Preface

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Biographical notes: Sam Pournazeri received his PhD in Mechanical Engineering at the University of California Riverside in 2012 and BSc in Mechanical Engineering at Sharif University of Technology, Tehran, Iran in 2008. His research focuses on environmental fluid dynamics, urban dispersion and micrometeorology, and the atmospheric boundary layer. Currently, he is working for the California Air Resources Board.

Ashok Kumar is Professor and Chairman of Civil Engineering at The University of Toledo, Toledo, Ohio. He previously worked for Syncrude Canada Ltd. as an Atmospheric Physicist. His research work has focused on finding innovative solutions to fundamental and applied problems in air quality modelling, risk analysis, and environmental data analysis. He received his BSc in Engineering (Hons) from Aligarh University in India (1970), his Masters of Applied Science from University of Ottawa, Canada (1972) and PhD from the University of Waterloo, Canada (1978). He is registered as a Professional Engineer in the Province of Alberta, Canada, and a Diplomat of the American Academy of Environmental Engineers. He is a fellow member of Air and Waste Management Association (A&WMA), which presented him with L.A. Ripperton Award for distinguished achievement as an educator in the field of air pollution control in 2003.

Air quality modelling became an essential tool for decision making after the introduction of air quality regulations over the last four decades. An air quality model is a mathematical description of the system that governs the fate of air contaminants emitted into the atmosphere. The air quality system consists of a large number of processes involving air contaminants. The different atmospheric processes include advection (transport of contaminants by the wind), dispersion through turbulence, scavenging through dry and wet deposition, and chemistry. Different approaches (theoretical, experimental, wind tunnel and water tank) have been used over the years to model air pollution depending on source-receptor distances and complexity of the air modelling

system. Air quality models based on Eulerian and Lagrangian approaches have been developed to deal with continuous and instantaneous releases.

Air quality models play a significant role in managing air quality in any nation as they provide valuable information on the possible adverse air quality impacts due to releases of contaminants from different sources. This information helps regulators in determining compliance with national regulatory requirements and to protect public from pollution problems. These models are also used to examine the effectiveness of different emission control strategies on the regional ambient air quality.

The field of air quality is still evolving and better models are needed for regulatory use. This special issue focuses on different aspects of air quality modelling from the short range dispersion to long range transport, photochemistry, and micrometeorology. The peer-reviewed papers provide a broad discussion on new methodologies and applications of different air quality modelling techniques. The following topics are covered in this issue:

- computational fluid dynamics (CFD) modelling approaches
- urban dispersion and micrometeorology
- air quality evaluation studies and applications
- air quality monitoring and analysis
- dispersion modelling for wildfire applications
- simulation of dispersion in complex terrains
- long range transport models and photochemical modelling
- impact of micrometeorology on air quality
- sensitivity of air quality models to micrometeorology
- modelling dispersion of vehicular emissions under complex urban conditions
- modelling emissions from on-road mobile sources at local and regional level
- improvement of emission inventory models for air quality modelling applications.

It is hoped that you will enjoy reading the papers and will get an overview of the emerging issue on air quality modelling for your applications. Note that this volume (*IJEP* 2013 Vol. 52 Nos. 3/4) contains Part 1 of the special issue; Part 2 will be published as *IJEP* 2013 Vol. 53 Nos. 1/2.