

Package ‘marelacTeaching’

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Version 1.1

Title Datasets and tutorials for use in aquatic sciences

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Description Datasets and tutorials for use in the MArine, Riverine, Estuarine, LAcustrine and Coastal sciences

License GPL (>= 2)

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R topics documented:

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marelacTeaching-package

Datasets and tutorials for use in the MArine, Riverine, Estuarine, LA-custrine and Coastal sciences

Description

R-package marelacTeaching has been designed as a tool to help in teaching students from the MA-rine, Riverine, Estuarine, LAcustrine and Coastal sciences.

It contains:

- a tutorial for novice R-users, focussing on the use of R in scientific computing.
- data sets used in science teaching.

Details

Package: marelac
Type: Package
Version: 1.1
Date: 2009-10-15
License: GNU Public License 2 or above

To open the lecture notes, copy-paste this sentence to R:

```
browseURL(paste(system.file(package="marelacTeaching"), "/doc/UsingR.pdf",  
sep=""))
```

which will open a PDF generated with WORD (Microsoft)

or type `vignette("UsingR")` which will open a LaTeX-generated file.

Author(s)

Karline Soetaert (Maintainer)

Filip Meysman

Examples

```
## Not run:  
## show examples (see respective help pages for details)  
example(Bathymetry)  
example(SCOC)  
example(Zoogrowth)  
  
## open the directory with documents  
browseURL(paste(system.file(package="marelacTeaching"), "/doc", sep=""))
```

```
## show document with the introduction to R - one file, a pdf generated with WORD:
browseURL(paste(system.file(package="marelacTeaching"), "/doc/UsingR.pdf", sep=""))

## the introduction to R - a vignette
vignette("UsingR")

## and the answers
vignette("Answers")

edit(vignette("UsingR"))
edit(vignette("Answers"))

## End(Not run)
```

Bathymetry

World bathymetric data

Description

This dataset, as used by Andersson et al. (2004) contains elevations, m of the world at 1 dg intervals.

Usage

Bathymetry

Format

A list with the bathymetry (depth) and hypsometry (altitude) of the world. It contains:

- x** the latitude,
- y** the longitude,
- z** the height (m).

Author(s)

Karline Soetaert <k.soetaert@nioo.knaw.nl>

References

Andersson, H., Wijsman, J., Herman, P., Middelburg, J., Soetaert, K., Heip, C., 2004. Respiration patterns in the deep ocean. *Geophysical Research Letters* 31, LO3304.

Examples

```

par(mar=c(2, 2, 2, 2))
image(Bathymetry$x, Bathymetry$y, Bathymetry$z, col=femmecol(100),
      asp=TRUE, xlab="dg", ylab="dg")
contour(Bathymetry$x, Bathymetry$y, Bathymetry$z, asp=TRUE, add=TRUE)

# remove land
zz <- Bathymetry$z
zz[zz>0]<-0

image(Bathymetry$x, Bathymetry$y, zz, col=c(femmecol(100), "black"), asp=TRUE)
contour(Bathymetry$x, Bathymetry$y, zz, asp=TRUE, add=TRUE)

```

Nemaspec

Nematode species composition of 6 deep-sea sediments in the Mediterranean

Description

Dataset of (Soetaert et al., 1991) with nematode species densities in Mediterranean deep-sea sediments, at depths ranging from 160 m to 1220 m.

The densities are expressed in individuals per 10 cm².

Nematodes are small free-living worms (<1mm long), generally very abundant in all aquatic sediments.

Usage

Nemaspec

Format

a data.frame, with stations as columns, species as rows.

There are 6 stations, for each station two replicates.

The stationname refers to the depth of the sediment and the replicate, e.g. M160b is a station at 160 metres depth, replicate b)

Note

The densities are non-integer values.

Species are called "Genus sname"; as most species are undescribed, they are called "Genus M1", "Genus M2", etc...

Author(s)

Karline Soetaert <k.soetaert@nioo.knaw.nl>

References

Soetaert, K., Heip, C. and M. Vincx, 1991. Diversity of nematode assemblages along a mediterranean deep-sea transect. *Marine Ecology Progress Series* 75, 275-282.

Examples

```
head(Nemaspec)
# select densities of species present in M160b
st160b<-data.frame(Nemaspec$SPECIES,dens=Nemaspec$M160b)
st160b<-st160b[st160b$dens!=0,]

plot(cumsum(rev(sort(st160b$dens)/sum(st160b$dens))),
      main="dominance curve",
      xlab="species rank",ylab="cum freq")
```

SCOC

a Sediment Community Oxygen Consumption (SCOC) dataset

Description

This literature dataset, compiled by Andersson et al. (2004) contains 584 measurements of sediment community oxygen consumption rates, as a function of water depth, and performed in deep-water sediments, either by in situ incubations or via modelling of oxygen microprofiles.

It is used in the book to demonstrate how one can obtain order-of-magnitude estimates of model parameters (i.e. sediment oxygen consumption rate, a measure of deposition flux) by performing log-log regression with water depth.

Usage

SCOC

Format

a dataframe with 584 rows, and with following columns:
Depth.m, the water depth at which the measurement was performed.
SCOC.mmol/m2/d, the oxygen consumption rate of the sediment, [mmolO2/m2/d]

Author(s)

Karline Soetaert <k.soetaert@nioo.knaw.nl>

References

Andersson, H., Wijsman, J., Herman, P., Middelburg, J., Soetaert, K., Heip, C., 2004. Respiration patterns in the deep ocean. *Geophysical Research Letters* 31, LO3304.

See Also

[Zoogrowth](#), a dataset containing zooplankton maximal growth rates
see the paper of Andersson et al. for a description of the original literature sources of this dataset

Examples

```
plot(SCOC[,1],SCOC[,2],log="xy",xlab="water depth, m",ylab="",
     main="SCOC, mmol O2/m2/d",pch=16,xaxt="n",yaxt="n",cex.main=1)

axis(1,at=c(0.5,5,50,500,5000),labels=c("0.5","5","50","500","5000"))
axis(2,at=c(0.1,1,10,100),labels=c("0.1","1","10","100"))

l1 <- lm(log(SCOC[,2])~ log(SCOC[,1]))
rr <- summary(l1)$r.squared
A <- exp(coef(l1)[1])
B <- (coef(l1)[2])
curve(A*x^B,add=TRUE,lwd=2)
AA <- round(A*100)/100
BB <- round(B*100)/100
expr <- substitute(y==A*x^B,list(A=AA,B=BB))
text(1,.1,expr,adj=0)
expr2 <- substitute(r^2==rr,list(rr=round(rr*100)/100))
text(1,0.04,expr2,adj=0)
```

Zoogrowth

a zooplankton growth dataset

Description

This literature dataset, compiled by Hansen et al. (1997) contains 84 measurements of maximal growth rates as a function of organism volume and temperature for various species of zooplankton. The maximal growth rates were obtained from laboratory experiments.

It is used in the book to demonstrate how one can obtain order-of-magnitude estimates of model parameters (i.c. maximal growth) via allometric relations, i.e. by performing log-log regression of organism rates versus size.

Usage

Zoogrowth

Format

a dataframe with 84 rows, and with following columns:

Volume the volume in [μm^3].

Mumax the maximal growth rate, [/hour].

Species the name of reared zooplankton species.

Temp the rearing temperature, [dg C].

Group the systematic group to which the organism belongs, one of Nanoflagellate, Dinoflagellate, Ciliate, Rotifer, Meroplankton, Copepod.

Author(s)

Karline Soetaert <k.soetaert@nioo.knaw.nl>

References

Hansen PJ, Bjornsen PK, Hansen BW, 1997. Zooplankton grazing and growth: Scaling within the 2-2,000- μ m body size range. *Limnology and Oceanography* 42: 687-704.

See Also

[SCOC](#), a dataset containing sediment community oxygen consumption rates

See the paper of Hansen et al. 1997 for a description of the original literature sources of this dataset.

Examples

```
plot(Zoogrowth$Volume, Zoogrowth$Mumax, log="xy",
     xlab="zooplankton volume, micrometer ^ 3",
     ylab="maximal growth rate, /hr", main="Zoogrowth", cex=2,
     pch=(15:20)[Zoogrowth$Group], col=(1:6)[Zoogrowth$Group])
legend("topright", legend=levels(Zoogrowth$Group), col=1:6, pch=15:20)

ll <- lm(log(Zoogrowth[,2]) ~ log(Zoogrowth[,1]))
rr <- summary(ll)$r.squared
A <- exp(coef(ll)[1])
B <- (coef(ll)[2])
curve(A*x^B, add=TRUE, lwd=2)
AA <- round(A*100)/100
BB <- round(B*100)/100
expr <- substitute(y==A*x^B, list(A=AA, B=BB))
text(100, .0035, expr, adj=0)
expr2 <- substitute(r^2==rr, list(rr=round(rr*100)/100))
text(100, 0.002, expr2, adj=0)
```

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