Scientific colour maps* User Guide

Version 9.0.0

✔ **Perceptually uniform**

✔ **Perceptually ordered**

✔ **Colour-vision-deficiency (CVD) friendly**

✔ **Readable in black&white prints**

✔ **All colour map types & classes in all major formats**

✔ **Citable & reproducible**

Crameri, F. (2018), Scientific colour maps, Zenodo, doi:10.5281/zenodo.1243862

Crameri, F. (2018), Geodynamic diagnostics, scientific visualisation and StagLab 3.0, Geosci. Model Dev., 11, 2541-2562, doi:10.5194/gmd-11-2541-2018

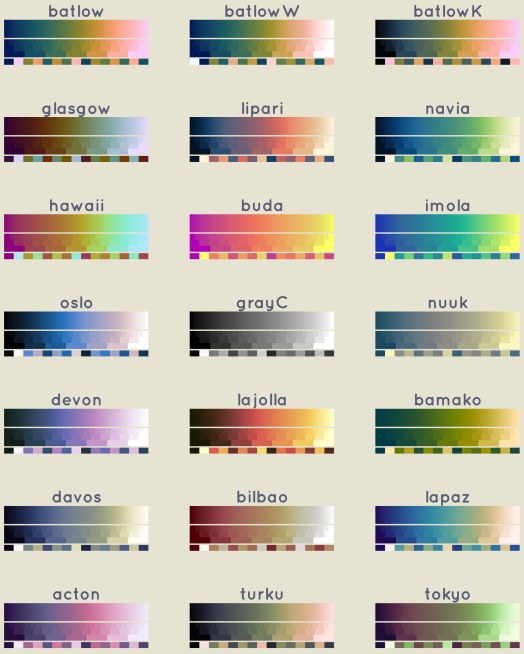
Crameri, F., G.E. Shephard, and P.J. Heron (2020), The misuse of colour in science communication, Nature Communications, 11, 5444. doi: 10.1038/s41467-020-19160-7

* www.fabiocrameri.ch/colourmaps

Made with love, fury, and a bit of ink.

Scientific Colour Maps

Sequential gradients



Scientific
Colour Maps

Perceptually uniform
Perceptually ordered
Colour-vision deficiency friendly
Readable in black&white

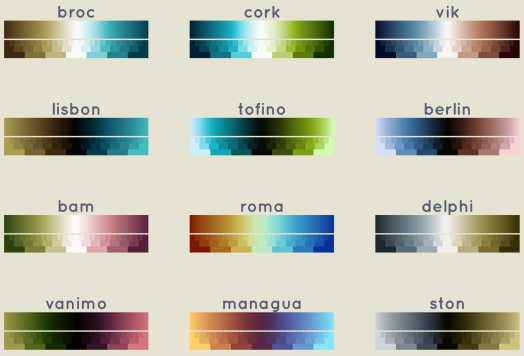
Widely compatible
Accessible and free
Versioned & citable

Continuous palettes
Discrete palettes
Categorical palettes

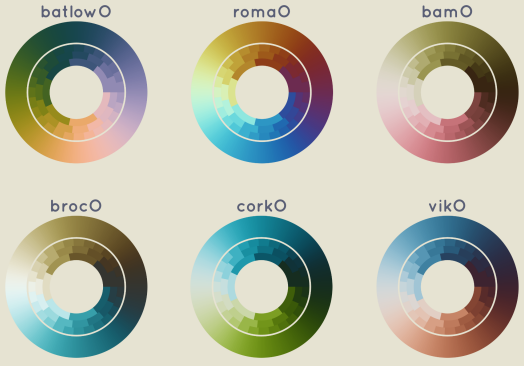
Multi-sequential gradients



Diverging gradients



Cyclic gradients



By the community, for the community.

www.fabiocrameri.ch/colourmaps

MIT License – Free to use, modify, and share. Just keep the copyright notice.

Made with love, fury, and a bit of ink. – Version 9.0

Contents

1 Creators 4

2 Supporters & sources of inspiration 5

3 Acknowledgement 6

4 Instructions 7

4.1 Adobe Illustrator . . . 7
4.2 Adobe Photoshop . . . 7
4.3 Affinity Designer . . . 7
4.4 ArcGIS Pro . . . 7
4.5 COMSOL Multiphysics . . . 7
4.6 d3 . . . 7
4.7 Ferret . . . 8
4.8 Fortran . . . 8
4.9 GIMP . . . 8
4.10 GlobalMapper . . . 8
4.11 GMT . . . 8
4.12 Gnuplot . . . 9
4.13 GPlates . . . 9
4.14 ImageJ/Fiji . . . 9
4.15 Inkscape . . . 9
4.16 iolite . . . 10
4.17 Julia . . . 10
4.18 Kingdom . . . 10
4.19 Mathematica . . . 10
4.20 MatLab . . . 11
4.21 MOVE Petroleum Experts . . . 11
4.22 Ncview . . . 11
4.23 Ocean Data View (ODV) . . . 12
4.24 OpendTect . . . 12
4.25 Originlab . . . 12
4.26 Paraview . . . 12
4.27 Petrel . . . 12
4.28 Plotly . . . 13
4.29 Python . . . 13
4.30 QGIS . . . 14
4.31 QPS Fledermaus & Qimera . . . 15
4.32 R . . . 15
4.33 SKUA-GOCAD . . . 15
4.34 Swift . . . 15
4.35 VisIt . . . 15

5 Software with built-in versions 17

6 Version history 17

7 License 20

1 Creators

Creator: Fabio **Crameri**

Contributors: Grace **Shephard** – Conversion to .cpt and .ase formats, promotion of Scientific colour maps, and other contributions

Phil **Heron** – Promotion of Scientific colour maps

Clint **Conrad** – Wider compatibility of .cpt format

Matteo **Albano** – Conversion to .clr format; QGIS compatibility

Casper **Pranger** – Mathematica compatibility

Alexis **Plunder** – Wider compatibility of .xml format

Krister Stræte **Karlsen** – User instruction for use with python

Philippe **Rivière** – Conversion instruction for d3

Emilia – Plotly versions

Thomas Lin **Pedersen** – The 'scico' package for use with R

Paul **Wessel** – Built-in version for 'GMT'

Wolfgang **Schwanghart** – Built-in version for 'TopoToolbox'

Chad **Greene** – MatLab file exchange version

Sean **Trim** – Conversion to .pal format

George Edward **Campbell** – Conversion to .lut format

Christophe **Leterrier** – NeuroCyto LUTs Fiji add-on

Kirstie **Wright** – User instruction for use with Petrel

Craig **Williams** – Style file for ArcGIS Pro

Jennifer **Levett** – Conversion to SKUA-GOCAD .xcmap format

Sam **Hatfield** – Conversion to Ncview .ncmap format

Patrick **Brockmann** – Conversion to Ferret .spk format

Thomas **Morrow** – Conversion to QPS .cmap format

Mark **Wieczorek** – Import init file for Python

Anthony **Jamelot** – Additions to import init file for Python

Andy **Emery** – Conversion to Kingdom .clm and .clb format

Benjamin **Witschas** – Conversion to Originlab .pal format

Steven **Reddy** – Conversion to Photoshop .grd format

Callum **Rollo** – Python package via pip and anaconda

Pierre **Lanari** – Built-in version for 'XMapTools'

Kaspar **Merz** – Importable package for 'OpendTect'

Fabrizio **Magrini** – Built-in version for 'SeisLab'

Amando **Lasabuda** – User instruction for GlobalMapper & MOVE

Megan **Brown** – Updated __init__.py for SCM 7.0 and 8.0

Lucía **Pérez Díaz** – GPlates package

Katrin **Hättig** – Conversion to ODV .pal formats

Vincent **Magnin** – Fortran colormap fpm library

Thomas **Junier** – Categorical .gpl formats

Jochen **Kiemes** – Porting to Swift

Sylvain **Théry** – QGIS plugin

Nicky **Wright** – Enabling built-in version for GPlates

Nicolas **Tharaud** – Help with CVD diagnostics

2 Supporters & sources of inspiration

Supporters:

Alan Baxter, Lucía Pérez-Díaz, Gian Maria, Marina von Tscharner, Li Fucheng, Anthony Lanati, Nicola Tuveri, Andrew Fletcher, Christoph Hofmeister

Sources of inspiration:

The '**endrainbow**' campaign initiated by Ed Hawkins.

The **Colorbrewer** colour maps, the **MPL** colour maps, the **cividis** colour map, the **CMOcean** colour maps, and the **CET** colour maps.

Peter **Kovesi**'s work, in particular, has helped to develop the Scientific colour maps: some of the many excellent, openly accessible scripts were used as a basis for the applied colour-map diagnostics and to make the file conversion to .tbl and .act formats.

References:

Included colour-map diagnostics are based on:

Kovesi (2015), Good Colour Maps: How to Design Them, CoRR, abs/1509.03700, http://arxiv.org/abs/1509.03700* and related MatLab functions available at https://www.peterkovesi.com/ matlabfns/index.html#colour.

For further details see:

Crameri, F. (2018), Geodynamic diagnostics, scientific visualisation and StagLab 3.0, *Geosci. Model Dev.*, 11, 2541-2562, doi:10.5194/gmd-11-2541-2018

Crameri, F., G.E. Shephard, and P.J. Heron (2020), The misuse of colour in science communication, *Nature Communications*, 11, 5444. doi: 10.1038/s41467-020-19160-7

Crameri, F. and S. Hason (2024), Navigating color integrity in data visualization, *Patterns, 5(5)*, 100972, (https://doi.org/10.1016/j.patter.2024.100972)

3 Acknowledgement

! → Please acknowledge the free use of the colour maps.

e.g., *"The Scientific colour map batlow (Crameri 2018) is used in this study to prevent visual distortion of the data and exclusion of readers with colour-vision deficiencies (Crameri et al., 2020)."*

The software : **Crameri, F. (2018a), Scientific colour maps. Zenodo. http://doi.org/10.5281/zenodo.1243862**

The research : **Crameri, F., G.E. Shephard, and P.J. Heron (2020), The misuse of colour in science communication, Nature Communications, 11, 5444. doi: 10.1038/s41467-020-19160-7**

Contributions like these are absolutely essential for science, and the scientific community.
Thank you to all who contributed. – Fabio

4 Instructions

4.1 Adobe Illustrator

4.1.1 .ase format

The .ase format for discrete and categorical colour palettes can be readily imported into Adobe Illustrator. To import the colour palettes, go to:

`Adobe Illustrator > Open New File > Window > Swatches > Swatches Library Menu > Other Library > #.ase`

The .ase formats for the continuous palettes are provided by Grace Shephard via an external link on: www.fabiocrameri.ch/colourmaps.

4.2 Adobe Photoshop

4.2.1 .grd format

The .grd format to read into Adobe Photoshop provided by Steven Reddy can be found at: www.geoscienceatomprobe.org/downloads.html

4.3 Affinity Designer

4.3.1 .ase format

The .ase format for discrete and categorical colour palettes can be readily imported into Affinity Designer. To import the colour palettes, go to:

`Affinity Designer > Open New File > Colour Swatches panel > Burger symbol > Import palette > #.ase`

The .ase formats for the continuous palettes are provided by Grace Shephard via an external link on: www.fabiocrameri.ch/colourmaps.

4.4 ArcGIS Pro

4.4.1 style file

Download the style file for the ArcGIS Pro provided by Craig Williams on https://www.arcgis.com/home/.

4.5 COMSOL Multiphysics

4.5.1 .txt format

Put the .txt colour map files in `COMSOL4.0a > data > colortables` (adjust version number, if necessary) Then restart COMSOL and the Scientific colour maps should be available within the program.

4.6 d3

4.6.1 .xml format

An instruction to convert the .xml format to d3's internal representation is provided by Philippe Rivière at https://beta.observablehq.com/@fil/colormaps.

4.7 Ferret

4.7.1 .spk format

To use the .spk colour map files in Ferret, follow the instructions given on the official homepage: https://ferret.pmel.noaa.gov/Ferret/documentation/users-guide/customizing-plots/COLOR#_VPID_247.

4.8 Fortran

4.8.1 Colour map library

A convenient Fortran colormap fpm library independent of any graphical toolkit created by Vincent Magnin is available on: https://github.com/vmagnin/forcolormap/

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

```
use forcolormap
...
type(Colormap) :: cmap
integer  :: red, green, blue
real(wp) :: z, x, y
...
call cmap%set("glasgow", 0.0_wp, 2.0_wp)
...
z = f(x,y)
call cmap%compute_RGB(z, red, green, blue)
call setpixelrgb(x, y, red, green, blue)
```

4.9 GIMP

4.9.1 .gpl format

To import the .gpl palettes, launch GIMP and go to `Windows > Dockable Dialogs > Palettes` to open the Palettes dialog. Then right-click anywhere on the list of palettes and select `Import Palette`. In the *Import a New Palette* dialog, select the *Palette file* radio button and then the button just to the right of the folder icon.

Then, navigate to and select the desired .gpl file in the corresponding folder. Clicking the *Import* button will add the scientific colour map to the existing list of palettes.

4.10 GlobalMapper

To use the Scientific colour maps with GlobalMapper 18 (64 bit), one can use the .PAL format provided as follows:

- Select `Configure`
- Select `Shader`
- Under `Custom Shaders`, select `New`
- Select `Initialize from palette file`
- Choose the Scientific colour map's "`...ORIGINLAB.PAL`" file version

4.11 GMT

Note: GMT 6.0.0 and later offers built-in Scientific colour maps (see Section 5).

4.11.1 .cpt format

The file davos.cpt can be resampled for a given z-value range with the Generic Mapping Tools (GMT; http://www.generic-mapping-tools.org) command "makecpt".

For example to resample for an array from -2000 to 2000 in 100 increments you could generate a new file with:

```
$makecpt -Cdavos.cpt -T-2000/2000/100 > davos_resampled.cpt
```

4.12 Gnuplot

4.12.1 .pal format

Launch the Gnuplot shell and load the specific .pal file (e.g., batlow) into Gnuplot with:

```
user@computer gnuplot
gnuplot> load "batlow.pal"
```

4.13 GPlates

4.13.1 .cpt format

To use the Scientific colour maps with GPlates, select the layer you would like to symbolise on the '**layers**' panel and click '**open .cpt file**', under the '**options**' tab.

For sequential colour maps, inverted versions are available with the postfix "**_I**": the inverted *batlow* is, for example, named **batlow_I.cpt**.

4.13.2 Convenience package

To conveniently import the entire suite of Scientific colour maps into GPlates at once, use the external package provided via www.fabiocrameri.ch/colourmaps, which also contains inverted gradients, as this option seems to be lacking in GPlates.

4.14 ImageJ/Fiji

4.14.1 .lut format

The .lut colour-map file (e.g., *batlow.lut*) can be imported to ImageJ or Fiji by placing it in the *luts* folder (to reveal folder location in Fiji: **File > Show Folder > LUTs**). Upon restart of ImageJ, the scientific colour map(s) should then be available under **Image > Lookup Tables**.

Alternatively, the colour-map .lut file may be applied using either (a) **File > Open**, (b) **File > Import > LUT**, or (c) drag and drop the .lut file onto the ImageJ window. To view available LUTs: **Image > Color > Display LUTs**.

4.14.2 NeuroCyto LUTs add-on

Detailed information about how to use a simple add-on that adds a handy LUTs drop-down menu to the Fiji user interface is given on https://forum.image.sc/t/neurocyto-luts-update-site/26244.

4.15 Inkscape

4.15.1 .gpl format

Inkscape uses the same file format for palettes as the GNU Image Manipulation Program (GIMP Colour Palettes, .gpl). To import the .gpl palettes, launch Inkscape and go to **View > Colour palettes**

and click the folder icon add the bottom of the opened Palettes dialog. Then, navigate to and select the desired .gpl file in the corresponding folder. Clicking the *Import* button will add the Scientific colour map to the existing list of palettes.

To install a Scientific colour palette into Inkscape more permanently—and keep them handy also in new documents—copy the .gpl file to the **share/palettes** directory in your Inkscape installation (on macOS e.g., **Contents > Resources > share > inkscape > palettes**). Once Inkscape has been restarted, the Scientific colour palette is readily available from the built-in options.

4.16 iolite

The software iolite offers a built-in version of *batlow*. To import other Scientific colour maps, go to: **Custom Colour Maps > Add** and then navigate to the Scientific colour map folder and select the colour map's .lut or .txt format.

4.17 Julia

The programming language Julia has built in Scientific colour maps in its colour map libraries, which makes them readily useable. The Julia file containing the colour maps is **scicolor.jl**: github.com/JuliaGraphics/ColorSchemes.jl/tree/master/data.

4.18 Kingdom

4.18.1 .clm format

On any screen, select **Show color bar** from the toolbar. Above the colour bar that appears, select **Select?**, then under **Files of type** choose **Color Bars (*.CLM)**, then navigate to the location the colour-map files are stored.

The continuous Scientific colour maps are also provided externally in Kingdom's native file format, .clb, for easier implementation. The .clb files are available separately on www.fabiocrameri.ch/colourmaps. To import them in Kingdom, select, on any screen, **Show color bar** from the toolbar. Above the colour bar that appears, select **Select?**, then navigate to the location the colour-map files are stored.

4.19 Mathematica

4.19.1 .mat format

```
ColorMapSuitePath = "/Path/To/ColourMapSuite/";

ColorMapSuite[name_String] := ColorMapSuite[name, -1]
ColorMapSuite[name_String, el_] := With[{
   list =
    Transpose@{Subdivide[0, 1, 255],
      RGBColor @@@
       First@Import[
         ColorMapSuitePath <> "/" <> name <> "/" <> name <> ".mat"]}
   },
  Blend[list, {##}[[el]]] &
  ]
```

The function call **ColorMapSuite["name", i = -1]** returns a lambda function whose ith argument is used to define color (see the Manual for **ColorFunction** for details). **"name"** should be replaced with the name (in quotes) of the color scheme, e.g. **"davos"**. Be sure to set the variable **ColorMapSuitePath** to the path where your ColorMapSuite is installed.

General rules are:

- 1D plots of 1D functions/data: no (default) argument *i* suffices
- 2D plots of 2D functions/data: no (default) argument *i* suffices
- 3D plots of 2D functions/data: use *i* = 3
- 3D plots of 3D functions/data: use *i* = 4 (results might be worse than default Mathematica color functions, possibly due to lack of surface normal mapping)

```
ContourPlot[Sin[x] Sin[y], {x, 0, 2 Pi},
{y, 0, 2 Pi}, ColorFunction -> ColorMapSuite["davos"]]
```

4.20 MatLab

4.20.1 .mat format)

Load the colour map into MatLab, either by adding the .mat file to the MatLab search path and using the command:

```
load('davos.mat');
```

or by specifying the full file path to the .mat file:

```
load('~/work/Colormaps/davos.mat');
```

Then use it, for example, with:

```
figure(1)
colormap(davos)
colorbar
```

4.20.2 File-exchange app

A convenient MatLab package provided by Chad Greene containing the full scientific colour-map suite is available on MatLab file exchange.

4.21 MOVE Petroleum Experts

4.21.1 .cpt format

To use the Scientific colour maps with MOVE (tested with version IPM 13):

1. Go to **Program Files**
2. Select **Petroleum Experts**
3. Select **IPM 13**
4. Select **Data**
5. Copy and paste the desired Scientific colour maps in .CPT format

4.22 Ncview

4.22.1 .ncmap format

The colour map .ncmap files can live in the following places:

1. **NCVIEW_LIB_DIR**, which is determined at installation time. A reasonable choice is **/usr/local/lib/ncview**.
2. In a directory named by the environmental variable **NCVIEWBASE**.
3. If there is no environmental variable **NCVIEWBASE**, then in **$HOME**.
4. In the current working directory.

Then when you open Ncview, it should automatically have all of the colour maps available.

4.23 Ocean Data View (ODV)

4.23.1 .pal format

Download and save the `xxx_ODV.pal` colour map file in the "Palettes" folder within the main "ODV" folder, which can be found on Windows and macOS usually in the "Documents" folder:

`Documents > ODV > palettes`

From within the running ODV, select `properties` then `general` to choose a new palette. Restart ODV and the imported scientific colour maps should appear in the properties panel.

4.24 OpendTect

For Import to OpendTect follow these steps:

1. Download the OpendTect package by Kaspar Merz from this direct link or via the separate link on www.fabiocrameri.ch/colourmaps under the section "Usable with:"
2. Click on `Survey/Manage/ColorTables...`
3. Click on `Import...`
4. Select `file`; navigate to directory and open this file
5. Select desired colour maps
6. Import

4.25 Originlab

4.25.1 .pal format

To use the .pal colour map files in the Originlab software, download the external package from www.fabiocrameri.ch/colourmaps or via the direct link. The .PAL files can then be copied to the origin palette folder and used similarly to the Originlab default color palettes.

4.26 Paraview

4.26.1 .xml format

Using Scientific colour maps in Paraview is done via the following procedure:

Click `Edit` color map panel. Once the colour map settings open, click the folder with the heart (i.e., `Choose Preset`), then `Import`, and then choose the PARAVIEW.xml format (e.g., `batlow_PARAVIEW.xml`). The colour map is now loaded and saved in Paraview, so one can now simply search for the colour map name (e.g., `batlow`) in the search field for the colour maps. Click on the desired colour map and hit `Apply`.

4.26.2 .json format

To colour categories in Paraview, you can/have to import .json file formats. These formats are provided for categorical and discrete versions of all Scientific colour maps, and importing follows the same procedure as outlined just above for the .xml format.

4.27 Petrel

4.27.1 .alut format

To import colour maps, select the `templates` pane and `colour tables` folder.

Then select the folder to import into (or insert a new folder) and right click `import on selection`.

Select **colour tables (alut files) (*.alut)** to view and select all suitable colour maps for import.

Accept default settings **trim colour control points** and **trim opacity control points** and finally use as any other colour table within Petrel.

4.28 Plotly

4.28.1 .py format

Plotly versions of the Scientific colour maps are provided by Emilia are available at https://github.com/empet/scientific-colorscales.

The plotly Scientific colour maps (see the file **scicolorscales.py**) were created by converting the provided .py file of each colour map.

Direct applications and some scientific tests are illustrated in this Jupyter Notebook: http://nbviewer.jupyter.org/github/empet/scientific-colorscales/blob/master/Tests-for-scientific-colorscales.ipynb.

4.29 Python

4.29.1 Package (pip and anaconda)

The convenient python package, https://pypi.org/project/cmcrameri/, by Callum Rollo is available through pip and anaconda.

Install with pip:

```
pip install cmcrameri
```

Install with conda:

```
conda config --add channels conda-forge
conda install cmcrameri
```

Usage example:

```
from cmcrameri import cm
import matplotlib.pyplot as plt
import numpy as np
x = np.linspace(0, 100, 100)[None, :]
plt.imshow(x, aspect='auto', cmap=cm.batlow) # or any other colourmap
plt.axis('off')
plt.show()
```

4.29.2 init file

A simple init file located in **ScientificColourMaps8/+TOOLS/** can be used to make the whole suite of colour maps readily available in python: Place the **__init__.py** file in the main directory **ScientificColourMaps8/** (adjust the single-digit version number where necessary) and update your PYTHONPATH environment like this:

(for linux/bash)

```
export PYTHONPATH=$PYTHONPATH:/full/path/to/ScientificColourMaps7/
```

Adjust the single-digit version number where necessary.

Then, in any python, you can import the palette collection, by using **import ScientificColourMaps8 as SCM8**, which allows for example commands like

```
plt.imshow(some_data, cmap=SCM8.berlin)     # Linear palette
plt.imshow(some_data, cmap=SCM8.berlin_r)   # Reversed, linear
plt.imshow(some_data, cmap=SCM8.berlin25_r) # Reversed, 25 steps, discrete
```

Adjust the single-digit version number where necessary.

4.29.3 .txt format

Step 1: Load colour-map data

Load the colour-map data into Python using `numpy.loadtxt()`:

```
import numpy as np
cm_data = np.loadtxt("batlow.txt")
```

Step 2: Set up colour map

Use `matplotlib.colors.LinearSegmentedColormap()` to create a colour map that can be used with matplotlib.

```
from matplotlib.colors import LinearSegmentedColormap
batlow_map = LinearSegmentedColormap.from_list('batlow', cm_data)
```

Complete example:

```
import numpy as np
import matplotlib.pyplot as plt
from matplotlib.colors import LinearSegmentedColormap

cm_data = np.loadtxt("batlow_RGB(0-1).txt")
batlow_map = LinearSegmentedColormap.from_list('batlow', cm_data)

x = np.linspace(0, 100, 100)[None, :]
plt.imshow(x, aspect='auto',cmap=batlow_map)
plt.axis('off')
plt.show()
```

4.29.4 Palettable library

The Palettable library provides the Scientific colour maps (and other scientifically-derived colour maps) in a convenient way for use with e.g., matplotlib. Palettable is available on PyPI for installation via pip: `pip install palettable`. Palettable is compatible with Python 2.6, 2.7, and Python 3. For more instructions see here.

4.29.5 Matplotlib

The dark-centred Scientific colour maps *berlin*, *managua*, and *vanimo* are directly built into and available from Matplotlib: matplotlib.org/stable/users/explain/colors/colormaps.html

4.30 QGIS

4.30.1 .xml format

Load the colour map into QGIS in:

```
Settings > Style manager > Import/Export > Import symbol(s)
> select the xxx_QGIS.xml file.
```

4.30.2 Style manager plugin

An extension developed by Sylvain Théry adds the Scientific color maps to the QGIS 3.x style manager and can be accessed via: https://plugins.qgis.org/plugins/scientific_color_maps/.

4.31 QPS Fledermaus & Qimera

4.31.1 .cmap format

To use the .cmap colour map files in the QPS software Fledermaus and Qimera, download the external package from www.fabiocrameri.ch/ colourmaps > `Extra formats for QPS software` or via the direct link.

4.32 R

4.32.1 scico package

'scico' (https://github.com/thomasp85/scico) – pronounced as "psycho" – is a small package developed by Thomas Lin Pedersen that provides access to the Scientific colour maps within R. It provides colour palettes for 'ggplot2') without requiring 'ggplot2' to be installed.

scico can be installed from CRAN with `install.packages('scico')`. If you want the development version then install directly from GitHub:

```
# install.packages("devtools")
devtools::install_github("thomasp85/scico")
```

For further details and user instructions are included in a README file within 'scico'.

4.33 SKUA-GOCAD

4.33.1 .xcmap format

To import a colormap into a SKUA-GOCAD project, navigate to `File > Import > GOCAD Resources > Colormaps`.

Alternatively, for advanced users, to include a colormap as a resource in all new projects, insert the .xcmap text into the *colormaps.xml* file located in `*/Gocad/lib/app-defaults`.

4.34 Swift

A port of the Scientific colour maps to Swift is made available under: github.com/gin66/ScientificColorMaps

To use the colour maps in this package, simply import it into your Swift project and use the global instance of the desired colour map. For example:

```
import ScientificColorMaps
let colorMap = ScientificColorMaps.batlow
```

To list all colour palettes, use:

```
ScientificColorMaps.palettes() -> [ScientificColorMaps]
```

To list all categorical colour palettes, use:

```
ScientificColorMaps.categorizedPalettes() -> [ScientificColorMaps]
```

4.35 VisIt

4.35.1 .ct format

The file davos.ct can imported to VisIt by placing the .ct file in the .visit directory, which can be found on macOS under e.g.,:

```
/Applications/VisIt.app/Contents/Resources/ ...
... 2.12.3/darwin-x86_64/resources/colortables
```

The colour map should appear in the built-in list after VisIt has been restarted.

5 Software with built-in versions

- GMT 6.0 and later
- TopoToolbox 2.2 and later
- GPlates 2.4 and later
- StagLab 3.0 and later
- SubMachine
- Geoscience ANALYST 2.80 and later
- Igor Pro 9.0 and later
- XMapTools 3.4.2 and later
- KDE LabPlot 2.9 and later
- Gen3sis 1.5 and later
- SeisLib 0.5.1 and later
- iolite 4.8.7 and later

6 Version history

Version 1 :	Original colour-map suite (*bilbao, broc, cork, davos, devon, grayC, lajolla, oslo, vik*)
Version 2 :	Additional colour-map file formats (.ct, .py, .svg)
Version 3 :	Additional colour-map file format (.txt)
	Dark background palettes (*berlin, lisbon, tofino*)
	Additional sequential palettes (*lapaz, tokyo, turku*)
	Surface topography special palette (*oleron*)
	Seismic tomography special palette (*roma*)
Version 4 :	Additional sequential palettes (*acton, bamako, buda, hawaii, imola, nuuk*)
	Scientific rainbow palette (*batlow*)
	Additional colour-map file formats (xmlQGIS, .clr)
Version 5 :	**Discrete colour maps** (e.g., *batlow10*)
	Improved perceptual uniformity of the original (v1) palettes
	Minor colour adjustment to vik
	Additional colour-map file formats (.alut, .ct, .lut, .ncmap, .pal, .spk, .xcmap)
Version 6 :	**Categorical colour maps** (*batlowS, devonS, davosS, osloS, lapazS, actonS, lajollaS, bilbaoS, grayCS, tokyoS, turkuS, bamakoS, nuukS, hawaiiS, budaS, imolaS*)
	Cyclic colour maps (*romaO, brocO, corkO, vikO*)
	Improved colour-map diagnostics for perceptual uniformity
	Additional colour-map file formats (.clm)
	Improved User guide
	Change to MIT License
Version 7 :	Additional diverging palettes (**bam, vanimo**)
	Additional cyclic palette (**bamO**)
	Additional multi-sequential palettes (**bukavu, fes**)
	batlowW: batlow with white ending

batlowK: batlow with black ending

cork: Improved lightness symmetry

roma: Improved lightness symmetry

More formats (e.g., .pal for OriginLab)

Updated __init__.py to flip colour gradients by Tobias Staal

Updated __init__.py adding all new colour maps by Megan Brown

New Python package by Callum Rollo

Colour map type and class flow chart

Version 8 : Additional sequential palettes (**glasgow, lipari, navia**)

Additional diverging palette (**managua**)

grayC: Reversed standard gradient

bilbao: Improved local colour contrast; Gradient reversed

lajolla: Improved local colour contrast; Gradient reversed

acton: Improved local colour contrast & vibrancy

bamako: Improved local colour contrast & vibrancy

batlowK: Improved local colour contrast & vibrancy

tokyo: Improved local colour contrast & vibrancy

More formats (e.g., .pal for ODV, .ase for Adobe Illustrator)

Additional software with built-in versions (e.g., Gen3sis and SeisLib)

More descriptive colour map suite figure allowing to hand-pick ten Categorical colours for each sequential palette

Cleaner diagnostic figures

Version 9 : Additional diverging palettes (**delphi, ston**)

Additional circular palette (**batlowO**)

fes: New inverted colouring: grey for land, blue for ocean

vik: White central colour and slight hue adjustments

berlin: Black central colour and slight hue adjustments

bam: Hue adjustments

vanimo: Hue adjustments

bamO: Hue adjustments

broc: Hue adjustments

lisbon: Hue adjustments

brocO: Hue adjustments

cork: Improved accessibility (hue adjustment)

corkO: Improved accessibility (hue adjustment)

tofino: Improved accessibility (hue adjustment)

oleron: Improved local colour contrast (additional hue)

devon: Improved local colour contrast (additional hue)

turku: Improved local colour contrast (additional hue)

glasgow: Improved local colour contrast (slight hue adjustment)

oslo: Improved local colour contrast (slight hue adjustment)

bukavu: Improved local colour contrast (slight hue adjustment)

davos: Improved local colour contrast (now off-black)

buda: Improved local colour contrast & vibrancy

imola: Improved local colour contrast & vibrancy

lapaz: Improved local colour contrast & vibrancy

nuuk: Improved local colour contrast (evenly diverging hue)

hawaii: Improved perceptual uniformity

Additional formats for discrete palettes (e.g., .json for Paraview)

Additional formats for categorical palettes (e.g., .gpl, .json)

Updated and consistent arrangement of the categorical palettes

More formats (e.g., .ase colour swatches for Adobe Illustrator and Affinity Designer)

More built-in versions (e.g., GPlates 2.4)

Updated description for Inkscape

7 License

The Scientific colour maps are licensed under a MIT License

Copyright (c) 2026, Fabio Crameri

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

