

濁水溪沖積扇補注區地下水之水化學特徵所顯示的環境意涵

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摘 要 經濟部為經營台灣地區之水資源,自 1992 年起開始進行“地下水觀測網計畫”,以收集及建立台灣地區地下水之基本資料庫。本研究即從此地下水資料庫中,擇取及整合濁水溪沖積扇各補注區之主要化學組成,比較濁水溪沖積扇彰化、雲林扇頂區與濁水溪中游三補注區地下水化學組成之異同,並鑑別各區控制地下水化學的反應機制。結果顯示:濁水溪沖積扇補注區地下水之水化學演化機制主要受土壤層特性及來自近期外來下滲之 SO_4^{2-} 、 H^+ 所影響。濁水溪中游之南岸地區,因未受此外來之 SO_4^{2-} 及 H^+ 的影響,故其水化學演化機制以碳酸鈣溶解作用為基礎,伴隨矽酸鹽礦物溶解作用或陽離子交換作用。其餘補注區之地下水則可能遭逢外來之 SO_4^{2-} 及 H^+ 進入的影響,故表現出碳酸鈣、白雲石及石膏之溶解作用,其中石膏並非原環境之基質礦物,為基質礦物與此外來之 SO_4^{2-} 及 H^+ 反應所產生之過渡產物。因為土壤層或含水層對此酸性物質進行緩衝作用,因此,受外來之 SO_4^{2-} 及 H^+ 影響程度較高地區之地下水,會表現出較高之 $\text{SO}_4^{2-}/\text{HCO}_3^-$ 濃度比值。

關鍵詞: 地下水、化學反應機制、補注區、濁水溪沖積扇。

Environmental Implication of Hydrochemical Features on Groundwater in Recharge Region of Choushuishi Alluvial Fan, Taiwan

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ABSTRACT The Ministry of Economic Affairs (MOEA) started “Groundwater Monitoring Network Plan” (GMNP) in 1992 to collect and establish a basic database of groundwater for efficient management of water resources in Taiwan. To compare the chemical composition difference and identify the controlling chemical mechanisms of groundwater among three areas of Changhua proximal fan, Yunlin proximal fan and Choushuishi midstream region, this study extracted and integrated major chemical compositions of groundwater in recharge regions of Choushuishi alluvial fan from the MOEA’s groundwater database. The results indicate that the mechanism of hydrochemical evolution of groundwater is significantly influenced by characteristics of soil layer and recently infiltrated SO_4^{2-} and/or H^+ in these recharge regions. However, as

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groundwater in the south side of Choushuishi midstream region aren't influenced by the external SO_4^{2-} and H^+ , the geochemical mechanism mainly based on calcium carbonate dissolution accompanied with silicate dissolution or cation exchange. while the rest of the areas where groundwater are affected by the external SO_4^{2-} and H^+ display the dissolution reactions of calcium carbonate, dolomite and gypsum. Gypsum was present as a transient product induced by reaction of matrix mineral with the external SO_4^{2-} and H^+ , rather as the original matrix mineral in the environment. Due to the acid buffering processes in soil or aquifer, the more it is influenced by the external SO_4^{2-} , H^+ , the higher $\text{SO}_4^{2-}/\text{HCO}_3^-$ concentration ratio is in groundwater.

Key Words: groundwater, hydrochemical reaction mechanism, recharge region, Choushuishi alluvial fan.