

## Preface

The usefulness of predictive simulations obtained by groundwater models is often hampered by the inability to indicate and preferably quantify the reliability of model results. Uncertainty in model predictions primarily stems from a number of errors relating to the model formulation, such as:

- inadequate conception of processes and interactions;
- inadequate description of processes and interactions;
- inadequate description of spatial and temporal variability;
- inadequate description of the state of the system (geometry, initial and boundary conditions, system stresses);
- incorrect coefficient values (parameter values) and improper specification of error bounds.

In recent years, significant research has been conducted resulting in a variety of approaches that can be used to incorporate the information about these errors into the modelling process and to establish the level of uncertainty in model-based decision-making. Increasingly, these new techniques are being applied to a variety of problems and sites.

This (post-published) publication comprises the proceedings of the International Conference on Calibration and Reliability in Groundwater Modelling: *Coping with Uncertainty* (ModelCARE 99) held in Zürich, Switzerland, in September 1999. As at the two previous conferences in the series, ModelCARE 90\* (held in The Hague, The Netherlands, in 1990) and ModelCARE 96† (held in Golden, Colorado, USA, in 1996), the major objectives of the ModelCARE 99 Conference were again to provide an international forum for state-of-the-art presentations on relevant methodologies and techniques, and the identification of the needs for future development. The conference also attempted to illustrate the applicability of various techniques through advanced case studies on calibration and reliability assessment.

Though the conference covered the entire field of groundwater modelling, three special focuses were selected, namely the estimation of groundwater recharge, techniques for decision-making under uncertainty, and integrated groundwater /surface water modelling. The relevant papers have not been included in separate chapters; they can be found throughout the publication.

This volume contains 74 papers spread over six topics. The papers were selected out of 91 pre-selected papers from both oral and poster presentations. The selection was performed by the Editors based on three reviews each. The three

\*The proceedings of ModelCARE 90 (ed. by K. Kovar) were published as IAHS Publ. no. 195.

†The proceedings of ModelCARE 96 (ed. by K. Kovar & P. K. M. van der Heijde) were published as IAHS Publ. no. 237.

reviewers consisted in general of one member of the Scientific Advisory Committee and two authors of candidate papers. The final version of the paper was again checked by the Editors. The overall procedure enabled, without doubt, a significant increase in the quality of the selected papers and therefore of the present volume. The Editors would herewith like to thank the reviewers for their efforts.

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