Foreword

Special Issue for the Australia–Taiwan Joint Symposium on Environmental Modelling

The Australia–Taiwan Joint Symposium on Environmental Modelling took place between 28 and 30 June 2000 in Tunghai University, Taiwan. The objectives of the symposium were to bring together a selection of Australian and Taiwan research organisations to present their latest research findings and to initiate collaboration between Australian and Taiwan scientists on environmental modelling, software and management. About 60 papers were presented in the symposium and the standard of the presentations was very high. Some of the problems addressed in the symposium are common to Australia and Taiwan, such as air quality, severe weather events and climate change, while others have strong regional characteristics, such as urban air pollution in Taiwan and land-use sustainability in Australia. Topics related to sustainable development and environmental management were also discussed.

We have selected 10 papers presented in the symposium and compiled this special issue for *Environmental Modelling & Software*. As in many major Asian cities and/or industrialized regions, air quality in Taiwan is of major concern. Four papers are devoted to this topic, representing different approaches to the problem. K.Y. Liu et al. applied a high-resolution air-pollution modelling system to study the impacts of sea/land breeze on the ozone distribution in northern Taiwan. They successfully simulated the local flow patterns that are influenced both by sea/land and mountain-valley circulations. These circulations play a significant role in the distribution of ozone and the transport of ozone from the urban to the coastal and mountainous areas. Carras et al. presented airborne observations for the Hong-Kong region. Their data provided a valuable validation for an air-quality assessment and prediction system which consists of modules for weather prediction and air-chemistry, an emissions inventory database and a graphical user interface. Carras et al. also presented data on other pollutants that are of interest with respect to the formation of photochemical smog. The study of C.M. Liu is concerned with air-quality assessment using 8-hourly average of O_3 and 24-hourly average of $PM_{2.5}$ concentrations as indicators, as newly proposed by the US EPA. He calculated

the air-quality indices for the Taiwan region and examined their usefulness and implications. The study of Lin and Lin is on the evaluation of transport-related air pollution in urban areas. They developed a system for estimating the emissions and distribution of traffic pollutants for Taichung by integrating models for vehicle-emission and pollution dispersion with relevant databases in the framework of a GIS.

Included in the special issue are three papers related to radiation. The study of Box is concerned with the climate forcing by atmospheric aerosol particles. He presented a comprehensive review of the radiative perturbation theory and discussed a series of applications and future developments. The paper of Schwerdtfeger is on the quantification of an important land-surface property (the albedo) of heterogeneous land-surfaces. He described an analytical model of the contributions to the albedo by the radiative elements of a non-homogeneous plane, as observed with an airborne pyranometer. A simple and effective model has been developed for the purpose. G.R. Liu et al. illuminated the improvements in the structure-function method for retrieving aerosol optical depth with SPOT HRV data. They demonstrated the effectiveness of using satellite images in air-quality monitoring.

The remaining three papers are concerned with land-surface processes. Li and Lyons applied three models to estimating evapotranspiration in central Australia, using limited routine meteorological data combined with remotely sensed surface temperature. This technique provides a simple and effective means of estimating large-scale evapotranspiration in remote arid regions. Xu and Shao presented a salt-transport model within the framework of a land-surface model that has detailed treatment of relevant land-surface processes. The model is applied to investigating the impact of irrigation water on land salinisation in a rice growing area. Finally, Letcher et al. examined various water-quality models and methods for estimating sediment, phosphorus and nitrogen loads in Australian catchment situations. The authors considered the implications of the limited available input data sets for load prediction in Australian

catchments. The importance of coordinated data collection over long time periods and fine temporal scales, covering a broad range of event sizes, is emphasised.

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