

Contents

Foreword	v
Xiaogang Ma, Matty Mookerjee, Leslie Hsu, and Denise Hills	
1. Cyberinfrastructure for collecting and integrating geology field data: Community priorities and research agenda	1
Matty Mookerjee, Marjorie A. Chan, Yolanda Gil, Gurman Gill, Charles Goodwin, Terry L. Pavlis, Thomas F. Shipley, Taylor Swain, Basil Tikoff, and Daniel Vieira	
2. Text mining and knowledge graph construction from geoscience literature legacy: A review	11
Chengbin Wang, Yuanjun Li, and Jianguo Chen	
3. Ontology of the complex rare-earth elements mineral system	29
Hassan A. Babaie, Armita Davarpanah, and W. Crawford Elliott	
4. Toward stronger coupling between technical infrastructures and institutional processes in data-intensive science	45
Matthew S. Mayernik	
5. Data science for geoscience: Recent progress and future trends from the perspective of a data life cycle	57
Xiaogang Ma	
6. ArcCI: A high-resolution aerial image management and processing platform for sea ice	71
Dexuan Sha, Anusha Srirenganathan Malarvizhi, Hai Lan, Xin Miao, Hongie Xie, Daler Khamidov, Kevin Wang, Seren Smith, Katherine Howell, and Chaowei Yang	
7. Improving reproducibility of geoscience models with Sciunit	85
Raza Ahmad, Young Don Choi, Jonathan L. Goodall, David Tarboton, Ayman Nassar, and Tanu Malik	
8. A scalable solution for running ensemble simulations for photovoltaic energy	97
Weiming Hu, Guido Cervone, Matteo Turilli, Andre Merzky, and Shantenu Jha	
9. Geographically weighted regression in mineral exploration: A new application to investigate mineralization	125
Wenlei Wang, Jie Zhao, and Qiuming Cheng	
10. Revealing Earth science code and data-use practices using the Throughput Graph Database	147
Andrea K. Thomer, Morgan F. Wofford, Michael C. Lenard, Socorro Dominguez Vidana, and Simon J. Goring	
11. A review of cyberinfrastructure for machine learning and big data in the geosciences	161
Ziheng Sun, Nicoleta Cristea, Daniel Tong, Jason Tullis, Zachary Chester, and Andrew Magill	