Package: tsHydro (via r-universe)

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Title Reconstruct water level time series from satellite altimetry data

Version 0.0.0.9000

Description What the package does (one paragraph).

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Contents

`export.tsHydro` *Export output*

Description

This function saves the predicted water levels to a file

Usage

```
export.tsHydro(x, filename = "ts.dat", exportPar = FALSE)
```

Arguments

`x`	An object of class "tsHydro"
`filename`	Name of output file
`exportPar`	Logic variable to specify if the estimated model parameters are saved to a file "tsPar.dat".
`addError`	To add error bars

Value

The following elements

- oupfile("ts.dat") A text file that contains three colunms; "time", "wl", "wlsd". "time" is the time of each pass, where the water level is estimated. "wl" is the estimated water level and "wlsd" is the standard deviation of the estimated water level.
- "tspar.dat" A text file that contains the optimized model parameters

Examples

```
data(lakelevels)
fit<-get.TS(lakelevels)
export.tsHydro(fit,file="myTS.dat",exportPar=TRUE)
```

`get.TS` *Reconstruct water level*

Description

Estimate the model parameters and return the estimated water levels

Usage

```
get.TS(
  dat,
  init.h = 0,
  init.logsigmarw = 0,
  init.logSigma = getSigmaInit(dat$satid),
  bias = rep(0, length(unique(dat$satid)) - 1),
  init.logit = log(0.1/(1 - 0.1)),
  priorHeight = numeric(0),
  priorSd = numeric(0),
  estP = FALSE,
  silent = TRUE,
  weights = rep(1, nrow(dat)),
  varPerTrack = FALSE,
  varPerQuality = FALSE,
  newdat = NULL,
  ...
)
```

Arguments

dat	A data.frame containing at least the columns: time, height, and track
init.h	Initial value for the mean water levels. The default value is 0.
init.logsigmarw	Initial value for the log of the standard deviation of the random walk
init.logSigma	Initial value for the log of the standard deviation of the random walk
bias	Optional, vector of length N-1 with Initial values of the bias estimates, where N is the numbers of satellite missions used. To estimate the bias "dat" must have a column "satid" with the ids of the satellites for each observation, 0,1,2,3,..,N-1. The number of bias estimates is N-1. The bias estimates is w.r.t. the satellite with the largest id. If dat$satid is provided the observation standard deviation is estimated pr satellite
init.logit	Initial value for the log of the standard deviation of the observation noise
priorHeight	...
priorSd	...
estP	A logic value FALSE if the outlier fraction is kept fixed at its initial value
weights	Optional vector of weights.
varPerTrack	Optional, a logic value: If TRUE, an observation standard deviation is "logSigma" is estimated per track.
varPerQuality	Optional, a logic value: If TRUE, an observation standard deviation is "logSigma" is estimated per quality id. If this option is used "dat" must have a column named "qf"
newdat	Optional, a data frame which at least should include a column named "time", containing the time in decimal years where the modeled water level is predicted. newdat may also include a column named "group" with a group id for each

	observation. Groups could be based on month, years, or something else. If "group" is provided a average water level pr group is also provided
exportPar	Logic variable to specify if the estimated model parameters are saved to a file "tsPar.dat".

Details

The function can handle the observation based standard deviation in different ways; either pr satellite, pr track, or pr quality. However, these options cannot be used together.

Value

An object of class "tsHydro" with the following elements

- oupfile("ts.dat") A text file that contains three colunms; "time", "wl", "wlsd". "time" is the time of each pass, where the water level is estimated. "wl" is the estimated water level and "wlsd" is the standard deviation of the estimated water level.
- "tspar.dat" A text file that contains the optimized model parameters

Examples

```
data(lakelevels)
fit<-get.TS(lakelevels)
```

---

plot.tsHydro *A Plot function*

Description

Plot an object returned by the function get.TS()

Usage

```
## S3 method for class 'tsHydro'
plot(
  x,
  addRawDat = TRUE,
  addLine = TRUE,
  addError = FALSE,
  zoomOut = FALSE,
  lwd = 4,
  col = "blue",
  ...
)
```

Arguments

x	Object returned by get.TS()
addLine	To add a line between the points that represents the estimated water levels.
addError	To add error bars
zoomOut	To zoom out. This option creates a plot which displays the range of the water level data.
lwd	Line width
col	Color
...	Additional argumants to plot
addRawdat	Adds the data, which the estimated water levels are based on

Examples

```
data(lakelevels)
fit<-get.TS(lakelevels)
#Plot with error bars
plot(fit,addError=TRUE,col='blue')
#plot that includes the water level data
#and displays the entire data range
plot(fit,zoomOut=TRUE,col='red')
```

---

summary.tsHydro *Summary of output*

Description

This function presents a summary of the output

Usage

```
## S3 method for class 'tsHydro'
summary(x)
```

Arguments

x	An object of class "tsHydro"

Value

Summary of output

Index