological Perspectives for Sustainable Development (HYPESD - 2005), 23 - 25 February 2005, Indian Institute of Technology Roorkee, India, pp. 932-940.

AWARDS AND RECOGNITIONS

1. Institute Chair Professor from March 2021.
2. American Geophysical Union Devendra Lal Memorial Award 2020
3. Conferred Fellow of American Geophysical Union
4. Departmental Excellence in Teaching Award from Department of Civil Engineering, IIT Bombay.
5. CRAY Dr A P J Abdul Kalam High Performance Computing Award 2020
6. Shanti Swarup Bhatnagar Prize 2019 in Earth, Atmospheric and Planetary Sciences
7. Swarnajayanti Fellowship 2018-19 in Earth, Atmospheric and Planetary Sciences
8. Editor of Journal “Water and Climate Change”
9. Associate Editor of “Frontiers in Water”.
10. Physical Research Laboratory (PRL) Award from PRL, Ahmedabad
11. IIT Bombay Research Publication Award 2018.
12. Article entitled “Coupled Land-Atmosphere Regional Model Reduces Dry Bias in Indian Summer Monsoon Rainfall Simulated by CFSv2”, published in Geophysical Research Letters has been selected as research spotlight of American Geophysical Union (2018)
13. Lead Author of Intergovernmental Panel on Climate Change (IPCC) Working Group –I for Assessment report 6 (2018-2022)
14. National Academy of Science India (NASI) Platinum Jubilee Young Scientist Award 2013 in Electronics, Computer and Engineering Sciences
15. Reviewer of IPCC AR5 report (WG II)

16. Young Scientist Award 2012 from Indian National Science Academy (INSA) in Engineering and Technology,
17. Young Investigator Award 2012 from Industrial Research & Consultancy Centre, Indian Institute of Technology Bombay, Mumbai.
18. Indian National Academy of Engineers (INAE) Young Engineer Award 2011.
19. Institute of Engineers (India) Young Engineer (Civil) Award 2011
20. The outstanding reviewer award for Journal of Hydrologic Engineering, American Society of Civil Engineers (ASCE), 2015.
21. Editorial Board Member (Associate Editor) of Journal of Earth System Science (JESS), published by Indian Academy of Sciences (2014-2020)
22. Editor of journal “Water and Climate Change”
23. The outstanding reviewer award for Journal of Hydrologic Engineering, American Society of Civil Engineers (ASCE), 2010.
24. BOYSCAST Fellowship 2010 from Department of Science and Technology, Government of India for carrying out research related to climate change in Oak Ridge national Laboratory, TN, United States of America.
25. Young Scientist Award 2010 in “Engineering Sciences” from Indian Science Congress Association.
26. Prof. N S Govinda Rao Medal Best Ph. D. Thesis Award 2007 from Department of Civil Engineering, Indian Institute of Science, Bangalore, India.
27. The Fast Track Project Grant for Young Scientists from Science and Engineering Research Council (SERC), Department of Science and Technology (DST), India (2008)
28. National Doctoral Fellowship Award from All India Council for Technical Education (AICTE) in 2004.
29. Awards Received by Students
 - a. S Kannan received the “Excellence in PhD Research Award” from IIT Bombay in 2013.
 - b. Kaustubh Salvi got the “Excellence in PhD Research Award” from IIT Bombay in 2015
 - c. Vittal H got the “Excellence in PhD Research Award” from IIT Bombay in 2018
 - d. Sahana A S got the “Excellence in PhD Research Award” from IIT Bombay in 2020
 - e. Anamitra Saha got prestigious Nehru Fulbright Fellowship in 2017.
 - f. Pratimal Patel received Overseas Visiting Doctoral Fellowship in 2019.
 - g. Tejasvi Chauhan received Prime Minister Research Fellowship (PMRF) in 2019
 - h. Sarosh Alam Ghausi received Innovative Student Project Award 2020 for

his Masters thesis from Indian National Academy of Engineers.

SELECTED INVITED LECTURES

1. Invited Lecture at Monash University, Australia on “Impacts of Climate Change on Water Resources at River Basin Scale” during September, 2009.
2. Invited Lecture at Indian Institute of Technology Kanpur on “Data Driven Modeling for Downscaling” in a workshop entitled “Development and Application of Advanced Soft Computing Techniques in Multi-dimensional Geospatial Data Analysis” during October, 2009
3. Invited Lecture at Kolkata University on “Regional Assessment of Climate Change” during December, 2009.
4. Invited lecture on “Statistical Downscaling” at Ministry of Water Resources, New Delhi, organized by Indian National Committee on Climate Change during September, 2012.
5. Invited Lecture on “Climate Change and Hydrology” at Indian Institute of Remote Sensing (Indian Space Research Organization), Dehradun, during December, 2012
6. Invited Lecture on “Regional Projections of Temperature and Rainfall and using them for Impacts Assessment” at the annual workshop entitled “Climate Science: Recent Research” during October, 2013, organized by Ministry of Earth Sciences.
7. Invited Lecture at Indian Institute of Tropical Meteorology, Pune during February 2013, on “Indian Monsoon and Extremes: Changing Patterns”.
8. Invited Lecture on “Indian Monsoon: Prediction Challenges in a Changing Environment” at Indian Institute of Science, Bangalore during April, 2015 [Workshop on “Water Security under Global Challenge”].
9. Invited Lecture at Indian Institute of Science, Education and Research, Pune on “Multi-disciplinary Water Research” during August, 2015.
10. Invited Lecture on “Land Atmosphere Interactions during Summer Monsoon in India” at India-UK Water Center, IITM, Pune during December, 2016.
11. Invited Lecture on “Impacts of Urbanization on Rainfall Extremes” at National Geophysical Research Institute, Hyderabad, during October, 2017.
12. Invited Lecture on “Improving Monsoon Forecasts with Physics Guided Data Driven Model” during June, 2018 at Indian Institute of Science, Bangalore [Workshop on Hydrological Outlook].
13. Invited Lecture on “Urban Flood Forecasting System” at Indian Institute of Science, Bangalore during July, 2018 [Monsoon School on “Urban Floods”].
14. Invited Lecture on “Uncertainty Assessment in Climate Change Projections” at Indian Institute of Tropical Meteorology, Pune during October 2018 [Workshop on “Climate Change over the High Mountains of Asia”].
15. Invited Lecture on “Hydrological Simulations of Human-Natural System: Simple vs Complex Models” at the Indian National Science Academy Anniversary General Meeting (December, 2018 in Ahmedabad)

16. Invited Lecture on “Hydrometeorology of Human-Natural System”, at Indian Institute of Science Education and Research (Kolkata) (February 2019)
17. Invited Lecture on “Land Atmosphere Interactions in Indian Monsoon” at Indian Institute of Technology Kanpur (September 2020, Virtual)
18. Invited Lecture on “Land Atmosphere Interactions in Indian Monsoon” at Indian Institute of Science Education and Research (Bhopal) (March 2021, Virtual)

SELECTED INVITED CONFERENCE PRESENTATION

1. Invited Keynote Presentation on “Finer Scale Temperature and Rainfall Projections for Climate Change Impacts Assessment” at the 4th International Conference on Environmental Science, Singapore, Sept 2011
2. Invited Presentation on “Land Contributions to Monsoon” at Indian Institute of Science, Bangalore during June, 2015 [Conference on “Climate Science”].
3. Invited Presentation on “Changing Pattern of Indian Monsoon Extremes: Global and Local Factors” during EGU Meeting at Vienna, Austria [April, 2017]
4. Invited Presentation on “Land Atmosphere Feedback in Indian Monsoon” during AGU meet 2020 [December 2020, virtual, award presentation]

COMMITTEES

1. Core Committee member for setting up Interdisciplinary Program on Climate Studies at IIT Bombay (2012), a center of excellence funded by Department of Science and Technology, Government of India.
2. Interdisciplinary Centre Policy Committee member for Climate Studies during 2012-2015 and 2019-2022.
3. Review Committee Member (Project Monitoring Committee on “Uncertainty in Engineering Applications”) of Bhaba Atomic Research Centre during 2012-2015
4. Department Policy Committee member for Department of Civil Engineering, IIT Bombay for 6 years (2011-2014 and 2018-2021)
5. Member of India-UK Water Centre at IITM, Pune
6. Project Review Committee Member for mega-projects assigned to Centre for Development of Advanced Computing, funded by Ministry of Earth Sciences, Government of India (2015-17)
7. Committee member for preparation of Updated Handbook for Faculty Members at IIT Bombay (2018)
8. Committee Member of the Academic Rehabilitation Program (ARP) for students with backlogs and poor academic performances (2019)

9. Member of Programme Advisory Committee on ‘Civil, Infrastructure & Transportation Engineering’, by Science and Engineering Research Board (SERB), Department of Science and Technology (DST), Government of India (2020 onward).
10. Advisory Committee member of the Technocraft Centre for Applied Artificial Intelligence, IIT Bombay
11. Member of Programme Advisory Committee on ‘Earth and Atmospheric Sciences’, by Science and Engineering Research Board (SERB), Department of Science and Technology (DST), Government of India (2021 onward).

MEMBERSHIPS

American Geophysical Union, Indian Science Congress Association, Associate of Indian National Academy of Engineers, National Academy of Science (India), Institute of Engineers (India), Indian National Science Academy, Indian Society for Hydraulics