

南投名間農業區與城鎮區地下水水質特徵比較

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摘 要 本研究以 11 個月的時間，分析南投名間地區農業區與城鎮區地下水之水質，以了解在不同土地利用條件下之水質特徵以及硝酸鹽之污染程度。結果顯示，城鎮區地下水表現出 Ca-Mg-HCO₃-SO₄ 之水化學組成特徵，其主要陰、陽離子之來源與碳酸鹽及硫酸鹽類物質之溶解作用有關。相較而言，受近期農業施肥影響之農業區地下水，其水化學組成特徵為 Na-Ca-Mg-NO₃-HCO₃。在研究期間，約有 54% 的地城鎮區下水之 NO₃⁻ 濃度測定超過飲用水水質標準，而在農業區之地下水幾已超過標準。一般而言，農業區地下水之 NO₃⁻ 濃度高於城鎮區地下水。農業區地下水在向城鎮流動過程中，因水力分散作用造成 NO₃⁻ 濃度逐漸降低。然而，因本研究區之土層質地粗、滲透性佳，且含水層中缺乏明顯的泥質滯水層，造成在下游處發生點源污染而出現高 NO₃⁻ 濃度的現象。由於名間地區地下水硝酸鹽污染之情況甚為明顯；因此，在利用地下水作為飲用水源前應加強去硝處理。

關鍵詞：地下水水質、硝酸鹽污染、農業區、城鎮區、名間。

Comparison of Groundwater Quality between Agricultural and Urban Regions of Ming-Jian, Nantou

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ABSTRACT Over an 11-month period, groundwaters included in agricultural and urban regions of Ming-Jian, Nantou were analyzed for their water quality. The goal was to understand the characteristics of groundwater quality, as well as the extent of nitrate contamination under different land-used conditions. The results point out urban groundwater is characterized as Ca-Mg-HCO₃-SO₄, referring to those major ions from the dissolutions of carbonate and sulfate. In comparison, agricultural groundwater is chemically characterized as Na-Ca-Mg-NO₃-HCO₃ because it is affected by recent farming fertilizers. Nearly 54% of the NO₃⁻ determinations of urban groundwater, as well as all the NO₃⁻ determinations in

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agricultural groundwater exceeded the criterion of drinking water during the studied period. In general, the NO_3^- concentrations are higher in agricultural groundwater than in urban groundwater, and the NO_3^- concentration of groundwater decreases as the groundwater flows from the agriculture region to the urban region due to hydraulic dispersion. However, soil texture in the study area is coarse with high permeability and the aquifer is free of retarded clay layer. Some high- NO_3^- spots were found in the downstream region owing to the point source pollution. Since the nitrate contamination of groundwater is significant in the Ming-Jian region, decontamination of nitrate in groundwater must be performed before the groundwater supplies are made available for drinking water.

Key Words: groundwater quality, nitrate contamination, agricultural region, urban region, Min-Jian.