



Time Frequency Analysis of The Land Subsidence Monitored Data with Exploration Geophysics

Shang-Wei Wang

Taiwan (david111tw@yahoo.com.tw)

Taiwan geographic patterns and various industry water, caused Zhuoshui River Fan groundwater extraction of excess leads to land subsidence, affect the safety of high-speed railway traffic and public construction. It is necessary to do the deeply research on the reason and behavior of subsidence. All the related element will be confer including the water extracted groundwater that be used on each industry or the impact of climate change rainfall and the ground formation characteristics. Conducted a series of in situ measurements and monitoring data with Hilbert Huang Transform. Discussion of subsidence mechanism and estimate the future high-speed rail traffic may affect the extent of providing for future reference remediation.

We investigate and experiment on the characteristic of land subsidence in Yun Lin area. The Hilbert-Huang Transform (HHT) and signal normalized are be used to discuss the physical meanings and interactions among the time series data of settlement, groundwater, pumping, rainfall and micro-tremor of ground.

The broadband seismic signals of the Broadband Array in Taiwan for Seismology, (BATS) obtained near the Zhuoshui River (WLGB in Chia Yi, WGKB in Yun Lin and RLNB in Zhang Hua) were analyzed by using HHT and empirical mode decomposition (EMD) to discuss the micro-tremor characteristics of the settled ground. To compare among ten years series data of micro-tremor, groundwater and land subsidence monitoring wells, we can get more information about land subsidence.

The electrical resistivity tomography (ERT) were performed to correlate the resistivity profile and borehole logging data at the test area. The relationships among resistivity, groundwater variation, and ground subsidence obtained from the test area have been discussed. Active and passive multichannel analysis of surface waves method (MASW) can calculate Poisson's ratio by using shear velocity and pressure velocity. The groundwater level can be presumed when Poisson's ratio arrive 0.5. We can know about undulate groundwater stages and variation of ground by more times measurements.