Package 'G2Sd'

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Type Package

Title Grain-Size Statistics and Description of Sediment

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Imports shiny, xlsx, rJava, xlsxjars, reshape2, ggplot2, stats,
graphics, grDevices

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Description Full descriptive statistics, physical description of sediment,
metric or phi sieves.

License GPL-3

LazyData TRUE

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http://regisgallon.wordpress.com/r-software/

NeedsCompilation no

Repository CRAN

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R topics documented:

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coord_gran   *Localisation of stations sampled*

Description

coord_gran is a dataframe of 2 observations and 21 variables. It corresponds to the localisation of the stations sampled.

Usage

```
data(coord_gran)
```

Format

A data frame with 21 observations on the following 2 variables.

X a numeric vector

Y a numeric vector

Source

Godet, L., Fournier, J., Toupoint, N., Olivier, F. 2009. Mapping and monitoring intertidal benthic habitats: a review of techniques and proposal of a new visual methodology for the European coasts. Progress in Physical Geography **33**, *378-402*

References

Fournier, J., Godet, L., Bonnot-Courtois, C., Baltzer, A., Caline, B. 2009. Distribution des formations superficielles de l archipel de Chausey (Manche). Geologie de la France **1**, *5-17*

Examples

```
data(coord_gran)
```

G2Sd   *Grain-size Statistics and Description of Sediment*

Description

G2Sd package gives full descriptive statistics and a physical description of sediment obtained with metric or phi sieves according to the grain size distribution.

Details

The G2Sd package is an evolution of the Gradistat v.4.0 macro for MS Excel initially developped by Blott and Pye (2001) for phi sieves and Laser granulometer. This package is suited to analyse data obtained from metric (micrometer) or phi sieves. The user is required to input the weight of sediment retained on sieves spaced at any metric or phi intervals. Statistics are calculated using arithmetic and geometric Method of Moments (micrometer) and using logarithmic Folk and Ward (1957) Method (phi scale): mean, standard-deviation, skewness, kurtosis. The mode(s) is(are) determined graphically by the user (with a maximum of 4 modes). The determination of the mode is optional (no determination by default). Several percentiles and common index are calculated: D10, D50, D90, D90/D10, D90-D10, D75/D25, D75-D25, Trask(So) Index, Krumbein(Qd) Index. Physical description of texture, sorting, skewness or kurtosis are provided as such as the sediment name after Folk (1954). Are also included the percentage of particules falling into each predefined size fraction, modified from Blott and Pye (2001) scale, Udden (1914) and Wentworth (1922). There are four functions. `granstat` is a function which provides all results organized in two ways: a complete matrix (by default) or by separate items; `granplot` is a function which provides a histogramm with a cumulative percentage curve; `grandistrib` is a function which provides a barplot of the different fractions composing the sediment; `granmap` is a function which provides a georeferenced map of the sediment distribution.

Author(s)

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References

Blott, S., Pye, K. 2001. Gradistat: grain size distribution and statistics package for the analysis of unconsolidated sediment. Earth, Surface Processes and Landforms **26**, *1237-1248*

Folk, R.L. 1954. The distinction between grain size and mineral composition in sedimentary-rock nomenclature. Journal of Geology **62**, *344-359*

Folk, R.L., Ward, W.C. 1957. Brazos River bar: a study in the significance of grain size parameters. Journal of Sedimentary Petrology **27**, *3-26*

Krumbein, W.C., Pettijohn, F.J. 1938. Manual of Sedimentary Petrography. *Appleton-Century-Crofts, New-York*

Udden, J.A. 1914. Mechanical composition of clastic sediments. Bulletin of the Geological Society of America **25**, *655-744*

Wentworth, C.K. 1922. A scale of grade and class terms for clastic sediments. Journal of Geology **30**, *377-392*

See Also

granstat, granplot, grandistrib

Examples

```
data(granulo)
data(coord_gran)
result=granstat(granulo)
granplot(granulo,1)
```

---

grandistrib   *Composition of the sediment*

Description

This function provides a barplot of the different fractions composing the sediment

Usage

```
grandistrib(x, main="", scale = "fine", xlab = "Stations", ylab = "Percentage")
```

Arguments

x	A numeric matrix or data frame (see the shape of data(granulo))
main	a label for the title
scale	If fine, display the detailed composition; If large, display the simplify composition
xlab	a label for the x axis, defaults to a description of x.
ylab	a label for the y axis, defaults to a description of y.

Details

The obtained graph is commonly used by Sedimentologists

Value

A barplot with the composition of sediment for each station sampled

Author(s)

Regis K. Gallon (MNHN) <reg.gallon@gmail.com>

See Also

[granplot](), [grandistrib]()

Examples

```
data(granulo)
grandistrib(granulo, scale="fine")
```

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granplot   *Histogram with a cumulative percentage curve*

Description

This function provides a histogram of the grain-size distribution with a cumulative percentage curve

Usage

```
granplot(x, xc = 1, hist = TRUE, cum = TRUE, main = "",
col.cum = "red", col.hist="gray", cexname=0.9,
cexlab=1.3,decreasing=FALSE)
```

Arguments

x	A numeric matrix or data frame (see the shape of data(granulo))
xc	A numeric value or a numeric vector to define columns
hist	If TRUE, display a histogram; if FALSE, do not display a histogram (only for only one column)
cum	If TRUE, display a cumulative percentage curve; if FALSE do not display a cumulative percentage curve (only for only one column)
main	Add a title to the current plot
col.cum	Color in which cumulative percentage curve will be drawn
col.hist	Color in which histogram will be drawn
cexname	A numerical value giving the amount by which plotting text and symbols should be magnified relative to the default.
cexlab	A numerical value giving the amount by which axis labels should be magnified relative to the default.
decreasing	A logical value defining the order increasing or decreasing

Details

The obtained graph is the most commonly used by Sedimentologists

Value

A histogram with a cumulative percentage curve

Author(s)

Regis K. Gallon (MNHN) <reg.gallon@gmail.com>, Jerome Fournier (CNRS) <fournier@mnhn.fr>

See Also

[grandistrib](#)

Examples

```
data(granulo)
granplot(granulo,xc=1,hist=TRUE,cum=TRUE,main="Grain-size Distribution",
col.hist="gray",col.cum="red")

granplot(granulo,xc=2:4,main="Grain-size Distribution")
```

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granstat   *Calculates all descriptive statistics*

Description

Statistics are calculated using arithmetic and geometric Method of Moments (micrometer) and using logarithmic Folk and Ward (1957) Method (phi scale): mean, standard-deviation, skewness, kurtosis. The mode(s) is(are) determined graphically by the user (with a maximum of 4 modes). The determination of the mode is optional (no determination by default). Several percentiles and common index are calculated: D10, D50, D90, D90/D10, D90-D10, D75/D25, D75-D25, Trask(So) Index, Krumbein(Qd) Index. Physical description of texture, sorting, skewness or kurtosis are provided as such as the sediment name after Folk (1954). Are also included the percentage of particules falling into each predefined size fraction, modified from Blott and Pye (2001) scale, Udden (1914) and Wentworth (1922). granstat is a function which provides all results organized in two ways: a complete matrix (by default) or by separate items.

Usage

```
granstat(x, web_interface=FALSE, statistic = "all", aggr = TRUE, modes = FALSE)
```

Arguments

x	A numeric matrix or data frame
web_interface	if TRUE, a simplified interface is displayed from your default web browser
statistic	Statistic used: "arithmetic", "geometric", "folk.ward", "all". If this argument is not used, all statistics are calculated
aggr	If TRUE, a complete matrix is provided. If FALSE, the results are organized in separate items: $stat, $index, $mode, $sedim. If this argument is not used, a complete matrix is provided
modes	If TRUE, the mode must be determinated graphically by the user. If FALSE, the mode is not determinated. If this argument is not used, no determination of the mode is proposed

Details

For the determination of the mode (modes=TRUE). All the samples are successively shown with a graph. The user can choose graphically the mode (1 in 4 maximum) by a click on the graph. If 4 modes are chosen, the following graph appears automatically. If 1, 2 or 3 modes are chosen, the user has to use the function stop locator in the graphic window.

If the weight of sediment retained on the broadest sieve exceeds 5 percent of the total mass of the sample, the Folk and Ward statistics cannot be computed.

Value

A matrix containing

`mean.arith`	the mean of grain-size distribution (arithmetic method of moments)
`sd.arith`	the standard-deviation of grain-size distribution (arithmetic method of moments)
`skewness.arith`	the skewness of grain-size distribution (arithmetic method of moments)
`kurtosis.arith`	the kurtosis of grain-size distribution (arithmetic method of moments)
`mean.geom`	the mean of grain-size distribution (geometric method of moments
`sd.geom`	the standard-deviation of grain-size distribution (geometric method of moments)
`skewness.geom`	the skewness of grain-size distribution (geometric method of moments)
`kurtosis.geom`	the kurtosis of grain-size distribution (geometric method of moments)
`Sediment`	physical description of the sediment, the sorting, the skewness and the kurtosis
`Mean.fw.mm`	the mean of grain-size distribution (logarithmic Folk and Ward method, mm scale)
`Sd.fw.mm`	the standard-deviation of grain-size distribution (logarithmic Folk and Ward method, mm scale)
`Skewness.fw.mm`	the skewness of grain-size distribution (logarithmic Folk and Ward method, mm scale)
`Kurtosis.fw.mm`	the kurtosis of grain-size distribution (logarithmic Folk and Ward method, mm scale)
`Mean.fw.phi`	the mean of grain-size distribution (logarithmic Folk and Ward method, phi scale)
`Sd.fw.phi`	the standard-deviation of grain-size distribution (logarithmic Folk and Ward method, phi scale)
`Skewness.fw.phi`	
	the skewness of grain-size distribution (logarithmic Folk and Ward method, phi scale)
`Kurtosis.fw.phi`	
	the kurtosis of grain-size distribution (logarithmic Folk and Ward method, phi scale)
`Mode`	the mode (mm scale), graphically defined by the user
`D10(mm)`	the 10th percentile
`D50(mm)`	the median
`D90(mm)`	the 90th percentile
`D90/D10`	ratio of the 90th percentile and the 10th percentile
`D90-D10`	difference between the the 90th percentile and the 10th percentile
`D75/D25`	ratio of the 75th percentile and the 25th percentile
`D75-D25`	difference between the the 75th percentile and the 25th percentile
`Trask(So)`	the Trask Index (So) defined as D25/D75 (mm scale)
`Krumbein(Qd)`	the Krumbein Index (Qd) defined as (D25-D75)/2 (phi scale)

Texture	physical description of the texture of the sediment
Boulder	percentage of sediment of the grain-size distribution retained in the Boulder class (upper to 63 mm)
Gravel	percentage of sediment of the grain-size distribution retained in the Gravel class (between 2 mm and 63 mm)
Sand	percentage of sediment of the grain-size distribution retained in the Sand class (between 63 micrometer and 2 mm)
Mud	percentage of sediment of the grain-size distribution retained in the Mud class (down to 63 micrometer)
Boulder	percentage of sediment of the grain-size distribution retained in the Boulder class (upper to 63 mm)
vcgravel	percentage of sediment of the grain-size distribution retained in the Very Coarse Gravel class (between 31.5 mm and 63 mm)
cgravel	percentage of sediment of the grain-size distribution retained in the Coarse Gravel class (between 16 mm and 31.5 mm)
mgravel	percentage of sediment of the grain-size distribution retained in the Medium Gravel class (between 8 mm and 16 mm)
fgravel	percentage of sediment of the grain-size distribution retained in the Fine Gravel class (between 4 mm and 8 mm)
vfgravel	percentage of sediment of the grain-size distribution retained in the Very Fine Gravel class (between 2 mm and 4 mm)
vcsand	percentage of sediment of the grain-size distribution retained in the Very Coarse Sand class (between 1 mm and 2 mm)
csand	percentage of sediment of the grain-size distribution retained in the Coarse Sand class (between 500 micrometer and 1 mm)
msand	percentage of sediment of the grain-size distribution retained in the Medium Sand class (between 250 micrometer and 500 micrometer)
fsand	percentage of sediment of the grain-size distribution retained in the Fine Sand class (between 125 micrometer and 250 micrometer)
vfsand	percentage of sediment of the grain-size distribution retained in the Very Fine Sand class (between 63 micrometer and 125 micrometer)
vcsilt	percentage of sediment of the grain-size distribution retained in the Very Coarse Silt class (between 40 micrometer and 63 micrometer)
silt	percentage of sediment of the grain-size distribution retained in the Silt class (lower than 40 micrometer)

Author(s)

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References

Blott, S., Pye, K. 2001. Gradistat: grain size distribution and statistics package for the analysis of unconsolidated sediment. Earth, Surface Processes and Landforms **26***, 1237-1248*

Folk, R.L. 1954. The distinction between grain size and mineral composition in sedimentary-rock nomenclature. Journal of Geology **62***, 344-359*

Folk, R.L., Ward, W.C. 1957. Brazos River bar: a study in the significance of grain size parameters. Journal of Sedimentary Petrology **27***, 3-26*

Krumbein, W.C., Pettijohn, F.J. 1938. Manual of Sedimentary Petrography. *Appleton-Century-Crofts, New-York*

Udden, J.A. 1914. Mechanical composition of clastic sediments. Bulletin of the Geological Society of America **25***, 655-744*

Wentworth, C.K. 1922. A scale of grade and class terms for clastic sediments. Journal of Geology **30***, 377-392*

Examples

```
#granulo is the data set
data(granulo)
granstat(granulo)
granstat(granulo,statistic="all",aggr=TRUE,modes=FALSE)
granstat(granulo,statistic="folk.ward",aggr=FALSE,modes=TRUE)

#to display the simplified interface
#granstat(web_interface=TRUE)
```

| granulo | *Data frame for G2Sd package* |

Description

granulo is a data frame of 29 observations and 21 variables. The first column corresponds to the apertures sizes of AFNOR sieves, in micrometer (25000, 20000, 16000, 12500, 10000, 8000, 6300, 5000, 4000, 2500, 2000, 1600, 1250, 1000, 800, 630, 500, 400, 315, 250, 200, 160, 125, 100, 80, 63, 50, 40, 0). Warning ! the last sieve 0 corresponds to the material retained in the < 40 micrometer pan after sieving. The others columns corresponds to the weight of samples beside each size class

Usage

```
data(granulo)
```

Format

A data frame with 29 rows corresponding to the apertures sizes on the following 21 stations sampled

Details

This example provide a data frame of sedimentary data obtained with AFNOR sieves (in micrometer)

Source

Godet, L., Fournier, J., Toupoint, N., Olivier, F. 2009. Mapping and monitoring intertidal benthic habitats: a review of techniques and proposal of a new visual methodology for the European coasts. Progress in Physical Geography **33**, *378-402*

References

Fournier, J., Godet, L., Bonnot-Courtois, C., Baltzer, A., Caline, B. 2009. Distribution des formations superficielles de l archipel de Chausey (Manche). Geologie de la France **1**, *5-17*

Examples

```
data(granulo)
```

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