氣候變遷下苗栗縣淹水災害之風險分析

Risk Analysis of Flood Disasters in Miaoli County under Climate Change

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摘　要

「氣候變遷」是指全球氣候在長時間內的整體變化過程，屬於自然現象的一種。氣候變遷可能是數百萬年間的緩慢變化，亦有可能是短短數十年間的快速變化，根據近年來全球專家學者的研究報告可得知目前所面臨的氣候變遷屬於後者且有加快變化之趨勢。隨著急劇加速的氣候變遷，除氣溫逐年突破歷史高溫記錄外，水災、旱災、強烈颱風等極端災害發生頻率亦逐漸增加，已經對於人類社會、經濟與自然生態環境造成深遠的影響。因此，針對氣候變遷下的天然災害風險評估，將可瞭解區域的災害風險等級，有助於提升高災害風險地區的抗災能力，藉此避免與減緩未來遭遇極端災害事件所帶來的威脅。根據國際政府間氣候變化專門委員會(Intergovernmental Panel on Climate Change, IPCC)評估報告的定義，風險可定義為危害度、脆弱度及暴露度等三種指標。本研究將應用「臺灣氣候變遷推估資訊與調適知識平台(Taiwan Climate Change Projection Information and Adaptation Knowledge Platform, TCCIP)」所提供之苗栗縣 AR6 日降雨量資料，進行在基期(1995 年至 2014 年)與四種未來推估(2081 年至 2100 年)情境下苗栗縣之降雨機率分析，分析苗栗縣各村里日降雨量超過 650 mm 之發生機率，並將其降雨發生機率等分間距為 5 個等級，結合第三代淹水潛勢圖產製苗栗縣 AR6 各情境下之淹水災害危害度圖；脆弱度及暴露度部分則分別以「減災動資料(Disaster Risk Reduction statistics, DRRStat)」網站提供之苗栗縣社會脆弱度資料與苗栗縣人口數分布資料進行分析產製。最後以半定量風險分析獲得 AR6 情境下苗栗縣淹水災害風險圖，可瞭解未來在氣候變遷下苗栗縣淹水災害風險等級之分布情形，有助於未來優先強化高風險村里之防災措施，規劃現地可行之調適策略，能更有效率提升苗栗縣面對淹水災害之容受能力。

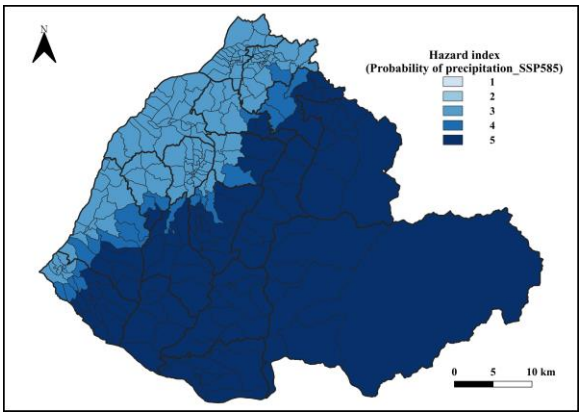
關鍵詞：淹水災害，風險分析，氣候變遷，AR6 情境，苗栗縣

Abstract

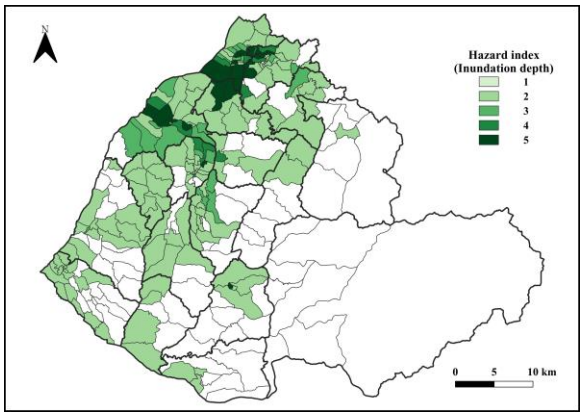
"Climate change" refers to the long-term overall process of global climate change, which is a natural phenomenon. Climate change can be a slow process over millions of years or a rapid change occurring in just a few decades. According to recent research reports by global experts and scholars, it is known that the current climate change we are facing belongs to the latter category and shows a trend of accelerating change. With the rapid acceleration of climate change, not only have annual temperatures consistently surpassed historical records, but the frequency of extreme disasters such as floods, droughts, and intense typhoons has also been gradually increasing. This has already had profound impacts on human society, the economy,

and natural ecosystems. Therefore, conducting risk assessments of natural disasters under climate change can help understand the level of disaster risk in specific regions. This process aids in enhancing the resilience of high-risk areas, thereby mitigating and preventing the threats posed by future extreme disaster events. According to the definition in the IPCC assessment report, risk can be defined by three indicators: hazard, vulnerability, and exposure. This study will use the daily rainfall data for Miaoli County provided by TCCIP to analyze rainfall probabilities in Miaoli County during the base period (1995 to 2014) and four future projections (2081 to 2100) under different AR6 scenarios. By analyzing the occurrence probability of daily rainfall exceeding 650 mm in each village and township of Miaoli County and categorizing these probabilities into 5 levels, we will integrate this information with third-generation flood potential maps to produce hazard maps of flood disasters in Miaoli County under various AR6 scenarios. Vulnerability and exposure will be assessed using social vulnerability data of Miaoli County provided by DRRStat and population distribution data of Miaoli County. Finally, through semi-quantitative risk analysis, we will obtain flood disaster risk maps for Miaoli County under AR6 scenarios. These maps provide insights into the distribution of flood disaster risk levels in Miaoli County under future climate change conditions. This would help prioritize strengthening disaster prevention measures in high-risk villages, planning locally feasible adaptation strategies, and enhancing Miaoli County's resilience to flood disasters more effectively.

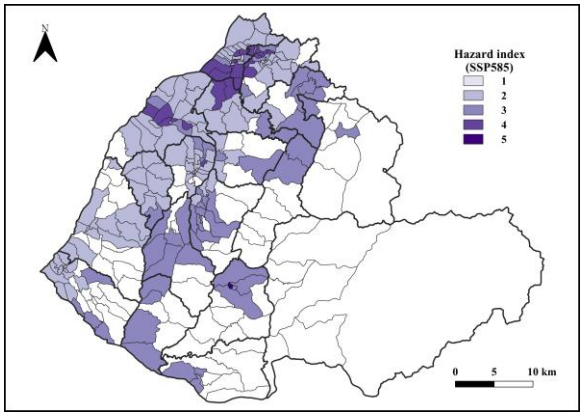
Keywords: Flood Disaster, Risk Analysis, Climate Change, AR6 Scenarios, Miaoli County



苗栗縣降雨機率圖(SSP5-8.5)



苗栗縣第三代淹水潛勢圖(村里尺度)



苗栗縣淹水災害危害度圖(SSP5-8.5)