



FORCOLORMAP

EXPLORE THE WORLD OF COLORS

February 8, 2024



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1 Basic Usage

Assuming your graphical library has a `setpixelgb()`-like function and you know your z values will be for example in the $[0, 2]$ range, you can write something like:

```
1 use forcolormap, only: Colormap, wp
2 ...
3 type(Colormap) :: cmap
4 integer :: red, green, blue
5 real(wp) :: z, x, y
6 ...
7 ! Let's use the glasgow colormap:
8 call cmap%set("glasgow", 0.0_wp, 2.0_wp)
9 ...
10 z = f(x,y)
11 call cmap%compute_RGB(z, red, green, blue)
12 call setpixelrgb(x, y, red, green, blue)
```

The library is using the precision `wp=>real64` defined in the module `iso_fortran_env`. And depending on the integers expected by your graphical library, you may need to convert the kinds of red, green, blue variables by writing for example `int(red, kind=int16)` if you need 16 bit integers.

2 Citing Colormaps

ForColormap includes 222 colormaps from the Scientific Colormap Collection v8.0.1, developed by Fabio Crameri [2]. They are grouped in families: acton*, bam*, bamako*, batlow*, berlin*, bilbao*, broc*, buda*, bukavu*, cork*, davos*, devon*, fes*, glasgow*, grayc*, hawaii*, imola*, lajolla*, lapaz*, lipari*, lisbon*, managua*, navia*, nuuk*, oleron*, oslo*, roma*, tofino*, tokyo*, turku*, vanimo*, and vik*. If you use any of these colormaps, please cite this paper [3].

Additionally, the colormaps magma, inferno, plasma, and viridis are sourced from the matplotlib colormaps. When employing these colormaps, please cite this webpage [1].

For the cubehelix colormap, please cite[4].

For the black_body colormap, please cite[5].

3 Colormaps

The colormaps are divided into five categories: sequential, diverging, cyclic, multi-sequential and categorical. That guideline can help you choose a colormap appropriate to your data: <https://s-ink.org/colour-map-guideline>

3.1 Sequential Gradients

Table 1: Sequential Gradients















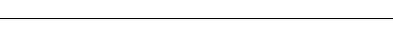
Name	Gradient	Palette	Levels	Colorbar
acton	Sequential	Continuous	256	
acton10	Sequential	Discrete	10	
acton25	Sequential	Discrete	25	
acton50	Sequential	Discrete	50	
acton100	Sequential	Discrete	100	
bamako	Sequential	Continuous	256	
bamako10	Sequential	Discrete	10	
bamako100	Sequential	Discrete	100	
bamako25	Sequential	Discrete	25	
bamako50	Sequential	Discrete	50	
batlow	Sequential	Continuous	256	
batlow10	Sequential	Discrete	10	
batlow100	Sequential	Discrete	100	
batlow25	Sequential	Discrete	25	
batlow50	Sequential	Discrete	50	
batlowK	Sequential	Continuous	256	
batlowK10	Sequential	Discrete	10	

Table 1 Continued: Sequential Gradients






















Name	Gradient	Palette	Levels	Colorbar
batlowK100	Sequential	Discrete	100	
batlowK25	Sequential	Discrete	25	
batlowK50	Sequential	Discrete	50	
batlowW	Sequential	Continuous	256	
batlowW10	Sequential	Discrete	10	
batlowW100	Sequential	Discrete	100	
batlowW25	Sequential	Discrete	25	
batlowW50	Sequential	Discrete	50	
bilbao	Sequential	Continuous	256	
bilbao10	Sequential	Discrete	10	
bilbao100	Sequential	Discrete	100	
bilbao25	Sequential	Discrete	25	
bilbao50	Sequential	Discrete	50	
buda	Sequential	Continuous	256	
buda10	Sequential	Discrete	10	
buda100	Sequential	Discrete	100	
buda25	Sequential	Discrete	25	
buda50	Sequential	Discrete	50	
davos	Sequential	Continuous	256	
davos10	Sequential	Discrete	10	
davos100	Sequential	Discrete	100	

Table 1 Continued: Sequential Gradients














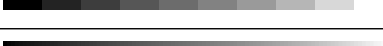







Name	Gradient	Palette	Levels	Colorbar
davos25	Sequential	Discrete	25	
davos50	Sequential	Discrete	50	
devon	Sequential	Continuous	256	
devon10	Sequential	Discrete	10	
devon100	Sequential	Discrete	100	
devon25	Sequential	Discrete	25	
devon50	Sequential	Discrete	50	
glasgow	Sequential	Continuous	256	
glasgow10	Sequential	Discrete	10	
glasgow100	Sequential	Discrete	100	
glasgow25	Sequential	Discrete	25	
glasgow50	Sequential	Discrete	50	
grayC	Sequential	Continuous	256	
grayC10	Sequential	Discrete	10	
grayC100	Sequential	Discrete	100	
grayC25	Sequential	Discrete	25	
grayC50	Sequential	Discrete	50	
hawaii	Sequential	Continuous	256	
hawaii10	Sequential	Discrete	10	
hawaii100	Sequential	Discrete	100	
hawaii25	Sequential	Discrete	25	

Table 1 Continued: Sequential Gradients





















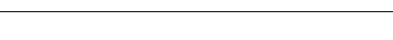
Name	Gradient	Palette	Levels	Colorbar
hawaii50	Sequential	Discrete	50	
imola	Sequential	Continuous	256	
imola10	Sequential	Discrete	10	
imola100	Sequential	Discrete	100	
imola25	Sequential	Discrete	25	
imola50	Sequential	Discrete	50	
lajolla	Sequential	Continuous	256	
lajolla10	Sequential	Discrete	10	
lajolla100	Sequential	Discrete	100	
lajolla25	Sequential	Discrete	25	
lajolla50	Sequential	Discrete	50	
lapaz	Sequential	Continuous	256	
lapaz10	Sequential	Discrete	10	
lapaz100	Sequential	Discrete	100	
lapaz25	Sequential	Discrete	25	
lapaz50	Sequential	Discrete	50	
lipari	Sequential	Continuous	256	
lipari10	Sequential	Discrete	10	
lipari100	Sequential	Discrete	100	
lipari25	Sequential	Discrete	25	
lipari50	Sequential	Discrete	50	

Table 1 Continued: Sequential Gradients


































Name	Gradient	Palette	Levels	Colorbar
navia	Sequential	Continuous	256	
navia10	Sequential	Discrete	10	
navia100	Sequential	Discrete	100	
navia25	Sequential	Discrete	25	
navia50	Sequential	Discrete	50	
naviaW	Sequential	Continuous	256	
naviaW10	Sequential	Discrete	10	
naviaW100	Sequential	Discrete	100	
naviaW25	Sequential	Discrete	25	
naviaW50	Sequential	Discrete	50	
nuuk	Sequential	Continuous	256	
nuuk10	Sequential	Discrete	10	
nuuk100	Sequential	Discrete	100	
nuuk25	Sequential	Discrete	25	
nuuk50	Sequential	Discrete	50	
oslo	Sequential	Continuous	256	
oslo10	Sequential	Discrete	10	
oslo100	Sequential	Discrete	100	
oslo25	Sequential	Discrete	25	
oslo50	Sequential	Discrete	50	
tokyo	Sequential	Continuous	256	

Table 1 Continued: Sequential Gradients

Name	Gradient	Palette	Levels	Colorbar
tokyo10	Sequential	Discrete	10	
tokyo100	Sequential	Discrete	100	
tokyo25	Sequential	Discrete	25	
tokyo50	Sequential	Discrete	50	
turku	Sequential	Continuous	256	
turku10	Sequential	Discrete	10	
turku100	Sequential	Discrete	100	
turku25	Sequential	Discrete	25	
turku50	Sequential	Discrete	50	
black_body	Sequential	Continuous	1024	
fire	Sequential	Continuous	-1	
cubehelix	Sequential	Continuous	-1	

3.2 Diverging Gradients

Table 2: Diverging Gradients




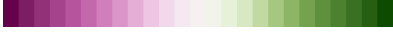
















Name	Gradient	Palette	Levels	Colorbar
bam	Diverging	Continuous	256	
bam10	Diverging	Discrete	10	
bam100	Diverging	Discrete	100	
bam25	Diverging	Discrete	25	
bam50	Diverging	Discrete	50	
berlin	Diverging	Continuous	256	
berlin10	Diverging	Discrete	10	
berlin100	Diverging	Discrete	100	
berlin25	Diverging	Discrete	25	
berlin50	Diverging	Discrete	50	
broc	Diverging	Continuous	256	
broc10	Diverging	Discrete	10	
broc100	Diverging	Discrete	100	
broc25	Diverging	Discrete	25	
broc50	Diverging	Discrete	50	
brocO10	Diverging	Discrete	10	
brocO100	Diverging	Discrete	100	
brocO25	Diverging	Discrete	25	
brocO50	Diverging	Discrete	50	
cork	Diverging	Continuous	256	

Table 1 Continued: Diverging Gradients

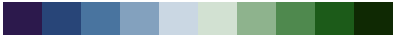

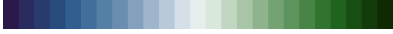









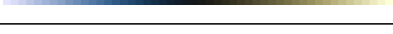








Name	Gradient	Palette	Levels	Colorbar
cork10	Diverging	Discrete	10	
cork100	Diverging	Discrete	100	
cork25	Diverging	Discrete	25	
cork50	Diverging	Discrete	50	
corkO10	Diverging	Discrete	10	
corkO100	Diverging	Discrete	100	
corkO25	Diverging	Discrete	25	
corkO50	Diverging	Discrete	50	
lisbon	Diverging	Continuous	256	
lisbon10	Diverging	Discrete	10	
lisbon100	Diverging	Discrete	100	
lisbon25	Diverging	Discrete	25	
lisbon50	Diverging	Discrete	50	
managua	Diverging	Continuous	256	
managua10	Diverging	Discrete	10	
managua100	Diverging	Discrete	100	
managua25	Diverging	Discrete	25	
managua50	Diverging	Discrete	50	
roma	Diverging	Continuous	256	
roma10	Diverging	Discrete	10	
roma100	Diverging	Discrete	100	

Table 1 Continued: Diverging Gradients





















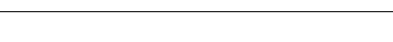













Name	Gradient	Palette	Levels	Colorbar
roma25	Diverging	Discrete	25	
roma50	Diverging	Discrete	50	
romaO10	Diverging	Discrete	10	
romaO100	Diverging	Discrete	100	
romaO25	Diverging	Discrete	25	
romaO50	Diverging	Discrete	50	
tofino	Diverging	Continuous	256	
tofino10	Diverging	Discrete	10	
tofino100	Diverging	Discrete	100	
tofino25	Diverging	Discrete	25	
tofino50	Diverging	Discrete	50	
vanimo	Diverging	Continuous	256	
vanimo10	Diverging	Discrete	10	
vanimo100	Diverging	Discrete	100	
vanimo25	Diverging	Discrete	25	
vanimo50	Diverging	Discrete	50	
vik	Diverging	Continuous	256	
vik10	Diverging	Discrete	10	
vik100	Diverging	Discrete	100	
vik25	Diverging	Discrete	25	
vik50	Diverging	Discrete	50	

Table 1 Continued: Diverging Gradients

Name	Gradient	Palette	Levels	Colorbar
vikO10	Diverging	Discrete	10	
vikO100	Diverging	Discrete	100	
vikO25	Diverging	Discrete	25	
vikO50	Diverging	Discrete	50	

3.3 Cyclic Gradients

Table 3: Cyclic Gradients

Name	Gradient	Palette	Levels	Colorbar
bamO	Cyclic	Continuous	256	
bamO10	Cyclic	Discrete	10	
bamO100	Cyclic	Discrete	100	
bamO25	Cyclic	Discrete	25	
bamO50	Cyclic	Discrete	50	
brocO	Cyclic	Continuous	256	
corkO	Cyclic	Continuous	256	
romaO	Cyclic	Continuous	256	
vikO	Cyclic	Continuous	256	

3.4 Multi-Sequential Gradients

Table 4: Multi-Sequential Gradients
















Name	Gradient	Palette	Levels	Colorbar
bukavu	Multi-Sequential	Continuous	256	
bukavu10	Multi-Sequential	Discrete	10	
bukavu100	Multi-Sequential	Discrete	100	
bukavu25	Multi-Sequential	Discrete	25	
bukavu50	Multi-Sequential	Discrete	50	
fes	Multi-Sequential	Continuous	256	
fes10	Multi-Sequential	Discrete	10	
fes100	Multi-Sequential	Discrete	100	
fes25	Multi-Sequential	Discrete	25	
fes50	Multi-Sequential	Discrete	50	
oleron	Multi-Sequential	Continuous	256	
oleron10	Multi-Sequential	Discrete	10	
oleron100	Multi-Sequential	Discrete	100	

Table 1 Continued: Multi Sequential Gradients



Name	Gradient	Palette	Levels	Colorbar
oleron25	Multi-Sequential	Discrete	25	
oleron50	Multi-Sequential	Discrete	50	

3.5 Categorical Gradients

Table 5: Categorical Gradients

Name	Gradient	Palette	Levels	Colorbar
actonS	Categorical	Continuous	256	
bamakoS	Categorical	Continuous	256	
batlowKS	Categorical	Continuous	256	
batlowS	Categorical	Continuous	256	
batlowWS	Categorical	Continuous	256	
bilbaoS	Categorical	Continuous	256	
budaS	Categorical	Continuous	256	
davosS	Categorical	Continuous	256	
devonS	Categorical	Continuous	256	
glasgowS	Categorical	Continuous	256	
grayCS	Categorical	Continuous	256	
hawaiiS	Categorical	Continuous	256	
imolaS	Categorical	Continuous	256	
lajollaS	Categorical	Continuous	256	
lapazS	Categorical	Continuous	256	
lipariS	Categorical	Continuous	256	
naviaS	Categorical	Continuous	256	
naviaWS	Categorical	Continuous	256	
nuukS	Categorical	Continuous	256	
osloS	Categorical	Continuous	256	

Table 1 Continued: Categorical Gradients

Name	Gradient	Palette	Levels	Colorbar
tokyoS	Categorical	Continuous	256	
turkuS	Categorical	Continuous	256	

4 License

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References

- [1] mpl colormaps. <https://bids.github.io/colormap>.
- [2] Fabio Crameri. Scientific colour maps 8.0.1, <https://www.fabiocrameri.ch/colourmaps/>, October 2023.
- [3] Fabio Crameri, Grace E. Shephard, and Philip J. Heron. The misuse of colour in science communication. *Nature Communications*, 11(1), October 2020.
- [4] D. A. Green. A colour scheme for the display of astronomical intensity images, <https://arxiv.org/abs/1108.5083v2>, 2011.
- [5] Kenneth Moreland. Color map advice for scientific visualization. <https://www.kennethmoreland.com/color-advice>.