

A site specific land subsidence induced by groundwater pumping in the Chousui River Alluvial Fan, Taiwan

Presenter: Gumilar Utamas Nugraha

Advisor: Prof. Chuen-Fa Ni

Date: 2022/12/02

Abstract

This study simulated the impact of pumping rate with different scenario in the different aquifer to characterizes which aquifer pumping scenario could cause serious land subsidence in the Chousui River Alluvial Fan (CRAF). Excessive groundwater withdrawal has caused severe land subsidence in CRAF; in the past 37 years (1975–2012), subsidence has occurred more than 2 meters. The multi-layered aquifer system in the CRAF consist of four aquifers and four aquitard units. The present model was developed simulation using CSUB package for MODFLOW 6. First, groundwater level and land subsidence were simulated for year 2019. The model was calibrated using hydraulic head measurements and Multi Level Compaction Well (MLCW) data. The simulation results were in fairly good agreement with the measurement results. The calibrated and evaluated model was then used to simulated different pumping rate scenario for 365 days. Scenario 1 shows that groundwater pumping in the Aquifer 2 cause 18 cm of land subsidence, this values is the largest than pumping in other aquifer. Scenario 2 show that with the same pumping rates applied into each aquifer, Aquifer 2 and 3 has larger subsidence value than aquifer 4 (5.3 and 5.5 cm). Scenario 3 assuming a constant rate of pumping in the future, land subsidence will reach 50 cm. The study confirmed that land subsidence caused by groundwater pumping is a serious threat to CRAF.

Keyword: land subsidence, CSUB, MODFLOW 6, Chousui River Alluvial Fan