

Evaluation of effect of human activities on groundwater recharge and nitrogen load, using distributed hydrological model

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Recently, groundwater resource has been more important because of surface water resource is getting more unstable due to changing amount and intensity of precipitation by climate change. At the same time, groundwater has many problems by human activities such as contamination by nitrate from agricultural area and decreasing recharge area due to urbanization. For these problems, we could assess and evaluate the effect using distributed hydrological model. This study aims to evaluate the effect of human activities on groundwater recharge and nitrogen loading, using SWAT which is one of major distributed hydrological model. The study area is the Takaya watershed (141km²) which is one of tributaries in Ashida River system, western Japan. The model was run on two periods (1976 and 2006) for evaluation of the effect. The results indicate that no signal was detected in the upper portion (mountainous area) because there are not any land-use changes. In contrast, decline of groundwater recharge was confirmed in the lower portion because there are high activities with land-use change from paddy fields to residential area. Nitrogen loading from agricultural area into groundwater has decreased due to decline of the area, although the loading from residential area has increased due to population increasing.

Keywords: Human Activities, Groundwater Resharge, Nitrogen Load, Distributed Hydrological Model