APPLICATION OF COMPUTATIONAL MECHANICS TO GEOSIENCE PROBLEMS: COMPUTATIONAL GEOSCIENCES

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In recent years, numerical methods and computer simulations provide a new way to deal with many geological, geophysical and geo-environmental problems, for which the traditionally-used theoretical and experimental methods may not be valid due to the large time and length scales of the problems themselves. This enables many hitherto unsolvable geoscience problems to be solved using numerical methods and computer simulations. In particular, through wide applications of computational mechanics to geoscience problems, a brand new branch, namely computational geosciences, has been established. However, due to the extremely large length and time scales, the numerical simulation of a real geological world also provides many challenging problems for the researchers involved in the field of computational mechanics.

The proposed minisymposium will provide a forum for presentation and discussion of the state-of-the-art development and application of computational mechanics to geoscience problems. Emphasis will be on novel computational methods, formulations and practical applications to the multiple-physics and multiple-scale geological systems. Contributions are solicited in (but not restricted to) the following modelling and simulation areas of Computational Geosciences:

- Fully coupled, multi-physics and multi-scale problems, namely fully-coupled problems between medium deformation, pore-fluid flow, heat transfer, mass transport and chemical reactions in porous media;
- Mountain building, faulting and folding processes within the Earth's crust;
- Controlling physical and chemical processes associated with ore body formation and mineralization in hydrothermal systems;
- Earthquake processes between the major plates of the Earth;
- Dynamic processes associated with the breakage of Northern China Craton;
- Elastic and inelastic wave propagation within the Earth's crust;
- Spontaneous crack generation and propagation within brittle rocks;
- Shear band formation in both large and small scale geological systems;
- Physical and chemical processes associated with geo-environmental problems;
- Structure control on the fluid flow and mineralization in geological systems;
- Large-scale land sliding and slope instability problems;
- Ore body formation and mineralization in magmatic systems;
- Physical and chemical processes associated with magma ascending phenomena within the Earth's crust.