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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE
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OFFICE NOTE 182

Monthly Mean Sea Surface Temperature Fields

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This is an unreviewed manuscript, primarily intended for informal exchange of information among NMC staff members.

Monthly Mean Sea Surface Temperature Fields

The information in this Office Note describes the global monthly mean sea surface temperature (SST) climatology fields that now reside in the data set 'NWS.NMC.PROD.FIX.' The monthly fields are on a 2° latitude, longitude grid. The data are ordered monthly by hemisphere, so that 24 fields are in the file.

The monthly mean SST data were obtained from the RAND Corporation (1). The Rand data are a blend of gridded data from the National Center for Atmospheric Research (NCAR) and from the U.S. Navy Fleet Numerical Weather Central (FNWC). The NCAR data were on a $2\frac{1}{2}^{o}$ latitude, longitude grid between 60°S to 60°N. FNWC data was a monthly climatology for the Northern Hemisphere on a 125 x 125 rectangular grid on a polar stereographic projection mesh length of 190.5 km at 60°N. Since FNWC appeared to provide better values in the cold portion of the eastern equatorial Pacific Ocean, the FNWC and NCAR data fields were merged by RAND near the equator. However, Alexander and Mobley (1) warned that at high southern latitudes near 60°S, errors of 2°C may exist. These errors are of the same magnitude as are monthly anomalies themselves. Sea temperatures are interpolated over land, requiring the user to provide a land-sea table.

The RAND fields specified ice as having a uniform temperature of 271.2^{o}C, open water temperatures are given in ^{o}C. Monthly ice limits for the Arctic were obtained from the U.S. Fleet Weather Facility and for the Antarctic mean ice limits were provided from U.S. Naval Hydrographic Office charts.

Although the resolution of NCAR and FNWC data is less than 1°, the global RAND SST is interpolated to a 1° grid.

The NMC 2° data were extracted directly from the 1° data. Water temperatures are given in ^{o}K and ice is designated as 268.0^{o}K.

The data points are located at grid intersections starting at (0°N, 0°W). The sea surface temperature fields are arranged in accordance with grid markers K=33 (Northern Hemisphere) and K=34 (Southern Hemisphere) described in Office Note 84 (2). The array is a 181 x 46 field (8326 points). Figure 1 shows the arrangement of the grid points in the Northern Hemisphere and the Southern Hemisphere. The identification label (in hexadecimal) of each field (6 words of 8 digits each) is given in Table 1. A sample program for accessing the climatology fields is given in Table 2.

The fields were interpolated to the standard 65 x 65 NMC grid (grid interval of 391.0 km at 60°N(S)), and contoured at 5°K intervals, and are shown in Figures 2-25. The 270°K isotherm approximates the ice edge.

The authors have the original 1° latitude, longitude SST data on tape and it is available upon request.

REFERENCES

1) Alexander, R. C. & R. L. Mobley, Monthly Average Sea-Surface Temperatures and Ice-Pack Limits on a 1° Global Grid (1976). Monthly Weather Review Vol. 104, No. 2, February 1976, pp. 143-148.

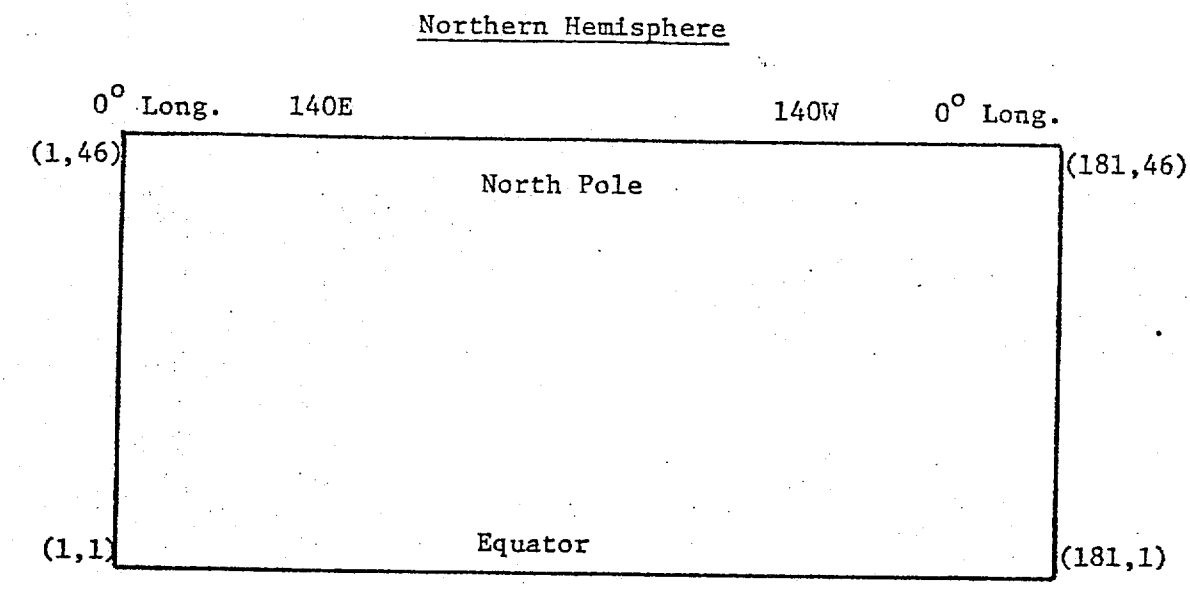
2) National Meteorological Center, Labels for NMC 360/195 Data Fields. Office Note 84 Rev. 1975, 18 pp.

Table 2. Fortran code to access correct month and hemisphere of the sea surface temperature climatology.

```
C       SAMPLE CODE TO ACCESS CORRECT MONTH AND HEMISPHERIC SST CLIMATOLOGY
C       AND PLACE IT IN ARRAY XFLD
        INTEGER*4 FLD(8338),XFLD(181,46),IDTBL(1539),LOCTBL(256)
        INTEGER*4 IWD5(24),ID(6)
        REAL*8 INPUT/'INPUT   '/
        EQUIVALENCE (XFLD(1,1),FLD(13))
        DATA N/255/,IN/4175/
        DATA ID/218008100,5*0/
        DATA IWD5/Z00010021,Z00020021,Z00030021,Z00040021,Z00050021,
       *Z00060021,Z00070021,Z00080021,Z00090021,Z000A0021,Z000B0021,
       *Z000C0021,Z00010022,Z00020022,Z00030022,Z00040022,Z00050022,
       *Z00060022,Z00070022,Z00080022,Z00090022,Z000A0022,Z000C0022,
       *Z000C0022/
C       SST CLIMATOLOGY MONTH(IMO) AND HEMISPHERE(IHEM)
C       SPECIFIED AS IMO=1 (JAN), ...,IMO=12 (DEC)
C                AND IHEM=1 (N HEM), IHEM=2 (S HEM)
C*******************
        IMO = 5
        IHEM = 1
C*******************
C
C        ID(5) = IWD5(K)  WHERE K = (IHEM-1)*12 + 273
C         IWD5(1)=JAN,N HEM,...,IWD5(12)=DEC,N HEM,IWD5(13)=JAN,S HEM,...
C         IWD5(24)=DEC,S HEM
C
        K = (IHEM-1)*12 + IMO
        ID(5) = IWD5(K)
C
        CALL W3FK00(INPUT,LOCTBL,N)
        CALL W3FK01(INPUT,ICTBL,N)
        CALL W3FK03(INPUT,ICTBL,ID,FLD,N,IN,IERR)
        IF(IERR) 1,2,1
      1 PRINT 10,IERR
     10 FORMAT(/' TROUBLE READING INPUT, IERR ',I2)
        GO TO 99
      2 CONTINUE
        CALL W3AI01(FLD,FLD(13),FLD)
C
C***    END OF ACCESSING XFLD
C
C** NEXT CARD CALLS A FICTITIOUS SUBROUTINE TO DISPLAY THE ARRAY XFLD AND MONTH
        CALL OUTPUT(XFLD,IMO)
     99 CONTINUE
        STOP
        END
```

Table 1. Identification labels for sea surface temperature climatology fields.

Label						Month	Hemisphere
18008100	00000000	00000000	00000000	00010021	00000000	Jan	Northern
				00020021		Feb	
				00030021		Mar	
				00040021		Apr	
				00050021		May	
				00060021		Jun	
				00070021		Jul	
				00080021		Aug	
				00090021		Sep	
				000A0021		Oct	
				000B0021		Nov	
				000C0021		Dec	
				00010022	.....	Jan	Southern
				00020022		Feb	
				00030022		Mar	
				00040022		Apr	
				00050022		May	
				00060022		Jun	
				00070022		Jul	
				00080022		Aug	
				00090022		Sep	
				000A0022		Oct	
				000B0022		Nov	
				000C0022		Dec	



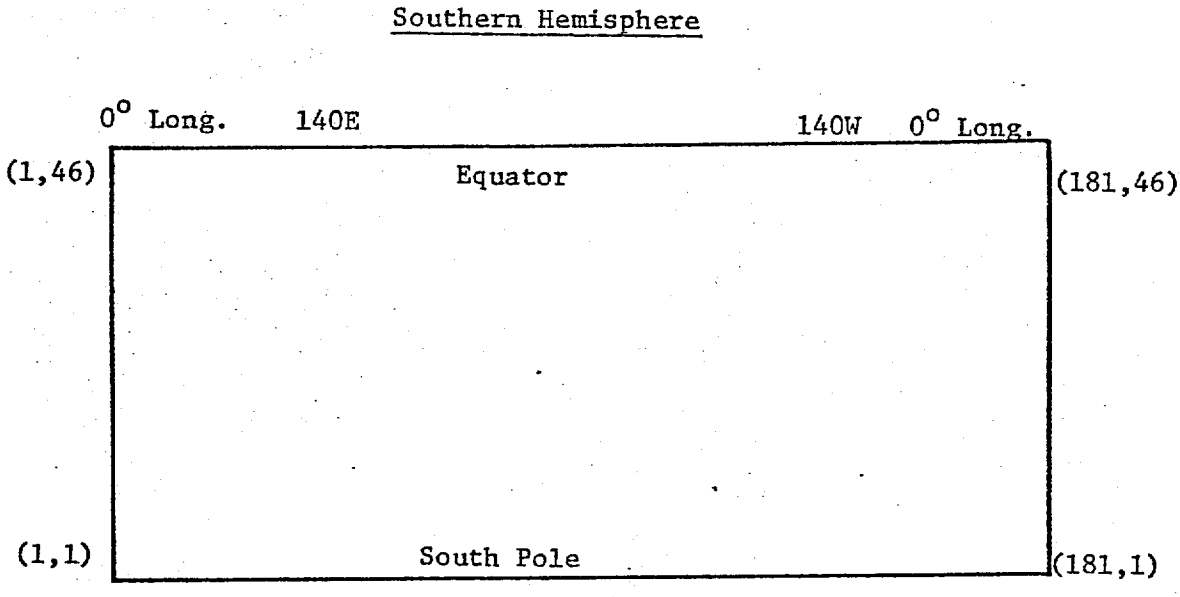


Fig. 1. The arrangement of grid points (2°Lat x 2°Long) for the monthly average sea surface temperatures.

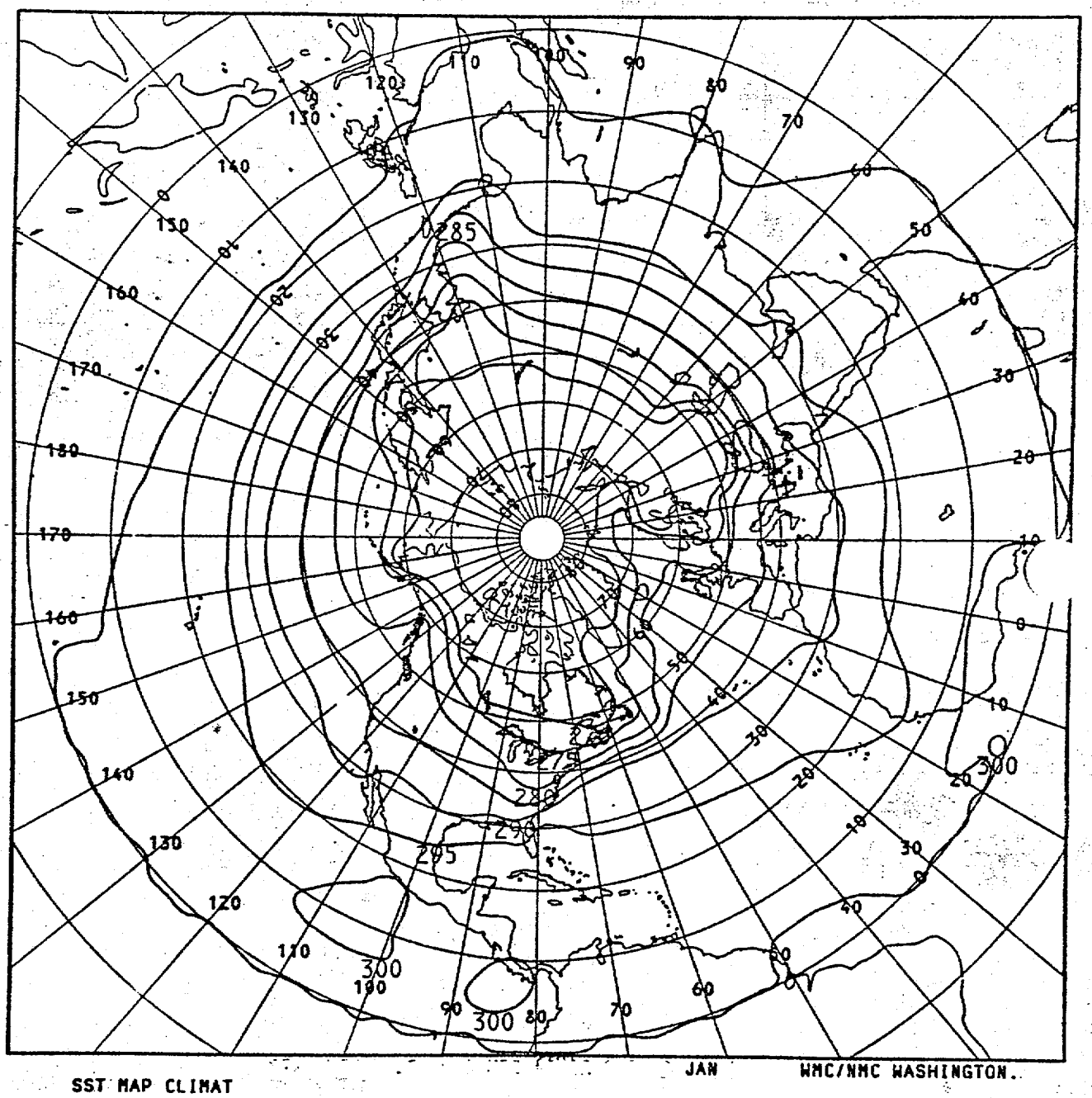


Fig. 2. January average sea surface temperatures ^{o}K: Northern Hemisphere. The 270K isotherm approximates the ice edge.

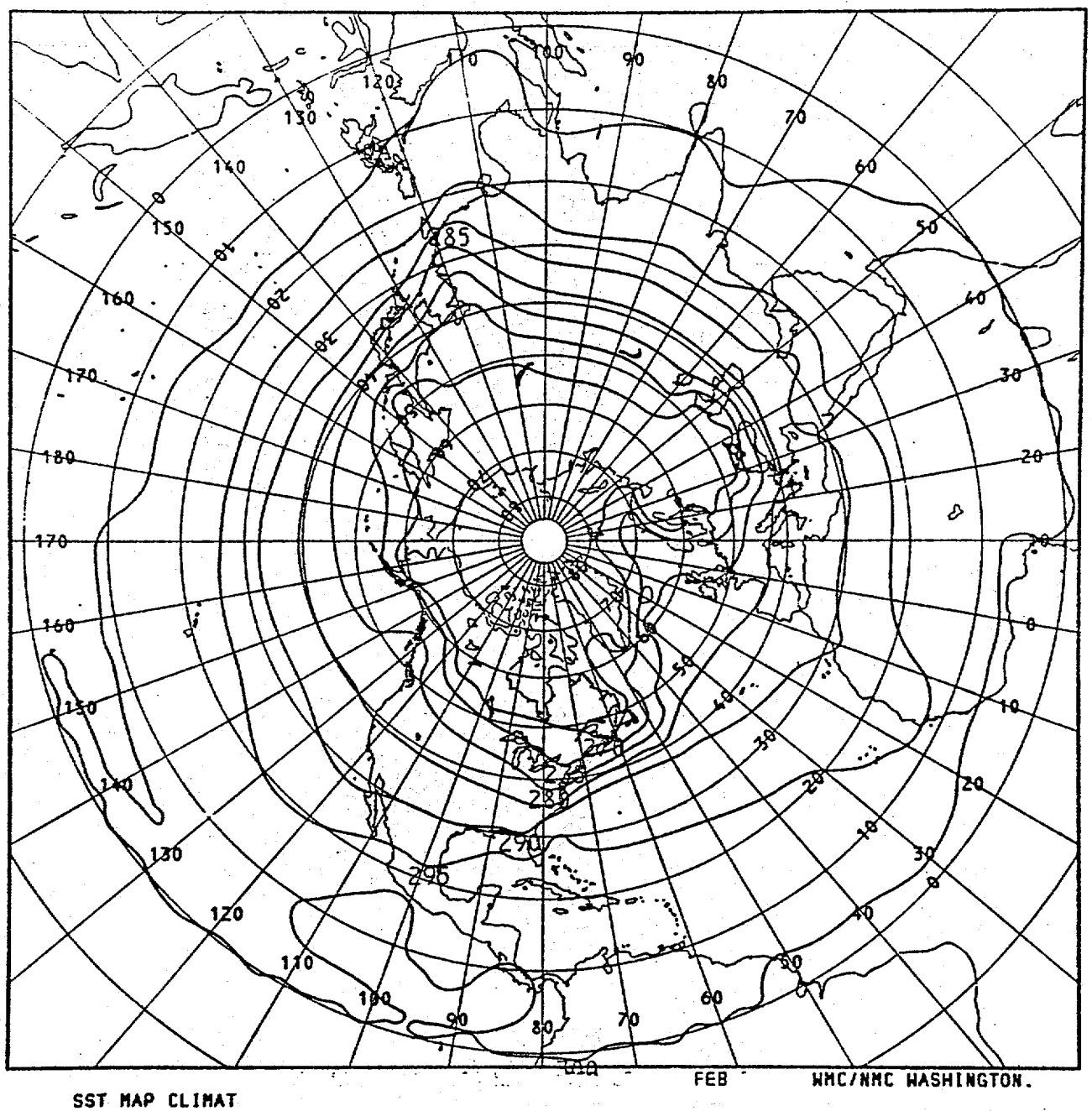


Fig. 3. February average sea surface temperatures ^{o}K: Northern Hemisphere. The 270K isotherm approximates the ice edge.

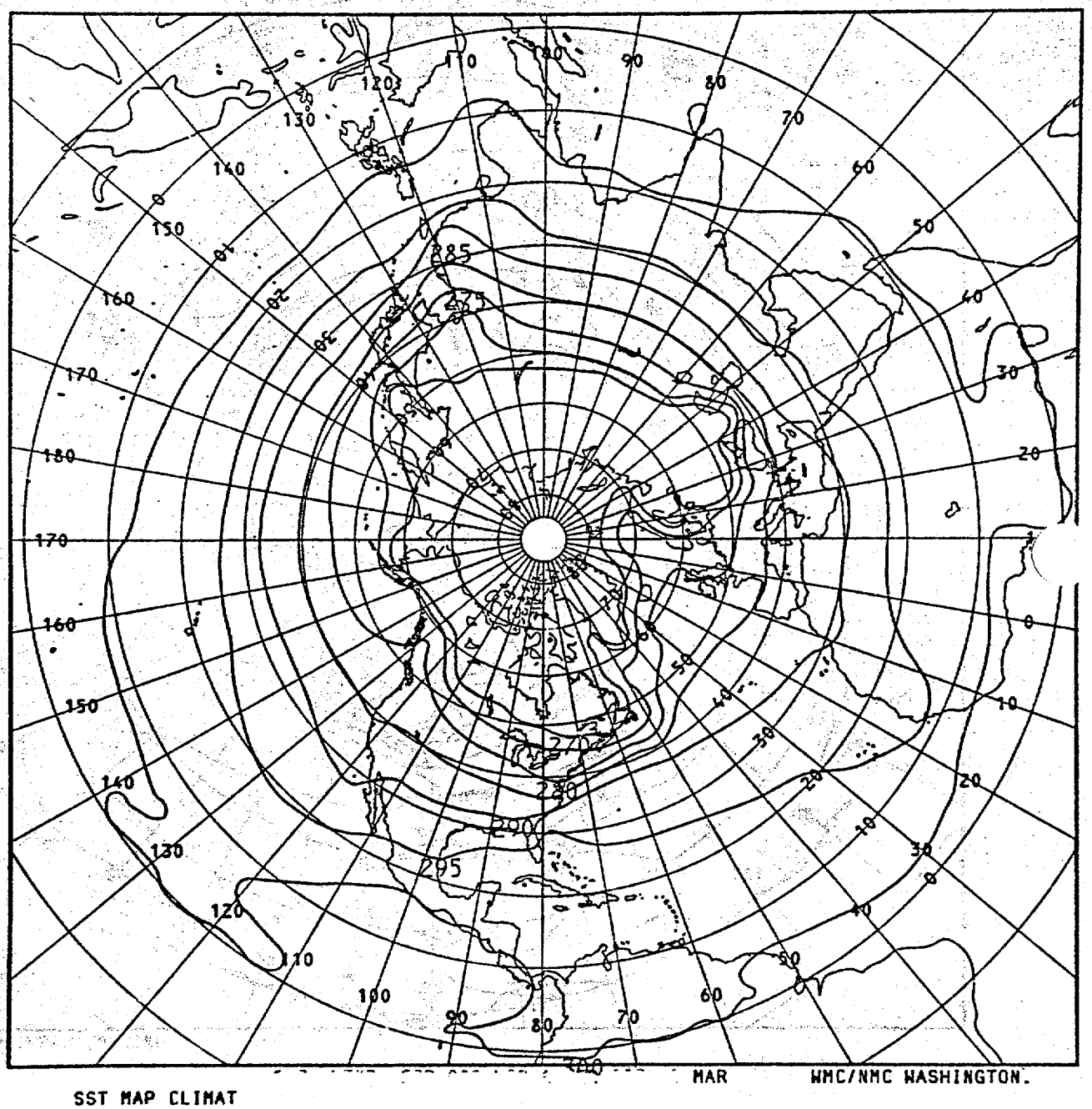
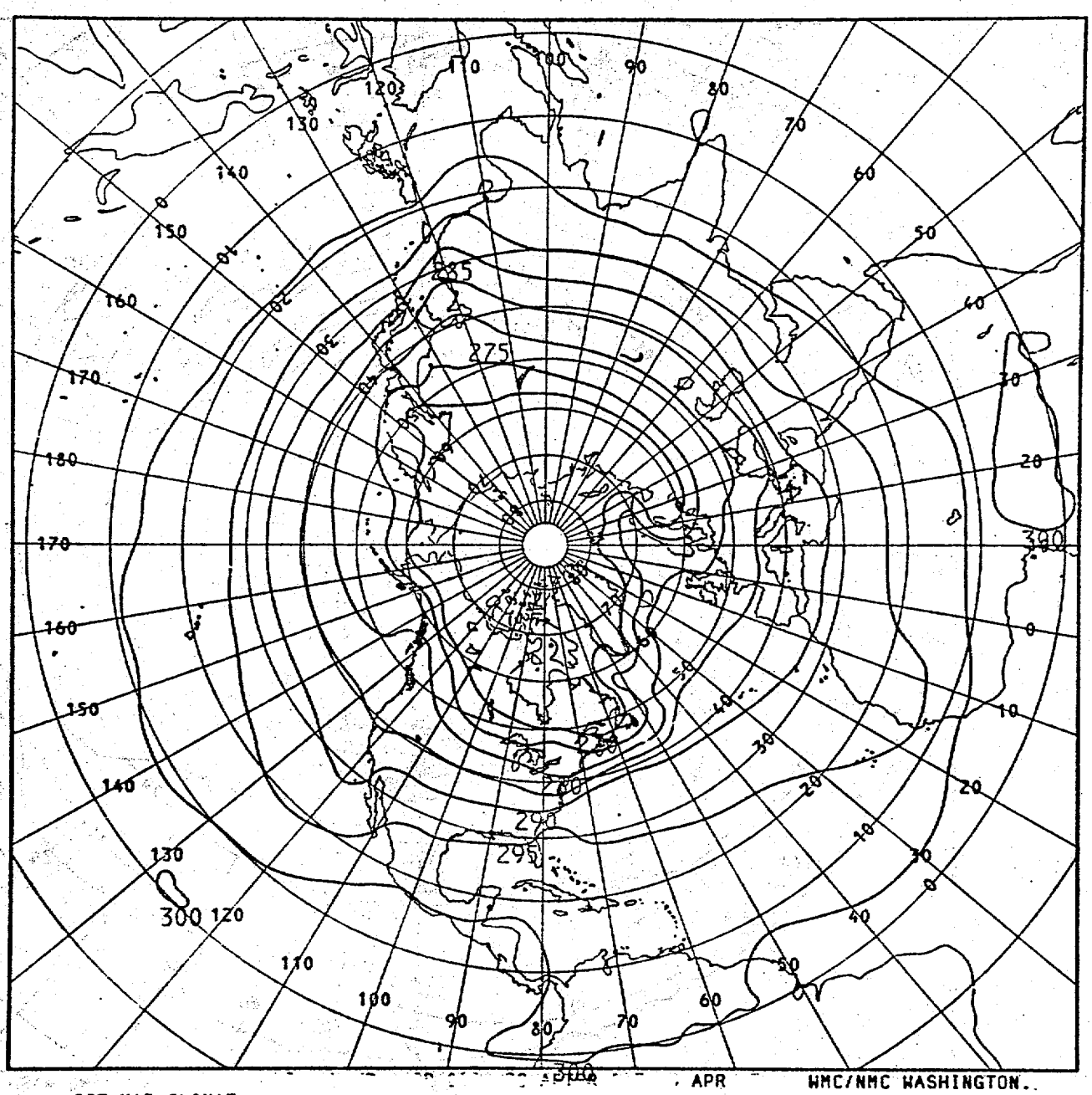


Fig. 4. March average sea surface temperatures °K: Northern Hemisphere. The 270K isotherm approximates the ice edge.



SST MAP CLIMAT

Fig. 5. April average sea surface temperatures °K: Northern Hemisphere. The 270K isotherm approximates the ice edge.

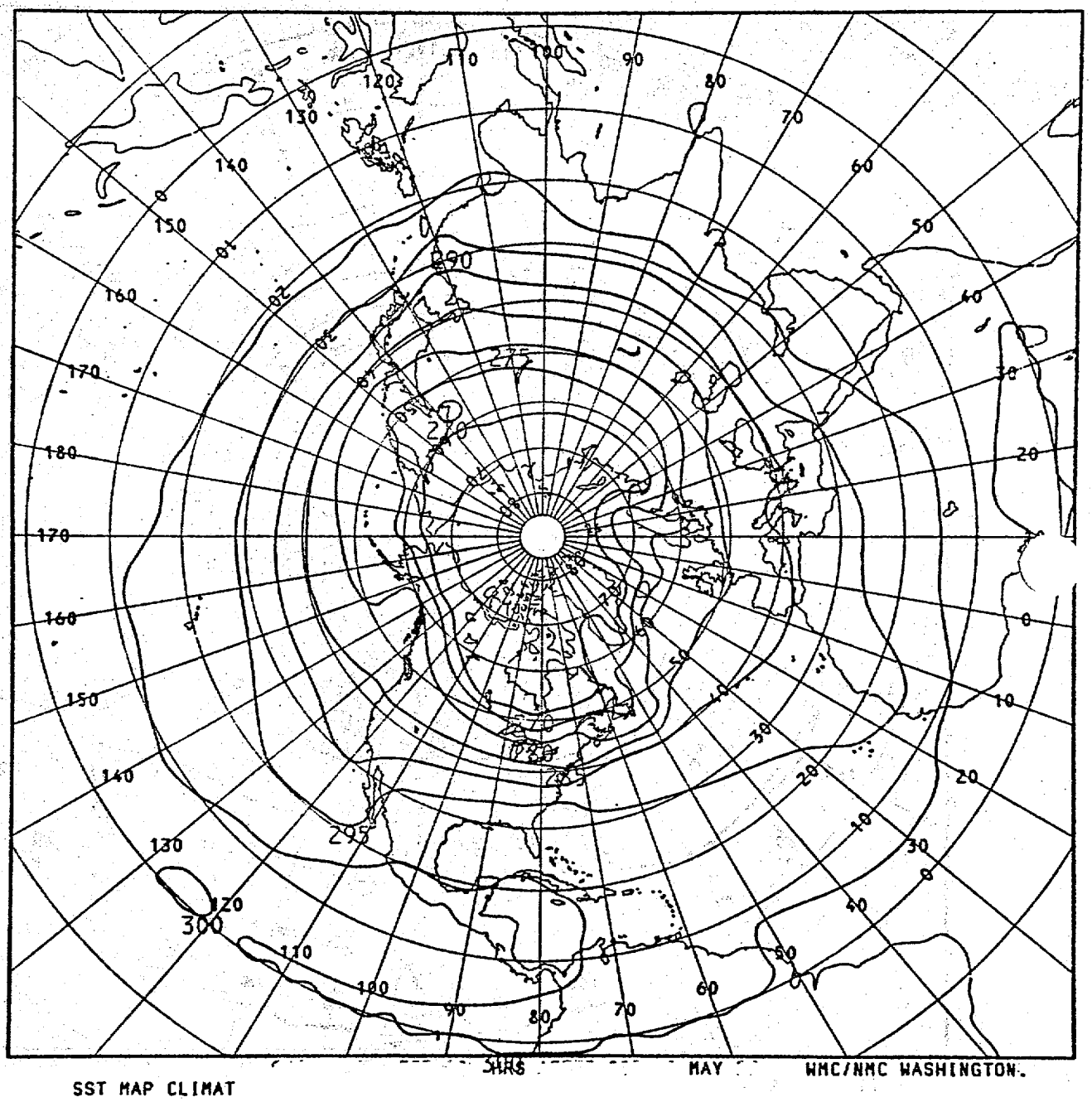


Fig. 6. May average sea surface temperatures °K: Northern Hemisphere. The 270K isotherm approximates the ice edge.

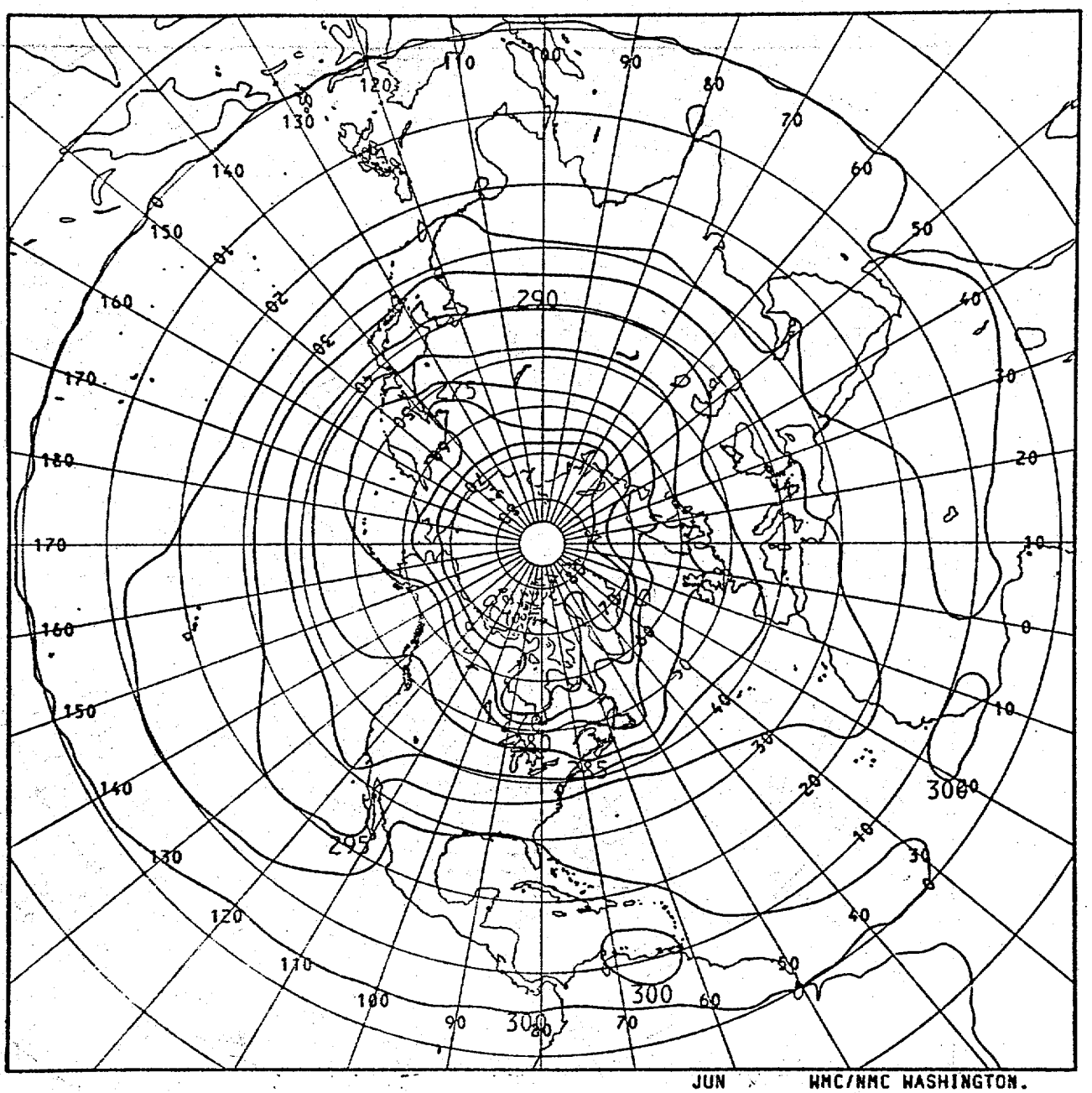


Fig. 7. June average sea surface temperatures °K: Northern Hemisphere. The 270K isotherm approximates the ice edge.

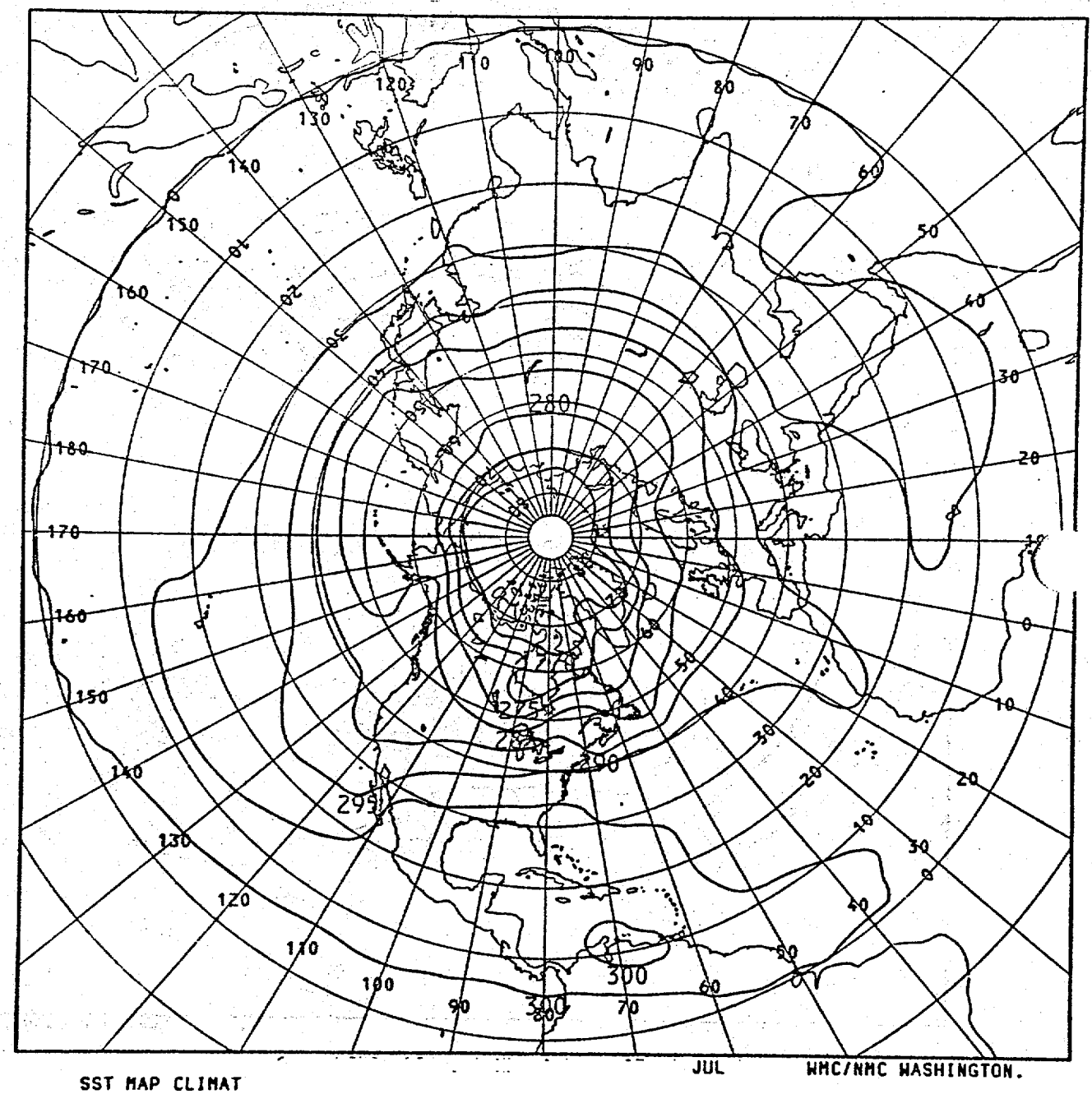


Fig. 8. July average sea surface temperatures °K: Northern Hemisphere. The 270K isotherm approximates the ice edge.

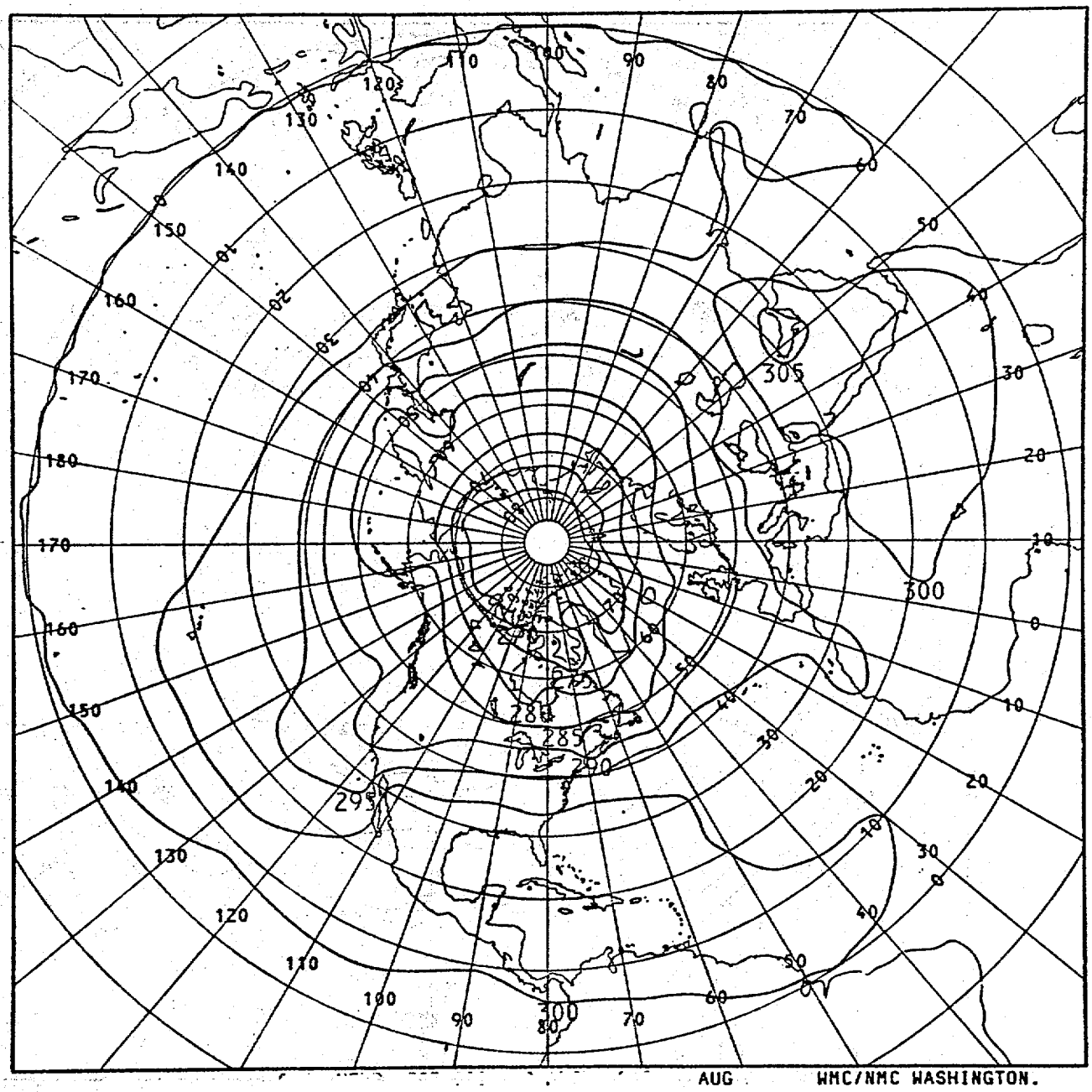


Fig. 9. August average sea surface temperatures ^{o}K: Northern Hemisphere. The 270K isotherm approximates the ice edge.

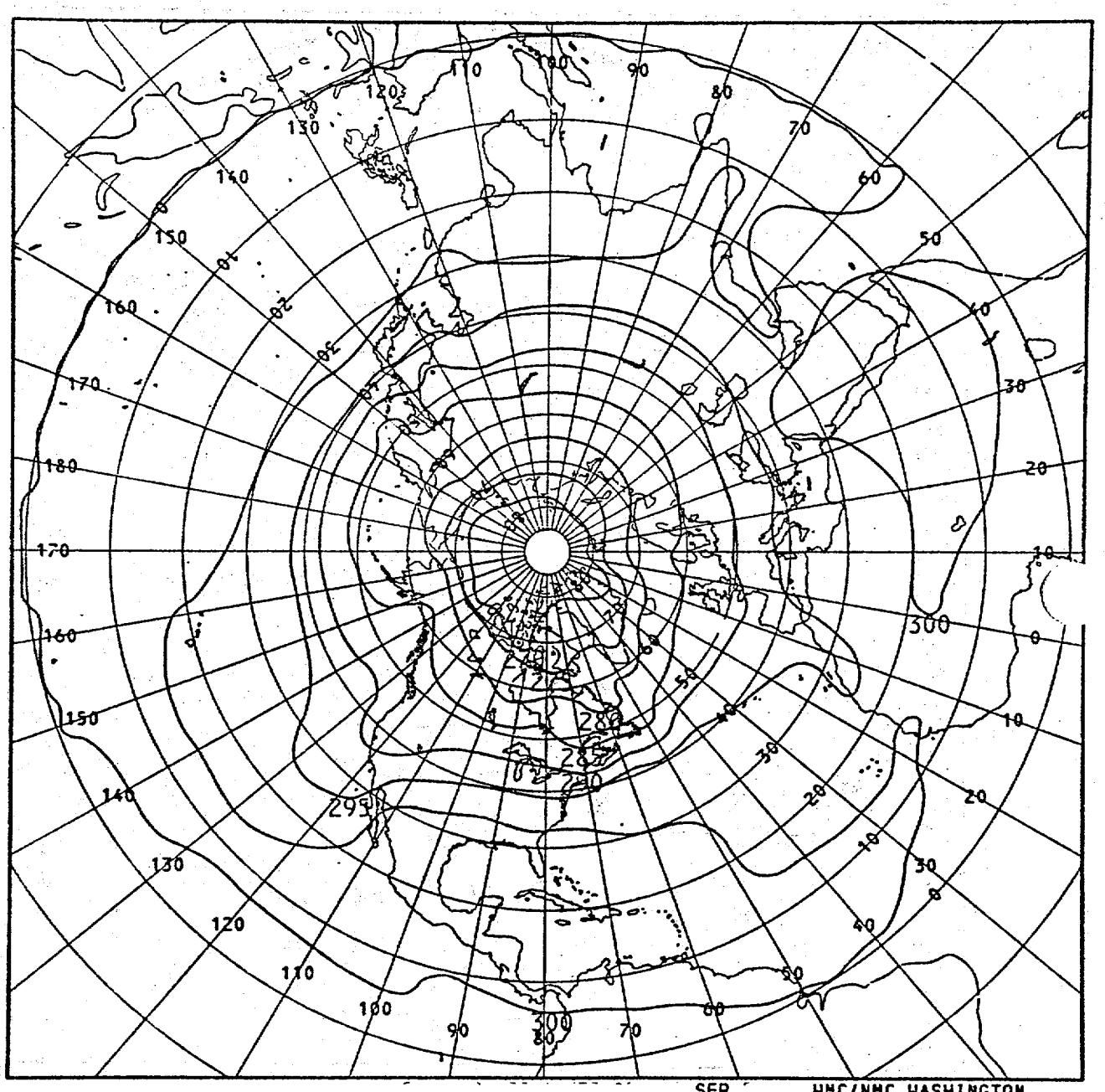


Fig. 10. September average sea surface temperatures °K: Northern Hemisphere. The 270K isotherm approximates the ice edge.

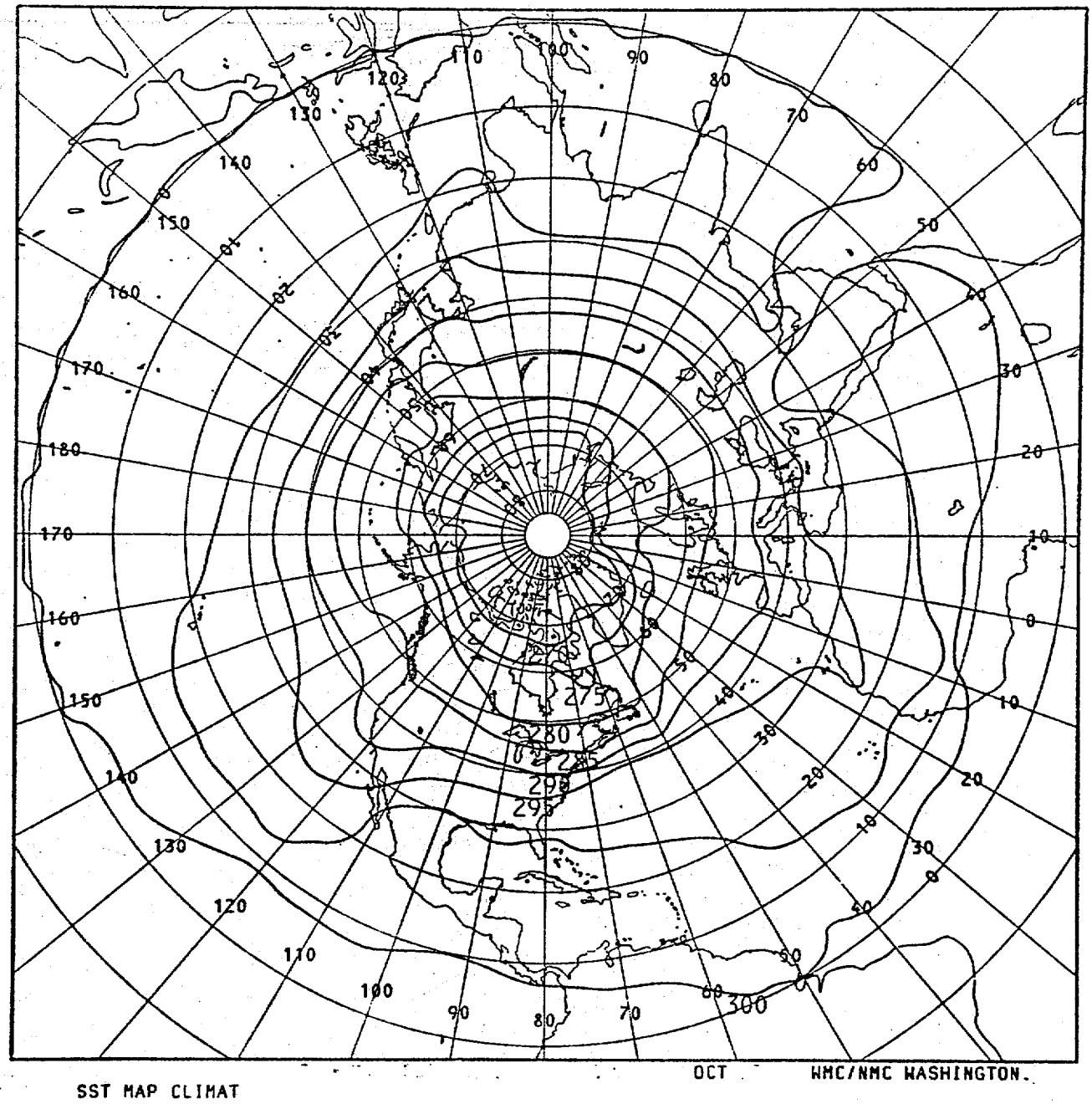


Fig. 11. October average sea surface temperatures ^{o}K: Northern Hemisphere. The 270K isotherm approximates the ice edge.

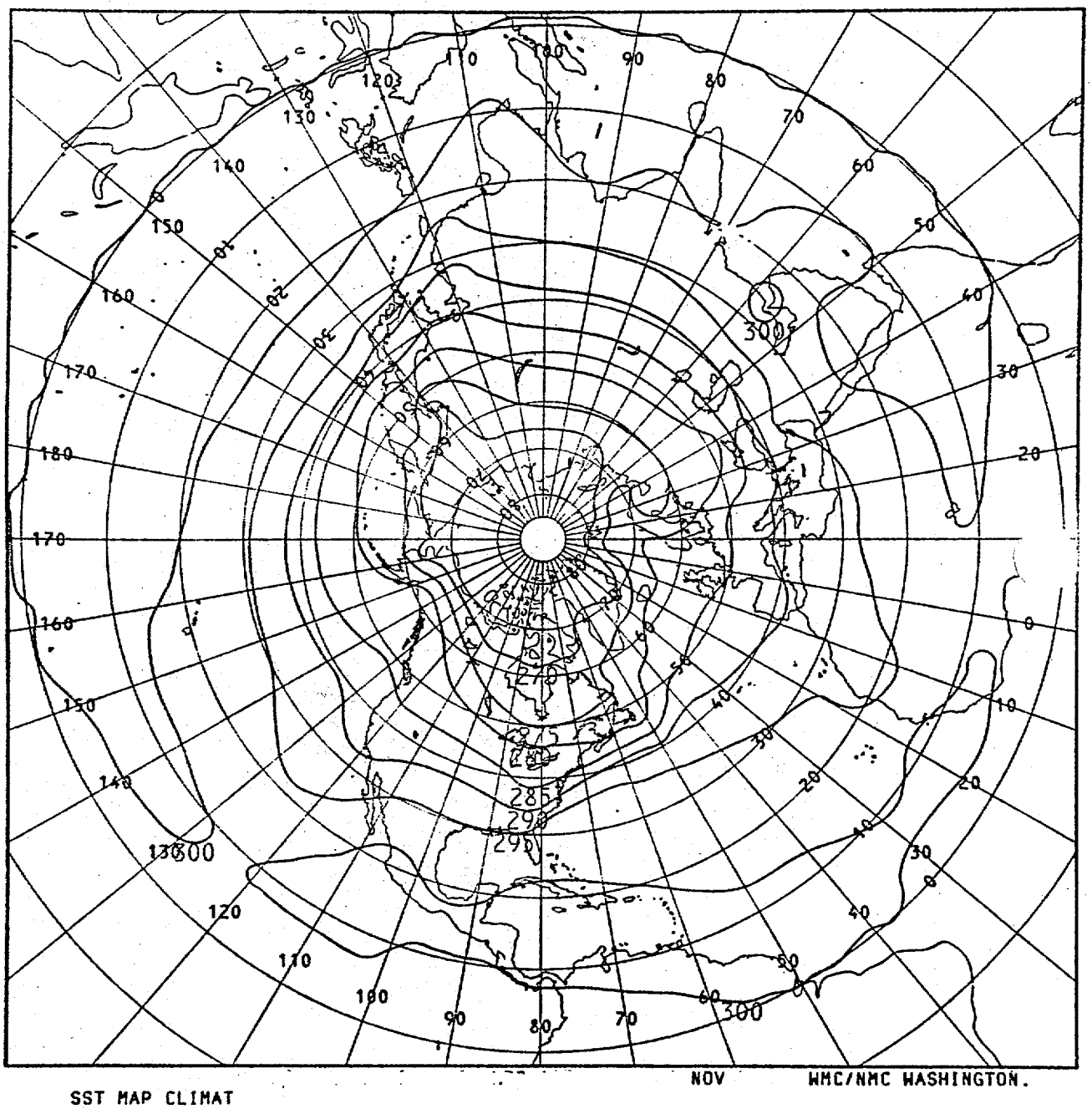


Fig. 12. November average sea surface temperatures °K: Northern Hemisphere. The 270K isotherm approximates the ice edge.

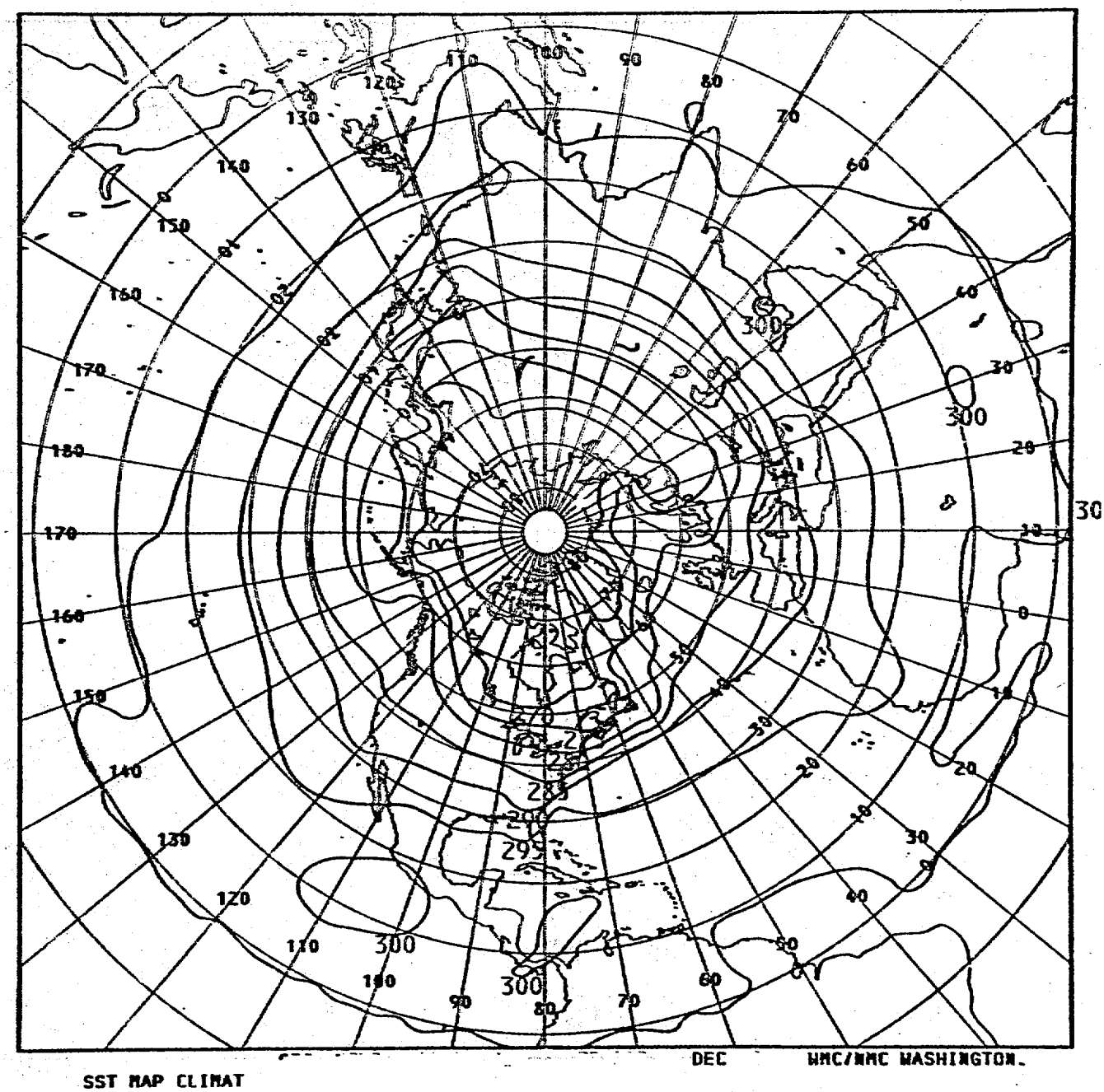


Fig. 13. December average sea surface temperatures °K: Northern Hemisphere. The 270K isotherm approximates the ice edge.

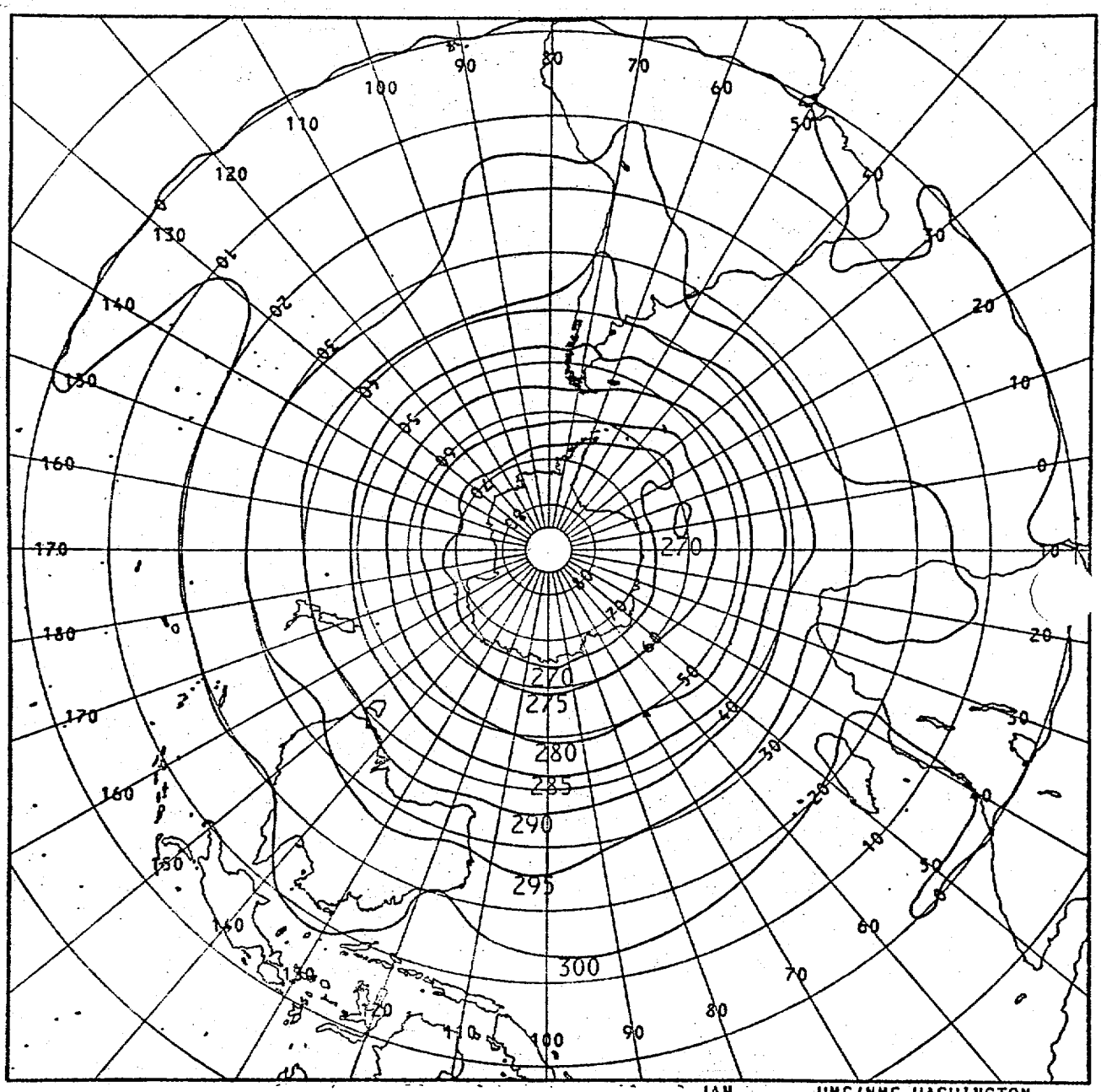


Fig. 14. January average sea surface temperatures ^{o}K: Southern Hemisphere. The 270K isotherm approximates the ice edge.

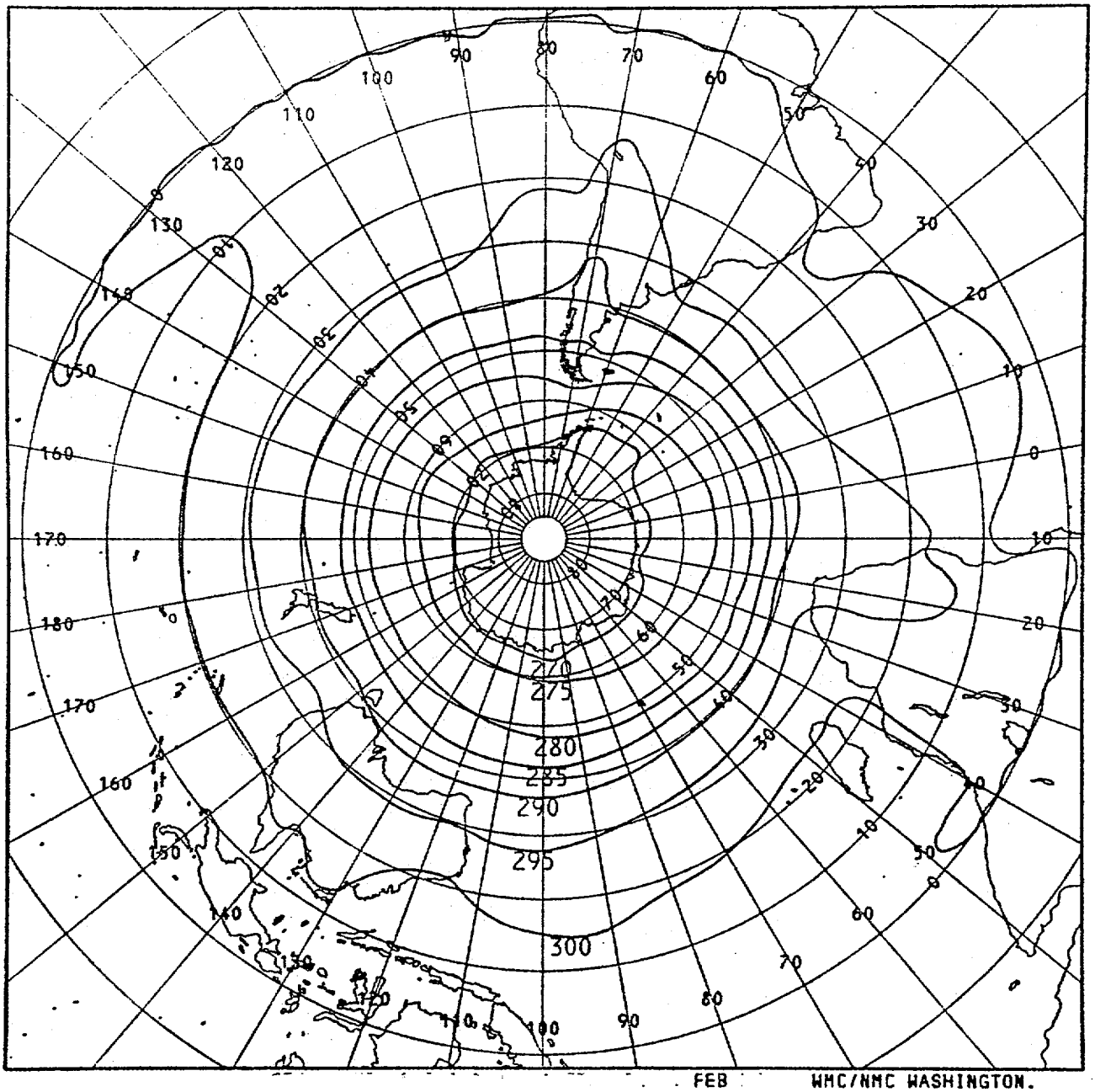


Fig. 15. February average sea surface temperatures ^{o}K: Southern Hemisphere The 270K isotherm approximates the ice edge.

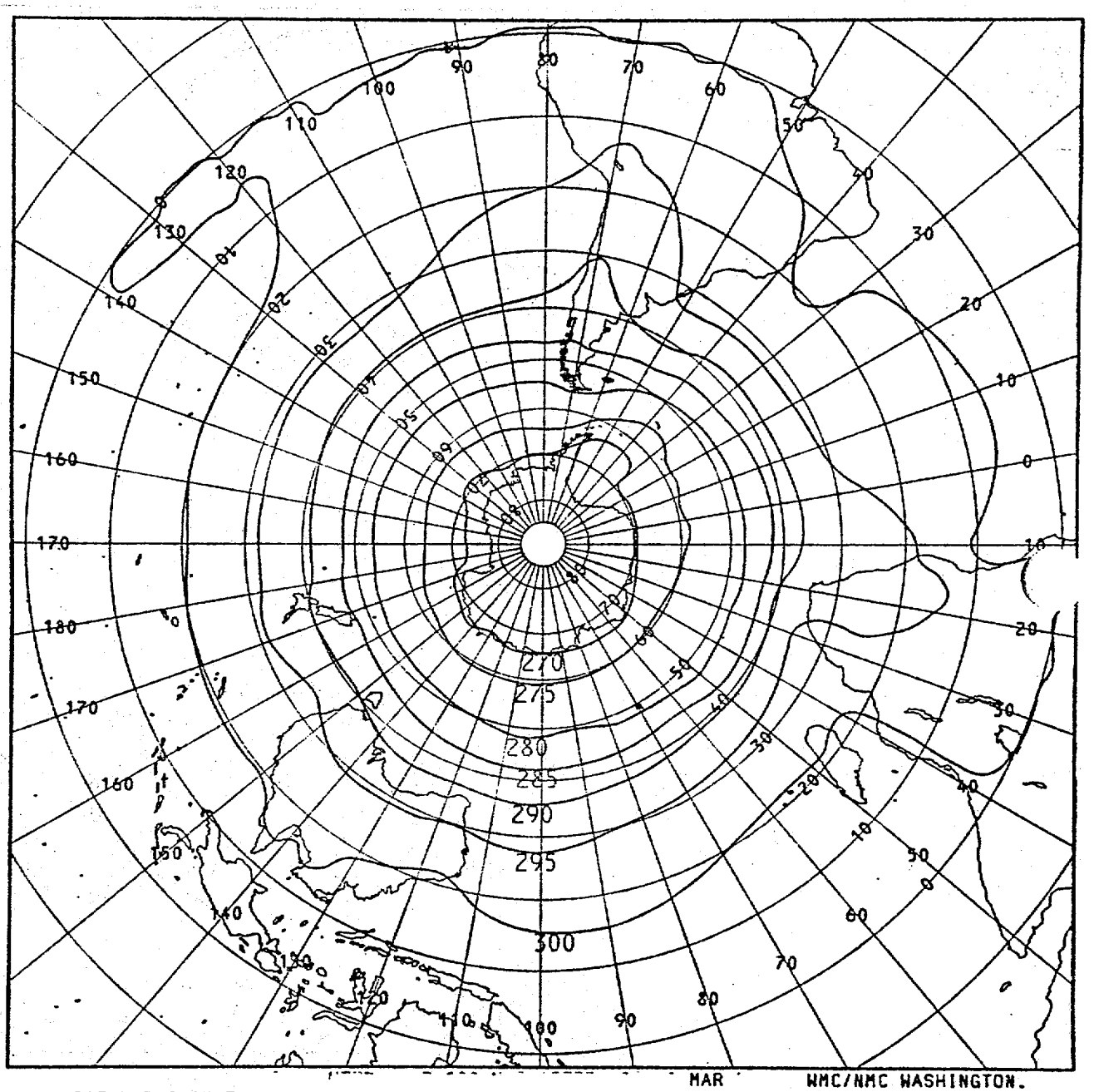


Fig. 16. March average sea surface temperatures ^{o}K: Southern Hemisphere. The 270K isotherm approximates the ice edge.

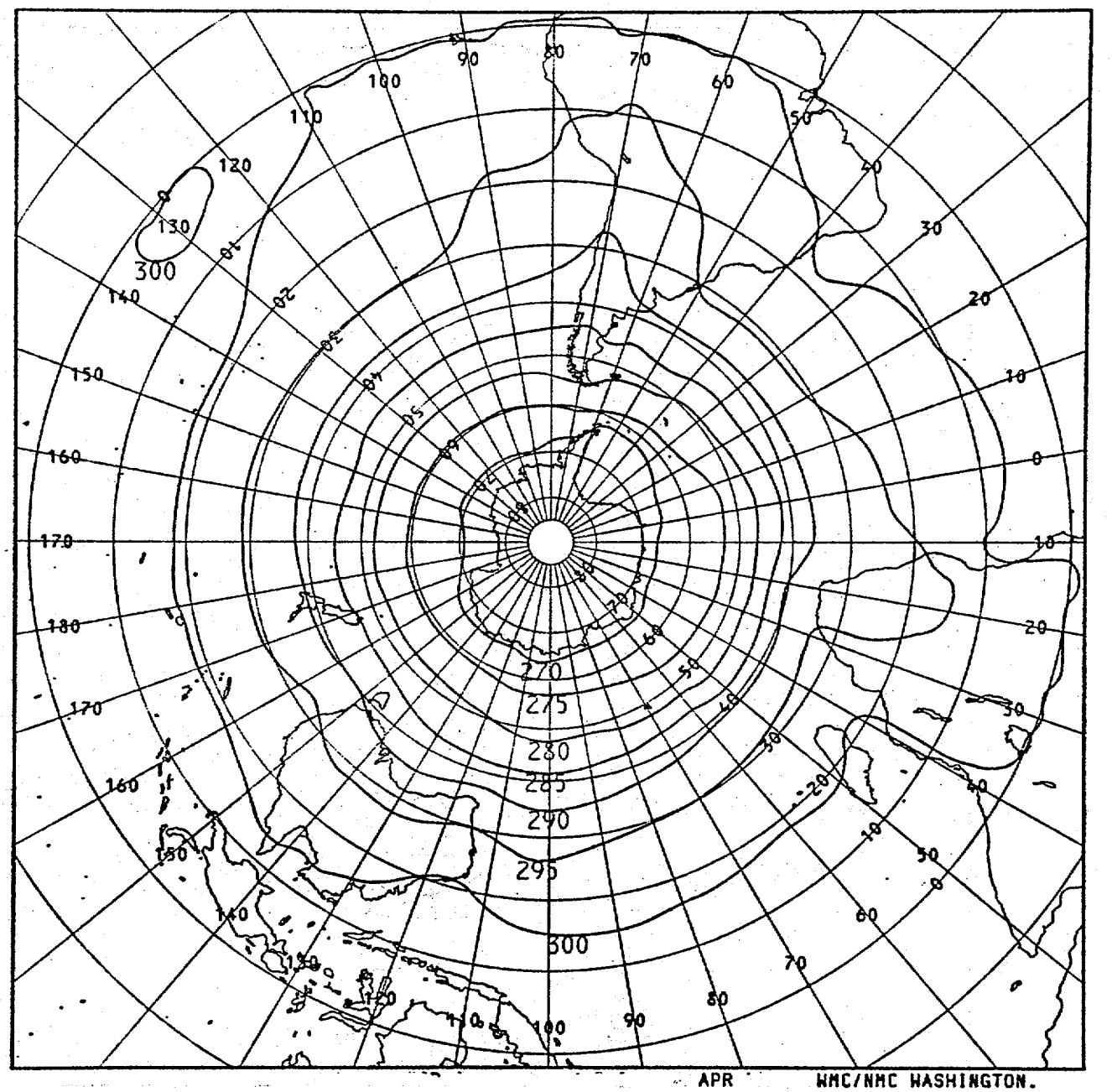


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Fig. 17: April average sea surface temperatures ^{o}K: Southern Hemisphere. The 270K isotherm approximates the ice edge.

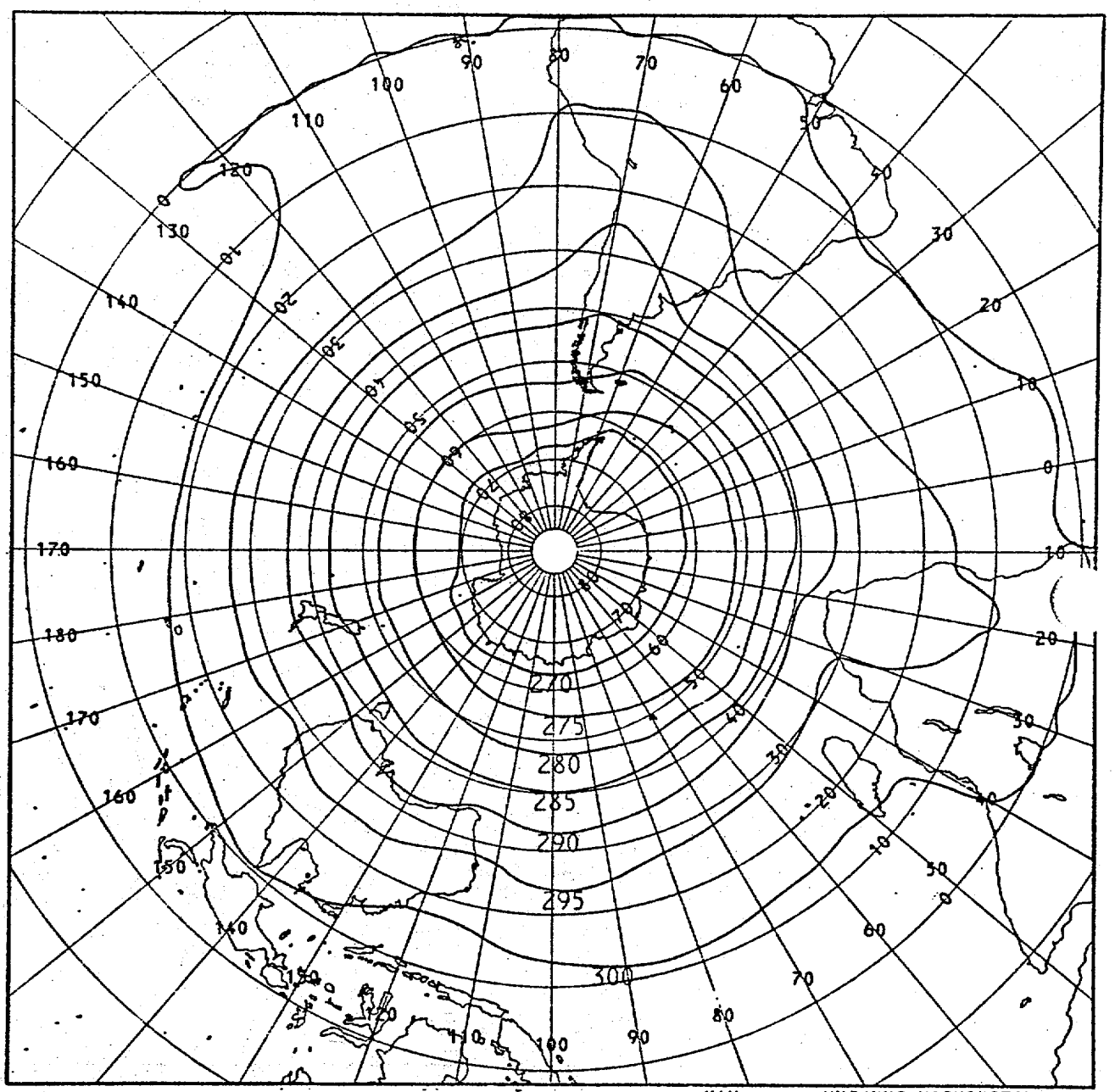


Fig. 18. May average sea surface temperatures °K: Southern Hemisphere. The 270K isotherm approximates the ice edge.

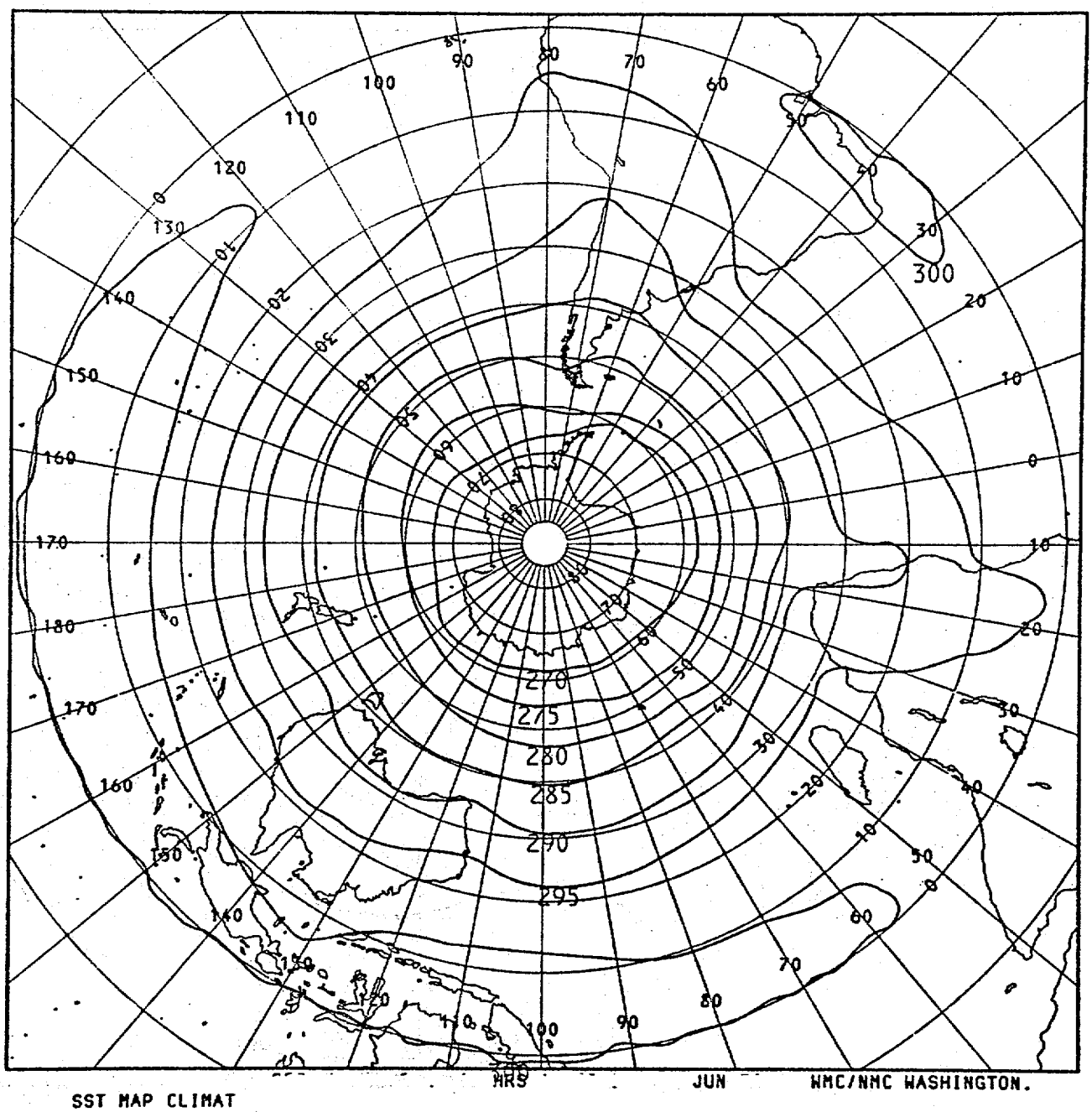


Fig. 19. June average sea surface temperatures ^{o}K: Southern Hemisphere. The 270K isotherm approximates the ice edge.

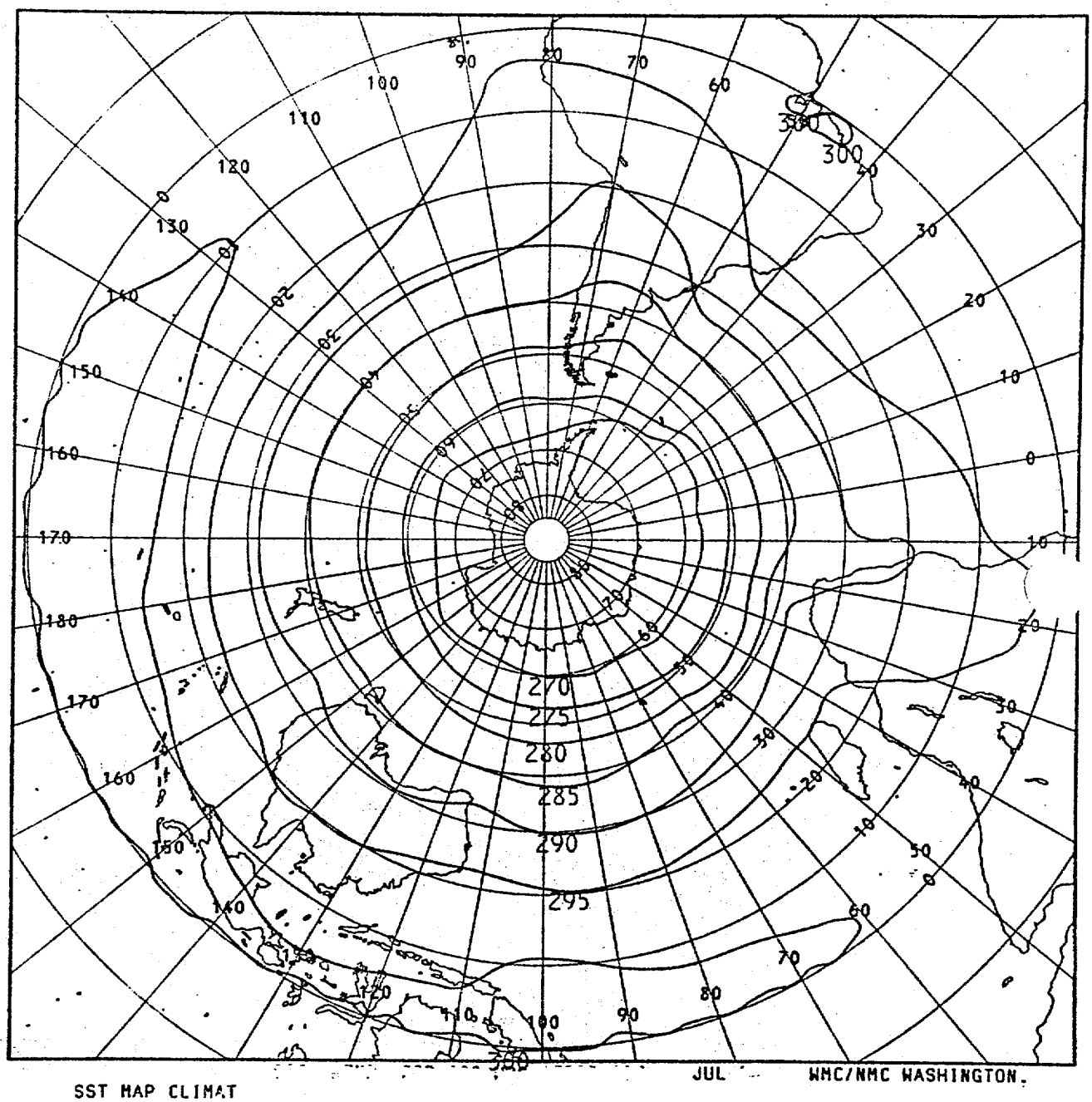


Fig. 20. July average sea surface temperatures °K: Southern Hemisphere. The 270K isotherm approximates the ice edge

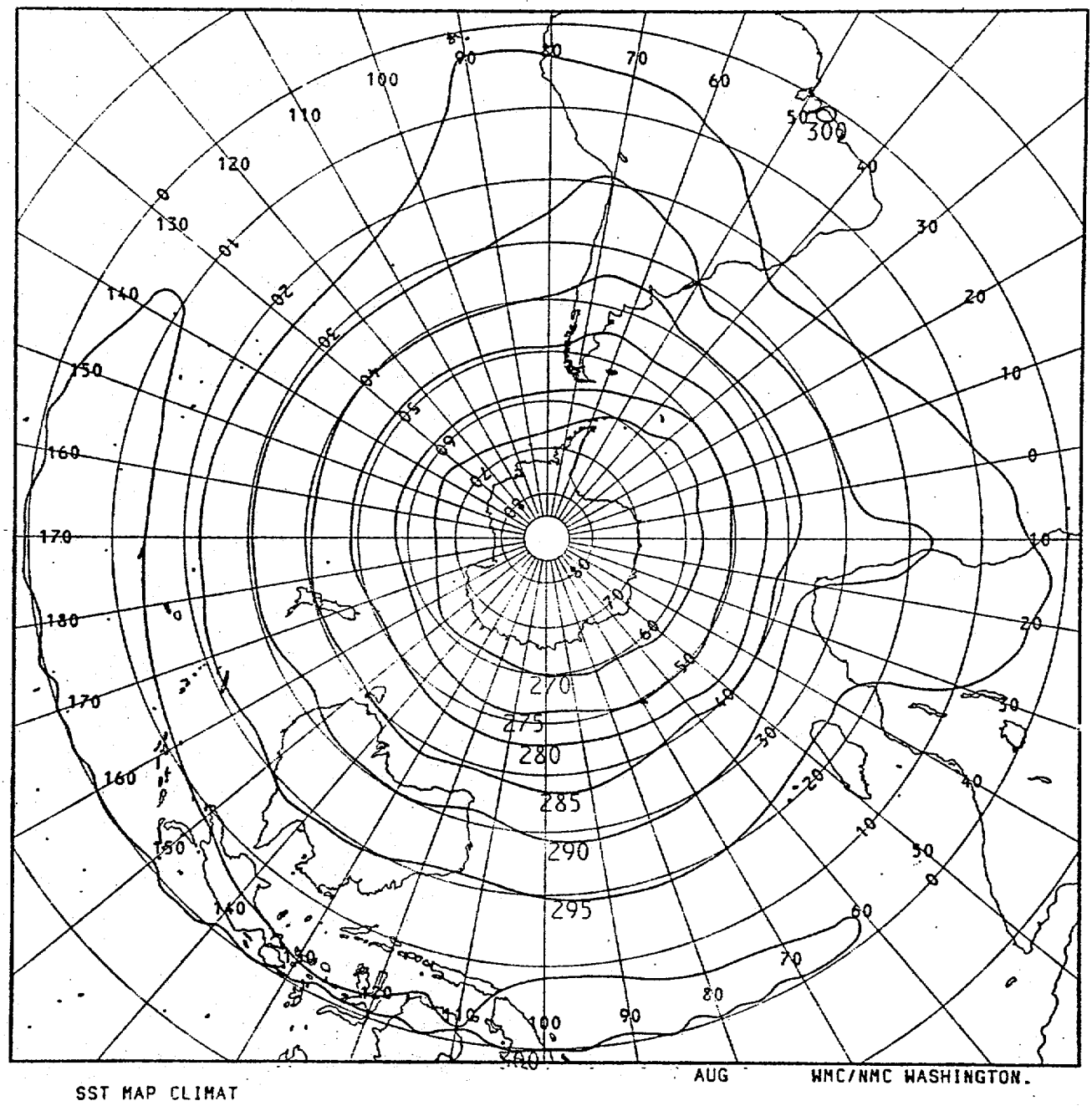


Fig. 21. August average sea surface temperatures ^{o}K: Southern Hemisphere. The 270K isotherm approximates the ice edge.

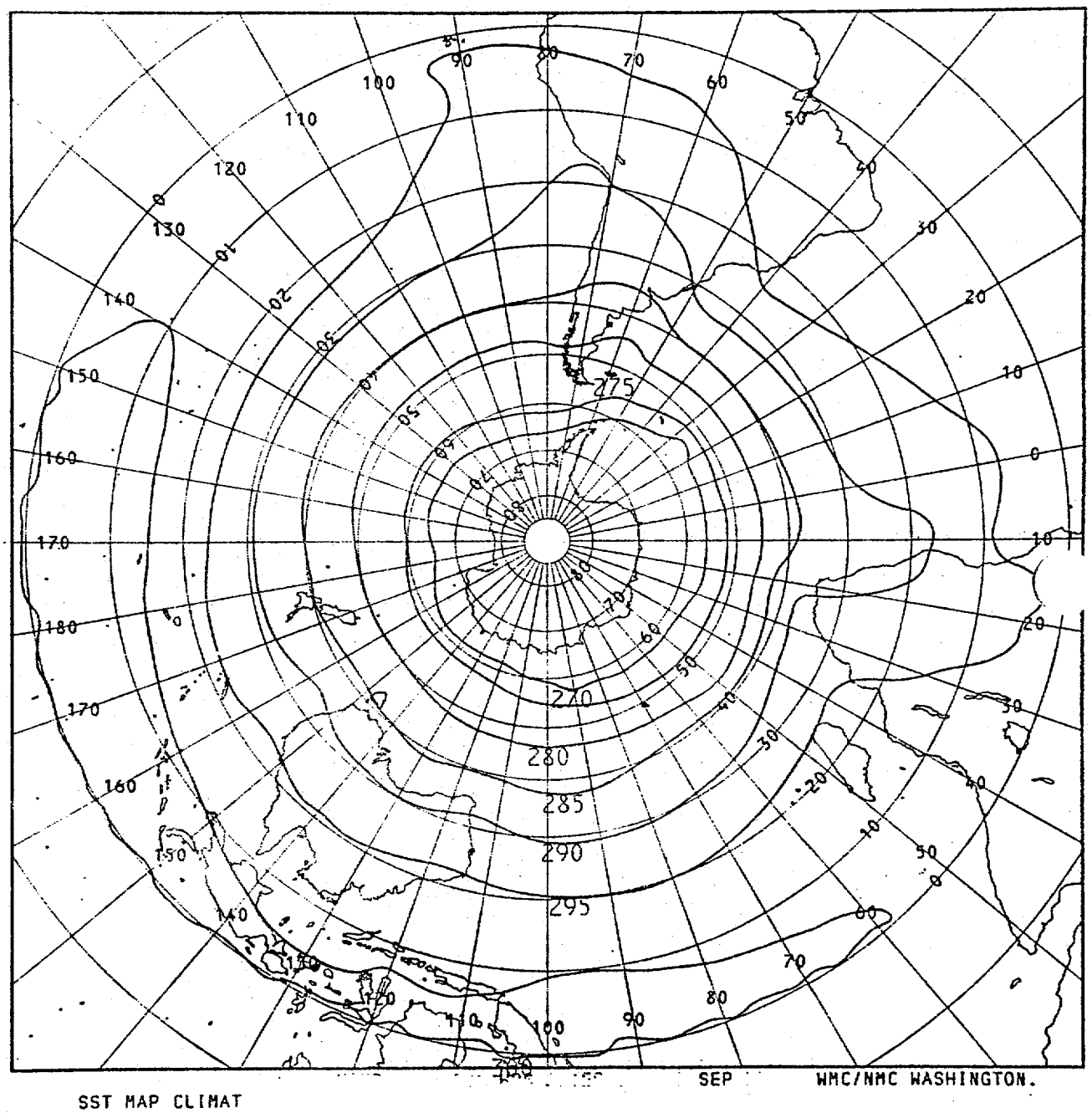


Fig. 22. September average sea surface temperatures ^{o}K: Southern Hemisphere. The 270K isotherm approximates the ice edge.

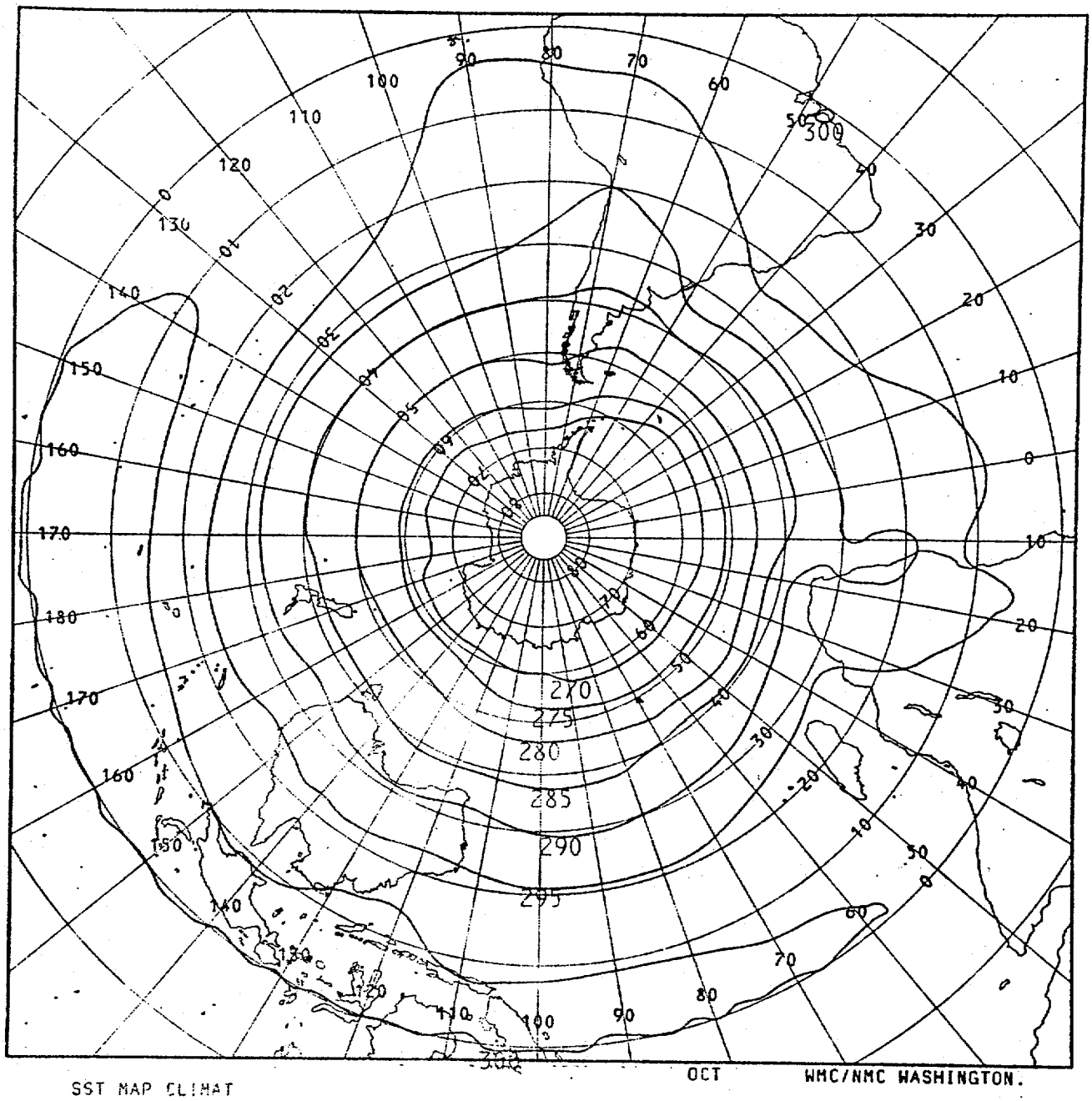
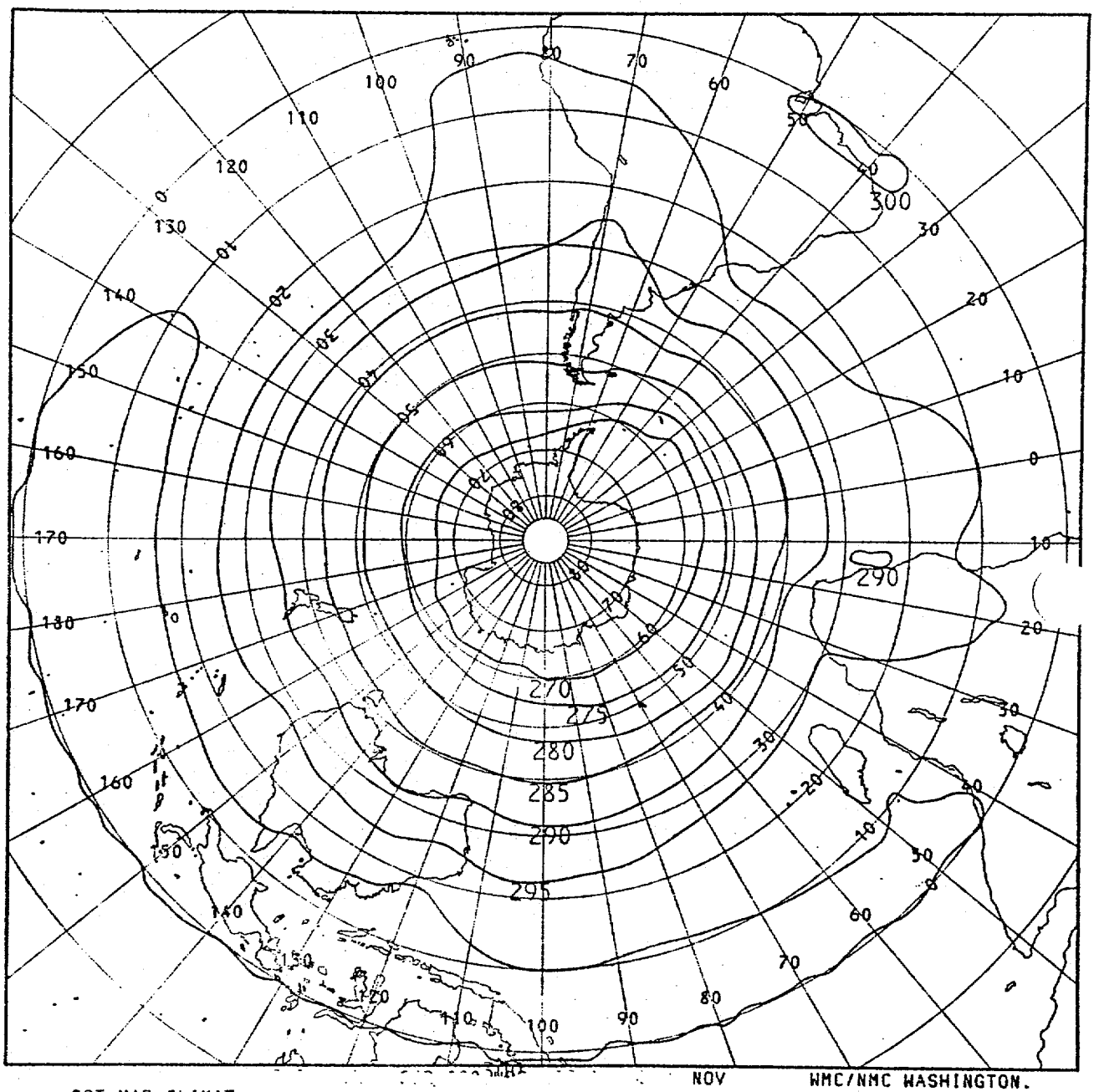


Fig. 23. October average sea surface temperatures ^{o}K: Southern Hemisphere. The 270K isotherm approximates the ice edge.



SST MAP CLIMAT

Fig. 24. November average sea surface temperatures ^{o}K: Southern Hemisphere. The 270K isotherm approximates the ice edge.

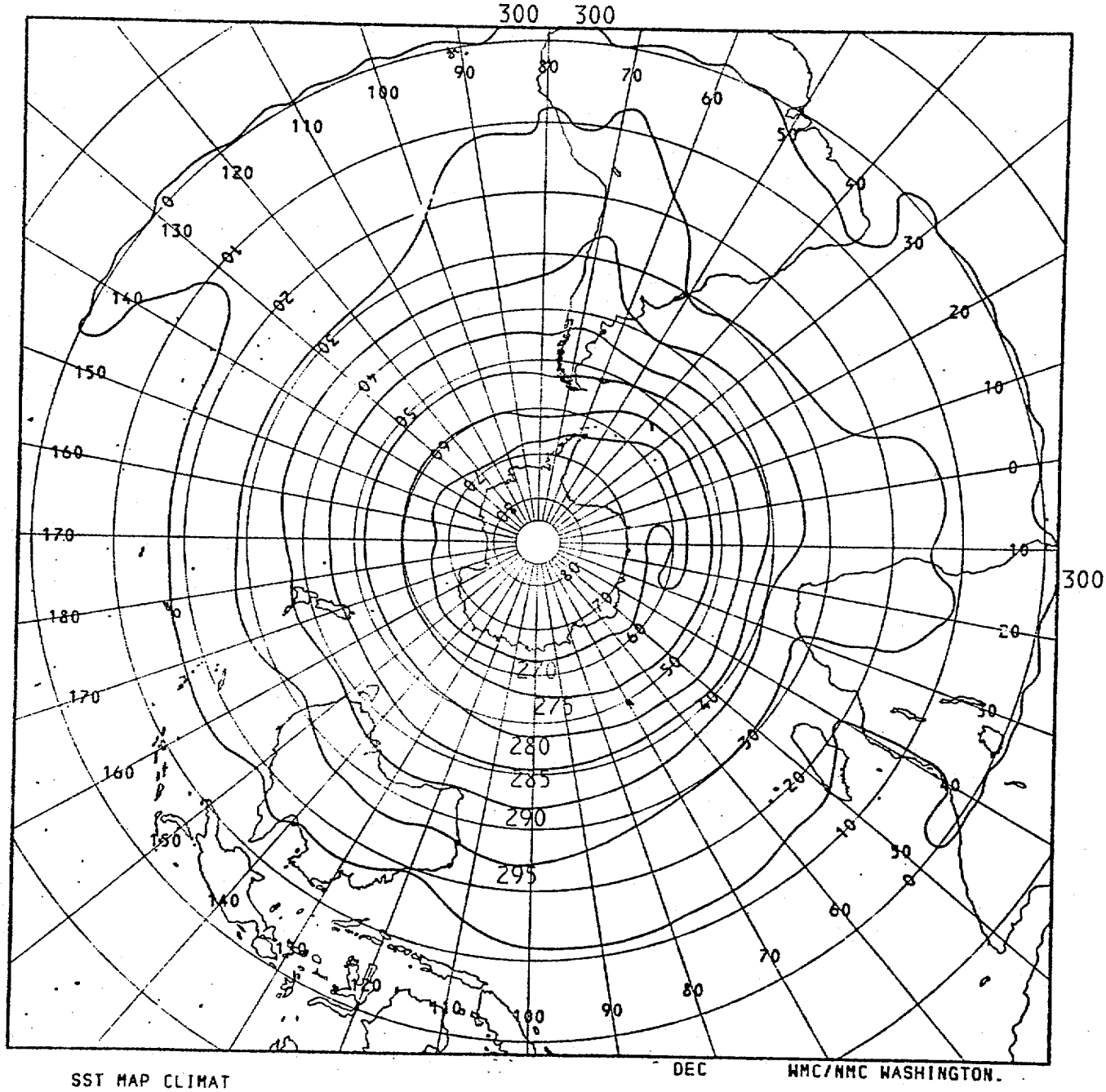


Fig. 25. December average sea surface temperatures °K: Southern Hemisphere. The 270K isotherm approximates the ice edge.