Package 'gsloid'

June 29, 2017

Type Package

Title Global Sea Level and Oxygen Isotope Data

Version 0.1.0

Maintainer Ben Marwick <benmarwick@gmail.com>

Description Contains published data sets for global benthic d18O data for 0-5.3 Myr <doi:10.1029/2004PA001071> and global sea levels based on marine sediment core data for 0-800 ka <doi:10.5194/cp-12-1-2016>.

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Depends R (>= 3.3.0)

Encoding UTF-8

LazyData true

RoxygenNote 6.0.1

Suggests knitr, rmarkdown, ggplot2

VignetteBuilder knitr

NeedsCompilation no

Author Ben Marwick [aut, cre],
Lorraine Lisiecki [aut],
Rachel Spratt [aut],
Maureen Raymo [aut]

Repository CRAN

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R topics documented:

`lisiecki2005` *LR04 Global Pliocene-Pleistocene Benthic d18O Stack (5.3-Myr).*

Description

The LR04 stack spans 5.3 Myr and is an average of 57 globally distributed benthic d18O records (which measure global ice volume and deep ocean temperature) collected from the scientific literature. Obtained from ftp://ftp.ncdc.noaa.gov/pub/data/paleo/contributions_by_author/lisiecki2005/lisiecki2005.txt on 28 June 2017

Usage

```
lisiecki2005
```

Format

A data frame with 2115 rows and 3 variables:

Time x 1000 years (i.e. ka)

d18O Benthic d18O (per mil)

Error Standard error (per mil) ...

Details

NAME OF DATA SET: LR04 Global Pliocene-Pleistocene Benthic d18O Stack LAST UPDATES: 8/2005 (Change number of significant digits in LR04 stack) 7/2005 (final version, 0.64 permil correction for Cibicidoides added) CONTRIBUTOR: Lorraine E. Lisiecki, Brown University IGBP PAGES/WDCA CONTRIBUTION SERIES NUMBER: 2005-008

SUGGESTED DATA CITATION: Lisiecki, L.E. and M.E. Raymo. 2005. LR04 Global Pliocene-Pleistocene Benthic d18O Stack. IGBP PAGES/World Data Center for Paleoclimatology Data Contribution Series #2005-008. NOAA/NGDC Paleoclimatology Program, Boulder CO, USA.

ORIGINAL REFERENCE: Lisiecki, L.E. and M.E. Raymo. 2005. A Pliocene-Pleistocene stack of 57 globally distributed benthic D18O records. Paleoceanography, Vol. 20, PA1003, doi:10.1029/2004PA001071.

ADDITIONAL REFERENCES:

Imbrie, J., J. D. Hays, D. G. Martinson, A. McIntyre, A. C. Mix, J. J. Morley, N. G. Pisias, W. L. Prell, and N. J. Shackleton. 1984. The orbital theory of Pleistocene climate: Support from a revised chronology of the marine d18O record. in Milankovitch and Climate, Part 1, edited by A. Berger, pp. 269-305, Springer, New York.

Shackleton, N. J. 1995. New data on the evolution of Pliocene climate variability. in Paleoclimate and Evolution, With Emphasis on Human Origins, edited by E. S. Vrba et al., pp. 242-248, Yale Univ. Press, New Haven, Ct.

ABSTRACT (Lisiecki and Raymo 2005): We present a 5.3-Myr stack (the "LR04" stack) of benthic d18O records from 57 globally distributed sites aligned by an automated graphic correlation algorithm. This is the first benthic d18O stack composed of more than three records to extend beyond 850 ka, and we use its improved signal quality to identify 24 new marine isotope stages in the early

Pliocene. We also present a new LR04 age model for the Pliocene-Pleistocene derived from tuning the d18O stack to a simple ice model based on 21 June insolation at 65N. Stacked sedimentation rates provide additional age model constraints to prevent overtuning. Despite a conservative tuning strategy, the LR04 benthic stack exhibits significant coherency with insolation in the obliquity band throughout the entire 5.3 Myr and in the precession band for more than half of the record. The LR04 stack contains significantly more variance in benthic d18O than previously published stacks of the late Pleistocene as the result of higher resolution records, a better alignment technique, and a greater percentage of records from the Atlantic. Finally, the relative phases of the stack's 41- and 23-kyr components suggest that the precession component of d18O from 2.7–1.6 Ma is primarily a deep-water temperature signal and that the phase of d18O precession response changed suddenly at 1.6 Ma.

PERIOD OF RECORD: 5.3 MMYrBP - present

GEOGRAPHIC REGION: Global

DESCRIPTION: Lisiecki-Raymo 2004 (LR04) Global Pliocene-Pleistocene Benthic D18O Stack.

The LR04 stack spans 5.3 Myr and was constructed by graphically aligning 57 globally distributed benthic d18O records. Its age model is orbitally tuned to June 21 insolation at 65N but is also constrained by the average sedimentation rates of the 57 sites.

LR04 Global Pliocene-Pleistocene Benthic d18O Stack

Source

ftp://ftp.ncdc.noaa.gov/pub/data/paleo/contributions_by_author/lisiecki2005/lisiecki2005.txt

Examples

```
names(lisiecki2005)
head(lisiecki2005)
# plot for 0-250 ka:
if (require("ggplot2")) {
   ggplot(lisiecki2005,
          aes(Time,
              d18O)) +
     geom_line() +
     scale_x_continuous(limits = c(0, 250),
                        name = "x 1000 years ago") +
     scale_y_reverse(name = bquote(delta^18*O)) +
     theme_bw()
   }
```

`LR04_MISboundaries` *Marine isotope stages (MIS) boundaries.*

Description

From http://www.lorraine-lisiecki.com/LR04_MISboundaries.txt

Usage

```
LR04_MISboundaries
```

Format

A data frame with 232 rows and 7 variables:

MIS_Boundary Marine isotope stage boundary, start/end

start_MIS start of this phase

end_MIS end of this phase

label_MIS short version of 'start_MIS' suitable for annotating plots

LR04_Age_ka_start Age of start of MIS, x 1000 years ago

LR04_Age_ka_end Age of end of MIS, x 1000 years ago

LR04_Age_ka_mid Age of middle of MIS, x 1000 years ago, suitable for controlling label placement on plots

Source

http://www.lorraine-lisiecki.com/LR04_MISboundaries.txt

Examples

```
names(LR04_MISboundaries)
head(LR04_MISboundaries)
# subset the MIS data for the last 250 ka years
mis_last_250ka <- LR04_MISboundaries[LR04_MISboundaries$LR04_Age_ka_start <= 250, ]
```

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spratt2016 *Global Sea Level Reconstruction using Stacked Records from 0-800 ka.*

Description

This is a Late Pleistocene sea level stack based on marine sediment core data (foraminiferal carbonate d18O) as estimated by several different techniques in seven different studies. Obtained from https://www.ncdc.noaa.gov/paleo-search/study/19982 on 28 June 2017

Usage

```
spratt2016
```

Format

An object of class `data.frame` with 799 rows and 9 columns.

Source

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

Examples

```
names(spratt2016)
head(spratt2016)
```

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