Package 'REMvisualizer'

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Type Package

Title Visualizations for Analyzing Output from the River Erosion Model (REM)

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Description Provides a series of functions to visualize and post-process output from the River Erosion Model (REM).

License GPL (>= 2)

Encoding UTF-8

LazyData true

Depends R (>= 3.4.2)

Imports colorspace (>= 1.3.2),
dplyr (>= 0.7.6),
plotrix (>= 3.7.2),
purrr (>= 0.2.5),
RColorBrewer (>= 1.1.2),
reshape2 (>= 1.4.3),
stochasim,
viridis (>= 0.5.1),
zoo (>= 1.8.3)

RoxygenNote 6.0.1

URL https://github.com/rodlammers/REMvisualizer

BugReports https://github.com/rodlammers/REMvisualizer/issues

R topics documented:

`avg_widths` *Calculates average of top and bottom channel width*

Description

Calculates average of top and bottom channel width

Usage

```
avg_widths(path = "", plot = FALSE)
```

Arguments

`path`	Path to folder with model outputs
`plot`	Should channel width be plotted (defaults to 'FALSE')

Value

A list of average channel widths by reach

calc_Dx — *Calculates grain size statistic from given distribution*

Description

Calculates Dx from a grain size distribtion, where 'x' is the fraction of the grain size distribution finer than the calculated grain size (e.g. 'x = 0.5' for D50).

Usage

```
calc_Dx(ps, Ds, x)
```

Arguments

ps	Grain size fractions
Ds	Grain sizes (mm)
x	Percetile to find (e.g. 0.5 for D50)

Value

Size of Dx

calc_sigmag — *Calculates geometric standard deviation of grain size distribtion*

Description

Calculates geometric standard deviation of grain size distribtion

Usage

```
calc_sigmag(ps, Ds)
```

Arguments

ps	Grain size fractions
Ds	Grain sizes (mm)

Value

Geometric standard deviation

cRamp *Creates a color ramp from a set of values*

Description

Creates a color ramp from a set of values

Usage

```
cRamp(x, palette, alpha = 1)
```

Arguments

x	Series of values to create color ramp for
palette	Palette of colors to use (either ‘viridis‘ or a palette from ‘RColorBrewer‘)
alpha	Transparency factor (defaults to ‘1‘)

Value

Set of colors corresponding to each supplied value

cRamp_legend *Creates a color ramp of specified length*

Description

Creates a color ramp of specified length

Usage

```
cRamp_legend(x, palette, alpha = 1)
```

Arguments

x	Length of color palette
palette	Palette of colors to use (either ‘viridis‘ or a palette from ‘RColorBrewer‘)
alpha	Transparency factor (defaults to ‘1‘)

Value

Set of colors of length ‘x‘

D50_plot — *Plots changes in bed median grain size over time for all cross sections*

Description

Plots changes in bed median grain size over time for all cross sections

Usage

```
D50_plot(path = "")
```

Arguments

path	Path to folder with model outputs

data_by_XS — *Transforms model outputs into data by each cross section*

Description

Transforms model outputs into data by each cross section

Usage

```
data_by_XS(data)
```

Arguments

data	A matrix of model output data

Value

A list of data by cross section

dz_lines — *Plots changes over time in bed elevation for the most upstream cross section in each reach*

Description

Plots changes over time in bed elevation for the most upstream cross section in each reach

Usage

```
dz_lines(path = "", type = 1)
```

Arguments

path	Path to folder with model outputs
type	'type = 1' plots all lines on same plot, 'type = 2' creates a separate plot for each reach

dz_MC_plot — *Plots network showing changes in channel bed elevation, with uncertainty*

Description

Plots network showing changes in channel bed elevation, with uncertainty

Usage

```
dz_MC_plot(print = FALSE, n_MC, path = "", MC_path = NULL,
  custom_sgn = NULL, prob = c(0.05, 0.95), use_files = TRUE)
```

Arguments

print	Should the plot be printed to a file (defaults to 'FALSE')
n_MC	Number of Monte Carlo simulations
path	Path to folder with model outputs
MC_path	Path to "MC Outputs" folder (only if different than 'path')
custom_sgn	Specifies the direction each reach should be plotted ('-1' is left, '1' is right)
prob	Numeric vector of percentiles of Monte Carlo results to plot in addition to the median (defaults to 0.05 and 0.95)
use_files	Logical. Should results files that have been loaded be used (defaults to 'TRUE')

dz_plot — *Plots changes in bed elevation for each cross section in the network*

Description

Plots changes in bed elevation for each cross section in the network

Usage

```
dz_plot(print = FALSE, gif = FALSE, max_plots = 10, path = "",
  custom_sgn = NULL, title = NULL)
```

Arguments

print	Should the plot be printed (defaults to 'FALSE')
gif	Should a gif be created (defaults to 'FALSE'). Must have ImageMagick installed and a folder titled "Figs" in the 'path' directory.
max_plots	Maximum number of plots in gif
path	Path to folder with model outputs
custom_sgn	Specifies the direction each reach should be plotted ('-1' is left, '1' is right)
title	Title to be printed on plot

gsd_maker *Creates a grain size distribution*

Description

Creates a grain size distribution, given a set of grain sizes, D50, and sp.

Usage

```
gsd_maker(D50, sp, ds, plot = TRUE)
```

Arguments

D50	Median grain size (mm).
sp	Spread of distribution (default is 1).
ds	Vector of grain sizes to map the gsd to (mm).
plot	Should the GSD be plotted (default is 'TRUE").

Value

The size fraction for each grain size.

knickpoint_plot *Plots knickpoint location over time*

Description

Plots knickpoint location over time

Usage

```
knickpoint_plot(path = "")
```

Arguments

path	Path to folder with model outputs

make_network — *Creates a series of points visualizing the channel network*

Description

Creates a series of points visualizing the channel network

Usage

```
make_network(n_nodes, n_xs, link, dx, custom_sgn)
```

Arguments

n_nodes	The number of channel reaches or nodes
n_xs	Number of cross sections per reach
link	Matrix specifying reach layout
dx	Cross section spacing
custom_sgn	Specifies the direction each reach should be plotted (‘-1‘ is left, ‘1‘ is right)

Value

List of x and y coordinates of channel network

network_XS_plot — *Plots the channel network showing changes in bed elevation, width, and width-depth ratio over time*

Description

Plots the channel network showing changes in bed elevation, width, and width-depth ratio over time

Usage

```
network_XS_plot(path = "", XS = NULL, pos = c("right", "right"),
  years = c(1, 3, 5, 10, 20), print = FALSE)
```

Arguments

path	Path to folder with model outputs
XS	Number of cross sections to label
pos	Position of labels for cross sections (‘right‘ or ‘left‘)
years	A numeric vectors of years of the simulation to plot
print	Should the plot be printed to a file (defaults to ‘FALSE‘)

plot_colors *A series of nice, color-blind friendly, colors for plotting*

Description

A series of nice, color-blind friendly, colors for plotting

Usage

```
plot_colors(alpha = 1, plot = FALSE)
```

Arguments

alpha	Transparency factor (defaults to ‘1‘)
plot	Should the colors be plotted (defaults to ‘FALSE‘)

Value

A set of eight named colors

plot_omega *Plots specific stream power*

Description

Plots specific stream power

Usage

```
plot_omega(path = "", type = 1)
```

Arguments

path	Path to folder with model outputs
type	‘type = 1‘ plots stream power over time for each reach separately; ‘type = 2‘ plots stream power longitudinally by reach

pollutant_loading *Plots cumulative or daily pollutant loading*

Description

Plots cumulative or daily pollutant loading

Usage

```
pollutant_loading(path = "", type = 1)
```

Arguments

path	Path to folder with model outputs
type	'type = 1' plots cumulative loads, 'type = 2' plots daily loads

profiles *Plots initial and final channel bed profile for each reach*

Description

Plots initial and final channel bed profile for each reach

Usage

```
profiles(path = "", type = 1)
```

Arguments

path	Path to folder with model outputs
type	'type = 1' plots all lines on same plot, 'type = 2' creates a separate plot for each reach

Rc_lines *Plots changes in bend radius of curvature over time for all cross sections*

Description

Plots changes in bend radius of curvature over time for all cross sections

Usage

```
Rc_lines(path = "")
```

Arguments

path	Path to folder with model outputs

reach_loads *Plots mass sediment loading rates by reach, with uncertainty*

Description

Plots mass sediment loading rates by reach, with uncertainty

Usage

```
reach_loads(path = "", custom_sgn = NULL, MC_path = NULL, n_MC = 0,
  units = "ton", prob = c(0.05, 0.95), print = FALSE, type = "sed",
  use_files = TRUE)
```

Arguments

path	Path to folder with model outputs
custom_sgn	Specifies the direction each reach should be plotted (‘-1‘ is left, ‘1‘ is right)
MC_path	Path to "MC Outputs" folder (only if different than ‘path‘)
n_MC	Number of Monte Carlo simulations
units	Character specifying units to be used in plot ("kg", "ton", or "1000 ton")
prob	Numeric vector of percentiles of Monte Carlo results to plot in addition to the median (defaults to 0.05 and 0.95)
print	Should the plot be printed to a file (defaults to ‘FALSE‘)
type	Whether sediment loading (‘type = "sed"‘, default) or pollutant loading (‘type = "p"‘) should be plotted
use_files	Logical. Should results files that have been loaded be used (defaults to ‘TRUE‘)

sed_lines *Plots sediment inflow and outflow over time*

Description

Plots sediment inflow and outflow over time

Usage

```
sed_lines(path = "")
```

Arguments

path	Path to folder with model outputs

sinuosity_plot *Plots changes in channel sinuosity over time by reach*

Description

Plots changes in channel sinuosity over time by reach

Usage

```
sinuosity_plot(path = "")
```

Arguments

path	Path to folder with model outputs

slope_lines *Plots changes in channel slope over time for all cross sections*

Description

Plots changes in channel slope over time for all cross sections

Usage

```
slope_lines(path = "")
```

Arguments

path	Path to folder with model outputs

width_depth *Calculates channel width-depth ratio*

Description

Calculates channel width-depth ratio

Usage

```
width_depth(path = "", plot = FALSE)
```

Arguments

path	Path to folder with model outputs
plot	Should the data be plotted (defaults to ‘FALSE‘)

Value

A dataframe with width-depth ratio by reach

width_lines *Plots changes in channel width over time for all cross sections*

Description

Plots changes in channel width over time for all cross sections

Usage

```
width_lines(path = "", print = FALSE)
```

Arguments

path	Path to folder with model outputs
print	Should the plot be printed to a file (defaults to 'FALSE')

width_MC_plot *Plots network showing changes in channel width, with uncertainty*

Description

Plots network showing changes in channel width, with uncertainty

Usage

```
width_MC_plot(print = FALSE, n_MC, path = "", MC_path = NULL,
  custom_sgn = NULL, prob = c(0.05, 0.95), use_files = TRUE)
```

Arguments

print	Should the plot be printed to a file (defaults to 'FALSE')
n_MC	Number of Monte Carlo simulations
path	Path to folder with model outputs
MC_path	Path to "MC Outputs" folder (only if different than 'path')
custom_sgn	Specifies the direction each reach should be plotted ('-1' is left, '1' is right)
prob	Numeric vector of percentiles of Monte Carlo results to plot in addition to the median (defaults to 0.05 and 0.95)
use_files	Logical. Should results files that have been loaded be used (defaults to 'TRUE')

width_plot *Plots changes in channel width for all cross sections in the network*

Description

Plots changes in channel width for all cross sections in the network

Usage

```
width_plot(print = FALSE, gif = FALSE, max_plots = 10, path = "",
  custom_sgn = NULL, title = NULL)
```

Arguments

print	Should the plot be printed (defaults to 'FALSE')
gif	Should a gif be created (defaults to 'FALSE'). Must have ImageMagick installed and a folder titled "Figs" in the 'path' directory.
max_plots	Maximum number of plots in gif
path	Path to folder with model outputs
custom_sgn	Specifies the direction each reach should be plotted ('-1' is left, '1' is right)
title	Title to be printed on plot

XS_areas *Calculates a mass balance of modeled channel change*

Description

Calculates changes in cross section area and compares that to sediment inputs and outputs to determine if mass was conserved during the simulation. Note the mass balance is not accurate if meandering was simulated.

Usage

```
XS_areas(path = "")
```

Arguments

path	Path to folder with model outputs

Value

Prints results of the mass balance and a plot of volume changes of channel cross sections.

Volume sum	Sum of total channel volume change ((-) indicates net erosion, (+) indicates net aggradation)
Bed vol out	Total volume of bed material load explorted from the watershed
Bed vol in	Total volume of bed material load imported to watershed
Bank tank	Volume of failed bank material in the bank "tank" (this is material that couldn't be deposited a
Bank washload	Volume of eroded bank washload

Bed washload (cohesive)	Volume of eroded washload from cohesive bed erosion
Knickpoint washload	Volume of eroded washload from knickpoint erosion
Knickpoint correction	A volume correction for when a knickpoint is initially located between two cross sections
Diff	Calculated volume difference between calculated change in sediment inflow and outflow and t
Percent Diff	Calculated volume difference as a percentage of Volume sum

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`XS_plots` *Plots initial and final cross section geometry for the most upstream cross section in each reach*

Description

Plots initial and final cross section geometry for the most upstream cross section in each reach

Usage

```
XS_plots(path = "")
```

Arguments

`path`	Path to folder with model outputs

`XS_plots2` *Plots initial and final cross section geometry for any specified cross sections*

Description

Plots initial and final cross section geometry for any specified cross sections

Usage

```
XS_plots2(path = "", XS = 1)
```

Arguments

`path`	Path to folder with model outputs
`XS`	A numeric vector of the cross sections to be plotted

XS_plots3 *Plots cross section geometry over time for any specified cross section*

Description

Plots cross section geometry over time for any specified cross section

Usage

```
XS_plots3(path = "", XS = 1, n_plots = 0, ts = 0.2, print = FALSE)
```

Arguments

path	Path to folder with model outputs
XS	The number of the cross section to be plotted
n_plots	The number of cross sections to plot
ts	The time step (in seconds) between plottings
print	Should the plot be printed to a file (defaults to 'FALSE')

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