

INSTITUTE FOR CLIMATE CHANGE STUDIES

*An autonomous Institution of Science and Technology Department
Govt. of Kerala*

ICCS Online Lecture Series Inauguration

Programme

Welcome 11.30 – 11.35 AM	Dr. D. Sivananda Pai SC- G & Director, Institute of Climate Change Studies
Remarks 11.35 – 11.40 AM	Prof. K.P. Sudheer Executive Vice President, KSCSTE & Ex-officio Principal Secretary, Dept. of S&T, Govt. of Kerala
Inaugural Address 11.40 – 11.50 AM	Padma Shri. Dr. M.C Dathan Scientific Advisor to Chief Minister of Kerala
Invited Talk 11.50 – 12.40 PM	Aerosols and Climate Change Dr. Sachin. S. Gunthe Professor, Environmental and Water Resources Engineering Division, IIT Madras.
12.40 – 12.55 PM	Interactive Session
Vote Of Thanks 12.55 – 1.00 PM	Mrs. Silpa Senan Junior Research Fellow, ICCS



Thursday, 12 May 2022



11.30 AM – 1.00 PM

To Join:

<https://meet.google.com/fhi-tigs-zci>



ICCS Online Lecture Series

“Aerosols and Climate Change”





Dr. Sachin S. Gundhe

Professor

Environmental and Water Resources

Engineering Division

IIT Madras

 **Thursday, 12 May 2022**
 **11.30 AM – 1.00 PM**

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Abstract of the Lecture

Aerosols and Climate Change

Interactions among the atmospheric aerosols including that of bioaerosols, with biosphere and climate in general, collectively termed as “aerosol indirect effect”, are thought to shape the behavior of the climate system in the Anthropocene¹ and have been identified to contribute greatest range of uncertainty in the current and future understanding of climate change. Most of the aerosol – biosphere – climate interaction studies over tropical Indian region have been limited to either investigating the radiative effects of aerosols (mostly absorbing aerosols, e.g., black carbon) or to relating the elevated PM_{2.5} (particulate matter $\leq 2.5 \mu\text{m}$ in diameter) over polluted regions with reduced visibility. However, no attention has been turned towards the microphysical effects associated with perturbations in the cloud active aerosols, the cloud condensation nuclei (CCN), and delineating the role of detailed chemistry on smog formation over the Indian national capital. Furthermore, another subset of aerosols called as bioaerosols, which includes fungal spores, pollen grains, bacteria, plant, and animal dander, etc. have been known to seriously impact the ecosystem health and climate. On climate side, these bioaerosols can act as potential ice nuclei (IN) and giant cloud condensation nuclei (GCCN) affecting the hydrological cycle. Whereas, on the human and ecosystem health they act as allergens and pathogens affecting the well-being of human and ecosystem posing danger to human health and crop production. To highlight the current advancement and fundamental knowledge The lecture will be based on a few highlights from the research of Dr. Sachin S. Gundhe based on high-end measurements and modeling of characteristic aerosol properties. The results of the research that helped in quantitative understanding of interaction among the aerosol, cloud, precipitation, and their role in climate system over Indian tropical region, in particular smog formation will be presented. The lecture will also highlight the role and importance of varying seasons and contrasting environments affecting underlying processes and mechanisms of aerosol – biosphere – climate interaction leading to improved understanding of aerosol induced climate change over Indian.

¹*Anthropocene is the proposed subdivision of the geological timescale starting from the point of significant human impact on the planet Earth's geology and ecosystem including anthropogenic climate change.*