How will water resources change in France? An ensemble projection using a semi-distributed model during the 21st century.

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EXPLORE2 Les futurs de l'eau

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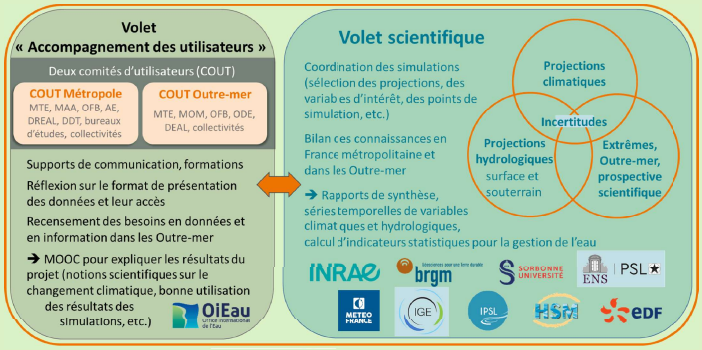
The Explore2 initiative

Assessment of climate change impacts on water resources

- Describe the future climate over France
- Evaluate changes in river flow regimes
- Characterize the extremes

A multi-scenario and multi-model approach

- 3 greenhouse gas concentration trajectories
- 19 pairs of global and regional climate models
- 2 bias correction methods
- 7 hydrological models



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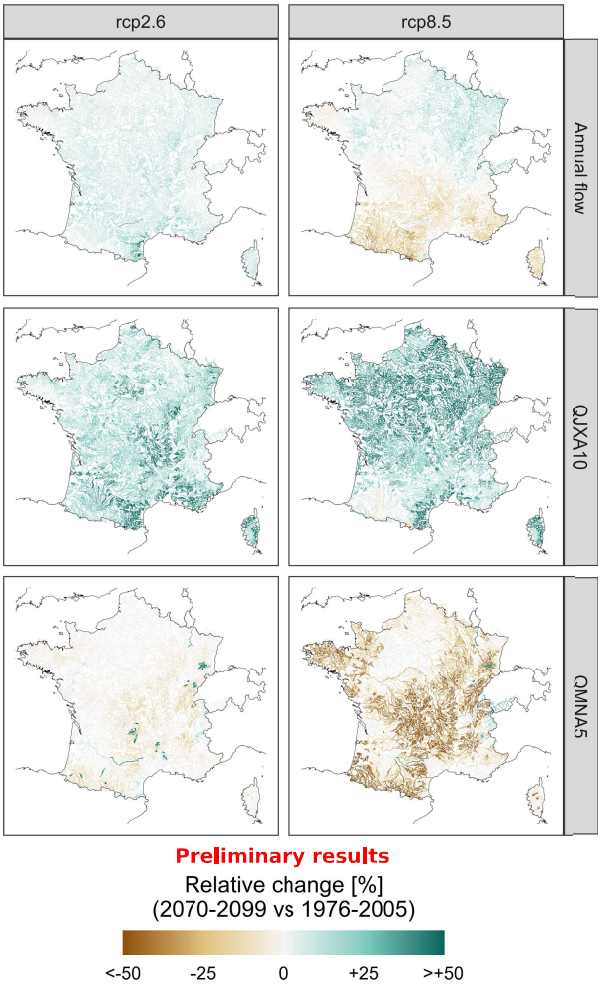
Methods

One hydrological model (GRSD)

- GR5J semi-distributed
- Calibrated using SAFRAN and observed daily discharge over 611 stations (1976-2019)
- Simulation of daily discharges for 4044 stations

Three hydrological indicators shown here

- Mean annual flow
- Annual maximum daily flow with a 10-year return period (QJXA10)
- Annual minimum monthly flow with a 5-year return period (QMNA5)



Conclusions

- Contrasted reponse of river flow in France (wetter in north vs. drier in south)
- Extreme flows are more likely to change than annual flow in 2070-2099
- Streamflows are less impacted in the optimistic (rcp2.6) than in the pessimistic (rcp8.5) scenario

Next: to include all hydrological models and to evaluate uncertainties in hydrological projections

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