Preface

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Biographical notes: Chonglong Wu is a Professor at the School of Computer, China University of Geosciences, Wuhan and the Director of the Institute of Geological Information Science and Technology. He received his BSc (1968) and MSc (1982) from the China University of Geosciences at Beijing. Since 1985, he is designing and developing 3D geological information visualisation software platform based on geological and mineral resources point-source information system, which serves the informatisation of geological and mineral exploration works. His research interests include coal geology, oil and gas geology, geological and mineral exploration information technology and geological processes computer simulation.

Frits Agterberg is an Emeritus Research Scientist at the Geological Survey of Canada. He received his BSc from the University of Utrecht in 1957, and MSc (1959) and PhD (1961) from that same institution. After a one-year stay at the University of Wisconsin as a Post-doctorate Fellow, he joined the Geological Survey of Canada in 1962. He is the former President of the International Association for Mathematical Geology (IAMG). His research interests are in the fields of mathematical statistics and artificial intelligence applied to solve geoscience problems.

Gang Liu is a Professor of School of Computer, China University of Geosciences, Wuhan. He received his PhD in Earth Exploration and Information Technology from China University of Geosciences in 2004. From 2006 to 2007, he stayed at the University of Ottawa, Canada as a

Post-doctorate Fellow. His research interests include geological information system engineering, 3D geographical information system and quantitative stratigraphic correlation software development and its applications.

'Modelling of petroleum systems' involves studies in the field of basin modelling and evaluation of petroleum resources, and opens a broader perspective for further studies. Its general objective is to rebuild the history of oil and gas generation, expulsion, migration, accumulation and dissipation in petroleum systems and, then, proceed with the quantitative analysis of basin and quantitative assessment of oil and gas resources. Modelling of petroleum systems has already shown its significance in recent years, deepening the understanding of oil and gas basins and processes of oil and gas pool-forming, reducing risks of oil and gas exploration and improving the target hit rate. Methods and technologies for modelling of petroleum systems have attracted broad attention and are being advanced globally.

The concept of 'modelling of petroleum systems' was first proposed by Waples (1994), and has been accepted by researchers globally. In China, the concept is often called 'simulation of petroleum pool-forming dynamics', because the modelling of petroleum systems is primarily based on petroleum pool-forming dynamics. Currently, modelling of petroleum systems still faces many challenges, including: informatisation and quantification of petroleum system analysis, 3D rebuilding of the physical space where oil and gas pools formed, co-relationships between geological events in a petroleum system, descriptions of the multi-stage evolution of organic matter from different thermal sources, description and rebuilding of non-linear processes of oil and gas migration and accumulation, quantitative identification of conditions for sealing and storage of hydrocarbon traps, and analysis and control of sensitive parameters in a petroleum system.

In order to promote works on theories, methods and technologies of this topic and developments of software, the *International Journal of Oil, Gas and Coal Technology* publishes this special issue. Topics of the 11 papers in this issue cover discussion of theories and methods, collection and management of data, modelling tectonic evolution of basins, modelling geothermal field of basins, modelling of hydrocarbon generation, modelling of hydrocarbon expulsion, modelling of hydrocarbon migration and accumulation, quantitative assessment of hydrocarbon traps. Those topics face complex problems which are necessarily to be solved, especially in the 3D, dynamic and visualized environment. Discussing solutions to these problems will promote understandings and quantitative assessments of petroleum systems. Besides the above topics, this issue also includes a successful example in application.

These papers are written by more than 20 authors who have conducted exploratory studies on petroleum systems for many years. Although the final solution to the problem is still to be achieved, great progress has been made, as shown in this special issue. We welcome more researchers to take part in the discussion and promote the advancement of studies in this field.

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References

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