

# Quarterly Journal of Engineering Geology and Hydrogeology

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## CONTENTS – Volume 52, Part 1, February 2019

### Editorial

<b>Editorial 2019</b>	<b>1</b>
<b>Thematic set: QJEGH 50th Anniversary Review paper</b>	
<b>A half-century of contributions to landslide knowledge in QJEGH</b> E. N. Bromhead & M. G. Winter	<b>3</b>
<b>Photographic feature</b>	
<b>A recurrent composite loess landslide in southwestern China</b> Yuxuan Zhu, Fuchu Dai, Jingxian Gao & Xin Yao	<b>17</b>
<b>Research article</b>	
<b>The role of septic tanks in the dissolved phosphorus budget of the Upper River Nar and possible implications for other catchments</b> C. D. Speed, B. A. Fretwell & P. S. Davison	<b>23</b>
<b>Loess slide susceptibility assessment using frequency ratio model and artificial neural network</b> Haijun Qiu, Peng Cui, Amar Deep Regmi, Sheng Hu & Junqing Hao	<b>38</b>
<b>Influence of weathering-induced iron precipitation on properties of sandstone in a tropical environment</b> Frederick F. Tating, H. Robert G.K. Hack & Victor G. Jetten	<b>46</b>
<b>3D modelling of the ancient underground quarries of the famous Parian marble in the Aegean Sea, Greece and assessment of their stability using LiDAR scanning</b> Vassilis Marinou, Ioannis Vazaios, George Papathanassiou, Triantafyllos Kaklis & Efi Goula	<b>61</b>
<b>Well flow and dilution measurements for characterization of vertical hydraulic conductivity structure of a carbonate aquifer</b> Alison H. Parker, L. Jared West & Noelle E. Odling	<b>74</b>
<b>Recognizing anthropogenic modification of the subsurface in the geological record</b> Colin N. Waters, Caroline Graham, Deodato Tapete, Simon J. Price, Lorraine Field, Andrew G. Hughes & Jan Zalasiewicz	<b>83</b>
<b>Syneresis dependent shear strength parameters of sodium silicate grouted sands</b> Eyubhan Avci & Murat Mollamahmutođlu	<b>99</b>
<b>Discriminating methane sources in ground gas emissions in NW England</b> Christopher J. Teasdale, Jean A. Hall, John P. Martin & David A. C. Manning	<b>110</b>
<b>In situ measurements of near-surface hydraulic conductivity in engineered clay slopes</b> N. Dixon, C. J. Crosby, R. Stirling, P. N. Hughes, J. Smethurst, K. Briggs, D. Hughes, D. Gunn, P. Hobbs, F. Loveridge, S. Glendinning, T. Dijkstra & A. Hudson	<b>123</b>
<b>Discussion</b>	
<b>Discussion on 'Utilization of X-ray computed micro-tomography to evaluate iron sulphide distribution in roofing slates': Quarterly Journal of Engineering Geology and Hydrogeology, Vol. 51, 2018, pp. 169–178</b> V. Cárdenes & A. Rubio-Ordoñez	<b>137</b>

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**Cover Photograph.** The journey-time between Gundewein and Mekane Selam, two towns located at approximately 2660 m a.s.l. in the Ethiopian Highlands, has been cut by more than 75% by the construction of 129 km of mountain road and a 300 m long bridge. The bridge is across the Blue Nile and 58 km of this new road descends and ascends the steep sides of the 1300 m deep Blue Nile gorge on an alignment with a cumulative rise and fall of over 2500 m over a straight-line distance of 21 km. The terrain is one of the most challenging of any for new road construction. Its underlying geology comprises Oligocene–Miocene basalt and pyroclastic rocks (pictured) overlying Cretaceous sandstone and siltstone which, in turn, overlie Late Jurassic limestone mudstone and shale. Its geomorphology comprises lithologically-controlled benches separated by sheer cliffs, with extensive deposits of colluvium, taluvium and rafted rock debris. Geohazards include large-scale rock toppling, rock falls, deep-seated and shallow landslides, flash flooding, shifting stream channels, slope erosion, stream erosion, debris flows, debris fans, seepage erosion and cavity collapse. The Total Geology Approach to design and construction involved landscape modelling, geotechnical reference condition mapping, engineering geological mapping and targeted ground investigation, implemented by a team of national and international specialists between 2006 and 2015. The dynamism of the terrain, and in particular the adjustment of its geomorphology to earthworks and road drainage systems, meant that slope stability and erosion problems required careful attention during construction, as they will during the operational lifetime of the road. The Gundewein – Mekane Selam road was designed initially by Renardet SA/SABA Engineering. This design was reviewed and revised by Scott Wilson (now AECOM). Construction was undertaken by CGC Overseas Construction Group, Beijing under the supervision of Scott Wilson/Dana & Associates and on behalf of the Ethiopian Roads Authority. Further details can be found at <https://doi.org/10.1007/s10064-015-0724-y> and <https://doi.org/10.1144/qjehg2018-058>

Photograph by: G J Hearn