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Editorial

River Ecological Restoration and Groundwater Artificial Recharge

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There is an extensive water exchange between river water and groundwater in natural conditions. With the large-scale exploitation of river water and groundwater resources, adverse ecological impacts on the river and groundwater environment arise, such as water table depression, water quality deterioration, land subsidence, dried up rivers and dry-up, and vegetation degradation. The mechanisms underlying the relationship between the river and the groundwater and its impacts on the water resource and ecosystems, its major driving factors and the responses of the ecosystems to the water pollution are still not fully understood. On the other hand, the study of numerical simulation, risk assessment model, and water resource sustainable utilization are undergoing a revolution due to the development and application of a diverse range of new technologies and methods. However, these latest technologies and methods are still supported by relatively limited scientific evidence. There is an increasing need for understanding how climate change and human activities affect river water and groundwater, considering the river shrinkage and groundwater depletion worldwide. The Special Issue "River Ecological Restoration and Groundwater Artificial Recharge" seeks to create a platform to review and present advanced methodologies, current progress and challenges, and future opportunities.

The Special Issue comprises ten papers with three interlinked research fields. Five papers focused on the impacts of river ecological replenishment and other human activities on river and watershed ecology and groundwater quality. Three papers focused on groundwater recharge and its impacts on the groundwater regime. Two papers focused on the sustainable utilization of water resources at the regional and river basin scale.

The first published paper of the Special Issue discussed the influence radius of a pumping well, which is a parameter with little scientific and practical significance that can easily be misleading [1]. This paper offers two suggestions: (1) The influence radius should not be used in the sustainable development and protection of groundwater resources, let alone in theoretical models. (2) From the perspective of regional overall planning, the calculation and evaluation of the sustainable development and the utilization of groundwater resources should be investigated systematically [1].

Most of the authors were interested in the relationship between river water and groundwater, especially in areas with strong human activities. Che et al. [2] evaluated the hydrochemical characteristics and evolution of groundwater in an alluvial plain, and the results could be useful for the effective management and utilization of groundwater resources and provide basic support for the ecological restoration of the Yangtze River Basin of China. Two teams evaluated the impacts of the ecological water supplement on groundwater restoration using numerical simulation [3,4]. Three teams focused their research on the environmental stress impacts on the groundwater, river, and basin based on a risk assessment model, respectively [5–7]. Zhang et al. [8] conducted a case study

of research on the application of the typical biological chain to control algal in the lake ecological restoration. This paper's significance is related to the issue of eutrophication. The authors suggested it can be addressed by introducing Zoop (an algal predator) and Macc to a large extent, resulting in improved ecosystem maturity.

Finally, the rest of the published papers were related to sustainably utilizing groundwater resources. Guo et al. [9] assessed the groundwater suitability for irrigation and drinking purposes in an agricultural region of the North China Plain. Zhang et al. [10] presented a water resource allocation system for the rational utilization of brackish water in a water shortage area.

These published papers provide useful scientific evidence that could lead to a better understanding of the relationship between river water and groundwater impacted by human activities and climate change. We believe that these high-quality papers have important reference value for the sustainable management of water resources and the protection of water ecological security.

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