

NOTE

Periodicity in the Average Daily Strength of Siberian Anticyclone from November 1967 to April 1968

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ABSTRACT

The average strength of the Siberian Anticyclone is defined. Daily values of average strength of this anticyclone have been computed for each day for the period of 1st November 1967 to 30th April 1968 from the daily 12 GMT, NHAC (New Delhi) charts. A power spectra of this data has been computed. A significant 5 day periodicity is observed. A possible connection of this anticyclone and western disturbances is discussed.

1. Introduction

A high pressure area situated over Siberia and its neighbourhood and surrounded by several closed isobars is an outstanding feature of the surface synoptic chart of the Northern Hemisphere (NH). This high pressure area is known as the Siberian High or Siberian Anticyclone. Hereafter this will be referred to as SA. Fig. 1 shows a typical SA on a 12 GMT, NHAC (New Delhi) chart of 23rd December 1965. The pressure in millibars corresponding to the innermost isobar of SA may be taken as a measure of the strength of SA. The center of this innermost isobar may further be taken as its position. During the course of a study of NH-charts it has been observed that the position as well as the strength of SA varies several times during a month. It is the purpose of this study to investigate whether there is any periodicity in the strength of SA.

2. Data

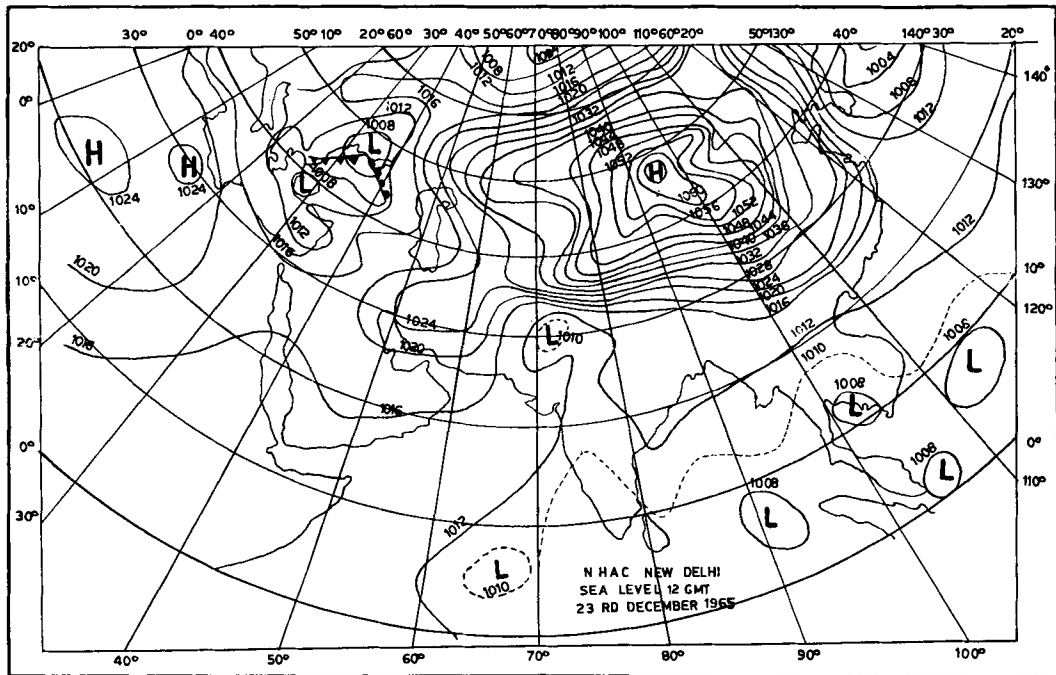
Since the position of SA fluctuates, the strength of SA as defined above may also, to some extent, be influenced by the geographic location of the innermost isobar of SA. To avoid this difficulty an average strength of SA is further defined. For this purpose the daily surface NH-charts are taken and from them the pressure values in millibars are read out for each day at each of the 20 grid points

formed by the intersection of 60° N, 50° N, 40° N and 30° N latitude parallels with 70° E, 80° E, 90° E, 100° E and 110° E longitude lines. This area between 30° N to 60° N and 70° E to 110° E is so chosen because in the preliminary study it was found that generally the position of SA oscillates between the bounds of these latitudes and longitudes. The mean of these 20 pressure values (in mb) for each day is referred to as the average daily strength of SA.

In the present study the daily 12 GMT surface charts for NH (New Delhi) for the period of November 1967 to April 1968 are taken and from them the average daily strength values of SA are computed. These average daily strength values, for the above period, are the basic data of the present analysis.

3. Theory

In recent years the periodicities in a time series are investigated by calculating the power spectra. Blackman & Tukey (1958) give a detailed account of the theory of power spectra. W.M.O. technical note no. 79 "On Climatic Changes" gives a simple scheme for the computation of power spectra and their significance limits. The average daily strength values of SA as calculated earlier are subjected to power spectrum analysis as outlined in the above report separately, for the



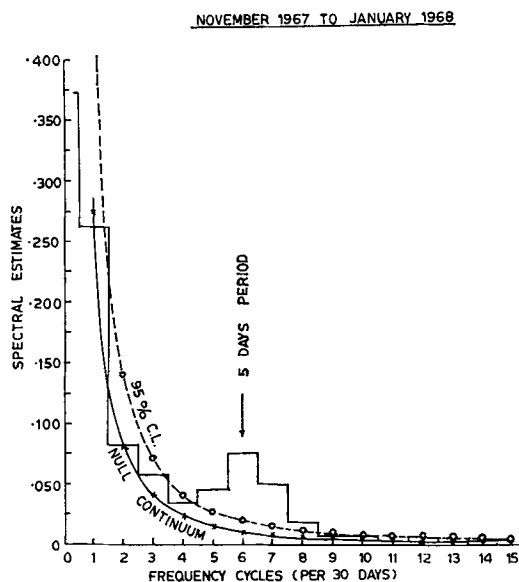


Fig. 2. Spectral estimates, null continuum and the 95 % confidence limit of the continuum for the period November 1967 to January 1968.

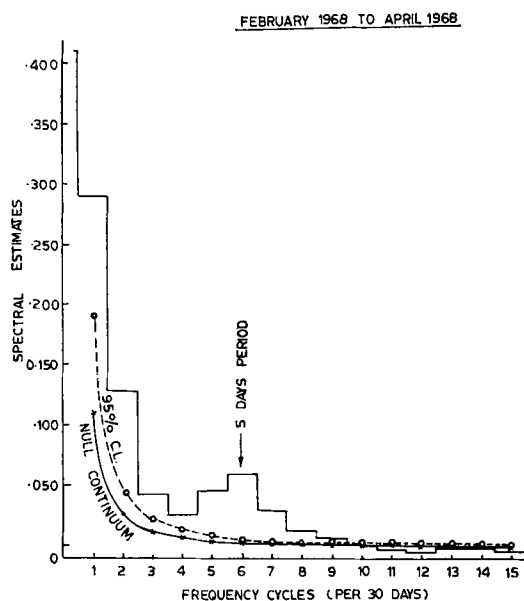


Fig. 3. Spectral estimates, null continuum and the 95 % confidence limit of the continuum for the period February 1968 to April 1968.

be related also. Fig. 1 shows two western disturbances along the western and southwestern periphery of the SA. It is suggested that when the SA attains maximum strength, conditions become favourable for the outbreak of the cold air and hence for the formation of the western disturbances to its west and subsequently when its strength decreases, the conditions become favourable again for its movement eastward along its southwestern or western periphery. It is possible, similarly, that the SA may have a connection with the disturbances

to its east. A detailed study of the relationship of the western disturbances and SA is in progress.

6. Acknowledgements

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REFERENCES

Blackman, R. W. & Tukey, J. W. 1958. The measurement of power spectra. Dover Publication, New York.

W.M.O. Technical note no. 79, 1966. On Climatic Changes.

ПЕРИОДИЧНОСТЬ В СРЕДНЕСУТОЧНОЙ ИНТЕНСИВНОСТИ СИБИРСКОГО АНТИЦИКЛОНА В ТЕЧЕНИЕ ВРЕМЕНИ С НОЯБРЯ 1967 Г. ПО АПРЕЛЬ 1968 Г.

Определяется средняя интенсивность сибирского антициклона. Суточные величины средней интенсивности этого антициклона были вычислены для каждого дня периода с 1 ноября 1967 г. по 30 апреля 1968 г. при использовании ежедневных карт на 12 часов

по Гринвичу. По этим данным были рассчитаны спектры энергии. Наблюдается статистически значимая периодичность в 5 дней. Обсуждается возможная связь этого антициклона с возмущениями, приходящими с запада.