

The approaches to quantify surface water-groundwater interactions through coupled models

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Abstract

The interactions between groundwater (GW) and surface water (SW) have been a major concern of researchers and managers in recent times. Numerical models are increasingly used to explore hypotheses and to develop new conceptual models of GW-SW interactions. With rapid increases in computational ability and wide availability of computers and model software, modeling has become a standard tool for effective water resource management. The coupled models to quantify SW-GW interactions in the study were HYPE for SW, known for its comprehensive flow and water quality simulation, and MODFLOW for GW, recognized for its powerful groundwater flow model. Part of this study is preliminary with the development of the conceptual model of regional groundwater flow. This study presents the beginning development of a groundwater flow model for the Choshui River Basin utilizing the Groundwater Modeling System (GMS). The modeling process involved data collection, geological and hydrogeological characterization, conceptual model development, and numerical simulation using GMS software MODFLOW 2000 package. Various parameters such as hydraulic conductivity, recharge rates, and boundary conditions were integrated into the model to represent the complex hydrogeological conditions of the basin. This is a useful initial result for further studies on the GW-SW interactions.

Keywords: Choshui River Basin, Groundwater model, Interactions, MODFLOW, Surface water