Package 'geoscale'

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Type Package

Title Geological Time Scale Plotting

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Description Functionality for adding the geological timescale to bivariate plots.

License GPL (>= 2)

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geoscale-package *Geological Time Scale Plotting*

Description

Functions for plotting time-series and distributions data against the international geological time scale.

Details

Package:	geoscale
Type:	Package
Version:	2.0
Date:	2015-05-12
License:	GPL (>=2)
LazyLoad:	no

Author(s)

Mark A. Bell <mark.bell521@gmail.com>

References

Gradstein, F. M., Ogg, J. M., and Schmitz, M., 2012, A geologic time scale, Boston, USA, Elsevier.

Examples

```
data(traits)
attach(traits)

geoscalePlot(age,trait,boxes="Age",ts.col=TRUE,scale="Period",type="l")
```

biozones *Ammonite biozone ages for the Upper Cretaceous*

Description

This dataset provides the lower and upper ages of ammonite biozones between the Turonian and the Maastrichtian.

Usage

```
data(biozones)
```

Format

A matrix of 50 biozonal ages.

Source

Hardenbol, J., Thierry, J., Farley, M. B., Jacquin, T., Graciansky, P.-C., and Vail, P. R., 1998, Mesozoic and Cenozoic sequence chronostratigraphic framework of European basins, in Graciansky, P.-C., Hardenbol, J., Jacquin, T., and Vail, P. R., eds., Mesozoic and Cenozoic sequence stratigraphy of European basins, Volume 60: Tulisa, OK, Society of Economic Palaeontologists and Mineralogists (SEPM) Special Publications, p. 3-14.

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geoscaleBox *Geological box plots.*

Description

Plots a series of box plots against the geological time-scale.

Usage

```
geoscaleBox(data, ages, units = c("Age", "Epoch", "Period"),
tick.scale = "myr", boxes = "Age", abbrev, cex.age = 0.3, cex.ts = 0.4,
cex.pt = 1, age.lim= NULL, data.lim = NULL, box.width=1, user.scale,
ts.col = TRUE, ts.width = 0.3, label,vers="ICS2015",no.axis=FALSE,
notch=FALSE,log=FALSE, color,direction ="horizontal",erotate,arotate,urotate,...)
```

Arguments

data	The distributions to be plotted, either a matrix of columns or as a list (see examples below).
ages	The ages in millions of years for each box to be plotted.
units	The temporal unit(s) to be included in the timescale, options include: "Eon", "Era", "Period", "Epoch", "Age" and "User". The option "User" is required when including a user-defined timescale. This also requires an object to be assigned to user.scale.
tick.scale	The resolution of the tick marks at the base of the timescale, the default is the same as units. The resolution of the scale can also be chosen by specifiying a value or removed entirely by using "no".
boxes	Option to include grey boxes for individual time bins. Same options as for scale.
abbrev	Option to abbreviate names of geological units in the time scale, options are the same as for units.

cex.age	Size of the numbers on the scale bar.
cex.ts	Size of the text in the time scale.
cex.pt	Size of the individual points.
age.lim	The range of values for the x-axis.
data.lim	The range of values for the y-axis.
box.width	The width of the boxes in millions of years.
user.scale	The data object to be used when including a user-defined time scale, requires the option "User" to be included in units. See data(UKzones) as an example of the required data format.
ts.col	Whether to include colours in the timescale.
ts.width	Proportion of the plot used for the time scale, value must be between 0 and 1.
label	Label for the y-axis.
vers	The version of the time scale to use. Options include: "ICS2015","ICS2014","ICS2013","ICS2012","ICS2 or "ICS2008".
no.axis	Option to remove the label on the y-axis.
notch	Option to draw notches in the individual boxes, see help(boxplot).
log	Option to plot the y-axis on a log scale, default is FALSE.
color	Option for the color of the boxes.
direction	The orientation of the plot, can be either "horizontal" or "vertical".
erotate	A numerical value for the rotation for the Epoch/Series temporal units, default values are 0 when direction = "upwards" and 90 when direction = "rightwards".
arotate	A numerical value for the rotation for the Age/Stage temporal units, default values are 0 when direction = "upwards" and 90 when direction = "rightwards".
urotate	A numerical value for the rotation for the User temporal units, default values are 0 when direction = "upwards" and 90 when direction = "rightwards".
...	All other options passed to points.

Author(s)

Mark A. Bell <mark.bell521@gmail.com>

Examples

```
## Plotting data from a matrix

 data1 <- matrix(ncol=10,nrow=30,data=runif(30,0,100))
  ages <- seq(10,100,10)
    geoscaleBox(data1,ages,boxes="Age",pch=19,box.width=2)

## Plotting data from a list

 data2 <- vector("list",10)
  for(d in 1:length(data2)){
```

```
   data2[[d]] <- runif(30,0,100)
  }
ages <- seq(10,100,10)
     geoscaleBox(data2,ages,boxes="Age",pch=19,box.width=2)

## Example dataset

 data(size)
  ages <- as.numeric(colnames(size))
   geoscaleBox(data=size,ages=ages,pch=19,boxes="Age")

# Plotting on a log scale
   geoscaleBox(data=size,ages=ages,pch=19,boxes="Age",log=TRUE)
```

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geoscalePlot *Geological time scale plotting.*

Description

Plots two variables and includes the geological time-scale with a number of possible scales.

Usage

```
geoscalePlot(ages,data,units=c("Age","Epoch","Period"),
  tick.scale="myr",boxes="Age",abbrev, cex.age=0.3,cex.ts=0.4,cex.pt=1,
  age.lim=NULL,data.lim=NULL,user.scale,ts.col=TRUE,ts.width=0.3,label,
  vers="ICS2015",no.axis=FALSE,direction="horizontal",erotate,arotate,
  urotate,...)
```

Arguments

ages	The first dataset, should be the age variable.
data	The second dataset, should be the data variable.
units	The temporal unit(s) to be included in the timescale, options include: "Eon", "Era", "Period", "Epoch", "Age" and "User". The option "User" is required when including a user-defined timescale. This also requires an object to be assigned to user.scale.
tick.scale	The resolution of the tick marks at the base of the timescale, the default is the same as units. The resolution of the scale can also be chosen by specifiying a value or removed entirely by using "no".
boxes	Option to include grey boxes for individual time bins. Same options as for scale.
abbrev	Option to abbreviate names of geological units in the time scale, options are the same as for units.
cex.age	Size of the numbers on the scale bar.
cex.ts	Size of the text in the time scale.

cex.pt	Size of the individual points.
age.lim	The temporal range for the plot.
data.lim	The range of data to the plotted.
user.scale	The data object to be used when including a user-defined time scale, requires the option "User" to be included in units. See data(UKzones) as an example of the required data format.
ts.col	Whether to include colours in the timescale.
ts.width	Amount of space taken up by plotting the time scale, value must be between 0 and 1.
label	Label for the data axis.
vers	The version of the time scale to use. Options include: "ICS2015","ICS2014","ICS2013","ICS2012","ICS2 or "ICS2008".
no.axis	Option to remove the label on the y-axis.
direction	The orientation of the plot, can be either "horizontal" or "vertical".
erotate	A numerical value for the rotation for the Epoch/Series temporal units, default values are 90 when direction='horizontal' and 0 when direction='vertical'.
arotate	A numerical value for the rotation for the Age/Stage temporal units, default values are 90 when direction='horizontal' and 0 when direction='vertical'.
urotate	A numerical value for the rotation for the User temporal units, default values are 90 when direction='horizontal' and 0 when direction='vertical'.
...	Other arguments passed to points.

Author(s)

Mark A. Bell <mark.bell521@gmail.com>

Examples

```
### Basic plots

data(traits)
attach(traits)

## 1. A simple bivariant plot
 geoscalePlot(age,trait)

## 2. Including the entire time scale
 geoscalePlot(age,trait,units=c("Eon","Era","Age","Epoch","Period"),type="l")

## 3. Including abbreviations in the time scale
 # (a) For one or more temporal units
  geoscalePlot(age,trait,units=c("Eon","Era","Age","Epoch","Period"),type="l",
   abbrev=c("Age","Epoch"))
 # (b) For all temporal units
  geoscalePlot(age,trait,units=c("Eon","Era","Age","Epoch","Period"),type="l",
```

```
   abbrev=c("All"))

## 4. Rotating names in the time scale
  geoscalePlot(age,trait,units=c("Eon","Era","Age","Epoch","Period"),type="l",
   erotate=45)

### Including a user defined timescale

data(traits)
 attach(traits)
  data(biozones)

geoscalePlot(age,trait,boxes="User",user.scale=biozones,type="o",
 units=c("Age","Period","User"),xlim=c(65,95),tick.scale="User")
```

---

size *Body-size data from trilobite specimens*

Description

This dataset contains the measurements of trilobite specimens from the Cambrian and Ordovician. Each column represents a geological Stage.

Usage

```
data(timescales)
```

Format

A matrix of geological stages for the Cambrian and Ordovician containing measurements of trilobite specimens.

Source

Bell, M, 2009, unpublished PhD Thesis, University of Bristol.

---

timescales *Geological time scale from Harland et al., (2012)*

Description

This dataset provides the geological ages for the entire geological timescale from Gradstein (2012) along with the RGB colour values used in the current version.

Usage

```
data(timescales)
```

Format

A matrix of first and last datums along with RBG values for each geological time period.

Source

Gradstein, F. M., Ogg, J. M., and Schmitz, M., 2012, A geologic time scale, Boston, USA, Elsevier.

`traits` *A time-series for one trait.*

Description

A set of randomly generated trait values along with their associated geological ages.

Usage

```
data(traits)
```

Format

A matrix of 30 trait values and geological ages.

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