REPORT UAG - 58

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## ATS6 RADIO BEACON ELECTRON CONTENT MEASUREMENTS AT BOULDER, JULY 1974 - MAY 1975

September 1976

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by

R. B. Fritz

Space Environment Laboratory*
National Oceanic and Atmospheric Administration
Boulder, Colorado 80302 USA

*currently with Wave Propagation Laboratory, NOAA

September 1976

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# ATS6 RADIO BEACON ELECTRON CONTENT MEASUREMENTS

# AT BOULDER, JULY 1974 - MAY 1975

by

R. B. Fritz
Space Environment Laboratory *
National Oceanic and Atmospheric Administration
Boulder, Colorado 80302, U.S.A.

## Introduction

The Radio Beacon Experiment aboard the synchronous satellite ATS6 [Davies *et al.*, 1975a] provided the first opportunity to routinely monitor the electron content of the earth's ionosphere and inner magnetosphere by both Faraday rotation and group delay (also known as modulation phase) techniques. Faraday rotation of polarization is an integrated measure of free electrons along the ray path between satellite and ground weighted by the earth's magnetic field strength and direction, while group delay is an integrated electron content measure without weighting. Content derived by Faraday measurements (i.e., Faraday content) is representative of the electron content of the ionosphere to a height of approximately 2000 km [Titheridge, 1972; Almeida, 1973; Davies *et al.*, 1976]. The difference between the total and Faraday contents then is a measure of the remaining plasmaspheric electron content. Routine monitoring of the plasmaspheric content was a primary objective of the ATS6 Radio Beacon Experiment (RBE) and this set critical requirements on transmitter and receiver stabilities [Grubb *et al.*, 1976].

The satellite transmitted linearly polarized signals on carrier frequencies of 40.016, 140.056, and 360.144 MHz, with modulations of 100.04 kHz and 1.004 MHz. This provided coarse and fine scales of measurements so that the cycle ambiguity in the phase measurements of both Faraday rotation and group delay could be resolved.

## Description of Data

Procedures of data reduction, basic definitions and derivations, and evaluation of accuracy are summarized in papers by Davies *et al.* [1975b, 1976]. This report summarizes 140 MHz data recorded at the Boulder, Colorado ground station (40.13°N, 105.24°W) while ATS6 was positioned above 94° West longitude, between July 1974 and May 1975. The satellite appeared at an azimuth of 163 degrees, elevation 42 degrees, with the projection of the ray path near the ground as shown in Figure 1. All data were digitally recorded once per second.

Hourly values of the following quantities are presented in graphical and tabular form:

$N_T$ : Total electron content along the oblique path between the satellite and the Boulder ground station. Units are electrons per square meter. $N_T$ is derived from the group delay measurement by the equation:

$$N_T = \int_0^S N\,ds = -4.89 \times 10^{14}\ \phi^R_{141} \qquad (1)$$

where N is electron number density, S is range to the satellite, and $\phi^R_{141}$ is the group delay of the 1 MHz modulation on the 140 MHz carrier relative to 360 MHz. The negative sign is in accordance with the notation of Davies *et al.* [1975b].

F : Shape factor in units of MHz. This is defined by:

$$F = \int_0^S f_L\,N\,ds \Big/ \int_0^S N\,ds = -0.829\ \Omega_{140} \Big/ \phi^R_{141} \qquad (2)$$

where $f_L$ is the component of the electron gyrofrequency along the ray path and $\Omega_{140}$ is the polarization rotation (one-half the phase difference between magnetoionic components).

* currently with Wave Propagation Laboratory, NOAA.

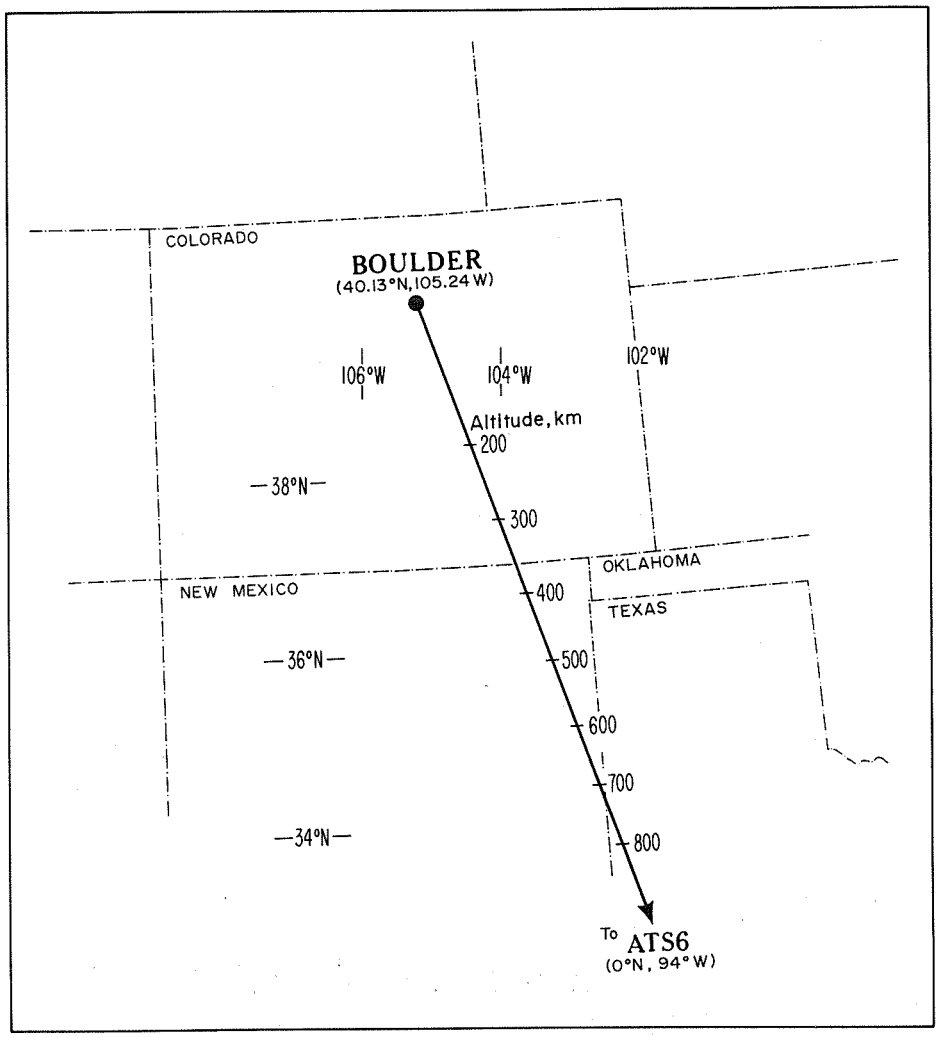



Fig. 1. Ground projection of the ATS6 - Boulder ray path.

$N_P$ : Plasmaspheric or residual electron content, in units of electrons per square meter along the oblique ray path. This is the electron content above the Faraday content ($N_F$) and is determined by:

$$N_P = N_T - N_F = N_T \ (1-F/1.15) \qquad (3)$$

Because $f_L$ can be related to a height along the ray path as shown in Figure 2, F can also be equated to an effective height ($h_{eff}$) in the ionosphere. This height scale is shown on the right side of the plots.

Preceding the daily plots and tables are similar presentations of the medians for each of the months July 1974 through May 1975. Regular observations began on 2 July 1974 and continued through 20 May 1975 when relocation of the satellite to 35° East longitude was begun. Times when no data appear on the daily plots are usually attributable to the transmitter being turned off because it had to share a limited spacecraft power budget with other experiments.

Acknowledgments

The assistance of Dr. K. Davies in interpretation of results, of Wm. M. Retallack in presentation of analyzed data, and of Helen E. Coffey for editorial guidance is acknowledged with appreciation. Our understanding of these results has benefited from discussions with many individuals in the international beacon satellite research community. This work has been supported by NOAA and NASA.

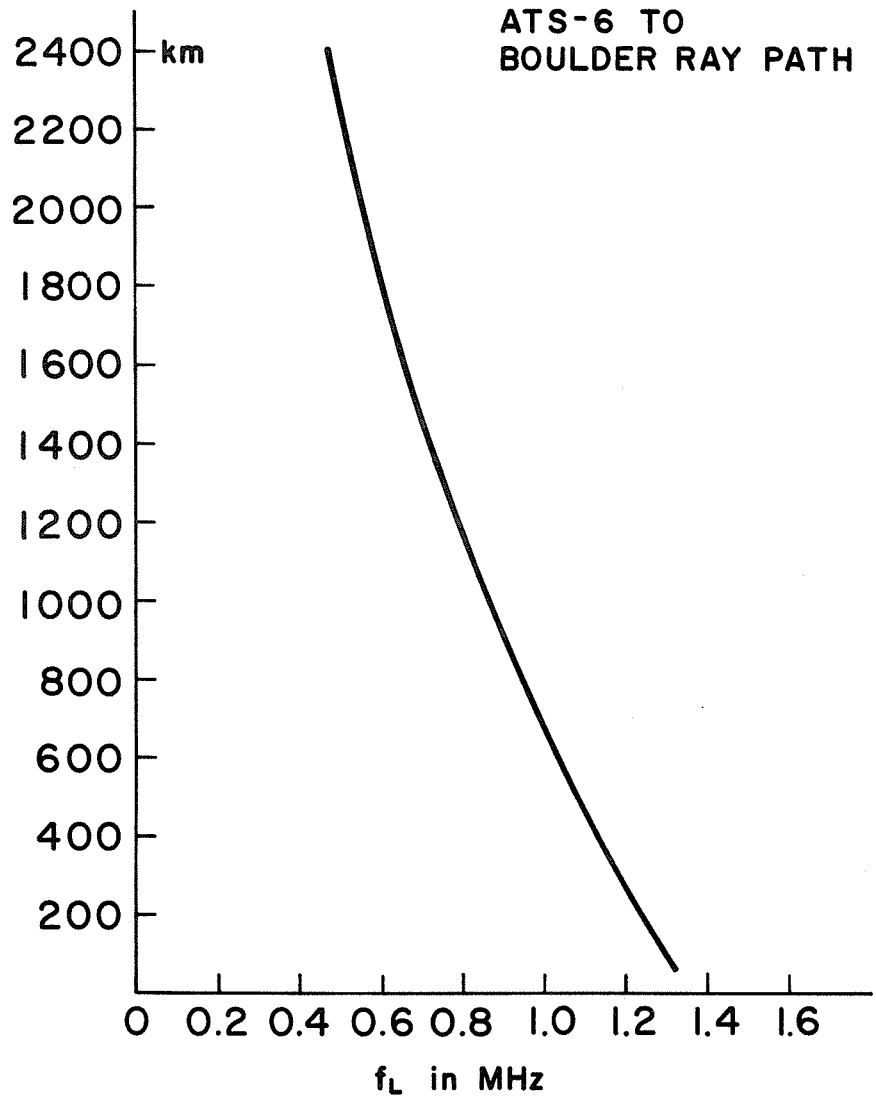



Fig. 2. Height variation of the electron longitudinal gyrofrequency along the ATS6 - Boulder ray path.

## REFERENCES


ALMEIDA, O. G. 1973 Protonospheric columnar electron content determination, 1, Analysis, *J. Atmos. Terr. Phys.*, *35*, 1657-1675.

DAVIES, K., R. B. FRITZ, R. N. GRUBB and J. E. JONES 1975a ATS-6 Radio Beacon Experiment: The First Year, *IEEE Trans. Aerospace and Electronic Systems*, *AES-11*, 1103-1109.

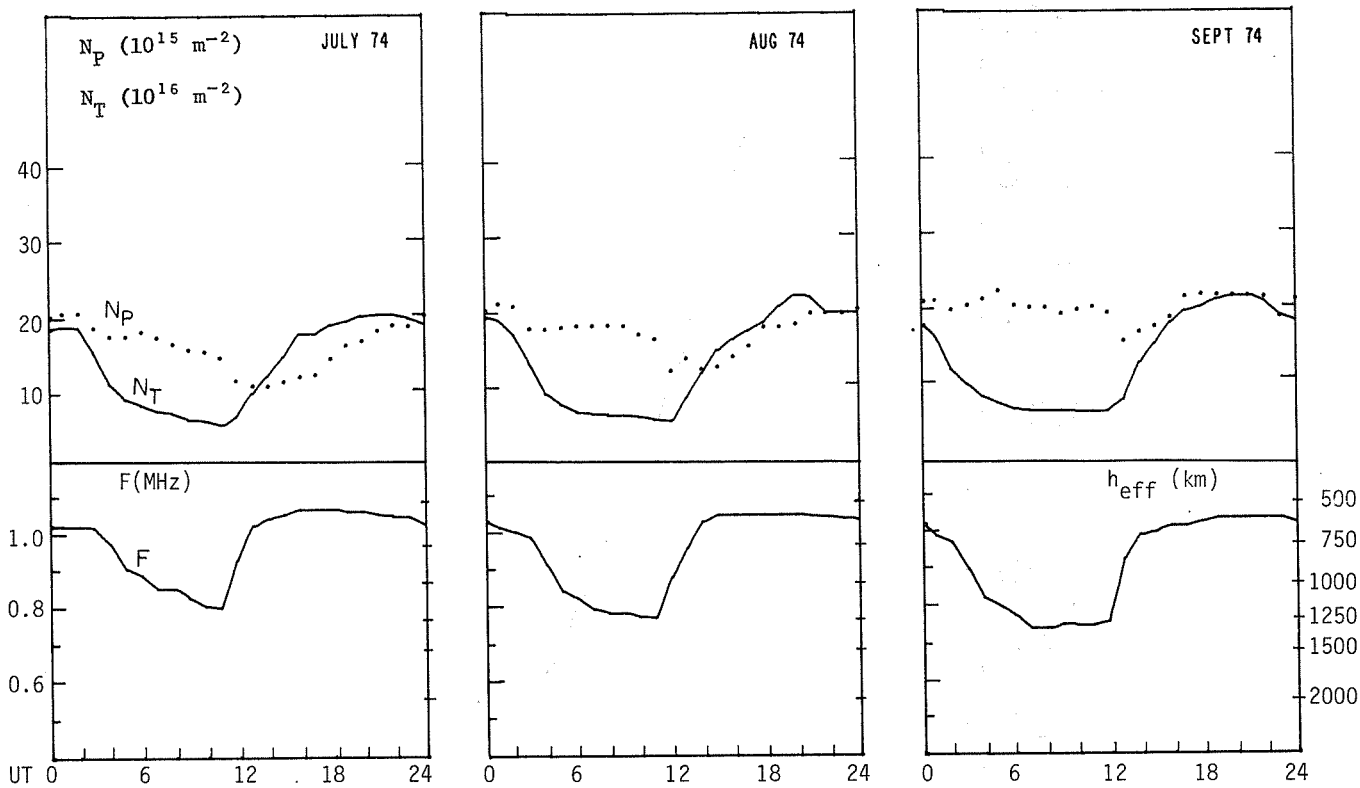
DAVIES, K., R. B. FRITZ, R. N. GRUBB and J. E. JONES 1975b Some early results from the ATS-6 Radio Beacon Experiment. *Radio Sci.*, *10*, 785-799.

DAVIES, K., R. B. FRITZ and T. B. GRAY 1976 Measurements of the columnar electron contents of the ionosphere and plasmasphere, *J. Geophys. Res.*, *81*, 2825-2834.

GRUBB, R. N. R. B. FRITZ and J. E. JONES 1976 The performance of the ATS-6 Radio Beacon as a measurement system, to be published in the *Proceedings of the COSPAR Symposium on The Geophysical Use of Satellite Beacon Observations*, Boston University.

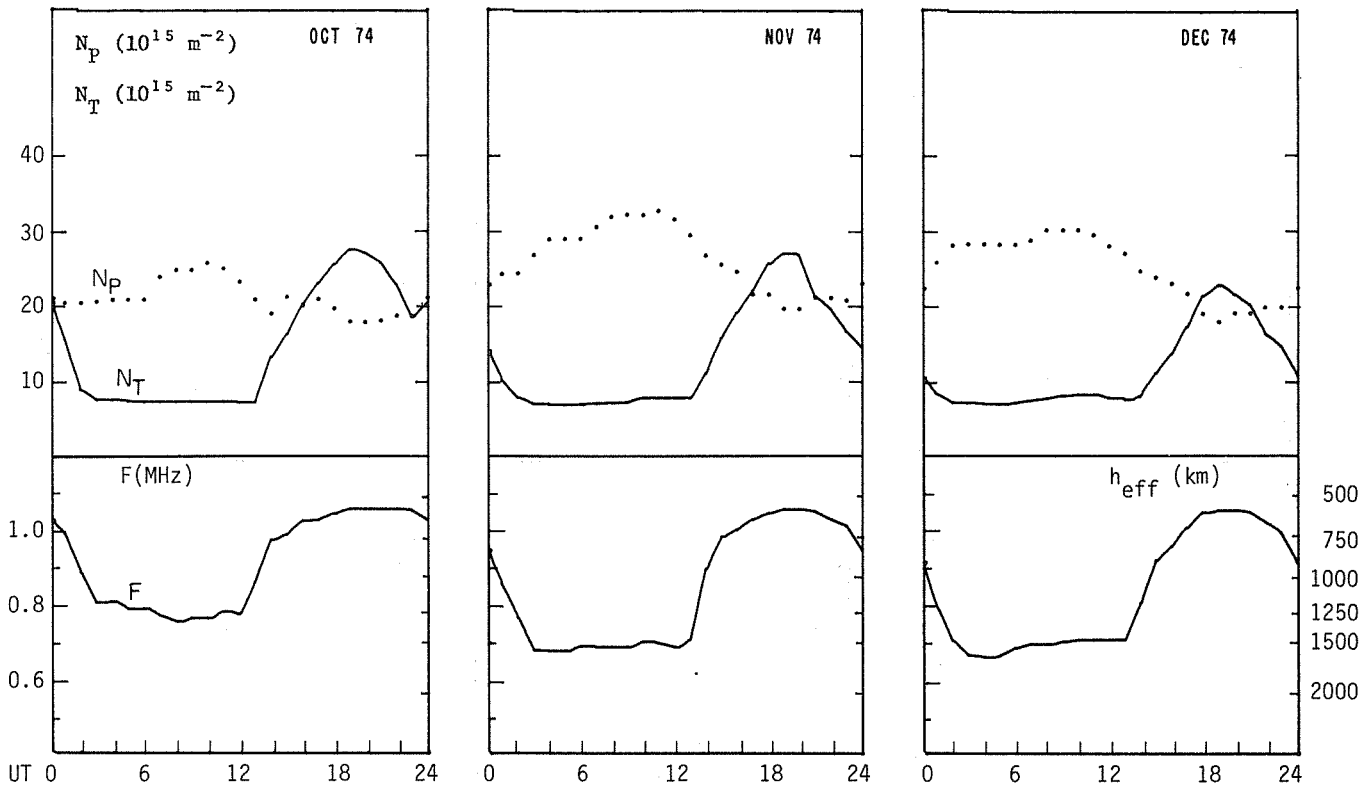
TITHERIDGE, J. E. 1972 Determination of ionospheric electron content from the Faraday rotation of geostationary satellite signals, *Planet. Space Sci.*, *20*, 353-369.

MONTHLY MEDIAN VALUES OF $N_T$, $N_P$, AND F in UT



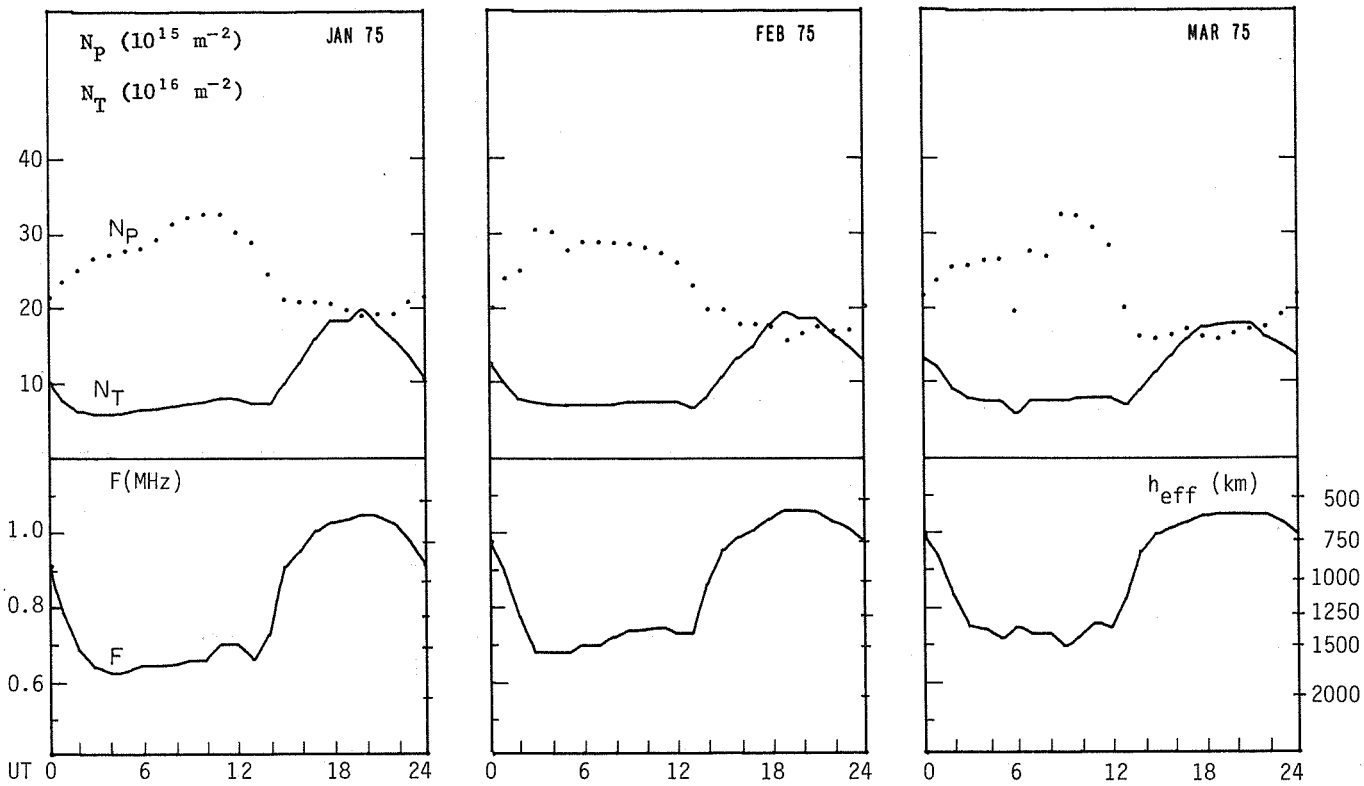

| UT | JULY 1974 F(140) MHz | JULY 1974 $N_T$ $10^{14}m^{-2}$ | JULY 1974 $N_P$ $10^{14}m^{-2}$ | JULY 1974 $N_P/N_T$ % | AUGUST 1974 F(140) MHz | AUGUST 1974 $N_T$ $10^{14}m^{-2}$ | AUGUST 1974 $N_P$ $10^{14}m^{-2}$ | AUGUST 1974 $N_P/N_T$ % | SEPTEMBER 1974 F(140) MHz | SEPTEMBER 1974 $N_T$ $10^{14}m^{-2}$ | SEPTEMBER 1974 $N_P$ $10^{14}m^{-2}$ | SEPTEMBER 1974 $N_P/N_T$ % | UT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 1.022 | 1807 | 197 | 11 | 1.029 | 1927 | 203 | 11 | 1.016 | 1790 | 212 | 12 | 00 |
| 01 | 1.020 | 1838 | 202 | 11 | 1.012 | 1841 | 212 | 12 | .984 | 1599 | 214 | 13 | 01 |
| 02 | 1.021 | 1771 | 201 | 11 | .999 | 1648 | 203 | 12 | .965 | 1154 | 195 | 17 | 02 |
| 03 | 1.016 | 1449 | 177 | 12 | .985 | 1261 | 173 | 14 | .895 | 946 | 206 | 22 | 03 |
| 04 | .974 | 1024 | 166 | 16 | .913 | 861 | 172 | 20 | .818 | 782 | 215 | 27 | 04 |
| 05 | .906 | 807 | 171 | 21 | .841 | 707 | 180 | 25 | .794 | 694 | 225 | 32 | 05 |
| 06 | .888 | 729 | 177 | 24 | .820 | 602 | 182 | 30 | .769 | 609 | 201 | 33 | 06 |
| 07 | .853 | 646 | 165 | 26 | .791 | 577 | 180 | 31 | .734 | 589 | 198 | 34 | 07 |
| 08 | .861 | 614 | 155 | 25 | .780 | 558 | 182 | 33 | .734 | 592 | 200 | 34 | 08 |
| 09 | .829 | 533 | 147 | 28 | .781 | 558 | 177 | 32 | .756 | 592 | 189 | 32 | 09 |
| 10 | .806 | 514 | 145 | 28 | .771 | 533 | 165 | 31 | .742 | 575 | 200 | 35 | 10 |
| 11 | .801 | 460 | 137 | 30 | .768 | 499 | 159 | 32 | .754 | 597 | 204 | 34 | 11 |
| 12 | .936 | 616 | 106 | 17 | .883 | 477 | 116 | 24 | .763 | 641 | 190 | 30 | 12 |
| 13 | 1.028 | 924 | 99 | 11 | .962 | 826 | 137 | 17 | .927 | 787 | 153 | 19 | 13 |
| 14 | 1.051 | 1161 | 102 | 9 | 1.034 | 1159 | 118 | 10 | .993 | 1260 | 170 | 13 | 14 |
| 15 | 1.061 | 1410 | 109 | 8 | 1.054 | 1467 | 126 | 9 | 1.004 | 1521 | 177 | 12 | 15 |
| 16 | 1.075 | 1716 | 116 | 7 | 1.054 | 1626 | 140 | 9 | 1.020 | 1804 | 189 | 10 | 16 |
| 17 | 1.073 | 1723 | 119 | 7 | 1.048 | 1746 | 154 | 9 | 1.019 | 1975 | 216 | 11 | 17 |
| 18 | 1.071 | 1848 | 139 | 8 | 1.052 | 1853 | 178 | 10 | 1.031 | 2029 | 220 | 11 | 18 |
| 19 | 1.058 | 1900 | 157 | 8 | 1.049 | 2059 | 180 | 9 | 1.040 | 2134 | 214 | 10 | 19 |
| 20 | 1.059 | 1971 | 164 | 8 | 1.049 | 2215 | 184 | 8 | 1.041 | 2178 | 218 | 10 | 20 |
| 21 | 1.050 | 1988 | 177 | 9 | 1.040 | 2137 | 197 | 9 | 1.040 | 2156 | 213 | 10 | 21 |
| 22 | 1.045 | 1943 | 185 | 10 | 1.037 | 1929 | 195 | 10 | 1.038 | 2054 | 211 | 10 | 22 |
| 23 | 1.044 | 1887 | 179 | 9 | 1.033 | 1958 | 195 | 10 | 1.031 | 1863 | 185 | 10 | 23 |

MONTHLY MEDIAN VALUES OF $N_T$, $N_P$, AND F

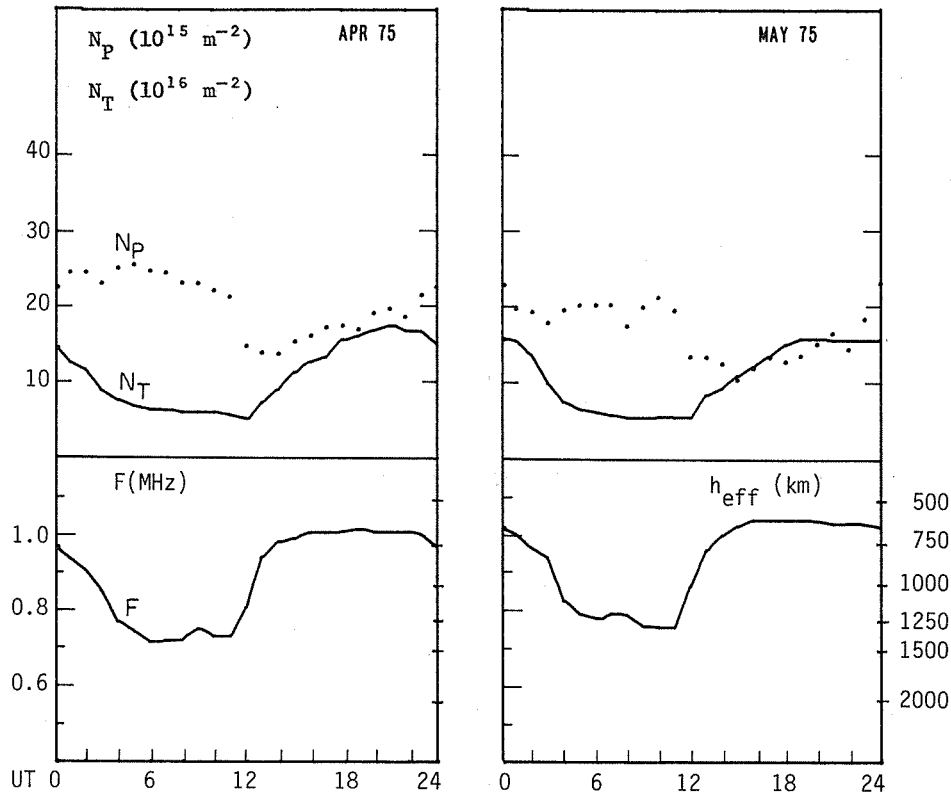



| UT | OCTOBER 1974 F(140) MHz | $N_T$ $10^{14}m^{-2}$ | $N_P$ $10^{14}m^{-2}$ | $N_P/N_T$ % | NOVEMBER 1974 F(140) MHz | $N_T$ $10^{14}m^{-2}$ | $N_P$ $10^{14}m^{-2}$ | $N_P/N_T$ % | DECEMBER 1974 F(140) MHz | $N_T$ $10^{14}m^{-2}$ | $N_P$ $10^{14}m^{-2}$ | $N_P/N_T$ % | UT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 1.022 | 2068 | 214 | 10 | .943 | 1433 | 233 | 16 | .912 | 1079 | 228 | 21 | 00 |
| 01 | .985 | 1540 | 202 | 13 | .854 | 1002 | 247 | 25 | .796 | 812 | 261 | 28 | 01 |
| 02 | .885 | 866 | 204 | 24 | .764 | 758 | 248 | 33 | .704 | 699 | 284 | 41 | 02 |
| 03 | .802 | 724 | 209 | 29 | .677 | 677 | 271 | 40 | .663 | 694 | 288 | 41 | 03 |
| 04 | .814 | 758 | 212 | 28 | .674 | 677 | 292 | 43 | .657 | 685 | 283 | 41 | 04 |
| 05 | .784 | 707 | 212 | 30 | .679 | 704 | 294 | 42 | .672 | 716 | 282 | 39 | 05 |
| 06 | .795 | 686 | 209 | 30 | .697 | 731 | 290 | 40 | .692 | 756 | 287 | 38 | 06 |
| 07 | .766 | 753 | 241 | 32 | .684 | 748 | 309 | 41 | .705 | 787 | 293 | 37 | 07 |
| 08 | .751 | 746 | 251 | 34 | .684 | 753 | 323 | 43 | .702 | 812 | 306 | 38 | 08 |
| 09 | .770 | 743 | 250 | 34 | .689 | 760 | 327 | 43 | .710 | 851 | 305 | 36 | 09 |
| 10 | .764 | 753 | 261 | 35 | .709 | 817 | 321 | 39 | .716 | 866 | 305 | 35 | 10 |
| 11 | .788 | 763 | 249 | 33 | .694 | 807 | 332 | 41 | .716 | 826 | 294 | 36 | 11 |
| 12 | .768 | 690 | 230 | 33 | .683 | 773 | 315 | 41 | .708 | 758 | 279 | 37 | 12 |
| 13 | .865 | 734 | 207 | 28 | .714 | 773 | 293 | 38 | .715 | 741 | 269 | 36 | 13 |
| 14 | .976 | 1330 | 188 | 14 | .899 | 1120 | 266 | 24 | .810 | 846 | 246 | 29 | 14 |
| 15 | .994 | 1638 | 214 | 13 | .985 | 1589 | 253 | 16 | .923 | 1139 | 237 | 21 | 15 |
| 16 | 1.030 | 2083 | 199 | 10 | 1.009 | 1927 | 245 | 13 | .964 | 1399 | 229 | 16 | 16 |
| 17 | 1.035 | 2323 | 213 | 9 | 1.036 | 2227 | 215 | 10 | 1.014 | 1751 | 216 | 12 | 17 |
| 18 | 1.050 | 2575 | 195 | 8 | 1.052 | 2586 | 214 | 8 | 1.054 | 2161 | 189 | 9 | 18 |
| 19 | 1.063 | 2778 | 177 | 6 | 1.063 | 2738 | 195 | 7 | 1.062 | 2323 | 178 | 8 | 19 |
| 20 | 1.057 | 2690 | 181 | 7 | 1.057 | 2673 | 195 | 7 | 1.054 | 2147 | 195 | 9 | 20 |
| 21 | 1.062 | 2557 | 184 | 7 | 1.046 | 2122 | 214 | 10 | 1.046 | 2005 | 192 | 10 | 21 |
| 22 | 1.057 | 2264 | 190 | 8 | 1.025 | 1946 | 211 | 11 | 1.020 | 1628 | 203 | 12 | 22 |
| 23 | 1.048 | 1846 | 186 | 10 | 1.007 | 1648 | 206 | 13 | .991 | 1457 | 203 | 14 | 23 |

MONTHLY MEDIAN VALUES OF $N_T$, $N_p$, AND F



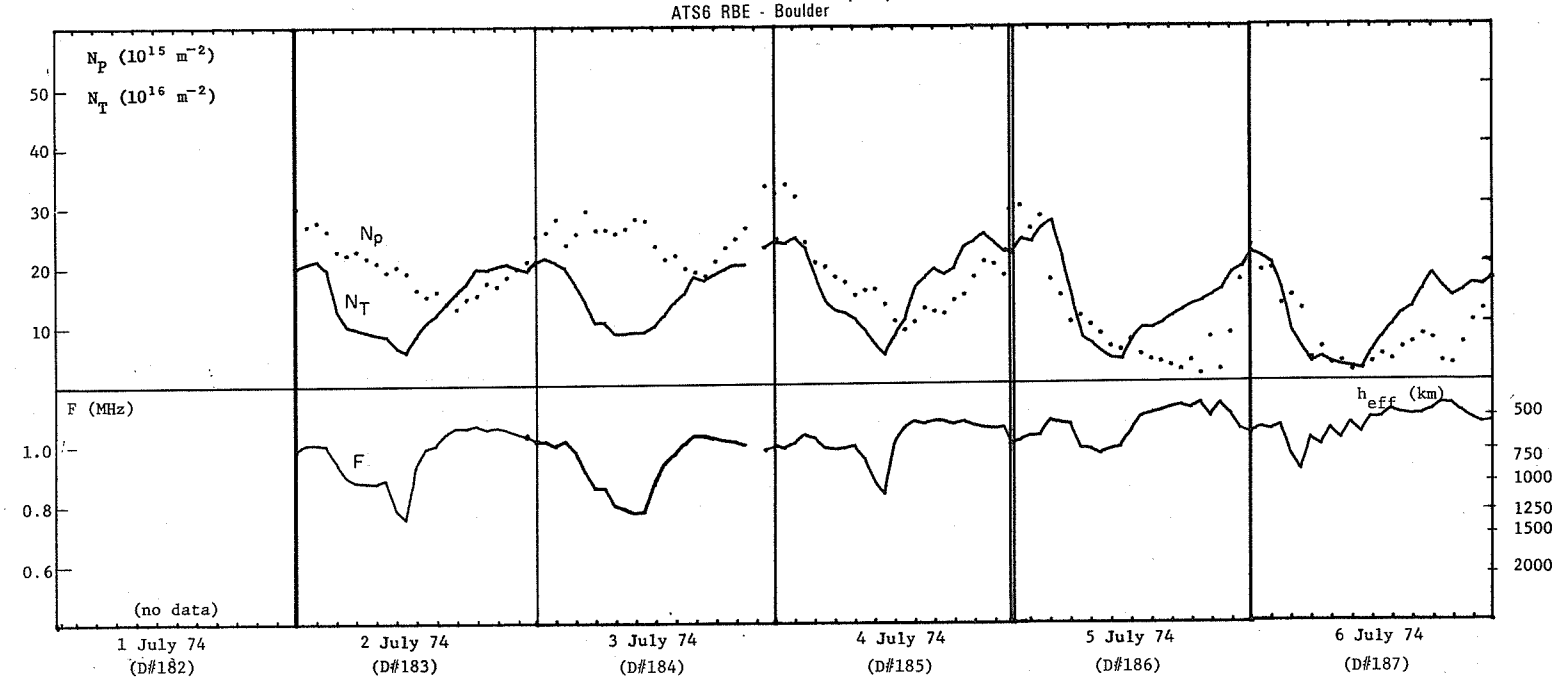

| UT | JANUARY 1975 F(140) MHz | $N_T$ $10^{14}m^{-2}$ | $N_p$ $10^{14}m^{-2}$ | $N_p/N_T$ % | FEBRUARY 1975 F(140) MHz | $N_T$ $10^{14}m^{-2}$ | $N_p$ $10^{14}m^{-2}$ | $N_p/N_T$ % | MARCH 1975 F(140) MHz | $N_T$ $10^{14}m^{-2}$ | $N_p$ $10^{14}m^{-2}$ | $N_p/N_T$ % | UT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | .906 | 1024 | 217 | 21 | .967 | 1271 | 201 | 16 | .982 | 1318 | 217 | 16 | 00 |
| 01 | .779 | 741 | 237 | 32 | .896 | 998 | 240 | 24 | .926 | 1164 | 237 | 20 | 01 |
| 02 | .679 | 587 | 252 | 43 | .767 | 741 | 251 | 34 | .822 | 873 | 254 | 29 | 02 |
| 03 | .632 | 553 | 268 | 48 | .671 | 694 | 304 | 44 | .737 | 734 | 257 | 35 | 03 |
| 04 | .617 | 597 | 274 | 46 | .670 | 690 | 298 | 43 | .726 | 704 | 264 | 37 | 04 |
| 05 | .632 | 631 | 279 | 44 | .674 | 699 | 273 | 39 | .705 | 724 | 266 | 37 | 05 |
| 06 | .647 | 675 | 282 | 42 | .699 | 716 | 289 | 40 | .742 | 533 | 191 | 36 | 06 |
| 07 | .648 | 690 | 294 | 43 | .696 | 714 | 289 | 40 | .715 | 753 | 274 | 36 | 07 |
| 08 | .650 | 719 | 314 | 44 | .720 | 729 | 283 | 39 | .725 | 729 | 263 | 36 | 08 |
| 09 | .660 | 751 | 324 | 43 | .738 | 758 | 281 | 37 | .683 | 748 | 323 | 43 | 09 |
| 10 | .662 | 773 | 329 | 43 | .741 | 758 | 276 | 36 | .716 | 797 | 319 | 40 | 10 |
| 11 | .703 | 822 | 327 | 40 | .747 | 748 | 268 | 36 | .753 | 807 | 302 | 37 | 11 |
| 12 | .695 | 746 | 299 | 40 | .719 | 724 | 256 | 35 | .732 | 753 | 278 | 37 | 12 |
| 13 | .652 | 690 | 285 | 41 | .721 | 626 | 226 | 36 | .816 | 653 | 196 | 30 | 13 |
| 14 | .726 | 687 | 243 | 35 | .858 | 804 | 194 | 24 | .942 | 888 | 158 | 18 | 14 |
| 15 | .907 | 993 | 209 | 21 | .949 | 1073 | 194 | 18 | .990 | 1125 | 157 | 14 | 15 |
| 16 | .952 | 1271 | 205 | 16 | .986 | 1330 | 174 | 13 | 1.010 | 1352 | 164 | 12 | 16 |
| 17 | 1.005 | 1594 | 209 | 13 | 1.006 | 1491 | 175 | 12 | 1.025 | 1570 | 172 | 11 | 17 |
| 18 | 1.029 | 1841 | 202 | 11 | 1.035 | 1770 | 170 | 10 | 1.042 | 1736 | 156 | 9 | 18 |
| 19 | 1.038 | 1816 | 194 | 11 | 1.058 | 1938 | 152 | 8 | 1.047 | 1775 | 153 | 9 | 19 |
| 20 | 1.050 | 2000 | 187 | 9 | 1.048 | 1809 | 167 | 9 | 1.043 | 1800 | 166 | 9 | 20 |
| 21 | 1.034 | 1741 | 194 | 11 | 1.045 | 1819 | 175 | 10 | 1.035 | 1770 | 171 | 10 | 21 |
| 22 | 1.014 | 1551 | 191 | 12 | 1.019 | 1628 | 164 | 10 | 1.035 | 1560 | 175 | 11 | 22 |
| 23 | .971 | 1340 | 210 | 16 | 1.000 | 1467 | 171 | 12 | 1.015 | 1457 | 191 | 13 | 23 |

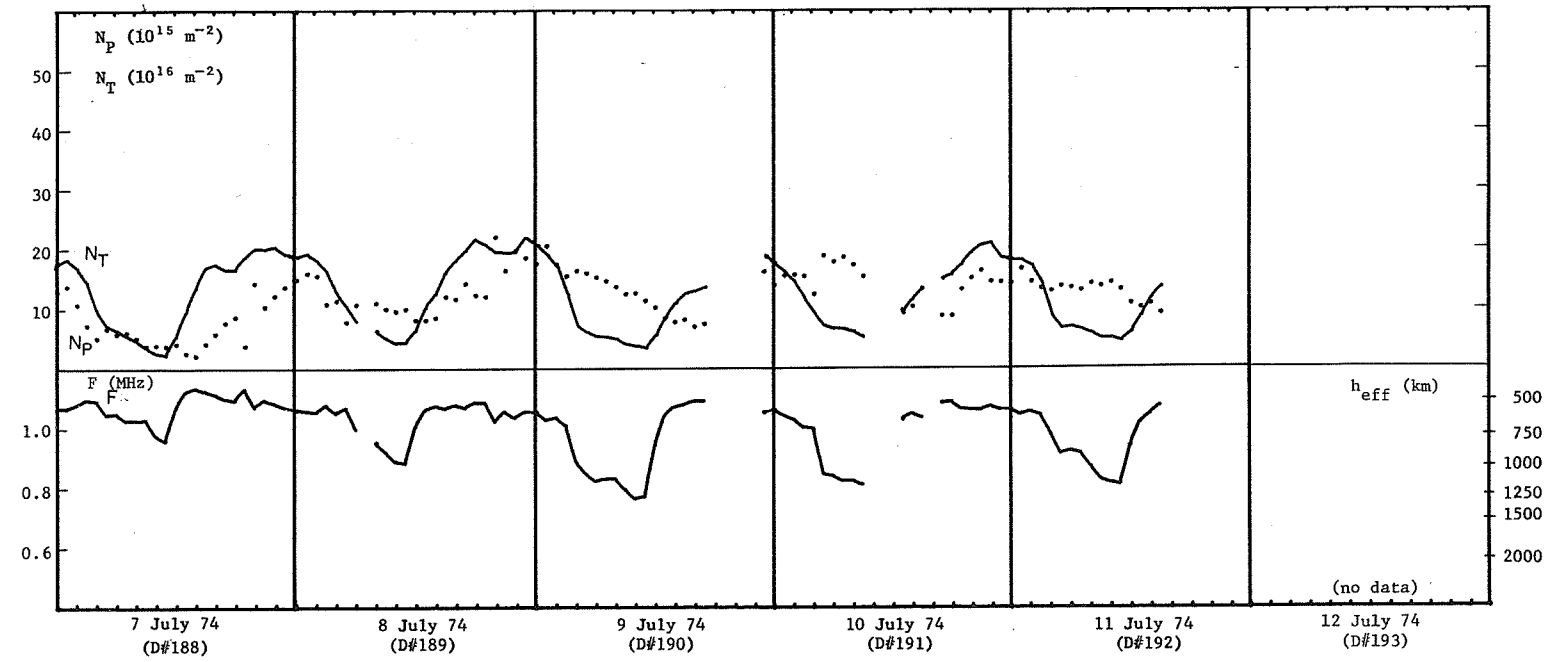



| UT | APRIL 1975 F(140) MHz | $N_T$ $10^{14}m^{-2}$ | $N_P$ $10^{14}m^{-2}$ | $N_P/N_T$ % | MAY 1975 F(140) MHz | $N_T$ $10^{14}m^{-2}$ | $N_P$ $10^{14}m^{-2}$ | $N_P/N_T$ % | UT |
|---|---|---|---|---|---|---|---|---|---|
| 00 | .967 | 1518 | 232 | 15 | 1.019 | 1638 | 236 | 14 | 00 |
| 01 | .936 | 1276 | 251 | 20 | 1.001 | 1565 | 200 | 13 | 01 |
| 02 | .905 | 1171 | 251 | 21 | .964 | 1374 | 195 | 14 | 02 |
| 03 | .852 | 907 | 232 | 26 | .939 | 1016 | 180 | 18 | 03 |
| 04 | .771 | 775 | 256 | 33 | .828 | 758 | 202 | 27 | 04 |
| 05 | .744 | 699 | 262 | 37 | .790 | 668 | 209 | 31 | 05 |
| 06 | .715 | 653 | 248 | 38 | .779 | 631 | 210 | 33 | 06 |
| 07 | .731 | 643 | 246 | 38 | .802 | 592 | 206 | 35 | 07 |
| 08 | .732 | 616 | 233 | 38 | .788 | 558 | 176 | 32 | 08 |
| 09 | .759 | 641 | 232 | 36 | .758 | 562 | 205 | 36 | 09 |
| 10 | .730 | 621 | 223 | 36 | .755 | 623 | 219 | 35 | 10 |
| 11 | .732 | 582 | 215 | 37 | .760 | 567 | 197 | 35 | 11 |
| 12 | .813 | 528 | 150 | 28 | .870 | 580 | 137 | 24 | 12 |
| 13 | .946 | 785 | 141 | 18 | .967 | 895 | 136 | 15 | 13 |
| 14 | .989 | 973 | 139 | 14 | 1.008 | 993 | 126 | 13 | 14 |
| 15 | 1.000 | 1188 | 159 | 13 | 1.033 | 1154 | 105 | 9 | 15 |
| 16 | 1.016 | 1340 | 168 | 13 | 1.050 | 1276 | 125 | 10 | 16 |
| 17 | 1.009 | 1403 | 179 | 13 | 1.048 | 1418 | 140 | 10 | 17 |
| 18 | 1.019 | 1619 | 182 | 11 | 1.048 | 1560 | 129 | 8 | 18 |
| 19 | 1.024 | 1679 | 171 | 10 | 1.048 | 1645 | 142 | 9 | 19 |
| 20 | 1.005 | 1758 | 197 | 11 | 1.036 | 1633 | 157 | 10 | 20 |
| 21 | 1.011 | 1814 | 204 | 11 | 1.028 | 1574 | 171 | 11 | 21 |
| 22 | 1.014 | 1692 | 188 | 11 | 1.041 | 1582 | 146 | 9 | 22 |
| 23 | .998 | 1682 | 220 | 13 | 1.028 | 1594 | 189 | 12 | 23 |

DAILY PLOTS AND TABLES OF $N_T$, $N_p$, and F in UT

ATS6 RBE - Boulder



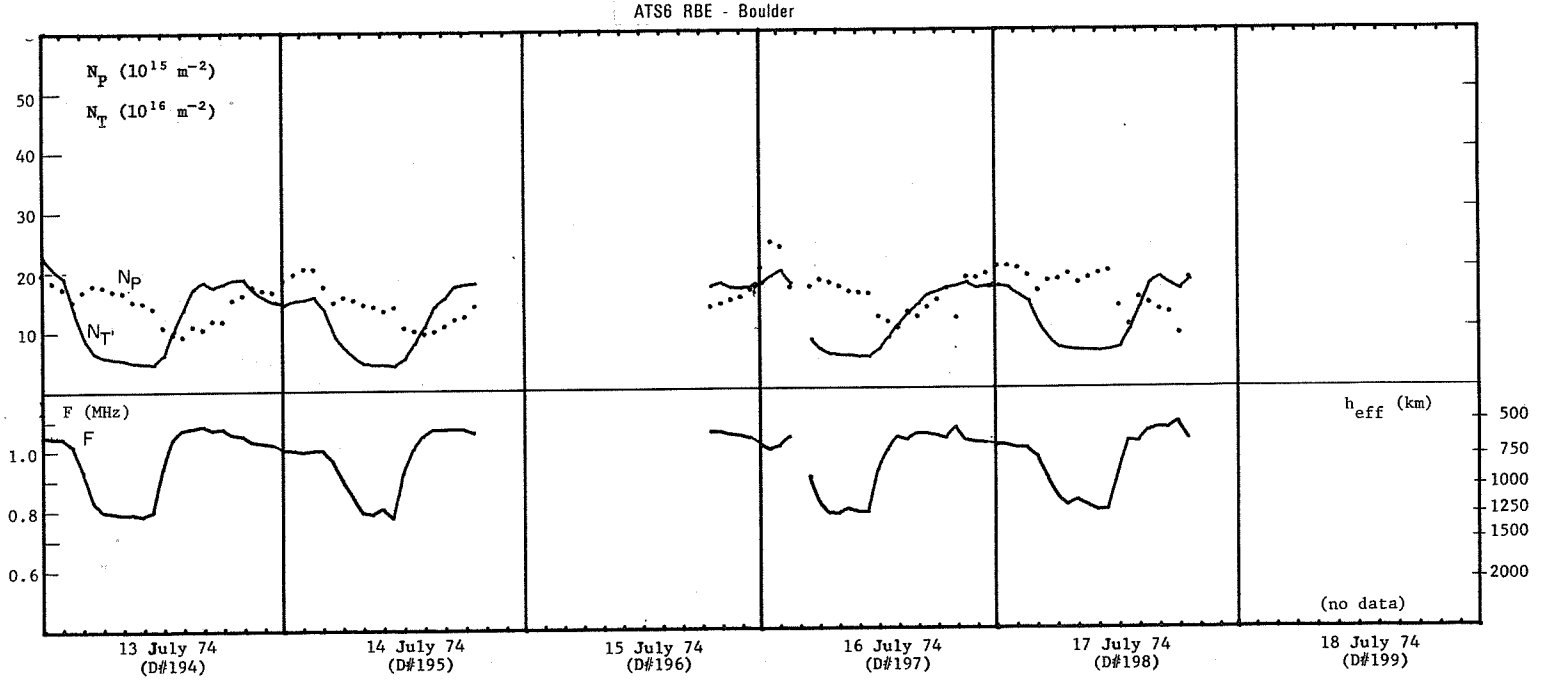



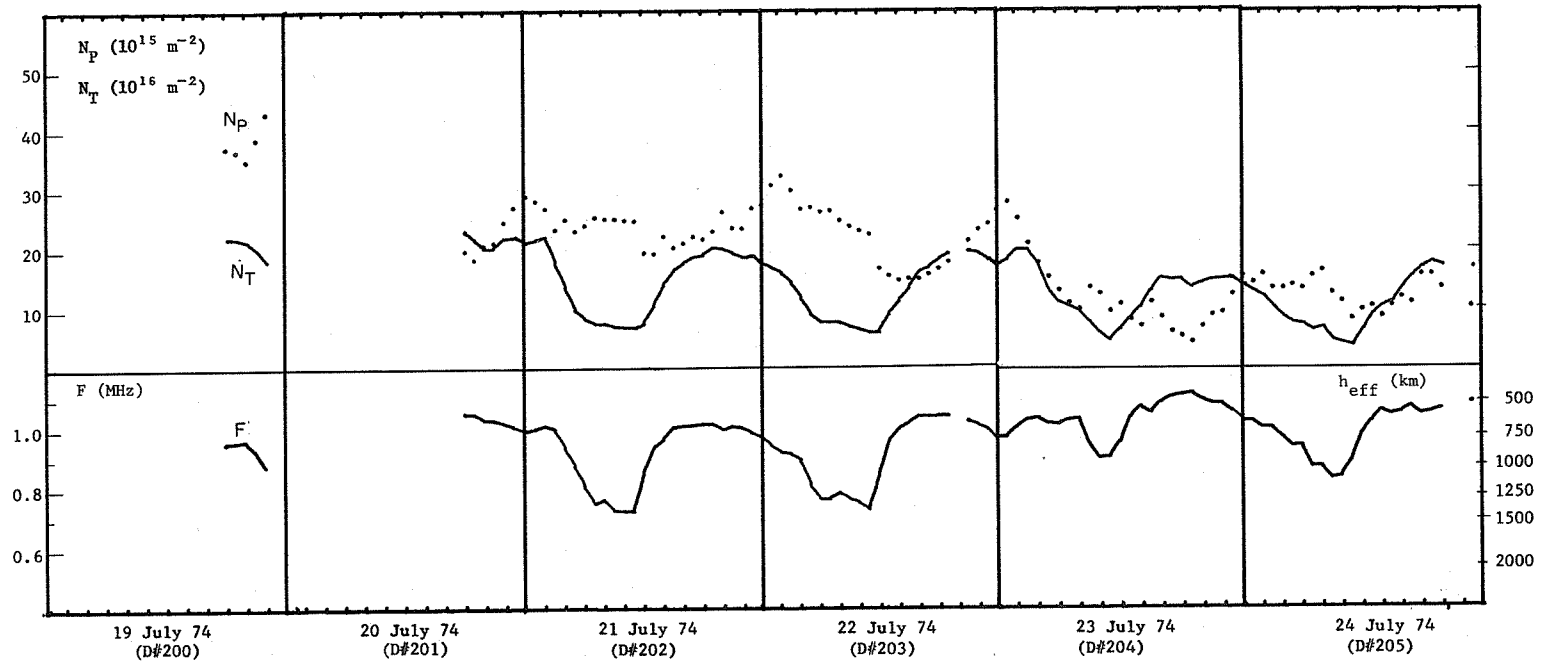
| DATE | | 183:74 | | | 184:74 | | | 185:74 | | | 186:74 | | | 187:74 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | | .977 | 1951 | 294 | 1.008 | 1995 | 247 | .995 | 2367 | 319 | .997 | 2186 | 291 | 1.029 | 2166 | 227 | 0 |
| 1 | | .999 | 2020 | 266 | 1.009 | 2078 | 254 | .987 | 2352 | 334 | 1.009 | 2425 | 298 | 1.048 | 2103 | 187 | 1 |
| 2 | | .999 | 2064 | 271 | .993 | 2015 | 275 | 1.002 | 2440 | 315 | 1.024 | 2381 | 261 | 1.041 | 1990 | 189 | 2 |
| 3 | | .996 | 1922 | 258 | 1.010 | 1917 | 234 | 1.030 | 2279 | 238 | 1.027 | 2616 | 281 | 1.054 | 1575 | 131 | 3 |
| 4 | | .942 | 1237 | 224 | .975 | 1653 | 252 | 1.021 | 1819 | 205 | 1.076 | 2729 | 176 | .959 | 861 | 143 | 4 |
| 5 | | .892 | 968 | 217 | .906 | 1364 | 289 | .988 | 1394 | 197 | 1.069 | 2127 | 150 | .906 | 577 | 122 | 5 |
| 6 | | .873 | 924 | 223 | .853 | 1002 | 259 | .983 | 1237 | 180 | 1.065 | 1418 | 105 | 1.011 | 323 | 39 | 6 |
| 7 | | .871 | 875 | 213 | .853 | 1002 | 259 | .985 | 1193 | 171 | .983 | 787 | 114 | .989 | 406 | 57 | 7 |
| 8 | | .868 | 831 | 204 | .794 | 817 | 253 | .993 | 1090 | 149 | .981 | 680 | 100 | 1.043 | 323 | 30 | 8 |
| 9 | | .880 | 802 | 189 | .784 | 817 | 260 | .951 | 900 | 156 | .966 | 533 | 85 | 1.010 | 269 | 33 | 9 |
| 10 | | .783 | 616 | 197 | .771 | 836 | 276 | .877 | 670 | 159 | .980 | 430 | 64 | 1.061 | 245 | 19 | 10 |
| 11 | | .750 | 538 | 187 | .773 | 836 | 274 | .833 | 489 | 135 | .987 | 411 | 58 | 1.031 | 210 | 22 | 11 |
| 12 | NO DATA | .921 | 797 | 159 | .864 | 929 | 231 | .997 | 797 | 106 | 1.036 | 743 | 74 | 1.079 | 504 | 31 | 12 |
| 13 | | .984 | 1022 | 148 | .933 | 1110 | 209 | 1.051 | 1066 | 91 | 1.088 | 939 | 51 | 1.080 | 734 | 44 | 13 |
| 14 | | .995 | 1149 | 155 | .964 | 1325 | 215 | 1.075 | 1584 | 104 | 1.099 | 939 | 42 | 1.105 | 934 | 37 | 14 |
| 15 | | 1.032 | 1335 | 136 | .998 | 1472 | 194 | 1.067 | 1760 | 127 | 1.107 | 1012 | 38 | 1.094 | 1139 | 55 | 15 |
| 16 | | 1.054 | 1516 | 127 | 1.027 | 1760 | 188 | 1.077 | 1922 | 122 | 1.118 | 1130 | 32 | 1.090 | 1242 | 65 | 16 |
| 17 | | 1.052 | 1672 | 143 | 1.027 | 1707 | 182 | 1.075 | 1834 | 119 | 1.126 | 1227 | 25 | 1.091 | 1531 | 78 | 17 |
| 18 | | 1.061 | 1922 | 149 | 1.019 | 1800 | 204 | 1.066 | 1922 | 140 | 1.117 | 1330 | 38 | 1.104 | 1800 | 72 | 18 |
| 19 | | 1.049 | 1917 | 168 | 1.011 | 1883 | 228 | 1.075 | 2284 | 149 | 1.135 | 1384 | 18 | 1.126 | 1599 | 34 | 19 |
| 20 | | 1.054 | 1971 | 164 | 1.008 | 1961 | 242 | 1.064 | 2377 | 179 | 1.089 | 1482 | 79 | 1.126 | 1428 | 30 | 20 |
| 21 | | 1.048 | 2010 | 179 | .997 | 1956 | 260 | 1.056 | 2509 | 205 | 1.132 | 1579 | 25 | 1.101 | 1506 | 64 | 21 |
| 22 | | 1.036 | 1946 | 193 | | | | 1.053 | 2367 | 201 | 1.097 | 1858 | 85 | 1.078 | 1633 | 102 | 22 |
| 23 | | 1.026 | 1902 | 205 | .981 | 2254 | 331 | 1.055 | 2215 | 183 | 1.047 | 1951 | 174 | 1.064 | 1614 | 121 | 23 |

| DATE | 188:74 | | | 189:74 | | | 190:74 | | | 191:74 | | | 192:74 | | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | | HR |
| 0 | 1.065 | 1741 | 128 | 1.058 | 1858 | 149 | 1.052 | 2054 | 175 | 1.059 | 1746 | 138 | 1.060 | 1790 | 140 | | 0 |
| 1 | 1.064 | 1819 | 136 | 1.055 | 1912 | 158 | 1.026 | 1902 | 205 | 1.041 | 1619 | 154 | 1.044 | 1790 | 165 | | 1 |
| 2 | 1.077 | 1682 | 106 | 1.051 | 1804 | 155 | 1.033 | 1702 | 174 | 1.027 | 1452 | 155 | 1.053 | 1702 | 144 | | 2 |
| 3 | 1.093 | 1438 | 72 | 1.074 | 1628 | 107 | 1.007 | 1242 | 155 | 1.001 | 1188 | 154 | 1.043 | 1423 | 133 | | 3 |
| 4 | 1.090 | 963 | 50 | 1.048 | 1267 | 112 | .886 | 709 | 163 | .997 | 929 | 124 | .980 | 870 | 128 | | 4 |
| 5 | 1.045 | 714 | 65 | 1.065 | 1032 | 77 | .846 | 601 | 159 | .846 | 709 | 187 | .913 | 655 | 135 | | 5 |
| 6 | 1.047 | 641 | 57 | .995 | 782 | 106 | .821 | 533 | 152 | .838 | 655 | 178 | .922 | 675 | 134 | | 6 |
| 7 | 1.025 | 548 | 59 | | | | .829 | 523 | 146 | .823 | 650 | 185 | .915 | 636 | 130 | | 7 |
| 8 | 1.025 | 465 | 50 | .950 | 621 | 108 | .829 | 489 | 136 | .822 | 606 | 173 | .871 | 577 | 140 | | 8 |
| 9 | 1.027 | 347 | 37 | .919 | 494 | 99 | .794 | 401 | 124 | .809 | 518 | 153 | .829 | 489 | 136 | | 9 |
| 10 | .975 | 249 | 38 | .888 | 416 | 95 | .764 | 372 | 125 | | | | .817 | 489 | 142 | | 10 |
| 11 | .958 | 220 | 37 | .882 | 421 | 98 | .770 | 342 | 113 | | | | .811 | 445 | 131 | | 11 |
| 12 | 1.065 | 533 | 40 | 1.000 | 616 | 80 | .936 | 548 | 102 | | | | .937 | 582 | 108 | NO DATA | 12 |
| 13 | 1.119 | 929 | 25 | 1.058 | 1007 | 80 | 1.037 | 856 | 84 | 1.028 | 905 | 96 | 1.015 | 861 | 101 | | 13 |
| 14 | 1.132 | 1330 | 21 | 1.072 | 1227 | 84 | 1.068 | 1086 | 77 | 1.046 | 1130 | 102 | 1.044 | 1159 | 107 | | 14 |
| 15 | 1.122 | 1672 | 40 | 1.064 | 1594 | 119 | 1.076 | 1247 | 80 | 1.034 | 1306 | 132 | 1.072 | 1345 | 92 | | 15 |
| 16 | 1.113 | 1736 | 56 | 1.075 | 1785 | 116 | 1.088 | 1291 | 70 | | | | | | | | 16 |
| 17 | 1.098 | 1653 | 75 | 1.067 | 1951 | 141 | 1.088 | 1355 | 73 | 1.082 | 1482 | 88 | | | | | 17 |
| 18 | 1.091 | 1648 | 85 | 1.085 | 2142 | 122 | | | | 1.086 | 1555 | 87 | | | | | 18 |
| 19 | 1.128 | 1853 | 36 | 1.083 | 2064 | 120 | | | | 1.062 | 1712 | 131 | | | | | 19 |
| 20 | 1.069 | 1995 | 141 | 1.021 | 1946 | 219 | | | | 1.061 | 1917 | 149 | | | | | 20 |
| 21 | 1.091 | 1990 | 103 | 1.053 | 1932 | 164 | | | | 1.059 | 2044 | 162 | | | | | 21 |
| 22 | 1.082 | 2029 | 121 | 1.034 | 1941 | 196 | | | | 1.070 | 2083 | 144 | | | | | 22 |
| 23 | 1.069 | 1917 | 135 | 1.052 | 2171 | 185 | 1.051 | 1863 | 160 | 1.061 | 1853 | 144 | | | | | 23 |

Units of $N_T$ and $N_P$ are $10^{14}$ electrons-meter$^{-2}$. Hours are in UT. F140 is in MHz.

ATS6 RBE - Boulder



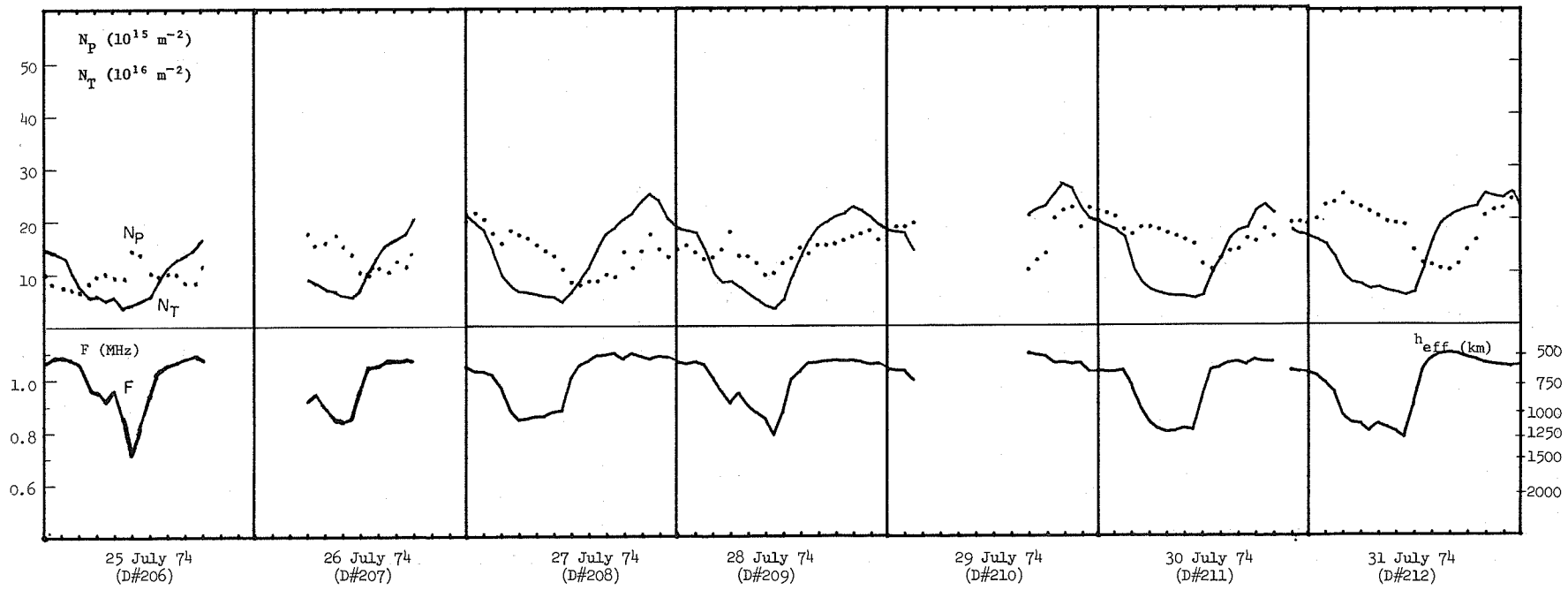



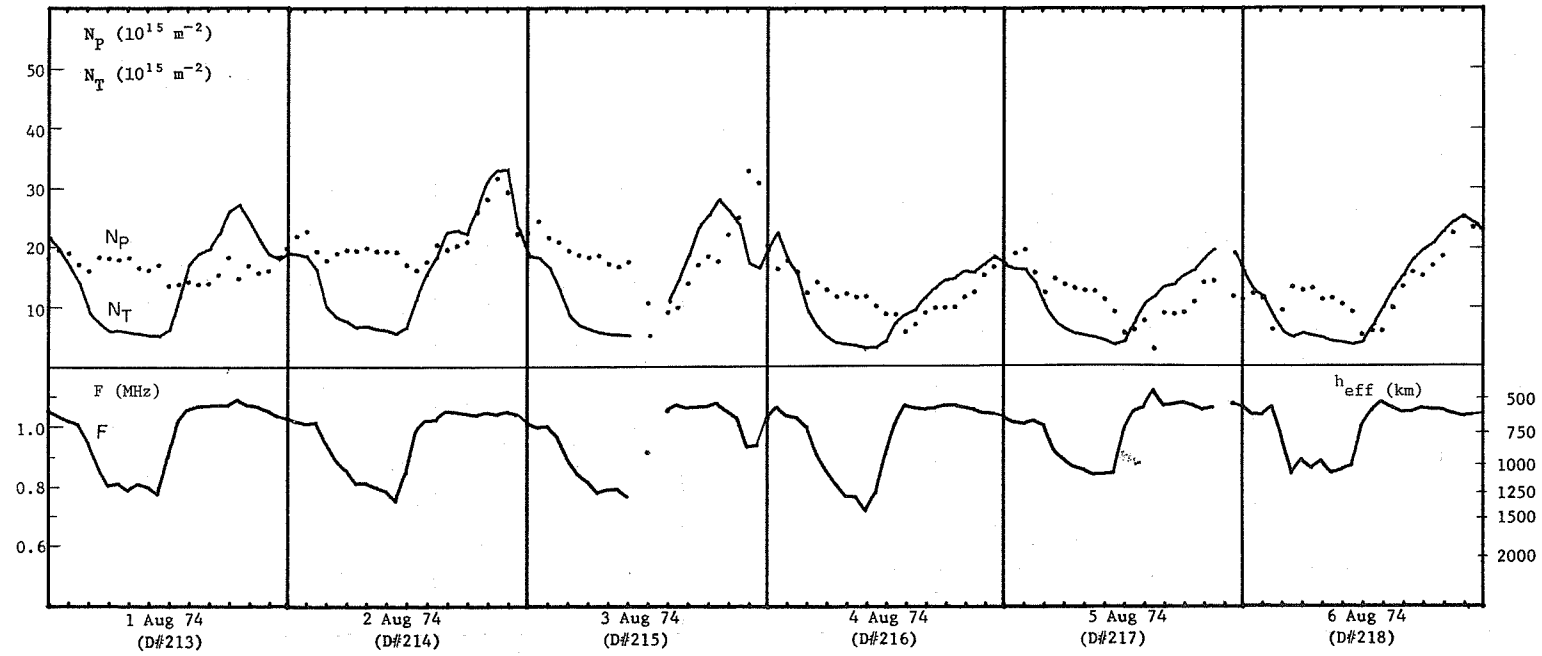
| DATE | 194:74 | | | 195:74 | | | 196:74 | | | 197:74 | | | 198:74 | | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | | HR |
| 0 | 1.048 | 2235 | 197 | 1.004 | 1457 | 185 | | | | 1.016 | 1736 | 203 | 1.012 | 1702 | 204 | | 0 |
| 1 | 1.046 | 2044 | 185 | 1.002 | 1521 | 195 | | | | .998 | 1858 | 245 | 1.010 | 1677 | 204 | | 1 |
| 2 | 1.045 | 1912 | 174 | .997 | 1540 | 204 | | | | 1.009 | 1946 | 238 | 1.002 | 1560 | 201 | | 2 |
| 3 | 1.021 | 1364 | 153 | 1.002 | 1584 | 204 | | | | 1.037 | 1741 | 170 | 1.001 | 1452 | 189 | | 3 |
| 4 | .935 | 900 | 168 | 1.003 | 1374 | 176 | | | | | | | .974 | 1066 | 164 | | 4 |
| 5 | .835 | 650 | 178 | .969 | 944 | 149 | | | | .907 | 807 | 171 | .902 | 831 | 179 | | 5 |
| 6 | .801 | 582 | 177 | .904 | 734 | 157 | | | | .823 | 641 | 182 | .841 | 675 | 181 | | 6 |
| 7 | .796 | 553 | 170 | .850 | 587 | 153 | | | | .786 | 562 | 178 | .810 | 645 | 191 | | 7 |
| 8 | .791 | 533 | 166 | .794 | 469 | 145 | | | | .784 | 538 | 171 | .826 | 626 | 176 | | 8 |
| 9 | .792 | 489 | 152 | .788 | 450 | 141 | | | | .799 | 533 | 163 | .809 | 621 | 184 | | 9 |
| 10 | .786 | 474 | 150 | .806 | 450 | 134 | | | | .790 | 513 | 161 | .793 | 616 | 191 | | 10 |
| 11 | .798 | 460 | 141 | .777 | 430 | 140 | | | | .789 | 509 | 160 | .794 | 631 | 195 | | 11 |
| 12 | .943 | 606 | 109 | .923 | 538 | 106 | | | | .927 | 621 | 120 | .914 | 670 | 138 | NO DATA | 12 |
| 13 | 1.039 | 1012 | 97 | 1.004 | 797 | 101 | | | | .993 | 826 | 113 | 1.023 | 963 | 107 | | 13 |
| 14 | 1.071 | 1364 | 94 | 1.048 | 1076 | 96 | | | | 1.037 | 1042 | 102 | 1.020 | 1345 | 152 | | 14 |
| 15 | 1.077 | 1712 | 109 | 1.069 | 1408 | 99 | | | | 1.029 | 1218 | 128 | 1.056 | 1736 | 143 | | 15 |
| 16 | 1.083 | 1824 | 106 | 1.070 | 1555 | 108 | | | | 1.049 | 1374 | 121 | 1.068 | 1844 | 132 | | 16 |
| 17 | 1.071 | 1741 | 119 | 1.072 | 1746 | 119 | | | | 1.049 | 1540 | 136 | 1.066 | 1731 | 127 | | 17 |
| 18 | 1.074 | 1795 | 118 | 1.070 | 1780 | 123 | | | | 1.043 | 1589 | 148 | 1.086 | 1643 | 92 | | 18 |
| 19 | 1.055 | 1858 | 154 | 1.059 | 1795 | 141 | 1.057 | 1716 | 139 | 1.034 | 1653 | 167 | 1.032 | 1790 | 184 | | 19 |
| 20 | 1.051 | 1873 | 161 | | | | 1.057 | 1770 | 143 | 1.069 | 1682 | 119 | | | | | 20 |
| 21 | 1.031 | 1687 | 175 | | | | 1.049 | 1697 | 149 | 1.027 | 1731 | 185 | | | | | 21 |
| 22 | 1.026 | 1575 | 170 | | | | 1.045 | 1682 | 154 | 1.021 | 1648 | 185 | | | | | 22 |
| 23 | 1.021 | 1496 | 167 | | | | 1.037 | 1702 | 167 | 1.019 | 1677 | 191 | | | | | 23 |

| DATE | 200:74 | | | 201:74 | | | 202:74 | | | 203:74 | | | 204:74 | | | 205:74 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | | | | | | | .991 | 2098 | 289 | .974 | 1785 | 273 | .970 | 1687 | 265 | 1.021 | 1384 | 155 | 0 |
| 1 | | | | | | | .999 | 2142 | 281 | .942 | 1697 | 306 | .971 | 1785 | 278 | 1.020 | 1281 | 144 | 1 |
| 2 | | | | | | | 1.010 | 2196 | 267 | .920 | 1609 | 322 | 1.003 | 1961 | 251 | 1.000 | 1198 | 156 | 2 |
| 3 | | | | | | | .998 | 1756 | 233 | .914 | 1447 | 297 | 1.027 | 1956 | 209 | .998 | 1017 | 134 | 3 |
| 4 | | | | | | | .936 | 1347 | 251 | .895 | 1198 | 266 | 1.033 | 1736 | 176 | .968 | 846 | 134 | 4 |
| 5 | | | | | | | .875 | 963 | 230 | .811 | 914 | 269 | 1.015 | 1306 | 153 | .937 | 748 | 138 | 5 |
| 6 | | | | | | | .809 | 812 | 241 | .764 | 778 | 261 | 1.012 | 1086 | 130 | .938 | 724 | 133 | 6 |
| 7 | | | | | | | .748 | 729 | 254 | .768 | 797 | 265 | 1.026 | 1017 | 109 | .868 | 626 | 154 | 7 |
| 8 | | | | | | | .764 | 748 | 251 | .788 | 782 | 247 | 1.030 | 939 | 98 | .869 | 665 | 163 | 8 |
| 9 | | | | | | | .725 | 680 | 251 | .766 | 709 | 237 | .945 | 753 | 134 | .829 | 450 | 126 | 9 |
| 10 | | | | | | | .723 | 670 | 249 | .753 | 665 | 230 | .900 | 572 | 124 | .834 | 406 | 112 | 10 |
| 11 | | | | | | | .722 | 665 | 247 | .730 | 611 | 223 | .903 | 440 | 95 | .886 | 357 | 82 | 11 |
| 12 | | | | | | | .848 | 738 | 194 | .842 | 621 | 166 | .952 | 611 | 105 | .975 | 626 | 95 | 12 |
| 13 | | | | | | | .935 | 1032 | 193 | .957 | 919 | 154 | 1.034 | 802 | 81 | 1.018 | 890 | 102 | 13 |
| 14 | | | | | | | .964 | 1379 | 223 | 1.002 | 1139 | 147 | 1.068 | 983 | 70 | 1.054 | 1027 | 86 | 14 |
| 15 | | | | | | | 1.006 | 1616 | 203 | 1.021 | 1350 | 151 | 1.050 | 1257 | 109 | 1.042 | 1095 | 103 | 15 |
| 16 | | | | | | | 1.011 | 1756 | 212 | 1.044 | 1638 | 151 | 1.084 | 1472 | 85 | 1.049 | 1335 | 117 | 16 |
| 17 | | | | | | | 1.012 | 1858 | 223 | 1.044 | 1716 | 158 | 1.102 | 1447 | 60 | 1.068 | 1521 | 109 | 17 |
| 18 | .956 | 2201 | 371 | 1.052 | 2347 | 200 | 1.017 | 1883 | 217 | 1.046 | 1848 | 167 | 1.109 | 1457 | 52 | 1.044 | 1672 | 155 | 18 |
| 19 | .958 | 2196 | 366 | 1.053 | 2201 | 186 | 1.018 | 2015 | 231 | 1.045 | 1946 | 178 | 1.113 | 1320 | 42 | 1.048 | 1756 | 155 | 19 |
| 20 | .963 | 2152 | 350 | 1.032 | 2049 | 211 | .998 | 1995 | 264 | | | | 1.093 | 1389 | 69 | 1.059 | 1707 | 134 | 20 |
| 21 | .930 | 2020 | 386 | 1.030 | 2073 | 216 | 1.009 | 1917 | 235 | 1.026 | 1985 | 214 | 1.081 | 1443 | 87 | | | | 21 |
| 22 | .879 | 1824 | 430 | 1.021 | 2235 | 250 | 1.003 | 1844 | 236 | 1.013 | 1951 | 233 | 1.078 | 1457 | 91 | | | | 22 |
| 23 | | | | 1.010 | 2254 | 275 | .985 | 1883 | 270 | .997 | 1829 | 243 | 1.054 | 1467 | 122 | 1.080 | 1677 | 102 | 23 |

Units of $N_T$ and $N_P$ are $10^{14}$ electrons-meter$^{-2}$.

ATS6 RBE - Boulder

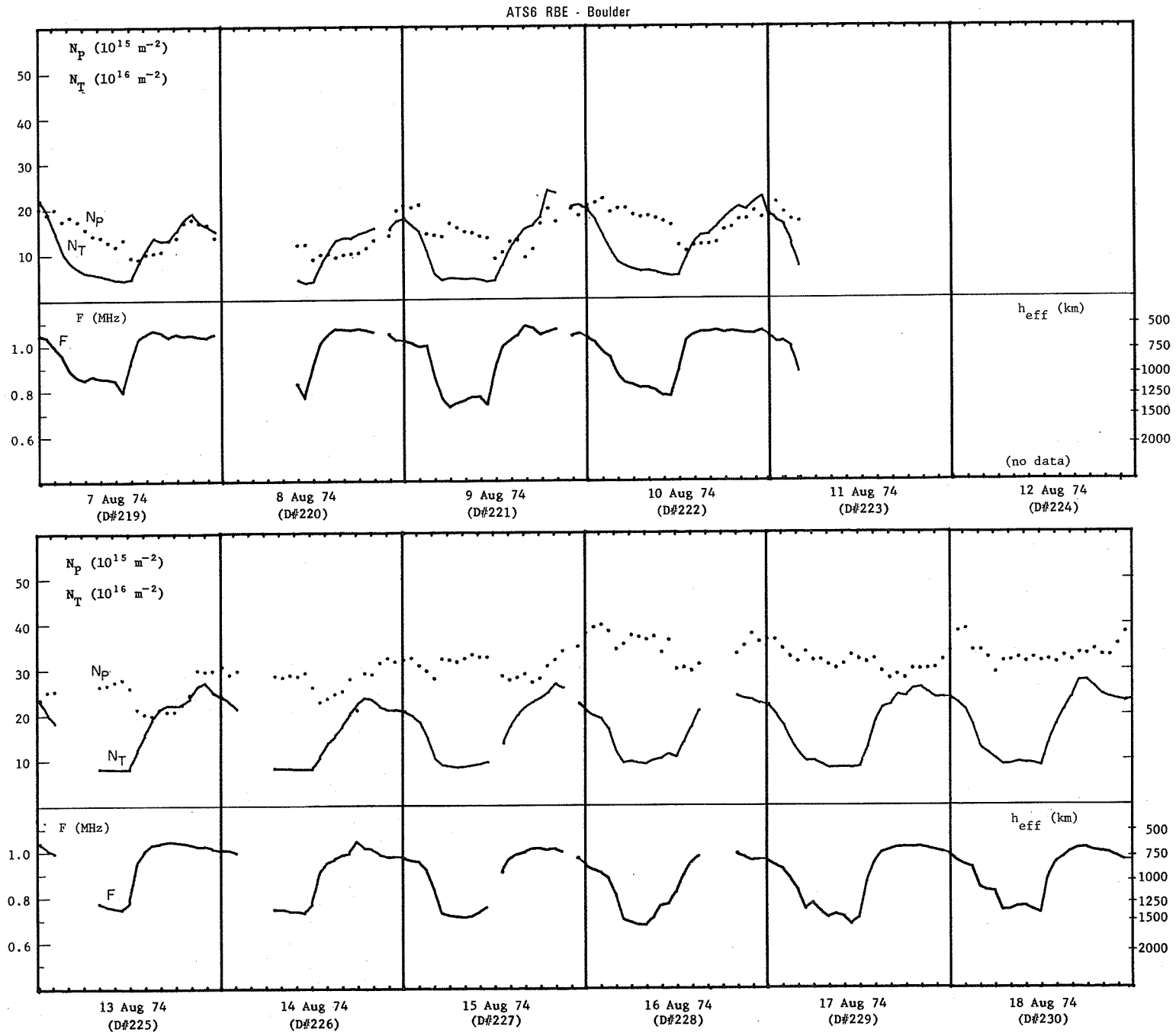


| DATE | 206:74 | | | 207:74 | | | 208:74 | | | 209:74 | | | 210:74 | | | 211:74 | | | 212:74 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | 1.071 | 1467 | 101 | | | | 1.043 | 2098 | 196 | 1.059 | 1824 | 144 | 1.032 | 1760 | 181 | 1.024 | 1951 | 213 | 1.020 | 1697 | 192 | 0 |
| 1 | 1.086 | 1403 | 78 | | | | 1.025 | 1946 | 212 | 1.053 | 1785 | 151 | 1.027 | 1731 | 185 | 1.020 | 1863 | 210 | 1.009 | 1633 | 200 | 1 |
| 2 | 1.085 | 1301 | 74 | | | | 1.023 | 1809 | 200 | 1.059 | 1746 | 138 | 1.025 | 1707 | 186 | 1.020 | 1795 | 203 | .982 | 1550 | 226 | 2 |
| 3 | 1.072 | 1042 | 70 | | | | 1.011 | 1438 | 174 | 1.049 | 1428 | 125 | .991 | 1389 | 192 | 1.026 | 1658 | 179 | .948 | 1315 | 231 | 3 |
| 4 | 1.047 | 743 | 66 | | | | .964 | 958 | 155 | 1.000 | 983 | 128 | | | | .971 | 1095 | 170 | .856 | 968 | 247 | 4 |
| 5 | .963 | 528 | 86 | | | | .880 | 758 | 178 | .947 | 807 | 142 | | | | .887 | 797 | 182 | .829 | 822 | 229 | 5 |
| 6 | .954 | 567 | 97 | .907 | 836 | 177 | .842 | 636 | 170 | .903 | 822 | 176 | | | | .832 | 660 | 183 | .824 | 787 | 223 | 6 |
| 7 | .914 | 499 | 102 | .920 | 778 | 155 | .845 | 621 | 165 | .939 | 719 | 132 | | | | .805 | 597 | 179 | .797 | 699 | 215 | 7 |
| 8 | .961 | 567 | 93 | .885 | 689 | 159 | .853 | 587 | 151 | .895 | 587 | 130 | | | | .792 | 553 | 172 | .823 | 724 | 206 | 8 |
| 9 | .841 | 347 | 93 | .842 | 641 | 172 | .855 | 548 | 141 | .867 | 479 | 118 | | | | .795 | 538 | 166 | .811 | 660 | 195 | 9 |
| 10 | .712 | 381 | 145 | .839 | 597 | 161 | .870 | 538 | 131 | .846 | 362 | 96 | | | | .806 | 533 | 159 | .797 | 626 | 192 | 10 |
| 11 | .807 | 460 | 137 | .852 | 528 | 137 | .875 | 440 | 105 | .783 | 308 | 98 | | | | .801 | 499 | 152 | .773 | 577 | 189 | 11 |
| 12 | .934 | 543 | 102 | .960 | 621 | 103 | .996 | 606 | 81 | .864 | 467 | 116 | | | | .913 | 553 | 114 | .891 | 626 | 141 | 12 |
| 13 | 1.028 | 914 | 97 | 1.041 | 1022 | 97 | 1.045 | 826 | 76 | .991 | 914 | 127 | | | | 1.028 | 978 | 104 | 1.025 | 1076 | 117 | 13 |
| 14 | 1.048 | 1164 | 103 | 1.054 | 1340 | 111 | 1.062 | 1071 | 82 | 1.020 | 1286 | 146 | | | | 1.036 | 1252 | 124 | 1.069 | 1599 | 113 | 14 |
| 15 | 1.058 | 1267 | 101 | 1.070 | 1531 | 106 | 1.083 | 1413 | 83 | 1.053 | 1604 | 136 | | | | 1.053 | 1628 | 137 | 1.087 | 1927 | 106 | 15 |
| 16 | 1.077 | 1340 | 85 | 1.068 | 1682 | 121 | 1.086 | 1716 | 95 | 1.056 | 1834 | 151 | 1.091 | 2034 | 104 | 1.059 | 1775 | 141 | 1.092 | 2064 | 104 | 16 |
| 17 | 1.084 | 1477 | 84 | 1.076 | 1765 | 114 | 1.093 | 1829 | 91 | 1.061 | 1941 | 151 | 1.085 | 2142 | 122 | 1.048 | 1829 | 162 | 1.089 | 2152 | 114 | 17 |
| 18 | 1.072 | 1663 | 113 | 1.071 | 2020 | 139 | 1.071 | 1995 | 137 | 1.064 | 2044 | 153 | 1.080 | 2201 | 135 | 1.066 | 2152 | 156 | 1.077 | 2210 | 141 | 18 |
| 19 | | | | | | | 1.091 | 2098 | 108 | 1.062 | 2093 | 159 | 1.055 | 2425 | 201 | 1.059 | 2259 | 179 | 1.069 | 2249 | 159 | 19 |
| 20 | | | | | | | 1.081 | 2318 | 139 | 1.064 | 2225 | 166 | 1.056 | 2621 | 215 | 1.060 | 2117 | 166 | 1.055 | 2499 | 206 | 20 |
| 21 | | | | | | | 1.071 | 2474 | 171 | 1.058 | 2156 | 172 | 1.050 | 2548 | 221 | | | | 1.049 | 2445 | 215 | 21 |
| 22 | | | | | | | 1.080 | 2357 | 143 | 1.050 | 2039 | 178 | 1.054 | 2201 | 184 | 1.027 | 1790 | 191 | 1.045 | 2416 | 220 | 22 |
| 23 | | | | | | | 1.077 | 2020 | 128 | 1.052 | 1892 | 162 | 1.023 | 1990 | 221 | 1.020 | 1707 | 193 | 1.042 | 2528 | 237 | 23 |

| DATE | 213:74 | | | 214:74 | | | 215:74 | | | 216:74 | | | 217:74 | | | 218:74 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | 1.053 | 2161 | 182 | 1.029 | 1902 | 200 | 1.011 | 1848 | 223 | 1.030 | 1946 | 203 | 1.031 | 1672 | 172 | 1.067 | 1589 | 114 | 0 |
| 1 | 1.035 | 1951 | 196 | 1.017 | 1888 | 218 | .997 | 1824 | 243 | 1.065 | 2240 | 165 | 1.016 | 1619 | 189 | 1.040 | 1286 | 123 | 1 |
| 2 | 1.019 | 1682 | 191 | 1.009 | 1853 | 226 | 1.000 | 1658 | 216 | 1.037 | 1804 | 178 | 1.010 | 1609 | 195 | 1.037 | 1178 | 116 | 2 |
| 3 | 1.008 | 1394 | 172 | 1.013 | 1628 | 194 | .965 | 1296 | 208 | 1.031 | 1555 | 161 | 1.020 | 1394 | 158 | 1.064 | 836 | 62 | 3 |
| 4 | .946 | 914 | 162 | .946 | 1007 | 179 | .890 | 861 | 194 | 1.001 | 968 | 126 | 1.006 | 998 | 125 | .964 | 587 | 95 | 4 |
| 5 | .862 | 734 | 184 | .888 | 831 | 190 | .841 | 694 | 187 | .910 | 680 | 142 | .922 | 743 | 148 | .841 | 499 | 134 | 5 |
| 6 | .802 | 601 | 182 | .856 | 763 | 195 | .816 | 631 | 183 | .853 | 504 | 130 | .892 | 616 | 138 | .887 | 562 | 129 | 6 |
| 7 | .809 | 606 | 180 | .811 | 660 | 195 | .780 | 577 | 186 | .809 | 401 | 119 | .867 | 538 | 133 | .860 | 523 | 132 | 7 |
| 8 | .787 | 577 | 182 | .811 | 675 | 199 | .788 | 548 | 172 | .769 | 372 | 123 | .857 | 504 | 128 | .883 | 489 | 114 | 8 |
| 9 | .807 | 557 | 166 | .797 | 631 | 194 | .791 | 538 | 168 | .766 | 352 | 118 | .842 | 474 | 127 | .843 | 430 | 115 | 9 |
| 10 | .799 | 533 | 163 | .786 | 611 | 194 | .768 | 528 | 176 | .721 | 318 | 119 | .843 | 425 | 113 | .854 | 411 | 106 | 10 |
| 11 | .775 | 523 | 171 | .753 | 557 | 193 | | | | .778 | 318 | 103 | .846 | 352 | 93 | .867 | 377 | 93 | 11 |
| 12 | .895 | 616 | 137 | .845 | 645 | 171 | .914 | 523 | 107 | .906 | 421 | 89 | .986 | 401 | 57 | .997 | 411 | 55 | 12 |
| 13 | 1.015 | 1178 | 139 | .983 | 1120 | 163 | | | | 1.010 | 729 | 89 | 1.050 | 714 | 62 | 1.051 | 694 | 60 | 13 |
| 14 | 1.055 | 1716 | 142 | 1.018 | 1540 | 176 | 1.054 | 1100 | 92 | 1.071 | 870 | 60 | 1.064 | 1027 | 77 | 1.080 | 993 | 60 | 14 |
| 15 | 1.066 | 1892 | 139 | 1.021 | 1824 | 204 | 1.072 | 1452 | 99 | 1.063 | 944 | 71 | 1.120 | 1149 | 30 | 1.063 | 1301 | 99 | 15 |
| 16 | 1.068 | 1966 | 140 | 1.049 | 2245 | 196 | 1.064 | 1858 | 140 | 1.059 | 1154 | 91 | 1.072 | 1320 | 90 | 1.048 | 1526 | 135 | 16 |
| 17 | 1.070 | 2225 | 154 | 1.047 | 2274 | 203 | 1.066 | 2328 | 170 | 1.063 | 1315 | 99 | 1.075 | 1359 | 89 | 1.049 | 1800 | 159 | 17 |
| 18 | 1.069 | 2601 | 183 | 1.042 | 2225 | 209 | 1.066 | 2528 | 184 | 1.071 | 1443 | 100 | 1.081 | 1506 | 91 | 1.060 | 1951 | 153 | 18 |
| 19 | 1.087 | 2709 | 148 | 1.037 | 2621 | 257 | 1.077 | 2792 | 177 | 1.072 | 1477 | 100 | 1.071 | 1589 | 109 | 1.056 | 2064 | 169 | 19 |
| 20 | 1.070 | 2445 | 170 | 1.046 | 3095 | 281 | 1.053 | 2616 | 221 | 1.065 | 1594 | 117 | 1.059 | 1775 | 141 | 1.056 | 2259 | 185 | 20 |
| 21 | 1.065 | 2137 | 158 | 1.040 | 3281 | 315 | 1.030 | 2391 | 250 | 1.059 | 1579 | 125 | 1.065 | 1927 | 143 | 1.044 | 2425 | 224 | 21 |
| 22 | 1.052 | 1883 | 161 | 1.048 | 3296 | 293 | .933 | 1736 | 328 | 1.046 | 1707 | 154 | | | | 1.035 | 2523 | 251 | 22 |
| 23 | 1.033 | 1814 | 184 | 1.040 | 2333 | 223 | .937 | 1658 | 308 | 1.045 | 1824 | 167 | 1.078 | 1883 | 118 | 1.039 | 2416 | 234 | 23 |

Units of $N_T$ and $N_p$ are $10^{14}$ electrons-meter$^{-2}$.


ATS6 RBE - Boulder
$N_P$ ($10^{15}$ $m^{-2}$)
$N_T$ ($10^{16}$ $m^{-2}$)
50
40
30
20
10
$N_P$
$N_T$
F (MHz)
F
1.0
0.8
0.6
$h_{eff}$ (km)
500
750
1000
1250
1500
2000
(no data)
7 Aug 74 (D#219)
8 Aug 74 (D#220)
9 Aug 74 (D#221)
10 Aug 74 (D#222)
11 Aug 74 (D#223)
12 Aug 74 (D#224)
13 Aug 74 (D#225)
14 Aug 74 (D#226)
15 Aug 74 (D#227)
16 Aug 74 (D#228)
17 Aug 74 (D#229)
18 Aug 74 (D#230)

| DATE | 219:74 | | | 220:74 | | | 221:74 | | | 222:74 | | | 223:74 | | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | | HR |
| 0 | 1.045 | 2191 | 201 | | | | 1.017 | 1780 | 206 | 1.030 | 1961 | 205 | 1.038 | 1897 | 184 | | 0 |
| 1 | 1.036 | 1902 | 189 | | | | 1.008 | 1633 | 202 | 1.011 | 1746 | 211 | 1.008 | 1741 | 214 | | 1 |
| 2 | .994 | 1472 | 199 | | | | .991 | 1491 | 207 | .970 | 1399 | 219 | 1.016 | 1638 | 191 | | 2 |
| 3 | .957 | 1042 | 174 | | | | .994 | 1066 | 144 | .946 | 1076 | 191 | .986 | 1227 | 175 | | 3 |
| 4 | .891 | 812 | 183 | | | | .858 | 557 | 142 | .869 | 812 | 198 | .877 | 724 | 172 | | 4 |
| 5 | .861 | 689 | 173 | | | | .765 | 411 | 138 | .832 | 719 | 199 | | | | | 5 |
| 6 | .849 | 597 | 156 | | | | .725 | 450 | 166 | .823 | 650 | 185 | | | | | 6 |
| 7 | .864 | 572 | 142 | | | | .742 | 445 | 158 | .809 | 606 | 180 | | | | | 7 |
| 8 | .855 | 538 | 138 | | | | .754 | 430 | 148 | .809 | 611 | 181 | | | | | 8 |
| 9 | .854 | 494 | 127 | | | | .769 | 440 | 146 | .797 | 577 | 177 | | | | | 9 |
| 10 | .847 | 450 | 119 | .829 | 430 | 120 | .771 | 421 | 139 | .775 | 523 | 171 | | | | | 10 |
| 11 | .796 | 430 | 132 | .767 | 362 | 120 | .737 | 377 | 135 | .772 | 494 | 163 | | | | | 11 |
| 12 | .917 | 460 | 93 | .891 | 391 | 88 | .890 | 396 | 89 | .881 | 504 | 118 | | | | NO DATA | 12 |
| 13 | 1.024 | 822 | 90 | .998 | 743 | 98 | .988 | 729 | 103 | 1.013 | 890 | 106 | | | | | 13 |
| 14 | 1.046 | 1110 | 100 | 1.040 | 1037 | 99 | 1.016 | 1086 | 127 | 1.040 | 1213 | 116 | | | | | 14 |
| 15 | 1.063 | 1359 | 103 | 1.068 | 1291 | 92 | 1.039 | 1325 | 128 | 1.052 | 1384 | 118 | | | | | 15 |
| 16 | 1.056 | 1296 | 106 | 1.067 | 1355 | 98 | 1.081 | 1531 | 92 | 1.052 | 1408 | 120 | | | | | 16 |
| 17 | 1.035 | 1311 | 131 | 1.064 | 1345 | 100 | 1.071 | 1599 | 110 | 1.059 | 1560 | 123 | | | | | 17 |
| 18 | 1.047 | 1516 | 136 | 1.069 | 1438 | 102 | 1.043 | 1775 | 166 | 1.050 | 1736 | 151 | | | | | 18 |
| 19 | 1.040 | 1760 | 169 | 1.064 | 1487 | 112 | 1.054 | 2372 | 198 | 1.055 | 1892 | 156 | | | | | 19 |
| 20 | 1.043 | 1892 | 176 | 1.055 | 1560 | 129 | 1.065 | 2323 | 171 | 1.051 | 2010 | 173 | | | | | 20 |
| 21 | 1.036 | 1697 | 169 | 0.000 | 0 | 0 | 0.000 | 0 | 0 | 1.047 | 1946 | 175 | | | | | 21 |
| 22 | 1.032 | 1609 | 165 | 1.046 | 1540 | 139 | 1.038 | 2020 | 197 | 1.045 | 2108 | 192 | | | | | 22 |
| 23 | 1.046 | 1506 | 137 | 1.020 | 1721 | 195 | 1.047 | 2054 | 184 | 1.058 | 2225 | 179 | | | | | 23 |

| DATE | 225:74 | | | 226:74 | | | 227:74 | | | 228:74 | | | 229:74 | | | 230:74 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | 1.034 | 2284 | 230 | 1.002 | 2381 | 307 | .971 | 2054 | 319 | .938 | 2049 | 378 | .958 | 2186 | 365 | .984 | 2347 | 338 | 0 |
| 1 | 1.005 | 1976 | 248 | 1.003 | 2249 | 288 | .961 | 1976 | 324 | .919 | 1951 | 391 | .939 | 1990 | 365 | .955 | 2249 | 381 | 1 |
| 2 | .988 | 1780 | 250 | .987 | 2093 | 297 | .956 | 1829 | 308 | .908 | 1888 | 396 | .923 | 1751 | 346 | .938 | 2098 | 386 | 2 |
| 3 | | | | | | | .922 | 1496 | 296 | .884 | 1658 | 383 | .881 | 1403 | 328 | .927 | 1756 | 340 | 3 |
| 4 | | | | | | | .837 | 1027 | 280 | .812 | 1169 | 344 | .831 | 1144 | 318 | .839 | 1257 | 340 | 4 |
| 5 | | | | | | | .730 | 880 | 321 | .702 | 910 | 354 | .744 | 958 | 338 | .825 | 1149 | 324 | 5 |
| 6 | | | | | | | .720 | 856 | 320 | .690 | 934 | 374 | .770 | 968 | 320 | .821 | 1017 | 291 | 6 |
| 7 | | | | .741 | 802 | 286 | .715 | 836 | 316 | .679 | 905 | 371 | .736 | 890 | 321 | .740 | 885 | 316 | 7 |
| 8 | .770 | 787 | 260 | .743 | 797 | 282 | .712 | 846 | 322 | .676 | 885 | 365 | .708 | 807 | 310 | .740 | 890 | 317 | 8 |
| 9 | .755 | 768 | 264 | .732 | 792 | 288 | .716 | 875 | 331 | .707 | 963 | 371 | .722 | 812 | 302 | .753 | 934 | 322 | 9 |
| 10 | .748 | 773 | 270 | .734 | 787 | 285 | .732 | 900 | 327 | .762 | 998 | 337 | .712 | 817 | 311 | .756 | 919 | 315 | 10 |
| 11 | .743 | 778 | 275 | .724 | 792 | 293 | .754 | 949 | 326 | .768 | 1095 | 364 | .678 | 807 | 331 | .742 | 910 | 323 | 11 |
| 12 | .775 | 782 | 255 | .764 | 778 | 261 | | | | .817 | 1037 | 300 | .705 | 831 | 322 | .728 | 861 | 316 | 12 |
| 13 | .943 | 1159 | 209 | .897 | 1037 | 228 | .909 | 1364 | 286 | .893 | 1359 | 304 | .860 | 1252 | 316 | .879 | 1350 | 319 | 13 |
| 14 | .999 | 1516 | 199 | .946 | 1335 | 237 | .966 | 1721 | 276 | .948 | 1687 | 296 | .946 | 1819 | 323 | .945 | 1760 | 313 | 14 |
| 15 | 1.029 | 1853 | 195 | .960 | 1496 | 247 | .986 | 1971 | 280 | .976 | 2044 | 310 | .990 | 2127 | 296 | .968 | 2068 | 327 | 15 |
| 16 | 1.035 | 2098 | 210 | .981 | 1724 | 254 | .995 | 2147 | 289 | | | | 1.002 | 2186 | 281 | .994 | 2352 | 318 | 16 |
| 17 | 1.043 | 2191 | 204 | .988 | 1985 | 280 | 1.012 | 2254 | 271 | | | | 1.012 | 2411 | 289 | 1.009 | 2719 | 332 | 17 |
| 18 | 1.041 | 2176 | 206 | 1.041 | 2215 | 210 | 1.013 | 2342 | 278 | | | | 1.015 | 2381 | 280 | 1.011 | 2734 | 331 | 18 |
| 19 | 1.035 | 2210 | 220 | 1.008 | 2362 | 293 | 1.007 | 2460 | 306 | | | | 1.014 | 2543 | 301 | .999 | 2597 | 341 | 19 |
| 20 | 1.030 | 2328 | 243 | 1.006 | 2323 | 291 | 1.012 | 2660 | 320 | .989 | 2381 | 333 | 1.016 | 2572 | 300 | .994 | 2430 | 329 | 20 |
| 21 | 1.020 | 2606 | 296 | .982 | 2161 | 316 | .998 | 2572 | 339 | .976 | 2323 | 350 | 1.009 | 2460 | 301 | .990 | 2357 | 328 | 21 |
| 22 | 1.025 | 2690 | 292 | .970 | 2083 | 326 | | | | .961 | 2298 | 377 | 1.002 | 2347 | 303 | .974 | 2313 | 353 | 22 |
| 23 | 1.012 | 2460 | 295 | .975 | 2090 | 317 | .970 | 2235 | 349 | .963 | 2220 | 361 | .994 | 2352 | 320 | .959 | 2279 | 379 | 23 |

Units of $N_T$ and $N_P$ are $10^{14}$ electrons-meter$^{-2}$.

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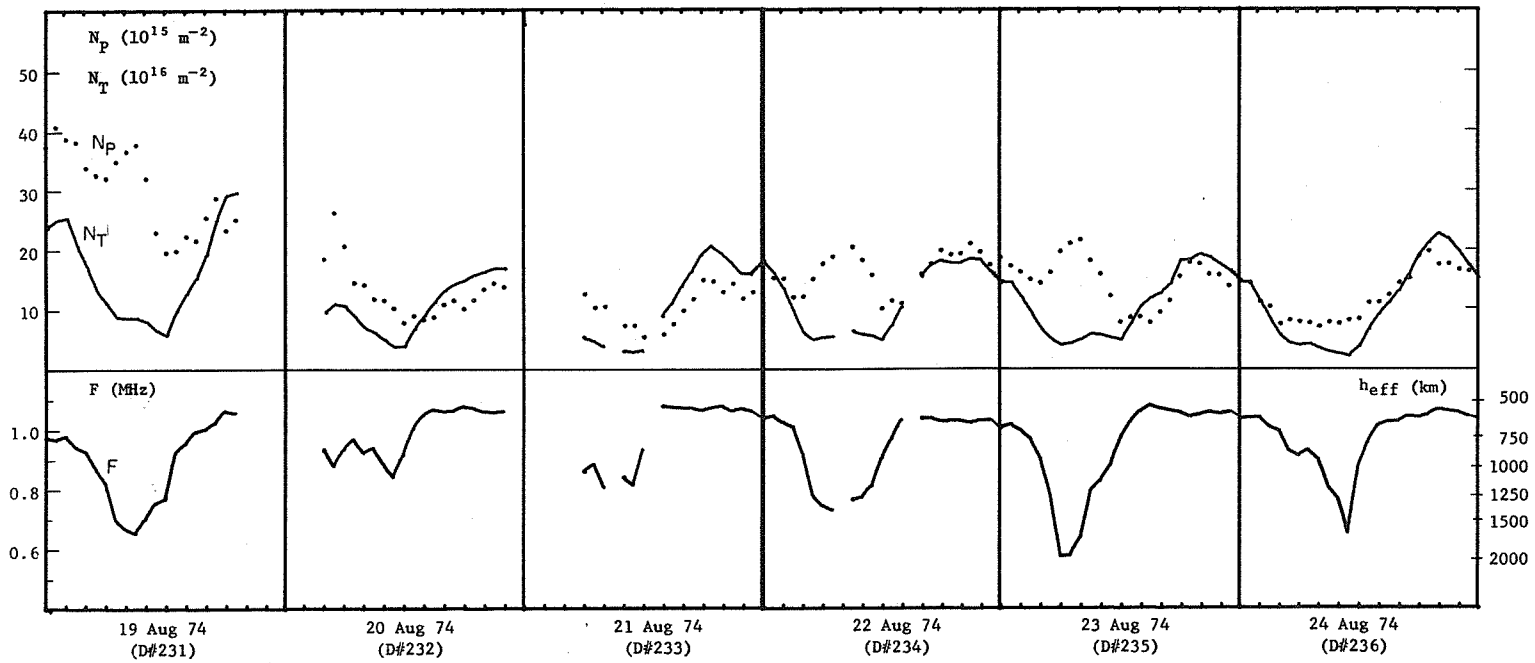
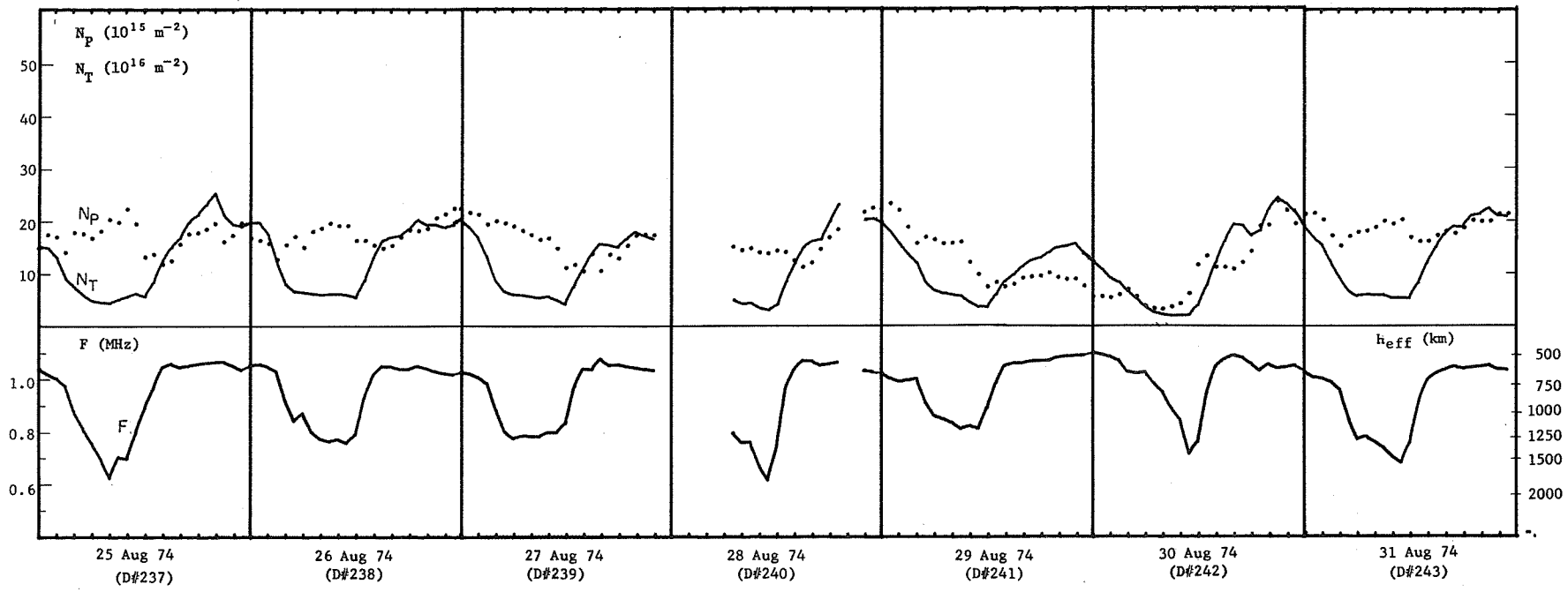


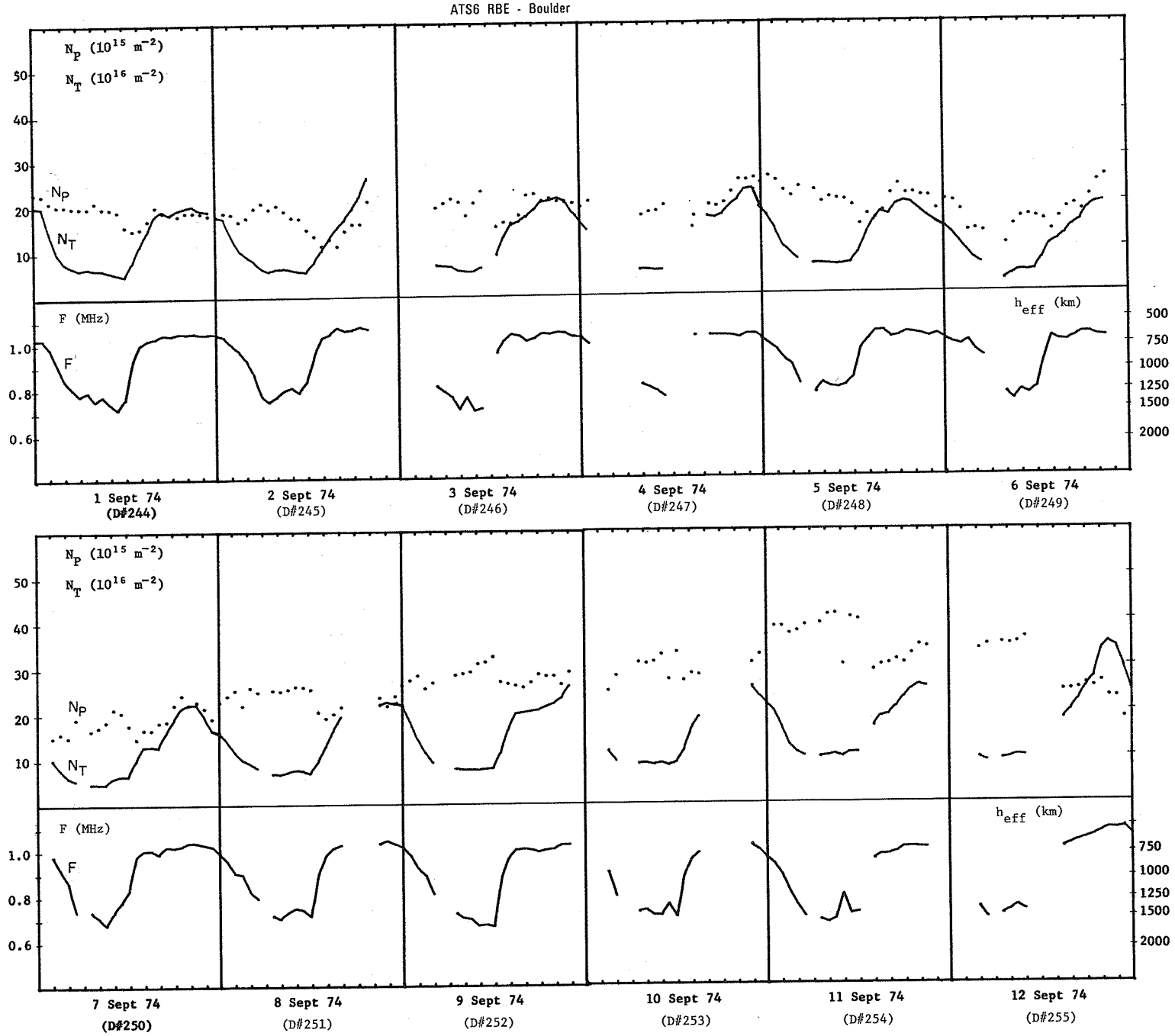



| DATE | 231:74 | | | 232:74 | | | 233:74 | | | 234:74 | | | 235:74 | | | 236:74 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | .970 | 2372 | 371 | | | | | | | 1.033 | 1756 | 178 | 1.002 | 1438 | 185 | 1.032 | 1418 | 146 | 0 |
| 1 | .964 | 2499 | 405 | | | | | | | 1.040 | 1575 | 150 | 1.012 | 1428 | 171 | 1.034 | 1403 | 141 | 1 |
| 2 | .975 | 2528 | 385 | | | | | | | 1.019 | 1311 | 149 | .993 | 1183 | 161 | 1.034 | 1095 | 110 | 2 |
| 3 | .939 | 2073 | 380 | | | | | | | 1.005 | 934 | 118 | .965 | 924 | 149 | 1.005 | 807 | 102 | 3 |
| 4 | .926 | 1721 | 336 | .931 | 958 | 183 | | | | .913 | 577 | 119 | .898 | 650 | 143 | .990 | 528 | 73 | 4 |
| 5 | .869 | 1325 | 324 | .875 | 1090 | 260 | | | | .776 | 455 | 148 | .770 | 484 | 160 | .925 | 401 | 78 | 5 |
| 6 | .820 | 1110 | 319 | .928 | 1061 | 205 | .858 | 489 | 124 | .742 | 489 | 174 | .572 | 386 | 194 | .907 | 362 | 76 | 6 |
| 7 | .698 | 880 | 346 | .963 | 890 | 144 | .880 | 435 | 102 | .728 | 504 | 185 | .575 | 416 | 208 | .925 | 381 | 75 | 7 |
| 8 | .667 | 866 | 363 | .919 | 699 | 141 | .805 | 342 | 103 | | | | .632 | 474 | 213 | .895 | 308 | 68 | 8 |
| 9 | .653 | 866 | 374 | .933 | 621 | 117 | | | | .760 | 592 | 200 | .786 | 567 | 179 | .805 | 249 | 75 | 9 |
| 10 | .699 | 812 | 318 | .882 | 494 | 115 | .837 | 264 | 72 | .769 | 543 | 180 | .822 | 553 | 158 | .765 | 220 | 74 | 10 |
| 11 | .752 | 660 | 228 | .840 | 377 | 102 | .812 | 245 | 72 | .806 | 518 | 155 | .873 | 504 | 121 | .650 | 181 | 79 | 11 |
| 12 | .766 | 582 | 194 | .911 | 372 | 77 | .927 | 269 | 52 | .897 | 450 | 99 | .963 | 469 | 76 | .866 | 328 | 81 | 12 |
| 13 | .920 | 983 | 197 | .998 | 670 | 88 | | | | .962 | 685 | 112 | 1.018 | 738 | 84 | .950 | 621 | 108 | 13 |
| 14 | .950 | 1271 | 221 | 1.043 | 890 | 83 | 1.073 | 846 | 56 | 1.025 | 993 | 108 | 1.055 | 1032 | 85 | 1.007 | 875 | 109 | 14 |
| 15 | .988 | 1526 | 214 | 1.062 | 1115 | 86 | 1.069 | 1046 | 74 | | | | 1.075 | 1164 | 76 | 1.019 | 1056 | 120 | 15 |
| 16 | .999 | 1922 | 253 | 1.056 | 1311 | 107 | 1.067 | 1335 | 96 | 1.032 | 1511 | 156 | 1.065 | 1247 | 92 | 1.022 | 1262 | 141 | 16 |
| 17 | 1.019 | 2499 | 285 | 1.058 | 1418 | 114 | 1.066 | 1579 | 115 | 1.033 | 1692 | 173 | 1.058 | 1399 | 112 | 1.038 | 1531 | 149 | 17 |
| 18 | 1.058 | 2900 | 231 | 1.072 | 1477 | 100 | 1.059 | 1858 | 147 | 1.023 | 1765 | 195 | 1.052 | 1785 | 153 | 1.035 | 1848 | 185 | 18 |
| 19 | 1.053 | 2944 | 249 | 1.067 | 1570 | 114 | 1.067 | 2010 | 145 | 1.025 | 1731 | 189 | 1.038 | 1804 | 176 | 1.042 | 2054 | 193 | 19 |
| 20 | | | | 1.056 | 1623 | 132 | 1.073 | 1897 | 128 | 1.024 | 1736 | 190 | 1.044 | 1892 | 174 | 1.060 | 2215 | 172 | 20 |
| 21 | | | | 1.053 | 1677 | 142 | 1.057 | 1741 | 140 | 1.018 | 1795 | 207 | 1.052 | 1844 | 157 | 1.057 | 2132 | 172 | 21 |
| 22 | | | | 1.056 | 1677 | 137 | 1.064 | 1560 | 116 | 1.025 | 1785 | 193 | 1.047 | 1731 | 155 | 1.053 | 1932 | 164 | 22 |
| 23 | | | | | | | 1.056 | 1545 | 126 | 1.026 | 1604 | 173 | 1.052 | 1623 | 138 | 1.041 | 1702 | 161 | 23 |

| DATE | 237:74 | | | 238:74 | | | 239:74 | | | 240:74 | | | 241:74 | | | 242:74 | | | 243:74 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | 1.036 | 1506 | 149 | 1.050 | 1922 | 166 | 1.022 | 1985 | 221 | | | | 1.019 | 1932 | 220 | 1.096 | 1183 | 55 | 1.020 | 1858 | 210 | 0 |
| 1 | 1.016 | 1487 | 173 | 1.053 | 1927 | 162 | 1.018 | 1858 | 214 | | | | .999 | 1760 | 231 | 1.089 | 1037 | 55 | 1.003 | 1658 | 212 | 1 |
| 2 | 1.000 | 1301 | 169 | 1.045 | 1702 | 156 | 1.005 | 1663 | 210 | | | | .988 | 1545 | 218 | 1.080 | 870 | 53 | .997 | 1506 | 200 | 2 |
| 3 | .972 | 905 | 140 | 1.028 | 1183 | 126 | .981 | 1306 | 192 | | | | .990 | 1335 | 186 | 1.066 | 787 | 58 | .985 | 1183 | 170 | 3 |
| 4 | .875 | 743 | 178 | .917 | 758 | 153 | .882 | 846 | 197 | | | | .997 | 1169 | 155 | 1.023 | 616 | 68 | .956 | 895 | 151 | 4 |
| 5 | .812 | 597 | 175 | .839 | 621 | 168 | .797 | 631 | 194 | | | | .908 | 792 | 166 | 1.017 | 474 | 55 | .845 | 636 | 169 | 5 |
| 6 | .754 | 484 | 167 | .866 | 601 | 149 | .772 | 572 | 188 | | | | .857 | 641 | 163 | 1.020 | 318 | 36 | .768 | 528 | 176 | 6 |
| 7 | .695 | 455 | 180 | .798 | 582 | 178 | .782 | 562 | 180 | .791 | 479 | 150 | .846 | 587 | 155 | .980 | 215 | 32 | .778 | 553 | 179 | 7 |
| 8 | .622 | 440 | 202 | .771 | 557 | 184 | .780 | 533 | 172 | .756 | 416 | 142 | .833 | 562 | 155 | .947 | 171 | 30 | .758 | 543 | 185 | 8 |
| 9 | .700 | 504 | 197 | .762 | 572 | 193 | .781 | 509 | 163 | .758 | 425 | 145 | .810 | 533 | 158 | .884 | 147 | 34 | .736 | 548 | 197 | 9 |
| 10 | .696 | 562 | 222 | .769 | 572 | 190 | .795 | 533 | 165 | .671 | 333 | 139 | .819 | 416 | 120 | .842 | 152 | 41 | .702 | 494 | 192 | 10 |
| 11 | .790 | 621 | 194 | .756 | 553 | 189 | .795 | 474 | 147 | .615 | 293 | 137 | .810 | 328 | 97 | .712 | 156 | 60 | .680 | 489 | 200 | 11 |
| 12 | .886 | 572 | 131 | .785 | 509 | 161 | .829 | 391 | 109 | .736 | 391 | 141 | .886 | 318 | 73 | .756 | 333 | 114 | .754 | 484 | 167 | 12 |
| 13 | .962 | 836 | 136 | .925 | 826 | 162 | .965 | 714 | 115 | .957 | 826 | 139 | .981 | 548 | 81 | .940 | 714 | 131 | .911 | 768 | 160 | 13 |
| 14 | 1.040 | 1237 | 118 | 1.011 | 1262 | 153 | 1.034 | 1027 | 103 | 1.029 | 1174 | 123 | 1.045 | 797 | 73 | 1.041 | 1159 | 110 | .989 | 1139 | 159 | 14 |
| 15 | 1.055 | 1491 | 124 | 1.043 | 1579 | 147 | 1.032 | 1325 | 135 | 1.064 | 1482 | 110 | 1.055 | 924 | 76 | 1.069 | 1560 | 109 | 1.015 | 1447 | 170 | 15 |
| 16 | 1.042 | 1663 | 156 | 1.044 | 1648 | 152 | 1.072 | 1526 | 103 | 1.065 | 1604 | 118 | 1.056 | 1081 | 88 | 1.084 | 1873 | 107 | 1.029 | 1692 | 178 | 16 |
| 17 | 1.048 | 1966 | 175 | 1.036 | 1677 | 167 | 1.048 | 1516 | 134 | 1.049 | 1633 | 144 | 1.063 | 1203 | 91 | 1.077 | 1863 | 118 | 1.041 | 1844 | 174 | 17 |
| 18 | 1.054 | 2103 | 176 | 1.035 | 1795 | 180 | 1.051 | 1472 | 127 | 1.053 | 1971 | 166 | 1.065 | 1247 | 92 | 1.054 | 1667 | 139 | 1.035 | 1834 | 184 | 18 |
| 19 | 1.058 | 2298 | 183 | 1.045 | 1971 | 180 | 1.044 | 1623 | 150 | 1.059 | 2284 | 181 | 1.066 | 1350 | 98 | 1.027 | 1751 | 187 | 1.039 | 2049 | 198 | 19 |
| 20 | 1.061 | 2513 | 194 | 1.038 | 1883 | 184 | 1.039 | 1756 | 169 | | | | 1.078 | 1447 | 90 | 1.049 | 2161 | 189 | 1.041 | 2083 | 197 | 20 |
| 21 | 1.063 | 2108 | 160 | 1.026 | 1883 | 203 | 1.033 | 1687 | 171 | | | | 1.082 | 1472 | 87 | 1.036 | 2377 | 235 | 1.046 | 2191 | 197 | 21 |
| 22 | 1.048 | 1927 | 171 | 1.018 | 1834 | 210 | 1.029 | 1628 | 171 | 1.028 | 2015 | 213 | 1.084 | 1516 | 86 | 1.040 | 2269 | 217 | 1.032 | 2054 | 210 | 22 |
| 23 | 1.032 | 1897 | 195 | 1.014 | 1873 | 221 | | | | 1.024 | 2020 | 222 | 1.086 | 1340 | 74 | 1.045 | 2103 | 192 | 1.031 | 2039 | 211 | 23 |

Units of $N_T$ and $N_P$ are $10^{14}$ electrons-meter$^{-2}$.

ATS6 RBE - Boulder



| DATE | 244:74 | | | 245:74 | | | 246:74 | | | 247:74 | | | 248:74 | | | 249:74 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
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| 1 | 1.018 | 1966 | 226 | 1.026 | 1712 | 185 | | | | .989 | 1472 | 206 | .981 | 1760 | 259 | .980 | 1359 | 201 | 1 |
| 2 | .980 | 1423 | 210 | .992 | 1330 | 183 | | | | | | | .956 | 1482 | 250 | .970 | 1164 | 182 | 2 |
| 3 | .907 | 958 | 202 | .965 | 1032 | 166 | | | | | | | .913 | 1105 | 227 | .988 | 968 | 136 | 3 |
| 4 | .837 | 743 | 202 | .925 | 890 | 174 | | | | | | | .889 | 949 | 215 | .946 | 782 | 139 | 4 |
| 5 | .801 | 655 | 199 | .860 | 773 | 195 | .804 | 645 | 194 | | | | .806 | 782 | 234 | .921 | 680 | 135 | 5 |
| 6 | .772 | 601 | 198 | .766 | 616 | 205 | .781 | 636 | 204 | | | | | | | | | | 6 |
| 7 | .787 | 626 | 198 | .739 | 543 | 194 | .758 | 626 | 213 | | | | .767 | 685 | 228 | | | | 7 |
| 8 | .747 | 597 | 209 | .760 | 592 | 200 | .704 | 533 | 207 | .808 | 592 | 176 | .808 | 680 | 202 | .759 | 318 | 108 | 8 |
| 9 | .767 | 592 | 197 | .789 | 601 | 189 | .754 | 513 | 177 | .794 | 587 | 181 | .790 | 675 | 211 | .729 | 406 | 149 | 9 |
| 10 | .736 | 543 | 196 | .801 | 577 | 175 | .696 | 518 | 205 | .779 | 572 | 184 | .786 | 660 | 209 | .767 | 494 | 164 | 10 |
| 11 | .711 | 499 | 190 | .780 | 538 | 173 | .707 | 597 | 230 | .755 | 572 | 197 | .796 | 670 | 206 | .754 | 489 | 168 | 11 |
| 12 | .753 | 455 | 157 | .825 | 523 | 148 | | | | | | | .829 | 694 | 194 | .777 | 509 | 165 | 12 |
| 13 | .921 | 748 | 149 | .936 | 719 | 134 | .949 | 875 | 153 | | | | .958 | 914 | 153 | .907 | 753 | 159 | 13 |
| 14 | .992 | 1105 | 152 | 1.018 | 978 | 113 | 1.003 | 1262 | 162 | | | | .995 | 1291 | 174 | 1.002 | 1066 | 137 | 14 |
| 15 | 1.013 | 1413 | 169 | 1.032 | 1227 | 126 | 1.030 | 1526 | 160 | 1.018 | 1511 | 173 | 1.032 | 1609 | 165 | .987 | 1154 | 164 | 15 |
| 16 | 1.021 | 1765 | 198 | 1.063 | 1467 | 112 | 1.024 | 1604 | 176 | | | | 1.035 | 1804 | 181 | .985 | 1286 | 184 | 16 |
| 17 | 1.035 | 1878 | 187 | 1.049 | 1648 | 144 | 1.001 | 1707 | 221 | 1.020 | 1741 | 197 | 1.006 | 1751 | 219 | 1.001 | 1477 | 192 | 17 |
| 18 | 1.032 | 1795 | 184 | 1.053 | 1888 | 159 | 1.012 | 1853 | 223 | 1.020 | 1712 | 194 | 1.010 | 1966 | 239 | 1.019 | 1579 | 180 | 18 |
| 19 | 1.041 | 1892 | 179 | 1.065 | 2156 | 160 | 1.032 | 2029 | 209 | 1.020 | 1775 | 201 | 1.026 | 2034 | 219 | 1.019 | 1848 | 211 | 19 |
| 20 | 1.040 | 1941 | 186 | 1.056 | 2567 | 209 | 1.031 | 2059 | 213 | 1.018 | 1961 | 225 | 1.024 | 2000 | 220 | 1.007 | 1966 | 244 | 20 |
| 21 | 1.042 | 1980 | 186 | | | | 1.037 | 2112 | 207 | 1.011 | 2083 | 252 | 1.017 | 1853 | 214 | 1.003 | 2000 | 255 | 21 |
| 22 | 1.037 | 1888 | 185 | | | | 1.035 | 2054 | 205 | 1.025 | 2313 | 251 | 1.007 | 1716 | 213 | | | | 22 |
| 23 | 1.039 | 1863 | 180 | | | | 1.020 | 1795 | 203 | 1.025 | 2347 | 255 | 1.017 | 1604 | 185 | | | | 23 |

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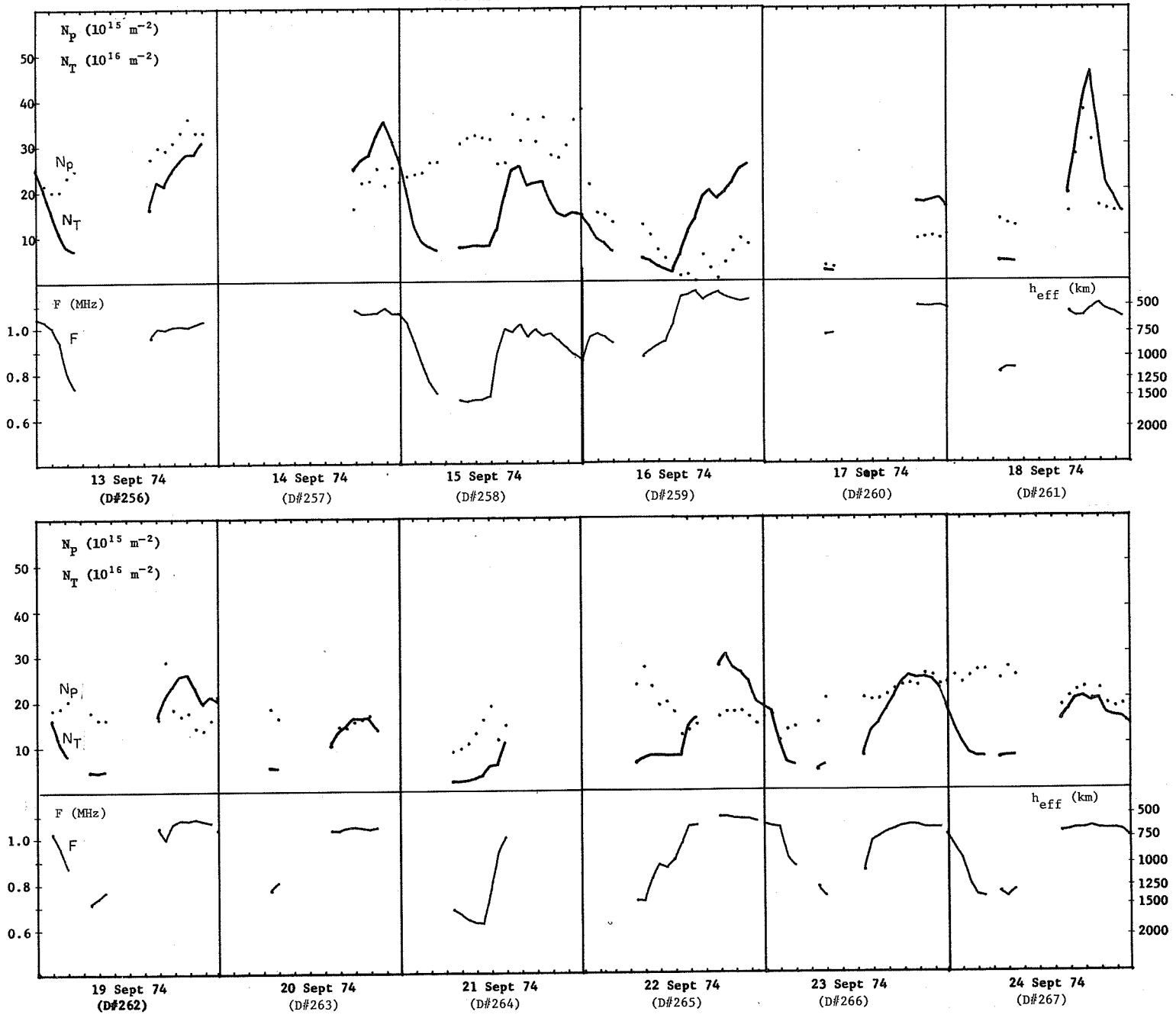
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | | | | .984 | 1560 | 226 | 1.009 | 2132 | 262 | | | | .952 | 2137 | 367 | | | | 0 |
| 1 | | | | .950 | 1374 | 239 | .974 | 1785 | 273 | | | | .925 | 1976 | 386 | | | | 1 |
| 2 | .973 | 968 | 149 | .898 | 1144 | 251 | .917 | 1399 | 283 | | | | .878 | 1628 | 386 | | | | 2 |
| 3 | .914 | 763 | 157 | .892 | 968 | 217 | .886 | 1110 | 255 | .893 | 1100 | 245 | .804 | 1232 | 370 | | | | 3 |
| 4 | .860 | 592 | 149 | .818 | 890 | 257 | .806 | 895 | 267 | .789 | 890 | 279 | .743 | 1061 | 376 | .732 | 919 | 334 | 4 |
| 5 | .731 | 518 | 189 | .788 | 787 | 248 | | | | | | | .695 | 980 | 388 | .686 | 851 | 343 | 5 |
| 6 | | | | | | | | | | | | | | | | | | | 6 |
| 7 | .730 | 450 | 164 | .712 | 660 | 251 | .719 | 758 | 284 | .721 | 826 | 308 | .679 | 958 | 393 | .701 | 890 | 347 | 7 |
| 8 | .705 | 440 | 170 | .698 | 636 | 250 | .699 | 734 | 288 | .727 | 831 | 306 | .667 | 978 | 410 | .716 | 914 | 345 | 8 |
| 9 | .672 | 440 | 183 | .725 | 685 | 253 | .694 | 734 | 291 | .704 | 797 | 309 | .681 | 1012 | 413 | .737 | 968 | 348 | 9 |
| 10 | .726 | 572 | 211 | .743 | 734 | 259 | .666 | 734 | 309 | .703 | 836 | 325 | .789 | 963 | 302 | .719 | 958 | 359 | 10 |
| 11 | .770 | 616 | 204 | .736 | 719 | 259 | .669 | 748 | 313 | .751 | 782 | 271 | .705 | 1046 | 405 | | | | 11 |
| 12 | .822 | 616 | 176 | .709 | 660 | 253 | .662 | 763 | 324 | .696 | 836 | 330 | .711 | 1051 | 401 | | | | 12 |
| 13 | .971 | 939 | 146 | .890 | 900 | 204 | .868 | 1100 | 270 | .868 | 1095 | 269 | | | | | | | 13 |
| 14 | .998 | 1257 | 166 | .974 | 1242 | 190 | .959 | 1604 | 266 | .945 | 1589 | 283 | .946 | 1633 | 290 | | | | 14 |
| 15 | 1.000 | 1267 | 165 | 1.006 | 1589 | 199 | .996 | 1961 | 262 | .975 | 1839 | 281 | .962 | 1839 | 300 | .992 | 1775 | 243 | 15 |
| 16 | .983 | 1247 | 181 | 1.020 | 1897 | 214 | 1.001 | 1990 | 258 | | | | .965 | 1883 | 303 | 1.006 | 1946 | 244 | 16 |
| 17 | 1.015 | 1560 | 183 | | | | .997 | 2015 | 268 | | | | .975 | 2051 | 312 | 1.019 | 2171 | 246 | 17 |
| 18 | 1.012 | 1829 | 220 | | | | .989 | 2039 | 285 | | | | .994 | 2254 | 305 | 1.030 | 2450 | 256 | 18 |
| 19 | 1.018 | 2098 | 240 | | | | .996 | 2112 | 282 | | | | .997 | 2430 | 324 | 1.042 | 2660 | 251 | 19 |
| 20 | 1.033 | 2181 | 221 | | | | 1.001 | 2176 | 282 | | | | .994 | 2533 | 344 | 1.058 | 3262 | 262 | 20 |
| 21 | 1.031 | 2186 | 226 | 1.025 | 2156 | 234 | 1.018 | 2293 | 264 | | | | .993 | 2494 | 340 | 1.073 | 3443 | 229 | 21 |
| 22 | 1.024 | 1936 | 213 | 1.038 | 2220 | 216 | 1.019 | 2553 | 290 | 1.010 | 2504 | 306 | | | | 1.072 | 3359 | 227 | 22 |
| 23 | 1.016 | 1633 | 190 | 1.025 | 2181 | 237 | | | | .988 | 2298 | 324 | | | | 1.078 | 2910 | 183 | 23 |

Units of $N_T$ and $N_P$ are $10^{14}$ electrons-meter$^{-2}$.

ATS6 RBE - Boulder



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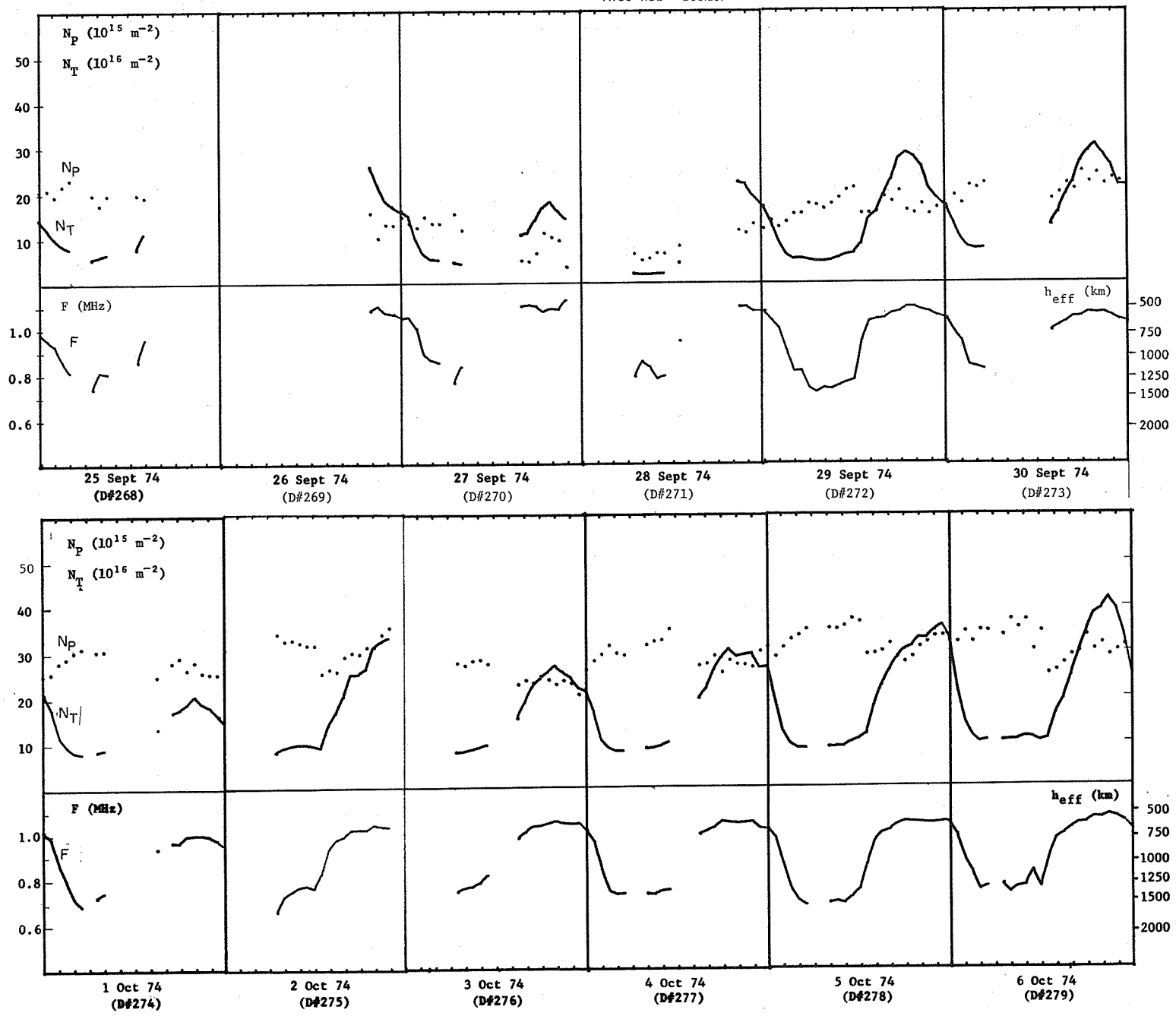
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | 1.041 | 2474 | 234 | | | | 1.058 | 2704 | 215 | .849 | 1443 | 378 | | | | 1.079 | 1619 | 99 | 0 |
| 1 | 1.029 | 2034 | 214 | | | | 1.021 | 2034 | 228 | .950 | 1227 | 214 | | | | | | | 1 |
| 2 | 1.004 | 1565 | 199 | | | | .932 | 1223 | 232 | .965 | 939 | 151 | | | | | | | 2 |
| 3 | .939 | 1086 | 199 | | | | .838 | 870 | 236 | .951 | 846 | 146 | | | | | | | 3 |
| 4 | .802 | 763 | 231 | | | | .756 | 753 | 258 | .926 | 670 | 131 | | | | | | | 4 |
| 5 | .737 | 680 | 244 | | | | .709 | 675 | 259 | | | | | | | | | | 5 |
| 6 | | | | | | | | | | | | | | | | | | | 6 |
| 7 | | | | | | | | | | | | | | | | .796 | 425 | 131 | 7 |
| 8 | | | | | | | .680 | 734 | 300 | .865 | 504 | 125 | .964 | 210 | 34 | .814 | 418 | 122 | 8 |
| 9 | | | | | | | .672 | 748 | 311 | .891 | 455 | 102 | .967 | 191 | 30 | .814 | 401 | 117 | 9 |
| 10 | | | | | | | .680 | 778 | 317 | .913 | 337 | 70 | | | | | | | 10 |
| 11 | | | | | | | .681 | 768 | 313 | .929 | 264 | 51 | | | | | | | 11 |
| 12 | | | | | | | .693 | 778 | 309 | 1.005 | 196 | 25 | | | | | | | 12 |
| 13 | | | | | | | .887 | 1120 | 256 | 1.126 | 567 | 12 | | | | | | | 13 |
| 14 | | | | | | | .990 | 1844 | 257 | 1.134 | 1049 | 14 | | | | | | | 14 |
| 15 | .953 | 1579 | 270 | | | | .978 | 2425 | 363 | 1.149 | 1335 | 1 | | | | | | | 15 |
| 16 | .995 | 2186 | 295 | | | | 1.010 | 2513 | 307 | 1.113 | 1824 | 58 | | | | 1.060 | 1897 | 148 | 16 |
| 17 | .991 | 2093 | 290 | | | | .957 | 2098 | 353 | 1.133 | 1980 | 29 | | | | 1.040 | 2866 | 273 | 17 |
| 18 | 1.004 | 2401 | 305 | 1.074 | 2445 | 161 | .987 | 2152 | 304 | 1.146 | 1804 | 7 | | | | 1.042 | 3927 | 370 | 18 |
| 19 | 1.006 | 2621 | 328 | 1.056 | 2650 | 216 | .961 | 2176 | 357 | 1.126 | 1941 | 41 | | | | 1.073 | 4567 | 305 | 19 |
| 20 | 1.002 | 2787 | 359 | 1.058 | 2753 | 220 | .970 | 1756 | 275 | 1.115 | 2147 | 65 | 1.088 | 1712 | 92 | 1.095 | 3374 | 161 | 20 |
| 21 | 1.014 | 2787 | 329 | 1.060 | 3179 | 247 | .941 | 1482 | 269 | 1.106 | 2445 | 94 | 1.086 | 1697 | 95 | 1.068 | 2147 | 153 | 21 |
| 22 | 1.026 | 3037 | 328 | 1.080 | 3491 | 211 | .910 | 1418 | 295 | 1.113 | 2548 | 82 | 1.086 | 1736 | 97 | 1.058 | 1853 | 149 | 22 |
| 23 | | | | 1.058 | 3125 | 250 | .880 | 1501 | 352 | | | | 1.090 | 1780 | 93 | 1.038 | 1516 | 148 | 23 |

| DATE | 262:74 | | | 263:74 | | | 264:74 | | | 265:74 | | | 266:74 | | | 267:74 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | | | | 1.032 | 2034 | 208 | | | | | | | 1.050 | 1863 | 162 | 1.004 | 1829 | 232 | 0 |
| 1 | | | | | | | | | | | | | 1.041 | 1751 | 166 | .950 | 1423 | 247 | 1 |
| 2 | 1.018 | 1584 | 181 | | | | | | | | | | 1.036 | 1115 | 110 | .899 | 1066 | 232 | 2 |
| 3 | .955 | 1090 | 185 | | | | | | | | | | .907 | 626 | 132 | .796 | 797 | 245 | 3 |
| 4 | .869 | 817 | 200 | | | | | | | | | | .868 | 567 | 139 | .736 | 719 | 259 | 4 |
| 5 | | | | | | | | | | | | | | | | .729 | 709 | 260 | 5 |
| 6 | | | | | | | | | | | | | | | | | | | 6 |
| 7 | .710 | 460 | 176 | .766 | 548 | 183 | .680 | 210 | 86 | .717 | 626 | 236 | .776 | 455 | 148 | .750 | 694 | 241 | 7 |
| 8 | .732 | 440 | 160 | .798 | 528 | 162 | .659 | 215 | 92 | .714 | 724 | 274 | .734 | 557 | 201 | .728 | 721 | 265 | 8 |
| 9 | .760 | 469 | 159 | | | | .635 | 230 | 103 | .811 | 787 | 232 | | | | .756 | 724 | 248 | 9 |
| 10 | | | | | | | .622 | 274 | 126 | .872 | 792 | 191 | | | | | | | 10 |
| 11 | | | | | | | .619 | 337 | 156 | .860 | 782 | 197 | | | | | | | 11 |
| 12 | | | | | | | .763 | 553 | 186 | .891 | 782 | 176 | | | | | | | 12 |
| 13 | | | | | | | .927 | 582 | 113 | .965 | 787 | 126 | .845 | 763 | 202 | | | | 13 |
| 14 | | | | | | | .994 | 1066 | 144 | 1.041 | 1433 | 136 | .973 | 1291 | 198 | | | | 14 |
| 15 | | | | 1.026 | 1017 | 109 | | | | 1.044 | 1609 | 148 | .993 | 1457 | 199 | 1.013 | 1521 | 181 | 15 |
| 16 | 1.040 | 1672 | 160 | 1.026 | 1315 | 142 | | | | | | | 1.013 | 1751 | 208 | 1.017 | 1726 | 200 | 16 |
| 17 | .991 | 2073 | 286 | 1.038 | 1443 | 140 | | | | | | | 1.025 | 2034 | 221 | 1.025 | 1971 | 213 | 17 |
| 18 | 1.060 | 2318 | 182 | 1.042 | 1623 | 152 | | | | 1.081 | 2763 | 165 | 1.038 | 2352 | 228 | 1.025 | 2020 | 220 | 18 |
| 19 | 1.075 | 2548 | 167 | 1.039 | 1623 | 157 | | | | 1.083 | 3002 | 175 | 1.044 | 2509 | 231 | 1.034 | 1922 | 194 | 19 |
| 20 | 1.073 | 2592 | 174 | 1.034 | 1643 | 166 | | | | 1.075 | 2714 | 176 | 1.043 | 2455 | 229 | 1.024 | 1976 | 217 | 20 |
| 21 | 1.080 | 2289 | 140 | 1.040 | 1413 | 135 | | | | 1.072 | 2616 | 177 | 1.032 | 2469 | 254 | 1.022 | 1653 | 185 | 21 |
| 22 | 1.070 | 1941 | 135 | 0.000 | 0 | 0 | | | | 1.072 | 2435 | 165 | 1.031 | 2425 | 250 | 1.022 | 1594 | 177 | 22 |
| 23 | 1.064 | 2088 | 156 | 0.000 | 0 | 0 | | | | 1.063 | 1990 | 150 | 1.031 | 2245 | 232 | 1.016 | 1570 | 183 | 23 |

Units of $N_T$ and $N_P$ are $10^{14}$ electrons-meter$^{-2}$.

ATS6 RBE - Boulder



| DATE | 268:74 | | | 269:74 | | | 270:74 | | | 271:74 | | | 272:74 | | | 273:74 | | | DATE |
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| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
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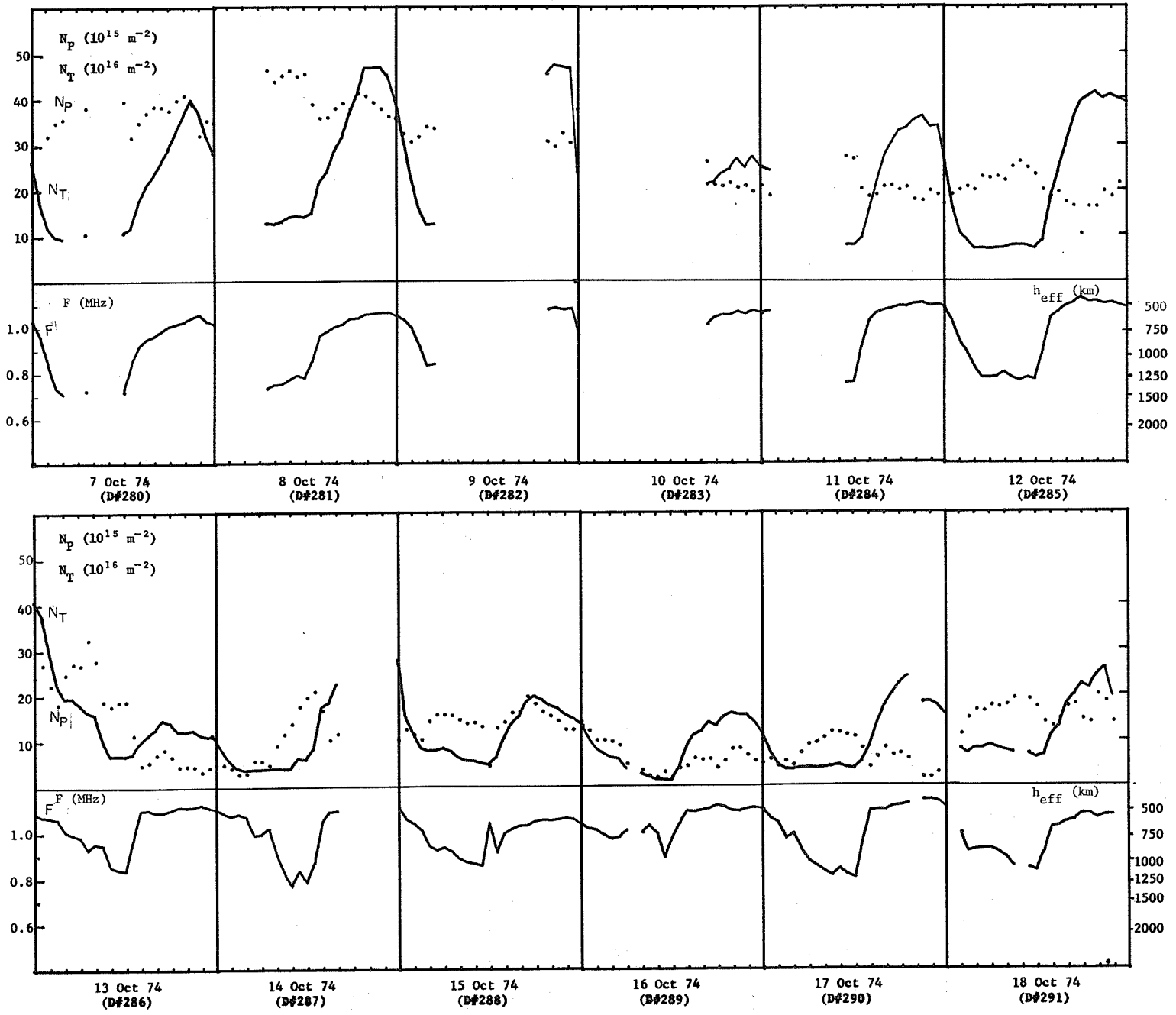
| 1 | .953 | 1218 | 209 | | | | 1.049 | 1487 | 131 | | | | 1.030 | 1320 | 138 | .984 | 1306 | 188 | 1 |
| 2 | .928 | 1007 | 195 | | | | 1.002 | 949 | 122 | | | | .994 | 910 | 123 | .942 | 949 | 171 | 2 |
| 3 | .860 | 861 | 217 | | | | .886 | 636 | 146 | | | | .896 | 606 | 134 | .834 | 763 | 209 | 3 |
| 4 | .811 | 782 | 231 | | | | .860 | 523 | 132 | | | | .805 | 504 | 151 | .826 | 729 | 205 | 4 |
| 5 | | | | | | | .849 | 499 | 130 | | | | .805 | 509 | 153 | .815 | 738 | 215 | 5 |
| 6 | | | | | | | | | | | | | .732 | 479 | 174 | | | | 6 |
| 7 | .737 | 553 | 198 | | | | .761 | 450 | 152 | .788 | 196 | 62 | .712 | 450 | 171 | | | | 7 |
| 8 | .808 | 592 | 176 | | | | .829 | 416 | 116 | .851 | 181 | 47 | .729 | 445 | 163 | | | | 8 |
| 9 | .804 | 650 | 196 | | | | | | | .829 | 181 | 51 | .725 | 469 | 173 | | | | 9 |
| 10 | | | | | | | | | | .776 | 191 | 62 | .740 | 523 | 187 | | | | 10 |
| 11 | | | | | | | | | | .788 | 196 | 62 | .754 | 592 | 204 | | | | 11 |
| 12 | | | | | | | | | | | | | .764 | 621 | 209 | | | | 12 |
| 13 | .853 | 763 | 197 | | | | | | | .942 | 430 | 78 | .937 | 826 | 153 | | | | 13 |
| 14 | .950 | 1105 | 192 | | | | | | | | | | 1.022 | 1384 | 154 | .983 | 1247 | 181 | 14 |
| 15 | | | | | | | | | | | | | 1.032 | 1521 | 157 | 1.003 | 1511 | 193 | 15 |
| 16 | | | | | | | 1.096 | 1046 | 49 | | | | 1.036 | 1902 | 189 | 1.020 | 1897 | 214 | 16 |
| 17 | | | | | | | 1.101 | 1095 | 47 | | | | 1.058 | 2240 | 179 | 1.043 | 2176 | 202 | 17 |
| 18 | | | | | | | 1.096 | 1364 | 64 | | | | 1.064 | 2704 | 201 | 1.045 | 2636 | 240 | 18 |
| 19 | | | | | | | 1.073 | 1643 | 110 | | | | 1.085 | 2831 | 159 | 1.063 | 2856 | 217 | 19 |
| 20 | | | | 1.080 | 2538 | 155 | 1.085 | 1768 | 100 | | | | 1.086 | 2753 | 153 | 1.060 | 3017 | 236 | 20 |
| 21 | | | | 1.097 | 2156 | 100 | 1.082 | 1579 | 94 | 1.092 | 2201 | 112 | 1.072 | 2543 | 172 | 1.063 | 2802 | 213 | 21 |
| 22 | | | | 1.068 | 1800 | 129 | 1.122 | 1413 | 35 | 1.093 | 2171 | 107 | 1.065 | 2044 | 151 | 1.050 | 2572 | 224 | 22 |
| 23 | | | | 1.062 | 1672 | 128 | | | | 1.074 | 1912 | 127 | 1.048 | 1844 | 164 | 1.031 | 2122 | 219 | 23 |

| DATE | 274:74 | | | 275:74 | | | 276:$$ | | | 277:74 | | | 278:74 | | | 279:74 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | 1.014 | 2083 | 247 | .913 | 1467 | 302 | | | | 1.011 | 2142 | 259 | 1.014 | 2636 | 311 | 1.038 | 3286 | 320 | 0 |
| 1 | .985 | 1746 | 251 | | | | | | | .963 | 1697 | 276 | .975 | 1902 | 289 | .985 | 2210 | 317 | 1 |
| 2 | .876 | 1154 | 275 | | | | | | | .838 | 1071 | 290 | .859 | 1218 | 308 | .885 | 1477 | 340 | 2 |
| 3 | .801 | 934 | 284 | | | | | | | .745 | 880 | 310 | .752 | 944 | 327 | .824 | 1120 | 318 | 3 |
| 4 | .720 | 797 | 298 | | | | | | | .731 | 807 | 294 | .699 | 856 | 336 | .743 | 968 | 343 | 4 |
| 5 | .685 | 758 | 307 | | | | | | | .732 | 797 | 289 | .679 | 851 | 349 | .756 | 998 | 342 | 5 |
| 6 | | | | | | | | | | | | | | | | | | | 6 |
| 7 | .721 | 807 | 301 | .659 | 787 | 336 | .744 | 782 | 277 | | | | | | | .765 | 993 | 333 | 7 |
| 8 | .740 | 846 | 301 | .724 | 866 | 321 | .758 | 797 | 272 | .732 | 856 | 311 | .687 | 870 | 350 | .730 | 1005 | 367 | 8 |
| 9 | | | | .745 | 914 | 322 | .764 | 836 | 281 | .729 | 870 | 319 | .693 | 880 | 350 | .753 | 1012 | 350 | 9 |
| 10 | | | | .765 | 949 | 318 | .781 | 885 | 284 | .745 | 914 | 322 | .687 | 885 | 356 | .759 | 1076 | 366 | 10 |
| 11 | | | | .771 | 949 | 312 | .814 | 944 | 276 | .749 | 993 | 347 | .713 | 978 | 372 | .825 | 1064 | 300 | 11 |
| 12 | | | | .761 | 919 | 311 | | | | | | | .745 | 1042 | 367 | .753 | 988 | 341 | 12 |
| 13 | | | | .824 | 885 | 251 | | | | | | | .855 | 1149 | 294 | .874 | 1037 | 249 | 13 |
| 14 | | | | .932 | 1364 | 259 | | | | | | | .960 | 1785 | 296 | .964 | 1575 | 254 | 14 |
| 15 | .933 | 1291 | 244 | .971 | 1638 | 255 | .976 | 1526 | 230 | .993 | 1961 | 267 | .994 | 2213 | 300 | .985 | 1883 | 270 | 15 |
| 16 | | | | .985 | 2000 | 287 | 1.003 | 1873 | 239 | 1.007 | 2166 | 270 | 1.007 | 2543 | 317 | 1.012 | 2396 | 288 | 16 |
| 17 | .961 | 1667 | 273 | 1.013 | 2484 | 295 | 1.029 | 2220 | 234 | 1.022 | 2582 | 287 | 1.032 | 2817 | 289 | 1.033 | 2895 | 295 | 17 |
| 18 | .961 | 1726 | 284 | 1.015 | 2489 | 293 | 1.031 | 2396 | 248 | 1.048 | 2846 | 252 | 1.044 | 3007 | 277 | 1.036 | 3350 | 332 | 18 |
| 19 | .989 | 1848 | 259 | 1.014 | 2601 | 307 | 1.041 | 2543 | 241 | 1.045 | 3034 | 278 | 1.043 | 3076 | 287 | 1.058 | 3775 | 301 | 19 |
| 20 | .994 | 2020 | 275 | 1.035 | 3073 | 308 | 1.051 | 2690 | 231 | 1.043 | 2885 | 270 | 1.041 | 3269 | 310 | 1.057 | 3878 | 314 | 20 |
| 21 | .994 | 1858 | 253 | 1.029 | 3198 | 336 | 1.043 | 2557 | 238 | 1.044 | 2917 | 268 | 1.037 | 3267 | 320 | 1.070 | 4127 | 288 | 21 |
| 22 | .988 | 1780 | 250 | 1.027 | 3281 | 350 | 1.041 | 2450 | 233 | 1.047 | 2944 | 263 | 1.039 | 3433 | 332 | 1.062 | 3892 | 299 | 22 |
| 23 | .972 | 1614 | 250 | | | | 1.042 | 2225 | 209 | 1.021 | 2645 | 298 | 1.042 | 3548 | 335 | 1.044 | 3345 | 310 | 23 |

Units of $N_T$ and $N_P$ are $10^{14}$ electrons-meter$^{-2}$.

ATS6 RBE - Boulder



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| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
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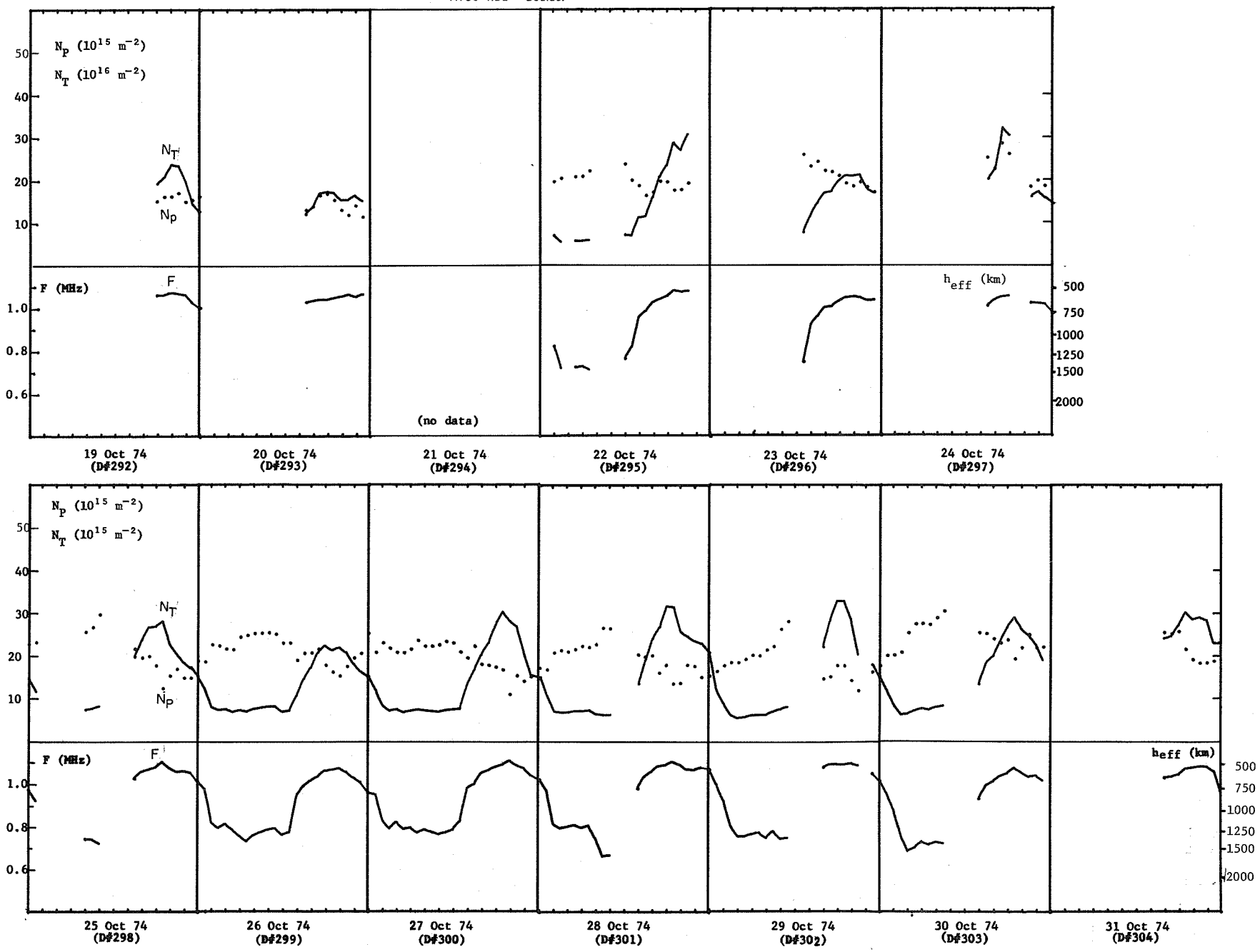
| 1 | .955 | 1726 | 293 | | | | 1.029 | 3076 | 323 | | | | 1.063 | 2401 | 182 | 1.023 | 1672 | 185 | 1 |
| 2 | .841 | 1160 | 314 | | | | .994 | 2240 | 304 | | | | | | | .936 | 1042 | 194 | 2 |
| 3 | .738 | 958 | 343 | | | | .919 | 1560 | 314 | | | | | | | .885 | 870 | 201 | 3 |
| 4 | .706 | 910 | 351 | | | | .829 | 1208 | 337 | | | | | | | .820 | 680 | 195 | 4 |
| 5 | | | | | | | .834 | 1213 | 333 | | | | | | | .772 | 680 | 223 | 5 |
| 6 | | | | | | | | | | | | | | | | .772 | 670 | 220 | 6 |
| 7 | .720 | 1007 | 376 | .728 | 1262 | 463 | | | | | | | | | | .776 | 685 | 223 | 7 |
| 8 | | | | .742 | 1237 | 439 | | | | | | | | | | .794 | 694 | 215 | 8 |
| 9 | | | | .745 | 1281 | 451 | | | | | | | | | | .772 | 743 | 244 | 9 |
| 10 | | | | .764 | 1379 | 462 | | | | | | | | | | .759 | 753 | 256 | 10 |
| 11 | | | | .783 | 1413 | 451 | | | | | | | .749 | 763 | 266 | .771 | 738 | 243 | 11 |
| 12 | .715 | 1032 | 390 | .774 | 1389 | 455 | | | | | | | .751 | 753 | 261 | .763 | 680 | 229 | 12 |
| 13 | .833 | 1130 | 312 | .846 | 1467 | 388 | | | | | | | .901 | 905 | 196 | .886 | 851 | 195 | 13 |
| 14 | .911 | 1653 | 343 | .956 | 2122 | 358 | | | | | | | 1.016 | 1540 | 180 | 1.030 | 1741 | 181 | 14 |
| 15 | .942 | 2020 | 365 | .975 | 2352 | 359 | | | | | | | 1.052 | 2137 | 182 | 1.057 | 2333 | 189 | 15 |
| 16 | .957 | 2254 | 379 | .996 | 2822 | 379 | | | | | | | 1.065 | 2699 | 200 | 1.083 | 2895 | 168 | 16 |
| 17 | .978 | 2538 | 379 | 1.006 | 3115 | 390 | | | | 1.006 | 2098 | 263 | 1.072 | 2998 | 202 | 1.097 | 3452 | 160 | 17 |
| 18 | 1.000 | 2851 | 371 | 1.031 | 3648 | 378 | | | | 1.037 | 2147 | 211 | 1.082 | 3262 | 193 | 1.121 | 3878 | 99 | 18 |
| 19 | 1.010 | 3227 | 393 | 1.034 | 4064 | 412 | | | | 1.047 | 2333 | 209 | 1.081 | 3320 | 199 | 1.105 | 4000 | 158 | 19 |
| 20 | 1.020 | 3589 | 404 | 1.050 | 4665 | 407 | 1.072 | 4513 | 305 | 1.048 | 2425 | 215 | 1.093 | 3491 | 173 | 1.106 | 4103 | 158 | 20 |
| 21 | 1.038 | 3951 | 386 | 1.053 | 4670 | 392 | 1.078 | 4699 | 293 | 1.061 | 2655 | 205 | 1.096 | 3575 | 169 | 1.094 | 3971 | 192 | 21 |
| 22 | 1.051 | 3677 | 316 | 1.057 | 4685 | 379 | 1.071 | 4670 | 322 | 1.052 | 2460 | 209 | 1.084 | 3340 | 190 | 1.099 | 4044 | 181 | 22 |
| 23 | 1.022 | 3139 | 349 | 1.057 | 4479 | 362 | 1.075 | 4631 | 302 | 1.066 | 2699 | 196 | 1.087 | 3364 | 183 | 1.089 | 3966 | 210 | 23 |

| DATE | 286:74 | | | 287:74 | | | 288:74 | | | 289:74 | | | 290:74 | | | 291:74 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | 1.082 | 4049 | 238 | 1.099 | 1066 | 47 | 1.106 | 2763 | 105 | 1.034 | 1403 | 141 | 1.098 | 1125 | 51 | 1.108 | 1575 | 57 | 0 |
| 1 | 1.068 | 3751 | 266 | 1.082 | 792 | 47 | 1.055 | 1540 | 127 | 1.016 | 1061 | 123 | 1.057 | 729 | 59 | | | | 1 |
| 2 | 1.063 | 2939 | 221 | 1.069 | 557 | 39 | 1.037 | 1178 | 116 | 1.009 | 831 | 102 | 1.040 | 462 | 44 | .994 | 812 | 110 | 2 |
| 3 | 1.057 | 2230 | 180 | 1.078 | 416 | 26 | 1.008 | 851 | 105 | .989 | 724 | 102 | .969 | 347 | 55 | .913 | 709 | 146 | 3 |
| 4 | 1.005 | 1936 | 244 | 1.066 | 377 | 28 | .939 | 792 | 145 | .970 | 631 | 99 | .991 | 337 | 47 | .921 | 817 | 163 | 4 |
| 5 | .991 | 1941 | 269 | .986 | 386 | 55 | .921 | 797 | 159 | .977 | 601 | 90 | .922 | 369 | 73 | .923 | 817 | 161 | 5 |
| 6 | .981 | 1804 | 266 | .990 | 391 | 55 | .931 | 836 | 159 | 1.006 | 389 | 49 | .872 | 377 | 91 | .924 | 875 | 172 | 6 |
| 7 | .925 | 1643 | 321 | 1.016 | 401 | 47 | .915 | 778 | 159 | | | | .851 | 367 | 95 | .911 | 817 | 170 | 7 |
| 8 | .951 | 1584 | 275 | .903 | 411 | 88 | .883 | 641 | 149 | .999 | 274 | 36 | .829 | 379 | 106 | .887 | 763 | 174 | 8 |
| 9 | .944 | 1042 | 187 | .824 | 401 | 114 | .868 | 572 | 140 | 1.027 | 215 | 23 | .809 | 401 | 119 | .849 | 719 | 188 | 9 |
| 10 | .850 | 675 | 176 | .764 | 406 | 136 | .861 | 565 | 142 | .995 | 147 | 20 | .838 | 435 | 118 | | | | 10 |
| 11 | .838 | 680 | 184 | .829 | 626 | 175 | .852 | 518 | 134 | .888 | 137 | 31 | .813 | 386 | 113 | .841 | 694 | 187 | 11 |
| 12 | .832 | 670 | 185 | .782 | 606 | 194 | 1.036 | 479 | 47 | .972 | 127 | 20 | .801 | 357 | 108 | .827 | 606 | 170 | 12 |
| 13 | .967 | 704 | 112 | .865 | 836 | 207 | .910 | 626 | 131 | 1.034 | 386 | 39 | .958 | 504 | 84 | .909 | 655 | 137 | 13 |
| 14 | 1.094 | 949 | 46 | 1.040 | 1746 | 167 | .992 | 1042 | 143 | 1.090 | 846 | 44 | 1.091 | 836 | 43 | 1.016 | 1095 | 128 | 14 |
| 15 | 1.097 | 1105 | 51 | 1.087 | 1853 | 101 | 1.011 | 1350 | 163 | 1.087 | 1115 | 61 | 1.095 | 1335 | 64 | 1.022 | 1281 | 143 | 15 |
| 16 | 1.087 | 1242 | 68 | 1.092 | 2259 | 114 | 1.026 | 1526 | 165 | 1.094 | 1193 | 58 | 1.094 | 1736 | 84 | 1.040 | 1780 | 171 | 16 |
| 17 | 1.087 | 1447 | 80 | | | | 1.026 | 1853 | 199 | 1.101 | 1394 | 59 | 1.110 | 1995 | 69 | 1.048 | 1966 | 175 | 17 |
| 18 | 1.097 | 1394 | 65 | | | | 1.043 | 1976 | 183 | 1.115 | 1320 | 41 | 1.113 | 2225 | 71 | 1.075 | 2205 | 143 | 18 |
| 19 | 1.109 | 1208 | 43 | | | | 1.050 | 1902 | 166 | 1.108 | 1516 | 55 | 1.121 | 2377 | 61 | 1.077 | 2137 | 136 | 19 |
| 20 | 1.108 | 1198 | 44 | | | | 1.049 | 1780 | 157 | 1.091 | 1599 | 81 | | | | 1.057 | 2421 | 196 | 20 |
| 21 | 1.110 | 1232 | 43 | | | | 1.053 | 1721 | 146 | 1.089 | 1565 | 83 | 1.137 | 1822 | 20 | 1.068 | 2562 | 183 | 21 |
| 22 | 1.118 | 1130 | 32 | | | | 1.058 | 1584 | 127 | 1.100 | 1565 | 68 | 1.138 | 1824 | 19 | 1.069 | 1956 | 137 | 22 |
| 23 | 1.108 | 1090 | 40 | | | | 1.054 | 1506 | 126 | 1.105 | 1418 | 56 | 1.131 | 1741 | 29 | | | | 23 |

Units of $N_T$ and $N_p$ are $10^{14}$ electrons-meter$^{-2}$.

ATS6 RBE - Boulder



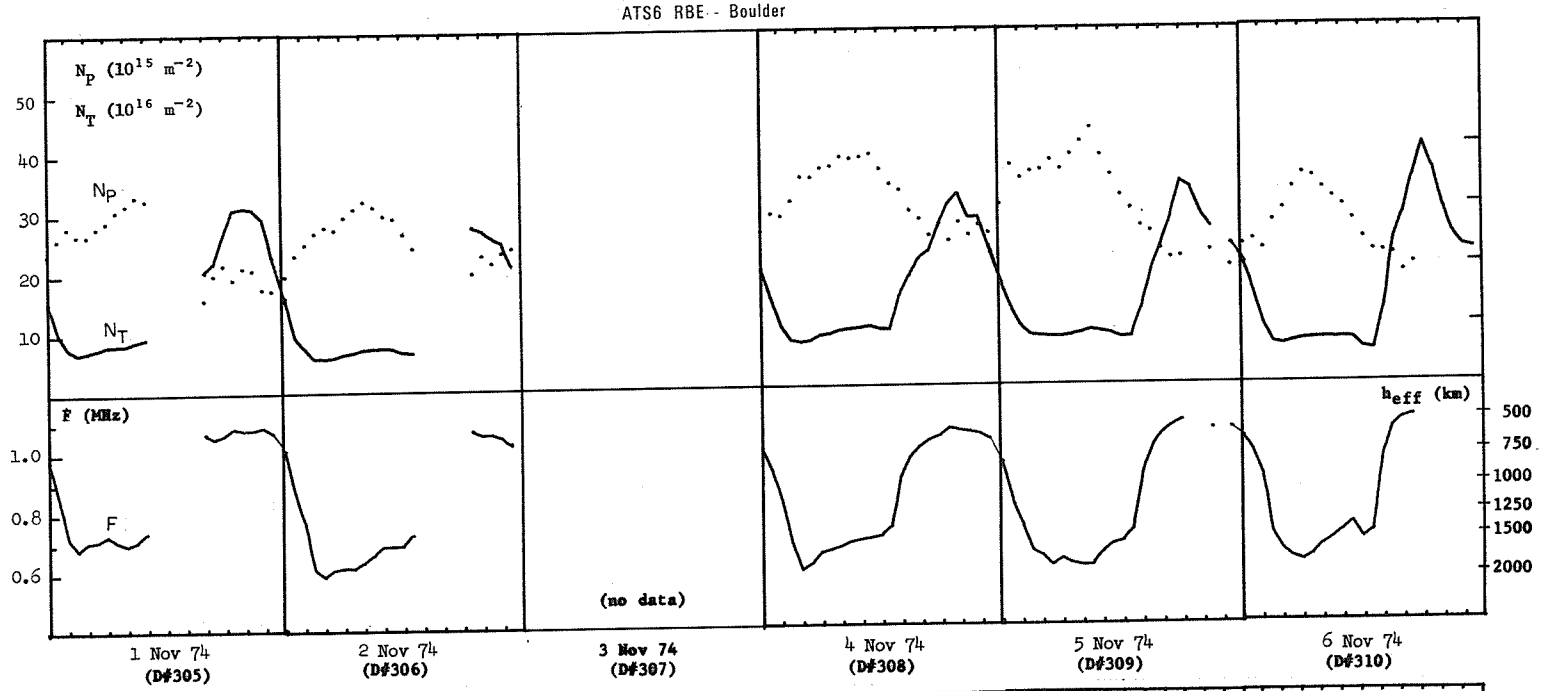
| DATE | 292:74 | | | 293:74 | | | | 295:74 | | | 296:74 | | | 297:74 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | | | | 1.002 | 1242 | 160 | | | | | | | | | | | 0 |
| 1 | | | | | | | | | | | | | | | | | 1 |
| 2 | | | | | | | | .820 | 689 | 198 | | | | | | | 2 |
| 3 | | | | | | | | .717 | 543 | 204 | | | | | | | 3 |
| 4 | | | | | | | | | | | | | | | | | 4 |
| 5 | | | | | | | | .720 | 557 | 208 | | | | | | | 5 |
| 6 | | | | | | | | .725 | 567 | 209 | | | | | | | 6 |
| 7 | | | | | | | | .711 | 582 | 222 | | | | | | | 7 |
| 8 | | | | | | | | | | | | | | | | | 8 |
| 9 | | | | | | | | | | | | | | | | | 9 |
| 10 | | | | | | | | | | | | | | | | | 10 |
| 11 | | | | | | | | | | | | | | | | | 11 |
| 12 | | | | | | | NO DATA | .759 | 699 | 237 | | | | | | | 12 |
| 13 | | | | | | | | .814 | 689 | 201 | .744 | 719 | 254 | | | | 13 |
| 14 | | | | | | | | .955 | 1110 | 188 | .913 | 1105 | 227 | | | | 14 |
| 15 | | | | 1.025 | 1178 | 128 | | .983 | 1134 | 165 | .955 | 1399 | 237 | 1.006 | 2010 | 251 | 15 |
| 16 | | | | 1.033 | 1340 | 136 | | 1.024 | 1570 | 172 | .998 | 1643 | 217 | 1.034 | 2240 | 227 | 16 |
| 17 | | | | 1.038 | 1667 | 162 | | 1.039 | 2054 | 198 | 1.003 | 1677 | 214 | 1.048 | 3213 | 285 | 17 |
| 18 | 1.060 | 1932 | 151 | 1.039 | 1702 | 165 | | 1.052 | 2313 | 196 | 1.027 | 1922 | 205 | 1.051 | 3037 | 261 | 18 |
| 19 | 1.061 | 2083 | 162 | 1.046 | 1687 | 152 | | 1.079 | 2851 | 177 | 1.045 | 2049 | 188 | | | | 19 |
| 20 | 1.071 | 2372 | 163 | 1.053 | 1521 | 128 | | 1.074 | 2690 | 178 | 1.048 | 2044 | 181 | | | | 20 |
| 21 | 1.066 | 2342 | 171 | 1.062 | 1516 | 116 | | 1.077 | 3046 | 193 | 1.045 | 2073 | 189 | 1.019 | 1614 | 184 | 21 |
| 22 | 1.062 | 1976 | 151 | 1.052 | 1619 | 138 | | | | | 1.033 | 1751 | 178 | 1.017 | 1712 | 197 | 22 |
| 23 | 1.027 | 1452 | 155 | 1.064 | 1501 | 112 | | | | | 1.034 | 1653 | 167 | 1.014 | 1575 | 186 | 23 |

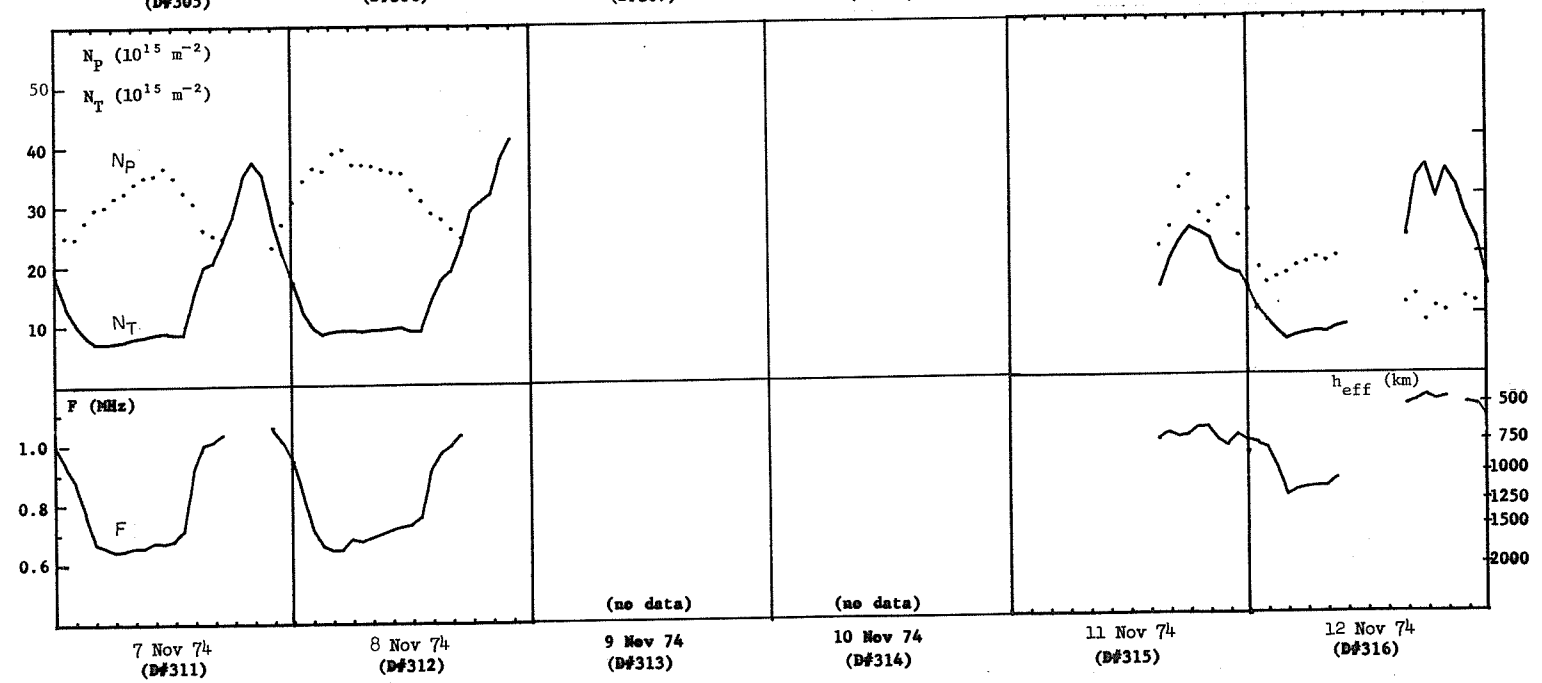


| DATE | 298:74 | | | 299:74 | | | 300:74 | | | 301:74 | | | 302:74 | | | 303:74 | | | 304:74 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | .970 | 1433 | 224 | 1.007 | 1487 | 185 | .955 | 1491 | 252 | 1.020 | 1496 | 169 | 1.065 | 2054 | 152 | 1.013 | 1506 | 179 | | | | 0 |
| 1 | .920 | 1139 | 228 | .975 | 1208 | 184 | .946 | 1178 | 209 | .972 | 1066 | 165 | .995 | 1198 | 162 | .954 | 1183 | 202 | | | | 1 |
| 2 | | | | .816 | 768 | 223 | .824 | 812 | 230 | .811 | 694 | 204 | .918 | 866 | 175 | .875 | 846 | 203 | | | | 2 |
| 3 | | | | .792 | 709 | 221 | .788 | 694 | 218 | .793 | 675 | 210 | .802 | 601 | 182 | .760 | 616 | 209 | | | | 3 |
| 4 | | | | .809 | 724 | 214 | .818 | 724 | 209 | .799 | 680 | 207 | .752 | 528 | 183 | .684 | 631 | 255 | | | | 4 |
| 5 | | | | .783 | 665 | 212 | .786 | 655 | 208 | .806 | 709 | 212 | .751 | 548 | 190 | .699 | 704 | 276 | | | | 5 |
| 6 | | | | .754 | 699 | 241 | .791 | 689 | 215 | .795 | 709 | 219 | .762 | 592 | 200 | .727 | 753 | 277 | | | | 6 |
| 7 | | | | .729 | 670 | 245 | .769 | 714 | 236 | .804 | 724 | 218 | .768 | 601 | 200 | .715 | 729 | 276 | | | | 7 |
| 8 | .740 | 709 | 253 | .757 | 729 | 249 | .783 | 699 | 223 | .746 | 636 | 223 | .745 | 601 | 212 | .726 | 787 | 290 | | | | 8 |
| 9 | .738 | 736 | 264 | .770 | 758 | 250 | .772 | 680 | 223 | .661 | 616 | 262 | .775 | 675 | 220 | .720 | 822 | 307 | | | | 9 |
| 10 | .721 | 787 | 294 | .783 | 787 | 251 | .762 | 670 | 226 | .666 | 621 | 261 | .741 | 734 | 261 | | | | | | | 10 |
| 11 | | | | .788 | 790 | 249 | .769 | 704 | 234 | | | | .744 | 790 | 279 | | | | | | | 11 |
| 12 | | | | .759 | 670 | 228 | .781 | 719 | 231 | | | | | | | | | | | | | 12 |
| 13 | | | | .770 | 689 | 228 | .821 | 734 | 210 | | | | | | | | | | | | | 13 |
| 14 | | | | .940 | 1027 | 188 | .976 | 1296 | 196 | .978 | 1345 | 201 | | | | .928 | 1330 | 257 | | | | 14 |
| 15 | 1.023 | 1941 | 214 | .986 | 1423 | 203 | .994 | 1638 | 223 | 1.031 | 1892 | 195 | | | | .989 | 1814 | 254 | | | | 15 |
| 16 | 1.055 | 2328 | 193 | 1.011 | 1692 | 204 | 1.046 | 2000 | 181 | 1.055 | 2401 | 198 | 1.074 | 2196 | 146 | 1.009 | 1980 | 243 | 1.027 | 2372 | 253 | 16 |
| 17 | 1.065 | 2641 | 196 | 1.030 | 2044 | 213 | 1.059 | 2269 | 179 | 1.082 | 2670 | 158 | 1.089 | 2802 | 149 | 1.035 | 2323 | 232 | 1.031 | 2421 | 251 | 17 |
| 18 | 1.074 | 2660 | 175 | 1.058 | 2210 | 176 | 1.075 | 2690 | 174 | 1.086 | 3159 | 175 | 1.088 | 3276 | 176 | 1.047 | 2660 | 238 | 1.040 | 2665 | 255 | 18 |
| 19 | 1.100 | 2778 | 121 | 1.063 | 2112 | 160 | 1.086 | 3007 | 168 | 1.101 | 3147 | 133 | 1.088 | 3276 | 176 | 1.072 | 2890 | 195 | 1.067 | 2978 | 214 | 19 |
| 20 | 1.073 | 2245 | 151 | 1.070 | 2171 | 151 | 1.104 | 2797 | 111 | 1.090 | 2562 | 134 | 1.093 | 2856 | 141 | 1.053 | 2628 | 221 | 1.073 | 2822 | 190 | 20 |
| 21 | 1.056 | 2020 | 165 | 1.053 | 2059 | 173 | 1.084 | 2665 | 153 | 1.068 | 2460 | 175 | 1.083 | 2024 | 117 | 1.033 | 2474 | 252 | 1.077 | 2861 | 182 | 21 |
| 22 | 1.057 | 1819 | 146 | 1.027 | 1800 | 192 | 1.071 | 2059 | 141 | 1.065 | 2352 | 174 | 0.000 | 0 | 0 | 1.038 | 2264 | 221 | 1.075 | 2797 | 181 | 22 |
| 23 | 1.051 | 1692 | 146 | 1.006 | 1619 | 203 | 1.038 | 1545 | 151 | 1.076 | 2293 | 148 | 1.046 | 1790 | 161 | 1.015 | 1902 | 223 | 1.055 | 2264 | 186 | 23 |

Units of $N_T$ and $N_P$ are $10^{14}$ electrons-meter$^{-2}$.

ATS6 RBE - Boulder



| DATE | 305:74 | | | 306:74 | | | | 308:74 | | | 309:74 | | | 310:74 | | | DATE |
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| HR | F140 | NT | NP | F140 | NT | NP | | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
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| 1 | .854 | 988 | 255 | .866 | 939 | 232 | | .919 | 1443 | 290 | .815 | 1262 | 367 | .971 | 1545 | 241 | 1 |
| 2 | .714 | 724 | 274 | .764 | 743 | 250 | | .819 | 993 | 286 | .736 | 958 | 345 | .888 | 993 | 226 | 2 |
| 3 | .676 | 636 | 262 | .609 | 572 | 269 | | .676 | 753 | 311 | .647 | 812 | 355 | .693 | 685 | 272 | 3 |
| 4 | .702 | 670 | 261 | .584 | 567 | 279 | | .587 | 719 | 352 | .629 | 792 | 359 | .637 | 655 | 292 | 4 |
| 5 | .706 | 709 | 274 | .606 | 582 | 275 | | .607 | 743 | 351 | .597 | 778 | 374 | .612 | 699 | 327 | 5 |
| 6 | .723 | 763 | 283 | .612 | 631 | 295 | | .644 | 831 | 366 | .618 | 778 | 360 | .600 | 734 | 351 | 6 |
| 7 | .704 | 775 | 302 | .611 | 660 | 309 | | .654 | 856 | 369 | .603 | 807 | 384 | .618 | 748 | 346 | 7 |
| 8 | .692 | 782 | 312 | .629 | 709 | 321 | | .664 | 910 | 384 | .595 | 841 | 406 | .651 | 753 | 327 | 8 |
| 9 | .704 | 841 | 326 | .653 | 724 | 313 | | .679 | 934 | 382 | .597 | 890 | 428 | .672 | 748 | 311 | 9 |
| 10 | .733 | 885 | 321 | .683 | 734 | 298 | | .687 | 954 | 384 | .638 | 861 | 383 | .698 | 758 | 298 | 10 |
| 11 | | | | .683 | 724 | 294 | | .692 | 978 | 389 | .666 | 831 | 350 | .725 | 743 | 274 | 11 |
| 12 | | | | .685 | 660 | 267 | NO DATA | .698 | 929 | 365 | .675 | 763 | 315 | .674 | 587 | 243 | 12 |
| 13 | | | | .720 | 650 | 243 | | .728 | 924 | 339 | .714 | 773 | 293 | .696 | 562 | 222 | 13 |
| 14 | | | | | | | | .895 | 1482 | 329 | .906 | 1242 | 264 | .946 | 1242 | 220 | 14 |
| 15 | | | | | | | | .963 | 1804 | 294 | .991 | 1839 | 254 | 1.045 | 2357 | 216 | 15 |
| 16 | 1.062 | 1995 | 153 | | | | | .997 | 2103 | 280 | 1.037 | 2293 | 225 | 1.073 | 2812 | 187 | 16 |
| 17 | 1.046 | 2142 | 194 | | | | | 1.019 | 2225 | 253 | 1.062 | 2748 | 210 | 1.083 | 3438 | 200 | 17 |
| 18 | 1.057 | 2611 | 211 | | | | | 1.032 | 2636 | 270 | 1.078 | 3367 | 211 | | 3995 | | 18 |
| 19 | 1.079 | 3032 | 187 | 1.066 | 2738 | 200 | | 1.057 | 3012 | 243 | | 3265 | | | 3589 | | 19 |
| 20 | 1.073 | 3066 | 205 | 1.052 | 2682 | 229 | | 1.051 | 3183 | 273 | | 2848 | | | 2943 | | 20 |
| 21 | 1.074 | 3042 | 202 | 1.053 | 2562 | 216 | | 1.046 | 2787 | 253 | 1.052 | 2604 | 221 | | 2489 | | 21 |
| 22 | 1.082 | 2885 | 171 | 1.042 | 2479 | 233 | | 1.040 | 2792 | 268 | | | | | 2279 | | 22 |
| 23 | 1.064 | 2245 | 168 | 1.018 | 2093 | 241 | | 1.023 | 2320 | 256 | 1.053 | 2318 | 196 | | 2245 | | 23 |

| DATE | 311:74 | | | 312:74 | | | | | 315:74 | | | 316:74 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | | | F140 | NT | NP | F140 | NT | NP | HR |
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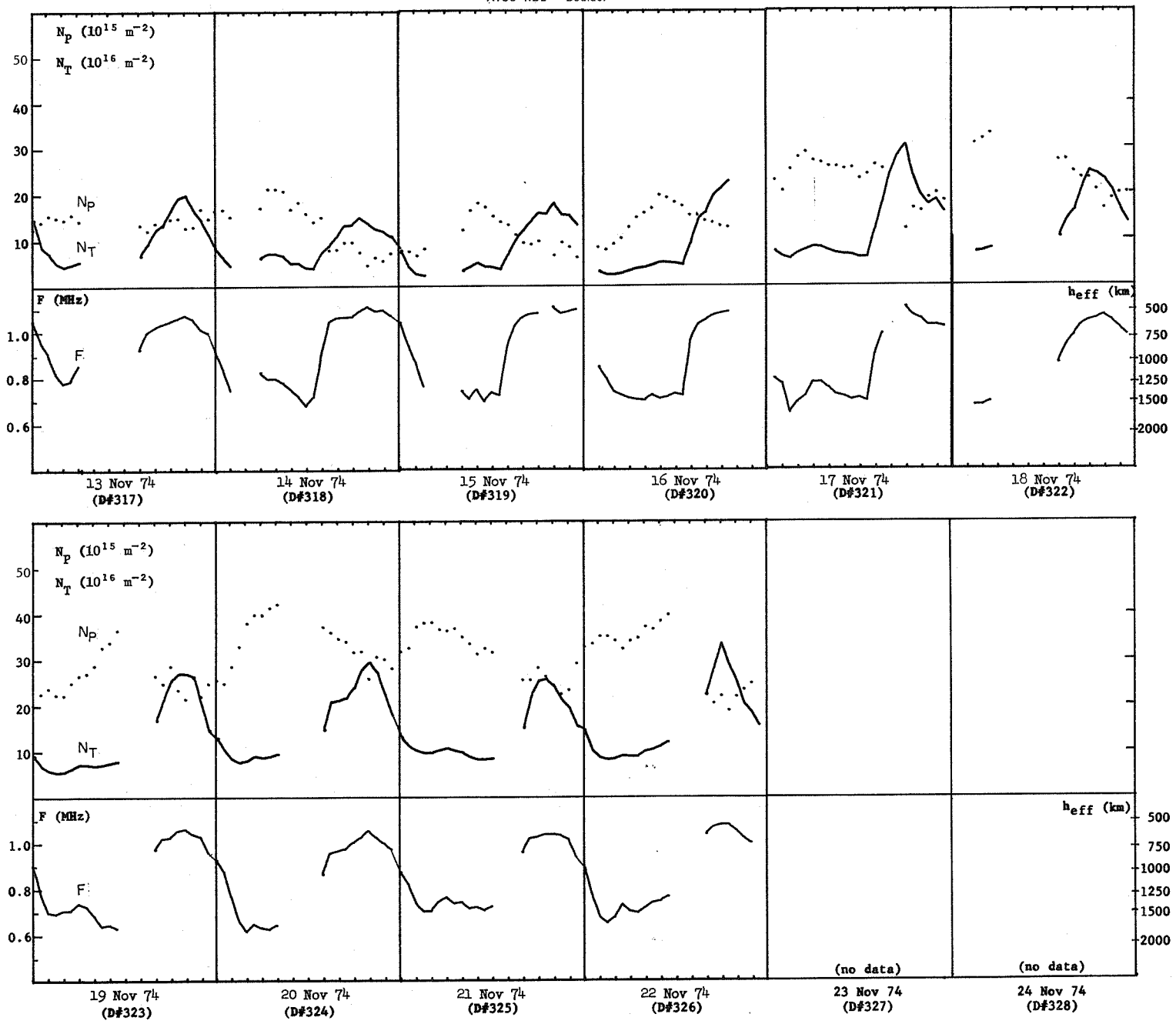
| 1 | .936 | 1340 | 249 | .831 | 1232 | 342 | | | | | | .962 | 1086 | 178 | 1 |
| 2 | .878 | 1042 | 247 | .715 | 958 | 363 | | | | | | .949 | 861 | 150 | 2 |
| 3 | .773 | 836 | 274 | .660 | 841 | 358 | | | | | | .883 | 680 | 158 | 3 |
| 4 | .672 | 709 | 295 | .646 | 885 | 388 | | | | | | .791 | 528 | 165 | 4 |
| 5 | .658 | 699 | 299 | .647 | 900 | 394 | | | | | | .809 | 597 | 177 | 5 |
| 6 | .644 | 714 | 314 | .681 | 905 | 369 | | | | | | .816 | 631 | 183 | 6 |
| 7 | .648 | 738 | 322 | .674 | 890 | 368 | | | | | | .820 | 665 | 191 | 7 |
| 8 | .657 | 787 | 338 | .686 | 910 | 367 | | | | | | .820 | 645 | 185 | 8 |
| 9 | .657 | 812 | 348 | .699 | 919 | 361 | | | | | | .846 | 729 | 193 | 9 |
| 10 | .674 | 851 | 352 | .712 | 934 | 356 | | | | | | | 773 | | 10 |
| 11 | .672 | 875 | 364 | .723 | 954 | 354 | | | | | | | | | 11 |
| 12 | .679 | 851 | 349 | .729 | 890 | 326 | NO DATA | NO DATA | | | | | | | 12 |
| 13 | .712 | 851 | 324 | .754 | 895 | 308 | | | | | | | | | 13 |
| 14 | .914 | 1487 | 306 | .909 | 1369 | 287 | | | | | | | | | 14 |
| 15 | .998 | 1971 | 261 | .966 | 1731 | 277 | | | .985 | 1511 | 217 | | | | 15 |
| 16 | 1.009 | 2049 | 251 | .991 | 1888 | 261 | | | 1.004 | 1966 | 249 | 1.092 | 2269 | 115 | 16 |
| 17 | 1.032 | 2411 | 246 | 1.028 | 2313 | 246 | | | .991 | 2269 | 314 | 1.104 | 3237 | 128 | 17 |
| 18 | | 2807 | | | 2900 | | | | .994 | 2474 | 335 | 1.121 | 3438 | 85 | 18 |
| 19 | | 3457 | | | 3042 | | | | 1.020 | 2401 | 272 | 1.107 | 2905 | 108 | 19 |
| 20 | | 3731 | | | 3169 | | | | 1.022 | 2308 | 256 | 1.115 | 3369 | 101 | 20 |
| 21 | | 3516 | | | 3760 | | | | .979 | 1902 | 282 | 1.109 | 3115 | 112 | 21 |
| 22 | 1.055 | 2782 | 230 | | 4088 | | | | .958 | 1770 | 295 | 1.096 | 2611 | 123 | 22 |
| 23 | 1.010 | 2201 | 269 | | | | | | .992 | 1712 | 235 | 1.090 | 2249 | 117 | 23 |

Units of $N_T$ and $N_p$ are $10^{14}$ electrons-meter$^{-2}$.

ATS6 RBE - Boulder



| DATE | 317:74 | | | 318:74 | | | 319:74 | | | 320:74 | | | 321:74 | | | 322:74 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | 1.051 | 1487 | 128 | .923 | 822 | 162 | 1.040 | 787 | 75 | | | | | | | | | | 0 |
| 1 | .966 | 900 | 144 | .842 | 616 | 165 | .943 | 425 | 76 | | | | .793 | 734 | 228 | | | | 1 |
| 2 | .910 | 753 | 157 | .749 | 430 | 150 | .866 | 274 | 68 | .848 | 313 | 82 | .770 | 621 | 205 | | | | 2 |
| 3 | .825 | 543 | 153 | | | | .763 | 245 | 82 | .796 | 249 | 77 | .645 | 572 | 251 | .677 | 748 | 308 | 3 |
| 4 | .781 | 465 | 149 | | | | | | | .740 | 249 | 89 | .689 | 694 | 278 | .677 | 773 | 318 | 4 |
| 5 | .789 | 509 | 160 | | | | | | | .725 | 274 | 101 | .715 | 763 | 289 | .692 | 826 | 329 | 5 |
| 6 | .854 | 567 | 146 | .826 | 597 | 168 | | | | .711 | 328 | 125 | .775 | 831 | 271 | | | | 6 |
| 7 | | | | .800 | 689 | 210 | | | | .706 | 379 | 146 | .777 | 822 | 266 | | | | 7 |
| 8 | | | | .800 | 689 | 210 | .741 | 347 | 123 | .703 | 401 | 156 | .753 | 748 | 258 | | | | 8 |
| 9 | | | | .782 | 641 | 205 | .707 | 430 | 166 | .725 | 450 | 166 | .724 | 694 | 257 | | | | 9 |
| 10 | | | | .754 | 484 | 167 | .747 | 518 | 182 | .709 | 509 | 195 | .716 | 670 | 253 | | | | 10 |
| 11 | | | | .725 | 489 | 181 | .695 | 440 | 174 | .716 | 504 | 190 | .702 | 655 | 255 | | | | 11 |
| 12 | | | | .682 | 386 | 157 | .734 | 425 | 154 | .730 | 491 | 179 | .708 | 604 | 232 | | | | 12 |
| 13 | | | | .720 | 372 | 139 | .723 | 381 | 142 | .724 | 465 | 172 | .696 | 611 | 241 | | | | 13 |
| 14 | .926 | 709 | 138 | .905 | 694 | 148 | .928 | 699 | 135 | .961 | 924 | 152 | .899 | 1198 | 261 | .859 | 1076 | 272 | 14 |
| 15 | .999 | 954 | 125 | 1.046 | 851 | 77 | 1.021 | 1012 | 113 | 1.029 | 1443 | 151 | .987 | 1785 | 253 | .933 | 1445 | 273 | 15 |
| 16 | 1.021 | 1257 | 141 | 1.065 | 1056 | 78 | 1.059 | 1223 | 96 | 1.049 | 1594 | 140 | | 2440 | | .977 | 1643 | 247 | 16 |
| 17 | 1.036 | 1379 | 136 | 1.067 | 1301 | 93 | 1.075 | 1418 | 93 | 1.070 | 1951 | 136 | | 2824 | | 1.024 | 2132 | 234 | 17 |
| 18 | 1.048 | 1687 | 150 | 1.068 | 1320 | 94 | 1.079 | 1604 | 99 | 1.080 | 2108 | 128 | 1.103 | 3037 | 123 | 1.043 | 2499 | 232 | 18 |
| 19 | 1.061 | 1958 | 152 | 1.093 | 1472 | 72 | | 1589 | | 1.086 | 2269 | 126 | 1.068 | 2355 | 167 | 1.052 | 2435 | 207 | 19 |
| 20 | 1.075 | 2020 | 132 | 1.113 | 1364 | 44 | 1.106 | 1819 | 69 | | | | 1.054 | 1946 | 163 | 1.067 | 2323 | 167 | 20 |
| 21 | 1.060 | 1702 | 133 | 1.094 | 1232 | 60 | 1.080 | 1570 | 96 | | | | 1.025 | 1756 | 190 | 1.046 | 2081 | 188 | 21 |
| 22 | 1.016 | 1482 | 172 | 1.098 | 1183 | 54 | 1.086 | 1555 | 87 | | | | 1.025 | 1848 | 200 | 1.015 | 1692 | 199 | 22 |
| 23 | 1.001 | 1169 | 152 | 1.075 | 1071 | 70 | 1.095 | 1355 | 64 | | | | 1.018 | 1609 | 185 | .984 | 1399 | 202 | 23 |

| DATE | 323:74 | | | 324:74 | | | 325:74 | | | 326:74 | | | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | | | HR |
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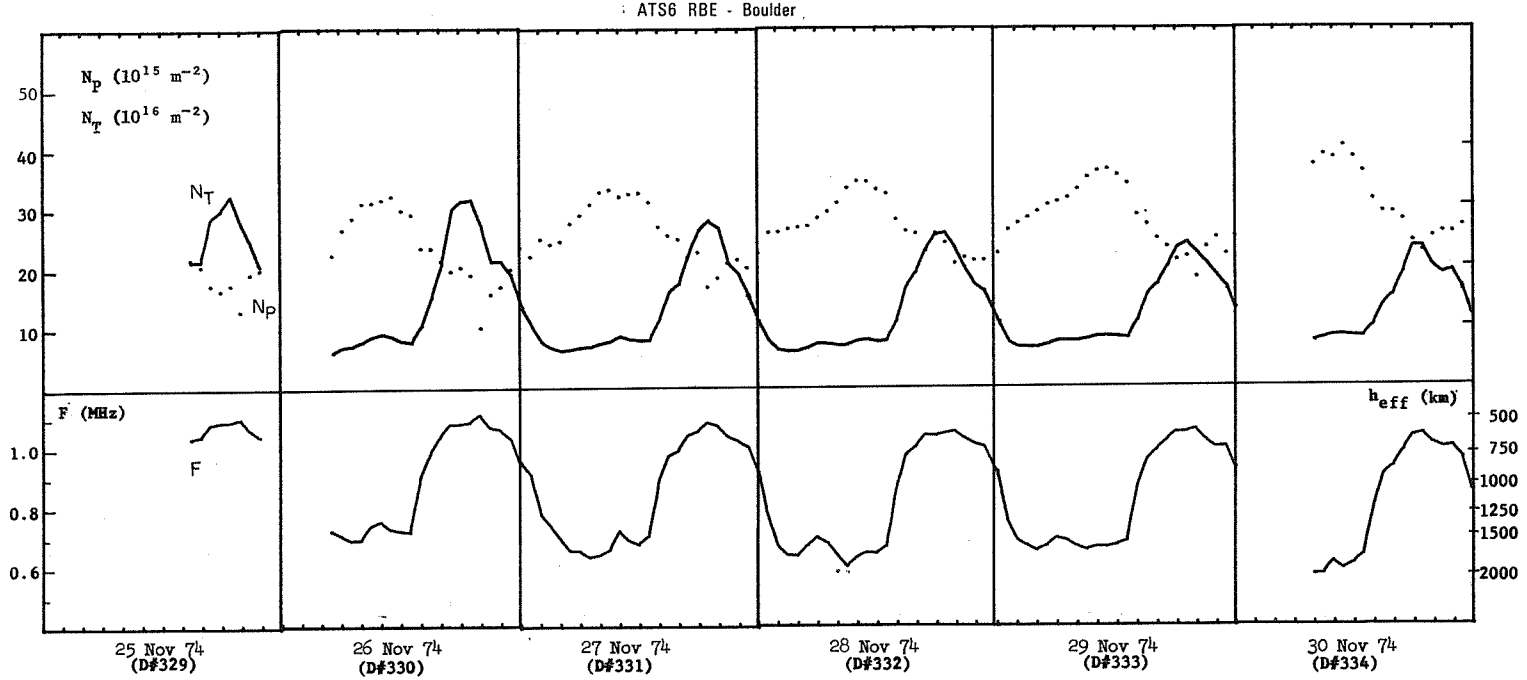
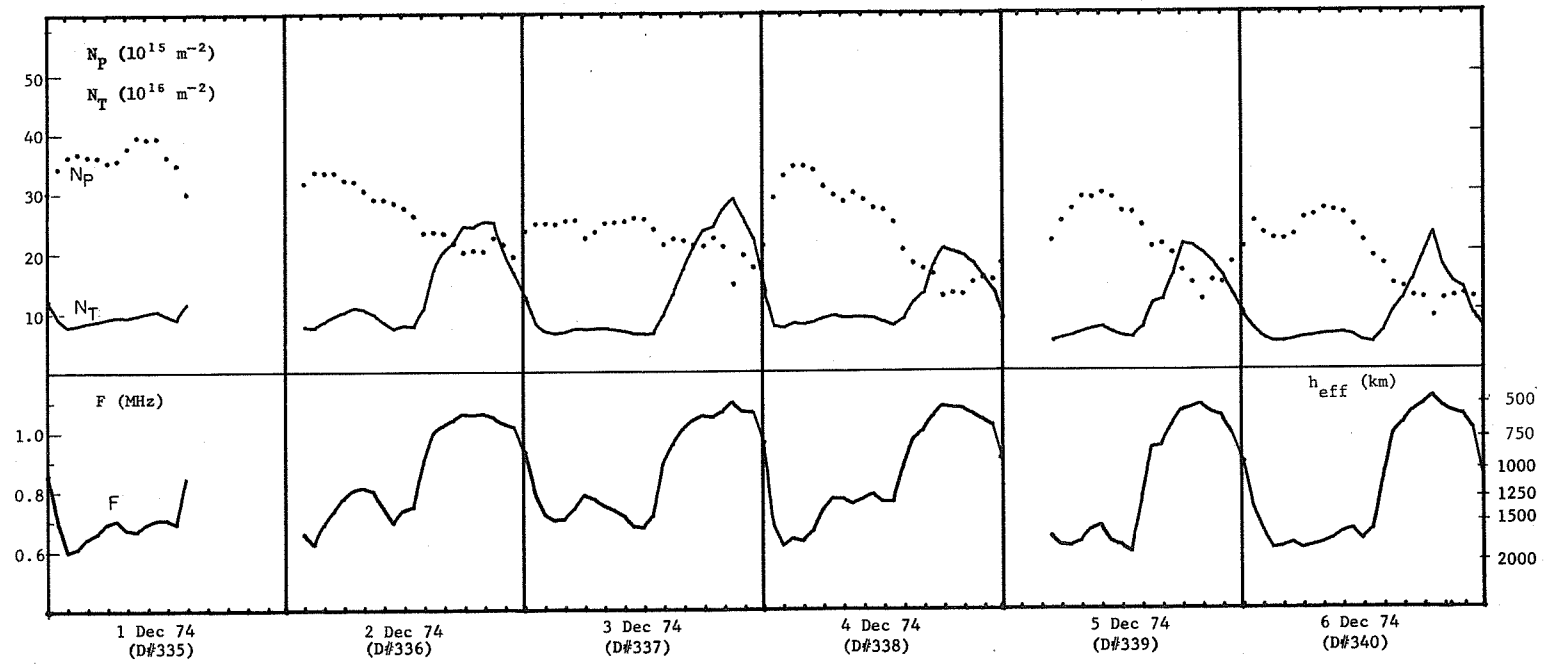
| 1 | .779 | 694 | 224 | .876 | 1037 | 247 | .816 | 1115 | 324 | .768 | 1002 | 333 | | | 1 |
| 2 | .696 | 597 | 235 | .764 | 846 | 284 | .734 | 1022 | 370 | .676 | 846 | 349 | | | 2 |
| 3 | .691 | 557 | 223 | .664 | 773 | 327 | .701 | 968 | 378 | .650 | 802 | 349 | | | 3 |
| 4 | .705 | 572 | 221 | .614 | 812 | 378 | .702 | 973 | 379 | .674 | 822 | 340 | | | 4 |
| 5 | .706 | 641 | 248 | .644 | 900 | 396 | .742 | 1027 | 364 | .727 | 875 | 322 | | | 5 |
| 6 | .734 | 729 | 263 | .630 | 875 | 396 | .761 | 1066 | 361 | .700 | 866 | 339 | | | 6 |
| 7 | .724 | 724 | 268 | .624 | 900 | 412 | .735 | 1012 | 365 | .694 | 870 | 345 | | | 7 |
| 8 | .684 | 704 | 286 | .641 | 949 | 420 | .739 | 973 | 347 | .715 | 978 | 370 | | | 8 |
| 9 | .637 | 729 | 325 | | | | .713 | 875 | 332 | .737 | 1017 | 365 | | | 9 |
| 10 | .643 | 763 | 336 | | | | .719 | 826 | 310 | .745 | 1086 | 382 | | | 10 |
| 11 | .629 | 802 | 363 | | | | .705 | 831 | 322 | .764 | 1178 | 396 | | | 11 |
| 12 | | | | | | | .721 | 841 | 314 | | | | NO DATA | NO DATA | 12 |
| 13 | | | | | | | | | | | | | | | 13 |
| 14 | | | | .861 | 1472 | 370 | | | | | | | | | 14 |
| 15 | | | | .952 | 2078 | 358 | | | | | | | | | 15 |
| 16 | .970 | 1692 | 264 | .963 | 2117 | 344 | .956 | 1511 | 254 | 1.034 | 2210 | 222 | | | 16 |
| 17 | 1.018 | 2147 | 247 | .971 | 2171 | 338 | 1.016 | 2186 | 254 | 1.066 | 2768 | 203 | | | 17 |
| 18 | 1.022 | 2560 | 284 | .999 | 2391 | 315 | 1.023 | 2533 | 281 | 1.075 | 3325 | 218 | | | 18 |
| 19 | 1.051 | 2704 | 233 | 1.020 | 2792 | 316 | 1.033 | 2572 | 261 | 1.075 | 2861 | 187 | | | 19 |
| 20 | 1.059 | 2704 | 214 | 1.050 | 2949 | 257 | 1.034 | 2411 | 243 | 1.051 | 2513 | 217 | | | 20 |
| 21 | 1.037 | 2650 | 260 | 1.022 | 2738 | 304 | 1.029 | 2127 | 224 | 1.018 | 2024 | 232 | | | 21 |
| 22 | 1.026 | 2034 | 219 | .997 | 2254 | 300 | 1.013 | 1946 | 231 | .996 | 1834 | 246 | | | 22 |
| 23 | .957 | 1467 | 246 | .971 | 1800 | 280 | .936 | 1555 | 290 | | 1550 | | | | 23 |

Units of $N_T$ and $N_p$ are $10^{14}$ electrons-meter$^{-2}$.

ATS6 RBE - Boulder



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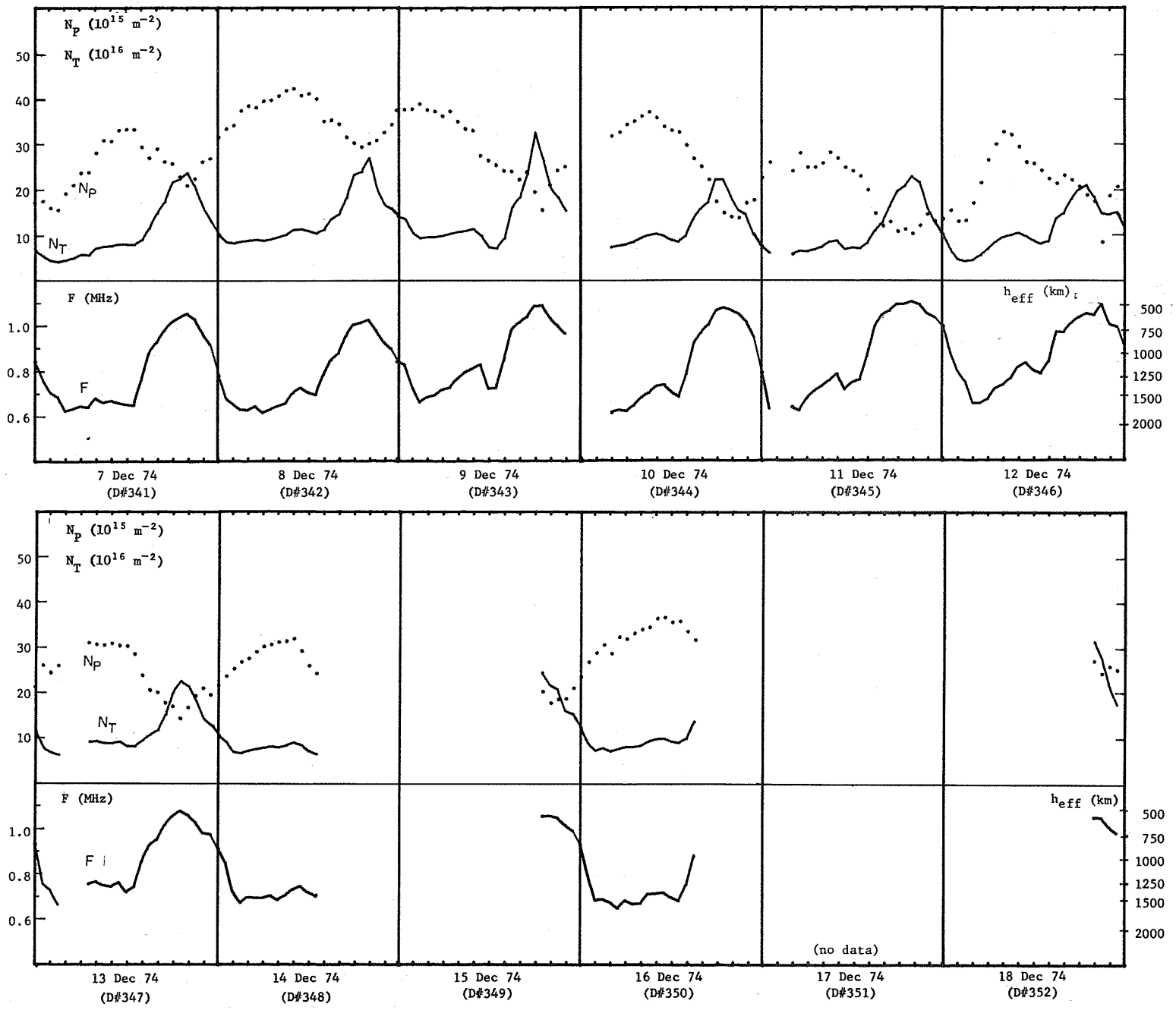
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | | | | | | | .952 | 1340 | 231 | .913 | 1081 | 222 | .914 | 1095 | 225 | .925 | 1262 | 246 | 0 |
| 1 | | | | | | | .911 | 1042 | 217 | .766 | 768 | 257 | .752 | 763 | 264 | | | | 1 |
| 2 | | | | | | | .781 | 763 | 245 | .667 | 611 | 257 | .686 | 680 | 274 | | | | 2 |
| 3 | | | | | | | .741 | 665 | 237 | .636 | 587 | 262 | .667 | 675 | 284 | | | | 3 |
| 4 | | | | | | | .696 | 611 | 241 | .634 | 592 | 266 | .651 | 677 | 294 | | | | 4 |
| 5 | | | | .720 | 597 | 223 | .655 | 631 | 271 | .666 | 636 | 267 | .665 | 724 | 305 | | | | 5 |
| 6 | | | | .705 | 685 | 265 | .654 | 660 | 285 | .695 | 709 | 281 | .691 | 778 | 310 | | | | 6 |
| 7 | | | | .689 | 709 | 284 | .634 | 675 | 303 | .677 | 709 | 291 | .684 | 782 | 317 | | | | 7 |
| 8 | | | | .690 | 773 | 309 | .640 | 729 | 323 | .637 | 685 | 306 | .665 | 785 | 331 | .569 | 724 | 366 | 8 |
| 9 | | | | .736 | 863 | 311 | .656 | 763 | 327 | .598 | 689 | 331 | .653 | 812 | 351 | .570 | 758 | 383 | 9 |
| 10 | | | | .751 | 910 | 316 | .722 | 851 | 317 | .627 | 753 | 342 | .663 | 856 | 362 | .610 | 807 | 379 | 10 |
| 11 | | | | .727 | 873 | 321 | .690 | 802 | 321 | .644 | 778 | 342 | .662 | 861 | 365 | .587 | 812 | 398 | 11 |
| 12 | | | | .720 | 797 | 298 | .676 | 782 | 322 | .641 | 743 | 329 | .669 | 851 | 356 | .603 | 797 | 379 | 12 |
| 13 | | | | .716 | 773 | 291 | .704 | 792 | 307 | .664 | 763 | 322 | .682 | 839 | 342 | .632 | 790 | 356 | 13 |
| 14 | | | | .893 | 1051 | 235 | .879 | 1130 | 266 | .850 | 1068 | 279 | .853 | 1120 | 290 | .783 | 968 | 309 | 14 |
| 15 | 1.033 | 2093 | 212 | .973 | 1521 | 234 | .968 | 1589 | 251 | .968 | 1643 | 259 | .949 | 1560 | 273 | .898 | 1315 | 288 | 15 |
| 16 | 1.040 | 2098 | 201 | 1.032 | 2078 | 213 | .987 | 1726 | 245 | .994 | 1888 | 255 | .983 | 1721 | 250 | .926 | 1477 | 287 | 16 |
| 17 | 1.080 | 2807 | 170 | 1.074 | 2978 | 197 | 1.039 | 2230 | 215 | 1.035 | 2269 | 226 | 1.016 | 2020 | 236 | .979 | 1844 | 275 | 17 |
| 18 | 1.087 | 2939 | 161 | 1.076 | 3130 | 202 | 1.052 | 2621 | 222 | 1.034 | 2523 | 255 | 1.045 | 2333 | 214 | 1.030 | 2289 | 239 | 18 |
| 19 | 1.089 | 3183 | 169 | 1.081 | 3149 | 190 | 1.081 | 2778 | 165 | 1.042 | 2557 | 240 | 1.046 | 2418 | 218 | 1.038 | 2289 | 223 | 19 |
| 20 | 1.097 | 2758 | 127 | 1.107 | 2709 | 102 | 1.072 | 2665 | 180 | 1.048 | 2308 | 205 | 1.056 | 2254 | 185 | 1.006 | 1976 | 247 | 20 |
| 21 | 1.061 | 2421 | 187 | 1.064 | 2117 | 157 | 1.037 | 2078 | 205 | 1.026 | 1980 | 214 | 1.020 | 2078 | 235 | .992 | 1844 | 254 | 21 |
| 22 | 1.039 | 2010 | 194 | 1.058 | 2122 | 169 | 1.022 | 1897 | 211 | 1.008 | 1707 | 210 | .996 | 1878 | 251 | .996 | 1892 | 253 | 22 |
| 23 | | | | 1.030 | 1907 | 199 | 1.004 | 1555 | 198 | .998 | 1594 | 211 | .997 | 1687 | 224 | .959 | 1594 | 265 | 23 |

| DATE | 335:74 | | | 336:74 | | | 337:74 | | | 338:74 | | | 339:74 | | | 340:74 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | .857 | 1178 | 301 | | | | .931 | 1232 | 235 | .960 | 1271 | 210 | .908 | 851 | 179 | .888 | 900 | 205 | 0 |
| 1 | .702 | 880 | 343 | | | | .796 | 802 | 247 | .689 | 724 | 290 | | | | .735 | 689 | 249 | 1 |
| 2 | .598 | 753 | 362 | .655 | 734 | 316 | .718 | 660 | 248 | .612 | 699 | 327 | | | | .659 | 538 | 229 | 2 |
| 3 | .607 | 778 | 367 | .620 | 729 | 336 | .700 | 631 | 247 | .636 | 768 | 343 | | | | .600 | 460 | 220 | 3 |
| 4 | .641 | 822 | 363 | .684 | 826 | 335 | .704 | 650 | 252 | .628 | 758 | 344 | | | | .604 | 460 | 218 | 4 |
| 5 | .659 | 846 | 361 | .729 | 914 | 335 | .737 | 704 | 253 | .660 | 792 | 338 | .642 | 489 | 216 | .615 | 484 | 225 | 5 |
| 6 | .692 | 885 | 353 | .773 | 983 | 322 | .783 | 699 | 223 | .731 | 851 | 310 | .612 | 533 | 249 | .599 | 528 | 253 | 6 |
| 7 | .703 | 914 | 356 | .802 | 1056 | 320 | .772 | 709 | 233 | .770 | 895 | 296 | .609 | 572 | 269 | .607 | 548 | 259 | 7 |
| 8 | .672 | 905 | 376 | .809 | 1027 | 304 | .749 | 709 | 247 | .770 | 861 | 284 | .623 | 631 | 289 | .615 | 577 | 269 | 8 |
| 9 | .667 | 939 | 394 | .799 | 949 | 289 | .735 | 689 | 249 | .754 | 866 | 298 | .662 | 680 | 288 | .629 | 587 | 266 | 9 |
| 10 | .691 | 983 | 392 | .745 | 822 | 289 | .716 | 665 | 251 | .768 | 866 | 287 | .677 | 719 | 296 | .652 | 606 | 263 | 10 |
| 11 | .705 | 1017 | 393 | .693 | 714 | 284 | .680 | 626 | 256 | .784 | 861 | 274 | .623 | 631 | 289 | .662 | 572 | 243 | 11 |
| 12 | .706 | 939 | 363 | .733 | 758 | 275 | .674 | 616 | 255 | .760 | 797 | 270 | .611 | 567 | 266 | .628 | 474 | 215 | 12 |
| 13 | .692 | 875 | 348 | .744 | 743 | 262 | .712 | 626 | 238 | .760 | 738 | 250 | .590 | 543 | 264 | .660 | 445 | 189 | 13 |
| 14 | .842 | 1120 | 300 | .890 | 1032 | 233 | .886 | 924 | 212 | .870 | 836 | 203 | .754 | 704 | 242 | .826 | 626 | 176 | 14 |
| 15 | | | | .991 | 1692 | 234 | .950 | 1271 | 221 | .965 | 1120 | 180 | .937 | 1110 | 206 | .979 | 958 | 142 | 15 |
| 16 | | | | 1.016 | 1995 | 233 | 1.002 | 1692 | 218 | .995 | 1271 | 172 | .943 | 1169 | 210 | 1.015 | 1169 | 138 | 16 |
| 17 | | | | 1.034 | 2137 | 216 | 1.031 | 2044 | 211 | 1.043 | 1751 | 163 | 1.009 | 1589 | 195 | 1.055 | 1487 | 122 | 17 |
| 18 | | | | 1.054 | 2411 | 201 | 1.047 | 2347 | 209 | 1.079 | 2020 | 125 | 1.059 | 2103 | 166 | 1.077 | 1888 | 120 | 18 |
| 19 | | | | 1.053 | 2406 | 203 | 1.044 | 2406 | 222 | 1.074 | 1966 | 129 | 1.069 | 2073 | 145 | 1.105 | 2274 | 88 | 19 |
| 20 | | | | 1.057 | 2499 | 202 | 1.061 | 2699 | 209 | 1.073 | 1912 | 128 | 1.081 | 1956 | 118 | 1.072 | 1726 | 117 | 20 |
| 21 | | | | 1.046 | 2489 | 224 | 1.092 | 2875 | 145 | 1.055 | 1785 | 147 | 1.055 | 1795 | 148 | 1.054 | 1457 | 121 | 21 |
| 22 | | | | 1.026 | 1985 | 214 | 1.063 | 2562 | 194 | 1.036 | 1565 | 155 | 1.044 | 1575 | 145 | 1.044 | 1364 | 125 | 22 |
| 23 | | | | 1.014 | 1633 | 193 | 1.061 | 2240 | 174 | 1.017 | 1325 | 153 | .987 | 1267 | 179 | 1.000 | 924 | 120 | 23 |

Units of $N_T$ and $N_p$ are $10^{14}$ electrons-meter$^{-2}$.

ATS6 RBE - Boulder



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| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | .839 | 621 | 168 | .776 | 963 | 313 | .838 | 1374 | 373 | | | | .789 | 709 | 223 | .991 | 963 | 133 | 0 |
| 1 | .761 | 509 | 172 | .679 | 812 | 332 | .826 | 1330 | 375 | | | | .629 | 567 | 257 | .874 | 631 | 151 | 1 |
| 2 | .704 | 406 | 157 | .650 | 782 | 340 | .725 | 1017 | 376 | | | | | | | .789 | 406 | 127 | 2 |
| 3 | .684 | 377 | 153 | .625 | 817 | 372 | .659 | 905 | 386 | | | | | | | .746 | 367 | 129 | 3 |
| 4 | .622 | 411 | 189 | .623 | 836 | 383 | .681 | 919 | 375 | .613 | 675 | 315 | .635 | 533 | 239 | .651 | 386 | 168 | 4 |
| 5 | .628 | 455 | 206 | .640 | 856 | 380 | .689 | 924 | 371 | .622 | 704 | 323 | .620 | 601 | 277 | .651 | 489 | 212 | 5 |
| 6 | .641 | 528 | 234 | .612 | 841 | 393 | .714 | 949 | 360 | .616 | 734 | 340 | .671 | 592 | 246 | .667 | 626 | 263 | 6 |
| 7 | .637 | 528 | 236 | .626 | 870 | 396 | .723 | 998 | 370 | .641 | 787 | 348 | .705 | 636 | 246 | .716 | 787 | 297 | 7 |
| 8 | .676 | 675 | 278 | .641 | 914 | 405 | .762 | 1032 | 348 | .675 | 870 | 359 | .726 | 689 | 254 | .731 | 890 | 324 | 8 |
| 9 | .659 | 714 | 305 | .652 | 963 | 417 | .789 | 1056 | 332 | .697 | 934 | 368 | .751 | 802 | 278 | .760 | 939 | 318 | 9 |
| 10 | .667 | 724 | 304 | .699 | 1076 | 422 | .807 | 1100 | 328 | .726 | 968 | 357 | .780 | 826 | 266 | .811 | 988 | 292 | 10 |
| 11 | .656 | 763 | 327 | .721 | 1090 | 407 | .823 | 958 | 273 | .733 | 929 | 337 | .713 | 645 | 245 | .829 | 924 | 258 | 11 |
| 12 | .650 | 758 | 330 | .702 | 1051 | 410 | .719 | 699 | 262 | .701 | 841 | 328 | .741 | 670 | 238 | .797 | 831 | 255 | 12 |
| 13 | .646 | 753 | 330 | .692 | 1002 | 400 | .721 | 675 | 252 | .682 | 797 | 325 | .755 | 660 | 227 | .783 | 753 | 240 | 13 |
| 14 | .758 | 856 | 292 | .776 | 1076 | 350 | .840 | 890 | 240 | .780 | 919 | 295 | .858 | 773 | 196 | .832 | 802 | 222 | 14 |
| 15 | .874 | 1115 | 267 | .841 | 1311 | 352 | .975 | 1565 | 238 | .913 | 1286 | 266 | .989 | 1037 | 145 | .964 | 1306 | 211 | 15 |
| 16 | .921 | 1438 | 287 | .871 | 1413 | 343 | 1.008 | 1785 | 220 | .961 | 1516 | 249 | 1.040 | 1223 | 117 | .964 | 1413 | 229 | 16 |
| 17 | .973 | 1687 | 259 | .947 | 1775 | 314 | 1.032 | 2303 | 236 | .997 | 1653 | 220 | 1.059 | 1579 | 125 | 1.004 | 1726 | 219 | 17 |
| 18 | 1.012 | 2117 | 254 | .999 | 2284 | 301 | 1.081 | 3208 | 192 | 1.059 | 2161 | 171 | 1.087 | 1902 | 104 | 1.029 | 1936 | 204 | 18 |
| 19 | 1.032 | 2191 | 226 | 1.007 | 2347 | 292 | 1.084 | 2655 | 152 | 1.072 | 2166 | 146 | 1.088 | 2020 | 109 | 1.045 | 2034 | 185 | 19 |
| 20 | 1.048 | 2323 | 206 | 1.020 | 2650 | 299 | 1.031 | 2005 | 207 | 1.063 | 1814 | 138 | 1.099 | 2240 | 100 | 1.040 | 1790 | 172 | 20 |
| 21 | 1.025 | 2020 | 220 | .975 | 2005 | 306 | .997 | 1800 | 240 | 1.046 | 1501 | 135 | 1.087 | 2117 | 117 | 1.084 | 1423 | 82 | 21 |
| 22 | .964 | 1594 | 258 | .923 | 1638 | 323 | .961 | 1506 | 248 | 1.012 | 1403 | 168 | 1.048 | 1594 | 142 | .999 | 1394 | 183 | 22 |
| 23 | .914 | 1291 | 265 | .895 | 1540 | 342 | | | | .945 | 978 | 174 | 1.032 | 1247 | 128 | .989 | 1447 | 203 | 23 |

| DATE | 347:74 | | | 348:74 | | | 349:74 | | | 350:74 | | | | 352:74 | | | DATE |
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| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | | F140 | NT | NP | HR |
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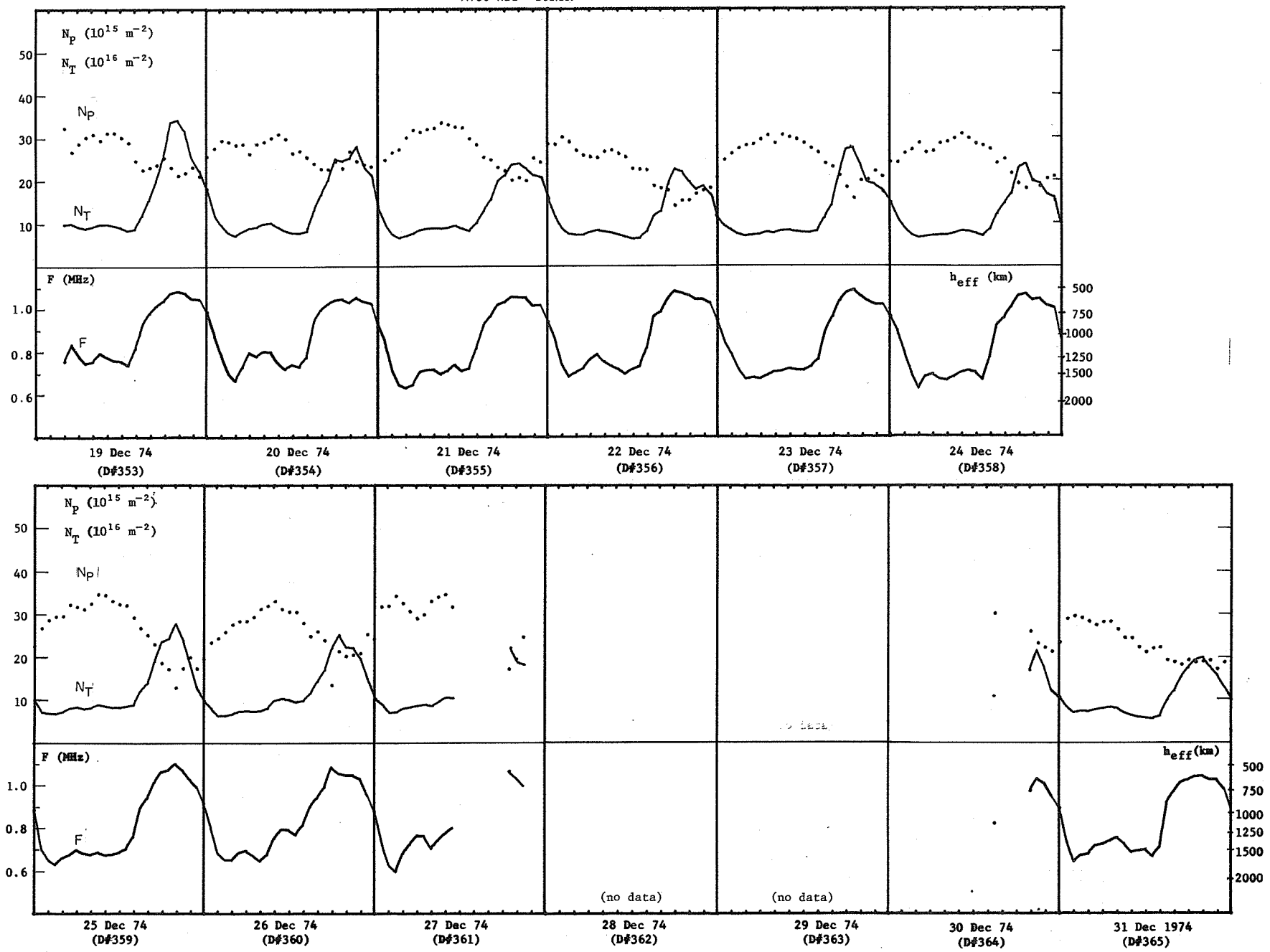
| 1 | .757 | 763 | 261 | .847 | 895 | 236 | | | | .799 | 875 | 267 | | | | | 1 |
| 2 | .728 | 665 | 244 | .717 | 670 | 252 | | | | .683 | 709 | 288 | | | | | 2 |
| 3 | .663 | 611 | 259 | .671 | 641 | 267 | | | | .687 | 758 | 305 | | | | | 3 |
| 4 | | | | .695 | 694 | 275 | | | | .674 | 694 | 287 | | | | | 4 |
| 5 | | | | .693 | 729 | 290 | | | | .648 | 738 | 322 | | | | | 5 |
| 6 | | | | .693 | 758 | 301 | | | | .681 | 782 | 319 | | | | | 6 |
| 7 | .755 | 900 | 309 | .703 | 787 | 306 | | | | .667 | 787 | 331 | | | | | 7 |
| 8 | .765 | 914 | 306 | .684 | 768 | 311 | | | | .669 | 812 | 339 | | | | | 8 |
| 9 | .747 | 870 | 305 | .703 | 807 | 313 | | | | .710 | 900 | 345 | | | | | 9 |
| 10 | .743 | 870 | 308 | .729 | 870 | 319 | | | | .713 | 958 | 364 | | | | | 10 |
| 11 | .761 | 900 | 304 | .743 | 826 | 292 | | | | .717 | 973 | 367 | | | | | 11 |
| 12 | .718 | 807 | 303 | .717 | 689 | 259 | | | | .697 | 905 | 357 | NO DATA | | | | 12 |
| 13 | .741 | 802 | 286 | .702 | 623 | 243 | | | | .682 | 880 | 358 | | | | | 13 |
| 14 | .853 | 924 | 239 | | | | | | | .752 | 973 | 337 | | | | | 14 |
| 15 | .925 | 1051 | 205 | | | | | | | .879 | 1345 | 317 | | | | | 15 |
| 16 | .950 | 1154 | 201 | | | | | | | | | | | | | | 16 |
| 17 | 1.014 | 1501 | 178 | | | | | | | | | | | | | | 17 |
| 18 | 1.052 | 1985 | 170 | | | | | | | | | | | | | | 18 |
| 19 | 1.077 | 2235 | 143 | | | | 1.054 | 2416 | 202 | | | | | | | | 19 |
| 20 | 1.060 | 2132 | 167 | | | | 1.055 | 2147 | 178 | | | | | 1.050 | 3110 | 271 | 20 |
| 21 | 1.028 | 1804 | 192 | | | | 1.047 | 2059 | 185 | | | | | 1.047 | 2729 | 243 | 21 |
| 22 | .980 | 1413 | 209 | | | | 1.015 | 1584 | 187 | | | | | 1.009 | 2108 | 259 | 22 |
| 23 | .975 | 1281 | 195 | | | | .991 | 1516 | 210 | | | | | .982 | 1724 | 252 | 23 |

Units of $N_T$ and $N_p$ are $10^{14}$ electrons-meter$^{-2}$.

ATS6 RBE - Boulder



| DATE | 353:74 | | | 354:74 | | | 355:74 | | | 356:74 | | | 357:74 | | | 358:74 | | | DATE |
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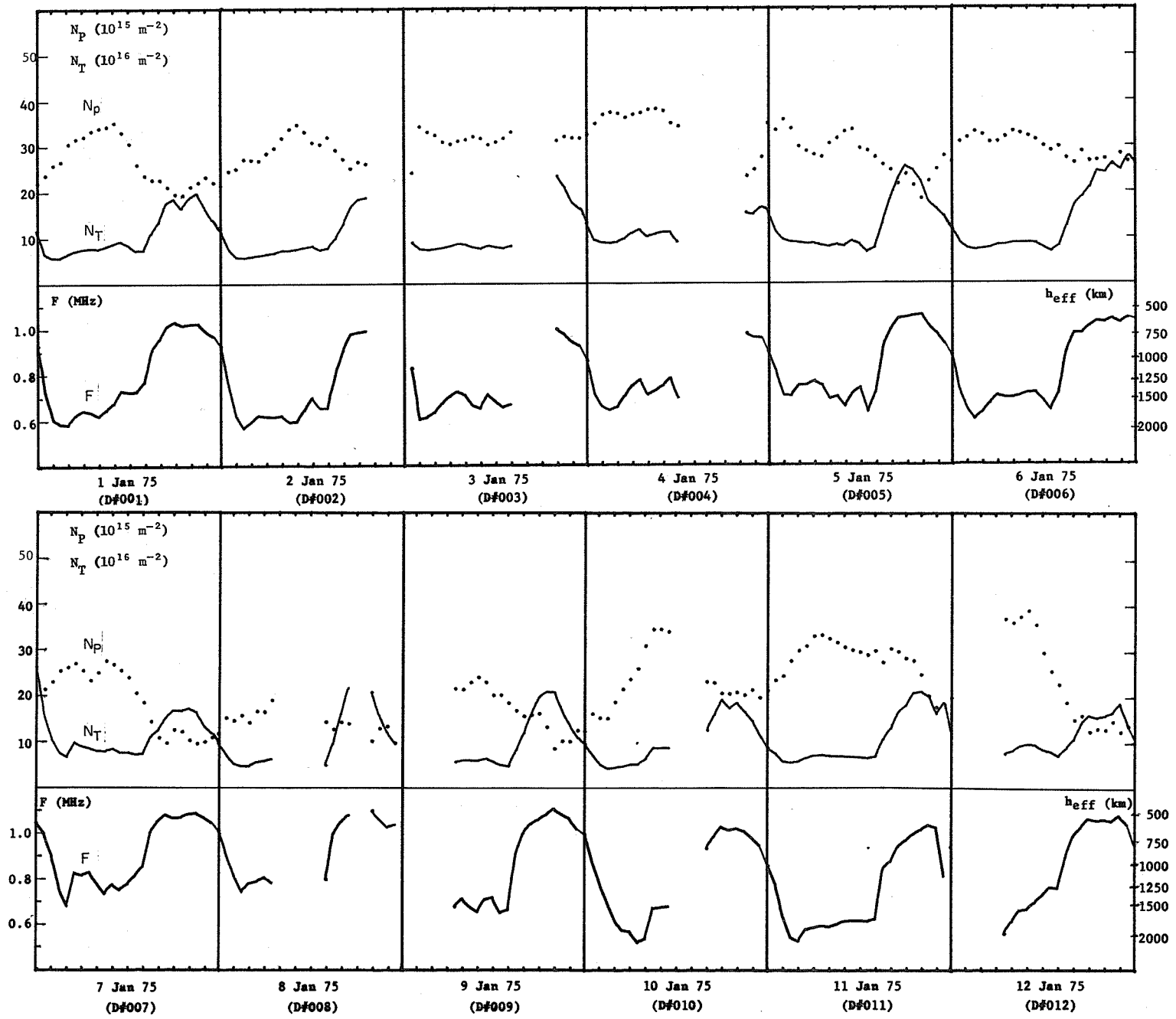
| 1 | | | | .880 | 1159 | 272 | .850 | 944 | 246 | .860 | 1120 | 283 | .846 | 929 | 245 | .893 | 1071 | 239 | 1 |
| 2 | | | | .785 | 914 | 290 | .719 | 699 | 262 | .736 | 831 | 299 | .784 | 817 | 260 | .790 | 831 | 260 | 2 |
| 3 | | | | .699 | 734 | 288 | .643 | 611 | 269 | .679 | 704 | 288 | .713 | 714 | 272 | .694 | 675 | 268 | 3 |
| 4 | .756 | 941 | 323 | .664 | 665 | 281 | .628 | 655 | 297 | .699 | 685 | 269 | .667 | 665 | 279 | .622 | 616 | 283 | 4 |
| 5 | .831 | 963 | 267 | .725 | 763 | 282 | .640 | 709 | 314 | .716 | 680 | 257 | .674 | 680 | 281 | .676 | 636 | 262 | 5 |
| 6 | .781 | 890 | 285 | .793 | 836 | 260 | .702 | 797 | 311 | .758 | 743 | 253 | .670 | 699 | 292 | .687 | 655 | 264 | 6 |
| 7 | .743 | 851 | 301 | .778 | 870 | 282 | .712 | 831 | 317 | .783 | 787 | 251 | .685 | 748 | 302 | .666 | 670 | 282 | 7 |
| 8 | .751 | 885 | 307 | .799 | 939 | 287 | .713 | 841 | 319 | .749 | 758 | 264 | .701 | 729 | 284 | .660 | 670 | 286 | 8 |
| 9 | .790 | 939 | 294 | .797 | 963 | 295 | .693 | 836 | 332 | .730 | 734 | 268 | .705 | 782 | 303 | .675 | 709 | 293 | 9 |
| 10 | .773 | 949 | 311 | .747 | 870 | 305 | .708 | 856 | 329 | .714 | 689 | 261 | .716 | 792 | 299 | .694 | 768 | 304 | 10 |
| 11 | .758 | 914 | 312 | .718 | 782 | 294 | .737 | 900 | 323 | .692 | 636 | 253 | .710 | 768 | 294 | .703 | 758 | 294 | 11 |
| 12 | .755 | 875 | 301 | .737 | 729 | 262 | .708 | 836 | 322 | .713 | 592 | 225 | .709 | 743 | 285 | .696 | 714 | 282 | 12 |
| 13 | .735 | 802 | 289 | .728 | 724 | 265 | .718 | 787 | 296 | .725 | 606 | 224 | .725 | 738 | 273 | .662 | 655 | 278 | 13 |
| 14 | .809 | 831 | 246 | .771 | 763 | 252 | .810 | 954 | 282 | .810 | 753 | 223 | .758 | 773 | 263 | .763 | 802 | 270 | 14 |
| 15 | .923 | 1139 | 225 | .933 | 1252 | 237 | .915 | 1232 | 252 | .959 | 1120 | 186 | .894 | 1066 | 238 | .913 | 1154 | 238 | 15 |
| 16 | .975 | 1511 | 230 | .991 | 1619 | 224 | .960 | 1496 | 247 | .981 | 1227 | 180 | .957 | 1364 | 229 | .948 | 1399 | 246 | 16 |
| 17 | 1.010 | 1936 | 236 | 1.019 | 1956 | 223 | 1.014 | 1936 | 229 | 1.041 | 1848 | 176 | 1.032 | 2039 | 210 | 1.000 | 1628 | 213 | 17 |
| 18 | 1.033 | 2474 | 252 | 1.037 | 2450 | 241 | 1.027 | 2064 | 220 | 1.078 | 2210 | 139 | 1.072 | 2670 | 181 | 1.052 | 2225 | 189 | 18 |
| 19 | 1.070 | 3325 | 230 | 1.042 | 2406 | 226 | 1.052 | 2323 | 199 | 1.070 | 2156 | 151 | 1.084 | 2719 | 156 | 1.062 | 2323 | 178 | 19 |
| 20 | 1.078 | 3379 | 212 | 1.027 | 2469 | 265 | 1.050 | 2352 | 204 | 1.059 | 1927 | 152 | 1.054 | 2347 | 197 | 1.034 | 1936 | 195 | 20 |
| 21 | 1.070 | 3125 | 217 | 1.048 | 2743 | 242 | 1.048 | 2235 | 197 | 1.040 | 1746 | 167 | 1.031 | 1917 | 198 | 1.038 | 1878 | 182 | 21 |
| 22 | 1.044 | 2484 | 230 | 1.032 | 2279 | 234 | 1.012 | 2083 | 250 | 1.040 | 1819 | 175 | 1.016 | 1868 | 218 | 1.008 | 1619 | 200 | 22 |
| 23 | 1.041 | 2210 | 210 | 1.024 | 2093 | 230 | 1.014 | 2039 | 241 | 1.023 | 1638 | 181 | 1.015 | 1756 | 206 | .998 | 1555 | 205 | 23 |

| DATE | 359:74 | | | 360:74 | | | 361:74 | | | | | 364:74 | | | 365:74 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | | | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | .882 | 958 | 223 | .913 | 939 | 193 | .877 | 1012 | 240 | | | | | | .888 | 1022 | 232 | 0 |
| 1 | .701 | 680 | 266 | .803 | 768 | 232 | .737 | 880 | 316 | | | | | | .735 | 797 | 288 | 1 |
| 2 | .648 | 650 | 284 | .682 | 592 | 241 | .625 | 694 | 317 | | | | | | .639 | 660 | 294 | 2 |
| 3 | .626 | 641 | 292 | .649 | 587 | 255 | .593 | 704 | 341 | | | | | | .668 | 694 | 291 | 3 |
| 4 | .657 | 685 | 293 | .648 | 626 | 273 | .678 | 792 | 325 | | | | | | .675 | 685 | 283 | 4 |
| 5 | .671 | 768 | 320 | .682 | 689 | 281 | .720 | 817 | 305 | | | | | | .714 | 724 | 274 | 5 |
| 6 | .694 | 797 | 316 | .691 | 704 | 281 | .760 | 851 | 289 | | | | | | .721 | 753 | 281 | 6 |
| 7 | .679 | 758 | 310 | .668 | 694 | 291 | .760 | 875 | 297 | | | | | | .736 | 782 | 282 | 7 |
| 8 | .673 | 778 | 323 | .645 | 704 | 309 | .702 | 846 | 330 | | | | | | .752 | 763 | 264 | 8 |
| 9 | .684 | 851 | 345 | .672 | 763 | 317 | .739 | 949 | 339 | | | | | | .725 | 660 | 244 | 9 |
| 10 | .672 | 826 | 343 | .750 | 944 | 329 | .771 | 1046 | 345 | | | | | | .684 | 601 | 244 | 10 |
| 11 | .674 | 797 | 330 | .790 | 993 | 311 | .798 | 1032 | 316 | | | | | | .691 | 557 | 223 | 11 |
| 12 | .683 | 792 | 322 | .789 | 968 | 304 | | | | NO DATA | NO DATA | | | | .696 | 533 | 210 | 12 |
| 13 | .700 | 817 | 320 | .767 | 910 | 303 | | | | | | | | | .665 | 518 | 219 | 13 |
| 14 | .755 | 846 | 291 | .810 | 939 | 278 | | | | | | | | | .705 | 572 | 221 | 14 |
| 15 | .889 | 1174 | 266 | .895 | 1110 | 246 | | | | | | .819 | 1042 | 300 | .914 | 934 | 192 | 15 |
| 16 | .936 | 1345 | 250 | .937 | 1389 | 257 | | | | | | | | | .965 | 1164 | 187 | 16 |
| 17 | 1.009 | 1868 | 229 | .985 | 1653 | 238 | | | | | | | | | 1.009 | 1484 | 182 | 17 |
| 18 | 1.059 | 2323 | 185 | 1.079 | 2161 | 133 | | | | | | | | | 1.021 | 1702 | 191 | 18 |
| 19 | 1.068 | 2391 | 170 | 1.052 | 2474 | 211 | 1.061 | 2205 | 171 | | | | | | 1.036 | 1888 | 187 | 19 |
| 20 | 1.096 | 2743 | 128 | 1.045 | 2191 | 201 | 1.031 | 1873 | 193 | | | .969 | 1648 | 259 | 1.039 | 1951 | 189 | 20 |
| 21 | 1.067 | 2377 | 172 | 1.043 | 2171 | 202 | .995 | 1819 | 245 | | | 1.024 | 2108 | 230 | 1.023 | 1731 | 191 | 21 |
| 22 | 1.023 | 1785 | 197 | 1.027 | 1932 | 206 | | | | | | 1.005 | 1751 | 221 | 1.023 | 1555 | 171 | 22 |
| 23 | .988 | 1223 | 172 | .951 | 1457 | 252 | | | | | | .946 | 1193 | 211 | .980 | 1262 | 186 | 23 |

Units of $N_T$ and $N_p$ are $10^{14}$ electrons-meter$^{-2}$.

ATS6 RBE - Boulder

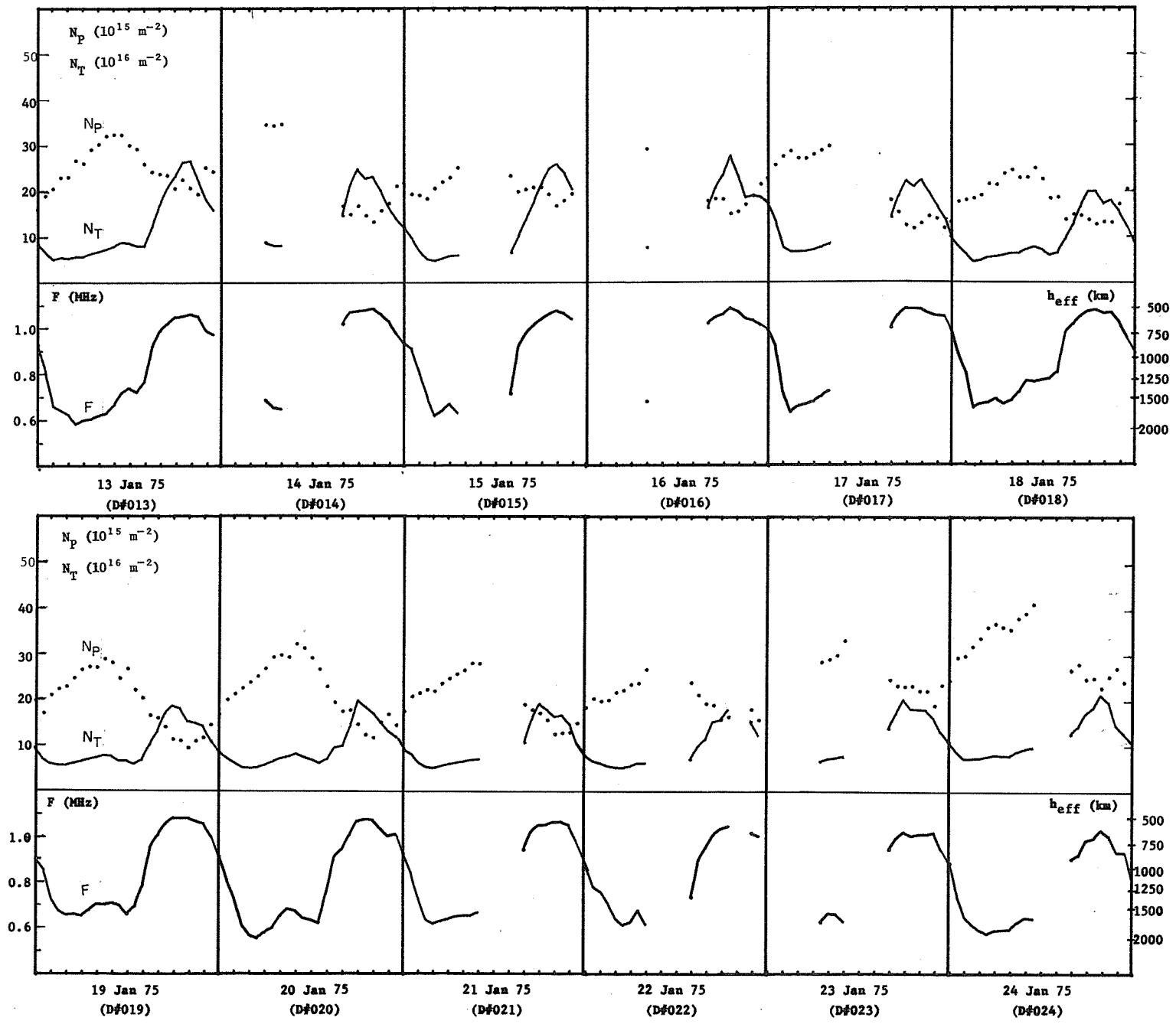


| DATE | 1:75 | | | 2:75 | | | 3:75 | | | 4:75 | | | 5:75 | | | 6:75 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | .929 | 1134 | 218 | .923 | 1076 | 212 | 0.000 | 0 | 0 | .858 | 1267 | 322 | .894 | 1550 | 345 | .878 | 1110 | 262 | 0 |
| 1 | .724 | 636 | 236 | .755 | 709 | 244 | .827 | 851 | 239 | .710 | 905 | 346 | .809 | 1115 | 331 | .727 | 831 | 306 | 1 |
| 2 | .605 | 543 | 257 | .618 | 538 | 249 | .602 | 714 | 340 | .655 | 851 | 366 | .704 | 910 | 353 | .640 | 709 | 314 | 2 |
| 3 | .584 | 538 | 265 | .564 | 528 | 269 | .609 | 699 | 329 | .640 | 836 | 371 | .701 | 856 | 334 | .596 | 680 | 327 | 3 |
| 4 | .582 | 616 | 304 | .591 | 553 | 269 | .630 | 714 | 323 | .654 | 856 | 369 | .747 | 841 | 295 | .625 | 704 | 322 | 4 |
| 5 | .622 | 685 | 314 | .618 | 577 | 267 | .669 | 734 | 307 | .702 | 924 | 360 | .750 | 817 | 284 | .663 | 719 | 305 | 5 |
| 6 | .641 | 724 | 320 | .615 | 606 | 282 | .700 | 773 | 302 | .745 | 1042 | 367 | .765 | 826 | 277 | .699 | 778 | 305 | 6 |
| 7 | .635 | 743 | 333 | .614 | 631 | 294 | .721 | 826 | 308 | .771 | 1125 | 370 | .748 | 778 | 272 | .691 | 792 | 316 | 7 |
| 8 | .619 | 734 | 339 | .619 | 685 | 316 | .706 | 807 | 312 | .707 | 978 | 377 | .688 | 748 | 300 | .691 | 822 | 328 | 8 |
| 9 | .644 | 778 | 342 | .591 | 689 | 335 | .661 | 748 | 318 | .724 | 1022 | 379 | .699 | 792 | 311 | .699 | 826 | 324 | 9 |
| 10 | .673 | 846 | 351 | .593 | 714 | 346 | .650 | 724 | 315 | .745 | 1066 | 375 | .655 | 758 | 326 | .710 | 831 | 318 | 10 |
| 11 | .728 | 900 | 330 | .642 | 748 | 330 | .707 | 782 | 301 | .778 | 1076 | 348 | .713 | 870 | 331 | .712 | 817 | 311 | 11 |
| 12 | .723 | 822 | 305 | .696 | 778 | 307 | .680 | 748 | 306 | .695 | 861 | 341 | .736 | 807 | 290 | .677 | 719 | 296 | 12 |
| 13 | .725 | 704 | 260 | .652 | 699 | 303 | .654 | 729 | 314 | | | | .630 | 631 | 285 | .636 | 641 | 286 | 13 |
| 14 | .766 | 704 | 235 | .652 | 734 | 318 | .665 | 778 | 328 | | | | .716 | 719 | 271 | .707 | 763 | 294 | 14 |
| 15 | .905 | 1061 | 226 | .794 | 939 | 290 | | | | | | | .915 | 1247 | 255 | .890 | 1193 | 270 | 15 |
| 16 | .952 | 1306 | 225 | .901 | 1247 | 271 | | | | | | | .993 | 1780 | 243 | .970 | 1663 | 260 | 16 |
| 17 | 1.010 | 1726 | 210 | .973 | 1628 | 250 | | | | | | | 1.039 | 2196 | 213 | .971 | 1824 | 284 | 17 |
| 18 | 1.027 | 1819 | 194 | .981 | 1795 | 263 | | | | | | | 1.043 | 2499 | 232 | 1.001 | 2029 | 263 | 18 |
| 19 | 1.014 | 1623 | 192 | .987 | 1834 | 260 | | | | | | | 1.051 | 2416 | 209 | 1.023 | 2386 | 264 | 19 |
| 20 | 1.019 | 1839 | 210 | | | | .995 | 2298 | 310 | | | | 1.055 | 2181 | 180 | 1.020 | 2367 | 268 | 20 |
| 21 | 1.020 | 1941 | 219 | | | | .972 | 2054 | 318 | .972 | 1491 | 231 | 1.005 | 1736 | 218 | 1.034 | 2548 | 256 | 21 |
| 22 | .989 | 1648 | 231 | | | | .939 | 1716 | 315 | .957 | 1457 | 245 | .973 | 1589 | 244 | 1.018 | 2425 | 279 | 22 |
| 23 | .966 | 1374 | 220 | | | | .922 | 1589 | 315 | .954 | 1599 | 272 | .929 | 1423 | 274 | 1.038 | 2704 | 263 | 23 |

| DATE | 7:75 | | | 8:75 | | | 9:75 | | | 10:75 | | | 11:75 | | | 12:75 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | 1.043 | 2601 | 241 | 1.008 | 939 | 116 | | | | .996 | 910 | 122 | .858 | 831 | 211 | .939 | 1066 | 195 | 0 |
| 1 | .997 | 1604 | 213 | .904 | 704 | 151 | | | | .877 | 675 | 160 | .779 | 724 | 234 | | | | 1 |
| 2 | .900 | 1051 | 228 | .813 | 494 | 145 | | | | .782 | 474 | 152 | .635 | 543 | 243 | | | | 2 |
| 3 | .754 | 734 | 252 | .741 | 435 | 155 | | | | .696 | 381 | 151 | .542 | 523 | 276 | | | | 3 |
| 4 | .679 | 636 | 260 | .778 | 435 | 141 | | | | .617 | 401 | 186 | .528 | 553 | 299 | | | | 4 |
| 5 | .823 | 944 | 269 | .786 | 518 | 164 | | | | .572 | 425 | 214 | .578 | 621 | 309 | | | | 5 |
| 6 | .813 | 866 | 254 | .803 | 543 | 164 | | | | .567 | 465 | 235 | .586 | 675 | 331 | | | | 6 |
| 7 | .827 | 826 | 232 | .781 | 587 | 188 | .678 | 523 | 215 | .521 | 474 | 259 | .594 | 689 | 333 | .561 | 719 | 368 | 7 |
| 8 | .776 | 763 | 248 | | | | .709 | 557 | 214 | .534 | 577 | 309 | .590 | 670 | 326 | .610 | 768 | 361 | 8 |
| 9 | .732 | 753 | 274 | | | | .675 | 553 | 228 | .670 | 826 | 345 | .600 | 665 | 318 | .660 | 875 | 373 | 9 |
| 10 | .772 | 812 | 267 | | | | .654 | 557 | 240 | .674 | 836 | 346 | .614 | 660 | 308 | .666 | 919 | 387 | 10 |
| 11 | .748 | 729 | 254 | | | | .707 | 597 | 230 | .678 | 831 | 341 | .617 | 650 | 301 | .694 | 900 | 357 | 11 |
| 12 | .773 | 729 | 239 | | | | .715 | 533 | 202 | | | | .617 | 641 | 297 | .725 | 797 | 295 | 12 |
| 13 | .808 | 689 | 205 | | | | .650 | 465 | 202 | | | | .615 | 626 | 291 | .762 | 753 | 254 | 13 |
| 14 | .849 | 704 | 184 | .794 | 460 | 142 | .661 | 435 | 185 | | | | .625 | 655 | 299 | .758 | 660 | 225 | 14 |
| 15 | .995 | 1061 | 143 | .992 | 919 | 126 | .902 | 778 | 168 | | | | .843 | 1027 | 274 | .889 | 817 | 186 | 15 |
| 16 | 1.048 | 1213 | 108 | 1.046 | 1560 | 141 | .995 | 1159 | 156 | .932 | 1223 | 232 | .875 | 1271 | 304 | .982 | 1007 | 147 | 16 |
| 17 | 1.076 | 1487 | 96 | 1.075 | 2132 | 139 | 1.036 | 1594 | 158 | .981 | 1560 | 229 | .940 | 1628 | 298 | 1.019 | 1374 | 156 | 17 |
| 18 | 1.063 | 1643 | 124 | | | | 1.055 | 1946 | 161 | 1.024 | 1888 | 206 | .966 | 1765 | 283 | 1.059 | 1540 | 122 | 18 |
| 19 | 1.065 | 1638 | 121 | | | | 1.076 | 2059 | 132 | 1.012 | 1707 | 205 | .994 | 2044 | 278 | 1.053 | 1496 | 127 | 19 |
| 20 | 1.081 | 1692 | 102 | 1.093 | 2054 | 101 | 1.102 | 2054 | 85 | 1.019 | 1824 | 208 | 1.013 | 2073 | 247 | 1.056 | 1535 | 125 | 20 |
| 21 | 1.083 | 1614 | 94 | 1.056 | 1555 | 127 | 1.079 | 1628 | 100 | 1.007 | 1628 | 202 | 1.033 | 1976 | 201 | 1.048 | 1594 | 142 | 21 |
| 22 | 1.065 | 1315 | 98 | 1.023 | 1193 | 132 | 1.063 | 1325 | 100 | .980 | 1438 | 213 | 1.024 | 1594 | 175 | 1.072 | 1790 | 121 | 22 |
| 23 | 1.043 | 1164 | 108 | 1.034 | 958 | 97 | 1.016 | 1061 | 123 | .946 | 1110 | 197 | .812 | 1819 | 534 | 1.036 | 1340 | 133 | 23 |

Units of $N_T$ and $N_P$ are $10^{14}$ electrons-meter$^{-2}$.

ATS6 RBE - Boulder

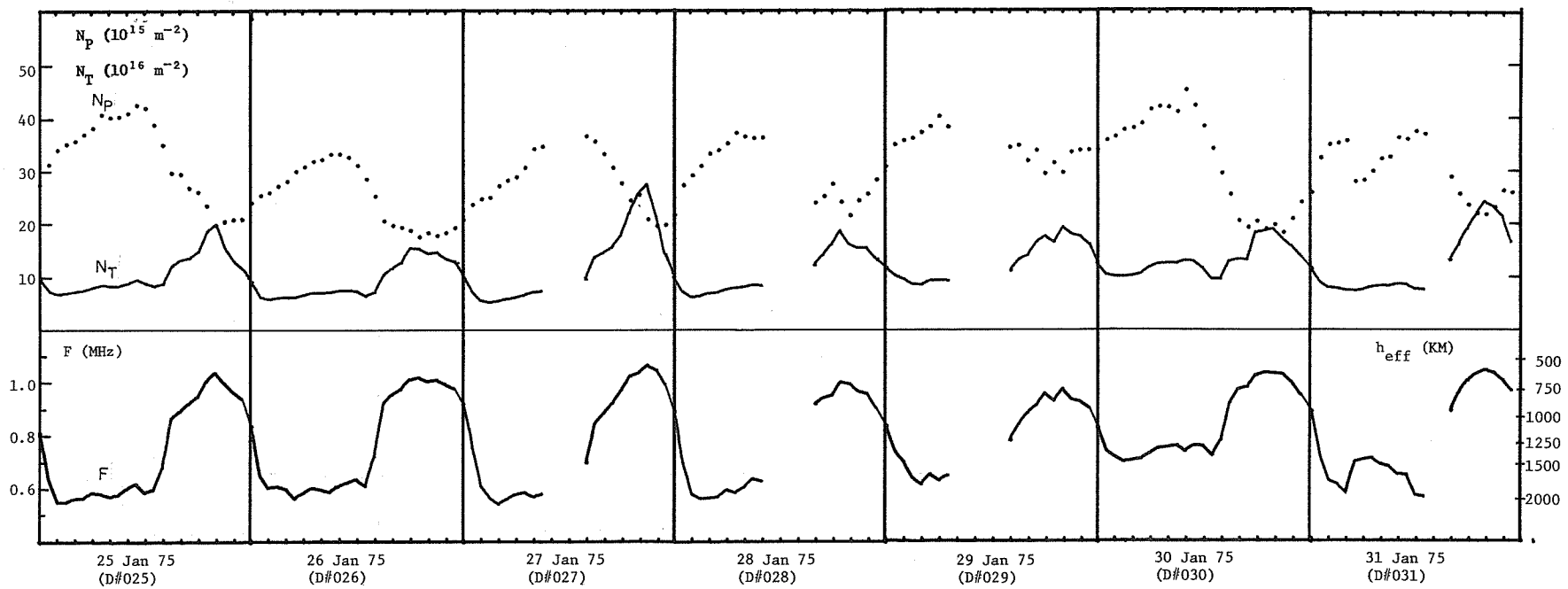


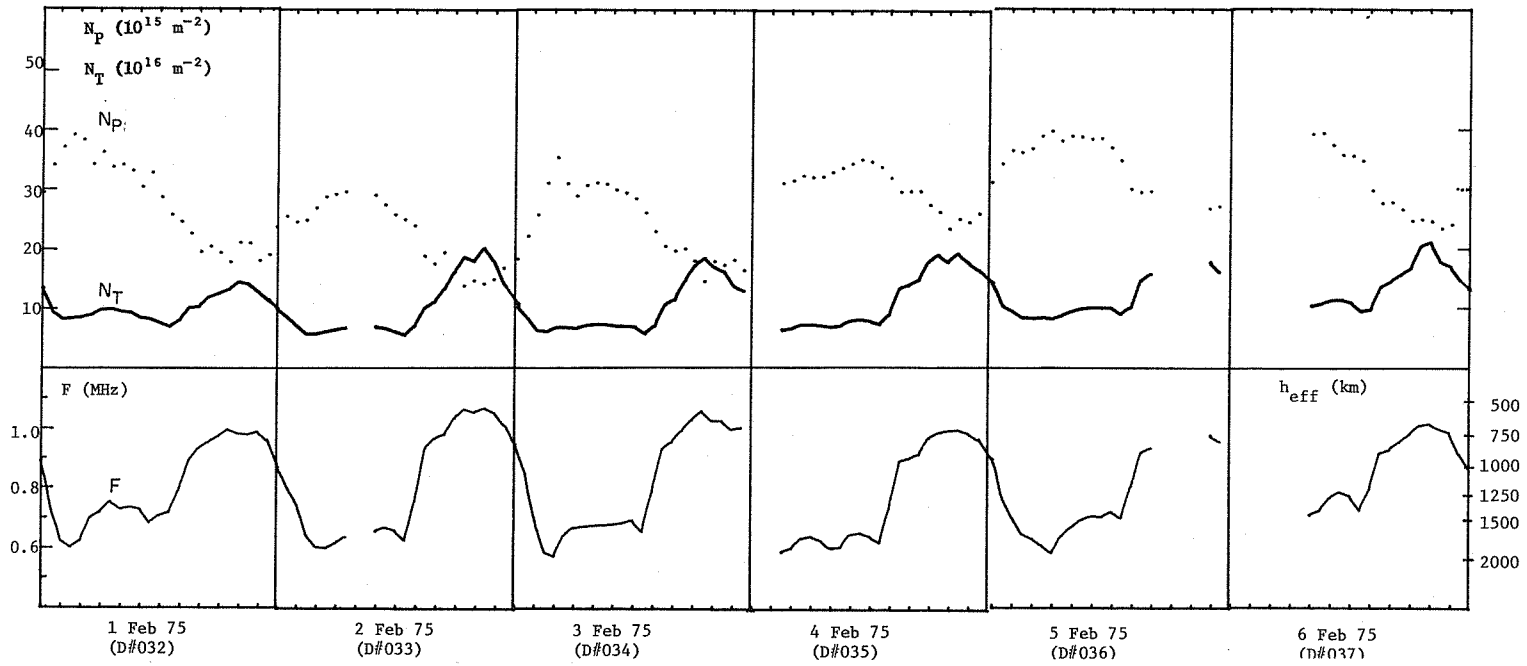
| DATE | 13:75 | | | 14:75 | | | 15:75 | | | 16:75 | | | 17:75 | | | 18:75 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | .927 | 826 | 160 | | | | .935 | 1169 | 219 | | | | .995 | 1682 | 226 | .995 | 963 | 130 | 0 |
| 1 | .807 | 631 | 188 | | | | .909 | 934 | 195 | | | | .924 | 1301 | 256 | .885 | 758 | 175 | 1 |
| 2 | .660 | 479 | 204 | | | | .807 | 645 | 193 | | | | .718 | 729 | 274 | .805 | 592 | 177 | 2 |
| 3 | .641 | 518 | 229 | | | | .706 | 479 | 185 | | | | .630 | 631 | 285 | .649 | 416 | 181 | 3 |
| 4 | .624 | 504 | 230 | | | | .615 | 445 | 207 | | | | .655 | 631 | 271 | .665 | 445 | 188 | 4 |
| 5 | .580 | 538 | 266 | | | | .636 | 494 | 221 | | | | .664 | 641 | 270 | .670 | 509 | 212 | 5 |
| 6 | .597 | 543 | 261 | .686 | 851 | 343 | .666 | 548 | 230 | | | | .676 | 675 | 278 | .686 | 523 | 211 | 6 |
| 7 | .604 | 611 | 290 | .652 | 792 | 343 | .629 | 557 | 253 | | | | .699 | 734 | 288 | .665 | 557 | 235 | 7 |
| 8 | .617 | 650 | 301 | .646 | 787 | 345 | | | | .680 | 709 | 290 | .722 | 797 | 297 | .678 | 592 | 243 | 8 |
| 9 | .628 | 704 | 320 | | | | | | | | | | | | | .713 | 597 | 226 | 9 |
| 10 | .662 | 763 | 324 | | | | | | | | | | | | | .766 | 680 | 227 | 10 |
| 11 | .715 | 856 | 323 | | | | | | | | | | | | | .763 | 734 | 247 | 11 |
| 12 | .737 | 836 | 300 | | | | | | | | | | | | | .769 | 675 | 224 | 12 |
| 13 | .720 | 782 | 292 | | | | | | | | | | | | | .774 | 557 | 182 | 13 |
| 14 | .763 | 773 | 260 | | | | .711 | 616 | 235 | | | | | | | .802 | 606 | 183 | 14 |
| 15 | .915 | 1183 | 242 | | | | .909 | 958 | 201 | | | | | | | .976 | 895 | 135 | 15 |
| 16 | .987 | 1672 | 238 | 1.017 | 1438 | 167 | .974 | 1340 | 205 | 1.021 | 1584 | 178 | 1.000 | 1384 | 180 | 1.012 | 1218 | 146 | 16 |
| 17 | 1.017 | 2034 | 235 | 1.068 | 2093 | 149 | 1.008 | 1697 | 209 | 1.046 | 2000 | 181 | 1.054 | 1839 | 154 | 1.047 | 1609 | 144 | 17 |
| 18 | 1.046 | 2279 | 206 | 1.072 | 2450 | 166 | 1.036 | 2108 | 209 | 1.059 | 2284 | 181 | 1.084 | 2171 | 125 | 1.070 | 1941 | 135 | 18 |
| 19 | 1.051 | 2597 | 224 | 1.076 | 2259 | 146 | 1.058 | 2440 | 195 | 1.086 | 2709 | 150 | 1.084 | 2054 | 119 | 1.076 | 1951 | 125 | 19 |
| 20 | 1.060 | 2636 | 207 | 1.084 | 2293 | 133 | 1.074 | 2553 | 170 | 1.073 | 2293 | 154 | 1.083 | 2191 | 129 | 1.062 | 1682 | 129 | 20 |
| 21 | 1.050 | 2215 | 194 | 1.060 | 2000 | 156 | 1.063 | 2367 | 179 | 1.043 | 1809 | 168 | 1.064 | 1922 | 143 | 1.065 | 1751 | 129 | 21 |
| 22 | .990 | 1809 | 251 | 1.030 | 1643 | 171 | 1.039 | 2010 | 194 | 1.034 | 1853 | 188 | 1.053 | 1648 | 139 | 1.024 | 1531 | 168 | 22 |
| 23 | .971 | 1565 | 243 | .975 | 1384 | 210 | 0.000 | 0 | 0 | 1.015 | 1819 | 213 | 1.050 | 1374 | 119 | .957 | 1203 | 202 | 23 |

| DATE | 19:75 | | | 20:75 | | | 21:75 | | | 22:75 | | | 23:75 | | | 24:75 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | .901 | 905 | 196 | .911 | 792 | 165 | .922 | 870 | 172 | .868 | 734 | 180 | | | | .882 | 1032 | 240 | 0 |
| 1 | .856 | 665 | 170 | .811 | 670 | 198 | .842 | 768 | 205 | .780 | 621 | 200 | | | | .740 | 817 | 291 | 1 |
| 2 | .724 | 562 | 208 | .725 | 567 | 209 | .727 | 577 | 212 | .758 | 572 | 195 | | | | .644 | 670 | 295 | 2 |
| 3 | .673 | 533 | 221 | .611 | 474 | 222 | .634 | 489 | 219 | .705 | 509 | 197 | | | | .613 | 675 | 315 | 3 |
| 4 | .656 | 528 | 227 | .567 | 465 | 235 | .617 | 469 | 217 | .639 | 479 | 213 | | | | .589 | 685 | 334 | 4 |
| 5 | .659 | 572 | 244 | .554 | 479 | 248 | .628 | 513 | 233 | .611 | 465 | 218 | | | | .573 | 714 | 358 | 5 |
| 6 | .652 | 606 | 263 | .578 | 533 | 265 | .637 | 548 | 245 | .624 | 504 | 230 | | | | .588 | 748 | 366 | 6 |
| 7 | .677 | 655 | 269 | .598 | 606 | 291 | .648 | 582 | 254 | .675 | 567 | 234 | .625 | 616 | 281 | .590 | 738 | 359 | 7 |
| 8 | .703 | 689 | 268 | .649 | 675 | 294 | .652 | 606 | 263 | .615 | 567 | 264 | .661 | 675 | 287 | .593 | 729 | 353 | 8 |
| 9 | .702 | 734 | 286 | .681 | 714 | 291 | .652 | 641 | 278 | | | | .660 | 694 | 296 | .622 | 822 | 377 | 9 |
| 10 | .709 | 729 | 279 | .674 | 773 | 320 | .666 | 660 | 278 | | | | .627 | 724 | 329 | .642 | 880 | 388 | 10 |
| 11 | .699 | 626 | 245 | .642 | 704 | 311 | | | | | | | | | | .639 | 919 | 408 | 11 |
| 12 | .659 | 621 | 265 | .634 | 645 | 289 | | | | | | | | | | | | | 12 |
| 13 | .693 | 553 | 219 | .622 | 577 | 265 | | | | | | | | | | | | | 13 |
| 14 | .784 | 636 | 202 | .752 | 655 | 227 | | | | .732 | 650 | 236 | | | | | | | 14 |
| 15 | .952 | 954 | 164 | .907 | 910 | 192 | | | | .890 | 924 | 209 | | | | | | | 15 |
| 16 | 1.003 | 1237 | 159 | .940 | 949 | 173 | .938 | 1022 | 188 | .950 | 1090 | 190 | .941 | 1340 | 244 | .899 | 1213 | 264 | 16 |
| 17 | 1.053 | 1648 | 139 | 1.004 | 1379 | 175 | 1.017 | 1531 | 177 | 1.005 | 1477 | 187 | .991 | 1663 | 230 | .918 | 1369 | 276 | 17 |
| 18 | 1.079 | 1814 | 112 | 1.064 | 1932 | 144 | 1.045 | 1863 | 169 | 1.032 | 1516 | 155 | 1.017 | 1966 | 228 | .980 | 1653 | 245 | 18 |
| 19 | 1.079 | 1765 | 109 | 1.072 | 1800 | 122 | 1.048 | 1746 | 154 | 1.044 | 1736 | 160 | 1.001 | 1765 | 228 | .991 | 1780 | 247 | 19 |
| 20 | 1.078 | 1482 | 93 | 1.070 | 1663 | 115 | 1.061 | 1599 | 124 | | | | 1.007 | 1756 | 219 | 1.024 | 2064 | 225 | 20 |
| 21 | 1.066 | 1447 | 106 | 1.033 | 1452 | 148 | 1.061 | 1623 | 125 | | | | 1.007 | 1746 | 218 | 1.000 | 1917 | 250 | 21 |
| 22 | 1.055 | 1389 | 114 | 1.000 | 1267 | 165 | 1.048 | 1433 | 127 | 1.015 | 1496 | 176 | 1.014 | 1570 | 186 | .930 | 1399 | 267 | 22 |
| 23 | .998 | 1081 | 143 | 1.007 | 1149 | 143 | .980 | 993 | 147 | 1.002 | 1198 | 155 | .941 | 1267 | 230 | .928 | 1232 | 238 | 23 |

Units of $N_T$ and $N_P$ are $10^{14}$ electrons-meter$^{-2}$.

ATS6 RBE - Boulder



| DATE | 25:75 | | | 26:75 | | | 27:75 | | | 28:75 | | | 29:75 | | | 30:75 | | | 31:75 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
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| 1 | .641 | 699 | 310 | .650 | 577 | 251 | .772 | 709 | 233 | .697 | 689 | 272 | .739 | 963 | 345 | .739 | 988 | 353 | .728 | 880 | 323 | 1 |
| 2 | .550 | 645 | 337 | .603 | 538 | 256 | .610 | 518 | 243 | .578 | 582 | 289 | .698 | 895 | 352 | .716 | 954 | 360 | .628 | 768 | 348 | 2 |
| 3 | .549 | 665 | 348 | .607 | 567 | 268 | .565 | 484 | 246 | .563 | 601 | 307 | .636 | 797 | 356 | .699 | 949 | 372 | .614 | 753 | 351 | 3 |
| 4 | .563 | 694 | 354 | .597 | 577 | 277 | .542 | 509 | 269 | .564 | 650 | 331 | .613 | 787 | 368 | .703 | 968 | 376 | .581 | 719 | 356 | 4 |
| 5 | .564 | 719 | 366 | .562 | 577 | 295 | .560 | 543 | 278 | .567 | 665 | 337 | .650 | 870 | 379 | .707 | 998 | 384 | .698 | 709 | 279 | 5 |
| 6 | .583 | 768 | 378 | .582 | 616 | 304 | .577 | 572 | 285 | .594 | 724 | 350 | .628 | 875 | 398 | .728 | 1120 | 411 | .707 | 729 | 281 | 6 |
| 7 | .581 | 817 | 404 | .602 | 660 | 315 | .586 | 616 | 302 | .584 | 753 | 371 | .646 | 866 | 379 | .747 | 1188 | 416 | .712 | 782 | 298 | 7 |
| 8 | .571 | 792 | 399 | .596 | 660 | 318 | .569 | 670 | 339 | .605 | 768 | 364 | | | | .751 | 1198 | 415 | .690 | 802 | 321 | 8 |
| 9 | .576 | 802 | 400 | .587 | 670 | 328 | .579 | 689 | 342 | .636 | 807 | 361 | | | | .758 | 1193 | 407 | .682 | 797 | 325 | 9 |
| 10 | .600 | 851 | 407 | .609 | 699 | 329 | | | | .628 | 797 | 362 | | | | .736 | 1247 | 449 | .652 | 836 | 362 | 10 |
| 11 | .618 | 914 | 423 | .622 | 704 | 323 | | | | | | | | | | .758 | 1232 | 420 | .650 | 826 | 359 | 11 |
| 12 | .586 | 851 | 417 | .634 | 685 | 307 | | | | | | | | | | .756 | 1105 | 379 | .573 | 743 | 373 | 12 |
| 13 | .596 | 802 | 386 | .610 | 601 | 282 | | | | | | | | | | .721 | 905 | 337 | .568 | 729 | 369 | 13 |
| 14 | .678 | 846 | 347 | .720 | 670 | 250 | .697 | 919 | 362 | | | | .779 | 1056 | 341 | .777 | 895 | 290 | | | | 14 |
| 15 | .862 | 1174 | 294 | .915 | 993 | 203 | .841 | 1315 | 353 | | | | .837 | 1262 | 343 | .915 | 1227 | 251 | | | | 15 |
| 16 | .889 | 1286 | 292 | .950 | 1120 | 194 | .881 | 1408 | 330 | .917 | 1178 | 239 | .880 | 1345 | 315 | .968 | 1271 | 202 | .891 | 1276 | 288 | 16 |
| 17 | .918 | 1320 | 266 | .971 | 1227 | 191 | .919 | 1511 | 304 | .939 | 1364 | 250 | .909 | 1594 | 334 | .977 | 1257 | 189 | .962 | 1560 | 256 | 17 |
| 18 | .943 | 1438 | 259 | 1.008 | 1496 | 185 | .968 | 1726 | 274 | .949 | 1560 | 273 | .953 | 1697 | 290 | 1.020 | 1760 | 199 | 1.005 | 1863 | 235 | 18 |
| 19 | 1.003 | 1819 | 233 | 1.017 | 1491 | 173 | 1.021 | 2161 | 242 | .998 | 1814 | 240 | .926 | 1589 | 310 | 1.031 | 1795 | 185 | 1.032 | 2127 | 218 | 19 |
| 20 | 1.034 | 1946 | 196 | 1.002 | 1403 | 180 | 1.035 | 2513 | 252 | .993 | 1579 | 215 | .969 | 1863 | 293 | 1.029 | 1834 | 193 | 1.046 | 2386 | 217 | 20 |
| 21 | .996 | 1506 | 202 | 1.008 | 1418 | 176 | 1.062 | 2690 | 206 | .965 | 1506 | 242 | .931 | 1741 | 331 | 1.026 | 1658 | 179 | 1.035 | 2298 | 229 | 21 |
| 22 | .962 | 1262 | 206 | .991 | 1301 | 180 | 1.044 | 2108 | 193 | .956 | 1511 | 254 | .924 | 1702 | 334 | .996 | 1521 | 204 | 1.009 | 2122 | 261 | 22 |
| 23 | .938 | 1120 | 207 | .975 | 1247 | 189 | .991 | 1413 | 195 | .904 | 1320 | 282 | .902 | 1555 | 335 | .948 | 1345 | 236 | .969 | 1638 | 258 | 23 |

| DATE | 32:75 | | | 33:75 | | | 34:75 | | | 35:75 | | | 36:75 | | | 37:75 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | .892 | 1311 | 294 | .873 | 973 | 235 | .947 | 1046 | 185 | | | | .895 | 1384 | 307 | | | | 0 |
| 1 | .729 | 929 | 340 | .805 | 841 | 252 | .853 | 861 | 223 | | | | .765 | 1012 | 339 | | | | 1 |
| 2 | .623 | 807 | 370 | .747 | 694 | 243 | .696 | 655 | 259 | | | | .699 | 919 | 361 | | | | 2 |
| 3 | .601 | 817 | 390 | .644 | 557 | 245 | .587 | 636 | 311 | .592 | 641 | 311 | .645 | 817 | 358 | | | | 3 |
| 4 | .622 | 834 | 383 | .606 | 562 | 266 | .575 | 709 | 355 | .603 | 665 | 316 | .631 | 807 | 364 | | | | 4 |
| 5 | .699 | 870 | 342 | .601 | 597 | 285 | .642 | 704 | 311 | .636 | 724 | 324 | .608 | 817 | 385 | | | | 5 |
| 6 | .717 | 958 | 361 | .619 | 626 | 289 | .668 | 694 | 291 | .643 | 729 | 321 | .582 | 797 | 393 | | | | 6 |
| 7 | .751 | 973 | 338 | .639 | 660 | 294 | .674 | 743 | 308 | .630 | 714 | 323 | .638 | 851 | 379 | | | | 7 |
| 8 | .729 | 929 | 340 | | | | .677 | 758 | 312 | .604 | 694 | 330 | .668 | 919 | 385 | .711 | 1027 | 392 | 8 |
| 9 | .734 | 914 | 331 | | | | .679 | 758 | 310 | .608 | 714 | 337 | .693 | 968 | 385 | .724 | 1066 | 394 | 9 |
| 10 | .729 | 831 | 304 | .658 | 675 | 289 | .681 | 738 | 301 | .650 | 792 | 344 | .706 | 988 | 381 | .766 | 1125 | 376 | 10 |
| 11 | .683 | 807 | 327 | .671 | 655 | 273 | .685 | 734 | 296 | .655 | 817 | 351 | .703 | 983 | 382 | .786 | 1134 | 359 | 11 |
| 12 | .706 | 743 | 287 | .661 | 601 | 256 | .695 | 724 | 287 | .645 | 792 | 348 | .719 | 980 | 367 | .773 | 1090 | 357 | 12 |
| 13 | .716 | 685 | 258 | .629 | 548 | 248 | .658 | 616 | 264 | .624 | 743 | 340 | .701 | 885 | 346 | .726 | 949 | 349 | 13 |
| 14 | .790 | 787 | 246 | .756 | 694 | 238 | .788 | 738 | 233 | .739 | 900 | 322 | .804 | 993 | 298 | .796 | 973 | 300 | 14 |
| 15 | .888 | 993 | 226 | .933 | 993 | 187 | .931 | 1090 | 207 | .894 | 1340 | 298 | .916 | 1438 | 292 | .913 | 1350 | 278 | 15 |
| 16 | .929 | 1017 | 196 | .967 | 1100 | 175 | .956 | 1183 | 200 | .904 | 1399 | 299 | .932 | 1550 | 293 | .927 | 1443 | 279 | 16 |
| 17 | .950 | 1174 | 204 | .982 | 1315 | 193 | .993 | 1491 | 203 | .918 | 1482 | 299 | | | | .952 | 1560 | 268 | 17 |
| 18 | .969 | 1232 | 194 | 1.034 | 1589 | 160 | 1.029 | 1736 | 183 | .971 | 1780 | 277 | | | | .978 | 1663 | 249 | 18 |
| 19 | .992 | 1296 | 178 | 1.064 | 1844 | 137 | 1.058 | 1873 | 149 | .990 | 1902 | 265 | | | | 1.008 | 2029 | 251 | 19 |
| 20 | .980 | 1423 | 210 | 1.056 | 1785 | 146 | 1.029 | 1726 | 182 | .997 | 1785 | 237 | | | | 1.015 | 2108 | 248 | 20 |
| 21 | .976 | 1389 | 210 | 1.069 | 1995 | 141 | 1.027 | 1648 | 176 | .999 | 1927 | 252 | | | | .997 | 1775 | 236 | 21 |
| 22 | .986 | 1267 | 181 | 1.054 | 1780 | 148 | .999 | 1403 | 184 | .990 | 1785 | 248 | .975 | 1741 | 266 | .986 | 1702 | 242 | 22 |
| 23 | .956 | 1130 | 190 | 1.013 | 1408 | 168 | 1.005 | 1335 | 168 | .968 | 1658 | 262 | .956 | 1594 | 269 | .913 | 1467 | 302 | 23 |

Units of $N_T$ and $N_p$ are $10^{14}$ electrons-meter$^{-2}$.

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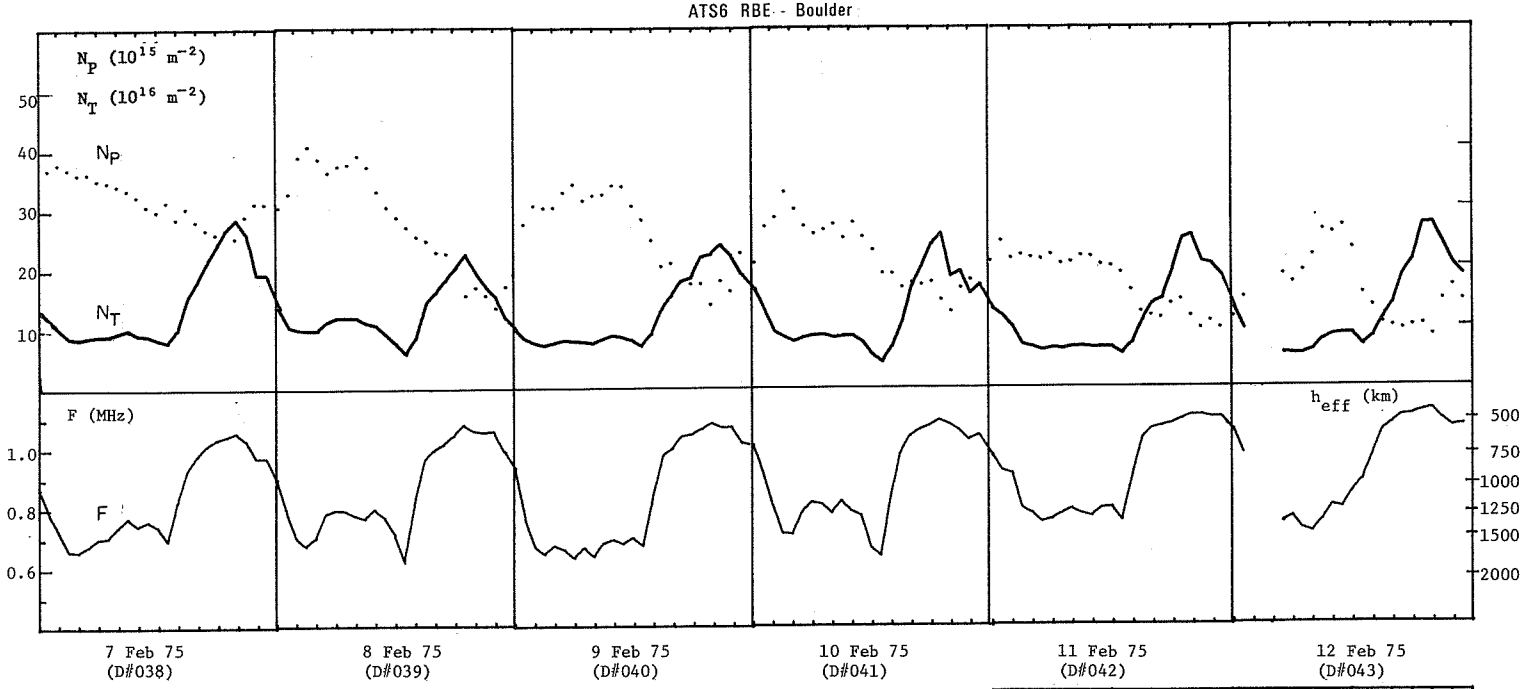


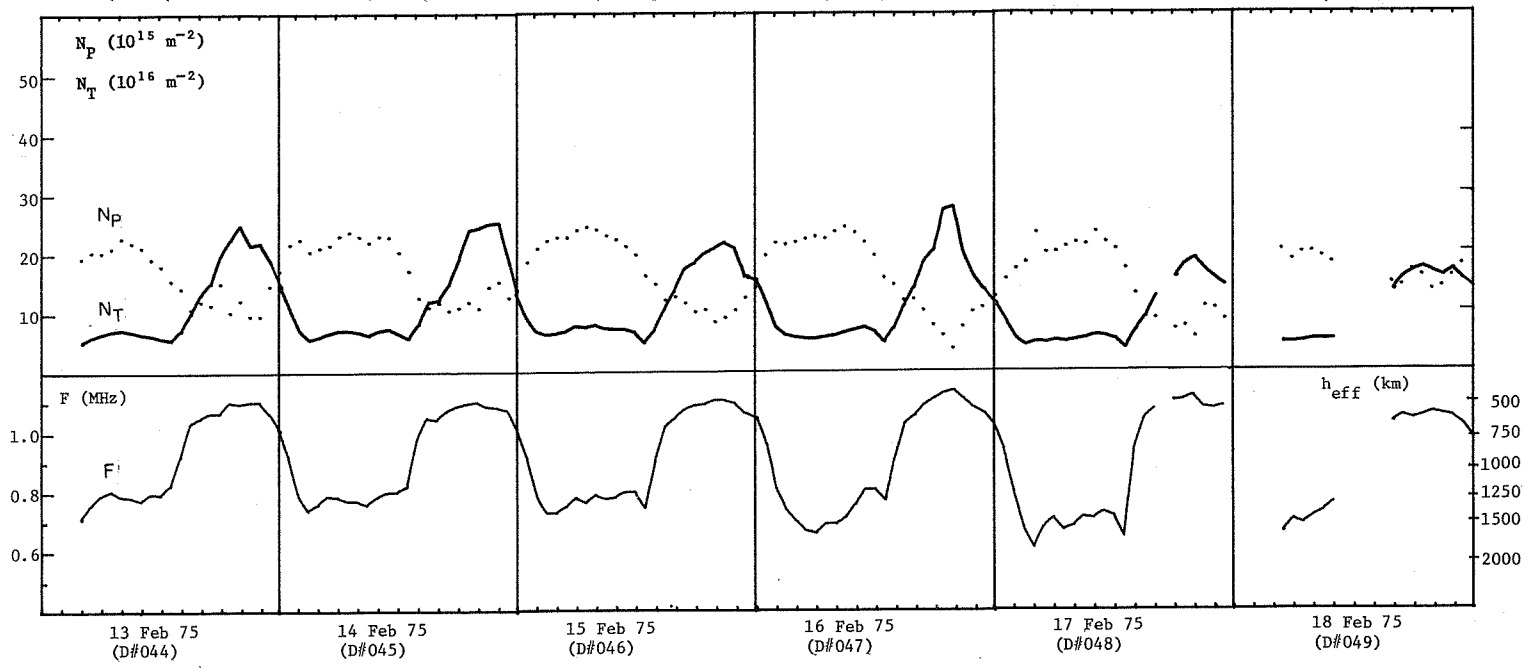

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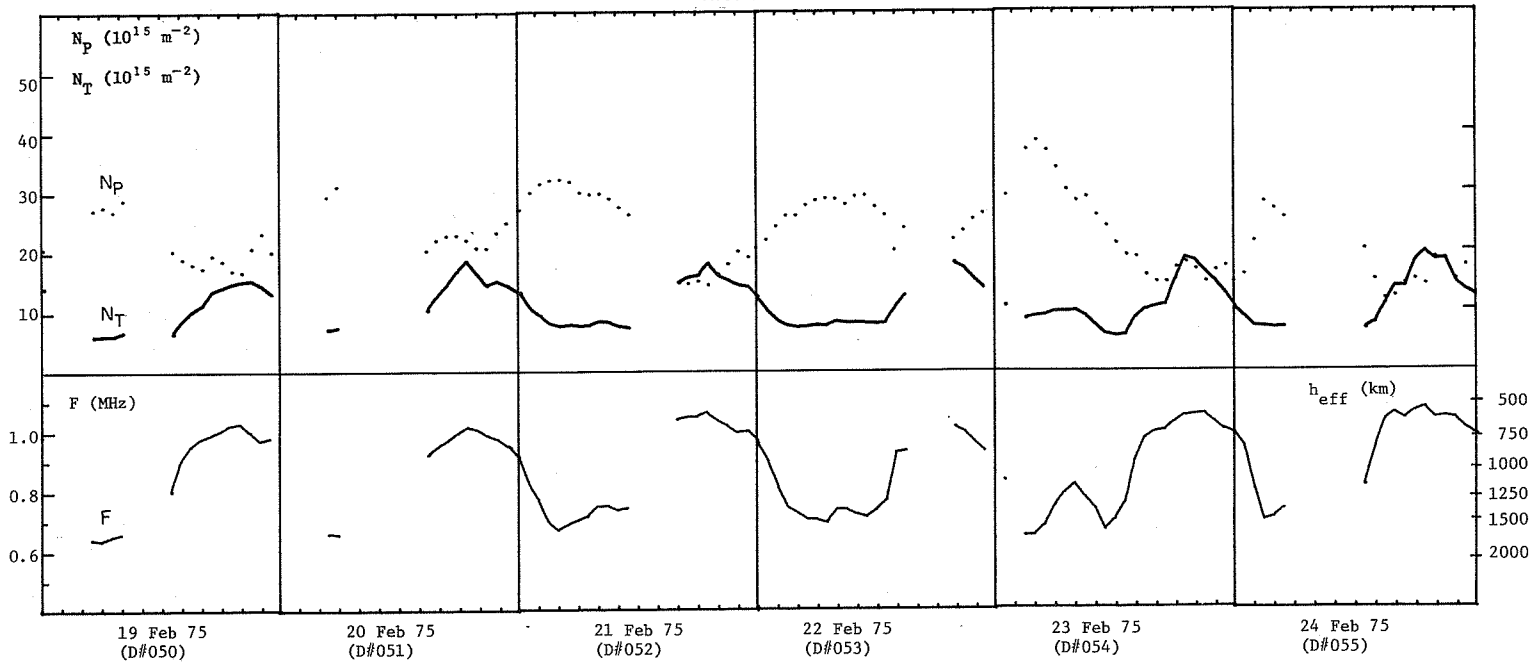
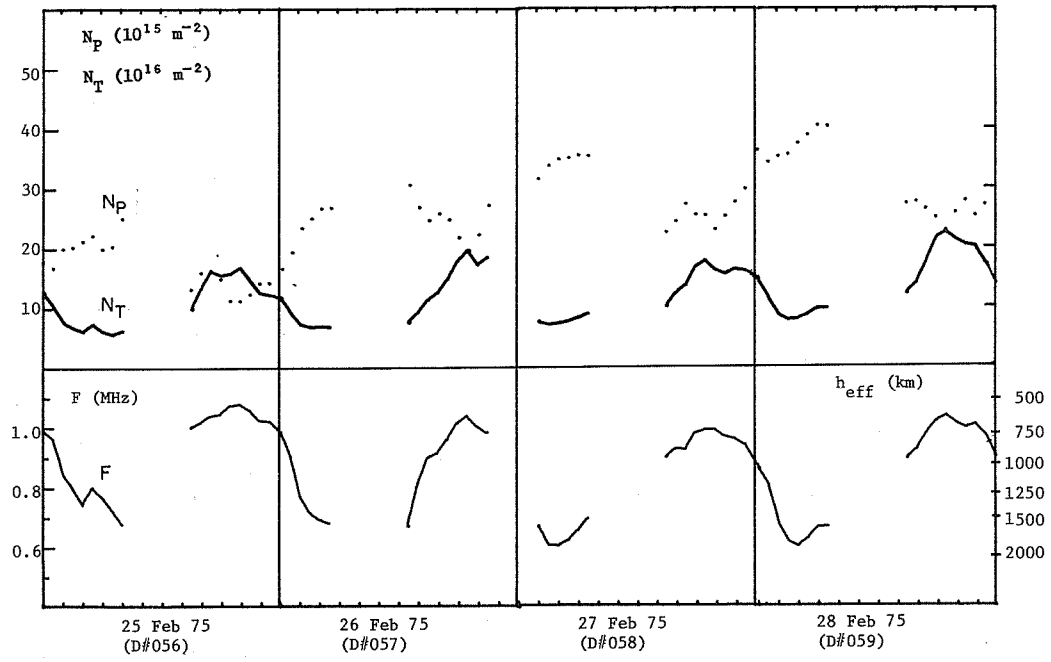
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | .865 | 0 | 1570 | .892 | 1345 | 301 | .931 | 978 | 187 | 1.003 | 1633 | 208 | .967 | 1291 | 205 | 1.047 | 1257 | 113 | 0 |
| 1 | .783 | 1139 | 364 | .785 | 1022 | 324 | .760 | 797 | 270 | .911 | 1291 | 269 | .915 | 1174 | 239 | .968 | 917 | 145 | 1 |
| 2 | .721 | 998 | 372 | .696 | 978 | 386 | .668 | 719 | 301 | .801 | 934 | 284 | .905 | 988 | 211 | | | | 2 |
| 3 | .657 | 851 | 364 | .669 | 963 | 403 | .643 | 675 | 298 | .709 | 851 | 327 | .791 | 689 | 215 | | | | 3 |
| 4 | .655 | 826 | 356 | .695 | 968 | 383 | .670 | 714 | 298 | .706 | 773 | 299 | .772 | 645 | 212 | | | | 4 |
| 5 | .674 | 861 | 357 | .776 | 1108 | 360 | .657 | 753 | 323 | .778 | 836 | 270 | .743 | 592 | 209 | .737 | 509 | 182 | 5 |
| 6 | .698 | 880 | 346 | .788 | 1174 | 370 | .630 | 743 | 336 | .810 | 870 | 257 | .751 | 621 | 216 | .755 | 494 | 170 | 6 |
| 7 | .702 | 880 | 343 | .786 | 1178 | 373 | .663 | 734 | 310 | .806 | 880 | 263 | .769 | 609 | 202 | .715 | 499 | 189 | 7 |
| 8 | .736 | 934 | 336 | .770 | 1174 | 388 | .635 | 709 | 318 | .776 | 836 | 272 | .785 | 641 | 203 | .704 | 553 | 214 | 8 |
| 9 | .765 | 983 | 329 | .760 | 1090 | 370 | .678 | 780 | 320 | .815 | 858 | 250 | .769 | 645 | 214 | .742 | 724 | 257 | 9 |
| 10 | .741 | 895 | 319 | .790 | 1051 | 329 | .690 | 836 | 335 | .782 | 861 | 275 | .762 | 631 | 213 | .792 | 812 | 253 | 10 |
| 11 | .755 | 880 | 302 | .764 | 900 | 302 | .677 | 812 | 334 | .767 | 758 | 252 | .788 | 636 | 200 | .785 | 831 | 264 | 11 |
| 12 | .737 | 817 | 293 | .709 | 743 | 285 | .696 | 763 | 301 | .659 | 538 | 229 | .790 | 631 | 197 | .836 | 831 | 227 | 12 |
| 13 | .691 | 773 | 308 | .615 | 577 | 269 | .672 | 670 | 279 | .634 | 425 | 191 | .747 | 533 | 187 | .875 | 636 | 152 | 13 |
| 14 | .819 | 976 | 281 | .802 | 836 | 253 | .824 | 861 | 244 | .826 | 675 | 190 | .892 | 704 | 158 | .957 | 778 | 131 | 14 |
| 15 | .922 | 1501 | 297 | .950 | 1408 | 245 | .968 | 1267 | 200 | .972 | 1078 | 167 | 1.019 | 1066 | 121 | 1.041 | 1076 | 102 | 15 |
| 16 | .971 | 1775 | 277 | .986 | 1589 | 227 | .992 | 1491 | 205 | 1.030 | 1672 | 174 | 1.053 | 1364 | 115 | 1.067 | 1330 | 96 | 16 |
| 17 | 1.006 | 2098 | 263 | 1.006 | 1795 | 224 | 1.035 | 1746 | 175 | 1.052 | 2010 | 171 | 1.062 | 1443 | 111 | 1.092 | 1819 | 92 | 17 |
| 18 | 1.026 | 2372 | 255 | 1.034 | 1995 | 201 | 1.041 | 1800 | 171 | 1.065 | 2377 | 175 | 1.070 | 1912 | 134 | 1.096 | 2044 | 96 | 18 |
| 19 | 1.037 | 2660 | 261 | 1.070 | 2225 | 154 | 1.058 | 2147 | 171 | 1.084 | 2550 | 146 | 1.084 | 2435 | 140 | 1.107 | 2665 | 99 | 19 |
| 20 | 1.048 | 2817 | 249 | 1.051 | 1941 | 166 | 1.078 | 2196 | 137 | 1.071 | 1848 | 126 | 1.098 | 2504 | 114 | 1.115 | 2680 | 82 | 20 |
| 21 | 1.023 | 2572 | 284 | 1.046 | 1702 | 154 | 1.064 | 2352 | 175 | 1.052 | 1929 | 165 | 1.098 | 2059 | 93 | 1.081 | 23[illegible]2 | 141 | 21 |
| 22 | .965 | 1897 | 306 | 1.050 | 1526 | 133 | 1.066 | 2181 | 159 | 1.019 | 1560 | 178 | 1.091 | 2022 | 104 | 1.056 | 2005 | 163 | 22 |
| 23 | .965 | 1897 | 306 | .983 | 1159 | 168 | 1.014 | 1873 | 222 | 1.034 | 1692 | 171 | 1.091 | 1836 | 94 | 1.061 | 1824 | 141 | 23 |

| DATE | 44:75 | | | 45:75 | | | 46:75 | | | 47:75 | | | 48:75 | | | 49:75 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | | | | 1.016 | 1477 | 173 | 1.009 | 1271 | 156 | 1.044 | 1506 | 138 | 1.021 | 1130 | 127 | | | | 0 |
| 1 | | | | .919 | 1076 | 216 | .912 | 880 | 182 | .955 | 1139 | 193 | .939 | 846 | 155 | | | | 1 |
| 2 | | | | .791 | 716 | 224 | .785 | 645 | 205 | .806 | 714 | 213 | .792 | 553 | 172 | | | | 2 |
| 3 | | | | .736 | 567 | 204 | .726 | 592 | 218 | .736 | 587 | 211 | .672 | 440 | 183 | | | | 3 |
| 4 | .711 | 499 | 190 | .756 | 611 | 209 | .725 | 606 | 224 | .699 | 548 | 215 | .607 | 494 | 233 | | | | 4 |
| 5 | .756 | 587 | 201 | .784 | 672 | 214 | .746 | 638 | 224 | .666 | 523 | 220 | .674 | 484 | 200 | .661 | 469 | 200 | 5 |
| 6 | .788 | 636 | 200 | .781 | 714 | 229 | .776 | 724 | 236 | .659 | 523 | 224 | .704 | 518 | 201 | .699 | 469 | 184 | 6 |
| 7 | .802 | 685 | 207 | .769 | 714 | 236 | .761 | 714 | 242 | .690 | 553 | 221 | .666 | 499 | 210 | .687 | 484 | 195 | 7 |
| 8 | .784 | 704 | 224 | .767 | 689 | 229 | .786 | 748 | 237 | .688 | 577 | 232 | .679 | 528 | 216 | .711 | 513 | 196 | 8 |
| 9 | .781 | 675 | 217 | .756 | 641 | 219 | .774 | 694 | 227 | .709 | 626 | 240 | .709 | 557 | 214 | .726 | 513 | 189 | 9 |
| 10 | .772 | 636 | 209 | .781 | 714 | 229 | .779 | 685 | 221 | .753 | 670 | 231 | .705 | 606 | 234 | .755 | 521 | 179 | 10 |
| 11 | .793 | 611 | 190 | .796 | 743 | 229 | .796 | 680 | 209 | .803 | 714 | 215 | .726 | 592 | 218 | | | | 11 |
| 12 | .790 | 567 | 178 | .799 | 665 | 203 | .797 | 636 | 195 | .804 | 641 | 193 | .713 | 543 | 206 | | | | 12 |
| 13 | .821 | 538 | 154 | .815 | 592 | 172 | .744 | 455 | 160 | .769 | 469 | 156 | .645 | 396 | 174 | | | | 13 |
| 14 | .917 | 694 | 141 | .972 | 822 | 127 | .891 | 650 | 146 | .913 | 699 | 144 | .927 | 680 | 132 | | | | 14 |
| 15 | 1.027 | 983 | 105 | 1.044 | 1198 | 111 | 1.013 | 1002 | 119 | 1.024 | 1071 | 117 | 1.034 | 910 | 92 | | | | 15 |
| 16 | 1.046 | 1301 | 118 | 1.040 | 1223 | 117 | 1.041 | 1311 | 124 | 1.050 | 1374 | 119 | 1.068 | 1257 | 90 | 1.026 | 1340 | 145 | 16 |
| 17 | 1.063 | 1491 | 113 | 1.068 | 1477 | 106 | 1.072 | 1687 | 115 | 1.086 | 1814 | 101 | | | | 1.046 | 1550 | 140 | 17 |
| 18 | 1.062 | 1946 | 148 | 1.084 | 1907 | 109 | 1.086 | 1785 | 100 | 1.106 | 1995 | 76 | 1.098 | 1584 | 72 | 1.036 | 1658 | 165 | 18 |
| 19 | 1.098 | 2210 | 101 | 1.093 | 2396 | 119 | 1.089 | 1946 | 103 | 1.125 | 2680 | 59 | 1.102 | 1800 | 76 | 1.045 | 1716 | 157 | 19 |
| 20 | 1.094 | 2450 | 120 | 1.098 | 2430 | 109 | 1.103 | 2034 | 83 | 1.134 | 2734 | 37 | 1.114 | 1897 | 59 | 1.057 | 1643 | 133 | 20 |
| 21 | 1.099 | 2117 | 94 | 1.084 | 2499 | 144 | 1.102 | 2132 | 89 | 1.107 | 1966 | 73 | 1.077 | 1712 | 109 | 1.050 | 1579 | 138 | 21 |
| 22 | 1.100 | 2147 | 93 | 1.081 | 2518 | 152 | 1.092 | 2039 | 102 | 1.079 | 1589 | 98 | 1.072 | 1570 | 107 | 1.044 | 1682 | 155 | 22 |
| 23 | 1.061 | 1868 | 144 | 1.072 | 1863 | 127 | 1.061 | 1584 | 123 | 1.061 | 1369 | 105 | 1.080 | 1452 | 88 | 1.018 | 1516 | 175 | 23 |

Units of $N_T$ and $N_P$ are $10^{14}$ electrons-meter$^{-2}$.

ATS6 RBE - Boulder



| DATE | 50:75 | | | 51:75 | | | 52:75 | | | 53:75 | | | 54:75 | | | 55:75 | | | DATE |
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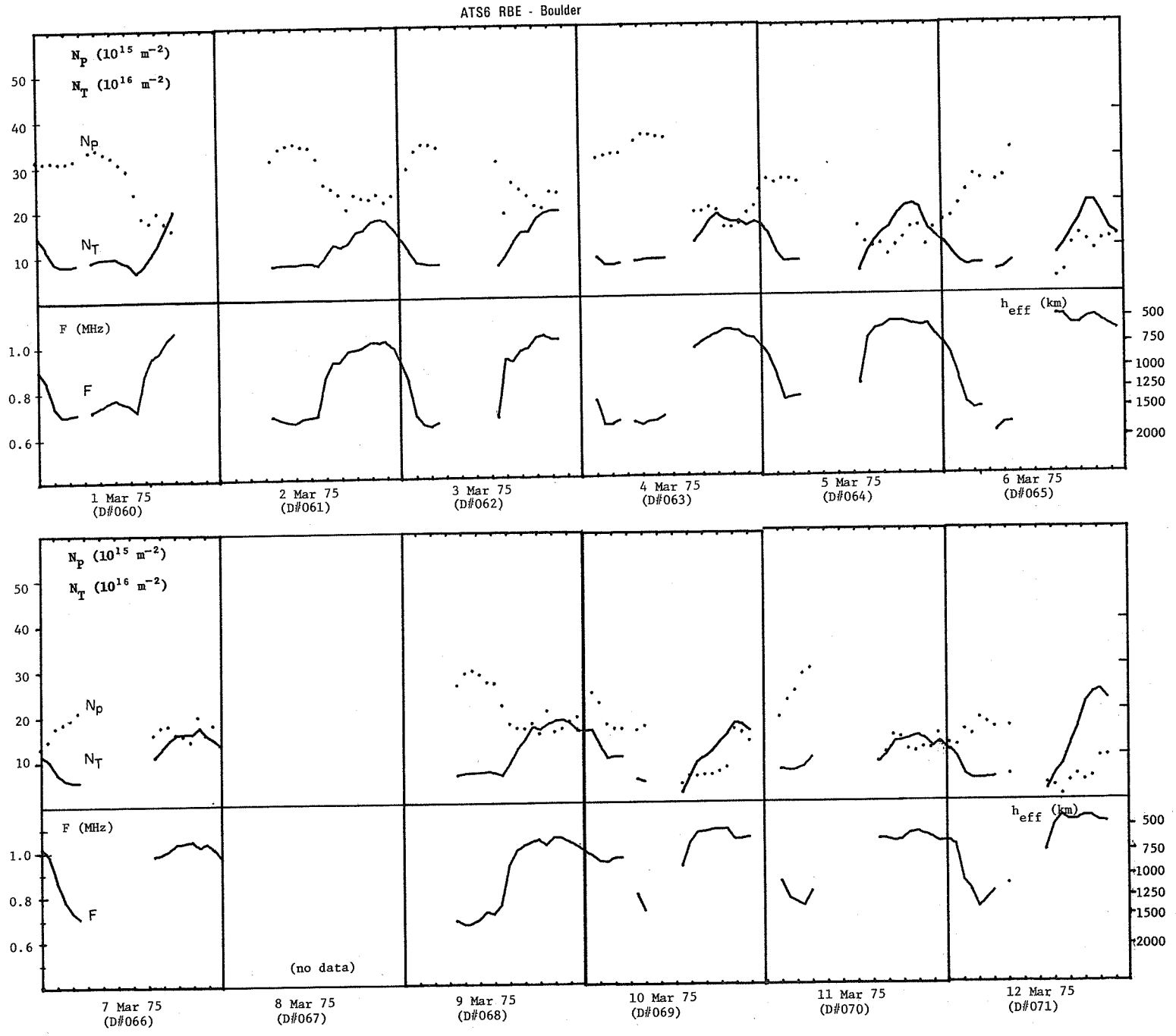
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | .982 | 1413 | 206 | | | | .915 | 1320 | 270 | .956 | 1193 | 201 | | | | .988 | 1022 | 144 | 0 |
| 1 | | | | | | | .827 | 1066 | 299 | .896 | 973 | 215 | .827 | 1037 | 291 | .943 | 870 | 157 | 1 |
| 2 | | | | | | | .769 | 944 | 313 | .811 | 807 | 238 | | | | .806 | 709 | 212 | 2 |
| 3 | | | | | | | .696 | 807 | 319 | .742 | 719 | 255 | .641 | 831 | 368 | .693 | 699 | 278 | 3 |
| 4 | | | | | | | .667 | 763 | 320 | .723 | 689 | 256 | .642 | 866 | 383 | .702 | 685 | 267 | 4 |
| 5 | .639 | 609 | 270 | .659 | 680 | 290 | .684 | 782 | 317 | .701 | 699 | 273 | .673 | 883 | 366 | .729 | 689 | 252 | 5 |
| 6 | .635 | 616 | 276 | .656 | 714 | 307 | .699 | 763 | 299 | .699 | 716 | 281 | .737 | 939 | 337 | | | | 6 |
| 7 | .648 | 616 | 269 | | | | .712 | 778 | 296 | .689 | 709 | 284 | .782 | 939 | 301 | | | | 7 |
| 8 | .657 | 670 | 287 | | | | .745 | 841 | 296 | .733 | 782 | 284 | .810 | 954 | 282 | | | | 8 |
| 9 | | | | | | | .748 | 826 | 289 | .733 | 758 | 275 | .768 | 866 | 287 | | | | 9 |
| 10 | | | | | | | .733 | 758 | 275 | .718 | 765 | 288 | .732 | 709 | 258 | | | | 10 |
| 11 | | | | | | | .739 | 736 | 263 | .708 | 753 | 290 | .660 | 562 | 240 | | | | 11 |
| 12 | | | | | | | | | | .731 | 743 | 271 | .691 | 528 | 211 | | | | 12 |
| 13 | .799 | 665 | 203 | | | | | | | .763 | 763 | 257 | .747 | 545 | 191 | .808 | 670 | 199 | 13 |
| 14 | .901 | 875 | 190 | | | | | | | .922 | 1002 | 199 | .890 | 831 | 188 | .925 | 758 | 148 | 14 |
| 15 | .947 | 1027 | 181 | .920 | 1002 | 201 | | | | .928 | 1213 | 235 | .963 | 968 | 157 | 1.025 | 1066 | 116 | 15 |
| 16 | .973 | 1130 | 174 | .947 | 1232 | 217 | 1.034 | 1482 | 149 | | | | .984 | 1017 | 146 | 1.049 | 1364 | 120 | 16 |
| 17 | .986 | 1359 | 194 | .968 | 1418 | 225 | 1.043 | 1575 | 147 | | | | .990 | 1049 | 146 | 1.031 | 1364 | 141 | 17 |
| 18 | .999 | 1418 | 186 | .993 | 1648 | 226 | 1.043 | 1604 | 150 | | | | 1.016 | 1457 | 170 | 1.055 | 1785 | 147 | 18 |
| 19 | 1.018 | 1482 | 170 | 1.012 | 1824 | 218 | 1.058 | 1800 | 145 | | | | 1.038 | 1824 | 178 | 1.067 | 1941 | 140 | 19 |
| 20 | 1.024 | 1521 | 167 | 1.004 | 1619 | 205 | 1.034 | 1604 | 162 | 1.008 | 1756 | 217 | 1.042 | 1785 | 167 | 1.033 | 1809 | 184 | 20 |
| 21 | .995 | 1535 | 207 | .985 | 1418 | 204 | 1.016 | 1531 | 179 | .992 | 1675 | 230 | 1.045 | 1604 | 146 | 1.037 | 1824 | 180 | 21 |
| 22 | .966 | 1447 | 231 | .972 | 1487 | 230 | .991 | 1447 | 200 | .959 | 1499 | 249 | 1.019 | 1447 | 164 | 1.031 | 1443 | 149 | 22 |
| 23 | .975 | 1320 | 201 | .950 | 1418 | 246 | .995 | 1418 | 191 | .928 | 1345 | 259 | .993 | 1252 | 171 | 1.000 | 1306 | 171 | 23 |

| DATE | 56:75 | | | 57:75 | | | 58:75 | | | 59:75 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | .987 | 1232 | 175 | .981 | 1134 | 167 | | | | .860 | 1428 | 360 | 0 |
| 1 | .959 | 998 | 166 | .900 | 890 | 194 | | | | .804 | 1130 | 340 | 1 |
| 2 | .843 | 738 | 197 | .765 | 699 | 234 | .665 | 743 | 313 | .676 | 846 | 349 | 2 |
| 3 | .794 | 645 | 200 | .711 | 655 | 250 | .602 | 704 | 336 | .615 | 758 | 353 | 3 |
| 4 | .739 | 587 | 210 | .689 | 665 | 267 | .599 | 724 | 347 | .598 | 773 | 371 | 4 |
| 5 | .795 | 709 | 219 | .676 | 650 | 268 | .616 | 753 | 349 | .624 | 841 | 385 | 5 |
| 6 | .763 | 587 | 197 | | | | .649 | 812 | 353 | .661 | 944 | 401 | 6 |
| 7 | .720 | 538 | 201 | | | | .689 | 880 | 353 | .664 | 949 | 401 | 7 |
| 8 | .673 | 597 | 248 | | | | | | | | | | 8 |
| 9 | | | | | | | | | | | | | 9 |
| 10 | | | | | | | | | | | | | 10 |
| 11 | | | | | | | | | | | | | 11 |
| 12 | | | | | | | | | | | | | 12 |
| 13 | | | | .668 | 729 | 306 | | | | | | | 13 |
| 14 | | | | .804 | 895 | 269 | | | | | | | 14 |
| 15 | .995 | 963 | 130 | .893 | 1105 | 247 | .893 | 1007 | 225 | .891 | 1203 | 271 | 15 |
| 16 | 1.012 | 1315 | 157 | .910 | 1232 | 258 | .922 | 1223 | 243 | .921 | 1369 | 273 | 16 |
| 17 | 1.034 | 1599 | 161 | .954 | 1457 | 248 | .920 | 1359 | 272 | .975 | 1721 | 262 | 17 |
| 18 | 1.040 | 1531 | 147 | 1.007 | 1760 | 218 | .974 | 1663 | 254 | 1.016 | 2122 | 247 | 18 |
| 19 | 1.068 | 1560 | 111 | 1.033 | 1936 | 197 | .985 | 1765 | 253 | 1.034 | 2225 | 225 | 19 |
| 20 | 1.074 | 1658 | 110 | .999 | 1702 | 223 | .987 | 1619 | 230 | 1.011 | 2108 | 255 | 20 |
| 21 | 1.054 | 1443 | 121 | .978 | 1819 | 272 | .964 | 1550 | 251 | .994 | 2020 | 275 | 21 |
| 22 | 1.020 | 1232 | 140 | | | | .956 | 1628 | 275 | 1.005 | 1990 | 251 | 22 |
| 23 | 1.016 | 1203 | 140 | | | | .937 | 1604 | 297 | .970 | 1712 | 268 | 23 |

Units of $N_T$ and $N_p$ are $10^{14}$ electrons-meter$^{-2}$.


ATS6 RBE - Boulder
$N_P$ ($10^{15}$ $m^{-2}$)
$N_T$ ($10^{16}$ $m^{-2}$)
$N_P$
$N_T$
F (MHz)
F
$h_{eff}$ (km)
1 Mar 75 (D#060)
2 Mar 75 (D#061)
3 Mar 75 (D#062)
4 Mar 75 (D#063)
5 Mar 75 (D#064)
6 Mar 75 (D#065)
7 Mar 75 (D#066)
8 Mar 75 (D#067)
9 Mar 75 (D#068)
10 Mar 75 (D#069)
11 Mar 75 (D#070)
12 Mar 75 (D#071)
(no data)

| DATE | 60:75 | | | 61:75 | | | 62:75 | | | 63:75 | | | 64:75 | | | 65:75 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | .896 | 1413 | 312 | | | | .914 | 1291 | 265 | | | | .974 | 1531 | 234 | .982 | 1125 | 164 | 0 |
| 1 | .845 | 1154 | 306 | | | | .835 | 1042 | 285 | | | | .927 | 1325 | 257 | .930 | 905 | 173 | 1 |
| 2 | .737 | 861 | 309 | | | | .681 | 792 | 323 | .740 | 861 | 307 | .844 | 934 | 248 | .826 | 714 | 201 | 2 |
| 3 | .695 | 773 | 306 | | | | .636 | 758 | 338 | .629 | 689 | 312 | .739 | 719 | 257 | .716 | 611 | 231 | 3 |
| 4 | .699 | 782 | 307 | | | | .627 | 743 | 338 | .629 | 699 | 317 | .749 | 738 | 257 | .687 | 655 | 264 | 4 |
| 5 | .706 | 807 | 312 | | | | .646 | 753 | 330 | .647 | 724 | 317 | .753 | 724 | 250 | .694 | 645 | 256 | 5 |
| 6 | | | | | | | | | | | | | | | | | | | 6 |
| 7 | .716 | 875 | 331 | .681 | 753 | 307 | | | | .637 | 773 | 344 | | | | .588 | 513 | 251 | 7 |
| 8 | .733 | 924 | 336 | .663 | 782 | 331 | | | | .627 | 792 | 360 | | | | .622 | 567 | 261 | 8 |
| 9 | .751 | 939 | 326 | .654 | 787 | 340 | | | | .642 | 812 | 359 | | | | .625 | 704 | 322 | 9 |
| 10 | .767 | 954 | 317 | .649 | 787 | 343 | | | | .646 | 807 | 354 | | | | | | | 10 |
| 11 | .753 | 875 | 302 | .671 | 807 | 336 | | | | .666 | 831 | 350 | | | | | | | 11 |
| 12 | .742 | 812 | 288 | .676 | 807 | 333 | | | | | | | | | | | | | 12 |
| 13 | .712 | 626 | 238 | .682 | 758 | 309 | .667 | 714 | 300 | | | | .809 | 504 | 149 | | | | 13 |
| 14 | .872 | 763 | 185 | .848 | 963 | 253 | .925 | 954 | 187 | | | | 1.005 | 900 | 114 | | | | 14 |
| 15 | .949 | 993 | 173 | .918 | 1208 | 244 | .914 | 1237 | 254 | .967 | 1178 | 188 | 1.047 | 1154 | 104 | 1.100 | 861 | 38 | 15 |
| 16 | .972 | 1262 | 195 | .921 | 1164 | 231 | .962 | 1462 | 239 | .993 | 1384 | 189 | 1.056 | 1340 | 110 | 1.096 | 1071 | 50 | 16 |
| 17 | 1.027 | 1609 | 172 | .966 | 1242 | 199 | .973 | 1462 | 225 | 1.012 | 1643 | 198 | 1.081 | 1462 | 87 | 1.058 | 1355 | 108 | 17 |
| 18 | 1.060 | 1971 | 154 | .972 | 1487 | 230 | 1.018 | 1760 | 202 | 1.028 | 1800 | 190 | 1.080 | 1736 | 106 | 1.058 | 1614 | 130 | 18 |
| 19 | | | | .983 | 1535 | 222 | 1.030 | 1888 | 197 | 1.047 | 1677 | 151 | 1.076 | 1917 | 123 | 1.084 | 2010 | 115 | 19 |
| 20 | | | | 1.004 | 1726 | 219 | 1.011 | 1932 | 234 | 1.043 | 1619 | 150 | 1.065 | 1971 | 146 | 1.095 | 2005 | 96 | 20 |
| 21 | | | | 1.000 | 1775 | 231 | 1.011 | 1922 | 232 | 1.039 | 1643 | 159 | 1.059 | 1888 | 150 | 1.071 | 1712 | 118 | 21 |
| 22 | | | | 1.009 | 1736 | 213 | | | | 1.011 | 1526 | 184 | 1.066 | 1452 | 106 | 1.048 | 1369 | 121 | 22 |
| 23 | | | | .980 | 1545 | 229 | | | | 1.007 | 1604 | 199 | 1.017 | 1252 | 145 | 1.032 | 1247 | 128 | 23 |

| DATE | 66:75 | | | | 68:75 | | | 69:75 | | | 70:75 | | | 71:75 | | | DATE |
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| HR | F140 | NT | NP | | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
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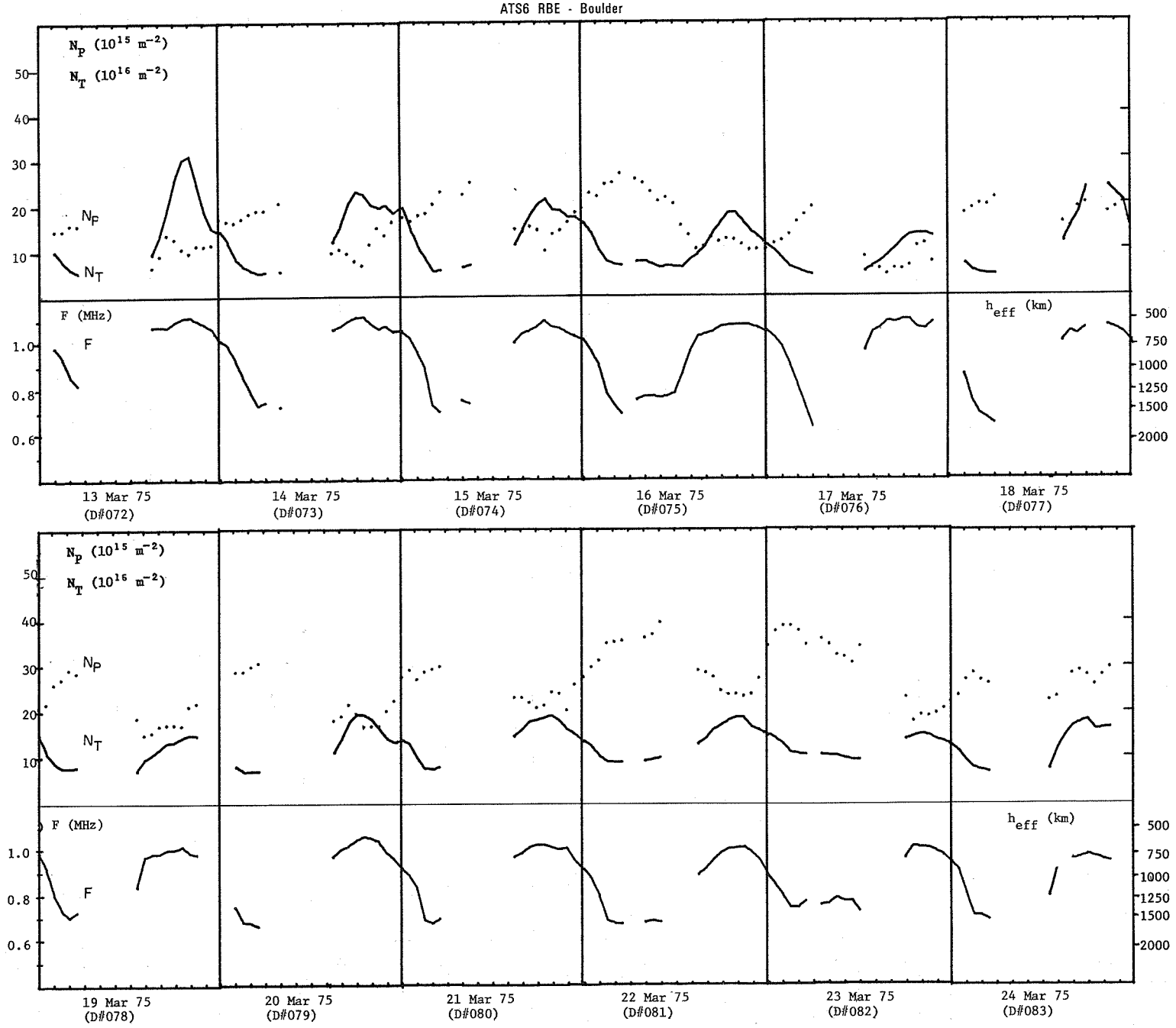
| 1 | .980 | 978 | 144 | | | | | .973 | 1614 | 248 | | | | 1.004 | 963 | 123 | 1 |
| 2 | .871 | 719 | 174 | | | | | .948 | 1281 | 225 | .852 | 719 | 187 | .849 | 601 | 157 | 2 |
| 3 | .787 | 582 | 184 | | | | | .944 | 988 | 177 | .776 | 689 | 224 | .808 | 494 | 147 | 3 |
| 4 | .734 | 533 | 193 | | | | | .963 | 1027 | 167 | .758 | 714 | 243 | .728 | 504 | 185 | 4 |
| 5 | .705 | 538 | 208 | | | | | .963 | 1017 | 166 | .741 | 787 | 280 | .763 | 518 | 175 | 5 |
| 6 | | | | | | | | | | | .806 | 978 | 292 | .799 | 538 | 164 | 6 |
| 7 | | | | | .684 | 655 | 266 | .799 | 533 | 163 | | | | | | | 7 |
| 8 | | | | | .664 | 689 | 291 | .725 | 469 | 173 | | | | .832 | 601 | 166 | 8 |
| 9 | | | | | .669 | 709 | 297 | | | | | | | | | | 9 |
| 10 | | | | | .687 | 714 | 287 | | | | | | | | | | 10 |
| 11 | | | | NO DATA | .721 | 729 | 272 | | | | | | | | | | 11 |
| 12 | | | | | .710 | 699 | 267 | | | | | | | | | | 12 |
| 13 | | | | | .753 | 641 | 221 | .924 | 235 | 46 | | | | .980 | 269 | 40 | 13 |
| 14 | | | | | .923 | 910 | 180 | 1.024 | 582 | 64 | | | | 1.085 | 601 | 34 | 14 |
| 15 | .981 | 1066 | 157 | | .990 | 1223 | 170 | 1.072 | 919 | 63 | 1.036 | 880 | 87 | 1.129 | 797 | 15 | 15 |
| 16 | .990 | 1257 | 175 | | 1.014 | 1428 | 169 | 1.076 | 1017 | 65 | 1.034 | 1056 | 106 | 1.109 | 1232 | 44 | 16 |
| 17 | 1.008 | 1447 | 178 | | 1.029 | 1716 | 181 | 1.085 | 1149 | 65 | 1.024 | 1311 | 144 | 1.108 | 1633 | 59 | 17 |
| 18 | 1.035 | 1575 | 158 | | 1.042 | 1658 | 156 | 1.088 | 1345 | 72 | 1.031 | 1335 | 138 | 1.126 | 2156 | 45 | 18 |
| 19 | 1.039 | 1589 | 153 | | 1.015 | 1775 | 208 | 1.089 | 1521 | 81 | 1.057 | 1384 | 111 | 1.124 | 2372 | 54 | 19 |
| 20 | 1.047 | 1570 | 140 | | 1.050 | 1858 | 161 | 1.043 | 1775 | 166 | 1.065 | 1457 | 107 | 1.105 | 2450 | 97 | 20 |
| 21 | 1.019 | 1731 | 198 | | 1.047 | 1873 | 169 | 1.046 | 1741 | 158 | 1.052 | 1364 | 116 | 1.099 | 2249 | 99 | 21 |
| 22 | 1.034 | 1540 | 155 | | 1.032 | 1804 | 185 | 1.051 | 1599 | 138 | 1.040 | 1198 | 114 | | | | 22 |
| 23 | 1.007 | 1443 | 179 | | 1.013 | 1633 | 195 | | | | 1.020 | 1306 | 148 | | | | 23 |

Units of $N_T$ and $N_P$ are $10^{14}$ electrons-meter$^{-2}$.

ATS6 RBE - Boulder



| DATE | 72:75 | | | 73:75 | | | 74:75 | | | 75:75 | | | 76:75 | | | 77:75 | | | DATE |
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| 0 | | | | 1.012 | 1418 | 170 | 1.045 | 1941 | 177 | 1.011 | 1575 | 191 | 1.044 | 1076 | 99 | | | | 0 |
| 1 | | | | .988 | 1174 | 165 | 1.019 | 1472 | 168 | .960 | 1359 | 224 | 1.016 | 954 | 111 | | | | 1 |
| 2 | .983 | 1002 | 146 | .927 | 831 | 162 | .957 | 1076 | 180 | .902 | 1002 | 216 | .975 | 778 | 118 | .852 | 699 | 181 | 2 |
| 3 | .935 | 782 | 146 | .854 | 660 | 170 | .889 | 817 | 186 | .778 | 753 | 244 | .900 | 601 | 131 | .743 | 543 | 192 | 3 |
| 4 | .858 | 626 | 159 | .787 | 577 | 182 | .727 | 557 | 205 | .726 | 670 | 247 | .810 | 538 | 159 | .681 | 494 | 201 | 4 |
| 5 | .818 | 543 | 157 | .726 | 513 | 189 | .694 | 587 | 233 | .684 | 655 | 266 | .721 | 469 | 175 | .659 | 465 | 198 | 5 |
| 6 | | | | .742 | 533 | 189 | | | | | | | .627 | 421 | 191 | .634 | 479 | 215 | 6 |
| 7 | | | | | | | | | | .748 | 729 | 254 | | | | | | | 7 |
| 8 | | | | .723 | 553 | 205 | .747 | 645 | 226 | .762 | 729 | 246 | | | | | | | 8 |
| 9 | | | | | | | .733 | 694 | 252 | .763 | 675 | 227 | | | | | | | 9 |
| 10 | | | | | | | | | | .755 | 601 | 207 | | | | | | | 10 |
| 11 | | | | | | | | | | .762 | 636 | 214 | | | | | | | 11 |
| 12 | | | | | | | | | | .776 | 616 | 200 | | | | | | | 12 |
| 13 | | | | | | | | | | .862 | 606 | 152 | .961 | 509 | 84 | | | | 13 |
| 14 | | | | | | | | | | .956 | 768 | 130 | 1.040 | 616 | 59 | | | | 14 |
| 15 | 1.070 | 944 | 66 | 1.058 | 1188 | 96 | .998 | 1125 | 148 | 1.022 | 895 | 100 | 1.058 | 709 | 57 | .994 | 1188 | 161 | 15 |
| 16 | 1.071 | 1330 | 91 | 1.073 | 1531 | 103 | 1.038 | 1457 | 142 | 1.035 | 1061 | 106 | 1.089 | 851 | 45 | 1.037 | 1531 | 151 | 16 |
| 17 | 1.067 | 1883 | 136 | 1.097 | 2015 | 94 | 1.049 | 1775 | 155 | 1.042 | 1340 | 125 | 1.083 | 998 | 58 | 1.027 | 1814 | 194 | 17 |
| 18 | 1.093 | 2548 | 126 | 1.112 | 2289 | 77 | 1.066 | 2010 | 147 | 1.065 | 1565 | 116 | 1.094 | 1169 | 57 | 1.051 | 2357 | 203 | 18 |
| 19 | 1.110 | 3002 | 105 | 1.114 | 2230 | 69 | 1.095 | 2132 | 102 | 1.072 | 1795 | 122 | 1.093 | 1291 | 64 | | | | 19 |
| 20 | 1.114 | 3090 | 96 | 1.085 | 2005 | 114 | 1.066 | 1892 | 139 | 1.073 | 1800 | 120 | 1.058 | 1325 | 106 | | | | 20 |
| 21 | 1.098 | 2494 | 113 | 1.061 | 1932 | 150 | 1.060 | 1878 | 147 | 1.072 | 1609 | 109 | 1.053 | 1320 | 111 | 1.062 | 2391 | 183 | 21 |
| 22 | 1.082 | 1888 | 111 | 1.073 | 1990 | 133 | 1.040 | 1731 | 166 | 1.070 | 1403 | 97 | 1.084 | 1257 | 72 | 1.050 | 2225 | 193 | 22 |
| 23 | 1.062 | 1511 | 115 | 1.047 | 1824 | 164 | 1.026 | 1736 | 187 | 1.058 | 1247 | 100 | | | | 1.033 | 2059 | 210 | 23 |

| DATE | 78:75 | | | 79:75 | | | 80:75 | | | 81:75 | | | 82:75 | | | 83:75 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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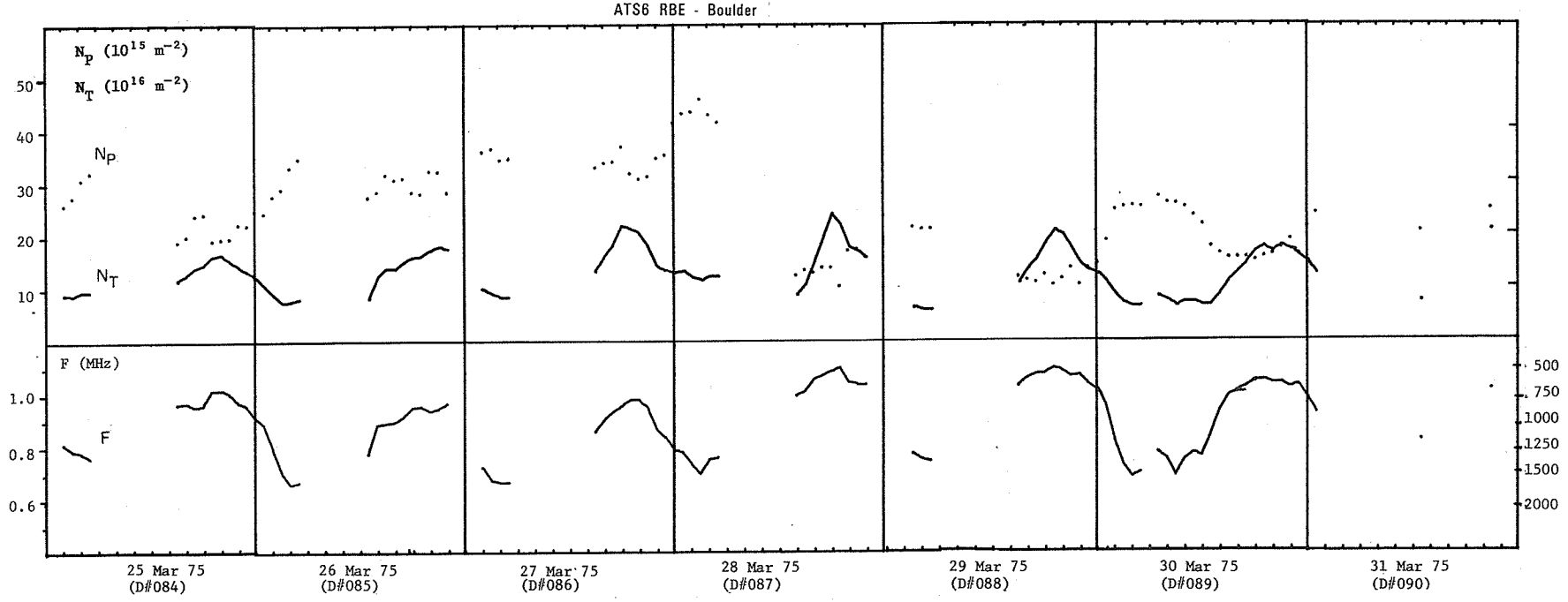
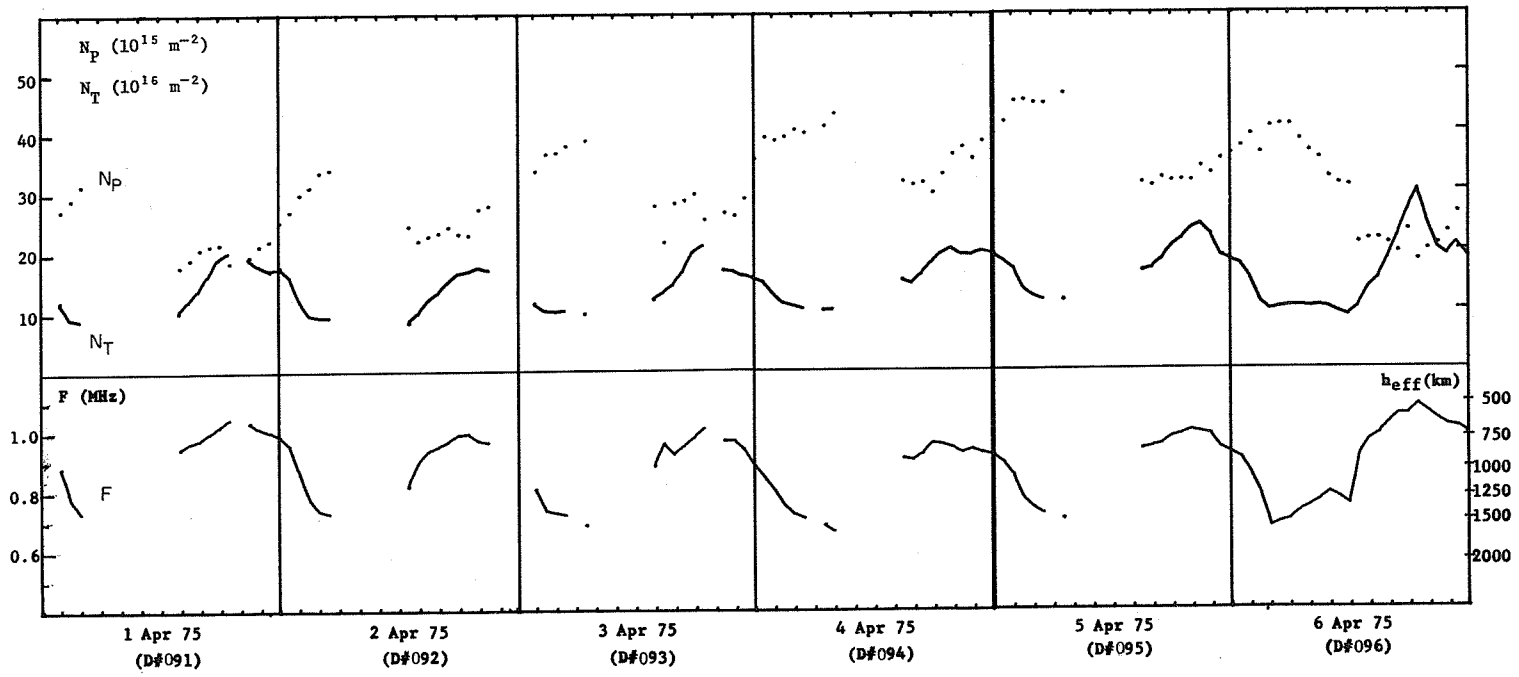
| 0 | .987 | 1477 | 210 | | | | .913 | 1335 | 276 | .908 | 1301 | 273 | .879 | 1467 | 346 | .941 | 1218 | 222 | 0 |
| 1 | .916 | 1071 | 218 | | | | .881 | 1247 | 292 | .865 | 1188 | 295 | .841 | 1403 | 378 | .906 | 1105 | 234 | 1 |
| 2 | .803 | 861 | 260 | .746 | 826 | 291 | .829 | 968 | 270 | .792 | 993 | 309 | .792 | 1247 | 389 | .806 | 895 | 267 | 2 |
| 3 | .734 | 748 | 271 | .677 | 709 | 291 | .687 | 714 | 287 | .685 | 861 | 348 | .737 | 1081 | 388 | .707 | 734 | 282 | 3 |
| 4 | .702 | 748 | 292 | .673 | 729 | 302 | .671 | 704 | 293 | .671 | 846 | 352 | .736 | 1051 | 378 | .706 | 689 | 266 | 4 |
| 5 | .726 | 768 | 283 | .658 | 724 | 310 | .691 | 748 | 299 | .668 | 846 | 354 | .764 | 1037 | 348 | .688 | 645 | 259 | 5 |
| 6 | | | | | | | | | | | | | | | | | | | 6 |
| 7 | | | | | | | | | | | | | .749 | 1037 | 362 | | | | 7 |
| 8 | | | | | | | | | | .676 | 875 | 361 | .755 | 1017 | 349 | | | | 8 |
| 9 | | | | | | | | | | .683 | 905 | 367 | .781 | 1012 | 325 | | | | 9 |
| 10 | | | | | | | | | | .676 | 954 | 393 | .766 | 958 | 320 | | | | 10 |
| 11 | | | | | | | | | | | | | .768 | 924 | 307 | | | | 11 |
| 12 | | | | | | | | | | | | | .722 | 924 | 344 | | | | 12 |
| 13 | .838 | 685 | 186 | | | | | | | | | | | | | .793 | 724 | 225 | 13 |
| 14 | .966 | 929 | 148 | | | | | | | | | | | | | .915 | 1134 | 232 | 14 |
| 15 | .980 | 1037 | 154 | .964 | 1144 | 185 | .962 | 1418 | 232 | .884 | 1242 | 287 | | | | | | | 15 |
| 16 | .983 | 1159 | 168 | .995 | 1443 | 195 | .978 | 1560 | 233 | .912 | 1364 | 282 | | | | .955 | 1658 | 281 | 16 |
| 17 | .998 | 1296 | 171 | 1.010 | 1814 | 221 | 1.004 | 1746 | 221 | .950 | 1570 | 272 | | | | .961 | 1751 | 288 | 17 |
| 18 | .998 | 1306 | 172 | 1.034 | 1985 | 200 | 1.015 | 1785 | 209 | .981 | 1663 | 244 | .955 | 1379 | 233 | .974 | 1809 | 278 | 18 |
| 19 | 1.013 | 1413 | 169 | 1.051 | 1966 | 170 | 1.016 | 1834 | 214 | .997 | 1770 | 235 | 1.005 | 1438 | 181 | .965 | 1604 | 257 | 19 |
| 20 | .985 | 1477 | 211 | 1.044 | 1858 | 171 | 1.002 | 1888 | 243 | 1.003 | 1844 | 236 | .999 | 1487 | 195 | .953 | 1628 | 278 | 20 |
| 21 | .977 | 1452 | 219 | 1.031 | 1648 | 171 | .994 | 1770 | 240 | 1.003 | 1824 | 232 | .997 | 1447 | 193 | .943 | 1636 | 294 | 21 |
| 22 | | | | .985 | 1433 | 206 | 1.002 | 1584 | 204 | .983 | 1623 | 236 | .985 | 1379 | 198 | | | | 22 |
| 23 | | | | .956 | 1355 | 228 | .947 | 1472 | 259 | .950 | 1555 | 270 | .967 | 1311 | 209 | | | | 23 |

Units of $N_T$ and $N_p$ are $10^{14}$ electrons-meter$^{-2}$.

ATS6 RBE - Boulder



| DATE | 84:75 | | | 85:75 | | | 86:75 | | | 87:75 | | | 88:75 | | | 89:75 | | | 90:75 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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| 0 | | | | .916 | 1218 | 248 | | | | .785 | 1296 | 411 | | | | 1.013 | 1242 | 148 | .981 | 1462 | 214 | 0 |
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| 2 | .811 | 885 | 261 | .797 | 900 | 276 | .723 | 968 | 359 | .734 | 1198 | 433 | | | | .817 | 861 | 249 | | | | 2 |
| 3 | .785 | 866 | 275 | .708 | 753 | 290 | .672 | 880 | 366 | .696 | 1154 | 456 | .770 | 653 | 216 | .727 | 694 | 256 | | | | 3 |
| 4 | .778 | 954 | 308 | .658 | 773 | 330 | .664 | 812 | 343 | .752 | 1232 | 427 | .749 | 606 | 212 | .681 | 631 | 257 | | | | 4 |
| 5 | .758 | 944 | 322 | .667 | 826 | 347 | .666 | 822 | 346 | .760 | 1213 | 411 | .741 | 597 | 212 | .698 | 650 | 256 | | | | 5 |
| 6 | | | | | | | | | | | | | | | | | | | | | | 6 |
| 7 | | | | | | | | | | | | | | | | .773 | 836 | 274 | | | | 7 |
| 8 | | | | | | | | | | | | | | | | .748 | 753 | 263 | | | | 8 |
| 9 | | | | | | | | | | | | | | | | .683 | 641 | 260 | | | | 9 |
| 10 | | | | | | | | | | | | | | | | .745 | 724 | 255 | | | | 10 |
| 11 | | | | | | | | | | | | | | | | .770 | 724 | 239 | | | | 11 |
| 12 | | | | | | | | | | | | | | | | .757 | 650 | 222 | | | | 12 |
| 13 | | | | .776 | 841 | 274 | | | | | | | | | | .838 | 665 | 180 | .823 | 724 | 206 | 13 |
| 14 | | | | .886 | 1237 | 284 | | | | .991 | 875 | 121 | | | | .929 | 870 | 167 | | | | 14 |
| 15 | .960 | 1159 | 191 | .891 | 1403 | 316 | .859 | 1296 | 328 | 1.009 | 1071 | 131 | 1.027 | 1115 | 119 | .986 | 1110 | 158 | | | | 15 |
| 16 | .964 | 1247 | 202 | .896 | 1389 | 307 | .903 | 1570 | 338 | 1.054 | 1496 | 125 | 1.055 | 1381 | 114 | 1.006 | 1271 | 159 | | | | 16 |
| 17 | .950 | 1389 | 241 | .916 | 1521 | 310 | .932 | 1795 | 341 | 1.070 | 1956 | 136 | 1.070 | 1570 | 109 | 1.023 | 1443 | 159 | | | | 17 |
| 18 | .956 | 1447 | 244 | .949 | 1619 | 283 | .954 | 2166 | 368 | 1.085 | 2421 | 136 | 1.074 | 1863 | 123 | 1.044 | 1667 | 153 | | | | 18 |
| 19 | 1.012 | 1619 | 194 | .954 | 1638 | 279 | .978 | 2112 | 316 | 1.098 | 2210 | 101 | 1.093 | 2108 | 104 | 1.046 | 1775 | 161 | | | | 19 |
| 20 | 1.012 | 1648 | 197 | .937 | 1746 | 323 | .977 | 2039 | 307 | 1.041 | 1780 | 169 | 1.084 | 2029 | 117 | 1.036 | 1667 | 166 | | | | 20 |
| 21 | 1.001 | 1521 | 197 | .946 | 1809 | 322 | .951 | 1800 | 312 | 1.034 | 1707 | 171 | 1.061 | 1765 | 137 | 1.035 | 1787 | 178 | 1.013 | 2078 | 247 | 21 |
| 22 | .968 | 1418 | 225 | .965 | 1756 | 282 | .869 | 1418 | 346 | 1.036 | 1579 | 157 | 1.068 | 1477 | 106 | 1.020 | 1716 | 194 | | | | 22 |
| 23 | .953 | 1296 | 222 | | | | .835 | 1296 | 355 | | | | 1.032 | 1330 | 137 | 1.031 | 1604 | 166 | | | | 23 |



| DATE | 91:75 | | | 92:75 | | | 93:75 | | | 94:75 | | | 95:75 | | | 96:75 | | | DATE |
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| 2 | .883 | 1169 | 272 | .867 | 1213 | 298 | .807 | 1130 | 336 | .802 | 1286 | 389 | .849 | 1726 | 452 | .850 | 1516 | 395 | 2 |
| 3 | .777 | 895 | 290 | .781 | 963 | 309 | .735 | 1012 | 365 | .753 | 1139 | 394 | .773 | 1384 | 454 | .780 | 1134 | 365 | 3 |
| 4 | .733 | 866 | 314 | .738 | 934 | 335 | .728 | 1002 | 368 | .724 | 1095 | 406 | .741 | 1262 | 449 | .674 | 988 | 409 | 4 |
| 5 | | | | .728 | 924 | 339 | .721 | 1017 | 379 | .709 | 1046 | 401 | .721 | 1203 | 449 | .687 | 1022 | 411 | 5 |
| 6 | | | | | | | | | | | | | | | | .696 | 1042 | 411 | 6 |
| 7 | | | | | | | .689 | 968 | 388 | .686 | 1022 | 412 | .704 | 1198 | 465 | .724 | 1046 | 387 | 7 |
| 8 | | | | | | | | | | .665 | 1027 | 433 | | | | .741 | 1032 | 367 | 8 |
| 9 | | | | | | | | | | | | | | | | .759 | 1046 | 356 | 9 |
| 10 | | | | | | | | | | | | | | | | .785 | 1022 | 324 | 10 |
| 11 | | | | | | | | | | | | | | | | .769 | 944 | 313 | 11 |
| 12 | | | | | | | | | | | | | | | | .746 | 880 | 309 | 12 |
| 13 | | | | .817 | 846 | 245 | | | | | | | | | | .909 | 1017 | 213 | 13 |
| 14 | .945 | 998 | 178 | .896 | 998 | 220 | .884 | 1208 | 279 | | | | | | | .962 | 1330 | 218 | 14 |
| 15 | .965 | 1178 | 190 | .934 | 1213 | 227 | .959 | 1311 | 218 | .908 | 1516 | 319 | .934 | 1677 | 315 | .981 | 1491 | 219 | 15 |
| 16 | .975 | 1359 | 207 | .950 | 1340 | 233 | .925 | 1443 | 283 | .904 | 1465 | 314 | .943 | 1721 | 309 | 1.017 | 1834 | 212 | 16 |
| 17 | .998 | 1609 | 213 | .966 | 1521 | 243 | .951 | 1663 | 288 | .923 | 1609 | 317 | .951 | 1863 | 323 | 1.047 | 2210 | 197 | 17 |
| 18 | 1.019 | 1888 | 215 | .989 | 1658 | 232 | .978 | 1990 | 298 | .959 | 1800 | 300 | .974 | 2078 | 317 | 1.048 | 2631 | 234 | 18 |
| 19 | 1.043 | 1995 | 185 | .994 | 1694 | 230 | 1.010 | 2098 | 256 | .955 | 1956 | 331 | .984 | 2201 | 318 | 1.079 | 2988 | 184 | 19 |
| 20 | | | | .971 | 1756 | 273 | | | | .945 | 2044 | 364 | .996 | 2377 | 318 | 1.056 | 2450 | 201 | 20 |
| 21 | 1.033 | 1902 | 194 | .964 | 1716 | 278 | .970 | 1702 | 267 | .928 | 1946 | 376 | .990 | 2455 | 342 | 1.030 | 2022 | 210 | 21 |
| 22 | 1.014 | 1785 | 212 | | | | .970 | 1677 | 263 | .938 | 1936 | 357 | .984 | 2289 | 330 | 1.011 | 1897 | 230 | 22 |
| 23 | 1.002 | 1712 | 220 | | | | .941 | 1604 | 291 | .928 | 1995 | 386 | .939 | 1932 | 354 | 1.005 | 2088 | 264 | 23 |

Units of $N_T$ and $N_p$ are $10^{14}$ electrons-meter$^{-2}$.

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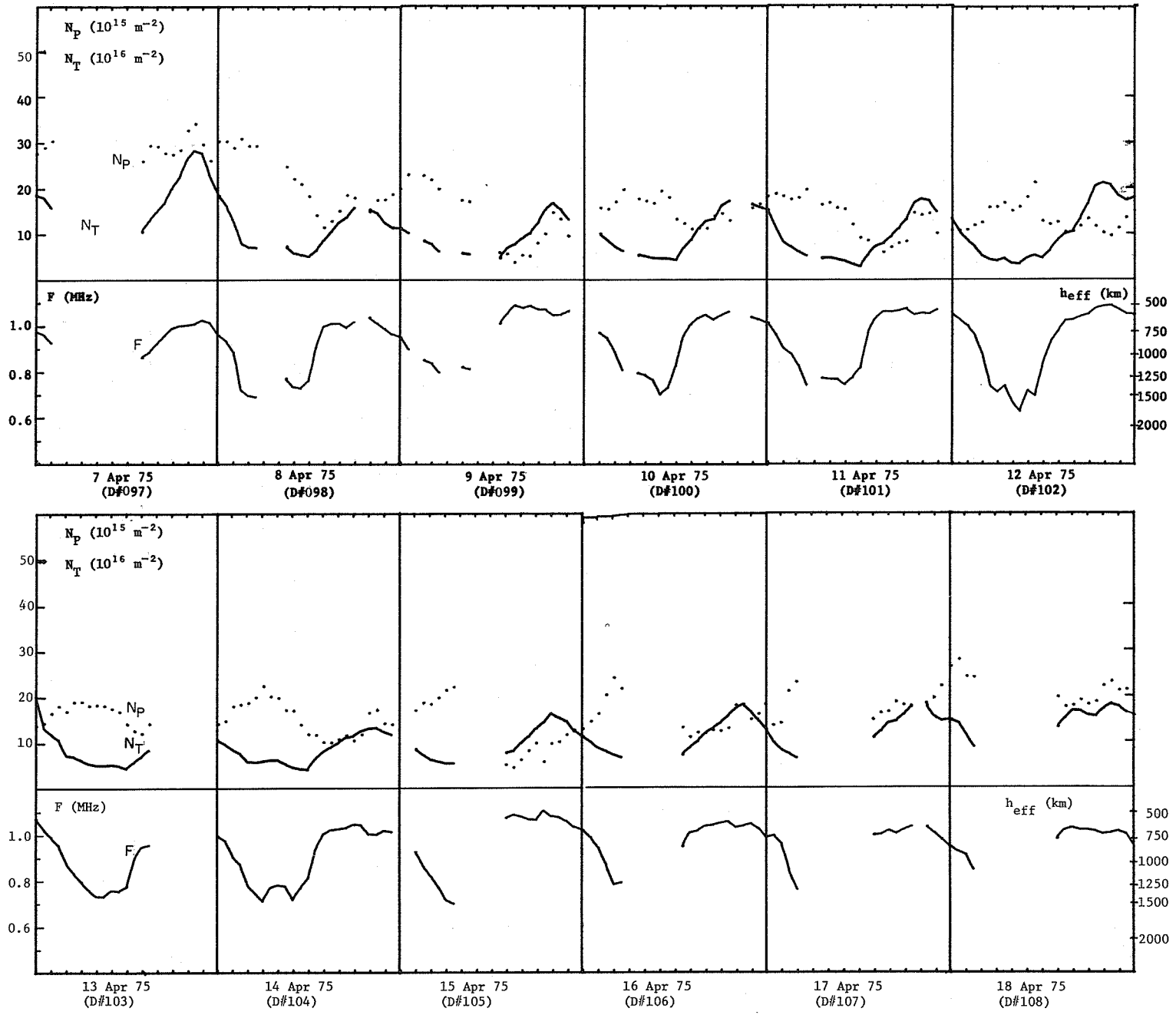

| DATE | 97:75 | | | 98:75 | | | 99:75 | | | 100:75 | | | 101:75 | | | 102:75 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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| 1 | .964 | 1800 | 291 | .938 | 1653 | 304 | .901 | 1066 | 231 | | | | .964 | 1169 | 189 | 1.032 | 1071 | 110 | 1 |
| 2 | .929 | 1584 | 305 | .889 | 1281 | 291 | | | | .973 | 1032 | 158 | .904 | 861 | 184 | 1.005 | 885 | 111 | 2 |
| 3 | | | | .725 | 836 | 309 | .854 | 890 | 229 | .951 | 900 | 156 | .880 | 753 | 177 | .963 | 743 | 121 | 3 |
| 4 | | | | .700 | 753 | 295 | .841 | 822 | 220 | .891 | 758 | 171 | .829 | 645 | 180 | .878 | 538 | 127 | 4 |
| 5 | | | | .692 | 738 | 294 | .801 | 660 | 200 | .811 | 670 | 198 | .744 | 557 | 197 | .744 | 455 | 160 | 5 |
| 6 | | | | | | | | | | | | | | | | .715 | 425 | 161 | 6 |
| 7 | | | | | | | | | | .798 | 582 | 178 | .773 | 504 | 165 | .742 | 479 | 170 | 7 |
| 8 | | | | | | | .822 | 616 | 176 | .789 | 553 | 174 | .769 | 509 | 168 | .669 | 367 | 153 | 8 |
| 9 | | | | .773 | 760 | 249 | .815 | 592 | 172 | .769 | 509 | 168 | .770 | 479 | 158 | .630 | 357 | 161 | 9 |
| 10 | | | | .738 | 621 | 223 | | | | .704 | 504 | 195 | .747 | 445 | 156 | .721 | 489 | 182 | 10 |
| 11 | | | | .731 | 582 | 212 | | | | .731 | 499 | 182 | .775 | 377 | 123 | .699 | 548 | 215 | 11 |
| 12 | | | | .762 | 548 | 185 | | | | .825 | 474 | 134 | .816 | 323 | 94 | .837 | 484 | 132 | 12 |
| 13 | | | | .907 | 680 | 144 | 1.013 | 518 | 62 | .955 | 738 | 125 | .972 | 567 | 88 | .927 | 641 | 124 | 13 |
| 14 | .867 | 1066 | 262 | 1.000 | 900 | 117 | 1.057 | 729 | 59 | 1.007 | 910 | 113 | 1.035 | 758 | 76 | .979 | 866 | 129 | 14 |
| 15 | .887 | 1291 | 295 | 1.013 | 1090 | 130 | 1.093 | 807 | 40 | 1.036 | 1154 | 114 | 1.063 | 822 | 62 | 1.028 | 1017 | 108 | 15 |
| 16 | .924 | 1496 | 294 | 1.014 | 1291 | 152 | 1.082 | 944 | 55 | 1.051 | 1325 | 114 | 1.063 | 968 | 73 | 1.032 | 1066 | 109 | 16 |
| 17 | .958 | 1677 | 280 | .997 | 1403 | 187 | 1.091 | 1051 | 54 | 1.031 | 1364 | 141 | 1.068 | 1144 | 81 | 1.046 | 1335 | 121 | 17 |
| 18 | .991 | 2000 | 276 | 1.020 | 1604 | 182 | 1.075 | 1267 | 82 | 1.048 | 1648 | 146 | 1.076 | 1335 | 85 | 1.056 | 1663 | 136 | 18 |
| 19 | 1.003 | 2235 | 285 | | | | 1.075 | 1565 | 102 | 1.064 | 1753 | 132 | 1.050 | 1697 | 148 | 1.083 | 2054 | 120 | 19 |
| 20 | 1.006 | 2631 | 329 | 1.039 | 1579 | 152 | 1.050 | 1707 | 149 | | | | 1.058 | 1790 | 144 | 1.092 | 2132 | 107 | 20 |
| 21 | 1.011 | 2831 | 343 | 1.015 | 1501 | 176 | 1.052 | 1575 | 135 | | | | 1.054 | 1756 | 146 | 1.095 | 2088 | 100 | 21 |
| 22 | 1.027 | 2782 | 298 | .992 | 1291 | 177 | 1.067 | 1355 | 98 | 1.042 | 1692 | 159 | 1.072 | 1521 | 104 | 1.078 | 1863 | 116 | 22 |
| 23 | 1.018 | 2289 | 263 | .967 | 1188 | 189 | | | | 1.033 | 1633 | 167 | | | | 1.059 | 1760 | 139 | 23 |

| DATE | 103:75 | | | 104:75 | | | 105:75 | | | 106:75 | | | 107:75 | | | 108:75 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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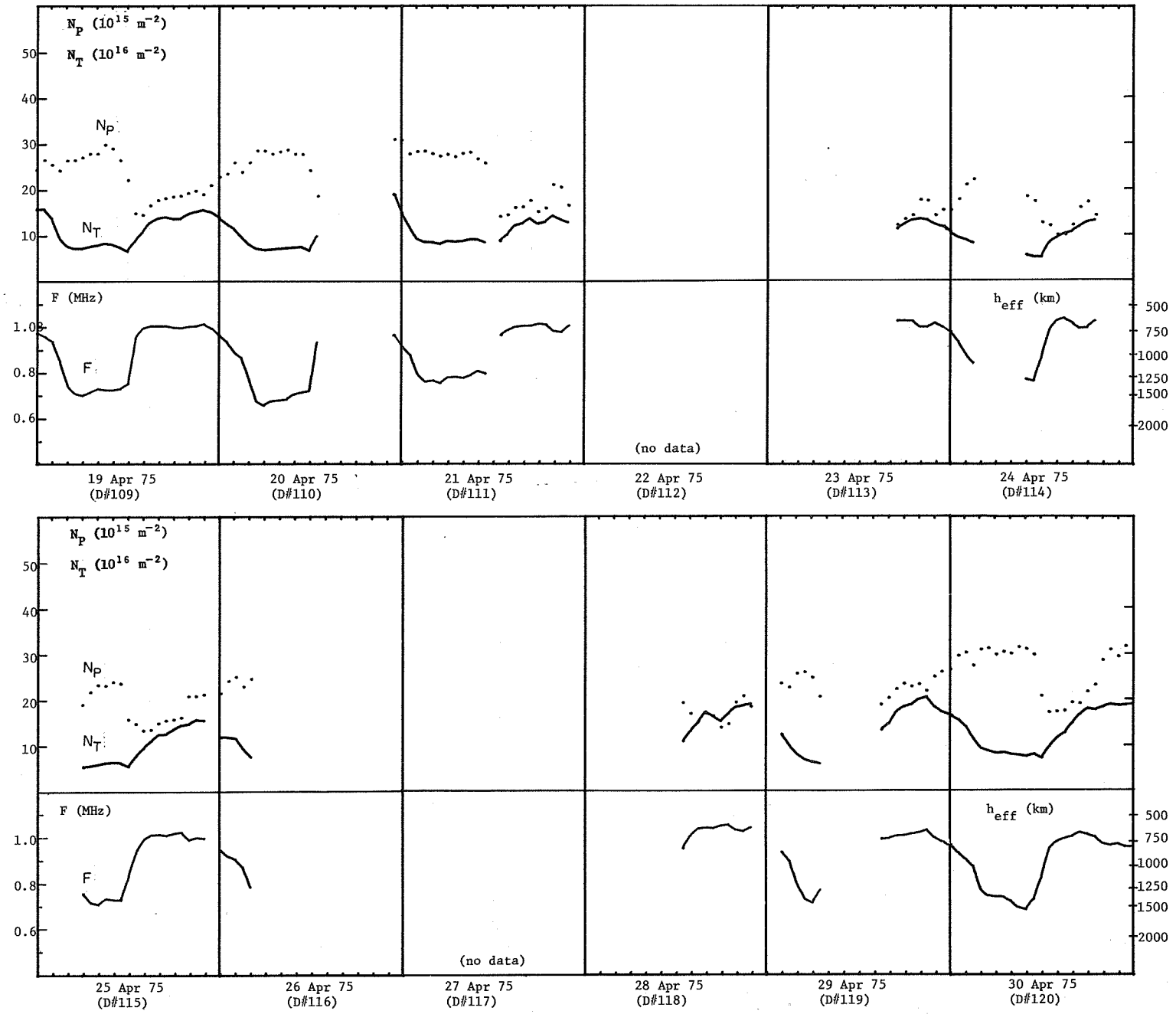
| 0 | 1.071 | 1995 | 137 | .994 | 1042 | 141 | | | | 1.019 | 1149 | 130 | .987 | 1296 | 184 | .947 | 1506 | 265 | 0 |
| 1 | 1.026 | 1320 | 143 | .974 | 963 | 147 | | | | .989 | 1042 | 146 | .995 | 1027 | 139 | .927 | 1447 | 281 | 1 |
| 2 | .990 | 1183 | 165 | .906 | 846 | 180 | .924 | 870 | 171 | .943 | 905 | 163 | .960 | 866 | 143 | .913 | 1183 | 244 | 2 |
| 3 | .955 | 1061 | 180 | .872 | 758 | 183 | .862 | 748 | 188 | .870 | 836 | 203 | .837 | 778 | 212 | .849 | 924 | 242 | 3 |
| 4 | .877 | 714 | 169 | .780 | 582 | 187 | .820 | 645 | 185 | .784 | 758 | 242 | .761 | 685 | 232 | | | | 4 |
| 5 | .835 | 689 | 189 | .747 | 567 | 199 | .772 | 601 | 198 | .791 | 699 | 218 | | | | | | | 5 |
| 6 | .796 | 616 | 190 | .712 | 587 | 224 | .715 | 567 | 215 | | | | | | | | | | 6 |
| 7 | .761 | 538 | 182 | .769 | 611 | 202 | .700 | 567 | 222 | | | | | | | | | | 7 |
| 8 | .732 | 504 | 183 | .780 | 616 | 198 | | | | | | | | | | | | | 8 |
| 9 | .731 | 499 | 182 | .775 | 528 | 172 | | | | | | | | | | | | | 9 |
| 10 | .758 | 513 | 175 | .718 | 455 | 171 | | | | | | | | | | | | | 10 |
| 11 | .754 | 489 | 168 | .766 | 421 | 140 | | | | | | | | | | | | | 11 |
| 12 | .772 | 430 | 141 | .809 | 401 | 119 | | | | | | | | | | | | | 12 |
| 13 | .890 | 562 | 127 | .935 | 631 | 118 | | | | .947 | 758 | 134 | | | | | | | 13 |
| 14 | .945 | 680 | 121 | 1.000 | 782 | 102 | 1.073 | 797 | 53 | 1.007 | 910 | 113 | .996 | 1130 | 151 | .981 | 1359 | 200 | 14 |
| 15 | .954 | 826 | 141 | 1.019 | 885 | 101 | 1.086 | 836 | 47 | 1.015 | 1037 | 122 | 1.000 | 1267 | 165 | 1.018 | 1555 | 178 | 15 |
| 16 | | | | 1.024 | 983 | 108 | 1.079 | 1007 | 63 | 1.036 | 1223 | 121 | 1.017 | 1447 | 168 | 1.029 | 1716 | 181 | 16 |
| 17 | | | | 1.029 | 1105 | 116 | 1.067 | 1149 | 83 | 1.040 | 1325 | 127 | 1.004 | 1491 | 189 | 1.020 | 1707 | 193 | 17 |
| 18 | | | | 1.043 | 1134 | 105 | 1.064 | 1320 | 99 | 1.050 | 1447 | 126 | 1.021 | 1628 | 183 | 1.019 | 1619 | 184 | 18 |
| 19 | | | | 1.041 | 1242 | 118 | 1.103 | 1457 | 60 | 1.056 | 1599 | 131 | 1.034 | 1790 | 181 | 1.014 | 1599 | 189 | 19 |
| 20 | | | | 1.004 | 1301 | 166 | 1.081 | 1648 | 99 | 1.032 | 1760 | 181 | | | | 1.003 | 1751 | 224 | 20 |
| 21 | | | | 1.000 | 1315 | 172 | 1.075 | 1565 | 102 | 1.037 | 1853 | 182 | 1.032 | 1814 | 186 | 1.006 | 1858 | 233 | 21 |
| 22 | | | | 1.017 | 1232 | 143 | 1.059 | 1487 | 117 | 1.047 | 1692 | 151 | 1.008 | 1589 | 197 | 1.014 | 1809 | 214 | 22 |
| 23 | | | | 1.012 | 1174 | 141 | 1.034 | 1267 | 128 | 1.026 | 1504 | 162 | .979 | 1501 | 223 | 1.003 | 1682 | 216 | 23 |

Units of $N_T$ and $N_P$ are $10^{14}$ electrons-meter$^{-2}$.

ATS6 RBE - Boulder

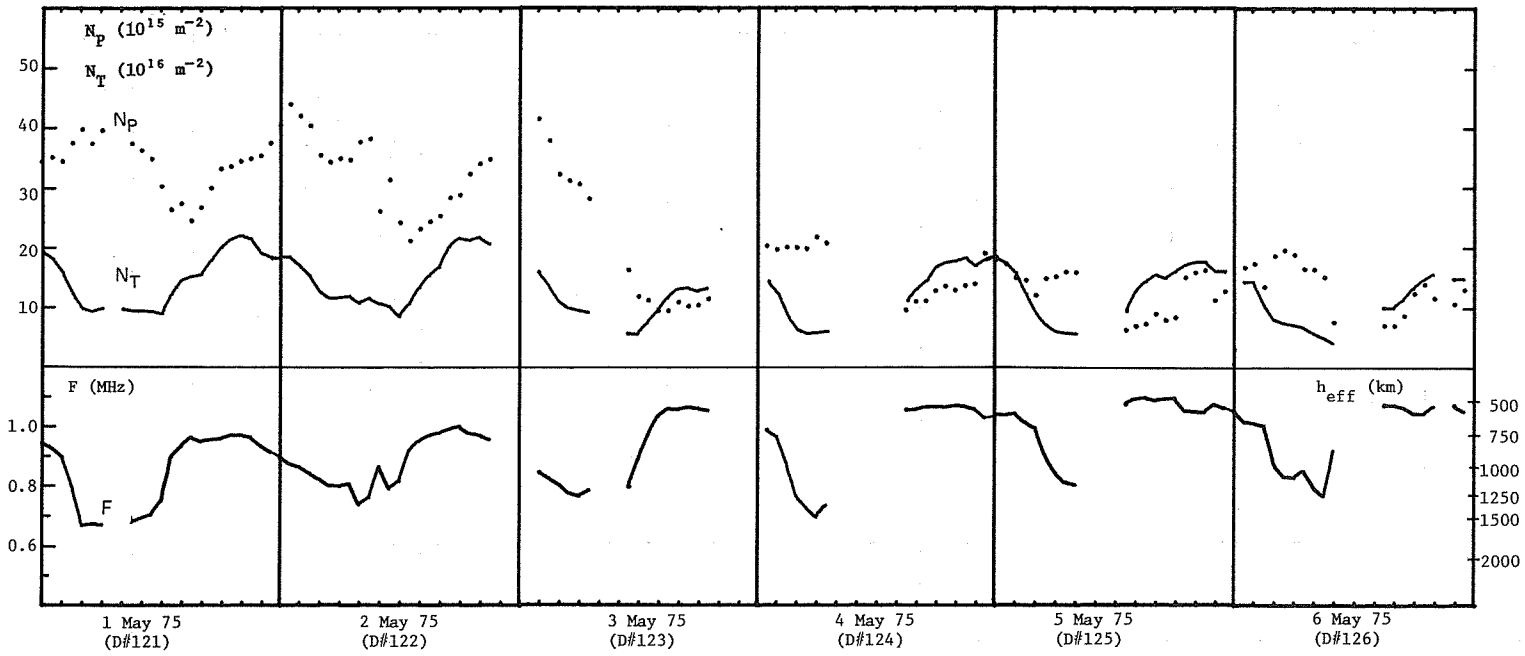


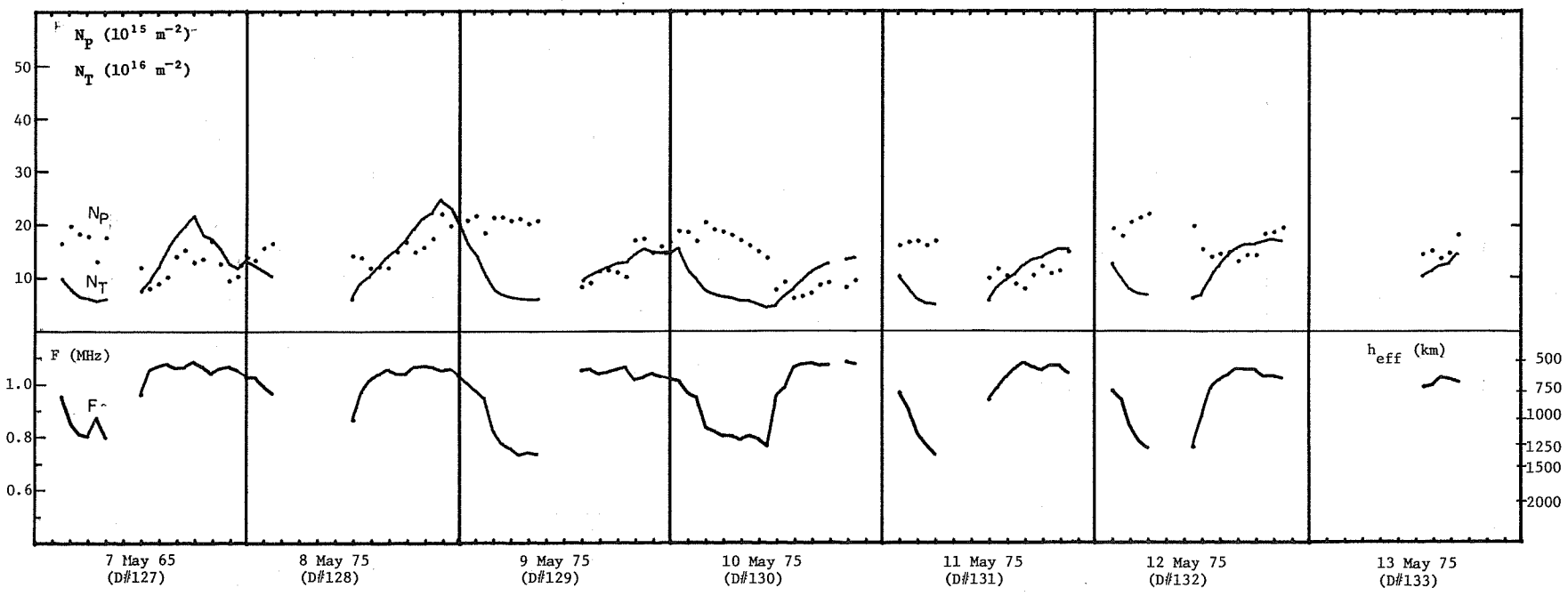
| DATE | 109:75 | | | 110:75 | | | 111:75 | | | | 113:75 | | | 114:75 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | .969 | 1531 | 240 | .960 | 1359 | 224 | .909 | 1462 | 306 | NO DATA | | | | .979 | 1039 | 154 | 0 |
| 1 | .955 | 1545 | 262 | .934 | 1232 | 231 | .875 | 1154 | 276 | | | | | .934 | 946 | 178 | 1 |
| 2 | .933 | 1340 | 252 | .888 | 1125 | 256 | .789 | 895 | 281 | | | | | .879 | 890 | 210 | 2 |
| 3 | .849 | 914 | 239 | .863 | 944 | 235 | .758 | 826 | 282 | | | | | .841 | 822 | 220 | 3 |
| 4 | .741 | 734 | 261 | .772 | 778 | 256 | .762 | 822 | 277 | | | | | | | | 4 |
| 5 | .707 | 680 | 262 | .674 | 680 | 281 | .751 | 782 | 271 | | | | | | | | 5 |
| 6 | .698 | 680 | 267 | .656 | 655 | 282 | .776 | 846 | 275 | | | | | | | | 6 |
| 7 | .711 | 724 | 276 | .674 | 665 | 276 | .778 | 836 | 270 | | | | | | | | 7 |
| 8 | .726 | 748 | 276 | .677 | 680 | 280 | .774 | 846 | 277 | | | | | | | | 8 |
| 9 | .722 | 792 | 295 | .680 | 694 | 284 | .785 | 880 | 279 | | | | | | | | 9 |
| 10 | .721 | 773 | 288 | .703 | 709 | 275 | .804 | 883 | 266 | | | | | .771 | 562 | 185 | 10 |
| 11 | .727 | 714 | 263 | .711 | 719 | 275 | .793 | 826 | 256 | | | | | .763 | 518 | 175 | 11 |
| 12 | .748 | 626 | 219 | .717 | 636 | 239 | | | | | | | | .861 | 509 | 128 | 12 |
| 13 | .948 | 836 | 147 | .927 | 949 | 184 | .960 | 851 | 141 | | | | | .979 | 820 | 122 | 13 |
| 14 | .990 | 1032 | 143 | | | | .983 | 988 | 144 | | | | | 1.025 | 939 | 102 | 14 |
| 15 | 1.000 | 1247 | 163 | | | | .996 | 1188 | 159 | | | | | 1.036 | 1022 | 101 | 15 |
| 16 | 1.000 | 1340 | 175 | | | | 1.000 | 1232 | 161 | | | | | 1.018 | 1071 | 123 | 16 |
| 17 | 1.000 | 1374 | 179 | | | | 1.001 | 1345 | 174 | | 1.025 | 1125 | 122 | .993 | 1183 | 161 | 17 |
| 18 | .993 | 1335 | 182 | | | | 1.009 | 1227 | 150 | | 1.024 | 1227 | 135 | .995 | 1281 | 173 | 18 |
| 19 | .991 | 1335 | 184 | | | | 1.007 | 1267 | 158 | | 1.024 | 1308 | 143 | 1.024 | 1320 | 145 | 19 |
| 20 | .997 | 1433 | 190 | | | | .978 | 1399 | 209 | | .998 | 1340 | 177 | | | | 20 |
| 21 | .999 | 1487 | 195 | | | | .973 | 1320 | 204 | | .997 | 1315 | 175 | | | | 21 |
| 22 | 1.008 | 1526 | 188 | | | | 1.000 | 1257 | 164 | | 1.015 | 1223 | 144 | | | | 22 |
| 23 | .990 | 1487 | 207 | .961 | 1863 | 307 | | | | | .998 | 1174 | 155 | | | | 23 |

| DATE | 115:75 | | | 116:75 | | | | 118:75 | | | 119:75 | | | 120:75 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | | | | .946 | 1203 | 213 | NO DATA | | | | | | | .965 | 1653 | 266 | 0 |
| 1 | | | | .920 | 1198 | 240 | | | | | | | | .933 | 1565 | 296 | 1 |
| 2 | | | | .906 | 1174 | 249 | | | | | .933 | 1247 | 235 | .904 | 1413 | 303 | 2 |
| 3 | | | | .872 | 944 | 228 | | | | | .893 | 1015 | 227 | .873 | 1144 | 275 | 3 |
| 4 | | | | .786 | 773 | 245 | | | | | .792 | 826 | 257 | .771 | 939 | 310 | 4 |
| 5 | | | | | | | | | | | .729 | 709 | 260 | .744 | 885 | 312 | 5 |
| 6 | .756 | 553 | 189 | | | | | | | | .713 | 653 | 248 | .739 | 836 | 299 | 6 |
| 7 | .717 | 577 | 217 | | | | | | | | .767 | 621 | 207 | .738 | 851 | 304 | 7 |
| 8 | .709 | 606 | 233 | | | | | | | | | | | .721 | 807 | 301 | 8 |
| 9 | .734 | 641 | 232 | | | | | | | | | | | .693 | 792 | 315 | 9 |
| 10 | .730 | 655 | 239 | | | | | | | | | | | .684 | 768 | 311 | 10 |
| 11 | .729 | 645 | 237 | | | | | | | | | | | .727 | 812 | 299 | 11 |
| 12 | .829 | 567 | 158 | | | | | | | | | | | .821 | 729 | 209 | 12 |
| 13 | .932 | 785 | 149 | | | | | .950 | 1105 | 192 | | | | .946 | 978 | 173 | 13 |
| 14 | .989 | 958 | 134 | | | | | 1.003 | 1325 | 169 | | | | .978 | 1169 | 175 | 14 |
| 15 | 1.011 | 1115 | 135 | | | | | 1.034 | 1506 | 152 | .989 | 1355 | 190 | .992 | 1281 | 176 | 15 |
| 16 | 1.014 | 1262 | 149 | | | | | 1.039 | 1741 | 169 | .993 | 1487 | 203 | 1.001 | 1496 | 194 | 16 |
| 17 | 1.009 | 1271 | 156 | | | | | 1.036 | 1648 | 164 | 1.003 | 1746 | 223 | 1.018 | 1682 | 193 | 17 |
| 18 | 1.018 | 1374 | 158 | | | | | 1.047 | 1545 | 139 | 1.005 | 1863 | 235 | 1.012 | 1809 | 218 | 18 |
| 19 | 1.023 | 1460 | 162 | | | | | 1.051 | 1697 | 146 | 1.012 | 1907 | 229 | 1.000 | 1785 | 232 | 19 |
| 20 | .989 | 1491 | 208 | | | | | 1.030 | 1848 | 193 | 1.017 | 2024 | 234 | .972 | 1848 | 287 | 20 |
| 21 | .998 | 1579 | 208 | | | | | 1.023 | 1878 | 207 | 1.028 | 2068 | 220 | .963 | 1902 | 309 | 21 |
| 22 | .995 | 1565 | 211 | | | | | 1.039 | 1917 | 184 | .995 | 1863 | 250 | .969 | 1878 | 295 | 22 |
| 23 | | | | | | | | | | | .979 | 1756 | 261 | .958 | 1892 | 317 | 23 |

Units of $N_T$ and $N_p$ are $10^{14}$ electrons-meter$^{-2}$.

ATS6 RBE - Boulder



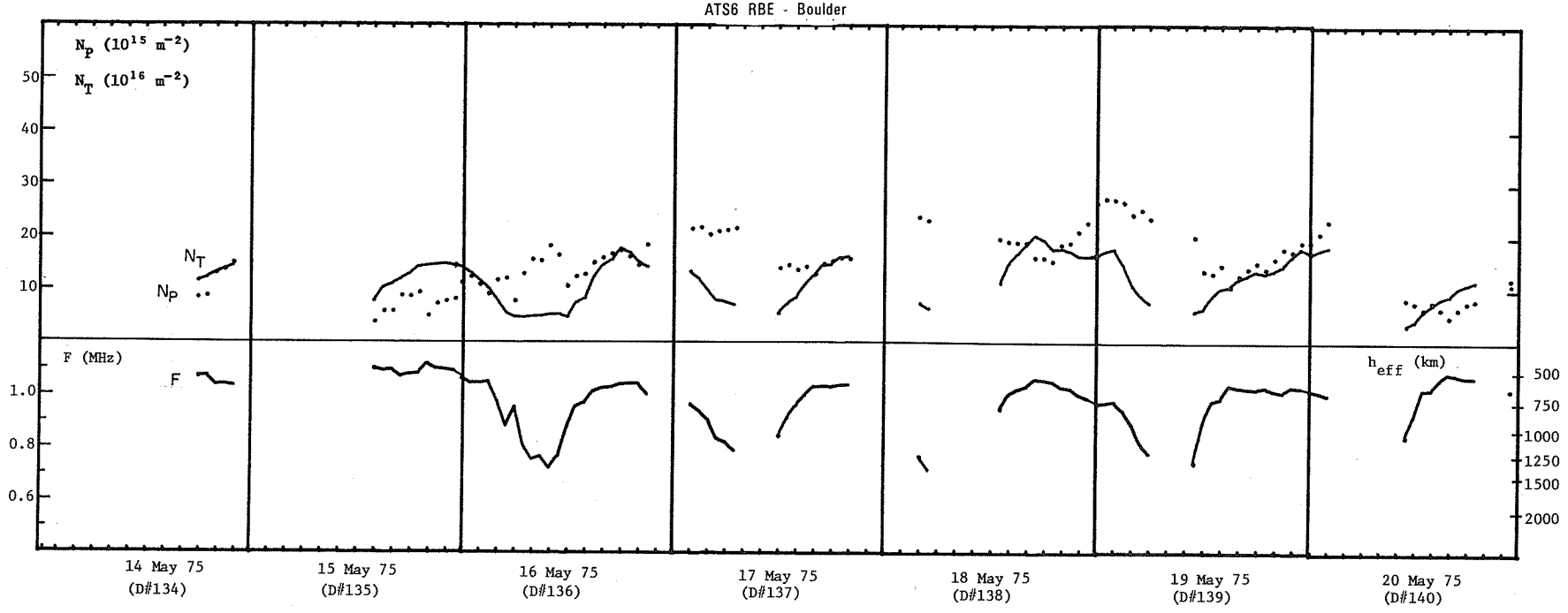



| DATE | 121:75 | | | 122:75 | | | 123:75 | | | 124:75 | | | 125:75 | | | 126:75 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | .941 | 1883 | 342 | .894 | 1804 | 401 | | | | | | | 1.036 | 1800 | 178 | 1.047 | | 1384 | 0 |
| 1 | .924 | 1775 | 349 | .872 | 1809 | 438 | | | | .986 | 1399 | 200 | 1.034 | 1716 | 172 | 1.012 | 1374 | 165 | 1 |
| 2 | .896 | 1550 | 343 | .862 | 1667 | 418 | .843 | 1545 | 412 | .963 | 1198 | 195 | 1.040 | 1550 | 149 | 1.007 | 1374 | 170 | 2 |
| 3 | .792 | 1198 | 373 | .841 | 1496 | 402 | .823 | 1325 | 377 | .875 | 831 | 199 | 1.011 | 1193 | 144 | 1.000 | 1017 | 132 | 3 |
| 4 | .665 | 939 | 396 | .821 | 1232 | 353 | .802 | 1061 | 321 | .764 | 592 | 199 | .992 | 870 | 120 | .869 | 753 | 184 | 4 |
| 5 | .670 | 895 | 373 | .800 | 1120 | 341 | .773 | 944 | 309 | .726 | 533 | 196 | .901 | 675 | 146 | .829 | 689 | 192 | 5 |
| 6 | .667 | 939 | 394 | .797 | 1125 | 346 | .764 | 905 | 304 | .695 | 543 | 215 | .843 | 562 | 150 | .826 | 660 | 186 | 6 |
| 7 | | | | .804 | 1144 | 344 | .783 | 875 | 280 | .733 | 567 | 206 | .810 | 533 | 158 | .849 | 621 | 163 | 7 |
| 8 | .857 | 929 | 236 | .735 | 1037 | 374 | | | | | | | .802 | 518 | 157 | .794 | 523 | 162 | 8 |
| 9 | .677 | 905 | 372 | .758 | 1110 | 379 | | | | | | | | | | .765 | 445 | 149 | 9 |
| 10 | .690 | 905 | 362 | .861 | 1027 | 258 | | | | | | | | | | .914 | 357 | 73 | 10 |
| 11 | .701 | 890 | 347 | .788 | 983 | 310 | .794 | 518 | 161 | | | | | | | | | | 11 |
| 12 | .746 | 856 | 301 | .812 | 812 | 239 | .885 | 504 | 116 | | | | | | | | | | 12 |
| 13 | .893 | 1174 | 262 | .915 | 1017 | 208 | .965 | 685 | 110 | | | | 1.071 | 895 | 61 | | | | 13 |
| 14 | .928 | 1408 | 271 | .947 | 1289 | 227 | 1.029 | 880 | 92 | | | | 1.088 | 1237 | 67 | | | | 14 |
| 15 | .960 | 1472 | 243 | .965 | 1491 | 240 | 1.055 | 1105 | 92 | 1.050 | 1081 | 94 | 1.092 | 1389 | 70 | 1.067 | 944 | 68 | 15 |
| 16 | .947 | 1506 | 265 | .974 | 1633 | 250 | 1.053 | 1257 | 106 | 1.053 | 1276 | 108 | 1.083 | 1506 | 87 | 1.067 | 944 | 68 | 16 |
| 17 | .953 | 1736 | 298 | .987 | 1976 | 280 | 1.061 | 1286 | 100 | 1.061 | 1413 | 109 | 1.089 | 1452 | 78 | 1.061 | 1076 | 83 | 17 |
| 18 | .956 | 1951 | 330 | .996 | 2117 | 284 | 1.056 | 1232 | 101 | 1.062 | 1643 | 126 | 1.090 | 1560 | 81 | 1.040 | 1267 | 121 | 18 |
| 19 | .967 | 2093 | 334 | .974 | 2088 | 320 | 1.050 | 1276 | 111 | 1.061 | 1721 | 133 | 1.048 | 1667 | 148 | 1.039 | 1408 | 136 | 19 |
| 20 | .967 | 2156 | 343 | .968 | 2137 | 337 | | | | 1.066 | 1746 | 128 | 1.045 | 1716 | 157 | 1.063 | 1506 | 114 | 20 |
| 21 | .961 | 2108 | 347 | .954 | 2024 | 345 | | | | 1.064 | 1795 | 134 | 1.043 | 1716 | 160 | | | | 21 |
| 22 | .933 | 1868 | 352 | | | | | | | 1.056 | 1672 | 137 | 1.069 | 1570 | 110 | 1.067 | 1433 | 104 | 22 |
| 23 | .912 | 1804 | 373 | | | | | | | 1.028 | 1775 | 189 | 1.058 | 1565 | 125 | 1.048 | 1428 | 127 | 23 |

| DATE | 127:75 | | | 128:75 | | | 129:75 | | | 130:75 | | | 131:75 | | | 132:75 | | | 133:75 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | | | | 1.024 | 1281 | 141 | 1.029 | 1985 | 209 | 1.015 | 1413 | 165 | | | | | | | | | | 0 |
| 1 | | | | 1.024 | 1203 | 131 | 1.001 | 1599 | 207 | 1.009 | 1521 | 187 | | | | | | | | | | 1 |
| 2 | | | | .990 | 1105 | 153 | .972 | 1379 | 214 | .963 | 1134 | 184 | .964 | 978 | 158 | .970 | 1208 | 189 | | | | 2 |
| 3 | .951 | 949 | 164 | .963 | 998 | 162 | .943 | 1015 | 183 | .947 | 949 | 168 | .903 | 768 | 165 | .937 | 954 | 176 | | | | 3 |
| 4 | .853 | 763 | 197 | | | | .821 | 738 | 211 | .834 | 738 | 203 | .811 | 567 | 167 | .837 | 743 | 202 | | | | 4 |
| 5 | .809 | 616 | 183 | | | | .772 | 645 | 212 | .820 | 660 | 190 | .768 | 479 | 159 | .779 | 650 | 210 | | | | 5 |
| 6 | .801 | 587 | 178 | | | | .754 | 597 | 205 | .803 | 614 | 185 | .732 | 460 | 167 | .755 | 631 | 217 | | | | 6 |
| 7 | .870 | 538 | 131 | | | | .730 | 572 | 209 | .802 | 592 | 179 | | | | | | | | | | 7 |
| 8 | .797 | 572 | 176 | | | | .738 | 557 | 200 | .788 | 538 | 170 | | | | | | | | | | 8 |
| 9 | | | | | | | .732 | 562 | 205 | .802 | 528 | 160 | | | | | | | | | | 9 |
| 10 | | | | | | | | | | .791 | 474 | 148 | | | | | | | | | | 10 |
| 11 | | | | | | | | | | .764 | 406 | 136 | | | | .758 | 572 | 195 | | | | 11 |
| 12 | .959 | 719 | 120 | .864 | 557 | 139 | | | | .947 | 428 | 75 | .936 | 528 | 98 | .868 | 616 | 151 | | | | 12 |
| 13 | 1.048 | 900 | 80 | .966 | 846 | 136 | | | | .982 | 611 | 90 | .980 | 778 | 115 | .976 | 910 | 138 | .983 | 963 | 140 | 13 |
| 14 | 1.063 | 1169 | 88 | 1.012 | 973 | 117 | 1.047 | 912 | 82 | 1.057 | 738 | 60 | 1.021 | 910 | 102 | 1.008 | 1154 | 142 | .990 | 1056 | 147 | 14 |
| 15 | 1.073 | 1496 | 100 | 1.033 | 1154 | 118 | 1.051 | 1022 | 88 | 1.070 | 900 | 63 | 1.052 | 1017 | 87 | 1.027 | 1359 | 145 | 1.018 | 1159 | 133 | 15 |
| 16 | 1.058 | 1751 | 140 | 1.050 | 1347 | 117 | 1.034 | 1100 | 111 | 1.075 | 1056 | 69 | 1.075 | 1188 | 78 | 1.050 | 1496 | 130 | 1.013 | 1198 | 142 | 16 |
| 17 | 1.060 | 1932 | 151 | 1.036 | 1472 | 146 | 1.040 | 1174 | 113 | 1.066 | 1154 | 84 | 1.059 | 1296 | 103 | 1.048 | 1579 | 139 | 1.002 | 1379 | 177 | 17 |
| 18 | 1.080 | 2122 | 129 | 1.035 | 1643 | 164 | 1.049 | 1242 | 109 | 1.068 | 1232 | 88 | 1.048 | 1335 | 119 | 1.048 | 1579 | 139 | | | | 18 |
| 19 | 1.063 | 1775 | 134 | 1.060 | 1868 | 146 | 1.059 | 1262 | 100 | | | | 1.064 | 1423 | 106 | 1.023 | 1628 | 180 | | | | 19 |
| 20 | 1.036 | 1702 | 168 | 1.064 | 2068 | 154 | 1.013 | 1413 | 169 | 1.079 | 1306 | 81 | 1.065 | 1496 | 111 | 1.024 | 1672 | 183 | | | | 20 |
| 21 | 1.054 | 1511 | 126 | 1.060 | 2171 | 171 | 1.019 | 1511 | 171 | 1.071 | 1340 | 92 | 1.037 | 1491 | 147 | 1.016 | 1638 | 191 | | | | 21 |
| 22 | 1.062 | 1227 | 94 | 1.047 | 2425 | 217 | 1.035 | 1457 | 146 | | | | | | | | | | | | | 22 |
| 23 | 1.049 | 1154 | 102 | 1.052 | 2298 | 196 | 1.024 | 1440 | 157 | | | | | | | | | | | | | 23 |

Units of $N_T$ and $N_p$ are $10^{14}$ electrons-meter$^{-2}$.

ATS6 RBE - Boulder



| DATE | 134:75 | | | 135:75 | | | 136:75 | | | 137:75 | | | 138:75 | | | 139:75 | | | 140:75 | | | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | F140 | NT | NP | HR |
| 0 | | | | | | | 1.057 | 1369 | 111 | | | | | | | .964 | 1623 | 263 | 1.020 | 1680 | 190 | 0 |
| 1 | | | | | | | 1.040 | 1267 | 121 | | | | | | | .966 | 1697 | 271 | 1.013 | 1741 | 207 | 1 |
| 2 | | | | | | | 1.040 | 1115 | 107 | .961 | 1291 | 212 | | | | .971 | 1736 | 270 | 1.002 | 1790 | 230 | 2 |
| 3 | | | | | | | 1.044 | 963 | 89 | .937 | 1164 | 216 | | | | .941 | 1452 | 264 | | | | 3 |
| 4 | | | | | | | .970 | 734 | 115 | .904 | 949 | 203 | .766 | 704 | 235 | .888 | 1061 | 242 | | | | 4 |
| 5 | | | | | | | .878 | 499 | 118 | .832 | 753 | 208 | .715 | 606 | 229 | .815 | 856 | 249 | | | | 5 |
| 6 | | | | | | | .947 | 430 | 76 | .818 | 729 | 210 | | | | .779 | 724 | 234 | | | | 6 |
| 7 | | | | | | | .805 | 425 | 128 | .787 | 680 | 214 | | | | | | | | | | 7 |
| 8 | | | | | | | .752 | 445 | 154 | | | | | | | | | | | | | 8 |
| 9 | | | | | | | .761 | 450 | 152 | | | | | | | | | | | | | 9 |
| 10 | | | | | | | .719 | 479 | 180 | | | | | | | | | | | | | 10 |
| 11 | | | | | | | .762 | 484 | 163 | | | | | | | .742 | 562 | 199 | .845 | 318 | 84 | 11 |
| 12 | | | | | | | .871 | 430 | 104 | .841 | 518 | 139 | | | | .891 | 601 | 135 | .922 | 391 | 77 | 12 |
| 13 | | | | | | | .952 | 709 | 122 | .908 | 689 | 145 | .944 | 1090 | 195 | .971 | 841 | 131 | 1.021 | 582 | 65 | 13 |
| 14 | | | | 1.094 | 734 | 36 | .965 | 787 | 126 | .956 | 812 | 137 | 1.000 | 1457 | 190 | .982 | 993 | 145 | 1.023 | 709 | 78 | 14 |
| 15 | | | | 1.086 | 978 | 54 | 1.008 | 1203 | 148 | .995 | 1051 | 142 | 1.018 | 1638 | 188 | 1.032 | 1027 | 105 | 1.058 | 822 | 65 | 15 |
| 16 | | | | 1.089 | 1051 | 56 | 1.022 | 1418 | 158 | 1.029 | 1227 | 129 | 1.031 | 1809 | 188 | 1.027 | 1169 | 125 | 1.085 | 880 | 50 | 16 |
| 17 | | | | 1.065 | 1144 | 85 | 1.025 | 1521 | 165 | 1.031 | 1418 | 147 | 1.057 | 1988 | 160 | 1.022 | 1242 | 139 | 1.078 | 1027 | 65 | 17 |
| 18 | 1.065 | 1105 | 82 | 1.072 | 1242 | 84 | 1.036 | 1731 | 171 | 1.029 | 1443 | 152 | 1.054 | 1907 | 159 | 1.019 | 1320 | 150 | 1.070 | 1095 | 77 | 18 |
| 19 | 1.067 | 1159 | 84 | 1.074 | 1379 | 91 | 1.039 | 1663 | 161 | 1.034 | 1570 | 158 | 1.049 | 1726 | 152 | 1.026 | 1286 | 139 | 1.069 | 1149 | 81 | 19 |
| 20 | 1.033 | 1252 | 127 | 1.111 | 1408 | 48 | 1.038 | 1491 | 145 | 1.036 | 1594 | 158 | 1.029 | 1736 | 183 | 1.014 | 1335 | 158 | | | | 20 |
| 21 | 1.033 | 1320 | 134 | 1.094 | 1423 | 69 | 1.000 | 1394 | 182 | | | | 1.023 | 1692 | 187 | 1.007 | 1413 | 176 | | | | 21 |
| 22 | 1.029 | 1389 | 146 | 1.091 | 1438 | 74 | | | | | | | 1.001 | 1604 | 208 | 1.026 | 1594 | 172 | | | | 22 |
| 23 | | | | 1.086 | 1413 | 79 | | | | | | | .988 | 1594 | 225 | 1.025 | 1736 | 188 | 1.022 | 1090 | 121 | 23 |

Units of $N_T$ and $N_P$ are $10^{14}$ electrons-meter$^{-2}$.

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