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ECOLOGICAL IMPACTS INDUCED BY GROUNDWATER AND THEIR THRESHOLDS IN THE ARID AREAS IN NORTHWEST CHINA

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Abstract

Based on the field survey, this paper analyzes the relationship between groundwater and ecological environment in arid and semiarid areas in northwest China. Groundwater in the arid and semiarid areas is a natural resource with economic and ecological values. The concept of the ecological value of groundwater is firstly presented. This ecological value can be reflected in four aspects: (1) the maintenance of base flow in rivers and areas of lakes and wetland; (2) the supply of physiological water demanded by vegetations; (3) the regulation of soil moisture and salt content; and (4) the stability of the geological environment (such as land subsidence etc.). In addition, the threshold system between the ecological environment and multi-dimensional indices as variations in levels of the groundwater table, groundwater quality, water and salt content in the vadose zone as well as groundwater exploitation, are proposed in the arid and semiarid areas. It is expected that the system could provide a scientific basis and technological support for the regulation of the groundwater status and the maintenance of sustainable development of the ecological environment and utilization of water resources.

Key words: arid and semiarid areas, ecological value of groundwater, supergene ecological effects, thresholds

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