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Research Area & Research Interests

Studies on atmospheric trace gases like Carbon Monoxide, Ozone, Methane, NO_x, etc. based on in-situ measurements, satellite observations and modeling.

Academic Qualification

- Ph.D. Pursuing Physics under faculty of science, Cochin University of Science & Technology, Cochin, India.
- M. Sc. 2007 Physics (Material Science), First class with Distinction (82.5%), Saurashtra University, Rajkot, India.
- B. Sc. 2005 Physics, First class (77.1%), Saurashtra University, Rajkot, India.

Professional Background

- Scientist-SE 2017–Present SPL, VSSC, ISRO, India
- Scientist-SD 2012–2017 SPL, VSSC, ISRO, India
- Scientist-SC 2008–2012 SPL, VSSC, ISRO, India
- Research Scholar 2007–2008 Institute for Plasma Research, Bhat, Gandhinagar, India

Awards & Honors

- **Best paper award** for the paper titled “**Global long-term trend in tropospheric carbon monoxide**” authored by Girach I. A. and Prabha R. Nair in “**International Conference on Climate Change and Disaster Management**” at Kovalam, Thiruvananthapuram, India during 26–28 February-2015.
- **Third prize** in the assessment of “SERC” school on “Atmospheric Chemistry and Air Pollution” at National Physical Laboratory during 2–22 March-2010.
- First Prize in Poster Presentation about LASER at PHYSICS CLUB, Saurashtra University, Rajkot in February 2007.
- First Prize in Multiple Choice Question Competition at PHYSICS CLUB, Saurashtra University, Rajkot in February 2007.
- Participated in Seminar Competition at PHYSICS CLUB, Saurashtra University, Rajkot in March 2007.

Scientific Recognition

- Member of ISRO delegate to COSPAR 2012, Mysore, India.

Participation in Scientific Expedition

- **Expedition to south eastern Arabian Sea and Equatorial Indian Ocean:** ICARB-2018 (Integrated Campaign for Aerosols, gases and Radiation Bedge-2018) during 16 January to 14 February 2018. Conducted experiment on board Sagar Kanya (SK-345).
- **Expedition to Antarctica:** 35th ISEA (Indian Scientific Expedition to Antarctica) during 4 January to 4 March 2016. Conducted various experiments at Bharati station.
- **Expedition to the Bay of Bengal – Monsoon Season:** CTCZ (Continental Tropical Convergence Zone) experiment conducted during 16 July to 17 August 2009. Conducted experiment on board Sagar Kanya (SK-261).
- **Expedition to the Bay of Bengal – Winter Season:** W_ICARB (Winter_Integrated Campaign for Aerosols, gases and Radiation Bedge) campaign during 27 December to 30 January 2009. Conducted experiment on board Sagar Kanya (SK-254).

Membership in Professional Bodies

- PSSI (Plasma Science Society of India)
- ISCA (Indian Science Congress Association)

Present Responsibilities

- Research & Development in the area of atmospheric trace gases
- Member, SPL Website Committee: April 2018 – Present (Member, SPL Website Development Team: May 2014 – April 2018)

Invited Talk

- “Trace gases in remote area: Observations and modeling” at Swami Rama Himalayan University, Dehradun on 10 April 2018.
- “Trace gases over the Bay of Bengal during monsoon season” at Physical Research Laboratory, Ahmedabad on 18 September 2017.

Publications (Peer-Reviewed Journals) - 19

1. Gogoi M. M., Babu S. S., Pandey S. K., Nair V. S., Vaishya A., **Girach I. A.** and Koushik N., “Scavenging Ratio of Black Carbon in the Arctic and the Antarctic”, 2018. (<https://doi.org/10.1016/j.polar.2018.03.002>)
2. Kavitha M., Nair P. R., **Girach I. A.**, Aneesh S., Sijikumar S., and Renju R., “Diurnal and seasonal variations in surface methane at a tropical coastal station: Role of mesoscale meteorology”, *Science of the Total Environment*, 631–632, 1472–1485, 2018. (<https://doi.org/10.1016/j.scitotenv.2018.03.123>)
3. Nair P. R., Revathy S. A., David L. M., **Girach, I. A.**, and Kavitha M., “Decadal changes in surface ozone at the tropical station Thiruvananthapuram (8.542° N, 76.858° E), India: effects of anthropogenic activities and meteorological variability”, *Environmental Science and Pollution Research*, 2018. (<https://doi.org/10.1007/s11356-018-1695-x>)
4. **Girach I. A.**, N. Ojha, Prabha R. Nair, Y. K. Tiwari, and K. Ravi Kumar, “Variations of trace gases over the Bay of Bengal during the summer monsoon”, *Journal of Earth System Science*, 127, 15, 2018. (<http://dx.doi.org/10.1007/s12040-017-0915-y>)
5. D.V. Phanikumar, K. Niranjana Kumar, S. Bhattacharjee, M. Naja, **I. A. Girach**, Prabha R. Nair, and Shweta Kumari, “Unusual enhancement in tropospheric and surface ozone due to orography induced gravity waves”, *Remote Sensing of Environment*, 199, 256–264, 2017. (<http://dx.doi.org/10.1016/j.rse.2017.07.011>)

6. **Girach I. A.**, N. Ojha, Prabha R. Nair, A. Pozzer, Y. K. Tiwari, K. Ravi Kumar and J. Lelieveld, "Variations in O₃, CO, and CH₄ over the Bay of Bengal during the summer monsoon season: shipborne measurements and model simulations", *Atmos. Chem. Phys.*, 17, 257-275, 2017. (<http://dx.doi.org/10.5194/acp-17-257-2017>)
7. **Girach I. A.** and Prabha R. Nair, "Long-term trend in tropospheric carbon monoxide over the globe", *Proc. SPIE 9876, Remote Sensing of the Atmosphere, Clouds, and Precipitation VI*, 987624, 2016. (<http://dx.doi.org/10.1117/12.2223380>)
8. Das S. S., M. V. Ratnam, K. N. Uma, A. K. Patra, K. V. Subrahmanyam, **I. A. Girach**, K.V. Suneeth, K. K. Kumar, and G. Ramkumar, "Stratospheric intrusion into the troposphere during the tropical cyclone Nilam (2012)", *Quarterly Journal of Royal Meteorological Society*, 2016. (<http://dx.doi.org/10.1002/qj.2810>)
9. Das S. S., M. V. Ratnam, K. N. Uma, K. V. Subrahmanyam, **I. A. Girach**, A. K. Patra, S. Aneesh, K. V. Suneeth, K. K. Kumar, A. P. Kesarkar, S. Sijikumar and G. Ramkumar, "Influence of tropical cyclones on tropospheric ozone: possible implication", *Atmospheric Chemistry and Physics.*, 16, 4837–4847, 2016. (<http://dx.doi.org/10.5194/acp-16-4837-2016>)
10. Hegde P., K. Kawamura, **I. A. Girach** and P. R. Nair, "Characterisation of water-soluble organic aerosols at a site on the southwest coast of India", *Journal of Atmospheric Chemistry*, 1-25, 2015. (<http://dx.doi.org/10.1007/s10874-015-9322-4>)
11. Aryasree S., P. R. Nair, **I. A. Girach** and S. Jacob, "In situ measured seasonal characteristics of near-surface aerosols over Bay of Bengal and MODIS-retrieved columnar properties: A multicampaign analysis", *Journal Geophysical Research*, 120, 2015. (<http://dx.doi.org/10.1002/2015JD023418>)
12. Aryasree S., P. R. Nair, **I. A. Girach** and S. Jacob, "Winter time chemical characteristics of aerosols over the Bay of Bengal: continental influence", *Environmental Science and Pollution Research*, 19, 14901-14918, 2015. (<http://dx.doi.org/10.1007/s11356-015-4700-7>)
13. **Girach, I. A.**, P. R. Nair (2014), "Carbon monoxide over Indian region as observed by MOPITT", *Atmos. Environ.*, 99, 599-609. (<http://dx.doi.org/10.1016/j.atmosenv.2014.10.019>)
14. **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", *Atmos. Environ.*, 94, 508-517. (<http://dx.doi.org/10.1016/j.atmosenv.2014.05.054>)
15. **Girach, I. A.**, P. R. Nair (2014), "On the vertical distribution of Carbon monoxide over Bay of Bengal during winter: Role of water vapour and vertical updrafts", *J. Atmos. Sol. Terr. Phys.*, 117, 31–47. (<http://dx.doi.org/10.1016/j.jastp.2014.05.003>)
16. **Girach, I. A.**, P. R. Nair, L. M. David, P. Hegde, M. K. Mishra, G. M. Kumar, S. M. Das, N. Ojha, and M. Naja (2012), "The changes in near-surface ozone and precursors at two nearby tropical sites during annular solar eclipse of 15 January 2010", *J. Geophys. Res.*, 117, D01303. (<http://dx.doi.org/10.1029/2011JD016521>)
17. David, L. M., **Girach, I. A.** and Nair, P. R. (2011), "Distribution of ozone and its precursors over Bay of Bengal during winter 2009: Role of meteorology", *Ann. Geophys.*, 29, 1613–1627. (<http://dx.doi.org/10.5194/angeo-29-1613-2011>)
18. Nair P. R., David, L. M., **Girach, I. A.**, George, K. S. (2011), "Ozone in the marine boundary layer of Bay of Bengal during post-winter period: Spatial pattern and role of

- meteorology”, Atmos. Environ., 45, 4671-4681.
(<http://dx.doi.org/10.1016/j.atmosenv.2011.05.040>)
19. **Girach I. A.** and Nair, P. R. (2010), “Spatial distribution of near-surface CO over bay of Bengal during winter: role of transport”, J. Atmos. Sol. Terr. Phys., 72, 1241–1250.
(<http://dx.doi.org/10.1016/j.jastp.2010.07.025>)

Participation in International School

1. **Girach I. A.**, "European Research Course on Atmosphere (ERCA) - 2015" conducted by Université Joseph-Fourier (UJF) and Centre National de la Recherche Scientifique (CNRS) during 7th January to 6th February 2015 at Grenoble, France.

Participation in International Conference

1. D.V. Phanikumar, K. Niranjan Kumar, S. Bhattacharjee, M. Naja, and **I. A. Girach**, “Enhancement of Tropospheric and Surface Ozone Observed During Orography Induced Gravity Waves Over Himalayan Region”, AS41-D4-PM2-334-007, AS41-A014, 14th Annual Meeting of the Asia Oceania Geosciences Society (AOGS - 2017), 6–11 August, 2017, Singapore.
2. **Girach I. A.** and Prabha R Nair, "Seasonal variations of surface Ozone and Carbon monoxide over the Bay of Bengal: Synthesis of multi-campaign measurements", Predicting and Projecting Climate change over Asian Region (UPCAR) conference during 26–28 June 2017 at Sri Venkateswara University, Tirupati and National Atmospheric Research Laboratory (NARL), Gadanki, India.
3. **Girach I. A.** and Prabha R. Nair, "Long-term trend in tropospheric carbon monoxide over the globe", SPIE Asia-Pacific Remote Sensing conference during 4–7 April 2016 at Vivanta by Taj-Dwarka, New Delhi, India.
4. Best paper award: **Girach I. A.** and Prabha R. Nair, "Global long-term trend in tropospheric carbon monoxide", International Conference on Climate Change and Disaster Management, during 26–28 February 2015 at Thiruvananthapuram, India.
5. Participated in the international school on "Data Assimilation" during 16–20 Decemeber, 2013 conducted by Indian Institute of Remote Sensing (IIRS), Department of Meteorology, University of Reading, United Kingdom and the UK space agency at IIRS, Dehradun, India.
6. Participated in AdMet-2013 Conference on “Advances in Metrology” held during 21-23rd February 2013 at CSIR-National Physical laboratory (NPL), New Delhi, India.
7. Participated in pre-AdMet-2013 workshop on “Chemical Metrology: Challenges and Opportunities in Gases & Aerosols” on 20th February 2013 at CSIR-National Physical laboratory (NPL), New Delhi, India.
8. Nair, P. R., David, L. M., Aryasree, S., **Girach, I. A.**, and Sijikumar, S., “Role of Mesoscale dynamics in modifying the diurnal variation of trace gases and aerosols at a coastal environment”, A1.1-0117-12 during 14–22 July 2012, 39th Committee on Space Research (COSPAR) - 2012, Mysore, India.

9. **Girach I. A.** and Prabha R. Nair, “Distribution of Carbon monoxide over Indian region as observed by Measurements of Pollution in the Troposphere (MOPITT)”, A1.1-0026-12, during 14–22 July 2012, 39th Committee on Space Research (COSPAR) - 2012, Mysore, India.
10. Liji Mary David, Prabha R Nair and **Girach I. A.**, “Association of synoptic circulation on the seasonal variability of near-surface ozone and NO_x at a tropical coastal site” during 5–9 July 2010, AOGS Conference, Hyderabad, India.
11. **Girach I. A.**, Prabha R Nair and Liji Mary David, “Spatial Variation of Ozone, Carbon Monoxide and Nitrogen Dioxide over Bay of Bengal during Winter” during 5–9 July 2010, AOGS Conference, Hyderabad, India.
12. **Girach I. A.**, Prabha R Nair, S Sijikumar and Aryasree, “Trace gases at coastal station and over marine environment: Close association with meteorology” during 14–24 March 2010, Indo-US Conference-cum-Workshop on Air Quality and Climate Research, Hyderabad, India.

Participation in National Conference/Symposium/Workshop

1. **Girach I. A.**, Prabha R. Nair, K. V. Subrahmanyam, Koushik N., Shreedevi P. R., Mohammed Nazeer M., and Kiran Kumar N. V. P., “Surface ozone variation during summer season at Bharati station, Antarctica”, NCPS – 2017 National Conference on Polar Sciences, 16 –17 May 2017, National Centre for Antarctic and Ocean Research (NCAOR), Ministry of Earth Sciences (MoES), Goa.
2. P. R. Nair, **Girach I. A.**, Kavitha M., Revathy S. A., and Aryasree S., Systematic seasonal pattern of tropospheric trace species over Indian region, TROPMET 2016 – National Symposium on Tropical Meteorology : Climate Change and Coastal Vulnerability, 18-21 December 2016, SOA university, Bhubneswar.
3. **Girach I. A.**, N. Ojha, P. R. Nair, Y. K. Tiwari, K. Ravi Kumar, Variations of trace gases over the Bay of Bengal during the summer monsoon, TROPMET 2016 – National Symposium on Tropical Meteorology : Climate Change and Coastal Vulnerability, 18-21 December 2016, SOA university, Bhubneswar.
4. **गिराच इमरान और प्रभा आर नायर**, तटीय स्टेशन थुम्बा पर विभिन्न परिवेशी अनुरेख गैसों का विचरण, केंद्र स्तरीय तकनीकी हिन्दी संगोष्ठी, 19-20 जुलाई 2016, विक्रम साराभाई अंतरिक्ष केंद्र, तिरुवनन्तपुरम-695022.
5. **Girach I. A.**, Prabha R. Nair and Prashant Hegde, Carbon monoxide over Indian region as observed by MOPITT, PS1A_237, National Space Science Symposium, 9-12 February 2016, Space Physics Laboratory, Vikram Sarabhai Space Centre, ISRO, Trivandrum-695022.
6. **Girach I. A.**, Prabha R. Nair, N. Ojha, Prashant Hegde and S. Aryasree, Variations in near-surface Ozone over Bay of Bengal during summer-monsoon, PS1A_236, National Space Science Symposium, 9-12 February 2016, Space Physics Laboratory, Vikram Sarabhai Space Centre, ISRO, Trivandrum-695022.
7. Aryasree S., Prabha R. Nair, **Girach I. A.**, Salu Jacob, Seasonal variation of aerosol chemical characteristics over Bay of Bengal: A Multi Campaign Analysis, Proceeding of IASTA (Indian Aerosol Science and Technology Association) – 2014, IASTA bulletin vol. 21, ISSN 09714510, (11-13 November 2014, Banaras Hindu University, Department of Geophysics, Banaras).

8. Prashant Hegde, **Girach I. A.**, Prabha R. Nair, Molecular composition of organic aerosols, Proceeding of IASTA (Indian Aerosol Science and Technology Association) – 2014, IASTA bulletin vol. 21, ISSN 09714510, (11-13 November 2014, Banaras Hindu University, Department of Geophysics, Banaras).
9. **Girach I. A.**, V. S. Nair, S. S. Babu, P. R. Nair, Black carbon and Carbon monoxide over bay of Bengal during W_ICARB, Proceeding of IASTA (Indian Aerosol Science and Technology Association) – 2014, IASTA bulletin vol. 21, ISSN 09714510, (11-13 November 2014, Banaras Hindu University, Department of Geophysics, Banaras).
10. Prabha R Nair, **Girach I. A.**, Prashant Hegde, Trace gases over marine environment, Workshop on “Regional Atmospheric Chemistry: Emerging Trends” at Physical Research Laboratory, Ahmedabad during May 06-07, 2013.
11. Participated in the ISRS symposium on “Indian Remote Sensing Satellite (IRS) Series - A SAGA OF 25 YEARS” at Indian Institute of Science (National Science Seminar Complex), Bangalore during March 16-17, 2013.
12. Prabha R. Nair, Liji Mary David, **Girach I. A.**, Photochemical destruction of ozone by water vapour in the marine environment of Bay of Bengal, National Space Science Symposium-2012, February 14-17, 2012, Sri Venkateswara University, Tirupati – 517 502.
13. **Girach I. A.**, Prabha R. Nair, Satellite based vertical profiles of carbon monoxide over Bay of Bengal during winter, National Space Science Symposium-2012, February 14-17, 2012, Sri Venkateswara University, Tirupati – 517 502.
14. **Girach I. A.**, Prabha R. Nair and G. Mohan Kumar, Solar eclipse induced changes in near-surface ozone at two near-by tropical coastal sites, National Space Science Symposium-2012, February 14-17, 2012, Sri Venkateswara University, Tirupati – 517 502.
15. **Girach I. A.**, and Prabha R. Nair, Spatial Variation of Ozone, Nitrogen dioxide and Aerosol mass loading over Bay of Bengal during Monsoon: Preliminary results from CTCZ campaign, National Workshop on CTCZ-Pilot: Initial Results, IITM, Pune.
16. **Girach I. A.**, Prabha R. Nair, Liji Mary David and Prashanth Hegde, The impact of solar eclipse of 15 January 2010 on near-surface ozone at Thiruvananthapuram, National Workshop: Results on Solar Eclipse, VSSC, Thiruvananthapuram, January 27-28, 2011.
17. Liji Mary David, Prabha R Nair and **Girach I. A.**, Influence of aerosols on near surface ozone mixing ratio at a tropical coastal environment, IASTA Conference, Bose Institute, Darjeeling, March 24-26, 2010.
18. **Girach I. A.**, Susan George K, Liji Mary David and Prabha R Nair, Transport of aerosols and trace gases over Bay of Bengal during pre-monsoon and winter, IASTA Conference, Bose Institute, Darjeeling, March 24-26, 2010.
19. **Girach I. A.**, Prabha R Nair and Susan George K, Seasonal Variation in near-surface ozone over Bay of Bengal, National Space Science Symposium, February 24-27, 2010, Saurashtra University, Rajkot.
20. **Girach I. A.**, and Prabha R Nair, Near-Surface Carbon Monoxide over Bay of Bengal during Winter: Advection and Dispersion, National Space Science Symposium-2010, February 24-27, 2010, Saurashtra University, Rajkot.