Package 'GCD'

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Type Package

Title Global Charcoal Database

Version 4.0.7

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Description Contains the Global Charcoal database data. Data include charcoal series (age, depth, charcoal quantity, associated units and methods) and information on sedimentary sites (localisation, depositional environment, biome, etc.) as well as publications informations. Since 4.0.0 the GCD mirrors the online SQL database at <http://paleofire.org>.

URL http://paleofire.org

License GPL (>= 2)

Depends R(>= 3.5.0)

Suggests paleofire

Imports raster

LazyLoad yes

Encoding UTF-8

RoxygenNote 7.1.1

NeedsCompilation no

Repository CRAN

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Contents

`GCD-package` *GCD: Global Charcoal Database data*

Description

The GCD package provides Global Charcoal Database data updated at regular intervals to be used in cunjuction with the paleofire package.

Details

Package:	GCD
Type:	Package
Version:	4.0.0
Date:	2018-03-01
License:	GPL (>=2)

Author(s)

Global Paleofire Working Group <paleofire gmail.com>

References

Power, M., J. Marlon, P. Bartlein, and S. Harrison. 2010. Fire history and the Global Charcoal Database: a new tool for hypothesis testing and data exploration. Palaeogeography, Palaeoclimatology, Palaeoecology 291:52-59.

See Also

http://paleofire.org

Examples

```
rm(list=ls())

library(GCD)

## Charcoal data:

data(paleofiredata)
head(paleofiredata)


## Associated sites informations:

data(paleofiresites)
head(paleofiresites)
```

---

basin_size *Basin size*

Description

Basin size

Format

A data frame with 7 observations on the following 5 variables.

ID_BASIN_SIZE a numeric vector

BASIN_SIZE_CODE a character vector

BASIN_SIZE_DESC a character vector

BASIN_SIZE_RANGE_MIN a character vector

BASIN_SIZE_RANGE_MAX a character vector

Examples

```
data(basin_size)
## maybe str(basin_size) ; plot(basin_size) ...
```

charcoal_methods *Extraction methods*

Description

Charcoal extractions methods present in the database

Format

A data frame with 13 observations on the following 3 variables.

ID_METHOD a factor with levels ACID CPRO GRAV HNPK HVLQ IMAG NOTK OPPF OTHE POLS SIEV SIPO THSL

METHOD a factor with levels Acidification of sample using gas chromatography to measure elemental carbon (Verardo etal 1990) charcoal part Ided as opaque phytoclasts/pyrofusinite in palynofacies anlaysis Charcoal part. Identified in thin slides (soil micromorphology) Charcoal particles identified by imaging software Charcoal separated by heavy liquid preparation Cumulative probability (95% confidence interval) alluvial soil charcoal GRAVIMETRIC chemical assay (Winkler method) Hand picked charcoal from soil samples Not known Other Pollen slide Sieved Sieved + Pollslide

METH_CODE a numeric vector

Examples

```
data(charcoal_methods)
## maybe str(charcoal_methods) ; plot(charcoal_methods) ...
```

charcoal_units *Charcoal units*

Description

Charcoal units used in GCD

Format

A data frame with 169 observations on the following 4 variables.

unit a factor with levels %125 %DWT %TOF %WTO 100P 1012 1220 1422 1424 3869 5015 5075 6914 7510 7738 7PRA 8POS ABSC ARCC AREA ARPG BCCT C004 C010 C01K C040 C100 C120 C125 C140 C150 C180 C250 C65X CARE CCMY CG2M CHCO CHRX CM10 CMGR CMML COML CP20 CPAR CPRA DC13 FRAG G05I G10I G250 GCHG GCMY GRG1 GRGR GRPC GT05 GT10 GT12 GT15 GT18 GT1M GT24 GT25 GT2X GT30 GT38 GT50 GT53 GT5C LT12 LT13 LT18 LT1M LT25 LT40 M2GR M2ML MCM3 MM2C MM2G MMDW MMML MT10 MULT NOTK ORDI OTHE PCM1 PCMY PHYT PP25 PP51 PP52 PPML PPOL PRAB PROB PTC0 PTC2 PTC3 PTCT PX25 SQC0 SQCU SQCY SQG1 SQG5 SQL5

TOCA TOM1 TOM2 TOM3 TOM4 TOM5 TOM6 TOM7 TOM8 TOM9 TOMX TOTA UCMY V025 V100 V125 V255 V501 X01K X105 X106 X120 X125 X150 X15G X160 X180 X18C X20P X250 X25P X310 X37P X459 X500 X50U X512 X515 X520 X53C X550 X55P X55U XA1K XARE XARP XARS XC25 XCM3 XCOP XFML XFRG XFRP XFRS XIMG XPEA XPEE XPIX XRIF

qtype a factor with levels C0P0 CONC INFL NOTK OTHE SOIL

type a character vector

code a numeric vector

Examples

```
data(charcoal_methods)
## maybe str(charcoal_methods) ; plot(charcoal_methods) ...
```

---

date *Date table*

Description

Table with the dating information contained in GCD

Format

A data frame with 4872 observations on the following 8 variables.

ID_SITE a numeric vector

DATE_LAB_NUMBER a factor with many levels

DEPTH a numeric vector

TICKNESS a numeric vector

AGE a numeric vector

ERROR a numeric vector

ID_DATE_TYPE a numeric vector

ID_MAT_DATED a factor with levels

obtained ~~

Examples

```
data(date)
## maybe str(date) ; plot(date) ...
```

date_type *Type of dates in date.rda*

Description

Type of dates in date.rda

Format

A data frame with 31 observations on the following 4 variables.

ID_DATE_TYPE a numeric vector

DATE_TYPE_CODE a character vector

DATE_TYPE_NAME a character vector

DATE_TYPE_NUMBER a numeric vector

obtained ~~

Examples

```
data(date_type)
## maybe str(date_type) ; plot(date_type) ...
```

depo_context *Depositional contexts*

Description

Depositional contexts

Format

A data frame with 17 observations on the following 4 variables.

ID_DEPO_CONTEXT a numeric vector

DEPO_CONTEXT_CODE a character vector

DEPO_CONTEXT_NAME a character vector

DEPO_CONTEXT_NUMBER a numeric vector

Examples

```
data(depo_context)
## maybe str(depo_context) ; plot(depo_context) ...
```

GCD-internal *Internal GCD Data*

Description

Internal GCD Data

lands_desc *Landscape description elements*

Description

Landscape description elements

Format

A data frame with 20 observations on the following 3 variables.

ID_LANDS_DESC a numeric vector

LANDS_DESC_CODE a character vector

LANDS_DESC_NAME a character vector

Examples

```
data(lands_desc)
## maybe str(lands_desc) ; plot(lands_desc) ...
```

mat_dated *Material Dated*

Description

Material Dated

Format

A data frame with 23 observations on the following 4 variables.

ID_MAT_DATED a numeric vector

MAT_DATED_STANDARD_LEVEL a character vector

MAT_DATED_TYPE a character vector

MAT_DATED_HIGH_LEVEL a character vector

obtained ~~

Examples

```
data(mat_dated)
## maybe str(mat_dated) ; plot(mat_dated) ...
```

`paleofiredata` *GCD Charcoal data*

Description

Charcoal series from the Global Charcoal Database

Format

A data frame with 134269 observations on the following 4 variables.

ID_SITE a numeric vector

DEPTH a numeric vector

EST_AGE a numeric vector

QUANTITY a numeric vector

METHOD a factor with levels `ACID` `CPRO` `GRAV` `HNPK` `HVLQ` `IMAG` `NOTK` `OREC` `OTHE` `POLS` `SIEV`

UNIT a factor see `paleofiresites` for details

TYPE a factor with levels `C0P0` `CONC` `INFL` `NOTK` `OTHE` `SOIL`

Examples

```
data(paleofiredata)
## maybe str(paleofiredata) ; plot(paleofiredata) ...
```

`paleofiresites` *GCD sites information*

Description

Sites description and features

Format

A data frame with 881 observations on the following 17 variables.

`id_site` sites primary key from GCD v4.x.x

`id_site_old` sites primary key from GCD v3.x.x, deprecated

`pref_units` a factor, see help("charcoal_units") and data("charcoal_units") for details

`site_name` a character vector

`lat` a numeric vector

`long` a numeric vector

`elevation` a numeric vector of elevations

`country` a character vector

`continent` a factor with levels `Africa` `Antarctica` `Asia` `Australia` `Europe` `North America` `South America`

`ISO3` ISO3 code by country

`num_dating` a numeric vector

`min_est_age` a numeric vector

`max_est_age` a numeric vector

`num_samp` a numeric vector

`has_depth` factor indicating presence of depths associated to ages

`date_int` a numeric vector, interval in years between two dates

`qtype` a factor, see help("charcoal_units") and data("charcoal_units") for details

`water_depth` a numeric vector

`depo_context` a character vector, see help("depo_contex") and data("depo_contex") for details

`id_site_type` a character vector, see help("site_type") and data("site_type") for details

`id_basin_size` a character vector, see help("basin_size") and data("basin_size") for details

`id_lands_desc` a character vector, see help("lands_desc") and data("lands_desc") for details

`l12` a numeric vector, Levavasseur et al. 2012

`rf99` a numeric vector, Ramankutty et al. 1999

`gcd_version` main GCD releases

`num_version` a numeric vector: version number 401 meaning 4.0.1

`update_date` date of data update in the GCD

Details

l12 levels

`0`= `Water`
`1`= `Boreal forest`
`2`= `Desert vegetation`
`3`= `Grassland and dry shrubland`
`4`= `Savannas abd dry woodlands`

5= Temperate forest
6= Tropical forest
7= Tundra
8= Warm temperate
9= Warm desert
10= Cold desert

rf99 levels

0= Water
1= Tropical Evergreen Forest/Woodland
2= Tropical Deciduous Forest/Woodland
3= Temperate Broadleaf Evergreen Forest/Woodland
4= Temperate Needleleaf Evergreen Forest/Woodland
5= Temperate Deciduous Forest/Woodland
6= Boreal Evergreen Forest/Woodland
7= Boreal Deciduous Forest/Woodland
8= Evergreen/Deciduous Mixed Forest/Woodland
9= Savanna
10= Grassland/Steppe
11= Dense Shrubland
12= Open Shrubland
13= Tundra
14= Desert
15= Polar Desert/Rock/Ice

References

Ramankutty, N., and J.A. Foley (1999). Estimating historical changes in global land cover: croplands from 1700 to 1992, Global Biogeochemical Cycles 13(4), 997-1027.

Levavasseur, G., M. Vrac, D. M. Roche, and D. Paillard. 2012. Statistical modelling of a new global potential vegetation distribution. Environmental Research Letters 7:044019.

Examples

```
data(paleofiresites)
## maybe str(paleofiresites) ; plot(paleofiresites) ...
```

---

pub *Publication List*

Description

List of GCD publications with DOI and link.

Usage

```
data("pub")
```

Format

A data frame with 664 observations on the following 4 variables.

`id_pub` a numeric vector

`citation` a character vector

`link` web adresses

`DOI` DOI

Examples

```
data(pub)
## maybe str(pub) ; plot(pub) ...
```

---

site_type *Type of sites*

Description

Type of sites

Format

A data frame with 53 observations on the following 4 variables.

ID_SITE_TYPE a numeric vector

SITE_TYPE_LEVEL a character vector

SITE_TYPE_DESC a character vector

SITE_TYPE_HIGH_LEVEL a character vector

Examples

```
data(site_type)
## maybe str(site_type) ; plot(site_type) ...
```

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