



## RADHIKA RAMACHANDRAN DIRECTOR, SPL, VSSC

SPACE PHYSICS LABORATORY  
VIKRAM SARABHAI SPACE CENTRE  
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### Area of Specific Research Interests

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Atmospheric and Oceanic Boundary Layer, Regional/Mesoscale Numerical Weather Prediction, Climate Change Science and Policy, International Co-operation and Technical Liaison, Terrestrial CO<sub>2</sub> Emissions

### Academic Qualifications

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- **Post-Doctoral Fellowship** (Numerical Modelling of the Atmosphere)  
North Carolina State University, Raleigh, North Carolina, USA
- **Ph.D.** in Physics (Studies on Atmospheric Boundary Layer),  
University of Kerala, Thiruvananthapuram, India
- **M. Sc (Physics)**, University of Kerala, Thiruvananthapuram, India
- **B. Sc (Physics)**, University of Kerala, Thiruvananthapuram, India

### Professional Background

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- Research in Atmospheric Science and Numerical Weather Prediction
- International Co-operation with Global Space Agencies
- Technical Co-ordination with Government of India and Prime Minister's Office of India

### Career Progression

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- **Mar 2017 - Present:** Director, Space Physics Laboratory, Vikram Sarabhai Space Centre, Indian Space Research Organisation, Thiruvananthapuram, INDIA
- **Sep 2014 - Present:** Head, Numerical Atmosphere Modelling, Space Physics Laboratory, Vikram Sarabhai Space Centre, Indian Space Research Organisation, Thiruvananthapuram, INDIA
- **Jul 2017 - Present:** Scientist "H", Space Physics Laboratory, Vikram Sarabhai Space Centre, Indian Space Research Organisation, Thiruvananthapuram, INDIA
- **Jul 2013 - Jun 2017:** Scientist "G", Space Physics Laboratory, Vikram Sarabhai Space Centre, Indian Space Research Organisation, Thiruvananthapuram, INDIA
- **Jul 2011 - Jun 2013:** Adjunct Professor, Indian Institute of Space Science and Technology, Thiruvananthapuram, INDIA
- **Jun 2008 - Jun 2011:** Counsellor (SPACE), Embassy of India, Paris and ISRO Technical Liaison Officer (TLO) for Europe, ISRO Technical Liaison Unit (ITLU), Paris, France
- **Jul 2006 - Jun 2008:** Technical Liaison Officer / Officer on Special Duty, DOS/ISRO Branch Secretariat, New Delhi, India
- **Jan 1984 - Jun 2006:** Scientist, Boundary Layer Physics Branch, Space Physics Laboratory, Vikram Sarabhai Space Centre, Indian Space Research Organisation, Thiruvananthapuram, INDIA

## Academic Positions held

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- Adjunct Professor, Indian Institute of Space Science and Technology, Thiruvananthapuram, INDIA, July 2012-June 2013
- Visiting Faculty, International Space University, Strasbourg, France, 2008 -2011
- Visiting Faculty, La Societ Italiana per lOrganizzazione Internazionale (SIOI), Rome, 2008-2011
- Registered Guide for Ph.D., University of Kerala, Thiruvananthapuram, Kerala, India
- Registered Guide for Ph.D., Cochin University of Science and Technology, Kochi, Kerala, India
- Registered Guide for Ph.D., Mahatma Gandhi University, Kottayam, Kerala, India
- Member , Editorial Board, Acta Astronautica and Member , Publications Committee of International Academy of Astronautics
- Reviewer of several journals in atmospheric science and thesis adjudicator

## Administrative/Managerial Accomplishments

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### **Counsellor (Space), ISRO Technical Liaison Officer, Embassy of India, Paris, 2008-2011**

- Was the sole representative of ISRO in Europe and had independent charge of the Space Wing of the Embassy, reporting to Ambassador, Embassy of India in Paris. Scientific knowledge and administrative ability could be well utilised in establishing cordial relations with all the major space agencies in Europe -CNES(France), DLR(Germany), ASI (Italy), ESA (Europe) and the British Space Agency for furthering Indias Space Programmes.

### **Experience in Techno-Managerial activities in Europe**

- Overview of Aerospace scenario in France and Europe in respect of technological developments for providing feedback to top management and technologists of ISRO.
- Interface with the French National Space Agency (CNES), European Space Agency (ESA) and other national Space agencies like DLR, with respect to proposals on bilateral/multilateral co-operation, joint missions, payloads, tracking station support, etc.
- Representation of ISRO in various technical meetings and forums like United Nations Committee on Peaceful Uses of Outer Space (UN-COPUOS), International Astronautical Federation (IAF), International Academy of Astronautics(IAA), Committee on Space Research (COSPAR),GEOS, IOAG, ISECG, etc., as advised by ISRO Headquarters.
- Co-ordination with M/s. Arianespace, Thales Alenia, EADS , EUTELSAT and other allied agencies for smooth conduct of ISRO's launch vehicle and satellite programmes. Update the Indian Mission particularly the Ambassador OF India in France on the status of important issues on Space related matters and on the Ongoing and Future programmes of ISRO.
- Policy making, planning and management activities related to Meteorology and atmospheric science

### **ISRO-EUMETSAT Space Cooperation Agreement Signed**

- Was responsible for planning and co-ordination of signing an agreement between ISRO and EUMETSAT on co-operation and exchange of images from meteorological satellites in support of weather analysis and forecasting and other related areas.

## **Assisted the Areas of Cooperation in**

1. **OCEANSAT-2 data access by EUMETSAT at Svalbard**
2. **Co-ordination with EUMETSAT for EUMETCast data reception by SAC/ISRO** EUMETCast data is received through Eurobird 9A satellite at SAC, Ahmedabad and is being used internally.
3. **Access of Megha Tropiques data by EUMETSAT** A trilateral agreement among ISRO-CNES-EUMETSAT was processed to facilitate the above. CNES has engaged EUMETSAT for processing and generation of operational products using the raw data received at Kiruna (Sweden) and Inuvik (Canada). Through dialogues with EUMETSAT, they agreed to provide the generated products to ISRO using the Darmstadt Svalbard and Svalbard - Shadnagar communication link (set up for OCEANSAT-2 Scatterometer data).
4. Engaged in discussion with Scientists at EUMETSAT and ECMWF to help procure ISROs requirements of data for meteorological modelling and data assimilation packages

## **Officer on Special Duty, Department of Space Branch Secretariat, New Delhi, 2006-2008**

- As Head of Office, managed the affairs of ISRO/Department of Space (DOS) office at New Delhi. Participated in high-level negotiations of Dept. of Space with various inter-governmental departments of Government of India and coordinated meetings with Planning Commission, Prime Ministers Office and the Parliament and also various Embassies in New Delhi.

## **Major Career Achievements in Atmospheric Science**

- Characterised the Atmospheric Boundary Layer at Thumba, near Trivandrum, India, a coastal zone, using observational data from meteorological towers, Sodar, Tethersonde etc, archived for the site for several years.
- Spatial Variation of air-sea exchange parameters over the Indian ocean was studied using meteorological data from an Indian Ocean research Vessel 'Sagar Kanya' as part of INDOEX (Indian Ocean Experiment) campaign in 1999.
- Air-sea interface fluxes of heat, momentum and moisture were characterised over the East Asian Marginal Seas (EAMS) surrounding the Korean Peninsula using surface layer meteorological observations for a period of about six years obtained from five oceanic buoys deployed in the Yellow Sea, Korean Strait and East (Japan) Sea.
- Initiated numerical regional model predictions for the first time at ISRO at the launch centre Sriharikota (SHAR) of ISRO, to simulate various meteorological fields over the Indian sub-continent using High-Resolution Regional Model (HRM). HRM forecast fields were disseminated near real-time to SHAR, during all the launch campaigns at launch centre . HRM has been recently replaced by the non-hydrostatic model COSMO (Consortium for Small-Scale Modelling ).
- Used Doppler Weather Radar (DWR) for data assimilation in the Advanced Regional Predictions System (ARPS) Model- the first time that such a project was taken up in India. This was a major step towards improvement in Prediction of Thunderstorms for launch sites like Sriharikota.
- Results from all the above are published in several peer-reviewed journals, scientific reports and international conference papers.

## **Current Research Activity**

- The theme to which my research activity is linked is centred around understanding the various physical processes pertaining to the weather and climate of the planet Earth through numerical modelling and supporting observations. It deals with:
  - (i) the analysis and initialization procedures involved in numerical weather prediction (NWP) models;
  - (ii) various physical processes and their parametrization in atmospheric models

- (iii) assimilation of different inventories in atmospheric models for improving the initial conditions
- (iv) employing Global Climate Models (GCMs) to study the evolving climate of the earth and major synoptic scale circulations
- (v) analysis of tropical weather systems using numerical models, satellite and ground-based measurements and
- (vi) studying the climate change scenario in the country using satellite data, atmospheric transport models and ground-based observations.

We also lend support to various VSSC/ISRO programmes . We provide short range weather prediction in support of PSLV/GSLV missions of ISRO and also support to the RLV-TD ( Reusable Launch Vehicle-Technology Demonstrator) mission for the Date of Launch -Wind Biasing (DOL-WB) team.

A new research initiative for estimating the terrestrial carbon fluxes over India is underway, using inversion models, satellite and ground- based observations. This research has produced very outstanding pioneering results in the area of CO<sub>2</sub> emissions to Scientists, Planners and Policy makers.

## Membership in Professional Bodies

- Associate, COSPAR, Paris, France
- Lifetime Member India Meteorological Society
- Lifetime Member Kerala Academy of Sciences
- Life Member - Astronautical Society of India
- Life Member - Indian Space Scientists Association

## Professional Responsibilities

### International

- Full Member, International Academy of Astronautics(IAA), Paris, since 2012
- Member , Editorial Board, Acta Astronautica (Elsevier), since 2013 onwards
- Member, IAA Study Group 5,18, Space and Disaster Management: new system, new usages and opportunities for international cooperation
- Member, IAA study group STEM - STEAM

### India

- Member, Board of Studies in Atmospheric Science , CUSAT, Since 2015
- Thesis Examiner, University of Kerala, Trivandrum
- Registered Research Guide, Cochin University of Science and Technology
- Registered Research Guide, University of Kerala
- Registered Research Guide, MG University, Kottayam

## Important Outreach activities for ISRO in Europe (2008-2011)

- **Rome Science festival, January 15-19 2009, Rome**  
Invited for the ROMA Science festival to give a public lecture on Space Exploration in the 21st century: Global Perspectives & Indian Initiatives.
- **Tech for Food, Paris, February 26 , 2009**  
Invited to Deliver a lecture on How Indian space techniques have been utilised to enhance agricultural development and food security

- **Eurisy workshop, March 11-14, 2009, Prague, Czech Republic**  
Invited for the EURISY WORKSHOP on Securing Human Resources for the Space Sector to give a talk on Best Practices to Address HR needs- The Indian Strategy .
- **CNES meeting, march 18-20, 2009, Biarritz, France**  
Participated in the CNES Council meeting and also had a review of CNES/ISRO Joint on-going projects by Chairman, ISRO and President, CNES which helped to bring out a lot of important issues with regard to SARAL, Megha-Tropiques and also w2m satellite power systems with a few possible solutions.
- **Institute Francais des Relations Internationales (IFRI), June 2009, Paris, France**  
Was invited to participate in the International workshop organised by IFRI on "Assessing the current dynamics of space security" to represent India. Presented a statement on the Indian perspectives on the topic.
- **Eumetsat Meeting, June 25-26, 2009, Darmstadt, Germany**  
Invited to EUMETSAT for linking up various action items post Chairmans meeting with DG, EUMETSAT in May 2009 . Also made a presentation on the Indian Space Programme with special emphasis of Earth Observation (EO) satellites and missions.
- **Inter Operability Agency Group (IOAG) meeting, September 22-23, 2009, Rome, Italy**  
Was requested by ISRO to make a presentation on behalf of Director, ISTRAC on the status of ISRO in various activities pertaining to Interoperability.
- **ECMWF meeting, September 24-27, 2009 Reading , UK**  
A talk on "Space Activities and Policies of India" was given at ECMWF.
- **ISRO-EADS Senior Managers meeting, October 5-7, 2009, Toulouse, France**  
The meeting was held to take stock of the status of collaboration with respect to EO programmes with the spot image , info terra group of the EADS offices in Toulouse, France.
- **3rd IAA African regional Conference, November 23-26,2009, Abuja, Nigeria**  
Represented ISRO at the Regional conference in Abuja and made a presentation on Space for Development The Indian Experience
- **Organisation for Economic Co-operation and Development (OECD), November 2009, Paris, France**  
Invited as an expert to deliver a lecture on Indias Experience in national food production monitoring using remote sensing at the seventh meeting of the working group of the OECD Future Programmes - Forum on Space Economics. The theme was on Space Technologies and Global Food Supplies: Production, Transport, and Distribution. As a non- OECD country, the presentation made on the Indian experience and best practices was significant and very much appreciated.
- **IV th ISECG Meeting, December 1-3, 2009, Noordwijk, The Netherlands**  
Participated in the ivth ISECG meeting in Noordwijk hosted by ESA and presented a statement on behalf of ISRO.
- **ESA/ESRIN, Rome, Italy January 18 to 22, 2010**  
As a member, attended the Joint Working Group for Earth Observation Meetings at ESA/ESRIN along with ISRO delegation and participated in the discussions on Earth Observation.
- **SATEXPO 2010 Rome, Italy February 2 to 6, 2010**  
Participated as a member of the ISRO delegation. Gave a talk on Climate change studies in ISRO at one of the workshops during the occasion.
- **Missile Technology Control Regime(MTCR) meeting June 15, 2010 Paris**  
Represented India and participated at the Point of Contact meetings of the MTCR held at Paris as Observer for recording the discussions that ensued and to give a feed back and analysis to ISRO and Ambassador of India in France.
- **Institute Francais des Relations Internationales (IFRI), Brussels, Belgium, October 4-5, 2010**  
Participated in the international conference on The Continuing Story of Europe and Space Security organised by IFRI and Secure World Foundation.
- **ICG, Turin, Italy October 17 to 22, 2010**  
Participated in the 5th Meeting of the International Committee on Global Navigation Systems (ICG) with Director, SCNP, ISRO as a member of the ISRO delegation.

- **UK Space Agency, London, UK November 2 to 4, 2010**

Participated in the Inter Agency Operability Group, IOAG-14 Meeting organised at UK Space Agency as the ISRO representative and made a presentation and update on the IOAG related activities of ISRO.

## **Awards and Recognition**

- Mentor, Project 'Mausam', Weather Prediction at SHAR using AI, 2019 - 2020  
Project 'Mausam' is an initiative of DTDI, Bengaluru for the usage of Artificial Intelligence (AI) for weather prediction over SHAR.
- Fellow, Kerala Academy of Sciences, December 2013
- ISRO-ASI award for Space Science Applications constituted by the Astronautical Society of India for year 2008 (awarded in 2012).
- First Woman Scientist from ISRO to be selected to the Technical Liaison Office for Europe , based in Paris, at the Embassy of India, Paris.( Completed tenure in 2011)
- International Award for Best Research Paper Presentation by a woman scientist (February 2004) at the International Symposium on Natural Hazards INTROMET-2004, Hyderabad.
- Adjudged the best paper in terms of content and presentation, Hindi Seminar held at Vikram Sarabhai Space Centre, Thiruvananthapuram, November 26, 2002.
- Adjudged the best paper in the Session on Space Science in the seminar, Inter Centre Technical Hindi Seminar held at ISRO Satellite Centre, Bangalore, September 13, 2001.
- BOYSCAST Award by Department of Science and Technology, India(1994) , Better Opportunities for Young Scientists in Chosen Areas of Science & Technology (BOYSCAST) Award for pursuing post-doctoral research abroad (availed at NC State University, Department of Marine, Earth & Atmospheric Sciences, USA).
- Best Scientific Paper Awards at the National Space Science Symposia, India Co-authored the best scientific papers in tropospheric studies area, four times in succession -1987, 1990, 1992, 1994.
- Rotary GSE (Group Study Exchange) Award of the Rotary Foundation for Professional Excellence (Underwent Vocational training in North Carolina, USA) March to April, 1992.
- Best Outgoing Student, H. H. The Maharajas College for Women, Trivandrum, Kerala 1980.
- Chairperson/Speaker, College Union, H.H. The Maharajas College for Women, 1979.
- University Merit scholarship for distinction in the Pre degree, BSc degree course and MSc Courses, in 1976, 1979 and 1981 respectively

## Detailed List of Publications in Books and Peer-Reviewed Journals

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### Books:

1. D. Bala Subrahmanyam and Radhika Ramachandran, "Marine Atmospheric Boundary Layer Studies during INDOEX: Observational and Modelling Studies of the Marine Atmospheric Boundary Layer over the Tropical Indian Ocean during INDOEX", Archive No.: V177160; ISBN (eBook): 978-3-640-98865-5; ISBN (Book): 978-3-640-98891-4, 2011.
2. S. Indira Rani, Radhika Ramachandran and D. Bala Subrahmanyam, "Atmospheric Modelling Studies over India through HRM and ARPS Models: Studies on Lower Atmospheric Processes over South India using Numerical Atmospheric Models and Experiments", Archive No.: V178406; ISBN (eBook): 978-3-656-00569-8; ISBN (Book): 978-3-656-00584-1, 2011.

### Invited Chapters in Books:

3. D. Bala Subrahmanyam and Radhika Ramachandran, "Applications of Mesoscale Atmospheric Models in Short-Range Weather Predictions during Satellite Launch Campaigns in India", Chapter in Book titled "Atmospheric Model Applications" Edited by Ismail Yucel; Published by InTech, Janeza Trdine 9, 51000 Rijeka, Croatia. ISBN 978-953-51-0488-9, pp 25 - 42. 2012.  
[ DOI : [10.5772/32518](https://doi.org/10.5772/32518) ]

### Peer-reviewed Journals:

4. Roshny S., D. Bala Subrahmanyam, T. J. Anurose and Radhika Ramachandran, "Implicit and Explicit Treatment of Convection in a regional NWP model "COSMO" at higher resolution during the passage of a Very Severe Cyclonic Storm", **Modeling Earth Systems and Environment**, (Under Review, 2019).
5. Nalini K., S. Sijikumar, Vinu Valsala, Yogesh K. Tiwari, Radhika Ramachandran, "Designing surface CO<sub>2</sub> monitoring network to constrain the Indian land fluxes", *Atmospheric Environment*, 218, 117003, 2019.
6. D. Bala Subrahmanyam and Radhika Ramachandran, "All About Cyclones", *Countdown (VSSC Home Journal)* 466: 02 - 05, February 2019.
7. D. Bala Subrahmanyam, Radhika Ramachandran, K. Nalini, Freddy P. Paul and S. Roshny, "Performance Evaluation of COSMO Numerical Weather Prediction Model in Prediction of OCKHI - One of the Rarest Very Severe Cyclonic Storms over the Arabian Sea: A Case Study", *Natural Hazards* 96: 431 - 459, 2019.  
[ DOI : [10.1007/s11069-018-3550-2](https://doi.org/10.1007/s11069-018-3550-2) ]
8. Roshny S., D. Bala Subrahmanyam, T. J. Anurose and Radhika Ramachandran, "Impact analysis of dynamical downscaling on the treatment of convection in a regional NWP model - COSMO: a case study during the passage of a very severe cyclonic storm OCKHI", *Natural Hazards and Earth System Science Discussions*, nhess-2018-288, 2018.  
[ DOI : [10.5194/nhess-2018-288](https://doi.org/10.5194/nhess-2018-288) ]
9. Nalini K., Uma K. N., Tiwari Y., and Ramachandran, R, "Satellite- and ground-based measurements of CO<sub>2</sub> over the Indian region: its seasonal dependencies, spatial variability, and model estimates", *International Journal of Remote Sensing*, 39(22): 7881 - 7900, 2018.  
[ DOI: [10.1080/01431161.2018.1479787](https://doi.org/10.1080/01431161.2018.1479787) ]
10. D. Bala Subrahmanyam, Radhika Ramachandran, S. Indira Rani, S. Sijikumar, T. J. Anurose and Asish Kumar Ghosh, "Location-specific weather predictions for Sriharikota (13.72°N, 80.22°E) through numerical atmospheric models during satellite launch campaigns", *Natural Hazards* 61(3): 893 - 910, 2012. [ DOI : [10.1007/s11069-011-9942-1](https://doi.org/10.1007/s11069-011-9942-1) ]
11. M. M. Ali, Sarika Jain and Radhika Ramachandran, "Effect of Temperature and Salinity on Sound speed in the Central Arabian Sea", *The Open Ocean Engineering Journal*, 4, 71-76, 2011.

12. S. Indira Rani, Radhika Ramachandran, D. Bala Subrahmanyam, P. K. Kunhikrishnan and Denny P. Alappattu, "Characterization of Sea/Land Breeze circulation along the west coast of Indian sub-continent during pre-monsoon", *Atmospheric Research* 95: 367 - 378, 2010.  
[ DOI : [10.1016/j.atmosres.2009.10.009](https://doi.org/10.1016/j.atmosres.2009.10.009) ]
13. D. Bala Subrahmanyam, S. Indira Rani, Radhika Ramachandran, P. K. Kunhikrishnan and B. Prasad Kumar, "Impact of wind speed and atmospheric stability on air-sea interface fluxes over the East Asian Marginal Seas", *Atmospheric Research* 94(1): 81 - 90, 2009.  
[ DOI : [10.1016/j.atmosres.2008.09.011](https://doi.org/10.1016/j.atmosres.2008.09.011) ]
14. D. Bala Subrahmanyam, S. Indira Rani, Radhika Ramachandran and P. K. Kunhikrishnan, "Nudging of Vertical Profiles of Meteorological Parameters in One-Dimensional Atmospheric Model: A Step Towards Improvements in Numerical Simulations", *Ocean Science Journal* 43(4): 165 - 173, 2008. [ DOI : [10.1007/BF03029921](https://doi.org/10.1007/BF03029921) ]
15. D. Bala Subrahmanyam, Radhika Ramachandran, S. Indira Rani, P. K. Kunhikrishnan and B. Prasad Kumar, "Intercomparison of Air-Sea Interface Fluxes over the Yellow Sea and Korea Strait: Impact of Tsushima Warm Ocean Current", *Boundary-Layer Meteorology* 127: 333 - 344, 2008.  
[ DOI : [10.1007/s10546-007-9248-8](https://doi.org/10.1007/s10546-007-9248-8) ]
16. Denny P. Alappattu, D. Bala Subrahmanyam, P. K. Kunhikrishnan, Radhika Ramachandran, K. M. Somayaji, R. Venkatesh, G. S. Bhat, A. Bhagvath Singh, "Spatio-temporal Variability of Surface-layer Turbulent Fluxes Over the Bay of Bengal and Arabian Sea During the ICARB Field Experiment", *Boundary-Layer Meteorology* 126: 297 - 309, 2008. [ DOI : [10.1007/s10546-007-9233-2](https://doi.org/10.1007/s10546-007-9233-2) ]
17. D. Bala Subrahmanyam, Radhika Ramachandran, S. Indira Rani and B. Prasad Kumar, "Air-sea interaction processes over the east-asian marginal seas surrounding the Korean peninsula", *Annales Geophysicae* 25: 1477 - 1486, 2007. [ [www.ann-geophys.net/25/1477/2007](http://www.ann-geophys.net/25/1477/2007) ]
18. Radhika Ramachandran, U. C. Mohanty, Sujata Pattanayak, M. Mandal and S. Indira Rani, "Location specific forecast of winds and wind shears at Sriharikota during the launch of GSLV-F01", *Current Science*, Vol. 91(3), 285 - 295, 2006.
19. D. Bala Subrahmanyam, Radhika Ramachandran and P. K. Kunhikrishnan, "Improvements in Simulation of Atmospheric Boundary Layer Parameters through Data Assimilation in ARPS Mesoscale Atmospheric Model", In T. N. Krishnamurti, B. N. Goswami and Toshiki Iwasaki (ed): *Remote Sensing and Modelling of Atmospheres, Oceans and Interactions*, Proc. of SPIE Vol. 6404, 64040K, 2006. [ DOI : [10.1117/12.694106](https://doi.org/10.1117/12.694106) ]
20. P. K. Kunhikrishnan, Radhika Ramachandran, Denny P. Alappattu, N. V. P. Kiran Kumar, D. Bala Subrahmanyam, "A Case study of sea breeze circulation at Thumba coast through observations and modelling" In T. N. Krishnamurti, B. N. Goswami and Toshiki Iwasaki (ed): *Remote Sensing and Modelling of Atmospheres, Oceans and Interactions*, Proc. of SPIE Vol. 6404, 640417, 2006.  
[ DOI: [10.1117/12.694125](https://doi.org/10.1117/12.694125) ]
21. D. Bala Subrahmanyam, Radhika Ramachandran, S. Indira Rani, P. K. Kunhikrishnan and B. Prasad Kumar, "A Comparative Study of Air-Sea Exchange Coefficients and Turbulent fluxes over Indian Sub-continent and Korean Peninsula". In T. N. Krishnamurti, B. N. Goswami and Toshiki Iwasaki (ed): *Remote Sensing and Modelling of Atmospheres, Oceans and Interactions*, Proc. of SPIE Vol. 6404, 640416, 2006. [ DOI : [10.1117/12.694109](https://doi.org/10.1117/12.694109) ]
22. Praveena Krishnan, P. K. Kunhikrishnan, S. M. Nair, Sudha Ravindran, Radhika Ramachandran, D. Bala Subrahmanyam and M. V. Ramana, "Observation of the Atmospheric surface layer parameters over a semi arid region during the solar eclipse of August 11th, 1999", *Proceedings of the Indian Academy of Sciences - Earth and Planetary Sciences* 113(3): 353 - 363, 2004.  
[ [www.ias.ac.in/article/fulltext/jess/113/03/0353-0363](http://www.ias.ac.in/article/fulltext/jess/113/03/0353-0363) ]
23. D. Bala Subrahmanyam and Radhika Ramachandran, "Wind Speed dependence of the air-sea exchange parameters over the Indian Ocean during INDOEX, IFP-99", *Annales Geophysicae* 21(7): 1667 - 1679, 2003. [ [www.ann-geophys.net/21/1667/2003/](http://www.ann-geophys.net/21/1667/2003/) ]



24. D. Bala Subrahmanyam, Radhika Ramachandran, K. Sen Gupta and T. K. Mandal, "Variability of Mixed Layer Heights over the Indian Ocean and Central Arabian Sea during INDOEX, IFP-99", *Boundary Layer Meteorology* 107(3): 683 - 695, 2003. [ DOI : [10.1023/A:1022811512160](https://doi.org/10.1023/A:1022811512160) ]
25. D. Bala Subrahmanyam and Radhika Ramachandran, "Structural Characteristics of Marine Atmospheric Boundary Layer (MABL) and its associated dynamics over the Central Arabian Sea during INDOEX, IFP-99 Campaign", *Current Science* 85: 1334 - 1340, 2003. [ [www.iisc.ernet.in/currsci/nov102003/1334.pdf](http://www.iisc.ernet.in/currsci/nov102003/1334.pdf) ]
26. D. Bala Subrahmanyam and Radhika Ramachandran, "Air-Sea Interface Fluxes over the Indian Ocean during INDOEX, IFP-99", *Journal of Atmospheric and Solar-Terrestrial Physics* 64(3): 291 - 305, 2002. [ DOI : [10.1016/S1364-6826\(01\)00091-8](https://doi.org/10.1016/S1364-6826(01)00091-8) ]
27. Prakash M. Dolas, Radhika Ramachandran, K. Sen Gupta, Patil, Jadhav, "Atmospheric Surface Layer Processes at a Tropical Inland Station during the Total Solar Eclipse of 11 August 1999", *Boundary Layer Meteorology*, 104, 445 - 461, 2002.
28. M. VenkataRamana, K. Sen Gupta, Radhika Ramachandran, Sudha Ravindran, S. Ameenulla and J.V.S. Raju, "Latitude Variation Of Boundary Layer Height Over Indian Ocean During Pre and First Field Phase (FFP-98) Of INDOEX", *Current Science*, 76, 899 - 902, 1999.
29. K. Sen Gupta and Radhika Ramachandran, "The Tropical Atmospheric Boundary Layer (Review Paper)", *Proc. of the Indian Academy of Science (Space Physics), PINSA*, 64A(3), 267 - 276, 1998.
30. Radhika Ramachandran, J Winston Jeeva Prakash, K Sen Gupta, K Narayanan Nair and P.K.Kunhikrishnan, "Variability of surface roughness and turbulent intensities at a coastal terrain in India", *Boundary Layer Meteorol.*, 70, 385, 1995.
31. Radhika Ramachandran, K Sen Gupta, K Narayanan Nair, P.K. Kunhikrishnan and J.W.J.Prakash, "On the estimation of the exchange parameters and turbulence intensity and their variability at a coastal terrain", *Exchange processes at the Land surface for a Range of Space and Time Scales*, International Association of Hydrological Science, Publ. No. 212, 195, 1993.
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2. Radhika Ramachandran and D. Bala Subrahmanyam: "Cyclogenesis of the OCKHI Cyclonic Storm over the Comorin Sea: Known and Unknown Facts", National Space Science Symposium (NSSS-2019), Pune University, Pune, January 29 - 31, 2019 [Invited Lead Talk].

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