台灣地形與颱風環流之分析研究

A Diagnostic Study of Typhoon Circulation Affected by Taiwan Island

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摘 要

選取對台灣影响最大之53個颱風，分析台灣地區之風場、有関之無线電探空資料，以明瞭颱風侵襲时之垂直風場和渦旋厚度。台灣地形對颱風環流有重大之影响，水平方向之分流渦旋與局部地形渦旋以及垂直方向之颱風噴射氣流為本研究之主要結果。

局部地形渦旋為宜蘭及大武附近之特有現象，分流渦旋多發生在中央山脈之西側與北端，東側因臨海測站少，海上缺乏資料，研判困難。渦旋之發生使水平風速減少極多，其厚度很少超過二公里。

從測風資料分析中，發現有特殊

之大風層，且在水平方向及時間連續上亦有明確之顯示，名之為「颱風噴射氣流」。

一 簡介

台灣中央山脈與台灣海峽所形成之特殊地形，對颱風風場有重大之影响。1963年以前，王時鼎與徐應璟二人曾研究中央山脈對颱風之影响。1954，1962，1963，1972至1974年，在國科會之輔導下，空軍氣象中心完成侵襲台灣颱風風力之研究。以上各種成果已開啟對台灣特殊地形之颱風風場初步之瞭解。為更進一步之研究，乃蒐集所需之資料，配合鮑咸平及汪群從二位教授之研究(1976)，以驗証實驗室與數值模擬之結果，結果尚稱良好。但是因為實驗室之模型簡單，未能與實際地形相配合，故更接近於實際狀況之現象無法模擬。

整個颱風之範圍與其垂直高度相

侵襲台灣颱風風力之研究，空軍氣象聯隊。

鮑咸平(1976)山脈對颱風影响的實驗研究，大氣科學三期 P.55-66。

Abstract

1. 1366 surface wind field maps of 53 typhoons which have affected Taiwan from 1952 to 1975 and some of the rawinsonde data from 1955 to 1975 were analysed in order to study the horizontal and vertical characteristics of the topographical affected typhoon wind field.
2. Typhoon circulation was affected significantly by the special feature of Taiwan Island. The main result of this study is knowing the separation vortex and local terrain vortex and the Typhoon Jet named by this study also were discovered and some of its patterns were preliminarily analysed.
3. Different pattern of wind field over Taiwan and Taiwan Strait will be associated with different location and strength of typhoon in the vicinity of Taiwan or the center of typhoon has landed over Taiwan. Based on the stream line maps of 58 individual typhoons composition stream line maps were made and the related occurance frequency of separation vortex also computed.
4. Local topographical vortex is a special phenomenon near Yilan and Tawu and most of the separation vortices were found in the west side and north of the Central Mountain Range. Much less of the separation vortices in east side of the mountain may be due to the terrain feature and lack of data in that area.
5. From the vertical profiles of wind of Taoyuan, Makung and Tungkang significant strong wind layers were found and good indications are both on the horizontal and time cross-section charts. So we name it as "Typhoon Jet." Its height varies considerably from about 300m to 20,000m in low level and from 40,000m to 50,000m in middle level. Sometimes the strong vertical wind shear of it is about two orders larger than the horizontal wind shear of the strong typhoons. The rolling current may be formed near the Jet and causes different rainfall distribution over Taiwan.