



An Assessment of Bedrock Bench Mark on Monitoring Land Subsidence in Tuku, Taiwan

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ABSTRACT

Land subsidence is a worldwide geological hazard which is often caused by human activities (i.e. groundwater extraction and load of construction). Groundwater in Western Taiwan has been extracted for over 40 years because of the industrial, residential, agricultural, and aquacultural uses. The groundwater pumping causes the decline of groundwater, and further gives rise to land subsidence. Therefore, it is important to monitor the groundwater level and the deformation of underground soil. In this study, an auto-monitoring system (bedrock bench mark, 300m depth) is applied to monitor the land subsidence for evaluating the monitoring capability. Tuku, Taiwan is considered as the study area because of its serious land subsidence. To estimate the monitoring efficiency of the bedrock bench mark, the measuring data by the bedrock bench mark are compared with the multiple monitoring systems in Tuku, including groundwater well, multi-level compaction monitoring well, and dual-frequency GPS stations. According to the higher time-resolution subsidence distribution resolved from the higher-frequency measuring data of the bedrock bench mark, we can easily understand the relation between groundwater level and subsidence changing with times. Additionally, the high time-resolution data is also employed to improve the interpretation of the measuring data from the monitoring well and the dual-frequency GPS stations.