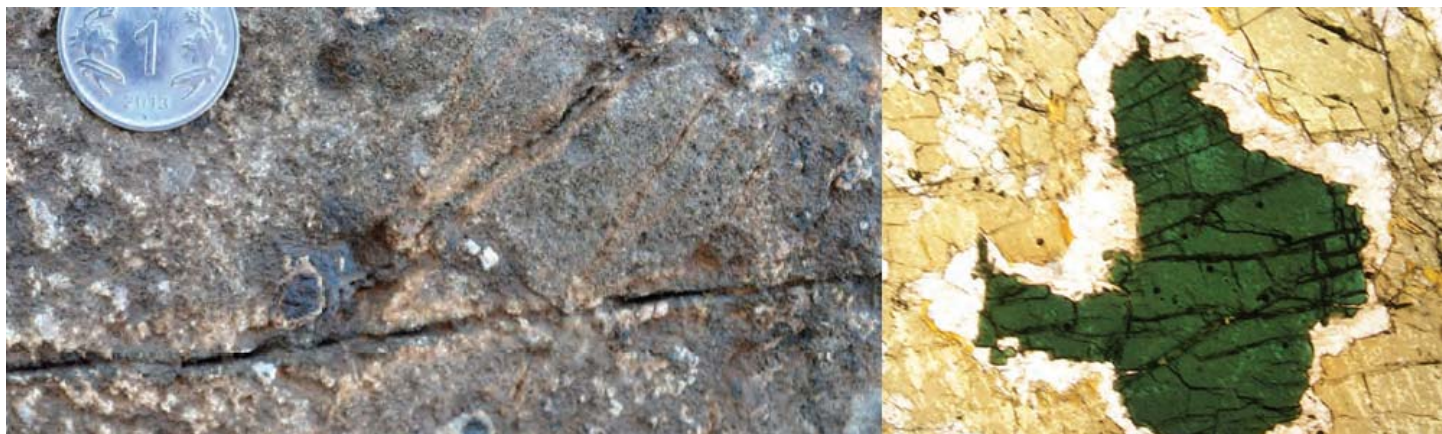


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Theme 27: Rock Deformation and Rheology

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27.1 Field Structures – Macro to Meso Scale Deformation Processes

Symposium Convenors: **Bernhard Grasemann** bernhard.grasemann@univie.ac.at (Austria), **T. K. Biswal** (India)

This symposium intends to invite abstracts on "Field Structures-Macro to meso scale deformation processes". It is expected that this will attract structural geologists who use field data to infer processes in polydeformed terrains and carry out kinematics as well as dynamic analyses using orientations of visible field structures.

27.2 Rheology and Deformation Mechanisms in the Earth

Symposium Convenors: **Nibir Mandal** nibirmandal@yahoo.co.in (India), **Susan Ellis** (New Zealand), **Joel Sarout** (Australia), **Santanu Misra** (India)

The deformation of rocks in response to tectonic stresses (rheology) is largely controlled by their ambient conditions (frequency and amplitude of stress perturbation, temperature, presence of fluids etc.), physical properties of the rocks and many other geological factors, such as synkinematic mineral reactions. The processes involved in rock deformation can be observed at multiple scales through a variety of mechanisms, ranging from brittle micro-fracturing to large-scale tectonic faulting (seismic and/or aseismic slip), crystal-plastic creep, stress-induced solid-state diffusion, partial-melting, and fluid flow. Such processes play a critical role in governing the Earth's deep-rooted dynamics, and shaping its surface morphology. This session on Rheology and Deformation Mechanisms is designed to present and discuss current research and knowledge of the diverse processes of Earth deformation, particularly emphasizing role of transient rheology and resultant structures at varied scales. The session will bridge studies from micro-mechanisms of crystal deformation to large-scale tectonics, shallow brittle faulting to deeper ductile flow, using evidence from theoretical, numerical, experimental and natural data and observations.

27.3 Fabric Analysis – Past, Present and Future Richard

Symposium Convenors: **Rick Law** rdlaw@vt.edu (USA), **Toru Takeshita** (Japan), **Koushik Sen** (India)

Fabric analysis is critical in deciphering mechanisms and microscale processes that operate in deformed rocks. Challenging problems such as identifying monoclinic vs. triclinic shear zones or host vs. recrystallized quartz grains require detailed investigation of microstructures and crystallographic preferred orientations (CPO). Microstructures are a direct indicator of the conditions of deformation (pressure/temperature/strain rate) and also provide geologists with kinematic information that can be eventually useful in interpreting larger scale structural and tectonic processes. Since the beginning of the 21st century, fabric analyses have been performed using both: 1) relatively recently developed techniques involving, for example, SEM-Electron Backscatter Diffraction (EBSD), SEM and Microprobe-based Cathodoluminescence, Transmission Electron Microscopy (TEM), Anisotropy of Magnetic Susceptibility (AMS), Computer-Integrated Polarization (CIP) microscopy and, now less commonly, 2) older techniques such as measurement of CPO by Universal Stage and X-ray Texture Goniometry. It is therefore prudent to bring together structural geologists who use different fabric-analysis tools and techniques under one roof. This will provide a platform for geoscientists from all over the world to look at fabric data from a variety of geological terrains and collected using different analytical methods. Moreover, this will provide an opportunity to discuss the pros-and-cons of different methods of fabric analysis, thus providing the present and future generation with a direction for their research.

27.4 Structural Control on Fluid Flow and Mineralization

Symposium Convenors: **Paul D. Bons** paul.bons@uni-tuebingen.de (Germany), **Tridib Kumar Mondal** (India), **Sivaji Lahiri** (India)

This session aims to bring together the communities working on crustal-scale fluid flow with the objective to promote a scientific interaction for understanding the role of geological structures in fluid flow and mineralization. We encourage the presentation of contributions (both oral and posters) showing how multi-methodological and multi-disciplinary approaches improve the knowledge of structural control on fluid flow and mineralization.

27.5 Extrapolating Experimental Rock Deformation Results to Field Structures

Symposium Convenors: **Alison Ord** alison.ord@uwa.edu.au (Australia), **Santanu Bose** (India), **H.B. Srivastava** (India), **J.H. Kruhl** (Germany), **Virginia G. Toy** (New Zealand)

This symposium, entitled aims to provide a common discussion platform for experimentalists, modellers and field geologists. We observe geological structures, and from them, we aim to decode the rheology of the rocks and understand the geological processes involved in their formation. One of the ways by which we enhance our understanding of the processes and mechanisms that lead to the formation of structures in naturally deformed rocks is to explore deformation in the laboratory. These experiments may be analogue or computational. They are typically performed at relatively high strain rates with the results subsequently extrapolated to natural strain rates. We invite contributions from geoscientists carrying out relevant field and experimental studies, at various temporal and spatial scales, to help geologists appreciate the conditions that lead to development of various brittle and ductile structures. We also encourage contributions that explore the extrapolation of experiments to natural strain rates, to mineral assemblages (rather than single phase aggregates), and to rocks undergoing chemical reactions during deformation.

27.6 Structural Geology and Society - Restoration, Geothermal Energy and Hydrocarbons

Symposium Convenors: **Rosalda Punturo** punturo@unict.it (Italy), **Dominico Liotta** (Italy), **Christoph Hilgers** (Germany), **Susanta Kumar Samanta** (India), **Sandeep Bhatt** (India)

This symposium invites contributions dealing with the integration of various approaches which, starting from structural investigations, affect society and increase awareness in population. Contributions dedicated to a profound understanding of structural Earth system processes as well as its utilization are welcome. This may include the structural and petrophysical heterogeneity during the sustainable exploitation of geothermal resources (from low- to high temperature conditions), hydrocarbon and mineral resources exploration, subsurface sequestration, application of structural geology in study of natural hazards such as landslides, as well as the restoration and preservation of heritage sites.

Keywords: Structural Geology, Restoration, Geothermal Energy, Hydrocarbons

- Theme-27 is an initiative of **IUGS Commission on Tectonics & Structural Geology (TecTask)**.
- **Structural Geology Community** is invited to actively participate in Theme 27.
- **Prof. Bruce E. Hobbs** (Australia) will deliver one of the 12 Plenary talks.
- There are pre/post conference field trips (including in the Himalaya).
- Registration & Abstract Submission is open.
- Visit www.36igc.org for online registration and abstract submission.

