Package 'swmmr'

July 13, 2017

Type Package

Title R Interface for US EPA's SWMM

Description Functions to connect the widely used Storm Water Management Model (SWMM) of the United States Environmental Protection Agency (US EPA) <https://www.epa.gov/water-research/storm-water-management-model-swmm> to R with currently two main goals: (1) Run a SWMM simulation from R and (2) provide fast access to simulation results, i.e. SWMM's binary '.out'-files. High performance is achieved with help of Rcpp. Additionally, reading SWMM's '.inp'-files is supported to glance model structures.

Version 0.7.0

Date 2017-07-13

URL https://github.com/dleutnant/swmmr

License GPL-3

BugReports https://github.com/dleutnant/swmmr/issues

ByteCompile TRUE

Imports Rcpp, utils, xts

LinkingTo Rcpp

RoxygenNote 6.0.1

NeedsCompilation yes

Author Dominik Leutnant [aut, cre]

Maintainer Dominik Leutnant <leutnant@fh-muenster.de>

Repository CRAN

Date/Publication 2017-07-13 16:11:52 UTC

R topics documented:

read_inp *Read SWMM's .inp file*

Description

Reads a SWMM .inp file and creates a list with corresponding SWMM sections. This function reads the .inp in a very simplified but reasonable manner. It's main purpose is to glance the model structure and simulation options set.

Usage

```
read_inp(inp, rm.comment = TRUE)
```

Arguments

inp	Name (incl. path) to an input file.
rm.comment	Should lines with comments starting with a ";" be discarded?

Value

A list with SWMM inp sections.

Examples

```
## Not run:
inp_sections <- read_inp("model.inp")

## End(Not run)
```

read_out *Read time series data from SWMM's .out file*

Description

Reads the binary output ('.out') generated by the stormwater management model 'SWMM' and creates a list of xts-objects.

Usage

```
read_out(file = "", iType = NULL, object_name = NULL, vIndex = NULL)
```

Arguments

`file`	The file to be read.
`iType`	Sets the result type: 0 for Subcatchments, 1 for nodes, 2 for links, 3 for system variables. Leave empty for retrieving elements available.
`object_name`	Sets the objects of which time series data is returned. Leave empty for retrieving elements available.
`vIndex`	Sets the variables to be read (s. Details). Leave empty for retrieving elements available.

Details

vIndex depends on the result type. Choices are...

for each **subcatchment** variable:

- 0 for rainfall rate (in/hr or mm/hr),
- 1 for snow depth (inches or millimeters),
- 2 for evaporation loss (in/day or mm/day),
- 3 for infiltration loss (in/hr or mm/hr),
- 4 for runoff flow (flow units),
- 5 for groundwater flow into the drainage network (flow units),
- 6 for groundwater elevation (ft or m),
- 7 for soil moisture in the unsaturated groundwater zone (volume fraction),
- 7 + N for washoff concentration of each pollutant (mass/liter).

for each **node** variable:

- 0 for water depth (ft or m above the node invert elevation),
- 1 for hydraulic head (ft or m, absolute elevation per vertical datum),
- 2 for stored water volume (including ponded water, ft3 or m3),
- 3 for lateral inflow (runoff + all other external inflows, in flow units),
- 4 for total inflow (lateral inflow + upstream inflows, in flow units),
- 5 for surface flooding (excess overflow when the node is at full depth, in flow units),
- 5 + N for concentration of each pollutant after any treatment (mass/liter),

for each **link** variable:

- 0 for flow rate (flow units),
- 1 for average water depth (ft or m),
- 2 for flow velocity (ft/s or m/s),
- 3 for volume of water (ft3 or m3),
- 4 for capacity (fraction of full area filled by flow for conduits; control setting for pumps and regulators),
- 4 + N for concentration of each pollutant (mass/liter),

for each **system-wide** variable:

- 0 for air temperature (deg. F or deg. C),
- 1 for total rainfall (in/hr or mm/hr),
- 2 for total snow depth (inches or millimeters),
- 3 for average losses (in/hr or mm/hr),
- 4 for total runoff (flow units),
- 5 for total dry weather inflow (flow units),
- 6 for total groundwater inflow (flow units),
- 7 for total RDII inflow (flow units),
- 8 for total external inflow (flow units),
- 9 for total direct inflow (flow units),
- 10 for total external flooding (flow units),
- 11 for total outflow from outfalls (flow units),
- 12 for total nodal storage volume (ft3 or m3),
- 13 for potential evaporation (in/day or mm/day),
- 14 for actual evaporation (in/day or mm/day).

Value

A list of xts-objects.

See Also

xts.

Examples

```
## Not run:
xts_list_of_results <- read_out("model.out")

## End(Not run)
```

run_swmm *Initiate a simulation run*

Description

This function runs a swmm inp file. If rpt and out files are not specified files are automatically created in the same directory of the inp file.

Usage

```
run_swmm(inp, rpt = NULL, out = NULL, exec = NULL, stdout = "",
  wait = TRUE)
```

Arguments

inp	Name and path to an input file.
rpt	Name and path to a report file.
out	Name and path to an out file.
exec	Name and path to swmm5 executable. If not manually set, the following paths are looked up: linux: "/usr/bin/swmm5" darwin: "/Applications/swmm5" windows: "C:/Program Files (x86)/EPA SWMM 5.1/swmm5.exe"
stdout	where output to 'stdout' or 'stderr' should be sent. Possible values are "", to the R console (the default), NULL or FALSE (discard output), TRUE (capture the output in a character vector) or a character string naming a file.
wait	a logical (not NA) indicating whether the R interpreter should wait for the command to finish, or run it asynchronously. This will be ignored (and the interpreter will always wait) if stdout = TRUE.

Examples

```
## Not run:
result <- run_swmm("model.inp")

## End(Not run)
```

Index