

## **Spatial Distribution of Estimated Hydraulic Properties by Two Wells Pumping Test**

Jian-Wei Chen (1), Yong-Lin Chen (2), Hong-Ru Lin (2), Shao-Yang Huang (3), Tian-Chyi J. Yeh (5), Jet-Chau Wen (3,4)

(1) Graduate School of Safety Health and Environmental Engineering, National Yunlin University of Science and Technology, 123, Section 3, University Road, Douliou, Yunlin 64002, Taiwan (R.O.C.). (m10414301@gmail.com), (2) Graduate School of Engineering Science and Technology, National Yunlin University of Science and Technology, 123, Section 3, University Road, Douliou, Yunlin 64002, Taiwan, (R.O.C.). (glin0505@gmail.com), (3) Research Center for Soil & Water Resources and Natural Disaster Prevention (SWAN), 123, Section 3, University Road, Douliou, Yunlin 64002, Taiwan (R.O.C.), (4) Department and Graduate School of Safety Health and Environmental Engineering, National Yunlin University of Science and Technology, 123, Section 3, University Road, Douliou, Yunlin 64002, Taiwan (R.O.C.), (5) Department of Hydrology and Water Resources, The University of Arizona, John Harshbarger Building 1133 E. North Campus Drive, Tucson, AZ, 85721

Many researches have been proved that tomography can be successfully applied to single pumping tests at the field site. However, how to apply the technique to large-scale problems would be a challenge. If we could pumping two well simultaneously, it would make more interference range. For now, two well pumping test has not been investigated in the field site. Therefore, the two well pumping test is conducted in this study. The transient observed drawdowns were used to estimate transmissivity (T) and storage coefficient (S). The estimated T and S would be validated, to test whether two well pumping test makes the better result and decrease cost at times.

Field two well pumping were conducted in National Yunlin University of science and Technology (NYUST) campus. The analysis method using Hydraulic Tomography (HT) applied to estimate T and S by VSAFT2 (Variably saturated flow and transport in 2-dimensions) software.

Results show when pumping tests have more stimuli and more information will be obtained. Therefore, the results of inversion will converge quickly and efficiently and the advantages of two well pumping tests can be used to estimate the heterogeneous spatial distribution of hydraulic properties by using fewer pumping tests than single well sequential pumping tests.

**Keywords:** Two Well Pumping test, Hydraulic Tomography, Heterogeneity