

# Package ‘oXim’

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**Type** Package

**Title** Oxycline Index from Matrix Echograms

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**Description** Tools for oxycline depth calculation from echogram matrices.

**License** GPL (>= 2)

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**Imports** R.matlab, gstat, sp, imagine

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oxim-package	<i>Oxycline Index from Matrix Echograms</i>
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### Description

Tools for oxycline depth calculation from echogram matrices

### Author(s)

Wencheng Lau-Medrano, <luis.laum@gmail.com>

---

colPalette	<i>Default color palette most using on acostic echograms.</i>
------------	---

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### Description

Vector with 256 colors commonly used on echograms plots.

### Usage

```
colPalette
```

### Format

A vector of 256 colors in RBG format.

### References

Boletines del Instituto del Mar del Peru.

---

createFilterSetting    *Create filter-settings Object.*

---

### Description

This function allows to create correctly a filter-settings object in order to insert as input on getOxyrange function.

### Usage

```
createFilterSetting(name = "default", type = NULL, radius = NULL,  
times = NULL, tolerance = NULL)
```

### Arguments

name	Parameter to indicate prefixed profile of settings. This parameter has priority over the others.
type	Indicates type of filter to use. See details below.
radius	Indicates the size (on pixels) of sides of square used to apply the filters.
times	Indicates number of times to apply the filters.
tolerance	For noiselessFilter, this parameter indicates proportion of pixels to consider from filter matrix (radius x radius).

### Details

About each parameter:

**name** This parameter must be a string and it works as a short way to select an specific set of filter settings. This parameter has priority over the others, so to create a personalized set of filters, 'name' will must set as NULL. (It will be fully available in next version.)

**type** This parameter must be a string and indicates what kind of filter method will be applied to the echograms. There are two options to select: `definerFilter` which works as a reverse-effect median filter and `noiselessFilter` which removes noisy signals on the echograms.

**radius** This parameter is useful to specify the size of the filter matrix which will be applied to the echogram. It must be integer, even and greater than 3.

**times** This parameter is useful to indicate how many times the filter will be applied to the echogram. It must be integer and greater than 1. The function will remove rows with `times=0` values.

**tolerance** Internal parameter to modify selected values on a convolution matrix filter. This parameter is meaningful only for `noiselessFilter`.

### Examples

```
# Use default profile  
createFilterSetting(name = "default")  
  
# Generate a personalized profile  
createFilterSetting(type = "definerFilter", radius = c(3, 5, 5))
```

---

defaultFilterSettings *Default set of filter parameters.*

---

### Description

data.frame object containing a settings used by getOxyrange function to apply echograms' matrix. It can be usefull as example of filter settings.

### Usage

```
defaultFilterSettings
```

### Format

A data.frame with columns name, type, radius, times and tolerance.

---

echogramPlot.default *Plot a matrix of a filtered echogram.*

---

### Description

This function takes an echogram matrix and plot it.

### Usage

```
## Default S3 method:
echogramPlot(x, colEchogram = "colPalette", ...)

echogramPlot(x, colEchogram = "colPalette", ...)

## S3 method for class 'matrix'
echogramPlot(x, ...)
```

### Arguments

x	Object of class oxyclineData, echoData or matrix with information for make an echogram plot. If x is a matrix, column names must indicate the time and row names, the depth.
colEchogram	Pallete of colours to plot the echograms. If NULL (default) the system will use the same combination used on object colPallete.
...	Extra arguments passed to <a href="#">echogramPlot</a> function.

### Details

Typically, 'echogramPlot' can be applied to echogram matrix object, however it also may use 'echoData' and 'oxyclineData' objects, as a method.

**Examples**

```
fileMode <- list(fish38_file = system.file("extdata", "fish38.mat", package = "oXim"),
               fluid120_file = system.file("extdata", "fluid120.mat", package = "oXim"),
               blue38_file = system.file("extdata", "blue38.mat", package = "oXim"))
echoData <- readEchograms(fileMode = fileMode)
echogramPlot(x = echoData)
```

---

echogramPlot.echoData *echogramPlot method for echoData*

---

**Description**

This method takes an echoData object and plots output echograms.

**Usage**

```
## S3 method for class 'echoData'
echogramPlot(x, ...)
```

**Arguments**

x	Object of class echoData
...	Extra arguments passed to <a href="#">echogramPlot</a> function.

---

echogramPlot.oxyclineData  
*echogramPlot method for oxyclineData*

---

**Description**

This method takes an oxyclineData object and plots output echograms. Optionally, users can add oxycline line.

**Usage**

```
## S3 method for class 'oxyclineData'
echogramPlot(x, colEchogram = "colPalette",
             oxyLine = TRUE, oxyLineParams = list(), ...)
```

**Arguments**

x	Object of class oxyclineData with internal echogram matrix to be plotted.
colEchogram	Pallete of colours to plot the echograms. If NULL (default) the system will use the same combination used on object colPallete.
oxyLine	logical. Do you want to add oxycline line to the plot?
oxyLineParams	If oxyLine = TRUE, parameters passed to <a href="#">lines</a> function.
...	Extra arguments passed to <a href="#">echogramPlot</a> function.

---

getOxyrange *Takes a matrix of echogram and calculate Oxycline.*

---

### Description

This function takes a filter configuration and applies to echograms given on an echoData object.

### Usage

```
getOxyrange(fluidMatrix, filterSettings = NULL, stepBYstep = FALSE, ...)
```

### Arguments

**fluidMatrix** Object of class echoData (from [readEchograms](#) function) with echogram

**filterSettings** List with combination of filters.

**stepBYstep** logical. If FALSE (default), returns just original and final echogram, otherwise each echogram (after applying filters one by one) will be returned.

**...** Arguments passed to [smooth.spline](#) function. See Details.

### Details

If filterSettings = NULL, oXim will use filter configuration present on defaultFilterSettings data set. For extra details about image filters, see [createFilterSetting](#) help.

Application of filters may produce some gaps in the final matrix. In order to fill them, the function uses [smooth.spline](#) whose arguments can be passed using by ...

### Examples

```
fileMode <- list(fish38_file = system.file("extdata", "fish38.mat", package = "oXim"),
                fluid120_file = system.file("extdata", "fluid120.mat", package = "oXim"),
                blue38_file = system.file("extdata", "blue38.mat", package = "oXim"))
echoData <- readEchograms(fileMode = fileMode)
oxyLimits <- getOxyrange(fluidMatrix = echoData)
```

---

plot.echoData *Plot method for echoData Objects.*

---

### Description

This function takes an echoData object and plots an interpolated map showing oxycline depth along shore.

**Usage**

```
## S3 method for class 'echoData'
plot(x, ...)
```

**Arguments**

x                    echoData object provided by readEchograms function.  
 ...                  Arguments passed to [echogramPlot](#) function.

---

plot.oxyclineData      *Plot method for oxyclineData*

---

**Description**

This method takes an oxyclineData object, make an interpolation of oxycline values and show them on a map. Interpolation methodology is based on akima package.

**Usage**

```
## S3 method for class 'oxyclineData'
plot(x, interpParams = list(myGrid = NULL),
     xlengthAxes = 6, ylengthAxes = 6, showLimits = FALSE, ...)
```

**Arguments**

x                    Object of class oxyclineData  
 interpParams       list object including parameters passed to [idw](#) function.  
 xlengthAxes       Desired length of the axis 'x' labels.  
 ylengthAxes       Desired length of the axis 'y' labels.  
 showLimits        logical. Do you want to show the oxycline limit line?  
 ...                  Extra arguments passed to [image](#) function.

---

print.echoData        *Print method for echoData Objects.*

---

**Description**

Shows main information from echodata Objects.

**Usage**

```
## S3 method for class 'echoData'
print(x, ...)
```

**Arguments**

x	echoData object provided by readEchograms function.
...	Extra arguments.

---

<code>print.oxyclineData</code>	<i>Print method for oxyclineData Objects.</i>
---------------------------------	---

---

**Description**

Shows main information from oxyclineData Objects.

**Usage**

```
## S3 method for class 'oxyclineData'
print(x, ...)
```

**Arguments**

x	Object of class oxyclineData.
...	Extra arguments.

---

<code>print.summary.echoData</code>	<i>Print method for summary.echoData</i>
-------------------------------------	--

---

**Description**

Shows main information from echodata.summary Objects.

**Usage**

```
## S3 method for class 'summary.echoData'
print(x, ...)
```

**Arguments**

x	echoData.summary object provided by application of summary method to echoData object.
...	Extra arguments.



---

```
print.summary.oxyclineData
    Print method for summary.oxyclineData
```

---

### Description

Shows main information from oxyclineData.summary objects.

### Usage

```
## S3 method for class 'summary.oxyclineData'
print(x, ...)
```

### Arguments

x	Object of class summary.oxyclineData.
...	Extra arguments.

---

readEchograms	<i>Takes outputs from Echoopen and generates a matrix to calculate Oxycline.</i>
---------------	--

---

### Description

This function search outputs of Echoopen for Fluid-like, Blue noise and Fish and use them to make a filtered matrix to calculate the Oxycline limits.

### Usage

```
readEchograms(fileMode = NULL, directoryMode = NULL, validFish38 = c(-100,
-21), validBlue38 = c(-100, -56), upLimitFluid120 = -53,
pinInterval = 50, date.format = "%d-%m-%Y %H:%M:%S")
```

### Arguments

fileMode	List with needed variables to read single Matlab files. See details below.
directoryMode	List with needed variables to read Matlab files from directory. See details below.
validFish38	Range of valid values for Fish-38kHz.
validBlue38	Range of valid values for Blue-38kHz.
upLimitFluid120	Upper limit for Fluidlike-120kHz.
pinInterval	Time threshold (in secs) to consider separate two matrices (echograms).
date.format	A character string. The default method is %Y-%m-%d %H:%M:%S.

**Details**

fileMode must be a list with the next structure: fish38\_file (directory for fish38 file), blue38\_file (directory for blue38 file) and fluid120\_file (directory for fluid120 file).

Similarly, directoryMode must be a list with the next structure: directory (folder where the files are stored), fish38\_pattern (text pattern for recognizing fish38 files), blue38\_pattern (text pattern for recognizing blue38 files) and fluid120\_pattern (text pattern for recognizing fluid120 files).

**Examples**

```
fileMode <- list(fish38_file = system.file("extdata", "fish38.mat", package = "oXim"),
               fluid120_file = system.file("extdata", "fluid120.mat", package = "oXim"),
               blue38_file = system.file("extdata", "blue38.mat", package = "oXim"))
echoData <- readEchograms(fileMode = fileMode)
print(echoData)
```

---

summary.echoData      *Summary method for echoData*

---

**Description**

Get summary information of echograms included on echodata Objects.

**Usage**

```
## S3 method for class 'echoData'
summary(object, ...)
```

**Arguments**

object	echoData object provided by readEchograms function.
...	Extra arguments.

---

summary.oxyclineData      *Summary method for oxyclineData Objects.*

---

**Description**

Get summary information of oxycline depth limits included on oxyclineData objects.

**Usage**

```
## S3 method for class 'oxyclineData'
summary(object, ...)
```

**Arguments**

object	Object of class <code>oxyclineData</code> .
...	Extra arguments.

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