

Estimation of Groundwater Content in Mingzhu Basin by Combination of Gravimetry and Electrical Resistivity Tomography

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Abstract

We combine the technologies of gravimetry and electrical resistivity tomography (ERT) to estimate the groundwater content in Minzhu Basin (Fig A). Gravimetry and ERT are used to observe mass variations and groundwater levels, respectively. Four joint surveying missions combining gravimetry and ERT have been carried out in September and December in 2016, and also will be carried out in March and June in 2017, respectively. On field surveys of gravimetry, we use the absolute gravimeter FG5 and relative gravimeter CG5 to collect the gravity observations at 16 gravity stations in Minzhu Basin (Fig B); on field surveys of ERT, we will lay 7 surveying profiles on both sides of Jhuoshuei River to collect the ERT observations. The gravimetry-derived and ERT-derived data will be combined with the data of 5m resolution DEM (Fig C) and ground water wells in Minzhu Basin area in order to estimate groundwater changes during the period from September 2016 to June 2017. The overall goal of this study is to estimate the groundwater content in Minzhu Basin during 2016~2017. To reach this purpose, the following issues have to be considered in advance: (1) analyze the suitability of the gravity and ERT observing stations; (2) determine the best geological density; (3) analyze the influence of gravity observation distance on groundwater change; (4) analyze the influence of groundwater level change on gravity values.

Keywords: Gravimetry, Electrical Resistivity Tomography, Groundwater Content

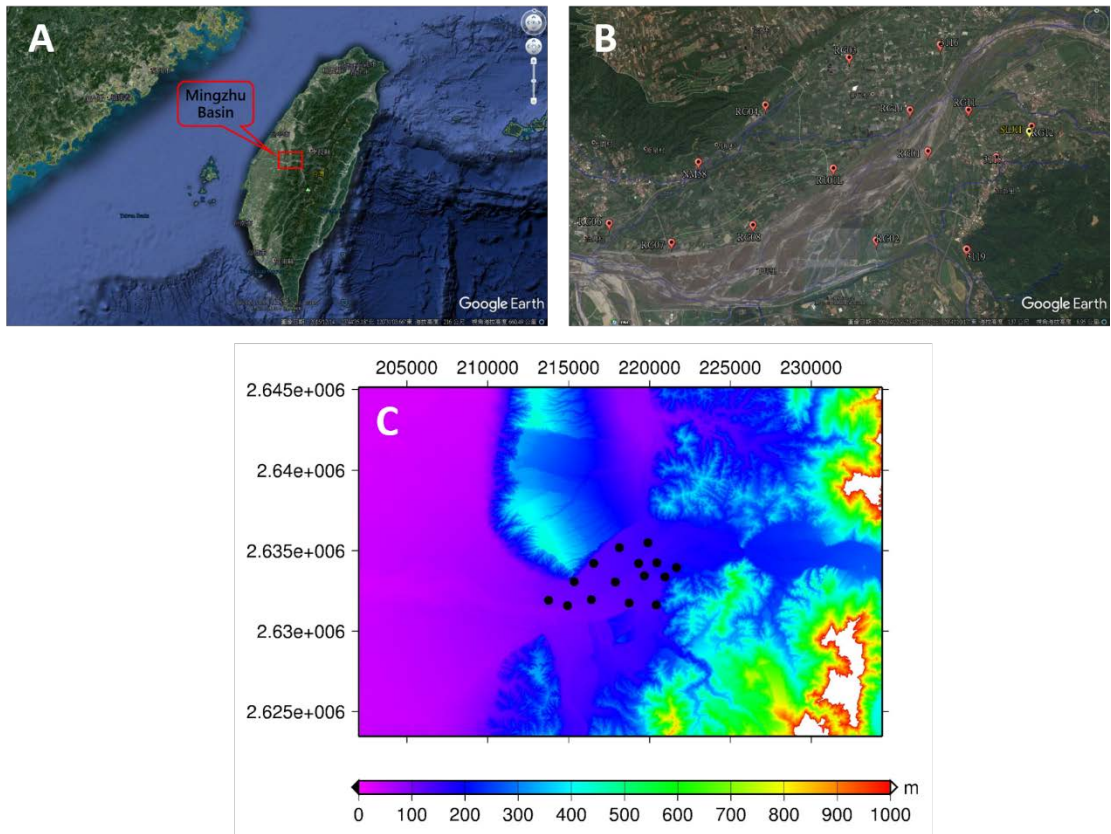


Fig.A The location of the Minchu Basin.

Fig.B Select points of the CG5.

Fig.C Using 5m resolution DEM to show the points.