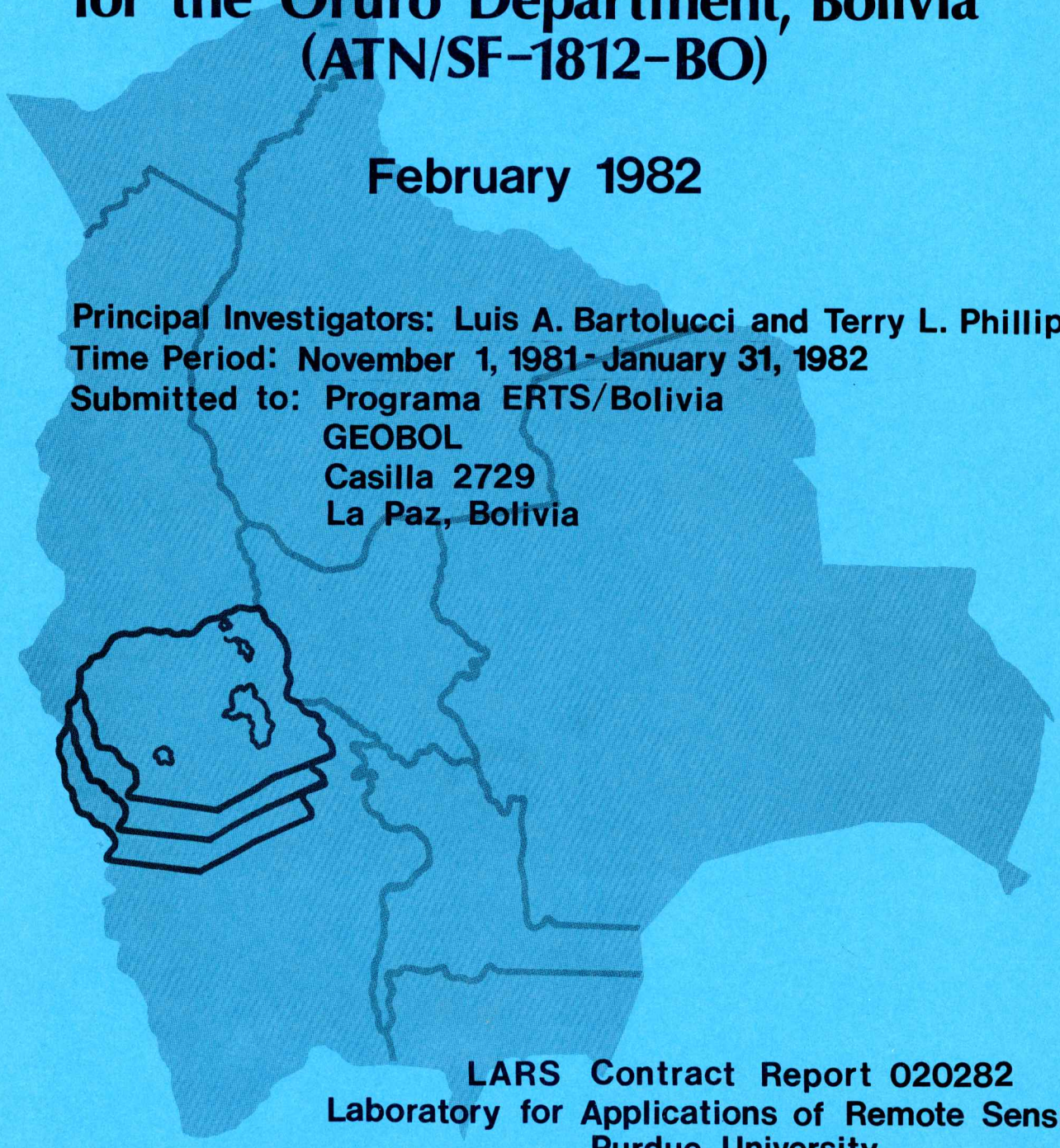
Quarterly Progress Report

Digital Information System for the Oruro Department, Bolivia (ATN/SF-1812-BO)

February 1982

Principal Investigators: Luis A. Bartolucci and Terry L. Phillips
Time Period: November 1, 1981 - January 31, 1982
Submitted to: Programa ERTS/Bolivia
GEOBOL
Casilla 2729
La Paz, Bolivia



LARS Contract Report 020282
Laboratory for Applications of Remote Sensing
Purdue University
West Lafayette, Indiana 47906
USA

QUARTERLY PROGRESS REPORT

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TABLE OF CONTENTS

Digital Geographic Information System for the Oruro Department, Bolivia

INTRODUCTION

During this reporting period, i.e. November 1, 1981 through January 31, 1982, the following project tasks were accomplished:

1. Development of data management software to provide a capability to relate the data stored in the Image Plane data base with the data stored in the Attribute data base.
2. Development of an Image Plane data editing capability for updating purposes.
3. Development of software for digitization of topographic data.
4. Determination of the spectral reflectance characteristics of a number of soil samples from a region of the Oruro Department.
5. Calculation of the Albers addresses and geographic coordinates for the corners of the level 2 (100m x 100m pixel data base) quadrangles that cover the Bolivian territory.
6. Computation of the statistical level of significance of the Landsat mosaic planimetric accuracy assessment results.
7. Creation of a recommended hierarchical geologic classification scheme (legend) for the entire Bolivian territory.
8. Coding and preparation of the geomorphology maps that cover the Oruro Department.
9. Decision and rational for storing basic meteorological data instead of climatological information.

The CCT's containing the Landsat digital mosaic that cover the Oruro Department have been received in the JPL VICAR format and they have been already converted to the LARSYS MIST format. Presently they are being converted to the Bolivian Image Plane data base format.

DATA BASE MANAGEMENT SOFTWARE

The Bolivian digital Geographical Information System is composed of several subsystems (see Figure 2 in progress report 080181). One of these subsystems, i.e. the Data Base Subsystem is in turn composed of two data bases: 1) the image plane and 2) the attribute data bases. The rasterized geo-coded data is stored in the image plane data base and the descriptive information related to the image plane data is stored in the attribute data base.

In order to merge the information stored in these two data bases, that is to be able to print or display a map of an element from the image plane data base that also contains descriptive information from its corresponding attribute data base file, a software package called MAPIT was developed. The processor MAPIP is called when the command MAP is typed in while running on the data base system environment. MAPIT will prompt the user for certain required inputs and then it will print a map from the current image file and it will print also ancillary data at the end of the map from the corresponding attribute file.

A brief description of the inputs required, the processes involved, and the outputs generated by the MAPIT program is included here.

MAPIT prompts the user for the following six inputs:

I. Input Device

II. Image Boundary Information

III. Map Scale Options

IV. Desired Map Border Information

V. Should Histogram Values Be Displayed on the Terminal?

VI. Should Shade (gray scale) Values Be Altered?

I. INPUT DEVICE

A. MAGNETIC TAPE - (not used at the present time)

1. TAPE NUMBER

2. FILE NUMBER

3. RUN NUMBER

4. CHANNEL NUMBER

B. DISK - (default device)

- MAPIT then checks if the disk file exists (if disk is the device)

II. IMAGE BOUNDRY INFORMATION

A. BEGINNING LINE ADDRESS

B. ENDING LINE ADDRESS

C. BEGINNING COLUMN ADDRESS

D. ENDING COLUMN ADDRESS

- MAPIT then checks if the boundary information is valid, and if any address is out of range it is set to the limit of the boundary address that is actually in the database.

III. MAP SCALE OPTIONS

A. 1/25,000

B. 1/50,000

C. 1/100,000

D. 1/250,000

E. 1/500,000

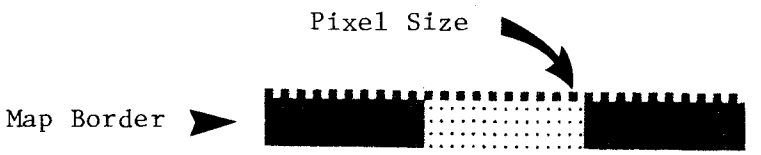
F. 1/1,000,000

G. 1/2,000,000

IV. IS MAP BORDER DESIRED?

A. YES

- A border will be printed around the entire map indicating where every pixel is located.



B. NO

- No border is printed

- MAPIT then calculates the actual map scales, sets up the appropriate input device and calculates the number of strips that need to be printed by using the map scale.

V. SHOULD HISTOGRAM VALUES BE DISPLAYED AT THE TERMINAL?

A. YES

- MAPIT scans through the data block specified by the user and keeps track of the number of occurences of each fill character (fill characters can have values from 0 to 255). MAPIT then calls the subroutine HIST to print the occurences of the fill characters on the terminal in a block graph. When scanning through the data set, MAPIT uses a call to GADLIN to get a line of data from a tape or a call to GADREL to get an image line from a disk file (the file must be on the A-disk).
- The histogram option is used mainly for debugging.
- Note: if the histogram option is used, this option will increase significantly the computer time required to run the program.

B. NO

- No histogram is printed

- MAPIT assignes a shade character (0-16) to each fill character, and it does it be assigning shades 1 to 16 to the first group of sixteen fill characters respectively, and then repeats the process for the subsequent groups of 16 fill characters (17-32, 33-48,...) until all the fill characters have been assigned a shade.

VI. ALTER SHADE VALUES?

A. YES

- MAPIT will prompt the user for the beginning reference

value, the ending reference value and the shade assignment (zero to 16 represents light to dark). The shade specified will then be assigned to all the fill characters in between the reference values, inclusive. If a shade of 0 is specified, it means that a blank (no grey pattern) will be printed for that fill character.

B. NO

- MAPIT uses the default shade values

C. PRINT HISTOGRAM

- The histogram showing the current shade assignments will be printed at the terminal.
- Note: This will not be an option if the display histogram option was not previously specified.

- MAPIT then prints a message on the terminal indicating how many printed strips will be produced for the map.

- MAPIT will then enter a loop in which it reads a line of data (using GADLIN or GADREC), scans through the line for occurences of fill characters and keeps track of the occurences by storing them in an array, and then calls SHADIT to cross-reference each fill character's shade assignment in the line and then to write out the line to the printer using the shade values. MAPIT repeats this loop for every line in each strip. Thus the program will run longer the more strips there are. MAPIT will print a message at the terminal when every 1/10 of the total number of lines are written for each strip.

- SHADIT will print out the number of lines (including the border if it is

specified) that correspond to one line of data depending on the scaling. To convert from the fill characters to the grey shades that are assigned, SHADIT calls SHADE. The subroutine SHADE indexes into an array that contains the grey shade patterns and calls TOBI to set up the raster line. TOBI turns on the correct bits in the raster line to correspond to the grey shades. After calling SHADE, SHADIT calls OTPB to output the raster line to the PRINTRONIX/KMW HASP converter RJE (Remote Job Entry) site.

- The routine MAPIT then makes a call to BDER to print the scale in the X direction and the scale in the Y direction.

- MAPIT then prints out the following information from the attribute file and the inputs:

    a) standard headers (two 132 byte arrays STDH1 and STDH2)
    b) level name
    c) quadrant name
    d) element name
    e) hectares per pixel
    f) date of most recent update
    g) history document
    h) beginning line
    i) number of lines
    j) number of samples
    k) number of dots per side
        - if tape used
            i) tape number

ii) file number

iii) channel number

l) line interval

m) sample interval

- MAPIT then uses the array that was made from the number of occurences of each fill character in the data block to set up another array of shade values in which fill characters are assigned to them. MAPIT then calls BOX to print out a box shaded in the shade value of each shade that has fill characters assigned to it. MAPIT then calls ITON and SHDTAB to get each fill character number and the name associated with it respectively. MAPIT then calculates the area in the map that is assigned to the fill character and then prints all this out so it lines up to the shaded box that the fill character corresponds. MAPIT will repeat this for all the fill characters that are assigned and then returns back to the database system.

Figures 1, 2, and 3 show an example of the map output product with its corresponding scale and attribute information that is generated by the MAPIT computer program.

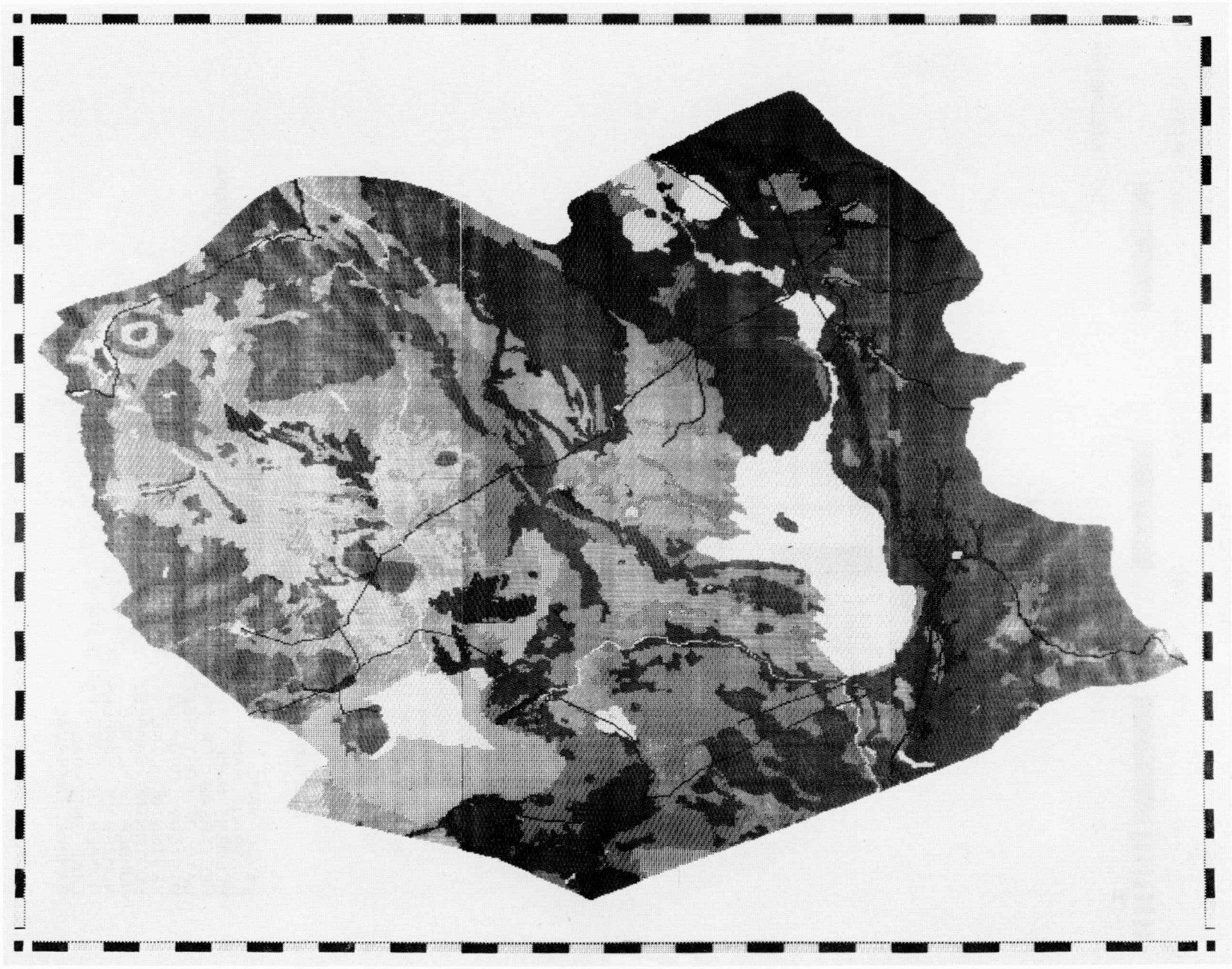
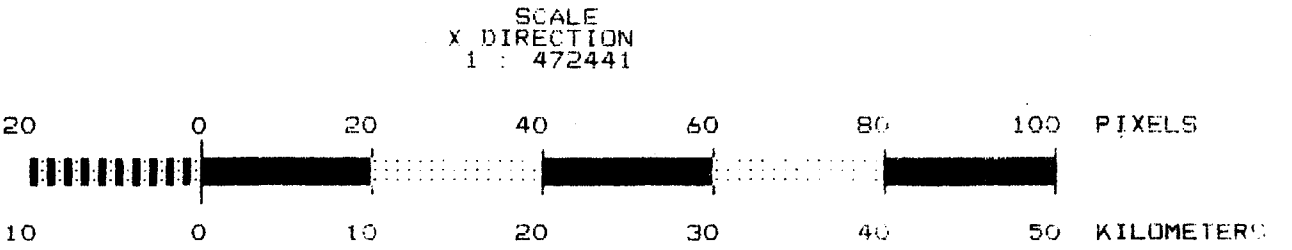
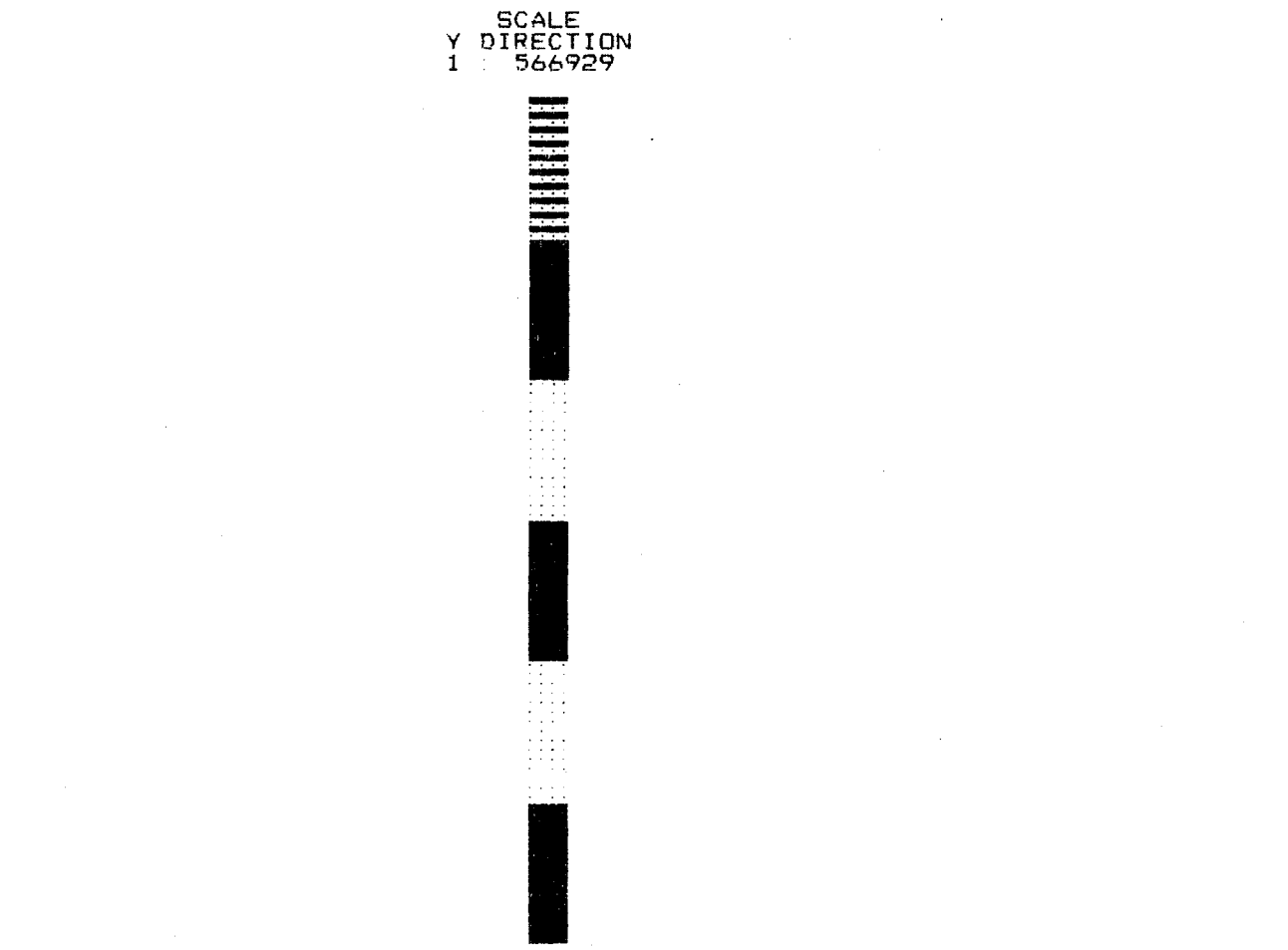


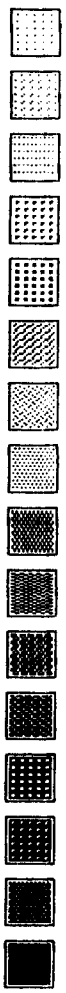
Figure 1. Land cover/land use grayscale map of Oruro at the Departmental or level 3 of detail. Each resolution element represents 25 hectares.





LEVEL NAME:	DEPARTAMENTO
QUADRANT NAME:	ORURO
ELEMENT NAME:	COBERTURA Y USO DE LA TIERRA
HECTAREAS PER PIXEL:	25.00
DATE OF MOST RECENT UPDATE:	1/14/82
HISTORY DOCUMENT:	1
BEGINNING LINE:	1700
BEGINNING SAMPLE:	250
NUMBER OF LINES:	601
NUMBER OF SAMPLES:	651
NUMBER OF DOTS PER SIDE:	3
LINE INTERVAL:	1
SAMPLE INTERVAL:	1

Figure 2. Margin information for the land cover/land use map shown in Figure 1.



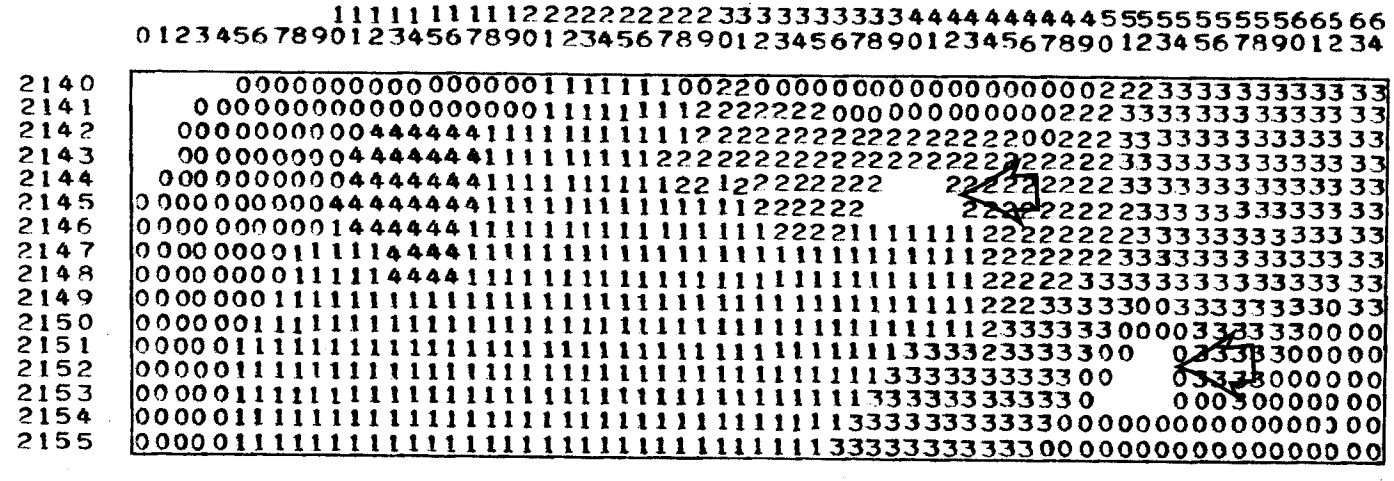
1	PASTOS Y/O ARBUSTOS EN AMBIENTE HUMEDO	27300.00 HECTAREAS
17	LAGOS	313175.00 HECTAREAS
2	PASTOS Y/O ARBUSTOS EN AMBIENTE TEMPORALMENTE HUMEDO	30575.00 HECTAREAS
18	LAGUNAS	15500.00 HECTAREAS
3	PASTO/ARBUSTOS EN AMB TMRAL HUMEDO Y PASTO/ARBUSTO EN TIERRA SAL	2700.00 HECTAREAS
19	RIOS	25425.00 HECTAREAS
4	PASTOS/ARBUSTOS EN AMBIENTE TMRAL HUMEDO Y TIERRAS SALINAS	8300.00 HECTAREAS
5	PASTOS/ARBUSTOS EN AMBIENTE TMRAL HUMEDO Y DEPOSITOS ARENOSOS	27375.00 HECTAREAS
21	SALAR	177125.00 HECTAREAS
6	PASTOS Y/O ARBUSTOS EN AMBIENTE SECO	708850.00 HECTAREAS
22	TIERRAS SALINAS	378450.00 HECTAREAS
7	PASTO/ARBUSTO EN AMBIENTE SECO Y PASTO/ARBUSTO EN TIERRA SALINA	269625.00 HECTAREAS
23	DEPOSITOS ARENOSOS	39125.00 HECTAREAS
8	PASTOS/ARBUSTOS EN AMBIENTE SECO Y DEPOSITOS ARENOSOS	434300.00 HECTAREAS
24	AFLORAMIENTOS ROCOSOS	26425.00 HECTAREAS
9	PASTOS/ARBUSTOS EN AMBIENTE SECO Y AFLORAMIENTOS ROCOSOS	1776475.00 HECTAREAS
25	AFLORAMIENTOS ROCOSOS Y PASTOS Y/O ARBUSTOS EN AMBIENTE SECO	40925.00 HECTAREAS
10	PASTOS Y/O ARBUSTOS EN TIERRAS SALINAS	546000.00 HECTAREAS
26	CUERPOS DE NIEVE PERMANENTE	6300.00 HECTAREAS
11	PASTO/ARBUSTOS EN TIERRAS SALINAS Y PASTO/ARBUSTO EN AMBTE SECO	191125.00 HECTAREAS
27	CIUDAD	775.00 HECTAREAS
12	PASTO/ARBUSTOS EN TIERRAS SALINAS Y DEPOSITOS ARENOSOS	63100.00 HECTAREAS
28	PUEBLO	625.00 HECTAREAS
13	CULTIVOS DIFERENCIADOS	1525.00 HECTAREAS
14	CULTIVOS, PASTOS Y/O ARBUSTOS INDIFERENCIADOS	162400.00 HECTAREAS
15	AREAS HUMEDAS Y/O ANEGADAS PERMANENTES	12875.00 HECTAREAS
31	CARRETERAS, CAMINOS, FERROVIAS, DUCTOS, SENDAS, ETC	82850.00 HECTAREAS
16	AREAS HUMEDAS Y/O ANEGADAS TEMPORALES	375.00 HECTAREAS

Figure 3. Attribute information for the Land Cover/Land Use map of Oruro shown in Figure 1. It shows also the gray patterns, fill characters, and number of hectares for each unit.

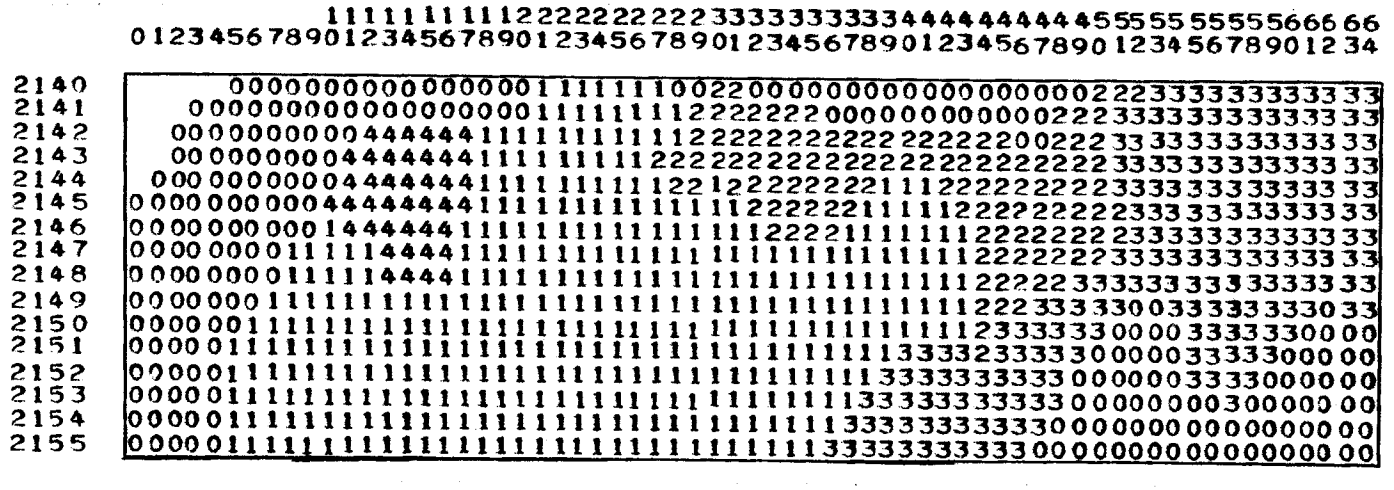
RASTERIZED DATA EDITING CAPABILITY

A flow diagram of the most recent configuration of the Bolivian GIS INPUT SUBSYSTEM was included in Figure 3 of the October 1981 quarterly progress report (LARS Contract Report 080181). This flow diagram shows that the Bolivian GIS INPUT SUBSYSTEM contains a capability for displaying (presently on a TEKTRONIX 4051 graphics terminal and in the near future also on an APPLE II microcomputer) and editing the digitized arc data using the "EDITMAP" processor. Note in this flow diagram that the editing of the arc data is performed before the arc data (relative "X" and "Y" coordinates) are converted to Longitude and Latitude (LONLAT file or geographic coordinates) and before the map projection transformation (Albers Addresses) is applyed to the LATLON file. Therefore, this editing process occurs before the rasterization (conversion of polygonal files to gridded-cell files) of the map data.

Recently, a new data editing capability has been developed and implemented in the Bolivian GIS. This new data editing process takes place after the map data have been rasterized and stored in the IMAGE PLANE DATA BASE. Figures 4-A and 4-B of this report show two alphanumeric printouts of a small portion of a digitized and rasterized soils map. The map in Figure 4-A contains two blank areas indicated by the arrows where several pixels are missing. The map in Figure 4-B shows the result of adding (editing) the missing information. In one of the blank areas eight pixels of the soil class (fill character) "1" were added, and in the other blank area nine pixels of the soil class (fill character) "0" were also added. This editing capability will be tremendously useful for updating maps after



4-A



4-B

Figure 4. This figure shows an alphanumeric representation of a portion of a soils map of the Oruro Department. Each symbol or pixel represents an area of 25 hectares on the ground. Note in Figure 4-A that there are two blank areas indicated by the arrows, which have several missing pixels. Figure 4-B shows the same portion of the soils map after editing of the data.

new and more accurate information is available and to improve the data quality of the Landsat digital mosaic, i.e. to change pixel by pixel, line by line, column by column, or entire blocks of poor quality Landsat data.

DIGITIZATION OF TOPOGRAPHIC MAPS

The basic information contained in a topographic map is the terrain elevation which is presented as contour lines of equal elevation. Presently, a capability for digitizing topographic maps is being developed at LARS and eventually it will be part of the Bolivian GIS INPUT SUBSYSTEM.

The definition of the functional specifications and design of the topographic data input capability required a great deal of research prior to the actual development, implementation and testing of the system itself. Some of the issues that had to be delt with and decisions that had to be made are:

Slope and Aspect. The slope and aspect (azimuth), in contrast with the elevation information, are not basic or fundamental information elements of the terrain. In fact, the slope and aspect are "derived" variables that can be obtained from the basic elevation element. Therefore, the only information that would have to be stored in the Image Plane data base should be the elevation information, and subsequently, if slope and aspect are desired, they could be derived from the stored elevation data every time that they are required. However, since both slope and aspect are required very often for modeling the terrain and are

needed for a large number of applications, it was decided that both slope and aspect would be treated as basic information and hence they would be derived only once and stored in the Image Plane data base as two separate "elements" or geo-coded planes. In other words, the topographic information in the Bolivian GIS will be composed of three elements: 1) elevation, 2) slope, and 3) aspect.

Coding and Storage of the "elevation" Element. To date, approximately only half of the Bolivian territory (the southern half) is covered by 1:250,000 and 1:50,000 scale topographic maps. The 1:250,000 scale topographic sheets have a contour interval of 100 meters (50 meter accuracy) and the 1:50,000 scale maps have a contour interval of 20 meters (10 meter accuracy).

The Bolivian territory presents a tremendous variation in topographic relief. The highest elevation in Bolivia is 7,010 meters (≈23,000 ft.) at the peak of the Nevado Illampu, and the lowest area of the country has an elevation of approximately 100 meters (≈300 ft.) in the eastern Plains. This means that within Bolivia there is at least 6,900 meters of elevation relief, and even within a single quadrangle, for example the one that contains the Nevado Illampu ($15^{o}50'S$ and $18^{o}35'W$), there are elevations as low as 2000 meters only 30 kilometers from the Nevado Illampu peak.

If consistency in the elevation interval accuracy is desired, the elevation data for Bolivia should be encoded with an accuracy of 10 meters. Therefore, if the total elevation range of the country, i.e. 6900 meters is encoded every 10 meters, 690 different elevations would have to be stored in the data base, which implies that more than one "element" or geo-coded

plane (more than one "byte")* would be required. Three possible alternatives are being investigated in order to find the optimum solution to this problem:

1. Use more than one channel or geo-coded plane (more than one "byte") to store the elevation information.
2. Use two or more different elevation intervals for the different portions of the country. For example use the 10 meter interval accuracy for the relatively flat regions of eastern Bolivia and say 20 or 30 meter interval accuracy for the rugged part of the country.
3. Use different elevation interval accuracies for different elevations within one single byte (geocoded plane). For example, describe the relatively flat areas with higher accuracy and the higher elevations with lower accuracy. This data storage strategy could be justified by the fact that the relative occurrence of high elevations is low as compared to the most predominant flatter areas. In addition, for purposes of resource planning, the flatter areas are more important than the areas of extremely high relief.

Coding and Storage of the "Slope" Element. At first sight it might appear that the coding and storage of the "slope" element would not present significant problems since the terrain slopes range from zero to 90 degrees. Therefore, one could encode the slope information in 1 degree

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* One "byte" would allow the storage of 254 different elevations since the zero and the 255 are already preassigned to two different cases of absence of data (see pg: 4 of the LARS Contract Report 020181).

increments, which would easily fit in one byte or geo-coded plane. However, from the user's viewpoint, more important information resides on flatter areas than on steep slopes. In addition, certain limitations concerning the accuracy of digitization have to be considered.

The absolute accuracy of the TALUS Table digitizer is 0.01 inch (0.254 mm)*; that is, the limiting accuracy for 1:50,000 scale maps is of approximately 12.7 meters. Table 1 shows the relationship between the slope angle and the corresponding contour line distance in a 1:50,000 scale map.

The contents of Table 1 show that for steep areas the slope cannot be coded in small increments of say 1^{o}. On the other hand, for relatively flat areas one can code the slopes with accuracies of less than 1^{o}.

A coding strategy that is being considered for storing the slope information in the Bolivian GIS data base consists of using variable accuracy as a function of the magnitude of the slope. Table 2 shows the recommended slope accuracy (increment interval) as a function of the slope magnitude (degrees of the angle).

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* For a complete description of the characteristics of the table digitizer used in this project see pp: 36-37 of the LARS Contract Report 020181.

Table 1. Relationship Between Slope Angle and Contour Line Distance for 1:50,000 Scale Maps.

Slope Angle (in degrees)	Contour Line Distance (in millimeters)
1	22.9
2	11.5
3	7.6
4	5.7
5	4.6
6	3.8
7	3.3
8	2.8
9	2.5
10	2.3
11	2.1
12	1.9
13	1.7
14	1.6
15	1.5
16	1.4
17	1.3
18	1.2
20	1.1
22	1.0
24	0.9
27	0.8
30	0.7
34	0.6
39	0.5
45	0.4
53	0.3
63	0.2
76	0.1

Table 2. Relationship Between Slope Accuracy and the Slope Magnitude.

Slope Magnitude (in degrees)	Slope Accuracy (in minutes and degrees)	Code (fill character)
0 - 3	15′	0 - 12
3 - 6	30′	13 - 18
6 - 10	1°	19 - 22
10 - 20	2°	23 - 27
20 - 30	5°	28 - 29
30 - 40	10°	30
40 - 60	20°	31
60 - 90	30°	32

Coding and Storage of the "Aspect" Element. The aspect or azimuth is the direction in which the slope is facing, and it varies from 0^{o} to 360^{o}. For example a slope with an aspect equal to 90^{o} represents a surface facing due East. Since the required accuracy for aspect data does not depend on the magnitude of the aspect, one can encode the aspect data in equal increments of about 2^{o}, which would permit the storage of all the aspect data in a single byte. Further research related to the impact of digitization accuracy on the expected accuracy of the derived aspect information is required.

The actual algorithms being developed for inputting the elevation data and deriving the slope and aspect elements will be described in detail in the next report. The development, implementation, and testing of these algorithms is being carried out by Dr. Minoru Akiyama.

SPECTRAL REFLECTANCE MEASUREMENTS OF SOILS FROM THE ORURO DEPARTMENT

Fifteen surface soil samples from the Oruro Department were collected by personnel from the ERTS/GEOBOL Program. Ing. Pierre-Marie Adrien from the InterAmerican Development Bank headquarters in Washington D.C. conducted an investigation at LARS/Purdue to determine the relationship between the physico-chemical properties of these soils and their spectral reflectance characteristics in the reflective portion of the spectrum (0.4 - 2.5 μm).

The bi-directional reflectance factor of each of the fifteen soil samples was measured under laboratory controlled conditions using an EXOTECH Model 20 spectroradiometer. The resulting spectral curves are shown in Figures 5 - 19, and a detailed description of the methods, materials and conclusions of this investigation is being prepared by Ing. Adrien in the form of a separate report (LARS Technical Report 121581) entitled "Characteristic Variations in Reflectance of Saline and Alkaline Soils of the Bolivian Altiplano."

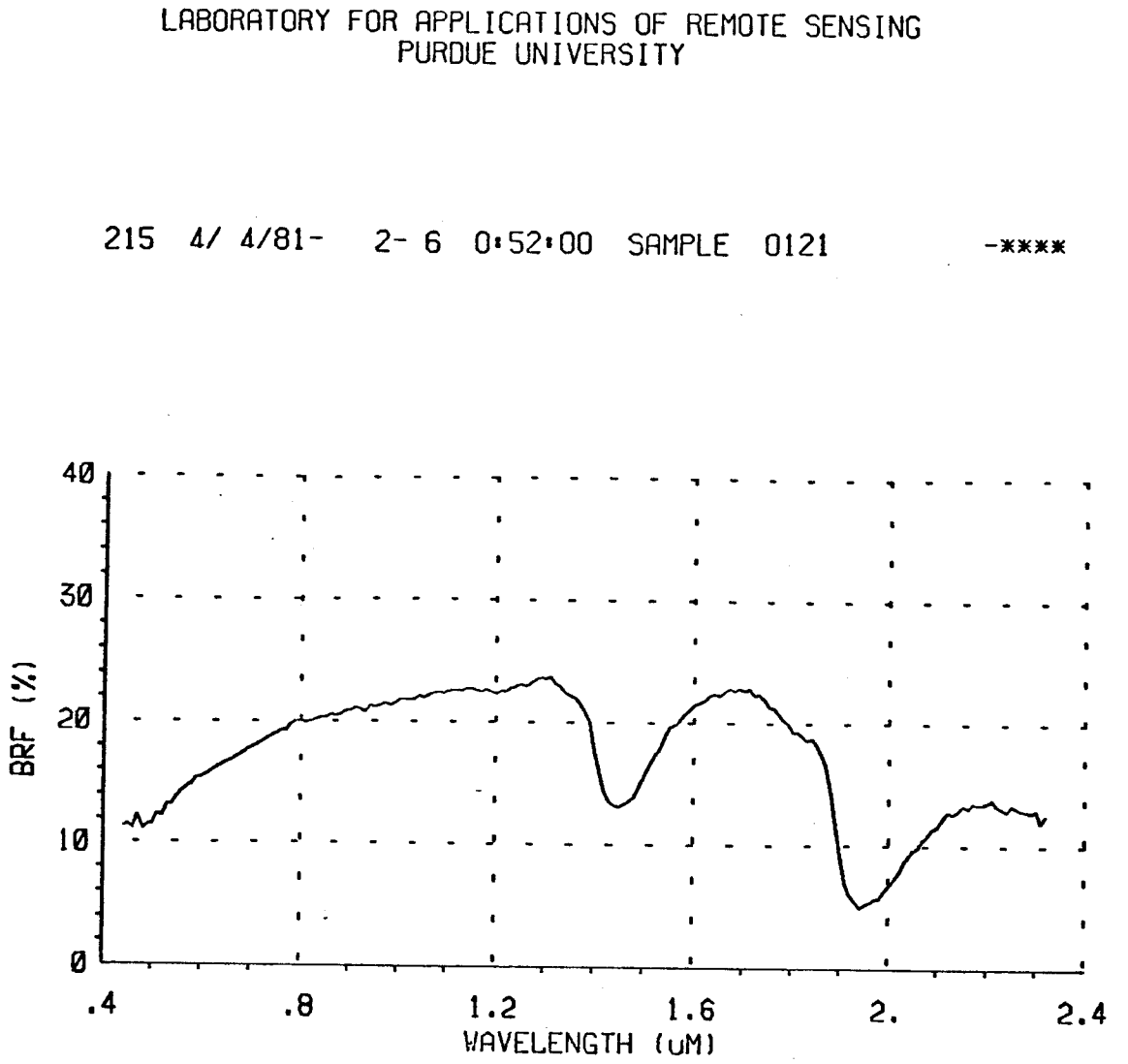

Figure 5. Saline-Alkali soil.

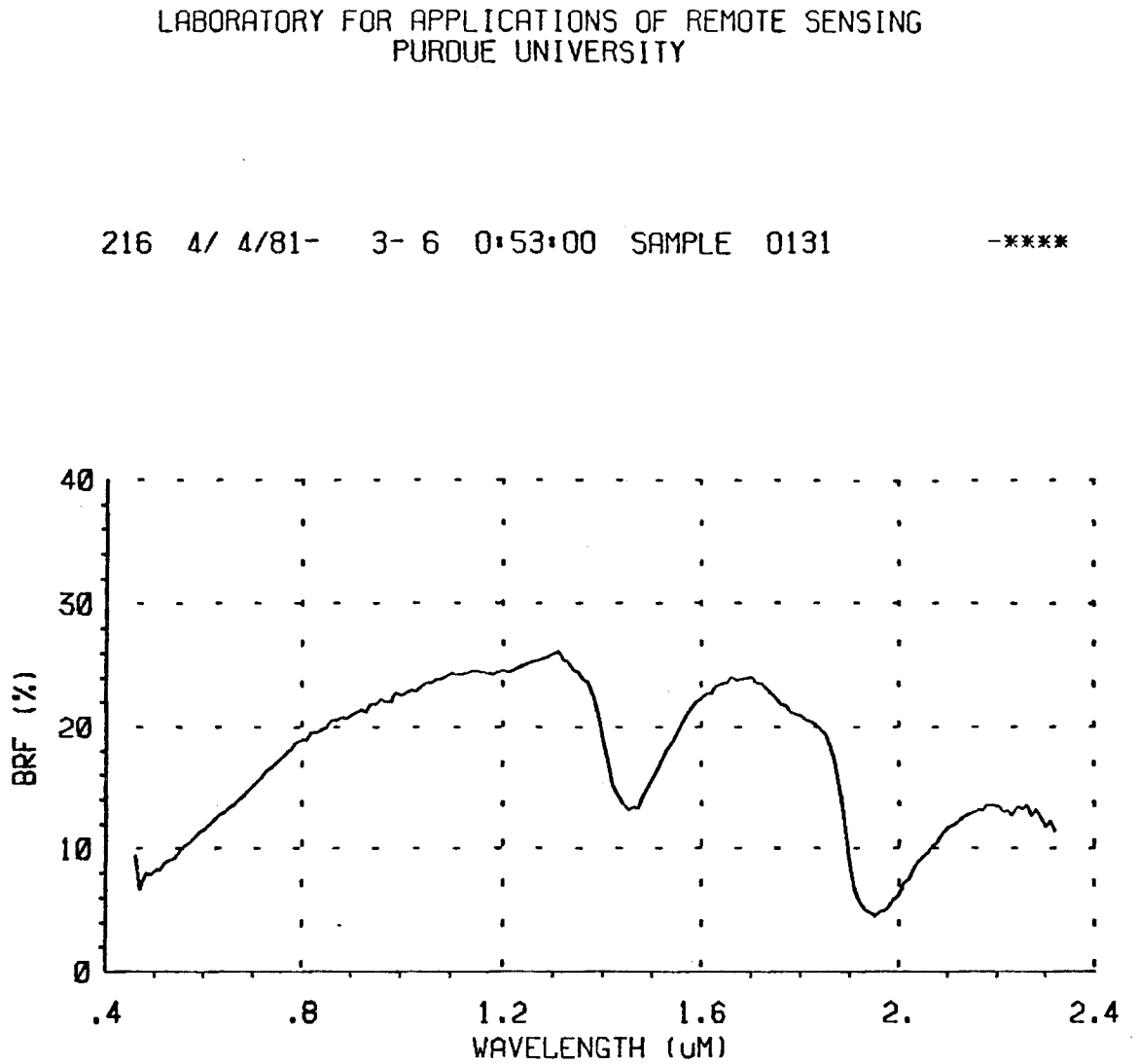

Figure 6. Saline-Alkali soil.

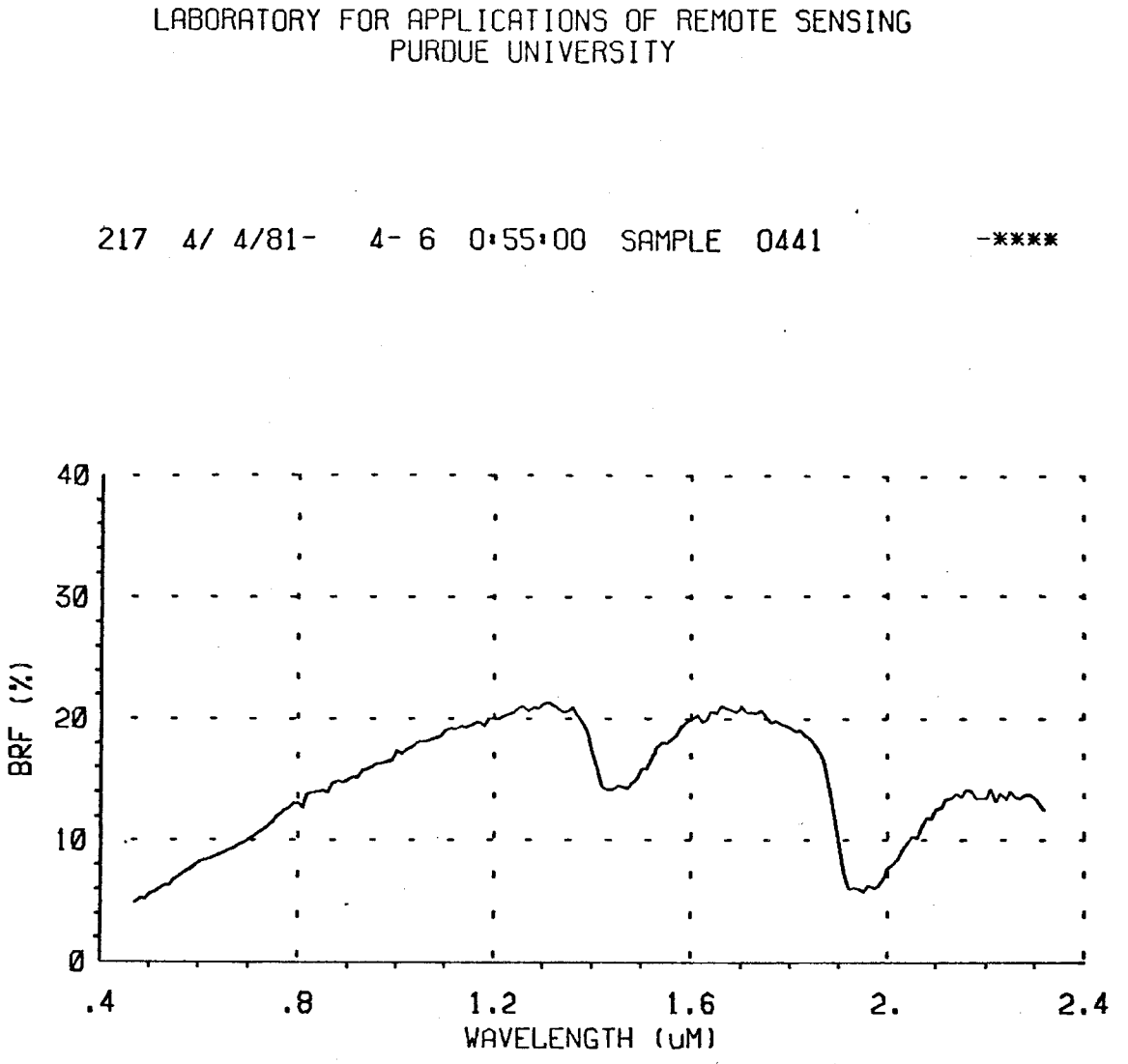

Figure 7. Saline-Alkali soil.

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PURDUE UNIVERSITY

218 4/ 4/81- 5- 6 0:56:00 SAMPLE 0551 -****

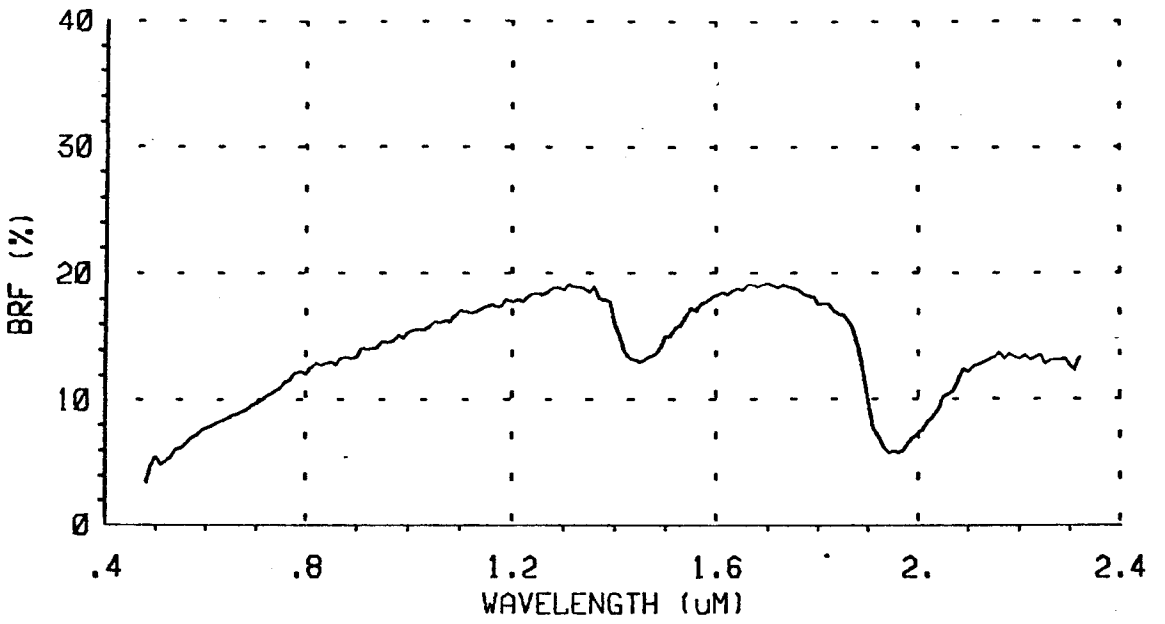

Figure 8. Saline-Alkali soil.

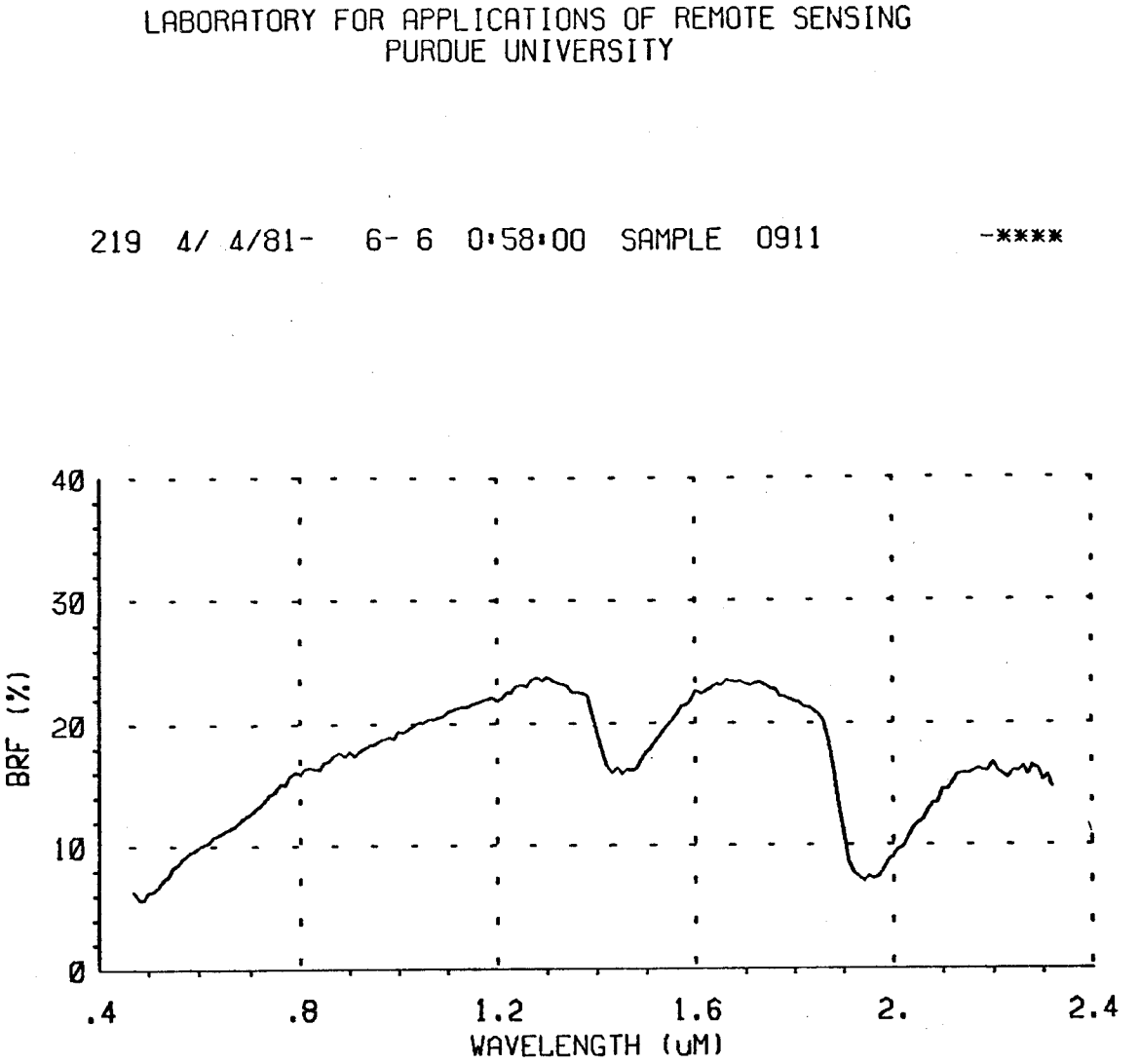

Figure 9. Saline-Alkali soil.

LABORATORY FOR APPLICATIONS OF REMOTE SENSING
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222 4/ 4/81- 9- 6 1:10:00 SAMPLE 0921 -****

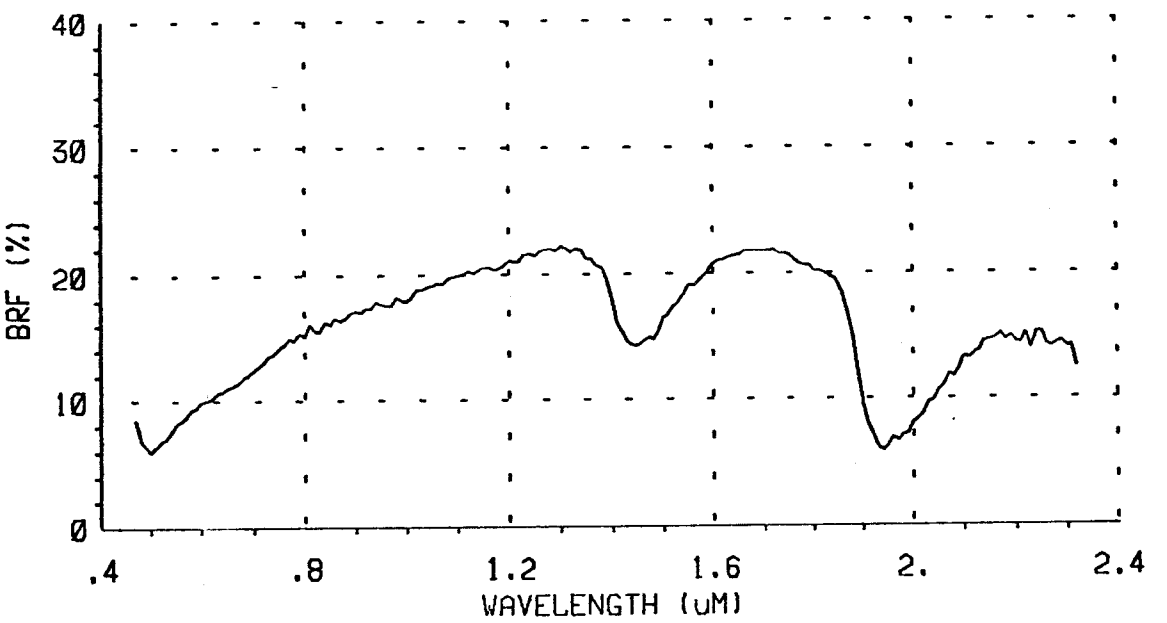

Figure 10. Saline soil.

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PURDUE UNIVERSITY

223 4/ 4/81- 10- 6 1:12:00 SAMPLE 1011 -****

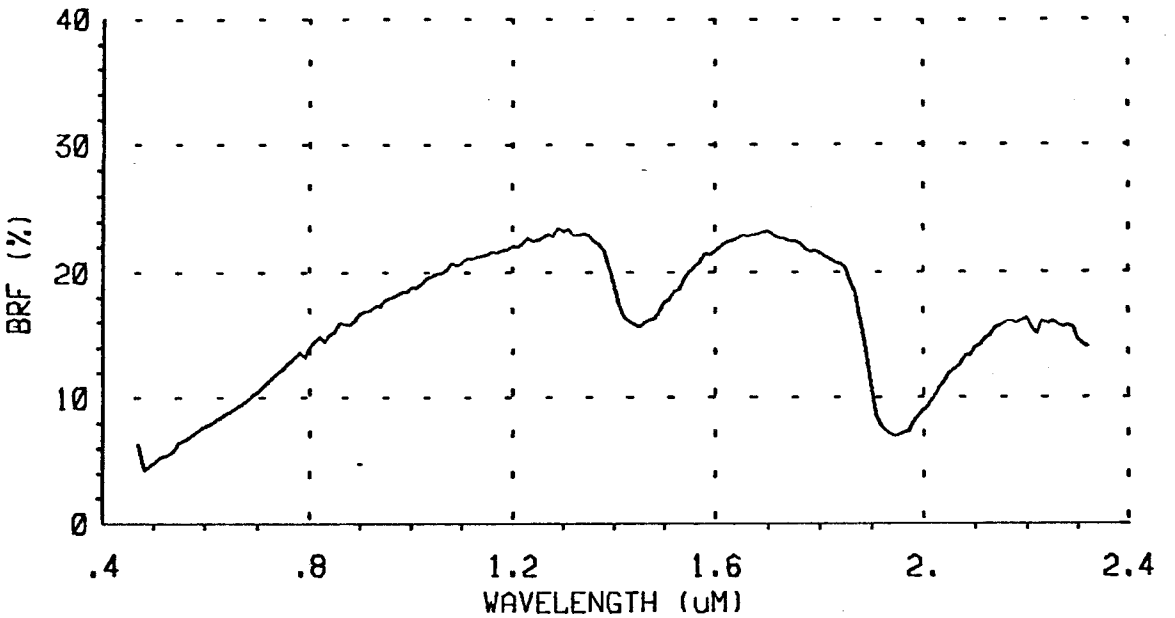

Figure 11. Nonsaline-Nonalkali soil.

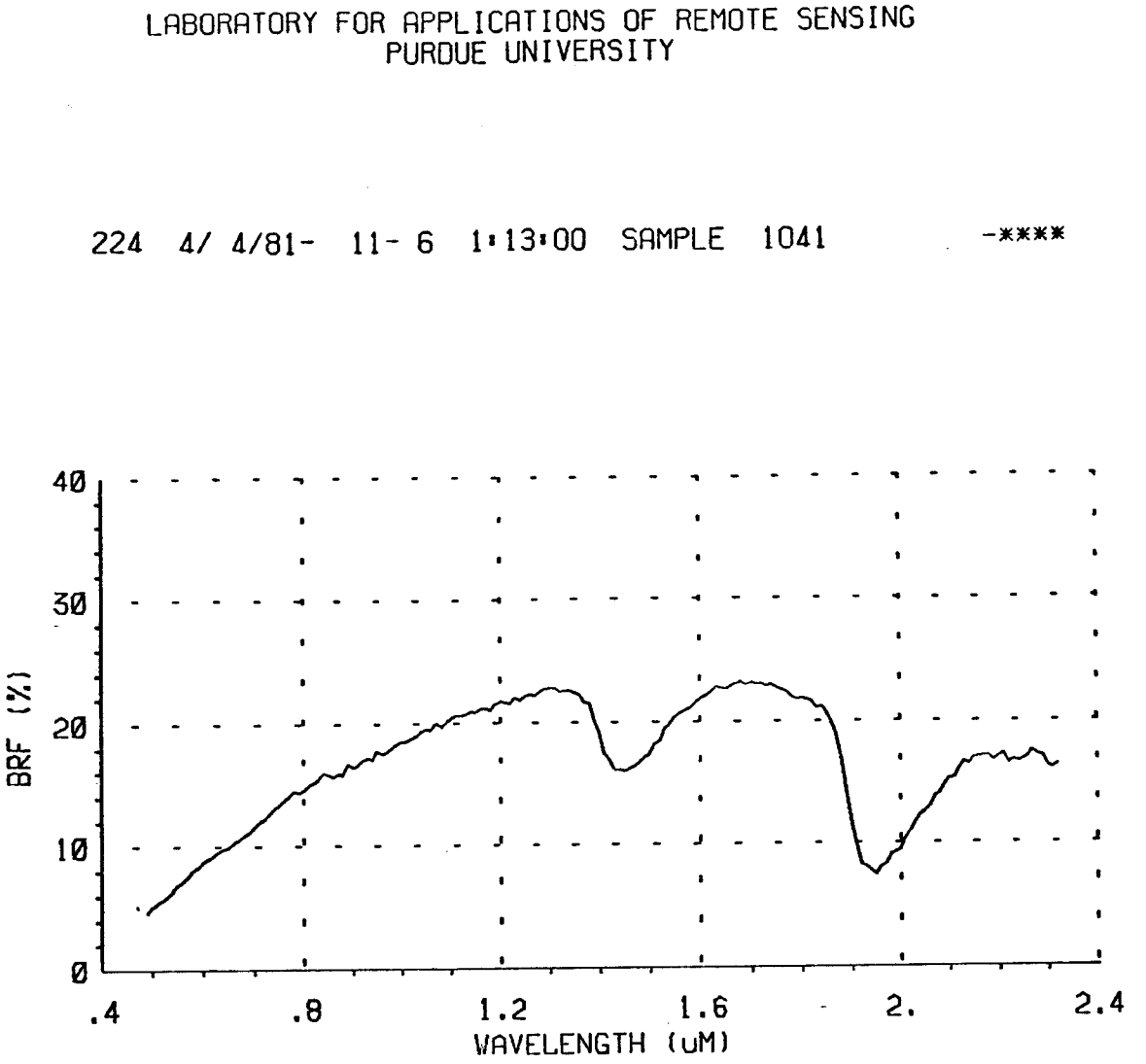

Figure 12. Nonsaline-Nonalkali soil.

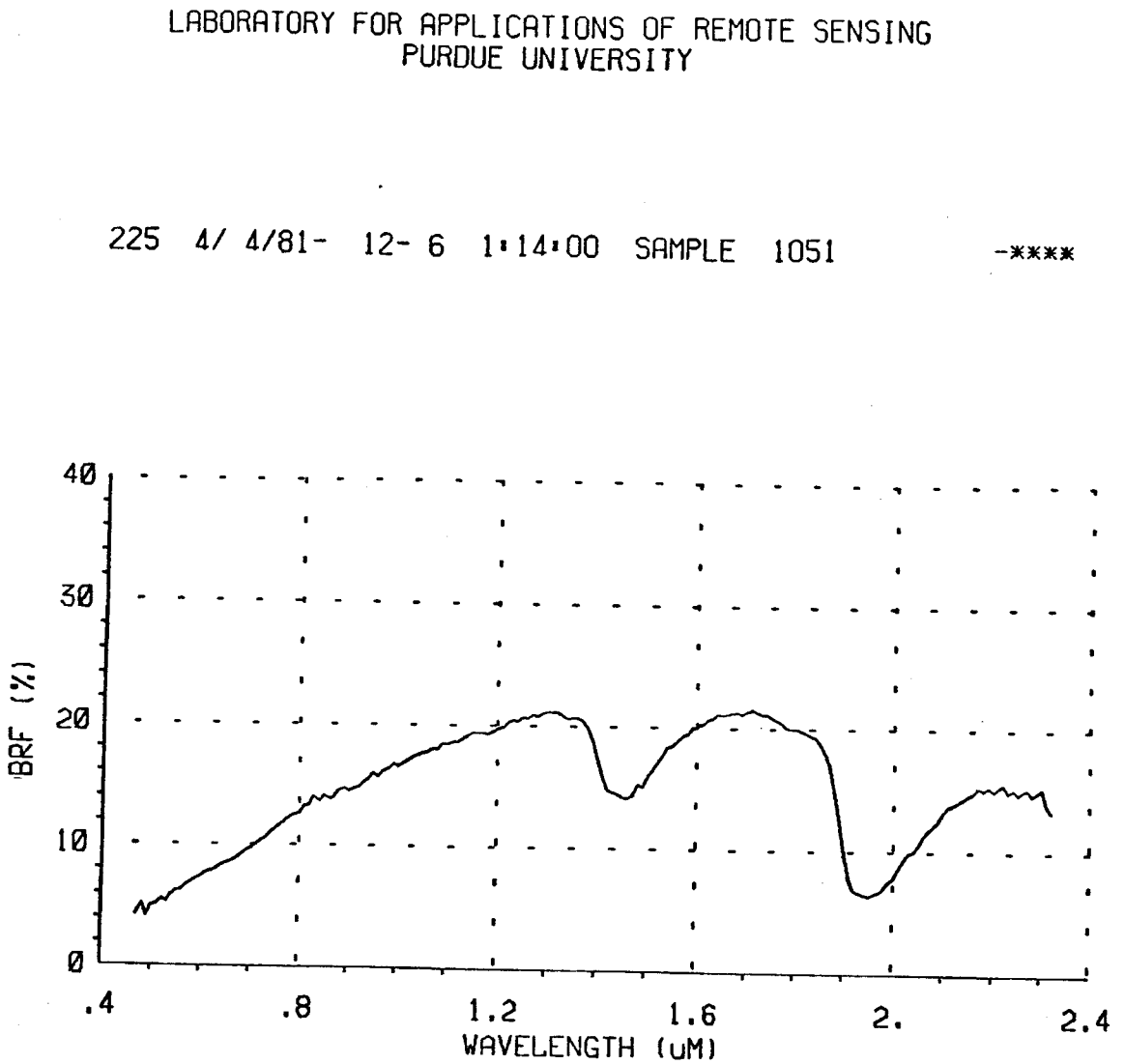

Figure 13. Nonsaline-Nonalkali soil.

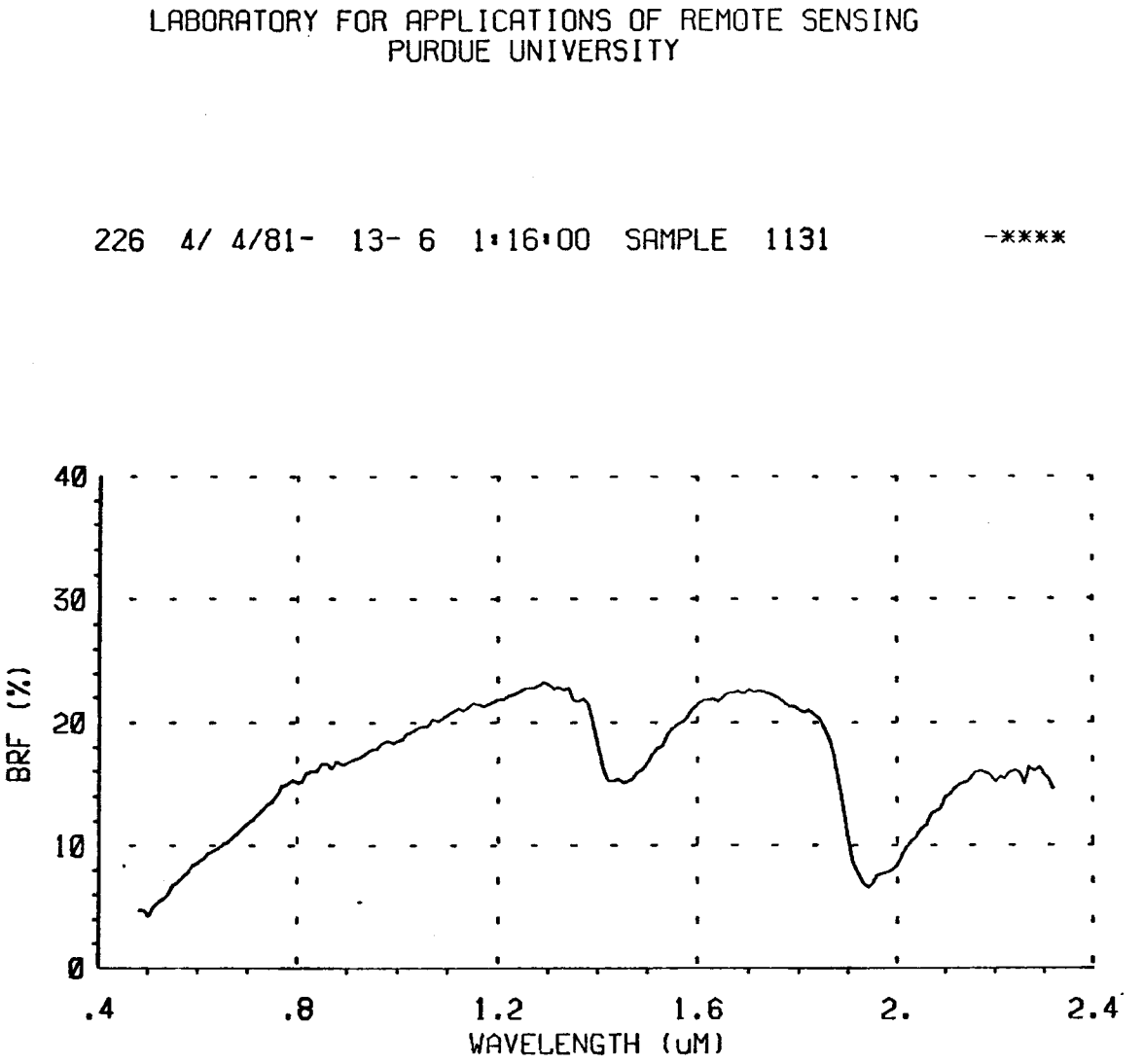

Figure 14. Nonsaline-Nonalkali soil.

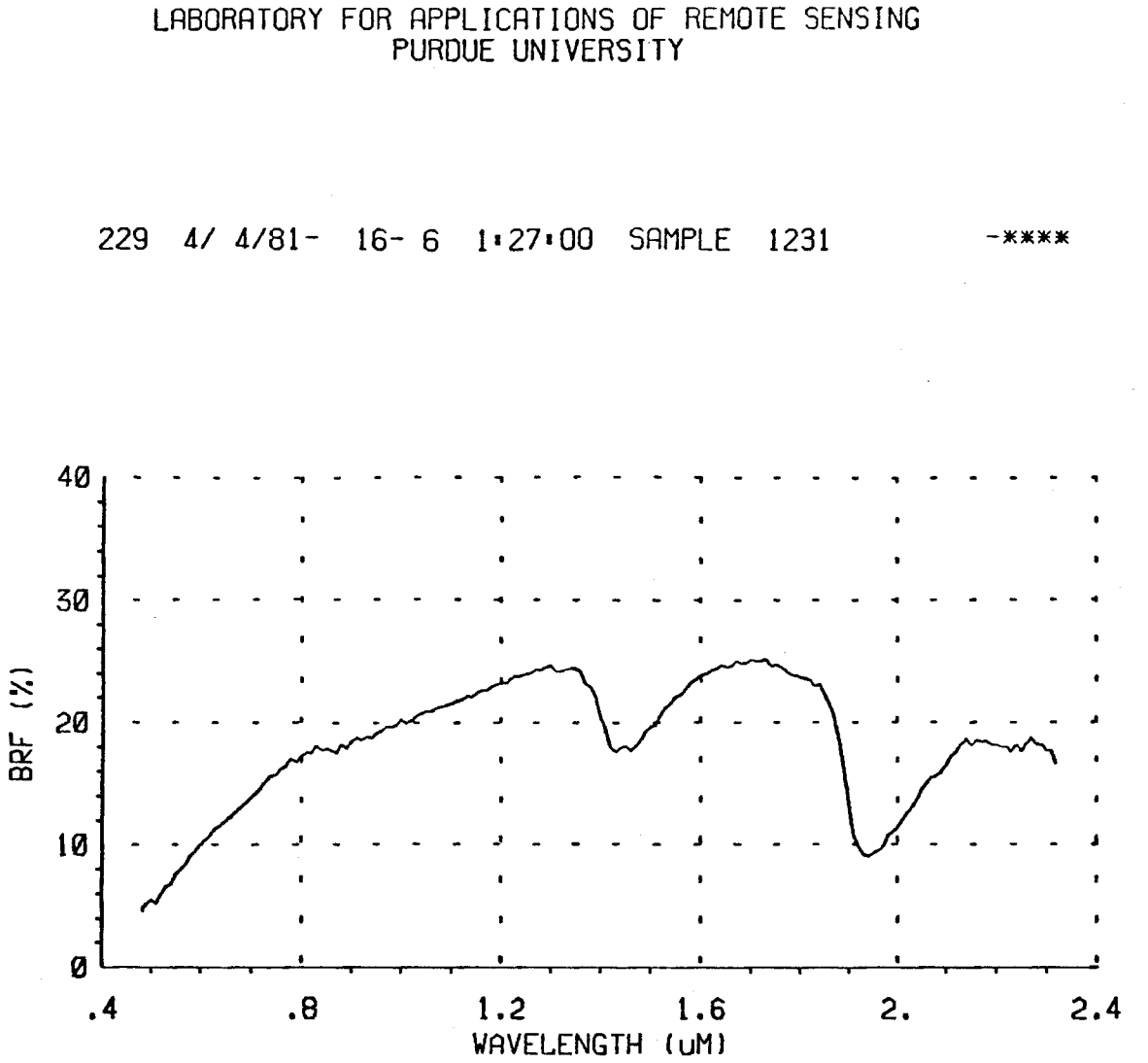

Figure 15. Nonsaline-Nonalkali soil.

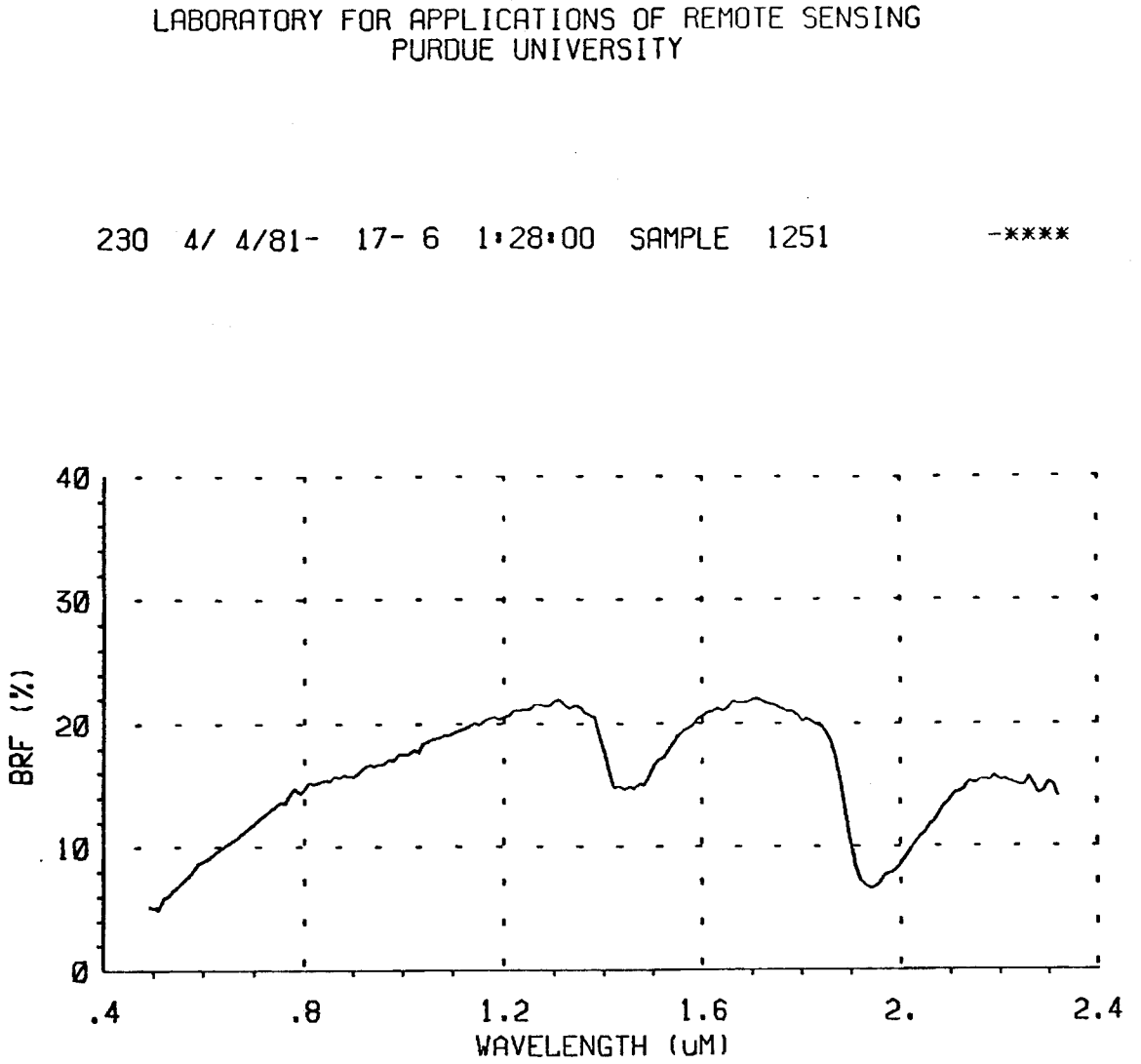

Figure 16. Nonsaline-Nonalkali soil.

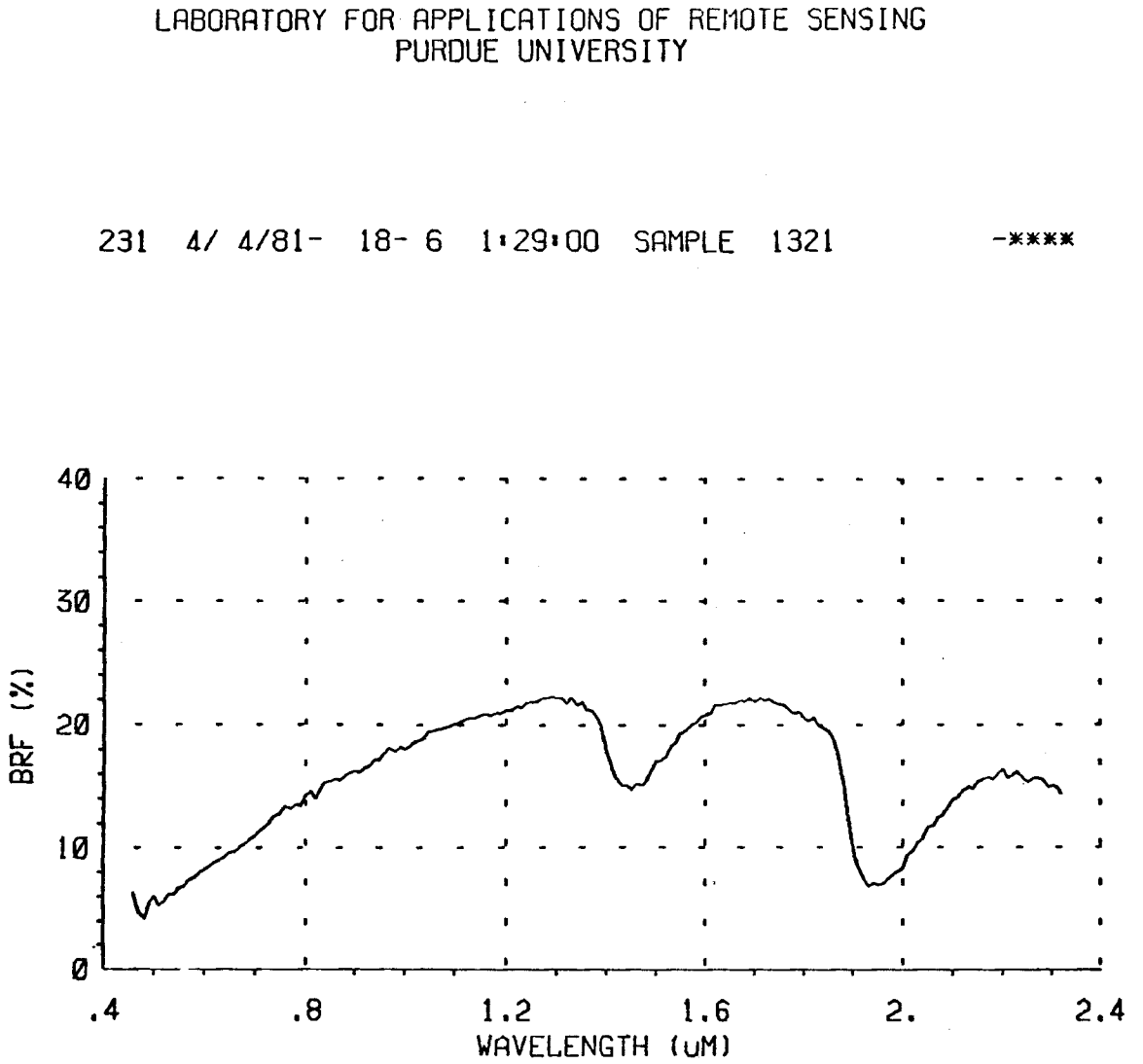

Figure 17. Nonsaline-Nonalkali soil.

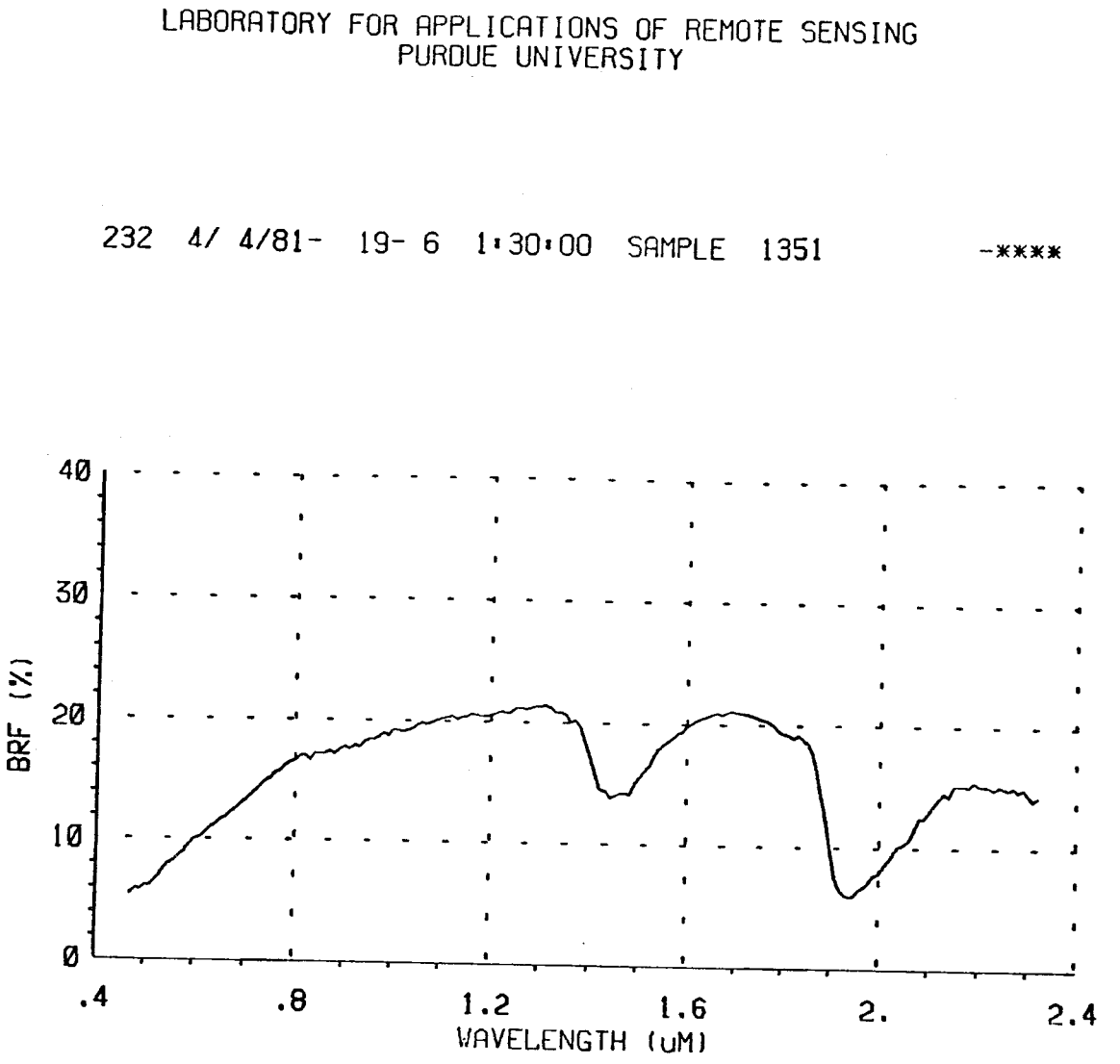

Figure 18. Nonsaline-Nonalkali soil.

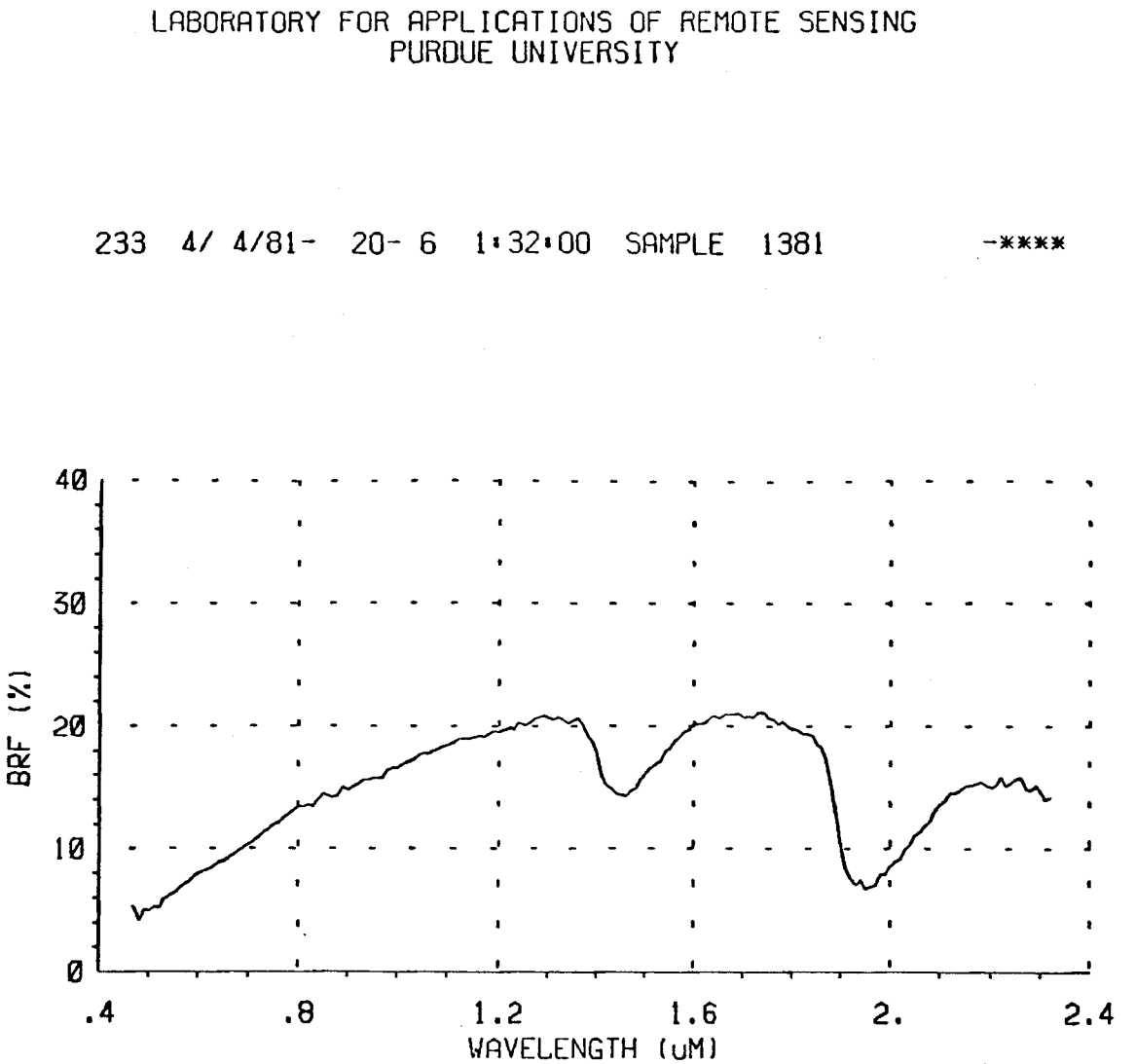

Figure 19. Nonsaline-Nonalkali soil.

ALBERS ADDRESSES FOR ALL THE LEVEL 2 QUADRANGLES OF BOLIVIA

Figure 20 shows the location of the 1:250,000 scale topographic sheets and the Level 2 (Local Level) data base quadrangles that cover the entire Bolivian territory. Table 3 contains the Albers Addresses and the geographic coordinates for the corners of all the quadrangles shown in Figure 20. Note that the Albers Addresses and the geographic coordinates in Table 3 are ordered in terms of columns of quadrangles from 1 (West) to 14 (East).

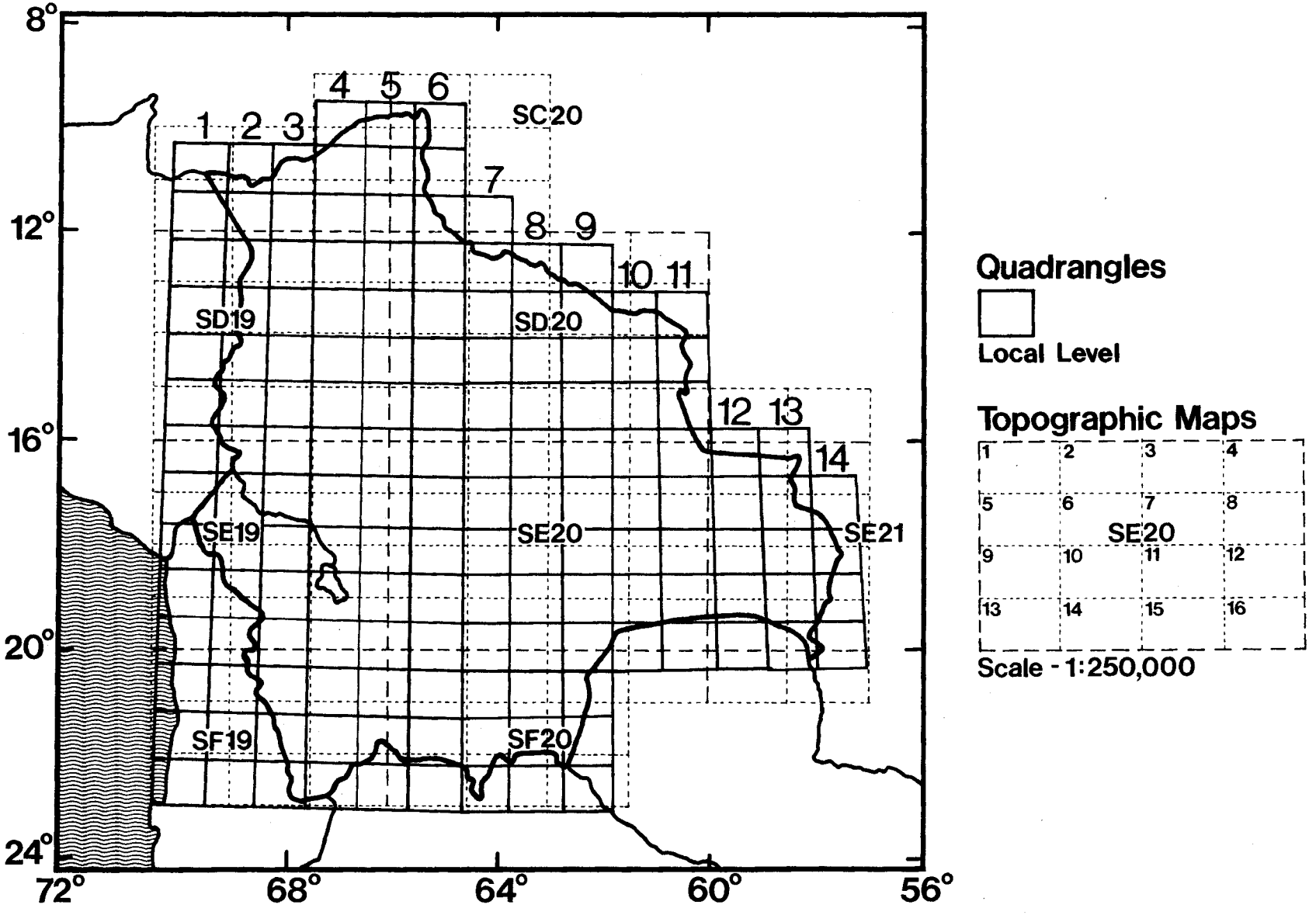

Figure 20. Relationship between the digital Landsat mosaic quadrangles (Level 2 or Local Level) and the 1:250,000 scale topographic maps.

Table 3. Albers Address, Geographic Coordinates in Degrees and Decimals with their Corresponding Degrees, Minutes and Seconds for the Corners of the Level 2 Quadrangles that Cover Bolivia.

COLUMN 1

Albers Address		Geographic Coordinates							
		Longitude				Latitude			
y	x								
2001	0001	70.1056388	70°	06′	20"	10.4022719	10°	24′	08"
4001	0001	70.1324514	70°	07′	57"	11.3073354	11°	18′	26"
6001	0001	70.1595005	70°	09′	34"	12.2112061	12°	12′	40"
8001	0001	70.1867892	70°	11′	12"	13.1140933	13°	06′	51"
10001	0001	70.2143207	70°	12′	51"	14.0162075	14°	00	58"
12001	0001	70.2420982	70°	14′	31"	14.9177604	14°	55′	04"
14001	0001	70.2701251	70°	16′	12"	15.818965	15°	49′	08"
16001	0001	70.2984047	70°	17′	54"	16.7200373	16°	43′	12"
18001	0001	70.3269406	70°	19′	36"	17.6211956	17°	37′	16"
20001	0001	70.355736	70°	21′	21"	18.5226618	18°	31′	21"
22000	0001	70.3847947	70°	23′	05"	19.4246618	19°	25′	29"
24001	0001	70.4141203	70°	24′	51"	20.327426	20°	19′	39"
26000	0001	70.4437164	70°	26′	37"	21.23119	21°	13′	52"
28000	0001	70.4735868	70°	28′	25"	22.1361954	22°	08′	10"
30001	0001	70.5037353	70°	30′	13"	23.0426904	23°	02′	34"

Table 3 (Continued)

COLUMN 2

Albers Address		Geographic Coordinates							
		Longitude				Latitude			
y	x								
2001	2001	69.1947600	69°	11′	41"	10.4268394	10°	25′	36"
4001	2001	69.2175763	69°	13′	03"	11.3319756	11°	19′	55"
6001	2001	69.2405937	69°	14′	26"	12.2359253	12°	14′	09"
8001	2001	69.263815	69°	15′	50"	13.1388981	13°	08′	20"
10001	2001	69.2872431	69°	17′	14"	14.0411044	14°	02′	28"
12001	2001	69.3108805	69°	18′	39"	14.9427561	14°	56′	34"
14001	2001	69.3347303	69°	20′	05"	15.8440664	15°	50′	39"
16001	2001	69.3587951	69°	21′	32"	16.7452515	16°	44′	29"
18001	2001	69.383078	69°	22′	59"	17.6465296	17°	38′	47"
20001	2001	69.4075819	69°	24′	27"	18.5481233	18°	32′	53"
22001	2001	69.4323099	69°	25′	56"	19.4502583	19°	27′	00"
24001	2001	69.457265	69°	27′	26"	20.3531653	20°	21′	11"
26001	2001	69.4824504	69°	28′	57"	21.2570803	21°	15′	25"
28001	2001	69.5078693	69°	30′	28"	22.1622451	22°	09′	44"
30001	2001	69.5335249	69°	32′	01"	25.0689083	23°	04′	08"

Table 3 (Continued)

COLUMN 3

Albers Address		Geographic Coordinates							
y	x	Longitude				Latitude			
2001	4001	68.2836827	68°	17′	01"	10.4474459	10°	26′	51"
4001	4001	68.3024998	68°	18′	09"	11.3526432	11°	21′	09"
6001	4001	68.3214829	68°	19′	17"	12.2566593	12°	15′	24"
8001	4001	68.3406343	68°	20′	26"	13.159704	13°	09′	35"
10001	4001	68.3599561	68°	21′	36"	14.0619878	14°	03′	43"
12001	4001	68.3794507	68°	22′	46"	14.9637223	14°	57′	49"
14001	4001	68.39991203	68°	24′	00"	15.8651215	15°	51′	54"
16001	4001	68.4189675	68°	25′	08"	16.77664013	16°	45′	59"
18001	4001	68.4389944	68°	26′	20"	17.6677802	17°	40′	04"
20001	4001	68.4592037	68°	27′	33"	18.5694808	18°	34′	10"
22001	4001	68.4795979	68°	28′	46"	19.4717291	19°	28′	18"
24001	4001	68.5001795	68°	30′	00"	20.3747563	20°	22′	29"
26001	4001	68.5209509	68°	31′	15"	21.2787981	21°	16′	44"
28001	4001	68.541915	68°	32′	31"	22.1840969	22°	11′	03"
30001	4001	68.5630744	68°	33′	47"	23.0909014	23°	05′	27"

Table 3 (Continued)

COLUMN 4

Albers Address		Geographic Coordinates							
y	x	Longitude				Latitude			
0001	6001	67.3577547	67°	21′	28"	9.55745748	9°	33′	27"
2001	6001	67.3724415	67°	22′	21"	10.4640905	10°	27′	56"
4001	6001	67.3872573	67°	23′	14"	11.3693373	11°	22′	10"
6001	6001	67.402204	67°	24′	08"	12.2734072	12°	16′	24"
8001	6001	67.417283	67°	25′	02"	13.17651	13°	10′	35""
10001	6001	67.4324963	67°	25′	57"	14.0788564	14°	04′	44"
12001	6001	67.4478457	67°	26′	52"	14.99806583	14°	59′	53"
14001	6001	67.4633329	67°	27′	48"	15.8821293	15°	52′	55"
16001	6001	67.4789599	67°	28′	44"	16.7834855	16°	47′	00"
18001	6001	67.4947286	67°	29′	41"	17.6849459	17°	41′	05"
20001	6001	67.5106408	67°	30′	38"	18.5867331	18°	35′	12"
22001	6001	67.5266986	67°	35′	12"	19.4890731	19°	29′	20"
24001	6001	67.5429039	67°	32′	34"	20.3921977	20°	23′	31"
26001	6001	67.5592589	67°	33′	33"	21.2963417	21°	17′	47"
28001	6001	67.5757655	67°	34′	33"	22.2017488	22°	12′	06"
30001	6001	67.5924259	67°	35′	33"	23.1086676	23°	06′	03"

Table 3 (Continued)

COLUMN 5

Albers Address		Geographic Coordinates							
y	x	Longitude				Latitude			
0001	8001	66.4503526	66°	27′	13"	9.57010526	9°	34′	12"
2001	8001	66.4610713	66°	27′	40"	10.4767728	10°	28′	36"
4001	8001	66.4718842	66°	28′	19"	11.3820573	11°	22′	55"
6001	8001	66.4827925	66°	28′	58"	12.2861681	12°	17′	10"
8001	8001	66.4937976	66°	29′	38"	13.1893154	13°	11′	21"
10001	8001	66.5049005	66°	30′	17"	14.0917095	14°	05′	30"
12001	8001	66.5161029	66°	30′	58"	14.9935626	14°	59′	37"
14001	8001	66.5274058	66°	31′	39"	15.8950883	15°	53′	42"
16001	8001	66.5388108	66°	32′	19"	16.7965031	16°	47′	47"
18001	8001	66.55031992	66°	33′	01"	17.6980257	17°	41′	52"
20001	8001	66.5619323	66°	33′	42"	18.5998788	18°	35′	59"
22001	8001	66.5736517	66°	34′	25"	19.5022888	19°	30′	08"
24001	8001	66.5854788	66°	30′	08"	20.405487	20°	24′	19"
26001	8001	66.5974151	66°	35′	51"	21.397096	21°	23′	49"
28001	8001	66.6094621	66°	36′	34"	22.2151994	22°	12′	55"
30001	8001	66.6216214	66°	37′	18"	23.1222053	23°	07′	20"

Table 3 (Continued)

COLUMN 6

Albers Address		Geographic Coordinates							
y	x	Longitude				Latitude			
0001	10001	65.5428575	65°	32′	34"	9.57880087	9°	34′	43"
2001	10001	65.5496069	65°	32′	58"	10.4854921	10°	29′	07"
4001	10001	65.5564156	65°	33′	23"	11.3908025	11°	23′	27"
6001	10001	65.5632844	65°	33′	48"	12.2949417	12°	17′	41"
8001	10001	65.5702141	65°	34′	13"	13.1981194	13°	11′	53"
10001	10001	65.5762055	65°	34′	34"	14.1005464	14°	06′	02"
12001	10001	65.5842594	65°	35′	03"	15.0024348	15°	00′	08"
14001	10001	65.5913767	65°	35′	29"	15.9039982	15°	54′	14"
16001	10001	65.5985582	65°	35′	54"	16.8054531	16°	48′	19"
18001	10001	65.6058049	65°	36′	20"	17.7070186	17°	42′	25"
20001	10001	65.6131176	65°	36′	47"	18.6089171	18°	36′	32"
22001	10001	65.6204971	65°	37′	13"	19.5113752	19°	30′	40"
24001	10001	65.6279445	65°	37′	40"	20.4146244	20°	24′	52"
26001	10001	65.6354606	65°	38′	08"	21.3189008	21°	19′	08"
28001	10001	65.6430465	65°	38′	23"	22.2244474	22°	13′	28"
30001	10001	65.6507031	65°	39′	02"	23.1315133	23°	07′	53"

Table 3 (Continued)

COLUMN 7

Albers Address		Geographic Coordinates							
y	x	Longitude				Latitude			
4001	12001	64.6408869	64°	38′	27"	11.3955728	11°	23′	44"
6001	12001	64.6437154	64°	38′	37"	12.2997273	12°	17′	59"
8001	12001	64.6465689	64°	38′	48"	13.2029217	13°	12′	10"
10001	12001	64.6494478	64°	38′	58"	14.1053667	14°	06′	19"
12001	12001	64.6523525	64°	39′	08"	15.0072743	15°	00′	26"
14001	12001	64.6552834	64°	39′	19"	15.9088584	15°	54′	32"
16001	12001	64.6582406	64°	39′	30"	16.8103352	16°	48′	37"
18001	12001	64.6612246	64°	39′	40"	17.711924	17°	42′	43"
20001	12001	64.6642359	64°	39′	51"	18.6138472	18°	36′	50"
22001	12001	64.6672747	64°	40′	00"	19.5163316	19°	30′	59"
24001	12001	64.6703414	64°	40′	13"	20.4196085	20°	25′	10"
26001	12001	64.6734364	64°	40′	24"	21.3239144	21°	19′	26"
28001	12001	64.6765602	64°	40′	35"	22.229492	22°	13′	46"
30001	12001	64.6797131	64°	40′	47"	23.1365905	23°	08′	11"

Table 3 (Continued)

COLUMN 8

Albers Address		Geographic Coordinates							
y	x	Longitude				Latitude			
6001	14001	63.7241213	63°	43′	26"	12.300525	12°	18′	02"
8001	14001	63.7228983	63°	43′	22"	13.2037222	13°	12′	13"
10001	14001	63.7216645	63°	43′	18"	14.1061701	14°	06′	22"
12001	14001	63.7204196	63°	43′	13"	15.0080808	15°	00′	29"
14001	14001	63.7191635	63°	43′	09"	15.9096684	15°	54′	35"
16001	14001	63.7178962	63°	43′	04"	16.8111489	16°	48′	40"
18001	14001	63.7166172	63°	42′	59"	17.7127415	17°	42′	46"
20001	14001	63.7153867	63°	42′	55"	18.6146689	18°	36′	53"
22001	14001	63.7140243	63°	42′	50"	19.5171576	19°	31′	02"
24001	14001	63.71271	63°	42′	46"	20.4204392	20°	25′	13"
26001	14001	63.7113836	63°	42′	41"	21.32475	21°	19′	29"
28001	14001	63.7100448	63°	42′	36"	22.2303328	22°	13′	49"
30001	14001	63.7886935	63°	47′	19"	23.1374368	23°	08′	14"

Table 3 (Continued)

COLUMN 9

Albers Address		Geographic Coordinates							
y	x	Longitude				Latitude			
6001	16001	62.804538	62°	48′	16"	12.2973345	12°	17′	50"
8001	16001	62.7992387	62°	47′	57"	13.2005205	13°	12′	02"
10001	16001	62.7938921	62°	47′	38"	14.1029566	14°	06′	11"
12001	16001	62.7884978	62°	47′	18"	15.0048545	15°	00′	17"
14001	16001	62.783055	62°	46′	59"	15.9064283	15°	54′	23"
16001	16001	62.7775632	62°	46′	39"	16.8078942	16°	48′	28"
18001	16001	62.7720215	62°	46′	19"	17.7094713	17°	42′	34"
20001	16001	62.7664293	62°	45′	59"	18.6113821	18°	36′	41"
22001	16001	62.760786	62°	45′	39"	19.5138534	19°	30′	50"
24001	16001	62.7550908	62°	45′	18"	20.4171163	20°	25′	02"
26001	16001	62.749343	62°	44′	57"	21.3214076	21°	19′	17"
28001	16001	62.7435419	62°	44′	36"	22.2269696	22°	13′	37"
30001	16001	62.7376867	62°	44′	16"	23.1340519	23°	08′	03"

Table 3 (Continued)

COLUMN 10

Albers Address		Geographic Coordinates							
y	x	Longitude				Latitude			
8001	18001	61.8756261	61°	52′	32"	13.1933172	13°	11′	36"
10001	18001	61.8661676	61°	51′	58"	14.0957263	14°	05′	45"
12001	18001	61.8566245	61°	51′	23"	14.9975954	14°	59′	51"
14001	18001	61.8469957	61°	50′	49"	15.8991382	15°	53′	56"
16001	18001	61.83728	61°	50′	14"	16.8005712	16°	48′	20"
18001	18001	61.8274762	61°	49′	39"	17.7021133	17°	42′	08"
20001	18001	61.8175831	61°	49′	03"	18.603987	18°	36′	14"
22001	18001	61.8075995	61°	48′	27"	19.5064189	19°	30′	23"
24001	18001	61.7975241	61°	47′	51"	20.4096402	20°	24′	35"

Table 3 (Continued)

COLUMN 11

Albers Address		Geographic Coordinates							
y	x	Longitude				Latitude			
8001	20001	60.9520971	60°	57′	07"	13.1821123	13°	10′	56"
10001	20001	60.9385277	60°	56′	18"	14.0844796	14°	05′	04"
12001	20001	60.924837	60°	55′	29"	14.9863038	14°	59′	11"
14001	20001	60.9110235	60°	54′	40"	15.8877987	15°	53′	16"
16001	20001	60.8970849	60°	53′	49"	16.7891806	16°	47′	21"
18001	20001	60.8830201	60°	52′	59"	17.6906682	17°	41′	26"
20001	20001	60.86882073	60°	52′	07"	18.5924841	18°	35′	33"
22001	20001	60.8545047	60°	51′	16"	19.4948549	19°	29′	41"
24001	20001	60.8400505	60°	50′	24"	20.3980114	20°	23′	52"

Table 3 (Continued)

COLUMN 12

Albers Address		Geographic Coordinates							
y	x	Longitude				Latitude			
14001	22001	59.9751755	59°	58′	31"	15.8724104	15°	52′	21"
16001	22001	59.9570161	59°	57′	25"	16.7737228	16°	46′	25"
18001	22001	59.9386922	59°	56′	19"	17.6751369	17°	40′	30"
20001	22001	59.9202015	59°	55′	13"	18.5768744	18°	34′	37"
22001	22001	59.9015416	59°	54′	05"	19.4791621	19°	28′	45"
24001	22001	59.8827103	59°	52′	57"	20.3822307	20°	22′	56"

Table 3 (Continued)

COLUMN 13

Albers Address		Geographic Coordinates							
y	x	Longitude				Latitude			
14001	24001	59.03949	59°	02′	22"	15.8529241	15°	51′	10"
16001	24001	59.0171119	59°	01′	01"	16.7841991	16°	45′	15"
18001	24001	58.9945311	58°	59′	40"	17.65552	17°	39′	19"
20001	24001	58.9717447	58°	58′	18"	18.5571588	18°	33′	26"
22001	24001	58.9487499	58°	56′	55"	19.4593418	19°	27′	34"
24001	24001	58.9255439	58°	55′	32"	20.3622996	20°	21′	44"

Table 3 (Continued)

COLUMN 14

Albers Address		Geographic Coordinates							
y	x	Longitude				Latitude			
16001	26001	58.0774105	58°	04′	38"	16.7306106	16°	43′	50"
18001	26001	58.0505755	58°	03′	02"	17.6318191	17°	37′	54"
20001	26001	58.0234963	58°	01′	24"	18.5333387	18°	32′	00"
22001	26001	57.9961694	57°	59′	46"	19.4353954	19°	26′	07"
24001	26001	57.9685916	57°	58′	7"	20.3382194	20°	20′	18"

STATISTICAL LEVEL OF SIGNIFICANCE FOR THE PLANIMETRIC ACCURACY OF THE LANDSAT MOSAIC

The previous quarterly report (LARS Contract Report 110181) contained the results from the quantitative planimetric accuracy assessment of the digital Landsat mosaic of the Oruro Department.

The statistical level of significance of those results is given in Tables 4 and 5. The "s" is the population standard deviation and "t" is the percentage point of the student's t distribution.

Table 4. Level of Significance with the Oruro (bad) Landsat Frame.

	s	t	Confidence
Δx	238	0.9854	60%< <70%
Δy	346	0.6778	40%< <50%
D	312	0.7517	50%< <60%

Table 5. Level of significance without the Oruro (bad) Landsat Frame.

	s	t	Confidence
Δx	118.5	1.8392	90%< <95%
Δy	201.5	1.0816	70%< <80%
D	82.0	2.6579	98%

RECOMMENDED HIERARCHICAL GEOLOGIC CLASSIFICATION SCHEME FOR BOLIVIA

Since the four different levels (input, local, departmental, and national levels) of the Bolivian GIS have been designed on the basis of a hierarchical level of detail criterion, the data to be input into the GIS data base should be mapped and coded following a hierarchical approach. This approach should take into account the correspondence among the amount of mapped information (level of detail), scale, and minimum mapping unit.

Dr. Carlos E. Brockmann, a Bolivian geologist presently working as an Adjunct Professor at Purdue University and Visiting Scientist at LARS has prepared a suggested hierarchical classification scheme for mapping, coding, and storing the geologic information of Bolivia in a digital GIS. This suggested classification scheme or legend is given in Table 6, and it is composed of four hierarchical levels:

1. Geomorphologic Provinces
2. Geologic Age
3. Group
4. Formation

Table 6. Suggested Hierarchical Geologic Classification for Bolivia.

1. ESCUDO BRASILENO
    1. Proterozoico
        1. Lomas Maneches
        2. La Bella (1)
            1. Psamita del Porvenir
            2. Esquisto del Quiser
            3. Semideltaica de la Dolorida
        3. Naranjal (1)
            1. Psamita de Sutto
            2. Pelita de la Honda
            3. Filita Negra de Santa Rosa
        4. San Ignacio (1)
            1. Ignea Metabasica de Suponema (2)
            2. Esquistos Motacu
            3. Esquistos Los Patos
        5. Las Petas (*)
            1. Ascension
        6. San Jose (*)
            1. San Diablo
            2. Los Huasos
            3. Taruma
        7. Buena Vista (1) (*)
            1. Esquisto Cristal/Complejo Basico Chaquipoc
        8. Santa Rita
        9. Complejo Metamorfilo de Momene
            1. Metagranito San Rafael
        10. La Fortuna (*) (1)
        11. San Juan (*) (1)
        12. San Diablo (*) (1)
        13. Aventura (*) (1)
            1. Patuju
        14. Complejo de Santo Corazon
        15. Granitoides A (1)
        16. Sunsas (1)
            1. Conglomerados de Guapama (4)
        17. Tajibos (1)
            1. Psamita Zapocoz
            2. Esquito Laguna
            3. Cuarcita Leon/Complejo Igneo Rincon del Tigre
        18. Vibosi (1)
            1. Santa Isabel
            2. San Marcos
            3. Columba
        19. Granitoides B
        20. Granitoides C
        21. Boqui
            1. Conglomerado San Francisco
            2. Cahama

Table 6 (Continued)

22. Tucavaca
    1. Poropo
    2. Potrero
    3. Piococa
    4. Boca Mina/Motacu
    5. Pesenema

2. Cambrico
    1. Murcielago

3. Ordovicico

4. Silurico
    1. San Jose

5. Devonico
    1. Santiago
        1. El Carmen
        2. Robore
        3. Limoncito

6. Carbonico

7. Permico

8. Triasico

9. Jurasico
    1. Provincia Alcalina de Velasco

10. Cretacico
    1. Provincia Alcalina de Velasco
    2. Porton
        1. Chochis
        2. Tobite
        3. Colorado
        4. Cerro Redondo

11. Terciario

12. Cuaternario
    1. Lateritas
    2. Aluvios
    3. Agua

---

(1) No Indica Posicion Estratigrafica
(2) Posicion Estratigrafica Desconocida
(3) Intrusivo
(4) No Incluye Unidad Psamitica, Arcillosa/Psamitica
* No Son Gurpos, Solo Ubicacion Geografica

Table 6 (Continued)

2. SIERRAS CHIQUITANAS
    1. Proterozoico
    2. Cambrico
    3. Ordovicico
    4. Silurilo
    5. Devonilo
    6. Carbonifero
    7. Permico
    8. Triasico
    9. Jurasico
    10. Cretacico
    11. Terciario
    12. Cuaternario

Observaciones: No se incluyen los niveles 3/4, por no disponser de los datos apropidados.

3. LLANURAS
    1. Proterozoico
    2. Cambrico
    3. Ordovicico
    4. Silurico
    5. Devonico
    6. Carbonico
    7. Permico
    8. Triasico
    9. Jurasico
    10. Cretacico
    11. Terciario
    12. Cuaternario

Observacanes: No se incluyen los niveles 3/4, por no disponer de los datos apropiados.

Table 6 (Continued)

4. SUBANDINO *
    1. Proterozoico

    2. Cambrico (C)
        1. Limbo
            1. Putintiri

    3. Ordovicico (C)
        1. Limbo
            1. A Vispas
        2. ?? (C)
            1. Cuchupunata
            2. San Benito

    4. Silurico (S,C)
        1. ?? (S,C)
            1. Cancaniri (C)
            2. Kirusillas (S,C)

    5. Devonico
        1. ??
            1. Santa Rosa (S,C)
            2. Icla (C)
            3. Los Monos (S), Pucara (C), Tequeje (N)
            4. Tampampi (C)
            5. Iquiri (S,C), Sin Nombre (N)

    6. Carbonifero
        1. Machareti (S,C), Retama (N)
            1. Itacua (S,C), Toregua (N)
            2. Tupambi (S,C)
            3. Tarija/Chorro (S,C), Kaka (N)
            4. Taiguati (S,C)
        2. Manduyuti (S,C)
            1. Escarpment (S,C)
            2. San Telmo (S)

    7. Permico
        1. ??
            1. Copacabana (S,N)

    8. Triasico
        1. Vitiacua (S)
            1. Cangapi
            2. Vitiacua
            3. Ipaguazu

    9. Jurasico

Table 6 (Continued)

10. Cretacico
    1. Tacuru (S,C), ? (N)
        1. Tapecua (S)
        2. Castellon (S)
        3. Ichoa (S,C), Beu (N)
        4. Yantata (S,C), Eslabon (N)
        5. Cajones (S,C), Flora (N)
    2. ? (S)
        1. Basalto de Entre Rios (S)

11. Terciario
    1. Chaco (S,C), ? (N)
        1. Petaca (S,C), Bala (N)
        2. Yecua (S,C), Quendeque (N)
        3. Tariquia (S,C), Charqui (N)
        4. Guandacay (S,C), Tutumo (N)
        5. Jujuy (S)

12. Cuaternario

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* Incluye Piedemonte
(S) Sur
(C) Centro
(N) Norte
?? Grupos por Determinar

Table 6 (Continued)

5. CORDILLERA ORIENTAL
    1. Proterozoico
        1. ?? (S)
            1. Puncoviscana

    2. Cambrico
        1. Tucumilla (S), Limbo (CE)
            1. Lizoite (S) ?
            2. Torohuayco (S), Putintiri (CE)
            3. Sama (S)

    3. Ordovicico
        1. ?? (S), Limbo (CE), Cochabamba (CE.CO), ?? (N)
            1. Iscayachi (S)
            2. Guanacuno(S), Avispas (CE)
            3. Cieneguillas (S), Independencia (CE.CO), Sin Nombre (N)
            4. Obispo (S), Capinota (CE.CO), Sin Nombre (N)
            5. Mojona (S), Cuchupunata (CE.CO)
            6. Otavi (S), Cuchupunata (CE.CO)
            7. Lecori (S), Mizque (CE), San Benito (CO), Amutara (N)
            8. Nuque (S)

    4. Silurico
        1. ?? (S.CE.CO.N)
            1. Cancaniri (S.CE.CO.N)
            2. Kirusillas (S), Huanuni (CE.CO.N)
            3. Kirusillas (S), Llallagua (CE.CO.N)
            4. Kirusillas (S), Uncia (CE.CO.N)
            5. Tarabuco (S), Catavi (CE.CO.N)

    5. Devonico
        1. ?? (S.CE.CO.N)
            1. Santa Rosa (S.CE), Vila Vila (CO.N)
            2. Icla-Gamoneda (S), ICLA (CE.CO), Belen (N)
            3. Huamampampa (S.CE.CO), Sicasica (N)
            4. Cha-Kjeri (CE), Colpacucho (N)

    6. Carbonico
        1. ?? (S.CE.N)
            1. Tupambi (?) (S), Ambo (CE,N)

    7. Permico
        1. ?? (CE.N)
            1. Copacabana (CE.N)

    6. Triasico
        1. Vitiacua (S)
            1. Cangapi
            2. Vitiacua

    7. Jurasico

Table 6 (Continued)

8. Cretacico
    1. Potosi (S.CE.CO.N)
        1. La Puerta (S.CO), Huancane (N)
        2. Tarapaya (S.CO), Moho Inf. (N)
        3. Miraflores (CO), Ayavacas (N)
        4. Aroifilla Inf. (S.CO), Moho Sup (N)
        5. Aroifilla Sup (S.CO), Torotoro (S.CE.N), Chaunaca (S.CO), Cotacucho (N)
        6. El Molino (S.CE.CO.N), Vilque Chico (N)

9. Terciario
    1. ?? (S.CE.N), Cerro Rico (CO)
        1. Santa Lucia (S.CE.CO.N), Munani (N)
        2. Cayara (CE.CO), Munani (N)
        3. Camargo (S), Luribay (N)
        4. Rio Chico (CE), Salla (N)
        5. Mondragon (CO), Kari Kari (CO)
        6. Nazareno (S), Agua Dulce (CO), Kari Kari (CO), Tres Creces (N)
        7. Tupiza (S), Cerro Rico (CO)
        8. Oploca (S)
        9. Choroma (S), Frailes (CE.CO), Taraco (N)

10. Cuaternario

S = Sur; CE = Centro Oriental; CO = Centro Occidental; N = Norte
?? Grupo Sin Nombre

Table 6 (Continued)

6. ALTIPLANO
    1. Proterozoico

    2. Cambrico

    3. Ordovicico

    4. Silurico
        1. ?? (S.N)
            1. Cancaniri
            2. Llallagua
            3. Uncia
            4. Catavi

    5. Devonico
        1. ?? (S.N)
            1. Vila Vila (S)
            2. Icla (S.N), Belen (N)
            3. Huamampampa (S), Sica Sica (N)
            4. Colpacuchu (N)

    6. Carbonico
        1. Ambo (N)
            1. Cumana
            2. Kasa

    7. Permico
        1. ?? (N)
            1. Copacabana
            2. Tiquina/Jesus de Machaca

    8. Triasico

    9. Jurasico

    10. Cretacico
        1. Potosi (S.N)
            1. La Puerta, Lacaya (S)
            2. Tarapaya, Lacaya (S)
            3. Miraflores-Anta (S)
            4. Aroifilla Inf-Orinoca Inf. (S)
            5. Aroifilla Sup. Orinica Sup (S), Toro Toro (N)
            6. Chaunaca-Mulasi (S), Toro Toro (N)
            7. Pahua (S), El Molino (S.N)

    11. Terciario
        1. ?? (N.S)
            1. Santa Lucia (S.N), Candelaria (S)
            2. Potoco (S), Tiahuanacu, Coniri (N)
            3. San Vicente (S), Kollu Kollu (N)
            4. Caquiaviri (N)
            5. Mauri-6 (N) Choquecota (N)
            6. Chocaya (S), Perez (N), Umala (N)

    12. Cuaternario

Table 6 (Continued)

7. CORDILLERA OCCIDENTAL
    1. Proterozoico
    2. Cambrico
    3. Ordovicico
    4. Silurico
    5. Devonico
    6. Permico
    7. Triasico
    8. Jurasico
    9. Cretacico
    10. Terciaria
    11. Cuaternario

CODING THE GEOMORPHOLOGY ELEMENT

According to Castaños and Rodrigo (1978), the entire Bolivian territory is divided into eight geomorphologic provinces as illustrated in Table 7, and the Oruro Department is located within three of these eight geomorphologic provinces: Macizo de los Andes, Antiplano, and Complejo Volcanico Occidental. Table 8 contains the coding and fill character information corresponding to the geomorphologic units present in the seven 1:250,000 scale geomorphology maps of the Oruro Department.

It is expected that the digitization of these maps will be completed during the next reporting period.

Table 7. Geomorphologic Provinces of Bolivia.
(After Castaños and Rodrigo, 1978)

1. Escudo Brasileño
2. Serranias Chiquitanas
3. Llanuras
4. Piedemonte
5. Subandino
6. Macizo de los Andes
7. Altiplano
8. Complejo Volcanico Occidental

Table 8. Geomorphologic Provinces, Units, and Landscapes for the Oruro Department.

	Code	Fill Character
6. MACIZO DE LOS ANDES		
1. Unidades de Origen Estructural		
1. Colinas Con Formas Sub a Redondeadas	(11)	(1)
2. Paisaje Montañoso Con Formas Redondeadas	(12)	(2)
3. Paisaje Montañoso Fuertemente Disectado	(13)	(3)
4. Paisaje Serrañias Anticlinales	(15)	(4)
5. Paisaje Montañoso Disectado por Glaciales	(16)	(5)
6. Meseta Estructural Denudada	(3)	(6)
7. Serranias Paralelas (Hog-Bagks)	(2)	(7)
2. Unidades de Origen Volcanico		
1. Cono Volcanico muy Disectado	(18)	(8)
2. Meseta de Lavas poco Disectado	(29)	(9)
3. Meseta de Lavas muy Afecta de por Procesos Glaciales	(32)	(10)
4. Meseta de Lavas de Diseccion Alta	(28)	(11)
5. Meseta de Lavas de Diseccion Extre madamente Alta Por Drenaje Paralelo	(27)	(12)
3. Unidades de Origen Denudacional		
1. Colinas Residuales	(39)	(13)
2. Remanentes de Superficie de Erosion	(36)	(14)
3. Glacis de Erosion	(47)	(15)
4. Pendientes al pie de Monte, Diseccion Baja	(33)	(16)
5. Paisaje Denudado a un Nivel Plano	(38)	(17)
6. Tierras Malas	(37)	(18)
4. Unidades de Origen Aluvial		
1. Aluviales en General	(49)	(19)
2. Abanicos Aluviales Recientes Bien Conservados	(53)	(20)
5. Unidades de Origen Eolico		
1. Mantos de Arena Estabilizados	(61)	(21)
2. Dunas Parabolicas y Barjanes Estabilizados	(62)	(22)
7. ALTIPLANO		
1. Unidades de Origen Estructural		
1. Serranias Paralelas (Hog Backs)	(2)	(23)
2. Colinas con Formas Subredondeadas	(11)	(24)
3. Meseta Estructural Denudada	(3)	(25)
4. Serrania Homoclinal	(1)	(26)
5. Paisaje de Cuestas	(8)	(27)
6. Meseta Tectonizada	(9)	(28)
7. Meseta poco Disectada	(4)	(29)
8. Serranias de Crestas Agudas (S. Homoclinal)	(10)	(30)
9. Cresta Estructural Abrupta	(14)	(31)

	2. Intrusivo Dacitico	(17)	(72)
	3. Paisaje Monoclinal Diseccion Baja	(6)	(73)
	4. Serrania Monoclinal con Lavas Plegadas	(7)	(74)
	5. Meseta Estructural Tectonizada	(9)	(75)
	6. Meseta Estructural Denudada	(3)	(76)
2.	Unidades de Origen Volcanico		
	1. Cono Volcanico muy Disectado	(18)	(77)
	2. Cono Volcanico Disectado	(19)	(78)
	3. Campos de Lava Ligeramente Disectadas	(20)	(79)
	4. Flujos de Lava Elongadas	(21)	(80)
	5. Conos Parasiticos	(22)	(81)
	6. Hornitos/Mamelones	(23)	(82)
	7. Flujos de Lava Basaltica Con Diseccion Alta	(24)	(83)
	8. Flujos de Lava Basaltica Plana/Inclinada	(25)	(84)
	9. Volcanes en Escudo/Domos Basalticos	(26)	(85)
	10. Meseta Lavas Diseccion Alta, Drenaje Paralelo	(27)	(86)
	11. Meseta Lavas Diseccion Alta	(28)	(87)
	12. Meseta de Lavas poco Disectada	(29)	(88)
	13. Caldera Volcanica	(30)	(89)
	14. Neck	(31)	(90)
3.	Unidades de Origen Denudacional		
	1. Glacis de Pie de Monte, Diseccion Baja	(33)	(91)
	2. Colinas Residuales	(39)	(92)
	3. Glacis de Pie de Monte Diseccion Alta	(34)	(93)
	4. Remanentes de Glacis en Pie de Monte	(35)	(94)
	5. Tierras Malas	(37)	(95)
	6. Remantes de Superficies de Erosion	(36)	(96)
4.	Unidades de Origen Fluvial		
	1. Aluviales en General	(49)	(97)
	2. Paramo	(54)	(98)
	3. Abanicos Aluviales Recientes	(53)	(99)
5.	Unidades de Origen Eolico		
	1. Arena, Dunas Estabilizadas por Vegetacion	(61)	(100)
	2. Lineas de Costa Antiguas	(66)	(101)
	3. Terrazas Lacustres lago Minchin	(67)	(102)
6.	Unidades de Origen Glacial		
	1. Nieves Eternas	(69)	(103)

METEOROLOGY ELEMENT

The ERTS/GEOBOL Program provided LARS with a climatology map of the Oruro Department, which had been produced by Ing. Percy Grundy using the SYMAP mapping software system.

After careful consideration and extensive discussions between LARS personnel and Ing. Carlos Valenzuela from ERTS/GEOBOL, it has been decided that since the available climatology map represents "derived" information as opposed to "basic" meteorological and terrain data, that the climatology information should not be stored in the geo-referenced plane data base. Instead, the basic meteorological data (point data) for the Oruro department would be stored in an attribute data file and then using a mapping program (for example SYMAP) and a modeling algorithm such as the Thornthwaite model, one could derive or generate the desired climatology maps.

There are only a few meteorological data collection stations in the Oruro Department, and they collect only air temperature and rainfall data. Table 9 shows a list of the meteorological stations of Oruro that are currently in operation and those that operated only for a certain period of time. The geographic location (in latitude and longitude) and elevation above sea level (in meters) for these stations is also included in Table 9.

Table 10 shows a list of suggested meteorological parameters that would be required to properly model and forecast the climate of Bolivia.

Table 9. Meteorological Data Collection Stations of the Oruro Department (After Proyecto CORDEOR Final Report).

Estation	Province	Longitud (S) Longitud (W)	Elevation in meters	Period of Operation	Type of Data
Salinas de Garci Mendoza	L. Cabrera	19°18' 10" 67°40' 00"	3.630	1969 - 1976	Temperature and Precipitation
Sajama	Sajama	18°08' 00" 68°59' 00"	4.200	1976	Temperature and Precipitation
Coipasa	Atahuallpa	19°16' 00" 68°16' 00"	3.650	1976	Precipitation
Todos Santos	Atahuallpa	19°00' 00" 68°43' 00"	4.055	1976	Precipitation
Huachacalla	Litoral	18°47' 00" 68°15' 00"	3.728	1976	Temperature and Precipitation
Cosapa	Sajama	18°10' 00" 68°43' 00"	3.890	1976	Precipitation
Orinoco	Carangas	18°58' 00" 67°15' 00"	3.970	1976	Temperature and Precipitation
Sacabaya	Atahuallpa	18°34' 00" 68°47' 00"	3.829	1975 - 1976	Precipitation
Curahuara de Carangas	Sajama	17°50' 00" 68°25' 00"	3.900	1976	Temperature and Precipitation
Chuquina	Saucari	17°48' 00" 67°26' 40"	3.823	1951 - 1976	Precipitation
Oruro	Cercado	17°48' 00" 67°27' 00"	3.800	1956 - 1976	Temperature and Precipitation
Eucaliptus	Cercado	17°36' 00" 67°30' 00"	3.814	1962 - 1976	Temperature and Precipitation
Sacagua	Abaroa	18°49' 00" 66°44' 00"	3.800	1965 - 1976	Temperature and Precipitation
Caracollo	Cercado	17°38' 00" 67°13' 00"	3.772	1974 - 1976	Temperature, Precipitation, and Pressure

Table 10. Suggested Meteorological Parameter*

A. Climatic belts (name)
    1. Location
    2. Description
B. Wind (annual, monthly, and/or daily)
    1. Velocity
        a. Minimum
        b. Mean
        c. Maximum
    2. Wind phenomena
    3. Direction
        a. Charting, mapping
        b. Wind rose: section
    4. Air monitoring parameters
    5. Inversions
C. Precipitation (annual, monthly, and/or daily)
    1. Relative humidity
    2. Air monitoring parameter
    3. Dewpoint
    4. Drought frequency
    5. Annual precipitation
        a. Rain per month
            1) Average hours
            2) Number of days
            3) Number of thunderstorm days
        b. Hail frequency
            1) Earliest (date)
            2) Latest (date)
        c. Snowfall by month
            1) Average
            2) Record maximum
            3) Earliest (date)
            4) Latest (date)
    6. Recorded low
    7. Recorded high
    8. Minimum
    9. Maximum
D. Temperature: air (annual, monthly, and/or daily)
    1. Number of days maximum 90° and above
    2. Number of days minimum 32° and below
    3. Recorded low and year
    4. Recorded high and year
    5. Mean
        a. Annual

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* Adapted from the International Base Line Data Coding System, TNSL Laboratory Index Series No. LIS-IBLDCS-81, Austin, Texas, 1981.

b. Monthly
6. Average minimum
a. Annual
b. Monthly
7. Average maximum
a. Annual
b. Monthly
8. Air monitoring parameters (hourly)

E. Evapotranspiration rate
F. Pan evaporation (inches) per month
G. Solar radiation
1. Percent possible sunshine
2. Average hours of sunshine/day by months
3. Times of sunrise and sunset on same given day each month
H. Ultraviolet radiation
1. Air monitoring parameters (hourly)
I. Visible haze
1. Air monitoring parameters
2. Fog frequency
a. number of hours/day
b. number of hours/months
3. Average cloudiness
a. percent coverage/day by months
J. Photosynthesis
1. Percent possible
2. Percent actual (air)
3. Percent transmissability (water)
4. Growing season
a. Agricultural
b. Terrestrial vegetation
c. Aquatic vegetation
d. Air monitoring parameters

THE LANDSAT DIGITAL MOSAIC

As stated in the INTRODUCTION of this report, the creation of the four-band Landsat MSS digital mosaic has been completed by the NASA-Jet Propulsion Laboratory (JPL). Every one of the four bands for the sixteen level 3 quadrangles that cover the Oruro Department were stored in individual computer tape files. Since these data were received in the VICAR format, the data were first reformatted to the LARSYS MIST format and they are currently being reformatted to the Bolivian GIS Image Plane Data Base format. Appendix A contains all the 64 grayscale images showing each one of the four Landsat bands of the sixteen level 2 quadrangles, and their corresponding attribute information (LARS Form 17D).

In addition to the digital mosaic tapes delivered by JPL, they have also prepared a final report containing all relevant documentation of the procedures used in compiling the mosaic. The JPL document is also being sent to the ERTS/GEOBOL Program.

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APPENDIX A

LARS FORM - 170

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000000
DATE TAPE GENERATED..... AUG 28,1981
TAPE NUMBER..... 5616
FILE NUMBER..... 1
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.0
MILES OF DATA..... 0.0
LINE RATE..... 0.0 LINES/SEC
FRAME CENTER LATITUDE..... -17.21

FLIGHTLINE ID..... ORURO QUAD I
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 68.90

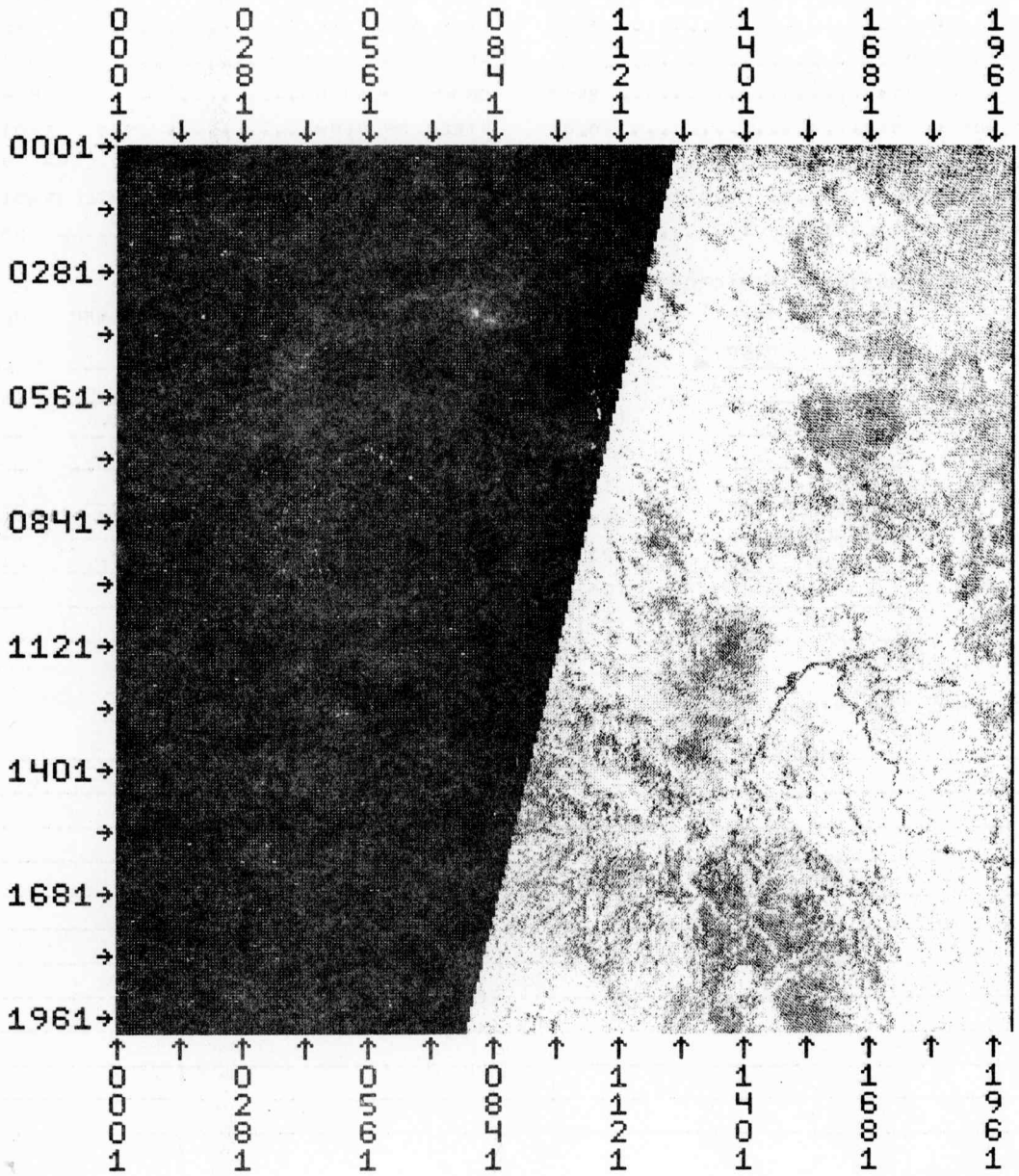
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.50	0.60	(2)	_____	_____	(3)	_____	_____
(4)	_____	_____	(5)	_____	_____	(6)	_____	_____
(7)	_____	_____	(8)	_____	_____	(9)	_____	_____
(10)	_____	_____	(11)	_____	_____	(12)	_____	_____
(13)	_____	_____	(14)	_____	_____	(15)	_____	_____
(16)	_____	_____	(17)	_____	_____	(18)	_____	_____
(19)	_____	_____	(20)	_____	_____	(21)	_____	_____
(22)	_____	_____	(23)	_____	_____	(24)	_____	_____
(25)	_____	_____	(26)	_____	_____	(27)	_____	_____
(28)	_____	_____	(29)	_____	_____	(30)	_____	_____

DATA TAPE COMMENTS...

WP-A27

Run(81000000),Band 4



LAPS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000001
DATE TAPE GENERATED..... FEB 11,1982
TAPE NUMBER..... 3167
FILE NUMBER..... 1
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.0
MILES OF DATA..... 0.0
LINE RATE..... 0.0 LINES/SEC
FRAME CENTER LATITUDE..... -17.21

FLIGHTLINE ID..... ORURO QUAD I
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 68.90

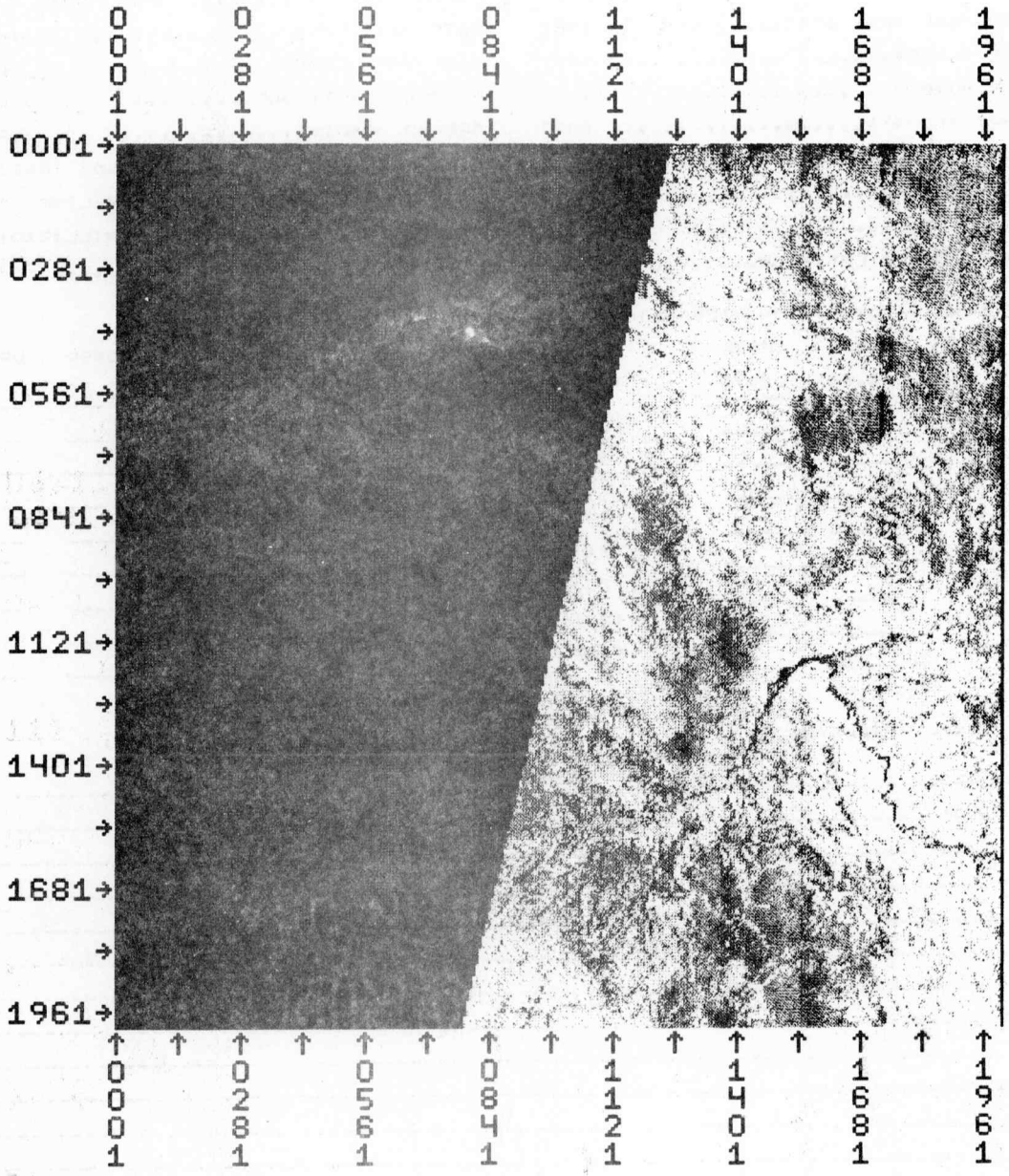
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.60	0.70	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-427

Run(81000001),Band 5



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER.....	81000002	FLIGHTLINE ID.....	ORURO QUAD I
DATE TAPE GENERATED.....	FEB 17,1982	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	4093	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	1	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.00	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.00	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.00 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-17.21	FRAME CENTER LONGITUDE.....	68.90

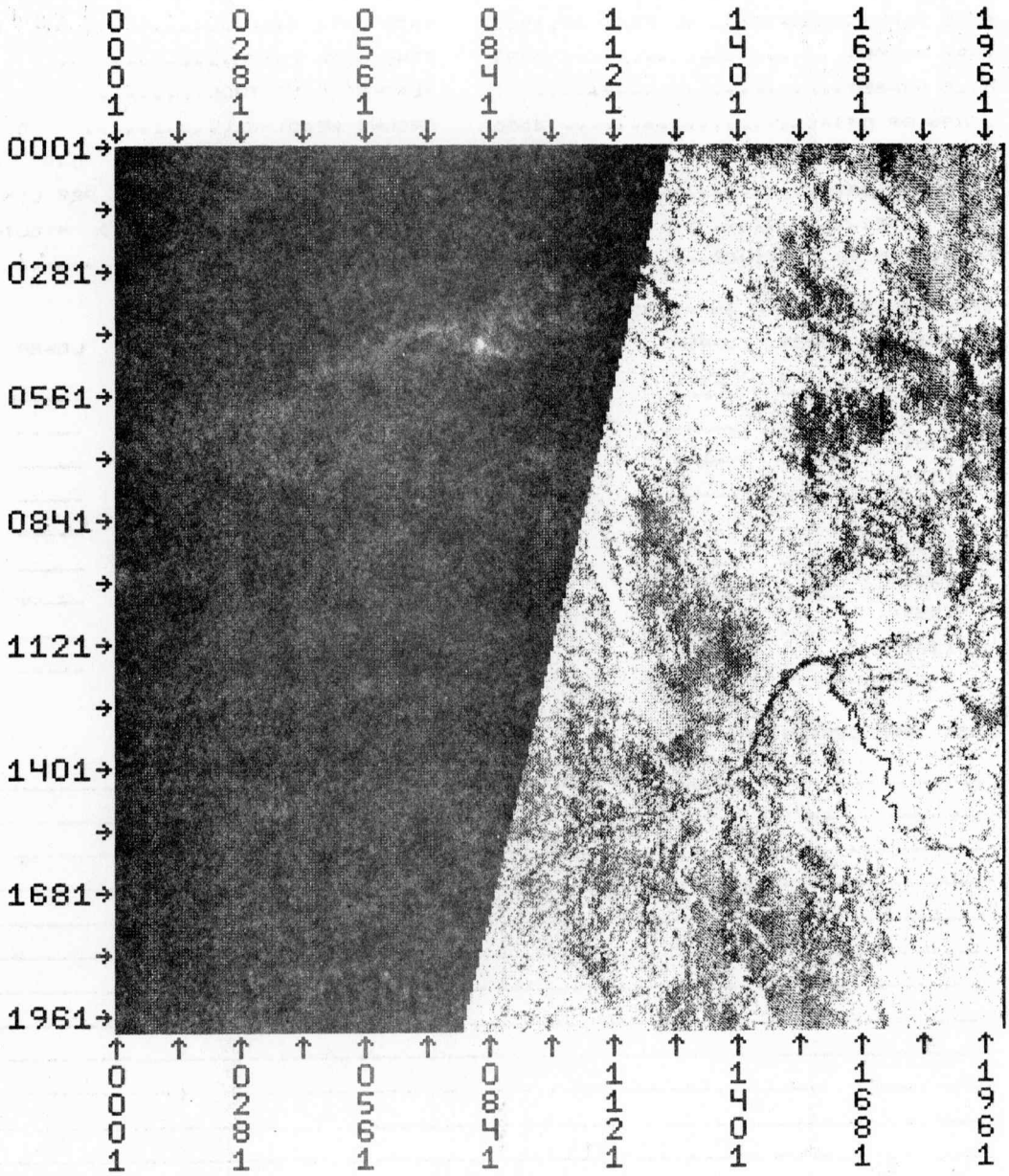
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.70	0.80	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000002),Band 6



LAPS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000003
DATE TAPE GENERATED..... FEB 17,1982
TAPE NUMBER..... 3828
FILE NUMBER..... 1
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.0
MILES OF DATA..... 0.0
LINE RATE..... 0.0 LINES/SEC
FRAME CENTER LATITUDE..... -17.21

FLIGHTLINE ID..... ORURO QUAD I
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 68.90

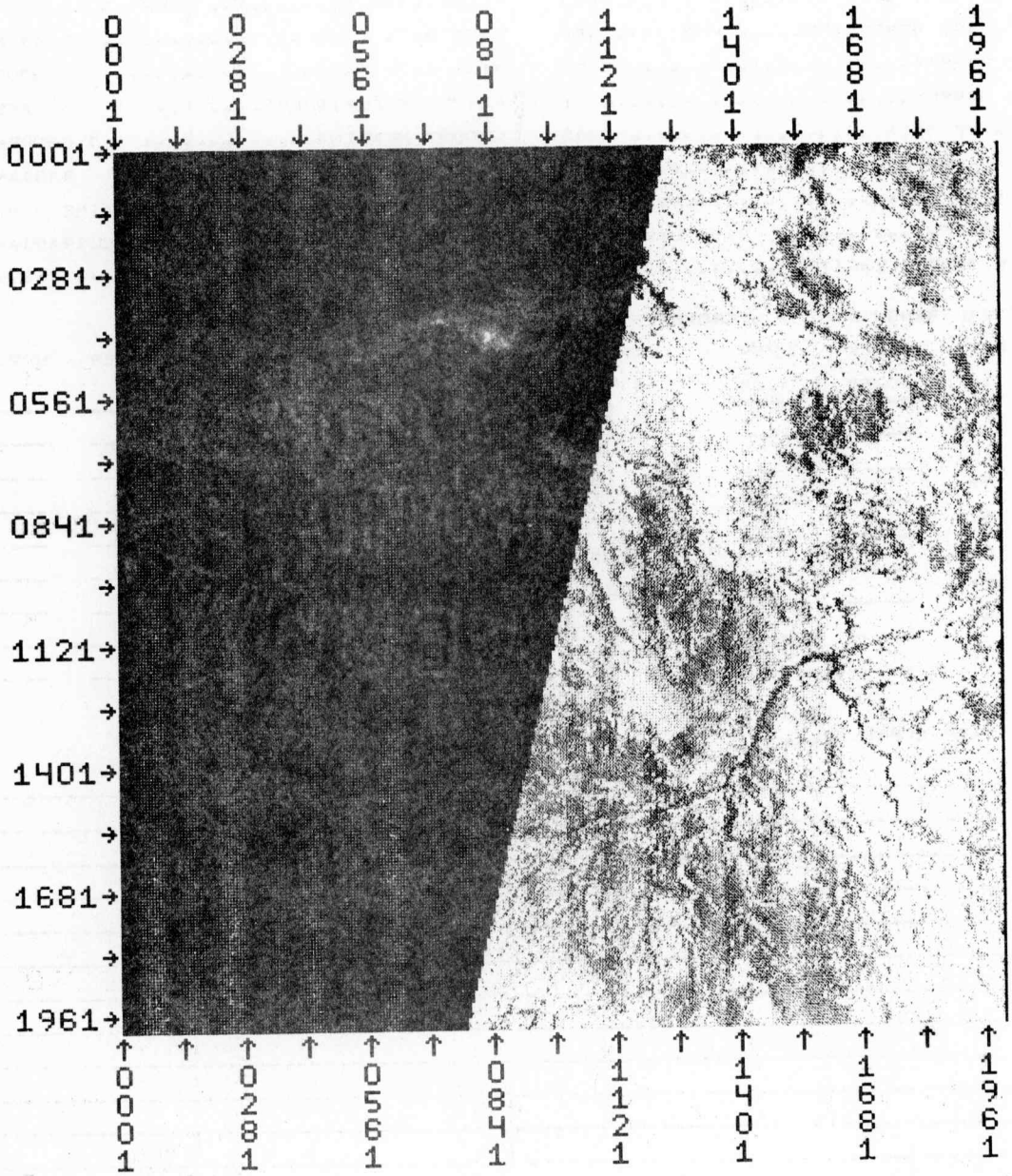
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.80	1.10	(2)			(3)		
(4)			(5)			(6)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-427

Run(81000003),Band 7



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER.....	81000300	FLIGHTLINE ID.....	CRURO QUAD II
DATE TAPE GENERATED.....	SEPT 14,1981	DATE DATA TAKEN.....	9/18/81
TAPE NUMBER.....	5616	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	4	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.0	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.0	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.0 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-17.23	FRAME CENTER LONGITUDE.....	67.96

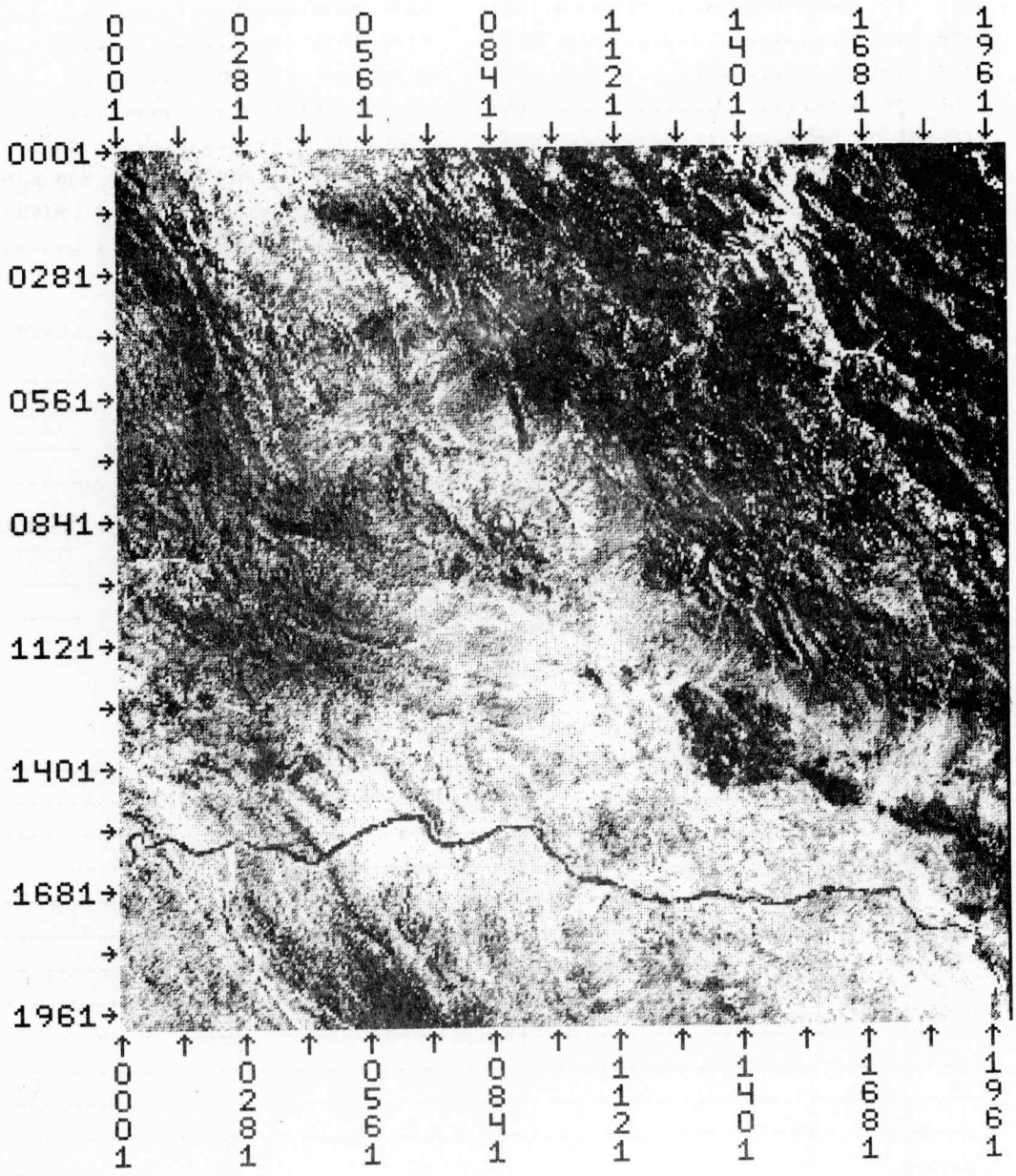
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.50	0.60	(2)			(3)		
(4)			(5)			(6)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-427

Run(81000300),Band 4



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000301
DATE TAPE GENERATED..... FEB 18,1982
TAPE NUMBER..... 3167
FILE NUMBER..... 2
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -17.23

FLIGHTLINE ID..... ORURO QUAD II
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 67.96

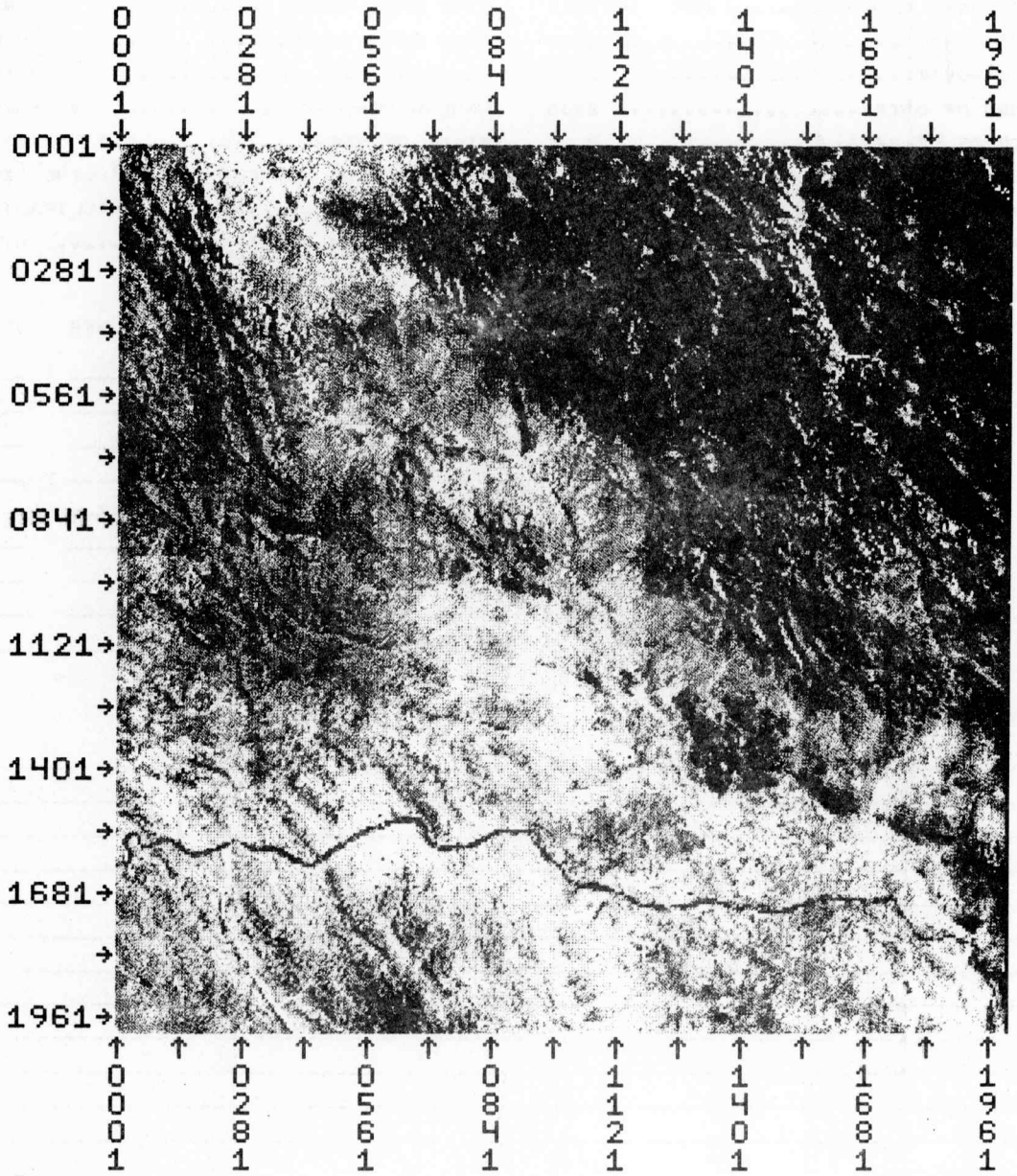
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.60	0.70	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000301),Band 5



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000302
DATE TAPE GENERATED..... FEB 18,1982
TAPE NUMBER..... 4093
FILE NUMBER..... 2
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -17.23

FLIGHTLINE ID..... ORURO QUAD II
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 67.96

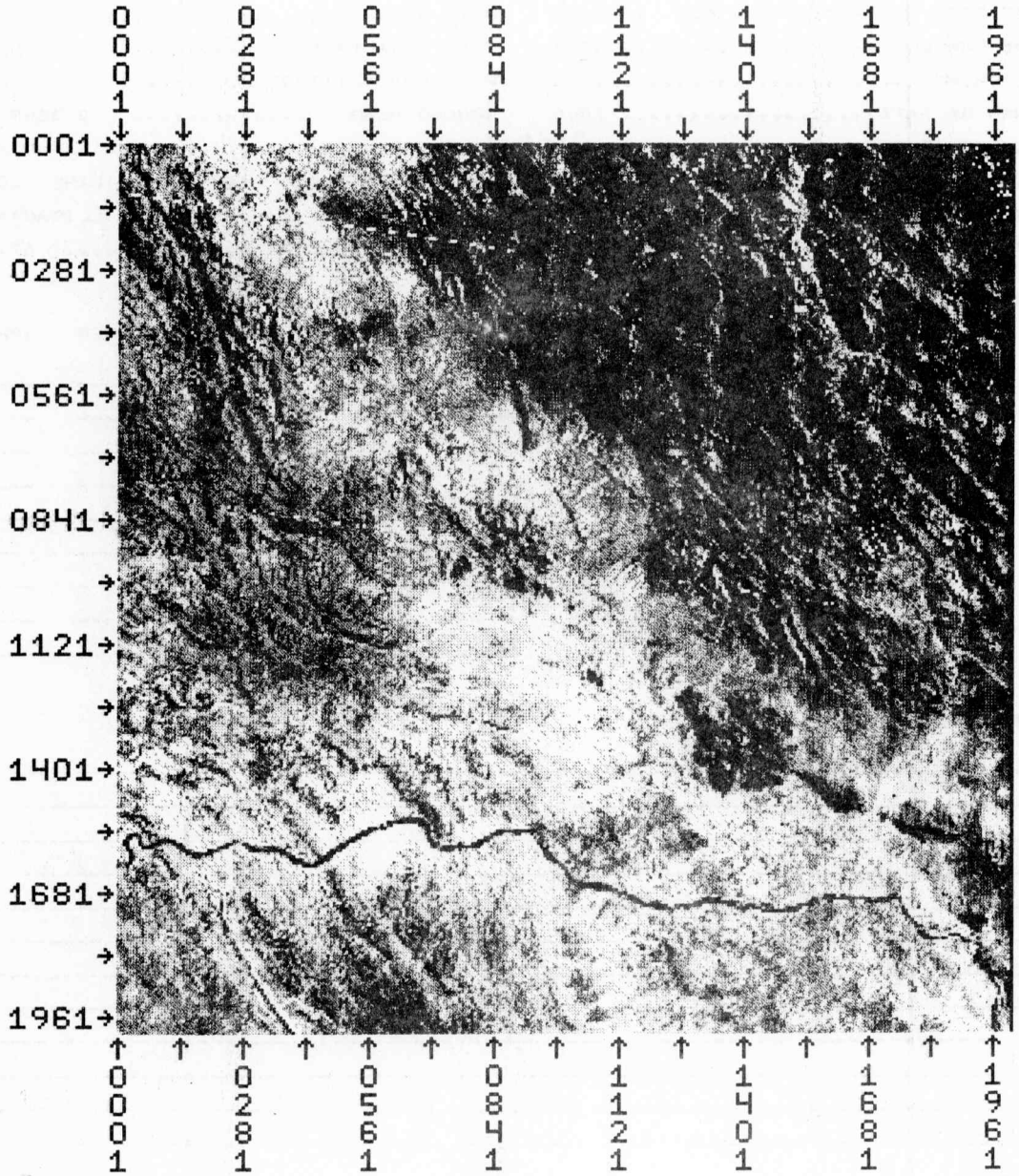
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.70	0.80	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000302),Band 6



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000303
DATE TAPE GENERATED..... FEB 18,1982
TAPE NUMBER..... 3828
FILE NUMBER..... 2
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -17.23

FLIGHTLINE ID..... ORURO QUAD II
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 67.96

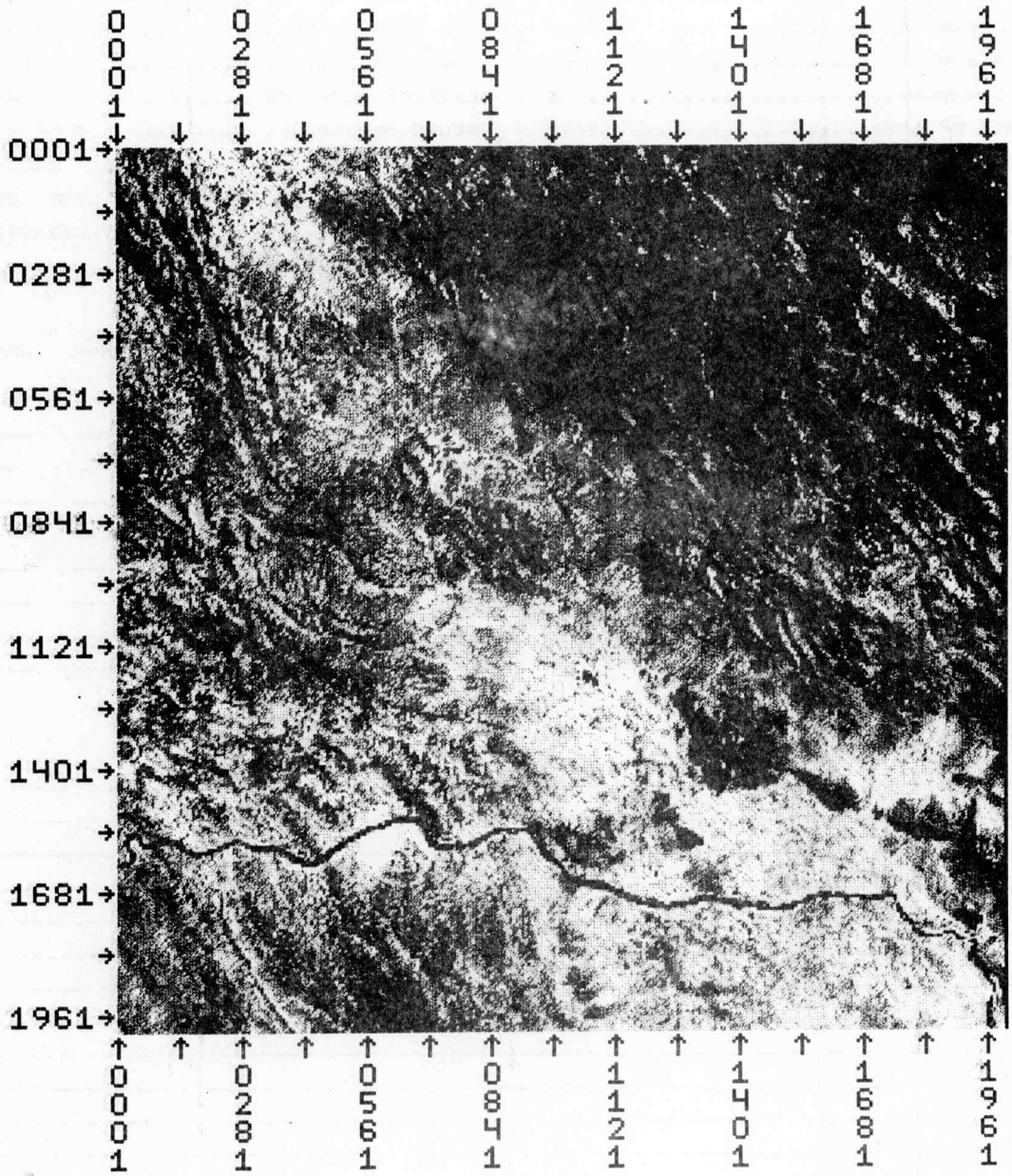
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.80	1.10	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000303),Band 7



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER.....	81000100	FLIGHTLINE ID.....	ORURO QUAD III
DATE TAPE GENERATED.....	SEPT 4,1981	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	5616	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	2	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.0	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.0	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.0 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-17.24	FRAME CENTER LONGITUDE.....	67.02

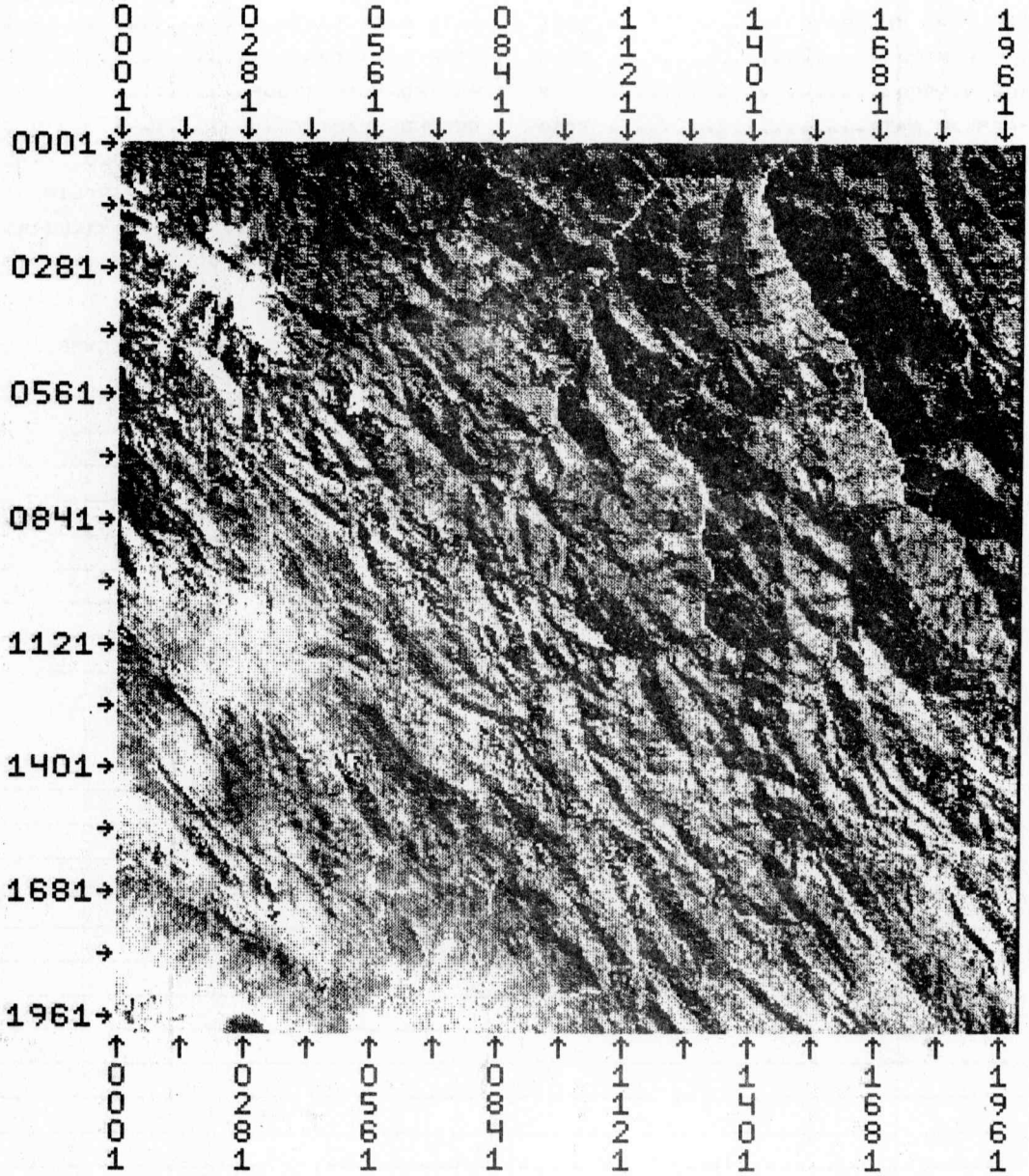
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.50	0.60	(2)			(3)		
(4)			(5)			(6)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-427

Run(81000100),Band 4



LARS FORM - 170

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000101
DATE TAPE GENERATED..... FEB 19,1982
TAPE NUMBER..... 3167
FILE NUMBER..... 3
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -17.24

FLIGHTLINE ID..... ORURO QUAD III
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 67.02

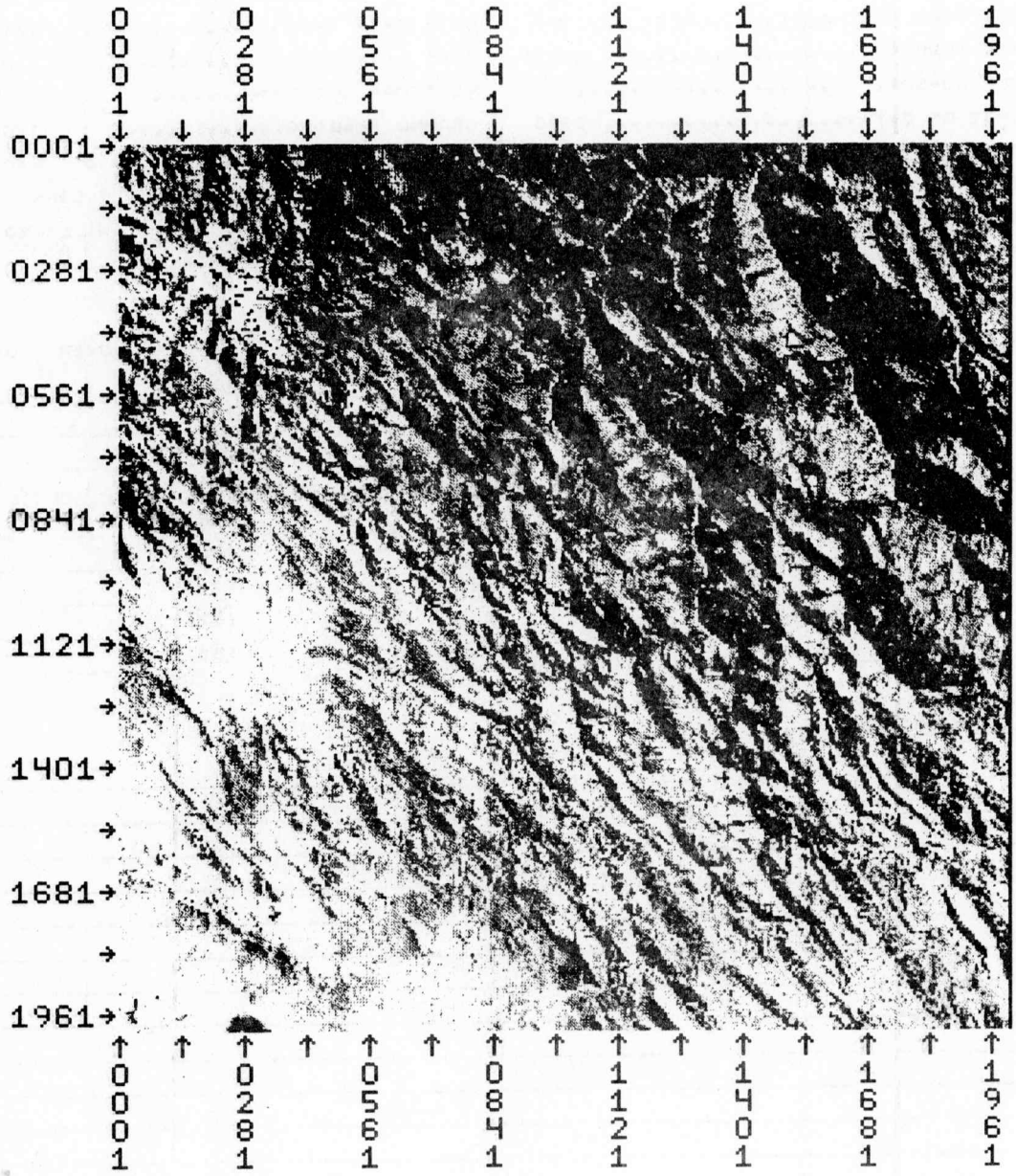
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.60	0.70	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(29)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000101),Band 5



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000102
DATE TAPE GENERATED..... FEB 19,1982
TAPE NUMBER..... 4093
FILE NUMBER..... 3
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -17.24

FLIGHTLINE ID..... ORURO QUAD III
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 67.02

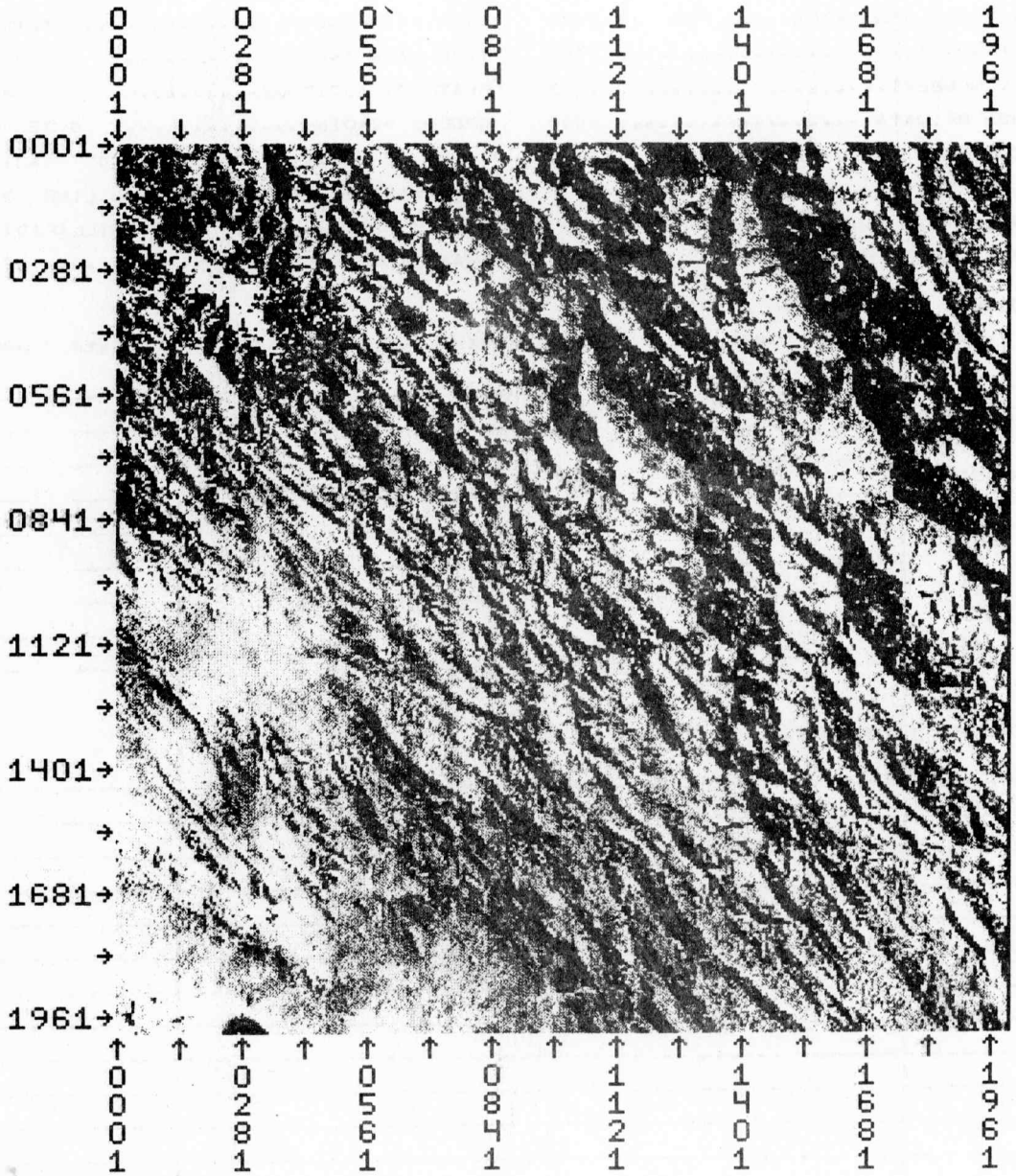
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.70	0.80	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000102),Band 6



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000103
DATE TAPE GENERATED..... FEB 19,1982
TAPE NUMBER..... 3828
FILE NUMBER..... 3
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -17.24

FLIGHTLINE ID..... ORURO QUAD III
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 67.02

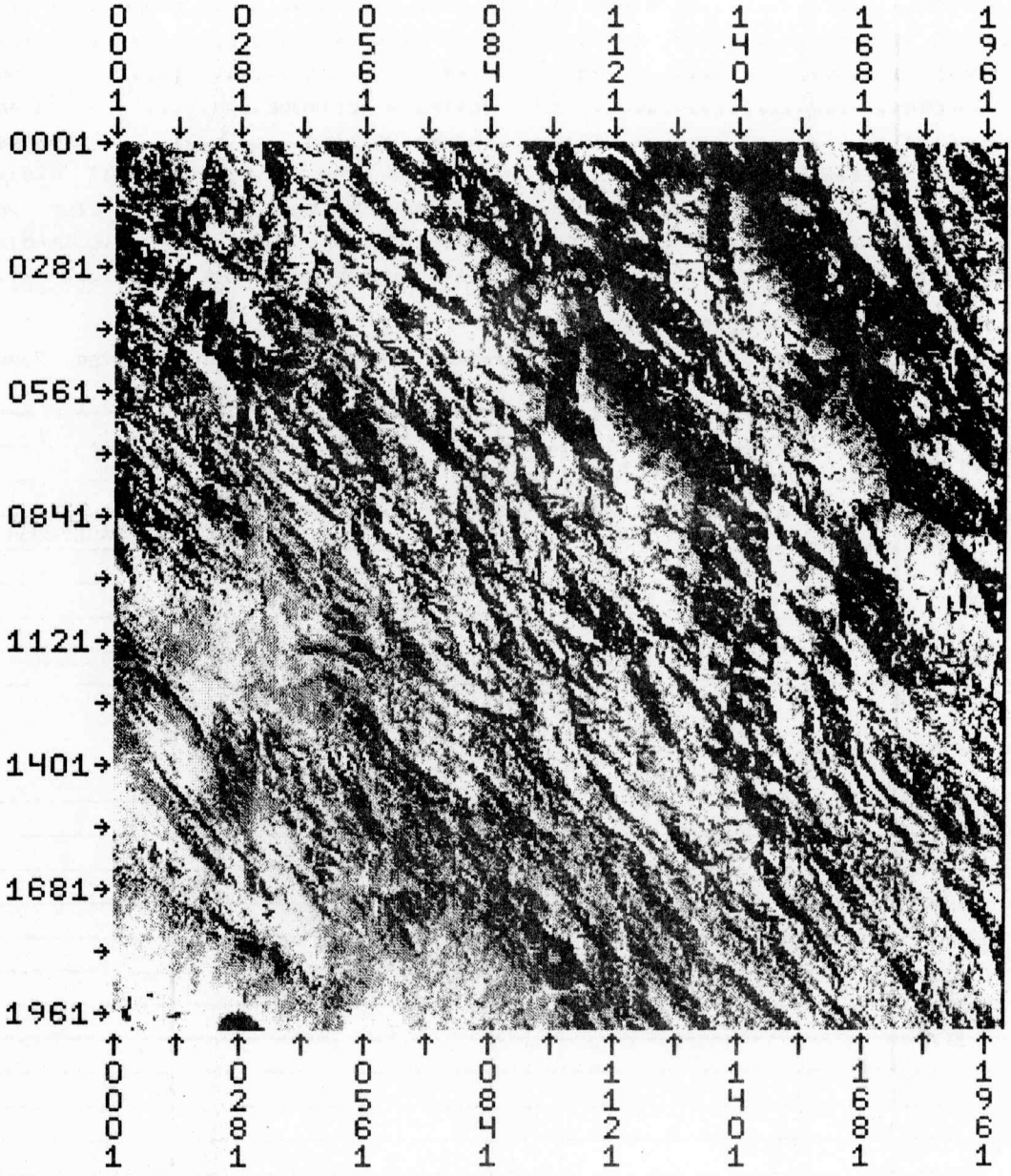
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.60	1.10	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000103),Band 7



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER.....	81000400	FLIGHTLINE ID.....	CRURO QUAD IV
DATE TAPE GENERATED.....	SEPT 19,1981	DATE DATA TAKEN.....	3/18/81
TAPE NUMBER.....	5616	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	5	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.0	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.0	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.0 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-17.25	FRAME CENTER LONGITUDE.....	66.07

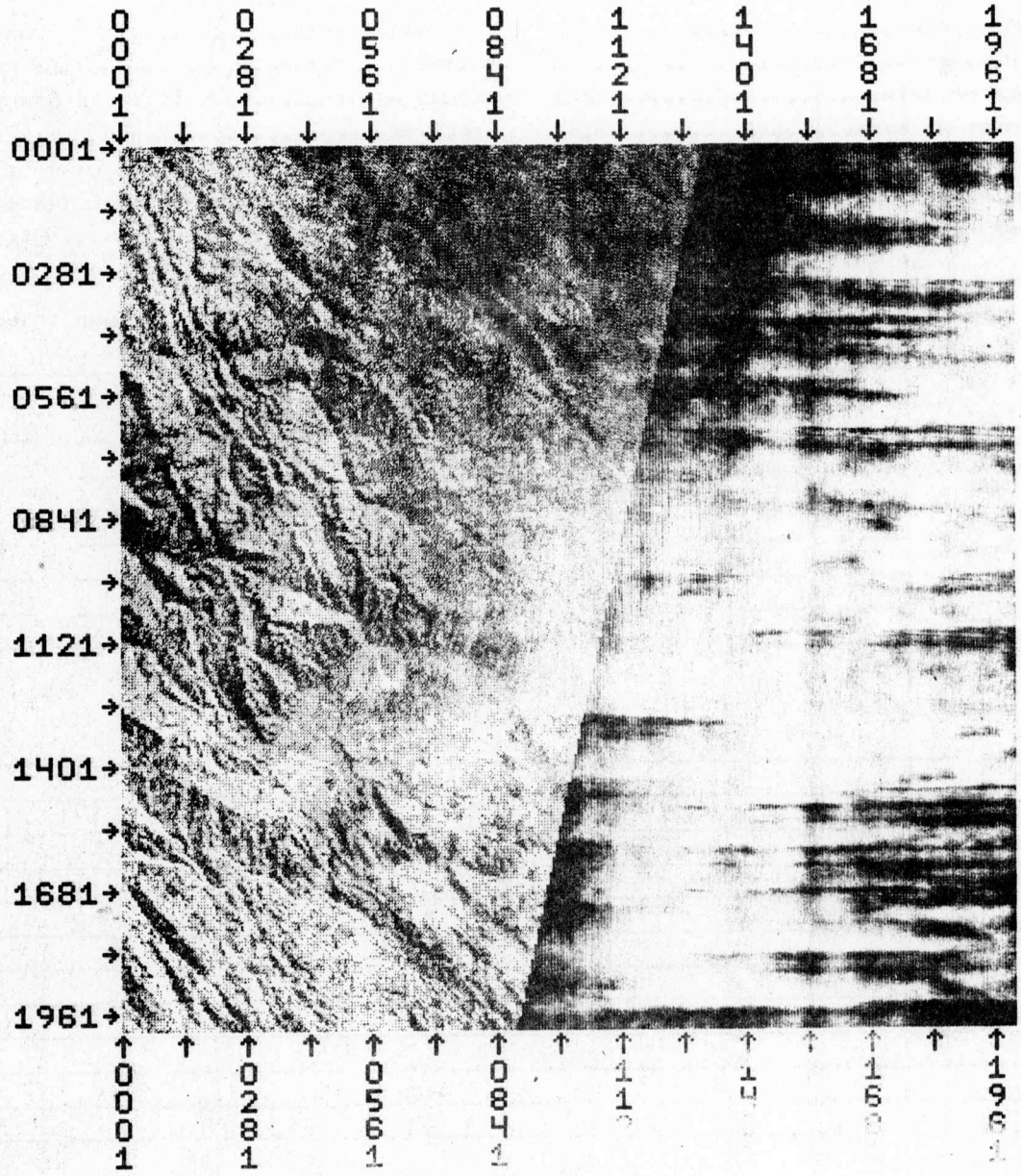
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.50	0.60	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-427

Run(81000400),Band 4



LARS FORM - 170

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000401
DATE TAPE GENERATED..... FEB 19,1982
TAPE NUMBER..... 3167
FILE NUMBER..... 4
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -17.25

FLIGHTLINE ID..... ORURO QUAD IV
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 66.07

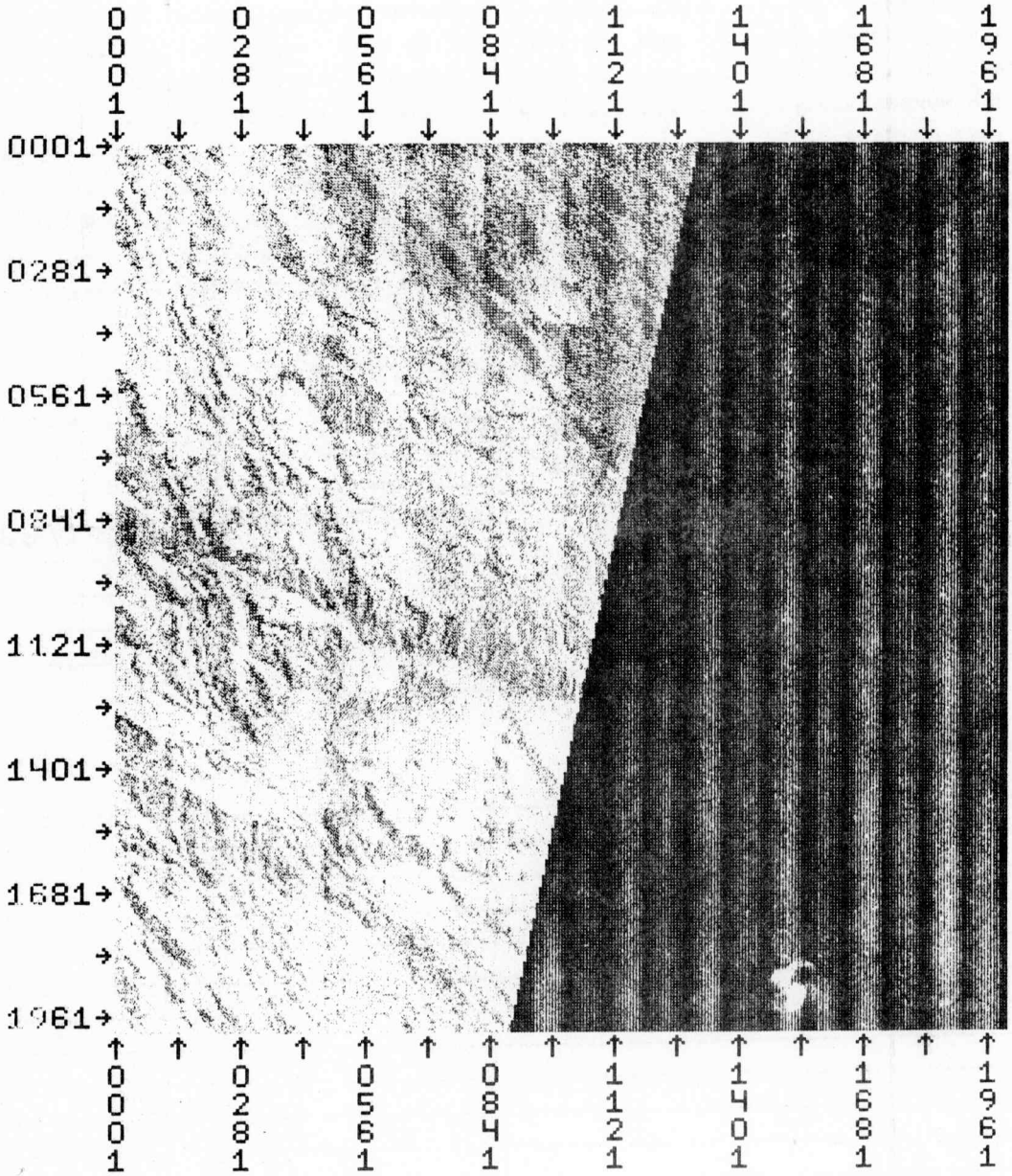
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.60	0.70	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000401),Band 5



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER.....	81000402	FLIGHTLINE ID.....	ORURO QUAD IV
DATE TAPE GENERATED.....	FEB 19,1982	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	4093	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	4	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.00	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.00	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.00 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-17.25	FRAME CENTER LONGITUDE.....	66.07

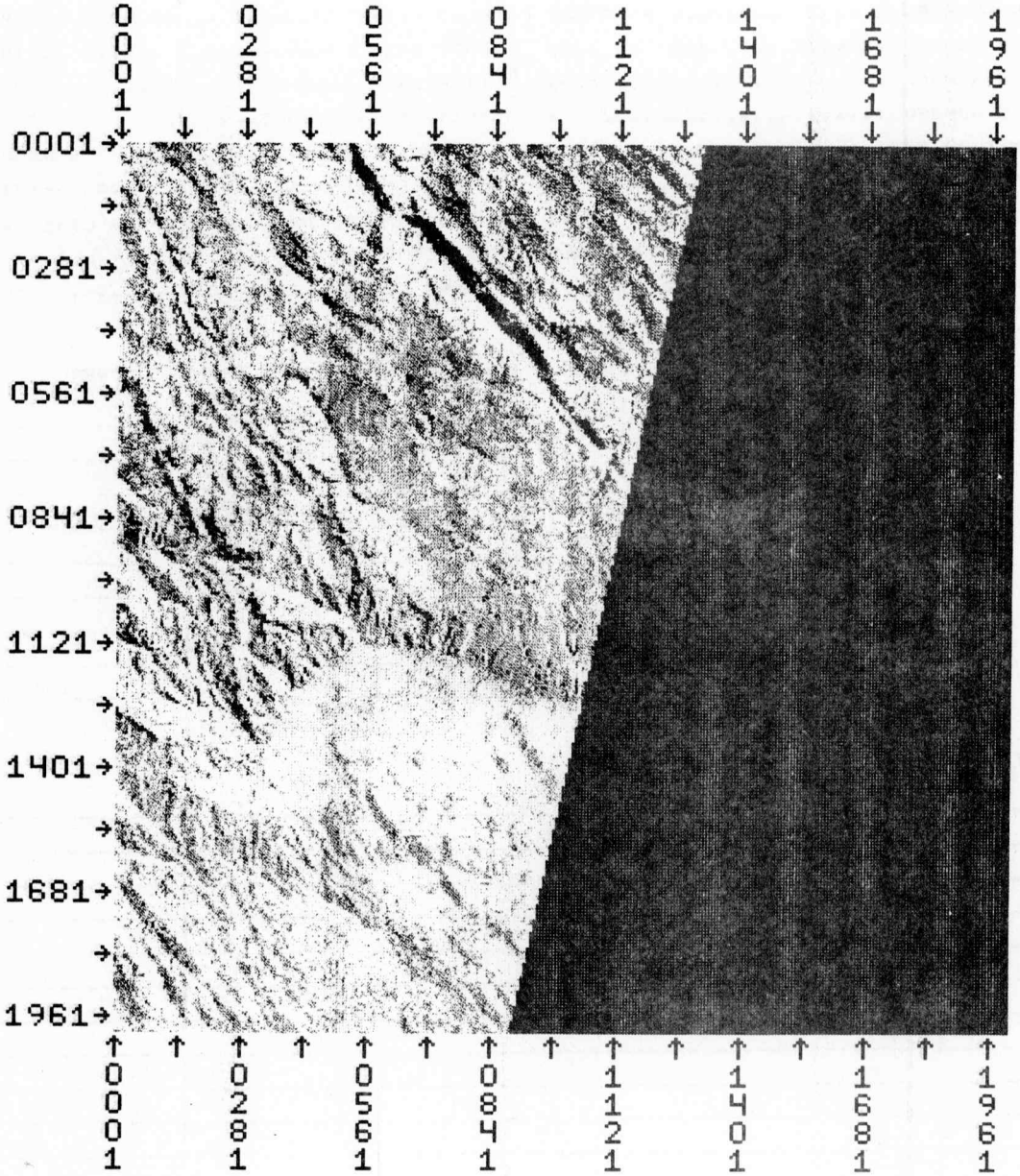
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.70	0.80	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000402),Band 6



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER.....	81000403	FLIGHTLINE ID.....	ORURO QUAD IV
DATE TAPE GENERATED.....	FEB 19,1982	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	3828	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	4	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.00	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.00	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.00 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-17.25	FRAME CENTER LONGITUDE.....	66.07

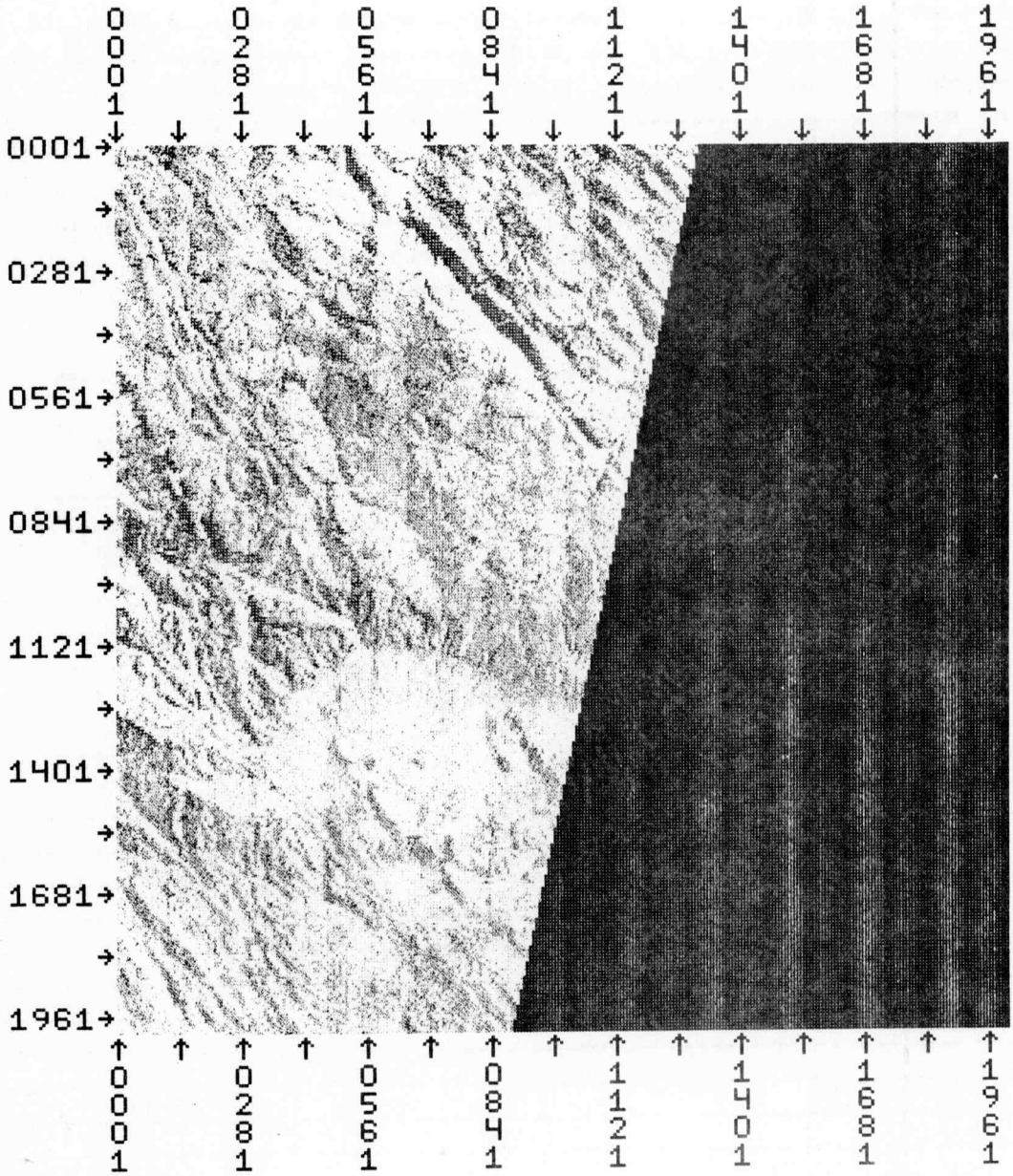
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.60	1.10	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000403),Band 7



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER.....	81000200	FLIGHTLINE ID.....	ORURO QUAD V
DATE TAPE GENERATED.....	SEPT 10,1981	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	5616	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	3	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.0	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.0	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.0 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-18.11	FRAME CENTER LONGITUDE.....	68.92

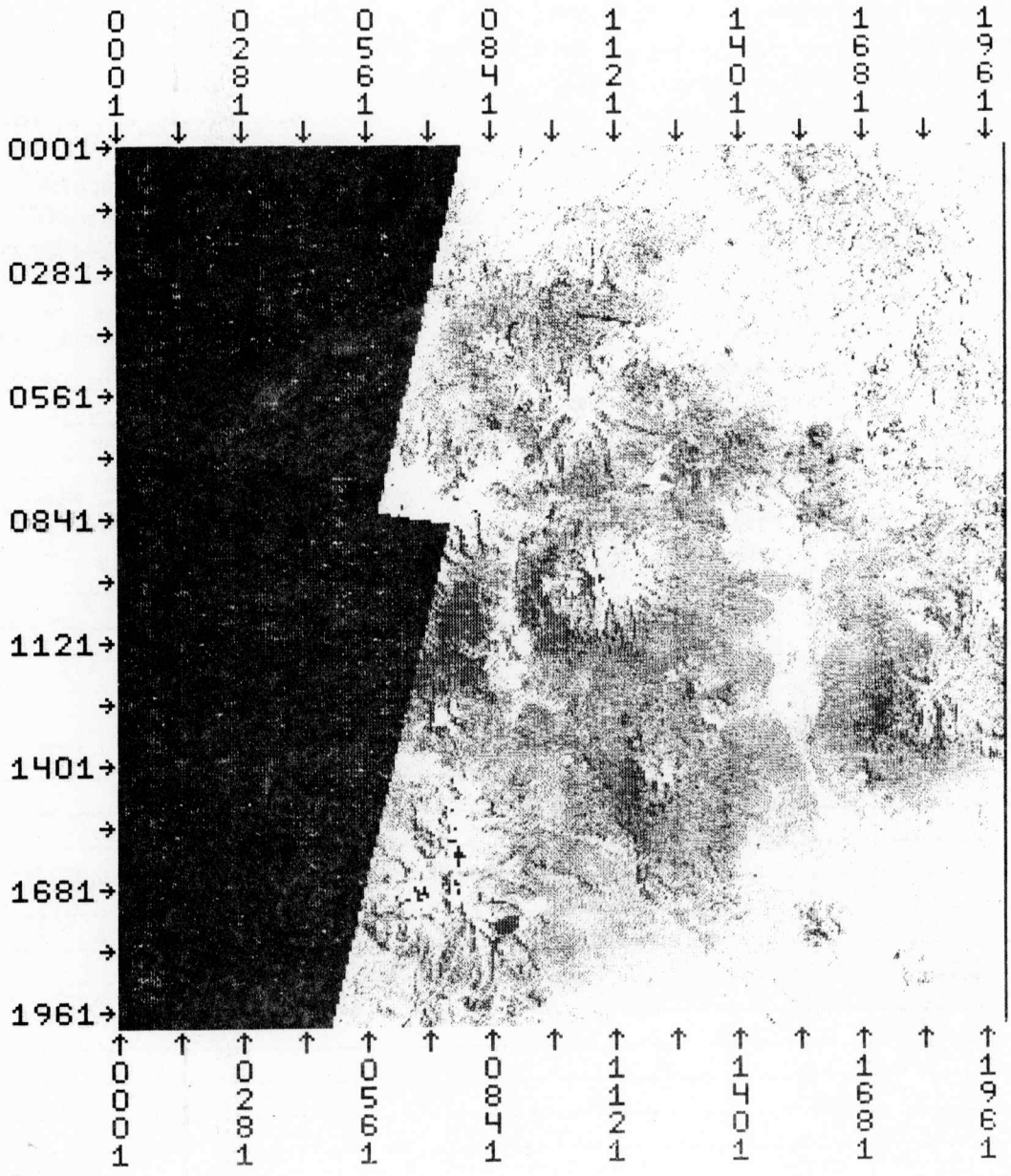
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.50	0.60	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-427

Run(81000200),Band 4



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER.....	81000201	FLIGHTLINE ID.....	ORURO QUAD V
DATE TAPE GENERATED.....	FEB 22,1982	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	3167	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	5	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.00	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.00	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.00 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-18.11	FRAME CENTER LONGITUDE.....	68.92

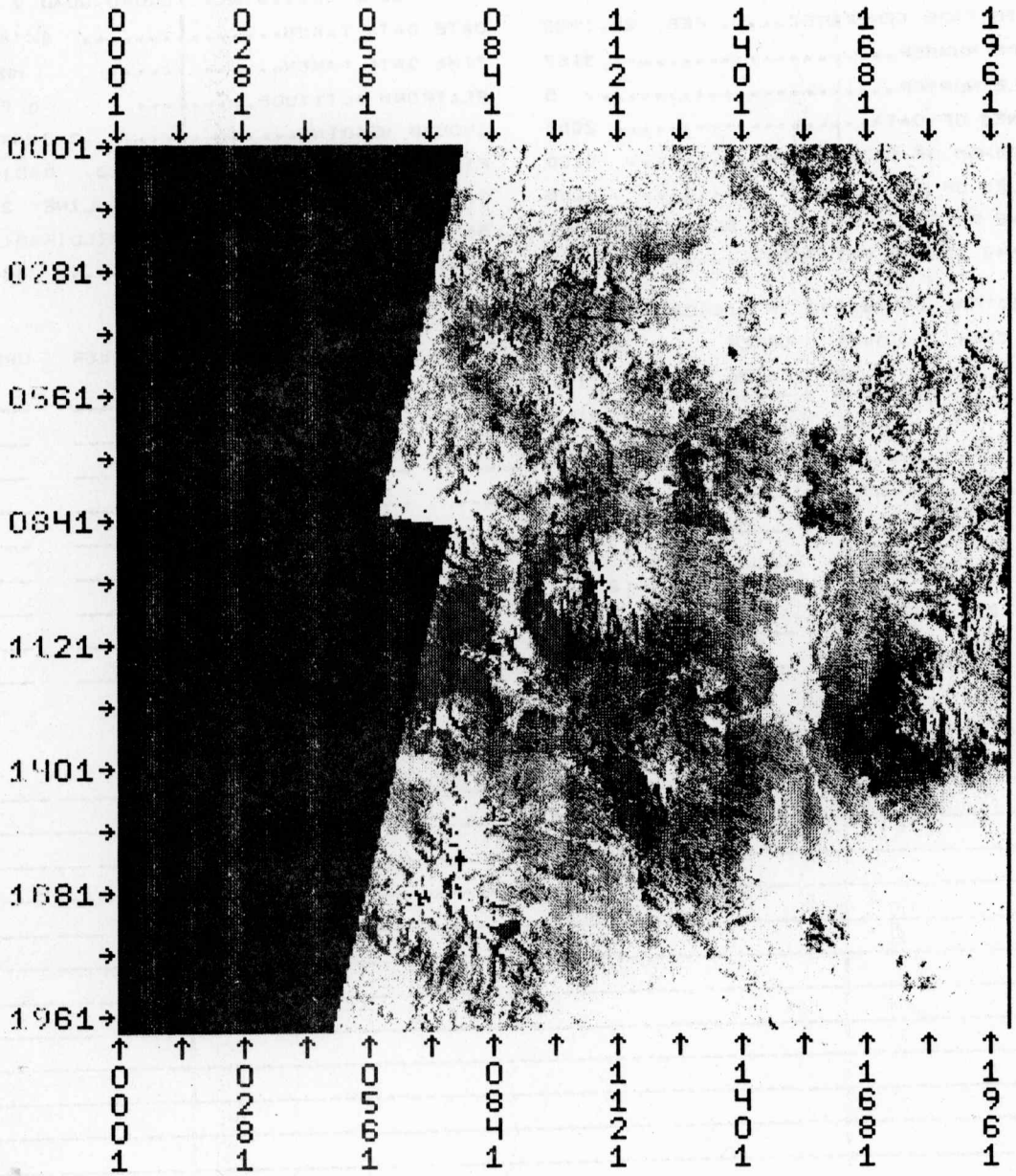
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.60	0.70	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000201),Band 5



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER.....	81000202	FLIGHTLINE ID.....	ORURO QUAD V
DATE TAPE GENERATED.....	FEB 22,1982	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	4093	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	5	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.00	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.00	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.00 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-18.11	FRAME CENTER LONGITUDE.....	68.92

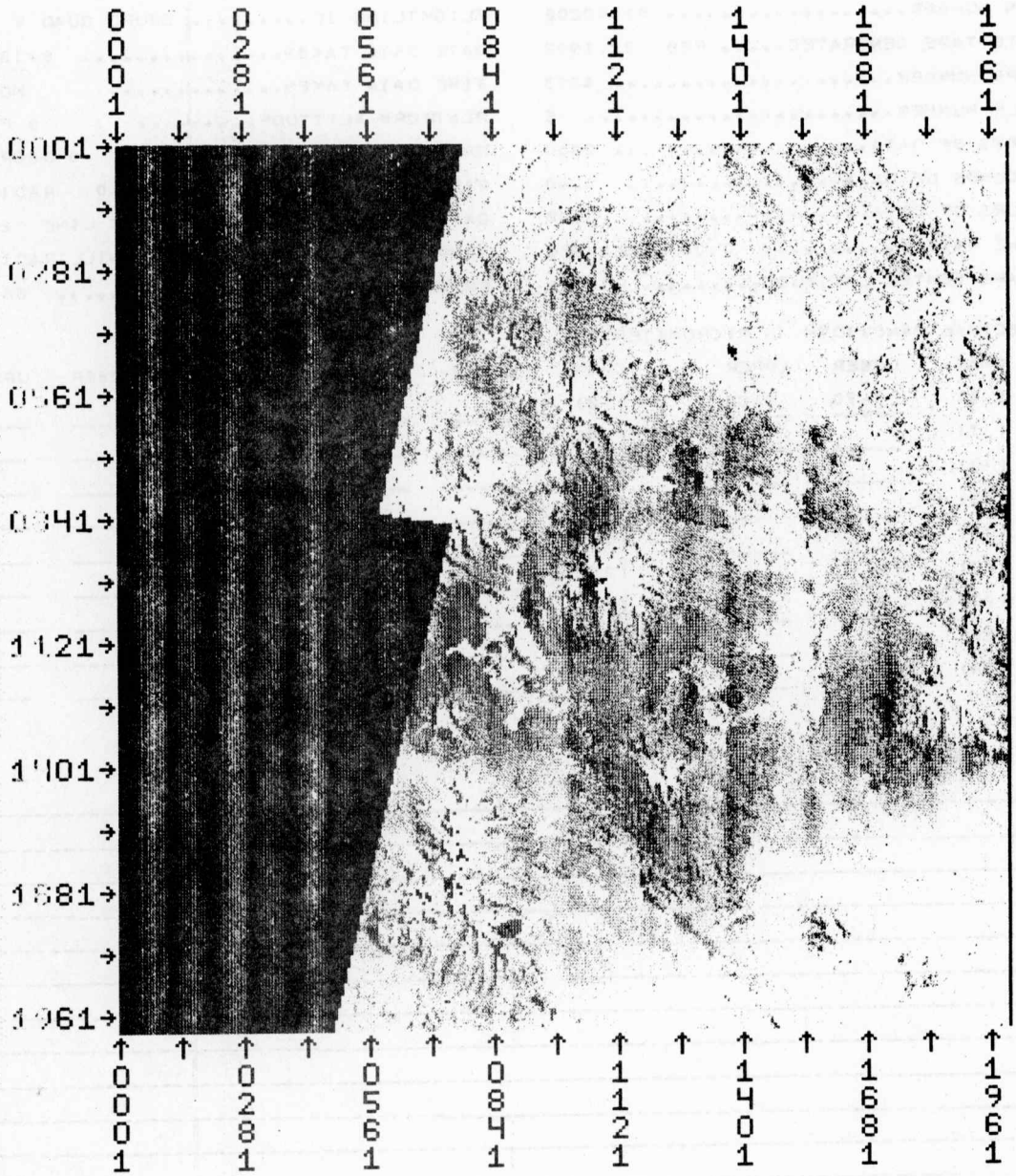
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.70	0.80	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000202),Band 6



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER.....	81000203	FLIGHTLINE ID.....	ORURO QUAD V
DATE TAPE GENERATED.....	FEB 22,1982	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	3828	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	5	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.00	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.00	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.00 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-18.11	FRAME CENTER LONGITUDE.....	68.92

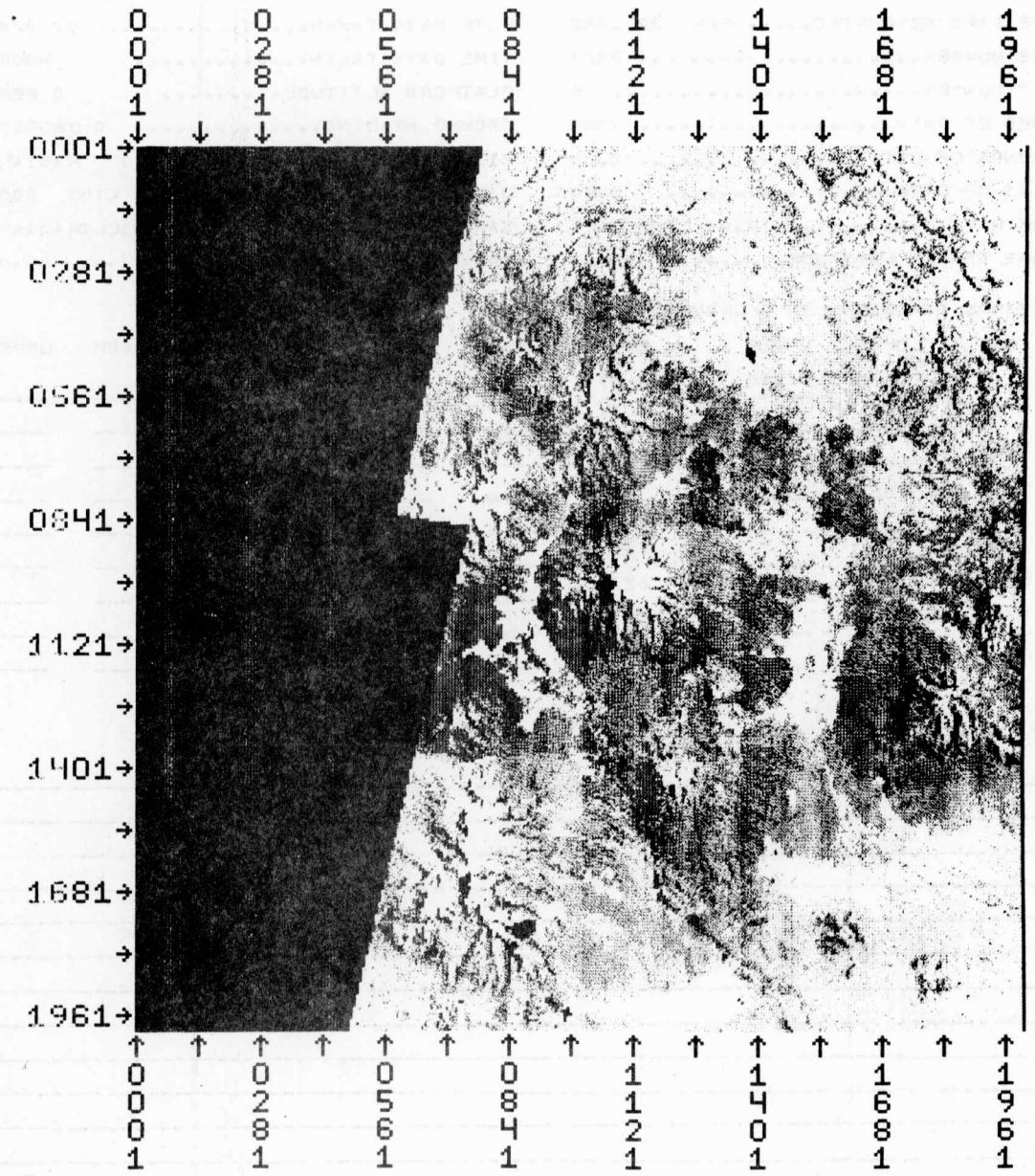
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.80	1.10	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000203),Band 7



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER.....	81000500	FLIGHTLINE ID.....	ORURO QUAD VI
DATE TAPE GENERATED.....	SEPT 22,1981	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	5616	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	6	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.0	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.0	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.0 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-18.13	FRAME CENTER LONGITUDE.....	67.98

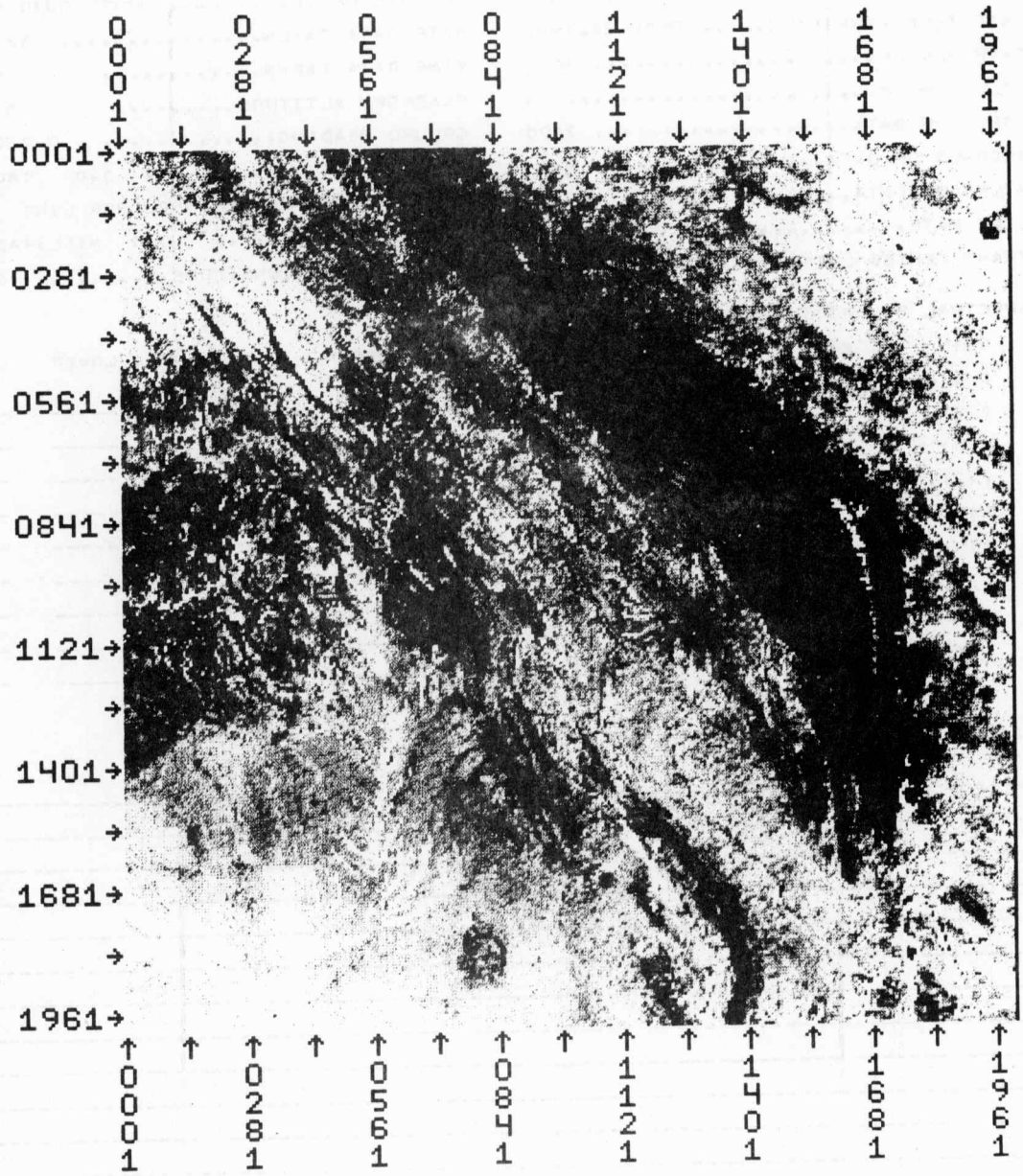
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.50	0.60	(2)	-----	-----	(3)	-----	-----
(4)	-----	-----	(5)	-----	-----	(6)	-----	-----
(7)	-----	-----	(8)	-----	-----	(9)	-----	-----
(10)	-----	-----	(11)	-----	-----	(12)	-----	-----
(13)	-----	-----	(14)	-----	-----	(15)	-----	-----
(16)	-----	-----	(17)	-----	-----	(18)	-----	-----
(19)	-----	-----	(20)	-----	-----	(21)	-----	-----
(22)	-----	-----	(23)	-----	-----	(24)	-----	-----
(25)	-----	-----	(26)	-----	-----	(27)	-----	-----
(28)	-----	-----	(29)	-----	-----	(30)	-----	-----

DATA TAPE COMMENTS...

WD-427

Run(81000500),Band 4



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000501
DATE TAPE GENERATED..... FEB 24,1982
TAPE NUMBER..... 3167
FILE NUMBER..... 6
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -18.13

FLIGHTLINE ID..... ORURO QUAD VI
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 67.98

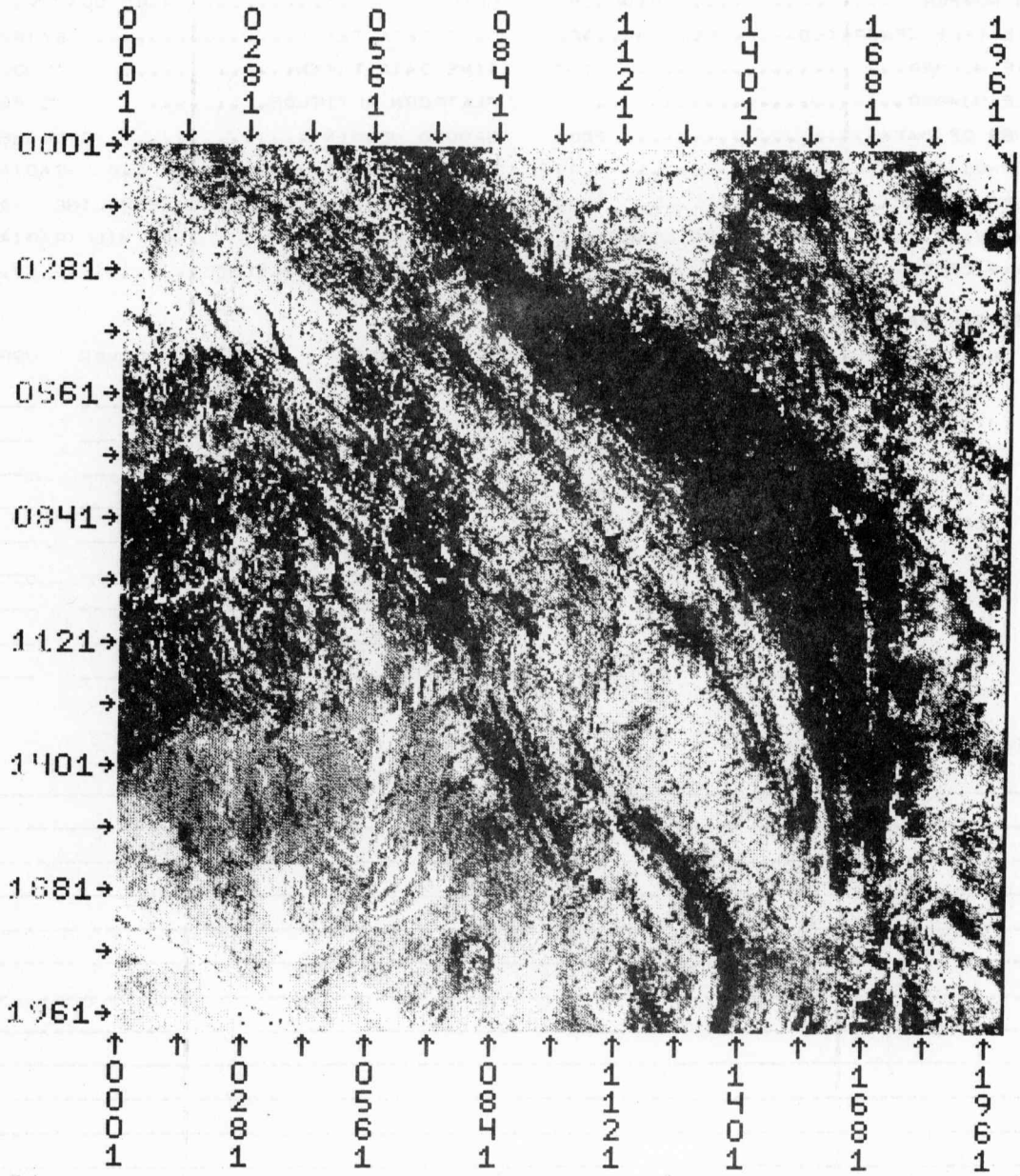
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.60	0.70	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000501),Band 5



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER.....	81000502	FLIGHTLINE ID.....	ORURO QUAD VI
DATE TAPE GENERATED.....	FEB 24,1982	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	4093	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	6	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.00	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.00	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.00 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-18.13	FRAME CENTER LONGITUDE.....	67.98

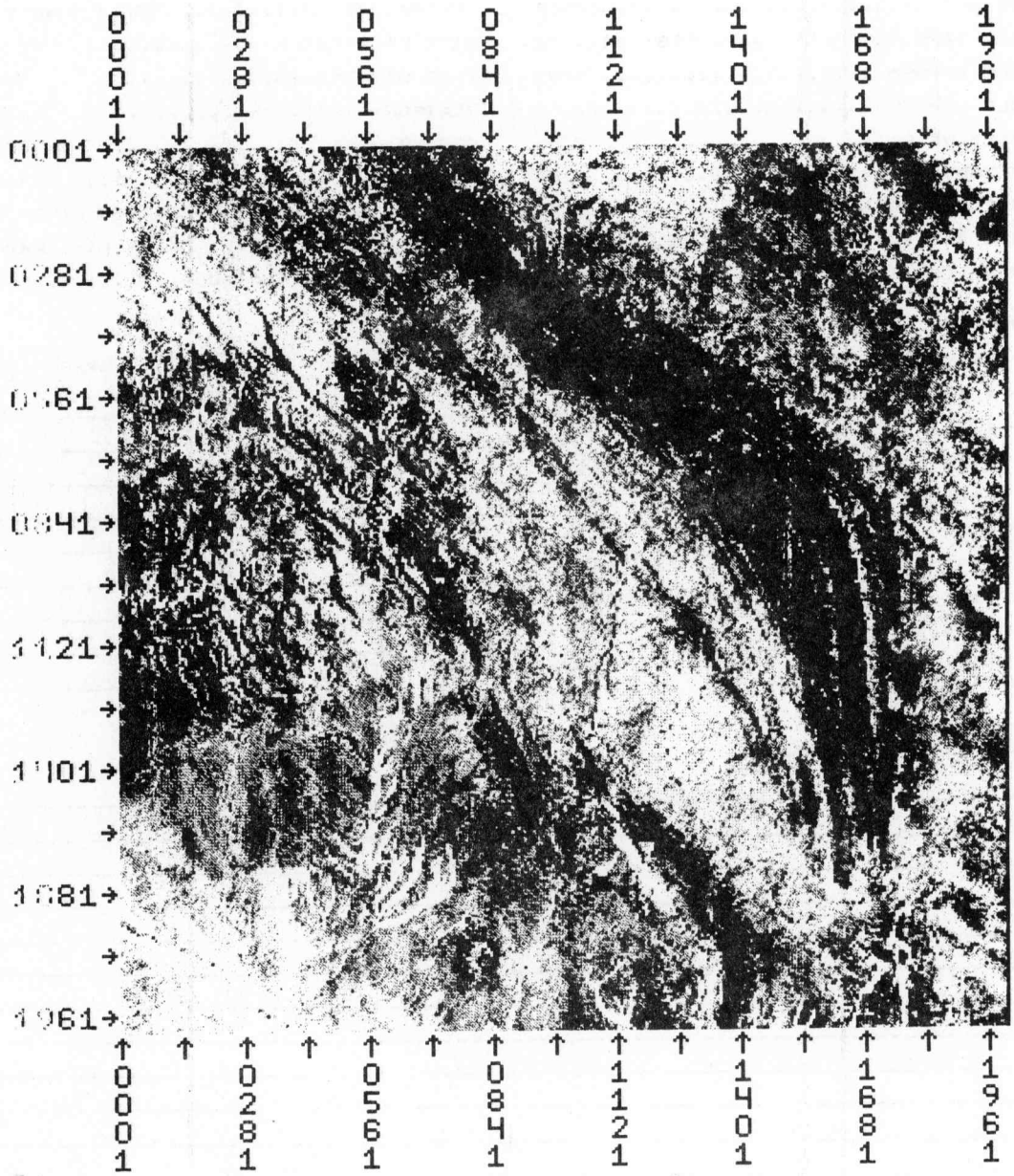
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.70	0.80	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000502),Band 6



LARS FORM - 170

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000503
DATE TAPE GENERATED..... FEB 24,1982
TAPE NUMBER..... 3828
FILE NUMBER..... 6
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -18.13

FLIGHTLINE ID..... ORURO QUAD VI
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 67.98

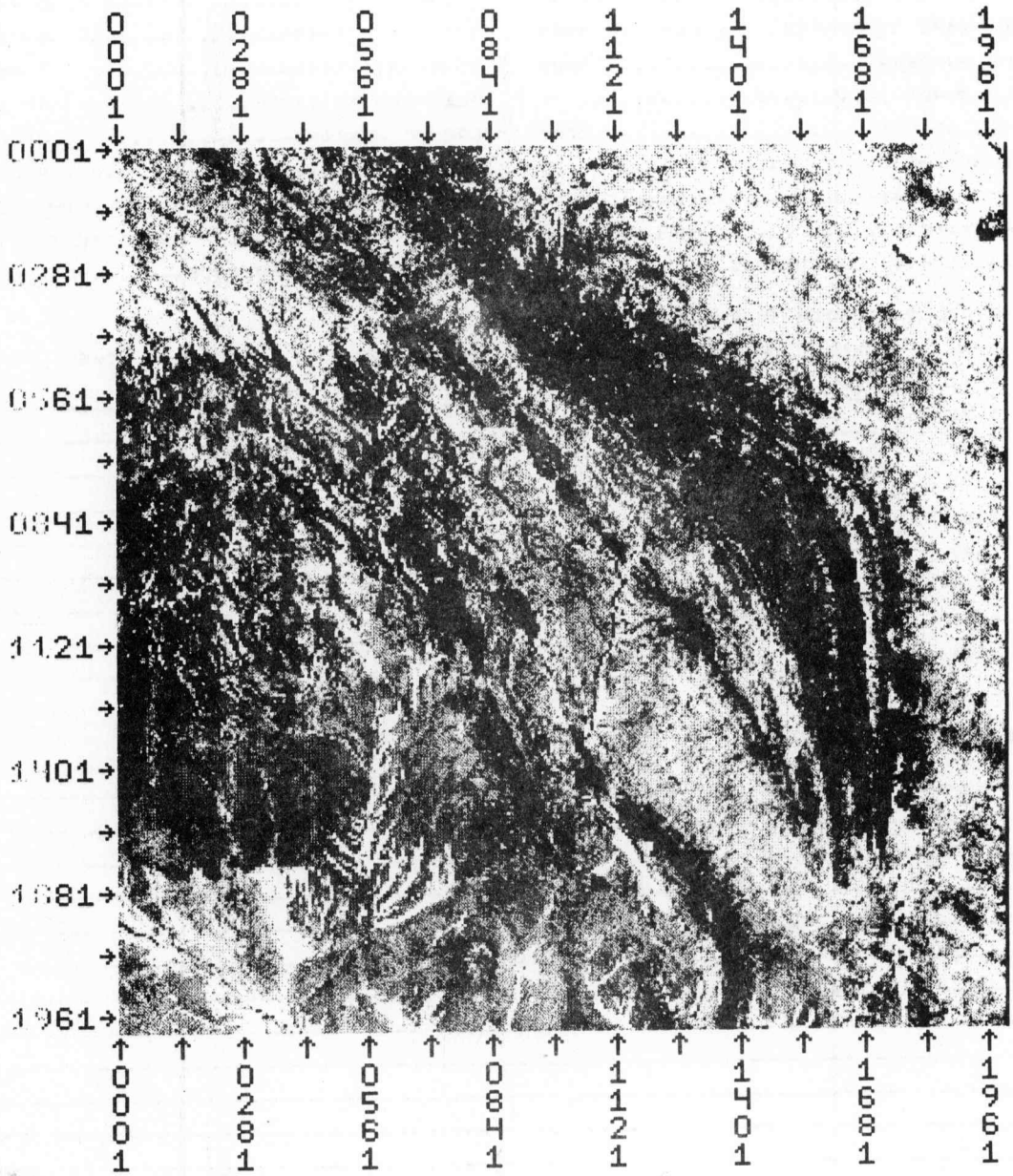
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.80	1.10	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000503),Band 7



LAPS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER.....	81000600	FLIGHTLINE ID.....	ORURO QUAD VII
DATE TAPE GENERATED.....	MAR 5,1982	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	5617	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	1	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.00	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.00	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.00 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-18.14	FRAME CENTER LONGITUDE.....	67.03

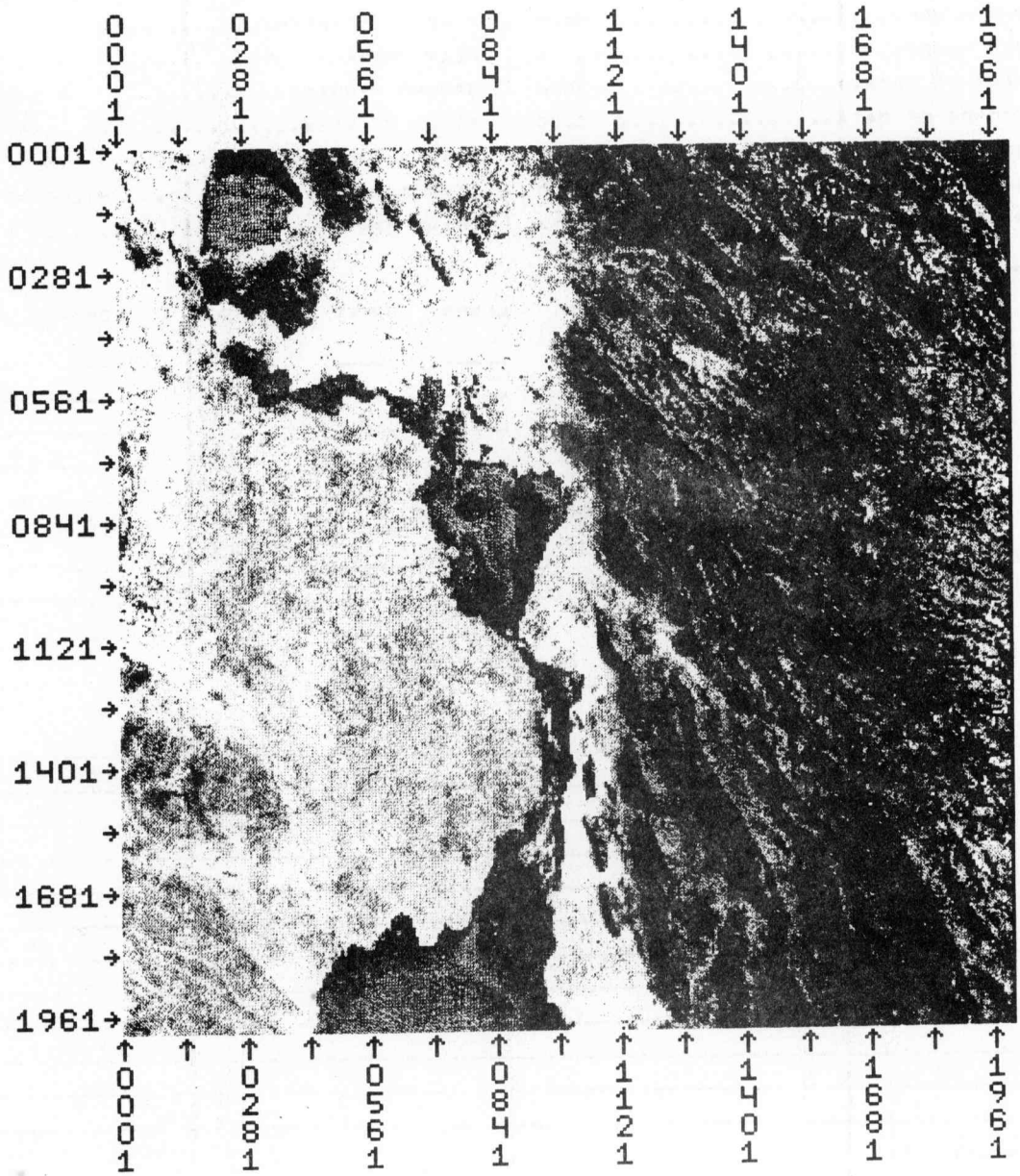
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.50	0.60	(2)			(3)		
(4)			(5)			(6)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-427

Run (81000600), Band 4



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000601
DATE TAPE GENERATED..... FEB 17,1982
TAPE NUMBER..... 5280
FILE NUMBER..... 1
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -18.14

FLIGHTLINE ID..... ORURO QUAD VII
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 67.03

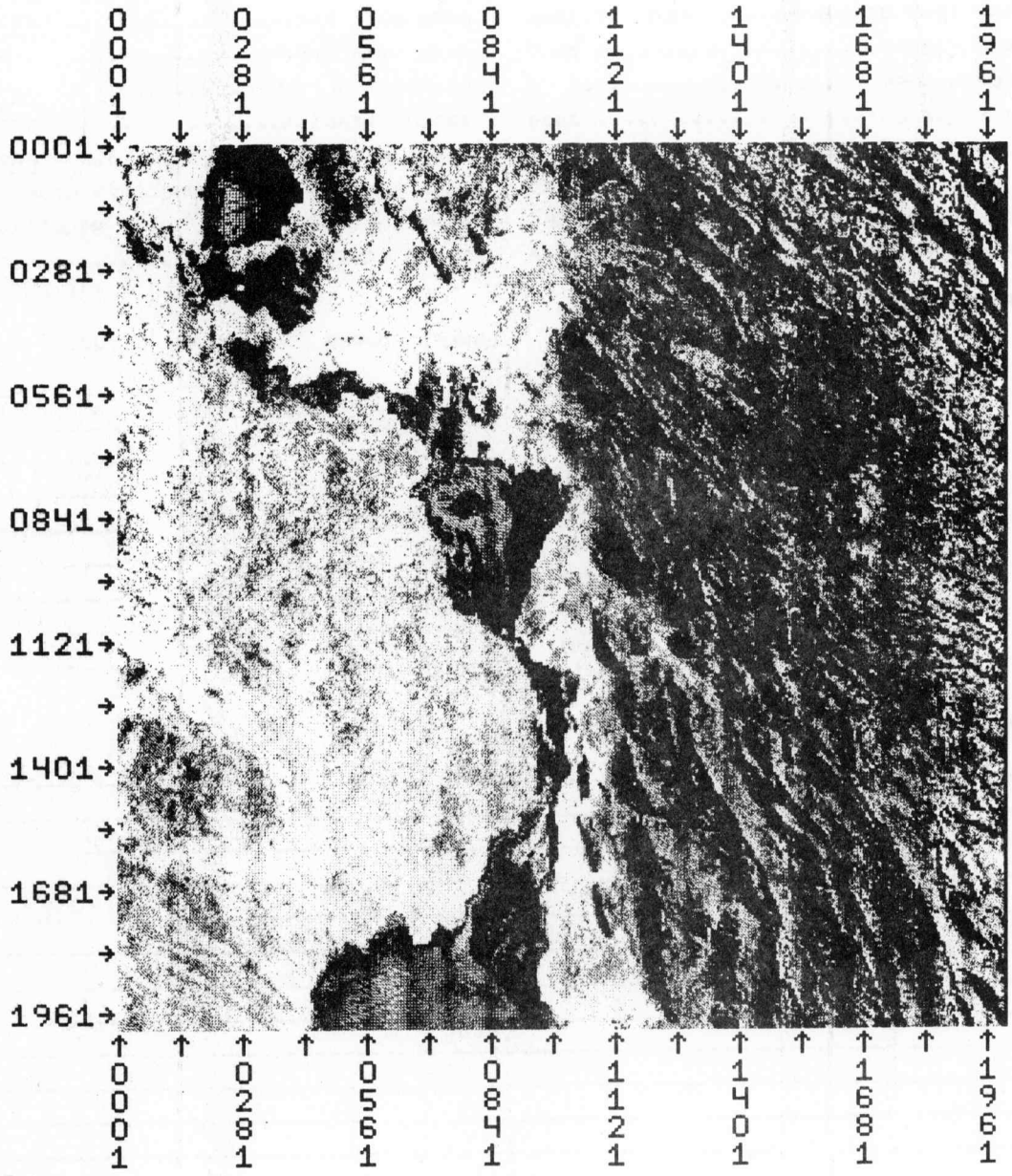
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.60	0.70	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000601),Band 5



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000602
DATE TAPE GENERATED..... FEB 17,1982
TAPE NUMBER..... 4094
FILE NUMBER..... 1
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -18.14

FLIGHTLINE ID..... ORURO QUAD VII
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 67.03

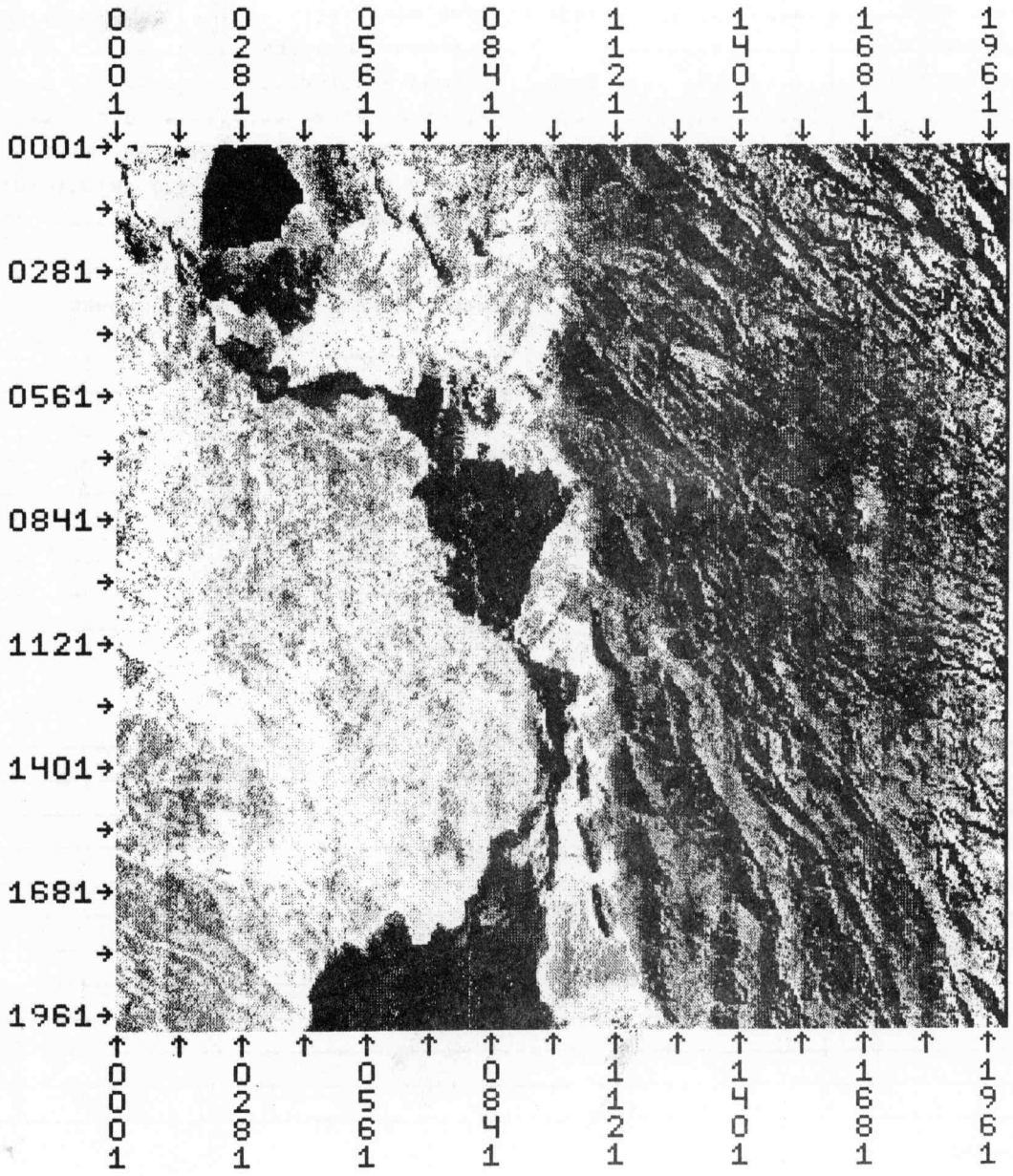
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.70	0.80	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000602),Band 6



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER.....	81000603	FLIGHTLINE ID.....	ORURO QUAD VII
DATE TAPE GENERATED.....	FEB 17,1982	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	3833	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	1	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.0	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.0	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.0 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-18.14	FRAME CENTER LONGITUDE.....	67.03

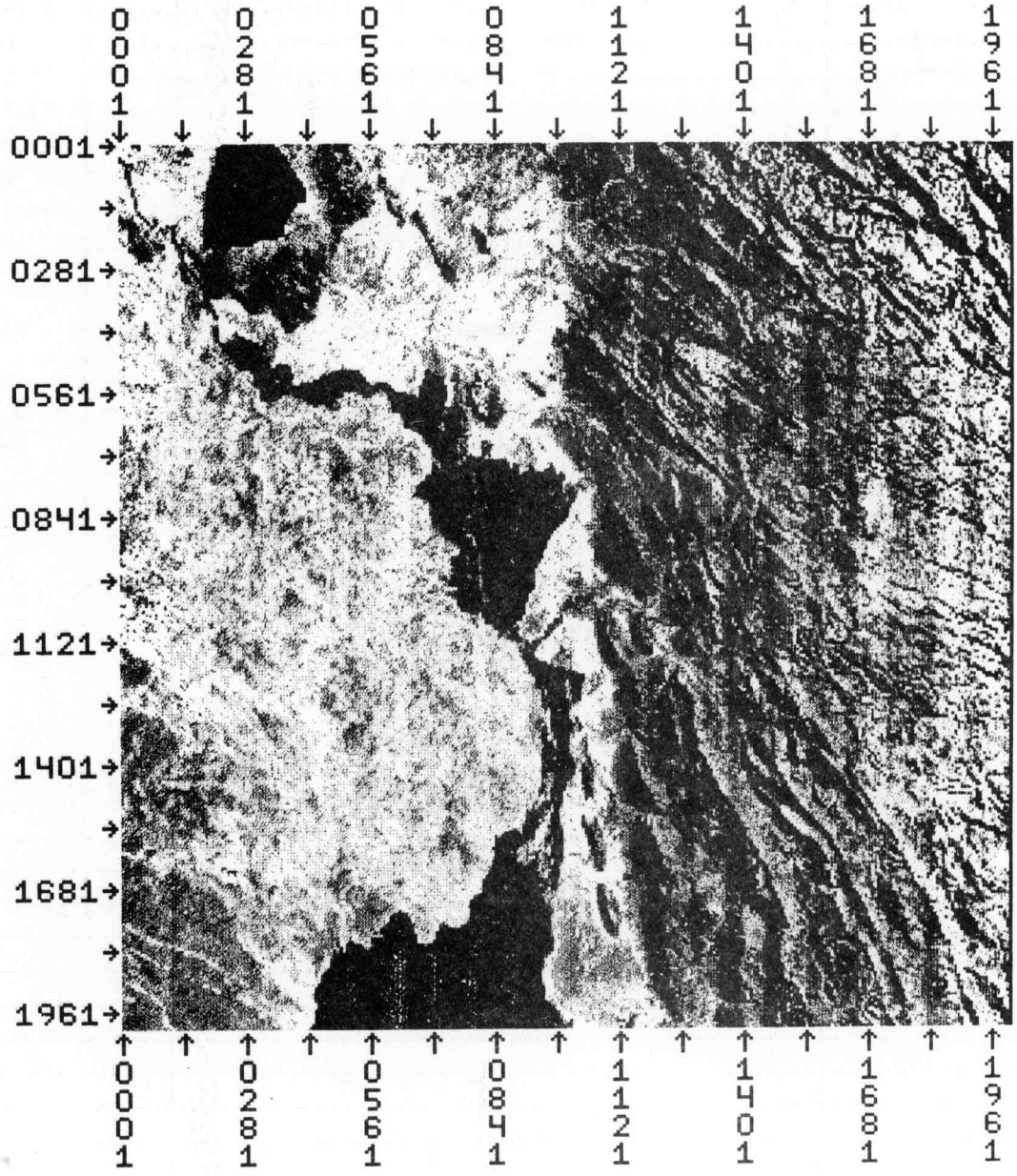
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.80	1.10	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-427

Run(81000603),Band 7



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000800
DATE TAPE GENERATED..... SEPT 16,1981
TAPE NUMBER..... 5617
FILE NUMBER..... 3
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.0
MILES OF DATA..... 0.0
LINE RATE..... 0.0 LINES/SEC
FRAME CENTER LATITUDE..... -18.15

FLIGHTLINE ID..... ORURO QUAD VIII
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 66.08

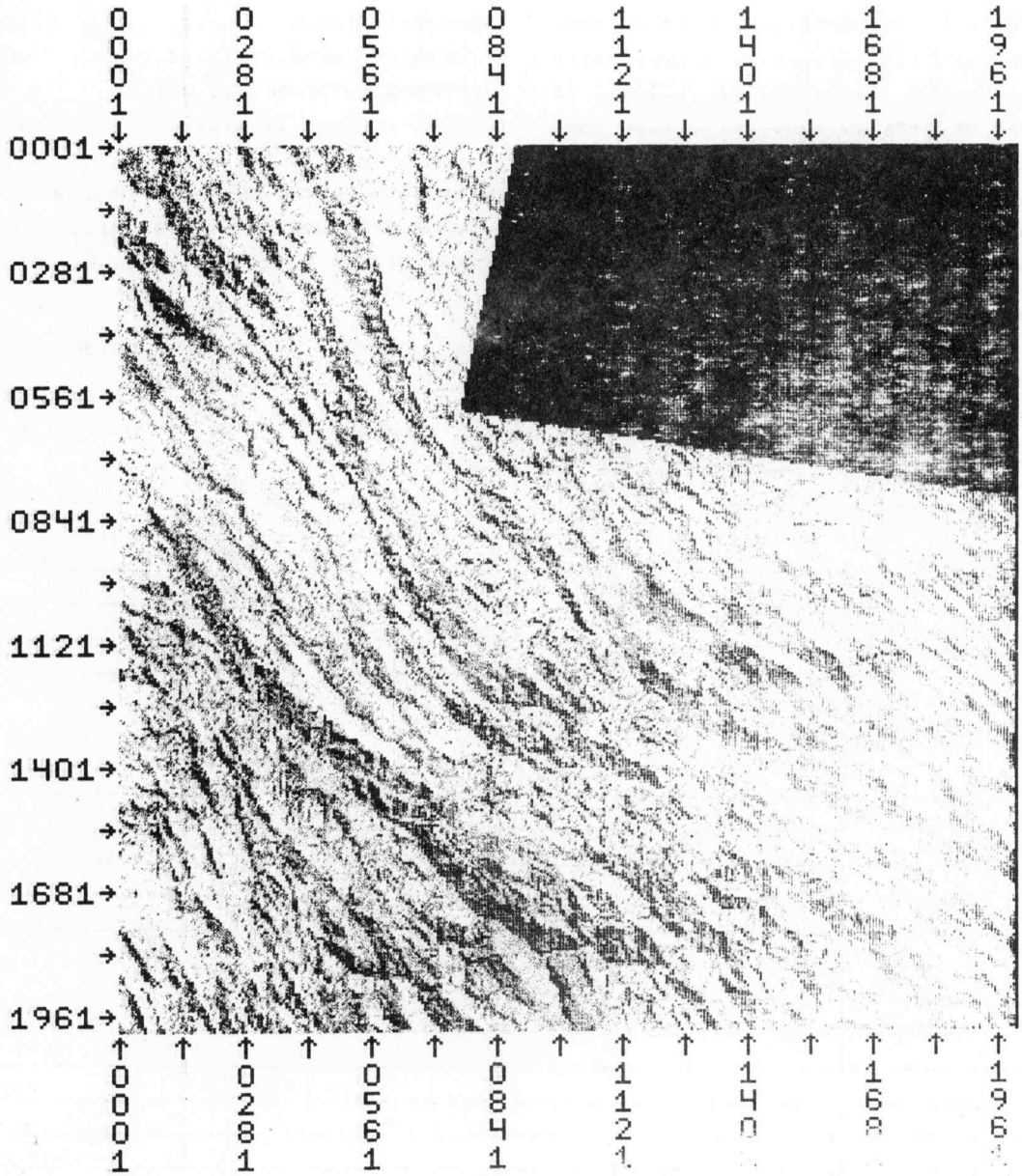
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.50	0.60	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(29)			(29)			(30)		

DATA TAPE COMMENTS...

WP-427

Run(81000800),Band 4



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000801
DATE TAPE GENERATED..... FEB 18,1982
TAPE NUMBER..... 5280
FILE NUMBER..... 2
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -18.15

FLIGHTLINE ID..... ORURO QUAD VIII
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 66.08

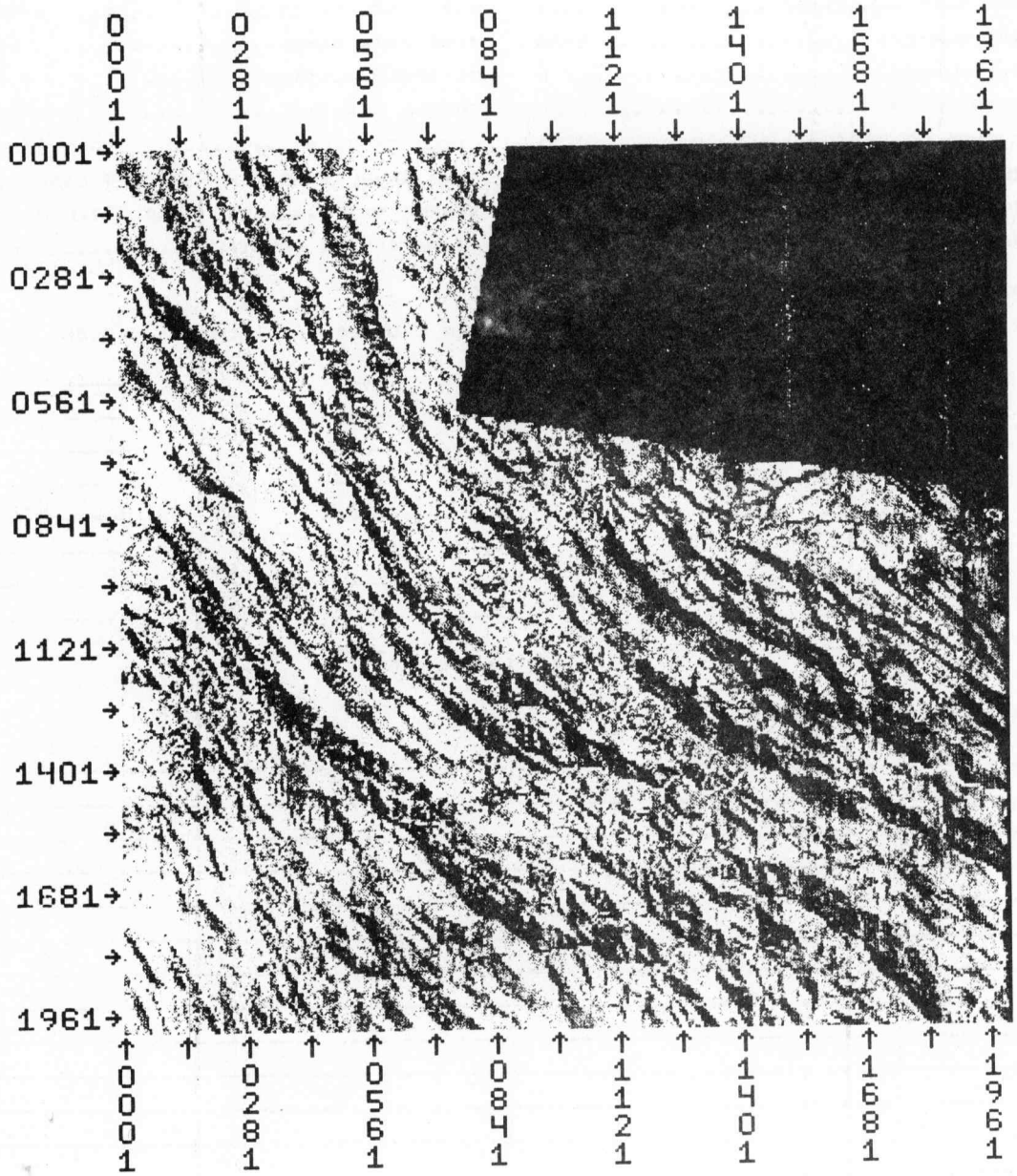
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.60	0.70	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000801),Band 5



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER.....	81000802	FLIGHTLINE ID.....	ORURO QUAD VIII
DATE TAPE GENERATED.....	FEB 18.1982	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	4094	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	2	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.00	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.00	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.00 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-18.15	FRAME CENTER LONGITUDE.....	66.08

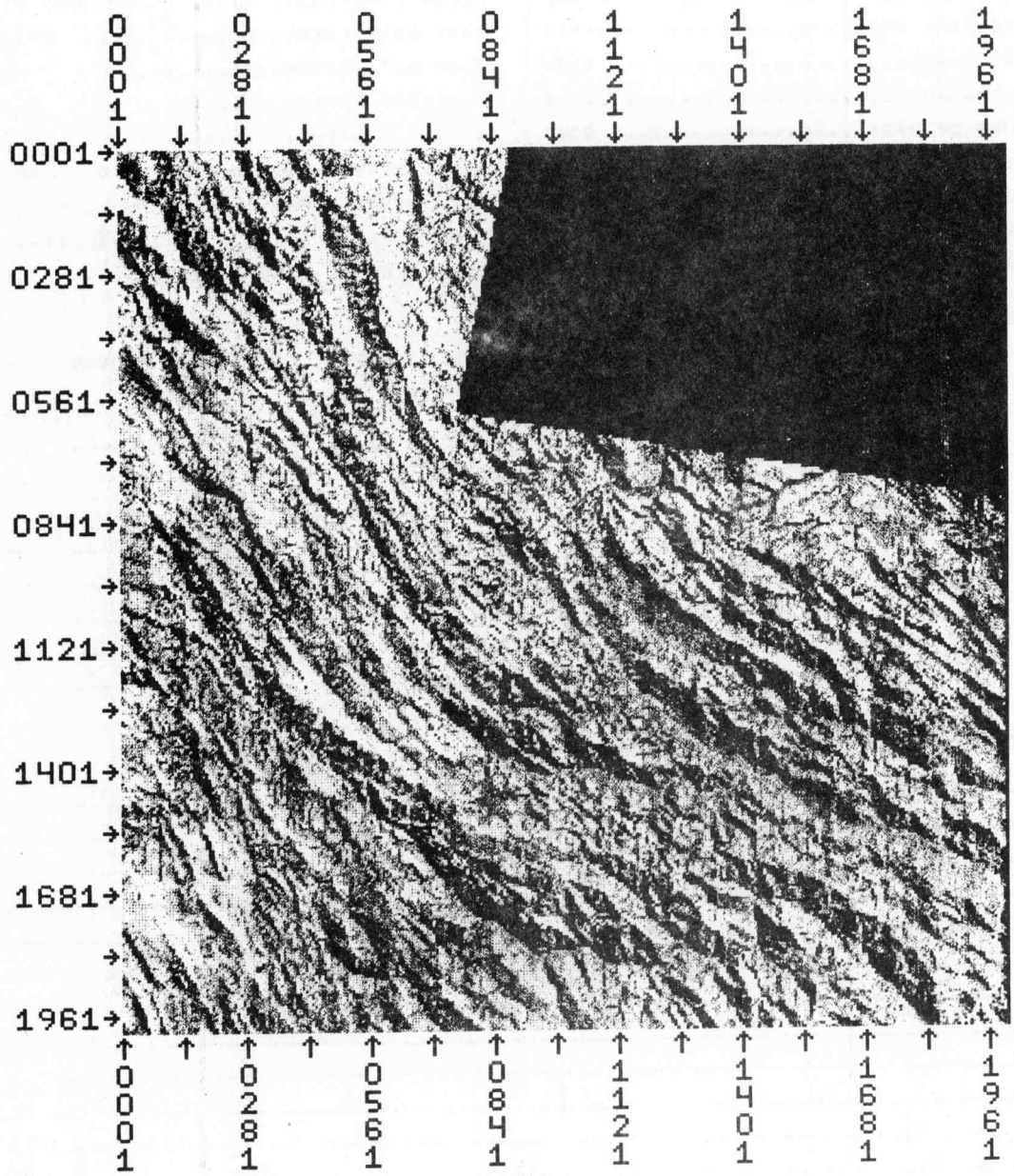
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.70	0.80	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000802),Band 6



LARS FORM - 170

DATA STORAGE TAPE FILE

RUN NUMBER.....	81000803	FLIGHTLINE ID.....	ORURO QUAD VIII
DATE TAPE GENERATED.....	FEB 18,1982	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	3833	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	2	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.00	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.00	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.00 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-18.15	FRAME CENTER LONGITUDE.....	66.08

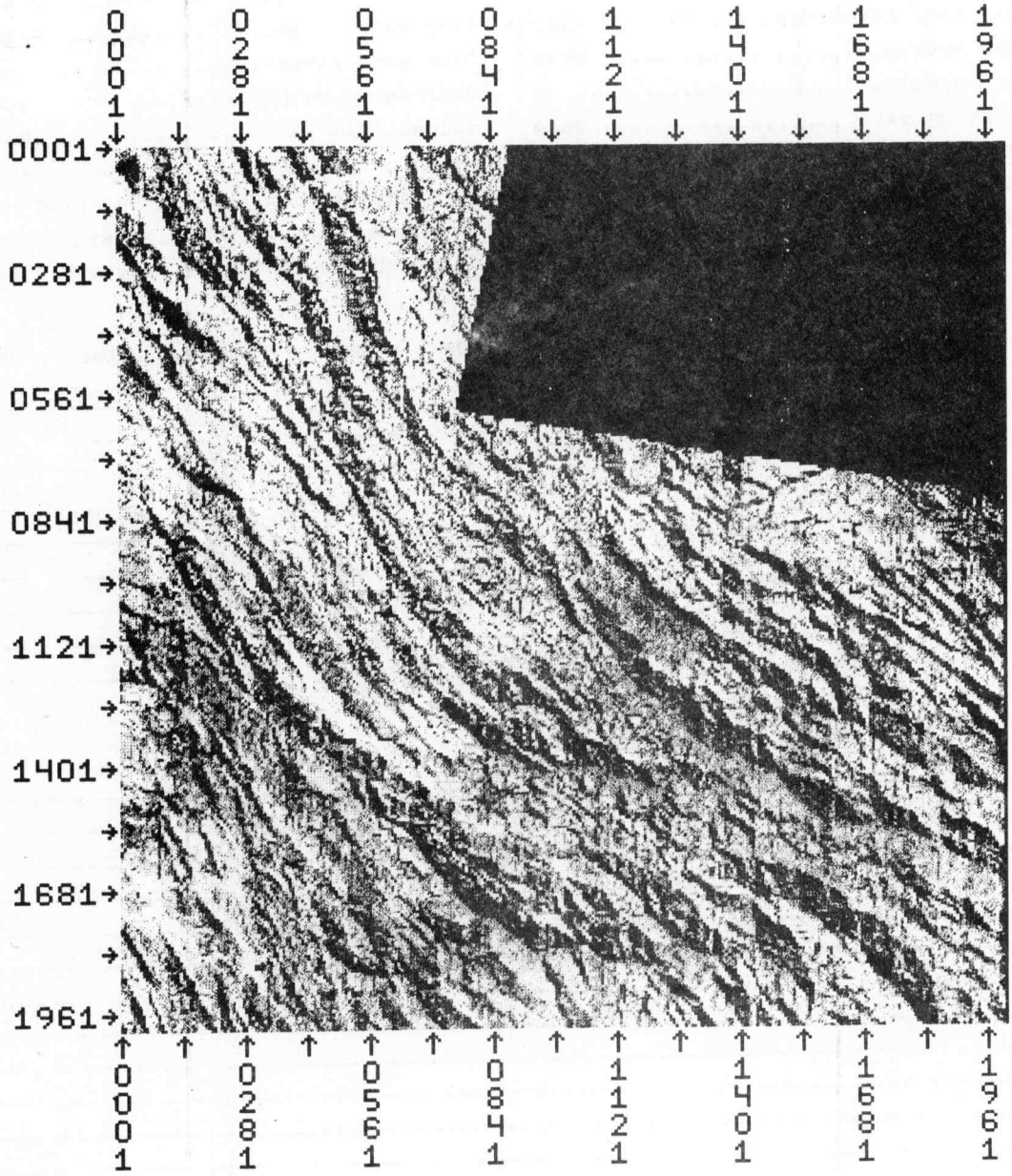
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.80	1.10	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000803),Band 7



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000700
DATE TAPE GENERATED..... SEPT 10,1981
TAPE NUMBER..... 5617
FILE NUMBER..... 2
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.0
MILES OF DATA..... 0.0
LINE RATE..... 0.0 LINES/SEC
FRAME CENTER LATITUDE..... -19.01

FLIGHTLINE ID..... ORURO QUAD IX
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 68.94

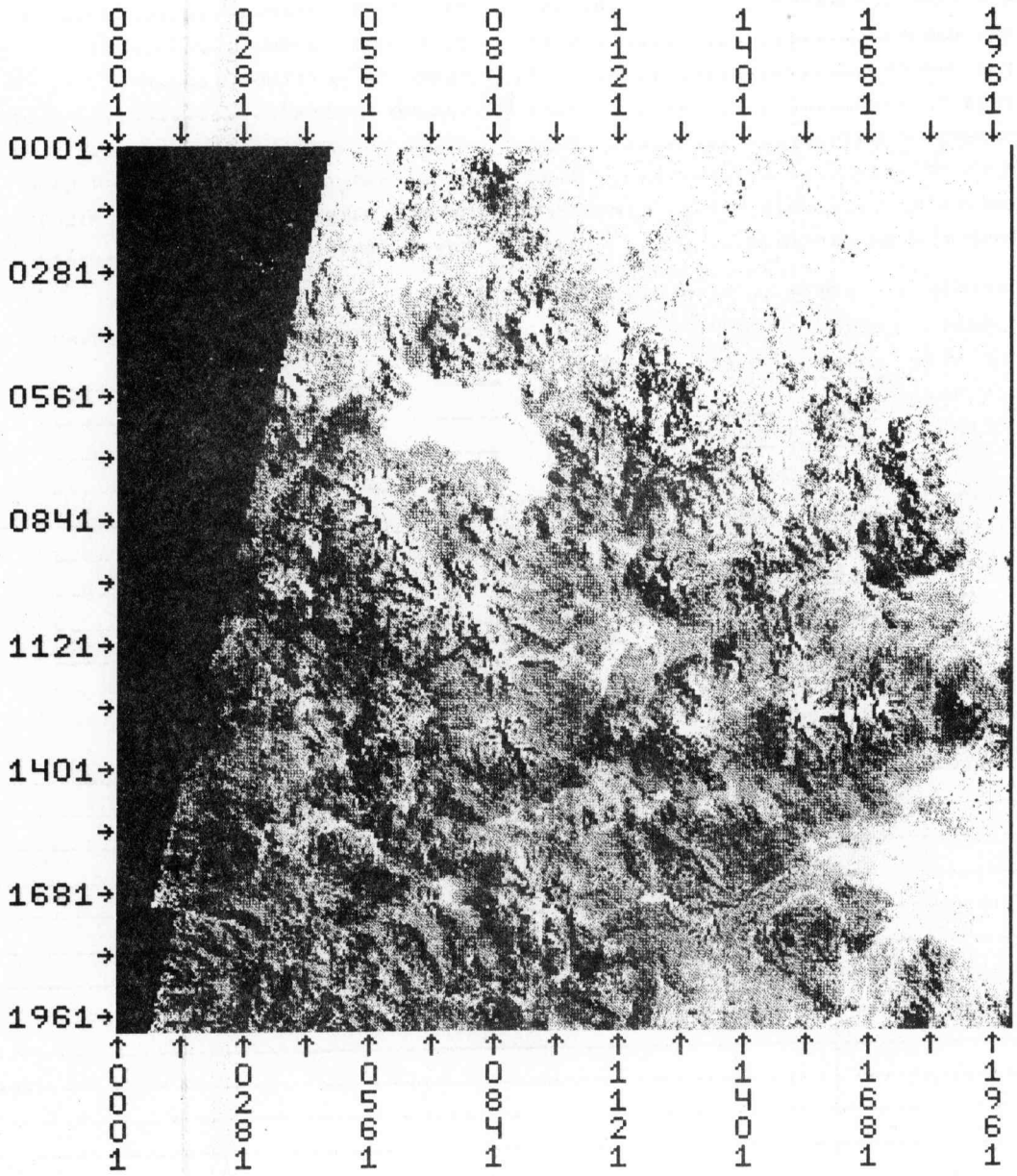
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.50	0.60	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(29)			(29)			(30)		

DATA TAPE COMMENTS...

WP-427

Run(81000700),Band 4



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000701
DATE TAPE GENERATED..... FEB 19,1982
TAPE NUMBER..... 5280
FILE NUMBER..... 3
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -19.01

FLIGHTLINE ID..... ORURO QUAD IX
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 68.94

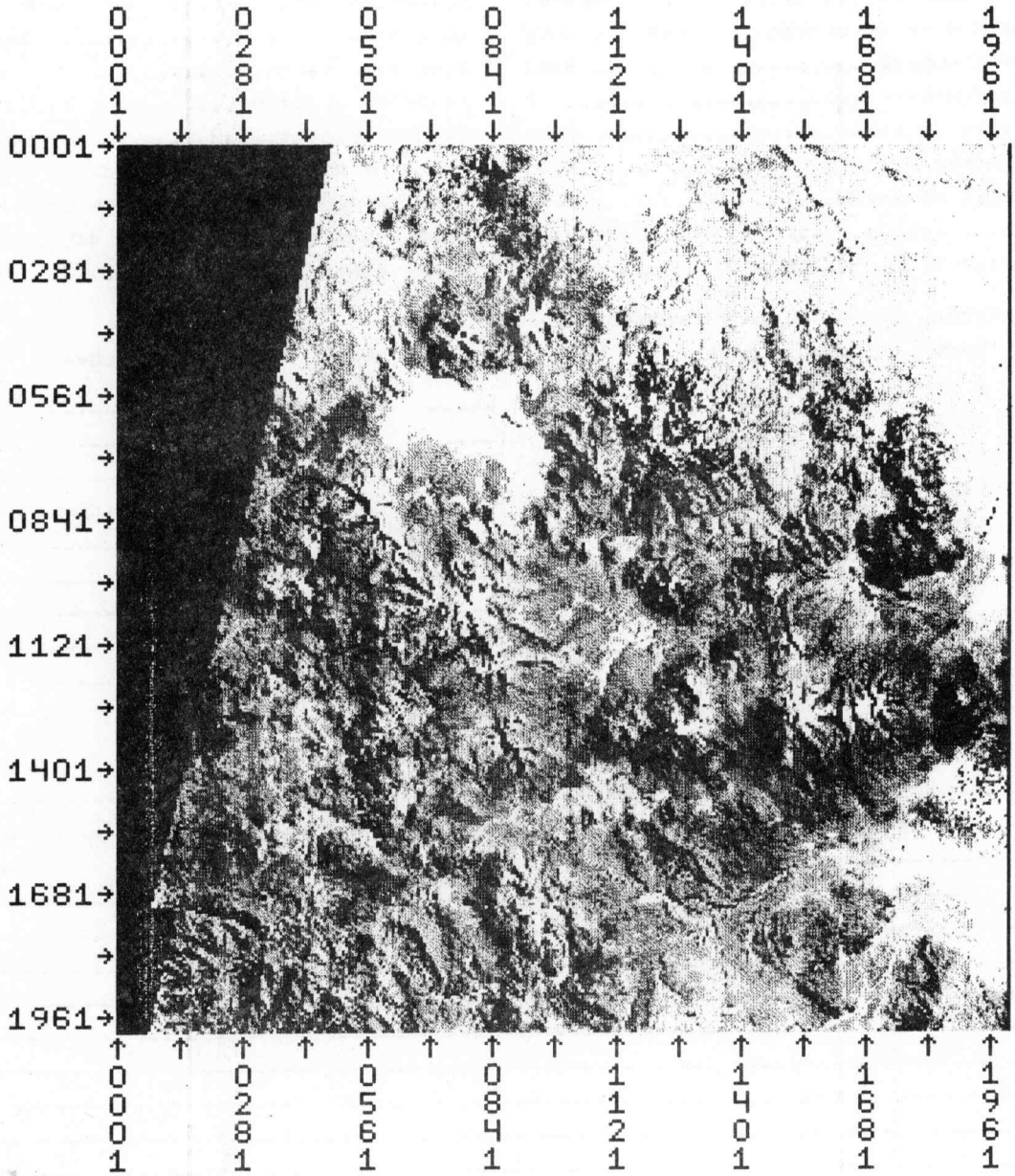
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.60	0.70	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run 81000701),Band 5



LARS FORM - 170

DATA STORAGE TAPE FILE

RUN NUMBER.....	81000702	FLIGHTLINE ID.....	CRURO QUAD IX
DATE TAPE GENERATED.....	FEB 19,1982	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	4094	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	3	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.00	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.00	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.00 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-19.01	FRAME CENTER LONGITUDE.....	68.94

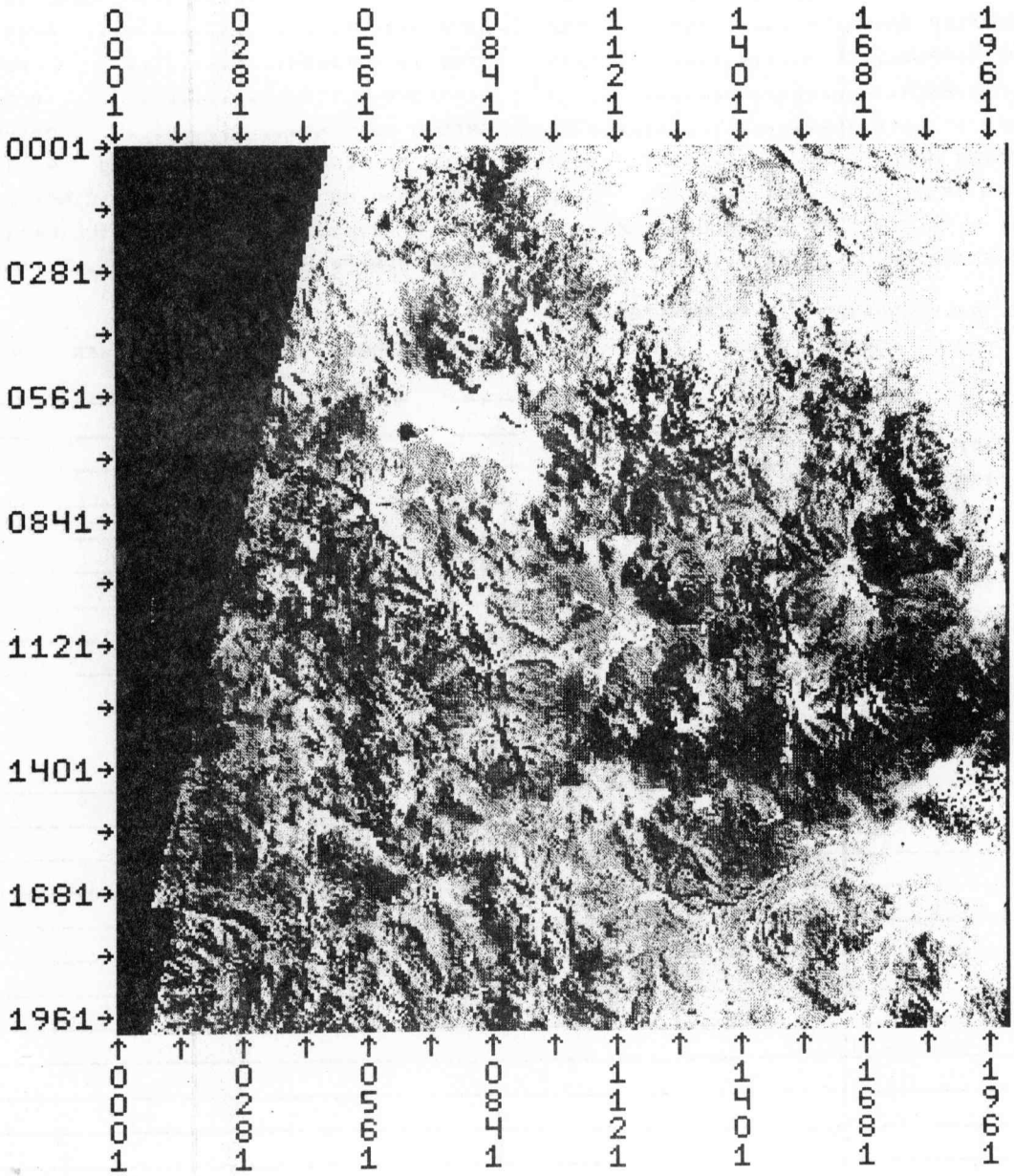
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.70	0.80	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000702),Band 6



LARS FORM - 170

DATA STORAGE TAPE FILE

RUN NUMBER.....	81000703	FLIGHTLINE ID.....	CRURO QUAD IX
DATE TAPE GENERATED.....	FEB 19,1982	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	3833	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	3	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.00	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.00	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.00 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-19.01	FRAME CENTER LONGITUDE.....	68.94

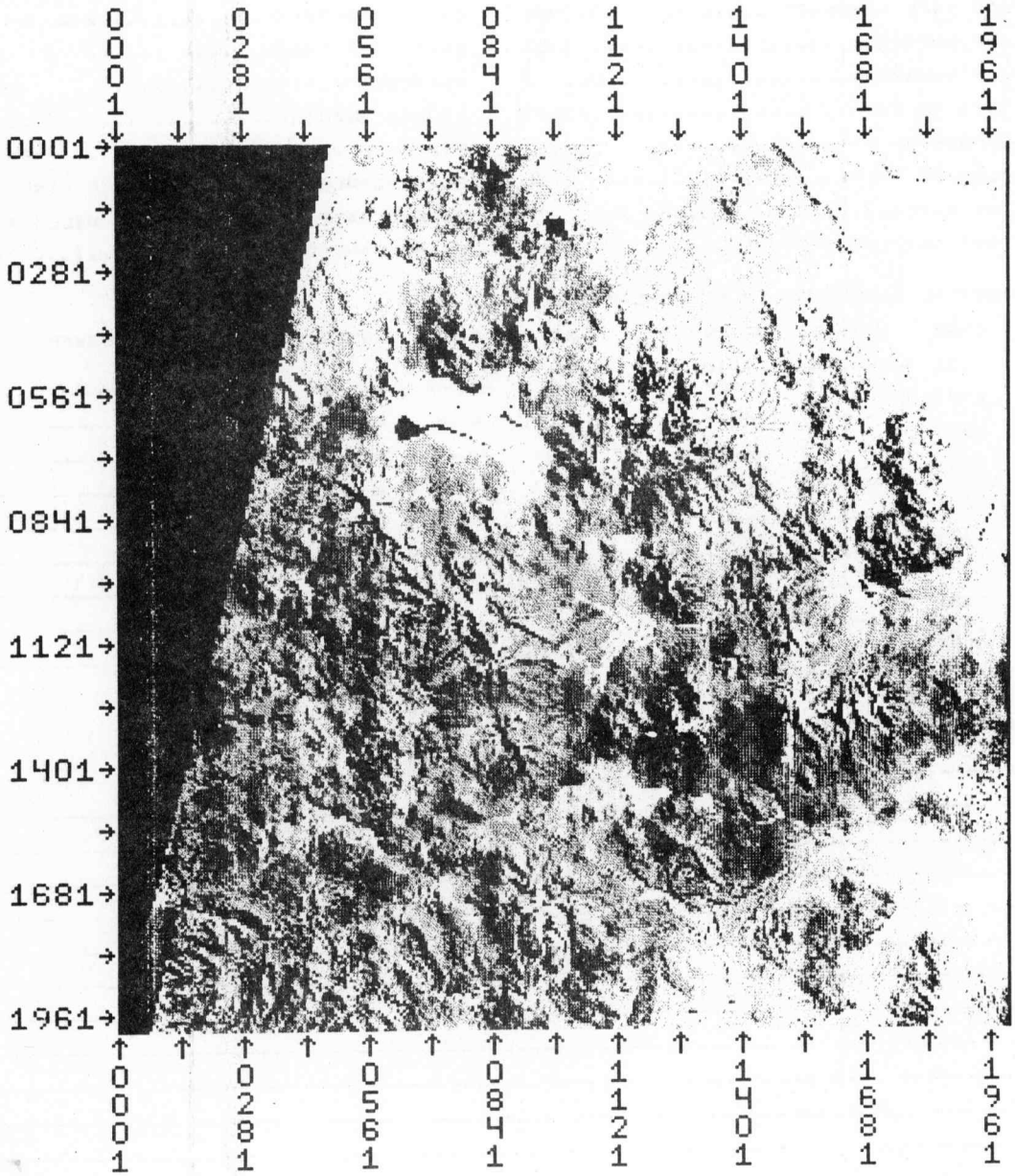
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.80	1.10	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000703),Band 7



LARS FORM - 170

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000900	FLIGHTLINE ID..... ORURO QUAD X
DATE TAPE GENERATED..... SEPT 19,1981	DATE DATA TAKEN..... 8/18/81
TAPE NUMBER..... 5617	TIME DATA TAKEN..... HOURS
FILE NUMBER..... 4	PLATFORM ALTITUDE..... 0 FEET
LINES OF DATA..... 2000	GROUND HEADING..... 0 DEGREES
SECONDS OF DATA..... 0.0	FIELD OF VIEW..... 0.0 RADIANS
MILES OF DATA..... 0.0	DATA SAMPLES PER CHANNEL PER LINE 2008
LINE RATE..... 0.0 LINES/SEC	SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LATITUDE..... -19.03	FRAME CENTER LONGITUDE..... 67.99

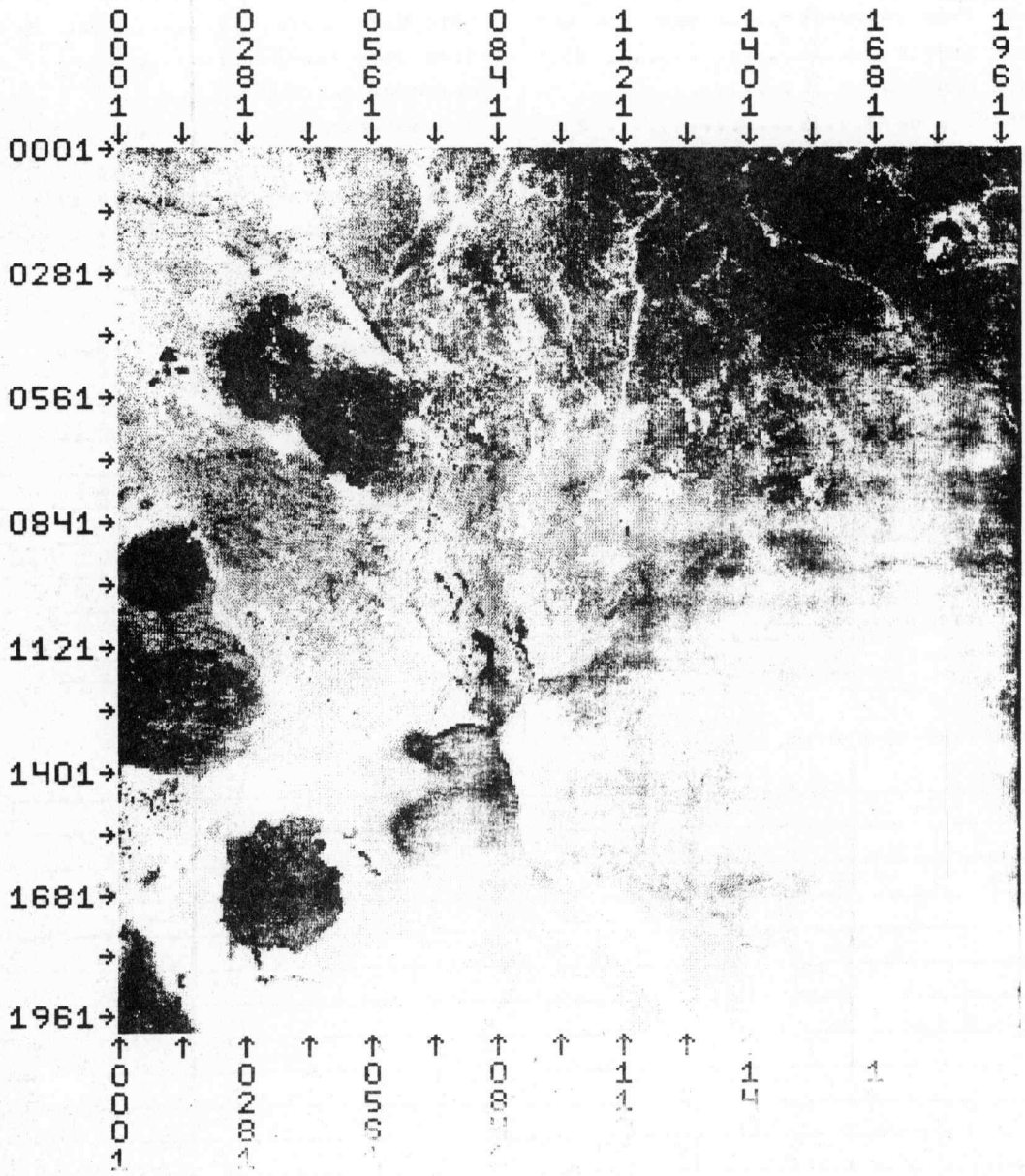
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.50	0.60	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-427

Run(81000900),Band 4



LARS FORM - 170

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000901
DATE TAPE GENERATED..... FEB 19,1982
TAPE NUMBER..... 5280
FILE NUMBER..... 4
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -19.03

FLIGHTLINE ID..... ORURO QUAD X
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 67.99

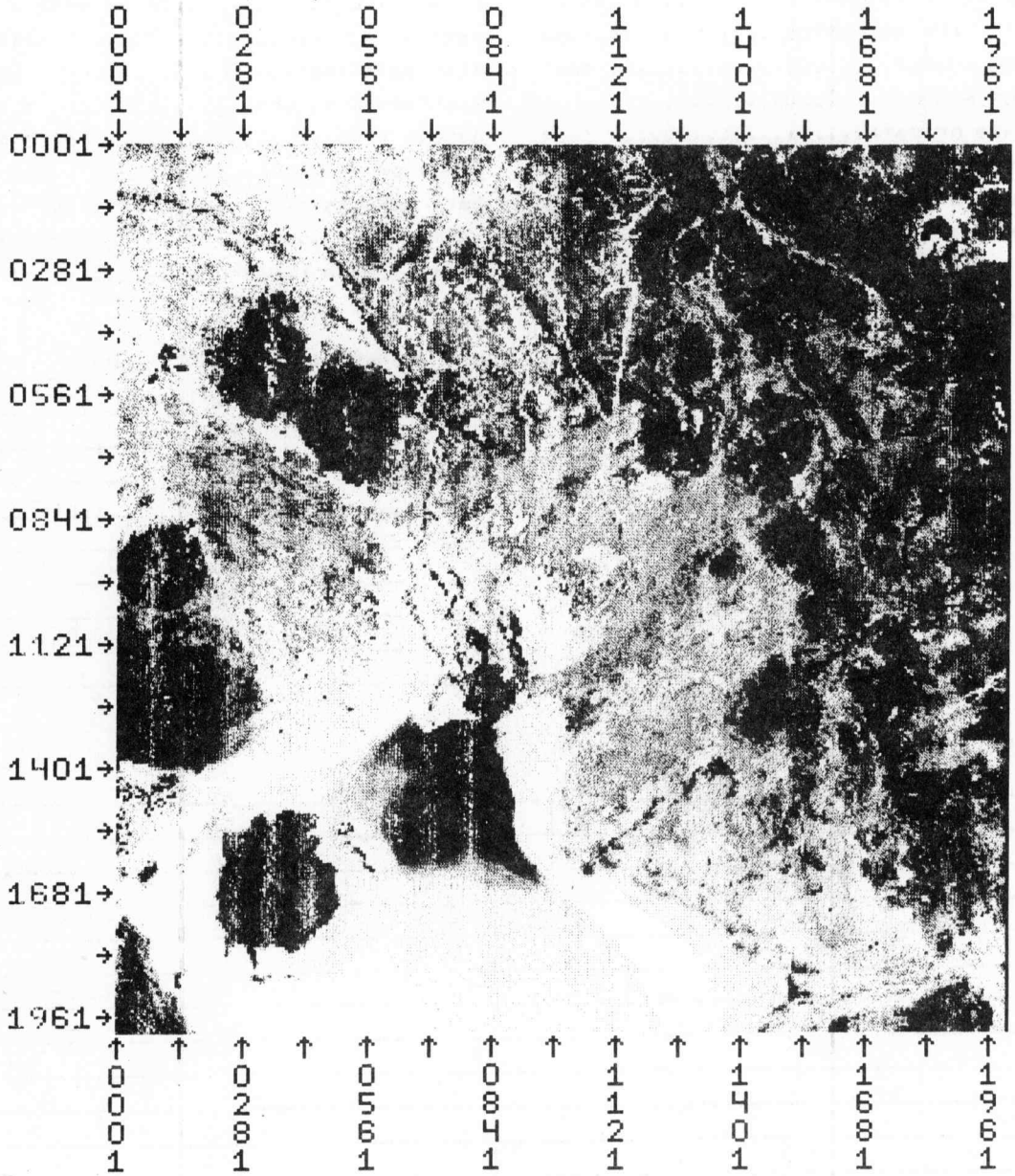
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.60	0.70	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000901),Band 5



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000902
DATE TAPE GENERATED..... FEB 19,1982
TAPE NUMBER..... 4094
FILE NUMBER..... 4
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -19.03

FLIGHTLINE ID..... ORURO QUAD X
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 67.99

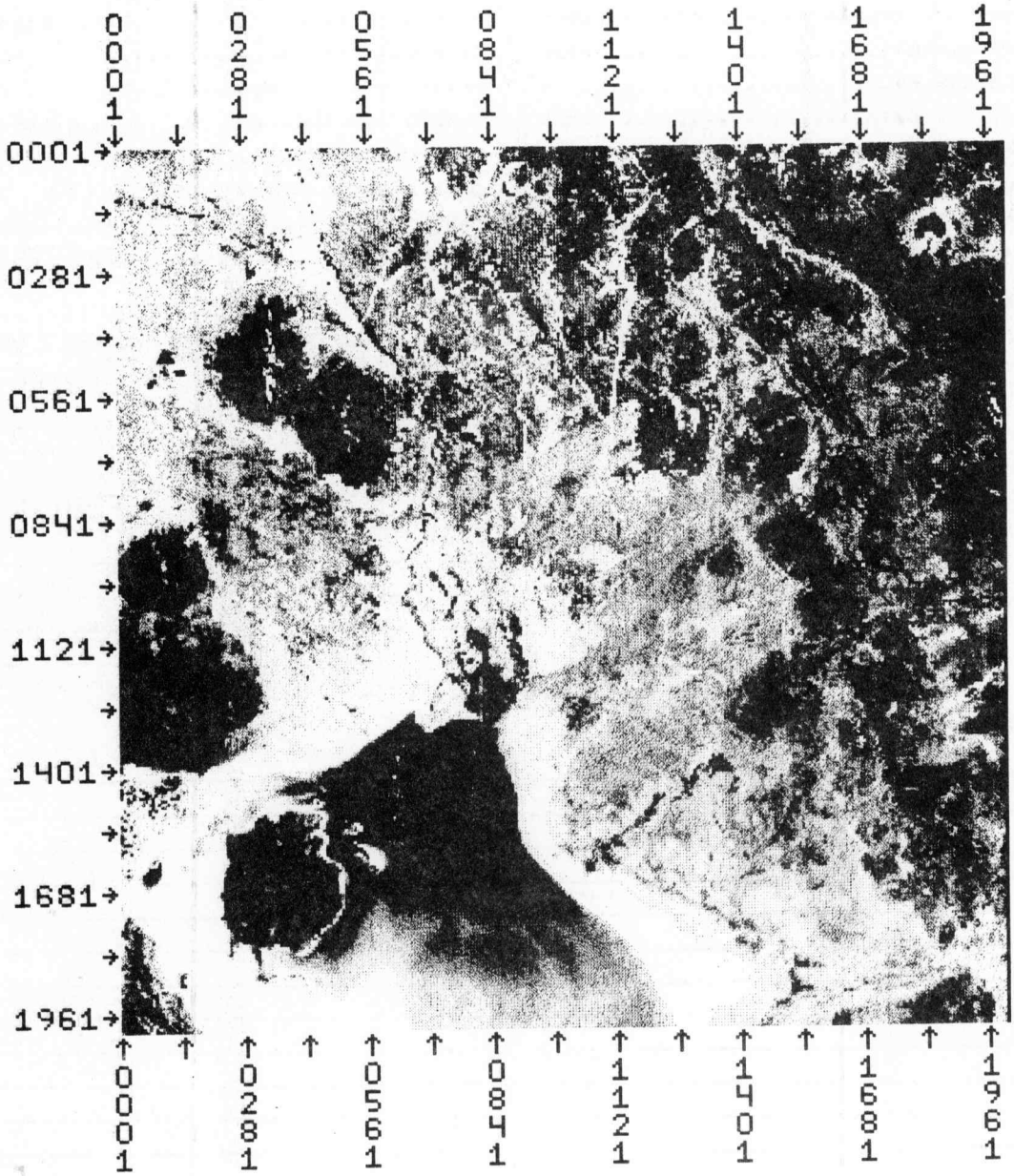
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.70	0.80	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000902),Band 6



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81000903
DATE TAPE GENERATED..... FEB 19,1982
TAPE NUMBER..... 3833
FILE NUMBER..... 4
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -19.03

FLIGHTLINE ID..... ORURO QUAD X
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 67.99

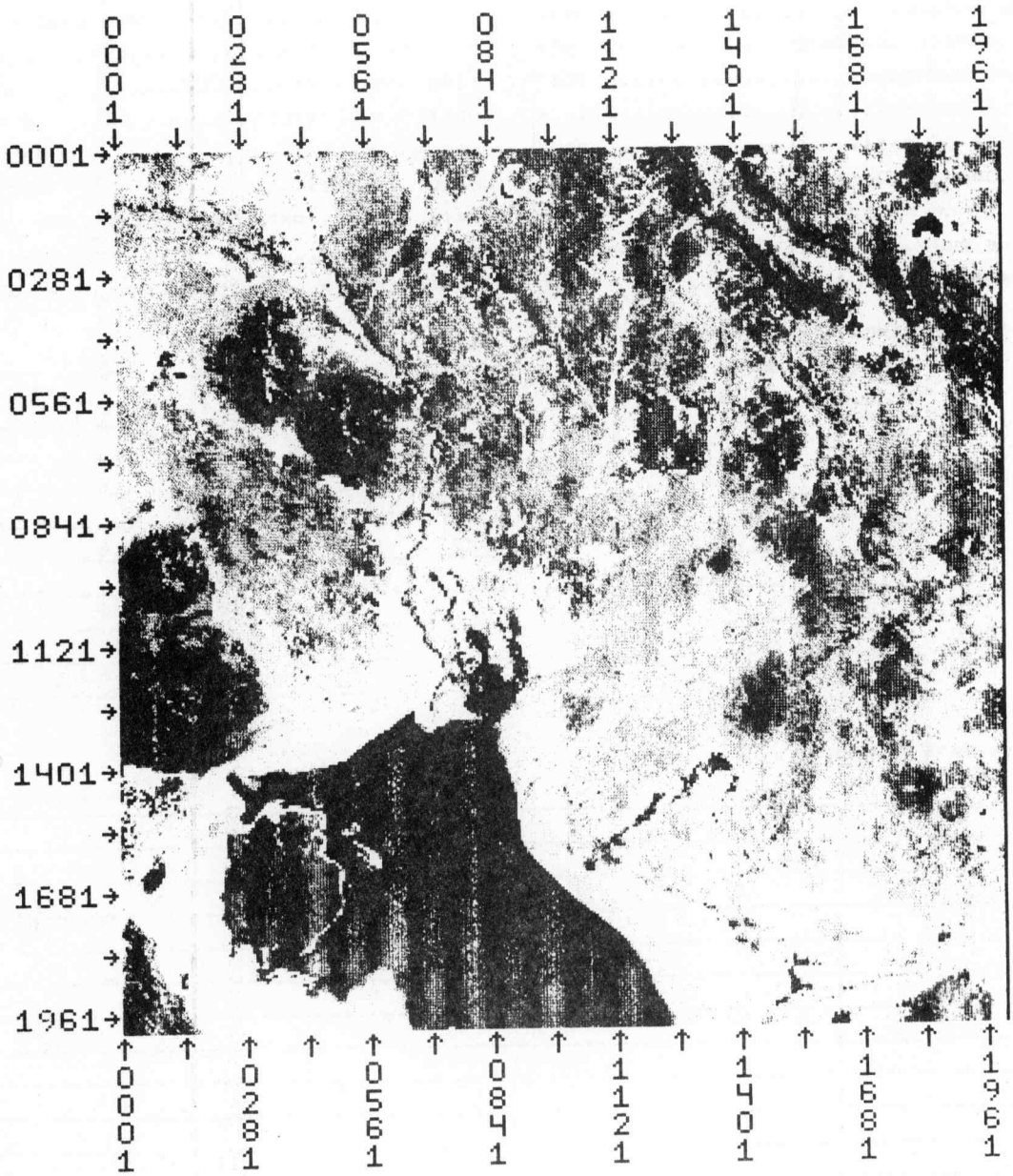
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.80	1.10	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81000903),Band 7



LARS FORM - 170

DATA STORAGE TAPE FILE

RUN NUMBER..... 81001000
DATE TAPE GENERATED..... SEPT 22,1981
TAPE NUMBER..... 5617
FILE NUMBER..... 5
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.0
MILES OF DATA..... 0.0
LINE RATE..... 0.0 LINES/SEC
FRAME CENTER LATITUDE..... -19.04

FLIGHTLINE ID..... ORURO QUAD XI
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2000
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 67.04

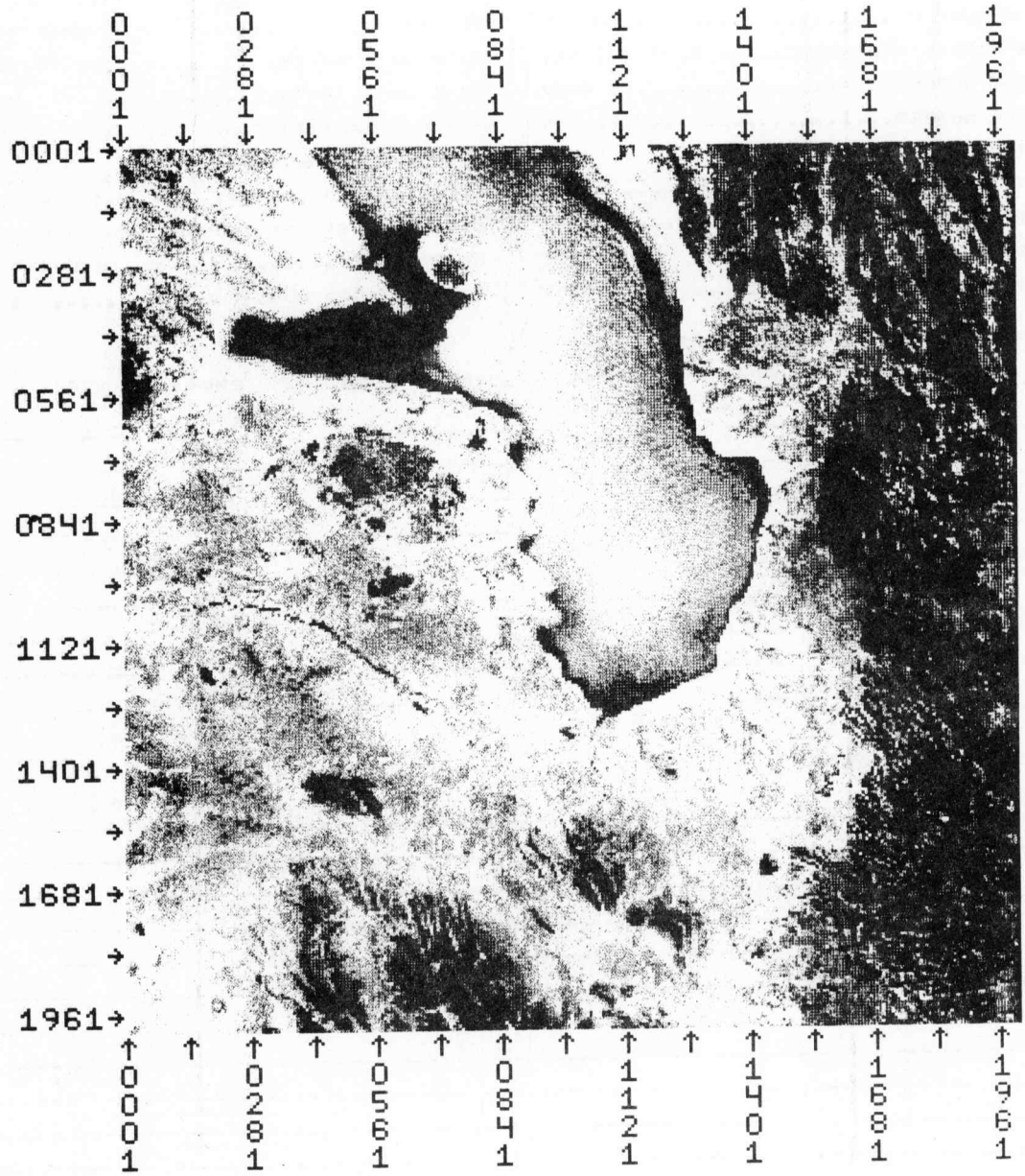
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.50	0.60	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-427

Run(81001000),Band 4



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER.....	81001001	FLIGHTLINE ID.....	ORURO QUAD XI
DATE TAPE GENERATED.....	FEB 22,1982	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	5280	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	5	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.00	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.00	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.00 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-19.04	FRAME CENTER LONGITUDE.....	67.04

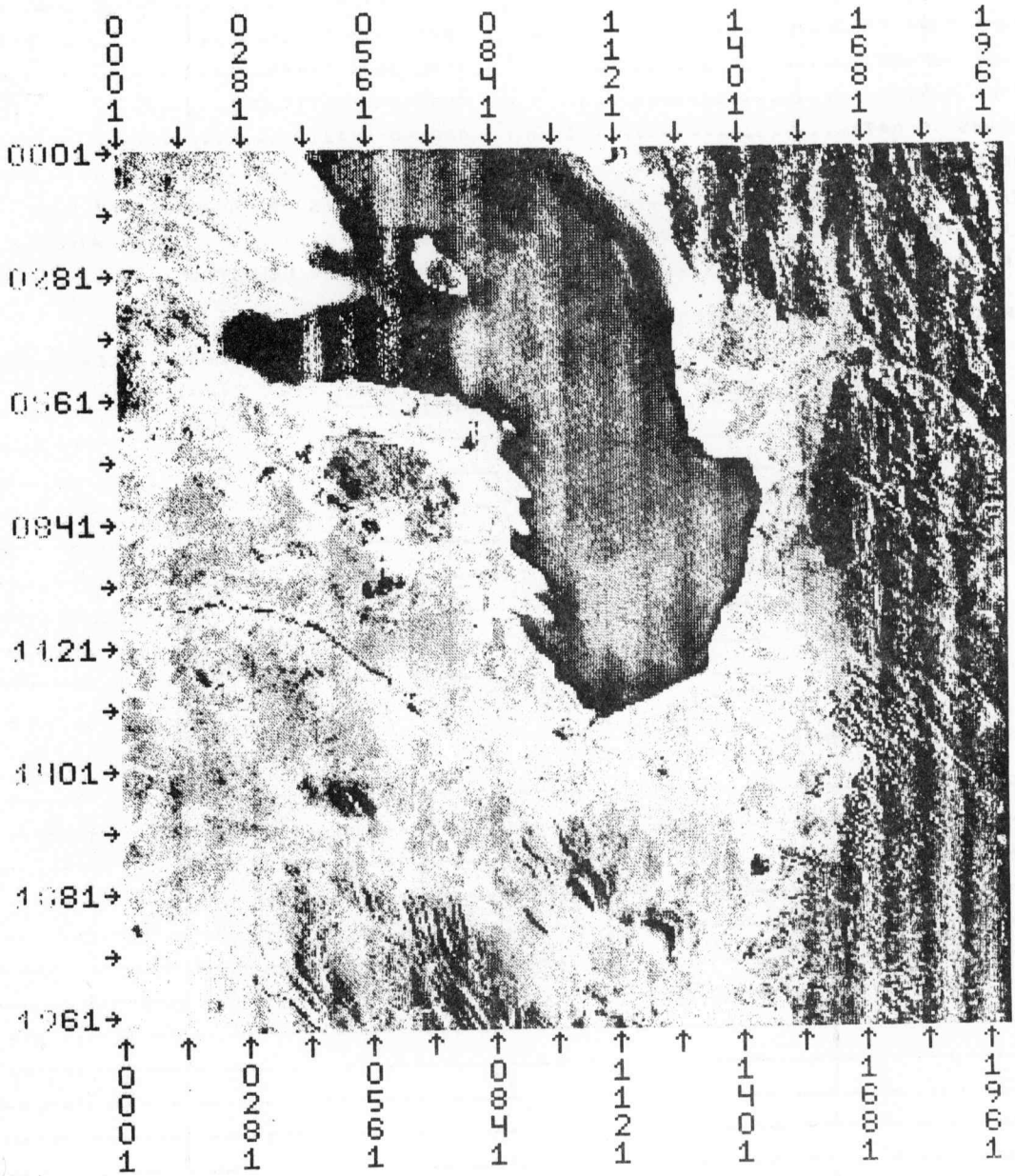
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.60	0.70	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81001001),Band 5



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81001002
DATE TAPE GENERATED..... FEB 22,1982
TAPE NUMBER..... 4094
FILE NUMBER..... 5
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -19.04

FLIGHTLINE ID..... ORURO QUAD XI
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 67.04

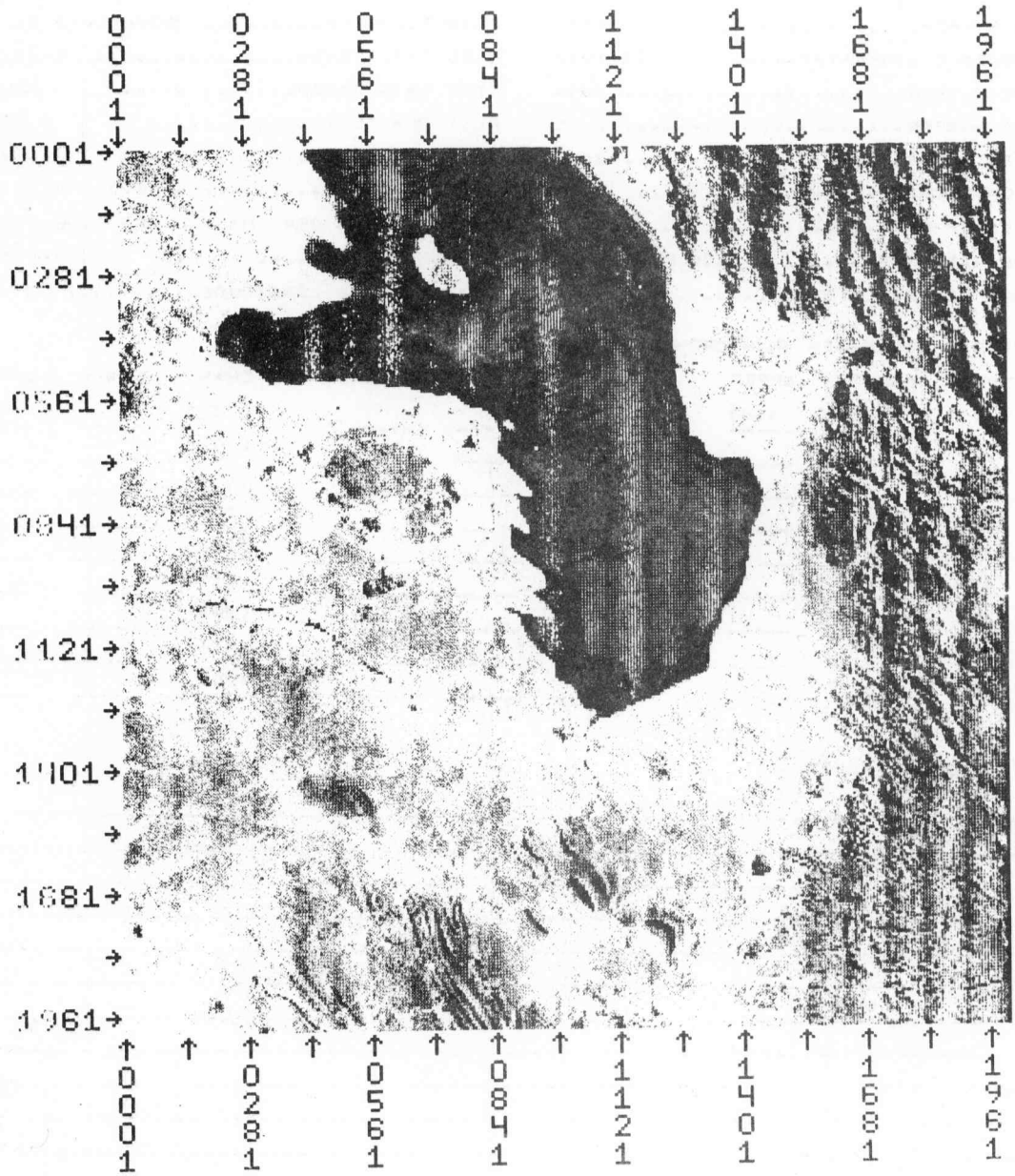
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.70	0.80	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81001002),Band 6



LARS FORM - 170

DATA STORAGE TAPE FILE

RUN NUMBER.....	81C01003	FLIGHTLINE ID.....	CRURO QUAD XI
DATE TAPE GENERATED.....	FEB 22,1982	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	3833	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	5	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.00	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.00	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.00 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-19.04	FRAME CENTER LONGITUDE.....	67.04

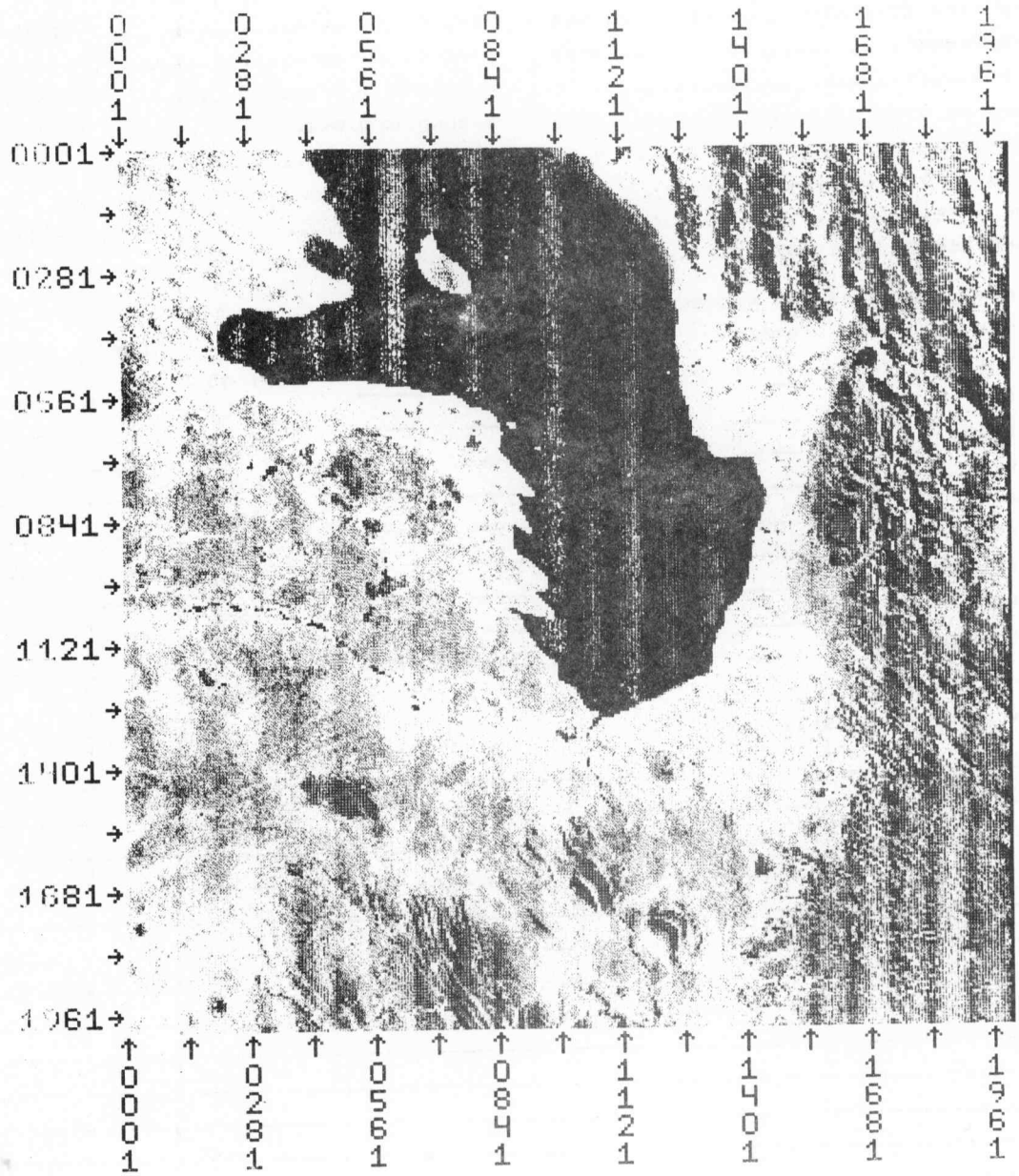
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.80	1.10	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81001003),Band 7



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81001100
DATE TAPE GENERATED..... SEPT 23,1981
TAPE NUMBER..... 5617
FILE NUMBER..... 6
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.0
MILES OF DATA..... 0.0
LINE RATE..... 0.0 LINES/SEC
FRAME CENTER LATITUDE..... -19.06

FLIGHTLINE ID..... ORURO QUAD XII
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 66.09

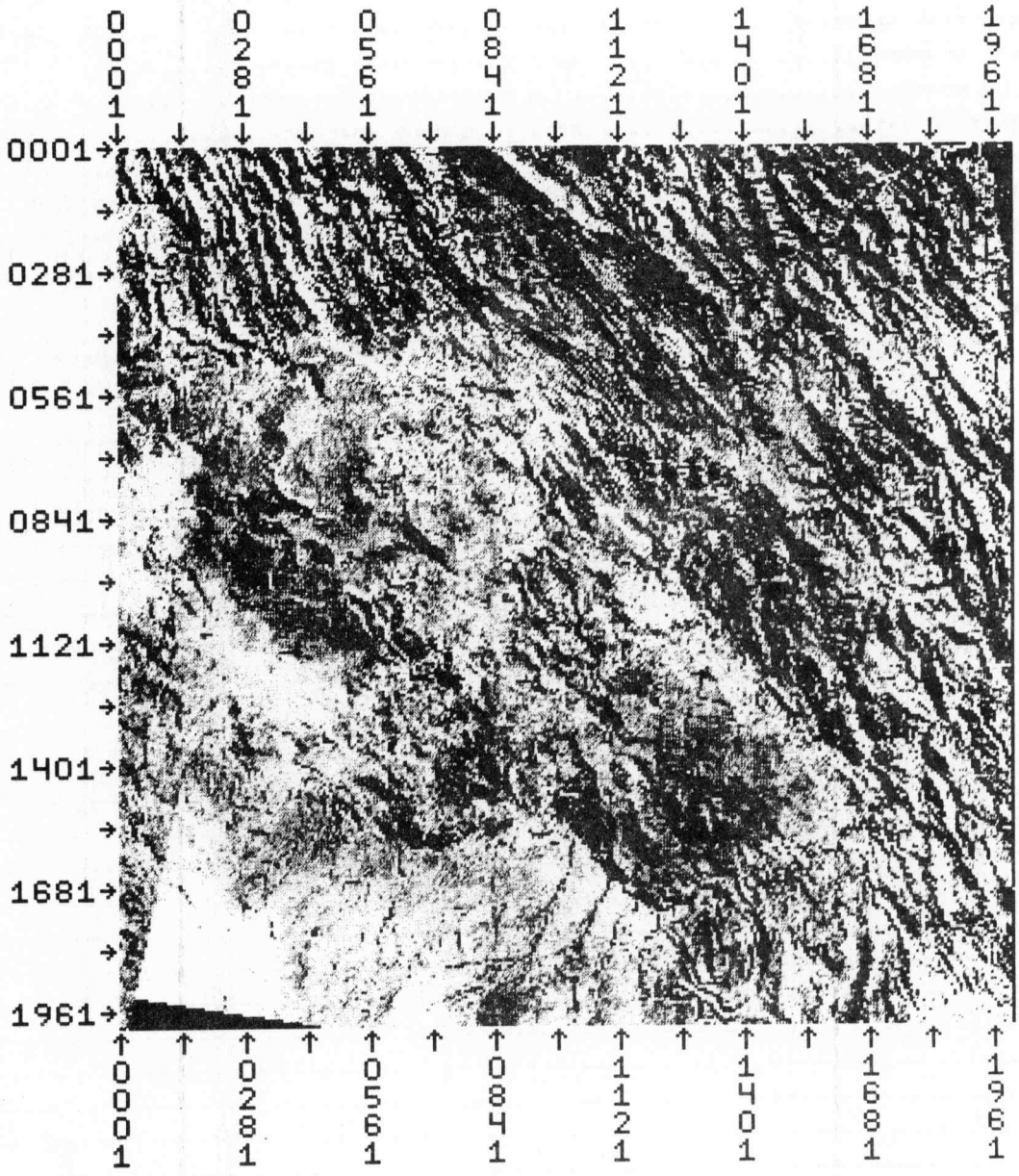
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.50	0.60	(2)	-----	-----	(3)	-----	-----
(4)	-----	-----	(5)	-----	-----	(6)	-----	-----
(7)	-----	-----	(8)	-----	-----	(9)	-----	-----
(10)	-----	-----	(11)	-----	-----	(12)	-----	-----
(13)	-----	-----	(14)	-----	-----	(15)	-----	-----
(16)	-----	-----	(17)	-----	-----	(18)	-----	-----
(19)	-----	-----	(20)	-----	-----	(21)	-----	-----
(22)	-----	-----	(23)	-----	-----	(24)	-----	-----
(25)	-----	-----	(26)	-----	-----	(27)	-----	-----
(28)	-----	-----	(29)	-----	-----	(30)	-----	-----

DATA TAPE COMMENTS...

WP-427

Run(81001100),Band 4



LARS FORM - 170

DATA STORAGE TAPE FILE

RUN NUMBER..... 81001101
FLIGHTLINE ID..... OSURO QUAD XII
DATE TAPE GENERATED..... FEB 24,1982
DATE DATA TAKEN..... 8/18/81
TAPE NUMBER..... 5290
TIME DATA TAKEN..... HOURS
FILE NUMBER..... 6
PLATFORM ALTITUDE..... 0 FEET
LINES OF DATA..... 2000
GROUND HEADING..... 0 DEGREES
SECONDS OF DATA..... 0.00
FIELD OF VIEW..... 0.0 RADIANS
MILES OF DATA..... 0.00
DATA SAMPLES PER CHANNEL PER LINE 2008
LINE RATE..... 0.00 LINES/SEC
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LATITUDE..... -19.06
FRAME CENTER LONGITUDE..... 66.09

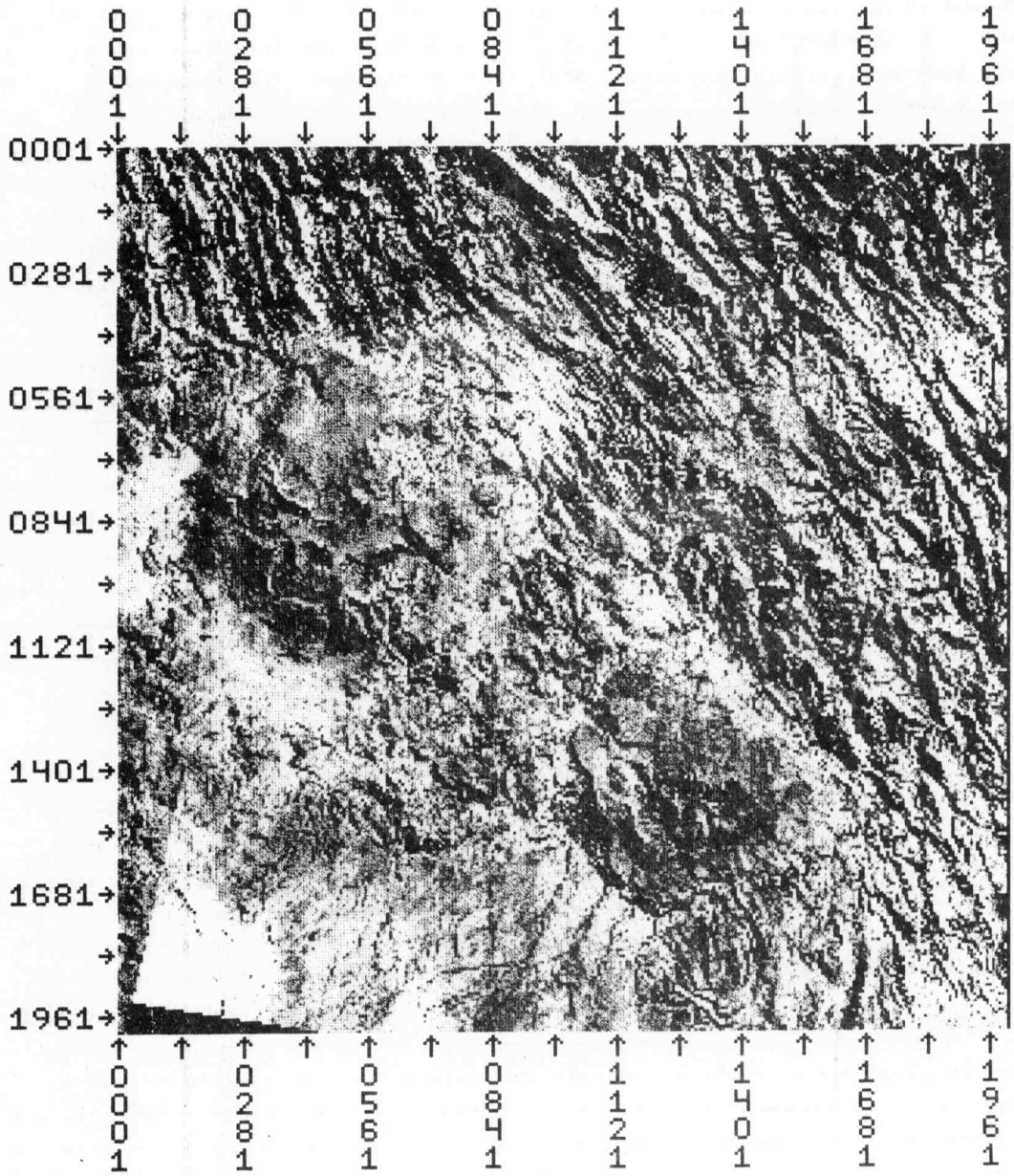
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.60	0.70	(2)			(3)		
(4)			(5)			(6)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81001101),Band 5



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER.....	81001102	FLIGHTLINE ID.....	OPURO QUAD XII
DATE TAPE GENERATED.....	FEB 24,1982	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	4094	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	6	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.00	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.00	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.00 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-19.06	FRAME CENTER LONGITUDE.....	66.09

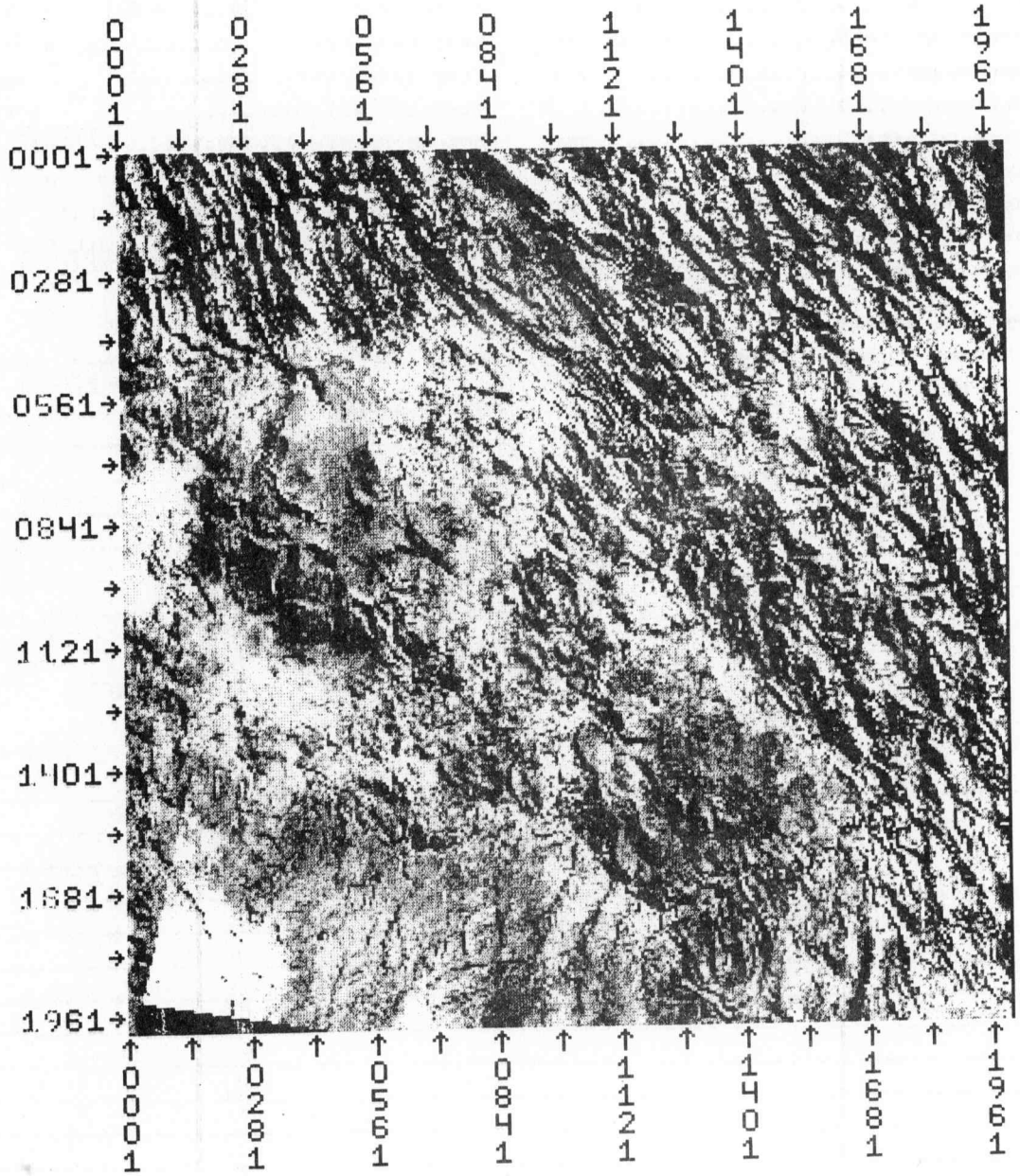
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.70	0.80	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81001102),Band 6



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81001103
DATE TAPE GENERATED..... FEB 24,1982
TAPE NUMBER..... 3833
FILE NUMBER..... 6
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -19.06

FLIGHTLINE ID..... ORURO QUAD XII
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 66.09

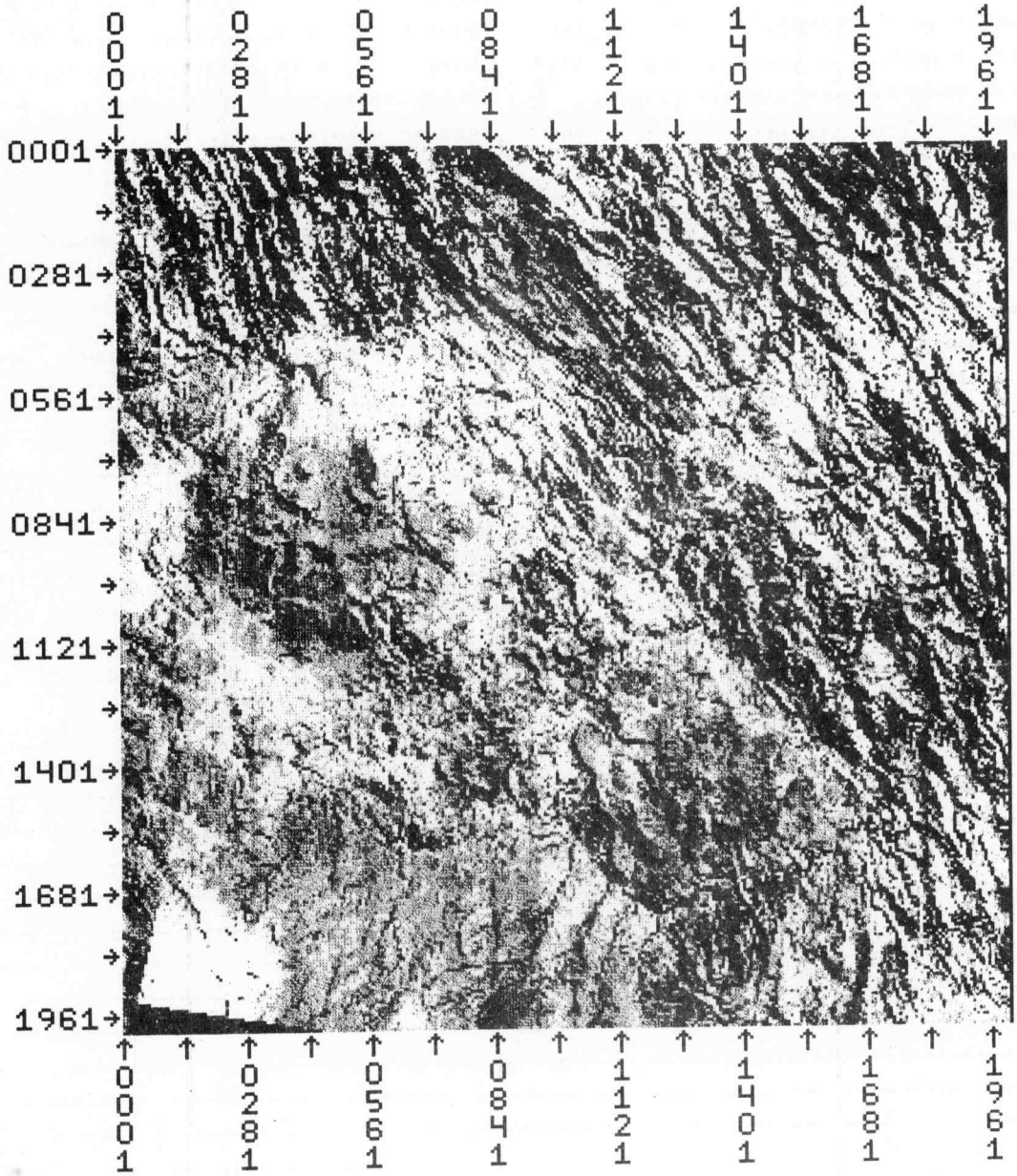
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.80	1.10	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81001103),Band 7



LARS FORM - 170

DATA STORAGE TAPE FILE

RUN NUMBER..... 81001200
DATE TAPE GENERATED..... MAR 5,1982
TAPE NUMBER..... 5618
FILE NUMBER..... 1
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -19.91

FLIGHTLINE ID..... OSURO QUAD XIII
DATE DATA TAKEN..... 3/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 58.97

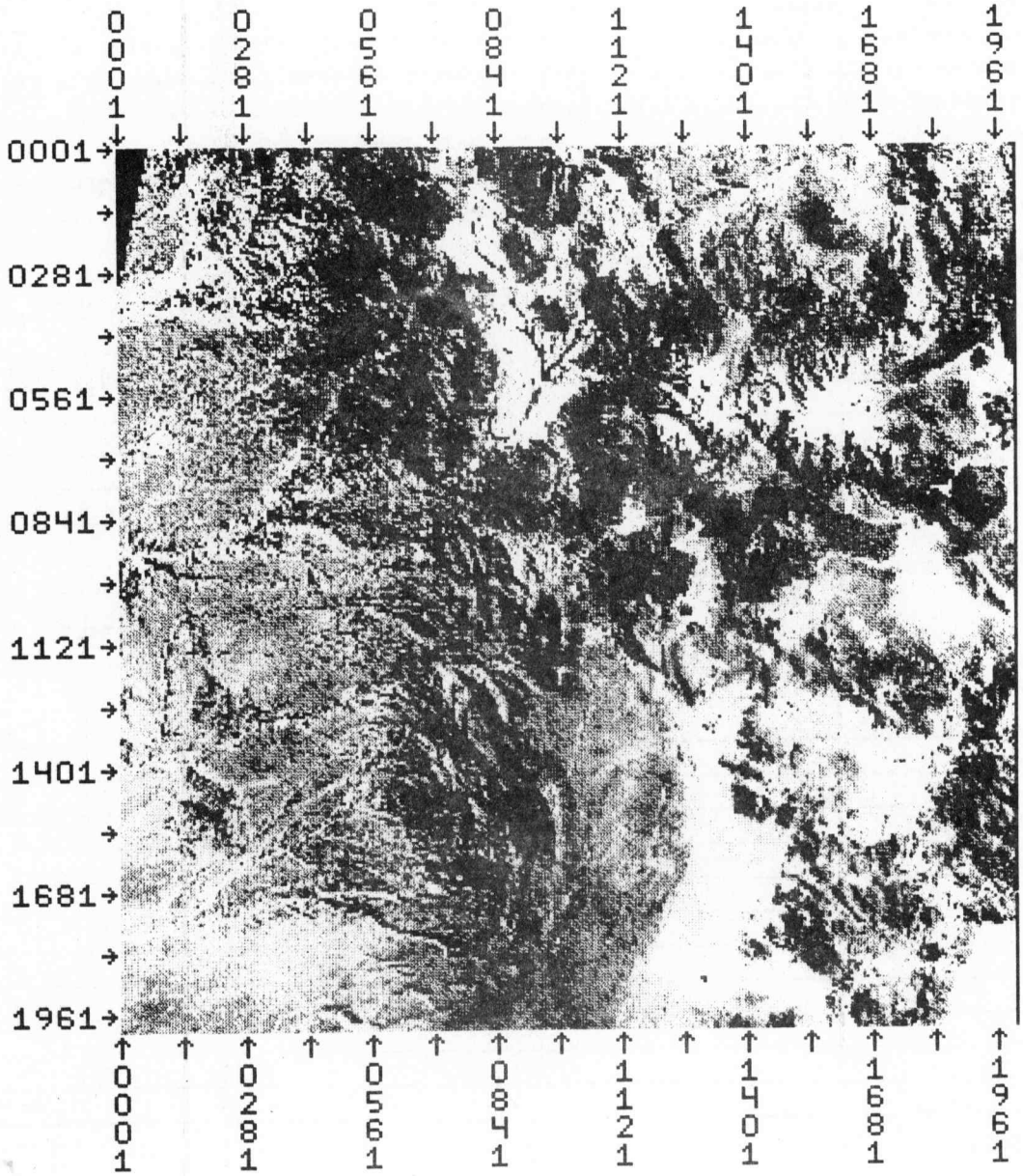
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.50	0.60	(2)			(3)		
(4)			(5)			(6)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-427

Run(81001200),Band 4



LARS FORM - 170

DATA STORAGE TAPE FILE

RUN NUMBER.....	81001201	FLIGHTLINE ID.....	ORURO QUAD XIII
DATE TAPE GENERATED.....	FEB 17,1982	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	3331	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	1	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.00	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.00	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.00 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-19.91	FRAME CENTER LONGITUDE.....	68.97

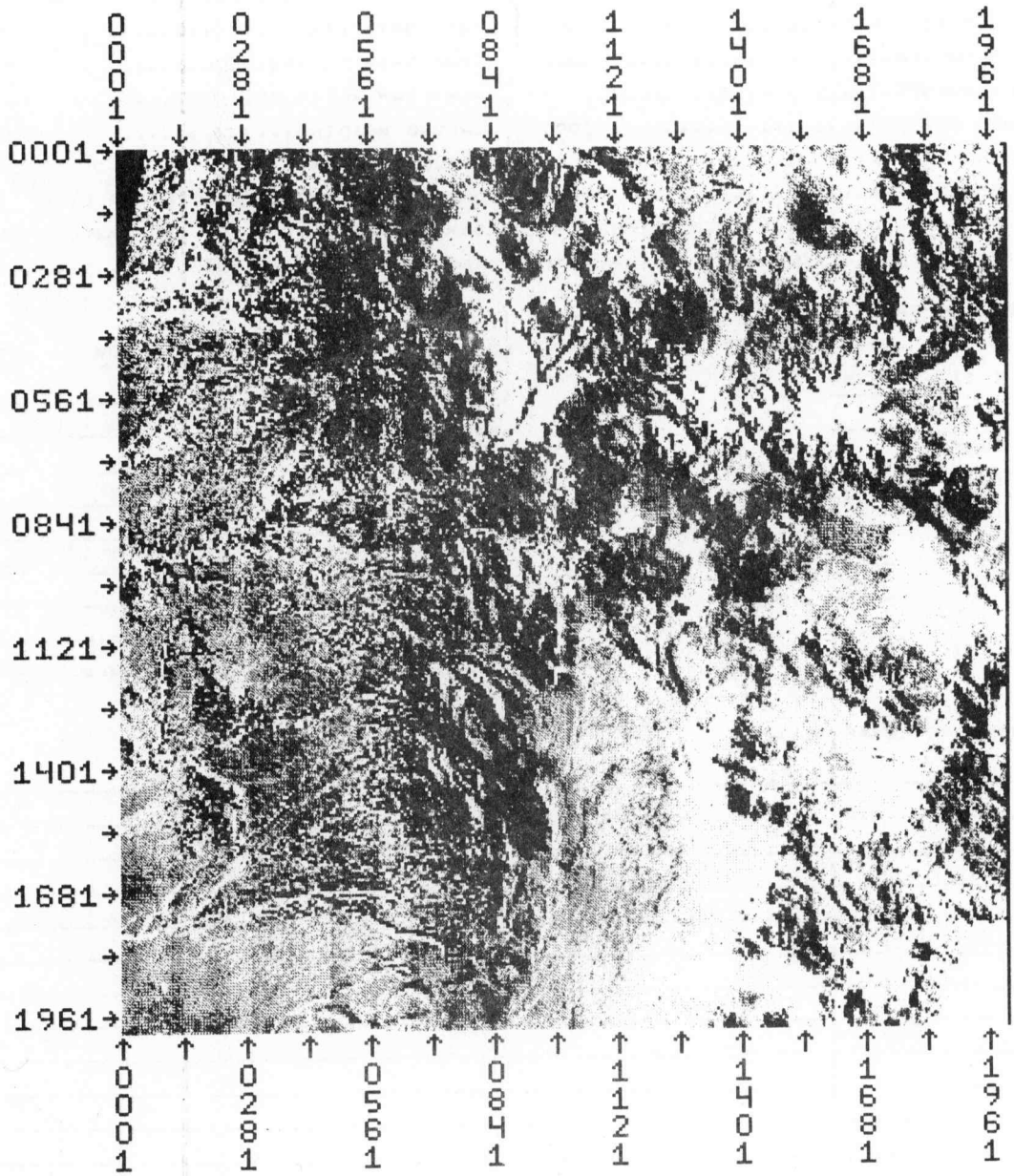
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.60	0.70	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81001201),Band 5



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81001202
DATE TAPE GENERATED..... FEB 17,1982
TAPE NUMBER..... 4095
FILE NUMBER..... 1
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -19.91

FLIGHTLINE ID..... CRURO QUAD XIII
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 68.97

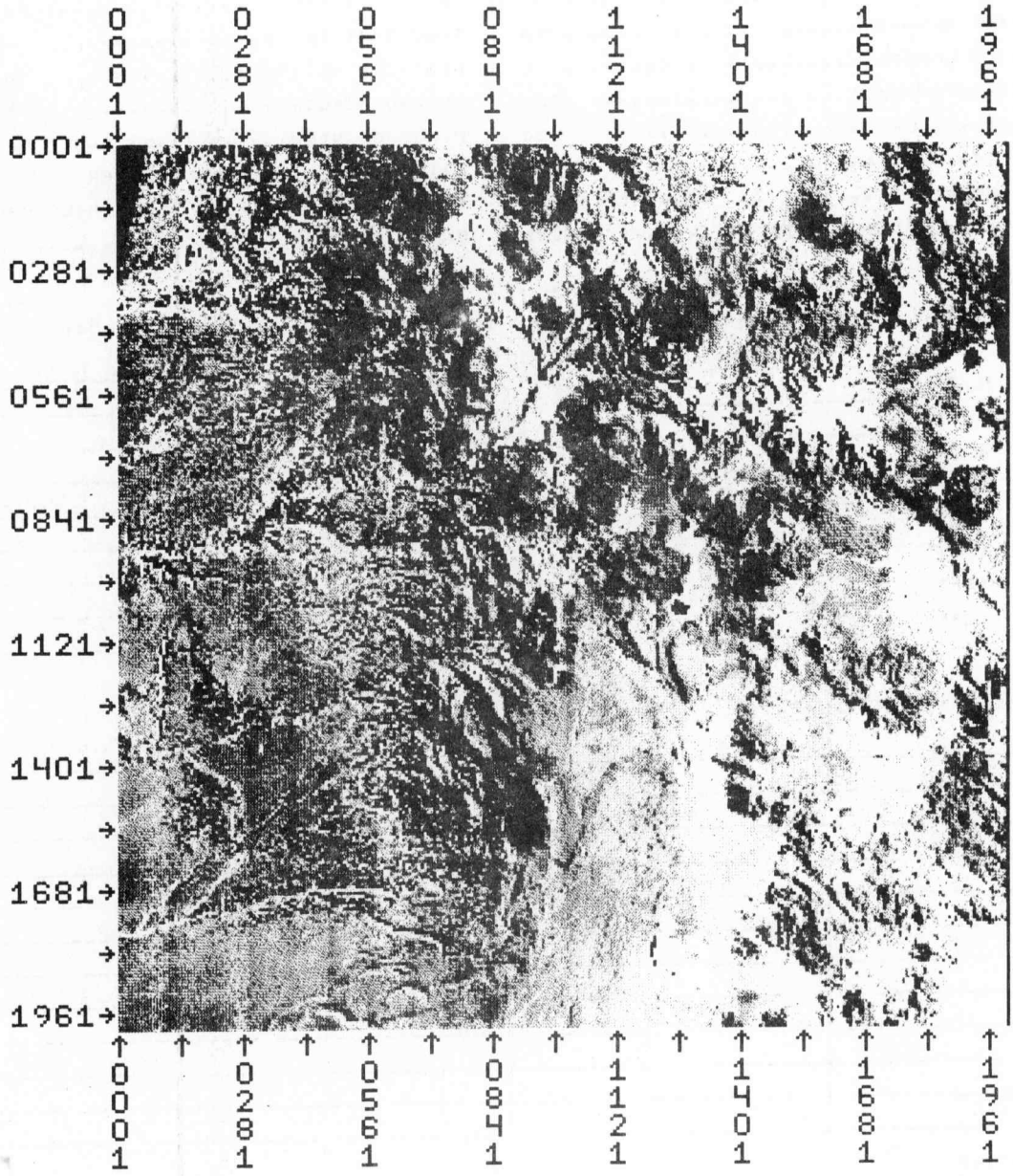
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.70	0.80	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81001202),Band 6



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER.....	81001203	FLIGHTLINE ID.....	ORURO QUAD XIII
DATE TAPE GENERATED.....	FEB 17,1982	DATE DATA TAKEN.....	9/18/81
TAPE NUMBER.....	4096	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	1	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.0	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.0	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.0 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-19.91	FRAME CENTER LONGITUDE.....	68.97

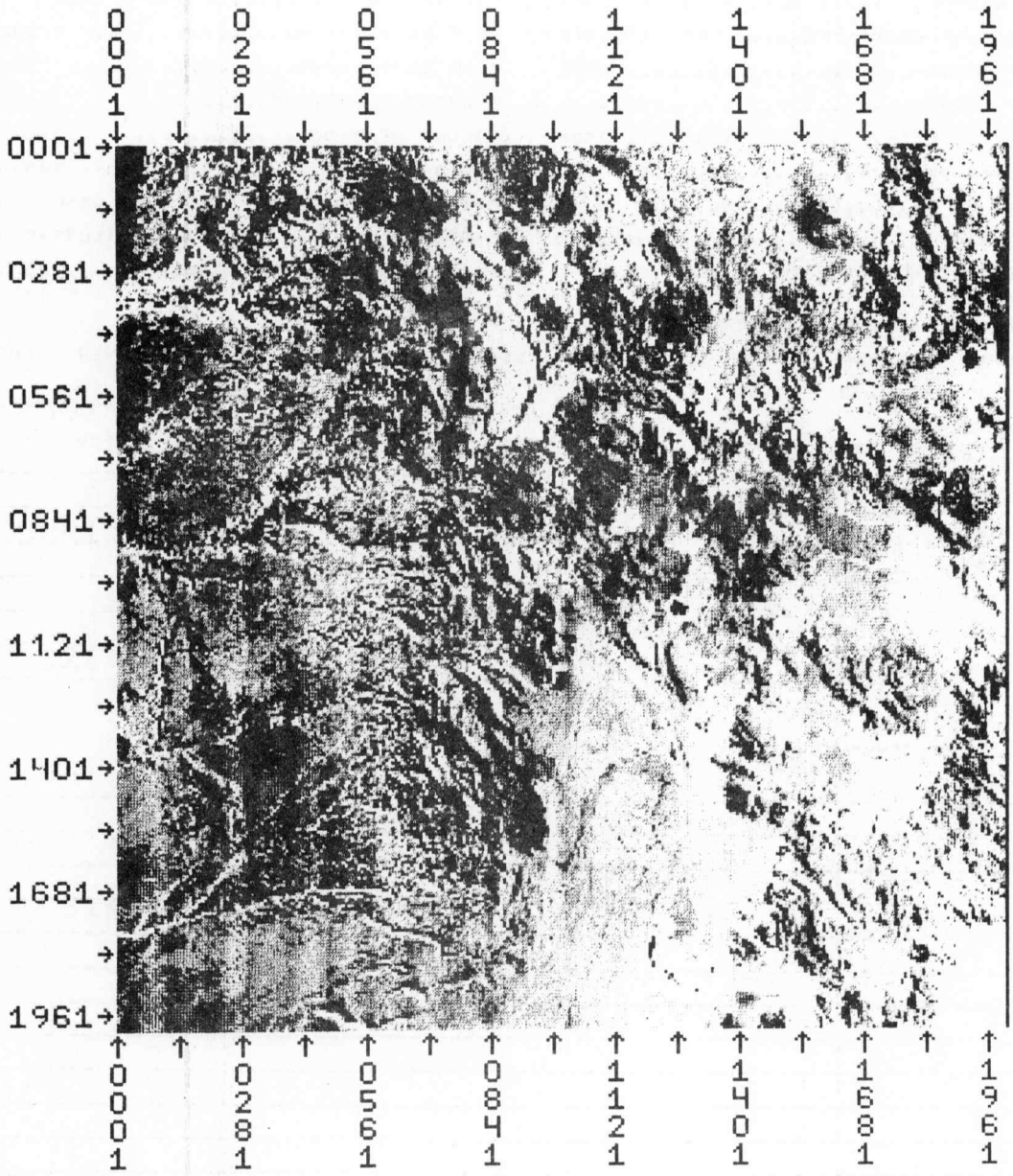
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.80	1.10	(2)			(3)		
(4)			(5)			(6)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-427

Run(81001203),Band 7



LARS FORM - 170

DATA STORAGE TAPE FILE

RUN NUMBER..... 81001400
DATE TAPE GENERATED..... MAR 9,1982
TAPE NUMBER..... 5618
FILE NUMBER..... 3
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -19.93

FLIGHTLINE ID..... ORURO QUAD XIV
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 68.01

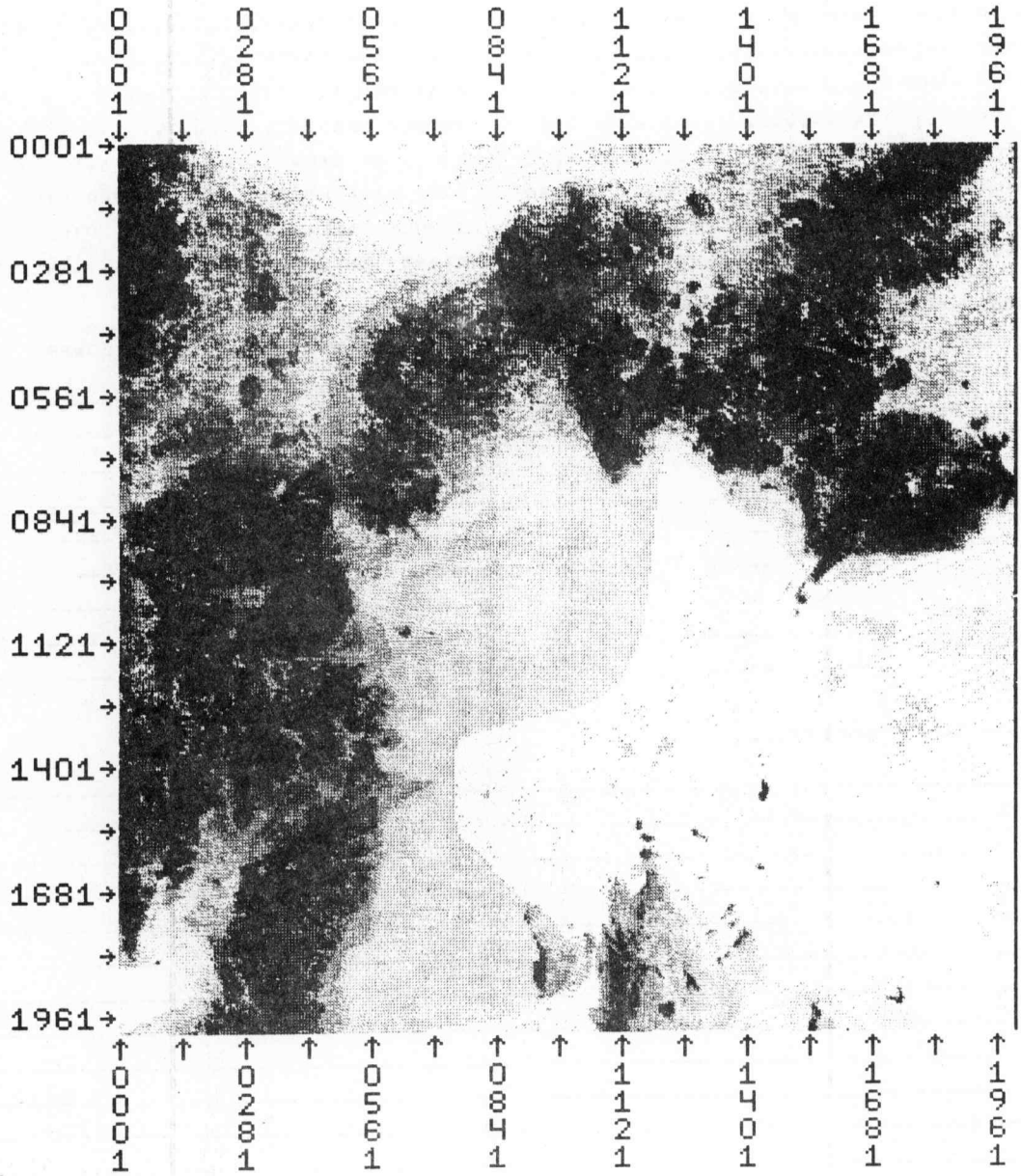
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.50	0.60	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-428

Run(81001400),Band 4



LARS FORM - 170

DATA STORAGE TAPE FILE

RUN NUMBER.....	81001401	FLIGHTLINE ID.....	ORURO QUAD XIV
DATE TAPE GENERATED.....	FEB 18,1982	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	3331	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	2	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.00	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.00	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.00 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-19.93	FRAME CENTER LONGITUDE.....	68.01

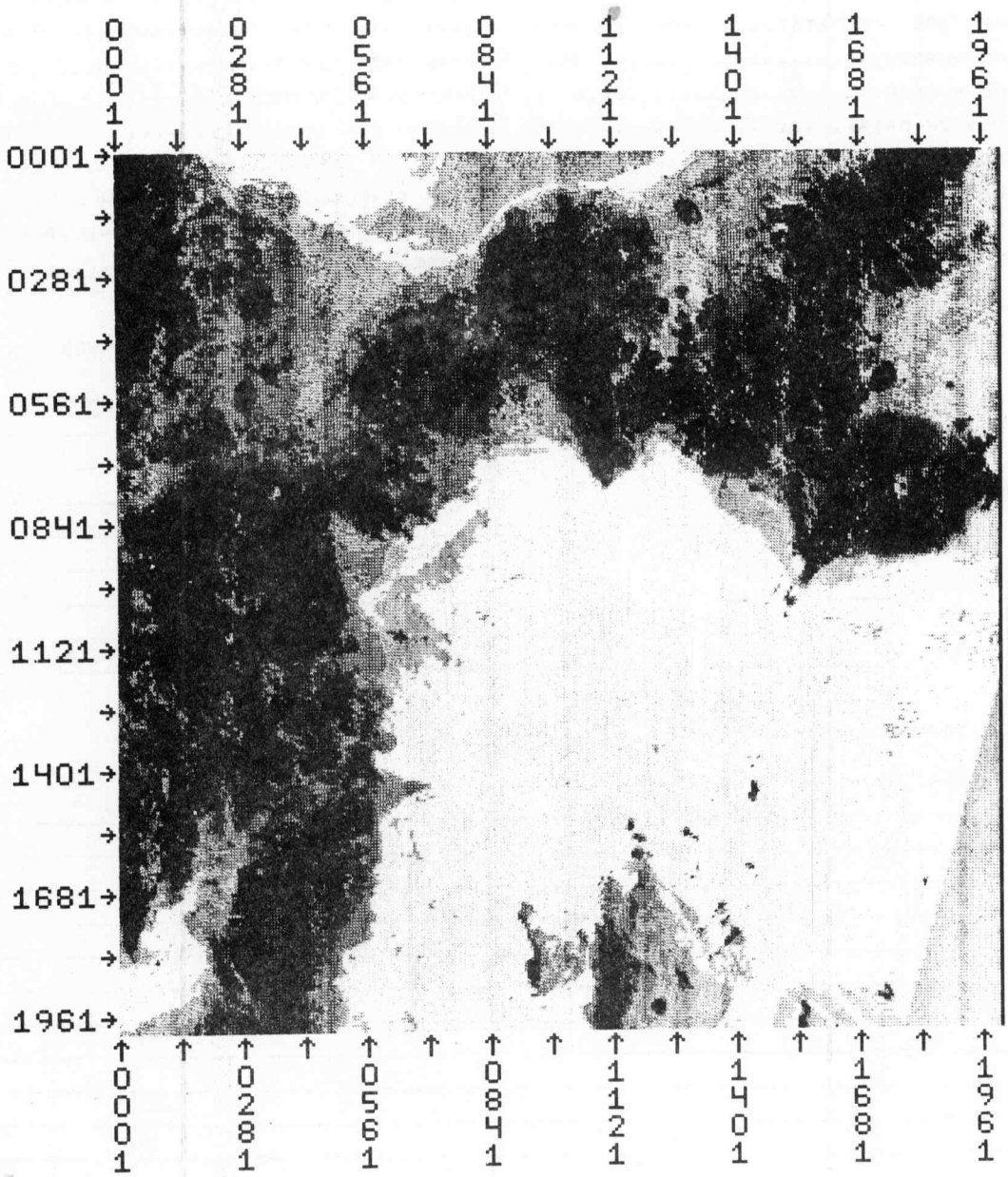
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.60	0.70	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81001401),Band 5



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81001402
DATE TAPE GENERATED..... FEB 18,1982
TAPE NUMBER..... 4095
FILE NUMBER..... 2
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -19.93

FLIGHTLINE ID..... ORURO QUAD XIV
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 68.01

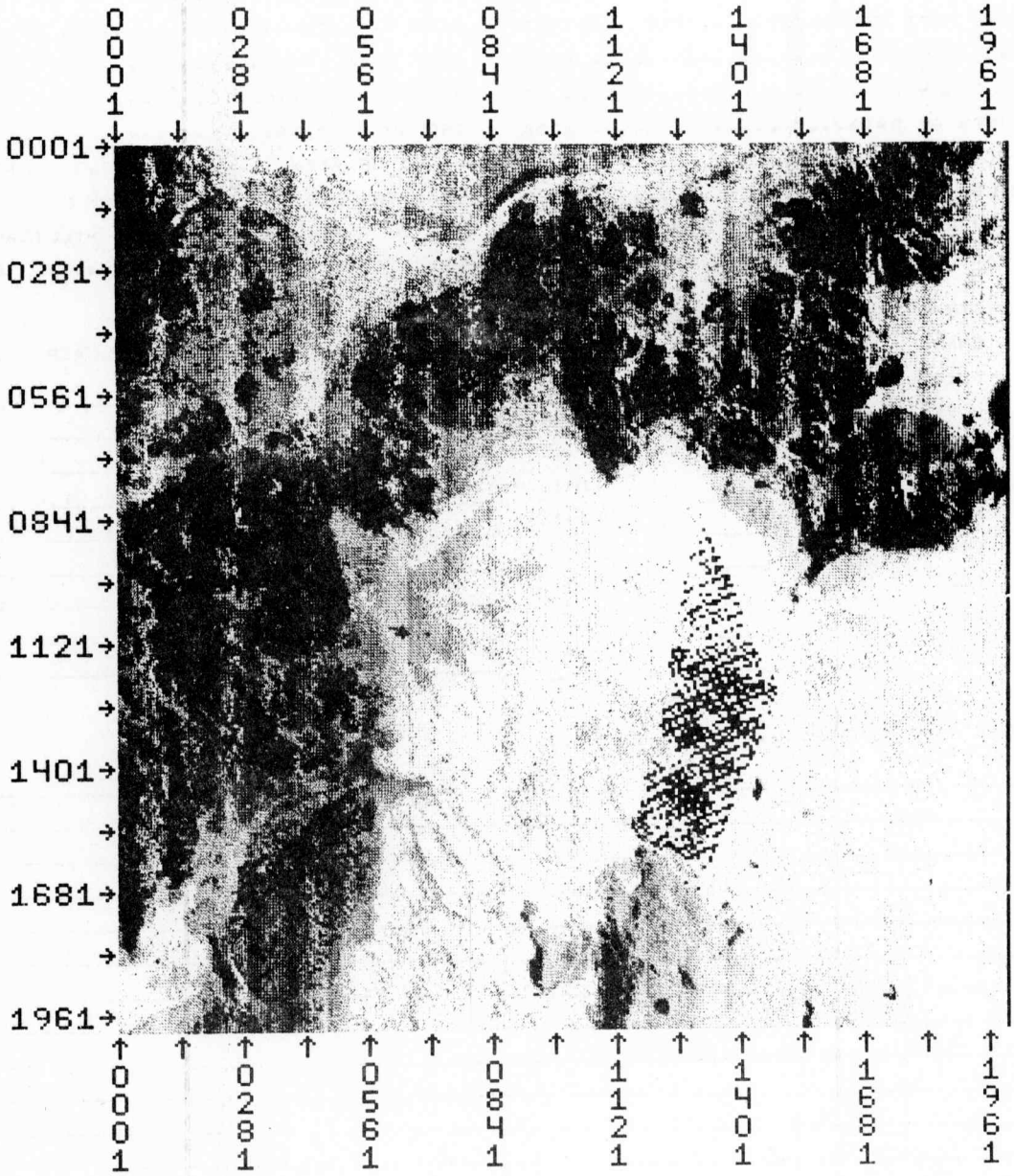
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.70	0.80	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81001402),Band 6



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81001403
DATE TAPE GENERATED..... FEB 18,1982
TAPE NUMBER..... 4096
FILE NUMBER..... 2
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -19.93

FLIGHTLINE ID..... CRURO QUAD XIV
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 68.01

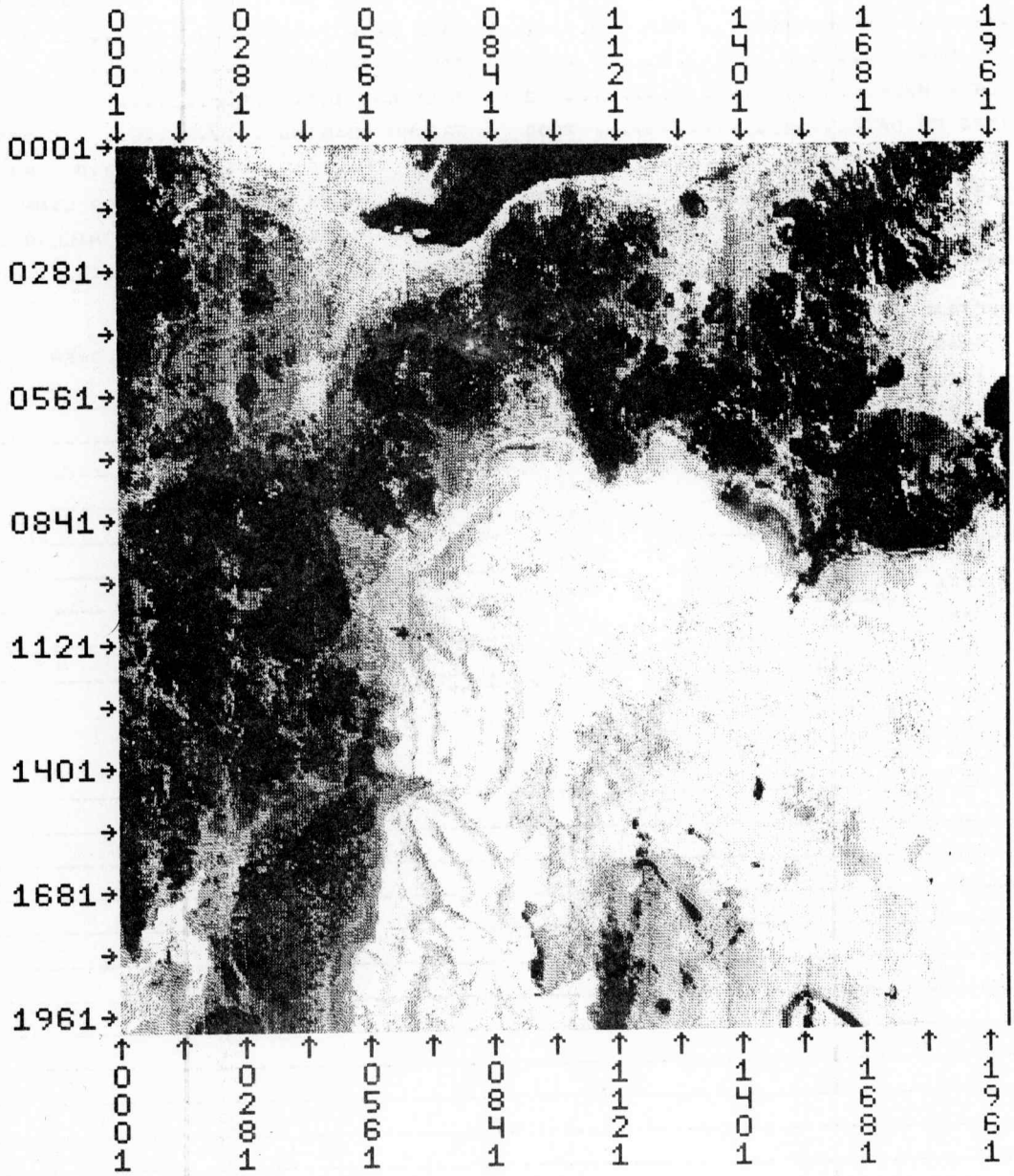
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.80	1.10	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81001403),Band 7



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81001300
DATE TAPE GENERATED..... MAR 9,1982
TAPE NUMBER..... 5618
FILE NUMBER..... 2
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -19.95

FLIGHTLINE ID..... ORURO QUAD XV
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 67.06

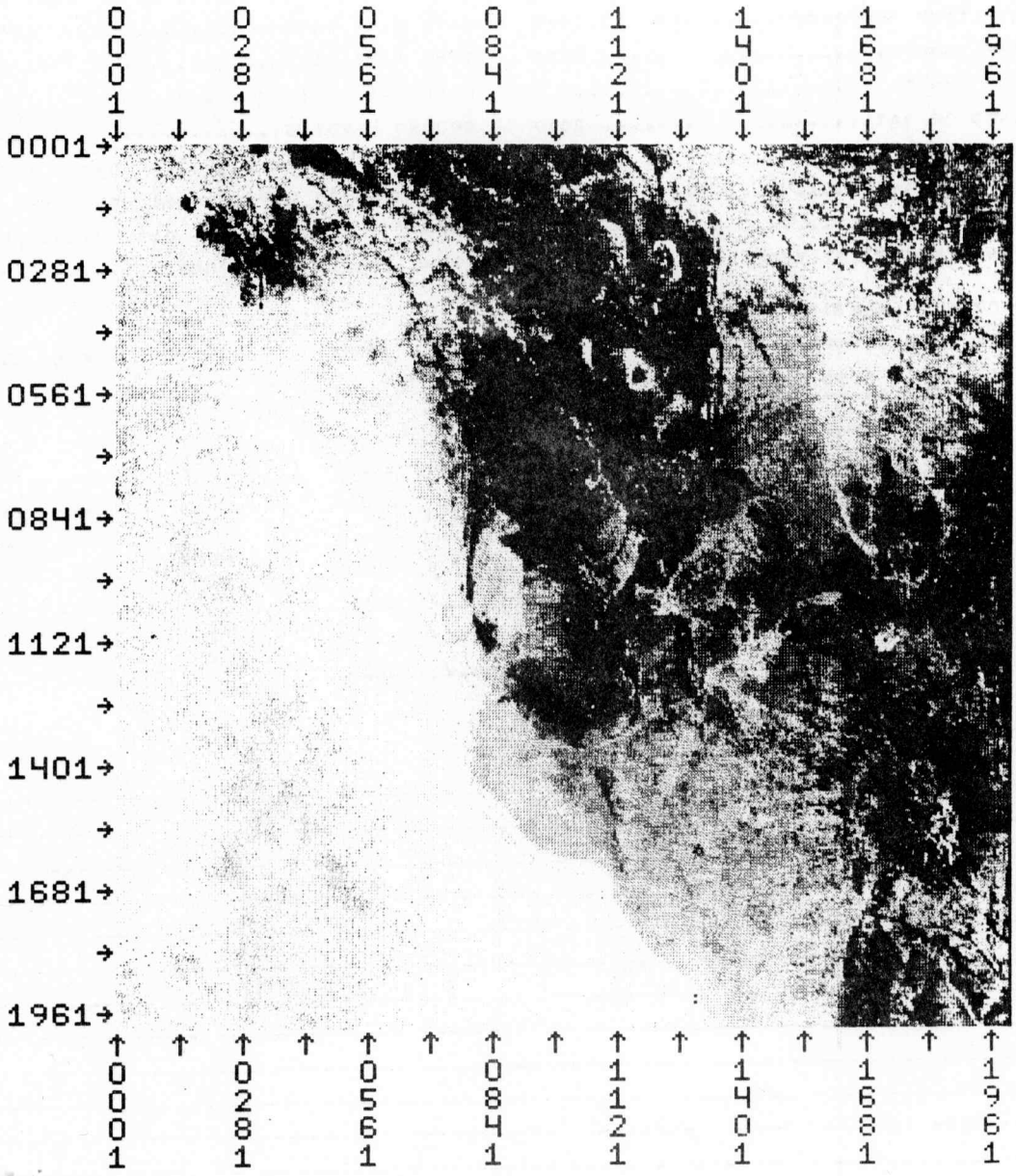
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.50	0.60	(2)			(3)		
(4)			(5)			(6)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-423

Run(81001300),Band 4



LARS FORM - 170

DATA STORAGE TAPE FILE

RUN NUMBER.....	81001301	FLIGHTLINE ID.....	GRUPO QUAD XV
DATE TAPE GENERATED.....	FEB 19,1982	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	3331	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	3	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.0	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.0	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.0 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUDE.....	-19.95	FRAME CENTER LONGITUDE.....	67.06

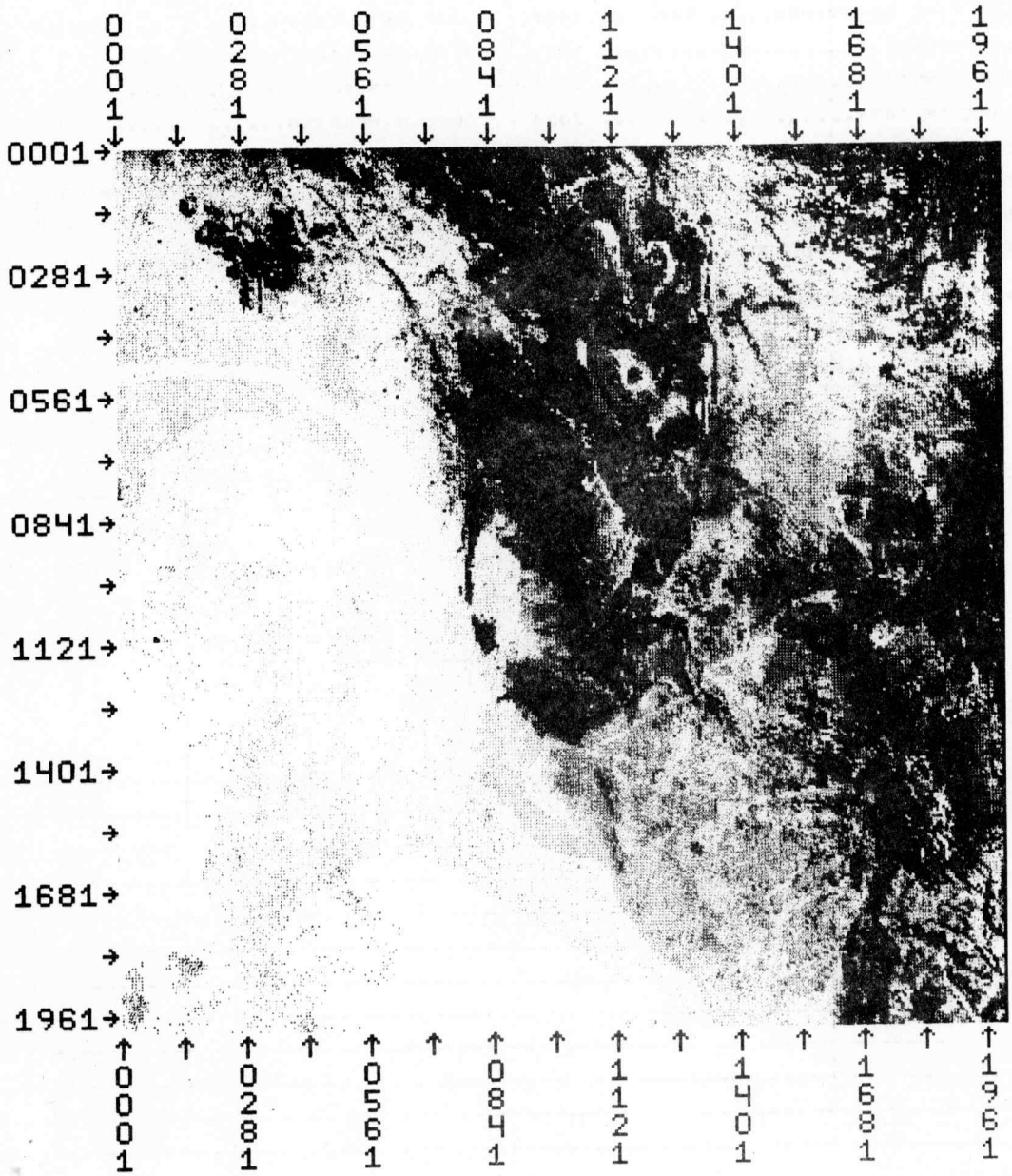
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.60	0.70	(2)	-----	-----	(3)	-----	-----
(4)	-----	-----	(5)	-----	-----	(6)	-----	-----
(7)	-----	-----	(8)	-----	-----	(9)	-----	-----
(10)	-----	-----	(11)	-----	-----	(12)	-----	-----
(13)	-----	-----	(14)	-----	-----	(15)	-----	-----
(16)	-----	-----	(17)	-----	-----	(18)	-----	-----
(19)	-----	-----	(20)	-----	-----	(21)	-----	-----
(22)	-----	-----	(23)	-----	-----	(24)	-----	-----
(25)	-----	-----	(26)	-----	-----	(27)	-----	-----
(28)	-----	-----	(29)	-----	-----	(30)	-----	-----

DATA TAPE COMMENTS...

WP-427

Run(81001301),Band 5



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER.....	81001302	FLIGHTLINE ID.....	ORURO QUAD XV
DATE TAPE GENERATED.....	FEB 19,1982	DATE DATA TAKEN.....	8/18/81
TAPE NUMBER.....	4095	TIME DATA TAKEN.....	HOURS
FILE NUMBER.....	3	PLATFORM ALTITUDE.....	0 FEET
LINES OF DATA.....	2000	GROUND HEADING.....	0 DEGREES
SECONDS OF DATA.....	0.00	FIELD OF VIEW.....	0.0 RADIANS
MILES OF DATA.....	0.00	DATA SAMPLES PER CHANNEL PER LINE	2008
LINE RATE.....	0.00 LINES/SEC	SAMPLE RATE.....	0.0 MILLIRADIANS
FRAME CENTER LATITUCE.....	-19.95	FRAME CENTER LONGITUDE.....	67.06

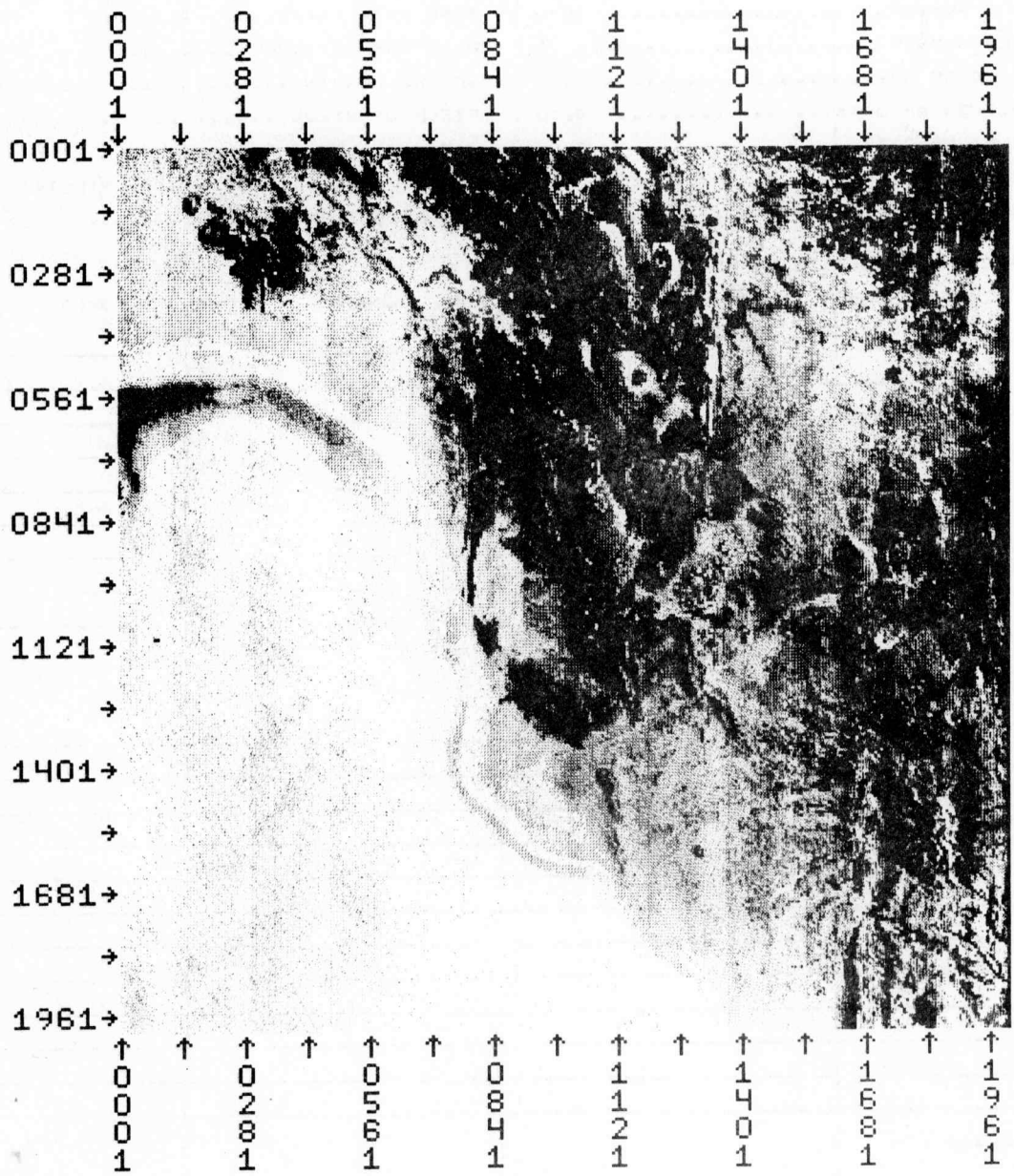
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.70	0.80	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WD-420

Run(81001302),Band 6



LARS FORM - 170

DATA STORAGE TAPE FILE

RUN NUMBER..... 81001303
DATE TAPE GENERATED..... FEB 19,1982
TAPE NUMBER..... 4096
FILE NUMBER..... 3
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -19.95

FLIGHTLINE ID..... ORURO QUAD XV
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 67.06

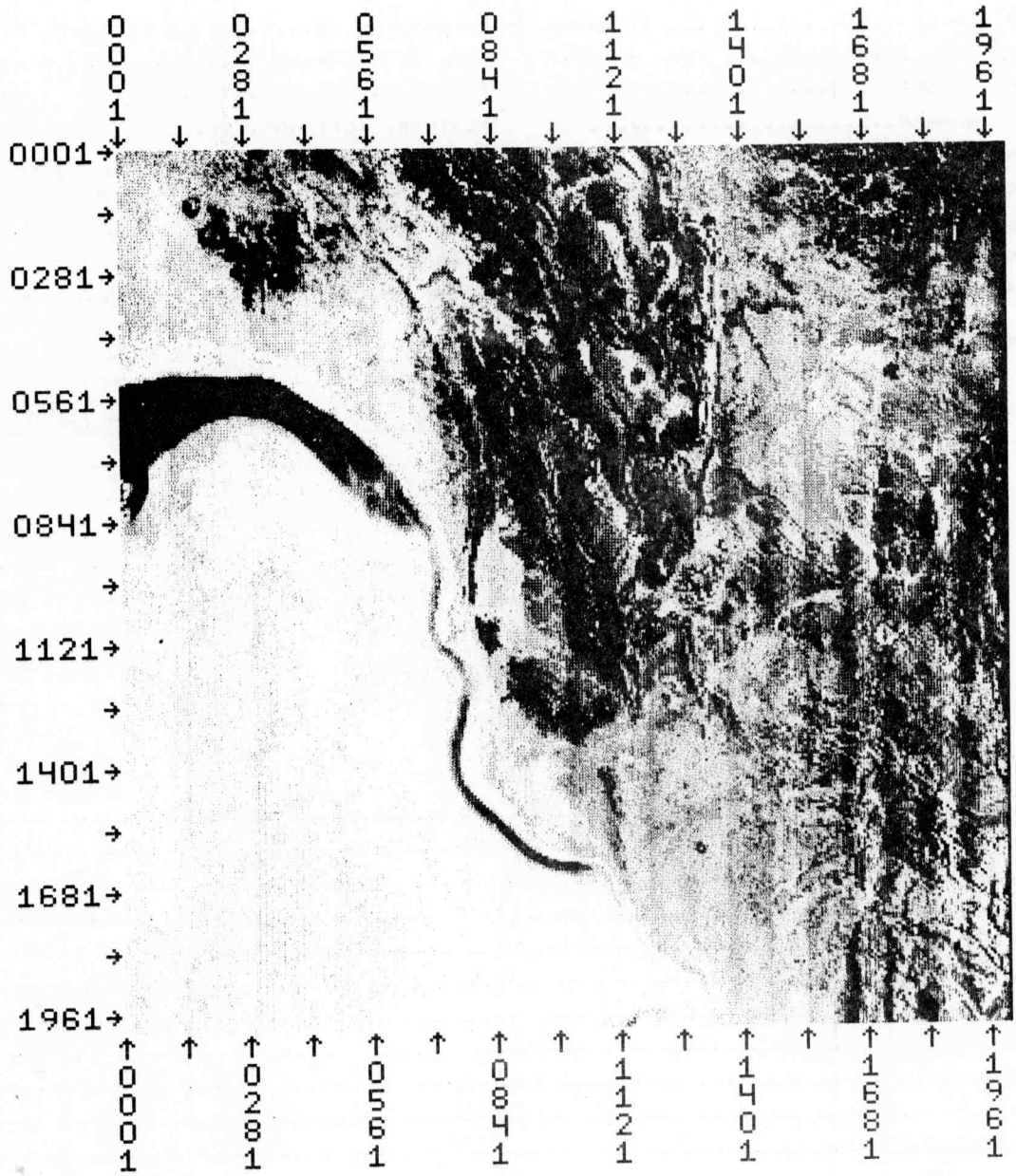
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.80	1.10	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81001303),Band 7



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81001500
DATE TAPE GENERATED..... MAR 9,1982
TAPE NUMBER..... 5618
FILE NUMBER..... 4
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -19.96

FLIGHTLINE ID..... ORURO QUAD XVI
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 66.10

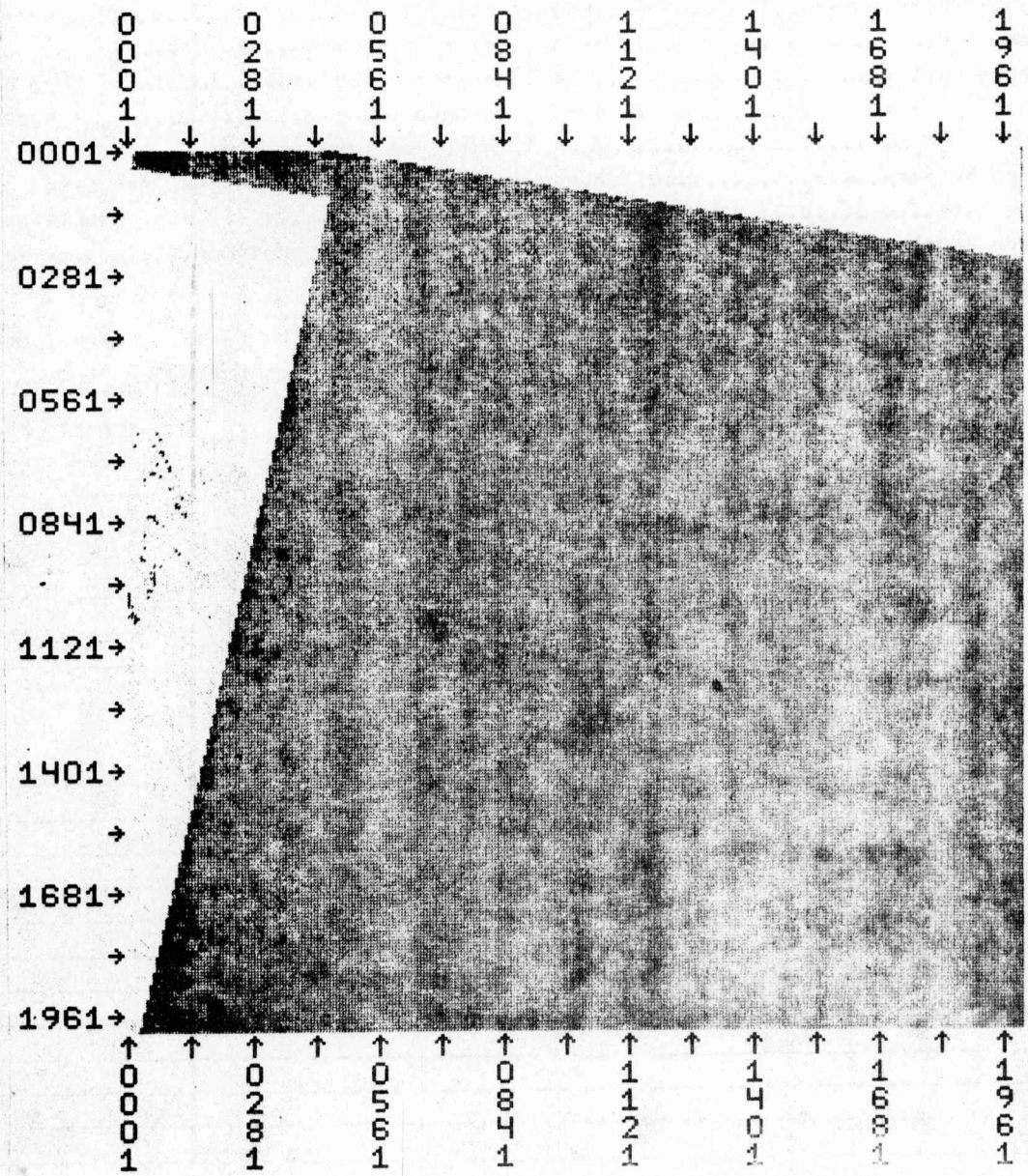
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.50	0.60	(2)			(3)		
(4)			(5)			(6)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WO-428

Run(81001500),Band 4



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81001501
DATE TAPE GENERATED..... FEB 20,1982
TAPE NUMBER..... 3331
FILE NUMBER..... 4
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -19.96

FLIGHTLINE ID..... ORURO QUAD XVI
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 66.10

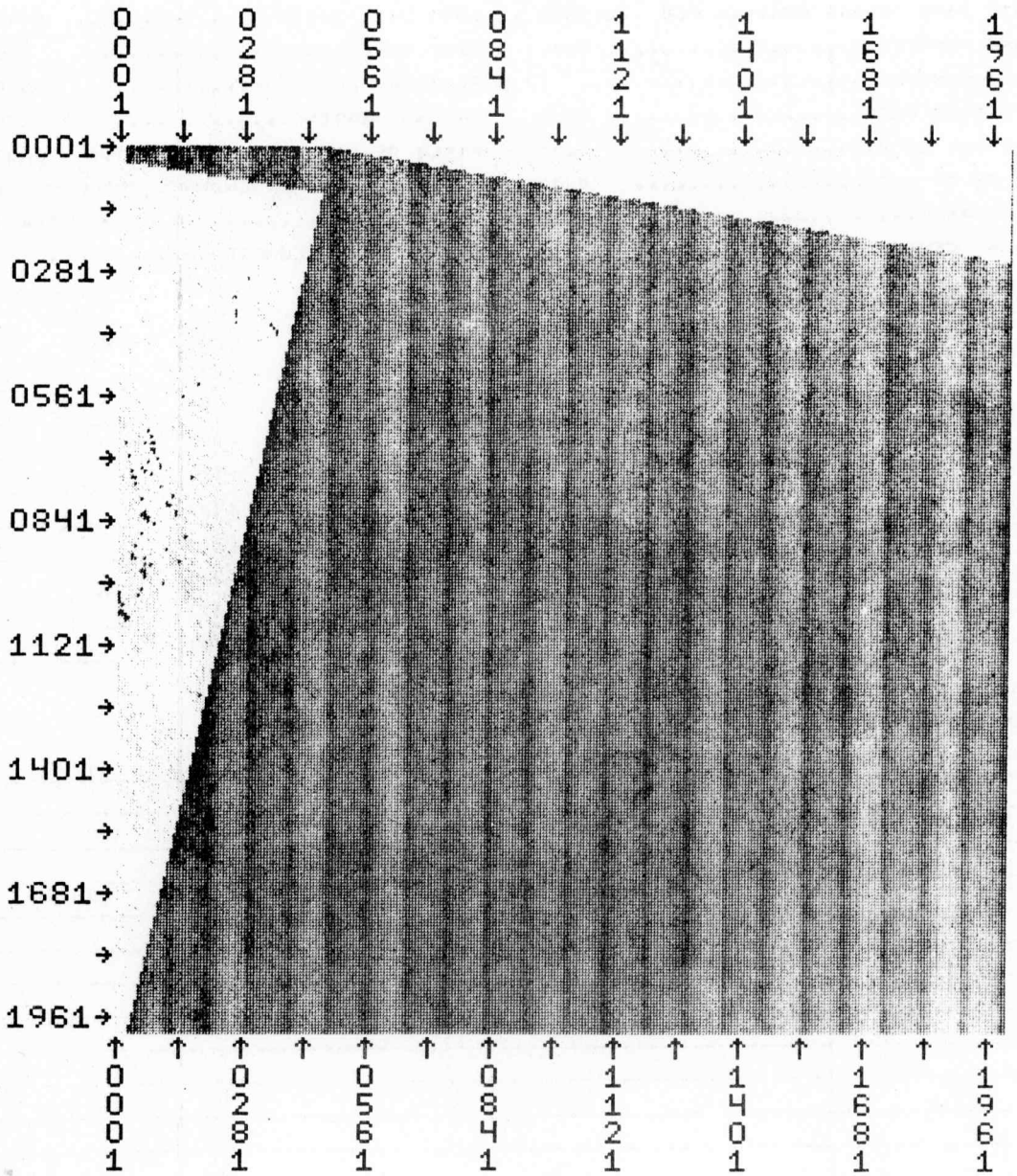
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.60	0.70	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81001501),Band 5



LARS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81001502
DATE TAPE GENERATED..... FEB 19,1982
TAPE NUMBER..... 4095
FILE NUMBER..... 4
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -19.96

FLIGHTLINE ID..... ORURO QUAD XVI
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 66.10

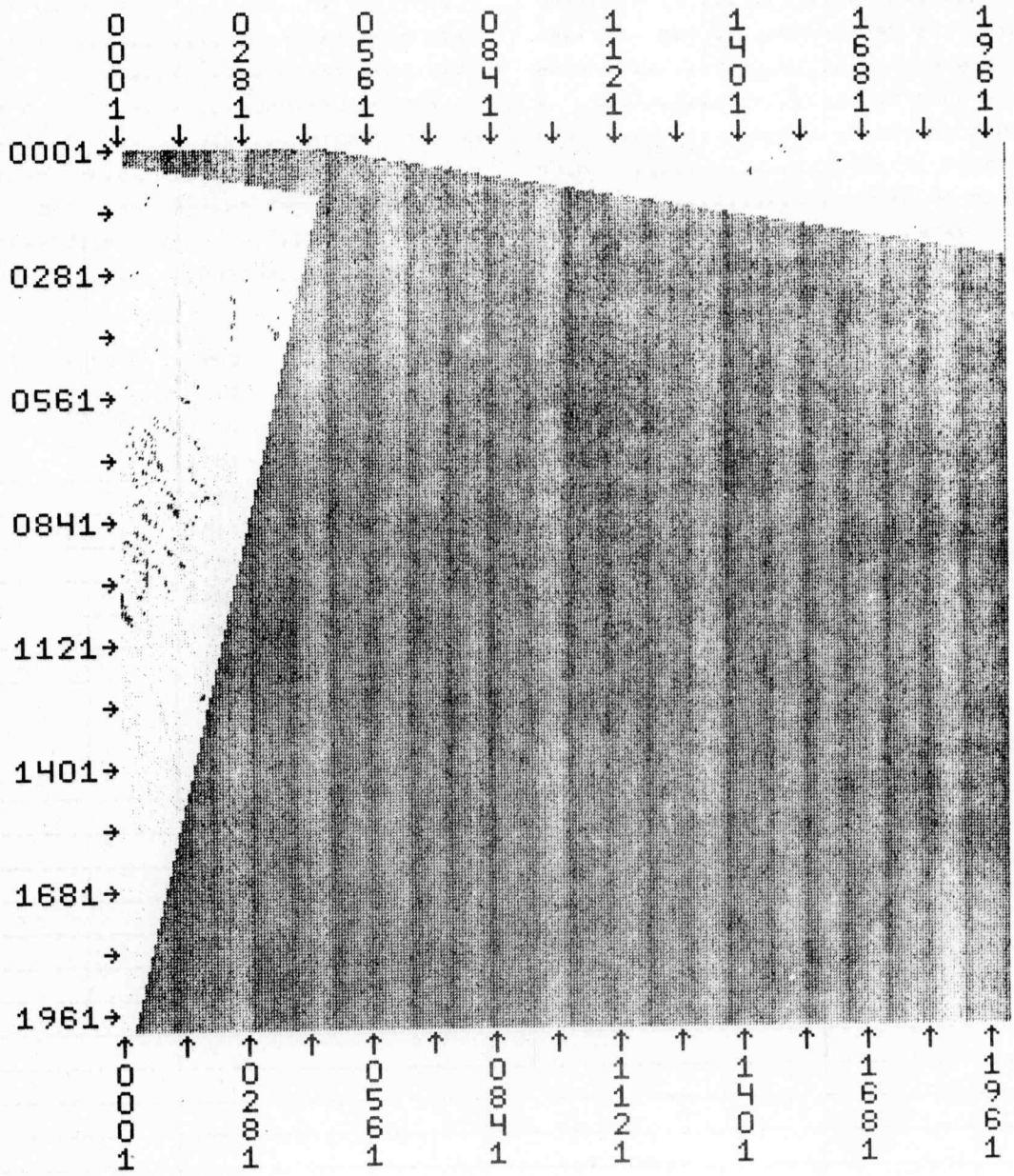
SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.70	0.80	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81001502),Band 6



LAPS FORM - 17D

DATA STORAGE TAPE FILE

RUN NUMBER..... 81001503
DATE TAPE GENERATED..... FEB 19,1982
TAPE NUMBER..... 4096
FILE NUMBER..... 4
LINES OF DATA..... 2000
SECONDS OF DATA..... 0.00
MILES OF DATA..... 0.00
LINE RATE..... 0.00 LINES/SEC
FRAME CENTER LATITUDE..... -19.96

FLIGHTLINE ID..... OPURO QUAD XVI
DATE DATA TAKEN..... 8/18/81
TIME DATA TAKEN..... HOURS
PLATFORM ALTITUDE..... 0 FEET
GROUND HEADING..... 0 DEGREES
FIELD OF VIEW..... 0.0 RADIANS
DATA SAMPLES PER CHANNEL PER LINE 2008
SAMPLE RATE..... 0.0 MILLIRADIANS
FRAME CENTER LONGITUDE..... 66.10

SPECTRAL BANDWIDTH IN MICROMETERS..

CHAN	LOWER	UPPER	CHAN	LOWER	UPPER	CHAN	LOWER	UPPER
(1)	0.80	1.10	(2)			(3)		
(7)			(8)			(9)		
(10)			(11)			(12)		
(13)			(14)			(15)		
(16)			(17)			(18)		
(19)			(20)			(21)		
(22)			(23)			(24)		
(25)			(26)			(27)		
(28)			(29)			(30)		

DATA TAPE COMMENTS...

WP-420

Run(81001503),Band 7