Preface

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Biographical notes: László Bozó is currently a Professor in Environmental Sciences, working as a Senior Scientific Advisor at the Hungarian Meteorological Service, and President of the Section of Earth Sciences of the Hungarian Academy of Sciences. He holds an MSc in Meteorology from ELTE Budapest, and PhD and DSc degrees in Earth Sciences. His studies are devoted to atmospheric dispersion and transport processes of anthropogenic pollutants at different spatial and temporal scales. He is a member of the Committees of the HARMO Conference and Editor-in-Chief of an international scientific *Journal IDŐJÁRÁS – Quarterly Journal of the Hungarian Meteorological Service*.

Zita Ferenczi is a Meteorologist and received her PhD in Earth Sciences from the Eötvös Loránd University of Budapest. She has been working at Hungarian Meteorological Service since 1992. Her activities range from air pollution modelling to air quality data processing. Her current research interests include relations between special meteorological parameters and air quality levels.

The 17th International Conference on Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes (Harmo 17) held in Budapest, Hungary, in 2016, continued the activities of the international initiative on this topic, which started in 1991. Detailed and extensive scientific, practical and historical information can be found at the website of the Harmo initiative: http://www.harmo.org.

The original focus of the workshops on harmonisation was on the development of dispersion models for regulatory purposes and for real-time applications in Europe, in such a way that latest scientific achievements are used, but also the specific demands of society and regulators are met. These meetings developed further into a series of high-level scientific conferences, motivated by the idea to apply in a better and harmonised way the meteorological and air quality sciences to serve the needs of European citizens.

Dispersion modelling is a tool to assess the actual or future impact of air pollution sources on environment and human health. To study dispersion requires an interdisciplinary approach, namely reliable meteorological forecasts (including for complex terrain, plant-canopy and urban areas); proved parametrisations of the atmospheric boundary layer and exchange with surface processes; precise descriptions of the variety of sources (such as transport sector releases, industrial releases, accidental releases, deliberate releases, natural releases, etc.); and proved parametrisations of all physical and chemical processes in the atmosphere. In addition, the real-time data

assimilation, the evaluation of model performance and the presentation of results to the public and managers are now disciplines of their own.

It has been proven through the success of the Harmo conferences by now, that this forum is needed to allow scientists focusing on one or several of these different topics, to work together and come up with improved and harmonised solutions. There is a variety of models – simple or complex – covering different space and time scales and different areas of applicability. The user needs to select a fit-for-purpose dispersion model that produces reliable results for a given task and also to know the uncertainties associated with the model results.

There are many requirements to models for regulatory purposes. These models should be scientifically sound; validated against observations; and accompanied by clear guidelines and support to ensure proper use. Constant efforts are needed to promote good practices and eliminate bad practices; to assure quality with respect to model development; to establish reference problems; and to exchange experiences.

The Harmo conferences are directed towards model developers, model users, environmental protection agencies, and environmental legislation experts. This series of conferences is different from other scientific fora, because it focuses on common tools and methodologies in a broad interdisciplinary field. These conferences are the natural forum for discussing modelling issues related to the European Union air quality directives. European networks such as the FAIRMODE network use the Harmo conferences to expose their work to a broader audience. Harmo 17 also provides an opportunity to present results from the MODITIC project. The Harmo conferences have a role as a forum where users and decision-makers can bring their requirements to the attention of scientists.

More than 150 participants from 29 countries – including Europe, North and South America, Asia and Australia – attended the Harmo 17 on 9–12 May 2016, at the Thermal Hotel Margitsziget, Budapest, Hungary, organised by the Hungarian Meteorological Service. This special issue presents revised and extended manuscripts from the conference that were submitted and passed the peer-review process according to the *IJEP* standards. The papers published in this special issue reflect the state-of-the-art on various scientific topics covered by the conference.