Package: keys.lid (via r-universe)

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Title R Package for Simulating the Impact of Different LIDs under Varying Climate Boundary Conditions on Annual Volume Rainfall Retention

Version 0.1.0

Description R Package for Simulating the Impact of Different LIDs (Low Impact Development) under Varying Climate Boundary Conditions in China on annual VRR (Volume Rainfall Retention).

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URL https://github.com/KWB-R/keys.lid

BugReports https://github.com/KWB-R/keys.lid/issues

Depends R (>= 2.10)

Imports dplyr, ggplot2, lubridate, kwb.event, kwb.swmm, kwb.utils, plotly, openxlsx, scales, stringr, swmmr, readr, readxl, rlang, tibble, tidyr, tidyselect, xts, zoo, magrittr

Suggests car, covr, DT, forcats, fs, knitr, rmarkdown

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Remotes github::kwb-r/kwb.event, github::kwb-r/kwb.swmm, github::kwb-r/kwb.utils

Encoding UTF-8

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LazyDataCompression xz

Roxygen list(markdown = TRUE)

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Repository https://kwb-r.r-universe.dev

RemoteUrl https://github.com/KWB-R/keys.lid

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`boxplot_runoff_max` *Boxplot Runoff Maximum per Event*

Description

Boxplot Runoff Maximum per Event

Usage

```
boxplot_runoff_max(
  lid = "bioretention_cell",
  zone_id = 1,
  performances = keys.lid::performances
)
```

Arguments

`lid`	tidy name of LID (default: "bioretention_cell")
`zone_id`	climate zone id to plot (default: 1)
`performances`	nested tibble (default: `performances`)

Value

interactive plot of performance results

Examples

```
## Not run:
boxplot_runoff_max(lid = "bioretention_cell", zone_id = 1)

## End(Not run)
```

`boxplot_runoff_volume` *Boxplot Runoff Volume per Event*

Description

Boxplot Runoff Volume per Event

Usage

```
boxplot_runoff_volume(
  lid = "bioretention_cell",
  zone_id = 1,
  performances = keys.lid::performances
)
```

Arguments

`lid`	tidy name of LID (default: "bioretention_cell")
`zone_id`	climate zone id to plot (default: 1)
`performances`	nested tibble (default: `performances`)

Value

interactive plot of performance results

Examples

```
## Not run:
boxplot_runoff_volume(lid = "bioretention_cell", zone_id = 1)

## End(Not run)
```

boxplot_vrr *Boxplot Volume Rainfall Retended per Year*

Description

Boxplot Volume Rainfall Retended per Year

Usage

```
boxplot_vrr(
  lid = "bioretention_cell",
  zone_id = 1,
  performances = keys.lid::performances
)
```

Arguments

lid	tidy name of LID (default: "bioretention_cell")
zone_id	climate zone id to plot (default: 1)
performances	nested tibble (default: performances)

Value

interactive plot of performance results

Examples

```
## Not run:
boxplot_vrr(lid = "bioretention_cell", zone_id = 1)

## End(Not run)
```

computeVol *computeVol*

Description

compute runoff volume for runoff in mm/s

Usage

```
computeVol(data, timeColumn, Qcolumn)
```

Arguments

`data`	data
`timeColumn`	timeColumn
`Qcolumn`	Qcolumn

Value

???

`export_performances` *Title*

Description

Title

Usage

```
export_performances(export_dir = tempdir())
```

Arguments

`export_dir`	default: tempdir()

Value

write "performances" to "swmm_lid-performances.xlsx" in directory "export_dir" and return path to fike

---

`extdata_file` *Get Path to File in This Package*

Description

Get Path to File in This Package

Usage

```
extdata_file(...)
```

Arguments

`...`	parts of path passed to `system.file`

get_event_percentiles *Get Percentiles for Events*

Description

Get Percentiles for Events

Usage

```
get_event_percentiles(performances = keys.lid::performances)
```

Arguments

performances	nested tibble (default: performances)

Value

list with percentiles for "event_sum" and "event_max"

lidconfig_to_swmm *Convert LID config to SWMM LID controls*

Description

Convert LID config to SWMM LID controls

Usage

```
lidconfig_to_swmm(df)
```

Arguments

df	data frame for a single scenario of a LID (as returned by read_scenarios)

Value

data frame with SWMM LID controls

Examples

```
scenarios <- keys.lid::read_scenarios()
unique(scenarios$lid_name_tidy)
lid <- "permeable_pavement"
lid_selected <- scenarios %>%  dplyr::filter(.data$lid_name_tidy == lid)
scenario_names <- unique(lid_selected$scenario_name)
scenario_name <- scenario_names[1]
scenario_name
lid_selected_scenario <- lid_selected[lid_selected$scenario_name == scenario_name,]
lid_controls <- lidconfig_to_swmm(lid_selected_scenario)
str(lid_controls)
```

`makeRainfallRunoffEvents` *makeRainfallRunoffEvents*

Description

makeRainfallRunoffEvents

Usage

```
makeRainfallRunoffEvents(rainfalldata, runoffdata)
```

Arguments

`rainfalldata`	rainfalldata
`runoffdata`	runoffdata

Value

????

`monthlyPattern` *monthlyPattern*

Description

monthlyPattern

Usage

```
monthlyPattern(data)
```

Arguments

`data`	data

Value

???

`performances` *Performance results for LIDs*

Description

A dataset containing the performance of LIDs for different climate conditions created with R script in /data-raw/performances.R

Usage

```
performances
```

Format

A nested tibble with 575 rows and 16 variables:

zone_id climate zone id

lid_name_tidy tidy LID name

scenario_name name of LID scenario

catchment_area_m2 catchment area in squaremeters

lid_area_fraction fraction of LID compared to total catchment

lid_area_m2 total LID area

lid_usage tibble with LID usage parameterisation

lid_controls tibble with LID controls parameterisation

subcatchment tibble with subcatchment parameterisation

annual tibble with two columns "year" and "vrr" (volume rainfall retended for each year

events_max tibble with maximum values for each rainfall event

events_sum tibble with sum values for each rainfall event

col_eventsep name of SWMM results used for event separation

model_inp path to SWMM model input file

model_rpt path to SWMM model report file

model_out path to SWMM model output file

plot_vrr_median *Plot Median VRR*

Description

Plot Median VRR

Usage

```
plot_vrr_median(
  lid = "bioretention_cell",
  performances = keys.lid::performances
)
```

Arguments

lid	tidy name of LID
performances	nested tibble (default: performances)

Value

interactive plot of performance results

Examples

```
## Not run:
lids <- unique(keys.lid::performances$lid_name_tidy)
sapply(lids, function(lid) print(keys.lid::plot_vrr_median(lid)))

## End(Not run)
```

readObservations *readObservations*

Description

readObservations

Usage

```
readObservations(
  subfolder,
  rainFile,
  runoffFile,
  temperatureFile,
  dateTimetz,
```

```
  dateTimeformat,
  to_mmperhour,
  NAval
)
```

Arguments

subfolder	subfolder
rainFile	rainFile
runoffFile	runoffFile
temperatureFile	temperatureFile
dateTimetz	dateTimetz
dateTimeformat	dateTimeformat
to_mmperhour	to_mmperhour
NAval	NAval

Value

????

`readPredictions` *readPredictions*

Description

readPredictions

Usage

```
readPredictions(
  subfolder,
  rainFile,
  runoffFile,
  temperatureFile,
  dateTimetz,
  dateTimeformat,
  to_mmperhour,
  parTcontinuous
)
```

Arguments

subfolder	subfolder
rainFile	rainFile
runoffFile	runoffFile
temperatureFile	temperatureFile
dateTimetz	dateTimetz
dateTimeformat	dateTimeformat
to_mmperhour	to_mmperhour
parTcontinuous	parTcontinuous

Value

????

`read_scenarios` *read_scenarios*

Description

read_scenarios

Usage

```
read_scenarios(
  scenarios_xlsx = extdata_file("scenarios/swmm_lid-parameterisation.xlsx")
)
```

Arguments

scenarios_xlsx	path to LID scenarios Excel file (default: `extdata_file` with: "scenarios/swmm_lid-parameterisation.xlsx"

Value

tidy scenarios data frame

`simulate_performance` *Simulate Performance of LID*

Description

Simulate Performance of LID

Usage

```
simulate_performance(
  lid_selected,
  lid_area_fraction = 0,
  catchment_area_m2 = 1000,
  swmm_base_inp = keys.lid::extdata_file("scenarios/models/model_template.inp"),
  swmm_climate_dir = keys.lid::extdata_file("rawdata/weather_sponge_regions"),
  swmm_exe = NULL,
  model_dir = keys.lid::extdata_file("scenarios/models"),
  zone_ids = 1L:5L
)
```

Arguments

`lid_selected`	tibble with a selected LID as retrieved by `read_scenarios`
`lid_area_fraction`	fraction of LID in subcatchment (default: 0)
`catchment_area_m2`	catchment area (default: 1000 m2)
`swmm_base_inp`	path to SWMM model to be used as template for modification (default: keys.lid::extdata_file("scenarios/m
`swmm_climate_dir`	directory with climate data (default: keys.lid::extdata_file("rawdata/weather_sponge_regions")
`swmm_exe`	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", (default: NULL)
`model_dir`	default: keys.lid::extdata_file("scenarios/models")
`zone_ids`	climate zone ids to be used for simulation (default: 1L:5L)

Value

tibble with nested lists containing all scenario performance

Examples

```
## Not run:
scenarios <- keys.lid::read_scenarios()
unique(scenarios$lid_name_tidy)
lid <- "permeable_pavement"
```

```
lid_selected <- scenarios %>%  dplyr::filter(.data$lid_name_tidy == lid)
pp_0.00 <- keys.lid::simulate_performance(lid_selected,
                                          lid_area_fraction = 0.00)
pp_1.0 <- keys.lid::simulate_performance(lid_selected,
                                         lid_area_fraction = 1.0)
pp <- dplyr::bind_rows(pp_0.00, pp_1.0)

## End(Not run)
```

`simulate_performances` *Simulate Performances of LID*

Description

Simulate Performances of LID

Usage

```
simulate_performances(
  lid_selected,
  lid_area_fractions = c(0, 1),
  catchment_area_m2 = 1000,
  swmm_base_inp = keys.lid::extdata_file("scenarios/models/model_template.inp"),
  swmm_climate_dir = keys.lid::extdata_file("rawdata/weather_sponge_regions"),
  swmm_exe = NULL,
  model_dir = keys.lid::extdata_file("scenarios/models"),
  zone_ids = 1L:5L
)
```

Arguments

`lid_selected`	tibble with a selected LID as retrieved by `read_scenarios`
`lid_area_fractions`	fractions of LID in subcatchment (default: c(0,1)
`catchment_area_m2`	catchment area (default: 1000 m2)
`swmm_base_inp`	path to SWMM model to be used as template for modification (default: keys.lid::extdata_file("scenarios/m
`swmm_climate_dir`	directory with climate data (default: keys.lid::extdata_file("rawdata/weather_sponge_regions")
`swmm_exe`	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", (default: NULL)
`model_dir`	default: keys.lid::extdata_file("scenarios/models")
`zone_ids`	climate zone ids to be used for simulation (default: 1L:5L)

Value

tibble with nested lists containing all scenario performances for varying lid_area_fractions

Examples

```
## Not run:
scenarios <- keys.lid::read_scenarios()
unique(scenarios$lid_name_tidy)
lid <- "permeable_pavement"
lid_selected <- scenarios %>%  dplyr::filter(.data$lid_name_tidy == lid)
pp <- keys.lid::simulate_performances(lid_selected,
                                      lid_area_fractions = c(0,1)
                                      )

## End(Not run)
```

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