



## **Modeling regional aquifer-system compaction and land subsidence in Yunlin County, Taiwan**

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Yunlin is a county in central Taiwan that is home to several major economic development projects. Extracting groundwater has caused large-scale land subsidence in Yunlin, with the largest cumulative subsidence being 135 cm over 1992-2010. A multi-sensor monitoring system consisting of continuous GPS stations (CGPSs), a leveling network, gravity network, 300 m-deep multi-layer compaction monitoring wells and groundwater wells is deployed to monitor land subsidence and its mechanism in Yunlin. GPS data at CGPS station HWES in Huwei Township of Yunlin show a cumulative subsidence of 19.9 cm over May 2007- October 2011. Data from a nearby monitoring well show that the subsidence is caused by compactions occurring mainly at aquifers 2, 3 and 4. An analysis of subsidence and compaction at HWES suggests that the compaction is ongoing at depths > 300 m. Four hydrogeological parameters of the three sediment layers in Huwei, i.e. vertical hydraulic conductivity, elastic skeletal specific storage, inelastic skeletal specific storage, and the initial maximum preconsolidation stress, in the one-dimensional compaction model COMPAC, are estimated using the genetic algorithm. With the parameters, COMPAC predicts compactions to an accuracy consistent with in situ measurements, and the root mean square error are below 5mm. The result provides a key reference for water management in central Taiwan.