

**F-region Electric Field and Electrojet Observations
during the November 3, 1994, Total Eclipse**

**R.F. Woodman, O. Veliz, M. Sarango A., F. Aquino Q.,
and F. Villanueva R.**

**Jicamarca Radio Observatory
Instituto Geofísico del Perú
Apartado 13-0207
Lima 13, PERU**

On November 3, 1994, a total solar eclipse occurred at about 7:10 a.m. local time, with a maximum occultation path tangent to the southern coast of Peru. Occultation was not total at Jicamarca; it was 95%. The maximum occultation path touched tangentially the magnetic equator 700 km west of Jicamarca. Multiple instrument observations were made including incoherent scatter of the F-region, coherent backscatter of the Electrojet, Digisonde observations and a longitudinal chain of magnetograms. During a previous total eclipse which occurred on November 12, 1966, an interesting enhancement of the electric field occurred. This motivated us to run the Jicamarca radar in a vertical drift (E-W E-field) mode. Total backscattered power was also recorded, which also allowed simultaneous measurements of the electron density profiles. In addition to the I.S. measurements, a coherent radar was used with an antenna beam pointing 60 degrees west, sampling electrojet echoes up to 500 km west of Jicamarca. Apart of the radar data, the Jicamarca Digisonde was run, and a chain of magnetometers including points right under the maximum occultation were deployed. Preliminary results of these observations will be presented. Electron depletions are observed as expected, but no obvious electric field effects were noticed. The latter, if present, were obscured by the slight magnetic disturbance effects of magnetospheric origin occurring during the eclipse.

Figure captions

Figure 1) World map showing the path of maximum occultation of the eclipse, the electrojet latitudes and the location of the magnetogram stations used in this study. At this scale, Ancón is almost at the same location as Jicamarca.

Figure 2) Vertical drift velocity of the F-region obtained by Incoherent Scatter techniques during the time of the Nov. 3, 1995, eclipse (7:10 Local Time). No vertical velocity enhancement is seen. This contrasts a very conspicuous enhancement seen during the total eclipse of 12 Nov., 1966.

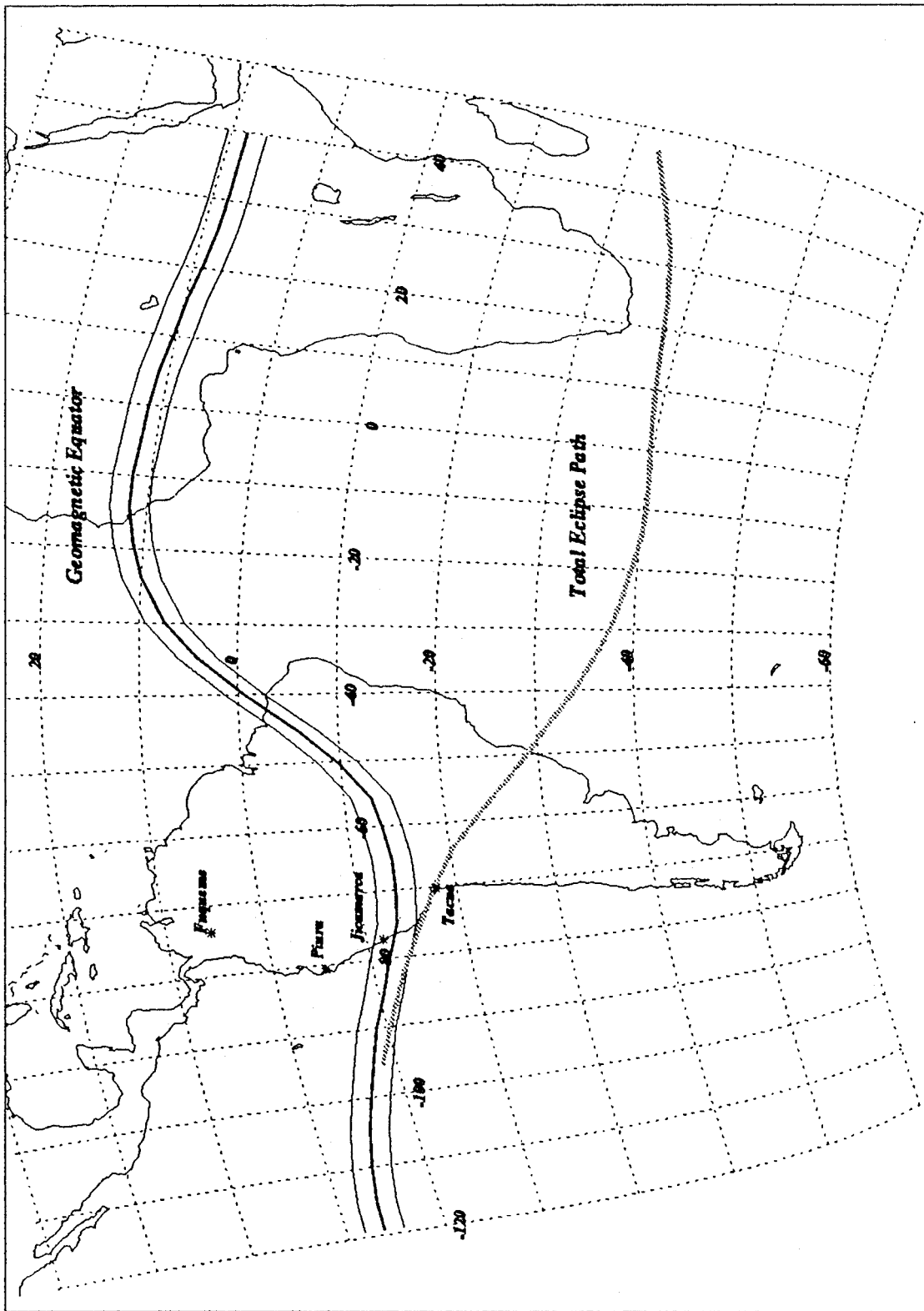
Figure 3) Range time intensity plot of electrojet echoes obtained using a tilted (60 off zenith) beam. There is a reduction of power after the time of the maximum occultation (7:10 a.m. Local Time) as expected. (Ignore the white strip at 7:25-7:30).

Figure 4) Magnetogram records at Ancón, Tacna and Fuquene (see Fig. 1 for location) during the eclipse. After subtracting Fuquene, only a small unexpected increase, before the time of maximum occultation (12:10 UT), is noticed in the Ancón record. Note that the day was slightly magnetically disturbed.

Figure 5a) Three dimensional plot of the virtual height profile of the ionosphere, measured by the Jicamarca Digisonde. Notice the ledge formed right after occultation drifting with time to higher altitudes.

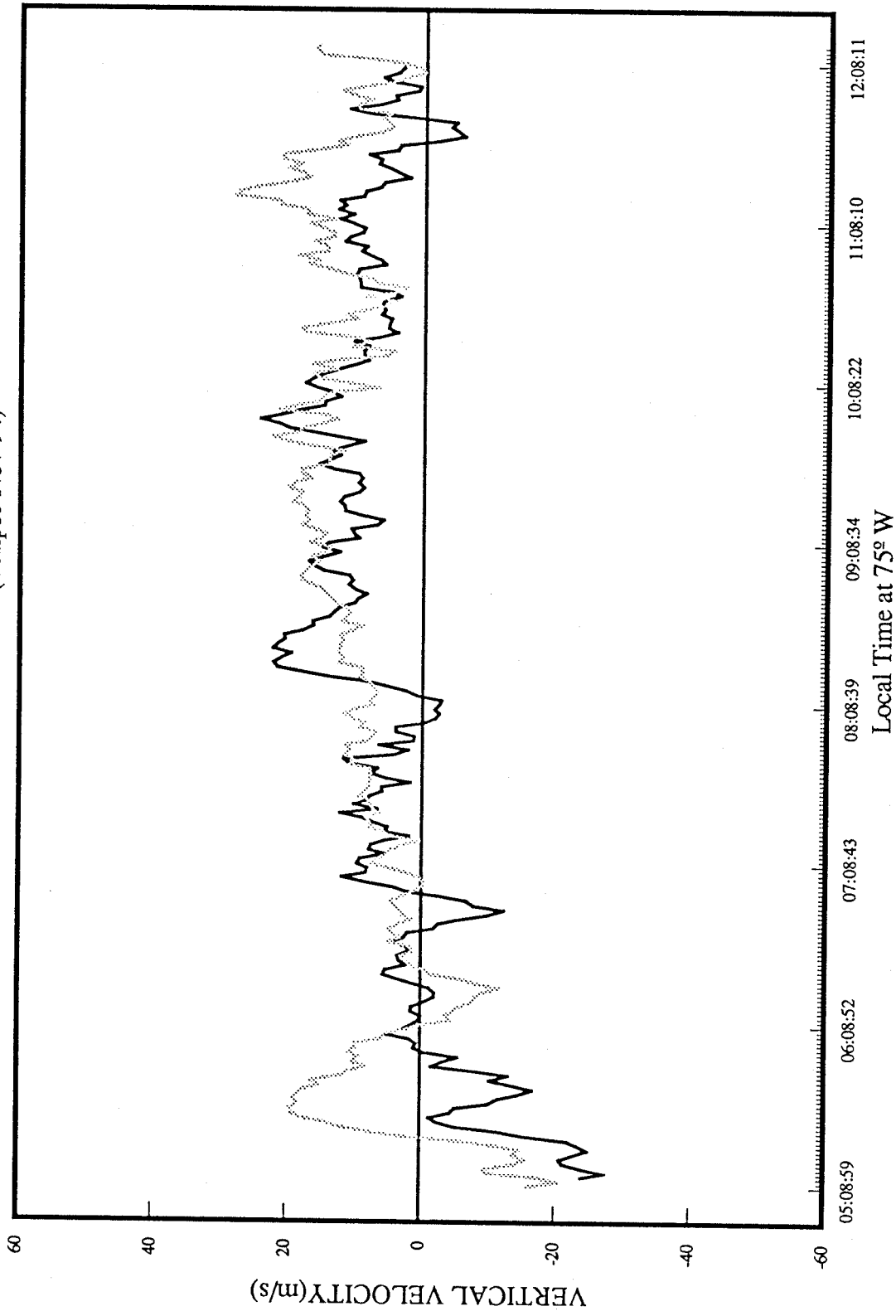
Figure 5b) Corresponding Fof2 plot (triangles) together with a similar plot corresponding to the next day used as control (diamonds). It shows an expected byte out right after maximum occultation.

TOTAL SOLAR ECLIPSE OF NOVEMBER 3, 1994

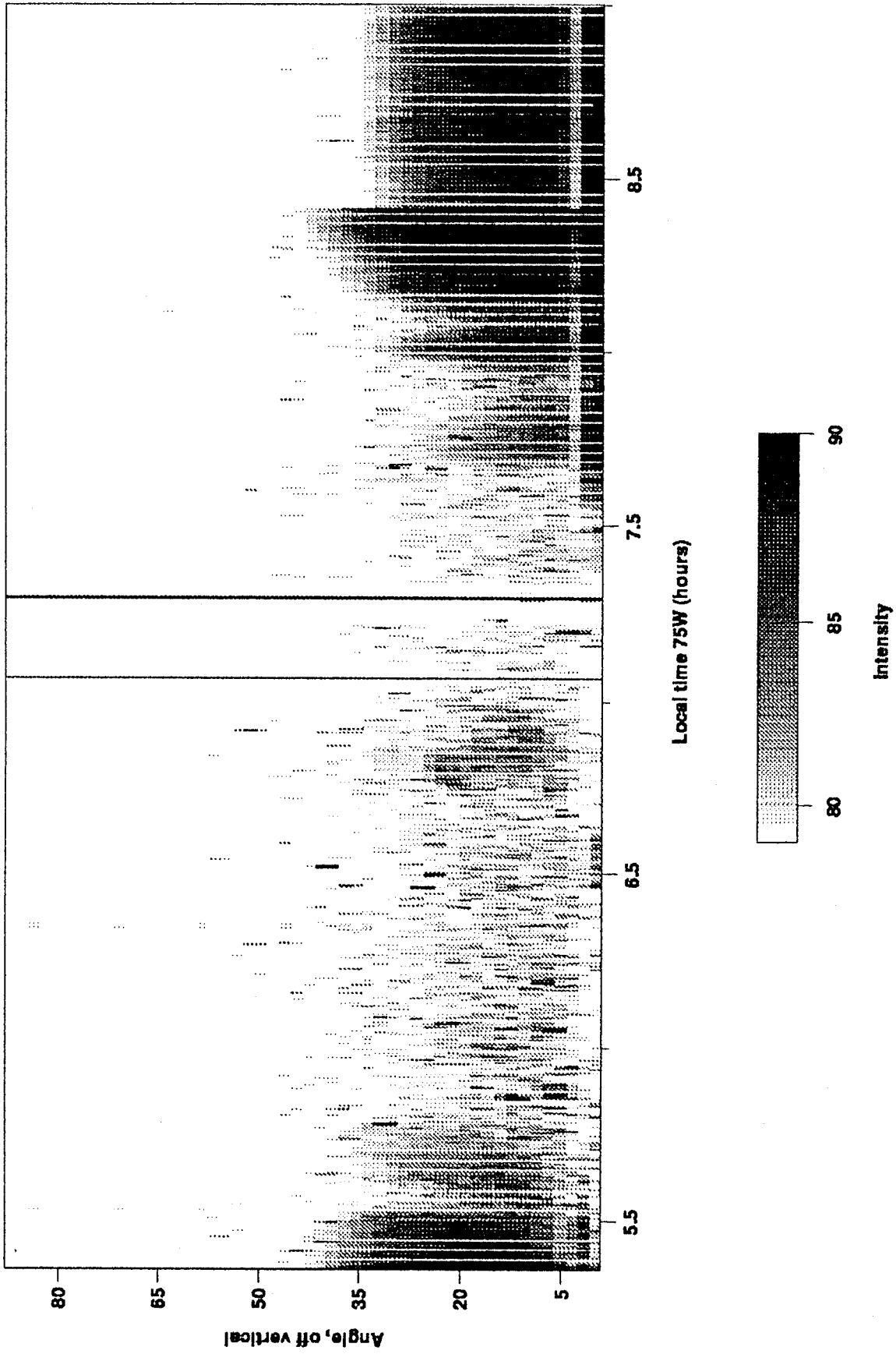


Doc 1

VERTICAL DRIFT (Eclipse Nov 94)

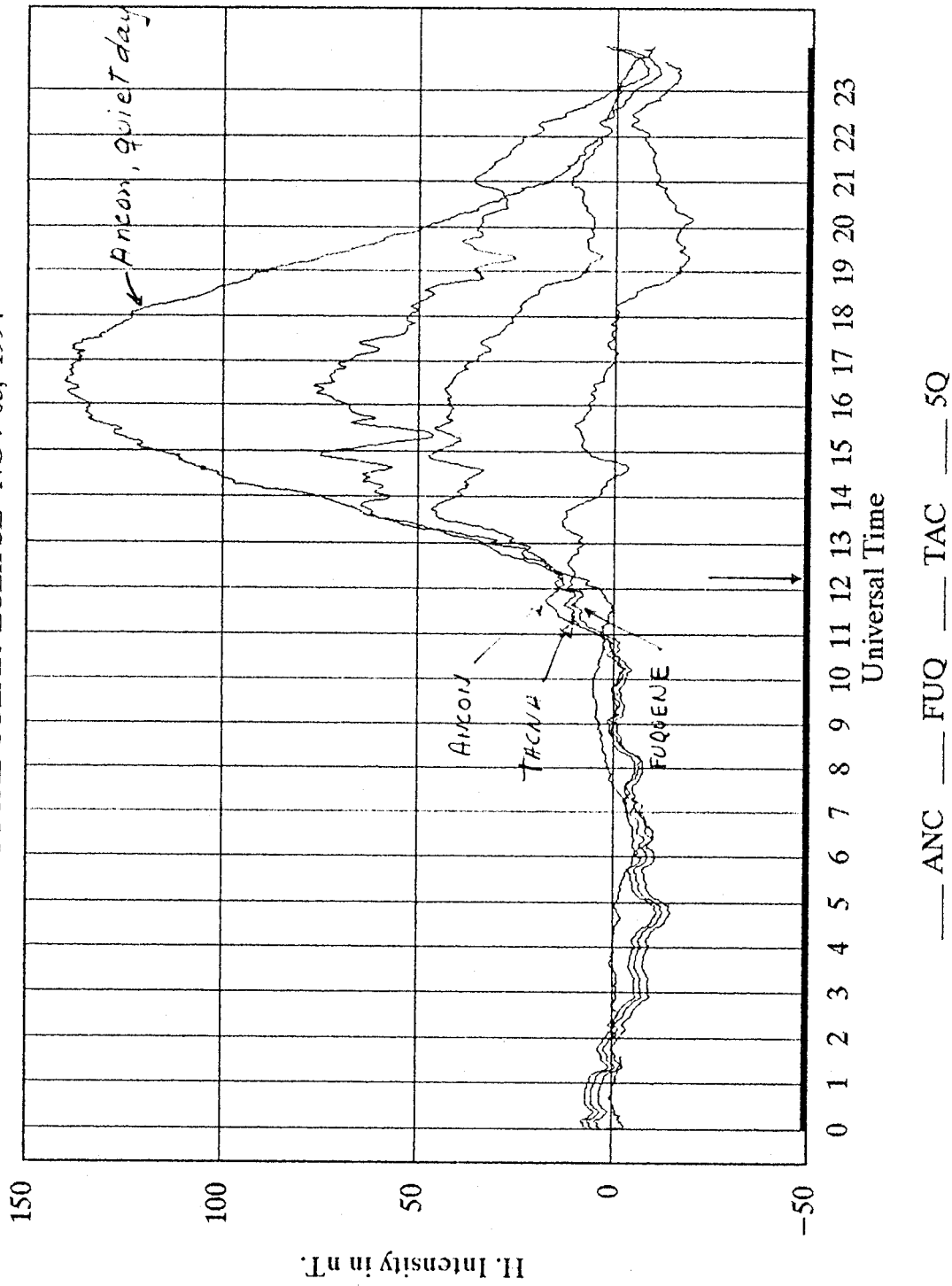


5 point average

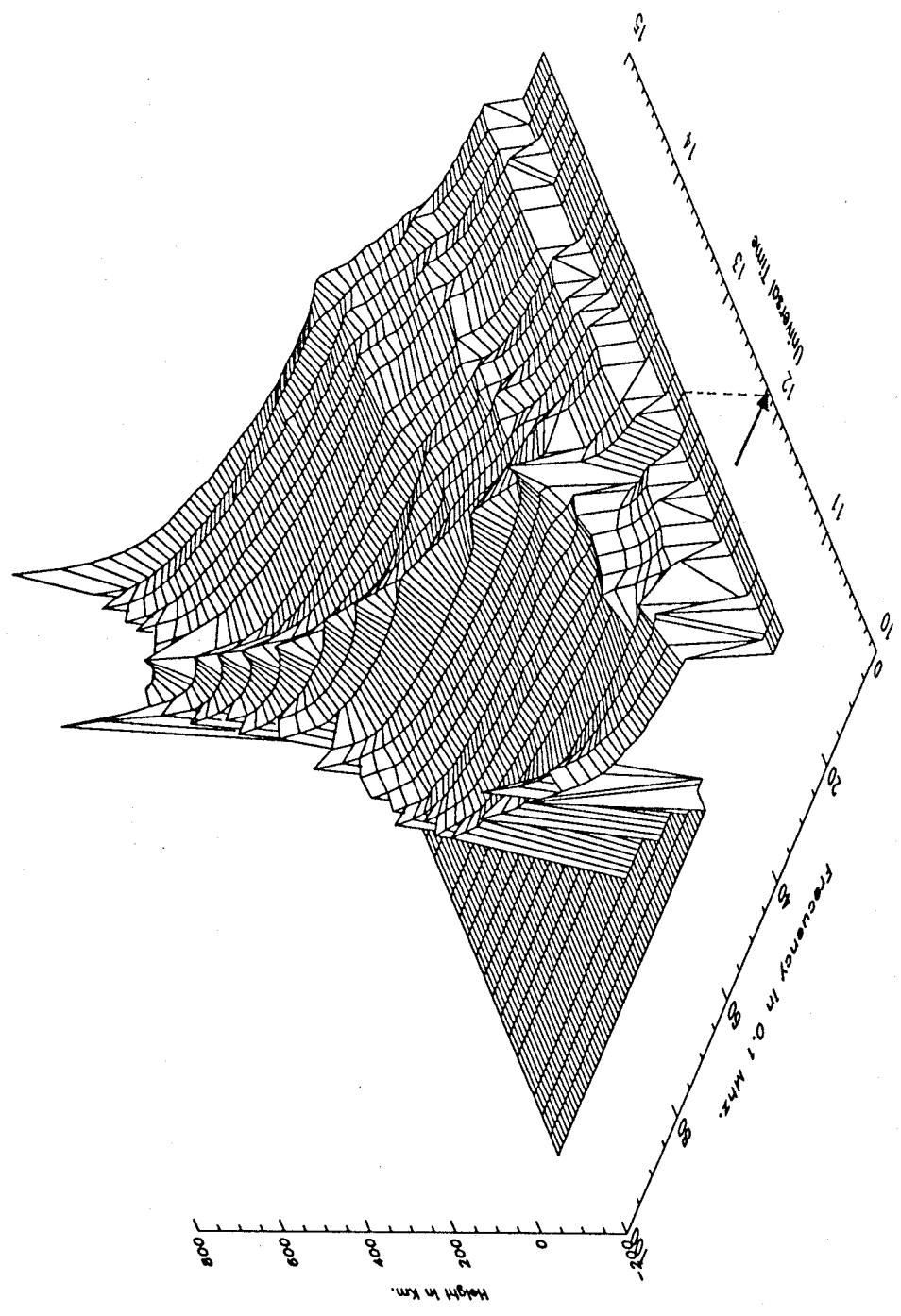


HORIZONTAL INTENSITY DIURNAL VARIATION

TOTAL SOLAR ECLIPSE NOV 03, 1994



TOTAL SOLAR ECLIPSE DAY - NOVEMBER 03, 1994
ROJ DIGISONDE - VIRTUAL HEIGHT PROFILE



Fo f2 PLOT
JICAMARCA - NOV 03-04, 1994

