

## **Confined water quality evaluation of drawdown cone in Jining based on improved fuzzy comprehensive evaluation method**

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**Abstract** Groundwater quality evaluation is a fuzzy concept that involves many influence factors and multi complex interactions. The traditional fuzzy comprehensive evaluation method used in groundwater quality evaluation relies so much on the expert's knowledge and experiences that the evaluation results are imprecise. In order to solve this problem and better reflect the effect of each influence factor on groundwater quality evaluation, an improved fuzzy comprehensive evaluation method based on entropy weight method and weighted average principle was proposed in this paper and used to evaluate confined water quality in the study area by analysing the confined water quality samples in a drawdown cone in Jining, China, collected in April 2009. The evaluation results were compared with those of a traditional fuzzy comprehensive evaluation method and a five-element connection number method (another systematic method of handling fuzziness and uncertainty in groundwater quality assessment), and the comparison indicated that our proposed improved method was applicable and predominant in groundwater quality evaluation because it is more objective and rational, effectively avoiding the uncertainty in evaluation results.

**Key words** improved fuzzy comprehensive evaluation; entropy weight; drawdown cone; confined water; groundwater quality evaluation