

THE USE OF SFERICS IN ANALYSIS - A PRELIMINARY SURVEY

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Abstract: A survey is made of sferics reported by the Brisbane-Townsville-Charleville network for the period July to September 1957.

It is found that a fairly satisfactory "synoptic" classification of fixes is possible under five main headings, but some fixes appear "anomalous".

It is concluded that sferics can make an important contribution to analysis in the Australian area, but the present network may not be adequate for the purpose envisaged.

1. INTRODUCTION

A sferics network consisting of three stations - Brisbane, Charleville, Townsville - was established late in May 1957. Fixes are made thrice daily at 0500, 1230 and 1615 EST. In Central Analysis Section, these reports are plotted on the 0600, 1200 and 1500 EST charts respectively, and as far as practicable used as an aid in surface analysis.

In this preliminary survey, no attempt is made to assess the accuracy or other possible limitations of the fixes. Any comments upon such aspects of the reports are offered merely as tentative impressions. Apart from the inherent difficulty of accurately placing surface features which may be associated with sferics, it is premature at this stage to attempt any synoptic assessment of the accuracy of fixes in the Australian region. The logical procedure is to accept the fixes as stated, and see to what extent they can be employed as a routine synoptic tool. As with most other types of observation, obvious mistakes and discrepancies will be readily discernible.

2. METHOD OF CLASSIFICATION OF SYNOPTIC FEATURES

ASSOCIATED WITH SFERICS

Sferics being essentially instability phenomena, certain associated synoptic features come readily to mind. In the present study, the following synoptic features are found to be associated with most of the sferics activity reported:

- (a) easterly streams in the tropics
- (b) cold fronts and troughs
- (c) convergence zones (usually in N to W streams) ahead of fronts or troughs
- (d) streams (usually S to W) behind troughs or fronts
- (e) at or near the centre of depressions.

For counting purposes, fixes within any two-degree square have been considered as one fix. All fixes have been classified synoptically for a test period of three months - July, August, September 1957 - and the results are shown in Table 1.

Table 1. Number of fixes associated with various synoptic features, July - September, 1957

Easterly Stream in Tropics (N of 25°S)	Vicinity of Low Centre		In Front or Trough	Stream ahead of Front or Trough	Stream behind Front or Trough
	N of 25°S	S of 25°S			
A	B	C	D	E	F
480	30	130	120	120	30

There was a small number of "fixes" reported from areas where sferics appeared most unlikely, and several where such activity appeared impossible under the prevailing synoptic conditions. Such anomalous "fixes" have been experienced by overseas observers.

3. DISCUSSION OF RESULTS

The large number of fixes north of latitude 25°S (more than the combined total from other sources) occurred almost wholly in the prevailing easterly stream, there being practically no well-defined lows present during the period considered. Instability over the New Guinea area accounted for a considerable number of these fixes. Apart from the general indication of wide-spread instability, there is no specific aid to analysis here. However, an interesting point emerges from the small number of fixes obtained near low centres north of 25°S. Most of these occurred in the vicinity of the Solomon Islands where these appeared to be a semi-permanent, weak cyclonic circulation during the months under review. There is therefore some early evidence that sferics may be of importance in placing tropical cyclone centres in areas where there is little or no surface data.

Comparison of the numbers under columns C, D, E above indicates that the incidence of sferics activity associated with middle-latitude depressions is fairly evenly divided between the synoptic elements of such depressions.

As stated earlier, no attempt is made in this study to investigate the accuracy and other possible limitations of the sferics fixes, but from chart examination associated with the preliminary assessment attempted, it seems likely that the present network of observing points is inadequate to pick up all significant areas of sferics activity, particularly those in the western half of the Australian analysis area.

4. CONCLUSIONS

- (1) Sferics in the Australian regions are a useful observational and synoptic tool, particularly over the ocean regions east of Australia, where fronts and troughs previously located over the mainland can often be placed with greater certainty than is obtainable by projection from known positions.
- (2) It is found that a convenient "synoptic" classification of sferics fixes is possible under five main headings, with subsidiary latitudinal partition in two of these.
- (3) The present network, though useful, may be inadequate to cover the whole Australian analysis area efficiently. A further period of more detailed examination, particularly during the summer period, is necessary before firm conclusions can be drawn as to the overall value of the present sferics network in the Australasian area.