airGR: a suite of lumped hydrological models in an R-package

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GR is a family of lumped hydrological models designed for flow simulation at various time steps. The models are now available in a flexible R-package called airGR (Coron et al., 2016, in prep.). The models can easily be implemented on a set of catchments with limited data requirements.
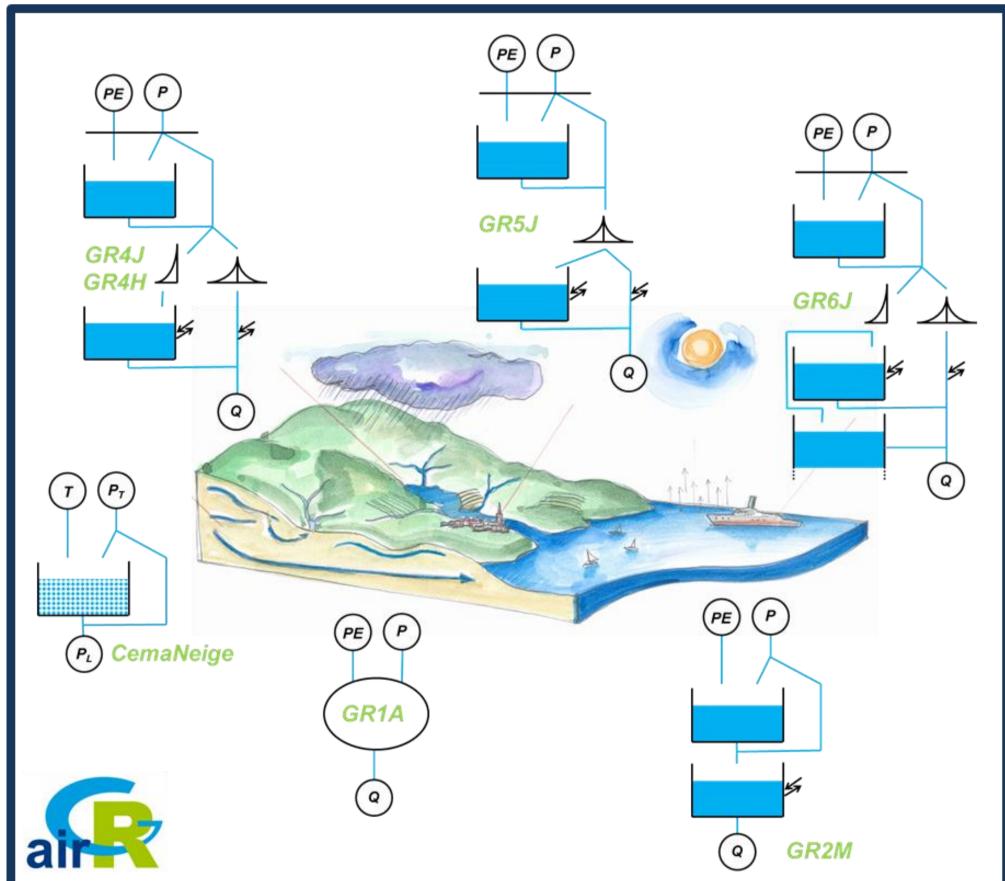
The GR hydrological models

The GR models were designed with the objective to be as efficient as possible for flow simulation at various time steps, ranging from hourly to interannual (Perrin et al., 2009).

The model structures were developed with the intention to have warranted complexity and limited data requirements. The models can be applied on a wide range of conditions, including snowy catchments thanks to the CemaNeige snow routine.
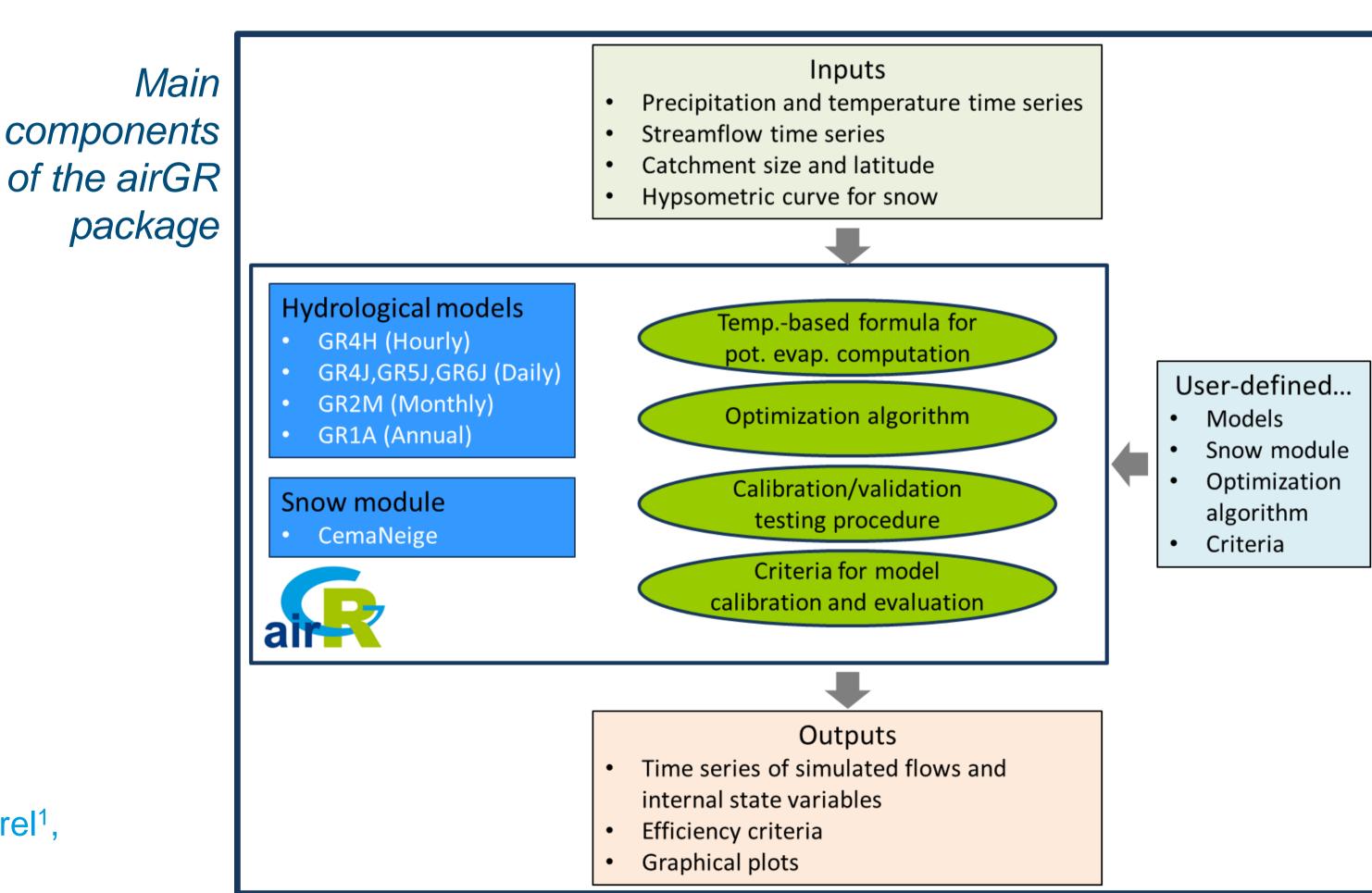

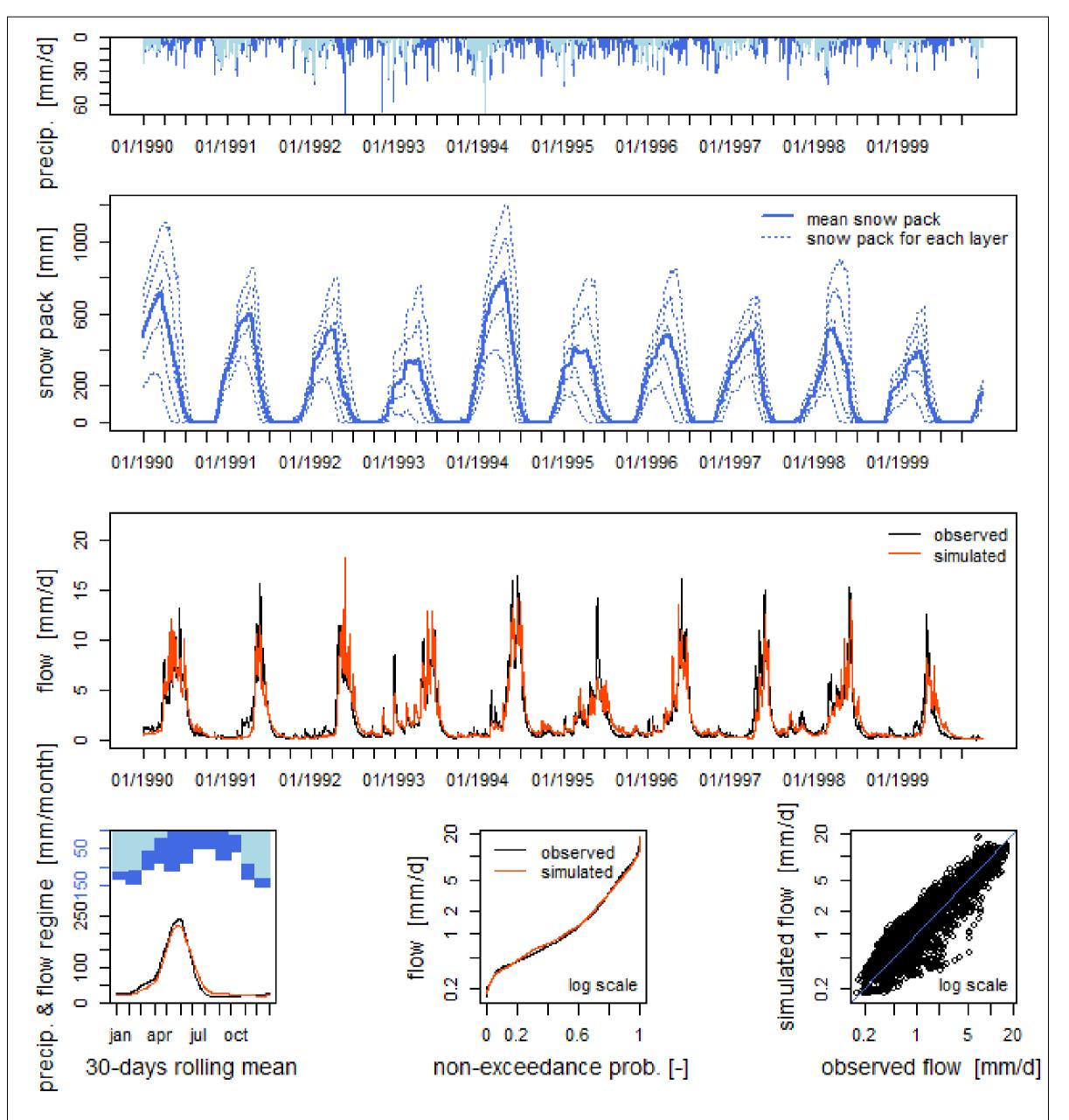*Schematic diagram of the GR models*

The airGR functionalities

- The R-package was designed to easily implement the proposed models on a set of study catchments
- Data requirements are limited to precipitation, temperature and streamflow time series
- The package includes one calibration procedure, testing options and a set of efficiency criteria
- Computation times are limited thanks to the use of fortran routines to run the models
- Outputs include numerical criteria, graphical plots and simulated time series of flows and internal state variables
- The package is flexible enough to include external user-defined models, efficiency criteria or optimization algorithms.

Main components of the airGR package

Example of graphical output produced by the airGR package. The GR4J and CemaNeige models were used here.

Download the airGR package

The airGR package is available after email registration on the following website:
http://webgr.irstea.fr/airgr/?lang=en

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Download the package: http://webgr.irstea.fr/airgr/?lang=en

www.irstea.fr

References

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Perrin, C., C. Michel et V. Andréassian, 2009. A set of hydrological models (Chapter 16). *Environmental Hydraulics*. J. M. Tanguy. Paris, ISTE Ltd, John Wiley & Sons. Volume 2 Mathematical models: 493-509.