Preface

There is increasing pressure on the world's groundwater resources in response to greater demand for potable water from the human population and on-going growth in industrial development. The consequences of this pressure are the increasing contamination of water supplies and the need to ensure that these supplies are improved and protected for continued exploitation. This is necessary to sustain current groundwater resources and to ensure their availability for future generations.

This places tremendous pressures on water supplies that are provided by groundwater, in terms of managing the available resource and protecting its quality. There remains a need to develop innovative and especially cost-effective methods to clean up polluted groundwater. It is now widely acknowledged that many engineered technologies available for groundwater remediation are costly and often impractical, particularly in urban settings or with complex industrial sites and pollution histories. A more practical philosophy to groundwater resource management and remediation is needed, within the concept of sustainable development.

Restoration using monitored and enhanced natural attenuation has received significant attention over the last few years, as a cost-effective, risk-based, low intensity technology for the *in situ* treatment of contaminated land and groundwater. Much of this interest has been stimulated by the success in using natural attenuation to remediate petroleum hydrocarbon spills. However, the focus is now shifting towards developing an understanding of the natural attenuation of a wider range of contaminants that impact groundwater. Important issues that need to be addressed are:

- identifying contaminants for which natural attenuation is an unsuitable technology;
- defining conditions under which natural attenuation is not likely to be effective;
- developing suitable site investigation methods to reliably monitor natural attenuation processes;
- extending and applying numerical modelling techniques to predict attenuation and risk reduction;
- developing practical ways to enhance or increase natural attenuation.

This publication comprises the proceedings of the GQ2001 International Conference on Groundwater Quality: Natural and Enhanced Restoration of Groundwater Pollution, held in Sheffield, UK, 18–21 June 2001. It continues the series established by the previous conferences, GQM'93 (held in Estonia in 1993), GQ'95 (held in the Czech Republic in 1995) and GQ'98 (held in Germany in 1998)*. The major objective of the conference was to provide an international forum to discuss the newest advances in research on natural and enhanced restoration of pollutants in soils and groundwater.

*The conference proceedings volumes are all available from IAHS Press.

Groundwater Quality Management. Proceedings of the GQM'93 Conference held at Tallinn, Estonia, September 1993 (ed. by K. Kovar & J. Soveri). IAHS Publ. no. 220 (1994).

Groundwater Quality: Remediation and Protection. Proceedings of the GQ'95 Conference held at Prague, May 1995 (ed. by K. Kovar & J. Krásný). IAHS Publ. no. 225 (1995).

Groundwater Quality: Remediation and Protection. Proceedings of the GQ'98 Conference held at Tübingen, September 1998 (ed. by M. Herbert & K. Kovar). IAHS Publ. no. 250 (1998).

Particular focus was given to site characterization and remediation strategies using state-of-the-art techniques, field-scale demonstration of treatment technologies, fundamental understanding of natural attenuation processes in the subsurface and their application in remediation design, reactive barrier design and performance, and reactive transport modelling of natural attenuation processes.

This volume contains 88 peer-reviewed papers from the conference and includes both oral and poster presentations. The papers presented at the conference were selected by the conference organizers and Scientific Advisory Committee from over 220 submitted abstracts.

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The conference was organized by the following committee:

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Conference Papers	Steven Thornton and Sascha Oswald
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