Despite of many years of studies, predicting fluid flow, heat, and chemical transport in fractured-porous media remains a challenge for scientists and engineers worldwide. This monograph is the third in a series on the dynamics of fluids and transport in fractured rock published by the American Geophysical Union (Geophysical Monograph Series, Vol. 162, 2005; and Geophysical Monograph, No. 122, 2000). This monograph is dedicated to the late Dr. Paul Witherspoon for his seminal influence on the development of ideas and methodologies and the birth of contemporary fractured rock hydrogeology, including such fundamental and applied problems as environmental remediation; exploitation of oil, gas, and geothermal resources; disposal of spent nuclear fuel; and geotechnical engineering.

This monograph addresses fundamental and applied scientific questions and is intended to assist scientists and practitioners bridge gaps in the current scientific knowledge in the areas of theoretical fluids dynamics, field measurements, and experiments for different practical applications. Readers of this book will include researchers, engineers, and professionals within academia, Federal agencies, and industry, as well as graduate/undergraduate students involved in theoretical, experimental, and numerical modeling studies of fluid dynamics and reactive chemical transport in the unsaturated and saturated zones, including studies pertaining to petroleum and geothermal reservoirs, environmental management and remediation, mining, gas storage, and radioactive waste isolation in underground repositories.

**Volume highlights include discussions of the following:**

- Fundamentals of using a complex systems approach to describe flow and transport in fractured-porous media.
- Methods of Field Measurements and Experiments
• Collective behavior and emergent properties of complex fractured rock systems
• Connection to the surrounding environment
• Multi-disciplinary research for different applications

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