

颱風期間台北電離層特性之變化

IONOSPHERIC CHANGES OVER TAIPEI DURING THE PASSAGE OF TYPHOONS

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ABSTRACT

By using the superposed epoch method, the changes in the ionospheric characteristics over Taipei during the passage of typhoons through Northern Taiwan have been investigated for the period 1960-1974. Student distribution has been applied to test the statistical significance of the results.

The relation between typhoons and ionosphere has been found as follows:

(1) The changes in the ionosphere begin two days before a typhoon arrives at the point closest to Taipei which means that the effect of typhoon appears in the ionosphere while the typhoon is 1000 km away from Taipei.

(2) A drop of 10 km in  $h'F$ , an increase of 0.74 MHz in  $f_oF2$ , a decrease of  $E_s$  occurrence from 30% to 10% and a decrease of 0.25 MHz in  $f_oE_s$  have been found following the passage of typhoons.

(3)  $f_oE_s$  and  $E_s$  occurrence attain their extreme values two days after typhoon passage.

(4) The extreme values of  $h'F$  and  $f_oF2$  are attained on the 5th day, the 3rd day and the zeroth day following typhoon passage for weak, moderate and intense typhoons respectively.

Three cases of pairs of typhoons separated by less than ten days are also studied. The result indicates that the combined effect of two typhoons seems to obey the law of superposition.

A comparison is made between the present result and the earlier reports. Finally, a possible explanation is presented and some suggestions given for future studies.

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中文摘要

本文應用時刻重疊法 ( SUPERPOSED EPOCH METHOD )，藉電離層與颱風資料分析十四年 ( 1960~1974 ) 期間，颱風經過北部地區時，台北上空電離層特性突變之情形，並對所得結果做顯著性檢定 ( SIGNIFICANT TEST ) 以確定各種突變現象的可靠性。

研究結果顯示，颱風與電離層之關係如下：

1. 一般而言，在颱風最接近台北前兩天 ( 距離約為一千公里 ) 台北上空電離層已受颱風影響開始變化。

2. 電離層受颱風影響之變化為  $h'F$  下降約十公里， $f_oF_2$  增加 0.74 MHz； $E_s$  層出現率由 30% 降至 10%， $f_oE_s$  減少 0.25 MHz。

3.  $E_s$  層之臨界頻率  $f_oE_s$  與出現率變化量達最大時刻為颱風過後兩天與颱風強度無關。

4.  $F$  層之  $h'F$  與  $f_oF_2$  變化量達最大時刻，輕度、中度颱風分別為颱風過後五天及三天，而強烈颱風則為當天。

除此之外，亦就相隔不遠的兩次颱風對電離層之影響加以研究發現颱風對電離層效應有可加性，此雙颱風之結果與單獨颱風之影響相加所得的結果大致相同，最後，且將本研究所得與其他學者之研究做一比較，並提出可能的解釋。