Package ‘folio’

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Title Datasets for Teaching Archaeology and Paleontology
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Description Datasets for teaching quantitative approaches and modeling in archaeology and paleontology. This package provides several types of data related to broad topics (cultural evolution, radiocarbon dating, paleoenvironments, etc.), which can be used to illustrate statistical methods in the classroom (multivariate data analysis, compositional data analysis, diversity measurement, etc.).
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R topics documented:

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arnold1949

Arnold and Libby's Curve of Knowns

Description

"The agreement between prediction and observation is seen to be satisfactory."

Usage

arnold1949

Format

A data.frame with 6 observations and 8 variables:

- **sample**  Sample name.
- **age_expected**  Expected age (year BP).
- **age_expected_error**  Error on age_expected (year BP).
- **age_found**  Measured age (year BP).
- **age_found_error**  Error on age_found (year BP).
- **activity_expected**  Expected specific activity (cpm/g of carbon).
- **activity_found**  Measured specific activity (cpm/g of carbon).
- **activity_found_error**  Error on activity_found (cpm/g of carbon).
Source

See Also
Other radiocarbon dating: intcal09, intcal13, intcal20

---

**birds**

*European Birds*

**Description**
A dataset of birds species abundance in remote European woodlands.

**Usage**
birds

**Format**
A *data.frame* with 35 rows (species) and 3 variables (woodlands).

**Source**

**See Also**
Other count data: boves, chevelon, compiegne, merzbach, mississippi, zuni

---

**boves**

*Boves Ceramics*

**Description**
A dataset containing the ceramic counts from the castle site of Boves (Somme, France). The data are grouped into eight periods ranging from the 10th to the 18th century and thirteen ceramic types.

**Usage**
boves
chevelon

Format

A data.frame with 8 rows and 13 variables (ceramic types):

I
IIa
IIb
IIc
IIIA
IIIB
IIIC
IVA
IVb
Va
Vb
VI
VII

Source


See Also

Other count data: birds, chevelon, compiegne, merzbach, mississippi, zuni

chevelon

<table>
<thead>
<tr>
<th>chevelon</th>
<th>Chevelon Ground Stone</th>
</tr>
</thead>
</table>

Description

A dataset of ground stone artifact counts from the Cholla project (USA).

Usage

chevelon
compiegne

Format

A data.frame with 12 rows and 10 variables (ground stone types):

- **BMe** Basin metate.
- **SMe** Slab metate.
- **TMe** Trough metate.
- **IMe** Indeterminate metate.
- **UMa** Unifacial mano.
- **BMa** Bifacial mano.
- **MUHa** Modified unifacial handstone.
- **MBHa** Modified bifacial handstone.
- **UUHa** Unmodified unifacial handstone.
- **UBHa** Unmodified bifacial handstone.

Source


See Also

Other count data: birds, boves, compiegne, merzbach, mississippi, zuni

---

compiegne  Compiègne Ceramics

Description

A dataset containing the ceramic counts from the Place des Hallettes in Compiègne (Oise, France). The data are grouped into five periods of about a century, ranging from the 9th to the 14th century, and sixteen ceramic types.

Usage

compiegne

Format

A data.frame with 5 rows (chronological periods, numbered from the oldest to the most recent from 1 to 5) and 16 variables (ceramic types):

- **A** Red to white ceramics with fine sized inclusions.
- **B** Red to white ceramics with medium sized inclusions.
- **C** Dark ceramics with fine sized inclusions.
D Dark ceramics with medium sized inclusions.
E Ceramics close to those of groups B or D, with similarities to group F.
F Black, red or beige ceramics with coarse inclusions.
G Red polished ceramics with fine to medium sized inclusions.
H Black polished ceramics with fine sized inclusions.
I Black polished ceramics with medium sized inclusions.
J Polished and painted ceramics with fine to medium sized inclusions.
K Painted ceramics, similar to those of group A.
L Painted ceramics, similar to those of group B.
M Painted ceramics with coarse inclusions.
N Glazed ceramics.
O Stamped ceramics.
P Coated ceramics.

Source

See Also
Other count data: birds, boves, chevelon, merzbach, mississippi, zuni

<table>
<thead>
<tr>
<th>epica2008</th>
<th>EPICA Dome C</th>
</tr>
</thead>
</table>

Description
EPICA Dome C 800-ka composite $CO_2$ data.

Usage
epica2008

Format
A data.frame with 2 variables:

- age Year BP.
- CO2 $CO_2$ (ppmv).

Source
https://www.ncei.noaa.gov/access/paleo-search/study/6091
References


See Also


Examples

```r
plot(
  x = epica2008$age / 1000,
  y = epica2008$CO2,
  type = "l",
  xlim = c(800, 0),
  xlab = "kilo year BP",
  ylab = expression("CO"^2~"(ppmv")
)
```

Description

The IntCal series of radiocarbon calibration curves.

Usage

`intcal09`
Format

A `data.frame` with 5 variables:

- `calBP` Calendar (calibrated) age (year BP).
- `age` Radiocarbon age (year BP).
- `error` Radiocarbon error (year BP).
- `delta` Isotopic ratio $\Delta^{14}C$ (per mil).
- `sigma` Error on delta (per mil).

Source


See Also

Other radiocarbon dating: `arnold1949`, `intcal13`, `intcal20`
intcal20

See Also

Other radiocarbon dating: arnold1949, intcal09, intcal20

<table>
<thead>
<tr>
<th>intcal20</th>
<th>IntCal20</th>
</tr>
</thead>
</table>

Description

The IntCal series of radiocarbon calibration curves.

Usage

intcal20

Format

A `data.frame` with 5 variables:

- **calBP** Calendar (calibrated) age (year BP).
- **age** Radiocarbon age (year BP).
- **error** Radiocarbon error (year BP).
- **delta** Isotopic ratio $\Delta^{14}C$ (per mil).
- **sigma** Error on delta (per mil).

Source


See Also

Other radiocarbon dating: arnold1949, intcal09, intcal13
Transport Jars from Kommos (Crete).

Description

Chemical analysis (neutron activation analysis) of 88 Late Bronze Age transport jars found in excavations at Kommos, Crete.

Usage

kommos

Format

A data.frame with 22 variables (chemical elements):

- **type**: CJ: Canaanite jar; EJ: Egyptian jar; TSJ: transport stirrup jar; SNA: short-necked amphora.
- **date**: Chronology (period).
- **Sm**: Sm content (ppm).
- **Lu**: Lu content (ppm).
- **U**: U content (ppm).
- **Yb**: Yb content (ppm).
- **As**: As content (ppm).
- **Sb**: Sb content (ppm).
- **Ca**: Ca content (ppm).
- **Na**: Na content (ppm).
- **La**: La content (ppm).
- **Ce**: Ce content (ppm).
- **Th**: Th content (ppm).
- **Cr**: Cr content (ppm).
- **Hf**: Hf content (ppm).
- **Cs**: Cs content (ppm).
- **Sc**: Sc content (ppm).
- **Rb**: Rb content (ppm).
- **Fe**: Fe content (ppm).
- **Ta**: Ta content (ppm).
- **Co**: Co content (ppm).
- **Eu**: Eu content (ppm).
References


See Also

Other chemical data: *verre*

---

**law2006** *Law Dome Ice Core*

**Description**

Law Dome Ice Core 2000-year $CH_4$, $CO_2$ and $N_2O$ data.

**Usage**

law2006

**Format**

A `data.frame` with 2004 observations and 8 variables:

- **year** Year AD.
- **NOAA04** NOAA04 $CH_4$ scale.
- **CH4_spl** $CH_4$ spline (ppb).
- **CH4_grw** $CH_4$ growth Rate (ppb/yr).
- **CO2_spl** $CO_2$ spline (ppb).
- **CO2_grw** $CO_2$ growth Rate (ppb/yr).
- **N2O_spl** $N_2O$ spline (ppb).
- **N2O_grw** $N_2O$ growth Rate (ppb/yr).

**Source**

https://www.ncei.noaa.gov/access/paleo-search/study/9959

**References**


**See Also**

Examples

```r
plot(
    x = law2006$year,
    y = law2006$CO2_sp1,
    type = "l",
    xlab = "Year AD",
    ylab = expression("CO"[2]~"("ppm")")
)
```

lisiecki2005

Global Benthic $\delta^{18}O$ Stack

Description

A global Pliocene-Pleistocene benthic $\delta^{18}O$ stack.

Usage

lisiecki2005

Format

A `data.frame` with 3 variables:

- `age` Calendar age (kilo year cal BP).
- `delta` Benthic $\delta^{18}O$ (per mil).
- `error` Standard error (per mil).

Details

The LR04 stack spans 5.3 Myr and is an average of 57 globally distributed benthic $\delta^{18}O$ records (which measure global ice volume and deep ocean temperature) collected from the scientific literature.

Source

https://www.ncei.noaa.gov/access/paleo-search/study/5847

References


See Also

Other isotopic data: ngrip2004, nydal1996, spratt2016
Examples

plot(
  x = lisiecki2005$age,
  y = lisiecki2005$delta,
  type = "l",
  xlim = c(500, 0),
  xlab = "kilo year BP",
  ylab = expression(delta^{18}*'O')
)

Description

A dataset containing the ceramic counts from the Merzbach assemblage (Germany). The data are grouped into eight phases.

Usage

merzbach

Format

A data.frame with 8 rows (phases, numbered from VII to XIV) and 36 variables (pottery motifs).

Source


References


See Also

Other count data: birds, boves, chevelon, complegne, mississippi, zuni
**Description**

A dataset containing ceramic counts from the Mississippi region.

**Usage**

mississippi

**Format**

A data.frame with 20 rows and 10 variables (ceramic types):

- ParkinPunctate
- BartonKentMPI
- Painted
- FortuneNoded
- RanchIncised
- WallsEngraved
- WallaceIncised
- RhodesIncised
- VernonPaulApplique
- HullEngraved

**Source**


**See Also**

Other count data: birds, boves, chevelon, compiegne, merzbach, zuni
Description

50-year averaged oxygen isotope data from the North Greenland Ice Core Project.

Usage

ngrip2004

Format

A data.frame with 2 variables:

- age  Calendar age (years before 2000 AD).
- delta δ^{18}O (per mil).

Source

https://www.ncei.noaa.gov/access/paleo-search/study/2481

References


See Also

Other isotopic data: lisiecki2005, nydal1996, spratt2016

Examples

```
plot(
x = ngrip2004$age / 1000,
y = ngrip2004$delta,
type = "l",
xlim = c(120, 0),
xlab = "kilo year b2k",
ylab = \(\text{expression}(\delta^{18}O)\)
)
```
nydal1996

\(^{14}C\) Measurements in Atmospheric CO\(_2\)

Description

Corrected \(^{14}C\) measurements from air samples collected at five Norwegian sites from 1962-1993.

Usage

nydal1996

Format

A \texttt{data.frame} with 5 variables:

- \texttt{site} Sampling station.
- \texttt{start} Beginning date of the sampling period.
- \texttt{end} Ending date of the sampling period.
- \texttt{delta} Isotopic ratio \(\Delta^{14}C\) (per mil).
- \texttt{sigma} Error on \texttt{delta} (per mil).

Source


See Also

Other isotopic data: \texttt{lisiecki2005}, \texttt{ngrip2004}, \texttt{spratt2016}

Examples

```r
plot(
  x = nydal1996$start,
  y = nydal1996$delta,
  type = "p",
  xlab = "Date",
  ylab = expression(Delta^{14}C)
)
```
Late Pleistocene Sea Level Stack

Description

A Late Pleistocene sea level stack based on marine sediment core data (foraminiferal carbonate $\delta^{18}O$).

Usage

spratt2016

Format

A data.frame with 9 variables:

- **age_calkaBP**: Age (calendar kilo year BP).
- **SeaLev_shortPC1**: Sea Level (meters above present day), climate reconstructions (scaled first principal component of seven sea level reconstructions (0-430 ka)).
- **SeaLev_shortPC1_err_sig**: Sea Level standard deviation from bootstrap (meters), climate reconstructions (scaled first principal component of seven sea level reconstructions (0-430 ka)).
- **SeaLev_shortPC1_err_lo**: Sea Level 95% confidence interval lower bound (meters), climate reconstructions (scaled first principal component of seven sea level reconstructions (0-430 ka)).
- **SeaLev_shortPC1_err_up**: Sea Level 95% confidence interval upper bound (meters), climate reconstructions (scaled first principal component of seven sea level reconstructions (0-430 ka)).
- **SeaLev_longPC1**: Sea Level (meters above present day), climate reconstructions (scaled first principal component of five sea level reconstructions (0-798 ka)).
- **SeaLev_longPC1_err_sig**: Sea Level standard deviation from bootstrap (meters), climate reconstructions (scaled first principal component of five sea level reconstructions (0-798 ka)).
- **SeaLev_longPC1_err_lo**: Sea Level 95% confidence interval lower bound (meters), climate reconstructions (scaled first principal component of five sea level reconstructions (0-798 ka)).
- **SeaLev_longPC1_err_up**: Sea Level 95% confidence interval upper bound (meters), climate reconstructions (scaled first principal component of five sea level reconstructions (0-798 ka)).

Source

https://www.ncei.noaa.gov/access/paleo-search/study/19982

References

See Also

Other isotopic data: lisiecki2005, ngrip2004, nydal1996

Examples

```r
plot(
  x = spratt2016$age_calkaBP,
  y = spratt2016$SeaLev_longPC1,
  type = "l",
  xlim = c(500, 0),
  xlab = "kilo year BP",
  ylab = "Sea level (meters above present)"
)
```

---

### stratigraphy

**Chronostratigraphic Chart**

**Description**

The ICS international chronostratigraphic chart (v2022/2).

**Usage**

```r
stratigraphy
```

**Format**

A `data.frame` with 5 variables:

- **type**: Unit type ("eon", "era", "period", "series" or "stage"). Precambrian and Hadean are informal units.
- **name**: Unit name.
- **age**: Numerical age (Ma).
- **error**: Error on numerical age (Ma).
- **parent**: Parent unit.

**Source**


**References**

**Description**

Chemical analysis (electron probe X-ray micro analysis) of 398 medieval glass vessels found in France.

**Usage**

verre

**Format**

A data.frame with 17 variables:

- **Site** CNL: Cour Napoléon, Louvre; ORL: Orléans; POI: Poitiers; ANG: Angers; OMO: Omonville, Seine Maritime; ROU: Rouen; MEA: Meaux; CHL: Châlons-sur-Marne; PAI: Pairu (Argonne, Ardennes); BER: Bercettes (Argonne, Ardennes); BIN: Binois (Argonne, Ardennes); CHE: Chevrie (Argonne, Ardennes); MIT: Mitte (Argonne, Ardennes); MET: Metz; CHM: Chambaran.

- **Sample** Sample code.

- **Type** Typology.

- **Age** Century.

- **Periode** I: 9th-12th century; II: 13th-first half of the 15th century; III: end of the 15th to end of the 16th century; IV: end of 16th to end of the 17th century.

- **Tint** B: blue; CL: colourless; CLg colourless (greyish tint); PB: pale blue; PGE: pale greenish; PGE-B: pale green-blue or blue-green; PGY-B: pale grey-blue; R: opaque red; W: opaque white; *av: added aventurine spots; *bl: added thread blue or blue spots; *r: added thread opaque red or opaque red spots; *w: added thread opaque white.

- **Na2O** Na2O content (percent).

- **CaO** CaO content (percent).

- **K2O** K2O content (percent).

- **MgO** MgO content (percent).

- **P2O5** P2O5 content (percent).

- **SiO2** SiO2 content (percent).

- **Al2O3** Al2O3 content (percent).

- **FeO** FeO content (percent).

- **MnO** MnO content (percent).

- **Cl** Cl content (percent).

**Reference** Site reference.
References


See Also

Other chemical data: kommos

Examples

```r
plot(
  x = verre$Na2O,
  y = verre$CaO / (verre$CaO + verre$K2O),
  type = "p",
  xlab = expression("Na"[2]*"O (%)"),
  ylab = expression("CaO"/(CaO+"K"[2]*"O"))
)
```

zuni

Zuni Ceramics

Description

A dataset containing ceramic counts from the Zuni region of the American Southwest.

Usage

zuni

Format

A data.frame with 420 rows (assemblages) and 18 variables (ceramic types). The numbers in brackets correspond to the date range of each type (in AD years):

- **LINO** Lino Gray (575-875).
- **KIAT** Kiatuthlanna Black-on-white (850-910).
- **RED** Red Mesa Black-on-white (900-1030).
- **GALL** Gallup Black-on-white (1025-1150).
- **ESC** Escavada Black-on-white (1050-1150).
- **PUBW** Puerco Black-on-white (1050-1200).
- **RES** Reserve Black-on-white (1071-1115).
- **TULA** Tularosa Black-on-white (1175-1300).
- **PINE** Pinedale Black-on-white (1275-1325).
- **PUBR** Puerco Black-on-red (1050-1200).
- **WING** Wingate Black-on-red (1070-1200).
WIPO  Wingate Polychrome (1150-1250).
SJ  St. Johns Black-on-red/Polychrome (1200-1300).
LSJ  St. Johns glaze, Techado Polychrome (1275-1300).
SPR  Springerville Polychrome (1250-1300).
PINER  Pinedale Black-on-red/Polychrome (1275-1325).
HESH  Heshotauthla Polychrome (1285-1400).
KWAK  Kwakina Polychrome (1285-1400).

Source

See Also
Other count data: birds, boves, chevelon, complegne, merzbach, mississippi
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