551·552 : 623·428·2 (548·1)

GROUND WIND CHARACTERISTICS AT THUMBA EQUATORIAL ROCKET LAUNCHING STATION

Surface wind characteristics are very important in the design and operation of rocket and satellite launch vehicles. Ground wind characteristics at Kennedy Space Center have been reported by Mc Vehil and Camnitz (1969). The vertical wind shear in the lowest layers of the atmosphere at Thumba Equatorial Rocket Launching Station has been studied by Narayanan and Devassy (*Ref.*). Detailed wind data for a period of one year (June 1968 to May 1969) from wind recorders situated at 58 and 200 ft on the Meteorological Tower are analysed to find out the surface wind variability at Thumba. There is no temperature recording facility at present on the Met. Tower. Hourly wind data are tabulated from wind records and processed to provide diurnal, monthly, seasonal and annual statistics on mean wind speed, vector wind speed and steadiness factor. Frequency distribution of mean wind speed, direction and steadiness factor are shown for two levels 58 and 200 ft in Fig. 1.

Fig. 2 shows the variability of the wind at the two levels. The monthly variation of the wind parameters at two levels is presented in Table 1.

It is seen from Table 1 that the mean wind speed is in the range 0-10 kt with standard deviation of 5 kt. The surface wind is more steady and

TABLE 1

Monthly variation of wind parameters at Thumba at 58 and 200-ft levels

	Mean wind speed		Standard deviation		Mean vector wind		Steadiness factor at		No. of observations	
	58 ft	200 ft	58 ft	200 ft	58 ft	200 ft	58 ft	200 ft	58 ft	200 ft
					1968					
Jun	8·6	9·5	5·7	4·6	7·4	8·5	0·9	0·9	639	603
Jul	3·9	10·5	3·6	5·0	3·5	9·5	0·9	0·9	550	610
Aug	7·8	11·7	4·0	3·0	5·9	10·5	0 8	0·9	493	665
Sep	5·3	8·2	3·9	5·3	4·8	4·9	0·9	0·6	551	467
Oct	2·2	6·7	2·6	3·5	2·1	4·7	0·9	0·7	402	570
Nov	3·3	5·3	2·5	3·0	1·5	3·2	0·5	0·6	576	618
Dec	3·6	5·7	2·4	3·3	1·0	3·4	0·3	0·6	609	578
					1969					
Jan	5·1	6·5	2·4	2·5	3·8	4·6	0·7	0·7	474	622
Feb	5·0	6·6	2·3	2·5	3·7	4·6	0·7	0·7	616	441
Mar	5·4	7·9	2·7	3·3	3·7	7·1	0·7	0·9	679	626
Apr	6·4	7·0	3·7	3·6	4·6	4·9	0·7	0·7	638	647
May	4·0	8·0	3·0	3·7	3·6	7·2	0·9	0·9	404	684
Annual mean	5·0	7·8	3·2	3·6	4·0	6·1	0·7	0·8	6631 (Total)	7131

strong during summer and southwest monsoon. Strong wind condition exceeding 10 kt at 200-ft level is 24 per cent, *i.e.*, twice that of at 58-ft level. Frequency distribution of wind direction suggests that the winds are northerly and westerly and it is more stable at 200ft level.

Gust factor and Richardson number are not studied in this note. But the frequency distribution of mean wind speed, direction and steadiness factor may give indirectly the magnitude of gustiness. The frequency variation is relatively little with height. Only one year of tower wind data were utilised for analysis and since one year is not necessarily typical, climatological inferences from the result must be drawn with caution. Detailed analysis of gust characteristics are required for this. It is felt that these preliminary and first estimate results reported here will be useful, particularly for operational purposes.

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3 February 1971

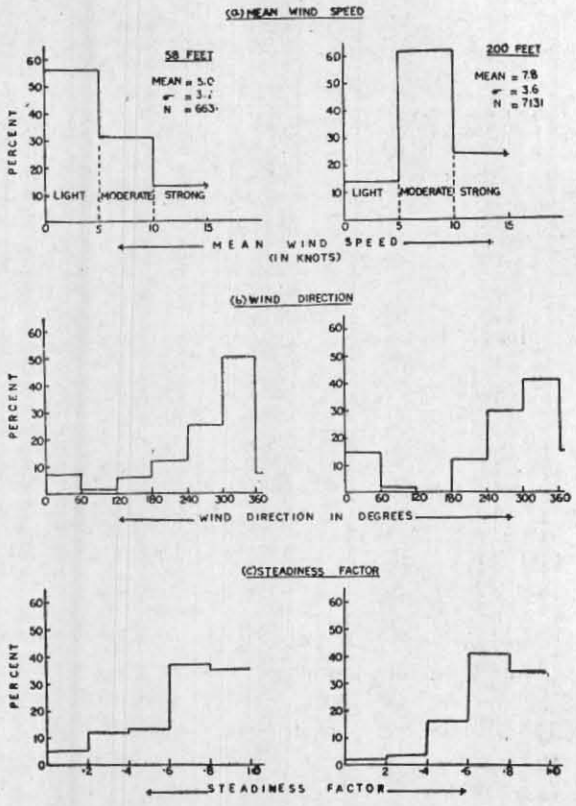
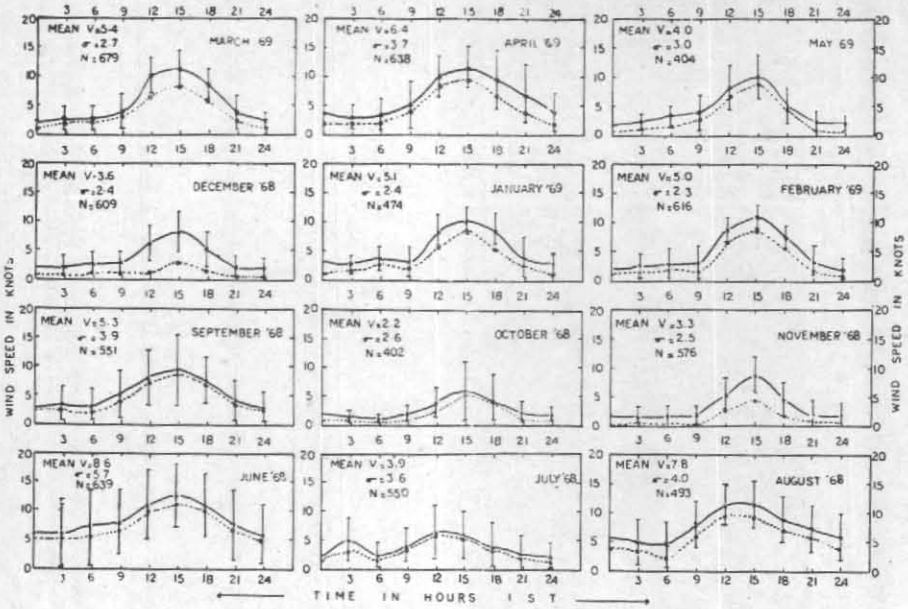
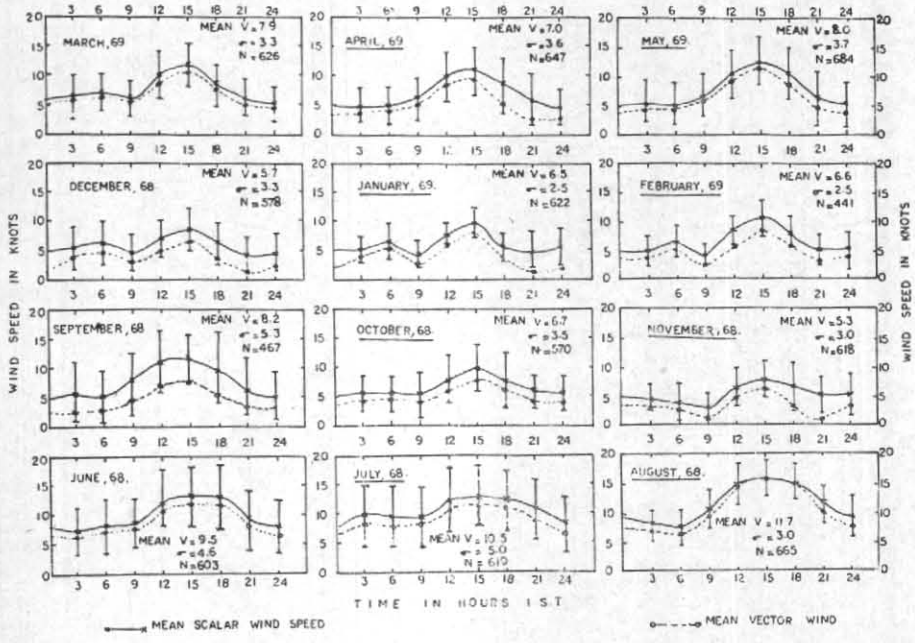


Fig. 1

Frequency distribution of mean wind speed, direction and steadiness factor at 58 and 200-ft levels



(a) VARIABILITY OF WIND AT 58 FEET AT THUMBA
(BASED ON WIND RECORDS JUNE 68-MAY 1969)



(b) VARIABILTY OF WIND AT 200 FT. AT THUMBA
(BASED ON WIND RECORDS JUNE 68-MAY 1969)

Fig. 2

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