

Military Aspects of Hydrogeology

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Military Aspects of Hydrogeology

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Preface

The framework for this book was provided by 12 papers, presented at a meeting at the Geological Society in London on 18 November 2009. Entitled 'Military uses of hydrogeology: past and present', the meeting was convened under the auspices of the History of Geology Group and the Society's Hydrogeological Group, co-sponsored as a Joint Professional Meeting by the Institution of Royal Engineers.

Inspiration for the meeting was provided by two previous one-day symposia convened under the Society's auspices. The first of these, held on 16 April 1996 during an Applied Geoscience conference at the University of Warwick, generated a book on 'Geology and warfare' (Rose & Nathanail 2000). The second symposium, held on 12 December 2002 at Burlington House in London, resulted in a Special Publication on '200 years of British hydrogeology' (Mather 2004).

The original 12 papers have been developed, and supplemented by additional papers to generate the present book. Following an introduction and overview of the subject (**Mather & Rose**), two papers (**Younger; Mather**) illustrate how groundwater has long been important in military history. Military uses of hydrogeology as such became important on the battlefield only during World War I, the largely static 'Great War' of 1914–1918. **Rose** demonstrates the importance of groundwater as a resource and **Doyle** outlines its importance as an obstacle during excavation, both from a British perspective. A complementary German perspective to both these topics is provided by **Willig & Häusler**.

Groundwater was again important in World War II, in the more mobile conflicts of 1939–1945. **Rose** shows how Boring Sections of the Royal Engineers, disbanded after World War I, were raised again in World War II and used widely to support British military operations. **Mather** describes how military requirements during the war provided a significant stimulus to hydrogeological work by the Geological Survey of Great Britain. **Greenwood** shows how a British multidisciplinary team pioneered studies on the effects of variations in soil and soil moisture conditions on cross-country vehicle movement: 'going'. **Willig & Häusler** provide a German perspective, demonstrating that in World War II as in World War I, German armed forces made earlier and more extensive use of military geology than the Allies. **Robins *et al.*** provide a unique case history: of German military hydrogeological expertise deployed on British terrain during the war years.

Subsequent papers bring military operational uses of hydrogeology up to date. **Gellasch** reviews

hydrogeology and US military operations during the last 100 years, culminating with his own operational experience in the Middle East. **Dow & Rose** complement this with a British perspective of recent operations in Afghanistan, and **Willig** again provides a German perspective, based on his personal operational experience serving with German armed forces.

Four papers give examples of recent or ongoing research in hydrogeology generated by military imperatives or funding, especially in the USA. **Downer *et al.*** provide a review of past, present and future US Army research in hydrological modelling. **Howington *et al.*** focus on the influence of very-near-surface hydrogeology on thermal infrared signatures for detecting landmines and other targets. **Priddy *et al.*** discuss the effect of near-surface hydrology on soil strength and vehicle mobility. **Miller & Foran** describe research into groundwater and land remediation at sites contaminated by military use.

The final two papers consider very different military aspects of hydrogeology. **McCaffrey & Bullock** describe how, in the UK, responsibility for water supply and wastewater treatment at Ministry of Defence sites has been devolved to private companies. **Mansour *et al.*** discuss how the equitable allocation of groundwater from the transboundary Mountain Aquifer is an ongoing cause of political and, potentially, military, tension in Israel and the West Bank.

The editors have spent some time discussing an appropriate title for this collection of papers as it contains details of recent research on near-surface hydrology, which many would consider to lie within the realm of the hydrologist or soil scientist rather than the hydrogeologist. However, Joseph Lucas, who first used the word hydrogeology in its modern context, considered that 'Hydrogeology takes up the history of rain water from the time that it touches the soil and follows it through the various rocks which it subsequently percolates' (Lucas 1877, p. 154). All the papers in this volume can be considered to fall within the scope of such a definition and 'hydrogeology' has therefore been retained in the title as the most appropriate description of the science presented.

In accordance with standard Geological Society practice, each chapter has been peer-reviewed by at least two referees anonymous to the authors. The following friends and colleagues assisted in this way, some for more than one paper, and are thanked for their help and support, which greatly improved the book: D. Banks, A.H. Bath, J.H. Black, F.C. Brassington, W.G. Burgess, J.A.

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