

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Users's Guide to QPLOT, An Interactive
Computer Plotting Program for
Earthquake and Geophysical Data.

by
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Open-File Report 83-621

This report is preliminary and has not been reviewed
for conformity with U. S. Geological Survey
editorial standards and stratigraphic nomenclature.

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INTRODUCTION

QPLOT makes many types of plots of interest to seismologists and geophysicists, including plots of earthquakes, deformation, general time-series and XY data. It is designed to be both interactive, enabling the user to experiment with looking at data in different ways, and also to make reasonably polished and complex plots for publication or routine data processing. QPLOT is very flexible in the way plots can be scaled, controlled and embellished. Because this flexibility is achieved by many commands, QPLOT cannot be mastered in just a couple of minutes: it is not a "quick and dirty" program.

QPLOT is an expanded and revised program built upon the EQPLT and ZEQLT programs (Klein, USGS Open File Report 80-827, 1980). It is written entirely in FORTRAN 77, makes use of a few simple VERSAPLOT subroutine calls and call a couple of routines in the VAX system library. QPLOT is presently running on the VAX computer in the Office of Earthquakes, Volcanoes and Engineering at the U.S. Geological Survey in Menlo Park.

This report is intended to help you decide if QPLOT could be useful to you, and to assist you in understanding and running the program. The introduction gives a general outline of QPLOT's capabilities and use. The next section contains notes on the mechanics of making plots in Menlo Park. The bulk of this report is a listing of the documentation which is available on-line using QPLOT's HELP command. The HELP command gives information that is brief but self-tutoring. Included are the overall structure of QPLOT, which commands are used to make different kinds of plots, and information about the commands themselves.

Unlike this report, the on-line documentation can be continually updated: the user is therefore cautioned that the HELP documentation may contain some additions and clarifications not presented here.

QPLOT makes the following types of plots (each plot type expects the data file type listed below):

1. Earthquakes, stations and lines on a map (file types, 1, 6 or 7).
2. Cross-section of earthquakes (file type 1).
3. Space-time plot of earthquakes (file type 1).
4. Depth-time plot of earthquakes (file type 1).
5. Magnitude-time plot of earthquakes (file type 1).
6. Cumulative number of earthquakes versus time (file type 1).
7. Bar graph of number of earthquakes versus time (file type 1).
8. Cumulative seismic moment versus time (file type 1).
9. Bar graph of seismic moment versus time (file type 1).
10. General time-series plot (file type 2).
11. General time-series bar graph (file type 2).
12. General cumulative time-series (file type 2).
13. General XY plot (file type 3, or special case of types 1 and 2).
14. Vectors (tilt, displacement, etc.) on a map (file type 4).
15. Geodimeter or other lines connecting two points on a map
(file type 5).

QPLOT plots from the following file types:

1. Earthquake summary data (origin time, hypocenter, magnitude, etc.),
in HYP071, HYPOINVERSE or HYPOELLIPSE format.

2. General time series containing month, day, year, hour and minute and from 1 to 15 data values per record in a user-defined format. Plot any data values versus time.
3. General XY file of multi-dimensional point data containing values for 2 to 15 parameters (one point) per record in a user-defined format. Plot any pair of parameters at one time.
4. Geophysical vector file containing latitude, longitude, Y and X vector components in user-defined format.
5. Geodimeter line file containing latitude and longitude of each endpoint, and an alphanumeric field used to label the line, in user-defined format.
6. Seismic stations or other point geographical data in HYP071, HYPOINVERSE, or HYPOELLIPSE format.
7. Linear data (coasts, faults, etc.) with from 1 to 10 latitude-longitude pairs per record, in user-defined format.

QPLOT recognizes more than 120 commands which may be either typed at the keyboard or executed from a file. Any command line may contain the parameters to be set, or if the parameters are absent QPLOT will interactively request what it needs. This allows great flexibility in controlling program flow. A user can make plots completely interactively, run preset plots and procedures, or mix these possibilities in various ways. Following are some of QPLOT's control capabilities:

- Interactively define the parameters for a plot and save them in a disk file, then restore them to recreate the plot at some future time.
- Change the program's defaults by placing a custom command file in your directory which is executed on startup.
- Using the editor, build files of frequently used command procedures, which may set parameters, request parameters from the keyboard, and make plots.
- Build subroutines of command procedures (one level only) which are called from other command procedures.
- When a command requests a parameter, pressing return preserves the current parameter. Thus you can inspect parameters and change only the ones you want to.
- Issue operating system commands while in QPLOT. You thus have access to the editor, files, other programs, etc.
- Superimpose different data sets within the same plot axes, or superimpose entirely different plots within the same screen or logical plot frame.
- Vary the size and position of plots.
- QPLOT contains several interactive macro-commands to set up simple plots.
- Draw a plot title, axis labels and titles, symbol key, and labels positioned either in inches or in units of the data (latitude, longitude, date, microradians, etc.).

The many control options, types of plots and formats of data require a large number of commands and stored parameters. Thus QPLOT becomes

more flexible and powerful as you learn more commands, though only a few commands are needed to get started. The best way to learn to use QPLOT is to run it, type HELP, and start reading the various HELP commands. The on-line HELP notes contain all the information needed to use the program. The HELP notes were designed for ready on-line reference; and are organized in a branching menu structure. They are not optimized as a tutorial for new users, although the HELP processors can be used this way. Read the HELP messages carefully, and do not expect important points to be repeated in several places. QPLOT is still evolving: the documentation will be clarified as needed, some commands will be modified, and new capabilities added as the demand justifies them. Good luck!

HOW TO RUN QPLOT ON THE O.E.V.E. VAX IN MENLO PARK

To conveniently run the current version of QPLOT, put this line in your LOGIN.COM file,

```
QPLOT  := RUN WE:[KLEIN.QPLOT]QPLOT.EXE
```

You can then run the program just by typing QPLOT. You need no other files, although a startup command file called QINST. in your directory can optionally be used to set you own default plot parameters. If you want a paper copy of all the current on-line HELP documentation, print the file

```
WE:[KLEIN.QPLOT]QHELPPRT.
```

This QHELPPRT file constitutes the bulk of this report.

USING THE MULTI-DEVICE PLOT INTERFACE ON THE VAX

This section describes how to use the multi-device plotting software which is incorporated into QPLOT. You will need to know some of its functions to (1) answer the questions you will be asked when you first run QPLOT, and (2) make plots on the VERSATEC or CALCOMP in Menlo Park. This plot package was written by Larry Baker.

Supplying Plot Device Information To The Plotting Package

QPLOT (or any other program using the plot package) first asks several questions:

- 1) You will first be shown which plot options are available and asked to choose one option. Specify whether you want to plot on the terminal, to send plots to a BATCH.PLT file for later plotting on the VERSATEC or CALCOMP; to exercise both these options with prompting at the terminal to save the plots in this BATCH.PLT file, or make no plots.
- 2) If you are plotting on a terminal, you will next be asked for the type of terminal.
- 3) If you are plotting to an off-line device, you will next be asked for a batch device, which is always a disk file.
- 4) If you are plotting on a terminal, you will be asked for the seconds to pause after each plot. Entering -1 means that you will have to press RETURN to continue at the end of each plot. Entering 0 means that the program will continue without any pause at the end of each plot.

- 5) If you are plotting on a terminal, you will be asked for the simulated screen height in inches. The screen shows a portion of the plot area available to you, which is in terms of inches of paper on the VERSATEC and CALCOMP. Taking the default here (8") is appropriate for QPLOT's default, which is a plot 6" high by 8" wide. This is a convenient size for a single strip of VERSATEC paper also.

You then enter QPLOT and are prompted for plot commands. Each plot you generate in QPLOT under the FULL condition will begin by erasing the screen and beginning a new output frame in the BATCH.PLT file. At the conclusion of each output frame you will be asked whether or not you wish to keep it. All frames in the BATCH.PLT file may later be plotted, or they may be plotted and manipulated individually.

Making Plots on the VAX's VERSATEC Plotter

The program QPLOT produces a "metafile" of plot commands called BATCH.PLT, which may contain several individually addressable frames. The next step is to run the program PUBL:[BGMF]VIEWERR. This program is driven by commands, and typing HELP gets a menu of the possibilities. To plot all frames without modification, type PLOT BATCH.PLT. The VIEWER program writes the files PARM.PLV and VECTR1.PLV. These files must be further processed and sent to the plotter by giving the system command MCR RASM. The plot will then come out of the VERSATEC.

The plot will be made in successive short strips. The pauses the plotter makes between strips often cause annoying smudges. The smudges can be avoided and plotting smoothed and speeded up by using a disk file intermediate between RASM and the VERSATEC. RASM writes to the logical name VEROUT, which by default is assigned to the VERSATEC device which is LVA :. You can reassign VEROUT to a scratch file, then copy the file to the VERSATEC. The plot should come out faster and more smoothly. If the computer is very busy, plot output may still be jerky and produce smudges. These three commands will accomplish this:

```
ASSIGN SCR:PLOTFILE.;1 VEROUT
MCR RASM
COPY SCR:PLOTFILE LVA :
DELETE SCR:PLOTFILE.; 1
```

Don't forget to delete the temporary file in SCR: when it is no longer needed.

Making Plots on the CALCOMP Pen Plotter

The CALCOMP plotter is physically connected to the RSX 11/70 and cannot be directly accessed from the VAX. To plot a BATCH.PLT file on the CALCOMP, you must copy the file to the RSX and execute VIEWERC. A guest account has been set up for this purpose. To login to the RSX guest account, locate an RSX terminal, or use the SET HOST RSXØ command on the VAX. When you see the > prompt, type HELLO or LOGIN. When you are prompted for Username and Password, type GUEST each time. For example,

```
$ SET HOST RSXØ  
> HELLO  
Account or name: GUEST  
Password: GUEST  
.  
.  
.  
$
```

Once you have logged on, you will need to copy your BATCH.PLT file, using the COPY command and the full pathname on the VAX to locate your file. For example,

```
$COPY VAX::WE:[KLEIN.QPLOT]BATCH.PLT KLEIN.PLT
```

Then you must run the VIEWERC program for the CALCOMP by typing RUN LB:[7,11]VIEWERC. It is exactly the same program as the VAX version, except that the output is sent directly to the CALCOMP. When you have finished plotting, be sure to delete the temporary file on the RSX. To log off the RSX, type LOGOUT, and you will be logged off or returned to the VAX.

NOTE:

The CALCOMP is a delicate instrument that requires a minimum amount of instruction in its proper use before you may use it. See Ed Cranswick or Joe Fletcher for assistance.

**** BE SURE YOU UNDERSTAND THE FOLLOWING BEFORE PROCEEDING ****

QPLOT is driven by 4-letter commands which may be either typed at the keyboard or read and executed from a file. Commands can do one of 3 things:

- Redefine some of the stored parameters which are used to make plots. These commands do not produce graphic output. Parameters are kept until they are explicitly changed.
- Make a plot using (but not changing) the stored parameters.
- Special tasks with an immediate action, such as plotting an axis or label, or saving a command file. These commands do not affect stored parameters.

Parameters can be given in 2 ways, & only those to be changed need be typed:

- Typing only the command results in prompts for each parameter (ie. FILE).
- The command line may include the parameters in free format, in which case no prompts will appear (ie. FILE 'DATA.SUM').

For more information (in progressively greater detail) type:

HELP 2 gets a little more general information.
 HELP MENU gets a listing of the command groups and other modules.
 HELP X gives a list of related commands in command group X.
 HELP XXXX gives the most detailed information on the command XXXX.

-- More general information on QPLOT --

No command abbreviations are allowed in QPLOT.

Data files may be of 5 types, & each plot command expects a definite type:

- Earthquake location (summary)
- General time-series (date, time and 1-15 data values per record)
- General XY (from 2-15 data values per record)
- Geodetic lines (lat & lon of endpoints, and a line label)
- Vectors on a map (lat & lon, vector components in arbitrary units)

Stations & lines can be plotted on a map, & labels placed on any plot.

To terminate a QPLOT session, type STOP (QUIT and EXIT also work).

For more info type "HELP X" where X is one of the command groups below:

EASY * Some basic plot set-ups as preset groups of other commands.
ALL * Commands applicable to all plots.
INQ * Make inquiries of the program parameters or the computer.
Q * Listing of all plot types and the commands that make them.
MAP * Plot a map.
MORE * Additional output on maps.
DEF * Define earthquake symbols.
ST * The symbol types available for earthquakes, stations, benchmarks, etc.
SEL * Set the earthquake selection criteria.
CROS * Make cross-sections and space-time plots.
ADJ * Make adjustments to maps and cross-sections.
Z * Make plots of depth, magnitude or distance vs. time.
T * Make general time-series, bar or XY plots.
EQ * Make cumulative or bar plots of earthquake number or seismic moment.
TAX * Set up a time axis.
Y * Set up a Y or X axis.
V * Plot vectors or geodimeter lines on a map.
ADD * Additional output or lettering on any plot.
NF * The NOTE file formats for different plot types.
FLOW * Command files, program flow, and setting defaults in a command file.
CONT * Control the position, superposition & advancing of plots.
FREE * How to place free-format parameters on a command line.

EASY * Some basic plot set-ups as preset groups of other commands.
 All of these command macros have "\$" as the first character.
 These commands only define parameters and do not make plots.
 No additional help is available on these command macros, but you can
 see the commands that \$XXX executes by typing WE:[KLEIN.GPLOT]XXX.GPL

\$MAP -Calls some basic commands to set-up a map.
 \$XS1 -Set up a cross-section by entering endpoint coords from the keyboard.
 \$XS2 -Set up a cross-section by entering endpoint coords from a file.
 \$SEL -Set up earthq. selection criteria for any plot reading an earthq. file.
 \$TIM -Set up basic parameters for a general time-series plot.
 \$XYP -Set up basic parameters for a general XY plot.
 \$TLB -Set up title & axis labels for a time-series plot.
 \$MLB -Set up title & axis labels for a map plot.
 \$XLB -Set up title & axis labels for a general XY plot.
 \$ST1 -Set up a space-time plot by entering endpoints from the keyboard.
 \$ST2 -Set up a space-time plot by entering endpoints from a file.
 \$BAR -Set up bar graph of number of earthquakes per interval of time.

ALL * Commands applicable to all plots.

FILE -Set the filename containing earthquake or time series data to plot.
 The filename is a string of from 1 to 40 characters.
 HELP -Gets on-line HELP in a brief self-tutoring manner. Follow "HELP" by
 "MENU", a group name or command name to get info. with increasing detail.
 FORE -Set the format to use in reading earthquake summary data.
 The formats are 1=hypoinverse, 2=hypo71, 3=hypoellipse.
 SPEN -Set the pen number (calcomp) or line width (versatec).
 RERR -Data error handling. Set TRUE to flag data errors, FALSE to skip bad data
 SPAW -Spawn a system command (contained in a string of up to 80 characters).
 You thus have access to the editor, directory files, programs, etc.
 MTIT -Set up a main plot title. Supply the letter height (inches, 0 for no
 title) and the title as a string of 1 to 80 characters.
 STIT -Set up a plot subtitle. Supply the letter height (inches, 0 for no
 title) and the title as a string of 1 to 80 characters.
 Titles are centered above the plot, main above subtitle.
 STOP -(Also QUIT or EXIT) Stop the program & return to system command level.

INQ * Make inquiries of the program parameters or the computer.
 Any parameter can be examined by typing its command and seeing the current
 value in the prompt. Pressing the return key will preserve the current value.

SHOW -Type out some general and earthquake selection parameters.
 SHOL -Type out the lengths in inches of all types of axes. You can thus deter-
 mine the final size of any type of plot using the current parameters.
 SHOM -Type out some current map parameters.
 SHOS -Type out the types and sizes of the current earthquake symbols.
 SHOT -Type out some current time series parameters.
 SHOX -Type out some current cross-section parameters.
 SPAW -Spawn a system command (contained in a string of up to 80 characters).
 You thus have access to the editor, directory files, programs, etc.

G * Listing of all plot types and the commands that make them.

PLOT -Earthquake symbols on a map.
 XSEC -Earthquake symbols on a cross-section.
 XSHF -Cross-section shifted parallel to section line.
 PMAG -Magnitude vs. time diagram.
 PLST -Distance (along a section line) vs. time diagram.
 PLZT -Depth vs. time diagram.
 PLXY -General XY plot.
 TIME -General time series plot.
 TBAR -General time series bar plot.
 TCUM -General time series cumulative count plot.
 PNUM -Cumulative number of earthquakes vs. time.
 PBAR -Bar plot of number of earthquakes vs. time.
 PMOM -Cumulative seismic moment vs. time.
 PMBR -Bar plot of seismic moment vs. time.
 PVEC -Vectors (tilt, displacement, etc.) on a map.
 PGEQ -Geodimeter or other lines connecting two points on a map.

MAP * Plot a map.

The only stored parameters defining a map area are scale, center coordinates, and final size in inches. These are independent and can be computed in four different ways:

- Set the scale, center and size directly.
- Set the scale, and then the latitude and longitude of the map edges.
- To match a particular map, give the height and width, and edge lat & lon.
- Set the map size, and autoscale the center and scale from a data file.

SCAL -Set the scale (a no. >> 1) for all maps, distance and depth axes.
 CNTR -Set the latitude (in deg & min), then longitude (d & m) of map center.
 MINS -Set the x and y sizes of the map in inches.
 AMAP -Using the current scale, amap resets the map center and size from the left lon (in deg & min), right lon, top lat, & bottom lat (all in d & m)
 FITS -Fit the lat and lon scales, center and size of an existing map. Give the left lon (in deg & min), right lon (d & m), x map size in inches, top lat (d & m), bottom lat (d & m), and y map size in inches.
 The FITS command usually produces slightly different lat & lon scales.
 (FITS & AMAP reset the center & size, and do not store the edge coords.)
 PROJ -Set the map projection (1=conic, 2=mercator).
 PLOT -Make a plot of earthquakes on a map, using present parameters.
 SCAY -Set the latitude scale only, leaving the lon scale unchanged.
 SCAM -Reset map center & scale from lat & lon extremes in the current file.

MORE * Additional output on maps.

MANO -Set up axis annotation for maps. Give the annotation code (which axis or both) and completeness code (label every degree, 10-minutes, 5-minutes or minute), each for both lon and lat axes. Also set letter height (in).
 LINE -Set the filename containing linear data (coastlines, etc.) to plot.
 The lines will then appear on every map.
 FORL -Set the number of lat-lon pairs per record and format for reading lines.

STAS -Set the format code, filename, flag (T or F) to plot a 4-letter label, and plotting symbol type & size for seismic stations on maps.
KBAR -Set the length (in km) and X & Y position (inches) of a km scale on maps.
MSEC -Set the code for plotting the current cross-section position on maps.

DEF * Define earthquake symbols.

SYMB -The type of symbol plotted (as controlled by a code) can be:
1 A plot symbol depending on magnitude.
2 A plot symbol depending on depth.
3 The three standard error bars.
4 Standard error bars and a depth symbol.
5 A symbol depending on days elapsed since the first event or a set time.
6 One ASCII character taken from the summary card.
7 One of the 36 characters "0-9, A-Z, *" translated from a data field using a linear function to define the character number: Char. no. = A+B*DATA, where you set A,B & the format for reading the parameter DATA
For a listing of the symbol type codes, type "HELP ST".
SIZE -Set the symbol sizes, which always depend on magnitude. Give the number of sizes, and pairs of 1) the lower magnitude limit for a particular size, and 2) the symbol diameter in .01" (an integer).
SKEY -Set the parameters for drawing a symbol key. Give the code (0 for no key, 1=type key, 2=size key, 3=both type & size), the symbol size for the type key, the type for the size key, and X & Y position for the key top.
PKEY -Plot only a symbol key, and do it right now.

ST * The symbol types available for earthquakes, stations, benchmarks, etc.
0 Blank (no symbol)
1 Square
2 X
3 Diamond (rotated square)
4 Octagon
5 +
6 Square and X
7 Diamond and +
8 Triangle with point up
9 Triangle with point down
10 Star (5 pointed)
11 Solid square
12 Small dot
13 Solid diamond (rotated square)
14 Solid circle

SEL * Set the earthquake selection criteria.
These commands only affect which events are plotted, not axis limits.

SDEP -Set the minimum and maximum depths (in km) of events to plot.
MAGS -Set the minimum and maximum magnitudes of events to plot.
DATE -Set the beginning & ending date, both in years, months, days, hours and minutes. These are the limits for selecting data to be plotted.
CLAS -Set the number of earthquake classes (use 0 for all classes), and a list of classes to plot. Class is determined by lat, lon & depth in a subrou-

time of GPLOT. The classes are for one network. See also the NETW command
NETW -Set the network number for earthquake classes. See also the CLAS command.
SERH -Set the maximum horizontal error of earthquakes to plot (km).
SERZ -Set the maximum vertical error of earthquakes to plot (km).
REMK -Select (or reject) events if any one of up to 4 characters is present
in any one of up to 4 places on the summary card. Give the number of
chars. to use in selecting events (1-4) (0 selects all events, -1 to -4
rejects them). Then give the no. of places characters could appear (1-4),
the characters to select, and the format for reading them (ie. (T79,A1))
WRIT -Write the plotted events to a file in the same format & give its name.
NOWR -Disable the writing of plotted events to a file.

CROS * Make cross-sections and space-time plots.
Section endpoints may be defined in any of 2 ways:
-Entered directly as lat and lon using the ENDP command.
-Digitized from a map using CURS and restored from a file using SECT.
ENDP -Enter the section endpoints directly. Enter the 1-letter section label,
then give the left endpoint as lat (deg & min) and lon, then right
endpoint lat and lon (all as deg & min).
CURS -Digitize the section endpoints with the cursor while a map is on the
screen. Enter the filename to which points are to be written.
SECT -Reads files such as those produced by CURS to obtain section endpoints.
Give the 1-letter section label and filename to search.
ZLIM -Set the top and bottom limits of the depth axis in km.
VTEX -Set the vertical exaggeration (=1 for no exaggeration).
ZONE -Set the limits on either side of the section to include in the plot (km)
Give the near limit first. Negative nos. are in front of the
section, positive behind.
XAND -Set up axis annotation for cross-sections & XY plots. Give annot. code
(which axis or both) and completeness code (label every 10-km or km),
each for the distance and the depth axis. Also set letter height (in).
XSEC -Plot a cross-section using the current endpoints and parameters.
XSHF -Plot a cross-sect. parallel to the endpoints, with left and right limits
(in km) set by the SLIM command. The original left point has a value 0.
PLST -Make a space-time plot using the current endpoints and time axis.

ADJ * Make adjustments to maps and cross-sections.

XSHF -Plot a cross-sect. parallel to the endpoints, with left and right limits
(in km) set by the SLIM command. The original left point has a value 0.
ZOOM -Change the map or section scale by a zoom factor (>1 to enlarge).
SPOT -Change the map center using the cursor and the current map on the screen
SHIF -Shift the map center by an amount in km in lat (pos N) & lon (pos E).

Z * Make plots of depth, magnitude or distance vs. time.

PLST -Make a space-time plot using the current endpoints and time axis.
PLZT -Make an earthquake symbol plot of depth vs. time. Set up the depth as
in a cross-section. A time axis must also be established.
PMAG -Make an earthquake symbol plot of magnitude vs. time. Set up the mag-
nitude axis as a Y-axis, and a time axis.

T * Make general time-series, bar or XY plots.
 Time-series data consists of a date, time and from 1 to 15 number values
 Also plot the sum of any values vs. time, or any 2 values vs. each other

PARM -Set the fields in your data assigned to the X and Y axes.
 Give the X field (1-15), number of fields to sum for Y (1-15),
 and the field numbers to sum (a subset of 1-15).

PNTS -Set up the plotting of lines or points on general time series or XY plots
 Plot lines (T or F), points (T or F), & point symbol type & size in ".01".

DASH -Set the dash line type (default is a solid line).

FORT -Set the format for reading time series. Format must include YR, MO, DA,
 HR & MIN as integers, and from 1 to 15 real values per record.

FORX -Set format for reading XY data. File must have 2-15 real vals. per record

TREN -Set the trend to subtract from time & cumulative plots in units/day.

TSET -Set the bar interval (width) in days, hrs. & mins. on bar graphs.

TIME -Make a time plot of data in general time series format.

TBAR -Make a Y vs. time plot as a bar graph of data in time series format.

TCUM -Make a line plot of cumulative (summed from 0) time series data.

PLXY -Make an XY plot of data in general XY format.

FACT -Set the factor by which all Y axis data are to be
 multiplied before plotting (axis ticks are not affected).

CLIP -Set the min & max Y values to clip from time-series data when plotting.

DATE -Set the beginning & ending date (both in Y, M, D, H & MN) of data to plot

EBAR -Enable plotting error bars on YT or XY plots by setting a flag T or F.

TAX * Set up a time axis.
 The stored parameters governing a time axis are beginning date and lengths in
 days & inches. You can enter these parameters directly or you can:
 -Set length in days, then the time scale (in/day) to change the inch length
 -Set the beginning date, then the ending date to change the length in days.

TBEG -Set the axis beginning date in Y, M, D, H & MN. If the beginning year
 is 0, the axis starts the day of the first datum in the file.

TLEN -Set the length of the time axis in days.

TINS -Set the lengths of the time (or X) axis and Y axis in inches.

TEND -Set the ending date of the time axis after the beginning has been set.

TSCL -Set the time axis scale (in/day) after the length in days has been set.

TAND -Set up annotation for labelling ticks on time axes (not XY plots). Give
 the annotation code (which axis or both) and completeness code for the
 time axis, then the Y axis. Also set the letter height in inches.

DELY -Set the delay (in integer days) of the first datum into the plot when
 the beginning date is determined by the data (beginning year = 0).

Y * Set up a Y or X axis.
 A Y or X axis is defined by the range of data values and its length in
 inches. These may either be set directly (and independently), or the range
 set first, then a scale (in inches per plot unit) can be given to reset the
 axis length in inches.

TINS -Set the lengths of the time (or X) axis and Y axis in inches.

SLIM -Set the range (min & max) of the Y axis in your plot units.

XLIM -Set the range (min & max) of the X axis in your plot units.

YSCL -Using the current range, give scale (inch/unit) to reset Y axis length.

XSCL -Using the current range, give scale (inch/unit) to reset X axis length.

ALAB -Set the axis labels. Each type of axis maintains its own label. Give

the axis type code, then the label string (80 characters maximum).

The axis types are: 1=time, 2=Y, 3=X, 4=depth, 5=distance (cross-sections & space-time), 6=magnitude, 7=number of earthquakes, 8=seismic moment.

SCAT -Reset the Y&T axis range from extrema in the current time-series file.

SCAX -Reset the Y & X axis range from extrema in the current XY file.

SCAB -Reset Y&T axis range from extrema in the earthq. file for a bar plot

SCAN -Reset Y&T axes prior to making a cumulative earthq. plot.

EQ * Make cumulative or bar plots of earthquake number or seismic moment.
These plot commands read an earthquake summary file, and
use the current earthquake selection criteria.

TREN -Set the trend to subtract from time & cumulative plots in units/day.

TSET -Set the bar interval (width) in days, hrs. & mins. on bar graphs.

PNUM -Plot cumulative number of earthquakes vs. time.

PBAR -Plot a bar graph of numbers of earthquakes vs. time.

PMOM -Plot cumulative seismic moment vs. time.

PMBR -Plot a bar graph of seismic moment vs. time.

MREL -Set the constants A & B in the relation:

seismic moment = 10 ** (A + B * magnitude)

V * Plot vectors or geodimeter lines on a map.

PVEC -Plot vectors on a map.

VECT -Set the scale for vectors in inches per plot unit, and symbol type &
size for the benchmark (vector tail). See "HELP ST" for symbol types.

VBAR -Set length (in your units), X & Y position (in) of a vector scale bar.

FORV -Set the format for reading vectors (a string of up to 80 characters).

PGEO -Plot geodimeter lines on a map, and label each line with a char. string.

GEOD -Set the symbol type & size for the benchmarks (line endpoints), and the
first & last character within the label string to use as a line label.

FORD -Set the format (a string of up to 80 chars.) for reading geodimeter lines

ADD * Additional output or lettering on any plot.

MTIT -Set up a main plot title. Supply the letter height (inches, 0 for no
title) and the title as a string of 1 to 80 characters.

STIT -Set up a plot subtitle. Supply the letter height (inches, 0 for no
title) and the title as a string of 1 to 80 characters.

ALAB -Set the axis labels. Each type of axis maintains its own label. Give the
axis type code, then the label string (80 characters maximum).

MESG -Plot a message (80 char. max) right now, at a position given in inches

MSYM -Plot a VERSAPLOT symbol positioned in inches.

ORIG -Set the origin (relative to the lower-left corner) to which the X & Y
MESG & MSYM positions are added. This allows moving blocks of text.

NOTE -Set the filename for reading plot notes positioned in plot units.

Plot units are lat, lon, date, depth or whatever units are in use.

Notes can be used to identify geographic features, special events, etc.

MAXS -Plot an extra map axis. Give the axis direction code (1=EW 2=NS), and
lat or lon in degrees and minutes.

TAXS -Plot an extra time axis. The starting date must already be set.

Give plot type (1=space-t 2=depth-t 3=others), and Y value to plot at.

'YAXS' -Plot an extra Y axis on time-series plots. The starting date must be set.
Give plot type (1=space-t 2=depth-t 3=others), and date (Y,M,D,H,MIN).

NF * The NOTE file formats for different plot types.

The formats for note files are fixed, and the variables listed below are in the order expected on each record. All positions are real values in F5.2 format, and degrees & minutes are read separately. Symbol types (see "HELP ST") and sizes (in .01") are read in I2 format. Dates are always Y, M, D, H & MIN in SI2 format. The note character height (in) and angle (deg) are each read in F5.2 format, and the note itself is read as A80. Since positioning is in plot units, file format varies with plot type:

Maps: lon (deg & min), lat (d & m), symbol type & size, note height (in), angle (deg) & the note. The format is (4F5.2, 2I2, 2F5.2, A80).
Cross-sections: lon (deg & min), lat (d & m), depth, symbol type & size, height (in), angle (deg) & the note. The format is (5F5.2, 2I2, 2F5.2, A80).
Space-time plots: date, lon (deg & min), lat (d & m), symbol type & size, height (in), angle (deg) & the note. Format (SI2, 4F5.2, 2I2, 2F5.2, A80).
Depth-time or magnitude-time: date, depth (or magnitude), symbol type & size, note height (in), angle (deg) & the note.
The depth-time or mag-time format is (SI2, F5.2, 2I2, 2F5.2, A80)
All other time-series plots: date, Y value, symbol type & size, height (in), angle (deg) & the note. The format is (SI2, F5.2, 2I2, 2F5.2, A80).
General XY plots: X value, Y value, symbol type & size, note height (in), angle (deg) & the note. The format is (2F5.2, 2I2, 2F5.2, A80).

FLOW * Command files, program flow, and setting defaults in a command file.

STOP -(Also QUIT or EXIT) Stop the program & return to system command level.
SAVE -Write all current plot parameters in command format to a file. Program status can later be restored with the JUMP command. Give the filename.
JUMP -Read and execute commands from a file as if they were typed at the keyboard. The file may program a plot sequence, combine direct assignment of parameters with interactive (prompting) commands, be a SAVED file, or be built with the editor. Give the filename to JUMP to.
PAUS -Pause the program to check a pen, go to lunch etc. Type C to continue.
CALL -Transfer control from a JUMP command file to a subordinate command file. Give the filename. Use CALL to avoid repeated commands in JUMP files.
REPT -Rewind the current command file and execute commands from the beginning.
COMD -Get & execute a command from the terminal w/o disturbing the command file
TYPE -The characters after the TYPE command are typed on the console as a message, but are unused by GPLLOT.
-Execute a system command by preceding it with # (short form of SPAW).
* -Any command starting with * is ignored and may be used for comments.
\$XXX -Transfers control to a command file XXX.GPL in GPLLOT's home directory.
@ -Transfer control to the command file following @ (short form of JUMP)
You can change the default parameters of GPLLOT by supplying a file called QINST. in your directory. QINST should contain commands with parameters, and will be executed before control is transferred to the keyboard.

CONT * Control the position, superposition & advancing of plots.

Plot data going to off-line devices is organized into frames. The screen is erased each time GPLLOT goes to a new frame. These commands allow you to control frame advance to superimpose different data sets and

to superimpose complete plots within one plot frame.

- MOVE -Move the plot origin within plot area. Give the X & Y origin (inches).
Use MOVE to change margins or place several plots in one frame.
- FULL -Advance to a new plot frame & erase screen before each plot.
- PART -Do not advance to a new plot frame & erase screen before each plot.
Use FULL for the first plot, then PART for any later plots to be placed in the same frame or superimposed on the previous plot.
- FRAM -Draw an axis frame, NOTES, symbol key & scale on every plot.
- NOFR -Do not draw an axis frame, NOTES, symbol key & scale on every plot.
Use FRAM for the first plot, then NOFR to superimpose any later data within the same frame. This will save time and ink.
- HARD -Make a hardcopy on your Tektronix terminal.

FREE * How to place free-format parameters on a command line.

Any command expecting parameters can receive them in two ways:

- Use only the 4-letter command, and GPLOT will prompt you for what it needs.
- Supply parameters in free-format after the 4-letter command to avoid prompts
- You can get a sample file of free-format commands with the SAVE command.

Several rules apply to free format input:

- The type and order of parameters expected is the same in the command documentation, the interactive command prompts and in free-format input.
- Free format values may be separated by either spaces or commas.
- Strings (for filenames, labels, titles etc.) are delimited by apostrophes ('MYFILE.DAT') Use a double apostrophe (') for one embedded in a string.
- A null field will leave the existing value unchanged. A null field is specified by two consecutive commas, or by an initial comma or trailing comma.
Thus , 2 , , 'MYFILE.' , changes only the 2nd and 4th of 5 values.
- A slash (/) at the end of line means all later fields are null.
- The form n* stands for n occurrences of a null field.

ALAB -Set the axis labels. Each type of axis maintains its own label. Give the axis type code, then the label string (80 characters maximum).
The axis types are: 1=time, 2=Y, 3=X, 4=depth, 5=distance (cross-sections & space-time), 6=magnitude, 7=number of earthquakes, 8=seismic moment.

[Examples: ALAB 1 'TIME'
ALAB 2 'YOUR UNITS'
ALAB 3 'YOUR UNITS'
ALAB 4 'DEPTH (KM)'
ALAB 5 'DISTANCE (KM)'
ALAB 6 'MAGNITUDE'
ALAB 7 'NUMBER OF EVENTS'
ALAB 8 'SEISMIC MOMENT (10**21 DYNE-CM)']

AMAP -Using the current scale, amap resets the map center and size from the left lon (in deg & min), right lon, top lat, & bottom lat (all in d & m)
[Example: AMAP 155 29.52 155 .48 19 30.28 19 9.72]
(FITS & AMAP reset the center & size, and do not store the edge coords.)

CALL -Transfer control from a JUMP command file to a subordinate command file. Give the filename. Use CALL to avoid repeated commands in JUMP files. At the end of the subordinate file, control returns to the point after the CALL in the original command file. There is only one level of depth, and a CALLED file may not CALL another file. You cannot CALL a file while in interactive mode at the keyboard.
[Example: CALL 'SUBFILE.']

CLAS -Set the number of earthquake classes (use 0 for all classes), and a list of classes to plot. Class is determined by lat, lon & depth in a subroutine of QPLOT. The classes are for one network. See also the NETW command
[Examples: CLAS 0, or CLAS 3 1 2 3]
If you do not have your own network and classes built into QPLOT, Fred will help set them up for a small consideration (a bottle of Cabernet).

CLIP -Set the min & max Y values to clip from time-series data when plotting. Clipping prevents overlap of lines or bars when plotted in the same frame
[Example: CLIP -1.E9 1.E9]

CNTR -Set the latitude (in deg & min), then longitude (d & m) of map center.
[Example: CNTR 19 20 155 15]

COMD -Get & execute a command from the terminal w/o disturbing the command file. Place a COMD command in JUMP control files to allow for a command which may be different each time the control file is executed. You may thus JUMP out of a control file or reset something before continuing through the control file. Not entering a command (by pressing RETURN) causes

CURS -Digitize the section endpoints with the cursor while a map is on the screen. Enter the filename to which points are to be written. To digitize a point, any key may be pressed. The symbol on that key is output as a 1-letter label. Pressing period (.) stops the digitizing. New endpoints are added to the end of a file each time CURS is run. The first occurrence of a label is taken as the left endpoint, and the second as the right endpoint. Many different labels can be in the same file. Third and later occurrences of a label are ignored. The file is in the same format as HYPOINVERSE stations, and endpoints may be plotted on maps with the STAS or MSEC commands.
[Example: CURS 'CURSOUT.']

DASH -Set the dash line type (default is a solid line). Dashed lines are not yet implemented - complain to Larry Baker.
[Example: DASH 1]

DATE -Set the beginning & ending date, both in years, months, days, hours and minutes. These are the limits for selecting data to be plotted. Note that the DATE command does not set the time axis range. Both earthquake and time-series data can be selected with the DATE command. If either beginning or ending year is 0, all dates are plotted. When the first datum determines the start of the time axis (see the TBEG command), any data prior to the beginning date are skipped before the start of the time axis is determined.
[Example: DATE 10*0 , or DATE 81 1 1 0 0 82 7 1 0 0]

DELY -Set the delay (in integer days) of the first datum into the plot when the beginning date is determined by the data (beginning year = 0).
[Example: DELY 1]

EBAR -Enable plotting error bars on YT or XY plots by setting a flag T or F. The parameter following an X or Y value on a data record must be the error in the same units. Thus if you are plotting parameter no. 5 on the record, its error must be in position 6. Plotting the sum of several parameters as Y is not allowed when plotting error bars.
[Example: EBAR F]

ENDP -Enter the section endpoints directly. Enter the 1-letter section label, then give the left endpoint as lat (deg & min) and lon, then right endpoint lat and lon (all as deg & min).
[Example: ENDP ' ' 19 15 155 30 19 15 155 0 is the default, or ENDP 'A' 32 16 120 10 32 18 120 40]

EXIT -(Also QUIT or STOP) Stop the program & return to system command level.

FACT -Set the factor by which all Y axis data are to be multiplied before plotting (axis ticks are not affected).
Axis ticks cannot be drawn at an interval of less than 1 unit, and tick labels are limited to 4-digit integers in the range -999 to 9999. You can therefore scale your data before plotting to lie in this range.
[Example: FACT 1]

FILE -Set the filename containing earthquake or time series data to plot.
The filename is a string of from 1 to 40 characters.
If the file doesn't exist, no data will appear on the plot and no warning will be given.
[Example: FILE 'NONE.']

FITS -Fit the lat and lon scales, center and size of an existing map. Give the left lon (in deg & min), right lon (d & m), x map size in inches, top lat (d & m), bottom lat (d & m), and y map size in inches.
The FITS command usually produces slightly different lat & lon scales. (FITS & AMAP reset the center & size, and do not store the edge coords.)
[Example: FITS 155 29.52 155 .48 8 19 30.28 19 9.72 6]

FORD -Set the format (a string of up to 80 chars.) for reading geodimeter lines
Geodimeter files (& formats) must have 8 numbers plus a label string:
lat (in deg & min) and lon (in deg & min) of the first benchmark,
lat (in deg & min) and lon (in deg & min) of the second benchmark,
and a label string (80 characters maximum) from which the line label will be drawn. The GEOD command specifies the part of a longer string to use as a label plotted near the midpoint of the geodimeter line.
[Example: FORD '(BF5.2, A)']
The format string must be enclosed in parentheses.

FORE -Set the format to use in reading earthquake summary data.
The formats are 1=hypoinverse, 2=hypo71, 3=hypoellipse.
The 3 possible formats (only the parts read by QPLOT) are:

	HYPDINVERSE	HYPD71	HYPDELLIP
YEAR, MONTH, DAY, HOUR, MIN	5I2	3I2, 1X, 2I2	5I2
SECOND	F4.2	F6.2	F4.2
LAT, DEG	F2.0	F3.0	F2.0
"N" OR " " (NORTH), OR "S"	A1	A1	A1
LAT, MIN	F4.2	F5.2	F4.2
LON, DEG	F3.0	F4.0	F3.0
"W" OR " " (WEST), OR "E"	A1	A1	A1
LON, MIN	F4.2	F5.2	F4.2
DEPTH	F5.5	F7.2	F5.2
AMPLITUDE MAGNITUDE	F2.1, 13X		F2.1, 13X
AZ, DIP & MAG OF LEAST S. ERR.	F3.0, F2.0, F4.2		SAME
AZ, DIP & MAG INTERMED. S. ERR.	F3.0, F2.0, F4.2		SAME
DURATION MAGNITUDE	F2.1, 3X	F7.2, 17X	F2.1, 3X
MAG OF LARGEST STD. ERROR	F4.2, 2X		F4.2
HORIZONTAL ERROR	F4.2	F5.1	
VERTICAL ERROR	F4.2	F5.1	

FORL -Set the number of lat-lon pairs per record and format for reading lines. Each pair must have a latitude then longitude, both in decimal degrees. The format must be enclosed in parentheses, not exceed 80 characters, and contain a repeat of two F formats. The default is (6(F6.4,F7.4)). One or more lat-lon pairs with either or both values =0 causes a pen lift between points. Use the LINE command to set the line filename.

[Example: FORL 6 '(6(F6.4,F7.4))']

FORT -Set the format for reading time series. Format must include YR, MO, DA, HR & MIN as integers, and from 1 to 15 real values per record. Be sure to include as many data fields as will be read (see PARM). The format is a string of up to 80 chars., including the required parens.

[Example: FORT '(5(I2,1X),2X,15F7.0)']

-Data values of -999.0 should be used where there is missing data and a gap in plotting is desired. No lines go to or from the -999.0 points.

-Data values of -998.0 should be used for missing data when you want the adjacent valid points connected by a line.

FORV -Set the format for reading vectors (a string of up to 80 characters). Vector files (& formats) must have 6 real numbers: lat of the benchmark (vector tail) in deg & min, lon (d & m), and Y & X vector components.

[Example: FORV '(6F5.2)']

The format string must be enclosed in parentheses.

FORX -Set format for reading XY data. File must have 2-15 real vals. per record. Be sure to include as many data fields as will be read (see PARM). The format is a string of up to 80 chars., including the required parens.

[Example: FORX '(17X,15F7.0)']

FRAM -Draw an axis frame, NOTES, symbol key & scale on every plot. The NOFR command has the opposite effect. Use FRAM for the first plot, then NOFR to superimpose any later data within the same frame. This will save time and ink.

This command sets a flag when given and takes no parameters.

The default is to draw a frame on every plot.

[Example: FRAM]

FULL -Advance to a new plot frame & erase screen before each plot. The PART command has the opposite effect. Use FULL for the first plot, then PART for any later plots to be placed in the same frame or superimposed on the previous plot. This command sets a flag when given & takes no parameters. The default is to advance the frame and erase the screen for every plot.

[Example: FULL]

GEOD -Set the symbol type & size for the benchmarks (line endpoints), and the first & last character within the label string to use as a line label. See "HELP ST" for the benchmark symbol codes. Geodimeter files (& formats) must have 8 numbers plus a label string: lat (in deg & min) and lon (in deg & min) of the first benchmark, lat (in deg & min) and lon (in deg & min) of the second benchmark, and a label string (80 characters maximum) from which the line label will be drawn. The GEOD command specifies the part of a longer string to use as a label plotted near the midpoint of the geodimeter line.
[Example: GEOD 1 10 1 10]

HARD -Make a hardcopy on your Tektronix terminal.
[Example: HARD]

HELP -Gets on-line HELP in a brief self-tutoring manner. Follow "HELP" by "MENU", a group name or command name to get info. with increasing detail.
[Example: HELP , HELP MENU , HELP PLOT , etc.]

JUMP -Read and execute commands from a file as if they were typed at the keyboard. The file may program a plot sequence, combine direct assignment of parameters with interactive (prompting) commands, be a SAVED file, or be built with the editor. Give the filename to JUMP to. All commands in the file are executed in order unless a JUMP, CALL, PAUS or REPT command is found. Control returns to the keyboard at end of file. The short form "@filename" is equivalent to "JUMP 'filename'".

You may wish to place command files in your directory to prompt for the essential parameters on plots you make frequently. For example, a file "MYMAP." containing the commands FILE, CNTR, SCAL & MTIT will prompt you for these parameters when you type " JUMP 'MYMAP.' ".
[Example: JUMP 'COMFILE.']

KBAR -Set the length (in km) and X & Y position (inches) of a km scale on maps. The bar scale of length X is labelled "X KM". Position is of the left end
[Example: KBAR 20 .2 .2]

LINE -Set the filename containing linear data (coastlines, etc.) to plot. The lines will then appear on every map. Use a nonexistent filename or "NONE" to omit lines from plot. The filename may contain up to 40 characters. See the FORL command for file format information.
[Example: LINE 'NONE.']

MAGS -Set the minimum and maximum magnitudes of events to plot.
[Example: MAGS 0 9]

MANO -Set up axis annotation for maps. Give the annotation code (which axis or both) and completeness code (label every degree, 10-minutes, 5-minutes or minute), each for both lon and lat axes. Also set letter height (in). The compl. codes are: 0=no labels, 1=degrees, 2=10-min, 3=5-min, 4=minute. The annotation codes are: -1=left or bottom, 0=both, 1=right or top.
[Example: MANO 0 2 0 2 .1]

MAXS -Plot an extra map axis. Give the axis direction code (1=EW 2=NS), and lat or lon in degrees and minutes.
The four possible direction codes are:
1 W to E, ticks down. 3 E to W, ticks up.
2 S to N, ticks right. 4 N to S, ticks left.
The extra axis is plotted right away and no parameters are stored.
[Example: MAXS 1 19 20]

MESG -Plot a message (80 char. max) right now, at a position given in inches (see NOTE for positioning in plot units). Give the X & Y position of the lower left corner of the first letter in inches, the character height ("") angle (deg E of N), and the message string. The message is plotted right away and not saved or plotted later. The origin for positioning messages starts at the lower left corner of the plot. It may be reset with the ORIG command, which allows a block of text to be moved around the plot. The message angle can be positive or negative.
[Example: MESG 2.1 2.3 .1 0 'MESSAGE_DAT']

MINS -Set the x and y sizes of the map in inches.
[Example: MINS 8 6]

MOVE -Move the plot origin within plot area. Give the X & Y origin (inches). Use MOVE to change margins or place several plots in one frame. If a plot is made under the FULL condition (screen erased just prior to plot), the MOVE coordinates are absolute: they position the LL corner of the next plot from the LL corner of the screen. If a plot is made under the PART condition (screen not erased), the MOVE coordinates are relative: they position the LL corner of the next plot relative to the LL corner of the last plot.
[Example: MOVE .75 .75]

MREL -Set the constants A & B in the relation:
seismic moment = 10 ** (A + B * magnitude)

For B = 1.4:	magnitude	moment(A=-4) (in 10**21 dyne-cm)	moment(A=-6) (in 10**23 dyne-cm)
	1	.0025	-
	2	.063	.0006
	3	1.58	.016
	4	40.	.4
	5	1000.	10.
	6	25120.	251.
	7	-	6310.

[Example: MREL -4. 1.4]

MSEC -Set the code for plotting the current cross-section position on maps.
You can choose 0=nothing plotted, 1=endpoints & 1-letter labels,
2=line connecting endpoints, 3=box (see ZONE command), 4=box & labels.
[Example: MSEC 0]

MSYM -Plot a VERSAPLOT symbol positioned in inches.
The symbol is plotted immediately and not saved. Give the symbol index
(see VERSAPLOT manual), X & Y position in inches (see ORIG for setting
the position origin). Then give the character height (in) and angle.
[Example: MSYM 35 2.1 2.3 .1 0]

MTIT -Set up a main plot title. Supply the letter height (inches, 0 for no
title) and the title as a string of 1 to 80 characters.
Titles are centered above the plot, main above subtitle.
[Example: MTIT 0 ' ']

NETW -Set the network number for earthquake classes. See also the CLAS command.
If you do not have your own network and classes built into QPLOT, Fred
will help set them up for a small consideration (a bottle of Cabernet).
[Example: NETW 1]

NOFR -Do not draw an axis frame, NOTES, symbol key & scale on every plot.
The FRAM command has the opposite effect.
Use FRAM for the first plot, then NOFR to superimpose any later data
within the same frame. This will save time and ink.
This command sets a flag when given and takes no parameters.
The default is to draw a frame on every plot.

NOTE -Set the filename for reading plot notes positioned in plot units.
Plot units are lat, lon, date, depth or whatever units are in use.
Notes can be used to identify geographic features, special events, etc.

Only the notes within the plot boundaries & .5" outside will be plotted.
Give a filename to enable the plotting of notes on every plot, much like
lines or stations on maps. To disable note plotting, give a nonexistent
filename or "NONE". The file itself contains all parameters
needed for plotting the note.

A plot symbol is normally plotted at the given position, with a note of
up to 80 characters beside it. A negative symbol number eliminates the
symbol and centers the note itself over the given position. A symbol type
and size must be supplied even if a symbol will not be plotted.
Positive or zero angles place the note to the right of the symbol,
and negative angles place it to the left. The note can thus be at any
angle and either right-side-up or up-side-down.

When placing notes on maps, a negative character height will be inter-
preted as the height in km at the map scale, not in inches.

Notes may be placed on any plot type, but the formats of the note files differ. Type "HELP NF" for the formats. 29

[Example: NOTE 'NONE.']

NOWR -Disable the writing of plotted events to a file.
The default is to not write out plotted events.

ORIG -Set the origin (relative to the lower-left corner) to which the X & Y
MESG & MSYM positions are added. This allows moving blocks of text.
The default origin is the lower left corner.
[Example: ORIG 0 0]

PARM -Set the fields in your data assigned to the X and Y axes.
Give the X field (1-15), number of fields to sum for Y (1-15),
and the field numbers to sum (a subset of 1-15).
The X field number is ignored when making time series plots.
[Example: PARM 2 1 1]

PART -Do not advance to a new plot frame & erase screen before each plot.
The FULL command has the opposite effect.
Use FULL for the first plot, then PART for any later plots to be placed
in the same frame or superimposed on the previous plot.
This command sets a flag when given & takes no parameters.
The default is to advance the frame and erase the screen for every plot.
[Example: PART]

PAUS -Pause the program to check a pen, go to lunch etc. Type C to continue.

PBAR -Plot a bar graph of numbers of earthquakes vs. time.
Reads an earthquake summary file, and uses the current earthquake
selection criteria. The data file must be in chronological order.
(See also the TBEG, TLEN, SLIM, TSET & TAND commands.
Other options are in the TAX, Y, EQ, SEL & ADD command groups).

PGEO -Plot geodimeter lines on a map, and label each line with a char. string.
Geodimeter files (& formats) must have 8 numbers plus a label string:
lat (in deg & min) and lon (in deg & min) of the first benchmark,
lat (in deg & min) and lon (in deg & min) of the second benchmark,
and a label string (80 characters maximum) from which the line label
will be drawn. The GEOD command specifies the part of a longer string to
use as a label plotted near the midpoint of the geodimeter line.
(See also the GEOD, FORD, CNTR, SCAL, MINS, PROJ, MANO & LINE commands.
Other options are in the V, MAP, MORE, ADJ & ADD command groups).

PKEY -Plot only a symbol key, and do it right now.

PLOT -Make a plot of earthquakes on a map, using present parameters.
 (See also the SCAL, CNTR, MINS, PROJ, SYMB, SIZE, MANO & LINE commands.
 Other options are in the MAP, MORE, DEF, SEL, ADJ & ADD groups.)

PLST -Make a space-time plot using the current endpoints and time axis.
 The distance axis is that of a cross-sect. & a time axis must be defined.
 (See also the SCAL, ENDP, ZONE, TBEG, TLEN, TANO, TINS & TEND commands.
 Other options are in the ADD, DEF, TAX, CROS & SEL groups).

PLXY -Make an XY plot of data in general XY format.
 (See also the SLIM, TINS, XLIM, XANO, ALAB, PARM & FORX commands.
 Other options are in the T, Y & ADD command groups).
 QPLOT will not draw points outside the plot frame, nor will it draw lines
 to or from points outside the frame.

-Data values of -999.0 should be used where there is missing data and a
 gap in plotting is desired. No lines go to or from the -999.0 points.
 -Data values of -998.0 should be used for missing data when you
 want the adjacent valid points connected by a line.

PLZT -Make an earthquake symbol plot of depth vs. time. Set up the depth as
 in a cross-section. A time axis must also be established.
 (See also the SCAL, VTEX, ZLIM, TBEG, TLEN, TINS, TEND & TANO commands.
 Other options are in the ADD, DEF, TAX, CROS & SEL command groups.)

PMAG -Make an earthquake symbol plot of magnitude vs. time. Set up the mag-
 nitude axis as a Y-axis, and a time axis.
 (See also the SLIM, TINS, TBEG, TLEN, TEND & TANO commands.
 Other options are in the ADD, DEF, TAX, Y & SEL command groups.)

PMBR -Plot a bar graph of seismic moment vs. time.
 Reads an earthquake summary file, and uses the current earthquake
 selection criteria. The data file must be in chronological order.
 (See also the TBEG, TLEN, SLIM, TSET, TANO & MREL commands.
 Other options are in the TAX, Y, EQ, SEL & ADD command groups).

PMOM -Plot cumulative seismic moment vs. time.
 Reads an earthquake summary file, and uses the current earthquake
 selection criteria. The data file must be in chronological order.
 (See also the TBEG, TLEN, SLIM, TSET, TANO & MREL commands.
 Other options are in the TAX, Y, EQ, SEL & ADD command groups).

PNTS -Set up the plotting of lines or points on general time series or XY plots
 Plot lines (T or F), points (T or F), & point symbol type & size in .01".

Type "HELP ST" to see the point symbol types.

Either or both of points or lines may be plotted. The data are plotted and connected by lines in the order they appear in the file.

[Example: PNTS T F , or PNTS T T 1 10]

PNUM -Plot cumulative number of earthquakes vs. time.

Reads an earthquake summary file, and uses the current earthquake selection criteria. The data file must be in chronological order.

(See also the TBEG, TLEN, SLIM, TSET & TANO commands.

Other options are in the TAX, Y, EQ, SEL & ADD command groups).

PROJ -Set the map projection (1=conic, 2=mercator).

The conic projection used here is the first-order approximation to all conic projections. If U, V are lon & lat, and Uo, Vo are the lon & lat of the map center, then for the conic projection:

X is proportional to $(U - U_o) * \cos(V)$

Y is proportional to $(V - V_o) + \sin(V) * \cos(V_o) * .5 * (U - U_o)**2$

For the Mercator projection:

X is proportional to $(U - U_o) * \cos(V_o)$

Y is proportional to $\cos(V_o) * \cos(V) * (\tan(V) - \tan(V_o))$

[Example: PROJ 1]

PVEC -Plot vectors on a map.

Vector files (& formats) must have 6 real numbers: lat of the benchmark (vector tail) in deg & min, lon (d & m), and Y & X vector components.

(See also the VECT, VBAR, FORV, CNTR, SCAL, MINS, MANO & LINE commands.

Other options are in the V, MAP, MORE, ADJ & ADD command groups).

QUIT -(Also STOP or EXIT) Stop the program & return to system command level.

REMK -Select (or reject) events if any one of up to 4 characters is present in any one of up to 4 places on the summary card. Give the number of

chars. to use in selecting events (1-4) (0 selects all events, -1 to -4 rejects them). Then give the no. of places characters could appear (1-4), the characters to select, and the format for reading them (ie. (T79,A1))

[Examples: REMK 0 , or

REMK 2 1 'A' 'B' '(T79,A1)' to select HYPO71 A & B quality events, or

REMK -1 1 '*' '(T79,A1)' to reject "*" events in HYPOINVERSE format.]

REPT -Rewind the current command file and execute commands from the beginning.

RERR -Data error handling. Set TRUE to flag data errors, FALSE to skip bad data. Data errors will be be flagged with an error message and no more data will be read from that file. If FALSE, all bad data is skipped and no error is given. Error handling applies to earthquake summary, line, station, notation, time-series and XY files (all data file types).

[Example: RERR F]

SAVE -Write all current plot parameters in command format to a file. Program status can later be restored with the JUMP command. Give the filename.

SAVE allows a plot to be redone or modified at a later date, but does not record a complex sequence of plot commands to superimpose data, add messages or axes, or produce a sequence of plots.

[Example: SAVE 'PLOT1.']

SCAB -Reset Y&T axis range from extrema in the earthq. file for a bar plot. Reads the current file and assumes it is an earthq. summary file in chronological order. The current earthq. selection criteria are used to eliminate some events. The ranges of the Y and time axes are reset using the current bar interval as if the TBEG, TLEN & SLIM commands were given. Use the SCAB command prior to the PBAR plot command.

SCAL -Set the scale (a no. >> 1) for all maps, distance and depth axes.
[Example: SCAL 250000.]

SCAM -Reset map center & scale from lat & lon extremes in the current file. The current earthquake selection criteria are used to eliminate some events. The map area is reset as if the SCAL & CNTR commands were given. Use SCAM prior to the PLOT command.

SCAN -Reset Y&T axes prior to making a cumulative earthq. plot. Reads the current earthq. summary file, assumed to be in chronological order. Resets the Y & time axis limits as if the TBEG, TLEN & SLIM commands were given. Use the SCAN command prior to the PNUM command.

SCAT -Reset the Y&T axis range from extrema in the current time-series file. Read the current field(s) from the current time-series file. The min & max Y & time values reset the axis range as if the TBEG, TLEN & SLIM commands were given. Use SCAT prior to the TIME plot command.

SCAX -Reset the Y & X axis range from extrema in the current XY file. Read the current fields from the current XY format file. The min & max Y & X values in the file reset the axis range as if the SLIM & XLIM commands were given. Use SCAX prior to the PLXY plot command.

SCAY -Set the latitude scale only, leaving the lon scale unchanged.
[Example: SCAY 250000.]

SDEP -Set the minimum and maximum depths (in km) of events to plot.

SECT -Reads files such as those produced by CURS to obtain section endpoints. Give the 1-letter section label and filename to search. The first occurrence of a label is taken as the left endpoint, and the second as the right endpoint. Many different labels can be in the same file. Third and later occurrences of a label are ignored. The file is in the same format as HYPOINVERSE stations, and endpoints may be plotted on maps with the STAS or MSEC commands.
[Example: SECT 'A' 'CURSOUT.']

SERH -Set the maximum horizontal error of earthquakes to plot (km).
[Example: SERH 99]

SERZ -Set the maximum vertical error of earthquakes to plot (km).
[Example: SERZ 99]

SHIF -Shift the map center by an amount in km in lat (pos N) & lon (pos E).
[Example: SHIF 6 -10 (shifts the center to the NW)]

SHOL -Type out the lengths in inches of all types of axes. You can thus determine the final size of any type of plot using the current parameters.

SHOM -Type out some current map parameters.

SHOS -Type out the types and sizes of the current earthquake symbols.

SHOT -Type out some current time series parameters.

SHOW -Type out some general and earthquake selection parameters.

SHOX -Type out some current cross-section parameters.

SIZE -Set the symbol sizes, which always depend on magnitude. Give the number of sizes, and pairs of 1) the lower magnitude limit for a particular size, and 2) the symbol diameter in .01" (an integer).
[Example: SIZE 7 0. 4 1. 6 2. 10 3. 16 4. 24 5. 32 6. 40]

SKEY -Set the parameters for drawing a symbol key. Give the code (0 for no key, 1=type key, 2=size key, 3=both type & size), the symbol size for the type key, the type for the size key, and X & Y position for the key top. The "key top" is the upper left corner of the symbol key.
 [Example: SKEY 3 10 1 8.88 5.8]

SLIM -Set the range (min & max) of the Y axis in your plot units.
 [Example: SLIM 0 10]

SPAW -Spawn a system command (contained in a string of up to 80 characters). You thus have access to the editor, directory files, programs, etc. while preserving the status of GPLLOT. The short form "#command" is equivalent to "SPAW 'command' ".
 [Examples: SPAW 'DIR' , or SPAW 'EDT MYDATA.' , etc.]

SPEN -Set the pen number (calcomp) or line width (versatec). You can change pens between plotting different data sets or segments on the same plot.
 [Example: SPEN 1]

SPOT -Change the map center using the cursor and the current map on the screen. Press any character key to register the new center. Important: be sure you have not changed the scale or center since the screen map was plotted, since this is how GPLLOT knows whats on the screen

STAS -Set the format code, filename, flag (T or F) to plot a 4-letter label, and plotting symbol type & size for seismic stations on maps. Use a format code of 0, a nonexistent filename, or a filename "NONE" to omit stations from the plot. The format codes are 1=HYPO71 2=HYPOINVERSE =HYPOELLIPSE. The plot symbol codes are the same as for earthquakes.
 [Example: STAS 2 'NONE.' T 10 10]

STIT -Set up a plot subtitle. Supply the letter height (inches, 0 for no title) and the title as a string of 1 to 80 characters. Titles are centered above the plot, main above subtitle.
 [Example: STIT 0 ' ']

STOP -(Also QUIT or EXIT) Stop the program & return to system command level.

SYMB -The type of symbol plotted (as controlled by a code) can be:

- 1 A plot symbol depending on magnitude.
- 2 A plot symbol depending on depth.
- 3 The three standard error bars.
- 4 Standard error bars and a depth symbol.

- 5 A symbol depending on days elapsed since the first event or a set time.
- 6 One ASCII character taken from the summary card.
Give the code (6) and an 8-character format for reading the character.
The default format is for depth (units digit) and is (T32,A1).
- 7 One of the 36 characters "0-9, A-Z, #" translated from a data field using a linear function to define the character number: Char. no. = A+B*DATA, where you set A,B & the format for reading the parameter DATA
The character number is the integer part of the linear function of DATA
0-9 stand for themselves, A-Z for 10-35, and # for 36 and greater.
Give the symbol dependence code (7), A, B and the 12-character format.
The defaults are one symbol for each km of depth & are: A=0, B=1, format = (T30,F3.0). Be sure to include parentheses around the format.
For the regular plot symbols, give the dependence code (1, 2, 4 or 5), the number of symbols, and pairs of 1) the lower limit of the parameter range for a symbol, and 2) the integer code for that symbol.
For a listing of the symbol type codes, type "HELP ST".
[Examples: SYMB 2 4 0. 5 5. 1 13. 3 20. 8 , or
SYMB 6 '(T32,A1)' , or SYMB 7 0. 1. '(T30,F3.0)']

TAND -Set up annotation for labelling ticks on time axes (not XY plots). Give the annotation code (which axis or both) and completeness code for the time axis, then the Y axis. Also set the letter height in inches.
The annotation codes are: -1=left or bottom, 0=both, 1=right or top.
The completeness codes are: 0=no labels, 1=years, 2=months, 3=10-day, 4=days, 5=hours.
The completeness codes are: 0=none, 1=1000's, 2=100's, 3=tens, 4=units.
[Example: TAND -1 2 0 3 .1]

TAXS -Plot an extra time axis. The starting date must already be set.
Give plot type (1=space-t 2=depth-t 3=others), and Y value to plot at.
The extra axis is plotted right away and no parameters are stored.
[Example: TAXS 3 5.]

TBAR -Make a Y vs. time plot as a bar graph of data in time series format.
If more than one datum is given in a bar interval, the data are summed.
(See also the SLIM, TBEG, TLEN, TINS, ALAB, PARM, FORT & TSET commands.
Other options are in the T, TAX, Y, EQ & ADD command groups).
The data file must be in chronological order.

TBEG -Set the axis beginning date in Y, M, D, H & MN. If the beginning year is 0, the axis starts the day of the first datum in the file.
If a starting date for selecting data is set (see DATE command) and the beginning year set with TBEG is 0, then the first datum read after the start date sets the time axis beginning.
It is thus advisable to have your file in chronological order when the data determines the axis. You can use the DELY command to set the time between the start of the plot and the first datum.
[Example: TBEG 5*0]

TCUM -Make a line plot of cumulative (summed from 0) time series data.
Cumulative plots from earthq. summary format use the PNUM & PMOM commands

The plotted line makes a step increase at the time of each datum.
 (See also the SLIM, TBEG, TLEN, TINS, ALAB, PARM, FORT & TANO commands.
 Other options are in the T, TAX, Y, EQ & ADD command groups).
 The data file must be in chronological order.

TEND -Set the ending date of the time axis after the beginning has been set.
 This command resets the axis length in days using the current start date.
 Be sure to give the TBEG command before the TEND command.
 [Example: TEND 84 12 31 0 0]

TIME -Make a time plot of data in general time series format.
 Plots may have points & lines. One or more data fields may be summed.
 Note that your plot will be messy if your data is not in chronological
 order & you are connecting points with lines (see the PNTS command).
 (See also the SLIM, TBEG, TLEN, TINS, TANO, ALAB, PARM & FORT commands.
 Other options are in the T, TAX, Y & ADD command groups).
 QPLOT will not draw points outside the plot frame, nor will it draw lines
 to or from points outside the frame.

-Data values of -999.0 should be used where there is missing data and a
 gap in plotting is desired. No lines go to or from the -999.0 points.
 -Data values of -998.0 should be used for missing data when you
 want the adjacent valid points connected by a line.

TINS -Set the lengths of the time (or X) axis and Y axis in inches.
 Note that the lengths of distance or depth axes are set by the map scale
 [Example: TINS 8 6]

TLEN -Set the length of the time axis in days.
 [Example: TLEN 30]

TREN -Set the trend to subtract from time & cumulative plots in units/day.

TSCL -Set the time axis scale (in/day) after the length in days has been set.
 This command redefines the axis length in inches using the current
 length in days, so be sure to give the TLEN command first.
 [Example: TSCL .26667]

TSET -Set the bar interval (width) in days, hrs. & mins. on bar graphs.
 The data falling within one bar interval will be summed before plotting.
 If the bar width is zero, a single spike is plotted for each data value.
 [Example: TSET 0 1 2*0]

TYPE -The characters after the TYPE command are typed on the console as a
 message, but are unused by QPLOT.

VBAR -Set length (in your units), X & Y position (in) of a vector scale bar.
The bar has a tick mark every unit & is similar to the kilometer scale
on maps. The X & Y position is of the left end.

[Example: VBAR 10 .5 1.]

VECT -Set the scale for vectors in inches per plot unit, and symbol type &
size for the benchmark (vector tail). See "HELP ST" for symbol types.

[Example: VECT .1 14 10]

VTEX -Set the vertical exaggeration (=1 for no exaggeration).

Note: the vertical exaggeration is used on all plots with a depth axis.

[Example: VTEX 1.]

WRIT -Write the plotted events to a file in the same format & give its name.
The default is to not write out plotted events.

XAND -Set up axis annotation for cross-sections & XY plots. Give annot. code
(which axis or both) and completeness code (label every 10-km or km),
each for the distance and the depth axis. Also set letter height (in).
XAND also sets annotation for XY plots. Give codes for the X then Y axis.
The annotation codes are: -1=left or bottom, 0=both, 1=right or top.
The completeness codes are: 0=none, 1=1000's, 2=100's, 3=tens, 4=units.

[Example: XAND -1 3 0 3 .1]

XLIM -Set the range (min & max) of the X axis in your plot units.

[Example: XLIM 0.10]

XSCL -Using the current range, give scale (inch/unit) to reset X axis length.

[Example: XSCL .8]

XSEC -Plot a cross-section using the current endpoints and parameters.

Note: plot size is determined only by scale, endpoints & depth limits.

(See also the SCAL, ENDP, ZLIM, VTEX, ZONE, XAND, MSEC & XSHF commands.

Other options are in the DEF, CROS, ADD & SEL groups).

XSHF -Plot a cross-sect. parallel to the endpoints, with left and right limits
(in km) set by the SLIM command. The original left point has a value 0.
Thus limits of -10,40 include an additional 10 km left of the left end-
point and 40 km to the right of the original left endpoint.

(See also the SCAL, ENDP, ZLIM, VTEX, ZONE, XAND, MSEC & SLIM commands.

Other options are in the DEF, CROS, ADD, & SEL command groups).

YAXS -Plot an extra Y axis on time-series plots. The starting date must be set.
Give plot type (1=space-t 2=depth-t 3=others), and date (Y,M,D,H,MIN).
The extra axis is plotted right away and no parameters are stored.
[Example: YAXS 3 82 3 6 0 0]

YSCL -Using the current range, give scale (inch/unit) to reset Y axis length.
[Example: YSCL .6]
Be sure to give the SLIM command before the YSCL command.

ZLIM -Set the top and bottom limits of the depth axis in km.
[Example: ZLIM 0 20]

ZONE -Set the limits on either side of the section to include in the plot (km)
Give the near limit first. Negative nos. are in front of the
section, positive behind.
Thus limits of -2,3 go from 2 km in front of section to 3 km behind.
[Example: ZONE -99 99]

ZOOM -Change the map or section scale by a zoom factor (>1 to enlarge).
[Example: ZOOM 1.]

***** -Any command starting with * is ignored and may be used for comments.

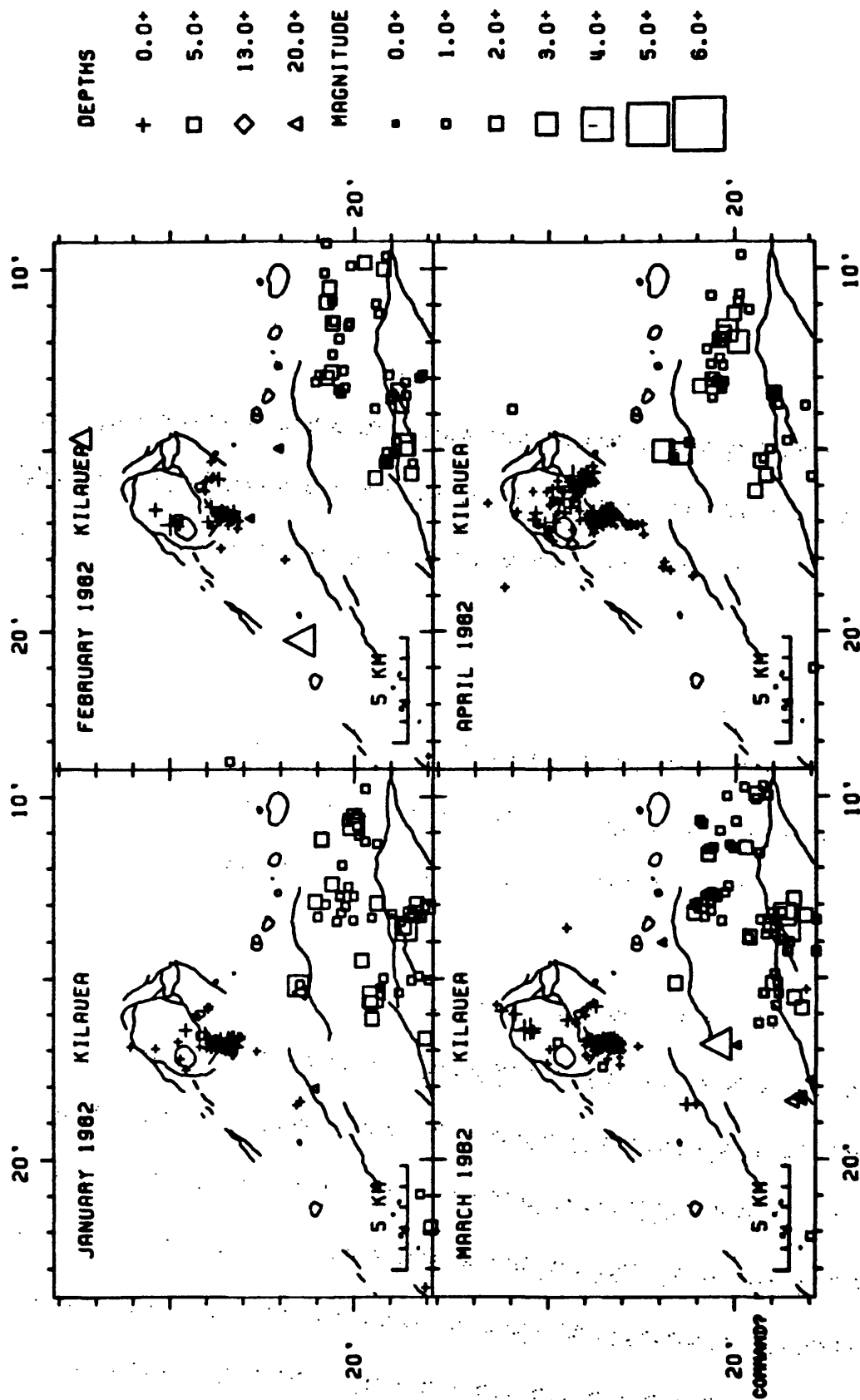
\$XXX -Transfers control to a command file XXX.GPL in QPLOT's home directory.

@ -Transfer control to the command file following @ (short form of JUMP)

-Execute a system command by preceding it with # (short form of SPAW).

EXAMPLE 1. This command file produces a group of four seismicity maps. It illustrates the use of several techniques and command types: superposition and moving of plots, free-format parameter input, and three kinds of labelling.

NOTE 'HAWAII.NOT'	Plot labels from the file HAWAII.NOT on each plot.
KBAR 5/	Make the scale bar 5 km long but leave its position in the plot unchanged.
SKEY 0/	Dont plot a symbol key on each plot, but leave its stored position the same.
CNTR 19 23 155 16.5	Set the map center.
FULL	Erase the screen before the next plot.
MINS 4 3	Make maps 4" long by 3" high.
MOVE .75 3.75	Set the origin to X=.75", Y=3.75" (relative to the lower-left corner of the screen, since we are under the FULL condition).
MANO 1,,,-1,,,	Put annotation on the left and top axes, leave other parameters unchanged.
FILE '182.SUM'	Plot from the summary file 182.SUM.
PLOT	Make the upper left plot.
MESG .3 2.7,,,'JANUARY 1982'	Add the label JANUARY 1982 to this plot only at X=.3", Y=2.7" relative to the current plot origin.
PART *	Do not erase the screen or automatically reset the origin between plots.
MOVE 4 0	Move the origin 4" to the right(from the current plot origin, since we are under the PART condition).
MANO 1,,1,,,	Put annotation on the top and right axes.
FILE '282.SUM'	Plot from the file 282.SUM.
MESG 4* 'FEBRUARY 1982'	Add the label FEBRUARY 1982 to this plot leaving the first 4 parameters the same.
PLOT	Make the upper right plot
SKEY 3/	Plot a size and type symbol key(at its current position) on the next plot.
MOVE -4 -3	Move the origin left 4" and down 3" from the current position.
MANO -1,,,-1,,,	Put annotation on the right and bottom axes.
FILE '382.SUM'	Plot from the file 382.SUM.
MESG 4* 'MARCH 1982'	Add the label MARCH 1982 to this plot leaving the first 4 parameters the same.
PLOT	Make the lower left plot, including the symbol key.
SKEY 0/	Cancell further plotting of a symbol key.
MOVE 4 0	Move the new plot origin 4" to the right of the present position.
MANO -1,,1,,,	Put annotation on the bottom and right axes.
FILE '482.SUM'	Plot from the file 482.SUM.
MESG 4* 'APRIL 1982'	Add the label APRIL 1982 to this plot leaving the first 4 parameters the same.
PLOT	Make the lower right plot.



EXAMPLE 1