



Regional assessment of groundwater for drinking purpose subject to water-quality parameters

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Owing to limited surface water during a long term drought, this work attempted to locate safe groundwater for drinking in aquifers of the Choushui River alluvial fan, Taiwan subject to its water-quality parameters. Because the aquifers contained multiple pollutions, such as the salinity pollution, the organic pollution, the nitrogen pollution and the heavy metal pollution, multiple-variable indicator kriging (MVIK) was adopted to estimate integration of several pollutions in groundwater based on water-quality standards for drinking and to characterize spatial uncertainty. According to probabilities estimated by MVIK, safe scopes were determined for four treatment conditions – no treatment, ammonium-N removal, manganese removal, and ammonium-N and manganese removals. The analyzed results reveal that, because of exceeding the standards of manganese and/or ammonium-N, groundwater in proximal-fan aquifers (a natural recharging zone) has to be treated appropriately, such as dilution and removals with some treatment approaches, before being drunk. The proximal-fan, southeastern and central regions are the best locations to pump clean and safe groundwater for drinking when devices of ammonium-N and manganese removals are available. Deep aquifers of exceeding 200 m depth have wider safe regions to obtain excellent groundwater for drinking than shallow aquifers do.

Keywords: Multiple-variable indicator kriging; groundwater; pollution; drinking