Changhwa County was once the most important aquacultural and agricultural area in Taiwan; however, it has been impacted by severe land subsidence caused by groundwater withdrawal during 1992 - 2010. We set up a multi-sensor monitoring system that includes GPS, leveling, multi-layer compaction monitoring wells and groundwater wells to monitor land subsidence and investigate the mechanism in Changhwa County. Each sensor yields vertical displacements matching to each other within 1 cm/year (RMS), and provides a high temporal resolution of subsidence.

This research uses the results of long-term monitoring records of GPS and monitoring wells to show that the stratum of the Changhwa County changed from plastic to elastoplastic after long-term compaction; the calculated coefficient of volume compressibility also shows similar results. At the same time, the vertical hydraulic conductivity, elastic skeletal specific storage, and inelastic skeletal specific storage are estimated by using a combination of the COMPAC model and genetic algorithms. Using the above-mentioned parameters to calculate the land subsidence, the simulated value agrees with the observed data within an acceptable range (0.5 cm/year). Therefore, these parameters could be used to predict future land subsidence and to aid the development of groundwater management strategy.