

An integrated Well Network System(WNS) developed for groundwater resource protection and management

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The objectives of this study are to develop an integrated Well Network System(WNS) that can control the pumping and injection system and suggest the optimized operation condition using graphical user interface on web-based service. The developed WNS system was utilized to manage the optimal pumping and treatment operation applied for groundwater remediation at DNAPL contaminated site and to suggest and manage the optimal groundwater supplement in the event of a drought. For the performance of the simulation-optimization method in an integrated WNS system, a module was developed to carry out the groundwater flow and solute transport modeling, and the algorithm optimization. This system also provides GIS-based site information. In the process of finding an optimal method for the remediation design and the water supplement, Genetic Algorithm(GA) method has been chosen to find the factors for optimal operation such as location and rate of pumping and injection, the number of well, operating cost and so on. The developed WNS system was enable to smoothly perform the model for groundwater flow and contaminant transport on the web. In case of the groundwater remediation, the optimization model related to remediation operation was well linked to the web operating system to derive optimal operating factors. Also, for water supply problem, it was possible to obtain the operation information on the optimal well location and pumping rate by using the pre-established groundwater well.

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