Package ‘tmap’

April 9, 2020

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Title Thematic Maps
Type Package
LazyLoad yes
Description Thematic maps are geographical maps in which spatial data distributions are visual-
ized. This package offers a flexible, layer-based, and easy to use approach to create the-
matic maps, such as choropleths and bubble maps.
Version 3.0
Date 2020-04-08
Depends R (>= 3.5.0), methods
Imports tmaptools (>= 3.0), sf (>= 0.9-1), stars (>= 0.4-1), units (>=
 0.6-1), grid, RColorBrewer, viridisLite, classInt (>= 0.4-3),
htmltools, htmlwidgets, leaflet (>= 2.0.2), leafsync, leafem
(>= 0.1), stats
Suggests rmapshaper, rmarkdown, knitr, png, cartogram, osmdata,
ggplot2, dplyr, tidyr, shiny, testthat, covr
URL https://github.com/mtennekes/tmap
BugReports https://github.com/mtennekes/tmap/issues
VignetteBuilder knitr
RoxygenNote 7.1.0
NeedsCompilation no
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Repository  CRAN
Date/Publication  2020-04-09 11:50:02 UTC

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Description

Thematic maps are geographical maps in which spatial data distributions are visualized. This package offers a flexible, layer-based, and easy to use approach to create thematic maps, such as choropleths and bubble maps. It is based on the grammar of graphics, and resembles the syntax of ggplot2.

Details

This page provides a brief overview of all package functions. See vignette("tmap-getstarted") for a short introduction with examples.

Quick plotting method

\texttt{qt \_ m} \hspace{1cm} \text{Plot a thematic map}

Main plotting method

Shape specification:

\texttt{tm \_ shape} \hspace{1cm} \text{Specify a shape object}

Aesthetics base layers:

\begin{itemize}
  \item \texttt{tm \_ polygons} \hspace{1cm} \text{Create a polygon layer (with borders)}
  \item \texttt{tm \_ symbols} \hspace{1cm} \text{Create a layer of symbols}
  \item \texttt{tm \_ lines} \hspace{1cm} \text{Create a layer of lines}
  \item \texttt{tm \_ raster} \hspace{1cm} \text{Create a raster layer}
  \item \texttt{tm \_ text} \hspace{1cm} \text{Create a layer of text labels}
  \item \texttt{tm \_ basemap} \hspace{1cm} \text{Create a layer of basemap tiles}
  \item \texttt{tm \_ tiles} \hspace{1cm} \text{Create a layer of overlay tiles}
\end{itemize}
Aesthetics derived layers:

- **tm_fill**: Create a polygon layer (without borders)
- **tm_borders**: Create polygon borders
- **tm_bubbles**: Create a layer of bubbles
- **tm_squares**: Create a layer of squares
- **tm_dots**: Create a layer of dots
- **tm_markers**: Create a layer of markers
- **tm_iso**: Create a layer of iso/contour lines
- **tm_rgb**: Create a raster layer of an image

Faceting (small multiples)

- **tm_facets**: Define facets

Attributes:

- **tm_grid**: Create grid lines
- **tm_scale_bar**: Create a scale bar
- **tm_compass**: Create a map compass
- **tm_credits**: Create a text for credits
- **tm_logo**: Create a logo
- **tm_xlab and tm_ylab**: Create axis labels
- **tm_minimap**: Create a minimap (view mode only)

Layout element:

- **tm_layout**: Adjust the layout (main function)
- **tm_legend**: Adjust the legend
- **tm_view**: Configure the interactive view mode
- **tm_style**: Apply a predefined style
- **tm_format**: Apply a predefined format

Change options:

- **tmap_mode**: Set the tmap mode: "plot" or "view"
- **ttm**: Toggle between the modes
- **tmap_options**: Set global tmap options (from tm_layout, tm_view, and a couple of others)
- **tmap_style**: Set the default style
Create icons:

| tmap_icons | Specify icons for markers or proportional symbols |

Output functions

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Author(s)

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References


See Also

vignette("tmap-getstarted")
## Stacking of tmap elements

### Description

The plus operator allows you to stack tmap-elements, and groups of tmap-elements.

### Usage

```r
## S3 method for class 'tmap'
+ e1 + e2
```

### Arguments

- `e1`: first tmap-element
- `e2`: second tmap-element

### References


### See Also

- tmap-element
- vignette("tmap-getstarted")

---

### Deprecated tmap functions

### Description

Since version 2.0, tmap function names are prefixed with a tm_ or tmap_. Therefore, function names used by tmap 1.x such as animation_tmap have been renamed to tmap_animation.

### Details

- `animation_tmap`: replaced by tmap_animation
- `save_tmap`: replaced by tmap_save
- `style_catalogue`: replaced by tmap_style_catalogue
- `style_catalog`: replaced by tmap_style_catalog
- `last_map`: replaced by tmap_last
- `tm_style_white`: replaced by tm_style("white")
- `tm_style_gray`: replaced by tm_style("gray")
- `tm_style_grey`: replaced by tm_style("grey")
land

Spatial data of global land cover

Description

Spatial data of global land cover, of class `RasterBrick`. The data includes a population times series from 1950 to (forecasted) 2030. All metro areas with over 1 million inhabitants in 2010 are included.

Usage

data(land)

Details

**Important:** publication of these maps is only allowed when cited to Tateishi et al. (2014), and when "Geospatial Information Authority of Japan, Chiba University and collaborating organizations." is shown. See [http://www.iscgm.org/gm/glcnmo.html#use](http://www.iscgm.org/gm/glcnmo.html#use).

Source

[http://www.iscgm.org/gm/glcnmo.html](http://www.iscgm.org/gm/glcnmo.html)

References

metro  

*Spatial data of metropolitan areas*

**Description**

Spatial data of metropolitan areas, of class `sf`. The data includes a population times series from 1950 to (forecasted) 2030. All metro areas with over 1 million inhabitants in 2010 are included.

**Usage**

```r
data(metro)
```

**Source**

[https://population.un.org/wup/](https://population.un.org/wup/)

**References**


---

**print.tmap**  

*Draw thematic map*

**Description**

Draw thematic map. If the tmap mode is set to "plot" (see `tmap_mode`), the map is plot in the current graphics device. If the mode is set to "view", the map is shown interactively as an htmlwidget.

**Usage**

```r
## S3 method for class 'tmap'
print(
  x,
  vp = NULL,
  return.asp = FALSE,
  mode = getOption("tmap.mode"),
  show = TRUE,
  knit = FALSE,
  options = NULL,
  ...
)
```

```r
knit_print.tmap(x, ..., options = NULL)
```
Arguments

x  tmap object. A tmap object is created with qtm or by stacking tmap-elements.
vp  viewport to draw the plot in. This is particularly useful for insets.
return.asp Logical that determines whether the aspect ratio of the map is returned. In that case, grid.newpage() will be called, but without plotting of the map. This is used by tmap_save to determine the aspect ratio of the map.
mode  the mode of tmap: "plot" (static) or "view" (interactive). See tmap_mode for details.
show  logical that determines whether to show to map. Obviously TRUE by default, but show=FALSE can be useful for just obtaining the returned objects.
knot  should knit_print be enabled, or the normal print function?
options  options passed on to knitprint
...  not used

Value

If mode="plot", then a list is returned with the processed shapes and the metadata. If mode="view", a leaflet object is returned (see also tmap_leaflet)

qtm  Quick thematic map plot

Description

Draw a thematic map quickly. This function is a convenient wrapper of the main plotting method of stacking tmap-elements. Without arguments or with a search term, this functions draws an interactive map.

Usage

qtm(
  shp,
  fill = NA,
  symbols.size = NULL,
  symbols.col = NULL,
  symbols.shape = NULL,
  dots.col = NULL,
  text = NULL,
  text.size = 1,
  text.col = NA,
  lines.lwd = NULL,
  lines.col = NULL,
  raster = NA,
  borders = NA,
by = NULL,
scale = NA,
title = NA,
projection = NULL,
bbox = NULL,
basemaps = NA,
overlays = NA,
style = NULL,
format = NULL,
...)

Arguments

shp One of
- shape object, which is an object from a class defined by the sf, sp, or raster package. For instance, an sf object, an SpatialPolygons(DataFrame), or a RasterBrick.
- Not specified, i.e. qtm() is executed. In this case a plain interactive map is shown.
- A OSM search string, e.g. qtm("Amsterdam"). In this case a plain interactive map is shown positioned according to the results of the search query (from OpenStreetMap nominatim)

fill either a color to fill the polygons, or name of the data variable in shp to draw a choropleth. Only applicable when shp contains polygons. Set fill = NULL to draw only polygon borders. See also argument borders.

symbols.size either the size of the symbols or a name of the data variable in shp that specifies the sizes of the symbols. See also the size argument of tm_symbols. Only applicable when shp contains spatial points, lines, or polygons.

symbols.col either the color of the symbols or a name of the data variable in shp that specifies the colors of the symbols. See also the col argument of tm_symbols. Only applicable when shp contains spatial points, lines, or polygons.

symbols.shape either the shape of the symbols or a name of the data variable in shp that specifies the shapes of the symbols. See also the shape argument of tm_symbols. Only applicable when shp contains spatial points, lines, or polygons.

dots.col name of the data variable in shp for the dot map that specifies the colors of the dots. If dots.col is specified instead symbols.col, dots instead of bubbles are drawn (unless symbols.shape is specified).

text Name of the data variable that contains the text labels. Only applicable when shp contains spatial points, lines, or polygons.

text.size Font size of the text labels. Either a constant value, or the name of a numeric data variable. Only applicable when shp contains spatial points, lines, or polygons.

text.col name of the data variable in shp for the that specifies the colors of the text labels. Only applicable when shp contains spatial points, lines, or polygons.

lines.lwd either a line width or a name of the data variable that specifies the line width. Only applicable when shp contains spatial lines.
lines.col either a line color or a name of the data variable that specifies the line colors. Only applicable when `shp` contains spatial lines.

raster either a color or a name of the data variable that specifies the raster colors. Only applicable when `shp` is a spatial raster.

borders color of the polygon borders. Use NULL to omit the borders.

by data variable name by which the data is split, or a vector of two variable names to split the data by two variables (where the first is used for the rows and the second for the columns). See also `tm_facets`.

scale numeric value that serves as the global scale parameter. All font sizes, symbol sizes, border widths, and line widths are controlled by this value. The parameters `symbols.size`, `text.size`, and `lines.lwd` can be scaled separately with respect to `symbols.scale`, `text.scale`, and `lines.scale`. See also `...`.

title main title. For legend titles, use `X.style`, where `X` is the layer name (see `...`).

projection Either a `crs` object or a character value (PROJ.4 character string). By default, the projection is used that is defined in the `shp` object itself.

bbox bounding box. Argument passed on to `tm_shape`.

basemaps name(s) of the provider or an URL of a tiled basemap. It is a shortcut to `tm_basemap`. Set to `NULL` to disable basemaps. By default, it is set to the `tmap` option `basemaps`.

overlays name(s) of the provider or an URL of a tiled overlay map. It is a shortcut to `tm_tiles`.

style Layout options (see `tm_layout`) that define the style. See `tmap_style` for details.

format Layout options (see `tm_layout`) that define the format. See `tmap_format` for details.

... arguments passed on to the `tm_*` functions. The prefix of these arguments should be with the layer function name without "tm_" and a period. For instance, the palette for polygon fill color is called `fill.palette`. The following prefixes are supported: `shape`, `fill`, `borders`, `polygons`, `symbols`, `dots`, `lines`, `raster`, `text`, `layout`, `grid`, `facets`, and `view`. Arguments that have a unique name, i.e. that does not exist in any other layer function, e.g. `convert2density`, can also be called without prefix.

Details

The first argument is a shape object (normally specified by `tm_shape`). The next arguments, from `fill` to `raster`, are the aesthetics from the main layers. The remaining arguments are related to the map layout. Any argument from any main layer function, such as `tm_polygons`, can be specified (see `...`). It is also possible to stack `tmap-elements` on a `qtm` plot. See examples.

By default, a scale bar is shown. This option can be set with `tmap_options` (argument `qtm.scalebar`). A minimap is shown by default when `qtm` is called without arguments of with a search term. This option can be set with `tmap_options` (argument `qtm.minimap`).

Value

`tmap-element`
References


See Also

vignette("tmap-getstarted")

Examples

data(World, rivers, metro)

# just the map
qtm(World)

# choropleth
qtm(World, fill = "economy", format = "World", style = "col_blind")

# choropleth with more specifications
qtm(World, fill="HPI", fill.n = 9, fill.palette = "div",
    fill.title = "Happy Planet Index", fill.id = "name",
    style = "gray", format = "World")

# this map can also be created with the main plotting method,
# which is recommended in this case.
## Not run:
    tm_shape(World) +
    tm_polygons("HPI", n = 9, palette = "div",
        title = "Happy Planet Index", id = "name") +
    tm_style("gray") +
    tm_format("World")

## End(Not run)

# bubble map
## Not run:
    qtm(World, borders = NULL) +
    qtm(metro, symbols.size = "pop2010",
        symbols.title.size= "Metropolitan Areas",
        symbols.id= "name",
        format = "World")

## End(Not run)

# dot map
## Not run:
current.mode <- tmap_mode("view")
qtm(metro, bbox = "China")
tmap_mode(current.mode) # restore mode

## End(Not run)

## Not run:
# without arguments, a plain interactive map is shown (the mode is set to view)
renderTmap

```r
qtm()
#
## End(Not run)
```

**Description**

Use `tmapOutput` to create a UI element, and `renderTmap` to render the tmap map. To update the map (more specifically, to add and remove layers) use `tmapProxy`. Adding layers is as usual, removing layers can be done with the function `tm_remove_layer`.

**Usage**

```r
renderTmap(expr, env = parent.frame(), quoted = FALSE)
tmapOutput(outputId, width = "100\%", height = 400)
tmapProxy(mapId, session = shiny::getDefaultReactiveDomain(), x)

`tmapProxy` is called whenever the `renderTmap` output is updated. You can pass a tmap object to the `x` argument of `tm_remove_layer` to remove layers.
```

**Arguments**

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>expr</code></td>
<td>A tmap object. A tmap object is created with <code>qtm</code> or by stacking <code>tmap-elements</code>.</td>
</tr>
<tr>
<td><code>env</code></td>
<td>The environment in which to evaluate <code>expr</code></td>
</tr>
<tr>
<td><code>quoted</code></td>
<td>Is <code>expr</code> a quoted expression (with <code>quote()</code>)? This is useful if you want to save an expression in a variable</td>
</tr>
<tr>
<td><code>outputId</code></td>
<td>Output variable to read from</td>
</tr>
<tr>
<td><code>width</code>, <code>height</code></td>
<td>the width and height of the map</td>
</tr>
<tr>
<td><code>mapId</code></td>
<td>single-element character vector indicating the output ID of the map to modify (if invoked from a Shiny module, the namespace will be added automatically)</td>
</tr>
<tr>
<td><code>session</code></td>
<td>the Shiny session object to which the map belongs; usually the default value will suffice</td>
</tr>
<tr>
<td><code>x</code></td>
<td>the tmap object that specifies the added and removed layers.</td>
</tr>
<tr>
<td><code>zindex</code></td>
<td>the z index of the pane in which the layer is contained that is going to be removed. It is recommended to specify the <code>zindex</code> for this layer when creating the map (inside <code>renderTmap</code>).</td>
</tr>
</tbody>
</table>
Details

Two features from tmap are not (yet) supported in Shiny: small multiples (facets) and colored backgrounds (argument bg.color of tm_layout). Workarounds for small multiples: create multiple independent maps or specify as.layers = TRUE in tm_facets.

Examples

```r
if (require("shiny")) {

  data(World)
  world_vars <- setdiff(names(World), c("iso_a3", "name", "sovereignt", "geometry"))

  ui <- fluidPage(
    tmapOutput("map"),
    selectInput("var", "Variable", world_vars)
  )

  server <- function(input, output, session) {
    output$map <- renderTmap({
      tm_shape(World) +
      tm_polygons(world_vars[1], zindex = 401)
    })

    observe({
      var <- input$var
      tmapProxy("map", session, {
        tm_remove_layer(401) +
        tm_shape(World) +
        tm_polygons(var, zindex = 401)
      })
    })
  }

  app <- shinyApp(ui, server)
  if (interactive()) app
}
```

rivers

<table>
<thead>
<tr>
<th>rivers</th>
<th>Spatial data of rivers</th>
</tr>
</thead>
</table>

Description

Spatial data of rivers, of class sf

Usage

data(rivers)
theme_ps

Source

http://www.naturalearthdata.com

| theme_ps | ggplot2 theme for proportional symbols |

Description

ggplot2 theme for proportional symbols. By default, this theme only shows the plotting area, so without titles, axes, and legend

Usage

```r
theme_ps(
  base_size = 12,
  base_family = "",
  plot.axes = FALSE,
  plot.legend = FALSE
)
```

Arguments

- `base_size`: base size
- `base_family`: base family
- `plot.axes`: should the axes be shown?
- `plot.legend`: should the legend(s) be shown?

Tmap-element

| tmap-element | tmap element |

Description

Building block for drawing thematic maps. All element functions have the prefix `tm_`.

Details

The fundamental, and hence required element is `tm_shape`, which specifies the shape object, and also specifies the projection and bounding box.

The elements that serve as aesthetics layers are

- **Base layers**:
  - `tm_polygons`: Create a polygon layer (with borders)
  - `tm_symbols`: Create a layer of symbols
  - `tm_lines`: Create a layer of lines
tm_raster Create a raster layer
tm_text Create a layer of text labels
tm_basemap Create a layer of basemap tiles
tm_tiles Create a layer of overlay tiles

Derived layers:

- tm_fill Create a polygon layer (without borders)
- tm_borders Create polygon borders
- tm_bubbles Create a layer of bubbles
- tm_squares Create a layer of squares
- tm_dots Create a layer of dots
- tm_markers Create a layer of markers
- tm_iso Create a layer of iso/contour lines
- tm_rgb Create a raster layer of an image

The layers can be stacked by simply adding them with the + symbol. The combination of the elements described above form one group. Multiple groups can be stacked. Each group should start with tm_shape.

Attributes layers:

- tm_grid Create grid lines
- tm_scale_bar Create a scale bar
- tm_compass Create a map compass
- tm_credits Create a text for credits
- tm_logo Create a logo
- tm_xlab and tm_ylab Create axis labels
- tm_minimap Create a minimap (view mode only)

Layout element:

- tm_layout Adjust the layout (main function)
- tm_legend Adjust the legend
- tm_view Configure the interactive view mode
- tm_style Apply a predefined style
- tm_format Apply a predefined format

References

tmap_animation

See Also

vignette("tmap-getstarted")
The examples in each of the element functions

---

**tmap_animation**  Create animation

**Description**

Create a gif or mpeg animation from a tmap plot. The free tool ImageMagick is required.

**Usage**

```r
  tmap_animation(
    tm,
    filename = "animation.gif",
    width = NA,
    height = NA,
    dpi = NA,
    delay = 40,
    loop = TRUE,
    restart.delay = 0
  )
```

**Arguments**

- **tm** tmap object. In order to create a series of tmap plots, which will be the frames of the animation, it is important to set `nrow` and `ncol` in `tm_facets`, for otherwise a small multiples plot is generated. Commonly, where one map is shown at a time, both `nrow` and `ncol` are set to 1.
- **filename** filename of the video (should be a .gif or .mpg file)
- **width** width of the animation file (in pixels)
- **height** height of the animation file (in pixels)
- **dpi** dots per inch. Only applicable for raster graphics. By default 300, but this can be set with the option `output.dpi` in `tmap_options`.
- **delay** delay time between images (in 1/100th of a second)
- **loop** logical that determined whether the animation is looped, or an integer value that determines how many times the animation is looped.
- **restart.delay** delay time between the loops (in 1/100th of a second)

**Note**

Not only tmap plots are supported, but any series of R plots.
tmap_arrange

### Examples

```r
## Not run:
data(NLD_prov)

m1 <- tm_shape(NLD_prov) +
  tm_polygons("yellow") +
  tm_facets(along = "name")

tmap_animation(m1, filename="Dutch_provinces.gif", width=800, delay=40)

data(World, metro)

m2 <- tm_shape(World, simplify = 0.5) +
  tm_fill() +
  tm_shape(metro) +
  tm_bubbles(size = paste0("pop", seq(1970, 2030, by=10)),
              col = "purple",
              border.col = "black", border.alpha = .5,
              scale = 2) +
  tm_facets(free.scales.symbol.size = FALSE, nrow=1,ncol=1) +
  tm_format("World", scale=.5)

tmap_animation(m2, filename="World population.gif", width=1200, delay=100)

## End(Not run)
```

### Description

Arrange small multiples in grid layout. Normally, small multiples are created by specifying multiple variables for one aesthetic or by specifying the by argument (see `tm_facets`). This function can be used to arrange custom small multiples in a grid layout.

### Usage

```r
tmap_arrange(  
  ...,  
  ncol = NA,  
  nrow = NA,  
  widths = NA,  
  heights = NA,  
  sync = FALSE,  
  asp = 0,  
  outer.margins = 0.02  
)
```
knit_print.tmap_arrange(x, ..., options = NULL)

## S3 method for class 'tmap_arrange'
print(x, knit = FALSE, ..., options = NULL)

Arguments

... tmap objects or one list of tmap objects. The number of multiples that can be plot is limited (see details).
ncol number of columns
nrow number of rows
widths vector of column widths. It should add up to 1 and the length should be equal to ncol
heights vector of row heights. It should add up to 1 and the length should be equal to nrow
sync logical. Should the navigation in view mode (zooming and panning) be synchronized? By default FALSE.
asp aspect ratio. The aspect ratio of each map. Normally, this is controlled by the asp argument from tm_layout (also a tmap option). This argument will overwrite it, unless set to NULL. The default value for asp is 0, which means that the aspect ratio is adjusted to the size of the device divided by the number of columns and rows. When asp is set to NA, which is also the default value for tm_layout, the aspect ratio will be adjusted to the used shapes.
outer.margins outer.margins, numeric vector four or a single value. If defines the outer margins for each multiple. If will overwrite the outer.margins argument from tm_layout, unless set to NULL.
x a tmap_arrange object (returned from tmap_arrange)
options options passed on to knitprint
knit should knit_print be enabled, or the normal print function?

Details

The global option tmap.limits controls the limit of the number of facets that are plotted. By default, tmap_options(tmap.limits=c(facets.view=4,facets.plot=64)). The maximum number of interactive facets is set to four since otherwise it may become very slow.

Examples

data(World)
w1 <- qtm(World, projection = "+proj=eck4", title="Eckert IV")
w2 <- qtm(World, projection = 3857, title="Mercator")
w3 <- qtm(World, projection = "+proj=gall", title="Gall stereographic")
w4 <- qtm(World, projection = "+proj=robin", title="Robinsin")
current.mode <- tmap_mode("plot")
tmap_arrange(w1, w2, w3, w4, widths = c(.25, .75))
tmap_mode(current.mode)
tmap_format  

Get or add format options

Description

Format options are tmap options that are shape dependent. With tmap_format() the predefined formats can be retrieved. The values for a specific format can be retrieved with tmap_format(format), where format is the name of the format. The function tmap_format_add is used to add a format.

Usage

tmap_format(format)

tmap_format_add(..., name)

Arguments

format  
name of the format. Run tmap_format() to see the choices.

...  
options from tm_layout or tm_view. Can also be a list of those options.

name  
name of the new format.

Value

the function tmap_format() returns the names of the available formats. When format is defined, it returns the option list corresponding the that format.

See Also

tm_layout for predefined styles, tmap_style_catalogue to create a style catalogue of all available styles, and tmap_options for tmap options.

tmap_options for tmap options

Examples

# available formats
tmap_format()

# create option list to be used as a new format
World_small <- tmap_format("World")
World_small$scale <- 2

# add format
tmap_format_add(World_small, name = "World_small")

# observe that World_small is successfully added:
tmap_format()

data(World)
tmap_icons

qtM(World, fill="HPI", format="World_small")

---

**tmap_icons**  Specify icons

**Description**

Specifies icons from a png images, which can be used as markers in thematic maps. The function `marker_icon` is the specification of the default marker.

**Usage**

```r
tmap_icons(
  file,
  width = 48,
  height = 48,
  keep.asp = TRUE,
  just = c("center", "center"),
  as.local = TRUE,
  ...
)
```

`marker_icon()`

**Arguments**

- **file** character value/vector containing the file path(s) or url(s).
- **width** width of the icon. If `keep.asp`, this is interpreted as the maximum width.
- **height** height of the icon. If `keep.asp`, this is interpreted as the maximum height.
- **keep.asp** keep the aspect ratio of the png image. If `TRUE` and the aspect ratio differs from `width/height` either `width` or `height` is adjusted accordingly.
- **just** justification of the icons relative to the point coordinates. The first value specifies horizontal and the second value vertical justification. Possible values are: "left", "right", "center", "bottom", and "top". Numeric values of 0 specify left alignment and 1 right alignment. The default value of `just` is `c("center","center").`
- **as.local** if the file is a url, should it be saved to local temporary file?
- **...** arguments passed on to `icons`. When `iconWidth`, `iconHeight`, `iconAnchorX` and `iconAnchorY` are specified, they override `width` and `height`, and `just`.

**Value**

icon data (see `icons`)

**See Also**

- `tm_symbols`
tmap_last

Retrieve the last map to be modified or created

Description

Retrieve the last map to be modified or created. Works in the same way as ggplot2's `last_plot`, although there is a difference: `last_map` returns the last call instead of the stacked `tmap-elements`.

Usage

```r
tmap_last()
```

Value

call

See Also

tmap_save

tmap_leaflet

Create a leaflet widget from a tmap object

Description

Create a leaflet widget from a tmap object. An interactive map (see `tmap_mode`) is an automatically generated leaflet widget. With this function, this leaflet widget is obtained, which can then be changed or extended by using leaflet's own methods.

Usage

```r
tmap_leaflet(
  x,
  mode = "view",
  show = FALSE,
  add.titles = TRUE,
  in.shiny = FALSE,
  ...
)
```
Arguments

x tmap object. A tmap object is created with `qtm` or by stacking `tmap-elements`. The mode of tmap, which is set to “view” in order to obtain the leaflet object. See `tmap_mode` for details.

mode should the leaflet map be shown? FALSE by default

show add titles to leaflet object

add.titles is the leaflet output going to be used in shiny? If so, two features are not supported and therefore disabled: facets and colored backgrounds.

in.shiny arguments passed on to `print.tmap`

Value

leaflet object

See Also

tmapOutput for tmap in Shiny, tmap_mode, tm_view, print.tmap

Examples

# world choropleth/bubble map of the world
data(World, metro)
metro$growth <- (metro$pop2020 - metro$pop2010) / (metro$pop2010 * 10) * 100

map1 <- tm_shape(metro) +
tm_bubbles("pop2010", col = "growth",
border.col = "black", border.alpha = .5,
style="fixed", breaks=c(-Inf, seq(0, 6, by=2), Inf),
palette="-RdYlBu", contrast=1,
title.size="Metro population",
title.col="Growth rate (%)", id="name") +
tm_layout(legend.bg.color = "grey90", legend.bg.alpha=.5, legend.frame=TRUE)

lf <- tmap_leaflet(map1)

# show leaflet widget
lf

# add marker
require(leaflet)
lf %>% leaflet::addMarkers(2.2945, 48.8582, popup = "Eiffel tower")

## Not run:
# alternative
eiffelTower <- geocode_OSM("Eiffel Tower, Paris", as.SPDF = TRUE)

map1 +
tm_shape(eiffelTower) +
tm_markers()
## tmap_mode

Set tmap mode to static plotting or interactive viewing

### Description

Set tmap mode to static plotting or interactive viewing. The global option `tmap.mode` determines the whether thematic maps are plot in the graphics device, or shown as an interactive leaflet map (see also `tmap_options`). The function `tmap_mode` is a wrapper to set this global option. The convenient function `ttm` is a toggle switch between the two modes. Tip 1: use `tmap_mode` in scripts and `ttm` in the console. Tip 2: use `ttm` in combination with `tmap_last` to redraw the last map in the other mode.

### Usage

```r
    tmap_mode(mode = c("plot", "view"))
    ttm()
```

### Arguments

- **mode**
  - one of
    - "plot" Thematic maps are shown in the graphics device. This is the default mode, and supports all tmap’s features, such as small multiples (see `tm_facets`) and extensive layout settings (see `tm_layout`). It is recommended for saving static maps (see `tmap_save`).
    - "view" Thematic maps are viewed interactively in the web browser or RStudio’s Viewer pane. Maps are fully interactive with tiles from OpenStreetMap or other map providers (see `tm_tiles`). See also `tm_view` for options related to the "view" mode. This mode generates a `leaflet` widget, which can also be directly obtained with `tmap_leaflet`. With RMarkdown, it is possible to publish it to an HTML page. There are a couple of constraints in comparison to "plot":
      - The map is always projected according to the Web Mercator projection. Although this projection is the de facto standard for interactive web-based mapping, it lacks the equal-area property, which is important for many thematic maps, especially choropleths (see examples from `tm_shape`).
      - Small multiples are not supported
      - The legend cannot be made for aesthetics regarding size, which are symbol size and line width.
      - Text labels are not supported (yet)
      - The layout options set with `tm_layout` regarding map format are not used. However, the styling options still apply.
Value
the mode before changing

References

See Also
vignette("tmap-getstarted"), tmap_last to show the last map, tm_view for viewing options, and tmap_leaflet for obtaining a leaflet widget, and tmap_options for tmap options.

Examples
# world choropleth/bubble map of the world
data(World, metro)
metro$growth <- (metro$pop2020 - metro$pop2010) / (metro$pop2010 * 10) * 100

map1 <- tm_shape(World) +
tm_polygons("income_grp", palette="-Blues", contrast=.7, id="name", title="Income group") +
tm_shape(metro) +
tm_bubbles("pop2010", col = "growth", border.col = "black", border.alpha = .5, style="fixed", breaks=c(-Inf, seq(0, 6, by=2), Inf), palette="-RdYlBu", contrast=1, title.size="Metro population", title.col="Growth rate (%)", id="name", popup.vars = c("pop2010", "pop2020", "growth")) +
tm_layout(legend.bg.color = "grey90", legend.bg.alpha=.5, legend.frame=TRUE)

# initial mode: "plot"
current.mode <- tmap_mode("plot")

# plot map
map1

# switch to other mode: "view"
ttm()

# view map
map1

## Not run:
# choropleth of the Dutch population in interactive mode:
require(tmaptools)
data(NLD_muni, NLD_prov)
NLD_muni$pop_dens <- calc_densities(NLD_muni, var = "population")

tm_shape(NLD_muni) +
tm_fill(col="pop_dens", style="kmeans", title = "Population (per km^2)", id = "name") +
tm_borders("grey25", alpha=.5) +
tm_shape(NLD_prov) +
tm_borders("grey40", lwd=2)

## End(Not run)

# restore current mode
tmap_mode(current.mode)

---

### tmap_options

**Options for tmap**

**Description**

Get or set global options for tmap. The behaviour of `tmap_options` is similar to `options`: all tmap options are retrieved when this function is called without arguments. When arguments are specified, the corresponding options are set, and the old values are silently returned as a list. The function `tmap_options_reset` is used to reset all options back to the default values (also the style is reset to "white"). Differences with the default values can be shown with `tmap_options_diff`. The function `tmap_options_save` can be used to save the current options as a new style. See details below on how to create a new style.

**Usage**

```r

tmap_options(
  ..., unit, limits, max.categories, max.raster, basemaps, basemaps.alpha, overlays, overlays.alpha, qtm.scalebar, qtm.minimap, show.messages, output.format, output.size, output.dpi
)

tmap_options_diff()

tmap_options_reset()

tmap_options_save(style)
```

---
Arguments

... options from \texttt{tm_layout} or \texttt{tm_view}. Note that the difference with using \texttt{tm_layout}
or \texttt{tm_view} directly, is that options set with \texttt{tmap_options} remain for the entire
session (unless changed with \texttt{tmap_options} or \texttt{tmap_style}). It can also be a
single unnamed argument which is a named list of options (similar behaviour as
\texttt{options}).

\texttt{unit} this is the default value for the \texttt{unit} argument of \texttt{tm_shape}. It specifies the unit
of measurement, which is used in the scale bar and the calculation of density
values. By default (when loading the package), it is "metric". Other valid
values are "imperial", "km", "m", "mi", and "ft".

\texttt{limits} this option determines how many facets (small multiples) are allowed for per
mode. It should be a vector of two numeric values named facets.view and
facets.plot. By default (i.e. when loading the package), it is set to \texttt{c(facets.view = 4,facets.plot = 64)}

\texttt{max.categories} in case \texttt{col} is the name of a categorical variable in the layer functions (e.g.
\texttt{tm_polygons}), this value determines how many categories (levels) it can have
maximally. If the number of levels is higher than \texttt{max.categories}, then levels
are combined.

\texttt{max.raster} the maximum size of rasters, in terms of number of raster cells. It should be
a vector of two numeric values named plot and view, which determines the
size in plotting and viewing mode. The default values are \texttt{c(plot = 1e7,view = 1e6)}. Rasters that are larger will be shown at a decreased resolution.

\texttt{basemaps} default basemaps. Basemaps are normally configured with \texttt{tm_basemap}. When
this is not done, the basemaps specified by this option are shown (in view
mode). Vector of one or more names of baselayer maps, or \texttt{NULL} if basemaps
should be omitted. For options see the list \texttt{leaflet::providers}, which can be previewed at \url{http://leaflet-extras.github.io/leaflet-providers/preview}. Also supports URL’s for tile servers, such as \url{http://s}.tile.openstreetmap.org/{z}/{x}/{y}.
If a named vector is provided, the names are used in the layer control legend
(similar to the group argument of \texttt{tm_basemap}. See also overlays, which is
the default option for overlay tiles.

\texttt{basemaps.alpha} default transparency (opacity) value for the basemaps. Can be a vector of values,
one for each basemap.

\texttt{overlays} default overlay tilemaps. Overlays tilemaps are shown as front layer (in contrast
to basemaps, which are background layers), so they are only useful when they
are semi-transparent. Like basemaps, a vector of tilemaps is expected, or \texttt{NULL}
is overlays should be omitted.

\texttt{overlays.alpha} default transparency (opacity) value for the overlay maps. Can be a vector of
values, one for each overlay map.

\texttt{qtm.scalebar} should a scale bar be added to interactive maps created with \texttt{qtm}. In other words,
should \texttt{tm_scale_bar()} be added automatically? The value \texttt{NA} means that the
scale bar is only added when \texttt{qtm} is called without arguments or with a search
term. The default value is \texttt{TRUE}.

\texttt{qtm.minimap} should a minimap be added to interactive maps created with \texttt{qtm}. In other words,
should \texttt{tm_minimap()} be added automatically? The value \texttt{NA} means that the
minimap is only added in navigation mode (i.e. when `qtM` is called without arguments or with a search term. The default value is `FALSE`.

**show.messages**
should messages be shown?

**output.format**
The format of the static maps saved with `tmap_save` without specification of the filename. The default is "png".

**output.size**
The size of the static maps saved with `tmap_save` without specification of width and height. The unit is squared inch and the default is 49. This means that square maps (so with aspect ratio 1) will be saved as 7 by 7 inch images and a map with aspect ratio 2 (e.g. most world maps) will be saved as approximately 10 by 5 inch.

**output.dpi**
The default number of dots per inch for `tmap_save` and `tmap_animation`.

**style**
style name

**Details**

The options can be divided into three parts: one part contains the arguments from `tm_layout`, one part contains the arguments from `tm_view`, and one part contains options that can only be set with `tmap_options`. Observe that the options from `tm_layout` and `tm_view` can also be set with those functions. It is recommended to use `tmap_options` when setting specific options during global session. However, options that are only relevant for a specific map can better be set with `tm_layout` or `tm_view`.

A new style can be created in two ways. The first approach is to use the function `tmap_options_save`, which takes a snapshot of the current tmap options. E.g., `tmap_options_save("my_style")` will save the current tmap options as a style called "my_style". See the examples in which a style called "red" is created. The second way to create a style is to create a list with tmap options and with a attribute called style. This approach is illustrated in the last example, in which a style called "black" is created.

The newly created style, say "my_style", will be accessible globally via `tmap_style("my_style")` and `+ tm_style("my_style")` until the R session is restarted or tmap is reloaded. In order to save the style for future use or sharing, obtain the option list as follows: `my_style <- tmap_options()` and save the object `my_style` in the usual way. Next time, the style can be loaded simply by running `tmap_options(my_style)`, which corresponds to the second way to create a style (see the paragraph above).

**See Also**

`tmap_layout`, `tm_view`, and `tmap_style`

**Examples**

```r
# load data
data(World)

# get current options
str(tmap_options())

# get current style
tmap_style()
```
# plot map (with default options)
tm_shape(World) + tm_polygons("HPI")

# change style to cobalt
tmap_style("cobalt")

# observe the changed options
tmap_options_diff()

# plot the map again
tm_shape(World) + tm_polygons("HPI")

# define red style
# change the background color
tmap_options(bg.color = "red")

# note that the current style is modified
tmap_style()

# observe the changed options
tmap_options_diff()

# save the current options as style "red"
tmap_options_save("red")

# plot the map again
tm_shape(World) + tm_polygons("HPI")

# the specified arguments of tm_layout and tm_view will override the options temporarily:
tm_shape(World) + tm_polygons("HPI") + tm_layout(bg.color="purple")

# when tm_style_ is called, it will override all options temporarily:
tm_shape(World) + tm_polygons("HPI") + tm_layout(bg.color="purple") + tm_style("classic")

# reset all options
tmap_options_reset()

# check style and options
tmap_style()
tmap_options_diff()

# define black style
# create style list with style attribute
black_style <- structure(
  list(
    bg.color = "black",
...
tmap_save

Save tmap

Description

Save tmap to a file. This can be either a static plot (e.g. png) or an interactive map (html).

Usage

```r
tmap_save(
  tm = NULL,
  filename = NA,
  width = NA,
  height = NA,
  units = NA,
  dpi = NA,
  outer.margins = NA,
  asp = NULL,
  scale = NA,
  insets_tm = NULL,
  insets_vp = NULL,
  add.titles = TRUE,
  verbose = NULL,
```

Arguments

tm  tmap object
filename  filename including extension, and optionally the path. The extensions pdf, eps, svg, wmf (Windows only), png, jpg, bmp, tiff, and html are supported. If the extension is missing, the file will be saved as a static plot in "plot" mode and as an interactive map (html) in "view" mode. The default format for static plots is png, but this can be changed using the option "output.format" in tmap_options.
height, width  The width and height of the plot (not applicable for html files). Units are set with the argument units. If one of them is not specified, this is calculated using the formula asp = width / height, where asp is the estimated aspect ratio of the map. If both are missing, they are set such that width * height is equal to the option "output.size" in tmap_options. This is by default 49, meaning that if the map is a square (so aspect ratio of 1) both width and height are set to 7.
units  units for width and height ("in", "cm", or "mm"). By default, pixels ("px") are used if either width or height is set to a value greater than 50. Else, the units are inches ("in")
dpi  dots per inch. Only applicable for raster graphics. By default it is set to 300, but this can be changed using the option "output.dpi" in tmap_options.
outer.margins  overrides the outer.margins argument of tm_layout (unless set to NA)
asp  if specified, it overrides the asp argument of tm_layout. Tip: set to 0 if map frame should be placed on the edges of the image.
scale  overrides the scale argument of tm_layout (unless set to NA)
insets_tm  tmap object of an inset map, or a list of tmap objects of multiple inset maps. The number of tmap objects should be equal to the number of viewports specified with insets_vp.
insets_vp  viewport of an inset map, or a list of viewports of multiple inset maps. The number of viewports should be equal to the number of tmap objects specified with insets_tm.
add.titles  add titles to leaflet object
verbose  Deprecated. It is now controlled by the tmap option show.messages (see tmap_options)
...
arguments passed on to device functions or to saveWidget

Examples

## Not run:
data(NLD_muni, NLD_prov)
m <- tm_shape(NLD_muni) +
tm_fill(col="population", convert2density=TRUE,
        style="kmeans",
        title=expression("Population (per " * km^2 * ")"))+
tm_borders("black", alpha=.5) +
tm_shape(NLD_prov) +
  tmBorders("grey25", lwd=2) +
  tmStyle("classic") +
  tmFormat("NLD", inner.margins = c(.02, .15, .06, .15)) +
  tmScaleBar(position = c("left", "bottom")) +
  tmCompass(position=c("right", "bottom"))

tmap_save(m, "choropleth.png", height=7)

data(World)
m2 <- tm_shape(World) +
  tm_fill("well_being", id="name", title="Well-being") +
  tm_format("World")

  # save image
  tmap_save(m2, "World_map.png", width=1920, height=1080, asp=0)

  # cut left inner margin to make sure Antarctica is snapped to frame
  tmap_save(m2 + tm_layout(inner.margins = c(0, -1, 0.05, 0.01)),
    "World_map2.png", width=1920, height=1080, asp=0)

  # save interactive plot
  tmap_save(m2, "World_map.html")

## End(Not run)

tmap_style

Set or get the default tmap style

Description

Set or get the default tmap style. Without arguments, the current style is returned. Also the available
styles are displayed. When a style is set, the corresponding tmap options (see tmap_options) will
be set accordingly. The default style (i.e. when loading the package) is "white".

Usage

  tmap_style(style)

Arguments

  style

name of the style. When omitted, tmap_style returns the current style and also
shows all available styles. When the style is specified, tmap_style sets the style
accordingly. Note that in that case, all tmap options (see tmap_options) will be
reset according to the style definition. See tm_layout for predefined styles, and
tmap_style_catalogue for creating a catalogue.
Details

Note that `tm_style` is used within a plot call (so it only affects that plot), whereas `tmap_style` sets the style globally.

After loading a style, the options that defined this style (i.e. the difference with the default "white" style) can be obtained by `tmap_options_diff`.

The documentation of `tmap_options` (details and the examples) shows how a new style is created.

Value

the style before changing

See Also

`tmap_options` for tmap options, and `tmap_style_catalogue` to create a style catalogue of all available styles.

Examples

data(World)

current.style <- tmap_style("classic")
qtm(World, fill="life_exp", fill.title="Life expectancy")

tmap_style("cobalt")
qtm(World, fill="life_exp", fill.title="Life expectancy")

# restore current style
tmap_style(current.style)

---

`tmap_style_catalogue`  
Create a style catalogue

Description

Create a style catalogue for each predefined tmap style. The result is a set of png images, one for each style.

Usage

`tmap_style_catalogue(path = "./tmap_style_previews", styles = NA)`

`tmap_style_catalog(path = "./tmap_style_previews", styles = NA)`

Arguments

- `path`: path where the png images are stored
- `styles`: vector of styles function names (see `tmap_style`) for which a preview is generated. By default, a preview is generated for all loaded styles.
tm_add_legend

Add manual legend

Description

Creates a tmap-element that adds a manual legend.

Usage

tm_add_legend(
  type = c("fill", "symbol", "text", "line"),
  labels = NULL,
  col = NULL,
  size = NULL,
  shape = NULL,
  lwd = NULL,
  lty = NULL,
  text = NULL,
  alpha = NA,
  border.col = "black",
  border.lwd = 1,
  border.alpha = NA,
  title = "",
  is.portrait = TRUE,
  legend.format = list(),
  reverse = FALSE,
Arguments

- **type** - type of legend. One of "fill", "symbol", "text", or "line"
- **labels** - legend labels
- **col** - legend colors
- **size** - legend symbol sizes (if type == "symbol")
- **shape** - legend symbol shapes (if type == "symbol")
- **lwd** - legend line widths (if type == "line")
- **lty** - legend line types (if type == "line")
- **text** - legend texts (if type == "text")
- **alpha** - legend fill transparency
- **border.col** - legend border col (if type is "fill" or "symbol")
- **border.lwd** - legend border width (if type is "fill" or "symbol")
- **border.alpha** - legend border alpha (if type is "fill" or "symbol")
- **title** - legend title
- **is.portrait** - is legend portrait (TRUE) or landscape (FALSE)?
- **legend.format** - options to format the legend, see `tm_symbols` (the description of the argument `legend.format`) for details. Note that many of these arguments are not applicable for `tm_add_legend` since `labels` should be a character vector. However, some options could still be handy, e.g. `list(text.align = "right")`.
- **reverse** - are the legend items reversed (by default FALSE)?
- **z** - legend stack position
- **group** - name of the group to which this layer belongs in view mode. Each group can be selected or deselected in the layer control item. By default NULL, which means that the legend will not be shown in the layer control item.

See Also

- `tm_symbols` for an example
Description

Create a tmap-element that draws a tile layer. This feature is only available in view mode. For plot mode, a tile image can be retrieved by read_osm. The function tm_basemap draws the tile layer as basemap (i.e. as bottom layer), whereas tm_tiles draws the tile layer as overlay layer (where the stacking order corresponds to the order in which this layer is called). Note that basemaps are shown by default (see details).

Usage

tm_basemap(server = NA, group = NA, alpha = NA, tms = FALSE)

Arguments

server name of the provider or an URL. The list of available providers can be obtained with leaflet::providers. See http://leaflet-extras.github.io/leaflet-providers/preview for a preview of those. When a URL is provided, it should be in template format, e.g. "http://{s}.tile.openstreetmap.org/{z}/{x}/{y}.png". Use NULL in tm_basemap to disable the basemaps.

group name of the group to which this layer belongs in view mode. Each group can be selected or deselected in the layer control item. Set group = NULL to hide the layer in the layer control item. By default, it will be set to the name of the shape (specified in tm_shape). Tile layers generated with tm_basemap will be base groups whereas tile layers generated with tm_tiles will be overlay groups.

alpha alpha

tms is the provided tile server defined according to the TMS protocol? By default FALSE.

zindex zindex of the pane in view mode. By default, it is set to the layer number plus 400. By default, the tm layers will therefore be placed in the custom panes "tmap401", "tmap402", etc., except for the base tile layers, which are placed in the standard "tile". This parameter determines both the name of the pane and the z-index, which determines the pane order from bottom to top. For instance, if zindex is set to 500, the pane will be named "tmap500".

Details

When tm_basemap is not specified, the default basemaps are shown, which can be configured by the basemaps argument in tmap_options. By default (for style "white") three basemaps are drawn: c("Esri.WorldGrayCanvas","OpenStreetMap","Esri.WorldTopoMap"). To disable basemaps, add tm_basemap(NULL) to the plot, or set tmap_options(basemaps = NULL). Similarly, when tm_tiles is not specified, the overlay maps specified by the overlays argument in
in \texttt{tmap\_options} are shown as front layer. By default, this argument is set to NULL, so no overlay maps are shown by default. See examples.

\textbf{Examples}

```r
## Not run:
current.mode <- tmap_mode("view")
data(World, metro)

tm\_basemap(leaflet::providers\$Stamen.Watercolor) +
tm\_shape(metro, bbox = "India") + tm\_dots(col = "red", group = "Metropolitan areas") +
tm\_tiles(paste0("http://services.arcgisonline.com/arcgis/rest/services/Canvas/
    "World\_Light\_Gray\_Reference/MapServer/tile/{z}/{y}/{x}")", group = "Labels")

# Use tmap options to set the basemap and overlay map permanently during the R session:
opts <- tmap\_options(basemaps = c(Canvas = "Esri.WorldGrayCanvas", Imagery = "Esri.WorldImagery"),
    overlays = c(Labels = paste0("http://services.arcgisonline.com/arcgis/rest/services/Canvas/
    "World\_Light\_Gray\_Reference/MapServer/tile/{z}/{y}/{x}")"))

qtm(World, fill = "HPI", fill\_palette = "RdYlGn")

# restore options
tmap\_options(opts)

# restore current mode
tmap\_mode(current\_mode)

## End(Not run)
```

\textbf{tm\_compass} \hspace{1cm} \textit{Map compass}

\textbf{Description}

Creates a map compass.

\textbf{Usage}

\texttt{tm\_compass(}
    \begin{itemize}
    \item \texttt{north} = 0,
    \item \texttt{type} = \texttt{NA},
    \item \texttt{text\_size} = 0.8,
    \item \texttt{size} = \texttt{NA},
    \item \texttt{show\_labels} = 1,
    \item \texttt{cardinal\_directions} = \texttt{c("N", "E", "S", "W")},
    \item \texttt{text\_color} = \texttt{NA},
    \item \texttt{color\_dark} = \texttt{NA},
\end{itemize}
\texttt{)}


Arguments

north  north direction in degrees: 0 means up, 90 right, etc.
type  compass type, one of: "arrow", "4star", "8star", "radar", "rose". The default is controlled by tm_layout (which uses "arrow" for the default style)
text.size  relative font size
size  size of the compass in number of text lines. The default values depend on the type: for "arrow" it is 2, for "4star" and "8star" it is 4, and for "radar" and "rose" it is 6.
show.labels  number that specifies which labels are shown: 0 means no labels, 1 (default) means only north, 2 means all four cardinal directions, and 3 means the four cardinal directions and the four intercardinal directions (e.g. north-east).
cardinal.directions  labels that are used for the cardinal directions north, east, south, and west.
text.color  color of the text. By default equal to the argument attr.color of tm_layout.
color.dark  color of the dark parts of the compass, typically (and by default) black.
color.light  color of the light parts of the compass, typically (and by default) white.
lwd  line width of the compass
position  position of the compass. Vector of two values, specifying the x and y coordinates. Either this vector contains "left", "LEFT", "center", "right", or "RIGHT" for the first value and "top", "TOP", "center", "bottom", or "BOTTOM" for the second value, or this vector contains two numeric values between 0 and 1 that specifies the x and y value of the left bottom corner of the compass. The uppercase values correspond to the position without margins (so tighter to the frame). The default value is controlled by the argument "attr.position" of tm_layout.
just  Justification of the attribute relative to the point coordinates. The first value specifies horizontal and the second value vertical justification. Possible values are: "left", "right", "center", "bottom", and "top". Numeric values of 0 specify left/bottom alignment and 1 right/top alignment. This option is only used, if position is specified by numeric coordinates. The default value is controlled by the argument "attr.just" of tm_layout.
fontsize  deprecated: renamed to text.size

Examples

current.mode <- tmap_mode("plot")
data(NLD_muni)
tm_credits

```r
qtmb(NLD_muni, theme = "NLD") + tm_compass()
qtmb(NLD_muni, theme = "NLD") + tm_compass(type="radar", position=c("left", "top"), show.labels = 3)

# restore current mode
tmap_mode(current.mode)
```

---

### tm_credits

**Credits text**

**Description**

Creates a text annotation that could be used for credits or acknowledgements.

**Usage**

```r
tm_credits(
  text, 
  size = 0.7, 
  col = NA, 
  alpha = NA, 
  align = "left", 
  bg.color = NA, 
  bg.alpha = NA, 
  fontface = NA, 
  fontfamily = NA, 
  position = NA, 
  just = NA
)
```

**Arguments**

- `text` - text. Multiple lines can be created with the line break symbol "\n". Facets can have different texts: in that case a vector of characters is required. Use "" to omit the credits for specific facets.
- `size` - relative text size
- `col` - color of the text. By default equal to the argument `attr.color` of `tm_layout`.
- `alpha` - transparency number between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of `col` is used (normally 1).
- `align` - horizontal alignment: "left" (default), "center", or "right". Only applicable if `text` contains multiple lines
- `bg.color` - background color for the text
- `bg.alpha` - Transparency number between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of the `bg.color` is used (normally 1).
- `fontface` - font face of the text. By default, determined by the fontface argument of `tm_layout`. 
fontfamily  font family of the text. By default, determined by the fontfamily argument of tm_layout.
position  position of the text. Vector of two values, specifying the x and y coordinates. Either this vector contains "left", "LEFT", "center", "right", or "RIGHT" for the first value and "top", "TOP", "center", "bottom", or "BOTTOM" for the second value, or this vector contains two numeric values between 0 and 1 that specifies the x and y value of the center of the text. The uppercase values correspond to the position without margins (so tighter to the frame). The default value is controlled by the argument "attr.position" of tm_layout.
just  Justification of the attribute relative to the point coordinates. The first value specifies horizontal and the second value vertical justification. Possible values are: "left", "right", "center", "bottom", and "top". Numeric values of 0 specify left/bottom alignment and 1 right/top alignment. This option is only used, if position is specified by numeric coordinates. The default value is controlled by the argument "attr.just" of tm_layout.

See Also

tm_xlab

Examples

current.mode <- tmap_mode("plot")
data(NLD_muni, NLD_prov)

tm_shape(NLD_muni) +
  tm_fill(col="population", convert2density=TRUE,
        style="kmeans", title = expression("Population (per " * km^2 * ")")) +
  tmBorders("grey25", alpha=.5) +
  tm_shape(NLD_prov) +
  tmBorders("grey40", lwd=2) +
  tm_format("NLD", bg.color="white", frame = TRUE) +
  tm_credits("(c) Statistics Netherlands (CBS) and\nKadaster Nederland", position=c("left", "bottom"))

# restore current mode
  tmap_mode(current.mode)

---

### tm_facets

Small multiples

Description

Creates a tmap-element that specifies facets (small multiples). Small multiples can be created in two ways: 1) by specifying the by argument with one or two variable names, by which the data is grouped, 2) by specifying multiple variable names in any of the aesthetic argument of the layer functions (for instance, the argument col in tm_fill). This function further specifies the facets, for instance number of rows and columns, and whether the coordinate and scales are fixed or free (i.e.
independent of each other). An overview of the different approaches to create facets is provided in the examples.

Usage

tm_facets(
  by = NULL,
  along = NULL,
  as.layers = FALSE,
  ncol = NA,
  nrow = NA,
  free.coords = !as.layers,
  drop.units = TRUE,
  drop.empty.facets = TRUE,
  drop.NA.facets = FALSE,
  sync = NA,
  showNA = NA,
  textNA = "Missing",
  free.scales = NULL,
  free.scales.fill = NULL,
  free.scales.symbol.size = NULL,
  free.scales.symbol.col = NULL,
  free.scales.symbol.shape = NULL,
  free.scales.text.size = NULL,
  free.scales.text.col = NULL,
  free.scales.line.col = NULL,
  free.scales.line.lwd = NULL,
  free.scales.raster = NULL,
  inside.original.bbox = FALSE,
  scale.factor = 2,
  drop.shapes = drop.units
)

Arguments

by data variable name by which the data is split, or a vector of two variable names to split the data by two variables (where the first is used for the rows and the second for the columns).

along data variable name by which the data is split and plotted on separate pages. This is especially useful for animations made with tmap_animation. The along argument can be used in combination with the by argument. It is only supported in "plot" mode (so not in "view" mode).

as.layers logical that determines whether facets are shown as different layers in "view" mode. By default FALSE, i.e. facets are drawn as small multiples.

ncol number of columns of the small multiples grid. Not applicable if by contains two variable names.

nrow number of rows of the small multiples grid. Not applicable if by contains two variable names.
free.coords  logical. If the by argument is specified, should each map have its own coordinate ranges? By default TRUE, unless facets are shown in as different layers (as.layers = TRUE)

drop.units logical. If the by argument is specified, should non-selected spatial units be dropped? If FALSE, they are plotted where mapped aesthetics are regarded as missing values. Not applicable for raster shapes. By default TRUE.

drop.empty.facets logical. If the by argument is specified, should empty facets be dropped? Empty facets occur when the by-variable contains unused levels. When TRUE and two by-variables are specified, empty rows and columns are dropped.

drop.NA.facets logical. If the by argument is specified, and all values of the defined aesthetic variables (e.g. `col` from `tm_fill`) for specific facets, should these facets be dropped? FALSE by default.

sync logical. Should the navigation in view mode (zooming and panning) be synchronized? By default TRUE if the facets have the same bounding box. This is generally the case when `rasters` are plotted, or when free.coords is FALSE.

showNA If the by argument is specified, should missing values of the by-variable be shown in a facet? If two by-variables are specified, should missing values be shown in an additional row and column? If NA, missing values only are shown if they exist. Similar to the useNA argument of `table`, where TRUE, FALSE, and NA correspond to "always", "no", and "ifany" respectively.

textNA text used for facets of missing values.

free.scales logical. Should all scales of the plotted data variables be free, i.e. independent of each other? Specific scales can be set with `free.scales.x`, where x is the name of the aesthetic, e.g. "symbol.col". By default, free.scales is TRUE, unless the by argument is used, the along argument is used, or a stars object with a third dimension is shown.

free.scales.fill logical. Should the color scale for the choropleth be free?

free.scales.symbol.size logical. Should the symbol size scale for the symbol map be free?

free.scales.symbol.col logical. Should the color scale for the symbol map be free?

free.scales.symbol.shape logical. Should the symbol shape scale for the symbol map be free?

free.scales.text.size logical. Should the text size scale be free?

free.scales.text.col logical. Should the text color scale be free?

free.scales.line.col Should the line color scale be free?

free.scales.line.lwd Should the line width scale be free?

free.scales.raster Should the color scale for raster layers be free?
inside.original.bbox
If `free.coords`, should the bounding box of each small multiple be inside the original bounding box?

scale.factor
Number that determines how the elements (e.g. font sizes, symbol sizes, line widths) of the small multiples are scaled in relation to the scaling factor of the shapes. The elements are scaled to the `scale.factor`th root of the scaling factor of the shapes. So, for `scale.factor=1`, they are scaled proportional to the scaling of the shapes. Since elements, especially text, are often too small to read, a higher value is recommended. By default, `scale.factor=2`.

drop.shapes
deprecated: renamed to `drop.units`

Details
The global option `limits` controls the limit of the number of facets that are plotted. By default, `tmap_options(limits=c(facets.plot=64,facets.view=4))`. The maximum number of interactive facets is set to four since otherwise it may become very slow.

Value
`tmap-element`

References

See Also
`vignette("tmap-getstarted")`

Examples
```r
data(World, NLD_muni, NLD_prov, land, metro)
current.mode <- tmap_mode("plot")

# CASE 1: Facets defined by constant values
tm_shape(World) +
  tm_fill(c("forestgreen", "goldenrod")) +
  tm_format("World", title=c("A green world", "A dry world"), bg.color="lightskyblue2",
              title.position=c("left", "bottom"))

# CASE 2: Facets defined by multiple variables
tm_shape(World) +
  tm_polygons(c("well_being", "life_exp"),
              style=c("pretty", "fixed"), breaks=list(NULL, seq(45, 85, by = 5)),
              palette=list("Oranges", "Purples"),
              border.col = "black",
              title=c("Well-Being Index", "Life Expectancy")) +
  tm_format("World")

## Not run:
```
tm_shape(NLD_muni) +
    tm_fill(c("pop_0_14", "pop_15_24", "pop_25_44", "pop_45_64", "pop_65plus"),
        style="kmeans",
        palette=list("Oranges", "Greens", "Blues", "Purples", "Greys"),
        title=c("Population 0 to 14", "Population 15 to 24", "Population 25 to 44",
            "Population 45 to 64", "Population 65 and older")) +

## End(Not run)

# CASE 3: Facets defined by group-by variable(s)
# A group-by variable that divides the objects spatially
    tm_shape(NLD_prov) +
        tm_polygons("gold2") +
        tm_facets(by="name")

## Not run:
    tm_shape(NLD_muni) +
        tm_borders() +
        tm_facets(by="province") +
        tm_fill("population", style="kmeans", convert2density = TRUE) +
    tm_shape(NLD_prov) +
        tm_borders(lwd=4) +
        tm_facets(by="name")

## End(Not run)

# The objects are divided by a non-spatial variable (e.g. date/time)
if (require(dplyr) && require(tidyr)) {
    metro_long <- metro %>%
        gather(year, population, -name, -name_long, -iso_a3, -geometry) %>%
            mutate(year = as.integer(substr(year, 4, 7)))

    tm_shape(metro_long) +
        tm_bubbles("population") +
        tm_facets(by = "year")
}

## Not run:
    tm_shape(land) +
        tm_raster("black") +
        tm_facets(by="cover_cls")

## End(Not run)

# Facets defined by two group-by variables
## Not run:
    World$HPI3 <- cut(World$HPI, breaks = c(20, 35, 50, 65),
        labels = c("HPI low", "HPI medium", "HPI high"))
    World$GDP3 <- cut(World$gdp_cap_est, breaks = c(0, 5000, 20000, Inf),
        labels = c("GDP low", "GDP medium", "GDP high"))
tm_shape(World) +
  tm_fill("HPI3", palette="Dark2", colorNA="grey90", legend.show = FALSE) +
  tm_facets(c("HPI3", "GDP3"), showNA=FALSE, free.coords = FALSE, drop.units = FALSE)

metro_edited <- metro %>%
  mutate(pop1950cat = cut(pop1950, breaks=c(0.5, 1, 1.5, 2, 3, 5, 10, 40)*1e6),
         pop2020cat = cut(pop2020, breaks=c(0.5, 1, 1.5, 2, 3, 5, 10, 40)*1e6))

tm_shape(World) +
  tm_fill() +
  tm_shape(metro_edited) +
  tm_dots("red", size = .5) +
  tm_facets(c("pop1950cat", "pop2020cat"), free.coords = FALSE) +
  tm_layout(panel.label.rot = c(0, 90), panel.label.size = 2)

## End(Not run)

# restore current mode
tmap_mode(current.mode)

---

### tm_fill

**Draw polygons**

**Description**

Creates a tmap-element that draws the polygons. tm_fill fills the polygons. Either a fixed color is used, or a color palette is mapped to a data variable. tm_borders draws the borders of the polygons. tm_polygons fills the polygons and draws the polygon borders.

**Usage**

```r
tm_fill(
  col = NA,
  alpha = NA,
  palette = NULL,
  convert2density = FALSE,
  area = NULL,
  n = 5,
  style = ifelse(is.null(breaks), "pretty", "fixed"),
  style.args = list(),
  as.count = NA,
  breaks = NULL,
  interval.closure = "left",
  labels = NULL,
  drop.levels = FALSE,
  midpoint = NULL,
  stretch.palette = TRUE,
  contrast = NA,
)```
colorNA = NA,
textNA = "Missing",
showNA = NA,
colorNULL = NA,
thres.poly = 0,
title = NA,
legend.show = TRUE,
legend.format = list(),
legend.is.portrait = TRUE,
legend.reverse = FALSE,
legend.hist = FALSE,
legend.hist.title = NA,
legend.z = NA,
legend.hist.z = NA,
id = NA,
popup.vars = NA,
popup.format = list(),
zindex = NA,
group = NA,
auto.palette.mapping = NULL,
max.categories = NULL,
...
)

tm_borders(col = NA, lwd = 1, lty = "solid", alpha = NA, group = NA)

tm_polygons(  
col = NA,
alpha = NA,
border.col = NA,
border.alpha = NA,
group = NA,
...
)

Arguments

**col**  
For `tm_fill`, it is one of

- a single color value
- the name of a data variable that is contained in `shp`. Either the data variable contains color values, or values (numeric or categorical) that will be depicted by a color palette (see `palette`). In the latter case, a choropleth is drawn.
- "MAP_COLORS". In this case polygons will be colored such that adjacent polygons do not get the same color. See the underlying function `map_coloring` for details.

For `tm_borders`, it is a single color value that specifies the border line color. If multiple values are specified, small multiples are drawn (see details).
alpha  transparency number between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of the `col` is used (normally 1).

palette  a palette name or a vector of colors. See `tmaptools::palette_explorer()` for the named palettes. Use a "-" as prefix to reverse the palette. The default palette is taken from `tm_layout`'s argument `aes.palette`, which typically depends on the style. The type of palette from `aes.palette` is automatically determined, but can be overwritten: use "seq" for sequential, "div" for diverging, and "cat" for categorical.

convert2density  boolean that determines whether `col` is converted to a density variable. Should be `TRUE` when `col` consists of absolute numbers. The area size is either approximated from the shape object, or given by the argument `area`.

area  Name of the data variable that contains the area sizes in squared kilometer.

n  preferred number of classes (in case `col` is a numeric variable).

style  method to process the color scale when `col` is a numeric variable. Discrete gradient options are "cat", "fixed", "sd", "equal", "pretty", "quantile", "kmeans", "hclust", "bclust", "fisher", "jenks", "dpih", "headtails", and "log10_pretty". A numeric variable is processed as a categorical variable when using "cat", i.e. each unique value will correspond to a distinct category. For the other discrete gradient options (except "log10_pretty"), see the details in `classIntervals` (extra arguments can be passed on via `style.args`). Continuous gradient options are "cont", "order", and "log10". The first maps the values of `col` to a smooth gradient, the second maps the order of values of `col` to a smooth gradient, and the third uses a logarithmic transformation. The numeric variable can be either regarded as a continuous variable or a count (integer) variable. See `as.count`.

style.args  arguments passed on to `classIntervals`, the function that determine color classes (see also `style`).

as.count  when `col` is a numeric variable, should it be processed as a count variable? For instance, if `style = "pretty"`, `n = 2`, and the value range of the variable is 0 to 10, then the column classes for `as.count = TRUE` are 0; 1 to 5; 6 to 10 (note that 0 is regarded as an own category) whereas for `as.count = FALSE` they are 0 to 5; 5 to 10. Only applicable if `style` is "pretty", "fixed", or "log10_pretty". By default, `TRUE` if `style` is one of these, and the variable is an integer.

breaks  in case `style="fixed"`, breaks should be specified. The breaks argument can also be used when `style="cont"`. In that case, the breaks are mapped evenly to the sequential or diverging color palette.

interval.closure  value that determines whether where the intervals are closed: "left" or "right". Only applicable if `col` is a numeric variable. If `as.count = TRUE`, interval.closure is always set to "left".

labels  labels of the classes.

drop.levels  should unused classes be omitted? `FALSE` by default.

midpoint  The value mapped to the middle color of a diverging palette. By default it is set to 0 if negative and positive values are present. In that case, the two sides of the
color palette are assigned to negative respectively positive values. If all values
are positive or all values are negative, then the midpoint is set to NA, which
means that the value that corresponds to the middle color class (see style) is
mapped to the middle color. Only applies when col is a numeric variable. If it
is specified for sequential color palettes (e.g. "Blues"), then this color palette
will be treated as a diverging color palette.

`stretch.palette` Logical that determines whether the categorical color palette should be stretched
if there are more categories than colors. If TRUE (default), interpolated colors are
used (like a rainbow). If FALSE, the palette is repeated.

`contrast` vector of two numbers that determine the range that is used for sequential and
diverging palettes (applicable when auto.palette.mapping=TRUE). Both num-
bers should be between 0 and 1. The first number determines where the palette
begins, and the second number where it ends. For sequential palettes, 0 means
the brightest color, and 1 the darkest color. For diverging palettes, 0 means the
middle color, and 1 both extremes. If only one number is provided, this number
is interpreted as the endpoint (with 0 taken as the start).

`colorNA` color used for missing values. Use NULL for transparency.

`textNA` text used for missing values.

`showNA` logical that determines whether missing values are named in the legend. By
default (NA), this depends on the presence of missing values.

`colorNULL` colour for polygons that are shown on the map that are out of scope

`thres.poly` number that specifies the threshold at which polygons are taken into account.
The number itself corresponds to the proportion of the area sizes of the polygons
to the total polygon size. By default, all polygons are drawn. To ignore polygons
that are not visible in a normal plot, a value like 1e-05 is recommended.

`title` title of the legend element

`legend.show` logical that determines whether the legend is shown

`legend.format` list of formatting options for the legend numbers. Only applicable if labels is
undefined. Parameters are:

- `fun` Function to specify the labels. It should take a numeric vector, and should
  return a character vector of the same size. By default it is not specified. If
  specified, the list items scientific, format, and digits (see below) are
  not used.

- `scientific` Should the labels be formatted scientifically? If so, square brackets
  are used, and the format of the numbers is "g". Otherwise, format="f", and text.separator, text.less.than, and text.or.more are used. Also,
  the numbers are automatically rounded to millions or billions if applicable.

- `format` By default, "f", i.e. the standard notation xxx.xxx, is used. If scientific=TRUE
  then "g", which means that numbers are formatted scientifically, i.e. n.dddE+nn
  if needed to save space.

- `digits` Number of digits after the decimal point if format="f", and the number
  of significant digits otherwise.

- `big.num.abbr` Vector that defines whether and which abbreviations are used for
  large numbers. It is a named numeric vector, where the name indicated the
abbreviation, and the number the magnitude (in terms on numbers of zero). Numbers are only abbreviation when they are large enough. Set it to NA to disable abbreviations. The default is `c("mln" = 6,"bln" = 9)`. For layers where style is set to log10 or log10_pretty, the default is NA.

prefix Prefix of each number

suffix Suffix of each number

text.separator Character string to use to separate numbers in the legend (default: "to").

text.less.than Character value(s) to use to translate "Less than". When a character vector of length 2 is specified, one for each word, these words are aligned when text.to.columns = TRUE

text.or.more Character value(s) to use to translate "or more". When a character vector of length 2 is specified, one for each word, these words are aligned when text.to.columns = TRUE

text.align Value that determines how the numbers are aligned, "left", "center" or "right". By default "left" for legends in portrait format (legend.is.protrait = TRUE), and "center" otherwise.

text.to.columns Logical that determines whether the text is aligned to three columns (from, text.separator, to). By default FALSE.

... Other arguments passed on to formatC

legend.is.portrait logical that determines whether the legend is in portrait mode (TRUE) or landscape (FALSE)

legend.reverse logical that determines whether the items are shown in reverse order, i.e. from bottom to top when legend.is.portrait = TRUE and from right to left when legend.is.portrait = FALSE

legend.hist logical that determines whether a histogram is shown

legend.hist.title title for the histogram. By default, one title is used for both the histogram and the normal legend.

legend.z index value that determines the position of the legend element with respect to other legend elements. The legend elements are stacked according to their z values. The legend element with the lowest z value is placed on top.

legend.hist.z index value that determines the position of the histogram legend element

id name of the data variable that specifies the indices of the polygons. Only used for "view" mode (see `tmap_mode`).

popup.vars names of data variables that are shown in the popups in "view" mode. If convert2density=TRUE, the derived density variable name is suffixed with _density. If NA (default), only aesthetic variables (i.e. specified by col and lwd) are shown). If they are not specified, all variables are shown. Set popup.vars to FALSE to disable popups. When a vector of variable names is provided, the names (if specified) are printed in the popups.

popup.format list of formatting options for the popup values. See the argument legend.format for options. Only applicable for numeric data variables. If one list of formatting options is provided, it is applied to all numeric variables of popup.vars.
(named) list of lists can be provided. In that case, each list of formatting options is applied to the named variable.

**zindex**

zindex of the pane in view mode. By default, it is set to the layer number plus 400. By default, the tmap layers will therefore be placed in the custom panes "tmap401", "tmap402", etc., except for the base tile layers, which are placed in the standard "tile". This parameter determines both the name of the pane and the z-index, which determines the pane order from bottom to top. For instance, if zindex is set to 500, the pane will be named "tmap500".

**group**

name of the group to which this layer belongs in view mode. Each group can be selected or deselected in the layer control item. Set group = NULL to hide the layer in the layer control item. By default, it will be set to the name of the shape (specified in `tm_shape`).

**auto.palette.mapping**

deprecated. It has been replaced by `midpoint` for numeric variables and `stretch.palette` for categorical variables.

**max.categories**

deprecated. It has moved to `tmap_options`.

**...**

for `tm_polygons`, these arguments passed to either `tm_fill` or `tm_borders`. For `tm_fill`, these arguments are passed on to `map_coloring`.

**lwd**

border line width (see `par`)

**lty**

border line type (see `par`)

**border.col**

border line color

**border.alpha**

transparency number between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of the `col` is used (normally 1).

### Details

Small multiples can be drawn in two ways: either by specifying the by argument in `tm_facets`, or by defining multiple variables in the aesthetic arguments. The aesthetic argument of `tm_fill` (and `tm_polygons`) is `col`. In the latter case, the arguments, except for `thres.poly`, and the ones starting with `legend`, can be specified for small multiples as follows. If the argument normally only takes a single value, such as `n`, then a vector of those values can be specified, one for each small multiple. If the argument normally can take a vector, such as `palette`, then a list of those vectors (or values) can be specified, one for each small multiple.

### Value

`tmap-element`

### References


### See Also

`vignette("tmap-getstarted")`
Examples

```
data(World)

# Constant fill
tm_shape(World) + tm_fill("darkolivegreen3") + tm_format("World", title="A green World")

# Borders only
tm_shape(World) + tm_borders()

# Data variable containing colours values
World$isNLD <- ifelse(World$name=="Netherlands", "darkorange", "darkolivegreen3")
tm_shape(World) +
  tm_fill("isNLD") +
  tm_layout("Find the Netherlands!")

tm_shape(World) +
  tm_polygons("economy", title="Economy", id="name") +
  tm_text("iso_a3", size="AREA", scale=1.5) +
  tm_format("World")

# Numeric data variable
tm_shape(World) +
  tm_polygons("HPI", palette="RdYlGn", style="cont", n=8,
              title="Happy Planet Index", id="name") +
  tm_text("iso_a3", size="AREA", scale=1.5) +
  tm_style("grey") +
  tm_format("World")

## Not run:
data(NLD_prov, NLD_muni)
# Map coloring algorithm
  tm_fill("name", legend.show = FALSE) +
  tm_shape(NLD_muni) +
    tm_polygons("MAP_COLORS", palette="Greys", alpha = .25) +
  tm_shape(NLD_prov) +
    tm_borders(lwd=2) +
    tm_text("name", shadow=TRUE) +
  tm_format("NLD", title="Dutch provinces and\nmunicipalities", bg.color="white")

# Cartogram
if (require(cartogram)) {
  NLD_prov_pop <- cartogram(NLD_prov, "population")
  tm_shape(NLD_prov_pop) +
  tm_polygons("origin_non_west", title = "Non-western origin (%)")
}

## End(Not run)

# TIP: check out these examples in view mode, enabled with tmap_mode("view")
```
Description

Creates a tmap-element that draws coordinate grid lines. It serves as a layer that can be drawn anywhere between other layers. By default, tm_grid draws horizontal and vertical lines according to the coordinate system of the (master) shape object. Latitude and longitude graticules are drawn with tm_graticules.

Usage

```r
tm_grid(
  x = NA,
  y = NA,
  n.x = NA,
  n.y = NA,
  projection = NA,
  col = NA,
  lwd = 1,
  alpha = NA,
  labels.show = TRUE,
  labels.size = 0.6,
  labels.col = NA,
  labels.rot = c(0, 0),
  labels.format = list(big.mark = ","),
  labels.cardinal = FALSE,
  labels.margin.x = 0,
  labels.margin.y = 0,
  labels.space.x = NA,
  labels.space.y = NA,
  labels.inside.frame = FALSE,
  ticks = labels.show & !labels.inside.frame,
  lines = TRUE,
  ndiscr = 100,
  zindex = NA
)
```

tm_graticules(
  x = NA,
  y = NA,
  n.x = NA,
  n.y = NA,
  projection = 4326,
  labels.format = list(suffix = intToUtf8(176)),
  labels.cardinal = TRUE,
  ...
Arguments

\texttt{x} \quad x \text{ coordinates for vertical grid lines. If NA, it is specified with a pretty scale and } n.x.
\texttt{y} \quad y \text{ coordinates for horizontal grid lines. If NA, it is specified with a pretty scale and } n.y.
\texttt{n.x} \quad \text{preferred number of grid lines for the x axis. For the labels, a pretty sequence is used, so the number of actual labels may be different than } n.x.
\texttt{n.y} \quad \text{preferred number of grid lines for the y axis. For the labels, a pretty sequence is used, so the number of actual labels may be different than } n.y.
\texttt{projection} \quad \text{projection character. If specified, the grid lines are projected accordingly. Many world maps are projected, but still have latitude longitude (epsg 4326) grid lines.}
\texttt{col} \quad \text{color of the grid lines.}
\texttt{lwd} \quad \text{line width of the grid lines}
\texttt{alpha} \quad \text{alpha transparency of the grid lines. Number between 0 and 1. By default, the alpha transparency of } \texttt{col} \text{ is taken.}
\texttt{labels.show} \quad \text{show tick labels. Either one value for both x and y axis, or a vector two: the first for x and latter for y.}
\texttt{labels.size} \quad \text{font size of the tick labels}
\texttt{labels.col} \quad \text{font color of the tick labels}
\texttt{labels.rot} \quad \text{Rotation angles of the labels. Vector of two values: the first is the rotation angle (in degrees) of the tick labels on the x axis and the second is the rotation angle of the tick labels on the y axis. Only 0, 90, 180, and 270 are valid values.}
\texttt{labels.format} \quad \text{list of formatting options for the grid labels. Parameters are:}
\hspace{1em} \texttt{fun} \quad \text{Function to specify the labels. It should take a numeric vector, and should return a character vector of the same size. By default it is not specified. If specified, the list items scientific, format, and digits (see below) are not used.}
\hspace{1em} \texttt{scientific} \quad \text{Should the labels be formatted scientifically? If so, square brackets are used, and the format of the numbers is \texttt{"g"}. Otherwise, format=\texttt{"f"}, and \texttt{text.separator, text.less.than, and text.or.more} are used. Also, the numbers are automatically rounded to millions or billions if applicable.}
\hspace{1em} \texttt{format} \quad \text{By default, \texttt{\texttt{"f"}}, i.e. the standard notation \texttt{xxx.xxx}, is used. If \texttt{scientific}=\texttt{TRUE} then \texttt{\"g"}, which means that numbers are formatted scientifically, i.e. \texttt{n.dddE+nn} if needed to save space.}
\hspace{1em} \texttt{digits} \quad \text{Number of digits after the decimal point if format=\texttt{"f"}, and the number of significant digits otherwise.}
\hspace{1em} \texttt{...} \quad \text{Other arguments passed on to } \texttt{formatC}
\texttt{labels.cardinal} \quad \text{add the four cardinal directions (N, E, S, W) to the labels, instead of using negative coordinates for west and south (so it assumes that the coordinates are positive in the north-east direction).}
labels.margin.x
margin between tick labels of x axis and the frame. Note that when labels.inside.frame == FALSE and ticks == TRUE, the ticks will be adjusted accordingly.

labels.margin.y
margin between tick labels of y axis and the frame. Note that when labels.inside.frame == FALSE and ticks == TRUE, the ticks will be adjusted accordingly.

labels.space.x
space that is used for the labels and ticks for the x-axis when labels.inside.frame == FALSE. By default, it is determined automatically using the widths and heights of the tick labels. The unit of this parameter is text line height.

labels.space.y
space that is used for the labels and ticks for the y-axis when labels.inside.frame == FALSE. By default, it is determined automatically using the widths and heights of the tick labels. The unit of this parameter is text line height.

labels.inside.frame
Show labels inside the frame? By default FALSE

ticks
If labels.inside.frame = FALSE, should ticks can be drawn between the labels and the frame? Either one value for both x and y axis, or a vector two: the first for x and latter for y.

lines
If labels.inside.frame = FALSE, should grid lines can be drawn?

ndiscr
number of points to discretize a parallel or meridian (only applicable for curved grid lines)

zindex
zindex of the pane in view mode. By default, it is set to the layer number plus 400. By default, the tmap layers will therefore be placed in the custom panes "tmap401", "tmap402", etc., except for the base tile layers, which are placed in the standard "tile". This parameter determines both the name of the pane and the z-index, which determines the pane order from bottom to top. For instance, if zindex is set to 500, the pane will be named "tmap500".

... arguments passed on to tm_grid

Examples

current.mode <- tmap_mode("plot")
data(NLD_muni, World)

tmap_arrange(
  qtm(NLD_muni, borders = NULL) + tm_grid(),
  qtm(NLD_muni, borders = NULL) + tm_graticules()
)

qtm(World, shape.projection = "+proj=robin", style = "natural") +
  tm_graticules(ticks = FALSE) +
  tm_layout(frame=FALSE)

tmap_mode(current.mode)
Draw iso (contour) lines with labels

Description

This function is a wrapper of tm_lines and tm_text aimed to draw isopleths.

Usage

```r
tm_iso(
  col = NA,
  text = "level",
  size = 0.5,
  remove.overlap = TRUE,
  along.lines = TRUE,
  overwrite.lines = TRUE,
  group = NA,
  ...
)
```

Arguments

- `col` line color. See `tm_lines`.
- `text` text to display.
- `size` text size (see `tm_text`)
- `remove.overlap` see `tm_text`
- `along.lines` see `tm_text`
- `overwrite.lines` see `tm_text`
- `group` name of the group to which this layer belongs in view mode. Each group can be selected or deselected in the layer control item. Set `group = NULL` to hide the layer in the layer control item. By default, it will be set to the name of the shape (specified in `tm_shape`).
- `...` arguments passed on to `tm_lines` or `tm_text`
Description

This element specifies the map layout. The main function `tm_layout` controls title, margins, aspect ratio, colors, frame, legend, among many other things. The function `tm_legend` is a shortcut to access all `legend.` arguments without this prefix. The other functions are wrappers for two purposes: `tm_format` specifies position related layout settings such as margins, and `tm_style` specifies general styling related layout settings such as colors and font. Typically, the former functions are shape dependent, and the latter functions are shape independent. See details for predefined styles and formats. With `tmap.style`, a default style can be specified. Multiple `tm_layout` elements (or wrapper functions) can be stacked: called arguments will be overwritten.

Usage

```r
tm_layout(
  title,
  scale,
  title.size,
  bg.color,
  aes.color,
  aes.palette,
  attr.color,
  sepia.intensity,
  saturation,
  frame,
  frame.lwd,
  frame.double.line,
  asp,
  outer.margins,
  inner.margins,
  between.margin,
  outer.bg.color,
  fontface,
  fontfamily,
  compass.type,
  earth.boundary,
  earth.boundary.color,
  earth.boundary.lwd,
  earth.datum,
  space.color,
  legend.show,
  legend.only,
  legend.outside,
  legend.outside.position,
  legend.outside.size,
  legend.position,
  legend.stack,
  legend.just,
  legend.width,
  legend.height,
)```
legend.hist.height,
legend.hist.width,
legend.title.color,
legend.title.size,
legend.title.fontface,
legend.title.fontfamily,
legend.text.color,
legend.text.size,
legend.text.fontface,
legend.text.fontfamily,
legend.hist.size,
legend.format,
legend.frame,
legend.frame.lwd,
legend.bg.color,
legend.bg.alpha,
legend.hist.bg.color,
legend.hist.bg.alpha,
title.snap.to.legend,
title.position,
title.color,
title.fontface,
title.fontfamily,
title.bg.color,
title.bg.alpha,
panel.show,
panel.labels,
panel.label.size,
panel.label.color,
panel.label.fontface,
panel.label.fontfamily,
panel.label.bg.color,
panel.label.height,
panel.label.rot,
main.title,
main.title.size,
main.title.color,
main.title.fontface,
main.title.fontfamily,
main.title.position,
attr.outside,
attr.outside.position,
attr.outside.size,
attr.position,
attr.just,
design.mode}
tm_legend(...)

tm_style(style, ...)

tm_format(format, ...)

Arguments

title Global title of the map. For small multiples, multiple titles can be specified. The title is drawn inside the map. Alternatively, use panel.labels to print the map as a panel, with the title inside the panel header (especially useful for small multiples). Another alternative is the main.title which prints a title above the map. Titles for the legend items are specified at the layer functions (e.g. tm_fill).

scale numeric value that serves as the global scale parameter. All font sizes, symbol sizes, border widths, and line widths are controlled by this value. Each of these elements can be scaled independently with the scale, lwd, or size arguments provided by the tmap-elements.

title.size Relative size of the title

bg.color Background color. By default it is "white". A recommended alternative for choropleths is light grey (e.g., "grey85").

aes.color Default color values for the aesthetics layers. Should be a named vector with the names chosen from: fill, borders, symbols, dots, lines, text, na. Use "#00000000" for transparency.

aes.palette Default color palettes for the aesthetics. It takes a list of three items: seq for sequential palettes, div for diverging palettes, and cat for categorical palettes. By default, Color Brewer palettes (see tmaptools::palette_explorer()) are used. It is also possible provide a vector of colors for any of these items.

attr.color Default color value for map attributes

sepia.intensity Number between 0 and 1 that defines the amount of sepia effect, which gives the map a brown/yellowish flavour. By default this effect is disabled (sepia.intensity=0). All colored used in the map are adjusted with this effect.

saturation Number that determines how much saturation (also known as chroma) is used: saturation=0 is greyscale and saturation=1 is normal. A number larger than 1 results in very saturated maps. All colored used in the map are adjusted with this effect. Hacking tip: use a negative number.

frame Either a boolean that determines whether a frame is drawn, or a color value that specifies the color of the frame.

frame.lwd width of the frame

frame.double.line draw a double frame line border?

asp Aspect ratio. The aspect ratio of the map (width/height). If NA, it is determined by the bounding box (see argument bbox of tm_shape), the outer.margins, and the inner.margins. If 0, then the aspect ratio is adjusted to the aspect ratio of the device.
outer.margins Relative margins between device and frame. Vector of four values specifying the bottom, left, top, and right margin. Values are between 0 and 1. When facets are created, the outer margins are the margins between the outer panels and the device borders (see also between.margin).

inner.margins Relative margins inside the frame. Vector of four values specifying the bottom, left, top, and right margin. Values are between 0 and 1. By default, 0 for each side if master shape is a raster, otherwise 0.02.

between.margin Margin between facets (small multiples) in number of text line heights. The height of a text line is automatically scaled down based on the number of facets.

outer.bg.color Background color outside the frame.

fontface global font face for the text in the map. It can also be set locally per element (see e.g. title.fontface).

fontfamily global font family for the text in the map. It can also be set locally per (see e.g. title.fontfamily).

compass.type type of compass, one of: "arrow", "4star", "8star", "radar", "rose". Of course, only applicable if a compass is shown. The compass type can also be set within tm_compass.

earth.boundary Logical that determines whether the boundaries of the earth are shown or an object that specifies the boundaries. This object can be a vector of size four, a 2 by 2 matrix (bounding box), or an extent object. By default, the boundaries are c(-180,-90,180,90). Useful for projected world maps. Often, it is useful to crop both poles (e.g., with c(-180,-88,180,88)).

earth.boundary.color Color of the earth boundary.

earth.boundary.lwd Line width of the earth boundary.

earth.datum Geodetic datum to determine the earth boundary. By default epsg 4326 (long/lat).

space.color Color of the space, i.e. the region inside the frame, and outside the earth boundary.

legend.show Logical that determines whether the legend is shown.

legend.only logical. Only draw the legend (without map)? Particularly useful for small multiples with a common legend.

legend.outside Logical that determines whether the legend is plot outside of the map/facets. Especially useful when using facets that have a common legend (i.e. with free.scales=FALSE).

legend.outside.position Character that determines the outside position of the legend. Only applicable when legend.outside=TRUE. One of: "right", "left", "top", or "bottom".

legend.outside.size Numeric value that determines the relative size of the legend, when legend.outside=TRUE. If the first value of legend.outside.position is "top" or "bottom", then it is the width of the legend, else it is the height of the legend. Note that the actual height or width of the legend is determined by the content of the legend (and the used font sizes). This argument specifies the upperbound of the width or height.
legend.position
Position of the legend. Vector of two values, specifying the x and y coordinates. Either this vector contains "left", "LEFT", "center", "right", or "RIGHT" for the first value and "top", "TOP", "center", "bottom", or "BOTTOM" for the second value, or this vector contains two numeric values between 0 and 1 that specifies the x and y coordinates of the left bottom corner of the legend. The uppercase values correspond to the position without margins (so tighter to the frame). By default, it is automatically placed in the corner with most space based on the (first) shape object. If legend.outside=TRUE, this argument specifies the legend position within the outside panel.

legend.stack
Value that determines how different legends are stacked: "vertical" or "horizontal". To stack items within a same legend, look at "legend.is.portrait" in the specific layer calls.

legend.just
Justification of the legend relative to the point coordinates. The first value specifies horizontal and the second value vertical justification. Possible values are: "left", "right", "center", "bottom", and "top". Numeric values of 0 specify left/bottom alignment and 1 right/top alignment. This option is only used, if legend.position is specified by numeric coordinates.

legend.width
width of the legend. This number is relative to the map area (so 1 means the whole map width). If it is a negative number, it will be the exact legend width. If it is a positive number (by default), it will be the maximum legend width; the actual legend width will be decreased automatically based on the legend content and font sizes.

legend.height
height of the legend. If it is a negative number, it will be the exact legend height. If it is a positive number (by default), it will be the maximum legend height; the actual legend height will be decreased automatically based on the legend content and font sizes.

legend.hist.height
height of the histogram. This height is initial. If the total legend is downscaled to legend.height, the histogram is downscaled as well.

legend.hist.width
width of the histogram. By default, it is equal to the legend.width.

legend.title.color
color of the legend titles

legend.title.size
Relative font size for the legend title

legend.title.fontface
font face for the legend title. By default, set to the global parameter fontface.

legend.title.fontfamily
font family for the legend title. By default, set to the global parameter fontfamily.

legend.text.color
color of the legend text

legend.text.size
Relative font size for the legend text elements

legend.text.fontface
font face for the legend text labels. By default, set to the global parameter fontface.
legend.text.fontfamily
font family for the legend text labels. By default, set to the global parameter fontfamily.

legend.hist.size
Relative font size for the choropleth histogram

legend.format
list of formatting options for the legend numbers. Only applicable for layer functions (such as tm_fill) where labels is undefined. Parameters are:

fun Function to specify the labels. It should take a numeric vector, and should return a character vector of the same size. By default it is not specified. If specified, the list items scientific, format, and digits (see below) are not used.

scientific Should the labels be formatted scientifically? If so, square brackets are used, and the format of the numbers is "g". Otherwise, format="f", and text.separator, text.less.than, text.or.more, and big.num.abbr are used. Also, the numbers are automatically rounded to millions or billions if applicable.

format By default, "f", i.e. the standard notation xxx.xxx, is used. If scientific=TRUE then "g", which means that numbers are formatted scientifically, i.e. n.dddE+nn if needed to save space.

digits Number of digits after the decimal point if format="f", and the number of significant digits otherwise.

big.num.abbr Vector that defines whether and which abbreviations are used for large numbers. It is a named numeric vector, where the name indicated the abbreviation, and the number the magnitude (in terms on numbers of zero). Numbers are only abbreviation when they are large enough. Set it to NA to disable abbreviations. The default is c("mln" = 6,"bln" = 9). For layers where style is set to log10 or log10_pretty, the default is NA.

text.separator Character string to use to separate numbers in the legend (default: "to")).

text.less.than Character value(s) to use to translate "Less than". When a character vector of length 2 is specified, one for each word, these words are aligned when text.to.columns = TRUE

text.or.more Character value(s) to use to translate "or more". When a character vector of length 2 is specified, one for each word, these words are aligned when text.to.columns = TRUE

text.align Value that determines how the numbers are aligned, "left", "center" or "right". By default "left" for legends in portrait format (legend.is.protrait = TRUE), and "center" otherwise.

text.to.columns Logical that determines whether the text is aligned to three columns (from, text.separator, to). By default FALSE.

text.align Value that determines how the numbers are aligned, "left", "center" or "right". By default "left" for legends in portrait format (legend.is.protrait = TRUE), and "center" otherwise.

text.to.columns Logical that determines whether the text is aligned to three columns (from, text.separator, to). By default FALSE.

... Other arguments passed on to formatC
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Type</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>legend.frame</code></td>
<td>Either a logical that determines whether the legend is placed inside a frame, or a color that directly specifies the frame border color.</td>
<td>logical or color</td>
<td></td>
</tr>
<tr>
<td><code>legend.frame.lwd</code></td>
<td>Line width of the legend frame (applicable if <code>legend.frame</code> is <code>TRUE</code> or a color)</td>
<td>numeric</td>
<td></td>
</tr>
<tr>
<td><code>legend.bg.color</code></td>
<td>Background color of the legend. Use <code>TRUE</code> to match with the overall background color <code>bg.color</code>.</td>
<td>color</td>
<td></td>
</tr>
<tr>
<td><code>legend.bg.alpha</code></td>
<td>Transparency number between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of the <code>legend.bg.color</code> is used (normally 1).</td>
<td>numeric</td>
<td></td>
</tr>
<tr>
<td><code>legend.hist.bg.color</code></td>
<td>Background color of the histogram</td>
<td>color</td>
<td></td>
</tr>
<tr>
<td><code>legend.hist.bg.alpha</code></td>
<td>Transparency number between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of the <code>legend.hist.bg.color</code> is used (normally 1).</td>
<td>numeric</td>
<td></td>
</tr>
<tr>
<td><code>title.snap.to.legend</code></td>
<td>Logical that determines whether the title is part of the legend. By default <code>FALSE</code>, unless the legend is drawn outside the map (see <code>legend.outside</code>).</td>
<td>logical</td>
<td></td>
</tr>
<tr>
<td><code>title.position</code></td>
<td>Position of the title. Vector of two values, specifying the x and y coordinates. Either this vector contains &quot;left&quot;, &quot;LEFT&quot;, &quot;center&quot;, &quot;right&quot;, or &quot;RIGHT&quot; for the first value and &quot;top&quot;, &quot;TOP&quot;, &quot;center&quot;, &quot;bottom&quot;, or &quot;BOTTOM&quot; for the second value, or this vector contains two numeric values between 0 and 1 that specifies the x and y coordinates of the tile. The uppercase values correspond to the position without margins (so tighter to the frame). By default the title is placed on top of the legend (determined by <code>legend.position</code>).</td>
<td>vector of two values or numeric pair</td>
<td></td>
</tr>
<tr>
<td><code>title.color</code></td>
<td>Color of the title</td>
<td>color</td>
<td></td>
</tr>
<tr>
<td><code>title.fontface</code></td>
<td>Font face for the title. By default, set to the global parameter <code>fontface</code>.</td>
<td>font face</td>
<td></td>
</tr>
<tr>
<td><code>title.fontfamily</code></td>
<td>Font family for the title. By default, set to the global parameter <code>fontfamily</code>.</td>
<td>font family</td>
<td></td>
</tr>
<tr>
<td><code>title.bg.color</code></td>
<td>Background color of the title. Use <code>TRUE</code> to match with the overall background color <code>bg.color</code>. By default, it is <code>TRUE</code> if <code>legend.frame</code> is <code>TRUE</code> or a color.</td>
<td>color</td>
<td></td>
</tr>
<tr>
<td><code>title.bg.alpha</code></td>
<td>Transparency number between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of the <code>title.bg.color</code> is used (normally 1).</td>
<td>numeric</td>
<td></td>
</tr>
<tr>
<td><code>panel.show</code></td>
<td>Logical that determines if the map(s) are shown as panels. If <code>TRUE</code>, the title will be placed in the panel header instead of inside the map. By default, it is <code>TRUE</code> when small multiples are created with the <code>by</code> variable. (See <code>tm_facets</code>)</td>
<td>logical</td>
<td></td>
</tr>
<tr>
<td><code>panel.labels</code></td>
<td>Panel labels. Only applicable when <code>panel.show</code> is <code>TRUE</code>. For cross tables facets, it should be a list containing the row names in the first, and column names in the second item.</td>
<td>list</td>
<td></td>
</tr>
<tr>
<td><code>panel.label.size</code></td>
<td>Relative font size of the panel labels</td>
<td>numeric</td>
<td></td>
</tr>
<tr>
<td><code>panel.label.color</code></td>
<td>Font color of the panel labels</td>
<td>color</td>
<td></td>
</tr>
<tr>
<td><code>panel.label.fontface</code></td>
<td>Font face for the panel labels. By default, set to the global parameter <code>fontface</code>.</td>
<td>font face</td>
<td></td>
</tr>
</tbody>
</table>
panel.label.fontfamily
  Font family for the panel labels. By default, set to the global parameter `fontfamily`.

panel.label.bg.color
  Background color of the panel labels.

panel.label.height
  Height of the labels in number of text line heights.

panel.label.rot
  Rotation angles of the panel labels. Vector of two values: the first is the rotation angle (in degrees) of the row panels, which are only used in cross-table facets (when `tm_facets`'s by is specified with two variables). The second is the rotation angle of the column panels.

main.title
  Title that is printed above the map (or small multiples). When multiple pages are generated (see along argument of `tm_facets`), a vector can be provided. By default, the main title is only printed when this along argument is specified.

main.title.size
  Size of the main title.

main.title.color
  Color of the main title.

main.title.fontface
  Font face for the main title. By default, set to the global parameter `fontface`.

main.title.fontfamily
  Font family for the main title. By default, set to the global parameter `fontfamily`.

main.title.position
  Position of the main title. Either a numeric value between 0 (left) and 1 (right), or a character value: "left", "center", or "right".

attr.outside
  Logical that determines whether the attributes are plot outside of the map/facets.

attr.outside.position
  Character that determines the outside position of the attributes: "top" or "bottom". Only applicable when `attr.outside=TRUE`. If the legend is also drawn outside (with `legend.outside=TRUE`) and on the same side of the map (e.g. also "top" or "bottom"), the attributes are placed between the map and the legend. This can be changed by setting `attr.outside.position` to "TOP" or "BOTTOM": in this case, the attributes are placed above respectively below the legend.

attr.outside.size
  Numeric value that determines the relative height of the attribute viewport, when `attr.outside=TRUE`.

attr.position
  Position of the map attributes, which are `tm_credits`, `tm_scale_bar`, `tm_compass`, and `tm_minimap`. Vector of two values, specifying the x and y coordinates. The first value is "left", "LEFT", "center", "right", or "RIGHT", and the second value "top", "TOP", "center", "bottom", or "BOTTOM". The uppercase values correspond to the position without margins (so tighter to the frame). Positions can also be set separately in the map attribute functions. If `attr.outside=TRUE`, this argument specifies the position of the attributes within the outside panel.

attr.just
  Justification of the attributes relative to the point coordinates. The first value specifies horizontal and the second value vertical justification. Possible values are: "left", "right", "center", "bottom", and "top". Numeric values of
specify left/bottom alignment and 1 right/top alignment. This option is only used, if attr.position is specified by numeric coordinates. It can also be specified per attribute function.

design.mode Logical that enables the design mode. If TRUE, inner and outer margins, legend position, aspect ratio are explicitly shown. Also, feedback text in the console is given.

... other arguments from tm_layout

style name of the style

format name of the format

Details

Predefined styles:

"white" White background, commonly used colors (default)
"gray"/"grey" Grey background, useful to highlight sequential palettes (e.g. in choropleths)
"natural" Emulation of natural view: blue waters and green land
"bw" Greyscale, obviously useful for greyscale printing
"classic" Classic styled maps (recommended)
"cobalt" Inspired by latex beamer style cobalt
"albatross" Inspired by latex beamer style albatross
"beaver" Inspired by latex beamer style beaver

Predefined formats

"World" Format specified for world maps
"World_wide" Format specified for world maps with more space for the legend
"NLD" Format specified for maps of the Netherlands
"NLD_wide" Format specified for maps of the Netherlands with more space for the legend

References


See Also

vignette("tmap-getstarted")

Examples

data(World, land)

tm_shape(World) +
  tm.fill("pop_est_dens", style="kmeans", title="Population density") +
tm_style("albatross", frame.lwd=10) + tm_format("World", title="The World")

## Not run:

tm_shape(land) +
tm_raster("elevation", breaks=c(-Inf, 250, 500, 1000, 1500, 2000, 2500, 3000, 4000, Inf),
palette = terrain.colors(9), title="Elevation", midpoint = NA) +
tm_shape(World, is.master=TRUE) +
tm_borders("grey20") +
tm_grid(projection="longlat", labels.size = .5) +
tm_text("name", size="AREA") +
tm_compass(position = c(.65, .15), color.light = "grey90") +
tm_credits("Eckert IV projection", position = c("right", "BOTTOM")) +
tm_style("classic") +
tm_layout(bg.color="lightblue",
inner.margins=c(.04,.03,.02,.01),
earth.boundary = TRUE,
space.color="grey90") +
tm_legend(position = c("left", "bottom"),
frame = TRUE,
bg.color="lightblue")

## End(Not run)

tm_shape(World, projection="+proj=robin") +
tm_polygons("HPI", palette="div", n=7,
title = "Happy Planet Index") +
tm_credits("Robinson projection", position = c("right", "BOTTOM")) +
tm_style("natural", earth.boundary = c(-180, -87, 180, 87), inner.margins = .05) +
tm_legend(position=c("left", "bottom"), bg.color="grey95", frame=TRUE)

# Example to illustrate the type of titles

tm_shape(World) +
tm_polygons(c("income_grp", "economy"), title = c("Legend Title 1", "Legend Title 2")) +
tm_layout(main.title = "Main Title",
main.title.position = "center",
main.title.color = "blue",
title = c("Title 1", "Title 2"),
title.color = "red",
panel.labels = c("Panel Label 1", "Panel Label 2"),
panel.label.color = "purple",
legend.text.color = "brown")

## Not run:

# global option tmap.style demo

# get current style

current.style <- tmap_style()

tmap_style("col_blind")

qtm(World, fill = "economy", format = "World")
tm_lines

Draw spatial lines

**Description**

Creates a **tmap-element** that draw spatial lines.

**Usage**

```r
tm_lines(
  col = NA,
  lwd = 1,
  lty = "solid",
  alpha = NA,
  scale = 1,
  lwd.legend = NULL,
  lwd.legend.labels = NULL,
  n = 5,
  style = ifelse(is.null(breaks), "pretty", "fixed"),
  style.args = list(),
  as.count = NA,
  breaks = NULL,
  interval.closure = "left",
  palette = NULL,
  labels = NULL,
  drop.levels = FALSE,
  midpoint = NULL,
  stretch.palette = TRUE,
  contrast = NA,
  colorNA = NA,
  textNA = "Missing",
  showNA = NA,
  colorNULL = NA,
  title.col = NA,
  title.lwd = NA,
  legend.col.show = TRUE,
  legend.lwd.show = TRUE,
  legend.format = list(),
)```
tm_lines

legend.col.is.portrait = TRUE,
legend.lwd.is.portrait = FALSE,
legend.col.reverse = FALSE,
legend.lwd.reverse = FALSE,
legend.hist = FALSE,
legend.hist.title = NA,
legend.col.z = NA,
legend.lwd.z = NA,
legend.hist.z = NA,
id = NA,
popup.vars = NA,
popup.format = list(),
zindex = NA,
group = NA,
auto.palette.mapping = NULL,
max.categories = NULL,
...
)

Arguments

col  color of the lines. Either a color value or a data variable name. If multiple values
     are specified, small multiples are drawn (see details).

lwd  line width. Either a numeric value or a data variable. In the latter case, the class
     of the highest values (see style) will get the line width defined by scale. If
     multiple values are specified, small multiples are drawn (see details).

lty  line type.

alpha  transparency number between 0 (totally transparent) and 1 (not transparent). By
        default, the alpha value of the col is used (normally 1).

scale  line width multiplier number.

lwd.legend  vector of line widths that are shown in the legend. By default, this is determined
             automatically.

lwd.legend.labels  vector of labels for that correspond to lwd.legend.

n  preferred number of color scale classes. Only applicable when lwd is the name
    of a numeric variable.

style  method to process the color scale when col is a numeric variable. Discrete
       gradient options are "cat", "fixed", "sd", "equal", "pretty", "quantile",
       "kmeans", "hclust", "bclust", "fisher", "jenks", "dpih", "headtails",
       and "log10_pretty". A numeric variable is processed as a categorical variable
       when using "cat", i.e. each unique value will correspond to a distinct category.
       For the other discrete gradient options (except "log10_pretty"), see the
details in classIntervals (extra arguments can be passed on via style.args). 
Continuous gradient options are "cont", "order", and "log10". The first maps
the values of col to a smooth gradient, the second maps the order of values
of col to a smooth gradient, and the third uses a logarithmic transformation.
The numeric variable can be either regarded as a continuous variable or a count (integer) variable. See \texttt{as.count}.

**style.args**

Arguments passed on to \texttt{classIntervals}, the function that determine color classes (see also \texttt{style}).

**as.count**

When \texttt{col} is a numeric variable, should it be processed as a count variable? For instance, if \texttt{style = "pretty"}, \texttt{n = 2}, and the value range of the variable is 0 to 10, then the column classes for \texttt{as.count = TRUE} are 0; 1 to 5; 6 to 10 (note that 0 is regarded as an own category) whereas for \texttt{as.count = FALSE} they are 0 to 5; 5 to 10. Only applicable if \texttt{style} is "pretty", "fixed", or "log10_pretty". By default, TRUE if \texttt{style} is one of these, and the variable is an integer.

**breaks**

In case \texttt{style="fixed"}, breaks should be specified. The \texttt{breaks} argument can also be used when \texttt{style="cont"}. In that case, the breaks are mapped evenly to the sequential or diverging color palette.

**interval.closure**

Value that determines whether where the intervals are closed: "left" or "right". Only applicable if \texttt{col} is a numeric variable. If \texttt{as.count = TRUE}, \texttt{interval.closure} is always set to "left".

**palette**

A palette name or a vector of colors. See \texttt{tmaptools::palette_explorer()} for the named palettes. Use a "-" as prefix to reverse the palette. The default palette is taken from \texttt{tm_layout}'s argument \texttt{aes.palettes}, which typically depends on the style. The type of palette from \texttt{aes.palettes} is automatically determined, but can be overwritten: use "seq" for sequential, "div" for diverging, and "cat" for categorical.

**labels**

Labels of the classes.

**drop.levels**

Should unused classes be omitted? FALSE by default.

**midpoint**

The value mapped to the middle color of a diverging palette. By default it is set to 0 if negative and positive values are present. In that case, the two sides of the color palette are assigned to negative respectively positive values. If all values are positive or all values are negative, then the midpoint is set to \texttt{NA}, which means that the value that corresponds to the middle color class (see \texttt{style}) is mapped to the middle color. Only applies when \texttt{col} is a numeric variable. If it is specified for sequential color palettes (e.g. "Blues"), then this color palette will be treated as a diverging color palette.

**stretch.palette**

Logical that determines whether the categorical color palette should be stretched if there are more categories than colors. If TRUE (default), interpolated colors are used (like a rainbow). If FALSE, the palette is repeated.

**contrast**

Vector of two numbers that determine the range that is used for sequential and diverging palettes (applicable when \texttt{auto.palette.mapping=TRUE}). Both numbers should be between 0 and 1. The first number determines where the palette begins, and the second number where it ends. For sequential palettes, 0 means the brightest color, and 1 the darkest color. For diverging palettes, 0 means the middle color, and 1 both extremes. If only one number is provided, this number is interpreted as the endpoint (with 0 taken as the start).

**colorNA**

Color used for missing values. Use \texttt{NULL} for transparency.
textNA text used for missing values.
showNA logical that determines whether missing values are named in the legend. By
default (NA), this depends on the presence of missing values.
colorNULL colour for polygons that are shown on the map that are out of scope
title.col title of the legend element regarding the line colors
title.lwd title of the legend element regarding the line widths
legend.col.show logical that determines whether the legend for the line colors is shown
legend.lwd.show logical that determines whether the legend for the line widths is shown
legend.format list of formatting options for the legend numbers. Only applicable if labels is
undefined. Parameters are:
  fun Function to specify the labels. It should take a numeric vector, and should
  return a character vector of the same size. By default it is not specified. If
  specified, the list items scientific, format, and digits (see below) are
  not used.
  scientific Should the labels be formatted scientifically? If so, square brackets
  are used, and the format of the numbers is "g". Otherwise, format="f",
  and text.separator, text.less.than, and text.or.more are used. Also,
  the numbers are automatically rounded to millions or billions if applicable.
  format By default, "f", i.e. the standard notation xxx.xxx, is used. If scientific=TRUE
  then "g", which means that numbers are formatted scientifically, i.e. n.dddE+nn
  if needed to save space.
  digits Number of digits after the decimal point if format="f", and the number
  of significant digits otherwise.
  big.num.abbr Vector that defines whether and which abbreviations are used for
  large numbers. It is a named numeric vector, where the name indicated the
  abbreviation, and the number the magnitude (in terms on numbers of zero).
  Numbers are only abbreviation when they are large enough. Set it to NA to
  disable abbreviations. The default is c("mln" = 6,"bln" = 9). For layers
  where style is set to log10 or log10_pretty, the default is NA.
  prefix Prefix of each number
  suffix Suffix of each number
  text.separator Character string to use to separate numbers in the legend (de-
  fault: "to").
  text.less.than Character value(s) to use to translate "Less than". When a char-
  acter vector of length 2 is specified, one for each word, these words are
  aligned when text.to.columns = TRUE
  text.or.more Character value(s) to use to translate "or more". When a character
  vector of length 2 is specified, one for each word, these words are aligned
  when text.to.columns = TRUE
  text.align Value that determines how the numbers are aligned, "left", "center"
  or "right". By default "left" for legends in portrait format (legend.is.protrait
  = TRUE), and "center" otherwise.
**text.to.columns** Logical that determines whether the text is aligned to three columns (from, text.separator, to). By default FALSE.

... Other arguments passed on to **formatC**

- **legend.col.is.portrait**
  Logical that determines whether the legend element regarding the line colors is in portrait mode (TRUE) or landscape (FALSE).

- **legend.lwd.is.portrait**
  Logical that determines whether the legend element regarding the line widths is in portrait mode (TRUE) or landscape (FALSE).

- **legend.col.reverse**
  Logical that determines whether the items of the legend regarding the line colors sizes are shown in reverse order, i.e. from bottom to top when **legend.col.is.portrait** = TRUE and from right to left when **legend.col.is.portrait** = FALSE.

- **legend.lwd.reverse**
  Logical that determines whether the items of the legend regarding the line widths are shown in reverse order, i.e. from bottom to top when **legend.lwd.is.portrait** = TRUE and from right to left when **legend.lwd.is.portrait** = FALSE.

- **legend.hist**
  Logical that determines whether a histogram is shown regarding the line colors.

- **legend.hist.title**
  Title for the histogram. By default, one title is used for both the histogram and the normal legend for line colors.

- **legend.col.z**
  Index value that determines the position of the legend element regarding the line colors with respect to other legend elements. The legend elements are stacked according to their z values. The legend element with the lowest z value is placed on top.

- **legend.lwd.z**
  Index value that determines the position of the legend element regarding the line widths. (See **legend.col.z**)

- **legend.hist.z**
  Index value that determines the position of the legend element regarding the histogram. (See **legend.col.z**)

- **id**
  Name of the data variable that specifies the indices of the lines. Only used for "view" mode (see **tmap_mode**).

- **popup.vars**
  Names of data variables that are shown in the popups in "view" mode. If NA (default), only aesthetic variables (i.e. specified by col and lwd) are shown. If they are not specified, all variables are shown. Set popup.vars to FALSE to disable popups. When a vector of variable names is provided, the names (if specified) are printed in the popups.

- **popup.format**
  List of formatting options for the popup values. See the argument **legend.format** for options. Only applicable for numeric data variables. If one list of formatting options is provided, it is applied to all numeric variables of popup.vars. Also, a (named) list of lists can be provided. In that case, each list of formatting options is applied to the named variable.

- **zindex**
  Zindex of the pane in view mode. By default, it is set to the layer number plus 400. By default, the tmap layers will therefore be placed in the custom panes "tmap401", "tmap402", etc., except for the base tile layers, which are placed in the standard "tile". This parameter determines both the name of the pane and
the z-index, which determines the pane order from bottom to top. For instance, if `zindex` is set to 500, the pane will be named "tmap500".

**group**

name of the group to which this layer belongs in view mode. Each group can be selected or deselected in the layer control item. Set `group = NULL` to hide the layer in the layer control item. By default, it will be set to the name of the shape (specified in `tm_shape`).

**auto.palette.mapping**

deprecated. It has been replaced by `midpoint` for numeric variables and `stretch.palette` for categorical variables.

**max.categories**

deprecated. It has moved to `tmap_options`.

... these arguments are passed on to `classIntervals`, the function that determine color classes (see also `style`).

**Details**

Small multiples can be drawn in two ways: either by specifying the `by` argument in `tm_facets`, or by defining multiple variables in the aesthetic arguments. The aesthetic arguments of `tm_lines` are `col` and `lwd`. In the latter case, the arguments, except for the ones starting with `legend`, can be specified for small multiples as follows. If the argument normally only takes a single value, such as `n`, then a vector of those values can be specified, one for each small multiple. If the argument normally can take a vector, such as `palette`, then a list of those vectors (or values) can be specified, one for each small multiple.

**Value**

tmap-element

**References**


**See Also**

vignette("tmap-getstarted")

**Examples**

data(World, rivers)

qtm(rivers)

## Not run:
tm_shape(World) +
  tm_fill() +
tm_shape(rivers) +
  tm_lines(col="black", lwd="scalerank", scale=2, legend.lwd.show = FALSE) +
tm_style("cobalt", title = "Rivers of the World") +
tm_format("World")

## End(Not run)
**tm_logo**

---

**Description**

Creates a map logo. Multiple logos can be specified which are shown next to each other. Logos placed on top of each other can be specified with stacking `tm_logo` elements.

**Usage**

```
tm_logo(
    file,
    height = 3,
    halign = "center",
    margin = 0.2,
    position = NA,
    just = NA
)
```

**Arguments**

- `file` either a filename or url of a png image. If multiple files/urls are provided with a character vector, the logos are placed near each other. To specify logos for small multiples use a list of character values/vectors. In order to stack logos vertically, multiple `tm_logo` elements can be stacked.

- `height` height of the logo in number of text line heights. The width is scaled based the height and the aspect ratio of the logo. If multiple logos are specified by a vector or list, the heights can be specified accordingly.

- `halign` if logos in one row have different heights, `halign` specifies the vertical alignment. Possible values are "top", "center" and "bottom".

- `margin` margin around the logo in number of text line heights.

- `position` position of the logo. Vector of two values, specifying the x and y coordinates. Either this vector contains "left", "LEFT", "center", "right", or "RIGHT" for the first value and "top", "TOP", "center", "bottom", or "BOTTOM" for the second value, or this vector contains two numeric values between 0 and 1 that specifies the x and y value of the center of the text. The uppercase values correspond to the position without margins (so tighter to the frame). The default value is controlled by the argument "attr.position" of `tm_layout`.

- `just` Justification of the attribute relative to the point coordinates. The first value specifies horizontal and the second value vertical justification. Possible values are: "left", "right", "center", "bottom", and "top". Numeric values of 0 specify left/bottom alignment and 1 right/top alignment. This option is only used, if position is specified by numeric coordinates. The default value is controlled by the argument "attr.just" of `tm_layout`.
Examples

```r
## Not run:
data(NLD_muni, NLD_prov)

tm_shape(NLD_muni) +
tm_polygons("origin_native", border.alpha=0.5, style="cont", title="Native Dutch (%)") +
tm_logo("http://statline.cbs.nl/Statweb/Images/cbs_logo.png",
       position=c("left", "bottom"), height = 2) +
tm_layout(bg.color="gray98")

data(World)

tm_shape(World) +
tm_polygons("HPI", palette="RdYlGn") +
tm_logo(c("https://www.r-project.org/logo/Rlogo.png",
      system.file("img/tmap.png", package="tmap"))) +
      height=5, position = c("left", "top")) +
tm_format("World")

## End(Not run)
```

### Description

Creates a minimap in view mode. See `addMiniMap`.

### Usage

```r
tm_minimap(server = NA, position = c("left", "bottom"), toggle = TRUE, ...)
```

### Arguments

- **server**: name of the provider or an URL (see `tm_tiles`). By default, it shows the same map as the basemap, and moreover, it will automatically change when the user switches basemaps. Note the latter does not happen when `server` is specified.
- **position**: position of the scale bar Vector of two values, specifying the x and y coordinates. The first is either "left" or "right", the second either "top" or "bottom".
- **toggle**: should the minimap have a button to minimise it? By default TRUE.
- **...**: arguments passed on to `addMiniMap`.

### See Also

- `addMiniMap`
Draw a raster

Description

Creates a tmap-element that draws a raster. For coloring, there are three options: 1) a fixed color is used, 2) a color palette is mapped to a data variable, 3) RGB values are used. The function `tm_raster` is designed for options 1 and 2, while `tm_rgb` is used for option 3.

Usage

```r
tm_raster(
  col = NA,
  alpha = NA,
  palette = NULL,
  n = 5,
  style = ifelse(is.null(breaks), "pretty", "fixed"),
  style.args = list(),
  as.count = NA,
  breaks = NULL,
  interval.closure = "left",
  labels = NULL,
  drop.levels = FALSE,
  midpoint = NULL,
  stretch.palette = TRUE,
  contrast = NA,
  saturation = 1,
  interpolate = NA,
  colorNA = NULL,
  textNA = "Missing",
  showNA = NA,
  colorNULL = NULL,
  title = NA,
  legend.show = TRUE,
  legend.format = list(),
  legend.is.portrait = TRUE,
  legend.reverse = FALSE,
  legend.hist = FALSE,
  legend.hist.title = NA,
  legend.z = NA,
  legend.hist.z = NA,
  zindex = NA,
  group = NA,
  auto.palette.mapping = NULL,
  max.categories = NULL,
  max.value = 255
)
```
tm_raster

```r
tm_rgb(
  r = 1,
  g = 2,
  b = 3,
  alpha = NA,
  saturation = 1,
  interpolate = TRUE,
  max.value = 255,
  ...
)
```

```r
tm_rgba(
  r = 1,
  g = 2,
  b = 3,
  a = 4,
  alpha = NA,
  saturation = 1,
  interpolate = TRUE,
  max.value = 255,
  ...
)
```

Arguments

col three options: the name of a data variable that is contained in shp, the name of a variable in shp that contain color values, a single color value. In the first case the values (numeric or categorical) that will be depicted by a color palette (see palette). If multiple values are specified, small multiples are drawn (see details). By default, it is a vector of the names of all data variables unless the by argument of tm_facets is defined (in that case, the default color of dots is taken from the tmap option aes.color). If the shape (stars object) contains a third dimension, small multiples are created per 3rd dimension value). Note that the number of small multiples is limited by tmap_options("limits").

alpha transparency number between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of the col is used (normally 1).

palette a palette name or a vector of colors. See tmaptools::palette_explorer() for the named palettes. Use a "-" as prefix to reverse the palette. The default palette is taken from tm_layout's argument aes.palette, which typically depends on the style. The type of palette from aes.palette is automatically determined, but can be overwritten: use "seq" for sequential, "div" for diverging, and "cat" for categorical.

n preferred number of classes (in case col is a numeric variable)

style method to process the color scale when col is a numeric variable. Discrete gradient options are "cat", "fixed", "sd", "equal", "pretty", "quantile", "kmeans", "hclust", "bclust", "fisher", "jenks", "dpih", "headtails", and "log10_pretty". A numeric variable is processed as a categorical variable
when using "cat", i.e. each unique value will correspond to a distinct category. For the other discrete gradient options (except "log10_pretty"), see the details in classIntervals (extra arguments can be passed on via style.args). Continuous gradient options are "cont", "order", and "log10". The first maps the values of col to a smooth gradient, the second maps the order of values of col to a smooth gradient, and the third uses a logarithmic transformation. The numeric variable can be either regarded as a continuous variable or a count (integer) variable. See as.count.

style.args arguments passed on to classIntervals, the function that determine color classes (see also style).

as.count when col is a numeric variable, should it be processed as a count variable? For instance, if style = "pretty", n = 2, and the value range of the variable is 0 to 10, then the column classes for as.count = TRUE are 0; 1 to 5; 6 to 10 (note that 0 is regarded as an own category) whereas for as.count = FALSE they are 0 to 5; 5 to 10. Only applicable if style is "pretty", "fixed", or "log10_pretty".

By default, TRUE if style is one of these, and the variable is an integer.

breaks in case style="fixed", breaks should be specified. The breaks argument can also be used when style="cont". In that case, the breaks are mapped evenly to the sequential or diverging color palette.

interval.closure value that determines whether where the intervals are closed: "left" or "right". Only applicable if col is a numeric variable. If as.count = TRUE, interval.closure is always set to "left".

labels labels of the classes

drop.levels should unused classes be omitted? FALSE by default.

midpoint The value mapped to the middle color of a diverging palette. By default it is set to 0 if negative and positive values are present. In that case, the two sides of the color palette are assigned to negative respectively positive values. If all values are positive or all values are negative, then the midpoint is set to NA, which means that the value that corresponds to the middle color class (see style) is mapped to the middle color. Only applies when col is a numeric variable. If it is specified for sequential color palettes (e.g. "Blues"), then this color palette will be treated as a diverging color palette.

stretch.palette Logical that determines whether the categorical color palette should be stretched if there are more categories than colors. If TRUE (default), interpolated colors are used (like a rainbow). If FALSE, the palette is repeated.

contrast vector of two numbers that determine the range that is used for sequential and diverging palettes (applicable when auto.palette.mapping=TRUE). Both numbers should be between 0 and 1. The first number determines where the palette begins, and the second number where it ends. For sequential palettes, 0 means the brightest color, and 1 the darkest color. For diverging palettes, 0 means the middle color, and 1 both extremes. If only one number is provided, this number is interpreted as the endpoint (with 0 taken as the start).

saturation Number that determines how much saturation (also known as chroma) is used: saturation=0 is greyscale and saturation=1 is normal. This saturation value is multiplied by the overall saturation of the map (see tm_layout).
Should the raster image be interpolated? By default FALSE for `tm_raster` and TRUE for `tm_rgb`.

colorNA color used for missing values. Use NULL for transparency.

textNA text used for missing values.

showNA logical that determines whether missing values are named in the legend. By default (NA), this depends on the presence of missing values.

colorNULL colour for polygons that are shown on the map that are out of scope

title title of the legend element

legend.show logical that determines whether the legend is shown

legend.format list of formatting options for the legend numbers. Only applicable if `labels` is undefined. Parameters are:

`fun` Function to specify the labels. It should take a numeric vector, and should return a character vector of the same size. By default it is not specified. If specified, the list items `scientific`, `format`, and `digits` (see below) are not used.

`scientific` Should the labels be formatted scientifically? If so, square brackets are used, and the format of the numbers is "g". Otherwise, `format="f"`, and `text.separator`, `text.less.than`, and `text.or.more` are used. Also, the numbers are automatically rounded to millions or billions if applicable.

`format` By default, "f", i.e. the standard notation `xxx.xxx`, is used. If `scientific=TRUE` then "g", which means that numbers are formatted scientifically, i.e. `n.dddE+nn` if needed to save space.

`digits` Number of digits after the decimal point if `format="f"`, and the number of significant digits otherwise.

`big.num.abbr` Vector that defines whether and which abbreviations are used for large numbers. It is a named numeric vector, where the name indicated the abbreviation, and the number the magnitude (in terms on numbers of zero). Numbers are only abbreviation when they are large enough. Set it to NA to disable abbreviations. The default is `c("mln" = 6, "bln" = 9)`. For layers where `style` is set to `log10` or `log10_pretty`, the default is NA.

`prefix` Prefix of each number

`suffix` Suffix of each number

`text.separator` Character string to use to separate numbers in the legend (default: "to").

`text.less.than` Character value(s) to use to translate "Less than". When a character vector of length 2 is specified, one for each word, these words are aligned when `text.to.columns = TRUE`

`text.or.more` Character value(s) to use to translate "or more". When a character vector of length 2 is specified, one for each word, these words are aligned when `text.to.columns = TRUE`

`text.align` Value that determines how the numbers are aligned. "left", "center" or "right". By default "left" for legends in portrait format (`legend.is.protrait = TRUE`), and "center" otherwise.

`text.to.columns` Logical that determines whether the text is aligned to three columns (from, text.separator, to). By default FALSE.
Other arguments passed on to `formatC`

- `legend.is.portrait` logical that determines whether the legend is in portrait mode (TRUE) or landscape (FALSE)
- `legend.reverse` logical that determines whether the items of the legend regarding the text sizes are shown in reverse order, i.e., from bottom to top when `legend.is.portrait` = TRUE and from right to left when `legend.is.portrait` = FALSE
- `legend.hist` logical that determines whether a histogram is shown
- `legend.hist.title` title for the histogram. By default, one title is used for both the histogram and the normal legend.
- `legend.z` index value that determines the position of the legend element with respect to other legend elements. The legend elements are stacked according to their z values. The legend element with the lowest z value is placed on top.
- `legend.hist.z` index value that determines the position of the histogram legend element
- `zindex` zindex of the pane in view mode. By default, it is set to the layer number plus 400. By default, the tmap layers will therefore be placed in the custom panes "tmap401", "tmap402", etc., except for the base tile layers, which are placed in the standard "tile". This parameter determines both the name of the pane and the z-index, which determines the pane order from bottom to top. For instance, if zindex is set to 500, the pane will be named "tmap500".
- `group` name of the group to which this layer belongs in view mode. Each group can be selected or deselected in the layer control item. Set `group = NULL` to hide the layer in the layer control item. By default, it will be set to the name of the shape (specified in `tm_shape`).
- `auto.palette.mapping` deprecated. It has been replaced by `midpoint` for numeric variables and `stretch.palette` for categorical variables.
- `max.categories` deprecated. It has moved to `tmap_options`.
- `max.value` for `tm_rgb`, what is the maximum value per layer? By default 255.
- `r` raster band for the red channel. It should be an integer between 1 and the number of raster layers.
- `g` raster band for the green channel. It should be an integer between 1 and the number of raster layers.
- `b` raster band for the blue channel. It should be an integer between 1 and the number of raster layers.
- `a` raster band for the alpha channel. It should be an integer between 1 and the number of raster layers.

Details

Small multiples can be drawn in two ways: either by specifying the by argument in `tm_facets`, or by defining multiple variables in the aesthetic arguments. The aesthetic argument of `tm_raster` is
col. In the latter case, the arguments, except for the ones starting with legend., can be specified for small multiples as follows. If the argument normally only takes a single value, such as \( n \), then a vector of those values can be specified, one for each small multiple. If the argument normally can take a vector, such as palette, then a list of those vectors (or values) can be specified, one for each small multiple.

Value

\texttt{tmap-element}

References


See Also

\texttt{vignette("tmap-getstarted")}

Examples

data(World, land, metro)

tm_shape(land, ylim = c(-88,88)) +
  tm_raster("cover_cls", palette = pal8, title = "Global Land Cover") +
tm_shape(metro) + tm_dots(col = "#E31A1C") +
tm_shape(World) +
  tm_borders(col = "black") +
tm_layout(scale = .8,
    legend.position = c("left","bottom"),
    legend.bg.color = "white", legend.bg.alpha = .2,
    legend.frame = "gray50")

## Not run:
pal20 <- c("#003200",="#C9500",="#06E00",="#556E19",="#00C800",="#8CBE8C",
 ="#467864",="#B4E664",="#9B82E6",="#EB42F2",="#9132E6",
 ="#FFFFF",="#5ADCDC")
tm_shape(land) +
tm_raster("cover", palette = pal20, title = "Global Land Cover") +
tm_layout(scale=.8, legend.position = c("left","bottom"))

## End(Not run)

tm_shape(land, ylim = c(-88,88)) +
  tm_raster("trees", palette = "Greens", title = "Percent Tree Cover") +
tm_shape(World) +
  tm_borders() +
tm_layout(legend.position = c("left", "bottom"), bg.color = "lightblue")

## Not run:
tm_scale_bar

## Description

Creates a scale bar. By default, the coordinate units are assumed to be meters, and the map units in kilometers. This can be changed in `tm_shape`.

## Usage

```r
tm_scale_bar(
  breaks = NULL,
  width = NA,
  text.size = 0.5,
  text.color = NA,
  color.dark = "black",
  color.light = "white",
  lwd = 1,
  position = NA,
  just = NA,
  size = NULL
)
```

## Arguments

- `breaks`: breaks of the scale bar. If not specified, breaks will be automatically be chosen given the preferred width of the scale bar. Not available for view mode.
- `width`: (preferred) width of the scale bar. Only applicable when `breaks=NULL`. In plot mode, it corresponds the relative width; the default is 0.25 so one fourth of the map width. In view mode, it corresponds to the width in pixels; the default is 100.
- `text.size`: relative text size (which is upperbound by the available label width)
- `text.color`: color of the text. By default equal to the argument `attr.color` of `tm_layout`.
- `color.dark`: color of the dark parts of the scale bar, typically (and by default) black.
- `color.light`: color of the light parts of the scale bar, typically (and by default) white.
- `lwd`: line width of the scale bar
**position**

Position of the scale bar. Vector of two values, specifying the x and y coordinates. Either this vector contains "left", "LEFT", "center", "right", or "RIGHT" for the first value and "top", "TOP", "center", "bottom", or "BOTTOM" for the second value, or this vector contains two numeric values between 0 and 1 that specifies the x and y value of the left bottom corner of the scale bar. The uppercase values correspond to the position without margins (so tighter to the frame). The default value is controlled by the argument "attr.position" of `tm_layout`.

**just**

Justification of the attribute relative to the point coordinates. The first value specifies horizontal and the second value vertical justification. Possible values are: "left", "right", "center", "bottom", and "top". Numeric values of 0 specify left/bottom alignment and 1 right/top alignment. This option is only used, if position is specified by numeric coordinates. The default value is controlled by the argument "attr.just" of `tm_layout`.

**size**

Deprecated: renamed to `text.size`

### Examples

```r
current.mode <- tmap_mode("plot")

data(NLD_muni)
qtm(NLD_muni, theme = "NLD") + tm_scale_bar(position=c("left", "bottom"))

# restore current mode

tmap_mode(current.mode)
```

---

**tm_sf**

*Draw simple features*

**Description**

Creates a `tm-element` that draws simple features. Basically, it is a stack of `tm_polygons`, `tm_lines` and `tm_dots`. In other words, polygons are plotted as polygons, lines as lines and points as dots.

**Usage**

```r
tm_sf(
  col = NA,
  size = 0.02,
  shape = 16,
  lwd = 1,
  lty = "solid",
  alpha = NA,
  palette = NULL,
  border.col = NA,
  border.lwd = 1,
  border.lty = "solid",
)```

border.alpha = NA,
group = NA,
...
)

Arguments

col           color of the simple features. See the col argument of tm_polygons, tm_lines
              and tm_symbols.
size          size of the dots. See the size argument tm_symbols. By default, the size is
              similar to dot size (see tm_dots)
shape         shape of the dots. See the shape argument tm_symbols. By default, dots are
              shown.
lwd           width of the lines. See the lwd argument of tm_lines
lty           type of the lines. See the lty argument of tm_lines
alpha         transparency number. See alpha argument of tm_polygons, tm_lines and
              tm_symbols
palette       palette. See palette argument of tm_polygons, tm_lines and tm_symbols
border.col    color of the borders. See border.col argument of tm_polygons and tm_symbols.
border.lwd    line width of the borders. See border.lwd argument of tm_polygons and
              tm_symbols.
border.lty    line type of the borders. See border.lty argument of tm_polygons and
              tm_symbols.
border.alpha  transparency of the borders. See border.alpha argument of tm_polygons and
              tm_symbols.
group         name of the group to which this layer belongs in view mode. Each group can
              be selected or deselected in the layer control item. Set group = NULL to hide the
              layer in the layer control item. By default, it will be set to the name of the shape
              (specified in tm_shape).
...
other arguments passed on to tm_polygons, tm_lines and tm_symbols

Value

tmap-element

See Also

vignette("tmap-getstarted")

Examples

data(World)

World$geometry[World$continent == "Africa"] <-
sf::st_centroid(World$geometry[World$continent == "Africa"])
World$geometry[World$continent == "South America"] <-
sf::st_cast(World$geometry[World$continent == "South America"],
"MULTILINESTRING", group_or_split = FALSE)

tm_shape(World) +
tm_sf()

---

**tm_shape**  
*Specify the shape object*

**Description**

Creates a tmap-element that specifies a spatial data object, which we refer to as shape. Also the projection and covered area (bounding box) can be set. It is possible to use multiple shape objects within one plot (see tmap-element).

**Usage**

```r
tm_shape(
  shp,
  name = NULL,
  is.master = NA,
  projection = NULL,
  bbox = NULL,
  unit = NULL,
  simplify = 1,
  point.per = NA,
  line.center = "midpoint",
  filter = NULL,
  ...
)
```

**Arguments**

- **shp**  
  shape object, which is an object from a class defined by the sf, sp, or raster package. For instance, an sf object, an SpatialPolygons(DataFrame), or a RasterBrick.

- **name**  
  name of the shape object (character) as it appears in the legend in "view" mode. Default value is the name of shp.

- **is.master**  
  logical that determines whether this tm_shape is the master shape element. The bounding box, projection settings, and the unit specifications of the resulting thematic map are taken from the tm_shape element of the master shape object. By default, the first master shape element with a raster shape is the master, and if there are no raster shapes used, then the first tm_shape is the master shape element.

- **projection**  
  Either a crs object or a character value (PROJ.4 character string). By default, the projection is used that is defined in the shp object itself.

- **bbox**  
  bounding box. One of the following:
• A bounding box (an `sf` bbox object, see `st_bbox`, a 2 by 2 matrix (used by the `sp` package), or an `Extent` object used by the `raster` package).

• Open Street Map search query. The bounding is automatically generated by querying `q` from Open Street Map Nominatim. See `http://wiki.openstreetmap.org/wiki/Nominatim`.

• Another shape object, from which the bounding box is extracted.

If unspecified, the current bounding box of `shp` is taken. The bounding box is feed to `bb` (as argument `x`). The other arguments of `bb` can be specified directly as well (see ..).

`unit` desired units of the map. One of "metric" (default), "imperial", "km", "m", "mi" and "ft". Used to specify the scale bar (see `tm_scale_bar`) and to calculate densities for choropleths (see argument `convert2density` in `tm_fill`).

`simplify` simplification factor for spatial polygons and spatial lines. A number between 0 and 1 that indicates how many coordinates are kept. See the underlying function `simplify_shape`, from which the arguments `keep.units` and `keep.subunits` can be passed on (see ...). This requires the suggested package `rmapshaper`.

`point.per` specification of how points or text labels are plotted when the geometry is a multi line or a multi polygon. One of "feature", "segment" or "largest". The first generates a point/label for every feature, the second for every segment (i.e. subfeature), the third only for the largest segment (subfeature). Note that the last two options can be significant slower. By default, it is set to "segment" if the geometry of `shp` is a (multi)points geometry or a geometrycollection, and "feature" otherwise.

`line.center` specification of where points are placed for (multi)line geometries. Either "midpoint" or "centroid". The former places a point at the middle of the line, the latter at the centroid.

`filter` logical vector which indicated per feature whether it should be included. Features for which filter is FALSE will be colored light gray (see the `colorNULL` argument in the layer functions).

... Arguments passed on to `bb` (e.g. `ext` can be used to enlarge or shrink a bounding box), and `simplify_shape` (the arguments `keep.units` and `keep.subunits`)

**Value**

`tmap-element`

**References**


**See Also**

`vignette("tmap-getstarted")`
Examples

current.mode <- tmap_mode("plot")
data(World, metro, rivers)

tm_shape(World, projection=4326) +
  tm_polygons() +
  tm_layout("Long lat coordinates (WGS84)", inner.margins=c(0,0,.1,0), title.size=.8)

World$highlighted <- ifelse(World$iso_a3 %in% c("GRL", "AUS"), "gold", "gray75")

tm_shape(World, projection=3857, ylim=c(.1, 1), relative = TRUE) +
  tm_polygons("highlighted") +
  tm_layout("Web Mercator projection. Although widely used, it is discouraged for statistical purposes. In reality, Australia is 3 times larger than Greenland!", inner.margins=c(0,0,.1,0), title.size=.6)

tm_shape(World, projection="+proj=robin") +
  tm_polygons() +
  tm_layout("Winkel-Tripel projection, adapted as default by the National Geographic Society for world maps.", inner.margins=c(0,0,.1,0), title.size=.8)

tm_shape(World) +
  tm_polygons() +
  tm_layout("Eckhart IV projection. Recommended in statistical maps for its equal-area property.", inner.margins=c(0,0,.1,0), title.size=.8)

# different levels of simplification
## Not run:
tm1 <- tm_shape(World, simplify = 0.05) + tm_polygons() + tm_layout("Simplification: 0.05")
tm2 <- tm_shape(World, simplify = 0.1) + tm_polygons() + tm_layout("Simplification: 0.1")
tm3 <- tm_shape(World, simplify = 0.25) + tm_polygons() + tm_layout("Simplification: 0.25")
tm4 <- tm_shape(World, simplify = 0.5) + tm_polygons() + tm_layout("Simplification: 0.5")

require(tmaptools)
tmap_arrange(tm1, tm2, tm3, tm4)
## End(Not run)

# three groups of layers, each starting with tm_shape
## Not run:
tm_shape(World) +
  tm_fill("darkolivegreen3") +
tm_shape(metro) +
  tm_bubbles("pop2010", col = "grey30", scale=.5) +
tm_shape(rivers) +
  tm_lines("lightcyan1") +
tm_layout(bg.color="lightcyan1", inner.margins=c(0,0,.02,0), legend.show = FALSE)
## End(Not run)
# restore current mode
tmap_mode(current.mode)

---

**tm_symbols**  
*Draw symbols*

**Description**

Creates a tmap-element that draws symbols, including symbols and dots. The color, size, and shape of the symbols can be mapped to data variables.

**Usage**

```r
tm_symbols(  
  size = 1,  
  col = NA,  
  shape = 21,  
  alpha = NA,  
  border.col = NA,  
  border.lwd = 1,  
  border.alpha = NA,  
  scale = 1,  
  perceptual = FALSE,  
  clustering = FALSE,  
  size.max = NA,  
  size.lim = NA,  
  sizes.legend = NULL,  
  sizes.legend.labels = NULL,  
  n = 5,  
  style = ifelse(is.null(breaks), "pretty", "fixed"),  
  style.args = list(),  
  as.count = NA,  
  breaks = NULL,  
  interval.closure = "left",  
  palette = NULL,  
  labels = NULL,  
  drop.levels = FALSE,  
  midpoint = NULL,  
  stretch.palette = TRUE,  
  contrast = NA,  
  colorNA = NA,  
  textNA = "Missing",  
  showNA = NA,  
  colorNULL = NA,  
  shapes = 21:25,  
  shapes.legend = NULL,  
  shapes.legend.fill = NA,  
)```

shapes.labels = NULL,
shapes.drop.levels = FALSE,
shapeNA = 4,
shape.textNA = "Missing",
shape.showNA = NA,
shapes.n = 5,
shapes.style = ifelse(is.null(shapes.breaks), "pretty", "fixed"),
shapes.style.args = list(),
shapes.as.count = NA,
shapes.breaks = NULL,
shapes.interval.closure = "left",
legend.max.symbol.size = 0.8,
just = NA,
jitter = 0,
xmod = 0,
ymod = 0,
icon.scale = 3,
grob.dim = c(width = 48, height = 48, render.width = 256, render.height = 256),
title.size = NA,
title.col = NA,
title.shape = NA,
legend.size.show = TRUE,
legend.col.show = TRUE,
legend.shape.show = TRUE,
legend.format = list(),
legend.size.is.portrait = FALSE,
legend.col.is.portrait = TRUE,
legend.shape.is.portrait = TRUE,
legend.size.reverse = FALSE,
legend.col.reverse = FALSE,
legend.shape.reverse = FALSE,
legend.hist = FALSE,
legend.hist.title = NA,
legend.size.z = NA,
legend.col.z = NA,
legend.shape.z = NA,
legend.hist.z = NA,
id = NA,
popup.vars = NA,
popup.format = list(),
zindex = NA,
group = NA,
auto.palette.mapping = NULL,
max.categories = NULL
)

tm_squares(size = 1, col = NA, shape = 22, scale = 4/3, ...)

tm_bubbles(
    size = 1,
    col = NA,
    shape = 21,
    scale = 4/3,
    legend.max.symbol.size = 1,
    ...
)

tm_dots(
    col = NA,
    size = 0.02,
    shape = 16,
    title = NA,
    legend.show = TRUE,
    legend.is.portrait = TRUE,
    legend.z = NA,
    ...
)

tm_markers(
    shape = marker_icon(),
    col = NA,
    border.col = NULL,
    clustering = TRUE,
    text = NULL,
    text.just = "top",
    markers.on.top.of.text = TRUE,
    group = NA,
    ...
)

Arguments

size          a single value or a shp data variable that determines the symbol sizes. The reference value size=1 corresponds to the area of symbols that have the same height as one line of text. If a data variable is provided, the symbol sizes are scaled proportionally (or perceptually, see perceptual) where by default the symbol with the largest data value will get size=1 (see also size.max). If multiple values are specified, small multiples are drawn (see details).

col           color(s) of the symbol. Either a color (vector), or categorical variable name(s). If multiple values are specified, small multiples are drawn (see details).

shape         shape(s) of the symbol. Either direct shape specification(s) or a data variable name(s) that is mapped to the symbols specified by the shapes argument. Note that the default shapes (specified by shapes) is not supported in "view" mode. See details for the shape specification.

alpha         transparency number between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of the col is used (normally 1).
border.col  color of the symbol borders.
border.lwd  line width of the symbol borders. If NA, no symbol borders are drawn.
border.alpha  transparency number, regarding the symbol borders, between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of the col is used (normally 1).
scale  symbol size multiplier number.
perceptual  logical that determines whether symbols are scales with a perceptually (TRUE) or mathematically (FALSE, default value). The perceived area of larger symbols is often underestimated. Flannery (1971) experimentally derived a method to compensate this for symbols, which is enabled by this argument.
clustering  value that determines whether the symbols are clustered in "view" mode. It does not work proportional bubbles (i.e. tm_bubbles). One of: TRUE, FALSE, or the output of markerClusterOptions.
size.max  value that is mapped to size=1. By default (NA), the maximum data value is chosen. Only applicable when size is the name of a numeric variable of shp
size.lim  vector of two limit values of the size variable. Only symbols are drawn whose value is greater than or equal to the first value. Symbols whose values exceed the second value are drawn at the size of the second value. Only applicable when size is the name of a numeric variable of shp
sizes.legend  vector of symbol sizes that are shown in the legend. By default, this is determined automatically.
sizes.legend.labels  vector of labels for that correspond to sizes.legend.
n  preferred number of color scale classes. Only applicable when col is a numeric variable name.
style  method to process the color scale when col is a numeric variable. Discrete gradient options are "cat", "fixed", "sd", "equal", "pretty", "quantile", "kmeans", "hclust", "bclust", "fisher", "jenks", "dpih", "headtails", and "log10_pretty". A numeric variable is processed as a categorical variable when using "cat", i.e. each unique value will correspond to a distinct category. For the other discrete gradient options (except "log10_pretty"), see the details in classIntervals (extra arguments can be passed on via style.args). Continuous gradient options are "cont", "order", and "log10". The first maps the values of col to a smooth gradient, the second maps the order of values of col to a smooth gradient, and the third uses a logarithmic transformation. The numeric variable can be either regarded as a continuous variable or a count (integer) variable. See as.count.
style.args  arguments passed on to classIntervals, the function that determine color classes (see also style).
as.count  when col is a numeric variable, should it be processed as a count variable? For instance, if style = "pretty", n = 2, and the value range of the variable is 0 to 10, then the column classes for as.count = TRUE are 0; 1 to 5; 6 to 10 (note that 0 is regarded as an own category) whereas for as.count = FALSE they are 0 to 5; 5 to 10. Only applicable if style is "pretty", "fixed", or "log10_pretty". By default, TRUE if style is one of these, and the variable is an integer.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>breaks</td>
<td>in case style==&quot;fixed&quot;, breaks should be specified. The breaks argument can also be used when style==&quot;cont&quot;. In that case, the breaks are mapped evenly to the sequential or diverging color palette.</td>
</tr>
<tr>
<td>interval.closure</td>
<td>value that determines whether where the intervals are closed: &quot;left&quot; or &quot;right&quot;. Only applicable if col is a numeric variable. If as.count = TRUE, interval.closure is always set to &quot;left&quot;.</td>
</tr>
<tr>
<td>palette</td>
<td>a palette name or a vector of colors. See tmaptools::palette_explorer() for the named palettes. Use a &quot;-&quot; as prefix to reverse the palette. The default palette is taken from tm_layout's argument aes.palette, which typically depends on the style. The type of palette from aes.palette is automatically determined, but can be overwritten: use &quot;seq&quot; for sequential, &quot;div&quot; for diverging, and &quot;cat&quot; for categorical.</td>
</tr>
<tr>
<td>labels</td>
<td>labels of the classes</td>
</tr>
<tr>
<td>drop.levels</td>
<td>should unused classes be omitted? FALSE by default.</td>
</tr>
<tr>
<td>midpoint</td>
<td>The value mapped to the middle color of a diverging palette. By default it is set to 0 if negative and positive values are present. In that case, the two sides of the color palette are assigned to negative respectively positive values. If all values are positive or all values are negative, then the midpoint is set to NA, which means that the value that corresponds to the middle color class (see style) is mapped to the middle color. Only applies when col is a numeric variable. If it is specified for sequential color palettes (e.g. &quot;Blues&quot;), then this color palette will be treated as a diverging color palette.</td>
</tr>
<tr>
<td>stretch.palette</td>
<td>Logical that determines whether the categorical color palette should be stretched if there are more categories than colors. If TRUE (default), interpolated colors are used (like a rainbow). If FALSE, the palette is repeated.</td>
</tr>
<tr>
<td>contrast</td>
<td>vector of two numbers that determine the range that is used for sequential and diverging palettes (applicable when auto.palette.mapping=TRUE). Both numbers should be between 0 and 1. The first number determines where the palette begins, and the second number where it ends. For sequential palettes, 0 means the brightest color, and 1 the darkest color. For diverging palettes, 0 means the middle color, and 1 both extremes. If only one number is provided, this number is interpreted as the endpoint (with 0 taken as the start).</td>
</tr>
<tr>
<td>colorNA</td>
<td>colour for missing values. Use NULL for transparency.</td>
</tr>
<tr>
<td>textNA</td>
<td>text used for missing values of the color variable.</td>
</tr>
<tr>
<td>showNA</td>
<td>logical that determines whether missing values are named in the legend. By default (NA), this depends on the presence of missing values.</td>
</tr>
<tr>
<td>colorNULL</td>
<td>colour for polygons that are shown on the map that are out of scope</td>
</tr>
<tr>
<td>shapes</td>
<td>palette of symbol shapes. Only applicable if shape is a (vector of) categorical variable(s). See details for the shape specification. By default, the filled symbols 21 to 25 are taken.</td>
</tr>
<tr>
<td>shapes.legend</td>
<td>symbol shapes that are used in the legend (instead of the symbols specified with shape). These shapes will be used in the legends regarding the size and col of the symbols. Especially useful when shapes consist of grobs that have to be represented by neutrally colored shapes (see also shapes.legend.fill).</td>
</tr>
</tbody>
</table>
shapes.legend.fill
   Fill color of legend shapes. These colors will be used in the legends regarding
   the size and shape of the symbols. See also shapes.legend.

shapes.labels
   Legend labels for the symbol shapes

shapes.drop.levels
   should unused symbol classes be omitted? FALSE by default.

shapeNA
   the shape (a number or grob) for missing values. By default a cross (number 4).
   Set to NA to hide symbols for missing values.

shape.textNA
   text used for missing values of the shape variable.

shape.showNA
   logical that determines whether missing values are named in the legend. By
   default (NA), this depends on the presence of missing values.

shapes.n
   preferred number of shape classes. Only applicable when shape is a numeric
   variable name.

shapes.style
   method to process the shape scale when shape is a numeric variable. See style
   argument for options.

shapes.style.args
   arguments passed on to classIntervals (see also shapes.style).

shapes.as.count
   when shape is a numeric variable, should it be processed as a count variable?
   See as.count argument for options.

shapes.breaks
   in case shapes.style="fixed", breaks should be specified

shapes.interval.closure
   value that determines whether where the intervals are closed: "left" or "right".
   Only applicable if shape is a numeric variable.

legend.max.symbol.size
   Maximum size of the symbols that are drawn in the legend. For circles and
   bubbles, a value larger than one is recommended (and used for tm_bubbles)

just
   justification of the symbols relative to the point coordinates. The first value
   specifies horizontal and the second value vertical justification. Possible val-
   ues are: "left", "right", "center", "bottom", and "top". Numeric val-
   ues of 0 specify left alignment and 1 right alignment. The default value is
   c("center", "center"). For icons, this value may already be specified (see
   tmap_icons). The just, if specified, will overrides this.

jitter
   number that determines the amount of jittering, i.e. the random noise added to
   the position of the symbols. 0 means no jittering is applied, any positive number
   means that the random noise has a standard deviation of jitter times the height
   of one line of text line.

xmod
   horizontal position modification of the symbols, in terms of the height of one
   line of text. Either a single number for all polygons, or a numeric variable in
   the shape data specifying a number for each polygon. Together with ymod, it
determines position modification of the symbols. See also jitter for random
position modifications. In most coordinate systems (projections), the origin is
located at the bottom left, so negative xmod move the symbols to the left, and
negative ymod values to the bottom.
ymod  vertical position modification. See xmod.
icon.scale  scaling number that determines how large the icons (or grobs) are in plot mode in comparison to proportional symbols (such as bubbles). In view mode, the size is determined by the icon specification (see tmap_icons) or, if grobs are specified by grob.width and grob.height.
grob.dim  vector of four values that determine how grob objects (see details) are shown in view mode. The first and second value are the width and height of the displayed icon. The third and fourth value are the width and height of the rendered png image that is used for the icon. Generally, the third and fourth value should be large enough to render a ggplot2 graphic successfully. Only needed for the view mode.
title.size  title of the legend element regarding the symbol sizes
title.col  title of the legend element regarding the symbol colors
title.shape  title of the legend element regarding the symbol shapes
legend.size.show  logical that determines whether the legend for the symbol sizes is shown
legend.col.show  logical that determines whether the legend for the symbol colors is shown
legend.shape.show  logical that determines whether the legend for the symbol shapes is shown
legend.format  list of formatting options for the legend numbers. Only applicable if labels is undefined. Parameters are:
   fun  Function to specify the labels. It should take a numeric vector, and should return a character vector of the same size. By default it is not specified. If specified, the list items scientific, format, and digits (see below) are not used.
   scientific  Should the labels be formatted scientifically? If so, square brackets are used, and the format of the numbers is "g". Otherwise, format="f", and text.separator, text.less.than, and text.or.more are used. Also, the numbers are automatically rounded to millions or billions if applicable.
   format  By default, "f", i.e. the standard notation xxx.xxx, is used. If scientific=TRUE then "g", which means that numbers are formatted scientifically, i.e. n.dddE+nn if needed to save space.
   digits  Number of digits after the decimal point if format="f", and the number of significant digits otherwise.
   big.num.abbr  Vector that defines whether and which abbreviations are used for large numbers. It is a named numeric vector, where the name indicated the abbreviation, and the number the magnitude (in terms on numbers of zero). Numbers are only abbreviation when they are large enough. Set it to NA to disable abbreviations. The default is c("mln" = 6, "bln" = 9). For layers where style is set to log10 or log10_pretty, the default is NA.
   prefix  Prefix of each number
   suffix  Suffix of each number
   text.separator  Character string to use to separate numbers in the legend (default: "to").
text.less.than  Character value(s) to use to translate "Less than". When a character vector of length 2 is specified, one for each word, these words are aligned when text.to.columns = TRUE

text.or.more  Character value(s) to use to translate "or more". When a character vector of length 2 is specified, one for each word, these words are aligned when text.to.columns = TRUE

text.align  Value that determines how the numbers are aligned, "left", "center" or "right". By default "left" for legends in portrait format (legend.is.protrait = TRUE), and "center" otherwise.

text.to.columns  Logical that determines whether the text is aligned to three columns (from, text.separator, to). By default FALSE.

...  Other arguments passed on to formatC

legend.size.is.portrait  logical that determines whether the legend element regarding the symbol sizes is in portrait mode (TRUE) or landscape (FALSE)

legend.col.is.portrait  logical that determines whether the legend element regarding the symbol colors is in portrait mode (TRUE) or landscape (FALSE)

legend.shape.is.portrait  logical that determines whether the legend element regarding the symbol shapes is in portrait mode (TRUE) or landscape (FALSE)

legend.size.reverse  logical that determines whether the items of the legend regarding the symbol sizes are shown in reverse order, i.e. from bottom to top when legend.size.is.portrait = TRUE and from right to left when legend.size.is.portrait = FALSE

legend.col.reverse  logical that determines whether the items of the legend regarding the symbol colors are shown in reverse order, i.e. from bottom to top when legend.col.is.portrait = TRUE and from right to left when legend.col.is.portrait = FALSE

legend.shape.reverse  logical that determines whether the items of the legend regarding the symbol shapes are shown in reverse order, i.e. from bottom to top when legend.shape.is.portrait = TRUE and from right to left when legend.shape.is.portrait = FALSE

legend.hist  logical that determines whether a histogram is shown regarding the symbol colors

legend.hist.title  title for the histogram. By default, one title is used for both the histogram and the normal legend for symbol colors.

legend.size.z  index value that determines the position of the legend element regarding the symbol sizes with respect to other legend elements. The legend elements are stacked according to their z values. The legend element with the lowest z value is placed on top.

legend.col.z  index value that determines the position of the legend element regarding the symbol colors. (See legend.size.z)

legend.shape.z  index value that determines the position of the legend element regarding the symbol shapes. (See legend.size.z)
legend.hist.z  index value that determines the position of the histogram legend element. (See legend.size.z)

id  name of the data variable that specifies the indices of the symbols. Only used for "view" mode (see tmap_mode).

popup.vars  names of data variables that are shown in the popups in "view" mode. If NA (default), only aesthetic variables (i.e. specified by col and lwd) are shown. If they are not specified, all variables are shown. Set popup.vars to FALSE to disable popups. When a vector of variable names is provided, the names (if specified) are printed in the popups.

popup.format  list of formatting options for the popup values. See the argument legend.format for options. Only applicable for numeric data variables. If one list of formatting options is provided, it is applied to all numeric variables of popup.vars. Also, a (named) list of lists can be provided. In that case, each list of formatting options is applied to the named variable.

zindex  zindex of the pane in view mode. By default, it is set to the layer number plus 400. By default, the tmap layers will therefore be placed in the custom panes "tmap401", "tmap402", etc., except for the base tile layers, which are placed in the standard "tile". This parameter determines both the name of the pane and the z-index, which determines the pane order from bottom to top. For instance, if zindex is set to 500, the pane will be named "tmap500".

group  name of the group to which this layer belongs in view mode. Each group can be selected or deselected in the layer control item. Set group = NULL to hide the layer in the layer control item. By default, it will be set to the name of the shape (specified in tm_shape).

auto.palette.mapping  deprecated. It has been replaced by midpoint for numeric variables and stretch.palette for categorical variables.

max.categories  deprecated. It has moved to tmap_options.

...  arguments passed on to tm_symbols. For tm_markers, arguments can also be passed on to tm_text. In that case, they have to be prefixed with text., e.g. the col argument should be names text.col.

title  shortcut for title.col for tm_dots

legend.show shortcut for legend.col.show for tm_dots

legend.is.portrait  shortcut for legend.col.is.portrait for tm_dots

legend.z  shortcut for legend.col.z shortcut for tm_dots

text  text of the markers. Shown in plot mode, and as popup text in view mode.

text.just  justification of marker text (see just argument of tm_text). Only applicable in plot mode.

markers.on.top.of.text  For tm_markers, should the markers be drawn on top of the text labels?
Details

Small multiples can be drawn in two ways: either by specifying the by argument in \texttt{tm_facets}, or by defining multiple variables in the aesthetic arguments, which are size, col, and shape. In the latter case, the arguments, except for the ones starting with \texttt{legend}, can be specified for small multiples as follows. If the argument normally only takes a single value, such as \texttt{n}, then a vector of those values can be specified, one for each small multiple. If the argument normally can take a vector, such as \texttt{palette}, then a list of those vectors (or values) can be specified, one for each small multiple.

A shape specification is one of the following three options.

1. A numeric value that specifies the plotting character of the symbol. See parameter \texttt{pch} of \texttt{points} and the last example to create a plot with all options. Note that this is not supported for the "view" mode.

2. A \texttt{grob} object, which can be a ggplot2 plot object created with \texttt{ggplotGrob}. To specify multiple shapes, a list of grob objects is required. See example of a proportional symbol map with ggplot2 plots.

3. An icon specification, which can be created with \texttt{tmap\_icons}.

To specify multiple shapes (needed for the shapes argument), a vector or list of these shape specification is required. The shape specification options can also be mixed. For the shapes argument, it is possible to use a named vector or list, where the names correspond to the value of the variable specified by the shape argument. For small multiples, a list of these shape specification(s) should be provided.

Value

\texttt{tmap-element}

References

Flannery J (1971). The Relative Effectiveness of Some Common Graduated Point Symbols in the Presentation of Quantitative Data.Canadian Cartographer, 8(2), 96-109.\n

See Also

vignette("tmap-getstarted")

Examples

data(World, metro)
metro$growth <- (metro$pop2020 - metro$pop2010) / (metro$pop2010 * 10) * 100

\begin{verbatim}
  tm_shape(World) +
  tm_fill("grey70") +
  tm_shape(metro) +
  tm_bubbles("pop2010", col = "growth",
  border.col = "black", border.alpha = .5,
  style="fixed", breaks=c(-Inf, seq(0, 6, by=2), Inf),
\end{verbatim}
tm_symbols

```
palette="-RdYlBu", contrast=1,
title.size="Metro population",
title.col="Growth rate (%)") +
tm_format("World")

tm_shape(metro) +
tm_symbols(size = "pop2010", col="pop2010", shape="pop2010",
legend.format = list(text.align="right", text.to.columns = TRUE)) +
tm_legend(outside = TRUE, outside.position = "bottom", stack = "horizontal")

if (require(ggplot2) && require(dplyr) && require(tidyr) && require(tmaptools) && require(sf)) {
data(NLD_prov)

origin_data <- NLD_prov %>%
  st_set_geometry(NULL) %>%
  mutate(FID= factor(1:n())) %>%
  select(FID, origin_native, origin_west, origin_non_west) %>%
  gather(key=origin, value=perc, origin_native, origin_west, origin_non_west, factor_key=TRUE)

origin_cols <- get_brewer_pal("Dark2", 3)
grobs <- lapply(split(origin_data, origin_data$FID), function(x) {
  ggplotGrob(ggplot(x, aes(x="", y=-perc, fill=origin)) +
  geom_bar(width=1, stat="identity") +
  scale_y_continuous(expand=c(0,0)) +
  scale_fill_manual(values=origin_cols) +
  theme_ps(plot.axes = FALSE))
})
names(grobs) <- NLD_prov$name

tm_shape(NLD_prov) +
tm_polygons(group = "Provinces") +
tm_symbols(size="population", shape="name",
shapes=grobs,
sizes.legend=c(.5, 1.3)*1e6,
scale=1,
legend.shape.show = FALSE,
legend.size.is.portrait = TRUE,
shapes.legend = 22,
title.size = "Population",
group = "Charts",
id = "name",
popup.vars = c("population", "origin_native",
"origin_west", "origin_non_west") +
tm_add_legend(type="fill",
group = "Charts",
col=origin_cols,
labels=c("Native", "Western", "Non-western"),
title="Origin") +
tm_format("NLD")
}
```
# TIP: check out these examples in view mode, enabled with tmap_mode("view")

## Not run:
if (require(rnaturalearth)) {
  airports <- ne_download(scale=10, type="airports")
  airplane <- tmap_icons(system.file("img/airplane.png", package = "tmap"))

  current.mode <- tmap_mode("view")
  tm_shape(airports) +
  tm_symbols(shape=airplane, size="natlscale",
             legend.size.show = FALSE, scale=1, border.col = NULL, id="name", popup.vars = TRUE) +
  tm_view(set.view = c(lon = 15, lat = 48, zoom = 4))
  tmap_mode(current.mode)
}

## End(Not run)

########################################################################
# plot all available symbol shapes:
if (require(ggplot2)) {
  ggplot(data.frame(p=c(0:25,32:127))) +
  geom_point(aes(x=p%%16, y=-(p%/%16), shape=p), size=5, fill="red") +
  geom_text(mapping=aes(x=p%%16, y=-(p%/%16+0.25), label=p), size=3) +
  scale_shape_identity() +
  theme(axis.title=element_blank(),
        axis.text=element_blank(),
        axis.ticks=element_blank(),
        panel.background=element_blank())
}

## End(Not run)

---

**tm_text**  
*Add text labels*

**Description**

Creates a **tmap-element** that adds text labels.

**Usage**

```r
 tm_text(
   text,  # text labels
   size = 1,
```
col = NA,
root = 3,
clustering = FALSE,
size.lim = NA,
sizes.legend = NULL,
sizes.legend.labels = NULL,
sizes.legend.text = "Abc",
n = 5,
style = ifelse(is.null(breaks), "pretty", "fixed"),
style.args = list(),
as.count = NA,
b breaks = NULL,
interval.closure = "left",
palette = NULL,
labels = NULL,
drop.levels = FALSE,
labels.text = NA,
midpoint = NULL,
stretch.palette = TRUE,
contrast = NA,
colorNA = NA,
textNA = "Missing",
showNA = NA,
colorNULL = NA,
fontface = NA,
fontfamily = NA,
alpha = NA,
case = NA,
shadow = FALSE,
bg.color = NA,
bg.alpha = NA,
size.lowerbound = 0.4,
print.tiny = FALSE,
scale = 1,
auto.placement = FALSE,
remove.overlap = FALSE,
along.lines = FALSE,
overwrite.lines = FALSE,
just = "center",
xmod = 0,
ymod = 0,
title.size = NA,
title.col = NA,
legend.size.show = TRUE,
legend.col.show = TRUE,
legend.format = list(),
legend.size.is.portrait = FALSE,
legend.col.is.portrait = TRUE,
name of the variable in the shape object that contains the text labels

relative size of the text labels (see note). Either one number, a name of a numeric variable in the shape data that is used to scale the sizes proportionally, or the value "AREA", where the text size is proportional to the area size of the polygons.

color of the text labels. Either a color value or a data variable name. If multiple values are specified, small multiples are drawn (see details).

root number to which the font sizes are scaled. Only applicable if size is a variable name or "AREA". If root=2, the square root is taken, if root=3, the cube root etc.

value that determines whether the text labels are clustered in "view" mode. One of: TRUE, FALSE, or the output of `markerClusterOptions`.

vector of two limit values of the size variable. Only text labels are drawn whose value is greater than or equal to the first value. Text labels whose values exceed the second value are drawn at the size of the second value. Only applicable when size is the name of a numeric variable of shp. See also size.lowerbound which is a threshold of the relative font size.

vector of text sizes that are shown in the legend. By default, this is determined automatically.

vector of labels for that correspond to sizes.legend.

vector of example text to show in the legend next to sizes.legend.labels. By default "Abc". When NA, examples from the data variable whose sizes are close to the sizes.legend are taken and "NA" for classes where no match is found.

preferred number of color scale classes. Only applicable when col is a numeric variable name.

method to process the color scale when col is a numeric variable. Discrete gradient options are "cat", "fixed", "sd", "equal", "pretty", "quantile", "kmeans", "hclust", "bclust", "fisher", "jenks", "dpih", "headtails", and "log10_pretty". A numeric variable is processed as a categorical variable when using "cat", i.e. each unique value will correspond to a distinct category.
For the other discrete gradient options (except "log10_pretty"), see the details in \texttt{classIntervals} (extra arguments can be passed on via \texttt{style.args}). Continuous gradient options are "cont", "order", and "log10". The first maps the values of \texttt{col} to a smooth gradient, the second maps the order of values of \texttt{col} to a smooth gradient, and the third uses a logarithmic transformation.

The numeric variable can be either regarded as a continuous variable or a count (integer) variable. See \texttt{as.count}.

\textbf{style.args} arguments passed on to \texttt{classIntervals}, the function that determine color classes (see also \texttt{style}).

\textbf{as.count} when \texttt{col} is a numeric variable, should it be processed as a count variable? For instance, if \texttt{style = "pretty"}, \texttt{n = 2}, and the value range of the variable is 0 to 10, then the column classes for \texttt{as.count = TRUE} are 0; 1 to 5; 6 to 10 (note that 0 is regarded as an own category) whereas for \texttt{as.count = FALSE} they are 0 to 5; 5 to 10. Only applicable if \texttt{style} is "pretty", "fixed", or "log10_pretty".

By default, \texttt{TRUE} if \texttt{style} is one of these, and the variable is an integer.

\textbf{breaks} in case \texttt{style=="fixed"}, breaks should be specified. The \texttt{breaks} argument can also be used when \texttt{style=="cont"}. In that case, the breaks are mapped evenly to the sequential or diverging color palette.

\textbf{interval.closure} value that determines whether where the intervals are closed: "left" or "right". Only applicable if \texttt{col} is a numeric variable. If \texttt{as.count = TRUE}, \texttt{interval.closure} is always set to "left".

\textbf{palette} a palette name or a vector of colors. See \texttt{tmaptools::palette_explorer()} for the named palettes. Use a "-" as prefix to reverse the palette. The default palette is taken from \texttt{tm_layout}'s argument \texttt{aes.palette}, which typically depends on the style. The type of palette from \texttt{aes.palette} is automatically determined, but can be overwritten: use "seq" for sequential, "div" for diverging, and "cat" for categorical.

\textbf{labels} labels of the color classes, applicable if \texttt{col} is a data variable name

\textbf{drop.levels} should unused color classes be omitted? \texttt{FALSE} by default.

\textbf{labels.text} Example text to show in the legend next to the \texttt{labels}. When \texttt{NA} (default), examples from the data variable are taken and "NA" for classes where they don’t exist.

\textbf{midpoint} The value mapped to the middle color of a diverging palette. By default it is set to 0 if negative and positive values are present. In that case, the two sides of the color palette are assigned to negative respectively positive values. If all values are positive or all values are negative, then the midpoint is set to \texttt{NA}, which means that the value that corresponds to the middle color class (see \texttt{style}) is mapped to the middle color. Only applies when \texttt{col} is a numeric variable. If it is specified for sequential color palettes (e.g. "Blues"), then this color palette will be treated as a diverging color palette.

\textbf{stretch.palette} Logical that determines whether the categorical color palette should be stretched if there are more categories than colors. If \texttt{TRUE} (default), interpolated colors are used (like a rainbow). If \texttt{FALSE}, the palette is repeated.
contrast

vector of two numbers that determine the range that is used for sequential and diverging palettes (applicable when auto.palette.mapping=TRUE). Both numbers should be between 0 and 1. The first number determines where the palette begins, and the second number where it ends. For sequential palettes, 0 means the brightest color, and 1 the darkest color. For diverging palettes, 0 means the middle color, and 1 both extremes. If only one number is provided, this number is interpreted as the endpoint (with 0 taken as the start).

colorNA

colour for missing values. Use NULL for transparency.

textNA

text used for missing values.

showNA

logical that determines whether missing values are named in the legend. By default (NA), this depends on the presence of missing values.

colorNULL

colour for polygons that are shown on the map that are out of scope

fontface

font face of the text labels. By default, determined by the fontface argument of tm_layout.

fontfamily

font family of the text labels. By default, determined by the fontfamily argument of tm_layout.

alpha

transparency number between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of the fontcolor is used (normally 1).

case

case of the font. Use "upper" to generate upper-case text, "lower" to generate lower-case text, and NA to leave the text as is.

shadow

logical that determines whether a shadow is depicted behind the text. The color of the shadow is either white or yellow, depending of the fontcolor.

bg.color

background color of the text labels. By default, bg.color=NA, so no background is drawn.

bg.alpha

number between 0 and 1 that specifies the transparency of the text background (0 is totally transparent, 1 is solid background).

size.lowerbound

lowerbound for size. Only applicable when size is not a constant. If print.tiny is TRUE, then all text labels which relative text is smaller than size.lowerbound are depicted at relative size size.lowerbound. If print.tiny is FALSE, then text labels are only depicted if their relative sizes are at least size.lowerbound (in other words, tiny labels are omitted).

print.tiny

boolean, see size.lowerbound

scale

text size multiplier, useful in case size is variable or "AREA".

auto.placement

logical (or numeric) that determines whether the labels are placed automatically. If TRUE, the labels are placed next to the coordinate points with as little overlap as possible using the simulated annealing algorithm. Therefore, it is recommended for labeling spatial dots or symbols. If a numeric value is provided, this value acts as a parameter that specifies the distance between the coordinate points and the text labels in terms of text line heights.

remove.overlap

logical that determines whether the overlapping labels are removed

along.lines

logical that determines whether labels are rotated along the spatial lines. Only applicable if a spatial lines shape is used.
overwrite.lines

logical that determines whether the part of the lines below the text labels is removed. Only applicable if a spatial lines shape is used.

just

justification of the text relative to the point coordinates. Either one of the following values: "left", "right", "center", "bottom", and "top", or a vector of two values where first value specifies horizontal and the second value vertical justification. Besides the mentioned values, also numeric values between 0 and 1 can be used. 0 means left justification for the first value and bottom justification for the second value. Note that in view mode, only one value is used.

xmod

horizontal position modification of the text (relatively): 0 means no modification, and 1 corresponds to the height of one line of text. Either a single number for all polygons, or a numeric variable in the shape data specifying a number for each polygon. Together with ymod, it determines position modification of the text labels. In most coordinate systems (projections), the origin is located at the bottom left, so negative xmod move the text to the left, and negative ymod values to the bottom.

ymod

vertical position modification. See xmod.

title.size

title of the legend element regarding the text sizes

title.col

title of the legend element regarding the text colors

legend.size.show

logical that determines whether the legend for the text sizes is shown

legend.col.show

logical that determines whether the legend for the text colors is shown

legend.format

list of formatting options for the legend numbers. Only applicable if labels is undefined. Parameters are:

fun Function to specify the labels. It should take a numeric vector, and should return a character vector of the same size. By default it is not specified. If specified, the list items scientific, format, and digits (see below) are not used.

scientific Should the labels be formatted scientifically? If so, square brackets are used, and the format of the numbers is "g". Otherwise, format="f", and text.separator, text.less.than, and text.or.more are used. Also, the numbers are automatically rounded to millions or billions if applicable.

format By default, "f", i.e. the standard notation xxx.xxx, is used. If scientific=TRUE then "g", which means that numbers are formatted scientifically, i.e. n.dddE+nn if needed to save space.

digits Number of digits after the decimal point if format="f", and the number of significant digits otherwise.

big.num.abbr Vector that defines whether and which abbreviations are used for large numbers. It is a named numeric vector, where the name indicates the abbreviation, and the number the magnitude (in terms on numbers of zero). Numbers are only abbreviation when they are large enough. Set it to NA to disable abbreviations. The default is c("mln" = 6,"bln" = 9). For layers where style is set to log10 or log10_pretty, the default is NA.

prefix Prefix of each number
suffix  Suffix of each number
prefix  Prefix of each number
suffix  Suffix of each number

text.separator  Character string to use to separate numbers in the legend (default: "to").
text.less.than  Character value(s) to use to translate "Less than". When a character vector of length 2 is specified, one for each word, these words are aligned when text.to.columns = TRUE

text.or.more  Character value(s) to use to translate "or more". When a character vector of length 2 is specified, one for each word, these words are aligned when text.to.columns = TRUE

text.align  Value that determines how the numbers are aligned, "left", "center" or "right". By default "left" for legends in portrait format (legend.is.portrait = TRUE), and "center" otherwise.
text.to.columns  Logical that determines whether the text is aligned to three columns (from, text.separator, to). By default FALSE.

...  Other arguments passed on to formatC

legend.size.is.portrait
  logical that determines whether the legend element regarding the text sizes is in portrait mode (TRUE) or landscape (FALSE)

legend.col.is.portrait
  logical that determines whether the legend element regarding the text colors is in portrait mode (TRUE) or landscape (FALSE)

legend.size.reverse
  logical that determines whether the items of the legend regarding the text sizes are shown in reverse order, i.e. from bottom to top when legend.size.is.portrait = TRUE and from right to left when legend.size.is.portrait = FALSE

legend.col.reverse
  logical that determines whether the items of the legend regarding the text colors are shown in reverse order, i.e. from bottom to top when legend.col.is.portrait = TRUE and from right to left when legend.col.is.portrait = FALSE

legend.hist
  logical that determines whether a histogram is shown regarding the text colors

legend.hist.title
  title for the histogram. By default, one title is used for both the histogram and the normal legend for text colors.

legend.size.z
  index value that determines the position of the legend element regarding the text sizes with respect to other legend elements. The legend elements are stacked according to their z values. The legend element with the lowest z value is placed on top.

legend.col.z
  index value that determines the position of the legend element regarding the text colors. (See legend.size.z)

legend.hist.z
  index value that determines the position of the histogram legend element. (See legend.size.z)

zindex
  zindex of the pane in view mode. By default, it is set to the layer number plus 400. By default, the tmap layers will therefore be placed in the custom panes
"tmap401", "tmap402", etc., except for the base tile layers, which are placed in the standard "tile". This parameter determines both the name of the pane and the z-index, which determines the pane order from bottom to top. For instance, if `zindex` is set to 500, the pane will be named “tmap500”.

**group**

name of the group to which this layer belongs in view mode. Each group can be selected or deselected in the layer control item. Set `group = NULL` to hide the layer in the layer control item. By default, it will be set to the name of the shape (specified in `tm_shape`).

**auto.palette.mapping**

deprecated. It has been replaced by `midpoint` for numeric variables and `stretch.palette` for categorical variables.

**max.categories**
deprecated. It has moved to `tmap_options`.

**Value**

`tmap-element`

**Note**

The absolute fontsize (in points) is determined by the (ROOT) viewport, which may depend on the graphics device.

**References**


**See Also**

`vignette("tmap-getstarted")`

**Examples**

current.mode <- tmap_mode("plot")

data(World, metro)

tm_shape(World) +
  tm_text("name", size="AREA")

tm_shape(World) +
  tm_text("name", size="pop_est", col="continent", palette="Dark2",
  title.size = "Population", title.col="Continent") +
  tm_legend(outside = TRUE)

tmap_mode("view")

## Not run:
require(tmaptools)
metro_aus <- crop_shape(metro, bb("Australia"))
tm_view

Options for the interactive tmap viewer

Description
Set the options for the interactive tmap viewer. Some of these options can also be set with tm_layout, since they are style dependent (e.g., the choice of basemaps). The function tm_view overrides these options when specified.

Usage
tm_view(
  alpha,
  colorNA,
  projection,
  symbol.size.fixed,
  dot.size.fixed,
  text.size.variable,
  bbox,
  set.bounds,
  set.view,
  set.zoom.limits,
  view.legend.position,
  control.position,
  popup.all.data,
  legend.position,
  basemaps = NULL,
  basemaps.alpha = NULL
)

Arguments
alpha transparency (opacity) parameter applied to whole map. By default, it is set to 0.7 if basemaps are used, and 1 otherwise.
colorNA  default color for missing values in interactive mode. If the color of missing values is not defined in the layer functions (e.g. `tm_fill`), then the default color is taken from the `na` value of the `aes.color` argument in `tm_layout`. This `colorNA` argument (if not `NA` itself) overrides that default value. For interactive maps, it can be useful to set `colorNA` to `NULL`, which means transparent.

projection  projection. Either a EPSG number, or a `leaflet_crs` object created with `leafletCRS`. By default, the Web Mercator (3857) is used, since the vast majority of basemaps are rendered accordingly. Other standards are EPSG numbers 4326 (WGS84) and 3395 (Mercator). If set to 0, the projection of the master shape is used (see `tm_shape`) provided that a EPSG number can be extracted.

dot.size.fixed  should dot sizes be fixed while zooming?

text.size.variable  should text size variables be allowed in view mode? By default FALSE, since in many applications, the main reason to vary text size is to prevent occlusion in plot mode, which is often not a problem in view mode due to the ability to zoom in.

bbox  bounding box. One of the following:

- A bounding box (an `sf` bbox object, see `st_bbox`, a 2 by 2 matrix (used by the `sp` package), or an `Extent` object used by the `raster` package).

If set, it overrides `set.view` and all bbox arguments of `tm_shape`.

set.bounds  logical that determines whether maximum bounds are set, or a numeric vector of four values that specify the lng1, lat1, lng2, and lat2 coordinates (see `setMaxBounds`).

set.view  numeric vector that determines the view. Either a vector of three: lng, lat, and zoom, or a single value: zoom. See `setView`. Only applicable if `bbox` is not specified

set.zoom.limits  numeric vector of two that set the minimum and maximum zoom levels (see `tileOptions`).

view.legend.position  Character vector of two values, specifying the position of the legend. Use "left" or "right" for the first value and "top" or "bottom" for the second value. It overrides the value of `legend.position` of `tm_layout`, unless set to NA.

control.position  Character vector of two values, specifying the position of the layer control UI. Use "left" or "right" for the first value and "top" or "bottom" for the second value.

popup.all.data  not used anymore. As of version 1.6, the popups are specified by the argument `popup.vars` in the layer functions `tm_fill`, `tm_symbols`, and `tm_lines`. 
tm_xlab

**Description**

Add axis labels

**Legend**

- `legend.position`: not used anymore, renamed to `view.legend.position`
- `basemaps`: Deprecated. Use `tm_basemap` instead, or set the default basemaps in `tmap_options`
- `basemaps.alpha`: Deprecated. See `basemaps`

**References**


**See Also**

vignette("tmap-getstarted")

**Examples**

```r
# world choropleth/bubble map of the world
data(World, metro)
metergrowth <- (metro$pop2020 - metro$pop2010) / (metro$pop2010 * 10) * 100

map1 <- tm_shape(metro) +
tm_bubbles("pop2010", col = "growth",
border.col = "black", border.alpha = .5,
style="fixed", breaks=c(-Inf, seq(0, 6, by=2), Inf),
palette="-RdYlBu", contrast=1,
title.size="Metro population",
title.col="Growth rate (%)", id="name",
popup.vars=c("pop2010", "pop2020", "growth")) +
tm_legend(outside=TRUE)
current.mode <- tmap_mode("plot")

# plot map
map1

# view map with default view options
tmap_mode("view")
map1

# view map with changed view options
map1 + tm_view(alpha = 1, basemaps = "Stamen.Watercolor")

# restore current mode
tmap_mode(current.mode)
```

---

Axis labels
Usage

```r
tm_xlab(text, size = 0.8, rotation = 0, space = 0)

tm_ylab(text, size = 0.8, rotation = 90, space = 0)
```

Arguments

- `text`: text for the axis
- `size`: fontsize, by default 0.8
- `rotation`: rotation angle in degrees. By default, 0 for the x axis label and 90 for the y axis label.
- `space`: space between labels and the map in numbers of line heights. By default, it is 0, unless grid labels are plotted outside the frame (i.e., `tm_grid` is called with `labels.inside.frame = FALSE`). In that case, space corresponds to the height of one line, taking the grid label size into account.

Examples

```r
data(World)

qtm(World, fill="#FFF8DC", projection=4326, inner.margins=0) +
  tm_grid(x = seq(-180, 180, by=20), y=seq(-90,90,by=10), col = "gray70") +
  tm_xlab("Longitude") +
  tm_ylab("Latitude")
```

---

Description

Maps of the world and the Netherlands (province and municipality level), class `sf`
NLD_prov and NLD_muni, maps of the Netherlands at province and municipality level of 2013. The used projection is the Rijksdriehoekstelsel projection. **Important:** publication of these maps is only allowed when cited to Statistics Netherlands (CBS) and Kadaster Nederland as source.

**Source**

- [http://www.naturalearthdata.com](http://www.naturalearthdata.com) for World
- [http://www.happyplanetindex.org](http://www.happyplanetindex.org) for World
- [http://www.cbs.nl](http://www.cbs.nl) for NLD_prov and NLD_muni.

**References**

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