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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

GSMROSE, A PROGRAM TO PLOT ROSE DIAGRAMS FROM LINEAR DATA IN GSDRAW AND GSMAP DATA BASES, USING A MICROCOMPUTER (IBM PC OR COMPATIBLE) AND PLOTTER

by
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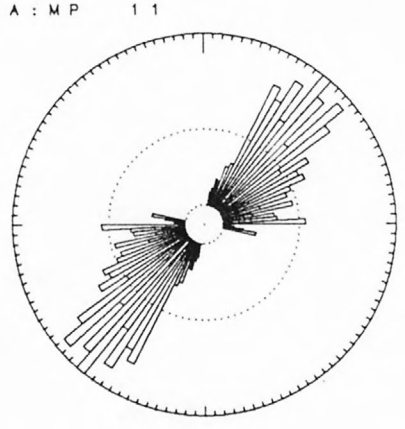

Open-File Report 90-488 Documentation and program disk

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INTRODUCTION

GSMROSE is a computer program for construction of rose diagrams from linear data in GSDRAW and GSMAP data bases. The user can specify the radius of the diagram, the angular measure of the sector used for analysis, and the output device, the screen, a plotter, or a disk file containing HPGL (Hewlett Packard Graphic Language) instructions. After drawing the rose diagram, a table can be printed that provides the numeric information used in constructing the diagram. Two methods of analyzing the linear data are provided; one length weighted, the second, count weighted.

Background

GSDRAW and GSMAP are practical graphics programs for the earth sciences. They enable digital compilation of graphical elements. GSDRAW uses Cartesian coordinates, GSMAP uses geodetic coordinates. Each kind of data is assigned a different code which serves as an attribute to identify the kind of data. As many as 199 different codes can be used for lines; an additional 100 codes can be used for areas (polygons). Codes 1-99 and 600-699 are used for lines; codes 400-499 are used for areas. GSMROSE uses linear data from a Cartesian or geodetic data base to quickly and easily construct a rose diagram to assist analysis of linear data; most diagrams can be produced in a few minutes. Some measure of familiarity with GSDRAW and GSMAP (Selner, G. I. and Taylor, R. B., 1989) is required to make use of the GSMROSE program.

System requirements

GSMROSE requires an IBM PC or compatible microcomputer with at least 512 Kbyte random access memory operating under DOS 2.0 or higher and a math coprocesor chip. A graphics adapter and matching monitor is required for plots to the screen. CGA graphics can be used but lack sufficient resolution for satisfactory graphical results. EGA VGA or Hercules monochrome graphics are desirable. A plotter that uses or emulates the Hewlett Packard Graphics Language (HPGL) at a level at or above that of the HP 7475A is required for hard-copy plots. HPGL files can be generated for use by programs such as QUEIT (Selner and Taylor, 1989), or by a variety of proprietary programs. A printer connected to parallel port 1 (LPT:1) is required to make prints of data tables.

Files on the release disk

```
GSMROSE.EXE      Executable program file GSMROSE
CONFIG.SCR       Sample screen configuration file For EGA graphics or VGA in EGA mode.
CONFIG.PLT       Sample plotter configuration file, 2400 baud, Serial port #1
0.FNT            Font file #0, contains definitions of letters and numbers
QBHERC.COM       Initialization file required only for systems that use Hercules graphics
```

Files required for operation and their functions

Program file
GSMROSE.EXE is the executable program file for GSMROSE.

Configuration files
CONFIG.SCR is the screen configuration file.
CONFIG.PLT is the plotter configuration file; it must be configured to match the system.

Font file
0.FNT contains the definition of the letters and numbers used to label plots.

Data base files:

The two data base files, extensions .NDX (index file) and .LSF (line segment file) e.g. DATABASE.LSF and DATABASE.NDX from GSDRAW or GSMAP are required for the data base to be used. These files do not have to be in the same drive or subdirectory as the program, configuration files, and font file.

Projection files:

Files containing map projection parameters (projection files) are required for GSMROSE when used with geodetic data (GSMAP data bases). These files are the same as those required by GSMAP Version 6. Map projections and the contents of projection parameter files are described, pages 6-10.

Installation

If you are already using GSMAP or GSDRAW Version 6.0, copy the file GSMROSE.EXE into the GSMAP subdirectory. If you are not using Version 6 GSMAP or GSDRAW, copy files on the release disk to a working copy on a diskette or to an appropriate subdirectory on a hard disk. Operation on a hard disk is urged. The file CONFIG.SCR must be configured to match the graphics adapter and monitor of the host system and the CONFIG.PLT file must be configured to match the plotter configuration of the system. For details on configuration files see p 11-16. Some RAM resident programs may create difficulties. Test if you wish but stay alert for possible problems.

GSMROSE options

GSMROSE derives data on lines or polygon boundaries from entries belonging to a specified code in a GSDRAW or GSMAP data base.

Using one option the program reads the data for specified codes (lines or polygon margins) in a data base, calculates the bearing and length of each interval between points along the lines, accumulates these lengths for angular sectors of bearing as specified (e.g. if 5 degrees was specified, for 0 to 5, 5 to 10 and so on through 175-180), calculates the total length of line segments in each sector, and divides the length in each sector by the length in the maximum sector. This ratio is used in the rose diagram as the radius for the sector. The radius of the diagram for the sector of maximum length is chosen by the user. For data bases that use Cartesian coordinates the Y coordinate of the data base is used as the Y coordinate (0 degrees) for the rose diagram.

Using the second option the program reads the data for lines, calculates the bearing of the line connecting the first and last point of the line, and records the number of entries for each 5 degree sector. The sector containing the most entries is plotted to the radius specified, the others are scaled to this distance according to the number of entries. For geodetic coordinates and most of the projections supported by the GSMROSE program the line of longitude used as central meridian in the projection parameter file is used as the Y coordinate (0 degrees) for the rose diagram. The 0 degree position is marked by a long tick mark, the 90, 180, and 270 by slightly shorter tick marks, and each angular sector as specified by short tick marks. After drawing a rose diagram a table can be printed that provides the number of entries, the total length in kilometers of all of the lines, the length of the lines in the sector of maximum length, and the length of the lines in each sector as chosen, or the number of entries and the number in each sector.

Data for lines, codes 1-99, polygon margins, codes 400-499, and lines codes 600-699 can be used to generate length-weighted diagrams, that for codes 1-99, 600-699 to make entry-weighted diagrams. The digitized data points,are used for codes 600-699 (not the points as splined by GSMAP or GSDRAW when lines with codes 600-699 are sent to a plotter).

On each plot, dotted circles are drawn at 10 percent of the radius and 50 percent of the radius, and a circle is drawn with a solid line at the radius specified (100 percent of the maximum value for a sector).

The directions and lengths of lines on a plotted map are dependent on the map projection used. For example, lines of longitude drawn using the Mercator projection are straight lines parallel to the Y axis, but on the Lambert Conformal Conic projection these north-south lines are drawn as curved lines converging at a pole. GSMROSE plots derived from geodetic data reflect these differences in map projection. The effects of different map projections shown by GSMROSE diagrams are small for areas up to that of a 1 degree by 2 degree sheet. A 3 to 5 degree class interval will cover most of these effects; the quality of data rarely warrants a smaller interval. This can not be said for large areas and certain map projections. The effect of map projection should be considered when using GSMROSE with geodetic data bases. We don't recommend use of this program with geodetic data bases for areas larger than a 1 degree by 2 degree sheet.

OPERATION

The program file GSMROSE.EXE and the configuration files CONFIG.SCR and CONFIG.PLT, and the font file 0.fnt should be on the active drive of the microcomputer. Turn the plotter and printer on. Start the program by entering **GSMROSE**. After a brief pause during the loading of the program and the font file, the first prompt will call for entry of the name of the data base to be edited, and the screen will show a list of files in the default area with extension .NDX (available data bases in this area):
ENTER DATA BASE NAME

Enter the name of the data base to containing the data to be used for the rose diagram. Enter the filename without extension(s). You may see the next prompt and if you do, answer appropriately:
CANNOT IDENTIFY TYPE OF DATA BASE
IS THIS A GEODETIC OR CARTESIAN DATA BASE?(G/C):

Enter **G** if geodetic or **C** if Cartesian. If geodetic the screen will display the names of the files in the active area with extension .PRJ, and the prompt:
ENTER FILENAME OF PROJECTION PARAMETERS (DATABASENAME.PRJ): The default projection file is shown by the prompt. Either use the default file (hit ENTER key, or enter the full name of the projection file to be used.

This prompt will be skipped if the file uses Cartesian coordinates. The next prompt will be:
ENTER CODE (0 TO EXIT:

Enter the code of the entries to be used in drawing the rose diagram. Codes 1-99,400,499,600-699 can be used as these define lines or outline polygons. The next prompt will be:
ENTER RADIAL WIDTH IN DEGREES(1 TO 10):

Enter the radial width of the sector interval that you want. The width can be 1-10 degrees; there is no default value. Values of 7 and 8 are projibited as they may generate anomalies because they are not factors of 180. The next prompt will be:
ENTER PEN,RADIUS,XOFF,YOFF:

Enter the values you wish to select, separated by commas. The next prompt will be:
ENTER WEIGHTING OPTION 0=LENGTH, 1=COUNT

Enter **0** if you want a diagram weighted by length of lines in each sector. Enter **1** if you wish weighting according to the number of entries in each sector.

If plots are to be drawn on the screen:
Enter the number of the color desired (see list p. 14) as the pen number, then enter a small number (1 works well) for the radius of the diagram, then an X offset of 0 and a Y offset of 0, e.g. **14,1,0,0** for a yellow display (pens 1-15 can be specified). Don't specify offsets if plotting to the screen. The radius of the circle is immaterial, as this value will automatically be scaled to use the largest possible area on the screen.

If the plot is to be made on the plotter or to a disk file:
Enter the number of the pen to be used to draw the rose diagram on the plotter, the radius of the circle desired, the X offset, and the Y offset. The radius and offset values are entered in inches. Four numbers separated by commas are required to respond to this prompt.

The next prompt provides a choice of output to the screen, to a plotter, or to a disk file.
PLOT TO SCREEN,PLOTTER,DISK? (S,P,D):

Enter **S** = screen, **P** = plotter, or **D** = disk file.

Screen

If you enter **S** = screen the program will operate. A Rose diagram (scaled to use the entire screen) will be displayed. The screen display will stay on the screen until you hit an key.

Plotter

If you enter **P** = plotter the next prompt will query:
ROTATE?(Y/N):

Enter Y (yes rotate)or N (no) (the default (hit the ENTER key) is N. A message will be displayed
PLOTTER SHOULD BE TURNED ON AND PAPER LOADED!!!!!
HIT ANY KEY WHEN READY

Hit any key when ready. The program will operate and plot a rose diagram on the plotter.

Disk

If you enter **D** = disk the program will prompt for entry of the name of the file where plot data is to be written.
ENTER DISK FILENAME:

Enter the name of the file (full name with extension). The next prompt calls for entry of scaling points:
P1X,P1Y,P2X,P2Y:

Enter the scaling points to be used for the plot (e.g. **80,320,10080,7520**. A brief discussion of scaling points is provided on p. 13. Consult the manual for the plotter to be used. After entry of the scaling points the next prompt will ask:
ROTATE (Y/N):

Enter **Y** or **N**. See p. 14 for a brief discussion of "rotation" of plots on a plotter.

After completion of the plot to the screen, on the plotter, or to a disk file,the prompt below will be displayed:
DO YOU WANT TO PRINT A TABLE OF VALUES?(Y/N)

Enter Y or N (the default is N. If you enter **Y** and the printer isn't ready, or there is no printer, the system will time out and return operations to the DOS prompt. If you answer **Y** and the printer is ready a table of values as shown below will be printed.

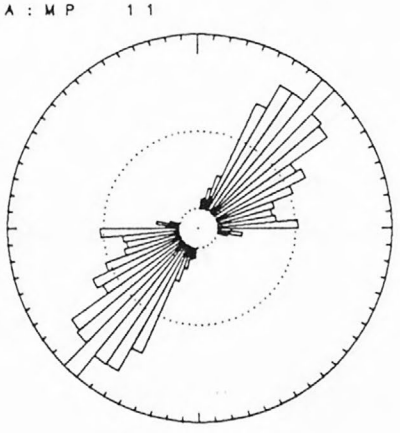
After completion of the print of the table of values, or a **N** answer to the prompt, the prompt: ENTER CODE (0 TO EXIT: will be displayed to provide opportunity for plotting of another diagram (same or different code) from the same data base. Enter **0** to return operation to DOS.

Table of values

The table of values provides data on the lines analyzed to produce the rose diagram. An example of the table produced after generating the length-weighted rose diagram to its right is provided below. Values for 5 degree sectors, 0-180 are printed. As direction is dependant on mechanics of digitizing as well as on trend, and the rose diagram plot is based on trend, data in sectors 180-360 are the same as for sectors 0-190 as the diagram is centrosymmetric, and therefore are not printed.

DATA BASE= A:MP
CODE GROUP 11 CONTAINS 139 ENTRIES
MAXIMUM DISTANCE= 3.18 KILOMETERS
TOTAL DISTANCE= 32.69

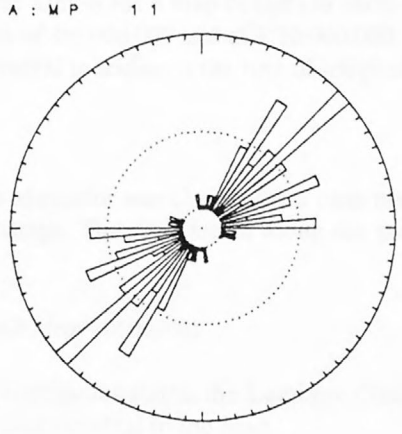
FROM	TO	DISTANCE	%
0	5	0.27	0.84
5	10	0.49	1.50
10	15	0.51	1.57
15	20	0.68	2.09
20	25	0.92	2.81
25	30	2.25	6.89
30	35	2.69	8.24
35	40	2.71	8.28
40	45	3.18	9.72
45	50	2.65	8.10
50	55	2.59	7.91
55	60	1.84	5.63
60	65	1.94	5.94
65	70	1.65	5.04
70	75	1.28	3.92
75	80	1.22	3.74
80	85	1.27	3.89
85	90	1.63	4.99
90	95	0.55	1.69
95	100	0.72	2.20
100	105	0.49	1.50
105	110	0.24	0.72
110	115	0.15	0.45
115	120	0.04	0.12
120	125	0.17	0.51
125	130	0.00	0.00
130	135	0.03	0.10
135	140	0.03	0.09
140	145	0.06	0.18
145	150	0.00	0.00
150	155	0.03	0.08
155	160	0.01	0.04
160	165	0.03	0.09
165	170	0.11	0.33
170	175	0.20	0.62
175	180	0.05	0.16



The table of values below is drawn from the same data set as that on the preceeding page, but the rose diagram is weighted by according to the number of entries in each 5 degree sector. Values for 5 degree sectors, 0-180 are printed. As direction is dependant on mechanics of digitizing not on trend, and the rose diagram shows trends only, values for sectors 180-360 would be the same as those for sectors 0-190 and therefore are not printed.

DATA BASE= A:MP
CODE GROUP 11 CONTAINS 139 ENTRIES
MAXIMUM Number= 17

FROM	TO	NUMBER	%
0	5	2.00	1.44
5	10	1.00	0.72
10	15	3.00	2.16
15	20	3.00	2.16
20	25	3.00	2.16
25	30	8.00	5.76
30	35	13.00	9.35
35	40	7.00	5.04
40	45	9.00	6.47
45	50	17.00	12.23
50	55	9.00	6.47
55	60	4.00	2.88
60	65	5.00	3.60
65	70	11.00	7.91
70	75	8.00	5.76
75	80	4.00	2.88
80	85	7.00	5.04
85	90	10.00	7.19
90	95	2.00	1.44
95	100	3.00	2.16
100	105	1.00	0.72
105	110	3.00	2.16
110	115	2.00	1.44
115	120	0.00	0.00
120	125	1.00	0.72
125	130	0.00	0.00
130	135	0.00	0.00
135	140	0.00	0.00
140	145	0.00	0.00
145	150	0.00	0.00
150	155	0.00	0.00
155	160	0.00	0.00
160	165	0.00	0.00
165	170	0.00	0.00
170	175	3.00	2.16
175	180	0.00	0.00



MAP PROJECTIONS

Map projections and USGS practice are described (Snyder, 1982, 1987), in U.S.Geological Survey Bulletin 1532 and Professional Paper 1395. Information on the map projection is given in marginal notes on USGS maps, but the data on the parallels and meridian used to prepare the map is not provided. The summary below should help, but please read the original by Snyder. This bulletin and the Professional Paper answer questions you should have. Unless otherwise stated on the map margin or in the Snyder reports, use the Clarke 1866 Ellipsoid.

Small Scale Maps

Maps labeled Albers Equal-Area projection

When used for maps of the 48 conterminous states, the standard parallels are 29,30,0,N degrees and 45,30,0,N . The central meridian is 96,0,0,W.

For maps of Alaska, the standard parallels are 55,0,0,N degrees and 65,0,0,N degrees. The central meridian is 154,0,0,W.

For maps of Hawaii, the standard parallels are 8,0,0,N and 18,0,0,N. The central meridian is 157,0,0,W.

Maps labeled Lambert Conformal Conic

The Lambert conformal conic is used by the USGS for a map of the US showing all 50 states in true relative position. This map has been issued at scales of 1:6,000,000 and at 1:10,000,000. For this map the standard parallels are 37,0,0,N and 65,0,0 N. The central meridian is the line of longitude at the center of the sheet.

Maps labeled Transverse Mercator

In 1979 a spherical form of the Transverse Mercator was chosen for a base map of North America at a scale of 1:5,000,000 for tectonic and other geologic maps. The scale factor along the central meridian of 100,0,0,W longitude is reduced to 0.926.

State Scale Maps (1:500,000)

For the 500,000 scale base maps of the 48 contiguous states, the Lambert Conformal Conic projection was used. The standard meridian is the line of longitude central to the map.

1 x 2 Degree Maps (1:250,000)

Maps labeled Transverse Mercator

Army Map Service (AMS) 1 degree by 2 degree sheets use the Transverse Mercator projection. The principal meridian is the line of longitude central to the map.

Maps labeled Universal Transverse Mercator (UTM)

The UTM projection will be used by the USGS for 1 x 2 degree sheets as it updates the AMS series. The proper central meridian can be determined either by using tables listing the central meridian for the UTM Zone or by locating the nearest line of longitude of whole number of degrees that is divisible by 3 but not by 2.

30' x 60' Maps (1:100,000)

For all new 30 minute by 60 minute quadrangles, the UTM projection is used. The proper central meridian can be determined either by using tables listing the central meridian for the UTM Zone or by locating

the nearest line of longitude of whole number of degrees that is divisible by 3 but not by 2.

15' Quadrangles (1:62,500)

Maps labeled Polyconic

Many 15 minute quadrangle maps have been drawn using the Polyconic projection. The central meridian is the line of longitude central to the map.

7 1/2' Quadrangles (1:24,000)

Maps labeled Polyconic

Many 7 1/2 minute quadrangle maps have been drawn using the Polyconic projection. The line of longitude central to the map can be used as the central meridian. The actual central meridian may be a line along the edge but the difference is negligible.

Maps labeled Lambert or Transverse Mercator

Beginning in the late 1950's the USGS began using projections that were based on the parameters that serve as the basis of the State Plane Coordinate system. Depending on the state, the projection will be either Lambert Conformal Conic, Transverse Mercator or Oblique Mercator (panhandle of Alaska only). USGS Bulletin 1532 (Snyder, 1982) presents an excellent description of the basis of the SPCS and the projection that is used for each State. This Bulletin also describes in Table 8 the projection parameters that are used for each zone of each State. Table 8 lists a scale reduction for Transverse Mercator such as 1:2500. The projection file requires a scale factor. The formula to compute scale factor from scale reduction is scale factor = 1.0 - (1/scale reduction) i.e. a 1:2500 scale reduction results in a scale factor of 0.9996 or scale factor = 1.0 -(1.0/2500) = 0.9996. A useful approximation for digitizing and plotting is to use the Polyconic Projection. The maximum difference in the 700-800 mm diagonals of 7 1/2 or 15 minute quadrangles between Transverse Mercator, Lambert, and Polyconic projections is about 0.05 mm. This is a much smaller figure than that expected due to size changes due to changes in humidity for a paper copy. It is only twice the accuracy attributed to a good digitizer.

Projections supported by GSMROSE

Cylindrical:

Mercator, Transverse Mercator, Universal Transverse Mercator, Oblique Mercator

Conic:

Polyconic, Lambert Conformal Conic, Albers Equal Area, Equidistant Conic

Examples of Projection Files

Latitude,Longitude values are entered in Degrees, Minutes, Seconds and followed by the appropriate letter designating compass direction: for example, W longitude, N latitude in the conterminous U.S. Equatorial and polar radii are specified in kilometers.

Universal Transverse Mercator

File	Description of Contents
1	"1" designates Universal Transverse Mercator
6378.2064	Equatorial radius, in km, Clarke 1866
6356.5838	Polar radius in km, Clarke 1866
105,0,0,W	Longitude, Principal Meridian of UTM Zone
0.9996	Scale factor

Albers Equal Area

File	Description of contents
2	"2" designates Albers Equal Area
6378.2064	Equatorial radius, in km, Clarke 1866
6356.5838	Polar radius in km, Clarke 1866
45,30,0,N	Latitude, first standard parallel
29,30,0,N	Latitude, second standard parallel
100,0,0,W	Longitude, meridian central to map

Lambert Conformal Conic

File	Description of contents
3	"3" designates Lambert Conformal Conic
6378.2064	Equatorial radius, in km, Clarke 1866
6356.5838	Polar radius in km, Clarke 1866
33,0,0,N	Latitude, first standard parallel
45,0,0,N	Latitude, second standard parallel
105,0,0,W	Longitude, meridian central to map

Mercator

File	Description of contents
4	"4" designates Mercator
6378.2064	Equatorial radius, in km, Clarke 1866
6356.5838	Polar radius in km, Clarke 1866
105,0,0,W	Longitude, Meridian Central to map

Polyconic

File	Description of contents
5	"5" designates Polyconic
6378.2064	Equatorial radius, in km, Clarke 1866
6356.5838	Polar radius in km, Clarke 1866
105,0,0,W	Longitude, meridian central to map

Transverse Mercator

File	Description of contents
6	"6" designates Transverse Mercator
6378.2064	Equatorial radius, in km, Clarke 1866
6356.5838	Polar radius in km, Clarke 1866
105,0,0,W	Longitude, meridian central to map
0.9996	Scale factor

Parameters of special DNAG map for spherical Earth

File	Description of contents
6	"6" designates Transverse Mercator
6371.204	Radius of Earth in km
6371.204	Radius of Earth in Km
100,0,0,W	Longitude, meridian central to map
0.926	Scale factor unique to this map

Oblique Mercator Projection

The sample oblique mercator projection file provides parameters used in generating the Appalachian Map

File	Contents
7	"7" designates Oblique Mercator
6378.2064	Equatorial radius, in km, Clarke 1866
6356.5838	Polar radius in km, Clarke 1866
1.0	Scale factor along central axis
42,0,0,N	Latitude, center point of projection
73,0,0,W	Longitude, center point of projection
51,30,0,N	Latitude, S end of line defining axis
56,0,0,W	Longitude, S end of line defining axis
33,30,0,N	Latitude, N end of line defining axis
84,30,0,W	Longitude, N end of line defining axis

Equidistant Conic

File	Description of contents
8	"8" designates Equidistant Conic
6378.38584	Radius of Earth in km
6356.910	Radius of Earth in Km
9,0,0,N	Latitude, first standard parallel
4,0,0,N	Latitude, second standard parallel
66,0,0,W	Longitude, meridian central to map

Values in this example are for Venezuela maps labeled "Proyeccion Conico Secante Compensada." This projection is also used for certain maps in Alaska labeled "Modified Mercator", see Snyder, 1982.

References

Selner, Gary I., and Taylor, 1988, Richard B, GSDRAW and GSMAP system Version 6.0: Graphics programs for the IBM PC and compatible microcomputers to assist compilation and publication of geologic maps and illustrations: U.S. Geological Survey Open-File Report 89-373A, documentation and tutorial, 156 p., and 89-373B, five executable program disks.

Snyder, J. P., 1982, Map Projections used by the U.S. Geological Survey: U.S. Geological Survey Bulletin 1532 313 p.

Snyder, J. P., 1987, Map projections, a working manual: U.S. Geological Survey Professional Paper 1395, 393 p.

Source code

GSMROSE has been written in QuickBasic and tested using the Microsoft QuickBasic Compiler Version 4.0b. The source code is available on request from the authors: pleas send a formatted 360 Kbyte or 1.2 megabyte 5 1/4"floppy disk to Gary I. Selner or Richard B. Taylor, U. S. Geological Survey, Denver Federal Center, M.S. 905, Lakewood CO 80225.

The contents of the configuration files, and changes that may be made to accommodate different systems are described on subsequent pages, with printouts of sample files annotated to explain their contents.

PLOTTER

Hewlett-Packard plotters were used to develop GSMROSE. It probably will operate using other plotters that use or emulate HPGL, the Hewlett-Packard Graphics Language.

Plotter Installation

1. Connect the cable from the plotter to the remaining asynchronous communications port; note on the worksheet whether it is connected to COM1 or COM2. If you have only one serial port you will have to use an external switch between the computer and the digitizer and plotter.
2. Set the plotter switches (hardware or software) for the communication speed at which you want to operate; we have found 2400 baud to work well. .
3. Set the plotter switches for parity. Generally you will have a choice of the following:

S - SPACE: Parity bit always transmitted and received as a space (0 bit).
N -NONE; No parity transmitted or checked on receive.
O -ODD: Odd transmit parity, odd receive parity checking.
E -EVEN: Even transmit parity, even receive parity checking.
M -Mark: Parity bit always transmitted and received as a mark (1 bit); We use N.

4. Set the number of stop bits on the plotter switches. You will have a choice of 1 or 2; we use 1.
5. Check other settings on the plotter. We use the following:

Remote
Standalone
Handshake: hardwire Direct
Duplex: Full

The following BASIC program (BASICA) can be used to check transmission between the plotter and computer. It may require modification to reflect values set in previous steps. It is set up for the values we normally use. Modifications normally are to line 10. This program came from the Hewlett-Packard operation and Interconnection Manual for the HP 7550A Graphics Plotter; refer to the BASIC manual supplied with your computer for a description of the OPEN COMn: command.

```
10 OPEN "COM1:2400,N,8,1,RS,CS65535,DS,CD" AS #1
20 PRINT #1 "IN;OI;"
30 INPUT #1,ID$
40 PRINT #1,"LB";ID$;" COMMUNICATION OK";CHR$(3)
60 PRINT #1, "PA O,O;SP0;"
70 END
```

The program will read the model of the plotter and plot the a message like the one following on the plotter using the pen in carousel position one.

7550A COMMUNICATIONS OK
(YOUR MODEL #, if not a 7550A)

If the above program does not run, check switch settings and/or cable connections and then retry the program. If it still does not work, check the plotter manual and seek assistance.

For the HP 7585B plotter the following switch settings apply: the cable must be connected to the COMPUTER/MODEM port; use the following settings.

INTERFACE MODE
RS232C
NORMAL
NORMAL
STANDALONE
NORMAL
NORMAL

RS-232-C
Parity OFF
ODD
Duplex half-full FULL
HARDWIRE
DTR-BYPASS NORMAL

For the HP 7475 plotter, the following switch settings apply:

0 S2
0 S1
0 Y
1 US
0 B/A3-.A/A4
1 B4
0 B3
1 B2
0 B1

CONFIG.PLT

The first line of the CONFIG.PLT file sets communication parameters between the computer and the plotter. The rest of the file contains the description for symbols, see p. 36. These parameters are described in the BASIC manual, see OPEN COM statement. The part of the CONFIG.PLT file after symbol 2 is not printed.

```
"COM1: 2400,N, 8, 1,RS,CS65535,DS,CD"
50,4,0,0,0
"PU",1.0,0.0
"PD",-1.0,0.0
"PD",0.0,-1.0
"PU",0.0,1.0
1,2,0,0,0
"PU",0.0,0.0
"CI",1.0,0.0
2,4,0,0,0
"PM",0,0
"PU",0.0,0.0
"CI",1.0,0.0
"PM",2,0
```

ROTATION

Rotation is a plotter feature enabling rotation of a plot by 90 degrees on the sheet in the plotter. Check the plotter manual for rotation instructions. The orientation of a plot depends on the plotter and on the size of the sheet in it. In most cases the X dimension (horizontal) of the sheet exceeds the Y (vertical) without "rotation".

SCALING POINTS P1 and P2

If a plot is sent to a plotter, values for scaling points are provided to the computer by the plotter. Entry of scaling Points is required if plots are sent to a file rather than to a plotter. Scaling points P1 and P2 are discussed in the documentation for each plotter. The values of scaling points depend on the kind of plotter and on the size of the plot paper. Values for two plotters are provided below. Paper dimensions are in inches. Scaling points are the coordinates of the lower left and upper right corner of the sheet in plotter units (1/1024"). Examples are provided below:

For the HP 7475A

	P1x,P1y	P2x,P2y
A size paper 8 1/2 x 11	250,596	10250,7796
B size paper 11 x 17	522,259	15722,10259

For the HP 7550A

	P1x,P1y	P2x,P2y
A size paper 8 1/2 x 11	80,320	10080,7520
B size paper 11 x 17	620,80	15820,10080

For the HP 7585/7586

	P1x,P1y	P2x,P2y
A size paper (8 1/2 x 11	-2790,-4500	2790,4500
B size paper 11 x 17	-7100,-4500	7100,4500
C size paper 17 x 22	-7090,-10075	7090,10075
D size paper 22 x 34	-15710,-15060	15710,15060
E size paper 34 x 44	-20840,-16180	20840,16180

If plots are rotated, P1x and P1y values are interchanged, and P2x and P2y values are also interchanged.

SCREEN AND GRAPHICS ADAPTER

GSMROSE can be used with the following kinds of graphics systems:
CGA color and monochrome
EGA color
VGA color
Hercules monochrome

Each is configured by appropriate entries in the CONFIG.SCR file. The system must be configured for graphics. Some systems require use of the GRAPHICS mode command. In addition, use of Hercules graphics requires use of the QBHERC.COM program supplied with this release before starting each use of GSMROSE to initialize graphics.

CONFIG.SCR

The CONFIG.SCR file must be configured to match the adapter and monitor of the system.

For CGA color or monochrome the file consists of one line:
"CGAC"

For EGA monochrome the file consists of one line:
"EGAM"

For EGA or VGA color the file consists of a series of lines. The first line configures the system for EGA/VGA color, each succeeding line contains a code number, a comma, and a color number. These lines specify colors from a list of 16 (15 plus background=black). An example is printed below (the list of colors is not a part of the file).
"EGAC"
1,1

```
Color #1=Blue              Color #2=Green
Color #3=Cyan              Color #4=Red
Color #5=Magenta           Color #6=Brown
Color #7=White             Color #8=Gray
Color #9=Light Blue        Color #10=Light Green
Color #11=Light Cyan       Color #12=Light Red
Color #13=Light Magenta    Color #14=Yellow
Color #15=High Intensity White
Color #0=Black
```

The color of plots to the screen on an EGA or VGA color monitor is chosen by selecting the appropriate pen=color # above.

Hercules graphics

For Hercules monochrome the CONFIG.SCR file consists of one line:
"HERM"

If Hercules graphics are to be used, before starting GSMROSE the system must be "set up" using the QBHERC.COM file included on the release disk. At the DOS prompt enter QBHERC. Then enter GSMROSE to start the program.