

## **Gas Geochemistry Applications in Earth Sciences**

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Gas geochemistry is a technique widely used in resolving problems relevant to various disciplines of earth sciences. Because volatile degassing has been a continuous and fundamental activity in the Earth's history, it is obvious that gas geochemistry is of great importance in tracing the interaction between atmosphere and lithosphere and in monitoring seismicity and volcanic eruptions. Changes in the chemical and isotopic composition of the gases (such as Rn, He, CO<sub>2</sub>, H<sub>2</sub>, N<sub>2</sub> and CH<sub>4</sub>) are considered to reflect physical and chemical processes occurring at depth such as mixing of fluids, changes in fluid pressures, micro-fracturing and permeability modification, and gas geochemistry is increasingly viewed as an essential complement to geophysical approaches in studies concerned with earthquake prediction. Given the different solubility of the various gas species during gas–water interaction, gas geochemistry is also important in understanding the dynamics of aquifer systems and in applications relevant to hydrogeology. Besides, being extremely sensitive parameters of volatile provenance, the isotopic composition of gases can have critical importance in the determination of the origin of hydrocarbons and hence in the assessment of petroleum systems. Moreover, natural emissions of CO<sub>2</sub> and CH<sub>4</sub> are considered as the major sources of greenhouse effects and, hence, gas geochemistry is an indispensable tool in studies relevant to climatology and environmental geochemistry.

The aim of this special session is to bring together the scientists working on multiple aspects of gas geochemistry in an attempt to provide a forum to present their studies, to share experiences and exchange ideas on the application of this tool to various geologic problems.