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Space Physics Laboratory,
Vikram Sarabhai Space Centre,
Thiruvananthapuram, Kerala, India
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RESEARCH INTEREST

Aerosol Climate interactions

MAJOR RESPONSIBILITIES

Scientific Investigator of (i) *Aerosol Radiative Forcing over India* (ARFI), (ii) *Integrated Campaign for Aerosols, gases and Radiation Budget* (ICARB) and (iii) *Regional Aerosol Warming Experiment* (RAWEX) projects under the of ISRO-Geosphere Biosphere Programme (I-GBP).

Co-Convener (PS-1) National Space Sciences Symposium, Pune University, India, 29-31 January 2019.

Co-Chair, *International Conference on Regional Climate* (ICRC-CORDEX), Beijing, China, 14-18 October 2019.

PROFESSIONAL EXPERIENCE

Scientist: (07/2011-till) Space Physics Laboratory Vikram Sarabhai Space Centre, Thiruvananthapuram, India.

Visiting Scientist: (07/2013 - 10/2013) Atmospheric Chemistry Division National Center for Atmospheric Research, Boulder, USA.

Visiting Scientist: (10/2010 - 07/2011) Earth System Physics Section The Abdus Salam International Centre for Theoretical Physics (ICTP), Italy.

Research Associate: (11/2009 - 10/2010) Space Physics Laboratory Vikram Sarabhai Space Centre, Thiruvananthapuram, India

EDUCATION

Ph.D Physics (2010): University of Kerala, Thiruvananthapuram, Kerala India Dissertation Title: "*Radiative Forcing due to Atmospheric Aerosols over the Oceanic Regions around the Indian Subcontinent*"

Advisor: K. Krishna Moorthy FASc, FNA, FNASc

AWARDS AND HONOURS

ICTP prize of International *Centre for Theoretical Physics*, Italy (2015)

Young Researcher Award of *Ministry of Earth Sciences*, Gov. of India (2014).

Young Scientist Award of *Kerala State Council for Science, Technology and Environment* (KSCSTE), Gov. of Kerala (2012)

Young Scientist medal of the *Indian National Science Academy* (INSA) for the year 2011.

Simons Associate (2014-2019) of Abdus Salam *International Centre for Theoretical Physics*, Trieste, Italy.

Young Associate of the *Indian Academy of Sciences* (IAS), Bangalore, since 2010.

RECOGNITIONS

Best paper Award in *National Space Science Symposium* (NSSS) held at Pune University, Maharashtra (2019).

Best paper Award in *National Space Science Symposium* (NSSS) held at Vikram Sarabhai Space Centre, Kerala (2016).

Best paper Award in *Kerala Science Congress* (KSC) held at Calicut University (2016)

Best Poster Award for work presented at *International Geosphere Biosphere Programme* (IGBP) symposium held at Bangalore, 2014.

Best paper Award in *National Space Science Symposium* (NSSS) held at Sri Venkateswara University, Tirupati, India (2012).

Co author in the work, which got highlighted in EOS transactions, American Geophysical Union, USA.

Best Paper Award in *Indian Aerosol Science and Technology Association* (IASTA) symposium held at Banaras Hindu University, Varanasi, 2014.

Team lead of the 4th Indian Scientific expedition to Arctic (Ny Alesund, Norway) in 2014.

PROFESSIONAL SERVICES

Reviewer of Nature Scientific reports, Journal of Geophysical Research, Tellus B, Geophysical Research Letters, Atmospheric Chemistry and Physics, Journal of Earth System Science, Current Science, International Journal of Climatology, Journal of Atmospheric and Solar-Terrestrial Physics, Atmospheric Research, Atmospheric Environment, Journal of Atmospheric and Ocean Technology

PUBLICATIONS

Total Citations: 2223; H index: 22

49. Jayachandran, V., S. Suresh Babu, A. Vaishya, M. M. Gogoi, **V. S. Nair**, S. K. Satheesh, K. K. Moorthy [2020] Altitude profiles of CCN characteristics across the Indo-Gangetic Plain prior to the onset of the Indian summer monsoon, *Atmospheric Chemistry and Physics*, 20, 561-576, <https://doi.org/10.5194/acp-20-561-2020>.
48. Gogoi, M.M., C.R. Tandule, V. Jayachandran, S.K. Kompalli, **V.S. Nair**, S.S. Babu [2019] Spatial gradient of aerosol mass concentrations and size distributions over southeastern Arabian Sea and equatorial Indian Ocean during ICARB-2018, *Atmospheric Environment*,
47. Gogoi, M.M., N.B. Lakshmi, **V.S. Nair**, S.K. Kompalli, K.K. Moorthy, S.S. Babu [2019] Seasonal contrast in the vertical profiles of aerosol number concentrations and size distributions over India: Implications from RAWEX aircraft campaign, *Journal of Earth System Science*, 128 (8), 225
46. Bharali, C., **Nair, V. S.**, Chutia, L., Babu, S. S., [2019], Modeling of the effects of wintertime aerosols on boundary layer properties over the Indo Gangetic Plain, *Journal of Geophysical Research: Atmospheres*, 124. <https://doi.org/10.1029/2018JD029758>
45. Lakshmi, N. B., S. S. Babu and **V. S. Nair**, [2018], Recent regime shift in mineral dust trend over South Asia from long term CALIPSO observations, *IEEE Transactions on Geoscience and Remote Sensing*, [accepted]
44. Banerjee, P., S. K. Satheesh, K. K. Moorthy, R. S. Nanjundiah, **V. S. Nair**, [2018], Long-range transport of mineral dust to the northeast Indian Ocean: regional versus remote sources and the implications, *Journal of Climate*, [accepted]
43. Jayachandran, V., **V. S. Nair**, S. S. Babu, [2018], CCN activation properties at a tropical hill station in Western Ghats during south-west summer monsoon: Vertical heterogeneity, *Atmospheric Research*, 214, 36-45, <https://doi.org/10.1016/j.atmosres.2018.07.018>
42. Gogoi, M. M., S. S. Babu, S. K. Pandey, **Nair, V. S.**, A. Vaishya, A. I. Girach, N. Koushik, [2018], Scavenging ratio of black carbon in the Arctic and the Antarctic, *Polar Science*, <https://doi.org/10.1016/j.polar.2018.03.002>
41. Lakshmi, N. B., **Nair, V. S.**, and S. S. Babu, [2017], Vertical structure of aerosols and mineral dust over the Bay of Bengal from multi-satellite observations, *Journal of Geophysical Research*, 122, 12845-12861. <https://doi.org/10.1002/2017JD027643>.
40. Jayachandran, V., **V. S. Nair**, S. S. Babu [2017] CCN characteristics over a tropical coastal station during south-west monsoon: observations and closure studies, *Atmospheric Environment*, 164, 299-308, [doi:10.1016/j.atmosenv.2017.06.012](https://doi.org/10.1016/j.atmosenv.2017.06.012)
39. **Nair, V.S.**, S. S. Babu, M.M. Gogoi and K. K. Moorthy, [2016], Large-scale Enhancement in Aerosol Absorption in the Lower Free Troposphere over continental India during pre-monsoon, *Geophysical Research Letters*, 43, [doi:10.1002/2016GL070669](https://doi.org/10.1002/2016GL070669).
38. **Nair, V.S.**, S. S. Babu, M. R. Manoj, K. K. Moorthy and M. Chin, [2016], Direct radiative effects of aerosols over South Asia from observations and modeling, *Climate Dynamics*, 1-18, [doi:10.1007/s00382-016-3384-0](https://doi.org/10.1007/s00382-016-3384-0)
37. Gogoi M.M., S.S. Babu, K. K. Moorthy, R.C. Thakur, J.P. Chaubey, **V. S. Nair**, [2016], Aerosol Black Carbon over Svalbard regions of Arctic, *Polar Science*, 10(1), 60-70, [doi:10.1016/j.polar.2015.11.001](https://doi.org/10.1016/j.polar.2015.11.001).
36. Jose, S., K. Niranjana, B. Gharai, P. V. N. Rao, **V. S. Nair**, [2016], Characterisation of absorbing aerosols using ground and satellite data at an urban location, Hyderabad, *Aerosol and Air Quality Research*, 16, 1427-1440, [doi:10.4209/aaqr.2014.09.0220](https://doi.org/10.4209/aaqr.2014.09.0220).
35. Babu, S. S., **V. S. Nair**, M. M. Gogoi, K. K. Moorthy, [2016], Seasonal variation of vertical

- distribution of aerosol single scattering albedo over Indian sub-continent: RAWEX aircraft observations, *Atmospheric Environment*, 125, 312-323, doi: 10.1016/j.atmosenv.2015.09.041.
34. Solmon, F., **V. S. Nair**, Mallet, [2015], Increasing Arabian dust activity and the Indian summer Monsoon, *Atmospheric Chemistry and Physics*, 15, 8051-8064.
 33. Kumar, R., M. C. Barth, G. Pfister, **V. S. Nair**, M. Naja, S. Gunthe, [2015], What controls the seasonal cycle of black carbon aerosols in India?, *Journal of Geophysical Research-Atmospheres*, 120(15), 7788-7812, doi: 10.1002/2015JD023298.
 32. Kumar, R., M. C. Barth, **V. S. Nair**, G. Pfister, G., S. S. Babu, S. K. Satheesh, K. K. Moorthy, and G. R. Carmichael, [2015], Sources of black carbon aerosols in South Asia and surrounding regions during the Integrated Campaign for Aerosols, Gases and Radiation Budget (ICARB), *Atmospheric Chemistry and Physics*, 14, 30727-30759, doi:10.5194/acpd-14-30727-2014.
 31. Kompalli, S. K., S. S. Babu, K. K. Moorthy, M. M. Gogoi, **V. S. Nair**, and J. P. Chaubey, [2014], The formation and growth of ultrafine particles in two contrasting environments: a case study, *Annales Geophysicae*, 32, 817-830.
 30. **Nair, V. S.**, S. S. Babu, K. K. Moorthy, S. K. Satheesh, [2014], Implications of multiple scattering on the assessment of black carbon aerosol radiative forcing, *Journal of Quantitative Spectroscopy & Radiative Transfer*, 148, 134-140.
 29. Girach, I. A., **V. S. Nair**, S. S. Babu, P. R. Nair [2014] Black carbon and carbon monoxide over Bay of Bengal during W ICARB: Source characteristics, *Atmospheric Environment*, 94, 508-517.
 28. Gogoi, M. M., K. K. Moorthy, S. K. Kompalli, J. P. Chaubey, S. S. Babu, M. R. Manoj, **V. S. Nair** [2013], Physical and Optical Properties of Aerosols in a Free Tropospheric Environment: Results from long-term observations over Western Trans Himalayas, *Atmospheric Environment*, 84, 262-274.
 27. Babu, S. S., M. R. Manoj, K. K. Moorthy, M. M. Gogoi, **V. S. Nair**, S. K. Kompalli, S. K. Satheesh, K. Niranjana, R. Gopal, P. Bhuyan, D. Singh [2013], Trends in Aerosol Optical Depth over Indian region: Potential causes and impact indicators, *Journal of Geophysical Research-Atmospheres*, 118 (20), 11794-11806.
 26. **Nair, V. S.**, S. S. Babu, K. K. Moorthy, A. K. Sharma, A. Marinoni and Ajai [2013], Black carbon aerosols over the Himalayas: direct and surface albedo forcing, *Tellus B*, 65, 19738.
 25. **Nair, V. S.**, K. K. Moorthy, and S. S. Babu [2013], Influence of continental outflow and ocean biogeochemistry on the distribution of fine and ultrafine particles in the marine atmospheric boundary layer over Arabian Sea and Bay of Bengal, *Journal of Geophysical Research-Atmospheres*, 118, doi:10.1002/jgrd.50541.
 24. **Nair, V. S.**, S. S. Babu, K. K. Moorthy and S. S. Prijith [2013] Spatial Gradients in Aerosol-Induced Atmospheric Heating and Surface Dimming over the Oceanic Regions around India: Anthropogenic or Natural?, *Journal of Climate*, 26,7611-7621.
 23. Kompalli, S. K., S. S. Babu, K. K. Moorthy, **V. S. Nair**, M. M. Gogoi, J. P. Chaubey [2013] Seasonal variation in the spatial distribution of aerosol black carbon over Bay of Bengal: A synthesis of multi-campaign measurements, *Atmospheric Environment*, 64, 366-373.
 22. Giorgi, F., E. Coppola, F. Solmon, L. Mariotti, M.B. Sylla, X. Bi, N. Elguindi, G.T. Diro, **V. Nair**, G. Giuliani, U.U. Turuncoglu, S. Cozzini, I. Guttler, T.A. O'Brien, A.B. Tawfik, A. Shalaby, A.S. Zakey, A.L. Steiner, F. Stordal, L.C. Sloan, C. Brankovic, [2012], RegCM4: Model description and preliminary tests over multiple CORDEX domains. *Climate Research*, 52, 7-29.
 21. Babu, S. S., M. M. Gogoi, V. H. Arun Kumar, **V. S. Nair**, K. K. Moorthy, [2012], Radiative properties of Bay-of-Bengal Aerosols: Spatial distinctiveness and source impacts, *Journal of Geophysical Research-Atmospheres*, 117, D06213, doi:10.1029/2011JD017355.
 20. **Nair, V. S.**, F. Solmon, F. Giorgi, L. Mariotti, S.S. Babu and K. K. Moorthy [2012], Simulation of South Asian aerosols for regional climate studies, *Journal of Geophysical Research-Atmospheres*, 117(D04209), doi:10.1029/2011JD016711.
 19. Sreekanth, V., K. K. Moorthy, S. K. Satheesh, S. S. Babu, **V. S. Nair**, K. Niranjana, [2011], Airborne measurements of aerosol scattering properties above the MABL over Bay of Bengal during W

- ICARB Characteristics and spatial gradients, *Annales Geophysicae*, 29,895-908.
18. Chaubey, J. P, K. K. Moorthy, S. S. Babu, **V. S. Nair**, [2011], The optical and physical properties of atmospheric aerosols over the Indian Antarctic stations during southern hemispheric summer of the international polar year 2007-2008, *Annales Geophysicae*, 29, 109-121.
 17. Moorthy, K.K., S. N. Beegum, S. S. Babu, A. Smirnov, S. R. John, K. R. Kumar, N. Narasimhulu, C.B.S. Dutt, **V. S. Nair**, [2010], Optical and physical characteristics of Bay of Bengal aerosols during W ICARB: Spatial and vertical heterogeneities in the MABL and in the vertical column, *Journal of Geophysical Research-Atmospheres*, 115, D24213, doi:10.1029/2010JD014094.
 16. **Nair, V. S.**, S.K. Satheesh, K.K. Moorthy, S.S. Babu, S.K. George, P.R. Nair, [2010], Surprising observation of large Anthropogenic Aerosol Fraction over the 'near-pristine' Southern Bay of Bengal: Climate Implications, *Journal of Geophysical Research Atmospheres*, 115, D21201, doi:10.1029/2010JD013954.
 15. Babu,S.S., V. Sreekanth, **V. S. Nair**, S. K. Satheesh, K. K. Moorthy, [2010], Vertical profile of aerosol single scattering albedo over west coast of India during W ICARB, *Journal of Atmospheric and Solar-Terrestrial Physics*, 72, 876-882.
 14. Chaubey, J. P., K. K. Moorthy, S. S. Babu, **V. S. Nair**, A. Tiwari, [2010], Black Carbon aerosols over Coastal Antarctica and its scavenging by snow during the Southern Hemispheric Summer, *Journal of Geophysical Research-Atmospheres*, 115, D10210, doi:10.1029/2009JD013381.
 13. Satheesh S. K., V. Vinoj, S. S. Babu, K. K. Moorthy, **V. S. Nair**, [2009], Vertical distribution of aerosols over the east coast of India inferred from airborne lidar measurements, *Annales Geophysicae*, 27, 4157-4169.
 12. Moorthy K. K., **V. S. Nair**, Babu S. S., S. K. Satheesh, [2009], Spatial and vertical heterogeneities of aerosol radiative forcing over the oceanic regions surrounding the Indian peninsula: climate implications, *Quarterly Journal of Royal Meteorological Society*, 135, 2131-2145.
 11. **Nair, V. S.**, K. K. Moorthy, S. Suresh Babu, [2009], Optical and physical properties of atmospheric aerosols over the Bay of Bengal during ICARB, *Journal of the Atmospheric Science*, 66(9), 2640-2658, doi:10.1175/2009JAS3032.1.
 10. Satheesh, S. K., K. K. Moorthy, S. S. Babu, V. Vinoj, **V. S. Nair**, S. N. Beegum, C. B. S. Dutt, D. P. Alappattu, P. K. Kunhikrishnan, [2009], Vertical structure and horizontal gradients of aerosol extinction coefficients over coastal India inferred from airborne lidar measurements during the Integrated Campaign for Aerosols, Gases and Radiation Budget (ICARB) field campaign, *Journal of Geophysical Research-Atmospheres*, 114, doi:10.1029/2008JD011033.
 9. **Nair, V. S.**, S. S. Babu, S. K. Satheesh and K. K. Moorthy, [2008], Effect of sea surface winds on marine aerosol characteristics and impacts on longwave radiative forcing over the Arabian Sea, *Atmospheric Chemistry and Physics-Discussion*, 8, 1-45.
 8. **Nair, V. S.**, S. S. Babu, K. K. Moorthy, [2008], Spatial distribution and spectral characteristics of aerosol single scattering albedo over the Bay of Bengal inferred from shipborne measurements, *Geophysical Research Letters*, 35, L10806, doi:10.1029/2008GL033687.
 7. **Nair, V. S.**, S. S. Babu, and K. K. Moorthy, [2008], Aerosol characteristics in the marine atmospheric boundary layer over the Bay of Bengal and Arabian Sea during ICARB: Spatial distribution and latitudinal and longitudinal gradients, *Journal of Geophysical Research-Atmospheres*, 113, D15208, doi:10.1029/2008JD009823.
 6. Aloysius, M., M. Mohan, S. S. Babu, **V. S. Nair**, K. Parameswaran, K. K. Moorthy, [2008], Influence of circulation parameters on the AOD variations over the Bay of Bengal during ICARB, *Journal of the Earth System Science*, 117, S1, 353-360.
 5. Babu, S. S, S. K. Satheesh, K. K. Moorthy, C. B. S. Dutt, **V. S. Nair**, D. P. Alappattu, P. K. Kunhikrishnan, [2008], Aircraft measurements of aerosol black carbon from a coastal location in north east part of peninsular India during ICARB, *Journal of the Earth System Science*, 117, S1, 263-271.

4. Beegum S. N, K. K. Moorthy, **V. S. Nair**, S. S. Babu, S. K. Satheesh, V. Vinoj, R. R. Reddy, K. R. Gopal, K. V. S. Badarinath, K. Niranjana, S. K. Pandey, M. Behera, A. Jeyaram, P. K. Bhuyan, M. M. Gogoi, S. Singh, P. Pant, U. C. Dumka, Y. Kant, J. C. Kuniyal, D. Singh, [2008], Characteristics of Spectral Aerosol Optical Depths over India during ICARB, *Journal of the Earth System Science*, 117, S1, 303-313.
3. Babu, S. S., **V. S. Nair**, K. K. Moorthy, [2008], Seasonal changes in aerosol characteristics over the Arabian Sea and consequence on aerosol radiative forcing: Results from ARMEX field campaign, *Journal of Atmospheric and Solar-Terrestrial Physics*, 70, 820-834. 45.
2. **Nair, V. S.**, K. K Moorthy, S. S. Babu, Narasimhulu, S. S. Reddy, R. R. Reddy, K. R. Gopal, V. Sreekanth, B. L. Madhavan, and K. Niranjana, [2008], Size segregated aerosol mass concentration measurements over the Arabian Sea during ICARB, *Journal of the Earth System Science*, 117, S1, 315-323.
1. **Nair, V. S.**, K. K Moorthy, D. P. Alappattu, P. K. Kunhikrishnan, S. K. George, P. R. Nair, S. S. Babu, B. Abish, S. K. Satheesh, S. N. Tripathy, K. Niranjana, B. L. Madhavan, V. Srikanth, C. B. S. Dutt, K. V. S. Badarinath, and R. R. Reddy, [2007], Wintertime aerosol characteristics over the Indo-Gangetic Plain (IGP): Impacts of local boundary layer processes and long range transport, *Journal of Geophysical Research-Atmospheres*, 112, D13205, doi: 10.1029/2006JD008099.
5. Climate impacts of atmospheric aerosols over the Indian region, **Central University of Kerala (CUK)**, Kasargod on 28th February 2013.
6. Climate impacts of aerosols over the Indian region, **Kerala Science Congress**, Thiruvananthapuram on 4 January 2013.

SCHOOLS AND WORKSHOPS ATTENDED

1. Modeling on planetary atmospheres, (2007), Physical Research Laboratory, Ahmedabad, India.
2. European Research School on Atmospheres (ERCA), (2010), University of Joseph Fourier, Grenoble, France.
3. Workshop on 'Theory and use of REGIONAL Climate Modeling' (2010, 2012, 2014, 2016, 2018), ICTP Trieste, Italy.
4. Regional workshop on Impact of aerosols and benefits of mitigation for south Asia organized by Divecha Centre for Climate Change, Indian Institute of Science, Bangalore from 03/02/2014 to 04/02/2014.
5. Summer School on Aerosol-Cloud Interactions, June-July 2016, ICTP, Trieste, Italy.

STUDENTS AND POSTDOCS

PhDs: 01 [on going]

Post Docs: 03

MSc and MTech: 05 & 02

INVITED TALKS

1. Aerosol-Climate interactions - **Cochin University of Science and Technology (CUSAT)** on 21 Feb 2019.
2. Climate impacts of aerosols over South Asia, **International Centre for Theoretical Physics**, Italy 2016.
3. Impact of aerosols and black carbon on glaciers, Indo-swiss capacity building training on Himalayan glaciology organized by **Jawaharlal Nehru University**, Delhi, on 7 January 2015.
4. Climate implications of Soot on Snow, Annual **meeting of Indian Academy of Sciences (IASc)**, at Chandigarh on 8-10 November, 2013.