基於 AR6 氣候情境嘉南地下水分區補注衝擊評估

Impact Assessment of Groundwater Recharge in the Chianan Region Under AR6 Climate Scenarios

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摘　要

臺灣長期仰賴地下水作為重要水源，然而地下水補注缺乏完善的監測資料，致使量化管理與氣候調適規劃面臨挑戰。隨著氣候變遷改變降雨時空分布，建構一套具空間適用性且能反映實際條件的補注評估機制，已成為確保水資源永續利用的關鍵。本研究聚焦於嘉南地區地下水分區，整合土壤質地與土地利用 GIS 圖資，結合飽和與非飽和入滲公式，建立 GIS 地下水補注評估方法。研究採用 TCCIP 計畫提供之 AR6 降雨資料，分析基期（1995－2014 年）與 GWL 2.0 氣候情境下之地下水補注變化。結果顯示，基期年平均補注量約為 12.53 億立方公尺；在 GWL 2.0 情境下，年補注總量變化幅度約 1.47%，整體趨勢為增加趨勢，惟呈現顯著季節性差異：6 月至 12 月補注量為增加趨勢，5 月相較基期明顯減少。此結果反映氣候變遷下降雨重新分配對地下水補注之潛在影響，並可作為嘉南地區地下水管理政策與調適策略制定之重要參考依據。

關鍵字：氣候變遷，地下水補注量，嘉南地區

Abstract

Taiwan has long relied on groundwater as a vital water resource. However, the lack of comprehensive monitoring data for groundwater recharge poses challenges for quantitative management and climate adaptation planning. As climate change alters the temporal and spatial distribution of rainfall, developing a recharge assessment mechanism that is spatially applicable and reflects real-world conditions has become essential for ensuring the sustainable use of water resources.this study focuses on the groundwater recharge zones in the Chianan region. It integrates soil texture and land use GIS data and applies both saturated and unsaturated infiltration formulas to establish a GIS-based groundwater recharge assessment method. The study utilizes AR6 rainfall data provided by the TCCIP project to analyze changes in groundwater

recharge between the baseline period (1995–2014) and the GWL 2.0 climate scenario.results indicate that the average annual recharge during the baseline period was approximately 1.253 billion cubic meters. Under the GWL 2.0 scenario, the total annual recharge is projected to change by about 1.47%, showing an overall increasing trend. However, there are significant seasonal differences: recharge from June to December shows an increasing trend, while May exhibits a noticeable decrease compared to the baseline.these findings highlight the potential impacts of rainfall redistribution due to climate change on groundwater recharge and serve as a crucial reference for developing groundwater management policies and adaptation strategies for the Chianan region alluvial fan.

Keywords: Climate Change，Groundwater Recharge，Chianan Region