

智慧化颱風災害氣象預警技術研發

The research of the intelligence early warning technology for typhoon and extreme weather

主管單位：國家災害防救科技中心

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摘要

台灣地區天然災害平均總損失以颱風、豪雨導致的災害最為頻繁，其次是寒害、乾旱。因此，將災害性天氣利用天氣尺度進行災害預警的分類，可以細分為極短期降雨預警、颱風預警與極端氣候預警三個部分。極短期降雨預警技術研發是以雷達與雨量觀測資料為基礎，利用雷達回波外延法與雷達資料同化的模擬技術，並研發整合技術(the extrapolation adjusted by model prediction, ExAMP)進行極短期雨量預警技術開發。颱風預警技術研發方面，以颱風系集雨量預報系統為基礎，利用統計方法進行分群與訊號分析，進行颱風與豪雨災害風險分析，提供預警資訊。極端氣候預警技術研發，是針對時空尺度較長的氣候事件進行監測與推估，透過 Model for Prediction Across Scales (MPAS) 全球模式的研發進行極端氣候預警技術的發展。為了擴大大數據資料的應用，嘗試引進不同的機器學習的演算法，來進行 AI 預警技術工具的開發。

關鍵詞：即時預報、颱風、洪水、預警

Abstract

The total loss of Taiwan natural hazard were most by typhoons and heavy rains, followed by cold damage and drought. Therefore, the early warning of severe weather could be classified into nowcasting, weather forecast and climate prediction by weather scale. The development of very short-term early warning technology is based on radar and rainfall observation data. This nowcasting technology generally included the radar echo extrapolation and radar data assimilation. In this study, we design one integrated method which ExAMP (the extrapolation adjusted by model prediction) can predict a better radar echo forecast in near future for development of nowcasting early warning. The development of flood warning technology is based on the ensemble rainfall forecast system and statistical rainfall prediction method for heavy rainfall risk analysis, and to provide the early warning information during emergency operation. The development of extreme climate early warning technology is to monitor and estimate climate events for long-term weather condition. In this study, we are established a climate forecast system by the Model for Prediction Across Scales (MPAS) for monthly prediction. In order to expand the application of big data, try to introduce different machine learning algorithms to develop AI early warning technology tools.

Keywords : Nowcasting, typhoon, flooding, early warning.