
Picture by Eric Sauquet

University of Zurich[UZH]

# Are temporary stream observations useful for the calibration of a lumped hydrological model?

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# Motivation

Temporary streams…

… cover more than half of the global river network.

… are highly dynamic.

… are unique habitats.

… are easy to observe.

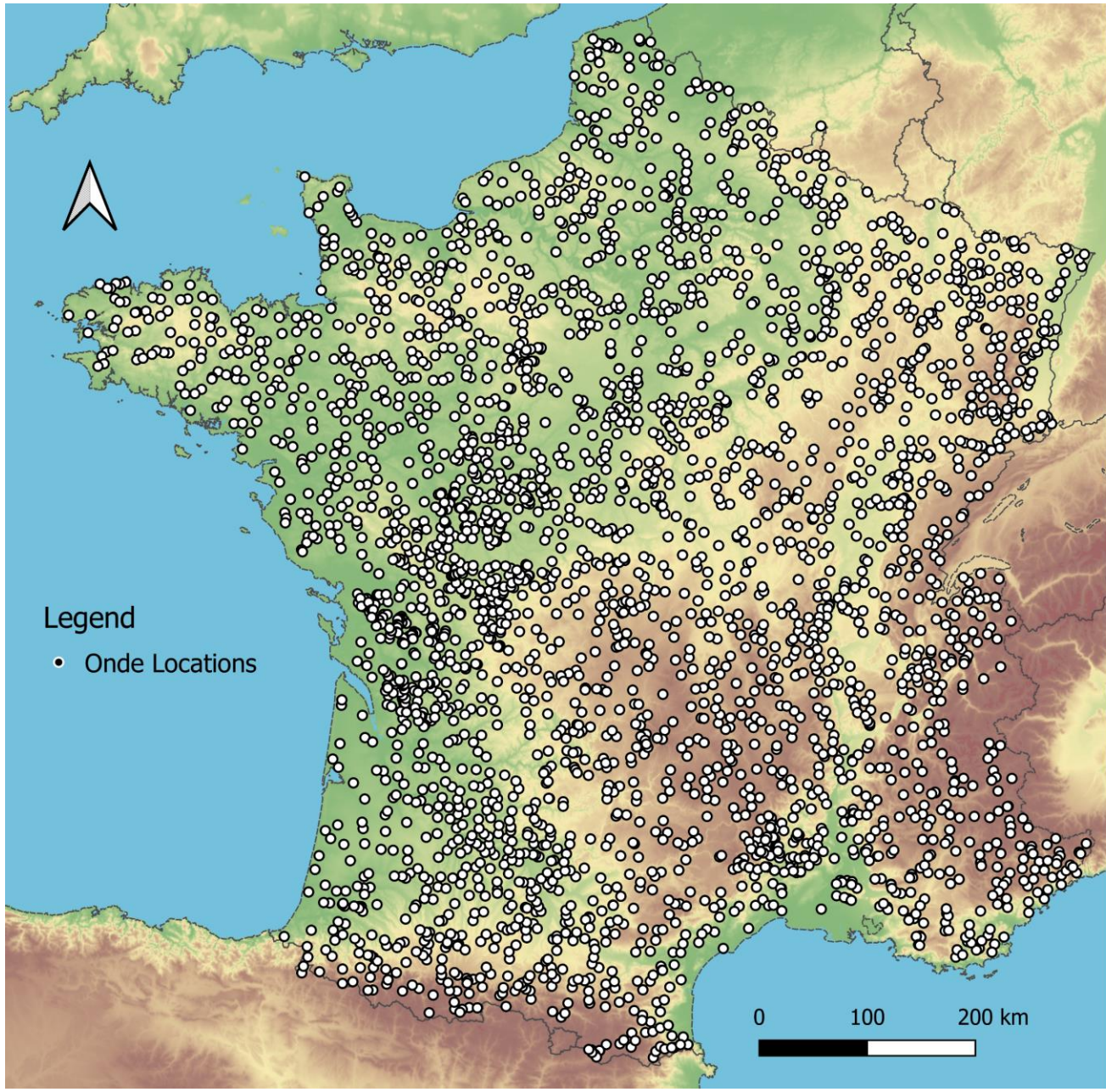
… have not been used in the calibration of a lumped hydrological model yet.

→ **Potential of temporary stream observations to improve model predictions in data-scarce regions.**

Pictures by Josep Fortesa

# Data sets

- **O**bservatoire **N**ational **D**es **E**tiages network (ONDE)
  - 3351 sites in France
  - Dry, standing, or flowing
  - Monthly from April - September since 2012
    → Emphasis: summer low flow



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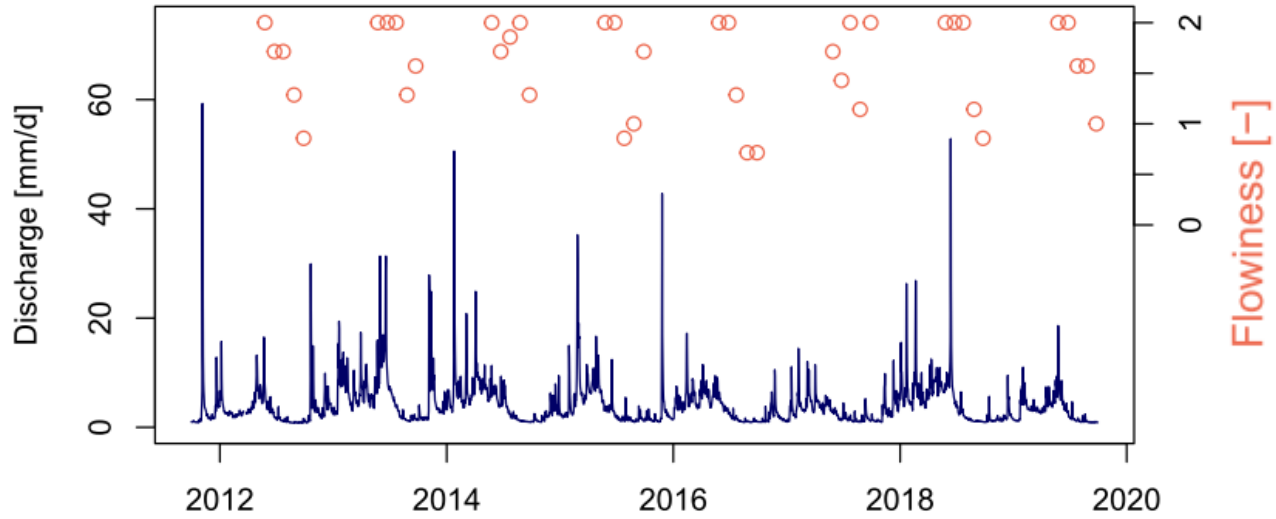
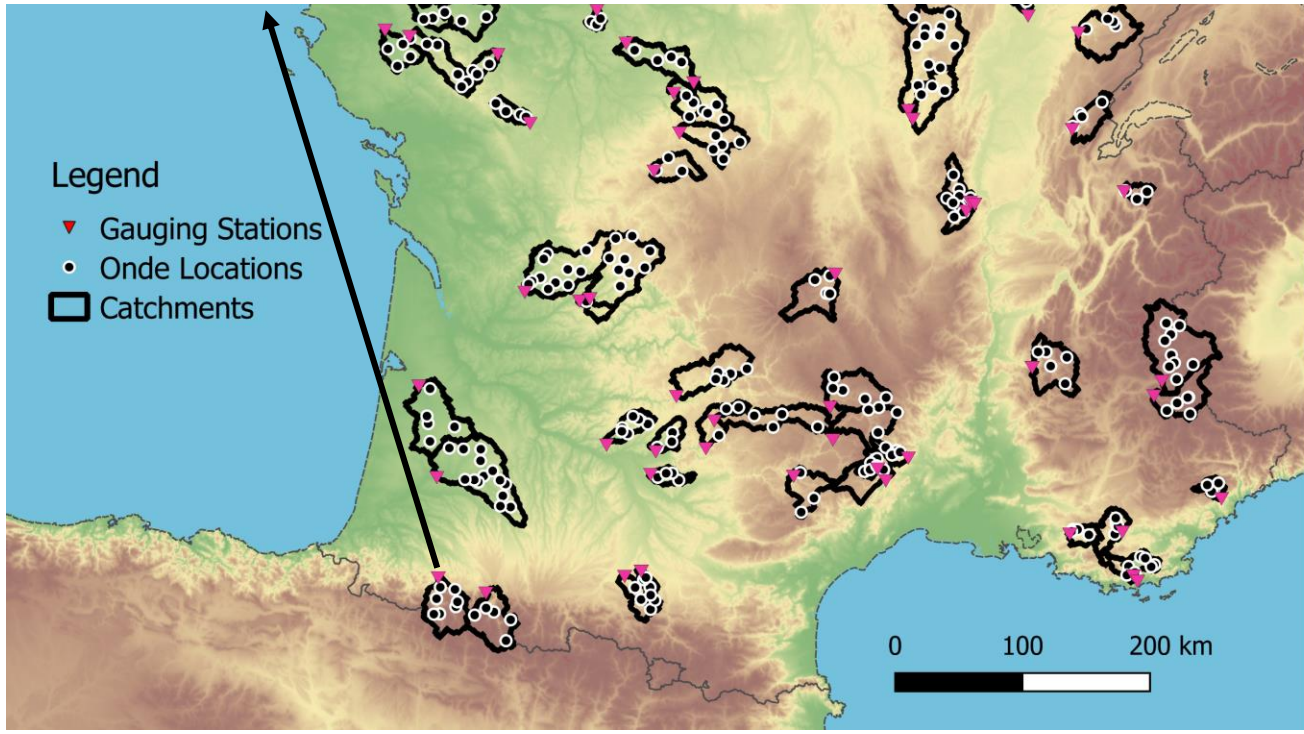
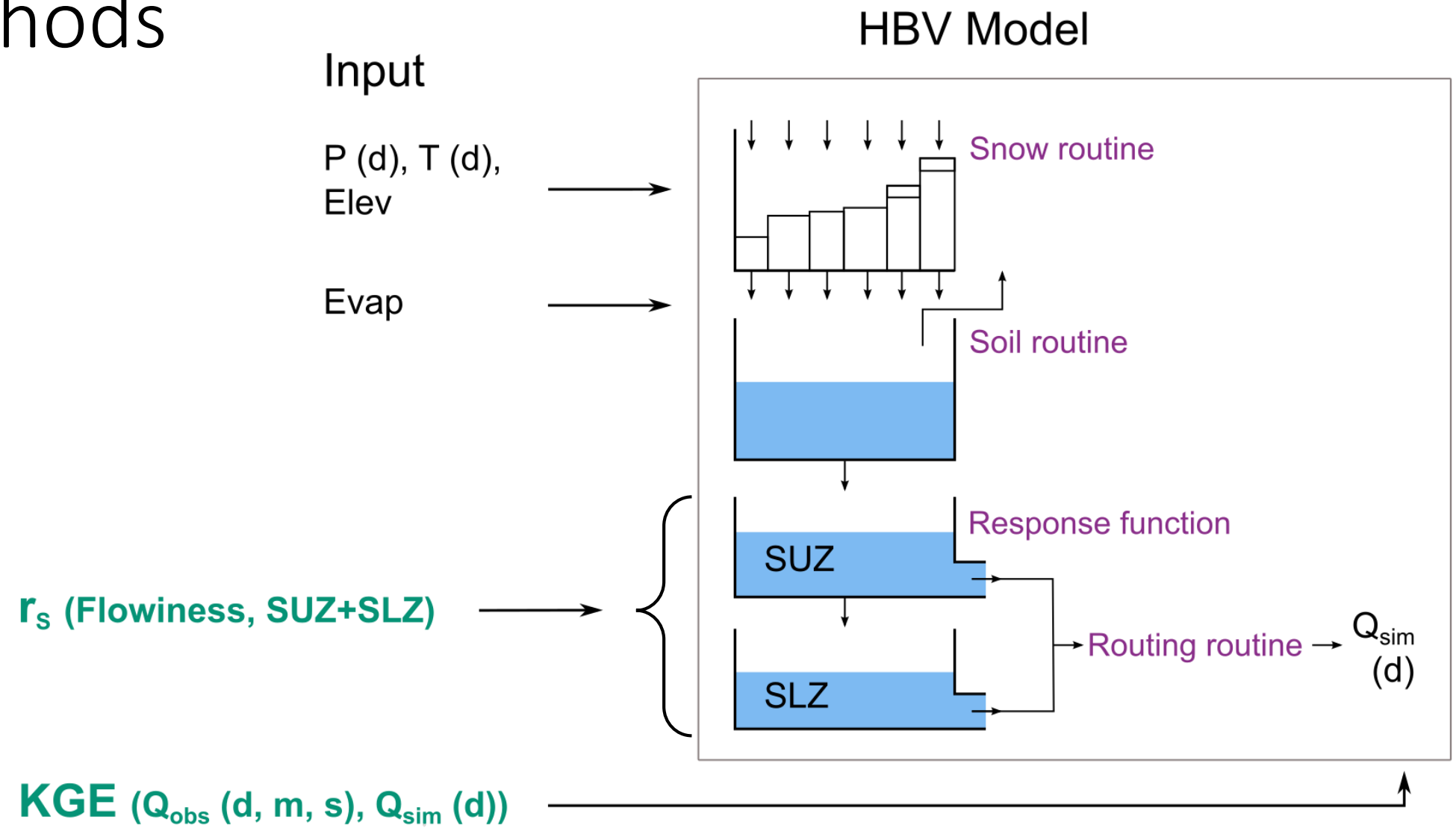
- Discharge (Eaufrance)
- Climate
  (SCOPE Climate; Caillouet et al. (2019))

→ 92 catchments



# Methods

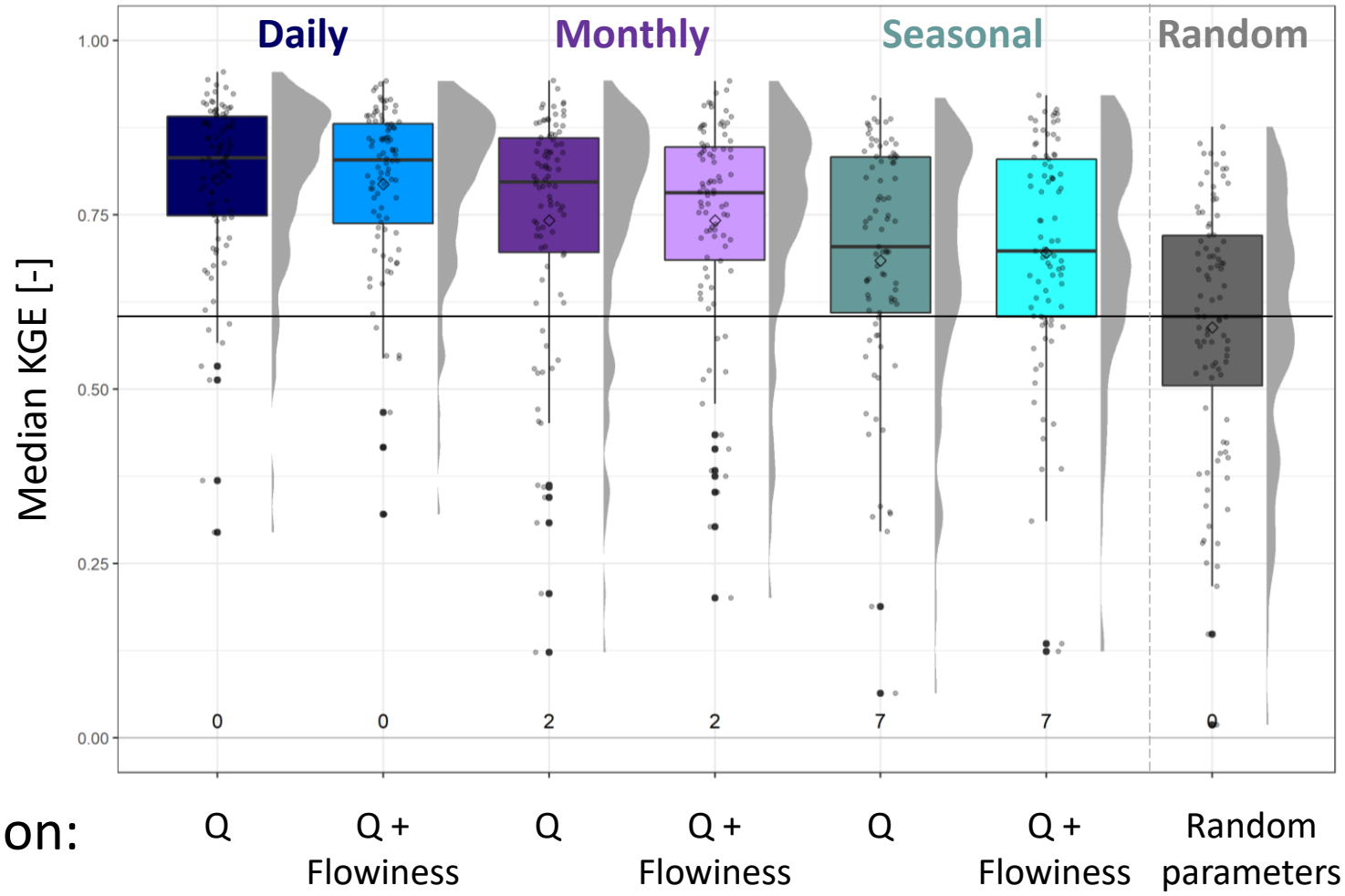



modified after Seibert (2000)

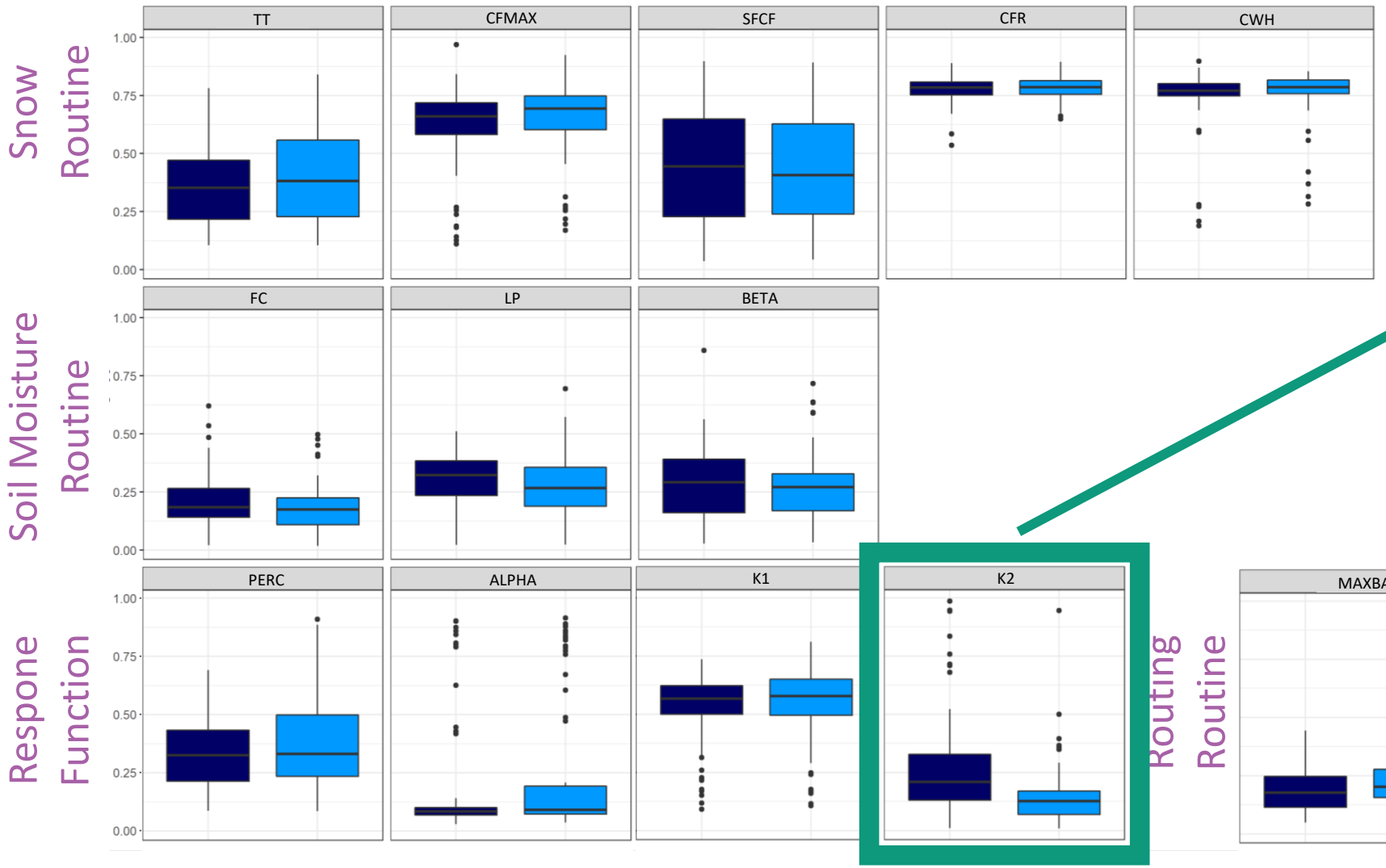
# Results – Model efficiency

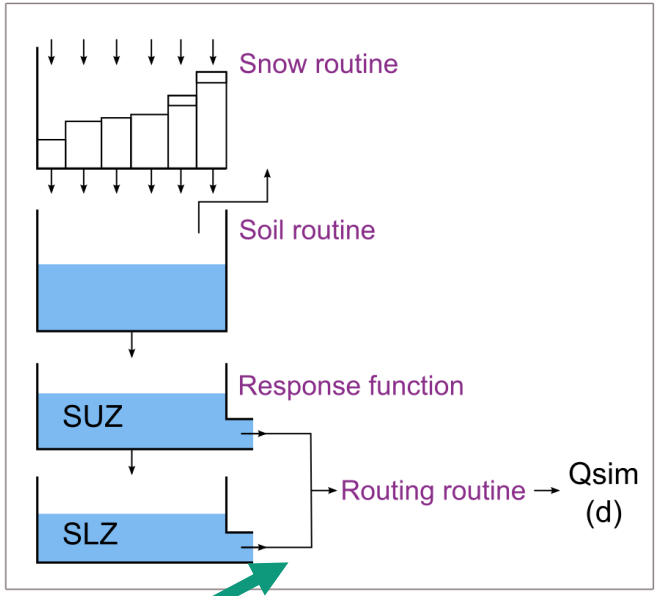
Validation period

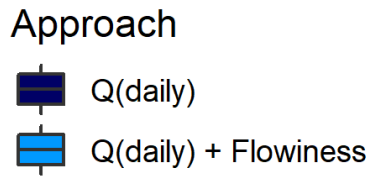
Median KGE of all 92 catchments.



# Parameter ranges (percentile: 0.1 - 0.9)



# Conclusion

Adding temporary stream data to the calibration of a lumped hydrological model….

… does not change overall model performance.

… helps to better constrain parameters that influence the baseflow.

… improves predictions of low flows for some catchments.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# References


- Seibert, J., 2000. Multi-criteria calibration of a conceptual runoff model using a genetic algorithm. Hydrol. Earth Syst. Sci. 4, 215–224. https://doi.org/10.5194/hess-4-215-2000

Data sets:

- Climate: Caillouet, L., Vidal, J. P., Sauquet, E., Graff, B., & Soubeyroux, J. M. (2019). SCOPE Climate: A 142-year daily high-resolution ensemble meteorological reconstruction dataset over France. *Earth System Science Data*, *11*(1), 241-260.
  - Caillouet, L., Vidal, J.-P., Sauquet, E., Graff, B., and Soubeyroux, J.-M.: SCOPE Climate: precipitation (Version v1.0.0), [Data set], Zenodo, https://doi.org/10.5281/zenodo.1299760, 2018a.
  - Caillouet, L., Vidal, J.-P., Sauquet, E., Graff, B., and Soubeyroux, J.-M.: SCOPE Climate: temperature (Version v1.0.0), [Data set], Zenodo, https://doi.org/10.5281/zenodo.1299712, 2018b.
  - Caillouet, L., Vidal, J.-P., Sauquet, E., Graff, B., and Soubeyroux, J.-M.: SCOPE Climate: Penman-Monteith reference evapotranspiration (Version v1.0.0), [Data set], Zenodo, https://doi.org/10.5281/zenodo.1251843, 2018c.
- Discharge: http://www.hydro.eaufrance.fr/
- Flowiness (ONDE data set): https://onde.eaufrance.fr/