

# Package ‘rworldmap’

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**Type** Package

**Title** Mapping Global Data

**Version** 1.3-6

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**Description** Enables mapping of country level and gridded user datasets.

**License** GPL (>= 2)

**Depends** R (>= 2.10.0), sp

**Imports** maptools, fields, methods

**Suggests** rgdal, rworldxtra, RColorBrewer, classInt

**LazyData** true

**URL** <https://github.com/AndySouth/rworldmap/>,  
<https://groups.google.com/forum/#!forum/rworldmap>,  
<http://andysouth.co.uk/>

**BugReports** <https://github.com/AndySouth/rworldmap/issues>

**RoxygenNote** 5.0.1

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**Repository** CRAN

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## R topics documented:

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rworldmap-package	<i>For mapping global data.</i>
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## Description

Enables mapping of country level and gridded user datasets by facilitating joining to modern world maps and offering visualisation options. Country borders are derived from Natural Earth data v 1.4.0.

Enables mapping of country level and gridded user datasets by facilitating joining to modern world maps and offering visualisation options. Country borders are derived from Natural Earth data v 1.4.0.

**Details**

Package: rworldmap  
 Type: Package  
 Version: 1.3-4  
 Date: 2014-11-11  
 License: GPL (>= 2)

Country Level Data can be joined to a map using [joinCountryData2Map](#), then mapped using [mapCountryData](#). These functions can cope with a range of country names and country codes.

Country boundaries are derived from version 1.4.0 of Natural Earth data as described in [countriesCoarse](#). Higher resolution boundaries are provided in a companion package [rworldxtra](#).

More generic functions allow the user to provide their own polygon map using [joinData2Map](#) and [mapPolys](#).

Bubble, bar and pie charts can be added to maps using [mapBubbles](#), [mapBars](#) and [mapPies](#).

Try the new method [barplotCountryData](#) for producing a ranked bar plot of country data with country names that can provide a useful companion to maps.

Options are provided for categorising data, colouring maps and symbols, and adding legends.

Gridded data can be mapped using [mapGriddedData](#), but the raster package is much more comprehensive.

Type `vignette('rworldmap')` to access a short document showing a few examples of the main [rworldmap](#) functions to get you started.

Country Level Data can be joined to a map using [joinCountryData2Map](#), then mapped using [mapCountryData](#). These functions can cope with a range of country names and country codes.

Country boundaries are derived from version 1.4.0 of Natural Earth data as described in [countriesCoarse](#). Higher resolution boundaries are provided in a companion package [rworldxtra](#).

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Type `vignette('rworldmap')` to access a short document showing a few examples of the main [rworldmap](#) functions to get you started.

### Author(s)

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## References

Stable version : <http://cran.r-project.org/web/packages/rworldmap>

Development version : <https://r-forge.r-project.org/projects/rworldmap/>

Discussion group : <http://groups.google.com/group/rworldmap>

Stable version : <http://cran.r-project.org/web/packages/rworldmap>

Development version : <https://github.com/AndySouth/rworldmap>

Discussion group : <http://groups.google.com/group/rworldmap>

## Examples

```
#mapping country level data, with no file specified it uses internal example data
mapCountryData()
#specifying region
mapCountryData(mapRegion="asia")
#mapping gridded data, with no file specified it uses internal example data
mapGriddedData()
#specifying region
mapGriddedData(mapRegion="africa")
#aggregating gridded data to country level
#with no file specified it uses internal example data
mapHalfDegreeGridToCountries()
```

---

addMapLegend

*Add a legend to a map*

---

## Description

Creates a colour bar legend, showing the range of colours and the values the colours correspond to. Relies heavily on `image.plot()` from the package `fields`. For simple use, simply use `addLegend=TRUE` in a `rworldmap` map function. Or users can call `addMapLegend` separately to fine tune the legend. The user should insure that `data`, `catMethod`, `numCats` and `colourPalette` match the values used in the plot. The legend is designed to be useful for the variety of classification methods that exist.

**Usage**

```
addMapLegend(colourVector = "", cutVector = "", legendLabels = "limits",
  labelFontSize = 1, legendWidth = 1.2, legendShrink = 0.9,
  legendMar = 3, horizontal = TRUE, legendArgs = NULL, tcl = -0.5,
  mgp = c(3, 1, 0), sigFigs = 4, digits = 3, legendIntervals = "data",
  plottedData = "", catMethod = "pretty", colourPalette = "heat")
```

**Arguments**

colourVector	colours used in the map
cutVector	the categories or breaks used in the map
legendLabels	Controls the style of the labels on the legend. Choose "none" for no labels, "limits" for the two end values, and "all" to show all the break values if they fit.
labelFontSize	Controls font size of the labels. A multiplier, so use 2 to double the size, 0.5 to halve it, etc.
legendWidth	Controls the width of the colour bar.
legendShrink	Controls the length of the colour bar. 1 means full width of the plot.
legendMar	Moves the legend away from the side of the plot. Measured in character widths.
horizontal	If TRUE the legend is horizontal, if FALSE, vertical.
legendArgs	For producing titles and labels. A list of arguments to be passed to mtext.
tcl	Controls the length of the tick marks. Useful when labelFontSize is changed.
mgp	Numeric vector length 3. The second element controls the distance between labels and the axis. Useful when labelFontSize is changed.
sigFigs	The number of significant figures for legend labels.
digits	An argument to the formatting of the labels
legendIntervals	"page" or "data". Controls the division of the colour bar, "page" sets the intervals equal on the page, "data" sets them to be equal in the units of the data.
plottedData	unused but are passed with mapParams
catMethod	unused but are passed with mapParams
colourPalette	unused but are passed with mapParams

**Details**

The default legend is a horizontal colour bar, with labels only at the extremes.

Can use a parameter list returned from mapping functions, e.g. mapCountryData(). mapCountryData(addLegend=TRUE) produces same results as: mapParams <- mapCountryData(addLegend=FALSE) do.call(addMapLegend, mapParams)

Using the following allows the modification of the legend : mapParams <- mapCountryData(addLegend=FALSE) do.call(addMapLegend, c(mapParams, legendLabels="all", legendWidth=0.5))

**Value**

Adds a legend to a plot.

**Note**

Can have the unintentional effect of modifying graphical parameters, e.g. mfcoll reverts to mfrow.

**Author(s)**

Andy South

**See Also**

mapCountryData, mapGriddedData, image.plot

**Examples**

```
#Set up the plot so the world map uses the full width.
mapDevice()
#join example data to a map
data("countryExData",envir=environment())
sPDF <- joinCountryData2Map(countryExData
  , joinCode = "ISO3"
  , nameJoinColumn = "ISO3V10"
)
#map the data with no legend
mapParams <- mapCountryData( sPDF
  , nameColumnToPlot="BIODIVERSITY"
  , addLegend='FALSE'
)

#add a modified legend using the same initial parameters as mapCountryData
do.call( addMapLegend, c( mapParams
  , legendLabels="all"
  , legendWidth=0.5
))
```

---

addMapLegendBoxes

---

*Add a legend of coloured boxes to a map*


---

**Description**

Creates a colour box legend, showing the range of colours and the values the colours correspond to. This works well for categorical data with relatively few categories.

**Usage**

```
addMapLegendBoxes(cutVector = "", colourVector = "", x = "bottomleft",
  horiz = FALSE, title = "category", cex = 1, pt.cex = 2,
  col = "gray", bg = "white", legendText = "",
  catMethod = "categorical", plottedData = "", colourPalette = "heat",
  sigFigs = 2, missingCountryCol = "white", ...)
```

**Arguments**

cutVector	the categories or breaks used in the map
colourVector	colours used in the map
x	positioning of legend e.g. 'bottomleft', 'topright'
horiz	if TRUE horizontal legend
title	title for Legend
cex	controls the font size, default is 1
pt.cex	controls size of colour boxes relative to cex, default is 2
col	colour for boundary of colour boxes, default is "gray"
bg	colour for legend background, default is "white", NA makes the legend background transparent
legendText	the text to put against each legend box, if left blank cutVector is used, needs to be a vector the same length as length cutVector
catMethod	the categorisation method used influences what text added to legend elements, for 'categorical' just the category names are used for other options limits are used
plottedData	not used yet but maybe in future
colourPalette	not used yet but maybe in future
sigFigs	not used yet but maybe in future
missingCountryCol	not used yet but maybe in future
...	to allow other params to be set in legend

**Details**

This creates a legend with separate boxes of colour rather than addMapLegend() which creates a colour bar. This method is used as the default for categorical data.

See the examples for how to use a parameter list returned from mapping functions.

**Value**

Adds a legend to a plot.

**Author(s)**

Andy South



**See Also**

addMapLegend, mapCountryData, mapGriddedData

**Examples**

```
#Set up the plot so the world map uses the full width.
mapDevice()
#map example categorical data with no legend
mapParams <- mapCountryData(nameColumnToPlot='GE03major'
                             , catMethod='categorical'
                             , addLegend='FALSE'
                             )

#add default legend using the same parameters as mapCountryData
do.call( addMapLegendBoxes, c( mapParams))

#adding a modified legend by specifying extra parameters
do.call( addMapLegendBoxes, c(mapParams,x='bottom',horiz=TRUE,title="Region"))

#user defined map colour scheme
mapParams <- mapCountryData(nameColumnToPlot='GE03major'
                             , catMethod='categorical'
                             , addLegend='FALSE'
                             , colourPalette=c('white','green','red','yellow','blue','black')
                             )

#changing legendText
mapParams$legendText <- c('antarctic','africa','oceania'
                          , 'americas','s.asia','eurasia')
do.call( addMapLegendBoxes, c(mapParams,x='bottom',title="Region",horiz=TRUE))

#or this way
#do.call( addMapLegendBoxes
#        , c(mapParams
#            ,list(legendText=c('antarctic','africa','oceania'
#                              , 'americas','s.asia','eurasia')
#                  ,x='bottom',title="Region",horiz=TRUE)))
```

---

aggregateHalfDegreeGridToCountries

*Aggregates global half degree gridded data to countries*

---

**Description**

Aggregates global half degree gridded data to countries (options for sum, mean, min, max ). Uses a very simple grid map defining a single country identity for each half degree cell. (other more

sophisticated approaches dividing cells between multiple countries will be investigated in future). The country identity at each cell is specified in `data(gridCountriesDegreesHalf)`.

### Usage

```
aggregateHalfDegreeGridToCountries(inFile = "", aggregateOption = "sum")
```

### Arguments

`inFile` either a gridascii filename or an `sp SpatialGridDataFrame` object specifying a global half degree grid dataset

`aggregateOption` how to aggregate the data ('sum','mean','min','max')

### Value

a dataframe with 2 columns : numeric country codes and the aggregated value for each country

### Author(s)

andy south

### See Also

[mapHalfDegreeGridToCountries](#)

### Examples

```
data(gridExData,envir=environment(),package="rworldmap")
gridExData <- get("gridExData")
#aggregating the gridded data to countries
dF <- aggregateHalfDegreeGridToCountries(gridExData)
#joining the aggregated data to a country map
sPDF <- joinCountryData2Map(dF, nameJoinColumn='UN', joinCode='UN')
#plotting the map
mapCountryData(sPDF,nameColumnToPlot='sum_pa2000.asc')
```

---

barplotCountryData      *Barplot country-level data.*

---

### Description

Draw a barplot of country-level data, ranking the countries to allow easy comparison. One bar per country and to be able to read country names. This is useful for comparing with maps created by [mapCountryData](#) and accepts many of the same arguments for categorising and colouring.

**Usage**

```
barplotCountryData(dF = "", nameColumnToPlot = "",
  nameCountryColumn = "NAME", numPanels = 4, scaleSameInPanels = FALSE,
  main = nameColumnToPlot, numCats = 5, catMethod = "quantiles",
  colourPalette = "heat", addLegend = TRUE, toPDF = FALSE, outFile = "",
  decreasing = TRUE, na.last = TRUE, cex = 0.7, ...)
```

**Arguments**

dF	a dataframe containing at least one column with numeric data and one with country names or other labels
nameColumnToPlot	name of column containing the data you want to plot
nameCountryColumn	name of column containing country names (or other labels to be used in plot)
numPanels	the number of layout panels in the plot
scaleSameInPanels	whether to set the scale the same in each panel TRUE/FALSE, default=FALSE allowing more of the variability in the data to be viewed
main	title for the plot
numCats	number of categories to put the data in, may be modified if this number is incompatible with the catMethod chosen
catMethod	method for categorisation of data "pretty", "fixedWidth", "diverging", "logFixed-Width", "quantiles", "categorical", or a numeric vector defining breaks
colourPalette	a string describing the colour palette to use, choice of : <ol style="list-style-type: none"> <li>1. = "palette" for the current palette</li> <li>2. a vector of valid colours, e.g. =c('red','white','blue') or output from RColourBrewer</li> <li>3. = one of "heat", "diverging", "white2Black", "black2White", "topo", "rainbow", "terrain", "negpos8", "negpos9"</li> </ol>
addLegend	NOT YET WORKING whether to add a legend or not, TRUE/FALSE
toPDF	whether to output the plot to a pdf rather than the screen, TRUE/FALSE
outFile	output filename if toPDF=TRUE
decreasing	logical. Should the sort order be increasing or decreasing?
na.last	for controlling the treatment of NAs. If TRUE, missing values in the data are put last; if FALSE, they are put first; if NA, they are removed.
cex	sizing of labels, default = 0.7
...	other arguments to pass to barplot

**Details**

Finer control can be achieved by [addMapLegend](#).

**Value**

invisibly returns a list containing the data and main options used for the map, the list can be passed to [addMapLegend](#) or [addMapLegendBoxes](#) along with additional options to allow greater flexibility in legend creation.

**Warning**

will generate unhelpful errors in data categorisation if inappropriate options are chosen, e.g. with `catMethod:Quantiles` if `numCats` too high so that unique breaks cannot be defined.

**Author(s)**

andy south

**See Also**

`classInt`, `RColorBrewer`

**Examples**

```
#default uses popn data in the default map
barplotCountryData()

data("countryExData",envir=environment(),package="rworldmap")

barplotCountryData( countryExData
  , nameColumnToPlot="BIODIVERSITY"
  , nameCountryColumn = "Country"
)
```

---

coastsCoarse

*A map of world coasts at coarse resolution.*

---

**Description**

A spatial lines dataframe containing world coasts at a coarse resolution.

**Format**

The format is: Formal class 'SpatialLinesDataFrame' [package "sp"] with 4 slots

## Details

Used in `mapGriddedData(addBorders='coasts')`. This is the 1:110m coasts data from Natural Earth version 1.3.0.

## Source

<http://www.naturalearthdata.com/downloads/110m-physical-vectors/>

## Examples

```
data(coastsCoarse)
mapGriddedData(addBorders='coasts')
plot(coastsCoarse,add=TRUE,col='blue')
```

---

<code>countriesCoarse</code>	<i>a coarse resolution world map, a vector map of 244 country boundaries,suitable for global maps</i>
------------------------------	---

---

## Description

A 'SpatialPolygonsDataFrame' [package "sp"] object containing a simplified world map. Polygons are attributed with country codes. 244 countries. Based on Natural Earth data.

## Format

The format is: Formal class 'SpatialPolygonsDataFrame' [package "sp"] with 5 slots

## Details

Derived from version 1.4.0 of Natural Earth data 1:110 m data. Missing countries at this resolution are added in from the higher resolution 1:50 m data so that these countries are included e.g. in [mapBubbles](#).

The different country boundaries in `rworldmap` are processed from Natural Earth Data as follows :

All :

- ~ rename any non-ASCII country names that cause R trouble
- ~ rename Curacao which is particularly troublesome !
- ~ check polygon geometries using `checkPolygonsHoles`
- ~ set projections, e.g. `proj4string(countriesCoarse) <- CRS("+proj=longlat +ellps=WGS84 +datum=WGS84 +no_defs")`
- ~ set polygon IDs to country names (from ADMIN field)
- ~ copy ISO\_A3 to ISO3
- ~ replace missing ISO3 codes (6 in this version) with ADM0\_A3
- ~ check for duplicate ISO3 codes (2 in this version)
- ~ set ISO3 for Gaza to Gaza and 'Ashmore and Cartier Islands' to Ashm
- ~ replace POP\_EST of -99 with NA

~ join on countryRegions data

countriesCoarseLessIslands : ne\_110  
 countriesCoarse : ne\_110 plus extra countries from ne\_50 plus Tuvalu from ne\_10  
 countriesLow : ne\_50 plus Tuvalu from ne\_10  
 countriesHigh (in package rworldxtra) : ne\_10

## Source

<http://www.naturalearthdata.com/downloads/110m-cultural-vectors/110m-admin-0-countries/>

## Examples

```
data(countriesCoarse)
```

---

countriesCoarseLessIslands

*a coarse resolution world map, a vector map of 177 country boundaries, suitable for global maps*

---

## Description

A 'SpatialPolygonsDataFrame' [package "sp"] object containing a simplified world map. Polygons are attributed with country codes. 177 countries. Derived from version 1.4.0 of Natural Earth data 1:110 m data.

## Format

The format is: Formal class 'SpatialPolygonsDataFrame' [package "sp"] with 5 slots

## Details

The different country boundaries in rworldmap are processed from Natural Earth Data as follows :

All :

- ~ rename any non-ASCII country names that cause R trouble
- ~ rename Curacao which is particularly troublesome !
- ~ check polygon geometries using checkPolygonsHoles
- ~ set projections, e.g. proj4string(countriesCoarse) <- CRS("+proj=longlat +ellps=WGS84 +datum=WGS84 +no\_defs")
- ~ set polygon IDs to country names (from ADMIN field)
- ~ copy ISO\_A3 to ISO3
- ~ replace missing ISO3 codes (6 in this version) with ADM0\_A3
- ~ check for duplicate ISO3 codes (2 in this version)
- ~ set ISO3 for Gaza to Gaza and 'Ashmore and Cartier Islands' to Ashm

```
~ replace POP_EST of -99 with NA
~ join on countryRegions data
```

```
countriesCoarseLessIslands : ne_110
countriesCoarse : ne_110 plus extra countries from ne_50 plus Tuvalu from ne_10
countriesLow : ne_50 plus Tuvalu from ne_10
countriesHigh (in package rworldxtra) : ne_10
```

## Source

<http://www.naturalearthdata.com/downloads/110m-cultural-vectors/110m-admin-0-countries/>

## Examples

```
data(countriesCoarseLessIslands)
```

---

countriesLow	<i>a low resolution world map, a vector map of 244 country boundaries, suitable for zooming in on regions or large global maps</i>
--------------	--

---

## Description

A 'SpatialPolygonsDataFrame' [package "sp"] object containing country boundaries derived from Natural Earth data. Polygons are attributed with country codes. Derived from version 1.4.0 of Natural Earth data 1:50 m data.

## Format

The format is: Formal class 'SpatialPolygonsDataFrame' [package "sp"] with 5 slots

## Details

The different country boundaries in rworldmap are processed from Natural Earth Data as follows :

All :

- ~ rename any non-ASCII country names that cause R trouble
- ~ rename Curacao which is particularly troublesome !
- ~ check polygon geometries using checkPolygonsHoles
- ~ set projections, e.g. proj4string(countriesCoarse) <- CRS("+proj=longlat +ellps=WGS84 +datum=WGS84 +no\_defs")
- ~ set polygon IDs to country names (from ADMIN field)
- ~ copy ISO\_A3 to ISO3
- ~ replace missing ISO3 codes (6 in this version) with ADM0\_A3
- ~ check for duplicate ISO3 codes (2 in this version)
- ~ set ISO3 for Gaza to Gaza and 'Ashmore and Cartier Islands' to Ashm

```
~ replace POP_EST of -99 with NA
~ join on countryRegions data
```

```
countriesCoarseLessIslands : ne_110
countriesCoarse : ne_110 plus extra countries from ne_50 plus Tuvalu from ne_10
countriesLow : ne_50 plus Tuvalu from ne_10
countriesHigh (in package rworldxtra) : ne_10
```

## Source

<http://www.naturalearthdata.com/downloads/50m-cultural-vectors/>

## Examples

```
data(countriesLow)
```

---

country2Region	<i>Produce regional data from country level data</i>
----------------	--

---

## Description

A function to aggregate country level data into regional data. For example finding the total population of Asia, Europe, etc, from country level populations. As well as sums, other functions can be used, like mean, median, min, max, etc. There are currently 8 choices of region and 4 choices of country code.

## Usage

```
country2Region(regionType = "", inFile = "", nameDataColumn = "",
  joinCode = "", nameJoinColumn = "", FUN = mean, ...)
```

## Arguments

regionType	Must be one of: "GEO3", "GEO3major", "IMAGE24", "GLOCAF", "Stern", "SRES", "SRESmajor" or "GBD"
inFile	a data frame
nameDataColumn	The name of the data column to aggregate
joinCode	The type of code to join with. Must be one of: "ISO2", "ISO3", "Numeric" or "FIPS"
nameJoinColumn	The name of a column of inFile. Contains joining codes.
FUN	A function to apply to each region, e.g. 'mean'
...	further arguments to be passed to FUN, e.g. na.rm=TRUE



## Details

The user must specify 'nameJoinColumn' from their data which contains country codes, and joinCode which specifies the type of code. regionType specifies which regions to aggregate the data to. Using FUN='identity' will return the names of the countries within each region.

## Value

If FUN returns a single value, country2Region returns a data frame, with value of FUN for each region.

If FUN returns more than one value, country2Region will return a list, with one element for each region.

## See Also

For producing maps of regional data from aggregated country level data, see [mapByRegion](#)

## Examples

```
data(countryExData)

#to report which countries make up regions
country2Region(regionType="Stern")

#Using country2Region to calculate mean Environmental Health index in Stern regions.
sternEnvHealth <- country2Region(inFile=countryExData
, nameDataColumn="ENVHEALTH"
, joinCode="IS03"
, nameJoinColumn="IS03V10"
, regionType="Stern"
, FUN='mean'
)

print(sternEnvHealth)

#A simple plot of this data.
#dotchart(sort(sternEnvHealth))
dotchart(sort(sternEnvHealth[,1]))

#use FUN='identity' to see which countries in your data belong to which region.
country2Region(inFile=countryExData
, nameDataColumn="Country"
, joinCode="IS03"
, nameJoinColumn="IS03V10"
, regionType="Stern"
, FUN='identity'
)

#Change FUN to length, to count the number of countries in each region.
country2Region(inFile=countryExData
, nameDataColumn="Country"
```

```
,joinCode="ISO3"
,nameJoinColumn="ISO3V10"
,regionType="Stern"
,FUN='length'
)
```

---

countryExData

*Example dataset for country level data (2008 Environmental Performance Index)*

---

### Description

A dataframe containing example country level data for 149 countries. This is the 2008 Environmental Performance Index (EPI) downloaded from <http://epi.yale.edu/>. Used here with permission, further details on the data can be found there. The data are referenced by ISO 3 letter country codes and country names.

### Format

A data frame with 149 observations on the following 80 variables.

**ISO3V10** a character vector

**Country** a character vector

**EPI\_regions** a character vector

**GEO\_subregion** a character vector

**Population2005** a numeric vector

**GDP\_capita.MRYA** a numeric vector

**landlock** a numeric vector

**landarea** a numeric vector

**density** a numeric vector

**EPI** a numeric vector

**ENVHEALTH** a numeric vector

**ECOSYSTEM** a numeric vector

**ENVHEALTH.1** a numeric vector

**AIR\_E** a numeric vector

**WATER\_E** a numeric vector

**BIODIVERSITY** a numeric vector

**PRODUCTIVE\_NATURAL\_RESOURCES** a numeric vector

**CLIMATE** a numeric vector

**DALY\_SC** a numeric vector  
**WATER\_H** a numeric vector  
**AIR\_H** a numeric vector  
**AIR\_E.1** a numeric vector  
**WATER\_E.1** a numeric vector  
**BIODIVERSITY.1** a numeric vector  
**FOREST** a numeric vector  
**FISH** a numeric vector  
**AGRICULTURE** a numeric vector  
**CLIMATE.1** a numeric vector  
**ACSAT\_pt** a numeric vector  
**WATSUP\_pt** a numeric vector  
**DALY\_pt** a numeric vector  
**INDOOR\_pt** a numeric vector  
**PM10\_pt** a numeric vector  
**OZONE\_H\_pt** a numeric vector  
**SO2\_pt** a numeric vector  
**OZONE\_E\_pt** a numeric vector  
**WATQI\_pt** a numeric vector  
**WATSTR\_pt** a numeric vector  
**WATQI\_GEMS.station.data** a numeric vector  
**FORGRO\_pt** a numeric vector  
**CRI\_pt** a numeric vector  
**EFFCON\_pt** a numeric vector  
**AZE\_pt** a numeric vector  
**MPAEEZ\_pt** a numeric vector  
**EEZTD\_pt** a numeric vector  
**MTI\_pt** a numeric vector  
**IRRSTR\_pt** a numeric vector  
**AGINT\_pt** a numeric vector  
**AGSUB\_pt** a numeric vector  
**BURNED\_pt** a numeric vector  
**PEST\_pt** a numeric vector  
**GHGCAP\_pt** a numeric vector  
**CO2IND\_pt** a numeric vector  
**CO2KWH\_pt** a numeric vector  
**ACSAT** a numeric vector

**WATSUP** a numeric vector  
**DALY** a numeric vector  
**INDOOR** a numeric vector  
**PM10** a numeric vector  
**OZONE\_H** a numeric vector  
**SO2** a numeric vector  
**OZONE\_E** a numeric vector  
**WATQI** a numeric vector  
**WATQI\_GEMS.station.data.1** a numeric vector  
**WATSTR** a numeric vector  
**FORGRO** a numeric vector  
**CRI** a numeric vector  
**EFFCON** a numeric vector  
**AZE** a numeric vector  
**MPAEEZ** a numeric vector  
**EEZTD** a numeric vector  
**MTI** a numeric vector  
**IRRSTR** a numeric vector  
**AGINT** a numeric vector  
**AGSUB** a numeric vector  
**BURNED** a numeric vector  
**PEST** a numeric vector  
**GHGCAP** a numeric vector  
**CO2IND** a numeric vector  
**CO2KWH** a numeric vector

### Details

2008 Environmental Performance Index (EPI) data downloaded from : <http://epi.yale.edu/Downloads>

Disclaimers This 2008 Environmental Performance Index (EPI) tracks national environmental results on a quantitative basis, measuring proximity to an established set of policy targets using the best data available. Data constraints and limitations in methodology make this a work in progress. Further refinements will be undertaken over the next few years. Comments, suggestions, feedback, and referrals to better data sources are welcome at: <http://epi.yale.edu> or [epi@yale.edu](mailto:epi@yale.edu).

### Source

<http://epi.yale.edu/Downloads>

### References

Esty, Daniel C., M.A. Levy, C.H. Kim, A. de Sherbinin, T. Srebotnjak, and V. Mara. 2008. 2008 Environmental Performance Index. New Haven: Yale Center for Environmental Law and Policy.

## Examples

```
data(countryExData,envir=environment(),package="rworldmap")
str(countryExData)
```

---

countryRegions	<i>Regional Classification Table</i>
----------------	--------------------------------------

---

## Description

A number of regional classifications exist, e.g. SRES, Stern, etc. This table can be used to find which grouping a country belongs to, given its country code. A variety of different codes or groupings can be used.

## Format

A data frame with the following variables.

**ISO3** ISO 3 letter country code

**ADMIN** country name

**REGION** 7 region continent classification

**continent** 6 continents classification

**GEO3major** Global Environment Outlook GEO3 major region names

**GEO3** Global Environment Outlook GEO3 major region names

**IMAGE24** Image24 region names

**GLOCAF** GLOCAF region names

**Stern** Stern report region names

**SRESmajor** SRES major region names

**SRES** SRES region names

**GBD** Global Burden of Disease GBD region names

**AVOIDnumeric** numeric codes for AVOID regions

**AVOIDname** AVOID regions

**LDC** UN Least Developed Countries

**SID** UN Small Island Developing states

**LLDC** UN Landlocked Developing Countries

## Details

Joined onto vector country maps. Used by [country2Region](#) and [mapByRegion](#).

## Examples

```
data(countryRegions,envir=environment(),package="rworldmap")
str(countryRegions)

#joining example data onto the regional classifications
data(countryExData,envir=environment(),package="rworldmap")
dF <- merge(countryExData,countryRegions,by.x='ISO3V10',by.y='ISO3')
#plotting ENVHEALTH for Least Developed Countries (LDC) against others
#plot( dF$ENVHEALTH ~ dF$LDC)
#points( y=dF$ENVHEALTH, x=dF$LDC)
```

---

countrySynonyms	<i>Synonyms of country names for each ISO 3 letter country code to enable conversion.</i>
-----------------	---

---

## Description

contains a variable number of synonyms (mostly English language) for each country

## Format

A data frame with 281 observations on the following 10 variables.

**ID** a numeric vector  
**ISO3** ISO 3 letter country code  
**name1** country name - most common  
**name2** country name - alternative  
**name3** country name - alternative  
**name4** country name - alternative  
**name5** country name - alternative  
**name6** country name - alternative  
**name7** country name - alternative  
**name8** country name - alternative

## Details

This is used by joinCountryData2Map() when country names are used as the joinCode. Note that using ISO codes is preferable if they are available.

**Source**

This was derived and used with permission from the Perl Locale package.  
Locale::Codes::Country\_Codes.  
Thanks to Sullivan Beck for pulling this together.  
Data sources are acknowledged here :  
<http://search.cpan.org/~sbeck/Locale-Codes-3.23/lib/Locale/Codes/Country.pod>

**Examples**

```
data(countrySynonyms)
```

---

getMap

*A simple way to access maps stored in the package.*

---

**Description**

A simple way to access maps stored in the package.

**Usage**

```
getMap(resolution = "coarse", projection = NA)
```

**Arguments**

resolution	options "coarse","low","less islands","li","high". For "high" you need to install the package rworldxtra
projection	DEPRECATED OCTOBER 2012 to reproject maps see spTransform in rgdal

**Value**

A SpatialPolygonsDataFrame object.

**Author(s)**

Barry Rowlingson & Andy South

**Examples**

```
plot(getMap())
```

---

gridCountriesDegreesHalf

*A global half degree grid specifying the country at each cell*


---

## Description

A grid covering the globe at half degree resolution, specifying the country (UN numeric code) at each cell.

## Format

The format is:

```
Formal class 'SpatialGridDataFrame'
[package "sp"] with 6 slots ..@ data :'data.frame': 259200 obs. of 1
variable: .. ..$ country.asc: num [1:259200] NA NA NA NA NA NA NA NA NA
... ..@ grid :Formal class 'GridTopology' [package "sp"] with 3 slots .. ..
..@ cellcentre.offset: num [1:2] -179.8 -89.8 .. ..@ cellsize : num [1:2]
0.5 0.5 .. ..@ cells.dim : int [1:2] 720 360 ..@ grid.index : int(0) ..@
coords : num [1:2, 1:2] -179.8 179.8 -89.8 89.8 .. ..- attr(*,
"dimnames")=List of 2 .. .. ..$ : NULL .. .. ..$ : chr [1:2] "coords.x1"
"coords.x2" ..@ bbox : num [1:2, 1:2] -180 -90 180 90 .. ..- attr(*,
"dimnames")=List of 2 .. .. ..$ : chr [1:2] "coords.x1" "coords.x2" .. ..
..$ : chr [1:2] "min" "max" ..@ proj4string:Formal class 'CRS' [package
"sp"] with 1 slots .. ..@ projargs: chr " +proj=longlat +datum=WGS84
+ellps=WGS84 +towgs84=0,0,0"
```

## Details

Uses a simple grid map defining a single country identity for each half degree cell. (sp, SpatialGridDataFrame), used by the function aggregateHalfDegreeGridToCountries()

## Source

created from getMap(resolution='low')

## Examples

```
data(gridCountriesDegreesHalf)
```



---

gridCountriesNumeric    *A global half degree grid specifying the country at each cell*

---

## Description

A grid covering the globe at half degree resolution, specifying the country (UN numeric code) at each cell.

## Format

The format is:

```
Formal class 'SpatialGridDataFrame'
[package "sp"] with 6 slots ..@ data :'data.frame': 259200 obs. of 1
variable: .. ..$ country.asc: num [1:259200] NA NA NA NA NA NA NA NA NA NA
... ..@ grid :Formal class 'GridTopology' [package "sp"] with 3 slots .. ..
..@ cellcentre.offset: num [1:2] -179.8 -89.8 .. ..@ cellsize : num [1:2]
0.5 0.5 .. ..@ cells.dim : int [1:2] 720 360 ..@ grid.index : int(0) ..@
coords : num [1:2, 1:2] -179.8 179.8 -89.8 89.8 .. ..- attr(*,
"dimnames")=List of 2 .. .. ..$ : NULL .. .. ..$ : chr [1:2] "coords.x1"
"coords.x2" ..@ bbox : num [1:2, 1:2] -180 -90 180 90 .. ..- attr(*,
"dimnames")=List of 2 .. .. ..$ : chr [1:2] "coords.x1" "coords.x2" .. ..
..$ : chr [1:2] "min" "max" ..@ proj4string:Formal class 'CRS' [package
"sp"] with 1 slots .. ..@ projargs: chr " +proj=longlat +datum=WGS84
+ellps=WGS84 +towgs84=0,0,0"
```

## Details

Uses a simple grid map defining a single country identity for each half degree cell. (sp, Spatial-GridDataFrame), used by the function aggregateHalfDegreeGridToCountries()

## Source

IIASA

## References

<http://www.iiasa.ac.at/Research/GGI/DB/>

## Examples

```
data(gridCountriesNumeric)
```

---

gridExData	<i>Example half degree grid data : population estimates for 2000 from IIASA</i>
------------	---

---

## Description

Example half degree grid data : people per cell estimates for 2000 from IIASA (International Institute for Applied System Analysis) (sp, SpatialGridDataFrame).

## Format

The format is:

```
Formal class 'SpatialGridDataFrame'
[package "sp"] with 6 slots ..@ data :'data.frame': 259200 obs. of 1
variable: .. ..$ pa2000.asc: num [1:259200] NA NA NA NA NA NA NA NA NA
... ..@ grid :Formal class 'GridTopology' [package "sp"] with 3 slots .. ..
..@ cellcentre.offset: num [1:2] -179.8 -89.8 .. ..@ cellsize : num [1:2]
0.5 0.5 .. ..@ cells.dim : int [1:2] 720 360 ..@ grid.index : int(0) ..@
coords : num [1:2, 1:2] -179.8 179.8 -89.8 89.8 .. ..- attr(*,
"dimnames")=List of 2 .. .. ..$ : NULL .. .. ..$ : chr [1:2] "coords.x1"
"coords.x2" ..@ bbox : num [1:2, 1:2] -180 -90 180 90 .. ..- attr(*,
"dimnames")=List of 2 .. .. ..$ : chr [1:2] "coords.x1" "coords.x2" .. ..
..$ : chr [1:2] "min" "max" ..@ proj4string:Formal class 'CRS' [package
"sp"] with 1 slots .. .. ..@ projargs: chr " +proj=longlat +datum=WGS84
+ellps=WGS84 +towgs84=0,0,0"
```

## Details

From International Institute for Applied System Analysis (IIASA) GGI Scenario Database, 2007 Available at: <http://www.iiasa.ac.at/Research/GGI/DB/> The data are made available for individual, academic research purposes only and on a "as is" basis, subject to revisions without further notice. Commercial applications are not permitted.

The data is used as the default dataset in other functions, e.g. `mapGriddedData()`, when no data file is given.

## Source

<http://www.iiasa.ac.at/web-apps/ggi/GgiDb/dsd?Action=htmlpage&page=about>

## References

Grubler, A., O'Neill, B., Riahi, K., Chirkov, V., Goujon, A., Kolp, P., Prommer, I., Scherbov, S. & Slentoe, E. (2006) Regional, national and spatially explicit scenarios of demographic and economic change based on SRES. *Technological Forecasting and Social Change* doi:10.1016/j.techfore.2006.05.023

## Examples

```
data(gridExData)
```

---

identifyCountries	<i>a function that will print country name and attribute values when a user clicks on the map</i>
-------------------	---

---

## Description

An interactive function that will print on a map the nearest country name to a user mouse click. The user can specify nothing and the function will use a map from the package. Alternatively the user can specify a data frame or SpatialPolygonsDataFrame in which case they need to define the column containing the country names (nameCountryColumn) and optionally a 2nd attribute column to print (nameColumnToPlot).

## Usage

```
identifyCountries(dF = "", nameCountryColumn = "NAME", nameX = "LON",
  nameY = "LAT", nameColumnToPlot = "", plotSelected = FALSE, ...)
```

## Arguments

dF	data frame or SpatialPolygonsDataFrame
nameCountryColumn	name of column containing country names to be printed on the map (could also be set to any other attribute the user wants to query)
nameX	name of column containing the X variable (longitude), not needed if dF is a SpatialPolygonsDataFrame
nameY	name of column containing the Y variable (latitude), not needed if dF is a SpatialPolygonsDataFrame
nameColumnToPlot	name of an attribute column in the data frame the value of which will be appended to the country name when it is printed
plotSelected	if set to TRUE a blue outline will be printed around the countries selected when the selection process is finished
...	other parameters that can be passed to identify()

## Details

Uses the identify() function, which waits for the user to click on the map, and stops when the user right clicks and selects 'stop'.

It uses country centroids, and will give a warning if one is too far away (default value of 0.25 inches).

**Value**

a vector of the indices of the countries selected

**Author(s)**

andy south

**See Also**

identify() [labelCountries](#)

**Examples**

```
#mapCountryData()
#identifyCountries()

#identifyCountries(nameColumnToPlot = "POP_EST", plotSelected = TRUE)
```

---

isoToName	<i>Returns the country name corresponding to the passed iso code (3 letter, 2 letter or numeric).</i>
-----------	---

---

**Description**

Searches `getMap()@data` to find the iso code. By default it returns the string in the ADMIN column. By modifying `nameColumn` you can also get it to return values from any other columns in `getMap()@data` - see the examples. Thus it can also be used to convert between ISO codes.

**Usage**

```
isoToName(iso = "", lookup = getMap()@data, nameColumn = "ADMIN")
```

**Arguments**

iso	iso code to convert to a country name
lookup	the dataframe containing iso codes and country names
nameColumn	which column to get the name from, see examples

**Details**

You could optionally provide a dataframe containing alternate iso conversions using `lookup=`. The passed dataframe would need to contain at least one of the following columns containing 2 letter, 3 letter or numeric iso codes respectively : ISO\_A2, ISO\_A3, ISO\_N3.

**Value**

The country name (or other field) associated with the ISO code passed. NA is returned if no matching code is found.

**Author(s)**

Andy South

**Examples**

```
isoToName('gb')
isoToName('gbr')
isoToName(826)
isoToName('uk') #generates a warning and returns NA
#beware that using nameColumn may be vulnerable to future changes
#in column names in Natural Earth data
isoToName('gb',nameColumn='ABBREV') #returns abbreviation
isoToName('gb',nameColumn='ISO_A3') #returns iso3 for this iso2
isoToName('gbr',nameColumn='continent') #returns continent for this iso3
```

---

joinCountryData2Map     *Joins user country referenced data to a map*

---

**Description**

Joins user data referenced by country codes or names to an internal map, ready for plotting using [mapCountryData](#). Reports join successes and failures.

**Usage**

```
joinCountryData2Map(dF, joinCode = "ISO3", nameJoinColumn = "ISO3V10",
  nameCountryColumn = "Country", suggestForFailedCodes = FALSE,
  mapResolution = "coarse", projection = NA, verbose = FALSE)
```

**Arguments**

dF	R data frame with at least one column for country reference and one column of data
joinCode	how countries are referenced options "ISO2","ISO3","FIPS","NAME", "UN" = numeric codes
nameJoinColumn	name of column containing country referencing
nameCountryColumn	optional name of column containing country names (used in reporting of success/failure)

suggestForFailedCodes	NOT YET ENABLED T/F whether you want system to suggest for failed codes
mapResolution	resolution of the borders in the internal map, only for projection='none' : options 'low', 'medium'
projection	DEPRECATED JUNE 2012
verbose	if set to FALSE it doesn't print progress messages to console

## Details

Joins data referenced by country codes to an internally stored map to enable plotting. The user specifies which country code their data are referenced by, and the name of the column in their data containing that referencing data. The user can choose from different map resolutions, using the function [getMap](#) to retrieve the map. The function reports on how many countries successfully join to the map. Data can then be plotted using [mapCountryData](#). NEW to version 1.01 Oct 2012 : for joinCode='NAME' alternative country names are matched using [countrySynonyms](#).

The projection argument has now been deprecated, you can project maps using package `rgdal` as shown below and in the FAQ.

```
library(rgdal)
#first get countries excluding Antarctica which crashes spTransform
sPDF <- getMap()[-which(getMap()$ADMIN=='Antarctica'),]
#transform to robin for the Robinson projection
sPDF <- spTransform(sPDF, CRS=CRS("+proj=robin +ellps=WGS84"))
mapCountryData( sPDF, nameColumnToPlot="REGION")
```

## Value

An R 'SpatialPolygonsDataFrame' [package "sp"] object with the passed data joined to it

## Author(s)

andy south

## See Also

[mapCountryData](#), [getMap](#)

## Examples

```
data("countryExData",envir=environment(),package="rworldmap")

sPDF <- joinCountryData2Map(countryExData
  , joinCode = "ISO3"
  , nameJoinColumn = "ISO3V10"
  )
mapCountryData( sPDF
  , nameColumnToPlot="BIODIVERSITY"
  )
```

---

joinData2Map	<i>Joins user polygon attribute data to a map</i>
--------------	---

---

### Description

Joins user polygon attribute data to a map of polygon boundaries. The map can either be one stored in the package or provided by the user. Returns a `spatialPolygonsDataFrame` ready for plotting using `mapPolys`. Reports join successes and failures.

### Usage

```
joinData2Map(dF = "", nameMap = "", nameJoinIDMap = "ISO3",
             nameJoinColumnData = "ISO3V10", nameNameColumnData = "Country",
             suggestForFailedCodes = FALSE, projection = NA,
             mapResolution = "coarse", verbose = FALSE)
```

### Arguments

<code>dF</code>	R data frame with at least one column of polygon IDs and one column of data
<code>nameMap</code>	the map to join the attribute data too
<code>nameJoinIDMap</code>	the name of the joinIDs in the map
<code>nameJoinColumnData</code>	name of column in the data containing country referencing
<code>nameNameColumnData</code>	optional name of column in the data containing polygon names (used in reporting of success/failure)
<code>suggestForFailedCodes</code>	NOT YET ENABLED T/F whether you want system to suggest for failed codes
<code>projection</code>	DEPRECATED JUNE 2012
<code>mapResolution</code>	resolution of the borders in the internal map: options 'coarse', 'low', 'less islands'
<code>verbose</code>	if set to FALSE progress messages to console are restricted

### Details

Joins user polygon attribute data provided in a 'data frame' to a map of polygon boundaries. The map can either be one stored in the package or provided by the user. Returns a `spatialPolygonsDataFrame` ready for plotting using `mapPolys`. Reports join successes and failures.

The user specifies the name of the column in their data containing polygon referencing.

The user can choose from different internal map resolutions. Uses the function `getMap` to retrieve the map.

### Value

An R 'SpatialPolygonsDataFrame' [package "sp"] object with the data joined to it

**Author(s)**

andy south

**See Also**

[mapPolys](#), [getMap](#)

**Examples**

```
## this example uses downloaded files
## to run it download the files
## and remove the comment symbols '#' from all the lines starting with a single '#'

## US states map downloaded from :
## http://www2.census.gov/cgi-bin/shapefiles2009/national-files

#inFile <- 'tl_2009_us_stateec.shp'
#sPDF <- readShapePoly(inFile)

#####
## use mapPolys to map the sPDF
#mapPolys(sPDF,nameColumnToPlot = "ALANDEC")
#mapPolys(sPDF,nameColumnToPlot = "AWATEREC",mapRegion='North America')

#####
## join some other data to it
## education data downloaded from here as xls then saved as csv
## http://nces.ed.gov/ccd/drpcompstatelvl.asp

#dataFile <- 'SDR071A_xls.csv'
#dF <- read.csv(dataFile,as.is=TRUE)
#str(dF)
## STATENAME
## DRP912 Dropout Rate, Grades 9 through 12

## joining the data to the map
## based upon state names (column NAMEEC in map, and STATENAME in the data)
#sPDF2 <- joinData2Map(dF
#      , nameMap = sPDF
#      , nameJoinIDMap = "NAMEEC"
#      , nameJoinColumnData = "STATENAME")

#####
## plot one of the attribute variables
#mapDevice()# to set nice shape map window
#mapPolys(sPDF2,nameColumnToPlot = "DRP912",mapRegion='North America')
```



---

labelCountries	<i>to print country labels on a world map</i>
----------------	---

---

### Description

Given no arguments it will print country names stored in the 'NAME' column of [getMap](#) onto an existing map at the centroids of each country polygon, stored in the 'LAT' and 'LON' columns. Alternatively the user can specify a data frame or `SpatialPolygonsDataFrame` in which case they need to define the column containing the country names (`nameCountryColumn`) and optionally a 2nd attribute column to print (`nameColumnToPlot`). First you need to create a map plot, for example using [mapCountryData](#) or [mapBubbles](#).

### Usage

```
labelCountries(df = "", nameCountryColumn = "NAME", nameX = "LON",
  nameY = "LAT", nameColumnToPlot = "", col = "grey", cex = 0.8, ...)
```

### Arguments

<code>df</code>	dataframe or <code>SpatialPolygonsDataFrame</code>
<code>nameCountryColumn</code>	name of column containing country names to be printed on the map (could also be set to any other column in the dataframe)
<code>nameX</code>	name of column containing the X variable (longitude), not needed if <code>df</code> is a <code>SpatialPolygonsDataFrame</code>
<code>nameY</code>	name of column containing the Y variable (latitude), not needed if <code>df</code> is a <code>SpatialPolygonsDataFrame</code>
<code>nameColumnToPlot</code>	name of an attribute column in the data frame the value of which will be appended to the country names
<code>col</code>	colour for labels, default 'grey', can be e.g. <code>rgb(1,1,0,alpha=0.5)</code>
<code>cex</code>	sizing of labels, default = 0.8
<code>...</code>	other parameters that can be passed to <code>text()</code> , e.g. <code>pos=4</code> to right, (1=below, 2=left, 3=above)

### Value

nothing

### Author(s)

andy south

### See Also

[identifyCountries](#)

## Examples

```
mapCountryData()
labelCountries()

labelCountries(nameColumnToPlot = "POP_EST")
```

---

mapBars

*function to produce bar plots on a map*


---

## Description

The function will produce a map with bars centred on country centroids (or other chosen points). The length of the bars is determined by the sum of the attribute columns and each section is coloured.

## Usage

```
mapBars(dF = "", nameX = "longitude", nameY = "latitude",
        nameZs = c(names(dF)[3], names(dF)[4]), zColours = c(1:length(nameZs)),
        barWidth = 1, barOrient = "vert", barRelative = TRUE, ratio = 1,
        addCatLegend = TRUE, addSizeLegend = TRUE, symbolSize = 1,
        maxZVal = NA, xlim = NA, ylim = NA, mapRegion = "world",
        borderCol = "grey", oceanCol = NA, landCol = NA, add = FALSE,
        main = "", lwd = 0.5, lwdSymbols = 1, ...)
```

## Arguments

dF	data frame or SpatialPolygonsDataFrame
nameX	name of column containing the X variable (longitude), not needed if dF is a SpatialPolygonsDataFrame
nameY	name of column containing the Y variable (latitude), not needed if dF is a SpatialPolygonsDataFrame
nameZs	name of columns containing numeric variables to determine bar sections
zColours	colours to apply to the bar section for each attribute column
barWidth	multiple for the width of bar symbols, relative to barOrient see below
barOrient	orientation of bars, options 'horiz' and 'vert'
barRelative	default is TRUE, each variable (column) is scaled to it's maximum value
ratio	the ratio of Y to N in the output map, set to 1 as default
addCatLegend	whether to add a legend for categories
addSizeLegend	whether to add a legend for symbol size
symbolSize	multiplier of default symbol size

maxZVal	the attribute value corresponding to the maximum symbol size, this can be used to set the scaling the same between multiple plots
xlim	map extents c(west,east), can be overridden by mapRegion
ylim	map extents c(south,north), can be overridden by mapRegion
mapRegion	a country name from getMap()[['NAME']] or 'world','africa','oceania','eurasia','uk' sets map extents, overrides xlim,ylim
borderCol	the colour for country borders
oceanCol	a colour for the ocean
landCol	a colour to fill countries
add	whether to add the symbols to an existing map, TRUE/FALSE
main	title for the map
lwd	line width for country borders
lwdSymbols	line width for symbols
...	any extra arguments to points()

### Details

Horizontal or vertical bars can be achieved by using the barOrient argument 'horiz' or 'vert'.

### Value

currently doesn't return anything

### Author(s)

andy south

### Examples

```
#getting example data
dF <- getMap()@data

mapBars( dF,nameX="LON", nameY="LAT",nameZs=c('POP_EST','GDP_MD_EST') )
mapBars( dF,nameX="LON", nameY="LAT",nameZs=c('POP_EST','GDP_MD_EST'), mapRegion='africa' )
mapBars( dF,nameX="LON", nameY="LAT",nameZs=c('POP_EST','GDP_MD_EST'),
  mapRegion='africa', symbolSize=20 )
mapBars( dF,nameX="LON", nameY="LAT",nameZs=c('POP_EST','GDP_MD_EST'), mapRegion='africa',
  symbolSize=20, barOrient = 'horiz' )

# this does work too
#mapBars( dF,nameX="LON", nameY="LAT"
#      , nameZs=c('POP_EST','GDP_MD_EST')
#      , mapRegion='africa'
#      , symbolSize=4 )
```

---

mapBubbles	<i>function to produce bubble plots on a map, size and colour determined by attribute data</i>
------------	--

---

## Description

The function will produce a map with bubbles (circles) centred on country centroids (or other chosen points). Bubbles can be sized and coloured according to specified attribute values.

## Usage

```
mapBubbles(dF = "", nameX = "longitude", nameY = "latitude",
  nameZSize = "", nameZColour = "", fill = TRUE, pch = 21,
  symbolSize = 1, maxZVal = NA, main = nameZSize, numCats = 5,
  catMethod = "categorical", colourPalette = "heat", xlim = NA,
  ylim = NA, mapRegion = "world", borderCol = "grey", oceanCol = NA,
  landCol = NA, addLegend = TRUE, legendBg = "white", legendVals = "",
  legendPos = "bottomright", legendHoriz = FALSE, legendTitle = nameZSize,
  addColourLegend = TRUE, colourLegendPos = "bottomleft",
  colourLegendTitle = nameZColour, add = FALSE, plotZeroVals = TRUE,
  lwd = 0.5, lwdSymbols = 1, ...)
```

## Arguments

dF	data frame or SpatialPolygonsDataFrame
nameX	name of column containing the X variable (longitude), not needed if dF is a SpatialPolygonsDataFrame
nameY	name of column containing the Y variable (latitude), not needed if dF is a SpatialPolygonsDataFrame
nameZSize	name of column containing numeric variable to set symbol size
nameZColour	name of column containing variable to set symbol colour
fill	whether or not to fill symbols TRUE/FALSE
pch	symbol type, default of 21 for circles, will work with other filled symbol types e.g. 22=square, 23=diamond, 24=triangle
symbolSize	multiplier of default symbol size
maxZVal	the attribute value corresponding to the maximum symbol size, this can be used to set the scaling the same between multiple plots
main	title for the map, set to nameZSize by default
numCats	number of categories to put the data in, may be modified if this number is incompatible with the catMethod chosen

catMethod	method for categorisation of data "pretty", "fixedWidth", "diverging", "logFixed-Width", "quantiles", "categorical", or a numeric vector defining breaks
colourPalette	a string describing the colour palette to use, choice of : <ol style="list-style-type: none"> <li>1. ="palette" for the current palette</li> <li>2. a vector of valid colours, e.g. =c('red','white','blue') or output from RColourBrewer</li> <li>3. = one of "heat", "diverging", "white2Black", "black2White", "topo", "rainbow", "terrain", "negpos8", "negpos9"</li> </ol>
xlim	map extents c(west,east), can be overridden by mapRegion
ylim	map extents c(south,north), can be overridden by mapRegion
mapRegion	a country name from getMap()\$NAME or 'world','africa','oceania','eurasia','uk' sets map extents, overrides xlim,ylim
borderCol	the colour for country borders
oceanCol	a colour for the ocean
landCol	a colour to fill countries
addLegend	whether to add a legend for symbol sizes
legendBg	background colour for the legend, NA=transparent
legendVals	allows user to set values & hence symbol sizing in legend
legendPos	positioning of legend e.g. 'bottomleft', 'topright'
legendHoriz	whether to arrange legend elements horizontally TRUE/FALSE
legendTitle	title for the symbol size legend
addColourLegend	whether to add a legend for symbol colour
colourLegendPos	positioning of colour legend e.g. 'bottomleft', 'topright'
colourLegendTitle	title for the colour size legend
add	whether to add the symbols to an existing map, TRUE/FALSE
plotZeroVals	whether to plot zero values as a cross, TRUE/FALSE
lwd	line width for country borders
lwdSymbols	line width for symbols
...	any extra arguments to points()

### Details

By default separate legends are added for symbol size and colouring on either side of the plot, these can be modified by altering legend parameters.

### Value

currently doesn't return anything

**Author(s)**

andy south

**Examples**

```

mapBubbles()
#square symbols
mapBubbles(pch=22)

mapBubbles(dF=getMap(), nameZSize="POP_EST", nameZColour="GE03")

#change colour
mapBubbles(dF=getMap(), nameZSize="POP_EST", nameZColour="GE03"
           ,colourPalette='rainbow', oceanCol='lightblue', landCol='wheat')

data("countryExData",envir=environment(),package="rworldmap")
sPDF <- joinCountryData2Map(countryExData,joinCode = "ISO3"
                           ,nameJoinColumn = "ISO3V10")

mapBubbles(sPDF, nameZSize="POP_EST",nameZColour="BIODIVERSITY"
           ,colourPalette='topo',numCats=5,catMethod="quantiles")

#filled bubbles with set transparency
mapBubbles(fill=TRUE,colourPalette=adjustcolor(palette(), alpha.f = 0.5))
#add bubble edge of a single colour (also with option to set transparency
mapBubbles(nameZColour = adjustcolor('black', alpha.f = 0.7), fill=FALSE, add=TRUE)

```

---

mapByRegion

---

*Produce maps of regional level data from country level data*


---

**Description**

This function will produce maps of regional statistics by aggregating country level data. For example mapping the total population of Asia, Europe,etc, from country level population data. As well as sums, other functions can be used, like mean, median, min, max, etc. There are currently 8 choices of region and 4 choices of country code.

**Usage**

```

mapByRegion(inFile, nameDataColumn, joinCode, nameJoinColumn, regionType = "",
            FUN = "mean", na.rm = TRUE, mapTitle = "", lwd = 0.5, ...)

```

**Arguments**

<code>inFile</code>	a data frame
<code>nameDataColumn</code>	The name of a column of <code>inFile</code> . This is data is aggregated by FUN
<code>joinCode</code>	The type of code to join with. Must be one of: "ISO2", "ISO3", "Numeric" or "FIPS"
<code>nameJoinColumn</code>	The name of a column of <code>inFile</code> . Contains joining codes.
<code>regionType</code>	Must be one of: "GEO3", "GEO3major", "IMAGE24", "GLOCAF", "Stern", "SRES", "SRESmajor", "GBD", "AVOIDname"
<code>FUN</code>	A function to apply to each region
<code>na.rm</code>	Only used for certain values of FUN. See details section below.
<code>mapTitle</code>	a title to be printed above the map
<code>lwd</code>	line width for country borders
<code>...</code>	further arguments to be passed to <a href="#">mapCountryData</a>

**Details**

The function is very similar to `country2Region`. The first difference is that the output is a map, rather than statistics. The second is the behaviour of extra arguments. In `country2Region` the extra arguments go to FUN, here they go to `mapCountryData`.

The `na.rm` argument is used when FUN has one of the following values: "mean", "min", "max", "median", "range", "var", "sd", "mad" or "IQR". This reduces the problem of not being able to supply extra arguments to FUN.

**Value**

invisibly returns a list containing the data and main options used for the map, the list can be passed to [addMapLegend](#) along with additional options to allow greater flexibility in legend creation.

**See Also**

An alternative tool to [country2Region](#). The plotting is done by [mapCountryData](#)

**Examples**

```
data(countryExData)

mapByRegion(inFile=countryExData
, nameDataColumn="CLIMATE"
, joinCode="ISO3"
, nameJoinColumn="ISO3V10"
, regionType="Stern"
, FUN='mean'
)
```

---

mapCountryData	<i>Map country-level data.</i>
----------------	--------------------------------

---

## Description

Draw a map of country-level data, allowing countries to be coloured, from an object created in [joinCountryData2Map](#).

## Usage

```
mapCountryData(mapToPlot = "", nameColumnToPlot = "", numCats = 7,
  xlim = NA, ylim = NA, mapRegion = "world", catMethod = "quantiles",
  colourPalette = "heat", addLegend = TRUE, borderCol = "grey",
  mapTitle = "columnName", oceanCol = NA, aspect = 1,
  missingCountryCol = NA, add = FALSE, nameColumnToHatch = "",
  lwd = 0.5)
```

## Arguments

mapToPlot	a spatial polygons dataframe from <code>joinCountryData2Map()</code> containing country polygons and data, if none specified an internal example data is used
nameColumnToPlot	name of column containing the data you want to plot
numCats	number of categories to put the data in, may be modified if this number is incompatible with the <code>catMethod</code> chosen
xlim	map extents <code>c(west,east)</code> , can be overridden by <code>mapRegion</code>
ylim	map extents <code>c(south,north)</code> , can be overridden by <code>mapRegion</code>
mapRegion	a country name from <code>getMap()[['NAME']]</code> or <code>'world'</code> , <code>'africa'</code> , <code>'oceania'</code> , <code>'eurasia'</code> , <code>'uk'</code> sets map extents, overrides <code>xlim</code> , <code>ylim</code>
catMethod	method for categorisation of data : <ol style="list-style-type: none"> <li>1. "categorical" - each unique value is treated as a separate category</li> <li>2. for numeric data : "pretty", "fixedWidth", "diverging", "logFixedWidth", "quantiles"</li> <li>3. a numeric vector defining breaks e.g. <code>c(0:5)</code>, note that a value of 2 goes into 1-2 not 2-3, uses <code>cut(include.lowest=TRUE)</code></li> </ol>
colourPalette	string describing the colour palette to use, choice of: <ol style="list-style-type: none"> <li>1. "palette" for the current palette</li> <li>2. a vector of valid colours, e.g. <code>=c('red','white','blue')</code> or output from <code>RColourBrewer</code></li> <li>3. one of "heat", "diverging", "white2Black", "black2White", "topo", "rainbow", "terrain", "negpos8", "negpos9"</li> </ol>
addLegend	whether to add a legend or not
borderCol	the colour for country borders



mapTitle	title to add to the map, any string or 'columnName' to set it to the name of the data column
oceanCol	a colour for the ocean
aspect	aspect for the map, defaults to 1, if set to 'variable' uses same method as plot.Spatial in sp
missingCountryCol	a colour for missing countries
add	whether to add this map on top of an existing map, TRUE/FALSE
nameColumnToHatch	allows hatching of country fills (e.g. to represent uncertainty) , specify a column containing numeric data , highest values will be solid and lower values will have a decreasing density of hatching , new feature more documentation will be added soon
lwd	line width for country borders

### Details

Certain catMethod and colourPalette options go well together. e.g. "diverging" and "diverging", "categorical" and "rainbow"

There are two styles of legend available. If catMethod='categorical' or the packages fields and spam are not installed a simple legend with coloured boxes is created. Otherwise a colour bar legend is created. Finer control can be achieved by [addMapLegendBoxes](#) or [addMapLegend](#) respectively.

### Value

invisibly returns a list containing the data and main options used for the map, the list can be passed to [addMapLegend](#) or [addMapLegendBoxes](#) along with additional options to allow greater flexibility in legend creation.

### Warning

will generate unhelpful errors in data categorisation if inappropriate options are chosen, e.g. with catMethod:Quantiles if numCats too high so that unique breaks cannot be defined.

### Author(s)

andy south

### See Also

classInt, RColorBrewer

### Examples

```
mapCountryData()
data("countryExData",envir=environment(),package="rworldmap")
sPDF <- joinCountryData2Map(countryExData
```

```

        , joinCode = "ISO3"
        , nameJoinColumn = "ISO3V10"
      )
mapCountryData( sPDF
  , nameColumnToPlot="BIODIVERSITY"
)

#user defined map colour scheme for categorical data
mapParams <- mapCountryData(nameColumnToPlot='GE03major'
  , catMethod='categorical'
  , addLegend='FALSE'
  , colourPalette=c('white','green','red','yellow','blue','black')
)

#changing legendText
mapParams$legendText <- c('antarctic','africa','oceania'
  , 'americas','s.asia','eurasia')
do.call( addMapLegendBoxes, c(mapParams,x='bottom',title="Region",horiz=TRUE))

##showing how rworldmap can be used with the classInt and RColorBrewer packages
library(classInt)
library(RColorBrewer)
#getting example data and joining to a map
data("countryExData",envir=environment(),package="rworldmap")
sPDF <- joinCountryData2Map(countryExData,joinCode = "ISO3"
  ,nameJoinColumn = "ISO3V10")
#getting class intervals using a 'jenks' classification in classInt package
classInt <- classIntervals( sPDF$EPI, n=5, style="jenks")
catMethod = classInt$brks
#getting a colour scheme from the RColorBrewer package
colourPalette <- brewer.pal(5,'RdPu')
#calling mapCountryData with the parameters from classInt and RColorBrewer
mapParams <- mapCountryData( sPDF, nameColumnToPlot="EPI", addLegend=FALSE
  , catMethod = catMethod, colourPalette=colourPalette )
do.call(addMapLegend, c(mapParams
  ,legendLabels="all"
  ,legendWidth=0.5
  ,legendIntervals="data"))

```

---

mapDevice

*Creates a plot device set up for maps*


---

## Description

Creates a plot device suited for rworldmap plotting functions.

**Usage**

```
mapDevice(device = "dev.new", rows = 1, columns = 1, plotOrder = "rows",
  width = NULL, height = NULL, titleSpace = NULL, mai = c(0, 0, 0.2, 0),
  mgp = c(0, 0, 0), xaxs = "i", yaxs = "i", ...)
```

**Arguments**

device	Character string which controls the type of plot default. The default uses your standard plot device. Giving the name of a plotting device function will use that instead. e.g. "pdf", "png", etc.
rows	The number of rows. Default 1
columns	The number of columns. Default 1
plotOrder	Option of 'rows' or 'columns'. For multiple plots whether to plot in row or column order. However, note that addMapLegend can have the effect of reverting order to rows.
width	The width of a single plot. This includes the margins. If you do not specify both width and height, suitable values will be calculated
height	The height of a single plot. This includes the margins. If you do not specify both width and height, suitable values will be calculated
titleSpace	The height in inches of the gap at the plot.
mai	The margin sizes in inches. If titleSpace is given this overrides mai[3].
mgp	As per par(mgp) in the graphics package
xaxs	As per par(xaxs) in the graphics package
yaxs	As per par(yaxs) in the graphics package
...	Further arguments to the device function

**Value**

Used for the side effect of creating a plot device, and setting graphical parameters for the device.

**See Also**

mapCountryData, mapGridAscii

**Examples**

```
## Not run:
#Basic Usage
mapDevice()
mapCountryData()

#2 by 2 plot
mapDevice(rows=2,columns=2)
columns<-c("BIODIVERSITY","EPI","ENVHEALTH","Population2005")
for(i in columns){
```

```

    mapCountryData(nameColumnToPlot=i)
  }
  #Creating a pdf that is 5 inches wide
  mapDevice(device="pdf",width=5,file=tempfile())
  mapCountryData()
  dev.off()

```

```
## End(Not run)
```

---

mapGriddedData	<i>Produce maps of global gridded data at half degree resolution</i>
----------------	--

---

## Description

Produce maps of global gridded data at half degree resolution

## Usage

```

mapGriddedData(dataset = "", nameColumnToPlot = "", numCats = 5,
  catMethod = "quantiles", colourPalette = "heat", xlim = c(-180, 180),
  ylim = c(-80, 90), mapRegion = "world", addLegend = TRUE,
  addBorders = "coarse", borderCol = "grey", oceanCol = NA,
  landCol = NA, plotData = TRUE, aspect = 1, lwd = 1)

```

## Arguments

dataset	gridded data either as a : <ol style="list-style-type: none"> <li>1. SpatialGridDataFrame (R object defined in package sp)</li> <li>2. file name of a GridAscii file - this is an Esri format</li> <li>3. 2D R matrix or array (rows by columns)</li> </ol>
nameColumnToPlot	name of column containing the data to plot
numCats	number of categories to put the data in, may be overridden if catMethod = 'pretty'
catMethod	method for categorisation of data "pretty", "fixedWidth", "diverging", "logFixed-Width", "quantiles", "categorical", or a numeric vector defining breaks
colourPalette	a string describing the colour palette to use, choice of : <ol style="list-style-type: none"> <li>1. "palette" for the current palette</li> <li>2. a vector of valid colours, e.g. =c('red','white','blue') or output from RColour-Brewer</li> <li>3. one of "heat", "diverging", "white2Black", "black2White", "topo", "rain-bow", "terrain", "negpos8", "negpos9"</li> </ol>
xlim	map extents c(west,east), can be overridden by mapRegion
ylim	map extents c(south,north), can be overridden by mapRegion

mapRegion	a country name from getMap()[['NAME']] or 'world','africa','oceania','eurasia','uk' sets map extents, overrides xlim,ylim
addLegend	whether to add a legend or not
addBorders	options for country borders, 'low','coarse' = low or coarse resolution, 'coasts' = coasts only, 'none' or NA for none
borderCol	the colour for country borders
oceanCol	a colour for the ocean if the grid values are NA
landCol	a colour to fill countries if the grid values are NA over land
plotData	whether to plotData, if FALSE a legend can be added on its own
aspect	aspect for the map, defaults to 1, if set to 'variable' uses same method as plot.Spatial in sp
lwd	line width for country borders

## Details

Plots a map of global half degree gridded data, allowing classification, colours and regions to be set.

Certain `catMethod` and `colourPalette` options go well together. e.g. `"diverging"` and `"diverging"`, `"categorical"` and `"rainbow"`

**Value**

invisibly returns a list containing the data and main options used for the map, the list can be passed to `addMapLegend` along with additional options to allow greater flexibility in legend creation.

**Author(s)**

andy south

## See Also

classInt, RColorBrewer

## Examples

[illegible]

```
#rename the categories
levels(gridExData@data$categories) <- c('low', 'med', 'high', 'vhigh')
#mapping
mapGriddedData( gridExData, nameColumnToPlot= 'categories'
                , catMethod='categorical')
```

---

```
mapHalfDegreeGridToCountries
```

*Maps user half degree gridded data at country level by first aggregating.*

---

## Description

Maps user half degree gridded data at country level by first aggregating.

## Usage

```
mapHalfDegreeGridToCountries(inFile = "", aggregateOption = "sum",
                             nameCountryColumn = "", suggestForFailedCodes = FALSE, projection = NA,
                             mapResolution = "low", numCats = 7, xlim = c(-160, 160), ylim = c(-80,
                             90), mapRegion = "world", catMethod = "quantiles",
                             colourPalette = "heat", addLegend = TRUE, lwd = 0.5)
```

## Arguments

inFile	either a gridascii filename or an sp SpatialGridDataFrame object specifying a global half degree grid dataset, if none specified an internal example data is used
aggregateOption	how to aggregate the data ('sum','mean','min','max')
nameCountryColumn	optional name of column containing country names (used in reporting of success/failure)
suggestForFailedCodes	T/F whether you want system to suggest for failed codes NOT YET WORKING
projection	deprecated june 2012
mapResolution	options low, medium, only for projection='none' initially
numCats	number of categories, may be overided e.g. if catMethod='pretty'
xlim	map extents c(west,east), can be overridden by mapRegion
ylim	map extents c(south,north), can be overridden by mapRegion
mapRegion	'world','africa','oceania','eurasia','uk' sets map extents, overrides we,ea etc.

catMethod	method for categorisation of data "pretty", any vector defining breaks, "fixed-Width","quantiles"
colourPalette	"heat","white2Black","palette":for current palette
addLegend	whether to add a legend or not T/F
lwd	line width for country borders

### Details

Aggregates half degree gridded data to countries using the option specified in 'aggregateOption' then maps at a country level.

### Value

invisibly returns a list containing the data and main options used for the map, the list can be passed to [addMapLegend](#) along with additional options to allow greater flexibility in legend creation.

### Author(s)

andy south

### See Also

[aggregateHalfDegreeGridToCountries](#)

### Examples

```
data(gridExData,envir=environment(),package="rworldmap")
gridExData <- get("gridExData")
mapHalfDegreeGridToCountries(gridExData)

#different aggregate option
mapHalfDegreeGridToCountries( gridExData, aggregateOption="mean" )
```

---

mapPies

*function to produce pie charts on a map*


---

### Description

The function will produce a map with pie charts centred on country centroids (or other chosen points). The size of the circles is determined by the sum of the attribute columns and each section is coloured.

**Usage**

```
mapPies(dF, nameX = "LON", nameY = "LAT", nameZs = c(names(dF)[3],
  names(dF)[4]), zColours = c(1:length(nameZs)), ratio = 1,
  addCatLegend = TRUE, symbolSize = 1, maxZVal = NA, xlim = NA,
  ylim = NA, mapRegion = "world", borderCol = "grey", oceanCol = NA,
  landCol = NA, add = FALSE, main = "", lwd = 0.5, ...)
```

**Arguments**

dF	data frame or SpatialPolygonsDataFrame
nameX	name of column containing the X variable (longitude), not needed if dF is a SpatialPolygonsDataFrame
nameY	name of column containing the Y variable (latitude), not needed if dF is a SpatialPolygonsDataFrame
nameZs	name of columns containing numeric variables to determine pie sections
zColours	colours to apply to the pie section for each attribute column
ratio	the ratio of Y to N in the output map, set to 1 as default
addCatLegend	whether to add a legend for categories
symbolSize	multiplier of default symbol size
maxZVal	the attribute value corresponding to the maximum symbol size, this can be used to set the scaling the same between multiple plots
xlim	map extents c(west,east), can be overridden by mapRegion
ylim	map extents c(south,north), can be overridden by mapRegion
mapRegion	a country name from getMap()[['NAME']] or 'world','africa','oceania','eurasia','uk' sets map extents, overrides xlim,ylim
borderCol	the colour for country borders
oceanCol	a colour for the ocean
landCol	a colour to fill countries
add	whether to add the symbols to an existing map, TRUE/FALSE
main	title for the map
lwd	line width for country borders
...	any extra arguments to points()

**Details**

Beware of creating plots that are difficult for the reader to interpret. More than 3 or 4 categories may be too many.

**Value**

currently doesn't return anything



**Author(s)**

andy south

**Examples**

```
#getting example data
dF <- getMap()@data

## these examples repeat the same column in 'nameZs'
## to show that equal sized pies are created

#mapPies( dF,nameX="LON", nameY="LAT",nameZs=c('AREA','AREA') )

#mapPies( dF,nameX="LON", nameY="LAT",nameZs=c('AREA','AREA')
#         , mapRegion='africa' )

mapPies( dF,nameX="LON", nameY="LAT"
        , nameZs=c('POP_EST','POP_EST','POP_EST','POP_EST'),mapRegion='africa' )
```

---

mapPolys	<i>Map polygon data.</i>
----------	--------------------------

---

**Description**

Plot a map of polygons, from a spatialPolygonsDataFrame, coloured according to one a specified attribute column.

**Usage**

```
mapPolys(mapToPlot = "", nameColumnToPlot = "", numCats = 7, xlim = NA,
        ylim = NA, mapRegion = "world", catMethod = "quantiles",
        colourPalette = "heat", addLegend = TRUE, borderCol = "grey",
        mapTitle = "columnName", oceanCol = NA, aspect = 1,
        missingCountryCol = NA, add = FALSE, lwd = 0.5)
```

**Arguments**

- mapToPlot            a spatial polygons dataframe (e.g. from joinData2Map()) containing polygons and associated data, if none specified an internal example data is used
- nameColumnToPlot    name of column containing the data you want to plot
- numCats             number of categories to put the data in, may be modified if this number is incompatible with the catMethod chosen

xlim	map extents c(west,east), can be overridden by mapRegion
ylim	map extents c(south,north), can be overridden by mapRegion
mapRegion	a country name from getMap()[['NAME']] or 'world','africa','oceania','eurasia','uk' sets map extents, overrides xlim,ylim
catMethod	for categorisation of data "pretty", "fixedWidth", "diverging", "logFixedWidth", "quantiles", "categorical", or a numeric vector defining breaks
colourPalette	string describing the colour palette to use, choice of: <ol style="list-style-type: none"> <li>1. "palette" for the current palette</li> <li>2. a vector of valid colours, e.g. =c('red','white','blue') or output from RColourBrewer</li> <li>3. one of "heat", "diverging", "white2Black", "black2White", "topo", "rainbow", "terrain", "negpos8", "negpos9"</li> </ol>
addLegend	whether to add a legend or not
borderCol	the colour for country borders
mapTitle	title to add to the map, any string or 'columnName' to set it to the name of the data column
oceanCol	a colour for the ocean
aspect	aspect for the map, defaults to 1, if set to 'variable' uses same method as plot.Spatial in sp
missingCountryCol	a colour for missing countries
add	whether to add this map on top of an existing map, TRUE/FALSE
lwd	line width for country borders

## Details

Certain catMethod and colourPalette options go well together. e.g. "diverging" and "diverging", "categorical" and "rainbow"

There are two styles of legend available. If catMethod='categorical' or the packages fields and spam are not installed a simple legend with coloured boxes is created. Otherwise a colour bar legend is created. Finer control can be achieved by [addMapLegendBoxes](#) or [addMapLegend](#) respectively.

## Value

invisibly returns a list containing the data and main options used for the map, the list can be passed to [addMapLegend](#) or [addMapLegendBoxes](#) along with additional options to allow greater flexibility in legend creation.

## Author(s)

andy south

## See Also

[joinData2Map](#), [classInt](#), [RColorBrewer](#)

**Examples**

```

## this example uses downloaded files
## to run it download the files
## and remove the comment symbols '#' from all the lines starting with a single '#'

## US states map downloaded from :
## http://www2.census.gov/cgi-bin/shapefiles2009/national-files

#inFile <- 'tl_2009_us_stateec.shp'
#sPDF <- readShapePoly(inFile)
#str(sPDF@data)

#####
## use mapPolys to map the sPDF
#mapPolys(sPDF,nameColumnToPlot = "ALANDEC")
#mapPolys(sPDF,nameColumnToPlot = "AWATEREC",mapRegion='North America')

#####
## join some other data to it
## education data downloaded from here as xls then saved as csv
## http://nces.ed.gov/ccd/drpcompstatelvl.asp

#dataFile <- 'SDR071A_xls.csv'
#dF <- read.csv(dataFile,as.is=TRUE)
#str(dF)
## STATENAME
## DRP912 Dropout Rate, Grades 9 through 12

## joining the data to the map
## based upon state names (column NAMEEC in map, and STATENAME in the data)
#sPDF2 <- joinData2Map(dF
#           , nameMap = sPDF
#           , nameJoinIDMap = "NAMEEC"
#           , nameJoinColumnData = "STATENAME")

#####
## plot one of the attribute variables
#mapDevice()# to set nice shape map window
#mapPolys(sPDF2,nameColumnToPlot = "DRP912",mapRegion='North America')

#####
###to map US counties data (Tiger) downloaded from :
###http://www2.census.gov/cgi-bin/shapefiles2009/national-files

#inFile <- 'tl_2009_us_county.shp'
#sPDF <- readShapePoly(inFile)
#str(sPDF@data)
#mapPolys(sPDF,nameColumnToPlot='AWATER',xlim=c(-140,-65), ylim=c(25,45))

```

---

rwmCheckAndLoadInput    *internal function to check and load input data to mapping functions*

---

### Description

Internal function checking and loading dFs or sPDFs to [mapCountryData](#), [mapPolys](#), [mapPies](#), [mapBubbles](#), [mapBars](#).

### Usage

```
rwmCheckAndLoadInput(inputData = "", inputNeeded = "sPDF",  
  callingFunction = "")
```

### Arguments

inputData	a dF, sPDF or "", for latter an internal example data is used
inputNeeded	"sPDF", "sPDF or dF", "dF"
callingFunction	optional : name of the calling function

### Details

a rworldmap internal function, unlikely to be of use to users

### Value

invisibly returns a dF or sPDF

### Author(s)

andy south

---

rwmGetClassBreaks	<i>Internal function to set the numeric values for the breaks between data categories</i>
-------------------	---

---

### Description

Sets the values that determine how a vector of continuous data is classified into categories. Called by mapCountryData() and mapGriddedData()

### Usage

```
rwmGetClassBreaks(dataColumn, catMethod, numCats, verbose = TRUE,  
  midpoint = 0)
```

### Arguments

dataColumn	the data vector to be classified, must be numeric
catMethod	the method to use to classify the data into categories, choice of "pretty", "fixed-Width", "diverging", "logFixedWidth", "quantiles", "categorical" or a numeric vector defining breaks
numCats	number of categories to put the data in, may be overridden if not possible under some classification methods
verbose	whether to print information messages to console TRUE/FALSE
midpoint	the midpoint to use if catMethod='diverging', default=0

### Value

A vector specifying the numeric breaks between data categories.

### Author(s)

andy south and matthew staines

### See Also

The classInt package

---

rwmGetColours	<i>to choose map colours for classified data</i>
---------------	--

---

### Description

Returns a vector of colours based upon the palette specified and number of colours specified. If colourPalette specifies a number of colours and this is different from numColours, numColours takes precedence and colours are interpolated to make the number fit.

### Usage

```
rwmGetColours(colourPalette, numColours)
```

### Arguments

colourPalette	string describing the colour palette to use, choice of: <ol style="list-style-type: none"> <li>1. "palette" for the current palette</li> <li>2. a vector of valid colours, e.g. =c('red','white','blue') or output from RColourBrewer</li> <li>3. one of "heat", "diverging", "white2Black", "black2White", "topo", "rainbow", "terrain", "negpos8", "negpos9"</li> </ol>
numColours	the number of colour categories desired

### Value

A vector specifying a number of colours.

---

rwmGetISO3	<i>Internal function for getting the ISO3 country code for a country name synonymn.</i>
------------	---

---

### Description

Searches countrySynonyms to get the ISO3 code. If the name is not found NA is returned. Allows joining of imperfect names to other country data in joinCountryData2Map( joinCode='NAME' )

### Usage

```
rwmGetISO3(oddName)
```

### Arguments

oddName	country name that user wishes to find code for
---------	--

**Value**

the ISO3 code (3 letters) corresponding to the country name passed, or NA if one is not found

**Author(s)**

Andy South

**References**

This was derived and used with permission from the Perl Locale package.

Locale::Codes::Country\_Codes.

Thanks to Sullivan Beck for pulling this together.

Data sources are acknowledged here :

<http://search.cpan.org/~sbeck/Locale-Codes-3.23/lib/Locale/Codes/Country.pod>

**Examples**

```
rwmGetISO3("vietnam")
```

---

rwmNewMapPlot

---

*Internal function to set up an existing device for plotting maps*


---

**Description**

Sets the region, aspect and ocean colour for a new map plot

**Usage**

```
rwmNewMapPlot(mapToPlot = getMap(), oceanCol = NA, mapRegion = "world",
  xlim = NA, ylim = NA, aspect = 1)
```

**Arguments**

mapToPlot	the worldmap to be plotted
oceanCol	a colour for the ocean
mapRegion	a string specifying the map region, see setMapExtents()
xlim	map extents c(west,east), can be overridden by mapRegion
ylim	map extents c(south,north), can be overridden by mapRegion
aspect	aspect for the map, defaults to 1, if set to 'variable' uses same default as plot.Spatial in sp

**Details**

Called by mapCountryData() and mapGriddedData()

**Value**

a dataframe containing xlim and ylim

**Author(s)**

andy south

---

rworldmapExamples	<i>Example code for plot creation</i>
-------------------	---------------------------------------

---

**Description**

Example code to demonstrate creation of a series of plots

**Usage**

```
rworldmapExamples()
```

**Author(s)**

andy south

---

setMapExtents	<i>Internal function allowing map extents to be set from area names</i>
---------------	---

---

**Description**

Allows map extents to be set from country or area names (e.g. India, Africa )

**Usage**

```
setMapExtents(mapRegion = "world")
```

**Arguments**

mapRegion	a country name from getMap()[['NAME']] or one of 'eurasia', 'africa', 'latin america', 'uk', 'oceania', 'asia'
-----------	--

**Details**

Can be called by [mapCountryData](#) and [mapGriddedData](#)

**Value**

a dataframe containing we,ea,so,no values in degrees between -180 & +180



**Author(s)**

andy south

**Examples**

```
mapCountryData( mapRegion='Africa' )  
mapCountryData( mapRegion='India' )
```

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