Curriculum vitae

Personal Information

Name : **Dr. K. N. Uma**
Designation : ***Scientist - 'SE'***
Address : **Space Physics Laboratory**
Vikram Sarabhai Space Centre
Indian Space Research Organisation
Dept. of Space, Govt. of India
Thiruvananthapuram-695022, INDIA
e-mail : **uma_kn[at]vssc[dot]gov[dot]in**
Phone : +91-471-2562157

Main Area of research: Tropical Mesoscale Convective systems and its Associated dynamics

Research Interest includes- Thermodynamical and Microphysical characteristics of Clouds, Wave dynamics, Impact of tropical cyclones/convection, Stratosphere-troposphere exchange processes and CO_2 variability and its impact on tropical weather and climate.

Academic Qualifications

Degree	Year	Division/Rank	Institute/University
Ph.D.(Physics/Atmospheric Science)	2009	Pre-PhD **First**	National Atmospheric Research Laboratory, Dept. of Space/ISRO, Gadanki & S. V. University, Tirupati, India
***Thesis Title*:**	*A study on vertical air motion and its variability during fair-weather and convection with a VHF wind profiler*		
M.Sc. (Physics/Digital Electronics)	2004	**First (87%)** ***University 3rd position***	University of Madras, Chennai, India
B.Sc. (Physics, Chemistry, Maths)	2002	**First (89%)** ***University 4th position***	University of Madras, Chennai, India

Research Positions

Period	Positions held	Institution/Organisation
2016-continue	Scientist-SE	**Space Physics Laboratory**, Vikram Sarabhai Space Centre, Indian Space Research Organisation (ISRO), Govt. of India, Trivandrum, India
2011-2016	Scientist-SD	**Space Physics Laboratory**, Vikram Sarabhai Space Centre, Indian Space Research Organisation (ISRO), Govt. of India, Trivandrum, India
2009- 2011	Research Associate	**Space Physics Laboratory**, Vikram Sarabhai Space Centre, Indian Space Research Organisation (ISRO), Govt. of India, Trivandrum, India
2008-2009	Senior Research Fellow	**Space Physics Laboratory**, Vikram Sarabhai Space Centre, Indian Space Research Organisation (ISRO), Govt. of India, Trivandrum, India
2004-2008	Senior Research Fellow	**National Atmospheric Research Laboratory**, Dept. of Space, Govt. of India, Gadanki, India

Research contribution

Extensive and comprehensive studies have been made on the dynamical and microphysical aspects of Tropical Mesoscale Convective Systems (TMCS) using long term observations from different platforms viz., radars, satellites and radiometer. The evolution of TMCS during different stages, its characteristics during different phases of monsoon and the properties of clouds over global monsoon regions have been explored. The possible mechanisms and hypothesis given have unveiled several aspects involved in the complicated dynamics of TMCS. The above comprehensive studies on the TMCS are a fundamental requirement for accurately representing the convective systems in the numerical models. It will also help to understand the energetics and hydrological cycle of the Earth's atmosphere. In addition to academia, the above studies will have practical implication during the designing of rockets and also for aircraft safety. Significant contributions have also been made in the field of regional and global monsoons for better understanding the processes and pathways that are involved in stratospheric fountain and intrusion processes using radar, satellites, and balloon borne experiments. I have proposed novel hypotheses that provided new insights into transport of water vapour from the troposphere to the stratosphere. I have explained new mechanisms for the transport of stratospheric ozone into the troposphere. The above studies have immense importance in quantifying the tropospheric/stratospheric ozone budget that lead to global change in weather and climate.

Awards and Honors

1. **ISRO Young Scientist Merit Award** (2017), Indian Space Research Organisation, Department of Space, Bengaluru.
2. **SERB Women Excellence Award** (2016), Science and Engineering Research Board, Department of Science and Technology (DST), New Delhi.
3. **Elected Young Associate (2015) of Indian Academy of Sciences**, Bengaluru.
4. **KSCSTE Young Scientist Award (2014)** from Kerala State Council of Science, Technology and Environment, Kerala.
5. **IETE Young Scientist Award (2014)** from Institute of Electronics and Tele-communication Engineers, New Delhi.
6. **AP-RASC Young Scientist Award (2010)** from Asia-Pacific International Union of Radio Science, Japan.
7. **Young Scientist Medal (2006)** from *Eleventh International Workshop on Technical and Scientific Aspects of MST Radar, India.*
8. **Gold Medal for young scientist (2014)** at *International Tropical Meteorology Symposium, India*

Best Paper Awards

1. **K. N. Uma**, T.N. Rao, K. K. Kumar and S. S. Das, "Studies on the characteristics of tropical convection and its associated dynamics during the Indian summer monsoon" during *Opportunities and challenges in monsoon prediction in a changing climate,* held at Indian Institute of Tropical Meteorology, Pune during 21-25 February, 2012.
2. R. Renju, C. S. Raju, **K. N. Uma**, T. Antony and K. Krishna Moorthy, " Thermodynamics of convective clouds system during a Waterspout studied using microwave radiometer observations at Trivandrum" during *Emerging trends in observation systems, meteorology for socioeconomic development, TROPMET-2011,* held at Hyderabad during 14 – 16 December, 2011.
3. **K. N. Uma** (2004), "Measurement of CO in ambient air using Gas Chromatography" during *CSIR Diamond Jubilee Celebrations,* held at Central Leather Research Institute, Chennai on 26th September 2003.

Honour

1. Honoured by Kerala Social Service Forum (KSSF) during International Women's Day celebration held at Palakkad, 2011.

Awards for Merit

1. Best Performance in M. Sc. Physics (First Year) by Madras Christian College, University of Madras during 2003.
2. Best Performance in M. Sc. Physics (Second Year) by Madras Christian College, University of Madras during 2004.

Fellowships/Scholarships

1. Scholarship by Devi Charity, Chennai to pursue B. Sc. Physics during 1999-2002.
2. Summer Trainee Fellowship by Physical Research Laboratory, Ahmedabad during 2004.
3. Junior Research Fellowship by Indian Space Research Organisation to pursue research at National Atmospheric Research Laboratory, Gadanki during 2004-2008.
4. Research Associateship by Indian Space Research Organisation to pursue research at Space Physics Laboratory, Trivandrum during 2009-2011.

Other Awards

1. First Prize in Elocution during International Women's Day by Vikram Sarabhai Space Centre, Trivandrum, 2014.
2. Second Prize in Debate during National Library Week Celebrations by Vikram Sarabhai Space Centre, Trivandrum, 2014.
3. First prize in Technical Hindi Seminar during Hindi day celebrations by Vikram Sarabhai Space Centre, Trivandrum, 2017.
4. First prize in Elocution and Third prize in Recitation as a part of Hindi celebrations by Vikram Sarabhai Space Centre, Trivandrum, 2017.

Member in the Professional Bodies

1. Executive Member of India Meteorological Department
2. Associates, COSPAR
3. Member, Indian Space Scientists' Association
4. Member, Indian Science Congress Association
5. Member, International Union of Radio Science (URSI)

Professional Responsibilities

1. Core Scientific Member of ISRO's Reusable Launch Vehicle Demonstration Project (RLV-TD) from 2012 (*Provide background wind information and turbulence parameters to decide on the reentry day and time of the vehicle)*
2. PI of Re-OrganizatioN of Atmospheric Convection Experiment (RONAC) from 2011.
   (Influence of Indian summer Monsoon in the formation and reorganization of convective systems)
3. Co-PI of Study of Atmospheric Forcing and Responses (SAFAR) from 2010 to 2013
   (Study on the characteristics of layer structures and tropopause height during the passage of tropical cyclone)
4. Co-PI of Climate and Weather of Sun & Earth System (CAWSES-India Phase II) from 2010 to 2013.
   (T*he impact of tropical cyclone on troposphere-stratosphere exchange).*
5. *Member Secretary for Generation of Revised Indian Atmospheric Model for ISRO Launch vehicle applications*

Research Supervision

1. Guided seven students for M. Sc. (Physics) Project
2. Co-guided two students for M. Sc. (Physics) Project
3. Guided one M. Phil Thesis.

Publications in International Refereed Journals

1. T. N. Rao., ***K. N. Uma***, D. N. Rao and S. Fukao, 2008: Understanding the Transportation Process of Tropospheric Air Entering the Stratosphere from Direct Vertical Air Motion Measurements over Gadanki and Kototabang, ***Geophysical Research Letters*** **(American Geophysical Union),** 35, doi: 10.1029/2008GL034220.

2. ***K. N. Uma,*** and T. N. Rao, 2009: Characteristics of Vertical Velocity Cores in different Convective Systems Observed over Gadanki, India. ***Monthly Weather Review*** **(American Meteorological Society).,** 137, doi : 10.1175/2008MWR2677.

3. ***K. N. Uma,*** and T.N. Rao, 2009: Diurnal variability of vertical air-motion over a tropical station Gadanki and its effects on the estimation of mean vertical air velocity***. Journal of Geophysical Research*** **(American Geophysical Union)**, D20106, doi:10.1029/2009JD012560.

4. T. N. Rao, ***K. N. Uma***, T. M. Satyanarayana, and D. N. Rao, 2009: Differences in draft core statistics from wet spell to dry spell over Gadanki (13.5 N, 79.2 E). India, ***Monthly Weather Review*** **(American Meteorological Society)**, 137, 4293-4306, doi: 10.1175/2009MWR3057.1.

5. K. K. Kumar, and ***K. N. Uma***, 2009: High temporal resolution VHF radar observations of stratospheric air intrusion into the upper troposphere during the passage of a mesoscale convective system over Gadanki. ***Atmospheric Chemistry and Physics Discussion*** **(European Geophysical Union),** 9, 13843–13857, doi:10.5194/acpd-9-13843-2009/2009

6. S. S. Das , K. K. Kumar, and ***K. N. Uma***, 2010: MST radar investigation on inertia-gravity waves associated with tropical depression in the upper troposphere and lower stratosphere over Gadanki (13.5oN, 79.2oE), ***Journal of Solar-Terrestrial Physics*** **(Elsevier)**, 72, 1184- 1194, doi:10.1016/j.jastp.2010.07.016

7. S. S. Das , A. K. Ghosh, K. Satheesan, A. R. Jain, and ***K. N. Uma,*** 2010: Characteristics of atmospheric turbulence in terms of background atmospheric parameters inferred using MST radar at Gadanki (13.5°N, 79.2°E), ***Radio Science*** **(American Geophysical Union)**, 45, RS4008, doi:10.1029/2009RS004256.

8. ***K. N. Uma,*** K. K. Kumar, and T. N. Rao, 2011: VHF radar observed characteristics of convectively generated gravity waves during wet and dry spells of Indian monsoon. ***Journal of Solar-Terrestrial Physics*** **(Elsevier),** 73, 815-824, doi:10.1016/j.jastp.2011.01.024.

9. ***K. N. Uma,*** K. K. Kumar, and S. S. Das, T.N.Rao, and T. M. Satyanarayana, 2011: On the Vertical Distribution of Mean Vertical Velocities in the Convective Regions during Wet and Dry Spells of Indian Summer Monsoon over Gadanki, ***Monthly Weather Review*** **(American Meteorological Society**), 140, 398-410, doi: 10.1175/MWR-D-11-00044.1.

10. S. S. Das., S. Sijikumar and ***K. N. Uma,*** 2011: Further investigation on stratospheric air intrusion into the troposphere during the episode of tropical cyclone: Numerical simulation and MST radar observations, ***Atmospheric Research*** **(Elsevier**), 101, 928-937, doi:10.1016/j.atmosres.2011.05.023.

11. K. V. Subrahmanyam, G. Ramkumar, K. K. Kumar, D. Swain, S. Sunilkumar, S.S.Das, R.K.Choudhary, K. V. S. Namboodiri, ***K. N. Uma***, S. B. Veena,S. R. John, and A. Babu, 2011: Temperature perturbation in the troposphere-stratosphere over Trivandrum during Solar eclipse 2009/2010, ***Annales Geophysicae*** **(European Geophysical Union),** 29, 275-282, doi: 10.5194/angeo-29-275-2011.

12. S. S. Das, ***K. N. Uma*** and S. K. Das 2012: MST radar observations of short-period gravity wave during the passage of tropical cyclone: Obstacle effect as triggering mechanism, ***Radio Science*** **(American Geophysical Union)**, doi: 10.1029/2011/rs004840

13. ***K. N. Uma***, S. K. Das, S. S. Das, K. K. Kumar, 2013: Aura-MLS Observations of Water Vapor Entering the Stratosphere over the Northern Bay of Bengal and East Equatorial Indian Ocean. ***Terrestrial, Atmospheric and Oceanic Sciences***. (**Chinese Geophysical Union**), 24(3), 357-368, doi:10.3319/TAO.2012.11.06.0 (A)

14. S. K. Das., ***K. N. Uma***, M. Konwar, P. Ernest Raj, S. Deshpande, M. C. R. Kalapureddy, 2013 : CloudSat-Caliop characterizations of cloud during the active and the break periods of Indian Summer Monsoon, ***J. Atmos. Sol.-Terr. Phys. (*Elsevier*),*** 97, 106-114, doi : 10.1016/j.jastp.2013.02.016.

15. G. Ramkumar., K. V. Subrahmanyam, K. Kishore Kumar, Siddarth Shankar Das, Debadatta Swain, S. V. Sunilkumar, K. V. S. Namboodiri, ***K. N. Uma*** , Veena Suresh Babu, Sherine Rache John and Asha Babu, 2013: First observational study during a solar eclipse event on variations in the horizontal winds simultaneously in the troposphere-stratosphere-mesosphere-lower thermosphere region over the equatorial station Thumba (8.5,Â° N, 77° E), ***Earth, Planets and Space***, 65, 781-790, doi:10.5047/eps.2012.12.007.

16. ***K. N. Uma***, S. S. Das and K. K. Kumar, 2014: On the Migrating and Non-migrating Diurnal and Semidiurnal Tides over a Tropical and an Equatorial Station. ***Indian Journal of Radio and Space Physics***, 42, 340-355, pacs.no.92.60.hh;92.60.Nv.92.60.jf

17. ***K. N. Uma***, S. K. Das and S. S. Das, 2014: A climatological perspective of water vapour at UTLS region over different global monsoon regions: Observations inferred from AURA-MLS and reanalysis data, **Climate Dynamics. (Elsevier).** doi: 10.1007/s0038-014-2085-9**.**

18. S. S. Das, K. K. Kumar, ***K. N. Uma***, M.V. Ratnam, A. K. Patra, S. K. Das, A. K. Ghosh and A. R. Jain, 2014: Modulation of thermal structure at upper troposphere and lower stratosphere (UTLS) region by short vertical scale gravity waves: A case study inferred from simultaneous MST radar and GPS sonde observations. ***Indian Journal of Radio and Space Physics,*** 43, 11-23, pacs no.92.60.jd;92.60.hf,92.60.hh.
19. C. Suresh Raju, T. Antony, N. Mathew, ***K. N. Uma*** and K. Krishna Moorthy, 2014: Land surface emissivity derived from MADRAS brightness temperatures and their comparison with TRMM Microwave Imager, ***Current Science*** , 104 (12) , 1643-1649.

20. S. S. Das***., K. N. Uma***, V.N.Bineesha, K.V.Suneeth, and G. Ramkumar, 2015: Four decadal climatological intercomparison of Rocketsonde and Radiosonde with different reanalysis data: Results from Thumba Equatorial Station, ***Quar. J. Roy. Meteo. Soc., (Royal Meteorological Society),*** 142, 91-101, doi:10.1002/qj.2632.

21. S. S. Das, 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, 2015: Influence of tropical cyclones on tropospheric ozone: possible implication, ***Atmos. Chem. Phys Disc. (European Geophysical Union),*** 15, 19305-19323, doi:10.5194/acp-15-19305-2015

22. ***K. N. Uma*** and S. S. Das, 2016: Quantitative and Qualitative Assessment of Diurnal Variability in the Tropospheric Humidity using SAPHIR on-board Megha-Tropiques, ***J. Atmos. Sol.-Terr. Phys. (*Elsevier*).*** 146, 89-100, http://dx.doi.org/10.1016/j.jastp.2016.05.009.

23. S. S. Das., M. V. Ratnam, ***K. N. Uma***, A. K. Patra, K. V. Subrahmanyam, G. A. Imran, K. K. Kumar, K.V. Suneeth and G. Ramkumar, 2016: Stratosphere-troposphere exchange during the tropical cyclone NILAM, ***Quar. J. Roy. Meteo. Soc., (Royal Meteorological Society),*** 142, 2168-2179***,*** doi:10.1002/qj.2810***.***

24. S. S. Das., 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, 2016: Influence of Tropical Cyclones on Tropospheric Ozone: Possible Implications (2016), ***Atmos. Chem. Phys. (European Geophysical Union).***, 16, 1-11, doi : 10.5194/acp-16-1-2016

25. S. K. Das., R. B. Golhait and ***K. N. Uma***, 2017: Clouds vertical properties over the Northern Hemisphere monsoon regions from CloudSat-CALIPSO measurements, ***Atmospheric Research*** **(Elsevier**)., 183, 73-83.

26. ***K. N. Uma*** and S. S. Das 2017: Do the stability indices indicate the formation of deep convection, ***Meteorology and Atmospheric Physics,*** DOI 10.1007/s00703-017-0550-9**.**

27. K. Nalini, ***K. N. Uma***, S. Sijikumar, Y. K. Tiwari and R. Ramachandran , Satellite and ground-based measurements of CO_2 over the Indian region; its seasonal dependencies, spatial variability, and model estimates, ***International Journal of Remote Sensing (In-Press)***.

Publications in International Refereed Proceedings

1. ***K. N. Uma***, T. N Rao and D. N. Rao, 2008: Characteristics of Convection using VHF Radar. *Proceedings of MST11*, 511-516.
2. ***K. N. Uma***, VHF radar studies on Tropical Convection, Proceedings of AP-RASC, 2010.
3. ***K. N. Uma***, C. Suresh Raju, R. Renju, Tinu Antony K. Krishna Moorthy, Relative Humidity Profiles retrieved from SAPHIR on board Megha-Tropiques: A quantitative evaluation against concurrent ground based microwave radiometer profiler over an equatorial station, *International Tropical Meteorology (INTROMET-2014), 20-24 February, 2014.*
4. ***K. N. Uma***, R. Renju, C. Suresh Raju, Tinu Antony K. Krishna Moorthy, Observations of Thermal and Microphysica characteristics of during the passage of cyclone and depression using microwave radiometer profiler, *International Tropical Meteorology (INTROMET-2014), 20-24 February, 2014.*
5. R. Renju, ***K. N. Uma***, C. Suresh Raju and K. Krishna Moorthy, Diurnal and Seasonal Variability of Precipitable water vapor over a equatorial station, *International Tropical Meteorology (INTROMET-2014), 20-24 February, 2014.*

Publications in ISRO/Government report

1. T. N. Rao, ***K. N. Uma*** and D. Narayana Rao, 2007: Characteristics of vertical velocity over a tropical station Gadanki, ISRO Work Report.
1. S. Sijikumar and ***K. N. Uma,*** *2016*: Model Atmosphere for SHAR from 0 to 80 km, SPL-SR-02-2016.