The Geological Society

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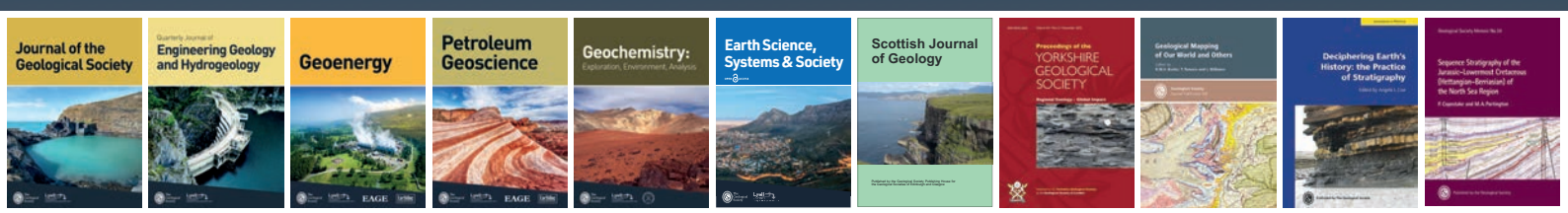
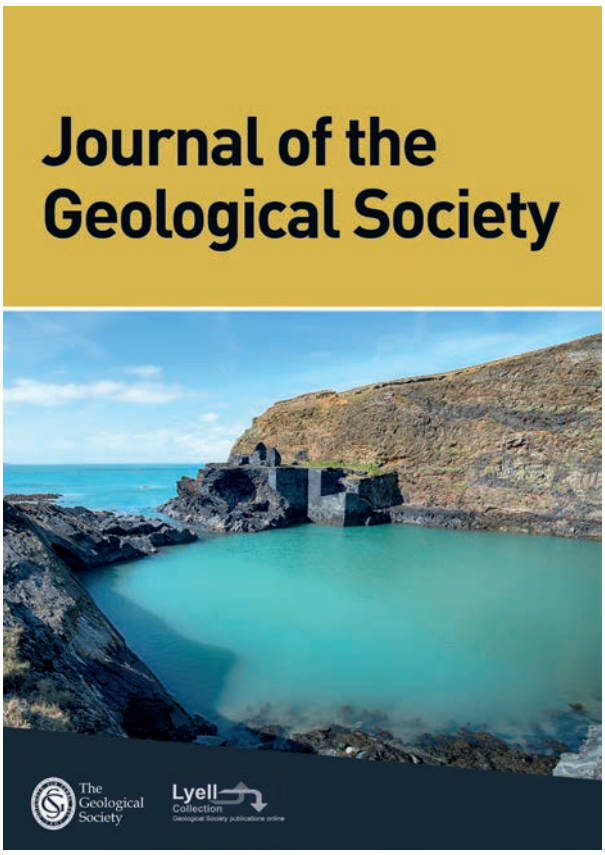
Geological Society Journal & Book Highlights





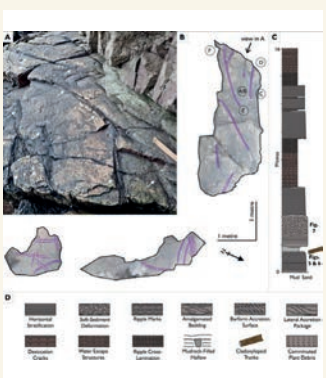
Journal of the Geological Society (JGS)

Editor-In-Chief: Yildirim Dilek

About the Journal

The flagship Journal of the *Geological Society of London* - the oldest geological society in the world, *JGS* is a key and established journal for researchers in the geosciences. The journal publishes topical, innovative and interdisciplinary research with global reach across the full range of Earth and planetary sciences. Papers emphasize the development of an understanding of fundamental geological processes. The journal features research, review, perspective and discussion articles as well as review focus series and thematic collections.

Explore more www.lyellcollection.org/journal/jgs



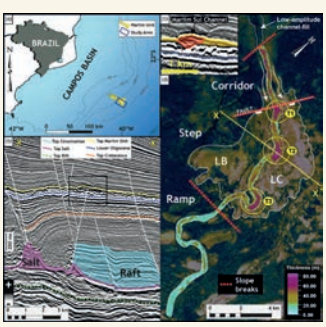
Open Access

Earth's earliest forest: fossilized trees and vegetation-induced sedimentary structures from the Middle Devonian (Eifelian) Hangman Sandstone Formation, Somerset and Devon, SW England

By Neil S. Davies, William J. McMahon and Christopher M. Berry

The oldest fossilized forest on Earth - dating from 390 million years ago - has been identified in fossils found along the Somerset and Devon coast, UK. The evolution of trees and forests through the Devonian Period fundamentally changed Earth's land biosphere, as well as impacting physical environments and geomorphology by stabilizing sediment and interacting with flowing air and water..

Read more on the Lyell Collection www.lyellcollection.org/doi/abs/10.1144/jgs2023-204



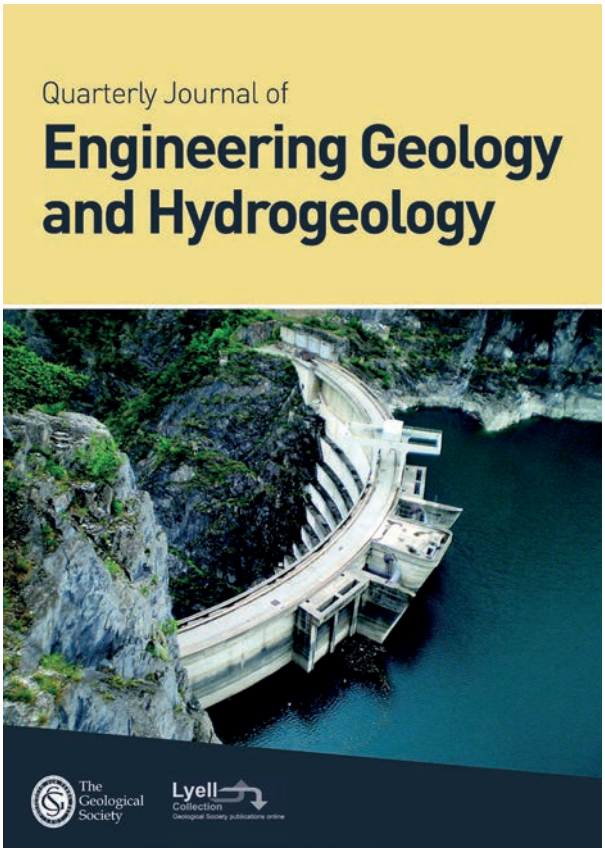
Open Access

A salty snapshot: extreme variations in basal erosion patterns preserved in a submarine channel

By Junia Casagrande, David M. Hodgson and Jeff Peakall

The bases of active submarine channels are marked by large erosional features, such as knickpoints and plunge pools. However, their presence in ancient channel-fills has rarely been documented, so their importance in submarine channel morphodynamics requires investigation.

Read more on the Lyell Collection www.lyellcollection.org/doi/full/10.1144/jgs2023-006



Quarterly Journal of Engineering Geology and Hydrogeology (QJEGH)

Editor-In-Chief: Cherith Moses

About the Journal

Quarterly Journal of Engineering Geology and Hydrogeology (QJEGH) was established in 1967 to foster engineering geology research and practice. International in scope, its focus is on geology as applied to civil and environmental engineering and groundwater resource management. Publishing high-quality, authoritative, peer-reviewed, international papers, addressing sustainability, climate change, energy transition, geohazards and geo-resilience, to inform academic and industry practitioners in engineering geology and hydrogeology.

QJEGH publishes research papers, case studies, review articles, technical notes, photographic features and thematic collections.

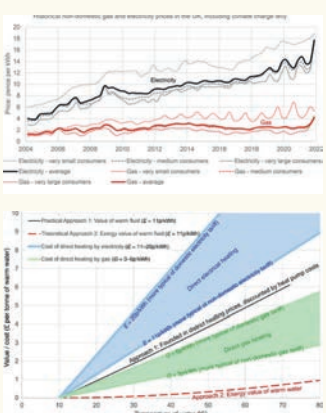
Explore more www.lyellcollection.org/journal/qjegh

Debris flow at Luib on the A87 strategic road: Isle of Skye, Scotland

By M. G. Winter and T. Waaser

A rainfall-induced debris flow occurred on 30 September 2022, closing the A87 trunk (strategic) road on the Isle of Skye for around 2 h. Ground-based and aerial drone inspections were used to describe the event and a comprehensive rainfall analysis was undertaken. It is concluded that the event was triggered by overland water flow from the slopes above the source zone as a result of high rainfall.

Read more on the Lyell Collection www.lyellcollection.org/doi/full/10.1144/qjegh2023-111



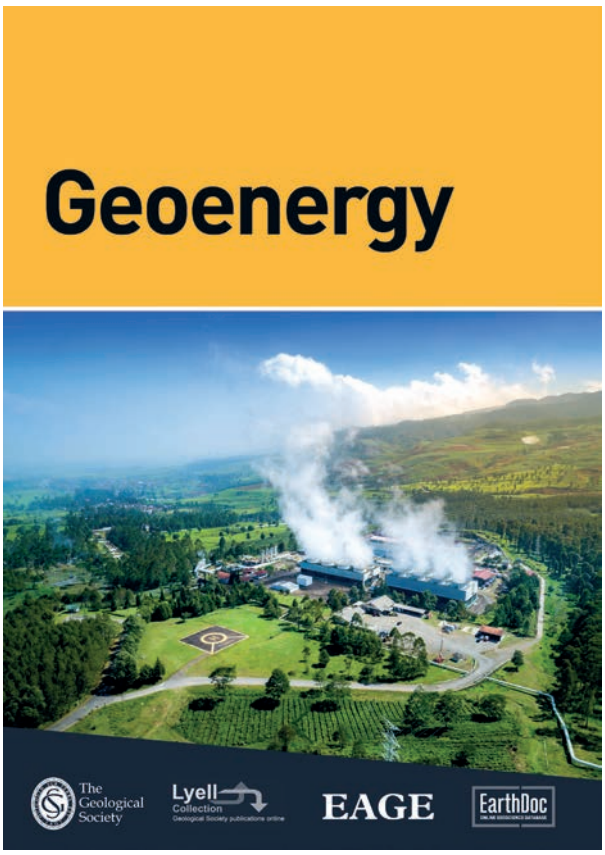
Open Access

Development of a drought-resilient water supply from dolomitized limestones of the Irish Midlands

By O. D. Higgins

A hydrogeological investigation is presented that focused on the development of a drought-resilient groundwater supply for a town (Carlow) in the Irish Midlands. The combination of thick overlying glacial deposits and Carboniferous limestones of low primary permeability posed a challenge to identifying a groundwater source. The source exploration strategy comprised surface geophysics and follow-on pilot well drilling to identify zones of high (secondary) permeability in bedrock.

Read more on the Lyell Collection www.lyellcollection.org/doi/full/10.1144/qjegh2023-043



Geoenergy

Editor-In-Chief: Sebastian Geiger

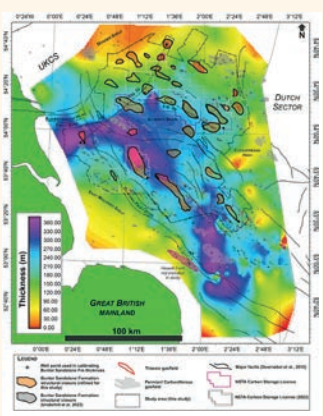
About the Journal

Published by GSL Publishing House on behalf of the *Geological Society of London* and the *European Association of Geoscientists and Engineers (EAGE)*, *Geoenergy* focuses on the publication of timely and topical research in subsurface geoscience, critical for this new era of sustainable energy.

The journal considers articles on the following themes:

- Energy storage: thermal energy storage, compressed air energy storage, hydrogen storage, hydroelectric storage
- Subsurface disposal and storage: carbon capture and storage (CCS), bioenergy with carbon capture and storage (BECCS), radioactive waste storage
- Geothermal energy: exploration, characterization and modelling of geothermal fields
- Hydrogen energy: exploration, production and storage of hydrogen
- Critical minerals and raw materials: minerals for the energy transition
- Sustainability: surveillance and long-term assurance for management

Explore more www.lyellcollection.org/journal/geoenergy



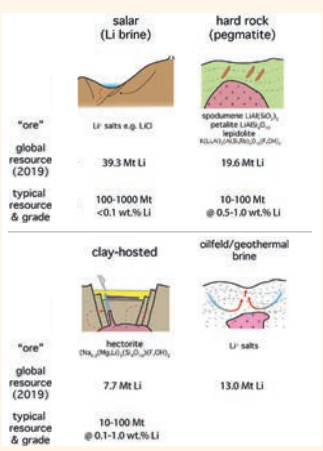
Open Access

Impact of reservoir quality on the carbon storage potential of the Bunter Sandstone Formation, Southern North Sea

By A. D. Hollinsworth, I. de Jonge-Anderson, J. R. Underhill and R. J. Jamieson

The Lower Triassic Bunter Sandstone Formation is a major prospective reservoir for carbon capture, utilisation and storage in the UK Southern North Sea, and is likely to play a pivotal role in the UK reaching mid-century Net Zero targets. A knowledge gap in reservoir quality exists between previous detailed, but highly focused front-end engineering and development projects, and large-scale regional analysis.

Read more on the Lyell Collection www.lyellcollection.org/doi/abs/10.1144/geoenergy2023-037



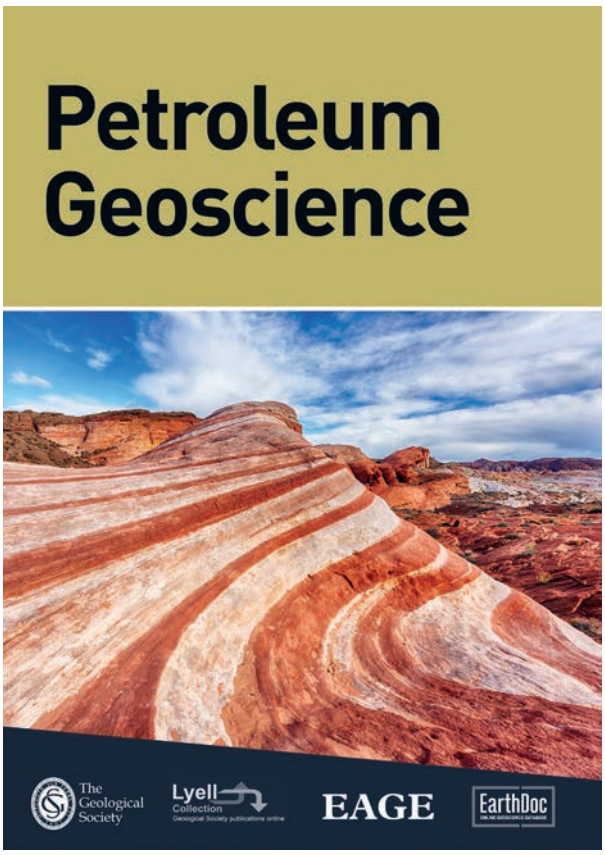
Open Access

Lithium: critical, or not so critical?

By Nicholas J. Gardiner, Simon M. Jowitt and John P. Sykes

Some metals necessary to deliver renewable energy are considered critical. Metal criticality is a major factor in achieving energy decarbonization, leading to efforts to make metals uncritical. Among the most critical is lithium which, like many critical metals, represents a small-scale market experiencing significant demand increase causing price and supply volatility, thereby hindering necessary transformative investment.

Read more on the Lyell Collection www.lyellcollection.org/doi/full/10.1144/geoenergy2023-045
This paper is part of the 'The energy-critical metals for a low carbon transition' collection



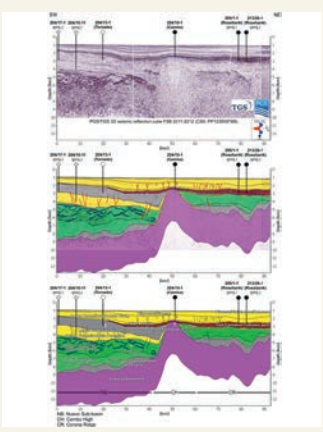
Petroleum Geoscience (PG)

Editor-In-Chief: Jonathan Redfern

About the Journal

Published by GSL Publishing House on behalf of the *Geological Society of London* and the *European Association of Geoscientists and Engineers (EAGE)*, *Petroleum Geoscience* transcends disciplinary boundaries and publishes a balanced mix of articles that drives the science to enhance sustainable development covering all aspects of the petroleum system. The journal content reflects the international nature of the research. *PG* welcomes a range of papers on themes that include: exploration, exploitation, appraisal, development and monitoring of sub-surface hydrocarbon resources; enhancing exploration efficiency, lowering technological and environmental risk, and improving hydrocarbon recovery; and transferable knowledge and integration of disciplines in an applied context.

Explore more www.lyellcollection.org/journal/pg



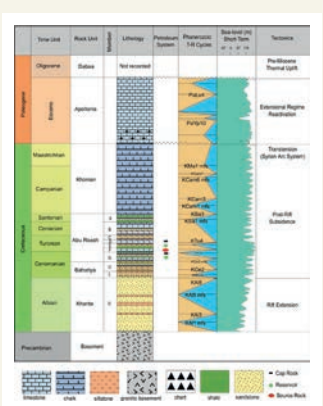
Open Access

Petroleum generation and migration through the Faroe–Shetland Basin – the role of igneous intrusions

By A. Mangione, N. Schofield, S. Holford, C. Grove, C. Ellis, C. Forster, O. Schenk, D. Gardiner, B. Hedley, L. Broadley and J. R. Underhill

Previous basin modelling of the Faroe–Shetland Basin (FSB, offshore UK) has suggested mid-Cretaceous petroleum generation, which predates the deposition of the working Paleogene reservoirs and traps. To justify the time discrepancy between generation, reservoir, and trap formation, factors such as intermediary accumulations and overpressure have been invoked.

Read more on the Lyell Collection www.lyellcollection.org/doi/full/10.1144/petgeo2022-084

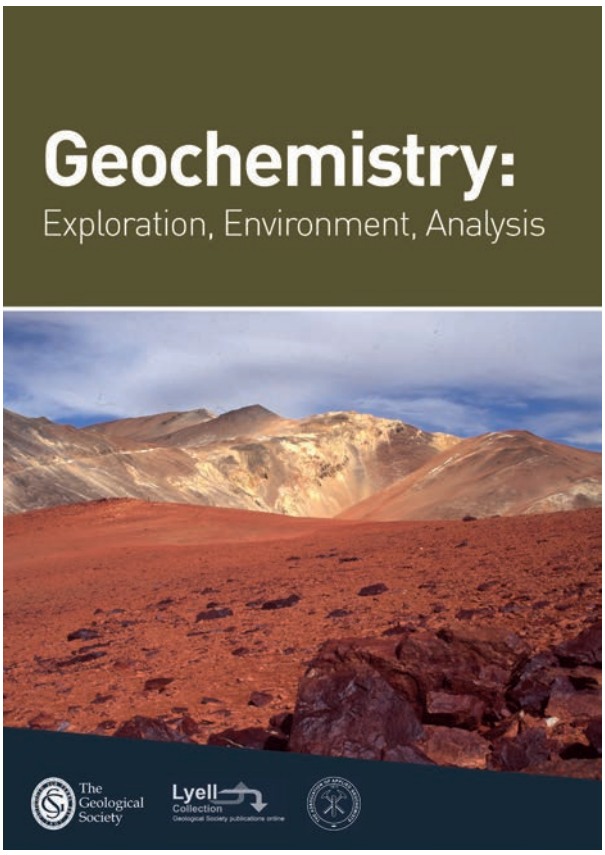


The Upper Cretaceous petroleum system of the East Beni Suef Basin, Egypt: an integrated geological and 2D basin modelling approach

By Ahmed Yousef Tawfik, Robert Ondrak, Gerd Winterleitner and Maria Mutti

We integrated geological and 2D basin modelling to investigate the tectonostratigraphic evolution of the East Beni Suef Basin (EBSB) of north central Egypt and its implications for the Upper Cretaceous petroleum system. Two intersecting seismic sections and three exploration wells were used for this study. The geological model defines the structural and geometrical framework of the basin, which formed the basis for subsequent 2D basin modelling.

Read more on the Lyell Collection www.lyellcollection.org/doi/full/10.1144/petgeo2022-077



Geochemistry: Exploration, Environment, Analysis (GEEA)

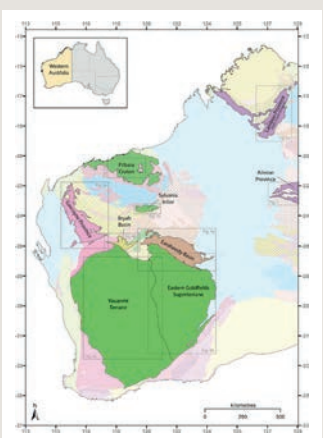
Editor-In-Chief: Scott Wood

About the Journal

Geochemistry: Exploration, Environment, Analysis (GEEA) is a co-owned journal of the *Geological Society of London* and the *Association of Applied Geochemists (AAG)*.

GEEA welcomes papers that focus on the use of geochemistry in mineral exploration and resource development, the application of geochemistry to environmental issues related to mining and mineral processing, and the development of methods and techniques to geochemically analyze rocks, soils, sediments, waters and vegetation.

Explore more www.lyellcollection.org/journal/geea



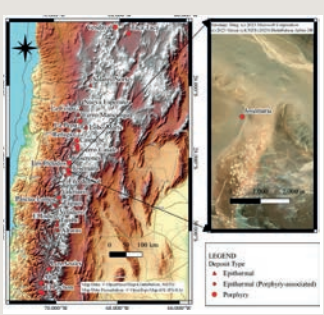
Open Access

Multi-element geochemical analyses on ultrafine soils in Western Australia – towards establishing abundance ranges in mineral exploration settings

By Anicia Henne, Ryan R. P. Noble and Morgan Williams

In this study, we present summary statistics for multi-element soil geochemistry across Western Australia based on over 74 000 soil samples using the UltraFine+® method that extracts and analyses the clay (<2xm) fraction of a soil sample. This method is a critical advancement for the detection of mobile element signatures for soil geochemical mineral exploration surveys in cover.

Read more on the Lyell Collection www.lyellcollection.org/doi/full/10.1144/geochem2023-043

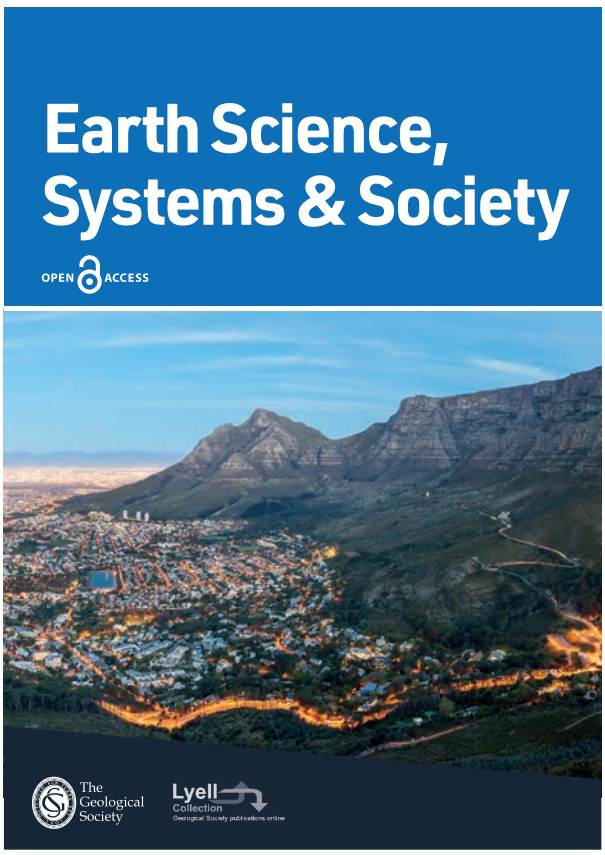


Alteration assemblage characterization using machine learning applied to high-resolution drill-core images, hyperspectral data and geochemistry

By McLean Trott, Cole Mooney, Shervin Azad, Sam Sattarzadeh, Britt Bluemel, Matthew Leybourne and Daniel Layton-Matthews

Integration of multiple data types is beneficial for prediction of geological characteristics. From the perspective that geochemistry characterizes the composition of a rock mass, hyperspectral data characterizes alteration mineralogy and image feature extraction characterizes texture, most geological classifications would be well-informed by the combination of these three features. The process of meaningfully integrating distinctly sourced datasets and producing scale-relevant predictions for geological classifications involves several steps.

Read more on the Lyell Collection www.lyellcollection.org/doi/full/10.1144/geochem2023-032



Earth Science, Systems and Society (ES³)

OPEN ACCESS

Editor-In-Chief: Kathryn Goodenough

About the Journal

Earth Science, Systems and Society (ES³) is a, fully gold Open Access journal, owned and published by *the Geological Society of London* using the systems and services of Frontiers Media. *ES³* is dedicated to the publication of timely and topical research of high importance across the breadth of the geosciences, with a special focus on cross-disciplinary research that showcases the relevance of geoscience to sustainability in society.

The Journal's mission focuses on encouraging inclusivity and diversity in publishing, engaging directly with early career researchers, embodying principles of openness and transparency in science, and presenting a forward-looking perspective on geoscience and related disciplines.

As a not-for-profit endeavour from the Geological Society of London, any surplus is reinvested in discounts and waivers to increase access for those without funding.

Explore more www.geolsoc.org.uk/es3

Open Access

"you just look at rocks, and have beards" Perceptions of Geology From the United Kingdom: A Qualitative Analysis From an Online Survey

By Steven L. Rogers, Natasha Dowey, Sarah E. Greene, Rehemat Bhatia, Katrien Van Landeghem and Chris King

In the last few decades, Geology courses, particularly in the Global North, have seen a decline in student enrolment. Geologists have linked this downturn to a lack of exposure to the subject at school and college level. This work seeks to understand the public's relationship with Geology and draws on over 5,000 open-ended question responses to a survey disseminated in 2021. The survey asked both those who had, and had not, studied geology as a subject a series of questions in order to explore their perceptions of the discipline. Our findings indicate that individuals "outside" of geology see the subject as old fashioned, boring, and environmentally damaging; simply the study of rock samples with nothing new to be discovered from.

Read more online www.escubed.org/journals/earth-science-systems-and-society/articles/10.3389/esss.2024.10078/full

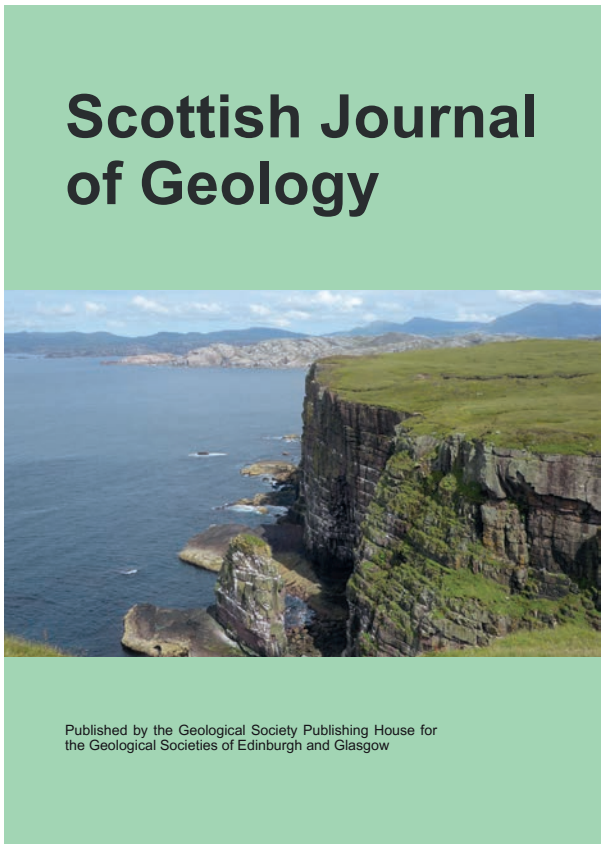
Open Access

A Critical Geological Evaluation of the Hydrogen Storage Potential in the Cousland Gas Field, Midland Valley of Scotland

By Malcolm Butler and John R. Underhill

Hydrogen is envisaged to be an important element in the drive to replace hydrocarbons in the energy mix and its geological storage in human-made salt caverns or porous subsurface reservoirs onshore in the United Kingdom is being actively investigated. It has recently been suggested that porous Carboniferous sandstone reservoirs of the partially depleted and abandoned Cousland Field, located *c.*15 km SE of Edinburgh, could be used for the storage of hydrogen as part of efforts to decarbonise the industrialised and heavily populated central belt of Scotland.

Read more online www.escubed.org/articles/10.3389/esss.2023.10076/full



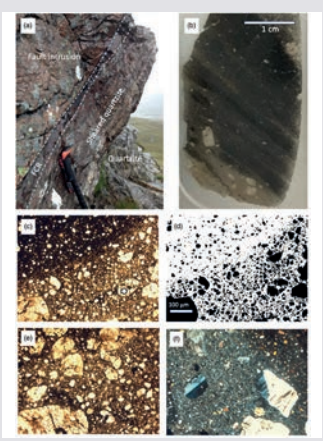
Scottish Journal of Geology (SJG)

Editor-In-Chief: Heather Stewart

About the Journal

Joint publication of the *Geological Society of Glasgow* and the *Edinburgh Geological Society*, *SJG* publishes papers on all aspects of the geology of Scotland and its adjacent areas, including the North Sea and North Atlantic margins. The geology of Scotland is an important natural laboratory for all branches of Earth science; many studies in geology have been carried out in Scotland and *SJG* provides a forum for their publication. Traditionally, the journal has acted as the focus for papers on all aspects of Scottish geology and its contiguous areas, including the surrounding seas. The publication policy has always been outward looking, with the Editors encouraging review papers and papers on broader aspects of the Earth sciences that cannot be discussed solely in terms of Scottish geology. The journal fully deserves its high reputation worldwide and intends to maintain its status in the front rank of publications in the Earth sciences.

Explore more www.lyellcollection.org/journal/sjg



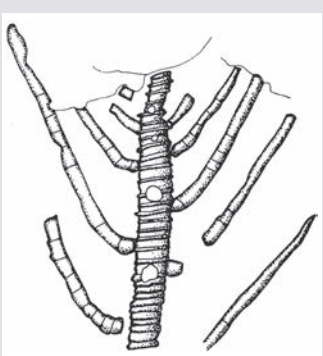
Open Access

Magma mixing between rhyolite and pseudotachylite as the origin for the Glencoe 'flinty crush rock'

By David P. Dobson and Viorela Martinescu

The Glencoe caldera is a well-studied example of a caldera system exposed to intermediate depths along the glacially excavated glen. We present a first quantitative assessment of clast-size population and matrix chemistry from the flinty crush rock that occurs on the main ring faults. Size–shape metrics of clasts differ from those of a 'normal' pseudotachylite from the Outer Hebrides. Both samples display good power-law clast-size populations, once allowance is made for dissolution of a portion of clasts into the melt that contained them, with fractal dimensions of 2.7 and 4.0 for the Outer Hebrides and Glencoe samples respectively.

Read more on the Lyell Collection www.lyellcollection.org/doi/full/10.1144/sjg2023-016

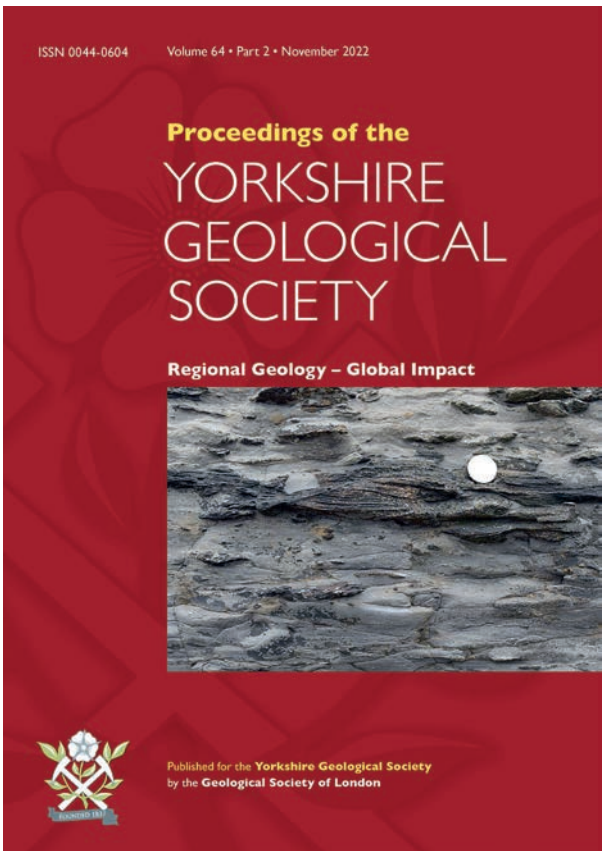


Functional morphology of the stem in the Lower Paleozoic crinoid *Macrostylocrinus* Hall from Scotland

By Stephen K. Donovan

Two species of the closely related monobathrid crinoid from the Lower Paleozoic of Scotland, namely *Macrostylocrinus cirrifer* Ramsbottom (Upper Ordovician, Katian) and *Macrostylocrinus silurocirrifer* Brower (Lower Silurian, Telychian), are similar in having elongate, unbranched radices proximally. These were not cirri, as suggested by their names, but were radices that were more or less inflexible, lacking contractile tissues. The function of these radices was uncertain.

Read more on the Lyell Collection www.lyellcollection.org/doi/full/10.1144/sjg2023-021



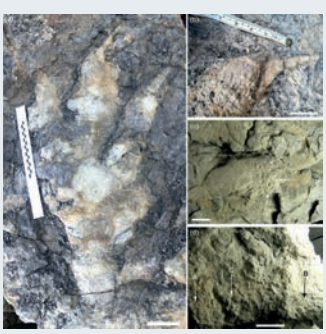
Proceedings of the Yorkshire Geological Society (PYGS)

Editor-In-Chief: Paul Wignall

About the Journal

The *Proceedings of the Yorkshire Geological Society (PYGS)* has been published without a break since 1839. It is one of the leading journals of British geology. Each year two parts are issued containing original research papers on all aspects of geology. The journal aims to make local observations, records and datasets available to inform understanding of geological processes and history more widely, both within and across disciplines. Emphasis is on publication of research and reviews relating to northern and eastern England and its offshore area, but not exclusively.

Explore more www.lyellcollection.org/journal/pygs



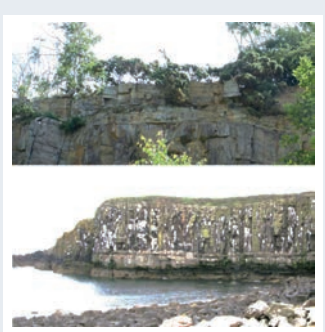
Open Access

A new giant theropod dinosaur track from the Middle Jurassic of the Cleveland Basin, Yorkshire, UK

By John G. Hudson, Mike Romano, Dean R. Lomax, Rob Taylor, and Marie Woods

A new specimen of a rare large theropod dinosaur print of Middle Jurassic age is described from the Long Nab Member of the Scalby Formation, Cleveland Basin, Yorkshire. This is only the sixth specimen of this type recorded from the Cleveland Basin since they were first discovered in 1934. The present specimen is included in the same, but slightly modified morphotype Bxviii as some of the previous ones, since it shows additional features including an elongated metapodium. The specimen is assigned to the ichnogenus *Megalosauripus*, and was possibly made by a *Megalosaurus*-like theropod. The elongated metapodium may be the result of resting or crouching behaviour.

Read more on the Lyell Collection www.lyellcollection.org/doi/10.1144/pygs2022-008

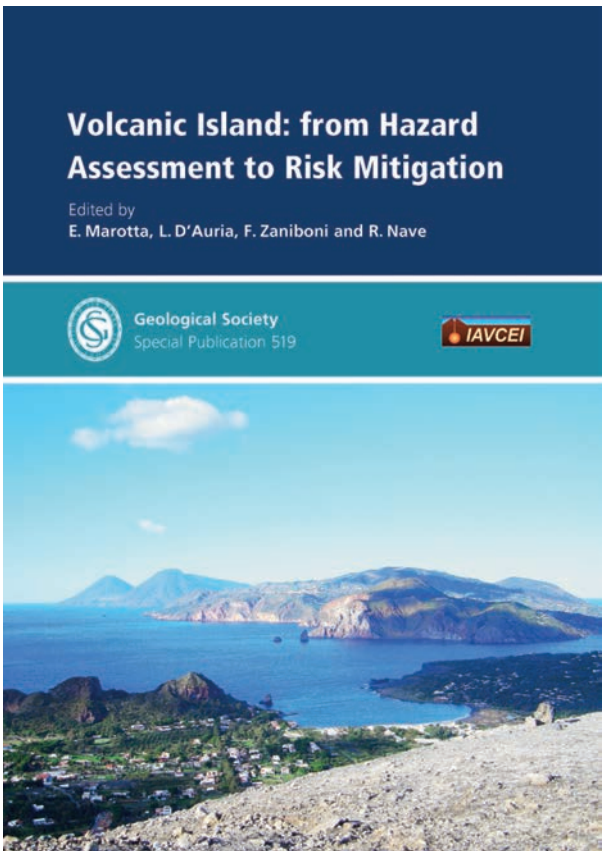


George Tate (1805–71) of Alnwick, an amateur Victorian polymath, and his contribution to geology in Northumberland and SE Scotland

By Douglas Holliday, Alison Tymon and Barry Tymon

George Tate, draper, postmaster and insurance agent, was not only a renowned civic figure during the mid-nineteenth century in his home town of Alnwick but was also, despite limited schooling, a widely celebrated and influential writer on the geology, biology, archaeology and history of Northumberland and adjacent parts of Scotland. His principal geological interests were wide ranging but in the main were devoted to the stratigraphy and palaeontology of the lower part of the Carboniferous System in his local area.

Read more on the Lyell Collection www.lyellcollection.org/doi/full/10.1144/pygs2023-010



Special Publications

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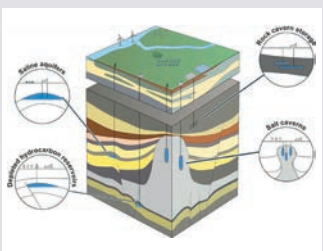


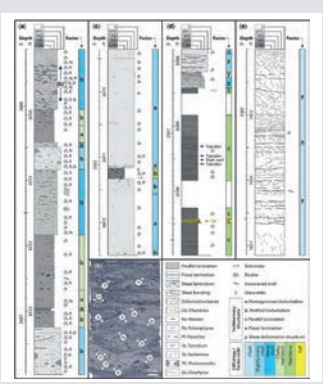
Open Access

Underground hydrogen storage: a review

By Johannes Miocic, Niklas Heinemann, Katriona Edlmann, Jonathan Scafidi, Fatemeh Molaei and Juan Alcalde

Large-scale underground storage of hydrogen gas is expected to play a key role in the energy transition and in near future renewable energy systems. Despite this potential, experience in underground hydrogen storage remains limited. This work critically reviews the most important elements of this crucial technology, including hydrogen properties and their significance for subsurface operations, sources for hydrogen and historical hydrogen storage operations, to set the state of the art. The cyclical nature of hydrogen storage operations will produce pressure and stress changes within the reservoir that could affect the integrity of the well, the reservoir, the caprock and the entire subsurface storage complex. To minimize geomechanical leakage risks and optimize the storage operation it is crucial to understand the pressure and stress history of the storage site, to optimize well locations to manage pressure and to identify the reservoir-specific cushion gas to working gas ratio.

Read more on the Lyell Collection www.lyellcollection.org/doi/full/10.1144/SP528-2022-88



Old chalk, new tricks: revisiting the Lower Cretaceous carbonates of the Danish Central Graben

By Mads E. Jelby, Jon R. Ineson, Emma Sheldon and Kresten Anderskouv

The Lower Cretaceous (upper Hauterivian–Albian) pelagic and hemipelagic carbonates of the Tuxen and Sola Formations in the Danish Central Graben, North Sea, constitute one of the oldest chalk successions recorded globally, but have received less attention than the Upper Cretaceous–Danian Chalk Group. This paper presents an updated depositional model for the succession drawn from synthesis of the latest published sedimentological and stratigraphic results, and correlation of 11 wells in the Valdemar, Boje, Adda and Tyra Fields. Four depositional sequences, deposited on a relatively deep subphotic shelf, record *c.* 20 Myr of transgressive–regressive cycles.

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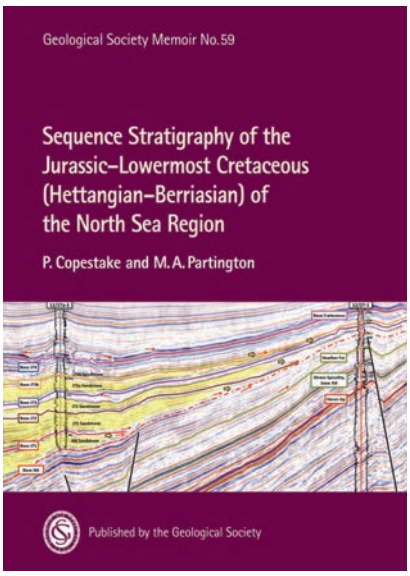

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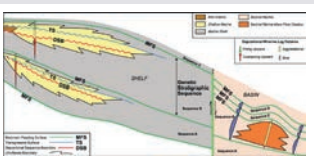

Sequence stratigraphic concepts and methodologies

By Philip Copestake

This chapter reviews sequence stratigraphic concepts and methodologies and presents an approach that is most applicable to the North Sea Jurassic, based on the concept of genetic sequence stratigraphy. The concept of depositional sequences, comprising rock units bounded by unconformities, has been developed from the late nineteenth century up to the present day. Many different studies have been carried out on North Sea Jurassic sequence stratigraphy, from the early 1980s to the present day and involving a range of different approaches.

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Open Access

Northern Svalbard Composite Tectono-Sedimentary Element

By Morten Smelror, Snorre Olaussen, Marie-Andrée Dumais, Sten-Andreas Grundvåg and Tesfamariam Berhane Abay

The Northern Svalbard Composite Tectono-Sedimentary Element (CTSE) comprises Proterozoic, Early Paleozoic and Devonian sedimentary rocks preserved in northern Svalbard and on the adjacent shelf margin between complexes of metamorphic and crystalline basement rocks. The Northern Svalbard CTSE covers four main tectono-sedimentary elements: Tonian synrift, Neoproterozoic–Cambrian post-rift, Ordovician passive margin and late Silurian?/Devonian synextensional basins.

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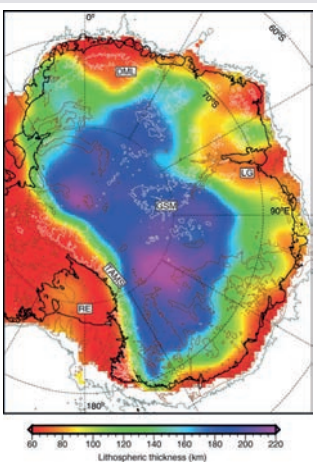

Open Access

The seismic structure of the Antarctic upper mantle

By Douglas A. Wiens, Weisen Shen and Andrew J. Lloyd

The deployment of seismic stations and the development of ambient noise tomography as well as new analysis methods provide an opportunity for higher-resolution imaging of Antarctica. Here we review recent seismic structure models and describe their implications for the dynamics and history of the Antarctic upper mantle. Results show that most of East Antarctica is underlain by continental lithosphere to depths of approximately 200 km. The thickest lithosphere is found in a band 500–1000 km inboard from the Transantarctic Mountains, representing the continuation of cratonic lithosphere with Australian affinity beneath the ice. Dronning Maud Land and the Lambert Graben show much thinner lithosphere, consistent with Phanerozoic lithospheric disruption.

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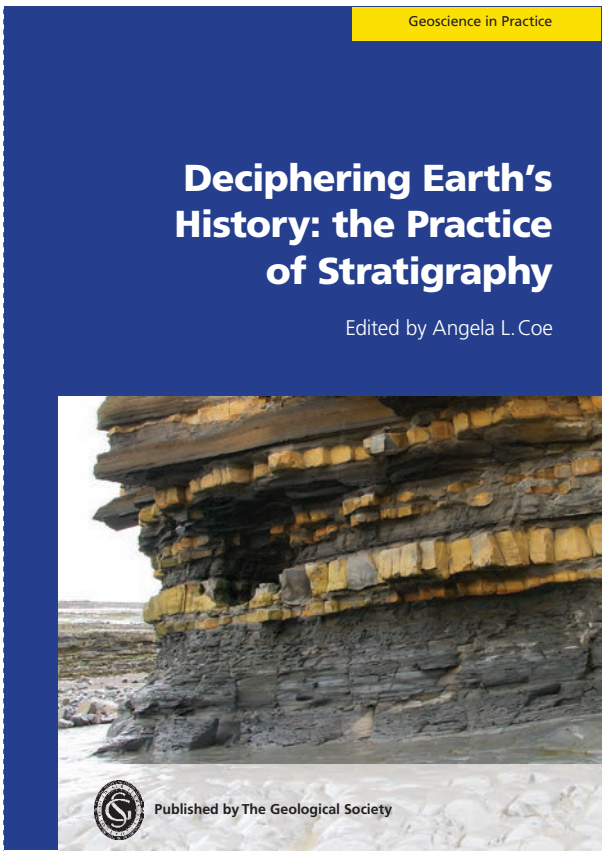

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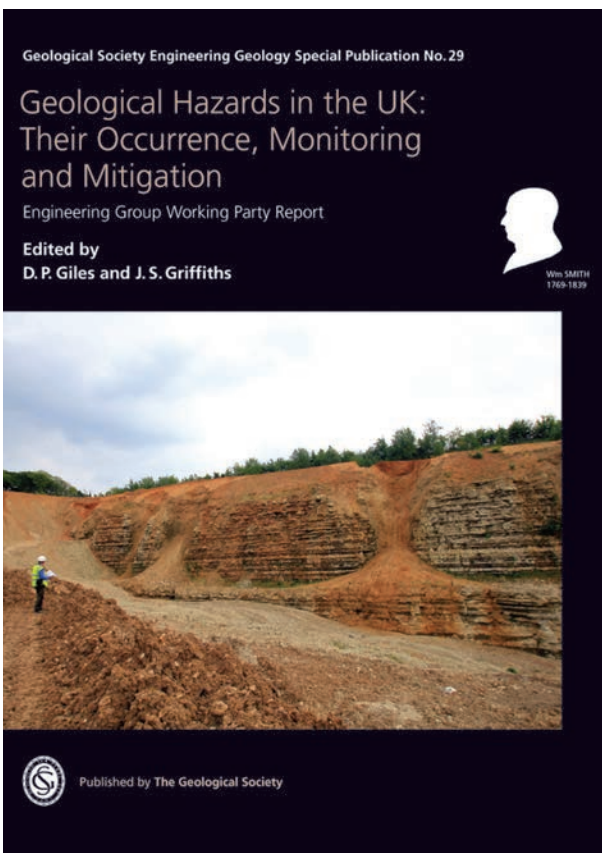

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Highlight

Radon gas hazard

By J. D. Appleton, D. G. Jones, J. C. H. Miles and C. Scivyer

Radon (^{222}Rn) is a natural radioactive gas that occurs in rocks and soils and can only be detected with special equipment. Radon is a major cause of lung cancer. Therefore, early detection is essential. The British Geological Survey and Public Health England have produced a series of maps showing radon affected areas based on underlying geology and indoor radon measurements, which help to identify radon-affected buildings.

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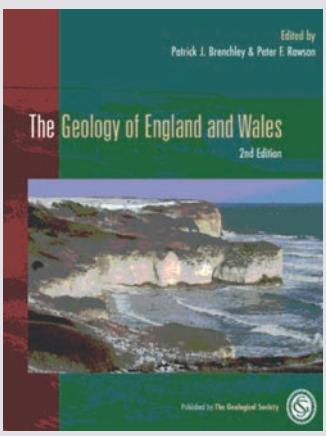

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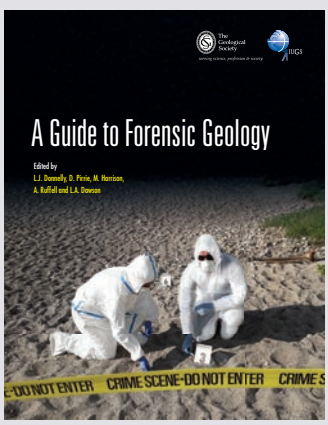

A Guide to Forensic Geology

Edited By Laurance J. Donnelly, Duncan Pirrie, Mark Harrison, Alastair Ruffell and Lorna A. Dawson

Forensic geology is the application of geology to aid the investigation of crime. *A Guide to Forensic Geology* was written by the International Union of Geological Sciences (IUGS), Initiative on Forensic Geology (IFG), which was established to promote and develop forensic geology around the world. This book presents the first practical guide for forensic geologists in search and geological trace evidence analysis. Guidance is provided on using geological methods during search operations. This developed following international case work experiences and research over the last 25 years for homicide graves, burials associated with serious and organised crime and counter terrorism. With expertise gained in over 300 serious crime investigations, the guidance also considers geological trace evidence, including the examination of crime scenes, geological evidence recovery and analysis from exhibits and the reporting of results. The book also considers the judicial system, reporting and requirements for presenting evidence in court. Included are emerging applications of geology to police and law enforcement: illegal and illicit mining, conflict minerals, substitution, adulteration, fraud and fakery..

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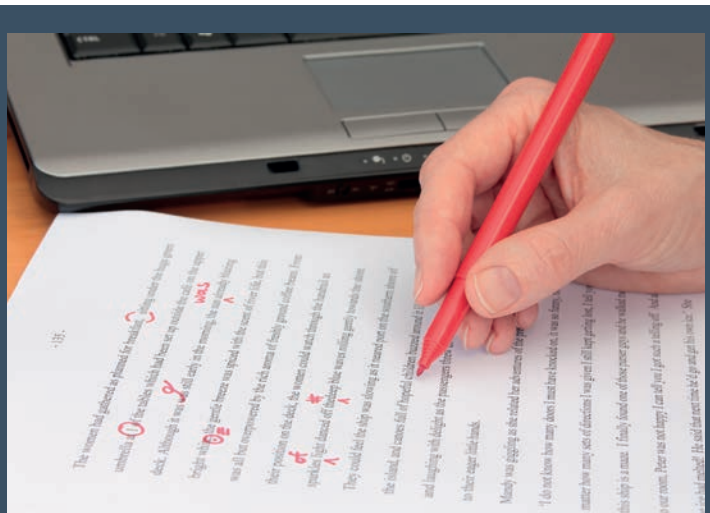

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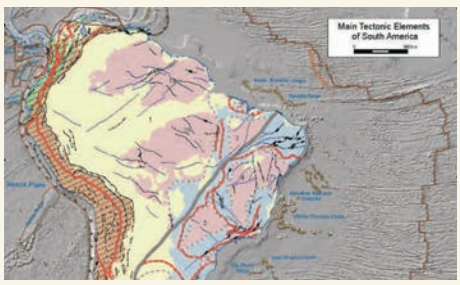

New perspectives on South American geology: a tribute to Emeritus Professor Reinhardt A. Fuck

Emeritus Professor Dr Reinhardt Fuck started his academic career at the Institute of Geosciences of the University of Brasília in 1969. Throughout his career, he has made a massive contribution to the geology of South America.

www.lyellcollection.org/topic/collections/new-perspectives-on-south-american-geology

Towards unravelling the 'Dolomite Problem': new approaches and novel perspectives

This thematic collection aims to provide a platform to present recent progress in the studies of dolomite/dolostone with the applications of diverse sedimentological, geochemical, numerical modeling, and experimental approaches, and also aims to share novel ideas toward understanding the origin of dolomite/dolostone.

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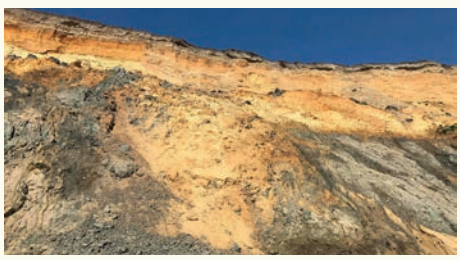

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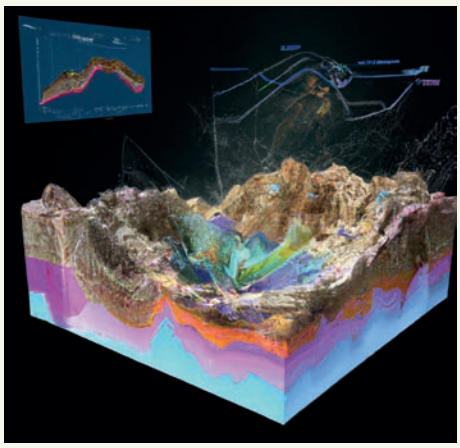

Digitally enabled geoscience workflows: unlocking the power of our data

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Data science – including automation, data analytics, machine learning and processing of extremely large datasets – is now an important part of everyday life and is transforming the way scientists conduct research and develop new technologies, enabling specific tasks to be implemented with minimal human supervision.

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