GeoMünster 2019 – List of Sessions

The Keynotes and their lecture working titles are suggestions. They depend also on how the DFG proposal will be approved.

1. Early Earth

1a) The Present is the Key to the Past – Reconstructing Early Earth Environments through Modern Analogues

Eroglu, Sümeyya; Strauss, Harald
Institute for Geology and Paleontology, University of Münster, Germany

Keynote: Paul R.D. Mason, Faculty of Geosciences, Utrecht University

Earth's litho-, bio-, hydro-, and atmosphere experienced major changes throughout its history, which are still partly preserved in the rock record. The reconstruction of environmental conditions of ancient marine and terrestrial settings is based on deciphering these rock records. A major obstacle hereby is that all of these archives experienced diagenetic or even metamorphic overprint and, hence, do not necessarily preserve the original (bio-)geochemical signatures. Studies on modern environments can improve our understanding of formation and preservation processes of these (bio-)geochemical signatures. Thereby, settings with a redox-stratified water column or unique parameters, e.g. high temperatures, acidity or Fe content are of particular interest as they can serve as modern analogues of Early Earth and the Precambrian. We invite contributions focusing on new insights into reconstructing Precambrian conditions based on (isotope) geochemical, mineralogical, and microbiological insights of these modern analogues. Furthermore, we encourage submissions on experimental approaches under lab conditions as well as novel applications on Precambrian sedimentary rocks.

1b) Early Earth Processes: Constraints from the Rock Record

Scherer, Erik E. (1); Zeh, Armin (2); Gerdes, Axel (3)
1: Institute for Mineralogy, University of Münster, Germany; 2: Institut für Angewandte Geowissenschaften - Mineralogie und Petrologie, Karlsruher Institut für Technologie, Germany; 3: Institut für Geowissenschaften Petrologie und Geochemie, Goethe-Universität Frankfurt, Germany

Keynote: Matthijs A. Smit, Dept. of Earth, Ocean & Atmospheric Sciences, University of British Columbia, Canada: "Archean lithospheric change and the start of modern-style plate tectonics"

The silicate Earth differentiated early in its history into a variety of mantle and crustal reservoirs. The the degree and style of interaction among these reservoirs is recorded in the chemical and isotopic signatures of Archean rocks and even older minerals, offering clues to their linked evolution in the context of a changing geodynamic setting. We encourage contributions that employ tools such as fieldwork, petrology, geochemistry, geochronology, and geodynamic modelling to illuminate early Earth processes ranging from the earliest silicate differentiation, through the evolution of continents and oceans, to the onset of plate tectonics.

2. Structure and evolution of planetary bodies

2a) Petrology, volcanism and surface processes on terrestrial bodies

Renggli, Christian J. (1); Morlok, Andreas (2); Weber, Iris (2)
1: Institut für Mineralogie, Universität Münster, Germany; 2: Institut für Planetologie, Universität Münster, Germany

Keynote: Bernard Charlier, Université de Liège, Belgium

In this session, we look for contributions from the fields of experimental petrology and volcanology, observational geology, remote sensing planetology, and the development of planetary analogue materials for the study of rocky bodies including the Moon, Mercury, Venus, Mars, the Galilean moons of Jupiter, Titan, asteroids and also comets. We invite contributions from experimentalists who use laboratory based methods to test processes in planetary interiors and on their surfaces, and results from the investigation of analogue materials to provide standards for remote observations. Remote observations from planetary missions provide information on the scale, dynamics and relative ages of volcanic and geologic processes from bodies where direct samples and landing missions are limited or not available. Additionally, a number of spectroscopic methods (IR, UV, X-rays, gamma rays or neutrons) provide information on the chemistry and mineralogy of planetary surfaces.

2b) High-spatial resolution studies of small-scale and complex extraterrestrial and terrestrial samples

Vollmer, Christian (1); Harries, Dennis (2); Roszjar, Julia (3)
1: Universität Münster, Germany; 2: Universität Jena, Germany; 3: Naturhistorisches Museum Wien, Austria

Keynote: Jeremy Bellucci, Stockholm, Sweden

Investigations of heterogeneous samples like meteorites, interplanetary dust particles, or returned mission samples require the application of high-spatial resolution analytical techniques to minimize sample destruction and maximize contextual information. This also applies to a wide variety of terrestrial rocks and experimental analogues that document the evolution of planetary bodies (e.g., impact-generated lithologies, shocked minerals, fluid/mineral inclusions, high-pressure/high-temperature experiments, synthetic nanomaterials). In this session, we welcome contributions from geo-cosmochemistry-material sciences disciplines that make use of high-spatial resolution methods (e.g., electron microscopy, laser-ablation and secondary ion mass spectrometry, atom probe tomography, Raman spectroscopy, and synchrotron radiation techniques) that improve our understanding of small-scale chemical, isotopic and structural properties and processes. Cross-disciplinary contributions giving possible new insights into old problems are particularly encouraged.

2c) Planetary Accretion and Impact Processes

Worsham, Emily; Archer, Gregory Jude; Haber, Thomas
Westfälische Wilhelms-Universität Münster, Germany

Keynote: Paolo Sossi, Zurich, Switzerland

Impact events of all sizes were crucial for the growth of the terrestrial planets and continue shaping their surfaces today. Thus, studying the nature of the impactors and the effects of the impacts themselves helps us to understand how the four terrestrial planets and related, smaller bodies (e.g., the Moon) formed and evolved. The goal of this session is to present and discuss research on the characteristics and origin of the material delivered to the terrestrial planets, the large-scale consequences of the addition of these materials for the isotopic and elemental compositions of terrestrial bodies, and the impact processes themselves, including the effects of giant impacts and the structures and materials generated by non-disruptive impacts. For this interdisciplinary session we invite contributions from the fields of planetary sciences, geophysics, petrology, and geochemistry.

2d) Planetary Processes

Hiesinger, Harald
Westfälische Wilhelms-Universität Münster, Germany

Each planet in our solar system had its own geologic history and evolution. Several geologic processes acted and are acting on their surfaces, including volcanism, tectonism, impact cratering, as well as glacial, fluvial, and aeolian processes. The purpose of this session is to provide a venue for presentations covering the multitude of geologic processes and planetary bodies.

2e) Recent advances in lunar science

Hiesinger, Harald
Westfälische Wilhelms-Universität Münster, Germany

The Moon is a fundamentally imortant object for our understanding of the solar system. In the last decade, several space missions visited the Moon and returned information on its internal structure, thermal evolution, chemical and mineralogical composition, physical properties, and morphology in unprecedented detail. We invite contributions that utilized these new data sets, as well as older Apollo-era data sets, to decipher the geologic history and evolution of the Moon.

3. Orogenesis

3a) Dynamics of convergent plate margins

Dielforder, Armin (1); von Hagke, Christoph (2)
1: GFZ Potsdam, Germany; 2: RWTH Aachen, Germany

Convergent plate margins are the main place on Earth were mountain building takes place. Over the past decades, the geophysical and geodetic monitoring of active convergent plate margins has improved our understanding, for example, on how strain is accommodated and released throughout the subduction earthquake cycle or how earthquakes trigger deformation and fluid flow in orogens. Linking such observations from active systems to the long-term structural and tectonic evolution of mountain belts yet remains one of the great challenges and requires multidisciplinary research highlighting the dynamics of convergent plate margins at different timescales.

In this session we would like to invite contributions from a broad range of disciplines and methodological approaches (field work to modelling) that provide insights into the physical and chemical processes at convergent plate margins. In particular, but not exclusively, we are interested in the mechanics and dynamics of megathrusts and other orogenic fault systems, the competition of deformation mechanisms, for example, around the brittle-viscous transition, and the development of fluid pathways in orogenic systems.

3b) Tectono-Metamorphic Evolution of the Cyclades, Greece

Bröcker, Michael (1); Xypolias, Paris (2)
1: WWU Münster, Germany; 2: University of Patras, Greece

Keynote: Prof. Laurent Jolivet Sorbonne Université, Paris, France: "Tectonic and geodynamic evolution of the Aegean region, from mantle dynamics to crustal evolution"

The Attic-Cycladic Crystalline Belt represents a major tectonostratigraphic unit of the Hellenides and records a complex structural and metamorphic evolution that illustrates many aspects of subduction zone metamorphism and the exhumation of HP/LT rocks. Many decades of intensive research have unravelled the general geological and tectonic context, but in detail there are still significant knowledge gaps. We invite contributions focusing on the P-T-t and structural evolution of the Cyclades including the pre-subduction stratigraphy and paleogeography, and encourage submissions that integrate new advances in micro-analytical methods and modelling techniques.

3c) Assembly of Pangea: What do we know about the Variscan orogen and its Avalonian-Cadomian precursers?

Linnemann, Ulf (1); Königshof, Peter (2); Salamon, Martin (3); Nesbor, Dieter (4)
1: Senckenberg Naturhistorische Sammlungen Dresden, Germany; 2: Senckenberg Forschungsinstut und Naturmusem Frankfurt; 3: Geologischer Dienst NRW; 4: Hessisches Landesamt für Naturschutz, Umwelt und Geologie

Keynote: Gabriel Gutiérrez-Alonso (University of Salamanca, Spain) Assembly of Pangea: "Assembly of Pangea: What do we know about the Variscan orogen and its Avalonian-Cadomian precursers?"

The Variscan orogen and its Avalonian-Cadomian precursers form the heart of the supercontinent Pangea. The Variscan orogen resulted from the continent-continent collision of the landmasses of Laurussia and Gondwana and its peripheral orogens. The Variscan mountain chain as the principal basement of Central and Western Europe is a target of intense geoscientific research since more than a century. During the last decades, numerous high quality data sets had been produced in the fields of mineralogical, geochemical, palaeontological, geological, and geophysical disciplines. Especially new robust geochronological data paved the way for new interpretation concerning the formation of the orogen and the architecture of the orocline. For this session we welcome presentations of all fields of geosciences which can contribute to answer our core question: What do we know about the Varsican orogen?

4. Continents, oceans and global change

4a) Limnogeology and paleolimnology including lagoon systems

Haberzettl, Torsten (1); Kasper, Thomas (2)
1: University of Greifswald, Germany; 2: Friedrich-Schiller-University Jena, Germany

A few decades ago, the status of lake research was equated to that of the hole in a doughnut (Collinson 1978). During the last decades there has been a rapid advance in understanding physical, chemical, and biological processes in lacustrine systems and how these processes affect the preservation of environmental information in sedimentary sequences. Today, it is widely accepted that lakes have a lot to offer in terms of potential

significant contributions to Earth sciences. Aside of the terrestrial lacustrine systems, highly significant (paleo)environmental information can be obtained from marginal marine systems, e.g., coastal lakes, estuaries and lagoons.

In this session, we welcome contributions from all investigations related to lake and marginal marine research such as paleoenvironmental and paleoclimatic reconstructions, anthropogenic impact studies, extreme and catastrophic events, mass balance surveys, paleomagnetic studies, or the reconstruction of sediment geometries and morphostratigraphies using geophysical data.

Collinson (1978): Lakes. In: Reading (ed.): Sedimentary Environments and Facies, 61-79.

4b) Beyond Plate Tectonics: Expressions of Plume and Plate Mode in the Continental Lithosphere

Glasmacher, Ulrich Anton (1); Friedrich, Anke (2); Bunge, Hans-Peter (2)
1: Heidelberg University, Germany; 2: Ludwig-Maximilians-Universität München

Are widespread changes of the lithosphere and topographic surface in the intraplate environment of Central Europe over the last 100 Myrs reflect material flow in the Earth's mantle? The plume-mode of vertical motion paradigm steps beyond classical plate tectonics by recognizing that earthquakes, volcanoes, orogens, fault systems and sedimentary basins in continental interiors are directly linked to the dynamic interaction of the Earth’s mantle with the lithosphere. Understanding the immediate and long-term dynamic topography response of the lithosphere requires a multidisciplinary effort to map, image, analyse, calibrate, and model the evolving surface, lithosphere, and underlying mantle. At a technical level, integration will be accomplished through a (plume)-stratigraphic framework that translates mantle flow into its lithospheric and surface response functions. Such a unique view into mantle dynamics is possible in intracontinental settings where the plate-boundary signals are very weak or absent. The plume-mode of vertical-motion influence on continental lithosphere is an emerging field in understanding planetary dynamics with far-reaching scientific relevance.We greatly appreciate all geoscientific studies that contribute to the features within the intraplate environment of Central Europe and other Lithospheric Plates.

4c) Palaeogeography through geologic time

Meinhold, Guido (1); Şengör, A. M. Celâl (2); Schulz, Bernhard (3)
1: Keele University, United Kingdom; 2: Istanbul Technical University, Turkey; 3: TU Bergakademie Freiberg/Sachsen, Germany

Keynote: Yves Goddéris, Géosciences Environnement Toulouse, France: “Modulation of the carbon cycle by horizontal and vertical tectonic motions”

Palaeogeography is the cartographic representation of the past distribution of geographic features such as deep oceans, shallow seas, lowlands, rivers, lakes and mountain belts on palinspastically restored plate tectonic base maps. Palaeogeographic changes profoundly influence ocean circulation patterns and ocean chemistry, climate, biological evolution, and the formation and distribution of mineral and hydrocarbon resources. Palaeogeographical research is therefore essential for understanding the evolution of our planet better and for the exploration of raw materials to meet the world’s needs in the future. Contributions on any topic relevant to palaeogeography and related geodynamic context are welcome, with special emphasis on presenting new methodologies and developments.

4d) Latest Achievements in Scientific Ocean and Continental Drilling

Lindhorst, Katja (1); Egger, Lisa M. (2); Harms, Ulrich (3)
1: Christian-Albrecht-Universität zu Kiel, Germany; 2: Bundesanstalt für Geowissenschaften und Rohstoffe, Hannover, Germany; 3: Helmholtz-Zentrum Potsdam, GFZ Deutsches GeoForschungsZentrum, Germany

National and international Earth science programs are utilizing Scientific Drilling as a critical tool to understand climate and environmental variability, natural hazards such as earthquakes and volcanic eruptions, natural resources, the deep biosphere and other topics of socio-economic relevance. The principal goal of the session is to summarize latest scientific achievements in ocean, continental and polar drilling.

4e) Archives of environmental changes throughout Earth history: bio- and authigenic mineralization to paleoenvironmental reconstruction

Teichert, Barbara M.A. (1); Heimhofer, Ulrich (2); Raddatz, Jacek (3); Gussone, Nikolaus (1); Hathorne, Ed C. (4); Böttcher, Michael E. (5)
1: Universität Münster, Germany; 2: Leibniz Universität Hannover, Germany; 3: Institute of Geosciences, Goethe University Frankfurt, Frankfurt am Main, Germany; 4: GEOMAR, Helmholtz Centre for Ocean Research Kiel, Germany; 5: IOW, Germany

Keynote: Micha Ruhl, Trinity College Dublin, Ireland: “The expression of global Oceanic Anoxic Events in continental interiors: An example from the Early Jurassic”

Keynote: Nicola Allison, Earth & Environmental Sciences at the University of St Andrews, UK: “Coral geochemistry: a window into the biomineralisation process”

Reconstruction of environmental changes and catastrophic events throughout Earth-history is of great importance for understanding climate dynamics of the Earth-system and predict possible future climate scenarios. The sedimentary record plays a key role as archive for major extinction events, perturbations of global biogeochemical cycles and prominent climate changes. In this session we address all aspects related to paleoenvironmental studies, such as formation of bio- and authigenic minerals, processes and parameters controlling geochemical signatures, preservation and diagenetic alteration as well as sedimentological, palaeontological and stratigraphical observations and modelling approaches.

4f) Cryospheric changes shape the Earth

Kuhn, Gerhard (1); Klages, Johann Philipp (2)
1: Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung, Germany; 2: Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung, Germany

Keynote: Gregor Knorr, Alfred-Wegener-Institut, Germany: “Geosphere-Climate Interactions: The role of volcanic degassing during glaciation”

We encourage contributions from different subdisciplines studying sedimentary archives from various perspectives, including paleoenvironmental reconstructions, experimental and modelling approaches, biomineralization processes and proxy development.

4g) Advances in geochronology from modern to deep time

Raddatz, Jacek (1); Linnemann, Ulf (2)
1: Institute of Geosciences, Goethe University Frankfurt, Frankfurt am Main, Germany; 2: Senckenberg Collections of Natural History Dresden, Museum of Mineralogy and Geology, Dresden, Germany

Keynote: Urs Schaltegger, University of Geneva, Switzerland: "High-resolution calibration of Earth system processes with precise and accurate U-Pb geochronology"

To fully understand the complexity of Earth History relies on precise and accurate chronologies. With recent advances in analytical geochemistry there are more and more possibilities to answer unsolved questions and target new aims, especially in geochronology. This session aims to bring together contributions from various fields in geosciences dealing with new analytical methods, new isotope systems, new archives as well as other improvements in geochronological techniques. We especially encourage contribution that combine different approaches from modern to deep time and improve existent techniques.

5. Magmatic systems and experimental petrology

5a) Volatiles in the Earth's Mantle – Elemental Budgets & Cycles

Grützner, Tobias; Bussweiler, Yannick; Tiraboschi, Carla
Universität Münster, Germany

Keynote: Celia Dalou, Centre de Recherches Pétrographiques et Géochimiques Nancy, France

Volatiles (e.g., H, C, N, S, halogens, noble gases) play an important role in petrological, geochemical, and geophysical processes in the Earth's mantle. Their presence can affect phase stabilities and initiate weakening and melting, with the potential to produce significant geophysical anomalies. Moreover, volatiles are involved in metasomatic processes, the products of which can be studied directly in mantle xenoliths.

This session aims to attract researchers studying any aspect of the Earth's deep volatile budget and cycle. We invite experimental and theoretical geochemists, isotope geochemists, mineralogists, and geophysicists to cover this topic from different perspectives. Potential specific topics include: 1) transport and recycling of volatiles in subduction zones, 2) incorporation and storage of volatiles in (nominally anhydrous) mantle minerals, 3) distribution and budget of volatiles in the Earth's mantle, 4) effect of volatiles on petrological processes (e.g., melting), geochemical processes (e.g., element mobility, isotope fractionation, oxidation states) and geophysical properties (e.g., rheology, conductivity).

5b) Volcanic geology

Breitkreuz, Christoph (1); Walter, Thomas (2)
1: TU Bergakademie Freiberg, Germany; 2: GFZ Potsdam

Keynote: Olivier Bachmann, ETH Zürich, Switzerland : "Processes and their rates in magmatic plumbing systems"

Volcanism, in the past and today, represents an important interface between the lithosphere and exogenic spheres. Studies of its (paleo-) environmental influence and complex interactions are of paramount relevance for understanding the crustal structure and morphology, as well as hazards and resources. At the same time, volcanoes and related products allow to reveal rifting environments, ocean and intraplate islands, arcs, and associated magmatic plumbing systems. Herewith we cordially invite presentations on field- to lab studies,

employing geologic mapping, geophysical imaging, remote sensing, chemical and monitoring studies, and also invite parametric studies, from analog to analytical to numerical modeling and experiments on ancient and active volcanic fields.

5c) Intraplate volcanism, mantle plumes and continental breakup

Homrighausen, Stephan (1); Jacques, Guillaume (2)
1: GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany; 2: Bundesanstalt für Geowissenschaften und Rohstoffe, Hannover

Keynote: Christine Meyzen, University of Padova, Italy: “Is there any remnants of a lost continent in the mantle underlying Crozet archipelago?”

Volcanic island chains are believed to be produced by long-lived stationary thermal anomalies, where hot material rises in the form of a plume from the deep mantle to the base of the lithosphere. The classical model predicts a plume-head often associated with Large Igneous Provinces (LIPs) and continental breakup. The mantle plume theory has been recently questioned and alternative models, such as tectonic related processes (plate model) were introduced.

We welcome any contribution from geochemistry, geochronology, geophysics and tectonics. Questions to be addressed include but are not restricted to: Do mantle plumes rise from the base of the lower mantle? Do they tap ancient reservoirs of recycled materials? Is continental breakup triggered by mantle plumes or vice versa? What is the causal link between major volcanism and plate tectonics?

5d) The role of subduction zones on Earth’s dynamic evolution

König, Stephan (1); Zack, Thomas (2)
1: Universität Tübingen, Germany; 2: University of Gothenburg, Sweden

Keynote: Frances Jenner, The Open University, UK: “Converging redox contrasts at subduction zones and a habitable Earth”

Subduction zones are an important factor of a dynamic Earth. Subduction of material into the mantle leads to a clash of oxidized surface material with Earth's reduced interior. As such evolving atmospheric oxygenation and increased redox contrast between surface and mantle has played a crucial role in mantle-crust-atmosphere interaction through geological time. Metamorphic reactions in the forearc and short-circuit recycling of some components affects the nature of arc magmatism, while long-term subduction recycling leads to distinct signatures of deep-originated plume-derived magmas. Moreover, secular mantle evolution may occur in response to continuous billion-year long input of changing surface material. Therefore, high pressure metamorphic belts, arc- and plume-related volcanic rocks as well as direct mantle samples provide important perspectives on surface-interior interaction while encompassing different time spans. We welcome contributions across all fields of the Earth Sciences including but not limited to mineralogical, (isotope-) geochemical, petrological investigations and field studies addressing the effect of subduction recycling and an evolving surface on Earth’s dynamic evolution.

5e) Stable isotope fractionation at high temperatures

Stracke, Andreas; Klemme, Stephan
WWU, Germany

Over the last two decades, technological advance has made it possible to resolve stable isotope variations at the parts per million level. This development facilitates investigation of mass-dependent or mass-independent stable isotope variations of many elements at temperatures of several hundred degrees or higher. We invite contributions employing a broad spectrum of computational, experimental, and analytical methods to study the origin and mechanisms of stable isotope fractionation at high temperature during diverse processes, including, but not limited to, the formation of planets, terrestrial magmatism, metamorphism, and interaction of hydrothermal fluids with rocks.

5f) The distribution and influence of volatile elements in the Earth's interior and their exchange with the surface.

Frost, Daniel (1); Matjuschkin, Vladimir (2)
1: University of Bayreuth; 2: Goethe University, Frankfurt am Main, Germany

The Earth's interior is an important reservoir for volatile elements such as carbon, hydrogen, nitrogen and halogens which are exchanged with the surface through the processes of subduction and volcanic outgassing. The mechanisms through which volatile species migrate within the interior, their involvement in melting and metasomatic processes and their influences on transport properties are, however, poorly understood. Similarly, we have an incomplete picture of the seafloor alteration processes that lead to the subduction of volatile species, the forms in which volatile elements are stored in the interior and the processes that lead to their eventual release to the surface. It is also increasingly being recognised that the redox state of the Earth's interior influences and may also be influenced by the occurrence of volatile species. In this session, we welcome contributions from observational, computational and experimental fields that deal with our current understanding of this deep volatile cycle and its implications for the geodynamic and geochemical evolution of the Earth. This might also include geophysical studies on the detection of deep volatiles, variations in the volatile cycle in the past in addition to cosmochemical assessments of how volatiles were accreted to the Earth.

5g) Reconstructing the evolution (P-T-t-X) of magmatic processes

Fischer, Lennart A. (1); Joachim-Mrosko, Bastian (2)
1: University of Freiburg, Germany; 2: University of Innsbruck, Austria

Keynote: Alexander Sehlke, NASA Ames Research Center, USA: "Rheological Evolution of Lavas During Cooling and Crystallization"

The texture and composition of igneous rocks, minerals and glasses store thermochemical information on the evolution of a magmatic environment, which makes them a time-sensitive recorder of the conditions present during their formation. This session is devoted to all studies that try to decipher and reconstruct the evolution of magmatic processes including the P-T-time path and the composition of magma reservoirs, conduits or lava flows. We welcome natural, experimental and theoretical studies from petrologists, mineralogists and geochemists to cover this topic from different perspectives.

5h) Processes and timescales in the evolution of transcrustal magma systems: from field and geochemical observations, through experiments to modelling

Schmitt, Axel Karl (1); Kaus, Boris (2); Holtz, Francois (3)
1: Heidelberg University, Germany; 2: Johannes-Gutenberg-University Mainz, Germany; 3: Leibniz Universität Hannover, Germany

Keynote: Maren Kahl, University of Iceland Reykjavík, Iceland: "Time-integrated magma plumbing studies: Accessing the dynamic evolution of magmatic systems in space and time"

This session aims at presenting new approaches to better understand transport, compositional processing, storage, and rejuvenation of magma on its move from the mantle to the surface. We invite the presentation of results from petrological, geochemical, and geochronological investigations focusing on the volcanic record of natural magma systems as well as experimental, geophysical and modelling studies that quantify rates and processes of transcrustal magma transport

6. Metamorphic systems

6a) Metamorphic processes

Bröcker, Michael (1); Klemd, Reiner (2)
1: WWU Münster, Germany; 2: Universität Erlangen, Germany

Keynote: Jaroslaw Majka, Uppsala, Sweden

We invite contributions focusing on the P-T-t evolution of metamorphic rocks from different geodynamic settings. The session is broad and interdisciplinary and covers the entire range of metamorphic petrology, including studies addressing microstructures, geochronology, the role of metamorphic fluids and the link between observations and models.

6b) Reaction and deformation

Trepmann, Claudia A. (1); Chakraborty, Sumit (2)
1: Ludwig-Maximilians University Munich, Germany; 2: Ruhr-University Bochum, Germany

Keynote: Holger Stünitz, University of Tromsø, Norway

Keynote: John Wheeler, University of Liverpool, UK

The session focusses on the interplay between metamorphic/metasomatic reactions and deformation as well as the influence of such interplay on the rates of the various processes. All contributions that address the pressure, temperature, stress and time evolution in deforming and reacting rocks using observations on natural systems as well as theoretical, experimental and analytical approaches are welcome.

6c) Fluid-rock interaction: from mechanisms to rates – from atoms to plates

Plümper, Oliver (1); King, Helen (1); Schwarzenbach, Esther (2)
1: Department of Earth Sciences, Utrecht University, Budapestlaan 4, 3584CD Utrecht, The Netherlands;
2: Institut für Geologische Wissenschaften, Freie Universität Berlin, Malteserstrasse 74-100, 12249 Berlin, Germany

Keynote: Johannes Vrijmoed, FU Berlin, Germany: "Modelling fluid-rock interaction"

Reactions between fluids and rocks have a fundamental impact on the geodynamics and geochemistry of the Earth at all scales. Fluid-rock interactions strongly affect the petrophysical properties and chemical and isotopic composition of reacted rocks. Therefore, they play an important role in processes such as plate tectonics, economic deposit formation, and global geochemical cycles. The fact that fluid has migrated through rocks is evident from the presence of geological structures including veins, metasomatic alteration zones, (de)hydration reaction fronts and porosity observed from the micron down to nanometre scale. Metasomatic alteration zones, but also ore deposits, point to the chemical effect of fluid flow that facilitates element mobilisation. Mechanical effects of fluid flow are expressed in phenomena such as zones of localised deformation.

The underlying mechanisms as well as the rates of fluidrock reactions are still poorly understood, despite the current field, experimental, and theoretical arguments for the importance of fluidrock interaction for geodynamic and geochemical processes. This is mainly because rocks only provide a snapshot in time, while processes like deformation, reaction, and fluid flow are complex coupled processes, which provide a challenge for numerical modelling as well as for interpreting and controlling experiments. Numerical modelling, experiments, and comprehensive field and laboratory studies that focus on the mechanisms, rates, interplay between fluid flow, reaction, deformation and mass transport processes, or the connection between small to large scales, will help to improve our understanding of fluidrock interactions.

Thus, we in-vite observational, analytical, experimental and numerical contributions that shed light on the coupled processes of fluid flow, reaction, deformation and fluidmediated mass transport at all scales, both from a fundamental and applied point of view.

7. Earth Surface Processes and Basin Analysis

7a) Quaternary Geochronology

Hetzel, Ralf (1); Dunai, Tibor (2); Preusser, Frank (3)
1: Institut für Geologie und Paläontologie, WWU Münster; 2: Institut für Geologie und Mineralogie, Universität zu Köln; 3: Institut für Geo- und Umweltnaturwissenschaften, Universität Freiburg

Keynote: Georgina King, University of Lausanne, Switzerland: “Luminescence thermochronometry“

Keynote: Vincent Godard, University of Aix-Marseille, France: “Application of 36Cl to landscape evolution in carbonates”

Understanding and quantifying the processes that modify and shape the surface of the Earth requires the determination of accurate dates and rates. Thus, the improvement and development of existing and new dating methods is essential for a better understanding of Earth`s surface processes and their relation to climate and tectonics. Currently employed geochronological methods include, for example, exposure and burial dating with cosmogenic nuclides, luminescence, radiocarbon, and paleomagnetic dating. This session invites contributions on developments and applications of all dating methods relevant to decipher Late Cenozoic landscape evolution, climate change, and active tectonics.

The keynote speakers Georgina King (Lausanne) and Vincent Godard (Aix-Marseille) will give talks on luminescence thermochronometry and the use of 36Cl in carbonate landscapes.

Interested participants are invited to visit the cosmogenic nuclide laboratory in Münster and discuss all aspects of 10Be separation and target preparation with R. Hetzel and T. Dunai.

7b) Sediment generation and quantitative provenance analysis

Castillo, Paula (1); Caracciolo, Luca (2); Eynatten, Hilmar v. (3); Stutenbecker, Laura (4)
1: Institut für Geologie und Paläontologie, WWU Münster, Germany; 2: GeoZentrum Nordbayern, FAU Erlangen-Nürnberg, Germany; 3: Geowissenschaftliches Zentrum (GZG) Abt. Sedimentologie/ Umweltgeologie, Universität Göttingen, Germany; 4: Institute of Applied Geosciences, TU Darmstadt, Germany

Keynote: Roland Stalder, Universität Innsbruck, Austria: "OH defects in quartz as monitor for igneous, metamorphic, and sedimentary processes"

The provenance signal stored in detrital sediments is intricately linked to diverse processes of sediment generation, and to modification during transport and storage. Thus source-sink relationships may be complicated to decipher or even obscured by climatic, geomorphic, tectonic and diagenetic factors.

This session welcomes contributions quantitatively analysing sediment generation and provenance by considering petrographical, geochemical, geochronological and textural properties of detrital sediments. Considerations of novel methods and approaches, case studies combining ancient and modern examples, and modeling studies are particularly welcome.

7c) Rock and fluid dynamics in deep sedimentary systems

Lutz, Rüdiger (1); Littke, Ralf (2); Schwark, Lorenz (3)
1: BGR, Germany; 2: RWTH Aachen; 3: CAU Kiel

Sedimentary basins contain the vast majority of all energy resources, including coal, petroleum, natural gas and are also the most important storage site for anthropogenic solids and fluids. During basin evolution organic matter-rich sediments and sedimentary rocks are exposed to changing pressure and temperature conditions, which lead to mineralogical and geochemical reactions. Systematic and innovative studies on rock properties, laboratory experiments under well-defined physical and chemical conditions as well as numerical modelling are required to determine rates of transformation, but also fluid flow at different scales.

We invite contributions to this session dealing with sedimentary systems and their constituent elements. We welcome basin modeling studies from crustal to reservoir scale, studies on various aspects of the petroleum system, e.g. source rock deposition, maturation, petroleum generation, expulsion and biodegradation, studies on temperature and heat flow evolution in sedimentary systems based on petrological, mineralogical, and geochemical data as well as studies on porosity and permeability evolution, transport and storage of fluids.

7d) The stable isotope toolbox in sedimentary systems: From water-rock-biosphere interactions to (palaeo-) environmental reconstructions

Hippler, Dorothee (1); Böttcher, Michael (2)
1: Graz University of Technology, Graz, Austria; 2: Leibniz-Institute for Baltic Sea Research, IOW, Warnemünde,Germany

Keynote: Anne-Desiree Schmitt, LHyGeS University of Straßbourg, France

Light and heavy stable isotope signatures in sediments and ambient waters (e.g. seawater, rivers, lakes, springs) act as highly useful proxies storing crucial information for the reconstruction of (palaeo-) environments on regional and global scales, as well as water-rock-biosphere interactions in a variety of sedimentary systems. The development of isotope signals is thereby related to element sources (e.g. weathering) or to the processes and pathways of mineral formation as part of the biogeochemical element

cycles. For a proper application of these proxies, careful calibrations are required from natural and experiment samples and the mechanisms impacting fractionation and thus signal formation must be understood. Biogenic and abiogenic sedimentary archives span the whole time range from the Precambrian until today. Post-depositional alteration (e.g., mineral recrystallization; sulfurization of organic matter; selective mineralization of organic compounds) may further modify primary signals thereby (partly) destroying the original information, but providing new evidence for (e.g.) water-solid interactions during (microbially-catalyzed) diagenetic processes.

The significance of some of these sedimentary archives, as proxy for their ambient fluids and vice versa of these fluids for the reconstruction of water-rock-biosphere interactions shaping the archives, is often obtained from time-resolved records. Whereas mass-dependent effects in the systems of light stable isotopes (e.g. H, C, O, N, S) have received much attention since the pioneering studies in 1947 (although still not fully understood), more recently also metal isotope signatures, non-mass dependent effects and isotope clumping are expanding the stable isotope tool box.

Here we invite contributions involving field, experimental and theoretical studies that contribute to a better understanding of mechanisms responsible for the (trans-) formation of solid and aqueous stable isotope signatures from different marine and terrestrial sedimentary systems.

7e) 3D applications in geosciences

Hoffmann, Gösta (1,2); Knaak, Mathias (3)
1: Uni Bonn, Germany; 2: RWTH Aachen, Germany; 3: Geologischer Dienst NRW, Krefeld, Germany

This theme aims to bring together researchers who are engaged with 3D spatial data. We aim on an interdisciplinary discussion on high resolution 3D application in geosciences on various scales from 3D-microscopy to 3D modelling of sedimentary basins. We welcome contributions dealing with surface related modelling derived from 3D-point clouds generated by both airborne or terrestrial laserscanner, photogrammetric range imaging techniques (structure from motion), optical multi- and hyperspectral as well as thermal sensor imaging techniques, differential GNSS or others. In the same way classical subsurface modelling, integrating tectonic and sedimentological 3D-approaches, as well as long term dynamic processes models and scaling analysis will be of central interest. Contributions covering methodical aspects such as data acquisition, analysis, visualisation, and integration in 3D geological models are welcome. We expect to identify interesting links between different scales and approaches and hope to attract an interdisciplinary group of researchers from all career stages. Student contributions are explicitly appreciated.

8. Applied and Environmental Geosciences

8a) Geological and hydrogeological characterisation of reservoir rocks

Göbel, Patricia (1); Hinderer, Matthias (2); Schafmeister, Maria-Theresia (3)
1: Westfälische Wilhelms-Universität Münster, Germany; 2: Technische Universität Darmstadt, Germany ; 3: Universität Greifswald, Germany

In this session we want to initiate an interdisciplinary discussion about different and innovative methods and concepts to characterize reservoir rocks at various scales. The primary focus is on porosity and permeability, their quantification, heterogeneity and genesis and involves all rock types either suitable as reservoir rocks or

as seals. Welcome are a priori geological concepts, outcrop-analogue studies, experimental lab set-ups in the laboratory, statistic concepts, modelling approaches and management systems. We are looking forward to interesting insights of research work as well as case studies, and in particular aim to bridge geology and hydrogeology.

8b) Deep subsurface groundwater systems

Fischer, Sebastian (1); Jahnke, Christoph (2)
1: Bundesanstalt für Geowissenschaften und Rohstoffe, Germany; 2: Landesamt für Bergbau, Geologie und Rohstoffe Brandenburg, Germany

Keynote: Rafael Schaeffer, TU Darmstadt, Germany: "The thermal provinces of Hesse, Germany"

Due to their unique chemical and physical properties deep groundwaters are of high geotechnical importance for the various subsurface use options, e. g. deep geothermal energy. Besides higher temperatures deep groundwaters are often characterised by higher salinities. Both higher temperatures and salinities may potentially cause problems for geotechnical applications of the deep subsurface. At least handling of deep groundwaters necessitates specific efforts and expenses, e. g. to prevent scaling and corrosion of technical components. While chemical compositions may vary even within one defined hydrostratigraphical unit, also profound knowledge of groundwater dynamics, regionally dominating forces and processes as well as hydraulical properties of subsurface faults and fractures is often limited. Hence, predictions of geotechnical use potentials of deep groundwaters at potential sites are complex and often unreliable.

We specifically, but not only, call for contributions that deal with collecting and analysing data of deep groundwaters and/or use numerical models to broaden the understanding of the chemistry as well as the dynamics, driving forces and dominating processes in the deep subsurface.

8c) Geosciences and safe nuclear waste disposal – current status and future directions

Liebscher, Axel; Borkel, Christoph; Magri, Fabien
Federal Office for the Safety of Nuclear Waste Management (BfE), Germany

Keynote: Thorsten Schäfer, University Jena, Germany: "State of knowledge in geological research on nuclear waste disposal"

The Site Selection Act (StandAG) re-started the German siting process for high-level radioactive waste disposal in 2017. Disposal is foreseen in deep geological formations and considers claystone, crystalline rock and rock salt as potential host rocks. Within the stepwise siting process, geological exclusion and assessment criteria and minimum requirements are applied, surface and subsurface exploration programs are executed and preliminary safety assessments are performed.
This session welcomes contributions on current status and future directions of the different geoscientific disciplines, like geophysics, geochemistry, mineralogy, geomechanics, geomicrobiology as well as geological, relevant for safe nuclear waste disposal. Topics may include, but are not limited to, advances in exploration, monitoring and modelling tools and approaches, fundamental and applied process understanding, THMC(B) coupled modelling, experimental and field studies, safety assessment strategies or disposal concepts.

9. The geological signatures of natural hazards and extrem events

9a) Natural Hazards like earthquakes, landslides, floods and sea-level changes

Mechernich, Silke (1); Bahlburg, Heinrich (2); Pint, Anna (3); Reicherter, Klaus (4)
1: Bundesanstalt für Gewässerkunde, Germany; 2: Instiutut für Geologie und Paläontologie, WWU Münster, Germany;
3: Geographisches Institut, Universität zu Köln, Germany; 4: Neotektonik und Georisiken, RWTH Aachen, Germany

Keynote: Max Engel, Royal Belgium Institute of Natural Sciences, Geologcial Survey of Belguim: “The geological legacy of typhoons in the Philippines”

Keynote: Maarten Van Daele, Ghent University, Belgium: “Recent advances in qualitative and quantitative lacustrine paleoseismology”

Natural hazards have always occurred in the Earth system and need to be evaluated cautiously in space (local, regional, global), time (duration, date), intensity and recurrence interval. All hazards require wide process knowledge to evaluate future impacts, and include global sea-level rise, marine and subaerial mass-movements, storms, tsunamis, earthquakes, and pyroclastic processes. To fully evaluate these processes, the considered time scales range from seconds to millennia.

We ask for contributions of natural hazard studies that recognize, evaluate and eventually manage past and future hazards affecting Earth and society. Interdisciplinary case studies as well as theoretical, analogue and numerical methods are explicitely invited.

10. Mineral Physics and Mineral Chemistry

10a) Minerals in the depths: an experimental approach

Kupenko, Ilya (1); Cerantola, Valerio (2); Pakhomova, Anna (3); Sanchez Valle, Carmen (1)
1: University of Münster, Münster, Germany; 2: European XFEL, Hamburg, Germany; 3: DESY, Hamburg, Germany

Keynote: Catherine McCammon, University of Bayreuth, Germany

Information on the physical and chemical properties of the constituents of the deep Earth and other planetary bodies is crucial for interpreting geophysical observations and understanding the structure and dynamics of the planets. Modern experimental techniques allow generating pressures and temperatures relevant to deep planetary interiors and, thus, bring new insights into dynamic processes and allow refinement of current structural models.

In this session, we welcome contributions further elaborating on the physical and chemical properties of materials at conditions of the deep interiors of the planets. The contributions may include for instance investigations of the elastic and plastic properties, transport properties, deep melting processes, equations of state and phase equilibria of mantle and core materials.

10b) Detailed insights into geodynamic processes and geotechnical applications through neutron and synchrotron X-ray diffraction

Scheffzük, Christian (1) & Nikolaus Froitzheim (2)
1: Karlsruhe Institute of Technology (KIT), Institute of Applied Geosciences, Karlsruhe, Germany; 2: University of Bonn, Germany

Keynote: Michael Stipp, University of Halle, Germany

Detailed studies of crystallographic preferred orientations, micro and macro strain can be used to improve our understanding of geodynamical process such as mountain building, subduction and deep mantle processes. Furthermore, the characterization of geomaterials in underground infrastructures, like base tunnels, mining operations, waste disposal sites, allows us a better understanding of the underlying processes and mechanisms of static and dynamic elasticity and failure of polycrystalline composite materials, such as rocks. The complementary methods neutron and synchrotron X-ray diffraction allows imaging and *in situ* investigations of rock samples and artificial materials. For this session, we encourage submissions of fundamental and applied science working groups to present their research in order promote a cross border discussion of new approaches for more detailed insights into geodynamical processes and geotechnical applications.

11. Crystallography

11a) Structural properties of minerals and materials

Fischer, Michael (1); Malcherek, Thomas (2)
1: University of Bremen, Germany; 2: University of Hamburg, Germany

Keynote: Paolo Lotti, University of Milan, Italy: “In situ synchrotron studies of open-framework silicates at non-ambient temperature and pressure”

The characterization of structure, from the atomic level to the micrometer scale, is an important area of overlap between the fields of mineralogy and materials science. This session is intended to bring together researchers from both disciplines. On the one hand, we invite “method-oriented” contributions that focus on the sophisticated application of characterization methods (e.g. X-ray, synchrotron, or neutron diffraction; vibrational spectroscopy; NMR spectroscopy; HRTEM) or of computations (e.g. density functional theory; molecular dynamics) to minerals or synthetic materials. On the other hand, more “materials-oriented” contributions are also very welcome, especially if they aim to enhance the fundamental understanding of material properties (e.g. structure-property relationships), or if they provide new insights that are relevant for technological applications of minerals or materials.

12. Mineral deposits and mining

12a) New Models for Old Deposits

Frenzel, Max (1); Krämer, Dennis (2); Graupner, Torsten (3)
1: Helmholtz-Zentrum Dresden-Rossendorf, Germany; 2: Jacobs University Bremen, Germany; 3: Bundesanstalt für Geowissenschaften und Rohstoffe (BGR), Germany

Keynote: Mathias Burisch, TU Bergakademie Freiberg, Germany: “New models for an old district - The Erzgebirge metallogenic province”

Despite its current reliance on imports for most metal and mineral raw materials, Europe is by no means poor in mineral resources. In fact, a wealth of historic mining districts, containing a number of world-class deposits (e.g. Rammelsberg, Freiberg), indicates significant potential for future production. However, little systematic work has been done on many of the relevant districts since mining ceased between 20 to 50 years ago. As a

result, there is a distinct lack of modern geological understanding, and many districts are now largely under-explored.

This session is dedicated to research that improves the understanding of historic mining districts in Europe, but particularly work conducted within the conceptual framework of mineral systems analysis. Mineral systems analysis is an approach in which ore deposits are not considered in isolation, but in a broader geo-tectonic context. It allows for the development of comprehensive exploration models, and therefore represents a key element in revitalizing exploration and mining activities in the EU.

In addition to contributions on historic mineral deposits, we also welcome contributions on active mines and recent discoveries in the region, as well as relevant sub-economic mineralizations.

12b) Mineral deposits of societal relevance for Europe

Wittenberg, Antje (1); Kolb, Jochen (2); Sievers, Henrike (1)
1: Federal Institute for Geosciences and Natural Resources (BGR), Germany; 2: Karlsruhe Institute of Technology (KIT), Germany

Keynote: Corina Hebestreit, Euromines: "Vision of a decarbonised and deindustrialised European society – independ from primary raw materials?"

Raw Materials are crucial components of a vital and wealthy society regardless a society is affected by mining, manufacturing and agriculture or it reached a de-industrialised status. Sustainable supply of raw materials always calls for accessibility to mineral deposits and productive mines. It is getting more and more challenging to meet these needs not only due to the competing land-use issues. The realisation of a low-carbon society and a self-concept of reliable sourcing increasingly require short feed strokes and local sourcing. Although Europe has a long history in mining, it is still widely underexplored in particular with modern exploration methods. A good understanding of mineral systems, mining sites and remaining resources of historical sites will stay of utmost importance.

This session thus invites contributions focussing on mineral deposits and mining activities that indicate a socio-economic importance to the German / European society in particular.

12c) Mineralogy of Ore Deposits – Genesis, Characterization, and Applications

Junge, Malte; Fischer, Lennart A.
University Freiburg, Germany

Keynote: Sarah Gleeson, GFZ Potsdam, Germany

The constant development in technology and the worldwide increasing standard of living, leads to continuous demand for raw materials. The understanding of existing as well as exploration for new ore deposits is therefore an important contribution to our society. Magmatic ore deposits cover a wide range of magmatic settings from dynamic MOR, back-arc systems, granite-related deposits to layered intrusions. These include rock types such as pegmatites, carbonatites and ultramafic-rocks, implying a vast number of ore formation processes. To understand the petrogenesis of magmatic ore deposits it is important to identify and explain ore formation processes including magma mixing, liquid immiscibility, crystal fractionation, partial melting, alteration and interaction with hydrous fluids. The diversity of different magmatic ore deposits provides the opportunity to study field relations, magmatic processes and mineralogy by using analytical tools, such as EPMA, LA-ICP-MS and isotope studies. We invite contributions from studies of natural rocks, experiments and numerical modelling in the field of magmatic ore deposits.

12d) Reuse Potential of Mining Residues

Meima, Jeannette; Drobe, Malte
Bundesanstalt für Geowissenschaften und Rohstoffe BGR, Germany

Keynote: Bernhard Dold; Luleå University of Technology, Sweden: "Sourcing of critical elements and minerals from mine waste"

This session focusses on mining residues as a potential source for metals and/or industrial minerals. A successful re-use of mining residues depends on several factors including the composition and size of the heap, the availability of appropriate processing technologies, as well as several infrastructural aspects. As the composition of mining heaps is usually very heterogeneous, it is extremely important to obtain a detailed knowledge of the spatial variations in relevant geochemical, mineralogical and textural properties inside a mining heap. Innovative exploration concepts and innovative processing technologies are required to deal with these challenges. We invite contributions that focus on the reuse potential of mining residues, including case studies, the benefits of mining waste cadasters, innovative exploration concepts, as well as innovative processing technologies.

13. Open sessions

13a) 3D Geological Modelling and subsurface potentials

Steuer, Stephan (1); Ziesch, Jennifer (2); Rouwen, Lehné (3)
1: Bundesanstalt für Geowissenschaften und Rohstoffe, Germany; 2: Landesamt für Bergbau, Energie und Geologie, Germany; 3: Hessisches Landesamt für Naturschutz, Umwelt und Geologie

In the past years, the application of 3D modeling has developed rapidly, and plays an increasing larger role in the geosciences. 3D models are created over a vast range of scales from sub-seismic structures to basin-wide structural 3D models, with a lateral extent of more than 100.000 km2. One of the biggest challenges is the construction of consistent complex 3D models (including salt structures and/or fault zones) based on the evaluation and processing of input data from structural/geological maps, wells, and geophysical data, for example, 2D/3D reflection seismic data. Also it is becoming increasingly important to connect (geologic) 3D models of the subsurface with data from other sources and of other scale. To discuss progress, problems and solutions, and to understand the complex interplay of geological 3D models, we offer this session as a platform for professional exchange in the community. Therefore, we are looking for contributions from geological Surveys, academia and the private sector, and all who deal with this topic.

13b) Young Scientist Session

Hornschu, Marko; Arndt, Iris
GeStEIN e.V, Germany

If you are a young scientist, this session is the possibility to present your project among peers. We consider everybody without PhD or recently finished PhD project a young scientist and especially welcome all those who will present at a conference for the first time. Project work, your thesis or PhD project – it doesn't matter! We welcome all kind of submissions from all fields in the Geosciences. The primary focus of the session is not

the scientific outcome but to provide a platform to practice conference presentations and discussions with a diverse audience.

The session will be subdivided according to different fields identified by the submitted papers.

13c) Tectonic Systems (TSK open session)

Ustaszewski, Kamil (1); Froitzheim, Nikolaus (2); Stipp, Michael (3)
1: Universität Jena; 2: Universität Bonn; 3: Universität Halle

Keynote: Janos Urai, RWTH Aachen, Germany: "Salt tectonics and its relevance for geological waste repositories"

We invite contributions from the fields of tectonics, structural geology, and crystalline geology. Regional and process-oriented studies from all kinds of active or fossil tectonic settings are welcome – rifting, subduction, collision, transform, as well as intra-plate deformation. Studies dealing with the development of methods related to the deformation of crust and lithosphere from the micro-scale to plate scale are also invited.

13d) Communicating (geo-)science

Bast, Rebecca (1); Laurenz-Heuser, Vera (2); Roszjar, Julia (3)
1: Fachbereich Geowissenschaften, Westfälische Wilhelms-Universität Münster; 2: S.-H. Eiszeitmuseum, Lütjenburg; 3: Mineralogisch-Petrographische Abteilung, Naturhistorisches Museum Wien

Making science accessible for everybody, and shaping discussions about key geoscience issues such as climate change, natural hazards or biodiversity helps rebutting fake news and answering the question "Why do we need fundamental research?". In times where the effects of man-made climate change are scientifically sound but publicly in doubt, the communication of scientific results to policy makers, journalists, and the general public becomes increasingly important. This session aims at bringing together various and innovative strategies to communicate science to a broad audience. How do you communicate your scientific work? Tell us for example about your citizen science project(s), science-related social media or public outreach activities. We especially invite unconventional contributions such as multimedia reports, public exhibits, press releases, etc. Please indicate in your abstract what you intend to present, and in which form (e.g. poster, exhibit, digital report, etc.).

13e) Building a Global Network of Geochemical Data

Elger, Kirsten; von Blanckenburg, Friedhelm
GFZ German Research Centre for Geosciences, Germany

Keynote: Kerstin Lehnert, Lamont Doherty Earth Observatory, USA: "To Infinity and Beyond: A New Era for Geochemical Data from the Deep Earth to Outer Space"

Future science endeavours in geochemistry, petrology, mineralogy, and volcanology will increasingly rely on access to and analysis of large volumes of data as data science is emerging as a new research paradigm in these fields. Data systems such as EarthChem and GEOROC have provided access to global, though thematically focused data syntheses. More geochemical data systems are emerging at national, programmatic, and subdomain levels in response to Open Access policies and science needs, and many other repositories manage geochemical data. There is an urgent need to develop and implement global standards and best

practices for geochemical data to become FAIR (Findable, Accessible, Interoperable, Re-usable), and to establish standard protocols for exchanging geochemical data among distributed data systems. This session aims at engaging relevant communities and groups in the Earth sciences to present their data facilities and to explore ideas and opportunities for a global geochemical data network that facilitates and promotes discovery and access of geochemical data through coordination and collaboration among international geochemical data providers.

13f) Research data and software management in times of FAIR and Open Data

Hübner, Andreas (1); Fleischer, Dirk (2)
1: GFZ German Research Centre for Geosciences, Germany; 2: Kiel University

Keynote: Jens Klump, Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia: “Wasn't "open" FAIR enough? The future of data and software publication”

Demands for integrity, transparency and reproducibility of today's research are increasing, posing new challenges for research data and software management in all science communities. The demands do arise from various directions within the scientific community, as it is growing together in scientific networks. Bottom-up driven initiatives like the Research Data Alliance (RDA) and national and international funding organizations bringing forward the German Alliance for Marine Science (DAM), the German National Research Data Infrastructure (NFDI) or the European Open Science Cloud (EOSC), all call for frictionless interoperability from the top-level side. All of this is supported by the intermediate activities like the Coalition for Publishing Data in the Earth and Space Sciences (COPDESS) and FAIR initiatives, promoting the cultural change in publishing and citation of data, samples and software in journal articles towards more transparent research. This session invites contributions that present novel approaches, best practices and community efforts in geoscience research data and research software management to enable open access and reuse of data and related code.