# FURTHER STUDIES ON ATMOSPHERIC GENERAL CIRCULATION AND TRANSPORT OF RADIOACTIVE DEBRIS

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## ABSTRACT

This paper is a continuation of a previous publication (Mahlman, 1966) which attempted to explain the physical bases for large-scale seasonal and short-term radioactive fallout fluctuations. The previous paper demonstrated that the seasonal fallout variation depends directly upon the stratospheric circulation and that the spring fallout peak is attributable to increased eddy fluxes of debris following the major breakdown of the polar night vortex.

In this paper an analysis is performed on a "minor breakdown" of the stratospheric circulation which occurred during a period of general intensification of the polar vortex (15 November to 15 December 1958). Computation of the v'w' covariances showed that this period is favorable for northward and downward transport of radioactive debris, but far less so than the period following the January 1958 major breakdown of the polar night circulation.

The mean meridional circulation was computed for the chosen time period using a thermodynamic method. For this period the mean cell is always <u>direct</u>, but changes direction when the mean north-south temperature gradient reverses from positive to negative. A calculation is also performed on the mean circulation relative to a polar vortex oriented coordinate system. For this system the mean cell is <u>indirect</u>. In the previous paper the latitudinal mean cell was computed to be <u>indirect</u> prior to the major polar night vortex breakdown while relative to the circulation coordinate, the mean cell was thermodynamically <u>direct</u>. These opposite results suggest that the mechanisms for maintaining the zonal mean circulation and the polar vortex differ considerably between the onset and termination of the stratospheric polar night circulation. Also, this implies that the debris transport characteristics of the lower stratosphere depend explicitly on circulation type and season.

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### I. INTRODUCTION

At the time of the first tests of thermonuclear weapons in the atmosphere, scientists believed that no significant surface fallout would result since such weapons contain enough thermal energy to inject most of the debris into the stable layers of the lower stratosphere. The assumption was that the debris would remain indefinitely in the stratosphere since the high static stability of the region acts to inhibit the vertical transport processes responsible for carrying it downward. It soon became evident, however, that significant amounts of radioactive debris were being transported downward from the stratosphere. This was verified through radiochemical and physical measurement of large surface fallout intensity variations many months after weapons testing had terminated. In view of the fact that the mean tropospheric residence half-time of a radioactive particle is about one month (Stewart, Crooks, and Fisher, 1955), the inference that the surface increases were of stratospheric origin was justified.

Even though the initial fallout measurements were very sporadic, within a relatively short time it became apparent that the atmospheric circulation acts to produce some surprising surface fallout characteristics over time periods following such thermonuclear weapons testing (for references, see Mahlman, 1966). These measurements revealed that very large local surface increases in fallout intensity can be documented for several years after cessation of nuclear testing. Furthermore, there existed a pronounced peak of fallout intensity in mid-latitudes, and a well-defined peak of radioactivity was present in the spring of each year.

The radiochemical measurements strongly suggested a very efficient mechanism for transporting stratospheric air into the troposphere. At that time, however, no atmospheric model was capable of explaining the phenomenon. Although substantiating local radiochemical measurements were not available at that time, Reed and Sanders (1953)

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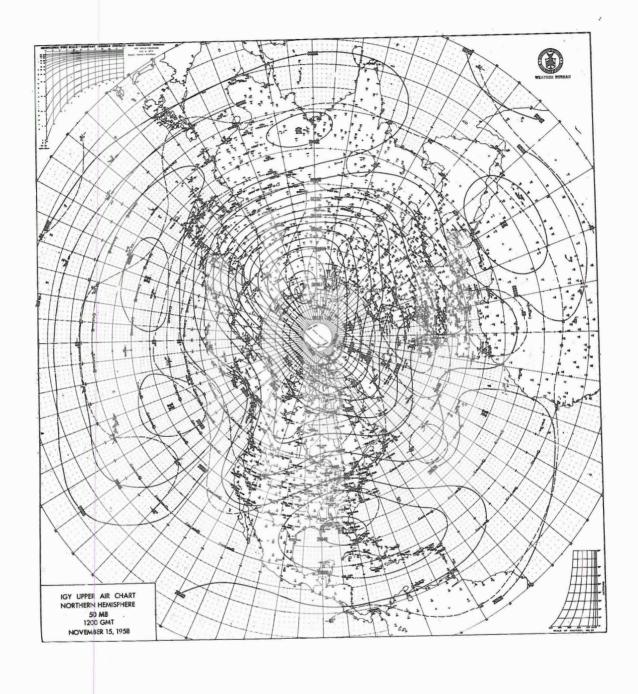
and Reed (1955) showed that stratospheric air can enter the troposphere in the intense frontal zones below the core of the jet stream. This process was substantiated in greater detail by subsequent investigators (Endlich and McLean, 1957; Danielsen, 1959a, b, 1964a, b; Danielsen, Bergman, and Paulson, 1962; Reed and Danielsen, 1959; Staley, 1960, 1962; Reiter, 1963a, b, 1964; Reiter and Mahlman, 1964, 1965a, b; Mahlman, 1964a, 1965b).

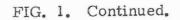
Some of these investigators (Staley, 1962; Danielsen, Bergman, and Paulson, 1962; Danielsen, 1964b) also were able to show through flight measurements that higher values of fallout intensity are associated with this frontal zone.

Staley (1960, 1962) demonstrated that the intrusion of air from the stratosphere into the troposphere is associated with high level cyclones. This hypothesis was corroborated with a case study by the author (Mahlman, 1964a, 1965b). These studies revealed that the descent of stratospheric air occurs in association with very pronounced cyclogenesis at tropopause level. This dependence of the sinking process upon cyclogenesis was also noted by Danielsen (1964a). The cyclogenetic mechanism was further substantiated by Reiter and Mahlman (1964, 1965a, b) through case study analyses. Also, it was hypothesized that the amount of mass in each descent is proportional to the intensity of cyclogenesis at tropopause level.

As a means of testing the above cyclogenetic hypothesis, a lengthy statistical analysis was performed on the 300 mb meteorological data and the Public Health Service surface fallout data during the test moratorium years 1963 and 1964 (Mahlman, 1964b, c, 1965a, 1966). This analyses showed quite conclusively that both the shorter-period fallout variations and the mid-latitude peak can be readily explained by the relative time frequency of strong cyclogenesis and the fact that the region of maximum cyclonic activity occurs in the optimum position for producing a mid-latitude maximum in downward transport of debris.

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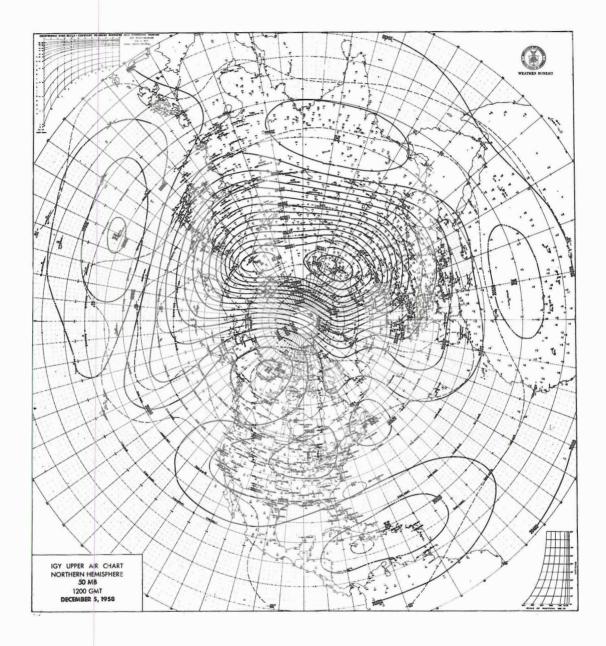
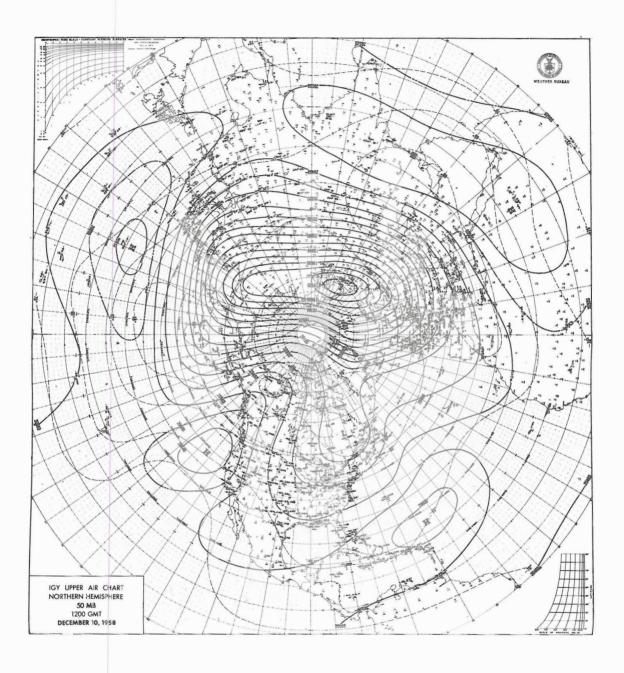
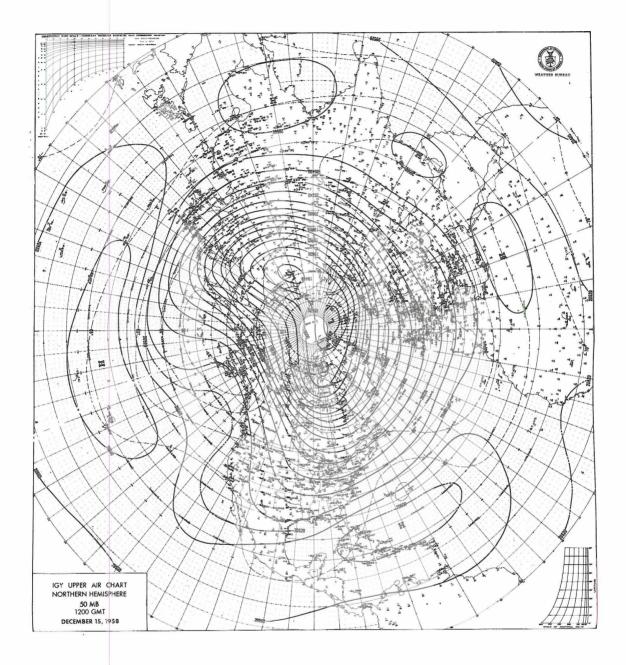


FIG. 1. Continued.









# II. EDDY TRANSPORT PROCESSES IN THE LOWER STRATOSPHERE --15 NOVEMBER-15 DECEMBER 1958

As a general rule the fall and wintertime circulation of the polar stratosphere is one of westerlies increasing in intensity as the winter season progresses. As this circulation intensifies there is a pronounced tendency for the flow to become more zonal--creating an intensely cold polar vortex. As noted by previous investigators, the intensification during the fall and early winter is not a gradual process but is marked by irregular interruptions of the circulation buildup (Lee and Godson, 1957; Godson and Lee, 1958; Hare, 1960; Boville, Wilson and Hare, 1961). In many winters the vortex begins to deform into a one, two, or three wave pattern leading to what is commonly referred to as the "sudden warming" phenomenon. The synoptic characteristics of such "sudden warmings" have been outlined in some detail by previous authors (Teweles, 1958; Teweles and Finger, 1958; Craig and Hering, 1959; Craig and Lateef, 1962; Palmer, 1959; Hare, 1960; Conover, 1961; Belmont, 1962; Miers, 1963; Morris and Miers, 1964). This warming process acts to destroy the mean latitudinal temperature gradient and most of the kinetic energy in the lower stratosphere. Since this sudden warming phenomenon often occurs in mid-winter, many times the westerlies will re-intensify. When the solar radiation returns to polar latitudes, the westerly regime completely disappears and the summertime easterlies set in.

In the previous paper (Mahlman, 1966) an extensive analysis was performed on the eddy transport processes in the lower stratosphere encompassing a period before, during, and after the stratospheric polar vortex breakdown of January—February 1958. This work showed rather clearly that favorable conditions for northward and downward debris transport at higher latitudes ( $\overline{v'w'} = -$ ) were present in the lower and middle stratosphere after the breakdown of the polar

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night vortex. This transport is in qualitative agreement with the time of occurrence of the spring surface fallout peak. These calculations also agree with those of Molla and Loisel (1962) which indicate favorable  $\overline{v'w'}$  values in the 100-50 mb layer for January and April 1958. These computations can, of course, be only indicative of the probable sense of the transports until synoptic measurements of trace substances become available on a more or less routine basis. The now discontinued ozonesonde network (Hering, 1964) was an excellent step in this direction.

As noted in the Introduction, these results indicated that a more thorough knowledge of the dynamics of the stratospheric circulation is necessary before a complete understanding of the fallout problem can be claimed. In order to proceed toward this goal, the period 15 November to 15 December 1958 was selected for analysis using the U.S. Weather Bureau (1963) stratospheric maps for the IGY period.

This period was characterized by an intensifying winter stratospheric circulation which was interrupted by large perturbations forming at higher latitudes (see Fig. 1). Fig. 2 shows a time series of cyclone index (Mahlman, 1966) at 50 mb, 60<sup>°</sup>N in which the index changes from high to low and back to high values again during the time period. As implied by Fig. 2, toward the end of the period the flow becomes increasing zonal. The period 10-15 December was dominated by a "sudden cooling" in the highest latitudes (see Fig. 3) due to an increasing zonal symmetry of the polar vortex and a damping of the disturbances which originally produced the cyclone index decrease. The hemispheric circulation was dominated by an eccentric polar vortex and a well-developed Aleutian anticyclone. According to Boville (1960), this Aleutian high developed in October 1958 in an almost barotropic stratosphere as a result of pronounced cyclogenesis in the troposphere. This high continues to dominate the flow until about 10 December.

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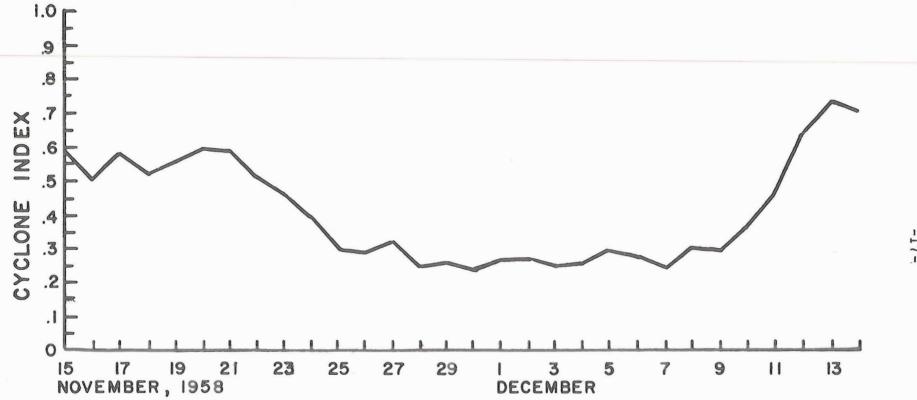


FIG. 2. Time series of cyclone index (Mahlman, 1966) at 50 mb, 60°N for the period 15 November-15 December 1958.

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DEGREES LATITUDE 20 40 50 60 30 70 5 i co .9 4 4 G SIN Ø -70° 30 MB TEMPERATURE (°C) 15 NOV. 15 NOV. 58.6 ° 58.50 58.4 ° 58.2 0 57.30 -550 9 56.6 ° - 70° 25 NOV. -65° -60° 25 NOV. 9 58.9° 59.0° 58.7 ° 58.6 0 58.3° 582° -550 -700 - 650 5 DEC. ی DEC. -60° 61.4 0 61.50 6I.I ° 59.60 57.1 -550 56.7 ° - 709 -650 15 DEC. 15 DEC -600 0.5 0 57.8 ° 6 56.7° 6.95 57.0° -550

0.1 T 06

**58.7°** 

60.8°

272.0°

FIG. 3c. Same as Fig. 3a except at 40 mb.

Since this selected case study is during a period of buildup of the polar night vortex, it is of interest to determine the transport properties of the lower stratosphere during this time and compare the results with those obtained previously for the breakdown period. Such computations should provide some insight into the reasons for the differences in surface fallout intensity between the winter and spring seasons. The determination of these transport properties demands a knowledge of the u, v, w, and T fields, where u is the zonal wind component and T is the temperature.

In most previous studies of the stratosphere (Jensen, 1961; Murakami, 1962; Dickenson, 1962; Oort, 1962; Molla and Loisel, 1962; Miller, 1966) the computations of u, v, w, and T were taken from the original station data. Mean values over the hemisphere were then obtained by computing an arithmetic average of all stations located within a given latitude belt. This approach is straightforward because the computations can then be computerized directly in terms of the original station data. One difficulty that has always been recognized by the above investigators is that such an averaging procedure can yield inaccuracies due to the unequal weighting of station data. This effect becomes particularly serious in cases where most of the effect of a given quantity may depend upon the contribution from a limited longitudinal region. Another shortcoming of the single station method is that the computed vertical motion depends upon the validity of the thermal wind approximation in relating the measured detailed vertical wind shear from the sounding to the larger scale horizontal temperature gradients. In some cases the effect may be to seriously overestimate the magnitude of the time averaged vertical motion field.

As a means of avoiding the difficulties pointed out above, all values of u, v, w, and T were calculated at 100 and 50 mb and at intervals of  $10^{\circ}$  longitude at the respective latitudes  $40^{\circ}$ ,  $50^{\circ}$ ,  $60^{\circ}$  and  $70^{\circ}$  North. At  $80^{\circ}$ N the data coverage is poor and the latitudinal circumference

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is relatively small. Below  $40^{\circ}$ N the data coverage is also inadequate due to the larger percentage of ocean area. Also, the circulation disturbances in higher latitudes are usually not present south of  $40^{\circ}$ N.

In obtaining the horizontal wind components, actual winds were used whenever possible, but geostrophic winds were computed when no wind measurements were available. Because the vertical wind component (w) must be derived, considerable uncertainty is present when one attempts to find accurate w fields. Since the static stability in the stratosphere is quite high and the radiative heat changes are somewhat simpler in higher latitudes at this time of year, the thermodynamic method for computing vertical velocity was chosen to be the most desirable. By solving the thermodynamic equation for w, one obtains

$$w = \frac{1}{\frac{g}{c_{p}} + \frac{\partial T}{\partial z}} \left[ \frac{1}{c_{p}} \frac{dh}{dt} - \frac{\partial T}{\partial t_{z}} - \vec{\nabla}_{2} \cdot \nabla T_{2} \right]$$
(1)

where g is the acceleration of gravity,  $c_p$  the specific heat of air at constant pressure, h the heat per unit mass,  $\vec{\nabla}_2$  the horizontal vector wind,  $\nabla$  the horizontal del operator, z the height, and t is the time. The subscript z denotes differentiation on a constant height surface. This equation is somewhat ambiguous the way it is to be used here because the temperature derivatives are to be computed relative to the pressure surface rather than the z surface. In the stratosphere, however, this approximation is quite valid since the vertical temperature gradients are very small in these regions. The validity of this approximation may be readily seen by writing the transformation equations for the temperature derivatives in Eq. (1) from z to pressure coordinates,

$$\frac{\partial T}{\partial t_{z}} = \frac{\partial T}{\partial t_{p}} - \frac{\partial T}{\partial z} \frac{\partial z}{\partial t_{p}}$$
(2a)

$$V_{s} \frac{\partial T}{\partial s_{z}} = V_{s} \frac{\partial T}{\partial s_{p}} - V_{s} \frac{\partial T}{\partial z} \frac{\partial z}{\partial s_{p}} , \qquad (2b)$$

where  $V_s \frac{\partial T}{\partial s}$  is the advection  $(V_2 \cdot \nabla T)$  expressed in natural coordinates, nates and the subscripts z and p denote height and pressure coordinates, respectively. Characteristic orders of magnitudes of the various terms are:  $\frac{\partial T}{\partial t_p} \sim V_s \frac{\partial T}{\partial s_p} \sim 2^{\circ}C/day; \frac{\partial T}{\partial z} \sim 10^{-3} deg m^{-1}; \frac{\partial z}{\partial t_p} (max) \sim 50 m/day;$  $\frac{\partial z}{\partial n_p} (max)$  (slope of p surface normal to wind)~. 2 x 10<sup>-3</sup>;  $\frac{\partial z}{\partial s_p} (max) \sim .02 \times 10^{-3};$  $V_s (max) \sim 50 m/sec.$  Substituting these numerical approximations into the transformation equations (2a and 2b) gives

$$\frac{\partial T}{\partial t_z} \approx 2 \text{ deg/day} + (<.05 \text{ deg/day})$$
$$V_s \frac{\partial T}{\partial s_z} \approx 2 \text{ deg/day} + (<.1 \text{ deg/day})$$

Therefore, one may with complete justification write

$$\frac{\partial T}{\partial t_z} = \frac{\partial T}{\partial t_p}$$
 and  $V_s \frac{\partial T}{\partial s_z} = V_s \frac{\partial T}{\partial s_p}$ 

and calculate the horizontal derivatives on pressure surfaces.

Computing w instead of  $\omega \left(\frac{dp}{dt}\right)$  is advantageous because the amount of adiabatic heating of the parcel due to compression is then given explicitly in terms of the computed value of w. The diabatic heating term was assumed to be a constant value of -1 deg/day in accordance with the computations of Ohring (1958), Davis (1963), and Kennedy (1964). The local time derivative of the temperature is obtained by taking an average of the 24-hour local temperature change on each side of the given observation time. As implied above, the temperature advection,

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the eddy correlation coefficients, eddy covariances, means, and products of means of all combinations of u, v, w, and T were computed from 15 November to 15 December 1958 at 100 and 50 mb for latitudes  $40^{\circ}$ ,  $50^{\circ}$ ,  $60^{\circ}$ , and  $70^{\circ}$ N. The results of all these computations are included in Table I. The tabulated mean values of v given in Table I probably have no physical significance, since the actual values of  $\overline{v}$  computed <u>indirectly</u> from the mean cell values in Chapter III are more than two orders of magnitude smaller than the mean absolute value of v. The chief merit in calculating  $\overline{v}$  directly is that large values point out probable errors in the initial wind tabulations.

In order to reveal the probable debris transport properties of the lower stratosphere during this period, the eddy correlation coefficients of  $v'w'(r_{v'w'} = v'w'/\sqrt{v'^2}\sqrt{w'^2})$  calculated for this period are plotted for the various latitudes and levels as a function of time in Fig. 4. Fig. 4 shows that the v'w' correlation is generally negative in the lower latitudes (40<sup>°</sup> and 50<sup>°</sup>N), indicating a general tendency for northward and downward transport of trace substances. In higher latitudes (60<sup>°</sup> and 70<sup>°</sup>N) the v'w' correlation is slightly negative during the first 15 days and then becomes positive thereafter. This change of sign is consistent with the reversal of the northward temperature gradient from positive to negative at about this time (thus partially reflecting a change in slope of the mean isentropic surfaces from negative to positive).

In view of the presence of these negative v'w' correlations, one might inquire why there is no appreciable lower stratospheric buildup of fallout intensity in the fall months compared to that observed in late winter and spring. A possible answer to this difficulty may be found in comparing the v'w' covariance data given in Table I with that presented in Appendix A of the earlier paper (Mahlman, 1966).

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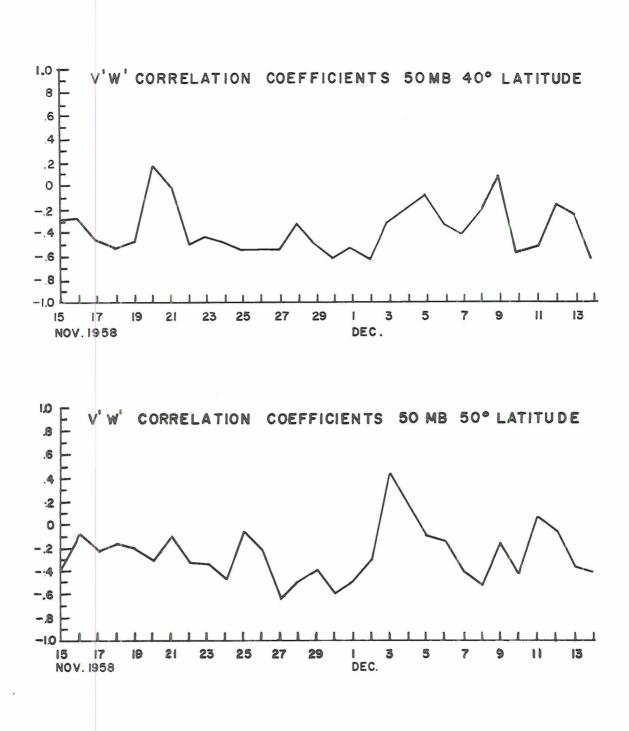
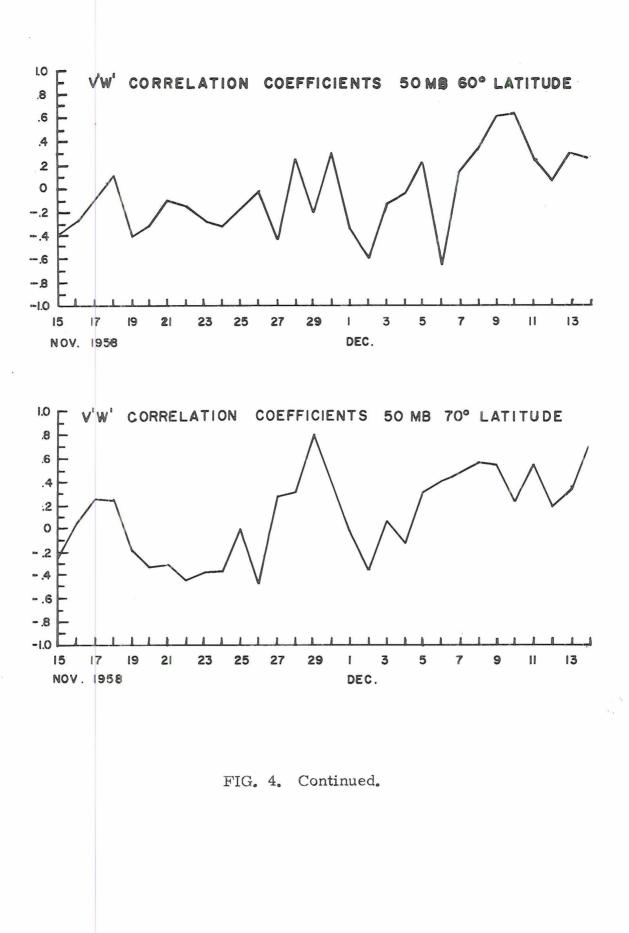


FIG. 4. v'w' eddy correlation coefficients for indicated levels and latitudes from 15 November to 15 December 1958.



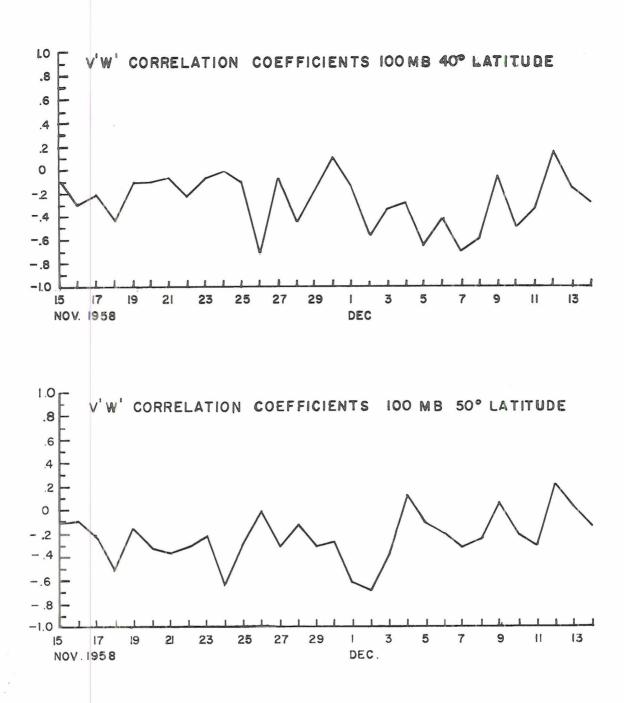
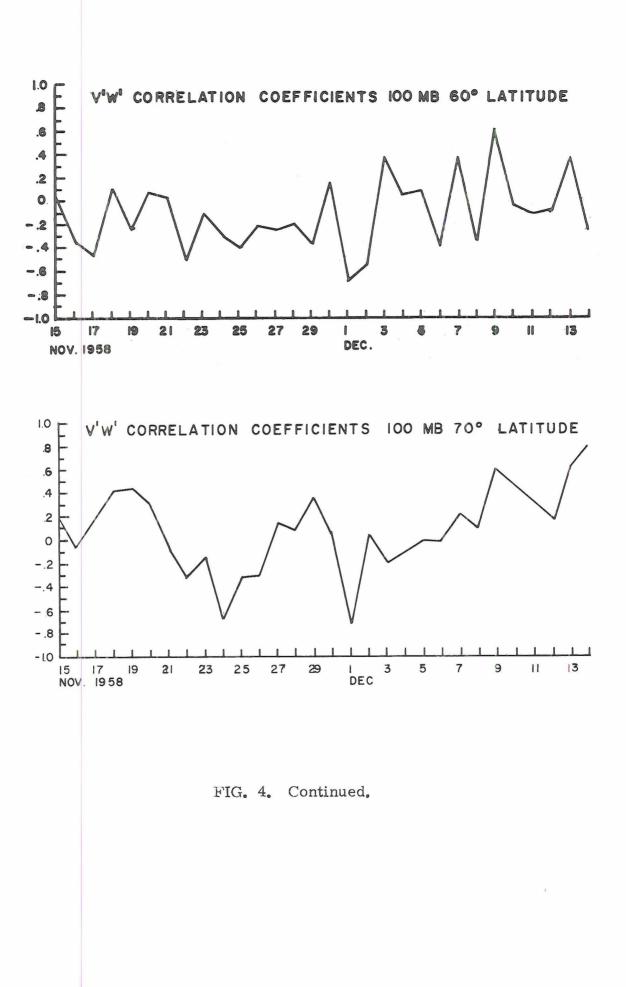


FIG. 4. Continued.



LEVEL 50 P	MB. LATITUDE	40 CO	VARIANCE				LEVEL 50	MB. LATITUDE	40 EDD	Y CORRELA	TION COEFFIC	CIENTS	
DAY	TU	TV	TW	UV	UW	VW	DAY	TU	TV	TW	UV	UW	W
NOV 15	-1.386	993	400	94.263	-1.080	850	NOV 15	039	034	581	. 580	284	273
NOV 16	7.316	11.888	498	99.930	-4.139	-1.133	NOV 16	.122	.279	438	.431	669	257
NOV 17	19.322	14.049	518	92.538	-4.394	-1.899	NOV 17	.358	.311	535	.387	857	442
NOV 18 NOV 19	15.634	8.980 8.452	376 461	64.044 66.121	-3.224	-2.645	NOV 18 NOV 19	.351 .010	.203	355 471	.293	418	508
NOV 20	. 426	-4.839	024	33.312	819	.452	NOV 20	.011	222	041	.206	186	.184
NOV 21	748	.243	268	84.378	-2.459	.029	NOV 21	014	.008	305	.352	341	.008
NOV 22	366	4.101	135	50.961	-1.516	812	NOV 22	007	.139	280	.295	538	485
NOV 23	2.328	3.399	108	82.559	-2.923	921	NOV 23	.040	.159	150	.472	494	421
NOV 24	-4.813 -2.171	6.317 9.682	079	101.130 131.733	-2.034	-1.420	NOV 24 NOV 25	074	.180	103	.384	351	455 519
NOV 25 NOV 26	-5.176	3.698	023	106.991	-4.154	-3.293	NOV 25	081	.211	018	.360	440	538
NOV 27	-5.889	13.548	295	103.821	-3.459	-2.310	NOV 27	110	.496	293	.450	408	531
NOV 28	-3.016	11.486	235	101.170	-6:772	-1.471	NOV 28	044	.360	231	.318	669	313
NOV 29	4.811	4.121	407	101.661	-4.760	-2.043	NOV 29	.085	.184	435	.404	454	490
NOV 30	7.144	9.430	362	122.298	-3.742	-2.644	NOV 30	.195	.424	466	. 592	519	605
DEC 1 DEC 2	11.095 -3.483	4.703	099	123.795 128.995	-1.081	-1.844 -1.364	DEC 1 DEC 2	.234	.170	160	.457	179	523
DEC 3	13.364	5.488	.131	124.082	-1.127	802	DEC 2 DEC 3	.235	.221	.217	.472	176	287
DEC 4	7.316	2.731	.078	86.389	-1.442	562	DEC 4	.171	.114	.170	.297	260	180
DEC 5	5.466	1.730	188	47.515	-1.671	253	DEC 5	.121	.087	301	.176	199	068
DEC 6	7.899	545	299	114.418	-3.478	-1.214	DEC 6	.142	021	384	.410	415	311
DEC 7	35.558	11.356	433	61.702	-5.053	-1.661	DEC 7	.498	.424	408	.219	454	397
DEC 8 DEC 9	19.203 31.330	11.048 14.674	164	87.118 86.534	-2.122	340	DEC 8 DEC 9	.318 .624	.500	397	.352	460	201
DEC 10	33.145	15.081	427	110.307	-3.632	-2.329	DEC 10	.608	.494	395	. 536	498	571
DEC 11	42.786	27.039	583	95.868	-3.078	-3.183	DEC 11	.661	. 599	341	.417	354	524
DEC 12	18.923	16.933	352	90.831	-1.289	462	DEC 12	.409	. 549	414	. 561	289	15!
DEC 13	12.324	10.867	274	82.666	-1.430	483	DEC 13	.361	.459	511	.694	531	25!
DEC 14 DEC 15	6.832 -26.288	7.341 46.101	258	80.021	-2.129	-2.080	DEC 14 DEC 15	.192	.315	339	.539	439 401	~.65
DEC 15	-20.200	40.101	001	17.583	-1.333	001	DEC 15	030					
LEVEL 50 N	MB. LATITUDE	40 PR	ODUCT OF	(U,V,W,T) BA	R		LEVEL 50	MB. LATITUDE	40 MEAN	S OF T, U	, V, AND W		
DAT	ru	TV	TW	UV	UW	VW	DAY	TBAR	UBAR	VBAR	WBAR		
DAT. NOV 15	TU -1337.142	TV .806	TW 8,822	UV 298	UW -3.268	.002	DAY Nov 15	TBAR -60.083	UBAR 22.255	VBAR 013	WBAR 147		
DAY NOV 15 NOV 16	TU -1337.142 -1338.554	TV .806 30.301	TW 8:822 12.503	UV 298 -11.214	UW -3.268 -4.628	.002	DAY NOV 15 NOV 16	TBAR -60.083 -60.139	UBAR 22.255 22.258	VBAR 013 504	WBAR 147 208		
DAT. NOV 15	TU -1337.142 -1338.554 -1368.047	TV .806 30.301 95.464	TW 8:822 12.503 10.408	UV 298 -11.214 -36.077	UW -3.268 -4.628 -3.933	.002 .105 .274	DAY NOV 15 NOV 16 NOV 17	TBAR -60.083 -60.139 -60.167	UBAR 22.255 22.258 22.738	VBAR 013 504 -1.587	WBAR 147 208 173		
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19	TU -1337.142 -1338.554	TV .806 30.301	TW 8:822 12.503	UV 298 -11.214	UW -3.268 -4.628	.002	DAY NOV 15 NOV 16	TBAR -60.083 -60.139	UBAR 22.255 22.258	VBAR 013 504	WBAR 147 208		
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20	TU -1337.142 -1338.554 -1368.047 -1498.344 -1585.596 -1407.520	TV .806 30.301 95.464 21.627 42.867 34.309	TW 8:822 12:503 10:408 13:419 11:328 9:123	UV 298 -11.214 -36.077 -9.026 -18.690 -13.278	UW -3.268 -4.628 -3.933 -5.601 -4.939 -3.531	.002 .105 .274 .081 .134 .086	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20	TBAR -60.083 -60.139 -60.167 -59.917 -60.306 -60.306	UBAR 22.255 22.258 22.738 25.007 26.293 23.340	VBAR 013 504 -1.587 361 711 569	WBAR 147 208 173 224 188 151		
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21	TU -1337.142 -1338.554 -1368.047 -1498.344 -1585.596 -1407.520 -1340.665	TV .806 30.301 95.464 21.627 42.867 34.309 5.896	TW 8:822 12:503 10:408 13:419 11:328 9:123 9:048	UV 298 -11.214 -36.077 -9.026 -18.690 -13.278 -2.180	UW -3.268 -4.628 -3.933 -5.601 -4.939 -3.531 -3.345	.002 .105 .274 .081 .134 .086 .015	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 18 NOV 20 NOV 21	TBAR -60.083 -60.139 -60.167 -59.917 -60.306 -60.306 -60.222	UBAR 22.255 22.258 22.738 25.007 26.293 23.340 22.262	VBAR 013 504 -1.587 361 711 569 098	WBAR 147 208 173 224 188 151 150		
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DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 20 NOV 21 NOV 22 NOV 22 NOV 23 NOV 23 NOV 24 NOV 25 NOV 25 NOV 25 NOV 26 NOV 25 NOV 26 NOV 26 DEC 1 DEC 5 DEC 6 DEC 7 DEC 6 DEC 7 DEC 2 DEC 2 DE	TU -1337.142 -1338.554 -1368.047 -1498.344 -1885.596 -1407.520 -1340.665 -1245.646 -1497.606 -1497.606 -1498.157 -1702.606 -1703.880 -1703.880 -1893.300 -1944.540 -1687.623 -1934.468 -1701.830 -1796.951 -1785.071 -1646.996 -1839.029 -2032.219 -2064.072 -2033.016 -1771.522 -2033.016 -1771.522 -1783.987	TV .806 30.301 21.627 42.867 34.309 5.896 67.923 41.764 -9.137 -2.221 17.774 101.557 1.601 4.396 18.362 -11.151 -23.884 -5.579 -22.897 4.772 28.394 -9.053	TW 8:822 12.503 10.408 13.419 11.328 9.123 9.123 9.123 9.123 9.123 9.123 11.325 12.100 15.303 11.075 12.255 12.378 10.4215 12.255 12.378 10.431 10.513 10.166 7.155 10.874 8.821 8.053 10.771 11.613	UV 298 -11.214 -36.077 -9.026 -13.278 -2.180 2.131 -27.945 -16.241 4.4250 -16.241 4.4250 -723 -7.045 -16.241 1.044 -2.180 -723 -7.111 10.555 -18.049 -723 -7.111 10.555 -18.049 -7.23 -7.111 10.555 -18.049 -7.23 -7.111 10.555 -18.049 -7.23 -7.111 -7.25	UW -3.268 -4.628 -3.933 -5.601 -4.939 -3.345 -2.036 -2.711 -2.822 -4.903 -7.118 -5.208 -7.218 -5.228 -4.907 -2.677 -3.758 -5.907 -4.537 -5.993 -5.020 -4.529	.002 .105 .274 .081 .134 .086 .015 .010 .123 .081 -036 -038 -038 -007 .068 .341 .004 .019 -053 .126 .050 -031 -031 -063 .011 .085 -030	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21 NOV 23 NOV 24 NOV 23 NOV 24 NOV 25 NOV 25 NOV 26 NOV 27 NOV 28 NOV 29 NOV 30 DEC 1 DEC 5 DEC 6 DEC 7 DEC 8 DEC 9 DEC 10	TBAR -60.083 -60.139 -60.167 -99.917 -60.306 -60.306 -60.222 -60.333 -61.028 -60.806 -60.806 -60.194 -61.083 -61.083 -61.883 -61.861 -62.056 -61.833 -61.250 -60.750 -60.750 -61.250 -60.750 -61.139 -61.250 -60.750 -61.250 -550 -550 -550 -550 -550 -550 -550 -	UBAR 22.255 22.738 22.738 25.007 26.293 23.340 22.262 23.733 24.638 28.142 28.306 24.638 28.142 28.306 30.995 32.009 31.271 27.603 31.271 27.424 29.144 29.161 29.141 33.467 34.274 29.3867 29.585 29.585 20.328 20.	VBAR - 013 - 504 -1.587 - 361 -711 - 569 - 078 - 078 - 1.126 - 684 - 1.126 - 684 - 1.127 - 307 - 291 - 1.672 - 026 - 227 - 385 - 621 - 300 - 1.84 213 092 - 430 - 079 - 078 - 078	WBAR - 147 - 208 - 208 - 173 - 224 - 188 - 151 - 099 - 119 - 150 - 099 - 119 - 253 - 184 - 233 - 204 - 171 - 086 - 171 - 017 - 018 - 118 - 118 - 017 - 017 - 019 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0		

TABLE I. Covariances, eddy correlation coefficients, mean products, and means of u, v, w, and T from 15 November to 15 December 1958 at indicated levels and latitudes.

LEVEL	50 MB. LATI	TUDE 50	COVARIANCE				LEVEL	50 MB.	LATITU	DE 50	EDDY	CORRELA	TION COEF	FICIENTS
DAY	TU	TV	TW	UV	UW	VW	DAY			v	TW	UV	UW	VW
NOV 15	12.191	25.929	115 74	4.146	-7.108	-2.020	NOV 15				036	.428	857	378
NOV 16	46.743	35.574			-5.231	350	NOV 16			96	.049	.402	689	076
NOV 17	46.031	43.439			-6.547	-1.218	NOV 17			62	.047	.493	662 549	208 159
NOV 18	35.454	37.575			-3.675	929	NOV 18 NOV 19			76 09	126	.110	363	203
NOV 19	8.742	31.230			-2.554	-1.118	NOV 19				077	.082	629	301
NOV 20 NOV 21	-17.452	17.921 27.808			-4.467 -6.402	-1.389	NOV 20				041	.169	746	985
NOV 21	-16.690	35.984			-3.846	-1.112	NOV 22				086	.260	748	315
NOV 22	-2.731	50.221			-6.771	-1.597	NOV 23			23	.118	.385	857	339
NOV 24	.100	46.721			4.573	-2.498	NOV 24		.001 .5	49	.137	.361	616	462
NOV 25	17.982	49.572			-4.830	282	NOV 25			31	.389	.479	411	045
NOV 26	23.836	47.445			-4.352	-1.056	NOV 26			10	.221	. 536	529	212
<b>NOV 27</b>	-27.199	39.228			-7.344	-4.435	NOV 27				088	. 562	577	630
NOV 28	-54.860	45.131			-6.685	-4.909	NOV 28				177	.369	306	475
NOV 29	-10.026	38.097			-7.503	-3.600	NOV 29				115	.398	479 532	382 585
NOV 30	-24.559	36.722			-5.315	-3.519	NOV 30 DEC 1				229	.090	424	475
DEC 1	-17.123	28.611			-4.061	-3.312	DEC 1 DEC 2			19	.133	.056	342	295
DEC 2 DEC 3	-37.859 -16.436	18.440 23.859		0.220 · 0.445	-3.346 .246	-1.846 3.446	DEC 3			42	.341	.304	.020	.453
DEC 4	-40.232	29.436		0.824	6.212	1.986	DEC 4			04	.078	.062	.359	.199
DEC 5	-59.224	21.078			-3.358	593	DEC 5				085	070	228	085
DEC 6	-84.865	27.805			-4.058	738	DEC 6	-	.721 .5	15	.084	184	342	135
DEC 7	-79.035	31.069			-5.392	-2.966	DEC 7			93	.010	167	385	399
DEC 8	-51.294	38.864	182 -4	4.560	-2.237	-3.146	DEC 8				110	014	270	523
DEC 9	-62.181	30.628		9.362	744	916	DEC 9				053	.049	069	151
DEC 10	-27.841	31.746			-7.168	-3.795	DEC 10				063	.288	551	422
DEC 11	-14.583	37.141			-4.058	.709	DEC 11				231 297	.131	298	.070 051
DEC 12	-38.695	28.679		7.428	.751	315	DEC 12 DEC 13				258	.303	451	- 362
DEC 13	-23.217	31.225			-2.133	-1.283	DEC 13 DEC 14			06	.038	.102	710	4(.8
DEC 14 DEC 15	-26.219 -121.560	20.763 111.488			-3.343 -3.169	-1.317 -1.688	DEC 15				026	389	453	333
	50 MB. LATI		PRODUCT OF (1					50 MB	LATITU				U, V, AND	W
DAY	TU	TV	TW	UV	TW	VW	DAY NOV 15		TBAR 58.667	UBAR 23.852		BAR	WBAR 248	
NOV 15 NOV 16	-1399.30			-18.518	-5.927	.193	NOV 15 NOV 16		59.278	20.862			278	
NOV 18	-1236.65			-7.152 1.857	-5.804	.095	NOV 17		58.389	23.801			333	
NOV 18	-1181.06			-35.722	-4.095	.351	NOV 18		57.861	20.412			201	
NOV 19	-1369.28			-46.519	-2.839	.236	NOV 19		57.917	23.642			120	
NOV 20	-1306.55			-11.695	-5.721	.136	NOV 20		58.889	22.187	!	527	258	
NOV 21	-1244.83			-10.783	-6.754	.162	NOV 21		68.667	21.219			318	
NOV 22	-1222.97			-27.094	-5.359	.328	NOV 22		58.167	21.025			255	
NOV 23	-1475.84			-55.716	-8.744	.764	NOV 23		58.444	25.252			346	
NOV 24	-1305.22			-43.339	-6.781	.592	NOV 24		58.583	22.280			304	
NOV 25	-1615.73			-28.959	-8.698	.329	NOV 25 NOV 26		58.361 57.389	27.685 26.925			314 285	
NOV 26 NOV 27	-1545.18			-14.973 -42.213	-7.687	.159	NOV 20		57.583	22.625			248	
NOV 28	-1238.69			-40.328	-4.982	.462	NOV 28		58.194	21.285			234	
NOV 29	-1455.29			-19.488	-8.569	.262	NOV 29		57.694	25.224			340	
NOV 30	-1414.96			-47.735	-4.295	.346	NOV 30		58.111	24.349			176	
<b>DEC 11</b>	-1656.97			-27.126	-5.975	.207	DEC 1	- !	59.222	27.979	9		214	
DEC 2	-1768.19			-32.915	-5.371	.205	DEC 2		60.278	29.334			183	
DEC 3	-1600.84			.14.249	-7.064	141	DEC 3		59.944	26.706			265	
DEC 4	-1383.80			-21.645	-5.532	.220	DEC 4		59.333	23.323			237	
DEC 5	-1400.53			-14.234	-6.883	.174	DEC 5		9.000	23.738			290	
DEC 6 DEC 7	-1611.00			-50.461	-4.862	.331	DEC 6 DEC 7		59.194 59.250	27.217 25.455			179 235	
DEC 8	-1453.04			-1.655 11.039	-5.977		DEC 8		58.806	24.709			186	
DEC 9	-1889.58			-2.754	-4.594	083	DEC 9		59.278	31.877			148	
DEC 10	-1924.81			-59.849	-9.247	.516	DEC 10		58.778	32.747			282	
DEC 11	-1893.18			-48.693	-5.395	.252	DEC 11		58.667	32.270			167	
DEC 12	-1601.85			-25.631	-3.728	.125	DEC 12		57.917	27.658	9		135	
DEC 13	-1618.34			-33.506	-5.000	.210	DEC 13		57.333	28.227			177	
DEC 14	-1703.91			-52.990	-7.061	.421	DEC 14		57.167	29.806			237	
DEC 15	-1573.10	168.908	9.935	-90.099	-5.299	.569	DEC 15		54.306	28.968	-3.	10	183	

# TABLE I. Continued.

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LEVEL	50 MB. LA	TITUDE 70	COVARIANCE				LEVEL	50 MB. LAT	ITUDE 70	EDDY C	ORRELATIO	ON COEF	FICIENTS
DAY	TU	TV	TW	UV	UW	VW	DAY	TU	TV	TW	UV	บพ	WW
NOV 15	18.633	64.750	756	1.148	1.116	-1.675	NOV 15	.252	.359	247	.007	.385	237
NOV 16	-47.374	77.097		-54.686	.451 1.821	.284 2.015	NOV 16 NOV 17	440	.352 .381	206	177	.173	.054
NOV 17 NOV 18	.427 25.385	73.240 72.538	.602 815	97.990	2.169	2.015	NOV 17 NOV 18	.007		195	.465	.481	.260
NOV 19	-21.531	96.884	-1.371	31.897	1.614	-2.331	NOV 19	211		223	.149	.313	181
NOV 20	-4.657	101.008	358	42.883	517	-3.217	NOV 20	079		073		.198	328
NOV 21	-9.229	63.614		-30.719	821	-3.273	NOV 21	124				.233	308
NOV 22 NOV 23	-18.628 11.600	86.808 121.767		102.205 -56.115	.861 1.851	-4.464 -3.935	NOV 22 NOV 23	279			578	.302	443
NOV 24	23.487	104.486		-24.856	.005	-3.200	NOV 24	.417			131	.002	361
NOV 25	48.025	73.639	488	17.611	.866	079	NOV 25	.607		228	.054	.265	009
NOV 26	43.809	69.024		157.832	.194	-4.465	NOV 26	.548		230	.415	.055	475
NOV 27 NOV 28	45.876 55.852	64.636 96.206	475	96.480 109.039	1.009 2.318	3.883 5.003	NOV 27 NOV 28	.539		166	.234	.167	.280
NOV 29	-33.884	116.029			-1.640	17.204	NOV 29	269	.347			.205	.808
NOV 30	-28.310	58.440		410.777	1.167	7.601	NOV 30	172	.182		587	.127	.425
DEC 1	2.338	83.268			-1.258	272	DEC 1	.031		342		.267	014
DEC 2 DEC 3	-4.215 52.053	129.301 44.337	-1.174 :	227.367 59.067	-2.410 2.409	-6.836	DEC 2 DEC 3	043	.361 .170	222	.647 -	.465	359
DEC 4	-5.798	2.264		190.888	.296	.850 892	DEC 4	079	.011		632	.131	134
DEC 5	33.862	4.730			-2.351	4.120	DEC 5	.247	.020	225	692 -	.304	.302
DEC 6	33.638	-10.195			-2.463	5.464	DEC 6	.345	045			415	.399
DEC 7 DEC 8	20.789	-27.107			-2.436	5.516	DEC 7 DEC 8	.221	124 043			479 681	.466 .555
DEC 9	27.849 42.772	-8.824 -17.509			-3.574 -1.846	5.883 5.013	DEC 9	.394	092			.344	.534
DEC 10	27.935	-19.660		-76.958	.321	1.043	DEC 10	.300	110		227	.126	.212
DEC 11	3.876	-39.609	. 567	-29.942	647	5.310	DEC 11	.068	234			195	.535
DEC 12	26.362	-18.773	.705	-1.063	1.433	1.111	DEC 12	.769	210		008	.582	.173
DEC 13 DEC 14	18.497 29.348	-8.032 14.108		93.104	.395	2.207	DEC 13 DEC 14	.520	173		478 499 -	.074	.318
DEC 15	27.852	139.428		272.707	4.107	3.610	DEC 15	.046	.244		626	.567	55!
LEVEL	50 MB. LA	TITUDE 70	PRODUCT OF	(U,V,W,T)	BAR		LEVEL	50 MB. LAT	TTUDE 70	MEANS	OF T, U,	V AND	W
DAY	TU	TV	TW	UV	BAR UW	VW	DAY	TBAR	UBAR	VBA	R WB4	AR	W
DAY NOV 15	TU -1142.:	TV 228 -34.5	TW 84 -9.564	UV 12.135	UW 3.356	.102	DAY NOV 15	TBAR -57.056	UBAR 20.020	VBA	R WB4 6 .16	AR 58	W
DAY NOV 15 NOV 16	TU -1142.: -1260	TV 228 -34.54 445 99.90	TW 84 -9.564 62 -11.73	UV 12.135 -39.392	UW 3.356 4.624	.102 367	DAY NOV 15 NOV 16	TBAR - 57.056 - 56.556	UBAR 20.020 22.287	VBA1 .60	R WBA 6 .16 8 .20	AR 58 07	W
DAY NOV 15	TU -1142.:	TV 228 -34.54 445 99.99 715 -11.4	TW 84 -9.564 62 -11.73 38 -8.380	UV 12.135 -39.392 0 3.939	UW 3.356 4.624 2.886	.102 367 .029	DAY NOV 15	TBAR -57.056	UBAR 20.020 22.287 19.899	VBA .60 -1.76	R WB4 6 .16 8 .20 8 .14	AR 58 07 45	W
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19	TU -1142.: -1260 -1149. -1216.: -1280.	TV 228 -34.54 445 99.99 715 -11.42 874 80.83 545 -42.22	TW 84 -9.564 62 -11.73 38 -8.380 32889 57 6.098	UV 12.135 3 -39.392 3.939 -30.861 17.221	UW 3.356 4.624 2.886 .339 -2.485	.102 367	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19	TBAR - 57.056 - 56.556 - 57.778 - 56.444 - 56.056	UBAR 20.020 22.287 19.899 21.550 22.844	VBA .60 .1.76 .19 .1.43 .75	R WBA 6 .16 8 .20 8 .14 2 .01 410	AR 58 07 45 16 09	w
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20	TU -1142. -1260. -1149. -1216. -1280. -1253.	TV 228 -34.54 445 99.99 715 -11.42 874 80.83 545 -42.22 809 77.64	TW 84 -9.564 62 -11.73 38 -8.380 32883 57 6.098 43 -3.988	UV 12.135 -39.392 3.939 -30.861 17.221 3 -31.923	UW 3.356 4.624 2.886 .339 -2.485 1.640	.102 367 .029 023 082 102	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20	TBAR -57.056 -56.556 -57.778 -56.444 -56.056 -55.222	UBAR 20.020 22.287 19.899 21.550 22.844 22.705	VBA .600 -1.766 .199 .1.433 .756 .1.400	R WBA 6 .16 8 .20 8 .14 2 .01 410 6 .07	AR 58 07 45 16 09 72	w
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21	TU -1142. -1260. -1149. -1216. -1280. -1253. -1175.	TV 228 -34.5 445 99.9 715 -11.4 874 80.8 374 -42.2 309 77.6 389 46.6	TW 84 -9.564 62 -11.733 38 -8.380 57 6.099 43 -3.988 83 -7.000	UV 12.135 -39.392 3.939 -30.861 17.221 -31.923 -17.672	UW 3.356 4.624 2.886 .339 -2.485 1.640 2.652	.102 367 .029 023 082 102 105	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21	TBAR - 57.056 - 56.556 - 57.778 - 56.444 - 56.056 - 55.222 - 55.722	UBAR 20.020 22.287 19.899 21.550 22.844 22.705 21.094	VBA .60 .1.76 .19 .1.43 .75 .1.40 	R WBA 6 .16 8 .20 8 .14 2 .01 410 6 .07 8 .12	AR 58 07 45 16 09 72 26	W
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20	TU -1142. -1260. -1149. -1216. -1280. -1253.	TV 228 -34.53 445 99.99 715 -11.44 874 80.83 545 -42.22 309 77.64 889 46.64 889 46.64	TW 84 -9.564 62 -11.733 38 -8.380 32889 57 6.099 43 -3.986 83 -7.000 99 -8.085	UV 12.135 3 -39.392 3.939 -30.861 17.221 3 -31.923 5 -17.672 5 .790	UW 3.356 4.624 2.886 .339 -2.485 1.640 2.652 1.696	.102 367 .029 023 082 102 105 .070	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20	TBAR -57.056 -56.556 -57.778 -56.444 -56.056 -55.222	UBAR 20.020 22.287 19.899 21.550 22.844 22.705 21.094 11.866	VBA) .600 .1.766 .199 .199 .1.433 .756 .1.400 	R         WB/           6         .16           8         .20           8         .14           2         .01           4        10           6         .07           8         .12           8         .12	AR 58 07 45 16 09 72 26 43	W
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21 NOV 22 NOV 23 NOV 24	TU -1142 -1260 -1149 -1216 -1280 -1253 -1175 -671 -272 -392	TV 228 -34.53 3445 99.99 715 -11.43 374 80.83 345 -42.22 309 77.66 389 46.64 379 -27.55 394 33.10 26 -85.66	TW 84 -9.56 62 -11.73 38 -8.38 3288 57 6.098 43 -3.988 83 -7.006 99 -8.08 02 -10.945 62 -6.445	UV 4 12.135 3 -39.392 3 .3939 -30.861 17.221 3 -31.923 5 -17.672 5 .790 9 -2.825 10.539	UW 3.356 4.624 2.886 .339 -2.485 1.640 2.652 1.696 1.696 9.34 .793	.102 367 .029 023 082 102 105	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21 NOV 22 NOV 23 NOV 24	TBAR -57.056 -56.556 -57.778 -56.444 -56.056 -55.222 -55.722 -56.550 -56.550 -56.500	UBAR 20.020 22.287 19.899 21.550 22.844 22.705 21.094 11.866 4.821 6.951	VBA) .600 .1.76 .199 .1.43 .759 .1.40 	R         WB/           6         .16           8         .22           8         .14           2         .01           4        10           6         .07           8         .14           6         .12           8         .14           6         .12           6         .12	AR 58 07 45 16 09 72 26 43 94 14	W
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21 NOV 22 NOV 23 NOV 24 NOV 25	TU -1142 -1260 -1149. -1216 -1280 -1253 -1175 -671 -392 -392 -208.4	TV 228 -34.55 1445 99.99 715 -11.42 174 80.83 1745 -42.22 189 46.61 179 -27.55 189 46.61 179 -27.55 1994 33.11 126 -85.61 168 -64.21	TW 84 -9.564 62 -11.733 38 -8.384 57 6.098 43 -3.988 57 6.099 43 -3.988 50 -0.99 99 -8.083 02 -10.944 62 -6.445 86 -12.591	UV 4 12.135 3 -39.392 0 3.939 9 -30.861 17.221 3 -31.923 5 -17.672 5 .790 0 -2.825 10.539 4.223	UW 3.356 4.624 2.886 .339 -2.485 1.640 2.652 1.696 .934 .793 .827	.102 367 .029 023 082 102 105 .070 114 .173 .255	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 21 NOV 21 NOV 23 NOV 23 NOV 25	TBAR -57.056 -56.556 -57.778 -56.444 -56.056 -55.222 -55.722 -56.556 -56.500 -56.333	UBAR 20.020 22.287 19.899 21.550 22.844 22.705 21.094 11.866 4.821 6.951 3.701	VBA 	R         WB/           6         .16           8         .20           2         .01           4        10           6         .07           8         .12           8         .12           6         .12           6         .12           1         .22	AR 58 07 45 16 09 72 26 43 94 14 24	W
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21 NOV 22 NOV 23 NOV 24 NOV 25 NOV 26	TU -1142 -1260 -1149. -1216 -1280 -1253 -1175 -671 -272 -392 -208 -320	TV 228 -34,5 59,99 715 -11.4; 374 80.8; 365 -42.2; 309 77.6; 389 46.6; 389 46.6; 33.1( 26 -85.6; 468 -64.2;	TW 84 -9,56 62 -11.73 38 -8.38 32 -88 57 6.09 43 -3.98 83 -7.00 99 -8.08 02 -10.945 52 -6.445 86 -12.59 91 -8.716	UV 4 12.135 3 -39.392 3 -30.861 3 -17.221 3 -31.923 5 -5.790 4.223 -4.752	UW 3.356 4.624 2.886 .339 -2.485 1.640 2.652 1.696 .934 .793 .827 .852	.102 367 .029 023 102 105 .070 114 .173 .255 129	DAY NOV 15 NOV 16 NOV 17 NOV 20 NOV 20 NOV 21 NOV 23 NOV 23 NOV 24 NOV 25	TBAR - 57.056 - 56.556 - 57.778 - 56.444 - 56.056 - 55.222 - 56.556 - 56.500 - 56.500 - 56.500 - 56.303 - 57.278	UBAR 20.020 22.287 19.899 21.550 22.844 22.705 21.094 11.866 4.821 6.951 3.700	VBA . 600 . 1.766 . 199 1.433 750 1.400 833 483 584 584 . 1.514 144	R         WB/           6         .16           8         .20           8         .12           9         .01           4         -10           6         .07           8         .12           6         .19           6         .11           1         .22           8         .15	AR 658 07 45 16 09 72 26 43 94 14 24 52	W
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 20 NOV 21 NOV 22 NOV 22 NOV 23 NOV 24 NOV 25 NOV 25 NOV 26 NOV 27 NOV 28	TU -1142 -1260 -1149. -1216 -1280 -1253 -1175 -671 -392 -392 -208.4	TV 228 -34,51 445 99,91 715 -11,44 748 80.81 545 -42,22 309 77,66 889 46,66 889 46,66 799 -27,55 394 33,11 26 -85,66 468 -64,22 327 48,55 40,66	TW 84 -9.56 62 -11.73 38 -8.38 57 6.099 43 -3.98 57 -6.09 43 -3.98 50 -8.88 50 -10.94 52 -6.44 56 -6.44 56 -6.45 56 -6.45	UV 4 12.135 3 -39.392 3 .393 9 -30.861 17.221 3 -31.923 5 -17.672 5 .790 9 -2.825 10.539 4.223 5 -4.752 5 .4.752 5 .280	UW 3.356 4.624 2.886 .339 -2.485 1.640 2.652 1.696 .934 .793 .827 .852 2.059	.102 367 .029 023 082 102 105 .070 114 .173 .255 129 .168	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 21 NOV 21 NOV 23 NOV 23 NOV 25	TBAR -57.056 -56.556 -57.778 -56.444 -56.056 -55.222 -55.722 -56.556 -56.500 -56.333	UBAR 20.022 22.287 19.899 21.550 22.844 22.705 21.094 11.866 4.821 6.951 3.701 5.601	VBA . 600 . 1.766 . 199 . 1.433 . 755 1.400 833 834 584 584 584 584 844 844 844 72	R         WB/           6         .16           8         .20           2         .01           4        10           6         .07           8         .12           6         .19           6         .19           6         .11           1         .22           1         .25	AR 658 07 45 16 09 72 26 43 94 14 24 52 33	W
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 20 NOV 21 NOV 22 NOV 22 NOV 22 NOV 22 NOV 25 NOV 26 NOV 27 NOV 28 NOV 29	TU -1142 -1260 -1216 -1280 -1253 -1253 -671 -272 -392 -208 -320 -259 -189 -33	TV 228 -34.53 245 99.91 715 -11.43 74 80.83 245 -42.22 309 77.66 389 46.61 799 -27.55 919 33.11 726 -85.61 6468 -64.22 247 48.55 140 -41.02 184 -38.55 7 -102.27	TW 84 -9.56/ 62 -11.73: 38 -8.38( 32 -8.88( 57 6.09( 57 -6.09( 52 -8.08( 57 -0.09( 99 -8.08( 52 -6.44( 56 -6.4	UV 4 12.135 3 -39.392 3 -30.861 17.221 3 -31.923 -17.672 5.790 -2.825 10.539 4.223 -4.752 3 .280 2 .308 4.114	UW 3.356 4.624 2.886 .339 -2.485 1.640 2.652 2.652 1.696 .934 .793 .827 .852 2.059 .927 -022	.102 367 .029 023 102 105 .070 114 .173 .255 129 .168 .189 .604	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 29 NOV 21 NOV 22 NOV 22 NOV 25 NOV 25 NOV 25 NOV 27 NOV 27 NOV 28 NOV 27	TBAR -57.056 -56.556 -57.778 -56.444 -56.056 -55.222 -55.722 -56.550 -56.550 -56.550 -56.333 -57.278 -57.200 -56.222 -57.333	UBAR 20.020 22.287 19.899 21.550 22.844 22.705 21.094 11.866 4.821 6.951 3.700 5.601 4.551 3.368 064	VBA           0         .600           7         -1.760           9         .190           0         -1.433           6         -756           5         -1.400           6         -833           5         -4.43           1         .511           1         1.141           1        844           1         .72           3        688           4         1.788	R         WB4           66         .16           88         .22           010         .01           44        10           6         .07           88         .14           66         .11           11         .22           88         .11           11         .22           5         .22           33         .33	AR 568 507 445 166 509 72 266 43 94 14 24 52 33 75 339	W
DAY NOV 15 NOV 15 NOV 17 NOV 18 NOV 29 NOV 21 NOV 22 NOV 22 NOV 23 NOV 25 NOV 25 NOV 26 NOV 27 NOV 28 NOV 29 NOV 30	TU -1142. -1260. -1149. -1216. -1280. -1253. -1175. -671. -272. -392. -208. -320. -259. -189. 3. -170.	TV 228 -34.51 445 99.91 715 -11.4 374 80.83 545 -42.22 309 77.6 389 46.61 779 -27.57 194 -33.11 126 -85.61 68 -64.21 327 48.55 110 -41.00 184 -38.55 577 -102.22	TW 84 -9.564 62 -11.73 38 -8.38( 32885 57 6.092 43 -3.98( 83 -7.000 99 -8.08( 02 -10.944 66 -12.59( 91 -8.71( 0 -13.26( 30 -15.47( 0 -15.18( 3 -15.	UV 4 12.135 3 -39.392 9 -30.861 8 17.221 3 -31.923 5 -17.672 5 -5.790 9 -2.825 9 10.539 4 4.223 5 -4.752 3 -280 4 2.238 6 -4.752 5 -3.280 8 -1.144 -13.474	UW 3.356 4.624 2.886 .339 -2.485 1.640 2.652 1.696 .934 .793 .827 .852 1.059 .927 -022 -272	.102 367 .029 023 102 105 .070 114 .173 .255 129 .168 .189 .604 .410	DAY NOV 15 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21 NOV 23 NOV 23 NOV 23 NOV 25 NOV 25 NOV 25 NOV 28 NOV 28 NOV 28 NOV 28 NOV 28	TBAR -57.056 -56.556 -57.778 -56.444 -56.056 -55.222 -56.556 -56.500 -56.333 -57.278 -57.278 -57.278 -57.278 -57.278 -57.278 -57.278 -57.278	UBAR 20.020 22.287 19.899 21.550 22.844 22.705 21.094 11.866 4.821 6.951 3.700 5.601 4.551 3.368 064 2990	VBA           0         -600           1         -1.767           0         -1.433           4         -755           5         -1.400           4         -833           5         -483           -         -584           -         -1.431           -         -484           -         -544           -         -723           -         -683           -         -723           -         -684           -         1.783           -         1.783	R         WB/           8         .12           8         .12           2         .01           6         .14           6         .078           8         .12           6         .13           6         .14           6         .11           1         .22           5         .22           3         .33           6         .03	AR 58 507 45 16 509 72 26 43 394 14 24 52 33 37 5 339 91	W
DAY NOV 15 NOV 16 NOV 17 NOV 19 NOV 20 NOV 22 NOV 23 NOV 23 NOV 23 NOV 25 NOV 25 NOV 26 NOV 28 NOV 28 NOV 28 NOV 29 NOV 20	TU -1142. -1260. -1149. -1216. -1280. -1253. -1175. -671. -272. -392. -392. -392. -320. -320. -189. 3. 1700. 640.	TV 228 -34.5i 245 99.9j 715 -11.4; 874 80.8; 874 80.8; 874 80.8; 979 -27.5; 984 33.1i 266 -85.66; 979 -27.5; 984 -38.5; 577 -102.22; 959 -257.1; 54 -72.2;	TW 84 -9.56/ 62 -11.73 38 -8.38( 32 -8.89( 57 6.09) 57 -6.09( 50 -0.94( 50 -12.59) 91 -8.71( 50 -13.26( 10 -15.47( 10 -19.42( 13 -5.18) 62 -6.44( 50 -13.26( 10 -19.42( 13 -5.18) 62 -6.44( 14 -19.42( 15 -6.44( 15 -19.42( 15 -6.44( 15 -6.44(	UV 12.135 3 -39.392 3 -30.861 17.221 3 -31.923 5 -17.672 5 .790 -2.825 4.223 4.223 5 .4.752 5 .280 -4.752 5 .280 -4.752 -4.752 -4.752 -4.752 -4.752 -4.752 -4.752 -4.752 -4.752 -4.752 -4.752 -4.752 -4.752 -4.752 -4.752 -4.752 -4.752 -4.752 -5.790 -1.847	UW 3.356 4.624 2.886 .339 -2.485 1.640 2.652 1.696 .934 .793 .827 .852 1.059 .927 - 022 - 272	.102 367 .029 023 102 105 .070 114 .173 .255 129 .168 .189 .604 .410 .334	DAY NOV 15 NOV 16 NOV 18 NOV 29 NOV 21 NOV 22 NOV 23 NOV 24 NOV 25 NOV 26 NOV 28 NOV 29 NOV 29 NOV 30 DEC 1	TBAR -57.056 -56.556 -57.778 -56.444 -56.056 -55.222 -55.722 -56.530 -56.333 -57.278 -57.278 -57.278 -57.278 -57.278 -57.278 -57.278 -57.278 -57.056	UBAR 20.020 22.287 19.899 21.550 22.844 422.705 21.094 11.866 4.821 3.700 5.601 3.366 064 -2.990 -11.330	VBAI           0         .600           7         -1.76i           9         .19i           9         -1.43i           6         .75i           5         -1.40i           6         .83i           1         .51i           1         1.51i           1         .72i           3         .68i           1         .72i           3         .68i           1         .72i           3         .68i           1         .78i           9         .68i           1         .78i	R         WBA           R         0.00           R         .20           R         .14           2         .00           44        10           66         .11           88         .12           8         .11           6         .11           1         .22           5         .22           3         .33           6         .09           5         .22	AR 568 57 445 16 59 72 26 443 94 14 24 52 333 75 339 91 52	W
DAY NOV 15 NOV 15 NOV 17 NOV 18 NOV 29 NOV 21 NOV 22 NOV 22 NOV 23 NOV 25 NOV 25 NOV 26 NOV 27 NOV 28 NOV 29 NOV 30	TU -1142. -1260. -1149. -1216. -1280. -1253. -1175. -671. -272. -392. -208. -320. -259. -189. 3. -170.	TV 228 -34,51 245 99,91 715 -11,44 74 80,81 845 -42,22 309 77,66 889 46,66 889 46,66 889 46,66 899 43,31 726 -85,66 408 -64,25 410 -41,00 884 -38,55 7 -102,27 999 -257,11 154 -72,21 154 -72,21 154 -72,21 154 -72,21 154 -72,21 154 -72,21 154 -72,21 154 -72,21 154 -72,21 155 -1445,76 155 -1445,76 155 -1445,76 155 -145,76 155 -155 -155 155 -155 1	TW 84 -9.56/ 62 -11.733 38 -8.38( 3288( 57 6.09( 99 -8.08) 02 -10.944 62 -6.449 86 -12.59( 91 -8.71( 80 -13.26( 30 -15.47( 1 -19.42( 13 -5.18( 26 -14.80( 51 -9.29( 51	UV 12.135 3.3939 2.30.861 3.17.221 3.31.17.221 3.32.17.17.221 3.32.17.17.221 3.32.17.17.17.17.17.17.17.17.17.17.17.17.17.	UW 3.356 4.624 2.886 339 -2.485 1.640 2.652 1.696 .934 .793 .827 .852 1.059 .927 -022 272 272 078	.102 367 .029 023 102 105 .070 114 .173 .255 129 .168 .189 .604 .410 .334 .407	DAY NOV 15 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21 NOV 23 NOV 23 NOV 23 NOV 25 NOV 25 NOV 25 NOV 28 NOV 28 NOV 28 NOV 28 NOV 28	TBAR -57.056 -56.556 -57.778 -56.444 -56.056 -55.222 -56.556 -56.500 -56.333 -57.278 -57.278 -57.278 -57.278 -57.278 -57.278 -57.278 -57.278	UBAR 20.02c 22.287 19.899 21.55C 22.844 22.705 21.024 4.821 6.951 3.701 4.551 3.368 064 2.990 -11.330	VBAI           0         .600           1         -1.76i           0         .19i           0         -1.43i           4         .755           5         -1.40i           6         .48i          58i         .51i           1.144        84i           1.72         .68i           0         4.500           0         1.27           7         2.52!	R         WBA           R	AR 568 507 445 16 509 72 26 443 944 14 24 52 333 75 39 91 52 52 51	W
DAY NOV 15 NOV 17 NOV 18 NOV 20 NOV 21 NOV 22 NOV 22 NOV 23 NOV 24 NOV 25 NOV 2	TU -1142. -1260. -1149. -1216. -1280. -1253. -1175. -671. -272. -392. -392. -320. -259. -320. -259. -320. -259. -320. -259. -320. -259. -320. -259. -320. -259. -320. -259. -320. -259. -320. -259. -320. -259. -320. -259. -320. -259. -320. -259. -320. -259. -320. -259. -320. -259. -320. -259. -320. -259. -2	TV 228 -34.5i 245 99.9j 715 -11.4; 746 80.8; 845 -42.22; 739 46.6i 849 46.6i 849 46.6i 849 46.6i 849 46.6i 849 48.5i 84 -38.5i 84 -38.5i 857 -102.2i 959 -257.1; 154 -72.1i 155 -66.44 33 -141.6i	TW 84 -9.56/ 62 -11.73 38 -8.38( 32889 57 6.099 57 -6.091 50 -10.945 62 -6.449 86 -12.591 91 -8.716 30 -15.477 01 -19.426 13 -5.183 62 -17.176 61 -9.299 49 -17.176 60 -3.256 60 -3.256 61 -3.256 72 -3.256 72 -3.256 73 -3.256 74 -3.256 75 -5.256 75	UV 12.135 3-39.392 3.9392 -30.861 3.7.221 3.7.221 3.7.672 5.790 -2.825 10.539 4.223 5.790 4.223 5.790 4.223 5.790 4.223 5.790 4.223 5.790 4.223 5.790 4.233 4.223 5.790 4.233 4.3344 4.33894 4.33884 4.33884 4.33884 4.33884 4.33884 4.33884 4.33884 4.33884 4.33884 4.33884 4.33884 4.33844 4.33884 4.338	UW 3.356 4.624 2.886 1.640 2.652 1.696 -934 .793 .827 .827 .059 -927 -022 272 078 078 078	.102 367 .029 023 102 105 .070 114 .173 .255 129 .168 .189 .604 .410 .334	DAY NOV 15 NOV 16 NOV 18 NOV 29 NOV 21 NOV 22 NOV 22 NOV 23 NOV 24 NOV 25 NOV 26 NOV 26 NOV 27 NOV 29 NOV 29 NOV 29 NOV 29 NOV 29 NOV 20 NOV 2	TBAR -57.056 -56.556 -57.778 -56.444 -56.056 -55.222 -55.722 -56.500 -56.500 -56.333 -57.278 -57.056 -56.222 -57.333 -57.056 -56.556 -57.722 -57.444 -58.278	UBAR 20.02c 22.287 31.550 21.550 21.094 11.866 4.821 6.951 3.701 5.601 4.551 3.566 064 -2.990 11.333 487 3.366	VBAI         .600           -         .601         .601           -         .1.763         .1.763           -         .1.99         -1.433         .755           -         .543	R         WB/           66         .16           88         .22           01         .01           4        116           6         .02           88         .14           6         .11           11         .22           23         .33           6         .03           5         .22           23         .33           6         .09           5         .22           5         .22           7         .29           1         .00	AR 558 07 45 16 09 72 26 33 75 24 33 35 75 39 91 552 551 556	W
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DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 20 NOV 21 NOV 22 NOV 22 NOV 22 NOV 22 NOV 22 NOV 22 NOV 22 NOV 22 NOV 23 NOV 24 NOV 27 NOV 26 NOV 29 NOV 29 NOV 29 NOV 29 DEC 1 DEC 2 DEC 4 DEC 5 DEC 5	TU -1142. -1260. -1280. -1280. -1253. -1175. -671. -671. -272. -208. -320. -259. -189. 3. 170. 640. 283. 179. 81. 85. 85. 66.	TV 228 -34.51 245 99.91 715 -11.42 374 80.82 374 -42.22 309 77.66 389 46.61 379 -27.52 309 72.65 327 48.52 100 -41.00 484 -38.52 557 -102.22 327 48.52 115 -145.77 45.55 -145.76 465 -66.44 333 -141.63 386 24.33 -141.63 -143.16 -145.16 -145.1	$\begin{array}{rrrr} TW \\ 84 & -9,564 \\ 62 & -11.73 \\ 38 & -8.38( \\ 32 & -8.88( \\ 32 & -8.38( \\ 32 & -8.38( \\ 32 & -8.38( \\ 32 & -10.945 \\ 64 & -12.98( \\ 56 & -12.98( \\ 30 & -15.47( $	UV 12.135 3-39.392 3.9392 -30.861 3.7.221 5.790 -2.825 10.539 4.223 4.223 -4.752 3.280 -4.752 3.280 -11.4449 -1.4.449 -1.4.449 -3.380 -3.984 -3.984 -3.980 -5.990 -5.90	UW 3.356 4.624 2.886 339 2.485 1.640 2.652 1.693 4.793 8.827 022 2.272 272 272 272 278 078 1.006 078 078 078	.102 367 .029 023 102 105 104 114 .173 .255 129 .168 .189 .604 .407 .334 .407 .346 .136 049 047	DAY NOV 15 NOV 17 NOV 18 NOV 20 NOV 21 NOV 22 NOV 23 NOV 24 NOV 24 NOV 24 NOV 25 NOV 26 NOV 27 NOV 28 NOV 29 NOV 29 NOV 29 NOV 29 NOV 20 DEC 1 DEC 2 DEC 3 DEC 4 DEC 5 DEC 6	TBAR -57.056 -56.556 -57.778 -56.444 -56.056 -55.222 -55.722 -56.530 -56.530 -56.333 -57.278 -57.278 -57.278 -57.278 -57.278 -57.278 -56.556 -56.556 -57.722 -57.444 -58.278 -59.056	UBAR 20.022 22.287 19.899 21.550 21.094 11.866 4.821 6.951 3.3701 5.601 4.551 3.366 -2.990 -11.330 487 -3.366 -1.390 -1.439	VBAI           0         .600           -1.766         .9           0         .193           0         -1433           6         .755           5         -14(0)           6         .753           6         .483           1.144        884           1         1.144          884         .72           6.68         .1.78           0         4.500           1         1.27           2         .683           1         .252           1         1.51           2         2.433           2        411           2        212	R         WB/           66         .16           88         .22           12         .01           4        116           6         .07           88         .14           6         .11           1         .22           3         .33           66         .005           5         .22           3         .33           66         .005           .25         .22           3         .33           66         .005           .25         .22           1         .22           5         .22           1         .03           .11         .22           5         .22           .11         .22           .12         .23           .13         .11           .11         .21           .12         .21           .13         .11           .13         .11           .14         .21	AR 58 07 16 09 72 26 43 94 14 24 39 44 42 45 23 39 31 52 53 99 56 19 56 19 56 19 56 19 56 10 10 10 10 10 10 10 10 10 10	W
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DAY NOV 15 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21 NOV 22 NOV 23 NOV 24 NOV 23 NOV 24 NOV 25 NOV 25 NOV 26 NOV 27 NOV 27 NOV 27 NOV 26 DEC 1 DEC 5 DEC 6 DEC 7 DEC 9 DEC 10 DEC 10	TU -1142. -1260. -1280. -1253. -1175. -671. -272. -392. -208. -320. -259. -189. 3. 1700. 640. 233. 193. 81. 85. 81. 81. 81. 81. 81. 81.	TV 228 -34.5 345 -99.9 3715 -11.4 374 80.8 3645 -42.22 309 77.6 389 46.6 389 46.6 389 46.6 468 -64.22 327 48.5 310 -27.5 310 -27.5 310 -27.5 310 -27.5 311 -27.5 312 -27.5	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	UV 12.135 3.9393 3.9392 3.9393 -30.861 17.221 3.7.672 5.799 4.223 5.7.99 4.223 5.7.99 4.223 5.7.99 4.223 5.3.280 4.233 5.3.280 4.233 5.3.280 5.5.3.280 5.5.3.280 5.5.3.280 5.5.3.280 5.5.3.280 5.5.3.280 5.5.3.280 5.5.3.280 5.5.3.280 5.5.3.280 5.5.3.280 5.5.3.280 5.5.3.380 5.5.3.30 5.5.3.30 5.5.3.30 5.5.3.30 5.5.3.30 5.5.3.30 5.5.3.30 5.5.3.30 5.5.3.3.30 5.5.5.3.30 5.5.3.30 5.5.3.30 5.5.3.30 5.5.3.30 5.5.3.30 5.5.3.3	UH 3.356 4.624 2.886 1.640 2.652 1.650 934 .793 .827 .059 .927 -022 -272 .078 1.006 -078 -172 .579 .446 .024 1.714 .988 1.908	. 102 - 367 . 029 - 023 - 102 - 105 - 105 - 105 - 105 - 105 - 105 - 129 168 . 189 . 604 . 410 . 334 . 407 . 346 . 136 - 049 - 046 - 056 - 070 - 049 - 046 - 049 - 046 - 046 - 049 - 046 - 049 - 046 - 046 - 049 - 046 - 046 - 049 - 046 - 026 - 088 - 026 - 057 - 026 - 026 - 057 - 056 - 057 - 057 - 056 - 057 - 05	DAY NOV 15 NOV 17 NOV 18 NOV 20 NOV 21 NOV 22 NOV 23 NOV 24 NOV 22 NOV 23 NOV 24 NOV 25 NOV 26 NOV 26 NOV 27 NOV 28 NOV 27 NOV 28 NOV 20 DEC 1 DEC 9 DEC 10	TBAR -57.056 -56.556 -57.778 -56.444 -56.056 -55.222 -56.556 -56.500 -56.500 -56.333 -57.278 -57.278 -57.278 -57.333 -57.278 -57.333 -57.278 -57.333 -57.278 -57.333 -57.278 -57.28 -57.444 -58.278 -59.056 -59.778 -59.778 -59.778 -59.778 -59.276 -50.389 -50.389 -50.389 -50.389 -50.389 -50.389 -50.389 -50.389 -50.389 -50.389 -50.283 -51.278 -52.2944 -52	UBAR 20.02C 22.287 19.899 21.550 22.844 22.705 21.094 11.866 4.821 3.701 5.601 5.915 5.601 5.915	VBAI         .600           0         .601           0         .191           0         -1.763           4         .755           5         -1.403           4         .756           5         -4.433           4         .501           1.144         .844          844         .783           0         4.500           1.27         .623           0        211           1.225         1.151           1.23         .683          4.100        401          211         .223           .623        4.100          989        899          292        221	R         WBM           66         .116           88         .121           22         .004           6         .070           88         .116           1         .222           38         .111           1         .222           3         .33           6         .095           5         .225           3         .111           99         .227           2         .002           2         .117           7         .200           2         .012           2         .002           2         .002           2         .002           2         .002           2         .002           2         .002           2         .002           2         .002           2         .002           2         .002           2         .002           2         .002           3         .022           .023         .023           .023         .023           .023         .023	NB 88 17 55 16 6 19 7 26 13 14 1	W
DAY NOV 15 NOV 17 NOV 18 NOV 20 NOV 22 NOV 22 NOV 22 NOV 22 NOV 22 NOV 22 NOV 22 NOV 22 NOV 22 NOV 26 NOV 27 NOV 28 NOV 26 DEC 1 DEC 2 DEC 6 DEC 6 DEC 6 DEC 7 DEC 8 DEC 12 DEC 12 DEC 12	TU -1142. -1260. -1280. -1283. -1216. -1283. -1216. -222. -392. -208. -320. -259. -208. -320. -259. -189. 3. -259. -189. 3. -28. 170. 640. -28. 193. 81.0 -85. 160. -148. 148. 122. -238.1 -101. -1201. -22140.2	TV 228 -34.5i 245 99.9j 715 -11.4; 374 80.8; 374 -42.2; 309 77.6; 389 46.6; 389 46.6; 389 -27.5; 99 -33.1i 126 -85.6; 48.5; 327 48.5; 327 48.5; 327 48.5; 327 -48.5; 327 -48.5; 328 -47.5; 328 -47.5; 329 -57.5; 329	$\begin{array}{rrrr} TW \\ 84 & -9.564 \\ 62 & -11.73 \\ 38 & -8.38 \\ 32 &885 \\ 57 & 6.099 \\ 833 & -7.000 \\ 99 & -8.083 \\ 02 & -10.945 \\ 64 & -12.593 \\ 91 & -8.716 \\ 800 & -13.266 \\ 03 & -15.477 \\ 01 & -19.426 \\ 13 & -5.153 \\ 14 & -6.256 \\ 90 & -11.706 \\ 10 & -12.846 \\ 00 & -11.706 \\ 10 & -5.153 \\ 14 & -6.925 \\ 14 &874 \\ 14$	UV 12.135 3.9392 3.9392 3.9392 3.9392 3.9392 4.223 4.223 4.223 4.223 4.223 5.790 4.223 5.790 4.223 5.790 4.223 5.790 4.223 5.790 4.223 5.790 5.9000 5.90000 5.90000 5.90000 5.90000 5.9000000000000000000000000000000000000	UW 3.356 4.624 2.886 339 -2.485 1.640 2.652 1.693 .827 -022 -272 -2.967 -078 -078 -078 -1.006 -078 -1.77 -488 -1.72 -579 -488 -1.713 -446 -024 1.714 -024 -7.764 -024 -7.764 -024 -7.764 -024 -7.764 -024 -7.764 -024 -7.764 -024 -7.764 -024 -7.764 -024 -024 -024 -024 -024 -024 -024 -02	.102 367 .029 023 102 105 .070 114 .173 .255 129 .168 .189 .604 .410 .334 .407 .346 .136 049 049 047 .360 047 .360 047 .360 048 026	DAY NOV 15 NOV 17 NOV 18 NOV 20 NOV 21 NOV 22 NOV 23 NOV 23 NOV 23 NOV 23 NOV 25 NOV 25 NOV 25 NOV 26 NOV 27 NOV 28 NOV 29 NOV 29 NOV 29 NOV 29 DEC 1 DEC 3 DEC 6 DEC 6 DEC 10 DEC 11 DEC 12 DEC 13	TBAR -57.056 -56.556 -57.778 -56.444 -56.056 -55.222 -56.556 -56.550 -56.500 -56.333 -57.278 -57.278 -57.278 -57.026 -56.556 -57.722 -57.444 -58.278 -59.778 -59.778 -60.389 -60.39	UBAR 20.022 22.287 19.899 21.550 21.094 21.094 4.821 6.951 3.3701 5.601 4.551 3.366 -2.990 -11.330 487 -2.990 -11.330 487 -2.990 -1.439 -2.652 -2.990 -1.439 -2.652 -2.990 -1.449 -2.690 -2.052 -2.920 -2.022 -3.914 -2.652 -2.990 -2.022 -3.914 -2.652 -2.990 -2.022 -3.914 -2.652 -2.990 -2.022 -2.919 -2.022 -3.914 -2.650 -2.990 -2.022 -3.914 -2.650 -2.900 -2.022 -2.919 -2.022 -3.914 -2.650 -2.900 -2.022 -3.914 -2.650 -2.900 -2.022 -3.914 -2.650 -2.900 -2.022 -3.914 -2.650 -2.900 -2.022 -3.914 -2.650 -2.900 -2.022 -3.914 -2.650 -2.900 -2.022 -3.914 -2.650 -2.900 -2.022 -3.914 -2.650 -2.900 -2.000 -2.900 -2.0000 -2.0000 -2.0000 -2.0000 -2.0000 -2.0000 -2.0000 -2.0000 -2.0000 -2.0000 -2.00000 -2.0000 -2.0000 -2.00000 -2.00000 -2.00000 -2.00000 -2.00000 -2.00000 -2.00000 -2.000000 -2.0000000000	VBAI           0         .600           -1.76:         .9           0         .19:           0         -14:3:           5         -1.40:           6         .75:           5         -1.40:           6         .75:           6         .48:           .114        84:           1         .14:           .83:         .15:           .12:         .68:           .13:         .62:           .15:         .24:           .25:         .15:           .24:         .25:           .12:         .25:           .12:         .23:           .24:         .24:           .24:         .24:           .24:         .24:           .25:         .25:           .2:         .24:           .2:         .24:           .2:         .24:           .2:         .24:           .2:         .2:           .2:         .2:           .2:         .2:           .2:         .2:           .2:         .2:	R         WBM           66         .16           88         .22           12         .01           4        116           6         .07           88         .14           6         .11           84         .12           1         .22           5         .22           3         .33           6         .005           5         .22           1         .023           7         .25           1         .003           3         .11           9         .22           17         .017           7         .02           2         .094           .0037         .22           .11        013	888 877 55 16 6 19 72 26 6 3 4 4 4 4 4 25 22 33 5 5 39 91 5 25 6 19 5 5 6 6 19 5 26 6 33 4 4 4 4 26 22 33 7 5 39 91 5 26 6 19 5 5 6 6 35 14 4 4 00 29 34 4 9 19 4 9 29 34 9 29 34 9 29 34 9 20 20 20 20 20 20 20 20 20 20 20 20 20	W

TABLE I. Continued.

LEVEL 1	OO ME. LAT	ITUDE 40	COVARIANCE				LEVEL	100 MB. 1	ATITUDE	0 EDDY	CORRELA	TION COEL	FFICIENTS
DAV	ĩU	TV	TW	UV	UW	VW	DAY	TU	TV	TW	UV	UW	VW
DAY NOV 15	30.624	12.113			2.156	461	NOV 15	.409	.190	287	.359	314	079
NOV 16	17.333	28.789			5.207	-2.887	NOV 16	.173	.310	421	. 393	498	298
NOV 17	12,965	14.465			2.813	-1.972	NOV 17	.151	.152	376	.426	332	210
NOV 18	33.771				6.528	-5.765	NOV 18 NOV 19	.450	.342	380	.478	585	435 107
NOV 19 NOV 20	39.370	24.250			3.449	-1.026 343	NOV 19 NOV 20	.080	116	.244	.277	297	097
NOV 20 NOV 21	2.911	-3.724 6.048			1.756	256	NOV 21	.209	.125	360	.207	303	061
NOV 22	10.101	10.554		84.183	.884	-1.167	NOV 22	.178	.230	116	.281	.137	224
NOV 23	7.807	-2.229			3.478	422	NOV 23	.138	068	.032	.353	346	073
NOV 24	14.488	1.851			4.532	023	NOV 24	.248	.063	120	.277	463	005
NOV 25	29.210	19.771			4.627	926 -9.474	NOV 25 NOV 26	.369	.356	414 257	.232	394	~.113 ~.725
NOV 26 NOV 27	16.950 21.380	3.324 20.175			1.745	717	NOV 27	.350	.359	396	.213	231	069
NOV 28	26.065	6.909			7.029	-4.950	NOV 28	.337	.122	454	.478	471	454
NOV 29	17.086	14.749		29.910 -1	0.262	-2.079	NOV 29	.161	.277	350	.297	429	173
NOV 30	11.728	8.025			4.496	.643	NOV 30	.155	.160	378	.413	478	.103
DEC 1	24.575	1.741			1.455	820	DEC 1 DEC 2	.273	.027	.028	.386	177	~.139 ~.573
DEC 2 DEC 3	5.199 -18.718	5.338 1.504			1.672	-4.721 -4.999	DEC 2 DEC 3	162	.093	.187	.402	450	340
DEC 3	-6.090	5.240			6.445	-2.263	DEC 4	085	.117	354	.266	520	291
DEC 5	873	1.835			4.443	-3.932	DEC 5	010	.040	003	.380	389	664
DEC 6	2.497	208			2.670	-2.286	DEC 6	.024	005	234	.144	193	430
DEC 7	36.795	1.022			4.916	-3.831	DEC 7 DEC 8	.290	.017	272	-167	419	~.708
DEC 8 DEC 9	28.641 47.171	9.788 5.653			2.575	-4.840 885	DEC 8 DEC 9	.322	.166	285	.272	212	598
DEC 10	64.357				6.371	-4.866	DEC 10	.684	.303	517	.506	506	503
DEC 11	54.561				4.394	-3.833	DEC 11	. 553	.172	544	. 399	426	340
DEC 12	46.488	16.793			1.273	1.029	DEC 12	.421	.175	056	.304	157	.145
DEC 13	10.804	3.172			1.637	-1.009	DEC 13	.234	.067	005	.225	.300	180
DEC 14 DEC 15	7.050 42.543	-2.634 38.581			4.944	-2.228	DEC 14 DEC 15	.094	054	.081	.362	433 487	299
200 15		501501											
	OO MB. LAT		PRODUCT OF					100 MB. L				U, V, ANI	W
DAY	TU	TV	TW	uv	UW		DAY	TBAR	UBAF	VBA	R	WBAR	W
DAY NOV 15	TU -2241.536	TV 6 69.102	<b>TW</b> 12.724	UV -41.476	UW -7.63	37 .235	DAY NOV 15	TBAR -61.11	UBAF 1 36.68	VBA	R 31 -	WBAR	W
DAY NOV 15 NOV 16	TU -2241.530 -2298.90	TV 6 69.102 1 -69.386	TW 12.724 7.563	UV -41.476 42.635	UW -7.63 -4.64	37 .235 47140	DAY NOV 15 NOV 16	TBAR -61.11 -51.16	UBAF 1 36.68 7 37.58	VBA 0 -1.1 4 1.1	R 31 - 34 -	WBAR .208 .124	W (
DAY NOV 15	TU -2241.536	TV 6 69.102 1 -69.386 9 85.564	<b>TW</b> 12.724	UV -41.476	UW -7.63	37 .235 47140 08 .187	DAY NOV 15	TBAR -61.11	UBAF 1 36.68 7 37.58 6 40.86	VBA 0 -1.1 4 1.1 3 -1.3	R 31 - 34 - 90 -	WBAR	D W
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19	TU -2241.530 -2298.900 -2515.359 -2463.529 -2488.258	TV 6 69.102 1 -69.386 9 85.564 9 -47.215 8 87.658	TW 12.724 7.563 8.297 21.163 -5.711	UV -41.476 42.635 -56.801 31.033 -58.246	UW -7.63 -4.64 -5.50 -13.90 3.79	37       .235         47      140         08       .187         09      267         95      134	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19	TBAR -61.11 -51.16 -61.55 -61.22 -61.19	UBAF 1 36.68 7 37.58 6 40.86 2 40.23 4 40.66	VBA 0 -1.1 4 1.1 3 -1.3 9 .7 2 -1.4	R 31 - 34 - 90 - 71 - 32	WBAR .208 .124 .135 .346 .093	o ₩
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20	TU -2241.530 -2298.90 -2515.359 -2463.529 -2488.258 -2603.810	TV 6 69.102 1 -69.386 9 85.564 9 -47.215 8 87.658 6 62.737	TW 12.724 7.563 8.297 21.163 -5.711 5.371	UV -41.476 42.635 -56.801 31.033 -58.246 -42.649	UW -7.63 -4.64 -5.50 -13.90 3.79 -3.65	37       .235         47      140         08       .187         09      267         95      134         51       .088	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20	TBAR -61.11 -51.16 -61.55 -61.22 -61.19 -61.88	UBAF 1 36.68 7 37.58 6 40.86 2 40.23 4 40.66 9 42.07	VBA 0 -1.1 4 1.1 3 -1.3 9 .7 2 -1.4 2 -1.0	R 31 - 34 - 90 - 71 - 32 14 -	WBAR .208 .124 .135 .346 .093 .087	₩
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21	TU -2241.530 -2298.900 -2515.359 -2463.529 -2488.255 -2603.810 -2405.881	TV 6 69.102 1 -69.386 9 85.564 9 -47.215 8 87.658 6 62.737 1 -10.816	TW 12.724 7.563 8.297 21.163 -5.711 5.371 6.892	UV -41.476 42.635 -56.801 31.033 -58.246 -42.649 6.751	UW -7.63 -4.64 -5.50 -13.90 3.79 -3.69 -4.30	37       .235         47      140         08       .187         09      267         95      134         51       .088         02      019	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21	TBAR -61.11 -51.16 -61.55 -61.22 -61.19 -61.88 -62.08	UBAF 1 36.68 7 37.58 6 40.86 2 40.23 4 40.66 9 42.07 3 38.75	VBA 0 -1.1 4 1.1 3 -1.3 9 .7 2 -1.4 2 -1.0 2 .1	R 31 - 34 - 90 - 71 - 32 914 - 74 -	WBAR .208 .124 .135 .346 .093 .087 .111	o w
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21 NOV 22	TU -2241.53( -2298.90) -2515.352 -2463.522 -2603.81( -2405.88) -2405.88]	TV 6 69.102 1 -69.386 9 85.564 9 -47.215 8 87.658 6 62.737 1 -10.816 6 51.765	TW 12.724 7.563 8.297 21.163 -5.711 5.371 6.892 7.739	UV -41.476 42.635 -56.801 31.033 -58.246 -42.649 6.751 -33.409	UW -7.63 -4.64 -5.50 -13.90 3.79 -3.65 -4.30 -4.30	37       .235         47      140         08       .187         09      267         95      134         51       .088         02      019         95       .105	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21 NOV 22	TBAR -61.11 -51.16 -61.55 -61.22 -61.19 -61.88 -62.08 -61.77	UBAF 1 36.68 7 37.58 6 40.86 2 40.23 4 40.66 9 42.07 3 38.75 8 39.87	VBA           10         -1.1           14         1.1           3         -1.3           9         .7           2         -1.4           2         -1.0           2         .1           2         .1           2         .1           2         .1           2         .1	R 31 - 34 - 90 - 71 - 32 914 - 74 - 88 -	WBAR .208 .124 .135 .346 .093 .087 .111 .125	W C
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21	TU -2241.530 -2298.900 -2515.359 -2463.529 -2488.255 -2603.810 -2405.881	TV 6 69.102 1 -69.386 9 85.564 9 -47.215 8 87.658 6 62.737 1 -10.816 6 51.765 6 82.709	TW 12.724 7.563 8.297 21.163 -5.711 5.371 6.892 7.739	UV -41.476 42.635 -56.801 31.033 -58.246 -42.649 6.751	UW -7.63 -4.64 -5.50 -13.90 3.79 -3.69 -4.30	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21	TBAR -61.11 -51.16 -61.55 -61.22 -61.19 -61.88 -62.08	UBAF 1 36.68 7 37.58 6 40.86 2 40.23 4 40.66 9 42.07 3 38.75 8 39.87 0 45.43	VBA           10         -1.1           14         1.1           3         -1.3           9         .7           2         -1.4           2         -1.6           2         .1           12        83           11         -1.3	R 31 - 34 - 90 - 71 - 32 914 - 74 - 88 - 339 -	WBAR .208 .124 .135 .346 .093 .087 .111	W (
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21 NOV 22 NOV 23 NOV 24 NOV 25	TU -2241.536 -2298.900 -2515.359 -2463.529 -2405.881 -2405.881 -2405.881.083 -2647.130	TV 6 69.102 1 -69.386 9 85.564 9 -47.215 8 87.658 6 62.737 1 -10.816 6 51.765 6 82.709 3 77.783 0 -61.472	TW 12.724 7.563 8.297 21.163 -5.711 5.371 6.892 7.739 16.160 13.110 9.985	UV -41.476 42.635 -56.801 31.033 -58.246 -42.649 6.751 -33.409 -60.850 -59.465 44.173	UW -7.63 -4.64 -5.50 -13.90 -3.79 -4.30 -4.30 -4.99 -11.88 -10.02 -7.15	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21 NOV 22 NOV 23 NOV 24 NOV 25	TBAR -61.11 -51.16 -61.55 -61.22 -61.88 -62.08 -61.77 -61.75 -61.38 -60.69	UBAF 1 36.68 7 37.58 6 40.86 2 40.23 4 40.66 9 42.07 3 38.75 8 39.87 0 45.43 9 46.93 4 43.61	VBA           00         -1.1           14         1.1           3         -1.3           99         .7           2         -1.4           2         -1.0           2         .1           2         .1.3           12        83           01         -1.3           12         .2           14         1.0	R 31 - 34 - 90 - 71 - 32 114 - 74 - 88 - 88 - 339 - 339 - 267 - 113 -	WBAR .208 .124 .135 .346 .093 .087 .111 .125 .262 .214 .165	W (
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21 NOV 22 NOV 23 NOV 24 NOV 25 NOV 26	TU -2241 53( -2298 90) -2515 35( -2463 52( -2468 251 -2603 81( -2405 88) -2463 17( -2805 34( -2881 08) -2647 130 -2647 130	TV 6 59.102 1 -69.386 9 35.564 9 -47.215 8 87.658 6 62.737 1 -10.816 6 51.765 6 82.709 3 77.783 0 -61.472 4 39.809	TW 12.724 7.563 8.297 21.163 -5.711 5.371 6.892 7.739 16.160 13.110 9.985 12.266	UV -41.476 42.635 -56.801 31.033 -58.246 -42.649 6.751 -33.409 -60.850 -59.465 44.173 -29.771	UW -7.63 -4.64 -5.50 -13.90 -3.79 -3.65 -4.30 -4.30 -11.88 -10.02 -7.17 -9.17	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 20 NOV 21 NOV 22 NOV 23 NOV 24 NOV 25 NOV 26	TBAR -61.11 -51.16 -61.55 -61.22 -61.19 -61.88 -62.08 -61.77 -61.75 -61.38 -60.69 -61.91	UBAF 1 36.68 7 37.58 6 40.86 2 40.23 4 40.66 9 42.07 3 38.75 8 39.87 0 45.43 9 46.93 4 43.61 7 46.30	VBA           100         -1.1           14         1.1           3         -1.3           99         .7           22         -1.4           22         -1.2           23         -1.3           24         -1.2           24         1.2           24        66	R 31 - 34 - 90 - 71 - 32 114 - 74 - 88 - 339 - 137 - 113 - 43 -	WBAR .208 .124 .135 .346 .093 .087 .111 .125 .262 .214 .165 .198	W (
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 20 NOV 21 NOV 22 NOV 23 NOV 24 NOV 25 NOV 26 NOV 27	TU -2241,53 -2298,90 -2515,355 -2663,52 -2683,52 -2683,52 -2663,81 -2605,88 -2663,17 -2805,34 -2805,34 -2863,17 -2805,34 -2867,01 -2867,01 -2710,45	TV 6 69.102 1 -59.386 9 -47.215 8 87.658 6 62.737 1 -10.816 6 51.765 8 22.709 3 77.783 0 -61.472 4 39.809 1 -153.479	TW 12.724 7.563 8.297 21.163 -5.711 5.371 6.892 7.739 16.160 13.110 9.985 12.266 12.064	UV -41.476 42.635 -56.801 31.033 -58.246 -42.649 6.751 -33.409 -60.850 -59.465 44.173 -29.771 110.685	UW -7.63 -4.64 -5.50 -13.90 3.79 -3.69 -4.30 -4.99 -11.88 -10.02 -7.17 -9.12 -8.68	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	DAY NOV 15 NOV 16 NOV 17 NOV 17 NOV 20 NOV 20 NOV 21 NOV 22 NOV 23 NOV 24 NOV 25 NOV 26 NOV 27	TBAR -61.11 -51.16 -61.55 -61.22 -61.19 -61.88 -62.08 -61.75 -61.75 -61.38 -60.69 -61.91 -61.30	UBAF 1 36.66 7 37.58 6 40.86 2 40.23 4 40.66 9 42.07 3 38.75 8 39.87 0 45.43 9 46.93 4 43.61 7 46.30 6 44.21	VBA           100         -1.1           4         1.1           3         -1.3           99         .7           2         -1.4           2         -1.4           2         -1.4           2         -1.3           12        83           11         -1.3           2        2           4         1.0           4        6           .2         2.5	R 31 - 90 - 32 114 - 774 - 88 - 139 - 139 - 139 - 139 - 139 - 131 - 139 - 130	WBAR .208 .124 .135 .346 .093 .087 .111 .125 .262 .214 .165 .198 .196	W (
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21 NOV 22 NOV 22 NOV 23 NOV 24 NOV 25 NOV 26	TU -2241,53 -2298,90 -2515,35 -2663,52 -2688,258 -2603,88 -2463,17 -2005,88 -2463,17 -2805,34 -2881,08 -2647,13 -2867,01 -2710,45 -2933,720	TV 6 69.102 1 -69.386 9 85.564 9 -47.215 8 87.658 6 62.737 1 -10.816 6 82.709 3 77.783 0 -61.422 4 39.809 1 -153.479 6 36.053	TW 12.724 7.563 8.297 21.163 -5.711 5.371 6.892 7.739 16.160 13.110 9.985 12.266 12.044 19.021	UV -41.476 42.635 -56.801 31.033 -58.246 -42.649 6.751 -33.409 -60.850 -59.465 44.173 -29.771 110.685 -27.639	UW -7.63 -4.64 -5.50 -13.90 3.77 -3.69 -4.30 -4.99 -11.88 -10.00 -7.11 -9.11 -8.66 -14.58	37         .235           47        140           38         .187           09        267           95        134           51         .088           02        019           95         .105           89         .351           22         .271           75         -167           73         .127           86        492           82         .179	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 20 NOV 21 NOV 22 NOV 23 NOV 24 NOV 25 NOV 26	TBAR -61.11 -51.16 -61.52 -61.22 -61.19 -61.88 -62.08 -61.77 -61.75 -61.38 -60.69 -61.91 -61.30 -61.86	UBAF 1 36.68 7 37.58 6 40.86 2 40.23 4 40.66 9 42.07 3 38.75 8 39.87 9 46.93 4 43.61 7 46.30 6 44.21 1 47.42	VBA           100         -1.1           144         1.1           3         -1.3           9         .7           2         -1.4           2         -1.0           2         .1           2         -1.3           9         .7           2         -1.2           .11         -1.3           .22         -1.2           .44         1.0           .04        6           .2         2.5           .44        5	R 31 - 34 - 90 - 71 - 32 114 - 74 - 139 - 139 - 139 - 133 - 143 - 139 - 133 - 143 - 139 -	WBAR .208 .124 .135 .346 .093 .087 .111 .125 .262 .214 .165 .198 .196 .307	W (
DAY NOV 15 NOV 15 NOV 17 NOV 18 NOV 20 NOV 20 NOV 22 NOV 22 NOV 23 NOV 24 NOV 24 NOV 25 NOV 26 NOV 27 NOV 28 NOV 27 NOV 28 NOV 29	TU -2241.53( -2298.90) -2515.35( -2663.52( -2603.81( -2605.84( -2865.34( -2865.34( -2867.01) -2667.113( -2667.101, -210.45( -2933.72( -3096.64())	TV 6 69.102 1 -69.386 9 35.564 9 -47.215 8 87.658 6 62.737 1 -10.816 6 51.765 6 82.709 3 77.783 0 -61.472 4 39.809 6 36.053 8 21.427 5 .572	TW 12.724 7.563 8.297 21.163 -5.711 5.371 6.892 7.739 16.160 13.110 9.985 12.266 12.044 19.021 18.057 5.190	UV -41.476 42.635 -56.801 31.033 -58.246 -42.649 -6.751 -33.409 -60.850 -59.465 44.173 -29.771 110.685 -27.639 -17.495 -451	UW -7.63 -4.66 -5.50 -13.90 -3.66 -4.30 -4.99 -11.88 -10.02 -7.11 -9.11 -8.66 -14.58 -14.58 -14.72	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 20 NOV 21 NOV 22 NOV 22 NOV 23 NOV 24 NOV 25 NOV 25 NOV 26	TBAR -61.11 -51.16 -61.55 -61.22 -61.19 -61.83 -62.08 -61.77 -61.75 -61.38 -60.69 -61.91 -61.30 -61.86 -61.58	UBAF 1 36.66 7 37.58 6 40.86 9 42.07 3 38.75 8 39.87 9 46.93 4 43.61 7 46.30 6 44.21 1 47.42 3 50.22 6 48.70	VBA           10         -1.1           14         1.1           3         -1.3           9         .7           2         -1.4           2         -1.0           12         -1.2           31         -1.2           32         -1.2           44         -6.2           2         2.5           14         -6.3           33         -33           99         -0.0	R 31 - 34 - 90 - 71 - 32 114 - 74 - 88 - 339 - 167 - 113 - 167 - 167 - 167 - 167 - 168 - 167 - 168 - 167 - 168 - 168 - 169 - 1	WBAR .208 .124 .135 .346 .093 .087 .111 .125 .262 .214 .165 .198 .196	₩ <b>₩</b>
DAY NOV 15 NOV 15 NOV 16 NOV 17 NOV 18 NOV 20 NOV 21 NOV 22 NOV 23 NOV 23 NOV 24 NOV 25 NOV 26 NOV 26 NOV 27 NOV 28 NOV 28 NOV 28 NOV 28 NOV 28	TU -2241.53 -2298.90 -2515.35 -2463.52 -2463.52 -2463.81 -2405.88 -2463.17 -2805.34 -2881.08 -2647.13 -2867.01 -2710.45 -2933.72 -3096.611 -3010.51 -3028.37	TV 6 69.102 1 -69.386 9 85.564 9 -47.215 8 87.658 6 62.737 1 -10.816 6 51.765 6 82.709 3 77.783 0 -61.422 4 39.809 1 -153.479 6 36.053 8 21.427 5 .572 2 43.871	TW 12.724 7.563 8.297 21.163 -5.711 6.892 7.739 16.160 13.110 9.985 12.266 12.064 19.021 18.057 5.190 2.064	UV -41.476 42.635 -56.801 31.033 -88.246 6.751 -33.409 -60.850 -59.465 44.173 -29.771 110.685 -27.639 -17.495 -3.326	UW -7.66 -4.64 -5.55 -13.90 3.77 -3.69 -4.33 -4.33 -4.34 -10.05 -7.15 -8.66 -14.58 -14.58 -14.74 -4.58 -1.56	37         .235           47        140           08         .187           09        267           95        134           51         .088           02        019           95         .105           89         .351           22         .271           73         .127           86        492           82         .179           44         .102           90         .001           68         .023	DAY NOV 15 NOV 16 NOV 18 NOV 17 NOV 19 NOV 20 NOV 21 NOV 22 NOV 22 NOV 23 NOV 25 NOV 25 NOV 26 NOV 25 NOV 26 NOV 28 NOV 28 NOV 29 NOV 30 DEC 1	TBAR -61.11 -51.16 -61.55 -61.22 -61.88 -62.08 -61.75 -61.38 -60.69 -61.91 -61.90 -61.86 -61.86 -61.58 -61.88 -61.88	UBAR 1 36.667 7 37.586 6 40.86 2 40.23 4 40.667 9 42.07 3 38.77 8 39.87 0 45.43 9 46.99 4 43.61 7 46.33 6 44.21 1 47.423 3 50.226 6 448.70 9 47.99 4 9 47.99 1 47.423 1 47.423 1 47.423 1 47.424 1 47.424	VBA           10         -1.1           14         1.1           3         -1.3           9         .7           2         -1.4           2         -1.2           11         2           12        83           11         -1.3           12        83           14         -1.0           12        33           13        31           13        31           19        00	R 31 - 90 - 90 - 114 - 11	WBAR .208 .124 .336 .093 .087 .111 .115 .262 .214 .165 .196 .307 .293 .084 .033	W (
DAY NOV 15 NOV 16 NOV 17 NOV 19 NOV 20 NOV 21 NOV 22 NOV 22 NOV 24 NOV 25 NOV 24 NOV 25 NOV 26 NOV 27 NOV 28 NOV 28 NOV 28 NOV 28 NOV 28 NOV 20 NOV 2	TU -2241.53 -2298.90 -2515.355 -2663.52 -2663.81 -2663.12 -2663.14 -2605.34 -2667.13 -2667.10 -2710.45 -2933.72 -3096.61 -3010.51 -3010.51 -3010.61 -3160.47	TV 6 69.102 1 -69.386 9 -47.215 8 87.658 6 62.737 1 -10.816 6 51.765 6 82.709 3 77.783 0 -61.472 4 39.809 1 -153.479 6 36.053 2 1.427 5 .572 2 43.871 4 -41.055	TW 12.724 7.563 8.297 21.163 -5.711 6.892 7.739 16.160 13.110 9.985 12.266 12.044 19.021 18.057 5.190 2.064 7.831	UV -41.476 42.635 -56.801 31.033 -58.246 -42.649 -6.751 -33.409 -60.850 -59.465 44.173 -29.771 110.685 -27.639 -17.495 -451 -33.326 32.720	UW -7.66 -4.64 -5.50 -13.99 -13.99 -13.97 -3.66 -4.99 -11.88 -10.05 -7.11 -9.11 -9.11 -9.12 -9.12 -14.55 -14.74 -4.00 -1.55 -6.24	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	DAY NOV 15 NOV 16 NOV 17 NOV 20 NOV 20 NOV 22 NOV 22 NOV 23 NOV 24 NOV 25 NOV 26 NOV 27 NOV 26 NOV 26 NOV 27 NOV 26 NOV 2	TBAR -61.11 -51.16 -61.55 -61.22 -61.88 -62.08 -61.77 -61.75 -61.38 -60.69 -61.91 -61.30 -61.68 -61.86 -61.86 -61.80 -61.90 -61.	UBAF 1 36.667 37.556 6 40.862 2 40.224 4 40.669 2 40.23 3 38.75 8 39.87 9 42.07 3 38.75 8 39.87 9 46.92 4 43.61 7 46.32 6 44.21 1 47.42 3 50.226 6 48.7(7.962 9 47.962 2 50.128 1 50.25 1 50	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	R 31 - 34 - 90 - 71 - 32 114 - 74 - 88 - 139 - 143 - 143 - 143 - 143 - 143 - 1448 - 104 - 1448 - 104 - 105 -	WBAR .208 .124 .135 .346 .093 .087 .111 .125 .262 .214 .198 .198 .198 .307 .293 .084 .033 .124	₩ ₩
DAY NOV 15 NOV 17 NOV 18 NOV 19 NOV 21 NOV 23 NOV 23 NOV 23 NOV 25 NOV 25 NOV 26 NOV 26 NOV 26 NOV 27 NOV 26 NOV 27 NOV 29 NOV 29 NOV 29 NOV 29 NOV 20 DEC 2	TU -2241.53( -2298.90) -2515.35( -2463.52) -2463.52( -2463.81) -2605.84( -2465.84) -2663.17( -2805.34( -2881.08) -2647.13( -2867.01) -2710.45( -2933.72) -3096.61( -3006.51) -3028.37( -3160.47) -3472.51(	TV 6 69.102 1 -69.386 9 35.564 9 -47.215 8 87.658 6 62.737 1 -10.816 6 51.765 6 82.709 3 77.783 0 -61.472 4 39.809 6 36.053 8 21.427 5 .572 2 43.871 6 -190.350 6 -190.350	TW 12.724 7.563 8.297 21.163 -5.711 6.892 7.739 16.160 13.110 9.985 12.266 12.044 19.021 18.057 5.190 2.064 7.831 16.586	UV -41.476 42.635 -56.801 31.033 -58.246 6.751 -33.409 -60.850 -59.465 -44.173 -29.771 110.685 -27.639 -17.495 -33.326 32.720 164.935	UW -7.66 -4.64 -5.55 -3.69 -4.99 -11.88 -0.00 -7.11 -9.11 -8.66 -14.72 -4.09 -14.72 -4.09 -1.55 -6.22 -14.33	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	DAY NOV 15 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21 NOV 23 NOV 23 NOV 24 NOV 25 NOV 26 NOV 26 NOV 26 NOV 27 NOV 28 NOV 20 DEC 1 DEC 2 DEC 3	TBAR -61.11 -51.16 -61.55 -61.22 -61.9 -61.88 -62.08 -61.75 -61.33 -60.69 -61.91 -61.36 -61.68 -61.58 -61.80 -63.13 -62.67 -63.13	UBAF 1 36.66 7 37.55 6 40.88 2 40.23 4 40.66 9 42.07 3 38.7 8 39.88 39.84 9 45.42 9 46.92 4 43.66 4 43.66 9 46.92 4 43.66 6 46.92 1 47.42 3 50.22 6 48.77 9 47.96 6 48.77 9 45.65 1 47.42 1 50.25 6 48.75 9 45.65 8 48.75 8 48.75	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	R 31 - 34 - 90 - 71 - 32 114 - 74 - 139 - 143 - 143 - 143 - 143 - 143 - 143 - 143 - 143 - 144 - 155 - 155 - 552 - 107 -	WBAR .208 .124 .135 .346 .093 .087 .111 .125 .262 .214 .165 .307 .293 .084 .033 .124 .262	₩ ₩
DAY NOV 15 NOV 16 NOV 18 NOV 18 NOV 20 NOV 20 NOV 21 NOV 22 NOV 22 NOV 24 NOV 24 NOV 24 NOV 26 NOV 26 NOV 28 NOV 29 NOV 29 NOV 30 DEC 1 DEC 3	TU -2241.53 -2298.900 -2515.355 -2463.52 -2463.81 -2463.81 -2463.81 -2463.17 -2805.34 -2881.08 -2647.13 -2867.01 -2805.34 -2881.08 -2647.13 -2867.01 -210.45 -2933.72 -3096.611 -3070.42 -3160.47 -3160.47 -3160.47	TV 6 69.102 1 -69.386 9 85.564 9 -47.215 8 87.658 6 62.737 1 -10.816 6 51.765 8 27.79 3 77.783 0 -61.472 4 39.809 1 -153.479 6 36.053 8 21.427 572 2 43.871 4 -41.055 6 -190.350 3 -3.886	TW 12.724 7.563 8.297 21.163 -5.711 5.371 6.892 7.739 16.160 13.110 9.985 12.266 12.044 19.021 18.057 5.190 2.064 7.831 16.586 12.617	UV -41.476 42.635 -56.801 31.033 -88.246 6.751 -33.409 -60.850 -59.465 44.173 -29.771 110.685 -27.639 -17.495 -33.326 32.720 164.935 3.114	UW -7.65 -4.66 -5.50 -13.99 -13.90 -4.33 -4.99 -11.88 -10.81 -7.17 -9.17 -9.17 -8.66 -14.58 -14.76 -14.58 -14.76 -6.22 -1.56 -6.22 -10.17	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 20 NOV 21 NOV 22 NOV 22 NOV 25 NOV 2	TBAR -61.11 -51.16 -61.55 -61.22 -61.88 -62.08 -61.77 -61.75 -61.33 -60.69 -61.91 -61.36 -61.66 -61.58 -61.80 -63.13 -62.97 -63.30 -63.30	UBAF 1 36.66 7 37.55 6 40.88 2 40.62 4 40.66 9 42.07 3 38.7 8 39.87 0 45.42 9 46.92 4 43.61 7 46.3 6 44.21 1 47.42 3 50.28 6 48.7 9 47.99 4.50.18 6 54.85 2 49.66 1 47.42 2 50.18 6 54.85 2 49.66 1 47.42 1 47.42 2 50.18 5 54.85 2 49.65 1 47.42 1 47.42	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	R 31 - 90 - 71 - 32 114 - 74 - 139 - 167 - 113 - 167 - 113 - 164 - 163 - 165 - 166 -	WBAR .208 .124 .135 .346 .093 .087 .111 .125 .262 .214 .165 .198 .198 .196 .293 .084 .033 .124 .262 .204	₩ <b>₩</b>
DAY NOV 15 NOV 16 NOV 18 NOV 18 NOV 20 NOV 21 NOV 22 NOV 24 NOV 25 NOV 25 NOV 25 NOV 25 NOV 25 NOV 28 NOV 20 NOV 20 NOV 20 NOV 20 NOV 2	TU -2241.53( -2298.90) -2515.35( -2463.52) -2463.52( -2463.81) -2605.84( -2465.84) -2663.17( -2805.34( -2881.08) -2647.13( -2867.01) -2710.45( -2933.72) -3096.61( -3006.51) -3028.37( -3160.47) -3472.51(	TV 6 69.102 1 -69.386 9 85.564 9 -47.215 8 7.658 6 62.737 1 -10.816 6 51.765 6 82.709 3 77.783 0 -61.472 4 39.809 6 36.053 1 -153.479 6 36.053 7 .783 0 -61.472 4 39.809 6 36.053 7 .783 0 -61.472 4 39.809 6 36.053 7 .783 0 -61.472 4 39.809 6 36.053 7 .783 0 -61.472 4 39.809 6 36.053 7 .783 0 -61.472 1 -153.479 6 36.053 7 .783 7	TW 12.724 7.563 8.297 21.163 -5.711 6.892 7.739 16.160 13.110 9.985 12.266 12.044 19.021 18.057 5.190 2.064 7.831 16.586	UV -41.476 42.635 -56.801 31.033 -58.246 6.751 -33.409 -60.850 -59.465 -44.173 -29.771 110.685 -27.639 -17.495 -33.326 32.720 164.935	UW -7.66 -4.64 -5.55 -3.69 -4.99 -11.88 -0.00 -7.11 -9.11 -8.66 -14.72 -4.09 -14.72 -4.09 -1.55 -6.22 -14.33	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	DAY NOV 15 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21 NOV 23 NOV 23 NOV 24 NOV 25 NOV 26 NOV 26 NOV 26 NOV 27 NOV 28 NOV 20 DEC 1 DEC 2 DEC 3	TBAR -61.11 -51.16 -61.55 -61.22 -61.9 -61.88 -62.08 -61.75 -61.33 -60.69 -61.91 -61.36 -61.68 -61.58 -61.80 -63.13 -62.67 -63.13	UBAR 1 36.62 7 37.52 6 40.84 2 40.22 4 40.66 9 42.07 3 38.72 8 39.87 9 46.92 4 43.61 9 46.92 4 43.61 9 46.32 6 48.77 9 47.92 2 50.12 6 48.43 9 45.62 9 47.92 9 47.92 9 45.62 9 47.92 9 47.92 9 47.92 9 45.62 9 47.92 9 47.92 9 45.62 9 47.92 9 47.92 9 45.62 9 45.6	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	R 31 - 34 - 90 - 71 - 32 114 - 74 - 139 - 167 - 133 - 167 - 133 - 167 - 133 - 167 - 163 - 152 - 163 - 163 - 165 - 165 - 166 -	WBAR .208 .124 .135 .346 .093 .087 .111 .125 .262 .214 .165 .307 .293 .084 .033 .124 .262	₩ <b>₩</b>
DAY NOV 15 NOV 16 NOV 18 NOV 19 NOV 20 NOV 21 NOV 22 NOV 23 NOV 24 NOV 25 NOV 24 NOV 25 NOV 25 NOV 25 NOV 27 NOV 27 NOV 29 NOV 29 NOV 30 DEC 1 DEC 5 DEC 5 DEC 6	TU -2241.53 -2298.900 -2515.355 -2463.52 -2463.81 -2463.81 -2465.88 -2463.17 -2805.34 -2881.08 -2647.130 -2867.01 -2710.45 -2933.72 -3096.611 -3070.51 -3028.37 -3160.47 -3160.47 -3160.47 -3472.510 -3077.92 -2953.05 -3427.505	TV 6 69.102 1 -69.386 9 85.564 9 -47.215 8 87.658 6 62.737 1 -10.816 6 51.765 6 82.709 3 77.783 0 -61.472 4 39.809 1 -153.479 6 36.053 8 21.427 5 .572 2 43.871 4 -41.055 6 -190.350 3 -3.886 7 48.611 8 17.635 3 -19.765 3 -19.765	TW 12.724 7.563 8.297 21.163 -5.711 5.371 6.892 7.739 16.160 13.110 9.985 12.266 12.044 19.021 18.057 5.190 2.064 7.831 16.586 12.617 7.803 5.811 11.803	UV -41.476 42.635 -56.801 31.033 -88.246 6.751 -33.409 -60.850 -59.465 44.173 -29.771 110.685 -27.639 -17.495 -33.326 32.720 164.935 -3.114 -37.178 -6.039 -16.336	UW -7.63 -4.66 -5.55 -13.90 3.7? -4.33 -4.33 -10.00 -7.11 -9.11 -9.11 -9.11 -9.11 -9.11 -9.11 -9.11 -9.11 -9.11 -9.12 -14.55 -14.74 -4.09 -1.55.96 -5.28 -5.28	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 20 NOV 21 NOV 22 NOV 23 NOV 24 NOV 25 NOV 25 NOV 27 NOV 28 NOV 29 NOV 29 NOV 30 DEC 1 DEC 2 DEC 3 DEC 5 DEC 6 DEC 7	TBAR -61.11 -51.16 -61.52 -61.22 -61.38 -62.08 -61.77 -61.75 -61.33 -60.69 -61.91 -61.36 -61.66 -61.58 -61.80 -63.13 -62.97 -63.30 -61.86 -63.13 -62.13 -62.13 -61.38 -62.13	UBAF 1 36.667 7 37.556 6 40.882 4 40.629 4 40.629 9 42.07 3 38.75 8 39.87 0 45.42 9 44.92 4 43.61 7 46.33 6 44.21 1 47.44 3 50.22 6 48.7(7) 9 47.99 47.55 9 47.55 9 45.55.83 0 55.83 0 55.85 0 55.85 0 55.85 0 55.85 0 55.85 0 55.85 0 55.85 0 55.85 0 55.85 0 55.85	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	R 31 - 34 - 900 - 71 - 32 - 114 - 139 - 143 - 143 - 143 - 143 - 143 - 143 - 143 - 143 - 144	WBAR .208 .124 .135 .346 .093 .087 .111 .125 .262 .214 .165 .198 .196 .293 .084 .198 .293 .033 .124 .262 .204 .204 .190 .190	₩ W
DAY NOV 15 NOV 17 NOV 17 NOV 18 NOV 19 NOV 21 NOV 22 NOV 23 NOV 23 NOV 23 NOV 24 NOV 24 NOV 26 NOV 26 NOV 26 NOV 26 NOV 25 DEC 1 DEC 2 DEC 5 DEC 6 DEC 7 DEC 7 DEC 7	TU -2241.53 -2298.900 -2515.35 -2663.52 -2663.814 -2665.84 -2663.17 -2805.34 -2667.01 -2805.34 -2667.01 -2647.133 -2647.133 -2647.133 -2647.133 -2647.133 -2647.133 -2647.133 -2647.133 -2647.133 -3076.92 -3472.5100 -3472.5100 -3472.5100 -3472.5100 -3472.5100 -3472.51000 -3472.	TV 6 69.102 1 -69.386 9 35.564 9 -47.215 8 87.658 6 62.737 1 -10.816 6 51.765 6 82.709 3 77.783 0 -61.472 4 39.809 6 36.053 8 21.427 1 -153.479 6 36.053 8 21.427 4 -39.809 6 36.053 8 21.427 1 -153.479 6 36.053 8 21.427 1 -153.479 6 36.053 8 21.427 1 -153.479 6 36.053 8 21.427 1 -155 6 -190.350 3 -3.886 7 48.611 8 17.655 8 28.372	TW 12.724 7.563 8.297 21.163 -5.711 5.371 6.892 7.739 16.160 13.110 9.985 12.266 12.064 19.021 18.057 5.190 2.064 7.831 16.586 12.617 7.803 5.811 11.803 9.836	UV -41.476 42.635 -56.801 31.033 -58.246 6.751 -33.409 -60.850 -59.465 44.173 -29.771 100.685 -27.639 -17.495 -33.326 32.720 164.935 3.114 -37.178 -16.039 16.336	UW -7.63 -4.64 -5.55 -13.99 -13.99 -13.99 -11.88 -10.00 -7.11 -9.11 -9.11 -9.11 -8.66 -14.58 -14.58 -14.72 -4.00 -1.55 -6.22 -14.33 -0.97 -5.28 -9.75 -8.88	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	DAY NOV 15 NOV 17 NOV 18 NOV 10 NOV 20 NOV 22 NOV 22 NOV 22 NOV 22 NOV 22 NOV 22 NOV 22 NOV 26 NOV 27 NOV 26 NOV 27 NOV 28 NOV 20 DEC 1 DEC 2 DEC 4 DEC 5 DEC 6 DEC 7 DEC 8	TBAR -61.11 -51.16 -61.55 -61.22 -61.98 -62.08 -61.77 -61.75 -61.33 -60.69 -61.91 -61.30 -61.63 -61.63 -63.13 -62.97 -63.30 -61.38 -62.97 -63.30 -61.38 -62.97 -62.13 -61.38 -62.00 -60.88	UBAF 1 36.66 7 37.55 6 40.84 2 40.22 4 40.66 9 42.07 3 38.7 8 39.88 39.88 39.88 39.84 4 3.66 9 44.27 1 47.42 3 50.26 6 44.27 1 47.42 3 50.26 6 48.77 9 4,96 9 4,97 9 4,96 9 4,96 9 4,96 9 4,96 9 4,96 9 4,79 9 4,79 9 5,83 9 5,83 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	R 31 - 32 - 32 - 32 - 32 - 33 - 34 - 35 - 36 - 36 - 36 - 37 - 36 - 37 - 38 - 38 - 38 - 39 - 36 - 39 - 30 - 39 - 30	WBAR .208 .124 .335 .346 .093 .087 .111 .125 .262 .214 .165 .196 .307 .293 .124 .084 .033 .124 .262 .204 .262 .204 .126 .205 .126	₩ <b>₩</b>
DAY NOV 15 NOV 16 NOV 18 NOV 19 NOV 21 NOV 22 NOV 22 NOV 22 NOV 24 NOV 24 NOV 26 NOV 26 NOV 26 NOV 26 NOV 27 NOV 28 NOV 29 NOV 29 DEC 1 DEC 2 DEC 5 DEC 7 DEC 6 DEC 7 DEC 8	TU -2241.534 -2298.900 -2515.355 -2463.524 -2463.524 -2463.814 -2405.88 -2463.171 -2805.344 -2881.08 -2647.131 -2867.014 -2710.45 -2933.721 -3096.614 -3010.517 -3072.511 -3028.377 -3472.511 -3077.922 -2953.055 -3427.501 -3177.212 -339.861 -3505.033	TV 6 69.102 1 -69.386 9 85.564 9 -47.215 8 87.658 6 62.737 1 -10.816 6 82.709 3 77.783 0 -61.432 4 39.809 1 -153.479 6 36.053 8 21.427 5 .572 2 43.871 4 -41.055 6 -190.350 3 -3.886 7 48.611 8 17.633 3 -19.763 2 36.970	TW 12.724 7.563 8.297 21.163 -5.711 5.371 6.892 7.739 16.160 13.110 9.985 12.266 12.064 19.021 18.057 5.190 2.064 7.831 16.586 12.617 7.803 5.811 11.803 9.836 8.618	UV -41.476 42.635 -56.801 31.033 -88.246 6.751 -33.409 -60.850 -59.465 44.173 -29.771 110.685 -27.639 -17.495 -3.326 32.720 164.935 3.114 -37.178 -16.039 16.336 -25.559	UW -7.63 -4.63 -5.55 -13.99 -4.33 -4.33 -4.34 -11.84 -10.00 -7.11 -9.11 -9.11 -9.12 -14.55 -14.77 -4.00 -1.56 -6.22 -14.33 -10.11 -5.99 -5.22 -9.77 -8.86	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	DAY NOV 15 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21 NOV 23 NOV 24 NOV 23 NOV 24 NOV 26 NOV 26 NOV 27 NOV 28 NOV 29 NOV 30 DEC 1 DEC 2 DEC 4 DEC 5 DEC 6 DEC 7 DEC 8 DEC 8	TBAR -61.11 -51.16 -61.55 -61.22 -61.19 -61.88 -62.08 -61.77 -61.75 -61.33 -60.69 -61.91 -61.30 -61.68 -63.13 -62.97 -63.30 -61.68 -63.13 -62.63 -63.	UBAF 1 36.667 37.556 4 40.862 4 40.669 9 42.073 3 38.75 8 39.87 0 45.42 9 46.92 4 43.667 7 46.30 6 44.21 1 47.42 3 50.22 6 48.70 9 47.52 9 47.52 9 45.82 2 49.667 9 47.52 9 55.83 2 49.56 5 54.85 7 57.55 1 20 9 55.83 1 20 9 55.83 1 20 9 55.83 1 20 9 55.83 1 20 1	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	R 31 - 32 - 71 - 32 - 74 - 88 - 167 - 163 - 164 - 164 - 165 - 166 -	WBAR .208 .124 .135 .346 .093 .087 .111 .125 .262 .214 .165 .198 .196 .307 .293 .084 .033 .124 .262 .204 .262 .204 .126 .095 .190 .162 .141	₩ W
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DAY NOV 15 NOV 16 NOV 18 NOV 19 NOV 21 NOV 22 NOV 22 NOV 22 NOV 24 NOV 24 NOV 26 NOV 26 NOV 26 NOV 26 NOV 27 NOV 28 NOV 29 NOV 29 DEC 1 DEC 2 DEC 5 DEC 7 DEC 6 DEC 7 DEC 8	TU -2241.53 -2298.900 -2515.35 -2463.52 -2463.52 -2463.61 -2463.81 -2465.84 -2463.17 -2805.34 -2867.01 -2710.45 -2867.01 -2710.45 -2933.72 -3096.61 -3077.92 -2953.05 -3427.50 -3428.50 -3428.50 -3505.03 -3408.50 -3408.50	TV 6 69.102 1 -69.386 9 35.564 9 -47.215 8 87.658 6 62.737 1 -10.816 6 51.765 6 82.709 3 77.783 0 -61.472 4 39.809 1 -153.479 6 36.053 8 21.427 5 .572 2 43.871 4 -41.055 6 -190.350 3 -3.866 7.533 8 21.427 5 .572 2 43.871 4 .41.055 6 .190.350 3 -3.866 7.558 2 8.372 2 36.970 0 4.886 1 -75.678	TW 12.724 7.563 8.297 21.163 -5.711 5.371 6.892 7.739 16.160 13.110 9.985 12.266 12.044 19.021 18.057 5.190 2.064 7.831 16.586 12.617 7.803 5.811 11.835 9.836 8.618 8.514 13.417	UV -41.476 42.635 -56.801 -31.033 -58.246 6.751 -33.409 -60.850 -59.465 -44.173 -29.771 110.685 -27.639 -17.495 -33.326 32.720 164.935 3.114 -37.178 -16.039 16.336 -25.559 -34.920 -4.223 58.456	UW -7.63 -4.64 -5.55 -13.99 -13.99 -4.99 -11.84 -10.00 -7.11 -9.11 -9.11 -9.11 -9.11 -9.11 -8.66 -14.58 -14.58 -14.58 -14.58 -14.58 -14.57 -4.00 -1.55 -6.22 -14.33 -5.28 -5.58 -5.58 -5.58 -5.58 -5.58 -5.58 -5.58 -5.58 -5.58 -5.58 -5.58 -5.58 -5.58 -5.5	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	DAY NOV 15 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21 NOV 23 NOV 22 NOV 23 NOV 24 NOV 25 NOV 26 NOV 26 NOV 26 NOV 26 DEC 1 DEC 2 DEC 4 DEC 5 DEC 6 DEC 7 DEC 6 DEC 7 DEC 8 DEC 9 DEC 10 DEC 11	TBAR -61.11 -51.16 -61.55 -61.22 -61.9 -61.88 -62.08 -61.75 -61.33 -60.69 -61.91 -61.36 -61.66 -61.58 -61.66 -63.13 -62.97 -62.137 -62.137 -62.137 -62.137 -62.00 -61.88 -60.91 -61.80 -61.80	UBAF 1 36.667 37.55 64.40.884 240.23 44.40.669 94.2.07 33.38.77 33.38.77 34.38 39.46.92 44.31 50.22 64.92 44.31 50.22 64.92 44.32 147.44 35.02 64.82 74.96 64.82 75.53 94.75 55.42 34.71 55.42 34.71 55.42 34.71 55.42 34.71 55.42 34.71 55.42 34.71 55.42 34.71 55.42 34.71 34.71 34.71 34.71 35.82 34.71 35.82 34.71 35.82 34.71 35.82 34.71 35.82 35.82 37.55 35.42 34.71 34.75	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	R 31 - 32 - 71 - 32 - 114 - 32 - 114 - 139 - 167 - 139 - 167 - 139 - 168 - 139 - 168 - 139 - 167 - 139 - 167 - 139 - 167 - 167 - 167 - 167 - 168 - 167 - 168 - 168 - 169 - 166 - 169 - 166 - 169 - 166 - 169 - 166 - 166 - 179 - 170	WBAR .208 .124 .135 .346 .093 .111 .125 .262 .214 .165 .198 .196 .307 .293 .124 .084 .033 .124 .262 .204 .126 .262 .204 .126 .126 .126 .126 .126 .126 .124 .126 .126 .126 .126 .126 .125 .125 .125 .125 .125 .125 .125 .125	₩ <b>₩</b>
DAY NOV 15 NOV 17 NOV 17 NOV 18 NOV 20 NOV 21 NOV 23 NOV 23 NOV 23 NOV 23 NOV 24 NOV 24 NOV 26 NOV 26 NOV 26 NOV 26 NOV 27 DEC 1 DEC 3 DEC 6 DEC 6 DEC 7 DEC 6 DEC 7 DEC 12 DEC 12 DEC 12	TU -2241.53 -2298.900 -2515.35 -2603.814 -2405.88 -2663.17 -2805.344 -2881.08 -2647.133 -2867.01 -2710.45 -2933.72 -3006.61 -3070.92 -3472.51 -3472	TV 6 69.102 1 -69.386 9 85.564 9 -47.215 8 87.658 6 62.737 1 -10.816 6 51.765 8 27.79 3 77.783 0 -61.472 4 39.809 1 -153.479 6 36.053 8 21.427 5 .572 4 43.871 4 -41.055 3 -3.886 7 48.611 8 17.635 3 -19.765 8 28.372 2 36.970 0 4.866 1 -75.678 -84.205 -84.205 -84.205 -84.205 -84.205 -84.205 -84.205 -84.205 -84.205 -84.205 -84.205 -94.	TW 12.724 7.563 8.297 21.163 -5.711 5.371 6.892 7.739 16.160 13.110 9.985 12.266 12.044 19.021 18.057 5.190 2.064 7.831 16.586 12.617 7.803 5.811 11.835 9.836 8.618 8.514 13.417	UV -41.476 42.635 -56.801 31.033 -58.246 -42.649 6.751 -33.409 -60.850 -59.465 -44.173 -29.771 120.685 -27.639 -17.495 -451 -33.326 32.720 164.935 3.114 -37.178 -16.039 16.336 -25.559 -4.223	UW -7.6; -4.64 -5.5; -13.99 -4.39 -11.8; -10.0; -7.1; -9.1; -8.6; -14.5; -14.5; -6.22 -14.3; -14.3; -6.22 -14.3; -5.99 -5.22 -9.7; -8.88	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	DAY NOV 15 NOV 17 NOV 18 NOV 19 NOV 20 NOV 22 NOV 23 NOV 22 NOV 22 NOV 22 NOV 22 NOV 22 NOV 22 NOV 22 NOV 22 DEC 1 DEC 2 DEC 3 DEC 4 DEC 5 DEC 6 DEC 7 DEC 8 DEC 9 DEC 19	TBAR -61.11 -51.16 -61.55 -61.22 -61.88 -62.08 -61.77 -61.75 -61.38 -60.69 -61.91 -61.30 -61.63 -61.66 -63.13 -62.97 -63.30 -61.38 -62.97 -62.13 -61.38 -62.90 -62.13 -62.97 -62.13 -61.86 -61.86 -61.86 -62.90 -62.13 -62.97 -62.13 -61.86 -62.90 -62.13 -62.90 -62.13 -62.90 -62.13 -62.90 -62.13 -62.90 -62.13 -62.90 -62.13 -62.90 -62.13 -62.90 -62.13 -62.90 -62.13 -62.90 -62.13 -62.90 -62.13 -62.90 -62.13 -62.90 -62.13 -62.90 -62.13 -62.90 -62.13 -62.90 -62.13 -62.90 -62.13 -63.13 -64.14 -63.13 -63.	UBAF 1 36.667 37.556 4 40.869 4 40.669 9 42.073 3 38.75 8 39.87 0 45.42 9 46.92 4 43.667 7 46.32 6 44.21 1 47.42 3 50.226 6 44.77 9 47.52 9 47.52 9 47.52 9 47.52 9 55.33 0 51.24 9 55.33 47.126 6 49.07 1 47.126 6 49.07 1 47.126 1 47.126	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	R 314 - 324 - 32 - 711 - 32 - 744 - 88 - 339 - 667 - 613 - 643 - 552 - 663 - 552 - 663 - 665 - 619 - 666 - 700 - 719 - 744 - 74	WBAR .208 .124 .335 .346 .093 .087 .111 .255 .262 .214 .165 .198 .307 .293 .084 .033 .124 .293 .084 .033 .124 .262 .204 .124 .264 .126 .126 .126 .126 .138	₩ <b>₩</b>
DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 21 NOV 22 NOV 22 NOV 22 NOV 24 NOV 24 NOV 24 NOV 26 NOV 26 NOV 26 NOV 26 NOV 27 NOV 26 NOV 20 SC 1 DEC 2 DEC 3 DEC 5 DEC 5 DEC 7 DEC 6 DEC 10 DEC 11 DEC 12	TU -2241.53 -2298.900 -2515.355 -2463.52 -2463.81 -2463.81 -2463.81 -2463.17 -2805.34 -2881.08 -2647.130 -2867.01 -2710.45 -2933.72 -3096.611 -3076.92 -3096.611 -3077.92 -3953.05 -3427.501 -3477.50 -3477.50 -3477.51 -339.86 -3505.03 -3301.810 -2882.09 -2971.65	TV 6 69.102 1 -69.386 9 85.564 9 -47.215 8 87.658 6 62.737 1 -10.816 6 82.709 3 77.783 0 -61.422 4 39.809 1 -153.479 6 36.053 8 21.427 5 572 2 43.871 4 -41.055 5 6 -190.350 3 -3.886 7 48.611 8 17.635 3 -3.886 7 48.61 1 -7.55.678 1 -75.678 1 -84.205 6 6.833 1 4.396	TW 12.724 7.563 8.297 21.163 -5.711 5.371 6.892 7.739 16.160 13.110 9.985 12.266 12.044 19.021 18.057 5.190 2.064 7.831 16.586 12.617 7.803 5.811 11.803 5.811 11.803 5.811 11.803 5.811 11.803 5.811 11.803 5.811 11.803 5.811 11.803 5.811 11.803 5.811 12.617 7.803 5.811 11.803 5.811 13.817 13.	UV -41.476 42.635 -56.801 31.033 -88.246 6.751 -33.409 -60.850 -59.465 -27.639 -17.495 -27.639 -17.495 -33.326 32.720 164.935 3.114 -37.178 -16.039 16.336 -25.559 -24.223 58.456 68.238	UW -7.63 -4.64 -5.55 -13.90 3.79 -4.33 -4.33 -4.39 -11.84 -10.00 -7.11 -9.11 -8.64 -14.55 -14.75 -14.75 -14.55 -14.73 -1.59 -1.59 -5.22 -9.77 -8.86 -8.24 -7.33 -7.34 -7	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	DAY NOV 15 NOV 16 NOV 17 NOV 18 NOV 20 NOV 21 NOV 22 NOV 24 NOV 22 NOV 26 NOV 26 NOV 26 NOV 27 NOV 28 NOV 29 NOV 30 DEC 1 DEC 5 DEC 6 DEC 7 DEC 8 DEC 10 DEC 11 DEC 11 DEC 11	TBAR -61.11 -51.16 -61.55 -61.22 -61.19 -61.88 -62.08 -61.77 -61.75 -61.33 -60.66 -61.91 -61.30 -61.66 -61.58 -61.80 -62.13 -62.62 -62.13 -62.63 -62.63 -61.68 -62.13 -61.83 -62.63 -61.80 -61.	UBAF 1 36.667 37.556 4 40.869 2 40.23 4 40.669 9 42.07 3 38.72 8 39.87 0 45.42 9 44.21 1 47.42 3 50.226 6 48.77 9 47.52 9 47.52 9 55.83 2 49.66 9 55.83 2 49.55 3 3.42 1 46.67 9 55.83 3 47.16 6 49.07 0 55.85 3 47.16 6 49.07 0 55.85 3 47.16 1 46.67 1 57.55 3 47.16 1 46.67 1 57.55 3 47.65 1 46.67 1 57.55 3 47.65 1 57.55 3 47.16 1 46.67 9 55.83 1 57.55 3 47.65 1 46.67 9 55.83 1 46.67 1 57.55 3 53.42 3 47.65 1 57.55 3 57.45 3 57.45 57.55 3 57.45 57.55	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	R 31 - 32 - 71 - 32 - 71 - 32 - 114 - 132 - 114 - 148 - 167 - 114 - 148 - 167 - 114 - 167 - 167 - 114 - 167 - 168 - 167 - 179 - 179 - 179 - 199 - 190 - 190 - 190 - 190 - 190 - 190 - 190 - 190 - 190 - 100 -	WBAR .208 .124 .135 .346 .093 .087 .111 .125 .262 .214 .165 .198 .196 .198 .198 .203 .033 .124 .262 .204 .262 .204 .126 .095 .190 .161 .138 .200 .161 .165 .190 .161 .165 .190 .165 .190 .165 .190 .165 .190 .165 .190 .165 .190 .115 .198 .105 .198 .105 .198 .198 .198 .198 .198 .198 .198 .198	₩ <b>₩</b>

# TABLE I. Continued,

-33-

	100 MB. LAI	ITUDE 50	COVARIANCE				Line 627/2		LATITUDE			LATION COE	
YAC	TU	TV	Tw	UV	UW	VW	DAY	TU	TV	TW	UV	UW	1
WOV 15	48.562	27.821		124.440	-1.812	986	NOV 15	.482	.325	006	.354	177	
OV 16	87.742	30.549		171.921	~2.159	718	NOV 16	.679	.388	195	.451	164	
OV 17	57.593	25.725	.422	90.296	1.033	-1.715	NOV 17	. 494	.276	.189	.211	.101	
KOV 18	52.723	18.983	.003	36.547	-3.120	-3.084	NOV 18	.471	.224	.002	.101	388	
OV 19	48.467	33.395	.013	-20.722	.558	-1.140	NOV 19	.604	.439	.006	083	.074	
OV 20	14.999	14.319	448	43.108	-1.070	-1.305	NOV 20	.240	.289	303	.251	209	
OV 21	10.909	29.419	538	-9.740	789	-1.841	NOV 21	.153	.446	241	059	141	
OV 22	17.871	14.808	.126	-17.216	-1.055	-1.506	NOV 22	.222	.207	.063	087	192	
NOV 23	29.296	21.132	209	12.310	-2.064	-1.423	NOV 23	.286	.277	077	.049	227	
							NOV 24	.256	.519	186	.299	371	
OV 24	22.768	38.134	562	58.795	-2.995	-4.188 -1.713	NOV 25	.072	.166	.152	046	497	
NOV 25	7.201	13.841		-11.431	-3.756		NOV 26	.255		.003	.039		
NOV 26	27.135	27.141		13.406	-4.178	043			.259			378	
NOV 27	22.250	31.776		107.503	-4.148	-2.797	NOV 27	.178	.313	.008	.297	368	
OV 28	8.752	30.320	952	32.612	431	993	NOV 28	.077	.293	290	.108	045	
NOV 29	-9.092	60.148	050	107.420	-4.055	-4.136	NOV 29	079	.511	012	.298	308	
OV 30	-21.730	45.563	383	18.628	.161	-2.446	NOV 30	261	.444	118	.078	.021	
DEC 1	-3.672	30.762	101	106.358	-1.463	-5.299	DEC 1	041	.298	050	.277	196	1
DEC 2	-9.586	13.392	.231	1.429	.237	-8.523	DEC 2	131	.140	.097	.004	.025	
	-10.982	15.626	.231	59.255	846	-3.010	DEC 3	139	.208	.141	.157	103	
DEC 3							DEC 4	279	.228	.268	029	226	
DEC 4	-31.754	19.466		-11.445	-2.584	1.104	DEC 4 DEC 5	340	.258	.268	.019		
DEC 5	-25.906	19.440	. 502	10.485	083	819						012	
DEC 6	-68.947	36.789		-71.994	-3.681	-2.599	DEC 6	492	.344	105	144	222	
DEC·7	-75.785	29.751	093	-90.171	-6.327	-4.990	DEC 7	629	.285	021	220	356	
DEC 8	-44.115	53.153	.093	-31.992	070	-2.413	DEC 8	577	.478	.042	098	011	
DEC 9	-30.382	47.134		-29.536	-2.480	.618	DEC 9	441	.492	.012	111	371	
DEC 10	-51.548	33.152		-46.322	.105	-1.584	<b>DEC 10</b>	705	.355	139	139	.018	
EC 11	-19.426	11.883		-11.276	.400	-3.099	DEC 11	411	.112	015	047	.092	
	-32.453			7.217	.651	1.709	DEC 12	614	.226	032	.039	.122	
DEC 12		17.109	071		.031		DEC 13	667	.356	253	235	328	
DEC 13	-46.366	22.804		-62.847	-2.489	.196	DEC 13 DEC 14	360	.548	.088			
EC 14	-23.284	36.655		-73.093	-3.287	-1.082	DEC 14 DEC 15	278	.275	269	227 705	442 294	
EC 15	-58.506 100 MB. LAT	88.608		155.536	-1.465	2.471		100 MB. 1				U, V, AND	
EVEL	100 MLB. LAI	TIONE 20 1	RODUCI OF	(U, V, W,	L) DAK			100 110. 1	ALL LICOPP	20 1140	NO OF I	, u, v, Altu	
	_						۳۵۳	TD			PAD	LIDAD	
AY	TU	TV	TW	UV	UW	W	DAY	TBA			BAR	WBAR	
IOV 15	-1619.81	1 25.830	10.169	-12.65	-4.982	2.079	NOV 15	- 57.50	28.1	.71	449	177	
IOV 15 IOV 16	-1619.81	1 25.830 8 -5.298	10.169 10.083	-12.65	5 -4.982 9 -5.650	2.079 0016	NOV 15 NOV 16	- 57.50	0 28.1 4 32.3	71 26 .	449 092	177 175	
IOV 15 IOV 16 IOV 17	-1619.81 -1865.03 -1774.05	1 25.830 8 -5.298 6 43.823	10.169 10.083 8.857	-12.65 2.96 -23.58	5 -4.982 9 -5.650 2 -4.766	2.079 0.016 5.118	NOV 15 NOV 16 NOV 17	- 57 . 50 - 57 . 69 - 57 . 41	0 28.1 4 32.3 7 30.8	.71 126 . 198	449 092 763	177 175 154	
IOV 15 IOV 16 IOV 17 IOV 18	-1619.81 -1865.03 -1774.05 -1768.33	1 <b>25.830</b> 8 -5.298 6 43.823 3 -98.141	10.169 10.083 8.857 9.986	-12.65 2.969 -23.58 54.526	5 -4.982 9 -5.650 2 -4.766 5 -5.548	2 .079 0016 5 .118 8308	NOV 15 NOV 16 NOV 17 NOV 18	- 57 . 50 - 57 . 69 - 57 . 41 - 56 . 41	0 28.1 4 32.3 7 30.8 7 31.3	.71 326 . 398 344 1.	449 092 763 740	177 175 154 177	
IOV 15 IOV 16 IOV 17 IOV 18 IOV 19	-1619.81 -1865.03 -1774.05 -1768.33 -1691.53	1 25.830 8 -5.298 6 43.823 3 -98.141 0 26.932	10.169 10.083 8.857 9.986 4.956	-12.65 2.969 -23.58 54.526 -14.746	5 -4.982 9 -5.650 2 -4.766 5 -5.548 5 -2.714	2 .079 0016 5 .118 3308 4 .043	NOV 15 NOV 16 NOV 17 NOV 18 NOV 19	- 57 . 50 - 57 . 69 - 57 . 41 - 56 . 41 - 55 . 58	0 28.1 4 32.3 7 30.8 7 31.3 3 30.4	.71 .26 . .398 .44 1. .32	449 092 763 740 485	177 175 154 177 089	
IOV 15 IOV 16 IOV 17 IOV 18 IOV 19 IOV 20	-1619.81 -1865.03 -1774.05 -1768.33 -1691.53 -1553.31	25.830           8         -5.298           6         43.823           3         -98.141           0         26.932           7         4.253	10.169 10.083 8.857 9.986 4.956 9.993	-12.65 2.969 -23.58 54.526 -14.746 -2.11	5 -4.982 9 -5.650 2 -4.766 5 -5.548 5 -2.714 1 -4.960	2 .079 0016 5 .118 3308 4 .043 0 .014	NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20	- 57 . 50 - 57 . 69 - 57 . 41 - 56 . 41 - 55 . 58 - 55 . 94	0         28.1           14         32.3           7         30.8           7         31.3           3         30.4           4         27.7	71            326         .           398            344         1.           32            65	449 092 763 740 485 076	177 175 154 177 089 179	
IOV 15 IOV 16 IOV 17 IOV 18 IOV 19 IOV 20 IOV 21	-1619.81 -1865.03 -1774.05 -1768.33 -1691.53	25.830           8         -5.298           6         43.823           3         -98.141           0         26.932           7         4.253	10.169 10.083 8.857 9.986 4.956	-12.65 2.969 -23.58 54.526 -14.746	5 -4.982 9 -5.650 2 -4.766 5 -5.548 5 -2.714 1 -4.960	2 .079 0016 5 .118 3308 4 .043 0 .014	NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21	- 57 . 50 - 57 . 69 - 57 . 41 - 56 . 41 - 55 . 58 - 55 . 94 - 56 . 22	0         28.1           14         32.3           7         30.8           7         31.3           13         30.4           4         27.7           2         28.6	71            326         .           398            344         1.           32            65	449 092 763 740 485 076	177 175 154 177 089	
IOV 15 IOV 16 IOV 17 IOV 18 IOV 19 IOV 20	-1619.81 -1865.03 -1774.05 -1768.33 -1691.53 -1553.31 -1610.36	25.830           8         -5.298           6         43.823           8         -98.141           0         26.932           7         4.253           7         6.273	10.169 10.083 8.857 9.986 4.956 9.993 10.193	-12.65 2.96 -23.58 54.526 -14.746 -2.111 -3.196	5 -4.982 9 -5.650 2 -4.766 5 -5.548 5 -2.714 1 -4.960 5 -5.193	2 .079 0016 5 .118 3308 4 .043 0 .014 3 .020	NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20	- 57 . 50 - 57 . 69 - 57 . 41 - 56 . 41 - 55 . 58 - 55 . 94	0         28.1           14         32.3           7         30.8           7         31.3           13         30.4           4         27.7           2         28.6	71          326       .         398          344       1.         32          65          43	449 092 763 740 485 076 112	177 175 154 177 089 179 181	
IOV 15 IOV 16 IOV 17 IOV 18 IOV 19 IOV 20 IOV 21	-1619.81 -1865.03 -1774.05 -1768.33 -1691.53 -1553.21 -1610.36 -1722.16	25.830           8         -5.298           6         43.823           8         -98.141           0         26.932           7         4.253           7         6.273           2         -10.112	10.169 10.083 8.857 9.986 4.956 9.993 10.193 10.333	-12.65 2.966 -23.58 54.526 -14.746 -2.111 -3.196 5.450	5 -4.982 9 -5.650 2 -4.766 5 -5.548 5 -2.714 1 -4.960 5 -5.193 0 -5.569	2 .079 0016 5 .118 3308 4 .043 0 .014 3 .020 9033	NOV 15 NOV 16 NOV 17 NOV 18 NOV 19 NOV 20 NOV 21	- 57 . 50 - 57 . 69 - 57 . 41 - 56 . 41 - 55 . 58 - 55 . 94 - 56 . 52 - 56 . 52	00       28.1         14       32.3         7       30.8         7       31.3         13       30.4         14       27.7         12       28.6         8       30.4	71            326         .           398            344         1.           32            65            443            666         .	449 092 763 740 485 076 112 179	177 175 154 177 089 179 181 183	
IOV       15         IOV       16         IOV       17         IOV       18         IOV       19         IOV       20         IOV       21         IOV       22         IOV       23	-1619.81 -1865.03 -1774.05 -1768.33 -1691.53 -1553.31 -1610.36 -1722.16 -1899.59	1         25.830           8         -5.298           6         43.823           8         -98.141           0         26.932           7         4.253           7         6.273           2         -10.112           7         -42.571	10.169 10.083 8.857 9.986 4.956 9.993 10.193 10.333 12.510	-12.65 2.966 -23.58 54.526 -14.746 -2.111 -3.196 5.450 26.019	5 -4.982 9 -5.650 2 -4.766 5 -5.548 5 -2.714 1 -4.960 5 -5.193 0 -5.569 9 -7.646	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	NOV         15           NOV         16           NOV         17           NOV         18           NOV         19           NOV         20           NOV         21           NOV         23	- 57 . 50 - 57 . 69 - 57 . 41 - 56 . 41 - 55 . 58 - 55 . 94 - 56 . 52 - 56 . 52 - 55 . 75	00       28.1         14       32.3         7       30.8         7       31.3         33       30.4         44       27.7         2       28.6         8       30.4         40       34.0	71            226         .           398            444         1.           432            65            443            666         .           773         .	449 092 763 740 485 076 112 179 764	177 175 154 177 089 179 181 183 224	
IOV       15         IOV       16         IOV       17         IOV       17         IOV       18         IOV       19         IOV       20         IOV       21         IOV       22         IOV       23         IOV       24	-1619.81 -1865.03 -1774.05 -1768.33 -1691.53 -1553.31 -1610.36 -1722.16 -1899.59 -1960.35	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	10.169 10.083 8.857 9.986 4.956 9.993 10.193 10.333 12.510 12.826	-12.65 2.969 -23.58 54.526 -14.746 -2.111 -3.196 5.450 26.019 -3.028	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	NOV         15           NOV         16           NOV         17           NOV         18           NOV         19           NOV         20           NOV         21           NOV         22           NOV         23           NOV         24	- 57 . 50 - 57 . 69 - 57 . 41 - 56 . 41 - 55 . 54 - 55 . 52 - 56 . 52 - 56 . 52 - 56 . 55 - 56 . 55	0         28.1           14         32.3           7         30.8           7         31.3           13         30.4           4         27.7           2         28.6           8         30.4           0         34.0           6         34.6	71            326         .           398            344         1.           32            65            443            466         .           773         .           662	449 092 763 740 485 076 112 179 764 087	177 175 154 177 089 179 181 183 224 227	
IOV       15         IOV       16         IOV       17         IOV       18         IOV       19         IOV       20         IOV       21         IOV       22         IOV       23         IOV       24         IOV       25	-1619.81 -1865.03 -1774.03 -1776.33 -1691.53 -1553.31 -1610.36 -1722.16 -1899.59 -1960.35 -1828.05	1         25.830           8         -5.298           6         43.823           8         -98.141           0         26.932           7         4.253           7         6.273           2         -10.112           7         -42.571           1         4.940           8         -97.095	10.169 10.083 8.857 9.986 4.956 9.993 10.193 10.333 12.510 12.826 15.373	-12.65 2.969 -23.58 54.526 -14.746 -2.111 -3.196 5.450 26.019 -3.028 55.547	5 -4.982 9 -5.650 2 -4.766 5 -5.548 5 -2.714 1 -4.960 5 -5.193 0 -5.569 -7.646 8 -7.861 7 -8.795	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	NOV         15           NOV         16           NOV         17           NOV         18           NOV         20           NOV         21           NOV         22           NOV         23           NOV         24           NOV         25	- 57.50 - 57.69 - 57.41 - 56.41 - 55.58 - 55.92 - 56.52 - 56.52 - 56.55 - 56.55 - 56.55	00       28.1         14       32.3         7       30.8         7       31.3         13       30.4         4       27.7         2       28.6         8       30.4         00       34.0         6       34.6         8       32.3	71            326         .           398            444         1.           332            65            443            65            66         .           666            62            399         1.	449 092 763 740 485 076 112 179 764 087 718	177 175 154 154 177 089 179 181 183 224 227 272	
IOV       15         IOV       16         IOV       17         IOV       18         IOV       19         IOV       20         IOV       21         IOV       22         IOV       23         IOV       24         IOV       25         IOV       26	-1619.81 -1865.03 -1774.05 -1768.33 -1691.53 -1650.31 -1610.36 -1722.16 -1899.59 -1960.35 -1828.05 -1861.71	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	10.169 10.083 8.857 9.986 4.956 9.993 10.193 10.333 12.510 12.826 15.373 16.978	-12.65 2.969 -23.58 54.526 -14.744 -2.111 -3.196 5.45 26.019 -3.028 55.547 20.889	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	NOV         15           NOV         16           NOV         17           NOV         18           NOV         20           NOV         21           NOV         22           NOV         23           NOV         25           NOV         26	- 57. 50 - 57. 44 - 56. 44 - 55. 58 - 55. 99 - 56. 22 - 56. 52 - 56. 36	0         28.1           14         32.3           7         30.8           7         31.3           3         30.4           4         27.7           2         28.6           8         30.4           0         34.0           6         34.0           8         32.3           1         33.0	771            326         .           398            444         1.           332            655            443            656         .           773            652            399         1.           392         .	449 092 763 740 485 076 112 179 764 087 718 632	177 175 154 154 177 089 179 181 183 224 227 272 301	
IOV       15         IOV       16         IOV       17         IOV       18         IOV       19         IOV       20         IOV       21         IOV       23         IOV       24         IOV       25         IOV       26         IOV       27	-1619.81 -1865.03 -1774.05 -1768.33 -1691.33 -1553.31 -1610.36 -1722.16 -1899.59 -1960.35 -1828.05 -1828.05 -1861.71 -1655.95	1	10.169 10.083 8.857 9.986 4.956 9.993 10.193 10.333 12.510 12.826 15.373 16.978 12.655	-12.65 2.96 -23.58 54.52 -14.74 -2.11 -3.19 5.45 26.01 -3.02 5.54 55.54 20.88 -8.642	5 -4.982 -5.655 2 -4.766 5 -5.545 5 -2.714 1 -4.960 5 -5.192 0 -5.192 0 -5.565 0 -7.646 3 -7.861 1 -8.792 0 -9.955 2 -6.934	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	NOV         15           NOV         16           NOV         17           NOV         18           NOV         19           NOV         20           NOV         21           NOV         22           NOV         23           NOV         24           NOV         25           NOV         26           NOV         27	- 57. 50 - 57. 44 - 56. 44 - 55. 58 - 55. 90 - 56. 22 - 56. 52 - 56. 52 - 56. 52 - 56. 52 - 56. 52 - 56. 52 - 56. 36 - 54. 97	0       28.1         14       32.3         7       30.8         7       31.3         13       30.4         4       27.7         2       28.6         8       30.4         0       34.0         6       34.0         8       32.3         1       33.0         2       30.1	71          326       .         434       1.         332          443          455          466       .         773       .         662          339       1.         332          224	449 092 763 740 485 076 112 179 764 087 718 632 287	177 175 154 177 089 179 181 183 224 227 272 301 230	
IOV         15           IOV         16           IOV         17           IOV         18           IOV         19           IOV         20           IOV         21           IOV         22           IOV         23           IOV         24           IOV         25           IOV         26           IOV         27           IOV         28	-1619.81 -1865.03 -1774.05 -1768.33 -1691.53 -1553.31 -1610.36 -1722.16 -1899.59 -1960.35 -1828.05 -1861.71 -1655.95 -1898.67	1 25.830 8 -5.298 6 43.823 3 -98.141 0 26.932 7 4.253 7 6.273 2 -10.112 7 -42.571 4 .4940 8 -97.095 5 -35.642 9 15.770 7 -118.562	10.169 10.083 8.857 9.986 4.956 9.993 10.193 10.333 12.510 12.826 15.373 16.978 12.655 9.550	-12.65 2.96 -23.58 54.52 -14.74 -2.11 -3.19 5.450 26.01 -3.02 55.54 20.88 -8.64 71.712	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	NOV         15           NOV         16           NOV         17           NOV         18           NOV         19           NOV         20           NOV         21           NOV         22           NOV         23           NOV         24           NOV         25           NOV         26           NOV         27           NOV         28	- 57.50 - 57.65 - 57.41 - 56.41 - 55.56 - 55.94 - 56.22 - 56.52 - 56.55 - 56.55 - 56.55 - 56.55 - 56.32 - 56.92	0       28.1         14       32.3         7       30.4         7       31.3         3       30.4         4       27.7         2       28.6         8       30.4         6       34.6         8       32.3         1       33.0         2       30.1         8       32.3         1       33.0         8       33.8	71          326       .         398          444       1.         32          65          443          65          366       .         773       .         662          399       1.         32       .         224          888       2.	449 092 763 740 485 076 112 179 764 087 718 632 287 116	177 175 154 177 089 179 181 183 224 227 222 301 230 170	
IOV         15           IOV         16           IOV         17           IOV         17           IOV         17           IOV         17           IOV         17           IOV         18           IOV         20           IOV         20           IOV         21           IOV         22           IOV         23           IOV         24           IOV         25           IOV         26           IOV         27           IOV         28           IOV         29	-1619.81 -1865.03 -1774.05 -1768.33 -1691.53 -1553.31 -1610.36 -1722.16 -1899.59 -1960.35 -1868.71 -1858.95 -1868.71 -1655.95 -1898.67 -1674.72	1	10.169 10.083 8.857 9.986 4.956 9.993 10.193 10.333 12.510 12.826 15.373 16.978 12.655 9.550 10.961	-12.65 2.96 -23.58 54.52 -14.74 -2.11 -3.19 5.45 26.01 -3.02 25.54 20.88 -8.64 71.71 22.27 8	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	NOV         15           NOV         16           NOV         17           NOV         18           NOV         19           NOV         20           NOV         21           NOV         23           NOV         24           NOV         25           NOV         26           NOV         27           NOV         28           NOV         29	- 57. 50 - 57. 66 - 57. 41 - 56. 41 - 55. 58 - 56. 52 - 56. 55. 55. 55. 55. 55. 55. 55. 55. 55.	0       28.1         14       32.3         7       30.8         7       31.3         33       30.4         4       27.7         2       28.6         8       30.4         0       34.0         6       34.6         8       32.3         1       33.6         2       30.1         8       32.3         1       33.6         2       30.1         8       32.9         9       9	71          126       .         198          144       1.         132          165          166       .         773          399       1.         399       1.         322          24          88       2.         995	449 092 763 740 485 076 112 179 764 087 718 632 287 116 743	177 175 154 177 089 179 181 183 224 227 272 301 230 230 170 196	
IOV         15           IOV         16           IOV         17           IOV         17           IOV         18           IOV         19           IOV         20           IOV         21           IOV         22           IOV         23           IOV         24           IOV         25           IOV         26           IOV         27           IOV         28           IOV         29           IOV         30	-1619.81 -1865.03 -1774.05 -1768.33 -1691.53 -1553.31 -1610.36 -1722.16 -1899.59 -1960.35 -1828.05 -1828.05 -1861.71 -1655.95 -1898.67 -1674.72 -1653.62	1	10.169 10.083 8.857 9.986 4.956 9.993 10.193 10.333 12.510 12.826 15.373 16.978 12.655 9.550 10.961 7.195	-12.65 2.96 -23.58 54.52 -14.744 -2.111 -3.19 5.455 26.01 -3.022 55.543 20.88 -8.64 71.712 22.278 8.901	5 -4.983 9 -5.650 2 -4.760 5 -5.544 -4.960 5 -5.193 0 -7.646 8 -7.861 7 -8.795 9 -9.950 2 -6.934 2 -5.776 8 -5.884	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	NOV         15           NOV         16           NOV         17           NOV         18           NOV         20           NOV         21           NOV         22           NOV         23           NOV         24           NOV         25           NOV         26           NOV         27           NOV         28           NOV         29           NOV         30	- 57. 50 - 57. 66 - 57. 41 - 56. 41 - 55. 58 - 56. 52 - 56. 52 - 56. 55 - 56. 53 - 56. 36 - 54. 97 - 56. 36 - 55. 83 - 55. 85 - 56. 92 - 55. 85 - 55. 85 - 56. 36 - 55. 85 - 56. 85 - 56. 92 - 55. 85 - 56. 85 - 56. 85 - 56. 92 - 56. 85 - 56. 85 - 56. 85 - 56. 92 - 56. 85 - 5	0       28.1         14       32.3         7       30.2         7       31.3         13       30.4         4       27.7         2       28.6         8       30.4         0       34.0         6       32.3         1       33.0         2       30.1         8       30.4         0       34.0         6       32.3         1       33.0         2       30.1         8       30.4         3       29.9         1       29.3	71          126       .         1998          132          132          132          133          144       1.         132          165          173       .         162          1339       1.         132       .         224          888       2.         195       .         440       .	449 092 763 740 485 076 112 179 776 0087 718 632 287 718 632 287 116 743 303	177 155 154 177 189 179 181 183 224 227 222 301 120 170 128	
IOV         15           IOV         16           IOV         16           IOV         17           IOV         18           IOV         19           IOV         20           IOV         21           IOV         22           IOV         23           IOV         24           IOV         25           IOV         26           IOV         27           IOV         28           IOV         20           IOV         20           IOV         20           IOV         28           IOV         30           DEC         1	$\begin{array}{c} -1619.81\\ -1865.03\\ -1774.05\\ -1768.33\\ -1691.53\\ -1553.31\\ -1610.36\\ -1722.16\\ -1722.16\\ -1899.59\\ -1960.35\\ -1828.05\\ -1861.71\\ -1655.95\\ -1898.67\\ -1674.72\\ -1653.62\\ -1756.40\end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	10.169 10.083 8.857 9.986 4.956 9.993 10.333 12.510 12.826 15.373 16.978 12.655 9.550 10.961 7.195 7.554	-12.65 2.966 -23.58 54.526 -14.744 -2.11 -3.196 5.456 26.019 -3.022 55.544 20.885 -8.644 71.712 22.276 8.900 -24.642	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	NOV         15           NOV         16           NOV         17           NOV         18           NOV         20           NOV         21           NOV         22           NOV         23           NOV         24           NOV         25           NOV         26           NOV         28           NOV         29           NOV         30           DEC         1	- 57. 50 - 57. 66 - 57. 41 - 56. 41 - 55. 58 - 55. 92 - 56. 52 - 56. 55 - 56. 52 - 56. 55 - 56. 56 - 56. 57 - 56. 55 - 56. 56 - 57. 50 - 56. 57 - 56. 56 - 57. 50 - 56. 57 - 56. 56 - 57. 50	0         28.1           14         32.3           7         30.8           7         31.3           33         30.4           4         27.7           2         28.6           8         30.4           6         34.6           8         32.3           1         33.0           2         30.1           8         32.3           1         33.6           3         29.9           1         29.3           0         30.5	71            126         .           398            132            332            132            132            132            133            143            1565            1330         1.           1332            224            224            132            244            400            446	449 092 763 740 485 076 112 179 776 0087 718 632 287 718 632 287 116 743 303	177 175 154 177 089 179 181 183 224 227 272 301 230 170 196	
IOV         15           IOV         16           IOV         16           IOV         17           IOV         18           IOV         18           IOV         20           IOV         21           IOV         22           IOV         23           IOV         24           IOV         25           IOV         26           IOV         27           IOV         28           IOV         29           IOV         29           IOV         20           IEC         1	-1619.81 -1865.03 -1774.05 -1768.33 -1691.53 -1553.31 -1610.36 -1722.16 -1899.59 -1960.35 -1828.05 -1828.05 -1861.71 -1655.95 -1898.67 -1674.72 -1653.62	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	10.169 10.083 8.857 9.986 4.956 9.993 10.193 10.333 12.510 12.826 15.373 16.978 12.655 9.550 10.961 7.195	-12.65: 2.966 -23.58: 54.522 -14.744 -2.111 -3.196 5.450 26.019 -3.022 55.54 20.888 -8.644 71.712 22.276 8.900 -24.644 -17.928	5 -4.983 9 -5.650 2 -4.766 5 -5.544 -4.960 5 -5.199 9 -7.644 8 -7.863 9 -7.644 8 -7.863 2 -6.933 2 -6.932 2 -6.932 2 -5.776 4 -5.7762 3 -7.888 1 -3.745 2 -4.013 3 -8.115	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	NOV         15           NOV         16           NOV         17           NOV         18           NOV         19           NOV         21           NOV         22           NOV         23           NOV         24           NOV         25           NOV         26           NOV         27           NOV         28           NOV         29           NOV         20           DEC         1           DEC         2	- 57. 5( - 57.6( - 57.5( - 55.5( - 55.5) - 56.22 - 56.22 - 56.32 - 56.32 - 56.32 - 56.32 - 56.32 - 56.32 - 56.32 - 56.32 - 56.36 - 57.50 - 57.38	00         28.1           14         32.3           7         30.8           7         31.3           33         30.4           44         27.7           2         28.6           8         30.4           4         27.7           2         28.6           8         30.4           4         27.7           2         28.6           8         30.4           6         34.6           8         32.3           1         33.0           2         30.1           8         32.3           1         33.0           2         30.1           8         33.8           3         29.9           1         29.3           0         30.5           9         32.9           3         29.32.9	71            126         .           198            144         1.           132            165            166            167            139         1.           132            133            132            132            132            132            132            132            132            148         2.           195            12	449 092 763 740 485 076 112 179 764 087 718 632 287 116 632 287 116 303 807	177 155 154 177 189 179 181 183 224 227 222 301 120 170 128	
IOV         15           IOV         16           IOV         16           IOV         17           IOV         18           IOV         19           IOV         20           IOV         21           IOV         22           IOV         23           IOV         24           IOV         25           IOV         26           IOV         27           IOV         28           IOV         20           IOV         20           IOV         20           IOV         28           IOV         30           DEC         1	$\begin{array}{c} -1619.81\\ -1865.03\\ -1774.05\\ -1768.33\\ -1691.53\\ -1553.31\\ -1610.36\\ -1722.16\\ -1722.16\\ -1899.59\\ -1960.35\\ -1828.05\\ -1861.71\\ -1655.95\\ -1898.67\\ -1674.72\\ -1653.62\\ -1756.40\end{array}$	1	10.169 10.083 8.857 9.986 4.956 9.993 10.133 10.333 12.510 12.826 15.373 16.978 12.655 9.550 10.961 7.195 7.554 14.149	-12.65: 2.966 -23.58: 54.522 -14.744 -2.111 -3.196 5.450 26.019 -3.022 55.54 20.888 -8.644 71.712 22.276 8.900 -24.644 -17.928	5 -4.983 9 -5.650 2 -4.766 5 -5.544 -4.960 5 -5.199 9 -7.644 8 -7.863 9 -7.644 8 -7.863 2 -6.933 2 -6.932 2 -6.932 2 -5.776 4 -5.7762 3 -7.888 1 -3.745 2 -4.013 3 -8.115	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	NOV         15           NOV         16           NOV         17           NOV         18           NOV         20           NOV         21           NOV         22           NOV         23           NOV         24           NOV         25           NOV         26           NOV         28           NOV         29           NOV         30           DEC         1	- 57. 5( - 57.6( - 57.5( - 55.5( - 55.5) - 56.22 - 56.22 - 56.32 - 56.32 - 56.32 - 56.32 - 56.32 - 56.32 - 56.32 - 56.32 - 56.36 - 57.50 - 57.38	00         28.1           14         32.3           7         30.8           7         31.3           33         30.4           44         27.7           2         28.6           8         30.4           4         27.7           2         28.6           8         30.4           4         27.7           2         28.6           8         30.4           6         34.6           8         32.3           1         33.0           2         30.1           8         32.3           1         33.0           2         30.1           8         33.8           3         29.9           1         29.3           0         30.5           9         32.9           3         29.32.9	71            126         .           198            144         1.           132            165            166            167            139         1.           132            133            132            132            132            132            132            132            132            148         2.           195            12	449 092 763 740 485 076 112 179 764 087 718 632 287 116 632 287 116 303 807 545	177 175 154 177 089 179 181 183 224 227 272 301 230 170 196 128 128 247	
IOV         15           IOV         16           IOV         17           IOV         17           IOV         20           IOV         21           IOV         22           IOV         23           IOV         24           IOV         25           IOV         26           IOV         27           IOV         28           IOV         29           IOV         20           IEC         1           IEC         2	-1619.81 -1865.03 -1774.05 -1768.33 -1691.53 -1553.31 -1610.36 -1722.16 -1899.59 -1960.35 -1828.05 -1861.71 -1655.95 -1898.67 -1674.72 -1653.62 -1756.40 -1888.94 -1786.91	1	10.169 10.083 8.857 9.986 4.956 9.993 10.333 12.510 12.826 15.373 16.978 12.655 9.550 10.961 7.195 7.554 14.149 12.032	-12.65 2.966 -23.58 54.522 -14.744 -2.111 -3.199 5.455 26.019 -3.028 55.542 20.888 -8.644 71.712 22.278 8.890 -24.642 -17.928 -2.055	5 - 4.983 -4.983 2 - 4.766 5 - 5.545 -5.545 -7.650 -7.664 -7.661 -8.795 -7.661 -8.795 -7.661 -8.795 -5.776 -5.883 -5.983 -5.883 -5.883 -5.883 -5.893 -5.893 -5.89	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	NOV         15           NOV         16           NOV         17           NOV         18           NOV         20           NOV         21           NOV         23           NOV         24           NOV         25           NOV         26           NOV         27           NOV         28           NOV         29           NOV         20           DEC         1           DEC         3	- 57. 50 - 57. 65 - 57. 64 - 55. 58 - 55. 58 - 55. 52 - 56. 52 - 56. 52 - 56. 52 - 56. 53 - 56. 52 - 56. 53 - 56. 52 - 56. 53 - 56. 52 - 56. 53 - 56. 52 - 55. 75 - 56. 53 - 56. 53 - 56. 53 - 57. 56 - 57. 57 - 56. 57 - 57. 56 - 57. 57. 57. 57. 57. 57. 57. 57. 57. 57.	00         28.1           14         32.3           7         30.6           8         30.4           4         27.7           2         28.6           8         30.4           4         27.7           2         28.6           8         30.4           6         34.6           3.3         29.3           1         33.6           2         30.1           3         29.9           1         32.5           9         32.9           9         32.9           0         30.5           9         32.9           0         31.6	71            126         .           198            144         1.           132            65            143            666            173         .           662            132            132         2.           24            88         2.           95            400            125            27	449 092 763 740 485 076 112 117 112 179 764 087 718 632 287 718 632 287 743 303 807 7545 565	177 175 154 177 089 179 181 224 227 272 230 170 196 128 128 128 213	
IOV         15           IOV         16           IOV         16           IOV         17           IOV         18           IOV         19           IOV         20           IOV         22           IOV         23           IOV         24           IOV         26           IOV         26           IOV         27           IOV         28           IOV         28           IOV         30           EEC         1           EEC         3           EEC         4	$\begin{array}{c} -1619.81\\ -1865.03\\ -1774.05\\ -1768.33\\ -1691.53\\ -1553.31\\ -1610.36\\ -1722.16\\ -1722.16\\ -1722.16\\ -1722.16\\ -1899.59\\ -1960.35\\ -1828.05\\ -1861.71\\ -1653.62\\ -1756.40\\ -1888.94\\ -1756.40\\ -1888.94\\ -1738.63\end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	10.169 10.083 8.857 9.986 4.956 9.993 10.333 12.510 12.826 15.373 16.978 12.655 9.550 10.961 7.195 7.554 14.149 12.032 9.017	-12.65: 2.966 -23.58: 54.526 -14.746 -2.111 -3.196 5.456 26.019 -3.022 55.547 20.889 -8.644 71.712 22.276 8.900 -24.647 -17.926 -2.050 26.199	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	NOV         15           NOV         16           NOV         17           NOV         18           NOV         21           NOV         22           NOV         23           NOV         23           NOV         25           NOV         26           NOV         28           NOV         29           NOV         30           DEC         1           DEC         2           DEC         3           DEC         4	- 57. 5( - 57. 6( - 57. 6( - 55. 6( - 55. 5) - 55. 52 - 56. 22 - 56. 52 - 56. 52 - 56. 52 - 56. 52 - 56. 52 - 56. 52 - 56. 56 - 57. 38 - 55. 52 - 55. 55 - 5	10         28.1           14         32.3           7         30.6           8         30.4           4         27.7           2         28.6           8         30.4           4         27.7           1         33.0.4           4         27.7           1         33.0.4           6         34.6           8         30.4           1         33.0           2         30.1           33         29.9           1         29.3           1         32.9           1         29.3           3         29.9           3         29.9           3         29.9           3         29.9           3         29.9           3         29.9           3         29.9           3         29.9           3         29.0           3         29.0	71          126       .         144       1.         132          165          144       1.         132          166       .         173       .         132       .         132       .         24       .         24       .         40       .         440       .         215       .         227       .         117       .	449 092 763 740 485 076 112 179 764 087 718 632 287 116 632 287 116 743 303 807 545 585	177 175 154 177 089 179 181 224 227 227 301 220 170 196 128 131 247 158	
IOV         15           IOV         16           IOV         17           IOV         18           IOV         19           IOV         20           IOV         21           IOV         22           IOV         23           IOV         24           IOV         26           IOV         26           IOV         27           IOV         28           IOV         29           IOV         29           IOV         29           IOEC         1           IEEC         2           IEEC         3           IEEC         3           IEEC         5	$\begin{array}{c} -1619, 81\\ -1865, 03\\ -1774, 05\\ -1768, 33\\ -1691, 53\\ -1553, 31\\ -1610, 36\\ -1722, 16\\ -1722, 16\\ -1722, 16\\ -1722, 16\\ -1726, 16\\ -1726, 16\\ -1756, 40\\ -1766, 40\\ -1756, 40\\ -1888, 94\\ -1786, 91\\ -1738, 63\\ -1685, 74\\ \end{array}$	1         25.830           -5.298         -5.298           6         -5.298           8         -5.298           3         -98.141           0         26.932           7         4.253           2         -10.112           7         -42.531           4         -940           8         -97.095           -35.642         15.770           7         -118.562           8         -17.098           2         46.386           9         -15.770           7         -118.562           8         -17.098           2         46.386           9         3.1258           9         3.663           4         -48.903	10.169 10.083 8.857 9.986 4.956 9.993 10.333 12.510 12.826 15.373 16.978 12.655 9.550 10.961 7.195 7.554 14.149 12.032 9.017 8.214	-12.65: 2.966 -23.58: 54.522 -14.744 -2.111 -3.196 5.450 26.015 -3.022 55.547 20.886 -8.644 71.712 22.276 8.900 -24.644 -17.928 -2.055 26.192 13.245	$ \begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	NOV         15           NOV         16           NOV         17           NOV         18           NOV         20           NOV         21           NOV         22           NOV         23           NOV         25           NOV         25           NOV         25           NOV         28           NOV         29           NOV         30           DEC         1           DEC         2           DEC         4           DEC         5	- 57, 5( - 57, 65 - 57, 64 - 55, 64 - 55, 55 - 55, 94 - 56, 52 - 56, 52 - 56, 52 - 56, 52 - 56, 52 - 56, 52 - 56, 56 - 55, 83 - 56, 97 - 56, 50 - 55, 98 - 56, 50 - 5	00         28         1           44         32         3           7         30         6           33         30         4           427         7         31           33         30         4           47         7         2           88         30         4           66         34         6           34         6         34           6         34         6           3         30         1           32         31         8           32         31         1           32         31         1           33         8         30           34         50         30           9         32         9           9         32         9           9         32         30           31         6         29           32         30         5           9         32         30           30         5         5           6         29         4	71            126         .           132            144         1.           132            165            166         .           173            166         .           173         1.           32         .           224            888         2.           95         .           446            15         .           27         .           17         .           31         .	449 092 763 740 485 076 112 179 764 087 718 632 287 116 743 303 807 545 545 545 5858 450	177 175 154 154 177 184 179 183 224 227 272 230 170 128 128 128 124 124 124 124	
IOV         15           IOV         16           IOV         16           IOV         17           IOV         18           IOV         19           IOV         21           IOV         22           IOV         23           IOV         24           IOV         25           IOV         26           IOV         28           IOV         29           IOV         29           IOV         29           IOV         29           IOV         29           IOV         20           IOV         29           IOV         20           IOV         20           IOV         29           IOV         20           IOV         20	$\begin{array}{c} -1619, 81\\ -1865, 03\\ -1774, 05\\ -1768, 33\\ -1691, 53\\ -1553, 31\\ -1610, 36\\ -1722, 16\\ -1722, 16\\ -1722, 16\\ -1722, 16\\ -1898, 59\\ -1828, 05\\ -1828, 05\\ -1861, 71\\ -1653, 62\\ -1756, 40\\ -1888, 94\\ -1766, 91\\ -1738, 63\\ -1685, 74\\ -1567, 75\end{array}$	1	10.169 10.083 8.857 9.986 4.956 9.993 10.333 12.510 12.826 15.373 16.978 12.655 9.550 10.961 7.195 7.554 14.149 12.032 9.017 8.214 4.4.462	-12.65 2.96 -23.58 5.4.522 -14.744 -2.111 -3.199 5.455 26.01 -3.022 55.543 20.888 -8.642 71.712 22.276 8.970 -24.642 -17.922 2.055 26.199 13.249 10.633	5         -4.983           6         -4.983           2         -4.766           2         -4.766           5         -5.545           6         -2.714           -4.960         -5.565           9         -7.646           9         -5.566           9         -7.648           9         -9.952           9         -9.952           9         -5.888           2         -4.013           3         -4.73           3         -4.8115           9         -6.733           5         -4.221           -4.221         -4.221	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	NOV         15           NOV         16           NOV         17           NOV         18           NOV         21           NOV         22           NOV         23           NOV         23           NOV         25           NOV         26           NOV         27           NOV         28           NOV         29           NOV         30           DEC         1           DEC         3           DEC         4           DEC         5           DEC         6	- 57, 5( - 57, 65 - 57, 64 - 55, 64 - 55, 94 - 55, 94 - 55, 94 - 55, 95 - 56, 52 - 56, 53 - 56, 53 - 56, 53 - 56, 53 - 56, 55 - 55, 55 - 56, 55 - 57, 56 - 57, 56 - 57, 56 - 56, 97 - 57, 27 - 56, 77, 27 - 56, 75 - 56, 99 - 57, 27 - 56, 99 - 57, 27 - 56, 99 - 57, 90 - 57, 90	10         28.1           44         32.3           7         30.6           33         30.4           4         27.7           2         28.6           8         30.4           40         34.0           6         34.0           6         34.2           7         30.1           8         30.4           1         33.0           2         30.1           8         32.3           30         29.9           1         29.3           0         30.5           9         32.9           0         30.5           2         30.5           8         34.6	71            226         .           128         .           144         1.           332            143            144         1.           332            166         .           773         .           224            224         .           132         .           940         .           125         .           27         .           17         .           31         .           54         .	449 092 763 760 7763 7763 7763 112 179 7764 087 718 632 287 116 632 287 116 632 287 116 545 545 545 545 545 545 50 5307	177 175 154 177 089 179 181 224 227 272 301 230 170 170 176 178 128 128 128 213 213 255	
IOV         15           IOV         16           IOV         16           IOV         17           IOV         18           IOV         19           IOV         21           IOV         22           IOV         23           IOV         24           IOV         25           IOV         26           IOV         27           IOV         28           IOV         29           IOV         28           IDEC         1           IEC         3           IEC         4           IEC         5           IEC         5           IEC         5           IEC         7           IEC         7	$\begin{array}{c} -1619, 81\\ -1865, 03\\ -1774, 05\\ -1768, 133\\ -1691, 53\\ -1553, 31\\ -1610, 36\\ -1722, 16\\ -1899, 59\\ -1960, 35\\ -1828, 05\\ -1861, 71\\ -1655, 95\\ -1898, 67\\ -1674, 72\\ -1674, 72\\ -1674, 72\\ -1633, 62\\ -1756, 40\\ -1888, 94i\\ -1738, 63\\ -1685, 74\\ -1967, 55\\ -1885, 30\\ -1$	1	10.169 10.083 8.857 9.986 4.956 9.993 10.193 10.333 12.510 12.826 15.373 16.978 12.655 9.550 10.961 7.195 7.554 14.149 12.032 9.017 8.214 14.462 9.256	-12.65 2.96 -23.58 54.522 -14.744 -2.111 -3.196 5.455 26.01 -3.022 55.544 20.885 -8.642 71.712 22.276 8.901 -24.644 -17.922 -2.055 26.199 13.245 10.631 47.544	5         -4.983           0         -5.650           2         -4.766           5         -5.546           5         -2.712           10         -2.712           5         -5.566           -7.646         -5.566           -7.646         -5.566           -7.646         -5.566           -7.642         -6.932           -6.932         -6.932           -6.932         -6.7325           -4.013         -8.113           -6.7325         -4.833           -4.221         -8.822           -4.221         -8.827           -5.356         -5.348	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	NOV         15           NOV         16           NOV         17           NOV         18           NOV         19           NOV         20           NOV         21           NOV         22           NOV         23           NOV         24           NOV         25           NOV         26           NOV         27           NOV         28           NOV         29           NOV         20           DEC         1           DEC         2           DEC         4           DEC         5           DEC         6           DEC         7	- 57. 5( - 57. 6( - 57. 6) - 57. 6( - 55. 5) - 55. 50 - 55. 50 - 55. 50 - 55. 72 - 56. 52 - 56. 52 - 56. 50 - 56. 30 - 56. 30 - 57. 35 - 57. 38 - 56. 50 - 57. 72 - 56. 50 - 57. 72 - 75. 75. 75. 75. 75. 75. 75. 75. 75. 75.	10         28.1           14         32.3           7         30.6           13         30.4           4         27.7           2         28.6           8         30.4           6         34.6           6         34.6           33.1         33.0           1         33.0           2         28.6           8         30.4           6         34.6           8         32.3           9         32.9           9         32.9           0         31.6           2         30.1           8         33.3           29.9         32.9           0         31.6           2         30.5           8         24.8           2         30.5           8         29.4           8         29.4           8         34.6           4         32.9	71            126         .           128         .           132            134         1.           132            165            166         .           173            132            132         .           132         .           132         .           132         .           132         .           132         .           132         .           132         .           133         .           1446         .           17         .           17         .           17         .           54         .           63         1	449 092 763 7763 7760 485 076 112 179 764 087 743 303 303 303 807 545 545 888 450 307	177 175 154 177 089 179 181 224 227 227 301 220 170 196 128 151 158 158 158 162	
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57, 6( - 57, 6( - 55, 64) - 55, 54 - 55, 54 - 55, 57, - - 56, 52 - 55, 57, - - 56, 52 - 56, 52 - 56, 55 - 56, 56 - 57, 56 - 55, 77, - - 56, 16 - 55, 17 - 55, 10 - 55, 10 -</td> <td>10         28.1           44         32.3           7         30.5           3         30.4           4         27.7           2         28.6           8         30.4           2         28.6           8         30.4           2         28.6           8         32.3           1         33.0           2         30.1           1         33.2           2         30.1           2         30.1           2         30.1           2         30.1           2         30.1           2         30.5           9         32.9           0         31.6           2         30.5           2         30.5           2         30.5           2         30.5           2         30.5           2         30.5           30.5         29.9           31.1         34.6           4         30.1           31.1         34.5           32.5         3           3         36.8</td> <td>711        </td> <td>449 763 7763 7763 7763 7763 7763 7763 7764 7718 632 287 718 632 287 718 632 287 718 632 287 718 632 287 713 303 807 743 303 807 743 303 807 545 545 565 858 850 857 858 850 806 811 818 835 806 817 740 811 818 818 806 817 740 817 818 818 806 817 740 817 818 818 818 817 740 817 818 818 807 817 818 818 818 818 818 818 818 818 81</td> <td>177 175 154 154 177 184 179 181 224 272 270 230 170 128 128 128 128 128 128 131 159</td> <td></td>	$ \begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	NOV         15           NOV         16           NOV         17           NOV         18           NOV         20           NOV         21           NOV         22           NOV         23           NOV         24           NOV         25           NOV         26           NOV         27           NOV         28           NOV         29           NOV         20           DEC         1           DEC         2           DEC         6           DEC         7           DEC         8           DEC         7           DEC         8           DEC         9           DEC         11           DEC         12	- 57, 5( - 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100         15           100         16           100         17           100         17           100         17           100         17           100         17           100         17           100         20           100         20           100         21           100         22           100         22           100         22           100         22           100         22           100         23           100         22           100         23           100         22           100         23           100         23           100         23           100         23           100         28           100         28           100         28           100         28           100         28           100         28           100         28           100         28           100         28           100         28	$\begin{array}{c} -1619, 81\\ -1865, 003\\ -1774, 05\\ -1768, 133\\ -1691, 53\\ -1553, 31\\ -1610, 36\\ -1722, 16\\ -1722, 16\\ -1722, 16\\ -1899, 59\\ -1960, 35\\ -1828, 05\\ -1828, 05\\ -1828, 05\\ -1888, 05\\ -1888, 05\\ -1888, 05\\ -1755, 40\\ -1764, 72\\ -1653, 62\\ -1756, 40\\ -1786, 91\\ -1738, 63\\ -1888, 94\\ -1786, 91\\ -1738, 63\\ -1888, 94\\ -1786, 91\\ -1738, 63\\ -1888, 94\\ -1786, 91\\ -1738, 63\\ -1888, 94\\ -1786, 91\\ -1738, 63\\ -1888, 94\\ -1786, 91\\ -1723, 53\\ -1865, 30\\ -1723, 53\\ -1865, 30\\ -1723, 53\\ -1807, 84\\ -2047, 28\\ -1971, 54\\ -2047, 28\\ -1971, 54\\ -1819, 21\\ -2049, 93\\ -2$	$  \begin{array}{ccccccccccccccccccccccccccccccccccc$	10.169 10.083 8.857 9.986 4.956 9.993 10.333 12.510 12.826 15.373 16.978 12.655 9.550 10.961 7.195 7.554 14.149 12.032 9.017 8.214 14.462 9.256 15.504 10.567 1.071 8.394 8.559 8.822	-12.65: 2.966 -23.58: 54.522 -14.744 -2.111 -3.196 5.455 26.011 -3.022 55.547 20.885 -8.644 71.712 22.278 8.901 -24.644 -77.922 -2.050 26.199 13.244 10.637 47.544 15.307 522 28.177 -6.303 19.663 6.538	5 - 4.983 4.766 2 - 4.766 5 - 5.545 5 - 5.545 5 - 2.712 1 - 4.960 5 - 5.565 9 - 7.646 9 - 7.507 9 - 6.935 1 - 6.735 1 - 6.835 1 - 6.835 1 - 6.835 1 - 6.681 1 - 5.076 8 - 4.990 6 - 5.354 6 - 5.854 8		NOV         15           NOV         16           NOV         17           NOV         18           NOV         20           NOV         21           NOV         22           NOV         23           NOV         24           NOV         25           NOV         26           NOV         27           NOV         28           NOV         29           NOV         30           DEC         1           DEC         3           DEC         5           DEC         6           DEC         7           DEC         8           DEC         10           DEC         11           DEC         12           DEC         11           DEC         12           DEC         13	- 57. 5( - 57. 6( - 57. 6( - 55. 6( - 55. 5) - 55. 52 - 56. 22 - 56. 52 - 57. 73 - 56. 97 - 57. 12 - 55. 77. 11 - 55. 66. 75 - 57. 11 - 55. 75. 11 - 55. 12 -	10         28.1           14         32.3           7         30.5           33         30.4           4         27.7           34         27.7           35         30.4           4         27.7           2         28.6           8         30.4           4         27.7           31.3         30.4           4         27.7           2         28.6           8         30.4           2         30.1           33.29.9         30.5           3         29.9           1         29.9           1         29.30.5           8         32.4           30.0         31.6           31         29.9           32.9         30.1           7         32.1           7         32.1           10         36.0           11         34.5           33         36.8           11         34.5           33         36.8           37         40.3	711	449 949 763 740 076 179 764 85 076 112 179 764 8632 287 116 16 303 807 545 545 858 807 545 565 858 858 807 545 506 506 816 16 183 507 417 77 19 91 77 19 91 77 10 77 10 78 78 78 78 78 78 78 78 78 78 78 78 78	177 175 154 154 177 089 179 181 224 227 272 301 230 170 196 128 131 243 213 158 213 213 213 215 162 271 188 188 188 188 188 188 188 188 188 188 188 188 188 188 188 188 188 188 188 189 181 217 181 217 19 19 19 19 19 19 19 19	
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NOV         15           NOV         15           NOV         16           NOV         16           NOV         19           NOV         19           NOV         20           NOV         20           NOV         20           NOV         21           NOV         20           NOV         20	-1619.81 -1685.03 -1774.05 -1768.33 -1691.53 -1553.31 -1610.36 -1722.16 -1899.59 -1960.35 -1828.05 -1828.05 -1828.05 -1828.05 -1888.94 -1764.72 -1653.62 -1756.40 -1888.94 -1766.91 -1738.63 -1685.74 -1865.97 -1875.5 -1885.30 -1723.53 -1807.84 -2047.28 -1971.28 -1819.21 -2049.93 -2233.93	$  \begin{array}{ccccccccccccccccccccccccccccccccccc$	10.169 10.083 8.857 9.986 4.956 9.993 10.333 12.510 12.826 15.373 16.978 12.655 9.550 10.961 7.195 7.554 14.149 12.032 9.017 8.214 14.462 9.256 15.504 10.567 1.071 8.394 8.559 8.822 8.822	-12.65: 2.966 -23.58: 54.522 -14.744 -2.111 -3.199 5.455 26.019 -3.022 55.543 20.889 -8.642 71.712 22.276 8.970 -24.642 -7.792 26.199 13.245 10.633 47.544 15.300 -5.22 28.177 -6.350 -6.536 -6.536 -16.888	5 - 4.983 4.766 2 - 4.766 5 - 5.545 5 - 5.545 5 - 2.712 1 - 4.960 5 - 5.565 9 - 7.646 9 - 7.507 9 - 6.935 1 - 6.735 1 - 6.835 1 - 6.835 1 - 6.835 1 - 6.681 1 - 5.076 8 - 4.990 6 - 5.354 6 - 5.854 8	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	NOV         15           NOV         16           NOV         18           NOV         18           NOV         20           NOV         21           NOV         23           NOV         23           NOV         24           NOV         25           NOV         26           NOV         27           NOV         28           NOV         29           NOV         30           DEC         1           DEC         3           DEC         4           DEC         6           DEC         7           DEC         8           DEC         10           DEC         10           DEC         10           DEC         11           DEC         12           DEC         12           DEC         12           DEC         12           DEC         14	- 57, 5( - 57, 6( - 57, 64) - 55, 64, 1 - 55, 64, 1 - 55, 94 - 55, 94 - 55, 94 - 55, 95 - 56, 55 - 56, 55 - 56, 55 - 56, 55 - 56, 57 - 56, 16 - 56, 75 - 57, 11 - 55, 86 - 55, 56 - 55, 54 - 55, 54 - 55, 54 - 55, 55, 55 - 55, 55, 55, 55, 55, 55, 55, 55, 55, 55	10         28.1           14         32.3           7         30.5           33         30.4           4         27.7           34         27.7           35         30.4           4         27.7           2         28.6           8         30.4           4         27.7           2         28.6           30.1         33.0           2         30.1           8         32.3           0         30.5           9         32.9           1         29.9           1         29.9           1         29.9           2         30.5           8         34.6           32.9         30.5           2         30.5           8         34.4           30.1         32.9           1         34.5           3         32.9           1         34.5           3         36.8           1         32.5           3         36.8	711	449 949 763 740 076 179 764 85 076 112 179 764 8632 287 116 16 303 807 545 545 858 807 545 565 858 858 807 545 506 506 816 16 183 507 417 77 19 91 77 19 91 77 10 77 10 78 78 78 78 78 78 78 78 78 78 78 78 78	177 175 154 177 089 179 181 224 227 272 301 230 170 196 131 247 170 196 131 247 213 213 255 162 271 188 143 255 162 271 188 147 153 159 254	
NOV         15           NOV         15           NOV         16           NOV         16           NOV         19           NOV         19           NOV         20           NOV         20           NOV         20           NOV         21           NOV         20           NOV         20	-1619.81 -1685.03 -1774.05 -1768.33 -1691.53 -1553.31 -1610.36 -1722.16 -1899.59 -1960.35 -1828.05 -1828.05 -1828.05 -1828.05 -1888.94 -1764.72 -1653.62 -1756.40 -1888.94 -1766.91 -1738.63 -1685.74 -1865.97 -1875.5 -1885.30 -1723.53 -1807.84 -2047.28 -1971.28 -1819.21 -2049.93 -2233.93	$  \begin{array}{ccccccccccccccccccccccccccccccccccc$	10.169 10.083 8.857 9.986 4.956 9.993 10.333 12.510 12.826 15.373 16.978 12.655 9.550 10.961 7.195 7.554 14.149 12.032 9.017 8.214 14.462 9.256 15.504 10.567 1.071 8.394 8.559 8.822 8.822	-12.65: 2.966 -23.58: 54.522 -14.744 -2.111 -3.199 5.455 26.019 -3.022 55.543 20.889 -8.642 71.712 22.276 8.970 -24.642 -7.792 26.199 13.245 10.633 47.544 15.300 -5.22 28.177 -6.350 -6.536 -6.536 -16.888	5 - 4.983 4.766 2 - 4.766 5 - 5.545 5 - 5.545 5 - 2.712 1 - 4.960 5 - 5.565 9 - 7.646 9 - 7.507 9 - 6.935 1 - 6.735 1 - 6.835 1 - 6.835 1 - 6.835 1 - 6.681 1 - 5.076 8 - 4.990 6 - 5.354 6 - 5.854 8		NOV         15           NOV         16           NOV         18           NOV         18           NOV         20           NOV         21           NOV         23           NOV         23           NOV         24           NOV         25           NOV         26           NOV         27           NOV         28           NOV         29           NOV         30           DEC         1           DEC         3           DEC         4           DEC         6           DEC         7           DEC         8           DEC         10           DEC         10           DEC         10           DEC         11           DEC         12           DEC         12           DEC         12           DEC         12           DEC         14	- 57, 5( - 57, 6( - 57, 64) - 55, 64, 1 - 55, 64, 1 - 55, 94 - 55, 94 - 55, 94 - 55, 95 - 56, 55 - 56, 55 - 56, 55 - 56, 55 - 56, 57 - 56, 16 - 56, 75 - 57, 11 - 55, 86 - 55, 56 - 55, 54 - 55, 54 - 55, 54 - 55, 55, 55 - 55, 55, 55, 55, 55, 55, 55, 55, 55, 55	10         28.1           14         32.3           7         30.5           33         30.4           4         27.7           34         27.7           35         30.4           4         27.7           2         28.6           8         30.4           4         27.7           2         28.6           30.1         33.0           2         30.1           8         32.3           0         30.5           9         32.9           1         29.9           1         29.9           1         29.9           2         30.5           8         34.6           32.9         30.5           2         30.5           8         34.4           30.1         32.9           1         34.5           3         32.9           1         34.5           3         36.8           1         32.5           3         36.8	711	449 949 763 740 076 179 764 85 076 112 179 764 8632 287 116 16 303 807 545 545 858 807 545 565 858 858 807 545 506 506 816 16 183 507 417 77 19 91 77 19 91 77 10 77 10 78 78 78 78 78 78 78 78 78 78 78 78 78	177 175 154 177 089 179 181 224 227 272 301 230 170 196 131 247 170 196 131 247 213 213 255 162 271 188 143 255 162 271 188 147 153 159 254	
NOV         15           NOV         15           NOV         16           NOV         16           NOV         19           NOV         19           NOV         20           NOV         20           NOV         20           NOV         21           NOV         20           NOV         20	-1619.81 -1685.03 -1774.05 -1768.33 -1691.53 -1553.31 -1610.36 -1722.16 -1899.59 -1960.35 -1828.05 -1828.05 -1828.05 -1828.05 -1888.94 -1764.72 -1653.62 -1756.40 -1888.94 -1766.91 -1738.63 -1685.74 -1865.97 -1875.5 -1885.30 -1723.53 -1807.84 -2047.28 -1971.28 -1819.21 -2049.93 -2233.93	$  \begin{array}{ccccccccccccccccccccccccccccccccccc$	10.169 10.083 8.857 9.986 4.956 9.993 10.333 12.510 12.826 15.373 16.978 12.655 9.550 10.961 7.195 7.554 14.149 12.032 9.017 8.214 14.462 9.256 15.504 10.567 1.071 8.394 8.559 8.822 8.822	-12.65: 2.966 -23.58: 54.522 -14.744 -2.111 -3.199 5.455 26.019 -3.022 55.543 20.889 -8.642 71.712 22.276 8.970 -24.642 -7.792 26.199 13.245 10.633 47.544 15.300 -5.22 28.177 -6.350 -6.536 -6.536 -16.888	5 - 4.983 4.766 2 - 4.766 5 - 5.545 5 - 5.545 5 - 2.712 1 - 4.960 5 - 5.565 9 - 7.646 9 - 7.507 9 - 6.935 1 - 6.735 1 - 6.835 1 - 6.835 1 - 6.835 1 - 6.681 1 - 5.076 8 - 4.990 6 - 5.354 6 - 5.854 8	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	NOV         15           NOV         16           NOV         18           NOV         18           NOV         20           NOV         21           NOV         23           NOV         23           NOV         24           NOV         25           NOV         26           NOV         27           NOV         28           NOV         29           NOV         30           DEC         1           DEC         3           DEC         4           DEC         6           DEC         7           DEC         8           DEC         10           DEC         10           DEC         10           DEC         11           DEC         12           DEC         12           DEC         12           DEC         12           DEC         14	- 57, 5( - 57, 6( - 57, 64) - 55, 64, 1 - 55, 64, 1 - 55, 94 - 55, 94 - 55, 94 - 55, 95 - 56, 55 - 56, 55 - 56, 55 - 56, 55 - 56, 57 - 56, 16 - 56, 75 - 57, 11 - 55, 86 - 55, 56 - 55, 54 - 55, 54 - 55, 54 - 55, 55, 55 - 55, 55, 55, 55, 55, 55, 55, 55, 55, 55	10         28.1           14         32.3           7         30.5           33         30.4           4         27.7           34         27.7           35         30.4           4         27.7           2         28.6           8         30.4           4         27.7           2         28.6           30.1         33.0           2         30.1           8         32.3           0         30.5           9         32.9           1         29.9           1         29.9           1         29.9           2         30.5           8         34.6           32.9         30.5           2         30.5           8         34.4           30.1         32.9           1         34.5           3         32.9           1         34.5           3         36.8           1         32.5           3         36.8	711	449 949 763 740 076 179 764 85 076 112 179 764 8632 287 116 16 303 807 545 545 858 807 545 565 858 858 807 545 506 506 816 16 183 507 417 77 19 91 77 19 91 77 10 77 10 78 78 78 78 78 78 78 78 78 78 78 78 78	177 175 154 177 089 179 181 224 227 272 301 230 170 196 131 247 170 196 131 247 213 213 255 162 271 188 143 255 162 271 188 147 153 159 254	

TABLE I. Continued.

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LEVEL 100 MB. LATITUDE 60 COVARIANCE

LEVEL 100 MB. LATITUDE 60 EDDY CORRELATION COEFFICIENTS

TEAET 1	100 MB. LATIT	UDE 60	COVARIANC	E			LEVEL	100 HB.	LAILIUDE	OO FDDA	CORRELAT	TOW COR	FFICIENTS
DAY	TU	TV	TW	UV	UW	VE	DAY	TU	TV	TW	UV	UW	V6J
NOV 15	16.649	52.824	.096	57.725	709	.336	NOV 15			.040	.454	324	.057
NOV 16	3.477	45.950	.178		-1.313	-1.881	NOV 16			.078	.395	566	313
NOV 17	28.399	46.860	231		-1.072	-2.655	NOV 17 NOV 18			089	.084	324	437
NOV 18	16.746	43.827	.186		-2.688	1.010	NOV 18			.060	.016	556	.128
DOV 19	26.137	27.987	.086	-56.814	061	-1.024 .439	NOV 19			.044	306	017 087	231
NOV 20 NOV 21	20.491 -3.533	44.909 46.523	.015	36.613 -18.588	186	.235	NOV 21			012	120	489	.047
NOV 22	-3.066	43.002	227	-42.609	760	-1.465	NOV 22			144	275	307	495
NOV 23	-7.858	70.291	.877		-1.660	449	NOV 23	081		.315	052	429	080
NOV 24	-21.263	56.897	062		-1.410	-1.905	NOV 24			019	.031	446	268
NOV 25	-40.262	54.632	.003		-2.975	-2.870	NOV 25			.001	026	501	382
NOV 26	-44.639	53.736	.468		-1.104	-1.034	NOV 26		.344	.283	088	280	199
NOV 27	-68.327	78.563	249	22.386	.745	-1.580	NOV 27 NOV 28			106	.057	.134	228
NOV 28 NOV 29	-53.218 -81.383	68.114 62.717	.828 287	46.470	-1.537 1.033	-1.134 -3.299	NOV 29			104	057	395	181 357
NOV 30	-73.540	44.609	.611		-1.080	1.411	NOV 30			.238	261	183	.173
DEC 1	-88.615	54.067	680	-62.525	194	-6.279	DEC 1			261	146	026	666
DEC 2	-37.533	38.968	250	107.663	435	-3.188	DEC 2		.237	158	.295	123	539
DEC 3	-34.881	37.179	.763	-10.769	786	1.976	DEC 3			.473	034	238	. 384
DEC 4	-60.774	7.114		-169.991	1.159	.361	DEC 4			224	452	.243	.059
DEC 5	-91.399	7.263	322	-80.056	3.113	.539	DEC 5			173	201	.567	.092
DEC 6	-108.347	31.374		-298.123	5.958	-5.008	DEC 6 DEC 7			131	513	.409	380
DEC 7	-85.170	24.804		-274.961	3.010	3.704	DEC 8	465 592	.197	221	495 543	.211	.376
DEC 8 DEC 9	-88.835 -106.214	19.483 23.725		-295.983 -194.318	4.849	-3.199 3.971	DEC 9	644	.241	115	384	.431	346
DEC 10	-42.588	-3.913	021	-54.820	.190	263	DEC 10	515		012	175	.036	039
DEC 11	-69.497	6.889	.096	-23.857	3.359	926	DEC 11	711	.063	.042	070	.474	116
DEC 12	-86.624	5.275	.306	-57.084	142	538	DEC 12	760	.077	.100	237	013	083
<b>DEC 13</b>	-57.404	20.647			-1.488	2.426	DEC 13	869	.362	.341	585	196	.369
DEC 14	-18.028	30.596		-163.642	1.900	-1.981	DEC 14 DEC 15	445	. 544	025	809	.392	294
DEC 15	-42.198	70.252	353 ·	193.768	2.081	-2.076	DEC 15	100	.208	052	832	.445	299
LEVEL 1	OO MB. LATIT	UDE 60	PRODUCT (	OF (U, V, W,	T) BAR		LEVEL	100 MB.	LATITUDE 6	O MEANS	OF T, U,	V AND W	
			20000-00-00-00									3 (COD/TO) (47	
DAY	TU	TV	TW	UV	UW	VW	DAY	TBA				BAR	
NOV 15	-1230.324	15.937			-3.42		NOV 15	- 55.6					
NOV 16 NOV 17	-1265.907	-47.490			-1.78		NOV 16 NOV 17	-55.4					
NOV 17 NOV 18	-1444.085 -1313.624	1.867 46.496			-5.90		NOV 18	-54.0					
NOV 19	-1049.714	-1.966			-3.80		NOV 19	-53.6					
NOV 20	-1024.705	15.672			-2.32		NOV 20	-53.6					
NOV 21	-1175.964	10.729			-3.77		NOV 21	-54.1	57 21.71	019	81	74	
NOV 22	-1097.959	-36.218			-4.92		NOV 22	-53.6					
NOV 23	-1056.455	-43.501			-5.41		NOV 23	-54.3					
NOV 24 NOV 25	-1296.374	-9.341			-3.18		NOV 24 NOV 25	-54.2					
NOV 25 NOV 26	-1058.917 -1112.708	-16.985 24.355			-2.25		NOV 25	- 54.8					
NOV 27	-944.797	25.518			-1.73		NOV 27	-54.1					
NOV 28	-903.234	44.015			-1.87		NOV 28	-54.22					
NOV 29	-751.444	85.882	4.463		-1.14		NOV 29	-54.1					
NOV 30	-756.461	101.708			.28		NOV 30	-54.38		8 -1.87	00	21	
DEC 1	-1130.093	26.922			-1.04		DEC 1	-54.27					
DEC 2	-982.363	4.166			-3.35		DEC 2 DEC 3	-54.08					
DEC 3 DEC 4	-1006.094 -912.360	-86.476 27.331			-1.08		DEC 4	-54.75					
DEC 5	-965.450	-34.350			2.53		DEC 5	-55.55				53 20	
DEC 6	-932.504	34.468			10		DEC 6	- 56.22					
DEC 7	-729.260	-16.355			3.10		DEC 7	-55.86					
DEC 8	-720-675	-9.406	.008	2.160	00	2000	DEC 8	-56.02	8 12.86	3.16			
DEC 9	-1167.139	32.327	-7.450		2.71		DEC 9	-56.58					
DEC 10	-935.273	26.540			1.82		DEC 10	-56.19					
DEC 11	-1119.981	-19.220	1.806		63		DEC 11 DEC 12	-56.25					
	-1516 370	77 000	2 010										
DEC 12 DEC 13	-1516.370	77.982			1.41							52 31	
DEC 12 DEC 13 DEC 14	-1516.370 -1625.492 -1542.572	14.047	-1.738	-7.435	.92	0008	DEC 12 DEC 13 DEC 14	-55.41	7 29.33	225	3.0	31	
DEC 13	-1625.492		-1.738 -3.846	-7.435 -28.845		0008 9072	DEC 13	-55.41	7 29.33 9 27.60	225 1 -1.04	3.0 5.0	31 69	

TABLE I. Continued.

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LEVEL	100 MB. LATIN	JDE 70 CO	VARIANCE				LEVEL	100 MB. 1	ATITUDE 70	eddy	CORRELATI	on coep	Picients
DAY	TU	TV	TH	UV	UW	VW	DAY	TU	TV	TW	บง	UW	W
NOV 15	-8.527	41.865	560	-5.022	2.605	1.105	NOV 15	092	.397	276	020	.551	.205
NOV 16 NOV 17	-3.398	39.016 36.594	351	-33.401 -5.815	1.289	275 1.148	NOV 16 NOV 17	051	.392	258	165	.467	067
NOV 17	2.099	37.584	.108	-26.980	1.085	2.431	NOV 18	.035	.363	.059	140	.319	.415
NOV 19	-19.346	49.114	.381	-20.811	.380	4.001	NOV 19	346	.423	.105	146	.086	.435
NOV 20	-9.402	33.372	143	-18.325	1.582	1.872	NOV 20	129	.316	057	100	.362	.296
NOV 21 NOV 22	-5.272	54.254 71.094	528 -1.243	-55.887 -25.986	1.636	451 -2.418	NOV 21 NOV 22	089	.435	228	361	.570 .359	075
NOV 23	-13.426	80.843	-1.952	-74.779	234	868	NOV 23	165	.461	782	391	086	148
NOV 24	-12.135	68.998	847	-45.393	095	-3.198	NOV 24	191	.479	479		047	691
NOV 25	8.100	39.417 40.827	318 319	3.502	1.263	-1.809	NOV 25 NOV 26	.121	.268	174	.018	.512	333
NOV 26 NOV 27	10.415	37.422	434	-11.559	1.537	1.223	NOV 27	.145	.237	189	041	.370	.134
NOV 28	18.363	81.226	163	46.092	. 998	.353	NOV 28	.297	.435	097	.194	.465	.055
NOV 29	-37.958	39.119	.320	-108.545	.755	3.152	NOV 29	426	.208	.124	336	.170	.336
NOV 30 DEC 1	-21.026	29.471 32.487	211 916	-76.104 31.342	.883	.039 -6.608	NOV 30 DEC 1	339 435	.176	119 349	347	.381	.006 735
DEC 2	5.359	76.568	323	79.336	.615	.156	DEC 2	.058	.348	222	.233	.272	.029
DEC 3	8.760	23.596	225	-6.224	1.075	-1.412	DEC 3	.121	.121	126	023	.437	213
DEC 4	-1.979	-30.911	.369	-143.811	2.335	848	DEC 4 DEC 5	024 215	226	.187	483	.545	117
DEC 5 DEC 6	-12.137 7.970	-19.552 -29.481	.154	-101.240	.758	080 073	DEC 6	213	254	314	367	.350	014 021
DEC 7	-7.365	-27.365	396	-288.214	.115	1.259	DEC 7	084	194	267	771	.029	.199
DEC 8	16.096	-47.705	037	-389.977	.116	.433	DEC 8	.154	352	022	867	.021	.062
DEC 9	813 4.700	-19.617 -23.535	.072	-143.243 56.403	338	2.064	DEC 9 DEC 10	014	168	.083	612	195	.574
DEC 10 DEC 11	-16.840	-53.590	406	28.205	.752	1.127	DEC 11	358	499	351	.177	.439	.288
DEC 12	25.304	-44.428	.159	-135.062	.035	.519	DEC 12	.541	596	.136	829	.014	.127
DEC 13	24.940	-28.904	135	-172.711	-1.535	3.627	DEC 13	.486	577	092		246	.596
DEC 14 DEC 15	22.358 -31.513	-15.422 66.513	516 -2.527	-200.455	-3.830	5.514 .458	DEC 14 DEC 15	.528	452	426	805	433 .104	.774
				(U,V,W,T) B4			LEVEL	100 MB. I	ATITUDE 70		OF T, U,		W
DAY	TU	TV	TW	UV	UW	W	DAY	TBAF		VBA			
NOV 15	-1128.838	18.116	-4.078	-6.899	1.553	025	NOV 15	- 54 . 44					
NOV 16 NOV 17	-1311.435 -1084.603	39.367 -21.361	192	-17.741 7.978	.087	003 003	NOV 16	- 53 . 94					
NOV 18	-1078.349	15.764					NOV 17						
NOV 19	-1118.638		-4.884	-5.818	1.802	026	NOV 17 NOV 18	-54.05					
NOV 20		3.723	.894	-1.394	1.802 335	026	NOV 18 NOV 19	-54.05 -54.66	6 19.949 7 20.463	29 06	2.09 8.~.01	0 6	
	-1355.113	3.723 -1.946	.894 2.844	-1.394 .933	1.802 335 -1.364	026 .001 002	NOV 18 NOV 19 NOV 20	-54.05 -54.66 -53.16	6 19.949 7 20.463 7 25.488	29 06 .03	2 .09 8 ~.01 7 ~.05	0 6 3	
NOV 21 NOV 22	-1355.113 -1216.582	3.723 -1.946 19.190	.894 2.844 -5.179	-1.394 .933 -8.073	1.802 335 -1.364 2.179	026 .001 002 034	NOV 18 NOV 19 NOV 20 NOV 21	-54.05 -54.66 -53.16 -53.77	6 19.949 7 20.463 7 25.488 8 22.622	29 06 .03 35	2 .09 8 ~.01 7 ~.05 7 .09	0 6 3 6	
NOV 22 NOV 23	-1355.113	3.723 -1.946	.894 2.844 -5.179 1.231 -4.940	-1.394 .933 -8.073 -38.881 9.195	1.802 335 -1.364	026 .001 002	NOV 18 NOV 19 NOV 20 NOV 21 NOV 22 NOV 23	-54.05 -54.66 -53.16 -53.77 -53.77 -53.61	6 19.949 7 20.463 7 25.488 8 22.622 8 19.708 1 6.68	29 06 .03 35 -1.97	2 .09 8 ~.01 7 ~.05 7 .09 3 ~.02	0 6 3 6 3	
NOV 22 NOV 23 NOV 24	-1355.113 -1216.582 -1059.877 -358.368 -536.440	3.723 -1.946 19.190 106.093 -73.746 -19.847	.894 2.844 -5.179 1.231 -4.940 -3.804	-1.394 .933 -8.073 -38.881 9.195 3.712	1.802 335 -1.364 2.179 451 .616 .712	026 .001 002 034 .045 .127 .026	NOV 18 NOV 19 NOV 20 NOV 21 NOV 22 NOV 23 NOV 24	-54.05 -54.66 -53.16 -53.77 -53.77 -53.61 -53.55	6 19.949 7 20.463 7 25.488 8 22.622 8 19.708 1 6.689 6 10.017	29 06 .03 35 -1.97 1.37 .37	2 .09 8 ~.01 7 ~.05 7 .09 3 ~.02 6 .09 1 .07	0 6 3 6 3 2 1	
NOV 22 NOV 23 NOV 24 NOV 25	-1355.113 -1216.582 -1059.877 -358.368 -536.440 -523.176	3.723 -1.946 19.190 106.093 -73.746 -19.847 -18.950	.894 2.844 -5.179 1.231 -4.940 -3.804 -5.940	-1.394 .933 -8.073 -38.881 9.195 3.712 3.435	1.802 335 -1.364 2.179 451 .616 .712 1.077	026 .001 032 034 .045 .127 .026 .039	NOV 18 NOV 19 NOV 20 NOV 21 NOV 22 NOV 23 NOV 24 NOV 25	-54.05 -54.66 -53.16 -53.77 -53.61 -53.55 -53.72	6 19.949 7 20.463 7 25.488 8 22.622 8 19.708 1 6.689 6 10.017 2 9.739	29 06 .03 35 -1.97 1.37 .37	2 .09 8 ~.01 7 ~.05 7 .09 3 ~.02 6 .09 1 .07 3 .11	0 6 3 6 3 2 1 1	
NOV 22 NOV 23 NOV 24	-1355.113 -1216.582 -1059.877 -358.368 -536.440 -523.176 -500.299	3.723 -1.946 19.190 106.093 -73.746 -19.847 -18.950 18.597	.894 2.844 -5.179 1.231 -4.940 -3.804 -5.940 -3.002	-1.394 .933 -8.073 -38.881 9.195 3.712 3.435 -3.088	1.802 335 -1.364 2.179 451 .616 .712 1.077 .498	026 .001 002 034 .045 .127 .026 .039 019	NOV 18 NOV 19 NOV 20 NOV 21 NOV 22 NOV 23 NOV 24	-54.05 -54.66 -53.16 -53.77 -53.61 -53.55 -53.72 -54.88	6 19.949 7 20.46 7 25.48 8 22.62 8 19.70 1 6.68 6 10.01 2 9.73 9 9.11	29 06 .03 35 -1.97 1.37 .37 .35 33	2 .09 801 705 7 .09 302 6 .09 1 .07 3 .11 9 .05	0 6 3 6 3 2 1 1 5	
NOV         22           NOV         23           NOV         24           NOV         25           NOV         26           NOV         27           NOV         28	-1355 113 -1216 582 -1059 877 -358 368 -536 440 -523 176 -500 299 -258 470 -325 506	3.723 -1.946 19.190 106.093 -73.746 -19.847 -18.950 18.597 46.115 128.381	.894 2.844 -5.179 1.231 -4.940 -3.804 -5.940 -3.002 032 -3.508	-1.394 .933 -8.073 -38.881 9.195 3.712 3.435 -3.088 -4.029 -14.127	1.802 335 -1.364 2.179 451 .616 .712 1.077 .498 .003 .386	026 .001 002 034 .045 .127 .026 .039 019 001 152	NOV         18           NOV         19           NOV         20           NOV         21           NOV         22           NOV         23           NOV         24           NOV         26           NOV         26           NOV         27           NOV         28	-54.05 -54.66 -53.16 -53.77 -53.61 -53.55 -53.72 -54.86 -54.38 -54.38	6 19.949 7 20.465 7 25.488 8 22.622 8 19.700 1 6.689 6 10.012 2 9.739 9 9.111 9 4.752 9 5.985	29 06 .03 35 -1.97 1.37 .37 .35 33 84 -2.36	2 .09 801 705 7 .09 302 6 .09 1 .07 3 .11 9 .05 8 .00 0 .06	0 6 3 6 3 2 1 1 5 1	
NOV         22           NOV         23           NOV         24           NOV         25           NOV         26           NOV         27           NOV         28           NOV         29	-1355 113 -1216 582 -1059 877 -358 368 -536 440 -523 176 -500 299 -258 470 -325 506 -276 047	3.723 -1.946 19.190 106.093 -73.746 -19.847 -18.950 18.597 46.115 128.381 9.366	.894 2.844 -5.179 1.231 -4.940 -3.804 -3.804 -3.002 032 032 -3.508 -8.358	-1.394 .933 -8.073 -38.881 9.195 3.712 3.435 -3.088 -4.029 -14.127 946	1.802 335 -1.364 2.179 451 .616 .712 1.077 .498 .003 .386 .801	026 .001 002 034 .045 .127 .026 .039 019 001 152 029	NOV         18           NOV         19           NOV         20           NOV         21           NOV         23           NOV         23           NOV         24           NOV         25           NOV         26           NOV         27           NOV         28           NOV         28           NOV         28	-54.05 -54.66 -53.77 -53.77 -53.61 -53.55 -53.72 -54.86 -54.36 -54.36	6 19.949 7 20.462 7 25.488 8 22.622 8 19.700 1 6.682 6 10.017 2 9.733 9 9.112 9 4.752 9 5.988 7 5.144	29 06 .03 35 -1.97 1.37 .37 .35 33 33 84 -2.36 18	2 .09 8 ~.01 7 ~.05 7 .09 3 ~.02 6 .09 1 .07 3 .11 9 .05 8 .00 0 .06 4 .15	0 6 3 6 3 2 1 1 5 1 4 6	
NOV         22           NOV         23           NOV         24           NOV         25           NOV         26           NOV         27           NOV         28           NOV         29           NOV         30	-1355,113 -1216,582 -1059,877 -358,368 -536,440 -523,176 -500,299 -258,470 -325,506 -276,047 -72,198	3.723 -1.946 19.190 106.093 -73.746 -19.847 -18.950 18.597 46.115 128.381 9.866 -8.510	.894 2.844 -5.179 1.231 -4.940 -3.804 -5.940 -3.002 032 032 -3.508 -8.358 -1.817	-1.394 .933 -8.073 -38.881 9.195 3.712 3.435 -3.088 -4.029 -14.127 946 .214	1.802 335 -1.364 2.179 451 .616 .712 1.077 .498 .003 .386 .801 .046	026 .001 002 034 .045 .127 .026 .039 019 001 152 029 .005	NOV         18           NOV         19           NOV         20           NOV         21           NOV         23           NOV         24           NOV         26           NOV         26           NOV         27           NOV         28           NOV         28           NOV         28           NOV         30	-54.05 -54.66 -53.77 -53.61 -53.57 -53.61 -53.72 -54.86 -54.36 -54.36 -53.60	6 19.949 7 20.46 7 25.48 8 22.62 8 19.70 1 6.68 6 10.01 2 9.73 9 9.11 9 4.75 9 5.98 7 5.144 1 1.34	29 06 .03 35 -1.97 1.37 .35 33 84 -2.36 18 .15	2 .09 801 705 7 .09 302 6 .09 1 .07 3 .11 9 .05 8 .00 0 .06 4 .15 9 .03	0 6 3 6 3 2 1 1 5 5 1 4 6 4	
NOV         22           NOV         23           NOV         24           NOV         25           NOV         26           NOV         27           NOV         28           NOV         29           NOV         30           DEC         1           DEC         2	-1355 113 -1216 582 -1059 877 -358 368 -536 440 -523 176 -500 299 -258 470 -325 506 -276 047	3.723 -1.946 19.190 106.093 -73.746 -19.847 -18.950 18.597 46.115 128.381 9.366	.894 2.844 -5.179 1.231 -4.940 -3.804 -3.804 -3.002 032 032 -3.508 -8.358	-1.394 .933 -8.073 -38.881 9.195 3.712 3.435 -3.088 -4.029 -14.127 946	1.802 335 -1.364 2.179 451 .616 .712 1.077 .498 .003 .386 .801	026 .001 002 034 .045 .127 .026 .039 019 001 152 029	NOV         18           NOV         19           NOV         20           NOV         21           NOV         23           NOV         23           NOV         24           NOV         25           NOV         26           NOV         27           NOV         28           NOV         28           NOV         28	-54.05 -54.66 -53.77 -53.77 -53.61 -53.55 -53.72 -54.86 -54.36 -54.36	6 19.949 7 20.46 7 25.48 8 22.62 8 19.700 1 6.68 6 10.01 2 9.73 9 9.11 9 4.755 9 5.98 7 5.144 1 1.34 9 1.619	29 06 .03 35 -1.97 .35 33 33 84 -2.36 18 .15 -1.05	2 .09 801 705 7 .09 302 6 .09 1 .07 3 .11 9 .05 8 .00 0 .06 4 .15 9 .03 500	0 6 3 6 3 2 1 1 5 5 1 4 6 4 7	
NOV         22           NOV         23           NOV         24           NOV         25           NOV         25           NOV         27           NOV         28           NOV         29           NOV         30           DEC         1           DEC         2           DEC         3	-355,113 -1216,582 -1059,877 -358,368 -536,440 -522,176 -500,299 -258,470 -325,506 -276,047 -72,198 -86,425 -240,920 -187,921	3.723 -1.946 19.190 106.093 -73.746 -19.847 -18.950 18.597 46.115 128.381 9.866 -8.510 56.335 35.784 -26.836	.894 2.844 -5.179 1.231 -4.940 -3.804 -5.940 -3.002 032 -3.508 -8.358 -1.817 .381 4.929 .408	-1.394 .933 -8.073 -38.881 9.195 3.712 3.435 -3.088 -4.029 -14.127 946 .214 -1.708 -3.012 1.807	1.802 335 -1.364 2.179 451 .616 .712 1.077 .498 .003 .386 .801 .046 012 415 027	$\begin{array}{c}026\\ .001\\002\\034\\ .045\\ .127\\ .026\\ .039\\019\\001\\152\\029\\ .005\\ .008\\ .062\\004\end{array}$	NOV         18           NOV         19           NOV         21           NOV         22           NOV         23           NOV         24           NOV         25           NOV         26           NOV         27           NOV         28           NOV         29           NOV         30           DEC         1           DEC         3	-54.05 -53.16 -53.77 -53.77 -53.61 -53.55 -53.72 -54.86 -53.55 -54.36 -54.36 -54.36 -53.61 -53.36 -53.36 -53.22.83	6         19.945           7         20.465           7         25.481           8         22.622           8         19.700           1         6.681           6         10.017           2         9.733           9         4.152           9         5.988           7         5.1444           1         1.344           9         1.615           0         4.505           3         3.557	29 06 03 35 -1.97 1.37 .37 35 33 84 -2.36 18 .15 66 .50	2 .09 801 705 7 .09 302 6 .09 1 .07 3 .11 9 .05 8 .00 0 .06 4 .15 9 .03 500 809 800	0 6 3 6 3 2 1 1 5 5 1 4 6 4 7 2 8	
NOV         22           NOV         23           NOV         24           NOV         25           NOV         26           NOV         27           NOV         28           NOV         29           NOV         30           DEC         1           DEC         2           DEC         3           DEC         4	-1355 113 -1216 582 -1059 877 -358 368 -536 440 -522 176 -500 299 -258 470 -325 506 -276 047 -72 198 -86 425 -240 920 -187 921 -166 958	3.723 -1.946 19.190 106.093 -73.746 -19.847 -18.950 18.597 46.115 128.381 9.866 -8.510 56.335 35.784 -26.836 25.992	.894 2.844 -5.179 1.231 -4.940 -3.804 -5.940 -3.002 032 -3.508 -8.358 -1.817 .381 4.929 .408 -6.931	-1.394 .933 -8.073 -38.881 9.195 3.712 3.435 -3.088 -4.029 -14.127 946 .214 -1.708 -3.012 1.807 -1.545	1.802 335 -1.364 2.179 451 .616 .712 1.077 .498 .003 .386 .801 .046 012 415 027 .412	026 .001 002 034 .045 .127 .026 .039 019 001 152 029 .005 .008 .062 004 064	NOV 18 NOV 29 NOV 22 NOV 21 NOV 22 NOV 23 NOV 24 NOV 25 NOV 25 NOV 26 NOV 27 NOV 28 NOV 27 NOV 28 NOV 29 NOV 29 NOV 20 DEC 1 DEC 2 DEC 3	-54.05 -54.66 -53.17 -53.77 -53.65 -53.55 -53.72 -54.86 -54.38 -54.38 -54.38 -54.38 -54.38 -53.61 -53.61 -53.38 -53.55 -52.83 -52.83	6 19.944 7 20.46 7 25.481 8 22.622 8 19.702 1 6.681 6 10.01 2 9.733 9 9.11 9 9.713 9 9.11 9 9.73 9 9.11 9 9.73 9 9.11 9 9.73 9 9.11 9 9.73 9 9.11 9 9.73 9 9.11 9 9.73 9 9.11 9 9.73 1.34 <sup>4</sup> 1.34 <sup>4</sup> 0 4.55 3 3.55 <sup>7</sup> 0 3.15 <sup>6</sup>	29 06 06 3 35 1.97 1.97 35 35 35 35 35 35 35 35	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0 6 3 6 3 2 1 1 5 5 1 4 6 6 4 7 2 8 8 1	
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NOV         22           NOV         23           NOV         24           NOV         25           NOV         26           NOV         27           NOV         28           NOV         27           NOV         28           NOV         29           NOV         20           DEC         1           DEC         30           DEC         4           DEC         5           DEC         6           DEC         7	$\begin{array}{c} -355,113\\ -1216,582\\ -1059,877\\ -358,366\\ -536,440\\ -523,176\\ -500,292\\ -258,470\\ -325,506\\ -276,047\\ -72,198\\ -86,425\\ -26,047\\ -72,198\\ -86,425\\ -246,920\\ -187,921\\ -166,958\\ 74,804\\ 146,241\\ -1,731\\ \end{array}$	3.723 -1.946 19.190 106.093 -73.746 -19.847 -18.950 18.597 46.115 128.381 9.866 -8.510 56.335 35.784 -26.836 25.992 -116.229 -46.502 47.843	.894 2.844 5.179 1.231 -4.940 -3.804 -5.940 -3.002 -032 -032 -032 -032 -1.817 4.929 -408 -6.931 -11.192 -3.061 -8.358	-1.394 .933 -8.073 -38.881 9.195 3.712 3.435 -3.088 -4.029 -14.127 946 .214 +1.708 -3.012 1.807 -1.545 -2.886 =2.195 026	1.802 335 -1.364 2.179 451 .616 .712 1.077 .498 .003 .386 012 415 027 .412 278 412 278 144	-026 .001 -002 -034 045 127 026 039 -019 -001 -152 -029 005 008 062 -004 -064 -322 064 -064 -127	NOV         18           NOV         19           NOV         20           NOV         21           NOV         22           NOV         24           NOV         25           NOV         26           NOV         27           NOV         20           NOV         20           DOC         29           NOV         30           DEC         3           DEC         4           DEC         5           DEC         6           DEC         6	-54, 05 -54, 06 -53, 16 -53, 77 -53, 61 -53, 55 -53, 75 -54, 36 -54, 38 -54, 38 -53, 61 -53, 61 -53, 35 -53, 50 -52, 83 -53, 50 -54, 88 -53, 55 -54, 88 -53, 55 -54, 88 -53, 55 -55, 66 -55, 66 -56, 27	6         19.944           7         20.463           7         25.481           8         22.623           8         19.703           1         6.681           6         10.013           9         9.112           9         9.732           9         9.112           9         4.752           9         5.988           7         5.144           1         1.344           9         1.650           3         3.557           9         -1.362           7         -2.627           8         .031	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0 6 3 6 3 2 1 1 5 1 4 6 4 7 2 8 1 4 5 9	
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NOV 22 NOV 22 NOV 23 NOV 25 NOV 25 NOV 25 NOV 27 NOV 28 NOV 29 NOV 30 DEC 1 DEC 3 DEC 4 DEC 5 DEC 6 DEC 7 DEC 6 DEC 7 DEC 10 DEC 11 DEC 11 DEC 11	$\begin{array}{c} -355,113\\ -1216,582\\ -1059,877\\ -358,366\\ -536,440\\ -523,176\\ -500,292\\ -258,2470\\ -325,506\\ -276,047\\ -72,198\\ -86,425\\ -246,920\\ -187,921\\ -166,958\\ 74,804\\ 146,241\\ -1,731\\ -35,525\\ 281,951\\ -54,985\\ -812,593\\ -812,593\\ -1127,735\end{array}$	3.723 -1.946 19.190 106.093 -73.746 -19.847 -18.950 18.597 46.115 128.381 9.866 -8.510 56.335 55.784 -26.836 25.992 -116.229 -46.502 47.843 9.196 -49.616 -12.085 70.690 20.730	.894 2.844 5.179 1.231 -4.940 -3.804 -5.940 -3.002 -0.32 -0.32 -0.32 -0.32 -1.817 -1.817 -1.192 -3.061 -1.192 -3.061 -7.623 3.402 5.088 -7.621 1.441	-1.394 .933 -8.073 -38.881 9.195 3.712 3.435 -3.088 -4.029 -14.127 946 .214 +1.708 -3.012 1.807 -1.545 -2.886 -2.195 026 .104 -4.314 -2.12 -16.913 -6.631	$\begin{array}{c} 1.802\\335\\ -1.364\\ 2.179\\451\\ .616\\ .712\\ 1.077\\ .498\\ .003\\ .386\\ .801\\ .046\\ .801\\ .046\\ .801\\ .042\\415\\027\\ .412\\278\\142\\ .005\\ .006\\ .089\\ .089\\ 1.823\\ .461\end{array}$	$\begin{array}{c}026\\ .001\\002\\034\\ .045\\ .127\\ .026\\ .039\\019\\001\\152\\029\\ .005\\ .008\\ .062\\004\\064\\ .432\\ .046\\127\\022\\ .046\\127\\052\\052\\052\\052\\059\\ .009\end{array}$	NOV 18           NOV 20           NOV 20           NOV 21           NOV 22           NOV 24           NOV 24           NOV 24           NOV 28           NOV 24           NOV 28           NOV 29           NOV 20           DEC 1           DEC 2           DEC 4           DEC 5           DEC 6           DEC 7           DEC 8           DEC 10           DEC 11           DEC 12	-54, 05 -54, 06 -53, 16 -53, 77 -53, 61 -53, 55 -53, 77 -53, 65 -54, 38 -54, 38 -53, 61 -53, 33 -53, 61 -53, 33 -53, 61 -53, 33 -53, 61 -54, 88 -55, 66, 02 -56, 27 -56, 02 -56, 28 -55, 94 -55,		$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0 6 3 6 3 2 1 1 5 1 4 6 4 7 2 8 1 4 5 9 6 0 1 1 4 4	
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TABLE I. Continued.

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Such a comparison quickly reveals that a consistent difference exists between the negative v'w' covariances for the two cases. After the polar night vortex breakdown of January 1958, characteristic magnitudes of the negative v'w' covariances are about 10 kt km day<sup>-1</sup>. For the present case, however, where the polar night vortex is in its formative stage, the characteristic magnitude is approximately 2 kt km day<sup>-1</sup>. Thus, it appears probable that the northward eddy debris transport characteristics differ by about a factor of five for the two cases under comparison.

The above hypothesis cannot be verified or disproven until such computations are made continuously through the various seasonal transitions in the lower stratosphere. A <u>complete</u> examination of the mechanisms of trace substance transport in these regions cannot be performed until measurements of such substances are available at approximately the same density as the radiosonde network. If such data were available, the flux calculations could be made directly in terms of the trace substance distributions.

The computations of the T'v' covariance given in Table I show persistent positive values at the lower two latitudes throughout the computation period. As may be seen in Fig. 2 this implies that the eddies are acting to transport heat against the mean temperature gradient. This observation is in agreement with results obtained by previous investigators (Priestly, 1949; White, 1954; Piexoto, 1960; Murakami, 1962; Peng, 1963; Mahlman, 1966). At the two higher latitudes, the T'v' covariances are initially positive, but decrease to zero and then to negative values shortly after 1 December. This sudden reversal in sign of T'v' covariance occurs at the same time as the pronounced cooling in the northernmost latitudes seen in Fig. 3. It remains to be seen what constitutes the physical cause for this rapid reversal in the sign of the northward eddy heat flux.

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The measurement of T'u' covariances given in Table I shows some very interesting results. At 40<sup>°</sup>N the T'u' covariance is a small positive value for the entire computation period. At  $50^{\circ}$  and  $60^{\circ}$ N for both levels T'u' is initially positive, decreasing to large negative values toward the end of the period. However, at  $70^{\circ}$ N the opposite effect is noted--initially small negative values increasing to moderate positive values toward the end of the period. At first glance such apparently contradictory behavior is very perplexing. The reason that  $\overline{T'u'}$  can be strongly negative at one latitude and be simultaneously positive at an adjacent latitude may be seen in Fig. 5. This figure is a schematic representation of the large scale flow conditions at 50 mb and is approximately representative of the circulation pattern between 1 and 10 December 1958. The plus, zero, and minus signs tabulated at discrete intervals along the 60° and 70°N latitude circles indicate the algebraic sign of the T'u' product at each point inferred qualitatively from the streamline and temperature patterns. This figure clearly demonstrates that large negative and positive values of  $\overline{T'u'}$  are expected at 60<sup>°</sup> and 70<sup>°</sup>N, respectively, for such an asymmetric polar vortex. This is in agreement with the observed differences in T'u' at these two latitudes.

The u'v' covariances given in Table I show that the northward eddy momentum transport is consistently positive throughout the time period at the lower two latitudes. At the higher latitudes  $\overline{u'v'}$  is initially positive but decreases to strongly negative values over the approximate period 5-10 December. In general, while the u'v' covariances are decreasing, the mean zonal speed  $\overline{u}$  is also decreasing. However, when  $\overline{u}$  begins to increase again,  $\overline{u'v'}$  is still negative. This suggests that the increase in zonal momentum toward the end of the computation period cannot be explained by the northward eddy flux, but is probably due to an upward flux of momentum through the tropopause.

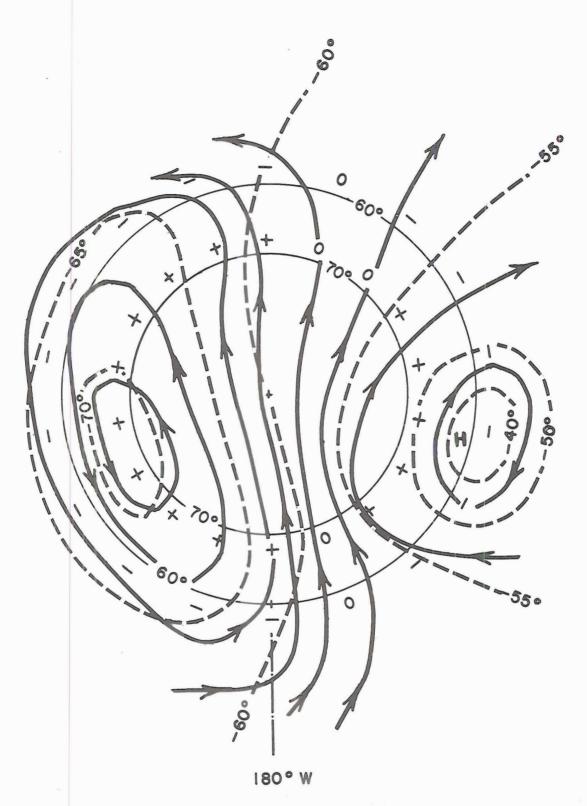


FIG. 5. Schematic diagram of typical 50 mb circulation over the pole from 1—10 December 1958. The +, 0, and - signs indicate the algebraic sign of the local T'u' product and demonstrate how T'u' can be strongly positive at one latitude and be just as strongly negative at an adjacent latitude.

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Table I also gives the T'w' covariances and show consistently small but negative values at  $40^{\circ}$ N. At  $50^{\circ}$  and  $60^{\circ}$ N the values are negligibly small while at  $70^{\circ}$ N they become negative again. This qualitatively indicates a buildup of eddy available potential energy in the highest and lowest latitudes under consideration. In most cases, however, the  $\overline{T'w'}$  values are too small to allow a great deal of confidence in them.

The u'w' covariances are negative at  $40^{\circ}$ N for the entire computation period. At 50° and 60°N, however, they are initially negative, but increase to small positive values toward the end of the period. On the other hand, u'w' at 70°N is positive at the onset and becomes negative by 12 December.

Of all the eddy transport quantities, the most pronounced is that of the T'v' covariance. As will be shown in the next two chapters, the large variation of this quantity has a definite modifying effect on the thermodynamics of the polar stratosphere.

## III. MEAN MERIDIONAL CIRCULATIONS IN THE STRATOSPHERE DURING THE COMPUTATION PERIOD

In the previous section detailed measurements of the stratospheric eddy fluxes during the period 15 November to 15 December 1958 were presented. This section will contain results of computations of stratospheric mean meridional circulations deduced indirectly from the results of the tabulations in Chapter II.

The possible presence of mean meridional circulations in the stratosphere is of great interest not only because of its importance to the transport of trace substances, but from a dynamical point of view as well. Brewer (1949) hypothesized the existence of a potential energy consuming direct meridional cell in the stratosphere. In view of the discovery of an indirect cell in the mid-latitude troposphere, however, it was realized that such a cell might also characterize some regions of the stratosphere as well.

Because a mean meridional cell usually is present as a small residual on a nearly geostrophic circulation in the earth's atmosphere, detection of such a cell by direct techniques often proves to be very difficult. However, the data taken during the International Geophysical Year have proven to be of sufficient accuracy to provide consistent computational results. Many studies have been undertaken using these data, most prominently by the members of the Planetary Circulations Project at the Massachusetts Institute of Technology. Members of this project have attempted to solve the stratospheric meridional cell problem by employing two distinct approaches. Oort (1962) made direct measurements by averaging over longitude the time mean v components at individual stations. His results showed a net equatorward motion at 100 mb in lower latitudes and a net poleward motion at polar latitudes and that a well-pronounced indirect cell apparently exists in the polar night stratosphere. The second approach employed by the MIT group and others is based on deductions of the

meridional circulation from momentum budget calculations (Palmen, 1955; Kuo, 1956; Palmén, Riehl, and Vuorela, 1958; Haurwitz, 1961; Dickenson, 1962; Miyakoda, 1963; Gilman, 1963, 1964; Newell and Miller, 1964). The computations of Dickenson (1962), Miyakoda (1963) and Newell and Miller (1964) all point to the existence of an indirect cell in the polar night stratosphere.

Other investigators have employed a thermodynamic approach (Jensen, 1961; Murgatroyd and Singleton, 1961; Teweles, 1963; Mahlman, 1966). Jensen (1961) and Teweles (1963) computed adiabatic vertical motions at single points and then averaged these values around latitude circles. These computations pointed to the existence of an indirect cell in the polar night stratosphere. Murgatroyd and Singleton (1961) used a heat flux model in which the effect of eddy heat transport was neglected. Their computation for the high latitude winter stratosphere indicated a direct circulation. Mahlman (1966) employed a method conceptually similar to that of Murgatroyd and Singleton, but the effect of eddy heat transport was included. The results showed that the eddy heat flux gave by far the largest contribution to the mean vertical motion and that rising motion was present over the polar regions for the entire computation period. The computed mean meridional circulation was indirect before and during the breakdown of the polar vortex and direct afterward. This is in accordance with the reversal of the meridional temperature gradient after the breakdown.

Earlier investigators on the problem of trace substance transport in the lower stratosphere concluded that a direct circulation with sinking over the pole was necessary to reconcile the circulation with the observed sense of these transports (Brewer, 1949; Goldie, 1950; Dobson, 1956; Stewart et al., 1957; Palmer, 1959).

On the basis of the quantitative mean cell computations given above and previous papers by Newell (1961, 1963a, b, 1964) and by the author (Mahlman, 1966), it appears reasonable to hypothesize at this time that the majority of the northward and downward debris transport is attributable to the effects of eddies. The intent of the following mean cell computation, along with the eddy transport calculations of Chapter II, is to test the applicability of this hypothesis during the chosen period of intensification of the polar night circulation. Such computations for similar and for differing conditions are necessary in order to check the original hypotheses and to understand the effect of differing seasonal, thermodynamical, and dynamical conditions on such mean circulations. Also, because any indirect calculation of a mean meridional cell must depend upon the accuracy of a number of terms, there is always some uncertainty as to the validity of the computational results.

### Computational Scheme for the Mean Meridional Cell

The expression for the vertical motion, obtained by solving the thermodynamic equation for w, is given by Eq. (1). However, as argued previously, the  $\frac{\partial T}{\partial t}$  and  $\vec{V}_2 \cdot \nabla T$  terms in Eq. (1) are to be measured on pressure surfaces.

By expanding  $\vec{V}_2 \cdot \nabla T$  in Eq. (1) and averaging over the area north of a given latitude circle (indicated by ~) one obtains

$$w\left(\frac{\partial T}{\partial z} + \frac{g}{c_{p}}\right) = \frac{1}{c_{p}}\frac{dh}{dt} - \frac{\partial T}{\partial t} - \nabla \cdot \vec{\nabla}_{2}T + T\nabla \cdot \vec{\nabla} . \quad (4)$$

One may define the following averages applicable to this problem

$$\begin{split} \mathbf{T} &= \ \mathbf{\widetilde{T}} + \mathbf{T}^{\dagger} &= \ \mathbf{\widetilde{T}} + \mathbf{T}^{\ast} \\ \mathbf{v} &= \ \mathbf{\widetilde{v}} + \mathbf{v}^{\ast} \\ \mathbf{w} &= \ \mathbf{\widetilde{w}} + \mathbf{w}^{\ast} \\ \nabla \cdot \mathbf{\widetilde{V}}_{2} &= \ \mathbf{\nabla} \cdot \mathbf{\widetilde{V}}_{2} + (\nabla \cdot \mathbf{\widetilde{V}}_{2})^{\ast} , \end{split}$$

where the " " represents an average around a latitudinal circle, the " ' " is a point deviation from this average, "  $\sim$  " represents the area average, and " \* " is the point deviation from this area average.

By using the divergence theorem, the third term on the right-hand side of Eq. (4) can be expressed in terms of a line integral along the boundary in the form

$$-\nabla \cdot \vec{\nabla}_2 T = \frac{1}{A} \oint_{\Phi} T v \, dx \tag{6}$$

where A is the total area enclosed by the latitude circle  $\phi$ , and x is the distance around the earth at latitude  $\phi$ . Applying the definitions  $v = \overline{v} + v'$  and  $T = \overline{T} + T'$  and substituting in Eq. (6) gives

$$-\overline{\nabla \cdot \overline{\nabla}_2 T} = \frac{1}{A} \oint_{\phi} T v \, dx = \frac{1}{A} \oint_{\phi} T' v' \, dx + \frac{1}{A} \oint_{\phi} \overline{T} \overline{v} \, dx \qquad (7)$$

since the closed integrals around a latitude circle of the cross products  $\overline{v}T'$  and  $v'\overline{T}$  must vanish identically. Now by substituting Eq. (7) into Eq. (4), expanding all terms in Eq. (4) in terms of the area averages given in Eq. (5) and dropping terms which vanish identically, Eq. (4) yields

$$\widetilde{w} \left(\frac{\partial \widetilde{T}}{\partial z} + \frac{g}{c_{p}}\right) + \widetilde{w* \frac{\partial T^{*}}{\partial z}} = \frac{\widetilde{1}}{c_{p}} \frac{dh}{dt} - \frac{\partial \widetilde{T}}{\partial t} + \frac{1}{A} \oint_{\phi} T'v' dx + \frac{1}{A} \oint_{\phi} \overline{Tv} dx$$

$$(8)$$

$$+ \widetilde{T} \left(\overline{v \cdot v_{2}}\right) + T^{*} \left(\overline{v \cdot v_{2}}\right) *$$

Now, if it is assumed that  $(\nabla \cdot \vec{\nabla}_2)^* = -\frac{\partial w^*}{\partial z}$  and the  $\nabla \cdot \vec{\nabla}_2$  term is written in line integral form similar to Eq. (6), Eq. (8) becomes

Finally, by expressing the fourth and fifth terms on the right side of Eq. (8) in integrated form and combining the last two terms, one obtains the equation for the vertical component of the mean meridional circulation

$$\widetilde{w} = \frac{1}{\frac{\partial \widetilde{T}}{\partial z} + \frac{g}{c_{p}}} \left[ \underbrace{\frac{1}{c_{p}} \frac{dh}{dt}}_{p} - \frac{\partial \widetilde{T}}{\partial t} + \frac{1}{A} \oint_{\phi} T'v' dx + \frac{v}{A} (\widetilde{T} - \widetilde{T}) - \frac{\partial}{\partial z} (\widetilde{w*T*}) \right]$$
(10)

Eq. (10) is now in a very convenient form because once this equation is multiplied by  $\frac{\partial \widetilde{T}}{\partial z} + \frac{g}{c_p}$ , each term has physical significance in terms of the heat budget of the area under consideration. The term on the left represents the temperature change due to a mean rising or sinking motion over the area. The  $\frac{1}{c_p}$   $\frac{dh}{dt}$  term is the contribution due to non-adiabatic heating effects.  $\frac{\partial \widetilde{T}}{\partial t}$  is the observed temperature change, and  $\frac{1}{A} \oint_{\phi} v'T'$  dx is the horizontal eddy flux. The  $\frac{Vx}{A}$  ( $\overline{T} - \widetilde{T}$ ) represents the heating in the area due to a mean horizontal inflow (or outflow) when the boundary temperature differs from the internal temperature. Finally,  $\frac{\partial}{\partial z}$  (w\*T\*) gives the heating due to an upward (or downward) eddy heat flux.

#### Computation of the Mean Cell

Eq. (10) derived above will now be used to calculate the sense and magnitude of the mean cell for the chosen period. The first, fourth, and fifth terms on the right-hand side of Eq. (10) are all difficult to evaluate to a satisfactory degree of accuracy. However, the first term can be estimated with some reliability. On the basis of the works by Ohring (1958), Davis (1963), and Kennedy (1964), a mean  $\frac{1}{c_p} \frac{dh}{dt}$  of  $-1^{\circ}$  C/day was assumed for the entire polar cap.

The second term in Eq. (9) was evaluated by plotting successive charts of mean temperature ( $\overline{T}$ ) with respect to sine of latitude (Fig. 2) and by determining graphically the mean temperature change north of the chosen latitude for five-day increments.

The third term  $(\frac{1}{A} \oint_{\phi} T'v' dx)$  was determined by taking five-day weighted averages of  $\overline{T'v'}$  and substituting this result into the integrated form of term three,  $\frac{x}{A} \overline{T'v'}_{\phi}$ . This procedure was repeated for each latitude and at 100 and 50 mb, respectively.

The fourth term  $(\frac{\nabla x}{A}(\overline{T} - \widetilde{T}))$  cannot be evaluated directly because  $\overline{v}$  depends upon a prior knowledge of the mean meridional circulation. However, it can be determined iteratively by solving for  $\widetilde{w}$  without this term included, using the calculated  $\widetilde{w}$  to get an estimate of  $\overline{v}$ , and then making a new calculation including the term, etc. Because of the relatively small contribution of this term, very few iterations are necessary. In the case under investigation here, this procedure is unnecessary because  $\overline{T} - \widetilde{T}$  is negligibly small in higher latitudes (except for the period 10-15 December) (see Fig. 2).

Finally, the fifth term  $(\frac{\partial}{\partial z} (w*T*))$  is probably quite small in the stratosphere, due to the nearly isothermal temperature distribution in the vertical. It can be directly computed provided that sufficiently detailed vertical motion fields are available. This is probably not the case. However, the previous report (Mahlman, 1966) showed that consistent vertical motion fields could be determined for the synoptic and planetary scales. Efforts to evaluate this term have indicated that its probable magnitude is less than  $0.1^{\circ}$ C per day. Consequently, for this calculation the term will be neglected.

In its present form Eq. (10) only computes the mean cell north of a given latitude circle. However, one can evaluate  $\widetilde{w}$  for intermediate latitude bands by solving the expressions (Mahlman, 1966)

$$\frac{A^{*}_{40}\circ -50^{\circ}}{A^{*}_{40}\circ -90^{\circ}} \widetilde{w}_{40}\circ -50^{\circ} + \frac{A^{*}_{50}\circ -90^{\circ}}{A^{*}_{40}\circ -90^{\circ}} \widetilde{w}_{50}\circ -90^{\circ} = \widetilde{w}_{40}\circ -90^{\circ}$$
(11a)

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$$\frac{A^{*}_{50}\circ_{-60}\circ}{A^{*}_{50}\circ_{-90}\circ} \widetilde{w}_{50}\circ_{-60}\circ + \frac{A^{*}_{60}\circ_{-90}\circ}{A^{*}_{50}\circ_{-90}\circ} \widetilde{w}_{60}\circ_{-90}\circ = \widetilde{w}_{50}\circ_{-90}\circ$$
(11b)

$$\frac{A_{60}^{*} - 70^{\circ}}{A_{60}^{*} - 90^{\circ}} \widetilde{w}_{60}^{\circ} - 90^{\circ} + \frac{A_{70}^{*} - 90^{\circ}}{A_{60}^{*} - 90^{\circ}} \widetilde{w}_{70}^{\circ} - 90^{\circ} = \widetilde{w}_{60}^{\circ} - 90^{\circ} \quad (11c)$$

for  $\widetilde{w}_{40} \circ_{-50} \circ$ ,  $\widetilde{w}_{50} \circ_{-60} \circ$ , and  $\widetilde{w}_{60} \circ_{-70} \circ$ , respectively. Here A\* is the area enclosed between the latitudes indicated by the respective subscripts.

The results of these calculations are given in Fig. 6. They are given for each five-day period so that consistency of results can be checked, and also so that the relation of the mean cell to the circulation buildup toward the end of the period can be investigated. The zonal mean w values from Table I (averaged over five-day periods) are also included in Fig. 6 as a consistency check. The two types of computations of mean vertical motion are seen to be in excellent agreement. Fig. 6 shows rather strikingly that a mean rising motion is present over the pole until about 5 December. Furthermore, strong descending motion is present at 100 and 50 mb in mid-latitudes. In view of the mean temperature profiles given in Fig. 3, this is a direct circulation. From 5-15 December, however, a marked change takes place in the mean cell structure. For this period descending motion is found over the pole with strong ascending motion between  $60^{\circ}$  and  $70^{\circ}$ N. Beginning on 5 December the north-south mean temperature gradient reverses in higher latitudes (Fig. 3). In view of this fact, the northernmost branch of the mean cell is still direct. On the other hand, the descending current at 50<sup>°</sup>N is now in the warmest air, and thus is an indirect circulation.

The basis for this rather peculiar behavior presently is not well understood. Through a comparison with the previous study (Mahlman, 1966), one might hypothesize that the 5-15 December mean cell

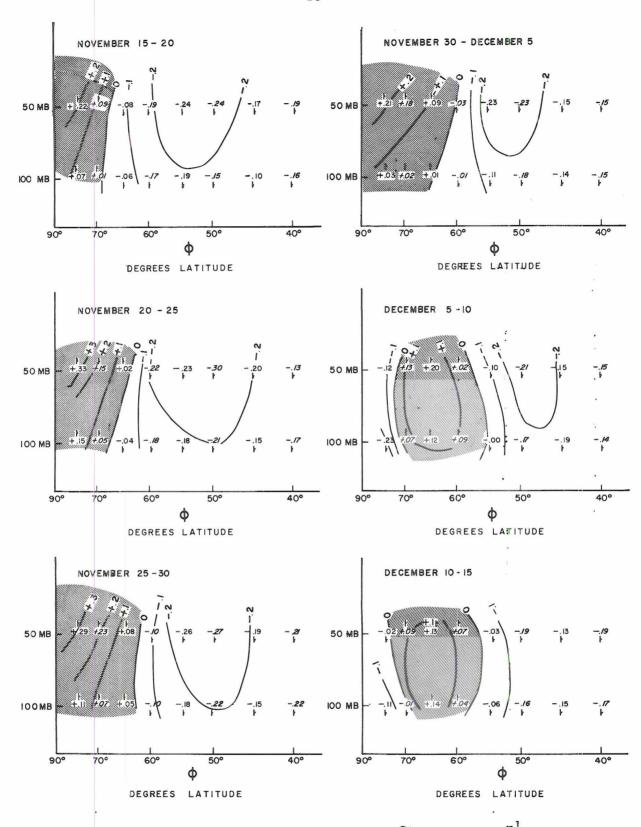


FIG. 6. Area averaged vertical motion  $(\widetilde{w})$  in km day computed from Eqs. 10, 11a, 11b, and 11c for successive five-day periods from 15 November to 15 December 1958. The zonal mean vertical motion  $(\overline{w})$  values are entered in italics and show the high degree of consistency between the two computational approaches.

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configuration represents a shorter period transition between the direct circulation of the fall regime (increasing T northward in high latitudes) and the indirect circulation of the winter regime. The 100 and 50 mb synoptic charts provide some corroborating evidence for this. From 5-13 December the mean descending motion over the pole can be seen to be due synoptically to strong cold air advection over the pole at the edge of the asymmetric polar vortex. This may be readily seen on the 10 December 50 mb chart in Fig. 1. By 15 December the cold air advection over the pole has vanished on the 50 mb chart. Probably at this time the descending current vanishes also, thus giving the indirect wintertime mean circulation computed previously. In view of the very large number of tabulations required (31,680 separate hand tabulations for this study) it was not possible to further extend the analysis at all levels and latitudes. However, a limited computation was performed at 50 mb, 70<sup>°</sup>N for 20-25 December and showed that ascending motion was present over the pole during this later period, in agreement with the above hypothesis.

Thus, it appears from the point of view of transport of trace substances that the mean meridional cell characteristics in the polar stratosphere are probably similar from the onset of westerlies through the breakdown of the polar vortex. That is, rising motions are present over the polar cap with sinking motion in mid-latitudes. The exception to this rule occurs during the brief period when the latitudinal temperature gradient reverses from positive to negative.

From a thermodynamical and energetical point of view, however, the mean meridional cell characteristics are highly variable through the fall and winter months. At the onset of the westerlies and through the temperature gradient reversal to the wintertime regime, the polar mean cell is a <u>direct</u> circulation. During the polar night when the circulation is particularly intense, the mean cell is <u>indirect</u>. Finally,

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after the breakdown of the polar vortex occurs, the mean circulation again becomes direct.

Before these tentative conclusions may be regarded as a satisfactory picture of the polar stratosphere, detailed studies over longer time periods must be performed.

#### Mean Cell Relative to the Polar Vortex

As pointed out in the previous paper (Mahlman, 1966), the mean circulation relative to a coordinate system oriented along a line of maximum circulation can be appreciably different from that of a mean cell measured with respect to latitude. In the previous case the circulation was characterized by an elongated bipolar vortex (predominately wave number two). The analysis revealed that the mean circulation was direct in the curvilinear system and indirect when measured with respect to the latitudinal frame. In view of this apparent paradox, it is of interest to prepare such a comparison for the present study. In the case analyzed here the polar vortex is displaced a considerable distance from the pole (see Fig. 1), but is far more symmetric relative to its center than in the previous case. Accordingly, the line of maximum circulation is also more symmetric relative to the vortex center. (The line of maximum circulation is defined as the height contour at which the highest average wind speed occurs.) Because of this a mean cell computation relative to this center lends not only insight into the transport processes, but also provides information on the mechanisms acting to maintain the thermal structure of the vortex itself.

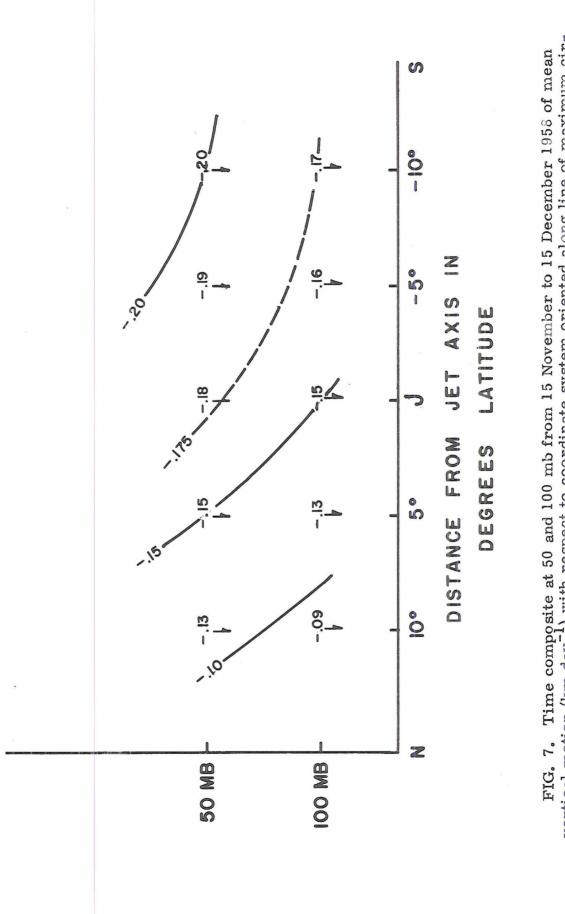
To perform this computation of the mean cell relative to the polar vortex, initially the height contour of maximum circulation intensity was noted on the 50 mb surface. By interpolating from analyses of the vertical motion fields used in determining the transport properties in Chapter II, w values were noted at discrete intervals along parallel lines located at  $\pm 10^{\circ}$ ,  $\pm 5^{\circ}$ ,  $0^{\circ}$ ,  $\pm 5^{\circ}$ , and  $\pm 10^{\circ}$  latitude distant from the

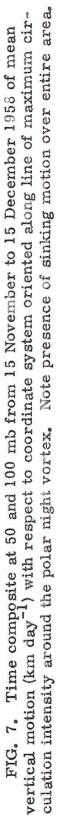
height contour of maximum circulation intensity. This process was repeated at 100 mb utilizing the same contour employed at 50 mb. By using the same maximum circulation contour at both levels, continuity with height was assured. The mean w for each day at the given distances  $\pm 10^{\circ}$ ,  $\pm 5^{\circ}$ ,  $0^{\circ}$ ,  $-5^{\circ}$ , and  $\pm 10^{\circ}$  latitude from the chosen contour was determined by summing the individual w tabulations. These daily values were averaged over the period 15 November to 15 December 1958 to determine a single mean cell relative to the polar vortex oriented coordinate system.

The results of this calculation are presented in Fig. 7. This figure shows rather remarkably that sinking motion is present over the entire region of the intense circulation around the cold polar vortex. However, the most intense mean sinking is to the outside of the polar vortex. In view of the cold vortex center, this circulation is <u>indirect</u>, thus acting to intensify the mean negative temperature gradient of the vortex. This result is opposite to the sense of the computed <u>direct</u> latitudinal mean cell for the same time period. Fig. 7 indicates that the mean temperature gradient in the vortex will probably intensify as time progresses. This is in agreement with the observed change.

In the previous paper on the "sudden warming" phenomenon (Mahlman, 1966), the mean cell relative to the maximum circulation contour was measured to be <u>direct</u> while the mean meridional cell was <u>indirect</u> over the time period. In view of the completely opposite results obtained in the two cases, it appears that the thermodynamical and dynamical processes in the polar stratosphere differ considerably at the beginning and at the end of the strong polar night circulation. Implications of this will be discussed in the next chapter.

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# IV. CAUSES OF THE "MINOR BREAKDOWN" AND COMPARISON WITH A MAJOR BREAKDOWN

As may be seen in Fig. 1, the period 15 November to 15 December was characterized by a significant interruption of the buildup of the winter stratospheric circulation. The first disturbance in the period was noted in the lower stratosphere over western Europe on 16 November. On about 22 November a cyclone formed in north central Canada and remained there until it weakened on 9 December and finally disappeared on 13 December. The disappearance of this disturbance is associated with a marked intensification of the polar night vortex.

#### Comparison with a Major Breakdown

In many respects the case analyzed here is qualitatively similar to a major breakdown of the polar night vortex. As shown by Reed (1962), Reed, Wolfe, and Nishimoto (1963), Miyakoda (1963), and by Muench (1964) the major polar vortex breakdown is associated with a significant transfer of energy from the zonal current and wave number 1 to higher wave numbers. The "minor breakdown" case investigated here exhibits similar characteristics. Furthermore, the time period required for the "minor breakdown" is roughly the same as for a major breakdown.

However, the dominant feature of the major breakdown is what has usually been termed the "sudden warming" phenomenon. At the time of the breakdown very large local warmings are observed. This warming aspect is also strong enough on the planetary scale to produce a complete reversal of the hemispheric mean north-south temperature gradient within a period of about five days (Mahlman, 1966). However, for the "minor breakdown" case under investigation no significant warming was observed on the planetary scale (Fig. 3). Another significant difference between the two types of breakdowns is that the major breakdown marks the end of the strong polar night circulation, while the circulation becomes even more intense following the "minor breakdown". Also, the total kinetic energy of the flow decreased drastically in the major breakdown case (Miyakoda, 1963; Sekiguchi, 1963; Muench, 1964; Murakami, 1965), while for this case the total kinetic energy increased over the polar cap from the beginning to the end of the chosen period (Boville, 1962).

Other noticeable differences are that in the "minor breakdown" case the structure of the polar vortex itself remains relatively unaffected. These major differences rather strongly suggest that the controlling dynamics of the two phenomena are completely different. It thus appears that a study of these differences may prove to be instrumental in developing a more adequate knowledge of the dynamics of the winter stratosphere, and indirectly, a fuller understanding of the trace substance transport problem.

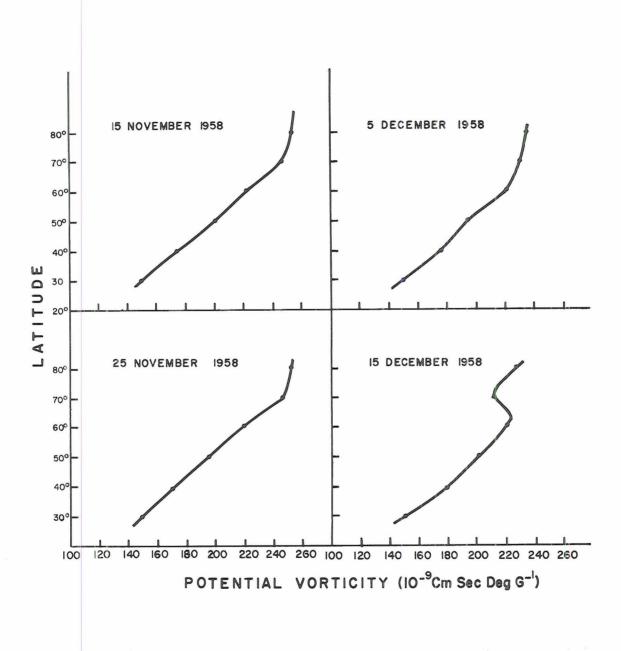
In the previous paper (Mahlman, 1966) a linear stability analysis was performed for a combined barotropic-baroclinic model circulation similar to the polar night vortex. This analysis showed that a necessary condition for instability is that the meridional gradient of mean potential vorticity must vanish on isentropic ( $\theta$ ) surfaces  $\left(\frac{\partial P}{\partial y_{\theta}} = \frac{\partial}{\partial y} \left[ -\frac{\partial \overline{\theta}}{\partial p} \left( f - \frac{\partial \overline{u}}{\partial y_{\theta}} \right) \right] = 0$ ). This result was similar to those obtained in previous analyses by Charney and Stern (1962) and by Pedlosky (1964a, b). Evaluation of this criterion revealed that the <u>necessary</u> condition for instability was satisfied prior to the January 1958 polar night vortex breakdown. This analysis also showed that the radiational properties of the Arctic polar night stratosphere led to eventual fulfillment of this instability condition. However, since the above is only a necessary condition for instability, there is no guarantee that the flow will break down when the meridional gradient of the zonal mean potential vorticity vanishes. However, if the meridional potential vorticity gradient is everywhere positive, the flow is absolutely stable and can not break down.

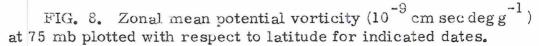
In view of the above results obtained for the major breakdown case, it is of interest to measure the stability criterion for the "minor breakdown" phenomenon and compare the results with the previous case. This was accomplished in crude fashion by computing the static stability between 100 and 50 mb and averaging the horizontal shear of the mean wind at the two levels to obtain the potential vorticity. The approximation is valid for this period since the inclination of the mean  $\theta$  surface relative to the mean p surface is very small and the shear of the zonal mean wind is small relative to the Coriolis parameter. The results of this calculation are given in Fig. 8. This figure suggests that relative to geographic latitude, the circulation is absolutely stable up until 15 December. At that time the meridional gradient of  $\overline{P}$  vanishes in high latitudes, thus fulfilling the necessary condition for instability. At the time of the "minor breakdown" seen in Fig. 2, however, the sufficient condition for stability is satisfied. Consequently, it would appear that the "minor breakdown" cannot be readily explained as an instability phenomenon.

In view of the rather large displacement of the polar vortex from the geographical pole (Fig. 1), the calculation of  $\overline{P}$  was repeated, but this time relative to the polar vortex oriented coordinate system introduced in the last section of Chapter III. Fig. 9 gives the results of this calculation and shows that on 15 November the necessary condition for <u>instability</u> is satisfied. The 25 November profile shows that the originally negative  $\overline{P}$  gradient within the polar vortex has nearly vanished. This measurement is in agreement with the onset time of the "minor breakdown" beginning on 21 November (Fig. 2). By 5 December the negative  $\overline{P}$  gradient is re-established and becomes even more intense by 15 December.

These  $\overline{P}$  profiles relative to the polar vortex (Fig. 9) are considerably different than the latitudinal  $\overline{P}$  profiles of Fig. 8. The results relative to the polar vortex (Fig. 9) imply that the minor breakdown may be due to an instability phenomenon while Fig. 8 suggests that this is not the case.

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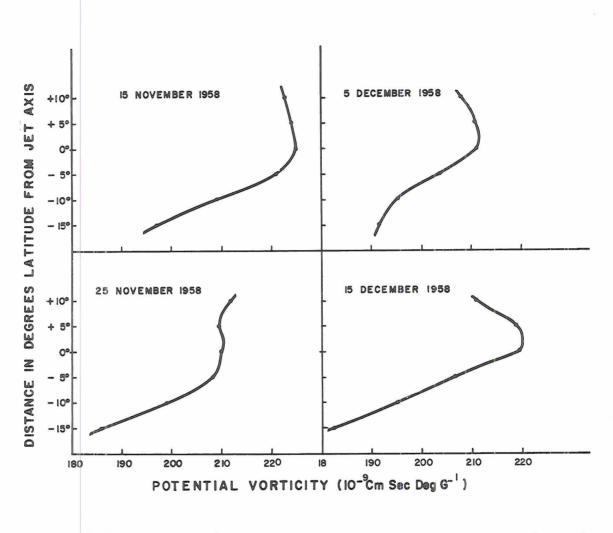


FIG. 9. Mean potential vorticity at 75 mb with respect to line of maximum circulation intensity around polar vortex. Values are plotted as a function of distance from this line for indicated dates.

In view of the modeling assumptions employed in developing the theory, it would appear that the  $\overline{P}$  profile relative to the polar vortex itself is probably more relevant. It still must be emphasized, however, that fulfillment of this instability condition does not guarantee that disturbances will amplify. This points to the need for finding mathematically <u>sufficient</u> conditions for instability for the combined barotropic-baroclinic problem.

### Synoptic Considerations

As noted by Miyakoda (1963) the major breakdown of January 1958 was associated with an extremely pronounced blocking anticyclone in the North Atlantic region. Also, Muench (1964) measured a large increase in the upward energy flux into the stratosphere just prior to the breakdown. This suggests that the apparent onset of instability in this major breakdown depended directly upon an upward energy flux from the troposphere. At first this appears to contradict observations by previous investigators that the onset of the breakdown initiates at higher elevations and propogates downward. However, the visible response to such tropospheric forcing may be initially seen at the higher levels. It is thus of interest to determine whether or not similar such evidence is present for this "minor breakdown" case.

The first stratospheric flow disturbance in this present case has already begun by 15 November (Fig. 1) in the form of a warm trough over western Canada and a developing cold ridge over western Europe. The 300 mb charts for the same period show that western Canada and the United States were dominated by formation of an intense tropospheric cold cyclone while western Europe was experiencing strong blocking action. With the onset of the "minor breakdown" on 22 November a warm stratospheric low formed in north central Canada and became well-pronounced by 25 November (Fig. 1). This disturbance was associated with formation of a 300 mb blocking anticyclone over Alaska and a very large cyclone over north central Canada. As a consequence of this the qualitative evidence for a tropospheric forcing of the "minor breakdown" appears to be strong. Substantiating evidence for this hypothesis may be seen in the 25 November chart in Fig. 1 which shows that the low over Canada has a warm core while the core of the polar vortex is cold. This indicates that the Canadian low will weaken with increasing height while the polar vortex will intensify.

This hypothesis of tropospheric forcing of the "minor breakdown" is easier to reconcile physically than for the major breakdown, since prior to the establishment of the strong polar night circulation, the stratospheric waves strongly resemble those of the upper troposphere. The above hypothesis needs to be tested quantitatively before it can be accepted with complete confidence. This would involve careful computation of the vertical energy fluxes at the tropopause and their effects on the energy budget of the stratosphere in a manner similar to that performed by Muench (1964) but for times of the year other than the period of a major breakdown.

# V. SUMMARY

A period encompassing a "minor breakdown" of the winter stratospheric circulation was investigated for its thermodynamic, dynamic, and radioactivity transport characteristics. Computation of eddy transport quantities revealed that such a "minor breakdown" of the stratospheric circulation is favorable for northward and downward transport of debris, but by about a factor of five less than for a period following a major breakdown of the polar night vortex.

The sense and magnitude of the mean meridional circulation period was obtained by employing a heat budget method. This mean cell was found to be thermodynamically <u>direct</u> in the polar regions over the entire time period. However, the sense of the mean cell reverses after 5 December 1958 at the same time that the north-south temperature gradient reverses. A computation is also performed on the sense and magnitude of the mean cell relative to a polar vortex oriented coordinate system. This reveals that the mean circulation in this system is thermodynamically <u>indirect</u>. The difference in the sense of the mean cells between these two coordinate systems suggests that the mechanisms for maintaining the polar vortex and zonal mean circulations differ considerably.

Finally, the factors acting to initiate the "minor breakdown" are reviewed. By calculating the stability criterion derived previously (Mahlman, 1966), the flow relative to a geographical coordinate system is absolutely <u>stable</u>. However, when the stability criterion is evaluated relative to the polar vortex, the <u>necessary</u> condition for <u>instability</u> is satisfied. In view of the suggestion that the polar vortex oriented coordinate system is the more logical one relative to the theoretical modeling assumptions, it appears that the "minor breakdown" may be an instability phenomenon. Synoptic evidence is presented which suggests that tropospheric forcing may provide the energy source for this "minor breakdown".

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#### REFERENCES

- Belmont, A., 1962: The reversal of stratospheric winds over North America during 1957, 1958, 1959. <u>Beiträge zur Physik der</u> Atmosphäre, 35, 126-140.
- Boville, B. W., 1960: The Aleutian stratospheric anticyclone. Journal of Meteorology, 17, 329-336.

\_\_\_\_\_, 1962: The polar night vortex. <u>Seminar on the Stratosphere</u> and <u>Mesosphere</u>, Publication in Meteorology No. 47, 9-18.

\_\_\_\_\_, C.W. Wilson, and F.K. Hare, 1961: Baroclinic waves of the polar night vortex. Journal of Meteorology, 18, 567-580.

- Brewer, A.W., 1949: Evidence for a world circulation provided by measurements of helium and water vapor distribution in the stratosphere, <u>Quarterly Journal of the Royal Meteorological</u> Society, 75, 351-363.
- Charney, J.G., and M.E. Stern, 1962: On the stability of internal baroclinic jets in a rotating atmosphere. <u>Journal of the Atmos-</u> pheric Sciences, 19, 159-172.
- Conover, W.C., 1961: An instance of a stratospheric explosive warming. Journal of Meteorology, 18, 410-413.

Craig, R. A., and W. S. Hering, 1959: The stratospheric warming of January—February 1957. Journal of Meteorology, 16, 91-107.
\_\_\_\_\_\_\_ and M. A. Lateef, 1962: Vertical motion during the 1957 stratospheric warming. Journal of Geophysical Research, 67, 1839-1854.

Danielsen, E.F., 1959a: A determination of the mass transported from stratosphere to troposphere over North America during a thirty-six hour interval (abstract). <u>Mitteilungen des Deutschen</u> Wetterdienstes, 20, 10-11.

\_\_\_\_\_, 1959b: The laminar structure of the atmosphere and its relation to the concept of a tropopause. <u>Archiv für Meteorologie</u>, Geophysik und Bioklimatologie, A 11, 293-332.

\_\_\_\_\_, 1964a: Radioactivity transport from stratosphere to tropopause. Mineral Industries, 33, 1-7. Danielsen, E. F., 1964b: Project Springfield report. <u>Defense Atomic</u> Support Agency, 97 pp.

, K. H. Bergman, and C. A. Paulson, 1962: Radioisotopes, potential temperature, and potential vorticity--a study of stratospheric-tropospheric exchange processes. <u>Department of</u> <u>Meteorology and Climatology</u>, University of Washington, 54 pp.

Davis, P. A., 1963: An analysis of the atmospheric heat budget. Journal of the Atmospheric Sciences, 20, 5-22.

- Dickenson, R. E., 1962: Momentum balance of the stratosphere during the IGY. <u>Studies of the Stratospheric General Circulation</u>, Final report, Contract No. AF19(605)-5223, Massachusetts Institute of Technology, 132-167.
- Dobson, G. M. B., 1956: Origin and distribution of polyatomic molecules in the atmosphere. <u>Proceedings of the Royal Society</u>, A 236, 187-193.
- Endlich, R. M., and G. S. McLean, 1957: The structure of the jet stream core. Journal of Meteorology, 14, 543-552.
- Gilman, P. A., 1963: Indirect measurements of the mean meridional circulation in the Southern Hemisphere. <u>Planetary Circulations</u> <u>Project</u>, Report No. 3, Contract AF19(628)-2408, Massachusetts Institute of Technology, 49 pp.

\_\_\_\_\_, 1964: On the mean meridional circulations in the presence of a steady state, symmetric, circumpolar vortex. <u>Tellus</u>, 16, 160-167.

- Godson, W. L., and R. Lee, 1958: High level fields of wind and temperature over the Canadian Arctic. <u>Beiträge zur Physik der Atmosphäre</u>, 31, 40-68.
- Goldie, A. H. R., 1950: The average planetary circulation in vertical meridian planes. <u>Centenary Proceedings of the Royal Meteorological</u> Society, A 238, 178-180.
- Hare, K. R., 1960: The disturbed circulation of the Arctic stratosphere. Journal of Meteorology, 17, 36-51.
- Haurwitz, B., 1961: Frictional effects and the meridional circulation in the mesosphere. Journal of Geophysical Research, 66, 2381-2392.

Hering, W. S., 1964: Ozonesonde Observations over North America, Vol. I., Air Force Cambridge Research Laboratories, 512 pp.

- Jensen, C. E., 1961: Energy transformation and vertical flux processes over the Northern Hemisphere. Journal of Geophysical Research, 66, 1145-1156.
- Kennedy, J. S., 1964: Energy generation through radiative processes in the lower stratosphere. <u>Planetary Circulations Project</u>, Report No. 11, Contract No. AT(30-1)-2241, Massachusetts Institute of Technology, 115 pp.
- Kuo, H.-L., 1956: Forced and free meridional circulations in the atmosphere. Journal of Meteorology, 13, 561-568.
- Lee, R., and W.L. Godson, 1957: The Arctic-stratospheric jet stream during the winter of 1955-1956. Journal of Meteorology, 14, 126-135.
- Libby, W. F., and C. E. Palmer, 1960: Stratospheric mixing from radioactive fallout. Journal of Geophysical Research, 65, 3307-3317.
- Mahlman, J. D., 1964a: Relation of stratospheric-tropospheric mass exchange mechanisms to surface radioactivity peaks. <u>Atmospheric</u> Science Technical Paper No. 58, Colorado State University, 1-19.

\_\_\_\_\_, 1964b: On the feasibility of relating seasonal fallout oscillations to hemispheric index patterns. <u>Atmospheric Science Technical</u> Paper No. 58, Colorado State University, 55-58.

, 1964c: Relation of upper air hemispheric index patterns to seasonal fallout fluctuations. <u>Radioactive Fallout from Nuclear</u> <u>Weapons Tests</u>, U.S. Atomic Energy Commission, Division of Technical Information, 464-476.

\_\_\_\_\_, 1965a: Relation of tropopause-level index changes to radioactive fallout fluctuations. <u>Atmospheric Science Technical Paper</u> No. 70, Colorado State University, 84-109.

\_\_\_\_, 1965b: Relation of stratospheric-tropospheric mass exchange mechanisms to surface radioactivity peaks. <u>Archiv für Meteorologie</u>, Geophysik und Bioklimatologie, A 15, 1-25.

\_\_\_\_\_, 1966: Atmospheric general circulation and transport of radioactive debris. <u>Atmospheric Science Paper No. 103</u>, Colorado State University, 184 pp. Miers, B. T., 1963: Zonal wind reversal between 30 and 80 km over southwestern United States. Journal of the Atmospheric Sciences, 20, 87-93.

- Miller, A. J., 1966: Vertical motion atlas for the lower stratosphere during the IGY. <u>Planetary Circulations Project</u>, Report No. 16, Contract No. AT(30-1)-2241, Massachusetts Institute of Technology, 35 pp.
- Miyakoda, K., 1963: Some characteristic features of the winter circulation in the troposphere and lower stratosphere. <u>Technical Report</u> <u>No. 14 to National Science Foundation (Grant NSF-GP-471),</u> University of Chicago, 93 pp.
- Molla, A. C., and C. J. Loisel, 1962: On the hemispheric correlation of vertical and meridional wind components. <u>Geofisica Pura e</u> <u>Applicita</u>, 51, 166-170.
- Morris, J. E., and B. T. Miers, 1964: Circulation disturbances between 25 and 70 km associated with the sudden warming of 1963. Journal of Geophysical Research, 69, 201-214.
- Muench, H. S., 1964: Stratospheric energy processes and associated atmospheric long wave structure in winter. <u>Environmental Research</u> <u>Paper No. 95</u>, Air Force Cambridge Research Laboratories, 73 pp.
- Murakami, T., 1962: Stratospheric wind temperature and isobaric height conditions during the IGY period, Part I. <u>Planetary</u> <u>Circulations Project</u>, Report No. 5, Contracts Nos. AT(30-1)-2241 and AF19(604)-5223, Massachusetts Institute of Technology, 213 pp.
- , 1965: Energy cycle of the stratospheric warming in early 1958. Journal of the Meteorological Society of Japan, 43, 262-283.
- Murgatroyd, R., and J. Singleton, 1961: Possible meridional circulations in the stratosphere and mesosphere. <u>Quarterly Journal of</u> the Royal Meteorological Society, 87, 125-135.
- Newell, R. E., 1961: The transport of trace substances in the atmosphere and their implications for the general circulation of the atmosphere. Geofisica Pura e Applicita, 49, 137-158.

, 1963a: Transfer through the tropopause and within the stratosphere. Quarterly Journal of the Royal Meteorological Society, 89, 167-205. Newell, R. E., 1963b: The general circulation of the atmosphere and its effects on the movement of trace substances. <u>Journal of Geo-</u> physical Research, 68, 3949-3962.

\_\_\_\_\_, 1964: Further ozone transport calculations and the spring maximum in ozone amount. <u>Pure and Applied Geophysics</u>, 59, 191-206.

\_\_\_\_\_, and A.J. Miller, 1964: Some aspects of the general circulation of the lower stratosphere. <u>Radioactive Fallout from Nuclear</u> <u>Weapons Tests</u>, U.S. Atomic Energy Commission, Division of Technical Information, 392-404.

- Ohring, G., 1958: The radiation budget of the stratosphere. <u>Journal</u> of Meteorology, 15, 440-451.
- Oort, A.H., 1962: Direct measurement of the meridional circulation in the stratosphere during the IGY. <u>Studies of the Stratospheric</u> <u>General Circulation</u>, Final Report, Contract No. AF19(604)-5223, Massachusetts Institute of Technology, 168-206.
- Palmén, E., 1955: On the mean meridional circulation in low latitudes of the Northern Hemisphere in winter and associated meridional flux of angular momentum. <u>General Circulation Project</u>, Paper No. 8, University of California at Los Angeles.

, H. Riehl, and L. A. Vuorela, 1958: On the meridional circulation and release of kinetic energy in the tropics. <u>Journal of</u> <u>Meteorology</u>, 15, 271-277.

- Palmer, C. E., 1959: The stratospheric polar vortex in winter. Journal of Geophysical Research, 64, 749-764.
- Pedlosky, J., 1964a: The stability of currents in the atmosphere and the ocean, Part I. Journal of the Atmospheric Sciences, 21, 201-219.

\_\_\_\_\_, 1964b: The stability of currents in the atmosphere and the ocean, Part II. Journal of the Atmospheric Sciences, 21, 342-353.

- Peixoto, J. P., 1960: Hemispheric temperature conditions during the year 1950: <u>Planetary Circulations Project</u>, Scientific Report No. 4, Contract No. AF19(605)-6108, Massachusetts Institute of Technology, 211 pp.
- Peng, L., 1963: Stratospheric wind, temperature, and isobaric (height) conditions during the IGY period, Part II. <u>Planetary Circulations</u> <u>Project</u>, Report No. 10, Contract No. AF(30-1)-2241, Massachusetts Institute of Technology, 208 pp.

Priestly, C. H. B., 1949: Heat transport and zonal stresses between latitudes. Quarterly Journal of the Royal Meteorological Society, 75, 28-40.

Reed, R.J., 1955: A study of a characteristic type of upper-level frontogenesis. Journal of Meteorology, 12, 226-237.

, 1962: On the cause of the stratospheric sudden warming phenomenon. <u>Symposium on Stratospheric and Mesospheric</u> Circulation, Freien Universität, Berlin, 315-334.

, and F. Sanders, 1953: An investigation of the development of a mid-tropospheric frontal zone and its associated vorticity field. Journal of Meteorology, 10, 338-349.

\_\_\_\_\_, and E.F. Danielsen, 1959: Fronts in the vicinity of the tropopause. <u>Archiv für Meteorologie, Geophysik und Bioklimatologie,</u> A 11, 1-17.

\_\_\_\_\_, J. L. Wolfe, and H. Nishimoto, 1963: A spectral analysis of the stratospheric sudden warming of early 1957. Journal of the Atmospheric Sciences, 20, 256-275.

Reiter, E. R., 1963a: <u>Jet Stream Meteorology</u>. University of Chicago Press, 513 pp.

\_\_\_\_\_, 1963b: A case study of radioactive fallout. <u>Journal of Applied</u> Meteorology, 2, 691-705.

, 1964: Comments on paper by S. Penn and E. A. Martell, "Analysis of the radioactive fallout over North America in late September 1961". Journal of Geophysical Research, 69, 786-788.

, and J. D. Mahlman, 1964: Heavy radioactive fallout over the southern United States, November 1962. <u>Atmospheric Science</u> Technical Paper No. 58, Colorado State University, 21-49.

, and J. D. Mahlman, 1965a: A case study of mass transport from stratosphere to troposphere, not associated with surface fallout. <u>Atmospheric Science Technical Paper No. 70</u>, Colorado State University, 54-83.

, and J. D. Mahlman, 1965b: Heavy radioactive fallout over the southern United States, November 1962. Journal of Geophysical Research, 70, 4501-4520. Sekiguchi, Y., 1963: Energy variation in the stratosphere during the winter season and its relation to dynamic stability of the polar vortex. <u>University of Oklahoma Research Institute</u>, NSF Grant 14067, University of Oklahoma, 35 pp.

Staley, D. O., 1960: Evaluation of potential vorticity changes near the tropopause and the related vertical motion, vertical advection of vorticity, and the transfer of radioactive debris from the stratosphere to the troposphere. Journal of Meteorology, 17, 591-620.

\_\_\_\_\_, 1962: On the mechanism of mass and radioactivity transport from stratosphere to troposphere. Journal of the Atmospheric Sciences, 19, 450-457.

- Stewart, N.G., R.N. Crooks, and E.M. Fisher, 1955: <u>Atomic</u> <u>Energy Research Establishment</u>, Publication No. AERE HP/R 1701, Harwell.
  - , R. G. D. Osmond, R. N. Crooks, E. M. Fisher, and M. J. Owens, 1957: The world-wide deposition of long-lived fission products from nuclear explosions. <u>Atomic Energy</u> <u>Research Establishment</u>, Publication No. AERE HP/R 2790, Harwell.
- Storebø, P.B., 1960: The exchange of air between stratosphere and troposphere. Science, 133, 461-462.
- Teweles, S., 1958: Anomalous warming of the stratosphere over North America in early 1957. <u>Monthly Weather Review</u>, 86, 377-396.

\_\_\_\_, 1963: Spectral aspects of the stratospheric circulation during the IGY. <u>Planetary Circulations Project</u>, Report No. 8, Massachusetts Institute of Technology, 191 pp.

\_\_\_\_\_, and F. B. Finger, 1958: An abrupt change in stratospheric circulation beginning in mid-January 1958. <u>Monthly Weather</u> <u>Review</u>, 86, 23-28.

United States Weather Bureau, 1963: Daily 100 millibar and 50 millibar and three times monthly 30 millibar synoptic weather maps. U.S. Department of Commerce, Weather Bureau.

White, R. M., 1954: The counter-gradient flux of sensible heat in the lower stratosphere. <u>Tellus</u>, 6, 177-179.