台灣冷季長期天氣預報法

—高空環流與鋒面系統部份—

Extended Weather Forecasting for Taiwan in the Cold Season

—Upper Air Circulation Patterns and Fronts—

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概 述

本研究係分三部份展開，計：

㈠第一部份：「亞洲區域 500mb 環流指標特性及其對天氣預報與分析之應用」。包括對亞洲「區域環流指標」（S.C.I.）之設計，1964—1974年冬月逐日指標製作，候(5)日平均值之求得，高、低指標及指標出現極端值（—200≥S.C.I.≥ +200）時高空環流型式之分類，長期指標異常及非異常情形下臺灣區域天氣因素變化之調查，以確認此項「區域環流指標」對本區長期天氣預報之應用價值。

㈡第二部份：「環流指標與自然週期法對臺灣冷季長期天氣預報之綜合應用」。爲就美國及蘇俄兩類長期預報學派對臺灣及有關區域三天以上天氣預報之綜合運用。藉本文所設計之「綜合類型圖」方法對臺灣長期連續惡劣與良好天氣類型及寒潮類型等，經已作出。另外，其他分類方法，亦經予以核驗。有關天氣部份，則配合衛星雲圖研究。

㈢第三部份：「亞洲區域 500mb 環流型式及環流指標之客觀分析與預報」。係就現代統計技術，包括傅氏分析（Fourier analysis），波譜與互波譜分析（Spectrum and cross-spectrum analysis），以及自回歸預報法（Autoregressive integrated moving average）等應用於亞洲區域高空環流及環流指標分析與預報之一項初步研究。成效甚見良好。

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Abstract

In order to establish an efficient extended forecast method for predicting the upper air circulation patterns in Asia and fronts near Taiwan, a sector circulation index (S.C.I.) has been developed and 10 years S.C.I. data calculated. The close relationships of 500mb circulation patterns to the S.C.I., are found. Furthermore, systematic synoptic types, expressed by the specified composite chart, regarding persistent dry and rainy weathers in Taiwan in winter time and some other important weather regimes for Taiwan have been classified. This composite chart is based on both the S.C.I. data initiated from American school and the methods of extended forecasting from Russian school.

In addition, some objective techniques for analysis and forecasting of upper air flow patterns and the S.C.I. are employed. These include Fourier analysis, spectrum analysis, and the ARIMA (autoregressive integrated moving average) model. The ARIMA technique is also used for 5-day temperature and pressure prediction of Taipei, Taiwan. The Results are evaluated and discussed.

本報告係摘自：王時鼎，1975：台灣冷季長期天氣預報法——高空環流與鋒面系統部份，空軍氣象中心研究報告 009號。