



HAL
open science

airGRteaching: an R-package designed for teaching hydrology with lumped hydrological models

Guillaume Thirel, Olivier Delaigue, Laurent Coron, Vazken Andréassian,
Pierre Brigode

► To cite this version:

Guillaume Thirel, Olivier Delaigue, Laurent Coron, Vazken Andréassian, Pierre Brigode. airGRteaching: an R-package designed for teaching hydrology with lumped hydrological models. EGU General Assembly 2017, Apr 2017, Vienna, Austria. Geophysical Research Abstracts, 19, pp.18, 2017. hal-02606231

HAL Id: hal-02606231

<https://hal.inrae.fr/hal-02606231>

Submitted on 28 Jun 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



airGRteaching

an R-package designed for teaching hydrology with lumped hydrological models

**Guillaume THIREL¹, Olivier DELAIGUE¹, Laurent CORON²
Vazken ANDRÉASSIAN¹ & Pierre BRIGODE³**

(1) IRSTEA, Hydrology Research Group, Antony, France

(2) EDF, DTG, Toulouse, France

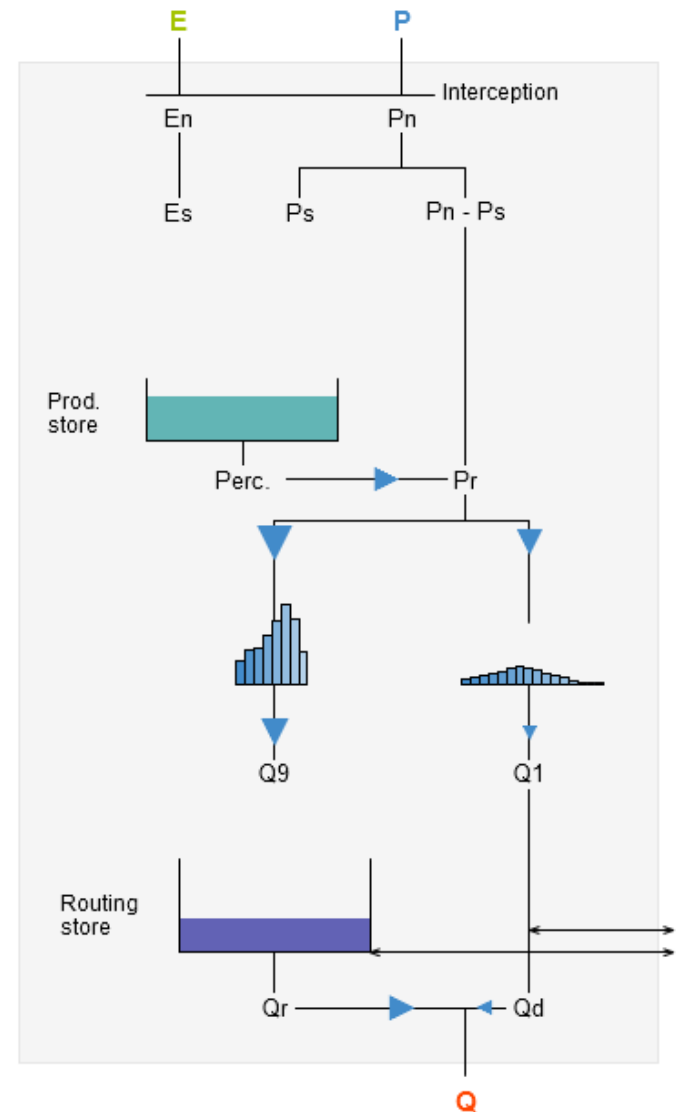
(3) University of Côte d'Azur, Géoazur, Nice, France

26th April 2017



Based on the airGR R-package:

- 3 daily models up to now (including GR4J)



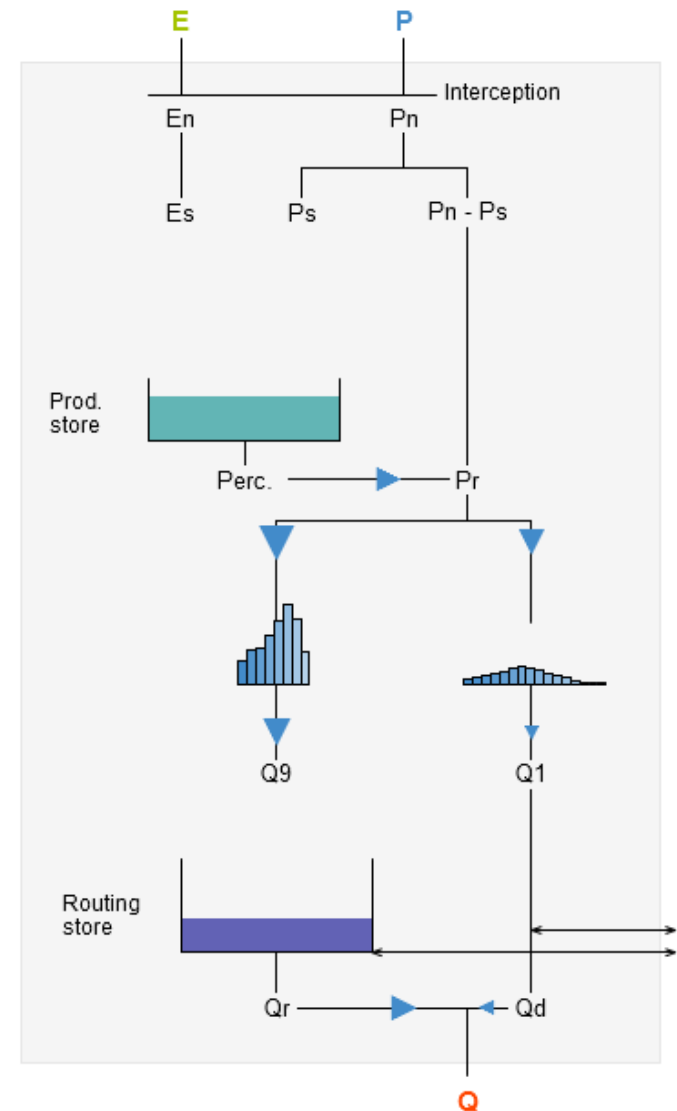
Based on the airGR R-package:

- 3 daily models up to now (including GR4J)

Basic level of programming required

Only 3 simple functions for a full modelling exercise

- Preparation of data
- Model calibration
- Model simulation



Based on the airGR R-package:

- 3 daily models up to now (including GR4J)

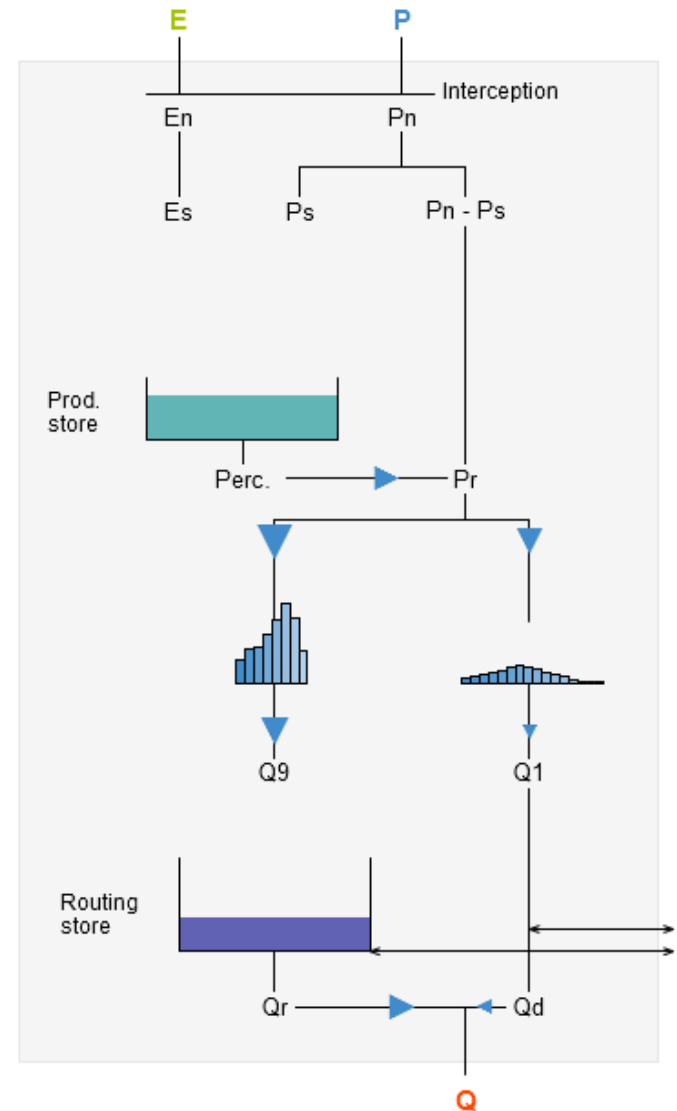
Basic level of programming required

Only 3 simple functions for a full modelling exercise

- Preparation of data
- Model calibration
- Model simulation

Pre-defined graphical plots

- Mouse events and interactive graphics



Based on the airGR R-package:

- 3 daily models up to now (including GR4J)

Basic level of programming required

Only 3 simple functions for a full modelling exercise

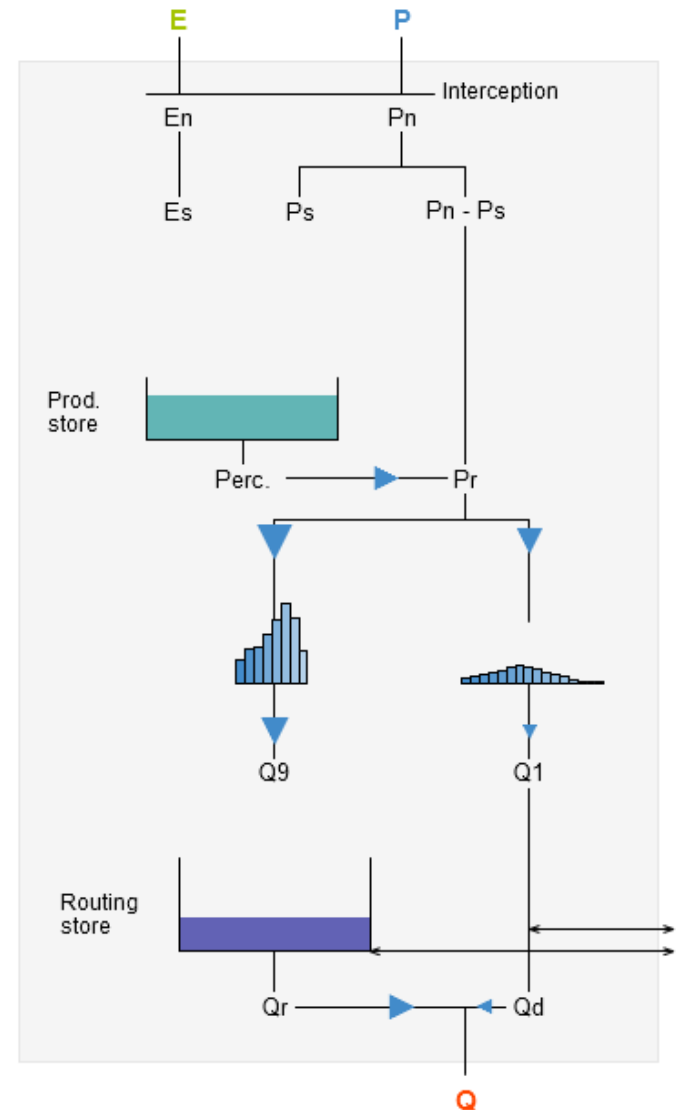
- Preparation of data
- Model calibration
- Model simulation

Pre-defined graphical plots

- Mouse events and interactive graphics

Graphical interface based on a Shiny interface

- Interactive flow simulation with parameters modifications
- Automatic calibration
- Internal variables evolution
- Time period selection



Choose a dataset:
 Low-land basin

Choose a model:
Hydrological model: GR4J
Snow module: None

Parameters values:

X1 (production store capacity): 200 [mm]

X2 (intercatchment exchange coeff.): 0 [mm/d]

X3 (routing store capacity): 100 [mm]

X4 (unit hydrograph time constant): 2 [d]

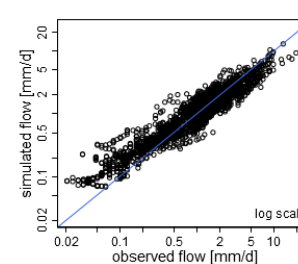
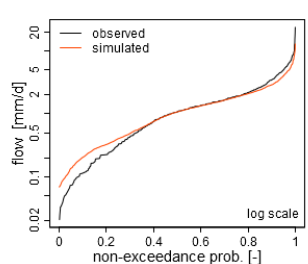
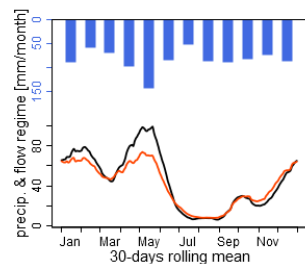
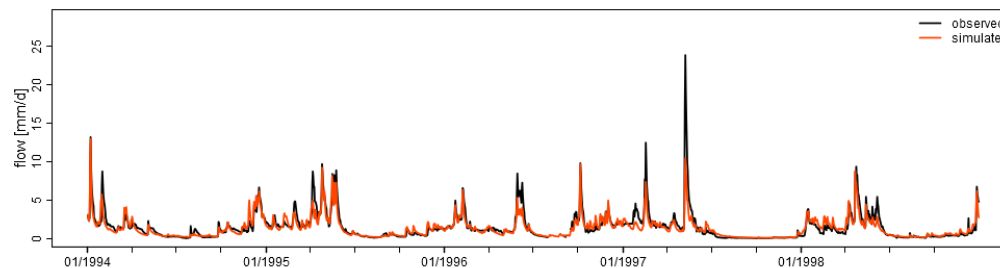
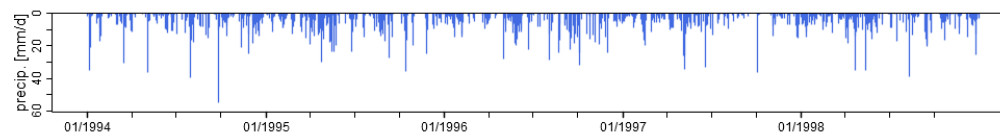
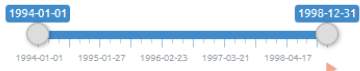
Automatic calibration (with KGE [Q]):

Run

Choose a plot:

Model performance

Select the time window:



Criteria	Value
NSE [Q]	0.78
NSE [log(Q)]	0.87
NSE [sqrt(Q)]	0.86
KGE [Q]	0.71
KGE [log(Q)]	0.54
KGE [sqrt(Q)]	0.82