Package 'rworldmap'

August 29, 2016

Type Package

Title Mapping Global Data

Version 1.3-6

Date 2016-02-03

Author Andy South

Maintainer Andy South <southandy@gmail.com>

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

NeedsCompilation no

Repository CRAN

Date/Publication 2016-02-03 12:26:35

R topics documented:

rworldmap-package 2
addMapLegend 5
addMapLegendBoxes 7
aggregateHalfDegreeGridToCountries 9
barplotCountryData 10
coastsCoarse 12

countriesCoarse . . . 13
countriesCoarseLessIslands . . . 14
countriesLow . . . 15
country2Region . . . 16
countryExData . . . 18
countryRegions . . . 21
countrySynonyms . . . 22
getMap . . . 23
gridCountriesDegreesHalf . . . 24
gridCountriesNumeric . . . 25
gridExData . . . 26
identifyCountries . . . 27
isoToName . . . 28
joinCountryData2Map . . . 29
joinData2Map . . . 31
labelCountries . . . 33
mapBars . . . 34
mapBubbles . . . 36
mapByRegion . . . 38
mapCountryData . . . 40
mapDevice . . . 42
mapGriddedData . . . 44
mapHalfDegreeGridToCountries . . . 46
mapPies . . . 47
mapPolys . . . 49
rwmCheckAndLoadInput . . . 52
rwmGetClassBreaks . . . 53
rwmGetColours . . . 54
rwmGetISO3 . . . 54
rwmNewMapPlot . . . 55
rworldmapExamples . . . 56
setMapExtents . . . 56

Index **58**

`rworldmap-package` *For mapping global data.*

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.

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Author(s)

Andy South

with contributions from Joe Scutt-Phillips, Barry Rowlingson, Roger Bivand and Pru Foster

Maintainer: <southandy@gmail.com>

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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 seperately 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. mfcol 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 eaxmple 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='GEO3major'
              , 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 sceme
mapParams <- mapCountryData(nameColumnToPlot='GEO3major'
              , 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", "logFixedWidth","quantiles","categorical", or a numeric vector defining breaks
colourPalette	a string describing the colour palette to use, choice of : 1. = "palette" for the current palette 2. a vector of valid colours, e.g. =c('red','white','blue') or output from RColourBrewer 3. = one of "heat", "diverging", "white2Black", "black2White", "topo", "rainbow", "terrain", "negpos8", "negpos9"
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')
```

---

countriesCoarse *a coarse resolution world map, a vector map of 244 country boundaries,suitable for global maps*

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 fronm 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 *a low resolution world map, a vector map of 244 country boundaries, suitable for zooming in on regions or large global maps*

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` *Produce regional data from country level data*

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 neames 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="ISO3"
,nameJoinColumn="ISO3V10"
,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="ISO3"
,nameJoinColumn="ISO3V10"
,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.

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` *Regional Classification Table*

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 *Synonyms of country names for each ISO 3 letter country code to enable conversion.*

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 gloabl 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, SpatialGridDataFrame), used by the function aggregateHalfDegreeGridToCountries()

Source

created from getMap(resolution='low')

Examples

```
data(gridCountriesDegreesHalf)
```

gridCountriesNumeric *A gloabl 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, SpatialGridDataFrame), used by the function aggregateHalfDegreeGridToCountries()

Source

IIASA

References

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

Examples

```
data(gridCountriesNumeric)
```

gridExData *Example half degree grid data : population estimates for 2000 from IIASA*

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 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` *a function that will print country name and attribute values when a user clicks on the map*

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 specifiy 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 (lattitude), 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` *Returns the country name corresponding to the passed iso code (3 letter, 2 letter or numeric).*

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 passe 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 *Joins user polygon attribute data to a map*

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

dF	R data frame with at least one column of polygon IDs and one column of data
nameMap	the map to join the attribute data too
nameJoinIDMap	the name of the joinIDs in the map
nameJoinColumnData	name of column in the data containing country referencing
nameNameColumnData	optional name of column in the data containing polygon names (used in reporting of success/failure)
suggestForFailedCodes	NOT YET ENABLED T/F whether you want system to suggest for failed codes
projection	DEPRECATED JUNE 2012
mapResolution	resolution of the borders in the internal map: options 'coarse','low', 'less islands'
verbose	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` *to print country labels on a world map*

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 specifiy 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

`dF`	dataframe or SpatialPolygonsDataFrame
`nameCountryColumn`	name of column containing country names to be printed on the map (could also be set to any other column in the dataframe)
`nameX`	name of column containing the X variable (longitude), not needed if dF is a SpatialPolygonsDataFrame
`nameY`	name of column containing the Y variable (lattitude), 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 names
`col`	colour for labels, default 'grey', can be e.g. rgb(1,1,0,alpha=0.5)
`cex`	sizing of labels, default = 0.8
`...`	other parameters that can be passed to text(), e.g. pos=4 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 (lattitude), 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 overidden by mapRegion
ylim	map extents c(south,north), can be overidden 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 *function to produce bubble plots on a map, size and colour determined by attribute data*

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 (lattitude), 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", "logFixedWidth", "quantiles", "categorical", or a numeric vector defining breaks
colourPalette	a string describing the colour palette to use, choice of : 1. ="palette" for the current palette 2. a vector of valid colours, e.g. =c('red','white','blue') or output from RColourBrewer 3. = one of "heat", "diverging", "white2Black", "black2White", "topo", "rainbow", "terrain", "negpos8", "negpos9"
xlim	map extents c(west,east), can be overidden by mapRegion
ylim	map extents c(south,north), can be overidden 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 fro 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="GEO3")

#change colour
mapBubbles(dF=getMap(), nameZSize="POP_EST", nameZColour="GEO3"
          ,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

inFile	a data frame
nameDataColumn	The name of a column of inFile. This is data is aggregated by FUN
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.
regionType	Must be one of: "GEO3", "GEO3major", "IMAGE24", "GLOCAF", "Stern", "SRES", "SRESmajor","GBD","AVOIDname"
FUN	A function to apply to each region
na.rm	Only used for certain values of FUN. See details section below.
mapTitle	a title to be printed above the map
lwd	line width for country borders
...	further arguments to be passed to mapCountryData

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` *Map country-level data.*

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 joinCountryData2Map() 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 catMethod chosen
`xlim`	map extents c(west,east), can be overidden by mapRegion
`ylim`	map extents c(south,north), can be overidden by mapRegion
`mapRegion`	a country name from getMap()[['NAME']] or 'world','africa','oceania','eurasia','uk' sets map extents, overrides xlim,ylim
`catMethod`	method for categorisation of data : 1. "categorical" - each unique value is treated as a separate category 2. for numeric data : "pretty", "fixedWidth", "diverging", "logFixedWidth", "quantiles" 3. a numeric vector defining breaks e.g. c(0:5), note that a value of 2 goes into 1-2 not 2-3, uses cut(include.lowest=TRUE)
`colourPalette`	string describing the colour palette to use, choice of: 1. "palette" for the current palette 2. a vector of valid colours, e.g. =c('red','white','blue') or output from RColourBrewer 3. one of "heat", "diverging", "white2Black", "black2White", "topo", "rainbow", "terrain", "negpos8", "negpos9"
`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 repectively.

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='GEO3major'
              , 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` *Produce maps of global gridded data at half degree resolution*

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 : 1. SpatialGridDataFrame (R object defined in package sp) 2. file name of a GridAscii file - this is an Esri format 3. 2D R matrix or array (rows by columns)
`nameColumnToPlot`	name of column containing the data to plot
`numCats`	number of categories to put the data in, may be overidden if catMethod =’pretty’
`catMethod`	method for categorisation of data "pretty", "fixedWidth","diverging", "logFixedWidth","quantiles","categorical", or a numeric vector defining breaks
`colourPalette`	a string describing the colour palette to use, choice of : 1. "palette" for the current palette 2. a vector of valid colours, e.g. =c(’red’,’white’,’blue’) or output from RColourBrewer 3. one of "heat", "diverging", "white2Black", "black2White", "topo", "rainbow", "terrain", "negpos8", "negpos9"
`xlim`	map extents c(west,east), can be overidden by mapRegion
`ylim`	map extents c(south,north), can be overidden 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

```
## mapping continuous data
data(gridExData,envir=environment(),package="rworldmap")
gridExData <- get("gridExData")
mapGriddedData(gridExData)

## reclassing continuous data to categorical & mapping
data(gridExData,envir=environment(),package="rworldmap")
#find quartile breaks
cutVector <- quantile(gridExData@data[,1],na.rm=TRUE)
#classify the data to a factor
gridExData@data$categories <- cut( gridExData@data[,1]
                                    , cutVector, include.lowest=TRUE)
```

```
#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 overidden by mapRegion
ylim	map extents c(south,north), can be overidden 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, "fixedWidth","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 overidden by mapRegion
ylim	map extents c(south,north), can be overidden 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 *Map polygon data.*

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 overidden by mapRegion
ylim	map extents c(south,north), can be overidden 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: 1. "palette" for the current palette 2. a vector of valid colours, e.g. =c('red','white','blue') or output from RColourBrewer 3. one of "heat", "diverging", "white2Black", "black2White", "topo", "rainbow", "terrain", "negpos8", "negpos9"
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 repectively.

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` *Internal function to set the numeric values for the breaks between data categories*

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", "fixedWidth", "diverging", "logFixedWidth","quantiles","categorical" or a numeric vector defining breaks
`numCats`	number of categories to put the data in, may be overidden 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 *to choose map colours for classified data*

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: 1. "palette" for the current palette 2. a vector of valid colours, e.g. =c('red','white','blue') or output from RColourBrewer 3. one of "heat", "diverging", "white2Black", "black2White", "topo", "rainbow", "terrain", "negpos8", "negpos9"
numColours	the number of colour categories desired

Value

A vector specifiying a number of colours.

rwmGetISO3 *Internal function for getting the ISO3 country code for a country name synonymn.*

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 overidden by mapRegion
ylim	map extents c(south,north), can be overidden 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` *Example code for plot creation*

Description

Example code to demonstrate creation of a series of plots

Usage

```
rworldmapExamples()
```

Author(s)

andy south

`setMapExtents` *Internal function allowing map extents to be set from area names*

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' )
```

Index

∗Topic **aplot**
addMapLegend, 5
addMapLegendBoxes, 7
barplotCountryData, 10
mapBars, 34
mapBubbles, 36
mapCountryData, 40
mapHalfDegreeGridToCountries, 46
mapPies, 47
mapPolys, 49
rwmCheckAndLoadInput, 52
rworldmapExamples, 56
∗Topic **datasets**
coastsCoarse, 12
countriesCoarse, 13
countriesCoarseLessIslands, 14
countriesLow, 15
countryExData, 18
countryRegions, 21
countrySynonyms, 22
gridCountriesDegreesHalf, 24
gridCountriesNumeric, 25
gridExData, 26
∗Topic **device**
mapDevice, 42
∗Topic **dplot**
aggregateHalfDegreeGridToCountries, 9
identifyCountries, 27
joinCountryData2Map, 29
joinData2Map, 31
labelCountries, 33
rwmGetClassBreaks, 53
setMapExtents, 56
∗Topic **hplot**
mapByRegion, 38
mapGriddedData, 44
∗Topic **manip**
country2Region, 16
isoToName, 28
rwmGetISO3, 54
∗Topic **misc**
getMap, 23
rwmNewMapPlot, 55
∗Topic **package**
rworldmap-package, 2

addMapLegend, 5, *11, 12*, *39*, *41*, *45*, *47*, *50*
addMapLegendBoxes, 7, *12*, *41*, *50*
aggregateHalfDegreeGridToCountries, 9, *47*

barplotCountryData, *4*, 10

coastsCoarse, 12
countriesCoarse, *4*, 13
countriesCoarseLessIslands, 14
countriesLow, 15
country2Region, 16, *21*, *39*
countryExData, 18
countryRegions, 21
countrySynonyms, 22, *30*

getMap, 23, *30–33*
gridCountriesDegreesHalf, 24
gridCountriesNumeric, 25
gridExData, 26

identifyCountries, 27, *33*
isoToName, 28

joinCountryData2Map, *4*, 29, *40*
joinData2Map, *4*, 31

labelCountries, *28*, 33

mapBars, *4*, 34, *52*
mapBubbles, *4*, *13*, *33*, 36, *52*
mapByRegion, *17*, *21*, 38

mapCountryData, *4*, *10*, *29, 30*, *33*, *39*, 40, *52*, *56*
mapDevice, 42
mapGriddedData, *4*, 44, *56*
mapHalfDegreeGridToCountries, *10*, 46
mapPies, *4*, 47, *52*
mapPolys, *4*, *31, 32*, 49, *52*

rwmCheckAndLoadInput, 52
rwmGetClassBreaks, 53
rwmGetColours, 54
rwmGetISO3, 54
rwmNewMapPlot, 55
rworldmap *(*rworldmap-package*)*, 2
rworldmap-package, 2
rworldmapExamples, 56

setMapExtents, 56