

Uncertainty propagation in hydrological modeling

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CONTEXT

- Lumped Parameter Hydrological Models (LPHM) aims to establish water table elevation and/or streamflow predictions using meteorological forcing data such as precipitation, temperature, evapotranspiration.
- The ability of LPHM to provide reliable predictions strongly depends on the model structure, the calibration procedure, the forcing data, calibration data as well as initial conditions.
- Recent developments in Earth Observation systems reach an estimation of various component of the continental cycle at high spatial and temporal resolutions (1 km, daily).

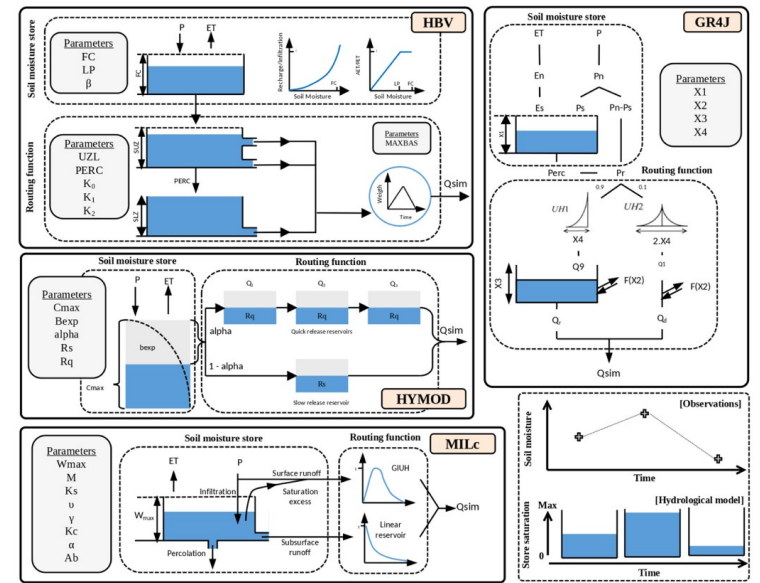


Fig. 1 : Lumped Parameter Hydrological Models

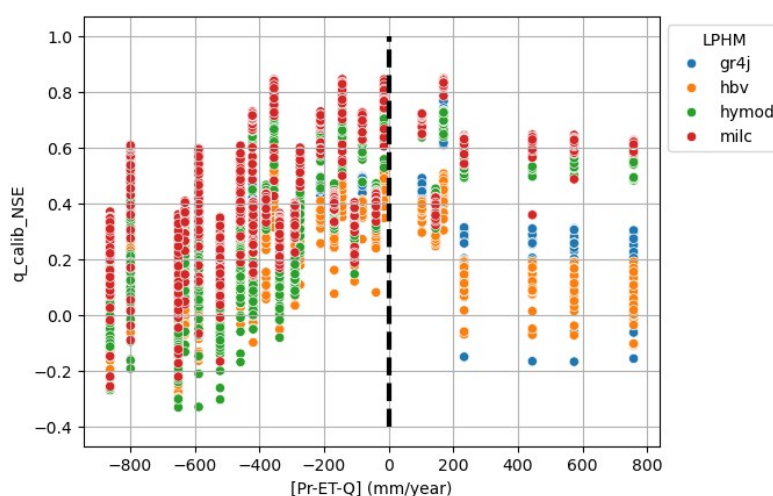


Fig. 2 : Effect of coupling various precipitation and evapotranspiration products on the predictive performance LPHMs.

SCIENTIFIC OBJECTIVES

The overall workflow counts several objectives :

- Assessing the potential added value of using downscaled precipitation/evapotranspiration products for better predictive performance of LPHMs over small catchment in the Mediterranean Region.
- Identifying the potential compensation between precipitation, evapotranspiration and LPHMs.
- Evaluation of various precipitation and evapotranspiration products over the Mediterranean Region.

THE MISSION

- Conduct an extensive literature review of high-resolution precipitation and evapotranspiration products over the Mediterranean Region.
- Prepare a complete database for a large sample of river catchments in the Mediterranean Region including an ensemble of precipitation and evapotranspiration product as well as *in-situ* measurements.
- Calibrate LPHMs over the complete database and apply the analysis required to fulfill the main objectives of the proposed workflow.

Required profile

- General knowledge of hydrology and a strong interest in hydrological modeling.
- Good skills in programming in particular with python.

THE RESEARCH UNIT: HydroSciences Montpellier

- HydroSciences Montpellier is a mixed research units (UM, CNRS, IRD, IMT Ales) dedicated to the water cycle under global change.
- HSM address research activities on the various components of the water cycle as well as the relation with human activities, regarding both quantity and quality.
- Students will be able to integrate themselves into a rich and welcoming environment of scientific diversity. They will share the building with key structures of the water community in Montpellier (OSU OREME, UNESCO ICIREWARD).

