

Special Issue

Exploring the Interplay of Water Quality and Groundwater Hydrology

Message from the Guest Editors

Groundwater is vital for human and ecological systems, supplying ~50% of drinking water and over 40% of irrigation. This Special Issue addresses the critical link between groundwater hydrology and water quality, emphasizing the need for integrated approaches.

Groundwater flow affects contaminant transport, while biogeochemical processes alter aquifer properties—highlighting their complex, two-way interactions. Topics include spatial-temporal flow variations, impacts of geological heterogeneity, climate change, and human activities such as agriculture and urbanization. Interface zones like hyporheic areas and fresh–saline transitions are key biogeochemical hotspots. Advanced tools—multitracers, coupled models, remote sensing, and in situ sensors—are improving our understanding and prediction of these systems. The issue promotes translating scientific insight into adaptive management and policy, featuring studies on remediation, protection, and regulation. By fostering interdisciplinary research, this collection aims to address global challenges: safe water access, food security, ecosystem preservation, and climate adaptation.

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