Hydrological modelling in the French part of the Meuse in the CHIMERE21 project

6th Symposium on the hydrological modelling of the Meuse basin

Liège, Belgium
13/09/2019

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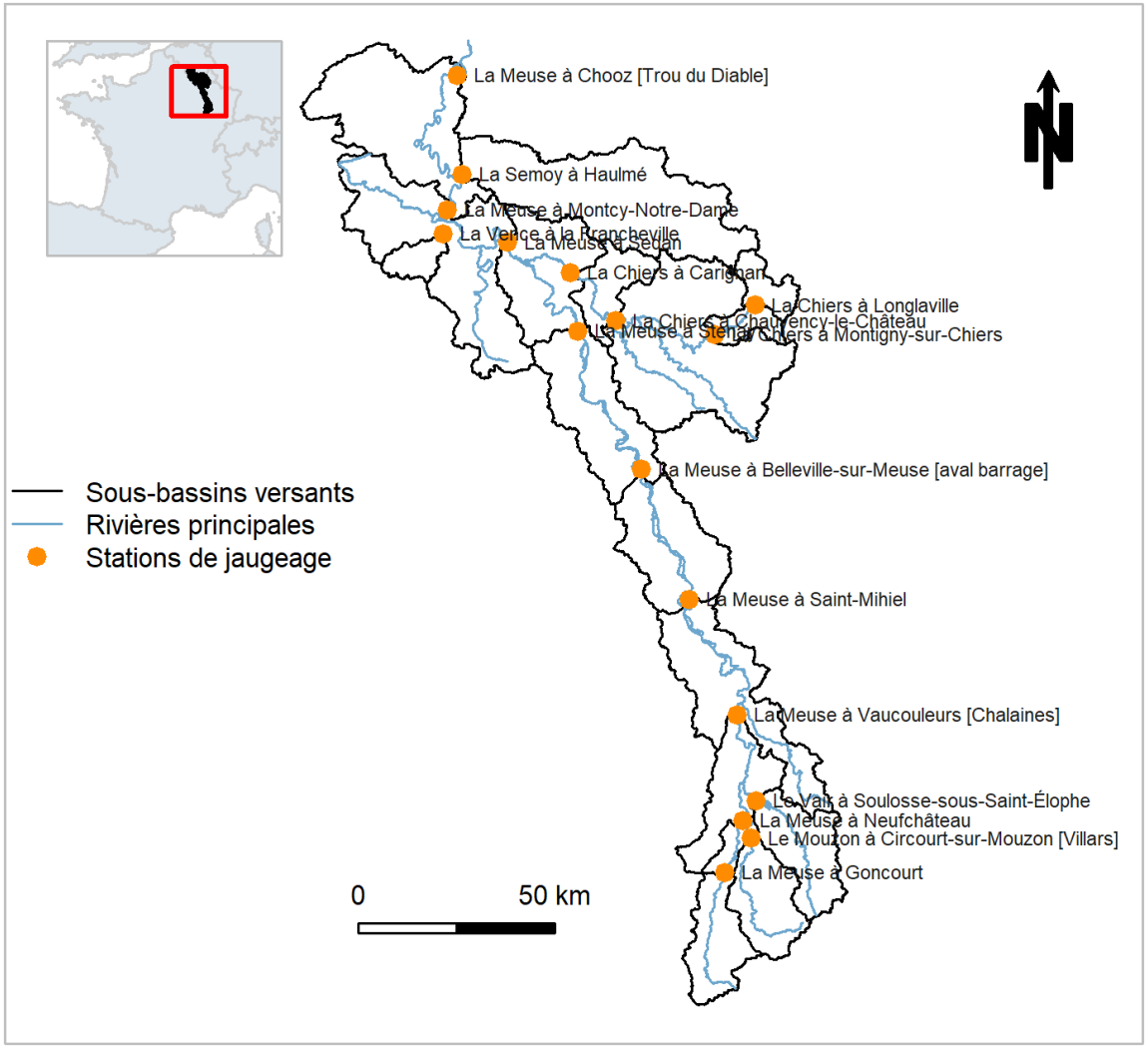
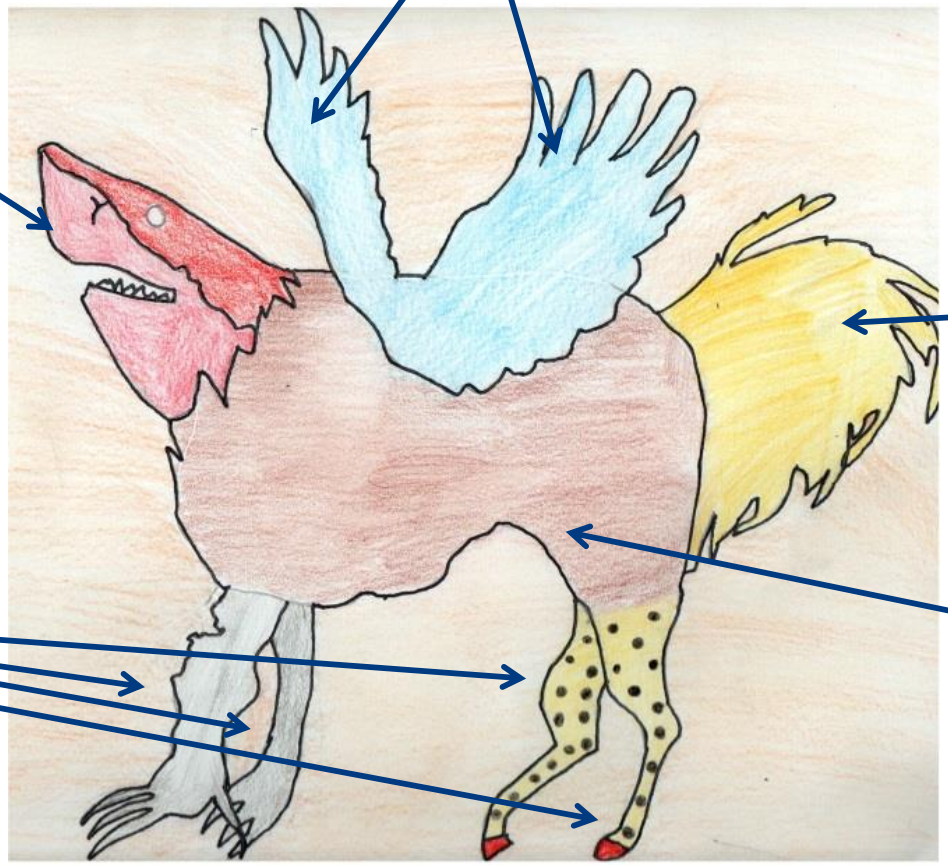
The CHIMERE21 project

- Funding: Rhin-Meuse Water Agency
- Aim: evaluate the impact of future climate change on the French Meuse, update former projections
- Approach: multi-modelling, assessment of uncertainty, communication to stakeholders



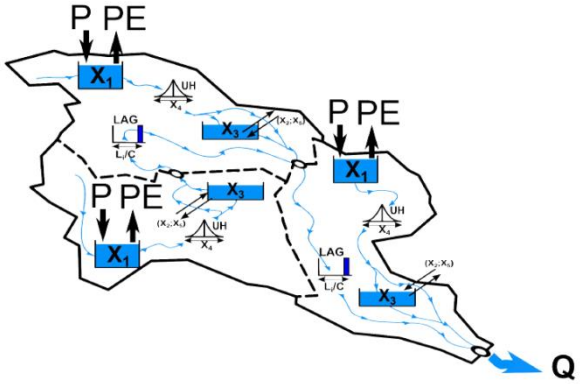
The CHIMERE21 project



The 4 hydrological models

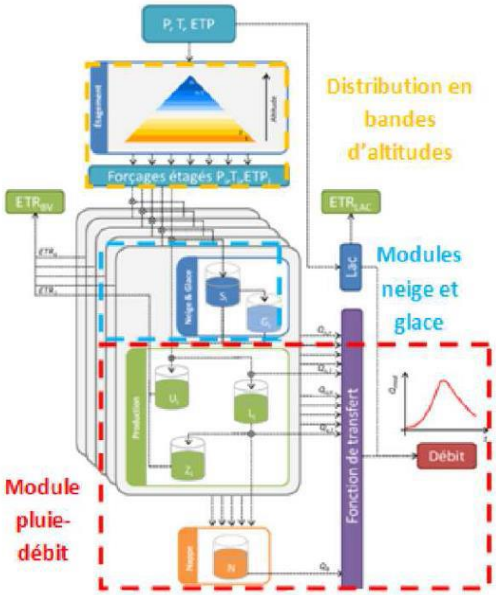
irstea

GRSD:



EDF

MORDOR:



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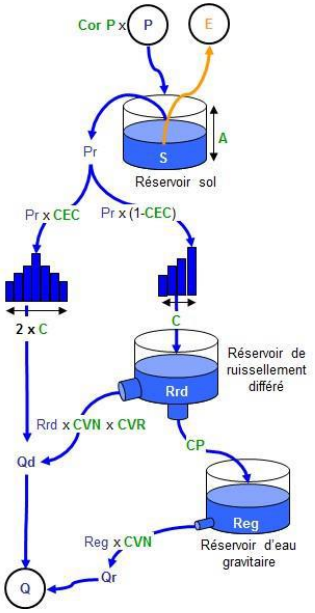
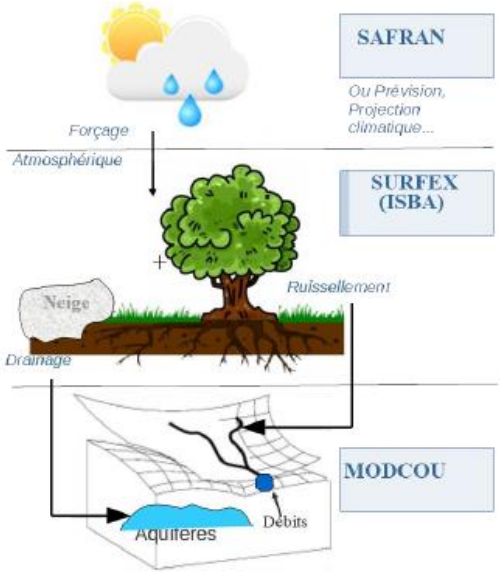
PRESAGES:



METEO FRANCE

SIM2:



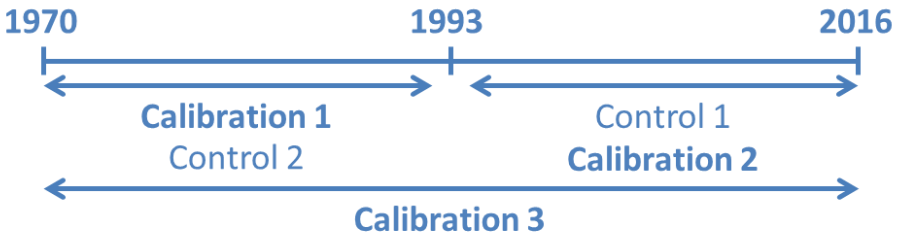
The 4 hydrological models

GRSD: Conceptual
Semi-distributed on subcatchments

MORDOR: Conceptual
Semi-distributed on subcatchments

PRESAGES: Conceptual model
Lumped

SIM2: Physically-based
Distributed over grid meshes



calibration on whole range range
+ calibration focused on low flows

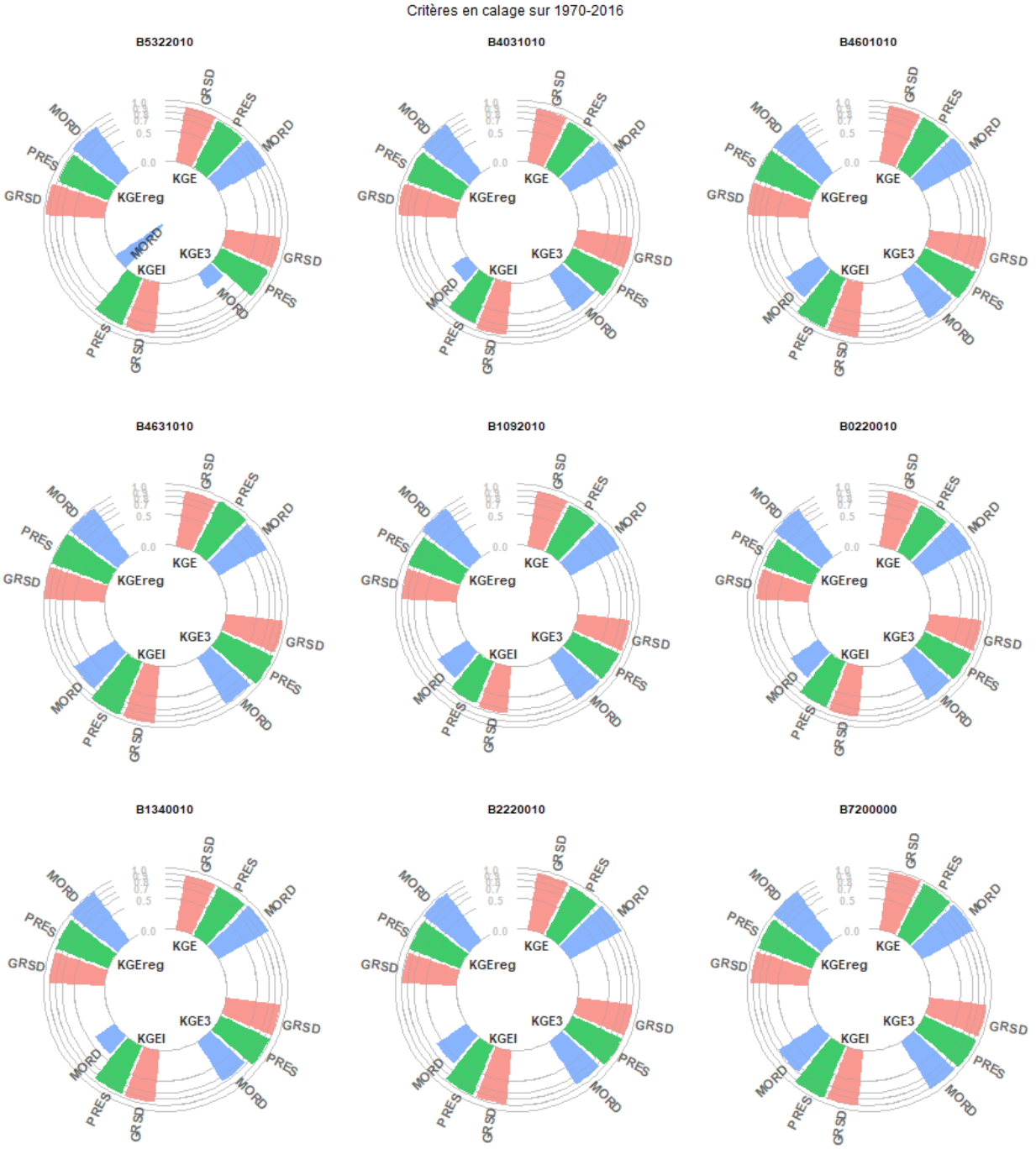
Specific adjustments for some subcatchments for the conceptual models

- Semoy @Haulme: catchment mostly in Belgium
- Chiers @Longlaville and @Montigny-sur-Chiers: catchment partly in Belgium
- Vence @Francheville: karstic catchment

- Solutions:
  - Correction of precipitation for the Belgian territory (+15%)
  - Correction of surface for the karstic catchment (+20%)

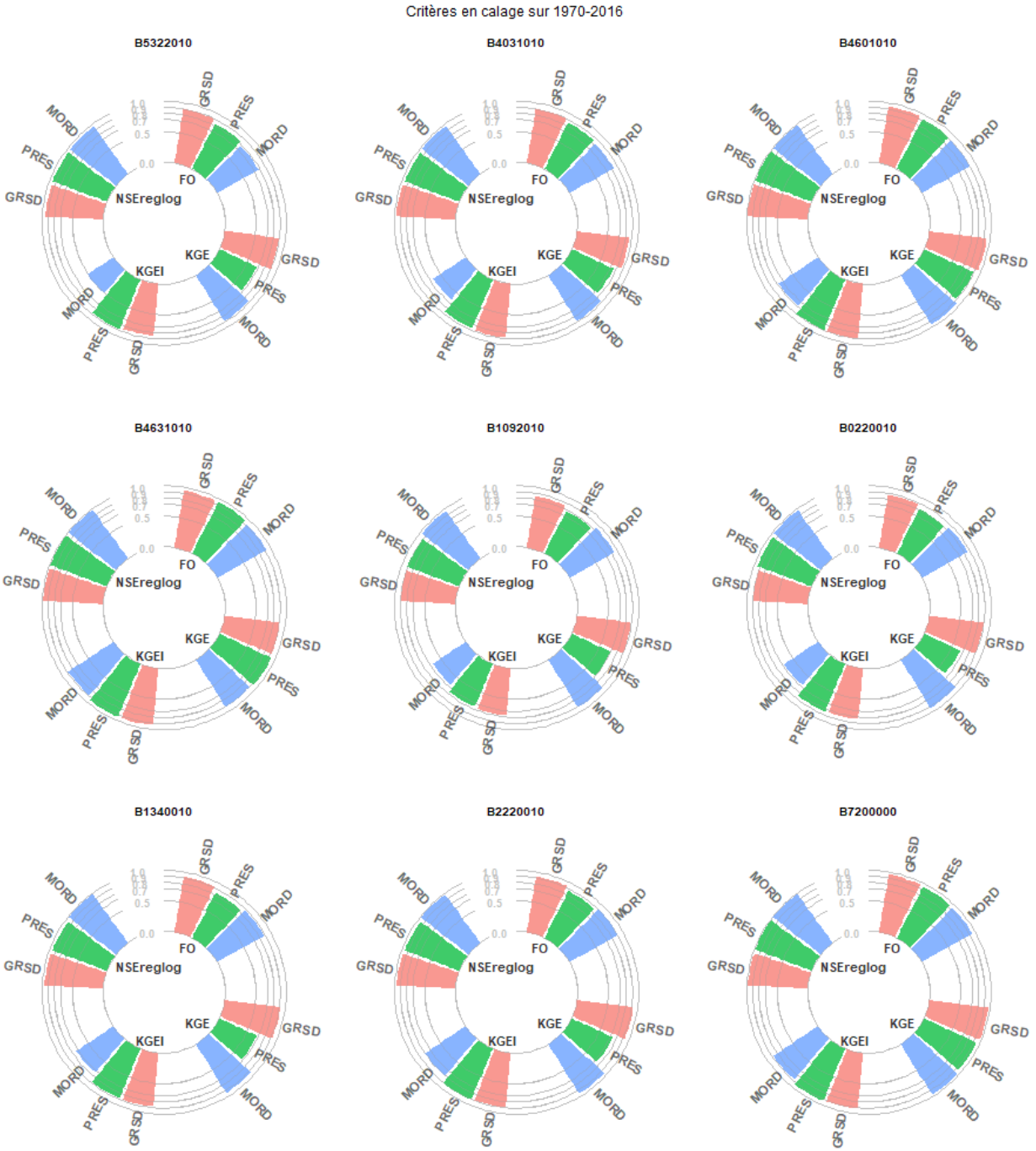
Whole range calibration results

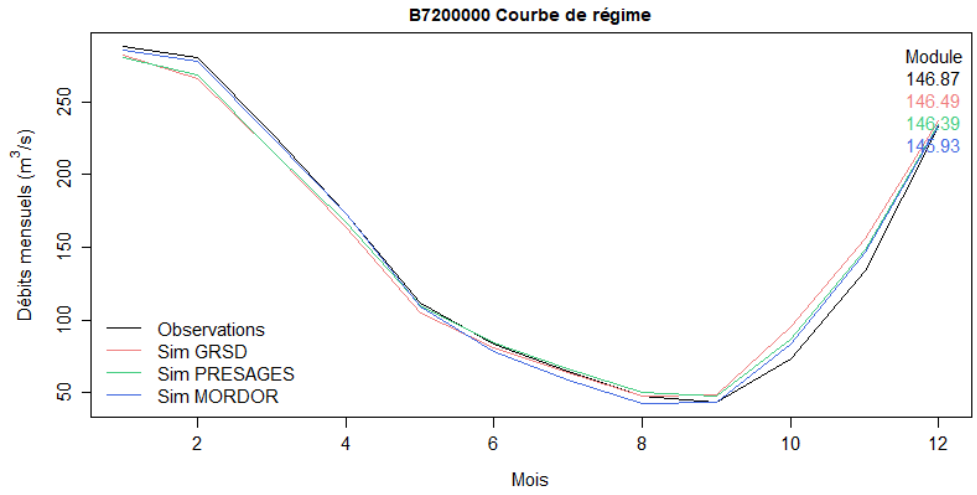
- KGE = KGE(Q)
- KGEI = KGE(1/Q)
- KGEreg = KGE(reg(Q))
- KGE3 = mean(KGE, KGEI, KGEreg)

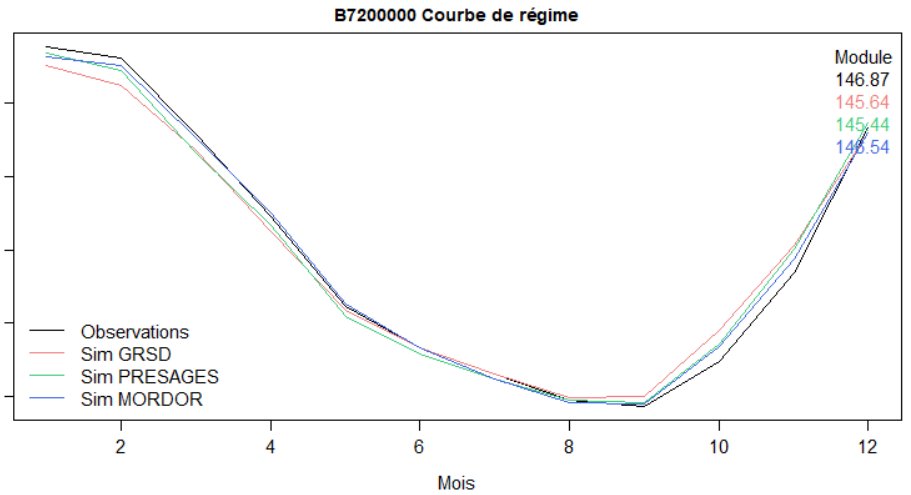


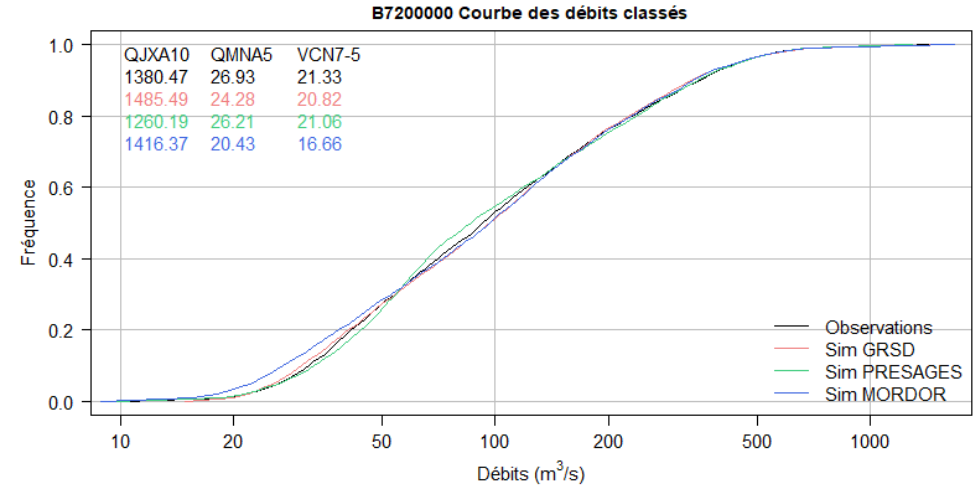
Low flows focused calibration results

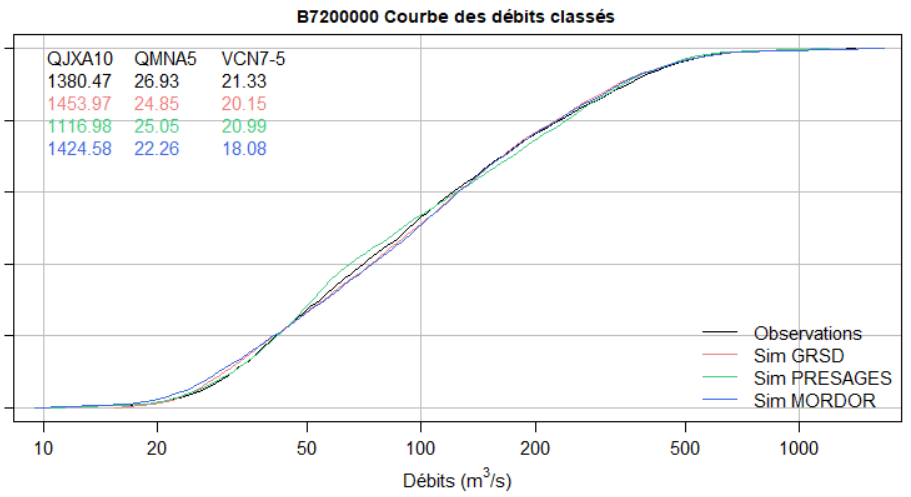
- KGE = KGE(Q)
- KGEI = KGE(1/Q)
- NSEreglog = NSE(log(reg(Q)))
- FO = mean(KGE, KGEI, NSEreglog)









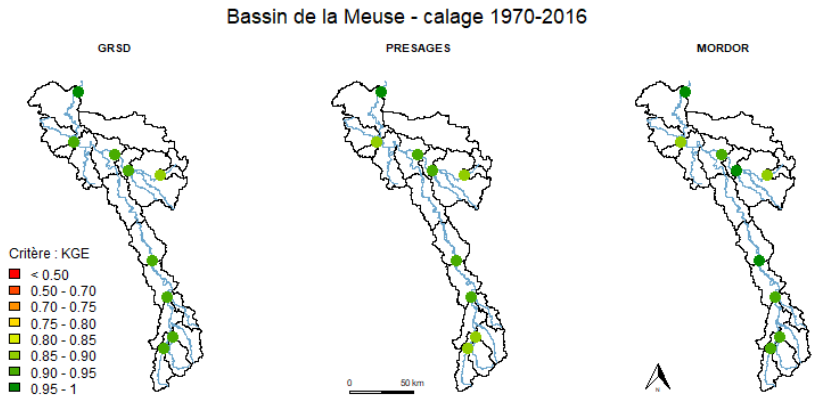


Whole-range calibration

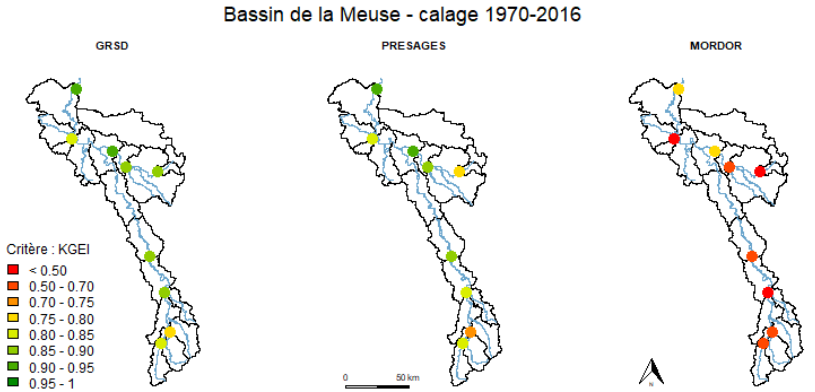
Low-flow calibration

Whole-range calibration

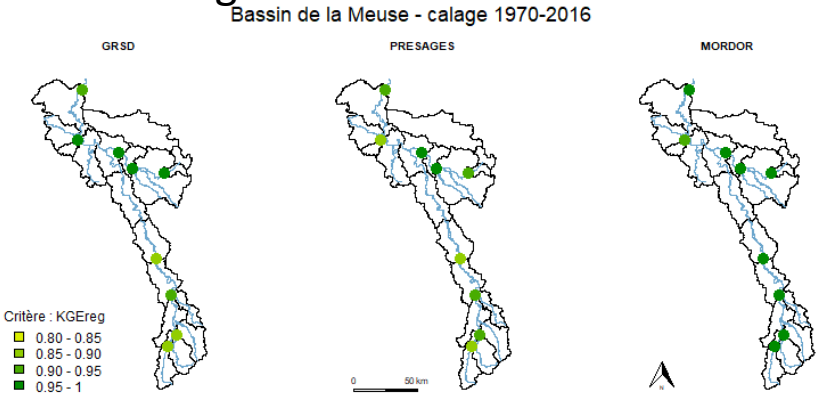
- KGE:



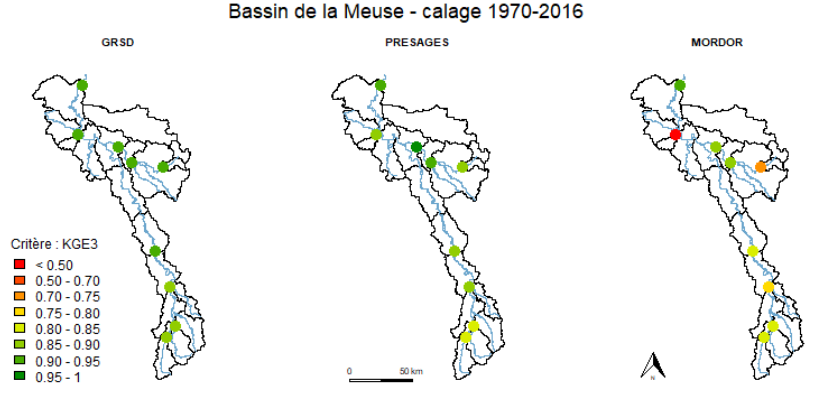
- KGEI:



- KGEreg:

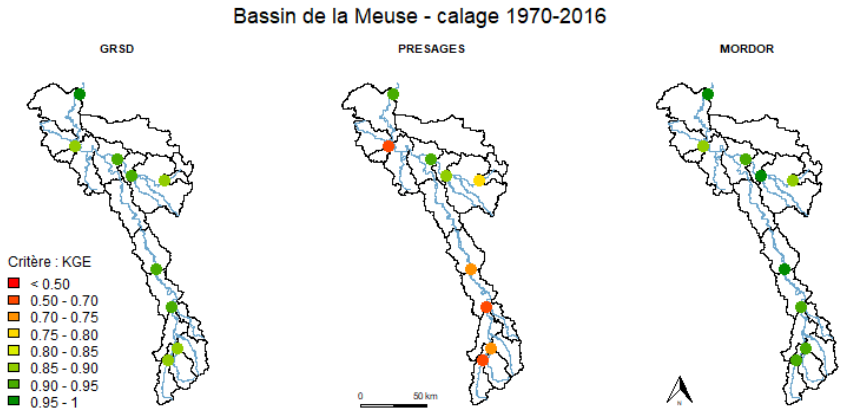


- KGE3:

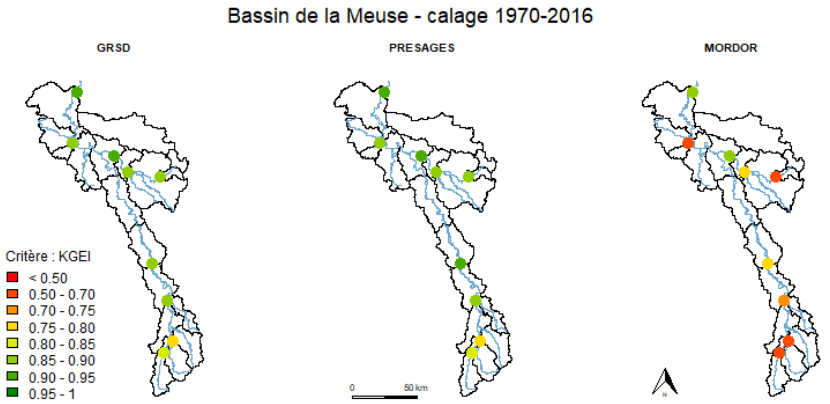


Low-flow calibration

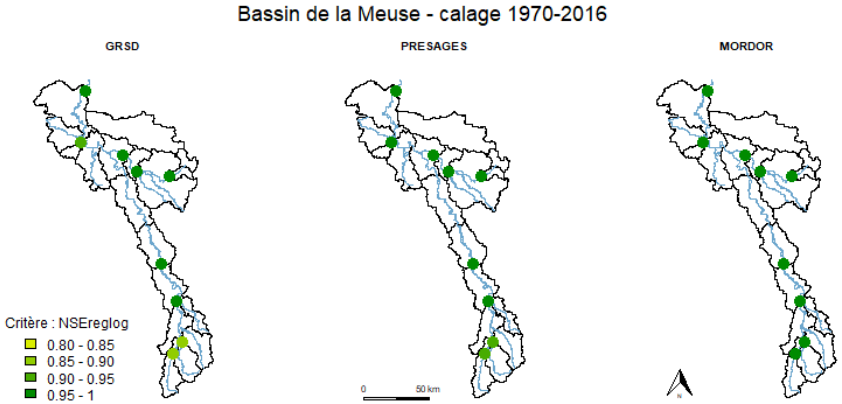
- KGE:



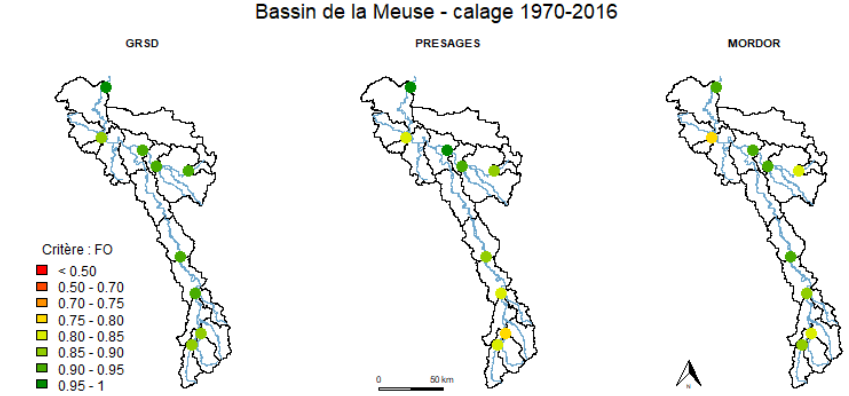
- KGEI:



- KGEreg:

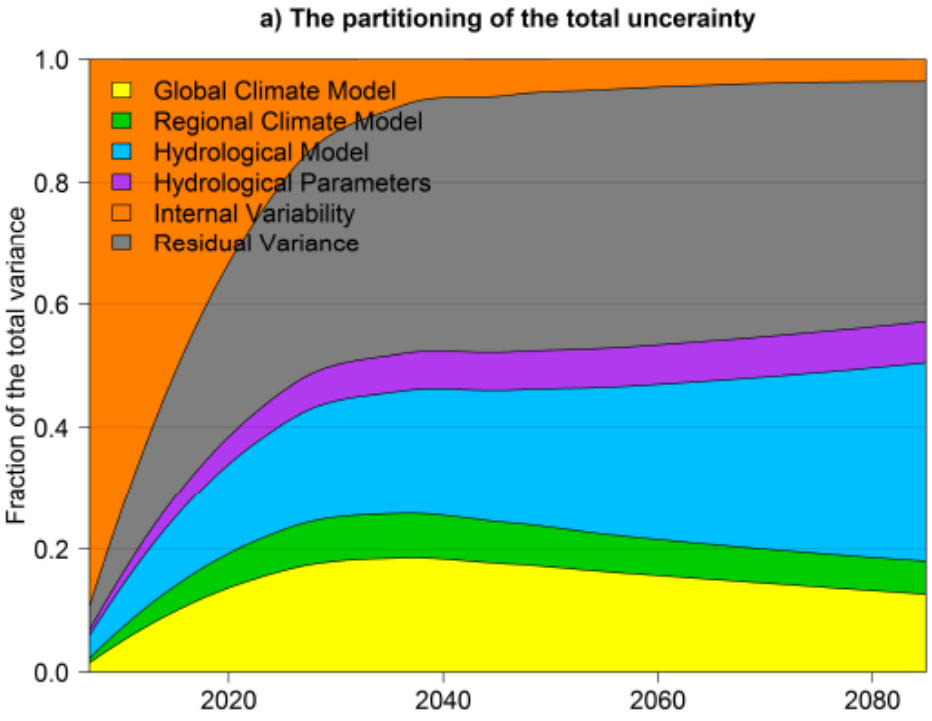


- KGE3:

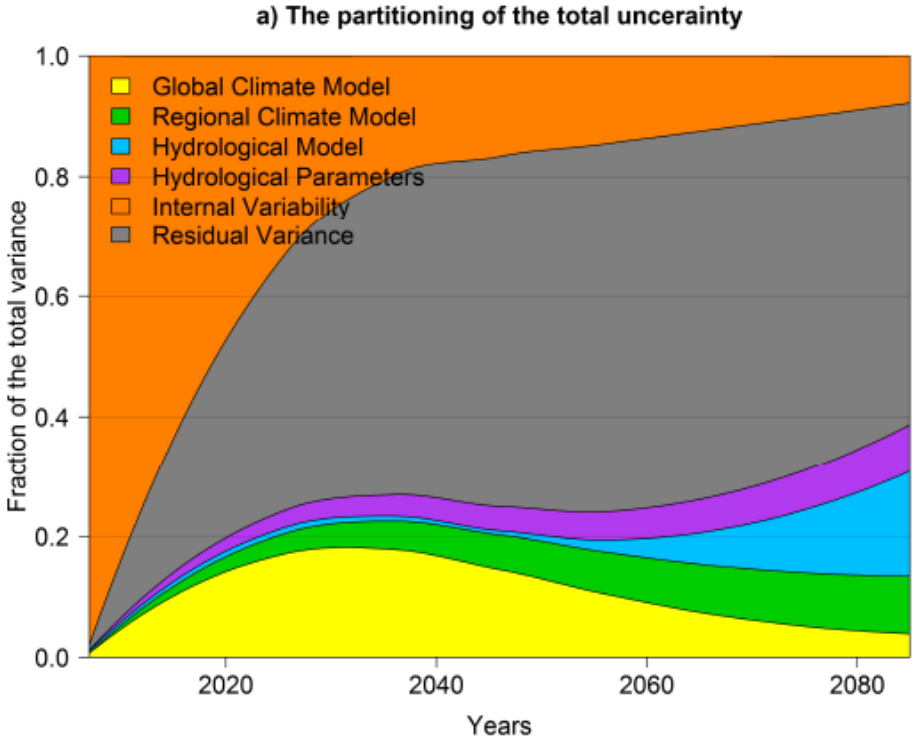


Future works

- Integrate SIM2 simulations
- Analysis of the evolution of the uncertainties from different sources



Low flows



High flows

Produced by: Thibault Lemaitre-Basset

Thanks!
Questions?

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