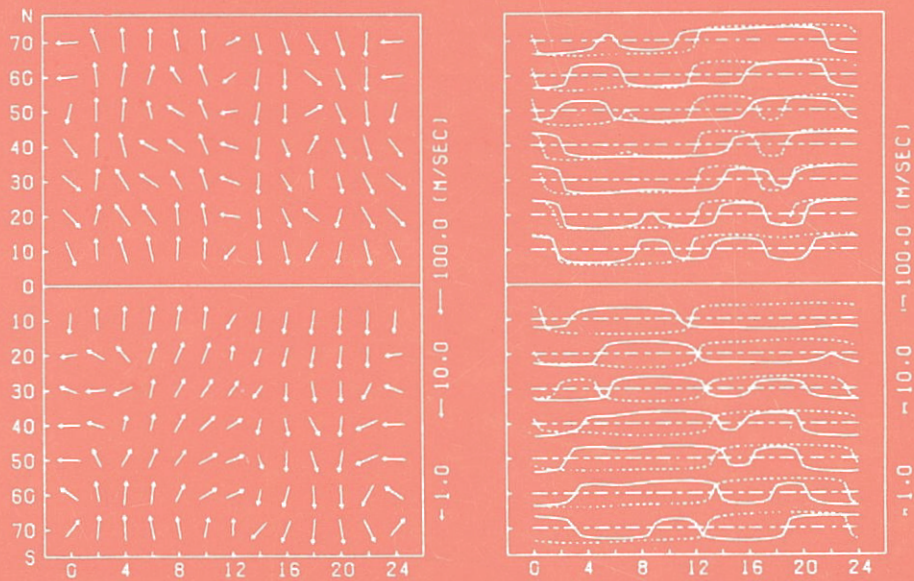


World Data Center C2 for Geomagnetism

DATA BOOK No. 2

Electric fields and neutral winds
in the ionospheric dynamo region



MARCH 1979

Data Analysis Center for
Geomagnetism and Spacemagnetism
FACULTY OF SCIENCE
KYOTO UNIVERSITY

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Electric fields and neutral winds in the
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the daily geomagnetic variations in
December 1964

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Electric Fields and Neutral Winds in the Ionospheric Dynamo Region as Deduced from the Daily Geomagnetic Variations in December 1964

1. Introduction

Many years ago, one of the authors (Maeda, 1955) first deduced the global distribution of electric fields and neutral winds in the ionospheric E region from the dynamo theory of the daily geomagnetic variations, and this method was further developed on different assumptions (Kato, 1956, Hirono and Kitamura, 1956, and others). At that time, it was very hard to confirm the calculated results by observation. In recent years a number of observations have been carried out for the electric field and neutral wind, especially incoherent scatter radars have been extensively used for the measurements of ionospheric parameters such as electron density, temperature, and drift from which the electric field and wind are separately deduced on some assumptions. Thus it becomes now possible to compare the calculated results with observation. Unfortunately, however, theoretical calculations were made only for an average state of the Sq fields, so that it is difficult to compare with instantaneous observation.

Recently we have obtained the Sq current systems at every two UT hours through December 1964, and published all the results in the DATA BOOK No. 1 (1978). Based on these current systems, we have solved the dynamo equation at every two UT hours and obtained global distributions of electric (electrostatic) fields and neutral winds.

2. Method

Since the method of calculation is almost the same as that already used, we describe here it only briefly. As is well known, the height-integrated current densities, J_x and J_y , are given by

$$\left. \begin{aligned} J_x &= \Sigma_{xx} E_x + \Sigma_{xy} E_y \\ J_y &= -\Sigma_{xy} E_x + \Sigma_{yy} E_y \end{aligned} \right\} \quad (1)$$

where E_x and E_y are the total electric fields, Σ_{xx} etc. are the height-integrated layer conductivities, and the subscripts x and y show the southward and eastward components, respectively. As we know the values of J_x and J_y , equation (1) is rewritten as follows:

$$\left. \begin{aligned} E_x &= R_{yy} J_x - R_{xy} J_y \\ E_y &= R_{xy} J_x + R_{xx} J_y \end{aligned} \right\} \quad (2)$$

where $R_{xx} = \Sigma_{xx}/L$, $R_{yy} = \Sigma_{yy}/L$, $R_{xy} = \Sigma_{xy}/L$, and $L = \Sigma_{xx}\Sigma_{yy} + \Sigma_{xy}^2$. Thus we can obtain the total electric fields, if we know the distribution of the layer conductivities.

The total electric fields consist of the dynamo electric fields, E_{dx} and E_{dy} , induced by neutral winds and the electrostatic fields, E_{ex} and E_{ey} , due to the non-uniform distribution of conductivities, i.e.

Maeda, H., J. Geomag. Geoelect., 7, 121 (1955).

Kato, S., J. Geomag. Geoelect., 8, 24 (1956).

Hirono, M. and Kitamura, T., J. Geomag. Geoelect., 8, 9 (1956).

Data Book, No. 1, WDC-C2 for Geomagnetism, Kyoto Univ. (1978).

$$\left. \begin{aligned} E_x &= E_{dx} + E_{sx} \\ E_y &= E_{dy} + E_{sy} \end{aligned} \right\} \quad (3)$$

The dynamo fields and the electrostatic fields are given by

$$\left. \begin{aligned} E_{dx} &= B_z \cdot V_y \\ E_{dy} &= -B_z \cdot V_x \end{aligned} \right\} \quad \left. \begin{aligned} E_{sx} &= -\partial S/a \partial \theta \\ E_{sy} &= -\partial S/a \sin \theta \partial \lambda \end{aligned} \right\} \quad (4)$$

where V_x and V_y are the wind velocities, B_z is the vertical component of the geomagnetic field, S is the electrostatic potential, and a is the geocentric distance of the dynamo layer. From (3) and (4) we have

$$\left. \begin{aligned} E_x &= -\partial S/a \partial \theta - C \cos \theta \cdot V_y \\ E_y &= -\partial S/a \sin \theta \partial \lambda + C \cos \theta \cdot V_x \end{aligned} \right\} \quad (5)$$

as $B_z = -C \cos \theta$ where $C = 0.618$ gauss (in 1964).

The equation (5) can be applicable to both the northern and southern hemispheres. If we use the asterisk to indicate the corresponding quantities projected onto the northern hemisphere from the southern hemisphere along the geomagnetic lines of force, then we have (see, Maeda, 1966)

$$\left. \begin{aligned} E_x + E_x^* &= -\partial(S + S^*)/a \partial \theta - C \cos \theta (V_y + V_y^*) \\ E_y + E_y^* &= -\partial(S + S^*)/a \sin \theta \partial \lambda + C \cos \theta (V_x + V_x^*) \end{aligned} \right\} \quad (6)$$

$$\left. \begin{aligned} E_x - E_x^* &= -\partial(S - S^*)/a \partial \theta - C \cos \theta (V_y - V_y^*) \\ E_y - E_y^* &= -\partial(S - S^*)/a \sin \theta \partial \lambda + C \cos \theta (V_x - V_x^*) \end{aligned} \right\} \quad (7)$$

Assuming that the northern and southern conjugate points in the dynamo layer are connected by a perfect conductor, then we can put $S = S^*$. Writing

$$\begin{aligned} E_x + E_x^* &= 2X, & E_y + E_y^* &= 2Y, \\ V_x + V_x^* &= 2U, & V_y + V_y^* &= 2V, \\ E_x - E_x^* &= 2x, & E_y - E_y^* &= 2y, \\ V_x - V_x^* &= 2u, & V_y - V_y^* &= 2v, \end{aligned}$$

we have from (6)

$$\left. \begin{aligned} X &= -\partial S/a \partial \theta - C \cos \theta \cdot V \\ Y &= -\partial S/a \sin \theta \partial \lambda + C \cos \theta \cdot U \end{aligned} \right\}$$

or

$$\left. \begin{aligned} U &= (Y + \partial S/a \sin \theta \partial \lambda)/C \cos \theta \\ V &= -(X + \partial S/a \partial \theta)/C \cos \theta \end{aligned} \right\} \quad (8)$$

On the other hand, equation (7) can be written as

$$\left. \begin{aligned} x &= -C \cos \theta \cdot v \\ y &= C \cos \theta \cdot u \end{aligned} \right\}$$

and we have immediately

$$\left. \begin{aligned} u &= y/C \cos \theta \\ v &= -x/C \cos \theta \end{aligned} \right\} \quad (9)$$

In order to solve equation (8) for U and V , the following equations of motion are used (see Kato, 1956)

$$\left. \begin{aligned} \partial U / \partial t - 2 \omega V \cos \theta &= -(1/a\bar{\rho}) \partial p / \partial \theta \\ \partial V / \partial t + 2 \omega U \cos \theta &= -(1/a\bar{\rho} \sin \theta) \partial p / \partial \lambda \end{aligned} \right\} \quad (10)$$

By taking the time factor $\exp(i\sigma t)$ and operating *curl* on (10), we have

$$i\sigma \{ \partial U / \partial \lambda - \partial (V \sin \theta) / \partial \theta \} - 2\omega \{ \partial (U \sin \theta \cos \theta) / \partial \theta + \cos \theta \partial V / \partial \lambda \} = 0 \quad (11)$$

Substitution of (8) into (11) gives

$$\begin{aligned} \frac{d^2 S}{d\theta^2} + \frac{1}{\sin \theta \cos \theta} \frac{dS}{d\theta} - \frac{m^2}{\sin^2 \theta} S &= -a \left[\frac{dX}{d\theta} + \left(2 \cos \theta + \frac{1}{\sin \theta \cos \theta} \right) X \right. \\ &\left. + \frac{2i \cos \theta}{m} \left\{ \frac{dY}{d\theta} + \left(\cot \theta + \frac{m^2}{2 \sin \theta \cos \theta} \right) Y \right\} \right] \end{aligned} \quad (12)$$

where we supposed $S, E \propto \exp(i\sigma t)$ and put $\sigma t (= m\omega t) = m\lambda$.

If we put

$$\begin{aligned} X &= \sum_m \{ a_m(\theta) \cos m\lambda + b_m(\theta) \sin m\lambda \} \\ Y &= \sum_m \{ c_m(\theta) \cos m\lambda + d_m(\theta) \sin m\lambda \} \end{aligned}$$

and

$$S = a \sum_m \{ A_m(\theta) \cos m\lambda + B_m(\theta) \sin m\lambda \}$$

then (12) is divided into the following two equations:

$$\left. \begin{aligned} \frac{d^2 A_m}{d\theta^2} + \frac{1}{\sin \theta \cos \theta} \frac{dA_m}{d\theta} - \frac{m^2}{\sin^2 \theta} A_m &= f_m(\theta) \\ \frac{d^2 B_m}{d\theta^2} + \frac{1}{\sin \theta \cos \theta} \frac{dB_m}{d\theta} - \frac{m^2}{\sin^2 \theta} B_m &= g_m(\theta) \end{aligned} \right\} \quad (13)$$

where

$$f_m(\theta) = - \left\{ \frac{da_m}{d\theta} + \frac{1 + 2\cos^2\theta}{\sin\theta \cos\theta} a_m + \frac{2\cos\theta}{m} \left(\frac{dd_m}{d\theta} + \frac{m^2 + 2\cos^2\theta}{2\sin\theta \cos\theta} d_m \right) \right\}$$

$$g_m(\theta) = - \left\{ \frac{db_m}{d\theta} + \frac{1 + 2\cos^2\theta}{\sin\theta \cos\theta} b_m + \frac{2\cos\theta}{m} \left(\frac{dc_m}{d\theta} + \frac{m^2 + 2\cos^2\theta}{2\sin\theta \cos\theta} c_m \right) \right\}$$

and they can be solven numerically, obtaining a particular solution $S_m(p)$. Thus, the general solution S_m is given by (Maeda, 1957) $S_m = S_m(p) + K \cdot S_m(c)$, where K is a constant and $S_m(c)$ is the complementary function given by $\sin^m\theta \cdot F(m/2, m/2, m+1; \sin^2\theta)$.

Once we obtain a general solution of (12) satisfying the boundary conditions at the pole (where $S = 0$) and the equator (where $\partial S/\partial\theta = 0$), we can calculate E_{gx} and E_{gy} (symmetric with respect to the equator) and so U and V from equation (8). By combining U, V from (8) and u, v from (9), we finally obtain the global wind field as follows:

$$\left. \begin{aligned} V_x &= U + u \\ V_y &= V + v \end{aligned} \right\} \quad \text{in the northern hemisphere}$$

and

$$\left. \begin{aligned} V_x &= -(U - u) \\ V_y &= V - v \end{aligned} \right\} \quad \text{in the southern hemisphere}$$

3. Results

Calculations have been carried out at every two UT hours in December 1964 on the assumption that the global distribution of the electrical onductivity does not change from day to day (see Fig. 3, which is obtained by taking the observed values of foF2 as is shown in Fig. 2 into account). The results for the electrostatic fields and neutral winds are illustrated in Fig. 4 by vector diagrams and daily-variation curves.

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A. Suzuki* and M. Takeda*

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** Data Analysis Center for

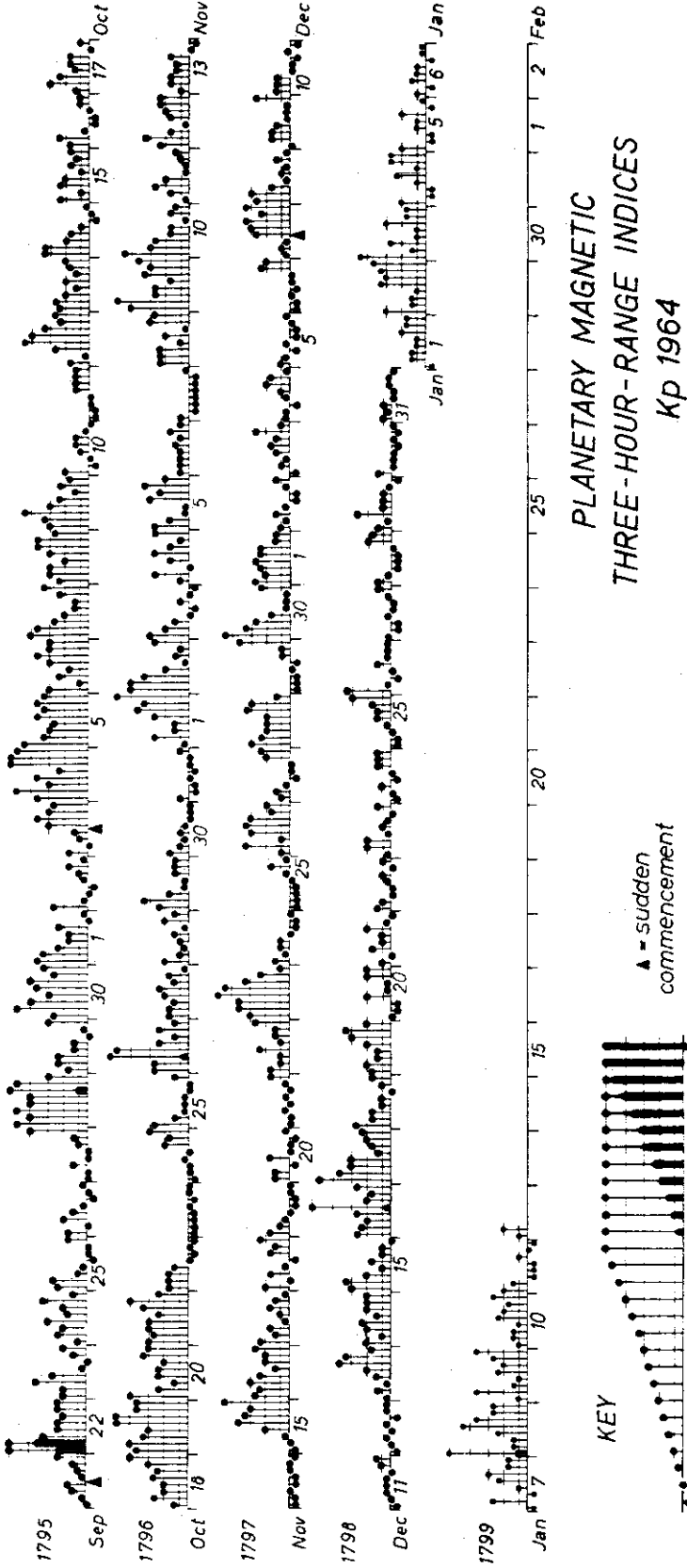
Geomagnetism and Spacemagnetism,

Faculty of Science,

Kyoto University.

DAYS IN SOLAR ROTATION INTERVAL

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27



PLANETARY MAGNETIC
THREE-HOUR-RANGE INDICES
Kp 1964

(and preliminary indices to 1965 January 12)

J.B.

Fig. 1. Geomagnetic Kp indices in December 1964.

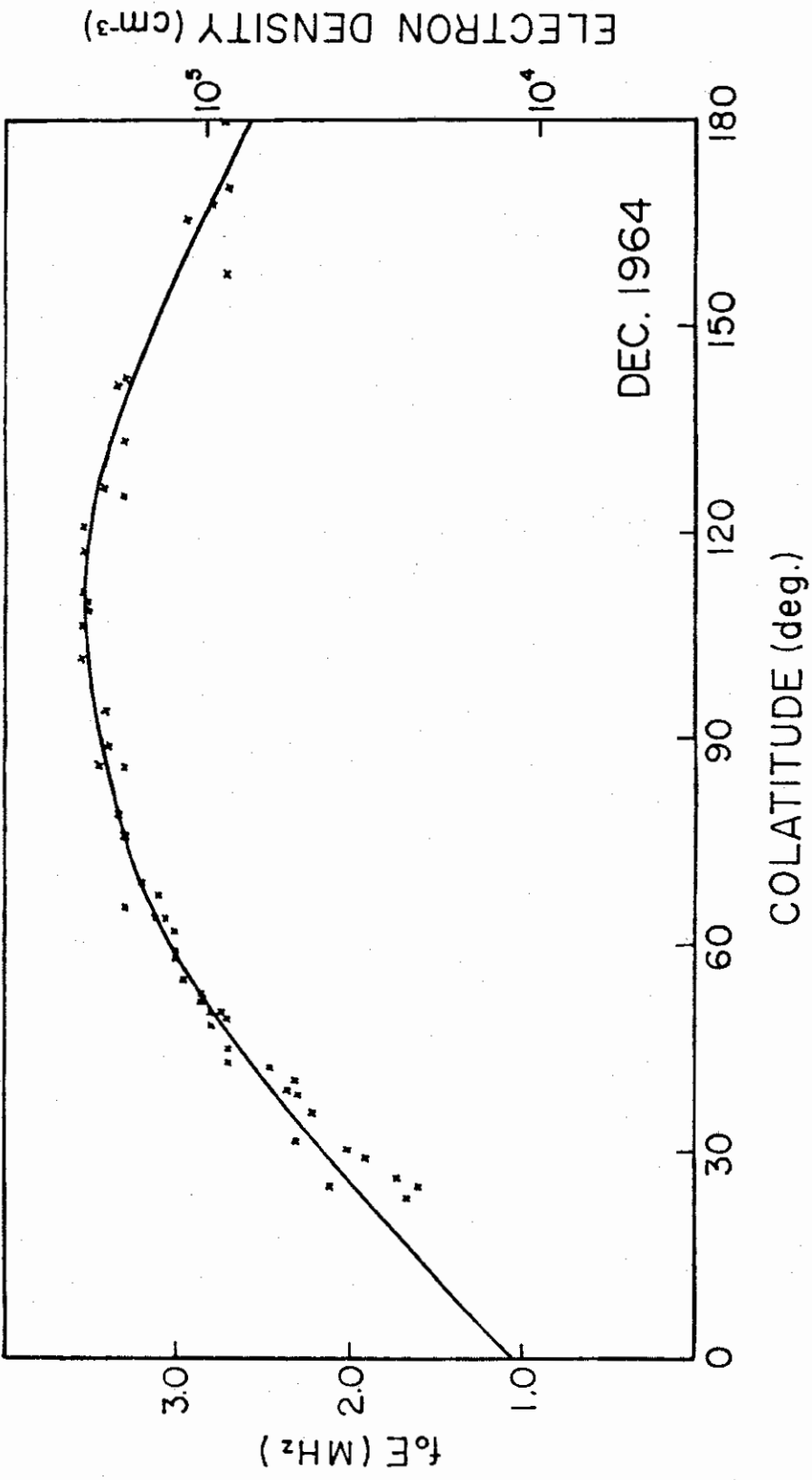


Fig. 2. Latitudinal distribution of foE (or electron density) at noon in December 1964, where the crosses show observed values.

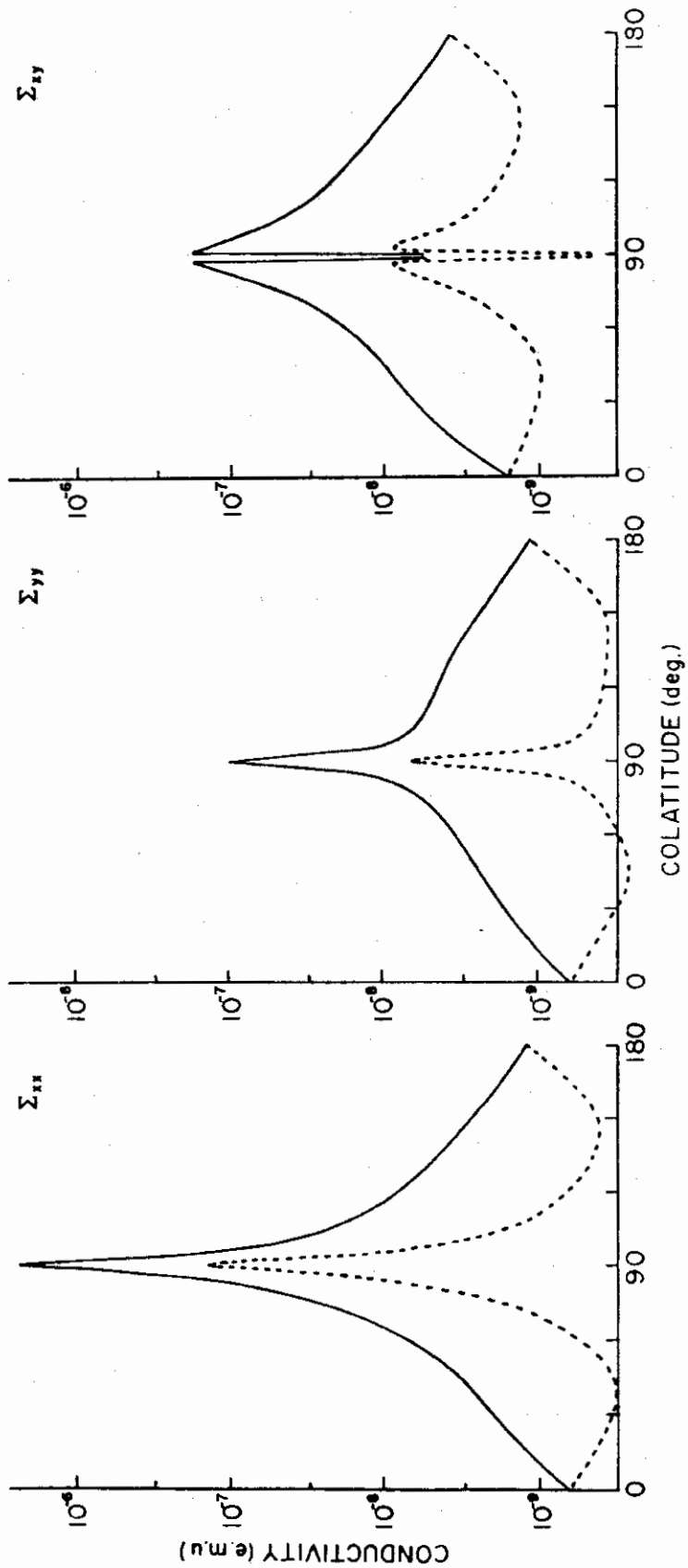


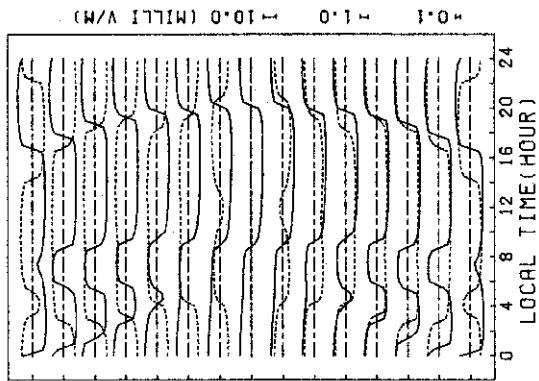
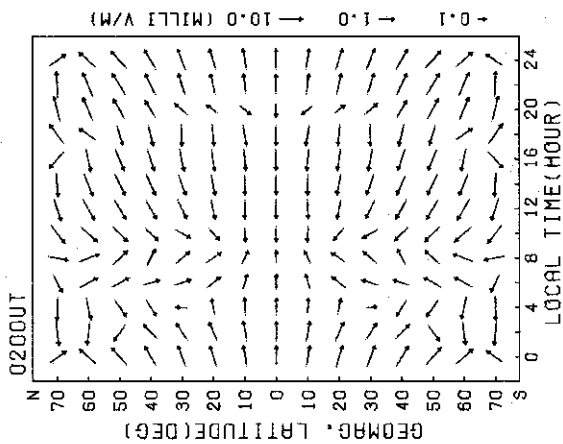
Fig. 3. Latitudinal distribution of the layer conductivities (Σ_{xx} , Σ_{yy} and Σ_{xy}) at noon (full line) and midnight (dotted line) in December 1964.

FIGURE 4

Global distribution (by arrows) and daily variations (southward component by dotted line, and eastward component by full line) of the electric field (two panels on the left-hand side) and wind velocity (two panels on the right-hand side) at successive two UT hours in December 1964, calculated on the basis of the external part of equivalent current systems as was shown in Figure 2 of the DATA BOOK No. 1.

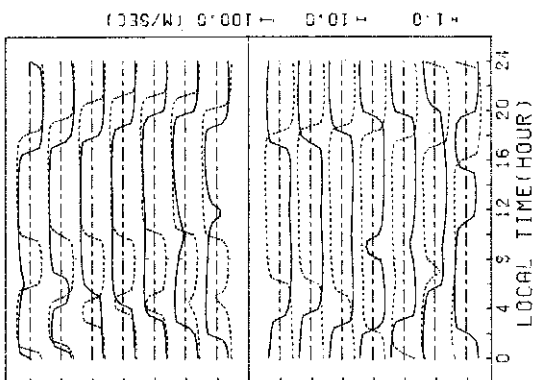
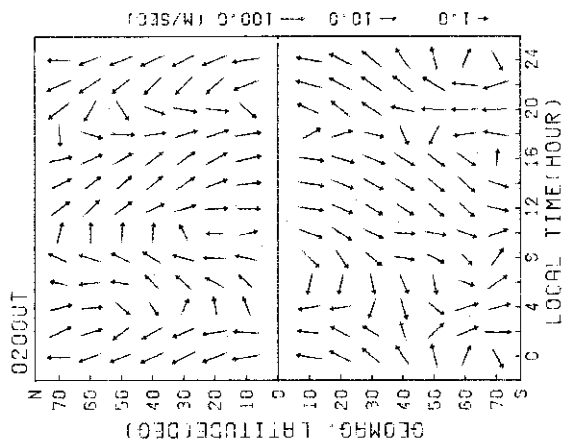
DEC. 1, 1964

ELECTRIC FIELD (LOG SCALE)

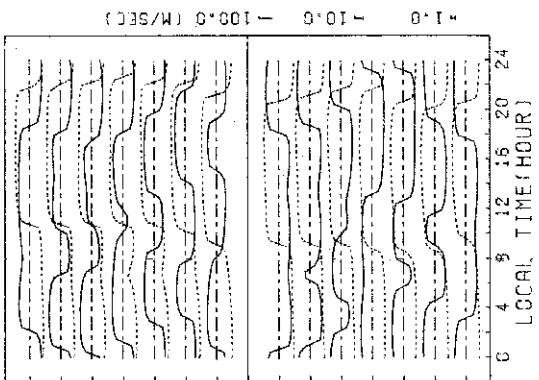
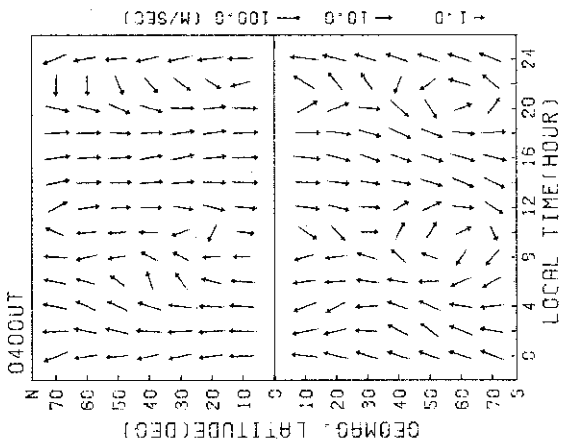
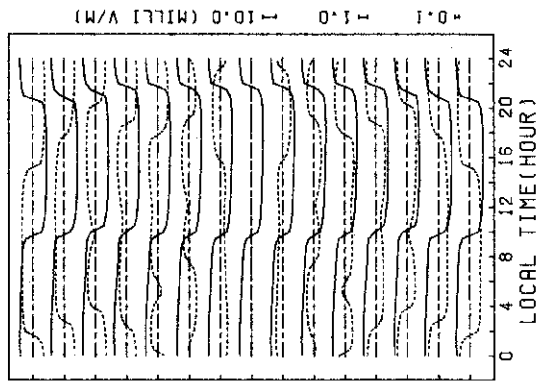
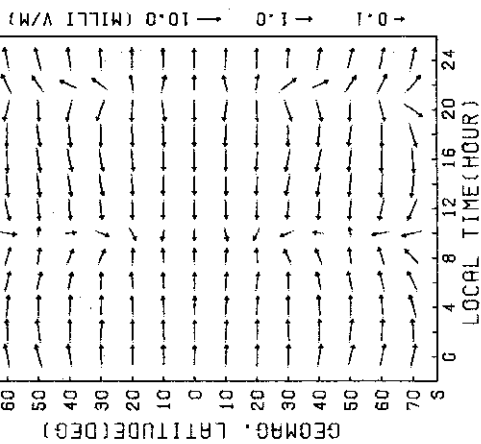


DEC. 1, 1964

WIND VELOCITY (LOG SCALE)

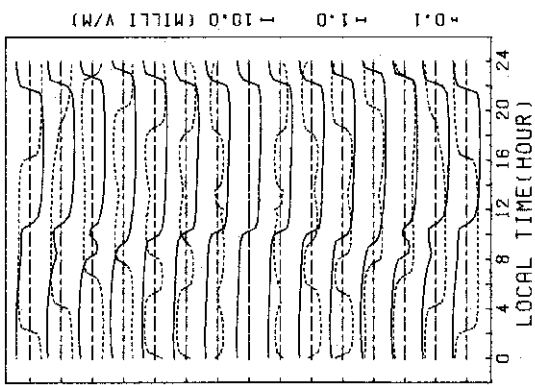
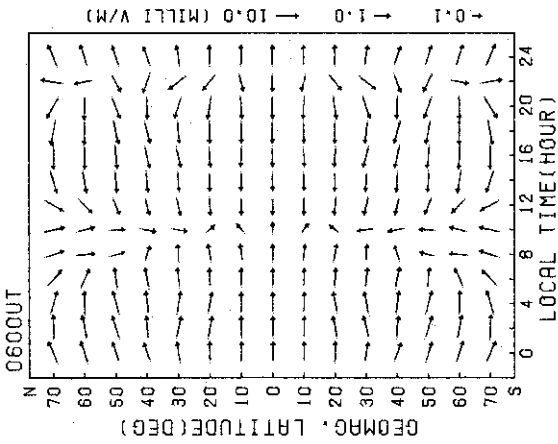


0400UT



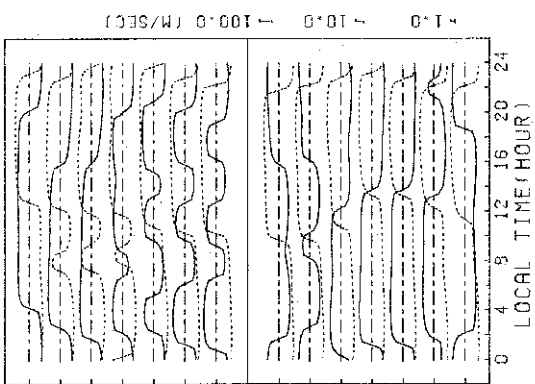
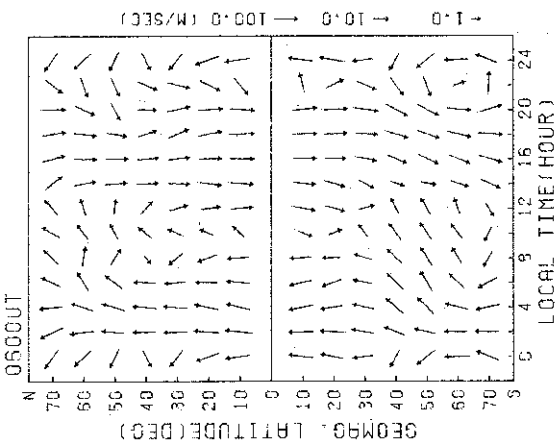
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ELECTRIC FIELD (LOG SCALE)

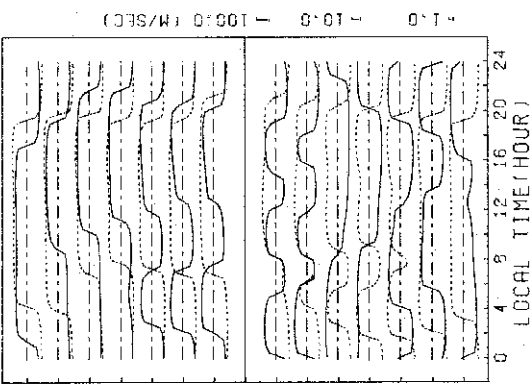
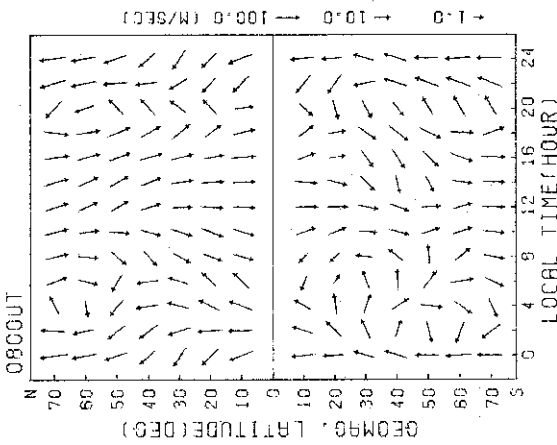
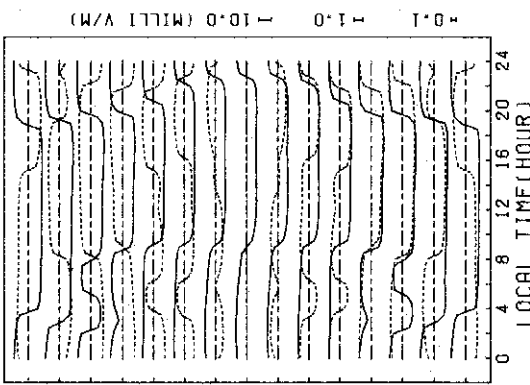
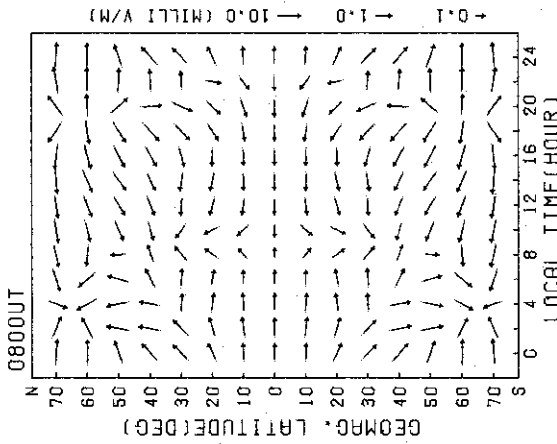


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WIND VELOCITY (LOG SCALE)

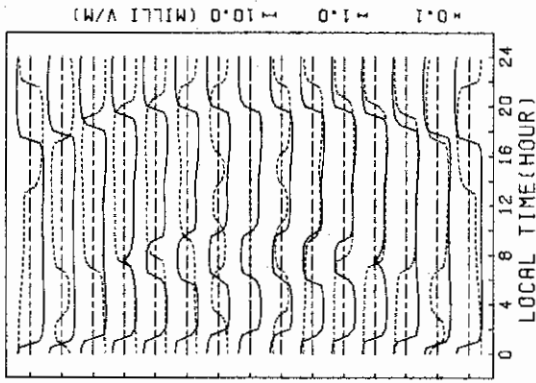
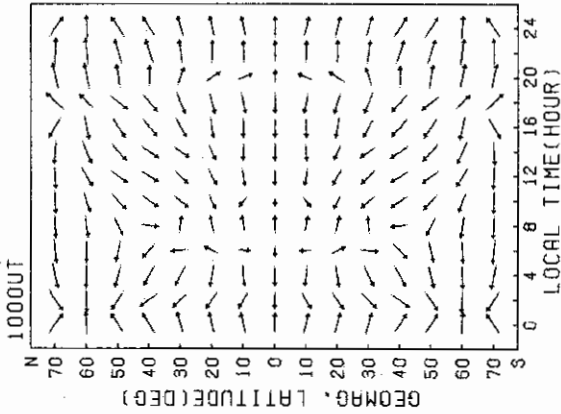


0800UT



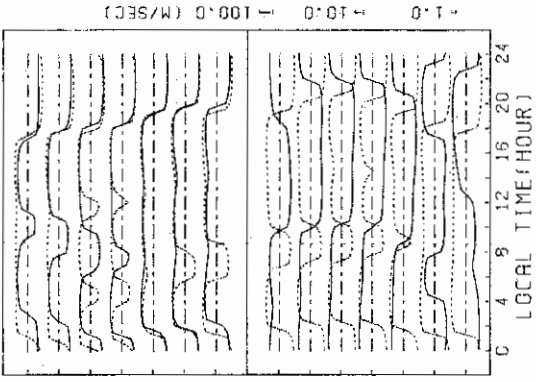
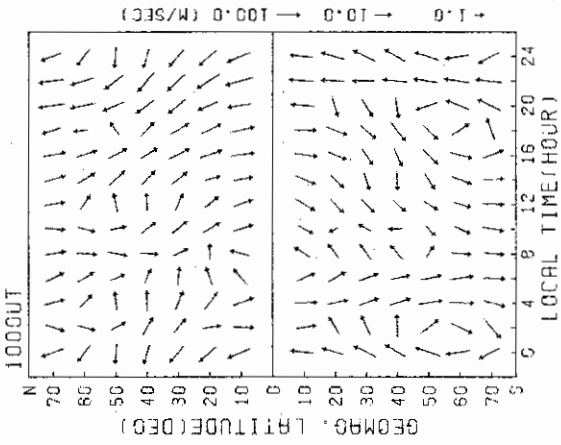
DEC.1.1964

ELECTRIC FIELD (LOG SCALE)

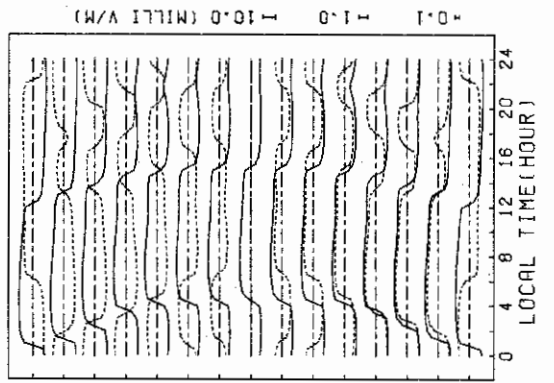
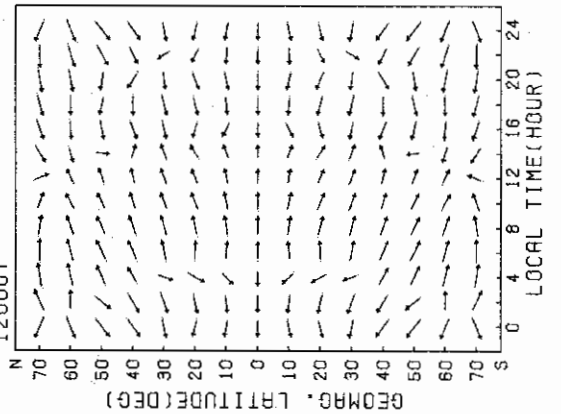


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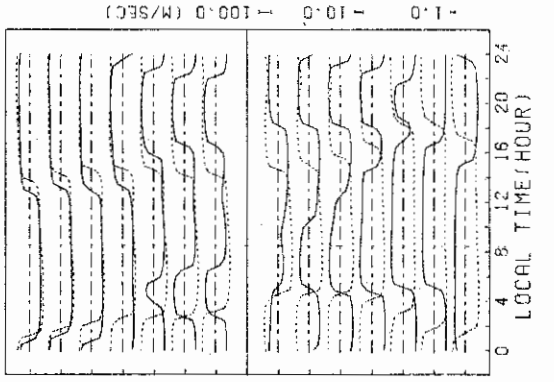
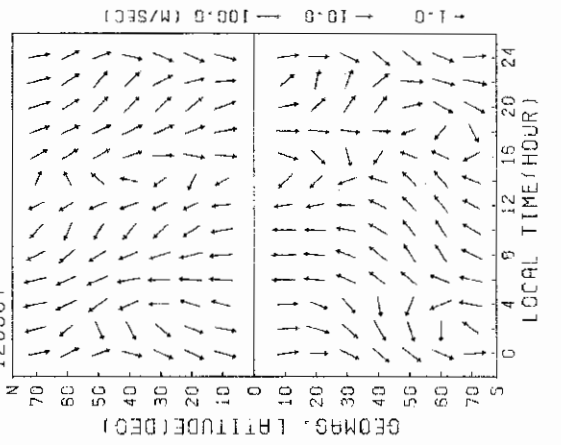
WIND VELOCITY (LOG SCALE)



12000

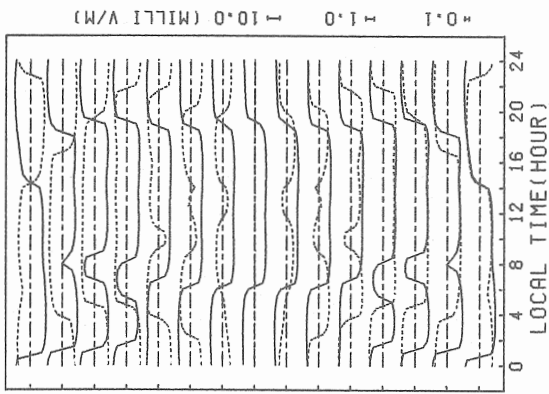
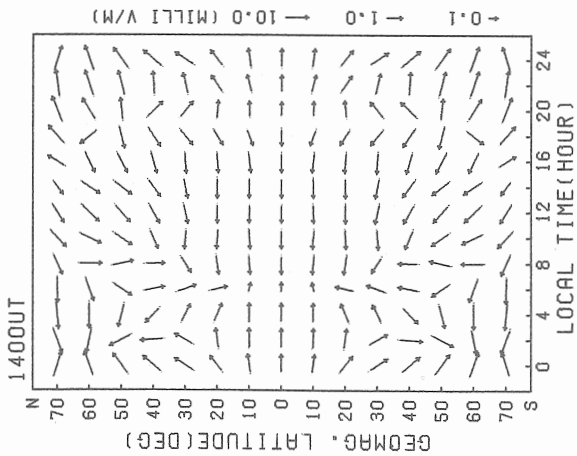


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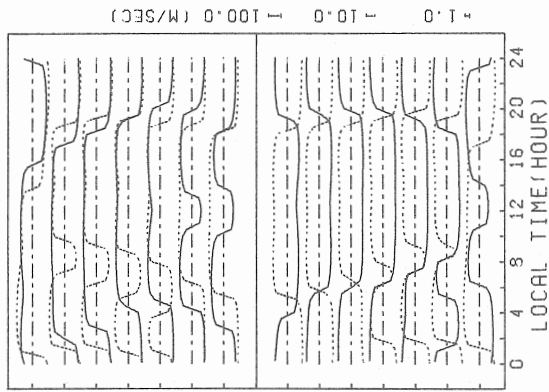
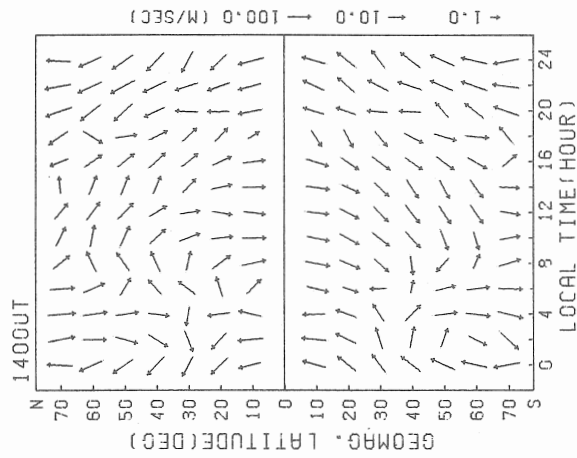
DEC. 1, 1964

ELECTRIC FIELD (LOG SCALE)

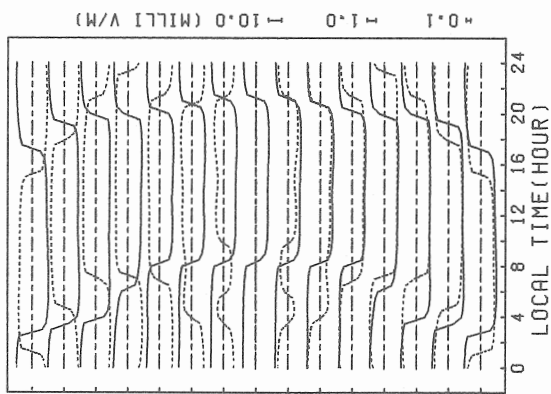
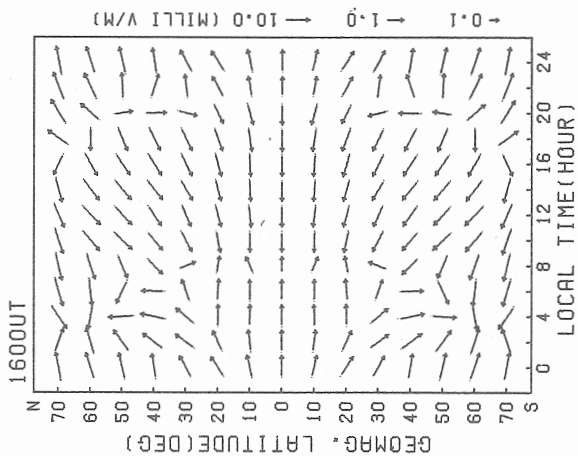


DEC. 1, 1964

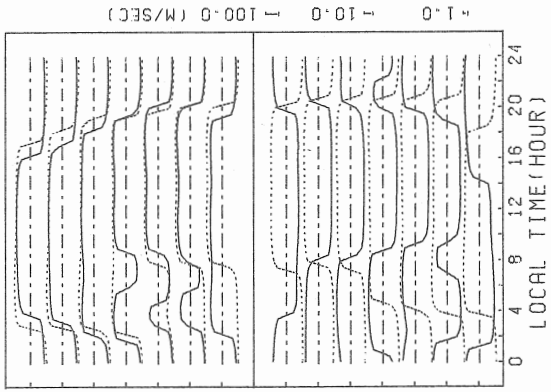
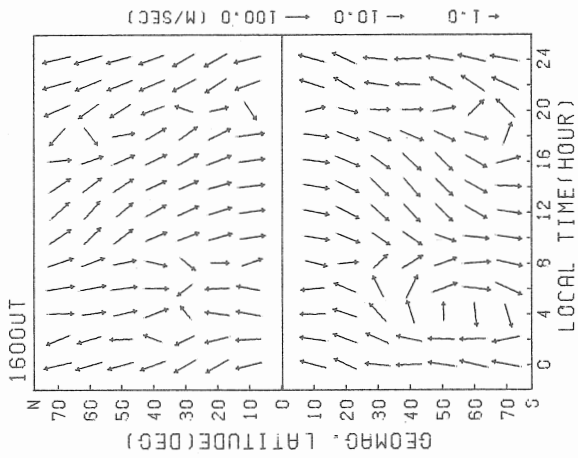
WIND VELOCITY (LOG SCALE)



1600UT

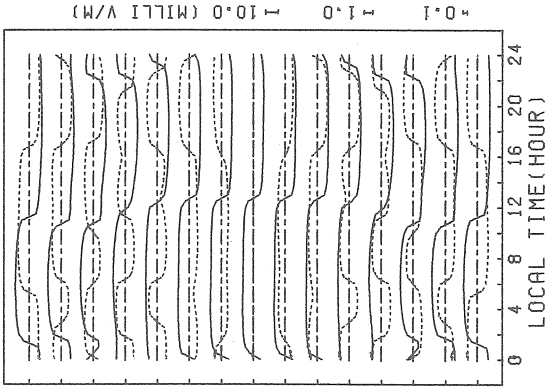
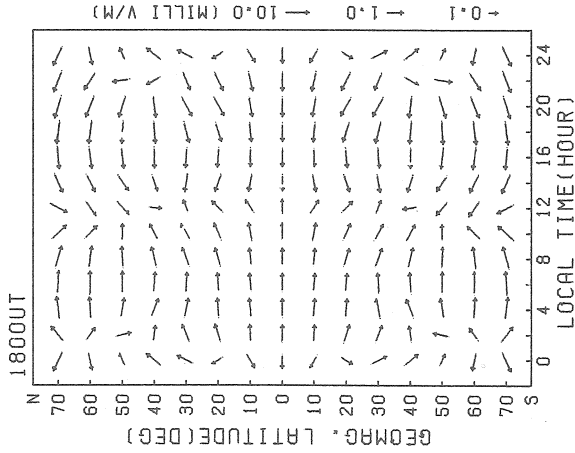


1600UT



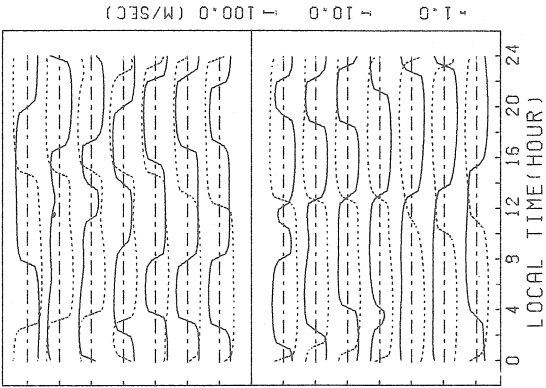
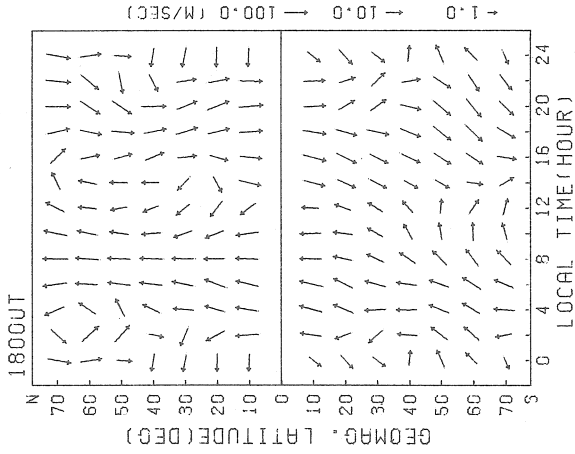
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ELECTRIC FIELD (LOG SCALE)

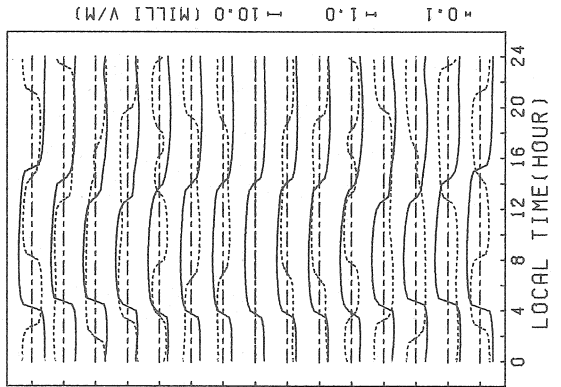
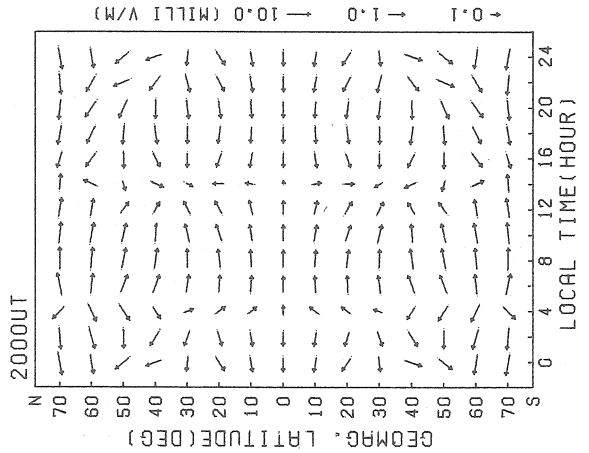


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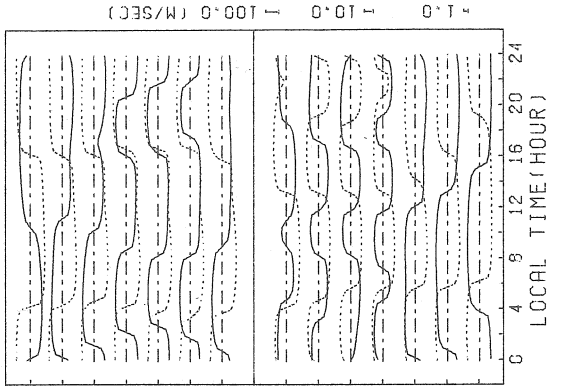
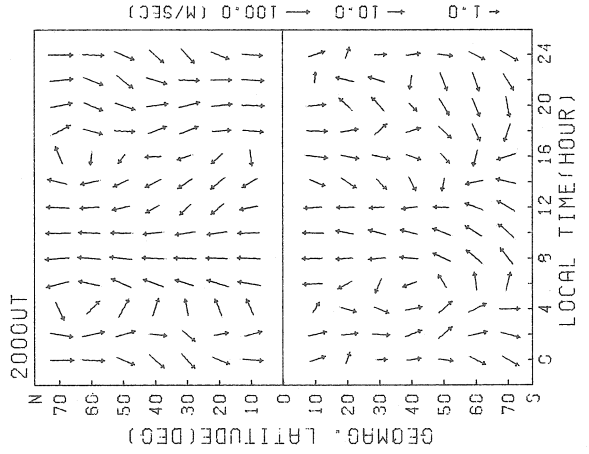
WIND VELOCITY (LOG SCALE)



2000UT

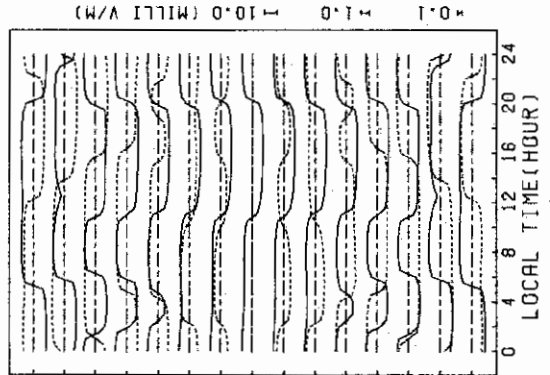
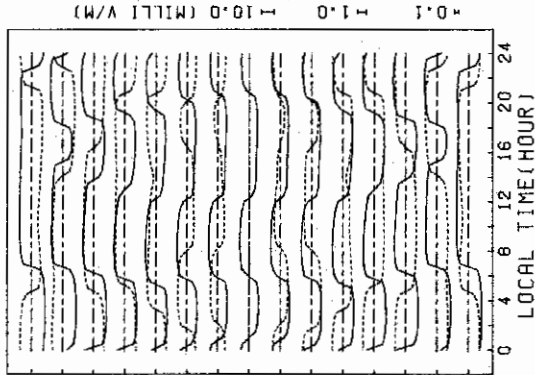
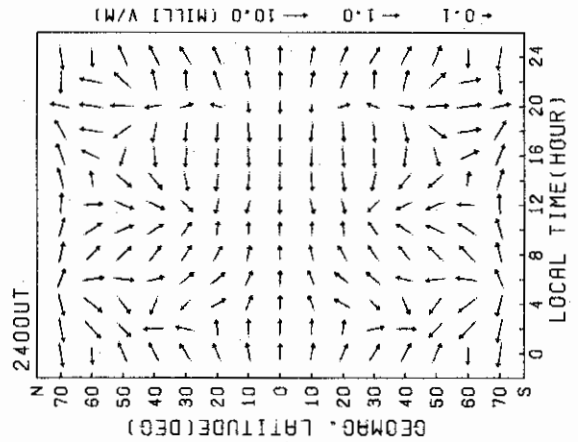
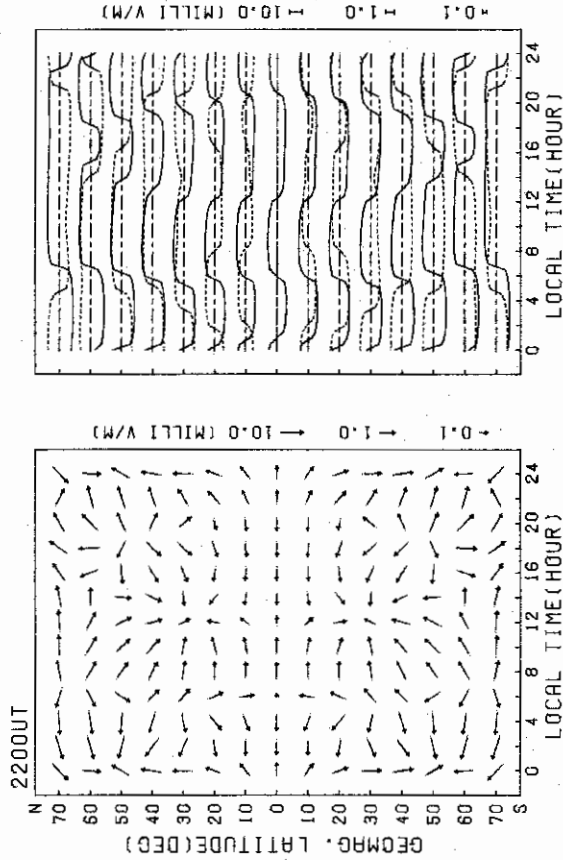


2000UT



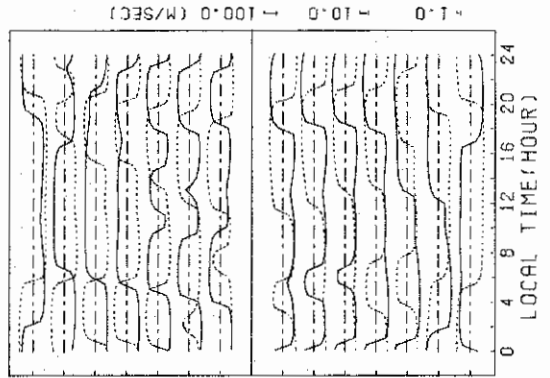
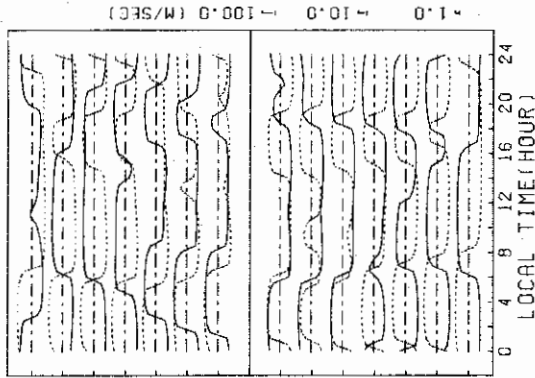
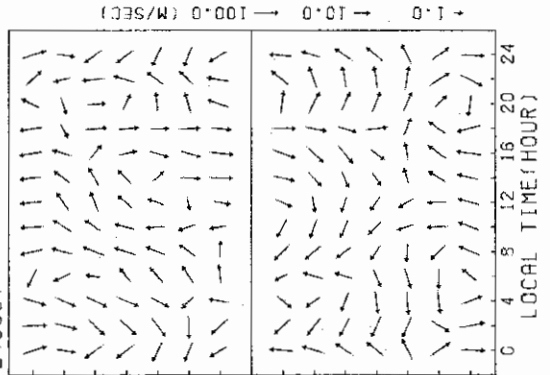
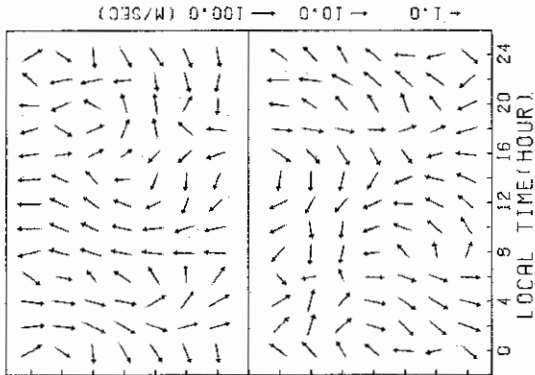
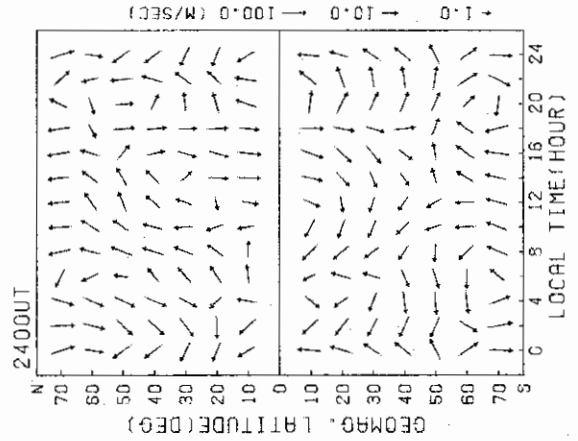
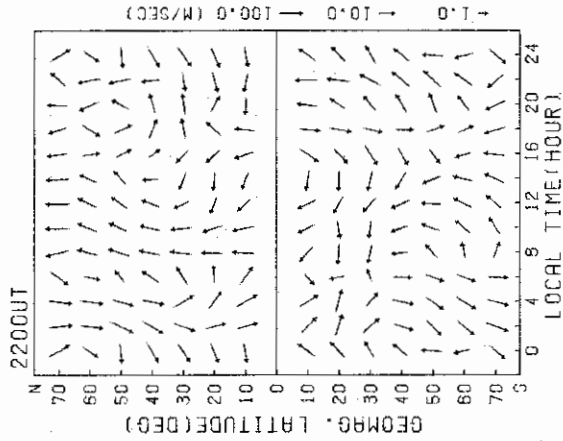
DEC.1,1964

ELECTRIC FIELD (LOG SCALE)



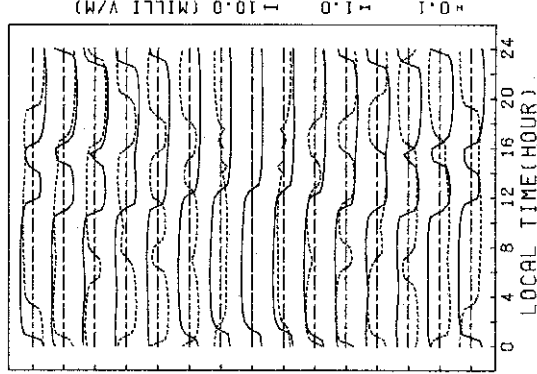
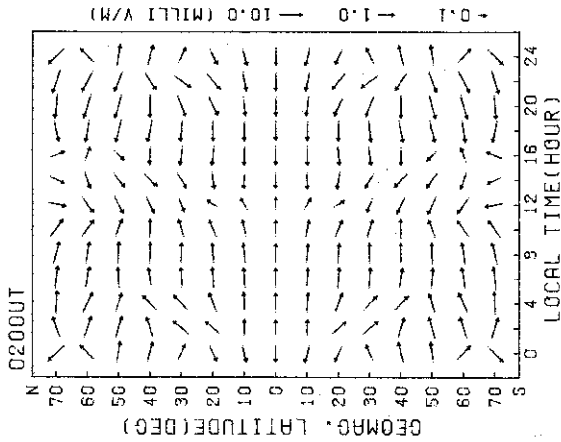
DEC.1,1964

WIND VELOCITY (LOG SCALE)



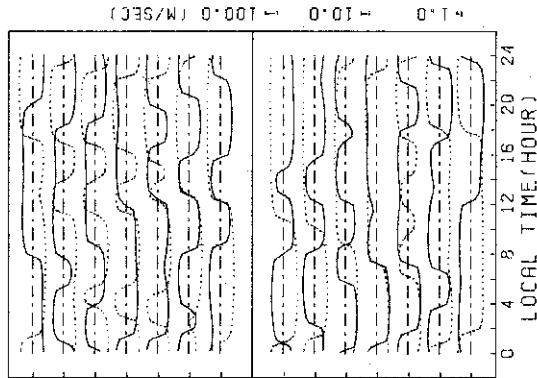
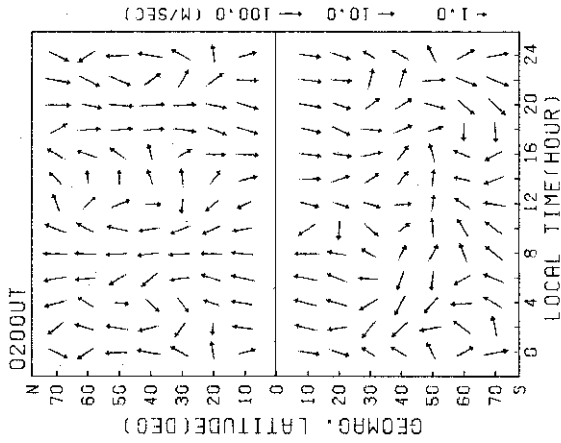
DEC.2,1964

ELECTRIC FIELD (LOG SCALE)

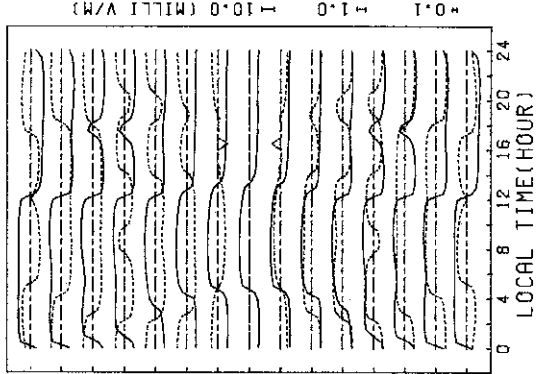
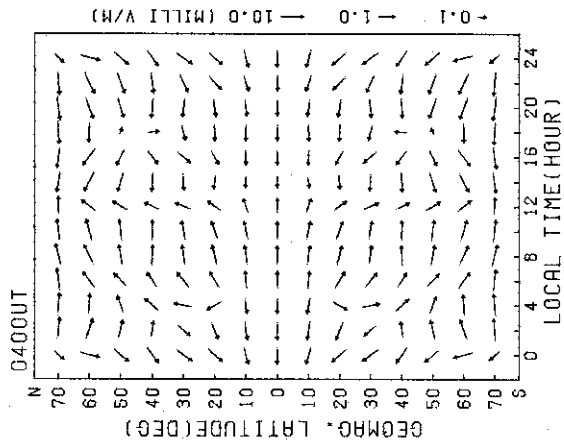


DEC.2,1964

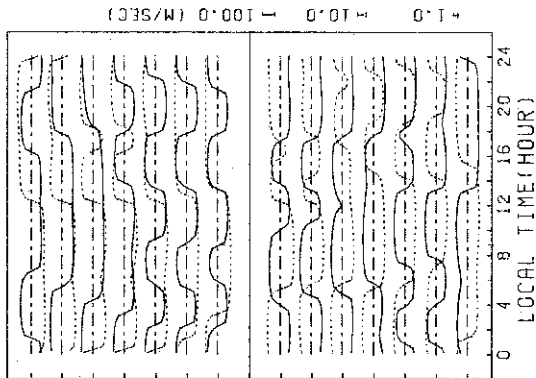
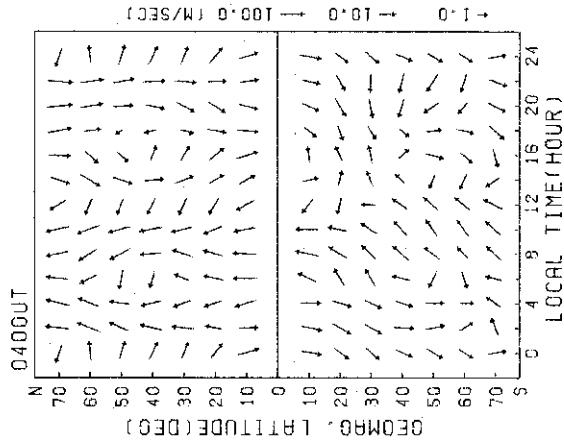
WIND VELOCITY (LOG SCALE)



0400UT

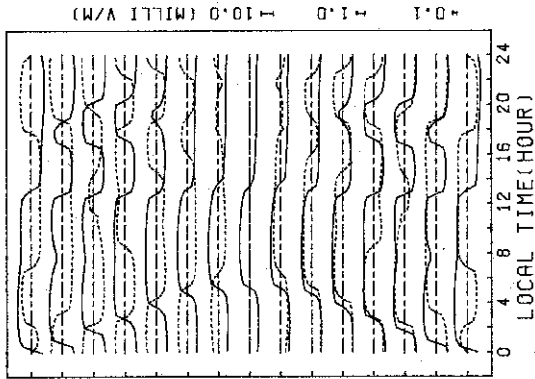
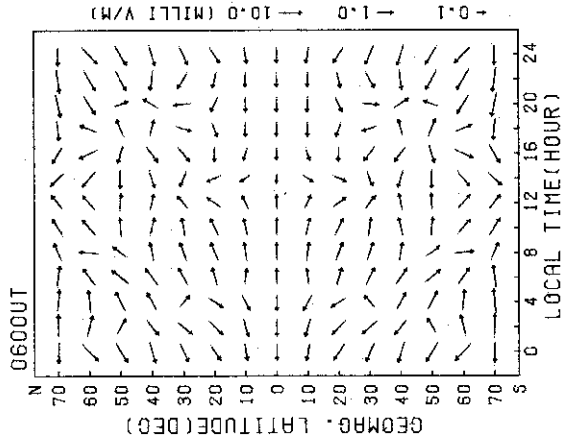


0400UT



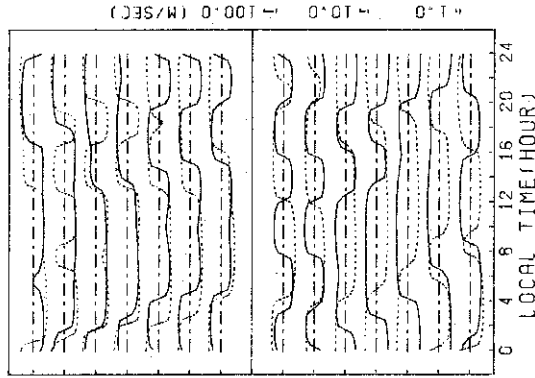
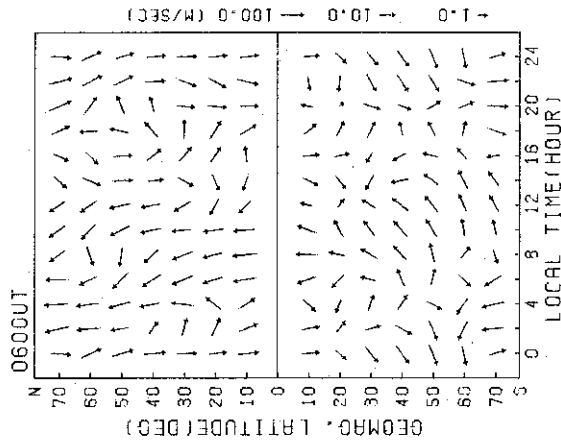
DEC.2,1964

ELECTRIC FIELD (LOG SCALE)

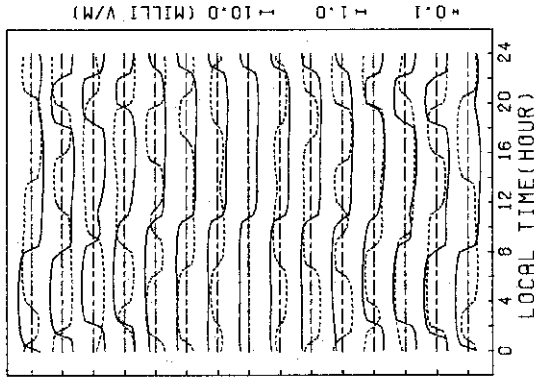
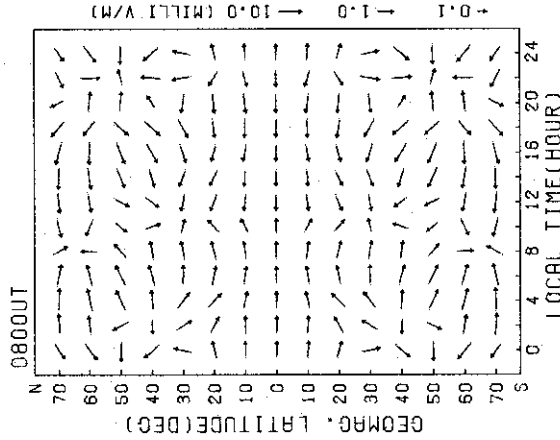


DEC.2,1964

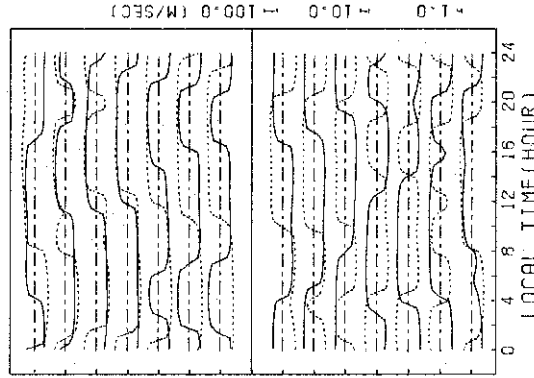
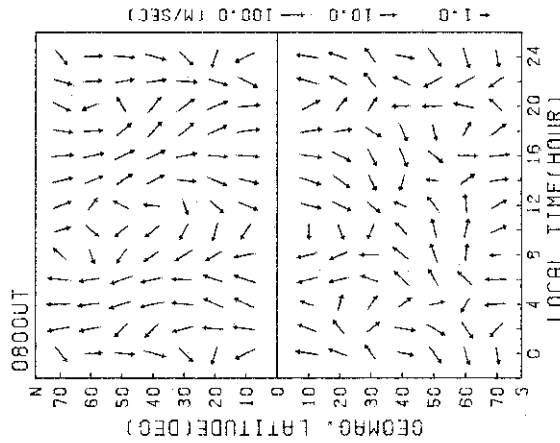
WIND VELOCITY (LOG SCALE)



0800UT

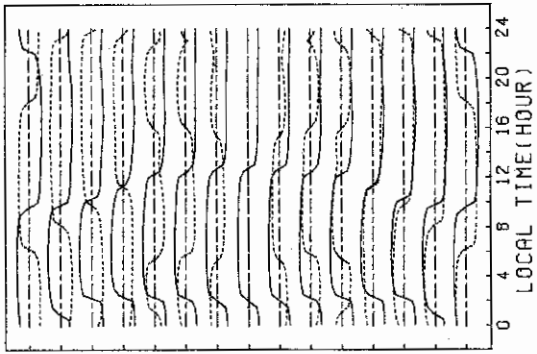
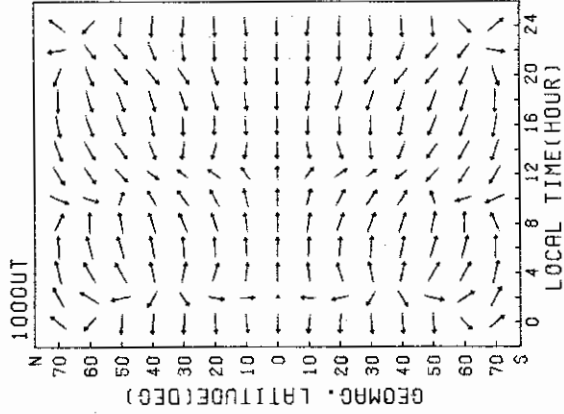


0800UT



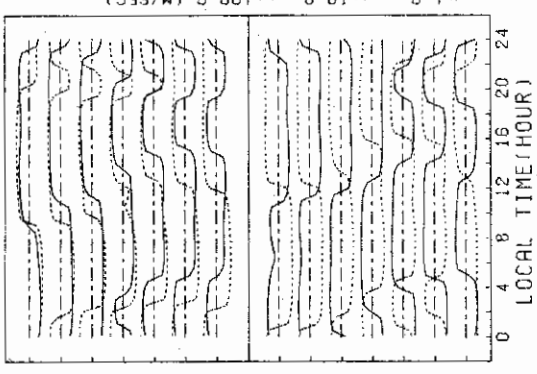
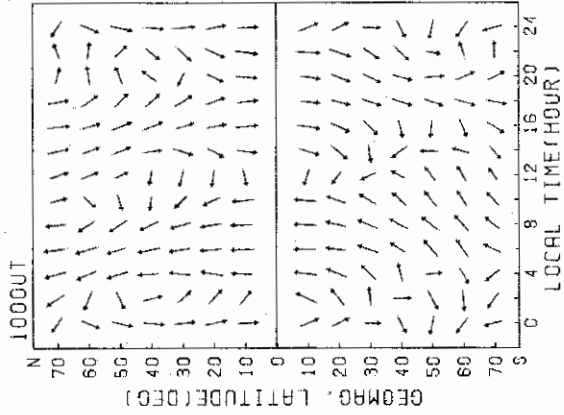
DEC. 2, 1964

ELECTRIC FIELD (LOG SCALE)

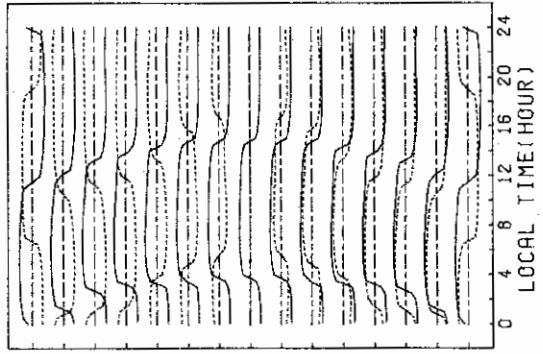
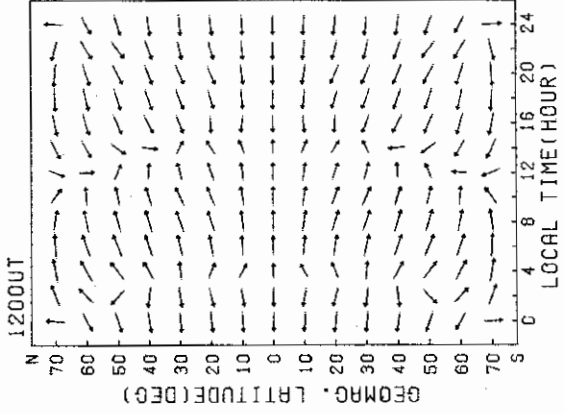


DEC. 2, 1964

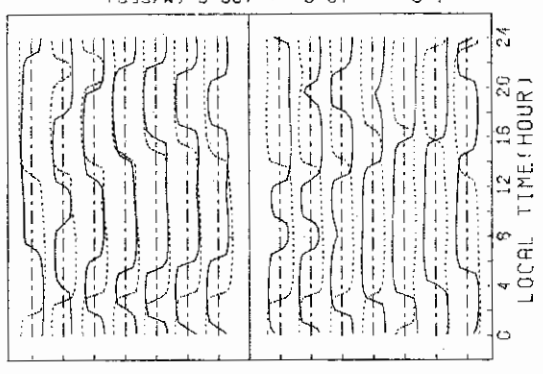
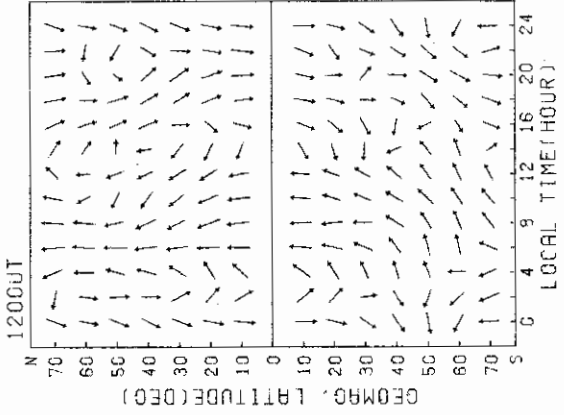
WIND VELOCITY (LOG SCALE)



1200UT

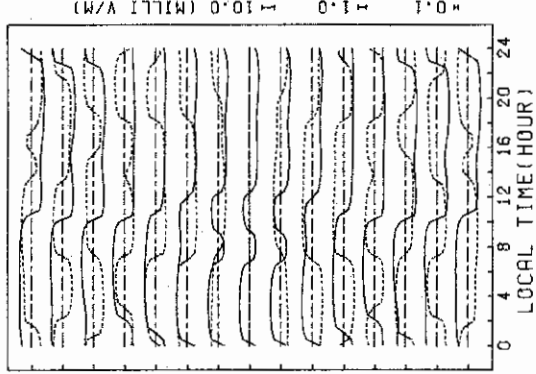
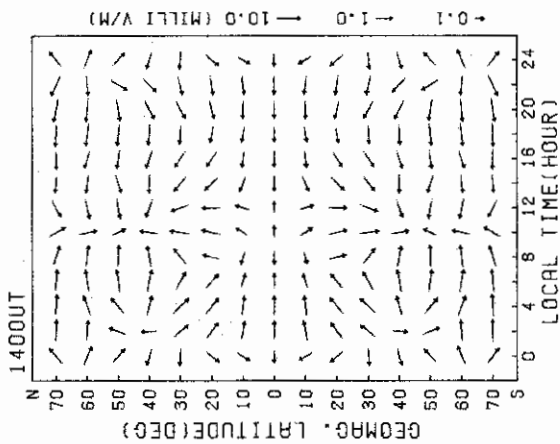


1200UT



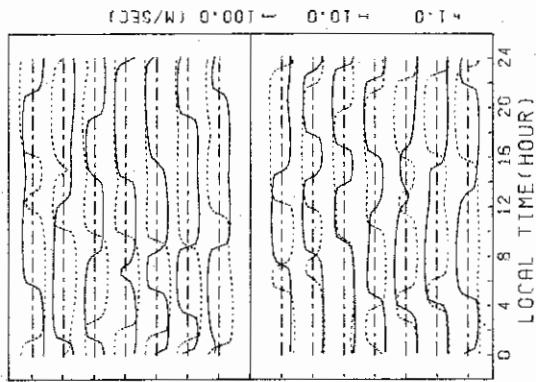
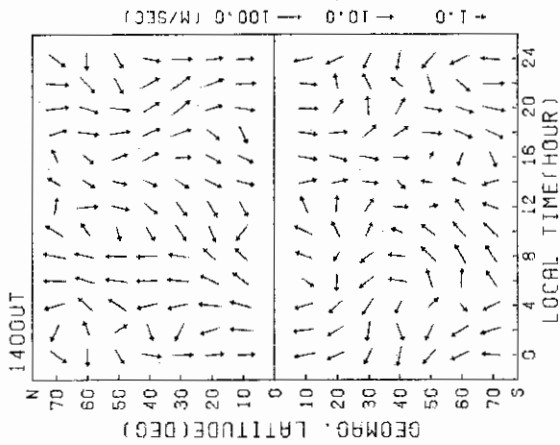
DEC.2.1964

ELECTRIC FIELD (LOG SCALE)

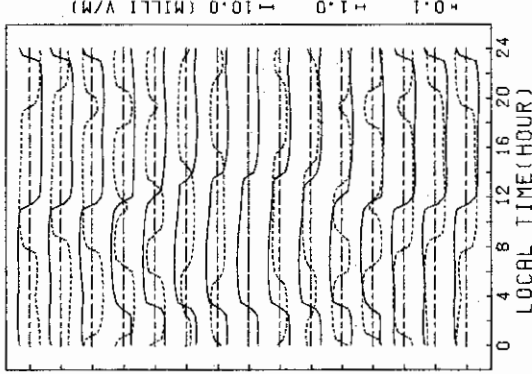
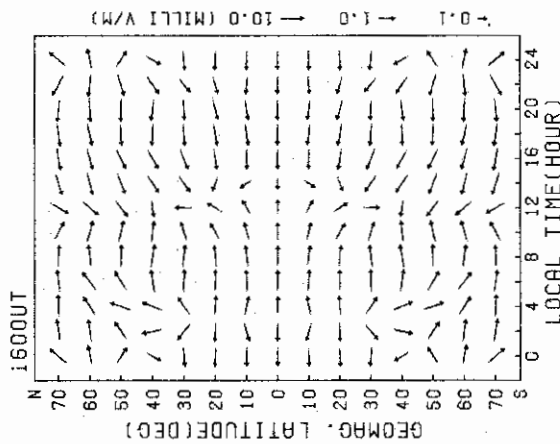


DEC.2.1964

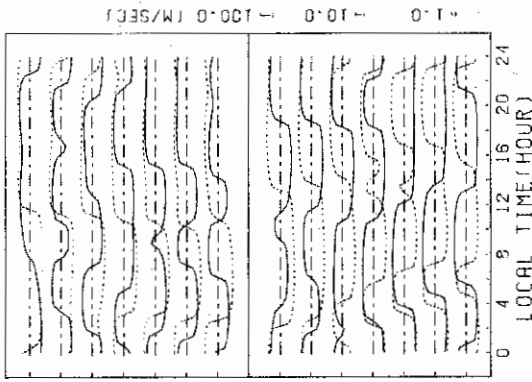
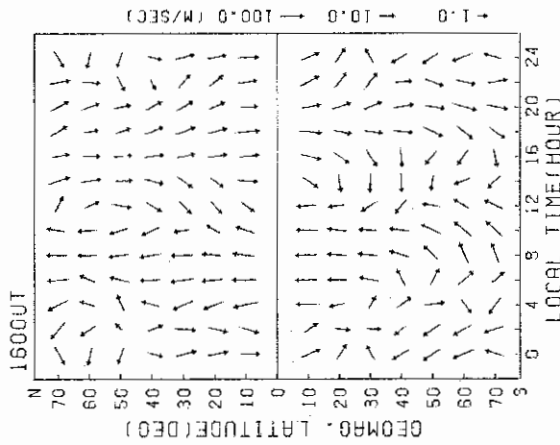
WIND VELOCITY (LOG SCALE)



1600UT

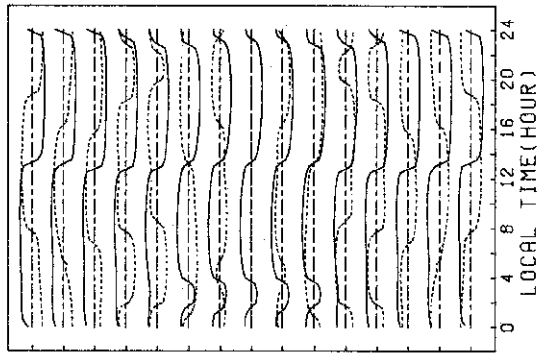
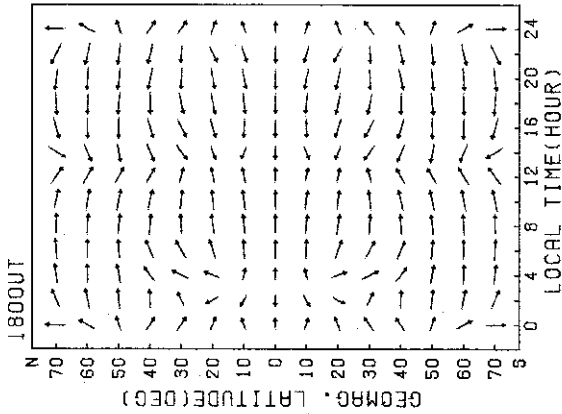


1600UT



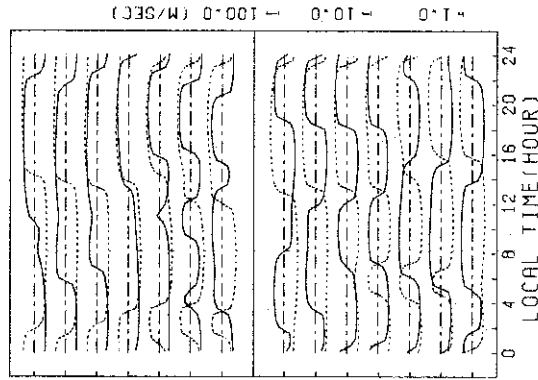
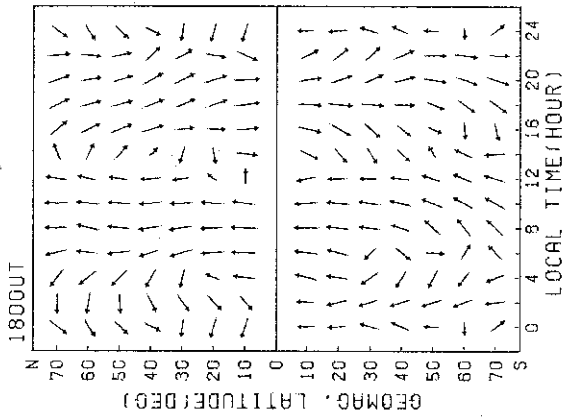
DEC.2,1964

ELECTRIC FIELD (LOG SCALE)

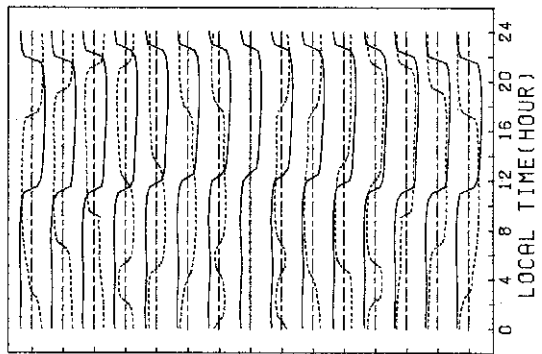
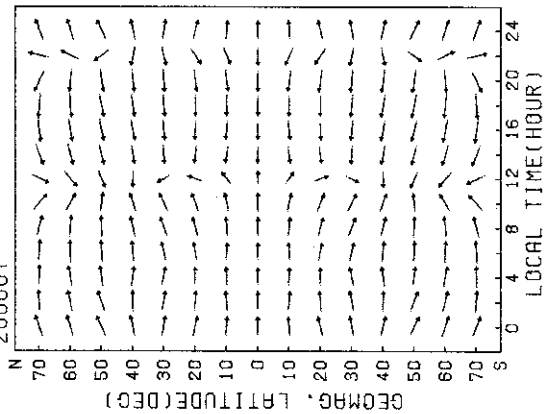


DEC.2,1964

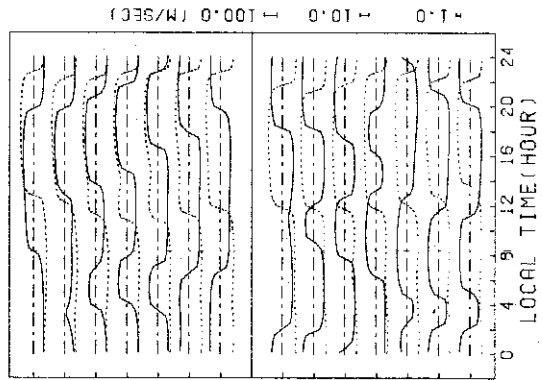
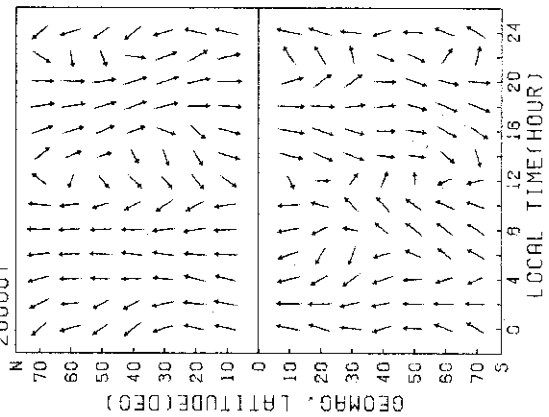
WIND VELOCITY (LOG SCALE)



2000UT

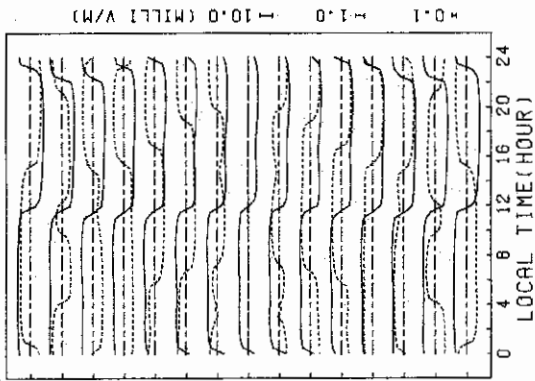
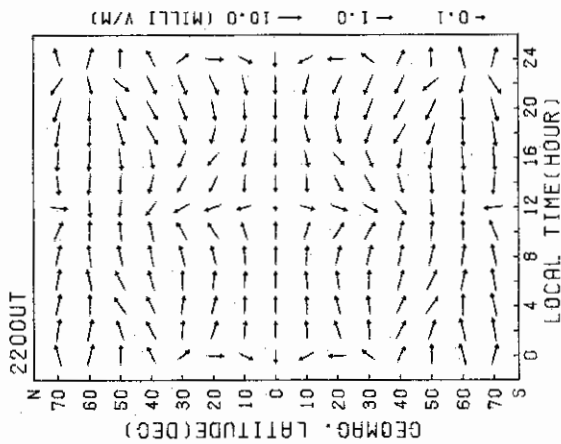


2000UT



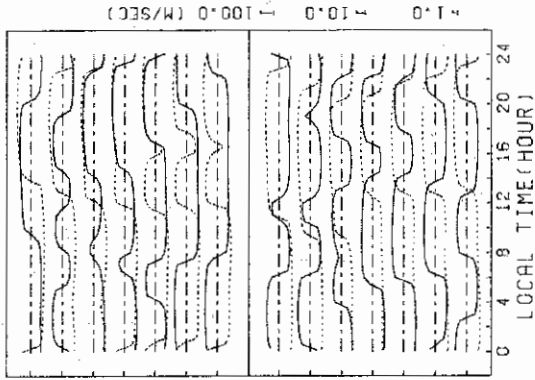
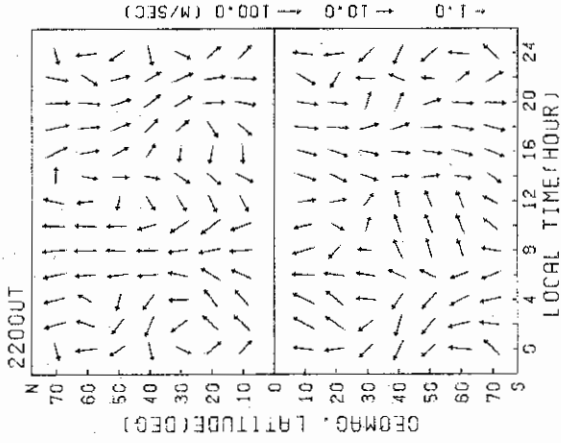
DEC.2,1964

ELECTRIC FIELD (LOG SCALE)

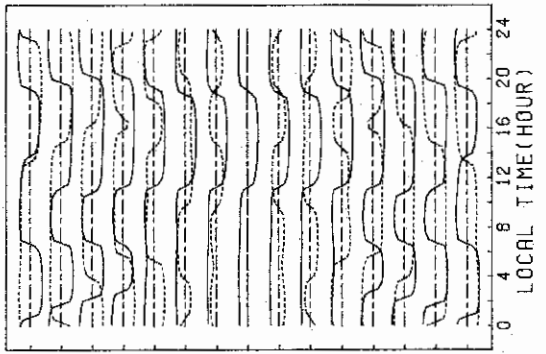
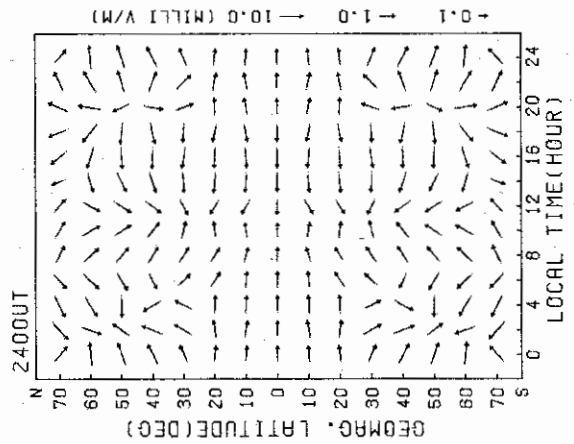


DEC.2,1964

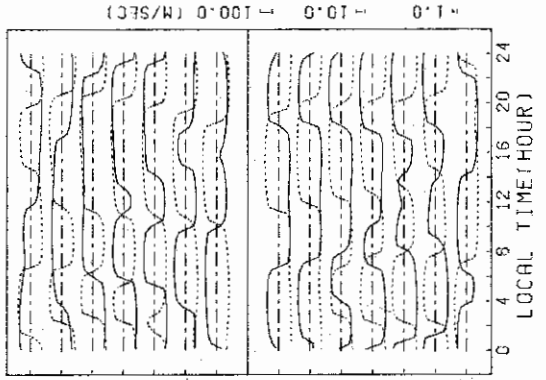
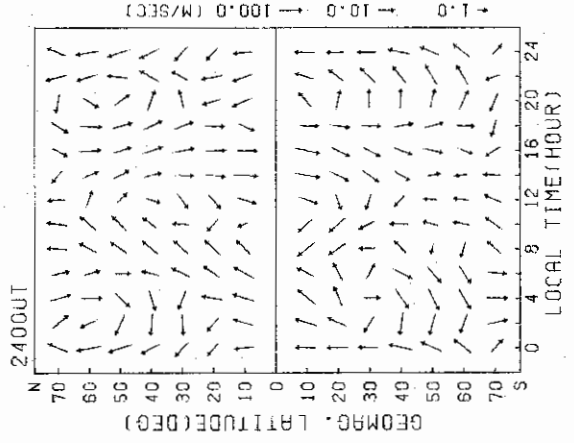
WIND VELOCITY (LOG SCALE)



2400UT

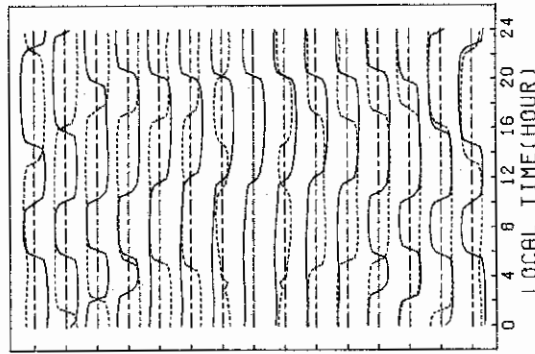
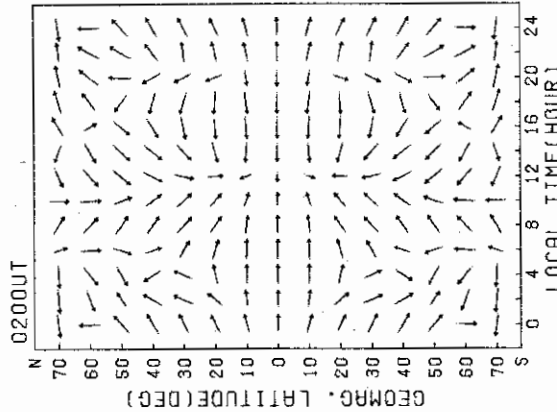


2400UT



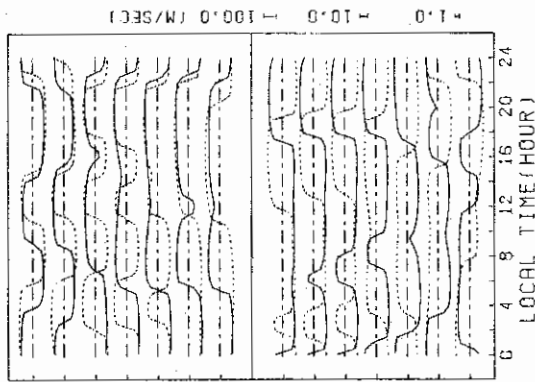
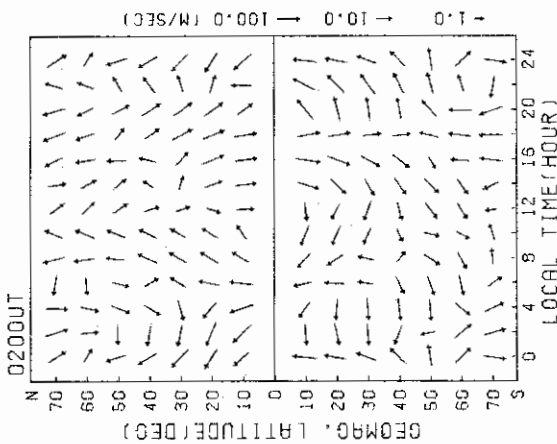
DEC-3-1964

ELECTRIC FIELD (LOG SCALE)



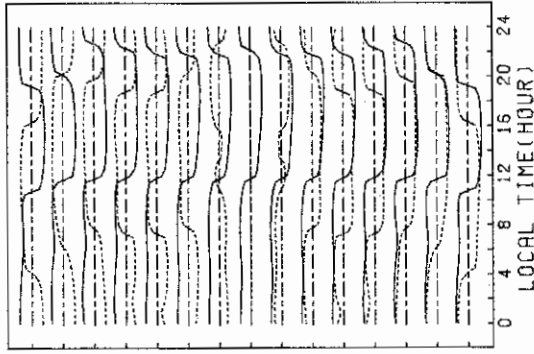
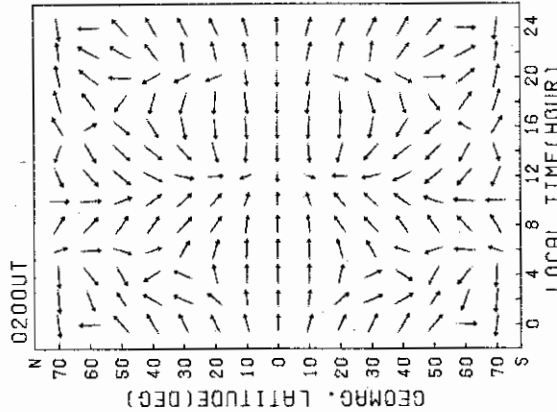
DEC-3-1964

WIND VELOCITY (LOG SCALE)



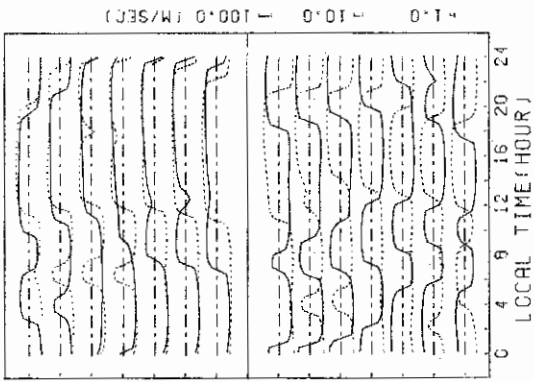
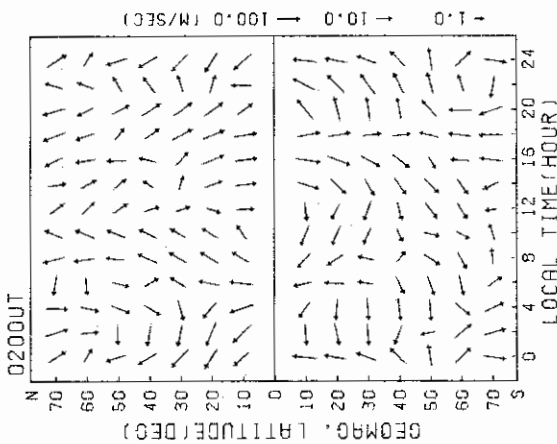
DEC-3-1964

ELECTRIC FIELD (LOG SCALE)



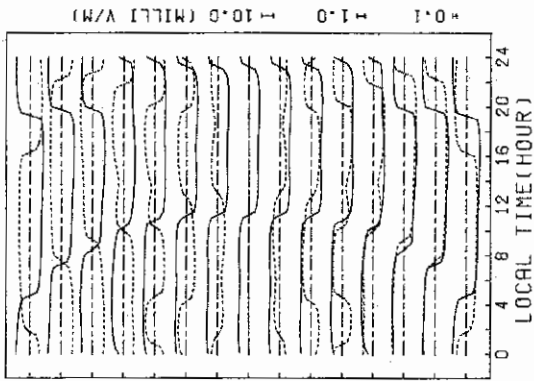
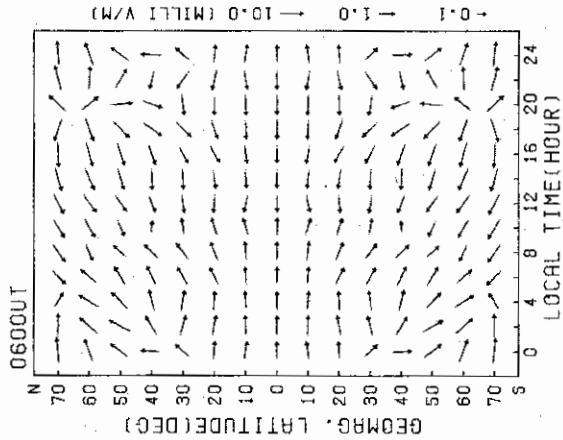
DEC-3-1964

WIND VELOCITY (LOG SCALE)



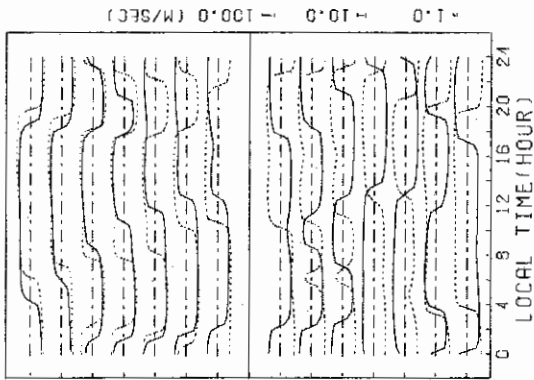
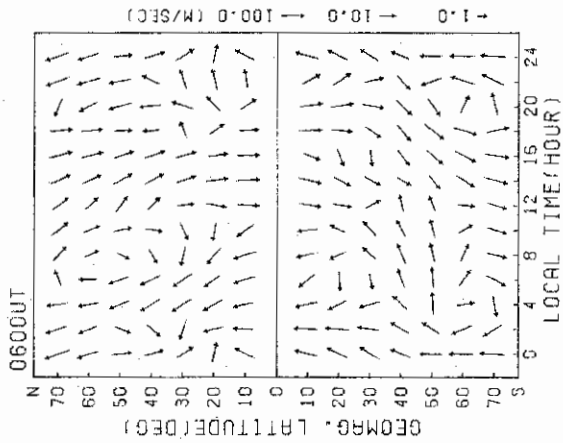
DEC. 3, 1964

ELECTRIC FIELD (LOG SCALE)

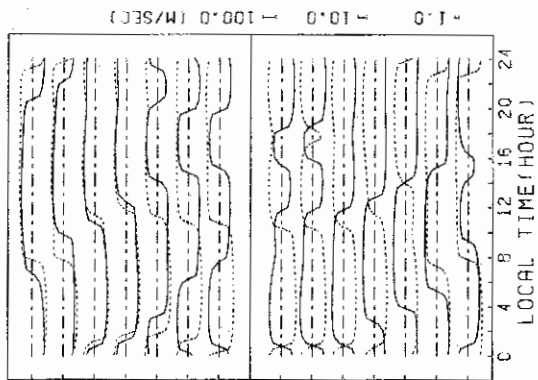
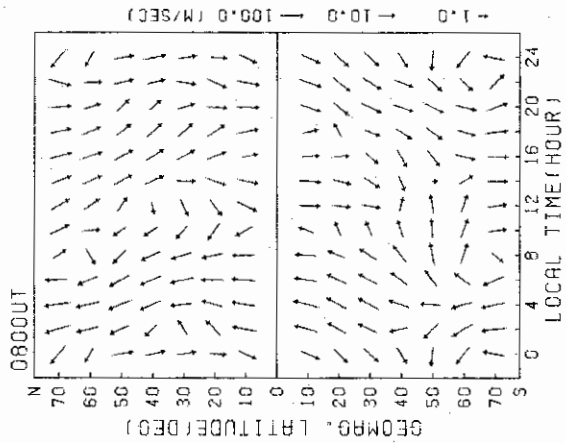
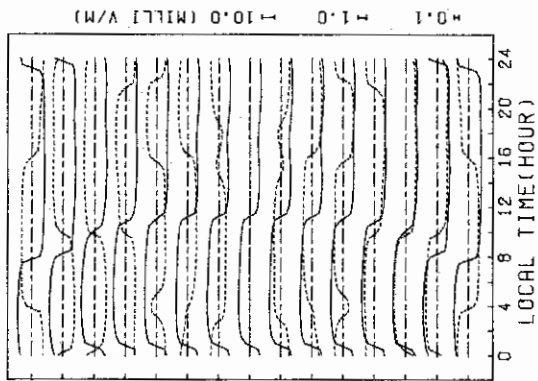
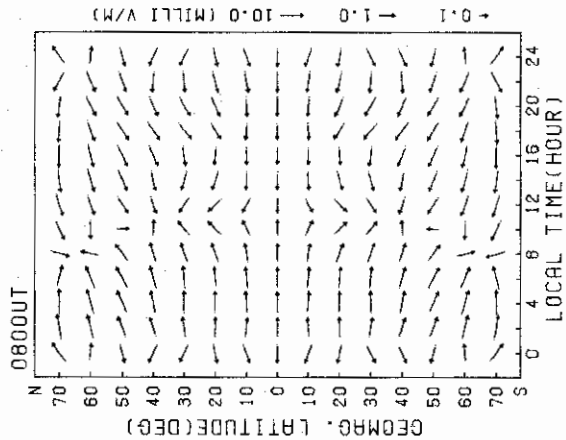


DEC. 3, 1964

WIND VELOCITY (LOG SCALE)

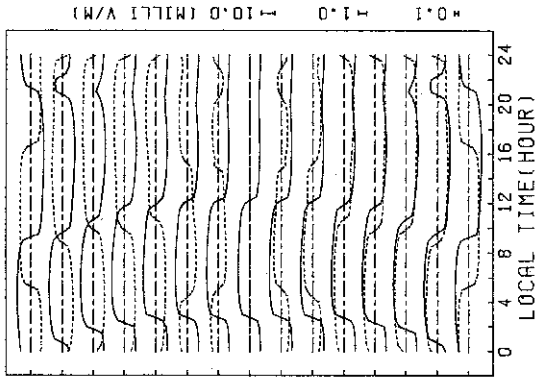
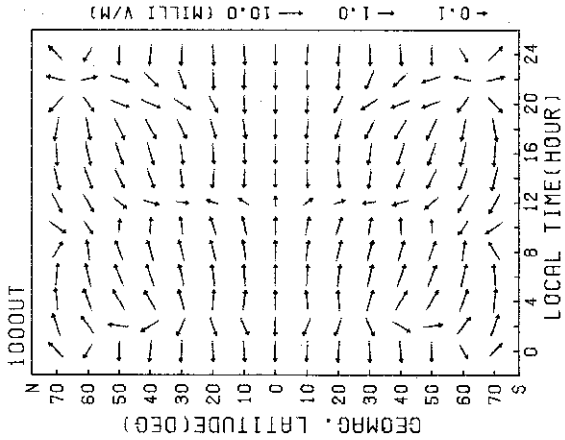


0800UT



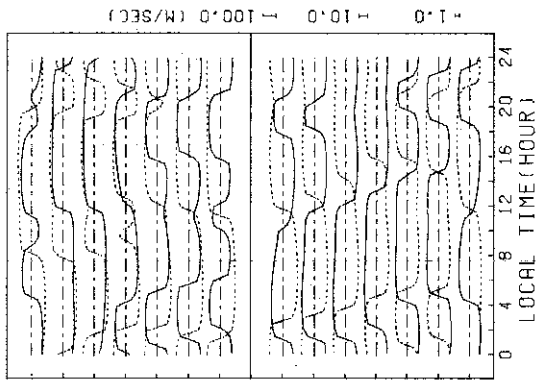
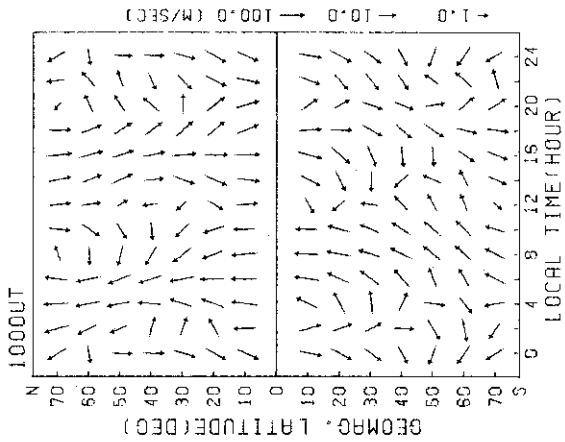
DEC. 3, 1964

ELECTRIC FIELD (LOG SCALE)

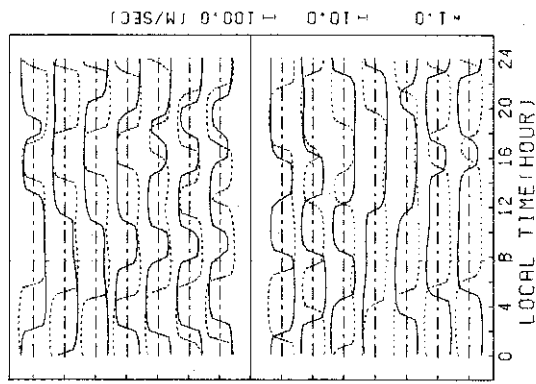
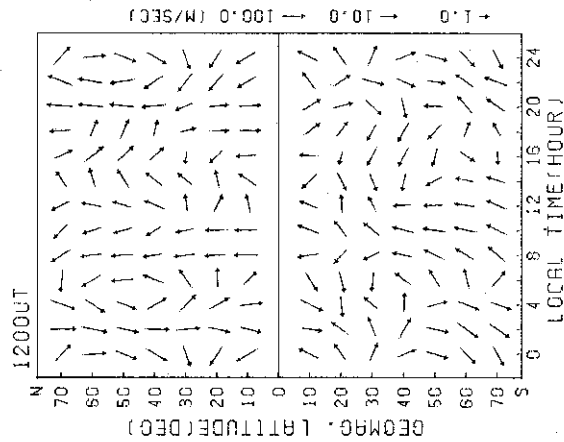
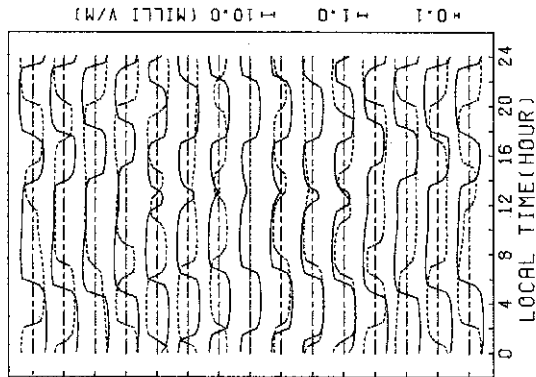
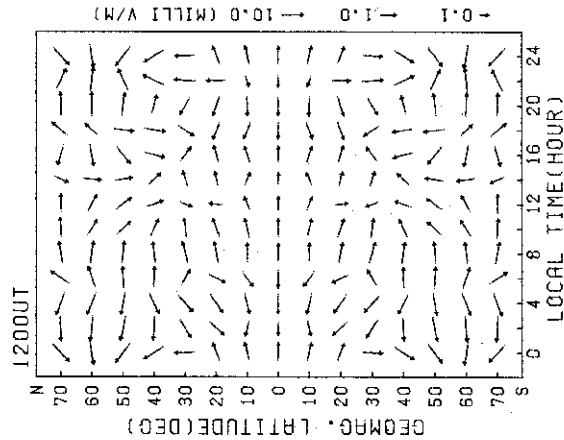


DEC. 3, 1964

WIND VELOCITY (LOG SCALE)

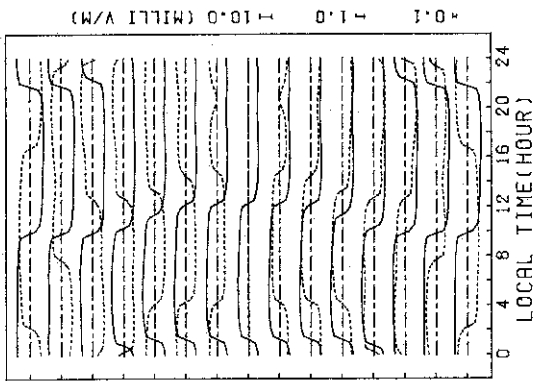
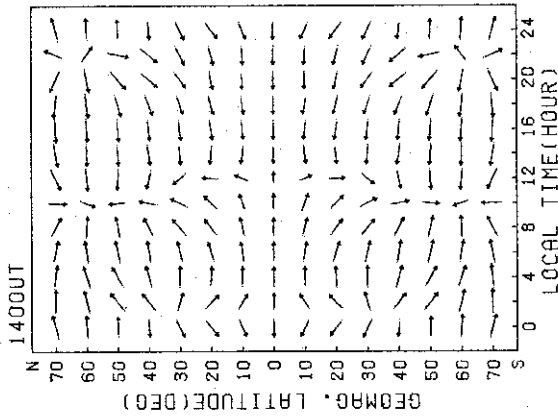


1200UT



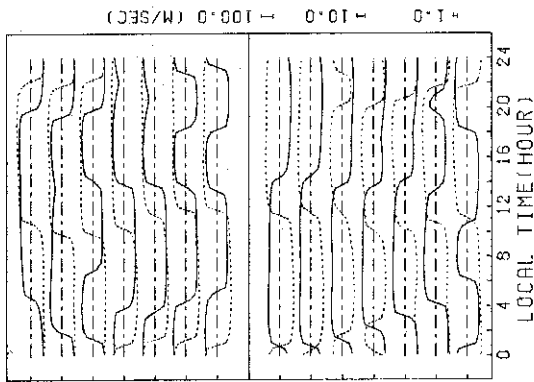
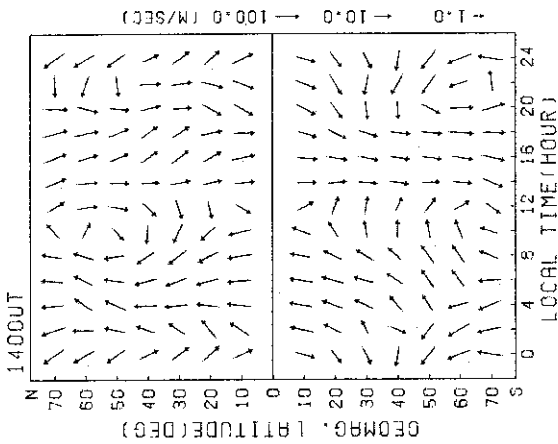
DEC.3.1964

ELECTRIC FIELD (LOG SCALE)

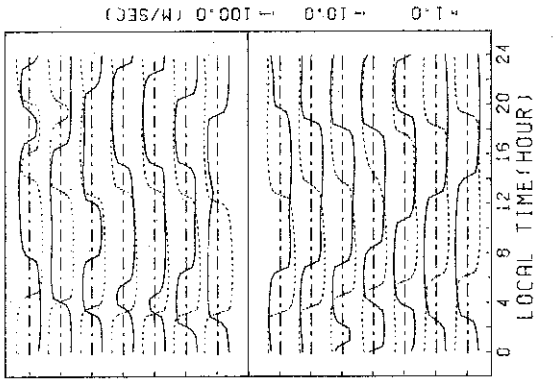
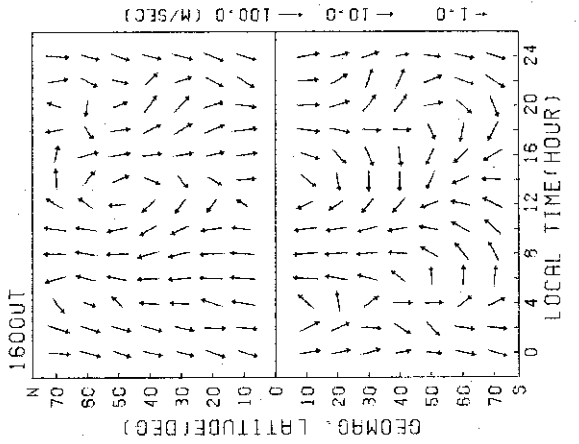
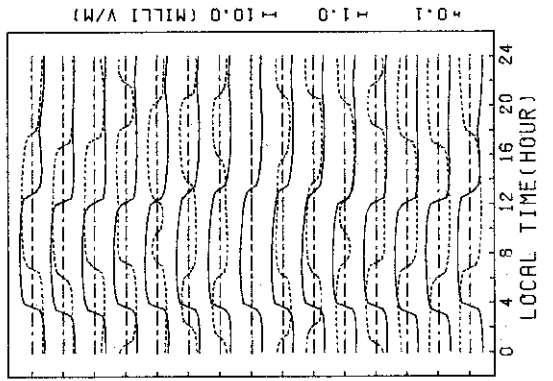
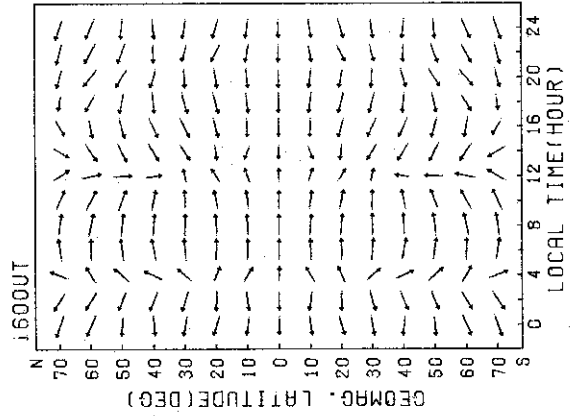


DEC.3.1964

WIND VELOCITY (LOG SCALE)

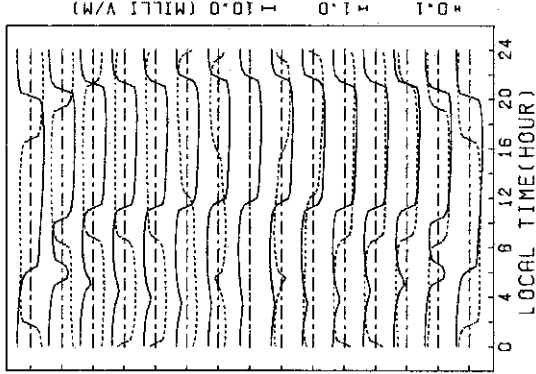
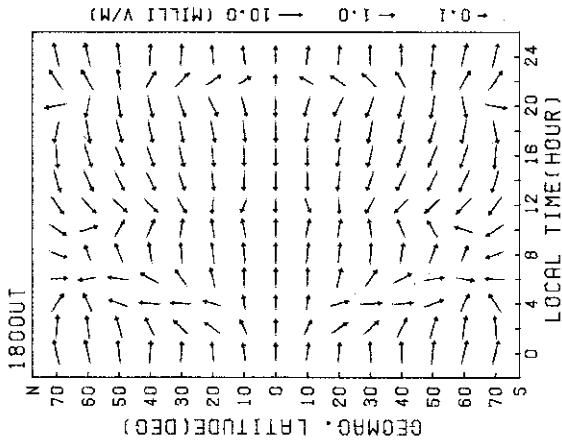


1600UT



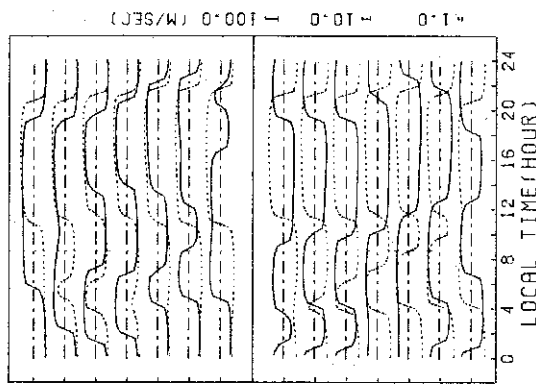
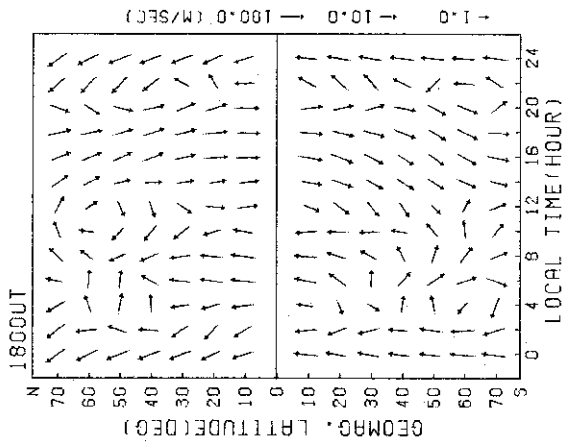
DEC.3.1964

ELECTRIC FIELD (LOG SCALE)

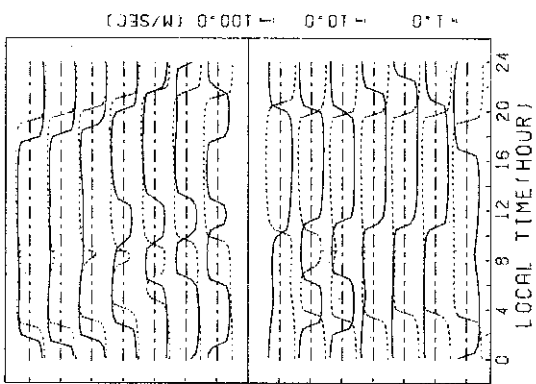
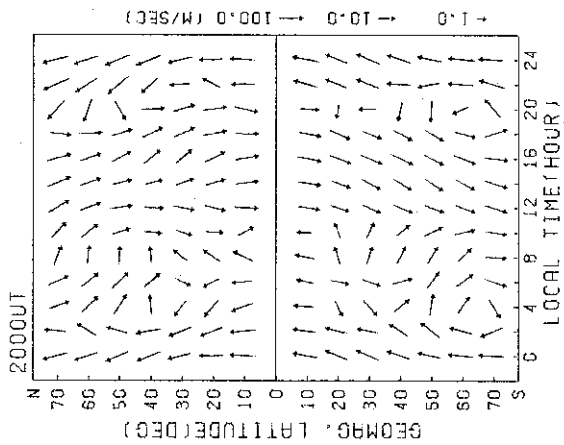
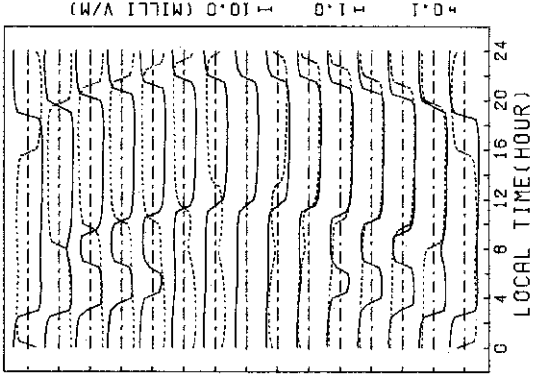
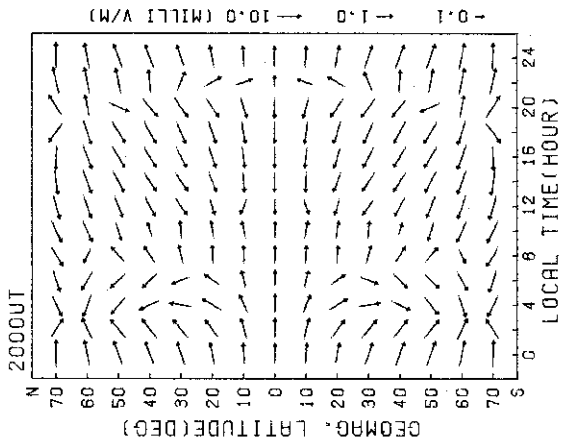


DEC.3.1964

WIND VELOCITY (LOG SCALE)

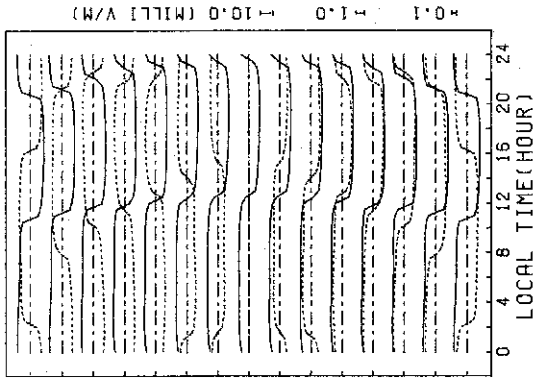
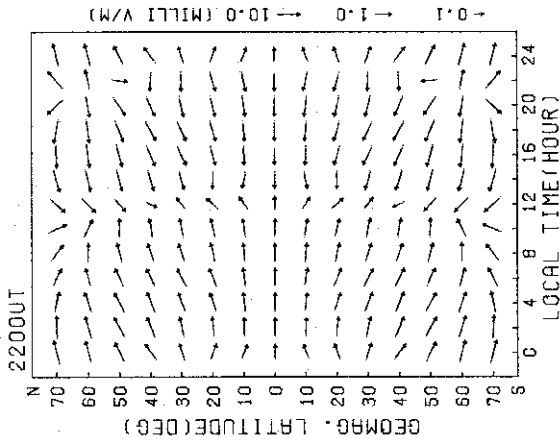


2000UT



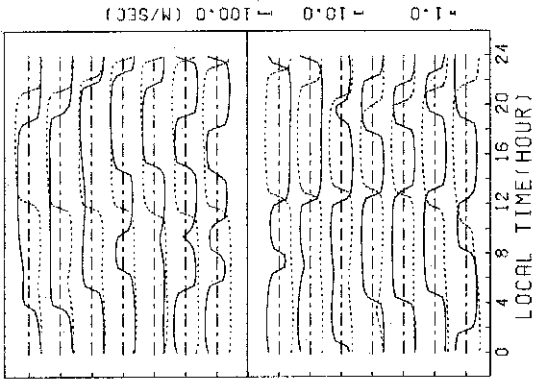
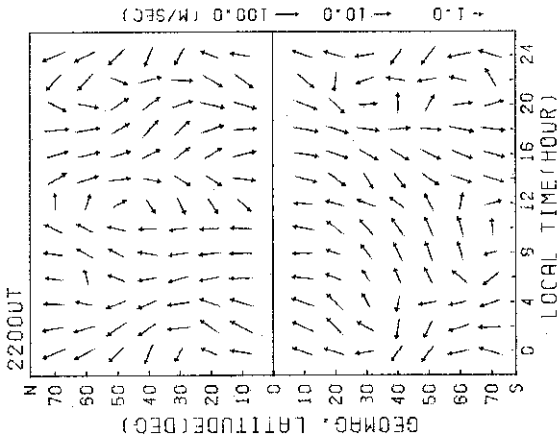
DEC. 3, 1964

ELECTRIC FIELD (LOG SCALE)

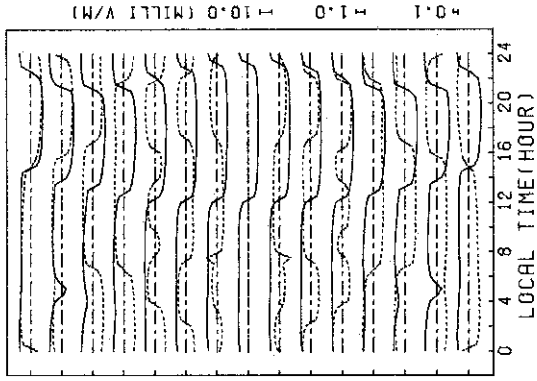
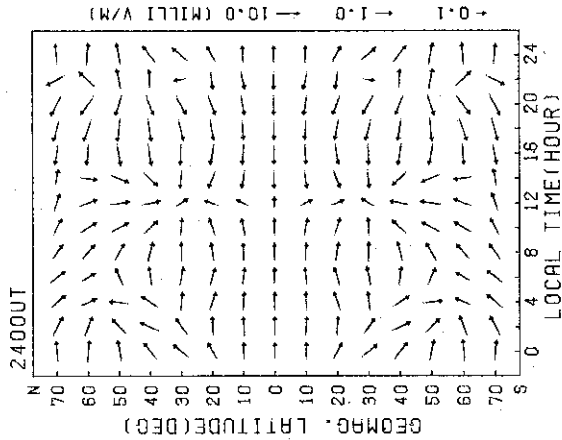


DEC. 3, 1964

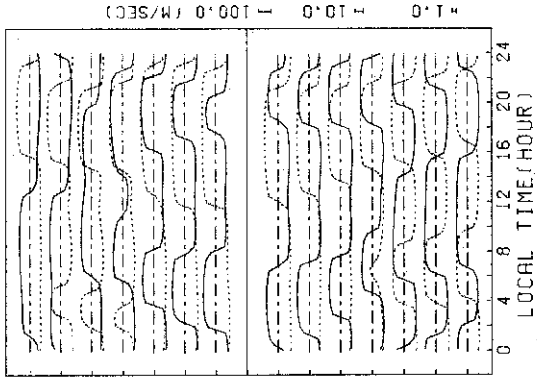
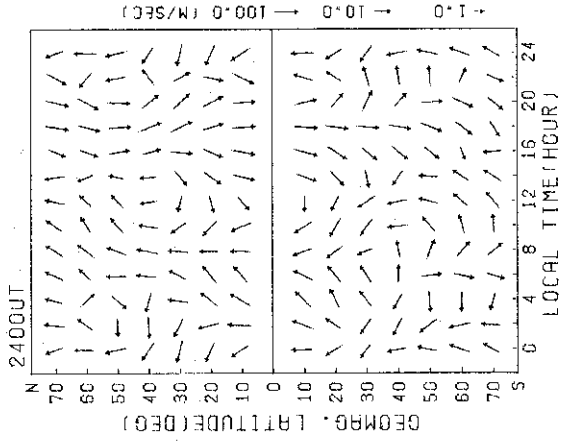
WIND VELOCITY (LOG SCALE)



2400UT

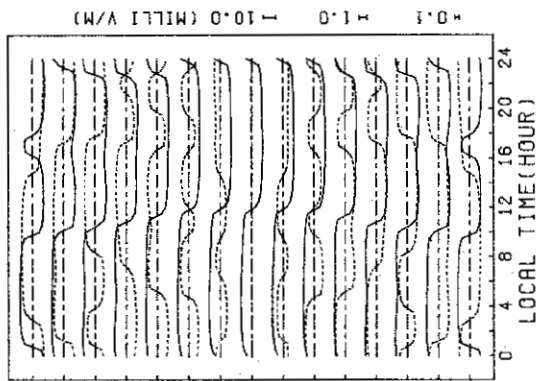
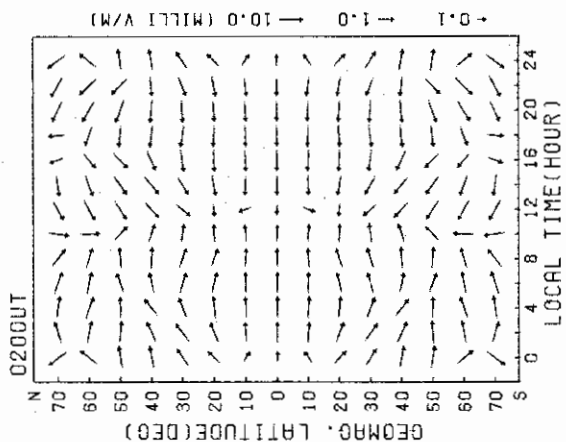


2400UT



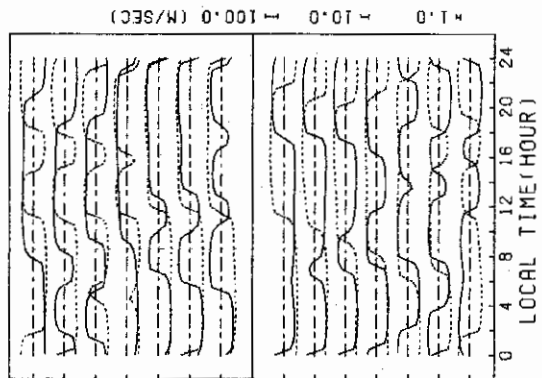
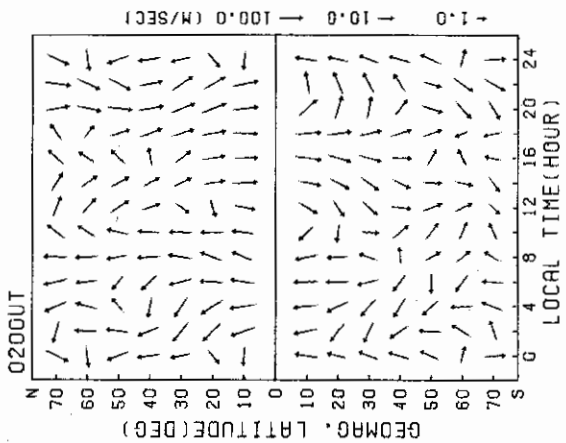
DEC.4.1964

ELECTRIC FIELD (LOG SCALE)

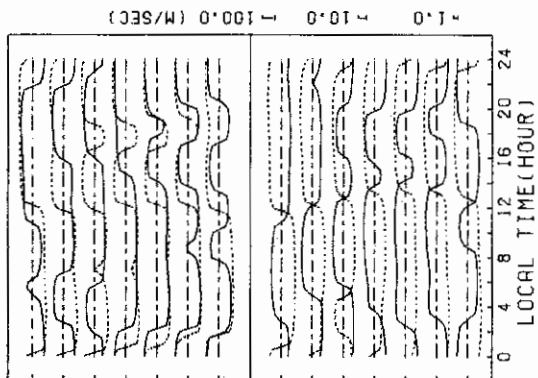
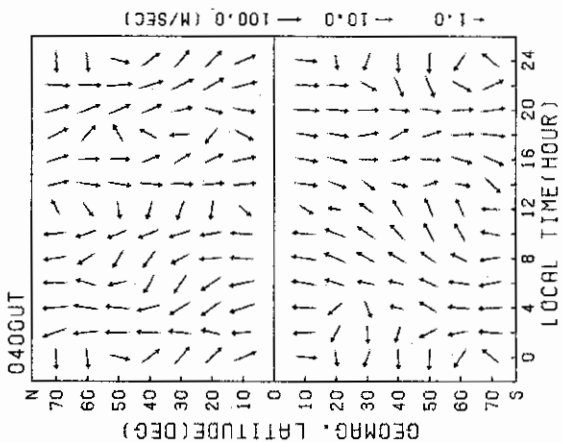
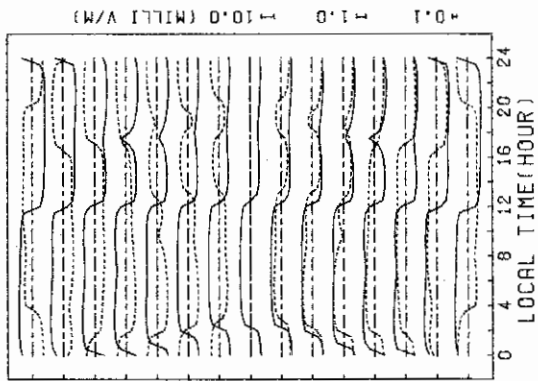
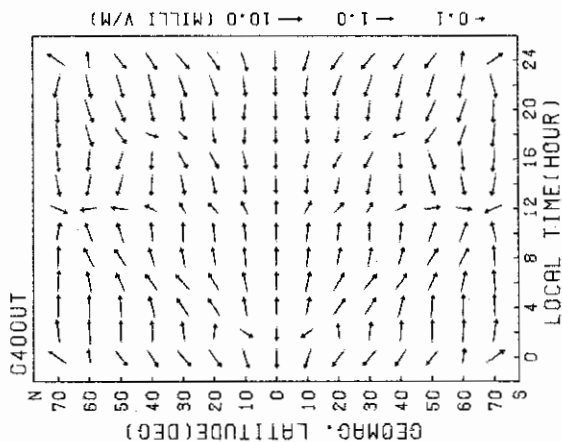


DEC.4.1964

WIND VELOCITY (LOG SCALE)

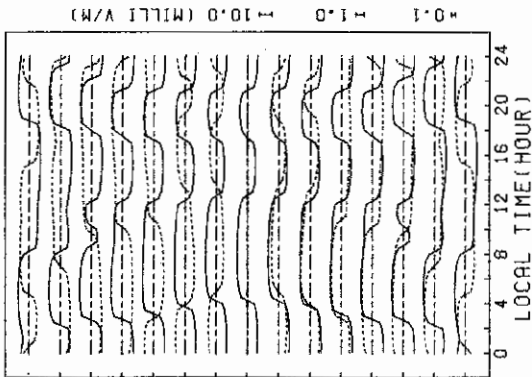
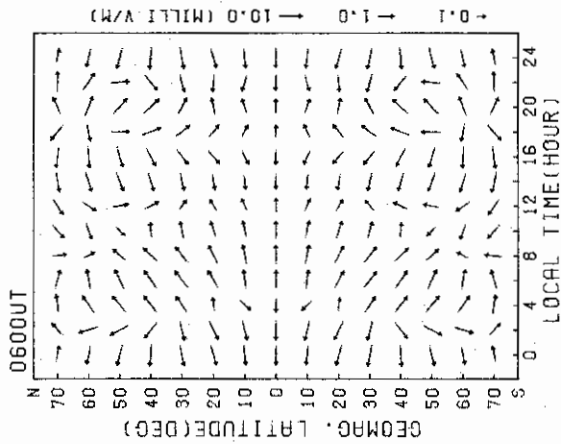


0400UT



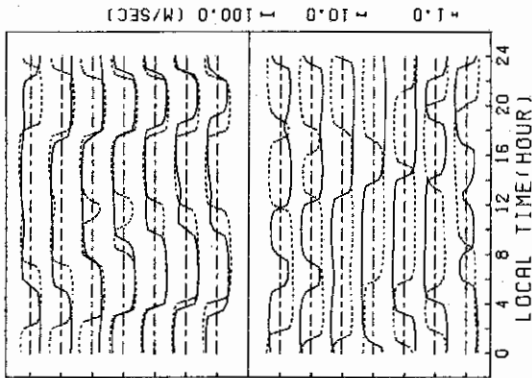
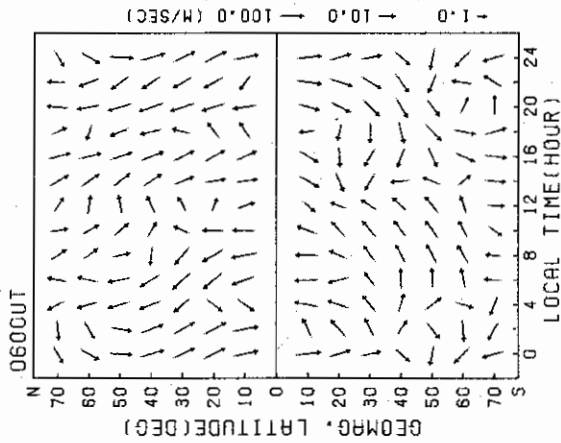
DEC.4.1964

ELECTRIC FIELD (LOG SCALE)

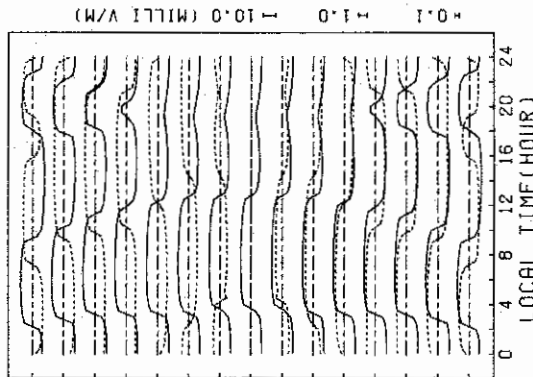
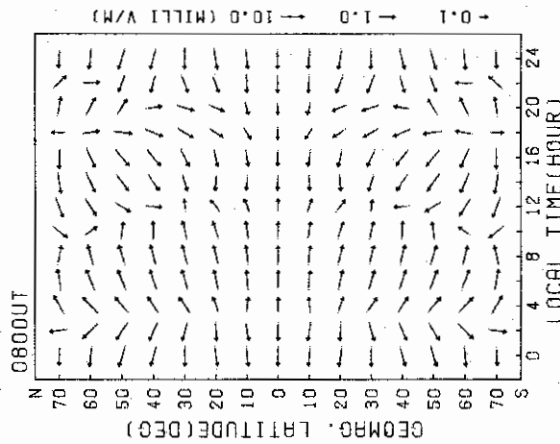


DEC.4.1964

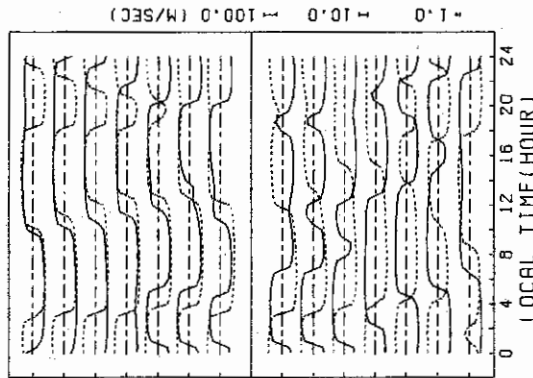
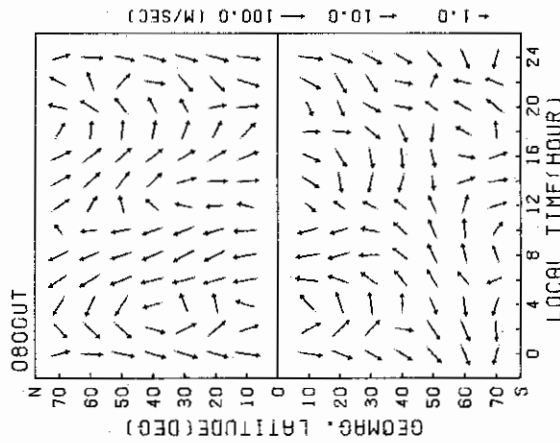
WIND VELOCITY (LOG SCALE)



0800UT

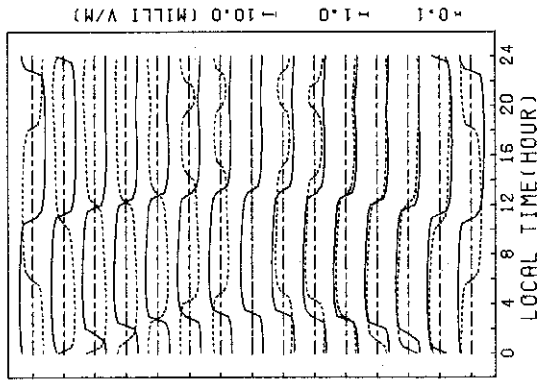
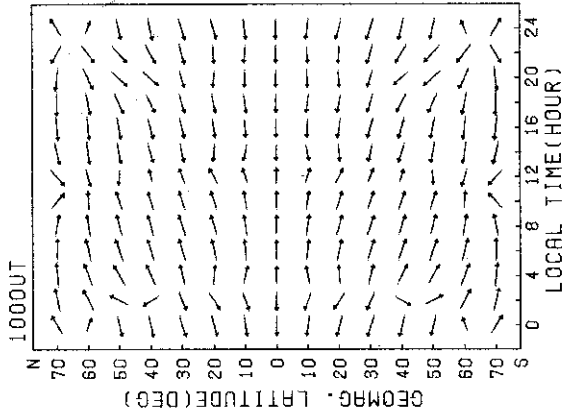


0800UT



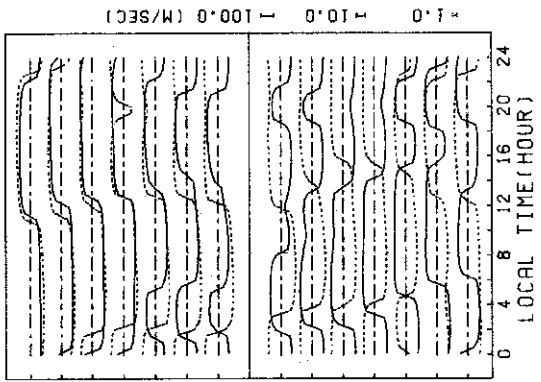
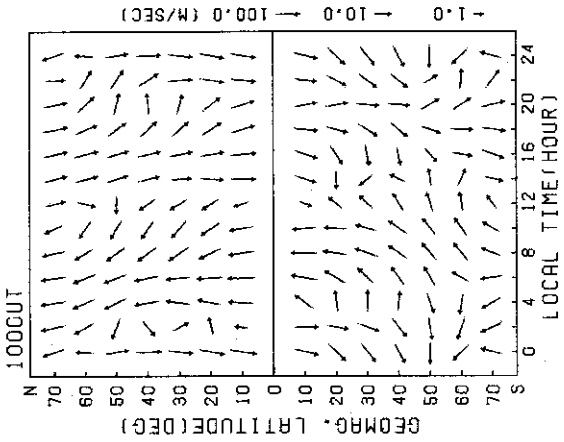
DEC.4,1964

ELECTRIC FIELD (LOG SCALE)

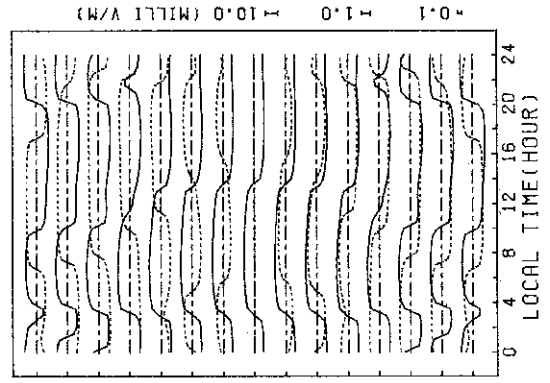
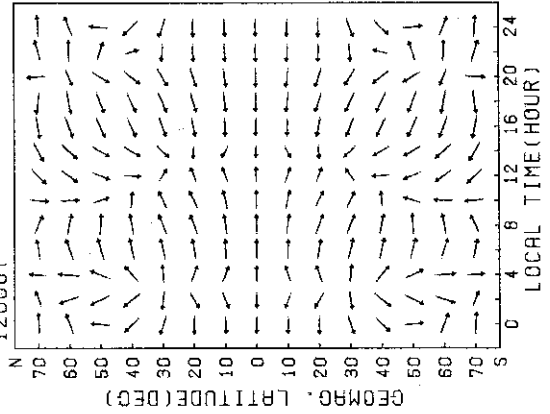


DEC.4,1964

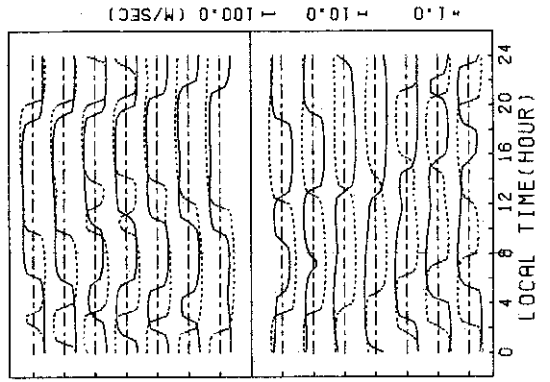
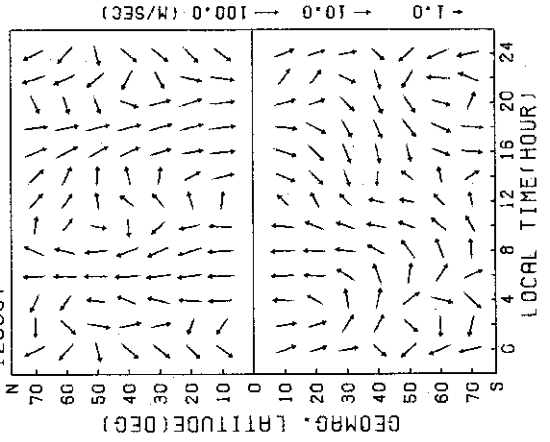
WIND VELOCITY (LOG SCALE)



1200UT

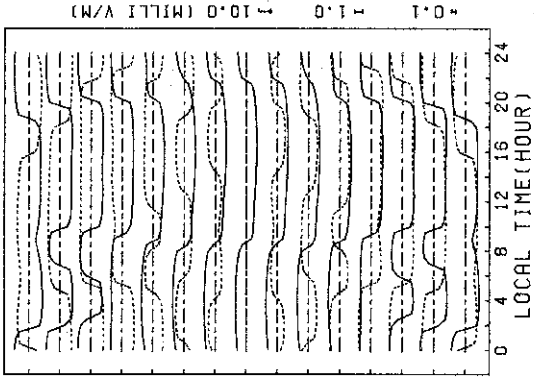
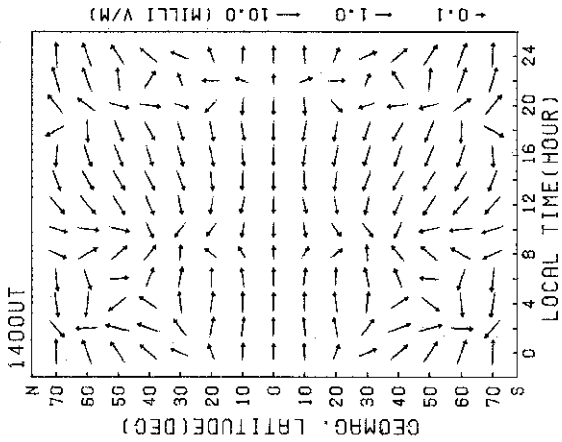


1200UT



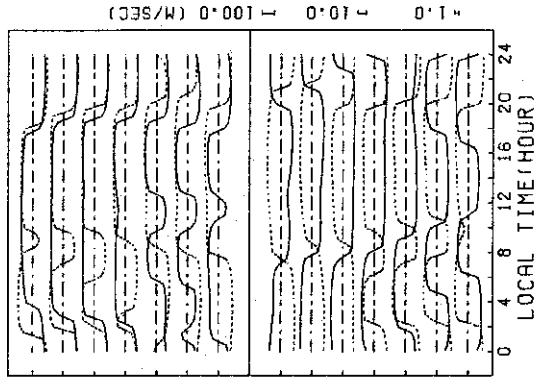
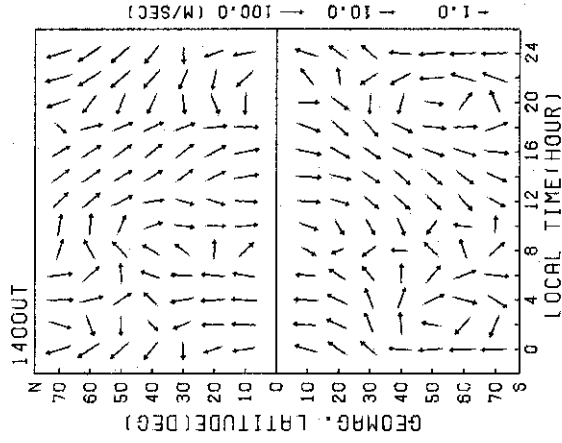
DEC.4.1964

ELECTRIC FIELD (LOG SCALE)

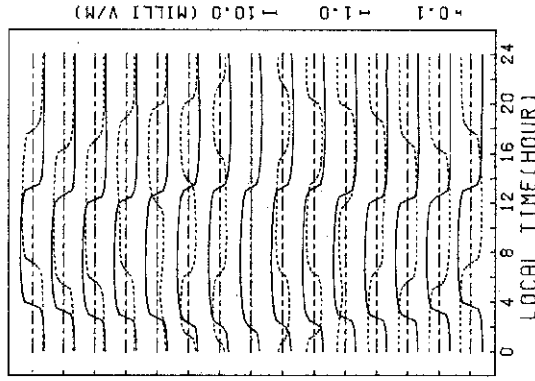
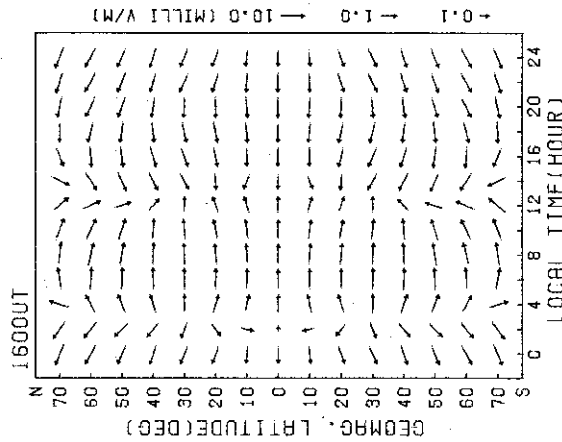


DEC.4.1964

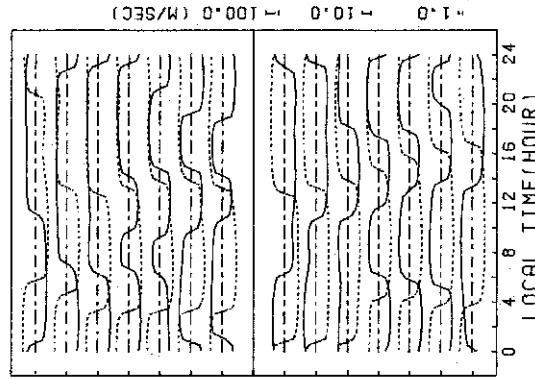
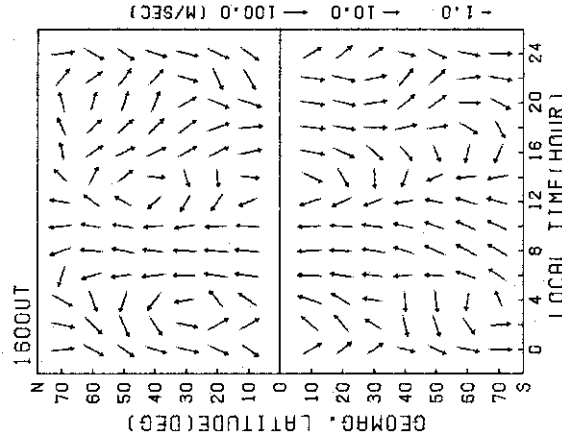
WIND VELOCITY (LOG SCALE)



1600UT

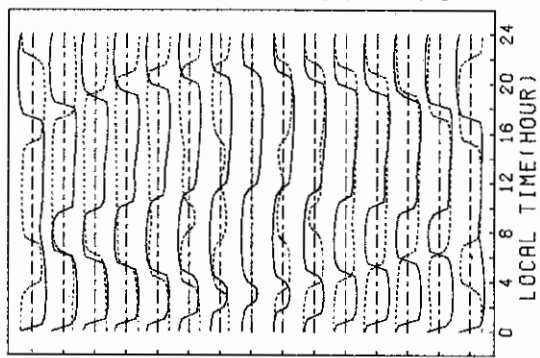
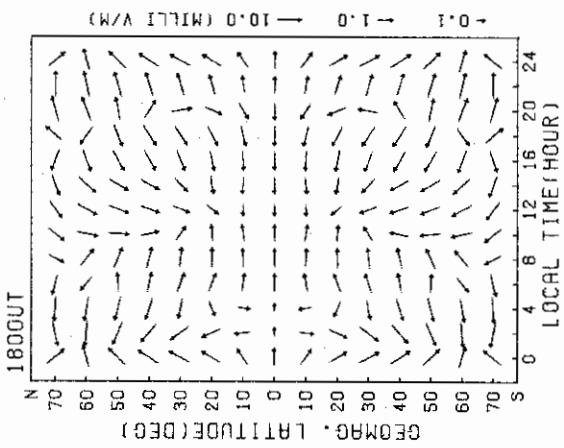


1600UT



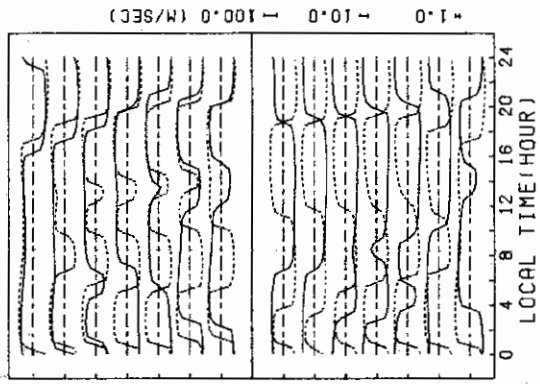
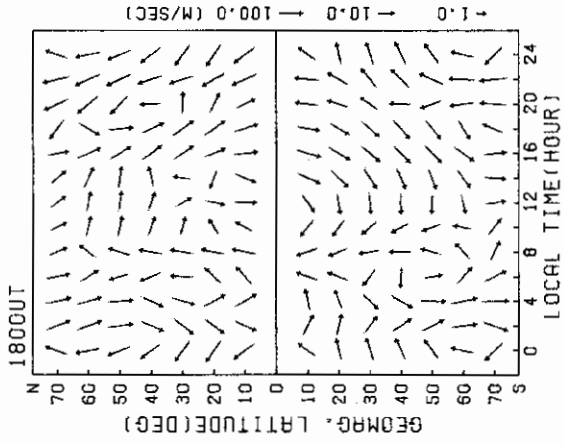
DEC.4.1964

ELECTRIC FIELD (LOG SCALE)

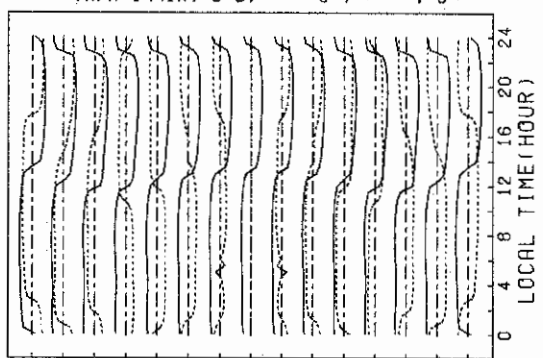
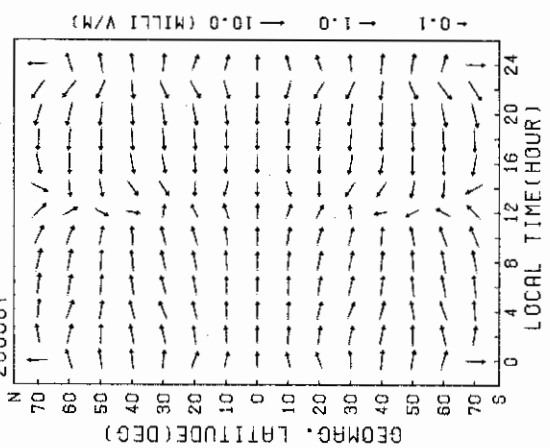


DEC.4.1964

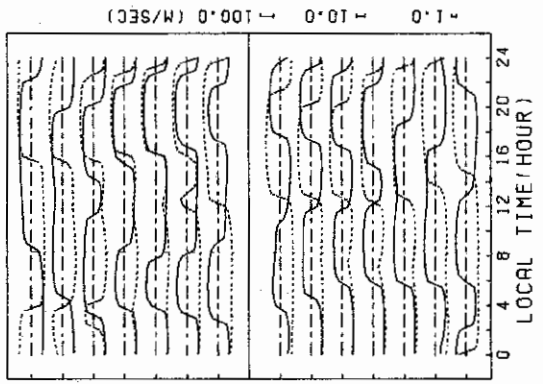
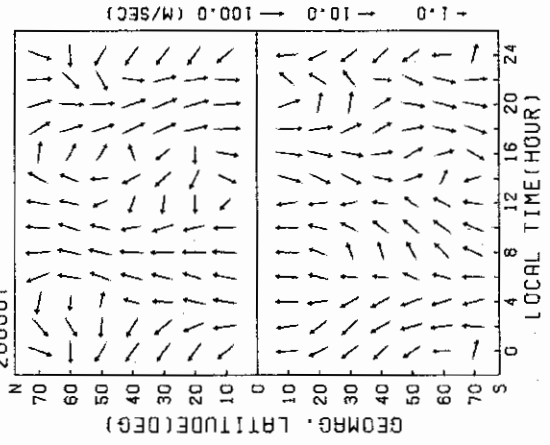
WIND VELOCITY (LOG SCALE)



2000UT

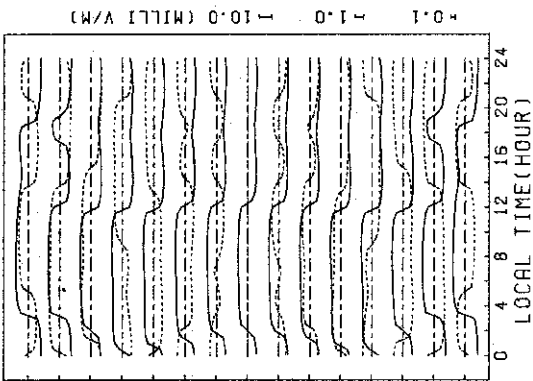
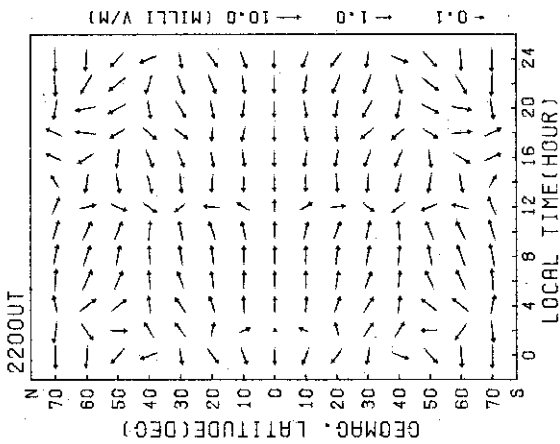


2000UT



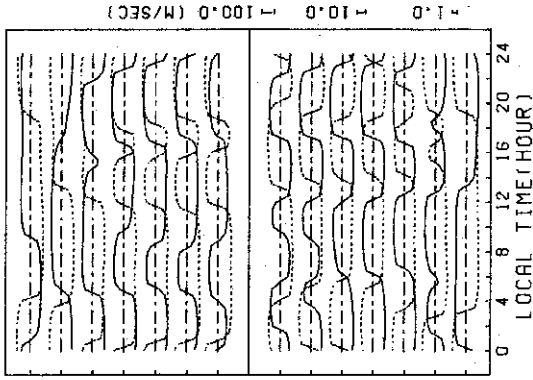
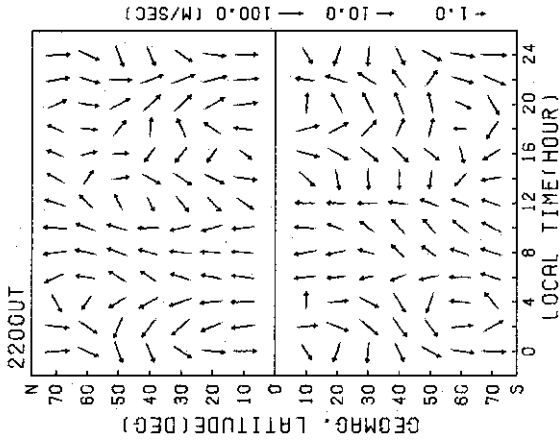
DEC.4.1964

ELECTRIC FIELD (LOG SCALE)

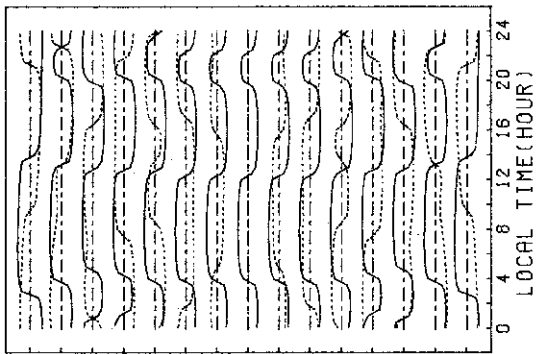
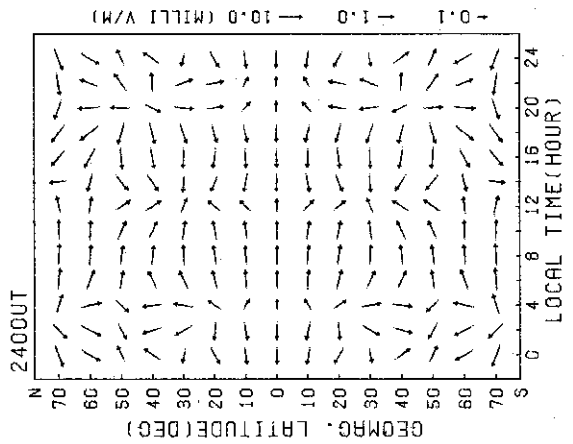


DEC.4.1964

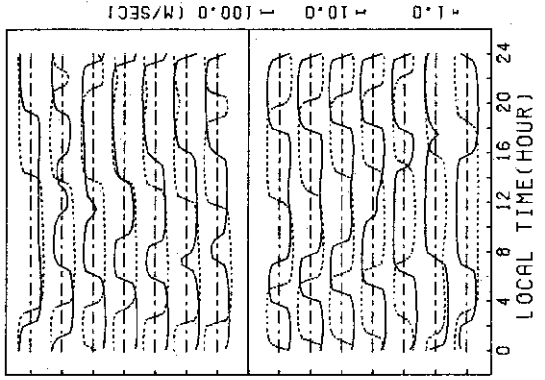
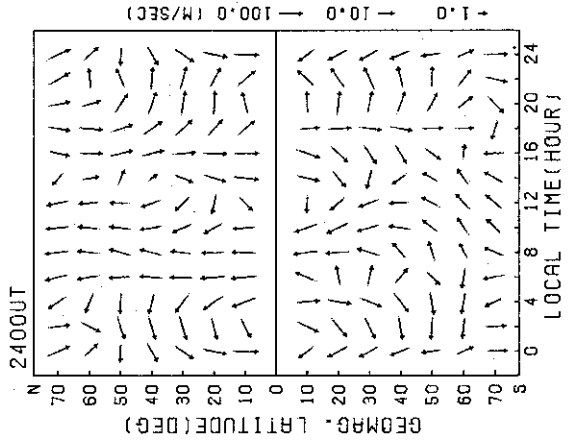
WIND VELOCITY (LOG SCALE)



2400UT

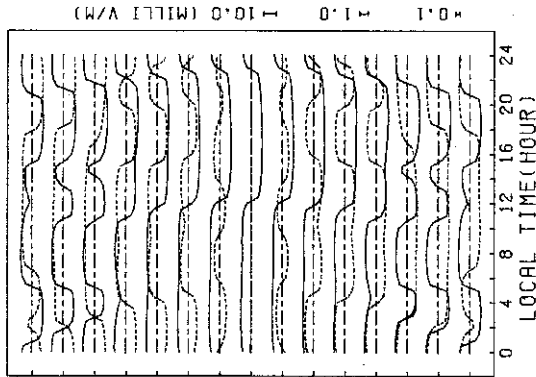
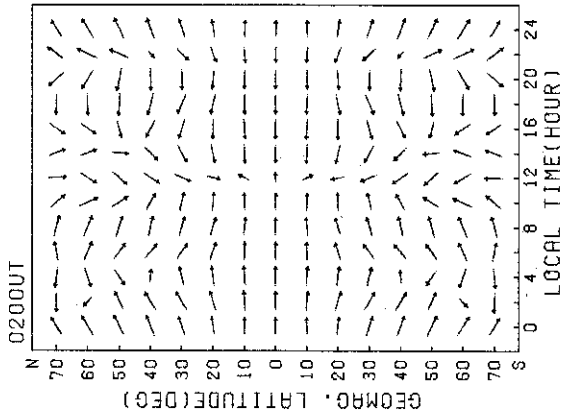


2400UT



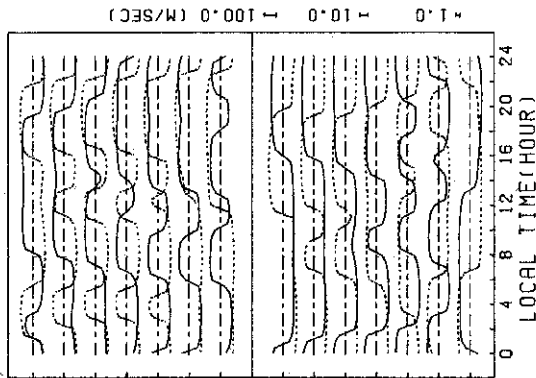
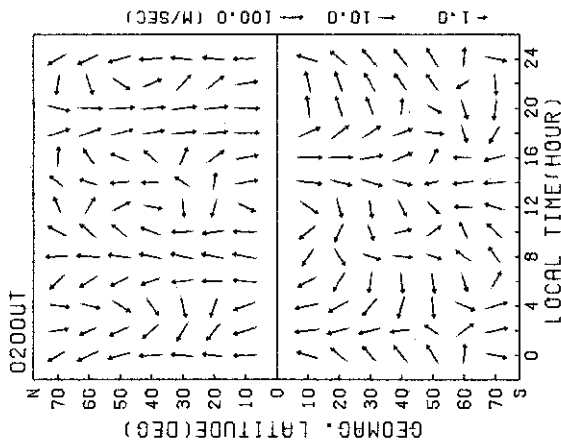
DEC. 5, 1964

ELECTRIC FIELD (LOG SCALE)

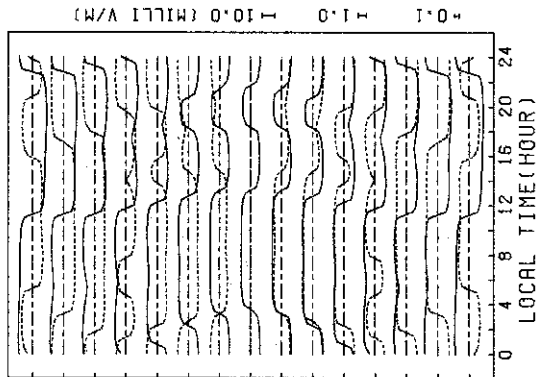
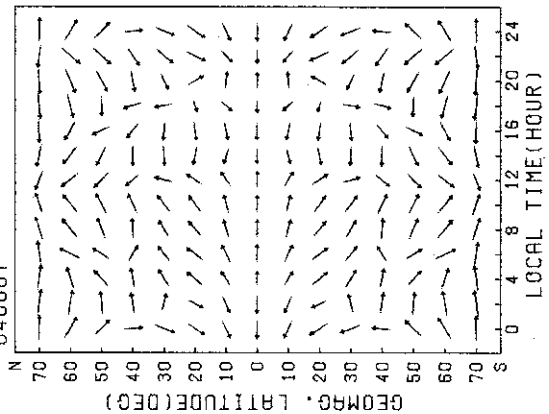


DEC. 5, 1964

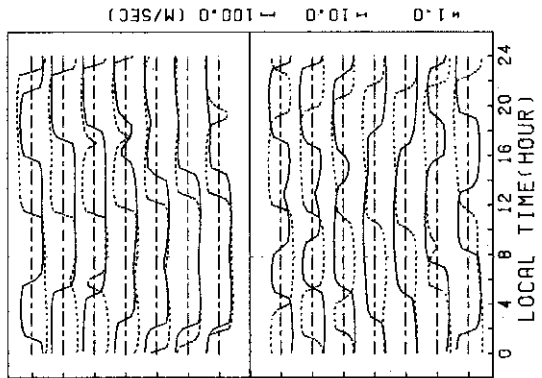
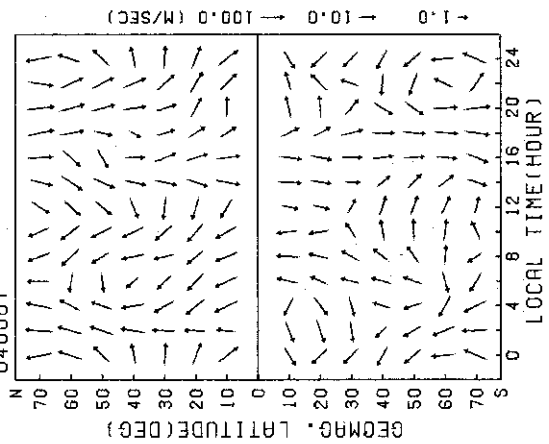
WIND VELOCITY (LOG SCALE)



0400UT

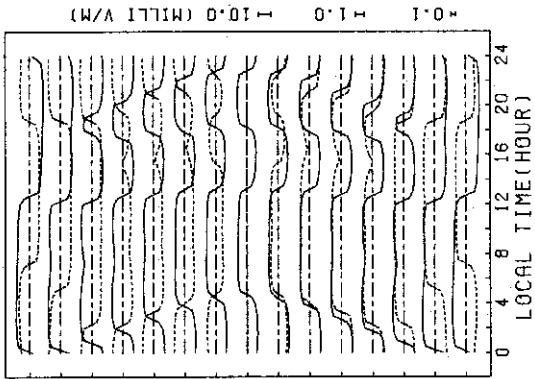
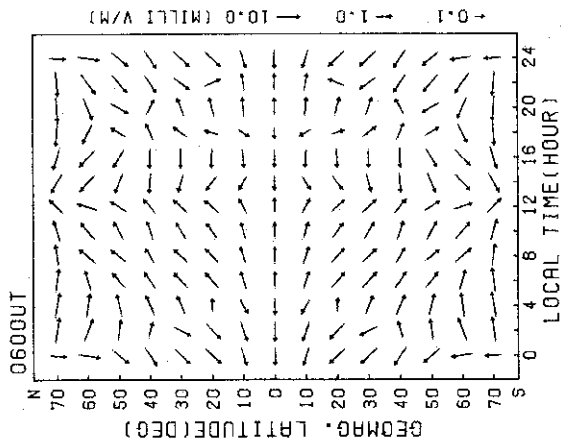


0400UT



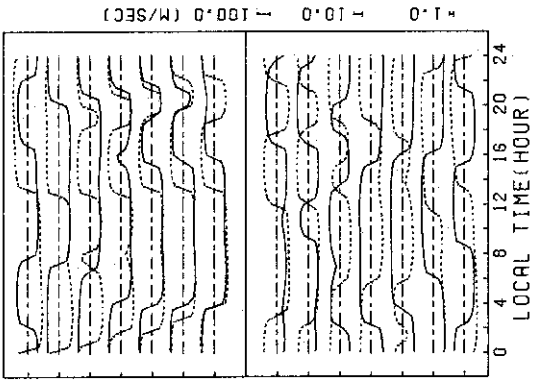
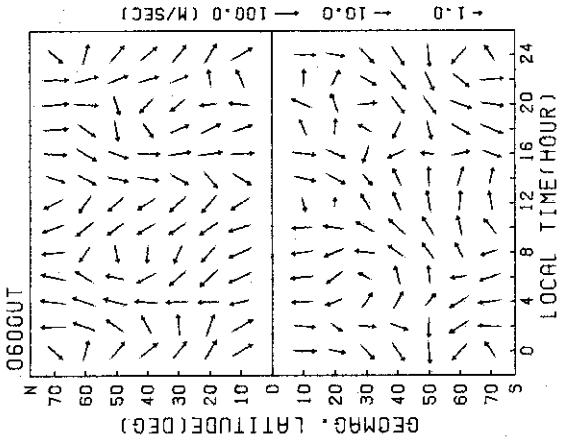
DEC.5.1964

ELECTRIC FIELD (LOG SCALE)

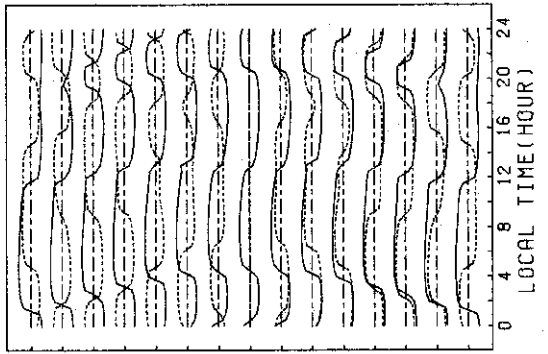
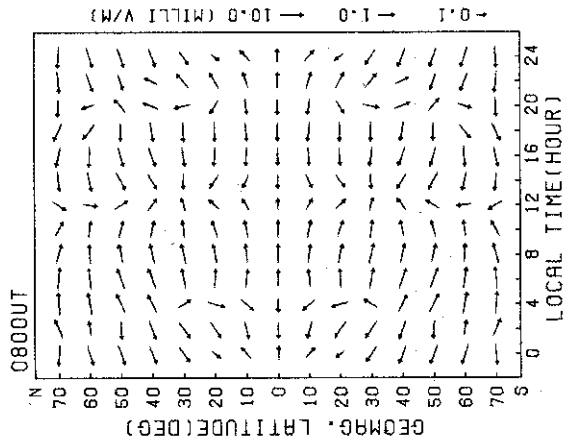


DEC.5.1964

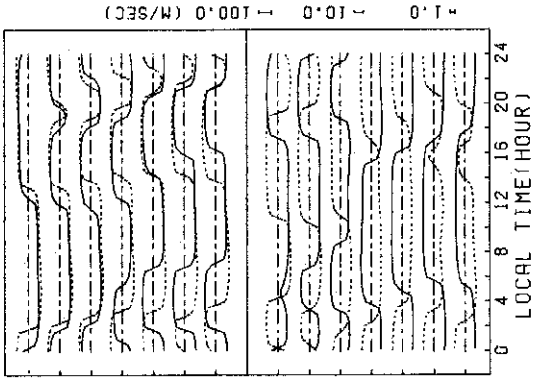
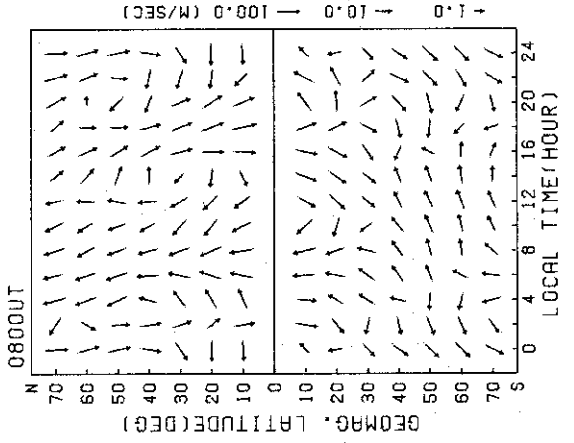
WIND VELOCITY (LOG SCALE)



0600UT

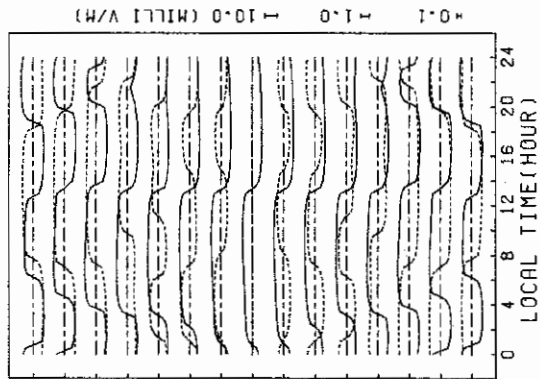
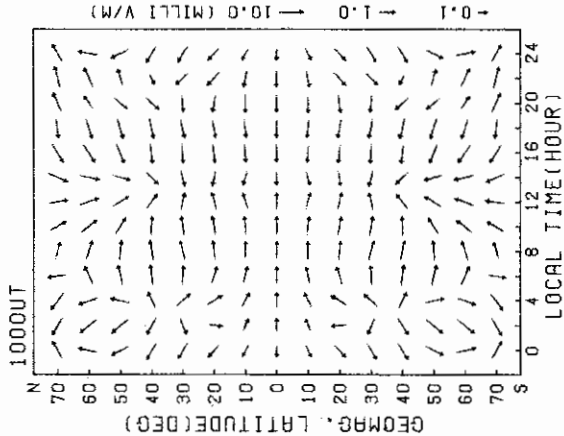


0800UT



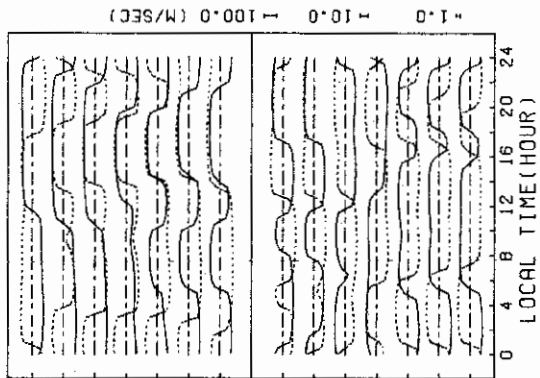
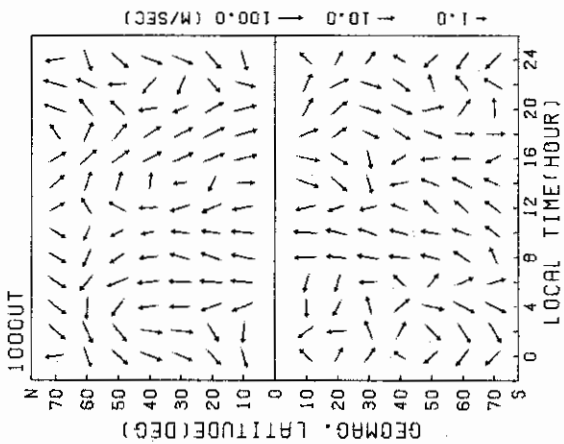
DEC. 5, 1964

ELECTRIC FIELD (LOG SCALE)

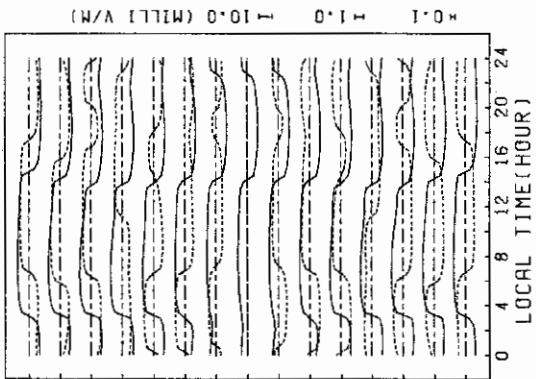
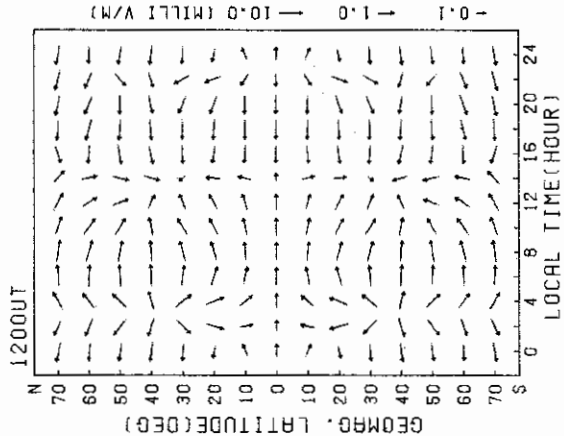


DEC. 5, 1964

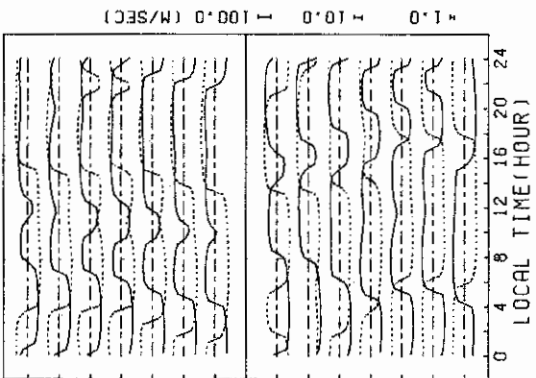
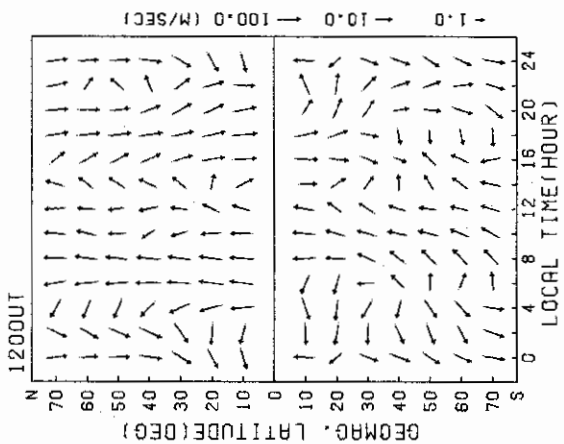
WIND VELOCITY (LOG SCALE)



1200UT

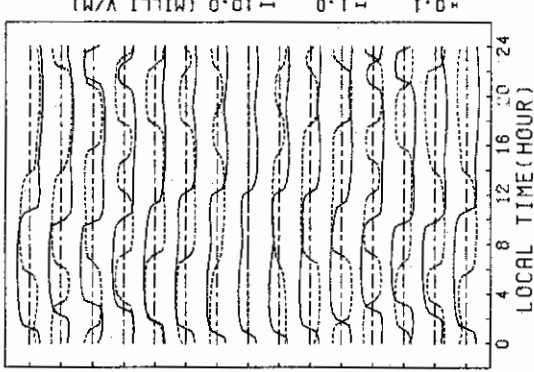
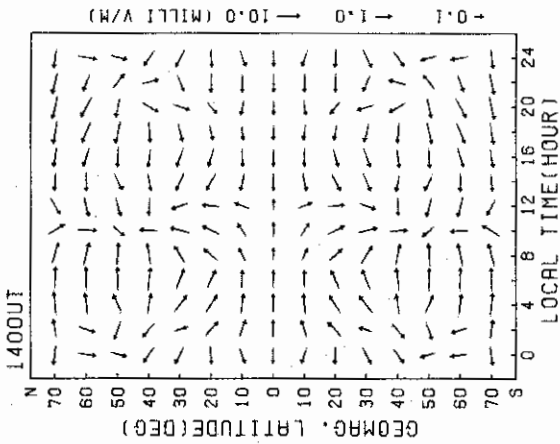


1200UT



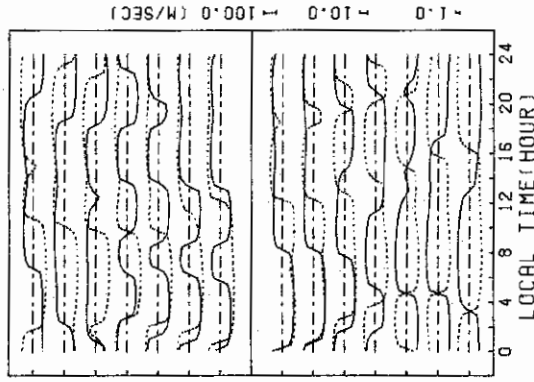
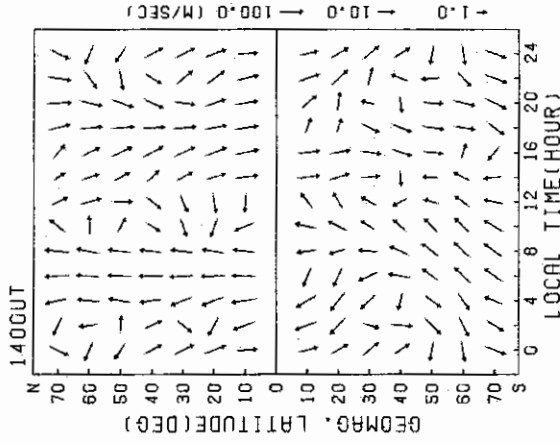
DEC-5, 1964

ELECTRIC FIELD (LOG SCALE)

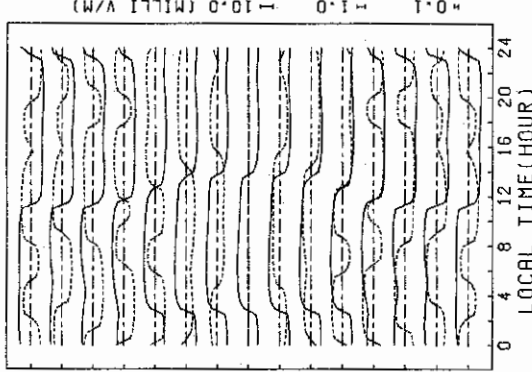
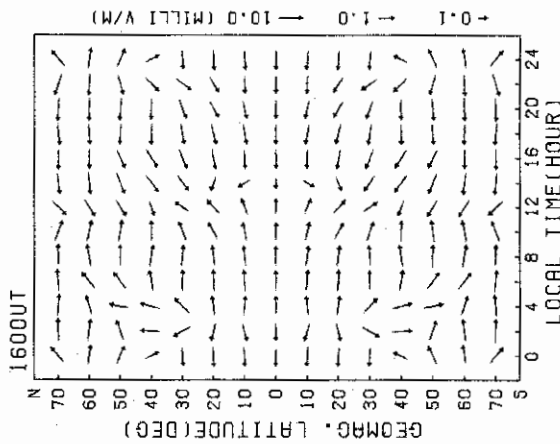


DEC-5, 1964

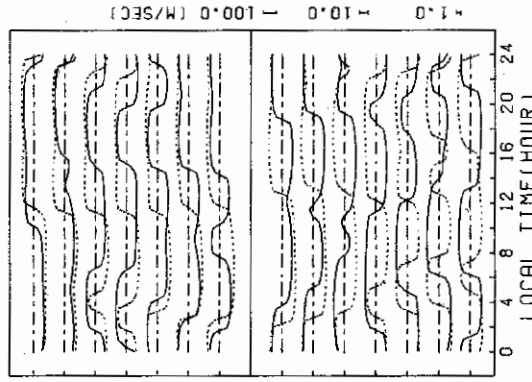
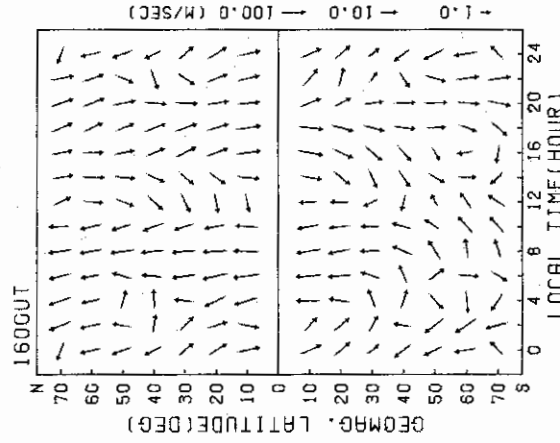
WIND VELOCITY (LOG SCALE)



1600UT

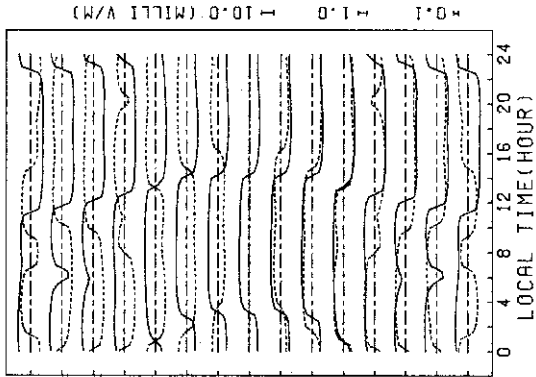
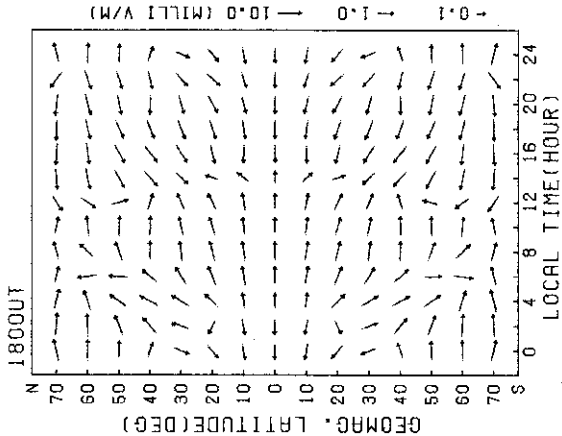


1600UT



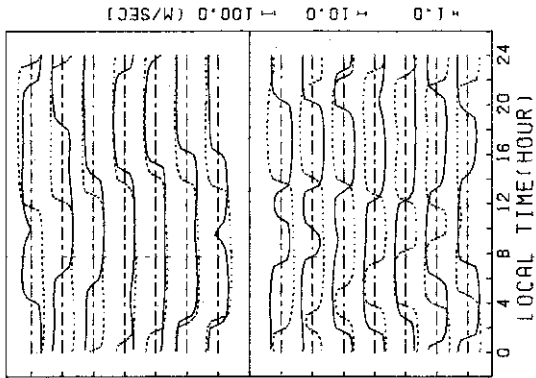
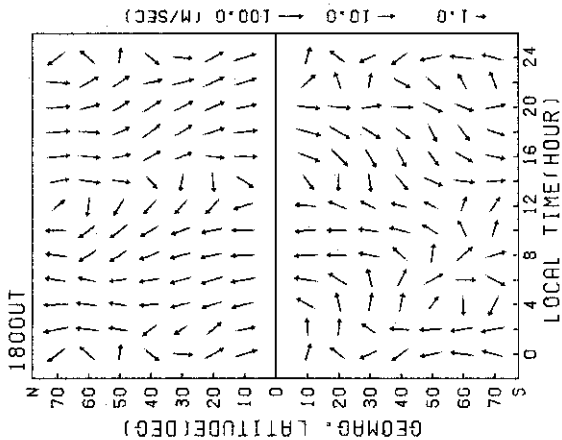
DEC. 5, 1964

ELECTRIC FIELD (LOG SCALE)

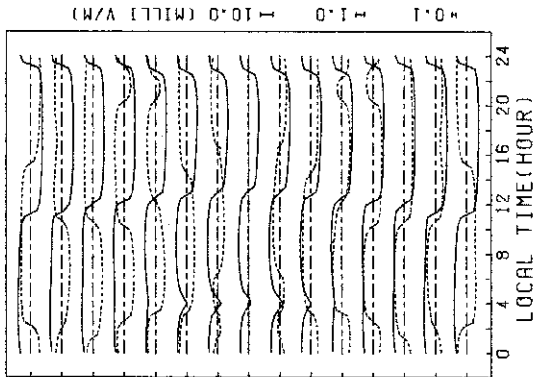
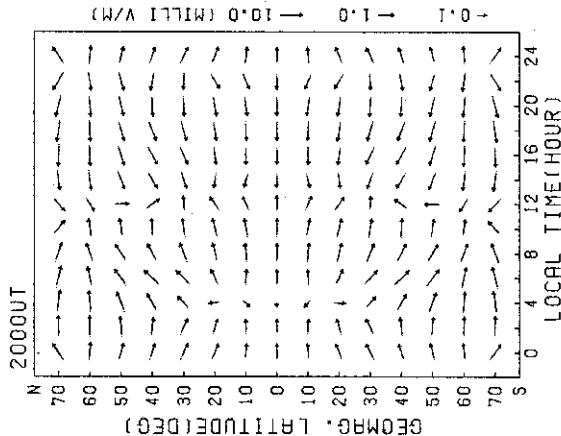


DEC. 5, 1964

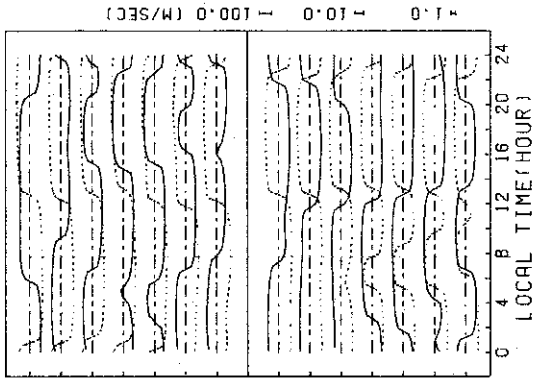
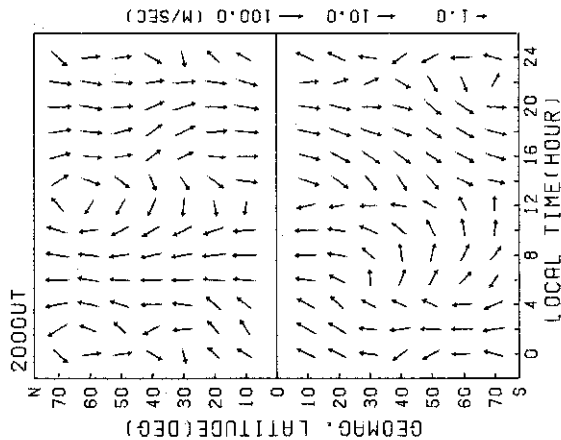
WIND VELOCITY (LOG SCALE)



2000UT

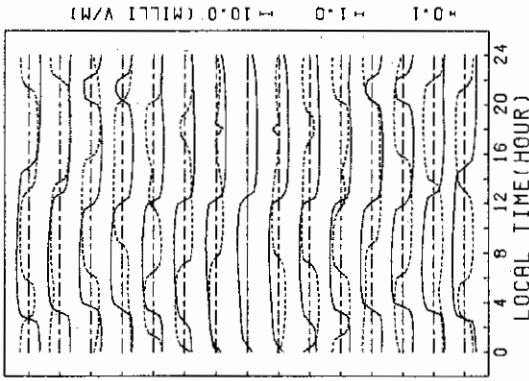
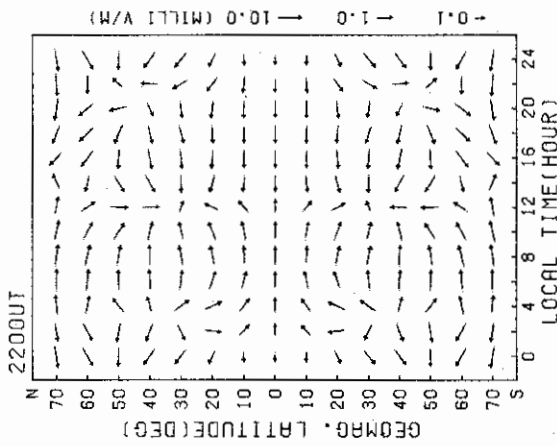


2000UT



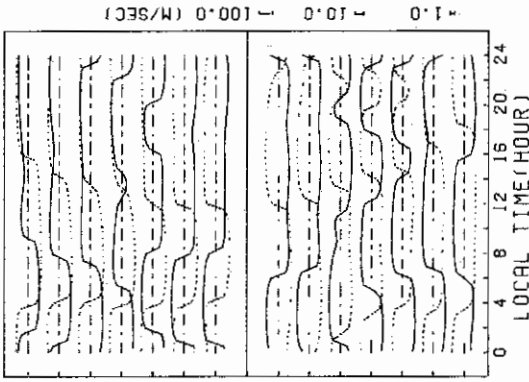
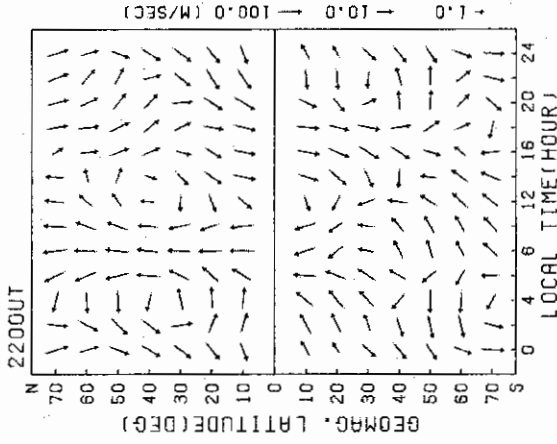
DEC. 5. 1964

ELECTRIC FIELD (LOG SCALE)

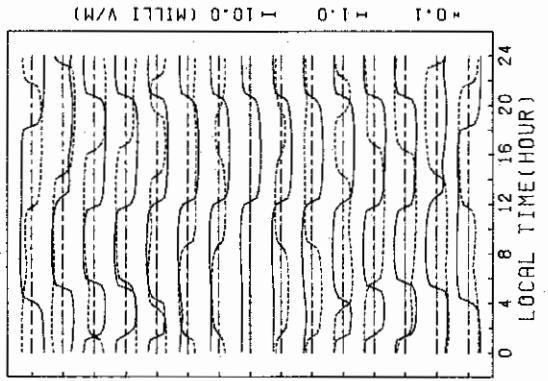
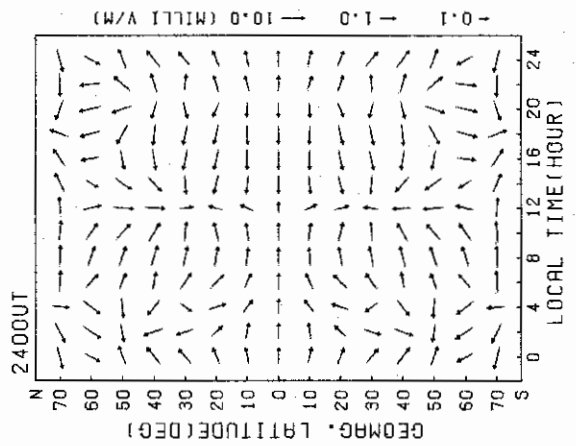


DEC. 5. 1964

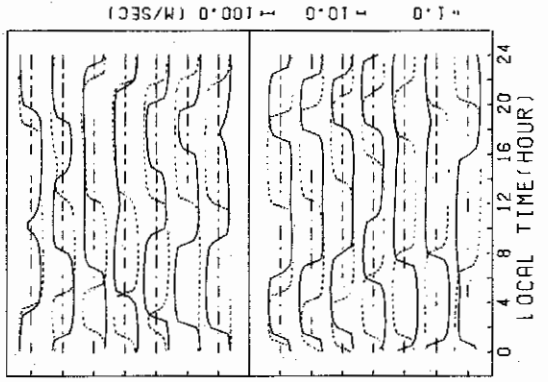
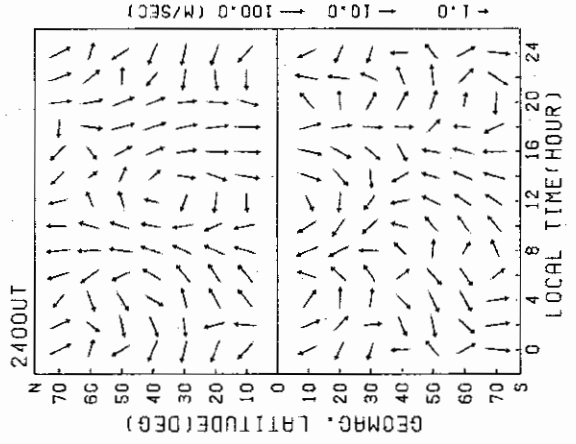
WIND VELOCITY (LOG SCALE)



2400UT

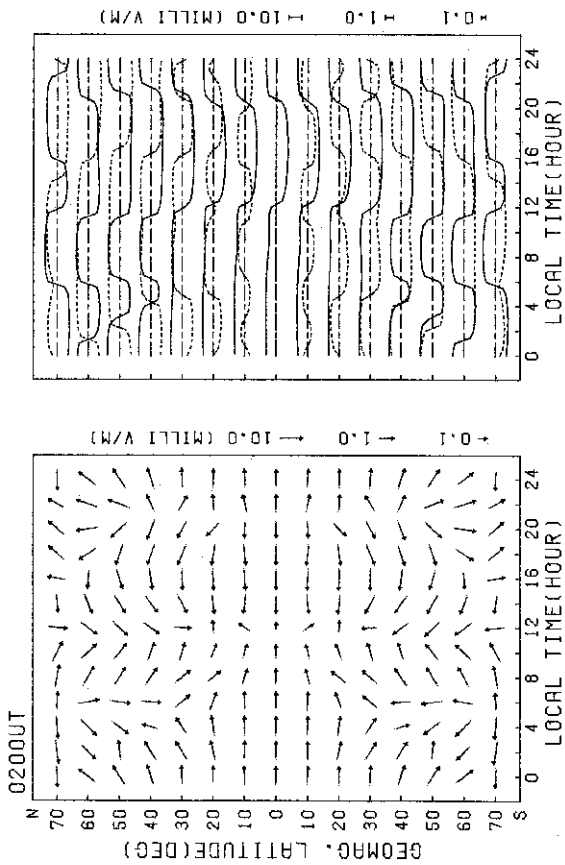


2400UT



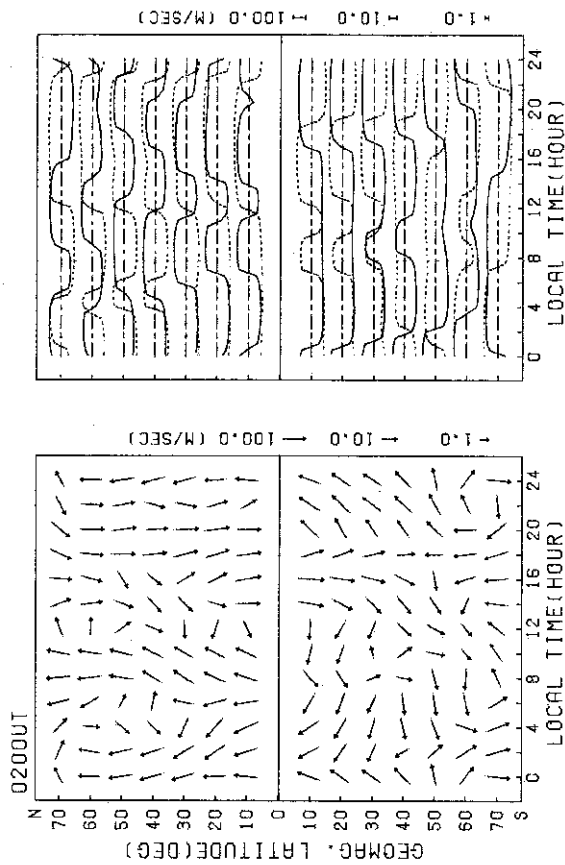
DEC.6,1964

ELECTRIC FIELD (LOG SCALE)

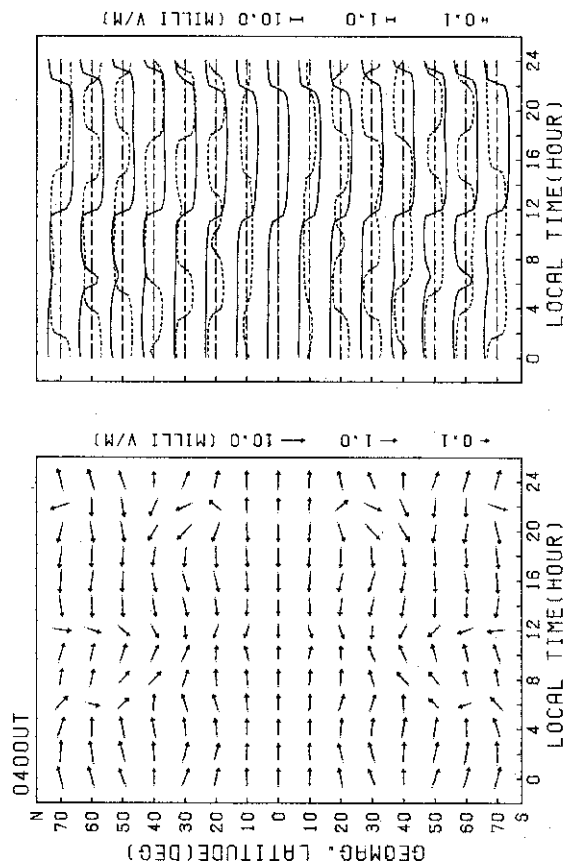


DEC.6,1964

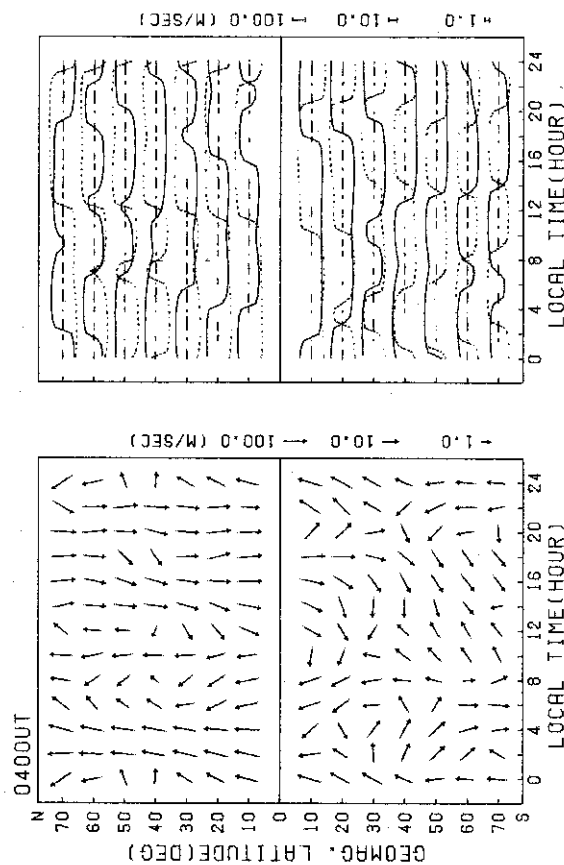
WIND VELOCITY (LOG SCALE)



0400UT

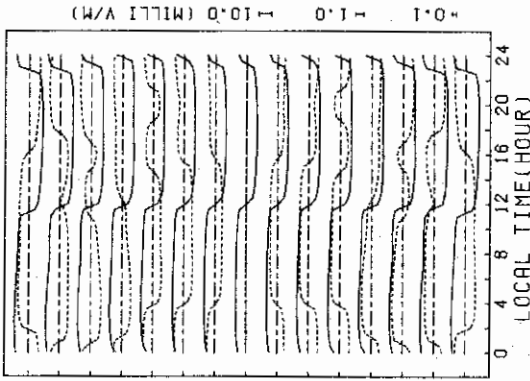
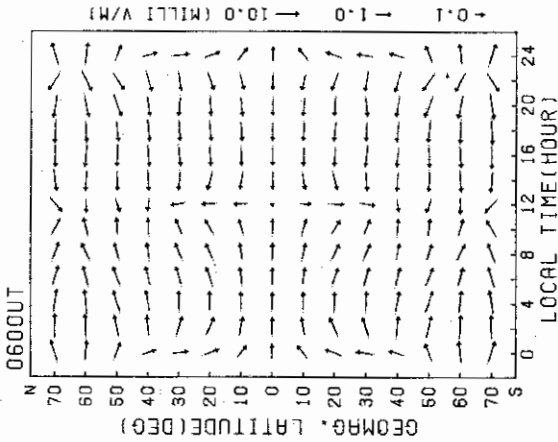


0400UT



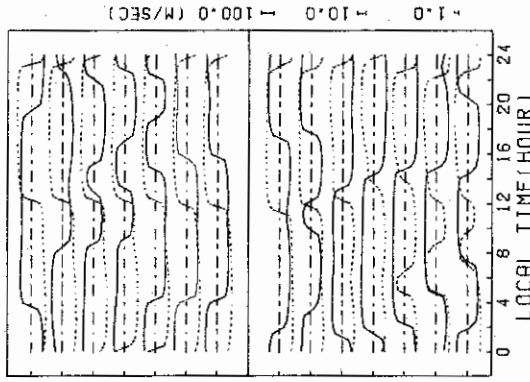
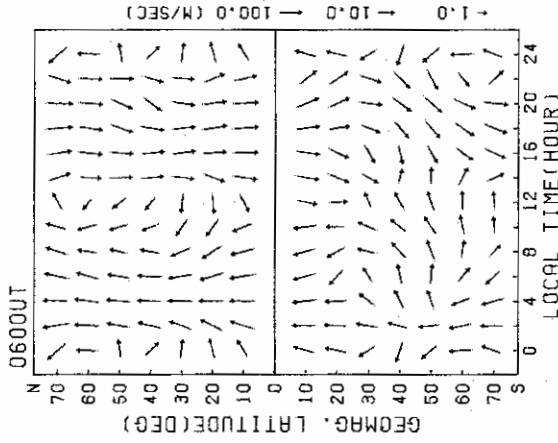
DEC.6.1964

ELECTRIC FIELD (LOG SCALE)

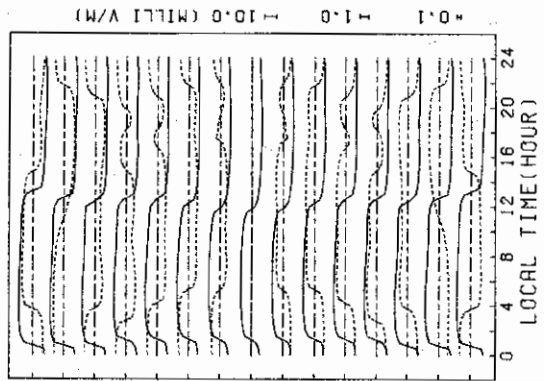
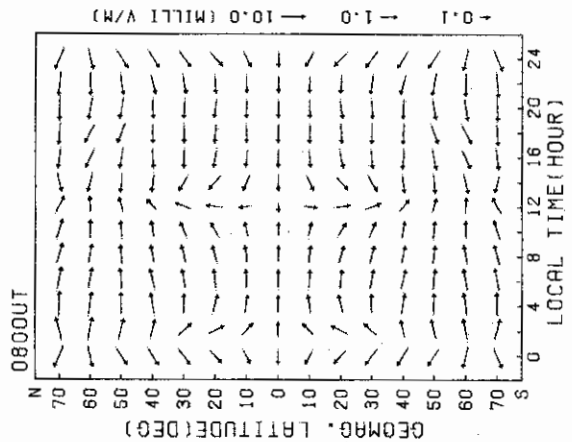


DEC.6.1964

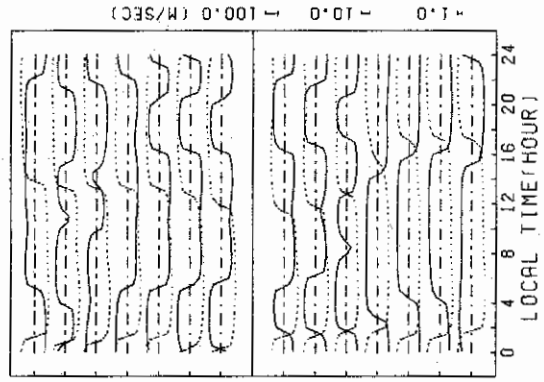
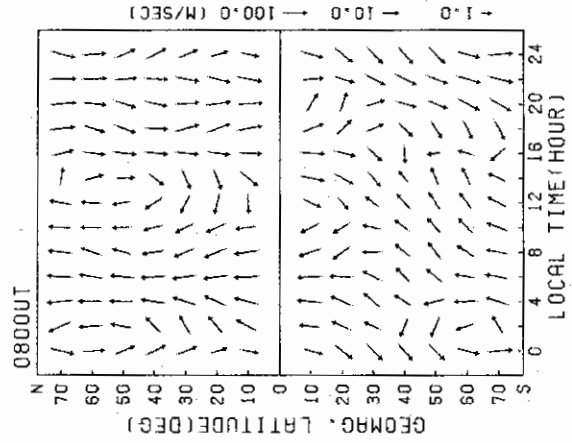
WIND VELOCITY (LOG SCALE)



0800UT

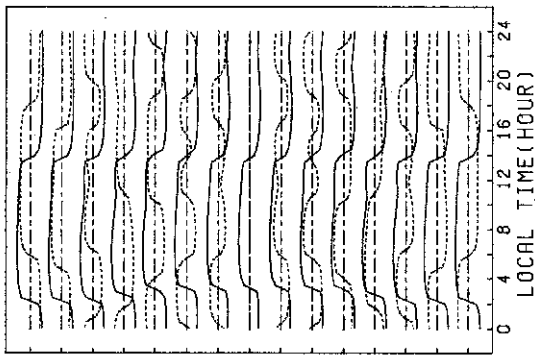
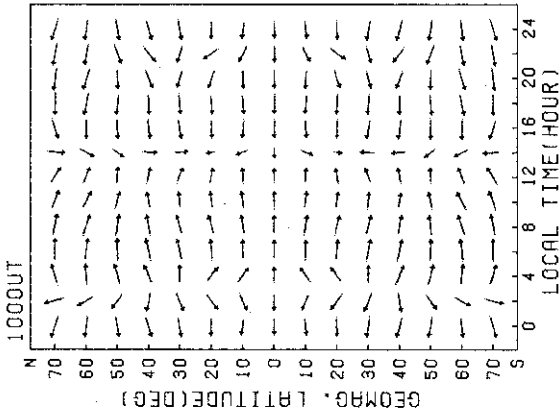


0800UT



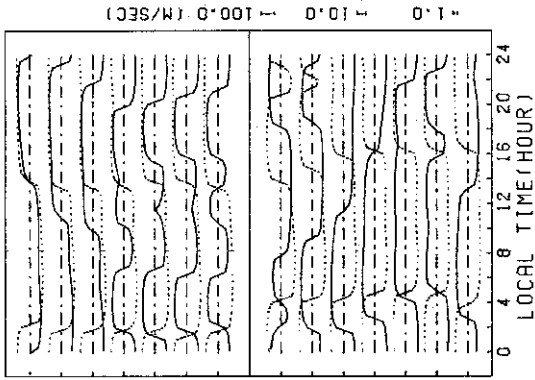
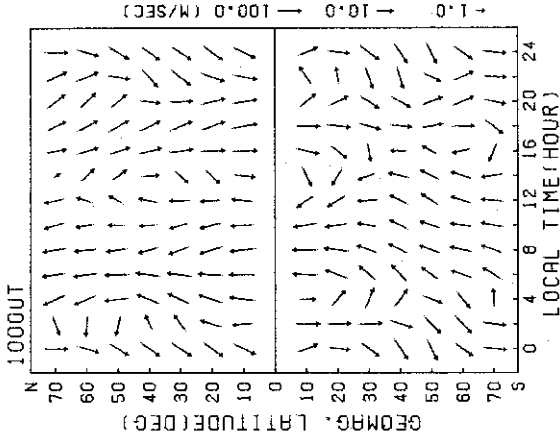
DEC. 6, 1964

ELECTRIC FIELD (LOG SCALE)

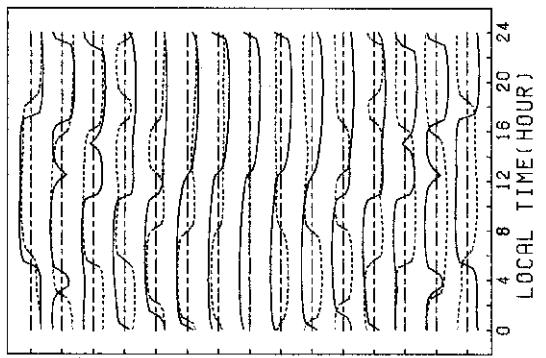
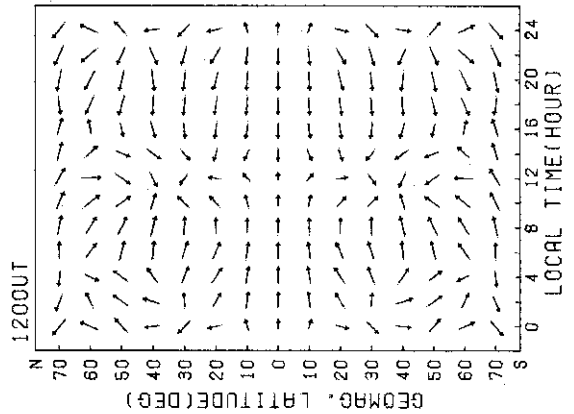


DEC. 6, 1964

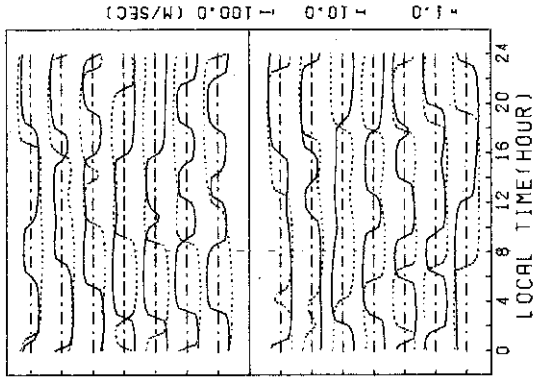
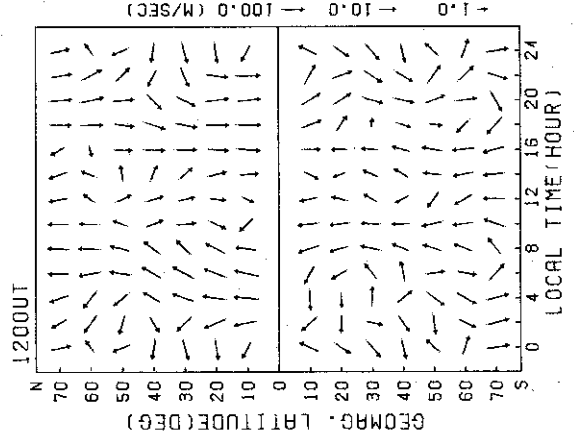
WIND VELOCITY (LOG SCALE)



1200UT

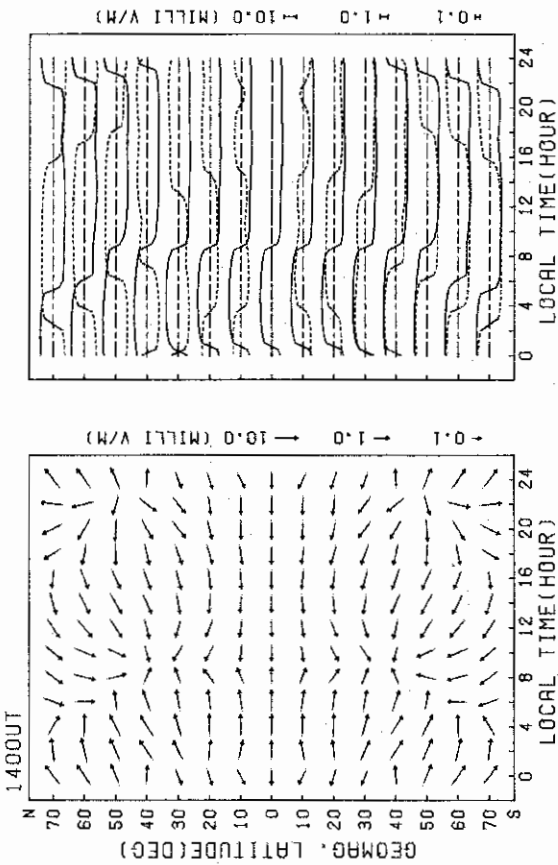


1200UT



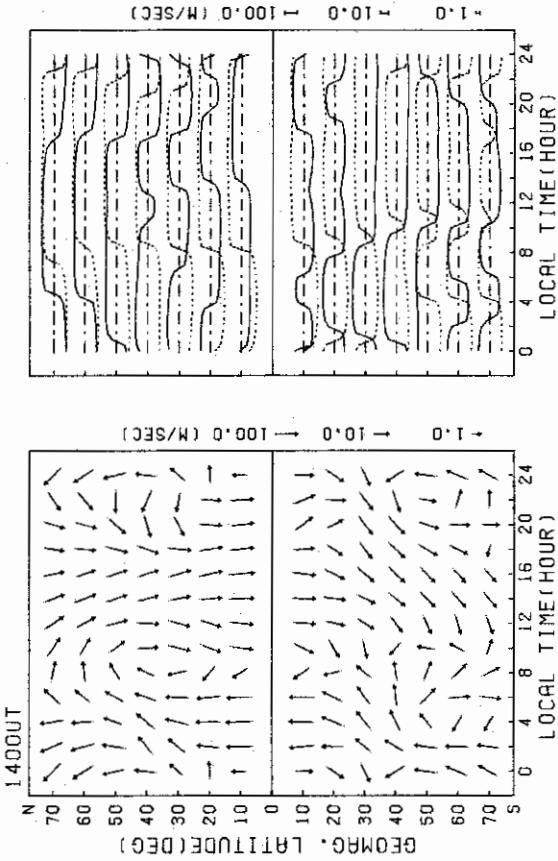
DEC.6.1964

ELECTRIC FIELD (LOG SCALE)

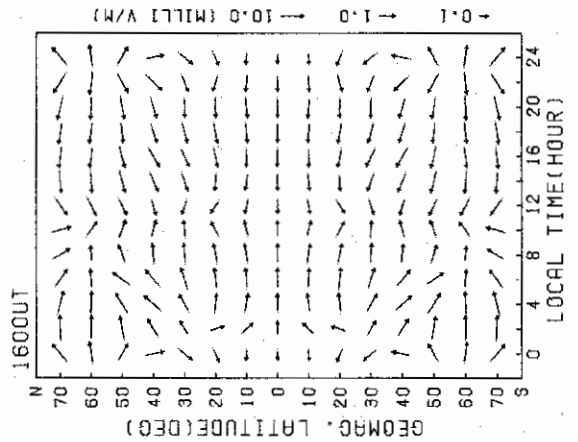


DEC.6.1964

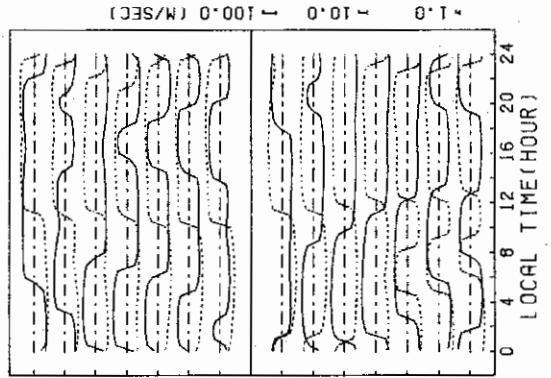
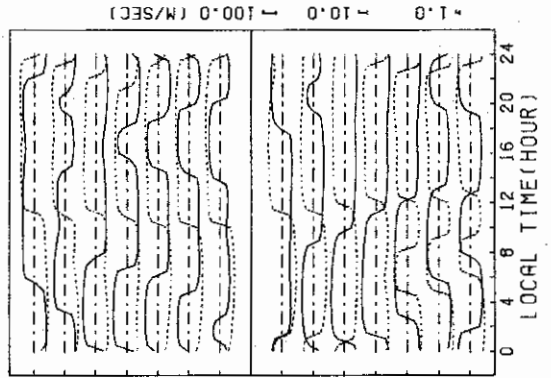
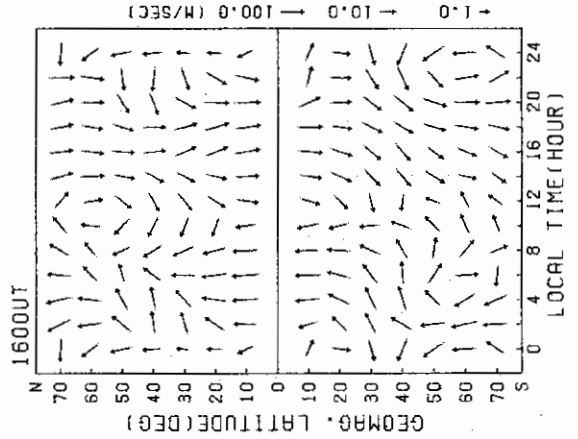
WIND VELOCITY (LOG SCALE)



1600UT

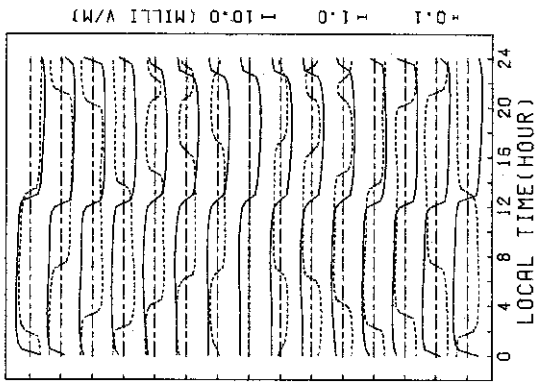
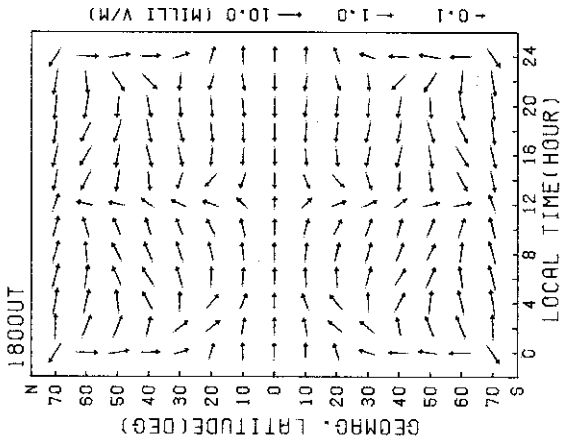


1600UT



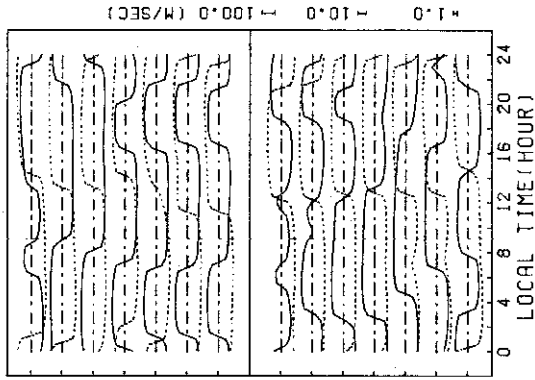
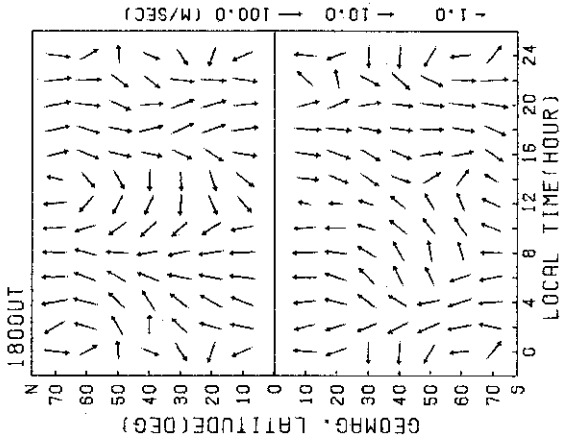
DEC. 6. 1964

ELECTRIC FIELD (LOG SCALE)

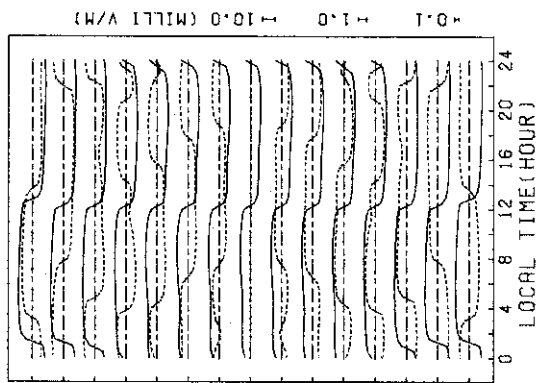
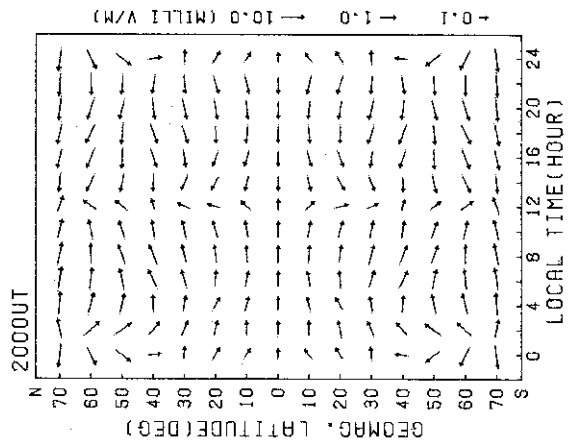


DEC. 6. 1964

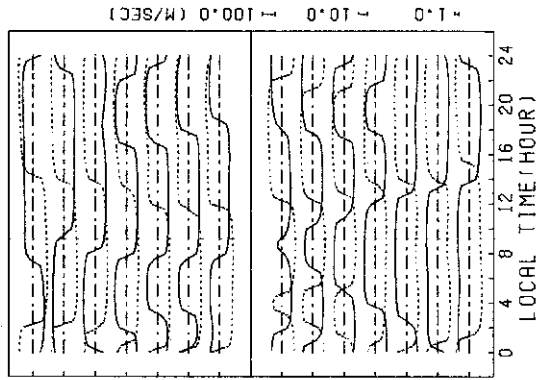
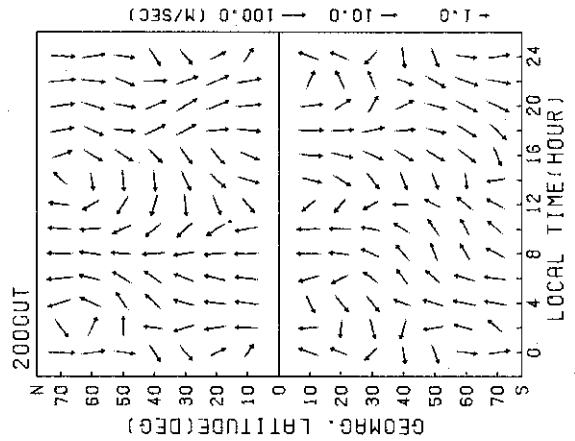
WIND VELOCITY (LOG SCALE)



DEC. 6. 1964

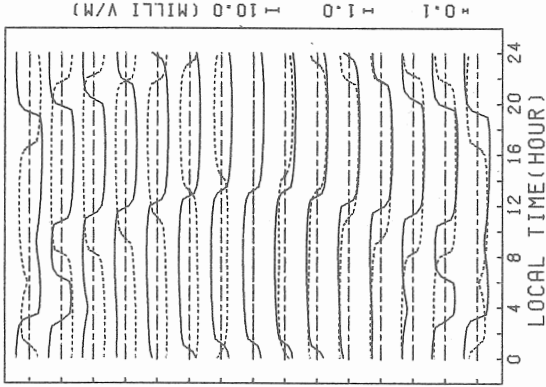
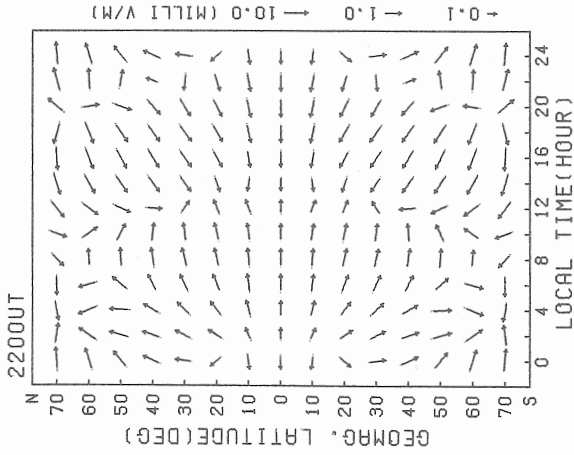


DEC. 6. 1964



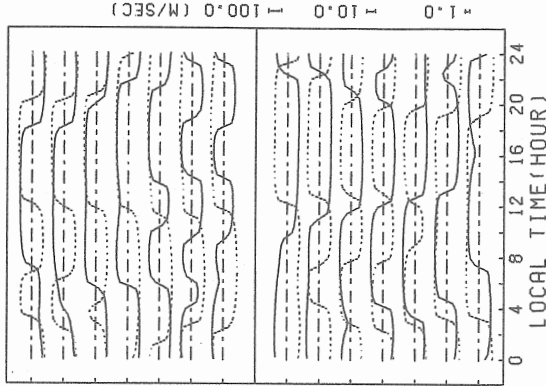
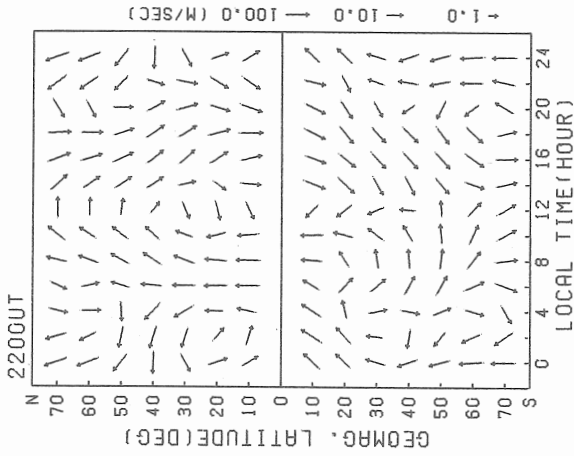
DEC.6,1964

ELECTRIC FIELD (LOG SCALE)

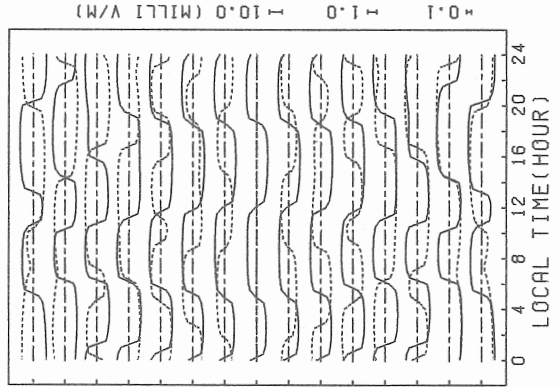
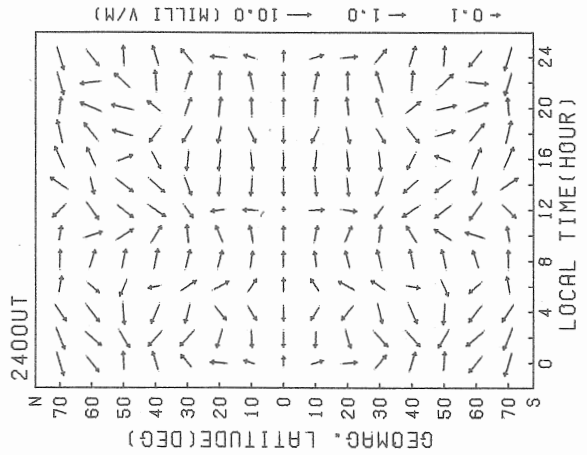


DEC.6,1964

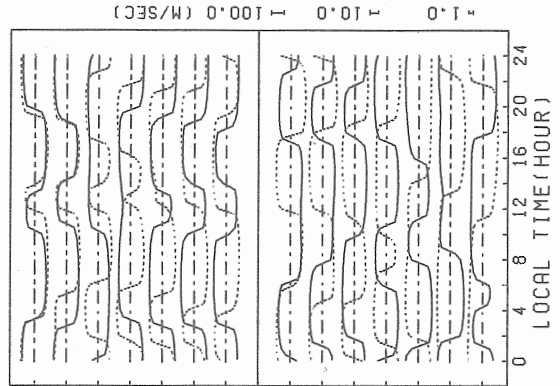
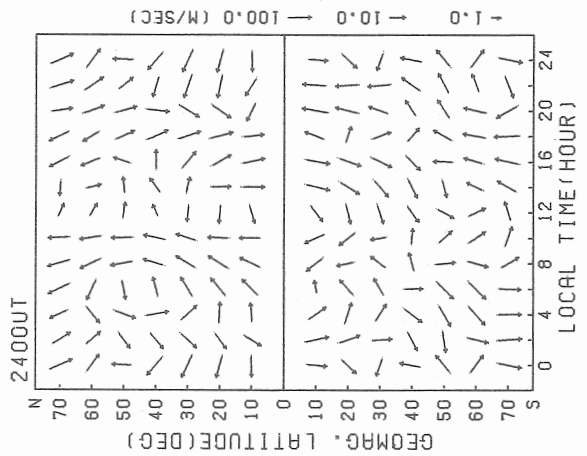
WIND VELOCITY (LOG SCALE)



2400UT

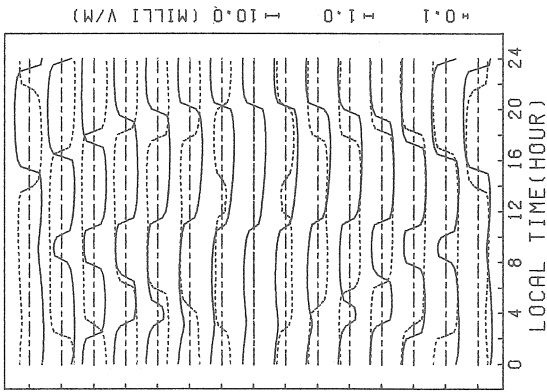
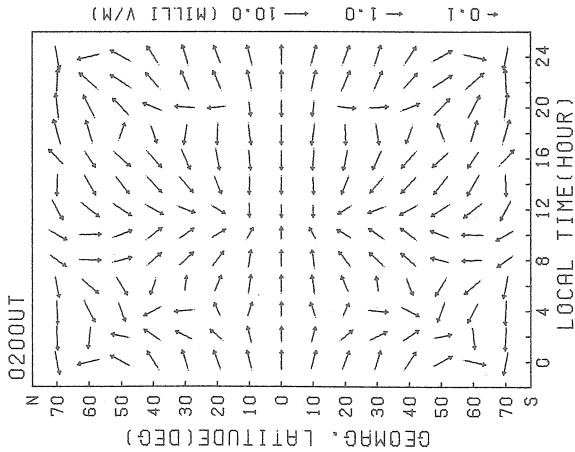


2400UT



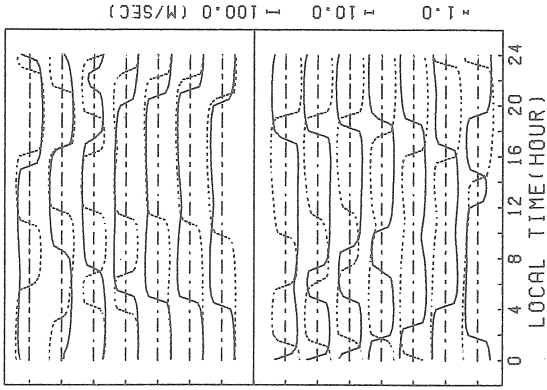
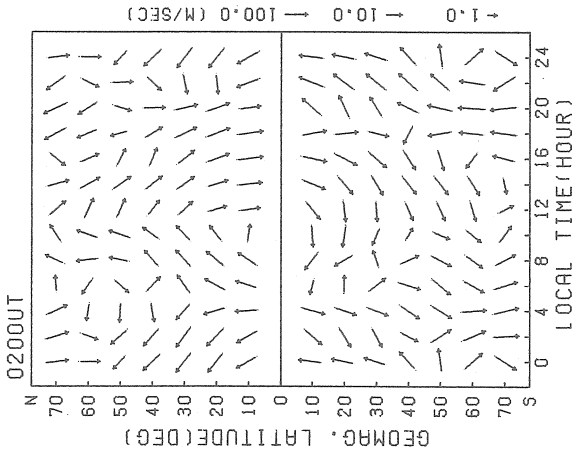
DEC.7,1964

ELECTRIC FIELD (LOG SCALE)

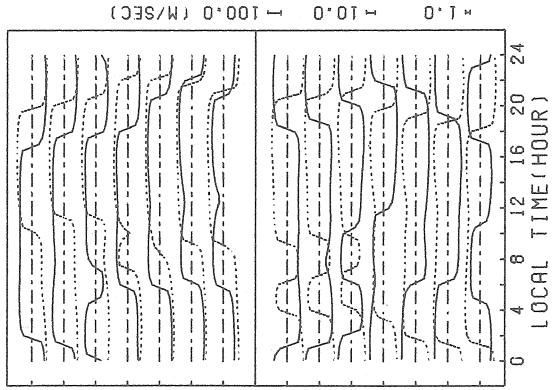
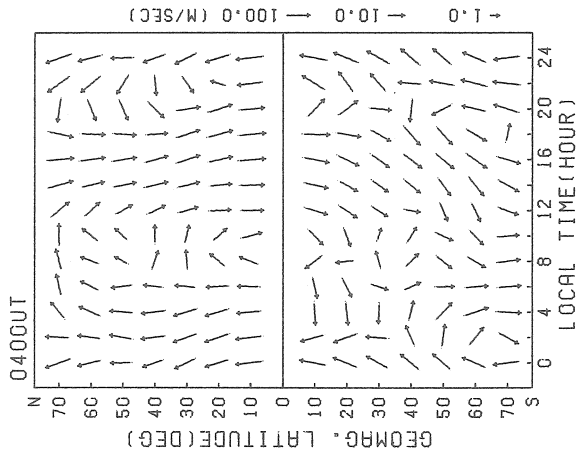
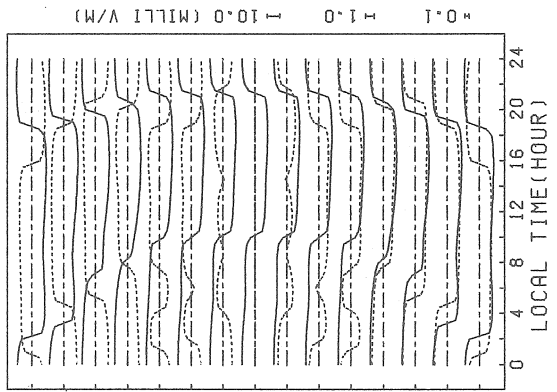
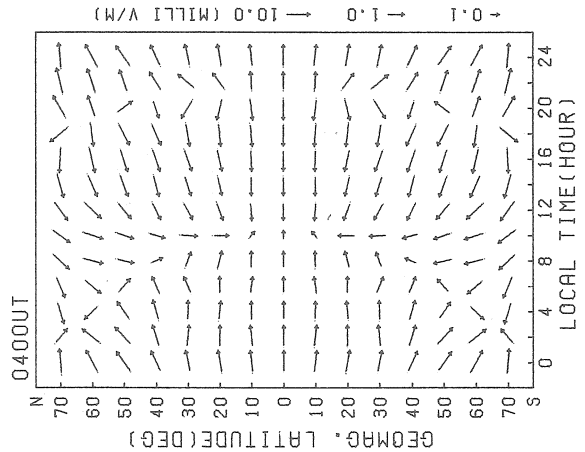


DEC.7,1964

WIND VELOCITY (LOG SCALE)

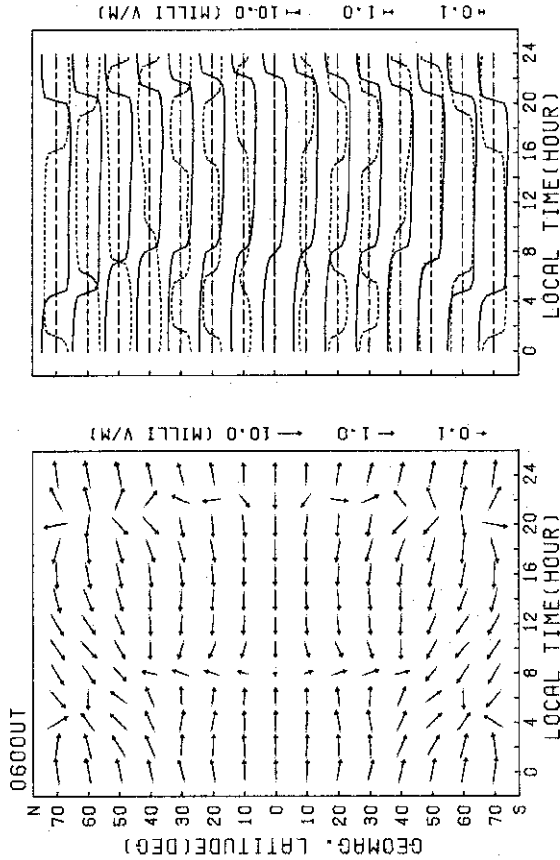


0400UT



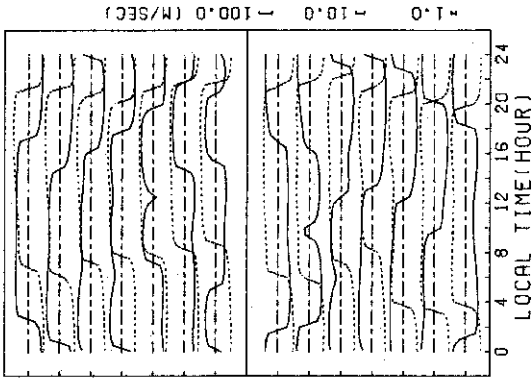
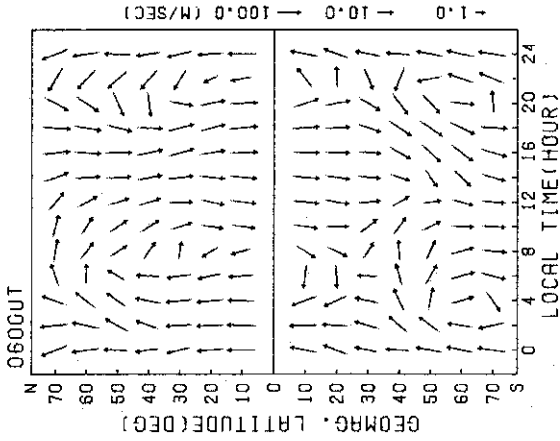
DEC.7.1964

ELECTRIC FIELD (LOG SCALE)

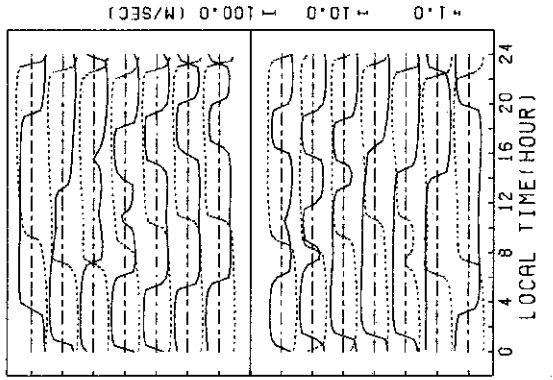
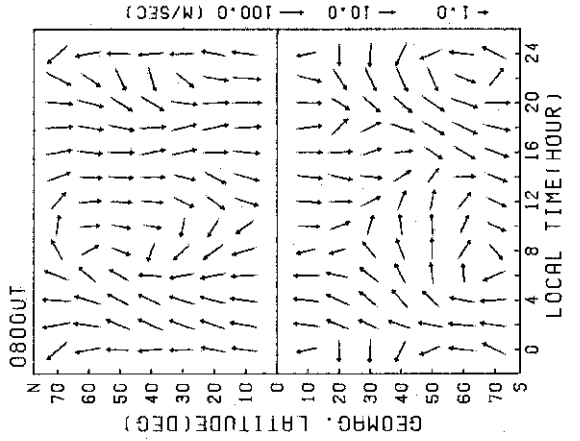
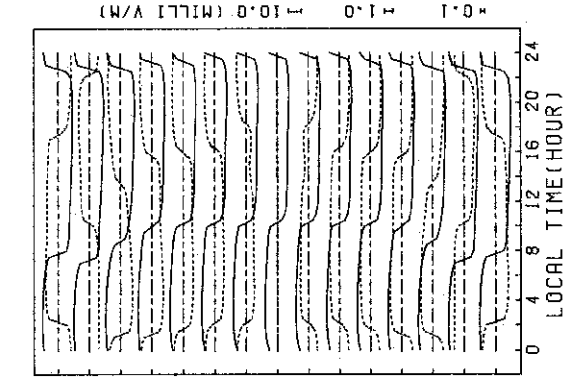
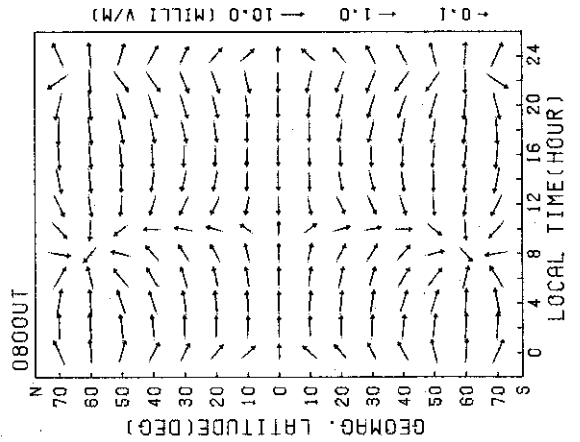


DEC.7.1964

WIND VELOCITY (LOG SCALE)

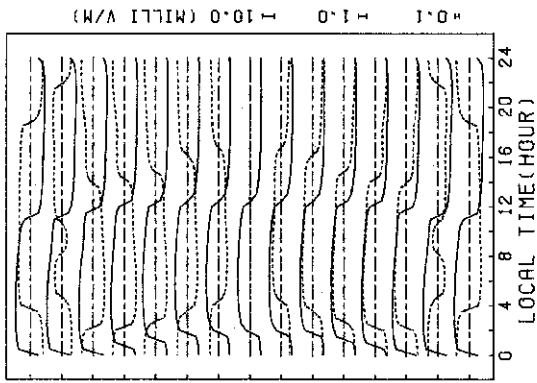
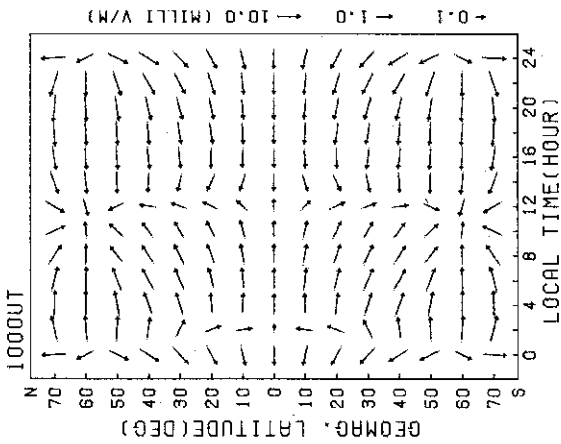


0800UT



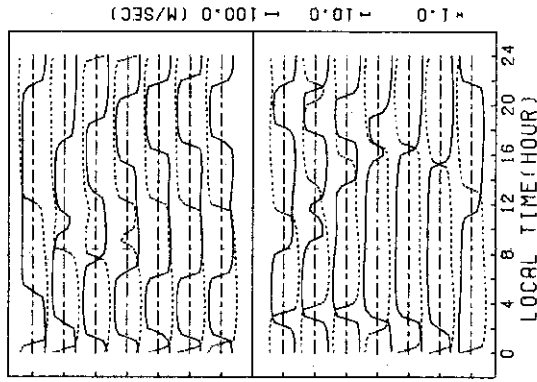
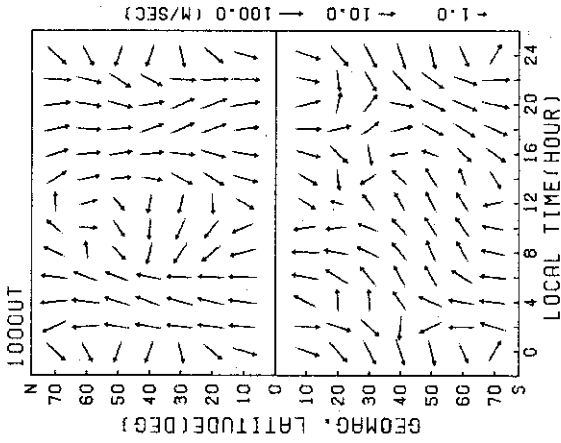
DEC. 7, 1964

ELECTRIC FIELD (LOG SCALE)

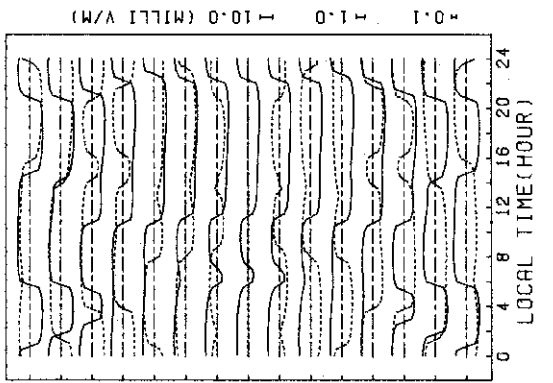
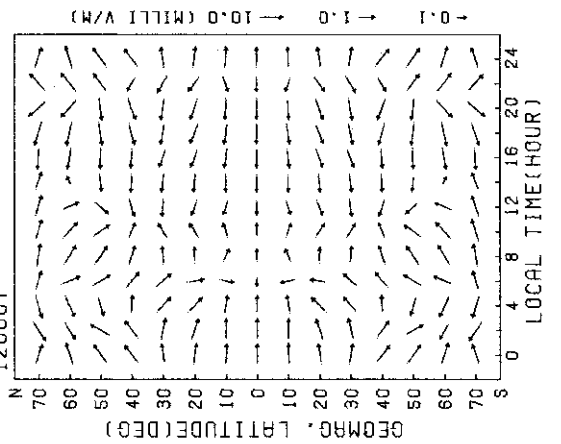


DEC. 7, 1964

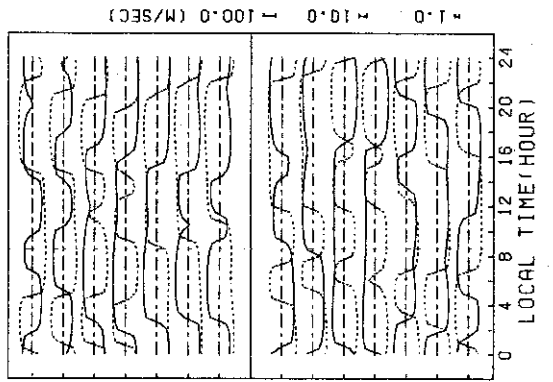
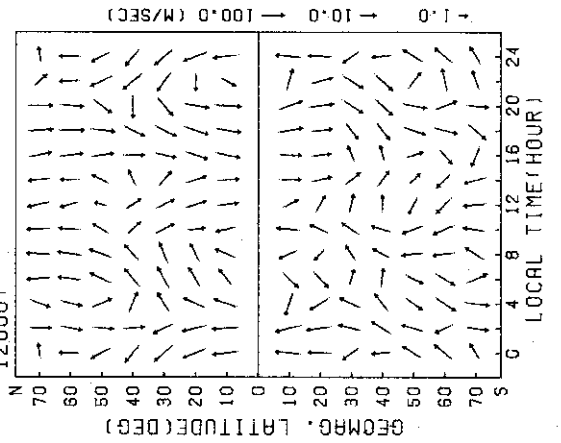
WIND VELOCITY (LOG SCALE)



1200UT

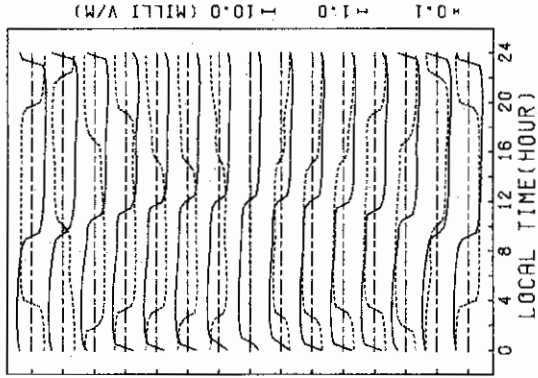
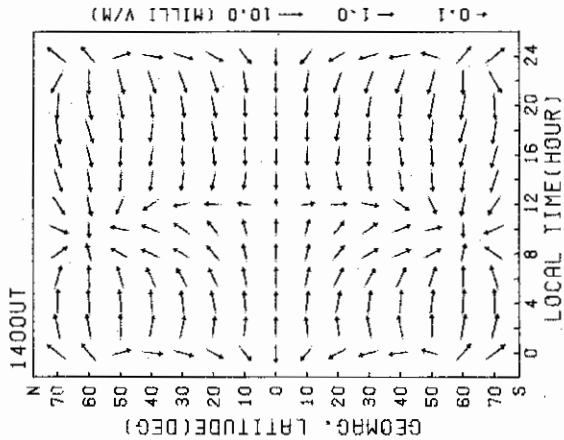


1200UT



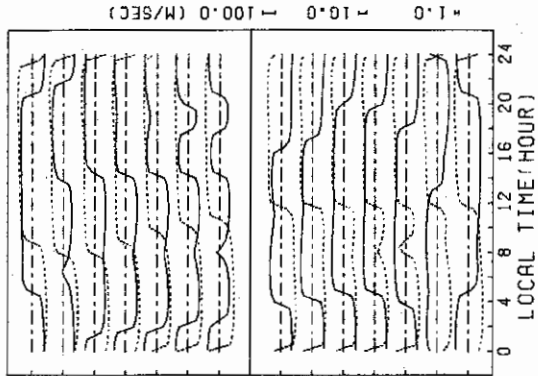
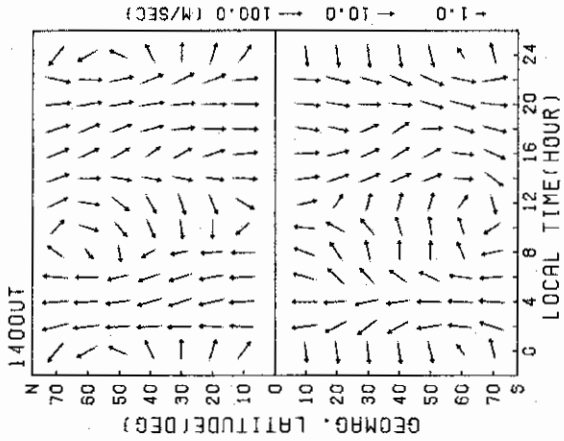
DEC. 7, 1964

ELECTRIC FIELD (LOG SCALE)

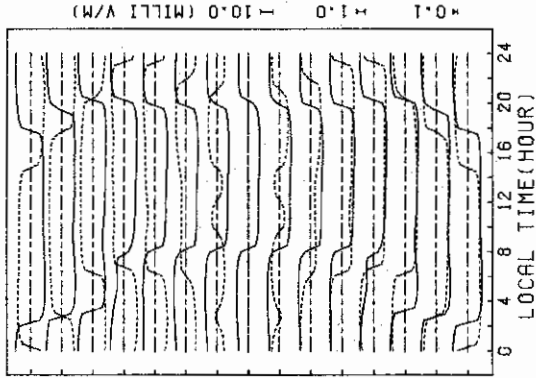
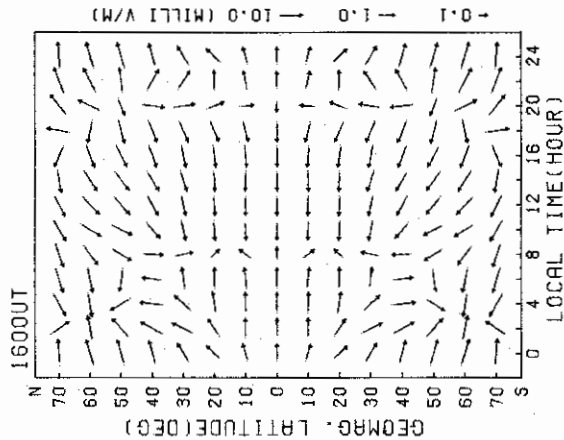


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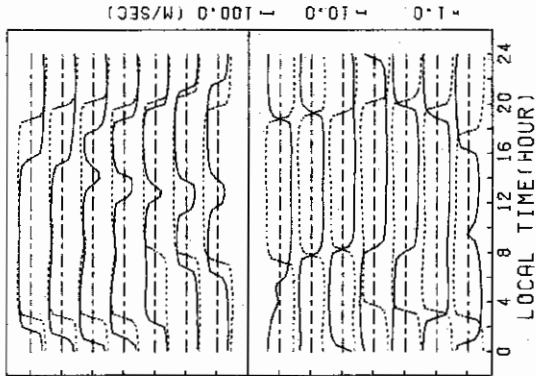
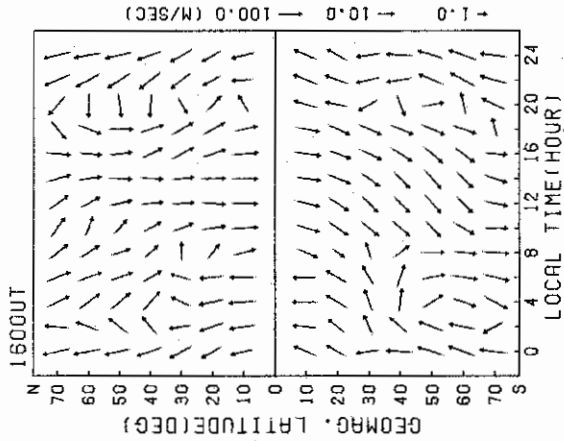
WIND VELOCITY (LOG SCALE)



1600UT

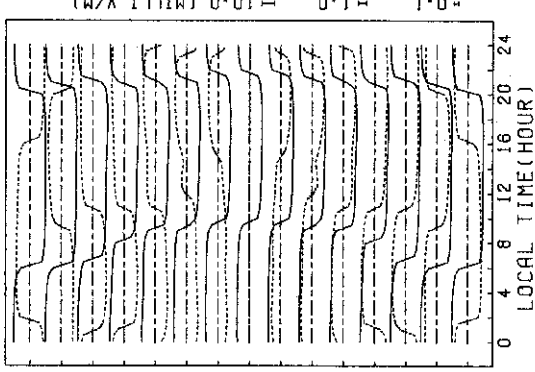
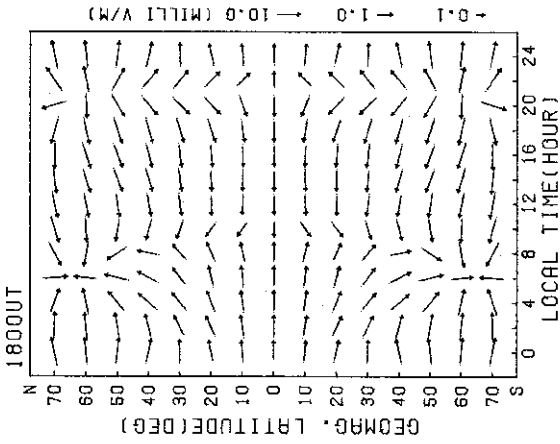


1600UT



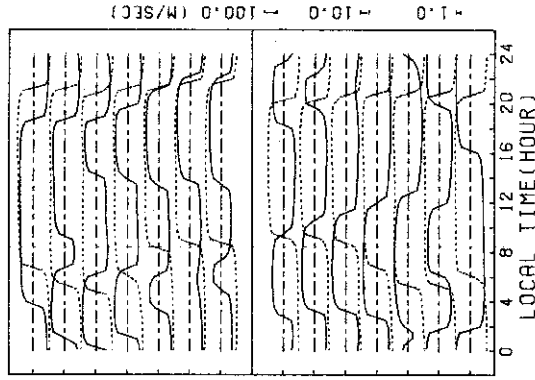
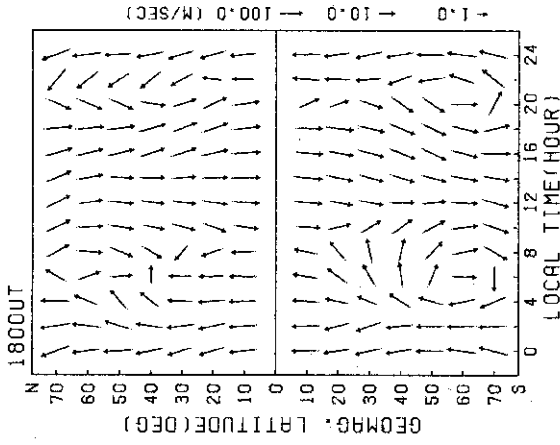
DEC. 7, 1964

ELECTRIC FIELD (LOG SCALE)

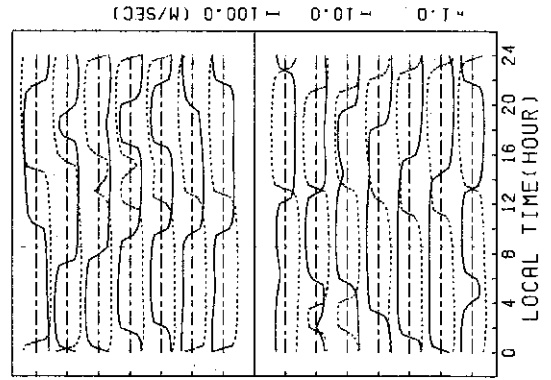
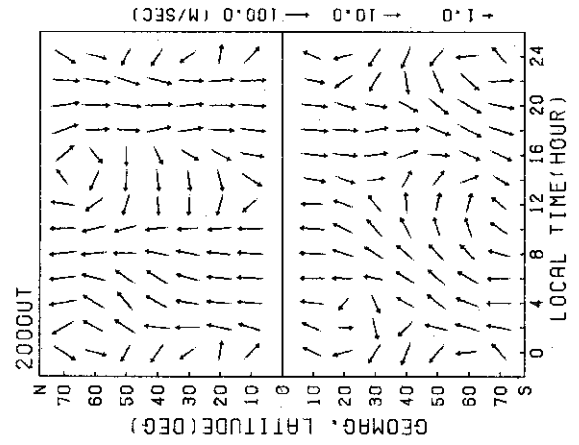
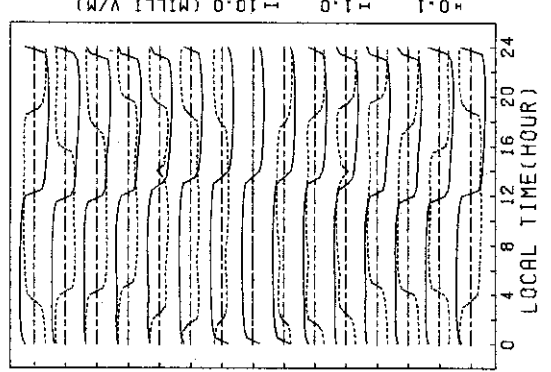
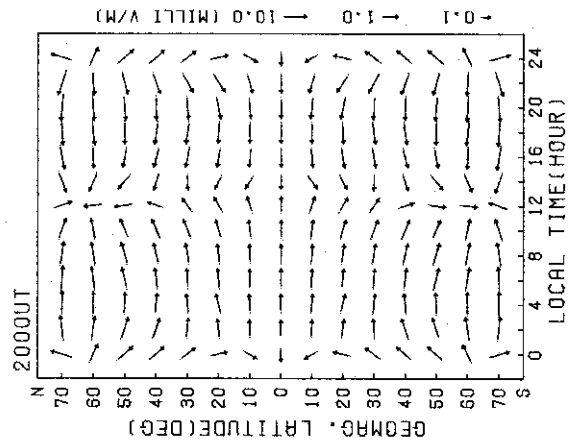


DEC. 7, 1964

WIND VELOCITY (LOG SCALE)

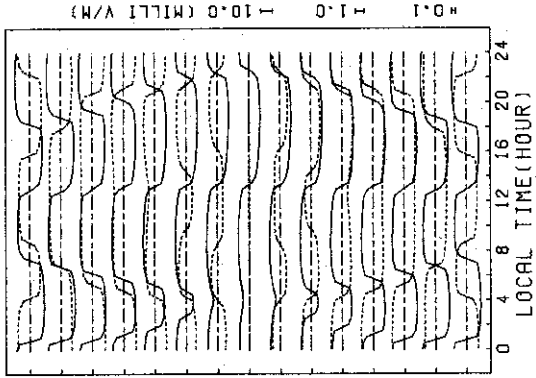
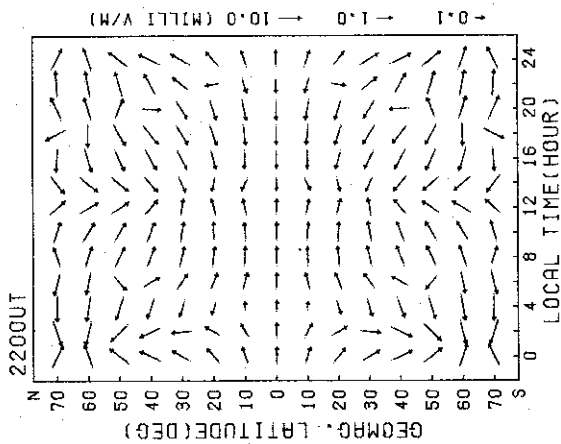


2000UT



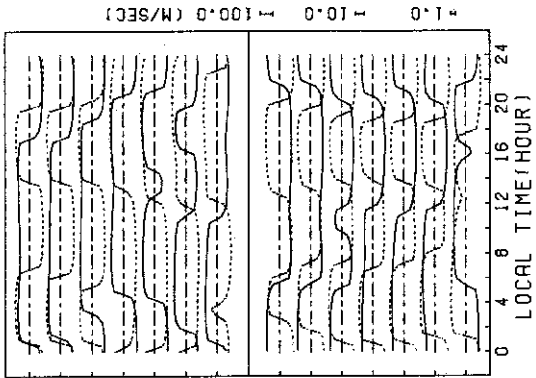
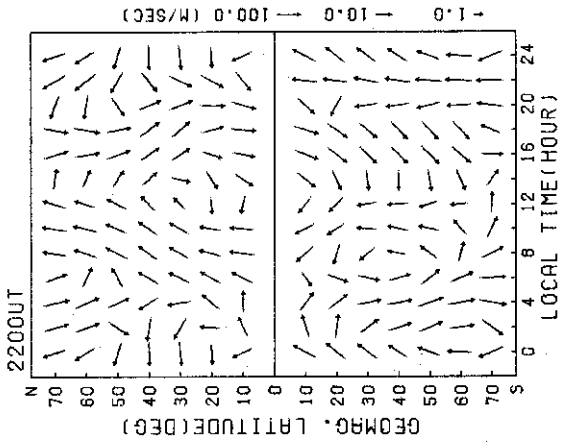
DEC. 7, 1964

ELECTRIC FIELD (LOG SCALE)

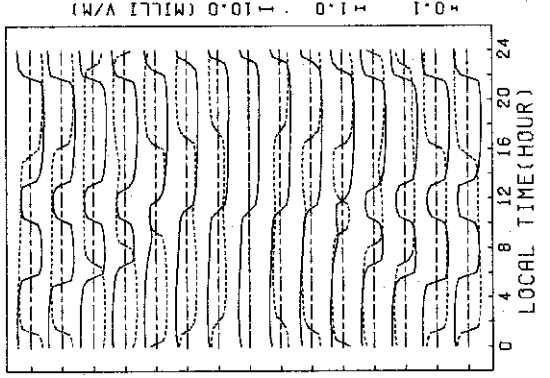
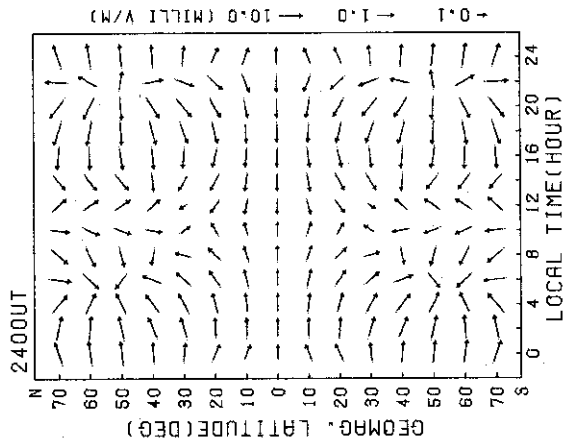


DEC. 7, 1964

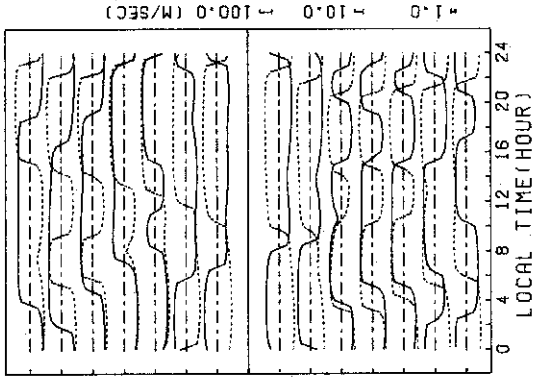
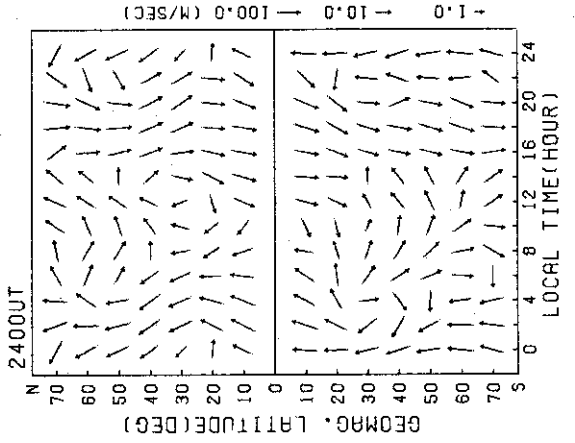
WIND VELOCITY (LOG SCALE)



2400UT

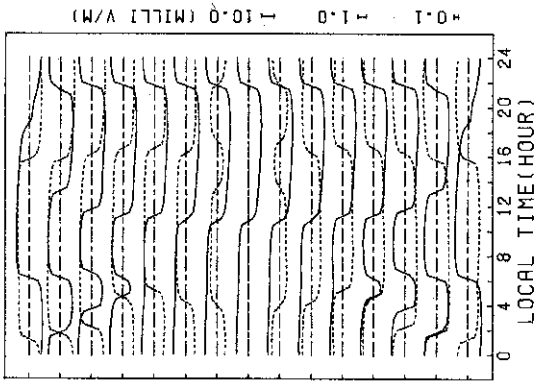
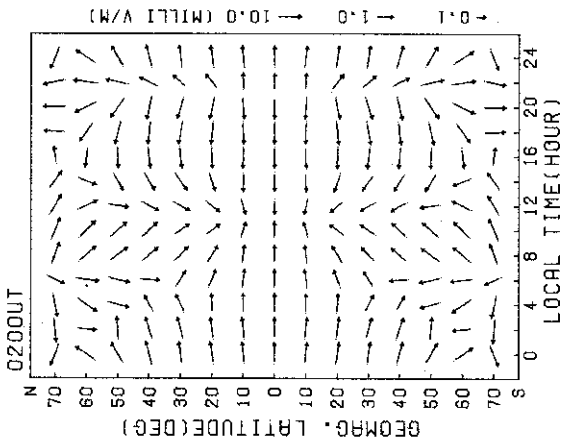


2400UT



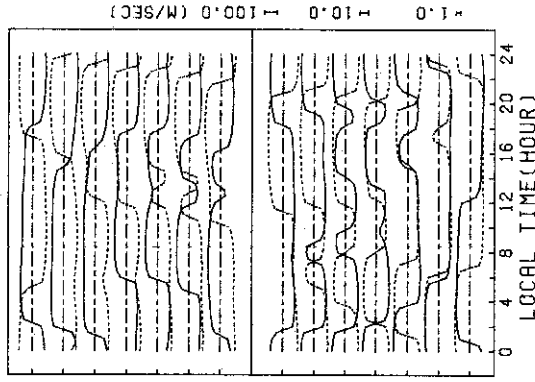
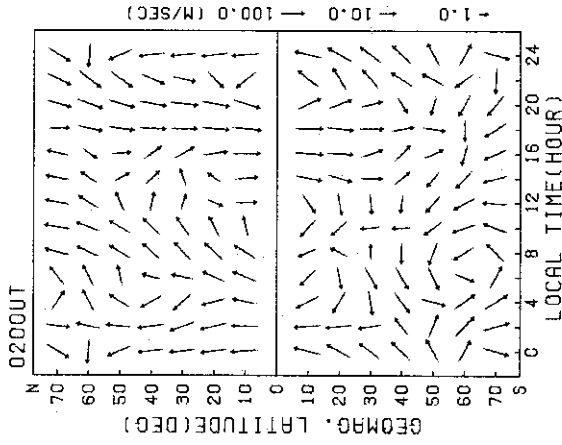
DEC. 8, 1964

ELECTRIC FIELD (LOG SCALE)

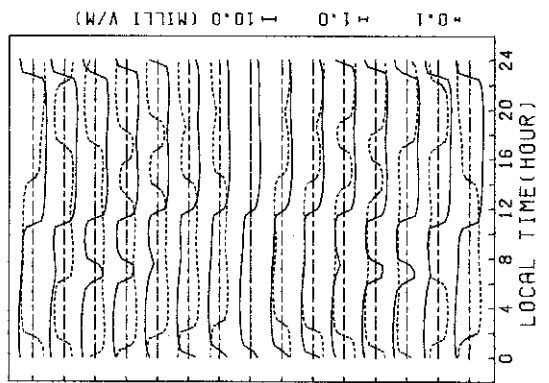
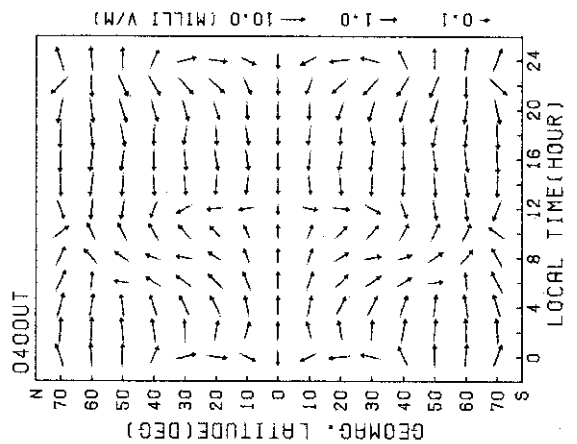


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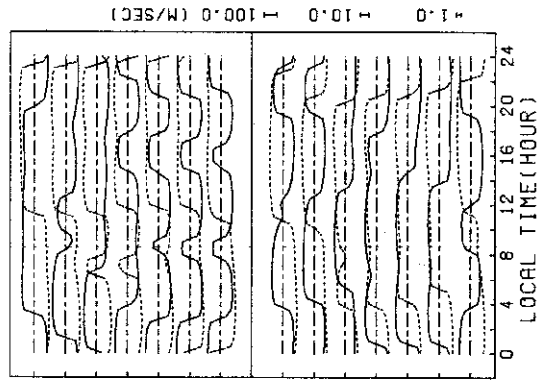
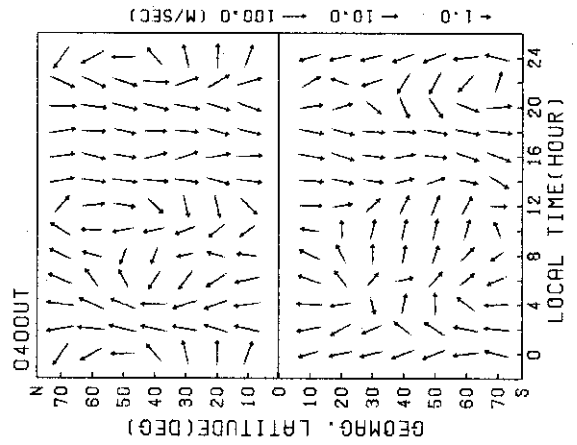
WIND VELOCITY (LOG SCALE)



0400UT

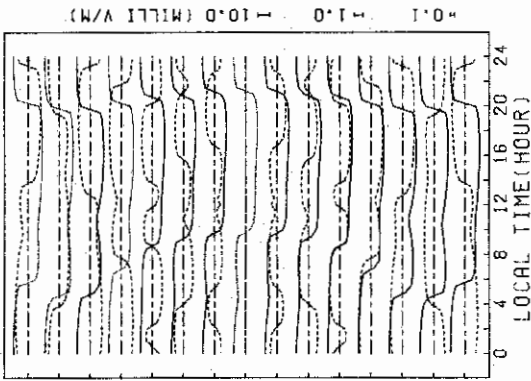
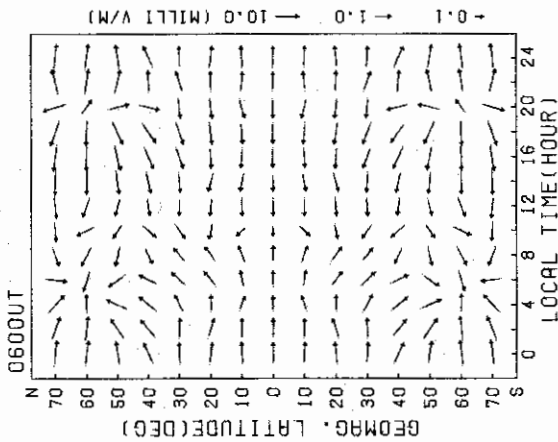


0400UT



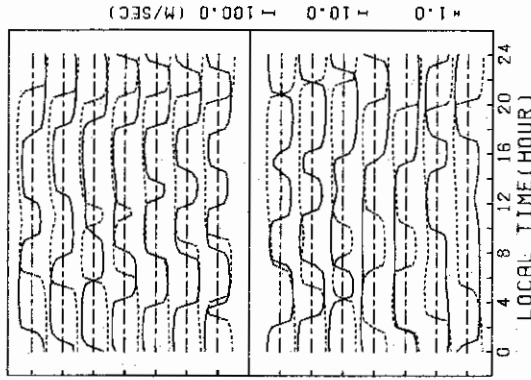
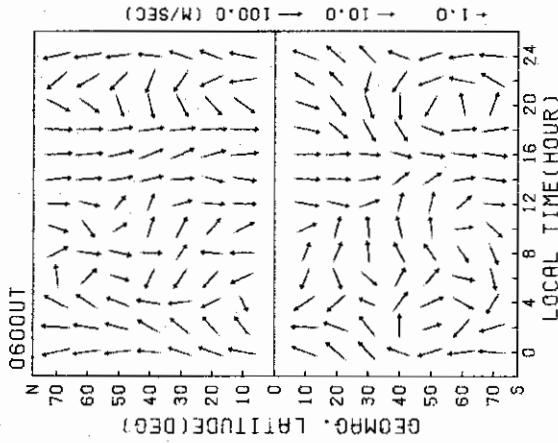
DEC. 8, 1964

ELECTRIC FIELD (LOG SCALE)

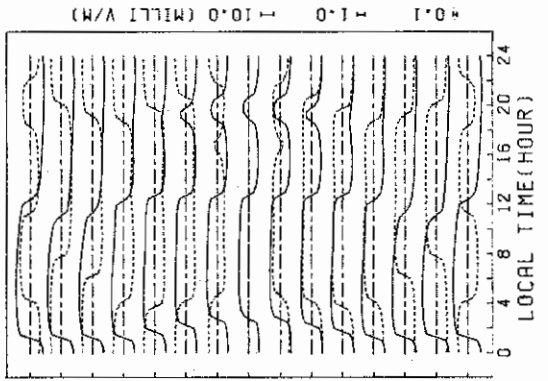
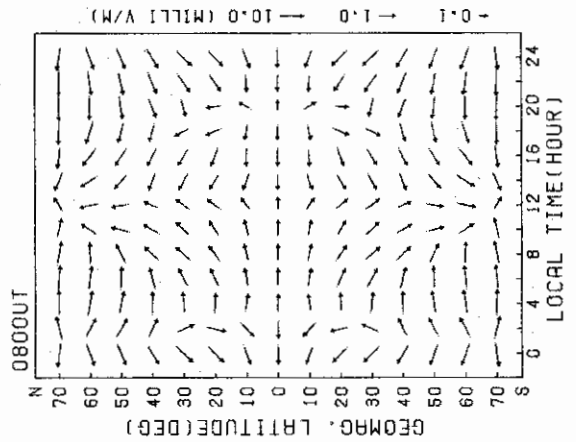


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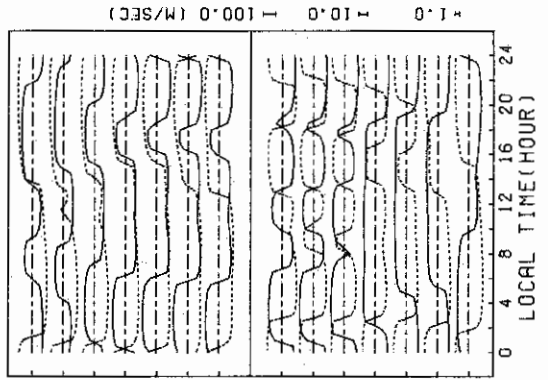
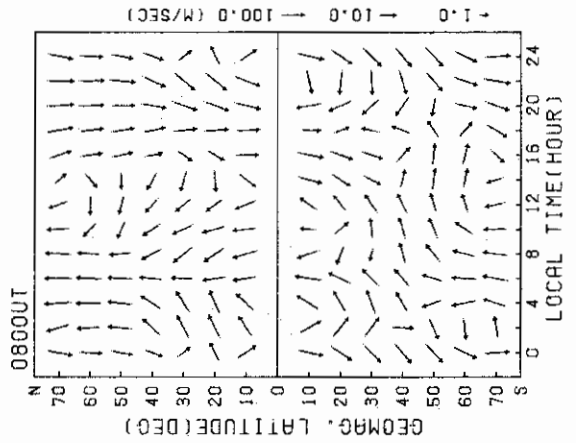
WIND VELOCITY (LOG SCALE)



0800UT

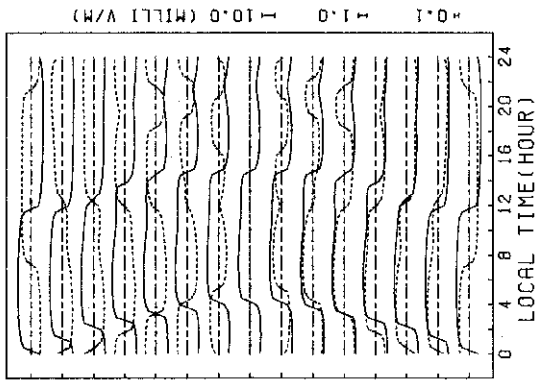
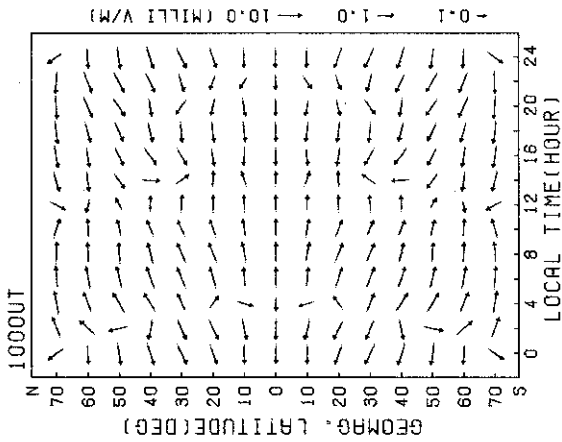


0800UT



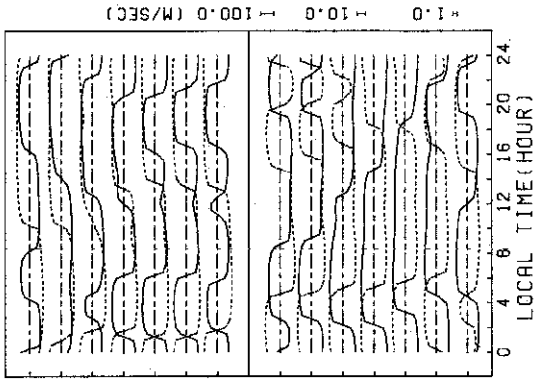
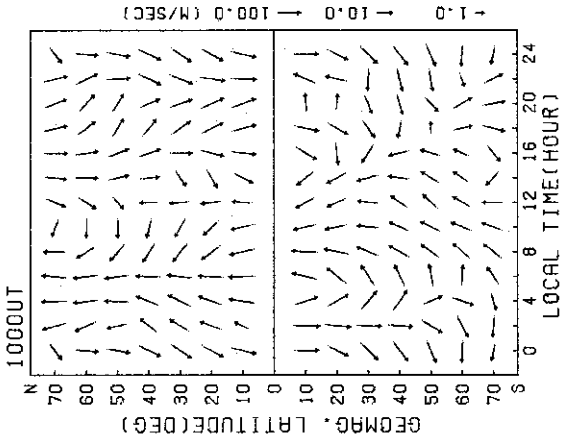
DEC.8.1964

ELECTRIC FIELD (LOG SCALE)

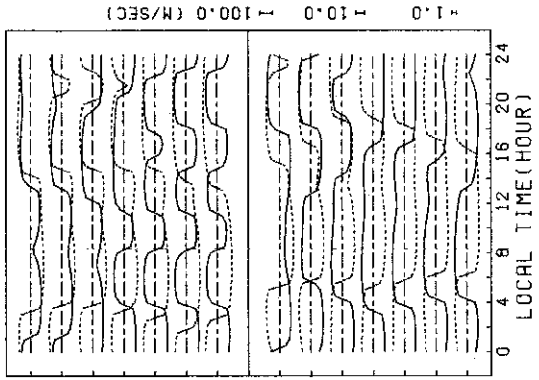
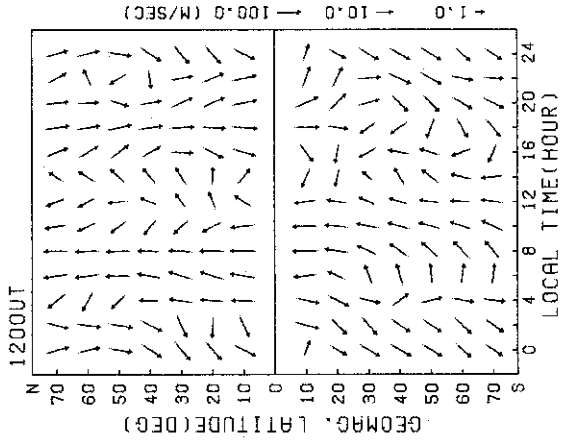
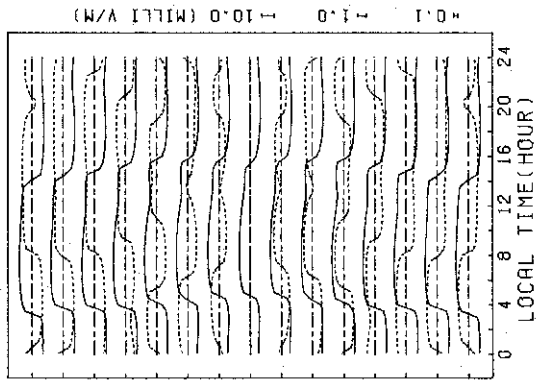
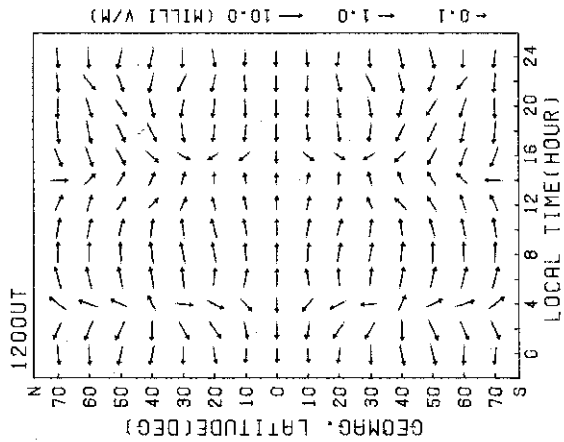


DEC.8.1964

WIND VELOCITY (LOG SCALE)

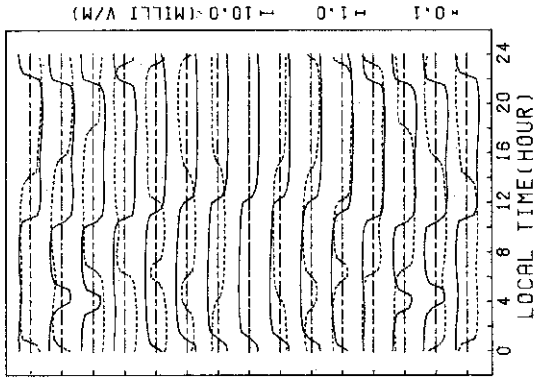
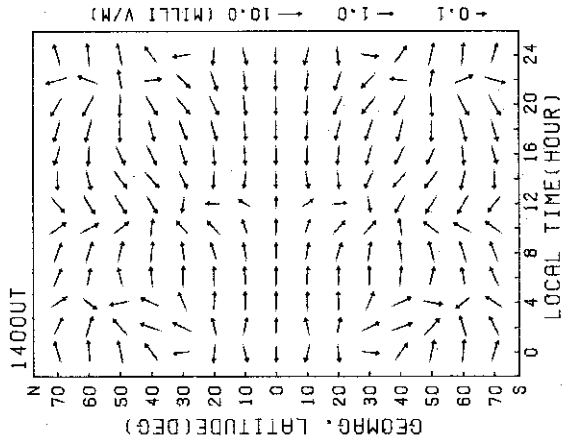


12000



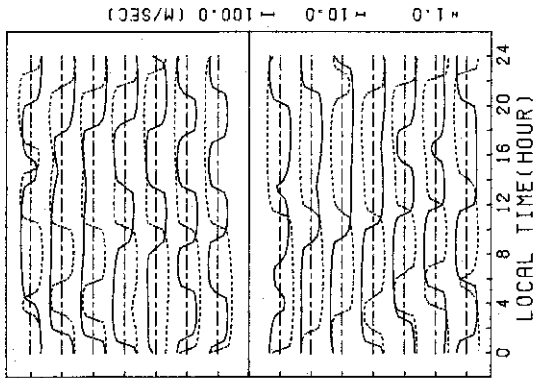
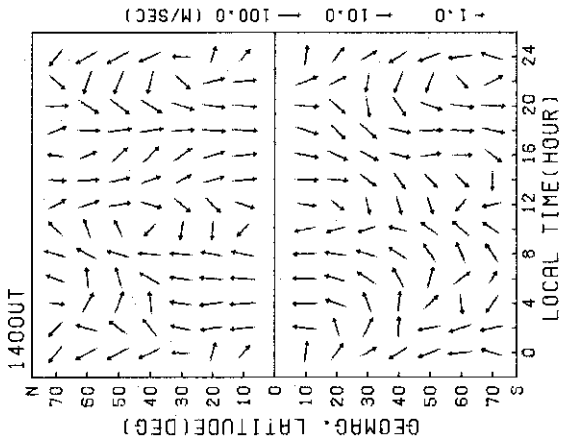
DEC. 8, 1964

ELECTRIC FIELD (LOG SCALE)

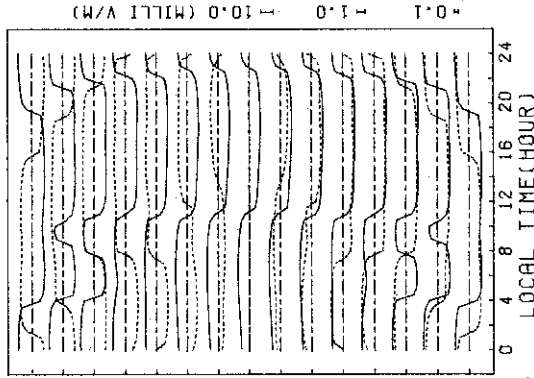
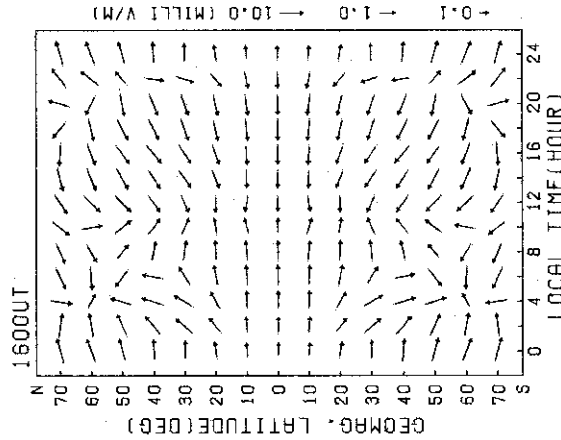


DEC. 8, 1964

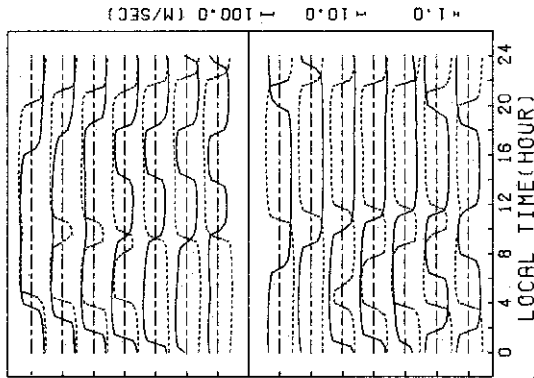
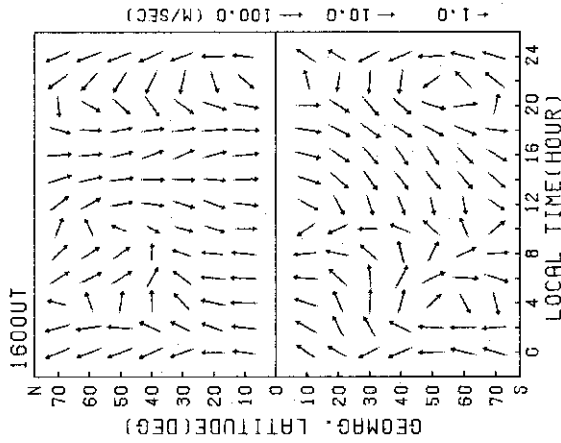
WIND VELOCITY (LOG SCALE)



16000

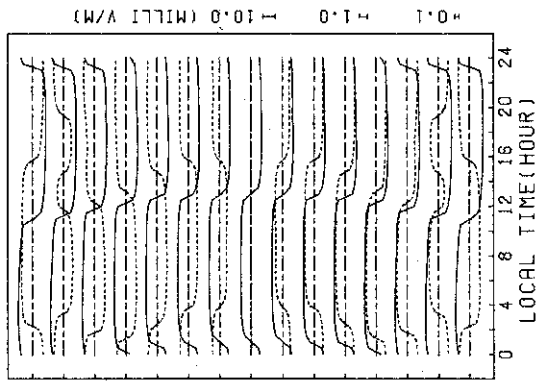
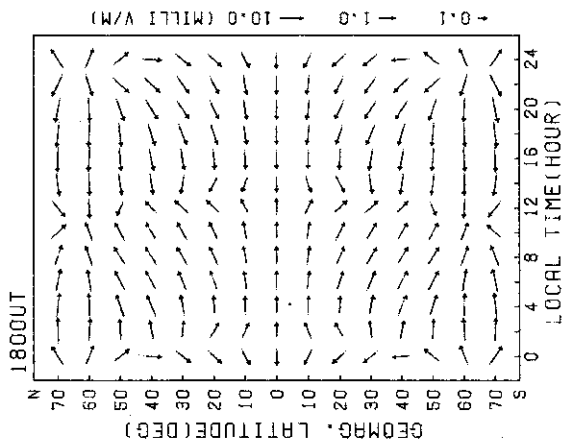


16000



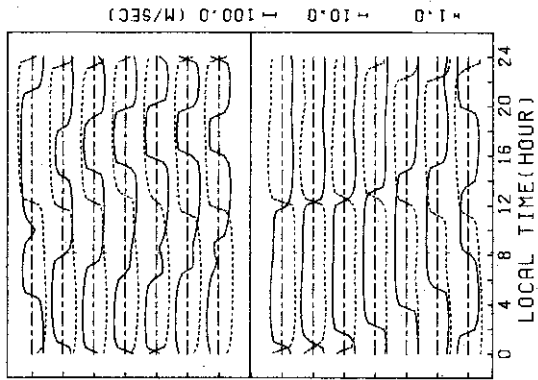
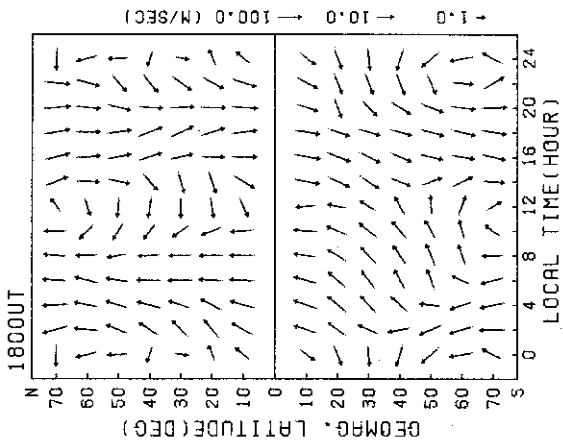
DEC. 8, 1964

ELECTRIC FIELD (LOG SCALE)

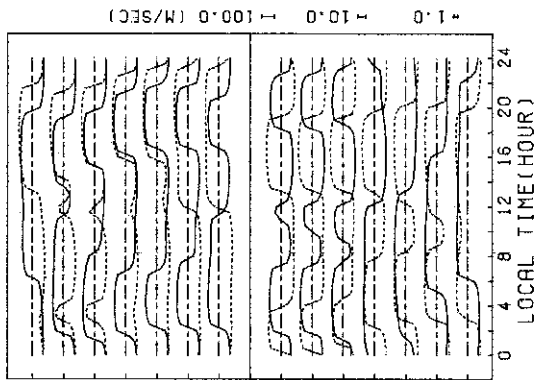
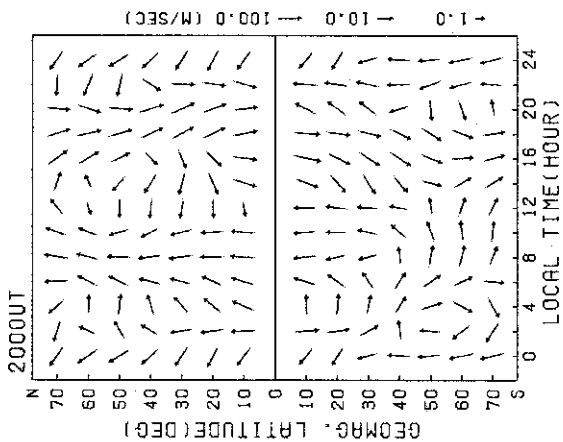
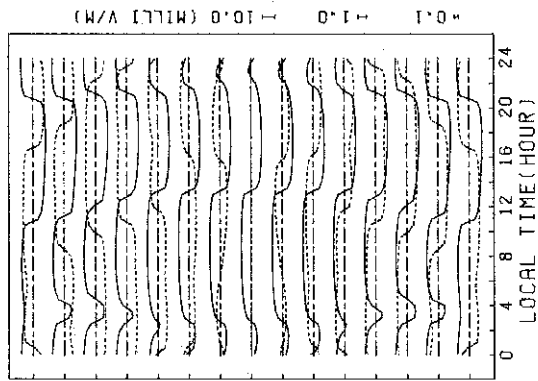
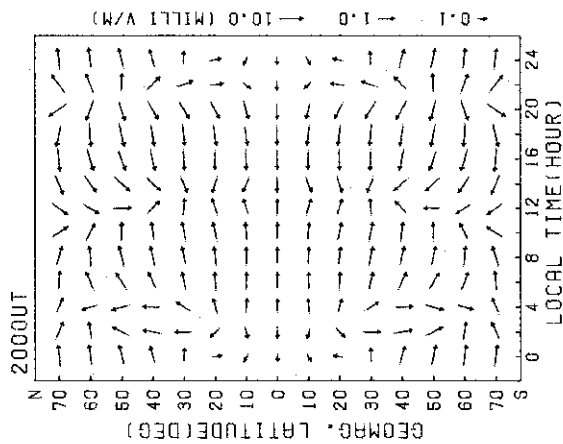


DEC. 8, 1964

WIND VELOCITY (LOG SCALE)

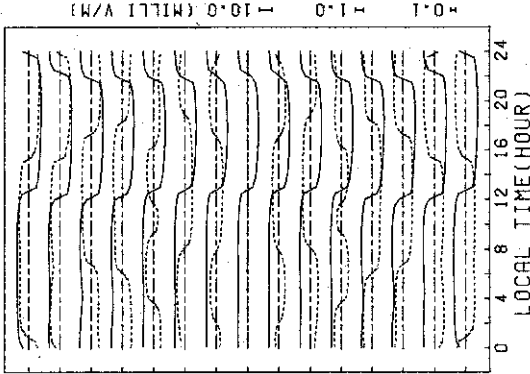
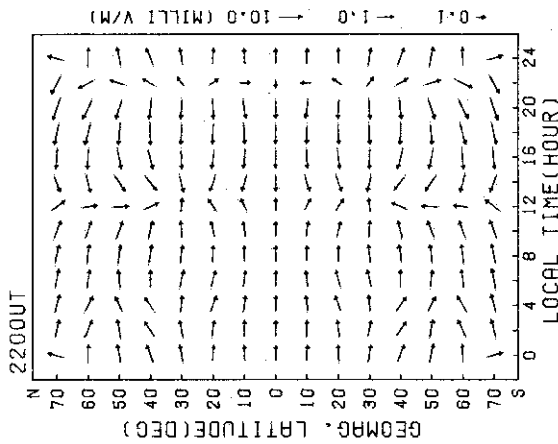


2000UT



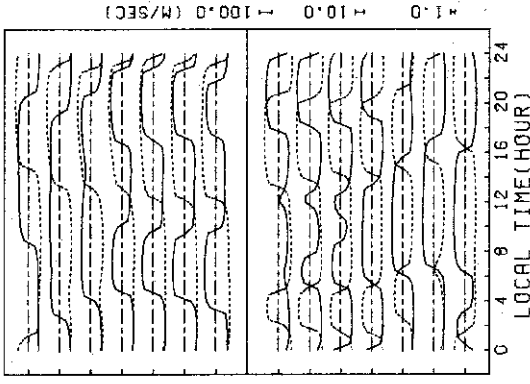
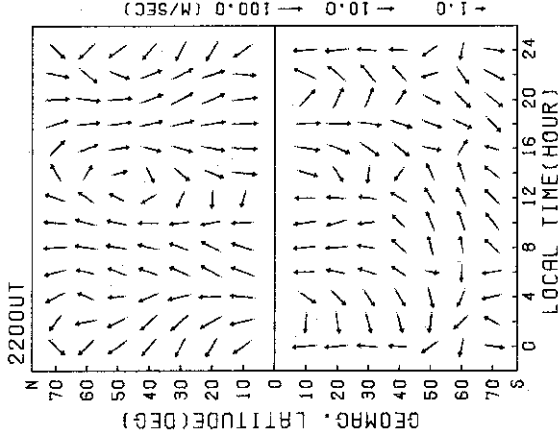
DEC. 8. 1964

ELECTRIC FIELD (LOG SCALE)

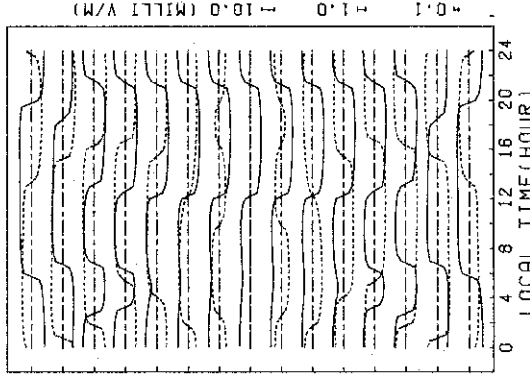
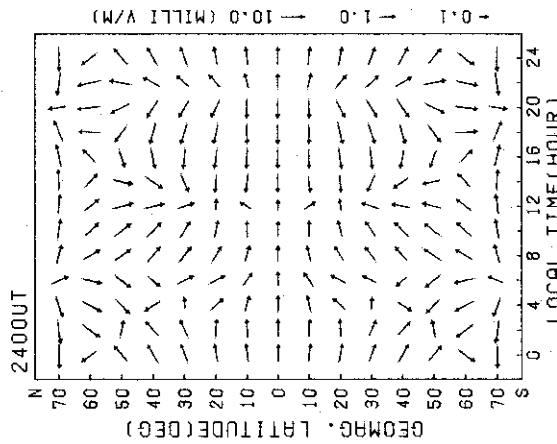


DEC. 8. 1964

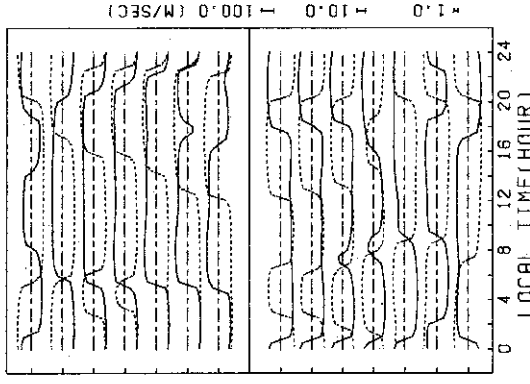
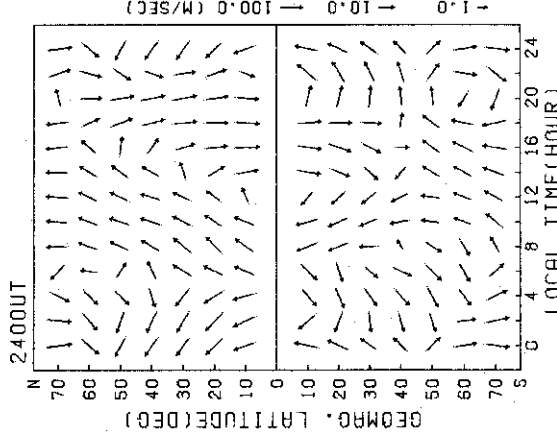
WIND VELOCITY (LOG SCALE)



2400UT

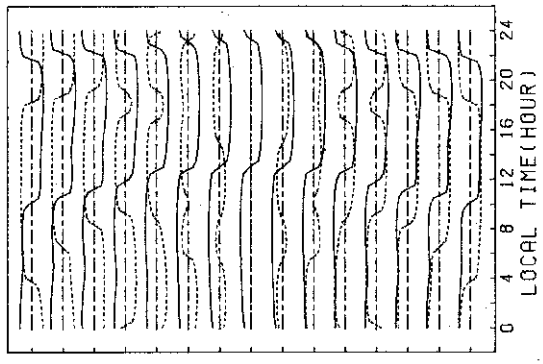
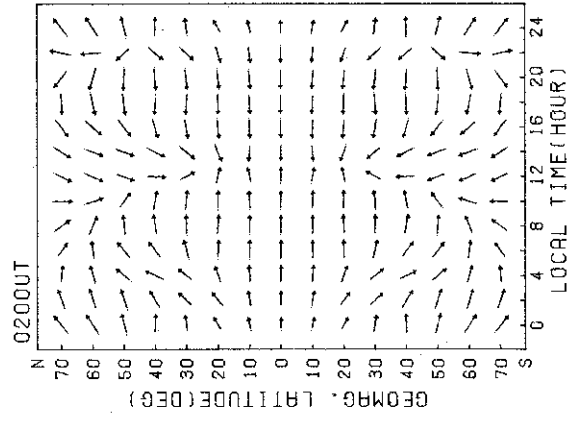


2400UT



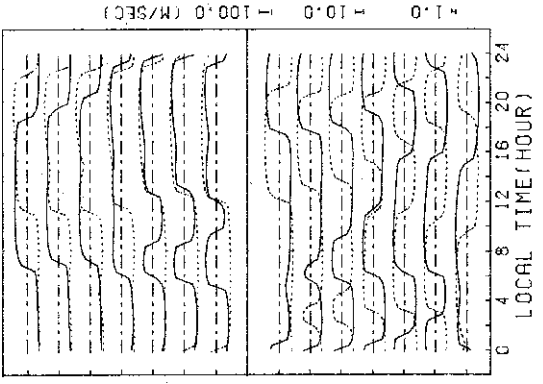
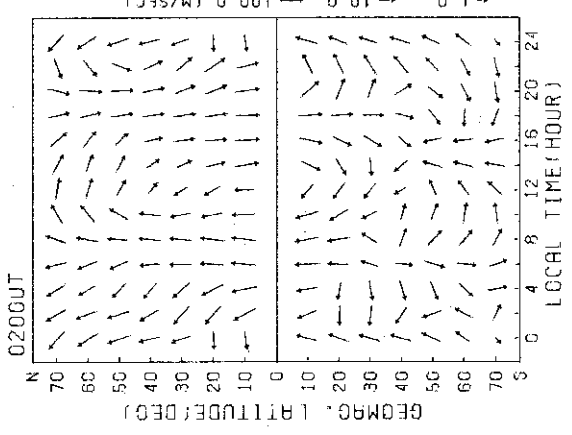
DEC.9,1964

ELECTRIC FIELD (LOG SCALE)

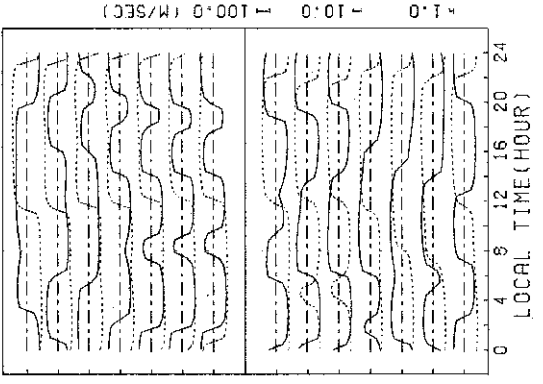
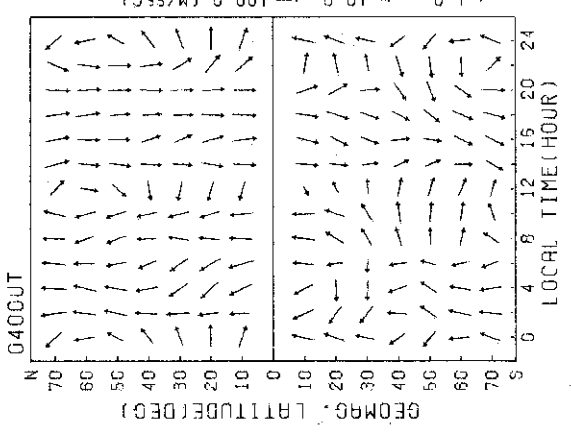
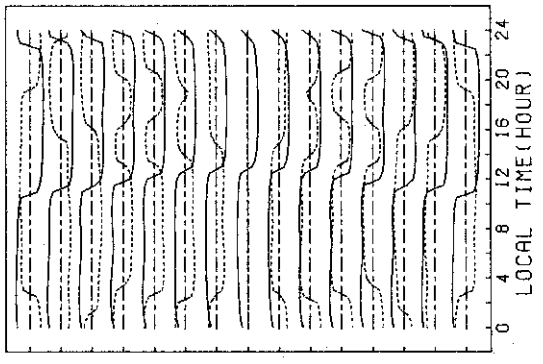
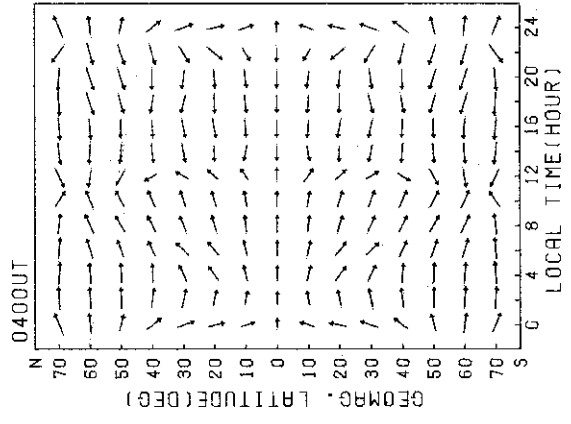


DEC.9,1964

WIND VELOCITY (LOG SCALE)

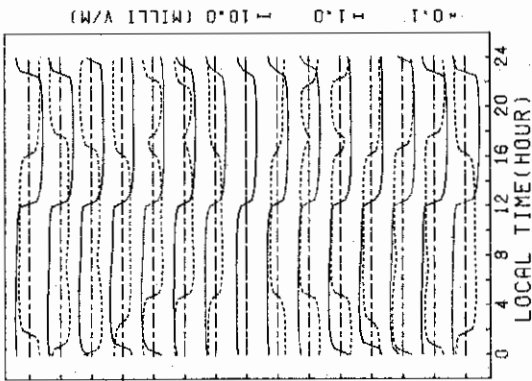
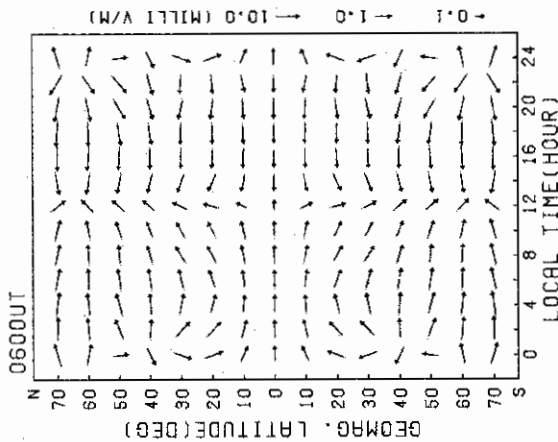


0400UT



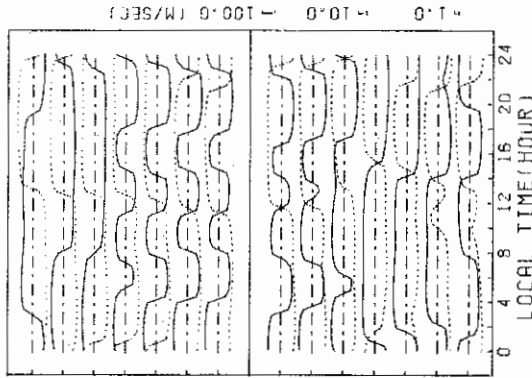
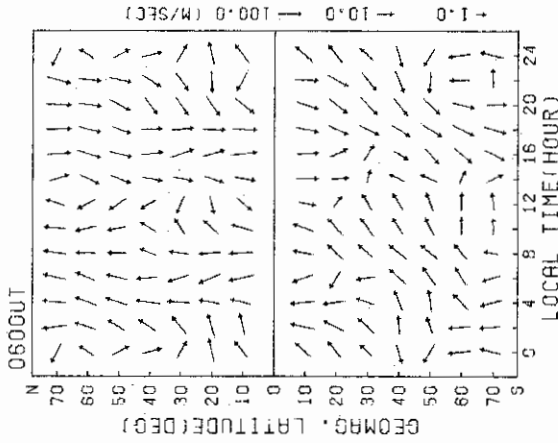
DEC. 9, 1964

ELECTRIC FIELD (LOG SCALE)

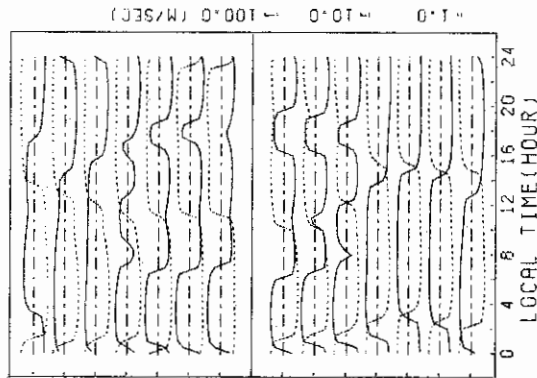
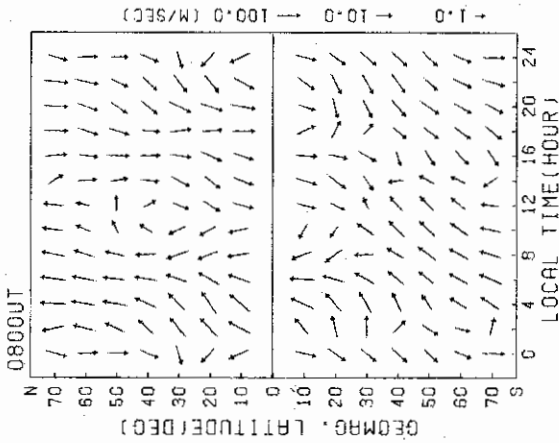
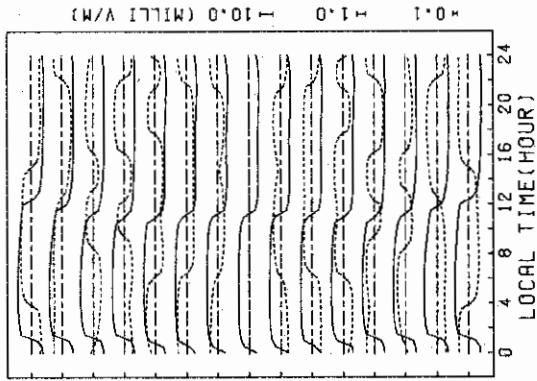
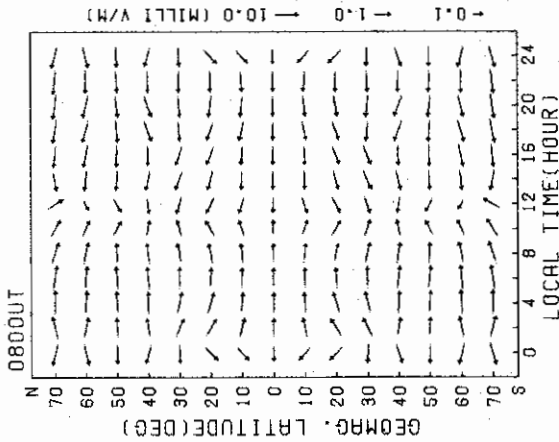


DEC. 9, 1964

WIND VELOCITY (LOG SCALE)

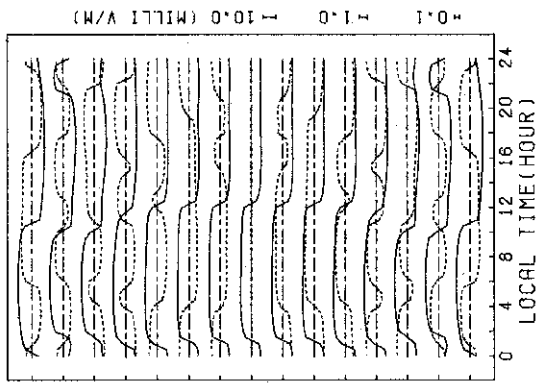
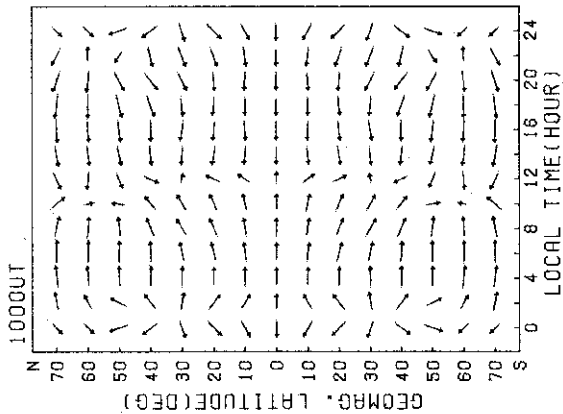


0800UT



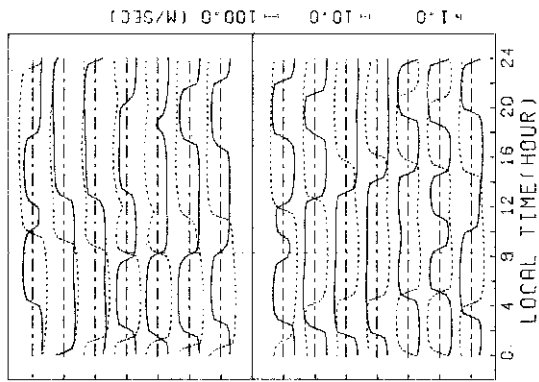
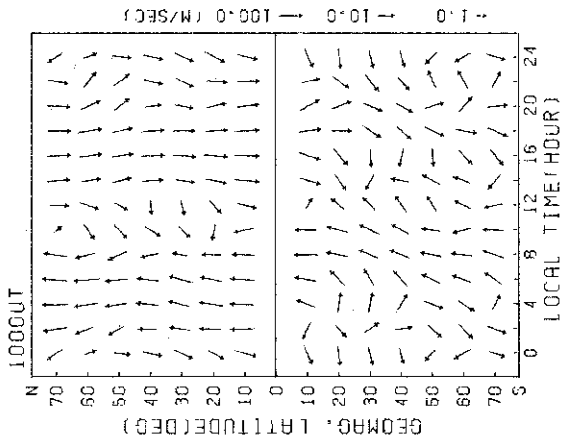
DEC. 9, 1964

ELECTRIC FIELD (LOG SCALE)

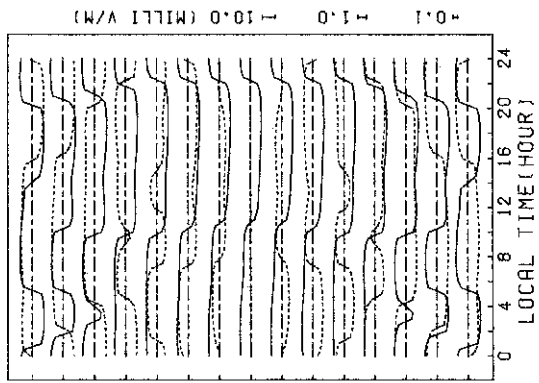
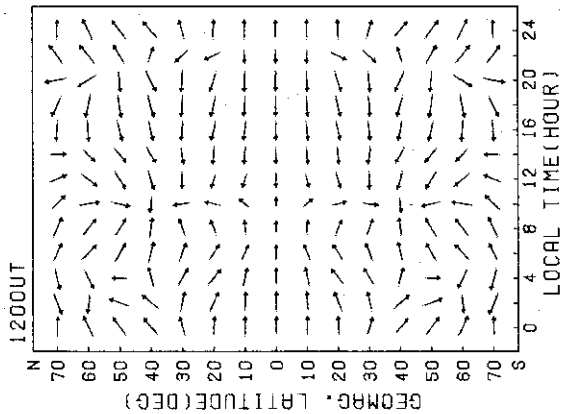


DEC. 9, 1964

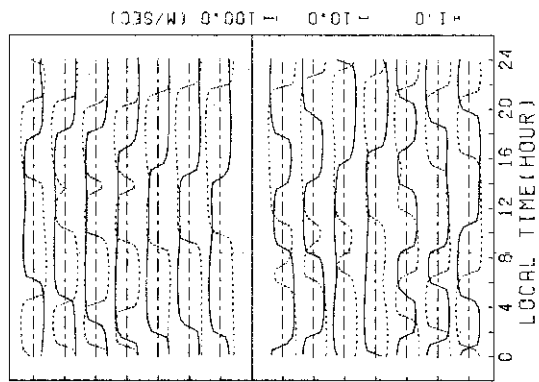
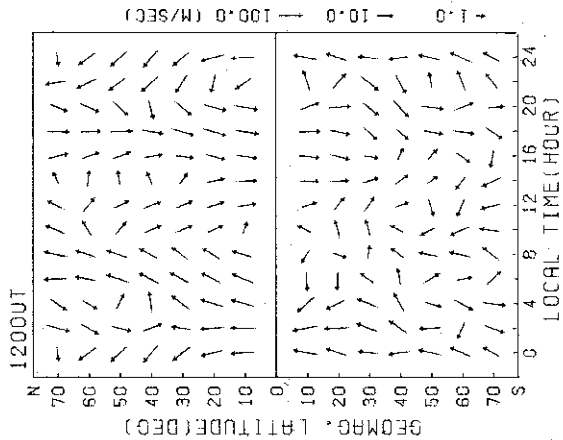
WIND VELOCITY (LOG SCALE)



1200UT

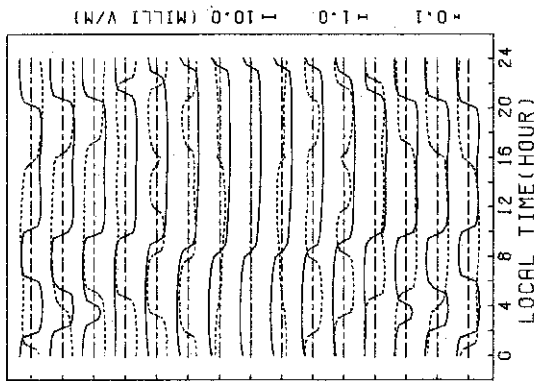
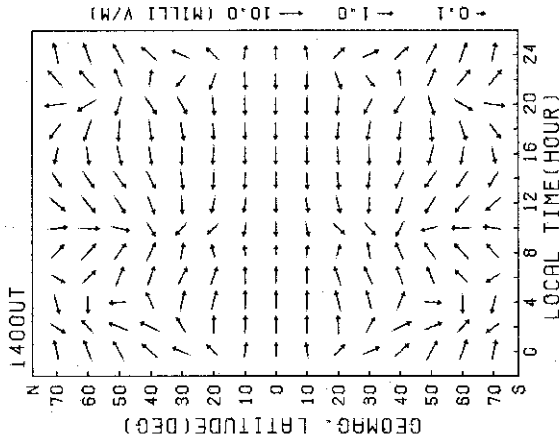


1200UT



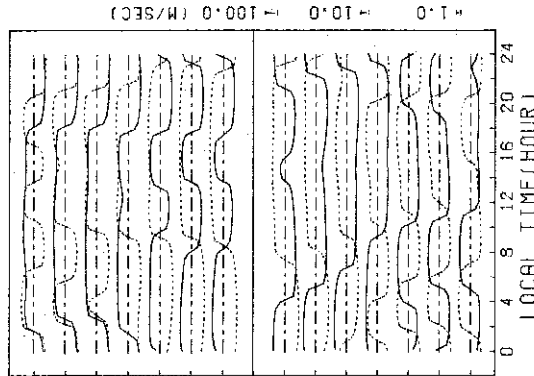
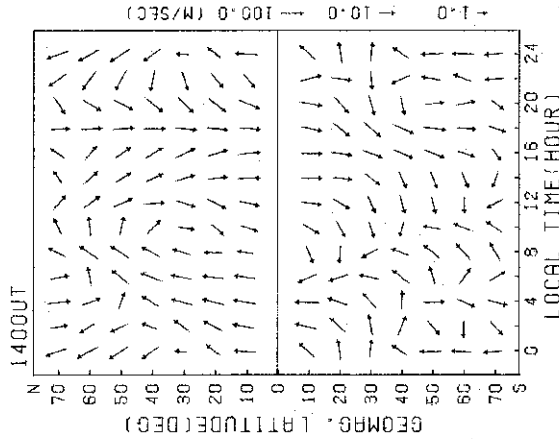
DEC. 9, 1964

ELECTRIC FIELD (LOG SCALE)

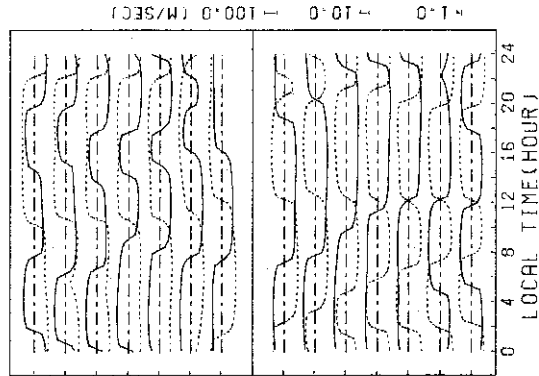
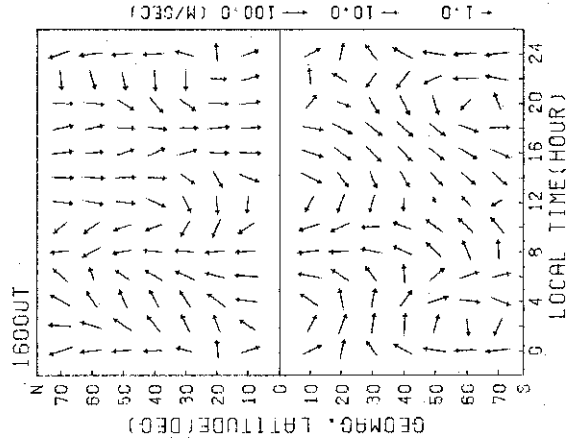
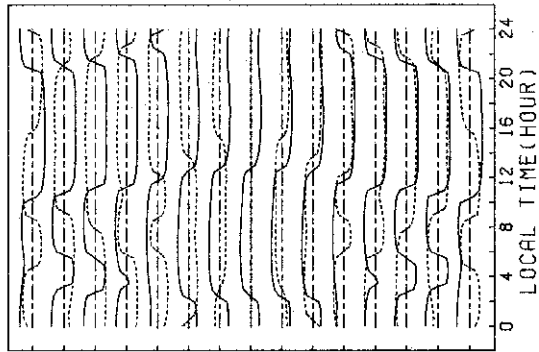
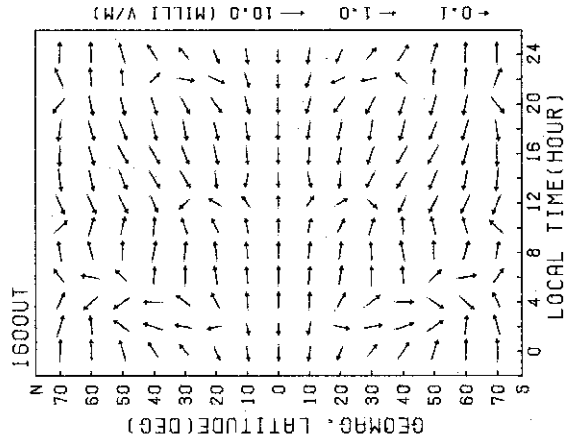


DEC. 9, 1964

WIND VELOCITY (LOG SCALE)

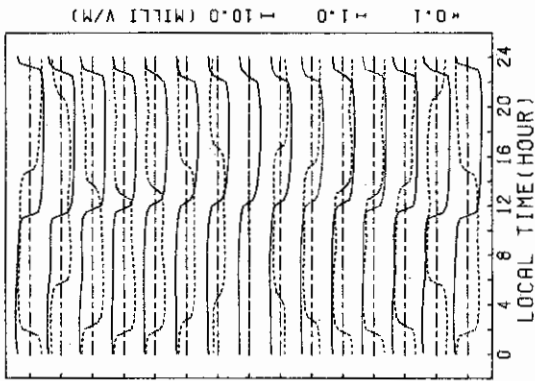
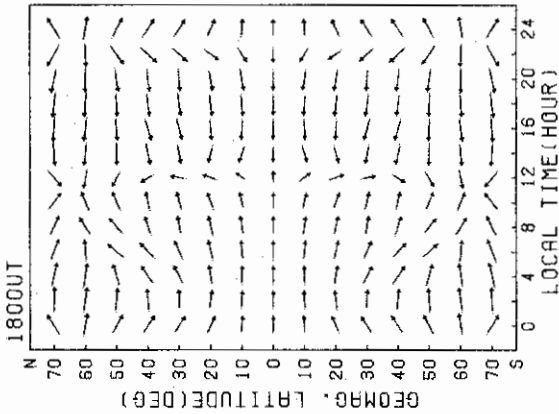


1600UT



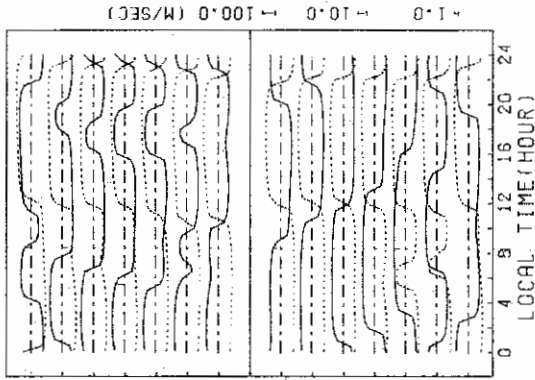
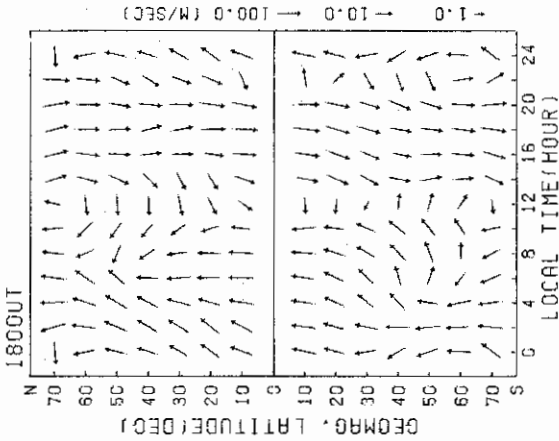
DEC.9.1964

ELECTRIC FIELD (LOG SCALE)

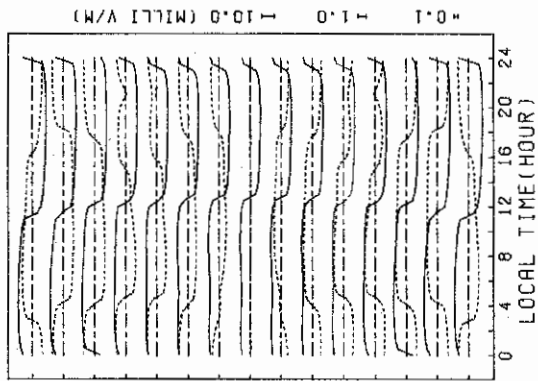
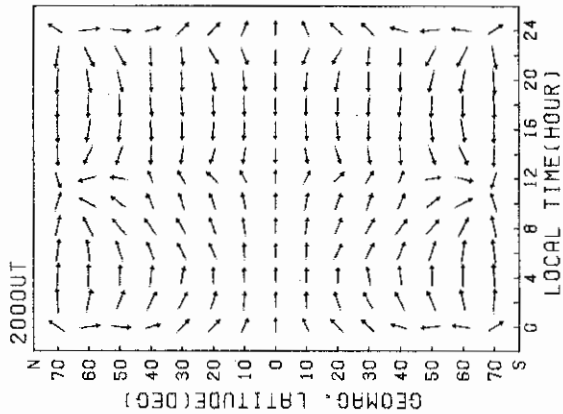


DEC.9.1964

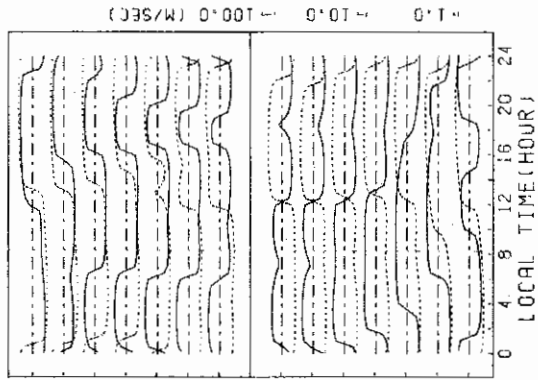
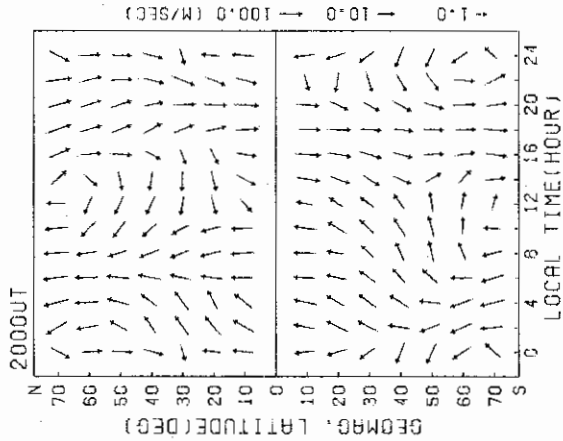
WIND VELOCITY (LOG SCALE)



2000UT

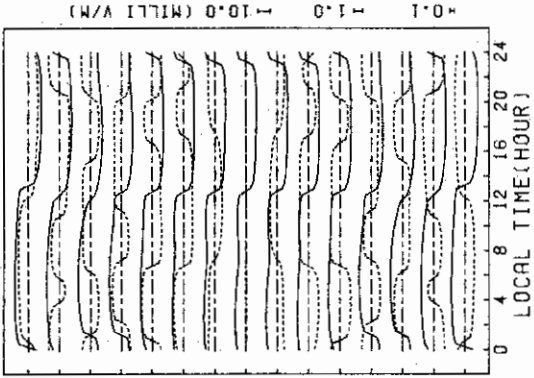
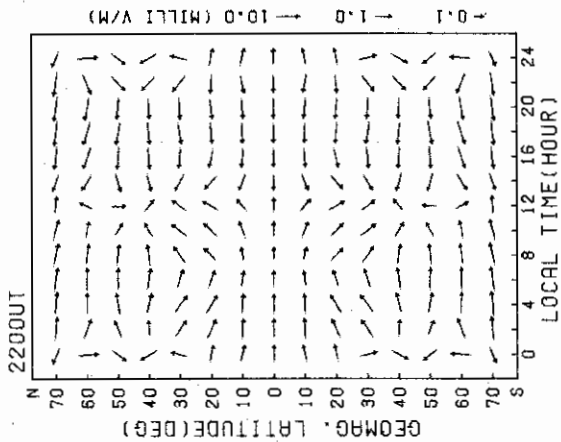


2000UT



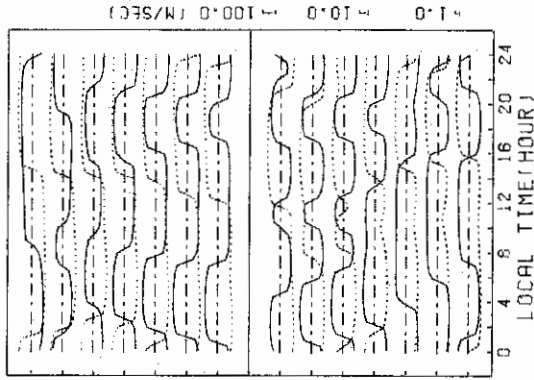
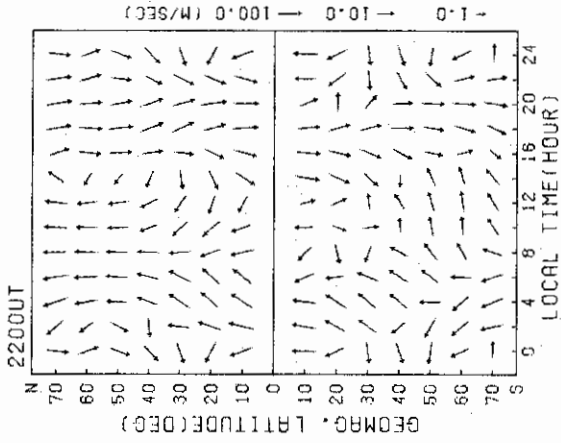
DEC. 9, 1964

ELECTRIC FIELD (LOG SCALE)

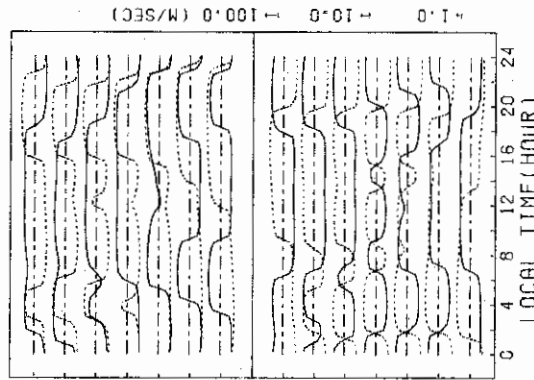
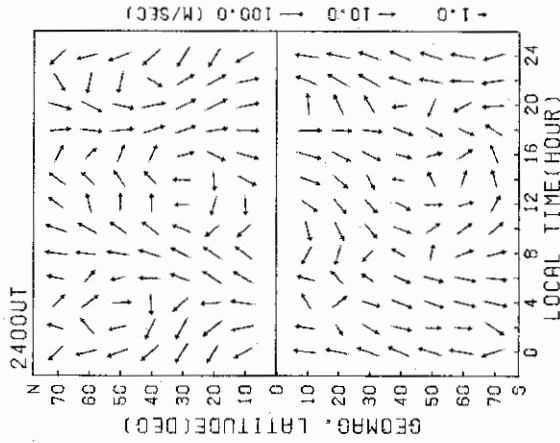
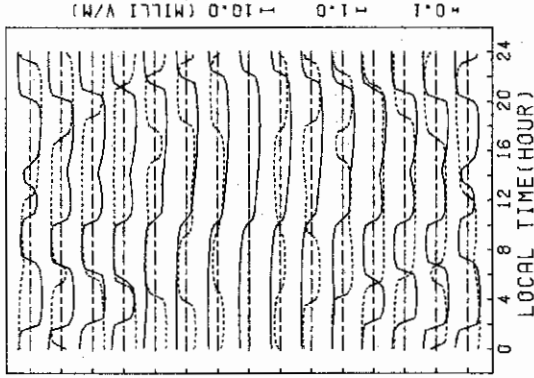
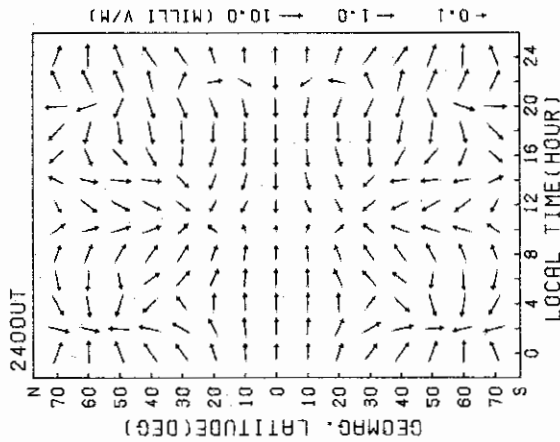


DEC. 9, 1964

WIND VELOCITY (LOG SCALE)

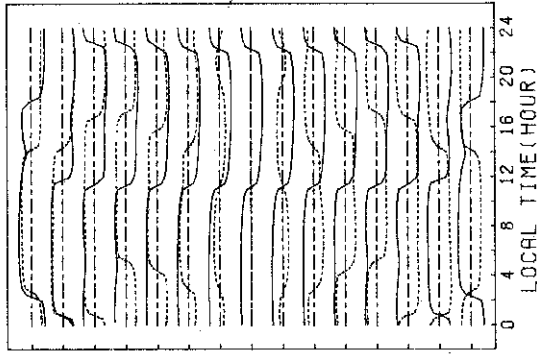
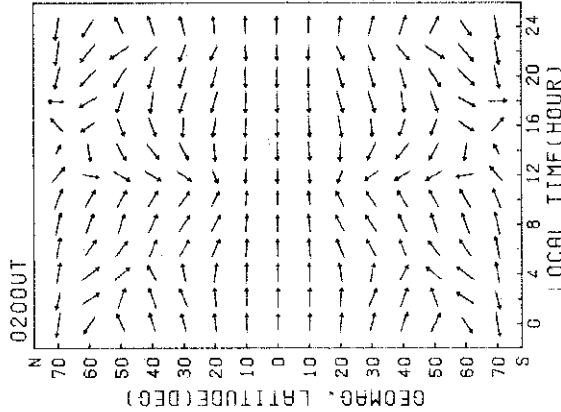


2400UT



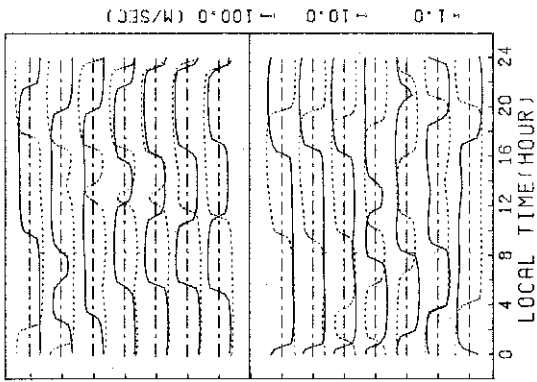
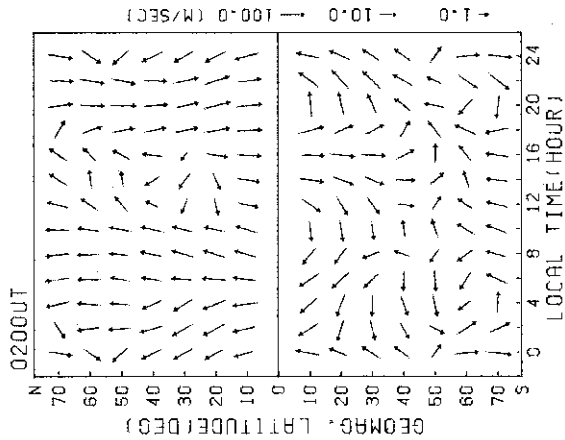
DEC.10,1964

ELECTRIC FIELD (LOG SCALE)

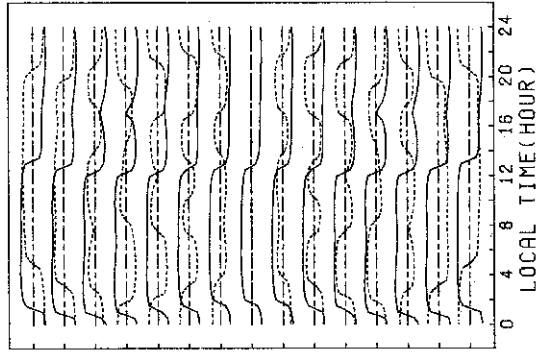
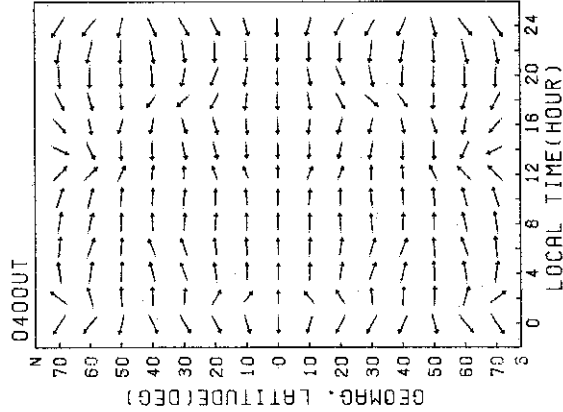


DEC.10,1964

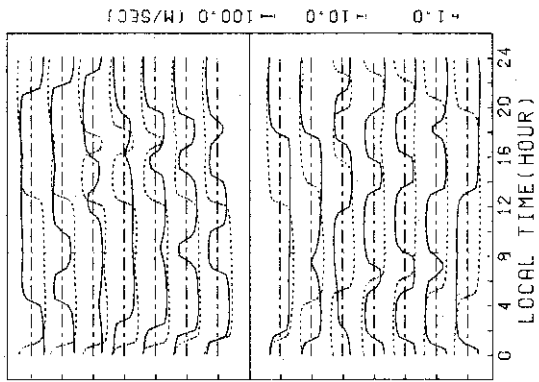
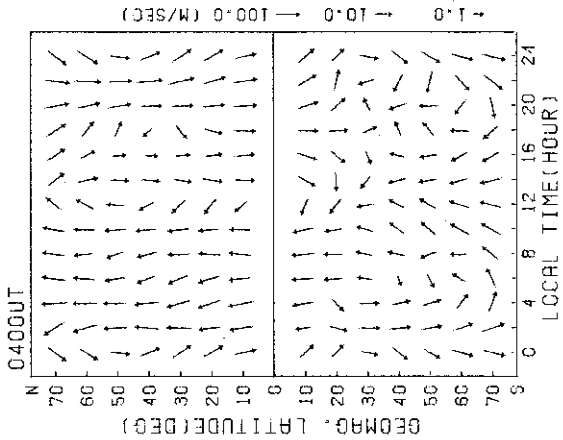
WIND VELOCITY (LOG SCALE)



0400UT

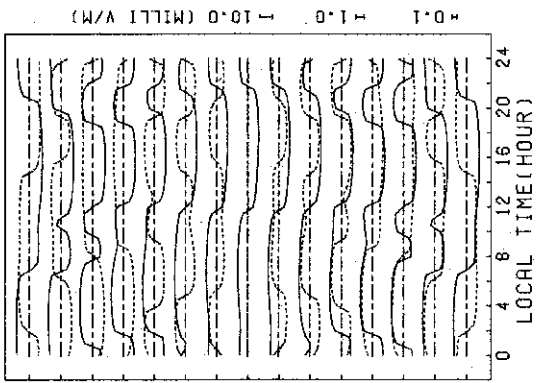
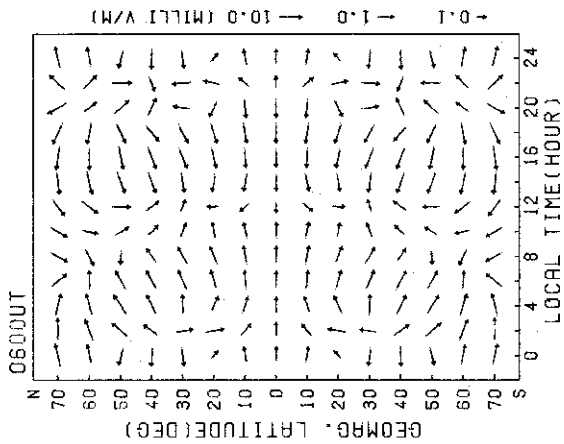


0400UT



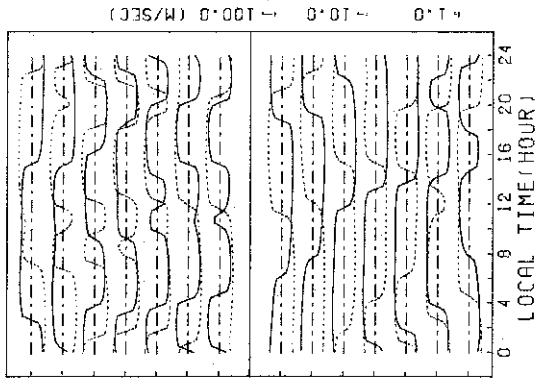
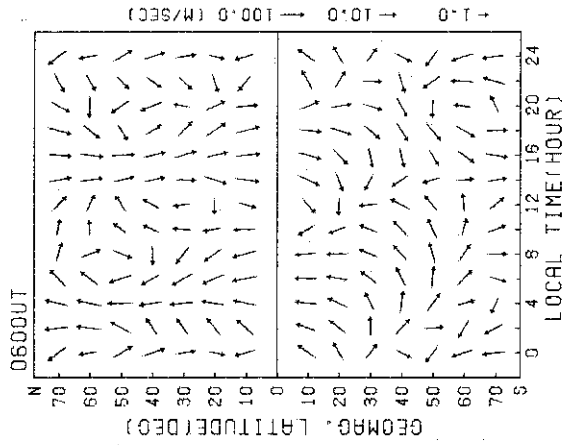
DEC.10.1964

ELECTRIC FIELD (LOG SCALE)

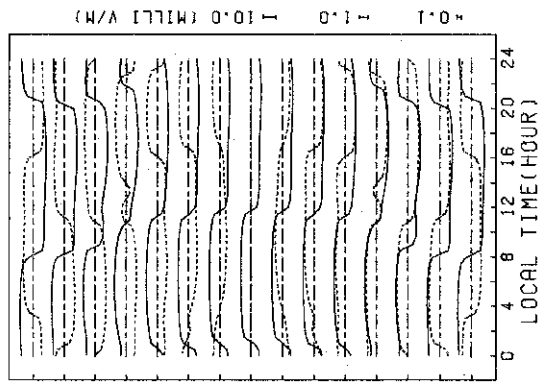
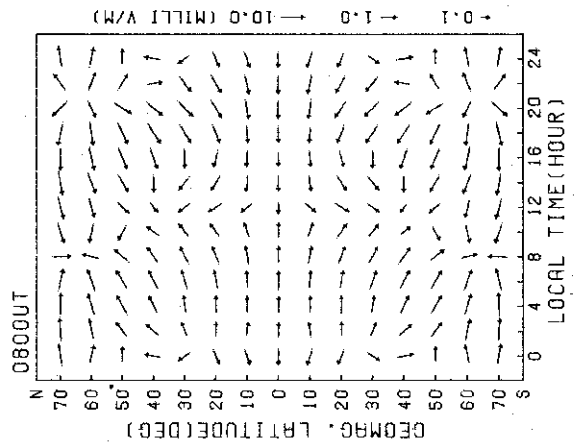


DEC.10.1964

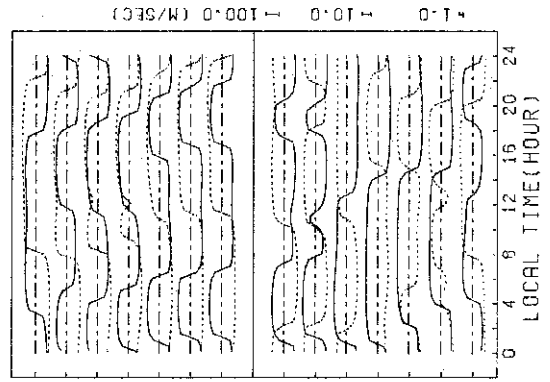
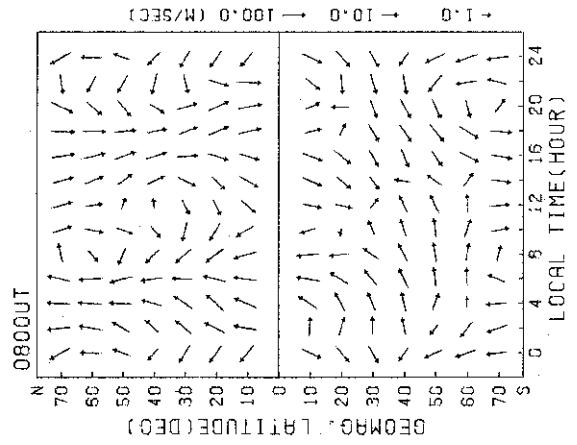
WIND VELOCITY (LOG SCALE)



0800UT

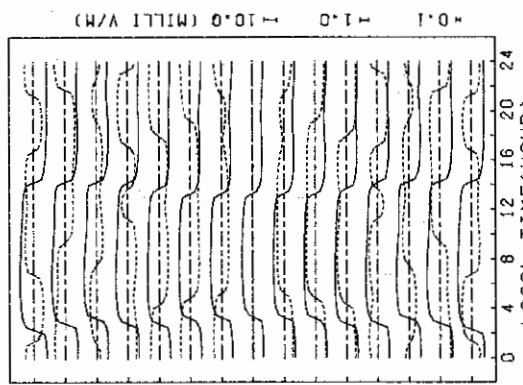
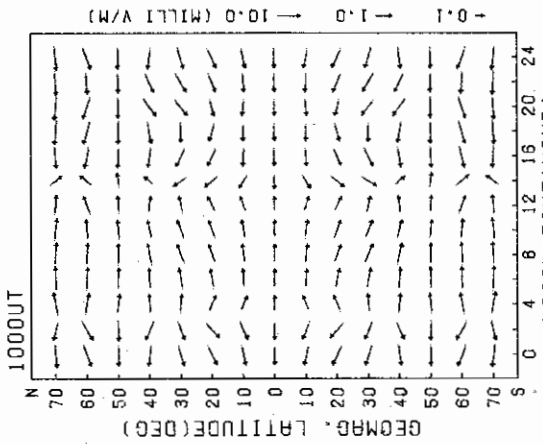


0800UT



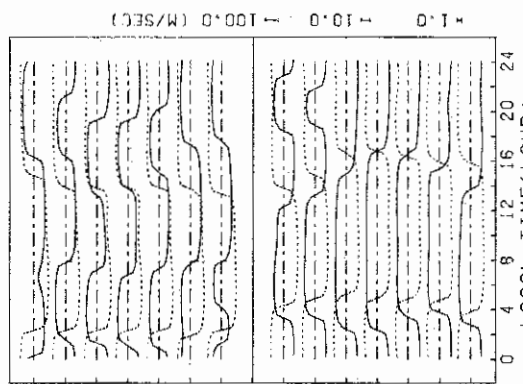
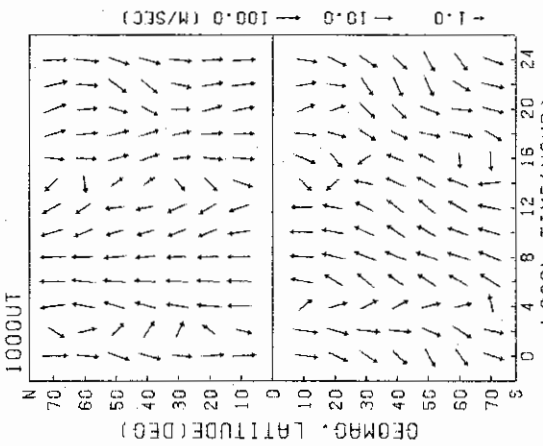
DEC. 10, 1964

ELECTRIC FIELD (LOG SCALE)

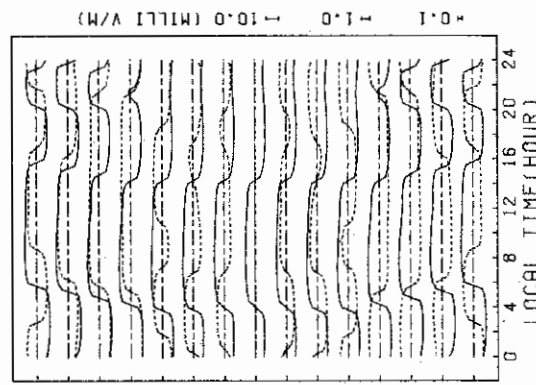
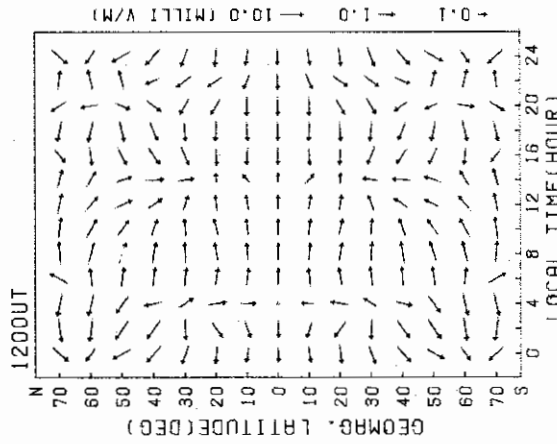


DEC. 10, 1964

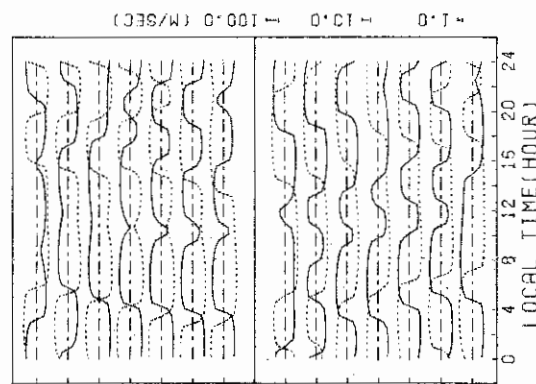
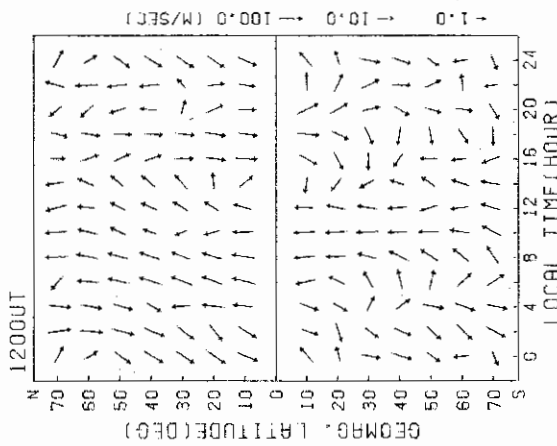
WIND VELOCITY (LOG SCALE)



1200UT

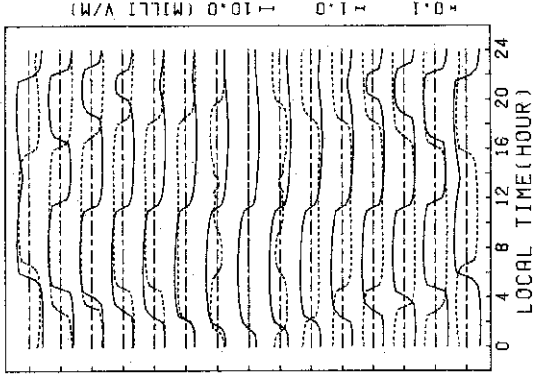
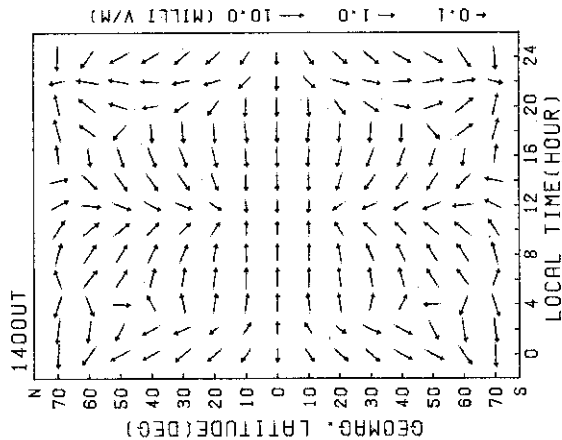


1200UT



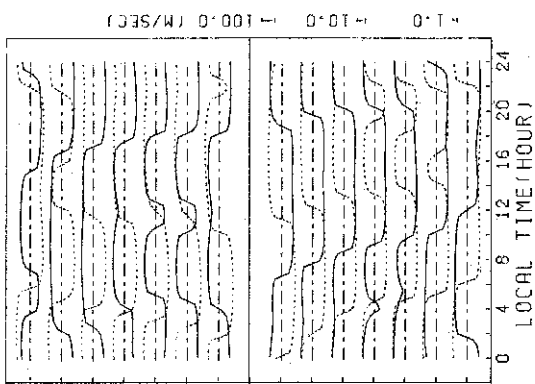
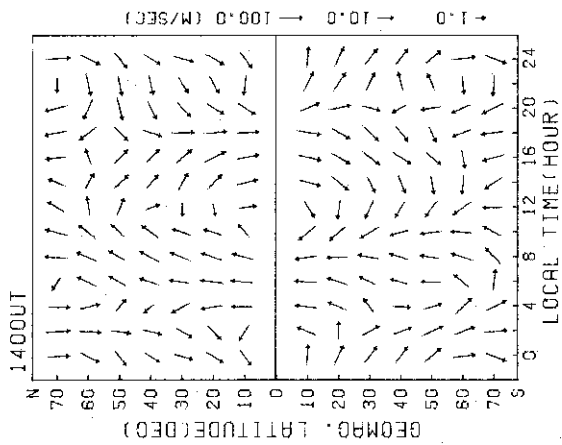
DEC.10.1964

ELECTRIC FIELD (LOG SCALE)

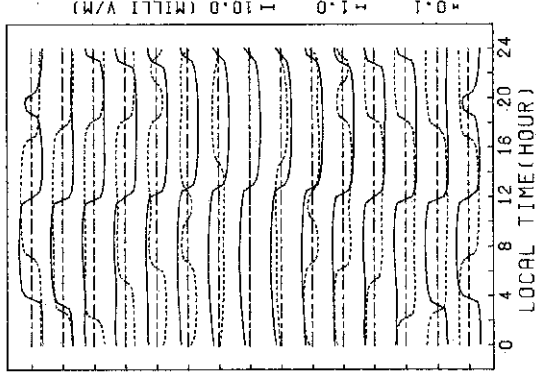
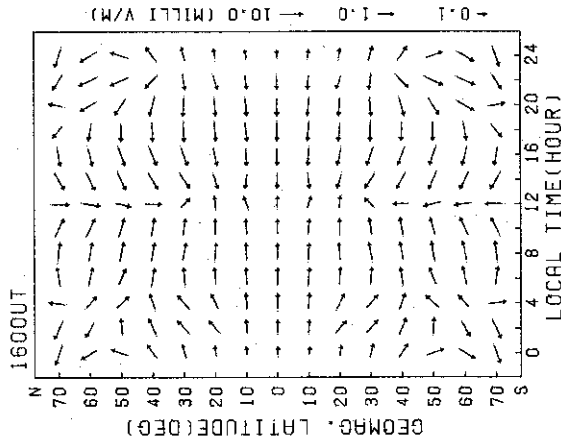


DEC.10.1964

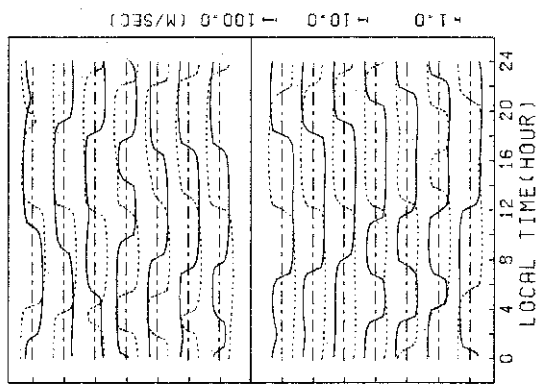
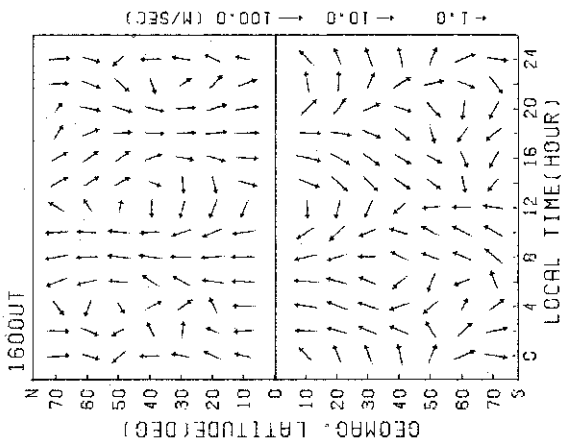
WIND VELOCITY (LOG SCALE)



1600UT

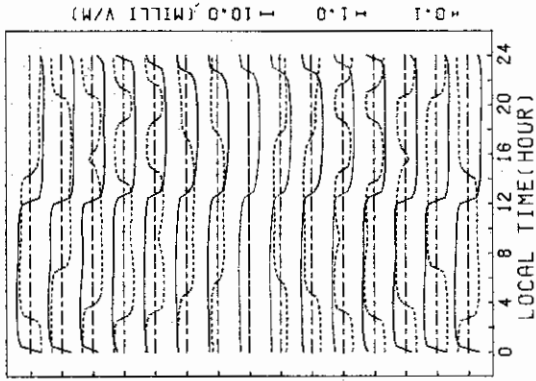
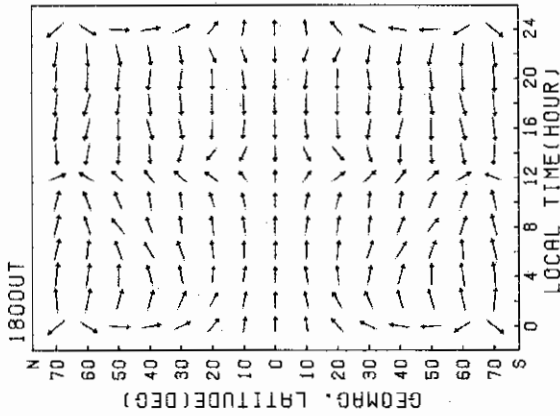


1600UT



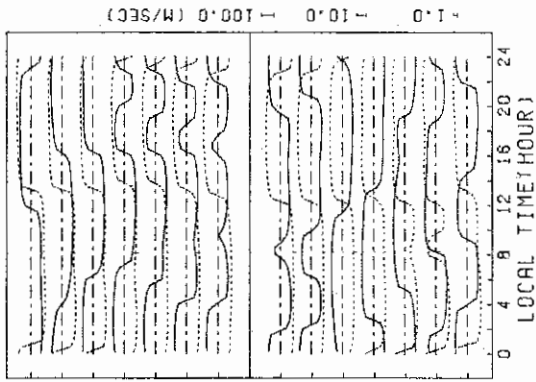
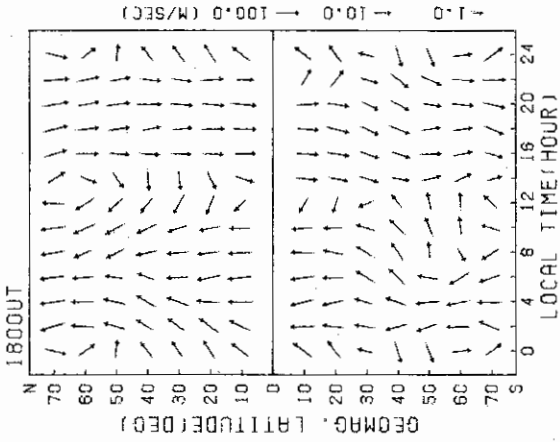
DEC. 10, 1964

ELECTRIC FIELD (LOG SCALE)

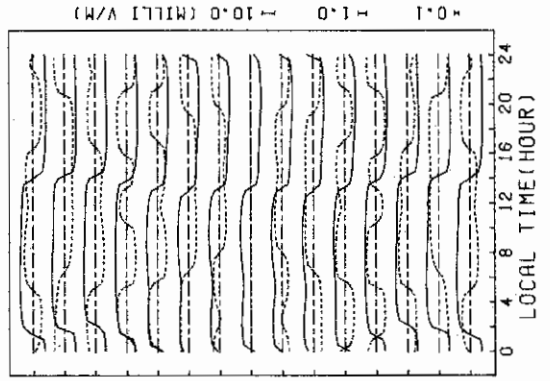
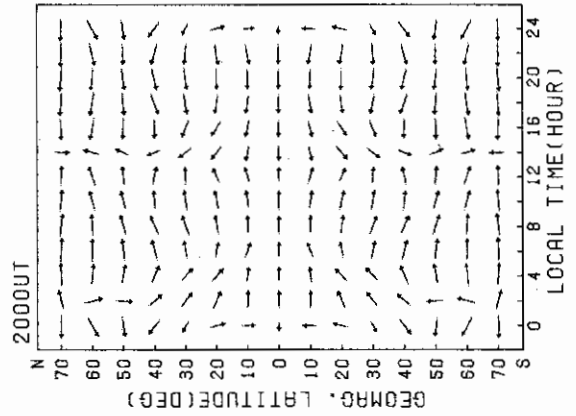


DEC. 10, 1964

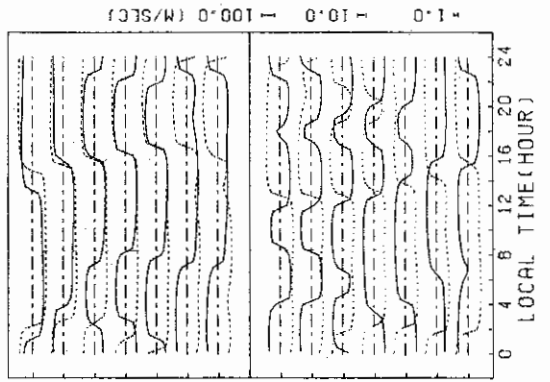
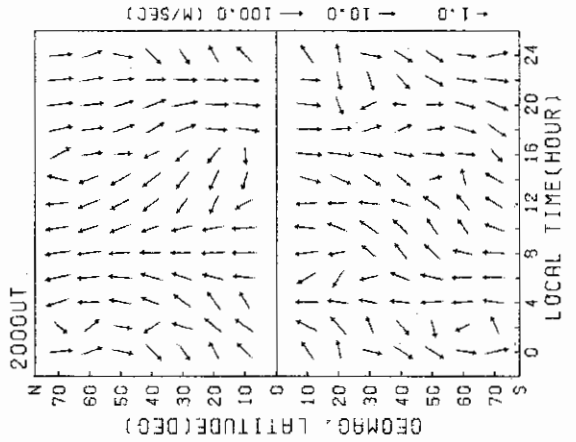
WIND VELOCITY (LOG SCALE)



2000UT

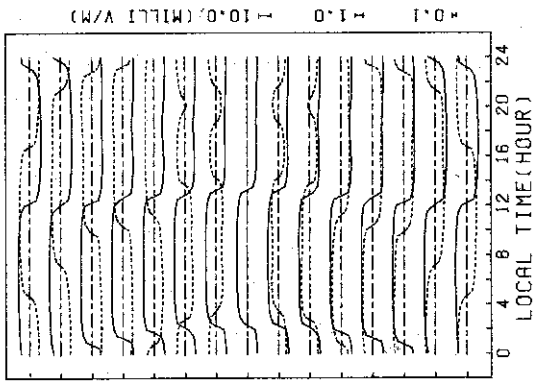
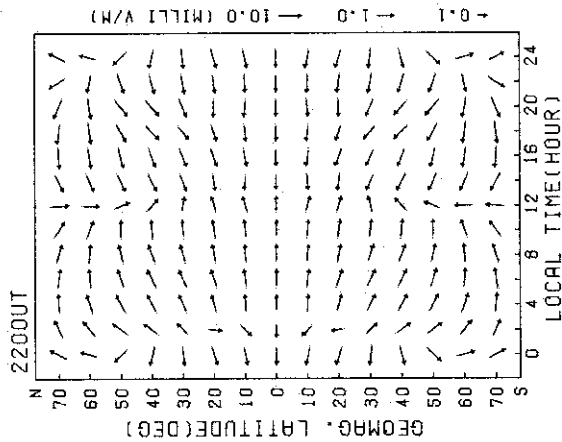


2000UT



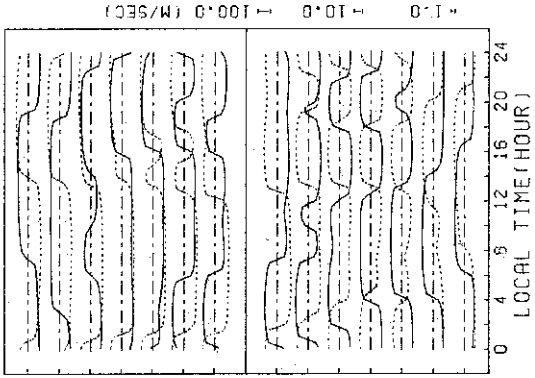
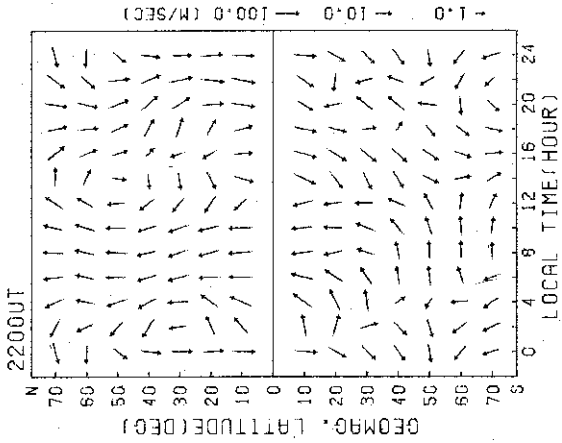
DEC.10.1964

ELECTRIC FIELD (LOG SCALE)

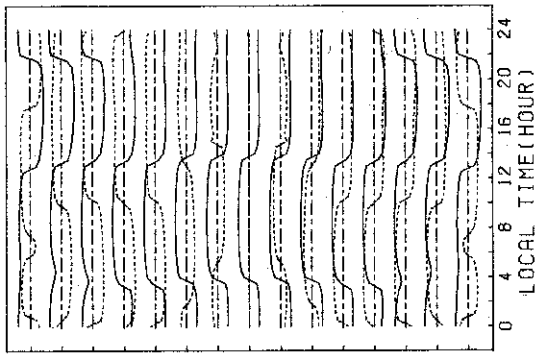
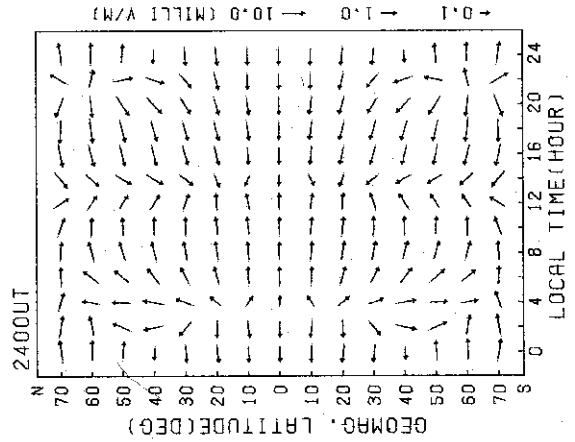


DEC.10.1964

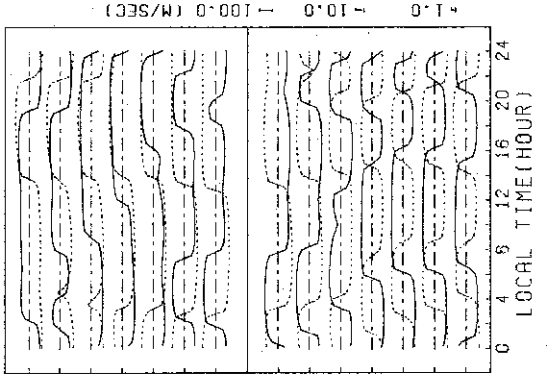
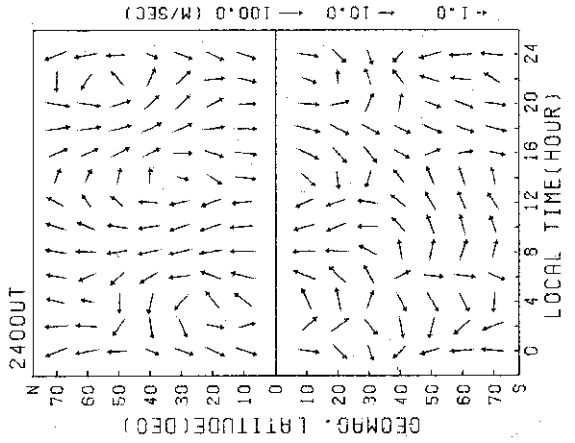
WIND VELOCITY (LOG SCALE)



2400UT

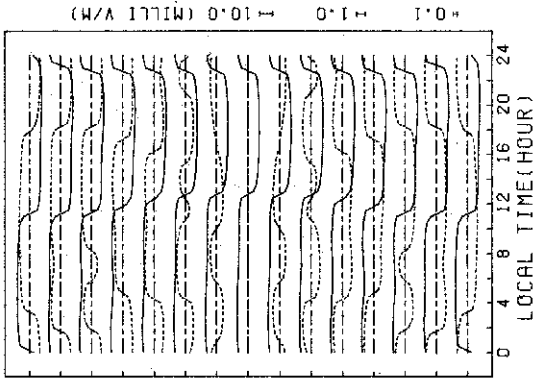
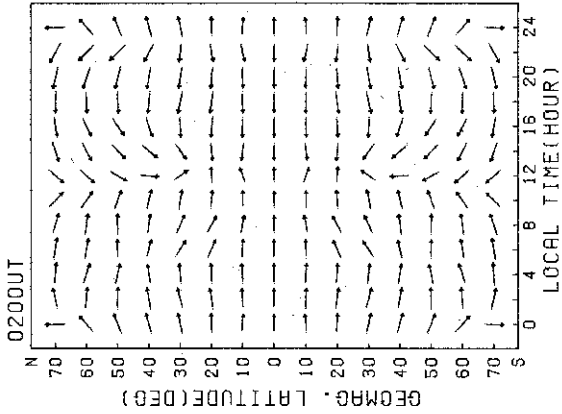


2400UT



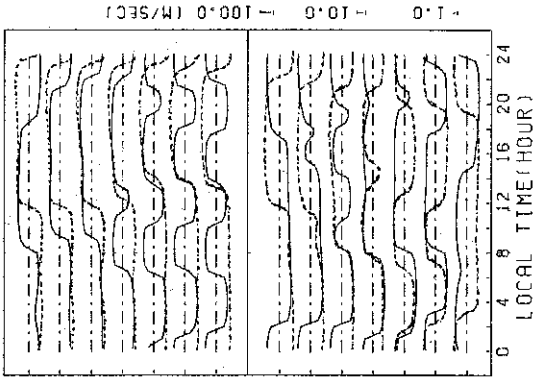
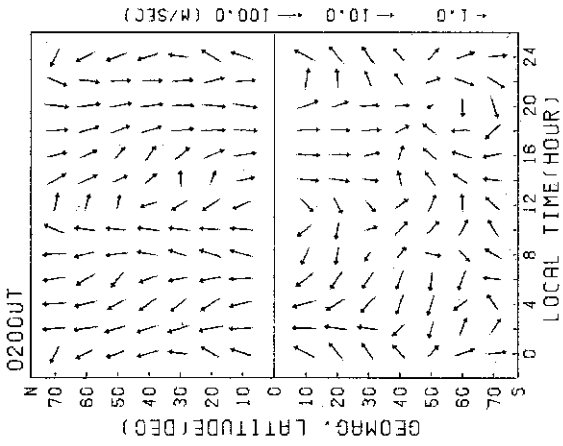
DEC.11.1964

ELECTRIC FIELD (LOG SCALE)

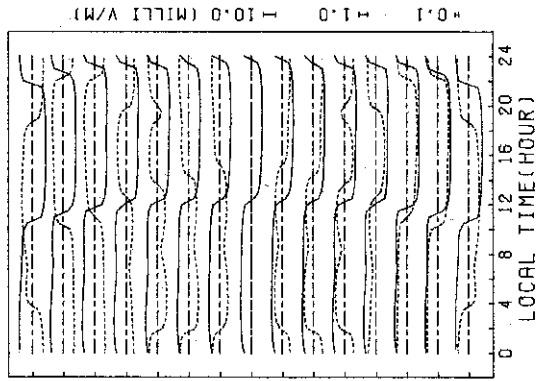
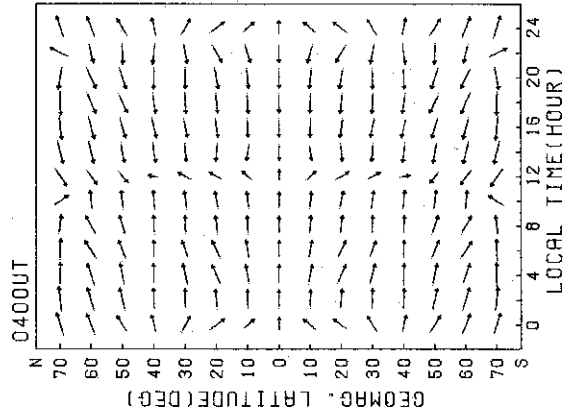


DEC.11.1964

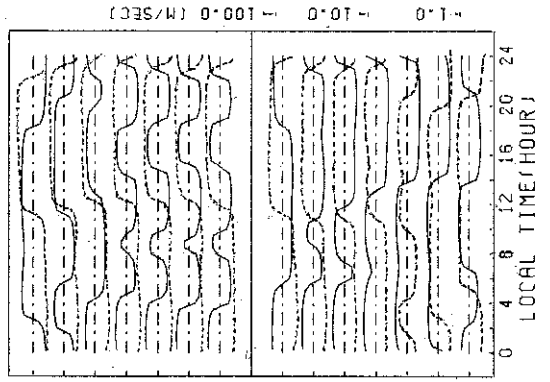
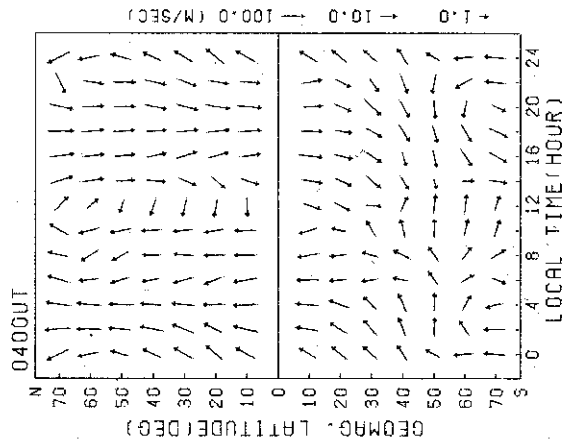
WIND VELOCITY (LOG SCALE)



0400UT

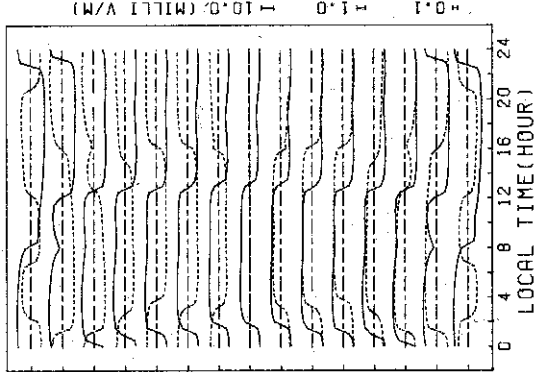
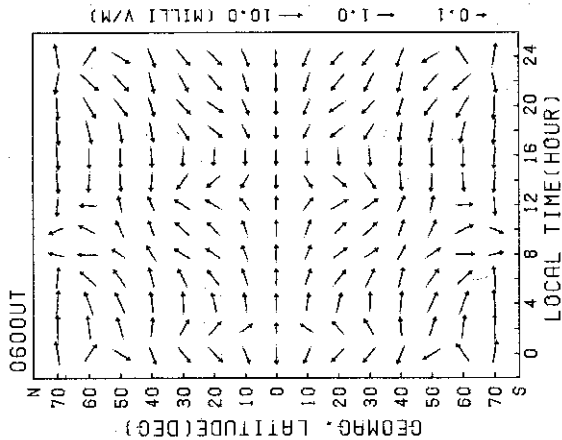


0400UT



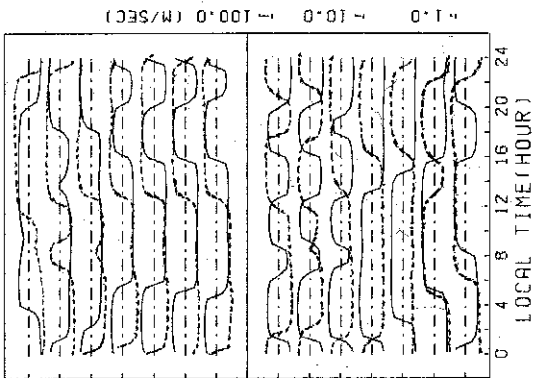
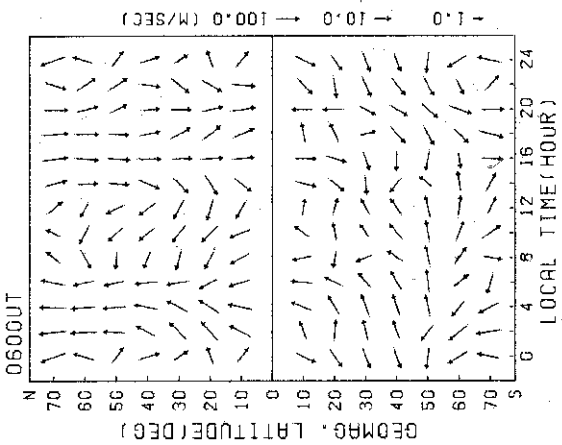
DEC.11.1964

ELECTRIC FIELD (LOG SCALE)

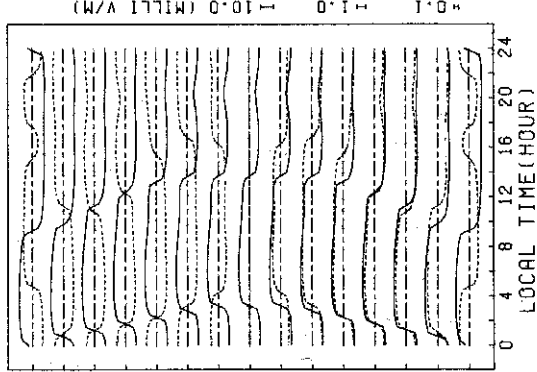
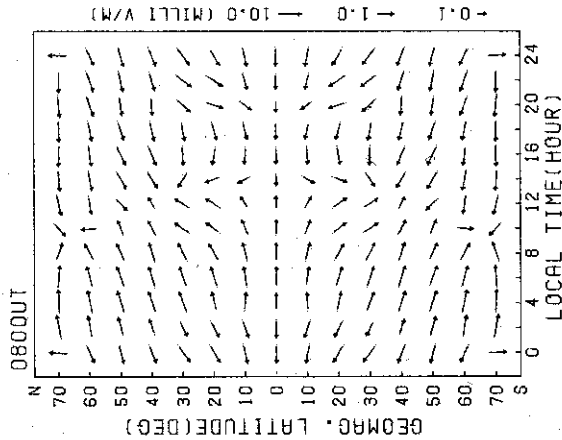


DEC.11.1964

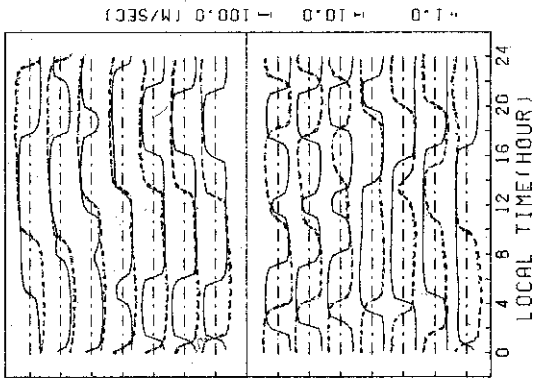
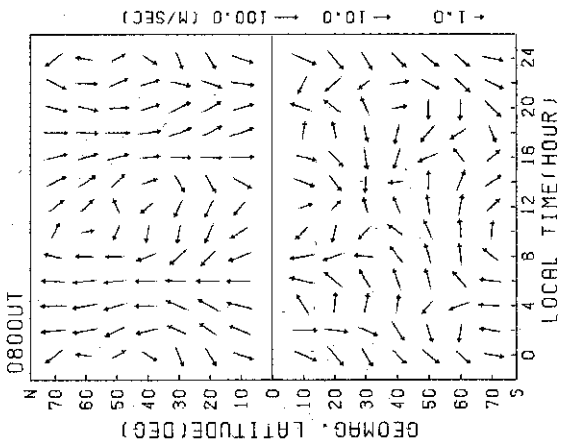
WIND VELOCITY (LOG SCALE)



0800UT

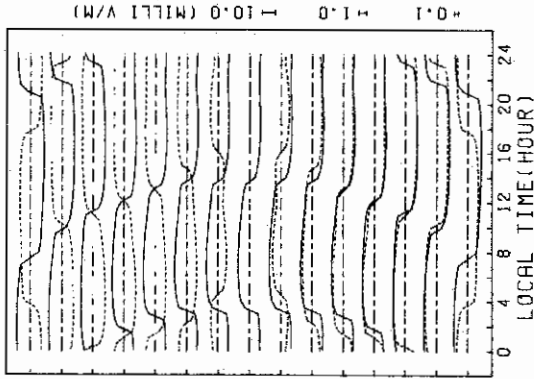
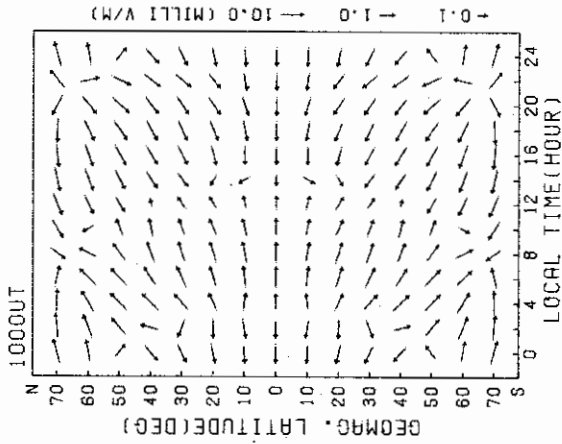


0800UT



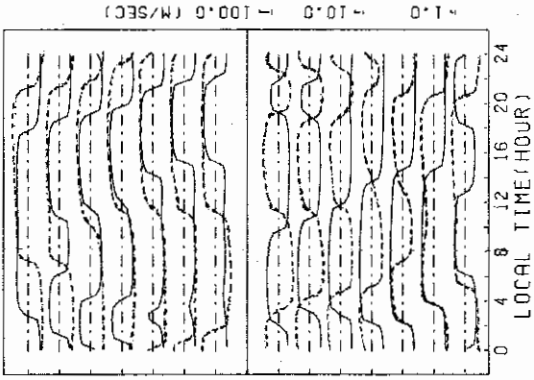
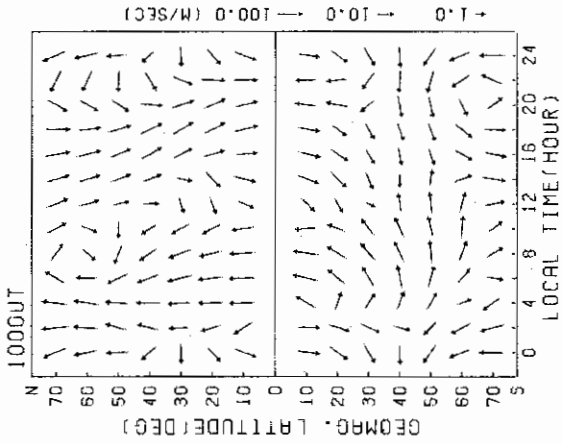
DEC.11.1964

ELECTRIC FIELD (LOG SCALE)

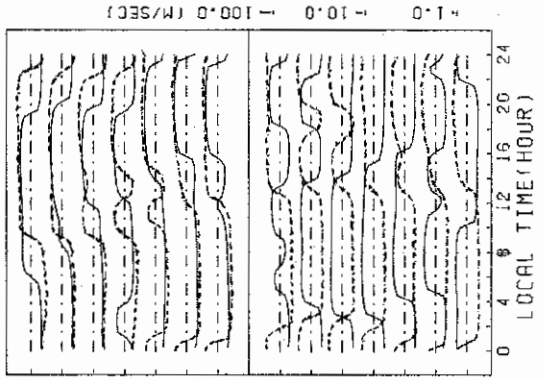
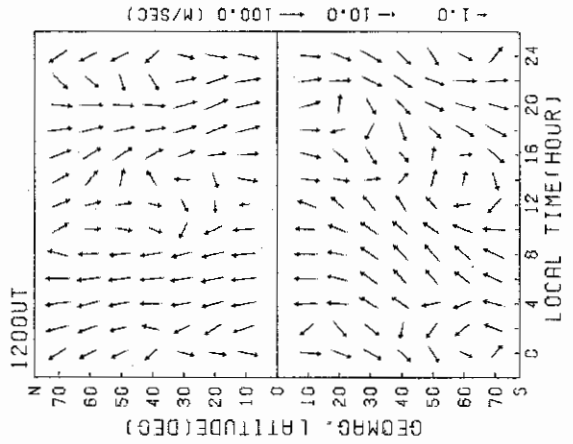
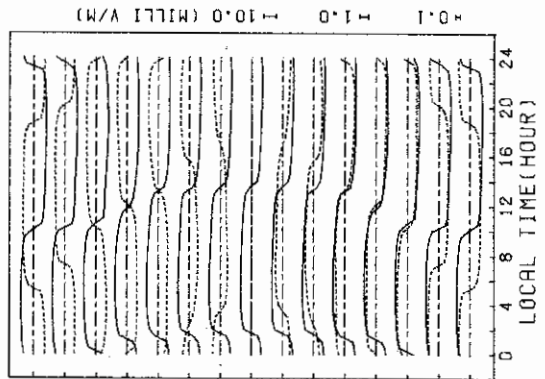
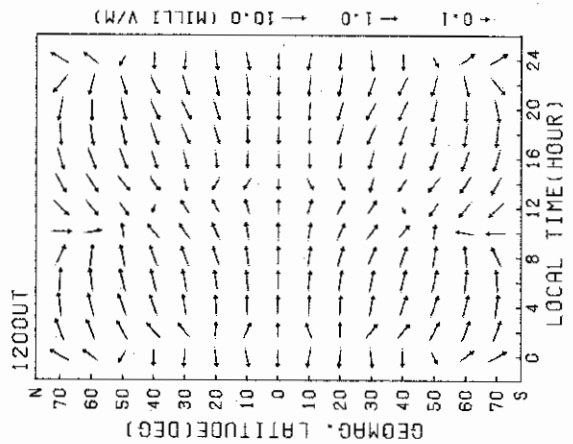


DEC.11.1964

WIND VELOCITY (LOG SCALE)

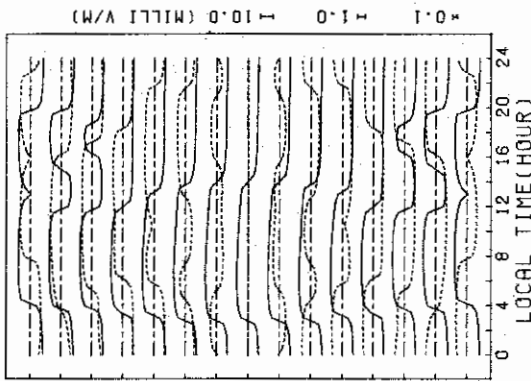
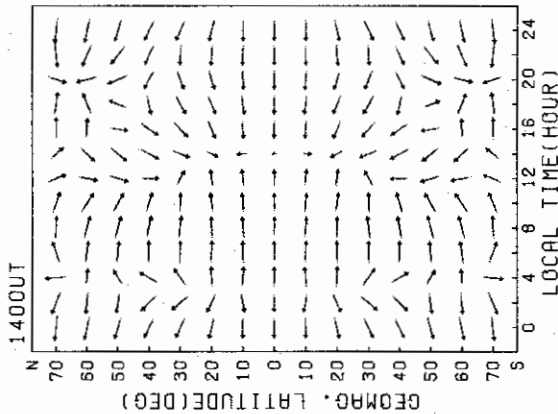


1200UT



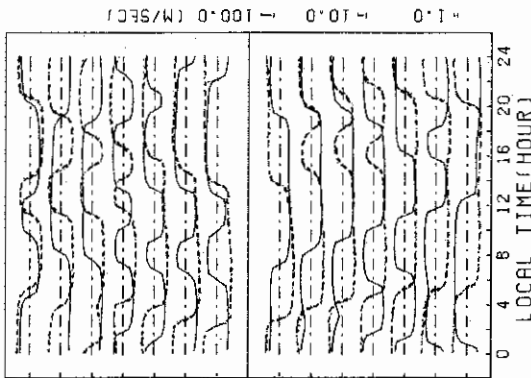
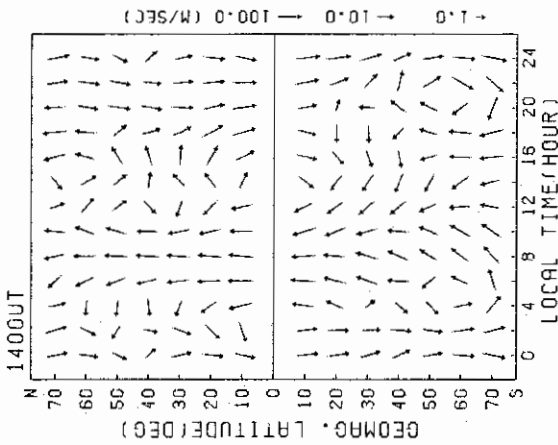
DEC. 11, 1964

ELECTRIC FIELD (LOG SCALE)

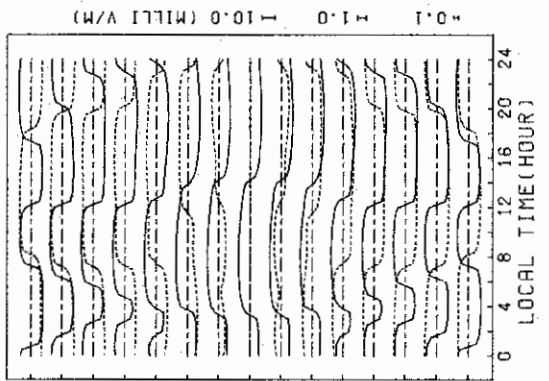
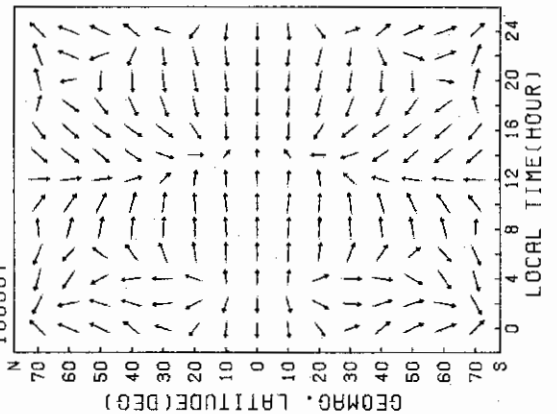


DEC. 11, 1964

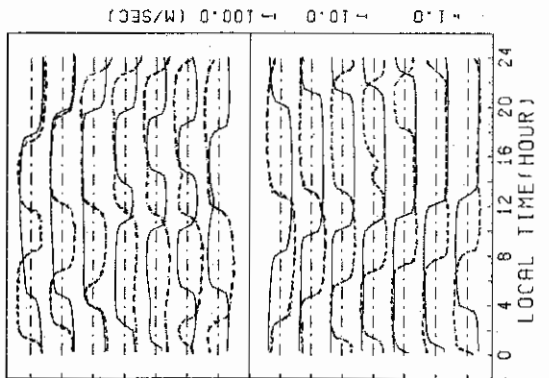
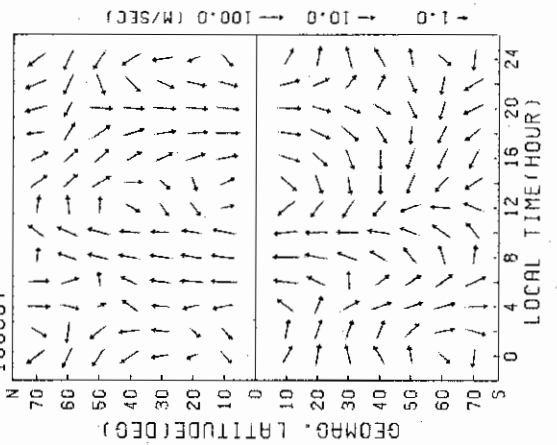
WIND VELOCITY (LOG SCALE)



1600UT

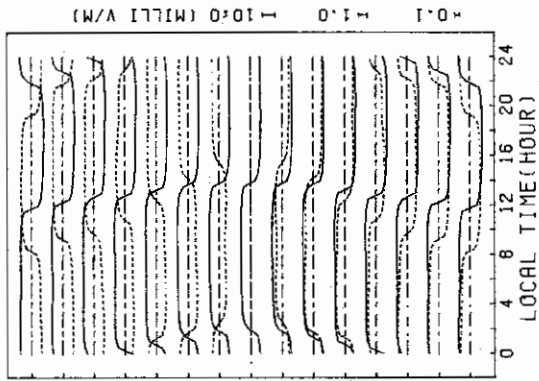
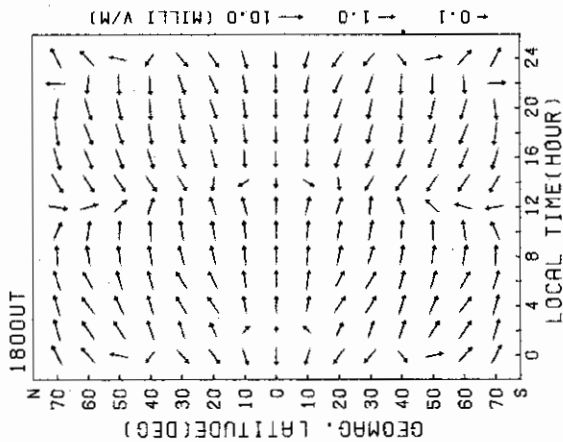


1600UT



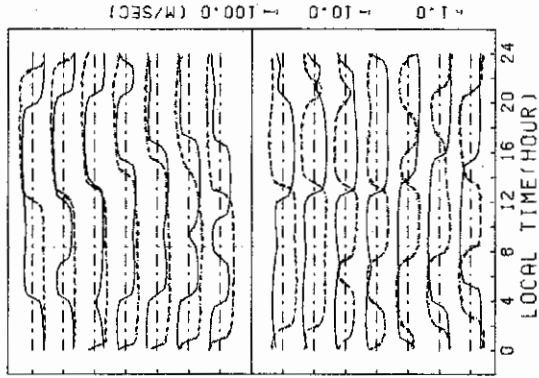
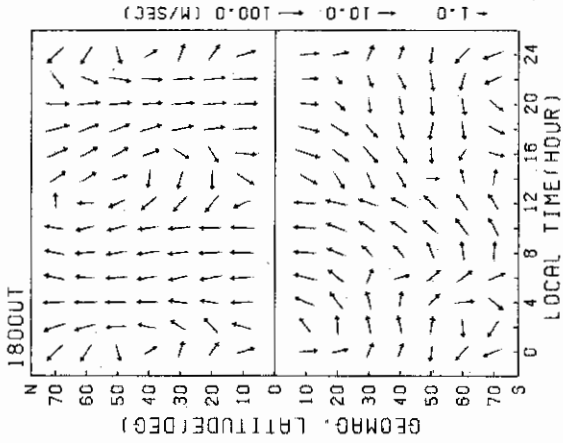
DEC.11.1964

ELECTRIC FIELD (LOG SCALE)

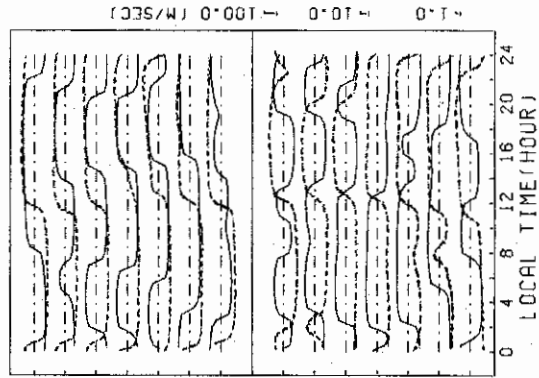
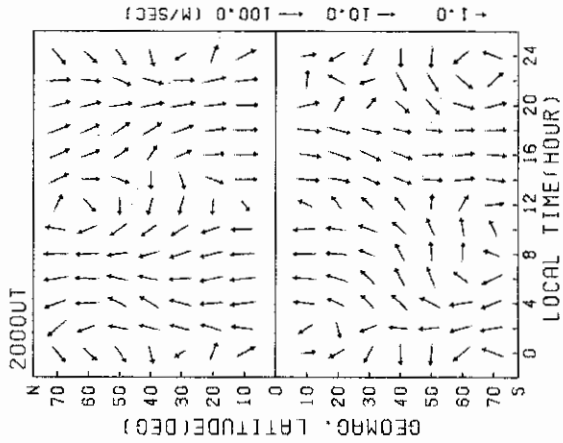
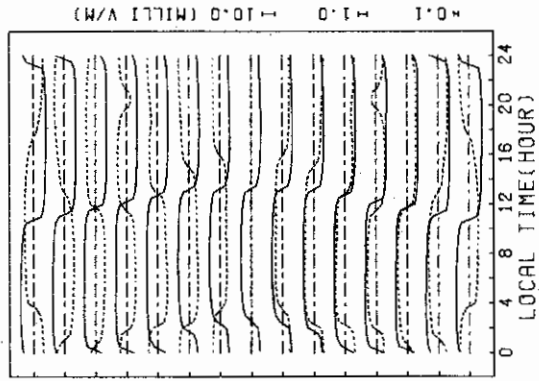
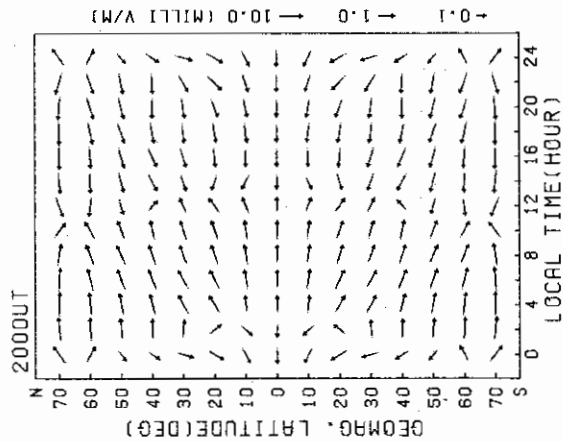


DEC.11.1964

WIND VELOCITY (LOG SCALE)

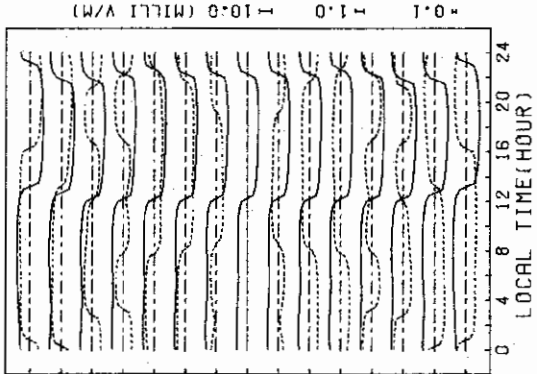
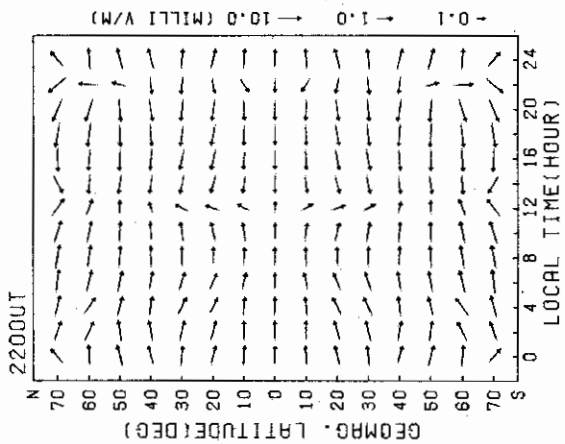


2000UT



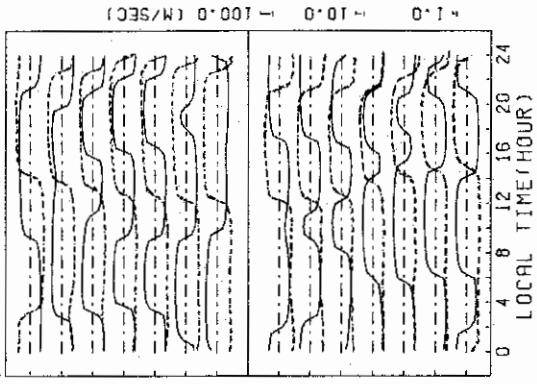
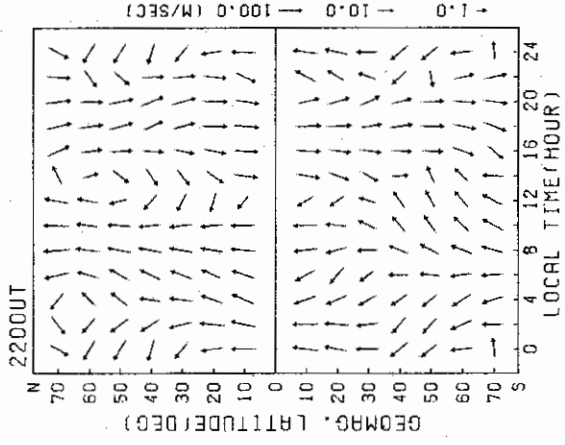
DEC. 11, 1964

ELECTRIC FIELD (LOG SCALE)

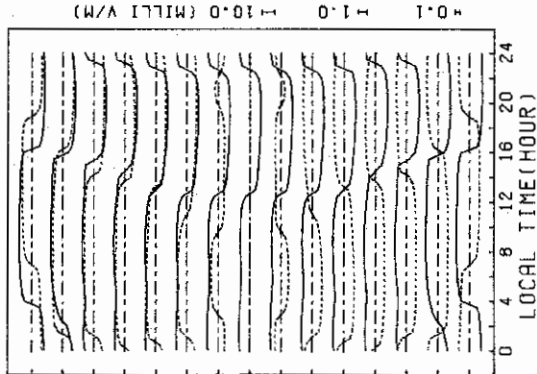
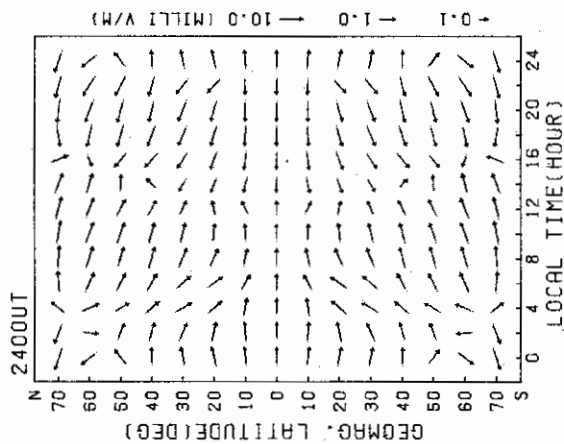


DEC. 11, 1964

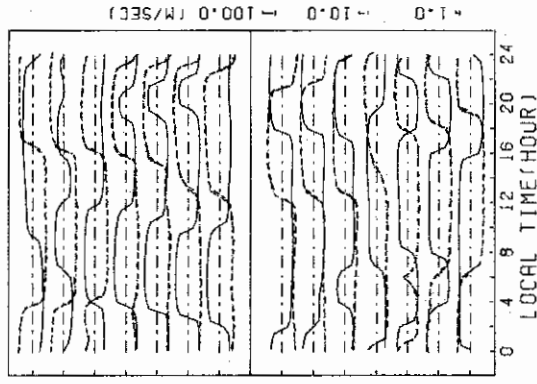
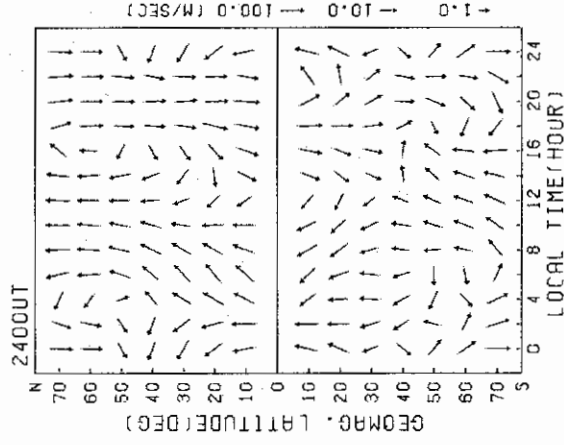
WIND VELOCITY (LOG SCALE)



2400UT

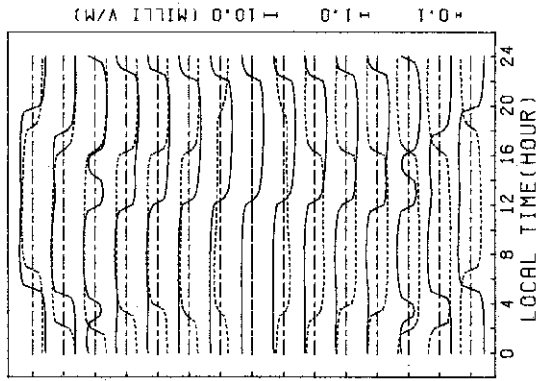
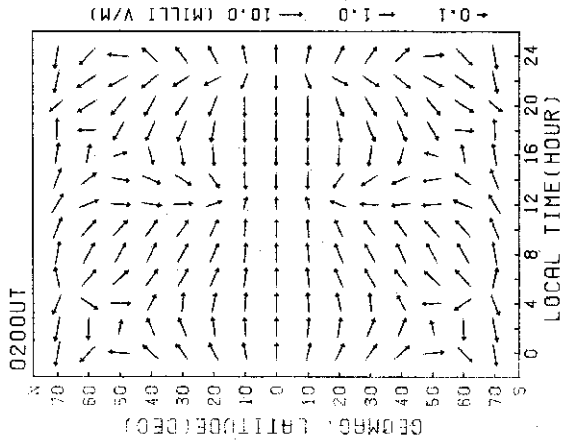


2400UT



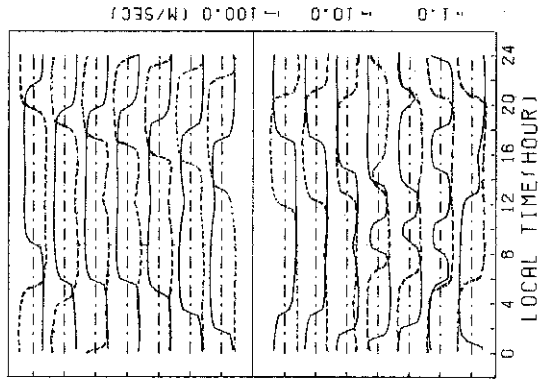
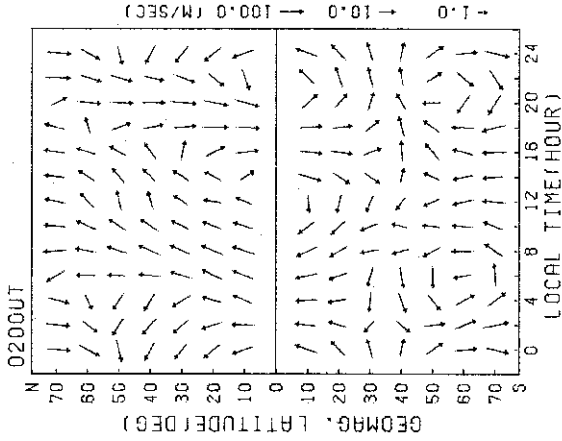
DEC. 12, 1964

ELECTRIC FIELD (LOG SCALE)

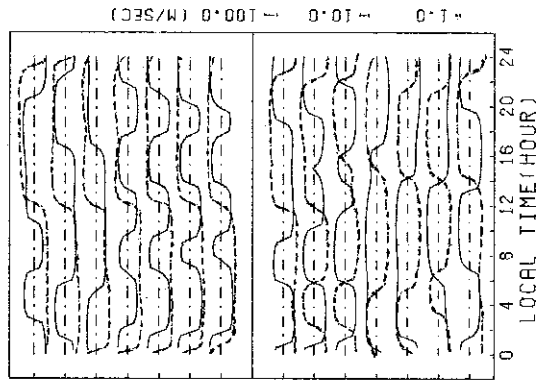
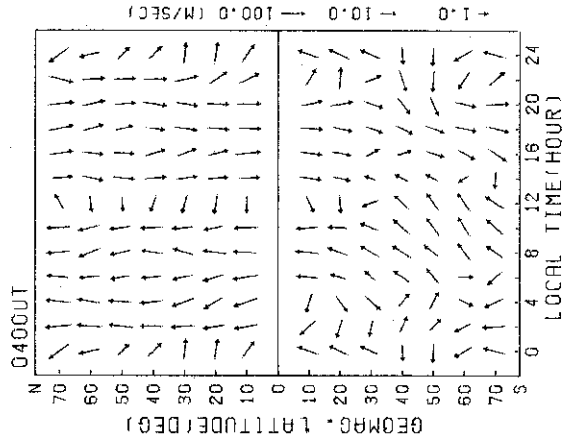
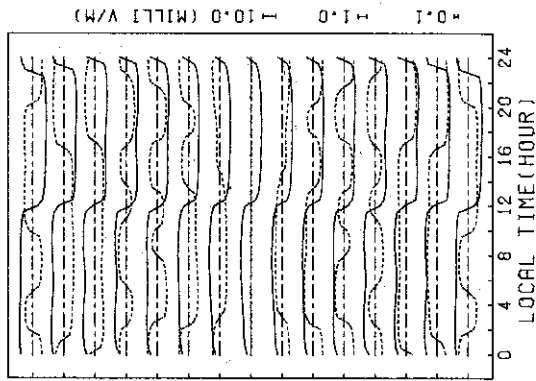
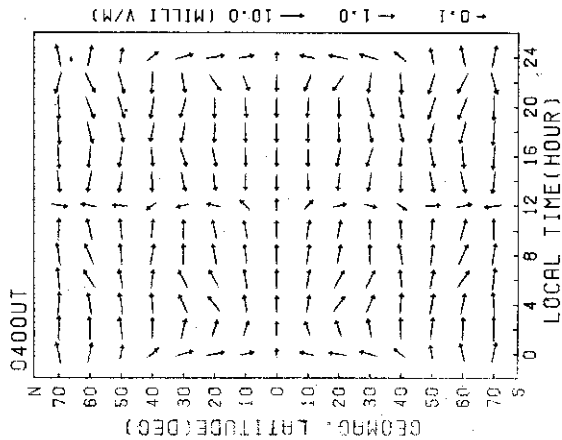


DEC. 12, 1964

WIND VELOCITY (LOG SCALE)

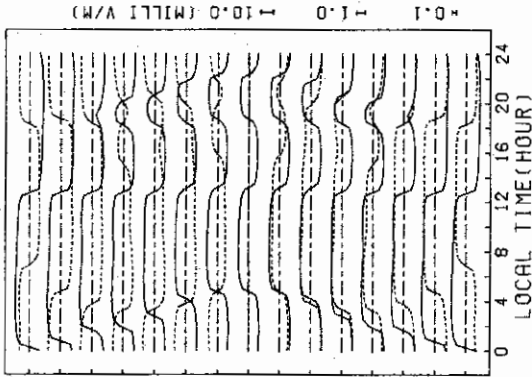
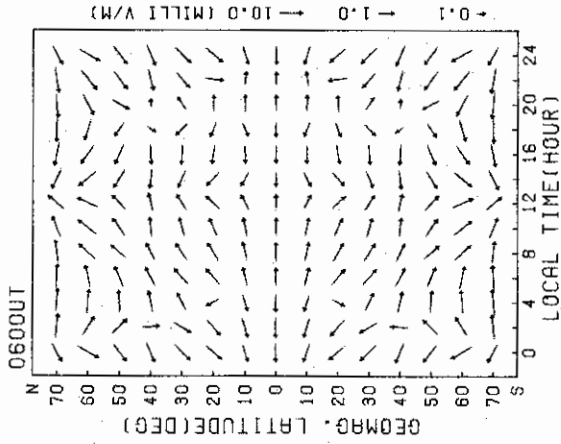


0400UT



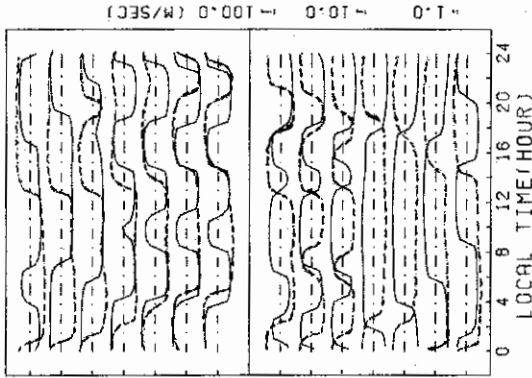
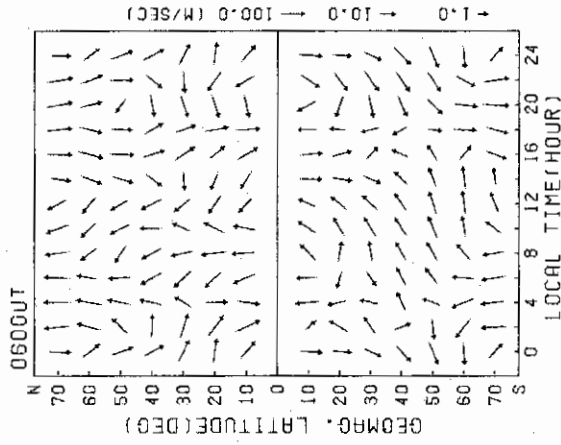
DEC.12.1964

ELECTRIC FIELD (LOG SCALE)

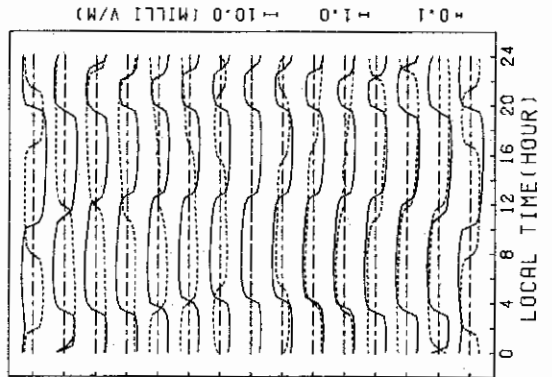
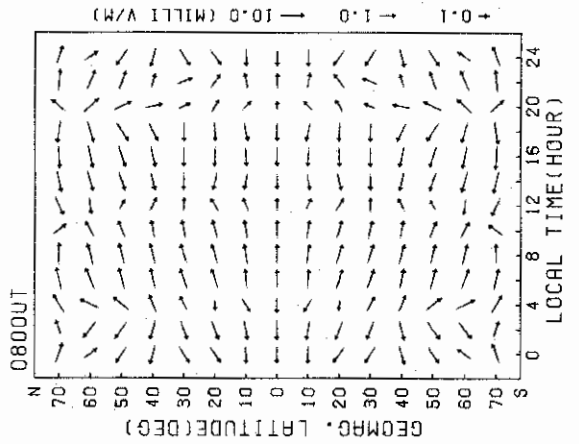


DEC.12.1964

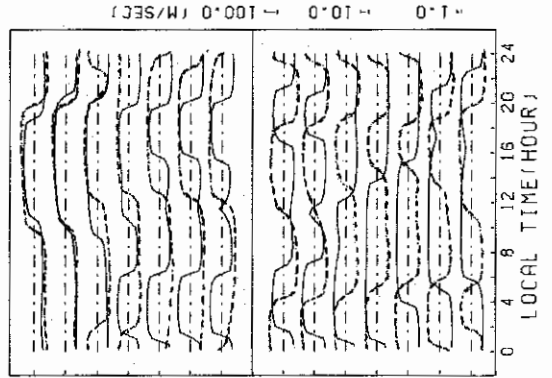
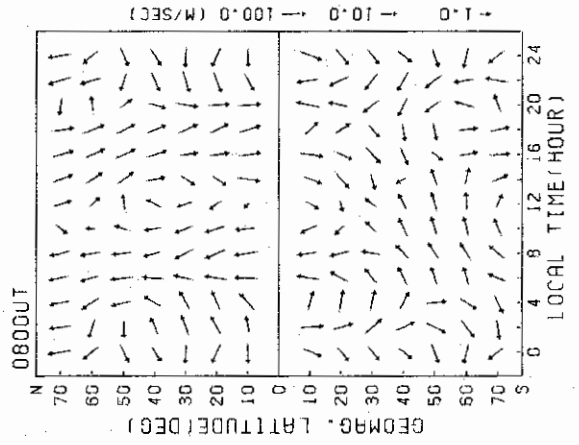
WIND VELOCITY (LOG SCALE)



0800UT

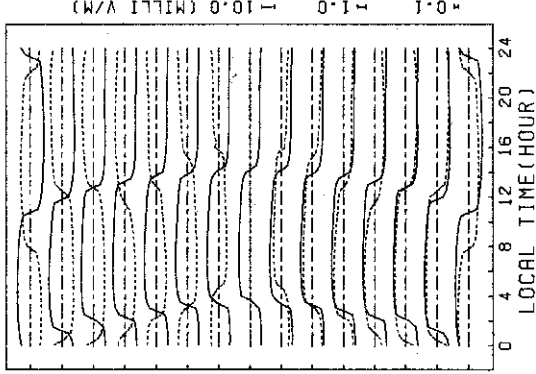
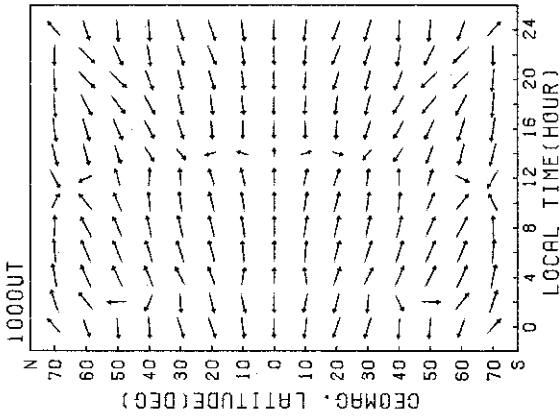


0800UT



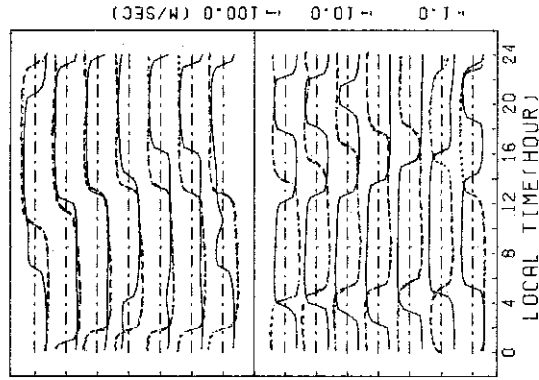
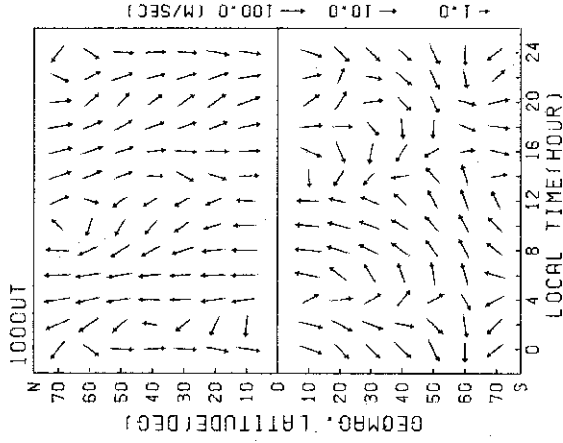
DEC.12.1964

ELECTRIC FIELD (LOG SCALE)

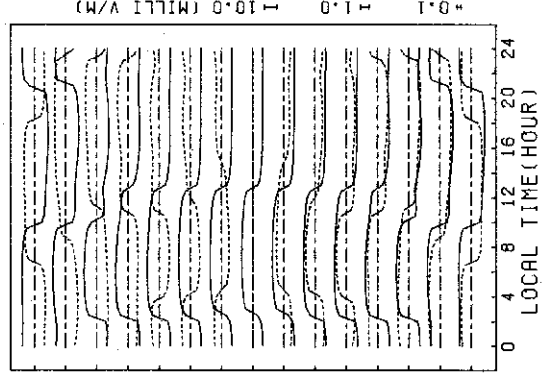
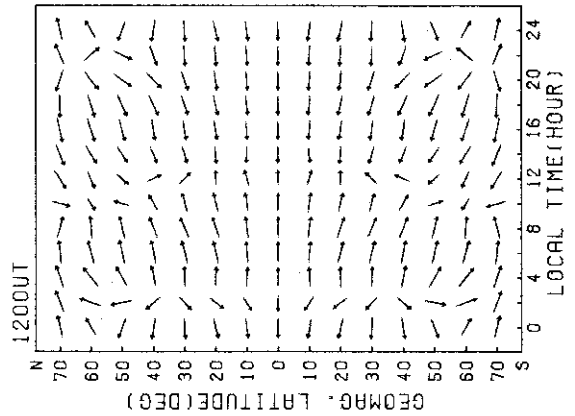


DEC.12.1964

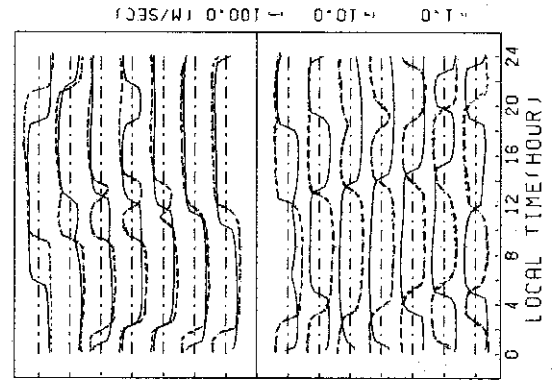
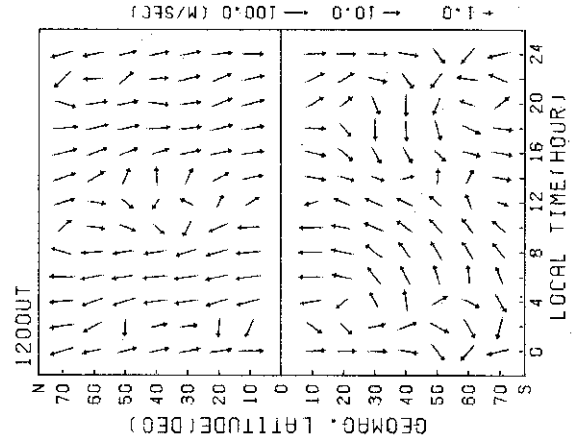
WIND VELOCITY (LOG SCALE)



12000

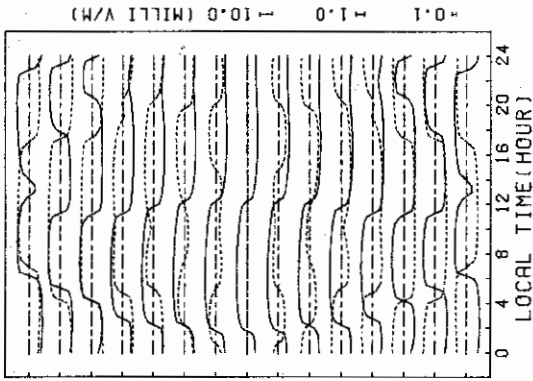
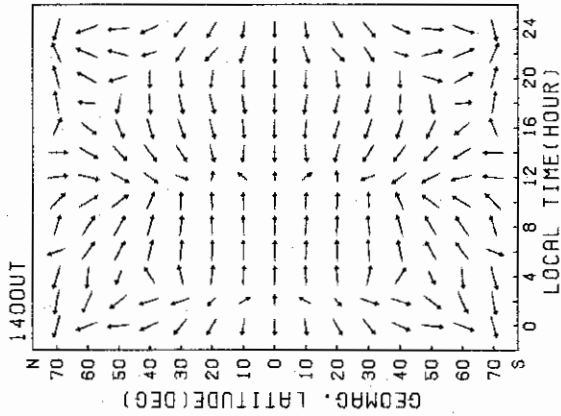


12000



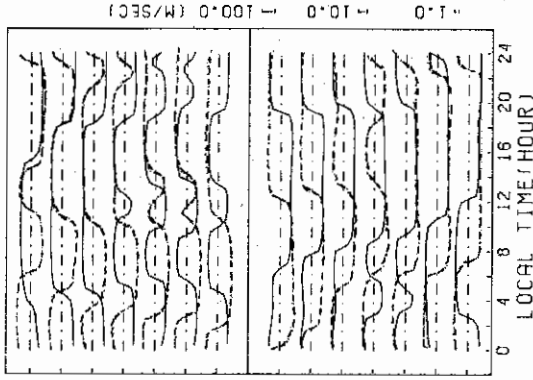
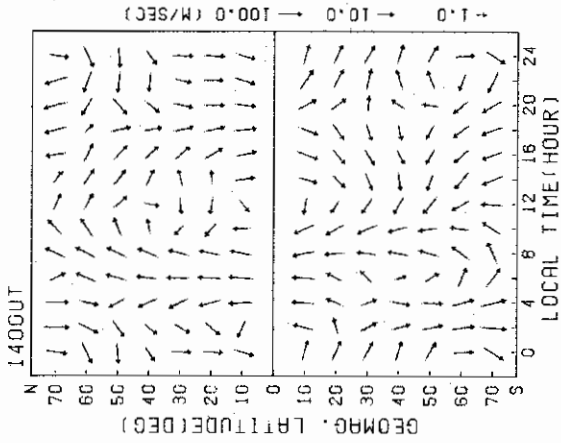
DEC.12.1964

ELECTRIC FIELD (LOG SCALE)

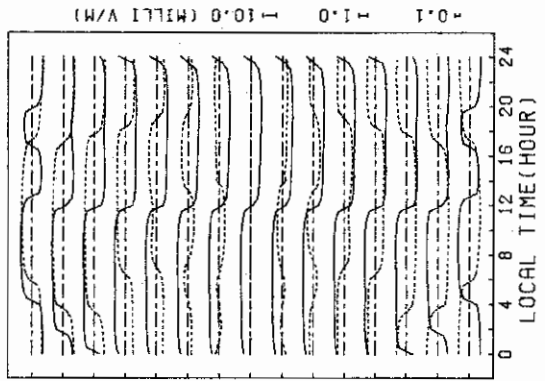
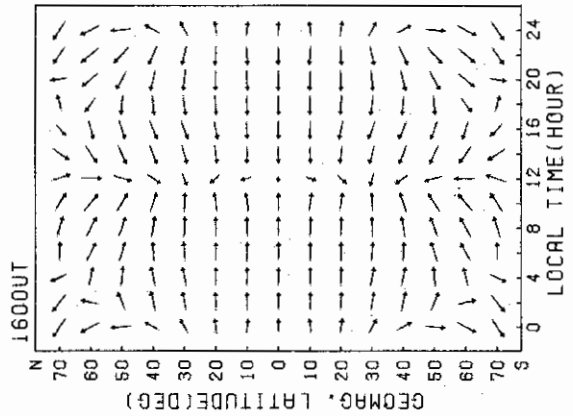


DEC.12.1964

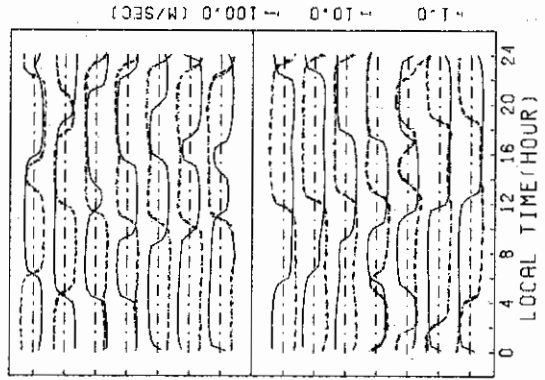
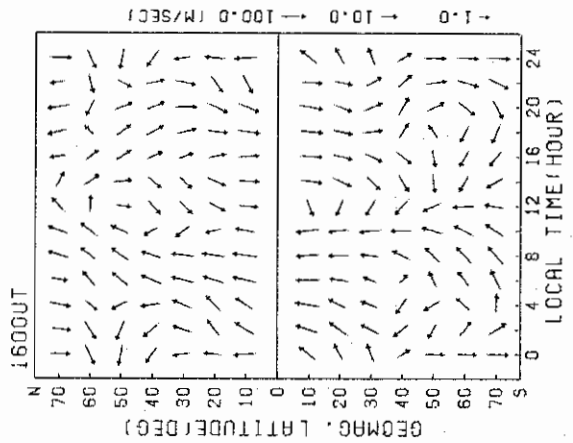
WIND VELOCITY (LOG SCALE)



1600UT

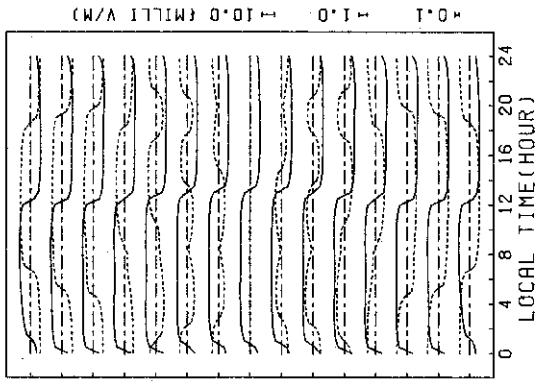
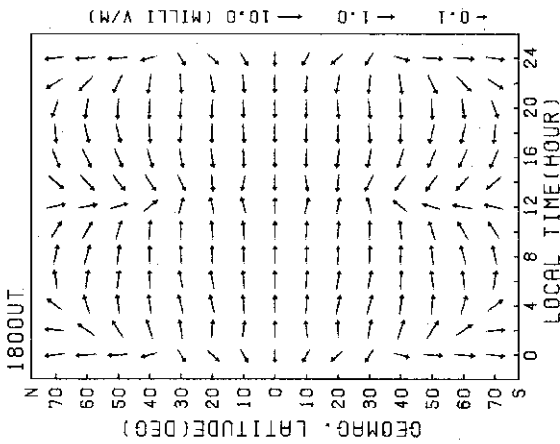


1600UT



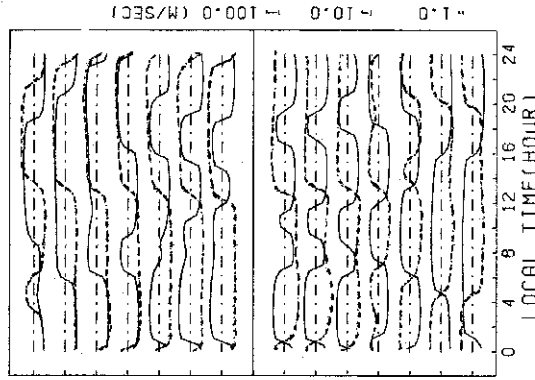
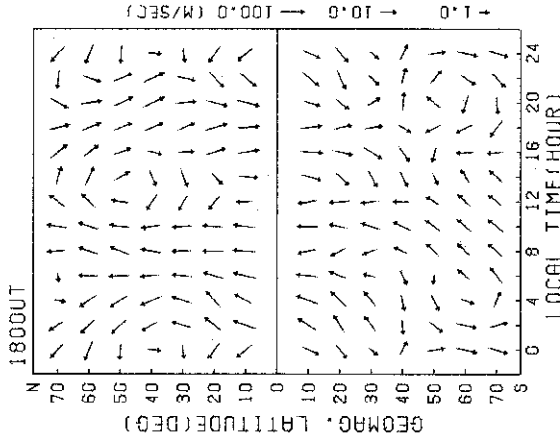
DEC.12.1964

ELECTRIC FIELD (LOG SCALE)

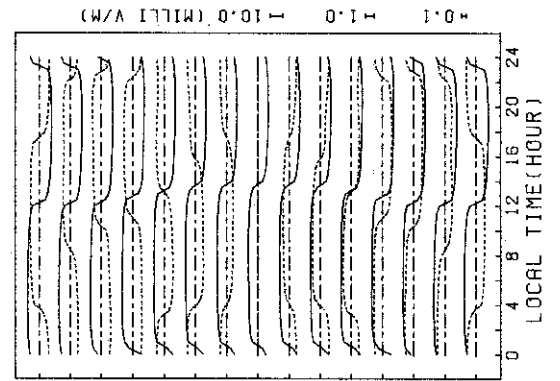
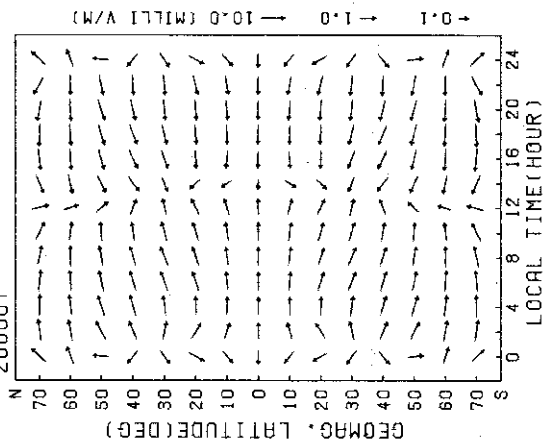


DEC.12.1964

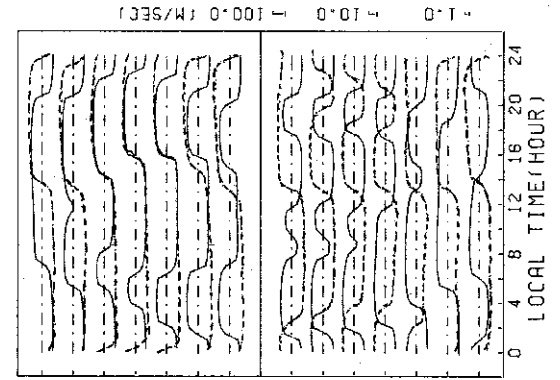
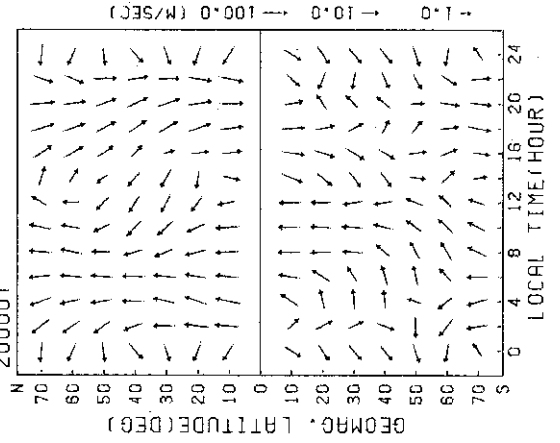
WIND VELOCITY (LOG SCALE)



2000UT

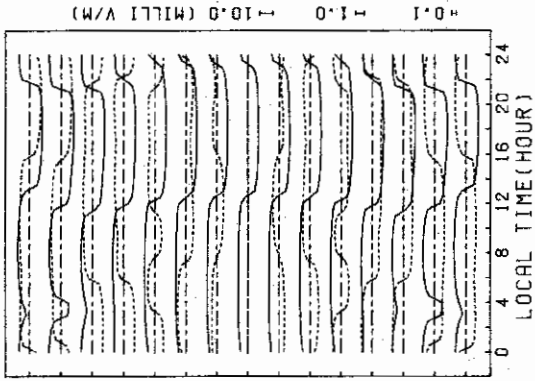
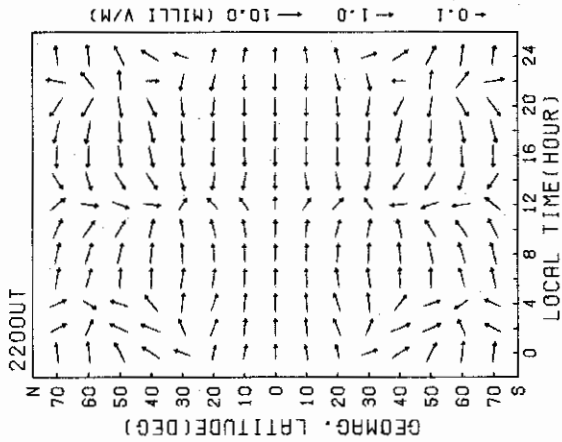


2000UT



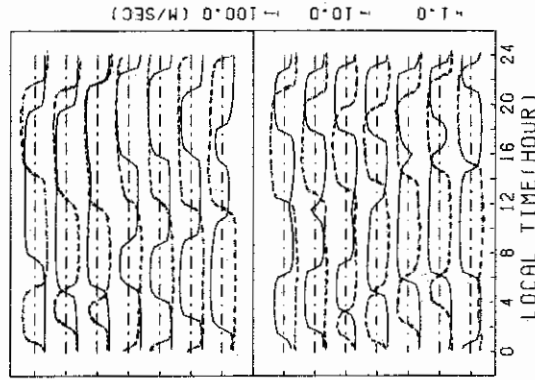
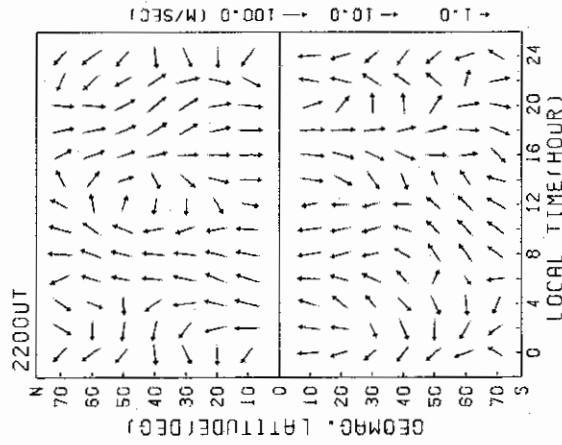
DEC.12.1964

ELECTRIC FIELD (LOG SCALE)

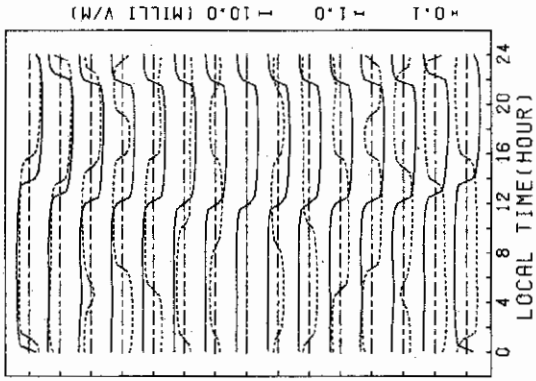
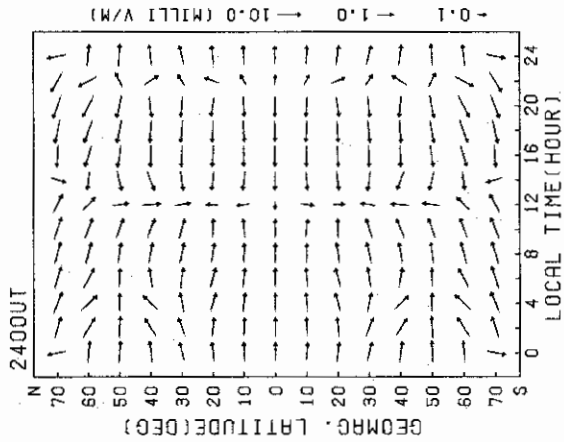


DEC.12.1964

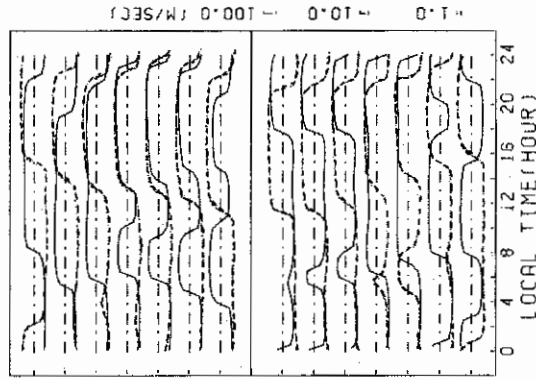
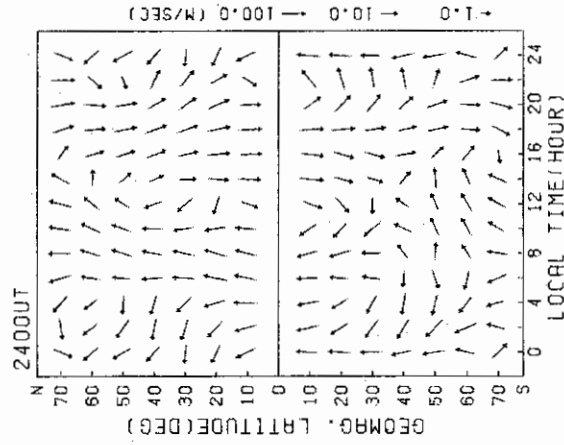
WIND VELOCITY (LOG SCALE)



2400UT

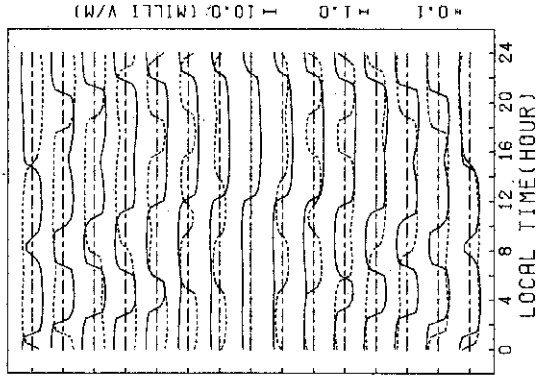
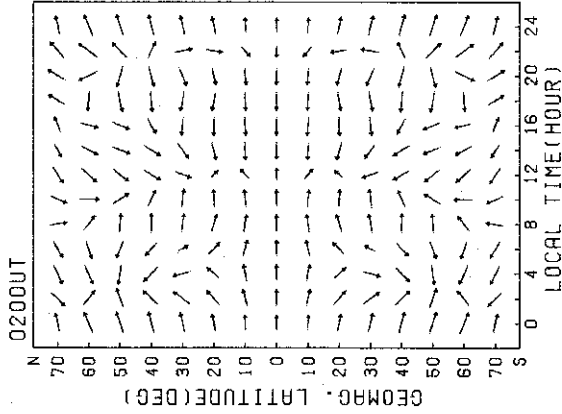


2400UT



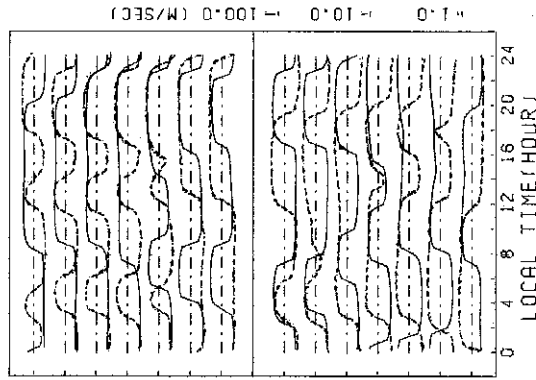
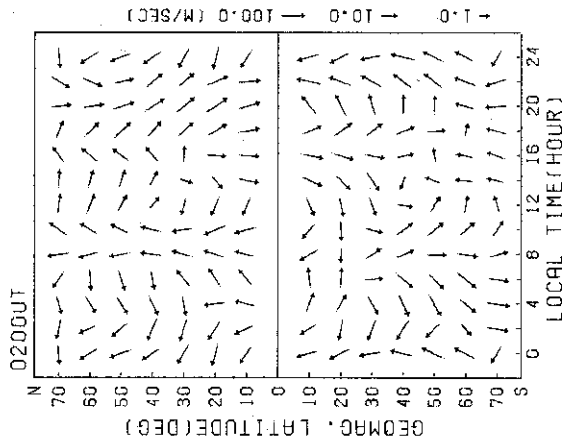
DEC. 13, 1964

ELECTRIC FIELD (LOG SCALE)

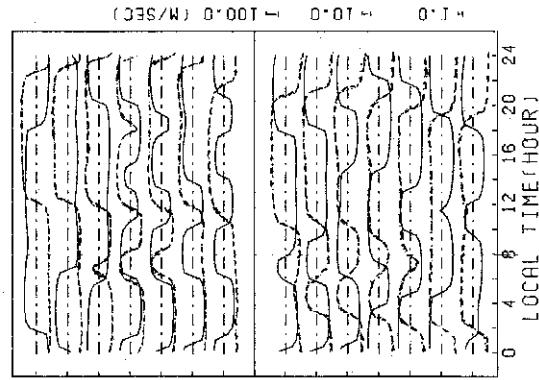
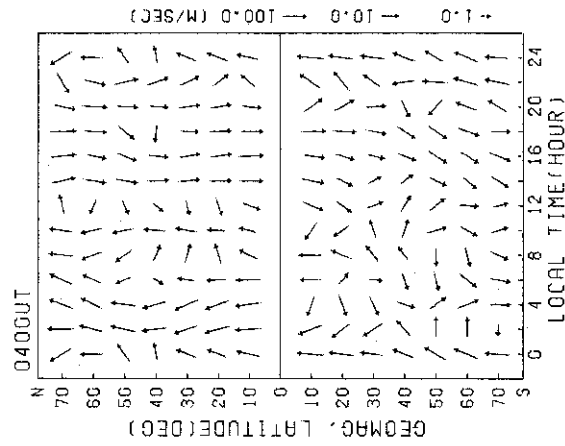
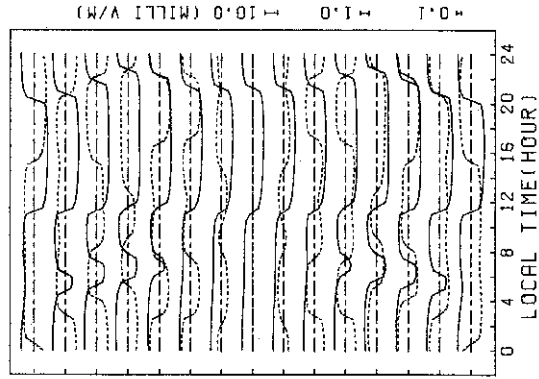
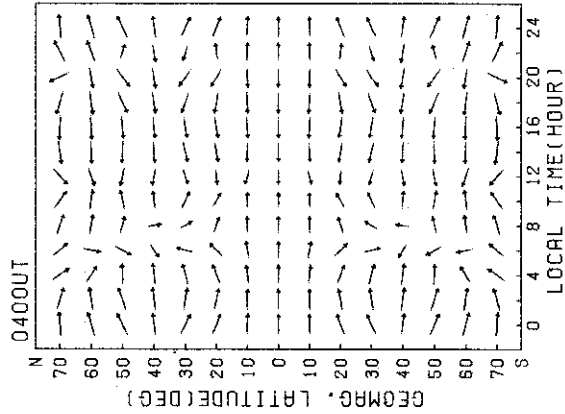


DEC. 13, 1964

WIND VELOCITY (LOG SCALE)

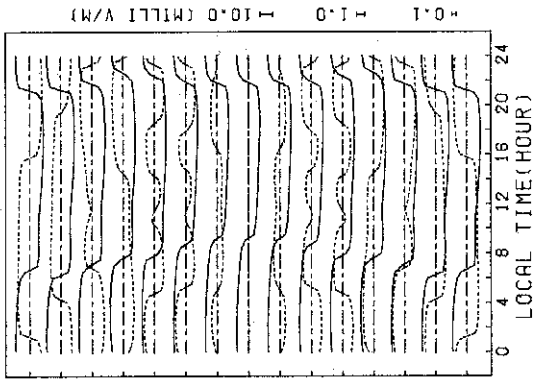
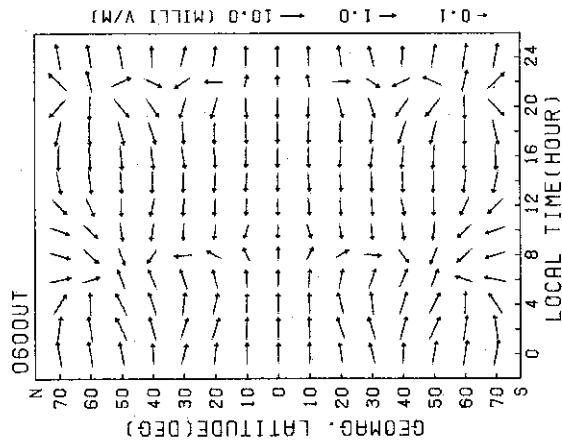


0400UT



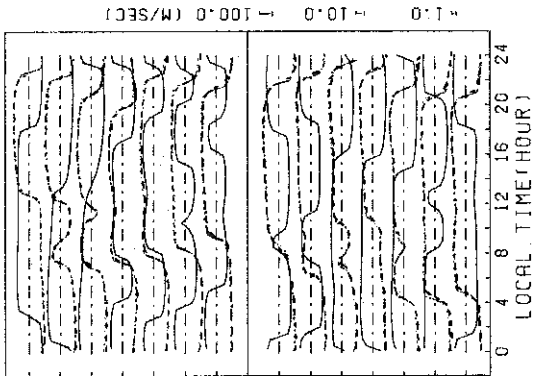
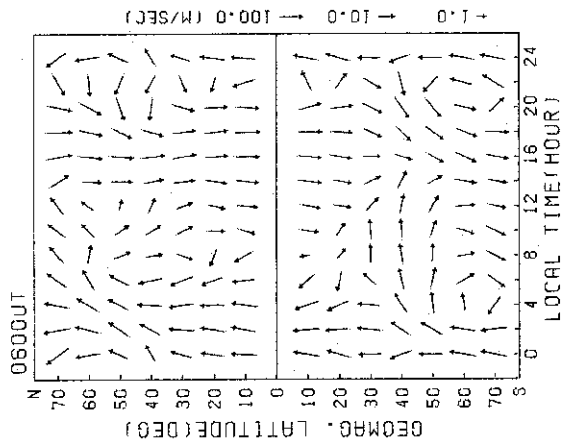
DEC.13.1964

ELECTRIC FIELD (LOG SCALE)

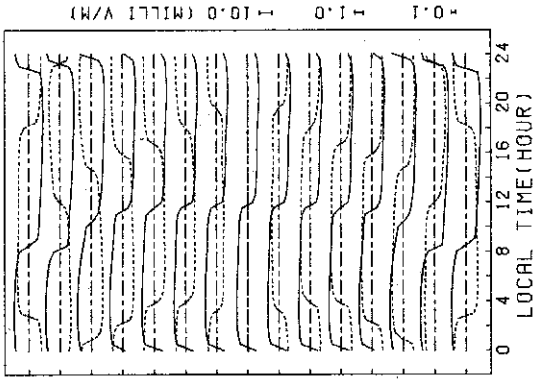
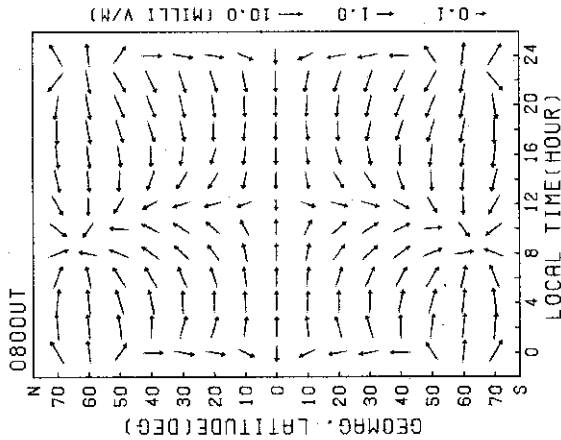


DEC.13.1964

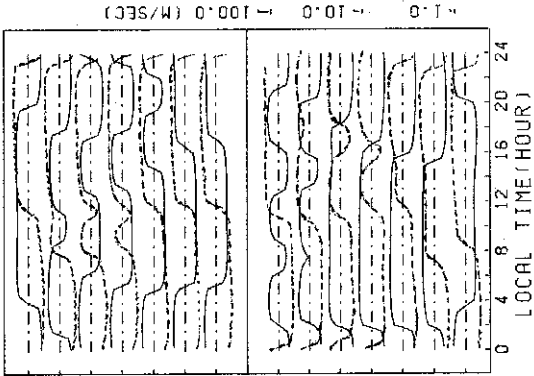
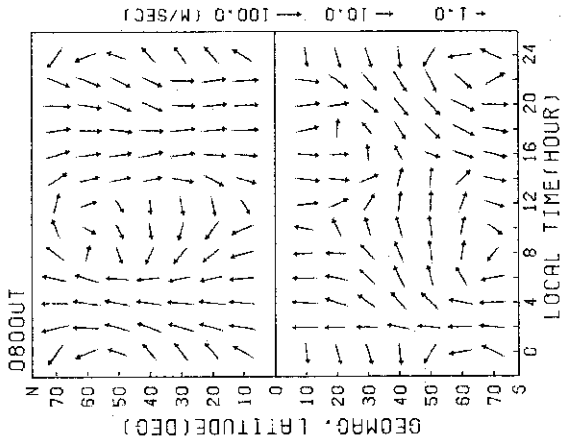
WIND VELOCITY (LOG SCALE)



0800UT

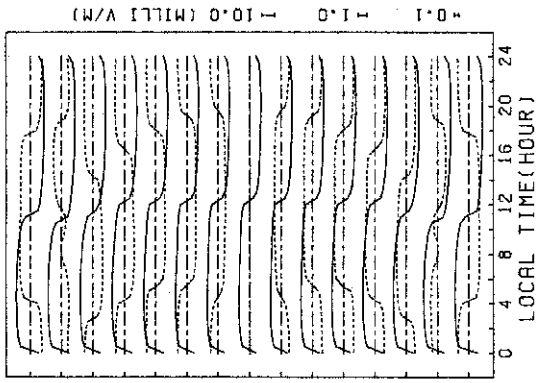
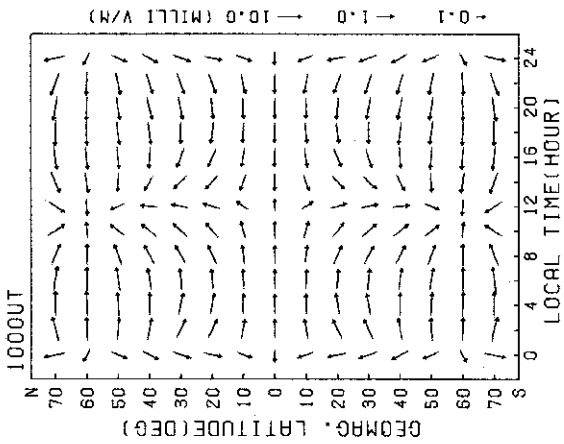


0800UT



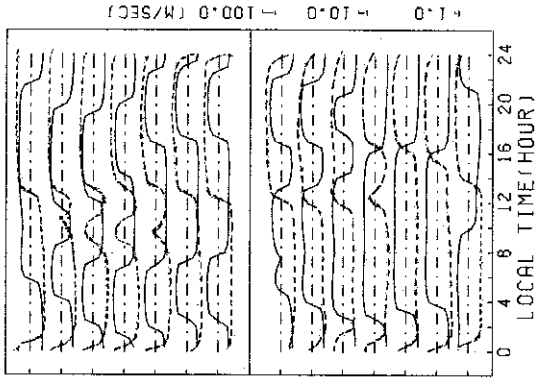
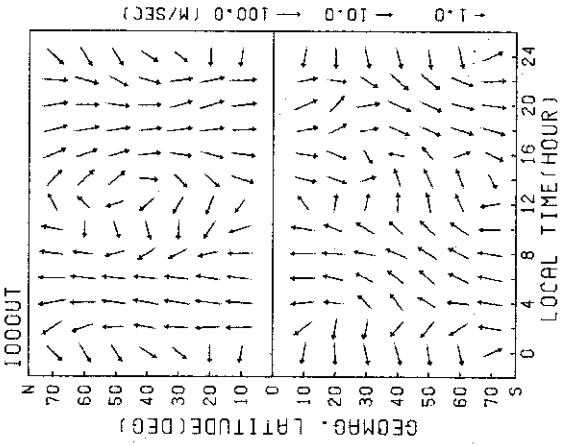
DEC-13-1964

ELECTRIC FIELD (LOG SCALE)



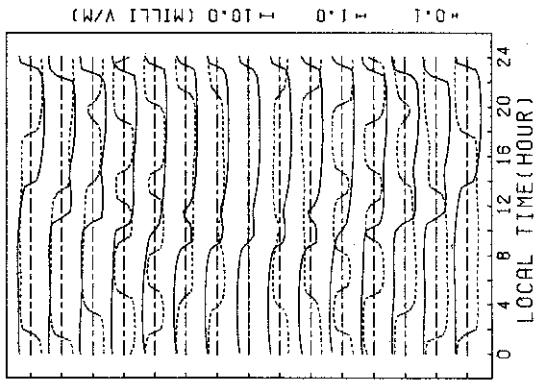
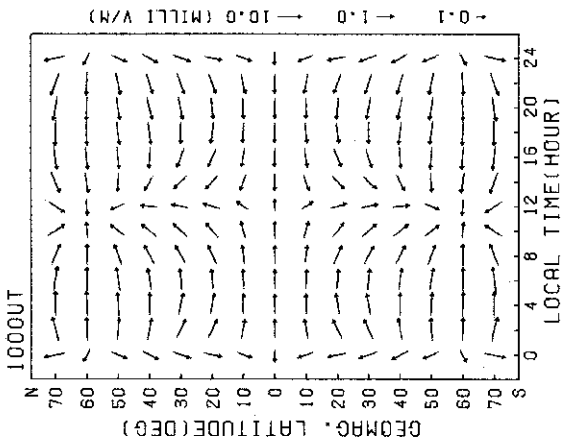
DEC-13-1964

WIND VELOCITY (LOG SCALE)



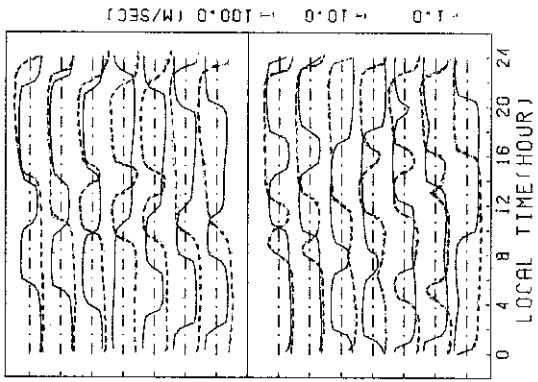
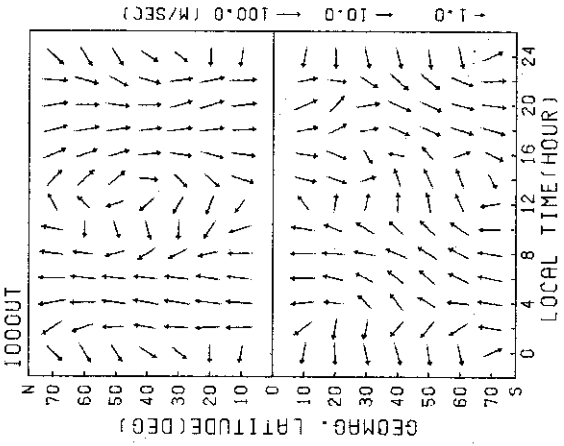
DEC-13-1964

ELECTRIC FIELD (LOG SCALE)



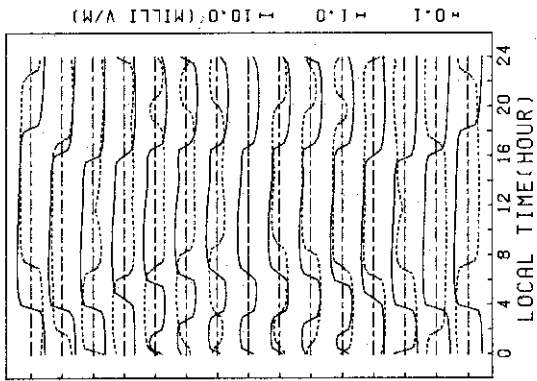
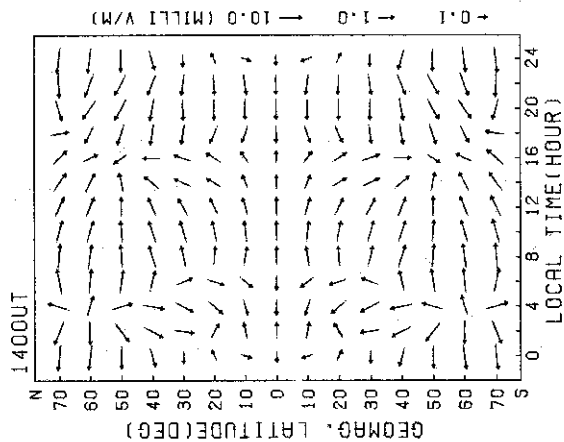
DEC-13-1964

WIND VELOCITY (LOG SCALE)



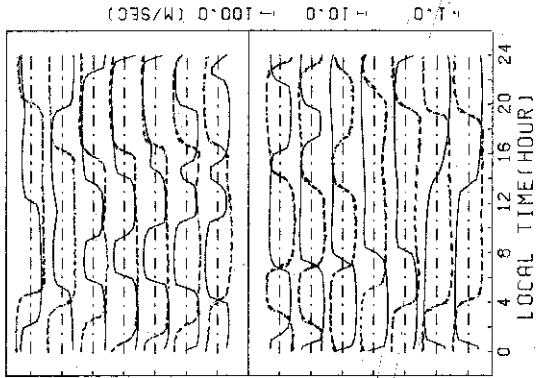
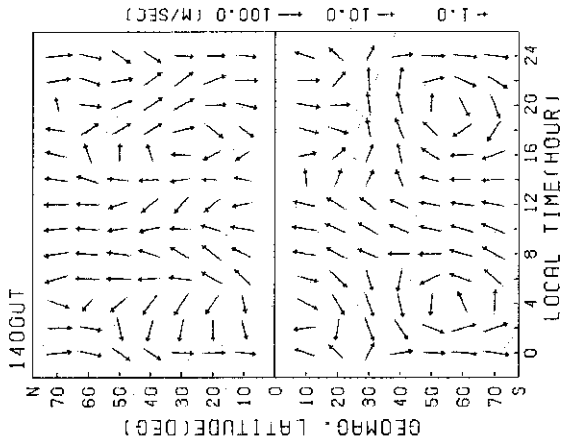
DEC.13.1964

ELECTRIC FIELD (LOG SCALE)

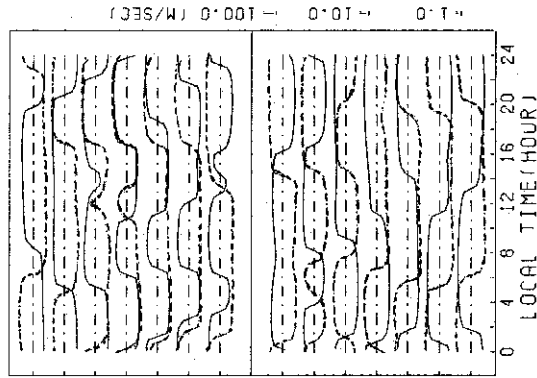
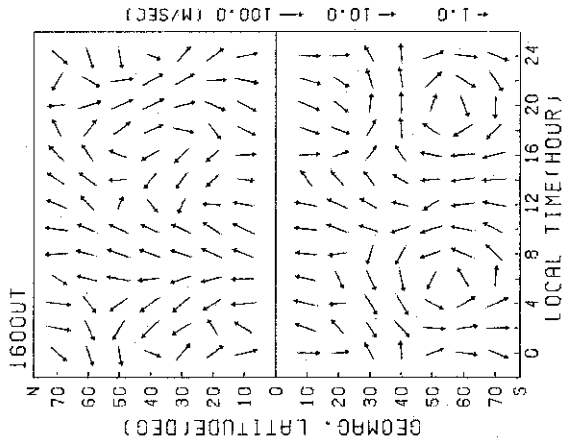
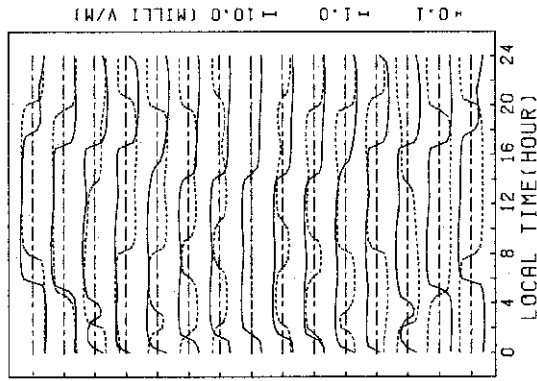
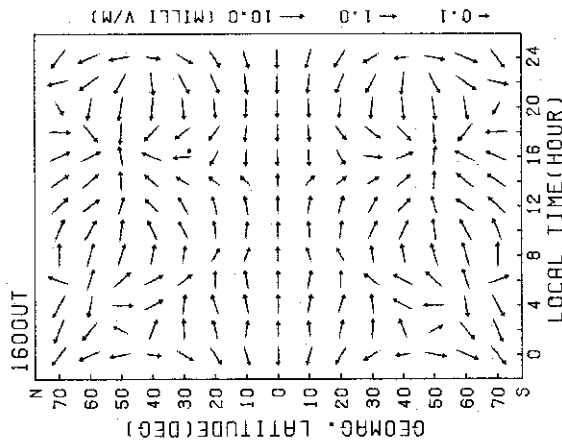


DEC.13.1964

WIND VELOCITY (LOG SCALE)

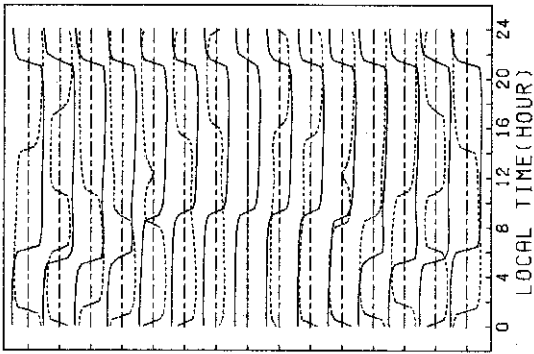
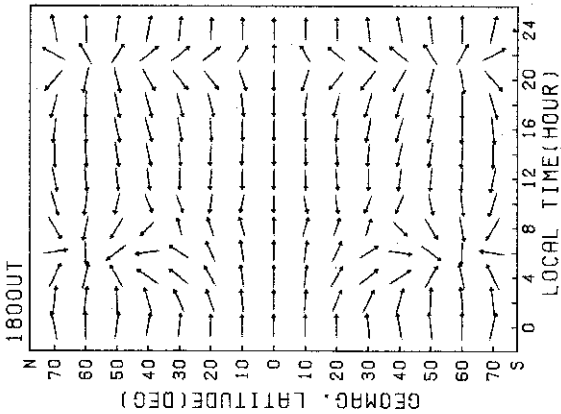


1600UT



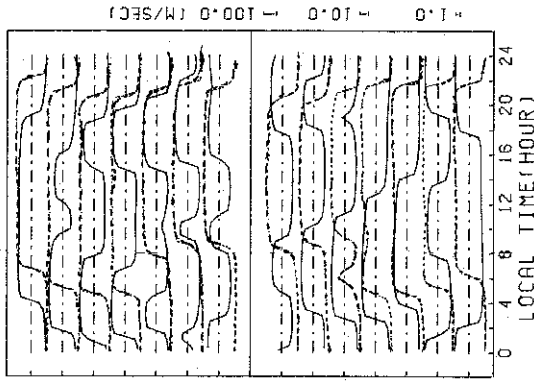
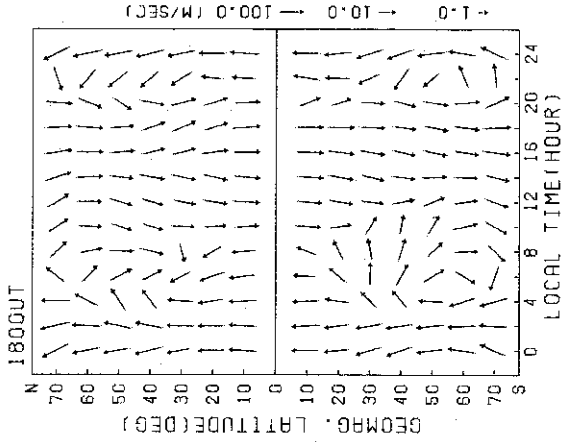
DEC.13,1964

ELECTRIC FIELD (LOG SCALE)

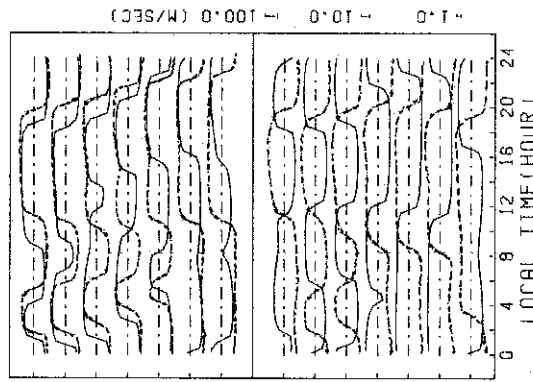
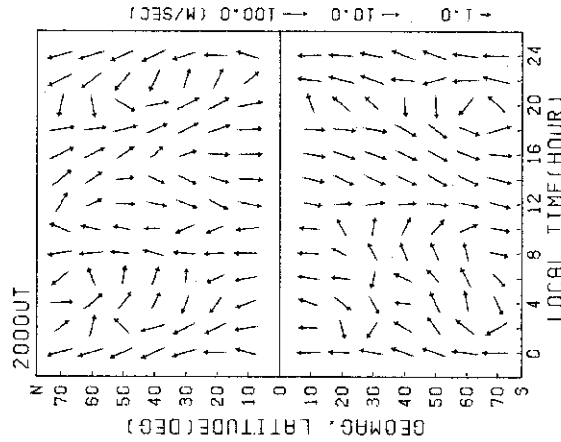
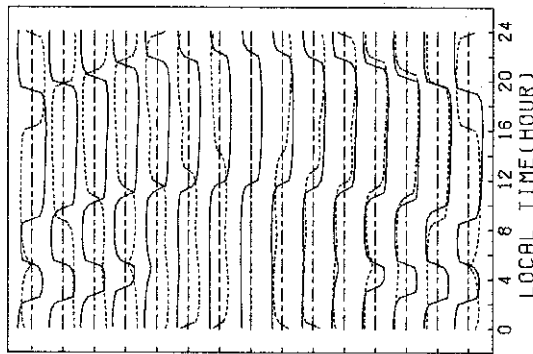
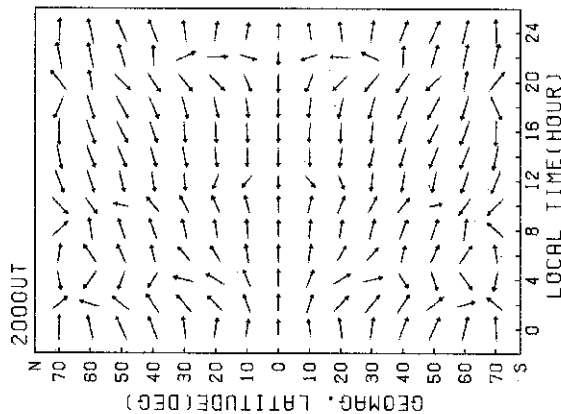


DEC.13,1964

WIND VELOCITY (LOG SCALE)

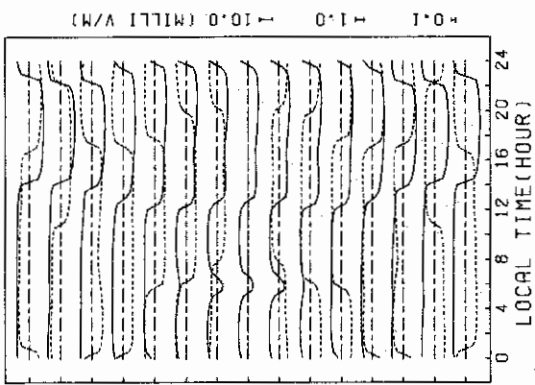
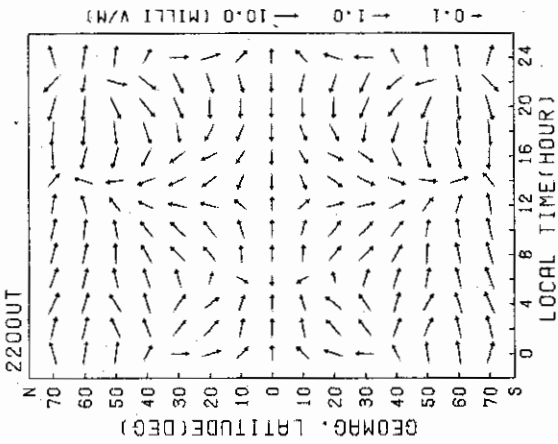


2000UT



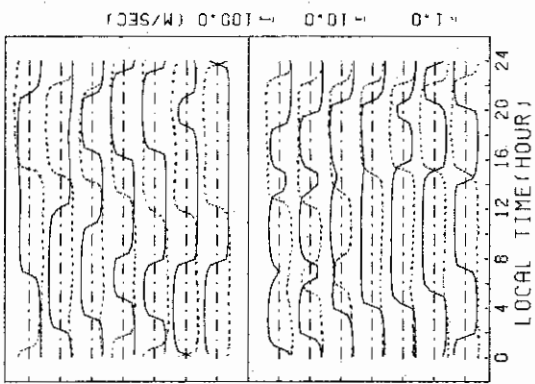
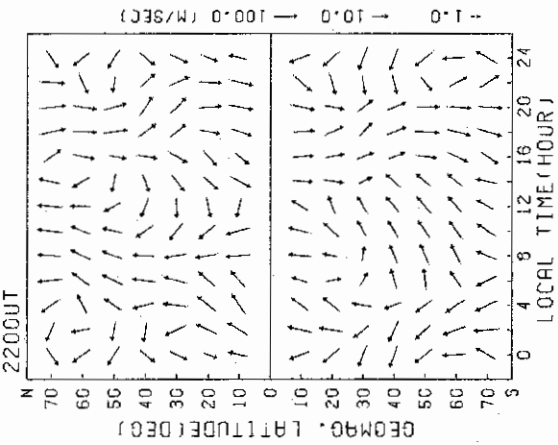
DEC.13.1964

ELECTRIC FIELD (LOG SCALE)

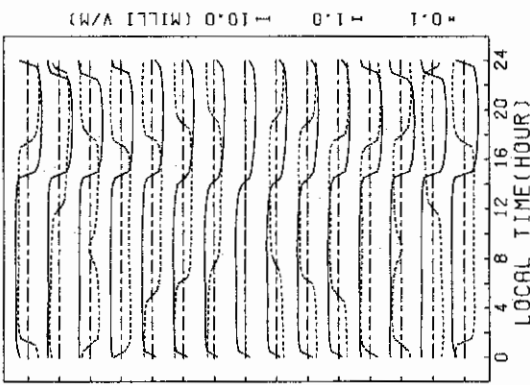
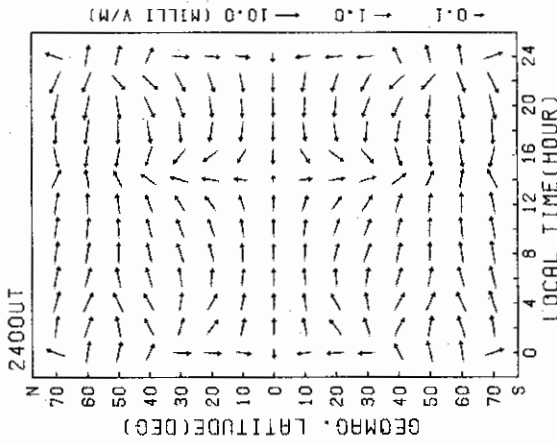


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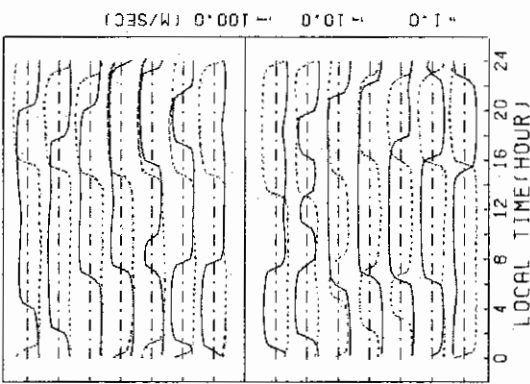
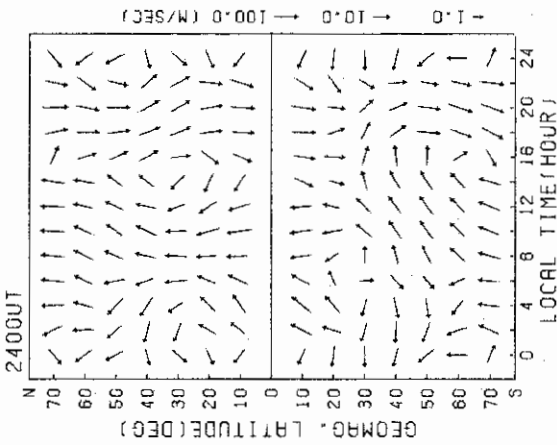
WIND VELOCITY (LOG SCALE)



24000UT

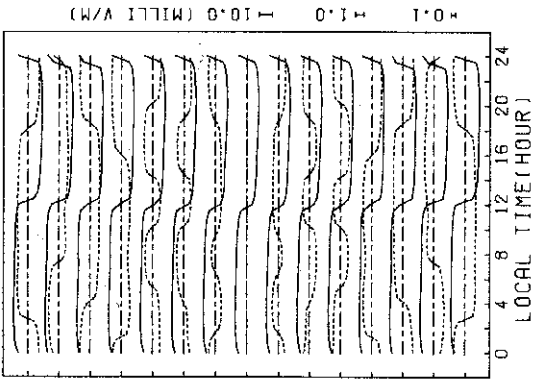
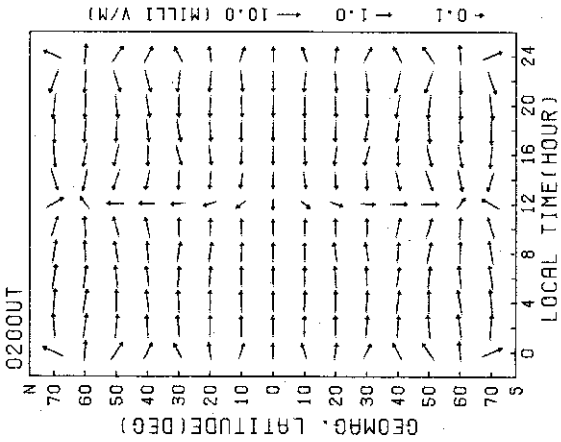


24000UT



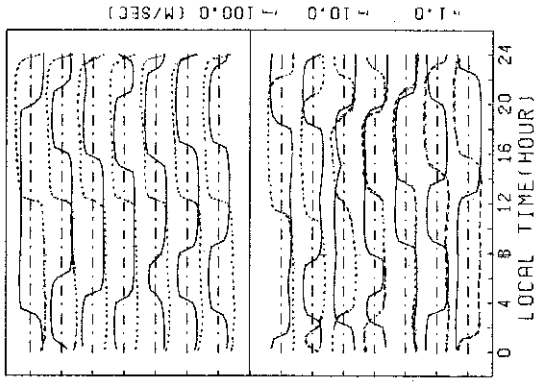
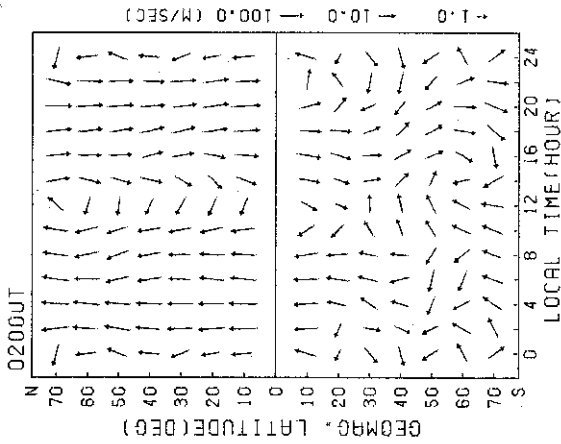
DEC.14.1964

ELECTRIC FIELD (LOG SCALE)

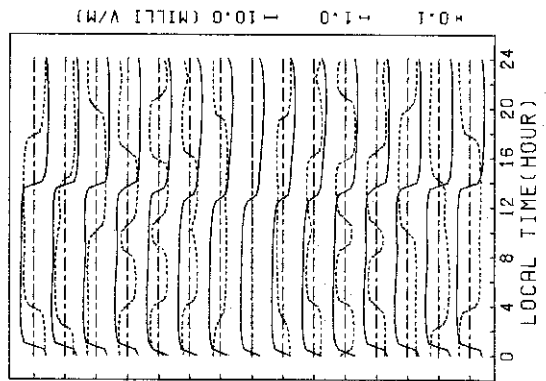
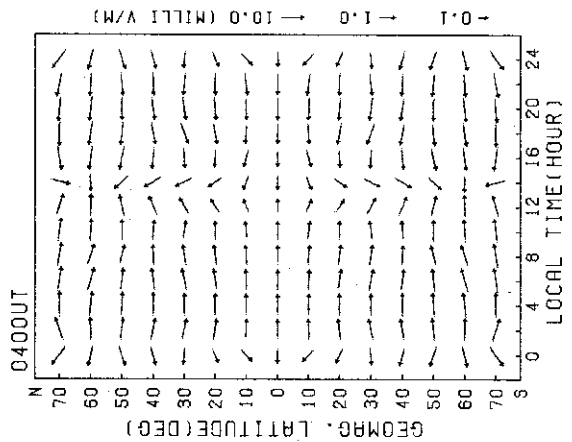


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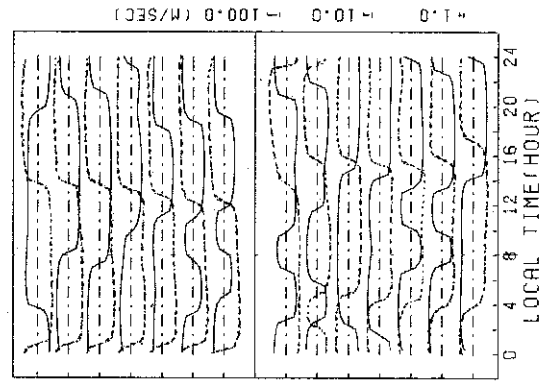
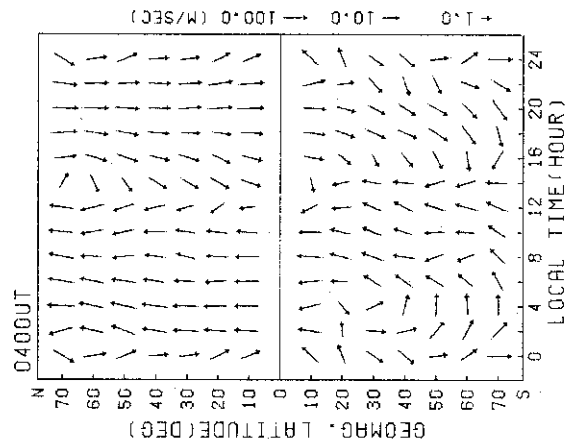
WIND VELOCITY (LOG SCALE)



0400UT

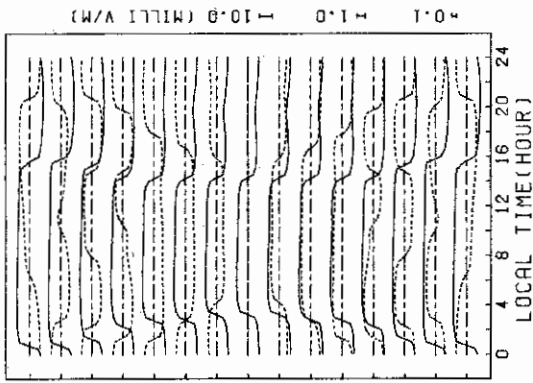
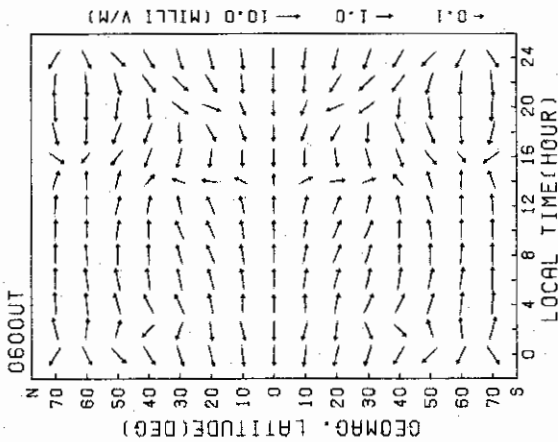


0400UT



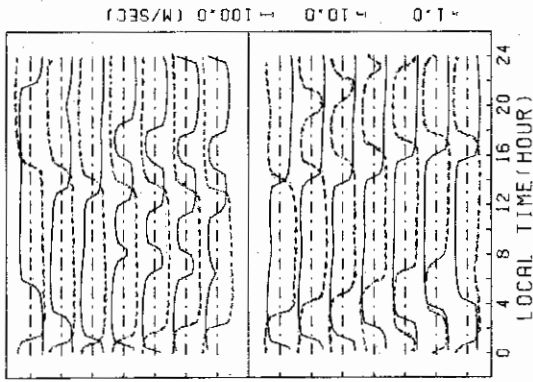
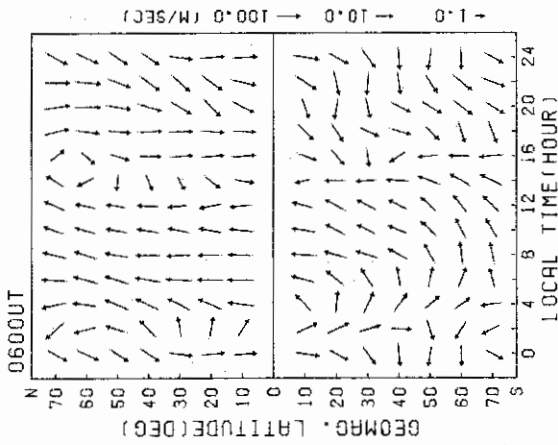
DEC.14.1964

ELECTRIC FIELD (LOG SCALE)

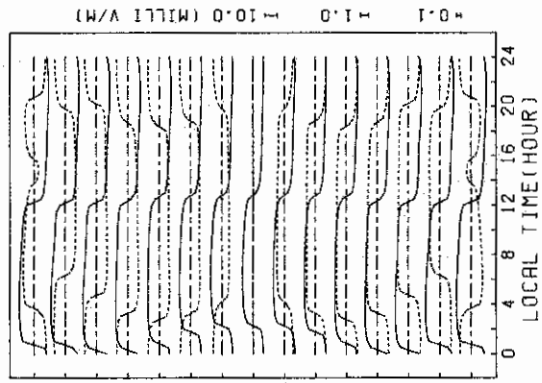
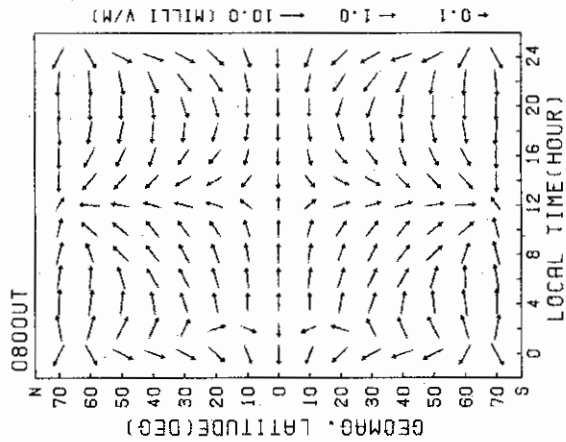


DEC.14.1964

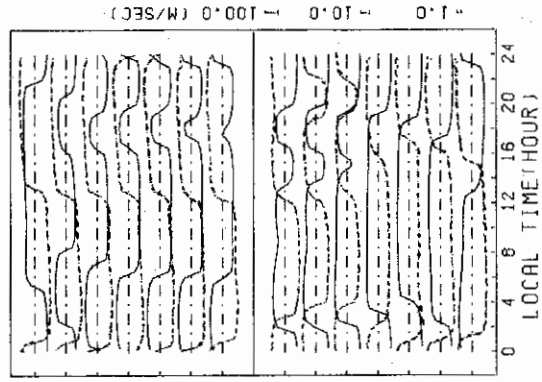
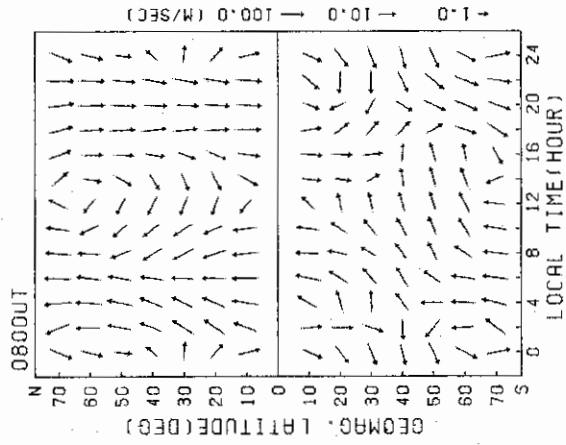
WIND VELOCITY (LOG SCALE)



0800UT

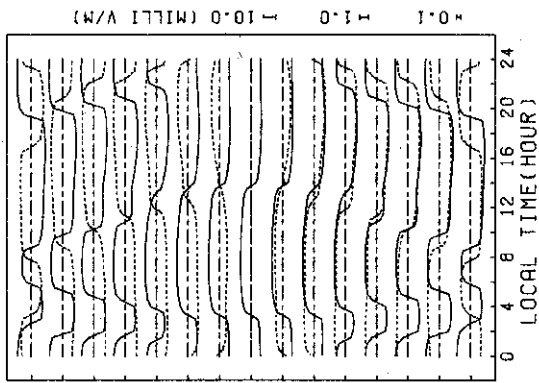
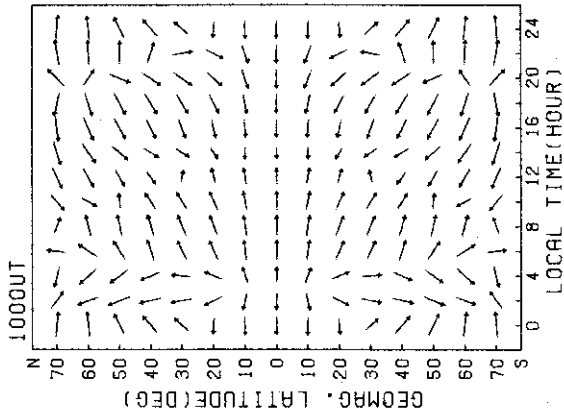


0800UT



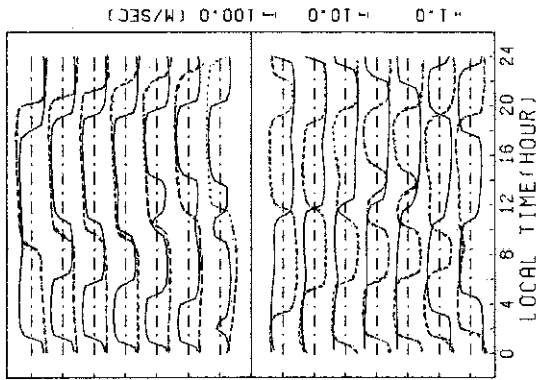
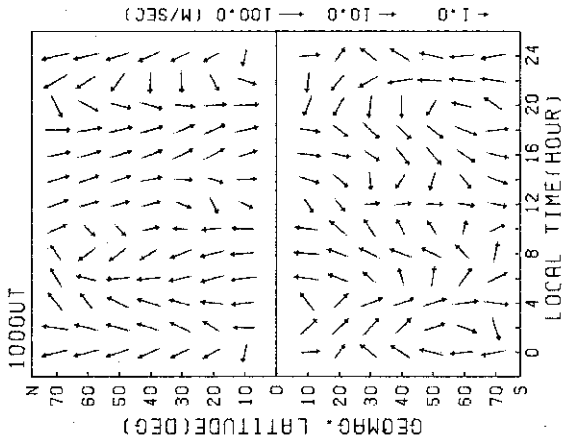
DEC.14.1964

ELECTRIC FIELD (LOG SCALE)

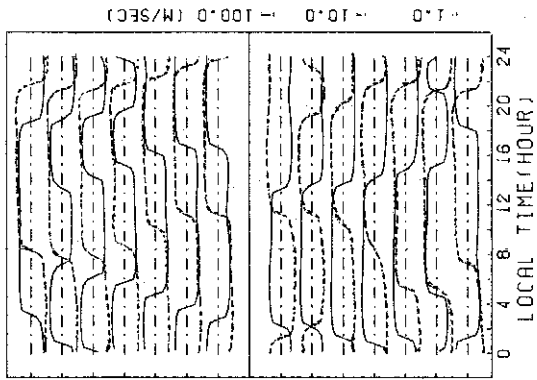
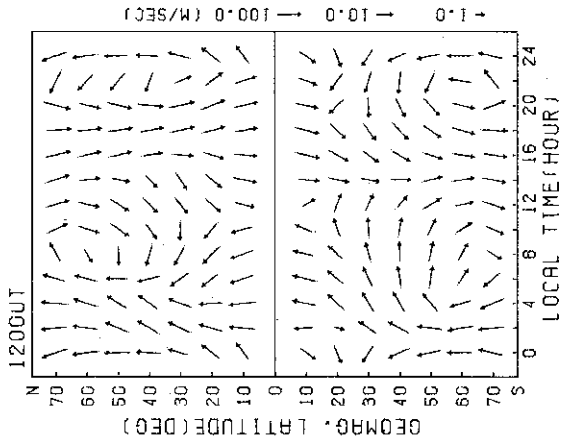
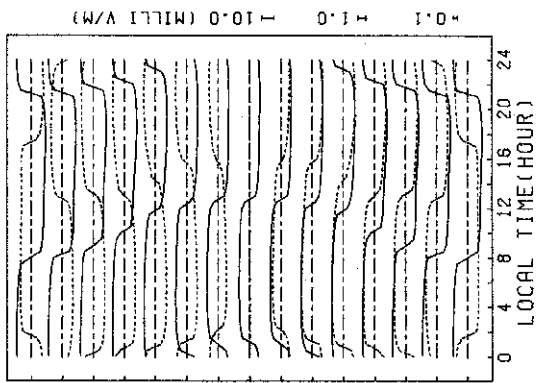
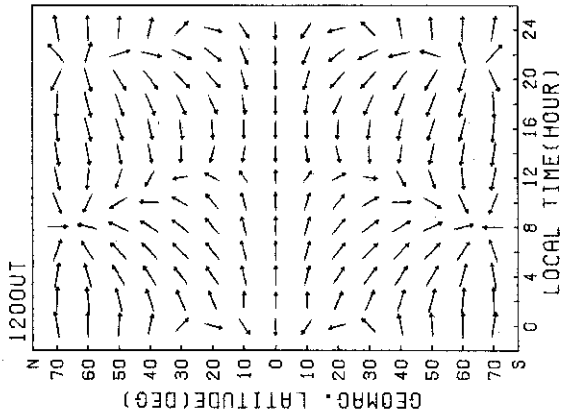


DEC.14.1964

WIND VELOCITY (LOG SCALE)

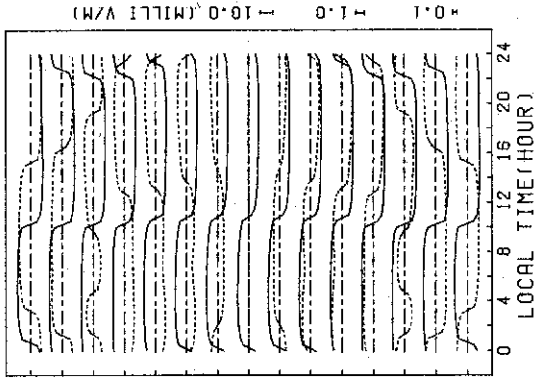
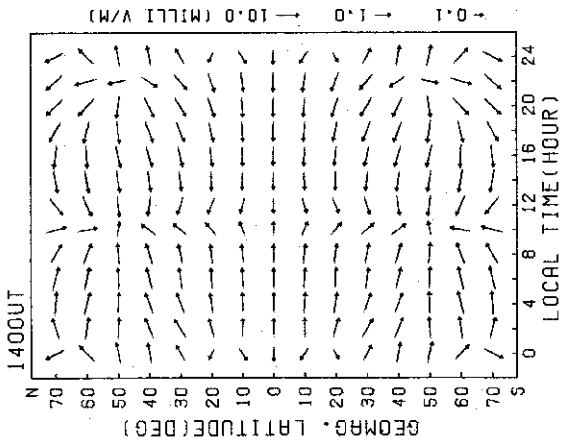


1200UT



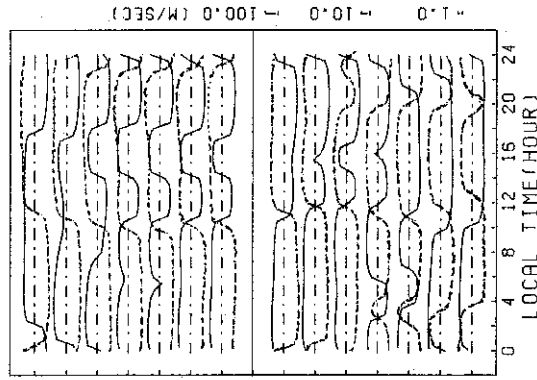
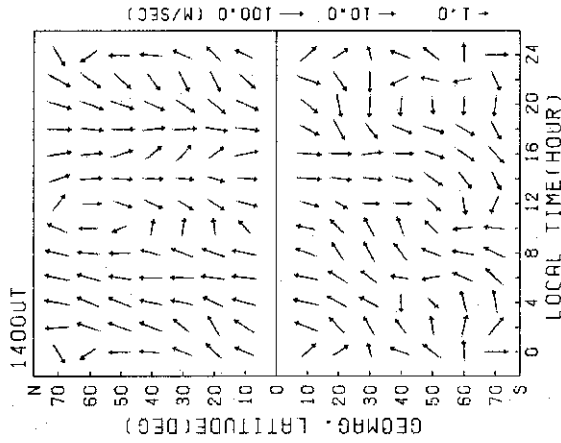
DEC.14.1964

ELECTRIC FIELD (LOG SCALE)

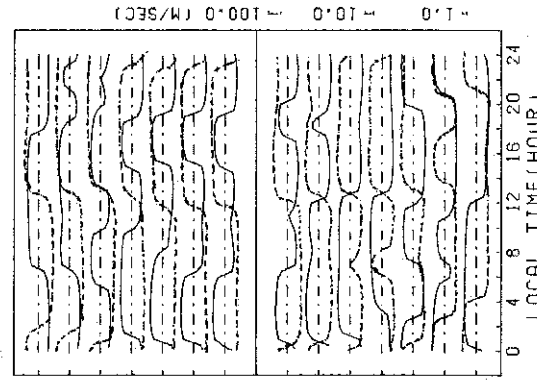
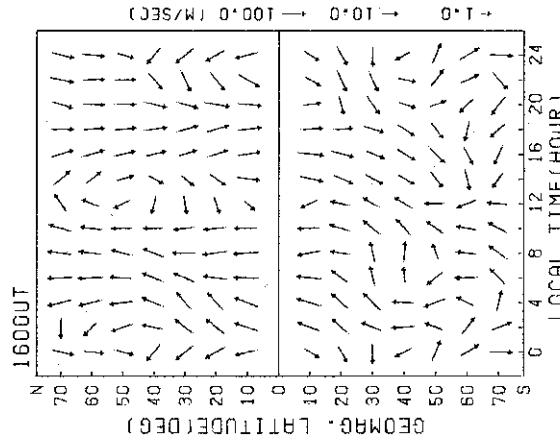
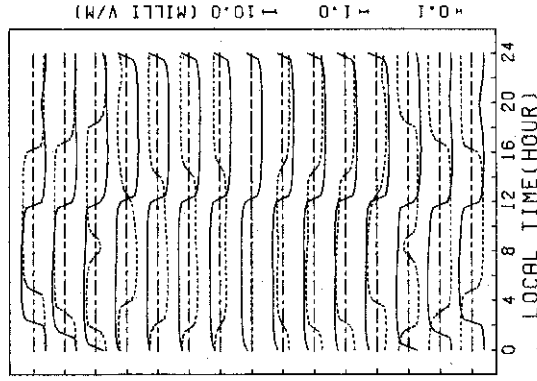
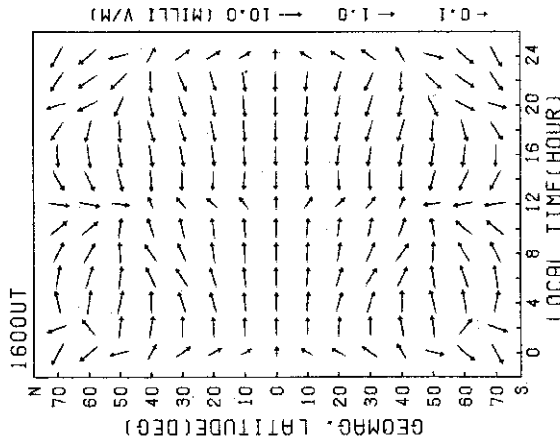


DEC.14.1964

WIND VELOCITY (LOG SCALE)

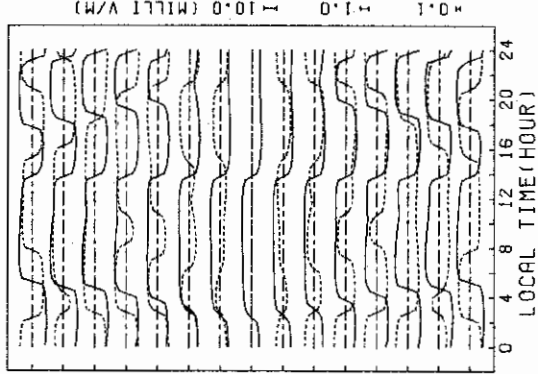
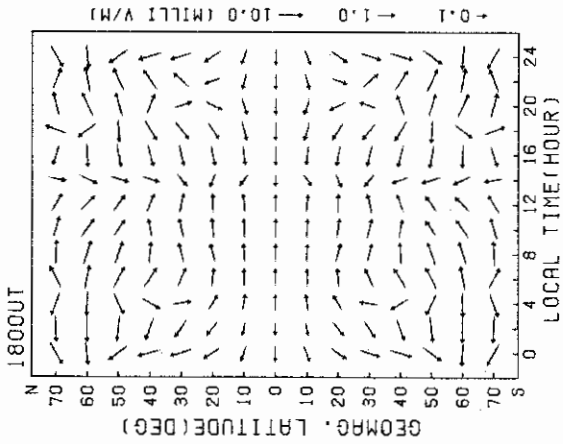


1600UT



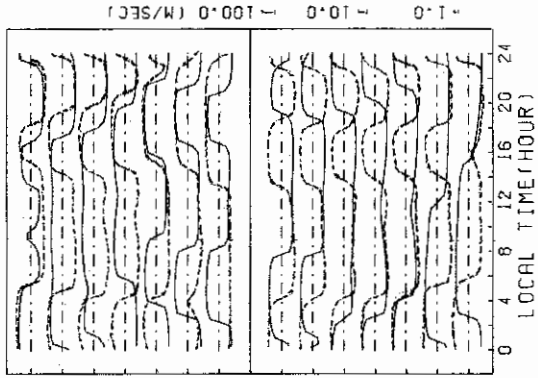
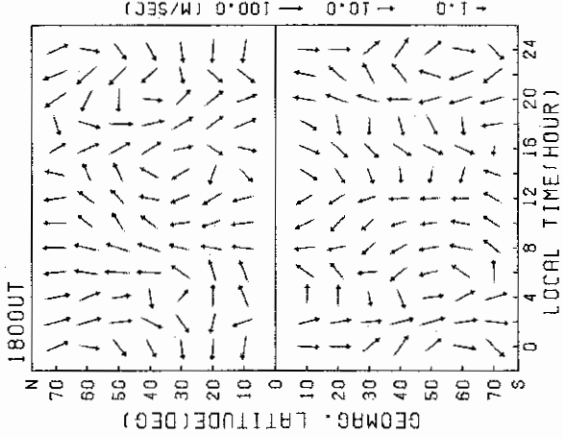
DEC.14.1964

ELECTRIC FIELD (LOG SCALE)

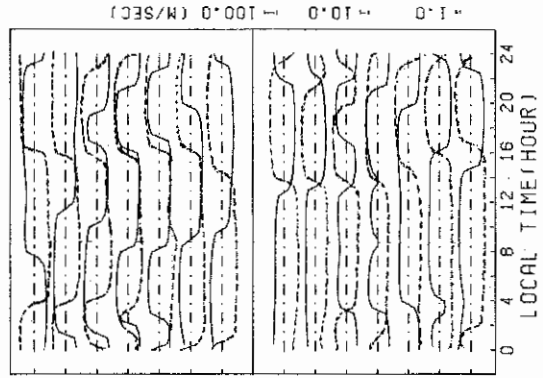
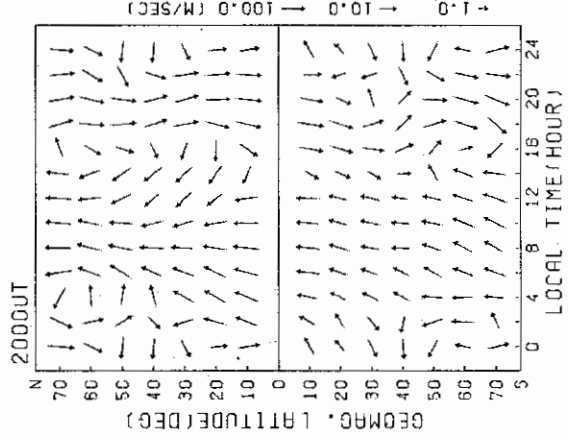
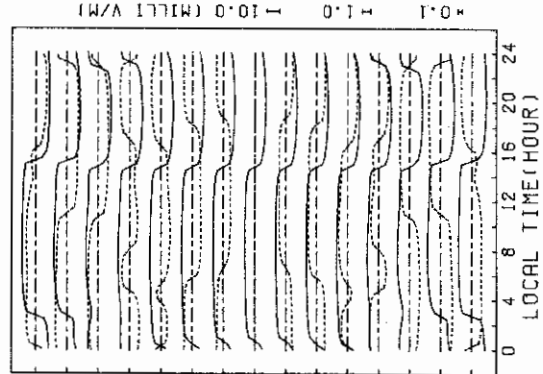
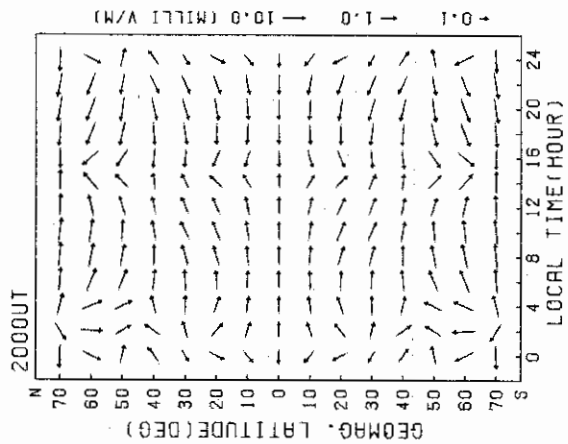


DEC.14.1964

WIND VELOCITY (LOG SCALE)

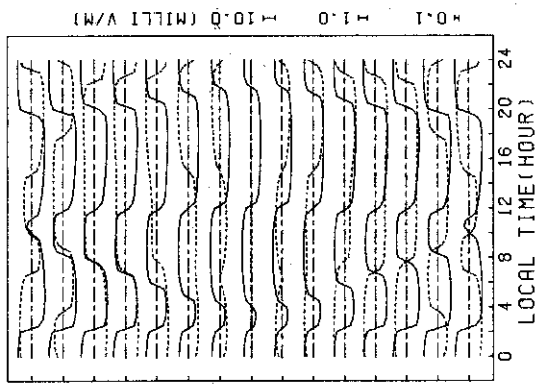
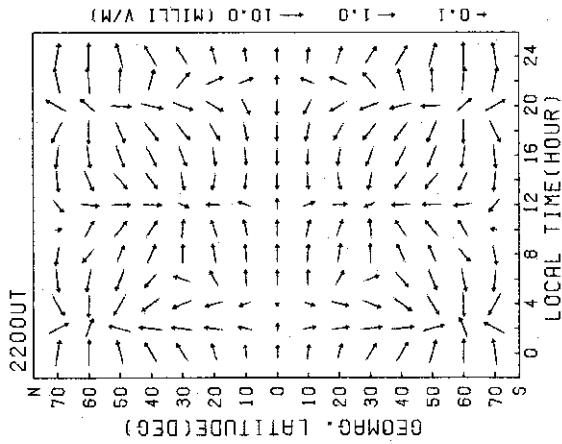


2000UT



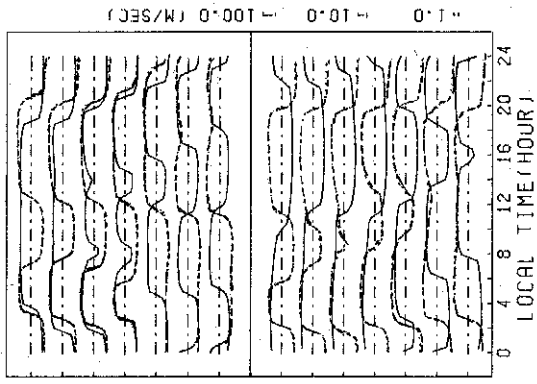
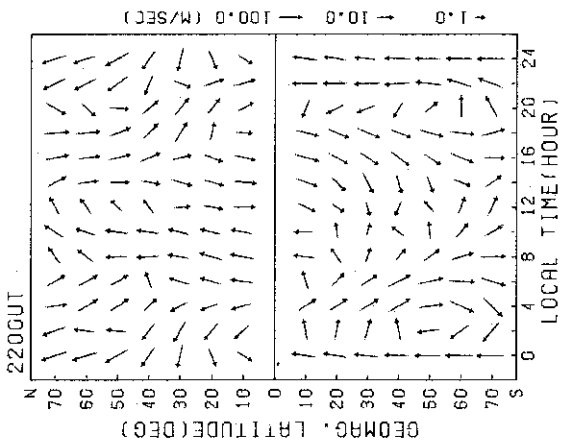
DEC. 14, 1964

ELECTRIC FIELD (LOG SCALE)

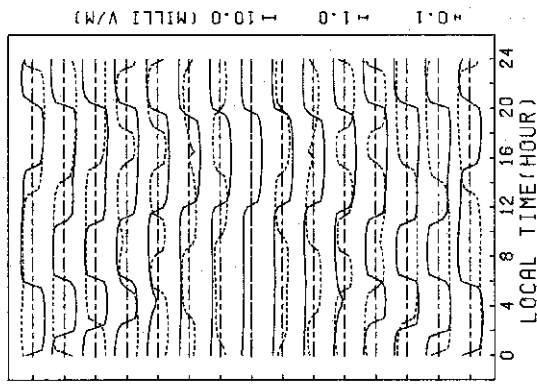
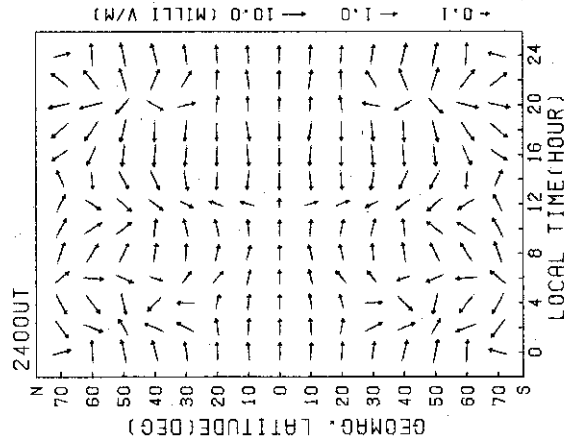


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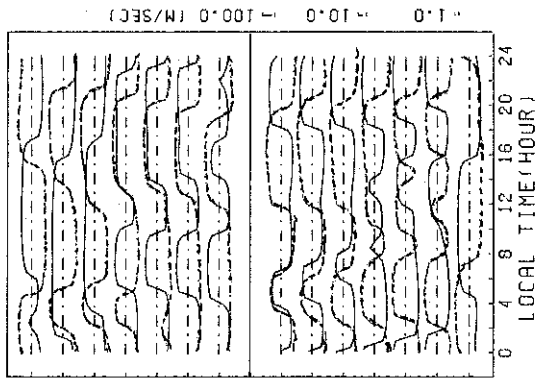
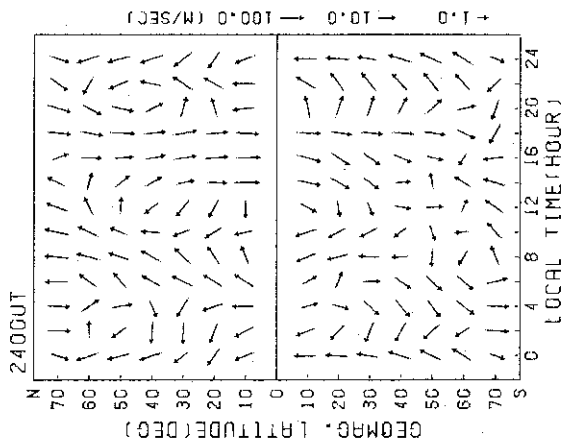
WIND VELOCITY (LOG SCALE)



2400UT

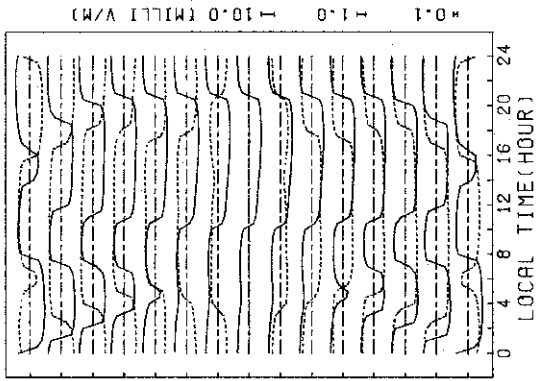
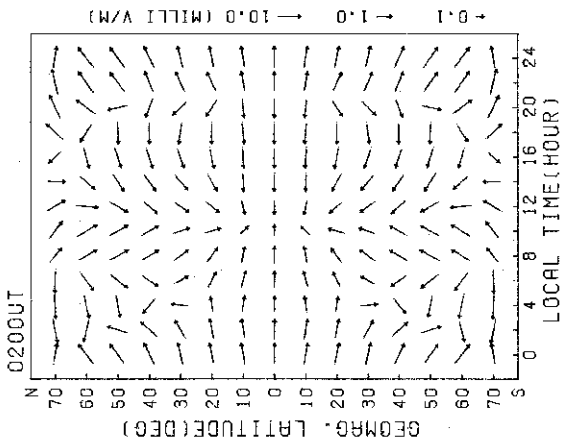


2400UT



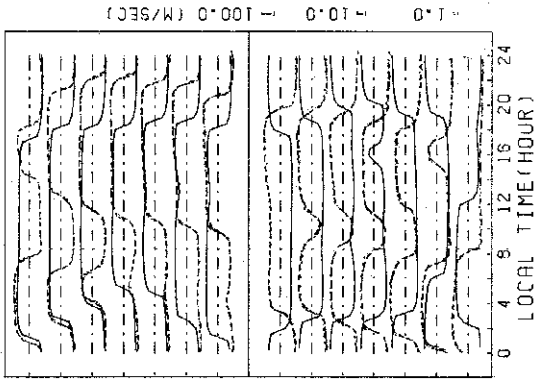
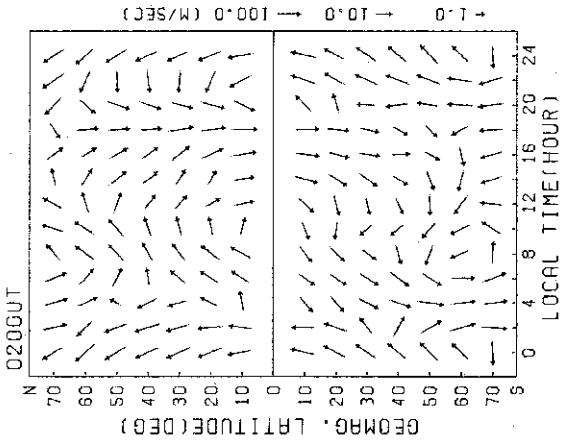
DEC.15.1964

ELECTRIC FIELD (LOG SCALE)

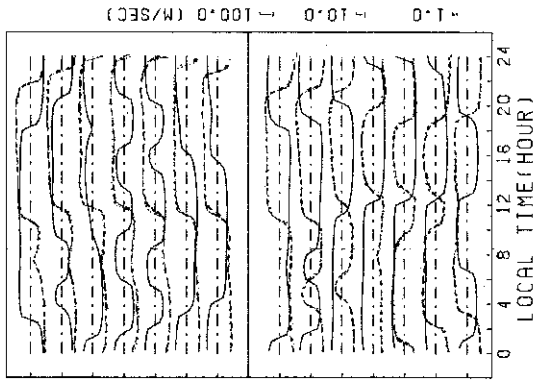
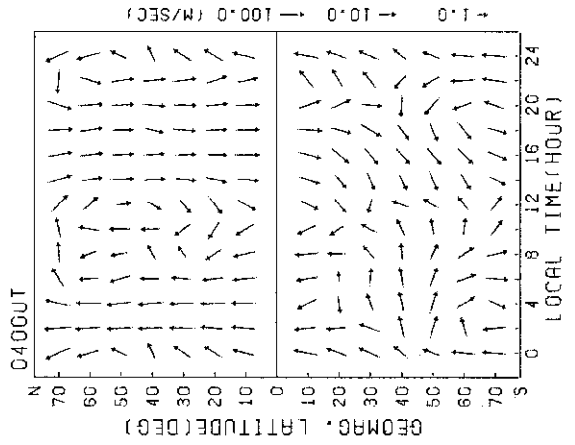
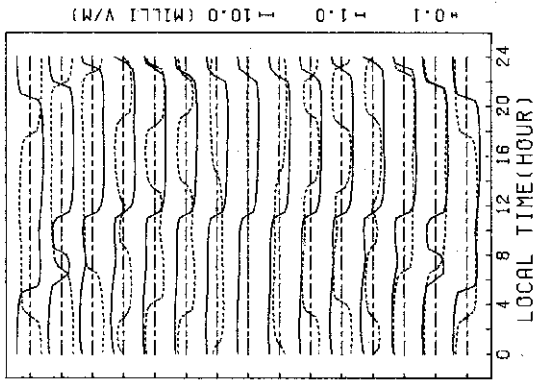
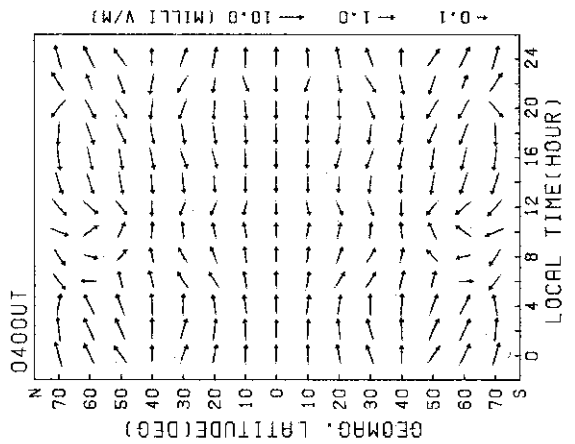


DEC.15.1964

WIND VELOCITY (LOG SCALE)

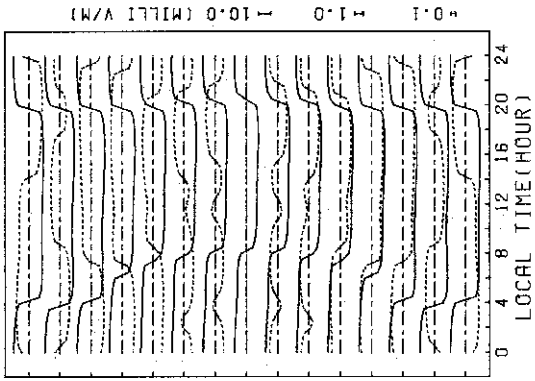
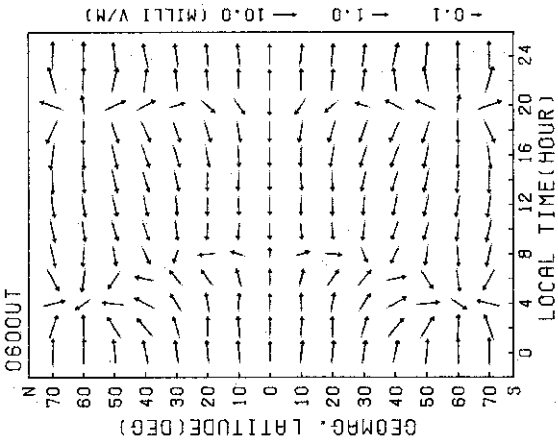


0400UT



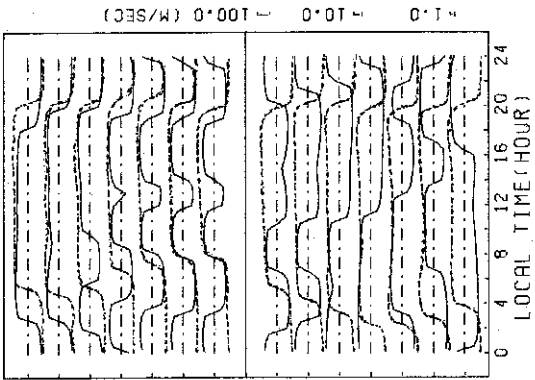
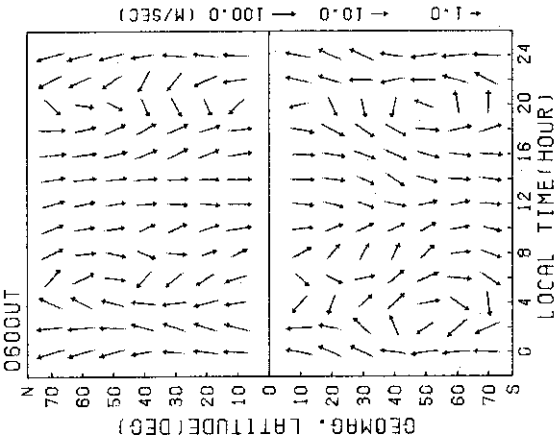
DEC.15.1964

ELECTRIC FIELD (LOG SCALE)

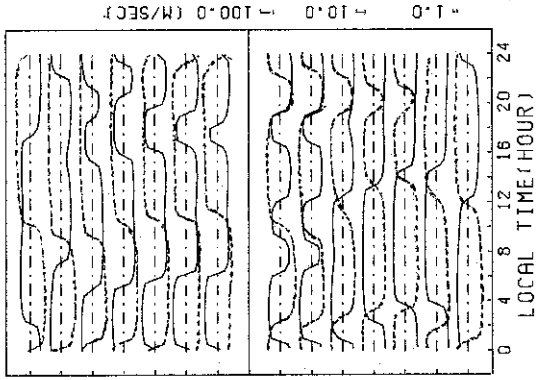
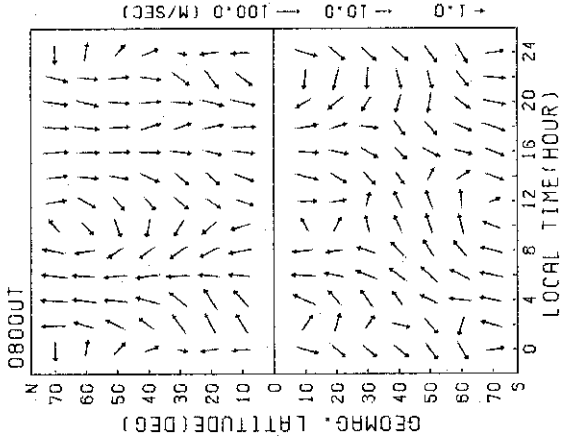
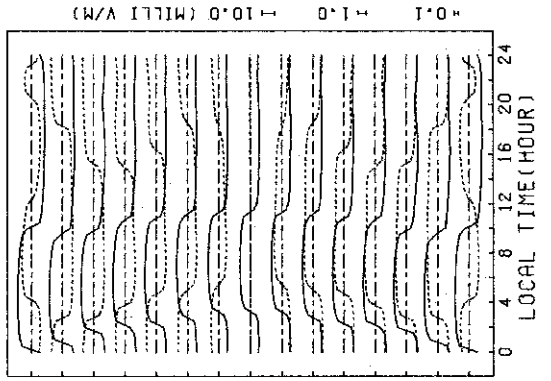
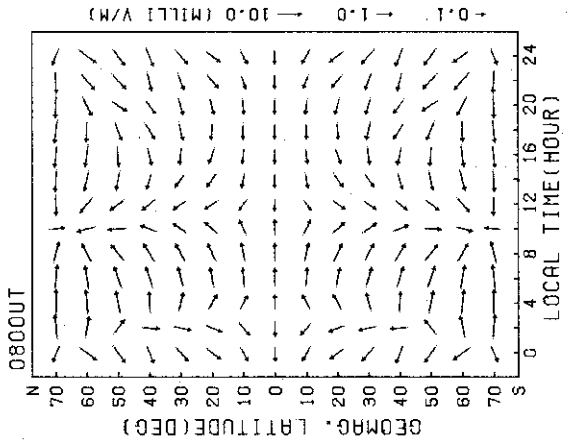


DEC.15.1964

WIND VELOCITY (LOG SCALE)

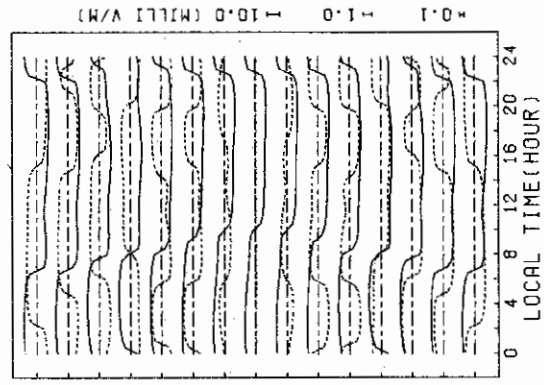
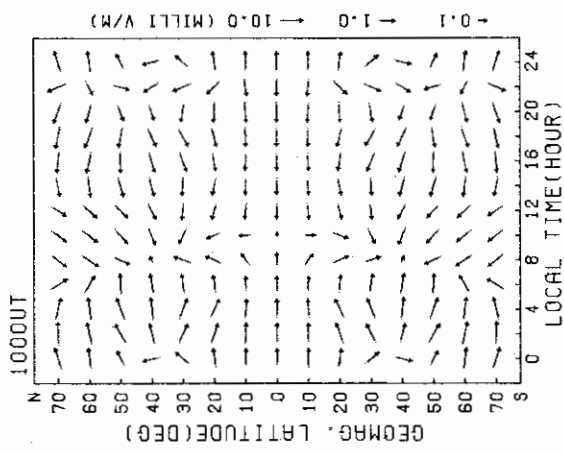


0800UT



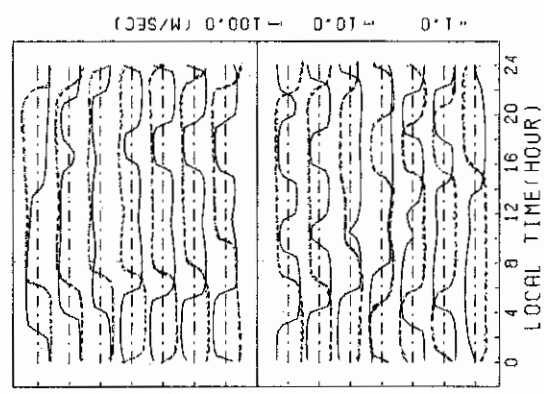
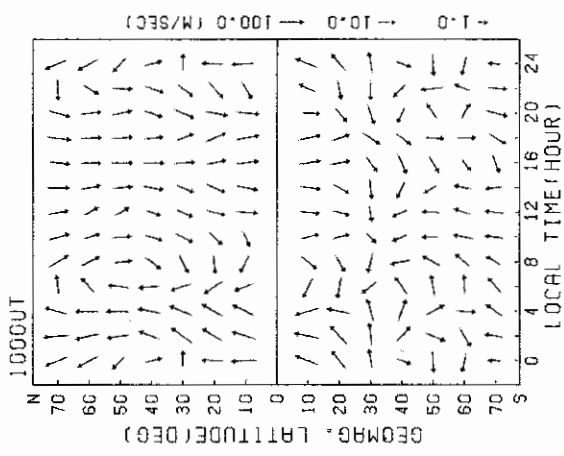
DEC. 15, 1964

ELECTRIC FIELD (LOG SCALE)

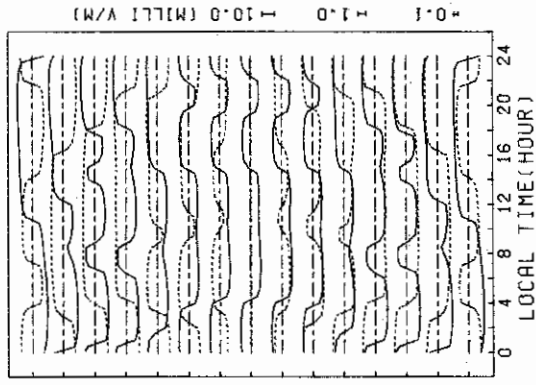
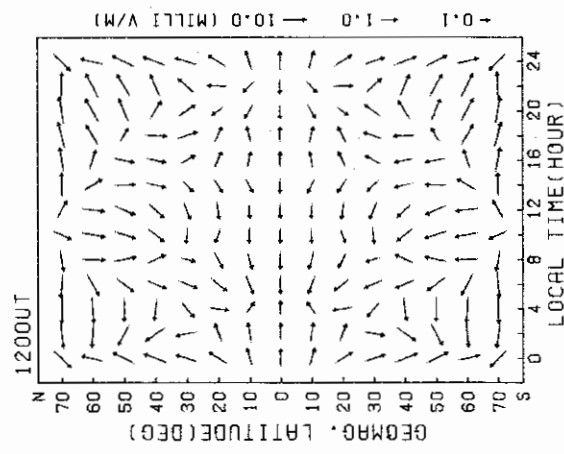


DEC. 15, 1964

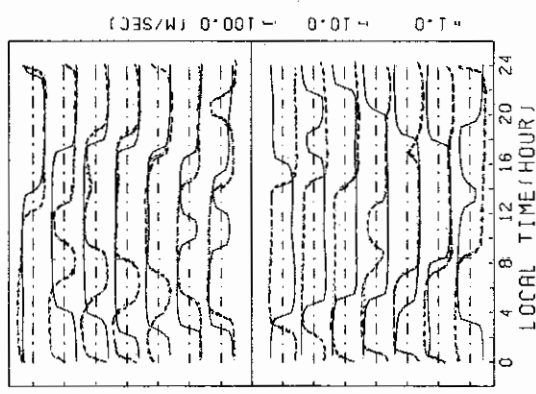
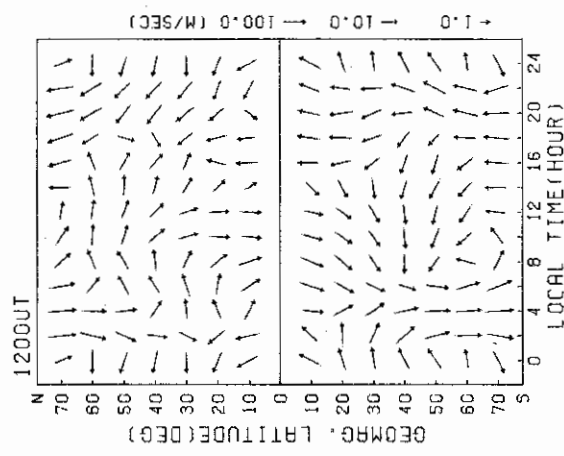
WIND VELOCITY (LOG SCALE)



1200UT

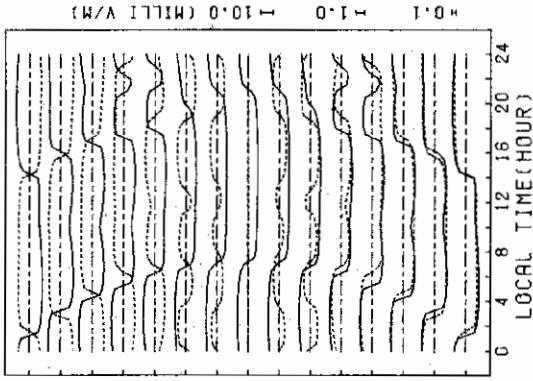
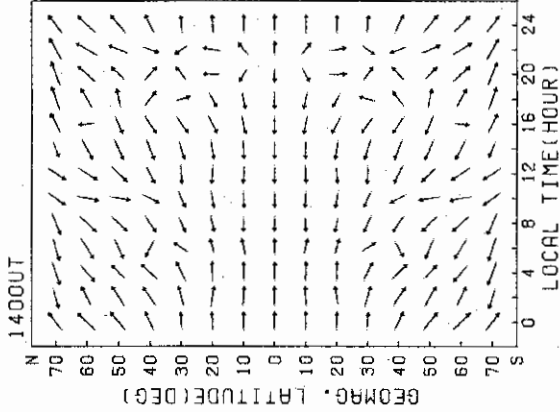


1200UT



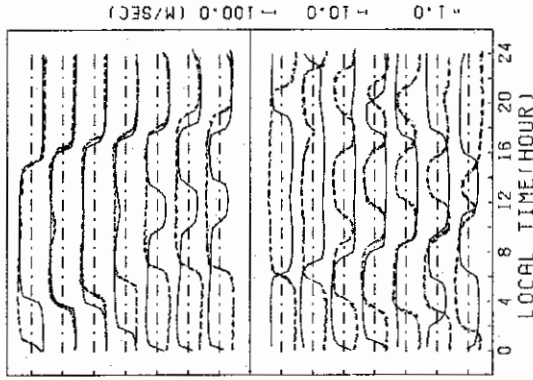
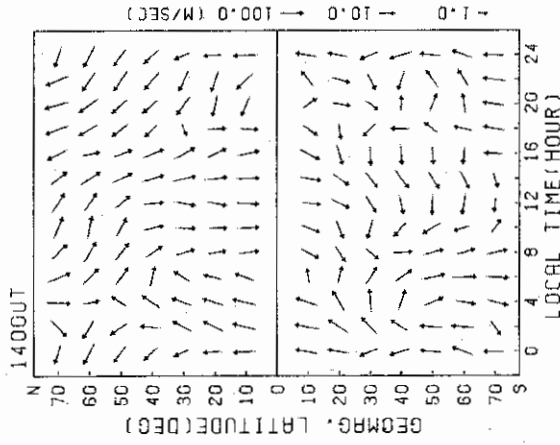
DEC. 15, 1964

ELECTRIC FIELD (LOG SCALE)

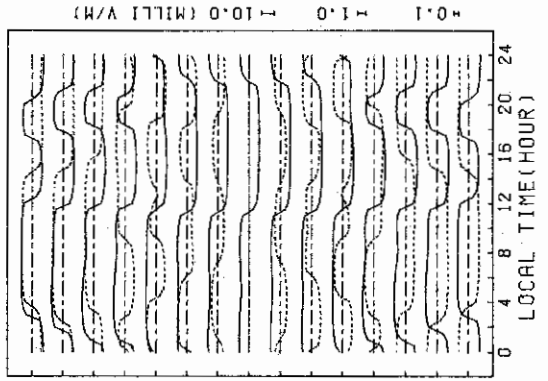
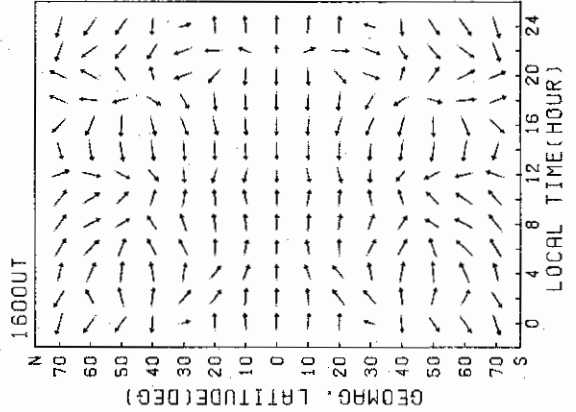


DEC. 15, 1964

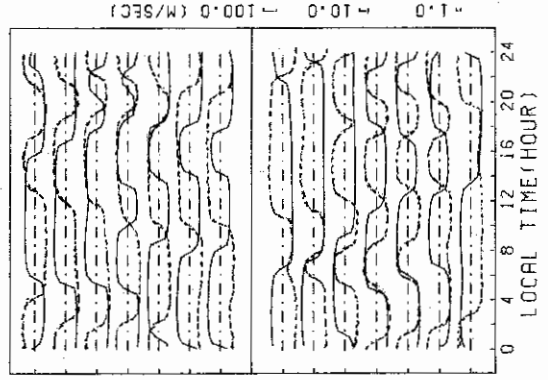
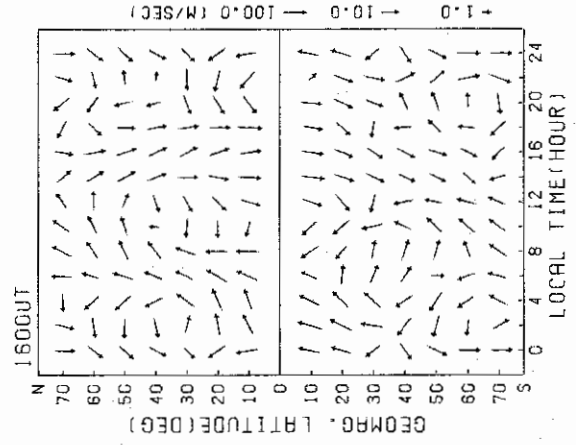
WIND VELOCITY (LOG SCALE)



1600UT

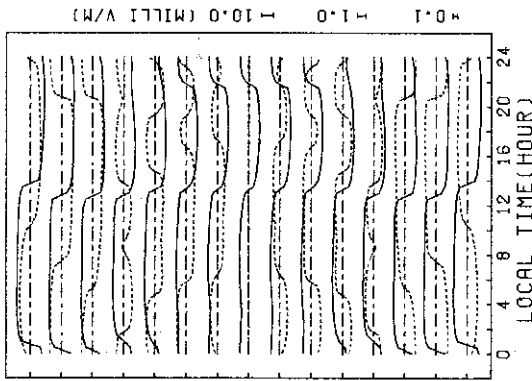
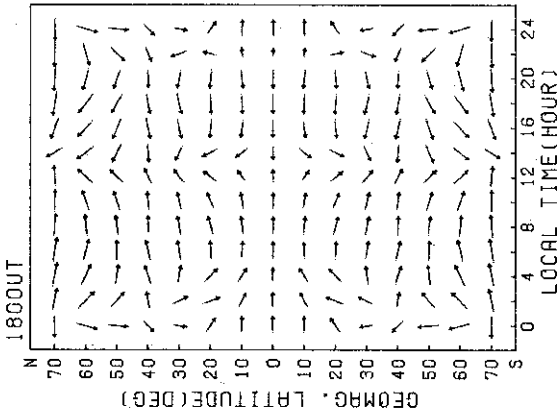


1600UT



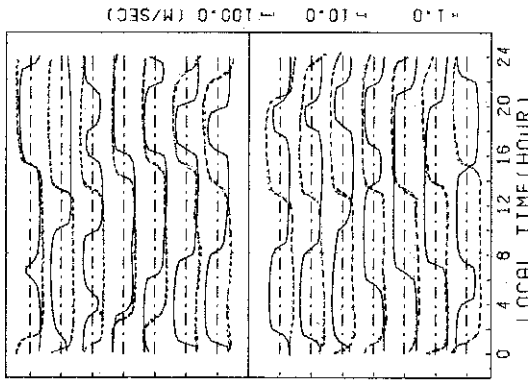
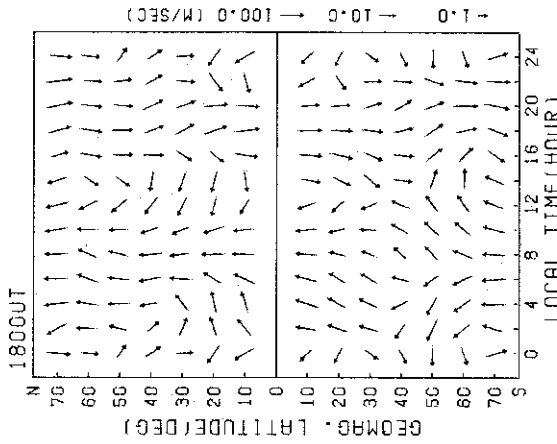
DEC.15.1964

ELECTRIC FIELD (LOG SCALE)

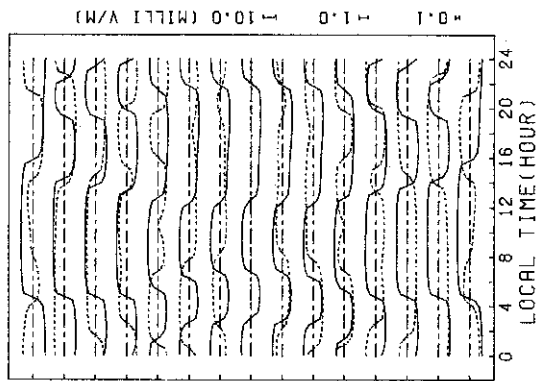
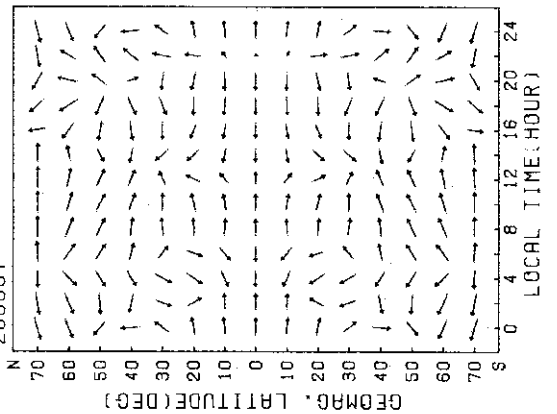


DEC.15.1964

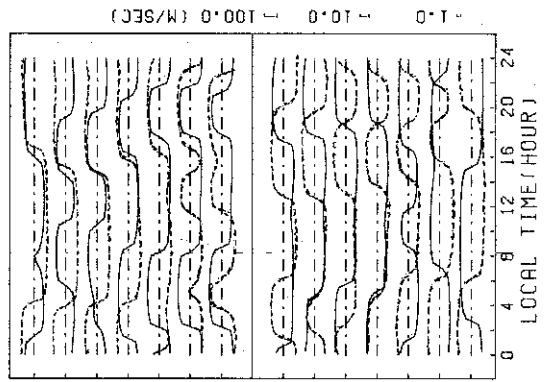
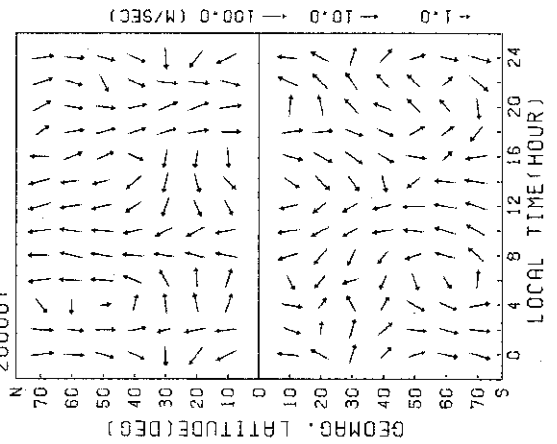
WIND VELOCITY (LOG SCALE)



2000UT

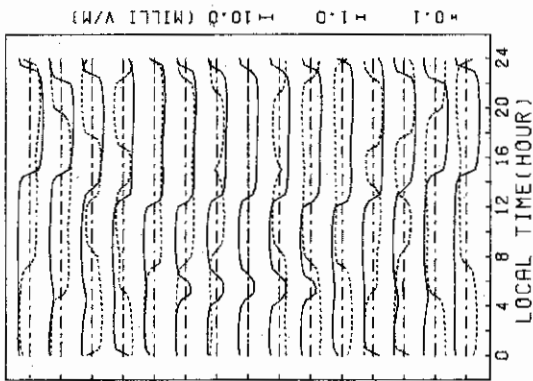
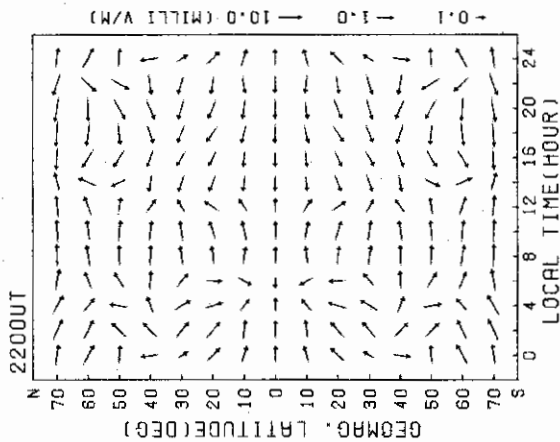


2000UT



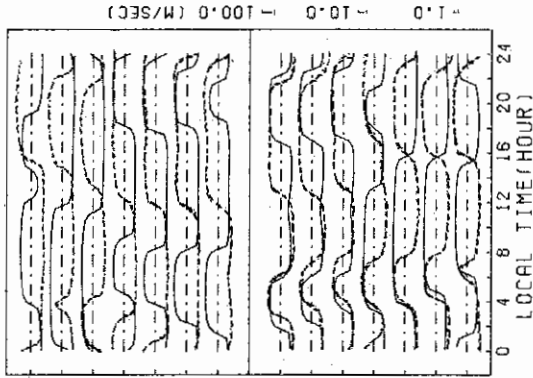
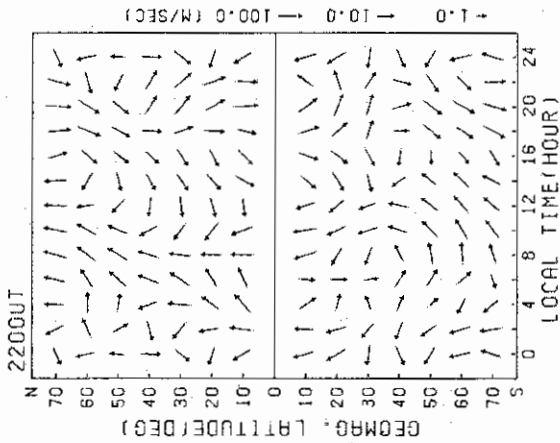
DEC. 15, 1964

ELECTRIC FIELD (LOG SCALE)

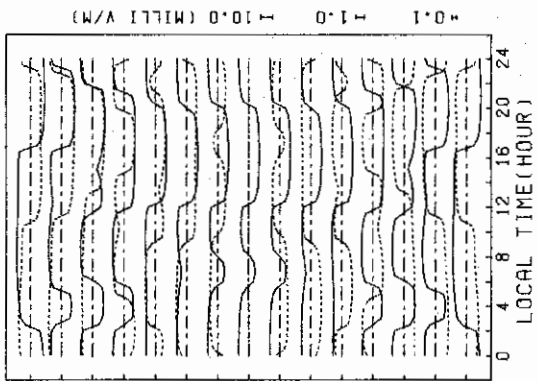
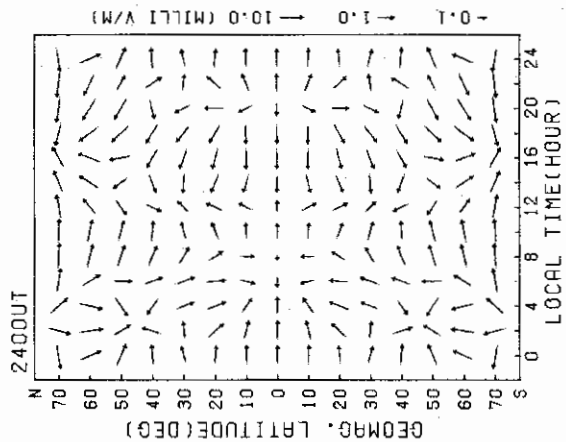


DEC. 15, 1964

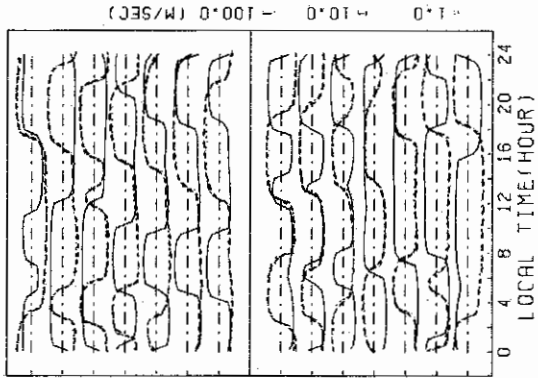
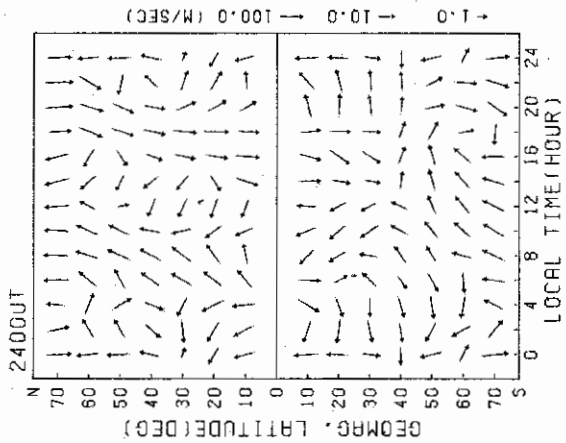
WIND VELOCITY (LOG SCALE)



2400UT

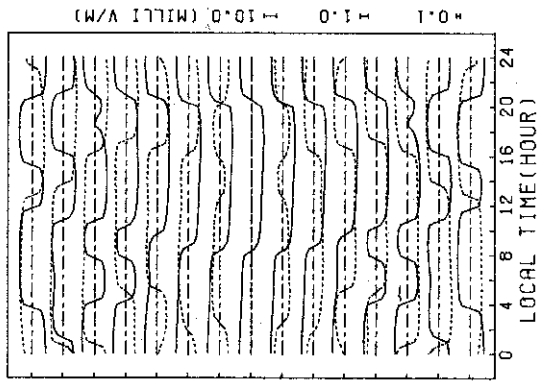
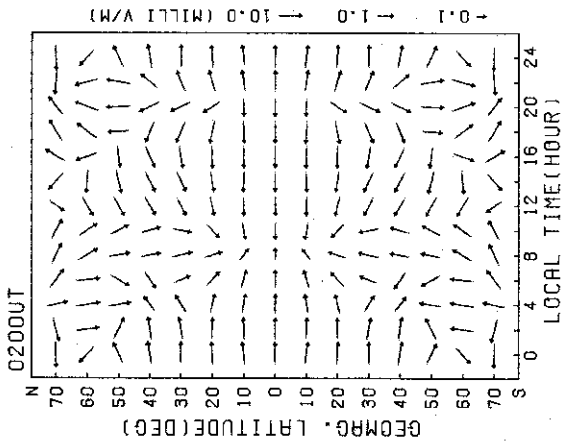


2400UT



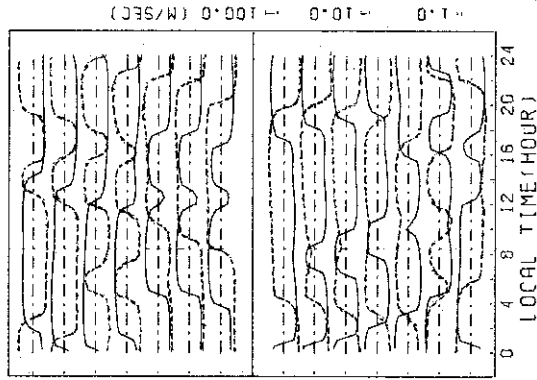
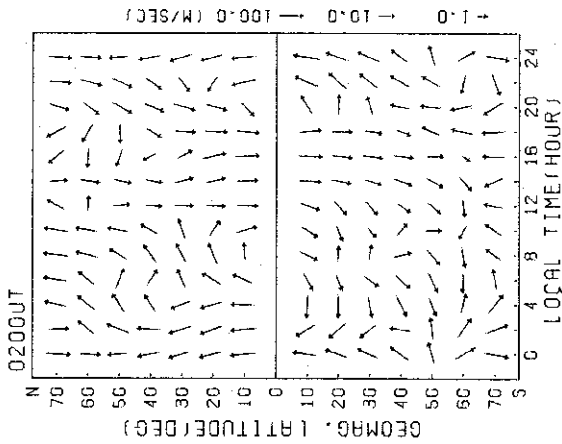
DEC. 16, 1964

ELECTRIC FIELD (LOG SCALE)

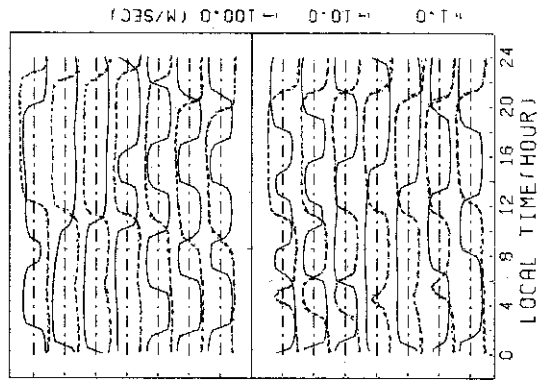
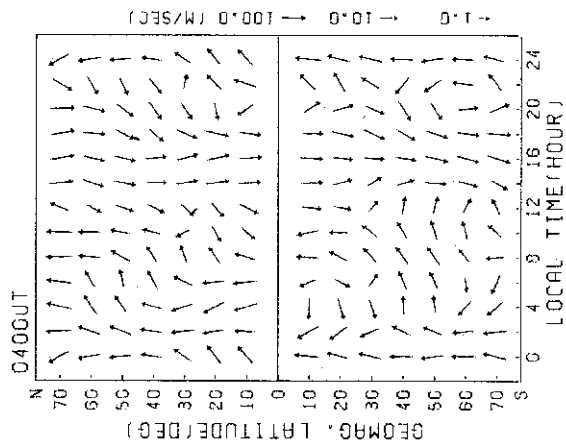
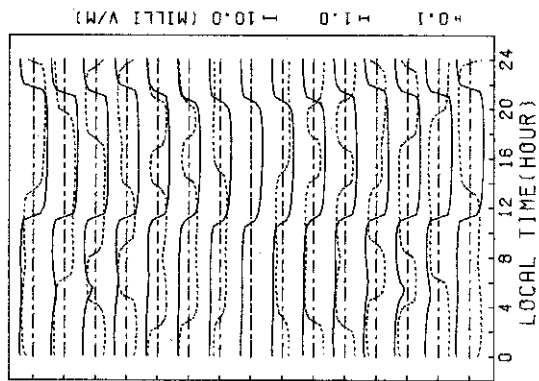
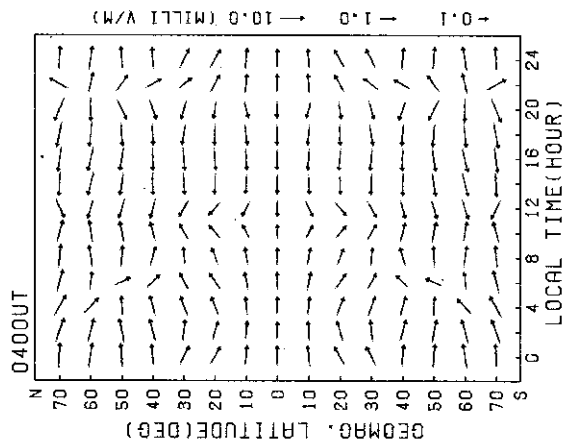


DEC. 16, 1964

WIND VELOCITY (LOG SCALE)

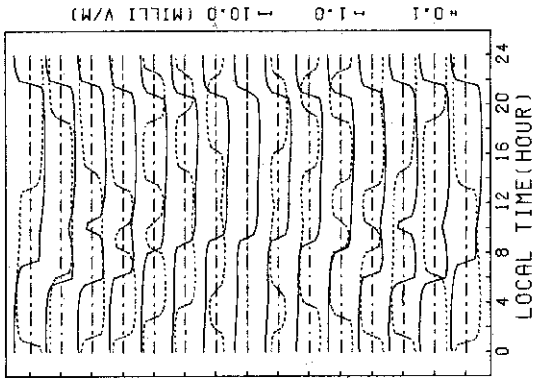
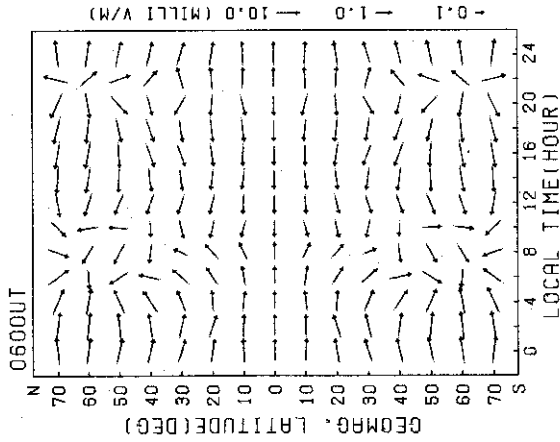


0400UT



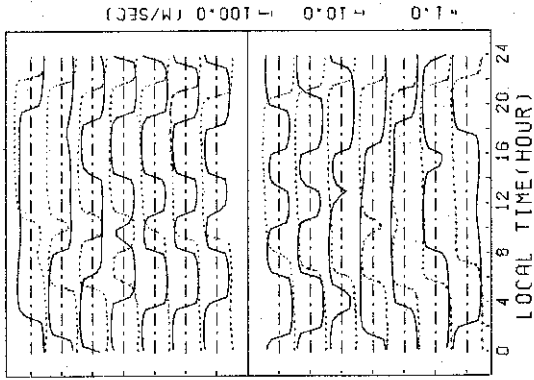
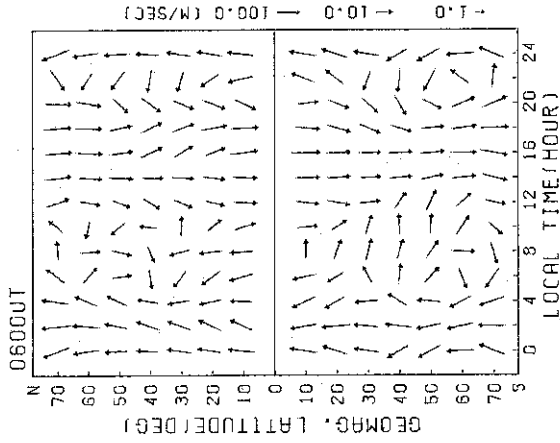
DEC.16.1964

ELECTRIC FIELD (LOG SCALE)

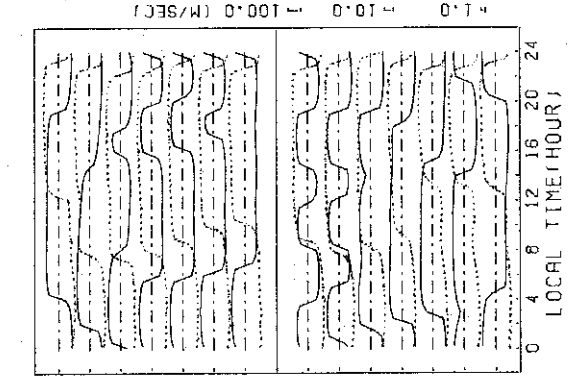
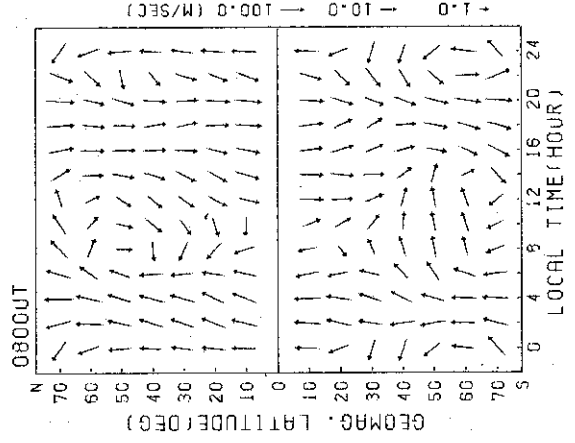
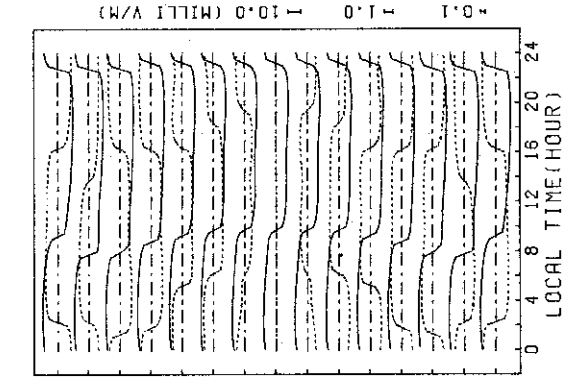
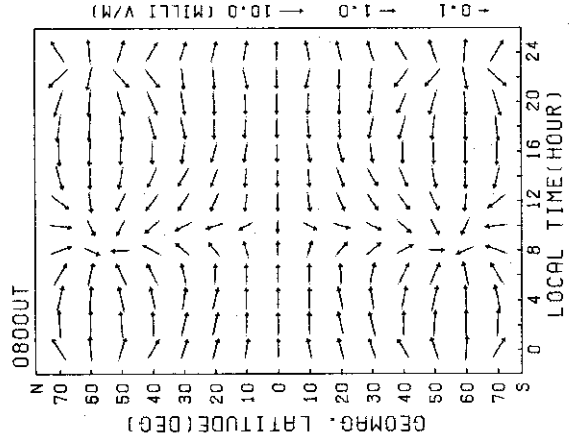


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WIND VELOCITY (LOG SCALE)

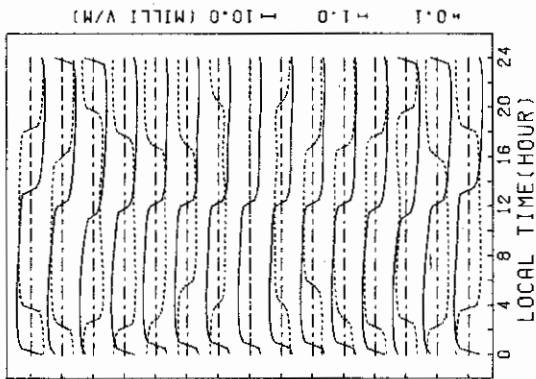
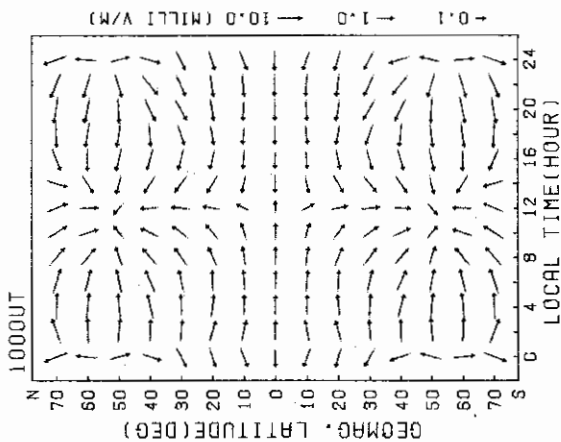


0800UT



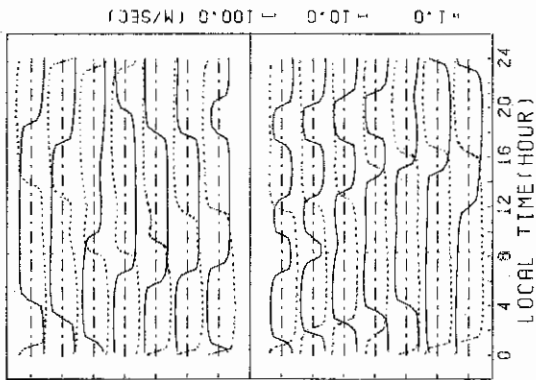
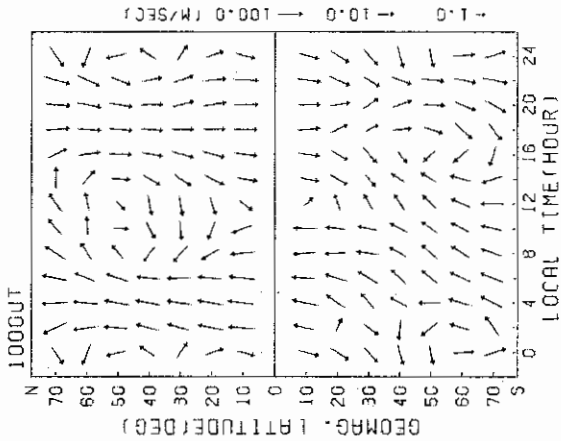
DEC.16.1964

ELECTRIC FIELD (LOG SCALE)

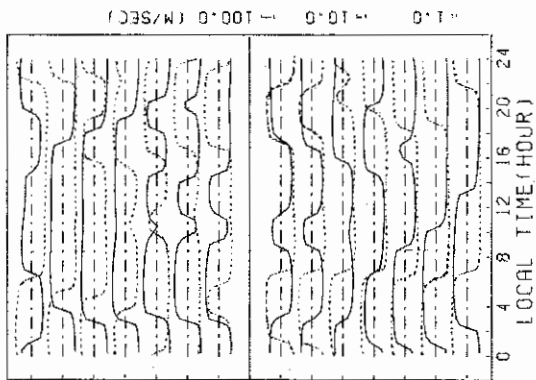
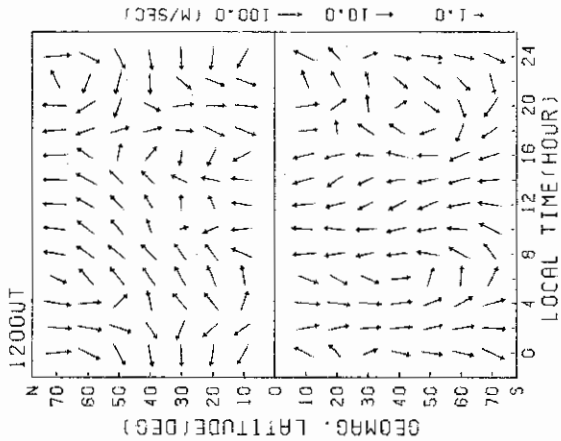
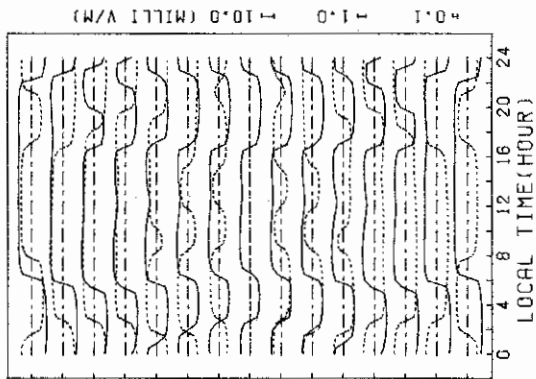
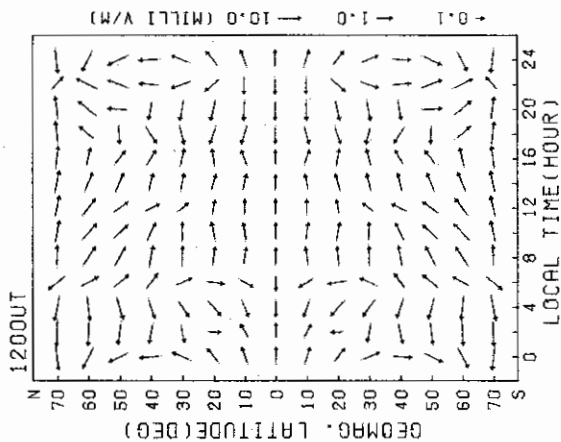


DEC.16.1964

WIND VELOCITY (LOG SCALE)

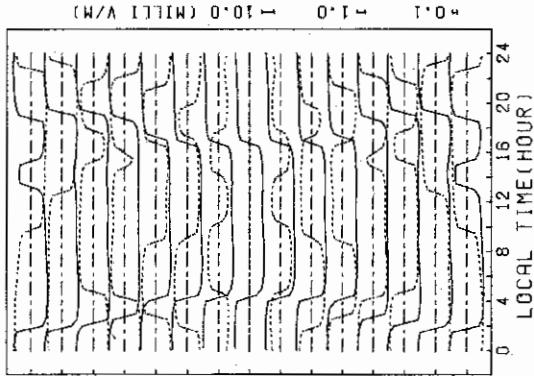
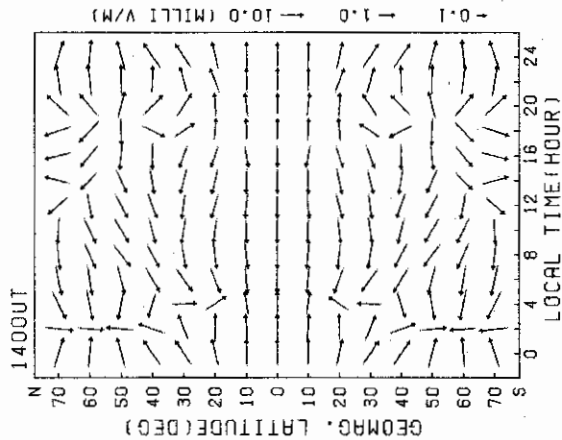


1200UT



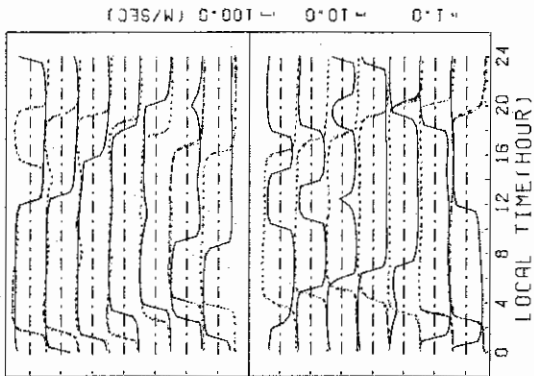
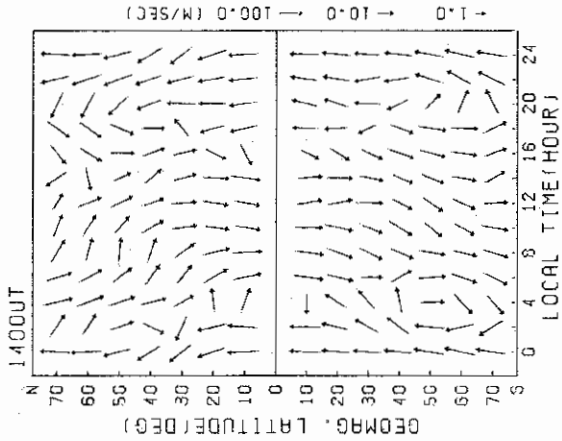
DEC. 16, 1964

ELECTRIC FIELD (LOG SCALE)

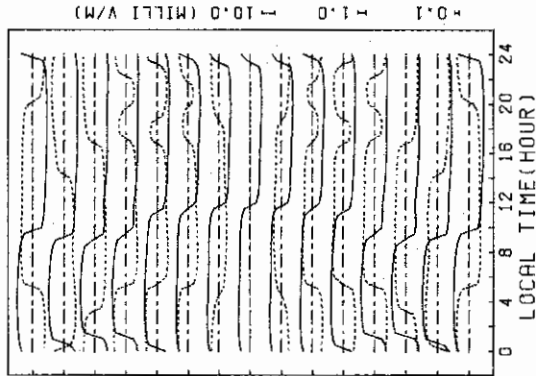
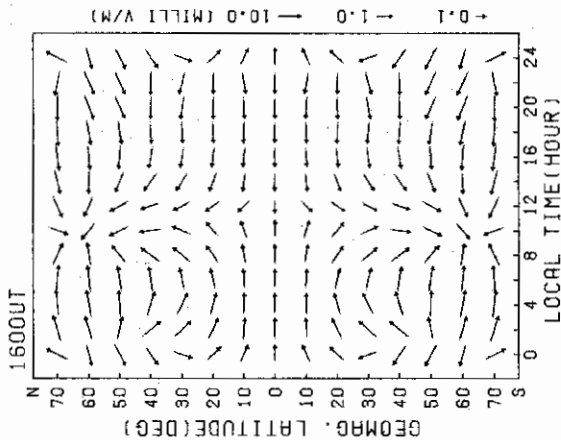


DEC. 16, 1964

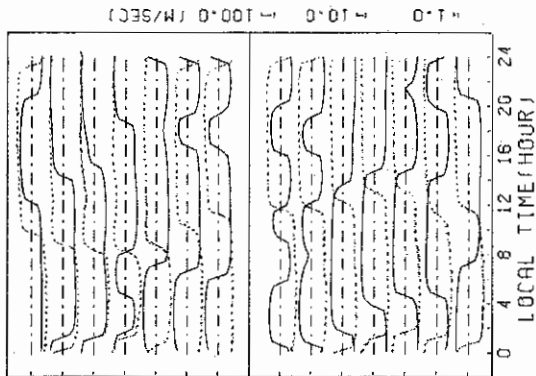
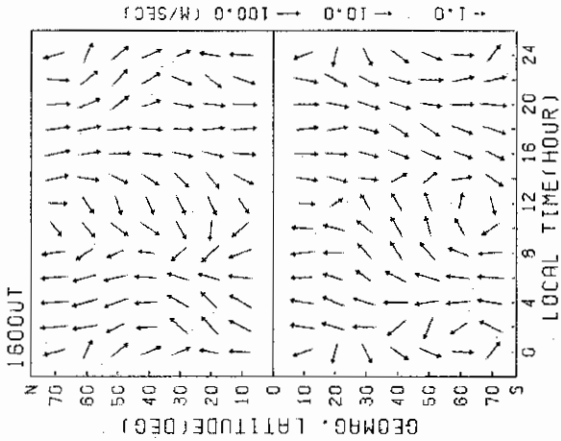
WIND VELOCITY (LOG SCALE)



1600UT

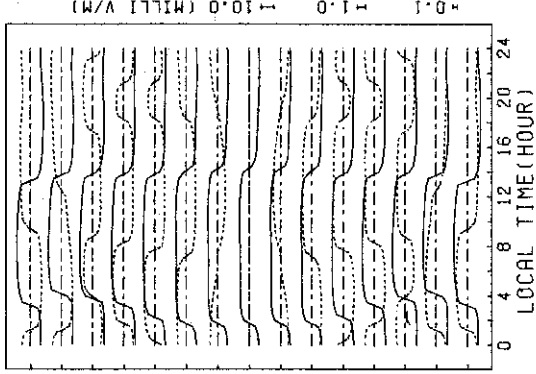
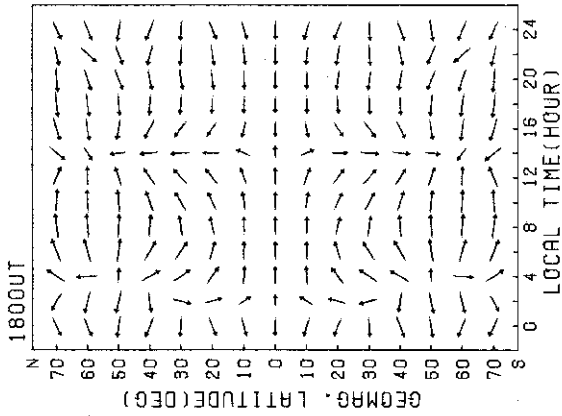


1600UT



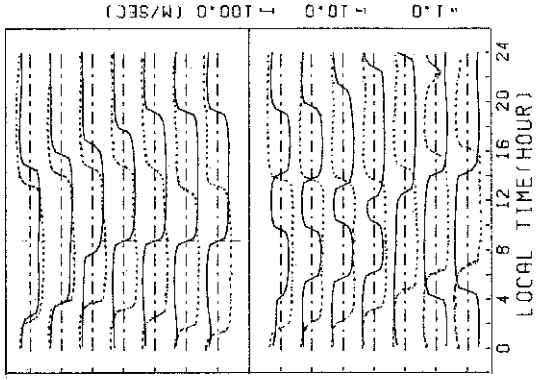
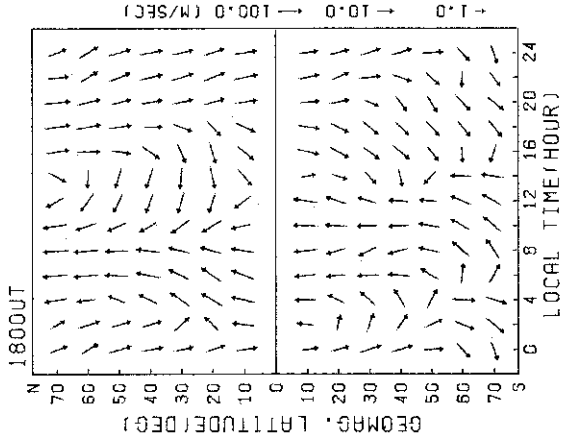
DEC.16.1964

ELECTRIC FIELD (LOG SCALE)

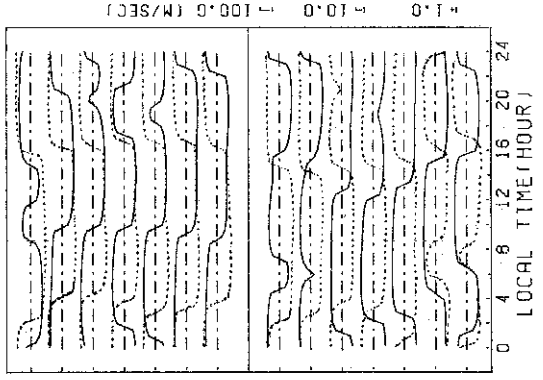
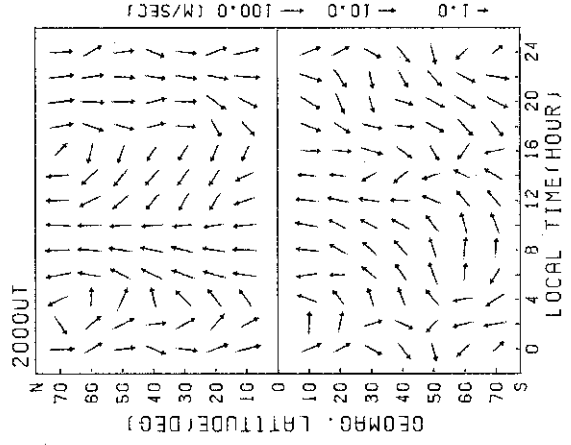
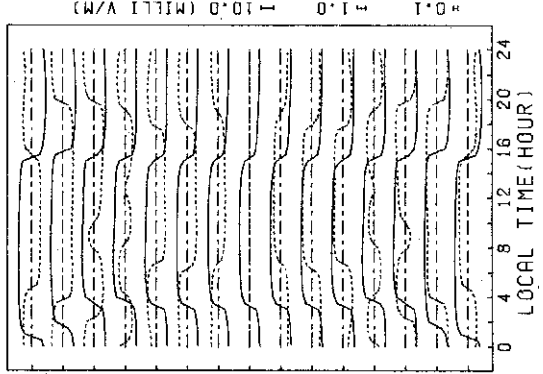
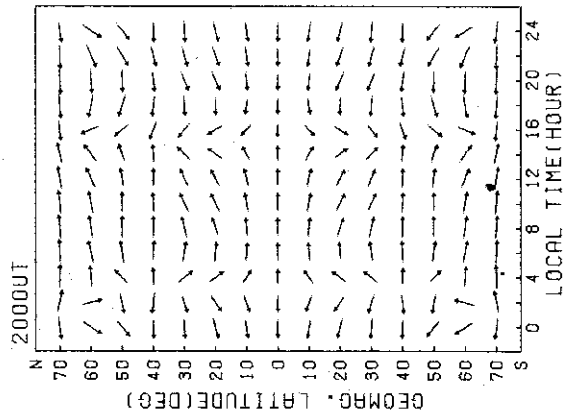


DEC.16.1964

WIND VELOCITY (LOG SCALE)

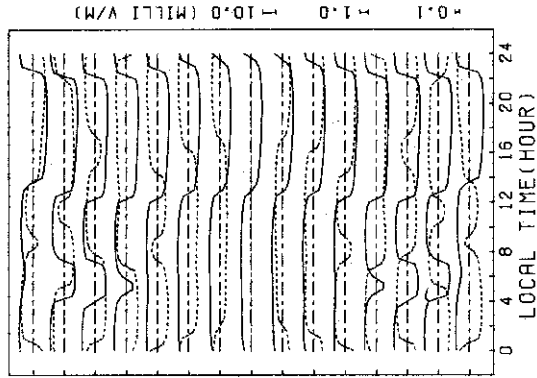
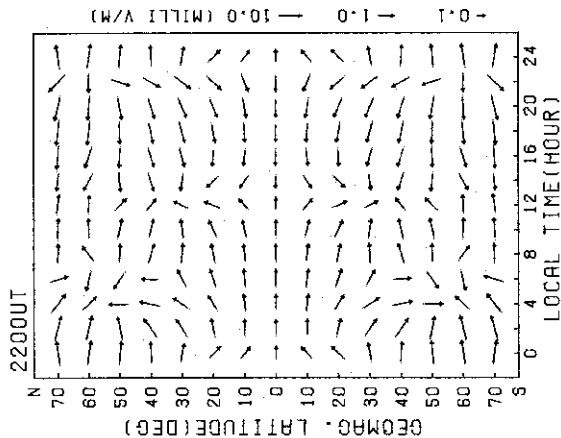


2000UT



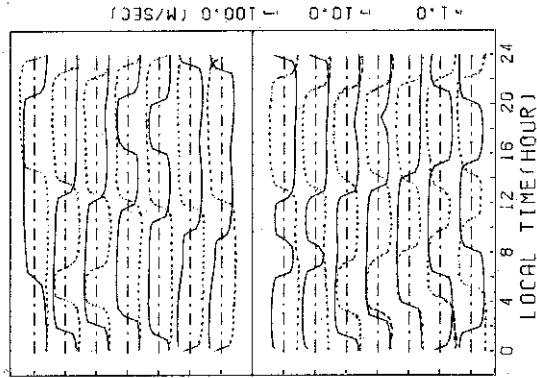
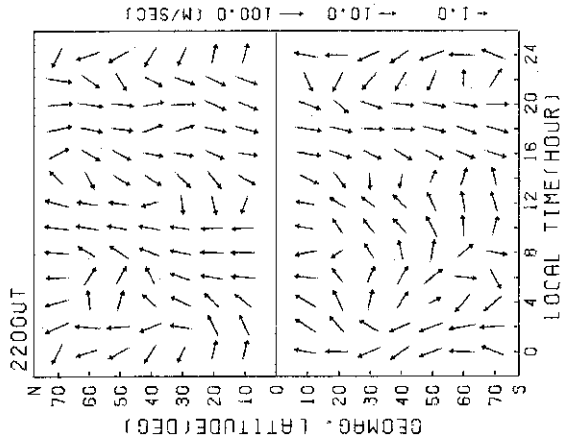
DEC.16.1964

ELECTRIC FIELD (LOG SCALE)

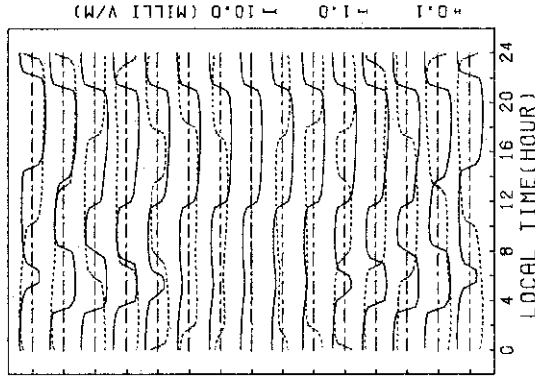
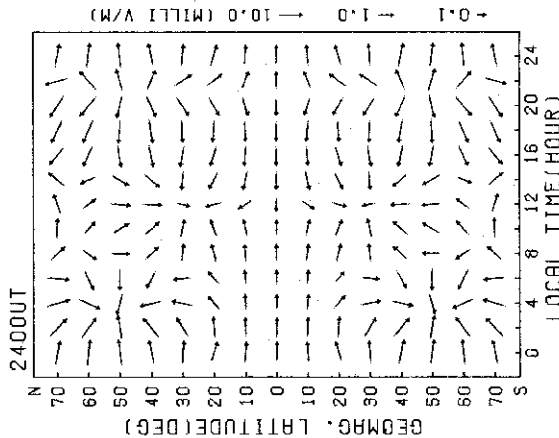


DEC.16.1964

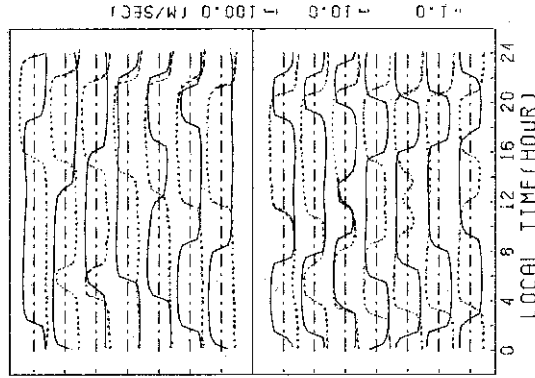
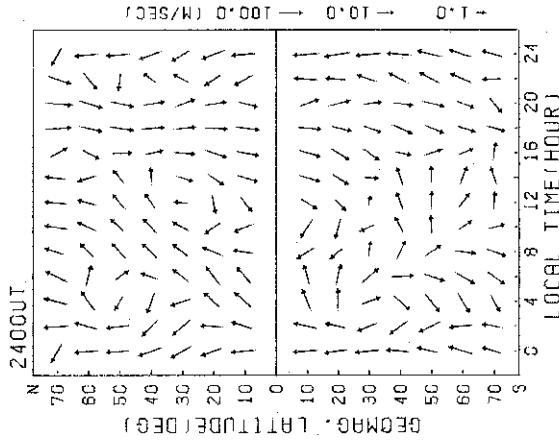
WIND VELOCITY (LOG SCALE)



2400UT

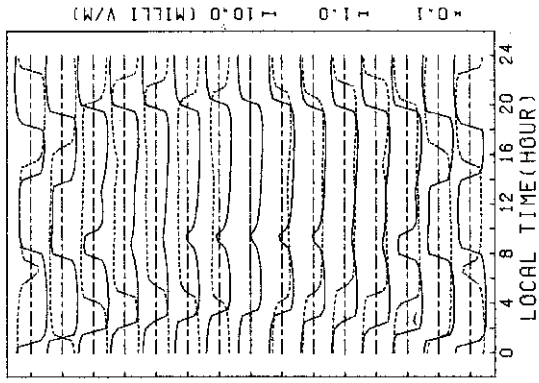
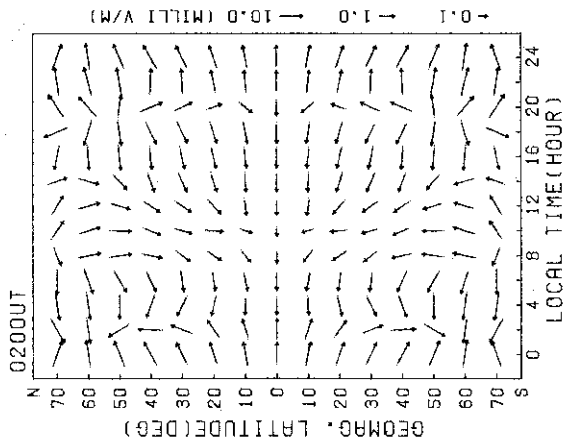


2400UT



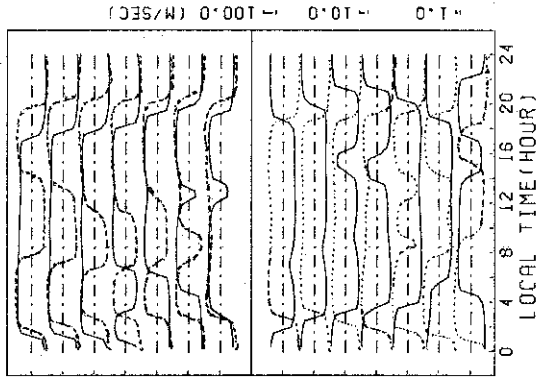
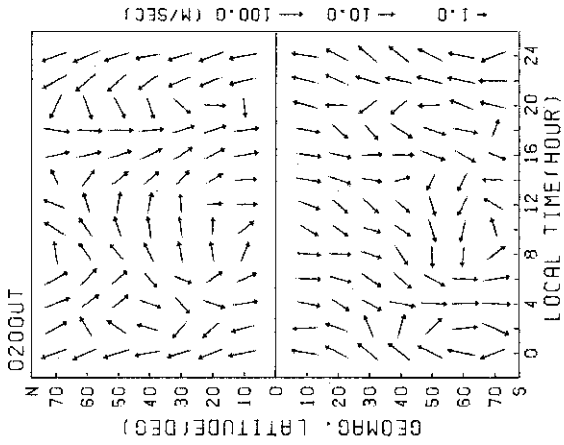
DEC.17,1964

ELECTRIC FIELD (LOG SCALE)

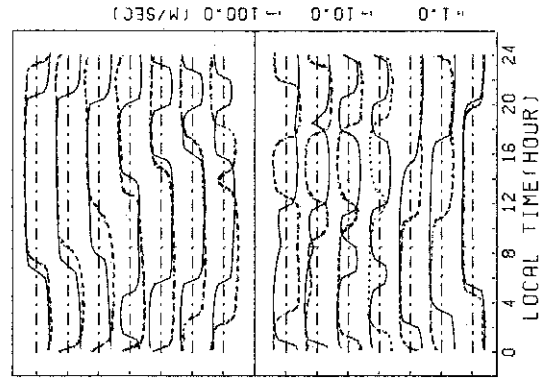
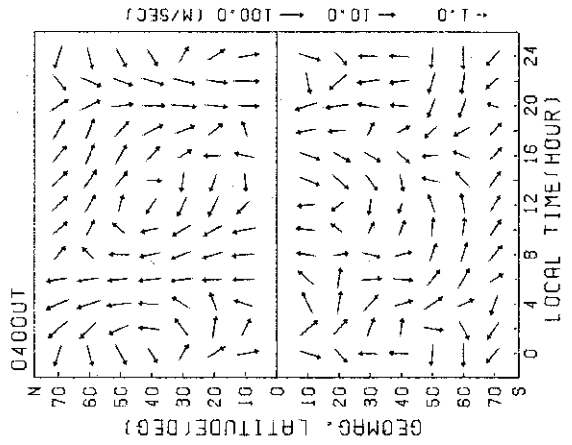
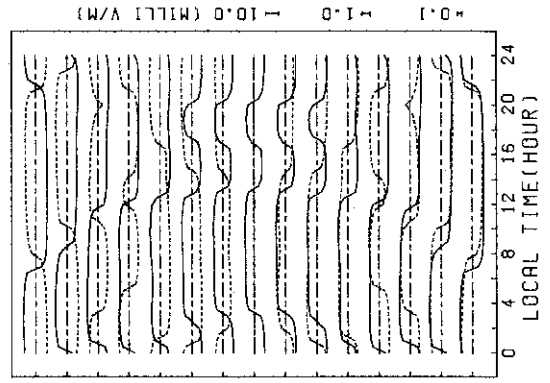
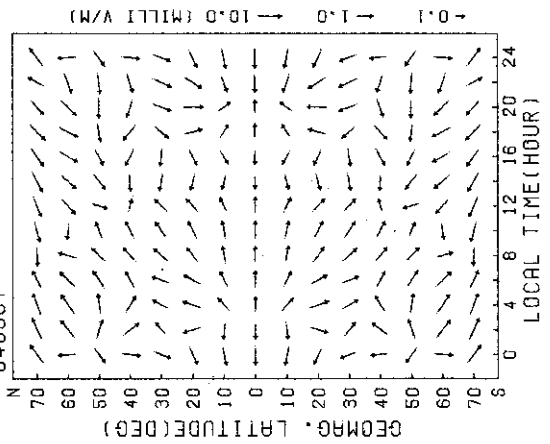


DEC.17,1964

WIND VELOCITY (LOG SCALE)

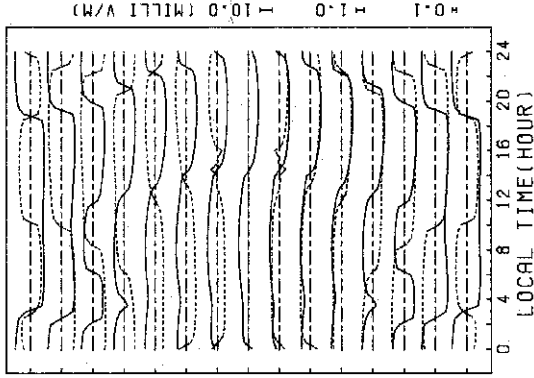
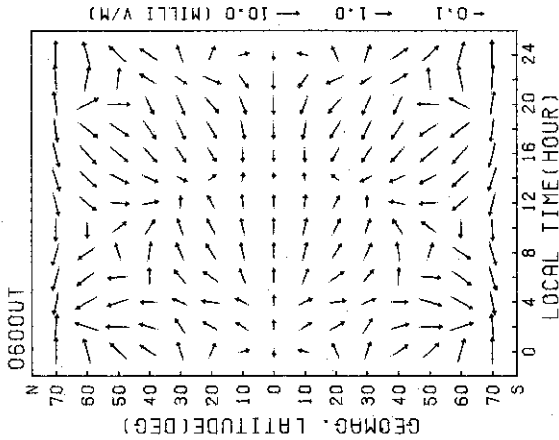


0400UT



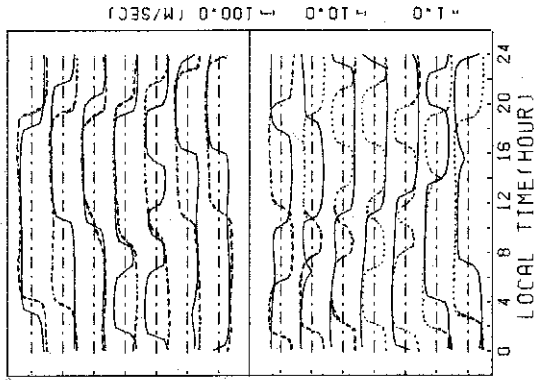
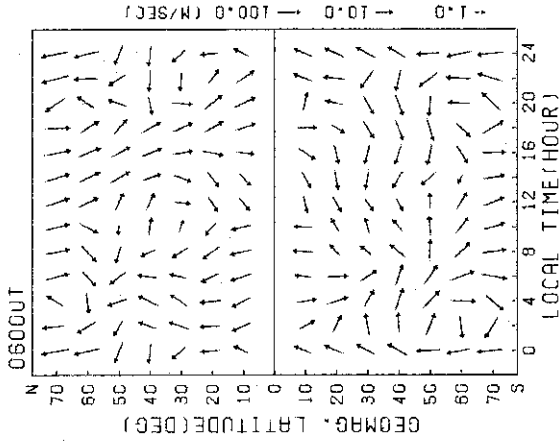
DEC.17.1964

ELECTRIC FIELD (LOG SCALE)

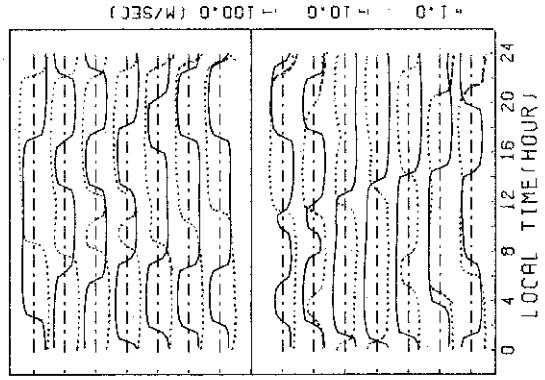
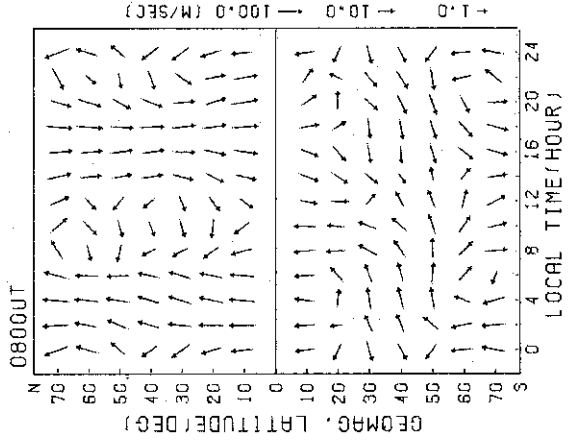
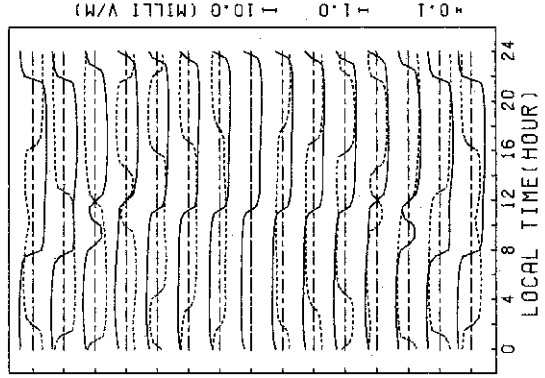
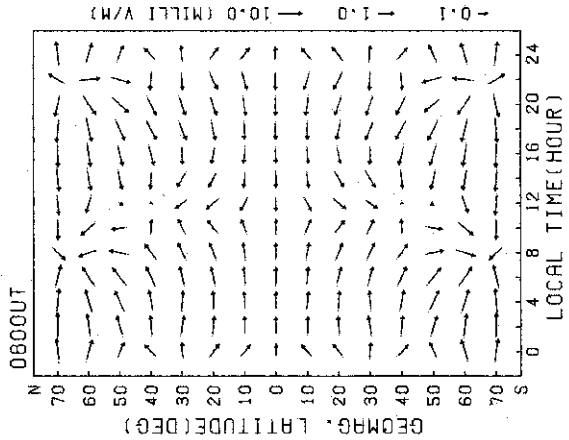


DEC.17.1964

WIND VELOCITY (LOG SCALE)

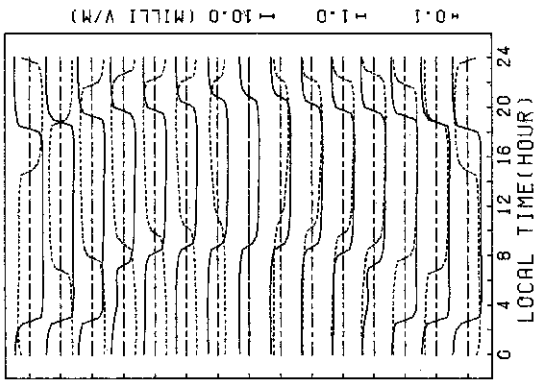
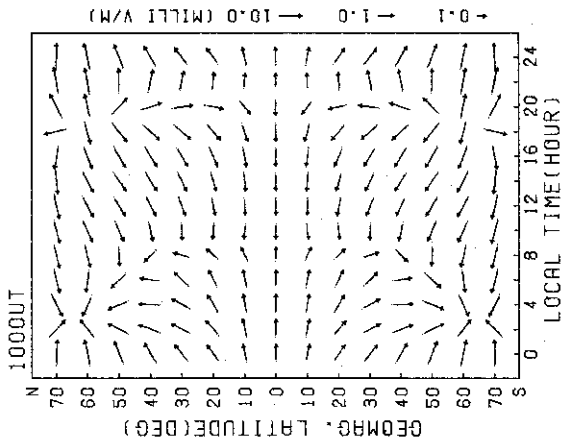


0800UT



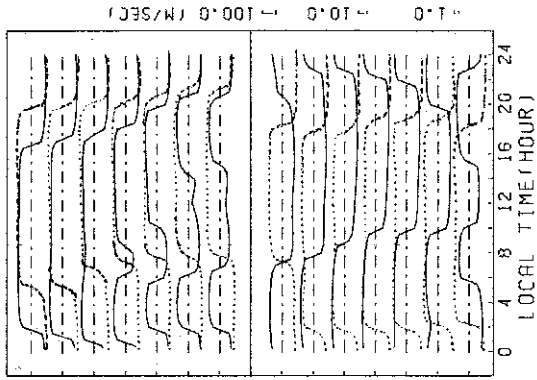
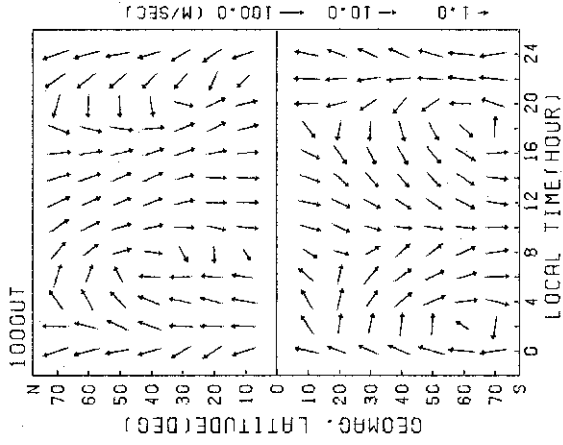
DEC.17,1964

ELECTRIC FIELD (LOG SCALE)

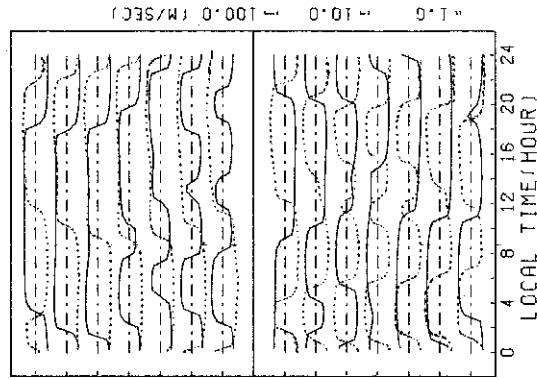
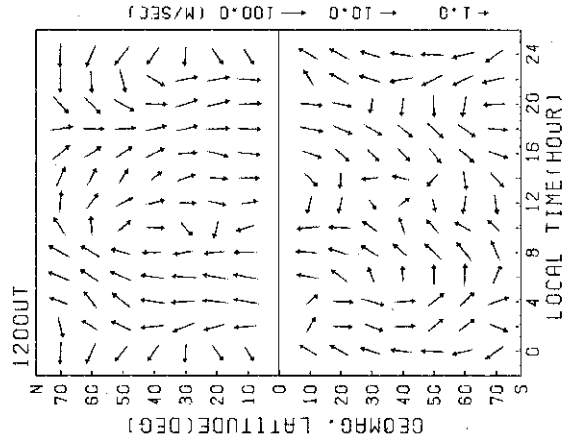
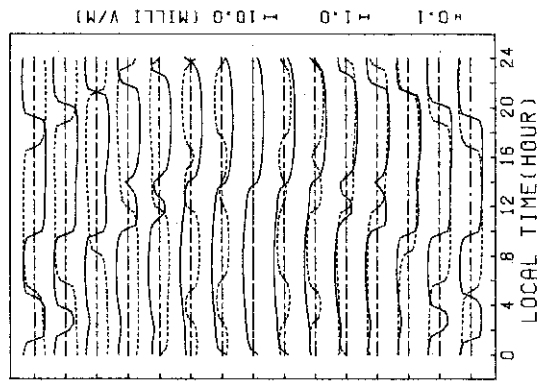
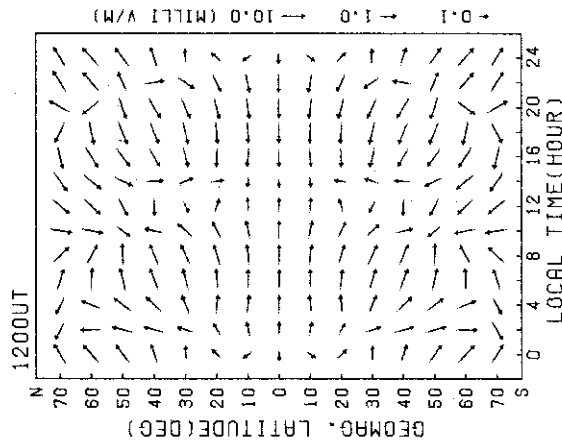


DEC.17,1964

WIND VELOCITY (LOG SCALE)

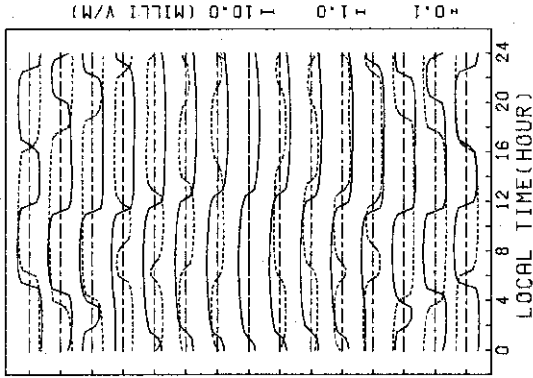
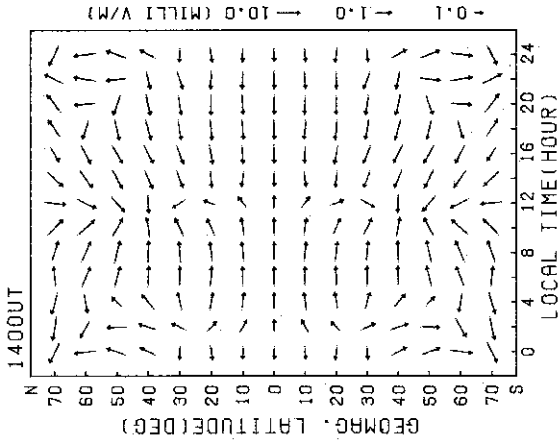


1200UT



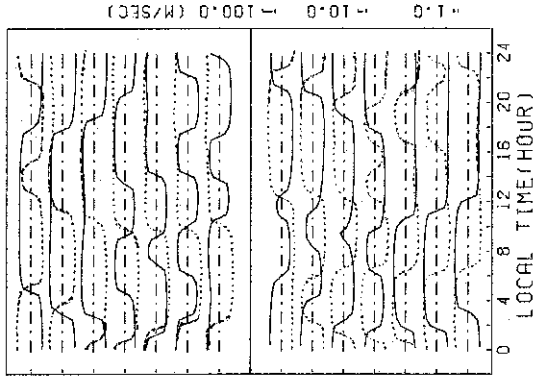
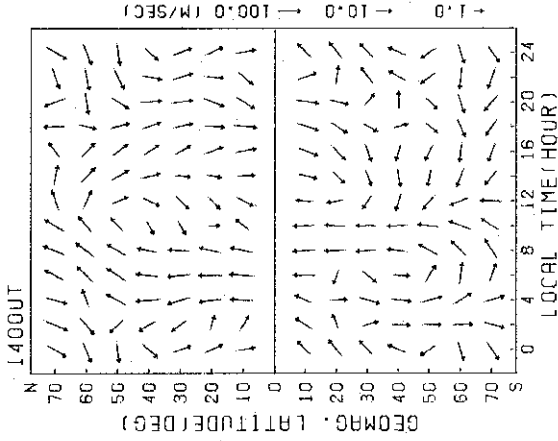
DEC. 17, 1964

ELECTRIC FIELD (LOG SCALE)

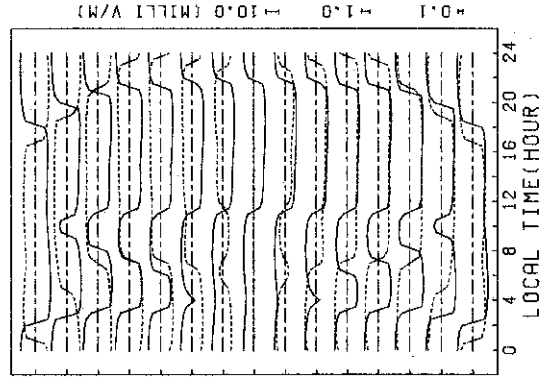
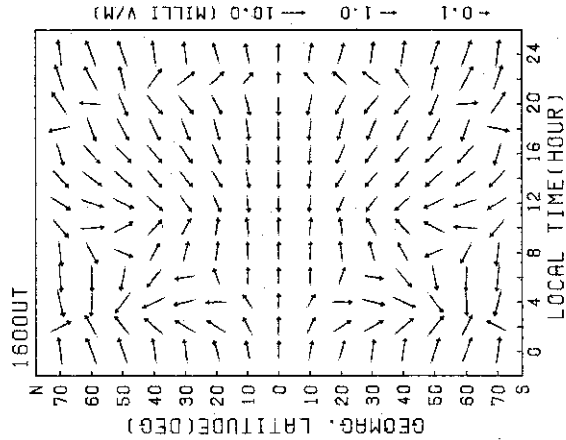


DEC. 17, 1964

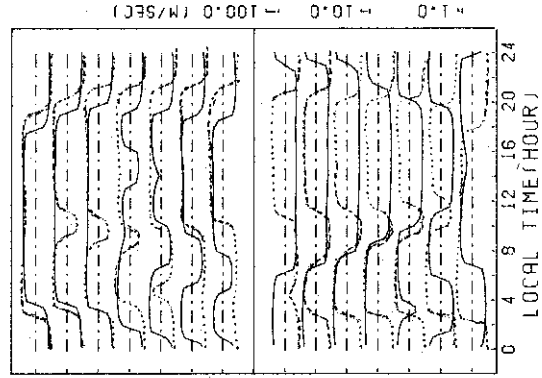
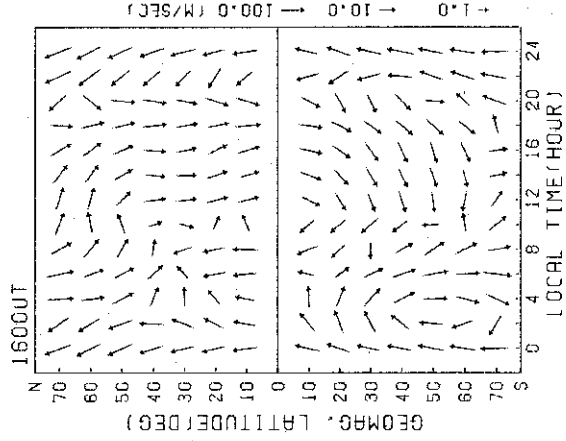
WIND VELOCITY (LOG SCALE)



1600UT

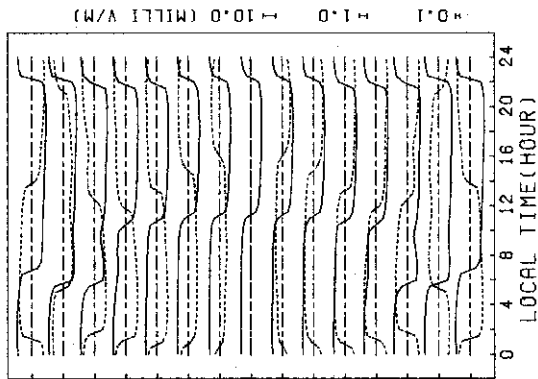
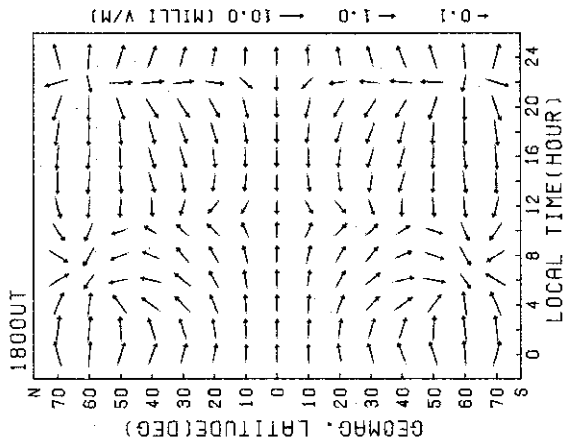


1600UT



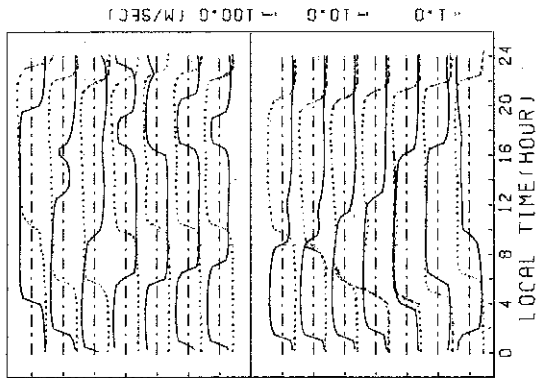
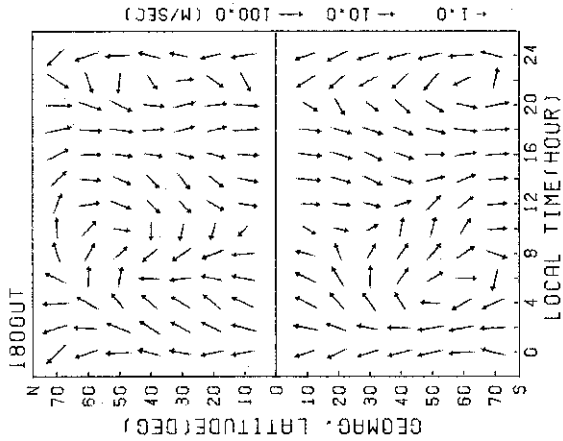
DEC.17.1964

ELECTRIC FIELD (LOG SCALE)

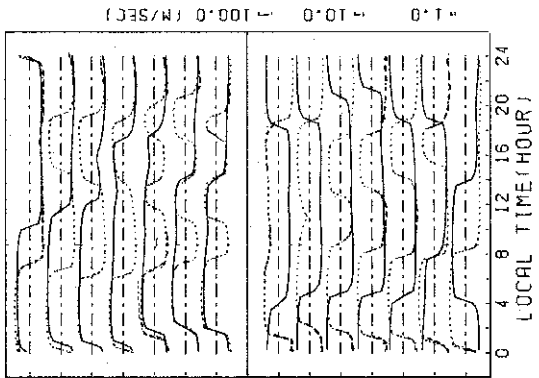
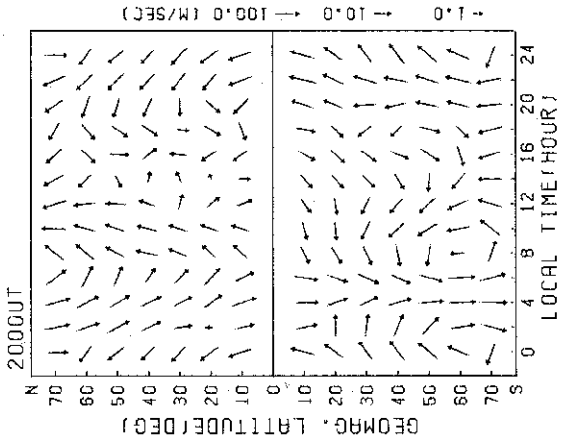
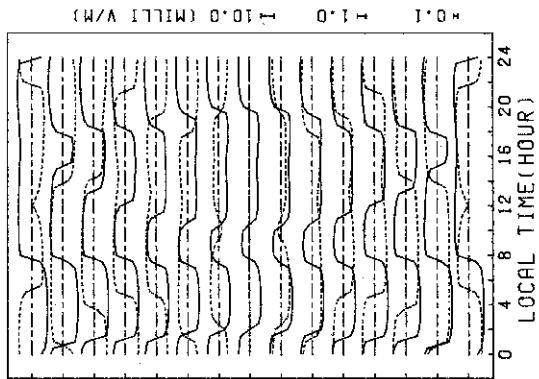
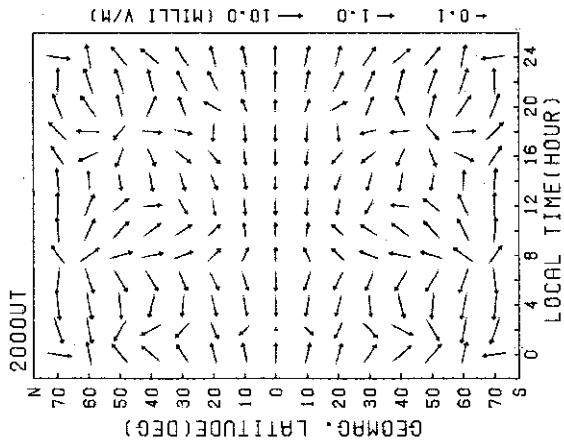


DEC.17.1964

WIND VELOCITY (LOG SCALE)

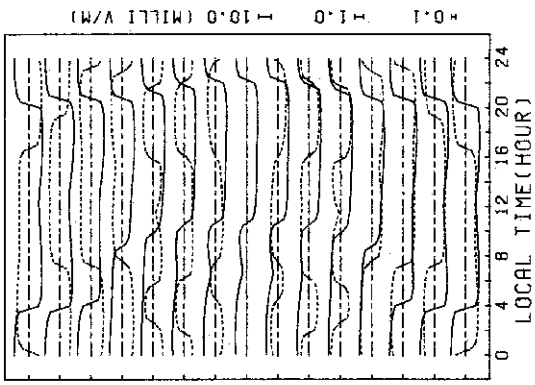
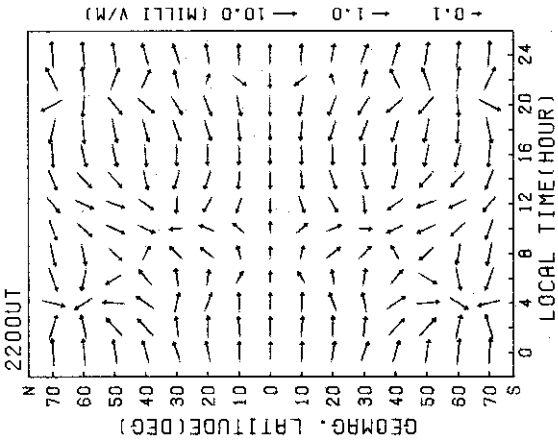


2000UT



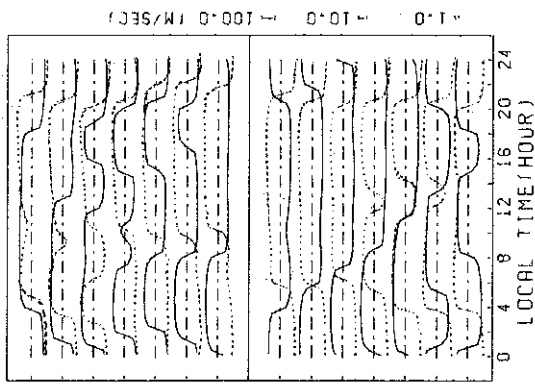
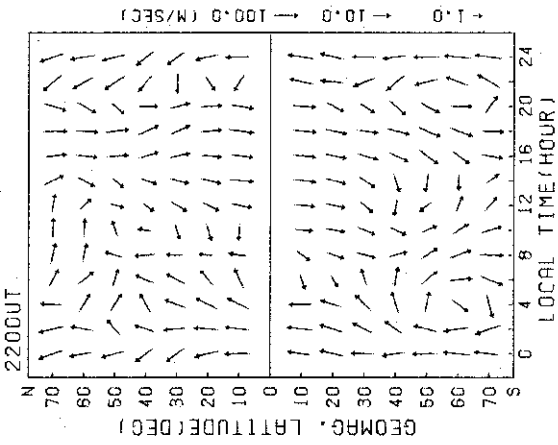
DEC. 17, 1964

ELECTRIC FIELD (LOG SCALE)

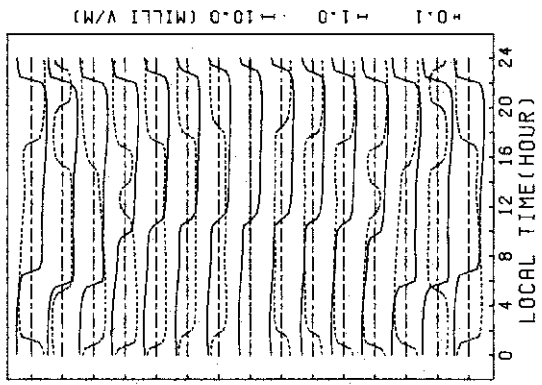
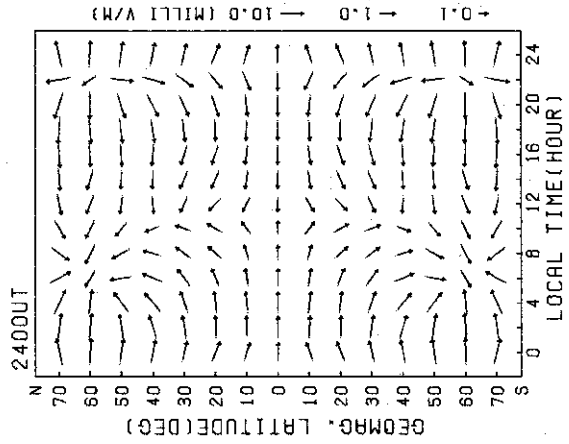


DEC. 17, 1964

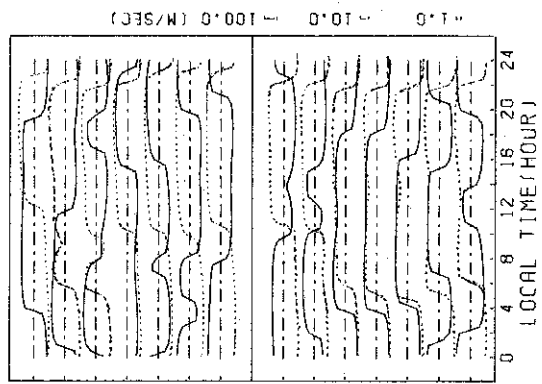
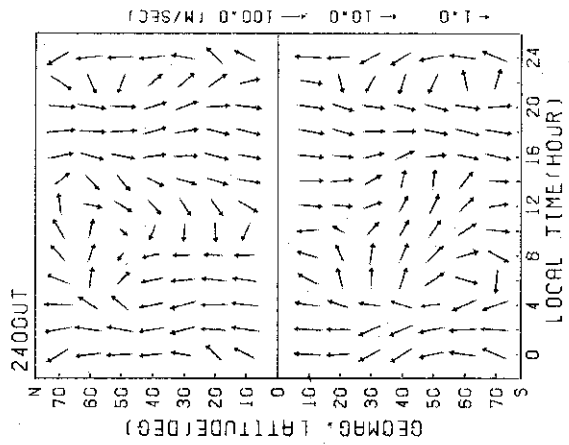
WIND VELOCITY (LOG SCALE)



2400UT

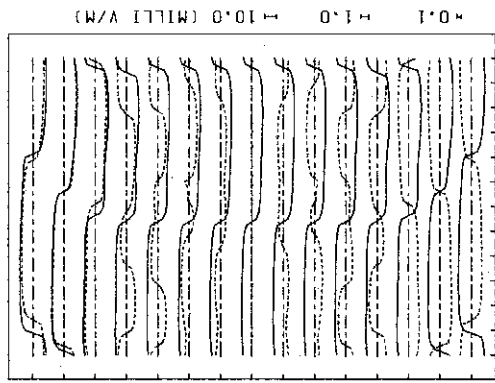
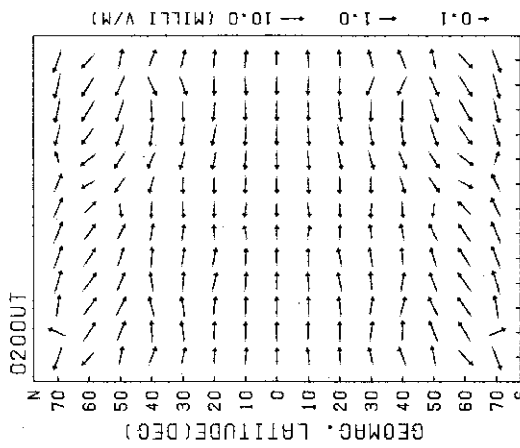


2400UT



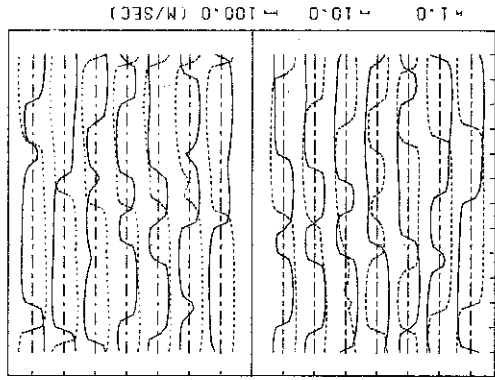
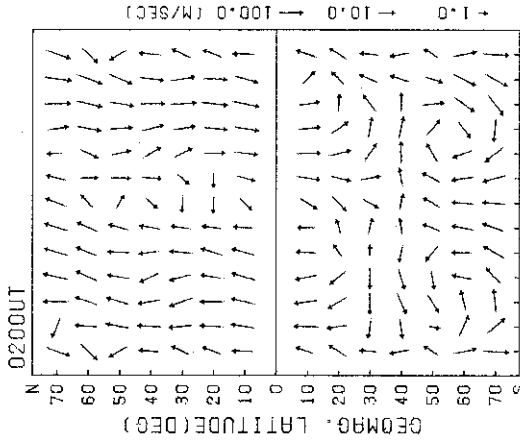
DEC. 18, 1964

ELECTRIC FIELD (LOG SCALE)

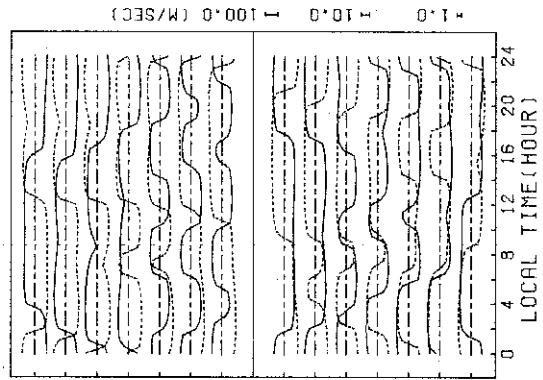
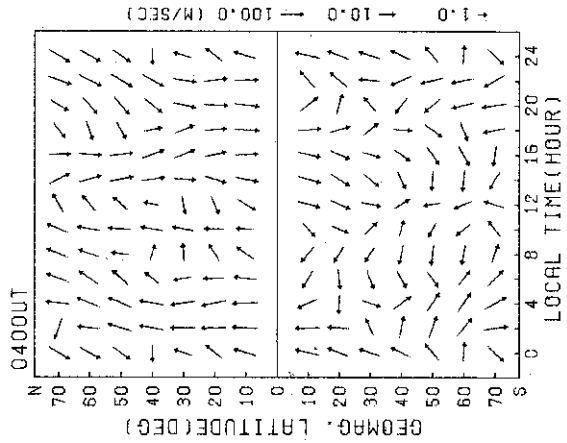
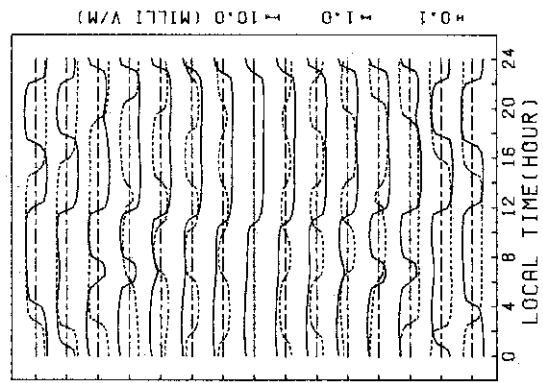
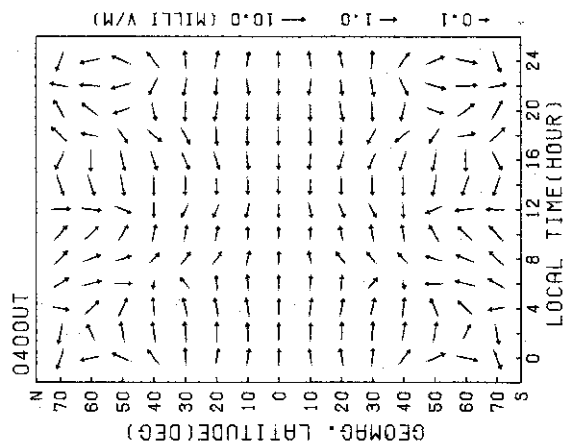


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WIND VELOCITY (LOG SCALE)

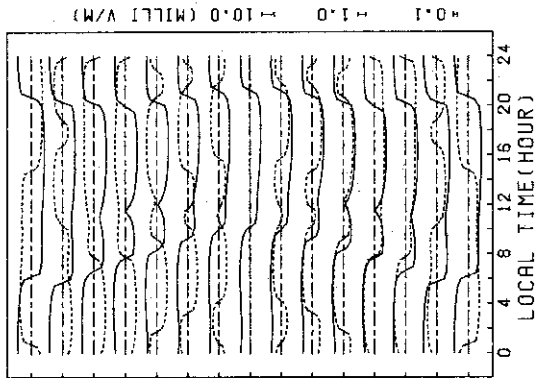
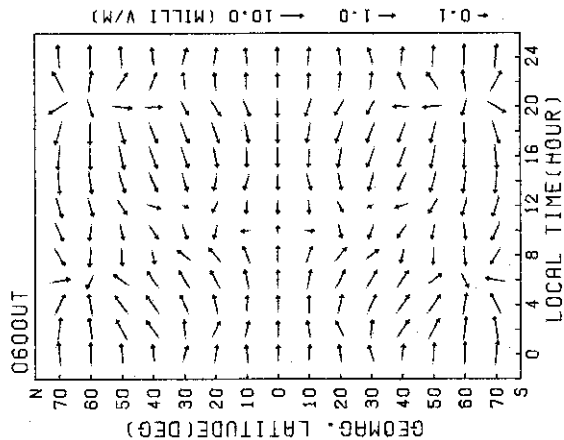


0400UT



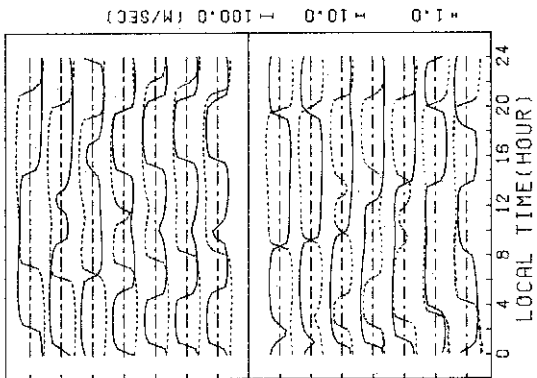
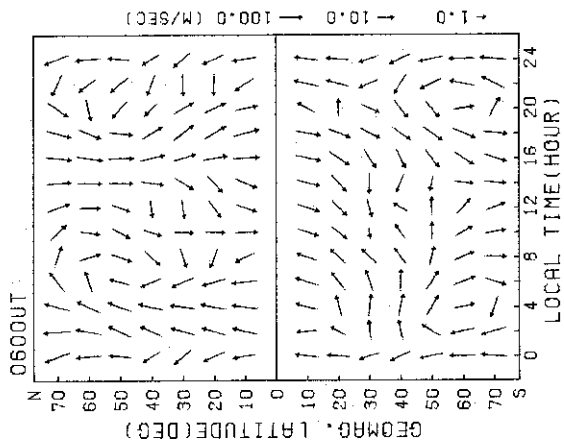
DEC.18,1964

ELECTRIC FIELD (LOG SCALE)

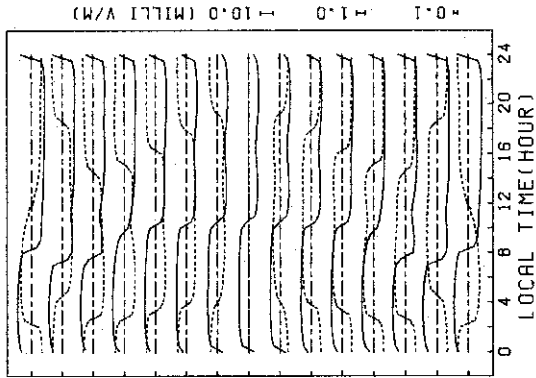
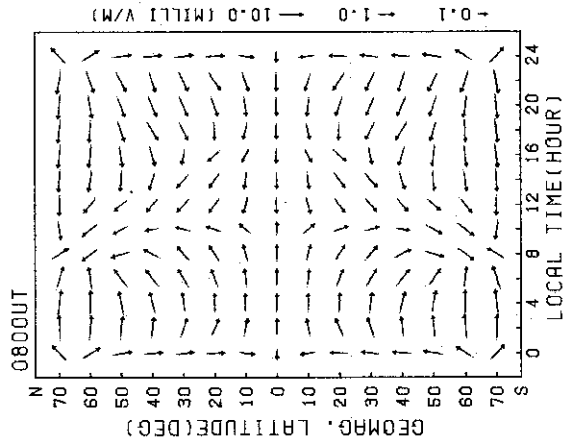


DEC.18,1964

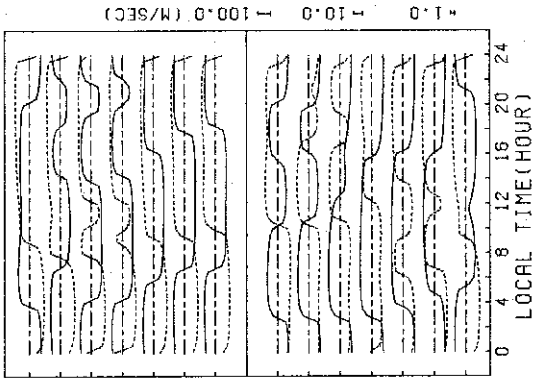
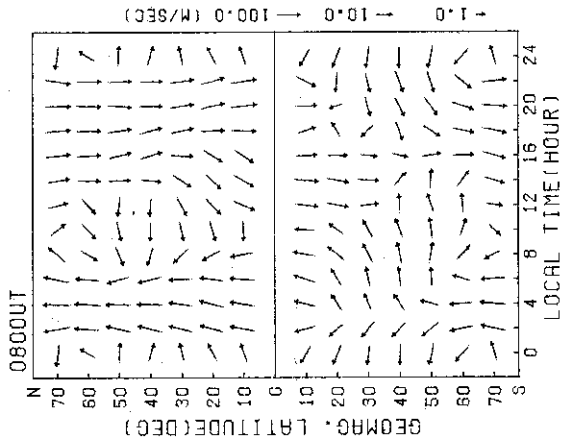
WIND VELOCITY (LOG SCALE)



0800UT

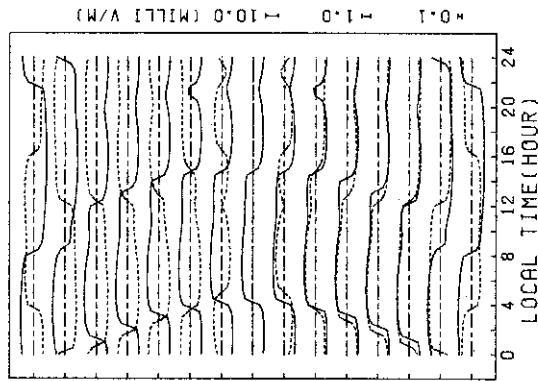
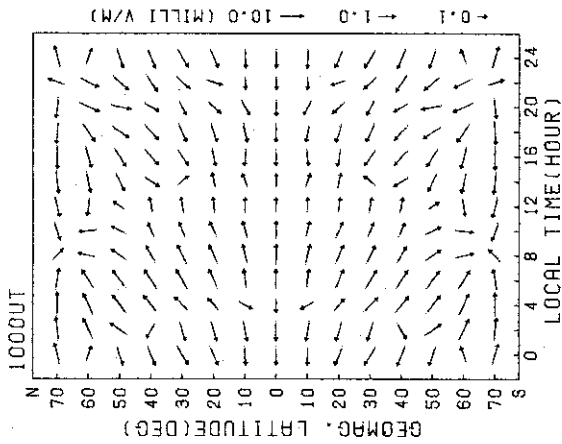


0800UT



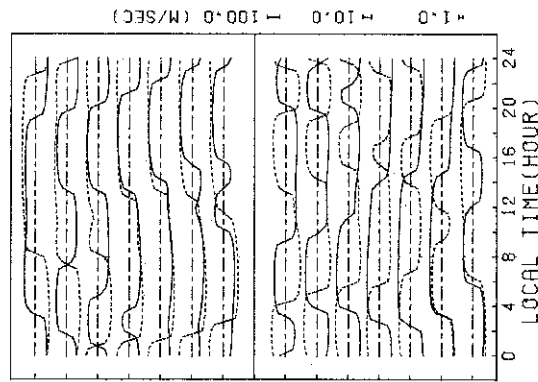
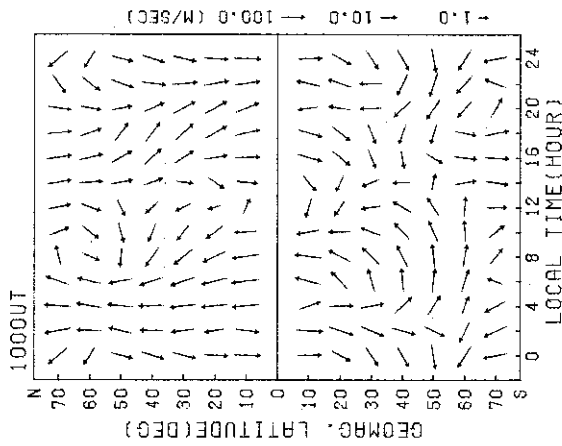
DEC.18.1964

ELECTRIC FIELD (LOG SCALE)

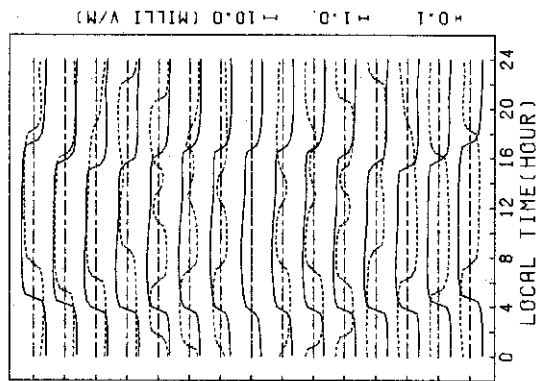
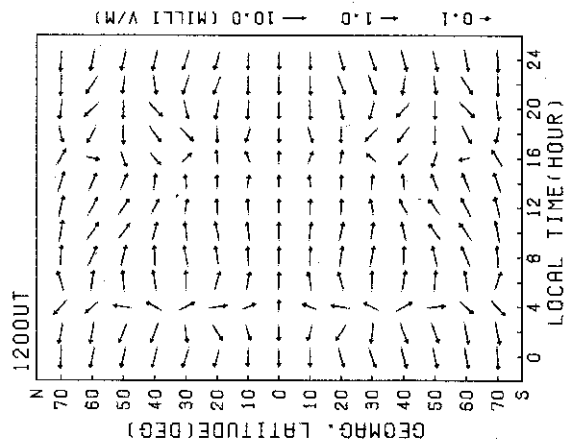


DEC.18.1964

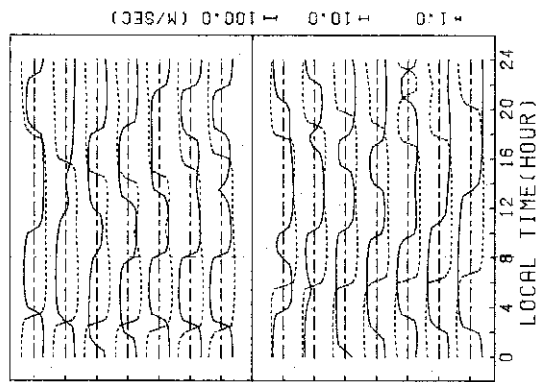
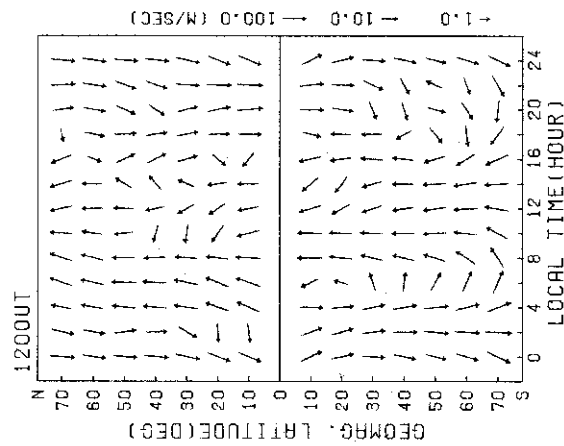
WIND VELOCITY (LOG SCALE)



12000

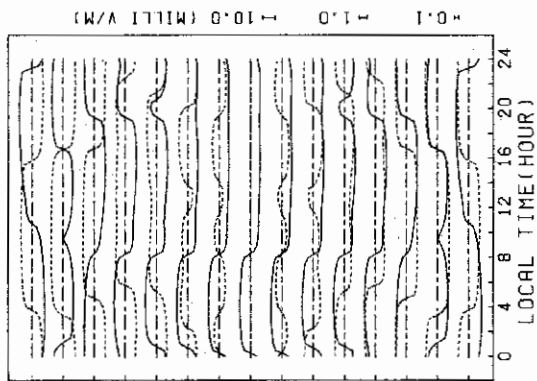
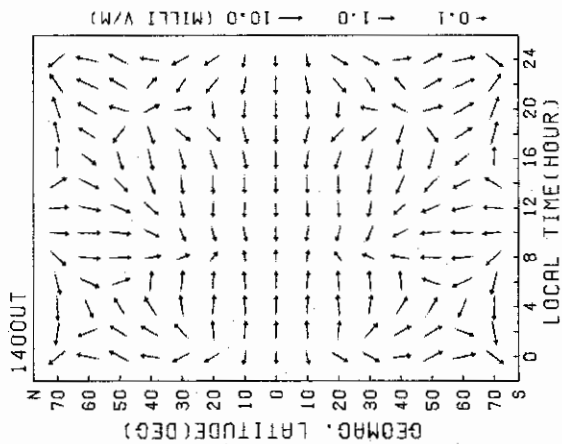


12000



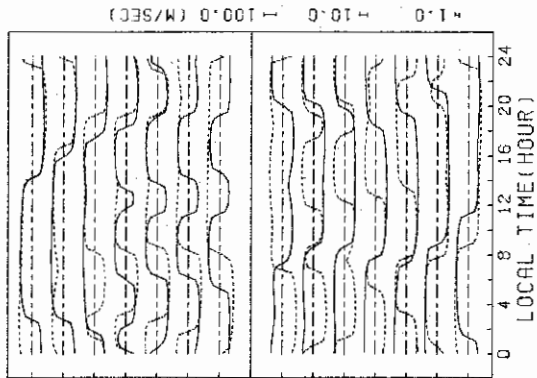
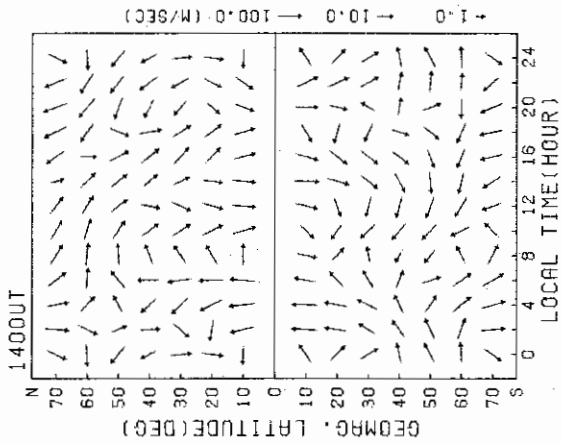
DEC. 18, 1964

ELECTRIC FIELD (LOG SCALE)

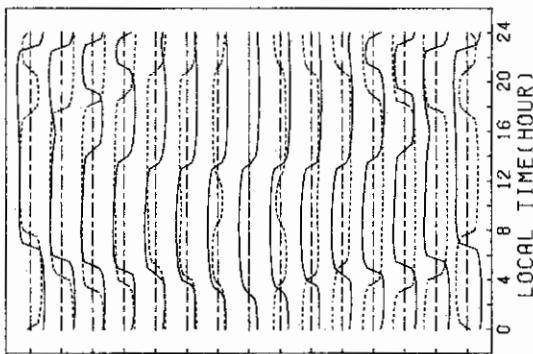
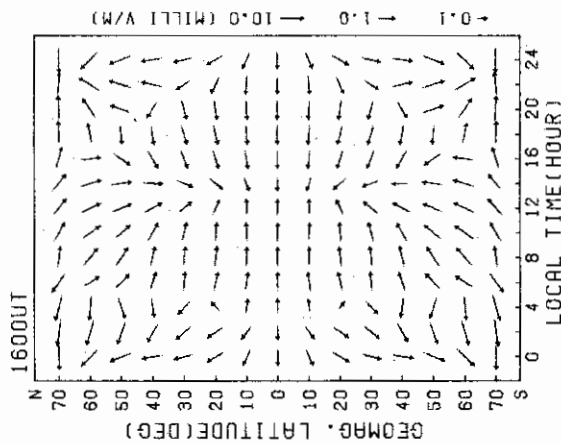


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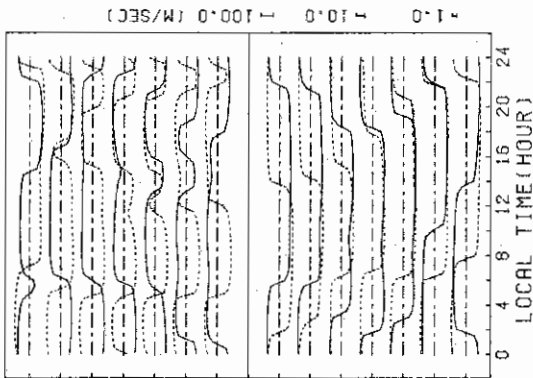
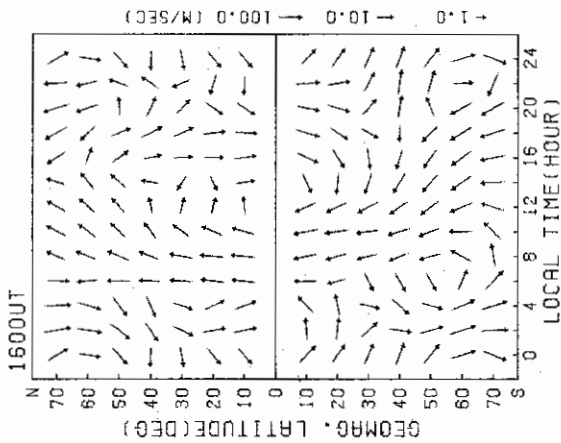
WIND VELOCITY (LOG SCALE)



1600UT

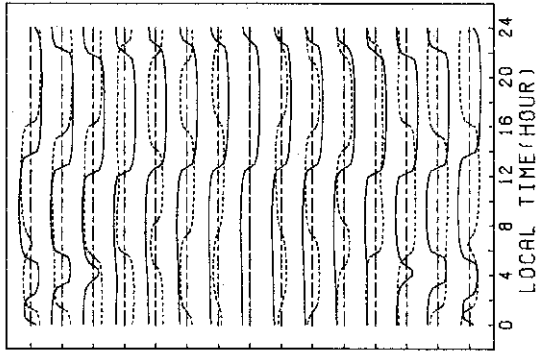
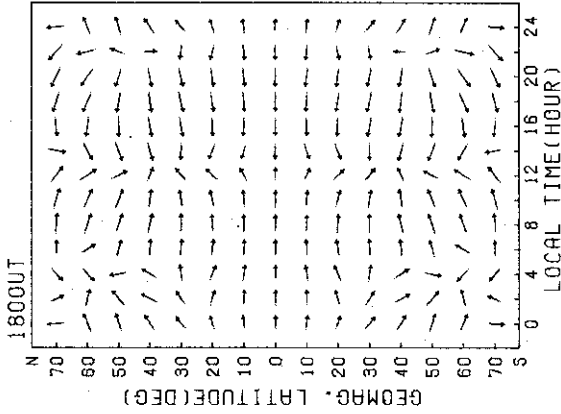


1600UT



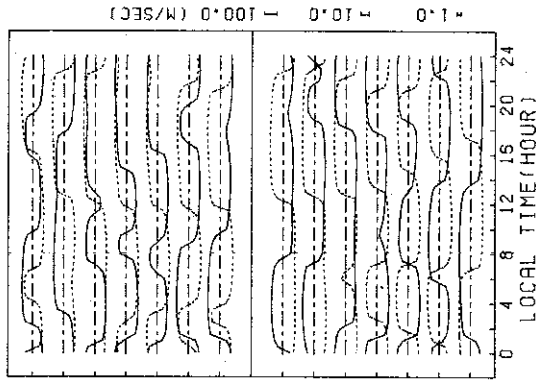
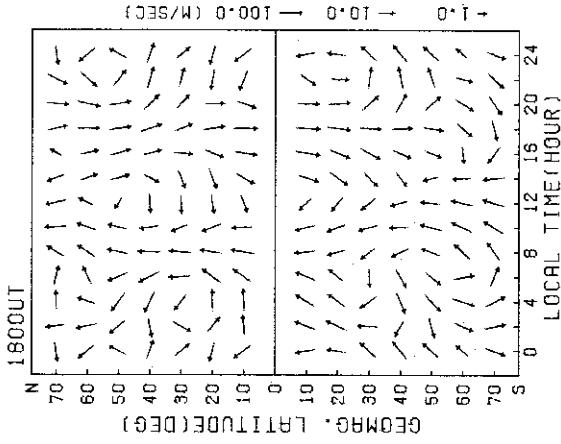
DEC.18.1964

ELECTRIC FIELD (LOG SCALE)

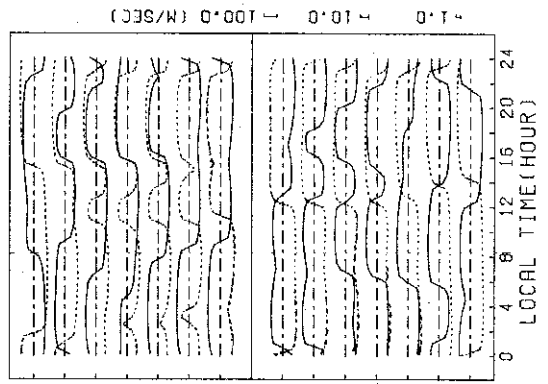
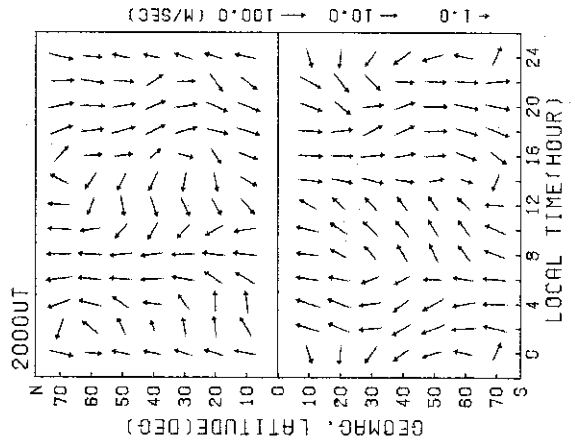
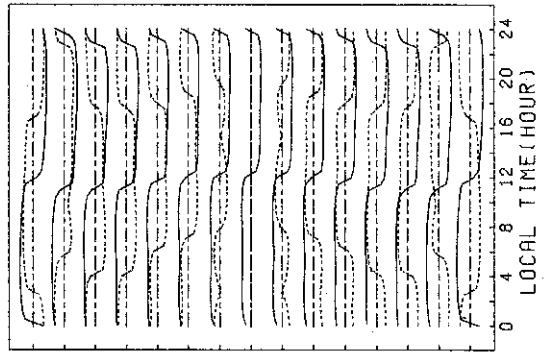
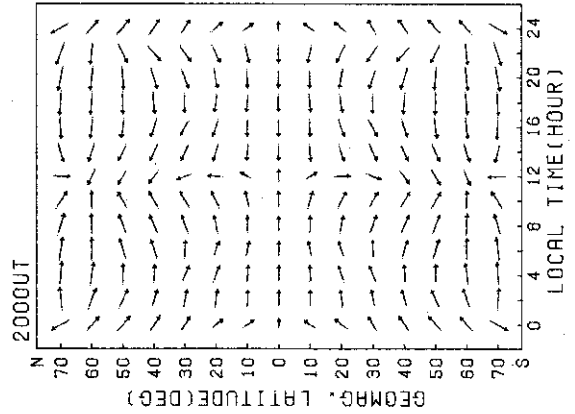


DEC.18.1964

WIND VELOCITY (LOG SCALE)

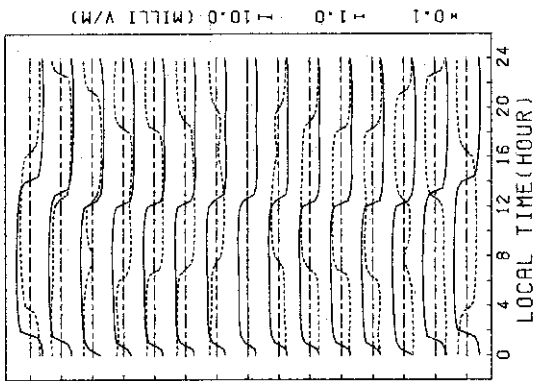
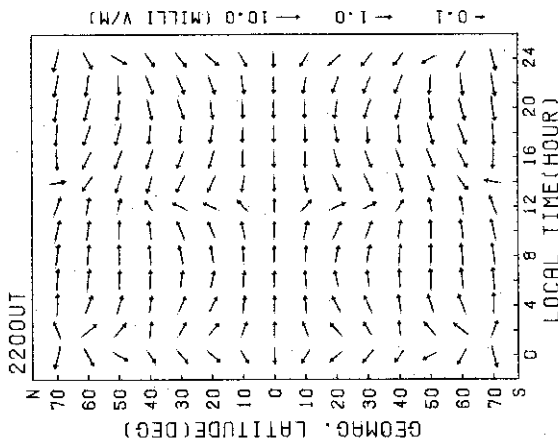


2000UT



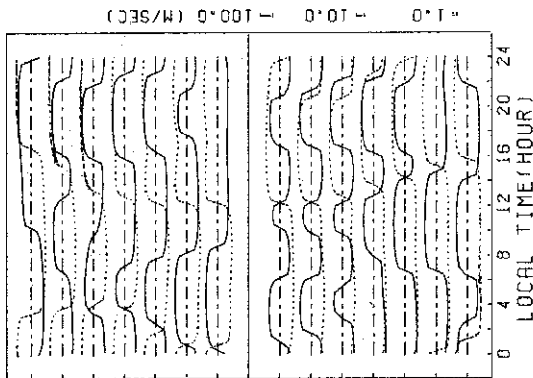
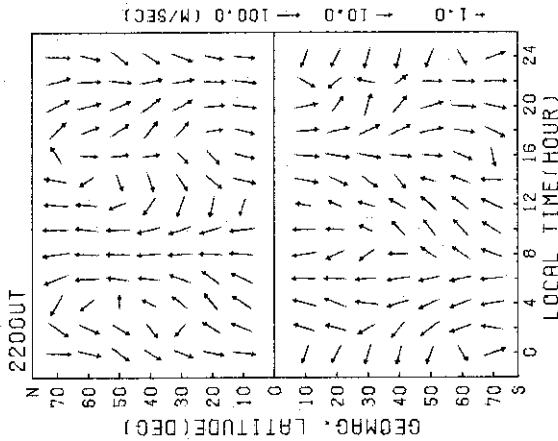
DEC. 18, 1964

ELECTRIC FIELD (LOG SCALE)

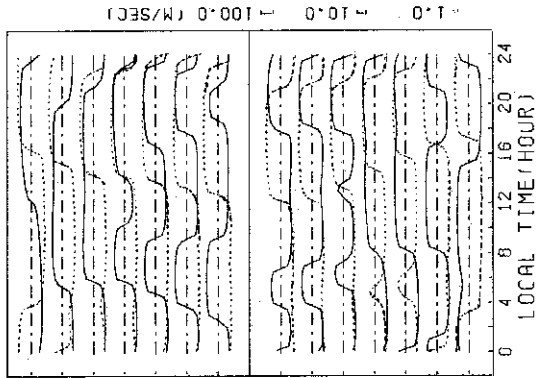
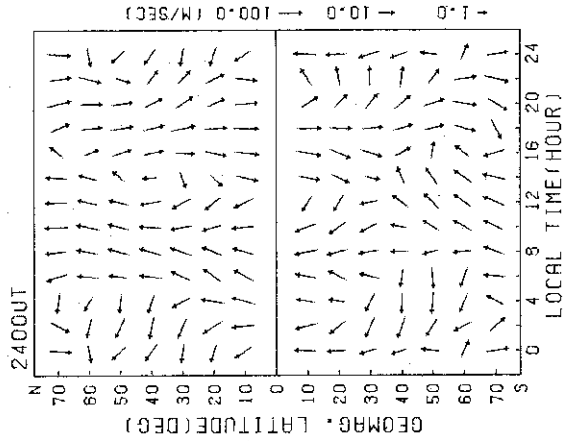
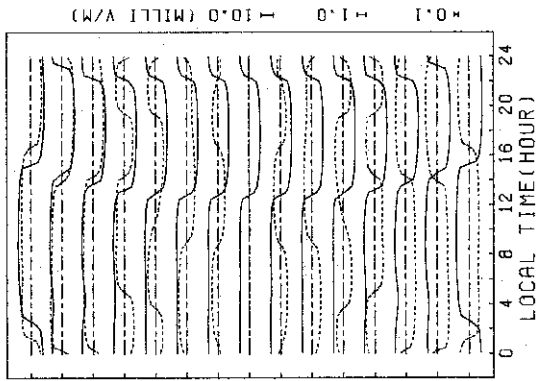
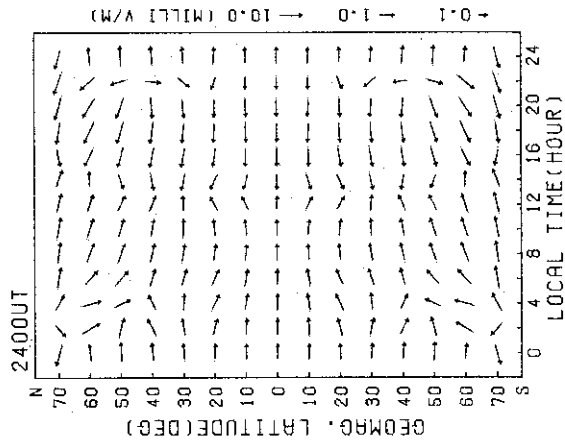


DEC. 18, 1964

WIND VELOCITY (LOG SCALE)

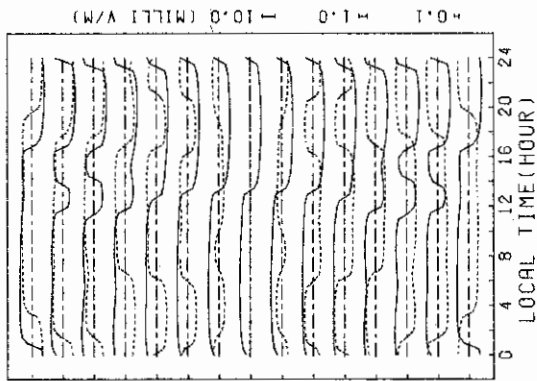
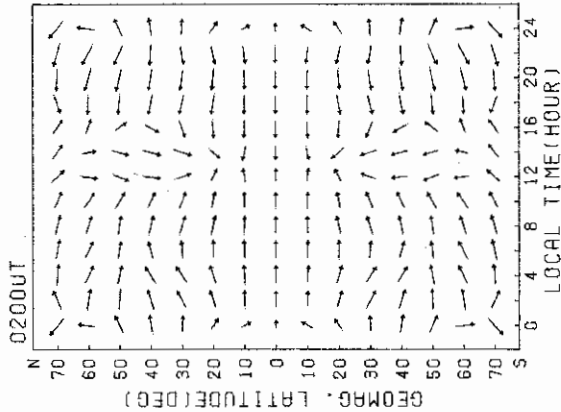


2400UT



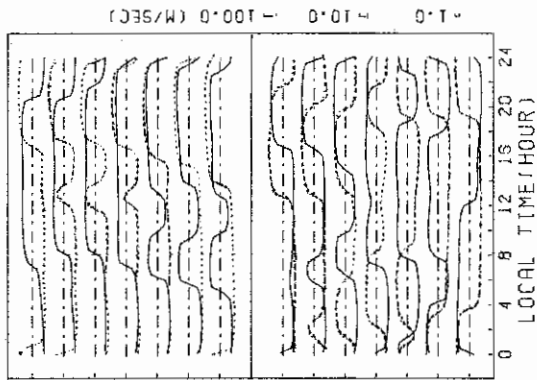
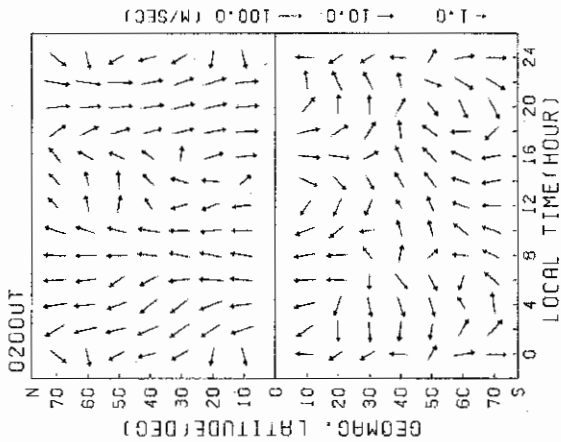
DEC. 19, 1964

ELECTRIC FIELD (LOG SCALE)

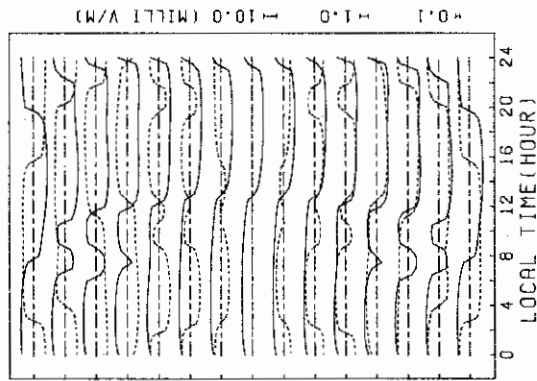
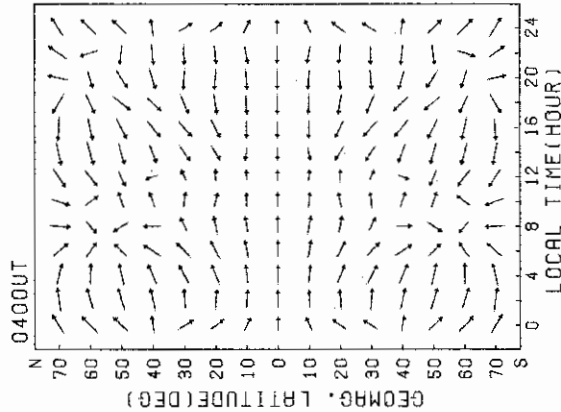


DEC. 19, 1964

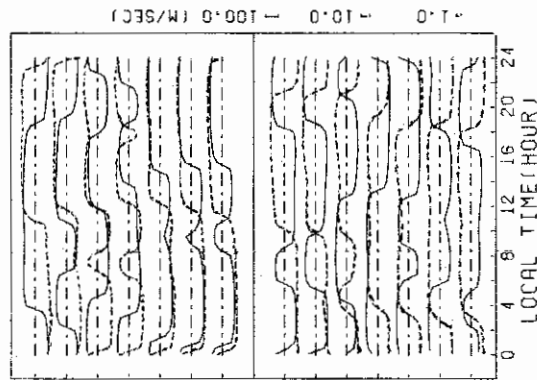
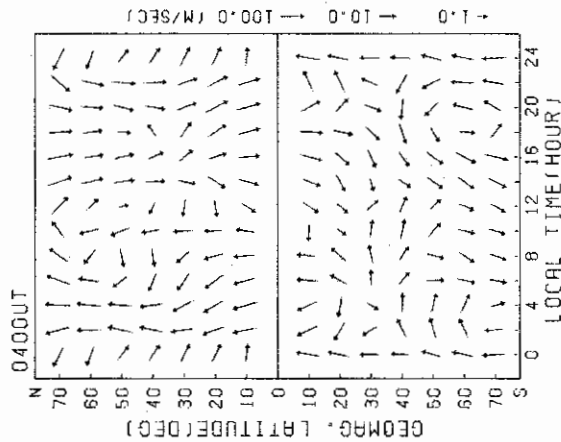
WIND VELOCITY (LOG SCALE)



0400UT

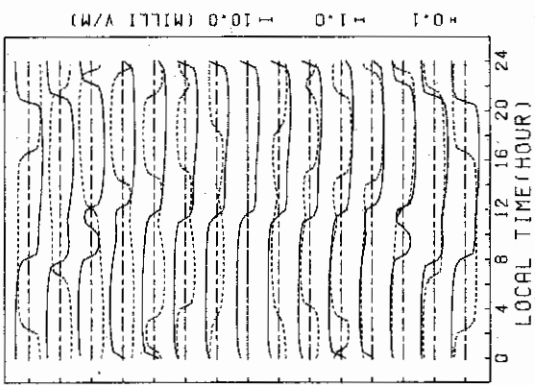
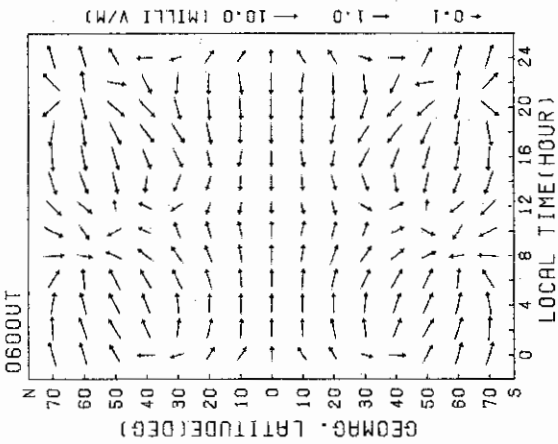


0400UT



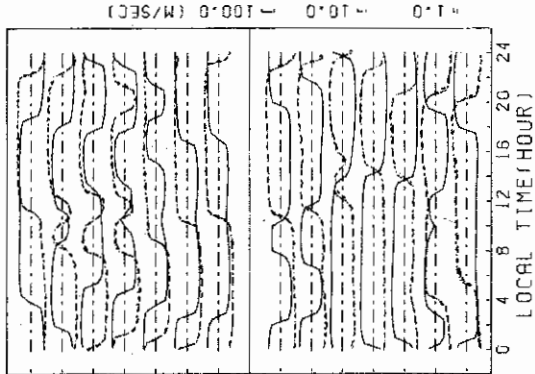
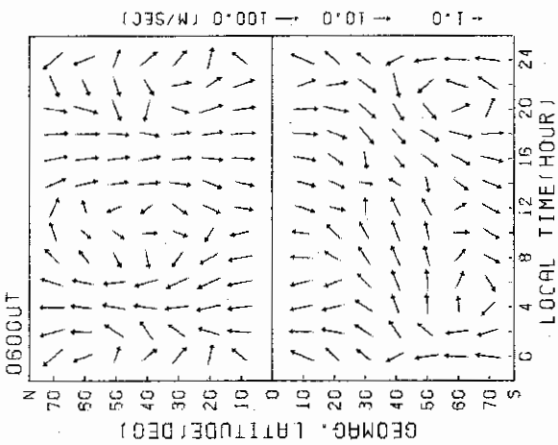
DEC. 19, 1964

ELECTRIC FIELD (LOG SCALE)

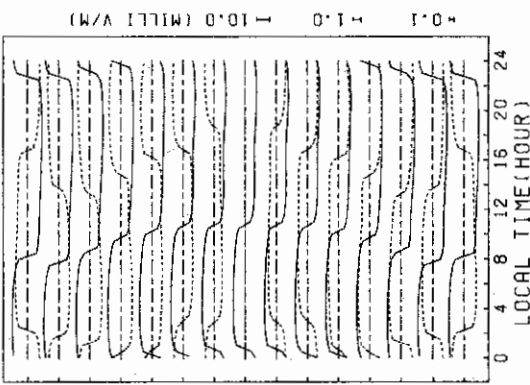
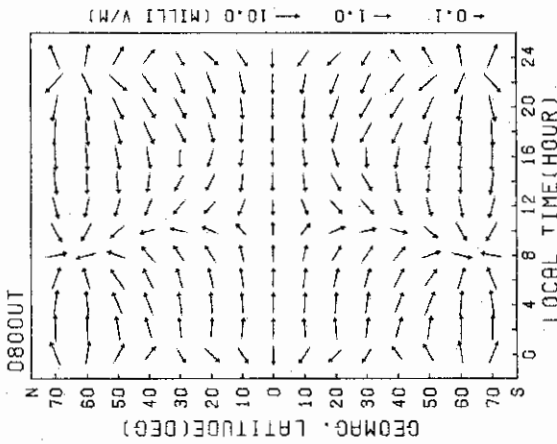


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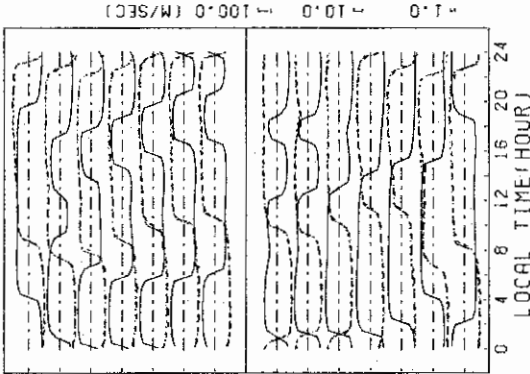
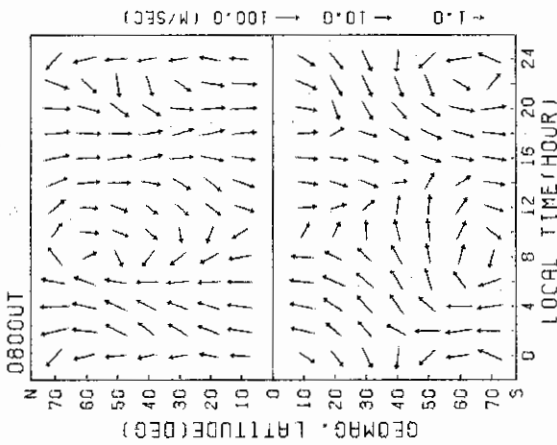
WIND VELOCITY (LOG SCALE)



0800UT

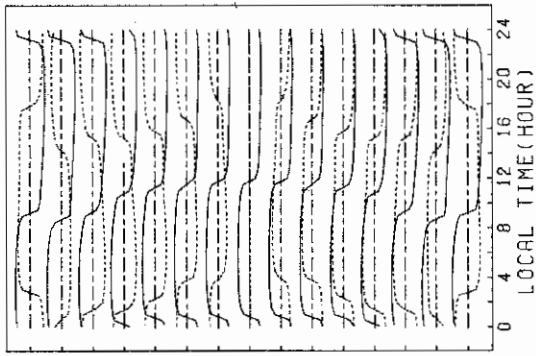
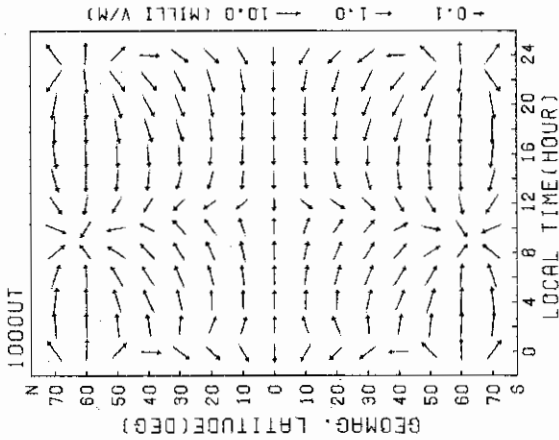


0800UT



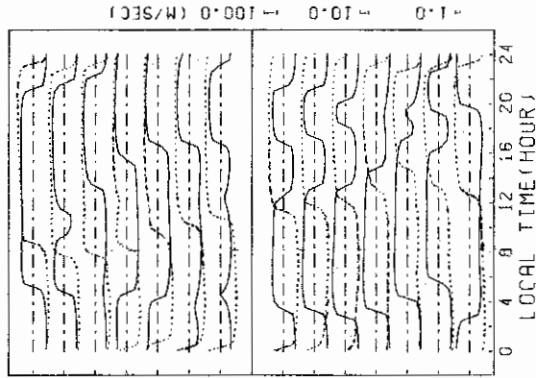
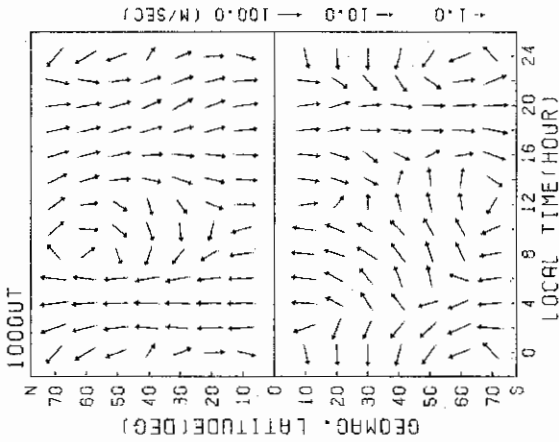
DEC.19.1964

ELECTRIC FIELD (LOG SCALE)

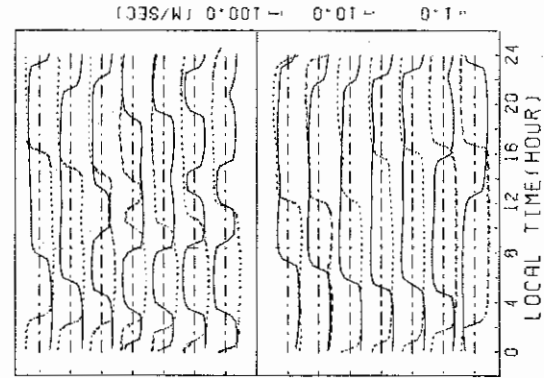
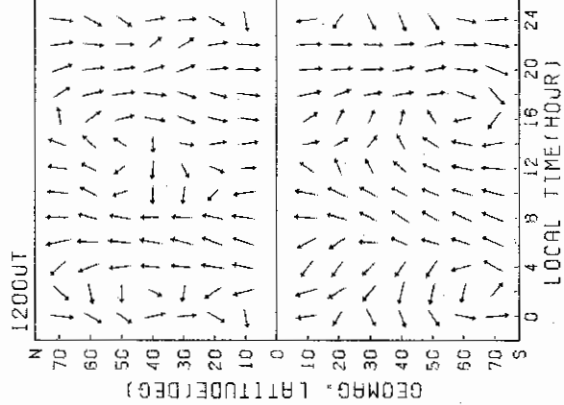
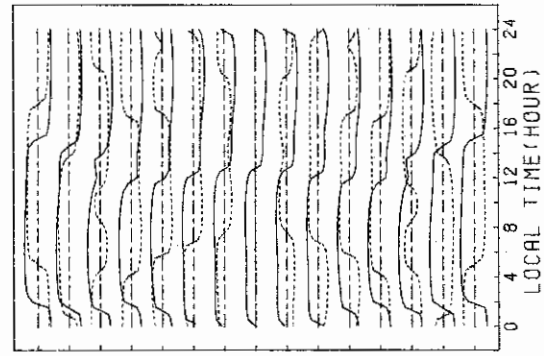
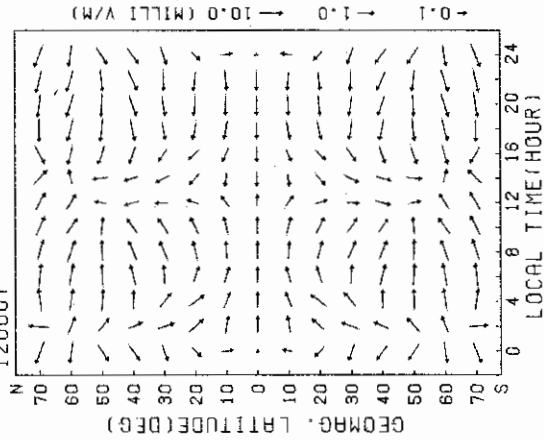


DEC.19.1964

WIND VELOCITY (LOG SCALE)

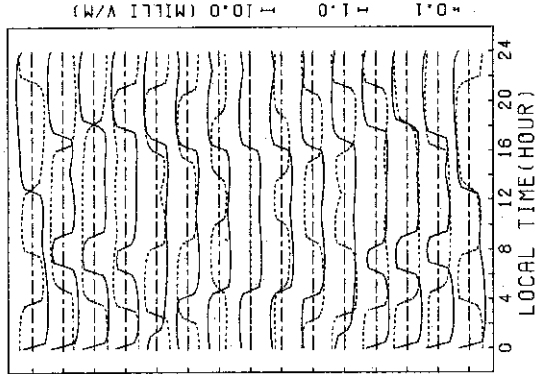
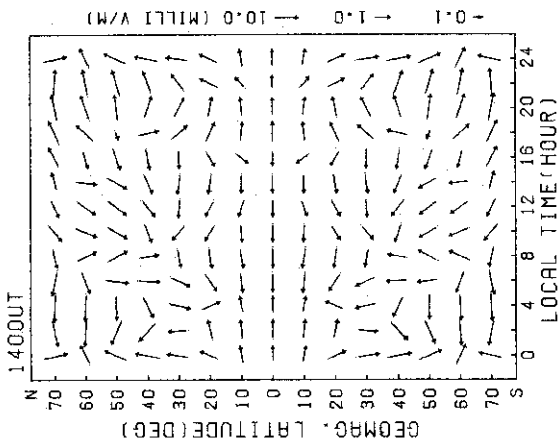


1200UT



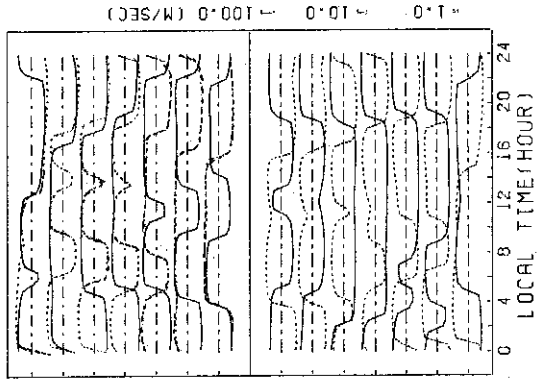
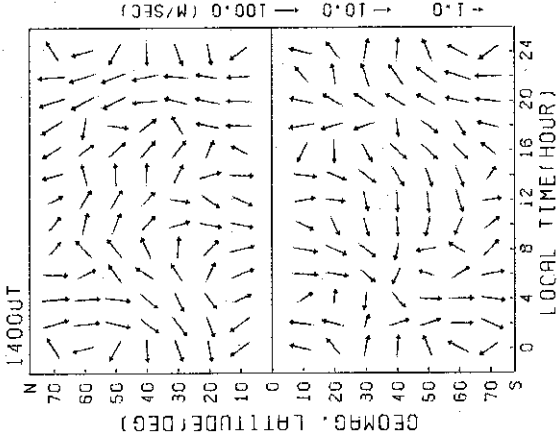
DEC. 19. 1964

ELECTRIC FIELD (LOG SCALE)

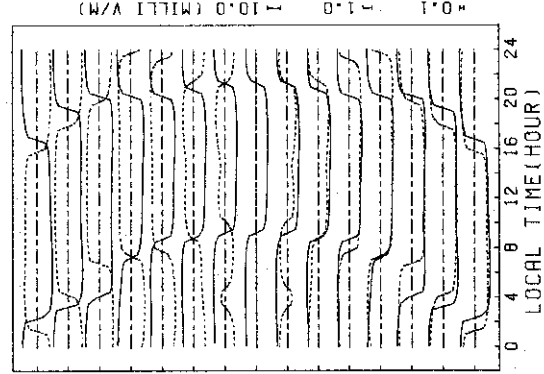
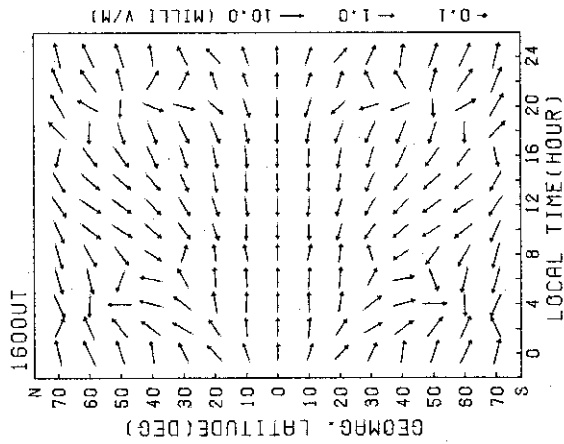


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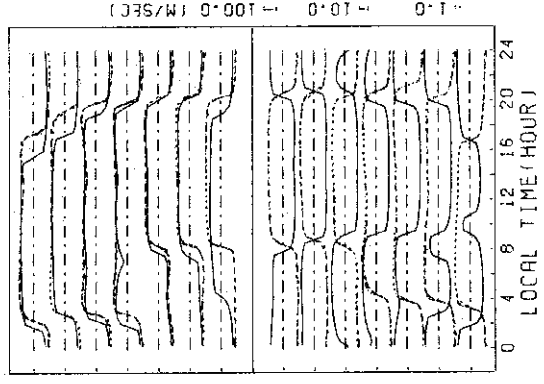
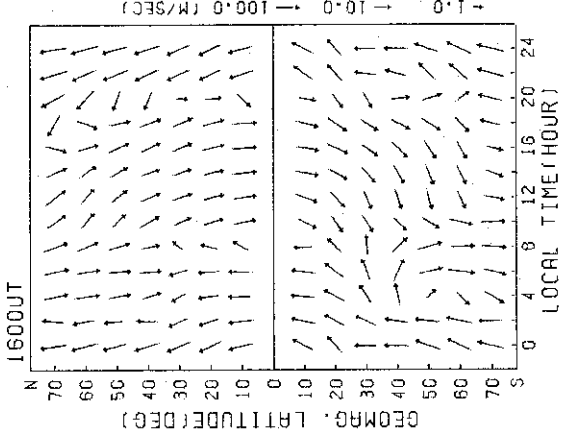
WIND VELOCITY (LOG SCALE)



1600UT

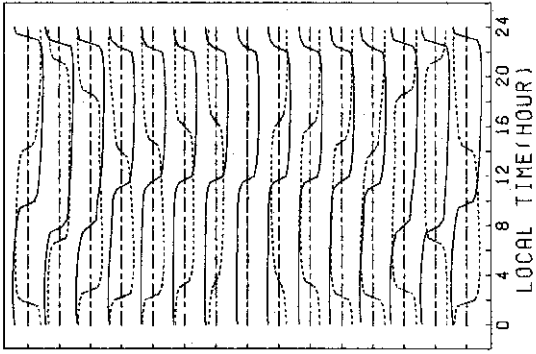
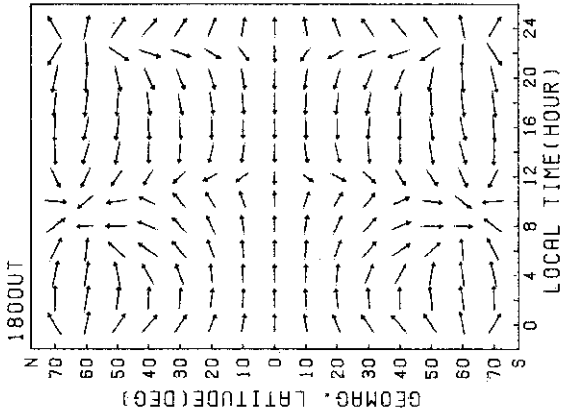


1600UT



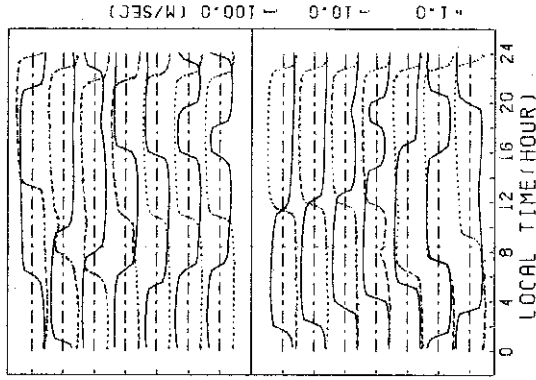
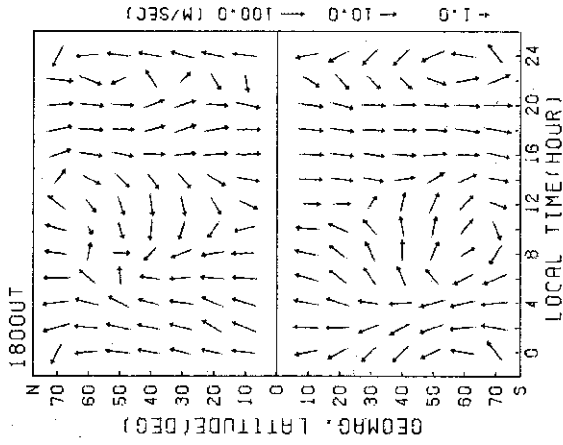
DEC.19.1964

ELECTRIC FIELD (LOG SCALE)

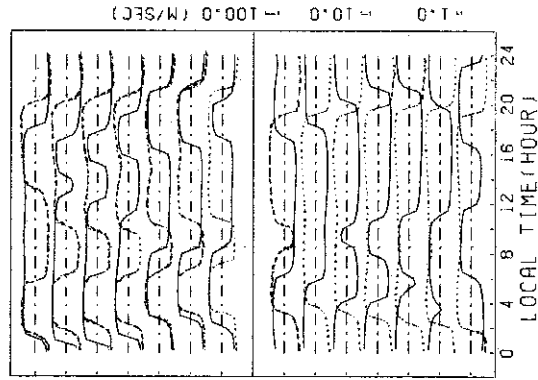
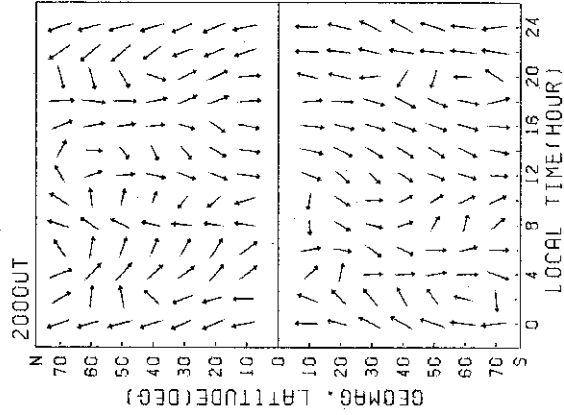
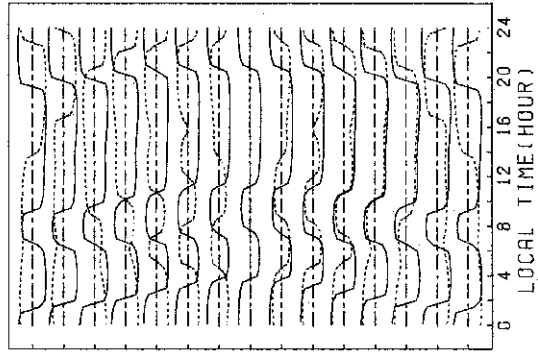
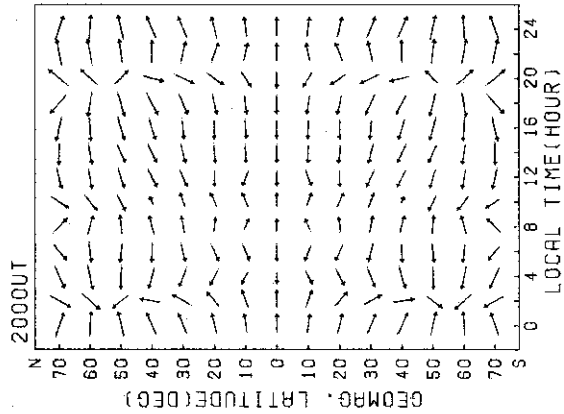


DEC.19.1964

WIND VELOCITY (LOG SCALE)

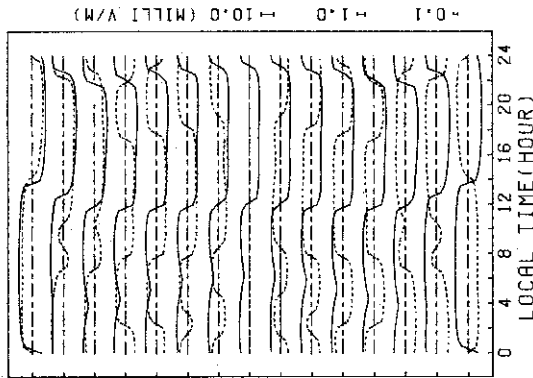
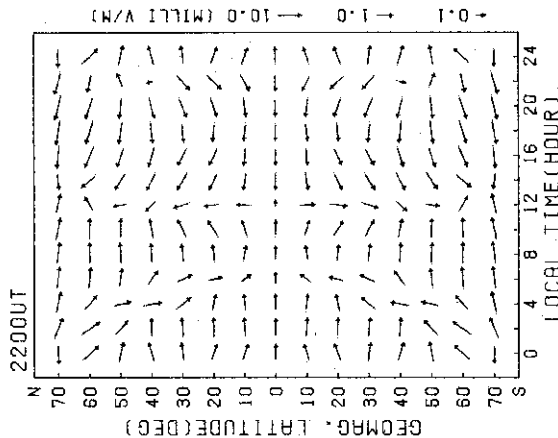


2000UT



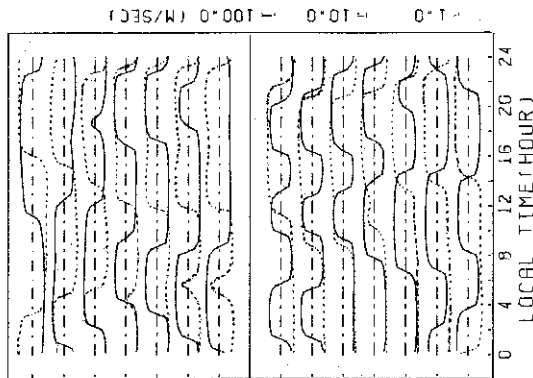
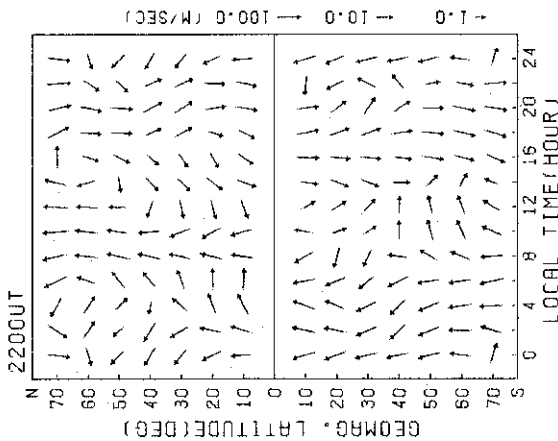
DEC. 19, 1964

ELECTRIC FIELD (LOG SCALE)

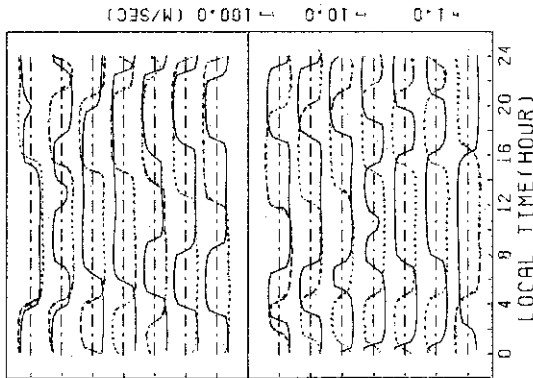
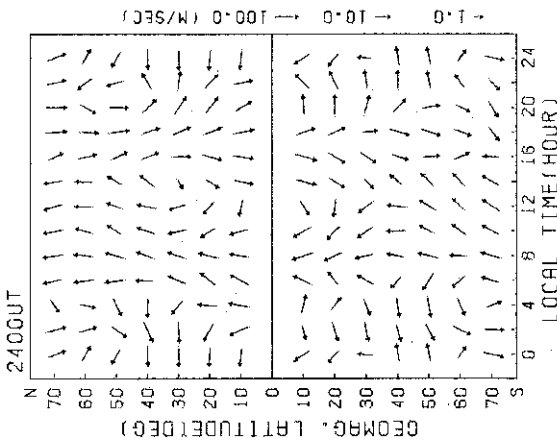
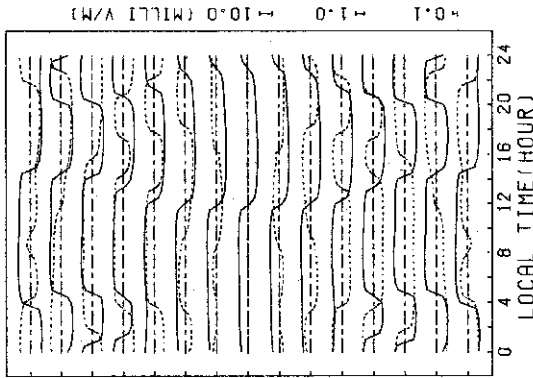
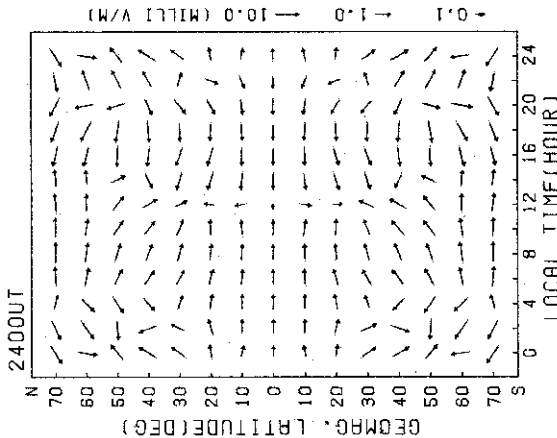


DEC. 19, 1964

WIND VELOCITY (LOG SCALE)

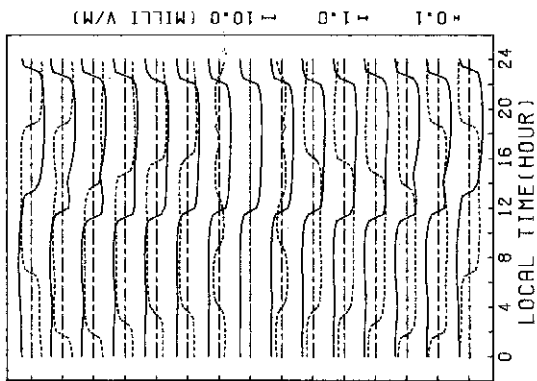
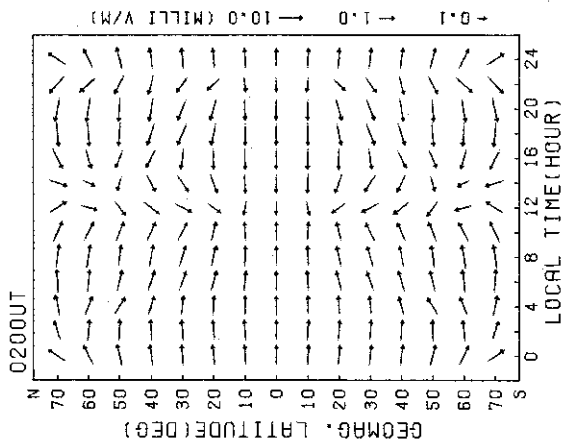


2400UT



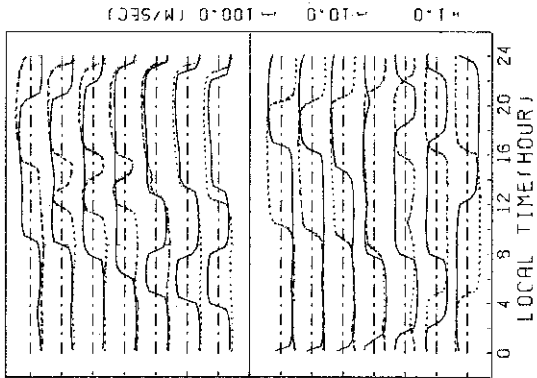
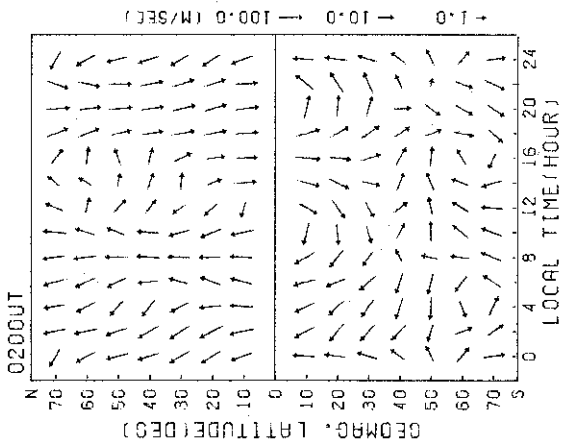
DEC.20.1964

ELECTRIC FIELD (LOG SCALE)



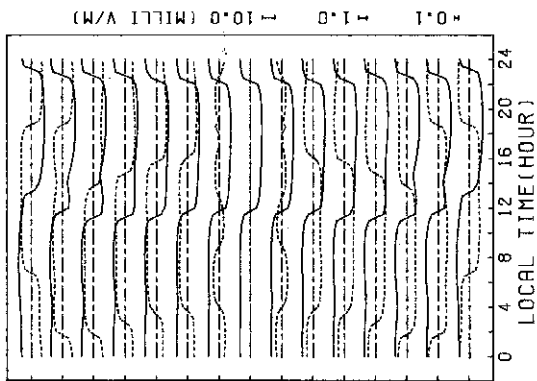
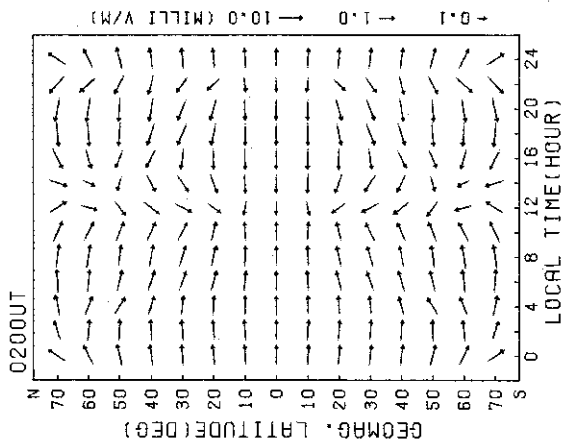
DEC.20.1964

WIND VELOCITY (LOG SCALE)



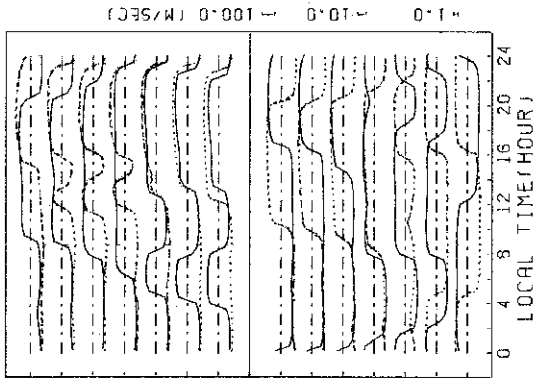
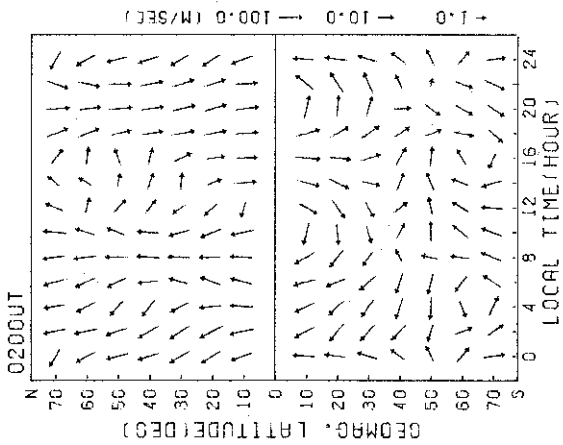
DEC.20.1964

ELECTRIC FIELD (LOG SCALE)



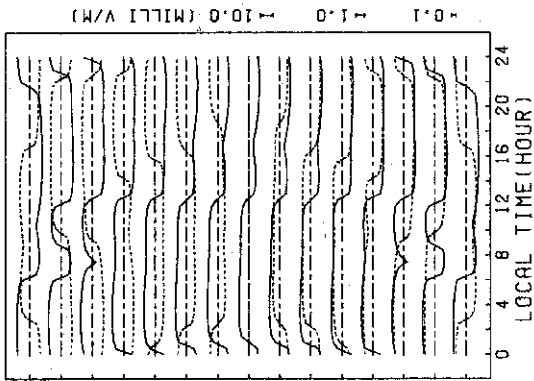
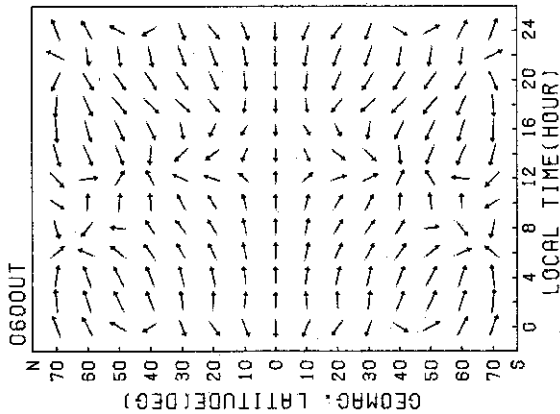
DEC.20.1964

WIND VELOCITY (LOG SCALE)



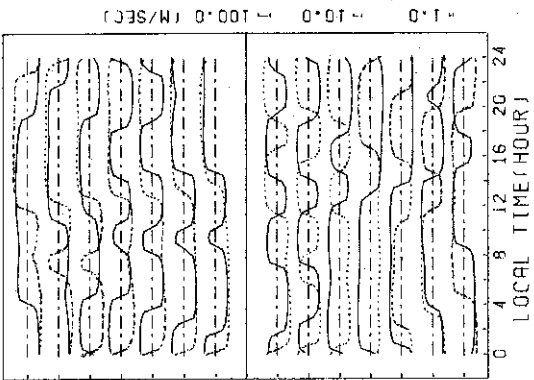
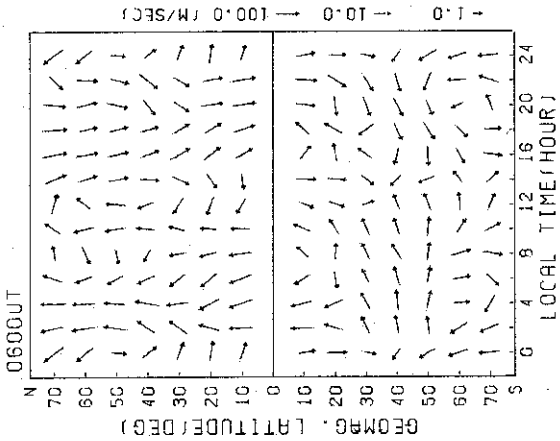
DEC. 20, 1964

ELECTRIC FIELD (LOG SCALE)

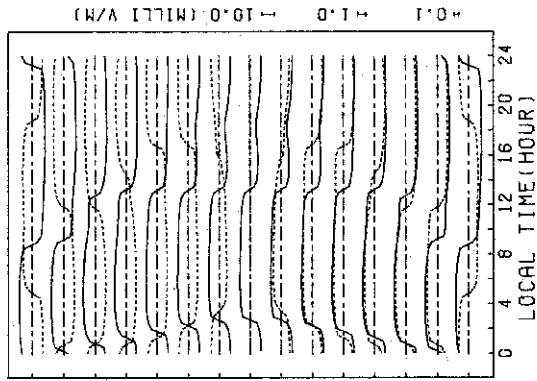
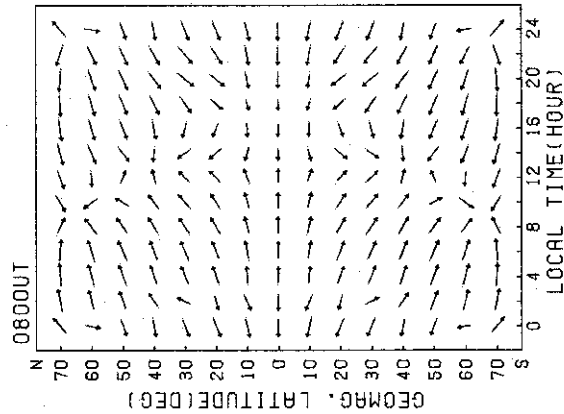


DEC. 20, 1964

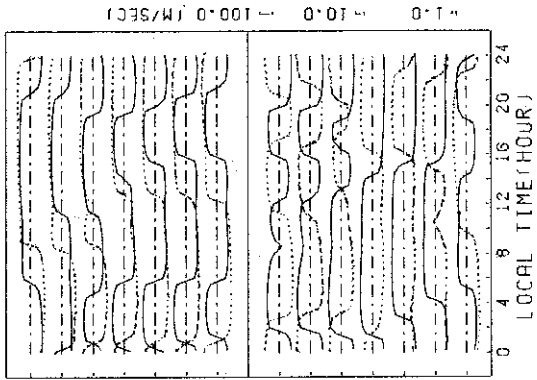
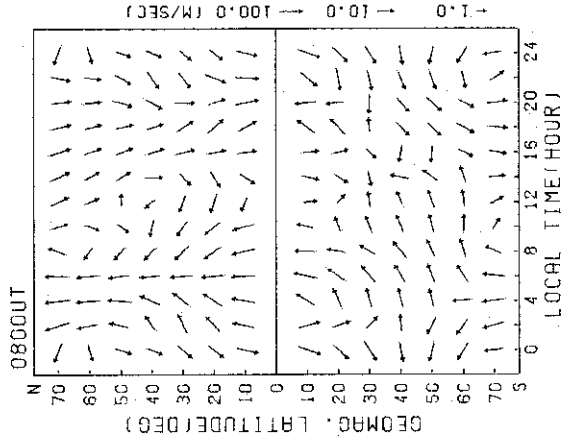
WIND VELOCITY (LOG SCALE)



0800UT

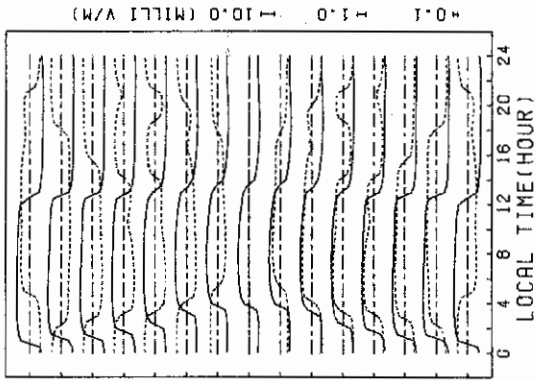
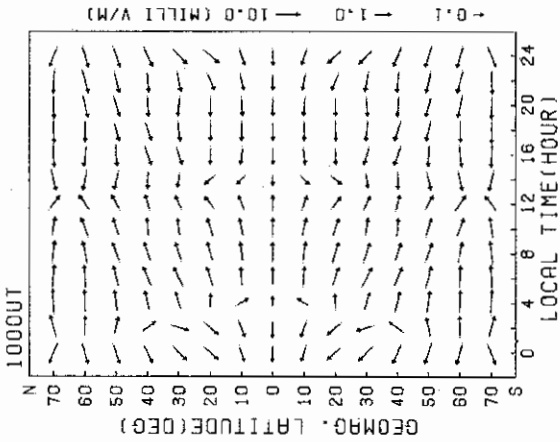


0800UT



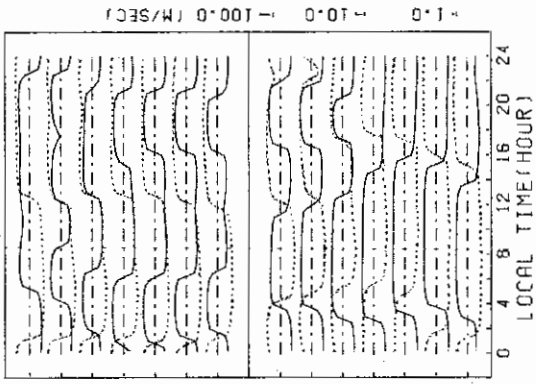
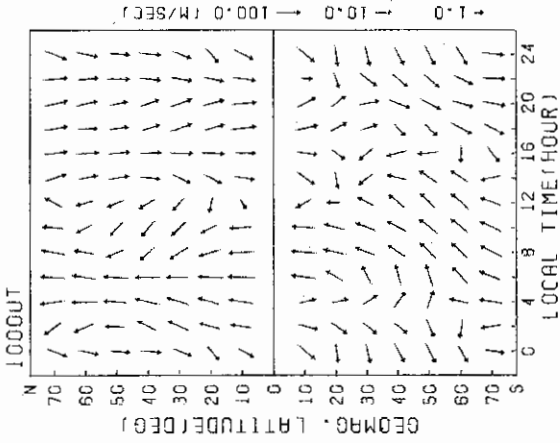
DEC. 20, 1964

ELECTRIC FIELD (LOG SCALE)

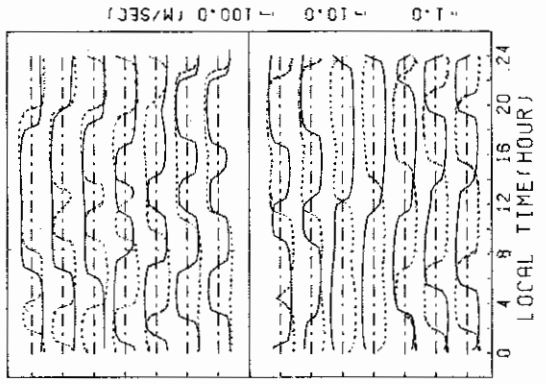
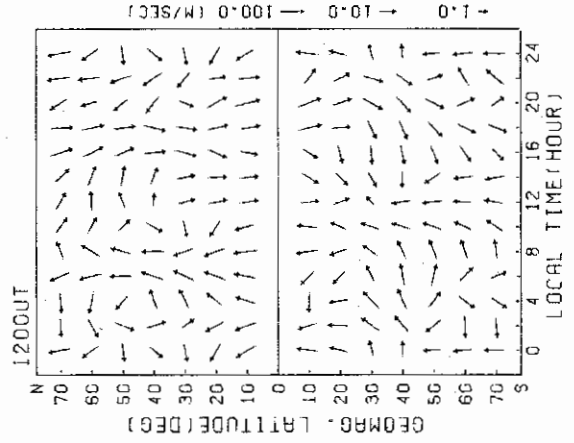
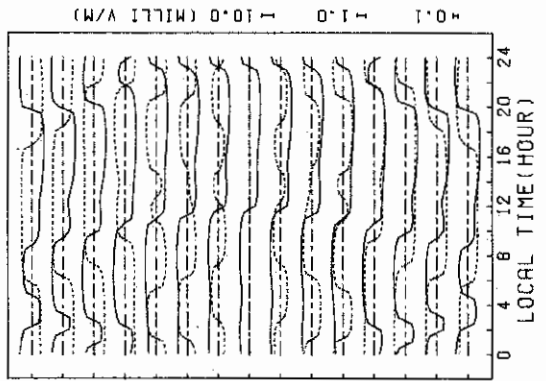
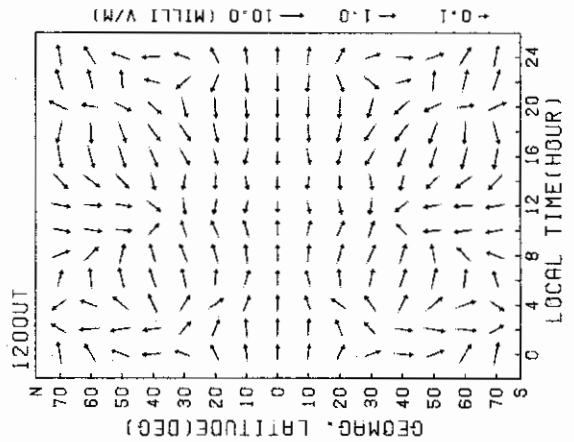


DEC. 20, 1964

WIND VELOCITY (LOG SCALE)

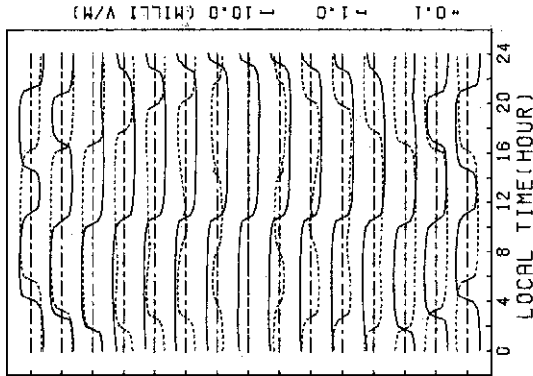
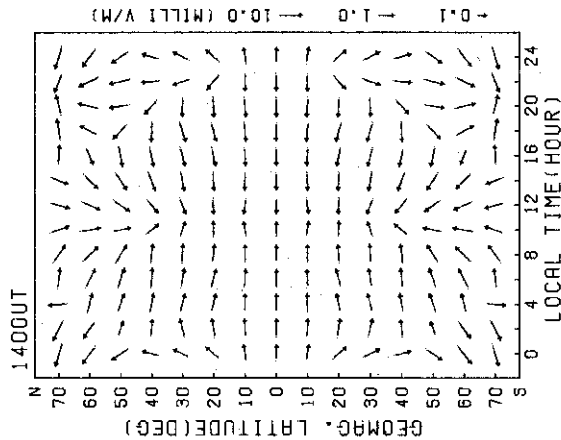


1200UT



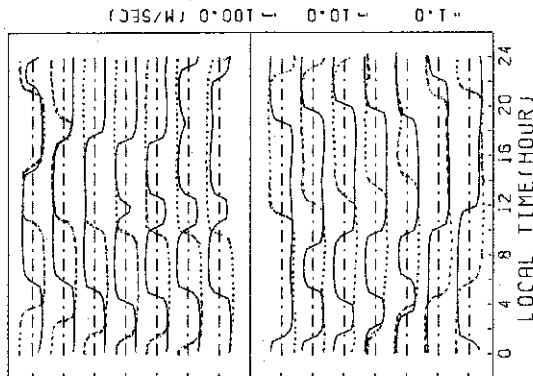
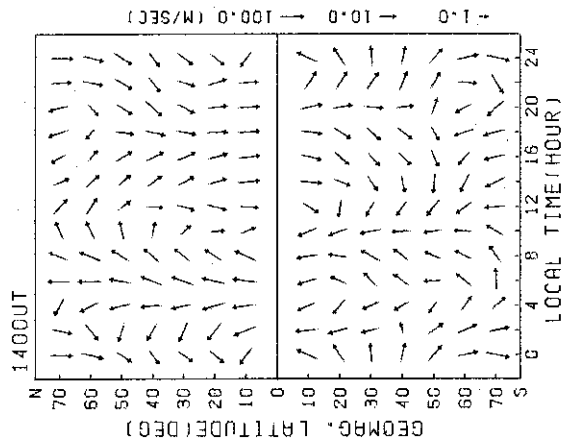
DEC. 20, 1964

ELECTRIC FIELD (LOG SCALE)

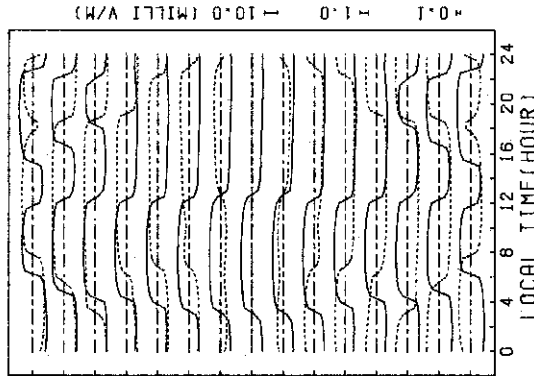
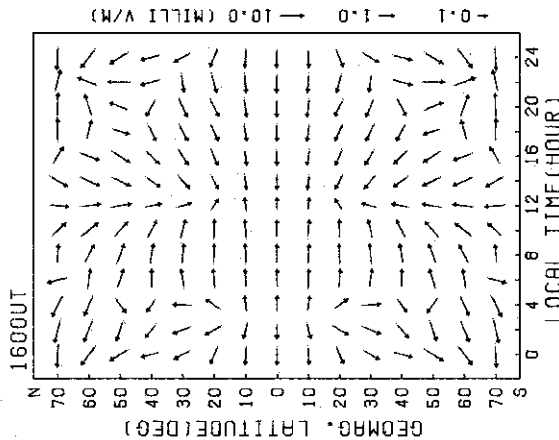


DEC. 20, 1964

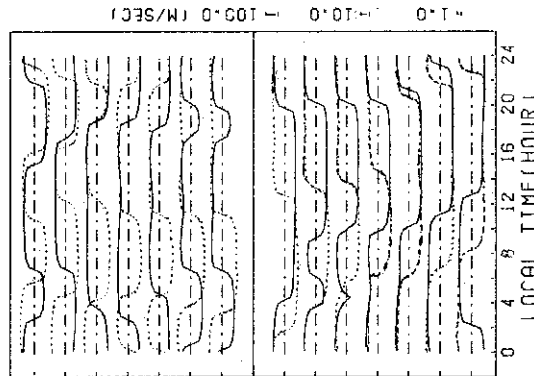
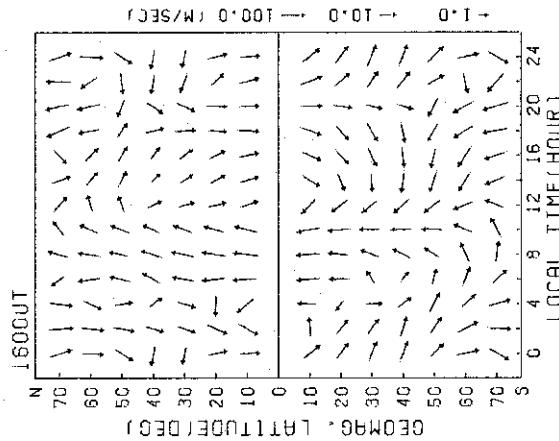
WIND VELOCITY (LOG SCALE)



1600UT

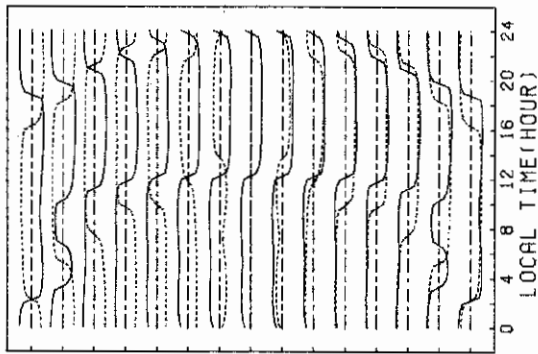
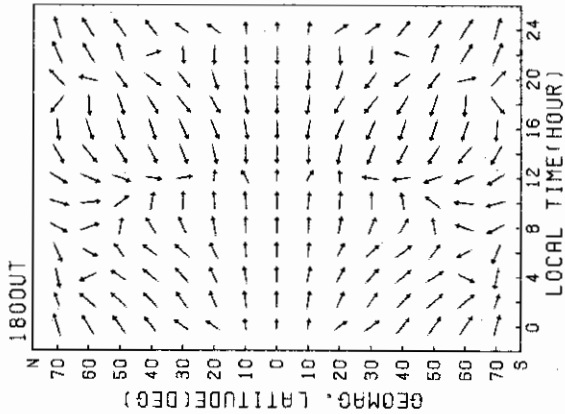


1600UT



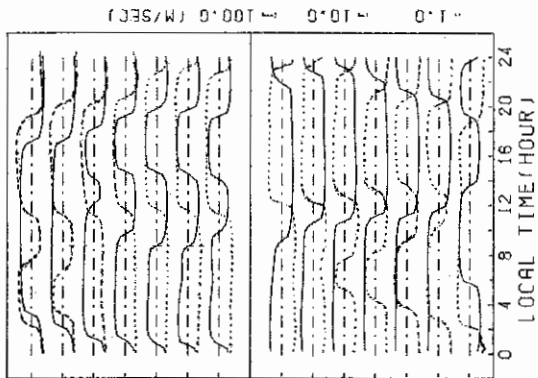
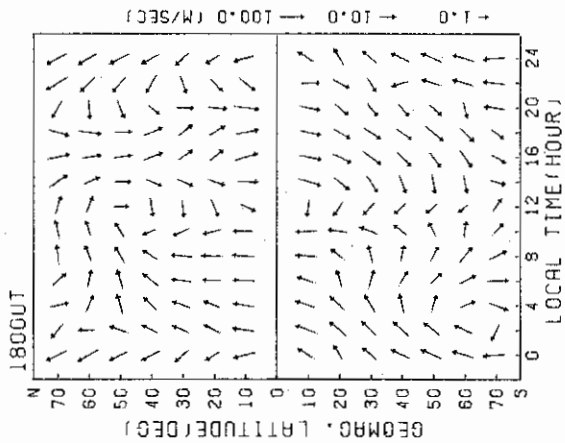
DEC. 20, 1964

ELECTRIC FIELD (LOG SCALE)

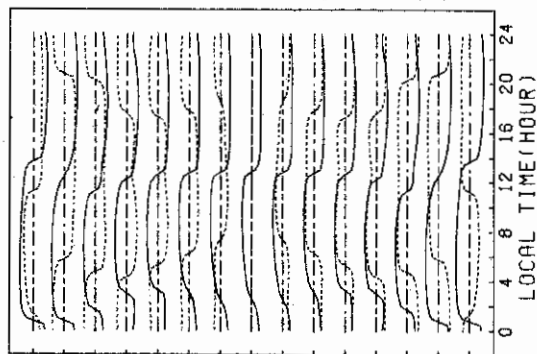
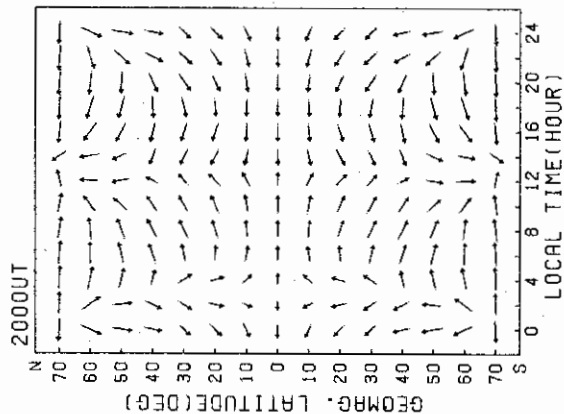


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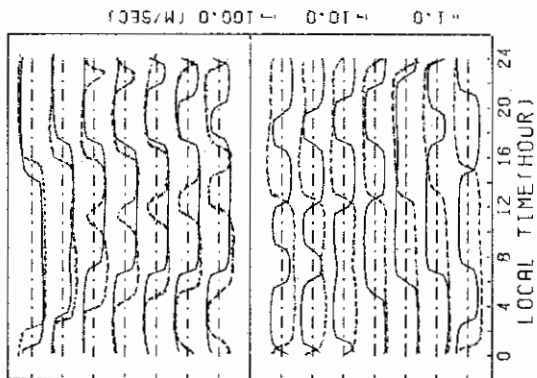
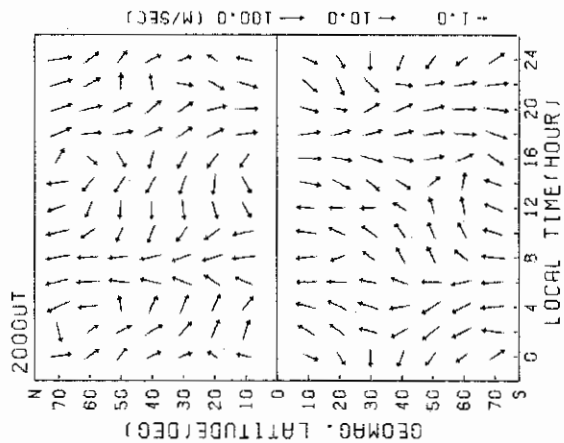
WIND VELOCITY (LOG SCALE)



2000UT

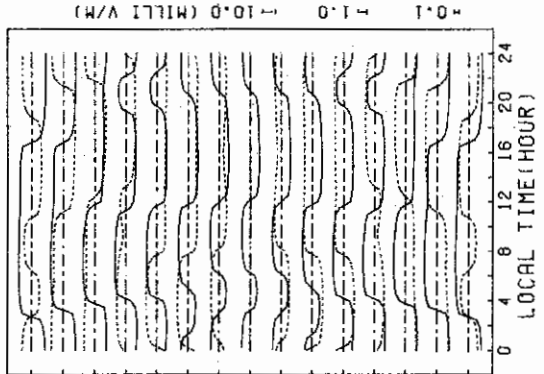
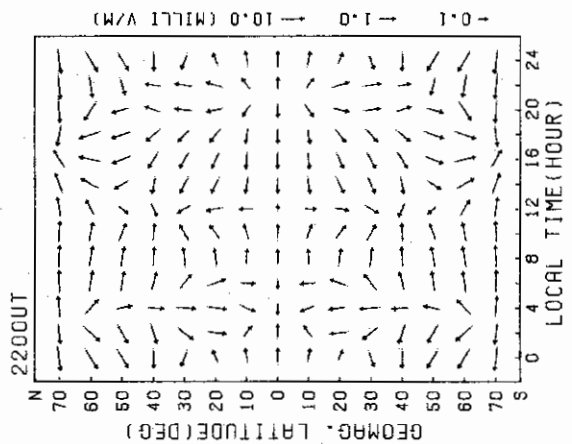


2000UT



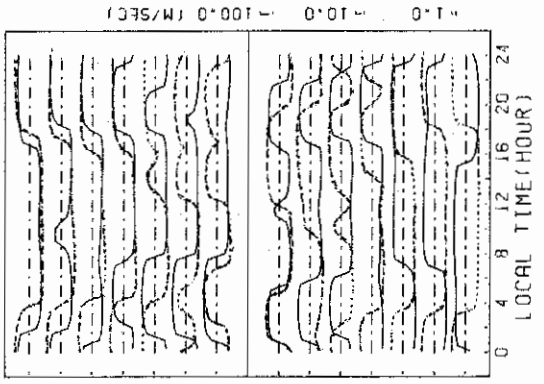
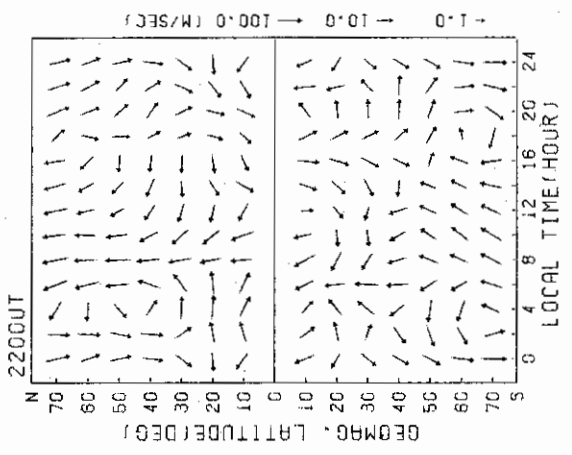
DEC.20.1964

ELECTRIC FIELD (LOG SCALE)

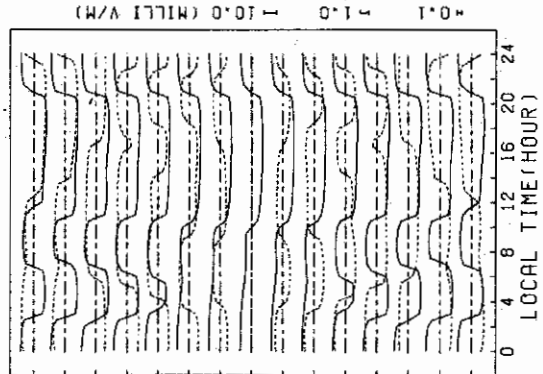
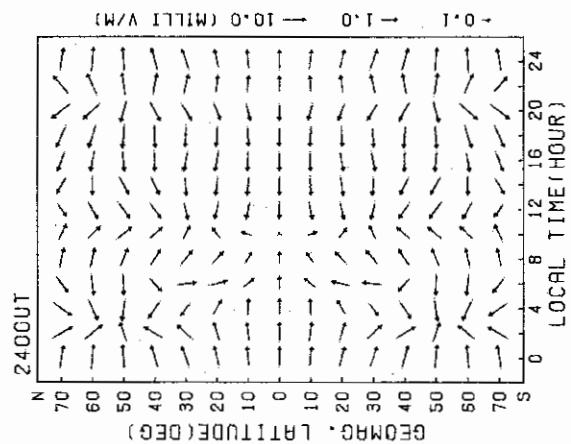


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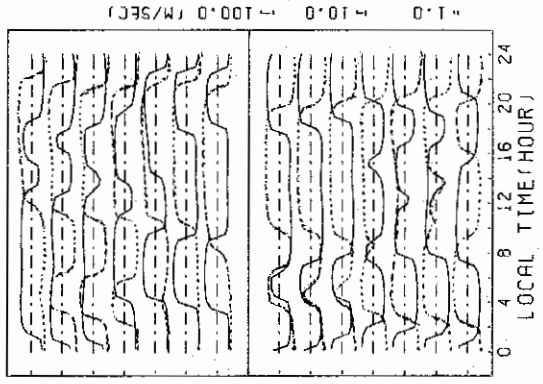
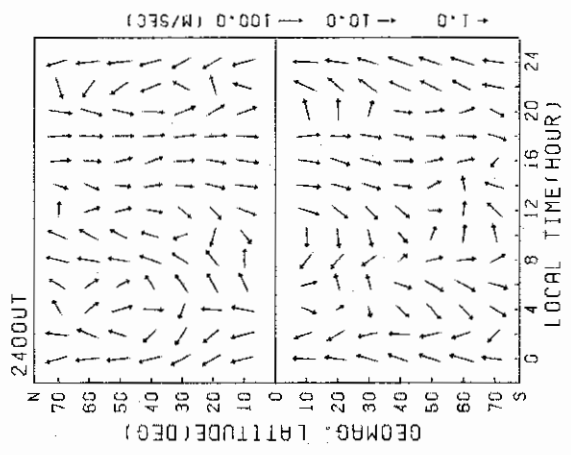
WIND VELOCITY (LOG SCALE)



2400UT

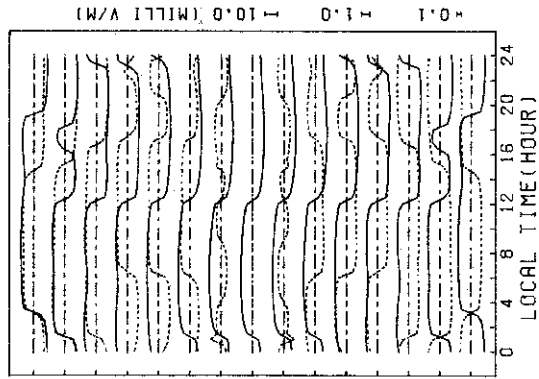
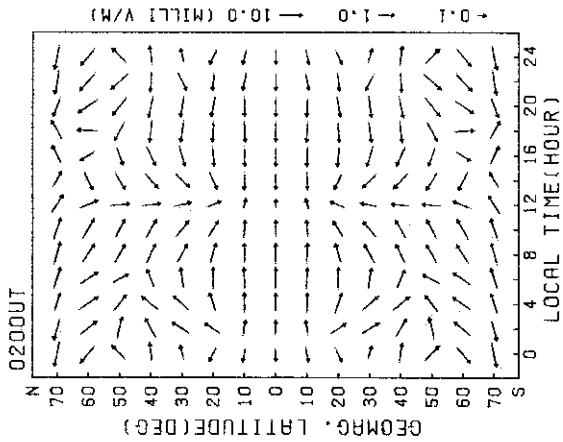


2400UT



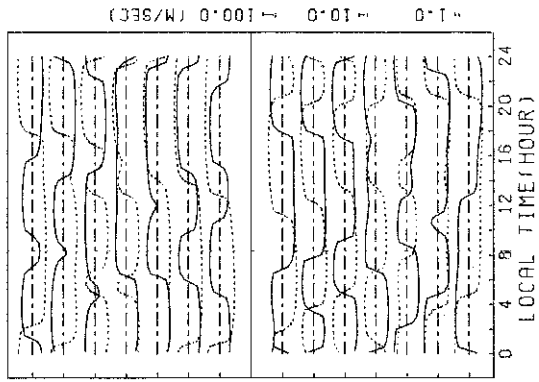
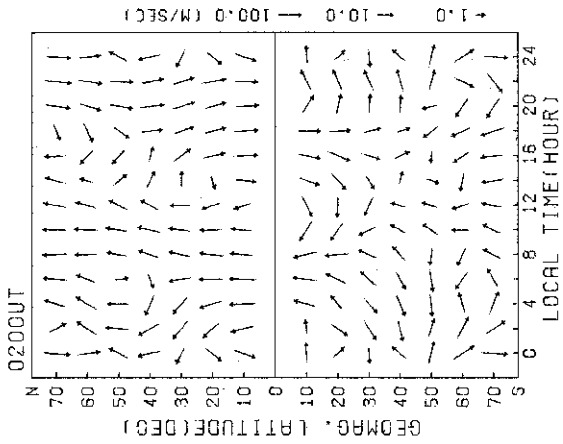
DEC.21,1964

ELECTRIC FIELD (LOG SCALE)

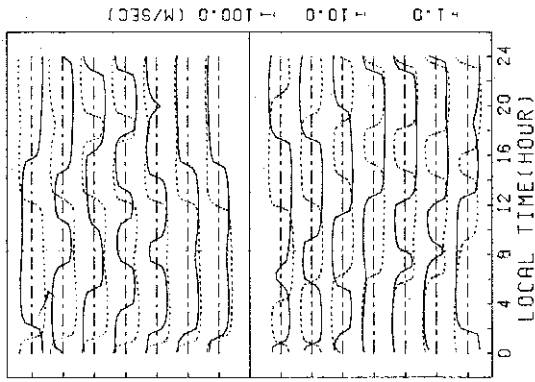
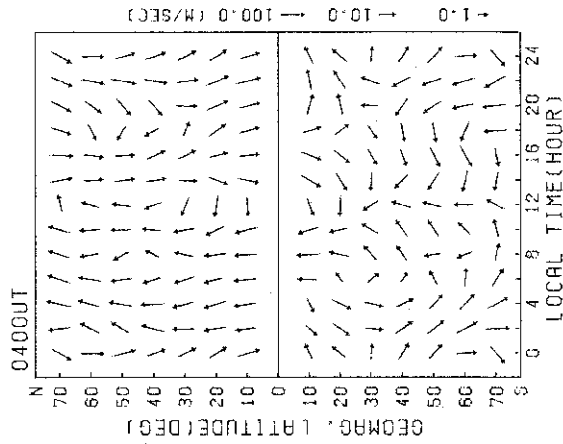
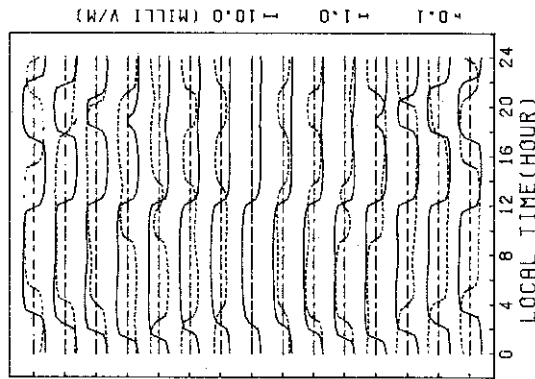
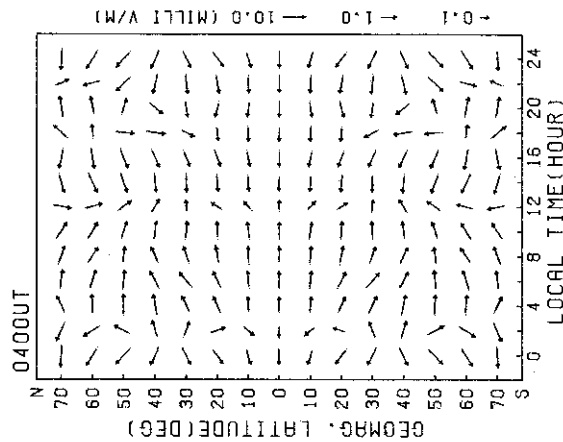


DEC.21,1964

WIND VELOCITY (LOG SCALE)

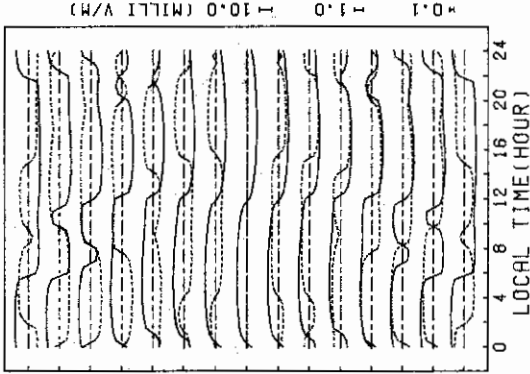
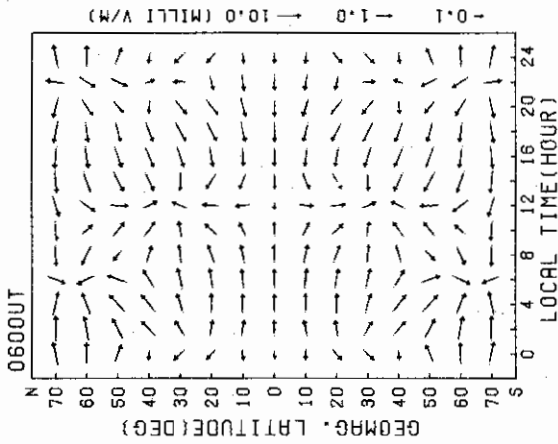


0400UT



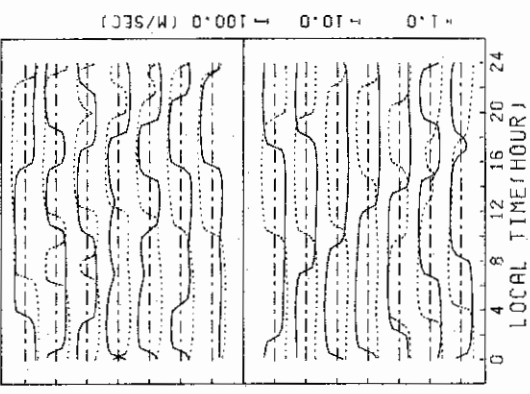
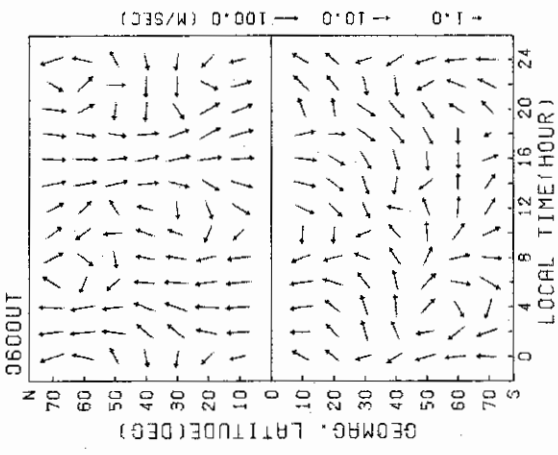
DEC. 21, 1964

ELECTRIC FIELD (LOG SCALE)

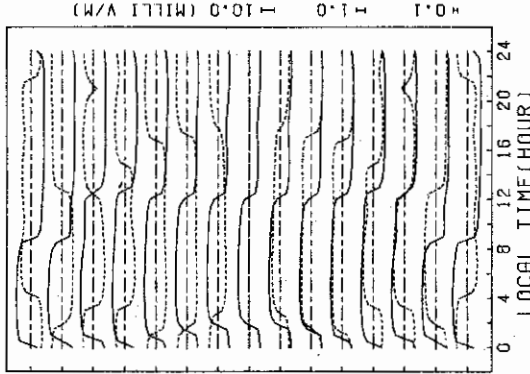
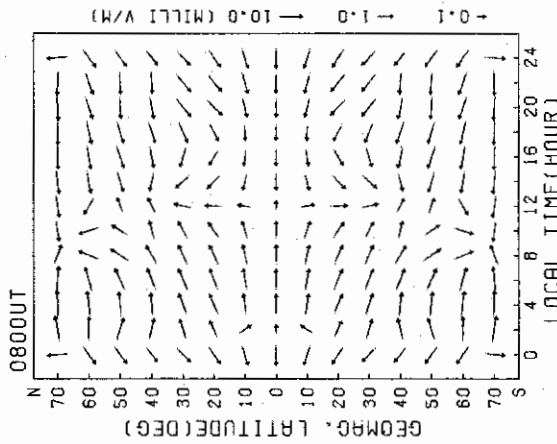


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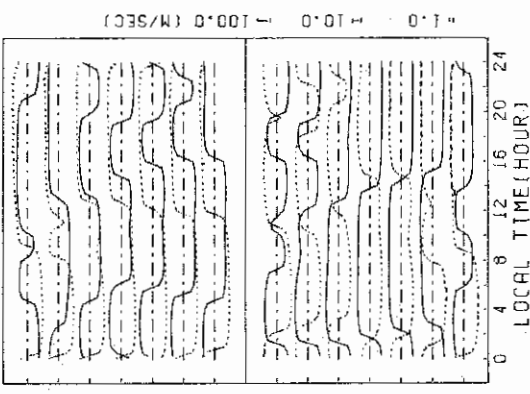
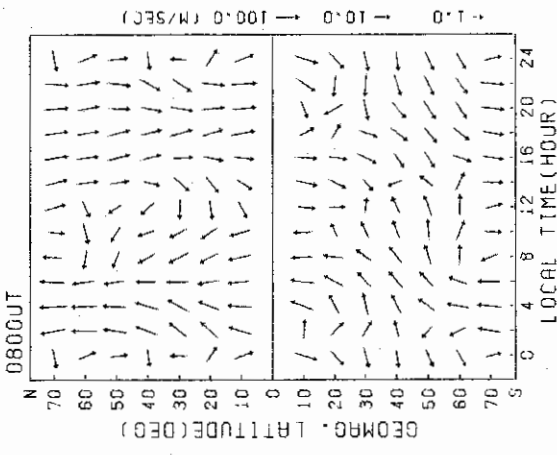
WIND VELOCITY (LOG SCALE)



0800UT

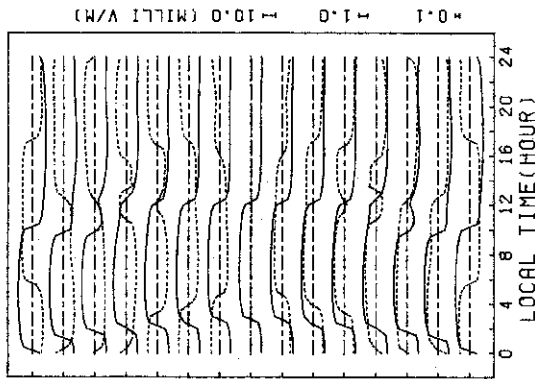
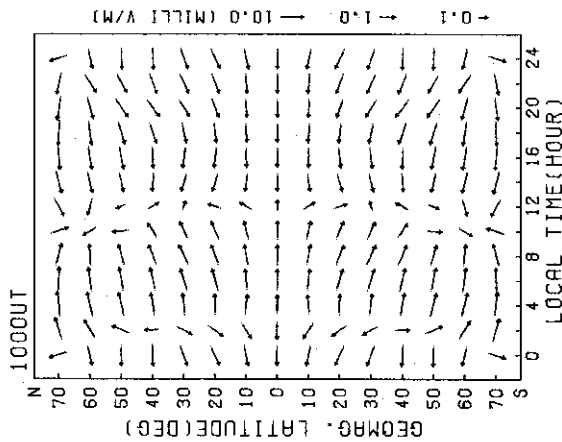


0800UT



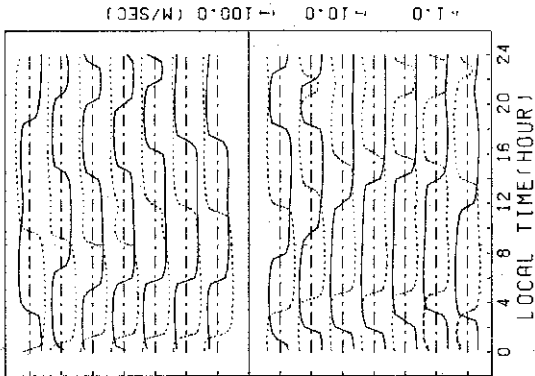
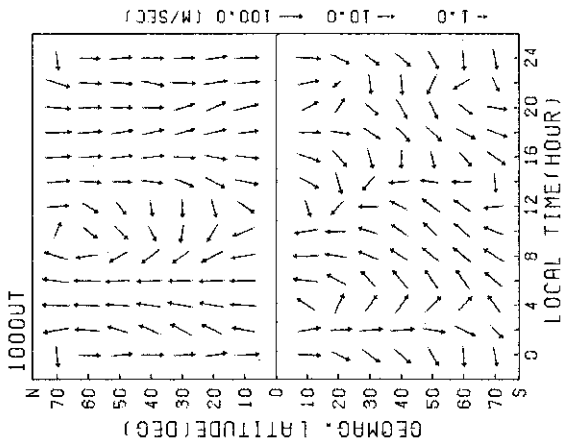
DEC.21.1964

ELECTRIC FIELD (LOG SCALE)

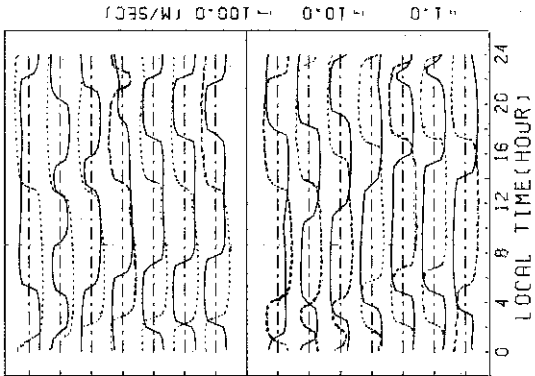
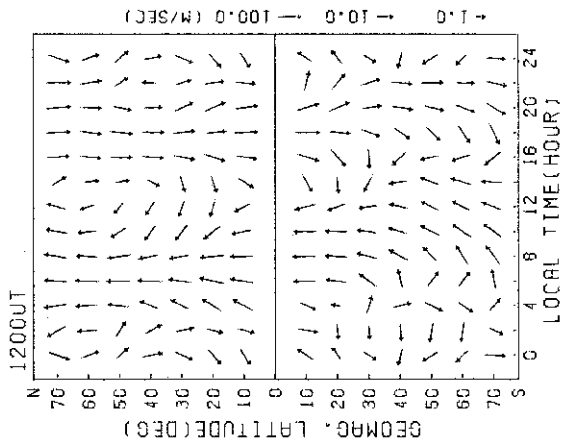
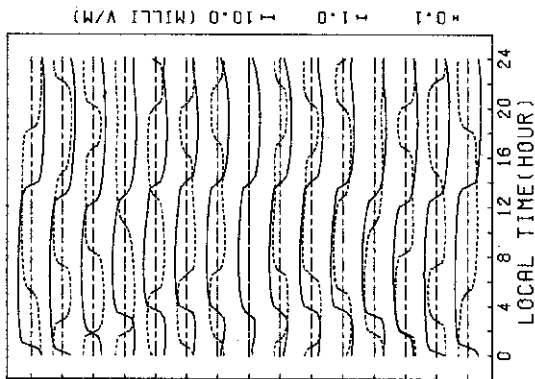
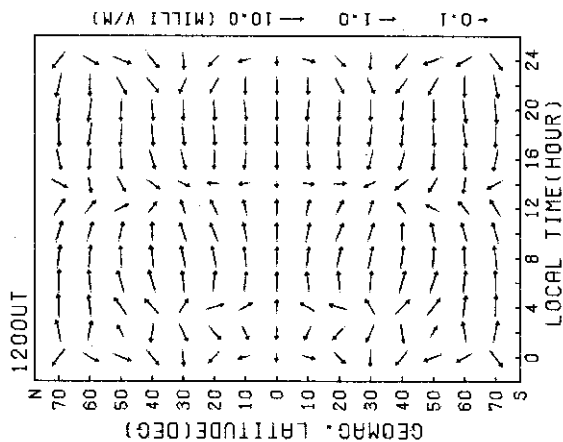


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WIND VELOCITY (LOG SCALE)

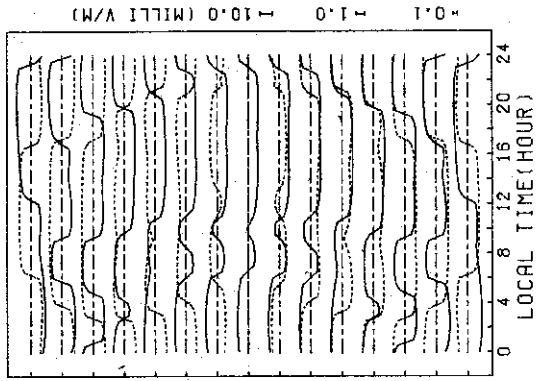
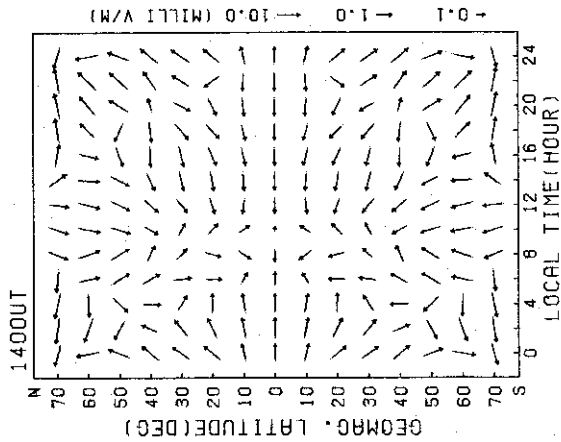


1200UT



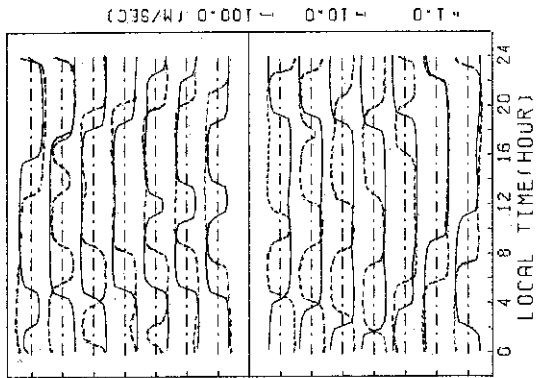
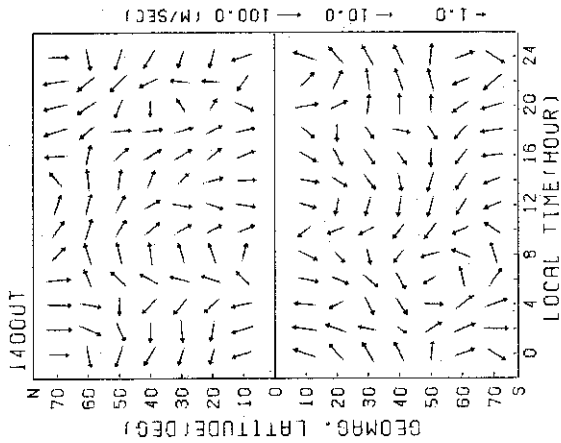
DEC. 21, 1964

ELECTRIC FIELD (LOG SCALE)

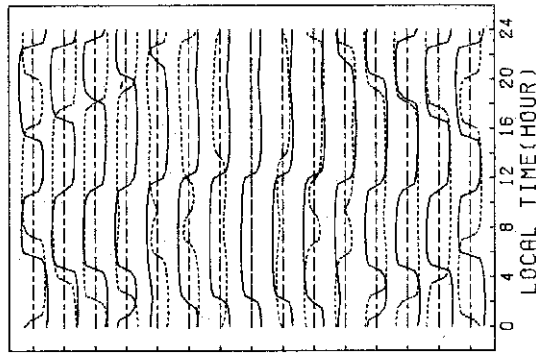
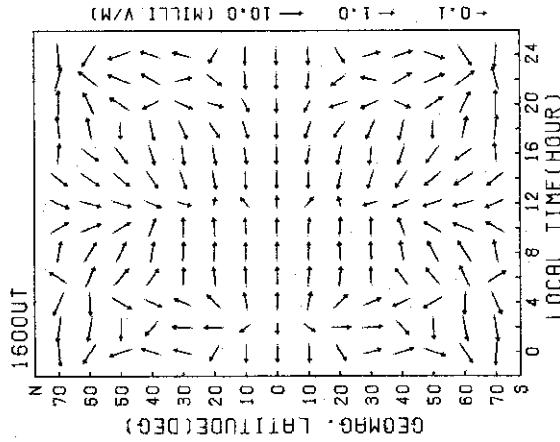


DEC. 21, 1964

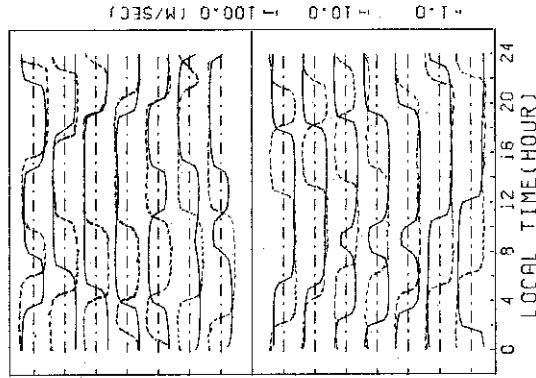
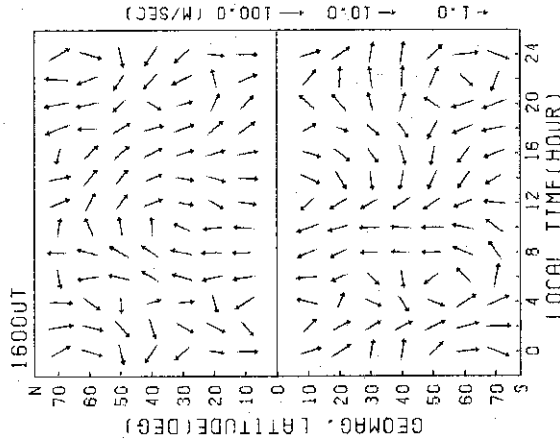
WIND VELOCITY (LOG SCALE)



1600UT

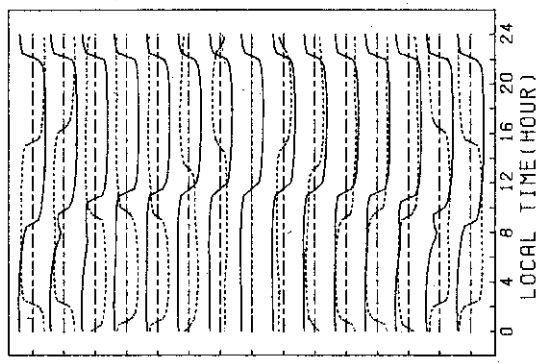
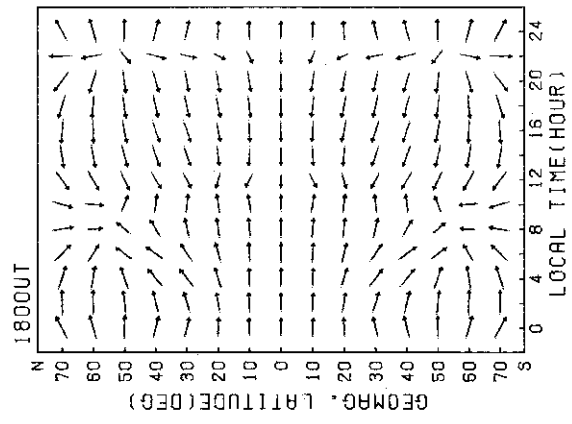


1600UT



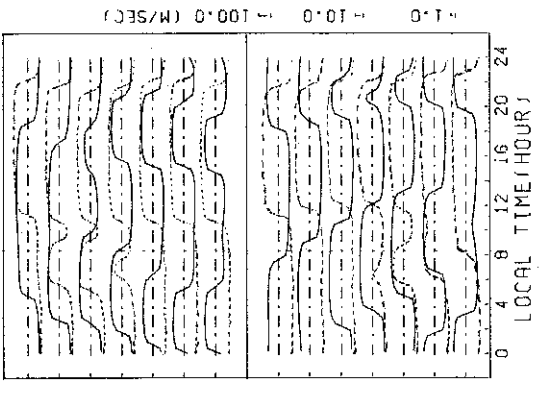
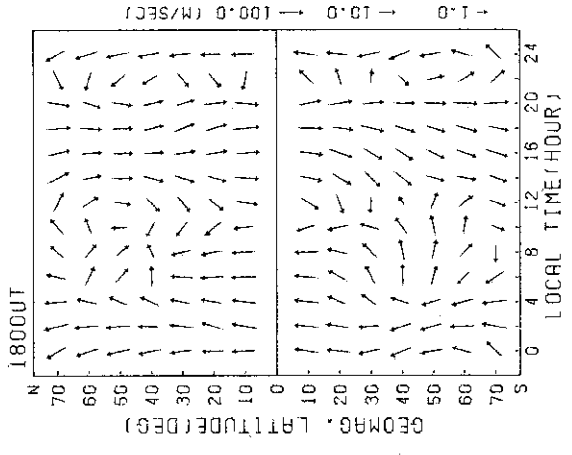
DEC.21,1964

ELECTRIC FIELD (LOG SCALE)

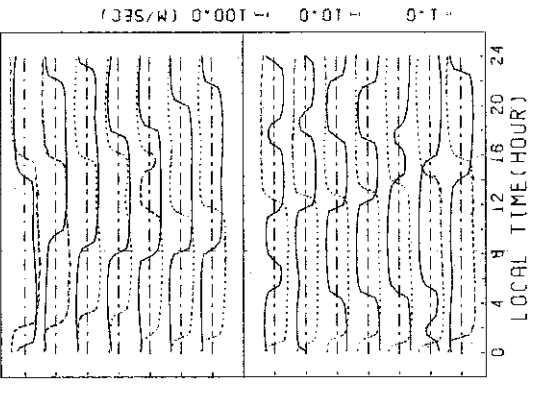
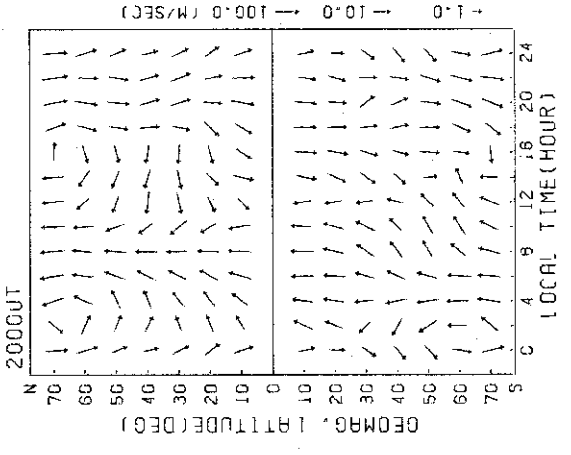
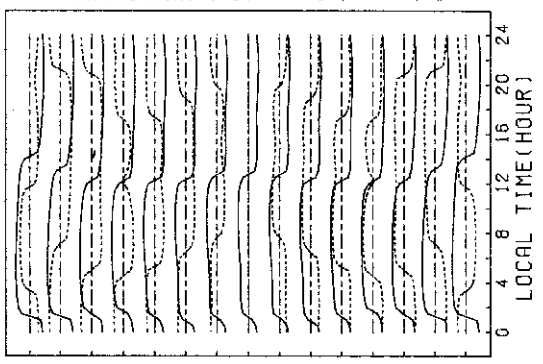
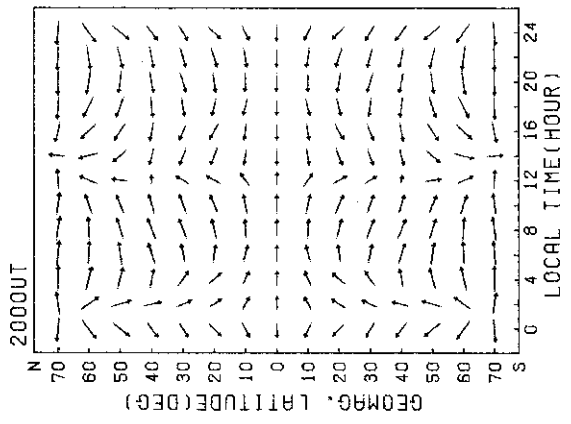


DEC.21,1964

WIND VELOCITY (LOG SCALE)

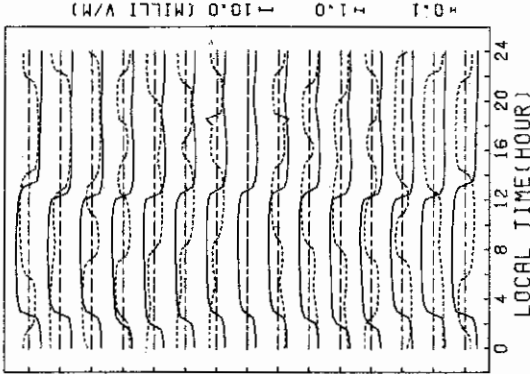
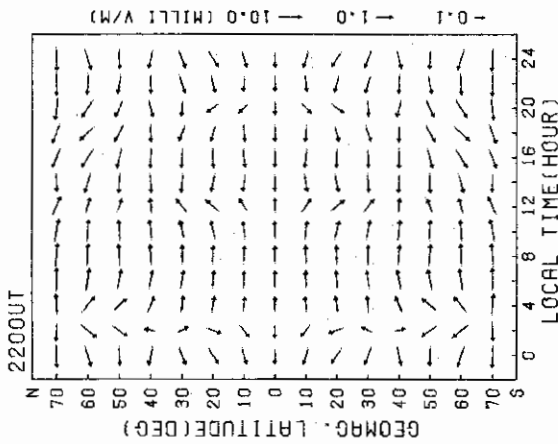


2000UT



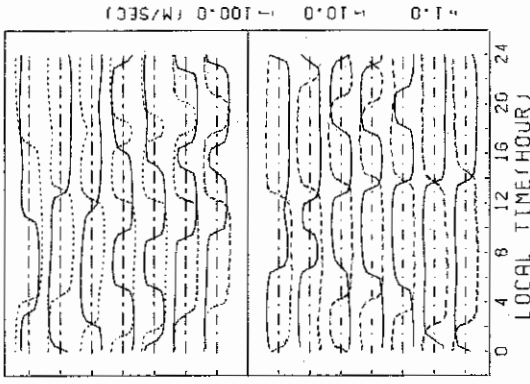
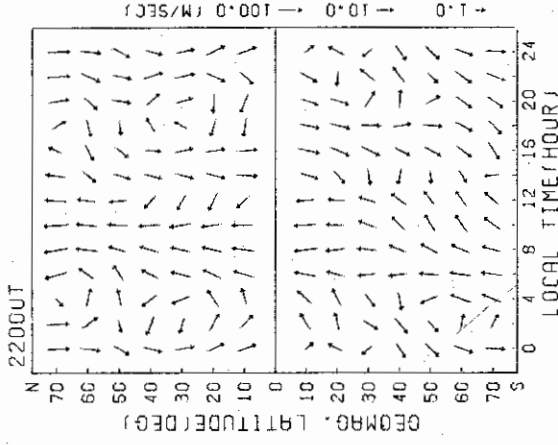
DEC.21.,1964

ELECTRIC FIELD (LOG SCALE)

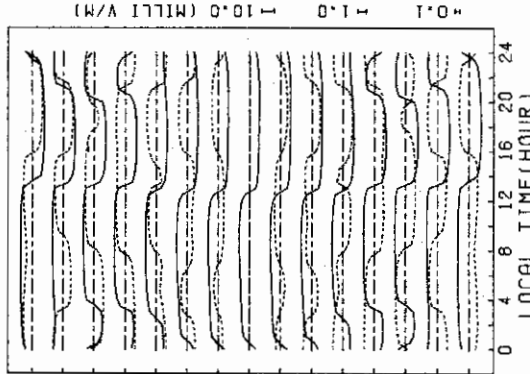
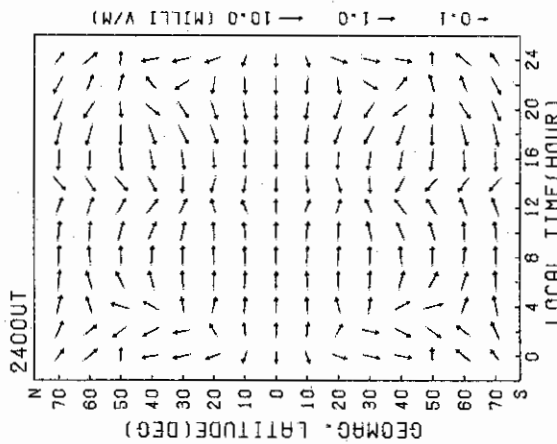


DEC.21.,1964

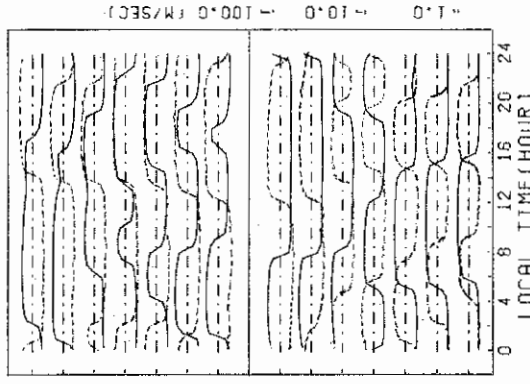
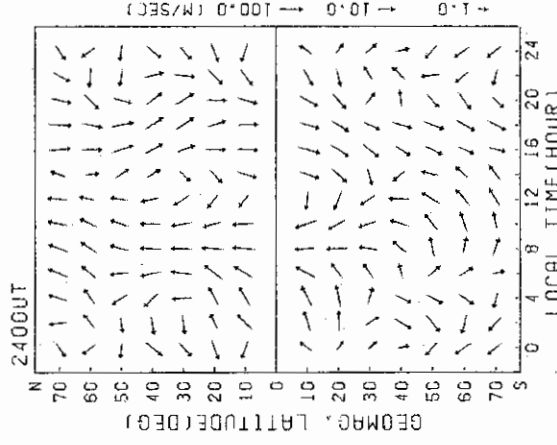
WIND VELOCITY (LOG SCALE)



2400UT

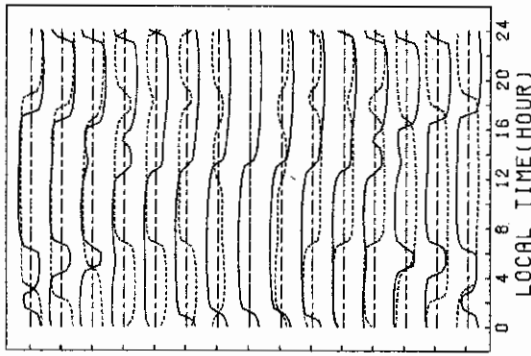
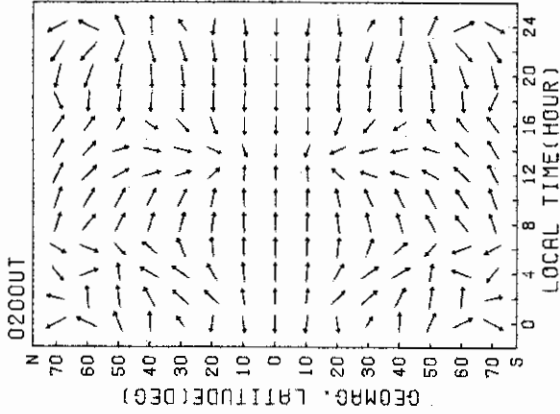


2400UT



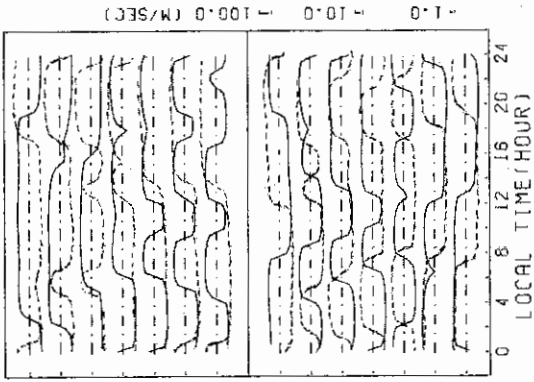
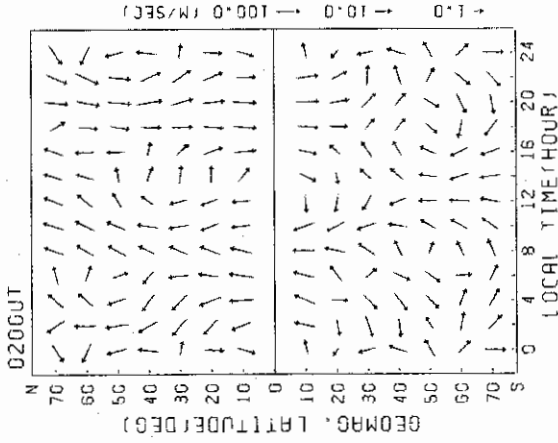
DEC.22.1964

ELECTRIC FIELD (LOG SCALE)

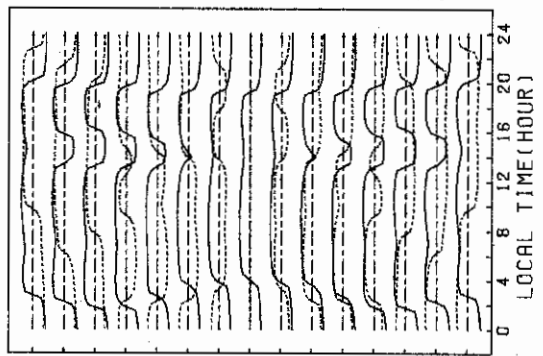
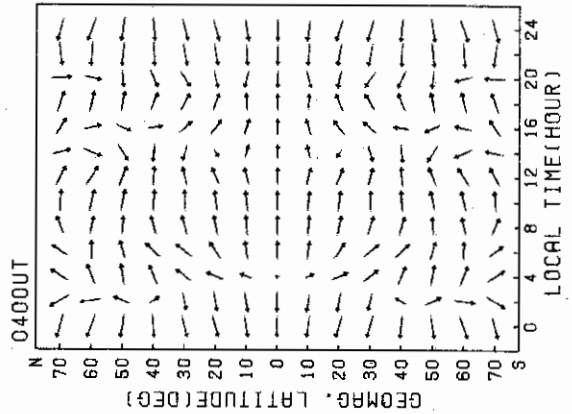


DEC.22.1964

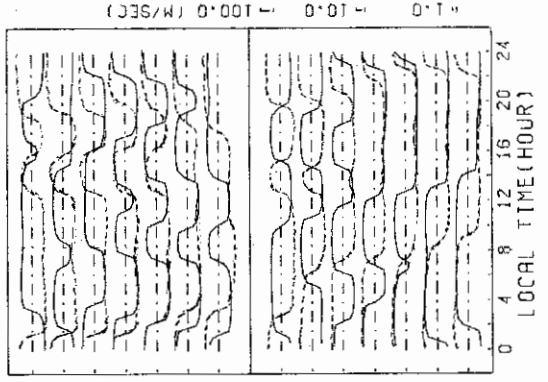
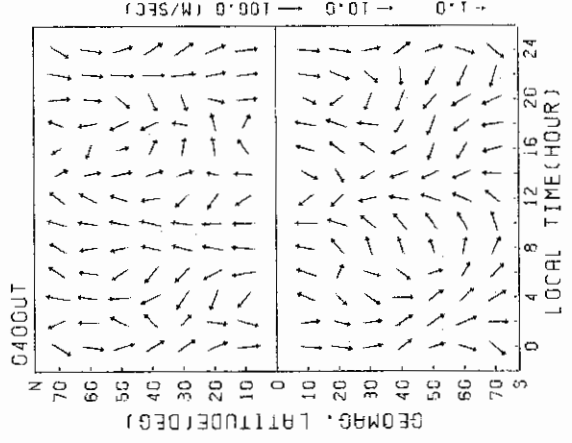
WIND VELOCITY (LOG SCALE)



0400UT

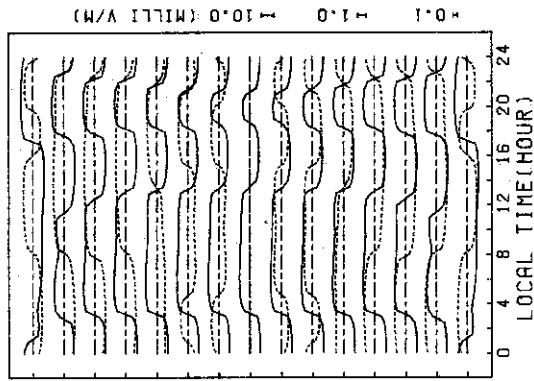
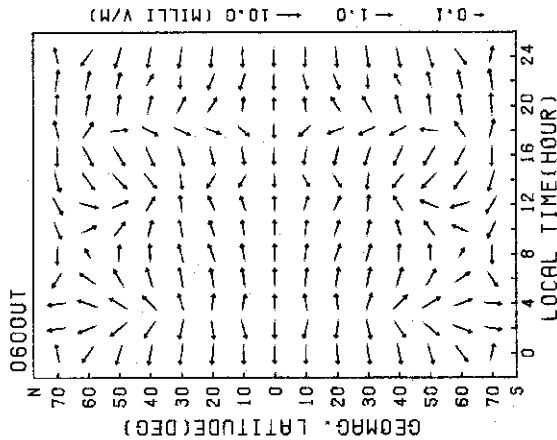


0400UT



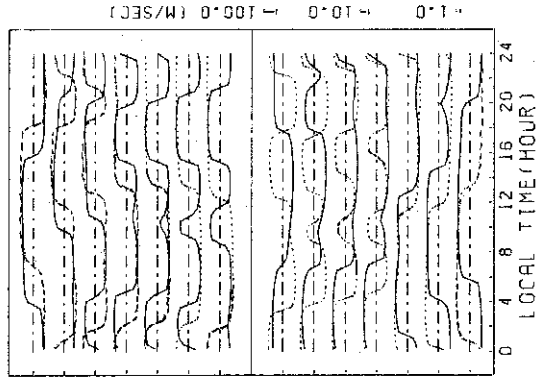
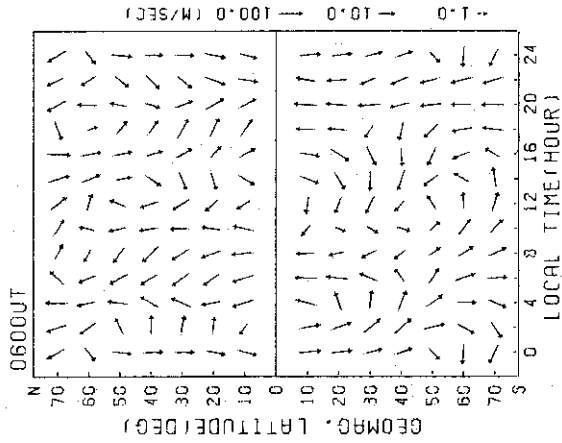
DEC.22,1964

ELECTRIC FIELD (LOG SCALE)

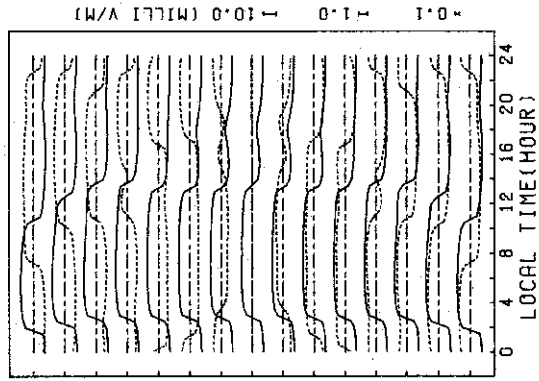
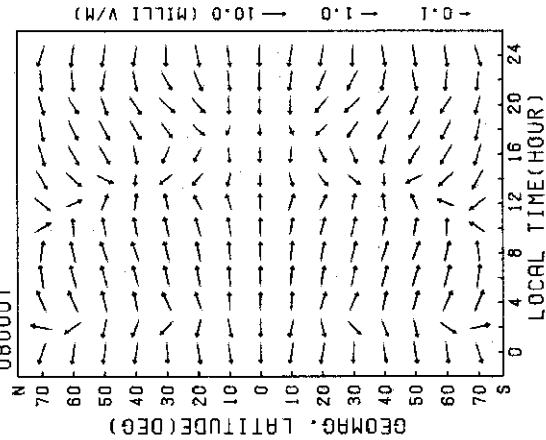


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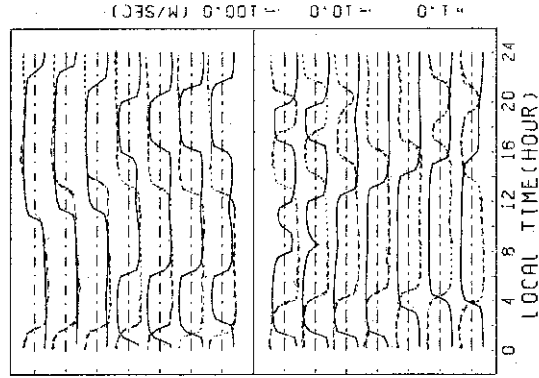
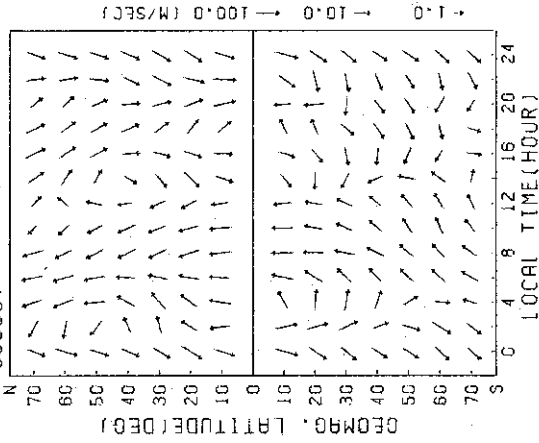
WIND VELOCITY (LOG SCALE)



0800UT

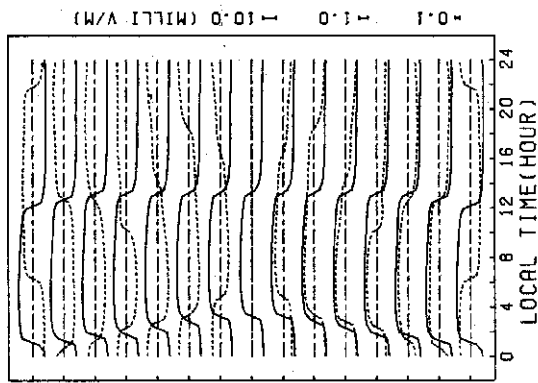
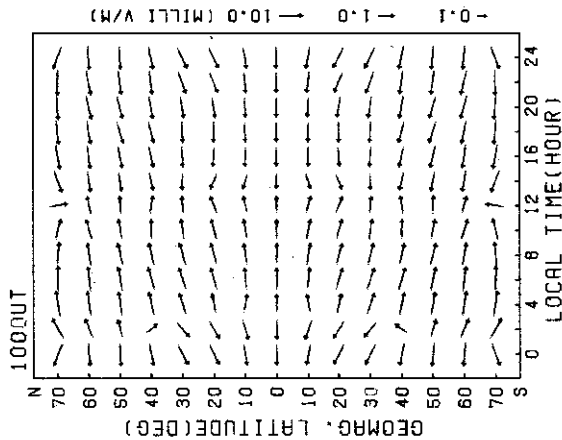


0800UT

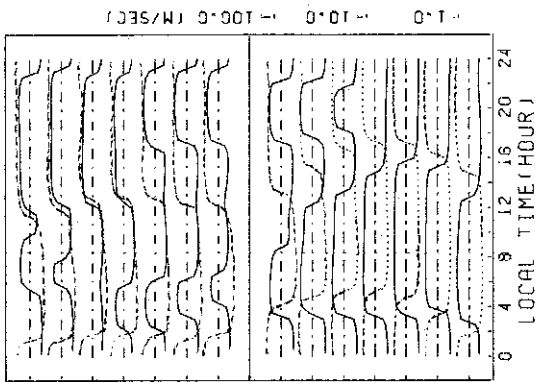
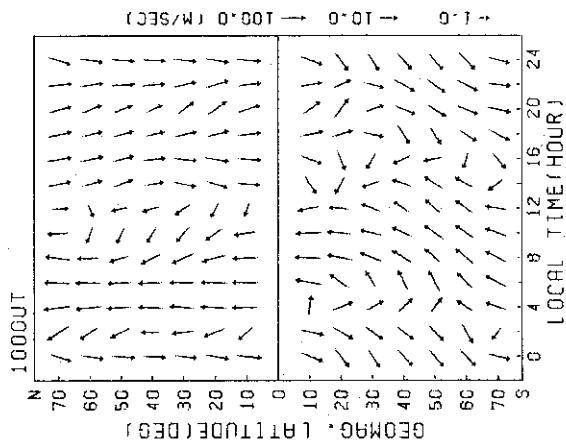


DEC.22.1964

ELECTRIC FIELD (LOG SCALE)

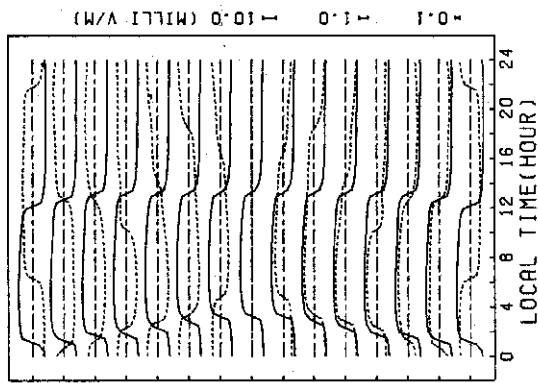
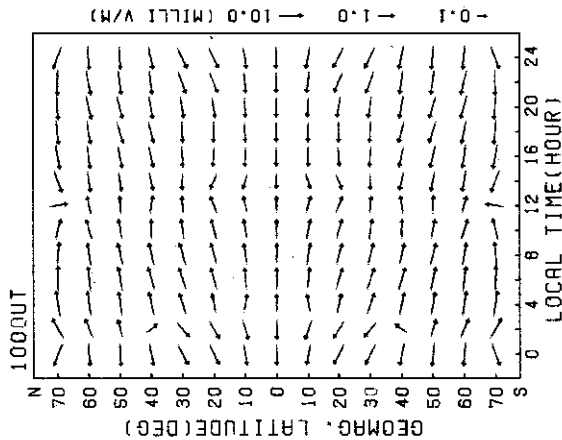


WIND VELOCITY (LOG SCALE)

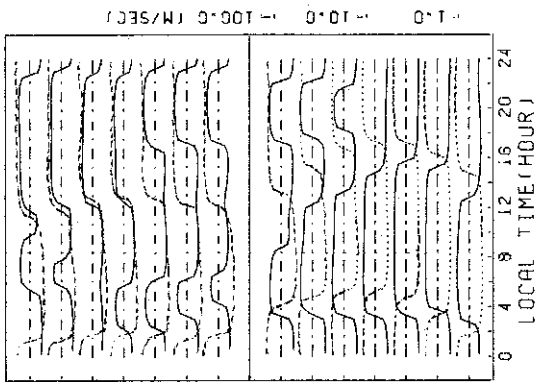
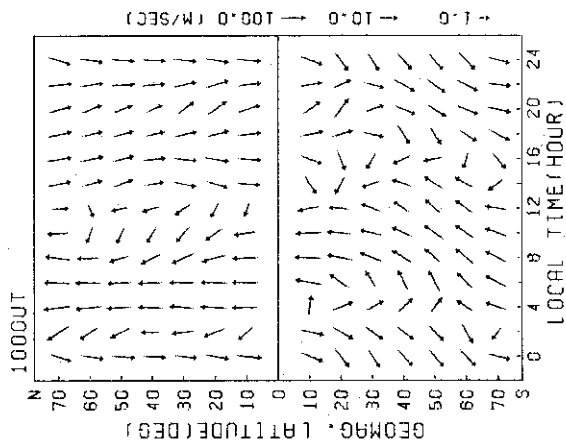


DEC.22.1964

ELECTRIC FIELD (LOG SCALE)

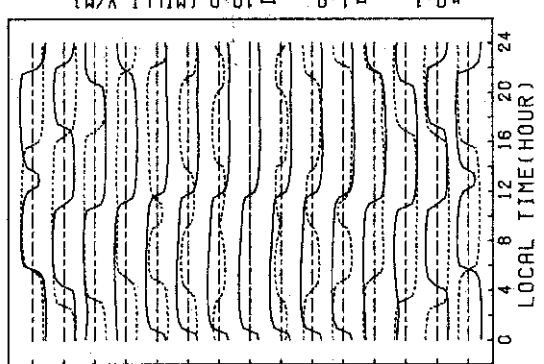
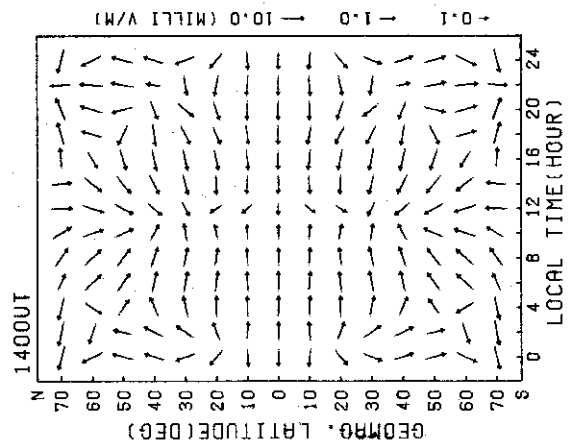


WIND VELOCITY (LOG SCALE)



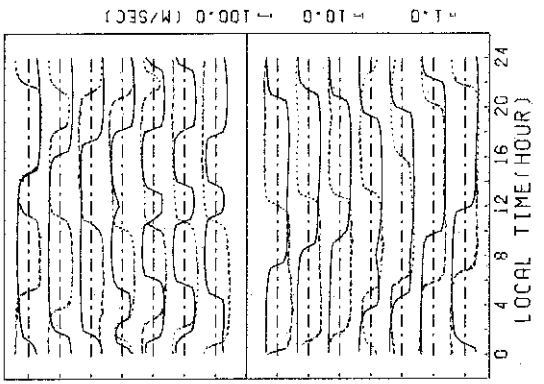
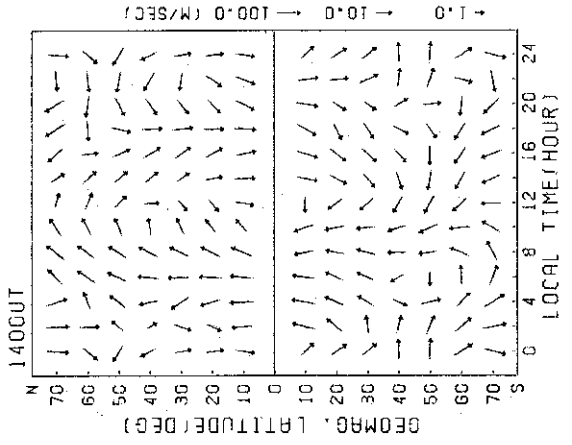
DEC. 22, 1964

ELECTRIC FIELD (LOG SCALE)

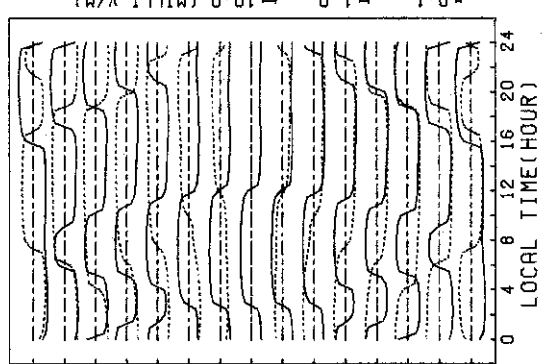
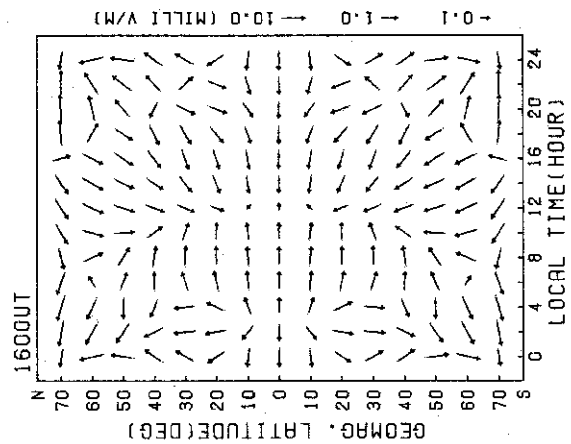


DEC. 22, 1964

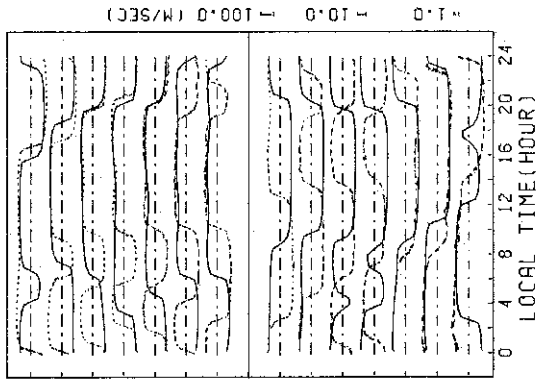
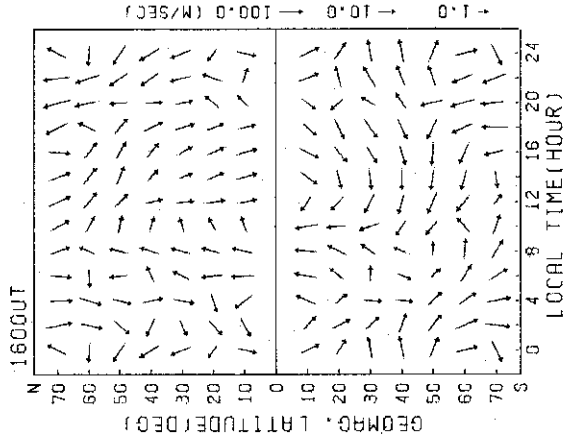
WIND VELOCITY (LOG SCALE)



1600UT

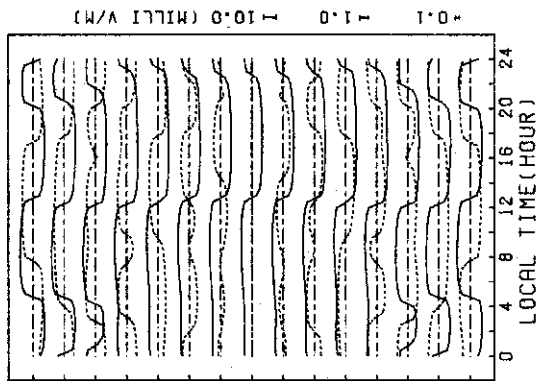
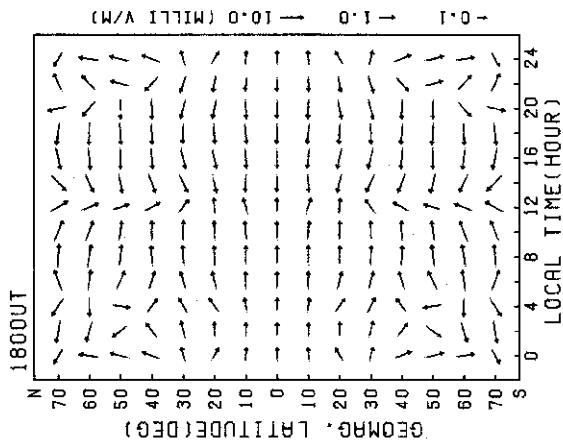


1600UT



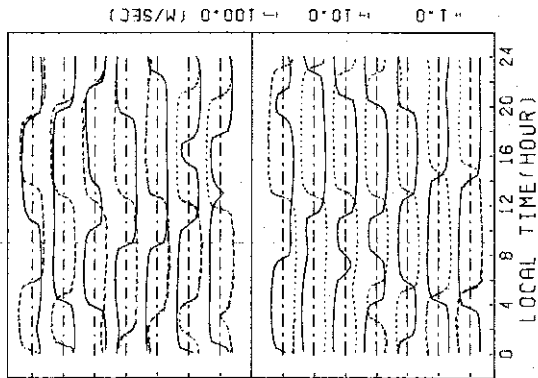
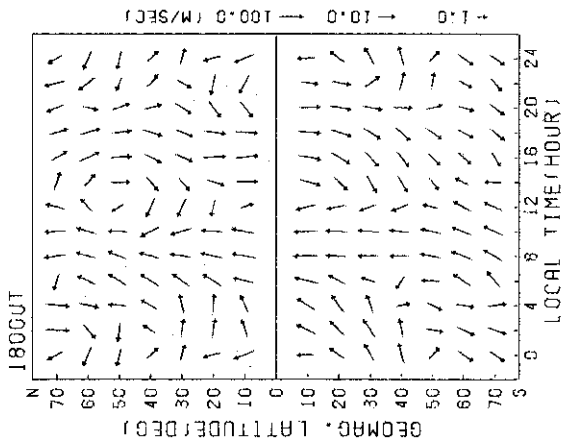
DEC.22.1964

ELECTRIC FIELD (LOG SCALE)

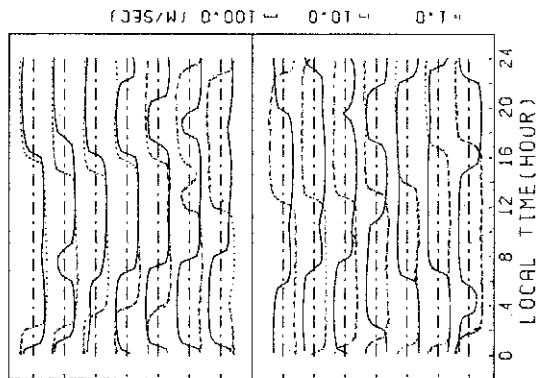
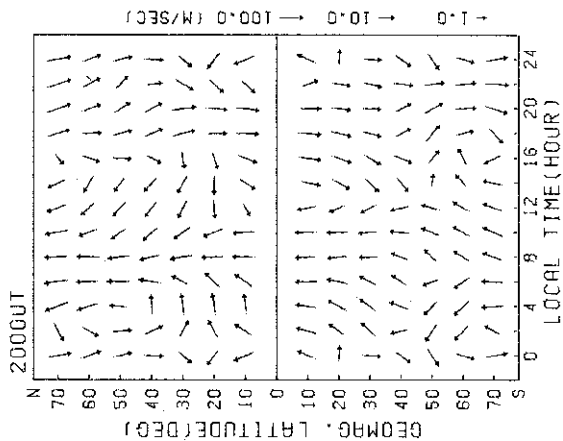
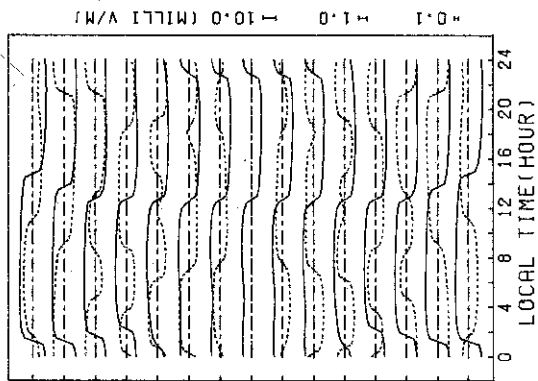
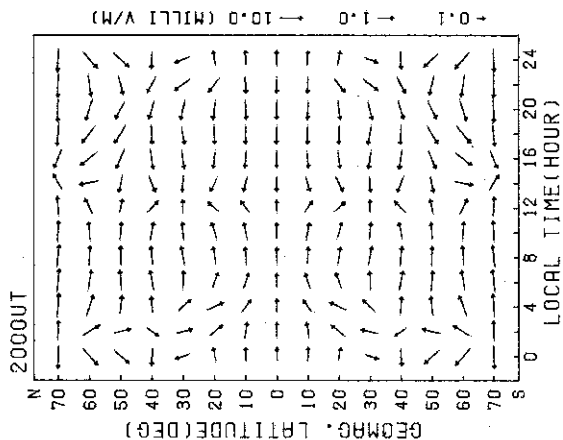


DEC.22.1964

WIND VELOCITY (LOG SCALE)

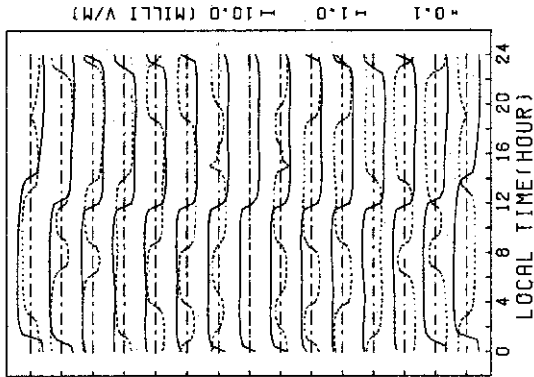
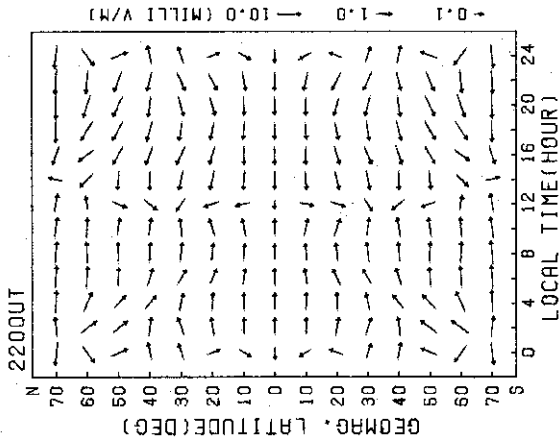


2000UT



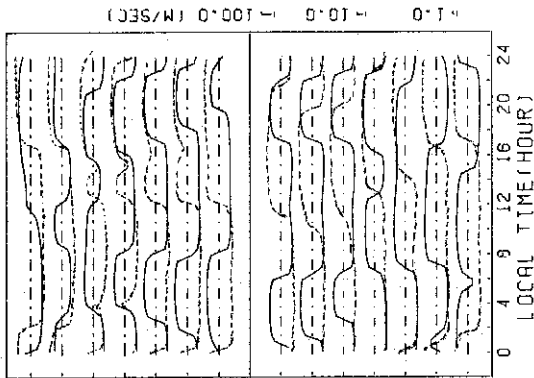
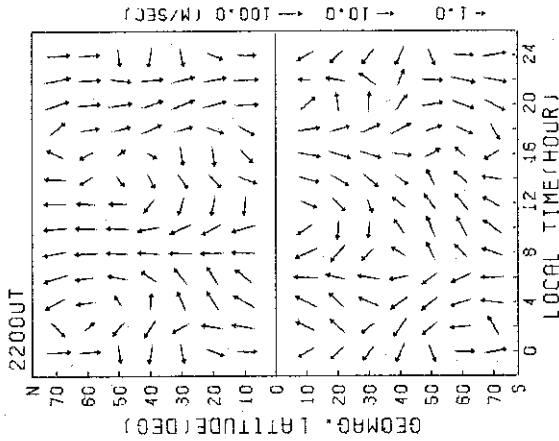
DEC.22.1964

ELECTRIC FIELD (LOG SCALE)

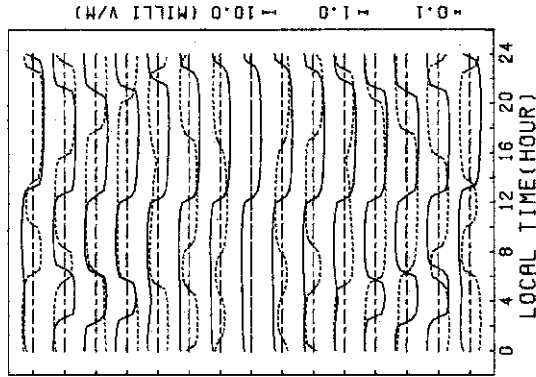
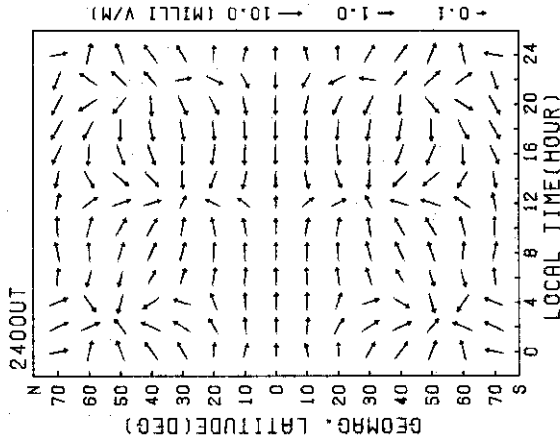


DEC.22.1964

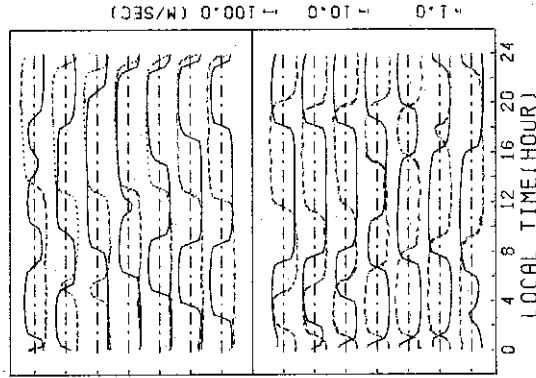
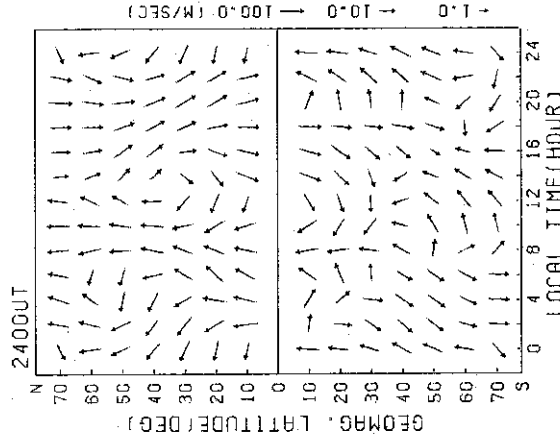
WIND VELOCITY (LOG SCALE)



2400UT

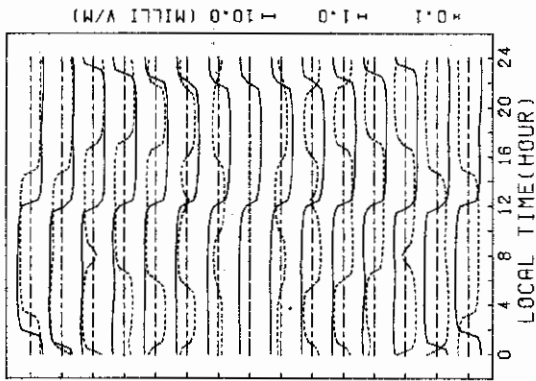
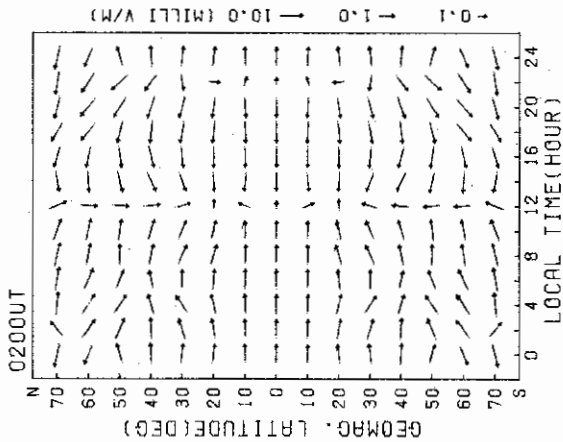


2400UT



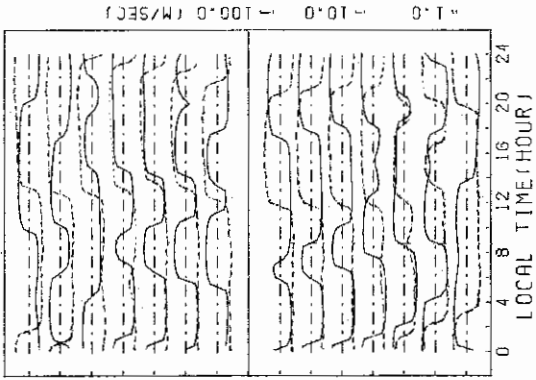
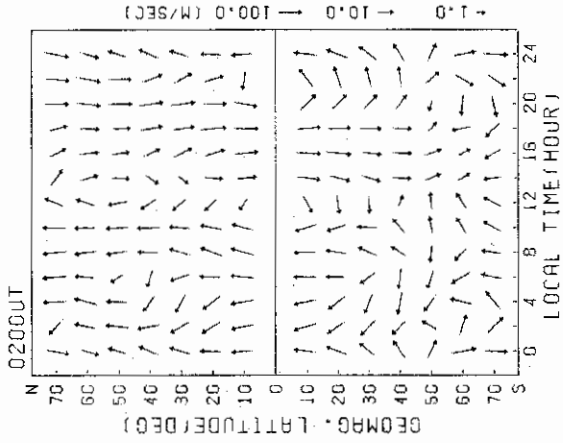
DEC.23,1964

ELECTRIC FIELD (LOG SCALE)

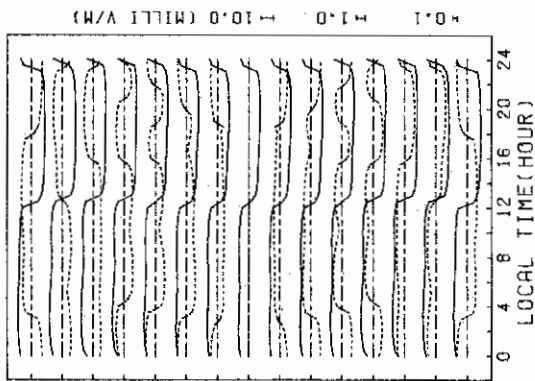
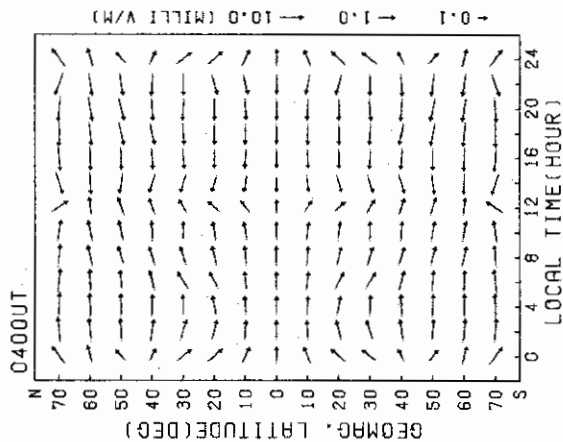


DEC.23,1964

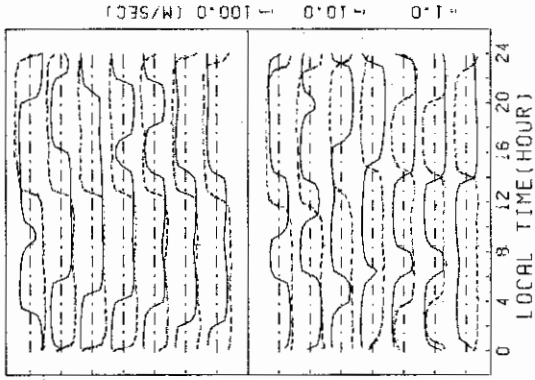
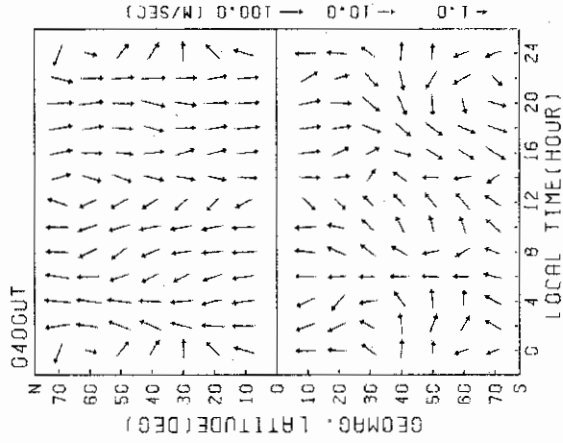
WIND VELOCITY (LOG SCALE)



0400UT

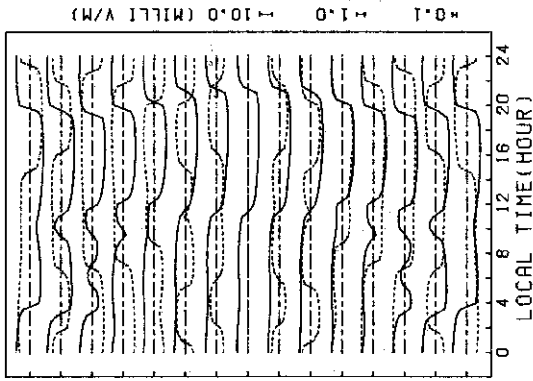
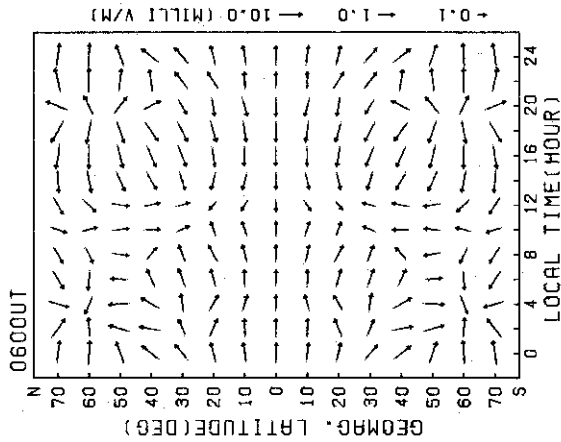


0400UT



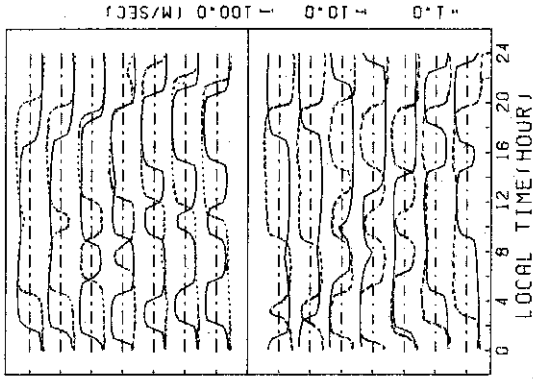
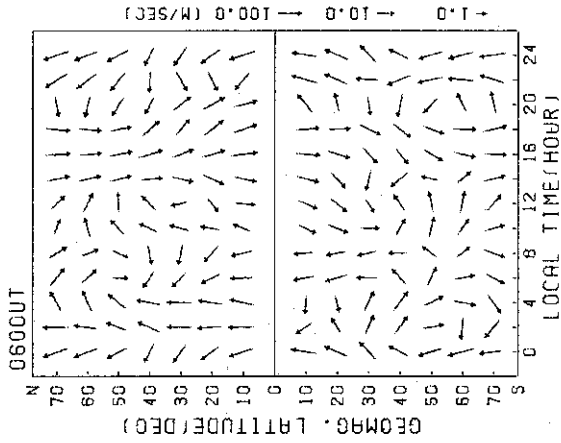
DEC. 23, 1964

ELECTRIC FIELD (LOG SCALE)

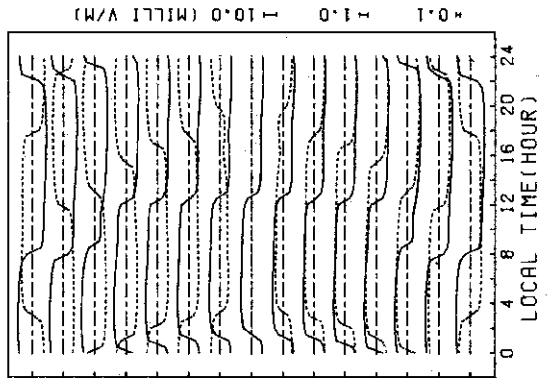
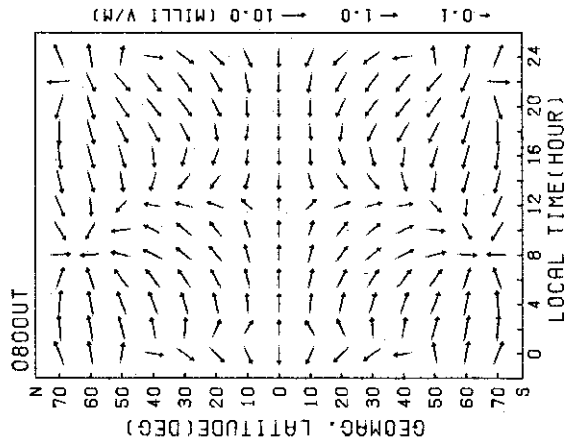


DEC. 23, 1964

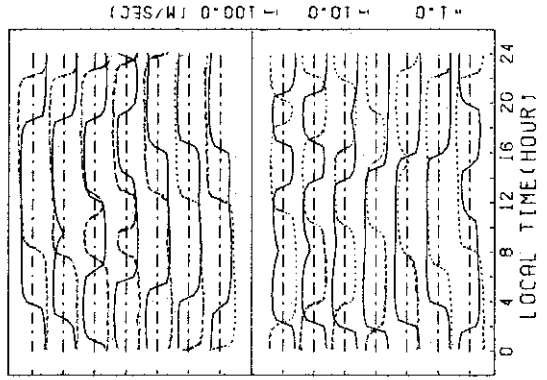
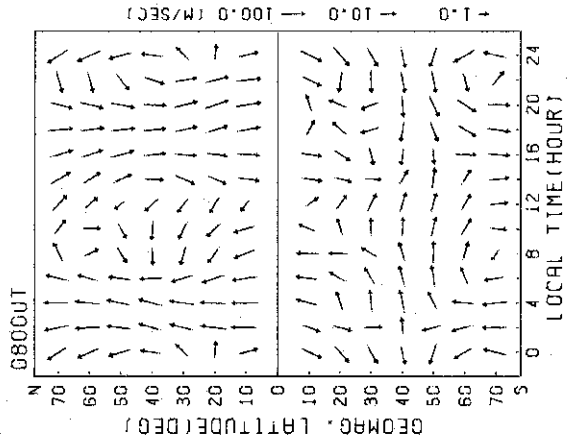
WIND VELOCITY (LOG SCALE)



0800UT

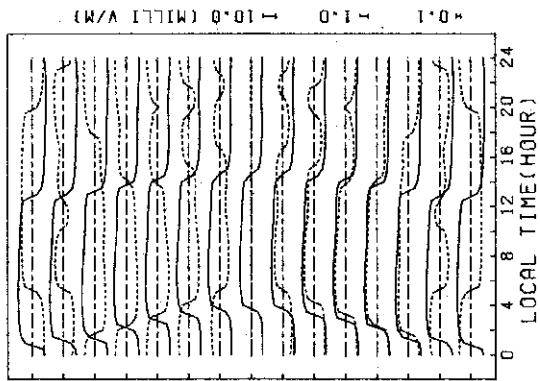
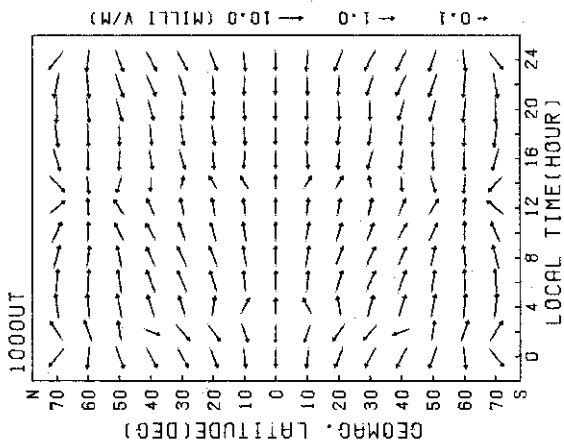


0800UT



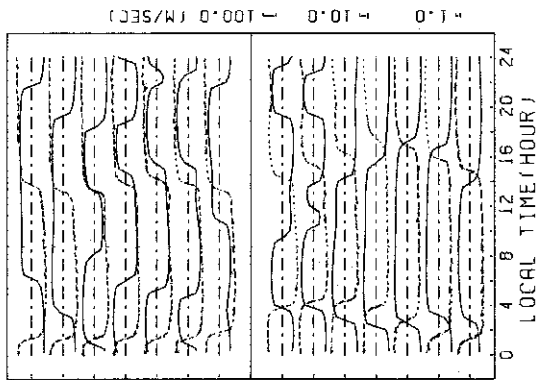
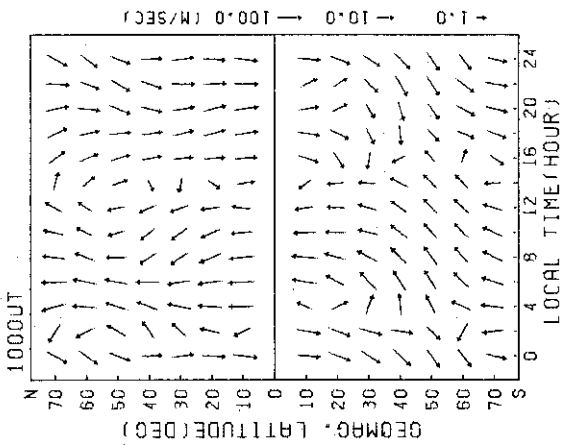
DEC.23.1964

ELECTRIC FIELD (LOG SCALE)

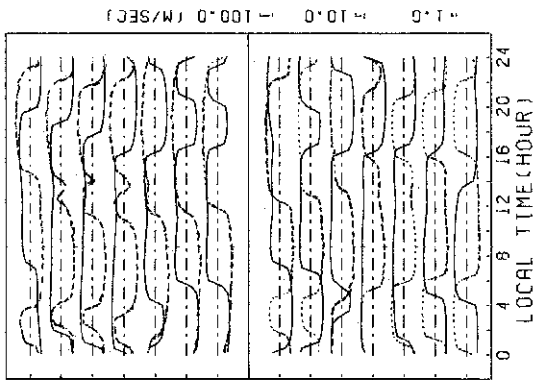
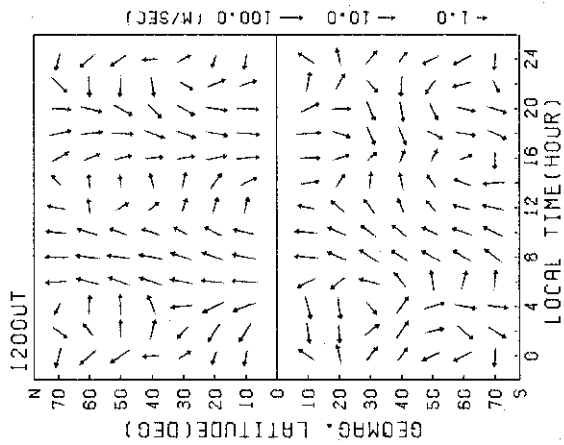
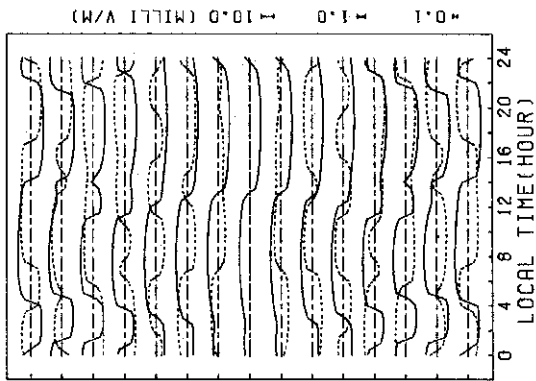
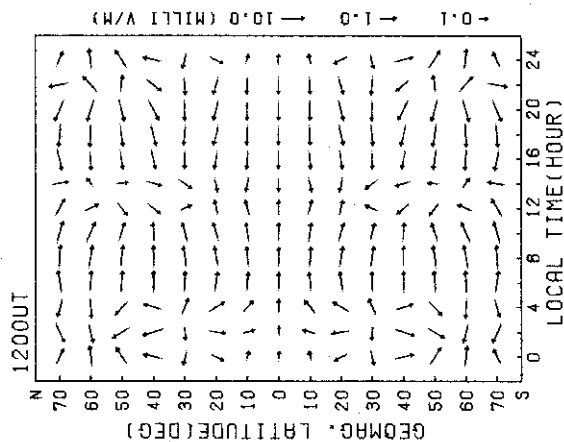


DEC.23.1964

WIND VELOCITY (LOG SCALE)

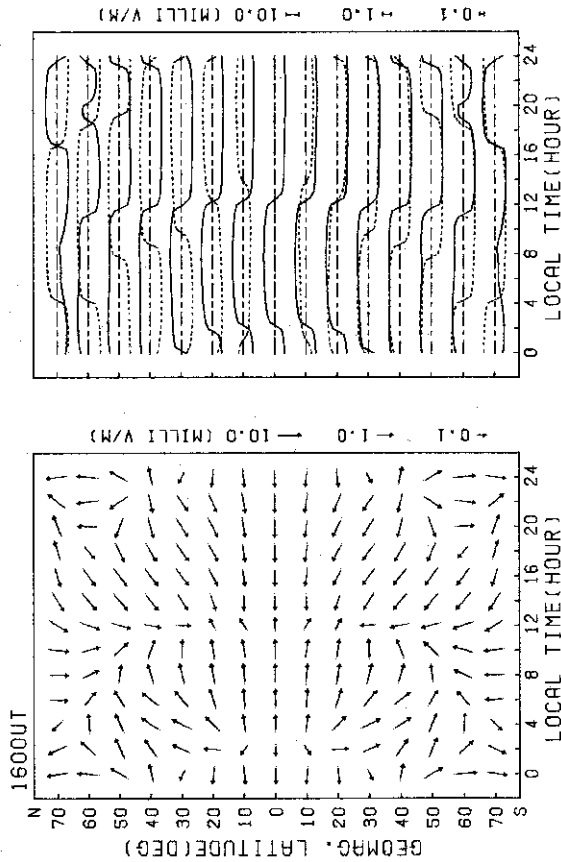
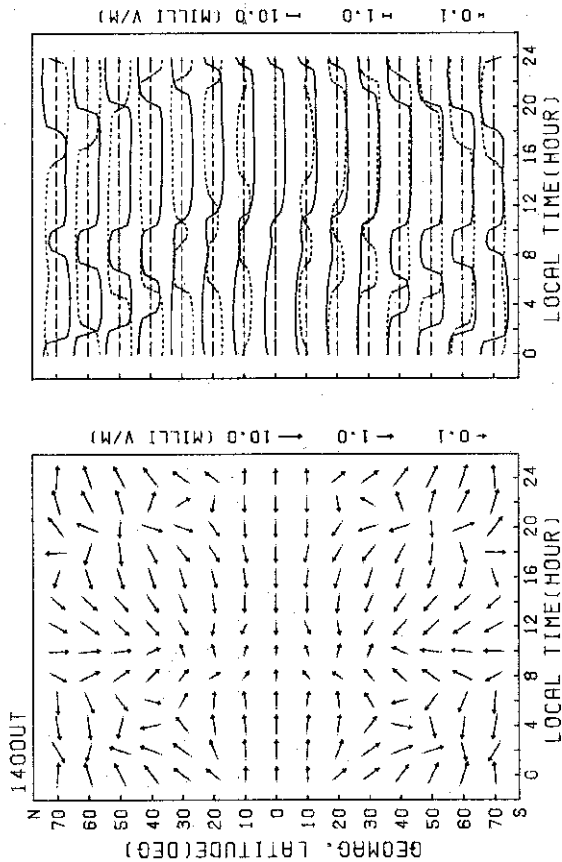


1200UT



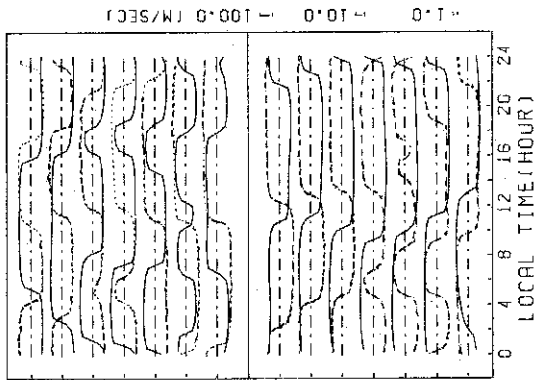
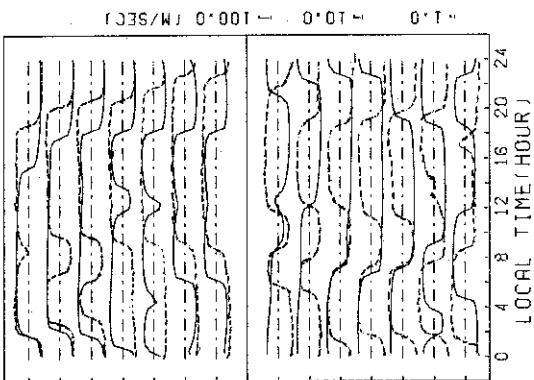
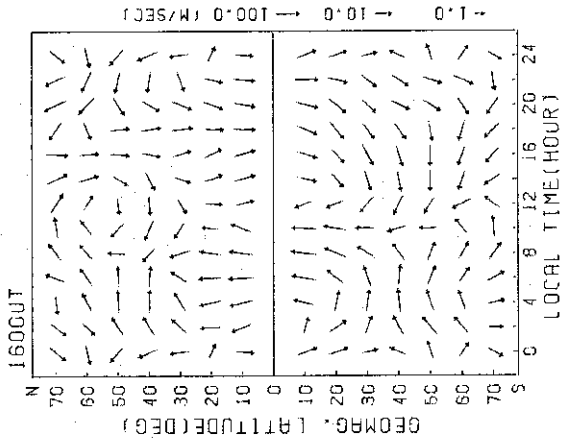
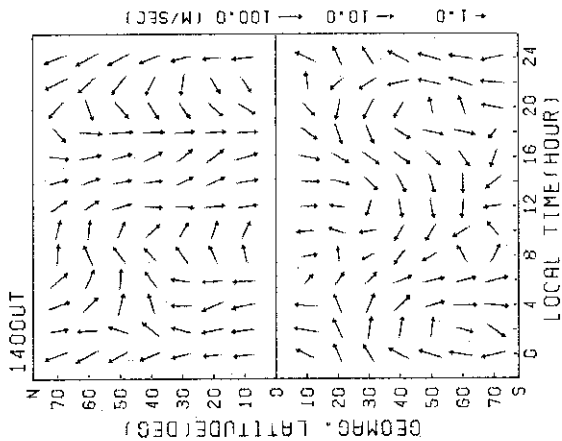
DEC-23-1964

ELECTRIC FIELD (LOG SCALE)



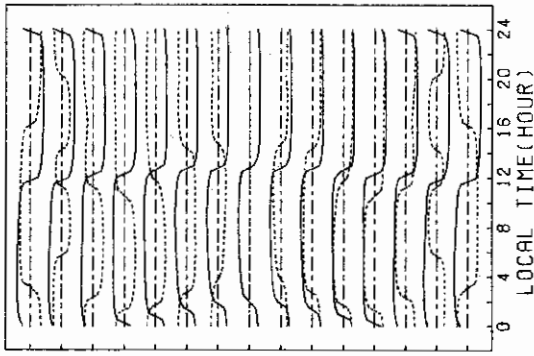
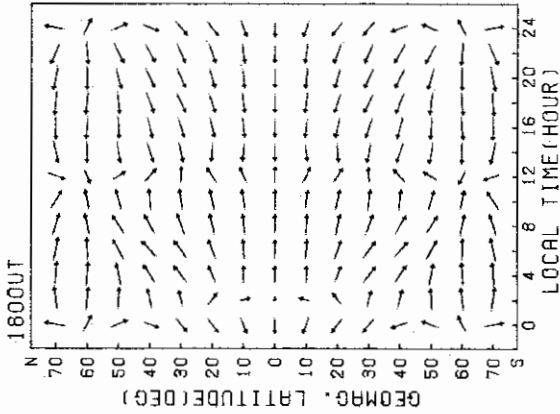
DEC-23-1964

WIND VELOCITY (LOG SCALE)



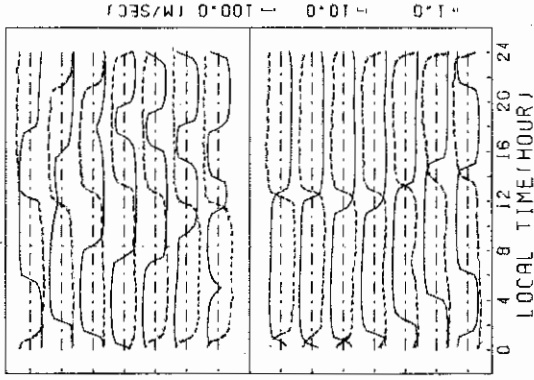
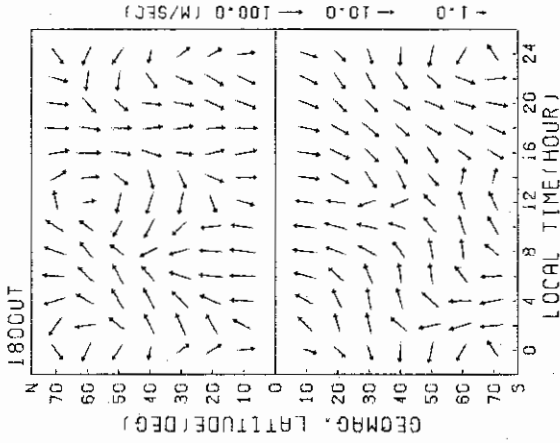
DEC.23.1964

ELECTRIC FIELD (LOG SCALE)

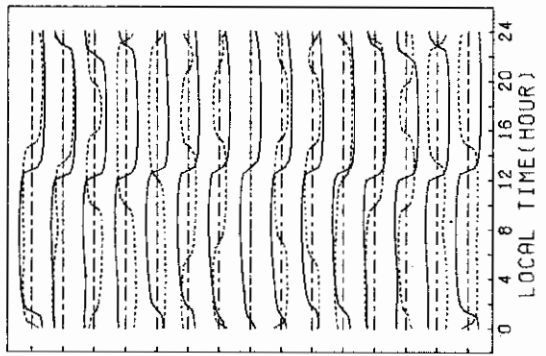
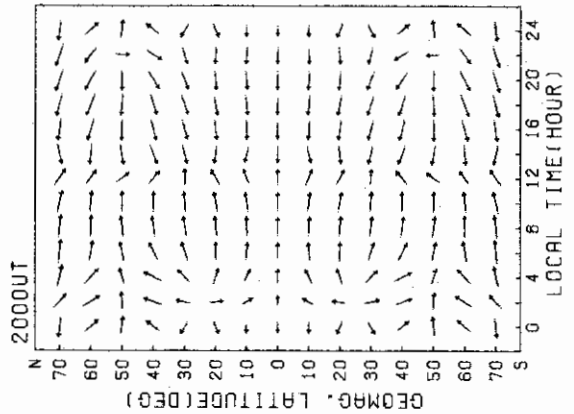


DEC.23.1964

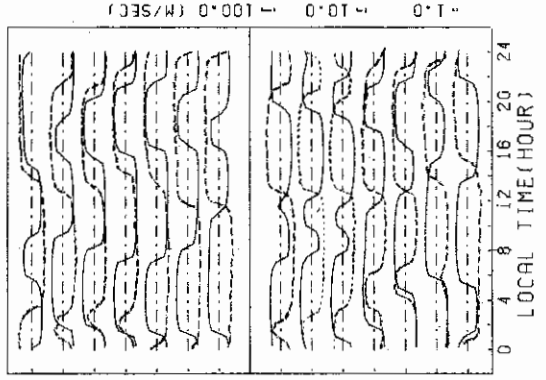
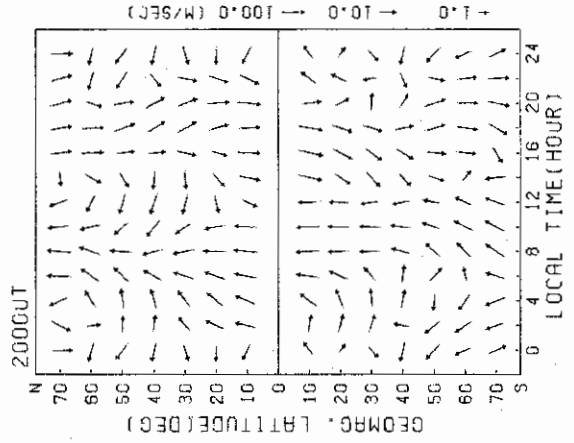
WIND VELOCITY (LOG SCALE)



2000UT

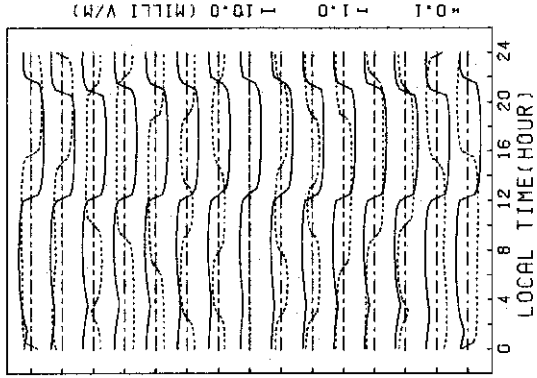
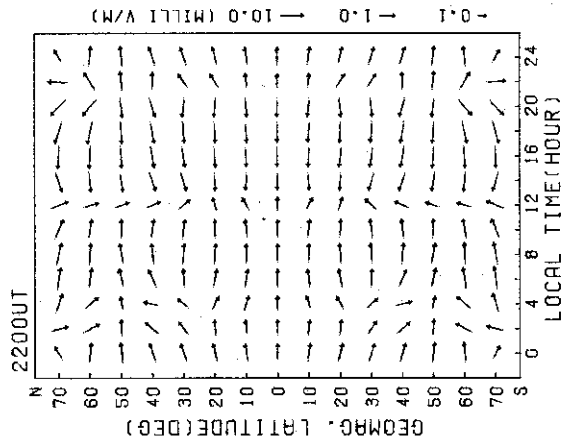


2000UT



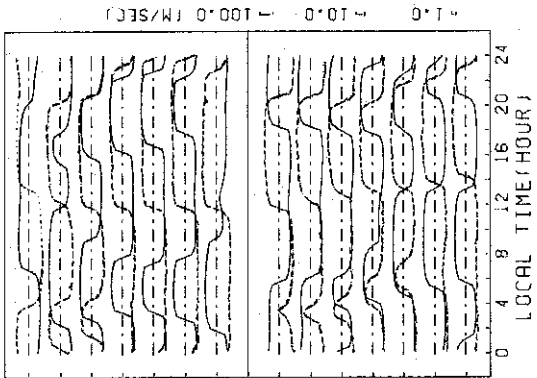
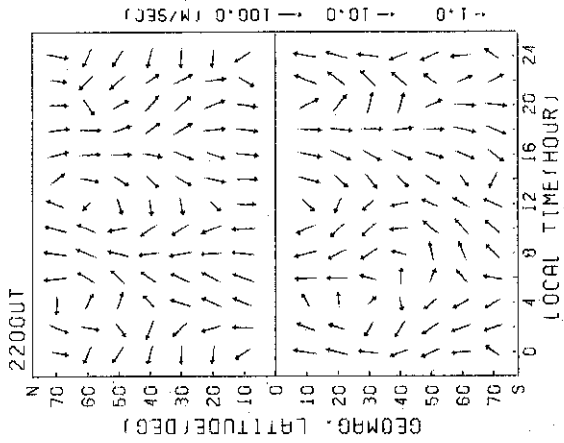
DEC.23.1964

ELECTRIC FIELD (LOG SCALE)

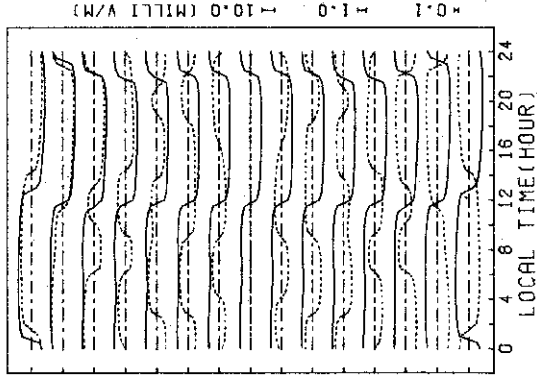
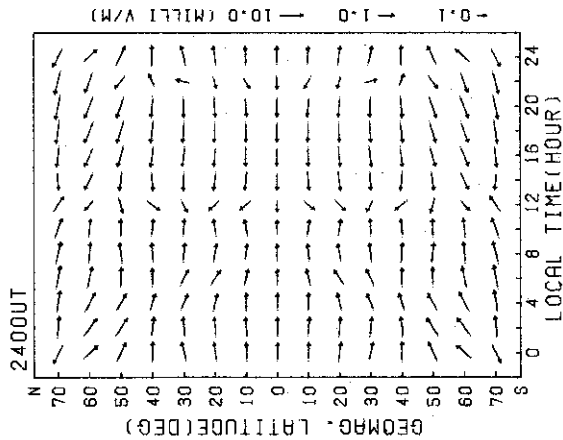


DEC.23.1964

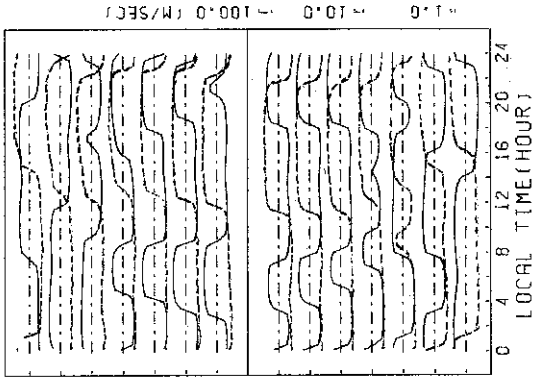
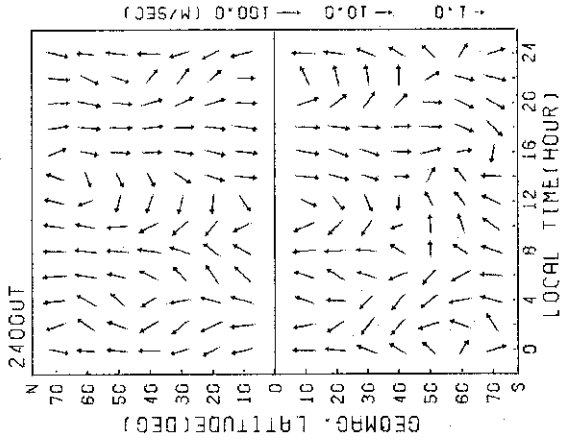
WIND VELOCITY (LOG SCALE)



2400UT

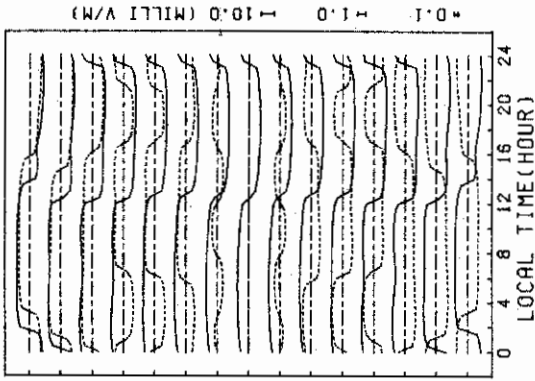
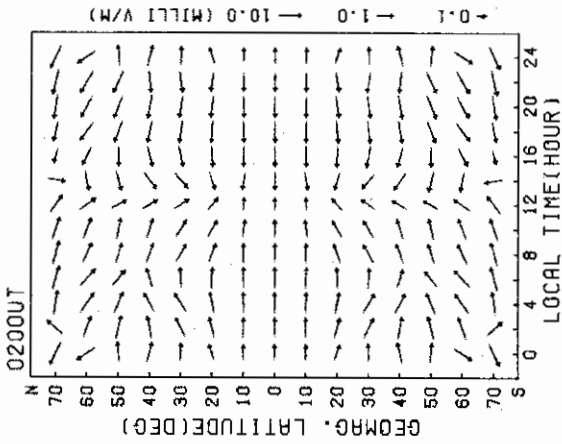


2400UT



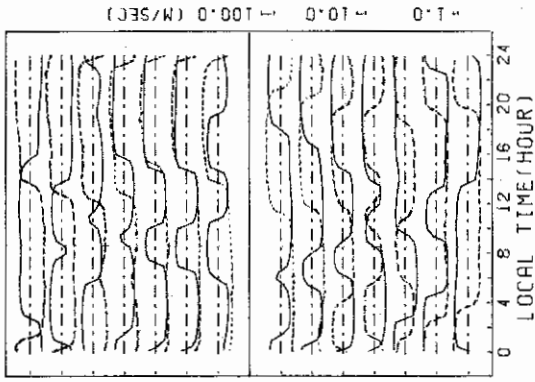
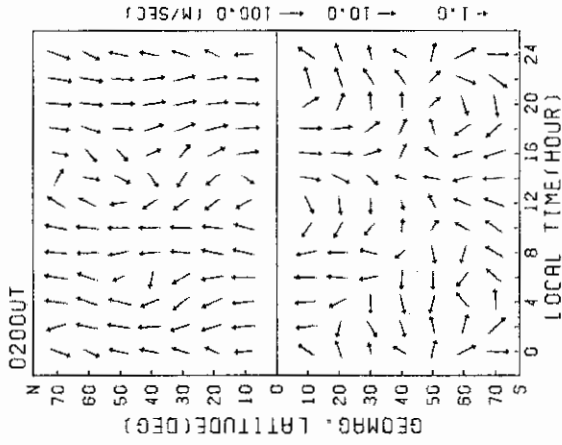
DEC.24.1964

ELECTRIC FIELD (LOG SCALE)

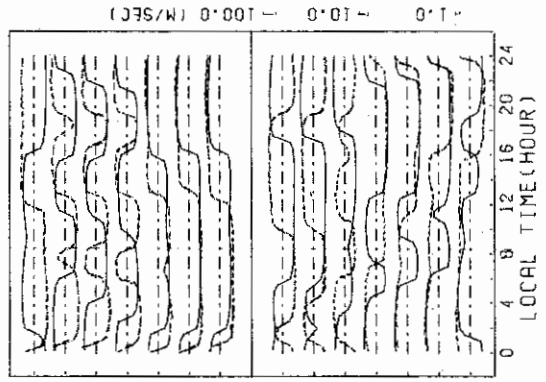
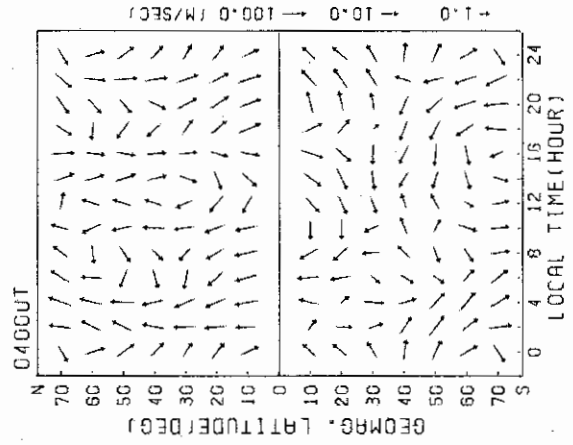
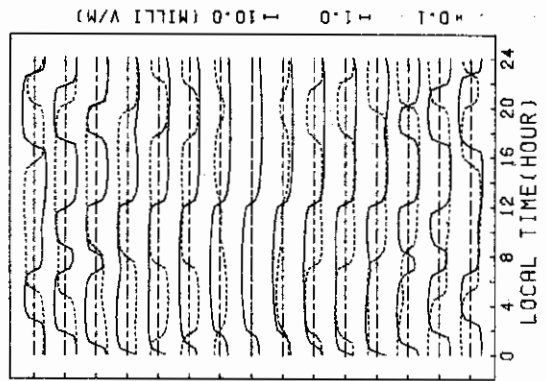
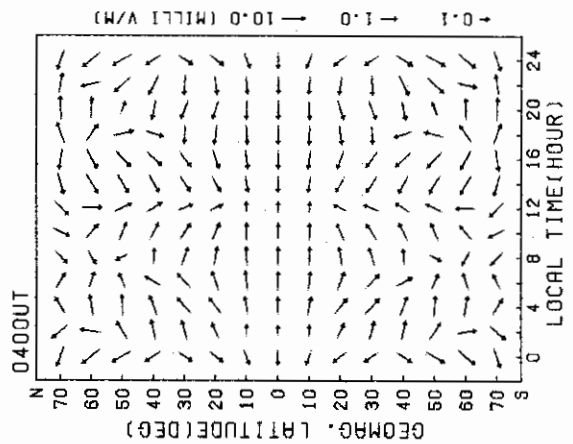


DEC.24.1964

WIND VELOCITY (LOG SCALE)

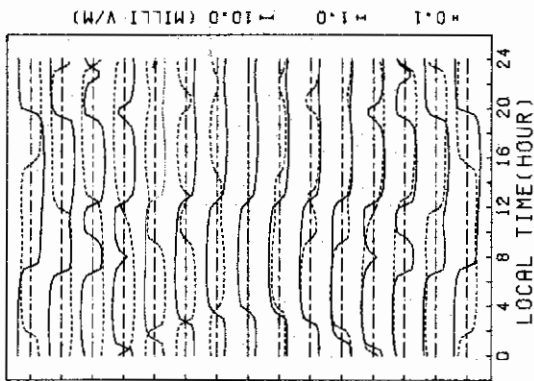
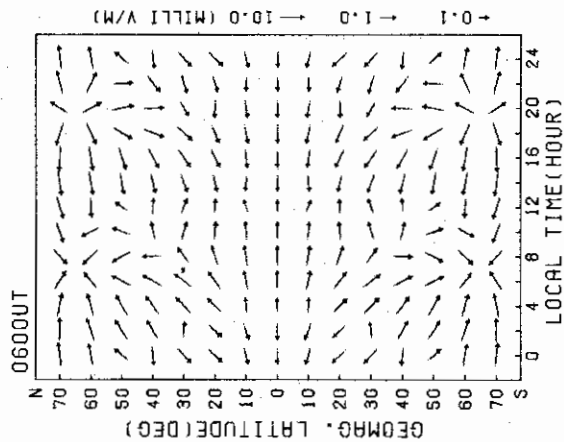


0400UT



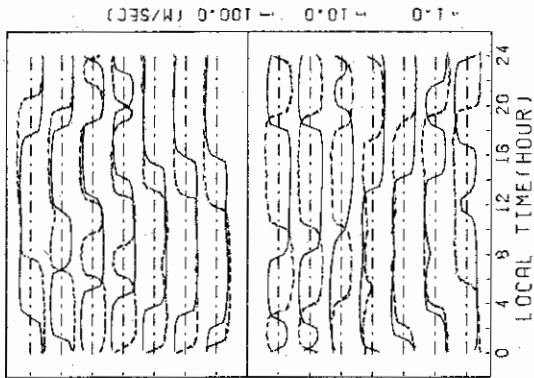
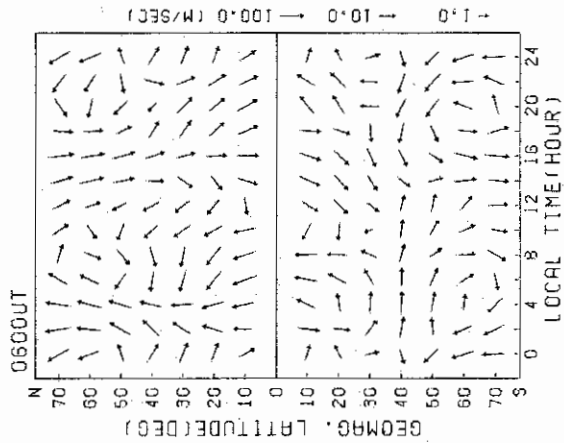
DEC.24.1964

ELECTRIC FIELD (LOG SCALE)

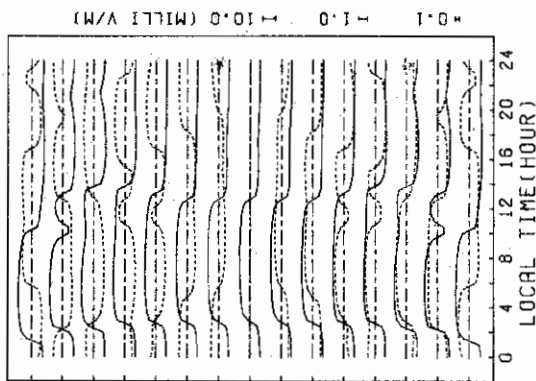
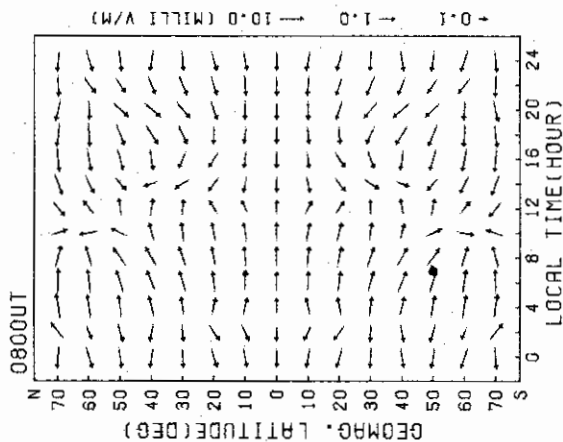


DEC.24.1964

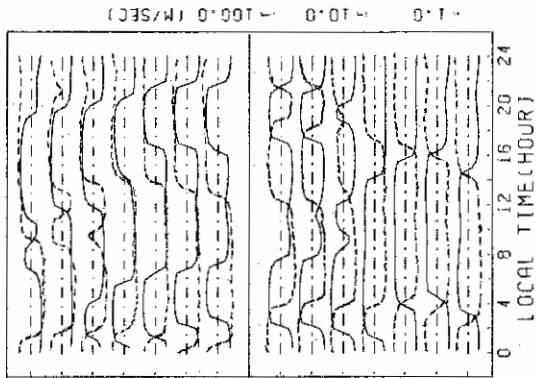
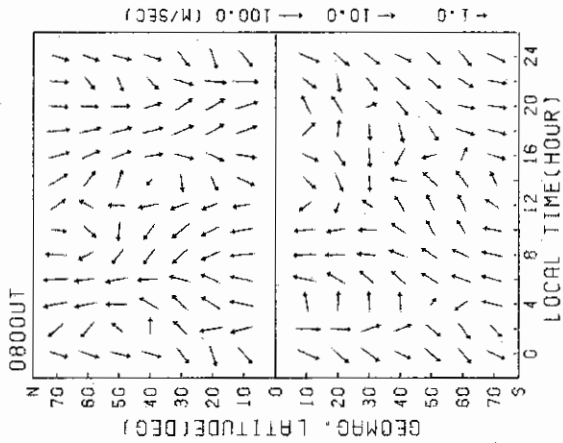
WIND VELOCITY (LOG SCALE)



0800UT

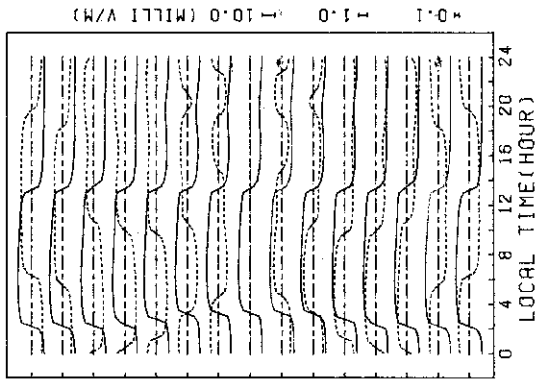
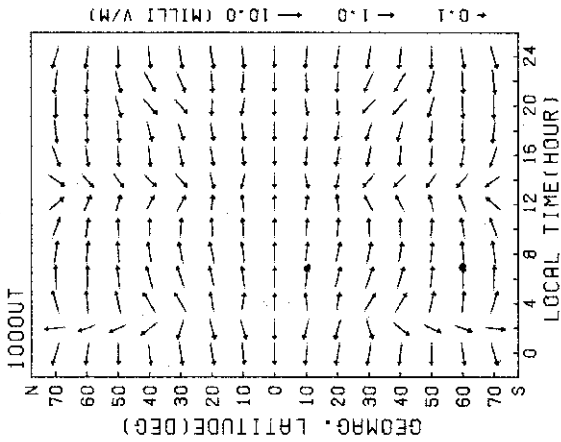


0800UT



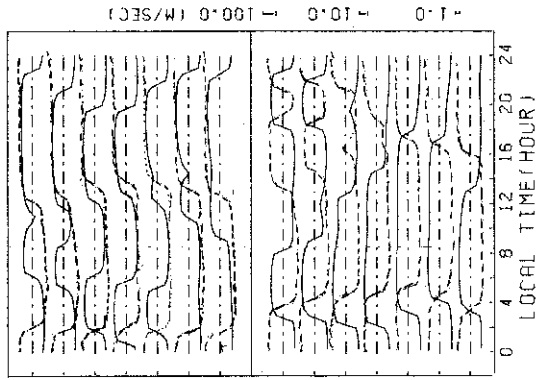
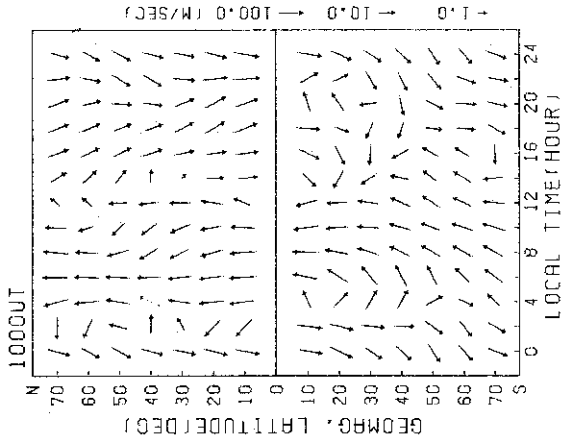
DEC.24,1964

ELECTRIC FIELD (LOG SCALE)

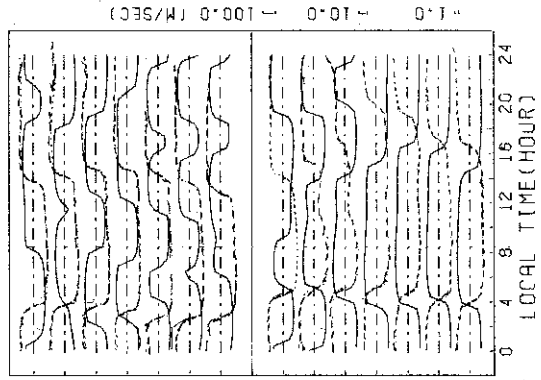
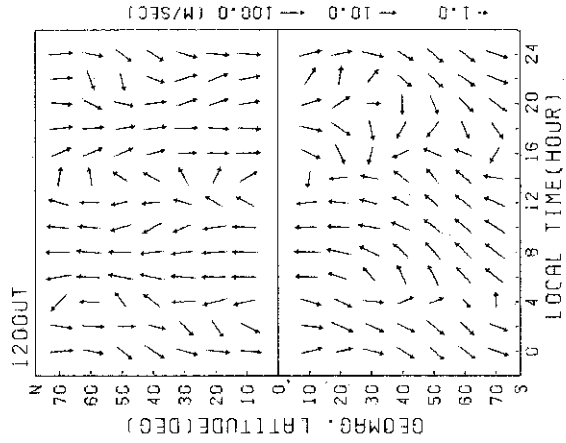
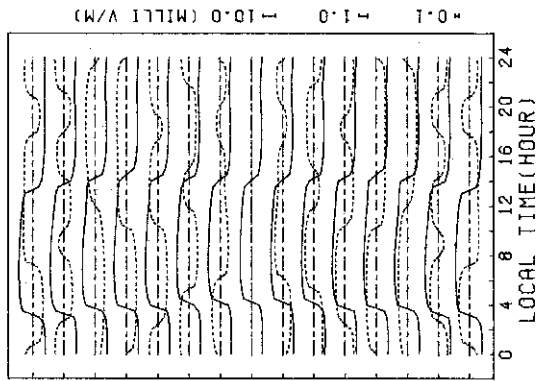
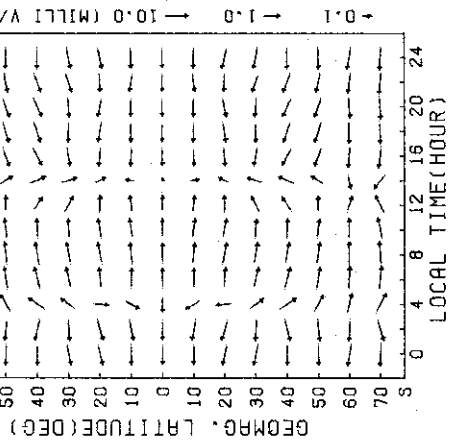


DEC.24,1964

WIND VELOCITY (LOG SCALE)

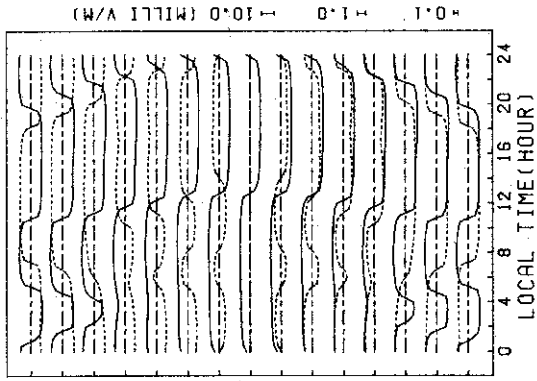
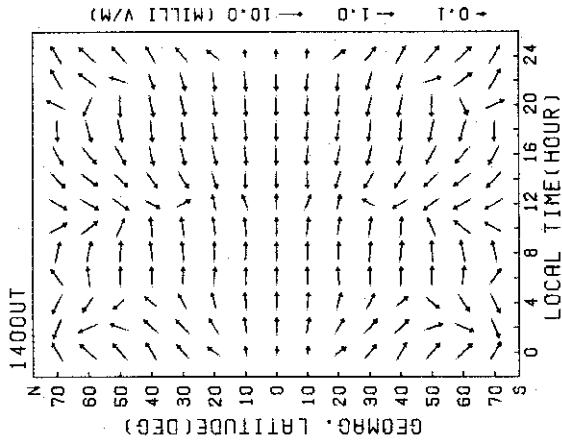


12000



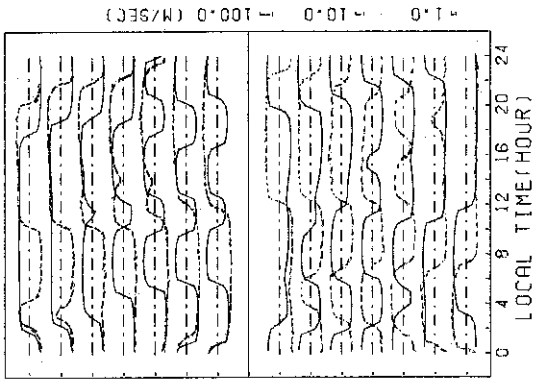
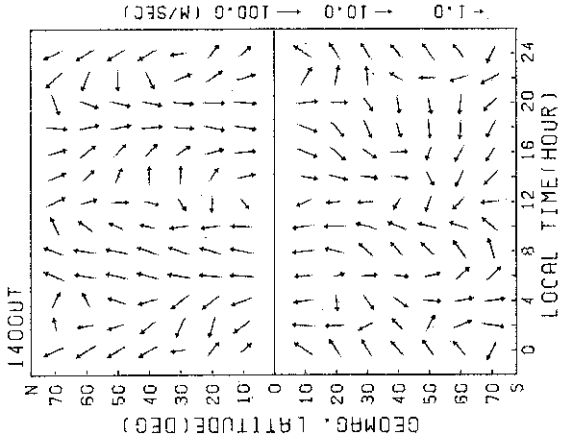
DEC.24.1964

ELECTRIC FIELD (LOG SCALE)

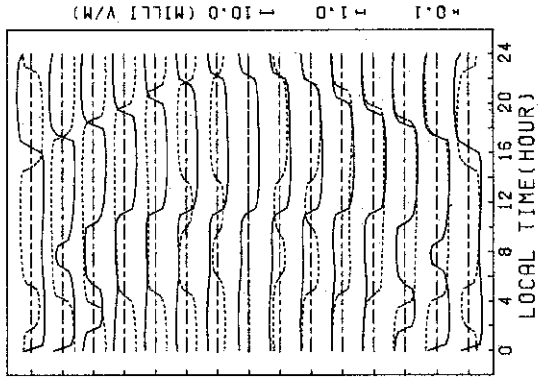
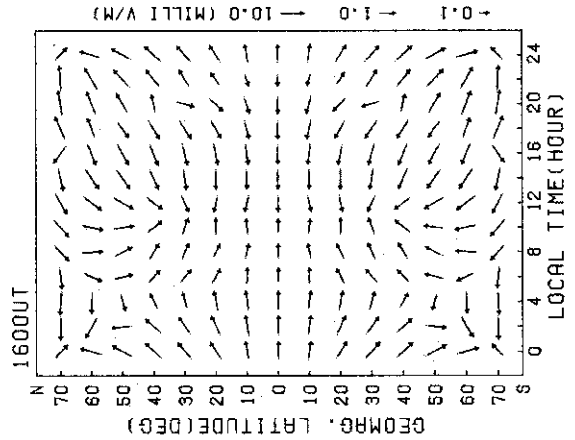


DEC.24.1964

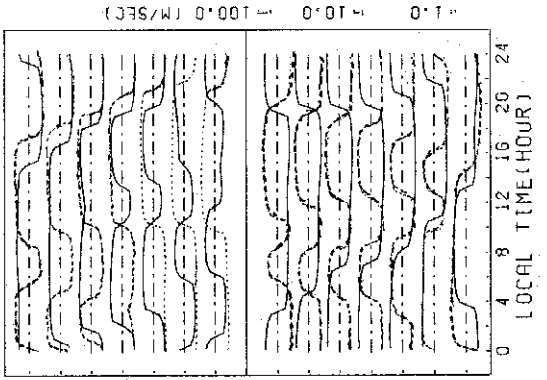
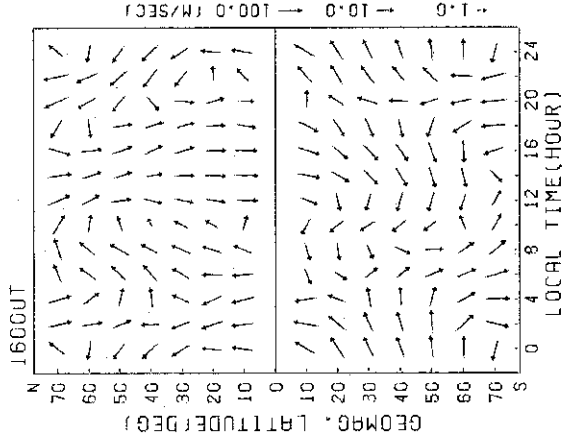
WIND VELOCITY (LOG SCALE)



1600UT

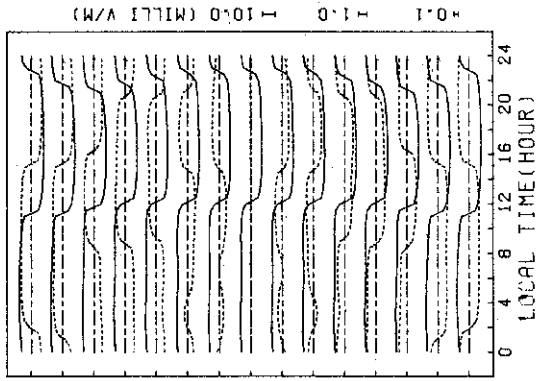
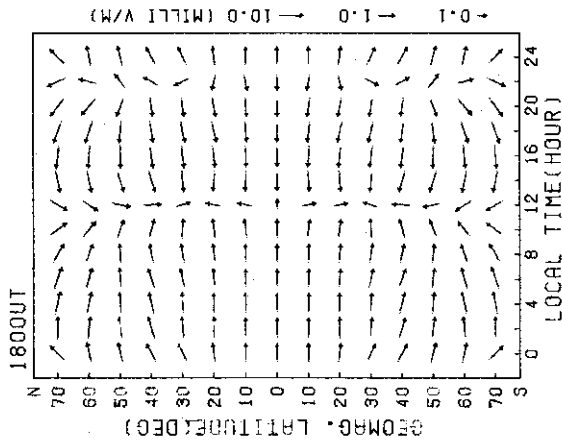


1600UT



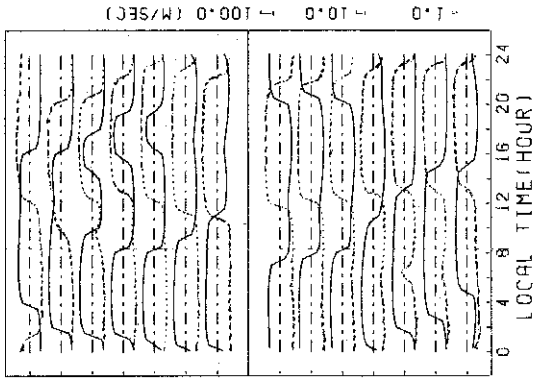
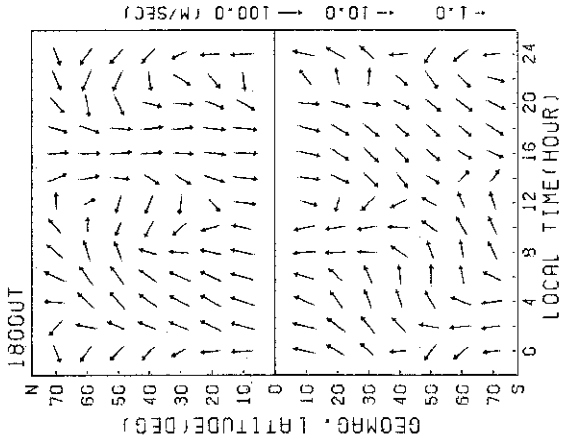
DEC-24, 1964

ELECTRIC FIELD (LOG SCALE)

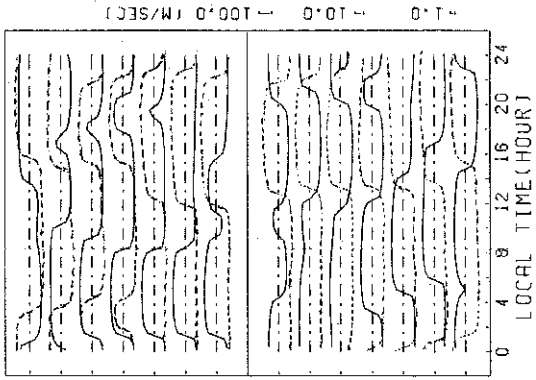
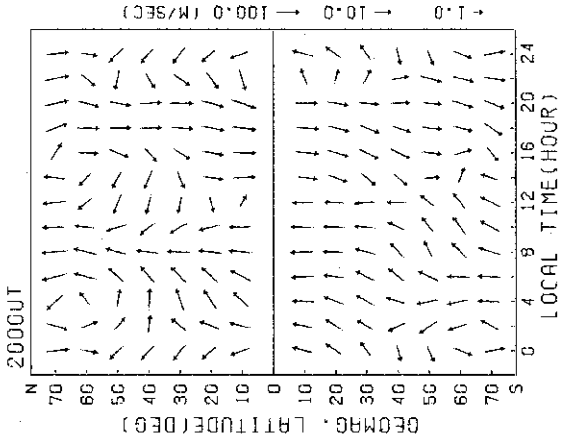
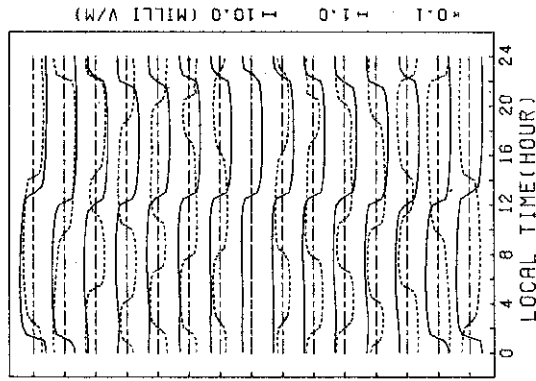
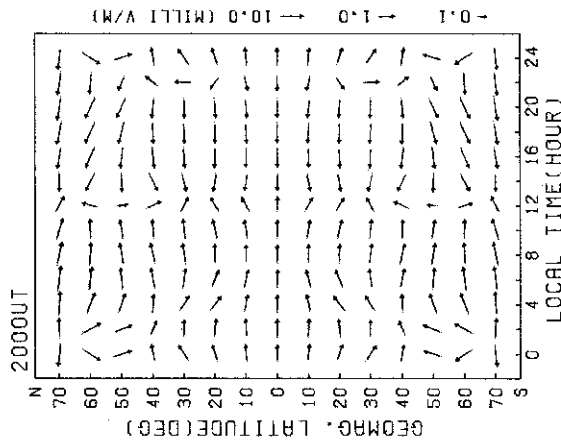


DEC-24, 1964

WIND VELOCITY (LOG SCALE)

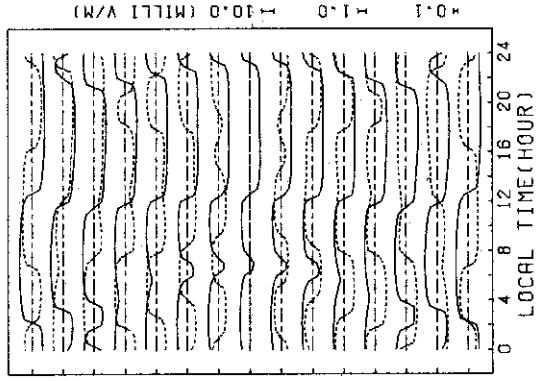
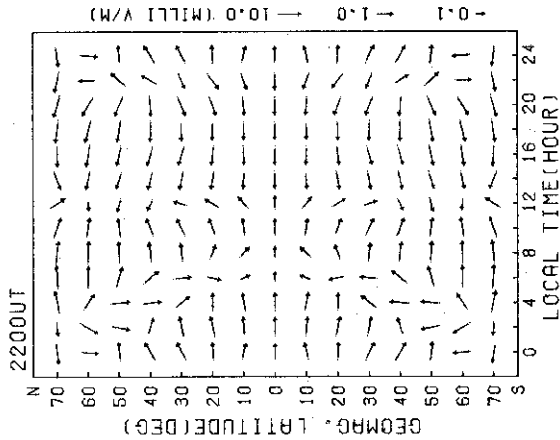


2000UT



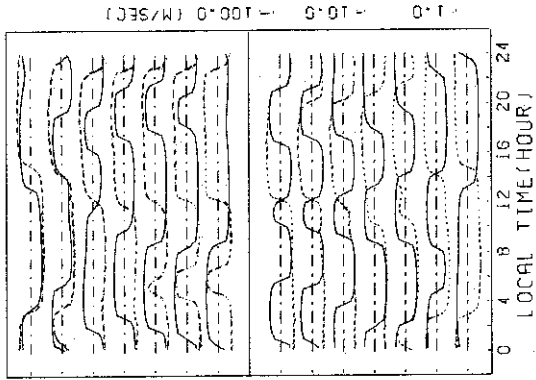
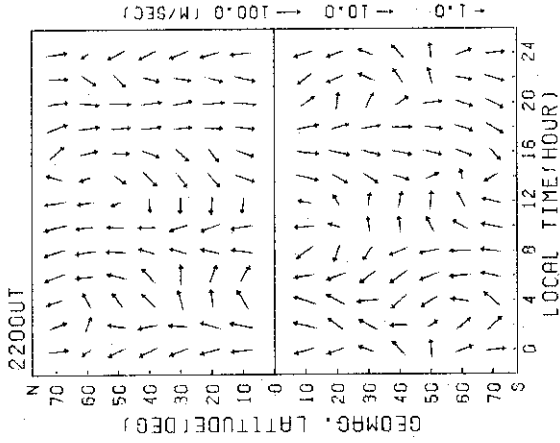
DEC.24.1964

ELECTRIC FIELD (LOG SCALE)

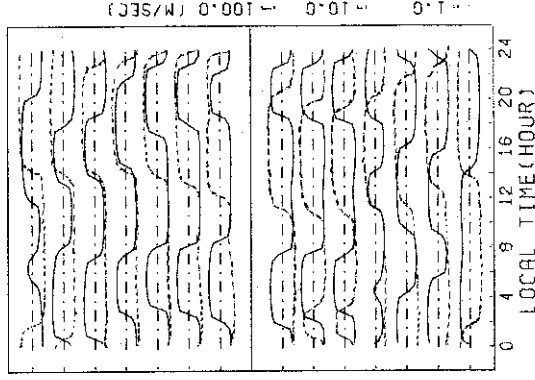
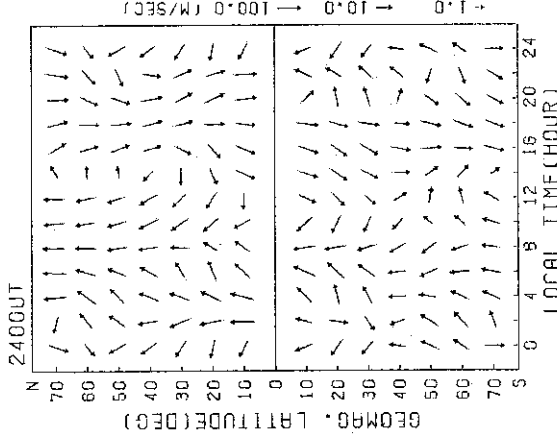
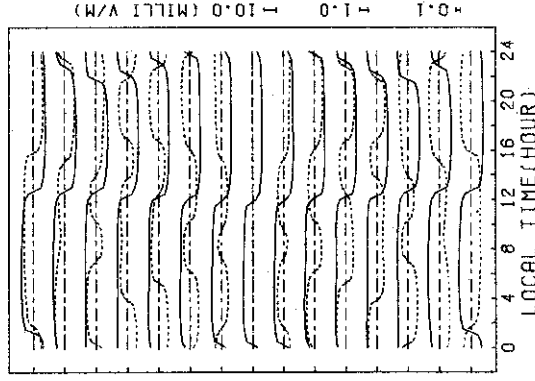
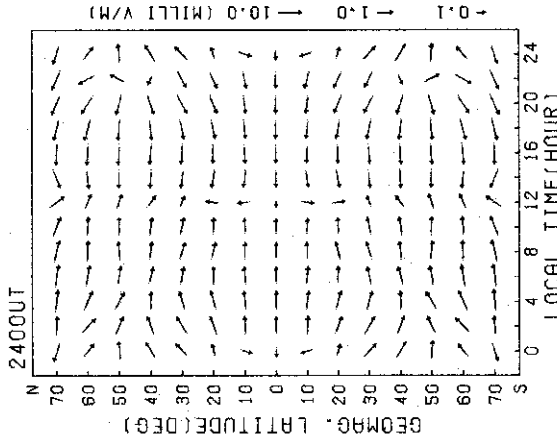


DEC.24.1964

WIND VELOCITY (LOG SCALE)

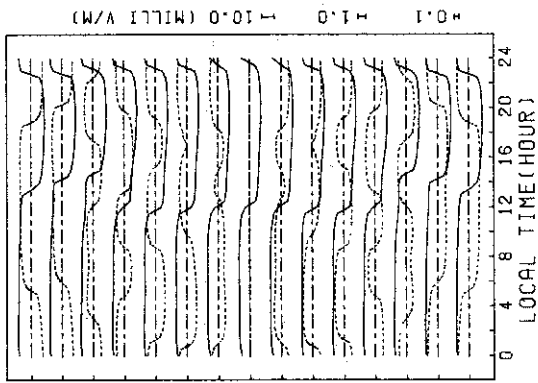
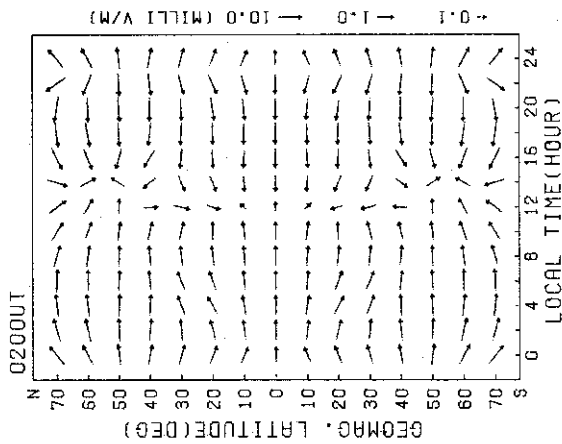


2400UT



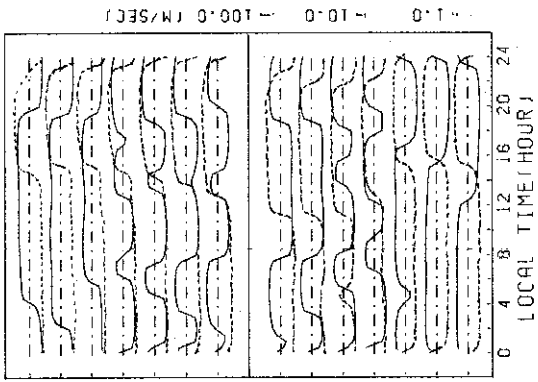
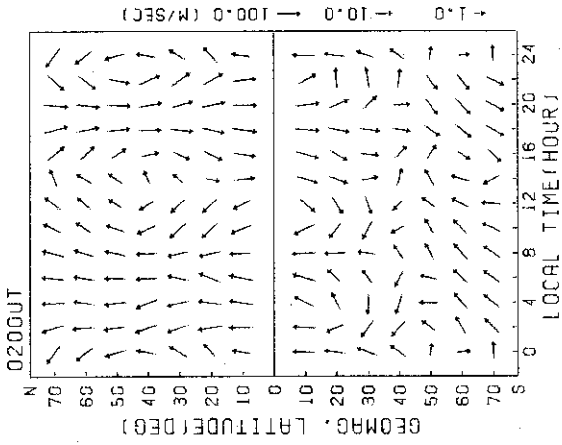
DEC.25.1964

ELECTRIC FIELD (LOG SCALE)

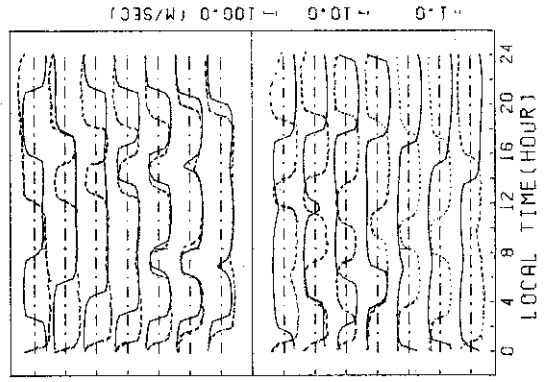
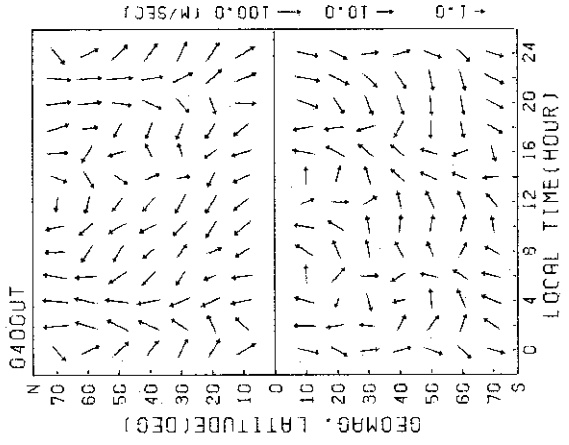
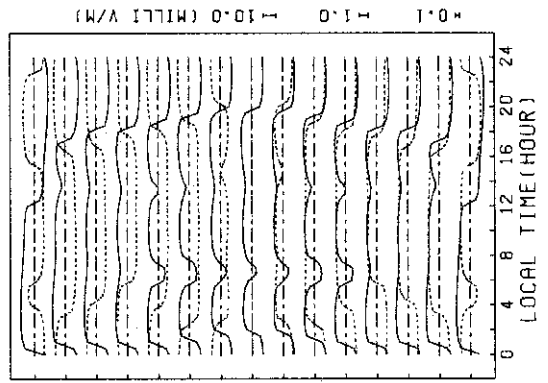
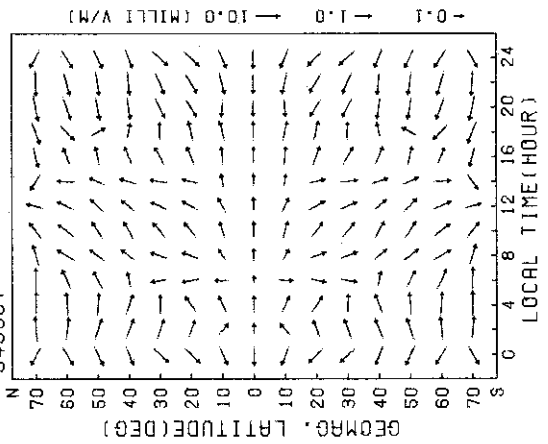


DEC.25.1964

WIND VELOCITY (LOG SCALE)

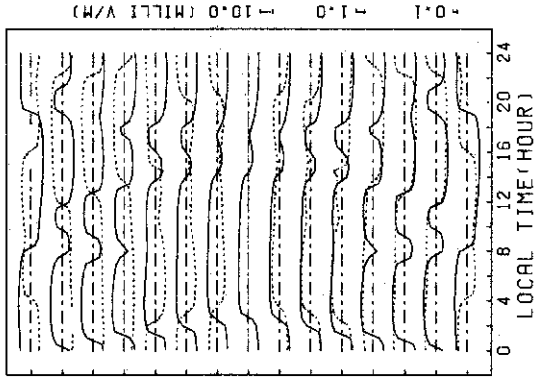
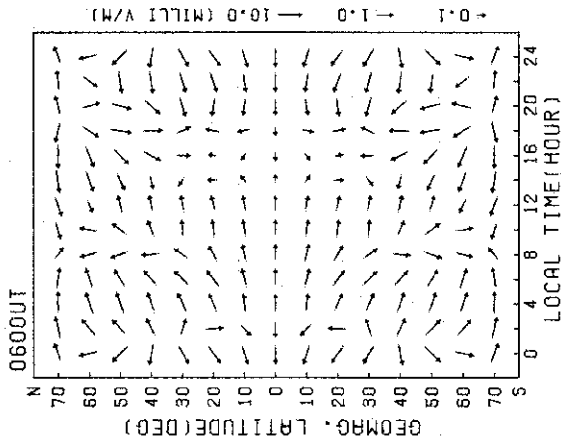


0400UT



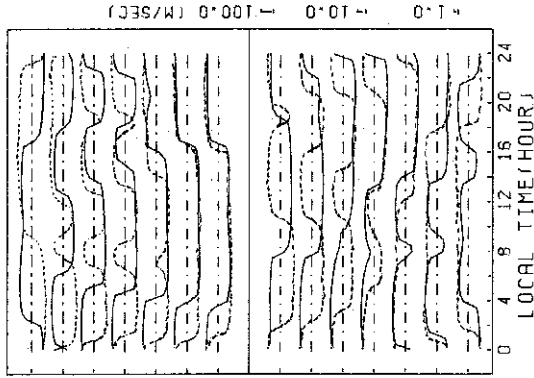
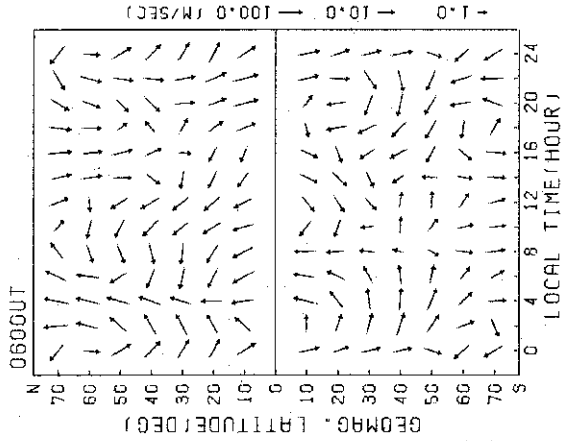
DEC.25.1964

ELECTRIC FIELD (LOG SCALE)

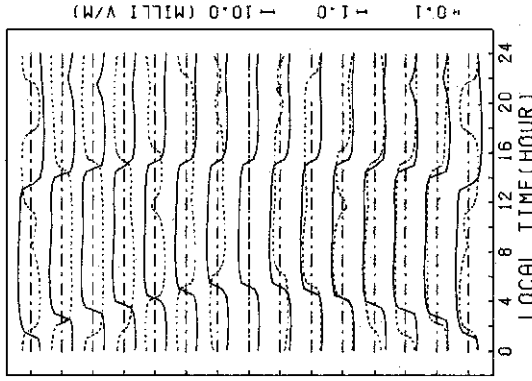
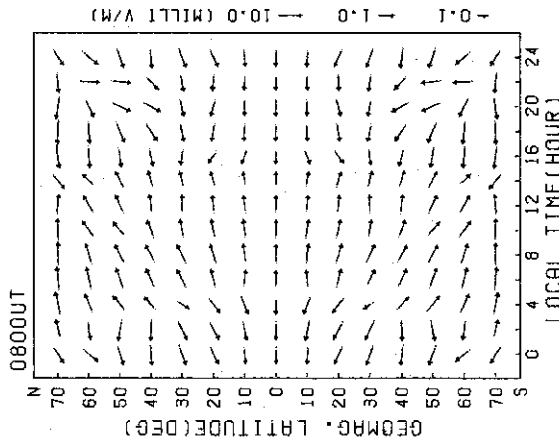


DEC.25.1964

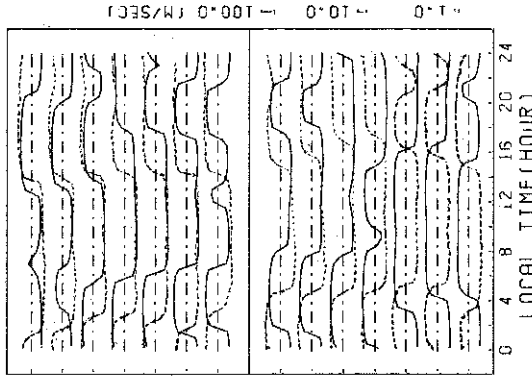
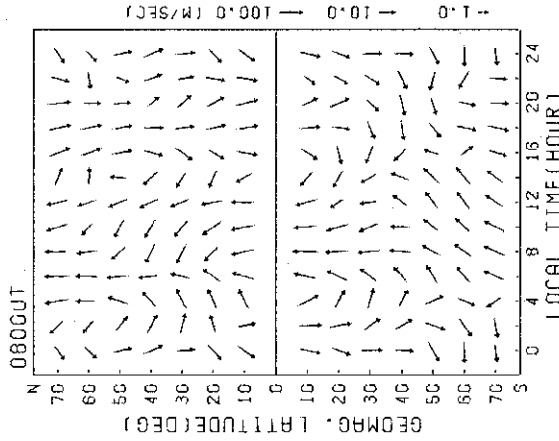
WIND VELOCITY (LOG SCALE)



0800UT

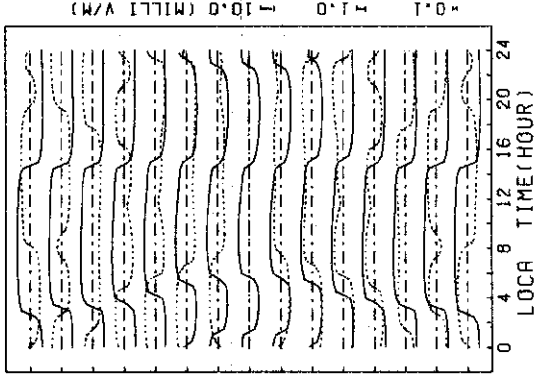
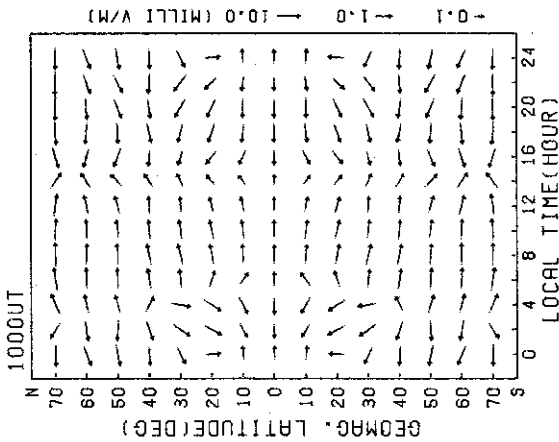


0800UT



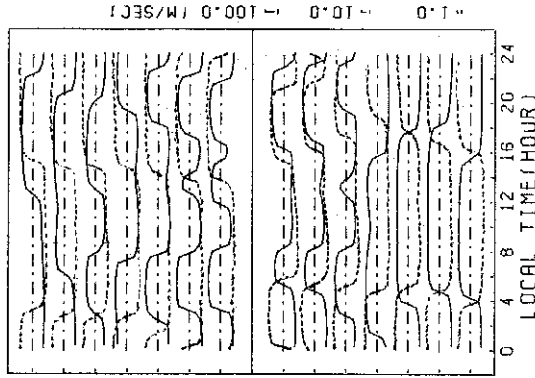
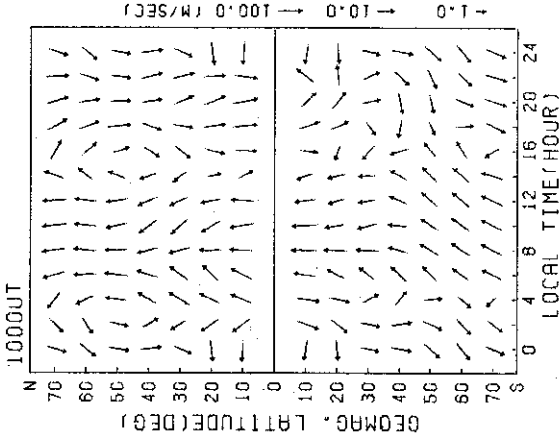
DEC.25.1964

ELECTRIC FIELD (LOG SCALE)

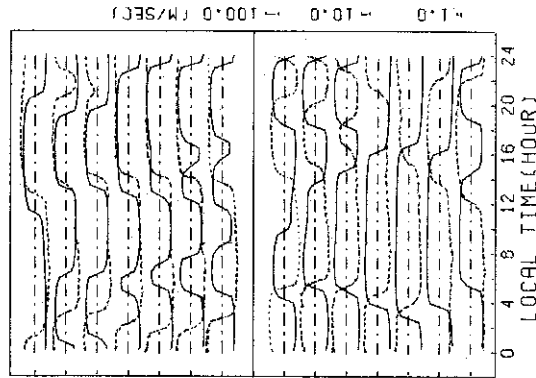
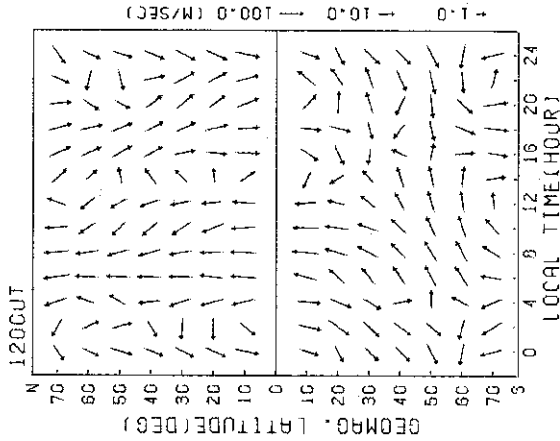
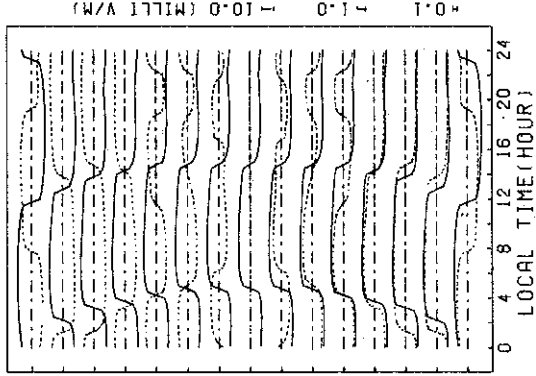
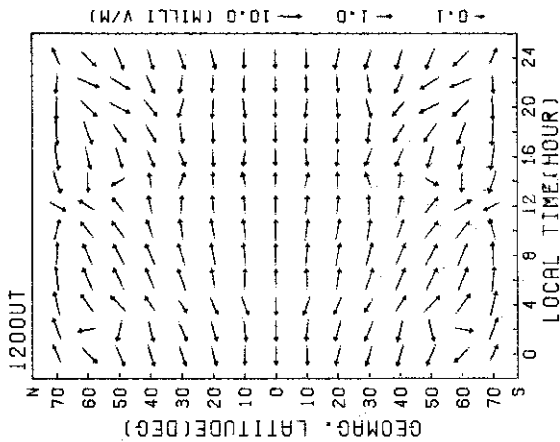


DEC.25.1964

WIND VELOCITY (LOG SCALE)

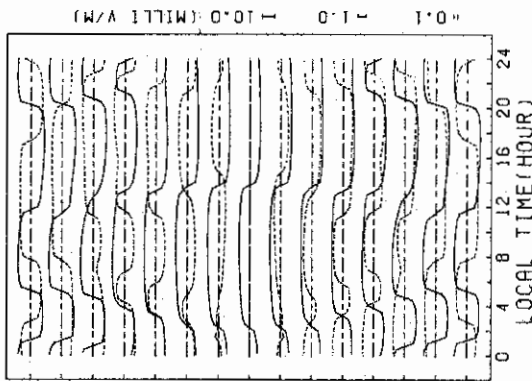
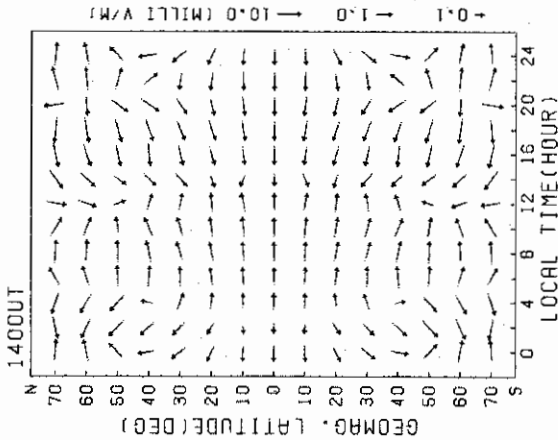


1200UT



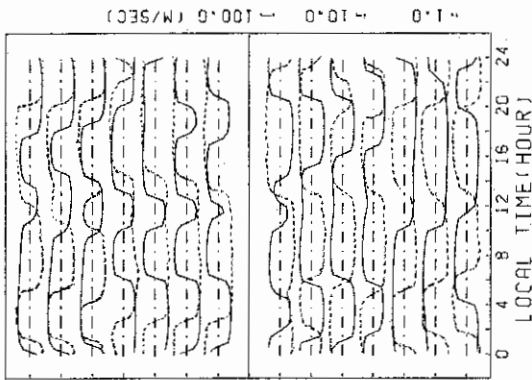
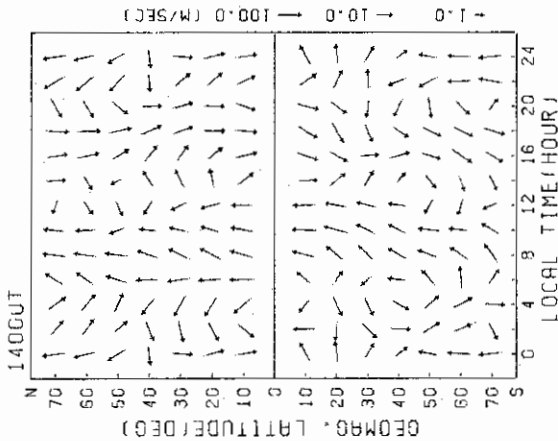
DEC.25.1964

ELECTRIC FIELD (LOG SCALE)

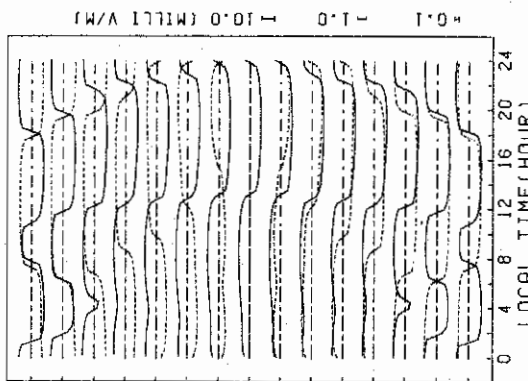
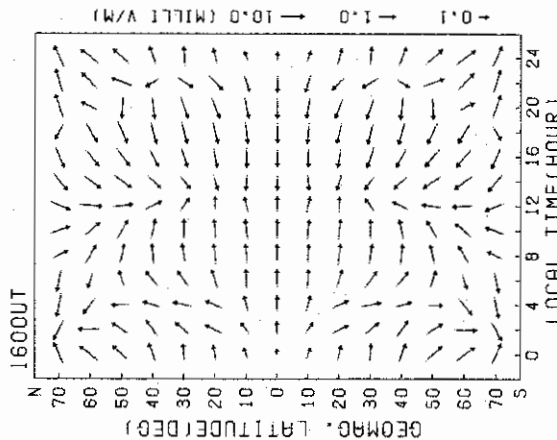


DEC.25.1964

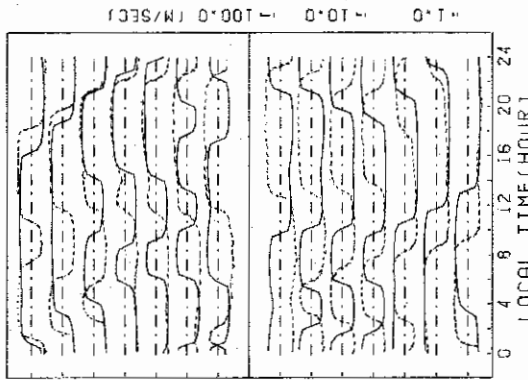
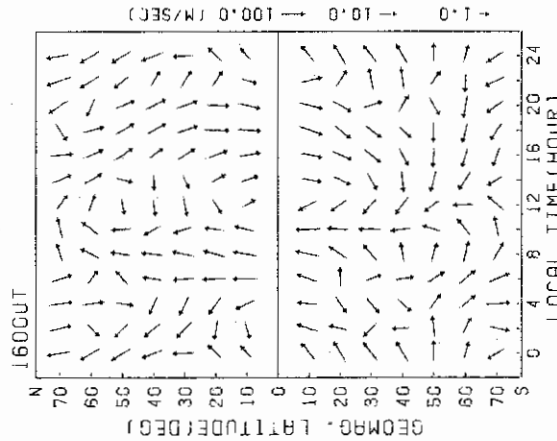
WIND VELOCITY (LOG SCALE)



1600UT

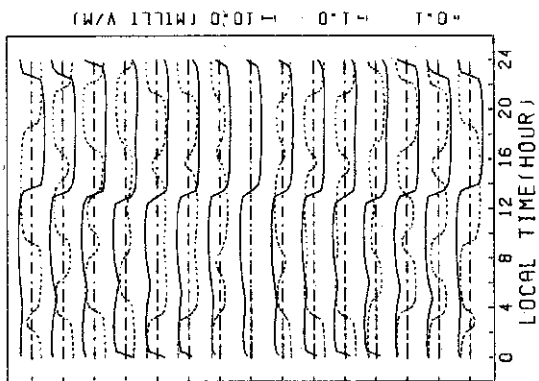
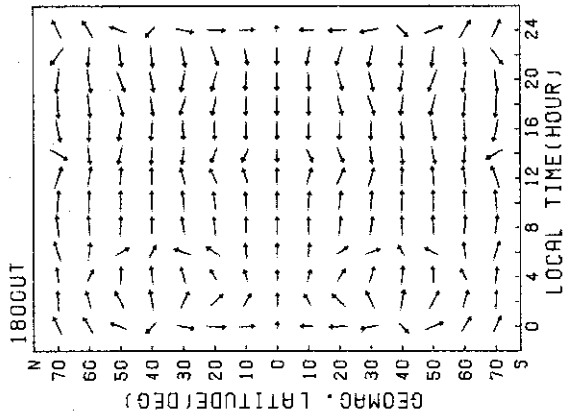


1600UT



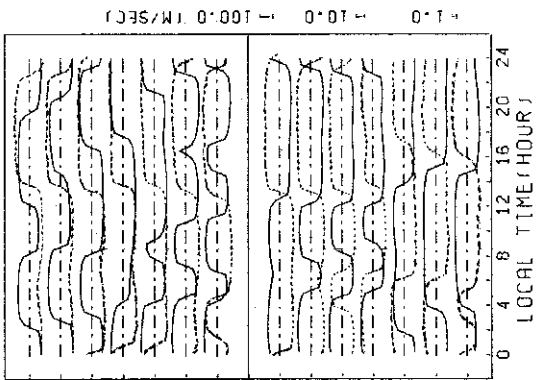
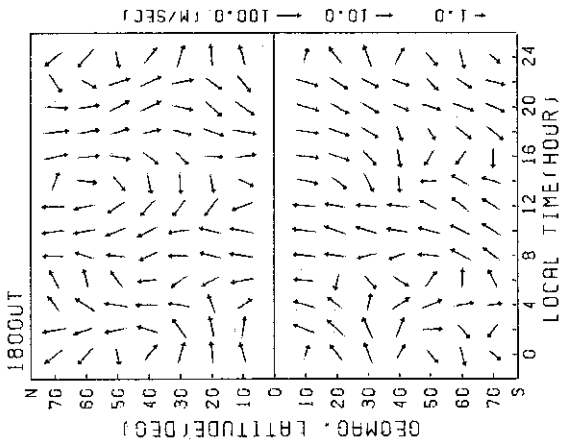
DEC.25.1964

ELECTRIC FIELD (LOG SCALE E)

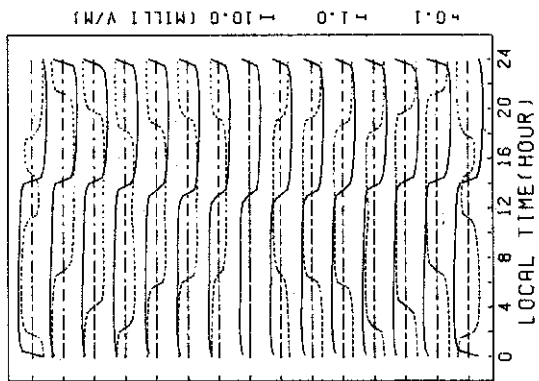
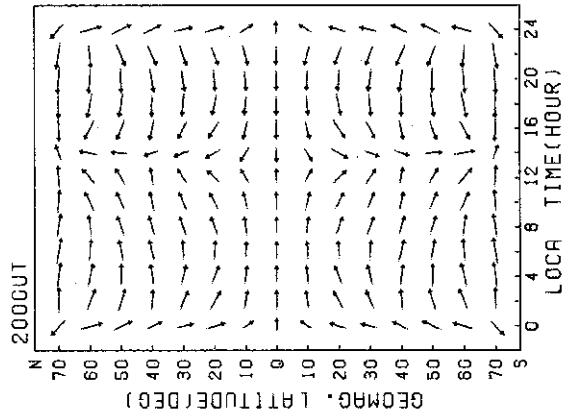


DEC.25.1964

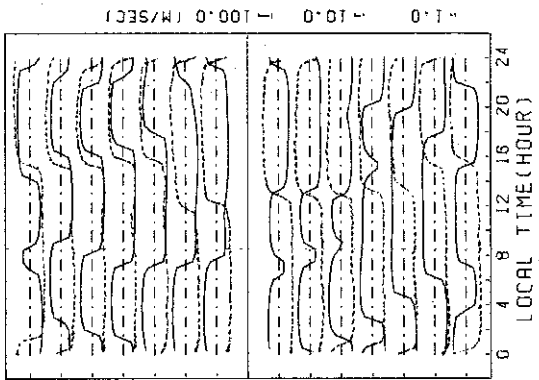
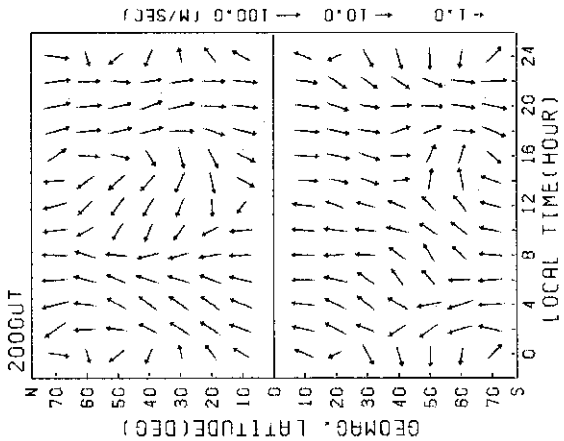
WIND VELOCITY (LOG SCALE)



2000UT

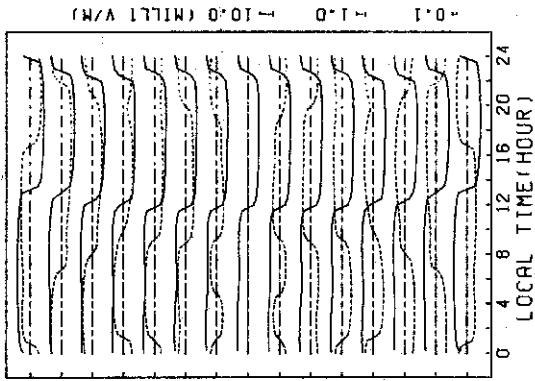
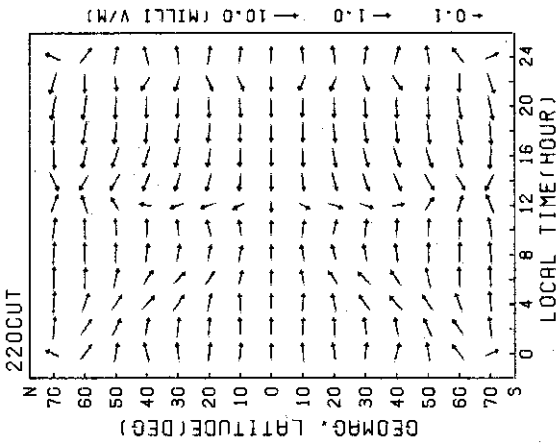


2000UT



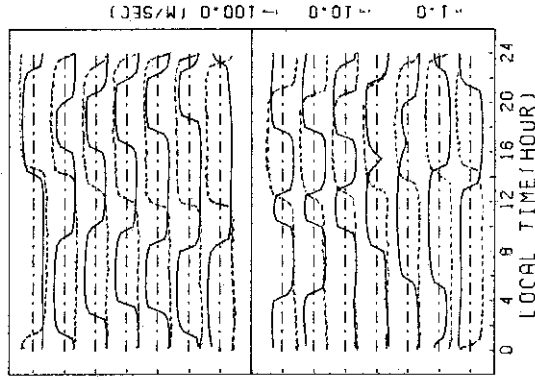
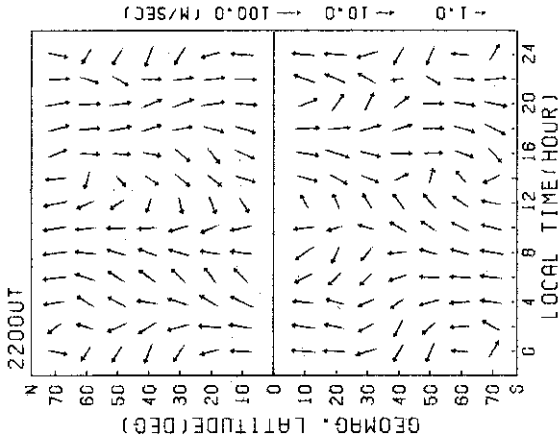
DEC. 25. 1964

ELECTRIC FIELD (LOG SCALE)

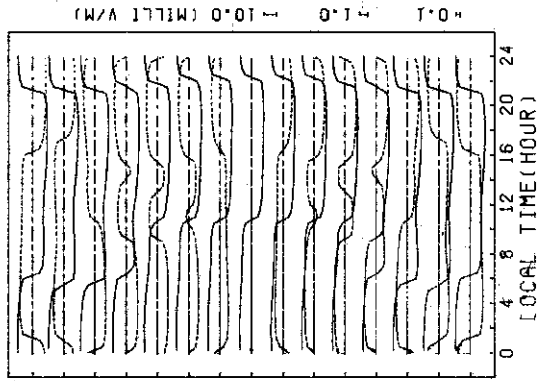
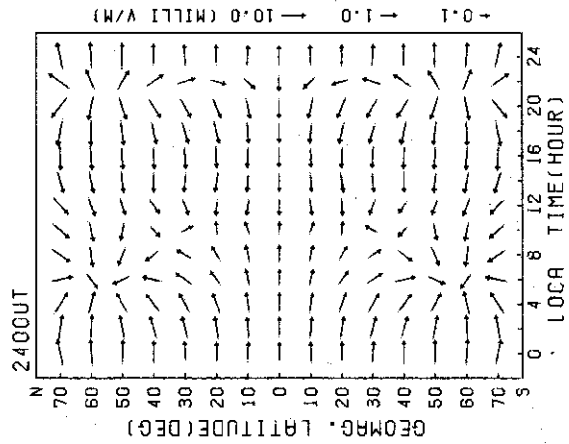


DEC. 25. 1964

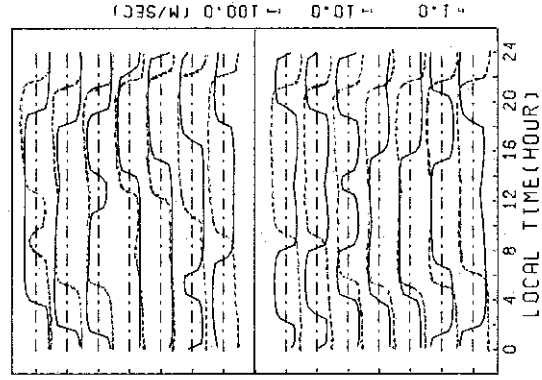
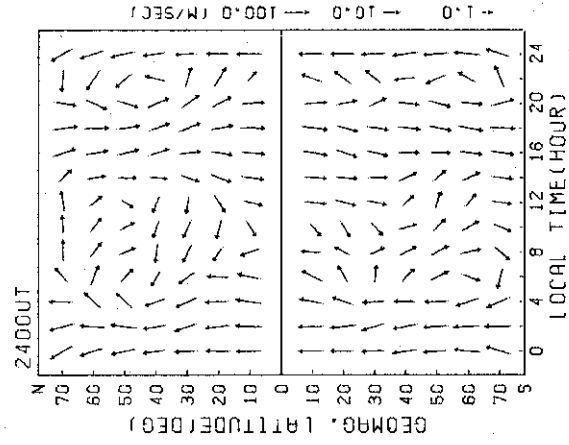
WIND VELOCITY (LOG SCALE)



2400UT

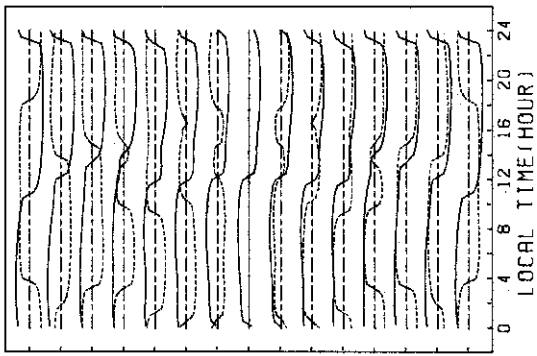
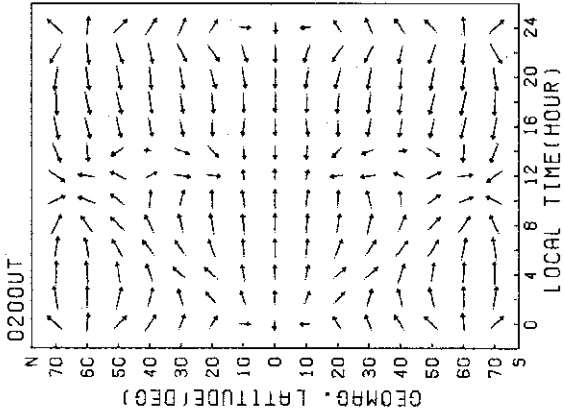


2400UT



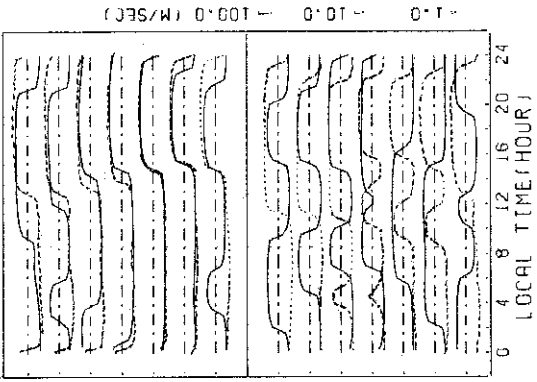
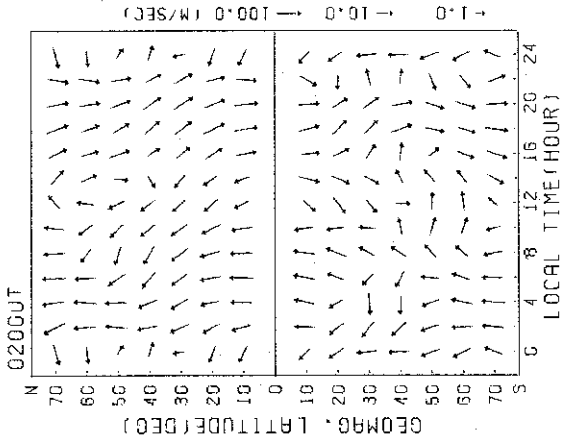
DEC.26.1964

ELECTRIC FIELD (LOG SCALE)

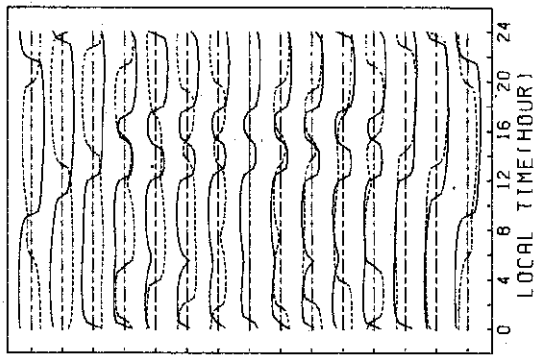
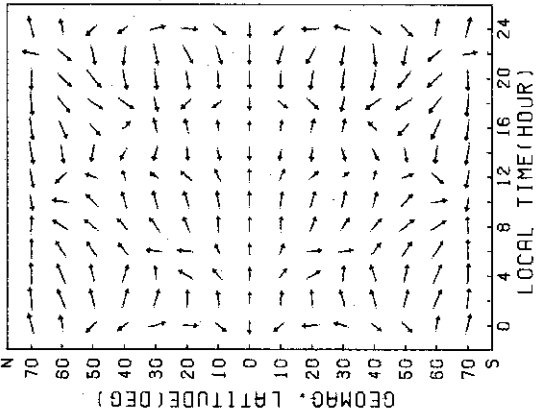


DEC.26.1964

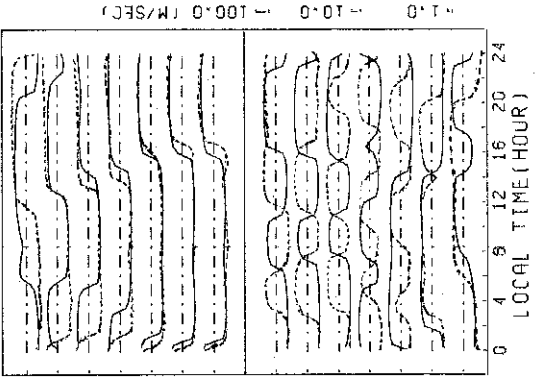
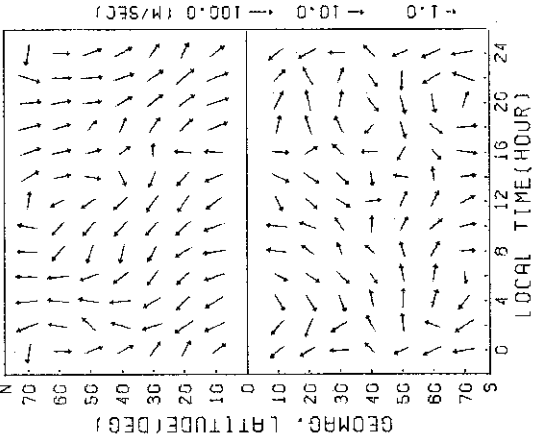
WIND VELOCITY (LOG SCALE)



0400UT

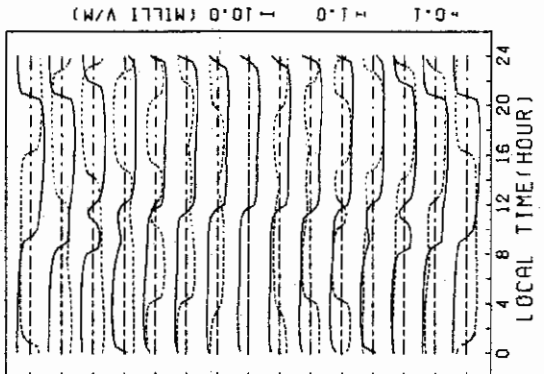
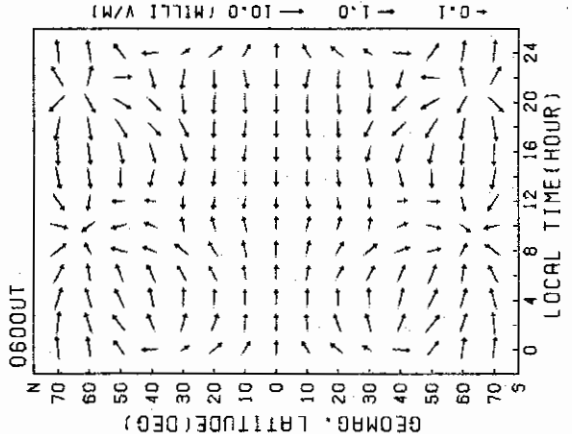


0400UT



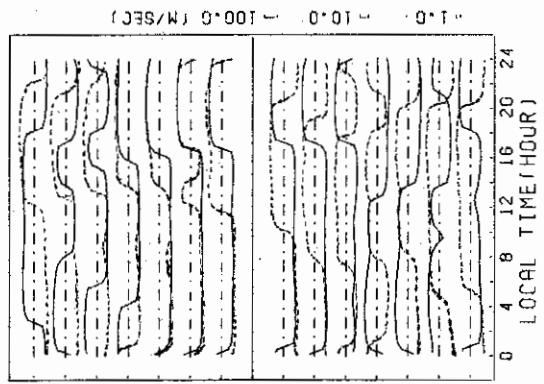
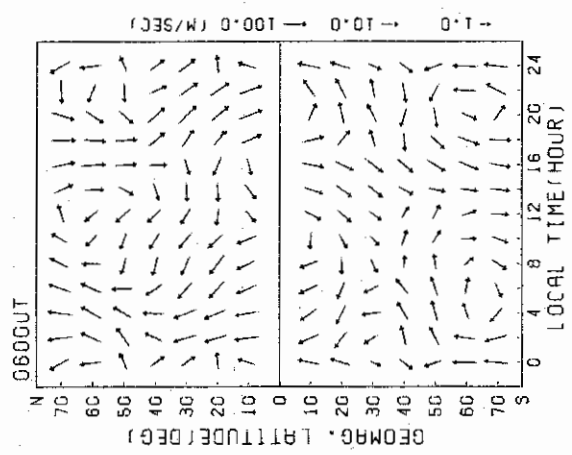
DEC. 26. 1964

ELECTRIC FIELD (LOG SCALE)

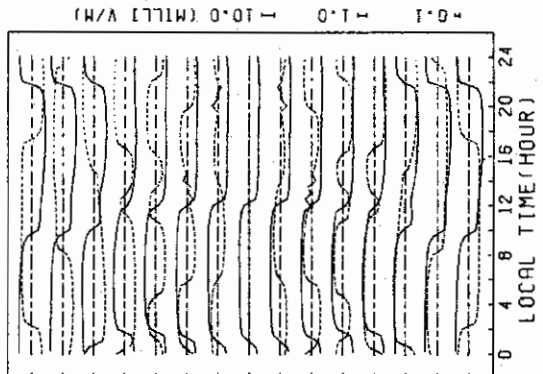
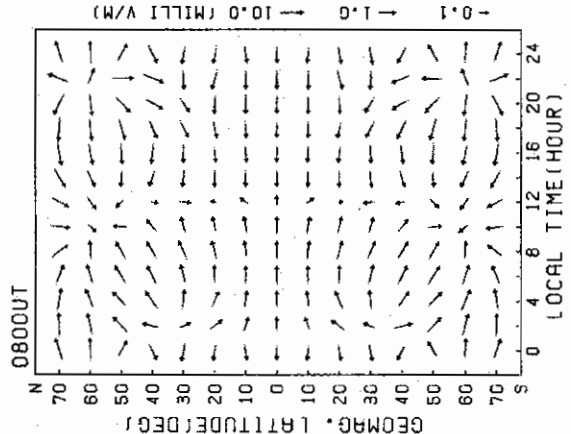


DEC. 26. 1964

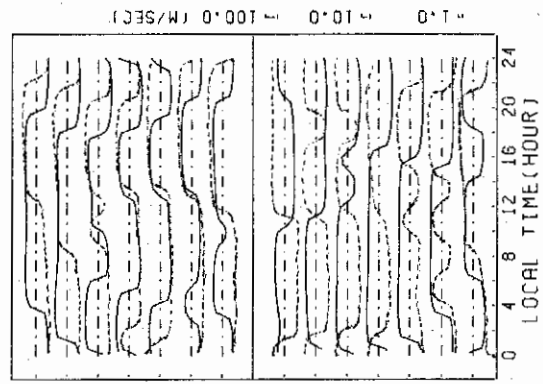
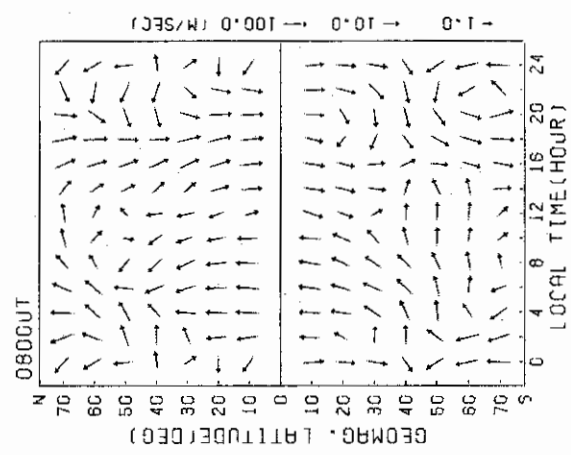
WIND VELOCITY (LOG SCALE)



0800UT

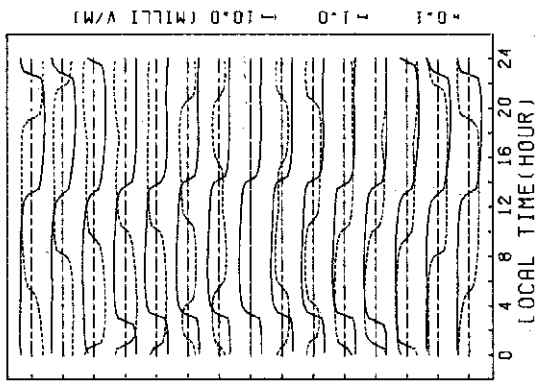
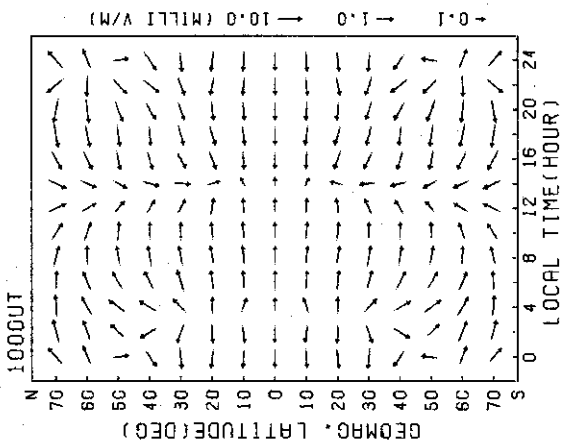


0800UT



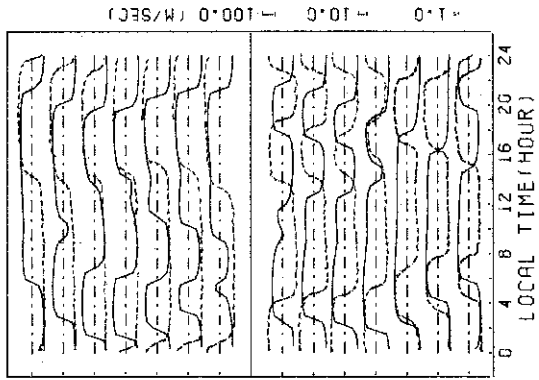
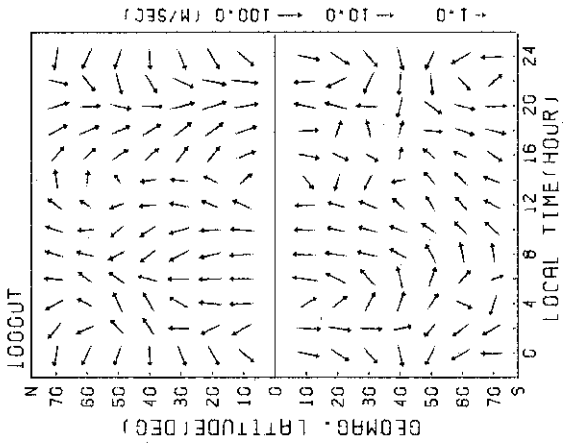
DEC.26.1964

ELECTRIC FIELD (LOG SCALE)

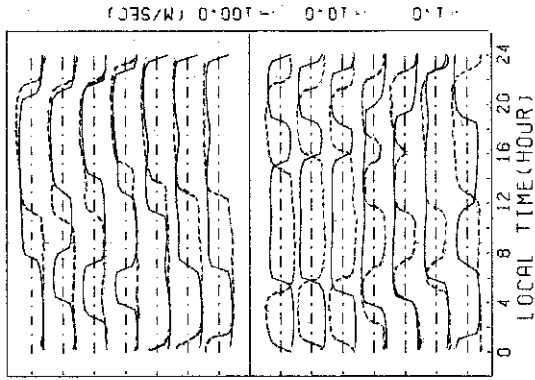
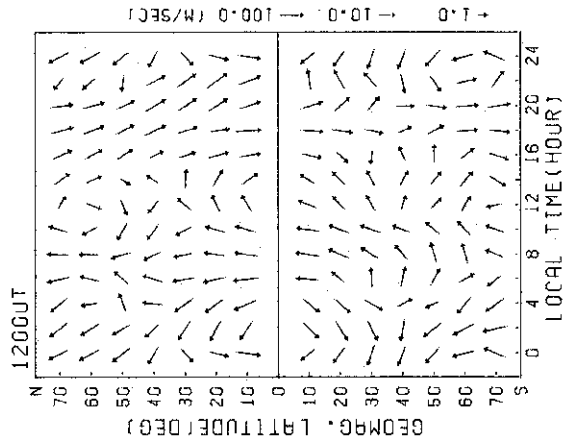
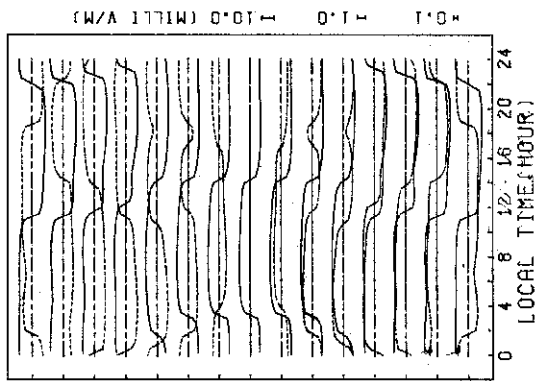
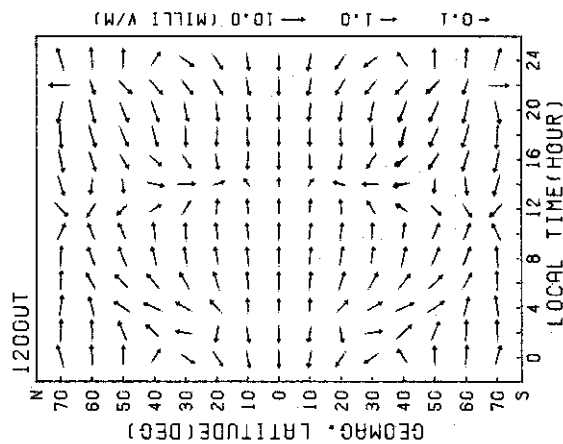


DEC.26.1964

WIND VELOCITY (LOG SCALE)

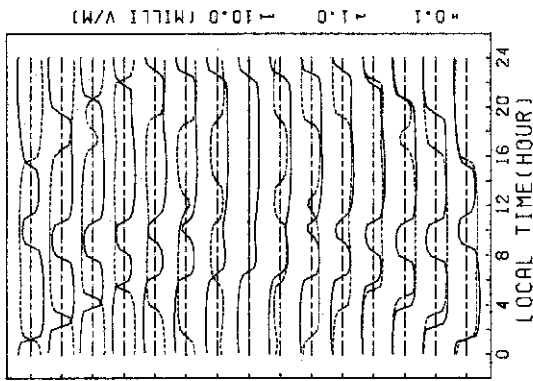
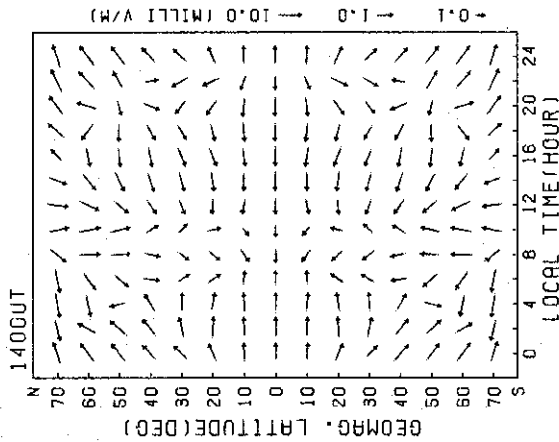


1200UT



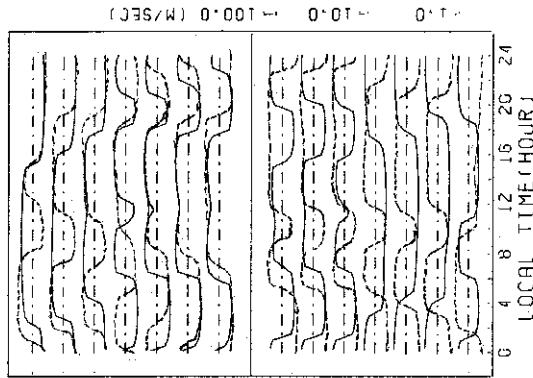
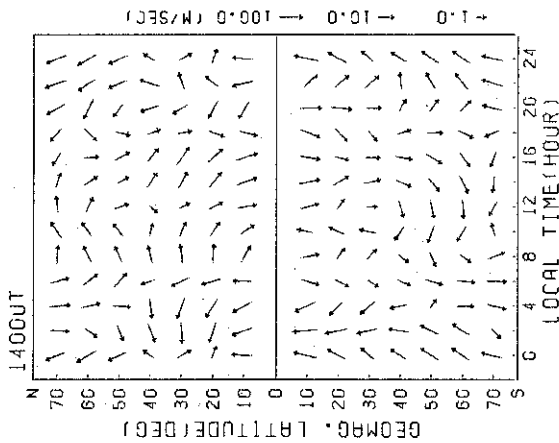
DEC. 26. 1964

ELECTRIC FIELD (LOG SCALE)

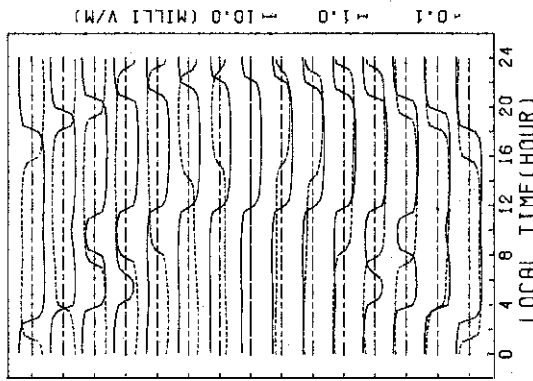
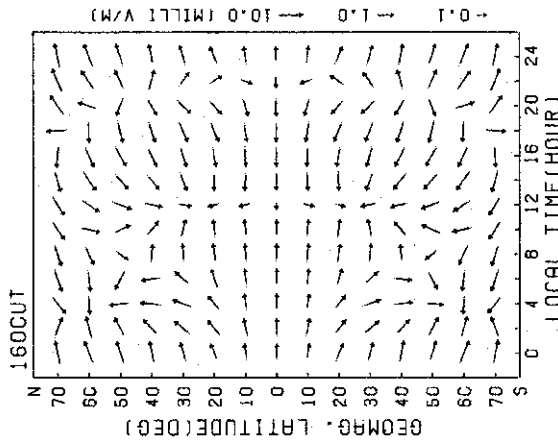


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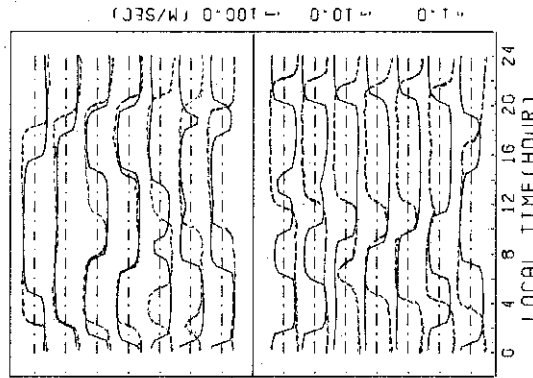
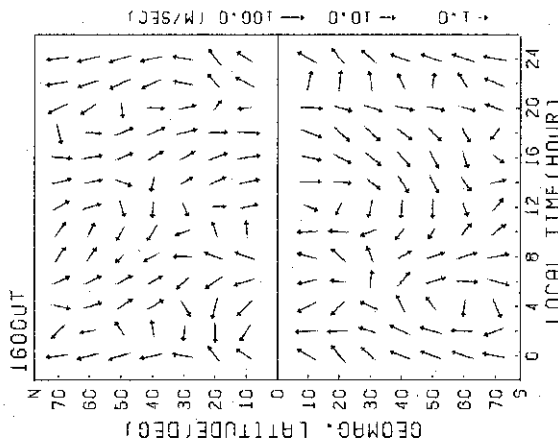
WIND VELOCITY (LOG SCALE)



1600UT

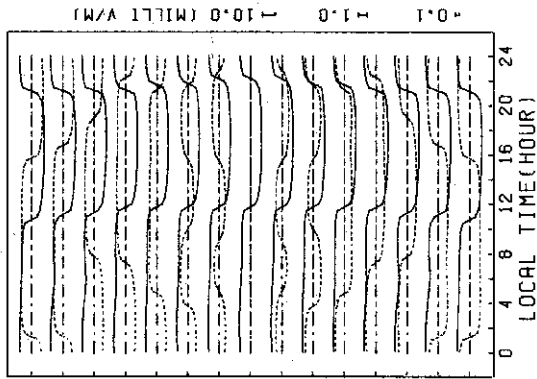
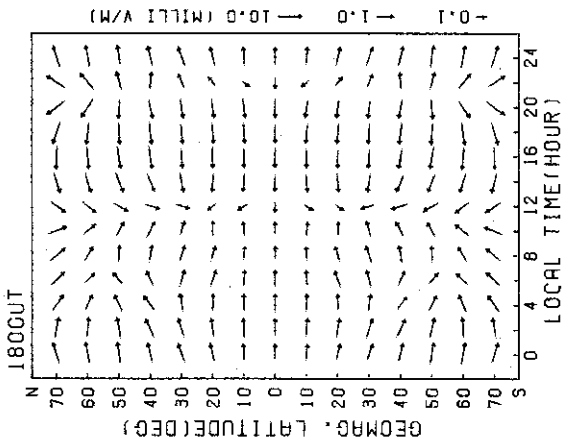


1600UT



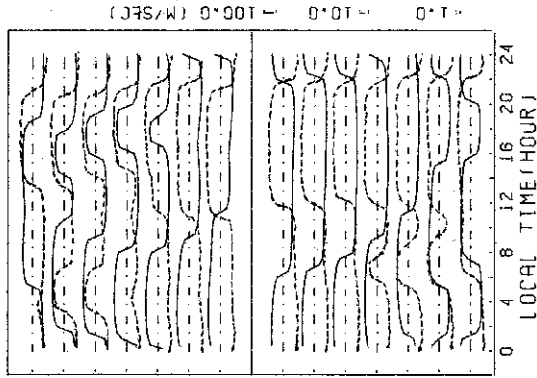
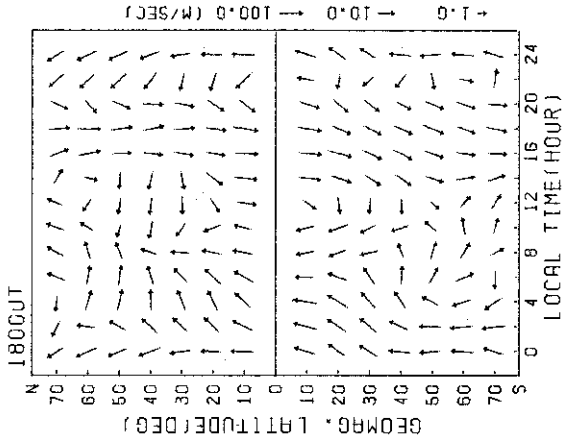
DEC.26.1964

ELECTRIC FIELD (LOG SCALE)

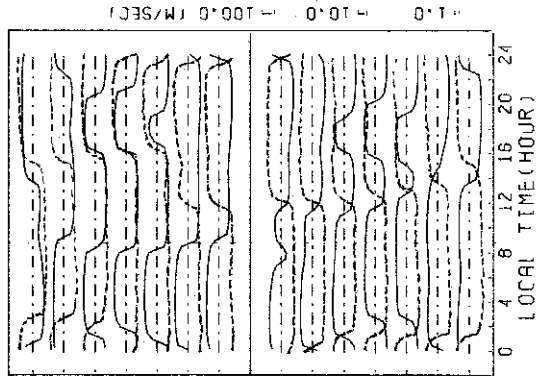
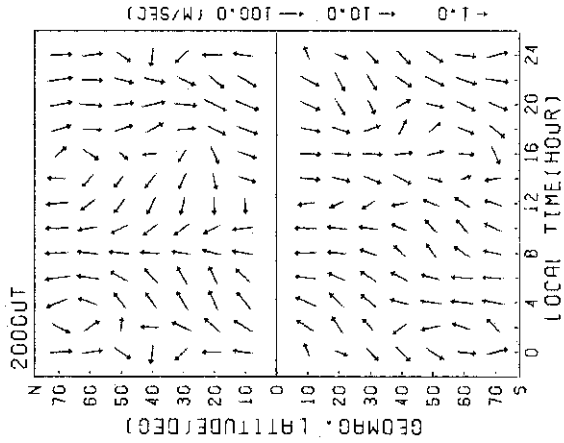
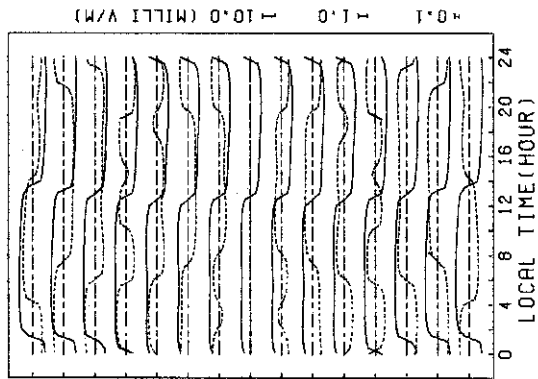
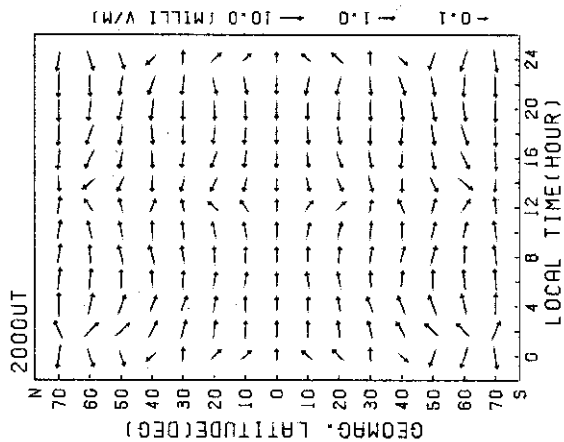


DEC.26.1964

WIND VELOCITY (LOG SCALE)

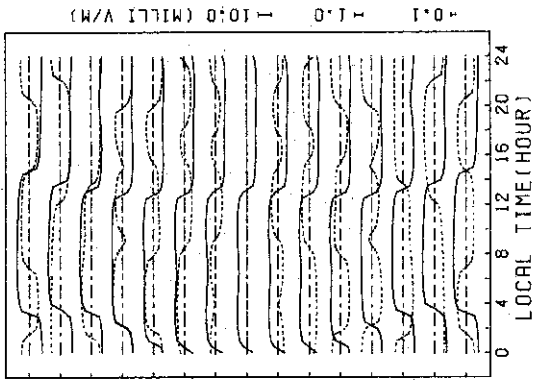
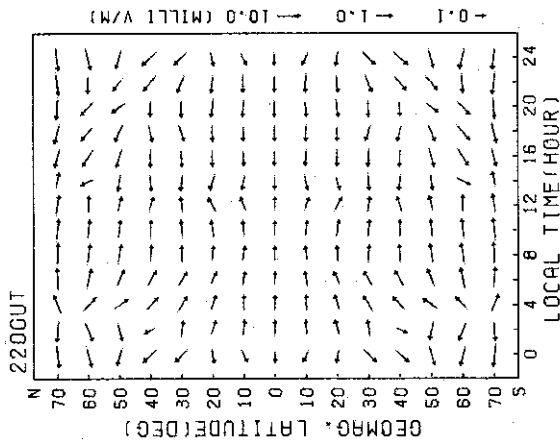


2000UT



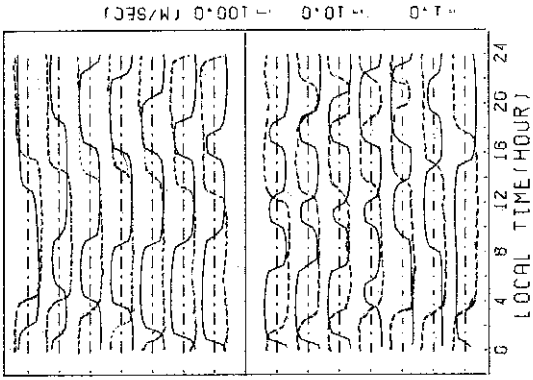
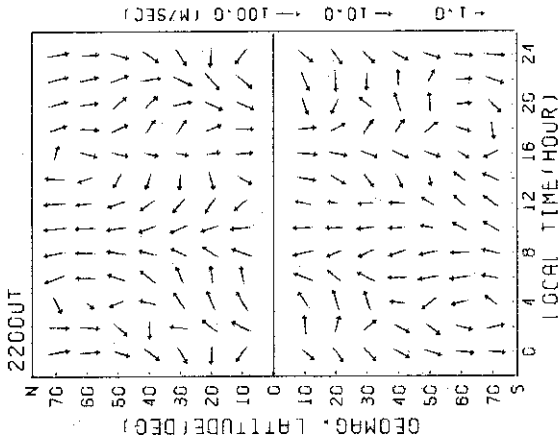
DEC.26.1964

ELECTRIC FIELD (LOG SCALE)

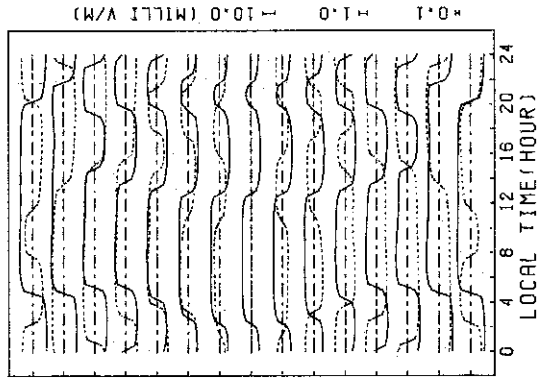
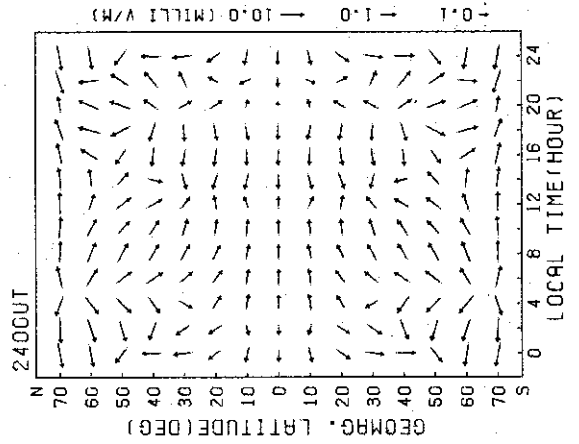


DEC.26.1964

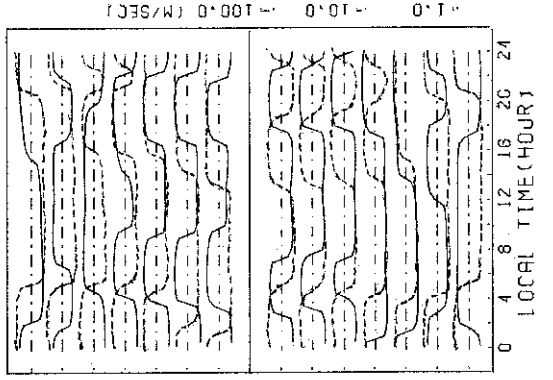
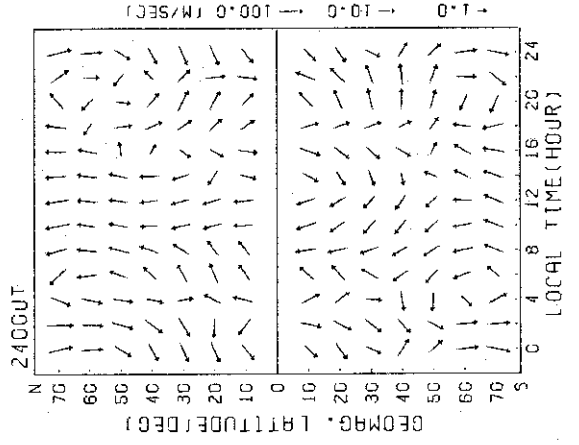
WIND VELOCITY (LOG SCALE)



2400UT

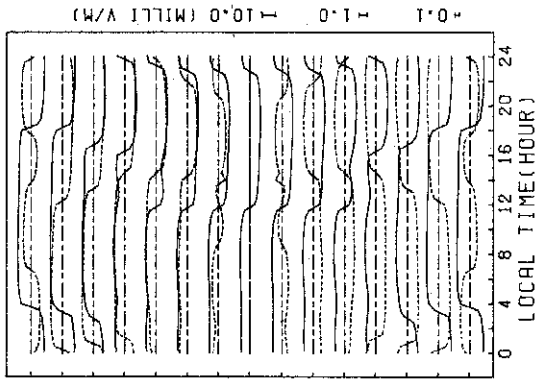
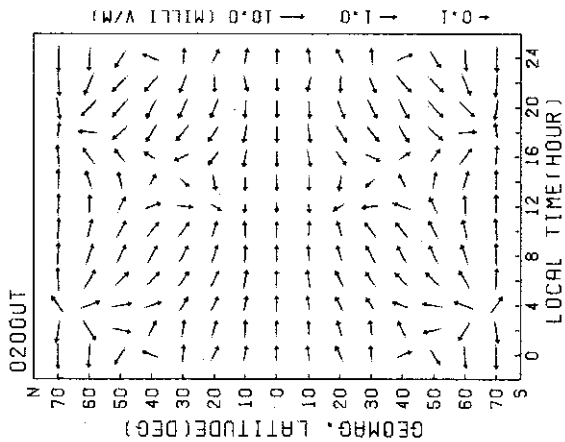


2400UT



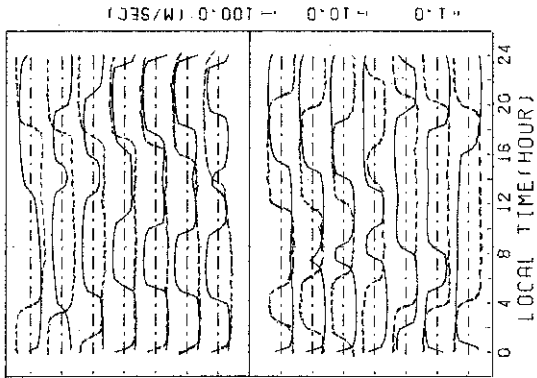
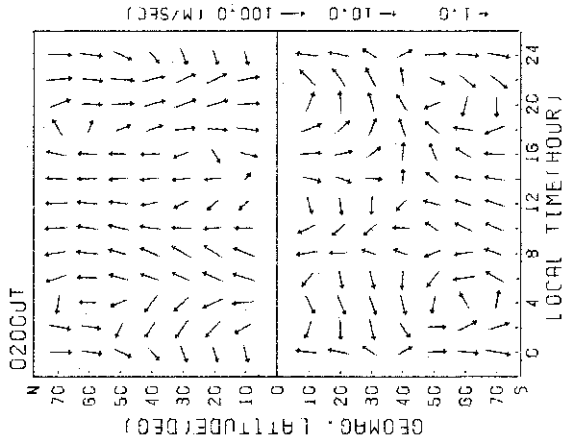
DEC.27.1964

ELECTRIC FIELD (LOG SCALE)

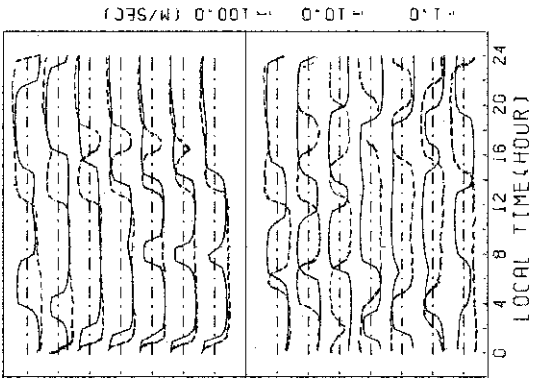
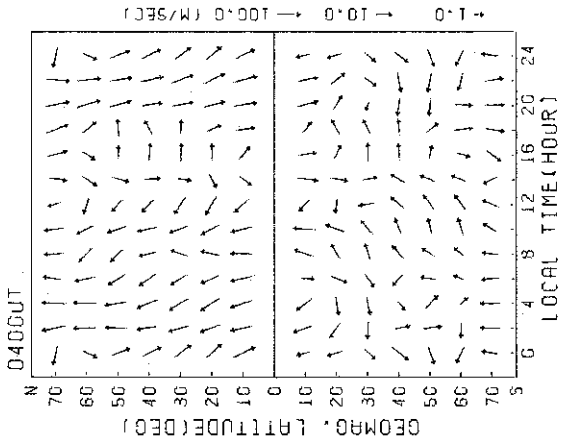
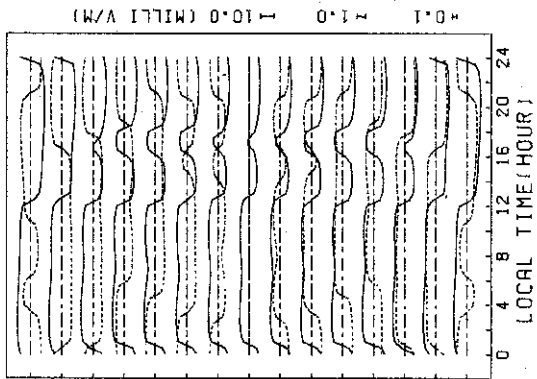
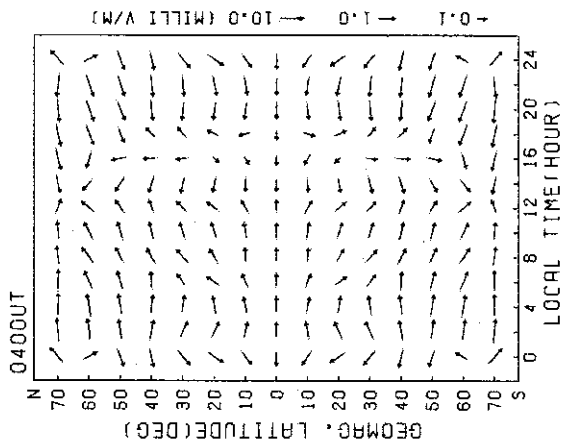


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WIND VELOCITY (LOG SCALE)

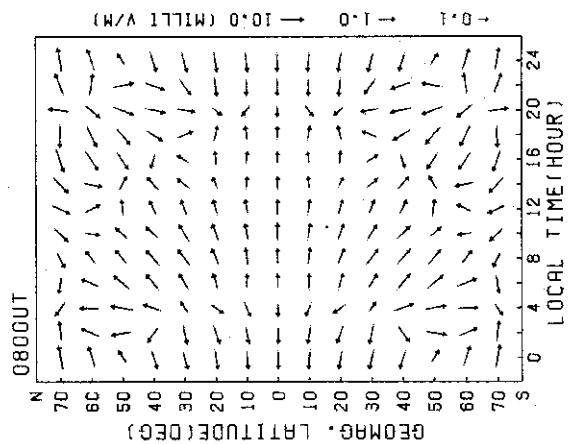
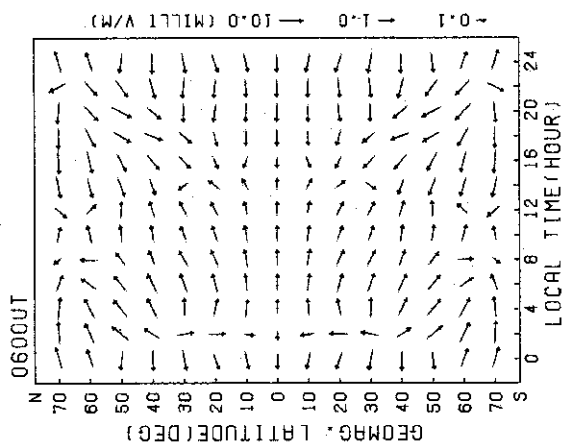


0400UT



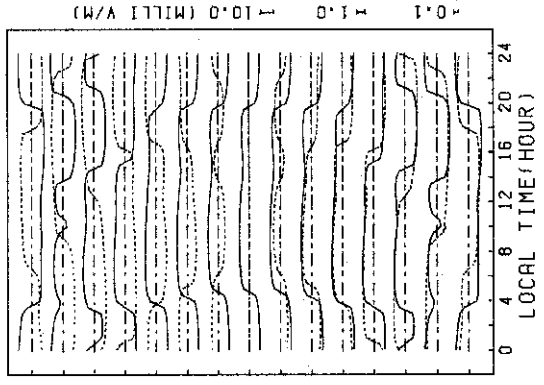
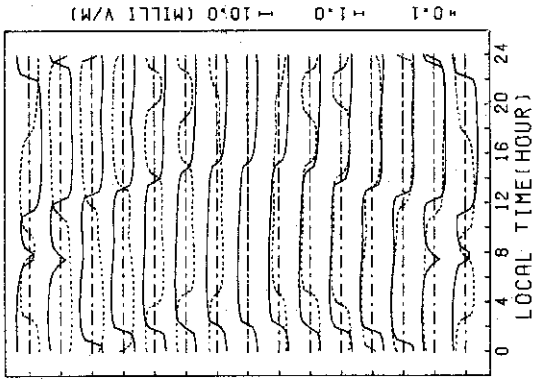
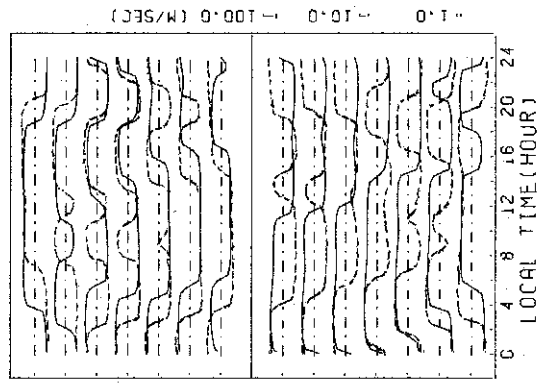
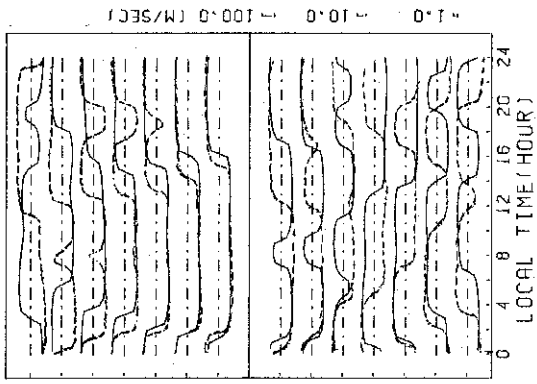
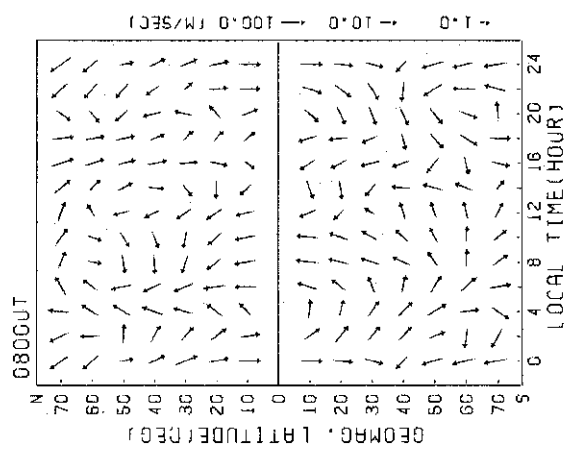
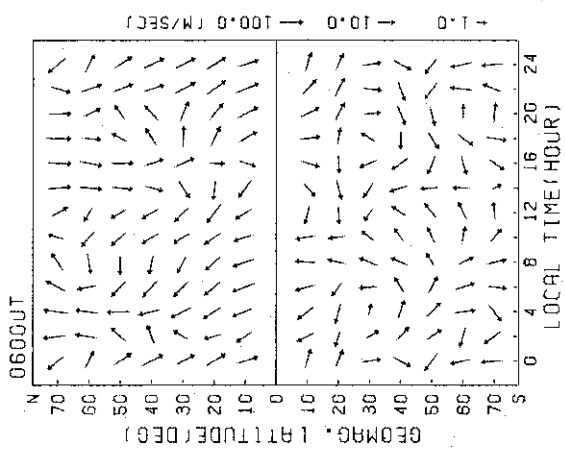
DEC. 27. 1964

ELECTRIC FIELD (LOG SCALE)



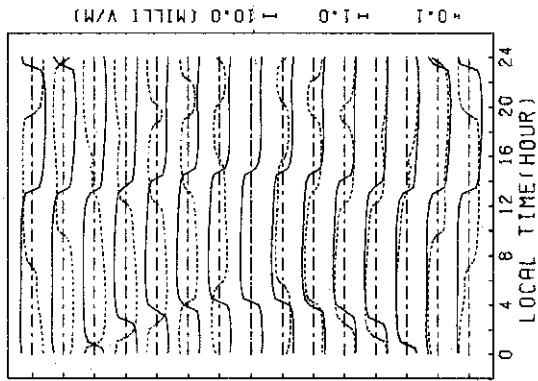
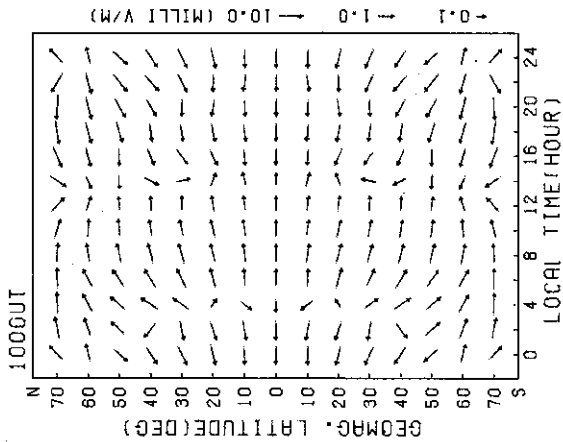
DEC. 27. 1964

WIND VELOCITY (LOG SCALE)



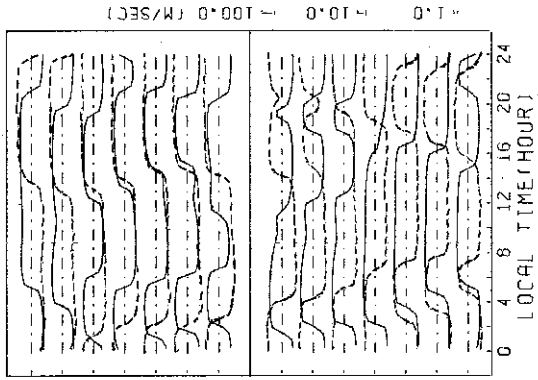
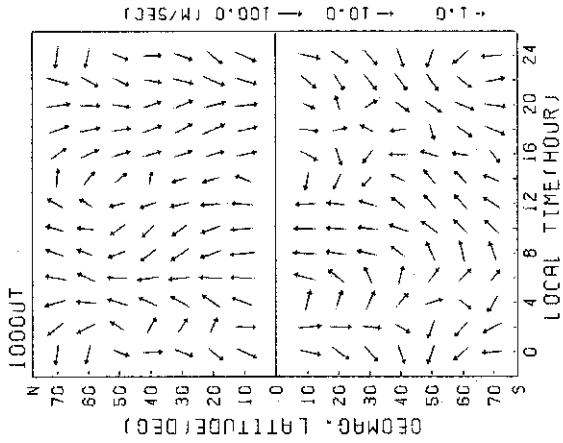
DEC. 27. 1964

ELECTRIC FIELD (LOG SCALE)

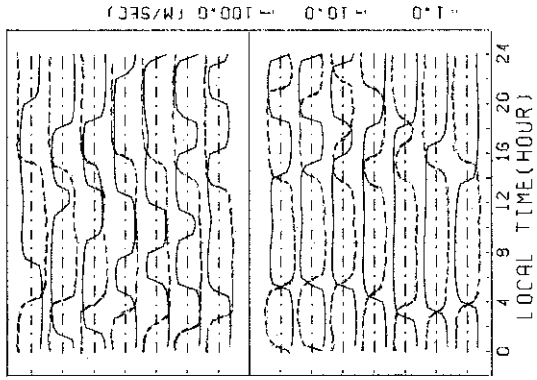
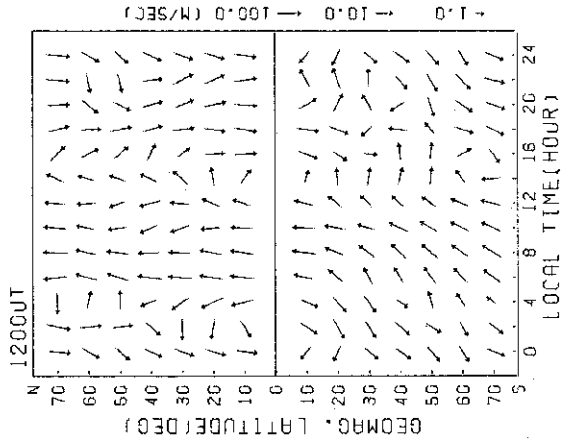
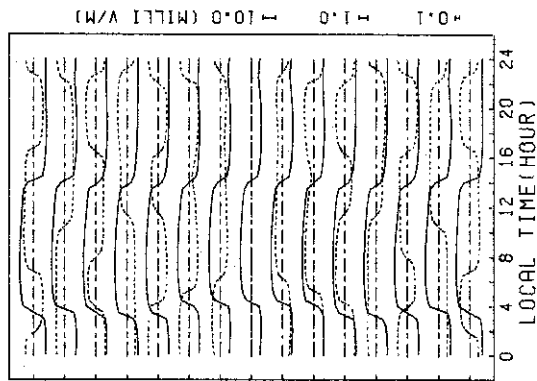
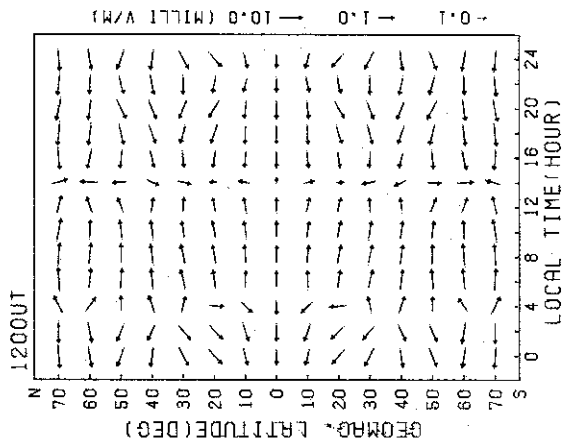


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WIND VELOCITY (LOG SCALE)

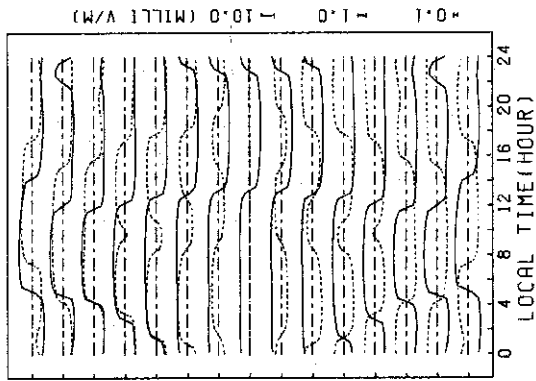
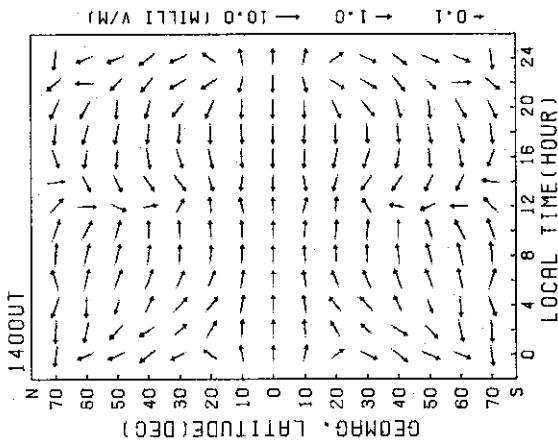


1200UT



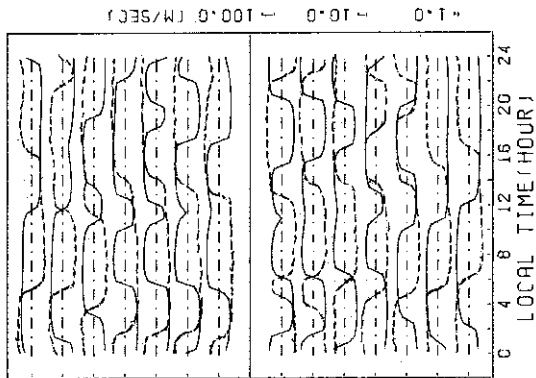
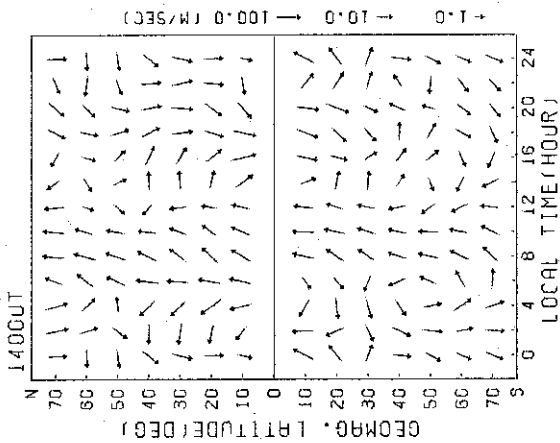
DEC-27-1964

ELECTRIC FIELD (LOG SCALE)

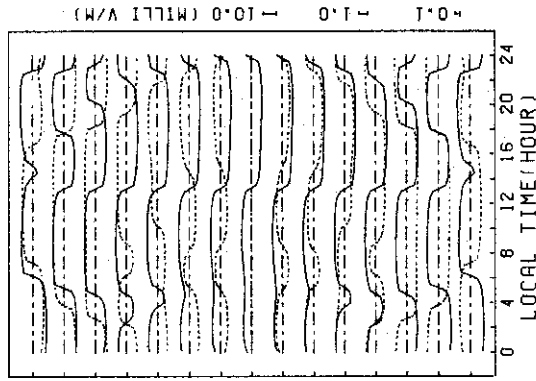
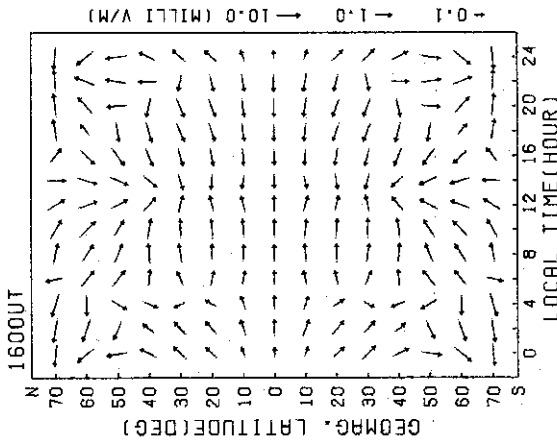


DEC-27-1964

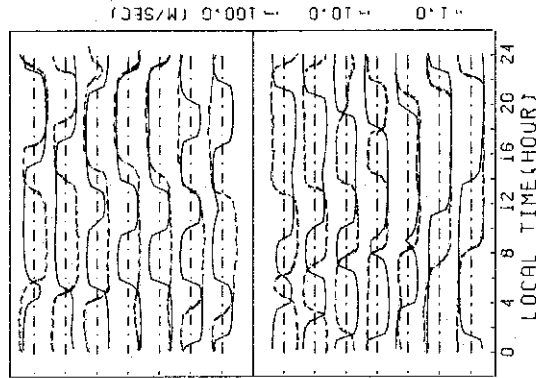
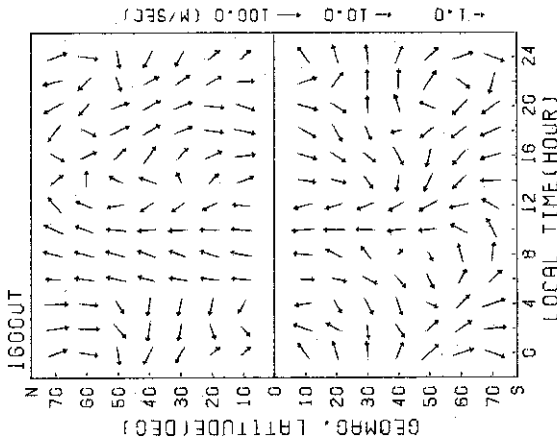
WIND VELOCITY (LOG SCALE)



1600UT

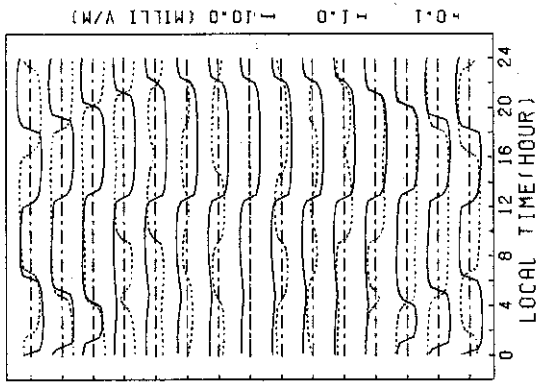
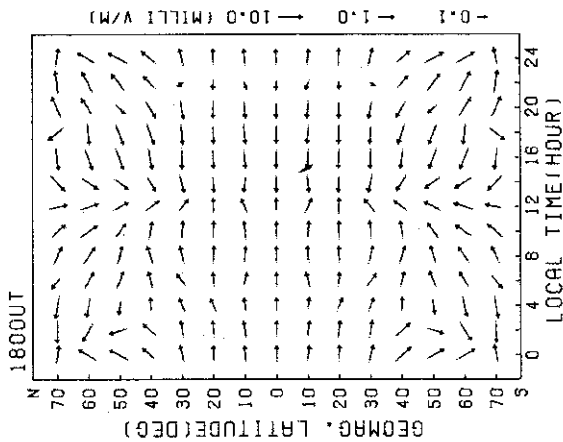


1600UT



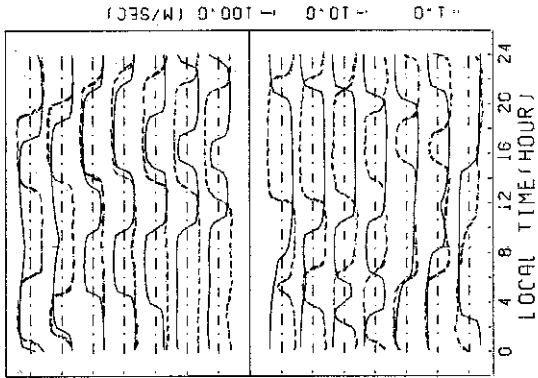
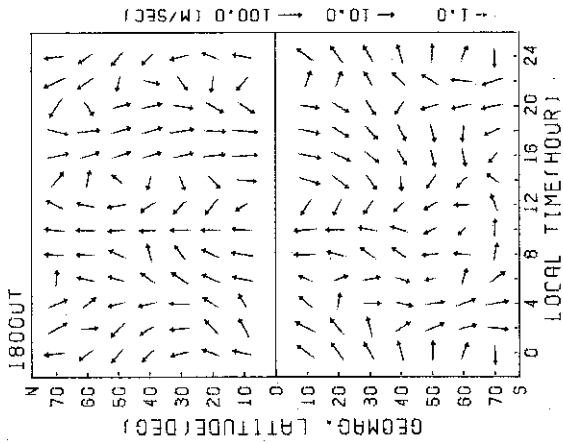
DEC-27-1964

ELECTRIC FIELD (LOG SCALE)

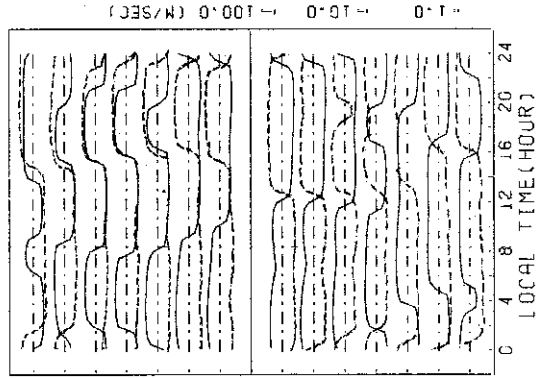
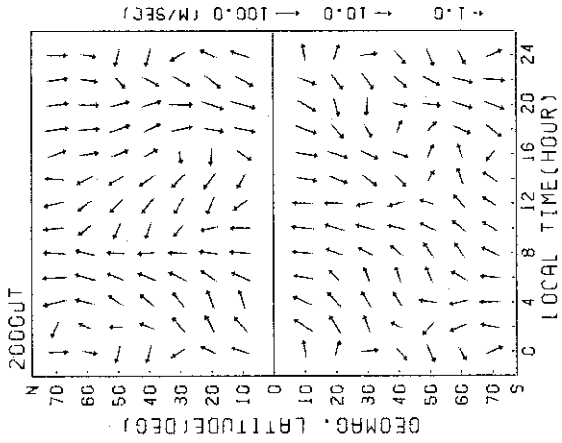
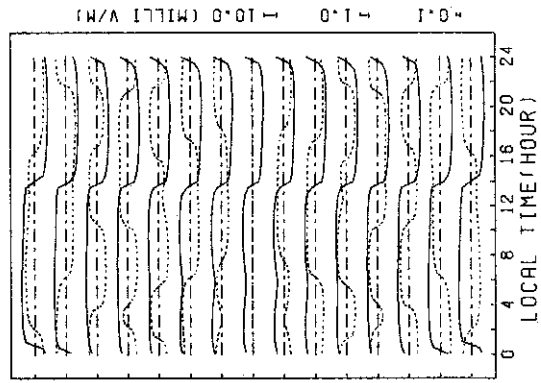
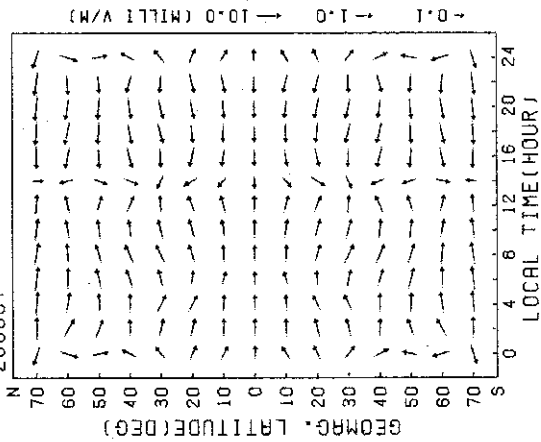


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WIND VELOCITY (LOG SCALE)

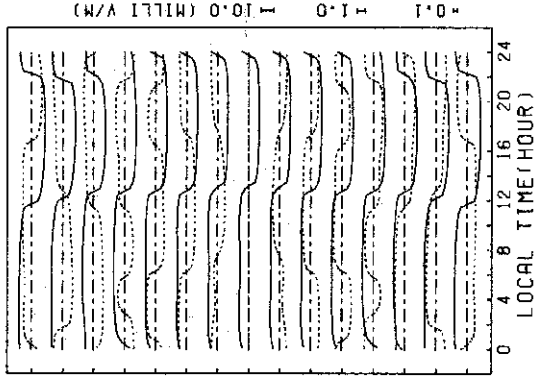
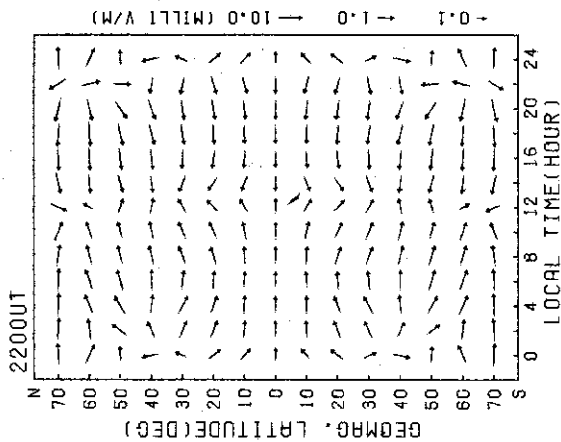


2000UT



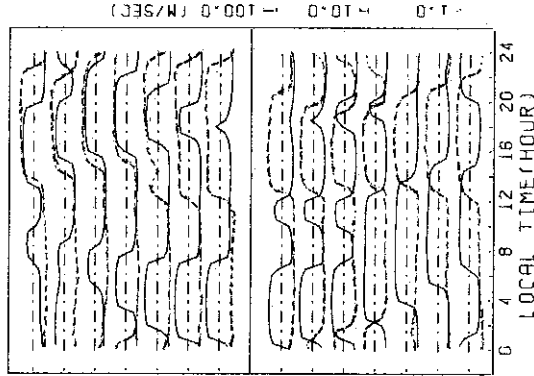
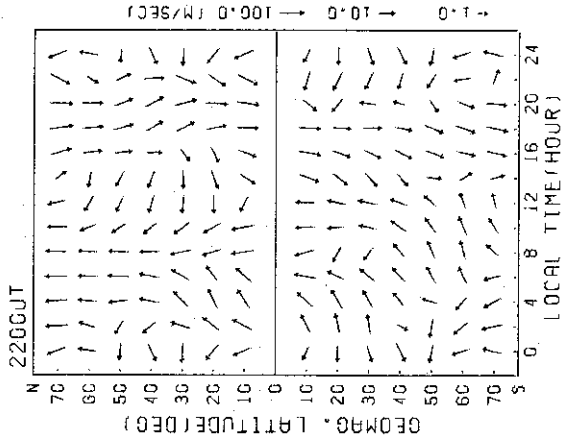
DEC.27.1964

ELECTRIC FIELD (LOG SCALE)

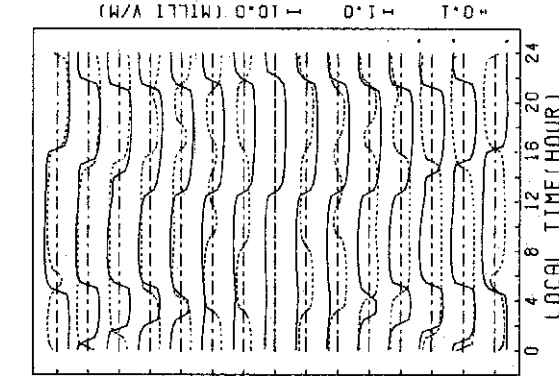
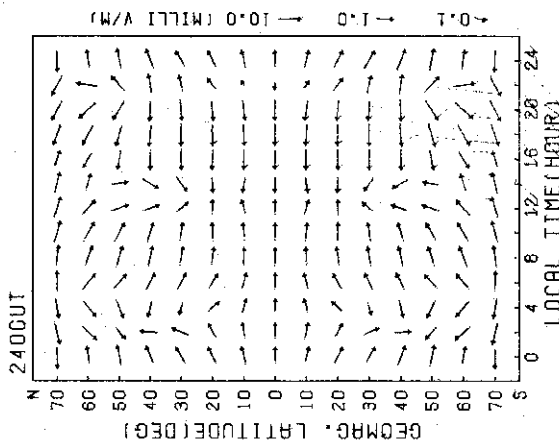


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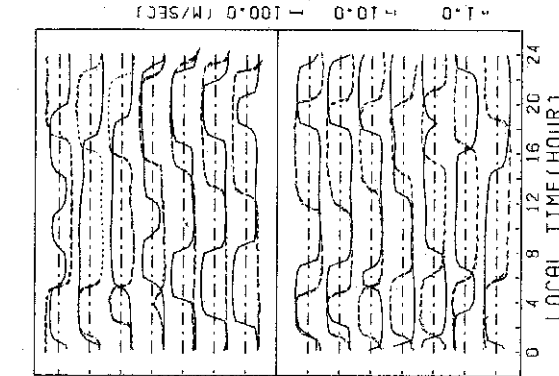
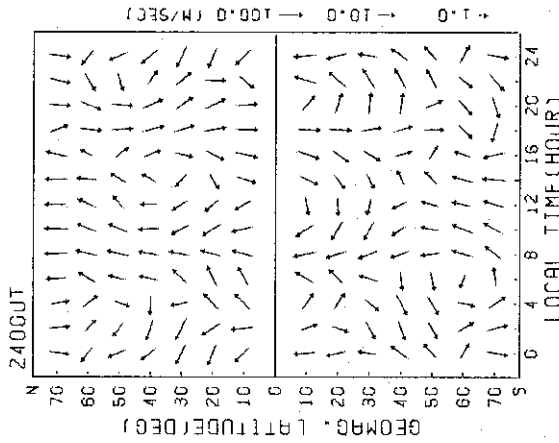
WIND VELOCITY (LOG SCALE)



2200UT

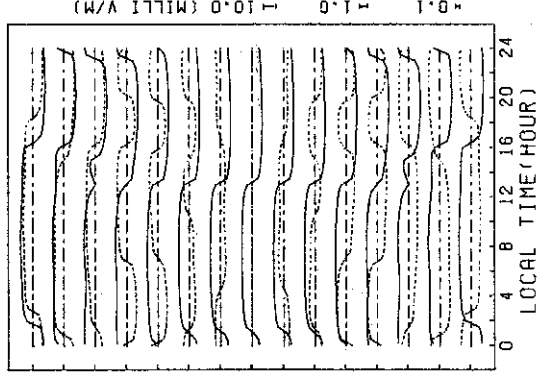
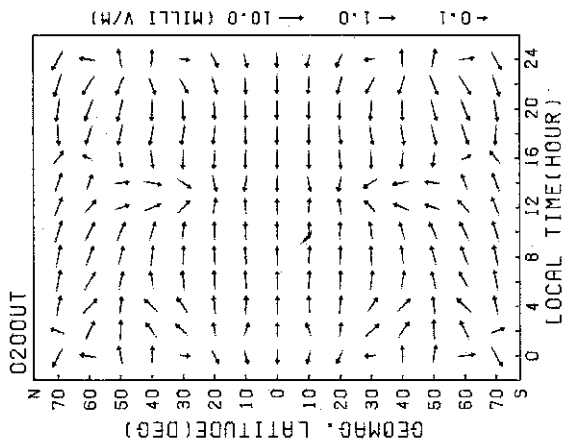


2400UT



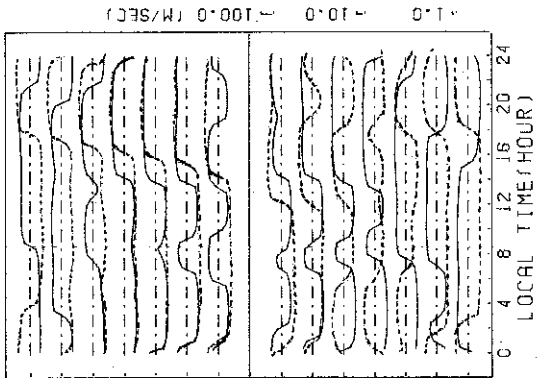
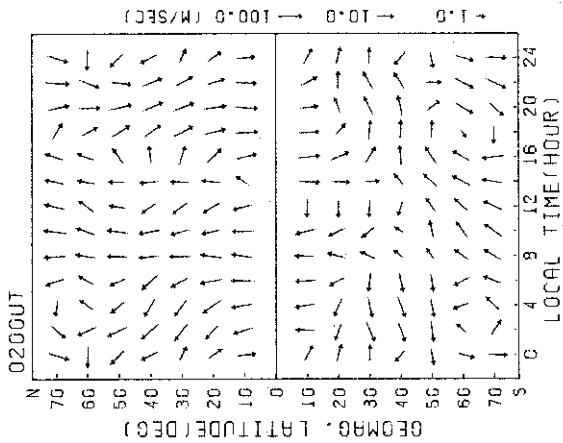
DEC. 28, 1964

ELECTRIC FIELD (LOG SCALE)

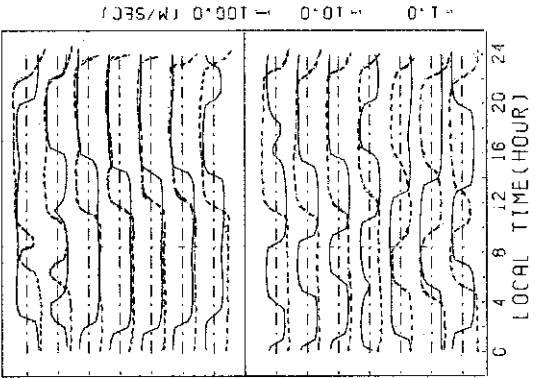
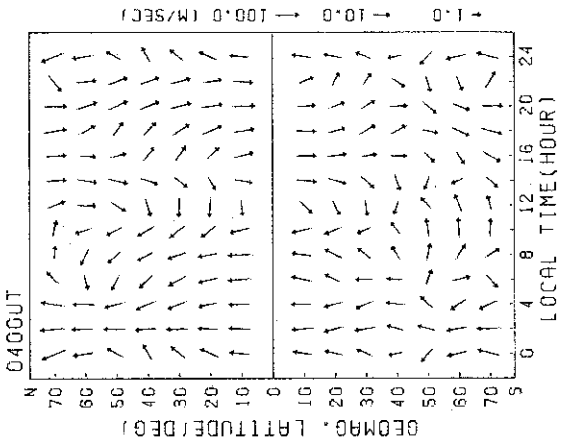
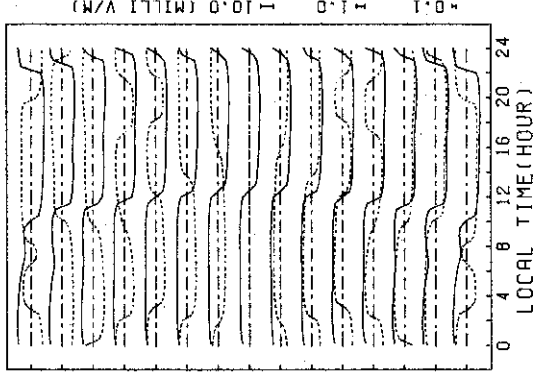
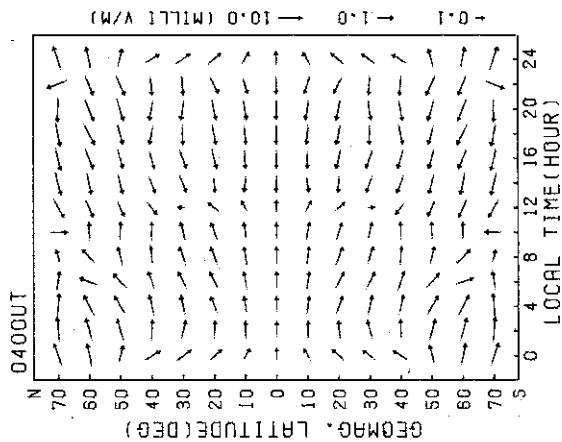


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WIND VELOCITY (LOG SCALE)

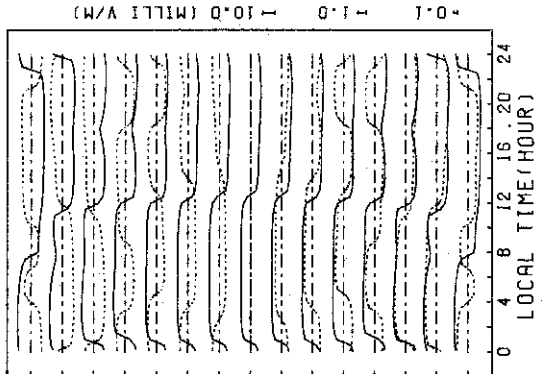
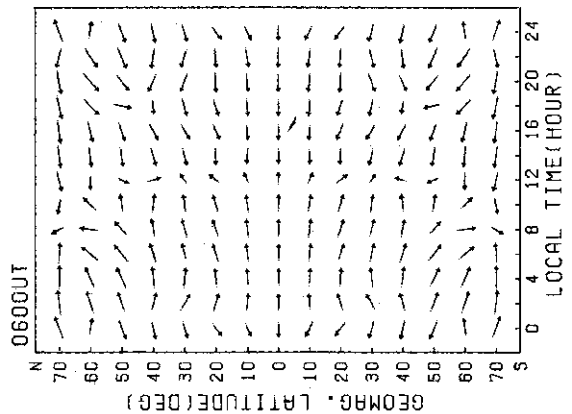


0400UT



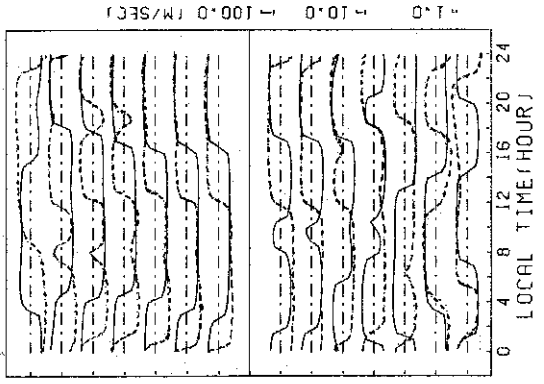
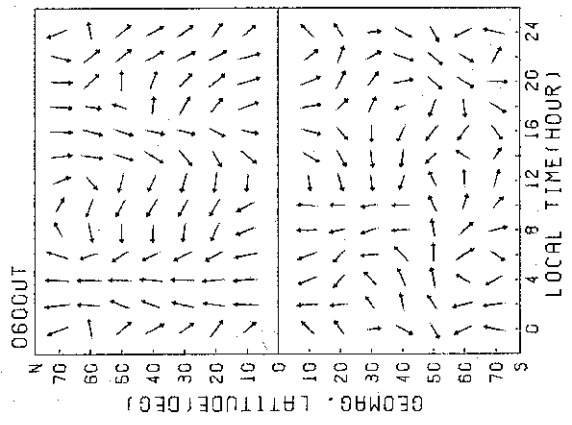
DEC.28.1964

ELECTRIC FIELD (LOG SCALE)

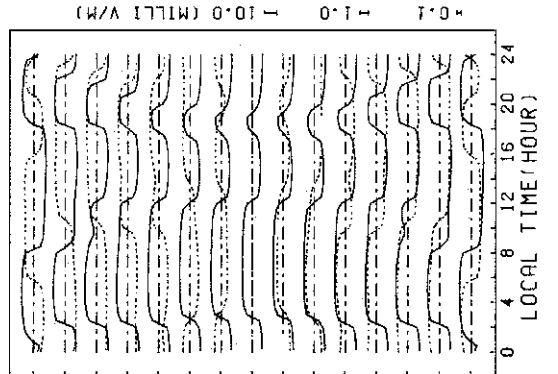
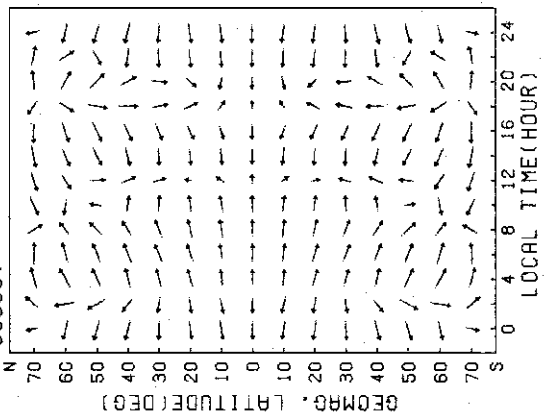


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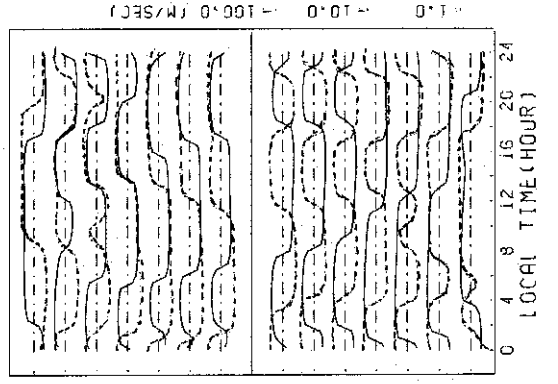
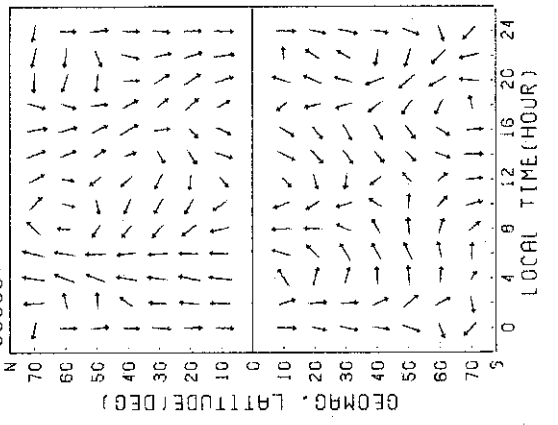
WIND VELOCITY (LOG SCALE)



0800UT

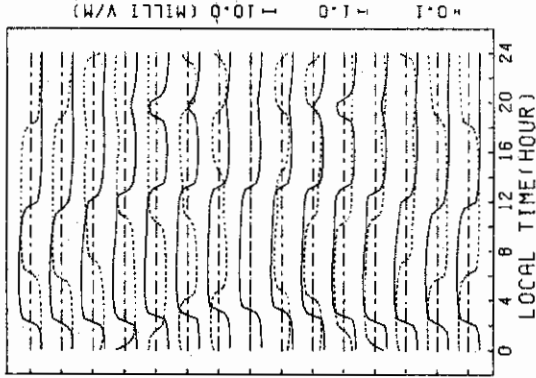
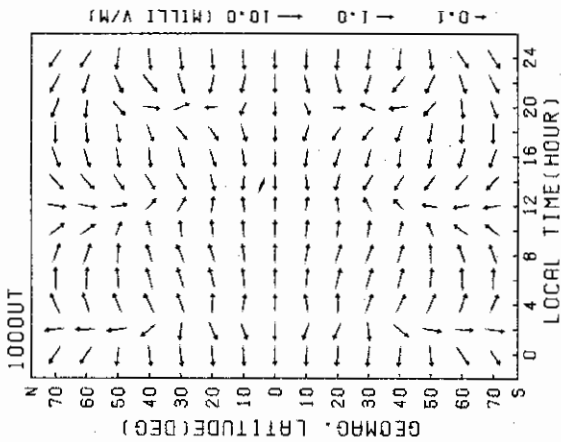


0800UT



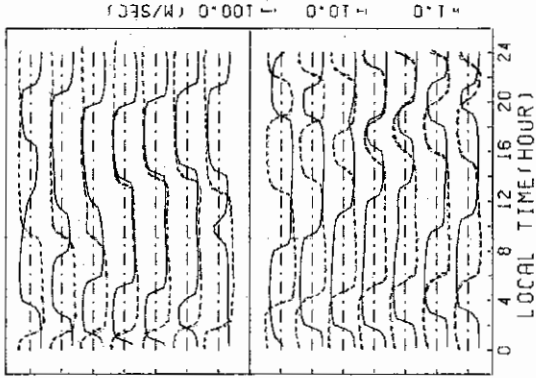
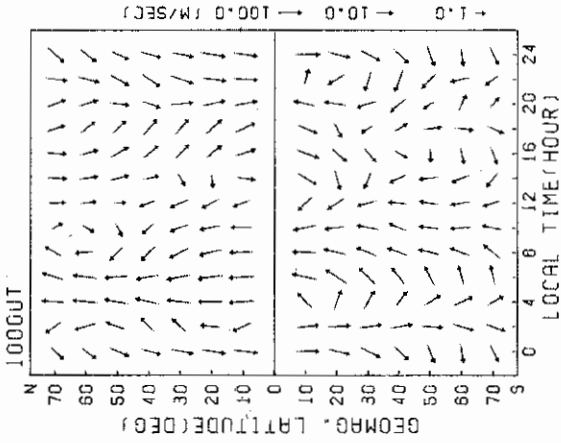
DEC. 28, 1964

ELECTRIC FIELD (LOG SCALE)

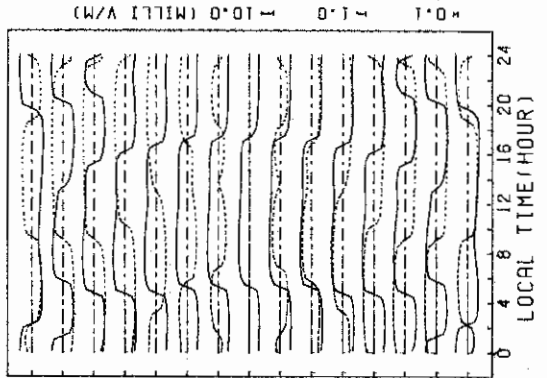
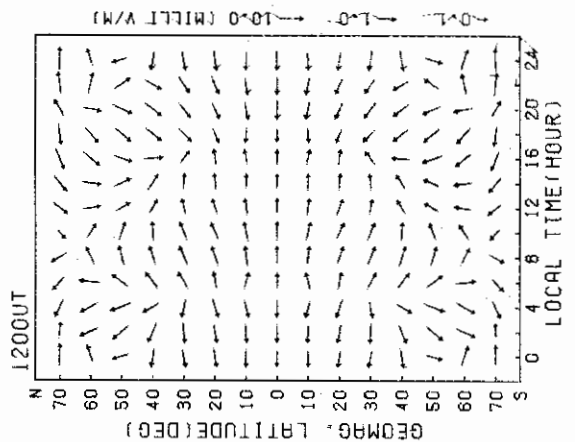


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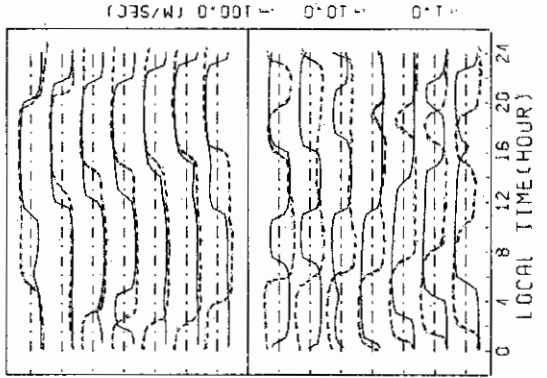
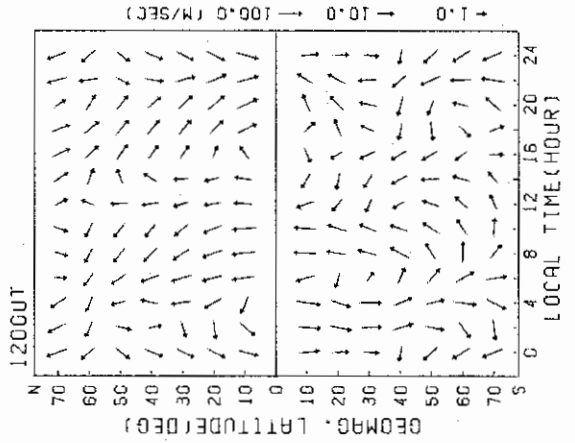
WIND VELOCITY (LOG SCALE)



1200UT

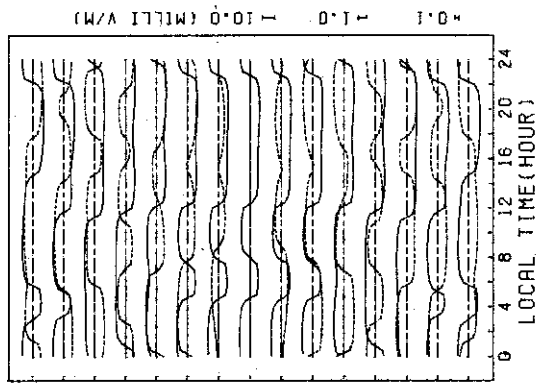
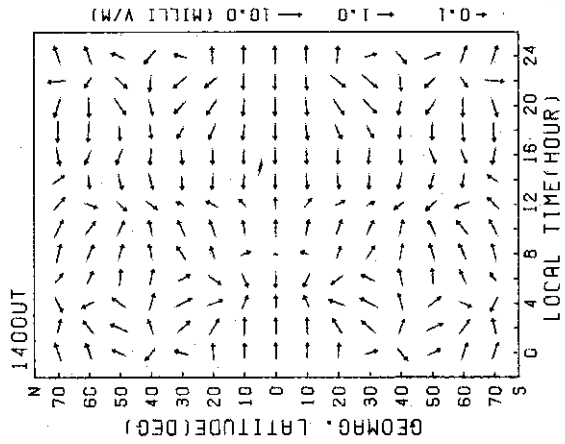


1200UT



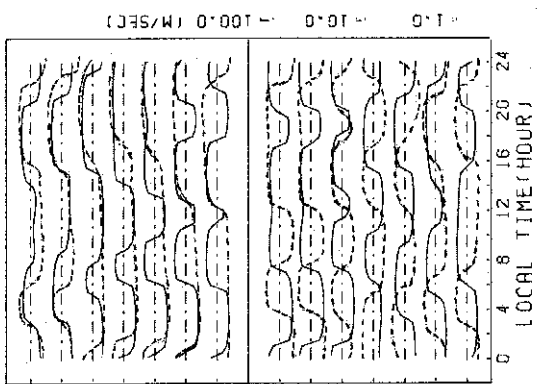
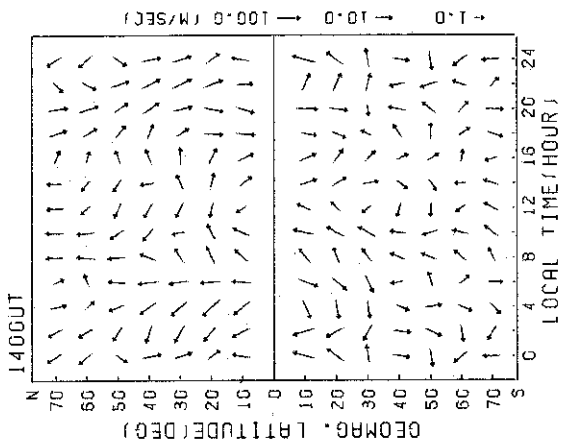
DEC.28.1964

ELECTRIC FIELD (LOG SCALE)

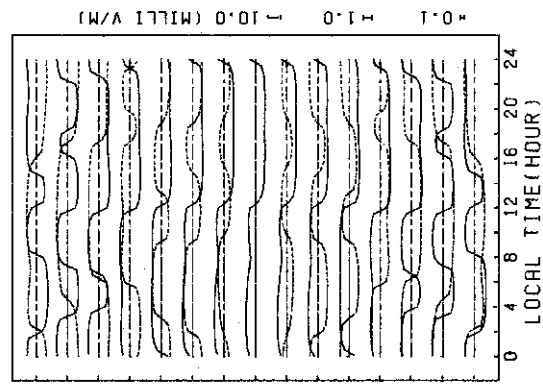
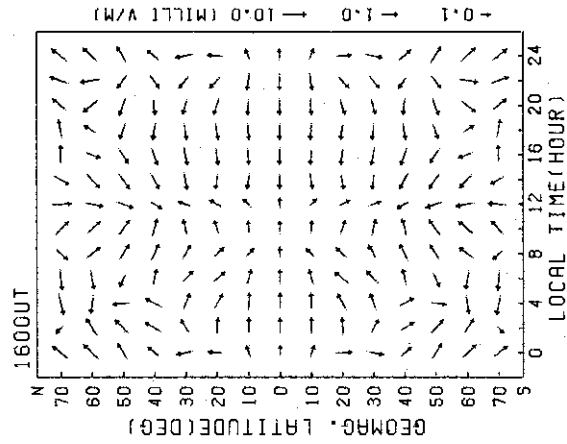


DEC.28.1964

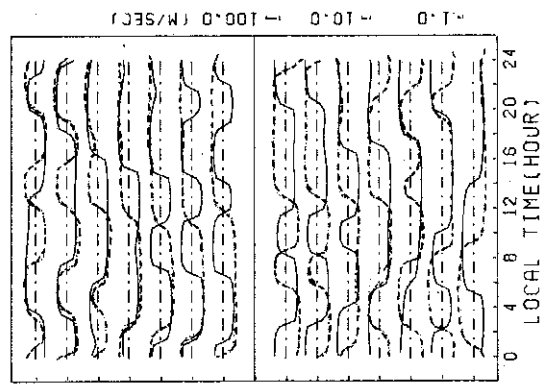
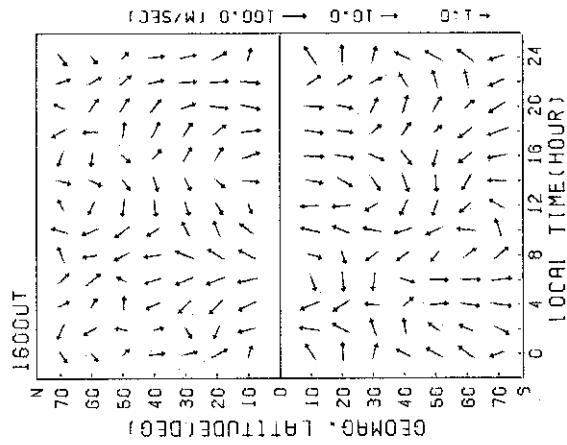
WIND VELOCITY (LOG SCALE)



1600UT

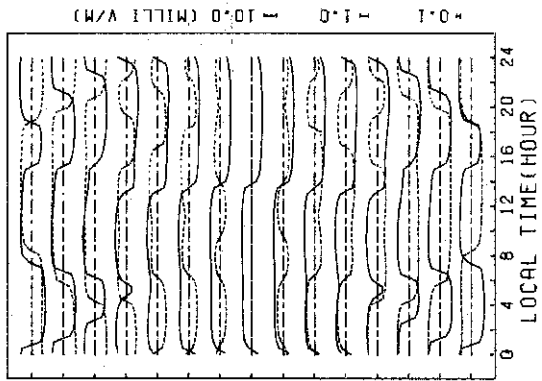
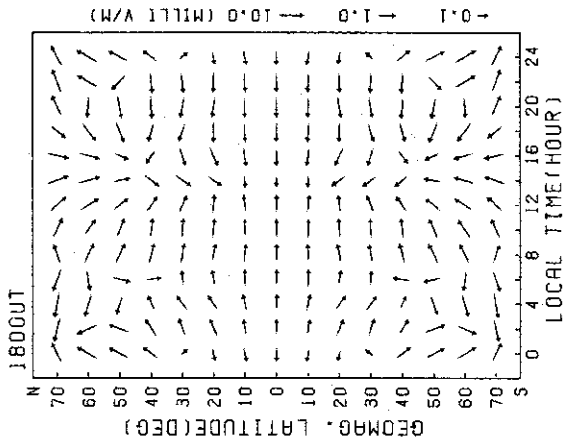


1600UT



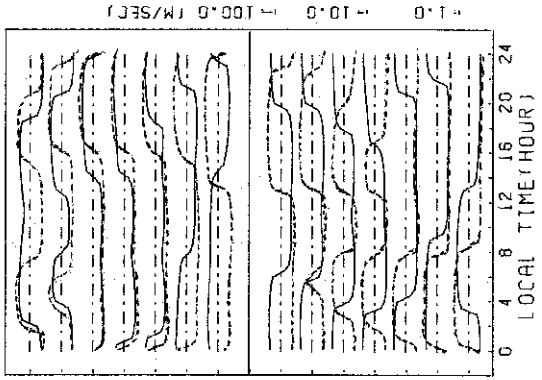
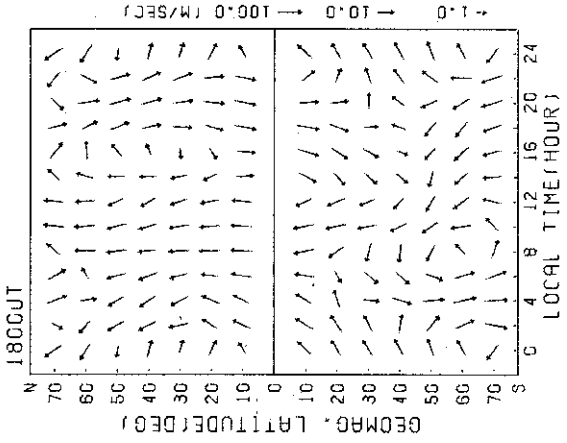
DEC.28.1964

ELECTRIC FIELD (LOG SCALE)

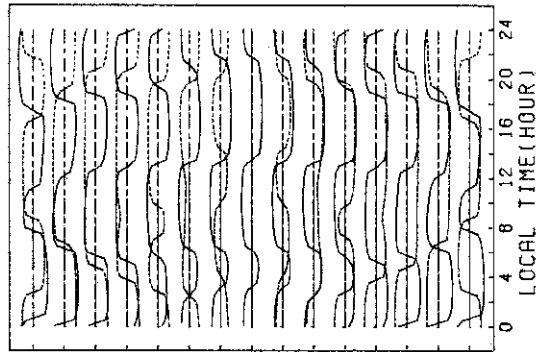
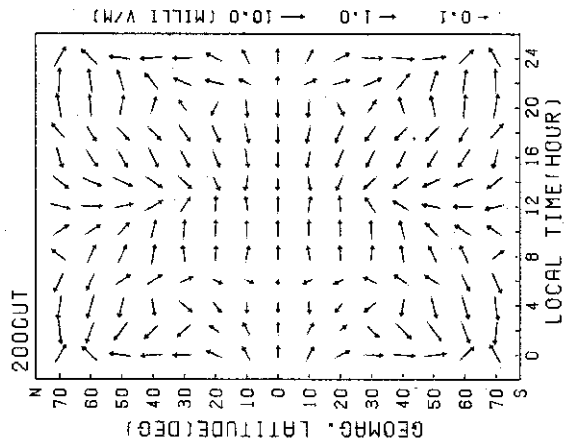


DEC.28.1964

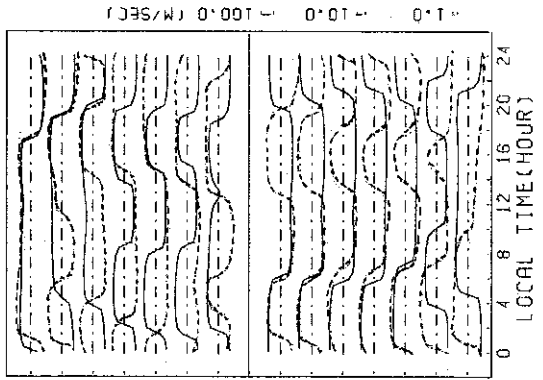
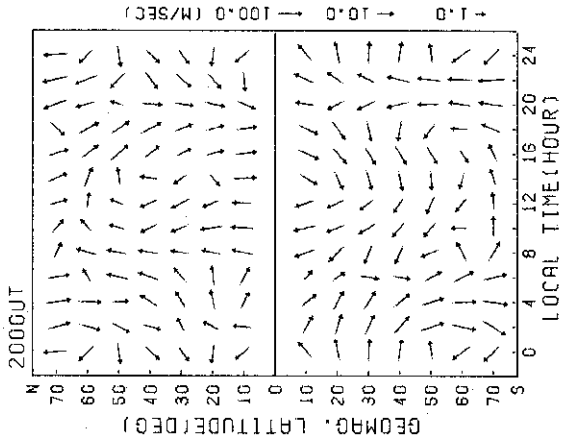
WIND VELOCITY (LOG SCALE)



2000UT

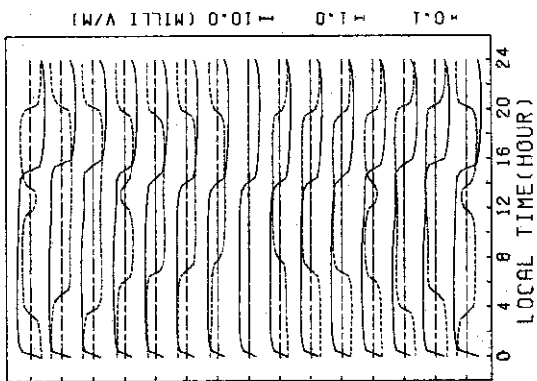
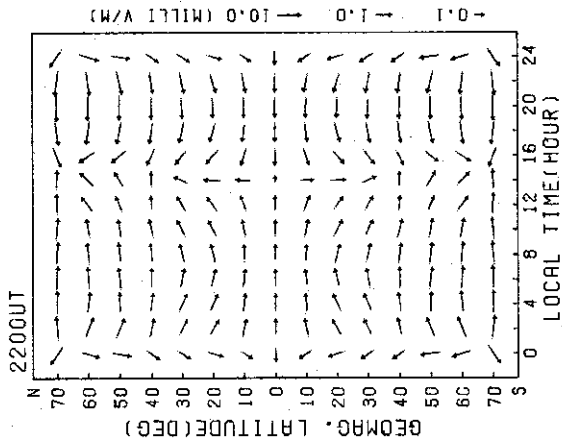


2000UT



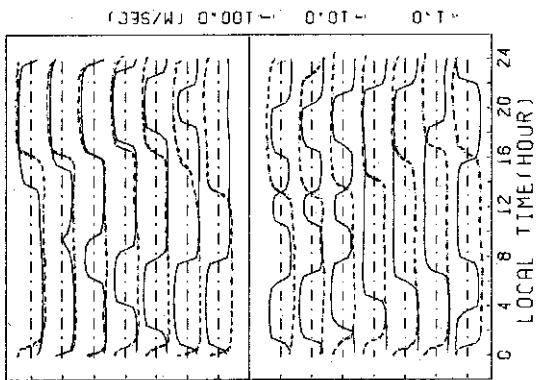
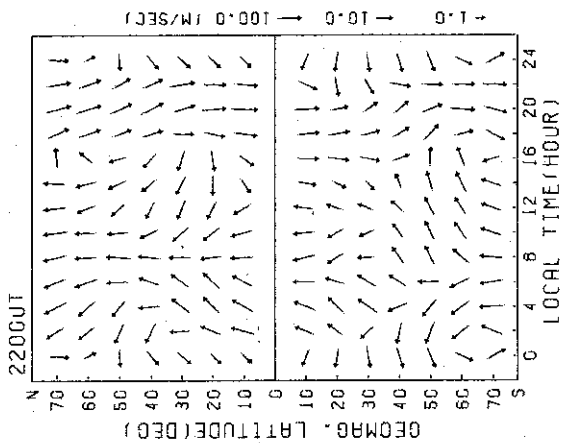
DEC.28.1964

ELECTRIC FIELD (LOG SCALE)

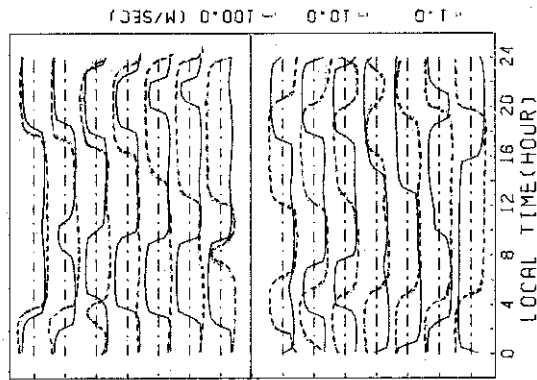
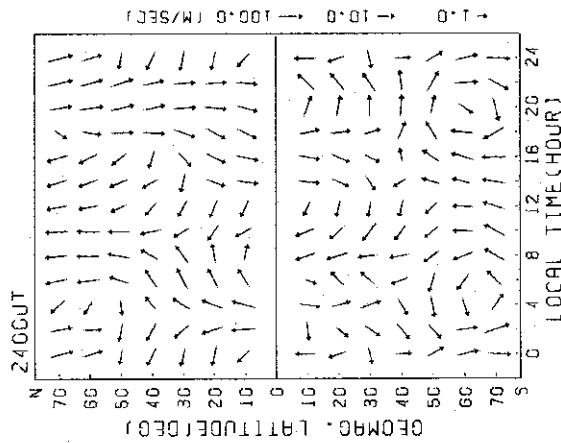
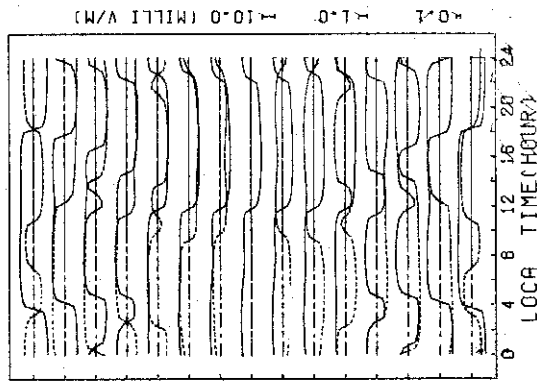
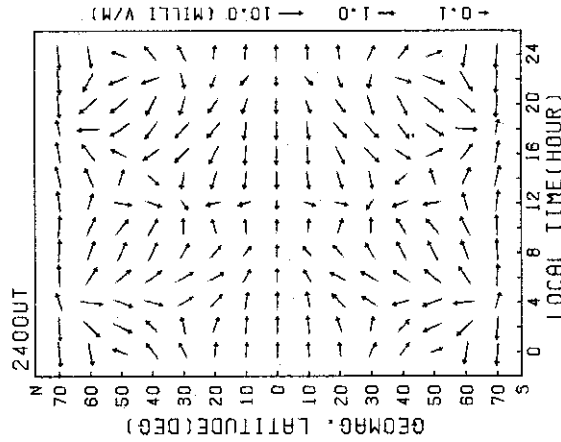


DEC.28.1964

WIND VELOCITY (LOG SCALE)

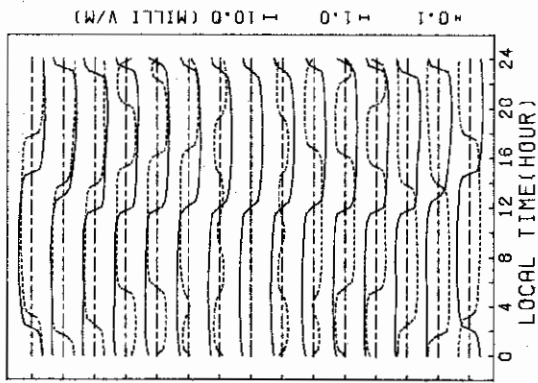
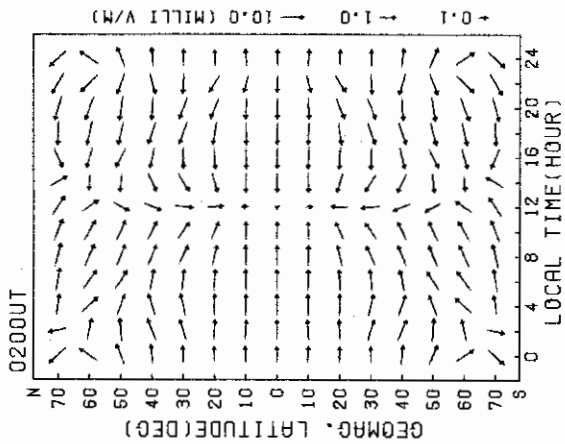


2400UT



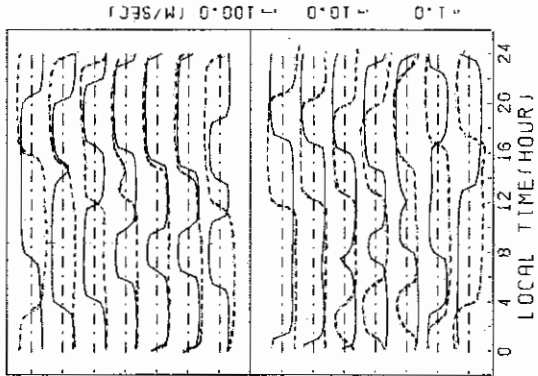
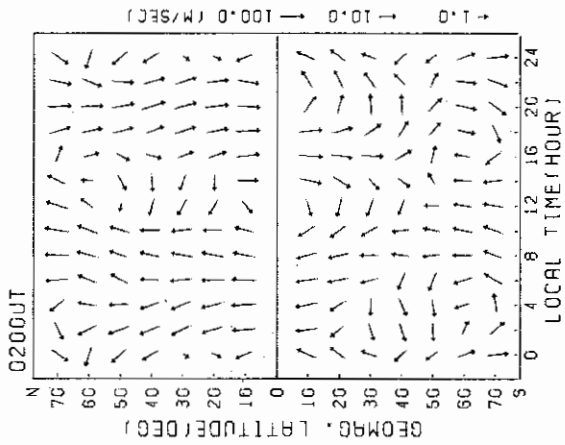
DEC.29,1964

ELECTRIC FIELD (LOG SCALE)

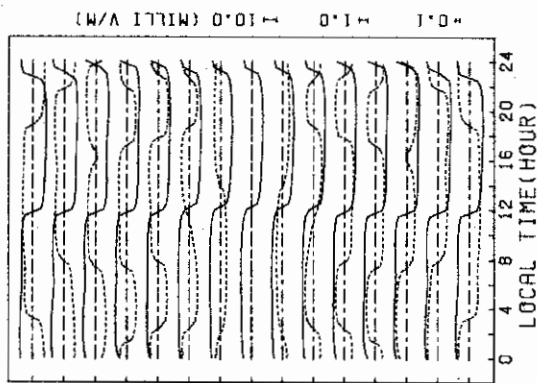
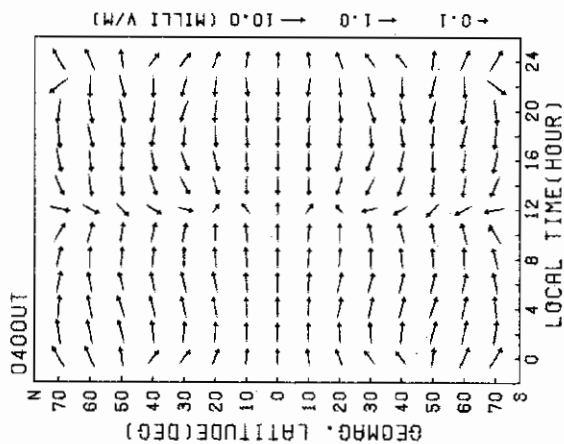


DEC.29,1964

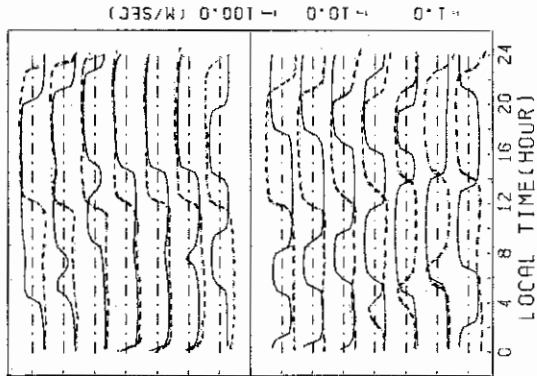
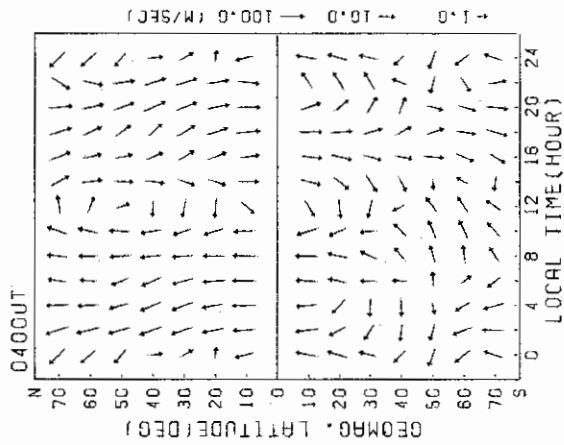
WIND VELOCITY (LOG SCALE)



0400UT

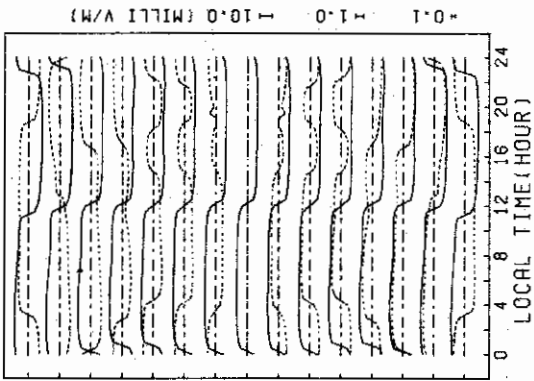
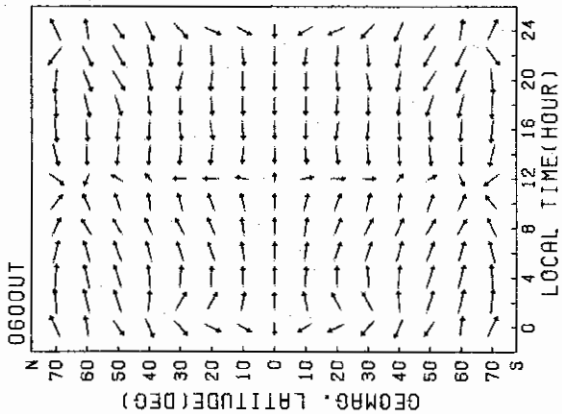


0400UT



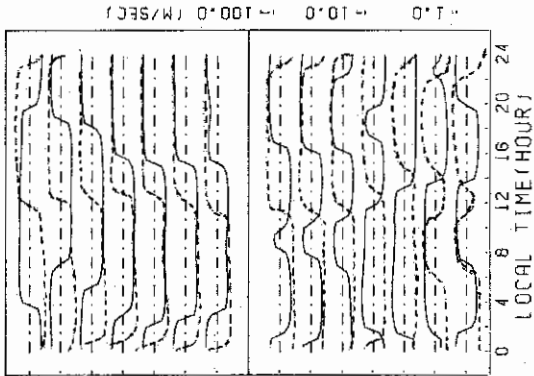
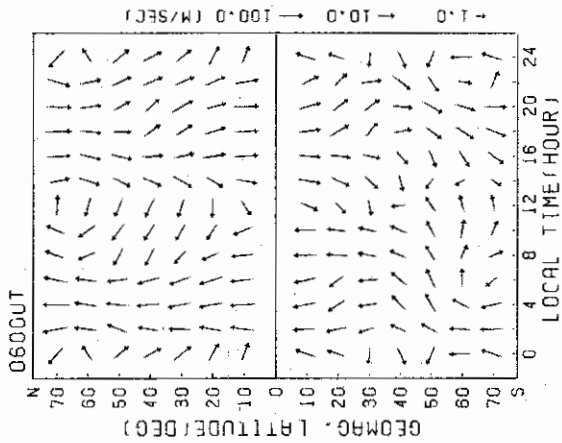
DEC.29.1964

ELECTRIC FIELD (LOG SCALE)

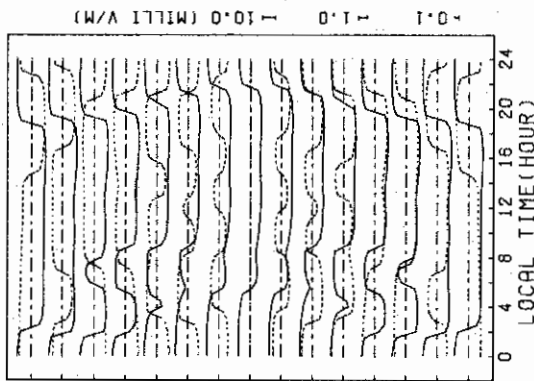
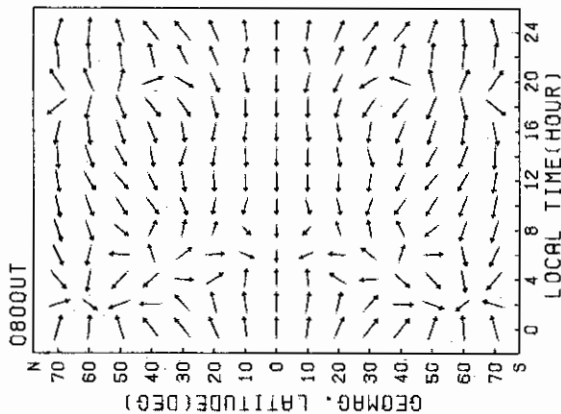


DEC.29.1964

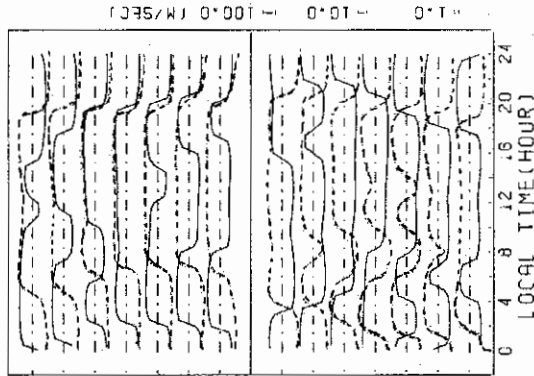
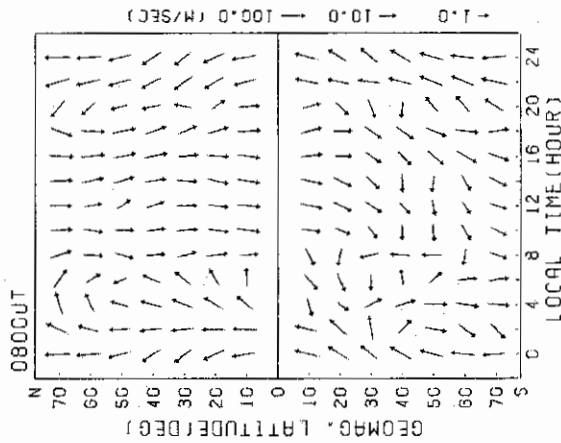
WIND VELOCITY (LOG SCALE)



0800UT

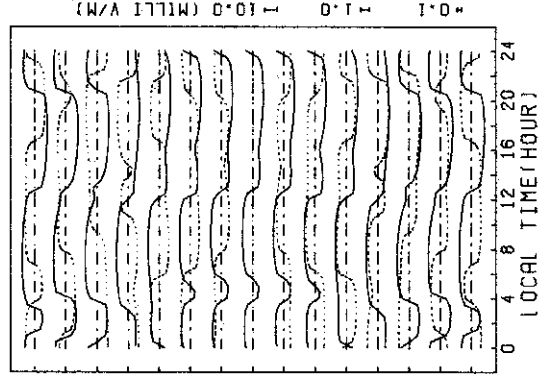
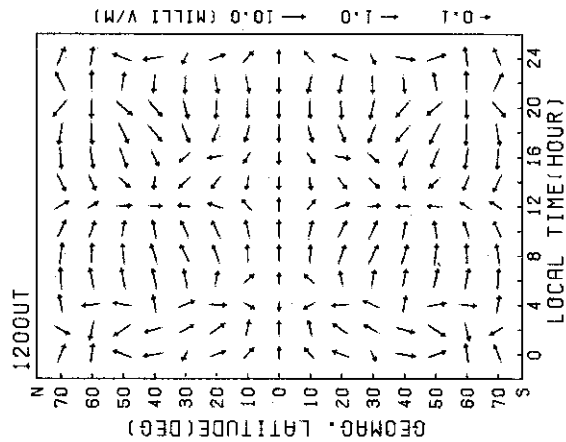
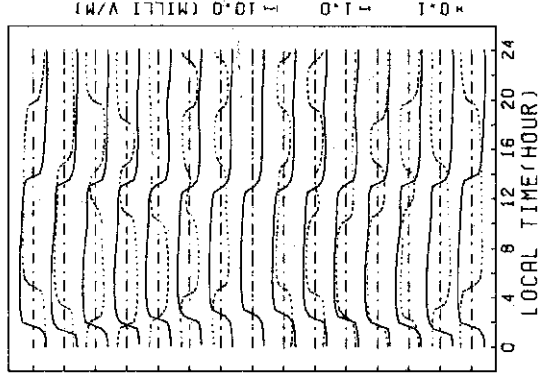
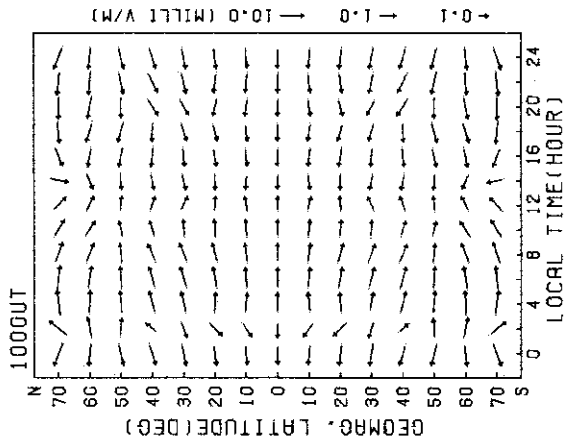


0800UT



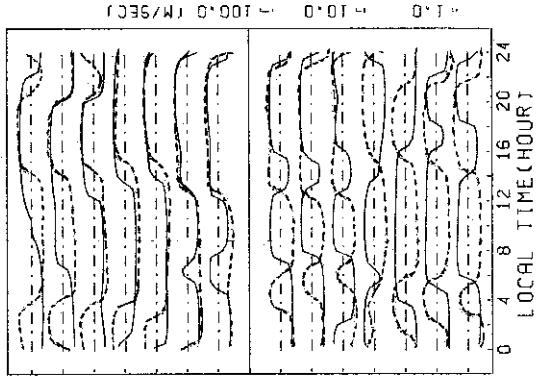
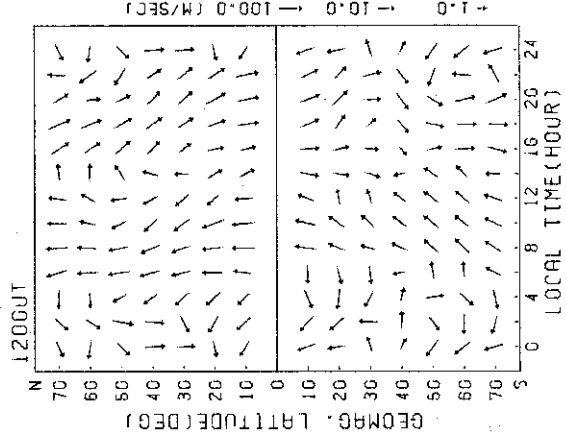
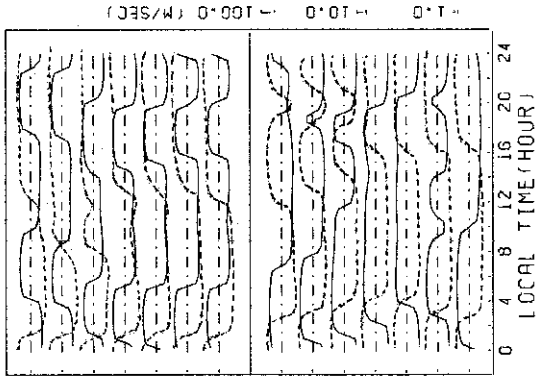
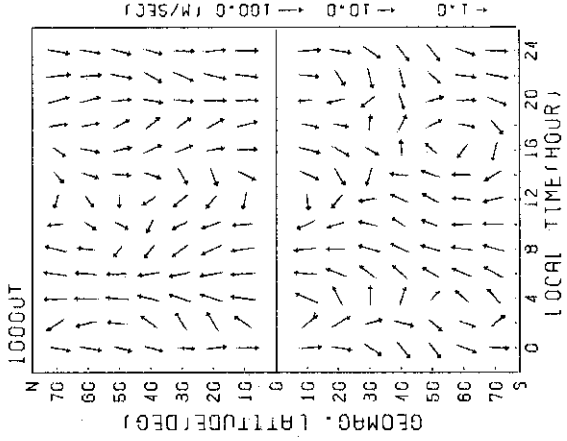
DEC.29.1964

ELECTRIC FIELD (LOG SCALE)



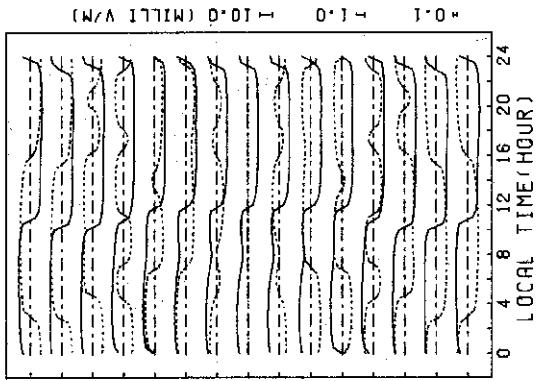
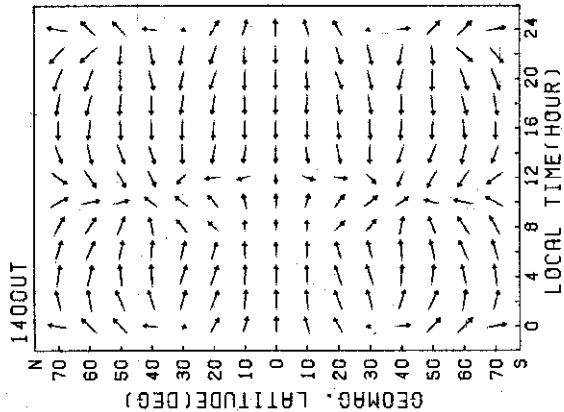
DEC.29.1964

WIND VELOCITY (LOG SCALE)



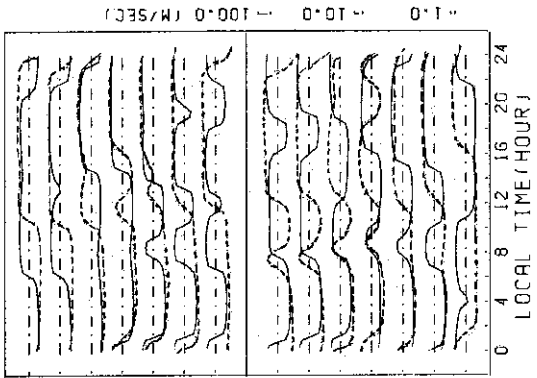
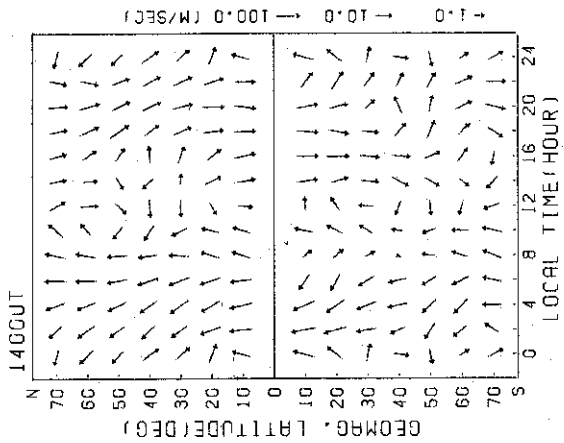
DEC.29.1964

ELECTRIC FIELD (LOG SCALE)

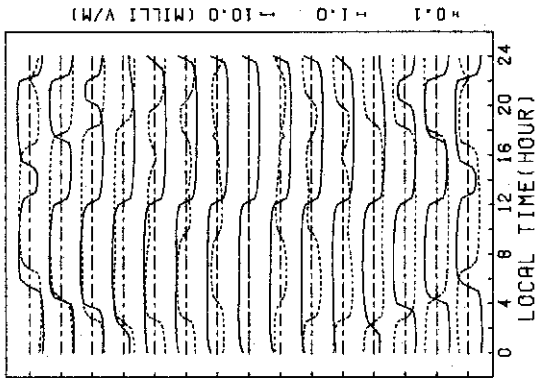
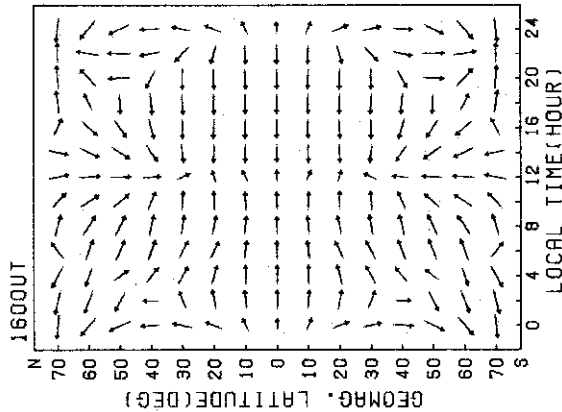


DEC.29.1964

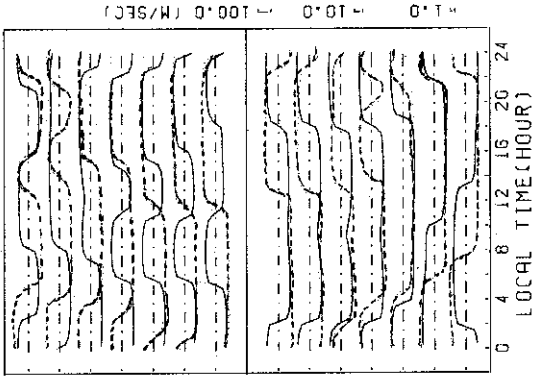
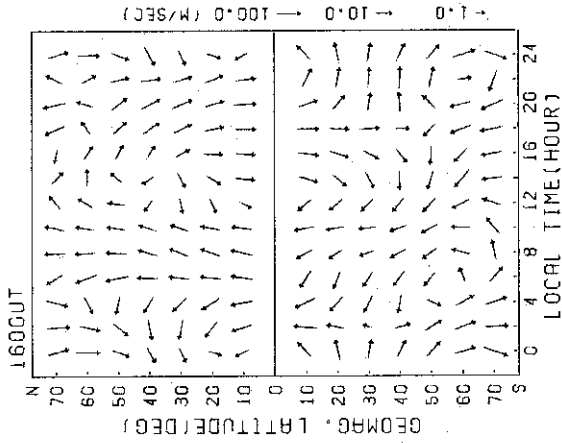
WIND VELOCITY (LOG SCALE)



1600UT

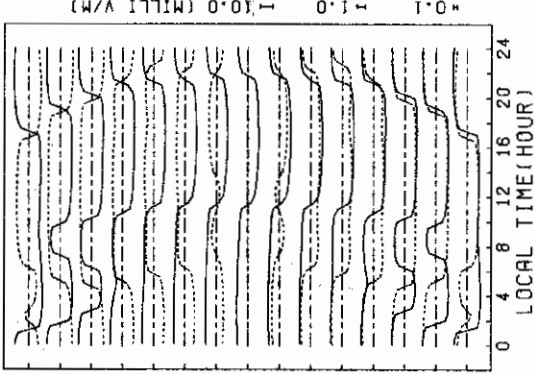
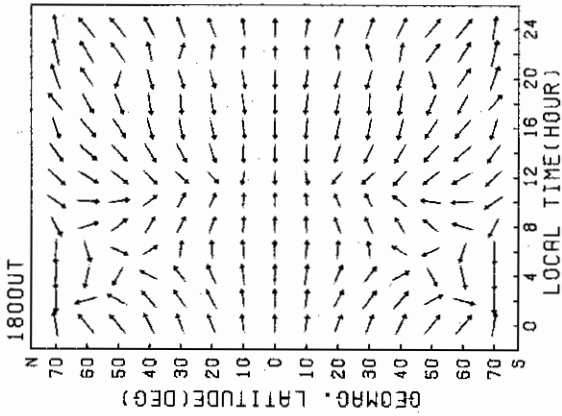


1600UT



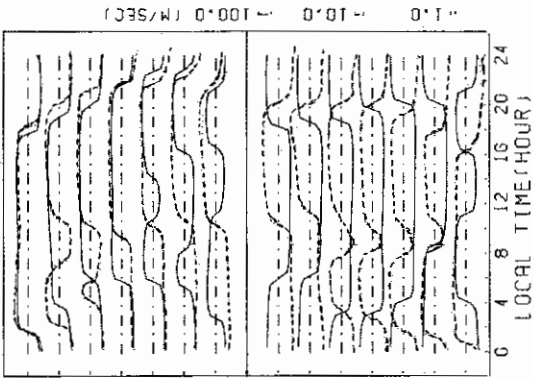
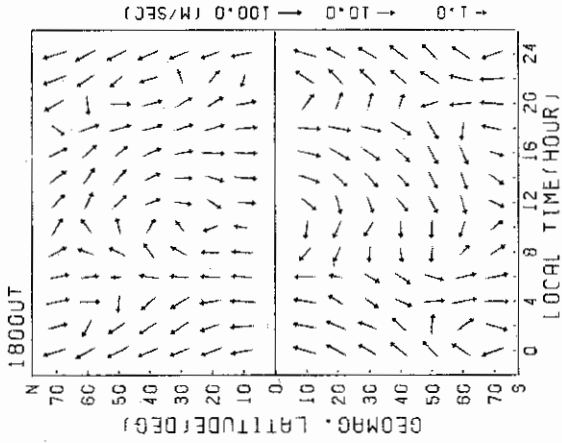
DEC.29.1964

ELECTRIC FIELD (LOG SCALE)

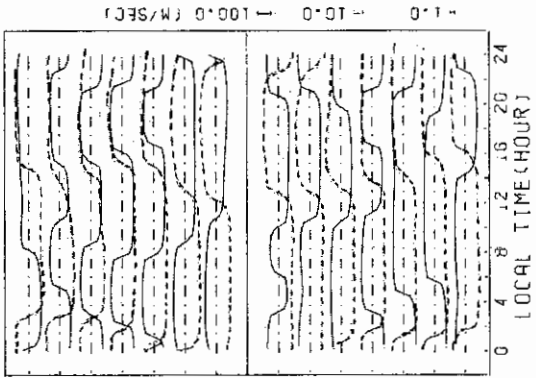
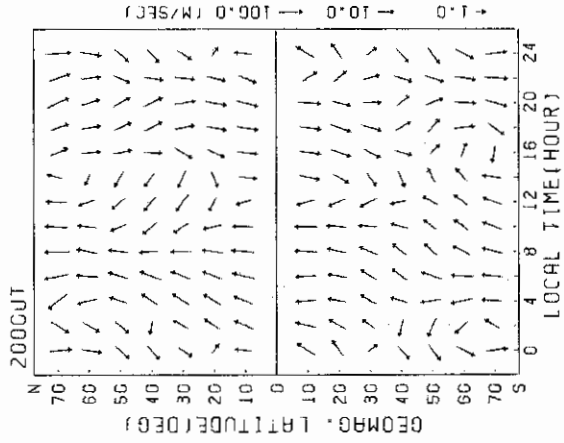
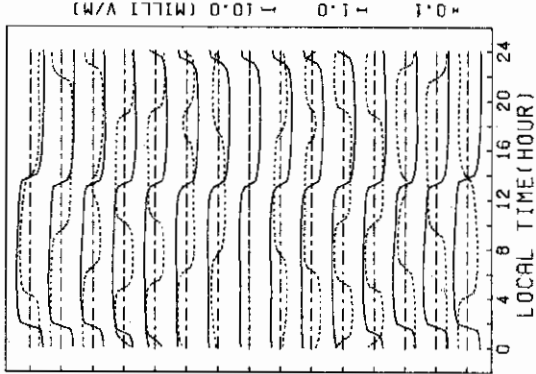
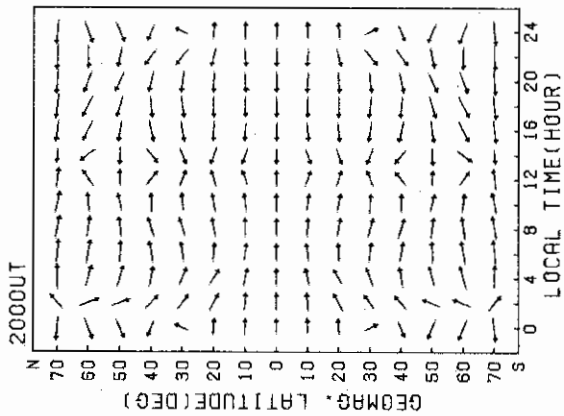


DEC.29.1964

WIND VELOCITY (LOG SCALE)

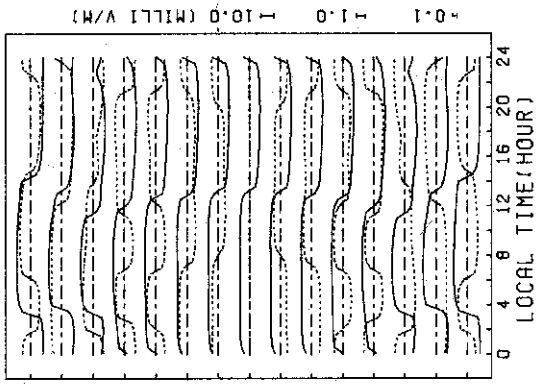
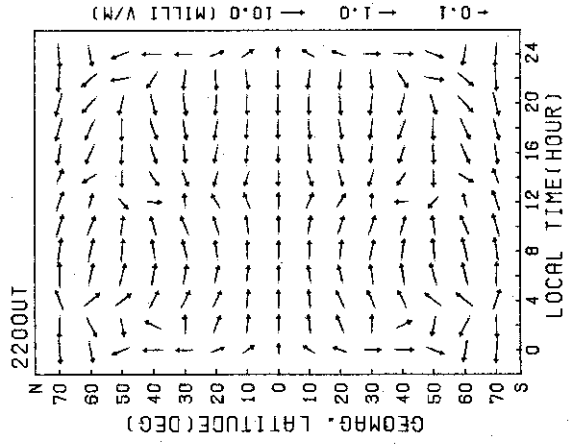


2000UT



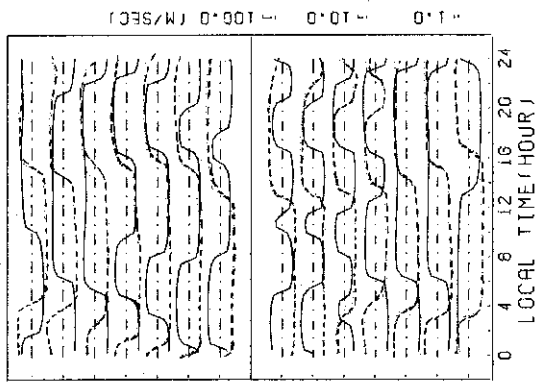
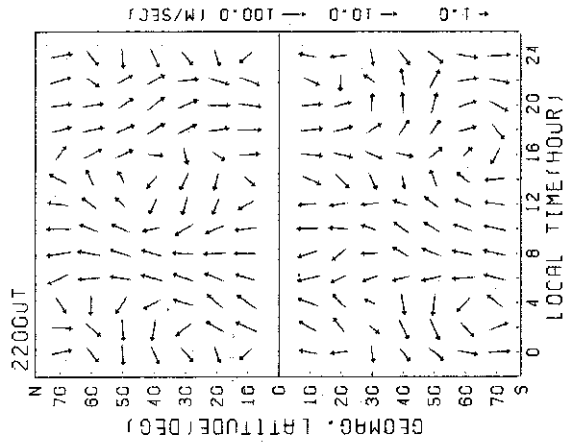
DEC. 29, 1964

ELECTRIC FIELD (LOG SCALE)

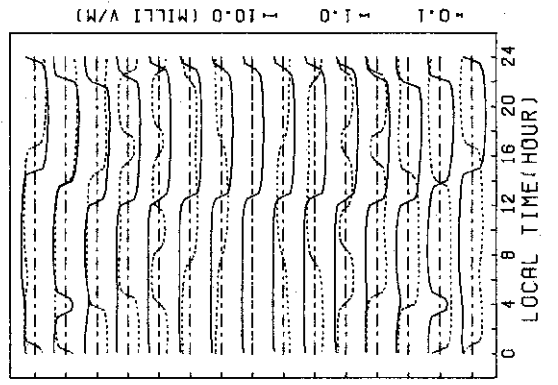
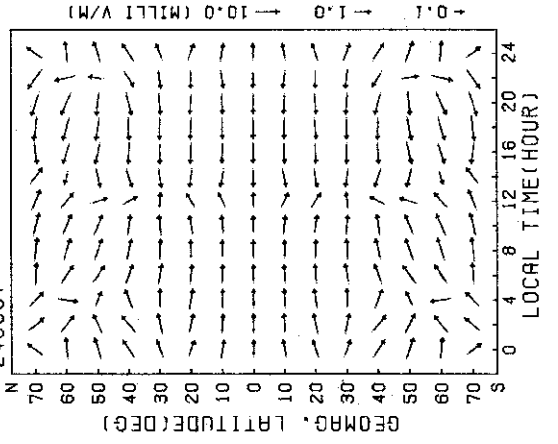


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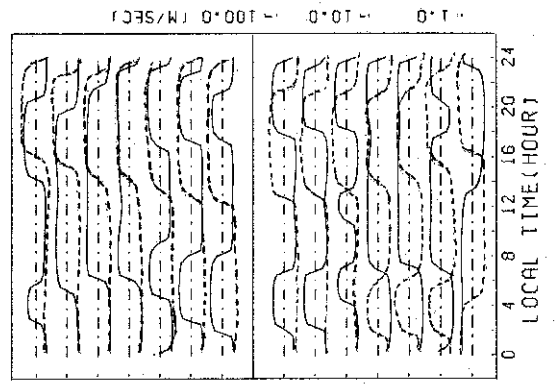
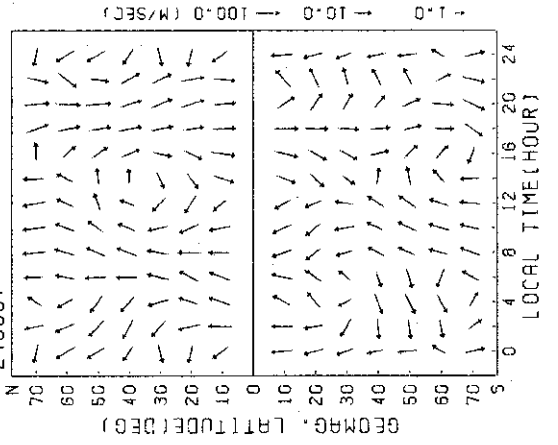
WIND VELOCITY (LOG SCALE)



2400UT

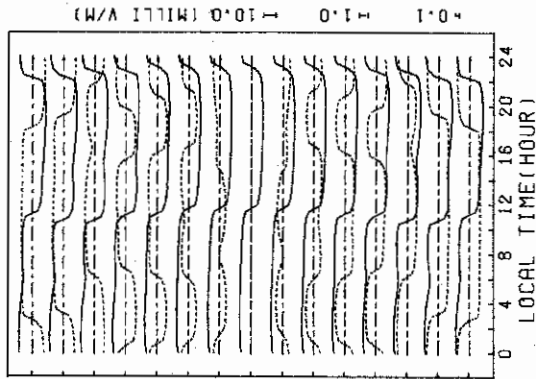
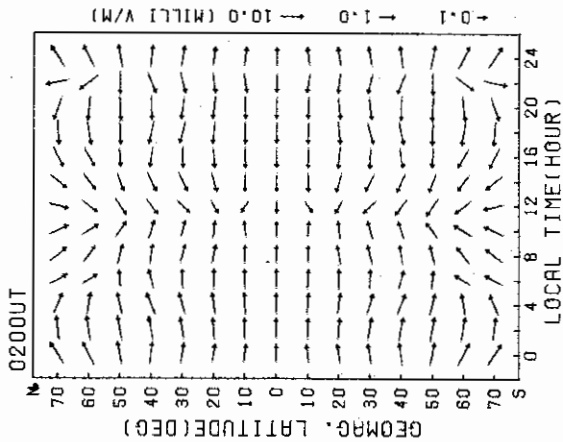


2400UT



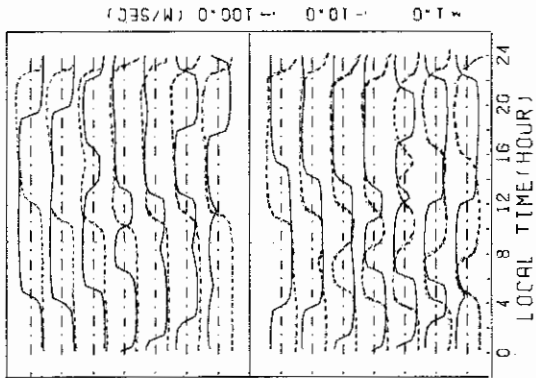
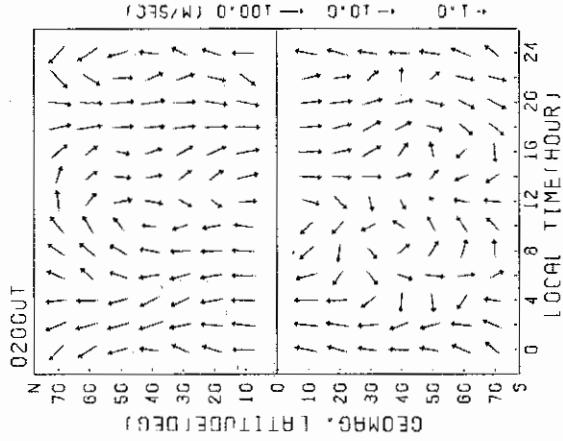
DEC.30.1964

ELECTRIC FIELD (LOG SCALE)

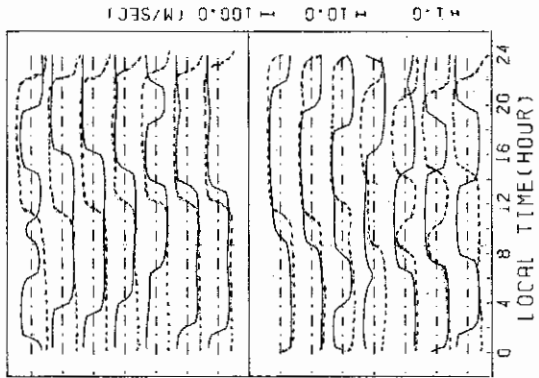
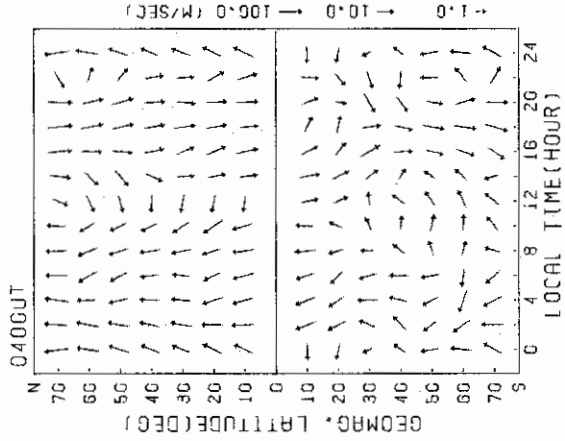
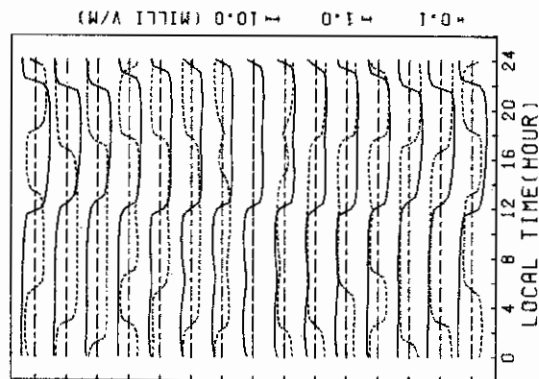
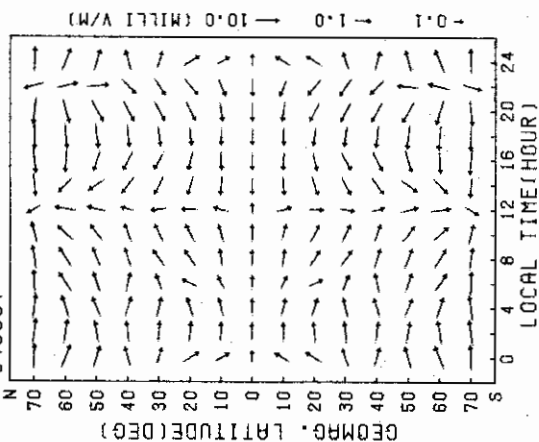


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WIND VELOCITY (LOG SCALE)

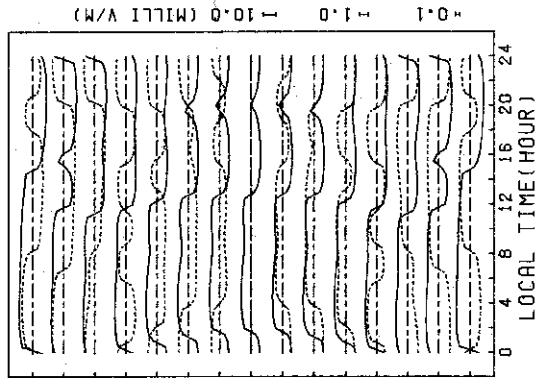
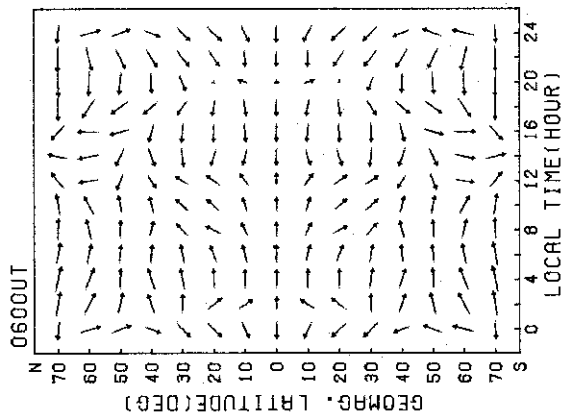


0400UT



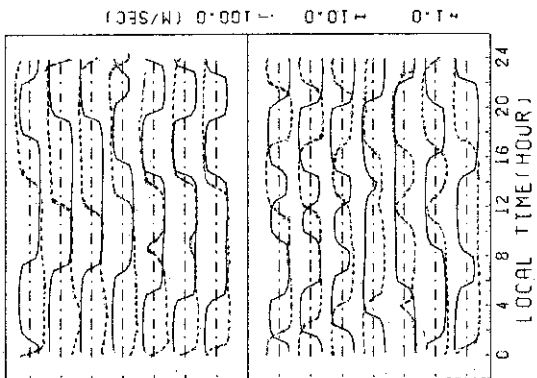
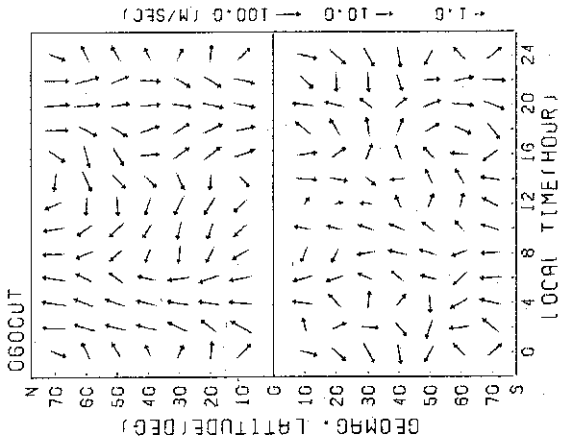
DEC. 30, 1964

ELECTRIC FIELD (LOG SCALE)

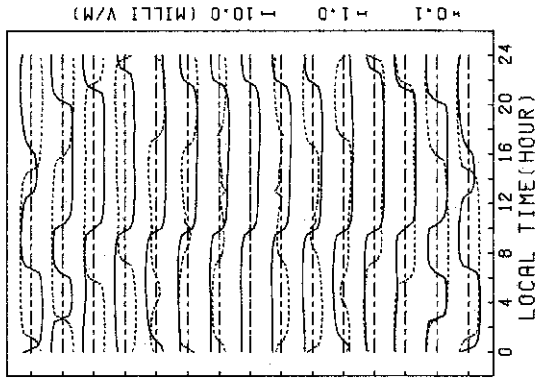
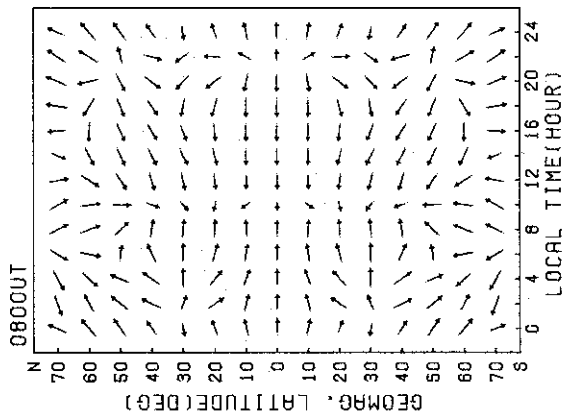


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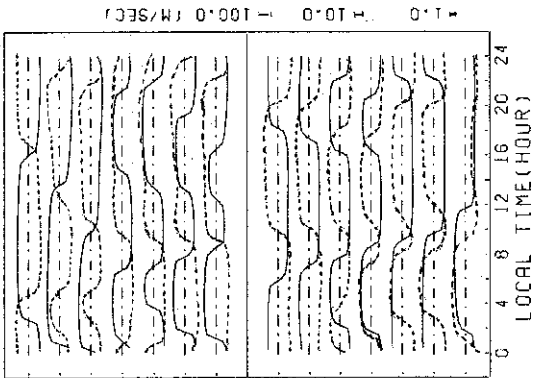
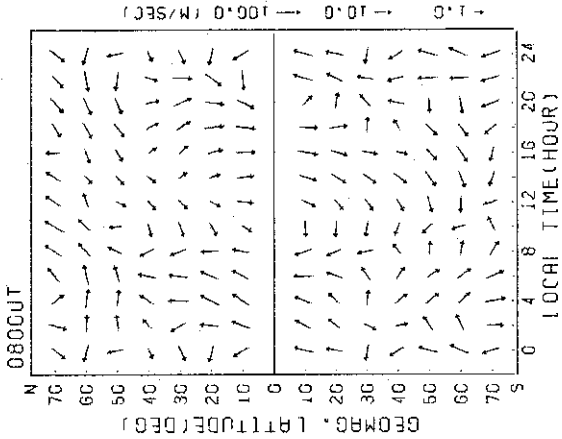
WIND VELOCITY (LOG SCALE)



0800UT

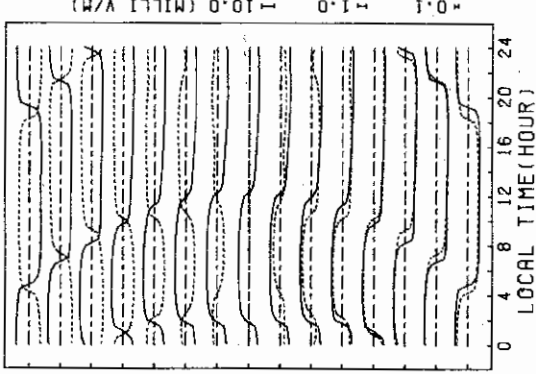
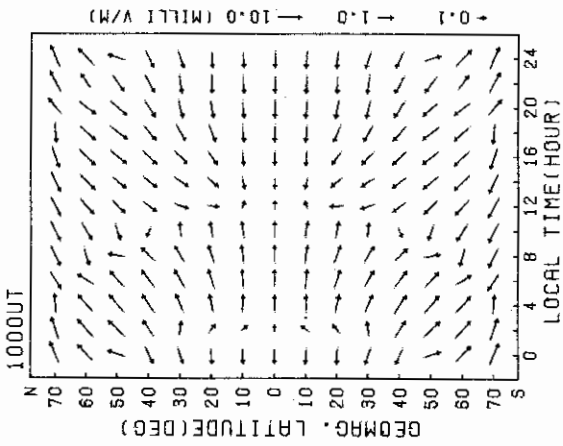


0800UT



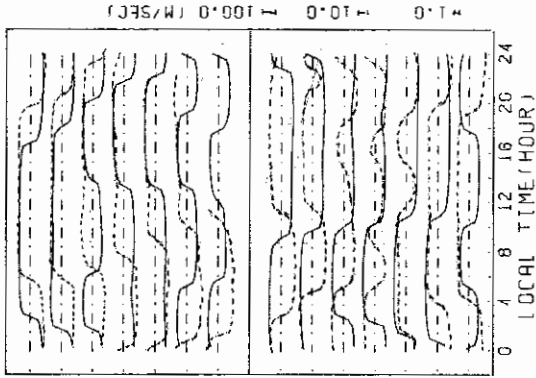
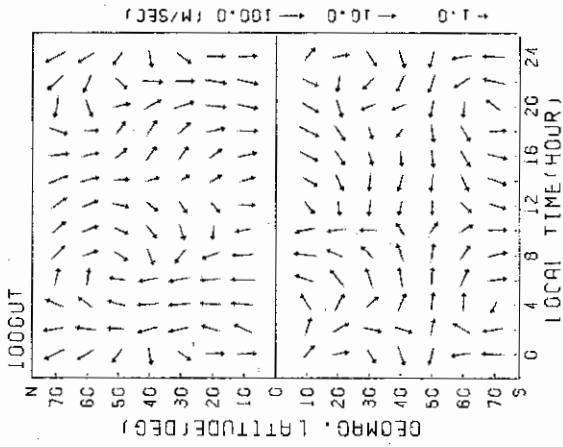
DEC.30.1964

ELECTRIC FIELD (LOG SCALE)

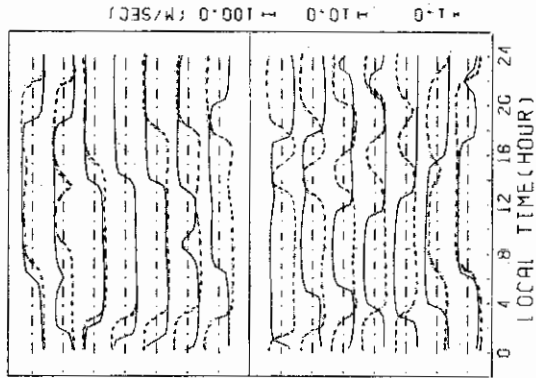
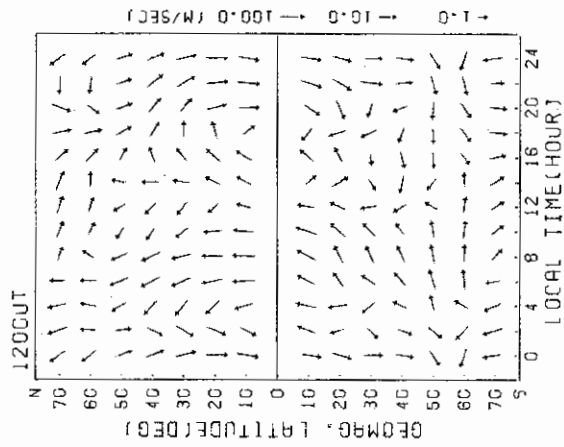
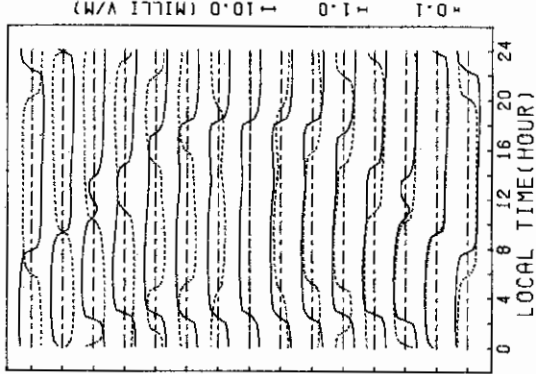
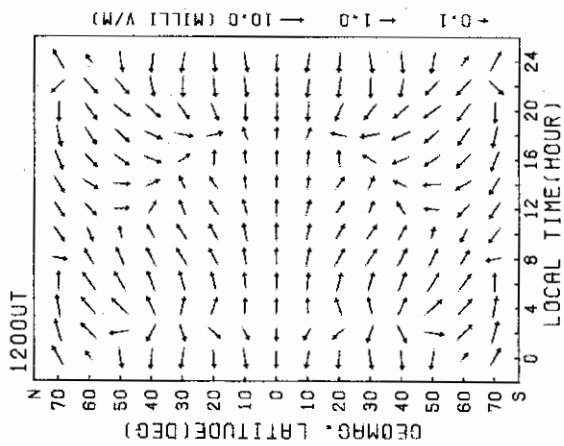


DEC.30.1964

WIND VELOCITY (LOG SCALE)

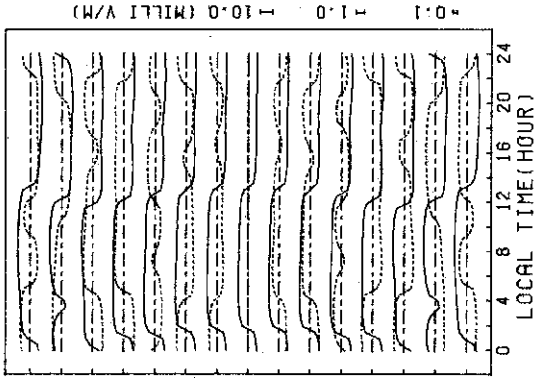
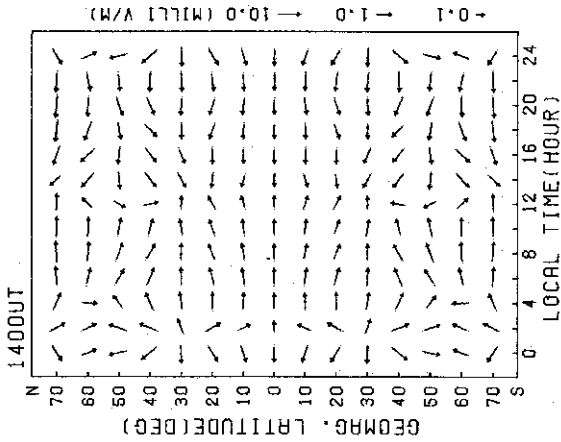


1200UT



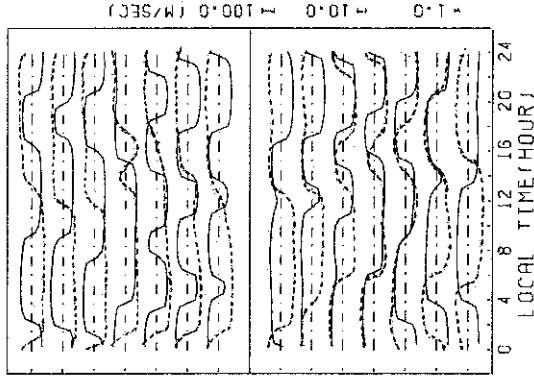
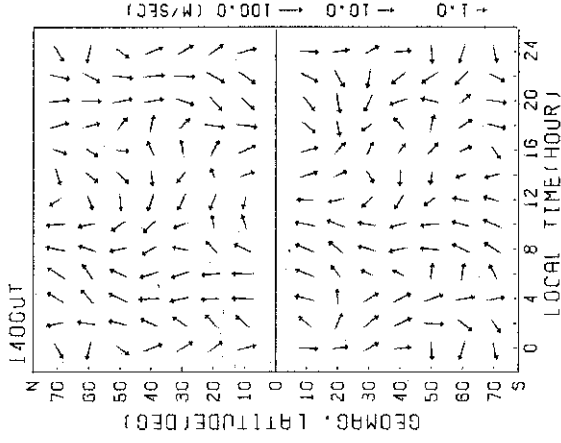
DEC. 30, 1964

ELECTRIC FIELD (LOG SCALE)

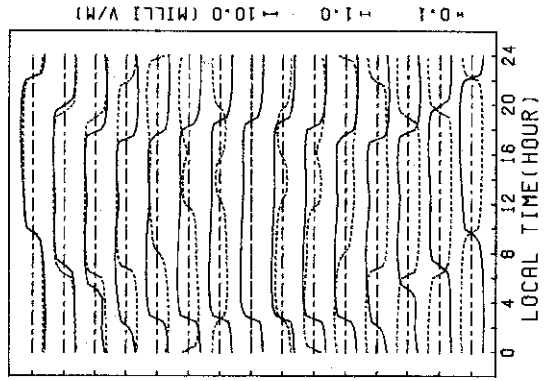
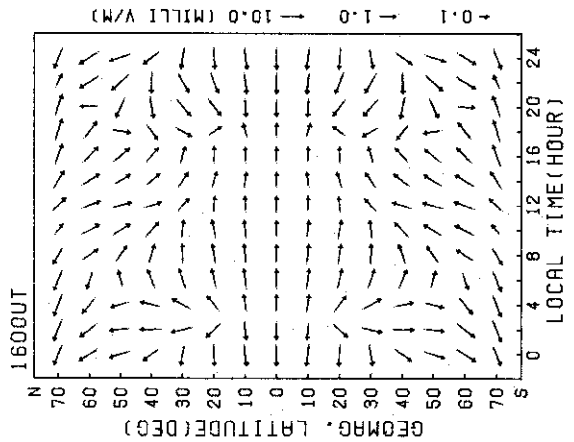


DEC. 30, 1964

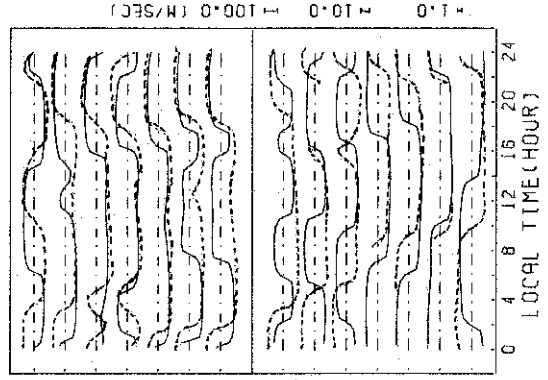
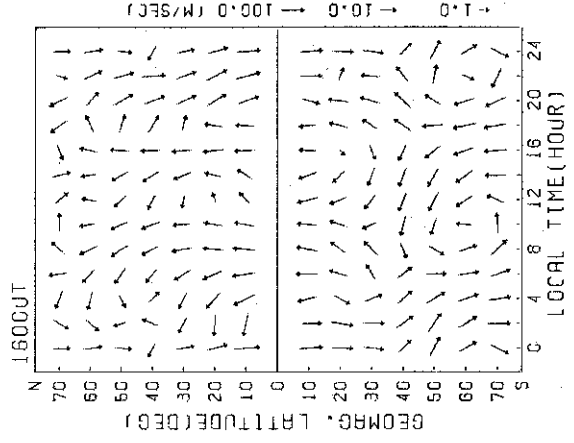
WIND VELOCITY (LOG SCALE)



1600UT

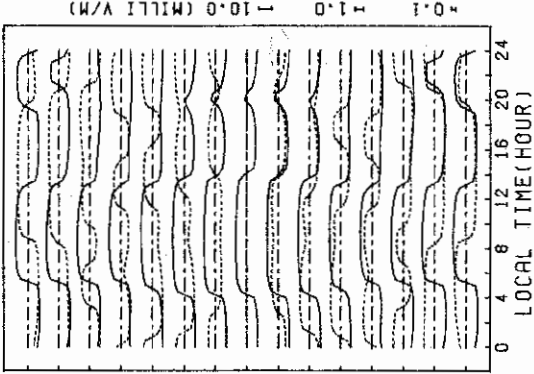
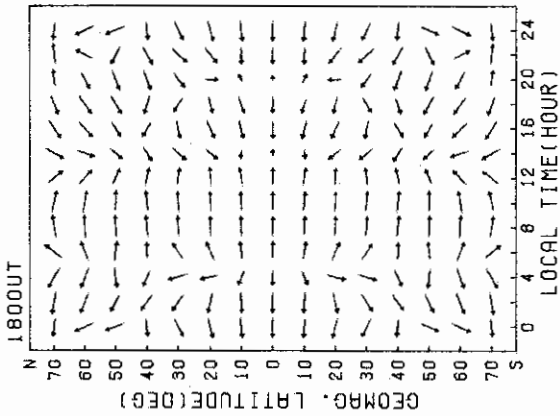


1600UT



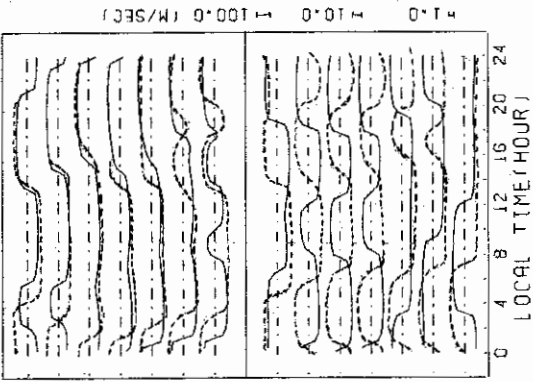
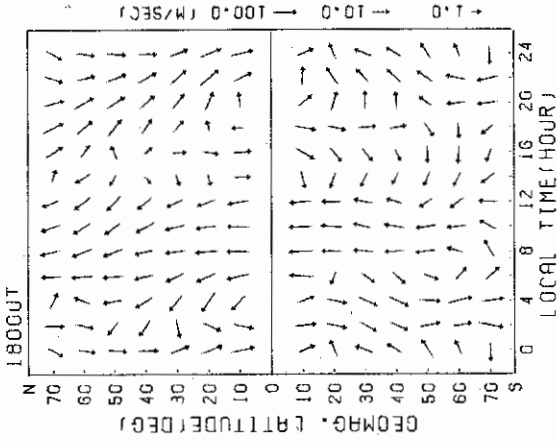
DEC.30.1964

ELECTRIC FIELD (LOG SCALE)

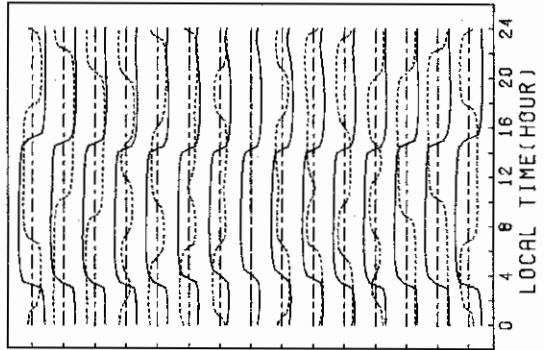
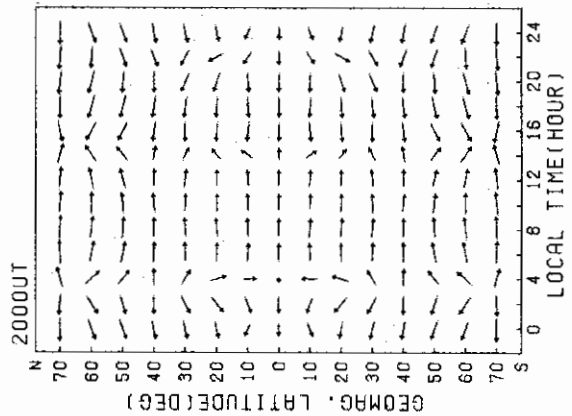


DEC.30.1964

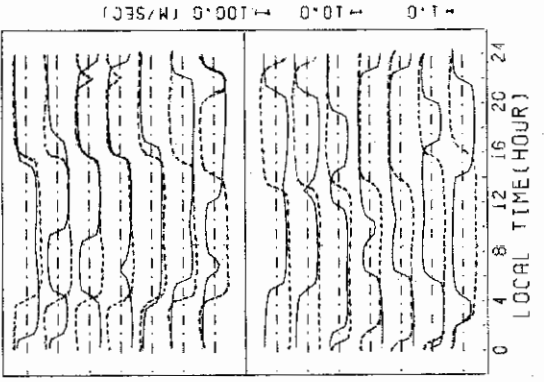
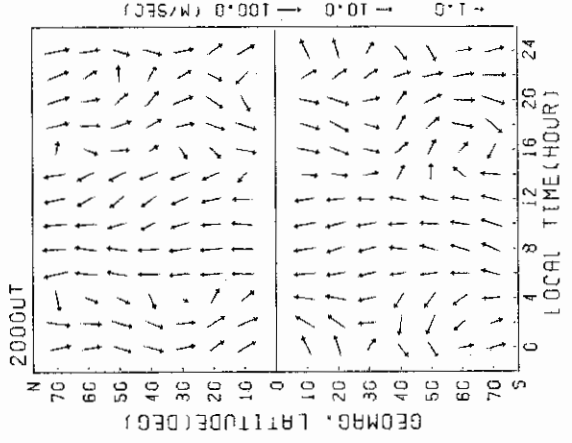
WIND VELOCITY (LOG SCALE)



2000UT

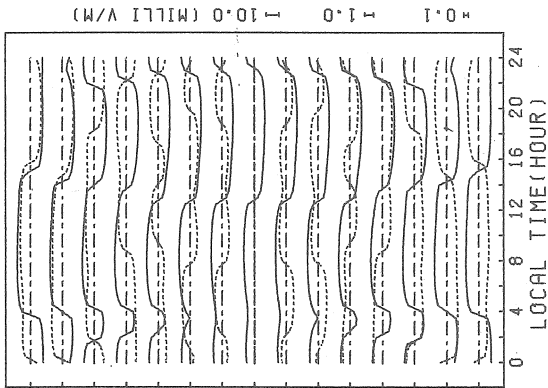
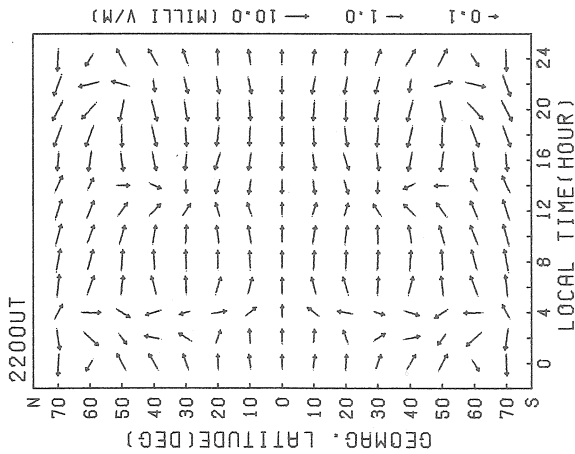


2000UT



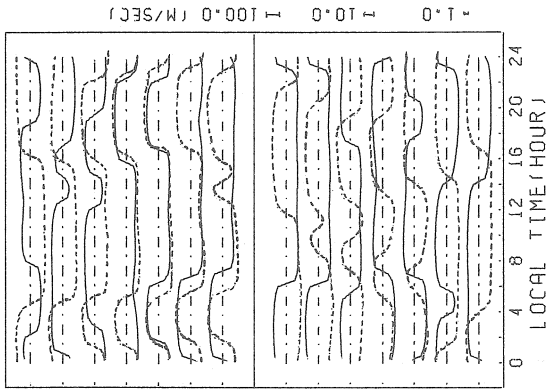
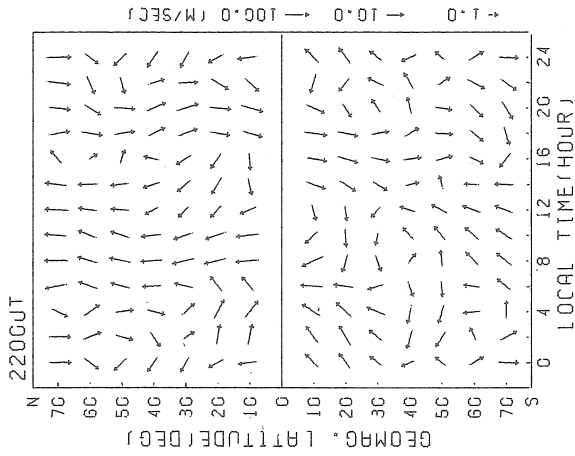
DEC. 30, 1964

ELECTRIC FIELD (LOG SCALE)

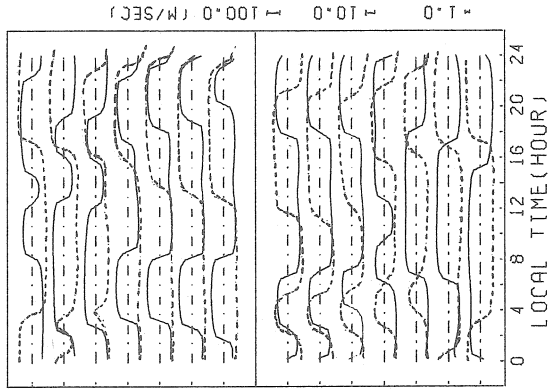
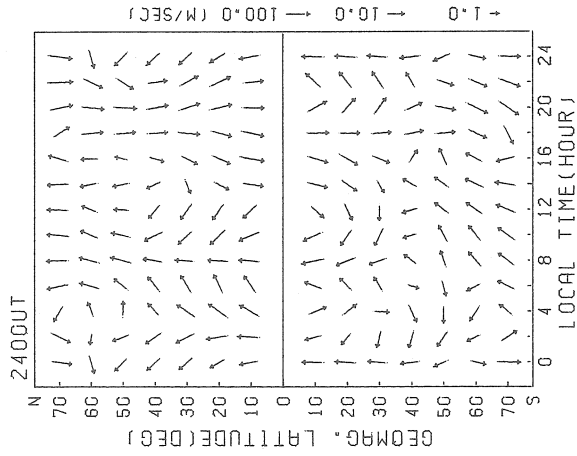
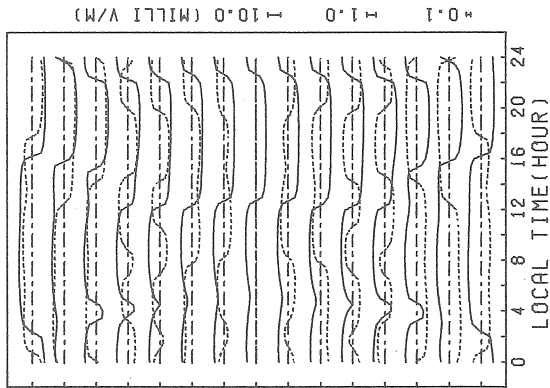
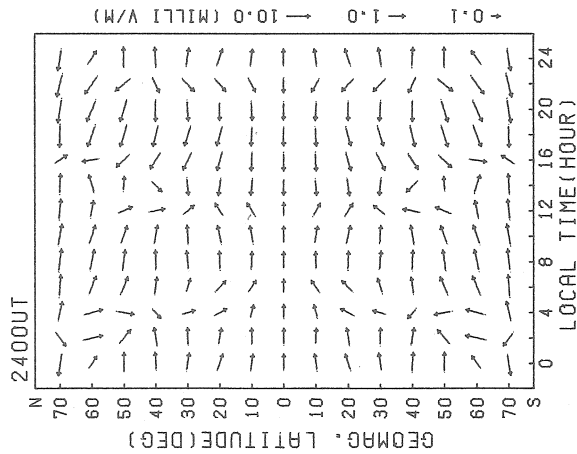


DEC. 30, 1964

WIND VELOCITY (LOG SCALE)

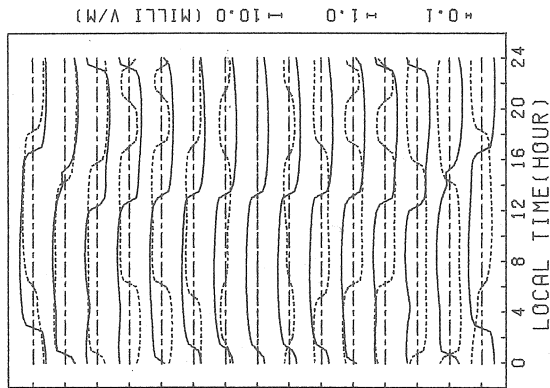
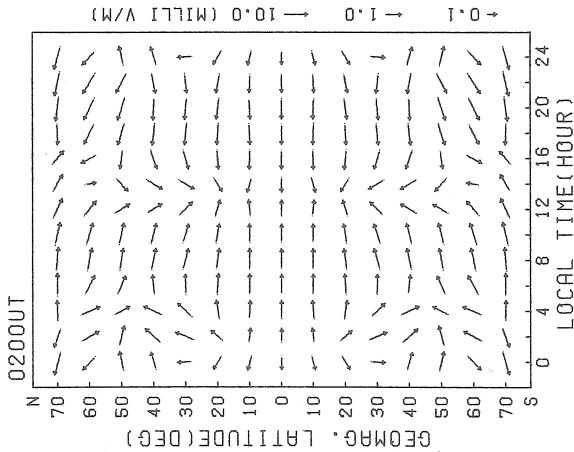


2400UT



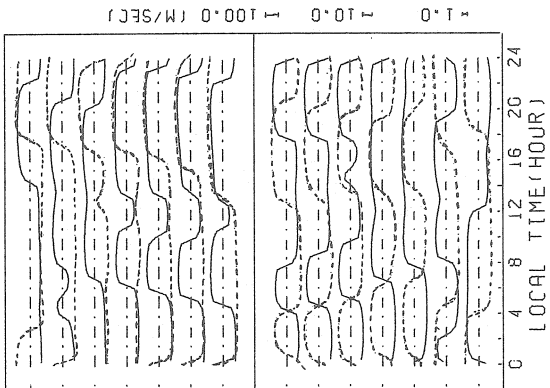
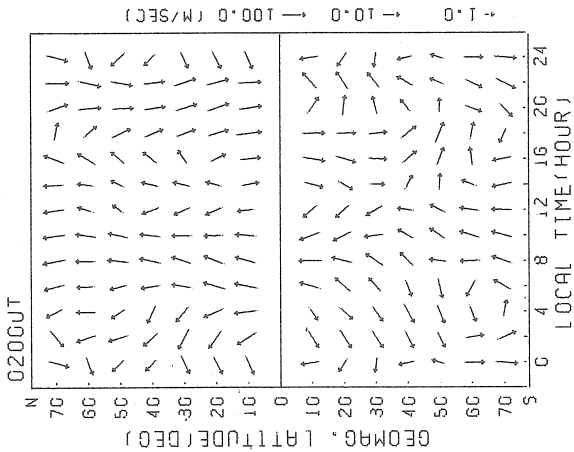
DEC. 31. 1964

ELECTRIC FIELD (LOG SCALE)



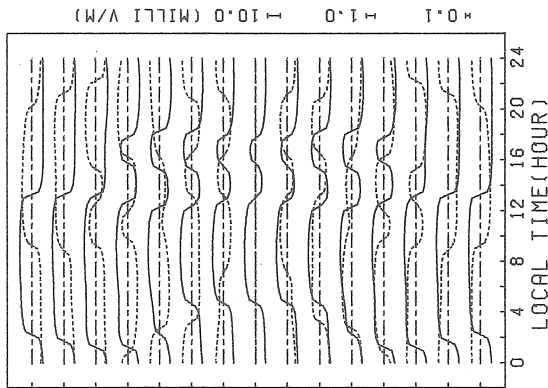
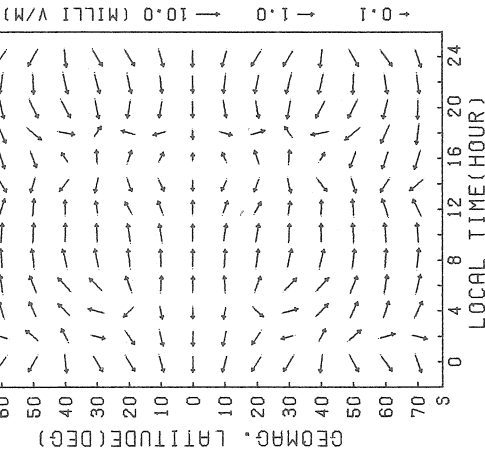
DEC. 31. 1964

WIND VELOCITY (LOG SCALE)



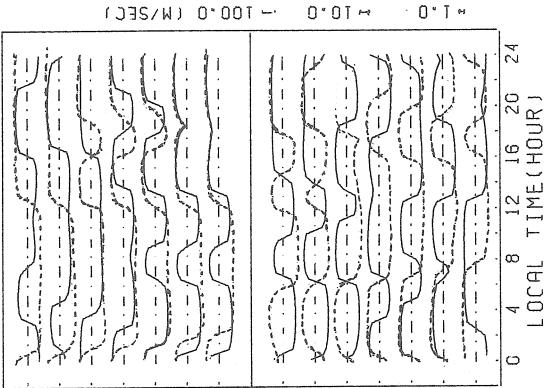
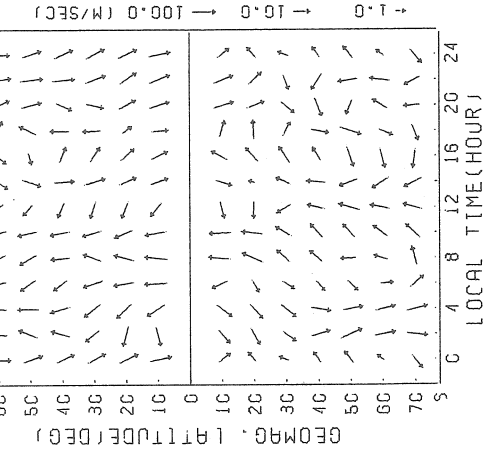
DEC. 31. 1964

ELECTRIC FIELD (LOG SCALE)



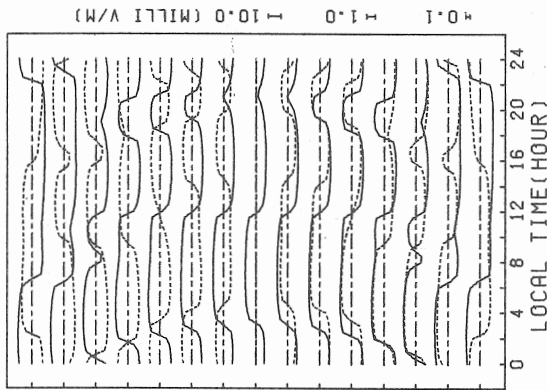
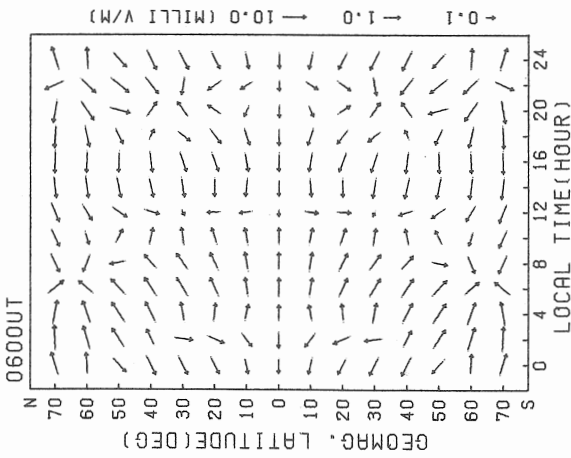
DEC. 31. 1964

WIND VELOCITY (LOG SCALE)



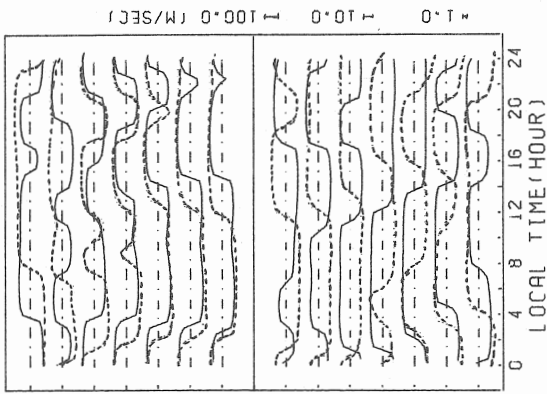
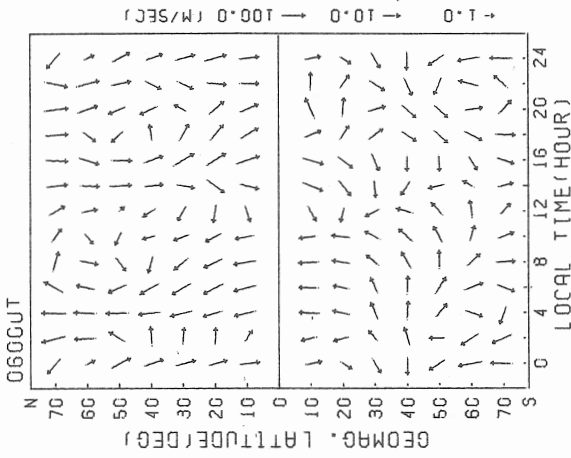
DEC. 31, 1964

ELECTRIC FIELD (LOG SCALE)



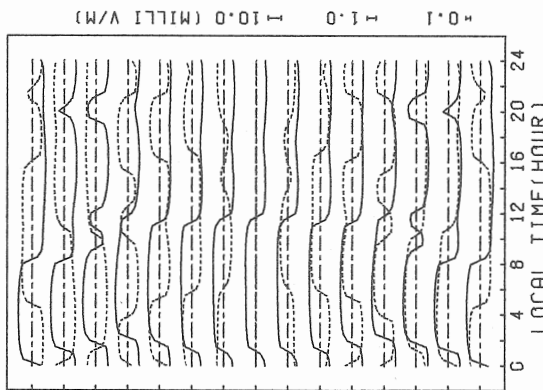
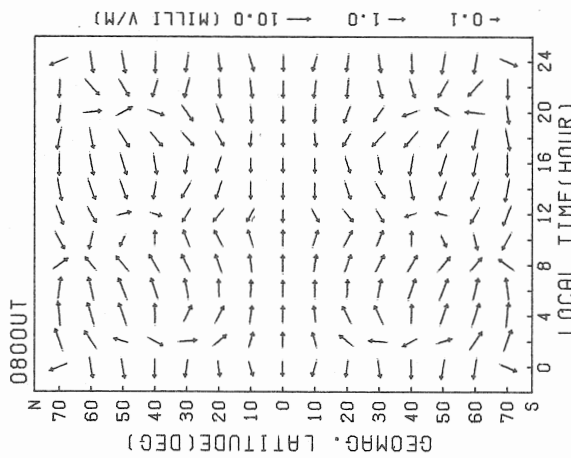
DEC. 31, 1964

WIND VELOCITY (LOG SCALE)



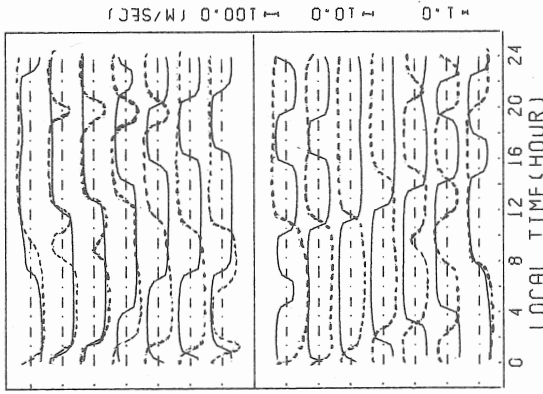
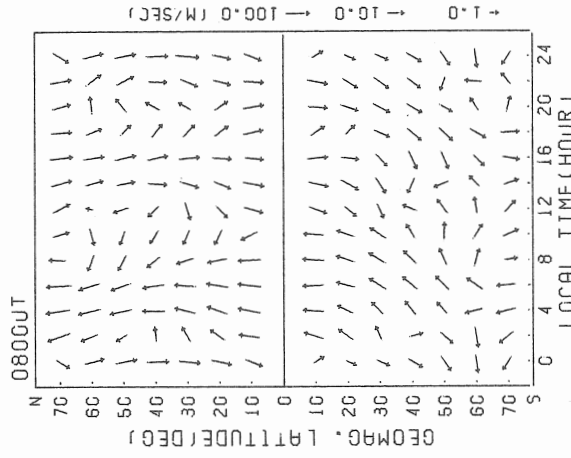
DEC. 31, 1964

ELECTRIC FIELD (LOG SCALE)



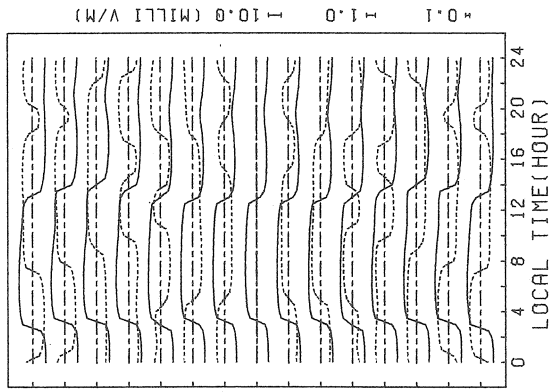
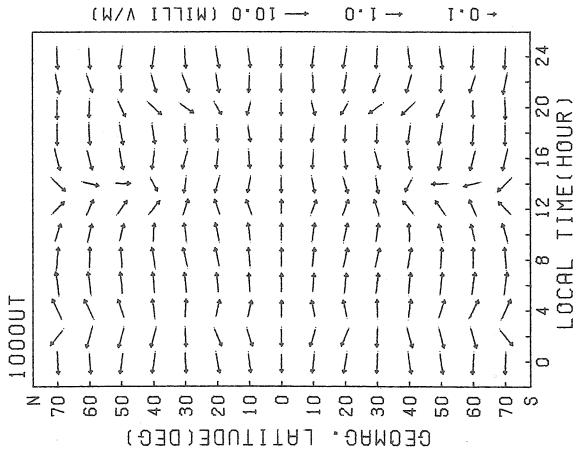
DEC. 31, 1964

WIND VELOCITY (LOG SCALE)



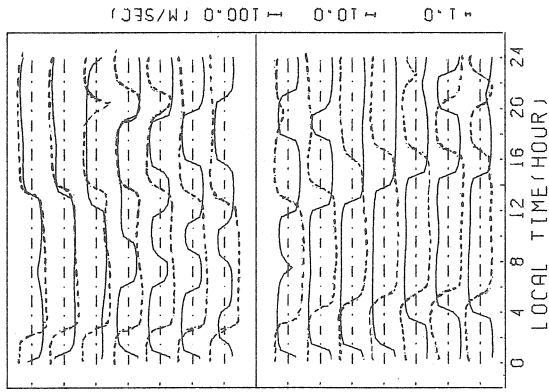
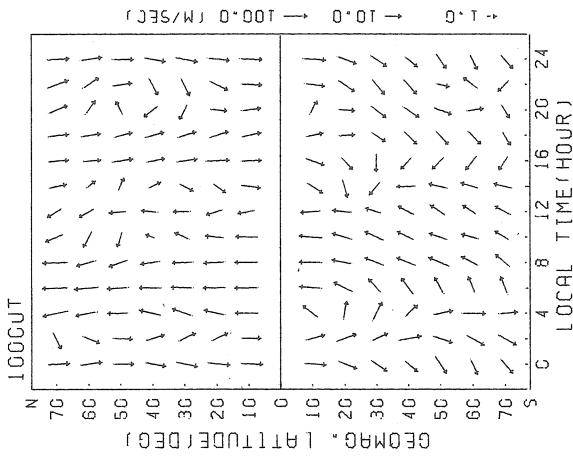
DEC.31.1964

ELECTRIC FIELD (LOG SCALE)

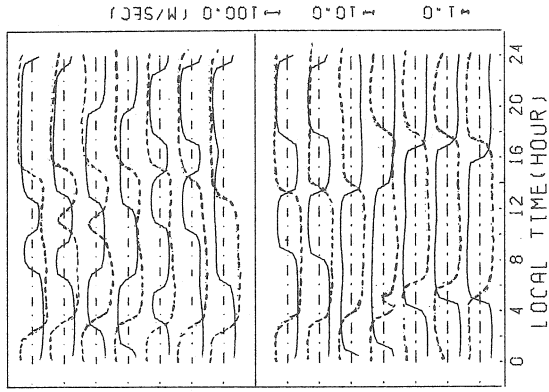
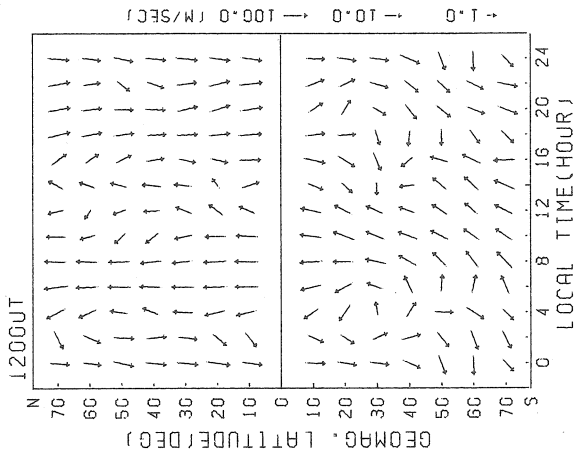
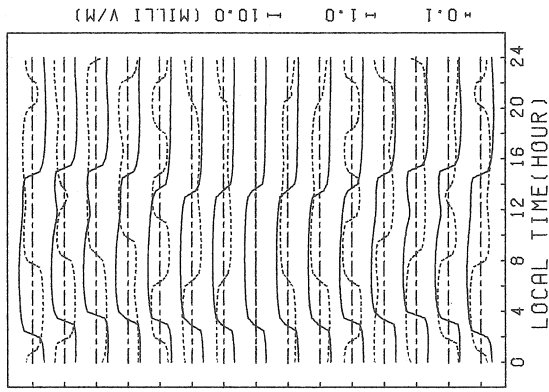
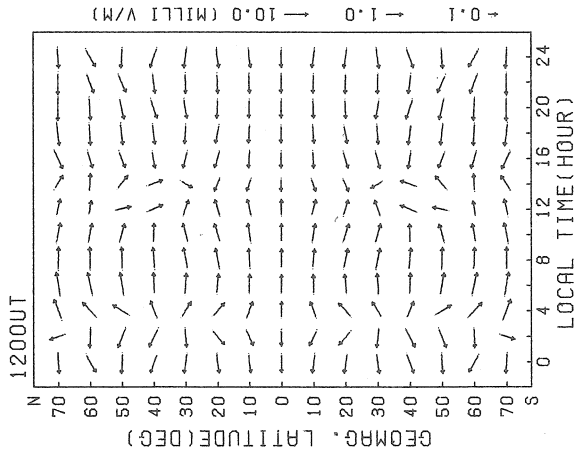


DEC.31.1964

WIND VELOCITY (LOG SCALE)

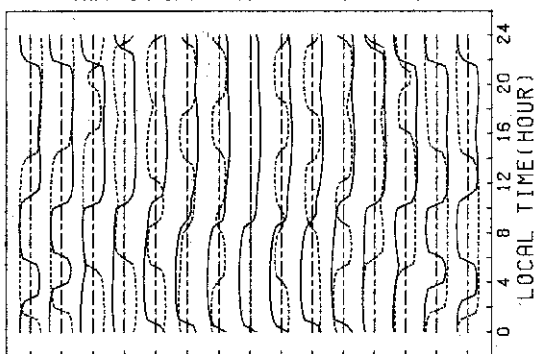
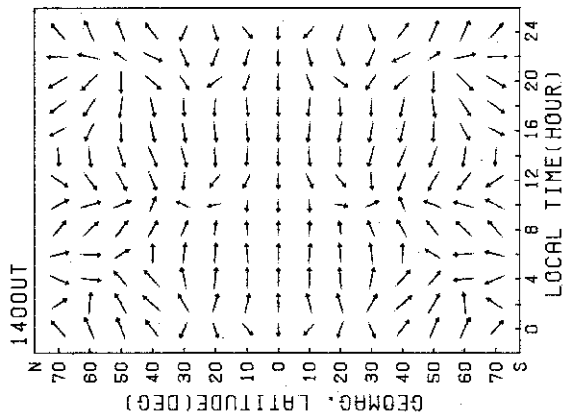


1200UT



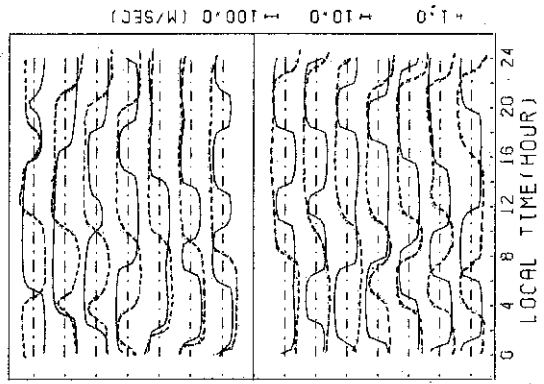
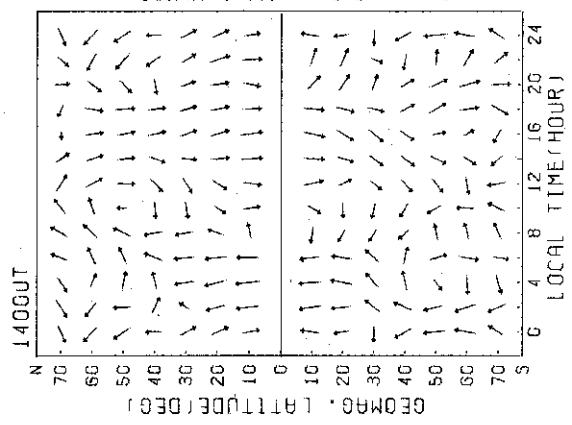
DEC. 31. 1964

ELECTRIC FIELD (LOG SCALE)

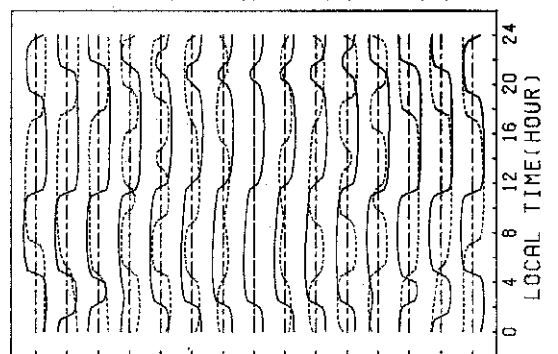
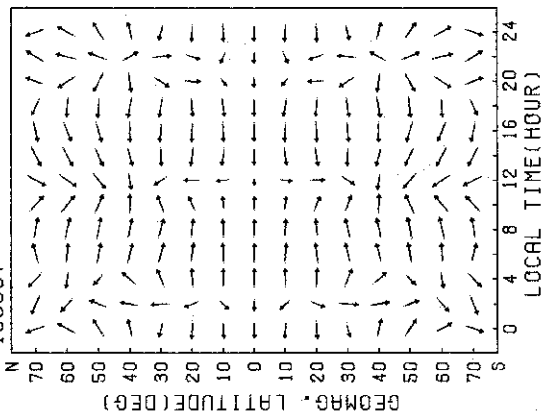


DEC. 31. 1964

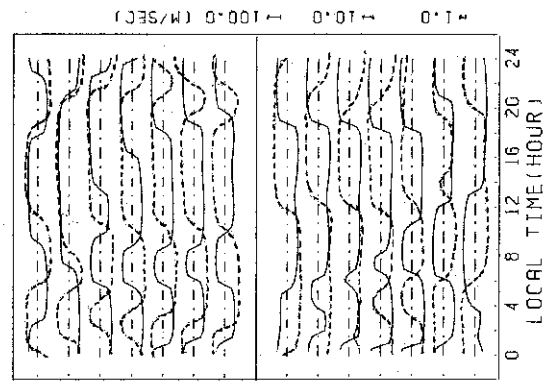
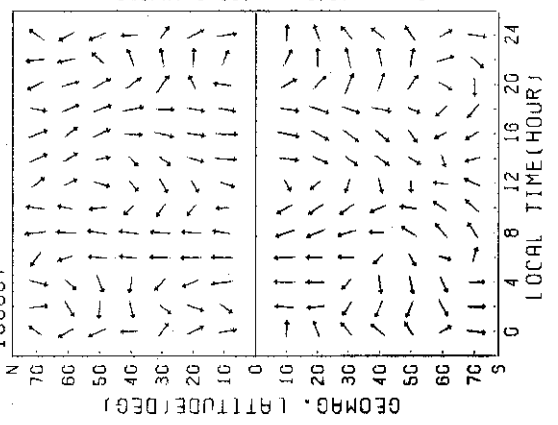
WIND VELOCITY (LOG SCALE)



1600UT

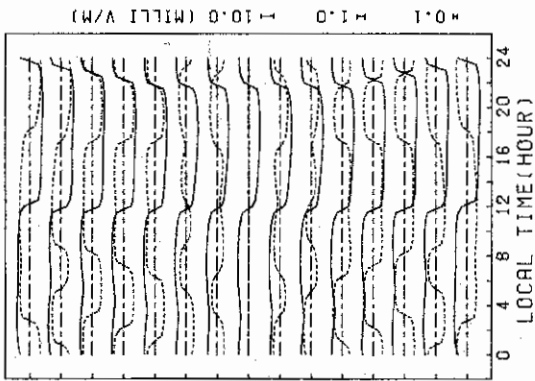
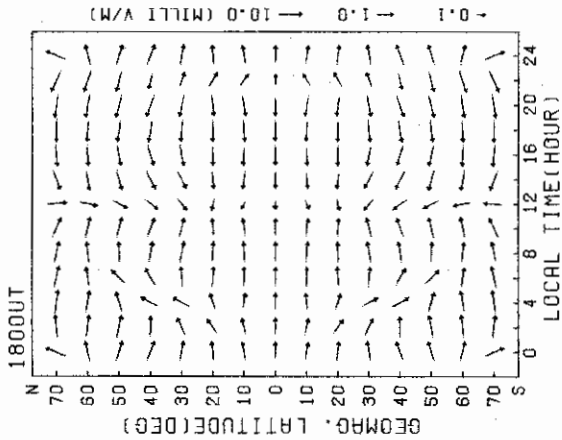


1600UT



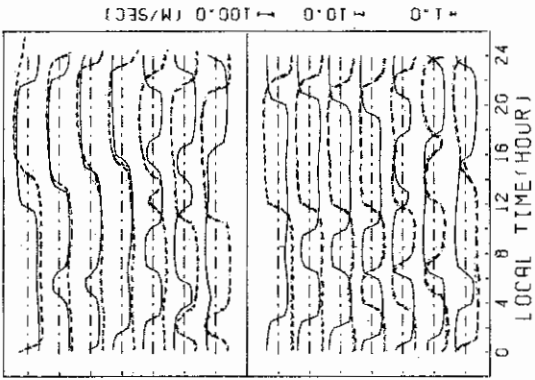
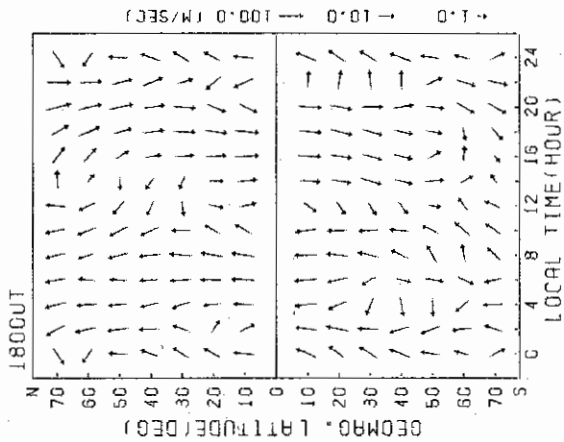
DEC.31,1964

ELECTRIC FIELD (LOG SCALE)

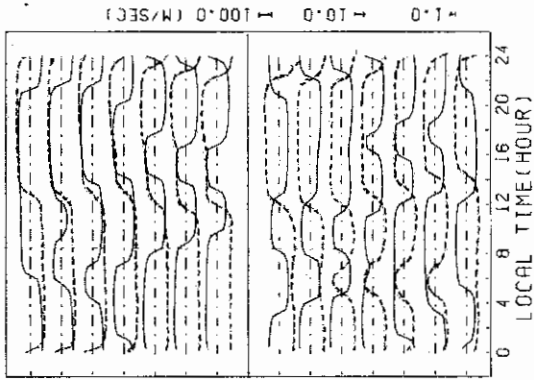
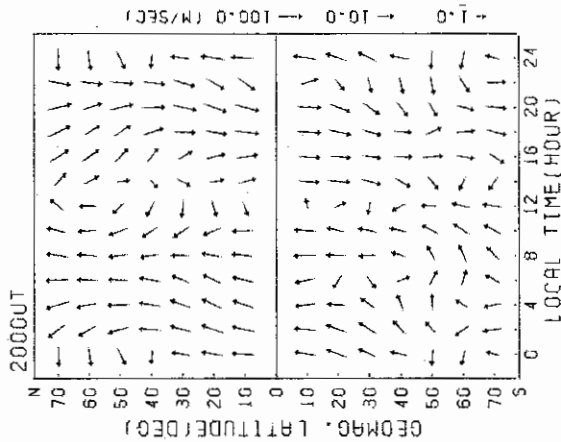
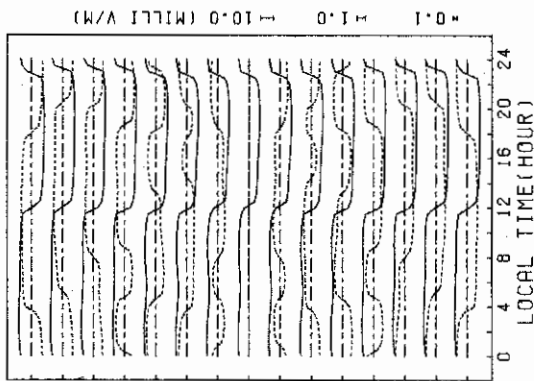
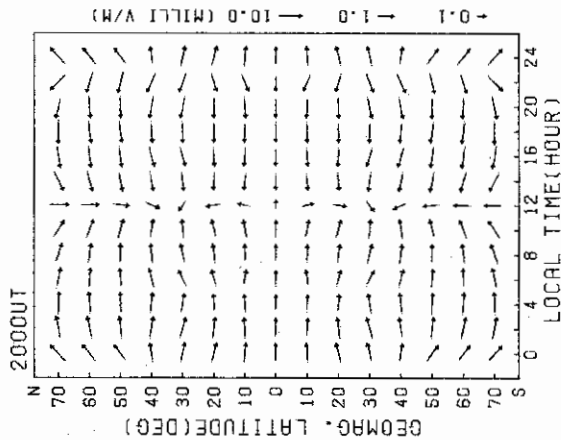


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WIND VELOCITY (LOG SCALE)

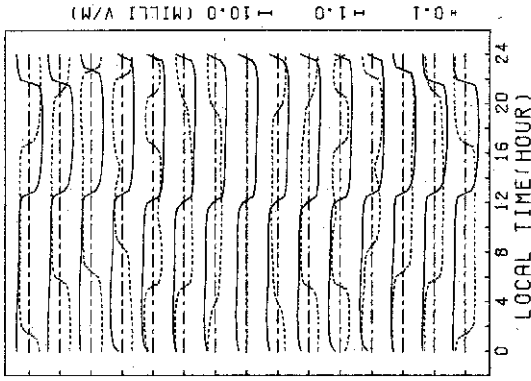
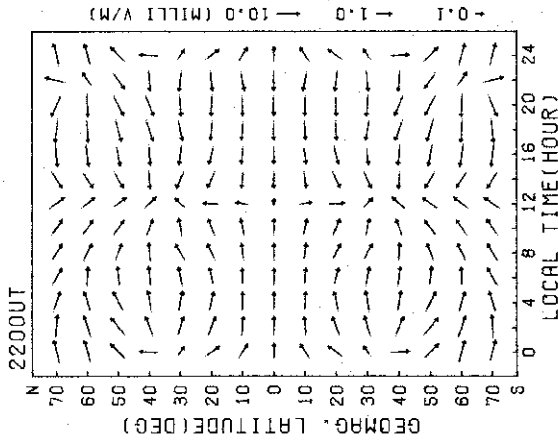


2000UT



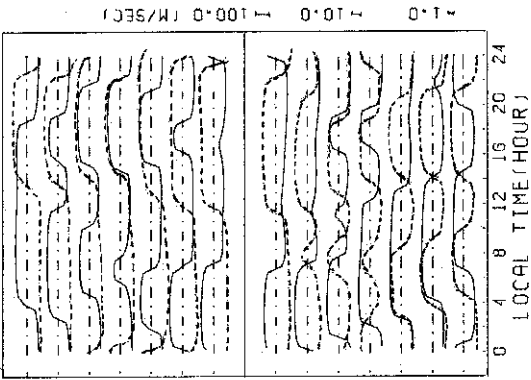
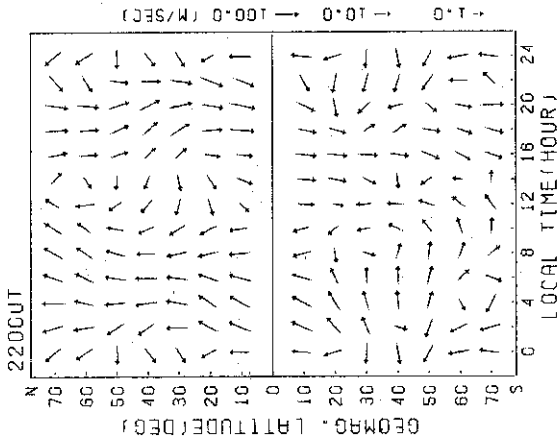
DEC. 31. 1964

ELECTRIC FIELD (LOG SCALE)



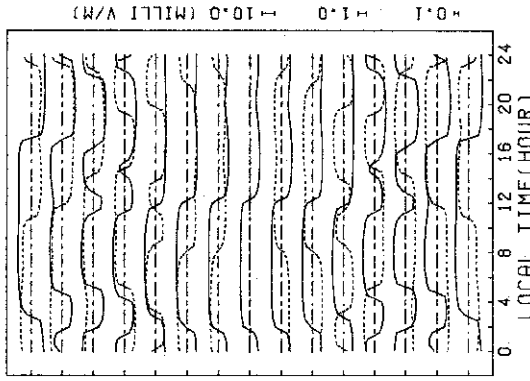
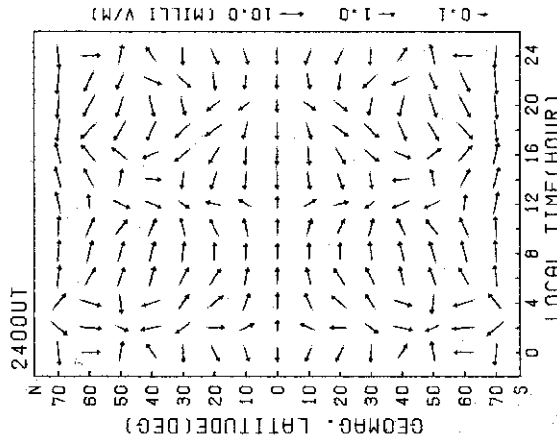
DEC. 31. 1964

WIND VELOCITY (LOG SCALE)



DEC. 31. 1964

ELECTRIC FIELD (LOG SCALE)



DEC. 31. 1964

WIND VELOCITY (LOG SCALE)

