

DATA SET CATALOG # 116  
ALOUETTE 1 - SWEEP FREQUENCY IONO 'P'

62-049A-01P

2 tapes

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## **1. INTRODUCTION:**

The documentation for this data set was originally on paper, kept in NSSDC's Data Set Catalogs (DSCs). The paper documentation in the Data Set Catalogs have been made into digital images, and then collected into a single PDF file for each Data Set Catalog. The inventory information in these DSCs is current as of July 1, 2004. This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system. The information existing in the DSCs is now not needed for locating the data files, but we did not remove that inventory information.

The offline tape datasets have now been migrated from the original magnetic tape to Archival Information Packages (AIP's).

A prior restoration may have been done on data sets, if a requestor of this data set has questions; they should send an inquiry to the request office to see if additional information exists.

## 2. ERRATA/CHANGE LOG:

NOTE: Changes are made in a text box, and will show up that way when displayed on screen with a PDF reader.

*When printing, special settings may be required to make the text box appear on the printed output.*

Version	Date	Person	Page	Description of Change
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01				
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02				
----	--	--	--	--

**3 LINKS TO RELEVANT INFORMATION IN THE ONLINE NSSDC INFORMATION SYSTEM:**

<http://nssdc.gsfc.nasa.gov/nmc/>

[NOTE: This link will take you to the main page of the NSSDC Master Catalog. There you will be able to perform searches to find additional information]

**4. CATALOG MATERIALS:**

- a. Associated Documents      To find associated documents you will need to know the document ID number and then click here.  
<http://nssdcftp.gsfc.nasa.gov/miscellaneous/documents/>
  
- b. Core Catalog Materials

ALOUETTE 1

UCLA N(H) INT PROFILES, TAPE

62-049A-01P

This data set has been restored. There was originally  
2 Binary 7-Track, 800 BPI tapes. There is one restored tape.  
The DR tape is a 3480 cartridge and the DS tape is 9-track, 6250 BPI.  
The tape was created on an IBM 360 computer. The DR and DS number  
along with the corresponding D number and the time span is as follows:

DR#	DS#	D#	FILES	TIME SPAN
DR03040	DS03040	D06052	1	09/30/62 - 12/13/62
		D06053	2	12/14/62 - 05/02/64

62-0493-612

ALIMENTO 1, SWING FADY 1A.80 \*\*

TAPES ARE 500' BPI, 8IN, 000, 7 track, 360/75

<u>DI</u>	<u>CI</u>	<u>FILES</u>	<u>START</u>	<u>SIZE</u>
D-06052	C-C4952	1	04/28/62	07/11/62
D-06053	C-04953	4	07/12/62	05/02/64

USERS' GUIDE FOR  $N(h)$  ANALYSIS OF  
CONVENTIONAL SF IONOGRAMS (PI-11D)

1. Introduction

Program PI-11D, stored in the NSSDC library, is an  $N(h)$  reduction program for converting based ionosonde data into vertical electron distributions. It uses the parabolic in log ( $N$ ) lamination method of analysis (Doupnik and Schmerling, 1965; Jackson, 1971).

This document describes how to (a) prepare the computer input data from  $h'(f)$  data scaled from ionograms and (b) run the program. Full details on the interpretation and the scaling of the ionograms can be obtained from the "URSI Handbook of Ionogram Interpretation and Reduction" (Piggott and Rawer, 1961), and an extensive treatment of  $N(h)$  reduction techniques is given in the special issue of Radio Science, Vol 2, published in September 1967.

2. Brief description of the program

Essentially the program uses the O-trace to calculate a number (specified by the user) of trial  $N(h)$  profiles corresponding to different combinations of starting frequency and E-valley depth. A theoretical X-trace is computed for each trial  $N(h)$  profile and the standard deviation and average virtual height difference between the observed X-trace and each computed trace are calculated. The  $N(h)$  profile which

CARD  
1  
2  
3  
4  
5  
6  
7...  
 $k+1$

leads to the minimum error is thus the most likely solution.

It should be appreciated, however, that the accuracy of the derived electron distributions depends critically on the quality of the ionograms. It is doubtful, therefore, whether it is worth taking account of the effects of the E-valley if the E-valley cusp is poorly defined or if the ionograms can not be scaled to an accuracy of better than 0.1 MHz in frequency and 5 km in virtual height (those recorded on photographic paper, for example).

### 3. Data Input

The program uses data cards containing the following parameters:

CARD	PARAMETERS	FORMAT	COMMENTS
1	KZN, HTN, GN, GIN	I10.3F10.4	
2	KZD, GD, GID, DELP	I10.3F10.4	Remain in deck at all times; rarely changed
3	TITLE	20A4	Heading for printer output
4	TITLE	20A4	
5	N, IYR, MO, MD, ITI, IDV, NV, LVA	8I10	The remaining cards are supplied for each ionogram
6	HT, DIP, FRS, DLAT, DLONG, XDATA, RUN, VAL START	6F10.4, P4.1 2F8.0	
7...k	HP(I), N(I), I=1, N	8F10.4	O-trace data in pairs/k pairs/card
k +1...k + 3	HPXD (I), FXD (I), I = 1, 10	8F10.4	X-trace data in pairs, 4 pairs/card

#### 3.1 Definition of the parameters

Night-time parameters { KZN Number of trial starting frequencies - usually 8.  
{ HTN Starting height - usually 150 km.  
{ (GN First trial starting frequency - usually 0.1 MHz.

{ GIN Increment by which starting frequency is increased-  
usually 0.1 MHz.  
{ KTD Number of trial starting frequencies - usually 3.  
Day- GD First trial starting frequency-usually 0.10 MHz.  
time GTD Increment by which starting frequency is increased-  
parameters usually 0.1 MHz.  
{ DELF Increment by which Z-valley depth is increased  
below foE-usually 0.2 MHz.  
  
TITLE Two cards are used for providing a heading to  
the computed results.  
N Number of data points scaled from the O-trace.  
IYR Year; for example, 1970 is given as 70.  
MO Month.  
MD Day.  
ITI Local standard time(Hrs. Mins. Secs) eg 1724 30.  
IDY Day of the year.  
NV 1 + number of data points scaled between  $f_{min}$  and  
foE inclusive.  
LVA Number of trial valley depths. i.e., 1 + LVA  
profiles are computed for each starting frequency  
with depths of 0, DELF, 2 DELF.....LVA x DELF MHz.  
HT Starting height. If less than 120 km. 'Martine  
parameters' assumed for calculating trial N(h)  
profiles.  
DIP Estimated magnetic dip at starting height: recalcul-  
lated in program.  
FHS Estimated gyrofrequency at starting height: recalcul-  
lated in program.  
DLAT Geographic latitude (north positive)

LG                    geographic longitude (east positive).  
 XDATA                XDATA = 0.0 if X-trace data are available.  
                       Otherwise, set XDATA = -1.0 and set all X-trace  
                       to zero on the data cards.  
 RUN                  RUN = 1.0 for special run, in which case VAL  
                       and START must be assigned values. Otherwise,  
                       RUN, VAL, START = 0.0.  
 VAL                  [Minimum electron concentration in the E-valley]  
                       Electron concentration corresponding to f<sub>OE</sub>.  
 START                [Starting frequency]  
                       f<sub>OE</sub>  
 P(1), HP(1)        P(1) = 0.0 always. HP(1) = starting height (HT).  
 R2, HP2             P(2) = f<sub>min</sub> HP(2). = virtual height of r<sub>2</sub>.  
 F(3), HP(3)        O-trace frequencies and corresponding virtual heights  
                       scaled at any frequency interval. It is unneces-  
                       sary to scale more than about 25 points.  
 R(0), HRM          X-trace frequencies and corresponding virtual  
                       heights. Ten points should be scaled, five of which  
 FXD(10), HPXD(10)   should be close to the E-layer cusp on the X-trace.  
 EXD(10),  
 HPXD(10)

#### 4. Printer output

Three pages of output are provided for each ionogram.  
 The first two show input data and details of the calculations.  
 The third is a summary of the results. This output includes:

O-trace input data  
 The magnetic dip and gyrofrequency at the starting height.  
 The electron concentration and gyrofrequency at, and  
 the height of, the reflection point of the coded O-trace  
 frequencies.  
 Extrapolated values of hmF2 and hmP2.  
 Extrapolated values of electron concentration at 10 km  
 intervals between h<sub>f</sub>(N) and hmF2.  
 The computed X-trace.  
 A detailed comparison of the observed and computed  
 X-traces.  
 Standard deviation and average difference between the  
 observed and computed X-traces.  
 Interpolated electron concentration at fixed densities

Interpolated electron concentration at 10 km intervals  
above the E-valley.

## ALOUETTE I TAPE FORMAT

### CHARACTERISTICS

Seven (7) track IBM 360 converted (TRTCH=G) tapes at 800 BPI density, variable logical records, variable physical records. The logical records contain up to a maximum of 440 bytes (characters), the physical records contain up to a maximum of 7294 bytes.

### FORMAT: (Physical Record)

	BDW	This word (4 bytes) is the Block Descriptor Word and contains the number of bytes in the physical record including its own 4 bytes. BDW $\leq$ 7294.
	RDW	This word (4 bytes) is the Record Descriptor Word and contains the number of bytes in the logical record including its own 4 bytes. RDW $\leq$ 440.
Bytes 9-10	PROFNUM	Number of 4 byte data words beyond LON below. The value of this number is always 9 less the value in RDW. It indicates the number of 4-byte words beyond LON that fills up the logical record.
Bytes 11-12	FIRST-HT	Half-word (2 bytes) containing the height of the first data word beyond LON below.
Bytes 13-14	DELTA-HT	Half-word (2 bytes) containing the height increment value between the data words beyond LON below.
Bytes 15-16	IPAS	Half-word containing pass number.
Bytes 17-18	LEN	The number of data words beyond LON that make up the interpolated profiles in the values of DELTA-HT.
Bytes 19-20	YEAR	Half-word containing the last two digits of YEAR (i.e., 63 for 1963).
22	DAY	Half-word containing Julian day of year (1-365).

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Bytes 23-24	HOUR	Half-word containing hour of ionogram.
Bytes 25-26	MNT	Minute of ionogram
Bytes 27-28	SEC	Second of ionogram
Bytes 29-33	COMENTS CHARACTER	TX (topside extraordinary ray)
Bytes 34	CRTFRQPRES CHARACTER	Y denotes critical frequency scaled N denotes no critical frequency scaled.
Bytes 35-40	STATION CHARACTER	Station Name

All the rest of the record is in 360 4 byte full-word binary, floating point format.

Bytes 41-44	GFQ	Gyrofrequency
Bytes 45-48	DIP	Magnetic dip angle
Bytes 49-52	LAT	North geographic latitude
Bytes 53-56	LON	East geographic latitude
Bytes 57-60		a list of data values described as follows:

Bytes  $n_2-n_1$

where  $i = \text{PROFNUM}$  and  $N \leq 440$

- a. The first LEN of these are the interpolated real height profile with the height of the first specified by FIRST-HT and the rest of these are at heights of last height + DELTA-HT.

The rest of the PROFNUM items are pairs of words, the first of which is the density, the second of which is the corresponding real heights for that density.

PRQPRES - 'Y', the last value is not the density, but the critical  
F<sub>0</sub>F<sub>2</sub>) and its corresponding extrapolated (by Chapman layer)

gth or occurrence of the above data values (bytes 57-60) are variants and  
on the values of PROFNUM and LEN. If the value of PROFNUM is  
less than the value of LEN, then there are 30 4-byte full-words beginning from LON (east  
latitude) and ending with the end of a logical record. If the value  
of PROFNUM is 26 that indicates that there are 26 words beginning from LON and  
contain satellite data as described in (a.). The value of PROFNUM minus LEN  
indicates the remainder of the data as described in (b.). Bytes 5 thru (56+n),  
where n=PROFNUM or the number of occurrences of the 4-byte data elements  
above, are considered as one logical record. The next logical record is a  
repetition of bytes 5 thru (56+n).

DEFINITIONS

BYTE =	one character (in a tape hexadecimal dump one character or byte is represented as 2 hexadecimal values)
=	4 bytes (IBM 360)
HALF-WORD =	2 bytes (IBM 360)
LOGICAL RECORD =	a logical unit of data ranging from one data element to a number of data elements that are meaningful and are logically grouped.
PHYSICAL RECORD =	from 1 to n number of logical records recorded on a physical device such as a tape or disk. Records are always written or recorded in terms of a physical record.

TPE	#	DESCRIPTION	NO. OF PROFILES	START TIME	STOP TIME
				YYDDD-HHMMSS	YYDDD-HHMMSS
Tape 1	1	One file, one tape	16,286	62273-032 958	62347-175 555
Tape 2	1	First of four files	8,050	62348-180 240	63082-160 106
	2	Second of four files	7,657	63083-050 955	63188-025 053
	3	Third of four files	6,121	63189-145 315	64052-182 614
	4	Fourth of four files	5,667	64061-185 858	64123-115 525
Tape 3	1	One file, one tape selected by ASM.PGM	1,031	62274-033 247	64198-134 209
Total	6		44,812		

1C24000000A0000001E 0401FF 7000C00100301001D003A53E74040425F20603C105E34083E80C21  
430FC2462137443750F443342C2443F461044421106444432A14445F6E04448733544E30584454389C4458576  
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453905034548C0F145628938443267393467000005C00000000A800001F040401FFE7000C0018802030111000300150013E

REC 1 LENGTH 7204

4-28-62 - 7-11-62

D-04052

1st + last 5 MC of  
file 1

01A0031011000300003A3E74009042E8E20603C105E34083E864E21E25EBC21F  
51044211B6444432A14445F6E044447335444FB058445439C4458576C44646095  
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511356345240C4452021A343376768454242954543D2A044289928434080000084  
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