EW-L1-04190
JSC-17437

AgRISTARS

Early Warning and Crop Condition Assessment

A Joint Program for Agriculture and Resources Inventory Surveys Through Aerospace Remote Sensing

February 1982

AREA ESTIMATION OF ENVIRONMENTAL PHENOMENA FROM NOAA-n SATELLITE DATA

G. Tappan and G. E. Miller

(E82-10275) AREA ESTIMATION OF ENVIRONMENTAL PHENOMENA FROM NOAA-n SATELLITE DATA (Lockheed Engineering and Management) 39 p HC A03/MF A01 CSCL 02C G3/43

N82-24553

Unclas 00275

Lockheed Engineering and Management Services Company, Inc.
1830 NASA Road 1, Houston, Texas 77058

Lyndon B. Johnson Space Center
Houston, Texas 77058

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
JSC-17437, EW-L1-04190		

4. Title and Subtitle	5. Report Date
Area Estimation of Environmental Phenomena From NOAA-n Satellite Data	February 1982
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
G. Tappan and G. E. Miller	LEMSCO-17312
	10. Work Unit No.

9. Performing Organization Name and Address	11. Contract or Grant No.
Lockheed Engineering and Management Services Company, Inc. 1830 NASA Road 1 Houston, Texas 77058	NAS 9-15800
	13. Type of Report and Period Covered
	Technical Memorandum

12. Sponsoring Agency Name and Address	14. Sponsoring Agency Code
Early Warning/Crop Condition Assessment Project Office U.S. Department of Agriculture, 1050 Bay Area Blvd. Houston, Texas 77058 Technical Monitor: V. S. Whitehead	

15. Supplementary Notes

The Agriculture and Resources Inventory Surveys Through Aerospace Remote Sensing is a joint program of the U.S. Department of Agriculture, the National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration (U.S. Department of Commerce), the Agency for International Development (U.S. Department of State), and the U.S. Department of the Interior.

16. Abstract

The NOAA-n environmental satellites which provide daily radiometric coverage of the Earth in four or five wavebands have potential for monitoring dynamic surface phenomena. Effective monitoring of phenomena such as major floods requires estimation of their areal extent. Because NOAA-n pixels represent varying areas on the ground, calibration is needed before accurate areal estimation can be performed.

Based on Earth-satellite geometry, a function was derived to calculate the effective pixel size (measured in terms of ground area) on any given pixel. Results were tested using NOAA-6 data to estimate the areas of several lakes. Accuracy was generally within 5 percent. Sources of error are discussed.

17. Key Words (Suggested by Author(s))	18. Distribution Statement
Environmental satellites Environmental phenomena Area estimation	

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price*
Unclassified	Unclassified	41	

*For sale by the National Technical Information Service, Springfield, Virginia 22161

EW-L1-04190
JSC-17437

AREA ESTIMATION OF ENVIRONMENTAL PHENOMENA FROM NOAA-n SATELLITE DATA

Job Order 72-458

This report describes activities of the Early Warning and Crop Condition Assessment project of the AgRISTARS program.

PREPARED BY

G. Tappan and G. E. Miller

APPROVED BY

USDA

G. O. Boatwright, Manager
Early Warning/Crop Condition Assessment
Project, AgRISTARS Program

Lockheed-EMSCO

J. K. Otey, Project Manager
Early Warning/Crop Condition Assessment
Project Office, Crop Applications
Department

LOCKHEED ENGINEERING AND MANAGEMENT SERVICES COMPANY, INC.

Contract NAS 9-15800

For

Earth Resources Applications Division

Space and Life Sciences Directorate

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LYNDON B. JOHNSON SPACE CENTER
HOUSTON, TEXAS

February 1982

LEMSCO-17312

PREFACE

The Agriculture and Resources Inventory Surveys Through Aerospace Remote Sensing is a multiyear program of research, development, evaluation, and application of aerospace remote sensing for agricultural resources, which began in fiscal year 1980. This program is a cooperative effort of the U.S. Department of Agriculture, the National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration (U.S. Department of Commerce), the Agency for International Development (U.S. Department of State), and the U.S. Department of the Interior.

The authors wish to express their sincere appreciation to Thomas I. Gray of the National Oceanic and Atmospheric Administration for his valuable support and critique.

CONTENTS

FIGURES

1. BACKGROUND

The NOAA-n environmental satellites of the TIROS-N family are currently being investigated as potential tools for the monitoring of worldwide resources. Designed to operate in a near-polar, Sun-synchronous orbit, they each contain an Advanced Very High Resolution Radiometer (AVHRR) from which spectral data are obtained in four or five spectral wavebands. The wide-view angle of the onboard scanners provides daily coverage over the globe. While the spatial resolution of the data is considerably lower than that of Landsat, the frequent rate of coverage is especially conducive to monitoring highly dynamic phenomena on the Earth's surface such as major floods.

Area estimation of dynamic surface phenomena is one of the most important requirements for effective monitoring. Some remote sensing systems such as Landsat provide data which is well-suited to area estimation because of the fairly constant pixel size across the image. Unlike Landsat, ground area represented by a pixel on NOAA-n satellite imagery increases significantly with distance from the satellite ground-track. Therefore, calibration is required before area estimation of surface phenomena can be obtained. This paper describes the derivation and results of a technique for documenting changes in pixel size which can, in turn, be used to perform area calculations for various land cover types from the NOAA-n satellite series.

2. EFFECTIVE PIXEL SIZE

Earth scan data from the NOAA-n satellites are retained within a view angle ±55.4° (nominal) from the subpoint view or nadir (Schwalb, 1978). The instantaneous field of view (IFOV) of each sensor is approximately 1.4 milliradians (Kidwell, 1981) and is produced by a circular aperture which, when mapped on the Earth's surface at the subpoint, represents a pixel having a diameter of about 1.16 kilometers for a nominal altitude of 833 kilometers. Because of the relatively wide scanner view angle and the constant IFOV, pixels along a scan become larger with respect to the ground as distance increases from the satellite subpoint. Also, the pixel's shape changes as a function of distance from

the satellite subpoint, ranging from nearly circular directly below the spacecraft to highly elliptical at the extremities of the view angle (see figure 1).

A significant amount of overlap is evident between adjacent pixels along a scan. This is explained by the fact that the angular displacement between adjacent pixel centerpoints is approximately 0.945 milliradian, while the diameter of the IFOV is about 1.4 milliradians. Pixel overlap is also significant between adjacent scan lines, with overlap increasing toward the scan extremities.

Techniques for area calculation of various land cover types based on pixel counts must take pixel overlap into consideration. The method presented here circumvents the problem of overlap by calculating the ground area of a pixel defined by boundaries which bisect perpendicularly the distance between adjacent pixel centerpoints. The resulting area, which we will refer to as the effective pixel size, is shown in figure 2. Like pixels, effective pixel size increases quasi-exponentially with distance from nadir. By knowing the effective pixel sizes and the number of pixels falling on a surface feature such as a lake, the area of that feature can then be determined.

3. DERIVATION OF A PIXEL SIZE FUNCTION

An exact function for determining the effective pixel size was derived from characteristics of the Earth-satellite geometry (see figure 3). While the effective pixel size is defined by its length and width, the function applies only to the length since the width (distance between adjacent scans) can be considered very nearly constant. The equation is simply an application of the law of sines plus an arclength formula. Calculations are based on the assumption of a spherical Earth.

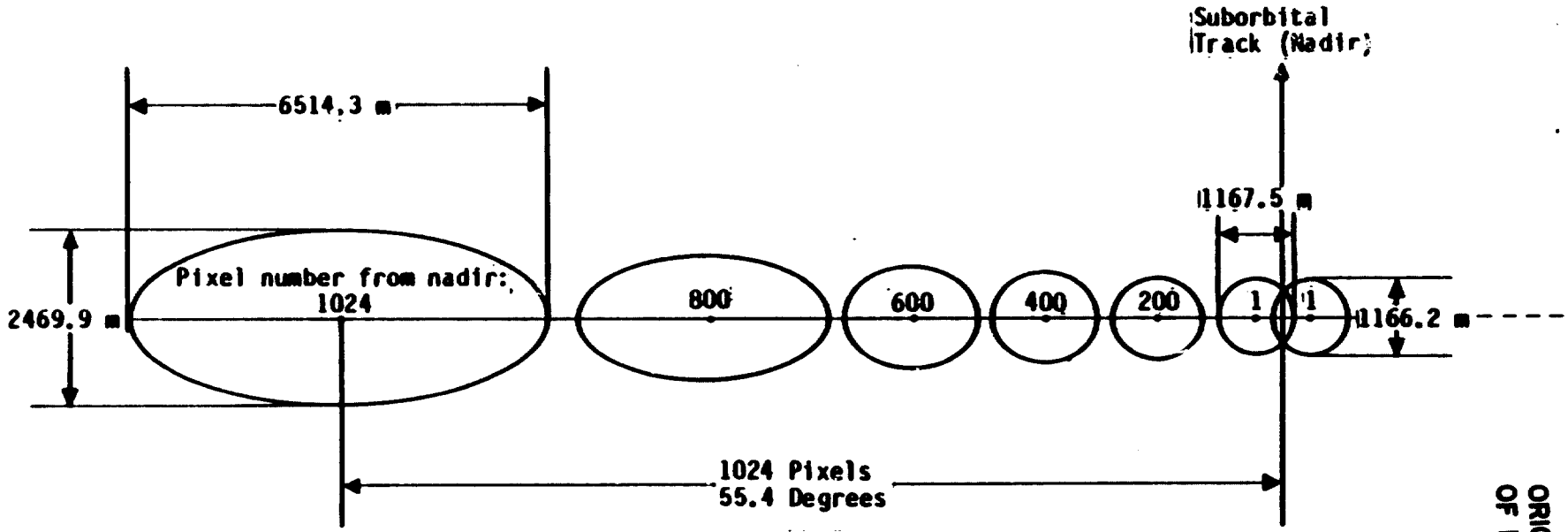
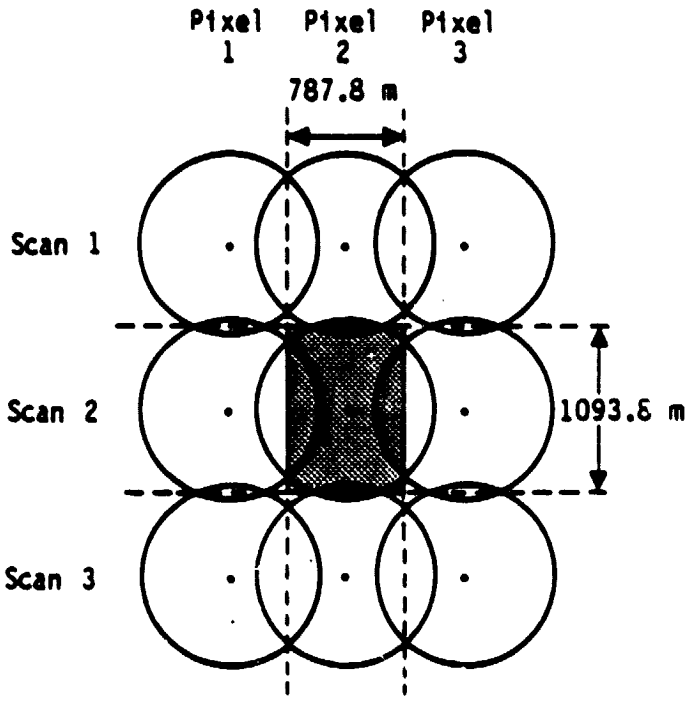


Figure 1.- Relative sizes of selected pixels along a scan line as projected on the Earth.



LEGEND:

Shaded area = The effective pixel size of a pixel near the suborbital track.

Dashed line = The effective pixel boundaries which bisect perpendicularly the distance between adjacent pixel centerpoints.

Figure 2.- The effective pixel size and pixel boundaries of a pixel near the suborbital track.

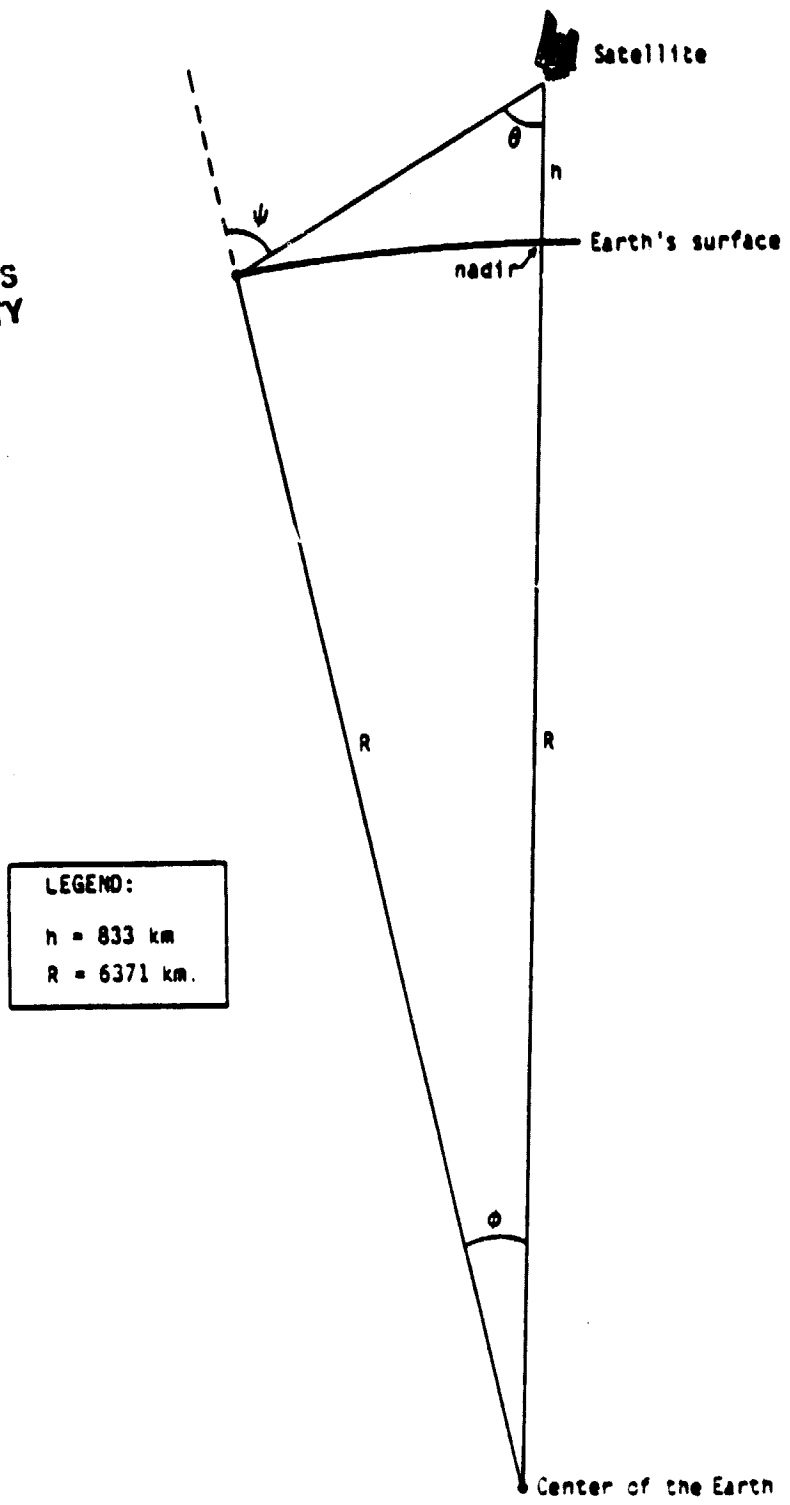


Figure 3.- A view of the Earth-satellite geometry used in determining pixel lengths (drawn to scale).

The measurements shown in figure 3 are as follows:

h = 833 kilometers (nominal height of the NOAA-6 satellite above the Earth)

R = 6371 kilometers (the mean radius of the Earth)

θ = satellite nadir angle

ψ = satellite zenith angle

ϕ = great circle arc

By the Law of Sines, $\frac{\text{SIN } \theta}{R} = \frac{\text{SIN } \psi}{R + h}$.

$\phi = \psi - \theta$ since all angles of a triangle must sum to 180°.

The steps for pixel length determination are as follows (using radians for all angles):

1. Determine $\theta_{x-1} = (x-1)(0.000945 \text{ radian})$ where x = pixel no.
2. Determine ψ_{x-1} using the law of sines
3. Determine $\phi_{x-1} = \psi_{x-1} - \theta_{x-1}$
4. Determine θ_x, ψ_x, and ϕ_x
5. Determine $\Delta_\phi = \phi_x - \phi_{x-1}$
6. Determine $\text{arclength}_x = R\Delta_\phi$.

The above steps are simplified into the following function:

$$\text{Arclength}_x = R\{\arcsin[a \sin(bx)] - bx - \arcsin[a \sin(b(x-1))] + b(x-1)\}$$

where,

arclength_x = pixel length for pixel x

x = pixel number from inside nadir pixel to outside pixel (1-1024)

$a = 1.131 = \frac{R + h}{h} = \frac{6371 + 833}{6371}$

b = 0.000945 radian

R = 6371 km.

A graphic illustration of effective pixel length plotted against the number of pixels from nadir is presented in figure 4(a). It is evident that little change in pixel size (and resolution) occurs within 500 pixels of nadir. In contrast, pixels in the 740 range from nadir have about twice the effective pixel size as those at nadir. Pixels at the far edge of the angle of view (1024 pixels from nadir) are nearly six times the length of the center pixels [fig. 4(b)]. The effective pixel lengths were found to range from 788.5 meters to 4568.5 meters. This corresponds to effective pixel areas ranging from 0.8624 square kilometers to 4.9970 square kilometers [See fig. 4(c)].

The effective pixel lengths, widths, and ground areas for all pixels between nadir and the extreme view angles were calculated and are presented in the appendices. Appendix A lists the results determined for NOAA-6 AVHRR data (satellite was launched June 27, 1979). The NOAA-7 satellite (launched June 23, 1981) was placed in a slightly higher orbit (nominal altitude of 848 kilometers) resulting in slightly larger pixels when mapped on the ground. Appendix B presents results of effective pixel dimensions for NOAA-7 data.

4. ACCURACY ASSESSMENT

Results of the pixel size function were tested on NOAA-6 data to estimate the areal extent of ground features. Several lakes within the continental United States, ranging from 48 square kilometers to 1470 square kilometers were chosen for the test. Since water is generally separable spectrally from land in the AVHRR Channel 2 data (0.725-1.100 micrometers), lakes represent ideal features for testing accuracy of areal mapping. The lakes were selected such that their positions within an image would range from near nadir to near the extreme edges of the view angle. Pixel counts of the lakes were performed from visual displays of NOAA-6 imagery on CRT's. The images were enlarged so that individual pixels could be counted easily. Pixel positions away from the scene center were also obtained for all water pixels.

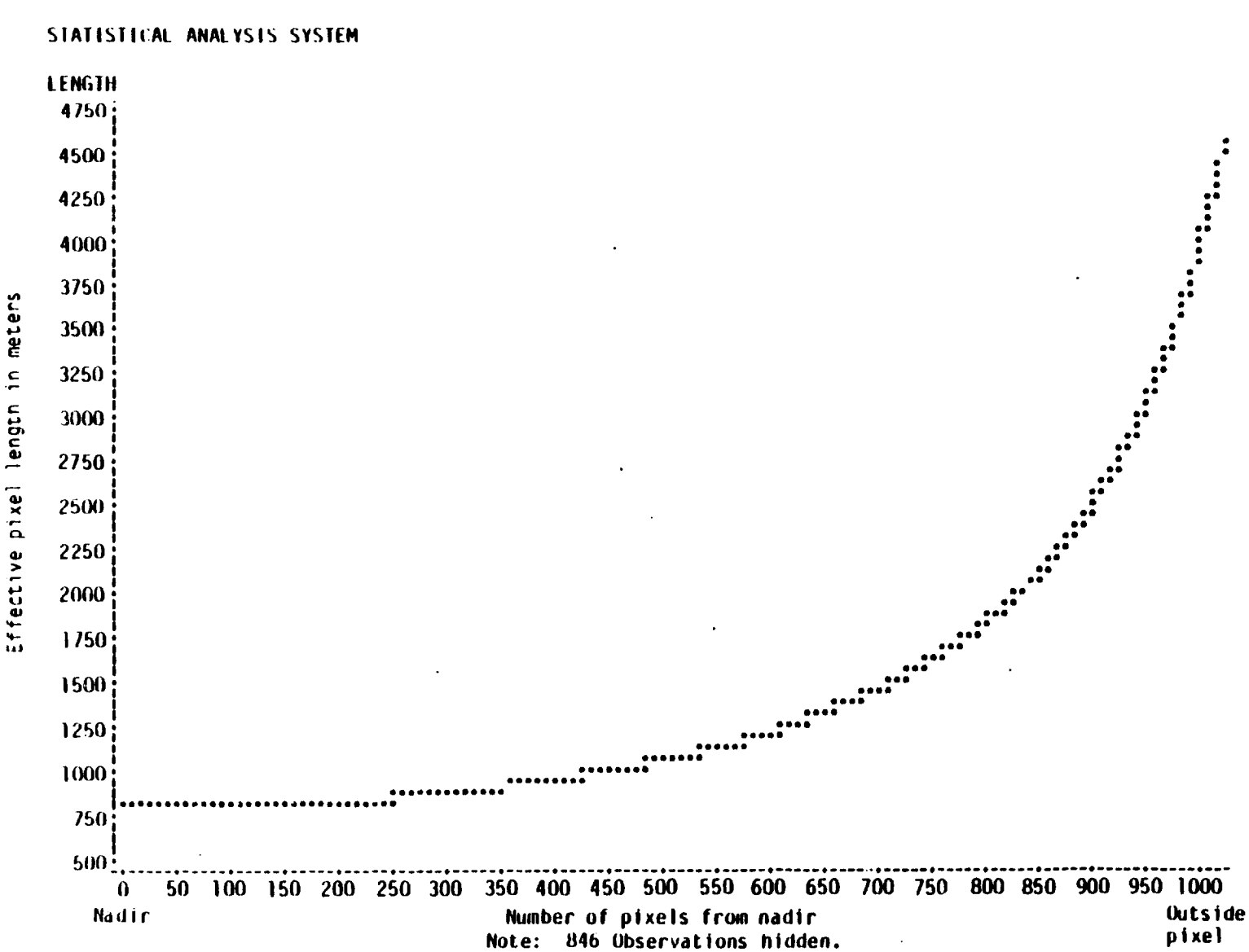


Figure 4(a).- The relationship between effective pixel length (meters) and number of pixels from nadir for NOAA-6 AVHRR data.

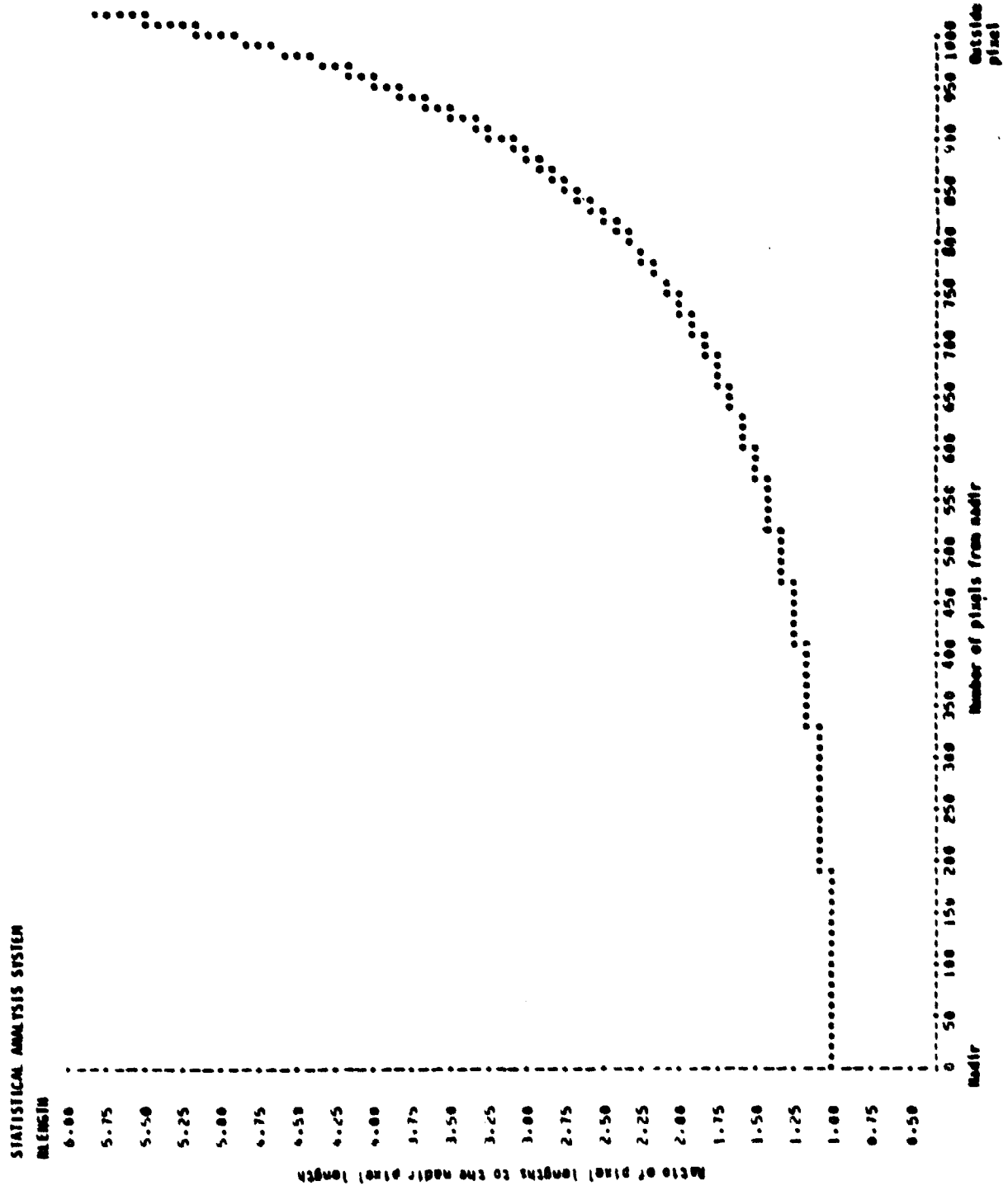


Figure 4(b).- Ratios of effective pixel lengths away from nadir to the effective pixel length at nadir for NOAA-6 AVHRR data.

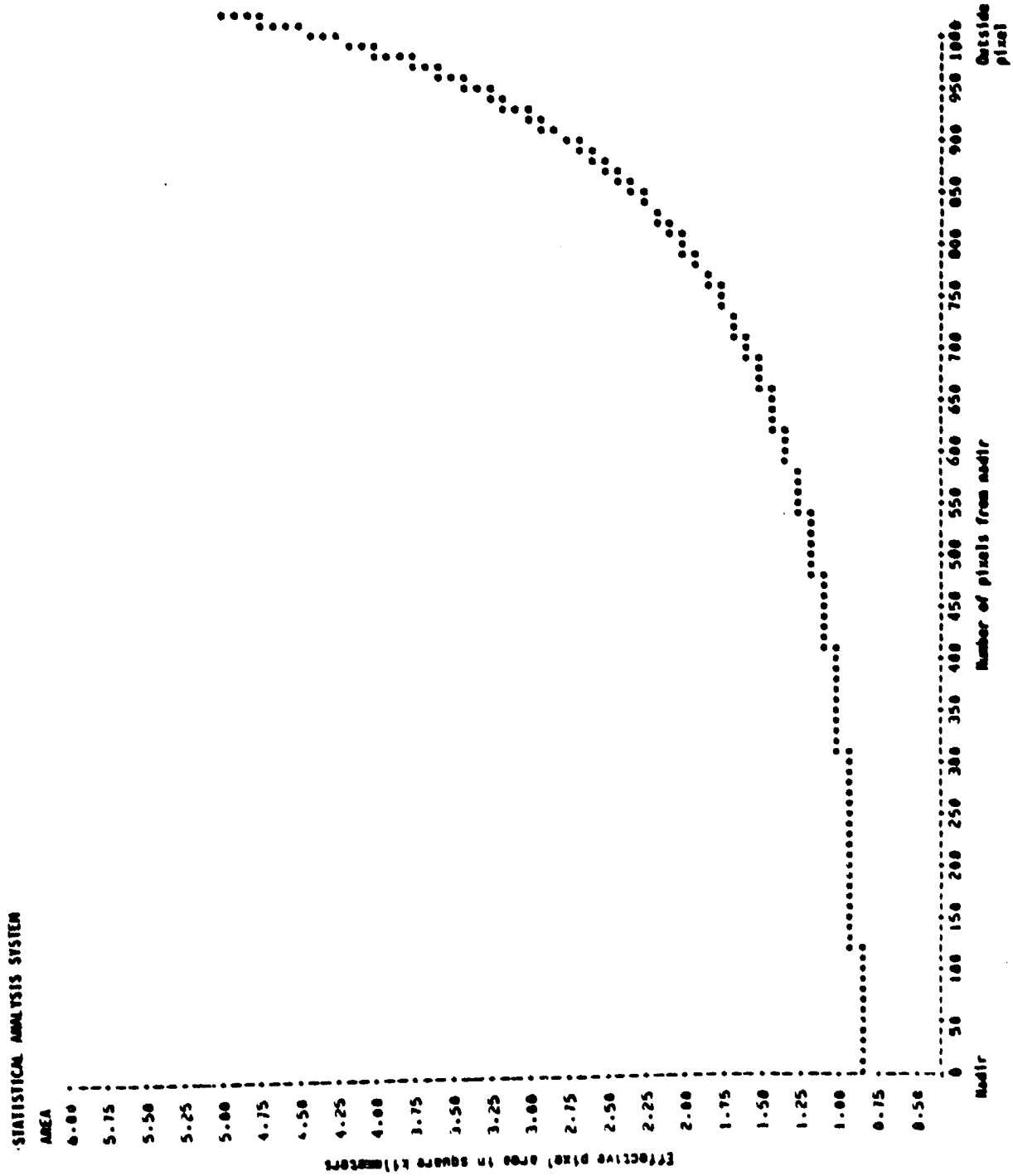


Figure 4(c).- The relationship between effective pixel area (square kilometers) and number of pixels from nadir for NOAA-6 AVHRR data.

Using the pixel counts, pixel positions away from nadir, and the results of the pixel size function, the areal extent of each lake was estimated. These estimates were then compared with areal measurements of the same lakes derived from Operational Navigation Charts (ONC's; scale: 1:1 000 000) using dot grid overlays for areal measurement. The estimates from the NOAA-6 data using the pixel size function compared well to those made from the maps (generally within 5 percent). The main source of error resulted from inconsistency in determining whether pixels falling on lake shores were predominantly land or water; also, error may have resulted from changes in lake size after the lakes were mapped on the ONC's. Automated discrimination of water from land would probably provide more consistent results.

Since subjective judgement contributed significantly to the error found in the tests discussed above, a more theoretical approach was taken to better quantify error associated with the pixel size function. Basically, deviations of actual pixel dimensions from those determined by the function can occur as a result of (a) a nonspherical Earth, and (b) slight variations in the satellite altitude.

Although both alter the distance between the satellite and the ground, the nonspherical nature of the Earth accounts for most of the deviations from the calculated values. At nadir, this contributes a maximum of 1.3 percent error in the calculated pixel dimensions at the poles, and .6 percent at the equator. At the far edges of the view angle, a maximum of 2.9 percent variance occurs at the poles, and 1.4 percent at the equator. The best fit occurs in the middle latitudes. Deviations resulting from variations in the satellite altitude were not considered significant, because the orbits tend to become stable and nearly circular with time about the Earth's center.

5. CONCLUSIONS

The pixel size function promises to be a useful tool for determining areal extent of surface phenomena as detected by the NOAA-n sensors. The function incorporates pixel overlap since it was designed to derive effective pixel

sizes rather than the full ground area within the IFOV. The function can be adapted easily to automated procedures, and has potential for monitoring dynamic phenomena. In addition, the graph and tables of effective pixel sizes provide quick references for manual estimates of data resolution, and areal extent of ground features.

6. REFERENCES

Helfert, M. R.; D. G. McCrary; and T. I. Gray: Utilization of Meteorological Satellite Imagery for Worldwide Environmental Monitoring of the Lower Mississippi River Flood of 1979 - Case 1. NASA, JSC-17144; AgRISTARS Report No. EW-N1-04104, 1981.

Kidwell, K. B.: NOAA Polar Orbiter Data (TIROS-N and NOAA-6) Users Guide. National Oceanic and Atmospheric Administration, Washington, D.C., 1981.

Schwalb, A.: The TIROS-N/NOAA A-G Satellite Series. National Oceanic and Atmospheric Administration, Washington, D.C., 1978.

APPENDIX A

PIXEL POSITION AWAY FROM NADIR AND THE PIXEL LENGTHS, WIDTHS, AND AREAS

APPENDIX A

PIXEL POSITION AWAY FROM NADIR AND THE PIXEL LENGTHS, WIDTHS, AND AREAS

The pixel position away from nadir and the effective pixel lengths, widths, and areas in meters are included in this appendix. The calculations refer to the NOAA-6 AVHRR data.

STATISTICAL ANALYSIS SYSTEM

OBS	LENGTH	WIDTH	AREA
1	788.5	1093.8	862415
2	788.5	1093.8	862417
3	788.5	1093.8	862421
4	788.5	1093.8	862426
5	788.5	1093.8	862434
6	788.5	1093.8	862443
7	788.5	1093.8	862454
8	788.5	1093.8	862467
9	788.5	1093.8	862482
10	788.5	1093.8	862498
11	788.6	1093.8	862517
12	788.6	1093.8	862537
13	788.6	1093.8	862560
14	788.6	1093.8	862584
15	788.6	1093.8	862610
16	788.7	1093.8	862638
17	788.7	1093.8	862667
18	788.7	1093.8	862699
19	788.7	1093.8	862732
20	788.8	1093.8	862768
21	788.8	1093.8	862805
22	788.8	1093.8	862844
23	788.9	1093.8	862885
24	788.9	1093.8	862927
25	789.0	1093.8	862972
26	789.0	1093.8	863018
27	789.1	1093.8	863066
28	789.1	1093.8	863117
29	789.1	1093.8	863169
30	789.2	1093.8	863222
31	789.2	1093.8	863278
32	789.3	1093.8	863336
33	789.4	1093.8	863395
34	789.4	1093.8	863457
35	789.5	1093.8	863520
36	789.5	1093.8	863585
37	789.6	1093.8	863652
38	789.7	1093.8	863721
39	789.7	1093.8	863791
40	789.8	1093.8	863864
41	789.9	1093.8	863938
42	789.9	1093.8	864014
43	790.0	1093.8	864092
44	790.1	1093.8	864172
45	790.1	1093.8	864254
46	790.2	1093.8	864338
47	790.3	1093.8	864424
48	790.4	1093.8	864511
49	790.5	1093.8	864601
50	790.5	1093.8	864692
51	790.6	1093.8	864785
52	790.7	1093.8	864880
53	790.8	1093.8	864977
54	790.9	1093.8	865076
55	791.0	1093.8	865176
56	791.1	1093.8	865279
57	791.2	1093.8	865383
58	791.3	1093.8	865489
59	791.4	1093.8	865598
60	791.5	1093.8	865708
61	791.6	1093.8	865820
62	791.7	1093.8	865933
63	791.8	1093.8	866049
64	791.9	1093.8	866167
65	792.0	1093.8	866286
66	792.1	1093.8	866408
67	792.2	1093.8	866531
68	792.3	1093.8	866656
69	792.5	1093.8	866783
70	792.6	1093.8	866912
71	792.7	1093.8	867043
72	792.8	1093.8	867176
73	792.9	1093.8	867310
74	793.1	1093.8	867447
75	793.2	1093.8	867585
76	793.3	1093.8	867726

OBS	LENGTH	WIDTH	AREA
77	793.4	1093.8	867868
78	793.6	1093.8	868012
79	793.7	1093.8	868158
80	793.8	1093.8	868306
81	794.0	1093.8	868456
82	794.1	1093.8	868608
83	794.3	1093.8	868762
84	794.4	1093.8	868917
85	794.5	1093.8	869075
86	794.7	1093.8	869234
87	794.8	1093.8	869396
88	795.0	1093.8	869559
89	795.1	1093.8	869724
90	795.3	1093.8	869891
91	795.4	1093.8	870060
92	795.6	1093.8	870231
93	795.8	1093.8	870404
94	795.9	1093.8	870579
95	796.1	1093.8	870756
96	796.2	1093.8	870935
97	796.4	1093.8	871116
98	796.6	1093.8	871298
99	796.7	1093.8	871483
100	796.9	1093.8	871669
101	797.1	1093.8	871858
102	797.3	1093.8	872048
103	797.4	1093.8	872240
104	797.6	1093.8	872435
105	797.8	1093.8	872631
106	798.0	1093.8	872829
107	798.2	1093.8	873029
108	798.3	1093.8	873231
109	798.5	1093.8	873435
110	798.7	1093.8	873641
111	798.9	1093.8	873849
112	799.1	1093.8	874059
113	799.3	1093.8	874271
114	799.5	1093.8	874485
115	799.7	1093.8	874701
116	799.9	1093.8	874919
117	800.1	1093.8	875138
118	800.3	1093.8	875360
119	800.5	1093.8	875584
120	800.7	1093.8	875810
121	800.9	1093.8	876037
122	801.1	1093.8	876267
123	801.3	1093.8	876499
124	801.5	1093.8	876732
125	801.8	1093.8	876968
126	802.0	1093.8	877206
127	802.2	1093.8	877445
128	802.4	1093.8	877687
129	802.6	1093.8	877931
130	802.9	1093.8	878178
131	803.1	1093.8	878424
132	803.3	1093.8	878674
133	803.6	1093.8	878925
134	803.8	1093.8	879179
135	804.0	1093.8	879435
136	804.3	1093.8	879692
137	804.5	1093.8	879952
138	804.7	1093.8	880214
139	805.0	1093.8	880478
140	805.2	1093.8	880743
141	805.5	1093.8	881011
142	805.7	1093.8	881281
143	806.0	1093.8	881553
144	806.2	1093.8	881827
145	806.5	1093.8	882103
146	806.7	1093.8	882381
147	807.0	1093.8	882661
148	807.2	1093.8	882943
149	807.5	1093.8	883227
150	807.7	1093.8	883514
151	808.0	1093.8	883802
152	808.3	1093.8	884092

STATISTICAL ANALYSIS SYSTEM

OBS	LENGTH	WIDTH	AREA
153	808.5	1093.8	884385
154	808.8	1093.8	884679
155	809.1	1093.8	884976
156	809.4	1093.8	885274
157	809.6	1093.8	885575
158	809.9	1093.8	885878
159	810.2	1093.8	886183
160	810.5	1093.8	886490
161	810.8	1093.8	886799
162	811.0	1093.8	887110
163	811.3	1093.8	887423
164	811.6	1093.8	887738
165	811.9	1093.8	888056
166	812.2	1093.8	888375
167	812.5	1093.8	888697
168	812.8	1093.8	889021
169	813.1	1093.8	889346
170	813.4	1093.8	889674
171	813.7	1093.8	890004
172	814.0	1093.8	890337
173	814.3	1093.8	890671
174	814.6	1093.8	891007
175	814.9	1093.8	891346
176	815.2	1093.8	891687
177	815.5	1093.8	892029
178	815.8	1093.8	892374
179	816.2	1093.8	892722
180	816.5	1093.8	893071
181	816.8	1093.8	893422
182	817.1	1093.8	893776
183	817.5	1093.8	894132
184	817.8	1093.8	894490
185	818.1	1093.8	894850
186	818.4	1093.8	895212
187	818.8	1093.8	895576
188	819.1	1093.8	895943
189	819.4	1093.8	896312
190	819.8	1093.8	896683
191	820.1	1093.8	897056
192	820.5	1093.8	897431
193	820.8	1093.8	897809
194	821.2	1093.8	898189
195	821.5	1093.8	898571
196	821.9	1093.8	898955
197	822.2	1093.8	899341
198	822.6	1093.8	899730
199	822.9	1093.8	900120
200	823.3	1093.8	900513
201	823.7	1093.8	900909
202	824.0	1093.8	901306
203	824.4	1093.8	901706
204	824.7	1093.8	902108
205	825.1	1093.8	902512
206	825.5	1093.8	902919
207	825.9	1093.8	903327
208	826.2	1093.8	903738
209	826.6	1093.8	904152
210	827.0	1093.8	904567
211	827.4	1093.8	904985
212	827.8	1093.8	905405
213	828.1	1093.8	905827
214	828.5	1093.8	906252
215	828.9	1093.8	906679
216	829.3	1093.8	907108
217	829.7	1093.8	907539
218	830.1	1093.8	907973
219	830.5	1093.8	908409
220	830.9	1093.8	908847
221	831.3	1093.8	909288
222	831.7	1093.8	909731
223	832.1	1093.8	910176
224	832.5	1093.8	910624
225	832.9	1093.8	911074
226	833.4	1093.8	911526
227	833.8	1093.8	911981
228	834.2	1093.8	912438

OBS	LENGTH	WIDTH	AREA
229	834.6	1093.8	912894
230	835.0	1093.8	913353
231	835.5	1093.8	913823
232	835.9	1093.8	914290
233	836.3	1093.8	914759
234	836.7	1093.8	915230
235	837.2	1093.8	915703
236	837.6	1093.8	916179
237	838.0	1093.8	916658
238	838.5	1093.8	917138
239	838.9	1093.8	917621
240	839.4	1093.8	918107
241	839.8	1093.8	918595
242	840.3	1093.8	919085
243	840.7	1093.8	919578
244	841.2	1093.8	920073
245	841.6	1093.8	920571
246	842.1	1093.8	921071
247	842.5	1093.8	921574
248	843.0	1093.8	922079
249	843.5	1093.8	922586
250	843.9	1093.8	923096
251	844.4	1093.8	923608
252	844.9	1093.8	924123
253	845.3	1093.8	924640
254	845.8	1093.8	925160
255	846.3	1093.8	925682
256	846.8	1093.8	926207
257	847.3	1093.8	926734
258	847.7	1093.8	927264
259	848.2	1093.8	927796
260	848.7	1093.8	928331
261	849.2	1093.8	928868
262	849.7	1093.8	929408
263	850.2	1093.8	929950
264	850.7	1093.8	930495
265	851.2	1093.8	931043
266	851.7	1093.8	931593
267	852.2	1093.8	932145
268	852.7	1093.8	932700
269	853.2	1093.8	933258
270	853.7	1093.8	933818
271	854.3	1093.8	934381
272	854.8	1093.8	934946
273	855.3	1093.8	935514
274	855.8	1093.8	936085
275	856.3	1093.8	936658
276	856.9	1093.8	937234
277	857.4	1093.8	937812
278	857.9	1093.8	938393
279	858.5	1093.8	938977
280	859.0	1093.8	939563
281	859.5	1093.8	940152
282	860.1	1093.8	940743
283	860.6	1093.8	941337
284	861.2	1093.8	941934
285	861.7	1093.8	942534
286	862.3	1093.8	943136
287	862.8	1093.8	943741
288	863.4	1093.8	944349
289	863.9	1093.8	944959
290	864.5	1093.8	945572
291	865.0	1093.8	946188
292	865.6	1093.8	946806
293	866.2	1093.8	947427
294	866.7	1093.8	948051
295	867.3	1093.8	948677
296	867.9	1093.8	949307
297	868.5	1093.8	949939
298	869.1	1093.8	950574
299	869.6	1093.8	951211
300	870.2	1093.8	951852
301	870.8	1093.8	952495
302	871.4	1093.8	953141
303	872.0	1093.8	953789
304	872.6	1093.8	954441

OBS	LENGTH	WIDTH	AREA
305	873.2	1093.8	955095
306	873.8	1093.8	955752
307	874.4	1093.8	956412
308	875.0	1093.8	957075
309	875.6	1093.8	957741
310	876.2	1093.8	958409
311	876.8	1093.8	959081
312	877.4	1093.8	959755
313	878.1	1093.8	960432
314	878.7	1093.8	961112
315	879.3	1093.8	961795
316	879.9	1093.8	962480
317	880.6	1093.8	963169
318	881.2	1093.8	963860
319	881.8	1093.8	964555
320	882.5	1093.8	965252
321	883.1	1093.8	965952
322	883.8	1093.8	966656
323	884.4	1093.8	967362
324	885.1	1093.8	968071
325	885.7	1093.8	968783
326	886.4	1093.8	969498
327	887.0	1093.8	970216
328	887.7	1093.8	970937
329	888.3	1093.8	971661
330	889.0	1093.8	972388
331	889.7	1093.8	973118
332	890.3	1093.8	973851
333	891.0	1093.8	974587
334	891.7	1093.8	975327
335	892.4	1093.8	976069
336	893.0	1093.8	976814
337	893.7	1093.8	977562
338	894.4	1093.8	978314
339	895.1	1093.8	979068
340	895.8	1093.8	979826
341	896.5	1093.8	980586
342	897.2	1093.8	981350
343	897.9	1093.8	982117
344	898.6	1093.8	982887
345	899.3	1093.8	983660
346	900.0	1093.8	984437
347	900.7	1093.8	985216
348	901.4	1093.8	985999
349	902.2	1093.8	986785
350	902.9	1093.8	987574
351	903.6	1093.8	988366
352	904.3	1093.8	989161
353	905.1	1093.8	989960
354	905.8	1093.8	990762
355	906.5	1093.8	991567
356	907.3	1093.8	992375
357	908.0	1093.8	993187
358	908.8	1093.8	994001
359	909.5	1093.8	994819
360	910.3	1093.8	995641
361	911.0	1093.8	996466
362	911.8	1093.8	997294
363	912.5	1093.8	998125
364	913.3	1093.8	998959
365	914.1	1093.8	999797
366	914.8	1093.8	1000639
367	915.6	1093.8	1001483
368	916.4	1093.8	1002331
369	917.2	1093.8	1003183
370	917.9	1093.8	1004039
371	918.7	1093.8	1004896
372	919.5	1093.8	1005757
373	920.3	1093.8	1006622
374	921.1	1093.8	1007491
375	921.9	1093.8	1008363
376	922.7	1093.8	1009238
377	923.5	1093.8	1010117
378	924.3	1093.8	1010999
379	925.1	1093.8	1011885
380	925.9	1093.8	1012774

OBS	LENGTH	WIDTH	AREA
381	926.7	1093.8	1013667
382	927.6	1093.8	1014563
383	928.4	1093.8	1015463
384	929.2	1093.8	1016366
385	930.0	1093.8	1017273
386	930.9	1093.8	1018183
387	931.7	1093.8	1019097
388	932.5	1093.8	1020015
389	933.4	1093.8	1020936
390	934.2	1093.8	1021861
391	935.1	1093.8	1022789
392	935.9	1093.8	1023721
393	936.8	1093.8	1024657
394	937.6	1093.8	1025596
395	938.5	1093.8	1026539
396	939.4	1093.8	1027486
397	940.2	1093.8	1028437
398	941.1	1093.8	1029391
399	942.0	1093.8	1030349
400	942.9	1093.8	1031310
401	943.8	1093.8	1032275
402	944.6	1093.8	1033245
403	945.5	1093.8	1034217
404	946.4	1093.8	1035194
405	947.3	1093.8	1036174
406	948.2	1093.8	1037159
407	949.1	1093.8	1038147
408	950.0	1093.8	1039139
409	950.9	1093.8	1040134
410	951.9	1093.8	1041134
411	952.8	1093.8	1042137
412	953.7	1093.8	1043145
413	954.6	1093.8	1044156
414	955.5	1093.8	1045171
415	956.5	1093.8	1046190
416	957.4	1093.8	1047213
417	958.3	1093.8	1048240
418	959.3	1093.8	1049271
419	960.2	1093.8	1050306
420	961.2	1093.8	1051345
421	962.1	1093.8	1052388
422	963.1	1093.8	1053435
423	964.1	1093.8	1054486
424	965.0	1093.8	1055541
425	966.0	1093.8	1056600
426	967.0	1093.8	1057663
427	967.9	1093.8	1058731
428	968.9	1093.8	1059802
429	969.9	1093.8	1060878
430	970.9	1093.8	1061957
431	971.9	1093.8	1063041
432	972.9	1093.8	1064129
433	973.9	1093.8	1065221
434	974.9	1093.8	1066318
435	975.9	1093.8	1067418
436	976.9	1093.8	1068523
437	977.9	1093.8	1069632
438	978.9	1093.8	1070745
439	979.9	1093.8	1071863
440	981.0	1093.8	1072985
441	982.0	1093.8	1074111
442	983.0	1093.8	1075242
443	984.1	1093.8	1076377
444	985.1	1093.8	1077516
445	986.2	1093.8	1078659
446	987.2	1093.8	1079807
447	988.3	1093.8	1080960
448	989.3	1093.8	1082117
449	990.4	1093.8	1083278
450	991.4	1093.8	1084444
451	992.5	1093.8	1085614
452	993.6	1093.8	1086789
453	994.7	1093.8	1087968
454	995.8	1093.8	1089151
455	996.8	1093.8	1090340
456	997.9	1093.8	1091532

STATISTICAL ANALYSIS SYSTEM

OBS	LENGTH	WIDTH	AREA
457	999.0	1093.A	109c730
458	1000.1	1093.A	1093932
459	1001.2	1093.A	1095138
460	1002.3	1093.A	1096350
461	1003.4	1093.A	1097565
462	1004.6	1093.A	1098786
463	1005.7	1093.A	1100011
464	1006.8	1093.A	1101241
465	1007.9	1093.A	1102475
466	1009.1	1093.A	1103715
467	1010.2	1093.A	1104959
468	1011.3	1093.A	1106208
469	1012.5	1093.A	1107461
470	1013.6	1093.A	1108720
471	1014.8	1093.A	1109983
472	1016.0	1093.A	1111251
473	1017.1	1093.A	1112524
474	1018.3	1093.A	1113802
475	1019.5	1093.A	1115085
476	1020.6	1093.A	1116372
477	1021.8	1093.A	1117665
478	1023.0	1093.A	1118962
479	1024.2	1093.A	1120265
480	1025.4	1093.A	1121573
481	1026.6	1093.A	1122885
482	1027.8	1093.A	1124203
483	1029.0	1093.A	1125525
484	1030.2	1093.A	1126853
485	1031.4	1093.A	1128186
486	1032.7	1093.A	1129524
487	1033.9	1093.A	1130867
488	1035.1	1093.A	1132215
489	1036.4	1093.A	1133569
490	1037.6	1093.A	1134927
491	1038.8	1093.A	1136291
492	1040.1	1093.A	1137660
493	1041.4	1093.A	1139035
494	1042.6	1093.A	1140414
495	1043.9	1093.A	1141799
496	1045.2	1093.A	1143189
497	1046.4	1093.A	1144585
498	1047.7	1093.A	1145986
499	1049.0	1093.A	1147392
500	1050.3	1093.A	1148804
501	1051.6	1093.A	1150222
502	1052.9	1093.A	1151644
503	1054.2	1093.A	1153073
504	1055.5	1093.A	1154506
505	1056.8	1093.A	1155946
506	1058.1	1093.A	1157390
507	1059.5	1093.A	1158841
508	1060.8	1093.A	1160297
509	1062.1	1093.A	1161758
510	1063.5	1093.A	1163226
511	1064.8	1093.A	1164699
512	1066.2	1093.A	1166177
513	1067.5	1093.A	1167662
514	1068.9	1093.A	1169152
515	1070.3	1093.A	1170647
516	1071.6	1093.A	1172149
517	1073.0	1093.A	1173657
518	1074.4	1093.A	1175170
519	1075.8	1093.A	1176689
520	1077.2	1093.A	1178214
521	1078.6	1093.A	1179745
522	1080.0	1093.A	1181282
523	1081.4	1093.A	1182825
524	1082.8	1093.A	1184374
525	1084.2	1093.A	1185929
526	1085.7	1093.A	1187490
527	1087.1	1093.A	1189057
528	1088.5	1093.A	1190630
529	1090.0	1093.A	1192209
530	1091.4	1093.A	1193795
531	1092.9	1093.A	1195386
532	1094.3	1093.A	1196984

OBS	LENGTH	WIDTH	AREA
533	1095.A	1093.A	1198588
534	1097.3	1093.A	1200199
535	1098.A	1093.A	1201815
536	1100.2	1093.A	1203438
537	1101.7	1093.A	1205067
538	1103.2	1093.A	1206703
539	1104.7	1093.A	1208345
540	1106.2	1093.A	1209993
541	1107.7	1093.A	1211648
542	1109.3	1093.A	1213310
543	1110.A	1093.A	1214978
544	1112.3	1093.A	1216652
545	1113.9	1093.A	1218333
546	1115.4	1093.A	1220021
547	1116.9	1093.A	1221715
548	1118.5	1093.A	1223416
549	1120.1	1093.A	1225124
550	1121.6	1093.A	1226838
551	1123.2	1093.A	1228559
552	1124.8	1093.A	1230287
553	1126.4	1093.A	1232022
554	1128.0	1093.A	1233763
555	1129.4	1093.A	1235512
556	1131.2	1093.A	1237267
557	1132.A	1093.A	1239030
558	1134.4	1093.A	1240799
559	1136.0	1093.A	1242575
560	1137.6	1093.A	1244358
561	1139.3	1093.A	1246149
562	1140.9	1093.A	1247946
563	1142.6	1093.A	1249751
564	1144.2	1093.A	1251563
565	1145.9	1093.A	1253382
566	1147.6	1093.A	1255208
567	1149.2	1093.A	1257042
568	1150.9	1093.A	1258882
569	1152.6	1093.A	1260731
570	1154.3	1093.A	1262586
571	1156.0	1093.A	1264449
572	1157.7	1093.A	1266319
573	1159.4	1093.A	1268197
574	1161.2	1093.A	1270083
575	1162.9	1093.A	1271976
576	1164.6	1093.A	1273878
577	1166.4	1093.A	1275788
578	1168.1	1093.A	1277706
579	1169.9	1093.A	1279632
580	1171.7	1093.A	1281565
581	1173.4	1093.A	1283506
582	1175.2	1093.A	1285454
583	1177.0	1093.A	1287409
584	1178.8	1093.A	1289372
585	1180.6	1093.A	1291343
586	1182.4	1093.A	1293321
587	1184.2	1093.A	1295307
588	1186.0	1093.A	1297299
589	1187.9	1093.A	1299300
590	1189.7	1093.A	1301308
591	1191.6	1093.A	1303323
592	1193.4	1093.A	1305347
593	1195.3	1093.A	1307378
594	1197.1	1093.A	1309416
595	1199.0	1093.A	1311462
596	1200.9	1093.A	1313515
597	1202.8	1093.A	1315576
598	1204.7	1093.A	1317644
599	1206.6	1093.A	1319720
600	1208.5	1093.A	1321803
601	1210.4	1093.A	1323894
602	1212.4	1093.A	1325992
603	1214.3	1093.A	1328097
604	1216.2	1093.A	1330210
605	1218.2	1093.A	1332331
606	1220.2	1093.A	1334459
607	1222.1	1093.A	1336596
608	1224.1	1093.A	1338740

STATISTICAL ANALYSIS SYSTEM

OBS	LENGTH	WIDTH	AREA
609	1226.1	1093.8	1341101
610	1228.1	1093.8	1343282
611	1230.1	1093.8	1345473
612	1232.1	1093.8	1347673
613	1234.1	1093.8	1349882
614	1236.1	1093.8	1352100
615	1238.2	1093.8	1354327
616	1240.2	1093.8	1356564
617	1242.3	1093.8	1358809
618	1244.3	1093.8	1361065
619	1246.4	1093.8	1363329
620	1248.5	1093.8	1365603
621	1250.6	1093.8	1367887
622	1252.7	1093.8	1370180
623	1254.8	1093.8	1372482
624	1256.9	1093.8	1374794
625	1259.0	1093.8	1377116
626	1261.2	1093.8	1379448
627	1263.3	1093.8	1381789
628	1265.4	1093.8	1384141
629	1267.6	1093.8	1386502
630	1269.8	1093.8	1388873
631	1271.9	1093.8	1391254
632	1274.1	1093.8	1393645
633	1276.3	1093.8	1396047
634	1278.5	1093.8	1398458
635	1280.7	1093.8	1400880
636	1283.0	1093.8	1403312
637	1285.2	1093.8	1405754
638	1287.4	1093.8	1408206
639	1289.7	1093.8	1410669
640	1292.0	1093.8	1413143
641	1294.2	1093.8	1415627
642	1296.5	1093.8	1418122
643	1298.8	1093.8	1420627
644	1301.1	1093.8	1423143
645	1303.4	1093.8	1425670
646	1305.7	1093.8	1428208
647	1308.1	1093.8	1430756
648	1310.4	1093.8	1433316
649	1312.8	1093.8	1435886
650	1315.1	1093.8	1438468
651	1317.5	1093.8	1441061
652	1319.9	1093.8	1443665
653	1322.3	1093.8	1446280
654	1324.7	1093.8	1448907
655	1327.1	1093.8	1451545
656	1329.5	1093.8	1454194
657	1331.9	1093.8	1456855
658	1334.4	1093.8	1459527
659	1336.8	1093.8	1462211
660	1339.3	1093.8	1464907
661	1341.8	1093.8	1467615
662	1344.2	1093.8	1470334
663	1346.7	1093.8	1473066
664	1349.2	1093.8	1475809
665	1351.8	1093.8	1478564
666	1354.3	1093.8	1481332
667	1356.8	1093.8	1484112
668	1359.4	1093.8	1486904
669	1362.0	1093.8	1489708
670	1364.5	1093.8	1492524
671	1367.1	1093.8	1495354
672	1369.7	1093.8	1498195
673	1372.3	1093.8	1501049
674	1374.9	1093.8	1503916
675	1377.6	1093.8	1506796
676	1380.2	1093.8	1509689
677	1382.9	1093.8	1512594
678	1385.5	1093.8	1515512
679	1388.2	1093.8	1518444
680	1390.9	1093.8	1521388
681	1393.6	1093.8	1524345
682	1396.3	1093.8	1527317
683	1399.1	1093.8	1530302
684	1401.8	1093.8	1533299

OBS	LENGTH	WIDTH	AREA
685	1404.6	1093.8	1536311
686	1407.3	1093.8	1539336
687	1410.1	1093.8	1542374
688	1412.9	1093.8	1545427
689	1415.7	1093.8	1548493
690	1418.5	1093.8	1551573
691	1421.3	1093.8	1554667
692	1424.2	1093.8	1557774
693	1427.0	1093.8	1560896
694	1429.9	1093.8	1564031
695	1432.8	1093.8	1567180
696	1435.7	1093.8	1570343
697	1438.6	1093.8	1573520
698	1441.5	1093.8	1576726
699	1444.4	1093.8	1579939
700	1447.4	1093.8	1583160
701	1450.4	1093.8	1586390
702	1453.3	1093.8	1589651
703	1456.3	1093.8	1592922
704	1459.3	1093.8	1596209
705	1462.3	1093.8	1599506
706	1465.4	1093.8	1602821
707	1468.4	1093.8	1606151
708	1471.5	1093.8	1609497
709	1474.5	1093.8	1612858
710	1477.6	1093.8	1616235
711	1480.7	1093.8	1619626
712	1483.9	1093.8	1623037
713	1487.0	1093.8	1626462
714	1490.1	1093.8	1629903
715	1493.3	1093.8	1633361
716	1496.5	1093.8	1636834
717	1499.7	1093.8	1640325
718	1502.9	1093.8	1643831
719	1506.1	1093.8	1647355
720	1509.3	1093.8	1650895
721	1512.6	1093.8	1654452
722	1515.8	1093.8	1658026
723	1519.1	1093.8	1661617
724	1522.4	1093.8	1665225
725	1525.7	1093.8	1668850
726	1529.1	1093.8	1672493
727	1532.4	1093.8	1676154
728	1535.8	1093.8	1679832
729	1539.2	1093.8	1683528
730	1542.6	1093.8	1687241
731	1546.0	1093.8	1690973
732	1549.4	1093.8	1694723
733	1552.8	1093.8	1698491
734	1556.3	1093.8	1702277
735	1559.8	1093.8	1706082
736	1563.3	1093.8	1709905
737	1566.8	1093.8	1713748
738	1570.3	1093.8	1717609
739	1573.9	1093.8	1721489
740	1577.4	1093.8	1725388
741	1581.0	1093.8	1729306
742	1584.6	1093.8	1733243
743	1588.2	1093.8	1737200
744	1591.9	1093.8	1741177
745	1595.5	1093.8	1745174
746	1599.2	1093.8	1749190
747	1602.9	1093.8	1753226
748	1606.6	1093.8	1757283
749	1610.3	1093.8	1761359
750	1614.1	1093.8	1765456
751	1617.8	1093.8	1769574
752	1621.6	1093.8	1773713
753	1625.4	1093.8	1777872
754	1629.2	1093.8	1782052
755	1633.1	1093.8	1786253
756	1636.9	1093.8	1790476
757	1640.8	1093.8	1794720
758	1644.7	1093.8	1798986
759	1648.6	1093.8	1803273
760	1652.5	1093.8	1807582

STATISTICAL ANALYSIS SYSTEM

OBS	LENGTH	WIDTH	AREA
761	1656.5	1093.4	1811914
762	1660.5	1093.4	1816267
763	1664.5	1093.4	1820643
764	1668.5	1093.3	1825041
765	1672.6	1093.4	1829462
766	1676.6	1093.8	1833905
767	1680.7	1093.8	1838373
768	1684.8	1093.4	1842863
769	1688.9	1093.4	1847376
770	1693.1	1093.8	1851913
771	1697.3	1093.4	1856474
772	1701.5	1093.8	1861058
773	1705.7	1093.4	1865666
774	1709.9	1093.8	1870299
775	1714.2	1093.4	1874956
776	1718.4	1093.8	1879637
777	1722.7	1093.8	1884343
778	1727.1	1093.8	1889074
779	1731.4	1093.8	1893830
780	1735.8	1093.8	1898611
781	1740.2	1093.8	1903418
782	1744.6	1093.4	1908250
783	1749.0	1093.4	1913108
784	1753.5	1093.8	1917992
785	1758.0	1093.8	1922903
786	1762.5	1093.8	1927839
787	1767.1	1093.4	1932803
788	1771.6	1093.4	1937793
789	1776.2	1093.4	1942810
790	1780.8	1093.8	1947854
791	1785.5	1093.4	1952926
792	1790.1	1093.8	1958026
793	1794.8	1093.8	1963153
794	1799.5	1093.4	1968308
795	1804.3	1093.4	1973492
796	1809.0	1093.8	1978704
797	1813.8	1093.4	1983944
798	1818.6	1093.8	1989214
799	1823.5	1093.8	1994513
800	1828.3	1093.8	1999841
801	1833.2	1093.4	2005199
802	1838.2	1093.4	2010586
803	1843.1	1093.4	2016004
804	1848.1	1093.4	2021452
805	1853.1	1093.8	2026930
806	1858.1	1093.8	2032439
807	1863.2	1093.8	2037979
808	1868.3	1093.4	2043551
809	1873.4	1093.4	2049154
810	1878.6	1093.8	2054789
811	1883.8	1093.4	2060456
812	1889.0	1093.4	2066155
813	1894.2	1093.4	2071886
814	1899.5	1093.8	2077651
815	1904.8	1093.8	2083448
816	1910.1	1093.4	2089279
817	1915.5	1093.8	2095143
818	1920.9	1093.8	2101042
819	1926.3	1093.8	2106974
820	1931.7	1093.4	2112941
821	1937.2	1093.8	2118943
822	1942.7	1093.8	2124979
823	1948.3	1093.4	2131051
824	1953.9	1093.8	2137159
825	1959.5	1093.4	2143302
826	1965.2	1093.4	2149482
827	1970.8	1093.4	2155698
828	1976.6	1093.8	2161951
829	1982.3	1093.4	2168241
830	1988.1	1093.8	2174568
831	1993.9	1093.4	2180933
832	1999.8	1093.8	2187335
833	2005.6	1093.4	2193777
834	2011.6	1093.8	2200256
835	2017.5	1093.4	2206777
836	2023.5	1093.8	2213336

OBS	LENGTH	WIDTH	AREA
837	2029.6	1093.8	2219934
838	2035.6	1093.4	2226573
839	2041.7	1093.4	2233252
840	2047.9	1093.8	2239971
841	2054.1	1093.4	2246732
842	2060.3	1093.4	2253534
843	2066.5	1093.8	2260377
844	2072.8	1093.4	2267265
845	2079.2	1093.4	2274193
846	2085.5	1093.4	2281167
847	2092.0	1093.4	2288180
848	2098.4	1093.4	2295239
849	2104.9	1093.4	2302342
850	2111.4	1093.4	2309490
851	2118.0	1093.4	2316682
852	2124.6	1093.4	2323920
853	2131.3	1093.4	2331203
854	2138.0	1093.4	2338533
855	2144.7	1093.4	2345909
856	2151.5	1093.4	2353332
857	2158.3	1093.8	2360803
858	2165.2	1093.4	2368321
859	2172.1	1093.8	2375886
860	2179.1	1093.8	2383500
861	2186.1	1093.4	2391161
862	2193.2	1093.4	2398869
863	2200.3	1093.4	2406626
864	2207.4	1093.4	2414433
865	2214.6	1093.4	2422289
866	2221.8	1093.4	2430195
867	2229.1	1093.4	2438151
868	2236.4	1093.4	2446159
869	2243.8	1093.4	2454218
870	2251.3	1093.4	2462329
871	2258.8	1093.8	2470491
872	2266.3	1093.8	2478706
873	2273.9	1093.8	2486973
874	2281.5	1093.8	2495293
875	2289.2	1093.8	2503666
876	2296.9	1093.8	2512092
877	2304.7	1093.8	2520572
878	2312.4	1093.8	2529106
879	2320.4	1093.8	2537694
880	2328.4	1093.4	2546336
881	2336.4	1093.8	2555032
882	2344.5	1093.8	2563784
883	2352.6	1093.4	2572590
884	2360.7	1093.8	2581451
885	2369.0	1093.4	2590367
886	2377.2	1093.4	2599338
887	2385.6	1093.4	2608365
888	2394.0	1093.8	2617448
889	2402.4	1093.8	2626587
890	2411.0	1093.4	2635782
891	2419.5	1093.8	2645033
892	2428.2	1093.4	2654340
893	2436.9	1093.4	2663704
894	2445.7	1093.8	2673125
895	2454.5	1093.4	2682603
896	2463.4	1093.4	2692138
897	2472.3	1093.4	2701730
898	2481.3	1093.4	2711380
899	2490.4	1093.8	2721087
900	2499.5	1093.8	2730851
901	2508.8	1093.8	2740673
902	2518.1	1093.8	2750553
903	2527.4	1093.8	2760491
904	2536.9	1093.4	2770488
905	2546.4	1093.4	2780543
906	2556.0	1093.4	2790657
907	2565.6	1093.4	2800830
908	2575.3	1093.4	2811062
909	2585.0	1093.4	2821353
910	2594.9	1093.4	2831704
911	2604.8	1093.4	2842115
912	2614.8	1093.4	2852586

STATISTICAL ANALYSIS SYSTEM

OBS	LENGTH	WIDTH	AREA
913	2824.9	1093.4	2871124
914	2835.1	1093.4	2888237
915	2845.3	1093.4	2905413
916	2855.6	1093.4	2922715
917	2866.0	1093.4	2940082
918	2876.5	1093.4	2957543
919	2887.0	1093.4	2975099
920	2897.7	1093.4	2992772
921	2908.4	1093.4	3010558
922	2919.2	1093.4	3028458
923	2930.1	1093.4	3046485
924	2941.1	1093.4	3064635
925	2952.2	1093.4	3082911
926	2963.3	1093.4	3101314
927	2974.6	1093.4	3119846
928	2985.9	1093.4	3138515
929	2997.3	1093.4	3157315
930	3008.8	1093.4	3176247
931	3020.5	1093.4	3195323
932	3032.2	1093.4	3214532
933	3044.0	1093.4	3233876
934	3055.9	1093.4	3253358
935	3067.9	1093.4	3272987
936	3080.0	1093.4	3292750
937	3092.2	1093.4	3312654
938	3104.5	1093.4	3332697
939	3116.9	1093.4	3352888
940	3129.4	1093.4	3373211
941	3142.1	1093.4	3393684
942	3154.8	1093.4	3414302
943	3167.6	1093.4	3435065
944	3180.6	1093.4	3455980
945	3193.6	1093.4	3477044
946	3206.8	1093.4	3498267
947	3220.1	1093.4	3519633
948	3233.5	1093.4	3541157
949	3247.0	1093.4	3562840
950	3260.7	1093.4	3584683
951	3274.4	1093.4	3606684
952	3288.3	1093.4	3628849
953	3302.3	1093.4	3651173
954	3316.5	1093.4	3673658
955	3330.7	1093.4	3696301
956	3345.1	1093.4	3719109
957	3359.7	1093.4	3742084
958	3374.3	1093.4	3765224
959	3389.1	1093.4	3788534
960	3404.0	1093.4	3812015
961	3419.1	1093.4	3835666
962	3434.3	1093.4	3859497
963	3449.7	1093.4	3883504
964	3465.2	1093.4	3907694
965	3480.9	1093.4	3932064
966	3496.6	1093.4	3956621
967	3512.5	1093.4	3981363
968	3528.6	1093.4	4006294
969	3544.9	1093.4	4031414
970	3561.3	1093.4	4056725
971	3577.9	1093.4	4082226
972	3594.6	1093.4	4107922
973	3611.5	1093.4	4133811
974	3628.5	1093.4	4159895
975	3645.8	1093.4	4186177
976	3663.2	1093.4	4212657
977	3680.8	1093.4	4239335
978	3698.5	1093.4	4266213
979	3716.4	1093.4	4293292
980	3734.5	1093.4	4320573
981	3752.9	1093.4	4348057
982	3771.4	1093.4	4375744
983	3790.0	1093.4	4403637
984	3808.9	1093.4	4431736
985	3828.0	1093.4	4460042
986	3847.3	1093.4	4488556
987	3866.7	1093.4	4517280
988	3886.4	1093.4	4546215

OBS	LENGTH	WIDTH	AREA
989	3906.3	1093.4	4575363
990	3926.4	1093.4	4604726
991	3946.8	1093.4	4634305
992	3967.3	1093.4	4664102
993	3988.1	1093.4	4694122
994	4009.1	1093.4	4724366
995	4030.3	1093.4	4754836
996	4051.9	1093.4	4785535
997	4073.5	1093.4	4816465
998	4095.5	1093.4	4847630
999	4117.7	1093.4	4879031
1000	4140.1	1093.4	4910670
1001	4162.9	1093.4	4942552
1002	4185.9	1093.4	4974677
1003	4209.1	1093.4	5007051
1004	4232.6	1093.4	5039677
1005	4256.4	1093.4	5072560
1006	4280.5	1093.4	5105703
1007	4304.8	1093.4	5139112
1008	4329.5	1093.4	5172791
1009	4354.4	1093.4	5206744
1010	4379.7	1093.4	5240976
1011	4405.3	1093.4	5275494
1012	4431.1	1093.4	5310302
1013	4457.3	1093.4	5345407
1014	4483.9	1093.4	5380815
1015	4510.7	1093.4	5416530
1016	4537.9	1093.4	5452560
1017	4565.5	1093.4	5488911
1018	4593.3	1093.4	5525589
1019	4621.4	1093.4	5562602
1020	4650.2	1093.4	5599957
1021	4679.2	1093.4	5637664
1022	4708.6	1093.4	5675731
1023	4738.3	1093.4	5714168
1024	4768.5	1093.4	5752987

APPENDIX B

THE EFFECTIVE PIXEL DIMENSIONS ASSOCIATED WITH NOAA-7 AVHRR DATA

ORIGINAL PAGE IS
OF POOR QUALITY

```
FILE: GRAYS [illegible]

DATA ONE;
A=1.133;
B=.9673447604;
C=.0009447117;
W=6371;
DO X=1 TO 1024;
XX=1025-X;
LENGTH=A*(ABS[illegible]
      =A*S[illegible];
LENGTH=LENGTH*100 ;
WIDTH=919;
AREA=LENGTH*WIDTH;
LENGTH=ROUND(LENGTH,.1);
AREA=ROUND(AREA,.1);
OUTPUT;
END;
PROC PLOT;
PLOT LENGTH*XX='*';
PROC SORT; BY XX;
DATA TWO (KEEP= [illegible];
PROC PRINT;
```

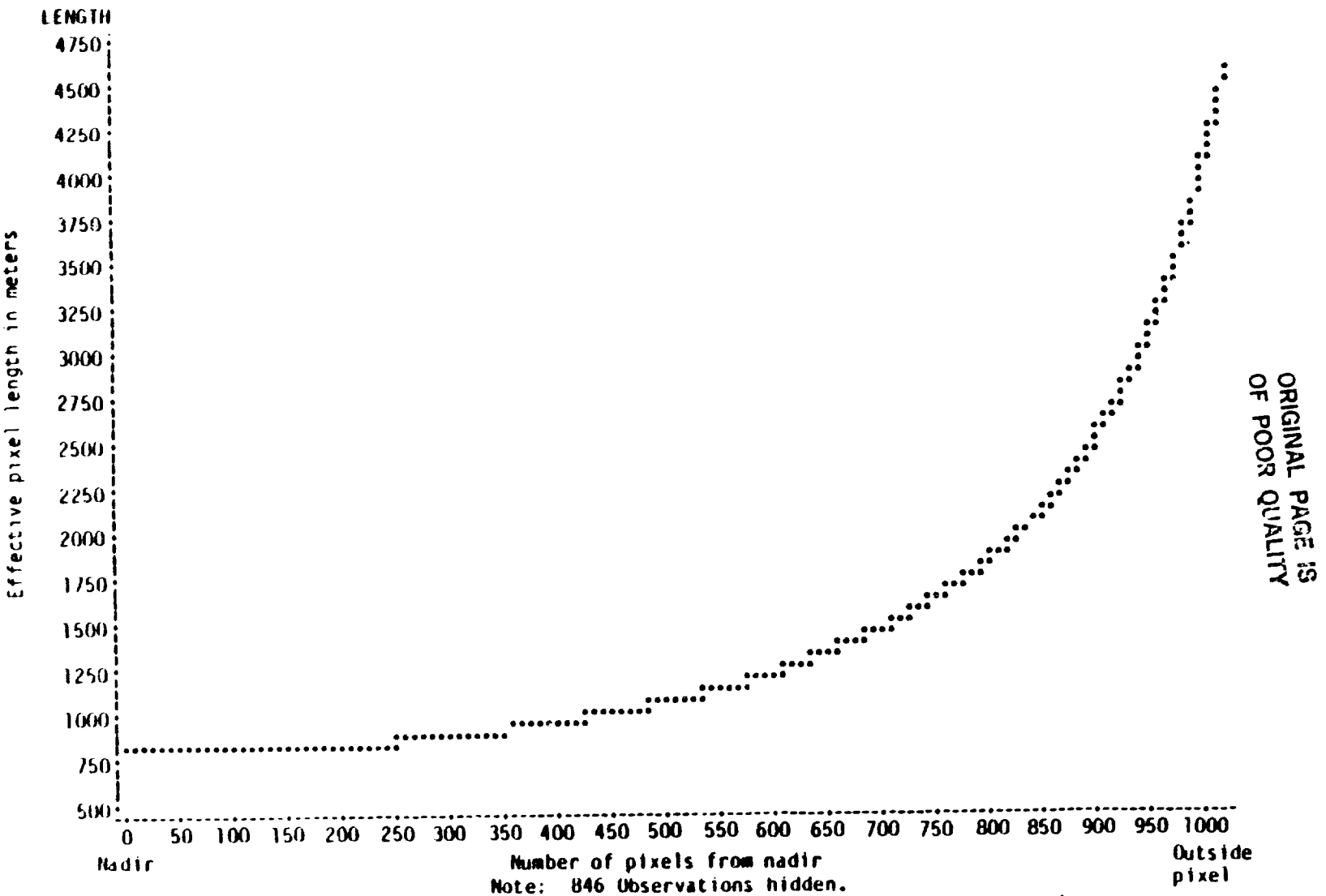


Figure B-1.- The relationship between effective pixel length (meters) and number of pixels from nadir for NOAA-7 AVHRR data.

ORIGINAL PAGE IS
OF POOR QUALITY

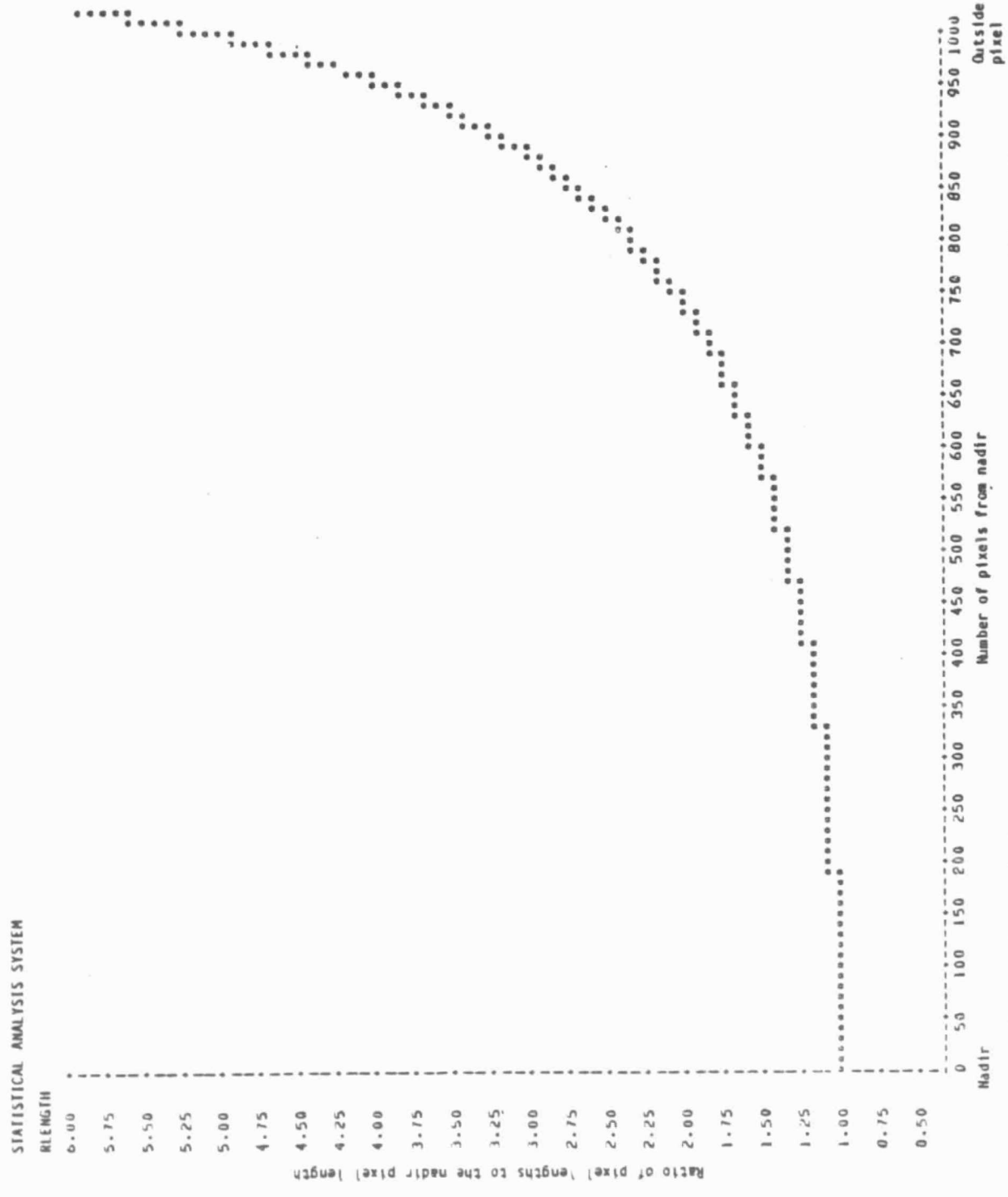


Figure B-2.- Ratios of effective pixel lengths away from nadir to the effective pixel length at nadir for NOAA-7 AVHRR data.

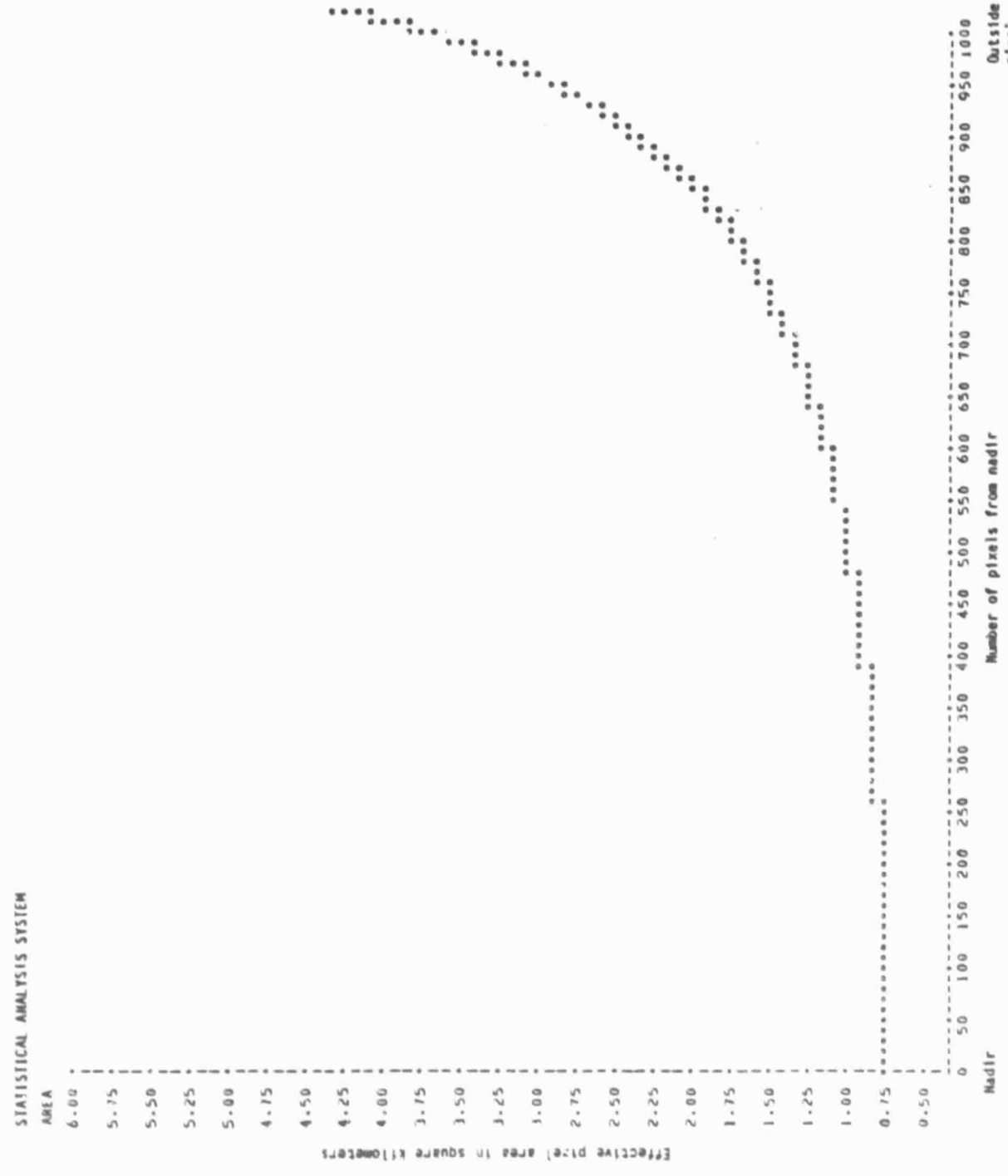
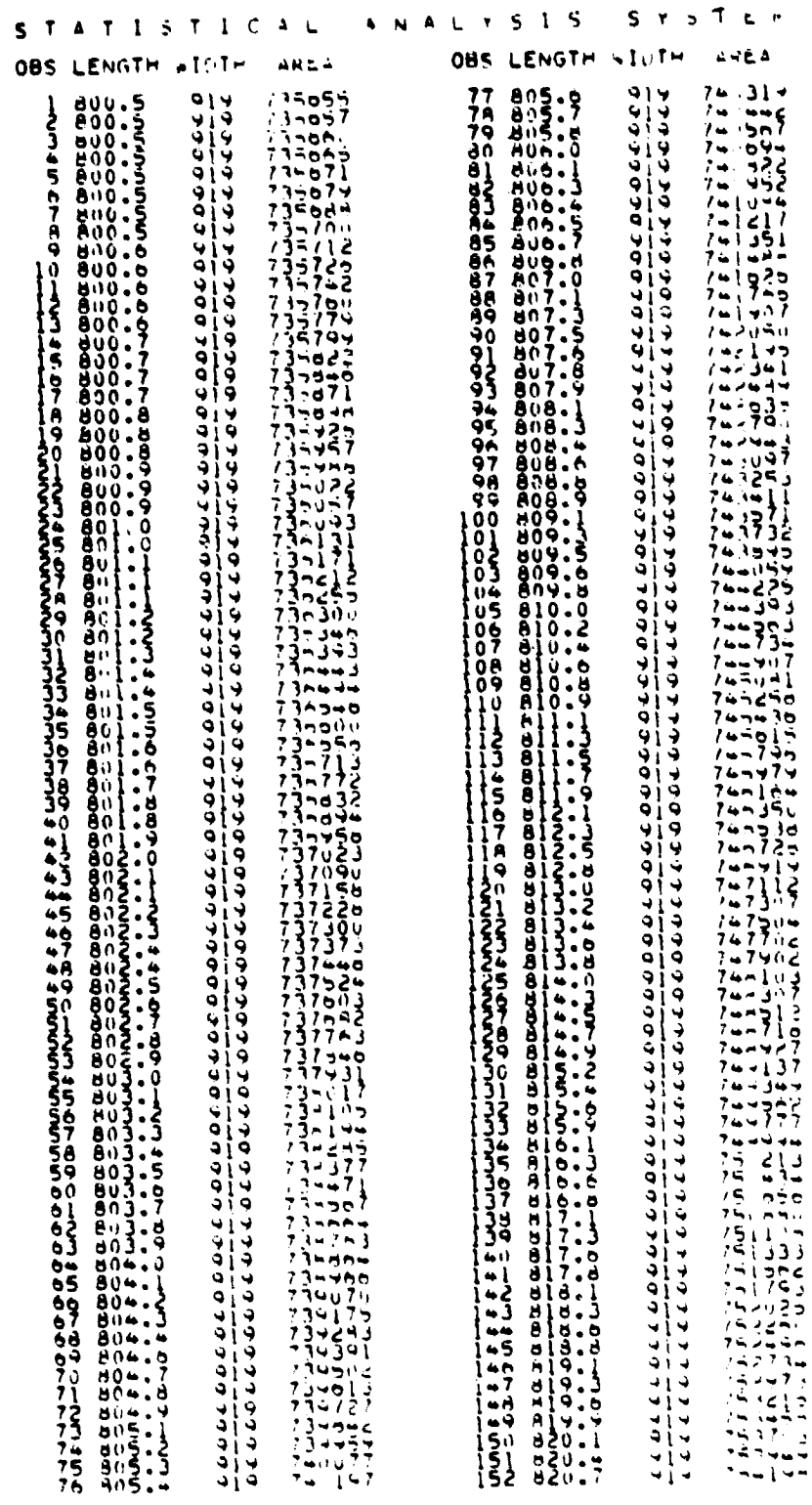


Figure B-3.- The relationship between effective pixel area (square kilometers) and number of pixels from nadir for NOAA-7 AVHPR data.

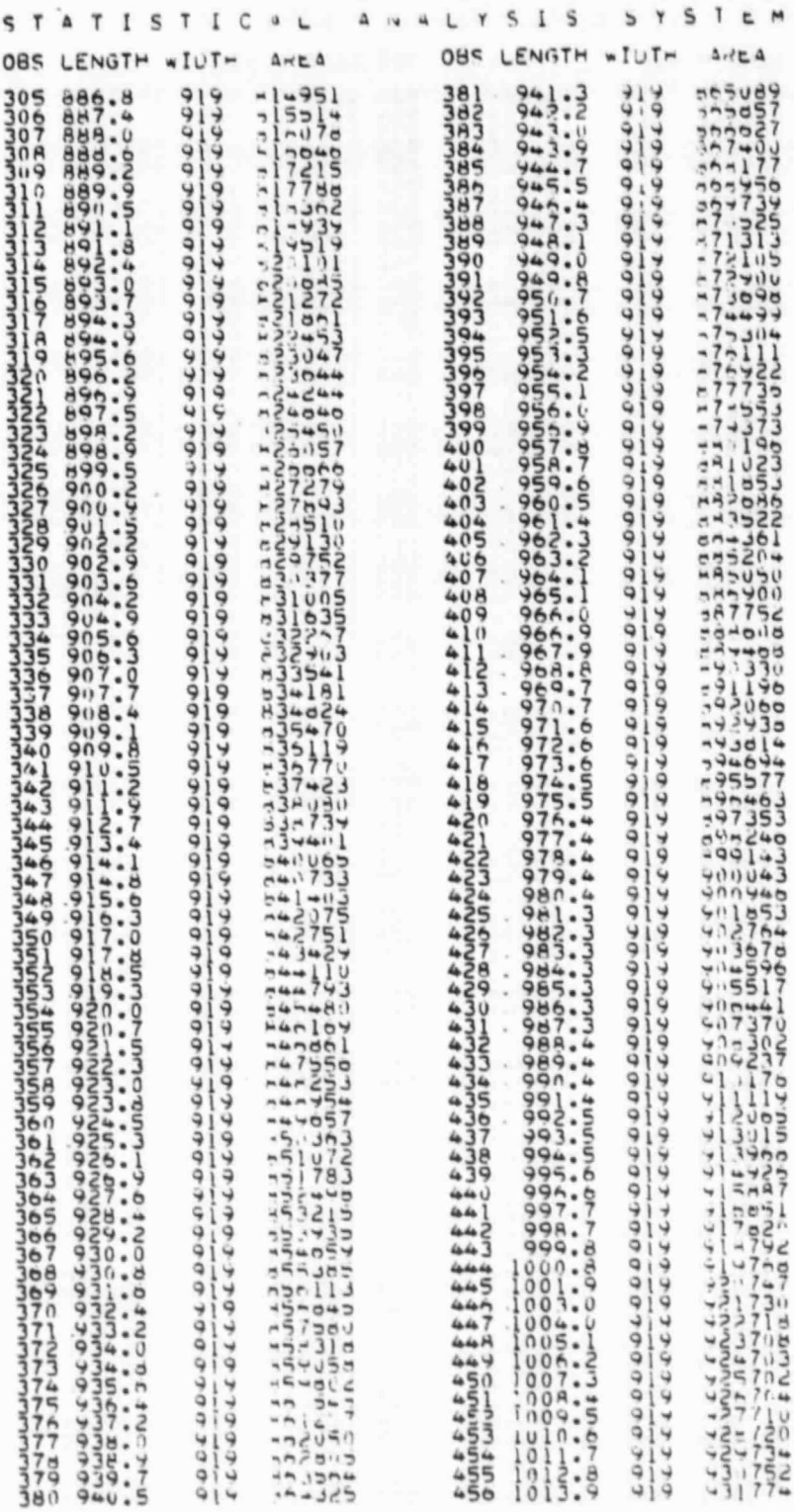


S T A T I S T I C A L A n a l y s i s S y s t e m

OBS	LENGTH	WIDTH	AREA
153	820.9	9	7
154	821.2	9	7
155	821.5	9	7
156	821.8	9	7
157	822.1	9	7
158	822.3	9	7
159	822.6	9	7
160	822.9	9	7
161	823.2	9	7
162	823.5	9	7
163	823.8	9	7
164	824.1	9	7
165	824.4	9	7
166	824.7	9	7
167	825.0	9	7
168	825.3	9	7
169	825.6	9	7
170	825.9	9	7
171	826.2	9	7
172	826.5	9	7
173	826.8	9	7
174	827.1	9	7
175	827.4	9	7
176	827.7	9	7
177	828.1	9	7
178	828.4	9	7
179	828.7	9	7
180	829.0	9	7
181	829.4	9	7
182	829.7	9	7
183	830.0	9	7
184	830.4	9	7
185	830.7	9	7
186	831.0	9	7
187	831.4	9	7
188	831.7	9	7
189	832.0	9	7
190	832.4	9	7
191	832.7	9	7
192	833.1	9	7
193	833.4	9	7
194	833.8	9	7
195	834.1	9	7
196	834.5	9	7
197	834.9	9	7
198	835.2	9	7
199	835.6	9	7
200	836.0	9	7
201	836.3	9	7
202	836.7	9	7
203	837.1	9	7
204	837.4	9	7
205	837.8	9	7
206	838.2	9	7
207	838.6	9	7
208	839.0	9	7
209	839.3	9	7
210	839.7	9	7
211	840.1	9	7
212	840.5	9	7
213	840.9	9	7
214	841.3	9	7
215	841.7	9	7
216	842.1	9	7
217	842.5	9	7
218	842.9	9	7
219	843.3	9	7
220	843.7	9	7
221	844.1	9	7
222	844.5	9	7
223	845.0	9	7
224	845.4	9	7
225	845.8	9	7
226	846.2	9	7
227	846.6	9	7
228	847.1	9	7

OBS	LENGTH	WIDTH	AREA
229	847.5	9	7
230	847.9	9	7
231	848.3	9	7
232	848.8	9	7
233	849.2	9	7
234	849.7	9	7
235	850.1	9	7
236	850.5	9	7
237	851.0	9	7
238	851.4	9	7
239	851.9	9	7
240	852.3	9	7
241	852.8	9	7
242	853.2	9	7
243	853.7	9	7
244	854.2	9	7
245	854.6	9	7
246	855.1	9	7
247	855.6	9	7
248	856.0	9	7
249	856.5	9	7
250	857.0	9	7
251	857.5	9	7
252	857.9	9	7
253	858.4	9	7
254	858.9	9	7
255	859.4	9	7
256	859.9	9	7
257	860.4	9	7
258	860.9	9	7
259	861.4	9	7
260	861.9	9	7
261	862.4	9	7
262	862.9	9	7
263	863.4	9	7
264	863.9	9	7
265	864.4	9	7
266	864.9	9	7
267	865.4	9	7
268	865.9	9	7
269	866.4	9	7
270	867.0	9	7
271	867.5	9	7
272	868.0	9	7
273	868.5	9	7
274	869.1	9	7
275	869.6	9	7
276	870.1	9	7
277	870.7	9	7
278	871.2	9	7
279	871.8	9	7
280	872.3	9	7
281	872.9	9	7
282	873.4	9	7
283	874.0	9	7
284	874.5	9	7
285	875.1	9	7
286	875.6	9	7
287	876.2	9	7
288	876.8	9	7
289	877.3	9	7
290	877.9	9	7
291	878.5	9	7
292	879.1	9	7
293	879.6	9	7
294	880.2	9	7
295	880.8	9	7
296	881.4	9	7
297	882.0	9	7
298	882.5	9	7
299	883.1	9	7
300	883.7	9	7
301	884.3	9	7
302	884.9	9	7
303	885.5	9	7
304	886.2	9	7

ORIGINAL PAGE IS
OF POOR QUALITY



S T A T I S T I C A L A N A L Y S I S S Y S T E M

OBS	LENGTH	WIDTH	AREA
457	1015.0	919	933400
458	1016.1	919	933824
459	1017.3	919	934885
460	1018.4	919	935901
461	1019.5	919	936942
462	1020.7	919	937988
463	1021.8	919	939037
464	1022.9	919	940041
465	1024.1	919	941140
466	1025.3	919	942211
467	1026.4	919	943270
468	1027.6	919	944340
469	1028.7	919	945342
470	1029.9	919	946443
471	1031.1	919	947540
472	1032.2	919	948607
473	1033.5	919	949757
474	1034.7	919	950852
475	1035.9	919	951951
476	1037.1	919	953094
477	1038.3	919	954102
478	1039.5	919	955274
479	1040.7	919	956394
480	1041.9	919	957510
481	1043.1	919	958634
482	1044.4	919	959760
483	1045.6	919	960897
484	1046.8	919	962028
485	1048.1	919	963170
486	1049.3	919	964322
487	1050.6	919	965474
488	1051.8	919	966626
489	1053.1	919	967778
490	1054.4	919	968930
491	1055.6	919	970121
492	1056.9	919	971293
493	1058.2	919	972472
494	1059.5	919	973655
495	1060.8	919	974844
496	1062.1	919	976033
497	1063.4	919	977226
498	1064.7	919	978424
499	1066.0	919	979625
500	1067.3	919	980834
501	1068.6	919	982050
502	1069.9	919	983270
503	1071.3	919	984502
504	1072.6	919	985731
505	1074.0	919	986966
506	1075.3	919	988202
507	1076.7	919	989443
508	1078.0	919	990679
509	1079.4	919	991940
510	1080.7	919	993205
511	1082.1	919	994480
512	1083.5	919	995735
513	1084.9	919	997010
514	1086.3	919	998282
515	1087.7	919	999560
516	1089.1	919	1000852
517	1090.5	919	1002145
518	1091.9	919	1003441
519	1093.3	919	1004745
520	1094.7	919	1006035
521	1096.2	919	1007362
522	1097.6	919	1008686
523	1099.0	919	1010002
524	1100.5	919	1011336
525	1101.9	919	1012663
526	1103.4	919	1014004
527	1104.8	919	1015344
528	1106.3	919	1016692
529	1107.8	919	1018042
530	1109.2	919	1019385
531	1110.7	919	1020743
532	1112.2	919	1022102
533	1113.7	919	1023514
534	1115.2	919	1024885
535	1116.7	919	1026245
536	1118.2	919	1027621
537	1119.7	919	1028982
538	1121.2	919	1030471
539	1122.8	919	1031879
540	1124.3	919	1033292
541	1125.8	919	1034711
542	1127.4	919	1036135
543	1128.9	919	1037565
544	1130.5	919	1039001
545	1132.1	919	1040442
546	1133.7	919	1041888
547	1135.3	919	1043342
548	1136.9	919	1044800
549	1138.5	919	1046264
550	1140.1	919	1047734
551	1141.7	919	1049210
552	1143.3	919	1050691
553	1144.9	919	1052179
554	1146.5	919	1053672
555	1148.2	919	1055174
556	1149.8	919	1056677
557	1151.5	919	1058188
558	1153.1	919	1059705
559	1154.8	919	1061226
560	1156.4	919	1062757
561	1158.1	919	1064293
562	1159.8	919	1065834
563	1161.4	919	1067382
564	1163.1	919	1068935
565	1164.8	919	1070495
566	1166.5	919	1072061
567	1168.2	919	1073634
568	1170.0	919	1075213
569	1171.7	919	1076798
570	1173.4	919	1078389
571	1175.2	919	1079987
572	1176.9	919	1081591
573	1178.7	919	1083201
574	1180.4	919	1084818
575	1182.2	919	1086442
576	1184.0	919	1088072
577	1185.8	919	1089708
578	1187.5	919	1091352
579	1189.3	919	1093002
580	1191.1	919	1094658
581	1193.0	919	1096321
582	1194.8	919	1097991
583	1196.6	919	1099668
584	1198.4	919	1101351
585	1200.3	919	1103042
586	1202.2	919	1104739
587	1204.0	919	1106443
588	1205.9	919	1108154
589	1207.7	919	1109872
590	1209.6	919	1111596
591	1211.5	919	1113327
592	1213.4	919	1115065
593	1215.3	919	1116811
594	1217.2	919	1118563
595	1219.1	919	1120322
596	1221.0	919	1122089
597	1222.9	919	1123862
598	1224.8	919	1125643
599	1226.8	919	1127431
600	1228.7	919	1129226
601	1230.7	919	1131028
602	1232.6	919	1132837
603	1234.6	919	1134653
604	1236.5	919	1136477
605	1238.5	919	1138308
606	1240.5	919	1140146
607	1242.5	919	1141992
608	1244.5	919	1143845

OBS	LENGTH	WIDTH	AREA
609	1246.7	919	1145744
610	1248.8	919	1147610
611	1250.8	919	1149448
612	1252.9	919	1151285
613	1254.9	919	1153122
614	1257.0	919	1154959
615	1259.1	919	1156796
616	1261.2	919	1158633
617	1263.3	919	1160470
618	1265.4	919	1162307
619	1267.5	919	1164144
620	1269.6	919	1165981
621	1271.7	919	1167818
622	1273.9	919	1169655
623	1276.0	919	1171492
624	1278.2	919	1173329
625	1280.3	919	1175166
626	1282.5	919	1177003
627	1284.7	919	1178840
628	1286.9	919	1180677
629	1289.1	919	1182514
630	1291.3	919	1184351
631	1293.5	919	1186188
632	1295.8	919	1188025
633	1298.0	919	1189862
634	1300.3	919	1191699
635	1302.6	919	1193536
636	1304.8	919	1195373
637	1307.1	919	1197210
638	1309.4	919	1199047
639	1311.7	919	1200884
640	1314.0	919	1202721
641	1316.3	919	1204558
642	1318.7	919	1206395
643	1321.0	919	1208232
644	1323.4	919	1210069
645	1325.7	919	1211906
646	1328.1	919	1213743
647	1330.5	919	1215580
648	1332.9	919	1217417
649	1335.3	919	1219254
650	1337.7	919	1221091
651	1340.1	919	1222928
652	1342.5	919	1224765
653	1345.0	919	1226602
654	1347.4	919	1228439
655	1349.9	919	1230276
656	1352.4	919	1232113
657	1354.9	919	1233950
658	1357.4	919	1235787
659	1359.9	919	1237624
660	1362.4	919	1239461
661	1364.9	919	1241298
662	1367.5	919	1243135
663	1370.0	919	1244972
664	1372.6	919	1246809
665	1375.2	919	1248646
666	1377.7	919	1250483
667	1380.3	919	1252320
668	1382.9	919	1254157
669	1385.5	919	1255994
670	1388.2	919	1257831
671	1390.8	919	1259668
672	1393.4	919	1261505
673	1396.1	919	1263342
674	1398.7	919	1265179
675	1401.4	919	1267016
676	1404.1	919	1268853
677	1406.7	919	1270690
678	1409.4	919	1272527
679	1412.1	919	1274364
680	1414.8	919	1276201
681	1417.5	919	1278038
682	1420.2	919	1279875
683	1422.9	919	1281712
684	1425.6	919	1283549
685	1429.1	919	1285386
686	1432.0	919	1287223
687	1434.8	919	1289060
688	1437.7	919	1290897
689	1440.5	919	1292734
690	1443.4	919	1294571
691	1446.3	919	1296408
692	1449.2	919	1298245
693	1452.1	919	1300082
694	1455.1	919	1301919
695	1458.0	919	1303756
696	1461.0	919	1305593
697	1463.9	919	1307430
698	1466.9	919	1309267
699	1469.9	919	1311104
700	1472.9	919	1312941
701	1476.0	919	1314778
702	1479.0	919	1316615
703	1482.1	919	1318452
704	1485.1	919	1320289
705	1488.2	919	1322126
706	1491.3	919	1323963
707	1494.4	919	1325800
708	1497.5	919	1327637
709	1500.7	919	1329474
710	1503.9	919	1331311
711	1507.1	919	1333148
712	1510.2	919	1334985
713	1513.4	919	1336822
714	1516.7	919	1338659
715	1519.9	919	1340496
716	1523.2	919	1342333
717	1526.5	919	1344170
718	1529.7	919	1346007
719	1533.0	919	1347844
720	1536.3	919	1349681
721	1539.6	919	1351518
722	1543.0	919	1353355
723	1546.3	919	1355192
724	1549.7	919	1357029
725	1553.0	919	1358866
726	1556.4	919	1360703
727	1559.8	919	1362540
728	1563.2	919	1364377
729	1566.6	919	1366214
730	1570.0	919	1368051
731	1573.4	919	1369888
732	1576.9	919	1371725
733	1580.3	919	1373562
734	1583.8	919	1375399
735	1587.3	919	1377236
736	1590.8	919	1379073
737	1594.3	919	1380910
738	1597.8	919	1382747
739	1601.3	919	1384584
740	1604.9	919	1386421
741	1608.4	919	1388258
742	1612.0	919	1390095
743	1615.6	919	1391932
744	1619.2	919	1393769
745	1622.8	919	1395606
746	1626.4	919	1397443
747	1630.0	919	1399280
748	1633.7	919	1401117
749	1637.3	919	1402954
750	1641.0	919	1404791
751	1644.7	919	1406628
752	1648.3	919	1408465
753	1652.0	919	1410302
754	1655.7	919	1412139
755	1659.5	919	1413976
756	1663.2	919	1415813
757	1667.0	919	1417650
758	1670.7	919	1419487
759	1674.5	919	1421324
760	1678.3	919	1423161

STATISTICAL ANALYSIS SYSTEM

OBS	LENGTH	WIDTH	AREA
761	1687.1	919	1550424
762	1691.2	919	1554173
763	1695.3	919	1557921
764	1699.4	919	1561723
765	1703.5	919	1565559
766	1707.7	919	1569306
767	1711.8	919	1573202
768	1716.0	919	1577073
769	1720.1	919	1580984
770	1724.3	919	1584880
771	1728.4	919	1588747
772	1732.6	919	1592745
773	1736.7	919	1596715
774	1740.8	919	1600705
775	1745.0	919	1604710
776	1749.2	919	1608744
777	1753.3	919	1612800
778	1757.5	919	1616874
779	1761.6	919	1620970
780	1765.8	919	1625040
781	1769.9	919	1629123
782	1774.1	919	1633266
783	1778.2	919	1637500
784	1782.4	919	1641744
785	1786.5	919	1645920
786	1790.7	919	1650102
787	1794.8	919	1654357
788	1799.0	919	1658660
789	1803.1	919	1662941
790	1807.3	919	1667255
791	1811.4	919	1671540
792	1815.6	919	1675920
793	1819.7	919	1680207
794	1823.9	919	1684515
795	1828.0	919	1688862
796	1832.2	919	1693244
797	1836.3	919	1697586
798	1840.5	919	1701931
799	1844.6	919	1706277
800	1848.8	919	1710623
801	1852.9	919	1715009
802	1857.1	919	1719420
803	1861.2	919	1723802
804	1865.4	919	1728197
805	1869.5	919	1732570
806	1873.7	919	1737006
807	1877.8	919	1741452
808	1882.0	919	1745880
809	1886.1	919	1750271
810	1890.3	919	1754731
811	1894.4	919	1759161
812	1898.6	919	1763595
813	1902.7	919	1768044
814	1906.9	919	1772496
815	1911.0	919	1776948
816	1915.2	919	1781400
817	1919.3	919	1785852
818	1923.5	919	1790304
819	1927.6	919	1794756
820	1931.8	919	1799208
821	1935.9	919	1803660
822	1940.1	919	1808112
823	1944.2	919	1812564
824	1948.4	919	1817016
825	1952.5	919	1821468
826	1956.7	919	1825920
827	1960.8	919	1830372
828	1965.0	919	1834824
829	1969.1	919	1839276
830	1973.3	919	1843728
831	1977.4	919	1848180
832	1981.6	919	1852632
833	1985.7	919	1857084
834	1989.9	919	1861536
835	1994.0	919	1865988
836	1998.2	919	1870440
837	2069.9	919	1902272
838	2074.0	919	1906024
839	2078.2	919	1909776
840	2082.3	919	1913528
841	2086.5	919	1917280
842	2090.6	919	1921032
843	2094.8	919	1924784
844	2098.9	919	1928536
845	2103.1	919	1932288
846	2107.2	919	1936040
847	2111.4	919	1939792
848	2115.5	919	1943544
849	2119.7	919	1947296
850	2123.8	919	1951048
851	2128.0	919	1954800
852	2132.1	919	1958552
853	2136.3	919	1962304
854	2140.4	919	1966056
855	2144.6	919	1969808
856	2148.7	919	1973560
857	2152.9	919	1977312
858	2157.0	919	1981064
859	2161.2	919	1984816
860	2165.3	919	1988568
861	2169.5	919	1992320
862	2173.6	919	1996072
863	2177.8	919	1999824
864	2181.9	919	2003576
865	2186.1	919	2007328
866	2190.2	919	2011080
867	2194.4	919	2014832
868	2198.5	919	2018584
869	2202.7	919	2022336
870	2206.8	919	2026088
871	2211.0	919	2029840
872	2215.1	919	2033592
873	2219.3	919	2037344
874	2223.4	919	2041096
875	2227.6	919	2044848
876	2231.7	919	2048600
877	2235.9	919	2052352
878	2240.0	919	2056104
879	2244.2	919	2059856
880	2248.3	919	2063608
881	2252.5	919	2067360
882	2256.6	919	2071112
883	2260.8	919	2074864
884	2264.9	919	2078616
885	2269.1	919	2082368
886	2273.2	919	2086120
887	2277.4	919	2089872
888	2281.5	919	2093624
889	2285.7	919	2097376
890	2289.8	919	2101128
891	2294.0	919	2104880
892	2298.1	919	2108632
893	2302.3	919	2112384
894	2306.4	919	2116136
895	2310.6	919	2119888
896	2314.7	919	2123640
897	2318.9	919	2127392
898	2323.0	919	2131144
899	2327.2	919	2134896
900	2331.3	919	2138648
901	2335.5	919	2142400
902	2339.6	919	2146152
903	2343.8	919	2149904
904	2347.9	919	2153656
905	2352.1	919	2157408
906	2356.2	919	2161160
907	2360.4	919	2164912
908	2364.5	919	2168664
909	2368.7	919	2172416
910	2372.8	919	2176168
911	2377.0	919	2179920
912	2381.1	919	2183672

S T A T I S T I C A L A N A L Y S I S S Y S T E M

OBS	LENGTH	WIDTH	AREA
913	2683.5	919	2466154
914	2694.0	919	2475846
915	2704.6	919	2485538
916	2715.3	919	2495230
917	2726.0	919	2504923
918	2736.8	919	2514615
919	2747.7	919	2524307
920	2758.7	919	2534000
921	2769.8	919	2543692
922	2781.0	919	2553384
923	2792.3	919	2563077
924	2803.6	919	2572769
925	2815.1	919	2582461
926	2826.6	919	2592154
927	2838.3	919	2601846
928	2850.0	919	2611538
929	2861.8	919	2621231
930	2873.8	919	2630923
931	2885.8	919	2640615
932	2897.9	919	2650308
933	2910.1	919	2660000
934	2922.5	919	2669692
935	2934.9	919	2679385
936	2947.4	919	2689077
937	2960.1	919	2698769
938	2972.8	919	2708462
939	2985.7	919	2718154
940	2998.6	919	2727846
941	3011.7	919	2737538
942	3024.9	919	2747231
943	3038.2	919	2756923
944	3051.7	919	2766615
945	3065.2	919	2776308
946	3078.9	919	2786000
947	3092.6	919	2795692
948	3106.6	919	2805385
949	3120.6	919	2815077
950	3134.7	919	2824769
951	3149.0	919	2834462
952	3163.4	919	2844154
953	3178.0	919	2853846
954	3192.7	919	2863538
955	3207.5	919	2873231
956	3222.4	919	2882923
957	3237.5	919	2892615
958	3252.7	919	2902308
959	3268.1	919	2912000
960	3283.6	919	2921692
961	3299.3	919	2931385
962	3315.1	919	2941077
963	3331.0	919	2950769
964	3347.1	919	2960462
965	3363.4	919	2970154
966	3379.8	919	2979846
967	3396.4	919	2989538
968	3413.2	919	2999231
969	3430.1	919	3008923
970	3447.1	919	3018615
971	3464.4	919	3028308
972	3481.8	919	3038000
973	3499.4	919	3047692
974	3517.1	919	3057385
975	3535.1	919	3067077
976	3553.2	919	3076769
977	3571.5	919	3086462
978	3590.0	919	3096154
979	3608.7	919	3105846
980	3627.6	919	3115538
981	3646.7	919	3125231
982	3666.0	919	3134923
983	3685.5	919	3144615
984	3705.2	919	3154308
985	3725.1	919	3164000
986	3745.2	919	3173692
987	3765.5	919	3183385
988	3786.1	919	3193077

OBS	LENGTH	WIDTH	AREA
989	3806.8	919	3202769
990	3827.8	919	3212462
991	3849.0	919	3222154
992	3870.4	919	3231846
993	3892.0	919	3241538
994	3913.8	919	3251231
995	3935.8	919	3260923
996	3958.0	919	3270615
997	3980.4	919	3280308
998	4003.0	919	3290000
999	4025.8	919	3299692
1000	4048.8	919	3309385
1001	4072.1	919	3319077
1002	4095.5	919	3328769
1003	4119.2	919	3338462
1004	4143.1	919	3348154
1005	4167.3	919	3357846
1006	4191.7	919	3367538
1007	4216.3	919	3377231
1008	4241.2	919	3386923
1009	4266.3	919	3396615
1010	4291.6	919	3406308
1011	4317.2	919	3416000
1012	4343.0	919	3425692
1013	4369.0	919	3435385
1014	4395.3	919	3445077
1015	4421.8	919	3454769
1016	4448.6	919	3464462
1017	4475.7	919	3474154
1018	4503.0	919	3483846
1019	4530.6	919	3493538
1020	4558.5	919	3503231
1021	4586.7	919	3512923
1022	4615.1	919	3522615
1023	4643.9	919	3532308
1024	4673.0	919	3542000

*U.S. GOVERNMENT PRINTING OFFICE: 1982—359-011/548