

OR/17/042 Foreword

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Lee, J R, and Hough, E. 2017. A conceptual geological model for investigating shallow sub-surface geology, Cheshire energy research field site. *British Geological Survey Internal Report*, OR/17/042.

New and emerging subsurface energy technologies and the extent to which they might make a major contribution to the energy security of the UK, the UK economy and to jobs is a subject of close debate. There is a need to better understand the impacts of energy technologies on the subsurface environment. The British Geological Survey vision is that the research facilities at the UK Geoenergy Observatories will allow ground-breaking scientific monitoring, observation and experimentation to gather critical evidence on the impact on the environment (primarily in terms of the sub-surface and linking to the wider environment) of a range of geoenergy technologies.

The Natural Environment Research Council (NERC) through the British Geological Survey, in collaboration with the UK environmental science-base and industry, will deliver the UK Geoenergy Observatories project comprised of two new world-class subsurface research facilities. These facilities will enable rigorous, transparent and replicable observations of subsurface processes, framed by the UK Geoenergy Observatories Science Plan. The two facilities will form the heart of a wider distributed network of sensors and instrumented boreholes for monitoring the subsurface across the UK. Scientific research will generate knowledge applicable to a wide range of energy technologies including: shallow geothermal energy, shale gas, underground gas storage, coal bed methane, underground coal gasification, and carbon capture and storage.

The UK Geoenergy Observatories project will create a first-of-its-kind set of national infrastructure research and testing facilities capable of investigating the feasibility of innovative unconventional and emerging energy technologies. Specifically, the project will allow us to:

- deploy sensors and monitoring equipment to enable world-class science and understanding of subsurface processes and interactions;
- develop real-time, independent data capable of providing independent evidence to better inform decisions relating to unconventional, emerging and innovative energy technologies policy, regulatory practice and business operations in these technology areas.

This report is a published product of the UK Geoenergy Observatories project (formerly known as the ESIOS project), by the British Geological Survey (BGS) and forms part of the geological characterisation of the Cheshire site. The report gives a conceptual overview of the shallow sub-surface geology around the Cheshire Energy Research Field Site, including a review of geological processes that have been active in this vicinity following the deposition of the youngest preserved bedrock in the area, the Sherwood Sandstone Group. This recent geological history has resulted in a complicated near-surface succession that influences the properties of rocks and soils. These have an effect on sub-surface flow processes and behaviour.

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