

Proceedings of Abstracts  
13<sup>th</sup> International Conference on

# Air Quality Science and Application

Venue:

Aristotle University's Research Dissemination Center (KEDEA)

27 June – 1 July 2022



## EDITORS

Nicolas Moussiopoulos, Ranjeet S. Sokhi, George Tsegas,  
Evangelia Fragkou, Eleftherios Chourdakis, Ioannis Pipilis

## ORGANISED BY

University of Hertfordshire, UK and Aristotle University of Thessaloniki, Greece

University of  
Hertfordshire **UH**





Proceedings of Abstracts  
13<sup>th</sup> International Conference on  
**Air Quality**  
**Science and Application**

**EDITORS**

Nicolas Moussiopoulos<sup>1</sup>, Ranjeet S. Sokhi<sup>2</sup>, George Tsegas<sup>1</sup>,  
Evangelia Fragkou<sup>1</sup>, Eleftherios Chourdakis<sup>1</sup>, Ioannis Pipilis<sup>1</sup>

<sup>1</sup>Laboratory of Heat Transfer and Environmental Engineering, Aristotle University of Thessaloniki, Greece

<sup>2</sup>Centre for Atmospheric and Climate Physics Research and Centre for Climate Change Research, University of Hertfordshire, UK

**ORGANISED BY**

University of Hertfordshire, UK  
Aristotle University of Thessaloniki, Greece



Published by the Air Quality Conference  
College Lane  
Hatfield  
AL10 9AB  
United Kingdom

ISBN: 978-1-3999-2835-9

DOI: **TO PROVIDE!!**

**Production:**

Laboratory of Heat Transfer and Environmental Engineering  
Aristotle University of Thessaloniki  
Thessaloniki  
Greece

*All inquiries to:*

Professor Ranjeet S Sokhi  
Centre for Atmospheric and Climate Physics Research (CACP)  
Department of Physics, Astronomy and Mathematics  
University of Hertfordshire  
College Lane, Hatfield, AL0 9AB, UK  
Tel: +44(0) 1707 284520  
Email: r.s.sokhi@herts.ac.uk

## ACKNOWLEDGMENT TO SPONSORS AND SUPPORTERS

The support of the following institutions and enterprises is gratefully acknowledged:

### ORGANISING INSTITUTIONS

University of Hertfordshire, UK

Aristotle University of Thessaloniki

### SPONSORS

Thessaloniki Water Supply & Sewerage Co S.A.

Thessaloniki Port Authority S.A.

Gaia EPICHEIREIN

Ktima Kir-Yianni

### SUPPORTERS

Research Committee – Aristotle University of Thessaloniki

Aristotle University's School of Mechanical Engineering

### SUPPORTING ORGANISATIONS

APHH UK-India Programme on Air Pollution and Human Health (funded by NERC, MOES, DBT, MRC, Newton Fund)

American Meteorological Society (AMS)

Air & Waste Management Association (A&WMA)

World Meteorological Organisation (WMO), GAW Urban Research Meteorology and Environment (GURME) Programme

We acknowledge the attendance of the following **exhibitors**:

Aerosol D.O.O.    Cambustion    Ellona    EMISIA S.A.    Passam AG    TSI ltd

## **CONFERENCE ORGANISING COMMITTEE**

### **Aristotle University of Thessaloniki, Greece**

Nicolas Moussiopoulos, Leonidas Ntziachristos, Nicolaos Theodossiou, Sokratis Basbas, John Bartzis, George Tsegas, Evangelia Fragkou, Theodora Slini, Afedo Koukounaris, Kleoniki Kyrkopoulou, Elli Chatzokou, Ioannis Pipilis and Christos Kalitsis

### **University of Hertfordshire, UK**

Ranjeet S Sokhi, Ummugulsum Alyuz, Kester Momoh, Saurabh Kumar

## **INTERNATIONAL SCIENTIFIC AND ADVISORY COMMITTEE**

Professor Ranjeet S Sokhi (Chair), University of Hertfordshire, UK

Professor Nicolas Moussiopoulos, Aristotle University of Thessaloniki, Greece

Professor John Bartzis, University of West Macedonia, Greece

Professor Zisis Samaras, Aristotle University of Thessaloniki, Greece

Professor Alexander Baklanov, World Meteorological Organisation

Dr Gufran Beig, Indian Institute of Tropical Meteorology, India

Professor Carlos Borrego, University of Aveiro, Portugal

Professor Greg Carmichael, University of Iowa, USA

Professor Judy Chow, Desert Research Institute, USA

Dr Sandro Finardi, ARIANET, Italy

Professor Eugene Genikhovich, Main Geophysical Observatory, Russia

Professor Sue Grimmond, University of Reading, UK

Professor Selahattin Incecik, Technical University of Istanbul, Turkey

Dr Jacek Kaminski, York University, Canada

Dr Matthias Ketzler, Aarhus University, Denmark

Professor Jaakko Kukkonen, Finnish Met Institute, Finland

Professor Roberto San Jose, Technical University of Madrid, Spain

Dr Vikas Singh, National Atmospheric Research Laboratory, India

Dr Andreas Skouloudis, JRC, ISPRA

Professor James Sloan, University of Waterloo, Canada

Dr Peter Suppan, Karlsruhe Institute of Technology, Germany

## PREFACE

The 13<sup>th</sup> International Conference on Air Quality - Science and Application is being held in the vibrant port city of Thessaloniki, Greece. To curtail the spread of COVID-19, the 12<sup>th</sup> International meeting, which was to be held in Thessaloniki, was changed to a fully online event. Since then, the pandemic landscape has changed and, for this meeting, we are offering for the first time a hybrid format.

We have the pleasure of working with the Aristotle University of Thessaloniki for a second time as the local hosts for the 13<sup>th</sup> Conference. The meeting is a continuation of the series that began at the University of Hertfordshire, UK in July 1996. Subsequent meetings have been held at the Technical University of Madrid (1999), Loutraki, Greece (2001), Charles University, Prague (2003), Valencia, Spain (2005), Cyprus (2007), Istanbul, Turkey (2009) Athens, Greece (2012), Garmisch-Partenkirchen (2014), Milan (2016) and Barcelona (2018), online (2020, hosted by Aristotle University of Thessaloniki).

During the pandemic years, **especially the earlier phase**, air quality showed some improvements in many parts of the world. Many studies, however, have shown that even with this drastic reduction in emissions, **the observed improvements** would not necessarily lead to the latest WHO guidelines being met. These findings emphasise the urgency of controlling air pollution and highlight the complexities of the challenge. **It is evident that** the problem of poor air quality persists in all cities of the globe. With increasing public awareness, the issue of poor air quality remains at the forefront of societal concern, **and with climate change, it is the most important environmental risk for humanity.**

As urbanisation grows, scientific research is showing that impact from air pollution in cities depends on contributions from local scales, as well as from regional and global scales, including interactions with climate change. Improvements in technology need to go hand in hand with management and assessment strategies, but also with effective control policies, for reducing the health impact of air pollution.

The presentations at the Conference address the diversity of scales, processes and interactions affecting air pollution and its impact on health and the environment. As usual, the conference is stimulating cross-fertilisation of ideas and cooperation between the different air pollution science and user communities. There is greater involvement of city, regional and global air pollution, climate change, users and health communities at the meeting.

The focus of the international conference will be to discuss the latest scientific advances in the understanding of air pollution and its impacts on our health and environment. The conference will also discuss new applications and developments in management strategies and assessment tools for policy and decision makers.

This Proceeding presents a collection of abstracts presented at the Conference under the following science themes:

Air pollution sources and emissions  
Air quality management and policy development  
Air quality prediction and forecasting  
Air Quality and COVID-19  
Characterisation of air pollutants  
Development, application and evaluation of air quality related models for local to global scales  
Dust and its impacts  
Exposure and health assessment related to air pollution  
Indoor air quality  
Integrated assessment and air quality  
Local air quality and impact studies  
Meteorological processes and interactions including connections with climate change  
Observations and emerging technologies for monitoring air pollution  
Special session - Air pollution and health  
Special Session - Biomonitoring air quality  
Special Session - Sensors, crowd sourcing and numerical simulations for urban air quality  
Special session - Shipping and air quality  
Special Session - Air pollution in urban areas - science challenges and policy implications  
Special Session - Green Mobility in SmartCities and Impact on Pollutant Emissions and Air Quality  
Special Session - Ensuring Air Quality through the implementation of the SDGs  
Special Session - Practical and usable solutions to air pollution  
Special Session - Helmholtz European Partnership for Technological Advancement (HEPTA)

Ranjeet S Sokhi, University of Hertfordshire, UK

Nicolas Moussiopoulos, Aristotle University of Thessaloniki, Greece

June 2022