



Centre for Oceans, Rivers, Atmosphere and Land Sciences IIT Kharagpur, Kharagpur - 721302, West Bengal, INDIA. **Phone:** +91-3222-281828 (O); 281829 (R) E-mail: cshaji@coral.iitkgp.ac.in

Nationality: Indian

Professional Experience in Research and Teaching

Current Academic Position

Associate Professor, Indian Institute of Technology Kharagpur, India. Duties: Teaching and Research.

Previous Academic & Professional Positions Held

01) November 2006 – November 2007 (USA)

UCAR Visiting Scientist in the Environmental Modeling Center, NCEP/NOAA, USA. Topic: Hybrid Coordinate Ocean Modeling and Analysis

02) November 2005 - October 2006 (USA)

Postdoc Research Scientist in the Courant Institute of Mathematical Sciences, New York University (NYU), USA.

Topic: Hybrid Coordinate Ocean Modeling

03) January 2004 – October 2005 (USA)

Postdoc Research Associate in the School for Marine Science and Technology, University of Massachusetts Dartmouth (UMASSD), USA. Topics: (1) Feature-oriented regional modeling in different coastal oceans and (2) North Atlantic Oscillation

04) June 2001 – December 2003 (USA)

Researcher in the Atlantic Oceanographic and Meteorological Laboratory (AOML) of the NOAA (National Oceanic and Atmospheric Administration), Miami, USA.

Topic: Numerical experiments using a Hybrid Coordinate Ocean Model in the tropical oceans

05) March 1999 – March 2001 (Japan)

Science and Technology Agency (STA) Fellow in the National Research Institute for Earth Science and Disaster Prevention (NIED), Tsukuba, Japan.

Topic: Numerical modeling using Modular Ocean Model (MOM2) and analysis to study the Indian Ocean climate variations

06) October 1997 – March 1999 (India)

Project Scientist in the Indian Institute of Technology (IIT) New Delhi, India. *Topic: Indian Ocean circulation studies using a barotropic ocean general circulation model*

07) January 1997 – July 1997 (India)

Lecturer in the Cochin University of Science and Technology, Cochin, India. Courses Taught: (1) Geophysical Fluid Dynamics, (2) Ocean Modeling and Technology

08) January 1993 – December 1996 (India)

CSIR Senior Research Fellow in the Indian Institute of Technology (IIT) New Delhi, India. *Topic: Three-dimensional circulation studies in the Indian Ocean using a semi-diagnostic primitive equation ocean model*

Education

Ph.D. Physical Oceanography

Jointly with the Indian Institute of Technology, New Delhi and the National Institute of Oceanography, Goa, India (January 1998).

Thesis Title: Semi-diagnostic modelling of 3-D climatic circulation in the western tropical Indian Ocean

M.Tech. Atmospheric Physics

Poona University, Poona, India, (2nd rank holder) (December 1990). Project Title: Numerical experiments on tides and development of a cyclone wind model for storm surge computation in the Bay of Bengal

M.Sc. Physical Oceanography

Cochin University of Science and Technology, Kerala, India, (3^d rank holder) (December 1988).

B.Sc. Mathematics

Kerala University, Kerala, India, December 1985.

Technical Skills

Computer Languages: FORTRAN, C, Matlab, and Python. *Operating Systems:* UNIX, LINUX, WINDOWS, VME, SINTRAN, SUN OS, and IRIX. *Computer Application Packages:* GPGS, GRADS, FERRET, and NCAR graphics packages and WORD packages.

Computer Systems: Modern High Performance Computing Systems – INTEL Clusters, Cray T932, J916 and T3E supercomputers and IBM PC machines.

Research Interests

Ocean Modeling and AnalysisUpper Equatorial Indian Ocean DynamicsWater Masses and Climate VariationsPhysical Forcing on Biological Activity

Teaching Experience

1) IIT Kharagpur, India

Ocean Dynamics (CL60002) Coastal Processes and Ecosystem (CL60018) UNIX Scripting and LINUX Weather Analysis and Prediction (CL60009) Ocean and Storm Surge Modeling (CL69002) Carbon Cycle and Global Climate Change (CL60019) Dynamics of Fluvial Systems (CL60001) Global Tectonics and Climate (CL60004) Environmental Science (EV20001)

2) School for Marine Science and Technology (SMAST), University of Massachusetts Dartmouth (UMASSD), USA

Ocean Modeling

3) Cochin University of Science and Technology, India

Geophysical Fluid Dynamics Ocean Modeling and Technology

Scholarships and Awards

- 01) Recipient of UCAR Visiting Scientist Fellowship of USA in 2006.
- 02) Recipient of Science and Technology Agency (STA) Fellowship of Japan in 1999.
- 03) Qualified the National Eligibility Test for Lectureship (NET) examination conducted jointly by the Council of Scientific and Industrial Research (CSIR) and University Grants Commission (UGC) in 1994.
- 04) Recipient of Senior Research Fellowship from the CSIR (Council of Scientific and Industrial Research), India in 1993.
- 05) Recipient of Junior Research Fellowship from the Indian Institute of Technology (IIT), Delhi in 1991.
- 06) Won Second Rank (First Class with Distinction) in the M.Tech. Atmospheric Sciences examination, Poona University in 1990.
- 07) Qualified GATE (Graduate Aptitude Test in Engineering) examination conducted by the ministry of education, Government of India in 1989.
- 08) Won the National Talent Search scholarships during classes 8-10 in the school level.

Professional Training

- 1) Participated in the 2002 Layered Ocean Model User's Workshop in February in the Rosenstein School of Marine and Atmospheric Science, University of Miami, Miami, USA.
- 2) Participated in the 2003 Layered Ocean Model User's Workshop in February in the Rosenstein School of Marine and Atmospheric Science, University of Miami, Miami, USA.
- 3) Participated in the training program in 'Modelling and Monitoring of Coastal Marine Processes' conducted by the Centre for Atmospheric Sciences, IIT Delhi from 6-24 November 1995.

Invited Talks and Presentaions

- 01) "On the Physical Forcing Controlling Biological Productivity in the Bay of Bengal", School of Industrial Fisheries, Cochin University of Science and Technology, Cochin, International Conference on 'Impact of Climate Change on Hydrological Cycle, Ecosystem, Fisheries and Food Security', February 11-14, 2020.
- 02) "Role of Intermediate Water Masses for the Ventilation of Arabian Sea Oxygen Minimum Zone", CSIR National Institute of Oceanography (NIO), Goa, India-ONR Arabian Sea Science Workshop, August 02-03, 2018.

- 03) "Physical Forcing Controlling Biological Productivity in the Indian Ocean", CSIR National Institute of Oceanography (NIO), Goa, brainstorming meeting on "Monsoon and Climate Change", October 07, 2016.
- 04) "Water Masses and Climate Change", CSIR National Institute of Oceanography (NIO), Goa, brainstorming meeting on "Monsoon and Climate Change", October 07, 2016.
- 05) Series of lectures on "Understanding the Climate System and Climate Change", National Workshop on Technology Development and Application for Climate Change (NATDAC), 15-17 March, 2016, CSIR-NIO, Kochi.
- 06) Lectures on "Understanding the Climate System and Climate Change, Forcing and Feedback Mechanisms of Climate Change, Climate Change Indicators, Advancement in Measurements and Climate Modelling, and Hand Held Practical Classes for Climate Change Indicators: Matlab Based, National Workshop on Technology Development and Application for Climate Change (NATDAC), 22-26 February, 2016, CSIR-NISCAIR, New Delhi.
- 07) "Modeling of SW Monsoon Induced Synoptic Features along India's West Coast", Department of Atmospheric and Space Sciences, University of Pune, December 18, 2012.
- 08) "Modeling of SW Monsoon Induced Synoptic Features along India's West Coast", Department of Atmospheric and Space Sciences, University of Pune, December 18, 2012.
- 09) "Tropical Pacific Ocean Circulations using HYbrid Coordinate Ocean Model (HYCOM) and Observations", Ocean Engg. & Naval Architecture, Indian Institute of Technology, Kharagpur, May 07, 2008.
- "Tropical Pacific and Atlantic Oceans Circulations Using HYbrid Coordinate Ocean Model (HYCOM) and Observations", Naval Research Laboratory, Stennis Space Center, Mississippi, USA, August 10, 2006.
- 11) "Synoptic Modeling in the Eastern Arabian Sea During SW Monsoon Using Upwelling Feature Models", Courant Institute of Mathematical Sciences, New York University, USA, May 05, 2006.
- 12) "Tropical Pacific and Atlantic Oceans Simulations Using a Hybrid Coordinate Ocean Model", Program in Atmospheric and Oceanic Sciences, Princeton University, Princeton, New Jersey, USA, July 08, 2005.
- 13) "Tropical Pacific and Atlantic Oceans Simulations Using a Hybrid Coordinate Ocean Model", National Center for Environmental Prediction (NCEP), NOAA, Camp Springs, Maryland, USA, March 15, 2005.
- 14) "Seasonal and Interannual Variability of Indian Ocean Circulation", Centre for Mathematical Modelling and Computer Simulation (C-MMACS), Bangalore, India, April 25, 2001.
- 15) "Response of the North Tropical Indian Ocean Associated with the Dominant Modes of Interannual Climate Variability", Institute for Global Change Research, FRSGC, Tokyo, Japan, December 7, 2000.

Training, Workshops and Conferences Conducted

- Convenor, International Conference on Climate Change Impacts, Vulnerabilities, and Adaptation: Emphasis on India and Neighbourhood (CCVA 2019), Centre for Oceans, Rivers, Atmosphere and Land Sciences, Indian Institute of Technology, Kharagpur, February 26 - March 02, 2019.
- 2) Principal coordinator, International Summer & Winter Term (ISWT) on "Numerical Ocean Modeling", Indian Institute of Technology, Kharagpur, June 16-28, 2014.

Membership in Scientific Societies

Member, Japan Oceanographic Society Life Member, American Geophysical Union Life Member, Indian Society of Theoretical and Applied Mathematics Life Member, Ocean Society of India Life Member, Indian Geophysical Union

Journal Editorial Board

Associate editor of Marine Geodesy

Reviewer of Journals

Geophysical Research Letters Continental Shelf Research Journal of Geophysical Research - Oceans Indian Journal of Marine Sciences Natural Hazards Marine Geodesy Advances in Space Research Environmental Monitoring and Assessment

Other Professional Positions in IIT Kharagpur

In-charge, Physical Facility of CORAL, IIT KGP. In-charge, Library and Seminar of CORAL, IIT KGP. Faculty Advisor & Course Co-ordinator of CORAL, IIT KGP. In-charge, Examinations and Time-table of CORAL, IIT KGP. Treasurer, Indian Society of Theoretical and Applied Mathematics Program officer, National Sports Organization (NSO) Health & Fitness, IIT KGP

Funded Projects

• Principal investigator of the following project

Name: Wind-driven Physical Forcing on Biological Productivity in the Bay of Bengal Using SCATSAT-1 Data Sponsoring Agency: SAC, ISRO, Ahmedabad.

• Principal investigator of the following project

Name: Intraseasonal and Interannual Variability Studies along the Indian Coasts Sponsoring Agency: CSIR-NISCAIR, New Delhi.

• Principal investigator of the following project

Name: Development of a Hybrid Coordinate Ocean Model (HYCOM) for the Bay of Bengal Sponsoring Agency: Indian National Centre for Ocean Information Services (INCOIS), Hyderabad.

• Co-principal investigator of the following project

Name: Study of the surface and upper ocean mesoscale features of North Indian Ocean from observation and model Sponsoring Agency: MOES, New Delhi.

• Co-principal investigator of the following project

Name: Study of the CO2 Pathways in the Indian Ocean

Sponsoring Agency: Department of Science and Technology, New Delhi.

Mentoring

Ph. D.

- Martin V. Mathew (completed 2016): *Physical mechanisms on the winter surface Chlorophyll-a bloom in the Bay of Bengal*
- **Ruma Samajdar** (completed 2021): On the characteristics, seasonality, interannual variability, and dynamical aspects of the Indian Ocean Equatorial Undercurrent
- **K. S. Sreejith** (submitted 2021): Seasonal and interannual variability of upper and intermediate water masses in the Arabian Sea and their influences on Arabian Sea oxygen minimum zone

Graduation (B. Tech.)

• Vishal Chaudhary (completed 2020): Variability of sea surface temperature (SST) in the Bay of Bengal

Post-Graduation (M. Tech.)

- Angad Kumar (completed 2009): Shallow water wave prediction and its impact on coastal structures
- K. S. Sreejith (completed 2010): Sea surface temperature in the Bay of Bengal
- Medepalli Santha Raju (completed 2011): Empirical orthogonal function analysis of sea surface temperature in the Bay of Bengal
- Avik Mukherjee (completed 2011): Direct numerical simulation of instabilities in rotating Rayleigh Benard Convection
- Mohd Shafi Bhat (completed 2012): Seasonal and interannual sea surface temperature variation in the Andaman Sea
- Vishal Shivaji Thorat (completed 2013): Systematic approach for the development of a storm surge model
- P. G. Chidambaram (completed 2014): Numerical modeling of ocean tides: a finite element approach
- **Dipak Sarkar** (completed 2014): *Tropical cyclone track determination by angular momentum conservation approach in the Bay of Bengal*
- Jithendra Raju (completed 2014): Wave energy attenuation by bottom friction in the east coast of India during a cyclone
- Santanu Nath (completed 2015): Upwelling surrounding the Sri Lankan Waters
- Ankur Tosh (completed 2016): NEMO Ocean Model: Indian Ocean simulations and validations
- Mayank Mishra (completed 2017): Long-term validation and the study on the occurence of extreme deepconvection and highly reflective clouds over the Indian region as observed by ScaRaB/Megha-Tropiques
- **Rohit Kr Shukla** (completed 2017): *Development of an algorithm for generation of global analysed wind fields from SCATSAT-1 and its application*
- Vikash Kumar Sharma (completed 2017): A study on diurnal variation of clouds and its associated features over tropical cyclones in the North Indian Ocean basins
- Jadhav Akash Manikrao (completed 2018): Simulation of an extreme heat wave over Bengaluru during March 2016: impact on air quality
- Jadhav Siddharth Manikrao (completed 2018): Flood analysis for Pune urban area using the HEC-RAS hydrology model
- **Chandramani Kumar** (completed 2019): Analysis of evaporation over the Arabian Sea with change in wind speed
- **Prabhakar Kumar** (completed 2019): Analysis of evaporation over the Bay of Bengal
- Md Imroz Alam (completed 2021): *Tropical cyclone heat potential and cyclone intensification in Bay of Bengal*
- **Puneet Kumar Saini** (completed 2021): *How did the air pollutants affect the lower tropospheric temperature in different parts of India during COVID 19?*

Publications

Journal Papers

- 01) **C. Shaji** and S. Ruma (2019) On the seasonal and inter-annual variability of the equatorial Indian Ocean surface winds, Meteorology and Atmospheric Physics, https://doi.org/10.1007/s00703-019-00690-9.
- 02) S. Ruma and C. Shaji (2019) Seasonal variability and long-term trends of the surface and subsurface circulation features in the equatorial Indian Ocean, Environmental Monitoring and Assessment, <u>https://doi.org/10.1007/s10661-019-7707-6</u>.

- 03) C. Shaji, K. S. Sreejith, R. R. Mary, and J. Sundaresan (2017) On the Seasonal Variability of Sea Surface Temperature and Air–Sea Fluxes in the Lakshadweep Sea, Proc. Natl. Acad. Sci., India, Sect. A Phys. Sci., <u>doi.org</u>: 10.1007/s40010-017-0448-4.
- 04) M. V. Martin and C. Shaji (2015) On the eastward shift of winter surface chlorophyll-a bloom peak in the Bay of Bengal, J. Geophys. Res. Oceans, 120, <u>doi:</u> <u>10.1002/2014JC010162</u>.
- 05) **C. Shaji**, S. K. Kar and T. Vishal (2014) Storm Surge Studies in the North Indian Ocean: A Review, IJMS, 43 (2), 125-147.
- 06) C. Shaji, M. P. Sudev and M. V. Martin (2013) Interannual Variability of Sea Surface Temperature in the Arabian Sea, In "Climate Change and Island and Coastal Vulnerability", (Edited Sundaresan et al.), Springer Verlag, New York, 53-76.
- 07) C. Shaji and A. Gangopadhyay (2007) Synoptic Modeling in the Eastern Arabian Sea during the Southwest Monsoon Using Upwelling Feature Models, Jour. Atmos. and Oceanic Techno., <u>DOI: 10.1175/JTECH1984.1, 877-893</u>.
- 08) **C. Shaji**, C. Wang, G.R. Halliwell, Jr. and A. Wallcraft. (2005) Simulation of Tropical Pacific and Atlantic Oceans Using a Hybrid Coordinate Ocean Model, Ocean Modelling, 9, 253-282.
- 09) S.P. Kumar, J.Narvekar, A. Kumar, C. Shaji, P. Anand, P. Sabu, G. Rijomon, J. Josia, K. A. Jayaraj, A. Radhika and K.K.C. Nair (2004) Intrusion of the Bay of Bengal water into the Arabian Sea during winter monsoon and associated chemical and biological response, Geophy. Res. Lett., 31, L15304, <u>doi:10.1029/2004GL020247</u>.
- C. Shaji, S. Iizuka and T. Matsuura (2003) Seasonal variability of near-surface heat budget of selected oceanic areas in the north tropical Indian Ocean, Journ. Oceanogr, 59, 87-103.
- 11) **C. Shaji**, A.D.Rao, S.K.Dube and N. Bahulayan (2000) On the semi-diagnostic computation of climatological circulation in the western tropical Indian Ocean, Mausam, 51, 329-348.
- 12) C. Shaji, N.Bahulayan, S.K.Dube and A.D.Rao (1999) A mlti-level adaptation model of circulation for the western Indian Ocean. Interna. Jour. Numer. Method. Fluids, 31, 1221-1264.
- 13) **C. Shaji**, N.Bahulayan, A.D.Rao and S.K.Dube (1998) Various approaches to the modelling of large-scale 3-dimensional circulation in the ocean. Ind. Jour. Mar. Sci., 27,104-114.

- 14) N.Bahulayan, C. Shaji, A.D.Rao and S.K.Dube (1997) Sensitivity experiments with an adaptation model of circulation of western tropical Indian Ocean. Ind. Jour. Mar. Sci., 26, 1-10.
- 15) **C. Shaji**, N.Bahulayan, S.K.Dube and A.D.Rao (1997) A Semi-diagnostic calculation of climatic circulation in the western Indian Ocean. Ind. Jour. Mar. Sci., 26,241-249.
- 16) C. Shaji, N.Bahulayan, A.D.Rao and S.K.Dube (1997) Computation of large-scale currents in the Arabian Sea during winter using a semi-diagnostic model. Proc. Ind. Nat. Sci. Acad. (Physical Sciences), 63, A, 4,351-364.
- 17) **C. Shaji**, N.Bahulayan, S.K.Dube and A.D.Rao (1997) Numerical experimentation of a diagnostic model of 3-D circulation in the Arabian Sea. Ind. Jour. Mar. Sci., 26,250-257.
- 18) N.Bahulayan and C. Shaji (1996) Diagnostic model of 3-D circulation in the Arabian Sea and western equatorial Indian Ocean: simulation results of sea surface topography. Proc. Ind. Nat. Sci. Acad. (Physical Sciences), 62,A, 4,325-347.
- 19) **C. Shaji** and N.Bahulayan (1996) Diagnostic circulation model for the sensitivity of eddy viscosity coefficients in the western tropical Indian Ocean. Ind. Jour. Mar. Sci., 25,195-203.

Proceeding and Conference Papers

- 01) K. S. Sreejith and C. Shaji (2019) Inter-annual variations of northern Arabian Sea SST and SSS and its impacts on ASHSW, International Conference on "Climate Change Impacts, Vulnerabilities, and Adaptation: Emphasis on India and Neighbourhood, CCIVA 2019", IIT Kharagpur, 26 February 02 March, 2019, pp 85.
- 02) K. S. Sreejith and C. Shaji (2019) Response of the upper Lakshadweep Sea water masses to climate change: trend or oscillation?, International Conference on "Climate Change Impacts, Vulnerabilities, and Adaptation: Emphasis on India and Neighbourhood, CCIVA 2019", IIT Kharagpur, 26 February – 02 March, 2019, pp 75.
- 03) S. Ruma and C. Shaji (2019) Inter-annual variability of winds over the equatorial Indian Ocean, International Conference on "Climate Change Impacts, Vulnerabilities, and Adaptation: Emphasis on India and Neighbourhood, CCIVA 2019", IIT Kharagpur, 26 February – 02 March, 2019, pp 88.
- 04) S. Ruma and C. Shaji (2019) Indian Ocean Equatorial Undercurrent: a comparative study, International Conference on "Climate Change Impacts, Vulnerabilities, and Adaptation: Emphasis on India and Neighbourhood, CCIVA 2019", IIT Kharagpur, 26 February 02 March, 2019, pp 79.
- 05) M. Mishra and C. Shaji (2019) Upper Ocean Response of the Bay of Bengal during the Cyclone Titli (October 09-13, 2018), International Conference on "Climate Change Impacts, Vulnerabilities, and Adaptation: Emphasis on India and Neighbourhood, CCIVA 2019", IIT Kharagpur, 26 February – 02 March, 2019, pp 90.

- 06) K. S. Sreejith and C. Shaji (2018) Ventilation and Circulation of Antarctic Intermediate Water in the Western Indian Ocean, 2nd International Workshop on Biodiversity and Climate Change, 155, 24-27 February 2018, IIT Kharagpur.
- 07) K. S. Sreejith and C. Shaji (2018) Inter-annual Variability of Lakshadweep Sea Water Masses, 2nd International Workshop on Biodiversity and Climate Change, 155-156, 24-27 February 2018, IIT Kharagpur.
- 08) M. Mishra, C. Shaji and V. Sathiyamoorthy (2018) Spatio-temporal Distributions of Extreme Deep Convection and Highly Reflective Clouds over the Indian Region as Revealed from ScaRaB Data, 2nd International Workshop on Biodiversity and Climate Change, 156, 24-27 February 2018, IIT Kharagpur.
- 09) S. Ruma and C. Shaji (2018) Inter-annual Variability of the Subsurface Equatorial Indian Ocean. 2nd International Workshop on Biodiversity and Climate Change, 156-157, 24-27 February 2018, IIT Kharagpur.
- 10) S. Ruma and C. Shaji (2017) Observed features of equatorial Indian Ocean subsurface currents, AGU Ocean Science Meeting, Portland, Oregon, USA, 11-16 February, 2018.
- 11) K. S. Sreejith and C. Shaji (2017) Inter-annual variations of sea surface temperature in the Arabian Sea, 19th International Conference on Oceanography, Edinburgh, UK, 15-16 June 2017, pp 844.
- 12) M. V. Martin and C. Shaji (2014) On the variability of thermocline depth in the southwestern Bay of Bengal during Indian Ocean Dipole, The Climate Symposium, Darmstadt, Germany, October, 2014.
- 13) M. V. Martin and C. Shaji (2012) Unusual surface chlorophyll-a bloom in the southwestern Bay of Bengal during winter 2005, Pan Ocean Remote Sensing Conference, Kochi, India, November, 2012.
- 14) K. S. Sreejith and C. Shaji (2011) On the Observed Seasonality of Sea Surface Temperature in the Arabian Sea, Proceedings, ISTAM 56, pp 235-244.
- 15) **C. Shaji**, M. P. Sudev and M. V. Martin (2010) Interannual variability of sea surface temperature in the Arabian Sea, International Conference on Climate Change and Environment, CUSAT, Kochi, September 2010.

- 16) C. Shaji (2010) The Annual Cycle of Sea Surface Temperature in the Arabian Sea, International Conference on Biodiversity and Climate Change, IIT, Kharagpur, December 2010.
- 17) M. V. Martin and C. Shaji (2010) Seasonality of chlorophyll concentration at various local regions in the Bay of Bengal, International Conference on Biodiversity and Climate Change, IIT, Kharagpur, December 2010.
- 18) C. Shaji, (2009) Simulation of synoptic features along the west coast of India, NASA Ocean Color Research Team Meeting, Proceedings, ISTAM 54, New Delhi, 18-21 December 2009, pp 97-102.
- 19) A. Gangopadhyay, H.S. Kim, **C. Shaji**, J. Bisagni, J. Goes, and C. Mouw (2005) Towards simulating High and Low NAO forced North Atlantic scenarios for flow and nutrient dynamics, NASA Ocean Color Research Team Meeting, Portland Oregon, April 2005.
- 20) C. Shaji and C. Wang (2003) Effect of vertical mixing on the equatorial ocean circulation in a HYCOM model, 2003 February Layered Ocean Modeling Workshop in Uni. of Miami.
- 21) C. Shaji, S. Iizuka and T. Matsuura (2000) Dominant Modes of Interannual Climate Variability in the tropical Indian Ocean, Japan Oceanographic Society Fall Meeting 2000,October 26-29, 2000.
- 22) C. Shaji, N.Bahulayan, S.K.Dube and A.D.Rao (1997) Numerical experimentation with an adaptation model of circulation in the western tropical Indian Ocean. International Symposium on Asian Monsoon and Pollution over the Monsoon Environment, INTROMET 97,IIT Delhi, 2-5 December 1997,pp 197-198.
- 23) C. Shaji and N.Bahulayan (1996) Numerical experiments with a diagnostic circulation model in the Arabian Sea and western equatorial Indian Ocean. National Symposium on Climate Variability and Predictability, Cochin, 18-19 September 1996, OA 8.
- 24) C. Shaji, N.Bahulayan, A.D.Rao and S.K.Dube (1996) Application of a semi-diagnostic 3-D circulation model in the western tropical Indian Ocean. National Symposium on Climate Variability and Predictability, Cochin, 18-19 September 1996, OA7.
- 25) N.Bahulayan, T.G.Prasad and C. Shaji (1995) Numerical simulation of seasonal mean circulation in the Arabian Sea and western equatorial Indian Ocean. International Scientific Conference on TOGA-95, Melbourne, Australia, 2-7 April 1995, pp 201-202.

- 26) N.Bahulayan, C. Shaji, S.K.Dube and A.D.Rao (1994) Sensitivity experiments with an adaptation model of circulation in the Arabian Sea and western equatorial Indian Ocean. National Symposium on climate variability, Pune, 8-11 February 1994, pp 4.9.
- 27) N.Bahulayan, C. Shaji, Sarit Manna and T.G.Prasad (1994) Effect of eddy viscosity coefficients on the 3-dimensional climatic circulation in the Arabian Sea and western equatorial Indian Ocean, derived diagnostically from hydrographic and wind stress data. National Symposium on climate variability, Pune, 8-11 February 1994, pp 4.13.
- 28) N.Bahulayan and **C. Shaji** (1994) Development of a multi-level adaptation model of circulation for the Arabian Sea and western equatorial Indian Ocean. Abstract, International Conference on monsoon variability and prediction, Trieste, Italy, 9-13 May 1994, pp 148.

Dissertations and Reports

- 01) **C. Shaji** and A.Gangopadhyay (2005) On the difference of surface forcing during the high and low phases of the North Atlantic Oscillation (NAO), SMAST, UMASSD Technical Report, 05-0901, 50 pp.
- 02) **C. Shaji** (1998) Semi-diagnostic modeling of 3-D climatic circulation in the western tropical Indian Ocean. Ph.D. Dissertation, Indian Institute of Technology, Delhi, 158 pp.
- 03) **C. Shaji** (1990) Numerical experiments on tides and development of a cyclone wind model for storm surge computation in the Bay of Bengal. M.Tech. Dissertation, University of Poona, 60 pp.
- 04) **C. Shaji** (1990) Ocean-Atmosphere interaction related with Indian Monsoon. M.Tech. internship training report submitted to the University of Poona, 53 PP.