Public-data File 91-22rr

NATIONAL URANIUM RESOURCE EVALUATION GEOCHEMICAL DATA FOR STREAM- AND LAKE-SEDIMENT SAMPLES IN THE VALDEZ QUADRANGLE, ALASKA

by

M.A. Wiltse

Alaska Division of
Geological & Geophysical Surveys

December 1990

THIS REPORT HAS NOT BEEN REVIEWED FOR TECHNICAL CONTENT (EXCEPT AS NOTED IN TEXT) OR FOR CONFORMITY TO THE EDITORIAL STANDARDS OF DGGS.

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INTRODUCTION

Purpose:

In December of 1990 the Alaska Division of Geological and Geophysical Surveys (ADGGS) began a mineral resource evaluation of those lands still available for state selection under the Alaska Statehood Act. As part of that process ADGGS is reviewing the stream- and lake-sediment geochemical data generated during the U.S. Department of Energy, National Uranium Resource Evaluation (NURE) program.

This Public-data File has been released so that a summary of that data is available to interested persons. This publication has not been formally reviewed for technical accuracy or for conformity to the editorial standards of ADGGS.

Scope of data:

ADGGS has reviewed NURE geochemical data for the following 1:250,000 quadrangles:

Anchorage	ANC
Baird Mountains	XBM
Beaver	BVR
Bendeleben	BEN
Bering Glacier	XBG
Bettles	BET
Big Delta	XBD
Black River	BLR
Candle	CAN
Chandalar	CHN
Charley River	CHR
Circle	CIR
Eagle	EAG
Gulkana	GUL
Healy	HEA
Hughes	HUG
Iditarod	IDT
Kateel River	KAT
Lime Hills	LIM
Livengood	LIV
Medfra	MED
Melozitna	MLZ
Misheguk Mountain	MIS
Mount Hayes	XMH
Nabesna	NAB

Nome	NOM
Norton Bay	NOB
Nulato	NUT
Phillip Smith Mountains	PSM
Point Hope	XPH
Point Lay	XPL
Ruby	RUB
Selawik	SLK
Shungnak	SHU
Sleetmute	SLT
Solomon	SOL
Talkeetna Mountains	TLM
Tanacross	TNX
Tanana	TAN
Teller	TEL
Umiat	UMI
Unalakleet	UKT
Utukok River	XUR
Valdez	VAL
Wiseman	WIS

Limitations of data:

Our review has been limited to the following elements: Ag, As, Au, Ba, Be, Bi, Cd, Co, Cr, Cu, Fe, La, Mn, Mo, Ni, Pb, Sb, Sn, Ti, U, U/Th, V, W, Zn

The Nure data set also contains analyses for: Al, Ca, Ce, Cl, Cs, Dy, Eu, Hf, K, Li, Lu, Mg, Na, Nb, Rb, Sc, Sm, Sr, Ta, Tb, Th, Yb, Zr. These data have not been analyzed in the present study.

Because of the procedures used in generating the initial chemical analyses, the NURE geochemical data set has severe limitations. Many elements were determined at only a few sample sites resulting in many samples having incomplete data coverage. The detection limit for many elements is high, making those data of limited effectiveness in delineating mineral resources. Regardless of these and other shortcomings, however, the NURE data do provide information concerning mineralization in many poorly accessible parts of Alaska.

Contents:

This Public-data File (PDF), and the PDF's for the above listed quadrangles, contain a columnar ASCII file on a 5 1/4" high density floppy disk that includes: sample number, replicate code, sample type code, latitude, longitude, and the complete set of elemental analyses available for each sample in the quadrangle. These data are consistently ordered in the file as shown below:

Sample number, Replicate code, Latitude, Longitude, Sample-type code, U Ag Bi Cd Cu Nb Ni Pb Sn W As Zr Mo Be Li Al Au Ba Ca Ce Cl Co Cr Cs Dy Eu Fe Hf K La Lu Mn Mg Na Rb Sb Sc Sm Sr Ta Tb Th Ti V Yb Zn U/Th

All values are entered as parts per million. The data file bears a three letter identification and the extension "ASC" (eg. EAG.ASC for the Eagle Quadrangle data file).

A sample replicate code of "0" indicates that the sample is the initial sample taken at a site and is the code found for most samples. Subsequent samples collected from the same site have successively higher integer designations. Sample type codes range from "01" to "99". The definition of these codes is found in Appendix A "Key to Sample Types".

Within the elemental analysis fields of a sample, values of -999 indicate that no analyses was attempted for that element. Other negative numbers (eg. -5) in an elemental analysis field of a record indicate that the element was not detected at a level equal to the absolute value of the negative number tabulated.

TREATMENT OF DATA

Elements:

Although all the elemental NURE data available for a quadrangle is included in the digital ASCII file supplied with this PDF, only a 24 element subset of data was analyzed for this PDF: Ag, As, Au, Ba, Be, Bi, Cd, Co, Cr, Cu, Fe, La, Mn, Mo, Ni, Pb, Sb, Sn, Ti, U, U/Th, V, W, Zn.

Grouping of data:

The majority of the Alaska Nure geochemical data is derived from stream sediment or lake sediment samples. Many data sets, however, have a few samples that are subtypes of these two fundamental sample groups. For the purpose of the data review released in this PDF, all subtype samples have been recoded to either the stream sediment type or the lake sediment type, whichever type they most closely resembled. We estimate that less than 1 percent of the samples encountered in this review were recoded.

Following sample-type recoding, brief summary statistics were calculated separately for the stream sediment samples (type=12) and for the lake sediment samples (type=13). These statistics provide a quick reference to the number of samples that have analytical values exceeding the detection limit and provide an indication of the geochemical dispersion of the elements for each sample type.

Single-element Pseudomaps of the data have been made that show the location of all samples having analytical values greater than the mean. This was accomplished by separately standardizing the data for each sample type, recoding all standard scores that were less-than-or-equal-to-zero to zero and then plotting a symbol at each sample site, the size of which is proportional to the elemental standardized value (Z-score) at that sample site. Because Z-scores are measures of standard deviation, this procedure results in a psuedomap with varying symbol size that directly reflects how far a sample's element content is above the mean. The larger symbols correspond to element values that are farthest above the mean value for the element in question. A Symbol-size key is provided in figure 1 which indicates the symbol size for element abundances from 1 to 6 standard deviations above the mean.

THE FOLLOWING RESULTS ARE FOR:
TYPE = 12.000

TOTAL OBSERVATIONS: 471

	U	AG	BI	CD	CU
N OF CASES	471	1	35	27	453
MINIMUM	0.090	5.000	5.000	5.000	12.000
MAXIMUM	21.500	5.000	10.000	8.000	350.000
MEAN	2.419	5.000	6.086	5.444	53.720
STANDARD DEV	1.777	.	1.147	0.892	28.986

	NI	PB	SN	W	AS
N OF CASES	420	132	5	12	23
MINIMUM	15.000	5.000	13.000	15.000	5.000
MAXIMUM	137.000	69.000	32.000	29.000	72.000
MEAN	39.060	10.182	21.200	19.417	19.609
STANDARD DEV	18.600	8.290	9.550	5.248	15.971

	MO	BE	AU	BA	CO
N OF CASES	0	419	23	421	464
MINIMUM	.	1.000	0.100	206.000	4.100
MAXIMUM	.	5.000	3.290	7486.000	271.000
MEAN	.	2.224	0.660	636.276	19.398
STANDARD DEV	.	0.605	0.863	386.640	15.048

	CR	FE	MN	SB	TI
N OF CASES	466	471	471	11	465
MINIMUM	30.000	11680.000	197.000	3.000	1728.000
MAXIMUM	1074.000	333200.000	6186.000	15.000	12000.000
MEAN	119.603	44614.544	914.310	5.000	4874.241
STANDARD DEV	88.707	21471.181	469.747	3.606	1327.894

	V	ZN	UTH	LA
N OF CASES	471	190	429	404
MINIMUM	34.000	33.000	0.252	6.000
MAXIMUM	554.000	443.000	5.244	61.000
MEAN	145.743	124.905	0.503	24.525
STANDARD DEV	58.094	53.292	0.335	8.326

THE FOLLOWING RESULTS ARE FOR:
TYPE = 13.000

TOTAL OBSERVATIONS: 500

	U	AG	BI	CD	CU
N OF CASES	500	1	30	15	449
MINIMUM	0.220	4.000	4.000	4.000	13.000
MAXIMUM	17.320	4.000	10.000	7.000	318.000
MEAN	1.849	4.000	5.600	5.467	51.548
STANDARD DEV	1.198	.	1.221	0.834	23.350

	NI	PB	SN	W	AS
N OF CASES	409	50	3	3	33
MINIMUM	15.000	4.000	9.000	14.000	5.000
MAXIMUM	111.000	108.000	15.000	22.000	65.000
MEAN	32.589	10.420	12.333	18.333	12.333
STANDARD DEV	13.298	14.539	3.055	4.041	10.600

	MO	BE	AU	BA	CO
N OF CASES	0	367	1	385	441
MINIMUM	.	1.000	0.170	286.000	4.000
MAXIMUM	.	4.000	0.170	1381.000	46.700
MEAN	.	1.793	0.170	553.486	14.755
STANDARD DEV	.	0.606	.	161.046	6.533

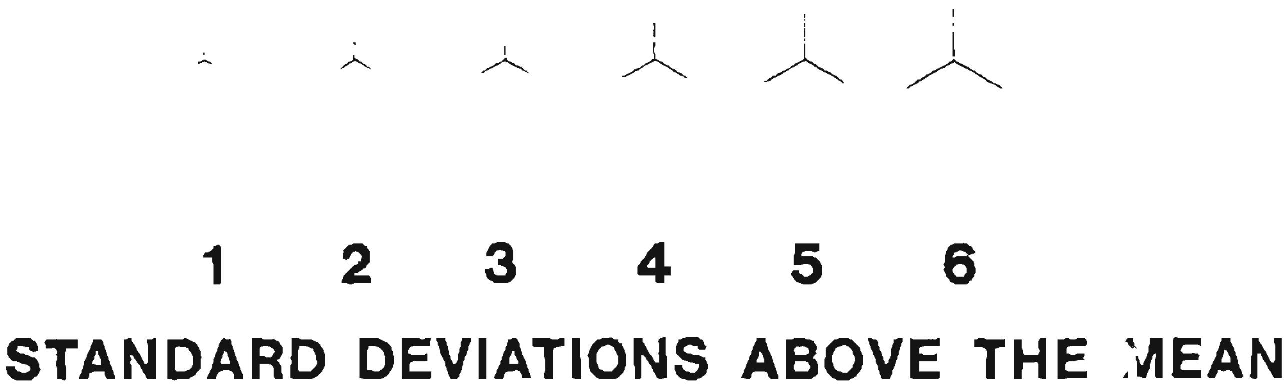
	CR	FE	MN	SB	TI
N OF CASES	452	498	500	3	459
MINIMUM	30.000	6059.000	65.000	5.000	1074.000
MAXIMUM	298.000	83120.000	4485.000	10.000	10130.000
MEAN	89.717	33183.882	607.418	7.000	4226.760
STANDARD DEV	35.107	12868.960	325.776	2.646	1266.484

	V	ZN	UTH	LA
N OF CASES	498	167	378	239
MINIMUM	14.000	48.000	0.200	9.000
MAXIMUM	299.000	334.000	3.339	35.000
MEAN	116.408	144.293	0.514	19.464
STANDARD DEV	42.549	54.786	0.280	4.800

THESE RESULTS ARE FOR VALL NURE DATA

TOTAL OBSERVATIONS: 971

Figure 1. Symbol-size key for single element pseudomaps indicating the size of plotted symbols for values that are from 1 to 6 standard deviations above the mean.



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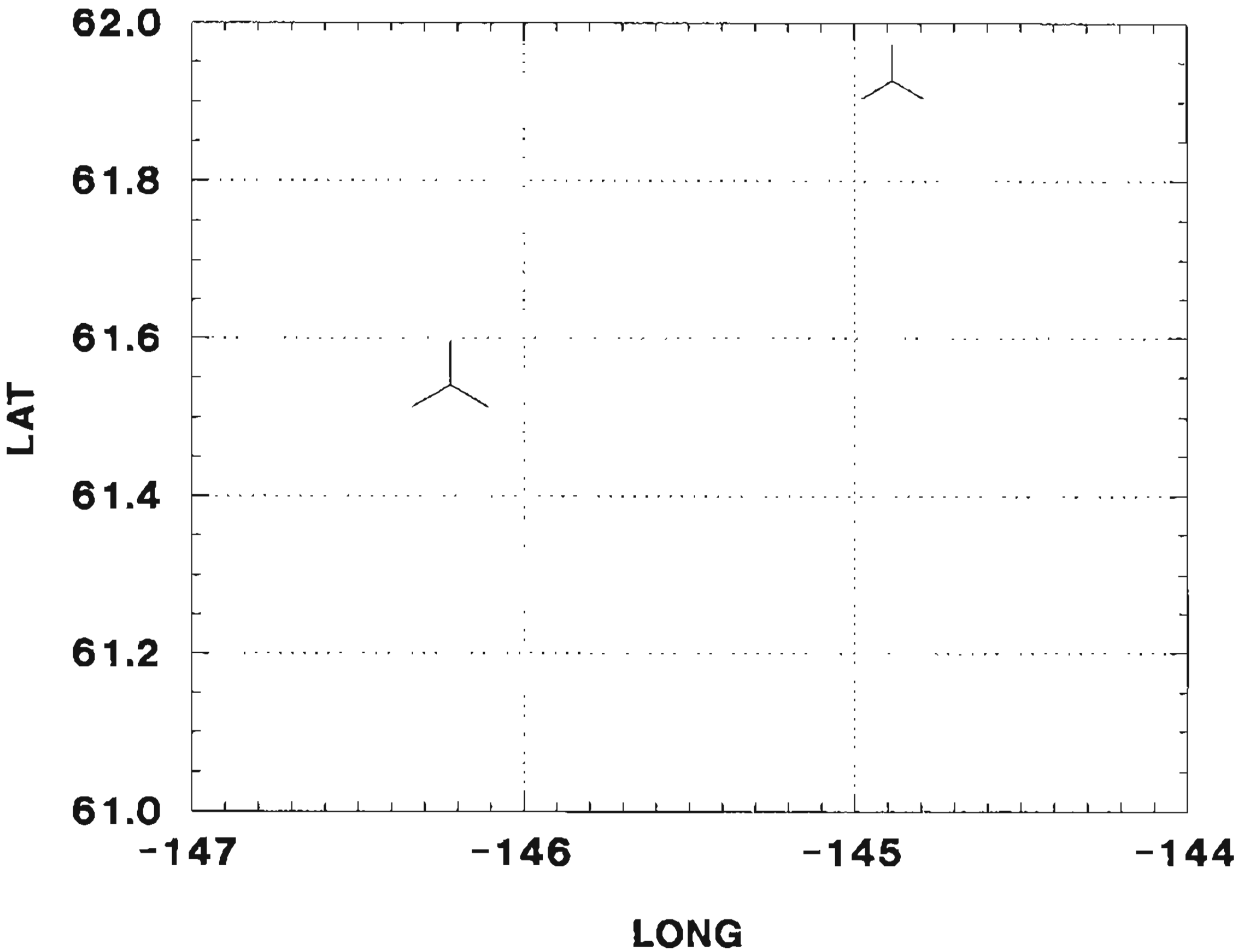

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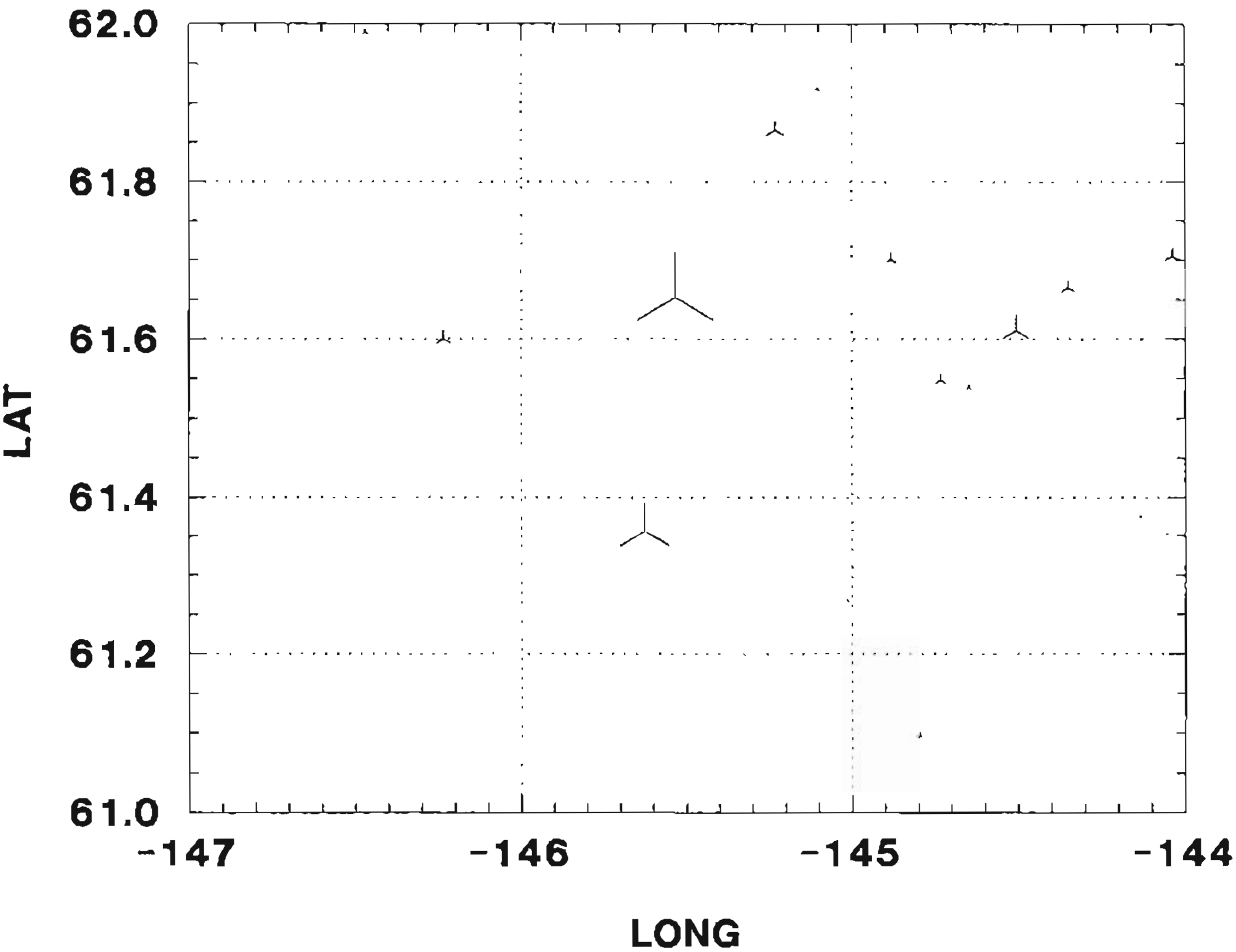
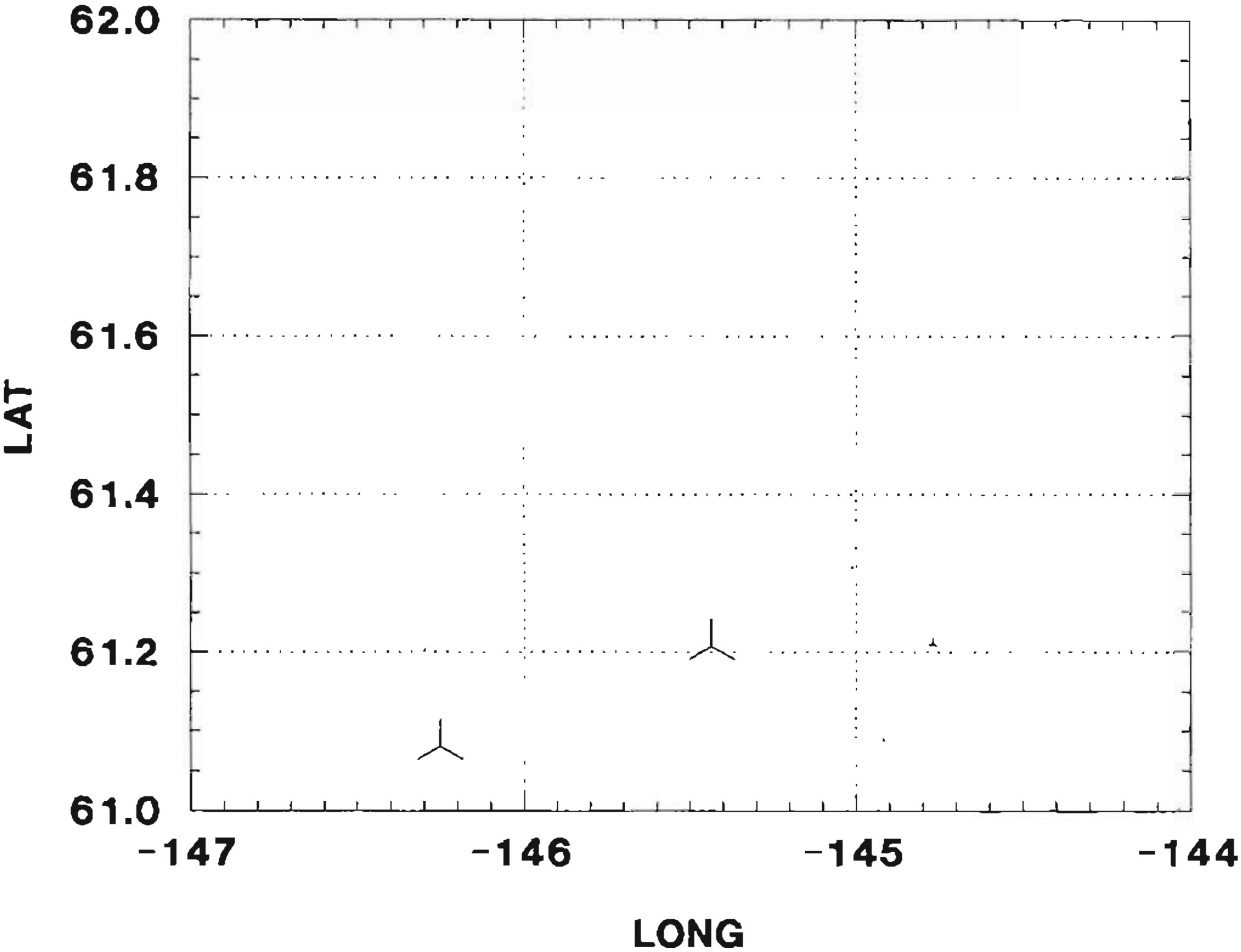


VALZMAP NURE DATA FOR AU



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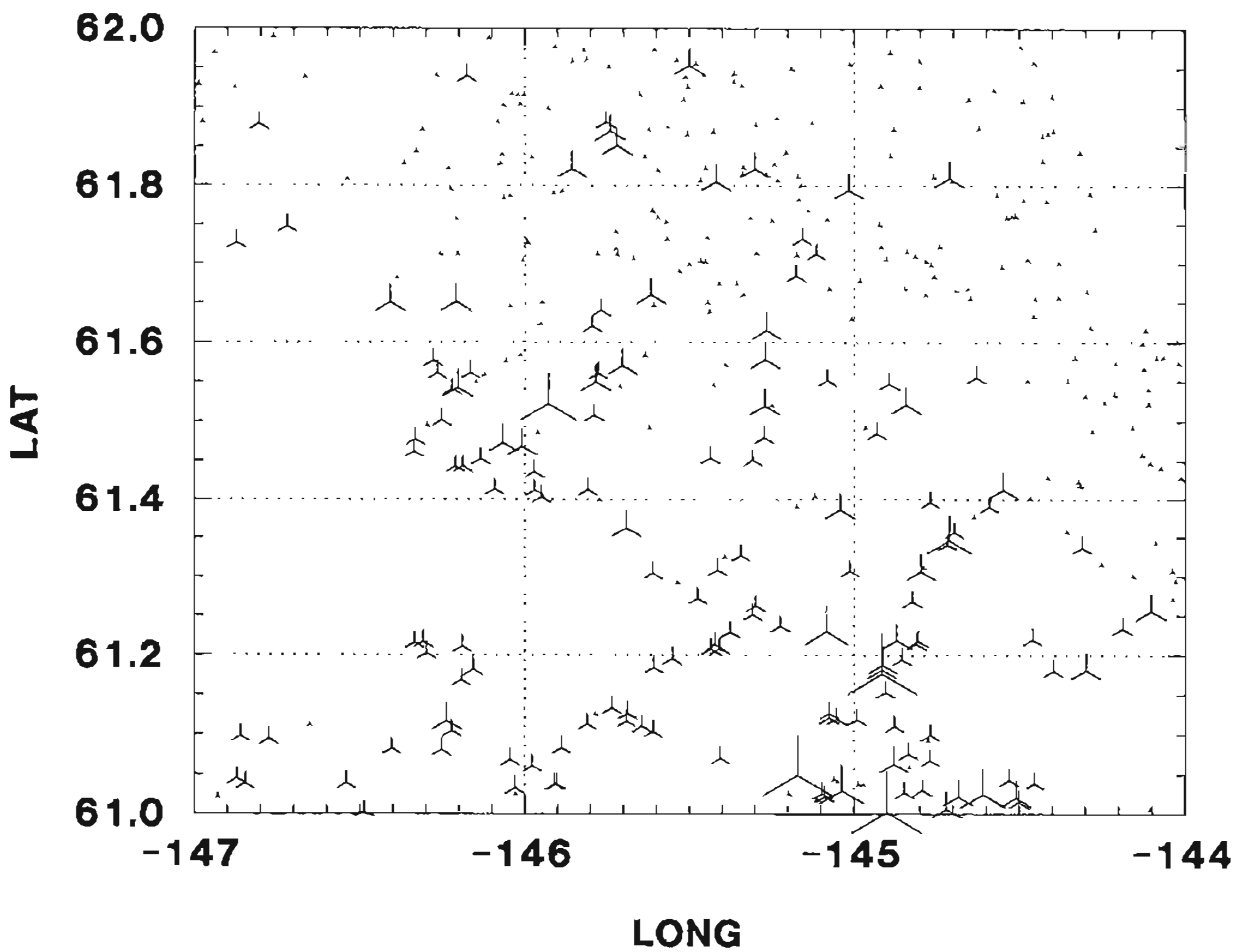
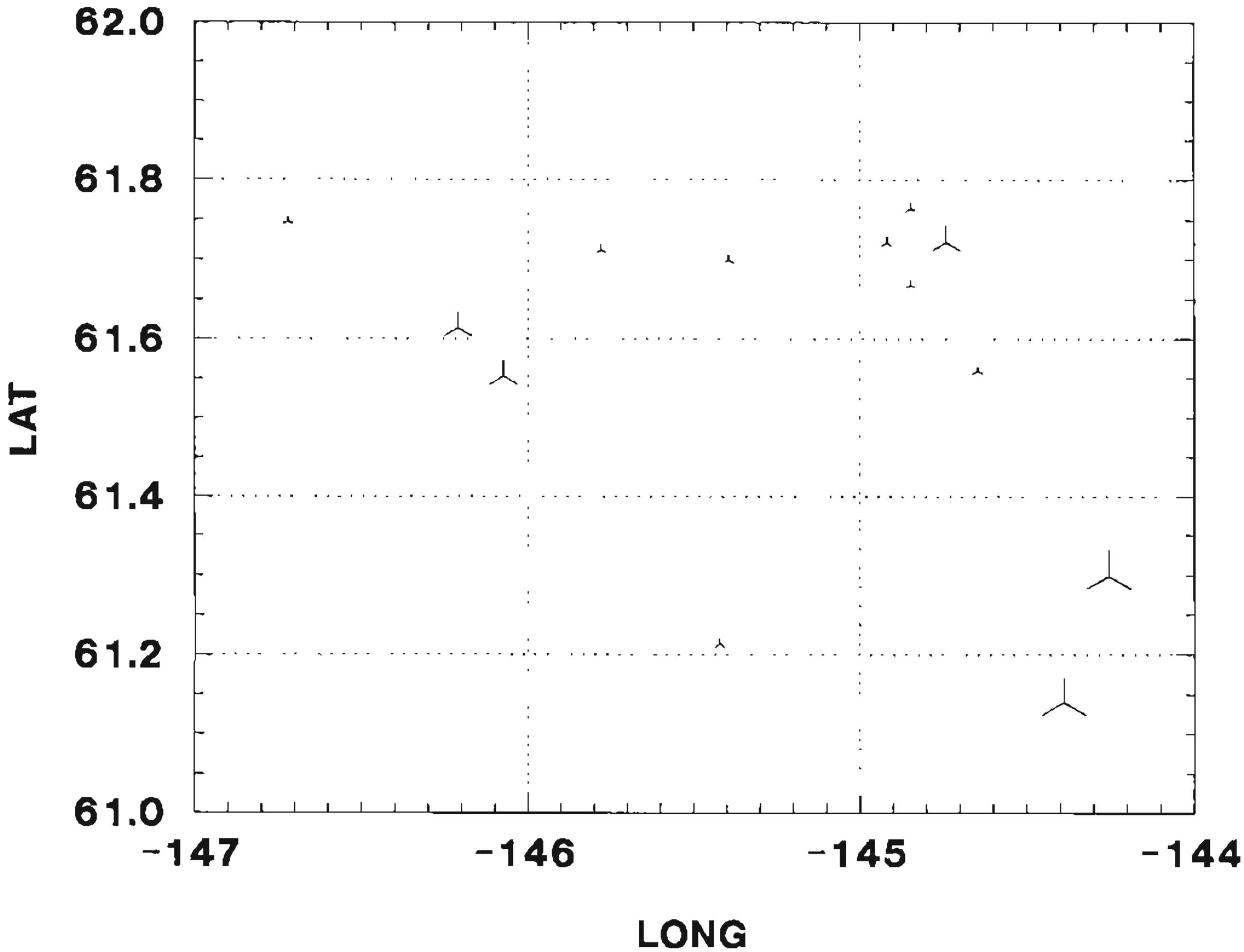
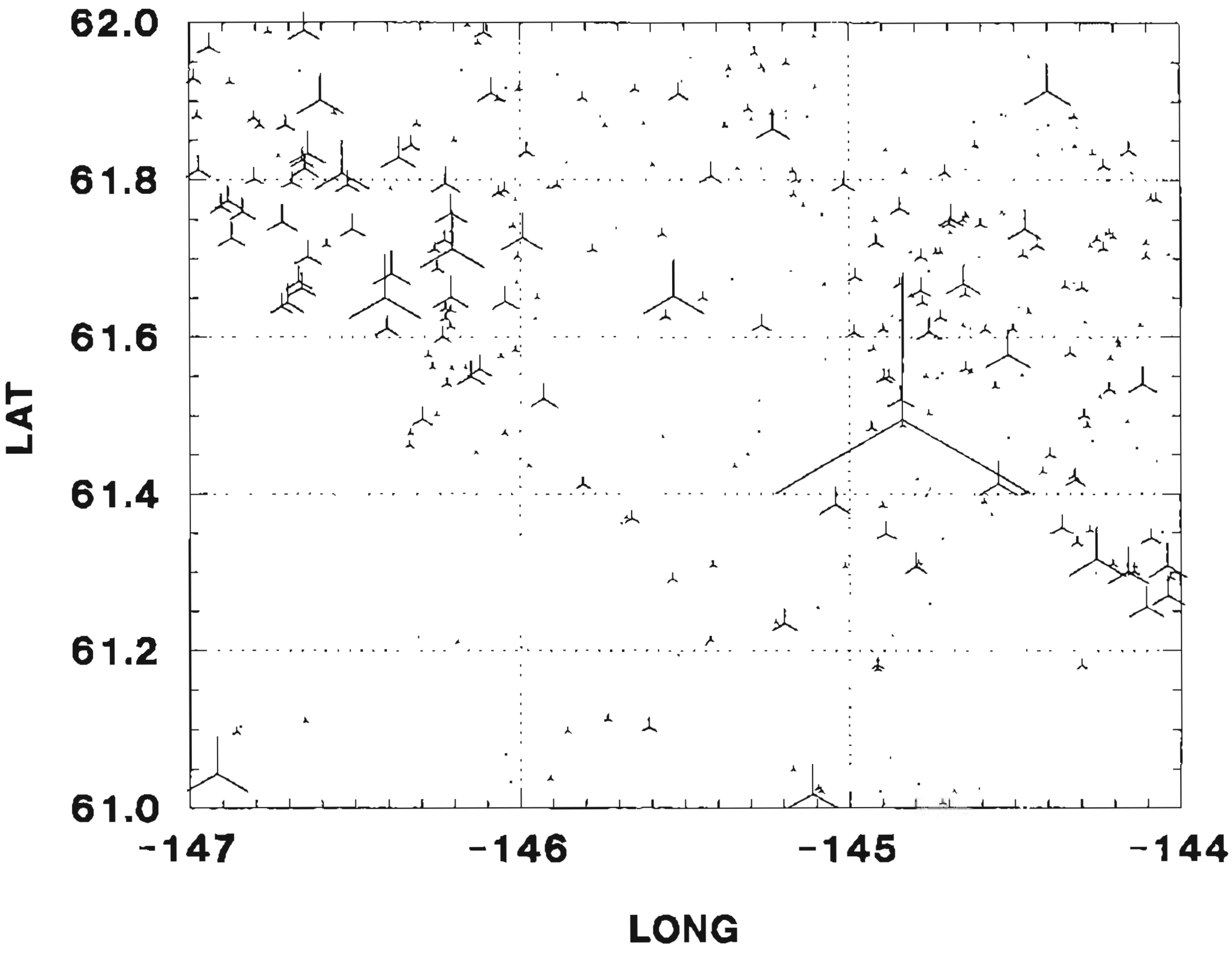


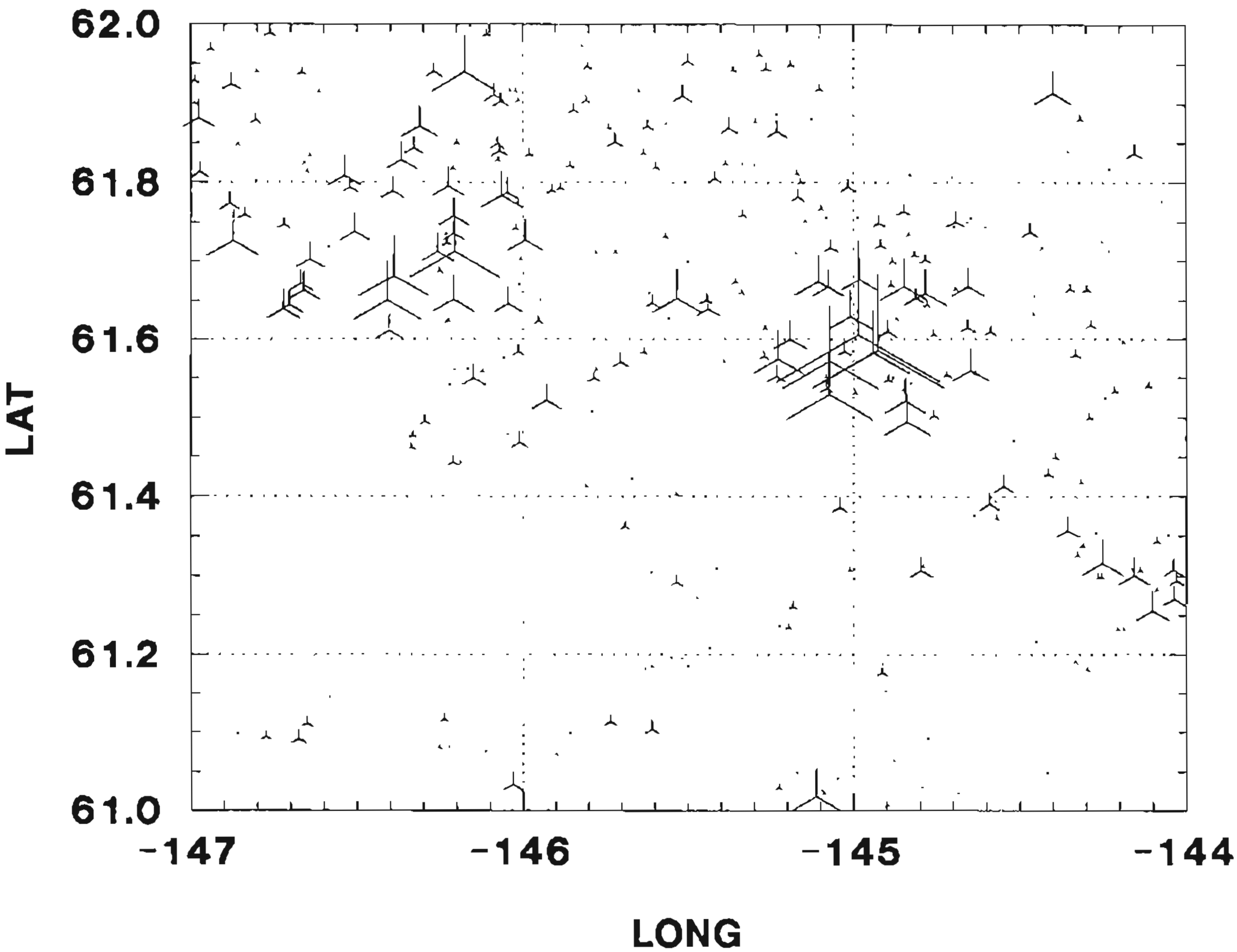
VALZMAP NURE DATA FOR CD



VALZMAP NURE DATA FOR CO



VALZMAP NURE DATA FOR CR



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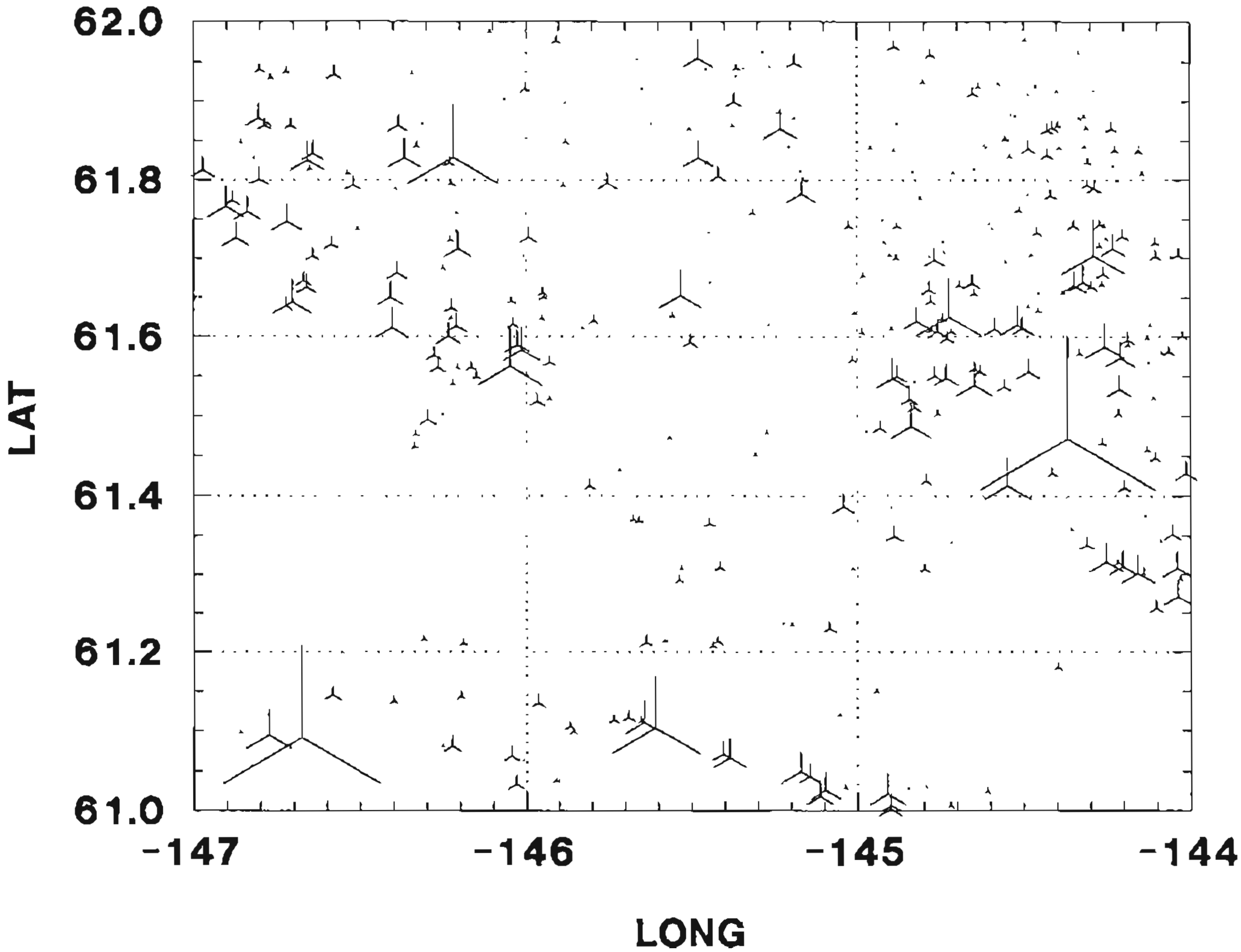

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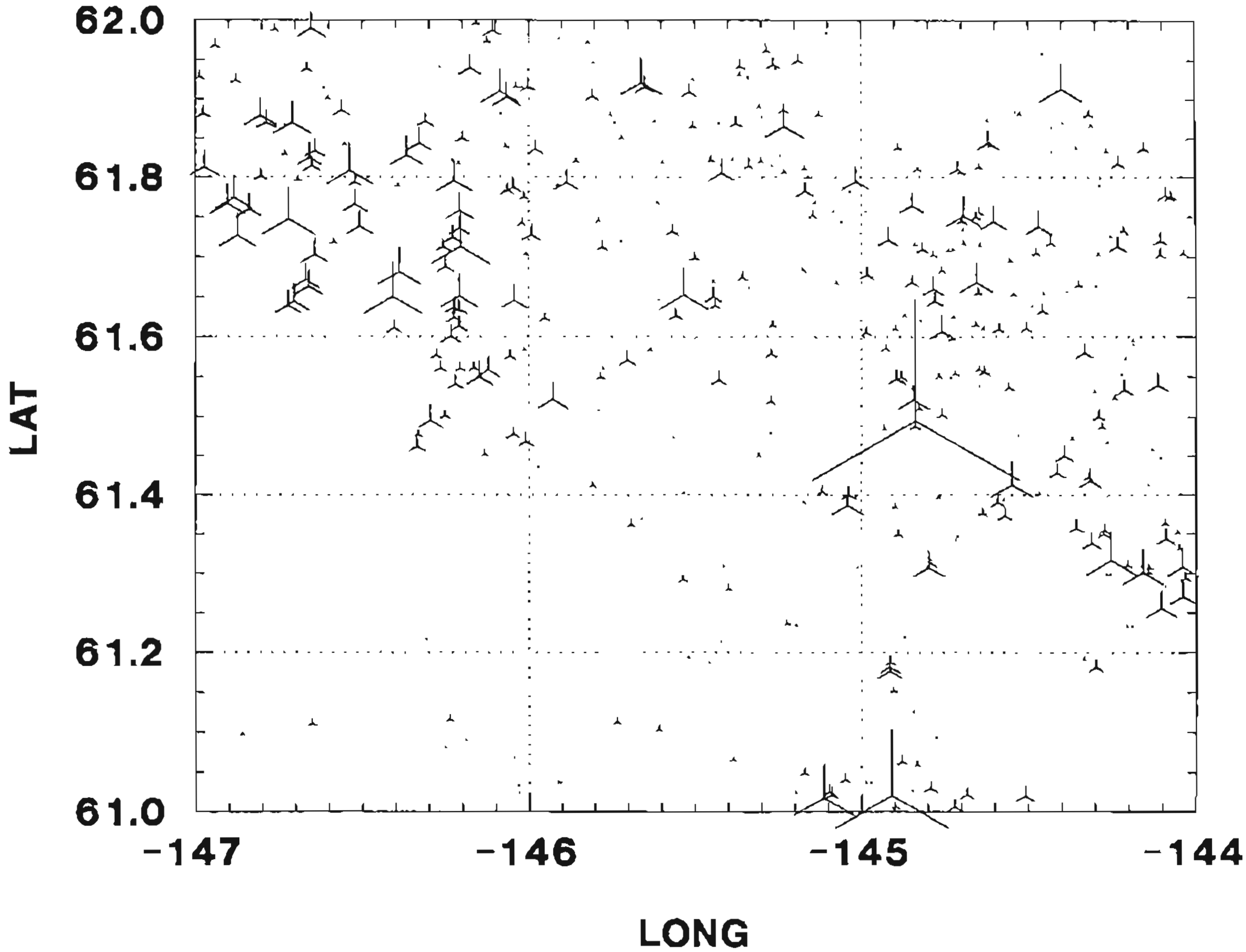

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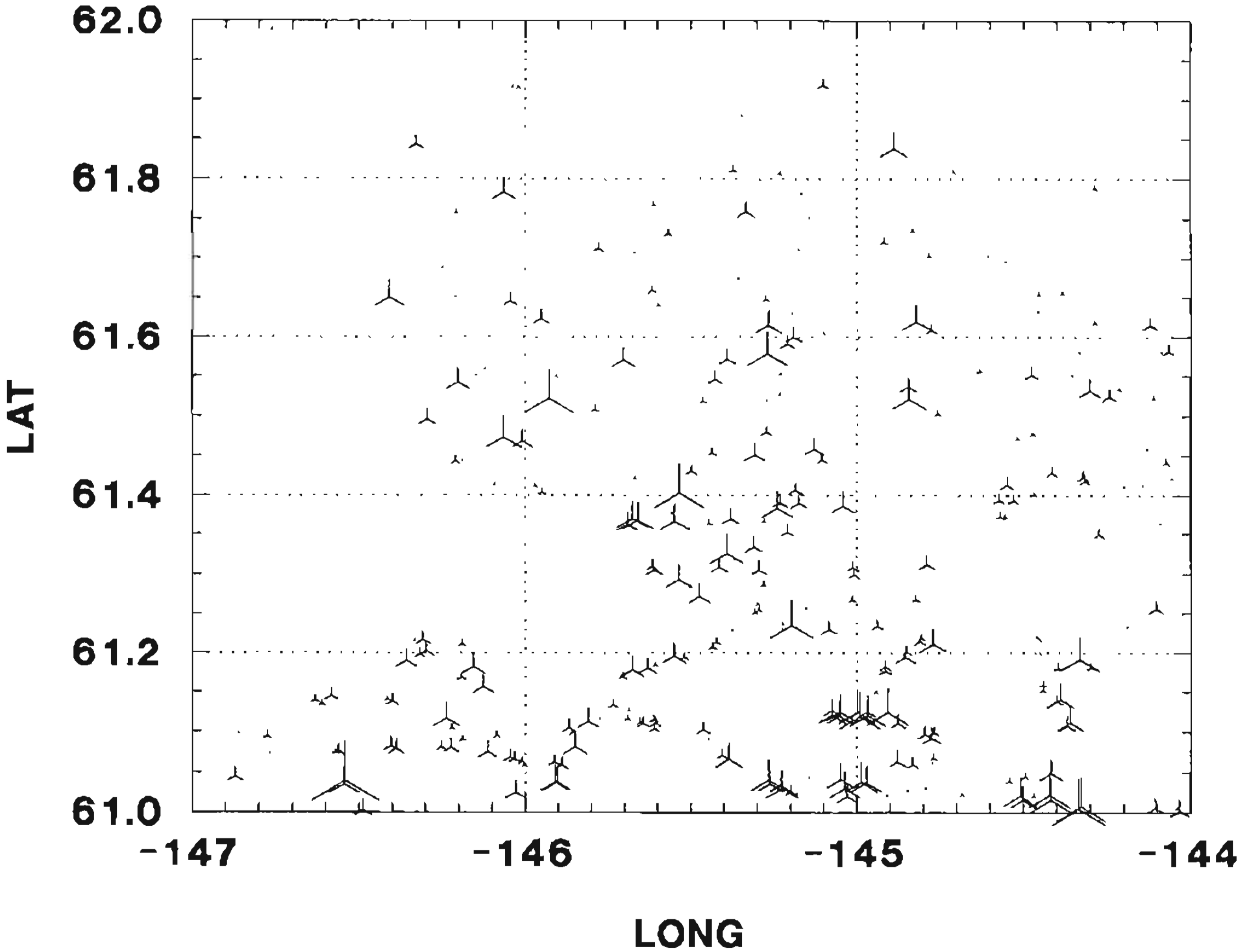

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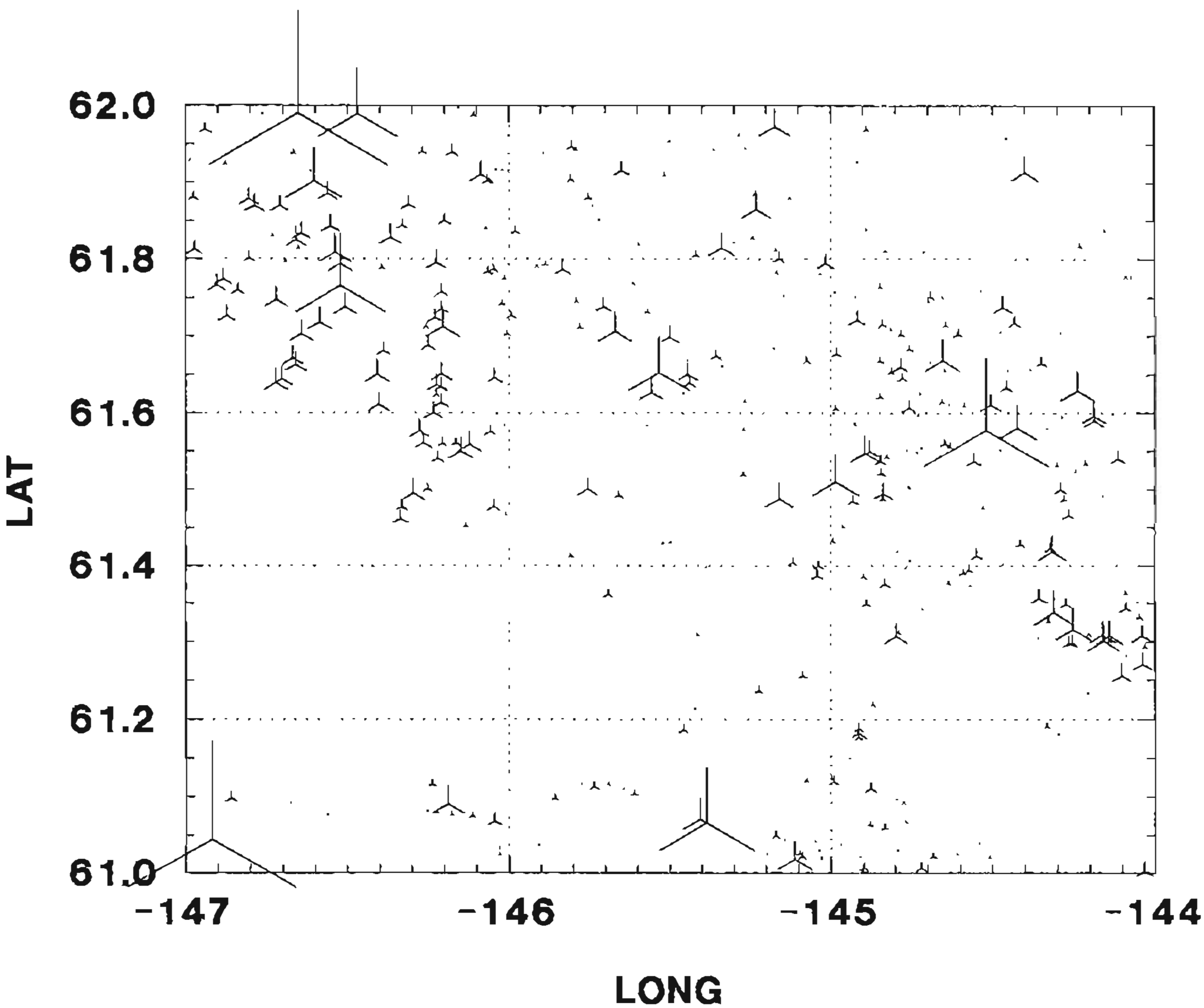
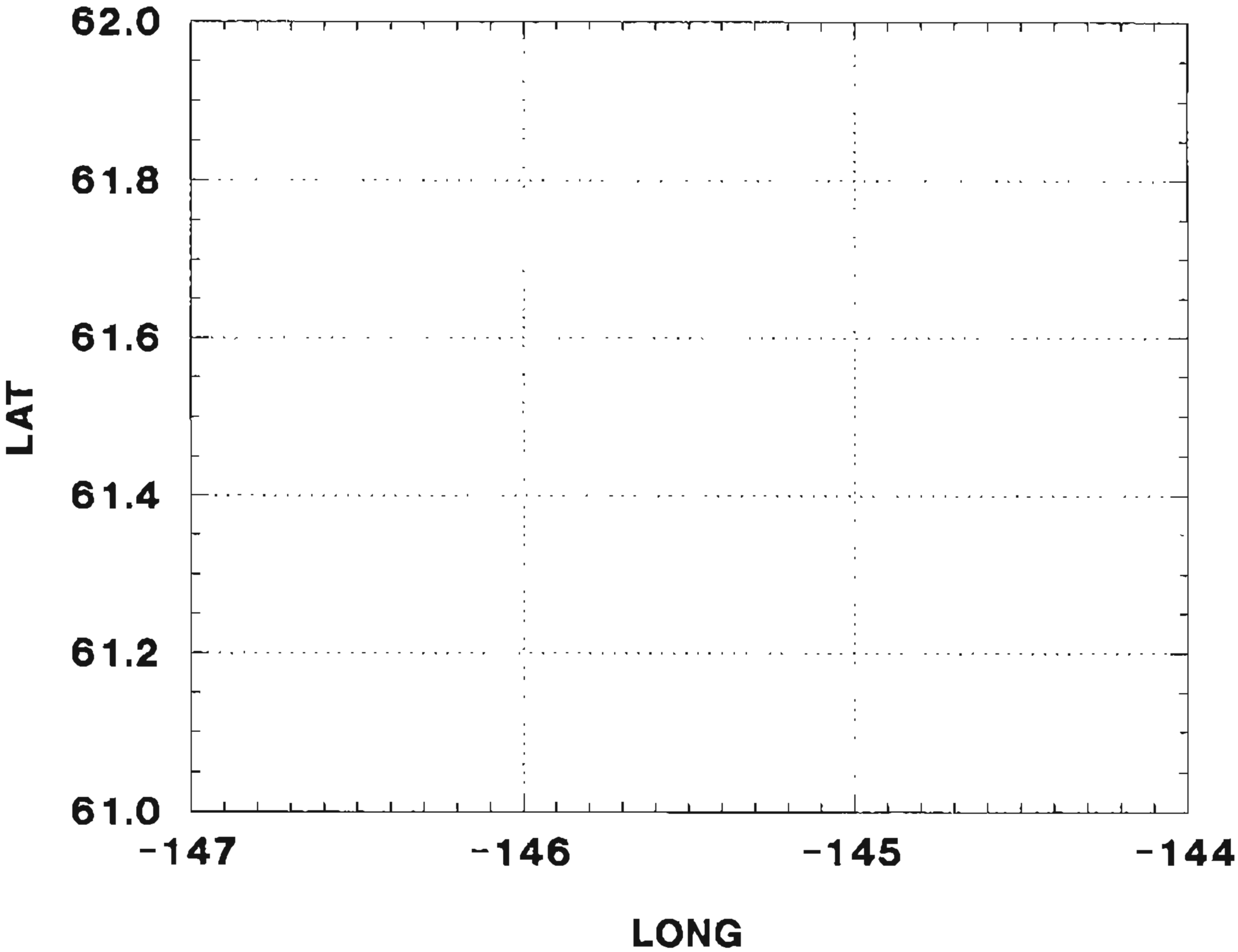


VALZMAP NURE DATA FOR MO



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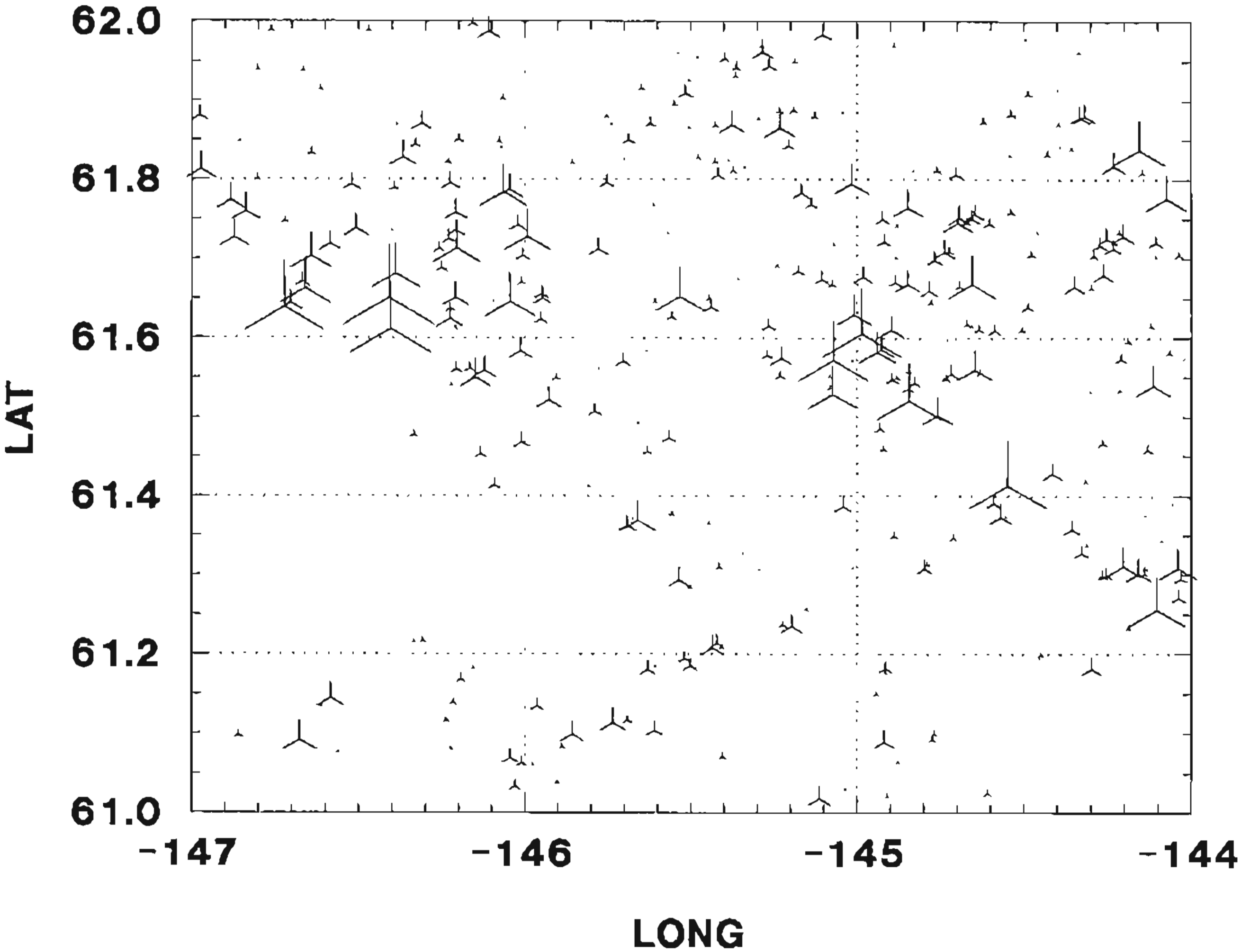
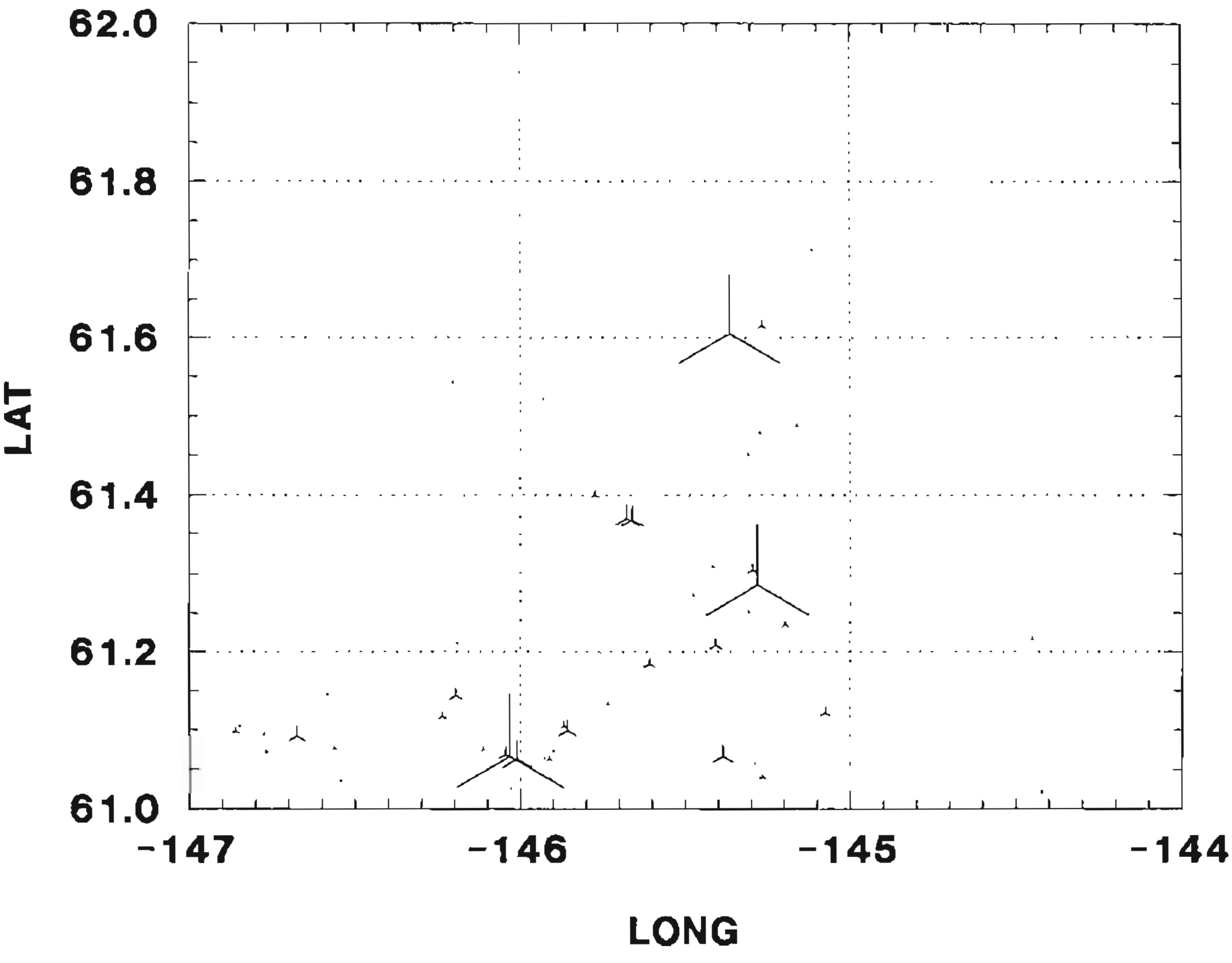


VALZMAP NURE DATA FOR PB



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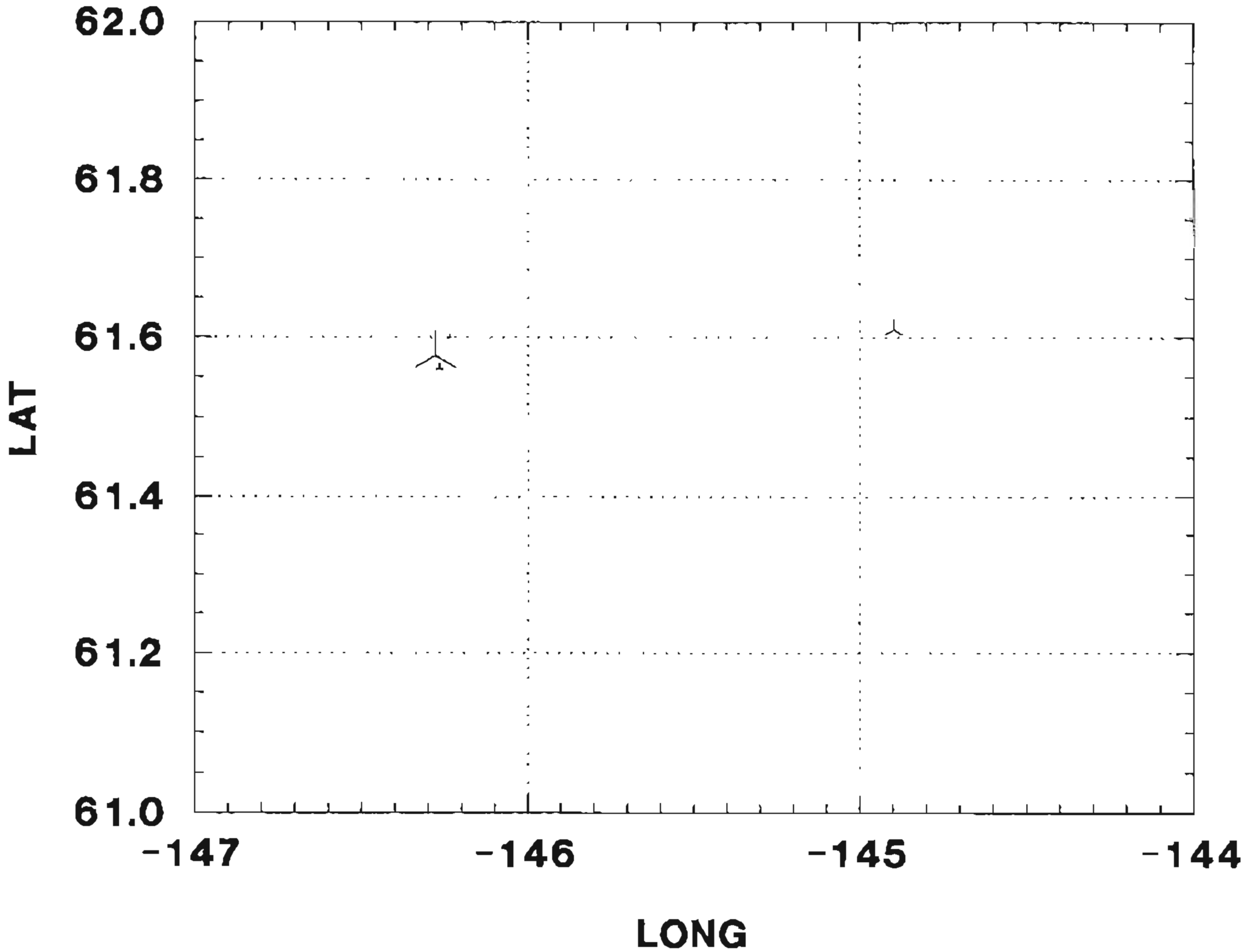
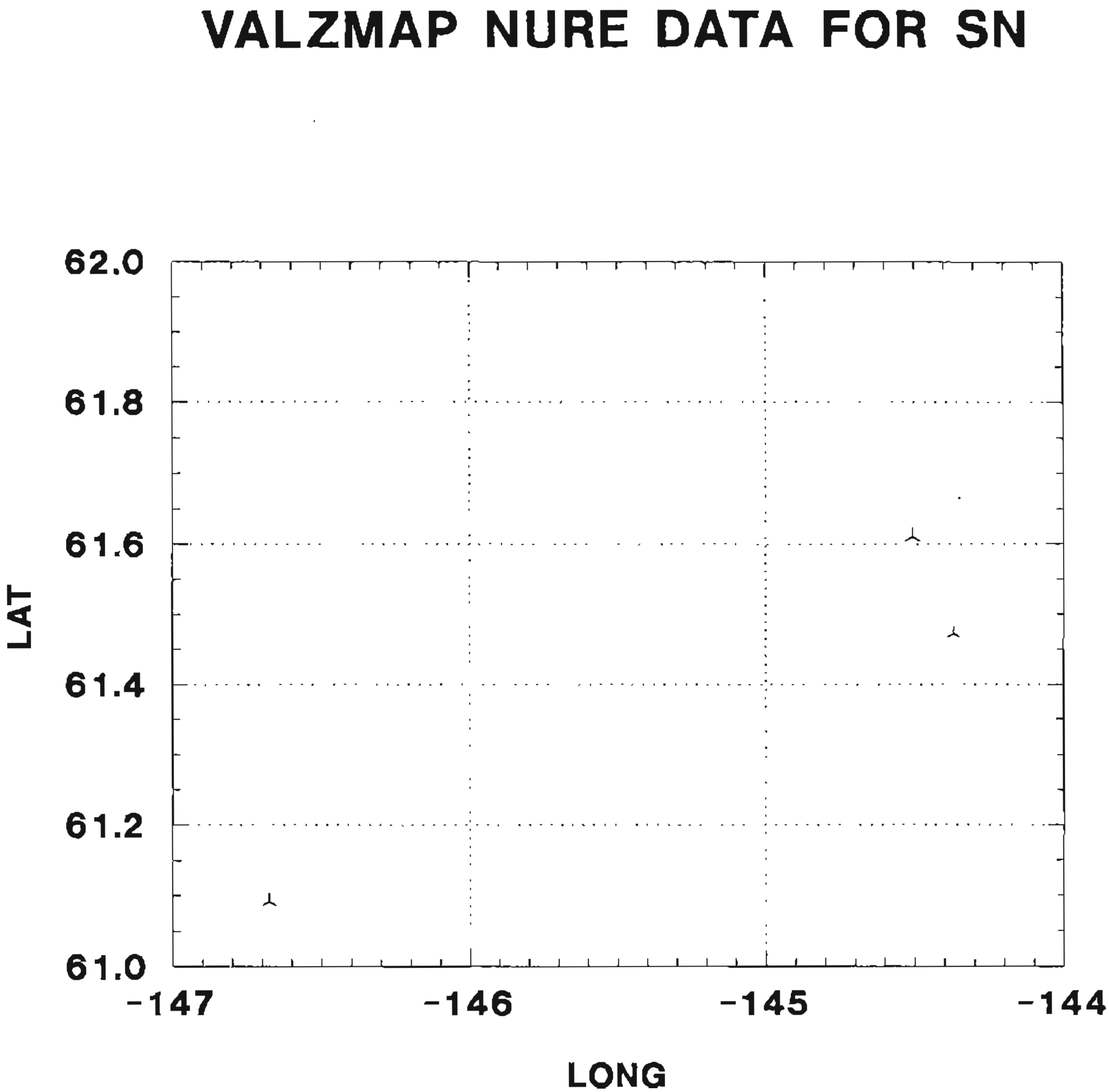
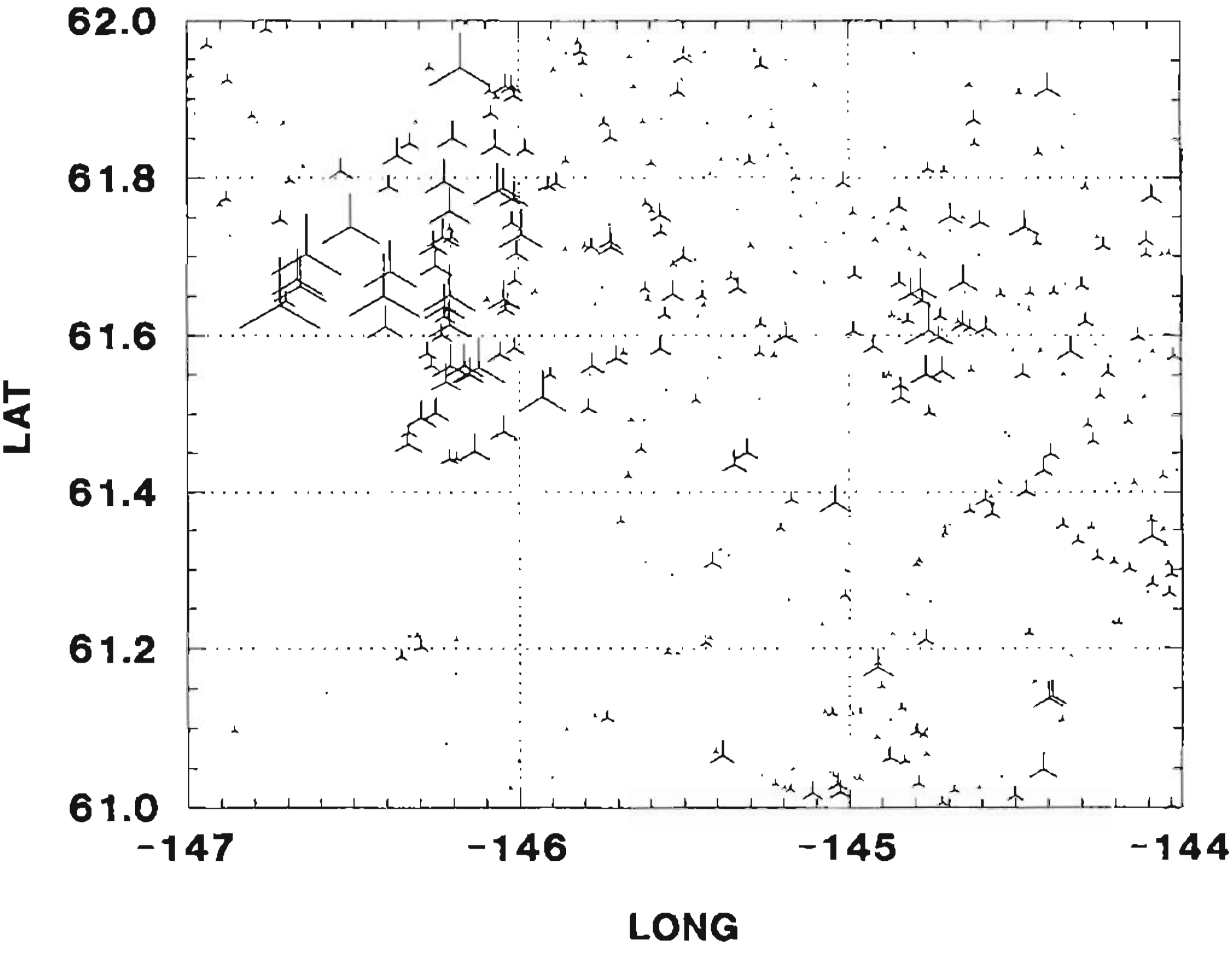
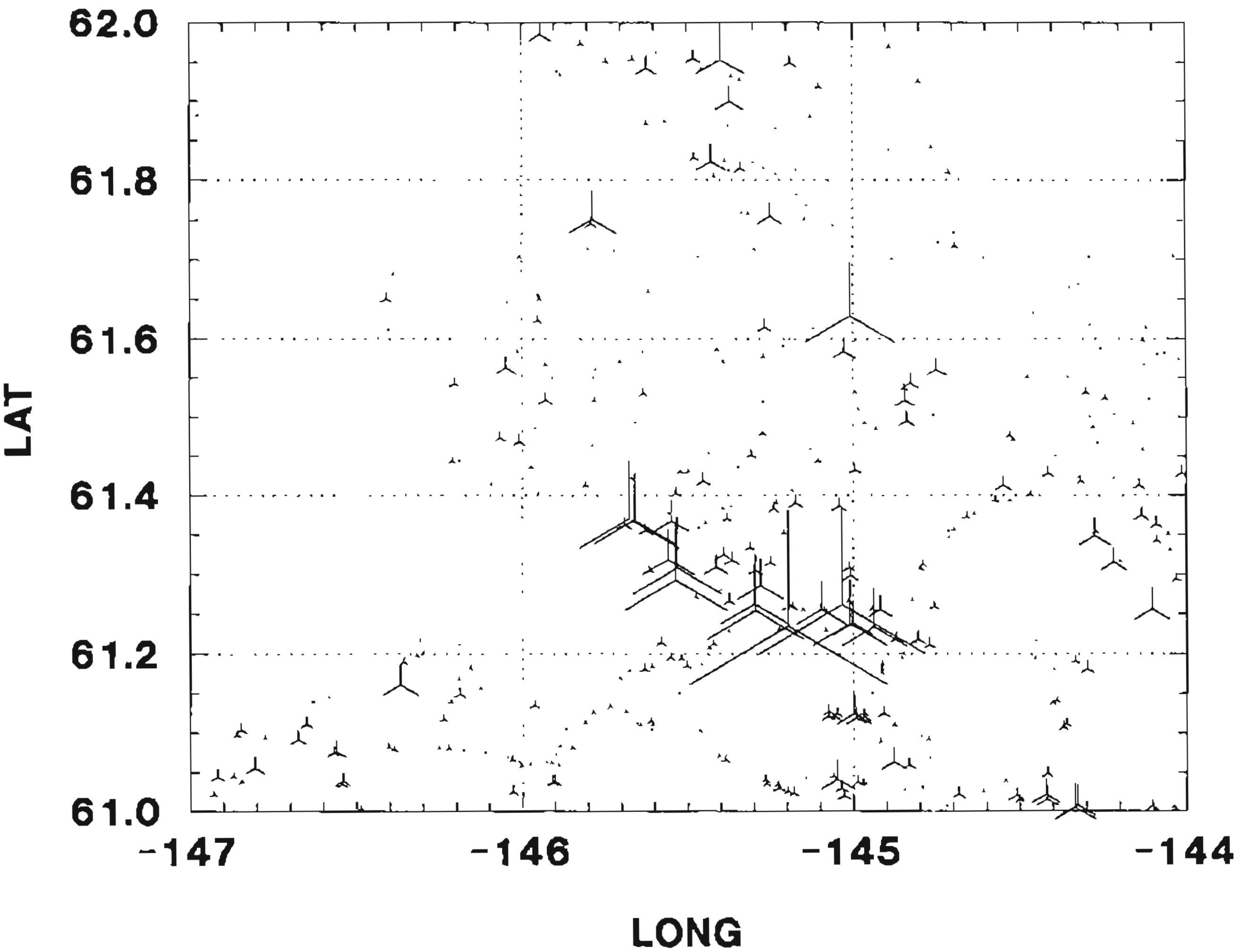



VALZMAP NURE DATA FOR SN
LAT
62.0
61.8
61.6
61.4
61.2
61.0
-147
-146
-145
-144
LONG

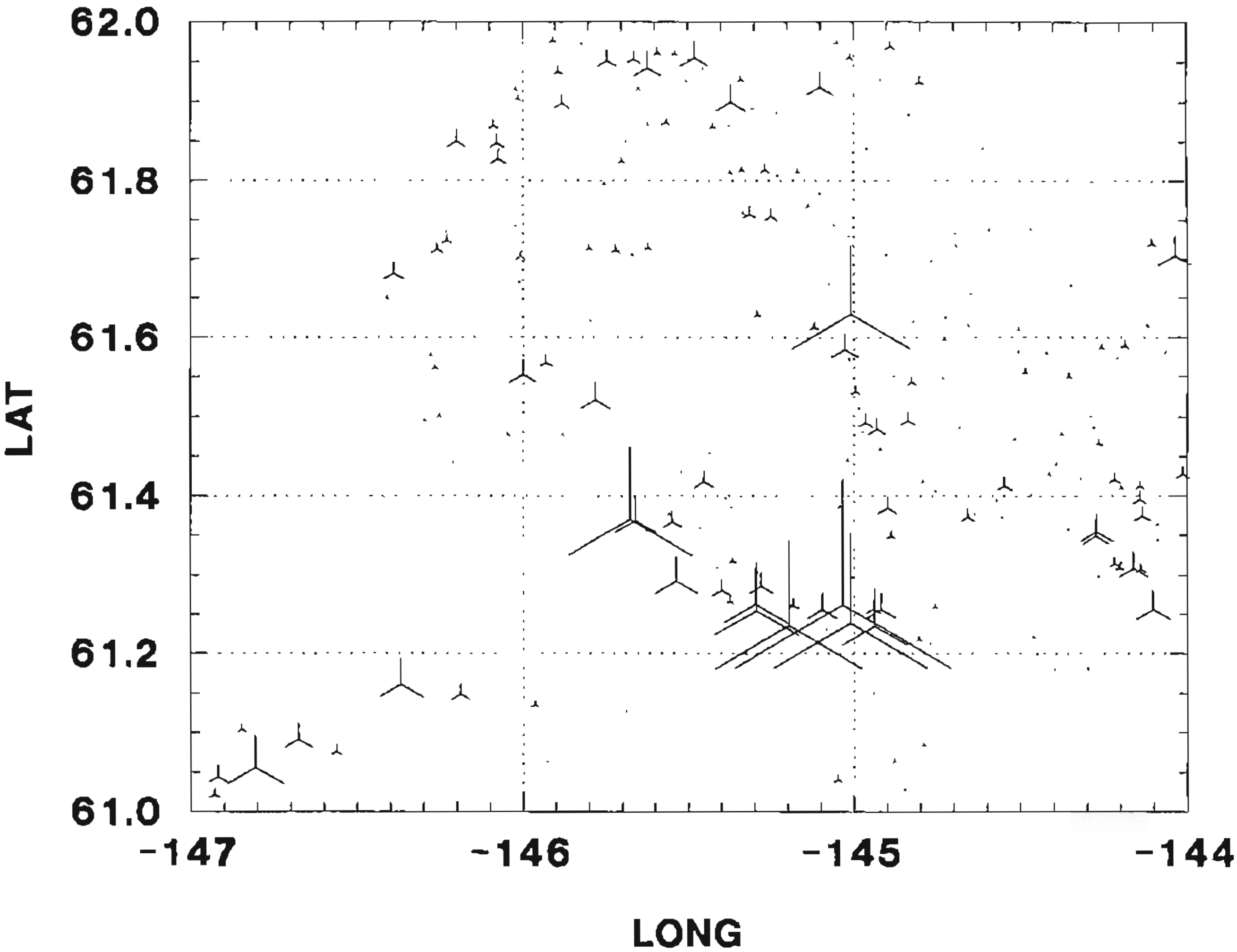
VALZMAP NURE DATA FOR TI



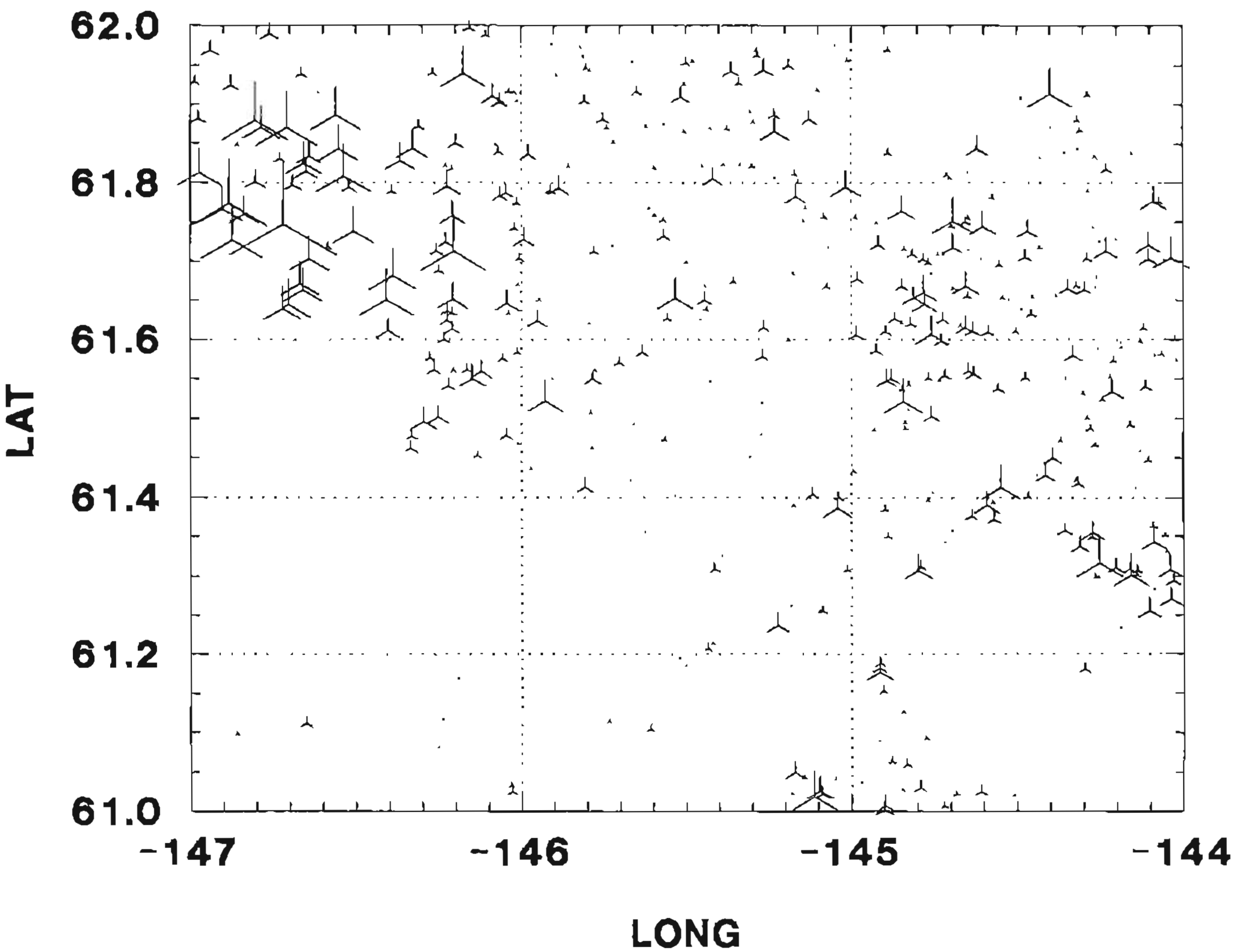
VALZMAP NURE DATA FOR U



VALZMAP NURE DATA FOR UTH



VALZMAP NURE DATA FOR V



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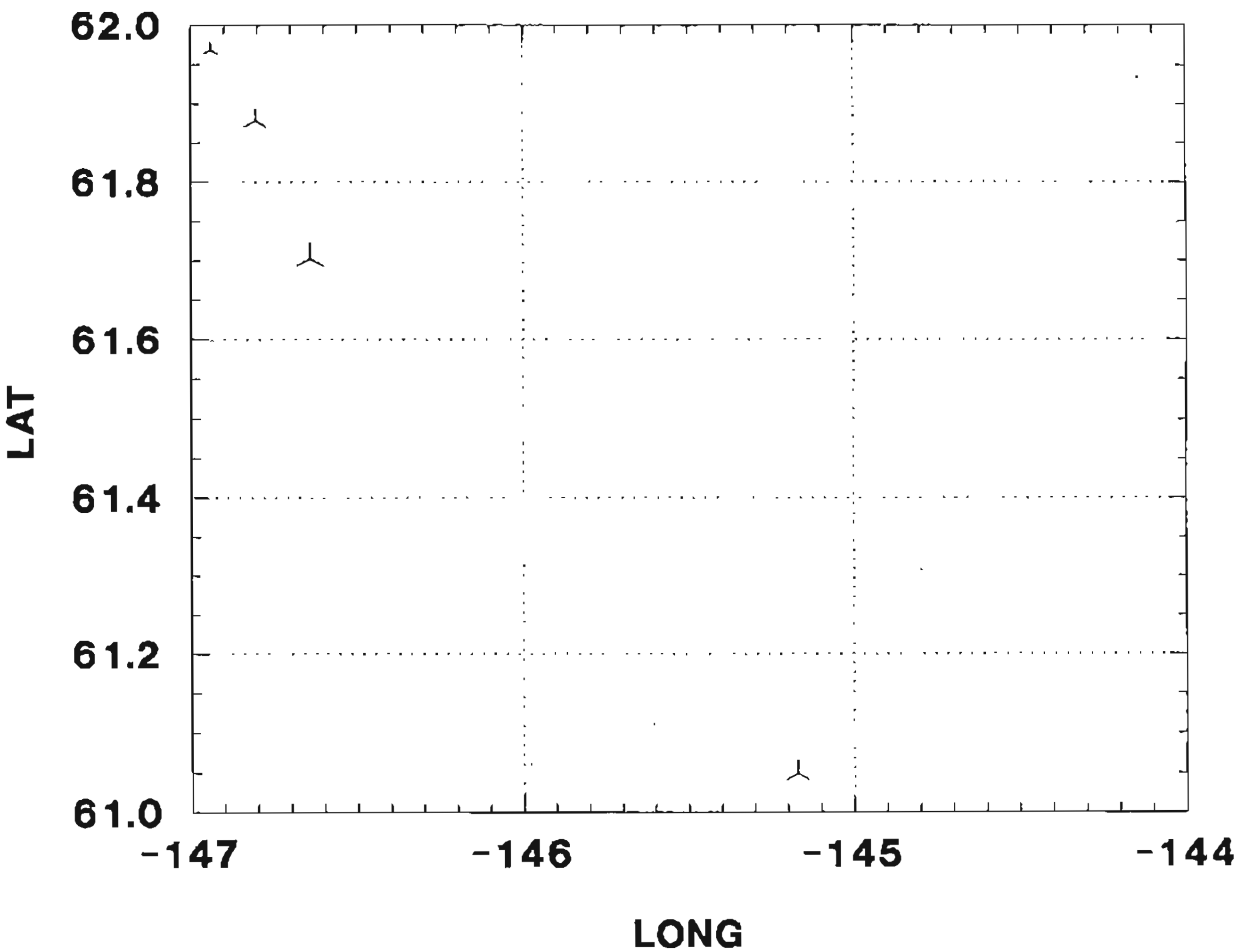

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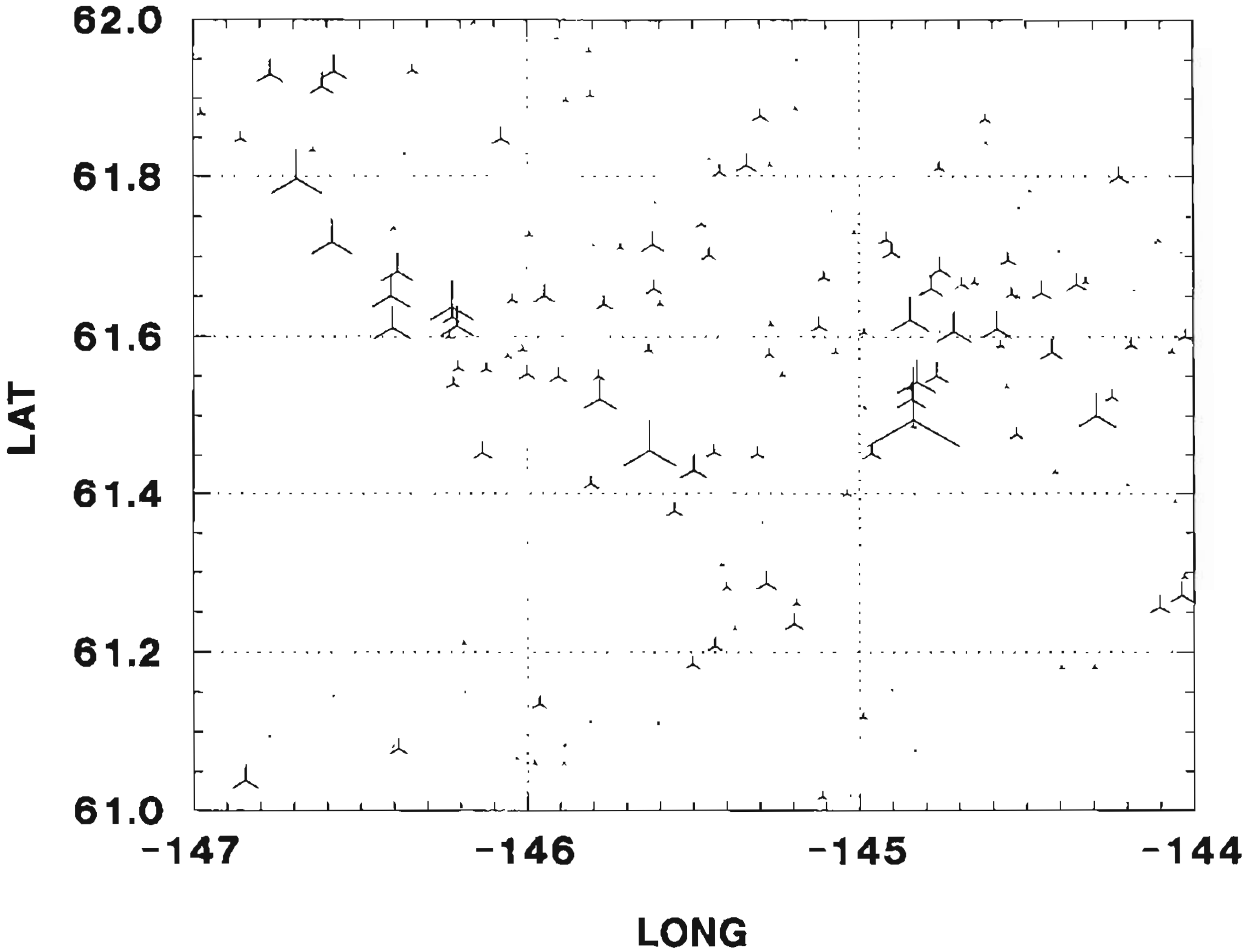

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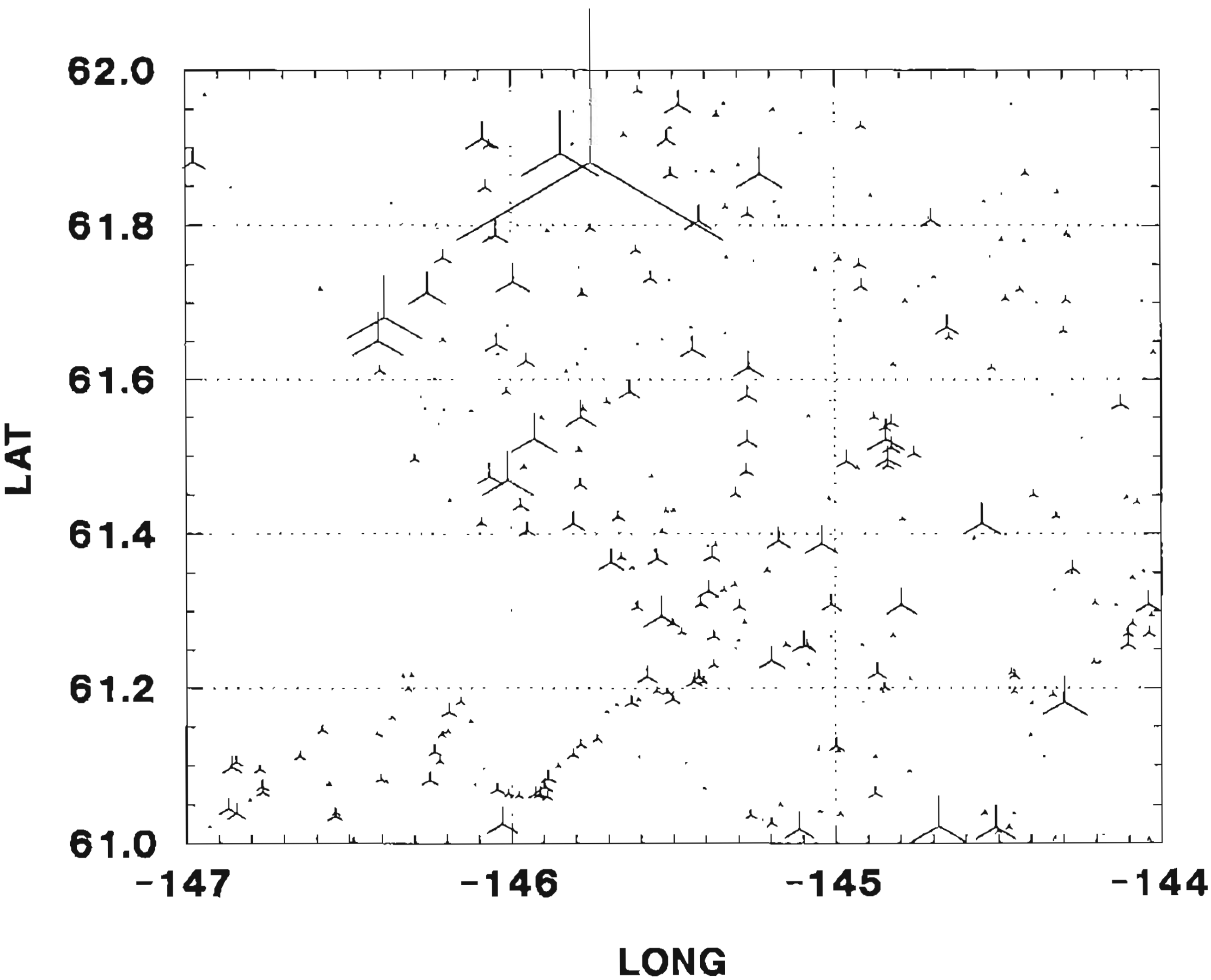

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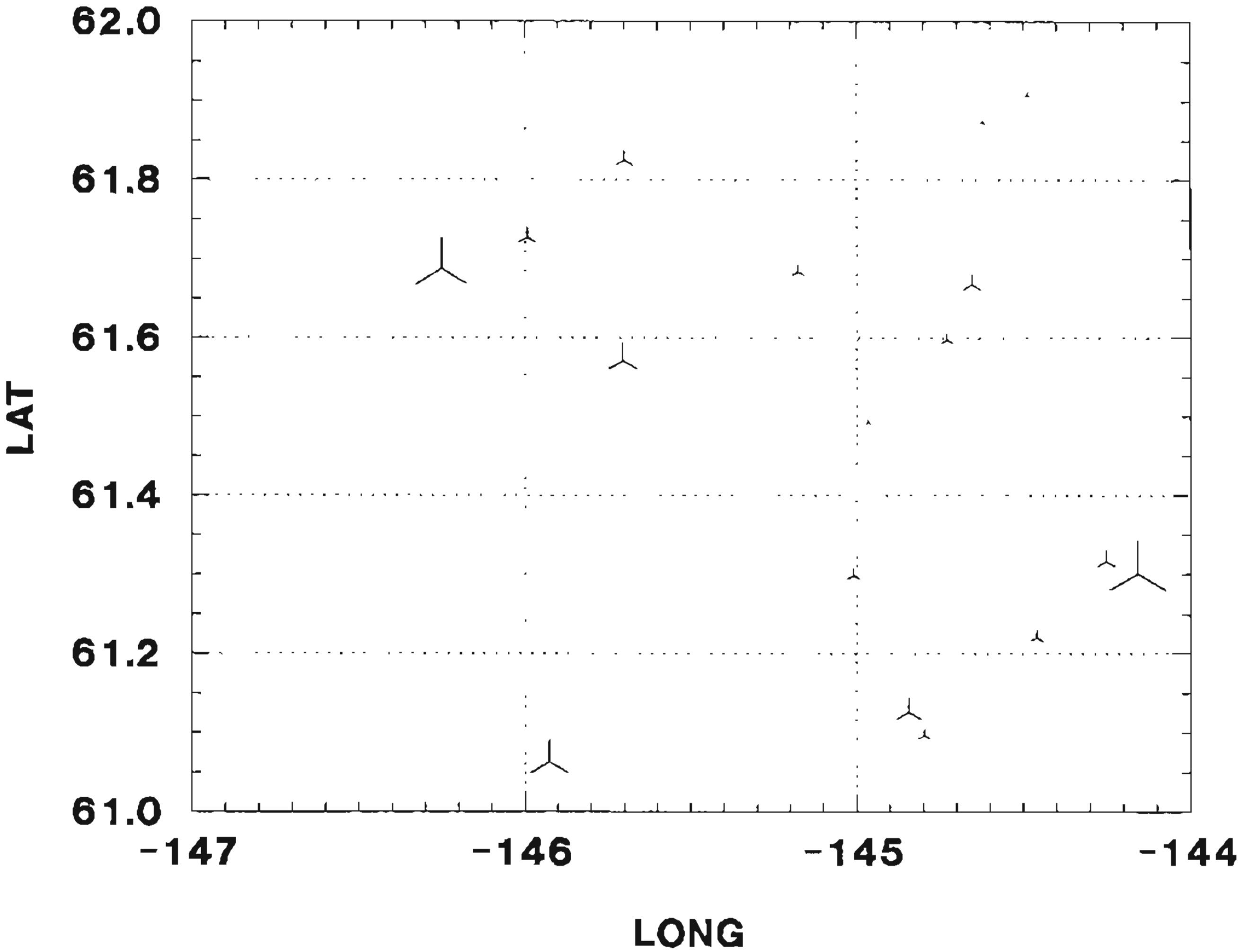

APPENDIX A

KEY TO SAMPLE TYPES

This numerical key provides the necessary tie between the specific type or form of each sample taken and each individual suite of field and laboratory data to which the sample relates. It defines the various sample types collected by the LASL in the DOE HSSR for uranium.

The two-digit key number assigned to each sample type designates three distinct properties of the samples taken. These properties are: (a) The general sample source (spring, stream, dry stream, etc.); (b) The sample medium (water or sediment); and (c) The treatment given the sample in the field or laboratory prior to its analysis by the LASL.

The key numbers are inserted in the sample type columns of the specially formatted DOE sample numbering system to positively identify the sample type for all LASL sample data submitted.

KEY NO. SOURCE / MEDIUM / TREATMENT

01 - Spring water sample untreated.

02 - Stream water sample untreated.

03 - Well water sample untreated.

04 - Natural pond water sample untreated.

05 - Artificial pond water sample untreated.

06 - Spring water sample filtered through a 0.45-μ membrane filter and acidified to a pH of ≤1 with reagent-grade nitric acid (HNO_3).

07 - Stream water sample filtered through a 0.45-μ membrane filter and acidified to a pH of ≤1 with reagent-grade nitric acid (HNO_3).

08 - Well water sample filtered through a 0.45-μ membrane filter and acidified to a pH of ≤1 with reagent-grade nitric acid (HNO_3).

09 - Natural pond water sample filtered through a 0.45-μ membrane filter and acidified to a pH of ≤1 with reagent-grade nitric acid (HNO_3).

10 - Artificial pond water sample filtered through a 0.45-μ membrane filter and acidified to a pH of ≤1 with reagent-grade nitric acid (HNO_3).

11 - Wet spring sediment sample dried at ≤100°C and sieved to -100 mesh through stainless steel sieves.

12 - Wet stream sediment sample dried at ≤100°C and sieved to -100 mesh through stainless steel sieves.

13 - Wet natural pond sediment sample dried at ≤100°C and sieved to -100 mesh through stainless steel sieves.

14 - Wet artificial pond sediment sample dried at ≤100°C and sieved to -100 mesh through stainless steel sieves.

15 - Dry stream sediment sample dried at ≤100°C (if necessary) and sieved to -100 mesh through stainless steel sieves.

26 - Spring water sample acidified to a pH of ≤1 with reagent-grade nitric acid (HNO_3).

27 - Stream water sample acidified to a pH of ≤1 with reagent-grade nitric acid (HNO_3).

29 - Natural pond or lake water sample acidified to a pH of ≤1 with reagent-grade nitric acid (HNO_3).

31- Wet spring sediment sample dried at ≤100°C and sieved to -40 mesh through stainless steel sieves.

32- Wet stream sediment sample dried at ≤100°C and sieved to -40 mesh through stainless steel sieves.

33- Wet natural lake sediment sample dried at ≤100°C and sieved to -40 mesh through stainless steel sieves.

35- Dry stream sediment sample dried at ≤100°C and sieved to -40 mesh through stainless steel sieves.

41- Wet spring sediment sample dried at ≤100°C and sieved to -80 mesh through stainless steel sieves.

42- Wet stream sediment sample dried at ≤100°C and sieved to -80 mesh through stainless steel sieves.

43- Wet natural lake sediment sample dried at ≤100°C and sieved to -80 mesh through stainless steel sieves.

45- Dry stream sediment sample dried at ≤100°C and sieved to -80 mesh through stainless steel sieves.

51- Wet spring sediment sample dried at ≤100°C and sieved to -170 mesh through stainless steel sieves.

52- Wet stream sediment sample dried at ≤100°C and sieved to -170 mesh through stainless steel sieves.

53- Wet natural lake sediment sample dried at ≤100°C and sieved to -170 mesh through stainless steel sieves.

55- Dry stream sediment sample dried at ≤100°C and sieved to -170 mesh through stainless steel sieves.

61- Wet spring sediment sample dried at -100°C and sieved to -230 mesh through stainless steel sieves.

62- Wet stream sediment sample dried at -100°C and sieved to -230 mesh through stainless steel sieves.

63- Wet natural lake sediment sample dried at -100°C and sieved to -230 mesh through stainless steel sieves.

65- Dry stream sediment sample dried at -100°C and sieved to -230 mesh through stainless steel sieves.

71- Sediment sample collected from the stream bank, dried at ≤100°C, and sieved to -40 mesh through stainless steel sieves.

72- Sediment sample collected from the stream bank, dried at ≤100°C, and sieved to -80 mesh through stainless steel sieves.

73- Sediment sample collected from the stream bank, dried at ≤100°C, and sieved to -100 mesh through stainless steel sieves.

74- Sediment sample collected from the stream bank, dried at ≤100°C, and sieved to -170 mesh through stainless steel sieves.

75- Sediment sample collected from the stream bank, dried at ≤100°C, and sieved to -230 mesh through stainless steel sieves.

96 - Dry natural pond sediment sample dried at ≤100°C (if necessary) and sieved to -100 mesh through stainless steel sieves.

97 - Dry artificial pond sediment sample dried at ≤100°C (if necessary) and sieved to -100 mesh through stainless steel sieves.

98 - Other water
99 - Other sediment

These key numbers are to be used only for water (98) or sediment (99) samples coming from a special source and/or given a special treatment not described for any of the types of samples above.

PDF 91 - 22: ERRATA

ONE ELEMENT WAS OMITTED FROM LISTING OF ELEMENTS ON DISK. THAT ELEMENT WAS ....SE.....IT SHOULD GO BETWEEN AS AND ZR.

CORRECT ORDER OF ELEMENTS ON FILE IS:

U	AG	BI	CD	CU	NB	NI	PB	SN
W	AS	SE	ZR	MO	BE	LI	AL	AU
BA	CA	CE	CL	CO	CR	CS	DY	EU
FE	HF	K	LA	LU	MN	MG	NA	RB
SB	SC	SM	SR	TA	TB	TH	TI	V
YB	ZN	and	U/TH					

PDF 91-22 - UPDATE

The section of PDF 91-22 which describes the format of the NURE data as it is available on computer disk has changed. Instead of all data on one file/quadrangle in columnar format separated by blanks, it is now split into 3 files/quadrangle with commas and blanks separating the fields. The new files are named "NXXX#.ASC". N is for NURE data, XXX is the 3 character quadrangle identification, and # is 1, 2, or 3. This new version will make it easier for users to input the data directly into Quatro-Pro, Lotus, or other spread sheets with a 250 character limit on record length. In Quatro-Pro use IMPORT option, ASCII file, QUOTE & COMMA delimited. Two records were added in front of the data:

1.) a header record which says

"Part <n>, Quadrangle: <name>"

2.) a record with column headings so users can tell which elements are in the file and the order. The column headings are comma and blank delimited too. The data is still in ASCII format and the commas can be eliminated by using a variety of text editors.

Following are the formats of the 3 files. Column 1 was left blank for all records so that all data in the files could be printed even when the first item is interpreted as a carriage control character.

FILE 1:

Record 1: 55 Characters of text. - starts col 2 and length depends on length of quadrangle name. It is enclosed in quotes.

Record 2: col 2-39

"Samp-Id","RC", "Lat.", "Long.", "ST" (Sample Type--see main text)

Starting in col 40, 14 groups of: , "Xx" which are the elements names for the columns. For this record they are: U, Ag, Bi, Cd, Cu, Nb, Ni, Pb, Sn, W, As, Se, Zr, and Mo. NOTE: There is NOT a comma after the last item and all items are enclosed in quotes.

Record 3 to end:

col 2-8. 7 digit sample number.
col 9-10 ", " - a comma followed by a blank
col 11-13 replicate code - 3 digits allowed, most values will be 0 or 1 digit.
col 14-24 ", " followed by Latitude in decimal degrees with 5 decimal places
col 25-35 ", " followed by Longitude in decimal degrees with 5 decimal places
col 36-39 ", " followed by 2 digit sample type

Starting in col 40, 17 groups of "," (comma) followed by 8 digit value of element in ppm. Decimal point is present. None of the values require all 8 digits so that leaves a blank space after the comma. NOTE: no comma after the last item.

FILE 2:

Record 1: - Same as for file 1

Record 2: col 2 to 8 - "Samp-Id"

Starting in col 9, 17 groups of: , "Xx", which are element names for the columns. For this file they are: Be, Li, Al, Au, Ba, Ca, Ce, Cl, Co, Cr, Cs, Dy, Eu, Fe, Hf, K, and La. NOTE: no comma at end and items enclosed in quotes.

Record 3 to end:

Col 2-8 7 digit sample number.
Starting in col 9, 17 groups of ",", followed by 8 eight digit value of element. As in File 1.

FILE 3: Same format as file 2 with different elements. The elements are: Lu, Mn, Mg, Na, Rb, Sb, Sc, Sm, Sr, Ta, Tb, Th, Ti, V, Yb, Zn, and U/Th

NOTE: In the original listing of the elements, Se was accidently left out. It goes between As and Zr.

A copy of this file is included on disk. It is labeled README.NUR. If there are any problems reading this data contact Shirley Liss at DGGS. (907) - 474 - 7147.