

makecpt

makecpt - Make GMT color palette tables

Synopsis

```
makecpt [ -A[+]transparency ] [ -Ccpt ] [ -D[i|o] ] [ -E[nlevels] ] [ -F[R|r|h|c ][+c] ] [ -Gzlo/zhi ] [
-l[c][z] ] [ -M ] [ -N ] [ -Q[i|o] ] [ -Tz_min/z_max[/z_inc[+]] | -Tztable | -Tz1,z2,...,zn ] [ -V[level]
] [ -W[w] ] [ -Z ] [ -bibinary ] [ -dinodata ] [ -iflags ]
```

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

Description

makecpt is a utility that will help you make static color palette tables (CPTs). You define an equidistant set of contour intervals or pass your own z-table or list, and create a new CPT based on an existing master (dynamic) CPT. The resulting CPT can be reversed relative to the master cpt, and can be made continuous or discrete. For color tables beyond the standard GMT offerings, visit `cpt-city`: <http://soliton.vm.bytemark.co.uk/pub/cpt-city/>.

The CPT includes three additional colors beyond the range of z-values. These are the background color (B) assigned to values lower than the lowest z-value, the foreground color (F) assigned to values higher than the highest z-value, and the NaN color (N) painted wherever values are undefined.

If the master CPT includes B, F, and N entries, these will be copied into the new master file. If not, the parameters `COLOR_BACKGROUND`, `COLOR_FOREGROUND`, and `COLOR_NAN` from the `gmt.conf` file or the command line will be used. This default behavior can be overruled using the options **-D**, **-M** or **-N**.

The color model (RGB, HSV or CMYK) of the palette created by **makecpt** will be the same as specified in the header of the master CPT. When there is no `COLOR_MODEL` entry in the master CPT, the `COLOR_MODEL` specified in the `gmt.conf` file or on the command line will be used.

Required Arguments

None.

Optional Arguments

-A[+]*transparency*

Sets a constant level of transparency (0-100) for all color slices. Prepend **+** to also affect the fore-, back-, and nan-colors [Default is no transparency, i.e., 0 (opaque)].

-C*cpt*

Selects the master color table CPT to use in the interpolation. Choose among the built-in tables (type **makecpt** to see the list) or give the name of an existing CPT [Default gives a rainbow CPT]. Yet another option is to specify **-Ccolor1,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).

-D[i|o]

Select the back- and foreground colors to match the colors for lowest and highest z-values in the output CPT [Default uses the colors specified in the master file, or those defined by the parameters COLOR_BACKGROUND, COLOR_FOREGROUND, and COLOR_NAN]. Append **i** to match the colors for the lowest and highest values in the input (instead of the output) CPT.

-E[*nlevels*]

Implies reading data table(s) from given command-line files or standard input. We use the last data column to determine the data range; use **-i** to select another column, and use **-bi** if your data table is native binary. This z-range information is used instead of providing the **-T** option. We create a linear color table by dividing the table data z-range into *nlevels* equidistant slices. If *nlevels* is not given it defaults to the number of levels in the chosen CPT.

-F[R**|*r*|**h**|**c**][**+c**]**

Force output CPT to written with r/g/b codes, gray-scale values or color name (**R**, default) or r/g/b codes only (**r**), or h-s-v codes (**h**), or c/m/y/k codes (**c**). Optionally or alternatively, append **+c** to write discrete palettes in categorical format.

-G*zlo/zhi*

Truncate the incoming CPT so that the lowest and highest z-levels are to *zlo* and *zhi*. If one of these equal NaN then we leave that end of the CPT alone. The truncation takes place before any resampling. See also Manipulating CPTs

-I[c**][**z**]**

Append **c** [Default] to reverse the sense of color progression in the master CPT. Also exchanges the foreground and background colors, including those specified by the parameters `COLOR_BACKGROUND` and `COLOR_FOREGROUND`. Append **z** to reverse the sign of z-values in the color table. Note that this change of z-direction happens before **-G** and **-T** values are used so the latter must be compatible with the changed z-range. See also [Manipulating CPTs](#)

-M

Overrule background, foreground, and NaN colors specified in the master CPT with the values of the parameters `COLOR_BACKGROUND`, `COLOR_FOREGROUND`, and `COLOR_NAN` specified in the `gmt.conf` file or on the command line. When combined with **-D**, only `COLOR_NAN` is considered.

-N

Do not write out the background, foreground, and NaN-color fields [Default will write them].

-Q[i|o]

Selects a logarithmic interpolation scheme [Default is linear]. **-Qi** expects input z-values to be $\log_{10}(z)$, assigns colors, and writes out z [Default]. **-Qo** takes $\log_{10}(z)$ first, assigns colors, and writes out z.

-Tz_min/z_max[/z_inc[+]] | -Tztable | -Tz1,z2,...,zn

Defines the range of the new CPT by giving the lowest and highest z-value and interval. Append `/z_inc` to sample the input CPT discretely at intervals `z_inc` between `z_min` and `z_max`; append a trailing **+** to interpret `z_inc` as the number of desired intervals instead. Alternatively, give the name of a ASCII file that has one z-value per record, or provide a list of comma-separated z-values instead. If **-T** is not given, the existing range in the master CPT will be used intact.

-V[level] (more ...)

Select verbosity level [c].

-W[w]

Do not interpolate the input color table but pick the output colors starting at the beginning of the color table, until colors for all intervals are assigned. This is particularly useful in combination with a categorical color table, like “categorical”. Cannot be used in

combination with **-Z**. Alternatively, use **-Ww** to produce a wrapped (cyclic) color table that endlessly repeats its range.

-Z

Creates a continuous CPT [Default is discontinuous, i.e., constant colors for each interval]. This option has no effect when no **-T** is used, or when using **-Tz_min/z_max**; in the first case the input CPT remains untouched, in the second case it is only scaled to match the range *z_min/z_max*.

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

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

-dinodata (more ...)

Replace input columns that equal *nodata* with NaN.

-icol[*+i*][*+sscale*][*+offset*][,...] (more ...)

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

-^ 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.

Notes on Transparency

The *PostScript* language originally had no accommodation for transparency. However, Adobe added an extension that allows developers to encode some forms of transparency using the *PostScript* language model but it is only realized when converting the *PostScript* to PDF (and via PDF to any raster image format). GMT uses this model but there are some limitations: Transparency can only be controlled on a per-object or per-layer basis. This

means that a color specifications (such as those in CPTs of given via command-line options) only apply to vector graphic items (i.e., text, lines, polygon fills) or to an entire layer (which could include items such as *PostScript* images). This limitation rules out any mechanism of controlling transparency in such images on a pixel level.

Color Hinges

Some of the GMT master dynamic CPTs are actually two separate CPTs meeting at a *hinge*. Usually, colors may change dramatically across the hinge, which is used to separate two different domains (e.g., land and ocean across the shoreline, for instance). CPTs with a hinge will have their two parts stretched to the required range separately, i.e., the bottom part up to the hinge will be stretched independently of the part from the hinge to the top, according to the prescribed new range. If the selected range does not include the hinge then no such partitioning takes place.

Color Aliasing

For best result when **-T -Z** is used we recommend you do not append a specific *z_inc*. This way the original CPT is used exactly as is but the *z* boundaries are adjusted to match the stated limits. Otherwise you may, depending on the nature of the input CPT, miss aspects of the color changes by aliasing the signal.

Examples

To make a CPT with *z*-values from -200 to 200, with discrete color changes every 25, and using a polar blue-white-red colortable:

```
gmt makecpt -Cpolar -T-200/200/25 > colors.cpt
```

To make an equidistant CPT from *z* = -2 to 6 using the continuous default rainbow of colors:

```
gmt makecpt -T-2/6 -Z > rainbow.cpt
```

To use the GEBCO look-alike CPT with its default range for bathymetry, run

```
gmt makecpt -Cgebco > my_gebco.cpt
```

or simply use **-Cgebco** directly in the application that needs the color table. To create a 24-level rainbow color table suitable for plotting the depths in the data table *depths.txt* (with lon, lat, depths), run

```
gmt makecpt -Cgebco depths.txt -i2 -Z -E24 > my_depths.cpt
```

To use the gebco color table but reverse the z-values so it can be used for positive depth values, try

```
gmt makecpt -Cgebco -Iz > my_positive_gebco.cpt
```

To create a 24-level rainbow color table suitable for plotting the depths in the data table depths.txt (with lon, lat, depths), run

To make a custom discrete color table for depth of seismicity, using red color for hypocenters between 0 and 100 km, green for 100-300 km, and blue for deep (300-1000 km) earthquakes, use

```
gmt makecpt -Cred,green,blue -T0,80,300,1000 -N > seis.cpt
```

To make a continuous CPT from white to blue as z goes from 3 to 10, try

```
gmt makecpt -Cwhite,blue -T3,10 -Z > cold.cpt
```

To make a wrapped (cyclic) CPT from the jet table over the interval 0 to 500, i.e., the color will be wrapped every 500 z-units so that we always get a color regardless of the z value, try

```
gmt makecpt -Cjet -T0/500 -Ww > wrapped.cpt
```

Bugs

Since **makecpt** will also interpolate from any existing CPT you may have in your directory, you should not use one of the listed cpt names as an output filename; hence the my_gebco.cpt in the example. If you do create a CPT of such a name, e.g., rainbow.cpt, then **makecpt** will read that file first and not look for the master CPT in the shared GMT directory.

See Also

[gmt](#), [grd2cpt](#)