Posted 15/10/85 51¢, Recd 17/12/85

Oct 15/85.

Dr. Reber,

Enclosed are some trough ~~trough~~ references you might find useful.

I enjoyed you visit to CRC and hope you are succesful in using the ~~HEDF~~ Ashton site.

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Trough References.

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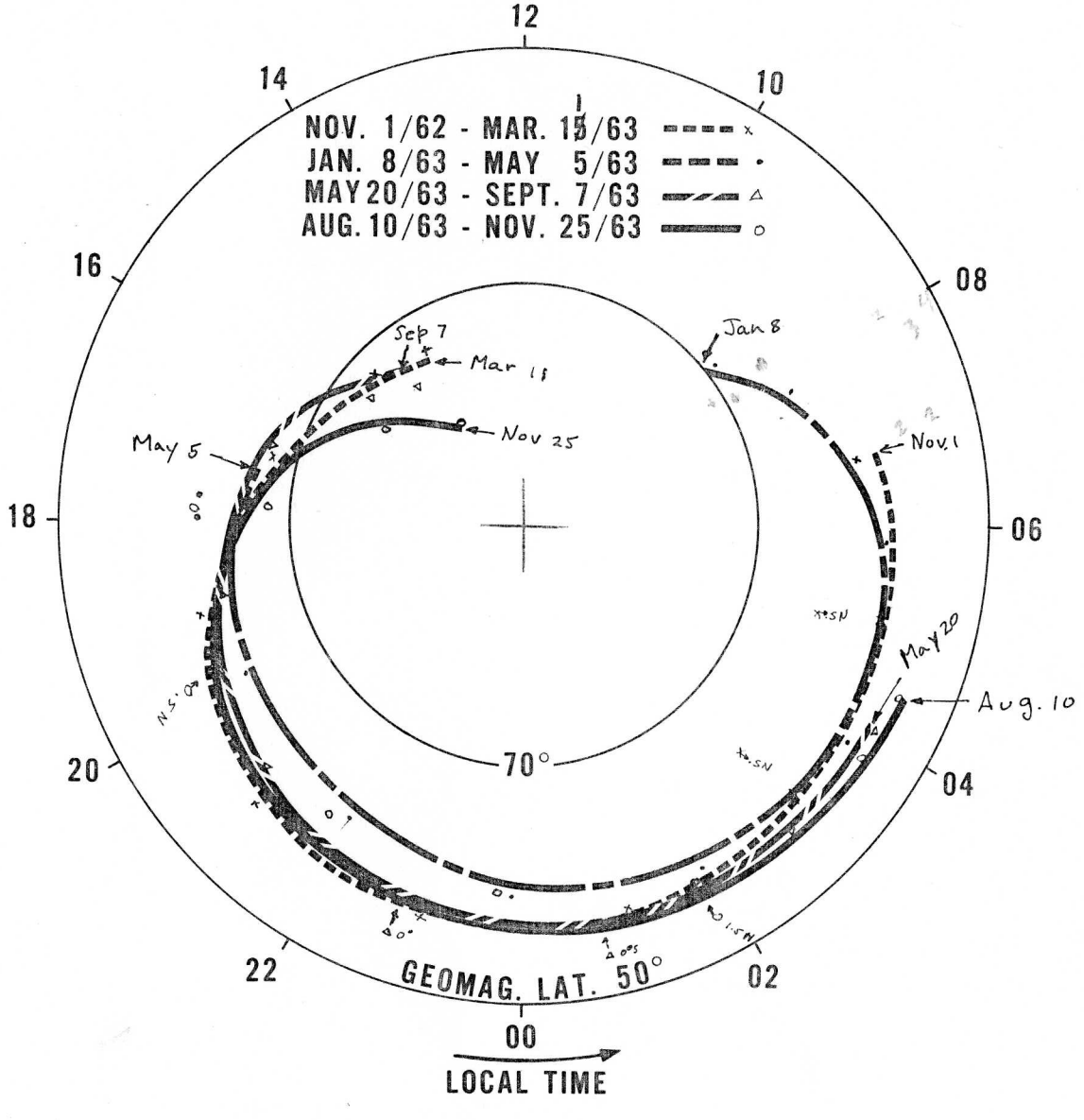
12
14
10
16
08
18
06
20
04
22
02
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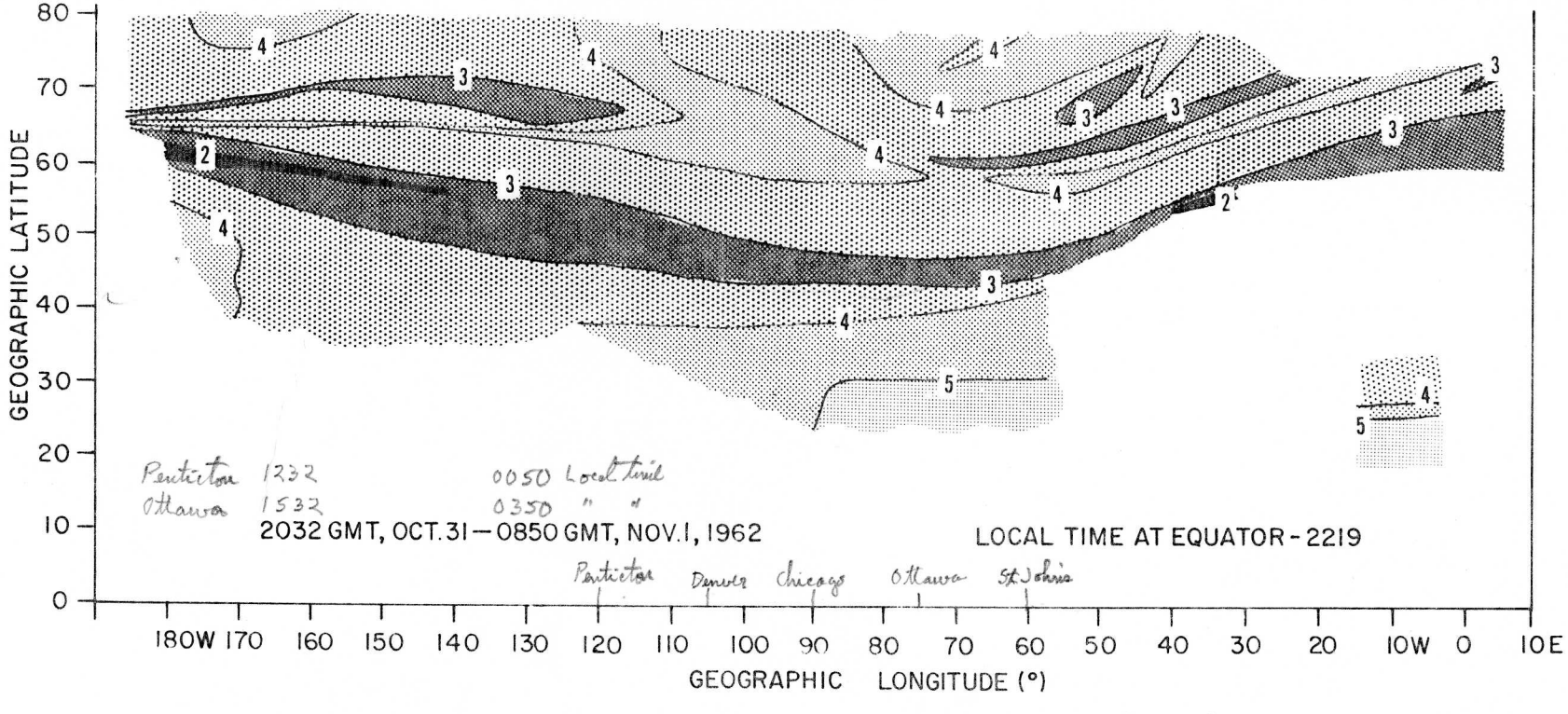
LOCAL TIME
NOV. 1/62 - MAR. 15/63
JAN. 8/63 - MAY 5/63
MAY 20/63 - SEPT. 7/63
AUG. 10/63 - NOV. 25/63
Sep 7
Mar 15
Jan 8
Nov 25
Nov 1
May 5
May 20
Aug. 10
70°
GEOMAG. LAT. 50°



Some kind of a composite secured during 12 hrs 18 mins observations.

STRUCTURE OF THE TROUGH AND PLASMAPAUSE

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The main trough, as observed at the peak of the F2 layer by the Alouette and ISIS sounders is due to a reduction in O^+ ions. At times it is only a few degrees of latitude in width with high densities to both the north and south. During the nighttime it appears statistically to be somewhat equatorward of the magnitude field extension of the equatorial plasmapause but during the daytime it can exist at $L > 10$. At about 3000 km height the H^+ density and hence plasmapause can be measured with the cylindrical electrostatic probe aboard ISIS 1; there is no indication of the late afternoon bulge which occurs in the equatorial plasmapause and there is no recovery in density poleward of the plasmapause. The probe also detects an electron temperature peak at the plasmapause which is likely responsible for the subauroral red arcs. Simultaneous ISIS 2 and whistler measurements at dawn and dusk indicate that the low altitude light ion plasmapause begins significantly equatorward of the equatorial plasmapause field line. The formation of the trough and plasmapause is complex but it appears that convection due to earth rotation and magnetospheric plasma flow is one of the major factors. F-layer ionization can remain on the night side of the earth for many hours, and hence be lost through recombination, before convecting westward around the evening side of the earth.