Preface

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Biographical notes: Khaiwal Ravindra is currently working as 'Scientist' at the University of Hertfordshire, UK and also holds a position of 'special academic personnel' at the University of Antwerp, Belgium. His research interests involve method development, chemical characterisation, source apportionment, health risks and mitigation policies for persistent and emerging pollutants; including global climate change and environmental impact assessment. Currently he is working on CAIR4HEALTH, ENVIRISK, HENVINET, MEGAPOLI, TRANSPHORM and other European Union projects. He has authored more than 35 peer reviewed articles having over 500 citations (H *index*: 13) and also wrote/edited four books. He is serving various international journals as a referee and is also a member of editorial board of *International Journal of Environment and Waste Management*, *Air, Soil and Water Research*, *Forum Geographic*, *Journal of Environmental Biology* and *Environmental Monitoring and Assessment*.

Special Issue: Part 2 of the special issue on 'Monitoring, fate and health risks of environmental pollutants' includes selected peer reviewed papers on the topic of environmental modelling and assessment. Modelling is an essential and inseparable part of all scientific activities. The application of environmental models having statistical and mathematical inputs can help to better understand sources, emission, process and environmental fate of various pollutants.

Numerous hydrologic/water quality models of runoff and soil erosion have been used with Geographical Information System (GIS) to monitor and determine surface sources of non-point pollutants from watersheds and agricultural areas. The paper by *Shams et al.*, discuss a real-time online hydrological information system that could be archived through a GIS based hydrological system. The study suggest to use hydrological information for planning and development of water resources e.g., estimation and monitoring of non-point source pollutant loads, flood defence.

Fuzzy logic has emerged as a practical and successful technique in the field of environmental sciences. It allows a better way to handle imprecise and uncertain information and easier transition between humans and computers for decision-making. *Girija and Mahanta*, evaluate the application of Fuzzy rule base model and compare the

performance with 'artificial neural network model' in predicting dissolved oxygen level, primarily based upon other sensitive parameters obtained from data generated. The authors suggest that correlating the critical parameters with dissolved oxygen concentration can help the decision makers to get an idea of the ecological health of the system. Similarly, *Rijal et al.*, applied fuzzy logic to investigate an association between bathing in polluted river and water borne diseases and also model epistemic uncertainty of the domain experts in supporting their evidence for various water borne diseases.

Vehicular emission are often considered significant contributor to the PM_{10} concentration in a city environment. A study by *Vanderstraeten et al.*, examines the $PM_{10}/PM_{2.5}$ levels during Car-Free Sunday in Brussels urban area. They report that around 80–90% of the PM_{10} mass concentration consisted of $PM_{2.5}$ and secondary aerosol accounted for 35–40% of the total particulate mass concentration. Interestingly, they conclude that the direct particulate traffic emissions are not the main contributor to the total PM_{10} mass concentration in Brussels. They suggest that other processes with a much greater impact are involved and hence high PM_{10} concentrations could be observed under quite contradictory conditions. *Badarinath et al.*, observed the variation in airborne particulate matter using ground based measurements and multi-satellite datasets. They found that Black Carbon predominant contributes to particulate matter mass loading in urban areas and specifically $PM_{1.0}$. The variations in particulate levels were found to be influenced by vehicular emission and on certain day's from biomass burning. In addition to the particulate pollution, elevated levels of ozone are of concern to policymakers and especially during summer seasons. During this period pollution levels exceed internationally-accepted guideline for the protection of human health and vegetation. The paper by *Alvim-Ferraz et al.*, evaluated the influence of land-sea breeze on the nocturnal ozone maxima in urban areas. An increase of ozone concentration during night was explained by the horizontal advection of ozone, associated with the development of land-sea breezes.

Several studies have documented high lead and other metal exposures in industries but very few studies have developed emission factors. *Iyiegbuniwe and Conroy* put their efforts to evaluate emission rate and develop emission factors during bridge construction works. Considering the associated health risk to workers, they also urge to banning new use of leaded paint in any infrastructure. An interesting study by *Moreira et al.*, compares the attained by the ADMM (integral solution) and GILTT (series solution) of the advection-diffusion equation. The solutions of two-dimensional advection-diffusion equation can be applied in operative models for describing dispersion of many scalar quantities e.g., air, water and soil pollution, radioactive material, and heat. Furthermore, these solutions can also be useful for evaluating the performances of numerical pollution models.

Heavy Gas Dispersion (HGD) models are used to simulate and predict the range of vulnerable area in case of emergency preparedness. Quantitative Risk Assessment (QRA) accomplished using HGD models do not quantify the risk potential in different areas, which are required for siting, planning and management of industries dealing with hazardous chemicals. Considering a need, *Mohan and Gurjar* proposed a modified HGD model, namely IITD-QRA to estimate individual risk factor with incorporation of various probit relations. *John and Chander* assess the toxicological effects of various combustion products that are susceptible to combustion and generate toxic gases during various manufacturing process. To evaluate the toxicity risk of engineering materials on combustion, they developed and validated a combustion toxicity index.

African and Asian regions are considered to be the world's largest source of biomass and mineral aerosols. The air quality in these regions is also becoming deleterious because of rapid increase in number of vehicles and poor control for emissions. In a case study *Nwofor* reviews the aerosol loading scenario and associated implication in Nigeria. Considering the air pollution and its health effects, developing countries are making efforts to strengthen emission regulations in various sectors to reduce emissions. Paper by *Hirota* estimates health costs and health impacts for the case of adulterated fuel market and for the case of emission regulation introduction by 2015. The author shows that fuel adulteration cause insufficient improvement on emission reduction from mobile source and emphasises increase of the efficiency of the fuel quality monitoring system to phase out fuel adulteration for introduction of lower emission standard.

The above discussion shows that the scientific models can help to understand complex environmental process in simple manner. The uses of scientific models build bridges between the scientific community's and the decision makers'. Decision makers can influence relevant policies and regulations on the basis of the best available information provided by the scientific communities. Finally, it is my great pleasure to thank all the contributors for submitting their manuscript for this special issue and all referees who did an excellent work for improving the manuscripts.

The motivation for editorial work was driven by the Health and Environmental Network (HENVINET) project. The main objective of the HENVINET is to establish long-term cooperation between researchers, policy makers and other stakeholders in the area of environment and health research. HENVINET was funded by the EU Commissions through the FP6 projects and for more information please visit the website: www.henvinet.eu