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A persistent variation in the "SIRS" 1000-100 mb thicknesses in the VTPR scan. By MAY, B.R.

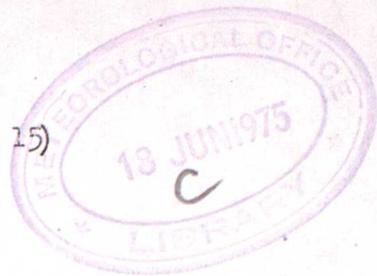
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Met O 19 Branch Memorandum (No 15)



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B R May

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A PERSISTENT VARIATION IN THE "SIRS" 1000-100mb THICKNESSES IN THE VTPR
CROSS-TRACK SCAN

The atmospheric radiances observed by the VTPR on the NOAA space-craft are processed to provide upper-air soundings of the atmosphere arranged in lines of three across the sub-spacecraft track (relative to the direction of travel of the space-craft these will be referred to as left (L), centre (C) and right (R) soundings, respectively). Staff of the CFO have recently noticed that in general the centre soundings of the 1000-100 mb thickness (and other thicknesses) are greater by several dm than the left or right soundings. This note describes the results of an analysis of the C-L and C-R differences in the 1000-100 mb thickness from northern hemisphere SIRS soundings during the period 1975 May 07/18Z to 10/06Z. Only SIRS soundings which could be unmistakably identified as left, centre or right were used in this investigation. An initial examination of the differences suggested that the C-R and the C-L differences were not of the same magnitude so that they were treated separately. Previous experience of SIRS soundings has suggested that they have a latitudinal variation so that the differences were also subdivided into latitude bands. The standard deviations of the C-L and C-R differences as a function of latitude are tabulated below, along with the mean difference and its standard error. The mean differences are also plotted in the attached figure. The overall mean differences (over all latitudes) are also given in the table.

COMMENTS ON THE RESULTS.

At all latitudes the mean C-L and C-R differences are positive and significantly different from zero demonstrating clearly that the thicknesses measured along the sub-spacecraft track are greater than those to the left and right of the track. At low latitudes (up to about 20°) the C-L and C-R differences are almost identical but with increasing latitude there is a tendency for the C-R difference to be greater than the C-L difference. At low latitudes where the 1000-100mb field is "flatter" the standard deviations are a good representation of the true variability of the C-L and C-R differences - at higher latitudes the standard deviation contains a component

due to the influence of the more variable field. The maxima in the mean differences between 40° and 50° has a high probability of being real (especially for the C-R difference), but is of unknown origin.

B R May
Met O 19

20 May 1975

RESULT OF ANALYSIS OF SIRS SOUNDINGS: LEFT, CENTRE AND RIGHT 1000-1000mb THICKNESSES

Latitude Band	0° - 9°		10° - 19°		20° - 29°		30° - 39°		40° - 49°		50° - 69°		All Latitudes	
	C-L	C-R	C-L	C-R	C-L	C-R	C-L	C-R	C-L	C-R	C-L	C-R	C-L	C-R
Number in sample	27	25	46	53	29	33	20	24	23	14	10	9	155	158
Standard deviation of differences	2.15	2.26	2.11	2.21	2.64	2.11	5.42	4.73	10.33	5.65	2.79	6.12	3.69	4.08
Mean difference	5.33	5.32	4.37	5.00	3.17	5.64	2.85	9.04	7.57	11.86	4.00	8.56	4.57	6.61
Standard error of mean	0.41	0.45	0.31	0.31	0.49	0.37	0.64	0.96	2.15	1.51	0.88	2.04	0.30	0.33

Thickness differences in dm.

decametres

MEAN DIFFERENCES BETWEEN LEFT AND CENTRE, AND
RIGHT AND CENTRE SOUNDINGS IN THE SIRS SCAN,
1000 - 100 MB THICKNESS FOR PERIOD
MAY 07/18Z TO 10/06Z 1975

