

Circulation Anomalies of the Subtropical Jets over the South Pacific

During November 1986-April 1987

<南太平洋副熱帶噴流系統之距平分析>

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1. Introduction

The structure and evolution of subtropical jet streaks over the South Pacific Ocean have been a subject of considerable interest in recent years (e.g., Hurrell and Vincent, 1990, 1991, 1992, Kiladis and Weickmann, 1992a,b, and Ko and Vincent, 1995, 1996, hereafter referred to as KV1 and KV2). KV1 showed that the jet streaks over the subtropical western South Pacific tended to recur and move eastward with a period of about 12 days. They did a composite study for the 6-month summer season of 1984-85. KV2 further analyzed the following 4 years with an El Niño year (1986-87) and a La Niña year (1988-89). They used filtering and lag correlation methods to identify the 1 to 2 week periodic behavior of the 200 hPa zonal wind maxima. This study examined the anomaly field of the 200 hPa zonal wind and try to find the link between the anomalies and the 1 to 2 week oscillation.

2. Data

The data used here are ECMWF/TOGA BASIC data which contain 2.5 degrees latitude by 2.5 degrees longitude grid point values of wind, temperature, and relative humidity. In the present study, only 200 hPa zonal wind data were used.

3. Results

This study used spectral analysis techniques to detect the periodic signals for the anomaly time series. Figure 1a showed the time series of the jet core area and the 30 day running means over the period from November 1986 to April 1987. In order to examine the anomaly field, 30 day running means were removed to form the anomaly time series as in Figure 1b. The anomaly time series revealed some fluctuations which might be linked to the intraseasonal oscillations with periods of 1 to 2 weeks.

The anomaly time series were further studied by performing the spectral analysis. Figure 2 illustrated the periodogram of the anomaly time series and it could be seen that 9 and 13 day signals were very clear to pass the 99% significance level.

4. Future work

It is suggested that more and more ENSO cases be examined to study the 1 to 2 week signals of the subtropical jets. Moreover, the NCEP re-analysis data which contain 15 years of analyses by the same model can also be used to establish the climatology of this regular feature. It is also believed that this study can be useful in medium range forecasting.

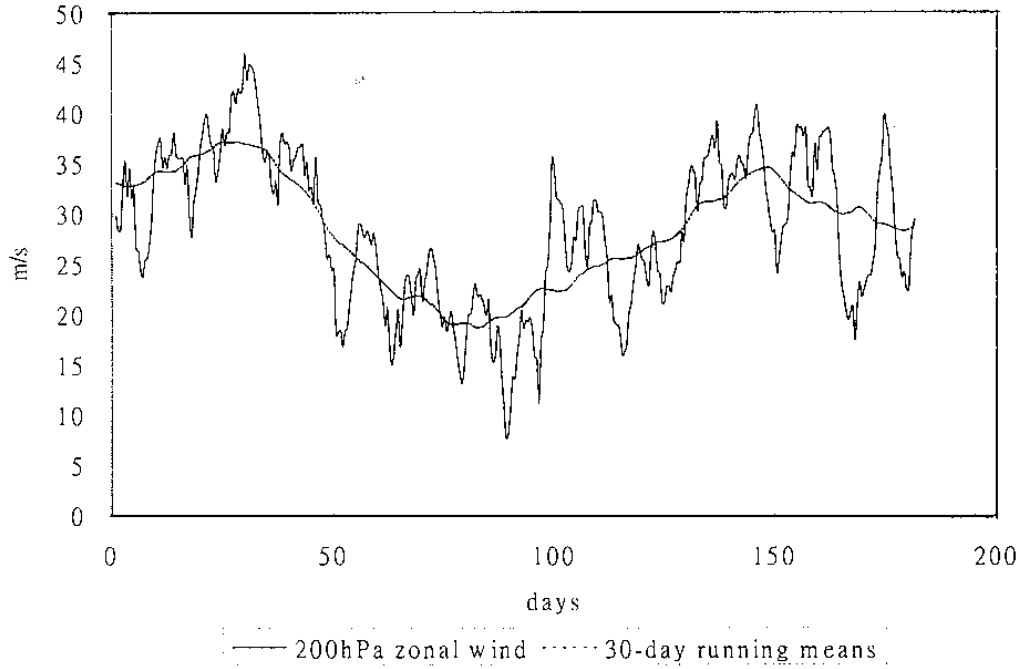
Acknowledgments

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a)



b)

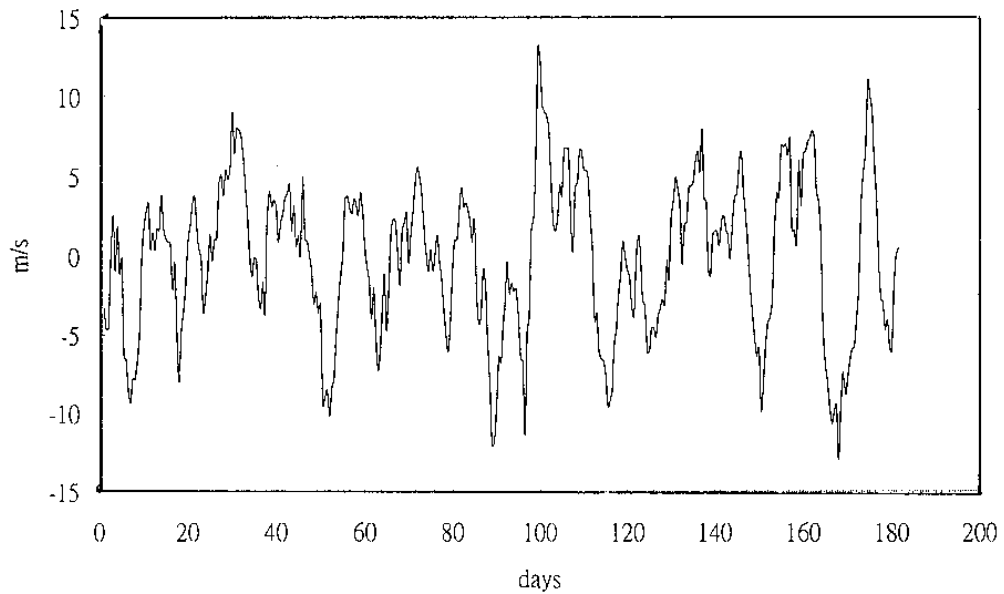


Fig1. Time series of the area-averaged 200hpa zonal wind • The boxed area is between 20-35 °N and 165 °E-165 °W. a) the total wind, b) anomalies

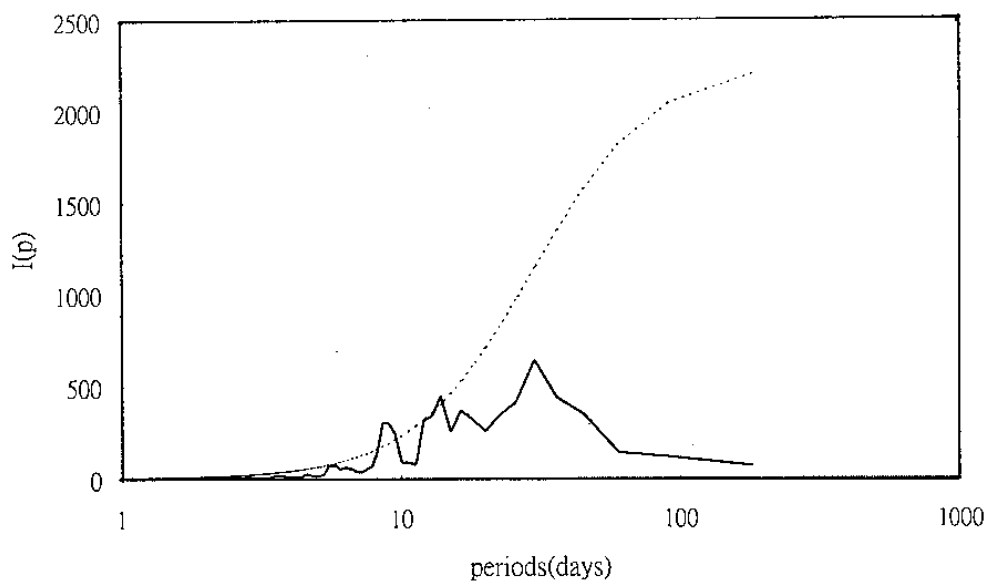


Fig2 Power spectrum of the time series as in Fig 2 b) . Also shown is the 99% significance level(dash)