Geophysical Research Abstracts
Vol. 20, EGU2018-11328, 2018
EGU General Assembly 2018

The Recharge Effect of Great Chaozhou Artificial Lake on Hydrology and Water Quality of Donggang River Watershed, Taiwan

Shih-Jung Wang (1), You-Cheng Chen (2), Nan-Ko Chiu (3), Chia Feng Lin (4), Chung Pei Lee (5), and Bing Nan Wang (6)

(1) Graduate Institute of Applied Geology, National Central University, Taoyuan, Taiwan (sjwang@ncu.edu.tw), (2) Department of Civil Engineering, National Chiao Tung University, Hsinchu, Taiwan (judobear903@gmail.com), (3) YUH SHAN Environmental Engineering Co., LTD, Pingtung, Taiwan (conch@mail.yuhshan.com.tw), (4) Southern Region Water Resources Office, Water Resources Agency, MOEA, Kaohsiung, Taiwan (wat111@wrasb.gov.tw), (5) Sinotech Environmental Technology, LTD, Kaohsiung, Taiwan (paylee@setl.com.tw), (6) Sinotech Environmental Technology, LTD, Kaohsiung, Taiwan (bn@setl.com.tw)

Great Chaozhou artificial recharge lake (GCARL) is located on top fan area of the right bank of Linbian River, Taiwan. This lake is used to recharge groundwater in the Pingtung plain, which is suffered by land subsidence and seawater intrusion problems due to groundwater over pumping in the coast area. The recharged water of GCARL might not only supply the water in the coast area but also flow into the nearby Donggang River watershed. The surface water quantity in Donggang River is plenty but the usage is less due to the water quality problem. Therefore, the recharged groundwater from GCARL is one of the possible water resources in Donggang River watershed. Modflow with MT3D softwares are used to evaluate the influences of groundwater recharge from GCARL to Donggang River watershed with the combination of field observations. The result for particle tracking shows that groundwater particles from GCARL is mainly flow into the first layer aquifer (unconfined aquifer) and a small part of the particles flow into the second layer aquifer (confined aquifer). The particles in the first layer flow into the central part of Donggang River and those in the second layer flow into the down-stream of Linbian River. The recharged water from GCARL increases the groundwater level significantly in the left bank of the Donggang River that can mitigate the concentration of ammonia nitrogen, which is the main pollutant in the Donggang River watershed. The increased groundwater level can provide the recharge of surface water and groundwater which can be the water resource for future exploitation. The project of water supply in Chaozhou Town is located on the flow path of the recharged water from GCARL. The influence of groundwater pumping quantity of 10,000 m3/d on the groundwater system is not significant. This area might be a good place to exploit the recharged water but the influence on groundwater system, both the water quantity and quality, should be carefully investigated.

Keywords: Donggang River watershed, Great Chaozhou artificial recharge lake, Water resources assessment, Numerical model.