Future discharge of the French tributaries of the Rhine

Guillaume Thirel, Alban de Lavenne, J. P. Wagner, Charles Perrin, K. Gerlinger, G. Drogue, Benjamin Renard

Future discharge of the French tributaries of the Rhine: A semi-distributed multi-model approach using CMIP5 projections

Needs to update our knowledge of future discharge with new projections
Sources of uncertainties considered in the project: ARs, GCMs, downscaling methods, HMs, HMs calibration conditions, sampling

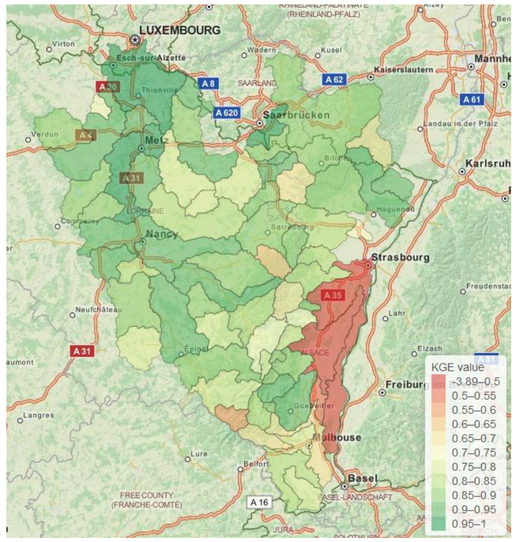


Fig. 1: Performance of the GRSD model over the MOSARH21 area

Methodology

- Multi-hydrological model (HM) approach *(only one on this poster)*
- Re-use of AR4 projections from former projects
- Use of new AR5 projections *(not in this poster)*
- Disentangling sources of uncertainty

Uncertainties

- Use of a Bayes estimator for the sampling uncertainty
- Calibration on different past periods of the GRSD model (de Lavenne et al., 2016): split-sample test + rolling periods
- Several GCMs and downscaling methods will be used

End-users

Methods and hydrological indices are discussed and adapted to the Water Agency demands in order to answer to their operational needs

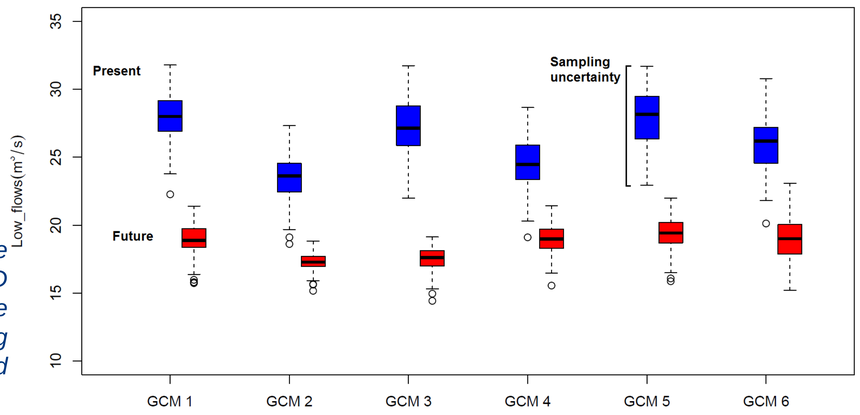
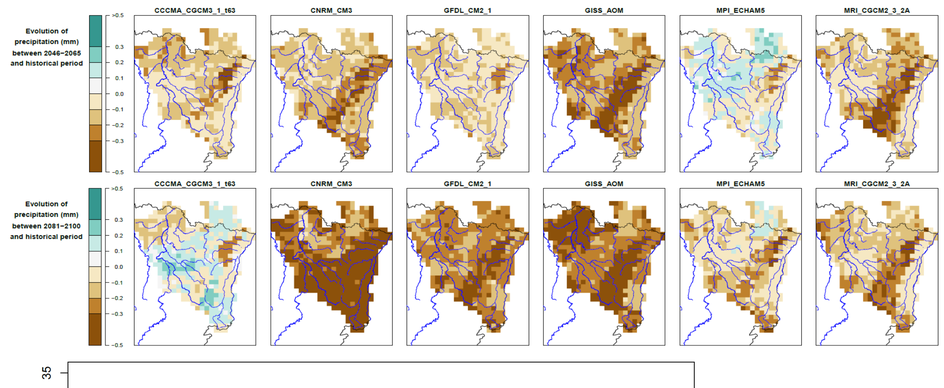


Fig. 3: Low flows values (monthly discharge with a 5-year return period) for the GRSD model calibrated over a single period. Here the impacts of GCMs, time periods and sampling uncertainty can be distinguished

Fig. 2: Evolution of precipitation for AR4 Scratch08 projections



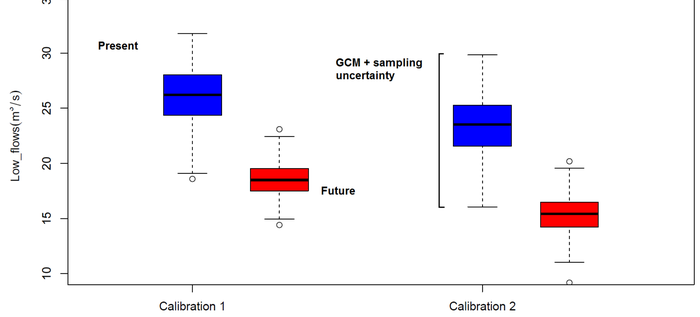


Fig. 4: Impact of the calibration of the GRSD model on low flows

Conclusions

GCM and sampling uncertainties are of a higher order on low flows than calibration
We will investigate the sources of uncertainty on different ranges of flow

Reference

De Lavenne A., Thirel G., Andréassian V., Perrin C., Ramos M.-H., Spatial variability of the parameters of a semi-distributed hydrological model, *Proc. IAHS*, 93, 1–8, 2016, in press

G. Thirel[1], A. de Lavenne[1], J.-P. Wagner[2], C. Perrin[1], K. Gerlinger[3], G. Drogue[4], and B. Renard[5]
1: UR HBAN, HYDRO Team – Irstea Antony, France
2: DREAL Lorraine, Metz, France
3: HYDRON, Karlsruhe, Germany
4: LOTERR, Univ. Lorraine, Metz, France
5: UR HHLY, Irstea Lyon, France

Contacts :
Guillaume Thirel ; guillaume.thirel@irstea.fr (poster presenter)
Jean-Pierre Wagner ; jean-pierre.wagner@developpement-durable.gouv.fr

The MOSARH21 project is funded by the French Rhin-Meuse Water Agency

www.irstea.fr

EGU General Assembly 2016 – 18-22 April 2016 – Vienna – EGU2016-8946