

Special Issue on
Focused Reactive Fluid Flow in the Upper Crust: Processes and Manifestations of Hypogene Karstification

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Hypogene karstification is associated with *per ascendum* migration (leakage and discharge) of basal, deep endogene, and deeply circulating meteoric fluids. It generates macroscopic void-conduit systems in rocks and promotes organization of fluid flow, thus enhancing reservoir properties and creating effective pathways for migration of deep fluids. Recent studies suggest the global widespread, although spatially uneven, development of hypogene karst within the upper (at least 4–5 km) crust, in a wide range of physicochemical conditions, geodynamic settings, and types of rocks, in both the continental and oceanic domains. Although these studies have significantly advanced our understanding of the development and distribution of hypogene void-conduit systems, many important aspects are still poorly understood. Dissolution potential of basal brines and deep endogene fluids with respect to different rock-forming minerals under various P-T conditions is yet not enough constrained. The dissolution-dominated formation of macroscopic void-conduit systems in deep settings is intimately related to other processes of fluid-induced transformations of rocks, particularly with metasomatism. In turn, being a powerful factor that controls fluid flow, hypogene karstification strongly influences fluid-induced diagenesis. While these relations are readily observed in the field, detailed studies documenting them are scarce. Further comprehension of hypogene karst is hindered by still incomplete understanding of provenance, properties, phase behaviors, and circulation of deep geofluids. It is additionally complicated by the complex evolution and interaction of deep flow systems of different nature.

This special issue aims to collate high-quality research articles and review papers addressing these and other relevant challenges and featuring recent advances in the development and application of the hypogene karst theory.

Potential topics include but are not limited to the following:

- ▶ Field-based and numerical models that describe and couple physical and chemical aspects of focused fluid flows and hypogene speleogenesis in different geodynamic and hydrogeological settings
- ▶ The role of mantle plums and lithosphere geodynamic processes in promoting vigorous fluid upwelling and hypogene karstification
- ▶ The thermodynamics of complex fluid-mineral systems and controls of dissolution capacity of basal brines and deep endogene fluids with respect to carbonates, sandstones, and other rocks in deep crustal P-T conditions
- ▶ Types of hypogene speleogenesis, patterns, morphologies, distribution, and geological and hydrogeological relationships of hypogene karst systems
- ▶ Geological and geochemical records and criteria of identification of hypogene karstification
- ▶ The role of hypogene karstification in the evolution of permeability and porosity of Earth's crust
- ▶ Implications of hypogene karst studies for prospecting and exploration of groundwater, petroleum, ore, and geothermal resources, the geological sequestering of fluids, and assessment and mitigation of geohazards

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First Round of Reviews

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