臺灣梅雨季西南氣流的成因與降水特徵之相關

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摘　　要

西南氣流（SW，southwesterly flow）可以輸送豐富的水氣至台灣地區，在暖季(梅雨季、颱風季)期間，對臺灣的降水扮演重要的角色，也經常造成極端降水事件。研究顯示SW的年際生成數量變化與梅雨季總雨量呈高度正相關，因此了解SW的成因非常重要。然而過去的研究通常採用個案分析的方式研究SW的成因，其結果僅限於單一強降水事件個案，對SW的成因缺乏全面性的調查。同時，不同SW事件期間，臺灣的降水特徵和強度也有相當大的差異，顯然SW事件的降水特徵受到生成之天氣系統類型的主宰。因此，本研究旨在探討SW事件期間的降水特徵與生成SW的天氣系統之間的關係。本研究將採用ERA5再分析資料，對1979-2022年台灣梅雨季期間（5/15 - 6/15），臺灣附近所有的西南氣流事件進行自動偵測。同時，也將使用綜觀天氣圖和衛星雲圖，對SW的成因進行分類。本研究的主要目的包括以下三個方面：一、根據天氣系統將SW生成原因進行分類。二、探討不同類型天氣系統生成的SW與臺灣降水特徵之間的相關性。三、分析SW生成原因的長期趨勢。預期本研究的結果將有助於深入了解SW的生成機制，以及SW如何影響臺灣的降水。這些結果可以作為災害防治決策和預報系統提升的參考。

關鍵字：臺灣梅雨季、西南氣流、成因分類、長期趨勢

Formation Mechanisms of Southwesterly Flows and the Relationship with Rainfall during Mei-yu Seasons

Abstract

Southwesterly flows (SW) can transport moisture-laden air to the Taiwan area and play an important role in the precipitation of Taiwan during warm seasons (Mei-yu and Typhoon seasons). It is also quite common to cause extreme precipitation events. Previous studies have shown that the number of SW events is closely related to the total amount of rainfall in Taiwan in a Mei-yu season. It is therefore important to understand the formation mechanism of SW events. Although many studies in the past have demonstrated research results in the related topics, most of them were based on single case study. A complete examination of all possible formation mechanisms of SW is lacking. Furthermore, precipitation characteristics and intensities are very different among different individual SW events because precipitation is dominantly influenced by its associated weather systems. The purposes of this study are therefore aiming on not only finding the SW formation mechanisms, but also examining the relationship between the precipitation characteristics and the weather systems that cause the SW events. The ECMWF ERA5 data will be used to detect the SW events during Mei-yu (15 May – 15 June) seasons in 1979–2022. In addition, the SW events will be classified according to the types of their formation mechanisms (weather systems). Specifically, this study will include three parts: 1. The classification of SW formation mechanisms according to the weather systems. 2. The examination of relationship between different formation mechanisms and precipitation in Taiwan. 3. The analyses of long-term trends of the different SW formation mechanisms.

Keywords：Mei-yu, southwesterly flow, formation mechanism, long-term trend