

Geological Hazards in the UK: Their Occurrence,  
Monitoring and Mitigation  
Engineering Group Working Party Report

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GILES, D. P. & GRIFFITHS, J. S. (eds) 2020. *Geological Hazards in the UK: Their Occurrence, Monitoring and Mitigation – Engineering Group Working Party Report*. Geological Society, London, Engineering Geology Special Publications, **29**.

GAMBLE, B., ANDERSON, M. and GRIFFITHS, J. S. 2020. Hazards associated with mining and mineral exploitation in Cornwall and Devon, SW England. *Geological Society, London, Engineering Geology Special Publications*, **29**, 321–368, <https://doi.org/10.1144/EGSP29.13>

GEOLOGICAL SOCIETY ENGINEERING GEOLOGY SPECIAL PUBLICATION NO. 29

Geological Hazards in the UK: Their Occurrence,  
Monitoring and Mitigation  
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2020  
Published by  
The Geological Society  
London

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### **British Library Cataloguing in Publication Data**

A catalogue record for this book is available from the British Library.

ISBN 978-1-78620-461-5

ISSN 0267-9914

### **Distributors**

For details of international agents and distributors see:

[www.geolsoc.org.uk/agentsdistributors](http://www.geolsoc.org.uk/agentsdistributors)

Typeset by Nova Techset Private Limited, Bengaluru & Chennai, India

Printed and bound by CPI Group (UK) Ltd, Croydon CR0 4YY

## Preface

News of environmental, personal and monetary losses arising from problems with the behaviour of the ground and with surface water appear regularly worldwide. Fortunately, the UK does not suffer from the extreme effects of such geological hazards (also known as 'geohazards') such as the large earthquakes, landslides, volcanic eruptions, floods and so forth that are an important feature of the physical environment in some other countries. Nevertheless, for the UK, such phenomena remain important on a local scale.

Within the UK, the wide variety and geographical spread of geohazards are a consequence of our varied geology and geomorphology, and the potentially adverse impacts and legacies of human activity such as mining and land management. This variety presents practical problems when writing at reasonable length and in appropriate detail for the broad

audience of professions who may have to deal with geohazards and their effects: engineering geologists and geomorphologists, civil engineers, planners, environmental managers, developers, government and aid organizations. The Working Party's approach has been to subdivide geohazards into four categories (geophysical, geotechnical, geochemical and georesource related) and, having explained how the geohazards occur and operate (individually or in combination), to suggest means by which they may be detected, monitored and managed.

I hope that users of the Working Party's report will agree that it has met its objective of helping geoscientists communicate an understanding of geohazards and, by doing so, to have contributed to the Geological Society's wider purpose of 'serving science, profession and society'.

**David Shilston CGeol, FGS, FRSA**

*Past President of the Geological Society*

*SNC Lavalin/Atkins Fellow and Technical Director for Engineering Geology*

## Acknowledgements

The original Geological Society Working Party on Geological Hazards was initiated under the leadership of Prof. Mike Rosenbaum, Dr David Entwistle and Dr Alan Forster in August 2002 following informal meetings held at the British Geological Survey, Keyworth, and they are thanked for their contributions at the start of this long project. Due to many membership changes the Working Group was reformatted in 2010 with lead authors designated to facilitate and compile the identified chapters. The following Working Party members are thanked (in chapter order) for their considerable efforts in bringing this project to completion: Prof. Roger Musson (British Geological Survey), Dr Mark

Lee (Ebor Geoscience), Professor Mike Winter (formerly TRL Scotland), Professor Martin Culshaw (British Geological Survey), Dr Lee Jones (British Geological Survey), Professor Jeff Warburton (Durham University), Tom Berry (Jacobs), Dr Laurance Donnelly (AHK), Dr Clive Edmonds (Peter Brett Associates), Barry Gamble (Independent consultant to UNESCO), Dr Tony Cooper (British Geological Survey), Dr Don Appleton (British Geological Survey) and Steve Wilson (EPG Ltd).

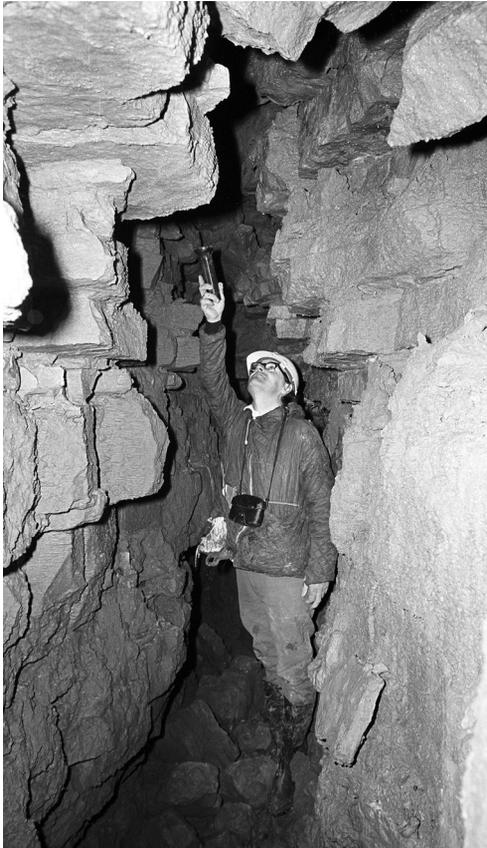
We would also like to thank the many chapter reviewers for their invaluable comments and suggestions.

## Dedication

This book is dedicated to Dr Brian Hawkins

### Alfred Brian Hawkins

*PhD DSc FICE FIMMM FIHT CEng CGeol EurIng  
(10 October 1934–22 January 2016)*



Brian Hawkins in a gull, doing what he will be most remembered for.

Brian Hawkins was born on a farm in Bitton, between Bristol and Bath, in 1934. After studying at the University of Bristol, initially for a geography and subsequently a geology degree, he took a teaching qualification to fulfil his long-held ambition to teach and began work in the first comprehensive school in Bristol. Fascinated by the Quaternary, he continued his research at the University and was invited to consolidate this by undertaking a doctorate. In order to do so, he took a

post in the Department of Extra-Mural Studies, organizing and teaching geology to the public. At the same time, he continued his research and began teaching in the Department of Geology and taking an active part in the recently formed Engineering Geology Group of the Geological Society. His enthusiasm for engineering geology led to his working with Bill Dearman to set up a UK branch of the International Association for Engineering Geology. A true engineering geologist, he was well respected by the engineering fraternity and became a Fellow of the Institution of Civil Engineers.

He established a strong engineering geological research unit at Bristol, embracing topics in Quaternary geology; superficial structures; slope stability in engineering soils and engineering rocks; the development of ground sulfates and the stability and remediation of mines and tunnels, particularly in the Bristol and south Cotswolds region. Brian was awarded a PhD in 1970 and DSc in 1989, being promoted to Reader in 1979.

Brian continued teaching and research in Engineering Geology at the University of Bristol in the departments of both Geology (later Earth Sciences) and Civil Engineering until his sudden death in 2016. During a university career spanning almost 50 years, he supervised over 35 PhD students and published some 120 paper and articles as well as editing books and conference proceedings.

Brian had boundless energy and enthusiasm – as will be appreciated by anyone who attended one of his lectures, or indeed worked with him on site! In the mid 1990s he took official early retirement from the University to give more time to his national and international consultancy work. He became a recognized authority on the pyrite problem beneath houses in Ireland. The practice enabled him to remain involved on a personal level, advising local authorities, public utilities, contractors and consultants on practical aspects of construction work as well as contractual issues and as an expert witness.

He was frequently invited to lecture at universities and international conferences and to be involved in field visits and has always been active in the profession. Amongst his many roles have been: Secretary (1974–76) and then Chair (1982–84) of the Engineering Group of the Geological Society; Vice President for Europe for the International Association for Engineering Geology and the Environment (IAEG) (1994–98); member of the Geotechnique Advisory Panel; Editor of the *Quarterly Journal of Engineering and Hydrogeology* (1990–93) and Editor-in-Chief of the *Bulletin of Engineering Geology and the Environment* (1998–2012).

He and co-editor Roger Cojean are cited by the IEAG as being responsible for where the journal stands today.

Brian was honoured with being the first recipient of the Marcel Arnould Medal presented at the 2014 IAEG Congress in Torino 'in recognition of people of significant repute within the IAEG and who have made a major contribution to the Association'.

Brian was a true inspiration. His delivery style for lectures and fieldtrips was the foundation for many a practical, hands-on career for countless students over the years. They are exceedingly lucky to have met such a man.

—Dr Kevin Privett and Dr Marian Trott