

THEMATIC TOPICS IN 2017

Volume 13, Number 1 (February)

VOLCANOES: SOURCE TO SURFACE

GUEST EDITORS: **Keith Putirka** (California State University – Fresno, USA) and **Kari M. Cooper** (University of California – Davis, USA)

Volcanoes have played a large role over Earth's history in building the crust, contributing to atmospheric formation, and transferring heat and mass from the interior to the surface. They are also capable of massive disruption of the surface environment and to human civilizations. Volcanoes themselves are the products of crustal-scale systems. But what controls whether a given magma will erupt or stall, and how do processes in one part of the system affect others? Volcano science is advancing rapidly, and improvements in monitoring tools, petrologic tools, and modeling of volcanic processes have greatly improved our understanding of volcanic behavior. This issue brings together contributions exploring volcanic behavior throughout the crustal system.

- **Down the Crater: Where Magmas are Stored and Why They Erupt**

Keith Putirka (California State University – Fresno, USA)

- **What Does a Magma Reservoir Look Like? The “Crystal’s Eye” View**

Kari M. Cooper (University of California – Davis, USA)

- **Volatiles and Exsolved Vapor in Volcanic Systems**

Marie Edmonds (University of Cambridge, UK) and Paul J. Wallace (University of Oregon, USA)

- **The Implications of Magma System Models for Forecasting Volcanic Activity**

R.S.J. Sparks (University of Bristol, UK) and Kathy Cashman (University of Bristol, UK)

- **Global Volcano Monitoring—What Does it Mean When Volcanoes Deform?**

Juliet Biggs (University of Bristol, UK) & Matt E. Pritchard (Cornell University, USA)

- **Volcanoes: Characteristics, Tipping Points and Those Pesky Unknown Unknowns**

Colin J.N. Wilson (Victoria University, New Zealand)



Volume 13, Number 2 (April)

SULPHIDES

GUEST EDITORS: **Kate Kiseeva** (University of Oxford, UK) and **Marie Edmonds** (University of Cambridge, UK)

Despite the bulk silicate Earth only containing 250 parts per million of sulphur, sulphide minerals and liquids have a powerful impact on the behaviour and fractionation of a wide range of elements in the Earth's crust and underlying mantle. According to the V. M. Goldschmidt classification, in the periodic table there are 18 chalcophile elements that have affinity for sulphur and form sulphides. Besides the chalcophile elements, a large number of siderophile elements are also found in nature in association with sulphides. This issue focuses on the broad topics of magmatic and volcanogenic sulphide deposits, the behaviour of sulphides during mantle melting and volcanism, and the mineralogy of sulphides and sedimentary sulphides and their role in the early development of the biosphere.

- **Mineralogy of Sulphides**

David Vaughan (University of Manchester, UK) and Clare Corkhill (University of Sheffield, UK)

- **Magmatic Sulfide Deposits**

Stephen Barnes (CSIRO Mineral Resources, Australia), Dave Holwell (University of Leicester, UK) and Margaux Le Vaillant (CSIRO Mineral Resources, Australia)

- **Hydrothermal Sulfide Deposits**

Lluís Fontboté (University of Geneva, Switzerland), Massimo Chiaradia (University of Geneva, Switzerland), Kalin Kouzmanov (University of Geneva, Switzerland), Gleb Pokrovski (University of Toulouse, France)

- **Volcanic Sulphides and Outgassing**

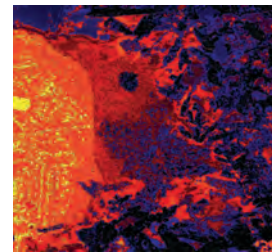
Marie Edmonds (University of Cambridge, UK) and Tamsin Mather (University of Oxford, UK)

- **Sulfides in the Upper Mantle: Controls over the Chalcophile Element Budget in Magmatic Systems**

Kate Kiseeva (University of Oxford, UK), Raúl Fonseca (University of Bonn, Germany) and Duane Smythe (University of Oxford, UK)

- **Sedimentary Sulfides**

David Rickard (Cardiff University, UK), Marc Mussmann (University of Vienna, Austria) and Jeff Steadman (CODES, University of Tasmania, Australia)



Volume 13, Number 3 (June)

ROCK AND MINERAL COATINGS

GUEST EDITORS: **Michael Schindler** (Laurentian University, Canada) and **Ronald Dorn** (Arizona State University, USA)

Chemical and/or biological processes can produce coatings on the surfaces of rocks and minerals. These coatings form at the interface between the lithosphere, biosphere, and atmosphere in a diverse range of environments, such as common soils, deserts, volcanic weathering environments, smelter-impacted areas, Antarctica and glaciated environments, and have even been found on Mars. Coatings on rocks and minerals can range from the nano- to the centimeter scale and are information packed on different scales. They provide fascinating records of the biological, geochemical, and environmental conditions present during coating development. Through the study of these coatings, scientists are uncovering important details about climate and environmental changes, temperature variations in the world's oceans, and so much more. This issue will introduce the reader to how these coatings form, how they react with their environment, and a few of the fascinating records that can be deciphered from them.

- **Rock Coatings: The Interface Between Lithosphere, Biosphere and Atmosphere**

Michael Schindler (Laurentian University, Canada), Ronald Dorn (Arizona State University, USA)

- **The Dynamic Transition Between Weathering Rinds and Rock Coatings**

Ronald Dorn (Arizona State University, USA), William Mahaney (York University, Canada), David Krinsley (University of Oregon, USA)

- **Life on Rocks**

Geoff Gadd (University of Dundee, UK)

- **Mineral Surface Coatings in Soils and Sediments: Hosts of Contaminants and Records of Environmental Changes**

Michael Schindler (Laurentian University, Canada), David Singer (Kent State University, USA)

- **Archaeological Implications of Climatic Change Signal in Rock Coatings**

David Whitley (ASM Affiliates, USA), Calogero Santoro (Universidad de Tarapacá, Chile), Daniela Valenzuela (Universidad Alberto Hurtado, Chile)

- **Marine Ferromanganese Encrustations: Archives of Changing Oceans**

Andrea Koschinsky (University Bremen, Germany), James Hein (U.S. Geological Survey, USA)

- **Rock Coatings and their Implications in Astrobiology on Mars: Protection, Preservation, and Practicality**

Cassandra Marnocha (Niagara University, USA), Barry DiGregorio (University of Buckingham, UK)



Volume 13, Number 4 (August)

MINERAL RESOURCES AND SUSTAINABLE DEVELOPMENT

GUEST EDITOR: **Georges Calas** (University Pierre and Marie Curie, Paris, France)

Mineral resources are a vital part of any economy, modern or ancient. Since the birth of civilization, man has used these resources for pigments, metals, glasses, ceramics, cements and much more. The media has recently suggested there is a crisis looming over finding mineral resources, including critical metals. Centered on the sustainability of mineral resources, themes addressed in this issue include customer-supplier relationships, exploration, recycling and the circular economy, and environmental post-mining impacts. The broad range of topics embraced by this issue – formation of mineral deposits, minerals engineering, and environmental and societal impacts – will provide readers a better understanding of the large-scale economic, historical and educational aspects of mineral resources.

- **Mineral Resources and Sustainable Development**
Georges Calas (University Pierre and Marie Curie, Paris, France)
- **Mineral Resources in the Context of Energy Transition and the Circular Economy**
Olivier Vidal (University Grenoble ALPES, France) and Patrice Christmann (BRGM, The French Geological Survey, France)
- **Sustainability of Mineral Resources: Mineral Beneficiation and Mineral Engineering**
Johan PR De Villiers (University of Pretoria, South Africa) and Frédéric Villieras (Lorraine University, France)
- **Critical Metals and Responsible Mining**
Frances Wall (University of Exeter, UK) and Alain Rollat (Solvay, France)
- **Improving the Mitigation of the Long-Term Legacy of Post-Mining Activities: New Tools, New Concepts**
Gordon E. Brown Jr. (Stanford University, USA), Michael F. Hochella Jr. (Virginia Tech, USA) and Georges Calas (University Pierre and Marie Curie, France)
- **The Education of the Resource Geologists of the Future: Between Observation and Imagination**
Michel Jebrak (University of Quebec at Montreal, Canada) and Jean-Marc Montel (Lorraine University, France)



Volume 13, Number 5 (October)

BORON: LIGHT AND LIVELY

GUEST EDITOR: **Edward Grew** (University of Maine, USA)

Fifth in the periodic table, boron is a “light” element whose origin has puzzled astronomers because it is not created in stars. It is “lively”, being an essential element for plants, and having medicinal properties, which has stimulated synthesis of organic compounds containing boron. Borates such as colemanite are thought by some to have stabilized ribose, an essential component of ribonucleic acid and critical for the self-assembly of prebiotic organic compounds to constitute life; others have proposed that ribose was stabilized by borate in solution. Boron isotopes provide insight on the processes responsible for the creation of continental crust, and act as a proxy for paleoclimate. Extreme concentrations of boron result in economic evaporitic deposits, and, thus, water-soluble boron minerals, notably borax, have been among the most accessible of useful compounds to humankind, even in antiquity.

- **Boron, a Quintessentially Crustal Element.**
Edward S. Grew (University of Maine, USA)
- **Boron Behavior During the Evolution of the Early Solar System. The First 200 Million Years.**
Charles K. Shearer (University of New Mexico, USA) and Steven B. Simon (University of Chicago, USA)

- **The Role of Borate in Prebiotic Organic Geochemistry.**
Yoshihiro Furukawa and Takeshi Kakegawa (Tohoku University, Japan)
- **Boron Isotopes in the Exogenic Cycle – Why is Seawater Boron so Isotopically Heavy?**
Martin R. Palmer (National Oceanography Centre, Southampton, UK)
- **Advances in the Boron Isotope Paleo-pH Proxy.**
N. Gary Hemming and E. Troy Rasbury (Queens College, UK)
- **Origin and Distribution of Evaporitic Borate - The Primary Economic Source of Boron.**
Cahit Helvacı (Dokuz Eylül Üniversitesi, Turkey)
- **Tripping the Light Fantastic: Organoboron Compounds.**
Penelope J. Brothers (University of Auckland, Australia)



Volume 13, Number 6 (December)

LAYERED INTRUSIONS: NATURAL LABORATORIES FOR MAGMA CHAMBER PROCESSES

GUEST EDITORS: **Brian O'Driscoll** (University of Manchester, UK) and **Jill VanTongeren** (Rutgers University, USA)

For more than 50 years, layered mafic-ultramafic intrusions have served as natural laboratories for studying magma chamber processes and magmatic differentiation. Further enhancing our understanding of layered intrusion formation will yield valuable insights into the solidification of magmatic systems, the formation of precious metal deposits, and the timescales over which substantial crust-forming episodes occur. The aims of this issue of Elements are to offer an overview of the state-of-the-art in the petrology of layered intrusions today and a look forward to the future challenges in the field.

- **Layered Intrusions: Dynamic Deposits and Petrological Paradises**
Brian O'Driscoll (University of Manchester, UK) and Jill VanTongeren (Rutgers University, USA)
- **The Skaergaard Intrusion of East Greenland: A Natural Laboratory for Igneous Petrology?**
Marian B. Holness (University of Cambridge, UK), Troels FD Nielsen (Geological Survey of Denmark), and Christian Tegner (Aarhus University, Denmark)
- **Metasomatic Chromitite Seams in the Bushveld and Rum Intrusions**
Edmond A. Mathez (American Museum of Natural History, USA) and Rosamond J. Kinzler (American Museum of Natural History, USA)
- **Plagioclase Zonation as an Archive for Magmatic Processes in Layered Intrusions**
Stearns A. Morse (University of Massachusetts Amherst, USA), Jon P. Davidson (Durham University, UK), and Frank J. Tepley III (Oregon State University, USA)
- **Quantitative Textural Insights into the Construction and Architecture of Layered Intrusions**
Michael J. Cheadle (University of Wyoming, USA) and Jeffrey S. Gee (SCRIPPS Institution of Oceanography, USA)
- **Layered Mafic-Ultramafic Intrusions of Fennoscandia: Mineral Prospectivity in Contrasting Tectonic Settings**
Wolfgang D. Maier (Cardiff University, UK) and Eero Hanski (University of Oulu, Finland)

