G4: inaugural editorial

Derek Elsworth · Herbert Huppert ·
JianChun Li · P. G. Ranjith · Jian Zhao

Published online: 12 August 2015
© Springer International Publishing Switzerland 2015

We are very pleased to launch *Geomechanics and Geophysics for Geo-Energy and Geo-Resources* (which for convenience we also call *G4*), the newest journal offering from Springer.

Fossil fuels satisfy over 85 % of global energy demand. Coal and petroleum have traditionally been the most utilized; but new unconventional resources such as shale gas and hot rock geothermal energy are now attracting more interest, because they are both plentiful and have lower carbon emissions. The

sustainable recovery of minerals with limited environmental impact is subject to intense interest, including rare earths that are indispensable in current technology. Worldwide demand for energy and minerals is rising steadily, and shows no sign of slowing down. At the same time, societies worldwide are acutely conscious of threats to the environment. Developed and developing nations alike demand sustainable, responsible, and environmentally sensitive use of resources. Geomechanics and geophysics will continue to play important roles in meeting those stringent requirements.

Advanced economies have enjoyed decades of recovering oil, gas, and minerals at shallow depth; but these resources are rapidly depleting. For the next phase we must look deeper than 5 km—a necessary endeavour, and one that faces huge challenges. New science will be essential, along with unprecedented developments in engineering. Most extraction from the deep earth involves processes with newly coupled components, whether physical, thermal, chemical, or mechanical. The new harvesting technologies must therefore also be composite, and both heavily dependent on and the primary reason for cross-disciplinary research—a core motivation for *G4*, and its main focus.

Our journal will be a platform for research on mechanical and physical processes in subsurface earth materials (primarily rocks), coupled with applications

D. Elsworth
The Pennsylvania State University, University Park, PA,
USA
e-mail: elsworth@psu.edu

H. Huppert
University of Cambridge, Cambridge, UK
e-mail: hehl@damtp.cam.ac.uk

J. Li
Institute of Rock and Soil Mechanics, Wuhan,
People's Republic of China
e-mail: jcli@whrsm.ac.cn

P. G. Ranjith · J. Zhao (✉)
Monash University, Clayton, VIC, Australia
e-mail: jian.zhao@monash.edu

P. G. Ranjith
e-mail: ranjith.pg@monash.edu

J. Zhao
EPFL, Lausanne, Switzerland

into the extraction of energy and mineral resources. *G4* will cover a wide range of science and engineering disciplines, including geomechanics, geophysics, and earth sciences, along with petroleum, mining, energy, and environmental engineering. This breadth distinguishes it from the existing journals in such fields.

Research and development leading to technological solutions have significant economical and political impacts. The energy and resources communities worldwide are working closely on new alliances for research and development, and new publications are appearing. Taking its place among them, *G4* will provide a unique platform for much-needed interdisciplinary research outcomes.

G4 is committed to publishing high-quality original research, emerging technical developments, review articles, and case studies in geomechanics and

geophysics related to subsurface earth energy and resources. The journal will consider all papers on such topics, dealing with theoretical and analytical developments, numerical methods, laboratory testing and equipment, field measurements and monitoring, engineering and project case studies—along with energy and resource advances in mining and resources engineering, conventional and unconventional petroleum engineering, natural and enhanced geothermal energy, energy storage, energy waste disposal, and carbon sequestration.

We look forward to receive your new article submissions, your comments and to reach a broad audience. Please do not hesitate to be in touch, and join us in making something special of this exciting new venture. We believe *G4* will be, in the near future, a leading scientific journal across several disciplines.