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STRUCTURE, COMPOSITION AND THERMAL STATE OF THE CRUST IN BRAZIL"

Investigation M-51

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## INTRODUCTION

This investigation aims at understanding the deep structure of the continental crust in Brazil and its variation in different structural environments. It is expected that a preliminary crustal model for the main structural provinces will be obtained. A secondary objective of this investigation is to check the normal geomagnetic field for the Brazilian area.

During the period covered by this report our activities were concentrated on the following topics:

- i) Aeromagnetic data analysis and comparison with Magsat anomalies
- ii) Implementation and testing of software required by the analysis of Magsat data.

In the following sections these topics will be discussed in greater detail.

## AEROMAGNETIC DATA ANALYSIS AND COMPARISON WITH MAGSAT ANOMALIES

The aeromagnetic survey of the state of Minas Gerais areas was analyzed. (This survey is described in the previous progress report). Because the surveyed region is a cratonic area (the São Francisco craton), the results derived from the analysis may serve as a guide-line to the interpretation of geophysical data (Magsat data included) relative to other cratonic areas of the Brazilian territory.

Initially the data set was used to determine the thickness of the magnetized crust (Mantovani & Shukowsky, in press). The value obtained is in agreement with crustal models derived from deep seismic sounding and gravity data (Blitzkow, et al., 1980).

indicating that the bottom of the magnetized layer occurs close to the Moho transition.

Then an analysis was made of the long wavelength pattern observable in the anomaly maps derived from the survey data (Shukowsky and Mantovani, 1981). The long wavelength anomalies form a series of lineations, elongated in a direction close to the magnetic E-W, as illustrate by Figure 1.

It was shown by the interpretation of the behaviour of the anomalies, when reduced to the pole, that these E-W lineations have no tectonic significance. They seem to be formed by the attenuation, which occurs at low inclination of the reference field, of the anomalies with variation predominantly in the magnetic E-W direction.

At present it is being verified if a similar situation may occur with the anomalies computed from Magsat data.

A striking characteristic of the total intensity anomaly map plotted by GSFC, which is particularly evident in the colored version of the map, is that the localized anomalies such as the Bangui anomaly, the anomalies related to the Himalayas and others, are superimposed onto an anomaly background formed by an alternation of positive and negative patches which are strongly elongated along the dip parallels. This situation is sketched for the South American continent in Figure 2, but it is readily observable in all area covered by the colored global anomaly map, being more pronounced in the vicinity of the dip equator.

Two alternative explanations were suggested for the peculiar anomaly pattern, at the group discussion sessions which took place at the Magsat investigator's meetings at GSFC and in Edinburgh. One of them proposes that the lineations are somehow caused by the process used by GSFC to eliminate the effect of the ring current

and other external fields. The other explanation relies on the existence of an equatorial current system, not modeled at present.

#### IMPLEMENTATION AND TESTING OF SOFTWARE

The analysis of the Magsat data is now proceeding along the following lines:

- i) Assessment of the resolution of the Magsat data by the examination of the anomaly profile along passes intersecting known crustal anomalies.
- ii) Evaluation of the noise level in the data by the comparison of geographically close passes, grouped according to the value of the  $K_p$  index.
- iii) Inversion of the Magsat data by the equivalent source technique.

To carry out the operations listed above it is essential to be able to manipulate the Magsat data in order to select passes which are close to some geographic location or to one another, as well as to restrict the data set to certain sub-regions for the purposes of inversion, regional studies and correlation with terrestrial data.

The geographic restriction of the Magsat data set is done by the program SELECTB. This program reads an Investigator B tape and selects data falling within an area confined by any two parallels and any two meridians. It finds out if a pass cuts across the selected area by examining the longitude of the ascending and descending nodes contained in the header record.

If the pass intersects the area of interest, then the header record is written to the output tape along with all data records

which have at least one data point inside the selected area. Otherwise the pass is rejected.

The listing of the program is given in the Appendix.

The re-processing of the latest Investigator B data tape (OF8023) by the program SELECTB has revealed that the data selection software used by NASA has some bugs. Our selection program has identified and rejected 52 passes from a total of 610 passes selected by NASA. All these passes, listed in Table 1, consist of the header record and of one single data record which straddles the  $180^{\circ}$  longitude, well outside of our area.

TABLE 1. PASSES ERRONEOUSLY SELECTED BY NASA

Pass n°	Pass n°	Pass n°	Pass n°
41	395	642	1027
57	410	657	1028
133	411	718	1043
134	426	719	1058
210	487	734	1074
211	488	749	1105
241	503	765	1135
257	580	795	1136
272	595	796	1151
287	610	811	1166
303	611	827	1167
333	626	950	1197
364	641	1012	1198

The selection of individual passes for mutual closeness or



for closeness to a given point on the surface of the Earth is made by the examination of the longitude of the ascending and descending nodes of the passes.

The longitudes of the nodes, along with the pass ID and other additional information are conveniently organized into a disk file, titled MS/NODES, by the program NODEGEN, listed in the Appendix.

To identify mutually close passes, the file is searched in the ascending order of the node longitudes. Two passes are considered to be "close" when the corresponding nodes differ in longitude by less than a predetermined value.

To identify passes which are close to a given point on the surface of the Earth the file MS/NODES is searched for passes which are close to a pass which is directly overhead of the given surface point.

The node longitude of such an overhead pass is computed by

$$\alpha = \arcsin (\pm \sin \phi / \sin I) \quad (1)$$

$$\beta = \arcsin (\pm \tan \phi \cot I) \quad (2)$$

$$\Omega = \lambda - \beta + \frac{\omega T}{2\pi} \alpha \quad (3)$$

Where  $(\phi, \lambda)$  are the geocentric latitude and longitude of the surface point,  $I$  is the inclination of the Magsat orbit,  $T$  is the orbital period and  $\omega$  is the angular velocity of the rotation of the Earth. The sign in (1) and (2) is positive for the ascending node and negative for the descending node.

The expressions (1) - (3), derived with the simplifying assumption of a circular orbit, are nevertheless sufficiently precise to be used for the pass selection, and are so simple as to be easily programmed even into a hand held calculator.

We intend to use the software distributed by NASA to compute the equivalent source parameters. For this purpose the program AESMAP is now being adapted and tested.

### PROBLEMS

We continue to experience difficulties with the customs clearance of the Magsat data tapes sent by post.

A lot of 35 data tapes was given provisional clearance, subject to the condition that we exhibit a statement by NASA declaring the tapes to be scientific material without monetary value.

We were informed at the time that all future data packages will be cleared only if accompanied by such a statement.

The matter has been referred to the Magsat Technical Officer.

### PUBLICATIONS

During the reporting period a paper was presented to the Fourth Scientific Assembly of IAGA, in Edinburgh (Shukowsky and Mantovani, 1981), dealing with the analysis of long wavelength anomalies in a large aeromagnetic survey.

### CONCLUSIONS

The results anticipated from the analysis of the Magsat data are stirring a lively interest among Brazilian geoscience researches, so as to envisage the possibility of co-operative research between our institution and other scientific institutions.

On the other hand, the mineral exploration industry has

manifested a great interest in the crustal models which are expected to be derived in the course of the present investigation, particularly for the region of the Paraná basin, now being intensively studied by the industry for the evaluation of petroleum potentiality.

#### REFERENCES

1. Blitzkow, D.; Gasparini, P.; Mantovani, M.S.M.; Sá, N.C. de - "Crustal structure of southeastern Minas Gerais, Brazil, deduced from gravity measurements". Rev. Bras. Geoc. 9:33-38, 1980.
2. Mantovani, M.S.M.; Shukowsky, W. - "Analysis of a large extent aeromagnetic survey near the geomagnetic equator (Minas Gerais, Brazil)". Pure and Applied Geophysics - in press.
3. Shukowsky, W.; Mantovani, M.S.M. - "Discussion of a large extent aeromagnetic survey analysis near the geomagnetic equator". IAGA Scientific Assembly, Edinburgh, 1981.

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BLACK AND WHITE PHOTOGRAPH

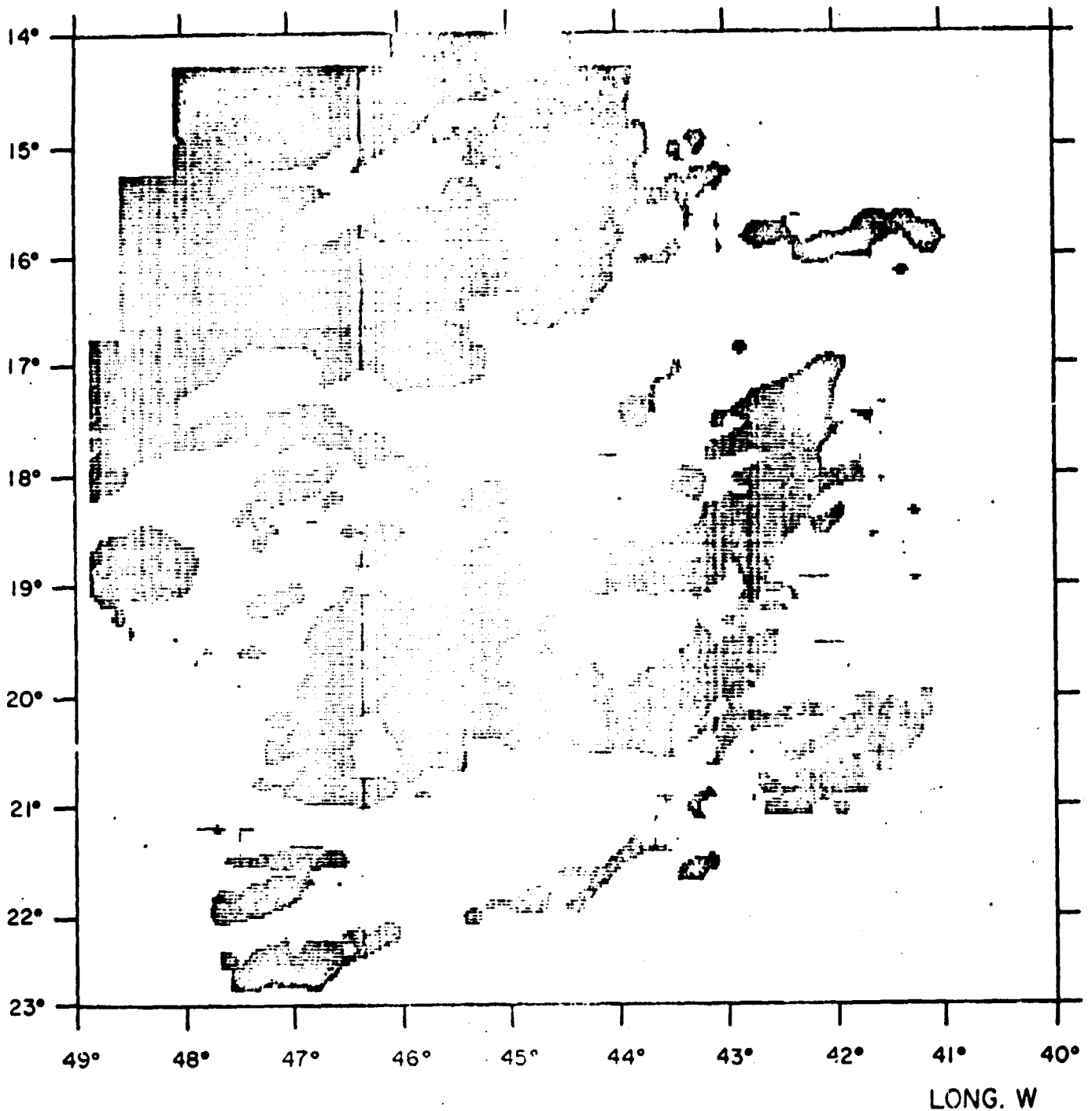


FIGURE 1. The long wavelength total intensity magnetic anomaly pattern over the state of Minas Gerais, Brazil. The shaded areas are negative, the clear areas are positive.

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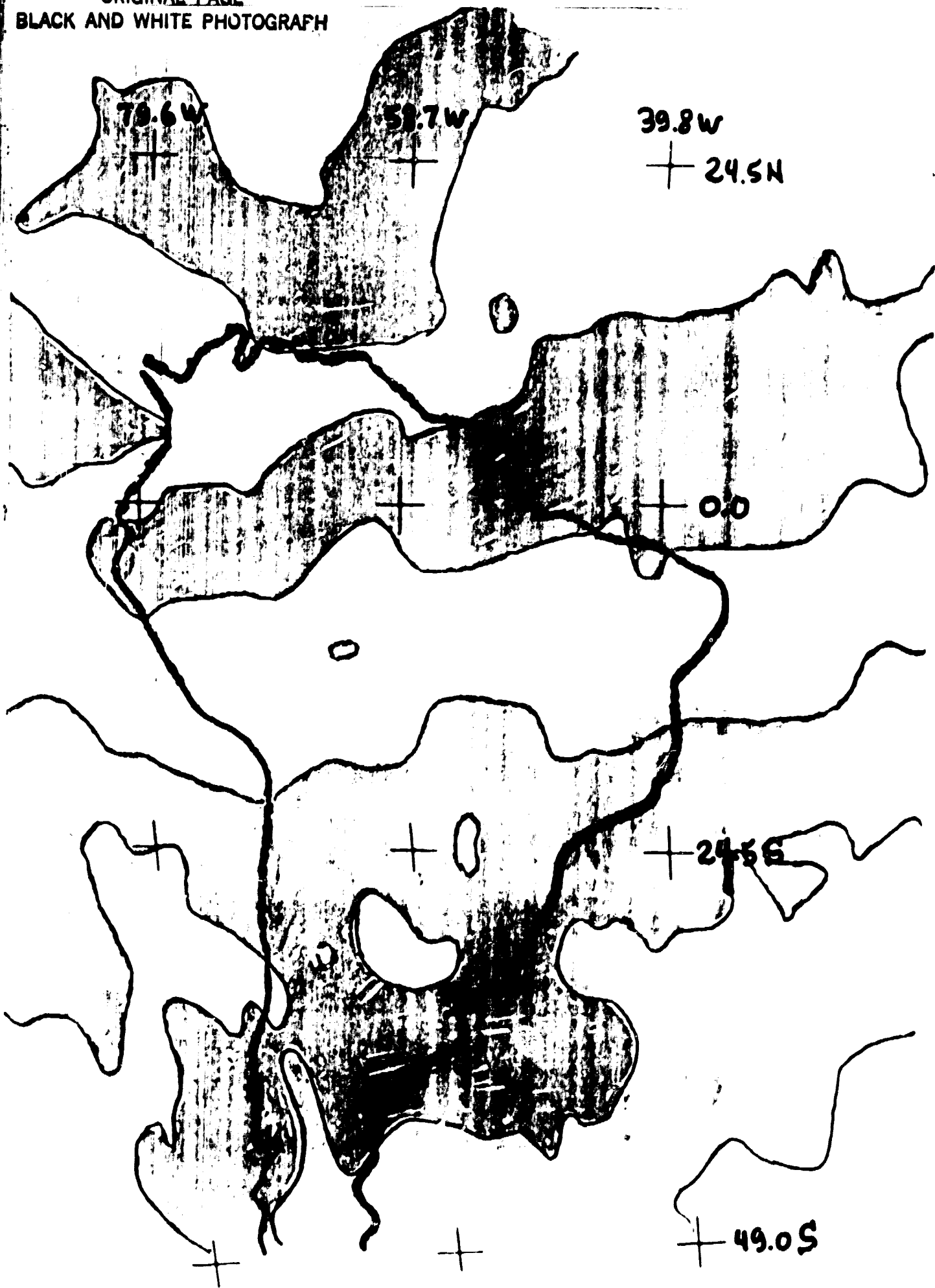


FIGURE 2. The total intensity anomaly pattern over the South American continent, from the Magsat anomaly map, prepared by GSFC. Dark gray areas are positive. Light gray areas are negative.

APPENDIX - PROGRAM LISTINGS





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```

200 IF(IPASSX.GT.LPASSX)GO TO 203
    *REPT=REPT+1)GO TO 202
203 LPASSX=IPASSX
    IF(ALCAX(1).LT.LONGL1.OR.ALONX(1).GT.LONGU1)GO TO 204
    KL=1)KU=3)GO TO 205
204 IF(ALCAX(2).LT.LONGL2.OR.ALONX(2).GT.LONGU2)GO TO 202
    KL=3)KU=1
C SAVE PESSER RECORD
205 GO 100 J=1,757
100 SVPCR(J)=E(J)
C GET DATA
208 CALL RCINVB(ERRMSG,EOF)
    IF(EOF)GO TO 201
    GO TO (200,206)I)TYPEX
C TEST FOR PADDED LATITUDES
206 IF(LAT(KL).NE.PAD)GO TO 207
    KPAC=READ+1)INC=1)IF(KL.LT.KU)INC=+1
    KL=KL+INC
209 IF(LAT(KL).NE.PAD)GO TO 207
    IF(KL.NE.KU)GO TO 209
    GO TO 208
207 IF(LAT(KU).NE.PAD)GO TO 210
    KPAC=PAD+1)INC=1)IF(KL.LT.KU)INC=+1
    KU=KU+INC
211 IF(LAT(KU).NE.PAD)GO TO 210
    IF(KU.NE.KL)GO TO 211
    GO TO 208
C TEST LATITUDE BOUNDS
210 IF(LAT(KU).LT.LATS.OR.LAT(KL).GT.LATN)GO TO 212
    J=PAD(KL,KU)JL=MAX(KL,KU)
    IF(LONG(JU).LT.LONGM.OR.LONG(JL).GT.LONGE)GO TO 212
    IF(PDCK)GO TO 213
C WRITE SAVED HEADER
    KOUT=KOUT+1
    SVPCR(1)=KOUT
    WRITE(9)SVPCR
C HDRCK=.TRUE.
C WRITE DATA OUT
213 KOUT=KOUT+1)IAUX=ISECB)NSECB=KOUT
    WRITE(9)B)NSECB)IAUX)GO TO 208
212 IF(PDCK)GO TO 202
    GO TO 208
201 LOCK 9
601 IF(ERMMSG)WRITE(6,601)
    *
    WRITE(6,602)KREPT,KPAC,KOUT
    FORMAT('C',I6,' " DUPLICATED OR OUT OF SEQUENCE PASSES DETECTED",/
    ,I6," DATA RECORDS WITH PADDED LAT VALUES DETECTED",/
    ,I6," RECORDS SELECTED",//,"EOT."')
C STOP
555 WRITE(6,666)I)STOP
566 FORPAT('O****UNDEFINED GEOGRAPHIC LIMITS "')
    ENC
C02:00A9:4 IS THE LOCATION FOR EXCEPTIONAL ACTION ON THE I/O STATEMENT AT C02:10089
C02:00A8:0 IS THE LOCATION FOR EXCEPTIONAL ACTION ON THE I/O STATEMENT AT C02:1007F
C02:00A8:1 IS THE LOCATION FOR EXCEPTIONAL ACTION ON THE I/O STATEMENT AT C02:10008
C02:00B1:2 IS THE LOCATION FOR EXCEPTIONAL ACTION ON THE I/O STATEMENT AT C02:10000

```

FIB IS 0006 LONG

SEGMENT 002 IS C002 LONG

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\*\*\*\*\*  
FCRPA1 SEGMENT IS 000E LONG  
START CF SEGMENT 000  
(150)

START CF SEGMENT 002  
SEGMENT 002 IS 000E LONG  
SEGMENT 006 IS 0019 LONG

\*\*\*\*\*  
WARNING: THE SUBROUTINE "ROINVB" WAS NOT FOUND

NO ERRORS DETECTED. NUMBER OF CARDS = 106.  
COMPILATION TIME = 23 SECONDS ELAPSED, 2.24 SECONDS PROCESSING.  
C2 STACK SIZE = 16 WORDS. FILESIZE = 218 WORDS. ESTIMATED CORE STORAGE REQUIREMENT = 2061 WORDS.  
TOTAL PROGRAM CODE = 270 WORDS. ARRAY STORAGE = 1528 WORDS.  
NUMBER OF PROGRAM SEGMENTS = 7. NUMBER OF DISK SEGMENTS = 31.  
PROGRAM CODE FILE = (112A5G)SELECTE ON PACK.  
COMPILER COMPILED ON 09/07/79 (FORTRAN CN PACK).



S E L E C T B

```

BINC = FROM MSLIB/
BEGIN BINDING RCINVB OF
FILE#
/IBUFB/
<SEG DICT ITEM>
<SEG DICT ITEM>
<SEG DICT ITEM>
END OF BINDING RCINVB

```

```

CUT FROM MSLIB/PDINVB
(02,0002) CHANGED TO (02,000C)
(02,0007) CHANGED TO (02,000B)
(02,0006) CHANGED TO (02,0010)
(02,0003) CHANGED TO (02,0002)
(01,0002) CHANGED TO (01,0008) = 03 00000480000A
(01,0004) CHANGED TO (01,000A) = 05 07000000000A
(01,0006) CHANGED TO (01,000R) = 05 02000284000E

```

```

=====
NUMBER OF ERRCPs DETECTED = 0.
WCST FILE = WCST
SEGMENT DICTIONARY LENGTH = 12. GLOBAL STACK SIZE = 18. STACK ESTIMATE = 512.
CORE ESTIMATE = 2061 WORDS. CODE FILE LENGTH = 39 DISK SEGMENTS.
BINDING TIME = 13 SECONDS ELAPSED, 3.05 SECONDS PROCESSOR, 2.32 SECONDS I/O.
=====

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IF(CITYPEX.NE.1)GO TO 200
ALCNX=ALCNX(1) DLN=ALCNX(2)
IF(ALCN.LT.AL.OR.ALGN.GT.AU)GO TO 202
ALCNX(2)=ASCJGO TO 203
IF(DLCN.LT.DL.OR.DLCN.GT.OU)GO TO 204
ALCNX(1)=DLN
ALCNX(2)=DSCJ GO TO 203
ALCNX(1)=99999.
ALCNX(2)=REJ
CONTINUE
WRITE(10)NSEOX,IPASSX,MJDX,MSECX,ALTMX,ALONX,IKP,ASCX,DSCX,
    GSM,DST
GO TO 200
WRITE(11)B
CLOSE(10,DISP=CRUNCH)
CLOSE(11,DISP=CRUNCH)
WRITE(6,600)NSEJX
FORMAT('OEDIT. 16,"RECCRS PROGRESSED"')
STOP
END
002:006114 IS THE LOCATION FOR EXCEPTIONAL ACTION ON THE I/O STATEMENT AT 002:00651
002:0063:0 IS THE LOCATION FOR EXCEPTIONAL ACTION ON THE I/O STATEMENT AT 002:00643
002:006412 IS THE LOCATION FOR EXCEPTIONAL ACTION ON THE I/O STATEMENT AT 002:00660
    SEGMENT 002 IS 006E LONG

```

\*\*\*\*\*

FORMAT SEGMENT IS 009 LCNG  
START OF SEGMENT 007  
(15C)

START OF SEGMENT 009  
SEGMENT 009 IS 000B LONG  
SEGMENT 007 IS 001B LONG

WARNING:THE SUBROUTINE "RCINVE" WAS NOT FOUND

NO ERRORS DETECTED. NUMBER OF CARDS = 72.  
 COMPILATION TIME = 10 SECONDS ELAPSED. 1.62 SECONDS PROCESSING.  
 C2 STACK SIZE = 16 ADRES. FILESIZE = 3634 RCDS. ESTIMATED CORE STORAGE REQUIREMENT = 4610 RCDS.  
 TOTAL PROGRAM CODE = 192 RCDS. ARKAY STORAGE = 757 RCDS.  
 NUMBER OF PROGRAM SEGMENTS = 9. NUMBER OF DISK SEGMENTS = 23.  
 PROGRAM CODE FILE = (112AGG)NOEGEN ON PACK.  
 COMPILER COMPILED ON 09/0779 (FORTRAN ON PACK).

M S L I B / S U B S

```

88SET SEPARATE
SUBROUTINE RDINVB(ERMSG,EOF)
LOGICAL ERMSG,EOF
COMMON/INBUF/BUF(757)
EQUIVALENCE (BUF(1),NSEC),(BUF(2),TYPE)
C
C INVESTIGATOR B READER ROUTINE
C
LSEQ=NSEC+1
205 READ(8,END=200,ERR=201)EUF
202 IF(NSEC=LSEQ)202,203,204
C**READ ERROR - BLOCK(S) MISSING
C
204 ERMSG=.TRUE.
DD 100 LSEQ=LSEQ,NSEC -1
WRITE(6,600)LSEQ
600 FORMAT(1H0," RDINVB*** READ ERR - BLOCK",I5," IS MISSING")
100 CONTINUE
C** CHECK TYPE CODE
203 IF(TYPE.LE.2)RETURN
C**FAR ERR ON CRIG TAPE (GSFC)
ERMSG=.TRUE.
WRITE(6,601)NSEQ,TYPE
601 FORMAT(1H0,"***RDINVB*** PAR ERR ON CRIG GSFC TAPE- BLOCK ",
1 I5," TYPE =",I7)
GO TO 205
C**FAR ERR ON CONVERTED TAPE
201 ERMSG=.TRUE.
WRITE(6,602)LSEQ
602 FORMAT(1H0,"***RDINVB*** PAR ERR BLOCK",I5)
LSEQ=LSEQ+1
GO TO 202
200 EOF=.TRUE.,BLOCK 8
RETURN
END
002:00412 IS THE LOCATION FOR EXCEPTIONAL ACTION ON THE I/O STATEMENT AT 002:0001
SEGMENT 002 IS 004B LONG

```

```

*****
START CF SEGMENT 005
SEGMENT 005 IS 0C16 LONG
*****
NO ERRORS DETECTED. NUMBER OF CARDS = 34.
COMPILATION TIME = 11 SECONDS ELAPSED, 1.00 SECONDS PROCESSING.
C2 STACK SIZE = 9 MCARDS. FILESIZE = 156 MCARDS. ESTIMATED CCRE STORAGE REQUIREMENT = 106B MCARDS.
TOTAL PROGRAM CODE = 132 MCARDS. ARRAY STORAGE = 757 MCARDS.
NUMBER OF PROGRAM SEGMENTS = 5. NUMBER OF DISK SEGMENTS = 20.
PROGRAM CODE FILE = (112AGG)MSLIB/RDINVB ON PACK.
COMPILER COMPILED ON 09/07/79 (FORTRAN ON PACK).

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N C D E G E N

```

SIND = FROM WSLIB/ =
BEGIN BINDING ROINVB OF
ROINVB
FILE0
FILE0
/INBUF/
<SEG DICT ITEM>
<SEG DICT ITEM>
<SEG DICT ITEM>
END OF BINDING ROINVB

```

```

.....
NUMBER OF ERRORS DETECTED = 0.
HOST FILE = HOST
SEGMENT DICTIONARY LENGTH = 13. GLOBAL STACK SIZE = 18. STACK ESTIMATE = 512.
CORE ESTIMATE = 4610 WORDS. CODE FILE LENGTH = 31 DISK SEGMENTS.
BINDING TIME = 7 SECONDS ELAPSED, 2.45 SECONDS PROCESSOR, 1.74 SECONDS I/O.
.....

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MODELISTER  
=====

FILE 6(KIND=PRINTER, MAXRECSIZE=22,PAGESIZE=60)  
FILE 10(KIND=DISK,MAXRECSIZE=33,BLOCKSIZE=990)

THIS PROGRAM LISTS THE FILE MS/MODES

DIMENSION TIT(14),E(33),MSECX(2),ALTX(2),ALONX(2),IKP(2),  
ASCX(2),DSCX(2),GSM(2,3),DST(2,6)  
EQUIVALENCE(ENSEQX,B(1)),(IPASSX,B(2)),(MJDXX,B(3)),(MSECX,B(4)),  
(ALTX,B(6)),(ALONX,B(8)),(IKP,B(10)),(ASCX,B(12)),  
(DSCX,B(14)),(GSM,B(16)),(DST,B(22))  
READ(5,500,END=200)TIT

500 FORMAT(13A6,A2)

200 CONTINUE  
GO TO 201

204 READ(10,END=205)B  
KONT=KONT+1  
WRITE(6,600,END=203)MSECX,IPASSX,MJDX,MSECX,ALTX,ALONX,  
IKP,ASCX,DSCX

600 FORMAT(")",I5,I6,I7,I8,I9,I10,I11,I12,I13,I14,I15,I16,I17,I18,I19,I20,I21,I22,I23,I24,I25,I26,I27,I28,I29,I30,I31,I32,I33,I34,I35,I36,I37,I38,I39,I40,I41,I42,I43,I44,I45,I46,I47,I48,I49,I50,I51,I52,I53,I54,I55,I56,I57,I58,I59,I60,I61,I62,I63,I64,I65,I66,I67,I68,I69,I70,I71,I72,I73,I74,I75,I76,I77,I78,I79,I80,I81,I82,I83,I84,I85,I86,I87,I88,I89,I90,I91,I92,I93,I94,I95,I96,I97,I98,I99,I100,  
I101,I102,I103,I104,I105,I106,I107,I108,I109,I110,I111,I112,I113,I114,I115,I116,I117,I118,I119,I120,I121,I122,I123,I124,I125,I126,I127,I128,I129,I130,I131,I132,I133,I134,I135,I136,I137,I138,I139,I140,I141,I142,I143,I144,I145,I146,I147,I148,I149,I150,I151,I152,I153,I154,I155,I156,I157,I158,I159,I160,I161,I162,I163,I164,I165,I166,I167,I168,I169,I170,I171,I172,I173,I174,I175,I176,I177,I178,I179,I180,I181,I182,I183,I184,I185,I186,I187,I188,I189,I190,I191,I192,I193,I194,I195,I196,I197,I198,I199,I200,  
I201,I202,I203,I204,I205,I206,I207,I208,I209,I210,I211,I212,I213,I214,I215,I216,I217,I218,I219,I220,I221,I222,I223,I224,I225,I226,I227,I228,I229,I230,I231,I232,I233,I234,I235,I236,I237,I238,I239,I240,I241,I242,I243,I244,I245,I246,I247,I248,I249,I250,I251,I252,I253,I254,I255,I256,I257,I258,I259,I260,I261,I262,I263,I264,I265,I266,I267,I268,I269,I270,I271,I272,I273,I274,I275,I276,I277,I278,I279,I280,I281,I282,I283,I284,I285,I286,I287,I288,I289,I290,I291,I292,I293,I294,I295,I296,I297,I298,I299,I300,  
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AL=-144.0 AU=6.0 CL=-126.0 DU=24.0  
EOT. 5743RECORDS PROCESSED

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SEC	PASS	M-JD	PSEC 1/2	LTH 1/2	LNOCDE A/D	IMP 1/2	ASCY 1/2	BSCX 1/2						
1	12	44179	60041376	68806704	17.959	5.959	-5.700	ASC	17	17	55.9	21.3	33.2	9.7
8	13	44179	71671072	74435968	17.959	5.959	-29.248	ASC	17	17	50.1	9.7	29.8	11.1
16	14	44179	77300736	80065316	17.958	5.958	-52.710	ASC	10	10	41.9	10.1	33.9	6.7
31	15	44179	82930816	85695184	17.958	5.958	-76.171	ASC	10	10	42.6	7.2	26.3	7.2
42	16	44180	2160104	4924761	-6.042	5.958	-99.631	ASC	7	7	43.6	14.3	31.5	6.1
53	17	44180	770993	10554304	-6.042	5.958	-123.092	ASC	7	7	44.9	8.8	32.2	3.0
61	18	44180	13419494	15702810	-6.043	6.234	99999.000	REJ***	3	3	40.3	8.4	31.2	2.7
63	19	44180	19049009	21813152	-6.043	5.957	-1.533	DSC	3	10	37.6	10.4	33.5	3.7
73	20	44180	24678464	27442480	17.957	5.957	-24.993	DSC	40	10	37.2	6.5	30.0	-4.0
67	32	44181	37693776	42365936	17.952	5.952	-17.248	DSC	27	27	51.1	14.5	10.6	-0.7
51	34	44181	45322736	47451442	17.952	5.952	-110.707	DSC	20	20	41.4	18.7	19.3	2.3
101	41	44181	10493448	52252032	17.951	5.951	99999.000	REJ***	17	17	37.6	12.9	20.7	-2.4
103	43	44181	67747792	0509072	17.951	5.950	-13.023	ASC	20	20	37.7	15.1	20.2	1.2
115	44	44181	73376416	76137584	17.950	5.950	-35.480	ASC	20	10	38.4	7.0	13.3	2.4
125	45	44181	74024976	81766176	17.950	5.950	-59.937	ASC	10	10	30.4	5.5	25.2	2.6
135	46	44181	84033616	994730	17.950	5.950	-93.393	ASC	10	3	32.7	8.4	18.7	1.9
149	47	44182	3262314	6623257	-6.050	5.950	-106.848	ASC	3	3	31.8	6.0	23.1	-0.2
161	48	44182	9490902	12251722	-6.051	5.949	-130.305	ASC	3	0	27.4	5.5	25.5	0.1
165	49	44182	15119391	1780080	-6.051	5.949	14.734	DSC	0	0	26.4	4.9	27.5	0.2
169	50	44182	20747824	23506432	-6.051	5.948	-8.722	DSC	0	3	34.1	3.6	26.3	-1.4
183	51	44182	26376176	29136688	17.948	5.948	-32.177	DSC	3	3	30.0	7.6	10.4	-1.0
197	52	44182	32004496	34764912	17.948	5.948	-55.632	DSC	3	7	24.8	8.0	11.8	-1.4
210	53	44182	37632832	40393489	17.948	5.948	-79.089	DSC	7	7	25.6	11.3	14.9	3.3
220	54	44182	43261232	46201600	17.948	5.948	-102.544	DSC	10	10	27.6	7.4	20.1	1.4
232	57	44182	60146144	62906032	17.947	5.947	99999.000	REJ***	7	7	29.4	7.7	14.6	-1.3
234	58	44182	65774256	85334016	17.947	5.946	-4.861	ASC	10	10	26.9	9.4	11.7	1.7
241	59	44182	71402352	74161984	17.946	5.946	-28.315	ASC	10	10	28.6	6.8	9.8	3.0
252	60	44182	77030368	79790048	17.946	5.946	-51.770	ASC	3	3	27.3	7.1	21.0	2.0
264	61	44182	82658432	85418032	17.946	5.946	-75.224	ASC	3	3	30.7	5.4	13.6	2.1

MS/NODES FROM CF0023 QUIET TIME/ PASS # ORDERED

SEC	PASS	MJC	PSEC 1/2	LTM 1/2	LNCDE A/L	IMP 1/2	ASCX 1/2	DSCX 1/2						
275	02	44103	1886578	4646017	76.054	5.945	98.677	ASC	7	7	31.9	6.8	23.4	-3.1
286	03	44103	7514675	10273990	74.055	5.945	-122.131	ASC	7	7	27.7	5.6	23.7	-2.2
294	04	44103	13142672	15901870	74.055	5.945	22.916	DSC	10	10	27.7	3.2	14.3	-3.7
296	05	44103	18770544	21529696	76.055	5.945	-0.538	DSC	10	10	24.1	1.6	18.5	-2.7
306	06	44103	24398416	27157424	17.944	5.944	-23.991	DSC	7	7	21.6	4.7	12.1	1.1
314	07	44103	30026192	32785120	17.944	5.944	-47.444	DSC	7	13	24.9	1.9	6.7	0.5
327	08	44103	35653568	38412864	17.944	5.944	-70.896	DSC	13	13	23.7	9.9	7.0	0.7
340	09	44103	41281608	44040704	17.944	5.944	-94.350	DSC	13	16	24.6	6.1	12.9	-2.0
353	70	44103	46909664	49668454	17.943	5.943	-117.804	DSC	10	10	19.7	4.3	10.7	-2.1
360	73	44103	-99599	6551120	*****	5.942	99999.000	REJ***	***	3	99556.0	99999.0	10.0	-0.5
362	74	44103	69420272	72178544	17.942	5.942	-20.117	ASC	3	3	1.3	4.9	7.7	1.6
374	75	44103	75047760	77806032	17.942	5.942	-43.569	ASC	3	3	17.9	3.5	11.5	0.1
385	76	44103	80675248	83433520	17.942	5.942	-67.022	ASC	3	3	19.2	4.3	10.6	-2.5
397	77	44103	86302784	2660972	17.942	5.941	-90.472	ASC	3	10	20.8	5.6	11.8	-5.0
400	77	44103	86302794	2660972	17.942	5.941	-90.472	ASC	3	10	20.8	5.6	11.8	-5.0
409	78	44184	5530376	8288412	74.059	5.941	-113.923	ASC	10	10	32.0	3.2	17.8	-3.9
420	79	44184	11157827	13915769	74.059	5.941	-137.376	ASC	20	20	27.0	3.7	19.4	-2.8
422	80	44184	16785158	19543040	74.059	5.941	7.680	DSC	20	20	29.9	7.4	19.9	-3.5
427	81	44184	22412432	25170272	17.940	5.940	-15.771	DSC	17	17	29.1	3.3	20.7	-6.8
441	82	44184	28039654	30797408	17.940	5.940	-39.222	DSC	17	17	26.9	7.5	5.7	0.2
454	124	44187	5144280	7899504	74.071	5.929	-112.498	ASC	13	13	59.0	10.2	44.3	7.6
466	125	44187	10769523	13524711	74.071	5.929	-135.941	ASC	13	20	55.4	11.4	38.3	7.9
469	126	44187	16394311	19149808	76.071	5.929	9.135	DSC	20	20	51.4	12.0	43.9	7.5
474	127	44187	22019728	24774864	17.928	5.928	-14.307	DSC	17	17	54.6	10.5	45.9	3.8
488	128	44187	27644720	30399808	17.928	5.928	-37.749	DSC	17	17	52.5	14.3	30.9	9.8
500	129	44187	-99999	16024752	*****	5.928	-61.189	DSC	***	17	99996.0	99999.0	99999.0	99999.0
512	130	44187	38894640	41649760	17.927	5.927	-84.631	DSC	13	13	44.0	16.5	36.8	5.4
525	131	44187	44519448	47274784	17.927	5.927	-108.073	DSC	13	13	54.3	11.1	37.5	6.2
535	133	44187	55769472	58524480	17.926	5.926	99999.000	REJ***	13	13	41.6	14.4	35.9	6.1

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