Package 'GR2MSemiDistr'

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Type Package

Title A package for hydrological modeling with a semi-distribute GR2M model adaptation

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Description This package run a semi-distributed GR2M model adaptation using the Weighted Flow Accumulation algorithm in TauDEM_537 (required)

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Encoding UTF-8

Depends R (>= 3.6),

Imports airGR, foreach, hydroGOF, ncdf4, raster, rgdal, rgeos, rtop, tictoc, lubridate, abind, sf, exactextractr,

LazyData true

RoxygenNote 7.1.0

R topics documented:

`Create_Forcing_Inputs` *Extract inputs data from gridded datasets and prepare data in airGR format*

Description

Extract inputs data from gridded datasets and prepare data in airGR format

Usage

```
Create_Forcing_Inputs(Subbasins, Precip, PotEvap, Qobs = NULL, DateIni,
  DateEnd, Save = FALSE, Update = FALSE, Resolution = 0.01,
  Buffer = 1.1, Members = NULL, Horiz = NULL)
```

Arguments

Subbasins	Subbasins shapefile.
Precip	Netcdf file for precipitation (in mm/month).
PotEvap	Netcdf file for potential evapotranspiration (in mm/month).
Qobs	Observed streamflow (in m3/s). NULL as default.
DateIni	Initial date of the data (in mm/yyyy format).
DateEnd	Final date of the data (in mm/yyyy format).
Save	Boolean to save database as textfile. FALSE as default.
Update	Boolean to extract the last values for model updating. FALSE as default.
Resolution	Resolution to resample gridded data. 0.01 as default.
Buffer	Multiplicative factor to buffer subbasins extents. 1.1 as default.
Members	Number of ensemble members for model forcasting. NULL as default.
Horiz	Number of months for model forcasting. NULL as default.

Value

Return a database in airGR format (DatesR,P,E,Q).

Optim_GR2MSemiDistr *Model parameter optimization with the SCE-UA algorithm.*

Description

Model parameter optimization with the SCE-UA algorithm.

Usage

```
Optim_GR2MSemiDistr(Data, Subbasins, RunIni, RunEnd, WarmUp = NULL,
  Parameters, Parameters.Min, Parameters.Max, Max.Functions = 5000,
  Optimization = "NSE", No.Optim = NULL)
```

Arguments

Data	File with input data in airGR format (DatesR,P,E,Q).
Subbasins	Subbasins shapefile.
RunIni	Initial date of model simulation (in mm/yyyy format).
RunEnd	Final date of model simulation (in mm/yyyy format).
WarmUp	Number of months for warm-up. NULL as default.
Parameters	GR2M model parameters and correction factor of P and E.
Parameters.Min	Minimum values of GR2M model parameters and correction factor of P and E.

Parameters.Max	Maximum values of GR2M model parameters and correction factor of P and E.
Max.Functions	Maximum number of function evaluation for optimization. 5000 as default.
Optimization	Objective function (NSE, KGE, RMSE).
No.Optim	Regions not to be optimized. NULL as default.

Value

Optimal GR2M model parameters.

Routing_GR2MSemiDistr *Routing discharges for each subbasin.*

Description

Routing discharges for each subbasin.

Usage

```
Routing_GR2MSemiDistr(Model, Subbasins, Dem, AcumIni = NULL,
  AcumEnd = NULL, Save = FALSE, Update = FALSE)
```

Arguments

Model	Model results from Run_GR2MSemiDistr.
Subbasins	Subbasins shapefile.
Dem	Raster DEM.
AcumIni	Initial date for accumulation (in mm/yyyy format). NULL as default
AcumEnd	Final date for accumulation (in mm/yyyy format). NULL as default
Save	Boolean to results as text file. FALSE as default.
Update	Boolean to update a previous accumulation file. FALSE as default.

Value

Export and save an accumulation csv file.

Run_GR2MSemiDistr *Run the GR2M model for 'n' subbasins.*

Description

Run the GR2M model for 'n' subbasins.

Usage

```
Run_GR2MSemiDistr(Data, Subbasins, RunIni, RunEnd, WarmUp = NULL,
  Parameters, IniState = NULL, Save = FALSE, Update = FALSE)
```

Arguments

Data	Dataframe with model input's data in airGR format for 'n' subbasins (DatesR, P_1, P_2,..,P_n, E_1, E_2, ...E_n, Q). If Q is not available please provide only DatesR, P, and E.
Subbasins	Subbasins shapefile with field of 'Area'(in km2),'Region' (letters), and 'COMID (numbers) in the attribute table (required).
RunIni	Initial date for model simulation (in mm/yyyy format).
RunEnd	Final date for model simulation (in mm/yyyy format).
WarmUp	Number of months for warm-up. NULL as default.
Parameters	Vector of model parameters and correction factor of P and E in the following order: X1, X2, fp and fpe. In the case of exist more than one 'Region' (e.g. regions A and B) please provide model parameters in the following order: X1_A, X1_B, X2_A, X2_B, Fp_a, Fp_B, Fpe_A, Fpe_B.
IniState	Initial states variables. NULL as default.
Save	Boolean to save outputs as text files. FALSE as default.
Update	Boolean to update previous outputs text files. FALSE as default.

Value

GR2M model outputs for each subbasin.

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