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Evaluation of groundwater recharge in Choushui River alluvial fan and Mingchu Basin for specific rainfall events

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Sound groundwater resources planning and management are lack in the Choushui River alluvial fan, resulting in the occurrence of serious land subsidence and seawater intrusion. Even the disasters induced by overpumping of groundwater pose a potential threat on the Taiwan High Speed Rail. In addition to improving the water resources management in the alluvial fan, the development of groundwater resources in the neighboring hills. Mingchu Basin, which is located on the midstream segment of the Choushui River and comprised of the gravel formation of Pleistocene, is an effective solution to resolve the problem in limited water resources. Moreover, the Dongpurui River and Qingshui River both converge into Choushui River in this basin. Because of wide drainage areas and good hydrogeological conditions, the Mingchu Basin is considered a high potential recharging region of groundwater. This work is to evaluate the groundwater recharge in the Choushui River alluvial fan and Mingchu Basin, using the WASH123D model equipped with the Groundwater Modeling System (GMS) to simulate the interaction of surface water and groundwater for specific five rainfall events. This study particularly focuses on the simulation of the groundwater flow, and evaluates the effect of different rainfall events on the groundwater recharge. First, to meet in-situ hydrogeological structure and hydraulic parameters, the GMS is used to construct hydrogeological database, mesh, hydrogeological parameters, initial condition and boundary conditions. Then, simulated parameters, such as hydraulic conductivity and pumping rates, need to be calibrated and verified in the model. After the calibration and verification, the simulated groundwater flow can reflect actual groundwater situation. Finally, when specific five rainfall events impose on the ground, groundwater recharge can be determined using the groundwater model.