

Evaluations of spatial distributions in groundwater recharge in an urban and suburban, Yamato river watershed

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In coastal megacities, severe groundwater depression and land subsidence occurred. For sustainable groundwater use and risk management of flood, it is necessary to estimate not only groundwater recharge in upstream area of a megacity but flood discharge in subsidence area. In addition, spatial distributions of them would be especially expected in various annual precipitations. However, such estimations and predictions in future have not been fully done in previous studies. Therefore, we aimed to evaluate spatial distribution in groundwater recharge and flood discharge in an urban and suburban watershed of 1000km² scale including Osaka metropolitan city. We applied SWAT model to predictions of floods and groundwater recharge from 1990 to 2013 in Yamato river watershed. It was calibrated by the daily river runoff data from 2003 to 2004 in Japanese Ministry of Land, Infrastructure and Transport and it was validated the data from 2008 to 2009. The daily variation in river runoff in 2012 indicated the typical increase at the rainfall event with the amount above 100mm, especially it was one of the largest flood on the end of June in 2012. According to these results, the increase of the flood risk on the Osaka megacity was suggested. Based on the river runoff simulation, the spatial distributions in groundwater recharge were also evaluated. The urban area indicated the low recharge rate but forest area had the high rate. For the sustainable groundwater use and decline of flood risk, it was suggested that we should keep the present percentage of forest cover.