

SOBHAN KUMAR KOMPALLI

Contact Information Space Physics Laboratory (SPL),
Vikram Sarabhai Space Centre (VSSC),
Indian Space Research Organization (ISRO),
Thiruvananthapuram-695022, Kerala, INDIA
Tel : +91-471-256-3326, Mobile: +91-999-515-2720
Email: kk_sobhan@vssc.gov.in, sobhanspl@gmail.com



Research interests

- Atmospheric Sciences
- Aerosol microphysics, aerosol life cycle processes

Academic Qualifications

- Presently pursuing PhD in Atmospheric Sciences (since December 2013)
Thesis Supervisor: Dr S Suresh Babu
Expected thesis submission: December 2019
- M.Sc. Physics (2006) (C.G.P.A. 8.4 /10)(2nd topper in University)
Pondicherry University, Pondicherry, India.
- B.Sc. (Mathematics, Physics, Chemistry) (2004) (89.4%)(University top-10 ranker)
Acharya Nagarjuna University, Guntur, India

Professional Background

- Feb. 2008 – Present : Scientist, Space Physics Laboratory, VSSC, Thiruvananthapuram
- Sep.2007 –Jan.2008 : Research Fellow, Space Application Centre, ISRO, Ahmedabad, India
- Jul. 2006 – Apr.2007 : Lecturer, Dharma Apparao College, Nuzvid, India

Personal Details

Date of Birth: 10- May-1984 (Age: 34)

Sex: Male

Marital status: Married

Nationality: Indian

Publications

Peer reviewed International Publications – **18**

National and International proceedings/presentations: **38**

Scientific and Technical reports: **05**

Achievements

- **Best Paper Award (Gold Medal)** in ‘Aerosols and Monsoon’ theme, for the paper entitled ‘Spring time enhancement in aerosol loading over the high altitude Himalayas: Implications to regional climate’, International Tropical Meteorology Symposium (INTROMET-2014), Chennai, India, February, 2014.

- **Best Paper award** in Space based meteorology, Oceanography and Geosphere-biosphere interactions, for paper entitled “Fine and Ultrafine particles at near Free Tropospheric Environment in Trans-Himalayas: Results from RAWEX”, National Space Science Symposium, Tirupati, February 14-17, 2012.
- Research Fellowship of Indian Space Research Organization (2007-08).

Projects and Experiments

My research focus is on **aerosol microphysics** and **life cycle processes**. I have been working in Aerosols & Radiative Forcing section of SPL which manages the project Aerosol Radiative Forcing over India (ARFI) of ISRO-Geosphere Biosphere Program. ARFI aims to understand the aerosol radiative impacts, microphysical processes and their climate implications using (a) network of observatories (ARFINET) spread across the country, (b) campaign-based measurements (Integrated Campaign for Aerosols, gases and Radiation Budget (ICARB) and Regional Aerosol Warming Experiment (RAWEX)) over the Indian region and adjoining oceans. In this regard,

- I am responsible for the design and execution of experiments related to **aerosol life cycle** studies over distinct environments using the state-of-the art scientific instrumentation.
- Responsible for setting up and operation of the high altitude Himalayan aerosol observatory (the highest aerosol observatory in the country) (4520m asl) at Hanle in the western Himalayas as part of RAWEX. *This is extremely important station to understand the background aerosols over this region, operational since 2009.*
- Responsible for setting up and operation of a super site for aerosol observations over Bhubaneswar located in the Indo-Gangetic Plains (IGP) outflow, since August-2016 as part of “South West Asian Aerosol Monsoon Interactions (SWAAMI)” experiment which is an Indo-UK collaborative effort. I am responsible for operation and calibration of sophisticated aerosol instrumentation including the Aerosol Chemical Speciation Monitor (ACSM) and Single Particle Soot Photometer (SP2). These are first of its kind observations over the Indian region. [2016-Present]
- Presently working on in-house development of the “Aerosol Humidograph Instrument” for the studies on aerosol hygroscopic properties.

Participated in and conceived various scientific field experiments:

- Participated in ICARB-2018 ship based cruise observations over the Indian Ocean and South Arabian Sea during January-February 2018 [2018]
- Participated in pre-monsoon aircraft based observations carried out over different regions over India as part of SWAAMI experiment [2016]
- Aerosol life cycle studies with an emphasis on ultrafine particle formation processes from high altitude forested location; Ooty in southern India [2014,2015]
- Aircraft, balloon borne and field experiments from various ARFINET stations and different geographical regions as part of RAWEX – 2013 over Indian region [2013]

- Ship-cruise based observations over Bay of Bengal during summer monsoon [CTCZ-2009]
- A balloon-borne field experiment using a 'High Altitude Black Carbon Aethalometer' for vertical profiles of Black Carbon (BC) up to 10 km altitude [RAWEX-2011]
- Deputed as a member of the 4th batch for year 2012 of Indian Scientific expedition to Arctic (NyAlesund, Svalbard), Norway, to make measurements on aerosol characteristics as part of the SPL's Polar Research Program [2012]
- Tethered balloon experiments for BC altitude profiles during a solar eclipse [2011]
- Deputed to University of Manchester, UK for the training on operation, calibration, maintenance and data processing of the ACSM and the SP2 instruments [2016, 2017]

Scientific Contributions

- Scientific pursuance of the long-term and unique data from the Himalayan aerosol observatory at Hanle (*which completed 7 years of operation*) brought out ***first of its kind*** results:
 - a) Fine and ultrafine particle concentrations, new particle formation process over near-free tropospheric Himalayan location and mechanisms responsible for it [Atmos. Env. 2014; Ann. Geo. 2014; IASTA 2014; JIE- 2012a, JGR 2011a]
 - b) Spring time enhancement is absorbing aerosol loading, its inter-annual variability and responsible process over the Himalayas [Curr. Sci. 2016, JIE- 2012c]
 - c) Physical and optical properties of aerosols over the pristine background Himalayas [Atmos. Env. 2014; Aeolian Res. 2014; JIE-2012b]
 - d) BC measurements over Hanle confirmed the presence of significant amount of absorbing BC in Himalayas during spring than winter. This finding has important climatic implications in view of the regional warming due to elevated aerosol layers which can influence south Asian monsoon and glacier retreat [JGR 2011b].
- From the scientific investigation of *aerosol size distributions over a broad regime* from the tropical coastal station Trivandrum ***proposed a mechanism*** for ultrafine particle bursts; explained particle formation, growth rate and seasonal influence on their size distributions [Sci. of the Tot. Envi. 2016; Ann. Geo. 2014]
- Ultrafine particle bursts over High altitude station over western Ghats and meteorological dependence on the bursts process [JASTP 2018]
- In a *first of its kind* study over Central India, using extensive measurements (~18 months), quantified the association between aerosols and atmospheric boundary layer [Atmos.Res. 2014]
- Observational evidence for the rapid response of atmospheric concentration of Black Carbon (BC) to anthropogenic activities [Atmos. Sci. Let. 2013]
- Investigated the seasonal changes in BC over Bay of Bengal using *multi-campaign measurements* and influence of spatially and temporally varying BC sources [Atmos. Env. 2013]

- Using long term (~25 years) data, brought out the phenomenal increase in aerosol loading over the Indian region and significant share of the anthropogenic fraction to it [JGR-2013]
- The impact of a dust episode on aerosol mass loading from the Himalayan site and the processes responsible for it [Aeolian Res. 2014].

Experience with Aerosol Instrumentation

Expertise in installation, operation and collection of scientific data using a large number of modern scientific instruments such as the following:

1. Multi Wavelength Aethalometer (Magee Scientific)
2. Scanning mobility Particle Sizer (Grimm, Germany and TSI, USA)
3. Single Particle Soot Photometer (DMT,USA)
4. Aerosol Chemical Speciation Monitor (Aerodyne, USA)
5. Sun Photometer (Microtops, Solar Light Co., USA)
6. Integrating Nephelometer (TSI,USA)
7. OC-EC Analyzer (Sunset Lab., USA)
8. Aerodynamic Particle Sizer (TSI,USA)
9. Quartz Crystal Microbalance (California meas.)
10. CCN counter (DMT,USA)
11. Photo Acoustic Soot Spectrometer (DMT,USA)

Publication Details

List of Publications in Refereed Scientific journals (Total: 18)

- 1) **Sobhan Kumar Kompalli**, S. Suresh Babu, C. Udayasoorian, R.M Jayabalakrishnan, “Role of anthropogenic emissions and meteorology on ultrafine particle bursts over a high altitude site in Western Ghats during pre-monsoon”, **Journal of Atmospheric and Solar-Terrestrial Physics**, 179, 2018. DOI: 10.1016/j.jastp.2018.09.001, 2018.
- 2) Prasad, P., Roja Ramana, M. Venkat Ratnam, Wei-Nai Chen, S. Vijaya Bhaskara Rao, Mukunda M. Gogoi, **Sobhan Kumar Kompalli**, K. Sarat Kumar, S. Suresh Babu, Characterization of atmospheric Black Carbon over a semi-urban site of Southeast India: Local sources and long-range transport, **Atmospheric Research**, 213, 411–421, DOI:10.1016/j.atmosres.2018.06.024, 2018.
- 3) **Sobhan Kumar Kompalli**, S. Suresh Babu, Lakshmi N. Bharatan and K. Krishna Moorthy, Spring-time enhancement in aerosol burden over a high altitude location (4520 m amsl) in western trans-Himalayas: results from long-term observations, **Current Science**, 111, 117 – 131, doi: 10.18520/cs/v111/i1/117-131, 2016.
- 4) S. Suresh Babu, **Sobhan Kumar Kompalli** and K. Krishna Moorthy, Aerosol number size distributions over a coastal semi urban location: Seasonal changes and ultrafine particle bursts, **Science of the Total Environment**, 563–564, pp 351–365, <http://dx.doi.org/10.1016/j.scitotenv.2016.03.246>, 2016.

- 5) **Sobhan Kumar Kompalli**, S. Suresh Babu, K. Krishna Moorthy, Mukunda M Gogoi, Vijayakumar S. Nair and Jai Prakash Chaubey, The formation and growth of ultrafine particles in two contrasting environments: A case study, **Annales Geophysicae.**, 32, 817–830, 2014 (doi:10.5194/angeo-32-817-2014)
- 6) **Sobhan Kumar Kompalli**, K. Krishna Moorthy, S. Suresh Babu, M.R. Manoj Aerosol mass size distribution and black carbon over a high altitude location in Western Trans-Himalayas: Impact of a dust episode. **Aeolian Research**, 15, 161-168, 2014 (<http://dx.doi.org/10.1016/j.aeolia.2014.05.003>)
- 7) **Sobhan Kumar Kompalli**, S. Suresh Babu, K. Krishna Moorthy, M.R. Manoj, N.V.P. Kirankumar, K. Hareef Baba Shaeb, A.K. Joshi, "Aerosol Black Carbon characteristics over Central India: Temporal variation and its dependence on mixed layer height", **Atmospheric Research**, 147–148, 27–37, 2014 (<http://dx.doi.org/10.1016/j.atmosres.2014.04.015>),
- 8) **Sobhan Kumar Kompalli**, K. Krishna Moorthy and S. Suresh Babu, Rapid response of atmospheric BC to anthropogenic sources: observational evidence, **Atmospheric Science Letters**, 15: 166–171, 2014 (DOI: 10.1002/asl2.483,2014).
- 9) Mukunda M. Gogoi, K. Krishna Moorthy, **Sobhan Kumar Kompalli**, Jai Prakash Chaubey, S. Suresh Babu, M.R. Manoj, Vijayakumar S. Nair, Tushar P. Prabhu, 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, 2014.
- 10) S. Suresh Babu, M. R. Manoj, K. Krishna Moorthy, Mukunda M. Gogoi, Vijayakumar S. Nair, **Sobhan Kumar Kompalli**, S. K. Satheesh, K. Niranjana, K. Ramagopal, P. K. Bhuyan, Darshan Singh, Trends in aerosol optical depth over Indian region: Potential causes and impact indicators, **Journal of Geophysical Research**, 118, 11,794–11,806, 2013 (doi: 10.1002/2013JD020507)
- 11) **Sobhan Kumar Kompalli**, S. Suresh Babu, K. Krishna Moorthy, Mukunda M. Gogoi, Vijayakumar S. Nair, Jai Prakash Chaubey: seasonal variation of aerosol black carbon distribution over the Bay of Bengal: multi-campaign measurements, **Atmospheric Environment**, 64, 366-373, 2013 (DOI: 10.1016/j.atmosenv.2012.09.073)
- 12) **Sobhan Kumar Kompalli**, V Sreekanth, Jai Prakash Chaubey, Mukunda M. Gogoi, S Suresh Babu, Tushar P Prabhu and K Krishna Moorthy, Aerosol number size distribution measurements at Hanle, a free tropospheric high-altitude site in Western Himalayas, **Journal of the Institute of Engineering**, Vol. 8, No. 3, pp. 140-146, 2012.
- 13) Moorthy, K.K., V Sreekanth , Chaubey, J. P., Gogoi, M. M., Babu, S. S., **Sobhan Kumar Kompalli**, Bagare, S. P. , Bhatt, B.C , Gaur, V , Prabhu, T.P., , Singh, S N., Fine and ultra fine particles at near free-tropospheric environment over the high altitude station Hanle, in Trans- Himalayas: New particle formation and size distribution, **Journal of Geophysical Research**, doi: 10.1029/2011 JD016343, 2011a.
- 14) Babu, S. S., Chaubey, J. P., Moorthy, K.K., Gogoi, M. M., **Sobhan Kumar Kompalli** , Sreekanth V , Bagare, S. P. , Bhatt, B.C, Gaur, V, Prabhu,T.P., Ningombam,S.S. , High Altitude (~ 4520 m

- amsl) measurements of Black Carbon aerosols over Western Himalayas: Seasonal heterogeneity and source apportionment, **Journal of Geophysical Research**, doi:10.1029/2011JD016722, 2011b.
- 15) Mukunda M. Gogoi, Jai PrakashChaubey, V Sreekanth, **Sobhan Kumar Kompalli**, S Suresh Babu, Tushar P Prabhu and K Krishna Moorthy, Columnar aerosol extinction characteristics: Measurements from a free-tropospheric observatory in western-Himalayas, **Journal of the Institute of Engineering**, Vol. 8, No. 3, pp. 52–57, 2012.
- 16) Chaubey, J P., S Suresh Babu, Mukunda M. Gogoi, **Sobhan Kumar Kompalli**, V Sreekanth, K Krishna Moorthy and Tushar P Prabhu, Black Carbon aerosol over a high altitude (~ 4.52 km) station in western Indian Himalayas, **Journal of the Institute of Engineering**, Vol. 8, No. 3, pp. 42-51, 2012.
- 17) Babu, S. S., Sreekanth, V., Moorthy, K. K., Mohan, M., Kirankumar, N.V.P., Subrahmanyam, D. B., Gogoi, M. M., **Sobhan Kumar Kompalli**, Beegum, N., Chaubey, J. P., Kumar, V. H. A., Manchanda, R. K., “Vertical profiles of aerosol black carbon in the atmospheric boundary layer over a tropical coastal station: Perturbations during an annular solar eclipse, **Atmospheric Research**, doi: 10.1016/j.atmosres.2010.11.019, 2010.
- 18) **Sobhan Kumar Kompalli**, S. Suresh Babu and K. Krishna Moorthy, “Inter-comparison of Aerosol Optical Depth from the Multi Wavelength Solar Radiometer with other radiometric measurements”, **Indian Journal of Radio and Space Physics**, Vol.39, pp 364-371, 2010.

Last updated: December 2018