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NORPAX
ADS REPORT
NUMBER 5
Issued by NORPAX DATA MANAGEMENT
S. Pazan, J. Bytof

The REGENTS of the UNIVERSITY OF CALIFORNIA
SIO Reference No. 81-39
December 1981

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INTRODUCTION

Since 1976, four reports on oceanographic and meteorological conditions in the North Pacific have been produced by the NORPAX Data Program covering the period from June, 1976 through May, 1978. This is the fifth in the series, and covers the period from June, 1978 through November, 1978. This issue contains: contour maps of monthly meaned Fleet Numerical Oceanographic Central (FNOC) air temperature, sea temperature, wind speed, wind direction, surface vapor pressure, and 700 mb height; NORPAX Data Management calculated wind stress, wind stress curl, wind shear velocity cubed, sensible heat flux, latent heat flux; objectively analyzed TRANSPAC temperatures at discrete depths, from White and Bernstein (SIO).

(TRANSPAC)

CONTOUR MAPS

Contour maps of FNOC (Fleet Numerical Oceanographic Central) fields and calculated flux fields are in Figures 2.1-2.11, 3.1-3.11, 4.1-4.11, 5.1-5.11, 6.1-6.11, and 7.1-7.11. TRANSPAC contour maps are in Figures 1.12, 2.12, 3.12, 4.12, 5.12, 6.12, and 7.12.

The analysis of FNOC fields and NORPAX calculated flux fields are explained in the Appendix to the 4th ADS Report.

XBT's have been regularly dropped from ships of opportunity in the Pacific since 1974. Recovered temperature profile data have been analyzed at Scripps by Bernstein and White and temperature residuals from their anomalies were contoured for 0, 60, 120, 200, 300 and 400 meter depths, by month.

BUOY DISPLACEMENT VECTORS

No buoys were deployed in the ADS study region during this period.

WIND STRESS CURL CORRECTIONS

Curl of the wind stress was calculated incorrectly in ADS Reports 1,2,3 and 4. Corrections for ADS 4 (December 1977 to May 1978) were included in the ADS Report Number 4,

and corrections for ADS 1,2, and 3 (June 1976 to November 1977) are included in a special appendix to this report.

ACKNOWLEDGEMENTS

Thanks to Ted Walker for producing the plots of subsurface temperature fields.

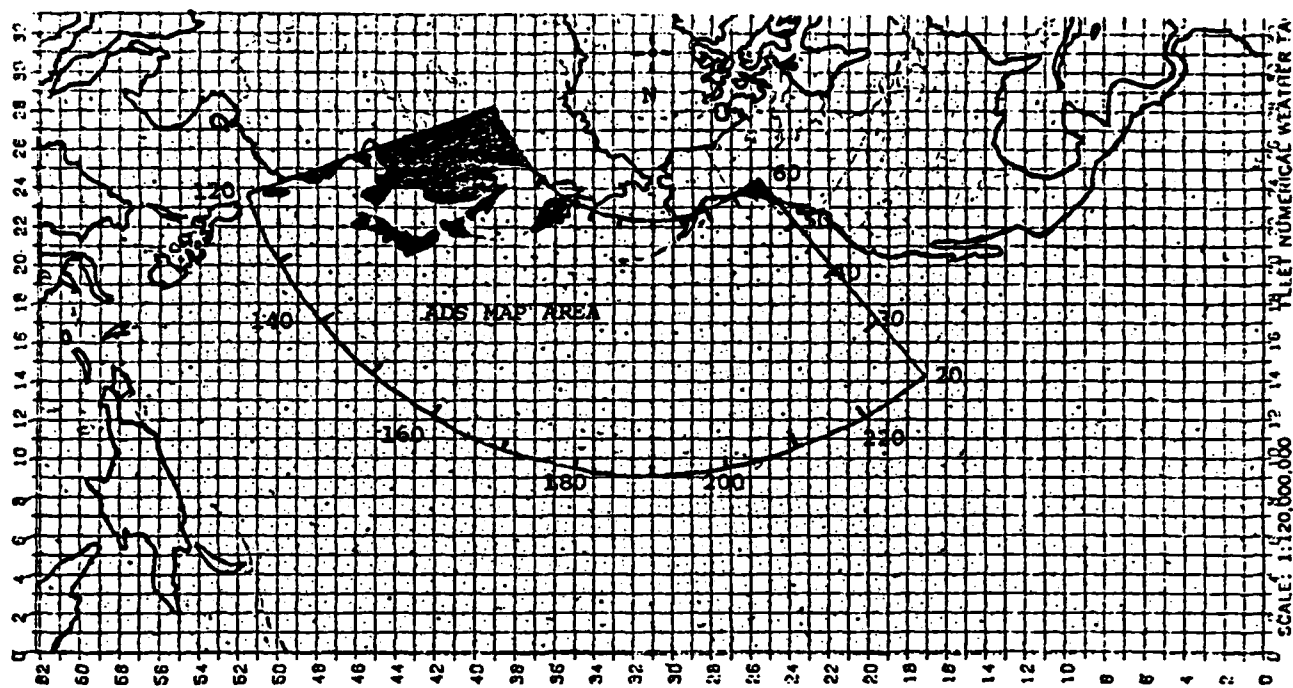


FIGURE 1. 33 x 63 field geographic coverage. The area of the ADS contour maps is as indicated. This map is a polar projection of the northern hemisphere.

WIND SPEED (M/SEC)

JUNE 78

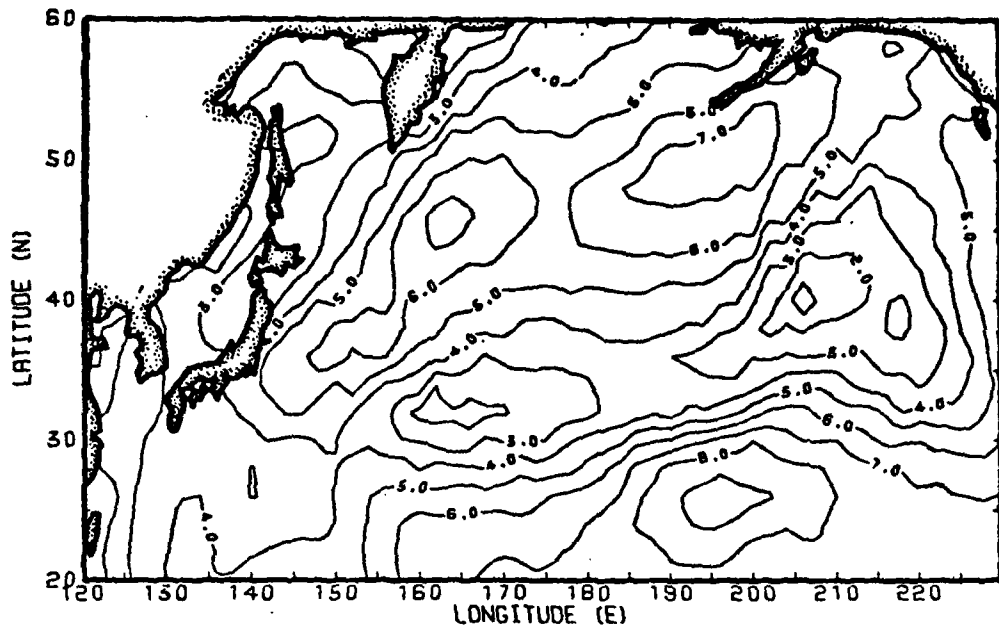


FIGURE 2.1 Absolute value of monthly mean vector wind velocities at 19.5 meters. Contour intervals are 1 m/sec.

WIND DIRECTION

JUNE 78

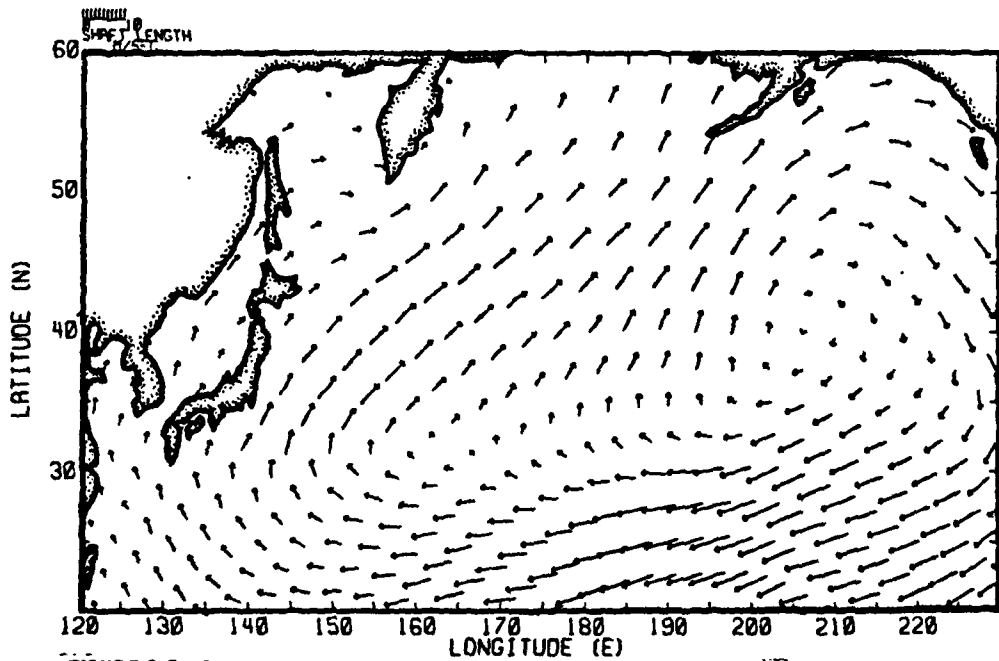


FIGURE 2.2 Direction arrows representing directions of monthly mean wind vectors at 19.5 meters. Length of arrow shaft indicates wind speed in m/sec. (See scale above figure).

WIND STRESS (DYNES/CM**2)

JUNE 78

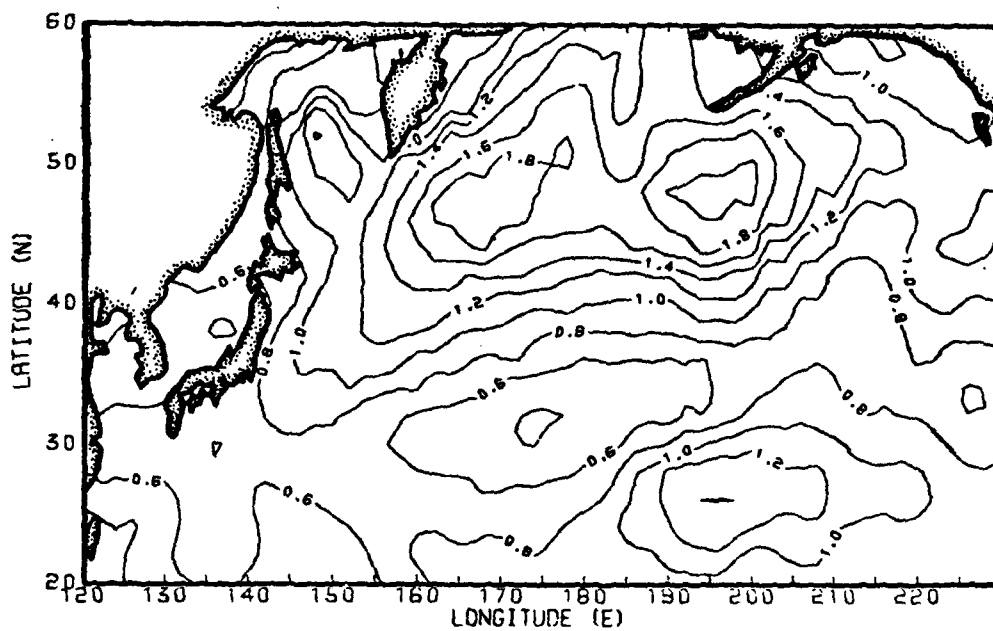


FIGURE 2.3 Monthly mean wind stress is the mean of 6-hourly wind stress at 10 meters calculated from FNWC wind data. Contour intervals are 0.2 dynes/cm².

CURL OF WIND STRESS (10^{-9} DYNES/CM**3)

JUNE 78

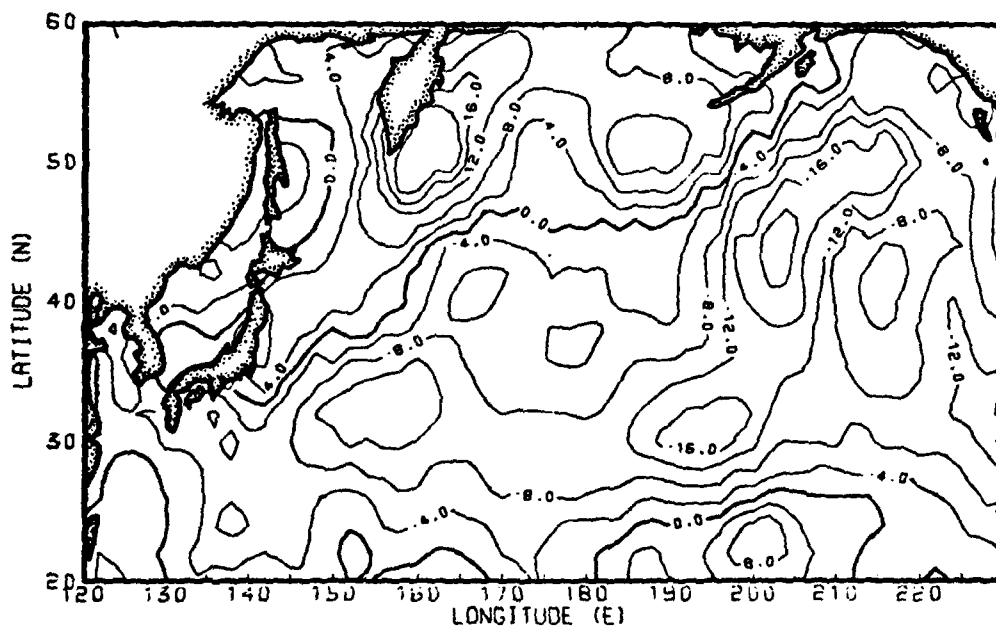


FIGURE 2.4 The vertical component of monthly mean wind stress curl is the mean of 6-hourly wind stress curl approximated by finite-differences from 6-hourly wind stresses at 10 meters. Isolines of zero curl are plotted heavily, and contour intervals are 4.0×10^{-9} dynes/cm³.

U STAR CUBED ((M/SEC)**3)

JUNE 78

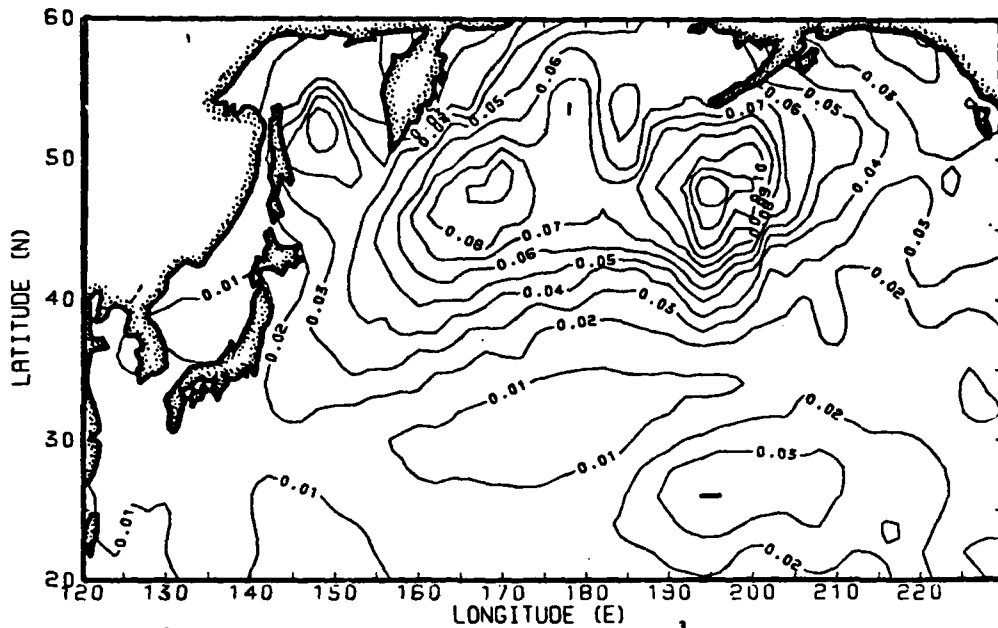


FIGURE 2.5 Monthly mean wind shear stress velocity cubed, U_*^3 is the mean of 6-hourly wind shear stress velocity cubed calculated from wind speed at 10 meters. Contour intervals are 0.02 (m/sec).

SEA SURFACE TEMPERATURE (DEG.C)

JUNE 78

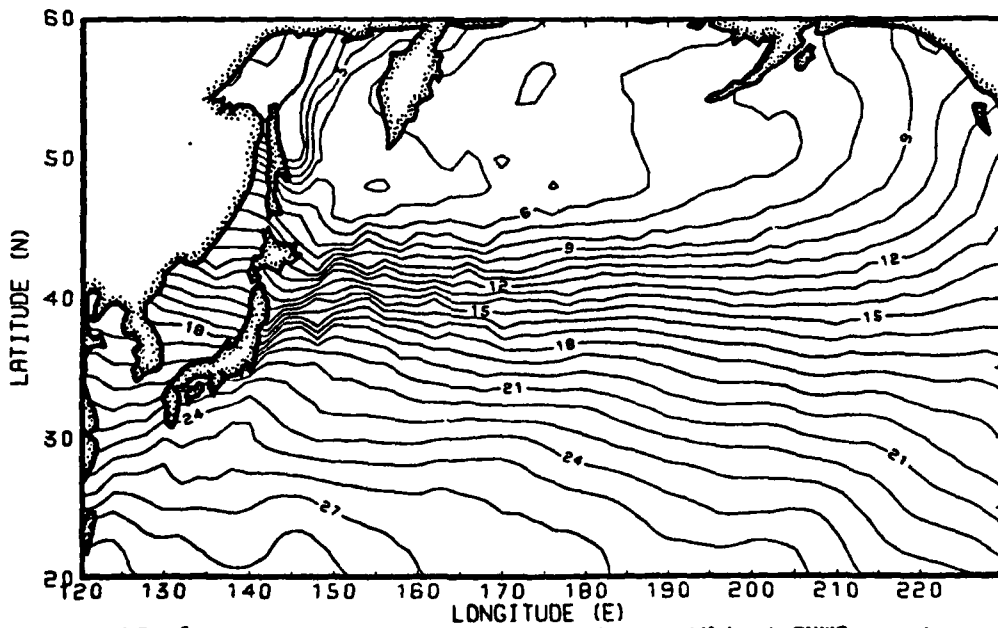


FIGURE 2.6 Monthly mean sea surface temperature is the mean of 12-hourly FNWC sea surface temperatures. Contour intervals are 1°C.

AIR TEMPERATURE (DEG. C) JUNE 78

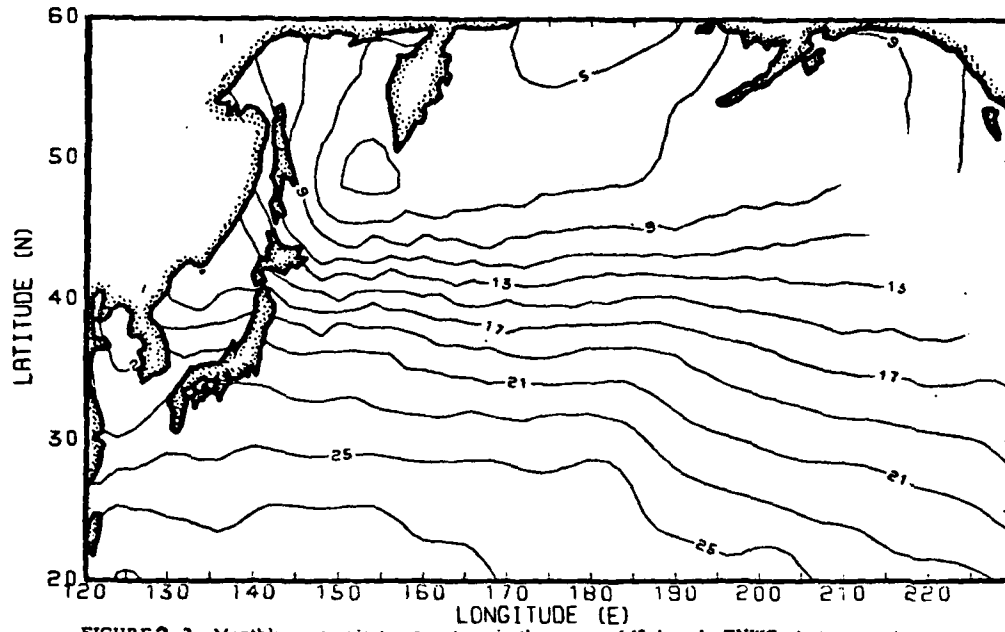


FIGURE 2.7 Monthly mean air temperature is the mean of 12-hourly FNWC air temperature. Contour intervals are 2°C.

700 MB HEIGHT (M) JUNE 78

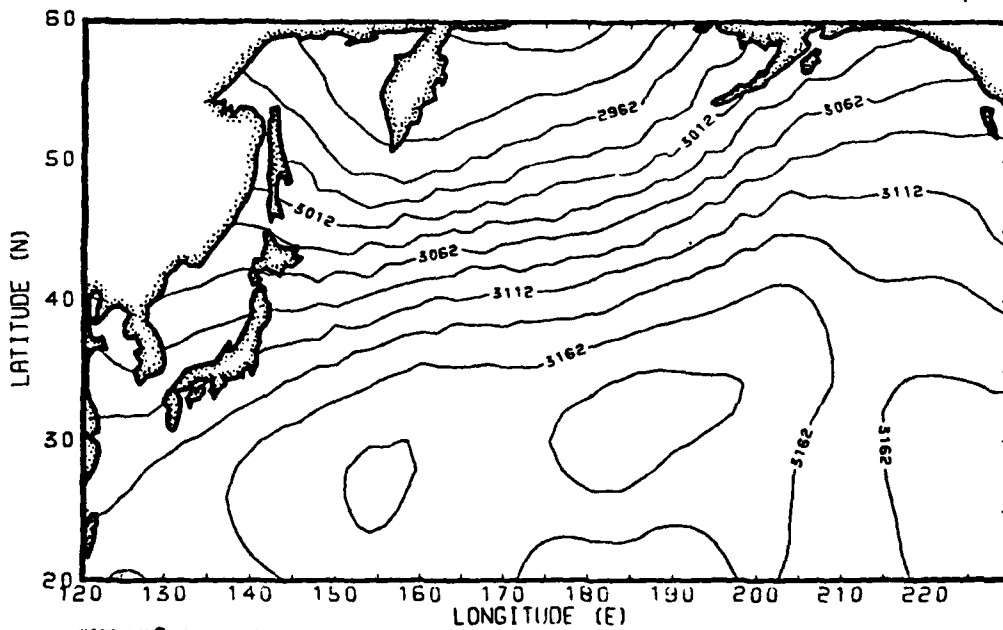


FIGURE 2.8 Monthly mean 700 mb height is the mean of 12-hourly FNWC 700 mb heights. Contour intervals are 25 meters.

VAPOR PRESSURE (MB)

JUNE 78

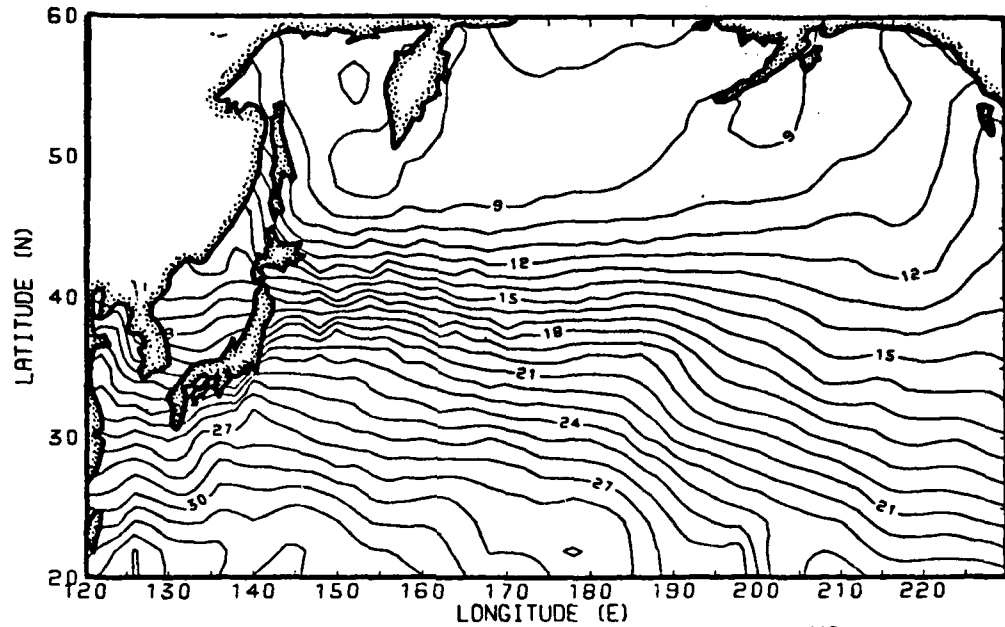


FIGURE 2.9 Monthly mean surface vapor pressure is the mean of 12-hourly FNWC vapor pressure at 19.5 meters. Contour intervals are 1 mb.

SENSIBLE HEAT FLUX (10^{-4} CAL/CM² SEC)

JUNE 78

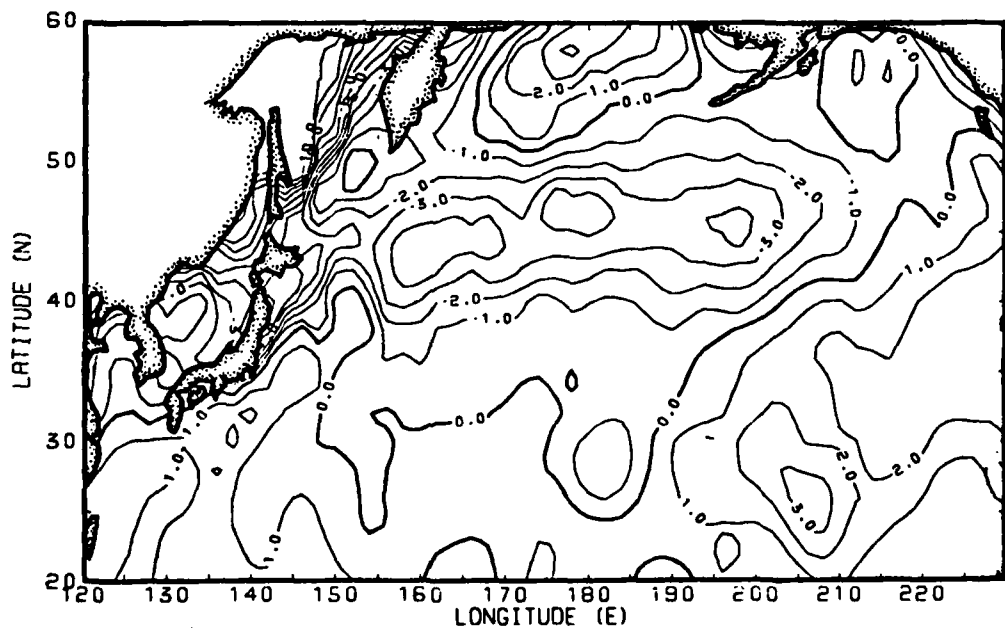


FIGURE 2.10 Monthly mean sensible heat flux (ocean to atmosphere) is the mean of 12-hourly sensible heat flux calculated from FNWC air and sea temperature and wind using a bulk formula. Isolines of zero heat flux are plotted heavily, and contour intervals are 1.0×10^{-4} cal/cm² sec.

LATENT HEAT FLUX ($10^{10} \text{ CAL/CM}^2 \text{ SEC}$)

JUNE 78

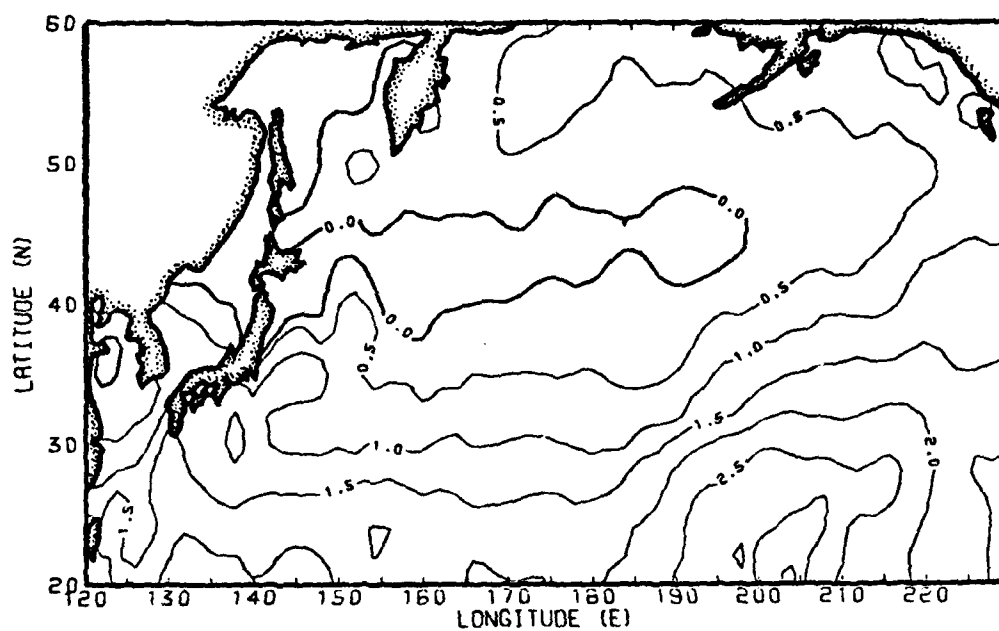


FIGURE 2.11 Monthly mean latent heat flux (ocean to atmosphere) is the mean of 12-hourly latent heat flux calculated from FNWC sea temperature, vapor pressure and wind using a bulk formula. Isojine of zero heat flux are plotted heavily, and contour intervals are $0.5 \times 10^{10} \text{ cal/cm}^2 \text{ sec}$.

OPTIMALLY INTERPOLATED TRANSPAC XBT OBS-JUN 1978

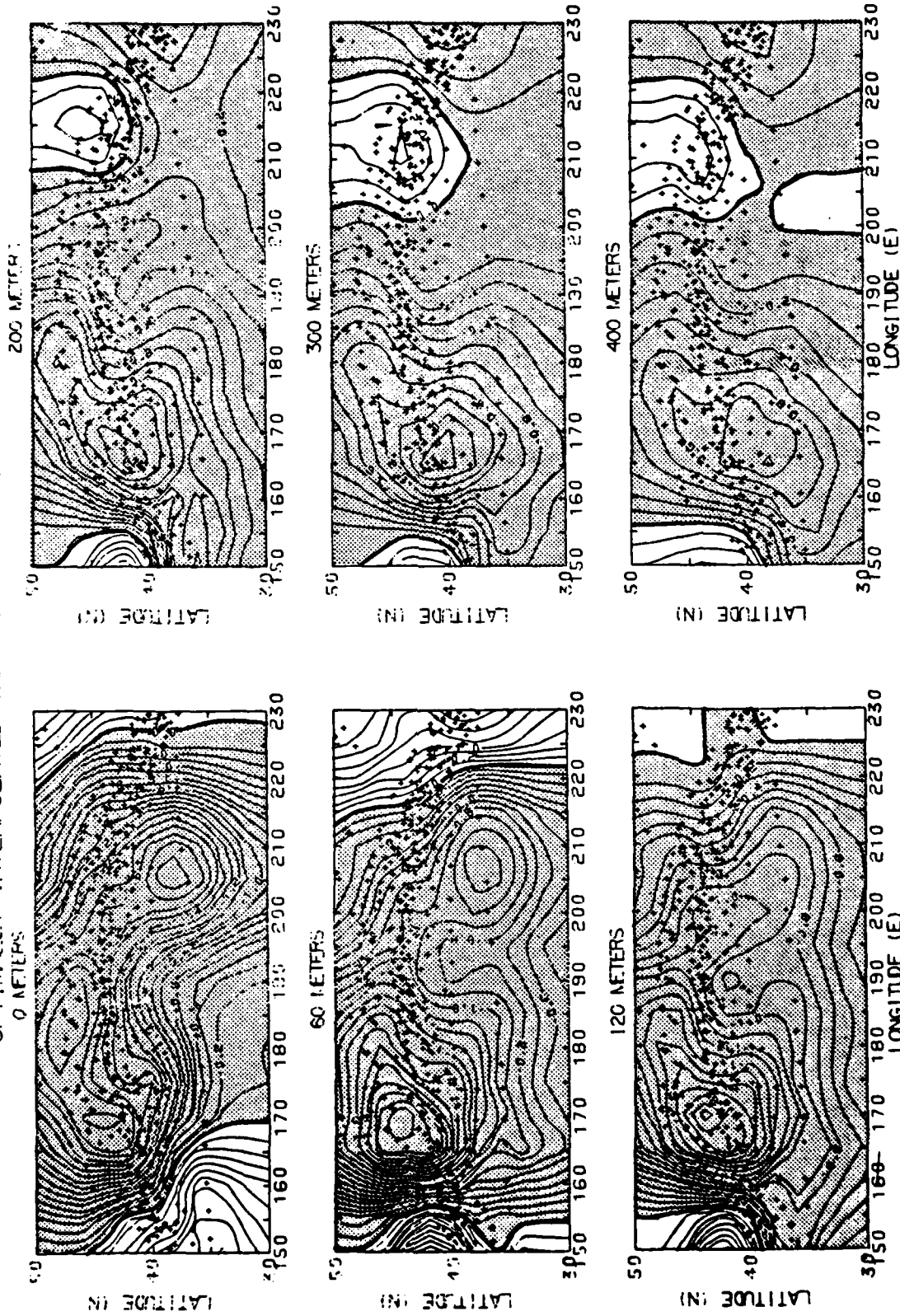


FIGURE 2.12 Monthly temperature anomalies ($^{\circ}\text{C}$) contoured at fixed depths. Negative anomaly areas are hatched and isolines of zero anomaly are drawn heavily. The crosses mark the positions of the TRANSPAC XBT drops. Increments are in $.1^{\circ}\text{C}$ (prepared by W. White, SIO).

WIND SPEED (M/SEC)

JULY 78

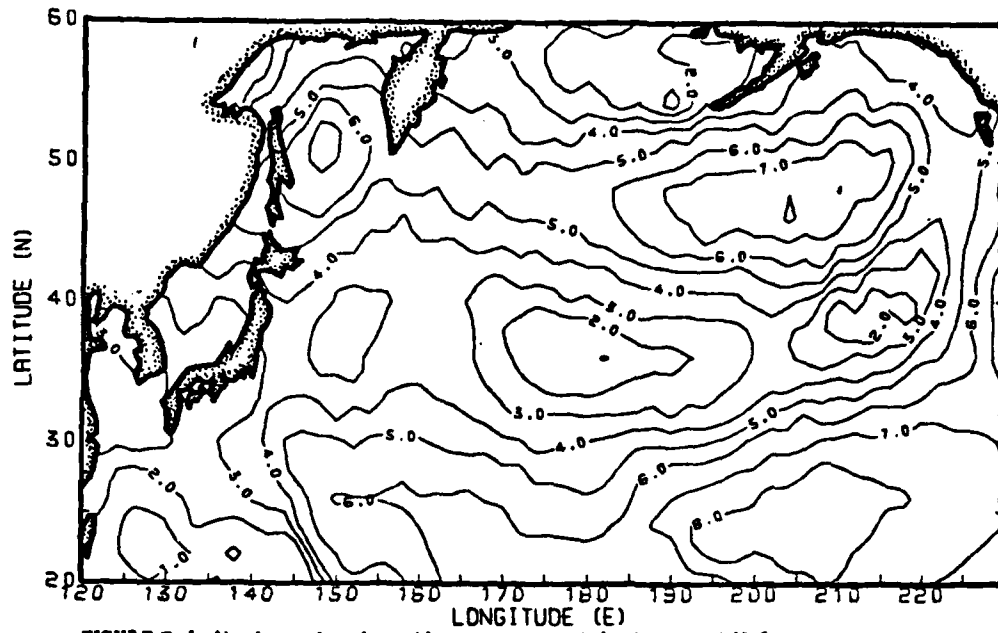


FIGURE 3.1 Absolute value of monthly mean vector wind velocities at 19.5 meters. Contour intervals are 1 m/sec.

WIND DIRECTION

JULY 78

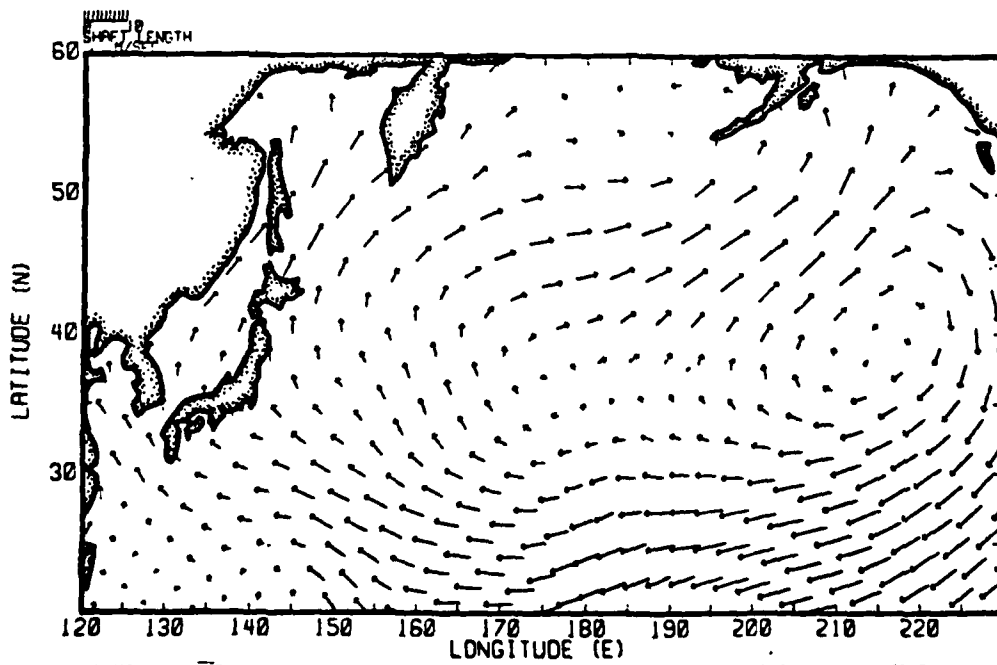


FIGURE 3.2 Direction arrows representing directions of monthly mean wind vectors at 19.5 meters. Length of arrow shaft indicates wind speed in m/sec. (See scale above figure).

WIND STRESS (DYNES/CM**2)

JULY 78

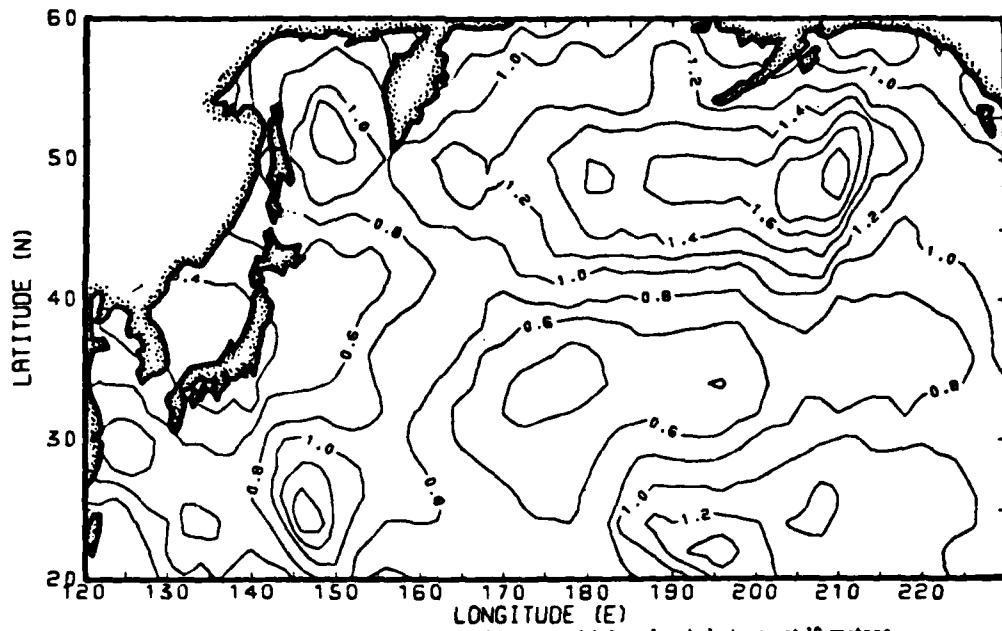


FIGURE 3.3 Monthly mean wind stress is the mean of 6-hourly wind stress at 10 meters calculated from FNWC wind data. Contour intervals are 0.2 dynes/cm².

CURL OF WIND STRESS (10**⁻⁹ DYNES/CM**3)

JULY 78

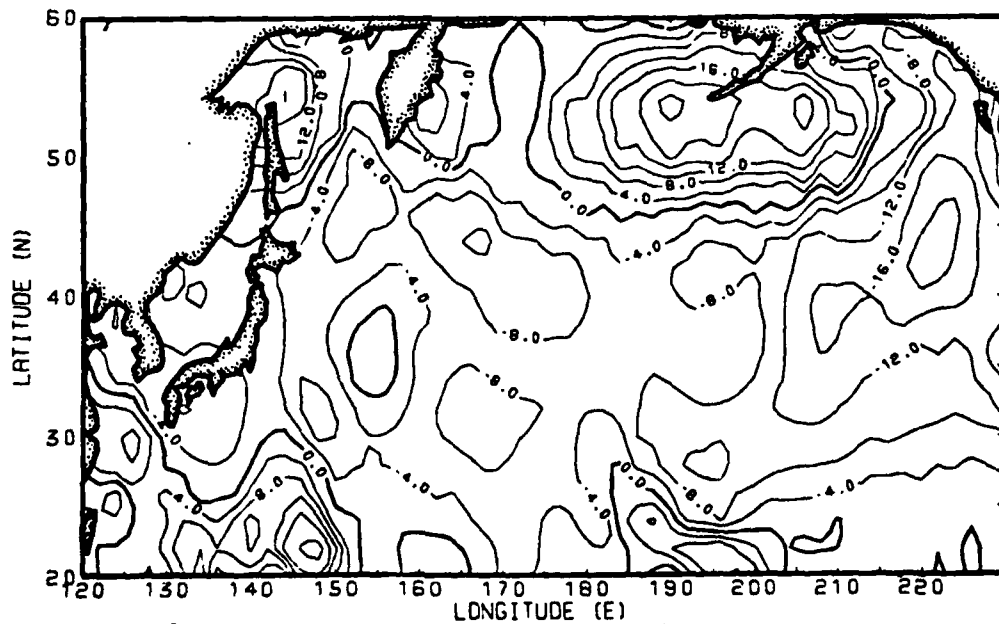


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U STAR CUBED ((M/SEC)**3)

JULY 78

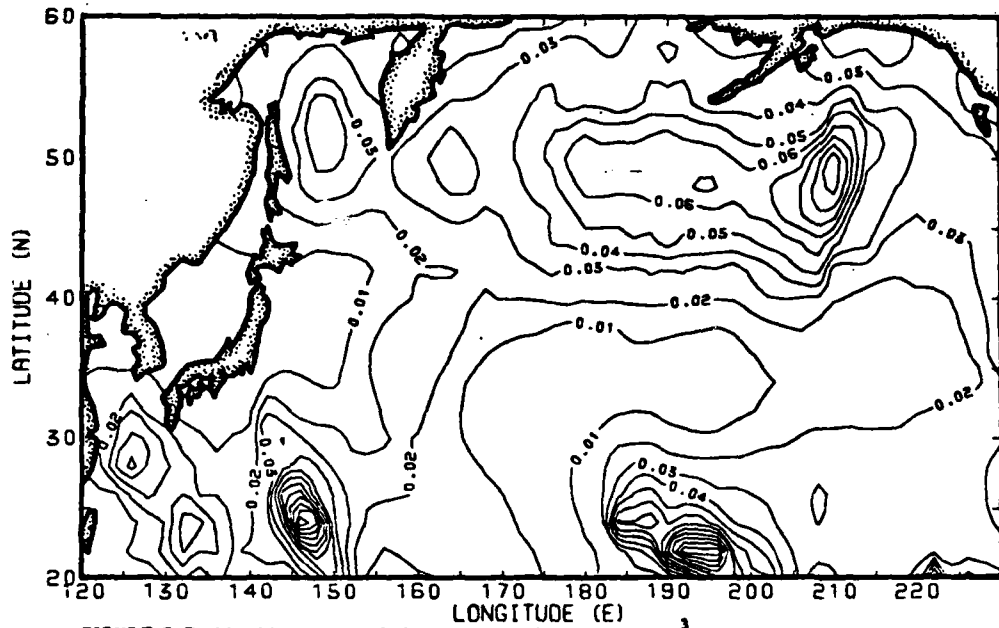


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SEA SURFACE TEMPERATURE (DEG.C)

JULY 78

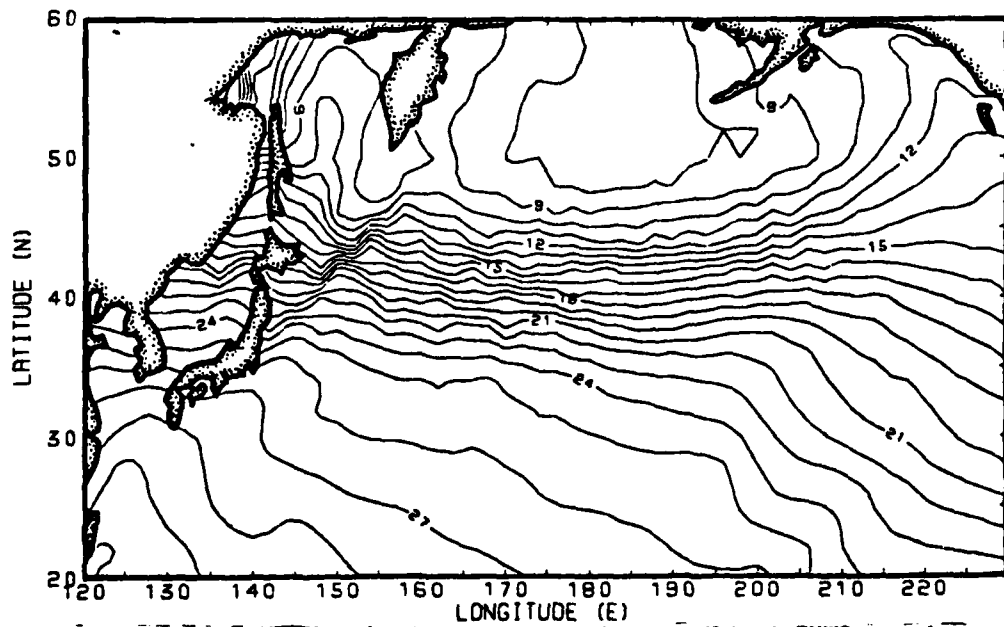


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AIR TEMPERATURE (DEG. C) JULY 78

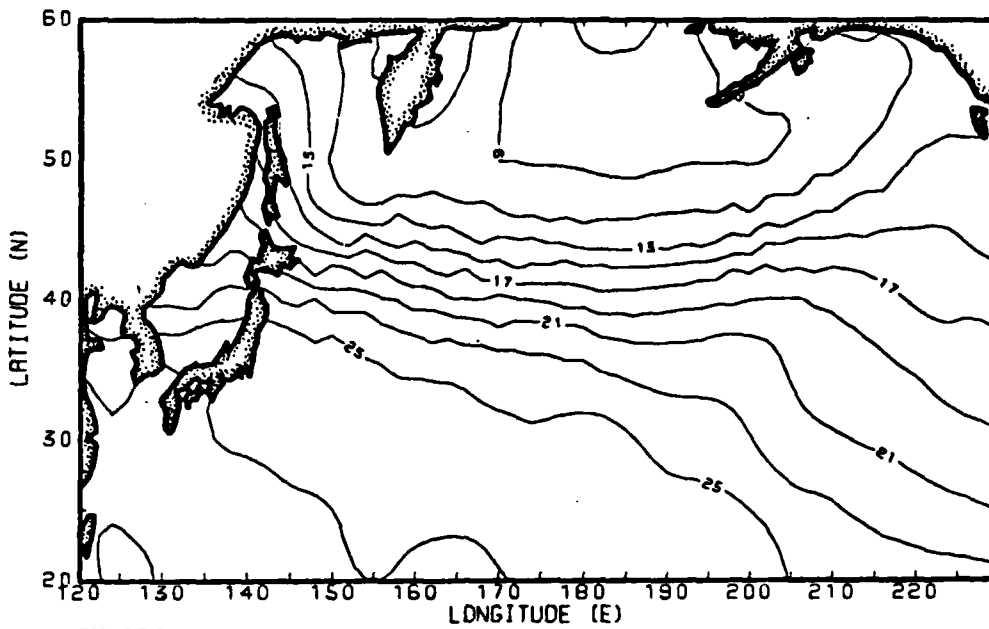


FIGURE 3.7 Monthly mean air temperature is the mean of 12-hourly FNWC air temperature. Contour intervals are 2°C.

700 MB HEIGHT (M) JULY 78

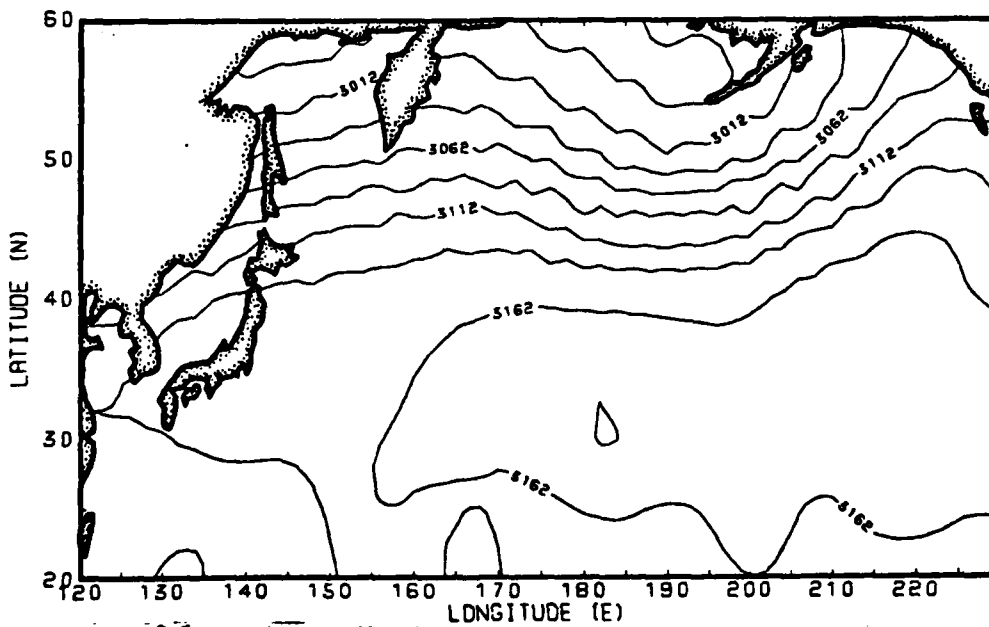


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VAPOR PRESSURE (MB) JULY 78

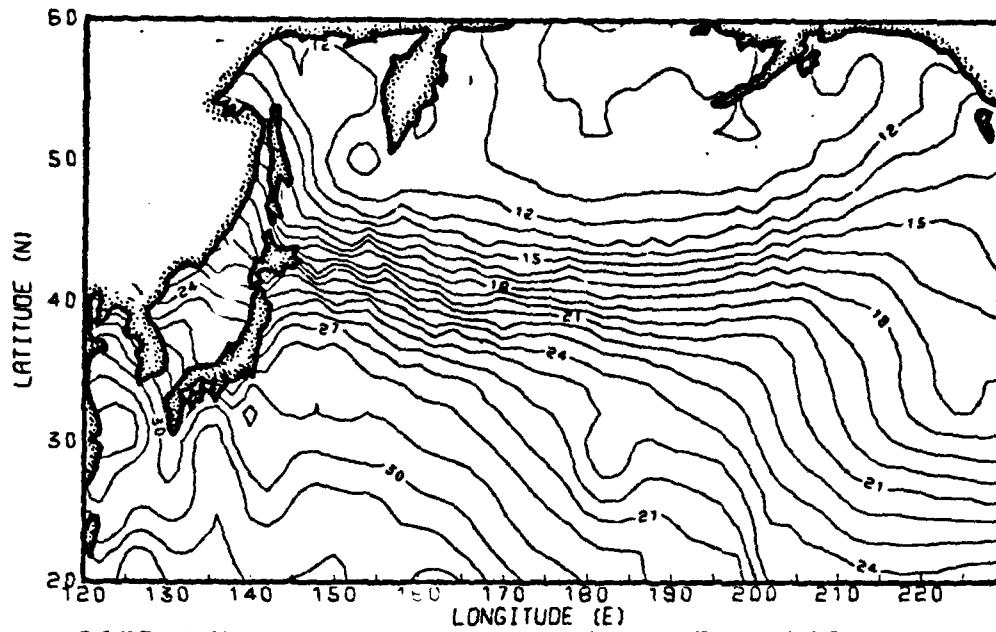


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SENSIBLE HEAT FLUX (10^{-4} CAL/CM² SEC) JULY 78

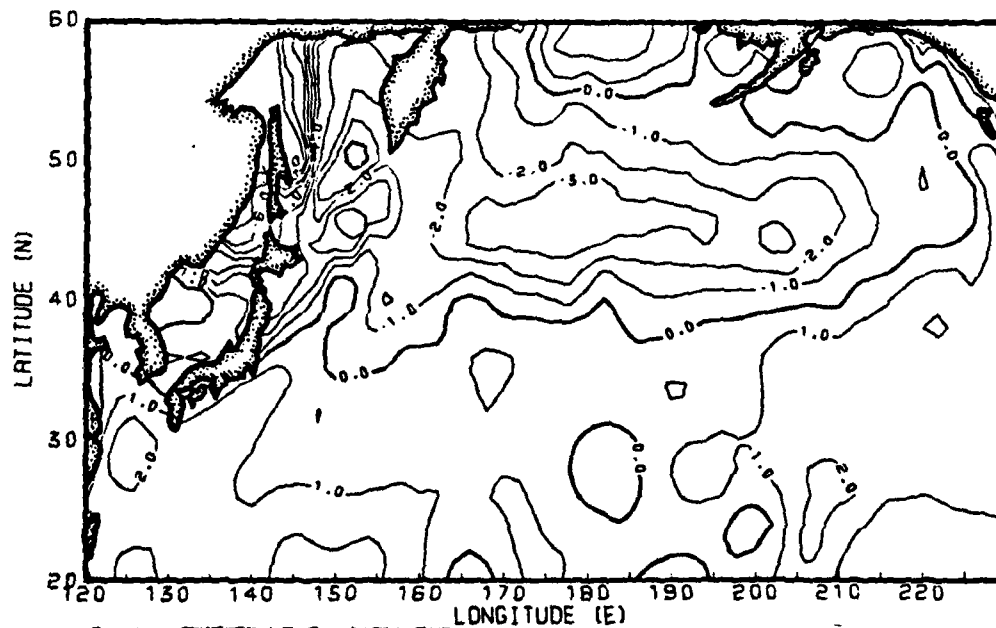


FIGURE 3.10 Monthly mean sensible heat flux (ocean to atmosphere) is the mean of 12-hourly sensible heat flux calculated from FNWC air and sea temperature and wind using a bulk formula. Isolines of zero heat flux are plotted heavily, and contour intervals are 1.0×10^{-4} cal/cm² sec.

LATENT HEAT FLUX (10^{-3} CAL/CM² SEC)

JULY 78

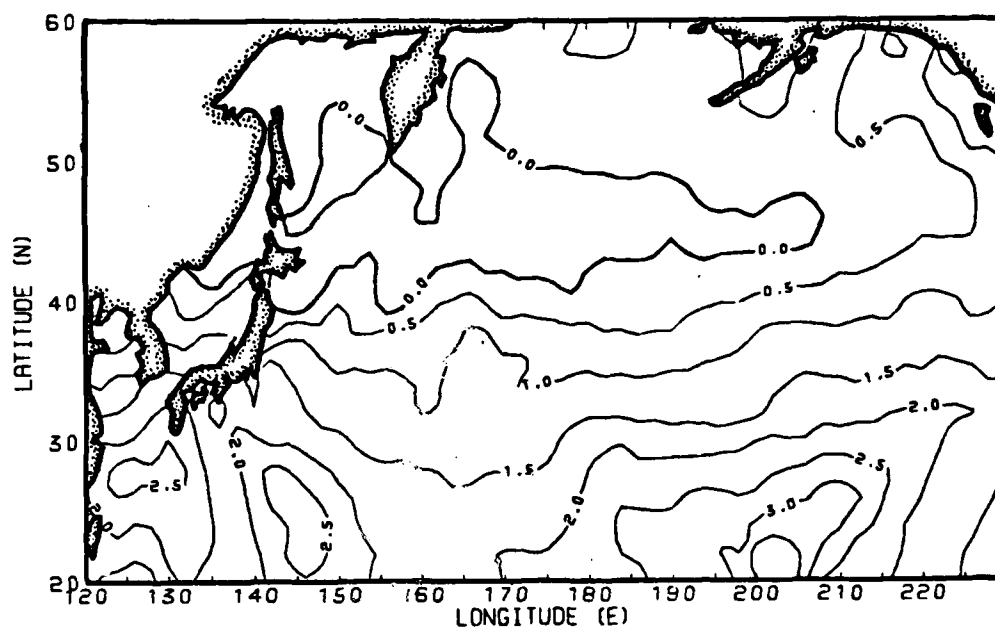


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OPTIMALLY INTERPOLATED TRANSPAC XBT OBS-JUL 1978

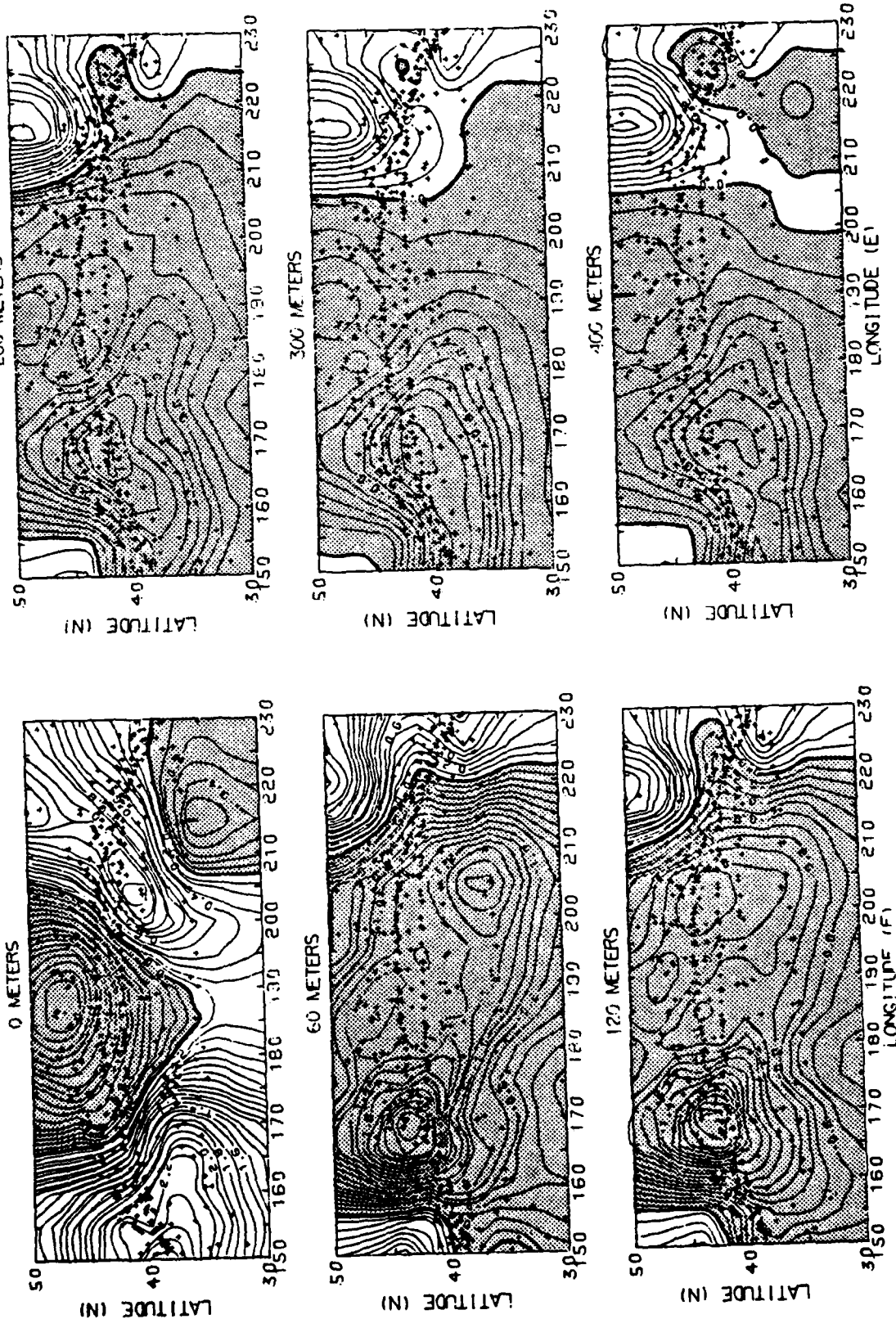


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WIND SPEED (M/SEC)

AUG 78

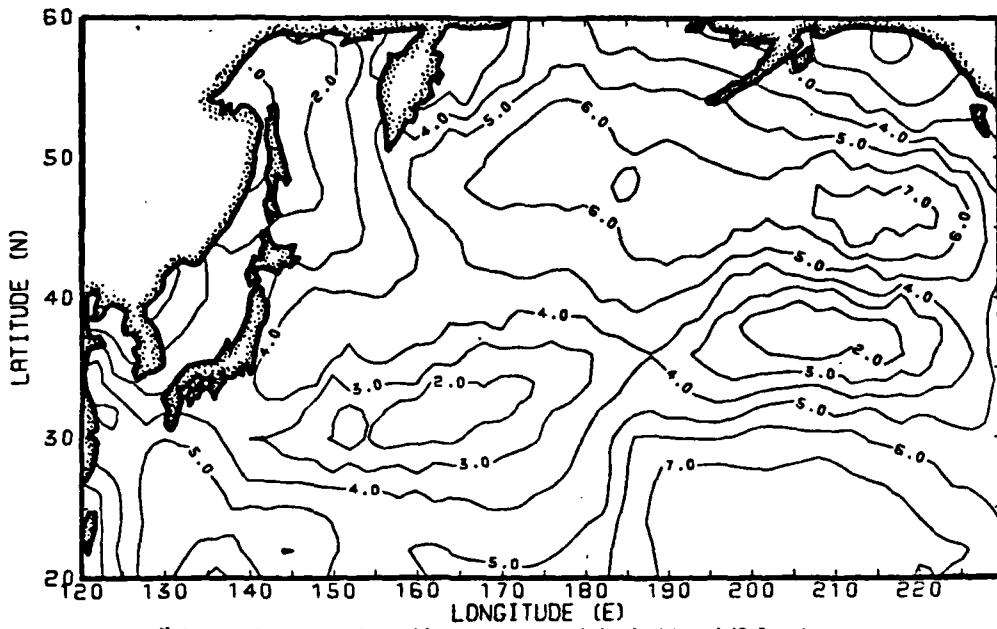


FIGURE 4.1 Absolute value of monthly mean vector wind velocities at 19.5 meters. Contour intervals are 1 m/sec.

WIND DIRECTION

AUG 78

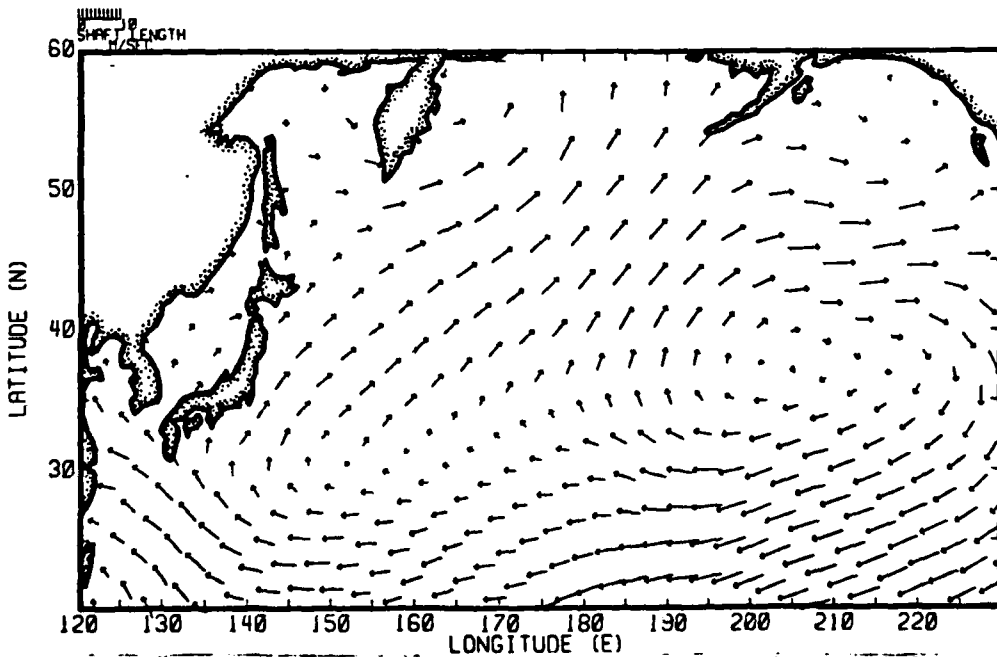


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WIND STRESS (DYNES/CM**2)

AUG 78

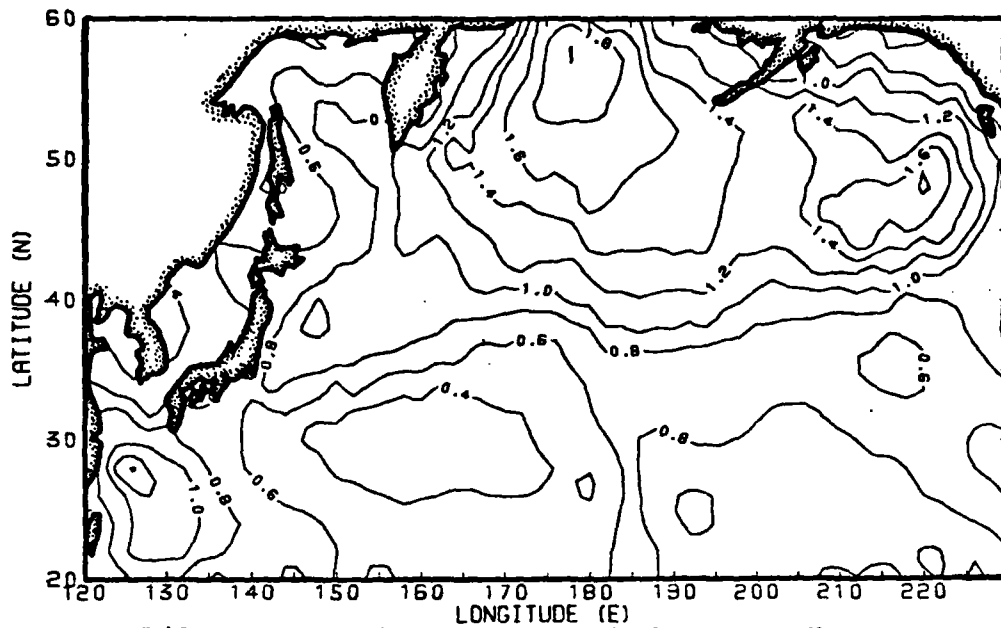


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CURL OF WIND STRESS ($10^{10} \times -9$ DYNES/CM**3)

AUG 78

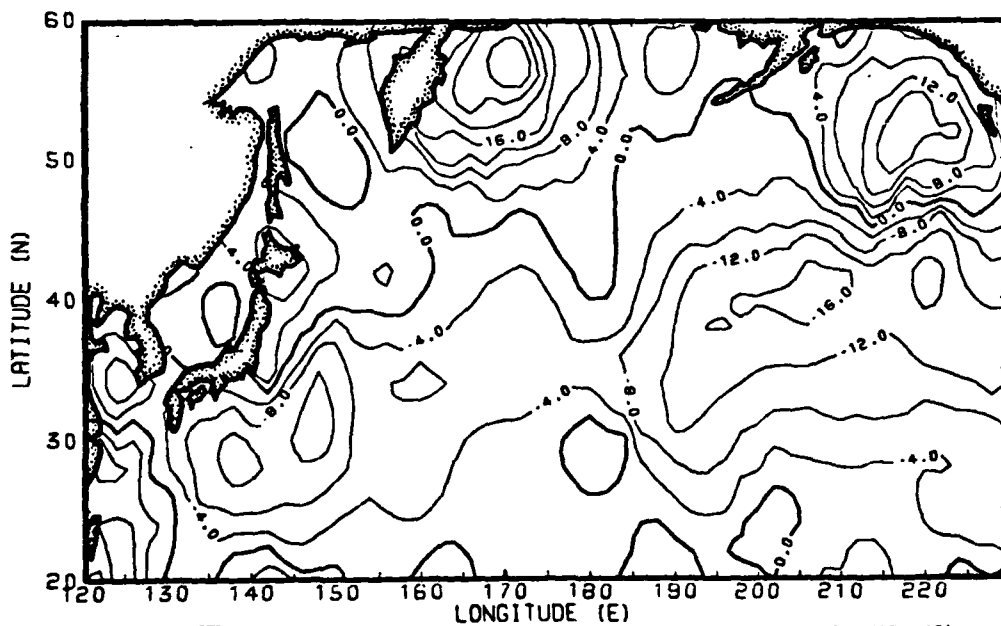


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U STAR CUBED ((M/SEC)**3)

AUG 78

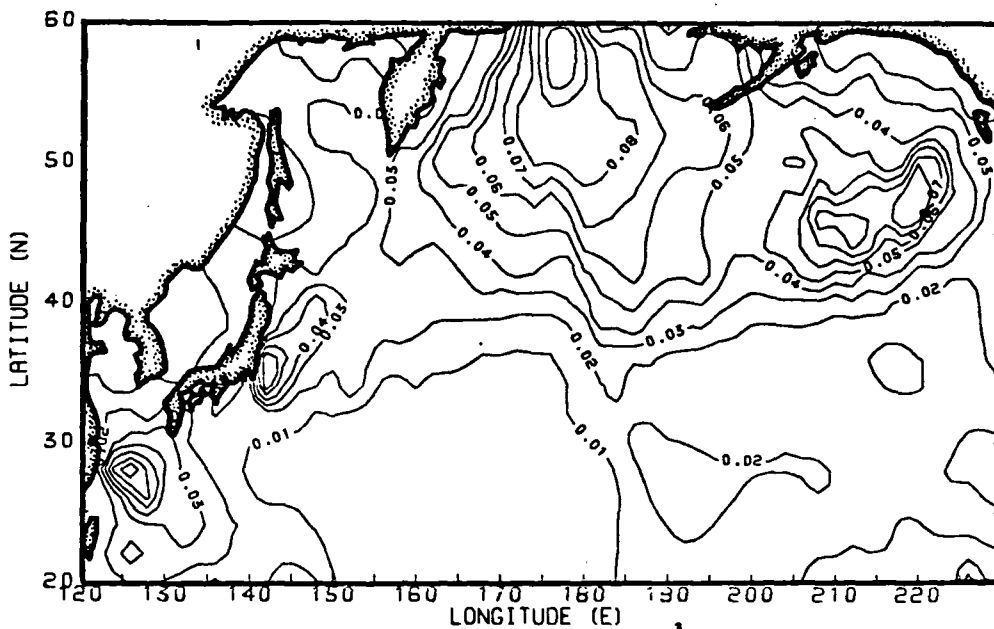


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SEA SURFACE TEMPERATURE (DEG.C)

AUG 78

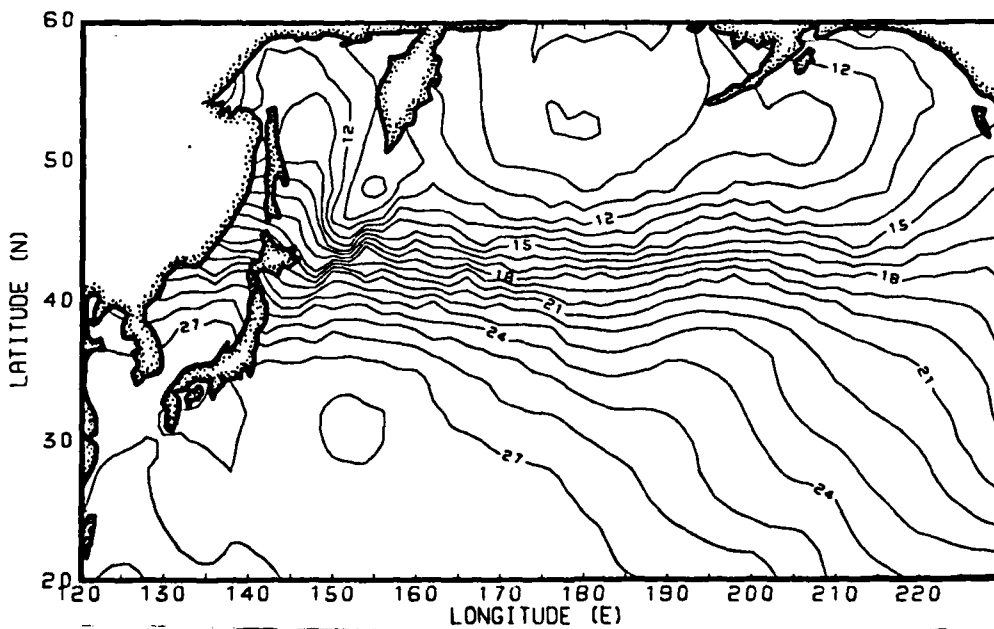


FIGURE 4.6 Monthly mean sea surface temperature is the mean of 12-hourly FNWC sea surface temperatures. Contour intervals are 1°C.

AIR TEMPERATURE (DEG. C) AUG 78

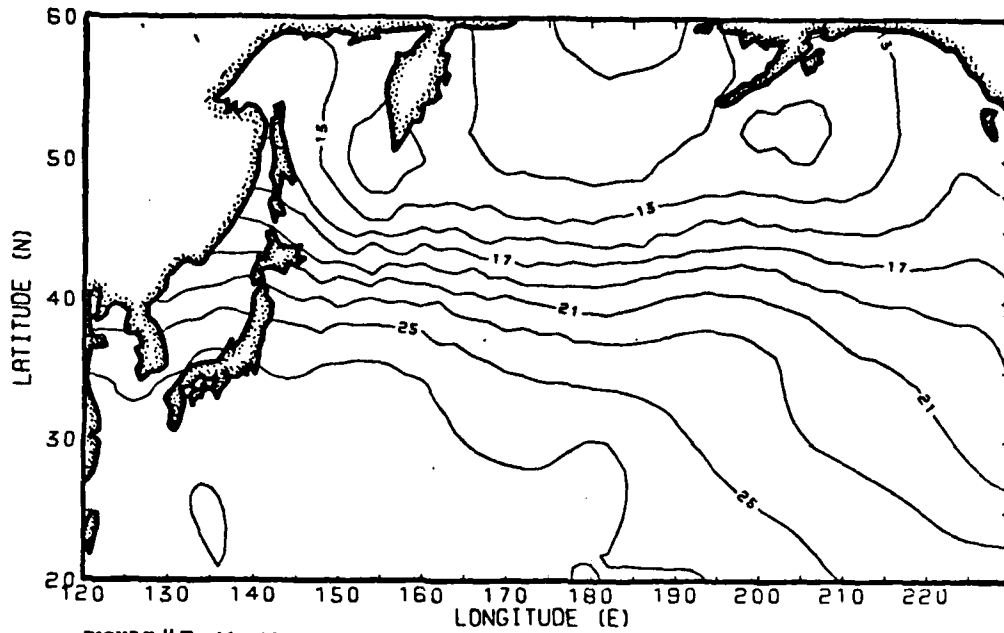


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700 MB HEIGHT (M) AUG 78

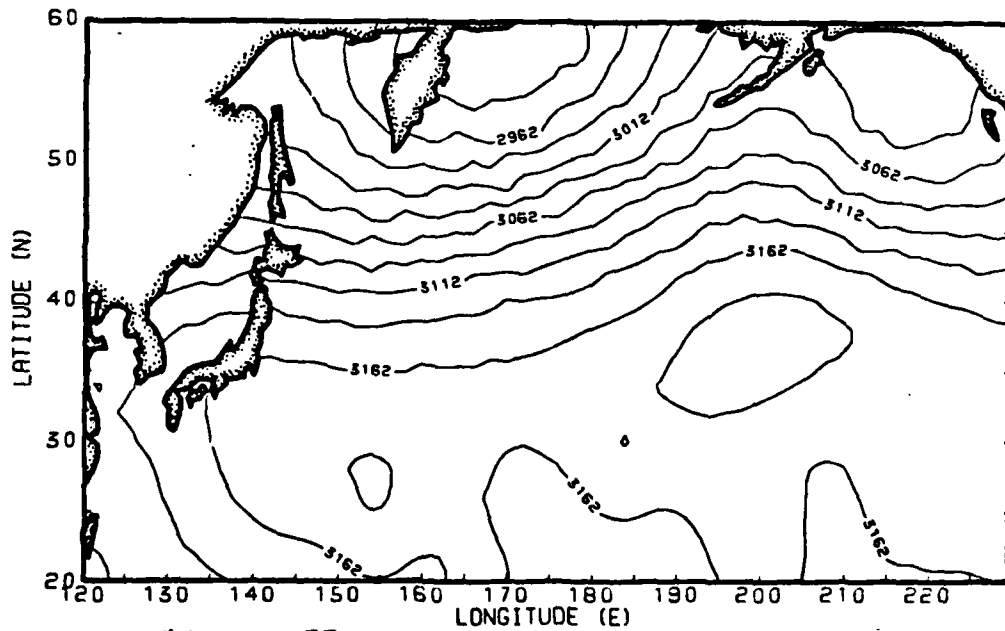


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VAPOR PRESSURE (MB) AUG 78

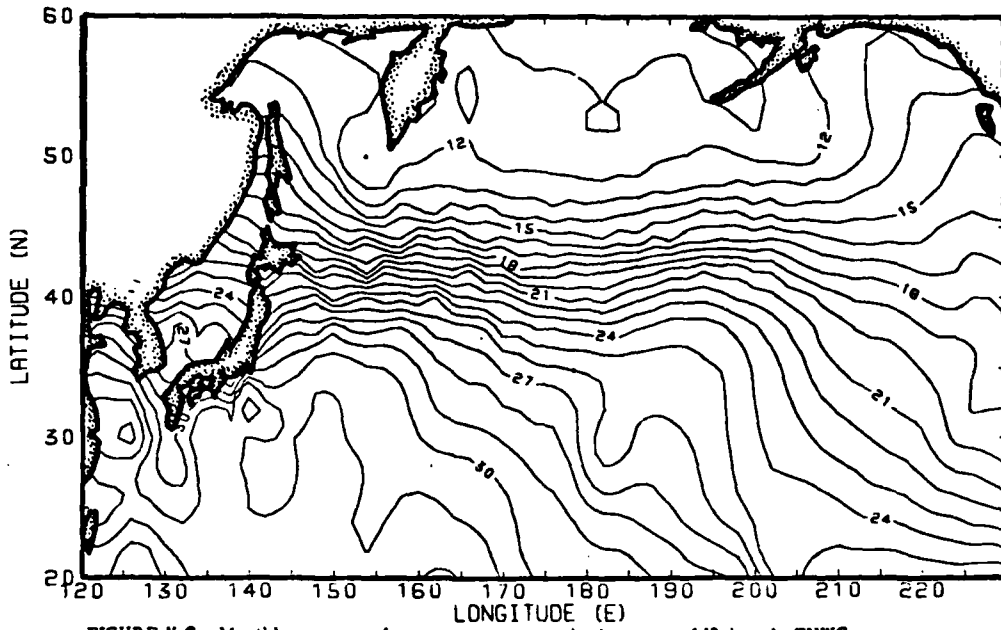


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SENSIBLE HEAT FLUX (10^{10} CAL/CM² SEC) AUG 78

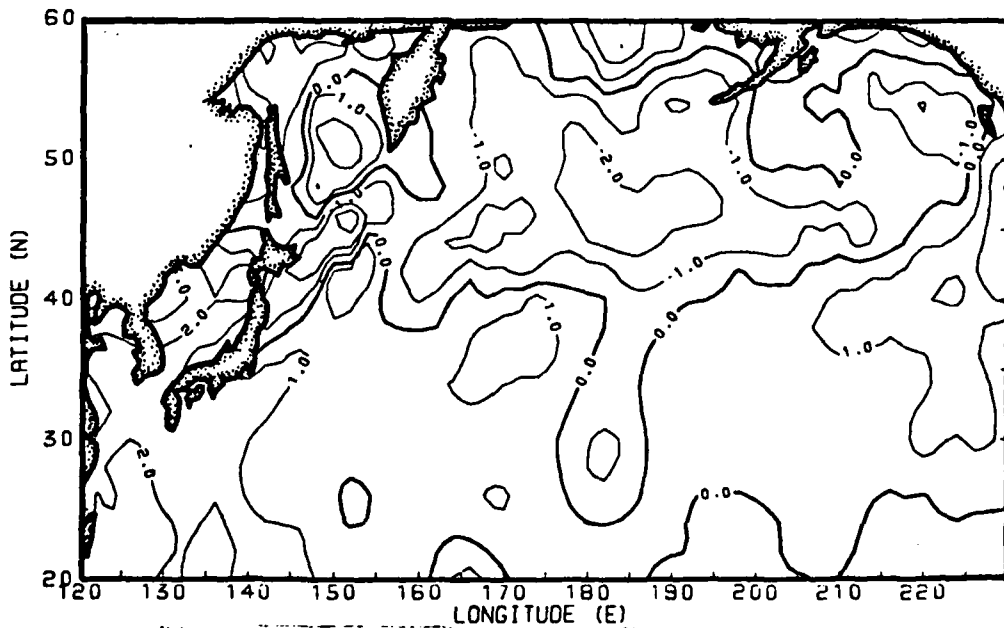


FIGURE 4.10 Monthly mean sensible heat flux (ocean to atmosphere) is the mean of 12-hourly sensible heat flux calculated from FNWC air and sea temperature and wind using a bulk formula. Isolines of zero heat flux are plotted heavily, and contour intervals are 1.0×10^{10} cal/cm² sec.

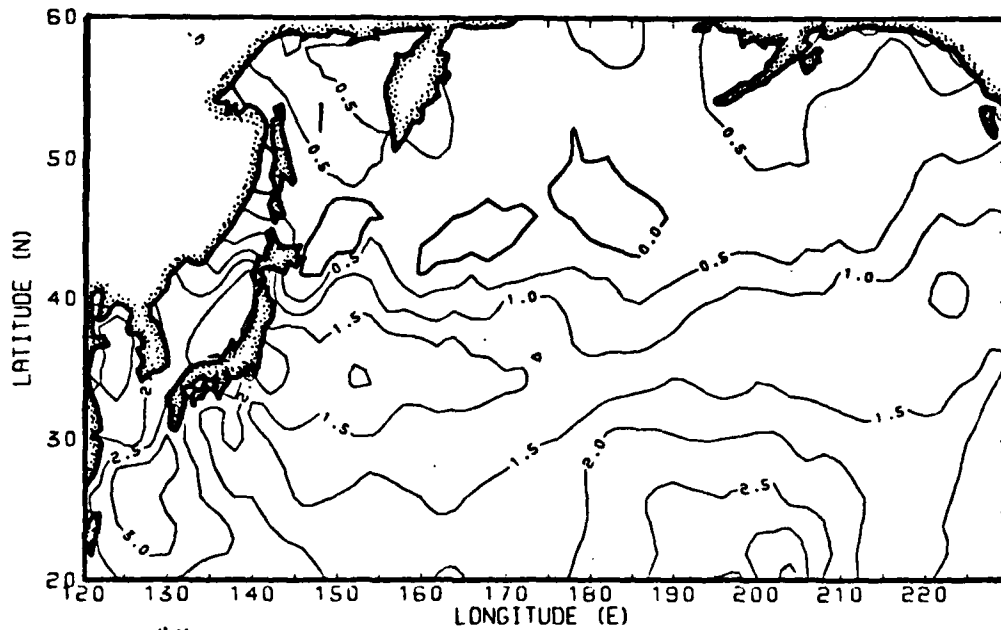


FIGURE 4.11 Monthly mean latent heat flux (ocean to atmosphere) is the mean of 12-hourly latent heat flux calculated from FNWC sea temperature, vapor pressure and wind using a bulk formula. Isotherms of zero heat flux are plotted heavily, and contour intervals are 0.5×10^{-3} cal/cm² sec.

OPTIMALLY INTERPOLATED TRANSFAC ABI UDS-AUG 1978

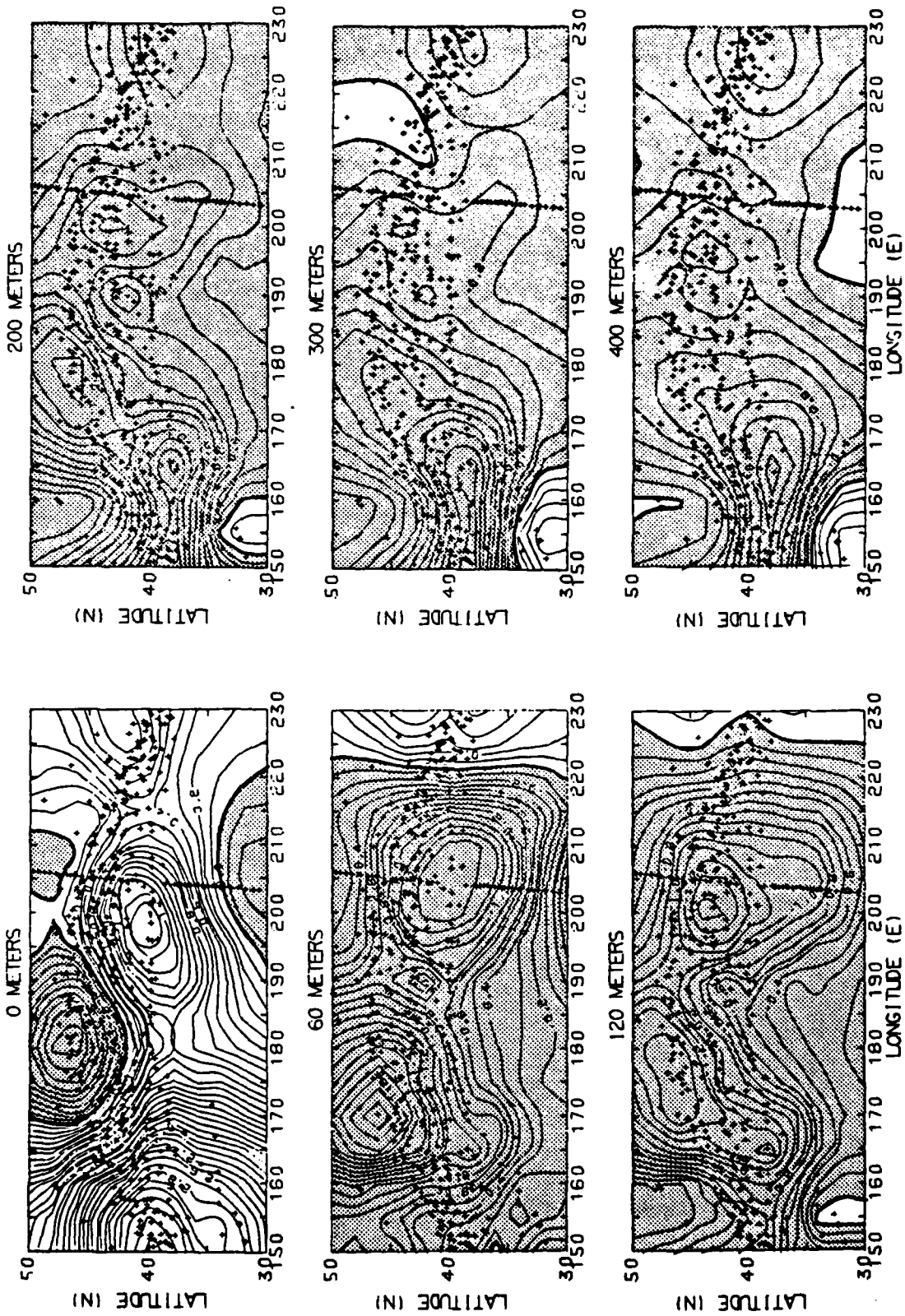


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WIND SPEED (M/SEC)

SEPT 78

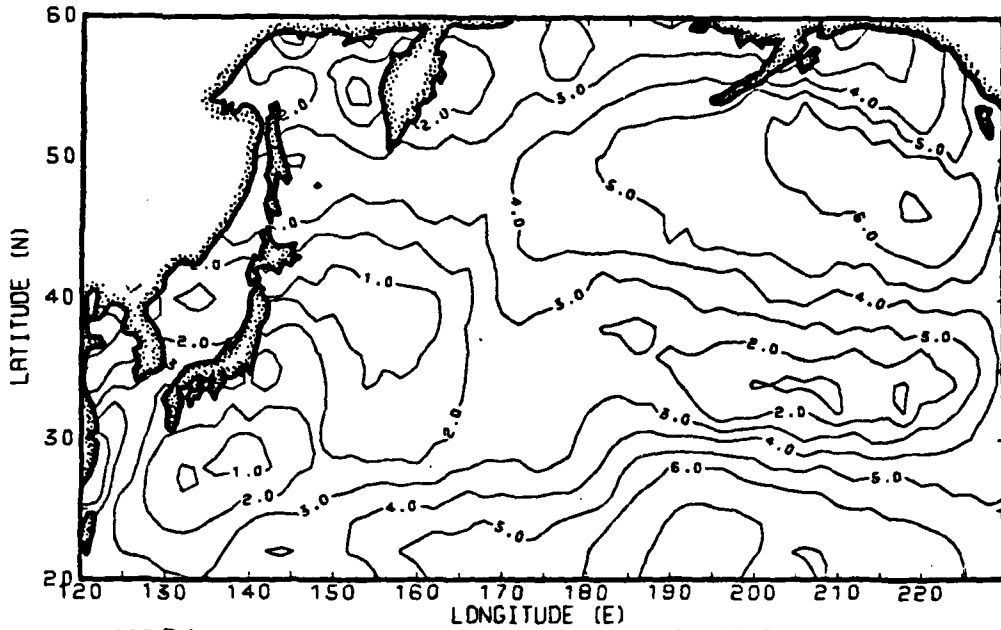


FIGURE 5.1 Absolute value of monthly mean vector wind velocities at 19.5 meters. Contour intervals are 1 m/sec.

WIND DIRECTION

SEPT 78

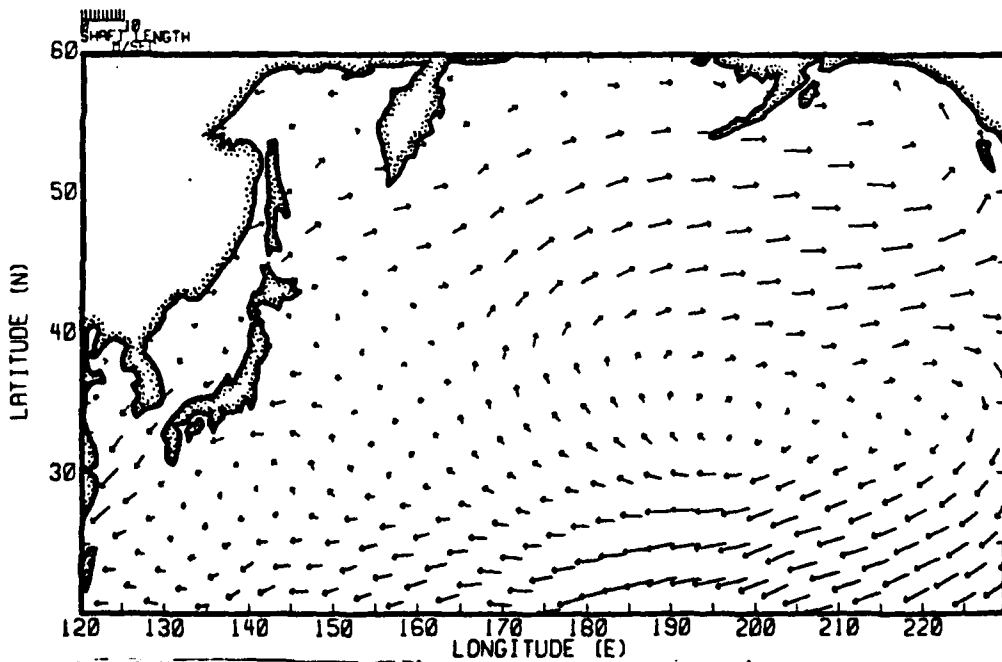


FIGURE 5.2 Direction arrows representing directions of monthly mean wind vectors at 19.5 meters. Length of arrow shaft indicates wind speed in m/sec. (See scale above figure).

WIND STRESS (DYNES/CM**2)

SEPT 78

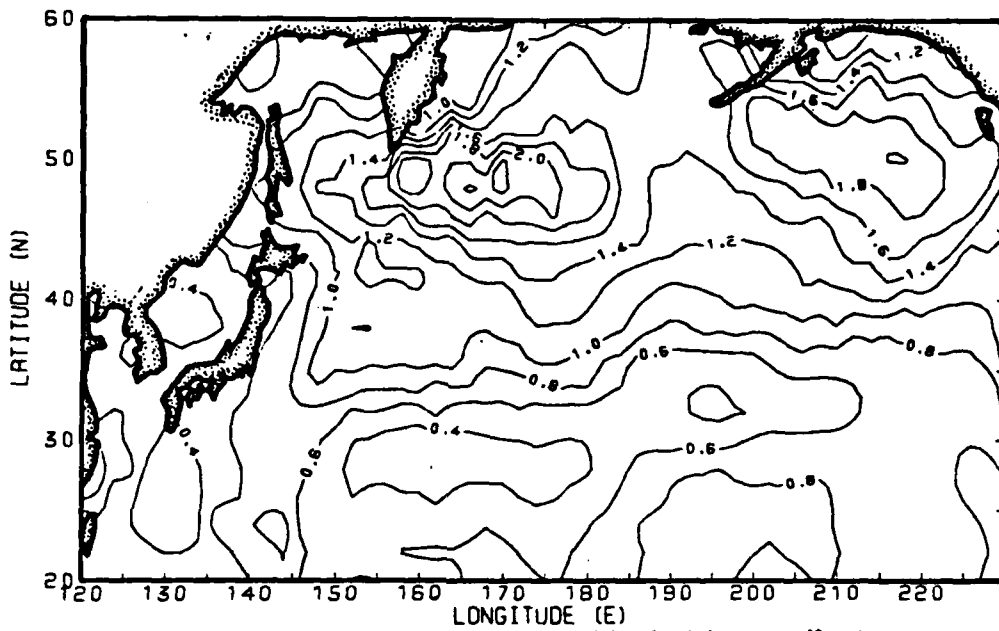


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CURL OF WIND STRESS (10^{11} -9 DYNES/CM**3)

SEPT 78

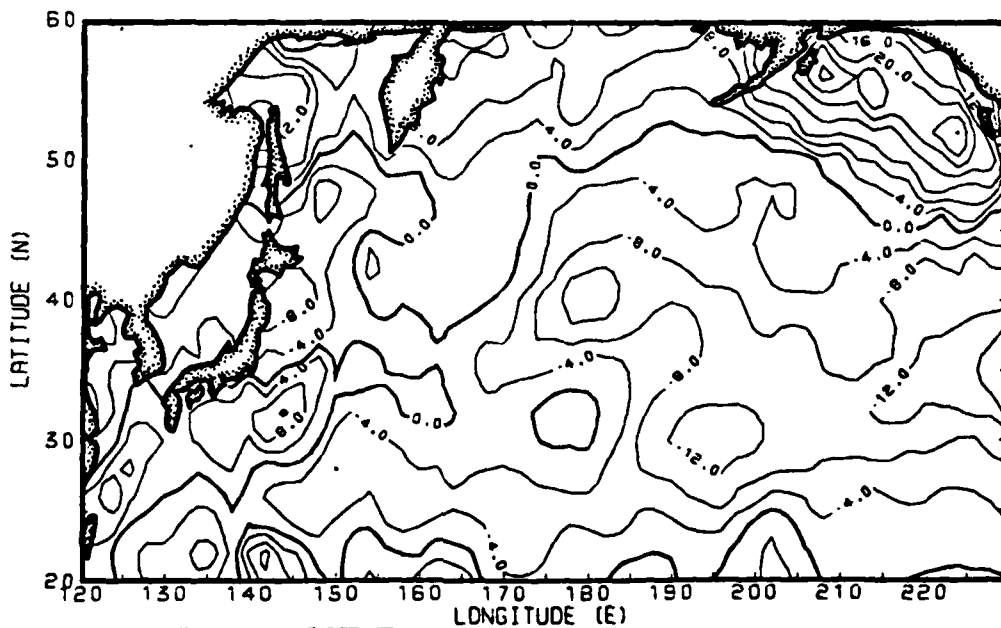


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U STAR CUBED ((M/SEC)**3)

SEPT 78

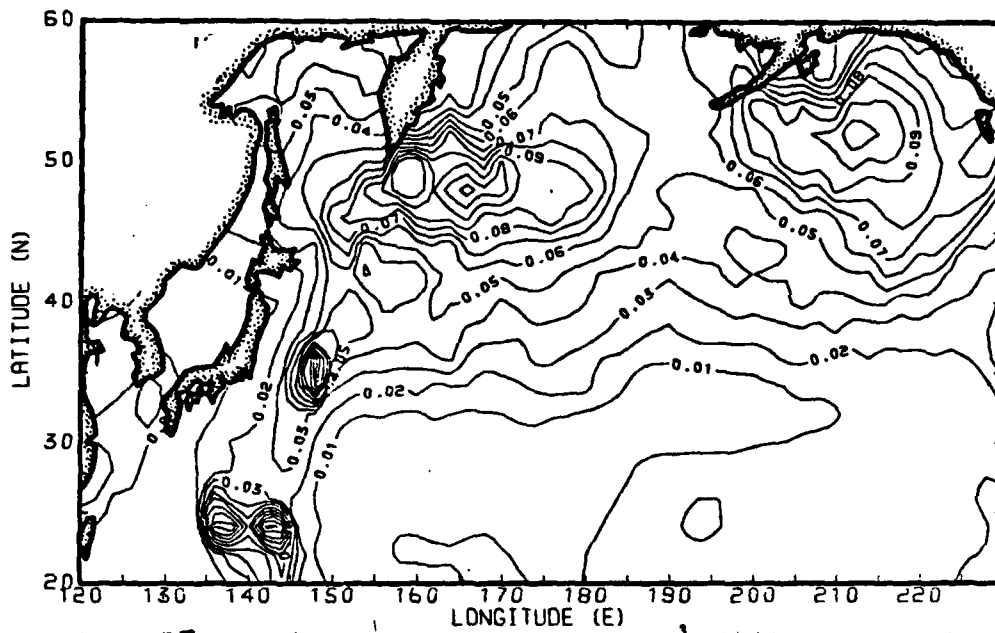


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SEA SURFACE TEMPERATURE (DEG.C)

SEPT 78

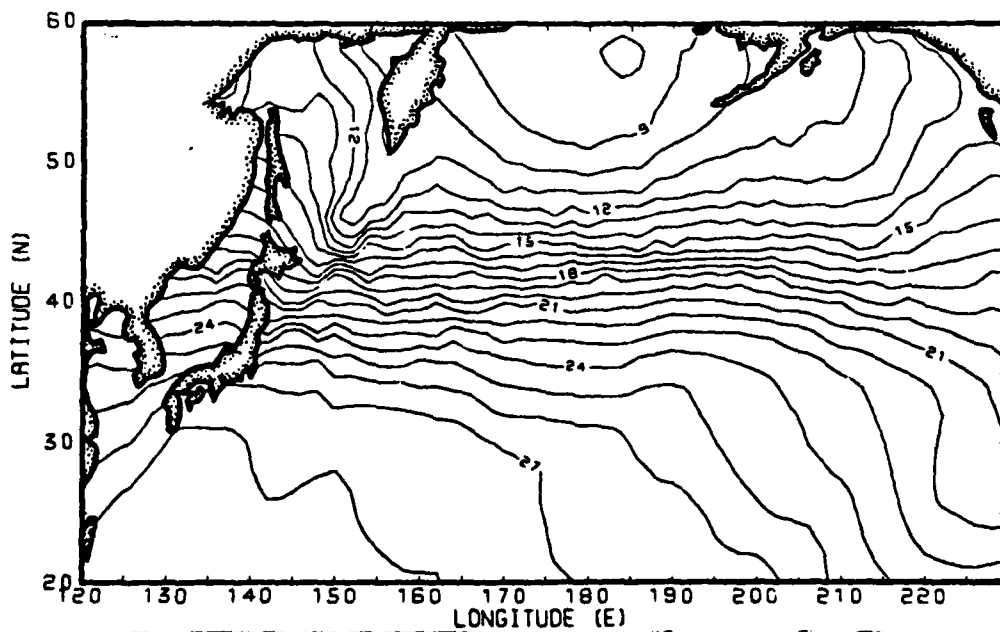


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AIR TEMPERATURE (DEG. C) SEPT 78

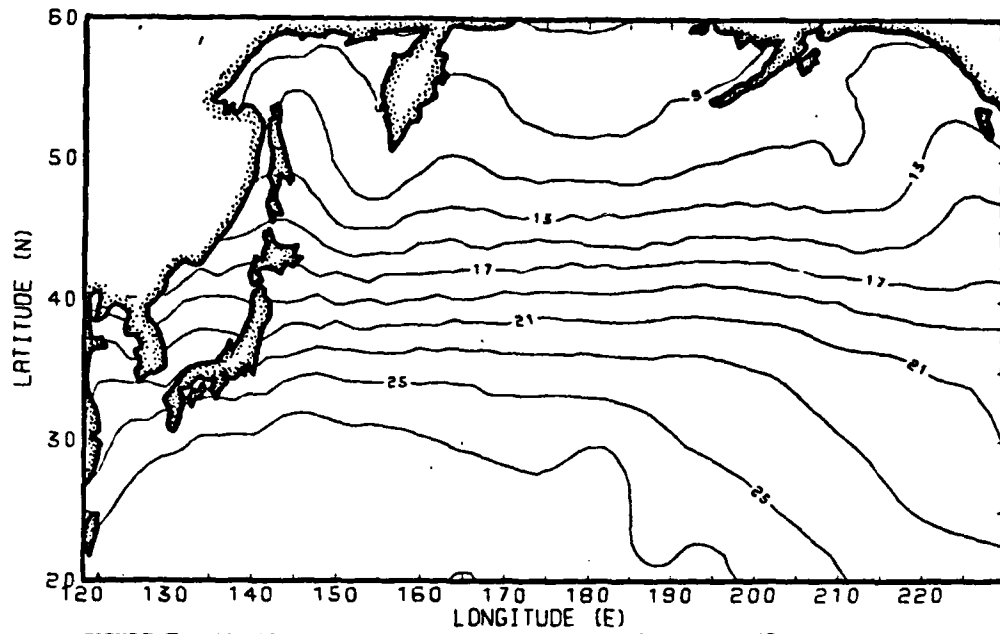


FIGURE 5.7 Monthly mean air temperature is the mean of 12-hourly FNWC air temperature. Contour intervals are 2°C.

700 MB HEIGHT (M) SEPT 78

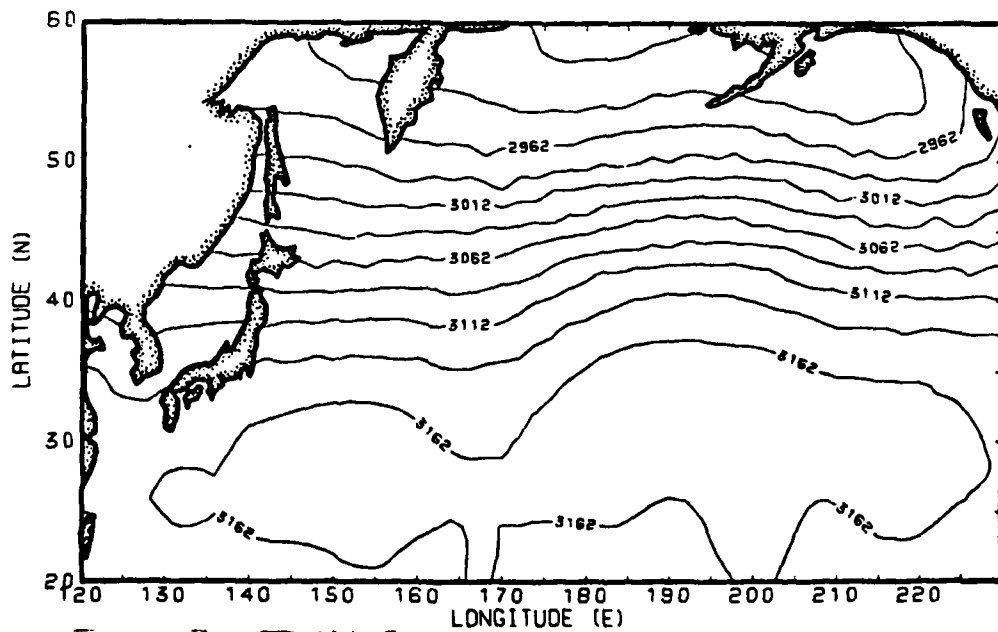


FIGURE 5.8 Monthly mean 700 mb height is the mean of 12-hourly FNWC 700 mb heights. Contour intervals are 25 meters.

VAPOR PRESSURE (MB)

SEPT 78

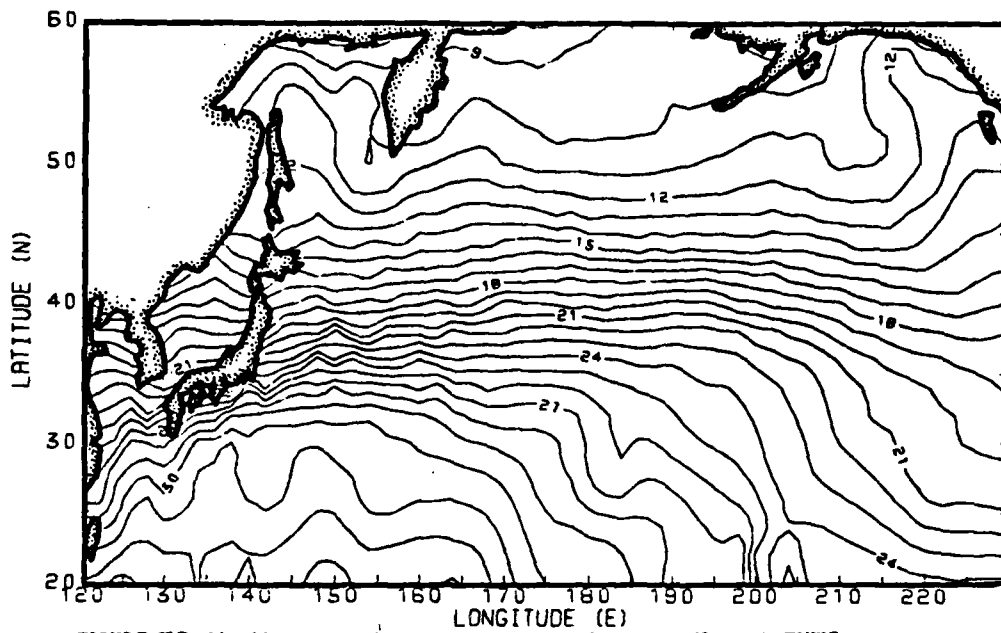


FIGURE 5.9 Monthly mean surface vapor pressure is the mean of 12-hourly FNWC vapor pressure at 19.5 meters. Contour intervals are 1 mb.

SENSIBLE HEAT FLUX (10^{**4} CAL/CM**2 SEC)

SEPT 78

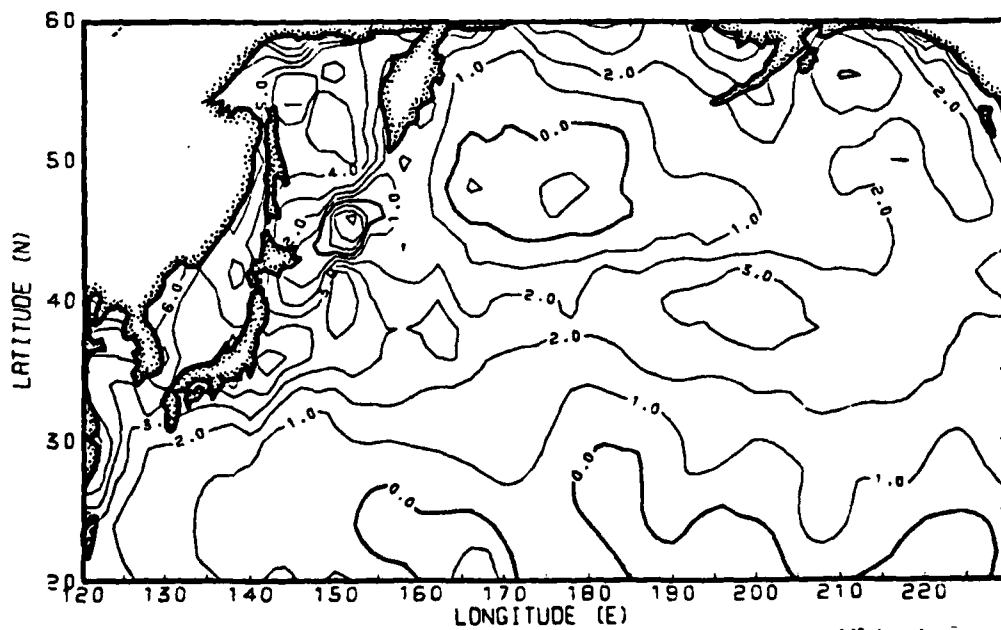


FIGURE 5.10 Monthly mean sensible heat flux (ocean to atmosphere) is the mean of 12-hourly sensible heat flux calculated from FNWC air and sea temperature and wind using a bulk formula. Isolines of zero heat flux are plotted heavily, and contour intervals are 1.0×10^4 cal/cm² sec.

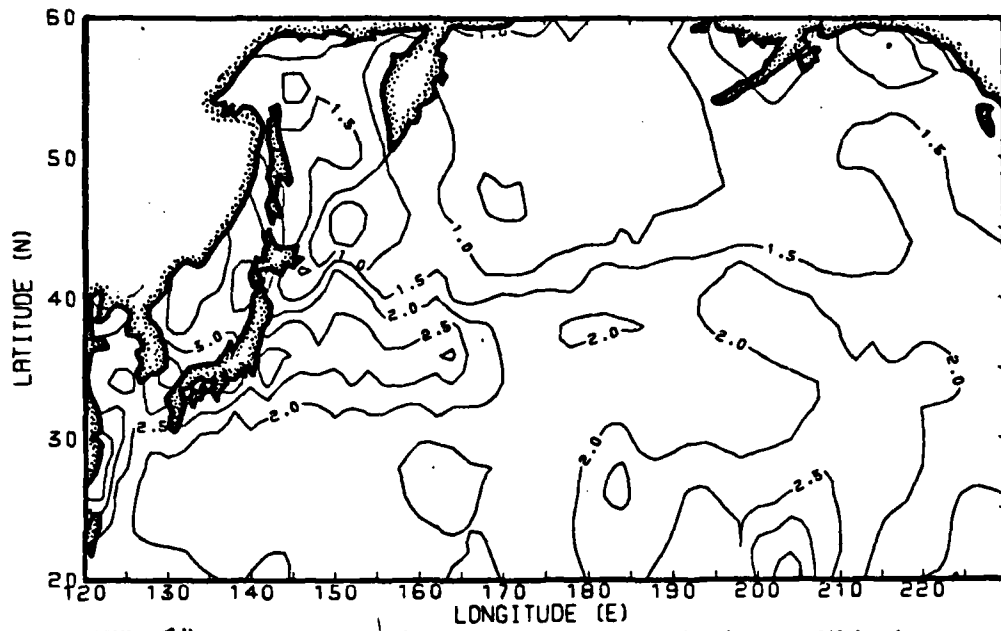


FIGURE 5.11 Monthly mean latent heat flux (ocean to atmosphere) is the mean of 12-hourly latent heat flux calculated from FNWC sea temperature, vapor pressure and wind using a bulk formula. Isofine of zero heat flux are plotted heavily, and contour intervals are 0.5×10^3 cal/cm² sec.

OPTIMALLY INTERPOLATED TRANSPAC XBT OBS-SEP 1978

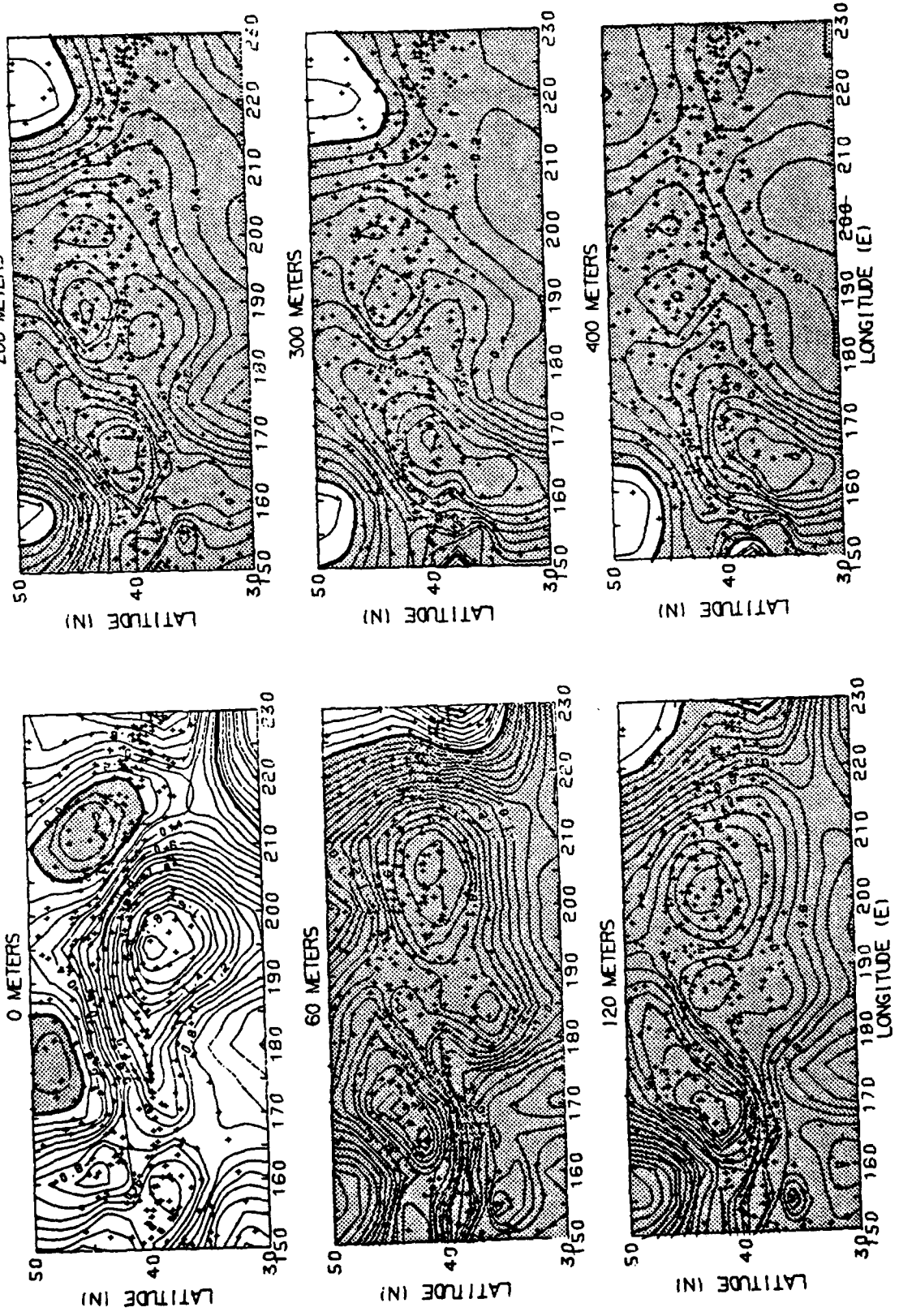


FIGURE 5.12 Monthly temperature anomalies ($^{\circ}\text{C}$) contoured at fixed depths. Negative anomaly areas are hatched and isolines of zero anomaly are drawn heavily. The crosses mark the positions of the TRANSPAC XBT drops. Increments are in $.1^{\circ}\text{C}$ (prepared by W. White, SIO).

WIND SPEED (M/SEC)

OCT 78

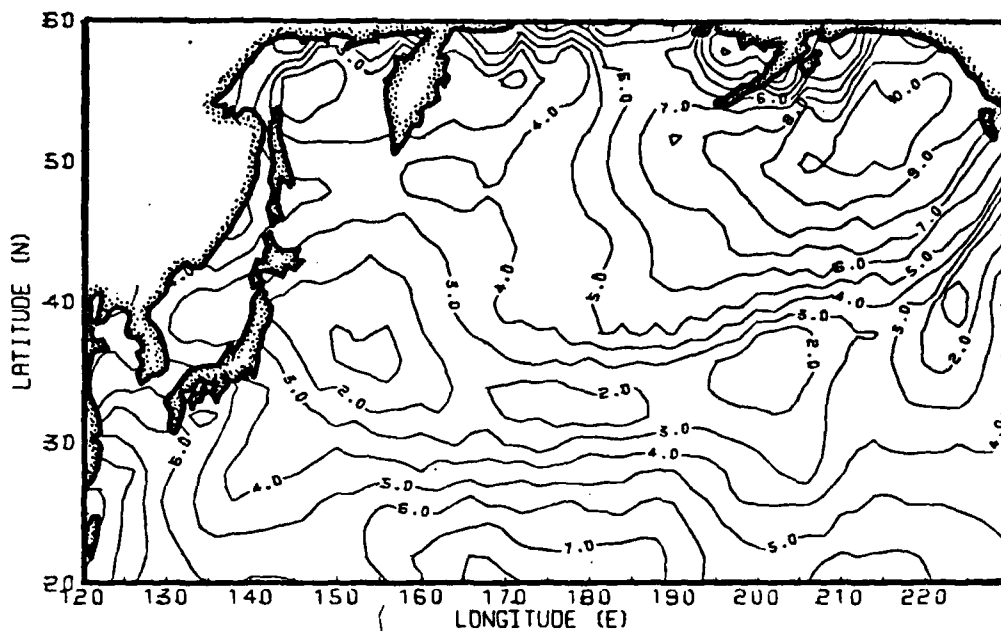


FIGURE 6.1 Absolute value of monthly mean vector wind velocities at 19.5 meters. Contour intervals are 1 m/sec.

WIND DIRECTION

OCT 78

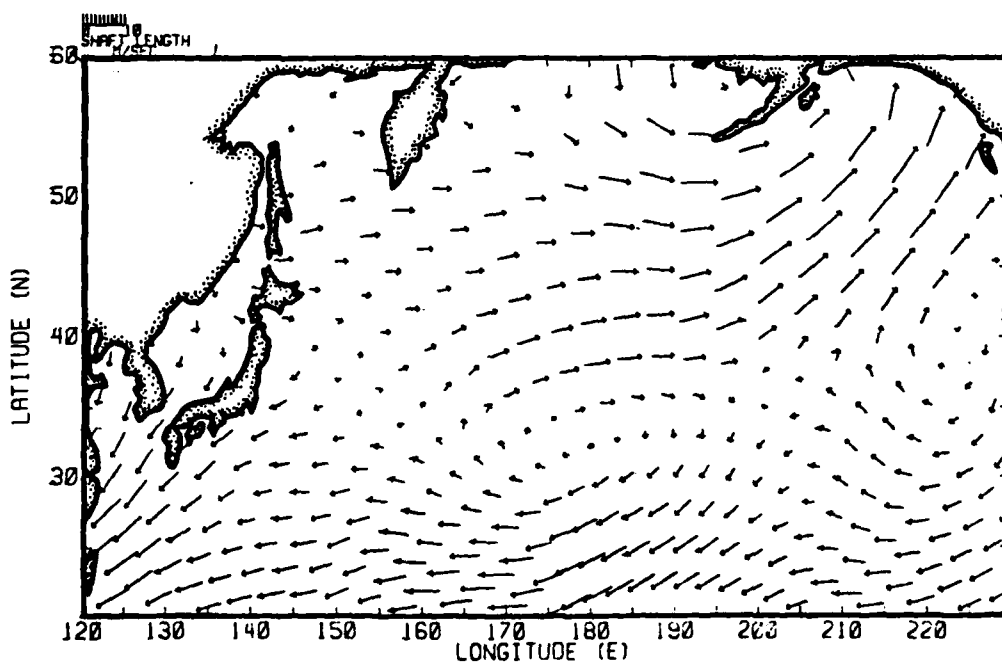


FIGURE 6.2 Direction arrows representing directions of monthly mean wind vectors at 19.5 meters. Length of arrow shaft indicates wind speed in m/sec. (See scale above figure).

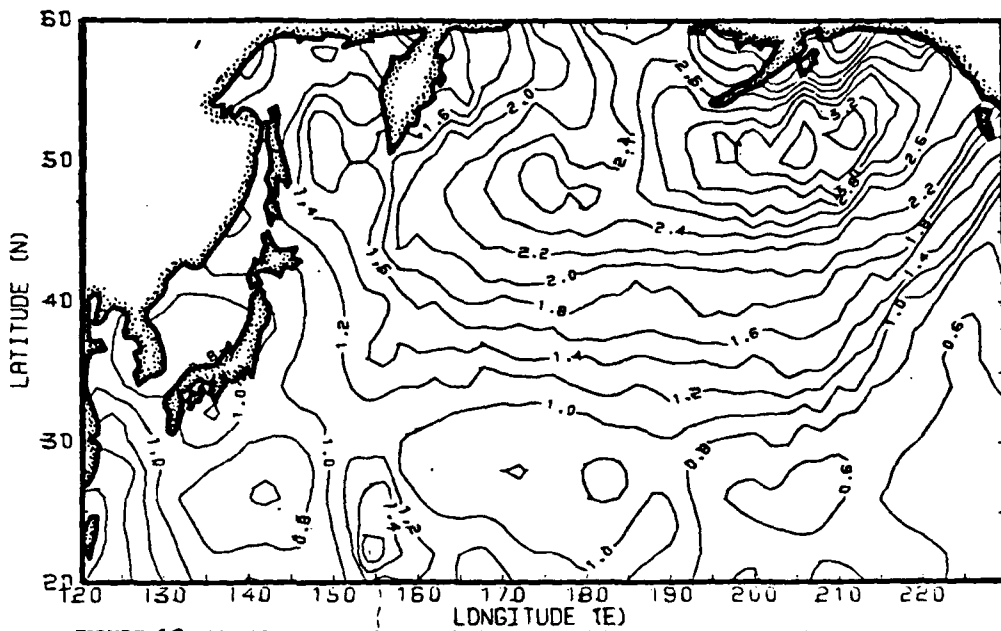


FIGURE 6.3 Monthly mean wind stress is the mean of 6-hourly wind stress at 10 meters calculated from FNWC wind data. Contour intervals are 0.2 dynes/cm².

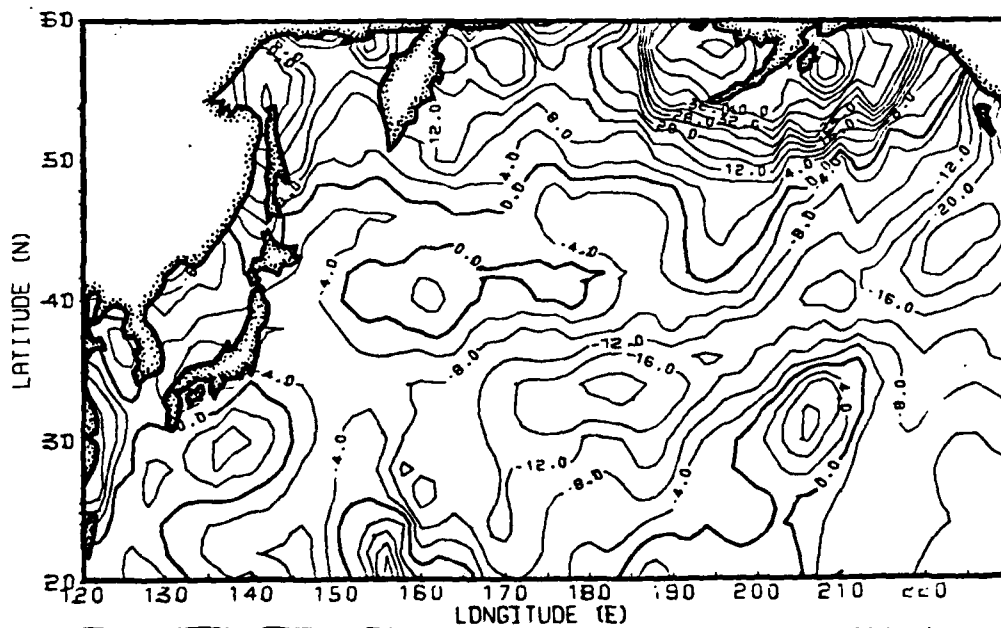


FIGURE 6.4 The vertical component of monthly mean wind stress curl is the mean of 6-hourly wind stress curl approximated by finite-differences from 6-hourly wind stresses at 10 meters. Isolines of zero curl are plotted heavily, and contour intervals are 4.0×10^{-9} dynes/cm³.

U STAR CUBED ((M/SEC)**3)

OCT 78

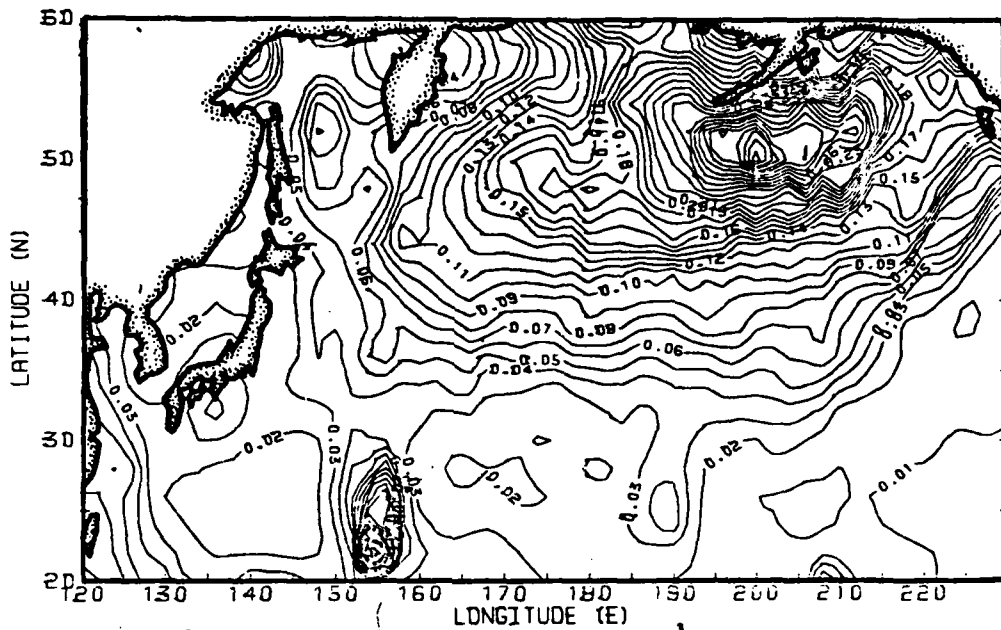


FIGURE 6.5 Monthly mean wind shear stress velocity cubed. U_*^3 is the mean of 6-hourly wind shear stress velocity cubed calculated from wind speed at 10 meters. Contour intervals are 0.02 (m/sec)³.

SEA SURFACE TEMPERATURE (DEG.C)

OCT 78

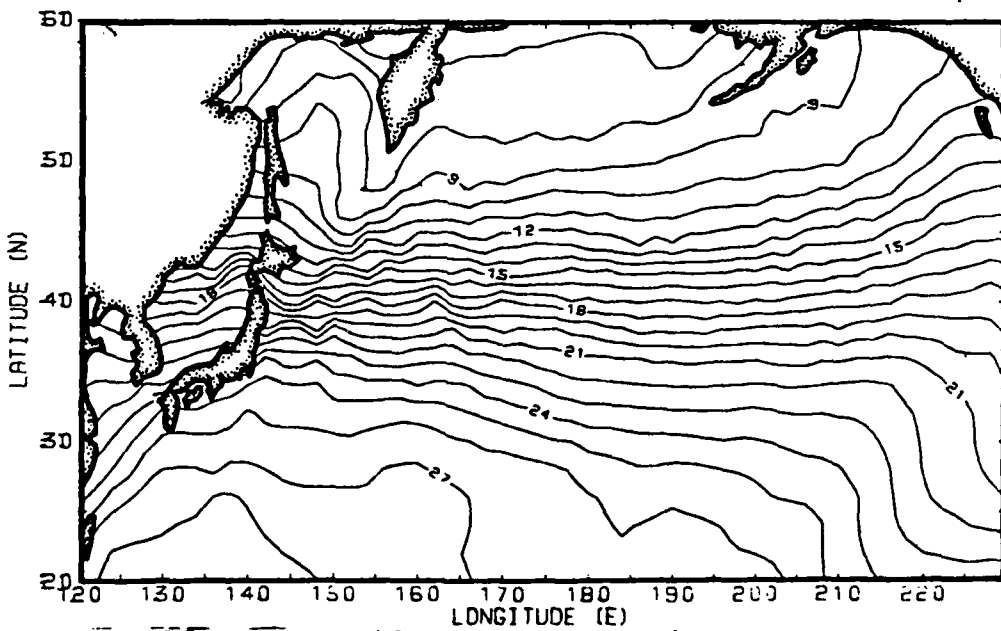


FIGURE 6.6 Monthly mean sea surface temperature is the mean of 12-hourly FNWC sea surface temperatures. Contour intervals are 1°C.

AIR TEMPERATURE (DEG. C) OCT 78

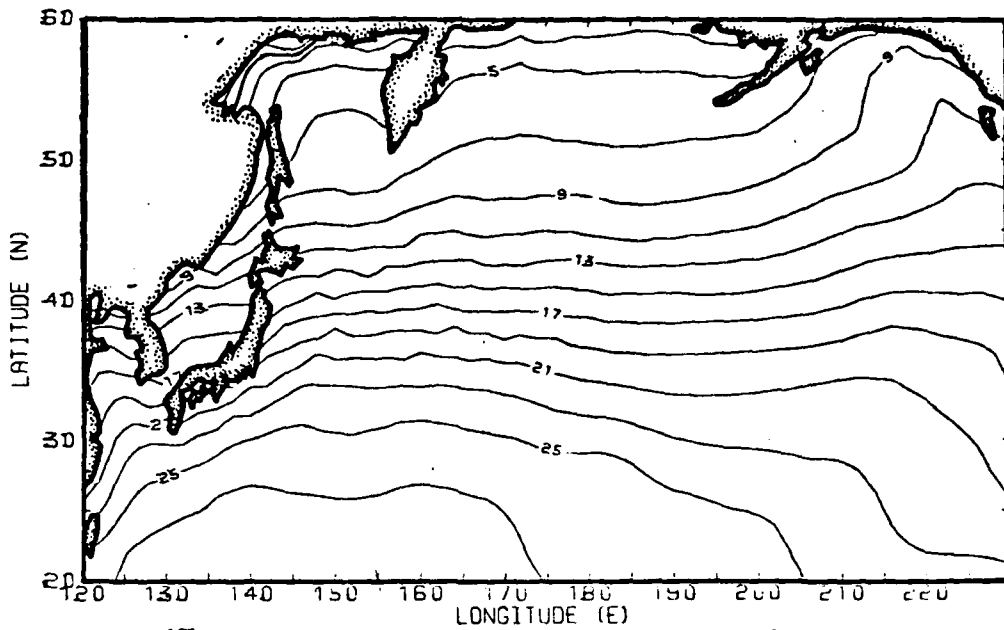


FIGURE 6.7 Monthly mean air temperature is the mean of 12-hourly FNWC air temperature. Contour intervals are 2°C.

700 MB HEIGHT (M) OCT 78

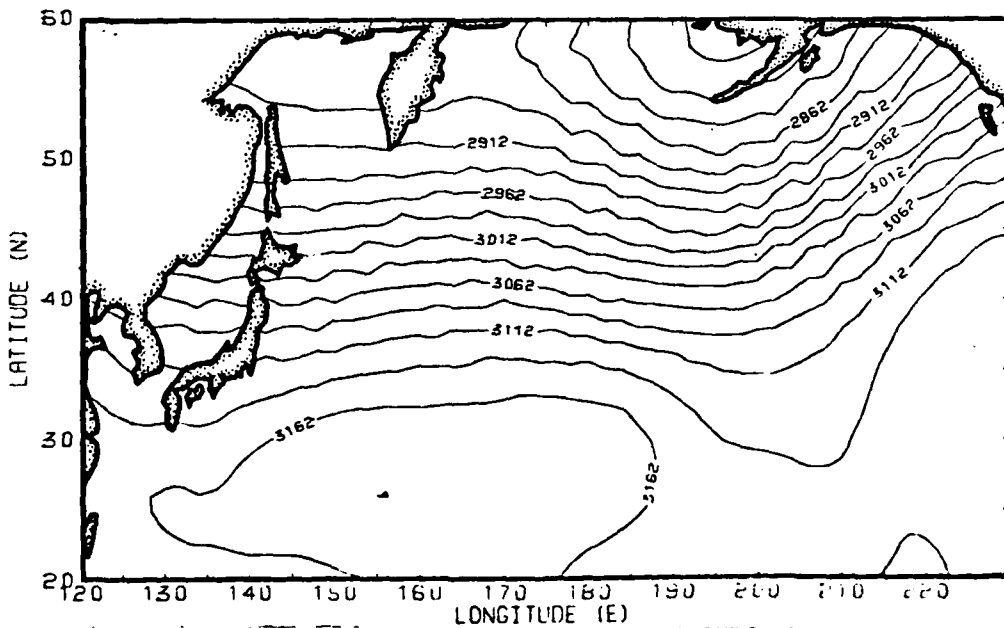


FIGURE 6.8 Monthly mean 700 mb height is the mean of 12-hourly FNWC 700 mb heights. Contour intervals are 25 meters.

VAPOR PRESSURE (MB) OCT 78

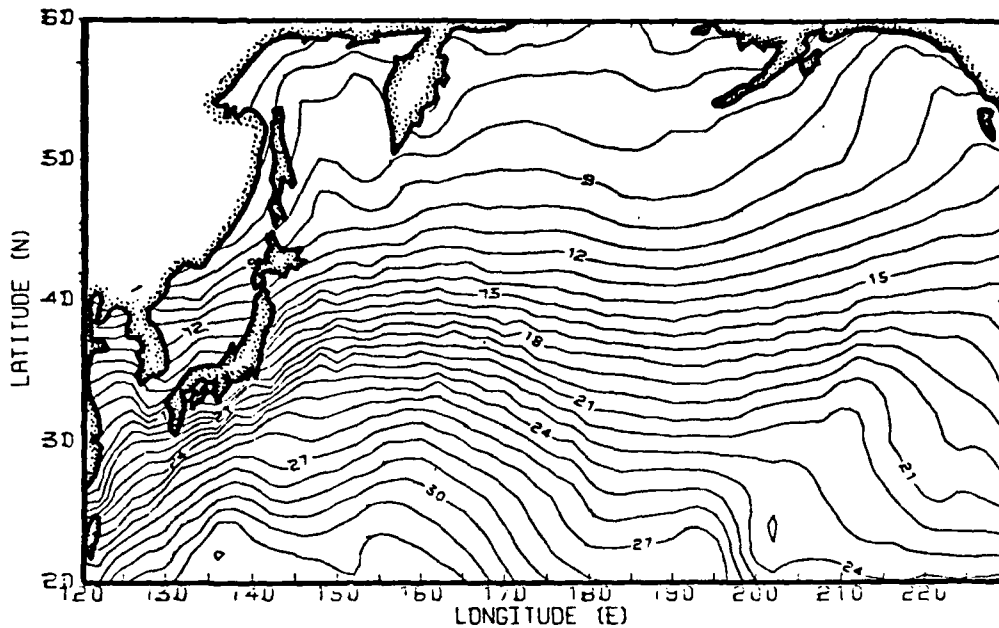


FIGURE 6.9 Monthly mean surface vapor pressure is the mean of 12-hourly FNWC vapor pressure at 19.5 meters. Contour intervals are 1 mb.

SENSIBLE HEAT FLUX (10^{10} CAL/CM² SEC) OCT 78

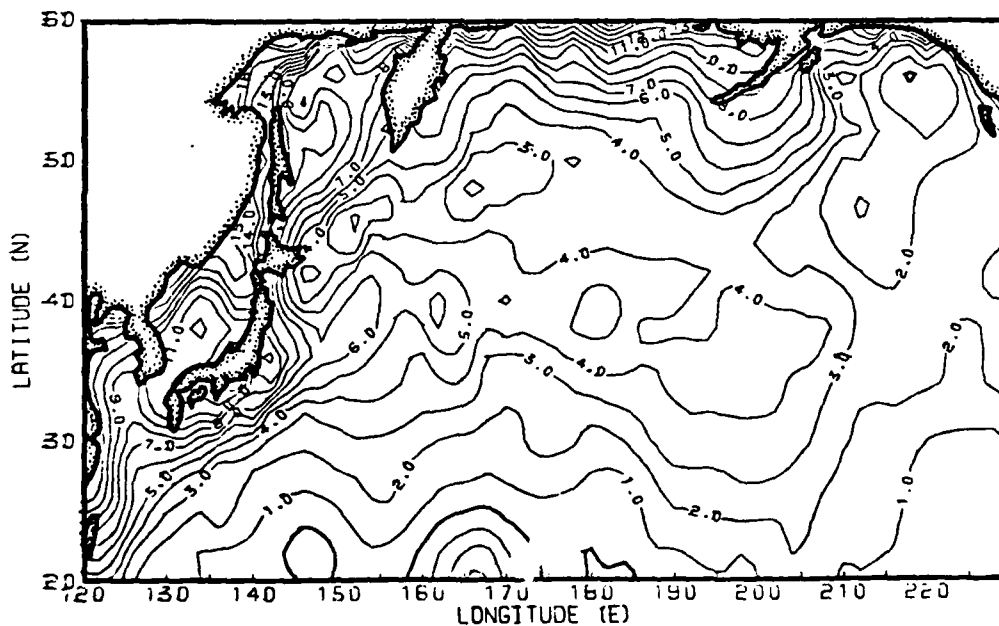


FIGURE 6.10 Monthly mean sensible heat flux (ocean to atmosphere) is the mean of 12-hourly sensible heat flux calculated from FNWC air and sea temperature and wind using a bulk formula. Isolines of zero heat flux are plotted heavily, and contour intervals are 1.0×10^{10} cal/cm² sec.

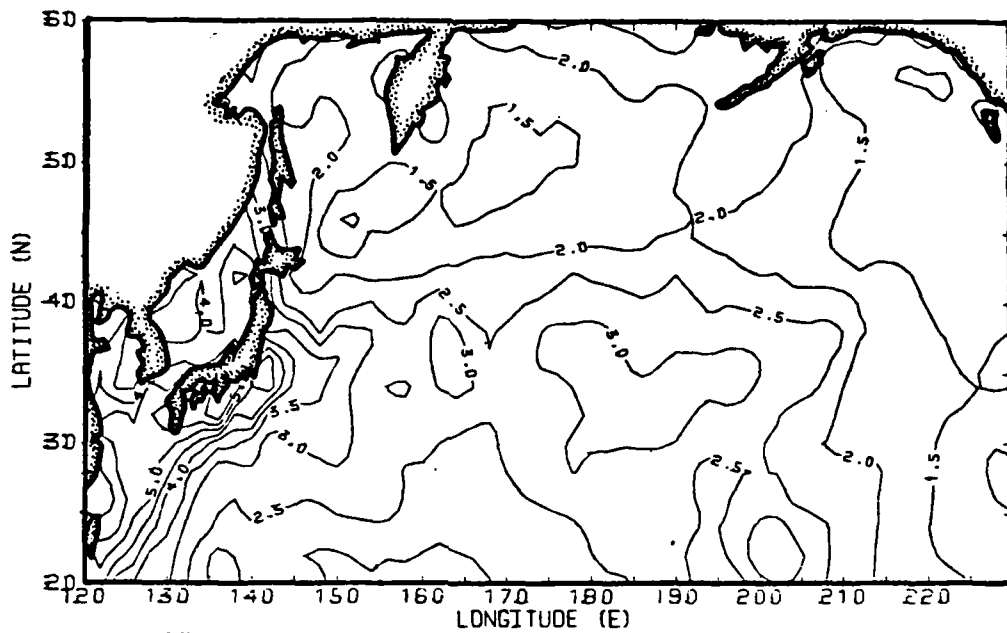


FIGURE 6.11 Monthly mean latent heat flux (ocean to atmosphere) is the mean of 12-hourly latent heat flux calculated from FNWC sea temperature, vapor pressure and wind using a bulk formula. Isofine of zero heat flux are plotted heavily, and contour intervals are 0.5×10^{-3} cal/cm² sec.

OFFICIAL INTERPOLATED TRANSPAC XBT OBS-OCT 1978

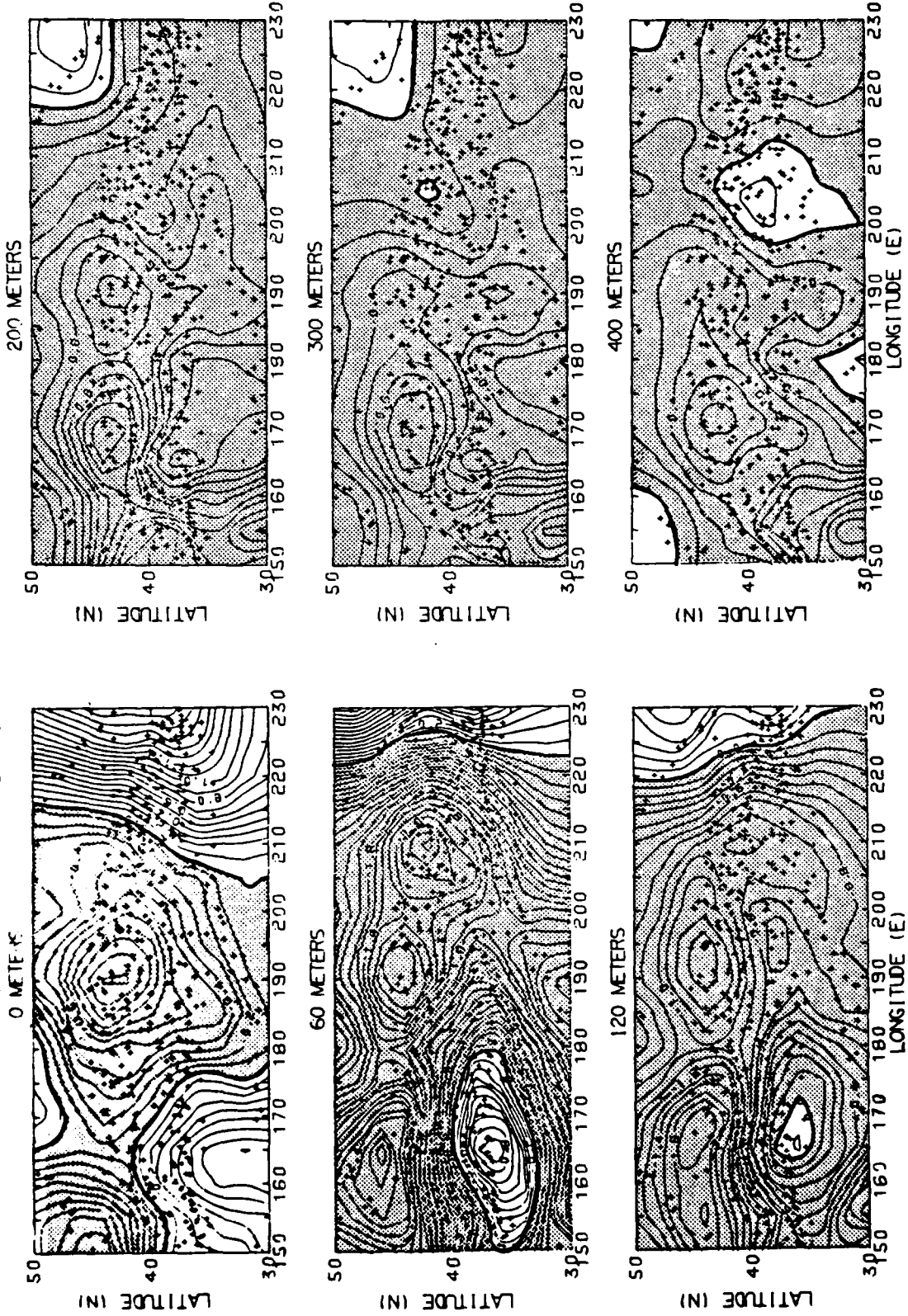


FIGURE 6.12 Monthly temperature anomalies ($^{\circ}\text{C}$) contoured at fixed depths. Negative anomaly areas are hatched and isolines of zero anomaly are drawn heavily. The crosses mark the positions of the TRANSPAC XBT drops. Increments are in $.1^{\circ}\text{C}$ (prepared by W. White, SIO).

WIND SPEED (M/SEC)

NOV 78

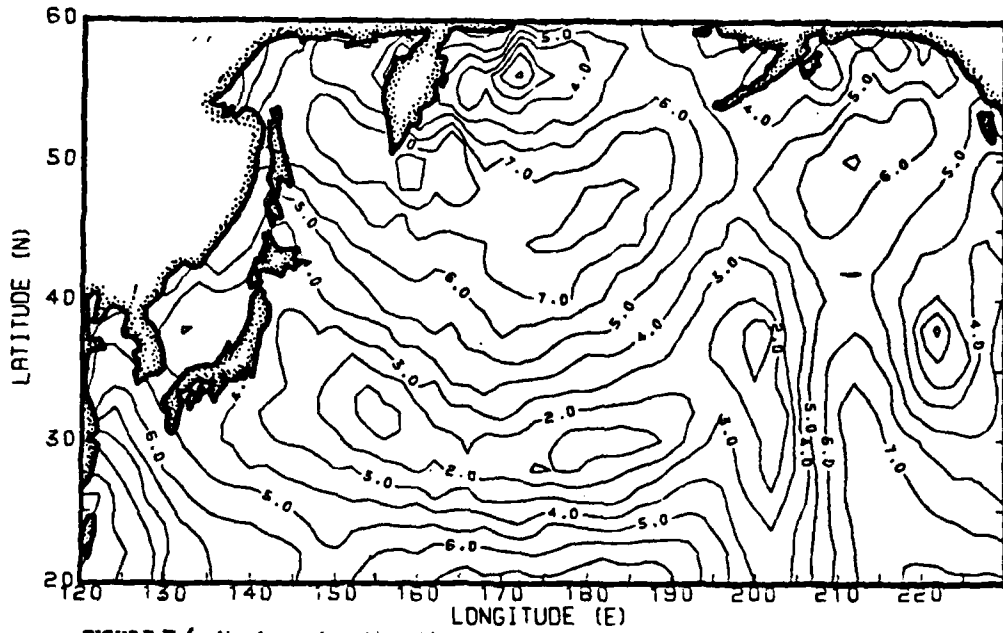


FIGURE 7.1 Absolute value of monthly mean vector wind velocities at 19.5 meters. Contour intervals are 1 m/sec.

WIND DIRECTION

NOV 78

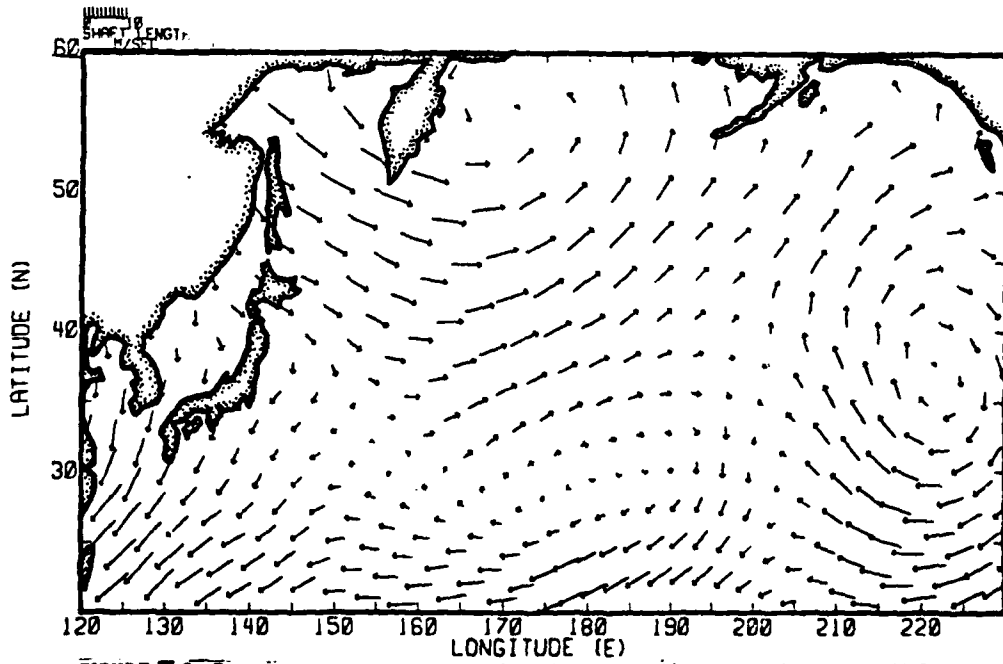


FIGURE 7.2 Direction arrows representing directions of monthly mean wind vectors at 19.5 meters. Length of arrow shaft indicates wind speed in m/sec. (See scale above figure).

WIND STRESS (DYNES/CM**2)

NOV 78

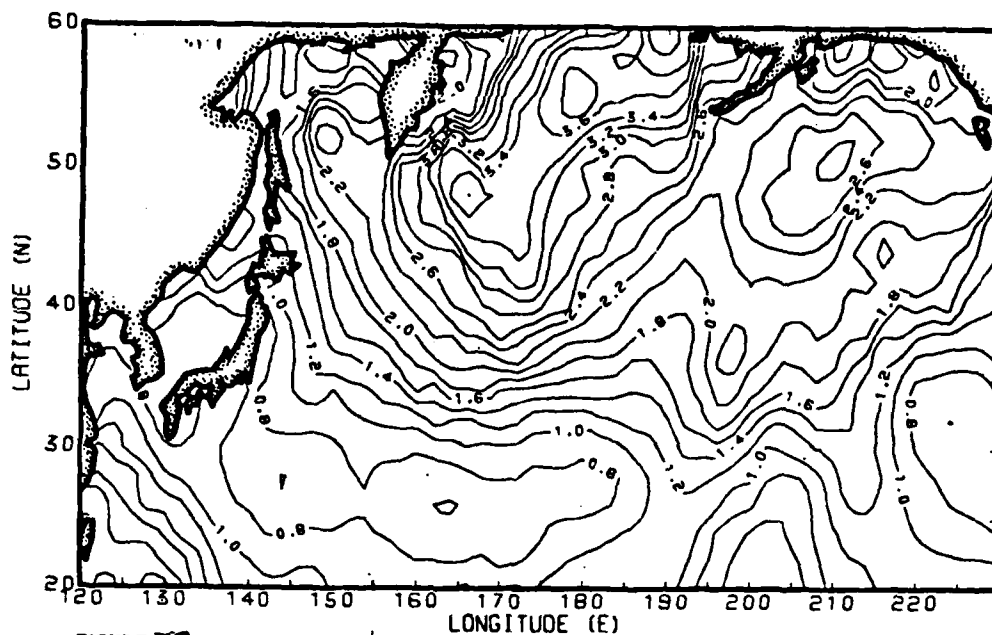


FIGURE 7.3 Monthly mean wind stress is the mean of 6-hourly wind stress at 10 meters calculated from FNWC wind data. Contour intervals are 0.2 dynes/cm².

CURL OF WIND STRESS (10**⁻⁹ DYNES/CM**3)

NOV 78

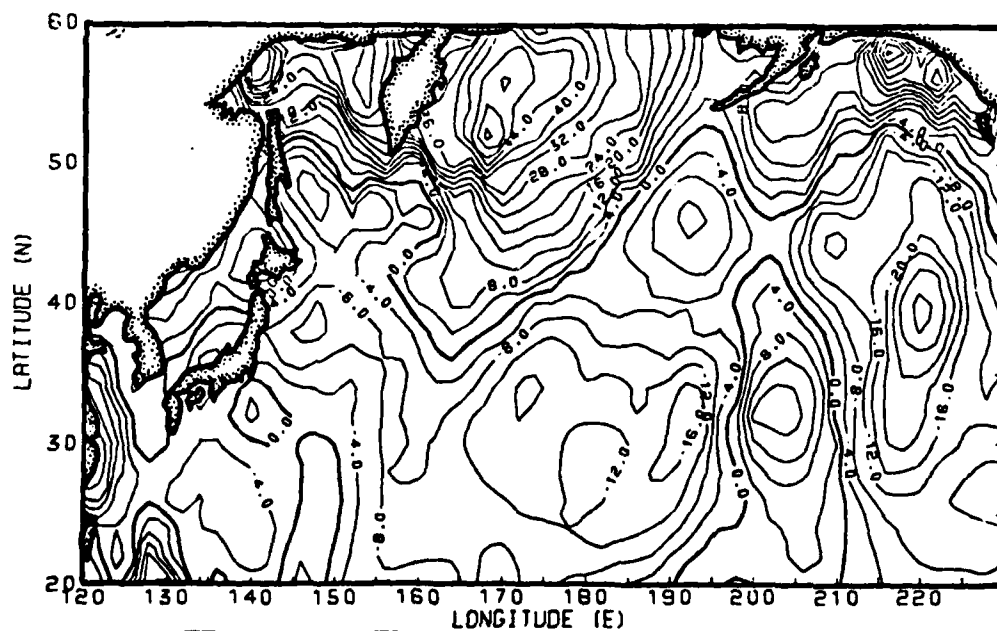


FIGURE 7.4 The vertical component of monthly mean wind stress curl is the mean of 6-hourly wind stress curl approximated by finite-differences from 6-hourly wind stresses at 10 meters. Isolines of zero curl are plotted heavily, and contour intervals are 4.0×10^{-9} dynes/cm³.

U STAR CUBED ((M/SEC)**3)

NOV 78

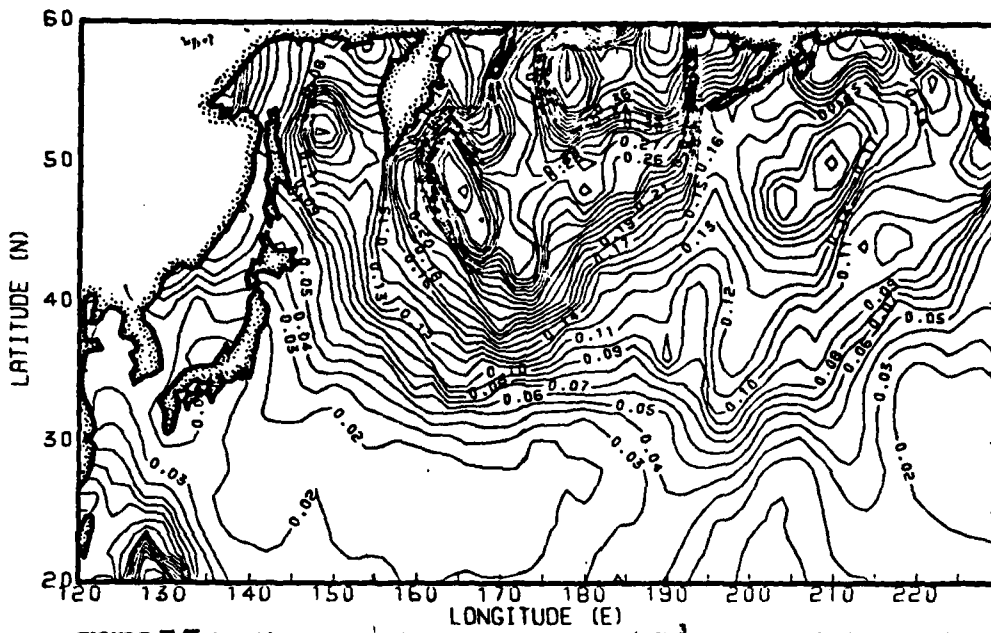


FIGURE 7.5 Monthly mean wind shear stress velocity cubed, U_*^3 is the mean of 6-hourly wind shear stress velocity cubed calculated from wind speed at 10 meters. Contour intervals are 0.02, (m/sec)³.

SEA SURFACE TEMPERATURE (DEG.C)

NOV 78

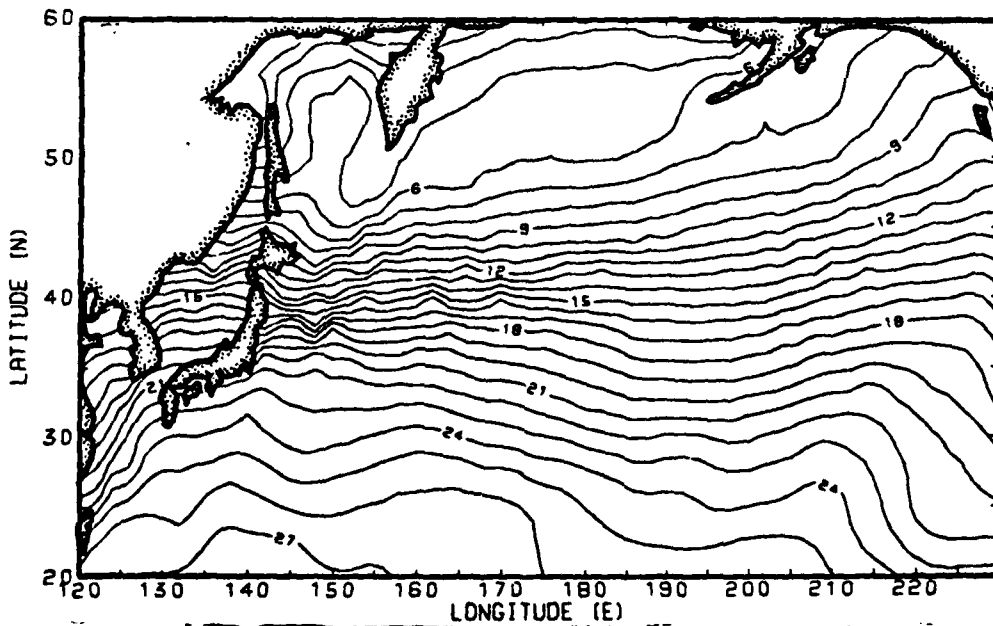


FIGURE 7.6 Monthly mean sea surface temperature is the mean of 12-hourly FNWC sea surface temperatures. Contour intervals are 1°C.

AIR TEMPERATURE (DEG. C) NOV 78

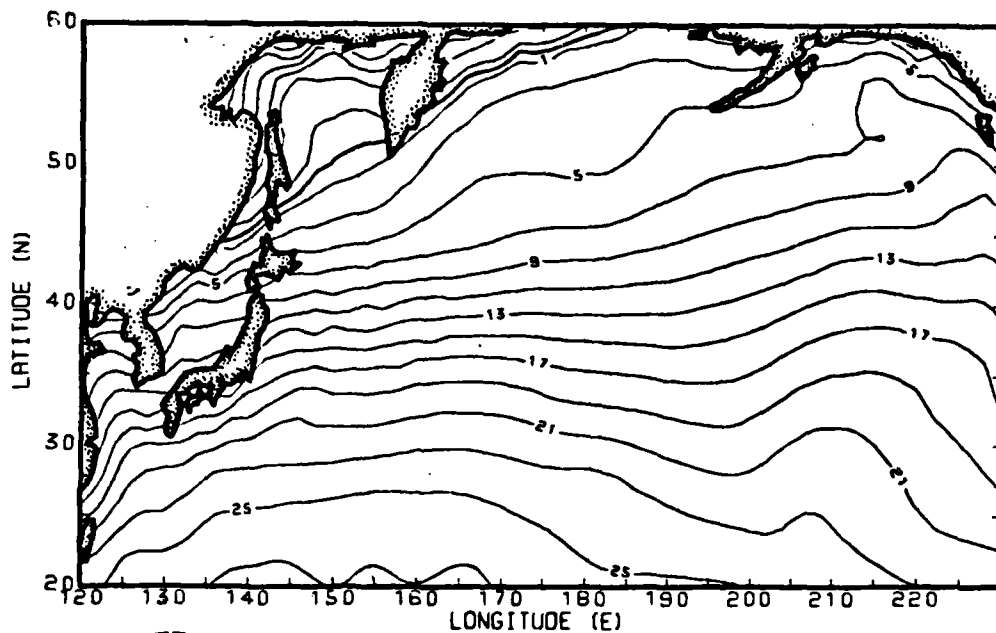


FIGURE 7.7 Monthly mean air temperature is the mean of 12-hourly FNWC air temperature. Contour intervals are 2°C.

700 MB HEIGHT (M) NOV 78

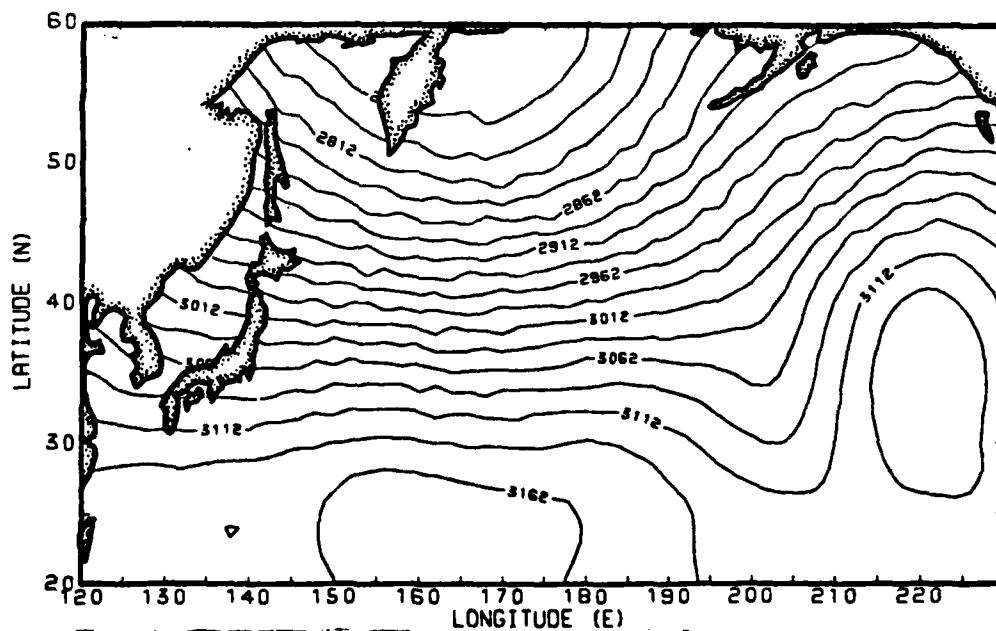


FIGURE 7.8 Monthly mean 700 mb height is the mean of 12-hourly FNWC 700 mb heights. Contour intervals are 35 meters.

VAPOR PRESSURE (MB) NOV 78

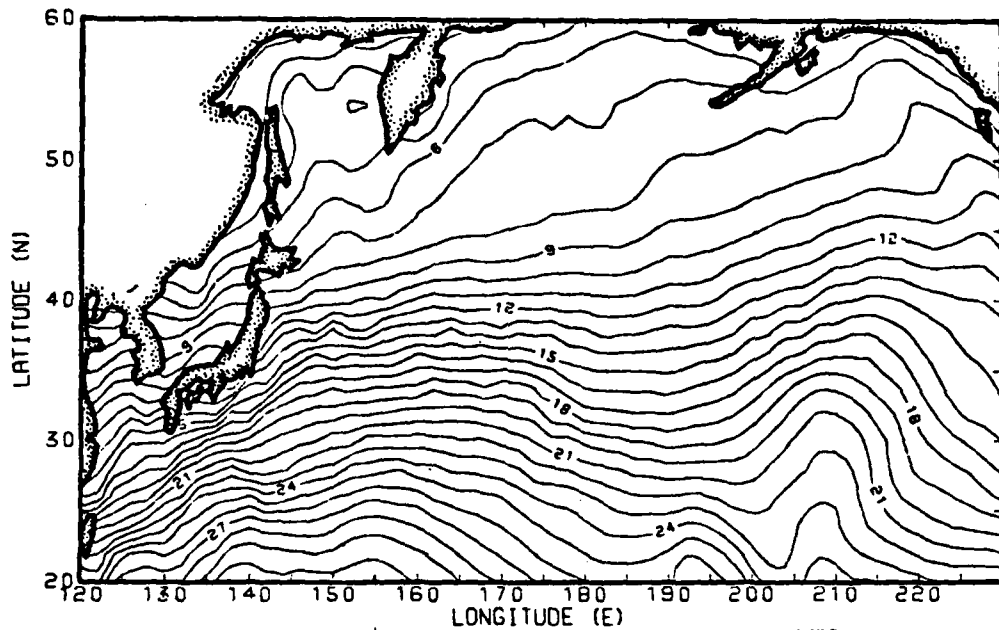


FIGURE 7.9 Monthly mean surface vapor pressure is the mean of 12-hourly FNWC vapor pressure at 19.5 meters. Contour intervals are 1 mb.

SENSIBLE HEAT FLUX (10^{-4} CAL/CM² SEC) NOV 78

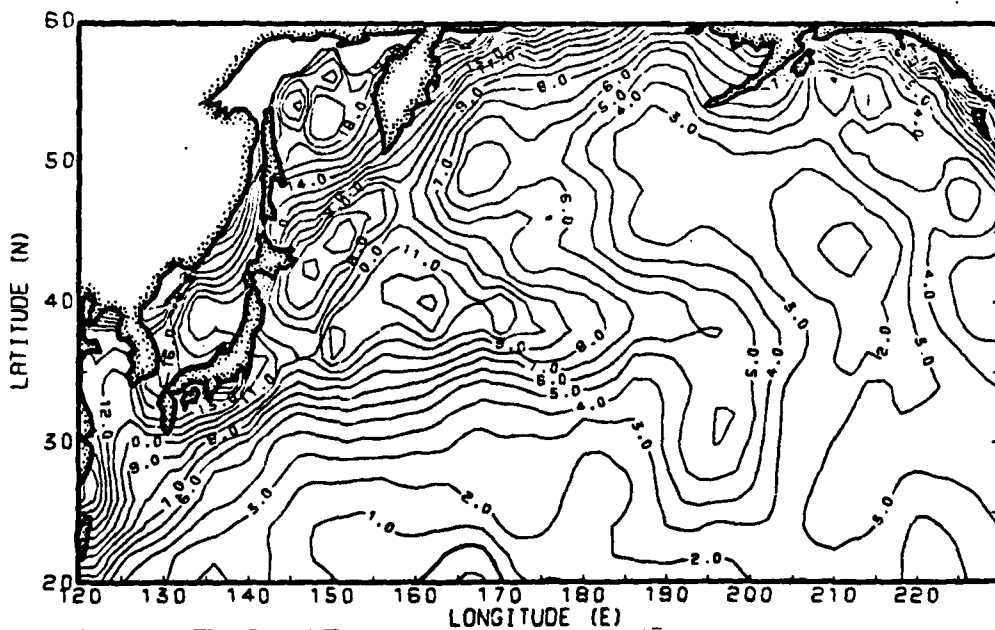


FIGURE 7.10 Monthly mean sensible heat flux (ocean to atmosphere) is the mean of 12-hourly sensible heat flux calculated from FNWC air and sea temperature and wind using a bulk formula. Isolines of zero heat flux are plotted heavily, and contour intervals are 1.0×10^{-4} cal/cm² sec.

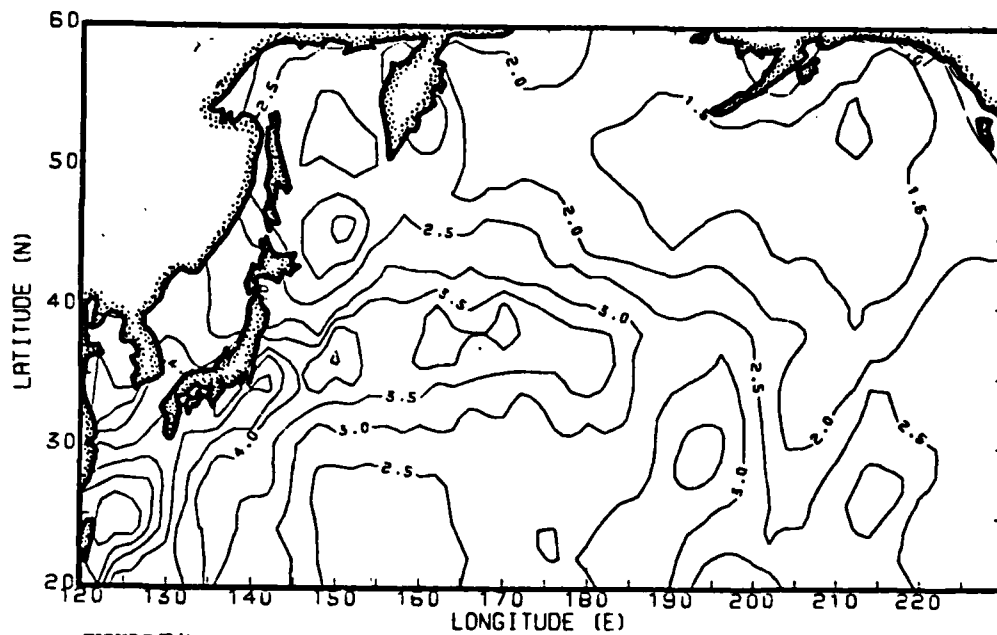


FIGURE 7.11 Monthly mean latent heat flux (ocean to atmosphere) is the mean of 12-hourly latent heat flux calculated from FNWC sea temperature, vapor pressure and wind using a bulk formula. Isotherms of zero heat flux are plotted heavily, and contour intervals are 0.5×10^{-3} cal/cm² sec.

OPTIMALLY INTERPOLATED TRANSPAC XBT OBS-NOV 1978

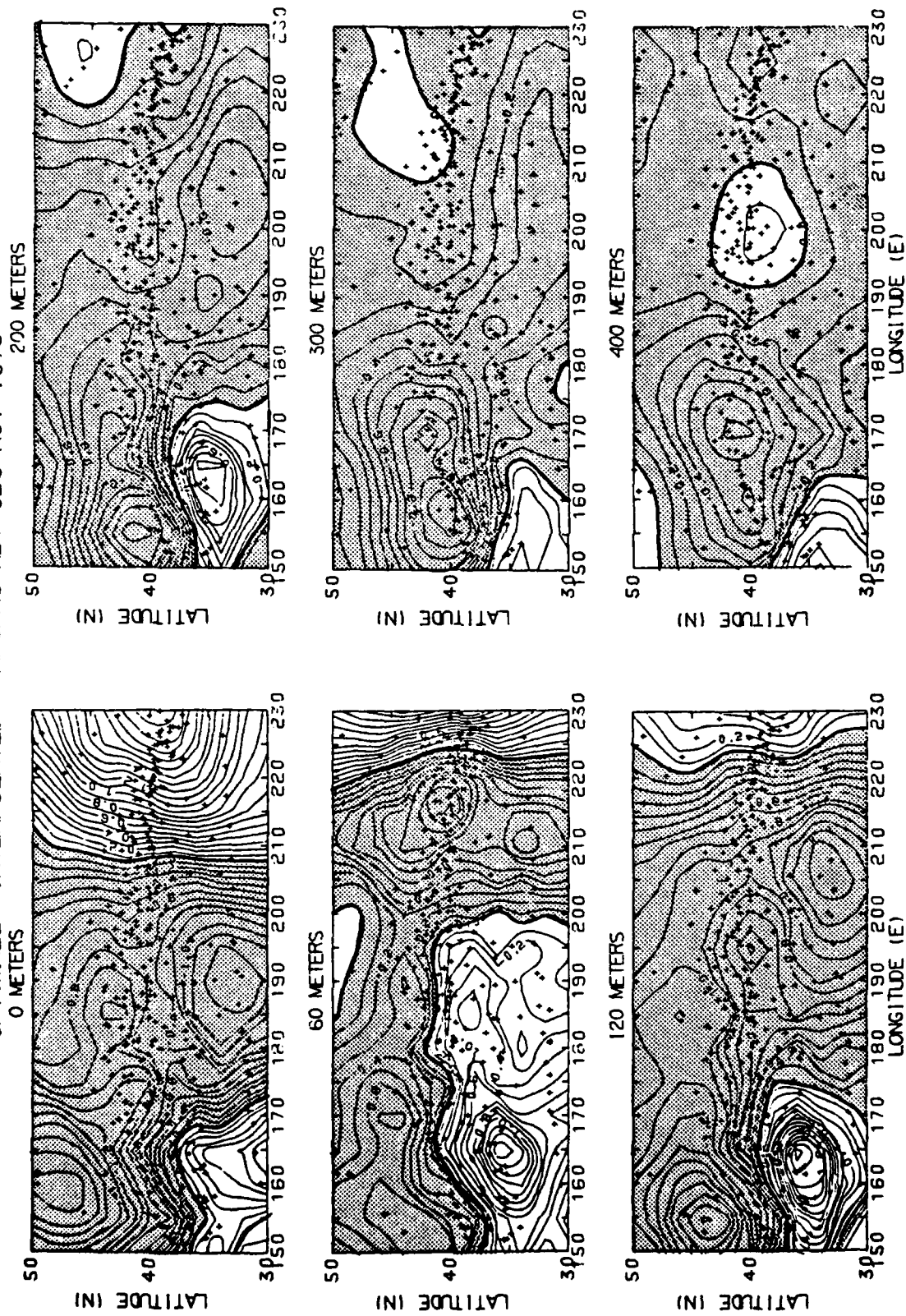


FIGURE 7.12 Monthly temperature anomalies ($^{\circ}\text{C}$) contoured at fixed depths. Negative anomaly areas are hatched and isoline of zero anomaly are drawn heavily. The crosses mark the positions of the TRANSPAC XBT drops. Increments are in $.1^{\circ}\text{C}$ (prepared by W. White, SIO).

APPENDIX. Curl of Wind Stress Corrections to ADS Reports 1, 2 and 3

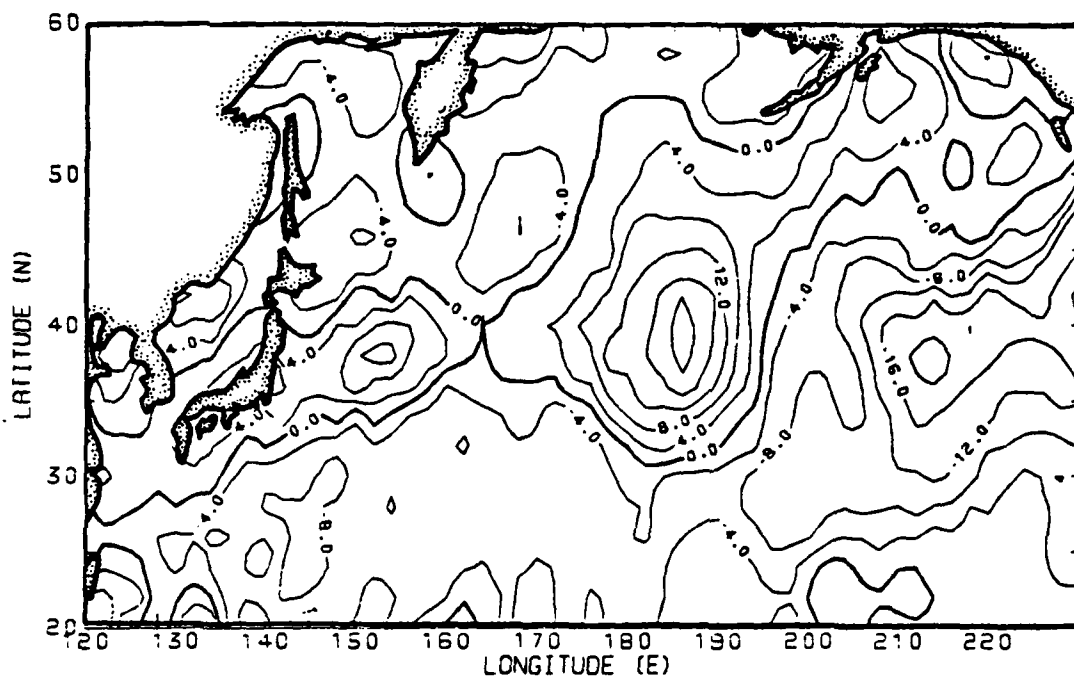


FIGURE A.1 The vertical component of monthly mean wind stress curl is the mean of 6-hourly wind stress curl approximated by finite-differences from 6-hourly wind stresses at 10 meters. Isolines of zero curl are plotted heavily, and contour intervals are 4.0×10^{-9} dynes/cm³.

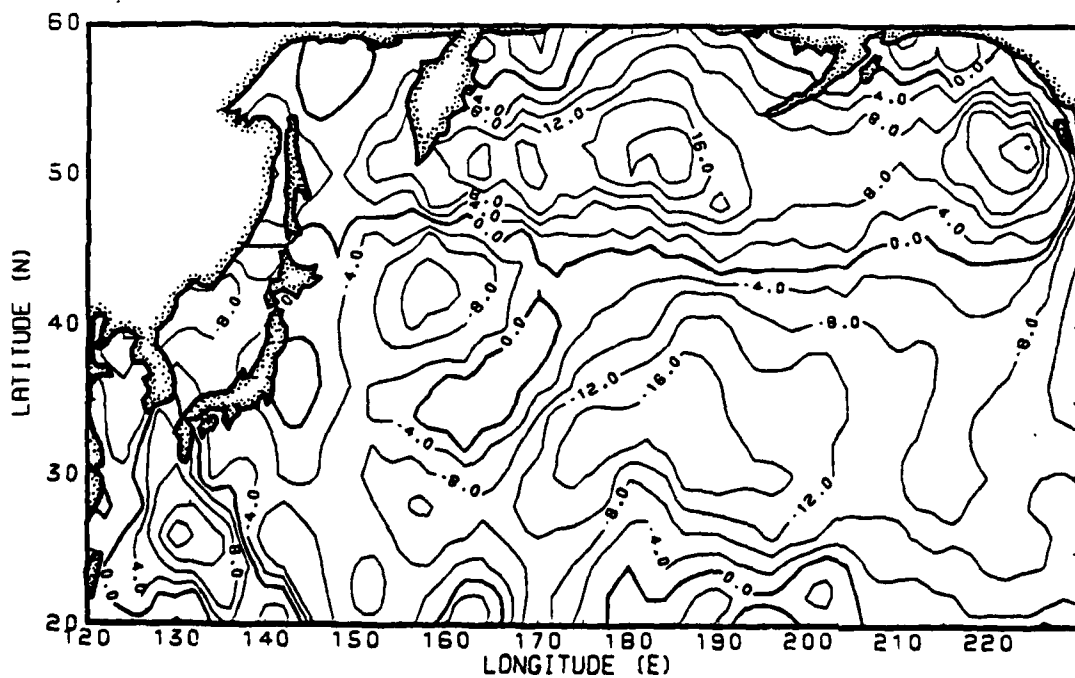


FIGURE A.2 The vertical component of monthly mean wind stress curl is the mean of 6-hourly wind stress curl approximated by finite-differences from 6-hourly wind stresses at 10 meters. Isolines of zero curl are plotted heavily, and contour intervals are 4.0×10^{-9} dynes/cm³.

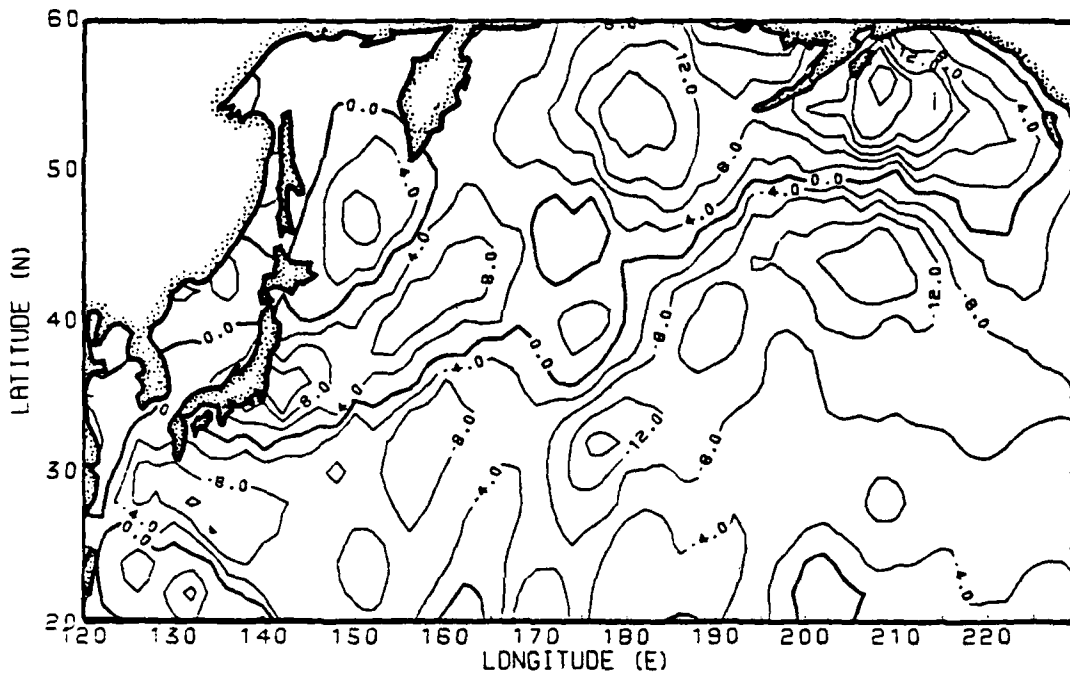


FIGURE A.3 The vertical component of monthly mean wind stress curl is the mean of 6-hourly wind stress curl approximated by finite-differences from 6-hourly wind stresses at 10 meters. Isolines of zero curl are plotted heavily, and contour intervals are 4.0×10^{-9} dynes/cm³.

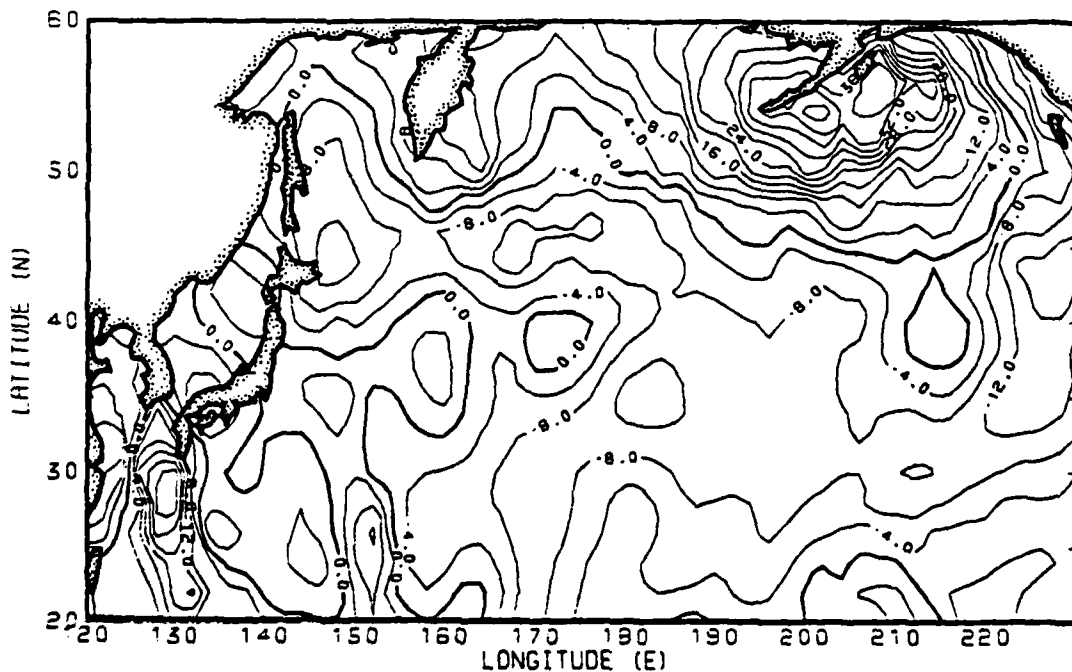


FIGURE A.4 The vertical component of monthly mean wind stress curl is the mean of 6-hourly wind stress curl approximated by finite-differences from 6-hourly wind stresses at 10 meters. Isolines of zero curl are plotted heavily, and contour intervals are 4.0×10^{-9} dynes/cm³.

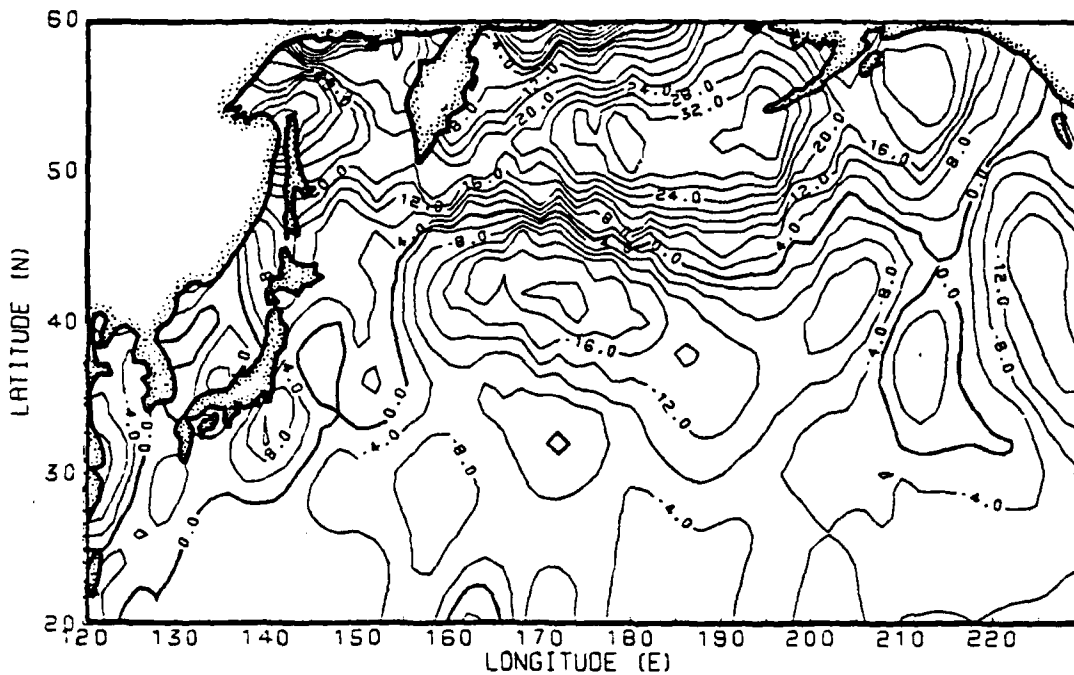


FIGURE A.5 The vertical component of monthly mean wind stress curl is the mean of 6-hourly wind stress curl approximated by finite-differences from 6-hourly wind stresses at 10 meters. Isolines of zero curl are plotted heavily, and contour intervals are 4.0×10^{-9} dynes/cm³.

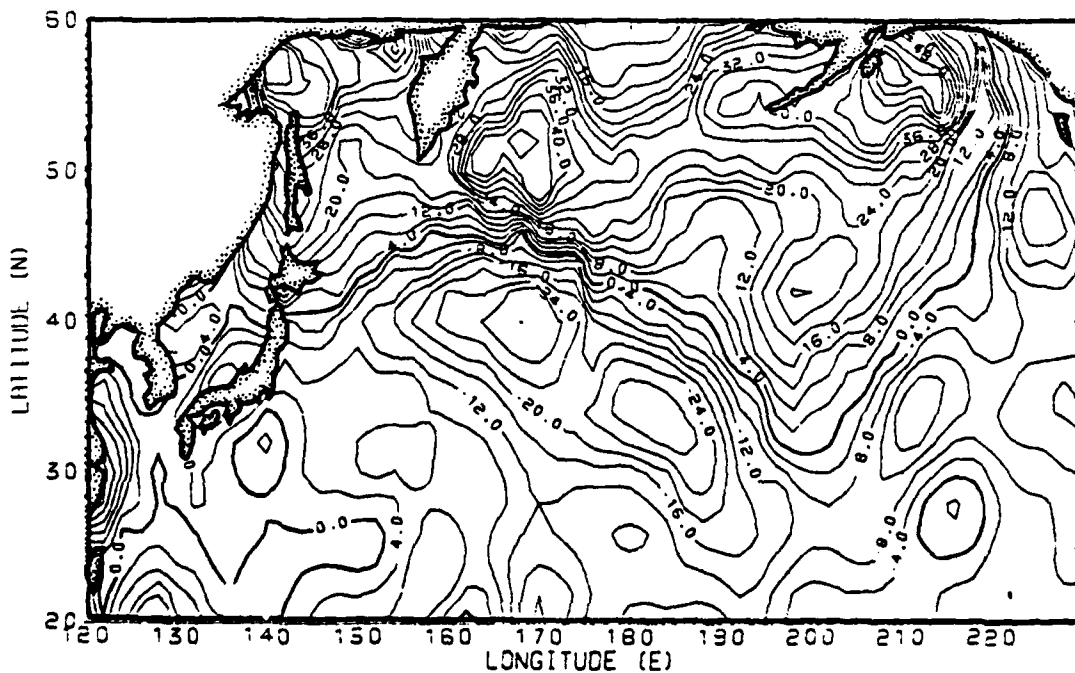


FIGURE A.6 The vertical component of monthly mean wind stress curl is the mean of 6-hourly wind stress curl approximated by finite-differences from 6-hourly wind stresses at 10 meters. Isolines of zero curl are plotted heavily, and contour intervals are 4.0×10^{-9} dynes/cm³.

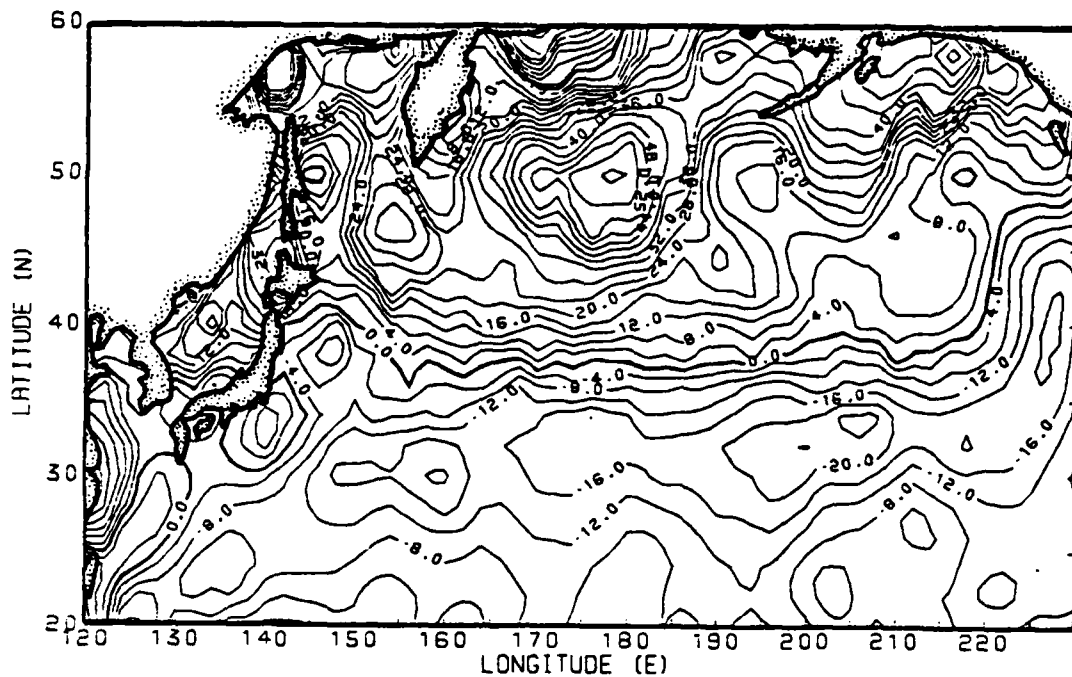


FIGURE A.7 The vertical component of monthly mean wind stress curl is the mean of 6-hourly wind stress curl approximated by finite-differences from 6-hourly wind stresses at 10 meters. Isolines of zero curl are plotted heavily, and contour intervals are 4.0×10^{-9} dynes/cm³.

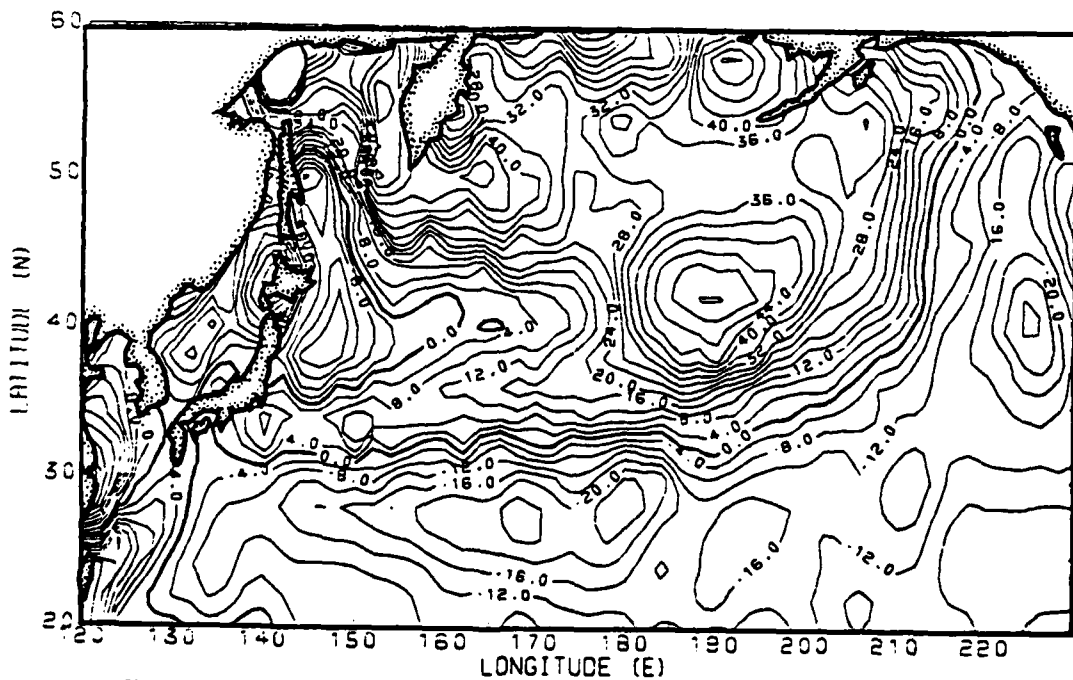


FIGURE A.8 The vertical component of monthly mean wind stress curl is the mean of 6-hourly wind stress curl approximated by finite-differences from 6-hourly wind stresses at 10 meters. Isolines of zero curl are plotted heavily, and contour intervals are 4.0×10^{-9} dynes/cm³.

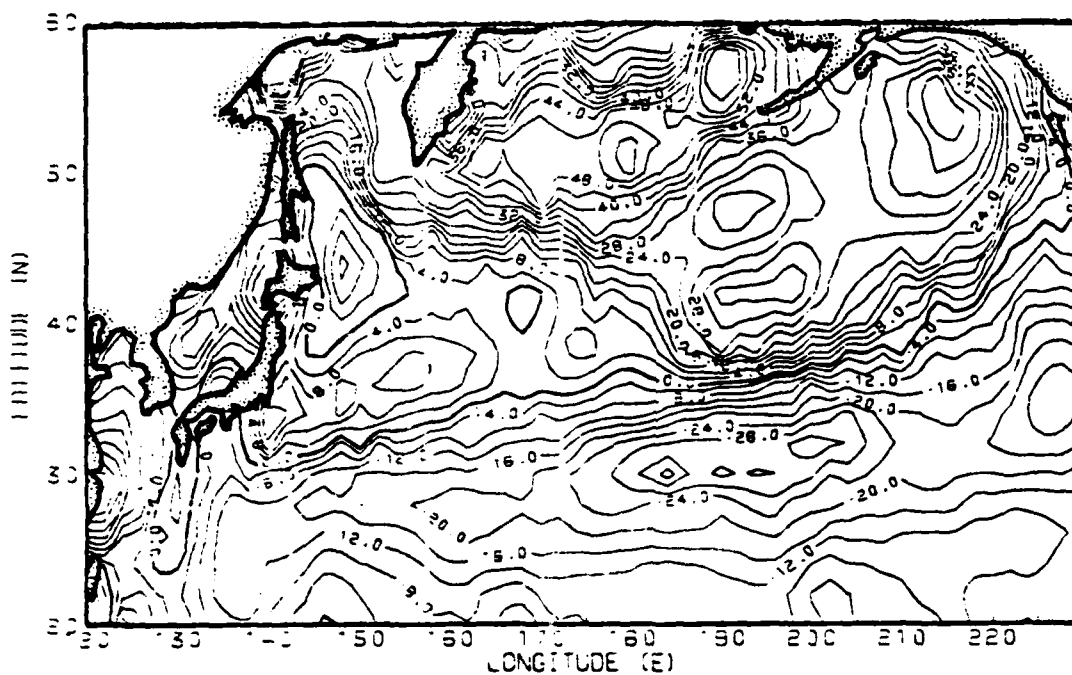


FIGURE A.7 The vertical component of monthly mean wind stress curl is the mean of 6-hourly wind stress curl approximated by finite-differences from 6-hourly wind stresses at 10 meters. Isolines of zero curl are plotted heavily, and contour intervals are 4.0×10^{-9} dynes/cm².

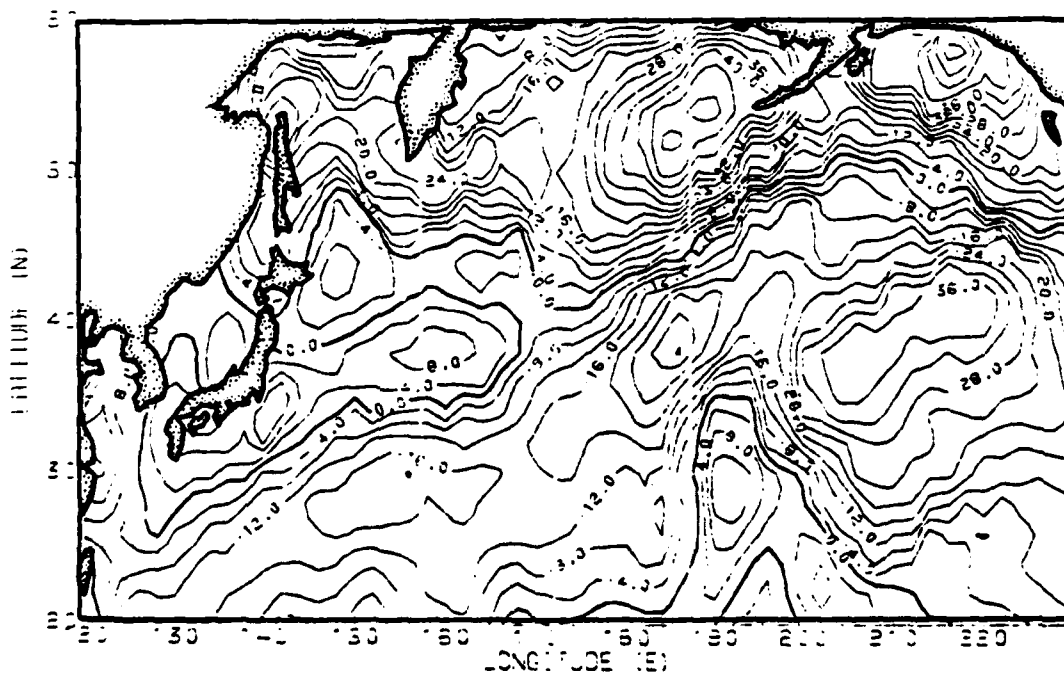


FIGURE A.10 The vertical component of monthly mean wind stress curl is the mean of 6-hourly wind stress curl approximated by finite-differences from 6-hourly wind stresses at 10 meters. Isolines of zero curl are plotted heavily, and contour intervals are 4.0×10^{-9} dynes/cm².

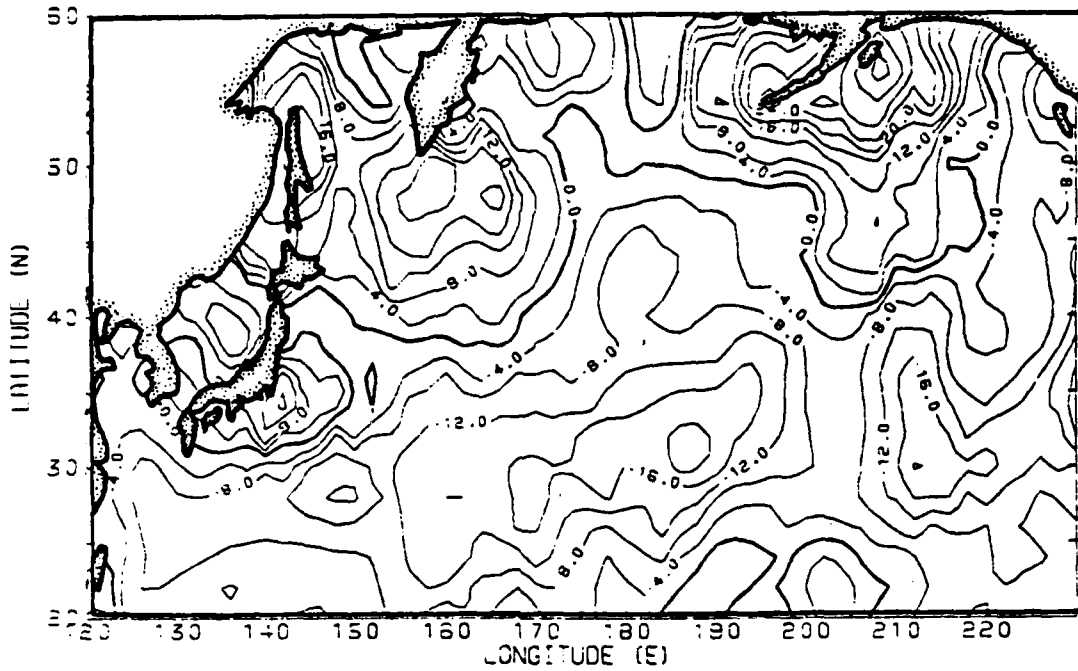


FIGURE A.1) The vertical component of monthly mean wind stress curl is the mean of 6-hourly wind stress curl approximated by finite-differences from 6-hourly wind stresses at 10 meters. Isolines of zero curl are plotted heavily, and contour intervals are 4.0×10^{-9} dynes/cm³.

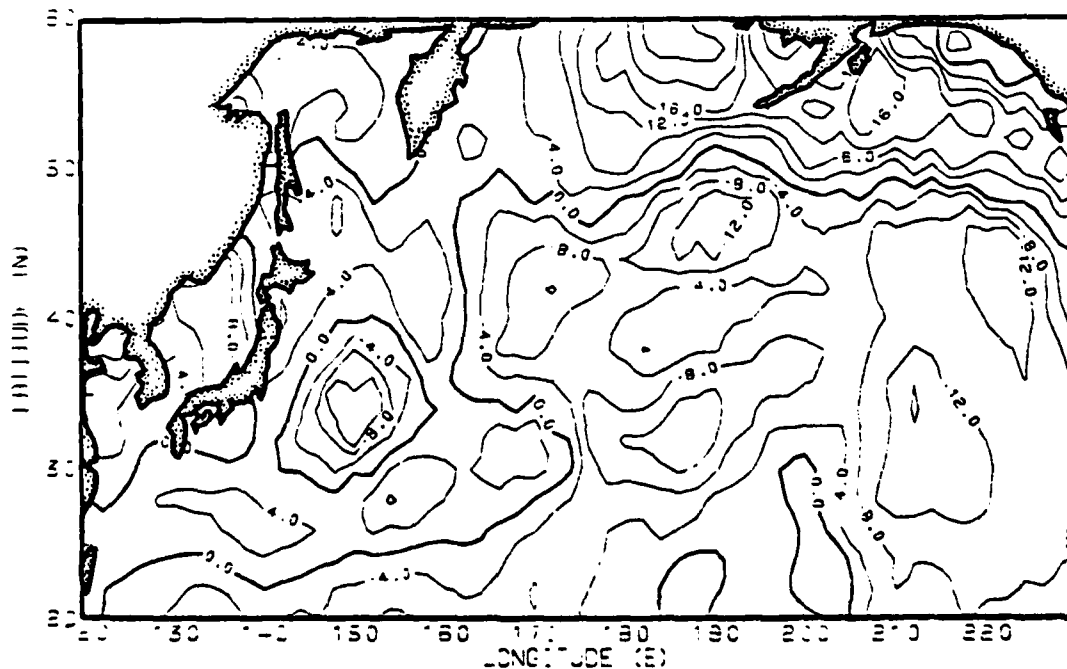


FIGURE A.12. The vertical component of monthly mean wind stress curl is the mean of 6-hourly wind stress curl approximated by finite-differences from 6-hourly wind stresses at 10 meters. Isolines of zero curl are plotted heavily, and contour intervals are 4.0×10^{-9} dynes/cm³.

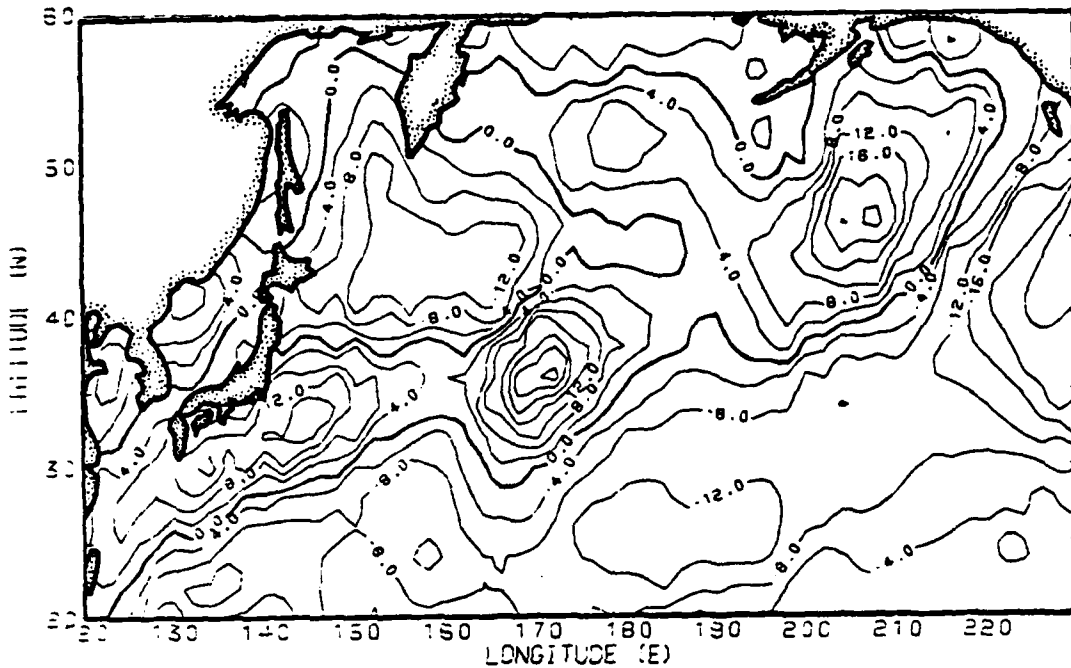


FIGURE A.13 The vertical component of monthly mean wind stress curl is the mean of 6-hourly wind stress curl approximated by finite-differences from 6-hourly wind stresses at 10 meters. Isolines of zero curl are plotted heavily, and contour intervals are 4.0×10^{-9} dynes/cm³.

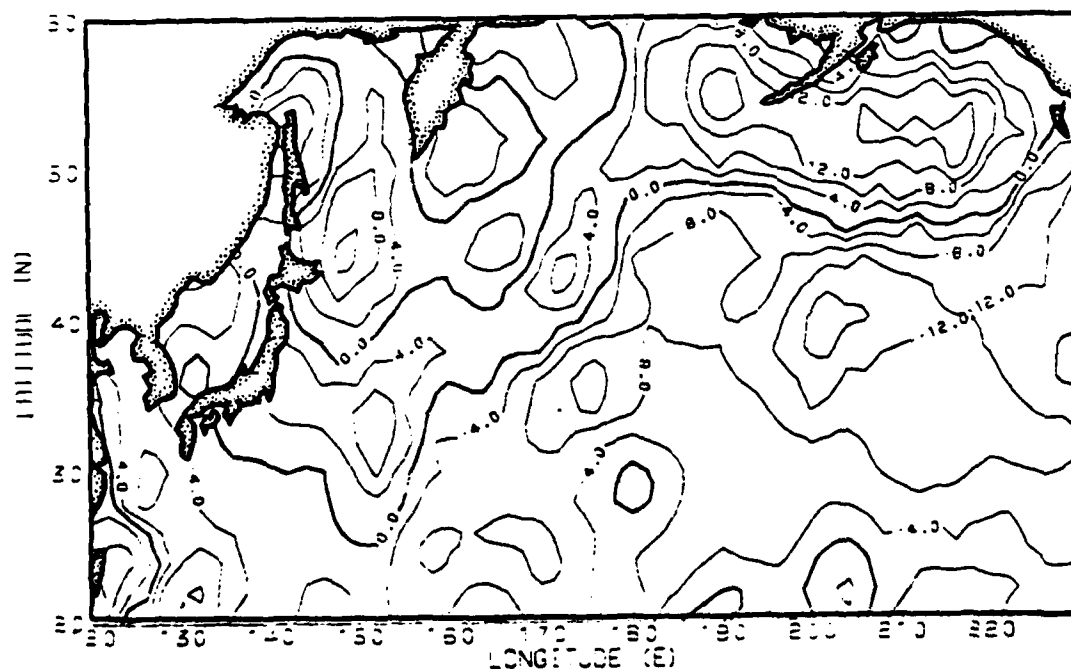


FIGURE A.14 The vertical component of monthly mean wind stress curl is the mean of 6-hourly wind stress curl approximated by finite-differences from 6-hourly wind stresses at 10 meters. Isolines of zero curl are plotted heavily, and contour intervals are 4.0×10^{-9} dynes/cm³.

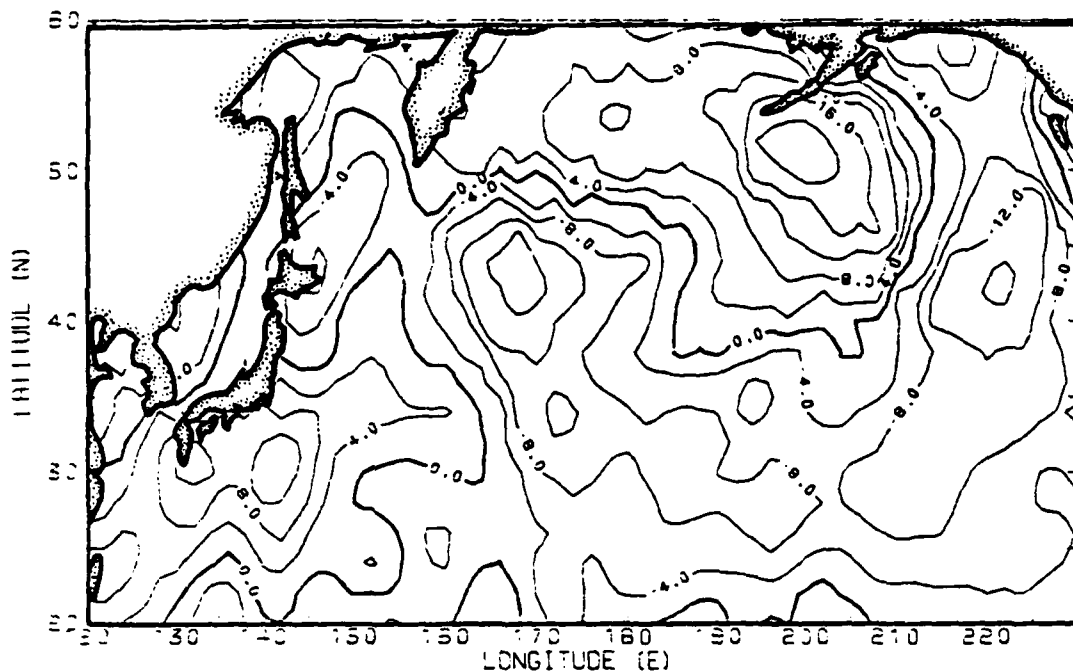


FIGURE A.15 The vertical component of monthly mean wind stress curl is the mean of 6-hourly wind stress curl approximated by finite-differences from 6-hourly wind stresses at 10 meters. Isolines of zero curl are plotted heavily, and contour intervals are 4.0×10^{-9} dynes/cm 3 .

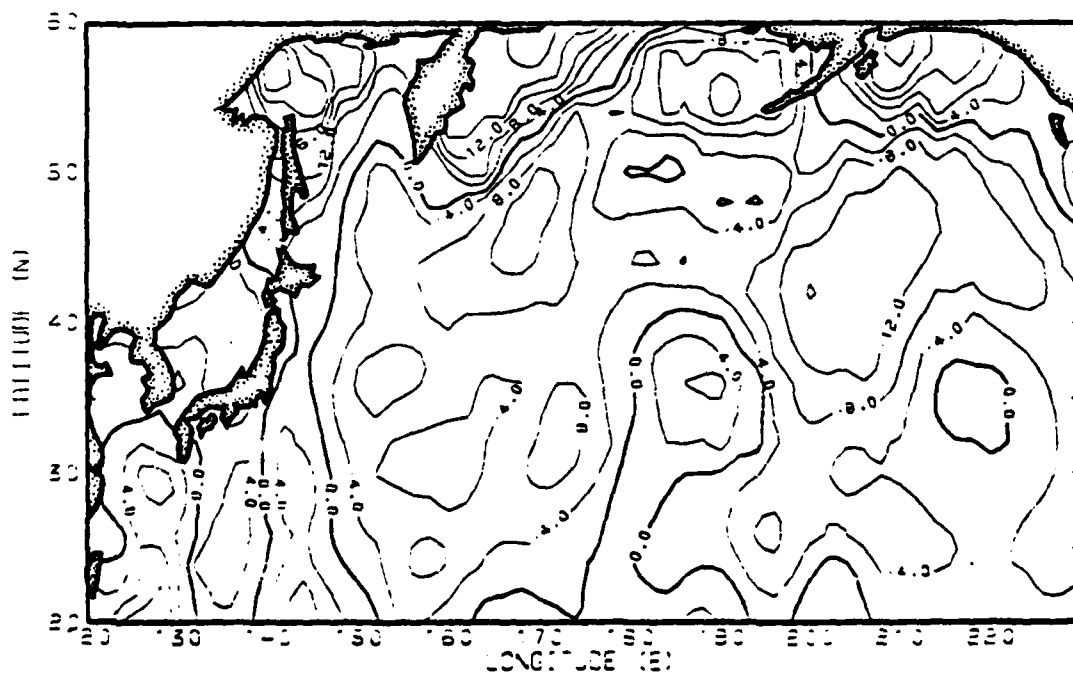


FIGURE A.16 The vertical component of monthly mean wind stress curl is the mean of 6-hourly wind stress curl approximated by finite-differences from 6-hourly wind stresses at 10 meters. Isolines of zero curl are plotted heavily, and contour intervals are 4.0×10^{-9} dynes/cm 3 .

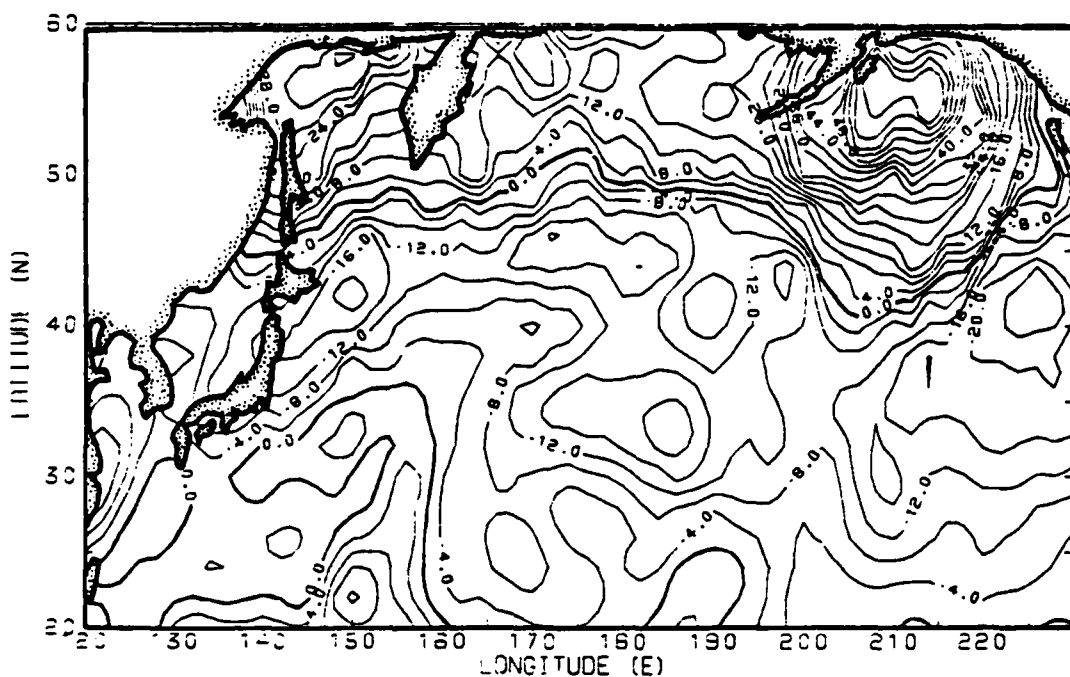


FIGURE A.17 The vertical component of monthly mean wind stress curl is the mean of 6-hourly wind stress curl approximated by finite-differences from 6-hourly wind stresses at 10 meters. Isolines of zero curl are plotted heavily, and contour intervals are 4.0×10^{10} dynes/cm 2 .

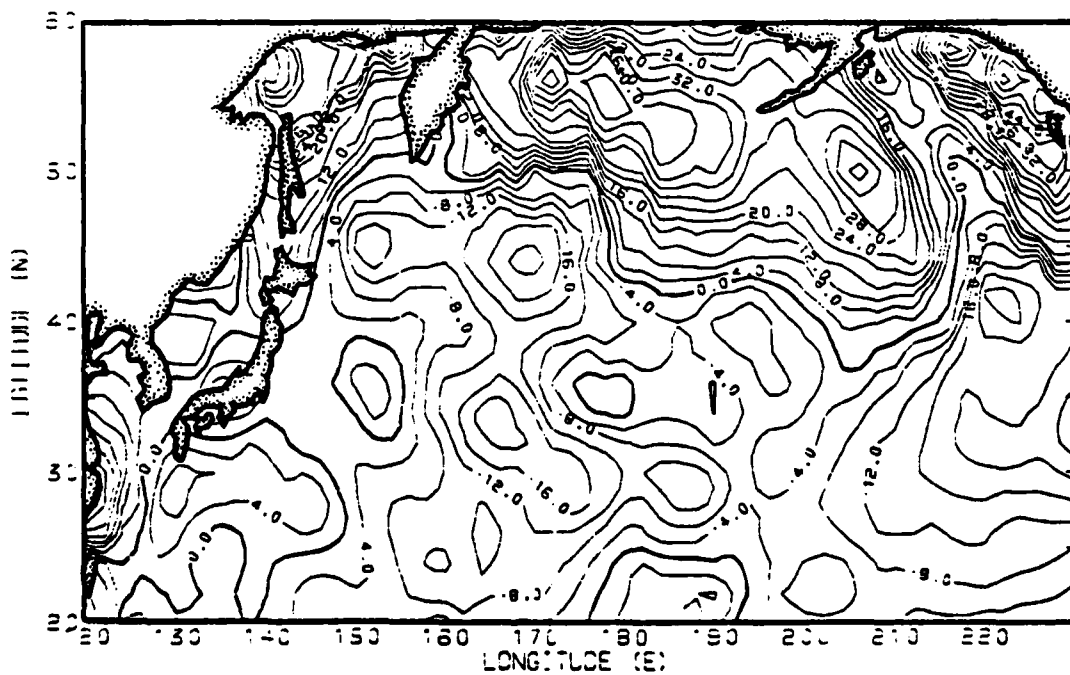


FIGURE A.18 The vertical component of monthly mean wind stress curl is the mean of 6-hourly wind stress curl approximated by finite-differences from 6-hourly wind stresses at 10 meters. Isolines of zero curl are plotted heavily, and contour intervals are 4.0×10^{10} dynes/cm 2 .

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