@prism project

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The `@prism` project [1] provides small size color palettes that can be used to create expressive color maps for graphics in different contexts.

Last changes

1.2.1
2025-11-09

Fix.

- Equal palettes: the floating point equality uses now a correct tolerance.

Break.

- Palettes: the extra `Greys` has been removed (it is equal to `Grays`).

New.

- Similar palettes: two PDF files show similar palettes in standard and black modes (semi-automated process used).

Update.

- `luadraw` product: the associative array `palNames` has been added for compatibility reasons with the `luadraw` package.
- `BlindFish` palette: the last color variation has been made smoother (`luadraw` process used).

[1] The name comes from "***@ · esthetic P · roducts*** *for* ***R · epresenting I · nformative S · cientific M · aps***". This name is a double play on words: [1] a prism splits light into an informative spectrum, symbolizing how data are decomposed into meaningful color, and [2] "@" read as "at" indicates where the light meets the prism to be broken down into an informative spectrum.

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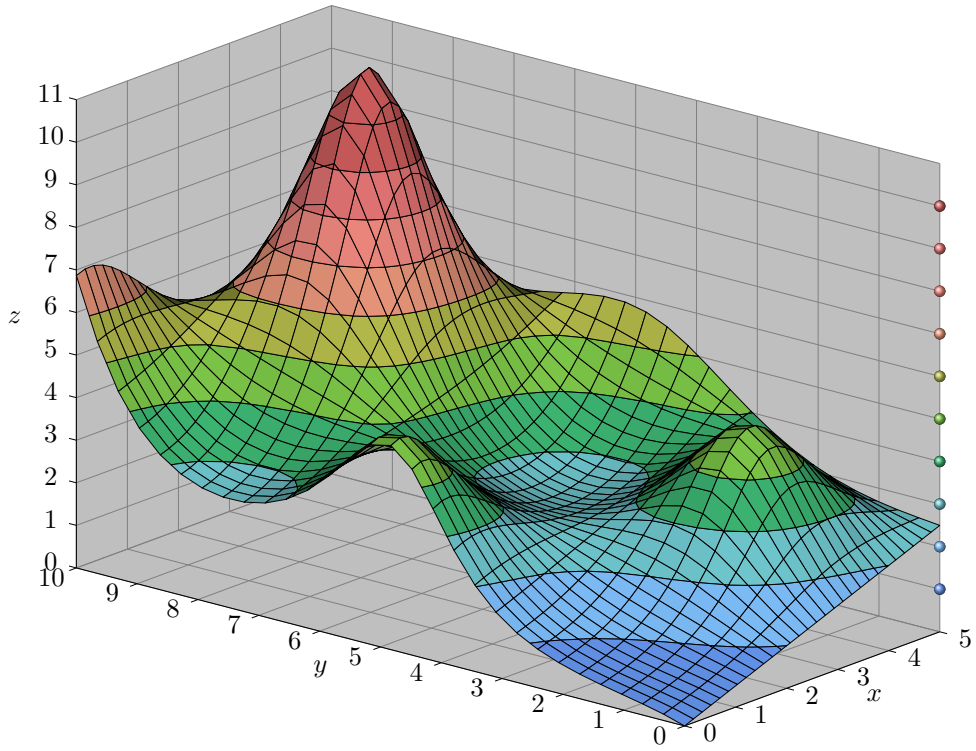
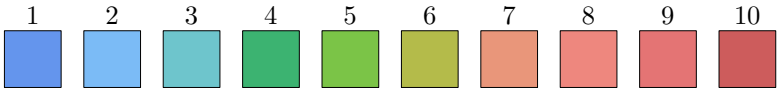
I. Motivations

Originally, this project was born out of a desire to enhance `luadraw` with a set of color palettes to easily produce something like the following 3D plot.



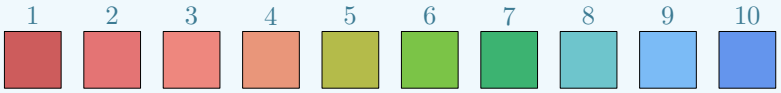
Technically, a finite list of colors is provided to `luadraw` which then uses linear interpolation to calculate the intermediate colors. In the previous case, the finite color palette used is defined as follows.



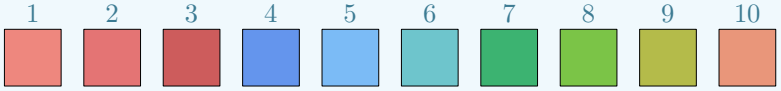
Using this palette, `luadraw` is able to produce the following spectrum, allowing us to create the graph above.

Note.

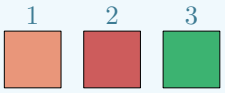
Using the `luadraw` *implementation of* `@prism`*, see the section V-2, we can create the palettes below made from the previous one named* `'GeoRainbow'`*. Each instruction used is given below each palette.*




```
getPal('GeoRainbow', {reverse = true})
```

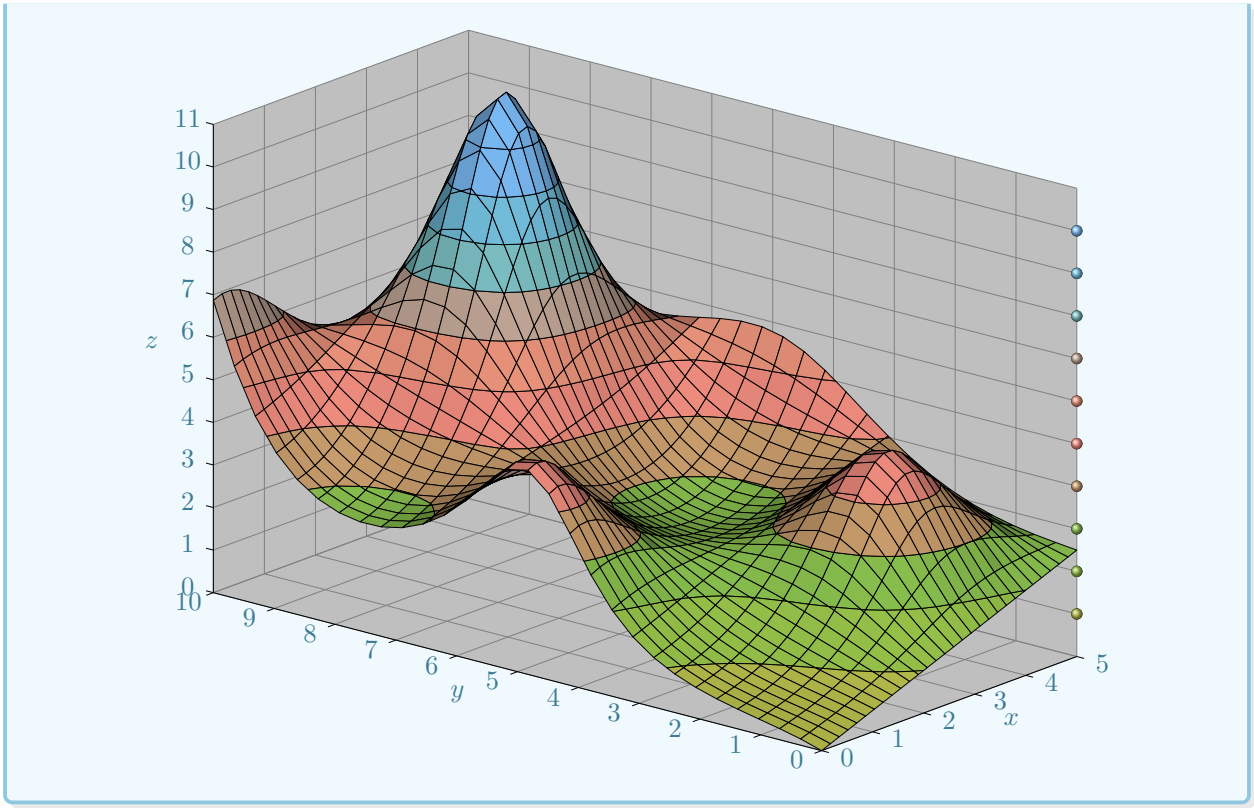



```
getPal('GeoRainbow', {shift = 3})
```




```
getPal('GeoRainbow', {extract = {7, 10, 4}})
```

This features provide remarkable creative flexibility: with the same surface as before, but using the setting `getPal('GeoRainbow', {extract = {2, 3, 7, 8, 5, 6}, reverse = true})` *instead of* `getPal('GeoRainbow')`*, we instantly change the visual tone, shifting from a seaside feel to a snow-covered world.*



II. Where do the color palettes come from?

`@prism` includes some original creations, but most color palettes are derived from the project below by segmenting their color maps into 10-value palettes.

- `Asymptote` is used, but currently offers nothing beyond `Matplotlib` (despite different implementations).
- `CartoColor` is extracted from `Palettable` project.
- `cmocean` is extracted from `Palettable` project.
- `Colorbrewer`.
- `Light and Bartlein` is extracted from `Palettable` project.
- `Matplotlib`.
- `MyCarta` is extracted from `Palettable` project.
- `Plotly` is extracted from `Palettable` project.
- `Scientific Coulour Maps`.
- `Tableau` is extracted from `Palettable` project.
- `Wes Anderson Palettes` is extracted from `Palettable` project.

Note.

Adding new palettes to `@prism` is straightforward (no coding skills required). See section VI-2 to get started.

We retain only palettes that comply with the following rules.

- **No repetition.** Unlike `Matplotlib`,[2] `@prism` use a one-to-one map from names to palettes.
- **No reversed versions.** Unlike `Matplotlib`,[3] `@prism` never includes reversed palettes as fixed data.

[2] Some `Matplotlib` palettes are duplicated, likely for historical reasons.
[3] Most `Matplotlib` color maps have a reversed version named with the `_r` suffix, possibly for performance reasons.

The following palettes were ignored due to duplication (straight or reversed).[4] The symbol $\boxed{=}$ indicates equality, $\boxed{\rightleftharpoons}$ indicates reversal, and the rightmost palette is the one retained in `@prism`.

Colorbrewer	`Greys`	=	`Grays`
Cubehelix	`Classic`	=	`Cubehelix`
Matplotlib	`GistGray`	⇌	`Binary`
	`GistGrey`	⇌	`Binary`
	`GistYarg`	=	`Binary`
	`GistYerg`	=	`Binary`
	`Grey`	⇌	`Binary`
Tableau	`Gray`	⇌	`Binary`
cmocean	`Balance`	=	`Vik`

III. Reuse from...

Here are the key points to remember when using palettes similar to those offered by projects listed in the section II.

1. `@prism` uses standardized `CamelCase` notation. Therefore, palette names such as `berlin` and `gist_heat` become `Berlin` and `GistHeat` respectively.
2. `Matplotlib` palettes with a name ending with the `_r` suffix (reversed color order) are not included in `@prism`.

Note.

Most `@prism` implementations provide methods to easily obtain reversed palettes, sub-palettes, and color-shifted palettes. See the section V.

Caution.

Most `@prism` implementations add the `pal` prefix to standardized `CamelCase` names. See the section V.

IV. How to choose a palette?

Two methods are available to find the ideal palette.

1. The documents `showcase-en-std.pdf` (light theme) and `showcase-en-dark.pdf` (dark theme) present use cases for each palette.
2. Appendix 1 page 10 presents all palettes organized by theme with a visualization of their color spectrum.

Note.

Appendix 2 page 28 groups visually similar palettes together.

V. Supported implementations

The implementations are inside the folder `products`.

1. JSON, the versatile default format

By default, a file `palettes.json` is provided to allow unsupported coding languages to also integrate `@prism` palettes. Here are the first line of this file.

[4] Recall that `Matplotlib` reversed color maps (with the `_r` suffix) are systematically excluded and therefore not shown here.

```
{
  "Accent": [
    [0.498039, 0.788235, 0.498039],
    [0.690196, 0.705881, 0.757298],
    [0.882352, 0.721568, 0.661437],
    [0.99477, 0.835294, 0.550326],
    [0.913289, 0.935947, 0.610021],
    [0.306317, 0.487581, 0.680174],
    [0.700653, 0.146404, 0.562091],
    [0.855772, 0.162962, 0.316775],
    [0.671459, 0.366448, 0.159041],
    [0.4, 0.4, 0.4]
  ],
  ...
}
```

2. luadraw palettes

a. Description

You can use `@prism` palettes with `luadraw` which is a package that greatly facilitates the creation of high-quality 2D and 3D plots via LuaLaTeX and `TikZ`.

Note.

Initially, the `@prism` project was created to provide ready-to-use palettes for `luadraw`.

b. Use a luadraw palette

The `Lua` palette names all use the prefix `pal` followed by the name available in the file `palettes.json`. You can access a palette by three ways.

- `palGistHeat` is a `Lua` variable.
- `getPal('GistHeat')` and `getPal('palGistHeat')` are equal to `palGistHeat`.
- `palNames['palGistHeat']` is equal to `palGistHeat`.

Note.

The `Lua` palette variables are arrays of arrays of three floats. Here is the definition of `palGistHeat`.

```
palGistHeat = {
    {0.0, 0.0, 0.0},
    {0.105882, 0.0, 0.0},
    {0.211764, 0.0, 0.0},
    {0.317647, 0.0, 0.0},
    {0.429411, 0.0, 0.0},
    {0.535294, 0.0, 0.0},
    {0.641176, 0.0, 0.0},
    {0.752941, 0.003921, 0.0},
    {0.858823, 0.145098, 0.0},
    {0.964705, 0.286274, 0.0},
    {1.0, 0.42745, 0.0},
    {1.0, 0.57647, 0.152941},
    {1.0, 0.717647, 0.435294},
    {1.0, 0.858823, 0.717647},
    {1.0, 1.0, 1.0}
}
```

The `getPal` function has some options. To explain how this works, let's consider the following use case.

```
mypal = getPal(
    'GistHeat',
    {
```

```
        extract = {2, 5, 8, 9},
        shift   = 1,
        reverse = true
    }
)
```

To simplify the explanations, we will refer to the colors in the standard palette `'GistHeat'` as `coul_1`, `coul_2`, etc. The options are then **processed in the following order**.

1. `{coul_2, coul_5, coul_8, coul_9}` is the result of the extraction.
2. `{coul_9, coul_2, coul_5, coul_8}` comes from the shifting applied to the extracted palette (colors move to the right if `shift` is positive).
3. `{coul_8, coul_5, coul_2, coul_9}` is the reversed version of the shifted palette.

Note.

The reversed version of any palette can be obtained using `getPal(palname, {reverse = true})`.

VI. Contribute via Git

Caution.

Never use the `main` *branch, which is for freezing the latest stable versions of all the projects in the mono repository* `https://github.com/projetmbc/for-writing`.

1. Complete the translations

Important.

Although we're going to explain how to translate the documentation, it doesn't seem relevant to do so, as English should suffice these days.

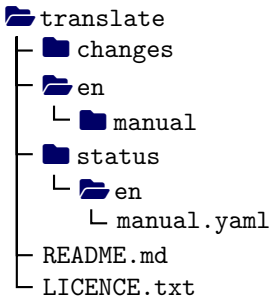


Figure 1: Simplified view of the translation folder

The translations are roughly organized as in figure 1 where just the important folders for the translations have been "*opened*".[5] **A little further down, the section VI-1-e explains how to add new translations.**

a. The en folder

This folder, managed by the author of `@prism`, contains files easy to translate even if you're not a coder.

b. The changes folder

This folder is a communication tool where important changes are indicated without dwelling on minor modifications specific to one or more translations.

[5] This was the organization on October 26, 2025.

c. The status folder

This folder is used to keep track of translations from the project's point of view. Everything is done via well-commented `YAML` files, readable by a non-coder.

d. The README.md and LICENCE.txt files

The `LICENCE.txt` file is aptly named, while the `README.md` file takes up in English the important points of what is said in this section about new translations.

e. New translations

Note.

The folder `manual` *is reserved for documentation. It contains* `TEX` *files that can be compiled directly for real-time validation of translations.*

Warning.

Only start from the `en` *folder, as it's the responsibility of the* `@prism` *author.*

Let's say you want to add support for Italian.[6] To do this, you must use `Git` as follows.

1. Via `https://github.com/projetmbc/for-writing/tree/aprism/@prism`, recover the entire project folder. Do not use the `main` branch, which is used to freeze the latest stable versions of all the projects in the mono repository `https://github.com/projetmbc/for-writing`.
2. In the `@prism/contrib/translate` folder, create an `it` copy of the `en` folder, where `it` is the short name of the language documented in the page "*IIETF language tag*" from `Wikipedia`.
3. Once the translation is complete in the `it` folder, share it via `https://github.com/projetmbc/for-writing/tree/aprism/@prism` using a classic `git push`.

2. Improving the source code

Participation as a coder is made via the repository `https://github.com/projetmbc/for-writing/tree/aprism/@prism` corresponding to the `@prism` development branch. Here is what you can do, details can be found in the file `https://github.com/projetmbc/for-writing/blob/aprism/@prism/contrib/products/README.md`.

1. Create new palettes within an existing implementation. No coding skills required.
2. Propose a new implementation in your favorite programming language.
3. Combine both approaches.

VII. History

1.2.1
2025-11-09

Fix.

- Equal palettes: the floating point equality uses now a correct tolerance.

Break.

- Palettes: the extra `Greys` has been removed (it is equal to `Grays`).

New.

- Similar palettes: two PDF files show similar palettes in standard and black modes (semi-automated process used).

Update.

- `luadraw` product: the associative array `palNames` has been added for compatibility reasons with the `luadraw` package.
- `BlindFish` palette: the last color variation has been made smoother (`luadraw` process used).

[6] As mentioned above, there is no real need for the `doc` folder.

1.2.0
2025-10-29

Break.

- Palettes: all final palettes now consist of 10 colors.
- `luadraw` products: the `getPal` dictionary array has been converted into a function accepting string palette names (with or without `pal` prefix). See below.

New.

- Palettes.
  - Added `Lemon` and `ShiftRainbow` palettes (`luadraw` creation process used).
  - Added 37 palettes from the `Scientific Coulour Maps` project.
- `luadraw` product: accessing a palette and creating new ones can be made using the `getPal` function which has an optional argument `options` (dict-like array) with the following keys and their values.
  - `extract`: a list of non-zero integers used to extract specific colors from the palette (the order is preserved).
  - `reverse`: a boolean value indicating whether to reverse the palette color order (`false` by default).
  - `shift`: an integer value for applying a circular color shift to the palette.
- Documentations
  - Added English PDF manual.
  - Showcase: two PDF files demonstrate the use of each palette (white and dark modes).

1.1.0
2025-10-14

Break.

- Duplicate palettes and those that are reverse of others are ignored (strict equalities only).

New.

- New palettes added: `BurningGrass`, `GeoRainbow` and `PastelRainbow` (`luadraw` creation process used).
- The `luadraw` palette product has a new dictionary like variable `getPal` to access a palette using its name (as a string variable).

Update.

- Palette contributions: in the mandatory `extend.py` file, the `build_code` function must work with the dictionary of all the palettes, and manage a credit to the `@prism` project.

1.0.0
2025-10-11

First public version of the project.

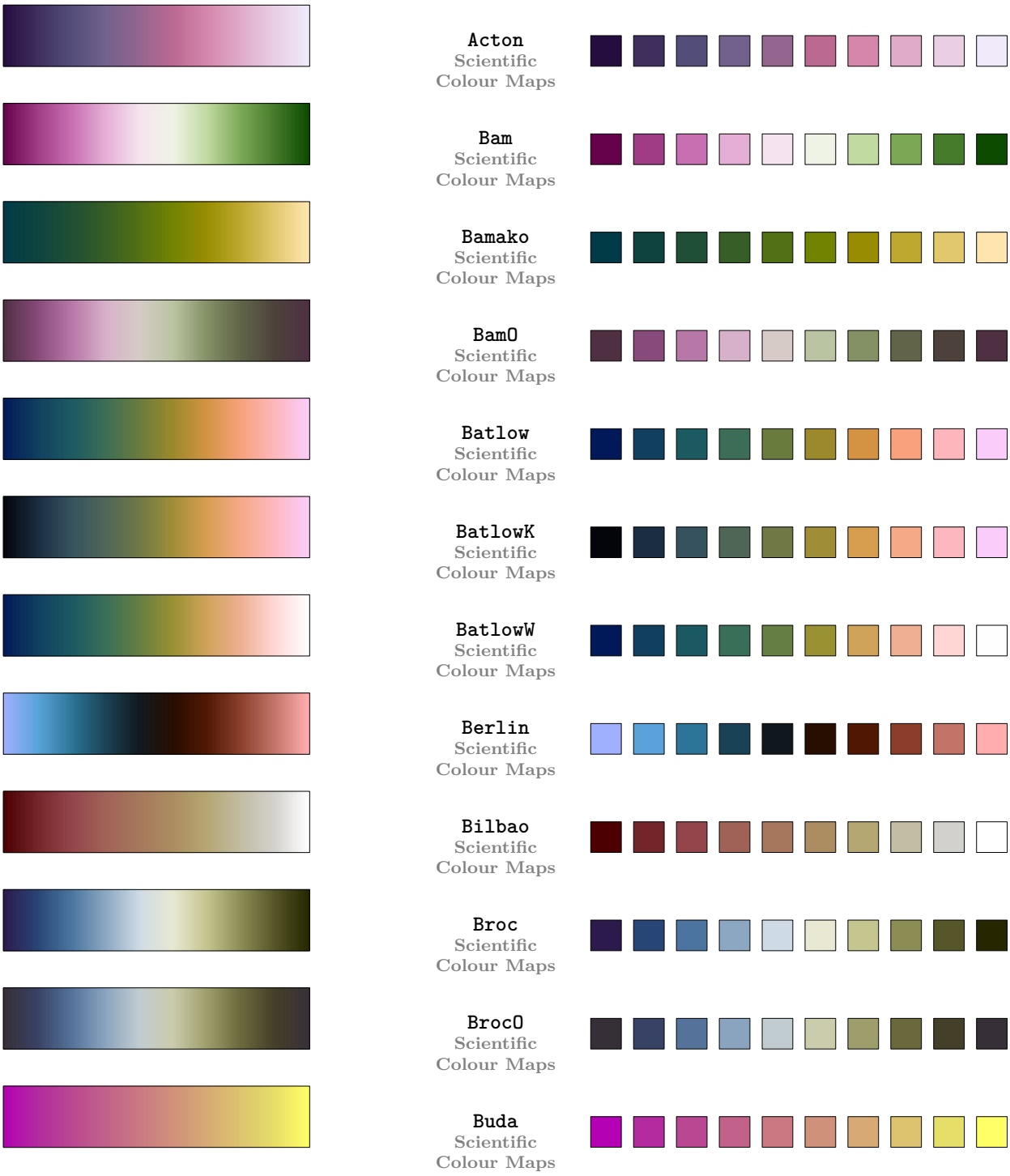
Appendix 1 – The 217 palettes at a glance

The palette names used in this appendix are standard, but most `@prism` implementations add the `pal` prefix.

Important.

Categories were generated semi-automatically using a program, followed by manual selection to obtain relevant choices. If you identify any errors, please contact the author of `@prism`.

Colorblind-friendly palettes – 40 palettes



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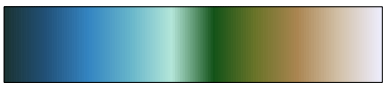
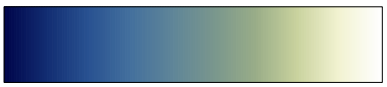


Bukavu
Scientific
Colour Maps

Cork
Scientific
Colour Maps

CorkO
Scientific
Colour Maps



Davos
Scientific
Colour Maps

Devon
Scientific
Colour Maps

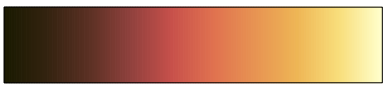
Fes
Scientific
Colour Maps

Glasgow
Scientific
Colour Maps

GrayC
Scientific
Colour Maps

Hawaii
Scientific
Colour Maps

Imola
Scientific
Colour Maps

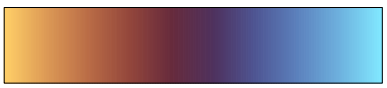


Lajolla
Scientific
Colour Maps

Lapaz
Scientific
Colour Maps

Lipari
Scientific
Colour Maps

Lisbon
Scientific
Colour Maps



Managua
Scientific
Colour Maps

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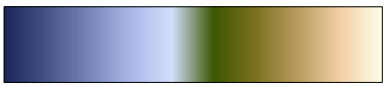
Navia
Scientific
Colour Maps

NaviaW
Scientific
Colour Maps

Nuuk
Scientific
Colour Maps



Oleron
Scientific
Colour Maps

Oslo
Scientific
Colour Maps

Roma
Scientific
Colour Maps

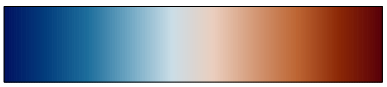
RomaO
Scientific
Colour Maps

Tofino
Scientific
Colour Maps

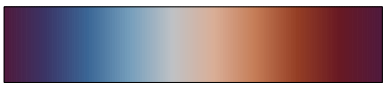
Tokyo
Scientific
Colour Maps

Turku
Scientific
Colour Maps

Vanimo
Scientific
Colour Maps



Vik
Scientific
Colour Maps



VikO
Scientific
Colour Maps

Two-color palettes – 49 palettes

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Purp
CartoColors
PurpOr
CartoColors
Purple
Cubehelix
Purples
Colorbrewer
RdPu
Colorbrewer
RedOr
CartoColors
Reds
Colorbrewer
Spring
Matplotlib
Summer
Matplotlib
Teal
CartoColors
TealGrn
CartoColors
Winter
Matplotlib
Wistia
Matplotlib
YlGn
Colorbrewer
YlOrBr
Colorbrewer
YlOrRd
Colorbrewer

Three-color palettes – 51 palettes

Acton
Scientific
Colour Maps

Afmhot
Matplotlib

Amp
cmocean

Bam
Scientific
Colour Maps

BamO
Scientific
Colour Maps

Bamako
Scientific
Colour Maps

Berlin
Scientific
Colour Maps

Bilbao
Scientific
Colour Maps

BlueGray
Light Bartlein

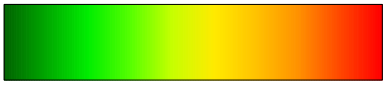
BlueGreen
Light Bartlein

BrBG
Colorbrewer

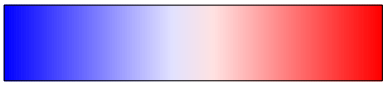
Broc
Scientific
Colour Maps

BrocO
Scientific
Colour Maps

BuPu
Colorbrewer



BurningGrass
@prism



Bwr
Matplotlib

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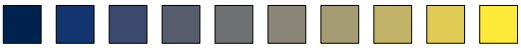
Cividis
Matplotlib

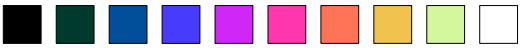


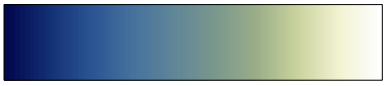
Coolwarm
Matplotlib

Cork
Scientific
Colour Maps

CorkO
Scientific
Colour Maps

Cubehelix3
Cubehelix



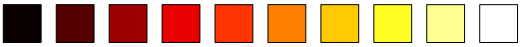


Davos
Scientific
Colour Maps

Glasgow
Scientific
Colour Maps

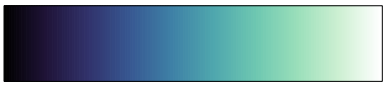
GnBu
Colorbrewer

Hot
Plotly

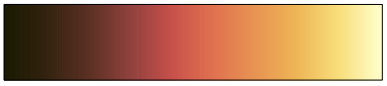


Ice
cmocean

Imola
Scientific
Colour Maps



JimSpecial
Cubehelix



Lajolla
Scientific
Colour Maps

Lapaz
Scientific
Colour Maps

Navia
Scientific
Colour Maps

NaviaW
Scientific
Colour Maps

Continued on next page

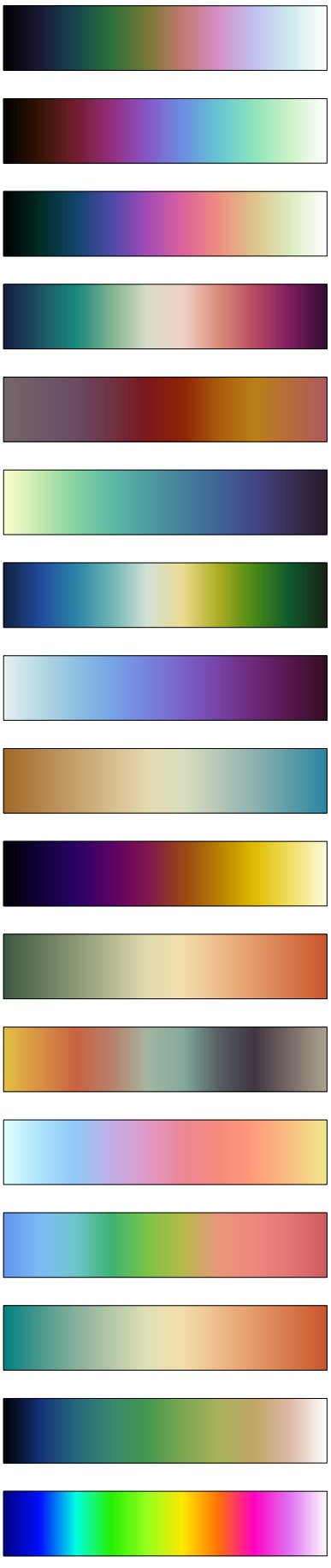
Continued on next page

Vanimo
Scientific
Colour Maps

YlGnBu
Colorbrewer

Rainbow-style palettes – 87 palettes

Continued on next page



Cubehelix
Matplotlib

Cubehelix1
Cubehelix

Cubehelix2
Cubehelix

Curl
cmocean

Darjeeling
Wes Anderson

Deep
cmocean

Delta
cmocean

Dense
cmocean

Earth
CartoColors

Electric
Plotly

Fall
CartoColors

FantasticFox
Wes Anderson

GasFlame
@prism

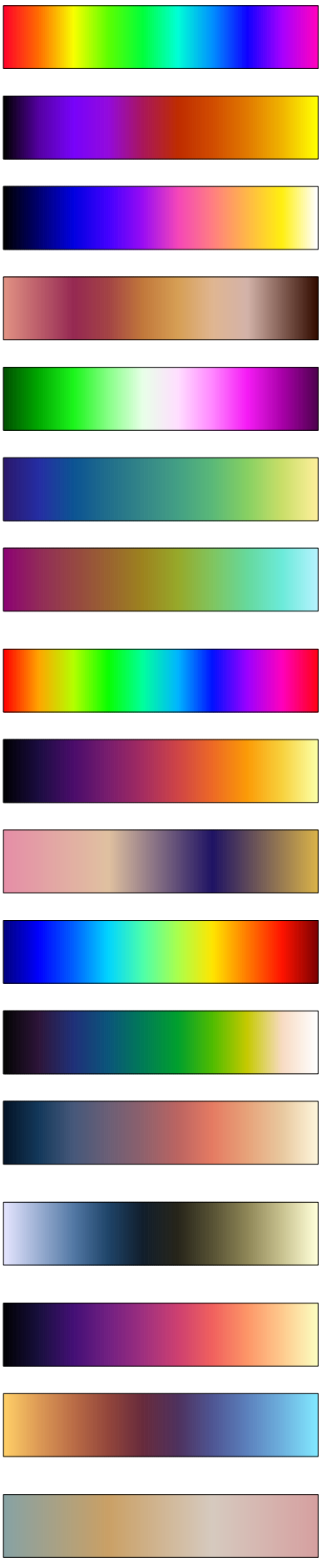
GeoRainbow
@prism

Geyser
CartoColors

GistEarth
Matplotlib

GistNcar
Matplotlib

Continued on next page



GistRainbow
Matplotlib

Gnuplot
Matplotlib

Gnuplot2
Matplotlib

GrandBudapest
Wes Anderson

GreenMagenta
Light Bartlein

Haline
cmocean

Hawaii
Scientific Colour Maps

Hsv
Matplotlib

Inferno
Matplotlib

IsleOfDogs
Wes Anderson

Jet
Plotly

LinearL
MyCarta

Lipari
Scientific Colour Maps

Lisbon
Scientific Colour Maps

Magma
Matplotlib

Managua
Scientific Colour Maps

Margot
Wes Anderson

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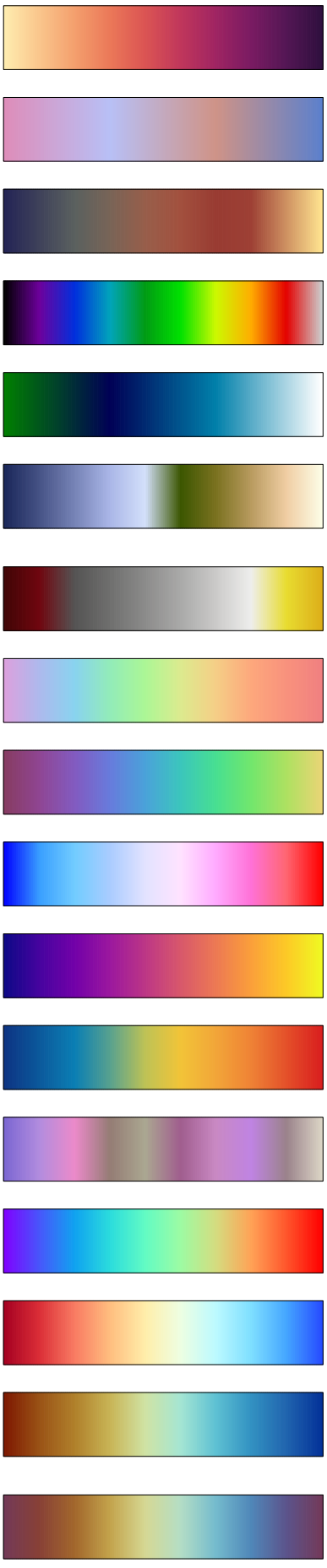


Matter
cmocean

Mend
Wes Anderson

Moonrise
Wes Anderson

NipySpectral
Matplotlib

Ocean
Matplotlib

Oleron
Scientific Colour Maps

Oxy
cmocean

PastelRainbow
@prism

PerceptualRainb
Cubehelix

Picnic
Plotly

Plasma
Matplotlib

Portland
Plotly

PurpleGray
Tableau

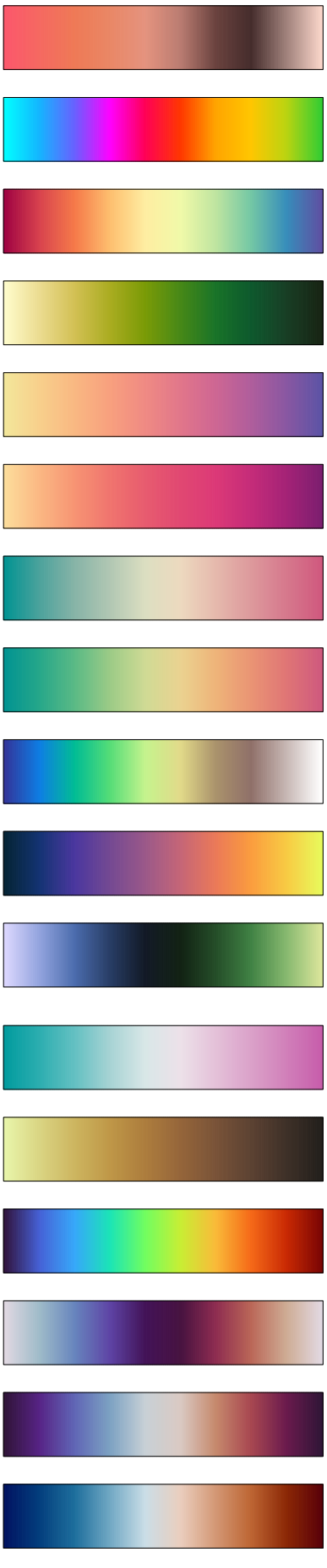
Rainbow
Plotly

RedYellowBlue
Light Bartlein

Roma
Scientific Colour Maps

RomaO
Scientific Colour Maps

Continued on next page



Royal
Wes Anderson

ShiftRainbow
@prism

Spectral
Colorbrewer

Speed
cmocean

Sunset
CartoColors

SunsetDark
CartoColors

TealRose
CartoColors

Temps
CartoColors

Terrain
Matplotlib

Thermal
cmocean

Tofino
Scientific Colour Maps

Tropic
CartoColors

Turbid
cmocean

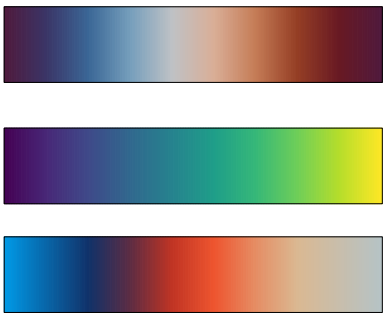
Turbo
Matplotlib

Twilight
Matplotlib

TwilightShifted
Matplotlib

Vik
Scientific Colour Maps

Continued on next page

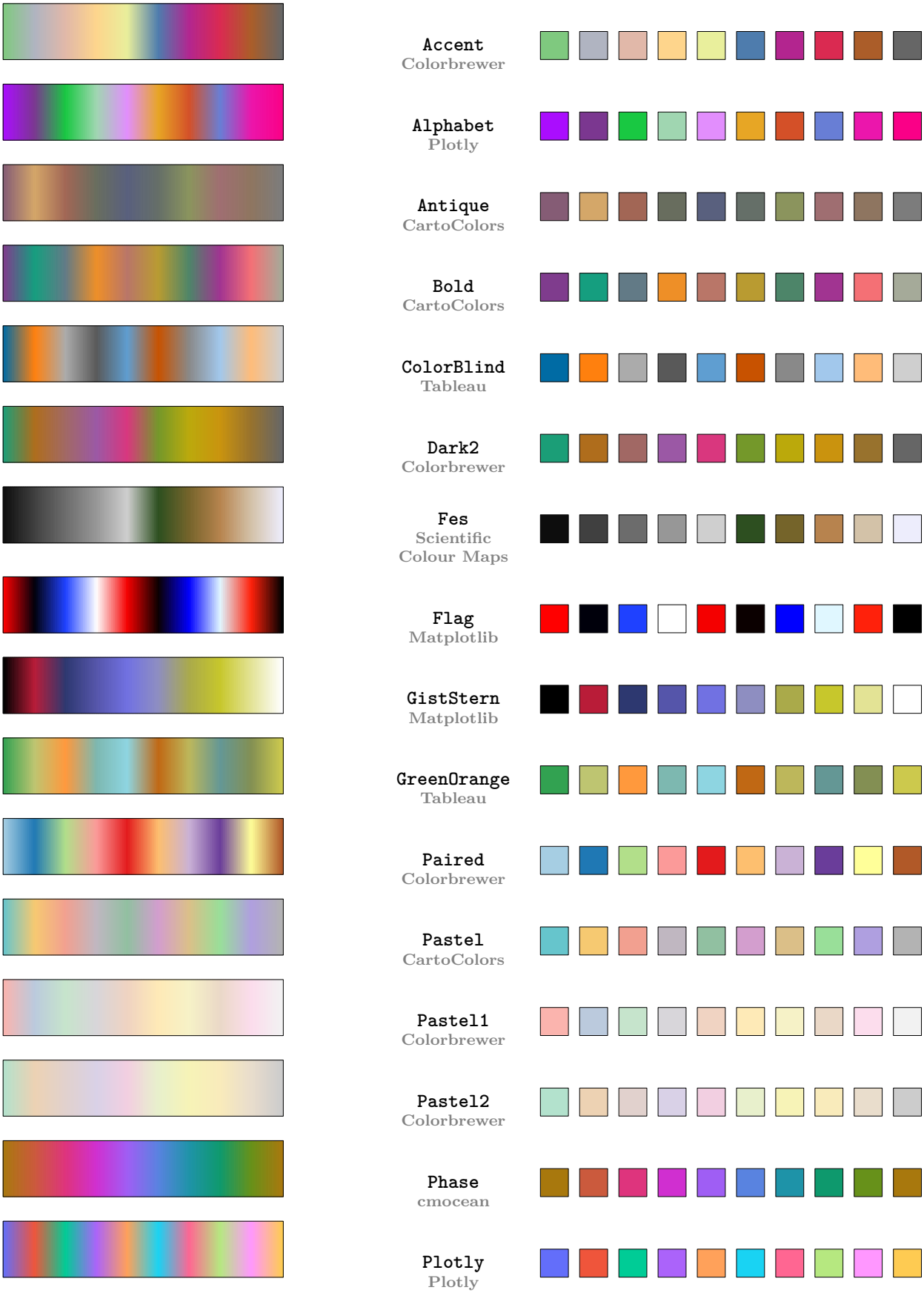


VikO
Scientific
Colour Maps

Viridis
Matplotlib

Zisso
Wes Anderson

High-contrast palettes – 30 palettes



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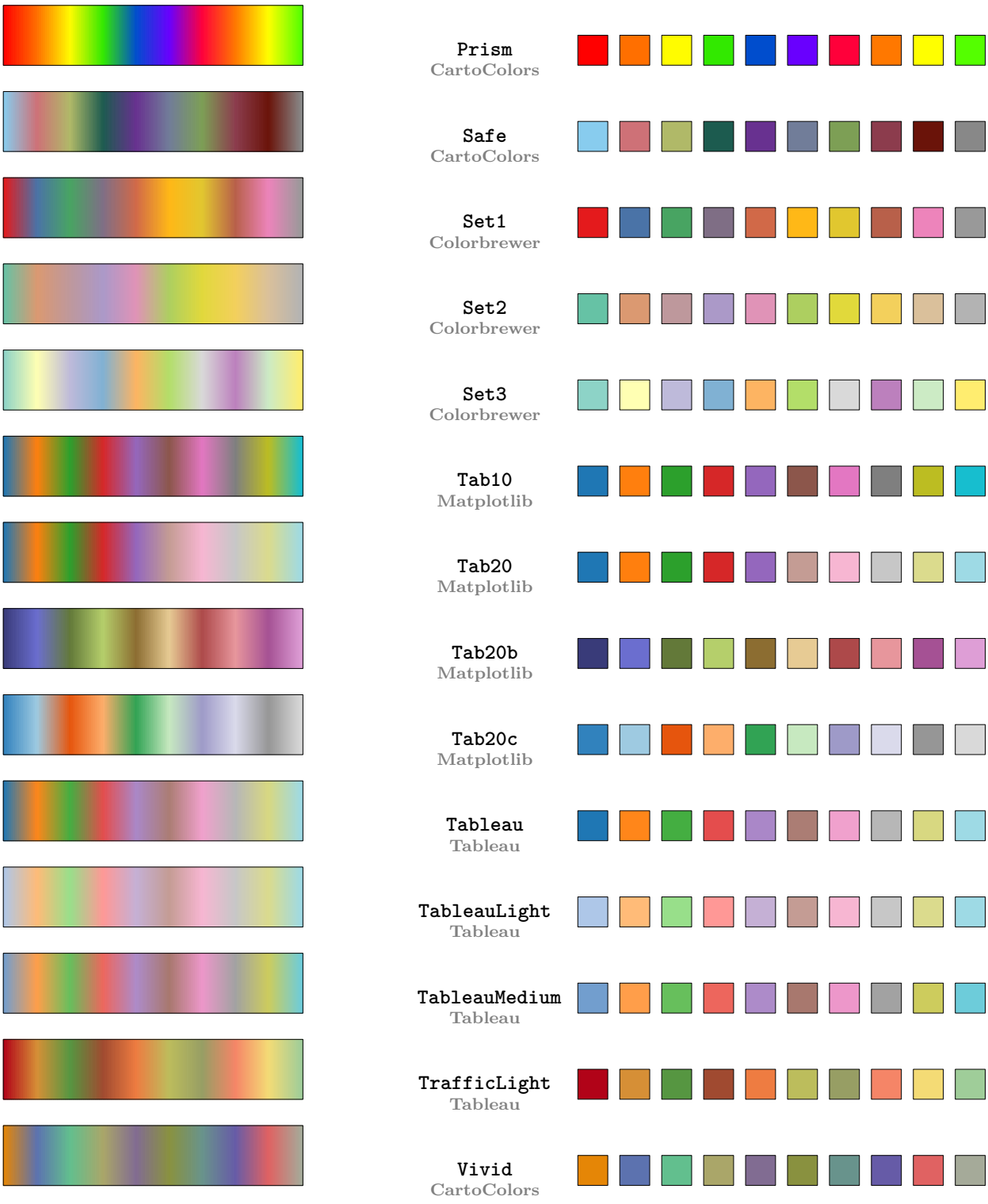

Prism
CartoColors
Safe
CartoColors
Set1
Colorbrewer
Set2
Colorbrewer
Set3
Colorbrewer
Tab10
Matplotlib
Tab20
Matplotlib
Tab20b
Matplotlib
Tab20c
Matplotlib
Tableau
Tableau
TableauLight
Tableau
TableauMedium
Tableau
TrafficLight
Tableau
Vivid
CartoColors

Appendix 2 – Similar palettes

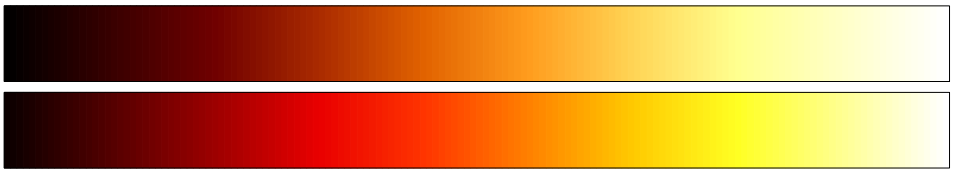
This appendix contains visually similar color palettes. While the differences between some are minimal, we have retained them to respect individual preferences.

Important.

Clusters were generated semi-automatically using a program that suggests similar palettes, followed by manual curation to retain only relevant groupings.[a] *This approach may occasionally miss some similarities. If you identify any omissions, please contact the author of* `@prism`.

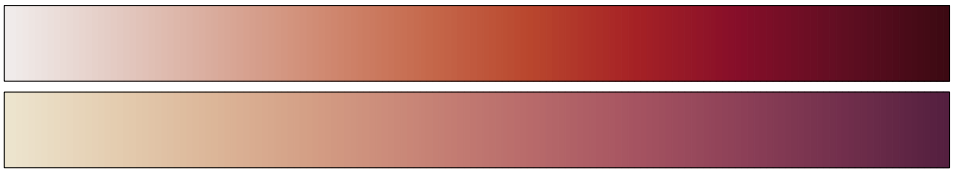
[a] The palettes are analyzed in both light and dark modes.

Cluster #1

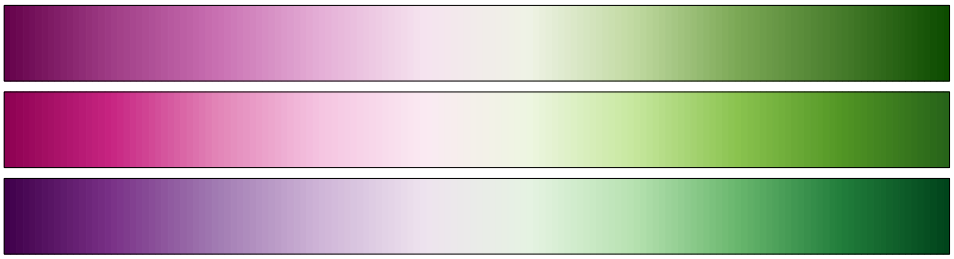


Cluster #2

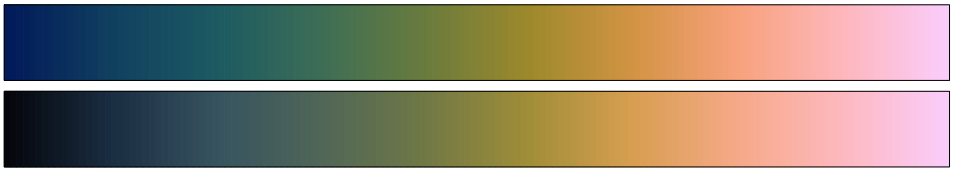
Cluster #3



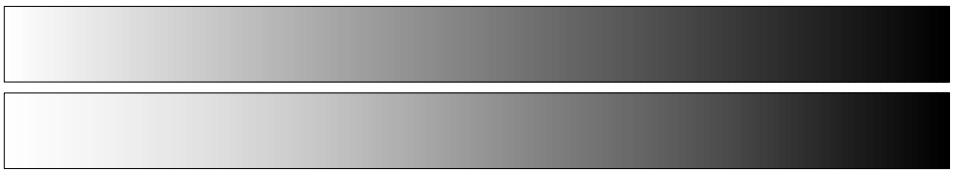
Cluster #4



Cluster #5



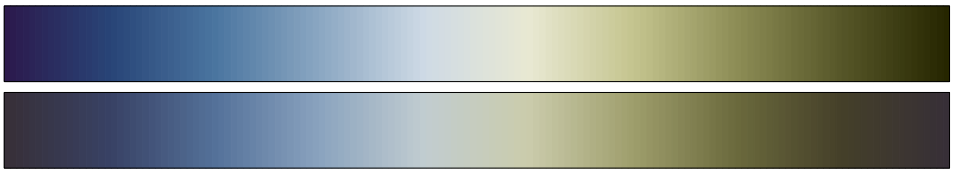
Cluster #6



Cluster #7

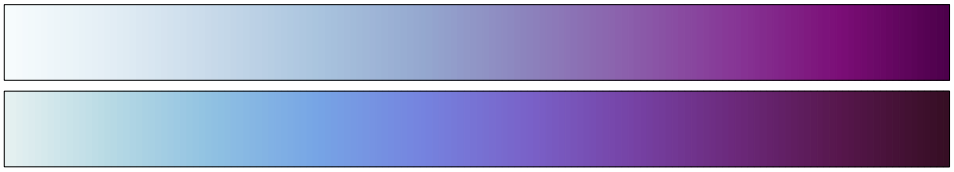
Cluster #8

Cluster #9



Cluster #10

Cluster #11

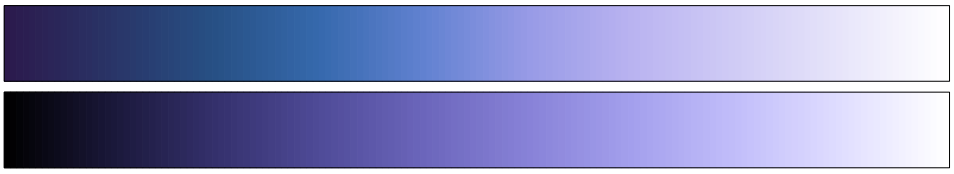


Cluster #12

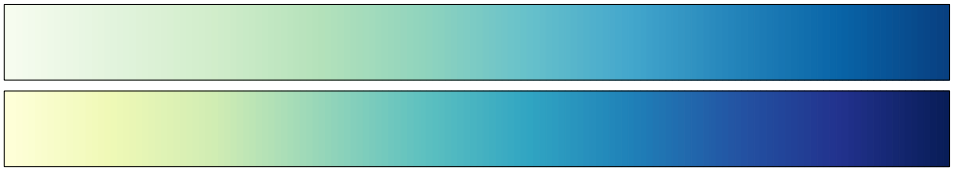
Cluster #13

Cluster #14

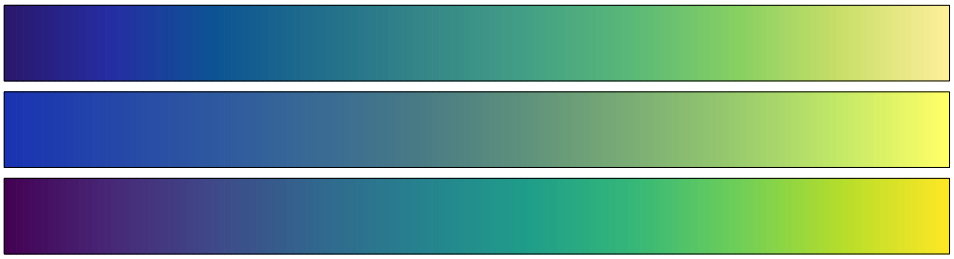
Cluster #15



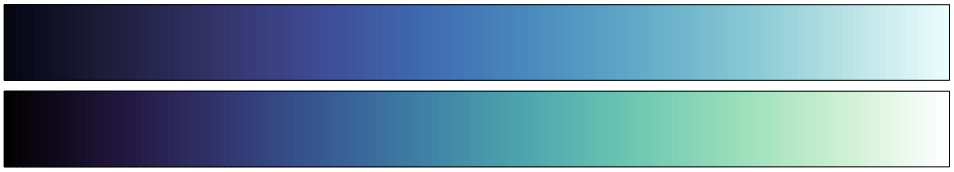
Cluster #16



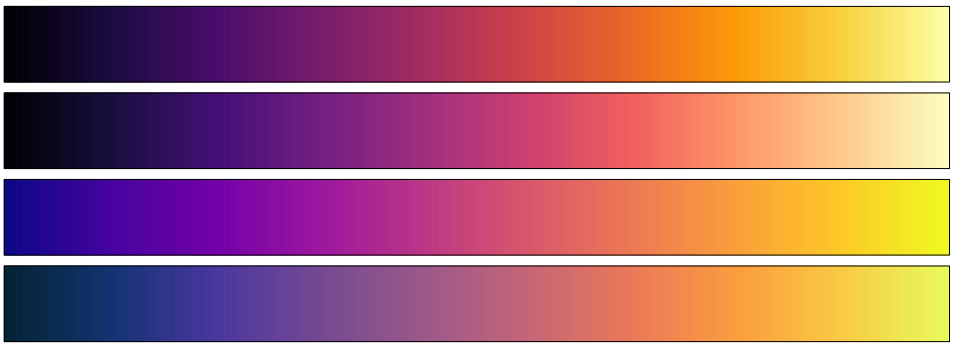
Cluster #17



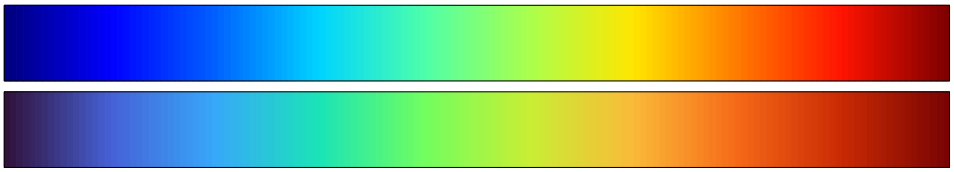
Cluster #18



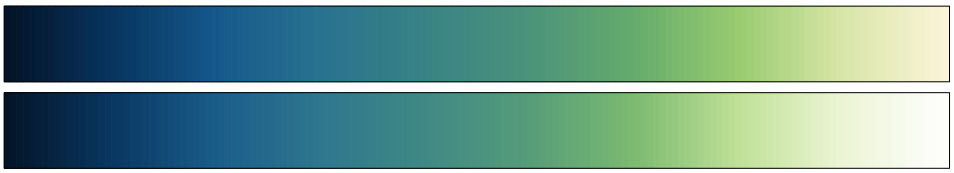
Cluster #19



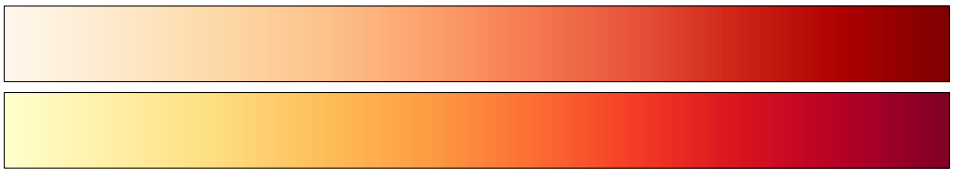
Cluster #20



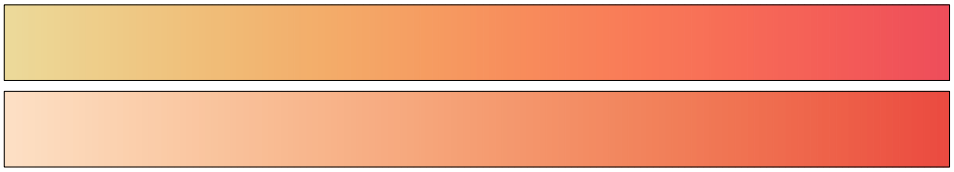
Cluster #21



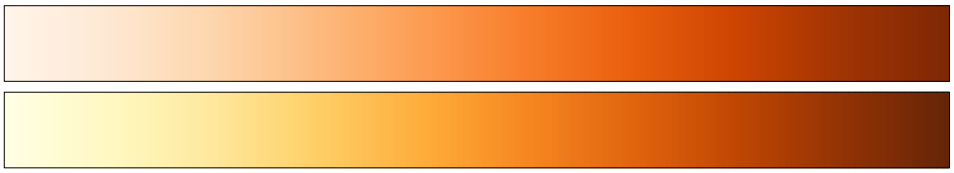
Cluster #22



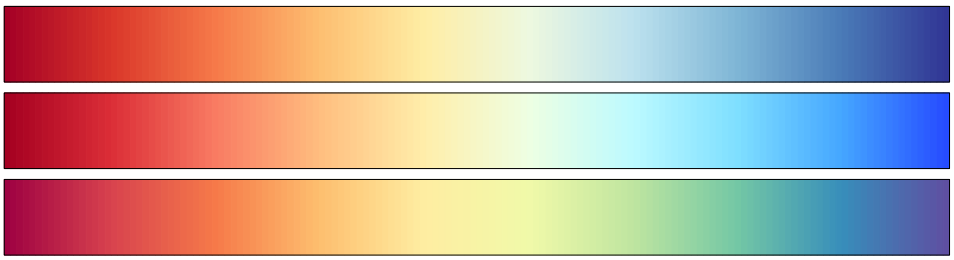
Cluster #23



Cluster #24



Cluster #25

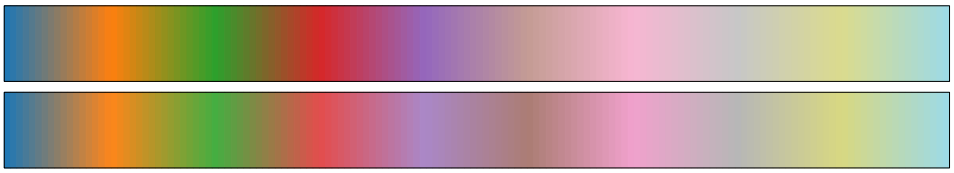


RdYlBu

RedYellowBlue

Spectral

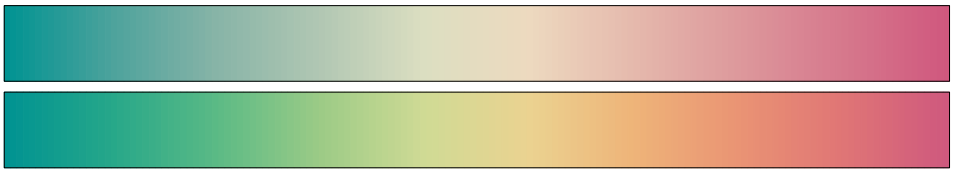
Cluster #26



Tab20

Tableau

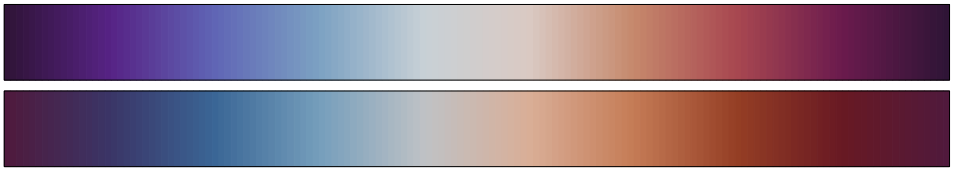
Cluster #27



TealRose

Temps

Cluster #28



TwilightShifted

VikO