

psxy

psxy - Plot lines, polygons, and symbols on maps

Synopsis

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psxy [ table ] -Jparameters -Rwest/east/south/north[/zmin/zmax][+r] [ -A[m|p|x|y] ] [
-B[p|s]parameters ] [ -Ccpt ] [ -Ddx/dy ] [ -E[x|y|X|Y][+a][+c|f][+n][+wcap][+ppen] ] [ -F[c|n|r]
[refpoint] ] [ -Gfill ] [ -Iintens ] [ -K ] [ -L[+b|d|D][+x|r|x0][+y|r|y0][+ppen] ] [ -N[c|r] ] [ -O ] [ -P
] [ -S[symbol][size[u] ] [ -T ] [ -U[stamp] ] [ -V[level] ] [ -W[pen][attr] ] [ -Xx_offset ] [ -Yy_offset
] [ -aflags ] [ -bbinary ] [ -dinodata ] [ -eregex ] [ -fflags ] [ -ggaps ] [ -hheaders ] [ -iflags ] [
-pflags ] [ -ttransp ] [ -:[i|o] ]
```

Note: No space is allowed between the option flag and the associated arguments.

Description

psxy reads (x,y) pairs from *files* [or standard input] and generates PostScript code that will plot lines, polygons, or symbols at those locations on a map. If a symbol is selected and no symbol size given, then **psxy** will interpret the third column of the input data as symbol size. Symbols whose *size* is ≤ 0 are skipped. If no symbols are specified then the symbol code (see **-S** below) must be present as last column in the input. If **-S** is not used, a line connecting the data points will be drawn instead. To explicitly close polygons, use **-L**. Select a fill with **-G**. If **-G** is set, **-W** will control whether the polygon outline is drawn or not. If a symbol is selected, **-G** and **-W** determines the fill and outline/no outline, respectively. The PostScript code is written to standard output.

Required Arguments

-Jparameters (more ...)

Select map projection.

-Rxmin/xmax/ymin/ymax[+r][+uunit] (more ...)

Specify the region of interest.

For perspective view **p**, optionally append */zmin/zmax*. (more ...)

Optional Arguments

table

One or more ASCII (or binary, see **-bi**[*ncols*][*type*]) data table file(s) holding a number of data columns. If no tables are given then we read from standard input. Use **-T** to ignore all input files, including standard input (see below).

-A[*m|p|x|y*]

By default, geographic line segments are drawn as great circle arcs. To draw them as straight lines, use the **-A** flag. Alternatively, add **m** to draw the line by first following a meridian, then a parallel. Or append **p** to start following a parallel, then a meridian. (This can be practical to draw a line along parallels, for example). For Cartesian data, points are simply connected, unless you append **x** or **y** to draw stair-case curves that whose first move is along *x* or *y*, respectively.

-B[*p|s*]parameters (more ...)

Set map boundary frame and axes attributes.

-Ccpt

Give a CPT or specify **-C***color1,color2[,color3,...]* to build a linear continuous CPT from those colors automatically. In this case *colorn* can be a *r/g/b* triplet, a color name, or an HTML hexadecimal color (e.g. #aabbcc). If **-S** is set, let symbol fill color be determined by the *z*-value in the third column. Additional fields are shifted over by one column (optional size would be 4th rather than 3rd field, etc.). If **-S** is not set, then **psxy** expects the user to supply a multisegment file where each segment header contains a **-Zval** string. The *val* will control the color of the line or polygon (if **-L** is set) via the CPT.

-D*dx/dy*

Offset the plot symbol or line locations by the given amounts *dx/dy* [Default is no offset]. If *dy* is not given it is set equal to *dx*.

-E[*x|y|X|Y*][**+a**][**+cl**][**f**][**+n**][**+wcap**][**+ppen**]

Draw symmetrical error bars. Append **x** and/or **y** to indicate which bars you want to draw (Default is both *x* and *y*). The *x* and/or *y* errors must be stored in the columns after the (*x,y*) pair [or (*x,y,z*) triplet]. If **+a** is appended then we will draw asymmetrical error bars; these requires two rather than one extra data column, with the low and high value. If upper case **X** and/or **Y** are used we will instead draw “box-and-whisker” (or “stem-and-leaf”) symbols. The *x* (or *y*) coordinate is then taken as the median value, and four more

columns are expected to contain the minimum (0% quantile), the 25% quantile, the 75% quantile, and the maximum (100% quantile) values. The 25-75% box may be filled by using **-G**. If **+n** is appended then we draw a notched “box-and-whisker” symbol where the notch width reflects the uncertainty in the median. This symbol requires a 5th extra data column to contain the number of points in the distribution. The **+w** modifier sets the *cap* width that indicates the length of the end-cap on the error bars [7p]. Pen attributes for error bars may also be set via **+ppen**. [Defaults: width = default, color = black, style = solid]. When **-C** is used we can control how the look-up color is applied to our symbol. Append **+cf** to use it to fill the symbol, while **+cl** will just set the error pen color and turn off symbol fill. Giving **+c** will set both color items.

-F[c|n|r][a|f|s|r]refpoint]

Alter the way points are connected (by specifying a *scheme*) and data are grouped (by specifying a *method*). Append one of three line connection schemes: **c**: Draw continuous line segments for each group [Default]. **r**: Draw line segments from a reference point reset for each group. **n**: Draw networks of line segments between all points in each group. Optionally, append the one of four segmentation methods to define the group: **a**: Ignore all segment headers, i.e., let all points belong to a single group, and set group reference point to the very first point of the first file. **f**: Consider all data in each file to be a single separate group and reset the group reference point to the first point of each group. **s**: Segment headers are honored so each segment is a group; the group reference point is reset to the first point of each incoming segment [Default]. **r**: Same as **s**, but the group reference point is reset after each record to the previous point (this method is only available with the **-Fr** scheme). Instead of the codes **a|f|s|r** you may append the coordinates of a *refpoint* which will serve as a fixed external reference point for all groups.

-Gfill

Select color or pattern for filling of symbols or polygons [Default is no fill]. Note that **psxy** will search for **-G** and **-W** strings in all the segment headers and let any values thus found over-ride the command line settings.

-lintens

Use the supplied *intens* value (nominally in the -1 to + 1 range) to modulate the fill color by simulating illumination [none].

-K (more ...)

Do not finalize the PostScript plot.

-L[+b|d|D][+xl|r|x0][+yl|t|y0][+ppen] Example

Force closed polygons. Alternatively, append modifiers to build a polygon from a line segment. Append **+d** to build symmetrical envelope around $y(x)$ using deviations $dy(x)$ given in extra column 3. Append **+D** to build asymmetrical envelope around $y(x)$ using deviations $dy1(x)$ and $dy2(x)$ from extra columns 3-4. Append **+b** to build asymmetrical envelope around $y(x)$ using bounds $yl(x)$ and $yh(x)$ from extra columns 3-4. Append **+xl|r|x0** to connect first and last point to anchor points at either $xmin$, $xmax$, or $x0$, or append **+yb|t|y0** to connect first and last point to anchor points at either $ymin$, $ymax$, or $y0$. Polygon may be painted (**-G**) and optionally outlined by adding **+ppen** [no outline].

-N[c|r]

Do NOT clip symbols that fall outside map border [Default plots points whose coordinates are strictly inside the map border only]. The option does not apply to lines and polygons which are always clipped to the map region. For periodic (360-longitude) maps we must plot all symbols twice in case they are clipped by the repeating boundary. The **-N** will turn off clipping and not plot repeating symbols. Use **-Nr** to turn off clipping but retain the plotting of such repeating symbols, or use **-Nc** to retain clipping but turn off plotting of repeating symbols.

-O (more ...)

Append to existing PostScript plot.

-P (more ...)

Select "Portrait" plot orientation.

-S[symbol][size[u]]

Plot symbols (including vectors, pie slices, fronts, decorated or quoted lines). If present, *size* is symbol size in the unit set in `gmt.conf` (unless **c**, **i**, or **p** is appended). If the symbol code (see below) is not given it will be read from the last column in the input data; this cannot be used in conjunction with binary input. Optionally, append **c**, **i**, or **p** to indicate that the size information in the input data is in units of cm, inch, or point, respectively [Default is `PROJ_LENGTH_UNIT`]. Note: if you provide *both* size and symbol via the input file you must use `PROJ_LENGTH_UNIT` to indicate the unit used for the symbol size or append the units to the sizes in the file. If symbol sizes are expected via the third data column then you may convert those values to suitable symbol sizes via the **-i** mechanism.

The uppercase symbols **A**, **C**, **D**, **G**, **H**, **I**, **N**, **S**, **T** are normalized to have the same area as a circle with diameter *size*, while the size of the corresponding lowercase symbols refers to the diameter of a circumscribed circle.

You can change symbols by adding the required **-S** option to any of your multisegment headers.

Choose between these symbol codes:

-S-

x-dash (-). *size* is the length of a short horizontal (x-dir) line segment.

-S+

plus (+). *size* is diameter of circumscribing circle.

-Sa

star. *size* is diameter of circumscribing circle.

-Sb[*size*[*c*|*i*|*p*|*u*]][*b*[*base*]]

Vertical **bar** extending from *base* to *y*. *size* is bar width. Append **u** if *size* is in x-units [Default is plot-distance units]. By default, *base* = *ymin*. Append **b**[*base*] to change this value. If *base* is not appended then we read it from the last input data column.

-SB[*size*[*c*|*i*|*p*|*u*]][*b*[*base*]]

Horizontal **bar** extending from *base* to *x*. *size* is bar width. Append **u** if *size* is in y-units [Default is plot-distance units]. By default, *base* = *xmin*. Append **b**[*base*] to change this value. If *base* is not appended then we read it from the last input data column.

-Sc

circle. *size* is diameter of circle.

-Sd

diamond. *size* is diameter of circumscribing circle.

-Se

ellipse. Direction (in degrees counter-clockwise from horizontal), *major_axis*, and *minor_axis* must be found in columns 3, 4, and 5.

-SE

Same as **-Se**, except azimuth (in degrees east of north) should be given instead of direction. The azimuth will be mapped into an angle based on the chosen map projection (**-Se** leaves the directions unchanged.) Furthermore, the axes lengths must be given in geographical instead of plot-distance units. An exception occurs for a linear projection in which we assume the ellipse axes are given in the same units as **-R**. For degenerate ellipses (circles) with just the diameter given, use **-SE-**. The diameter is excepted to be given in column 3. Alternatively, append the desired diameter to **-SE-** and this fixed diameter is used instead. For allowable geographical units, see UNITS.

-Sfgap[/*size*][**+l**]**+r**][**+b+c+f+s+t**][**+offset**][**+p**[*pen*]].

Draw a front. Supply distance *gap* between symbols and symbol *size*. If *gap* is negative, it is interpreted to mean the number of symbols along the front instead. If *size* is missing it is set to 30% of the *gap*, except when *gap* is negative and *size* is thus required. Append **+l** or **+r** to plot symbols on the left or right side of the front [Default is centered]. Append **+type** to specify which symbol to plot: **box**, **circle**, **fault**, **slip**, or **triangle**. [Default is **fault**]. Slip means left-lateral or right-lateral strike-slip arrows (centered is not an option). The **+s** modifier optionally accepts the angle used to draw the vector [20]. Alternatively, use **+S** which draws arcuate arrow heads. Append **+offset** to offset the first symbol from the beginning of the front by that amount [0]. The chosen symbol is drawn with the same pen as set for the line (i.e., via **-W**). To use an alternate pen, append **+ppen**. To skip the outline, just use **+p**. Note: By placing **-Sf** options in the segment header you can change the front types on a segment-by-segment basis.

-Sg

octagon. *size* is diameter of circumscribing circle.

-Sh

hexagon. *size* is diameter of circumscribing circle.

-Si

inverted triangle. *size* is diameter of circumscribing circle.

-Sj

Rotated rectangle. Direction (in degrees counter-clockwise from horizontal), x-dimension, and y-dimension must be found in columns 3, 4, and 5.

-SJ

Same as **-Sj**, except azimuth (in degrees east of north) should be given instead of direction. The azimuth will be mapped into an angle based on the chosen map projection (**-Sj** leaves the directions unchanged.) Furthermore, the dimensions must be given in geographical instead of plot-distance units. For a degenerate rectangle (square) with one dimension given, use **-SJ-**. The dimension is expected to be given in column 3. Alternatively, append the dimension diameter to **-SJ-** and this fixed dimension is used instead. An exception occurs for a linear projection in which we assume the dimensions are given in the same units as **-R**. For allowable geographical units, see UNITS.

-Sk

kustom symbol. Append *name/size*, and we will look for a definition file called *name.def* in (1) the current directory or (2) in *~/gmt* or (3) in **\$GMT_SHAREDIR/custom**. The symbol as defined in that file is of size 1.0 by default; the appended *size* will scale symbol accordingly. Users may add their own custom *.def files; see CUSTOM SYMBOLS below.

-Sl

letter or text string (less than 256 characters). Give size, and append **+tstring** after the size. Note that the size is only approximate; no individual scaling is done for different characters. Remember to escape special characters like *. Optionally, you may append **+ffont** to select a particular font [Default is `FONT_ANNOT_PRIMARY`] and **+jjustify** to change justification [CM].

-Sm

math angle arc, optionally with one or two arrow heads [Default is no arrow heads]. The *size* is the length of the vector head. Arc width is set by **-W**. The radius of the arc and its start and stop directions (in degrees counter-clockwise from horizontal) must be given in columns 3-5. See VECTOR ATTRIBUTES for specifying other attributes.

-SM

Same as **-Sm** but switches to straight angle symbol if angles subtend 90 degrees exactly.

-Sn

pentagon. *size* is diameter of circumscribing circle.

-Sp

point. No size needs to be specified (1 pixel is used).

-Sq

quoted line, i.e., lines with annotations such as contours. Append `[d|D|f|l|L|n|N|s|S|x|X]info[:labelinfo]`. The required argument controls the placement of labels along the quoted lines. Choose among six controlling algorithms:

ddist[c|i|p] or Ddist[d|e|f|k|m|M|n|s]

For lower case **d**, give distances between labels on the plot in your preferred measurement unit **c** (cm), **i** (inch), or **p** (points), while for upper case **D**, specify distances in map units and append the unit; choose among **e** (m), **f** (foot), **k** (km), **M** (mile), **n** (nautical mile) or **u** (US survey foot), and **d** (arc degree), **m** (arc minute), or **s** (arc second). [Default is 10**c** or 4**i**]. As an option, you can append *fraction* which is used to place the very first label for each contour when the cumulative along-contour distance equals *fraction* * *dist* [0.25].

ffile.d

Reads the ASCII file *ffile.d* and places labels at locations in the file that matches locations along the quoted lines. Inexact matches and points outside the region are skipped.

l|Lline1[,line2,...]

Give the coordinates of the end points for one or more comma-separated straight line segments. Labels will be placed where these

lines intersect the quoted lines. The format of each *line* specification is *start_lon/start_lat/stop_lon/stop_lat*. Both *start_lon/start_lat* and *stop_lon/stop_lat* can be replaced by a 2-character key that uses the justification format employed in **pstext** to indicate a point on the frame or center of the map, given as [LCR][BMT]. **L** will interpret the point pairs as defining great circles [Default is straight line].

n|N*n_label*

Specifies the number of equidistant labels for quoted lines [1]. Upper case **N** starts labeling exactly at the start of the line [Default centers them along the line]. **N-1** places one justified label at start, while **N+1** places one justified label at the end of quoted lines. Optionally, append */min_dist*[**c|i|p**] to enforce that a minimum distance separation between successive labels is enforced.

s|S*n_label*

Same as **n|N***n_label* but implies that the input data are first to be converted into a series of 2-point line segments before plotting.

x|X*xfile.d*

Reads the multisegment file *xfile.d* and places labels at the intersections between the quoted lines and the lines in *xfile.d*. **X** will resample the lines first along great-circle arcs. In addition, you may optionally append **+rradius**[**c|i|p**] to set a minimum label separation in the x-y plane [no limitation].

The optional *labelinfo* controls the specifics of the label formatting and consists of a concatenated string made up of any of the following control arguments:

+a*angle*

For annotations at a fixed angle, **+an** for line-normal, or **+ap** for line-parallel [Default].

+c*dx[/dy]*

Sets the clearance between label and optional text box. Append **c|i|p** to specify the unit or % to indicate a percentage of the label font size [15%].

+d

Turns on debug which will draw helper points and lines to illustrate the workings of the quoted line setup.

+e

Delay the plotting of the text. This is used to build a clip path based

on the text, then lay down other overlays while that clip path is in effect, then turning of clipping with `psclip -Cs` which finally plots the original text.

+ffont

Sets the desired font [Default `FONT_ANNOT_PRIMARY` with its size changed to 9p].

+g[*color*]

Selects opaque text boxes [Default is transparent]; optionally specify the color [Default is `PS_PAGE_COLOR`].

+jjust

Sets label justification [Default is MC]. Ignored when `-SqN|n+|-1` is used.

+l*label*

Sets the constant label text.

+L*flag*

Sets the label text according to the specified flag:

+Lh Take the label from the current segment header (first scan for an embedded `-Llabel` option, if not use the first word following the segment flag). For multiple-word labels, enclose entire label in double quotes. **+Ld** Take the Cartesian plot distances along the line as the label; append `c|i|p` as the unit [Default is `PROJ_LENGTH_UNIT`]. **+LD** Calculate actual map distances; append `d|e|f|k|n|M|n|s` as the unit [Default is `d`(egrees), unless label placement was based on map distances along the lines in which case we use the same unit specified for that algorithm]. Requires a map projection to be used. **+Lf** Use text after the 2nd column in the fixed label location file as the label. Requires the fixed label location setting. **+Lx** As **+Lh** but use the headers in the `xfile.d` instead. Requires the crossing file option.

+ndx[/*dy*]

Nudges the placement of labels by the specified amount (append `c|i|p` to specify the units). Increments are considered in the coordinate system defined by the orientation of the line; use **+N** to force increments in the plot x/y coordinates system [no nudging]. Not allowed with **+v**.

+o

Selects rounded rectangular text box [Default is rectangular]. Not applicable for curved text (**+v**) and only makes sense for opaque

text boxes.

+p[pen]

Draws the outline of text boxes [Default is no outline]; optionally specify pen for outline [Default is width = 0.25p, color = black, style = solid].

+rmin_rad

Will not place labels where the line's radius of curvature is less than *min_rad* [Default is 0].

+t[file]

Saves line label x, y, and text to *file* [Line_labels.txt]. Use **+T** to save x, y, angle, text instead.

+uunit

Appends *unit* to all line labels. If *unit* starts with a leading hyphen (-) then there will be no space between label value and the unit. [Default is no unit].

+v

Specifies curved labels following the path [Default is straight labels].

+w

Specifies how many (x,y) points will be used to estimate label angles [Default is 10].

+x[first,last]

Append the suffices *first* and *last* to the corresponding labels. This modifier is only available when **-SqN2** is in effect. Used to annotate the start and end of a line (e.g., a cross-section), append two text strings separated by comma [Default just adds a prime to the second label].

+prefix

Prepends *prefix* to all line labels. If *prefix* starts with a leading hyphen (-) then there will be no space between label value and the prefix. [Default is no prefix].

Note: By placing **-Sq** options in the segment header you can change the quoted text attributes on a segment-by-segment basis.

-Sr

rectangle. No size needs to be specified, but the x- and y-dimensions must be found in columns 3 and 4.

-SR

Rounded rectangle. No size needs to be specified, but the x- and y-dimensions and corner radius must be found in columns 3, 4, and 5.

-Ss

square. *size* is diameter of circumscribing circle.

-St

triangle. *size* is diameter of circumscribing circle.

-Sv

vector. Direction (in degrees counter-clockwise from horizontal) and length must be found in columns 3 and 4, and *size*, if not specified on the command-line, should be present in column 5. The *size* is the length of the vector head. Vector width is set by **-W**. See VECTOR ATTRIBUTES for specifying other attributes.

-SV

Same as **-Sv**, except azimuth (in degrees east of north) should be given instead of direction. The azimuth will be mapped into an angle based on the chosen map projection (**-Sv** leaves the directions unchanged.) See VECTOR ATTRIBUTES for specifying other attributes.

-Sw

pie wedge. Start and stop directions (in degrees counter-clockwise from horizontal) for pie slice must be found in columns 3 and 4. Append **+a** to just draw the arc line or **+r** to just draw the radial lines.

-SW

Same as **-Sw**, except azimuths (in degrees east of north) should be given instead of the two directions. The azimuths will be mapped into angles based on the chosen map projection (**-Sw** leaves the directions unchanged.) For geo-wedges, specify *size* as a radial geographical distance. For allowable geographical units, see UNITS. Append **+a** to just draw the arc or **+r** to just draw the radial lines.

-Sx

cross (x). *size* is diameter of circumscribing circle.

-Sy

y-dash (|). *size* is the length of a short vertical (y-dir) line segment.

-S=

geovector. Azimuth (in degrees east from north) and geographical length must be found in columns 3 and 4. The *size* is the length of the vector head. Vector width is set by **-W**. See VECTOR ATTRIBUTES for specifying attributes. Note: Geovector stems are drawn as thin filled polygons and hence pen attributes like dashed and dotted are not available. For allowable geographical units, see UNITS.

-S~

decorated line, i.e., lines with symbols along them. Append **[d|D|f|i|L|n|N|s|S|x|X]info[:symbolinfo]**. The required argument controls the placement of symbols along the decorated lines. Choose among six controlling algorithms:

ddist[c|i|p] or Ddist[d|e|f|k|m|M|n|s]

For lower case **d**, give distances between symbols on the plot in your preferred measurement unit **c** (cm), **i** (inch), or **p** (points), while for upper case **D**, specify distances in map units and append the unit; choose among **e** (m), **f** (foot), **k** (km), **M** (mile), **n** (nautical mile) or **u** (US survey foot), and **d** (arc degree), **m** (arc minute), or **s** (arc second). [Default is 10**c** or 4**i**]. As an option, you can append */fraction* which is used to place the very first symbol for each line when the cumulative along-line distance equals *fraction * dist* [0.25].

ffile.d

Reads the ASCII file *ffile.d* and places symbols at locations in the file that matches locations along the decorated lines. Inexact matches and points outside the region are skipped.

I|Lline1[,line2,...]

Give the coordinates of the end points for one or more comma-separated straight line segments. Symbols will be placed where these lines intersect the decorated lines. The format of each *line* specification is *start_lon/start_lat/stop_lon/stop_lat*. Both *start_lon/start_lat* and *stop_lon/stop_lat* can be replaced by a 2-character key that uses the justification format employed in **pstext** to indicate a point on the frame or center of the map, given as [LCR][BMT]. **L** will interpret the point pairs as defining great circles [Default is straight line].

n|Nn_symbol

Specifies the number of equidistant symbols for decorated lines [1]. Upper case **N** starts placing symbols exactly at the start of the line [Default centers them along the line]. **N-1** places one symbol at start, while **N+1** places one symbol at the end of decorated lines. Optionally, append */min_dist[c|i|p]* to enforce that a minimum distance separation between successive symbols is enforced.

s|Sn_symbol

Same as **n|Nn_symbol** but implies that the input data are first to be converted into a series of 2-point line segments before plotting.

x|Xxfile.d

Reads the multisegment file *xfile.d* and places symbols at the intersections between the decorated lines and the lines in *xfile.d*. **X** will resample the lines first along great-circle arcs.

The optional *symbolinfo* controls the specifics of the symbol selection and formatting and consists of a concatenated string made up of any of the following control arguments:

+a*angle*

For symbols at a fixed angle, **+an** for line-normal, or **+ap** for line-parallel [Default].

+d

Turns on debug which will draw helper points and lines to illustrate the workings of the decorated line setup.

+g[*fill*]

Sets the symbol fill [no fill].

+ndx[/*dy*]

Nudges the placement of symbols by the specified amount (append **c|i|p** to specify the units). Increments are considered in the coordinate system defined by the orientation of the line; use **+N** to force increments in the plot x/y coordinates system [no nudging].

+p[*pen*]

Draws the outline of symbols [Default is no outline]; optionally specify pen for outline [Default is width = 0.25p, color = black, style = solid].

+s<symbol><size>

Specifies the code and size of the decorative symbol.

+w

Specifies how many (x,y) points will be used to estimate symbol angles [Default is 10].

Note: By placing **-S~** options in the segment header you can change the decorated lines on a segment-by-segment basis.

-T

Ignore all input files, including standard input. This is the same as specifying /dev/null (or NUL for Windows users) as input file. Use this to activate only the options that are

not related to plotting of lines or symbols, such as **psxy -R -J -O -T** to terminate a sequence of GMT plotting commands without producing any plotting output.

-U*[[just]/dx/dy][c|label]* ([more ...](#))

Draw GMT time stamp logo on plot.

-V*[level]* ([more ...](#))

Select verbosity level *[c]*.

-W*[pen][attr]* ([more ...](#))

Set pen attributes for lines or the outline of symbols [Defaults: width = default, color = black, style = solid]. If the modifier **+cl** is appended then the color of the line are taken from the CPT (see **-C**). If instead modifier **+cf** is appended then the color from the cpt file is applied to symbol fill. Use just **+c** for both effects. You can also append one or more additional line attribute modifiers: **+offsetu** will start and stop drawing the line the given distance offsets from the end point. Append unit **u** from **c|l|p** to indicate plot distance on the map or append map distance units instead (see below) [Cartesian distances]; **+s** will draw the line using a *PostScript* Bezier spline [linear spline]; **+vvspecs** will place a vector head at the ends of the lines. You can use **+vb** and **+ve** to specify separate vector specs at each end [shared specs]. Because **+v** may take additional modifiers it must necessarily be given at the end of the pen specification. See the [Vector Attributes](#) for more information.

-X*[a|c|f|r][x-shift[u]]*

-Y*[a|c|f|r][y-shift[u]]* ([more ...](#))

Shift plot origin.

-bi*[ncols][t]* ([more ...](#))

Select native binary input. [Default is the required number of columns given the chosen settings].

-acol=*name***[...]** ([more ...](#))

Set aspatial column associations *col=name*.

-dinodata ([more ...](#))

Replace input columns that equal *nodata* with NaN.

-e[~]"pattern" | -e[~]/regexp/[i] ([more ...](#))

Only accept data records that match the given pattern.

-f[i|o]colinfo ([more ...](#))

Specify data types of input and/or output columns.

-g[a|x|y|d|X|Y|D][col/z[+|-]gap[u] ([more ...](#))

Determine data gaps and line breaks. The **-g** option is ignored if **-S** is set.

-h[i|o][n][+c][+d][+rremark][+rtitle] ([more ...](#))

Skip or produce header record(s).

-ico/s[+i][+sscale][+offset[,...]] ([more ...](#))

Select input columns and transformations (0 is first column).

-:[i|o] ([more ...](#))

Swap 1st and 2nd column on input and/or output.

-p[x|y|z]azim[/elev[/zlevel]][+wlon0/lat0/z0][+vx0/y0] ([more ...](#))

Select perspective view.

-t[transp] ([more ...](#))

Set PDF transparency level in percent.

-^ or just **-**

Print a short message about the syntax of the command, then exits (NOTE: on Windows just use **-**).

-+ or just **+**

Print an extensive usage (help) message, including the explanation of any module-specific option (but not the GMT common options), then exits.

-? or no arguments

Print a complete usage (help) message, including the explanation of all options, then exits.

Units

For map distance unit, append *unit* **d** for arc degree, **m** for arc minute, and **s** for arc second, or **e** for meter [Default], **f** for foot, **k** for km, **M** for statute mile, **n** for nautical mile, and **u** for US survey foot. By default we compute such distances using a spherical approximation with great circles. Prepend **-** to a distance (or the unit is no distance is given) to perform “Flat Earth” calculations (quicker but less accurate) or prepend **+** to perform exact geodesic calculations (slower but more accurate).

Vector Attributes

Several modifiers may be appended to the vector-producing options to specify the placement of vector heads, their shapes, and the justification of the vector. Below, left and right refers to the side of the vector line when viewed from the start point to the end point of the segment:

+aangle sets the angle of the vector head apex [30].

+b places a vector head at the beginning of the vector path [none]. Optionally, append **t** for a terminal line, **c** for a circle, **a** for arrow [Default], **i** for tail, **A** for plain arrow, and **I** for plain tail. Further append **l|r** to only draw the left or right side of this head [both sides].

+e places a vector head at the end of the vector path [none]. Optionally, append **t** for a terminal line, **c** for a circle, **a** for arrow [Default], **i** for tail, **A** for plain arrow, and **I** for plain tail. Further append **l|r** to only draw the left or right side of this head [both sides].

+g-|fill turns off vector head fill (if **-**) or sets the vector head fill [Default fill is used, which may be no fill].

+hshape sets the shape of the vector head (range $-2/2$). Default is controlled by `MAP_VECTOR_SHAPE` [0].

+l draws half-arrows, using only the left side of specified heads [both sides].

+m places a vector head at the mid-point the vector path [none]. Append **f** or **r** for forward or reverse direction of the vector [forward]. Optionally, append **t** for a terminal line, **c** for a circle, or **a** for arrow head [Default]. Further append **l|r** to only draw the left or right side of this head [both sides]. Cannot be combined with **+b** or **+e**.

+norm scales down vector attributes (pen thickness, head size) with decreasing length, where vectors shorter than *norm* will have their attributes scaled by $\text{length}/\text{norm}$ [arrow attributes remains invariant to length].

+oplon/plat specifies the oblique pole for the great or small circles. Only needed for great circles if **+q** is given.

+p[-][pen] sets the vector pen attributes. If *pen* has a leading - then the head outline is not drawn. [Default pen is used, and head outline is drawn]

+q means the input *angle*, *length* data instead represent the *start* and *stop* opening angles of the arc segment relative to the given point.

+r draws half-arrows, using only the right side of specified heads [both sides].

+t[b|e]trim will shift the beginning or end point (or both) along the vector segment by the given *trim*; append suitable unit. If the modifiers **b|e** are not used then *trim* may be two values separated by a slash, which is used to specify different trims for the two ends. Positive trims will shorten the vector while negative trims will lengthen it [no trim].

In addition, all but circular vectors may take these modifiers:

+jjust determines how the input *x,y* point relates to the vector. Choose from **beginning** [default], **end**, or **center**.

+s means the input *angle*, *length* are instead the *x*, *y* coordinates of the vector end point.

Finally, Cartesian vectors may take these modifiers:

+zscale[unit] expects input *dx,dy* vector components and uses the *scale* to convert to polar coordinates with length in given unit.

Examples

To plot solid red circles (diameter = 0.2 cm) at the positions listed in the file DSDP.txt on a Mercator map at 0.3 cm/degree of the area 100E to 160E, 20S to 30N, with automatic tick-marks and gridlines, use

```
gmt psxy DSDP.txt -R100/160/-20/30 -Jm0.3c -Sc0.2c -Gred -B
```

To plot the xyz values in the file quakes.xyzm as circles with size given by the magnitude in the 4th column and color based on the depth in the third using the CPT rgb.cpt on a linear map, use

```
gmt psxy quakes.xyzm -R0/1000/0/1000 -JX6i -Sc -Crgb -B200
```

To plot the file trench.txt on a Mercator map, with white triangles with sides 0.25 inch on the left side of the line, spaced every 0.8 inch, use

```
gmt psxy trench.txt -R150/200/20/50 -Jm0.15i -Sf0.8i/0.1i+l
```

To plot the data in the file `misc.d` as symbols determined by the code in the last column, and with size given by the magnitude in the 4th column, and color based on the third column via the CPT `chrome` on a linear map, use

```
gmt psxy misc.d -R0/100/-50/100 -JX6i -S -Cchrome -B20 > ma
```

If you need to place vectors on a plot you can choose among straight Cartesian vectors, math circular vectors, or geo-vectors (these form small or great circles on the Earth). These can have optional heads at either end, and heads may be the traditional arrow, a circle, or a terminal cross-line. To place a few vectors with a circle at the start location and an arrow head at the end, try

```
gmt psxy -R0/50/-50/50 -JX6i -Sv0.15i+bc+ea -Gyellow -W0.5p
10 10 45 2i
30 -20 0 1.5i
EOF
```

To plot vectors (red vector heads, solid stem) from the file `data.txt` that contains record of the form `lon, lat, dx, dy`, where `dx, dy` are the Cartesian vector components given in user units, and these user units should be converted to cm given the scale 3.60, try

```
gmt psxy -R20/40/-20/0 -JM6i -Sv0.15i+e+z3.6c -Gred -W0.25p
```

Segment Header Parsing

Segment header records may contain one or more of the following options:

-Gfill

Use the new *fill* and turn filling on

-G-

Turn filling off

-G

Revert to default fill (none if not set on command line)

-Wpen

Use the new *pen* and turn outline on

-W

Revert to default pen `MAP_DEFAULT_PEN` (if not set on command line)

-W-

Turn outline off

-Zzval

Obtain fill via cpt lookup using z-value *zval*

-ZNaN

Get the NaN color from the CPT

Custom Symbols

psxy allows users to define and plot their own custom symbols. This is done by encoding the symbol using our custom symbol macro code described in Appendix N. Put all the macro codes for your new symbol in a file whose extension must be `.def`; you may then address the symbol without giving the extension (e.g., the symbol file `tsunami.def` is used by specifying **-S*tsunami*/size**. The definition file can contain any number of plot code records, as well as blank lines and comment lines (starting with `#`). **psxy** will look for the definition files in (1) the current directory, (2) the `~/gmt` directory, and (3) the `$GMT_SHAREDIR/custom` directory, in that order. Freeform polygons (made up of straight line segments and arcs of circles) can be designed - these polygons can be painted and filled with a pattern. Other standard geometric symbols can also be used. See Appendix [Custom Plot Symbols](#) for macro definitions.

Polar Caps

psxy will automatically determine if a closed polygon is containing a geographic pole, i.e., being a polar cap. Such polygons requires special treatment under the hood to ensure proper filling. Many tools such as GIS packages are unable to handle polygons covering a pole and some cannot handle polygons crossing the Dateline. They work around this problem by splitting polygons into a west and east polygon or inserting artificial helper lines that makes a cut into the pole and back. Such doctored polygons may be misrepresented in GMT.

See Also

[gmt](#), [gmt.conf](#), [gmtcolors](#), [psbasemap](#), [psxyz](#)