

Package: **kwb.abimo** (via r-universe)

September 6, 2024

Title R Package with Functions for Working with Water Balance Model
ABIMO

Version 0.4.0

Description R Package with functions for working with water balance
bodel ABIMO

https://www.stadtentwicklung.berlin.de/umwelt/umweltatlas/download/goedecke_et_al_abimo2019_doku.pdf).

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URL <https://github.com/KWB-R/kwb.abimo>

BugReports <https://github.com/KWB-R/kwb.abimo/issues>

Imports archive, foreign, gh, gridExtra, kwb.utils, remotes, xml2

Suggests knitr, covr, rmarkdown

Remotes kwb-r/kwb.utils

Encoding UTF-8

LazyData true

Roxygen list(markdown = TRUE)

RoxygenNote 7.3.1

Depends R (>= 2.10)

VignetteBuilder knitr

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

RemoteUrl <https://github.com/KWB-R/kwb.abimo>

RemoteRef HEAD

RemoteSha f9e4791f349d8c371b8b3b482889a38e8e8feebd

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ABIMO_adapt_map	<i>adapt ABIMO output dbf-file to Berlin shape file</i>
-----------------	---

Description

changes order in dbf-file to match geographical shape file of Berlin "Stadtstruktur"

Usage

```
ABIMO_adapt_map(ABIMO_out, file_georef, out_file)
```

Arguments

ABIMO_out	data.frame of ABIMO output file
file_georef	path of dbf file that matches existing shape (incl. path)
out_file	file path and file name for ordered ABIMO output file (to be linked to shape files)

Value

ordered dbf returned and written to out_file

abimo_Berlin_average *calculate Berlin average of water balance terms*

Description

multiplies each water balance component by area, sums them up and divides the sum by the total surface

Usage

```
abimo_Berlin_average(abimo_df)
```

Arguments

abimo_df data.frame of ABIMO output file, merged with input file

Value

table with averages in mm of water balance components

abimo_comb_in_out *join ABIMO in- and output files*

Description

join ABIMO in- and output files

Usage

```
abimo_comb_in_out(file_ABIMO_out, file_ABIMO_in)
```

Arguments

file_ABIMO_out path of ABIMO output file in dbf format (incl. path)

file_ABIMO_in path of ABIMO input file in dbf format (incl. path)

Value

data.frame with matched ABIMO in- and output data

abimo_compare_output *Compares ABIMO-output-file to reference (or other ABIMO output file)*

Description

Compares two ABIMO-output-files by plotting parameters compared to 1:1 line into pdf-File and by doing a simple column statistics.

Usage

```
abimo_compare_output(x_reference, x_new)
```

Arguments

x_reference	reference data frame with ABIMO output (can be ABIMO output or downloaded from Berlin geoportal)
x_new	new ABIMO output to be compared to reference

Value

data.frame of column statistics; plots and evaluation open as pdf

abimo_grwater_interflow
calculate groundwater recharge and interflow

Description

uses correction factor to calculate groundwater recharge from infiltration RI. Difference is interflow. Requires a combined data.frame of ABIMO output and input, e.g. by using function [abimo_comb_in_out](#)

Usage

```
abimo_grwater_interflow(abimo_df)
```

Arguments

abimo_df	data.frame of ABIMO output file, merged with input file
----------	---

Value

input data.frame with two new columns "RI_K" and "INTERF"

abimo_input_2019	<i>"Official" Abimo Input Data for Berlin, 2019, with streets</i>
------------------	---

Description

The data was read from a file called "abimo_2019_mitstrassen.dbf" using [read.dbf](#). For a description of the input data, see the URL below.

Usage

```
abimo_input_2019
```

Format

A data frame with 25352 observations of 34 variables:

CODE Variable 'CODE', see URL below

BEZIRK Variable 'BEZIRK', see URL below

STAGEB Variable 'STAGEB', see URL below

BLOCK Variable 'BLOCK', see URL below

TEILBLOCK Variable 'TEILBLOCK', see URL below

NUTZUNG Variable 'NUTZUNG', see URL below

TYP Variable 'TYP', see URL below

FLGES Variable 'FLGES', see URL below

VG Variable 'VG', see URL below

PROBAU Variable 'PROBAU', see URL below

PROVGU Variable 'PROVGU', see URL below

REGENJA Variable 'REGENJA', see URL below

REGENSO Variable 'REGENSO', see URL below

BELAG1 Variable 'BELAG1', see URL below

BELAG2 Variable 'BELAG2', see URL below

BELAG3 Variable 'BELAG3', see URL below

BELAG4 Variable 'BELAG4', see URL below

VGSTRASSE Variable 'VGSTRASSE', see URL below

STR_BELAG1 Variable 'STR_BELAG1', see URL below

STR_BELAG2 Variable 'STR_BELAG2', see URL below

STR_BELAG3 Variable 'STR_BELAG3', see URL below

STR_BELAG4 Variable 'STR_BELAG4', see URL below

KANAL Variable 'KANAL', see URL below

KANART Variable 'KANART', see URL below

KAN_BEB Variable 'KAN_BEB', see URL below
KAN_VGU Variable 'KAN_VGU', see URL below
KAN_STR Variable 'KAN_STR', see URL below
FELD_30 Variable 'FELD_30', see URL below
FELD_150 Variable 'FELD_150', see URL below
FLUR Variable 'FLUR', see URL below
STR_FLGES Variable 'STR_FLGES', see URL below
KOR_FL_N Variable 'KOR_FL_N', see URL below
AGEB1_NR Variable 'AGEB1_NR', see URL below
AGEB1 Variable 'AGEB1', see URL below

Source

https://www.berlin.de/umweltatlas/_assets/literatur/goedecke_et_al_abimo2019_doku.pdf

ABIMO_read_output	<i>Reads two ABIMO output files</i>
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Description

Reads a new ABIMO output file in dbase format. In addition the original SENSTADTUM output file is read and made comparable. Alternatively two new ABIMO output files can be read. Output are two comparable (same dimensions and column names) data frames.

Usage

```
ABIMO_read_output(SENSTADTUM_dbf, new_dbf)
```

Arguments

SENSTADTUM_dbf path of original SENSTADTUM-database
new_dbf path of new output-database

Value

output are two comparable (same dimensions and column names) data frames.

abimo_xml_BER	<i>change "BERtoZero"-settings in Abimo config.xml to true</i>
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Description

as default irrigation of pervious areas is assumed based on "Nutzung" and "Typ". This function turns of irrigation for all areas (BERtoZero = true)

Usage

```
abimo_xml_BER(file_in = default_config(), file_out, line_BER = 56)
```

Arguments

file_in	path and file name of abimo xml-input file, default is default_config
file_out	path and file name to write changed abimo xml-input file
line_BER	line number in xml-file, where BERtoZero is defined, default is 56

Value

abimo xml-input file with changed BERtoZero-setting

abimo_xml_evap	<i>change potential evaporation in Abimo config.xml</i>
----------------	---

Description

potential evaporation (annual and summer) is a boundary condition defined in config.xml. This function sets potential evaporation to a given value for all surfaces (except lakes and rivers)

Usage

```
abimo_xml_evap(file_in = default_config(), file_out, evap_annual, evap_summer)
```

Arguments

file_in	path and file name of abimo xml-input file, default is default_config
file_out	path and file name to write changed abimo xml-input file
evap_annual	annual potential evaporation
evap_summer	potential evaporation for summer months

Value

abimo xml-input file with changed potential evaporation

add_ISU5_ID	<i>add ISU5 ID to dbf file from geoportal</i>
-------------	---

Description

the ID is an unambiguous identifier for all blocks of the Berlin Geoportal but is usually hidden

Usage

```
add_ISU5_ID(
  x_no_ID,
  ID_dbf = "C:/Aendu_lokal/ABIMO_Paper/Daten/Karten/Basis_ISU5_Daten_2015/ISU5_ID.dbf"
)
```

Arguments

x_no_ID	data.frame created from dbf file, downloaded from Berlin geoportal
ID_dbf	path of dbf file including ids, default is set to local folder with ISU5-Ids

Value

data.frame of x_no_ID with a new column "ID"

appendSubToFile	<i>Add "SUB" field to dbf-File</i>
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Description

Adds "SUB" field to the end of an existing file, as expected by some older applications (such as input-dbf-file for ABIMO) function by grandmaster HAUKESON

Usage

```
appendSubToFile(filename)
```

Arguments

filename	Path of file name of data.frame
----------	---------------------------------

Value

dbf file with sub field

`calculate_bagrov_curve`*Calculate the curve(s) of the Bagrov relation*

Description

Calculate the curve(s) of the Bagrov relation

Usage

```
calculate_bagrov_curve(  
  effectivity,  
  P_over_Ep_max = 4,  
  Ep = 650,  
  delta_Ea = 0.1,  
  dbg = FALSE  
)
```

Arguments

<code>effectivity</code>	Bagrov effectivity value (= n-value)
<code>P_over_Ep_max</code>	maximum value of the ratio P/Ep with precipitation P and potential evaporation Ep.
<code>Ep</code>	potential evaporation in mm/a (default: 650)
<code>delta_Ea</code>	step of actual evaporation (default: 0.1)
<code>dbg</code>	logical indicating whether or not to show debug messages

Value

data frame with columns `P_over_Ep` (P/Ep), `Ea_over_Ep` (Ea/Ep), `effectivity` (n-value)

Examples

```
## Not run:  
bagrov_data <- calculate_bagrov_curve(1:2)  
plot(bagrov_data$P_over_Ep, bagrov_data$Ea_over_Ep)  
  
## End(Not run)
```

create_configurator *Create Configuration Object from Abimo Configuration File*

Description

Create Configuration Object from Abimo Configuration File

Usage

```
create_configurator(xml_file = NULL)
```

Arguments

xml_file path to "config.xml". By default a configuration file that is stored in this package (system.file("extdata/config.xml")) is used.

Value

object of class "abimo_config"

default_config *Default ABIMO config.xml path*

Description

Default ABIMO config.xml path

Usage

```
default_config()
```

Examples

```
kwb.abimo::default_config()
```

extdata_file	<i>Get Path to File in This Package</i>
--------------	---

Description

Get Path to File in This Package

Usage

```
extdata_file(..., must_exist = TRUE, dbg = FALSE)
```

Arguments

...	parts of the file path to be passed to <code>system.file</code>
must_exist	if TRUE (the default) and the specified file does not exist, the program stops with an error message
dbg	if TRUE (the default is FALSE) debug messages are shown

get_bagrov_curves_from_abimo	<i>Get Bagrov curves from Abimo software</i>
------------------------------	--

Description

Call Abimo with the `--write-bagrov-table` argument being set and convert the console output to a data frame

Usage

```
get_bagrov_curves_from_abimo()
```

Value

data frame with columns `P_over_Ep` (P/E_p), `Ea_over_Ep` (E_a/E_p), `effectivity` (n-value)

get_xpaths	<i>Return List of XPath Expressions to Address Config Elements</i>
------------	--

Description

Return List of XPath Expressions to Address Config Elements

Usage

```
get_xpaths()
```

Value

List structure containing XPath expressions (see e.g. https://www.w3schools.com/xml/xpath_intro.asp)

install_abimo	<i>Install ABIMO</i>
---------------	----------------------

Description

Install ABIMO

Usage

```
install_abimo(  
    tag = latest_abimo_version(),  
    arch = get_architecture_suffix(),  
    ...  
)
```

Arguments

tag	tag of ABIMO version to be installed, e.g. "v3.2.2"
arch	target system architecture, one of "windows", "linux", "macos"
...	further arguments passed to <code>kwb.abimo::download_assets</code>

read_config	<i>Read Abimo Configuration from XML File</i>
-------------	---

Description

Read Abimo Configuration from XML File

Usage

```
read_config(file = default_config())
```

Arguments

file	path to XML file
------	------------------

read_intermediate_results_from_log	<i>Read Intermediate Results from Log File</i>
------------------------------------	--

Description

Read Intermediate Results from Log File

Usage

```
read_intermediate_results_from_log(  
  file = file.path(tempdir(), "abimo_input_result.log"),  
  pattern_remove = "Start|unknown|angenommen|nicht definiert|std::"  
)
```

Arguments

file	path to log file
pattern_remove	regular expression matching lines to remove from the log file before looking for "variable=expression" assignments

replace_value	<i>Helper function: replace value</i>
---------------	---------------------------------------

Description

searches string for parameter=<pattern_value> and replaces with parameter=<new_value> for all found entries

Usage

```
replace_value(
  string,
  new_value,
  parameter = "etp",
  pattern_value = "\\ "[0-9]+?\\.?[0-9]+?"
)
```

Arguments

string	string with ABIMO config
new_value	new parameter value
parameter	parameter name to search for (default: "etp")
pattern_value	pattern of value field (default: "\\ "[0-9]+?\\.?[0-9]+?"')

Value

returns string with modified parameter = value

Examples

```
### Simple string
string <- '<item bezirke="15,16,18,19,20" etp="807" etps="600" />'
replace_value(string, new_value = 100, parameter = "etp")
replace_value(string, new_value = 100, parameter = "etps")
### Default ABIMO config
config <- readLines(kwb.abimo::default_config())
replace_value(config, new_value = 100, parameter = "etp")
```

run_abimo	<i>Run Abimo with Input Data or Input File</i>
-----------	--

Description

Run Abimo with Input Data or Input File

Usage

```
run_abimo(  
  input_file = NULL,  
  input_data = NULL,  
  output_file = NULL,  
  config_file = NULL,  
  config = NULL,  
  tag = latest_abimo_version(),  
  read_intermediates = FALSE  
)
```

Arguments

input_file	path to input dbf file
input_data	data frame from which a temporary input file is to be generated
output_file	path to output file. By default the output file has the same name as the input file with "_result" appended
config_file	optional. Path to config.xml file
config	optional. Configuration object of class "abimoConfig", as returned by create_configurator. If given, config_file is ignored.
tag	version tag of Abimo release to be used, see https://github.com/KWB-R/abimo/releases .
read_intermediates	if TRUE the values of intermediate variables are read from the log file (if applicable). The default is FALSE.

Value

data frame, read from dbf file that was created by Abimo.exe. If read_intermediates is TRUE, intermediate results are returned in the attribute "intermediates"

```
run_abimo_command_line
```

Run Abimo on the Command Line

Description

Run Abimo on the Command Line

Usage

```
run_abimo_command_line(args, tag = latest_abimo_version())
```

Arguments

args	vector of arguments to be passed to Abimo
tag	version tag of Abimo release to be used, see https://github.com/KWB-R/abimo/releases

Value

The function returns what Abimo.exe sent to the standard output (as a vector of character).

```
write.dbf.abimo
```

writes data.frame into ABIMO-dbf

Description

Saves an existing data.frame into dBase-format and adds "SUB" field to the end of the file as required by ABIMO

Usage

```
write.dbf.abimo(df_name, new_dbf)
```

Arguments

df_name	name of data.frame
new_dbf	path of new ABIMO-input file to be written (.dbf)

Value

dbf file that can be processed by ABIMO

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