551.501.81 : 551.584.2(548.2)

RADAR CLIMATOLOGY OF BANGALORE AND NEIGHBOURHOOD DURING PRE-MONSOON SEASON

1. H.A.L. Airport, Bangalore (Lat. 12°57′ N; Long. 77°38′E) is situated in the southern side of the Mysore Plateau. There are small hills in and around Bangalore. The *Cauvery* rising from the hills of Coorg flows from west to east to the southwest of Bangalore, being only 40 n.m. away at its nearest point. There are two large reservoirs, Krishnarajasagar near Mysore and Stanley reservoir at about 60 n.m. to the south of Bangalore. A schematic diagram showing the topography is shown in Fig. 1.

A 3 cm Decca Type 41 radar with detecting range of 150 n.m. has been installed in the Meteorological Office at H.A.L. Airport, Bangalore in February 1964. Radarscope presentations for a period of seven years have been utilised in this study.

2. During 1965 and 1966, the radar was operated during synoptic hours and the frequency of observation was increased during bad or anticipated bad weather situation. From 1967 onwards, hourly observations are being recorded from 0600 to 1500 GMT every day. Outside these timings observations have been recorded at 3-hour intervals. However, if in any of these observations, echoes were seen, observations were continued every hour till the echoes disappeared. Polar diagrams were prepared whenever precipitation echoes were seen. These diagrams are available for all the seasons. The polar diagrams of the premonsoon season have been analysed and the result presented in this study.

3. The polar diagram is divided into sixty sectors upto the range of 100 n.m. by drawing radial lines at 30° interval and concentric range rings at 20 n.m. interval. The number of times each sector had echoes during the different observations of each month was determined and percentage frequencies worked out. These are pictorially represented in Figs. 2 to 4. The distribution of percentage frequencies for the entire season (March-May) is shown in Fig. 5.

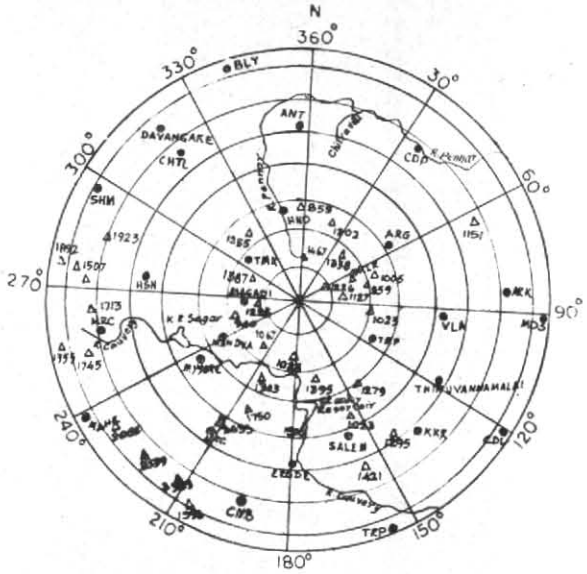

Fig. 1

Topography of Bangalore airport and its surroundings (Height in metres, Rings are 20 n. miles apart)

4. Analysis of monthwise frequencies reveals the following :

4.1. *March* — The percentage frequency of occurrence of precipitation echoes is highest (25 per cent) in the sector bounded by 60 and 80 n.m. rings and 180° and 210° radial lines. It is also high (16 to 20 per cent) in the areas bounded by 150° and 180° radial lines and 20 to 80 n.m. range.

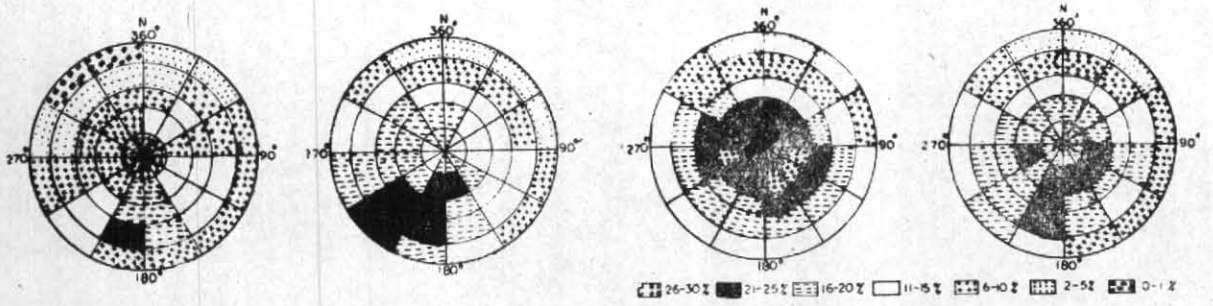

Fig. 2. March Fig. 3. April Fig. 4. May Fig. 5. March—May

Monthly and seasonal percentage distribution of precipitation echoes (Rings are 20 n. miles apart)

TABLE 1

	Period of day					Total
	Morning	Noon	Afternoon	Evening	Night	
March	Nil	14	65	81	54	214
April	6	72	282	302	151	813
May	34	65	340	458	282	1,179
Total	40	151	687	841	487	2,206

rings and 180° to 210° radial lines and 20 to 60 n.m. rings. The area between 270° and 300° radial lines outward of 60 n.m. rings has a very small frequency. It is thus seen that the southern sector is favourable for development of precipitation echoes in the month of March (Total number of polar diagrams analysed 446).

4.2. *April* — The percentage frequency of precipitation echoes in this month is 5 to 10 per cent more than in March in most of the sectors except those bounded by radial lines 030° to 120°. Again the southern sector is most favourable for development of echoes. However, the maximum value remains at 21-25 per cent as in March (Total number of polar diagrams analysed 1112).

4.3. *May* — There is a considerable change in the frequency distribution pattern as compared to that of April. Maximum occurrence of echoes is not restricted to 180° to 240° sector but is now all around the station, upto 60 n.m. The frequency is highest (25 to 30 per cent) in the sector bounded by 090° to 180° radial lines upto 40 n.m. Beyond 40 n.m. there is a general decrease in the frequency of occurrence of echoes (Total number of polar diagrams analysed 1412).

4.4. *Season* (*March-May*) — Fig. 5 gives a composite picture of the percentages for the entire season.

5. To study diurnal variation of the echoes in the different months, the day was divided into the five periods, giving due consideration to the geographical location of the station as follows—(*i*) Morning : 0200 to 0500 GMT; (*ii*) Noon : 0600 to 0800 GMT; (*iii*) Afternoon : 0900 to 1100 GMT; (*iv*) Evening : 1200 to 1500 GMT and (*v*) Night : 1600 to 0100 GMT.

In each of these periods, the average number of occasions when echoes are seen in all the sixty sectors was worked out. The result is shown in Table 1.

It is seen from Table 1 that the echoes are practically absent in the morning in March and April. They progressively increase from the morning, the increase from noon to afternoon being marked and the maximum is reached in the evening in all the three months. Though the number of occasions drops in the night, the activity is considerable during night also. The increase in activity from March to May is also seen from the table.

6. The aim of this analysis is to arrive at a climatological picture of the distribution of radar echoes around Bangalore during the three pre-monsoon months and to have an idea about their diurnal distribution. The study has shown the preferred area of thunderstorm activity in different months. The southern sector is seen to be more favourable for development of echoes. The role of the two large reservoirs to the west and south of Bangalore in this connection requires further study. Echoes commencing at noon hours increase in the afternoon and reach a maximum in the evening followed by a decrease in the night.

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