

How seasonal forecast could help a decision maker : an example of climate service for water resource management

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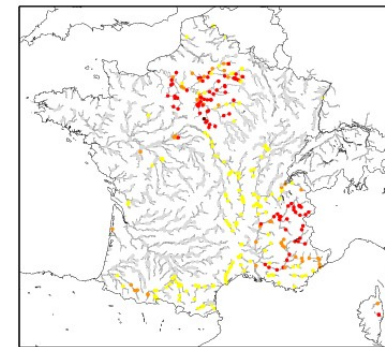
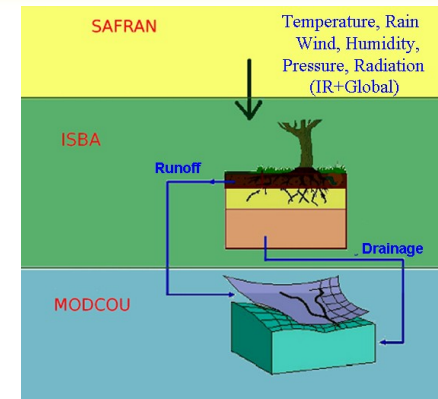
Climate Service Direction

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Context

- An operational SVAT suite, used for climate monitoring
SAFRAN-ISBA-MODCOU (operational since 2004, over France) : 8km daily analysis of soil parameters and river flow + reanalysis 1958-2015
- EPS-ISBA-MODCOU : 10-days forecast
- Some encouraging results of forcing ISBA-MODCOU with Seasonal Forecast (SF) to predict river flow (Singla, 2012)



EUPORIAS : an opportunity to develop and assess a concrete application (prototype for a stakeholder)

Outline

■ Our stakeholder EPTB Seine Grands-Lacs

- its roles, its needs

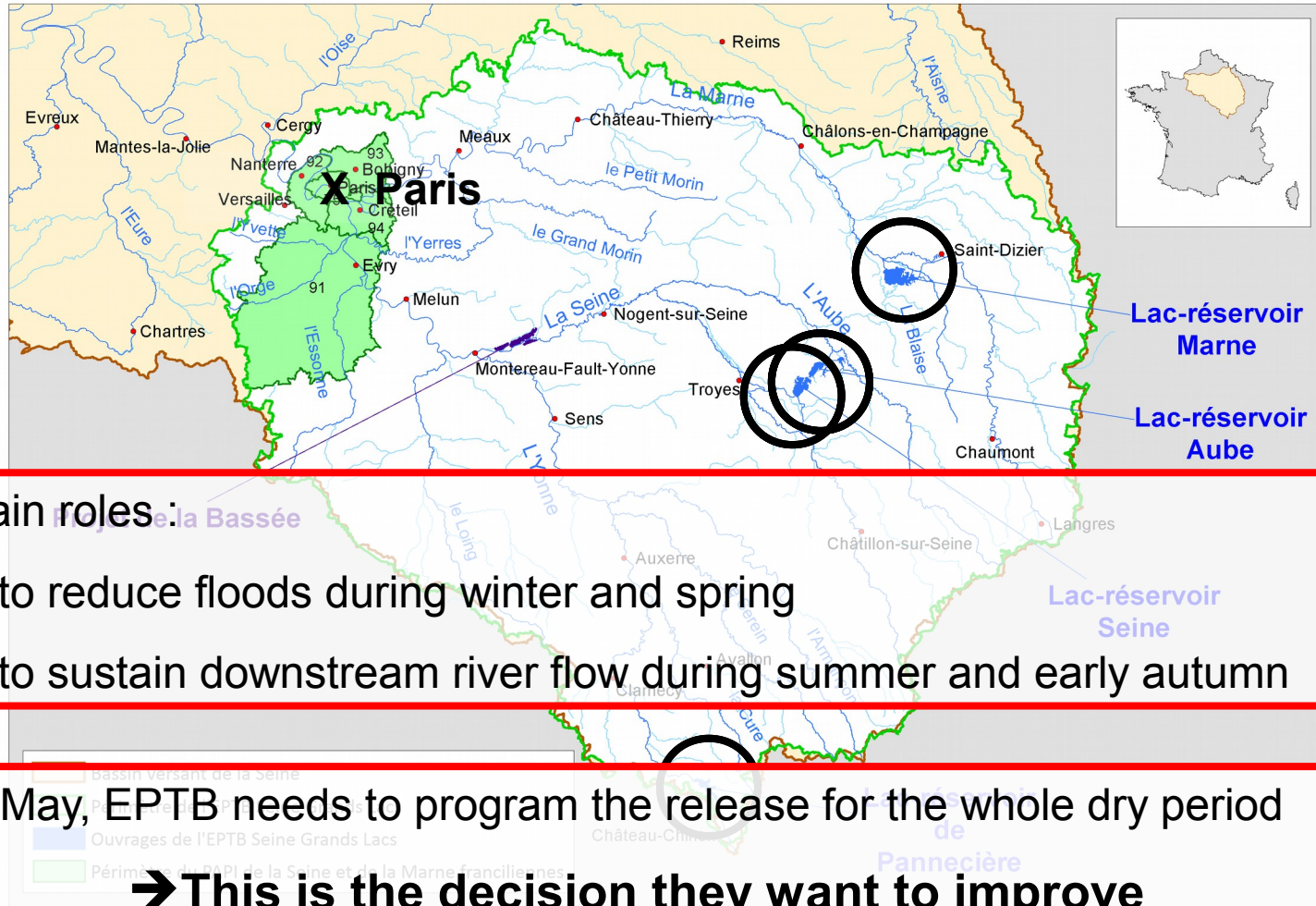
■ RIFF, the Météo-France prototype

- Forecasting chain
- Co-designing of the products
- Assessment protocol

■ Conclusion and perspective

Our stakeholder

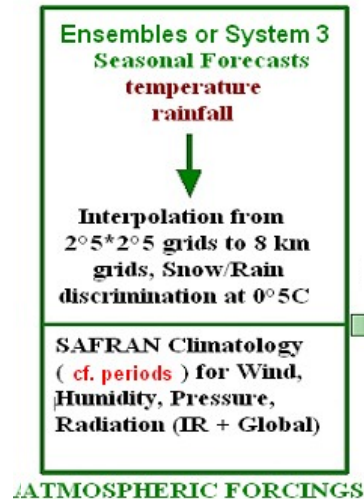
EPTB Seine Grands-Lacs (public institution)



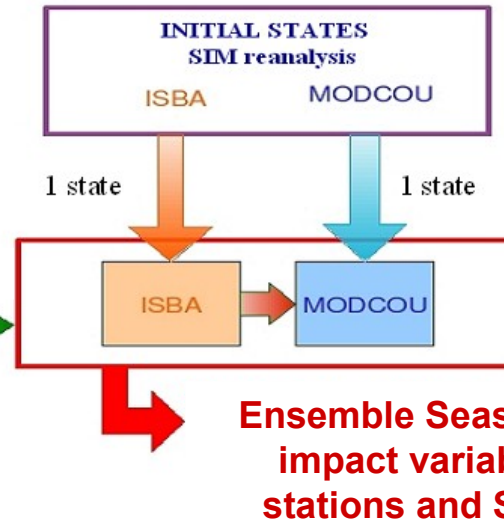
RIFF prototype

River Flow forecasts for water resource management in France

Atmospheric Seasonal Forecast



Impact models section (SVAT + River Routing models)



+

designing and
evaluation of
products in
collaboration
with the
stakeholder

3 important stages :

1 : tailoring climate outputs to
stakeholder requirements

2 : assessment of the forecasting
chain (objective scores)

3 : evaluation of the impact of
forecasts on the DMP

1 : Tailoring

(from climate outputs to usable indices)

**Climate outputs : ensemble
Seasonal Forecasts of river flow
Over the hindcast period (29 years)**

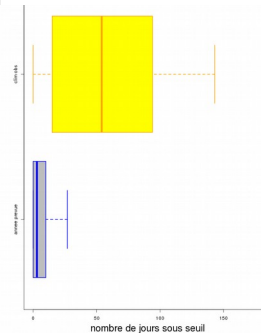
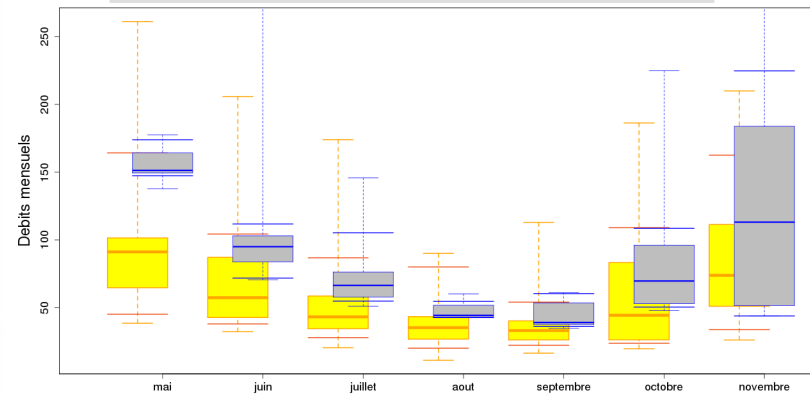
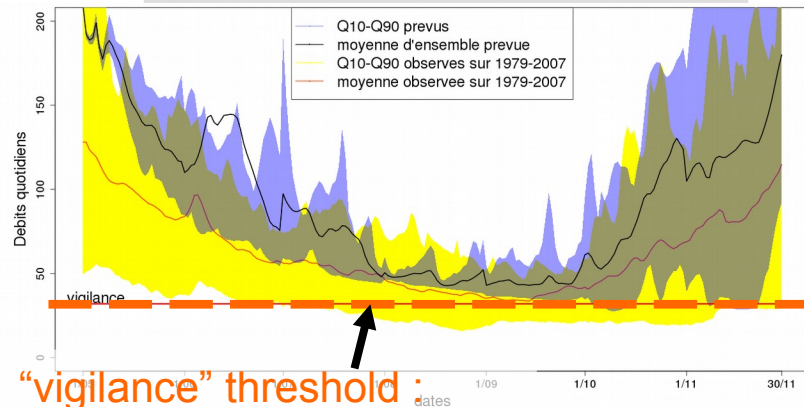
Local data : naturalized river flow

**Calibrated ensemble Seasonal
Forecasts of river flow**

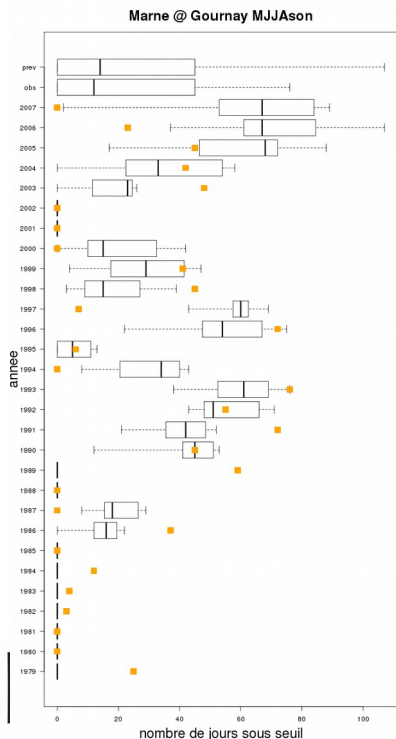
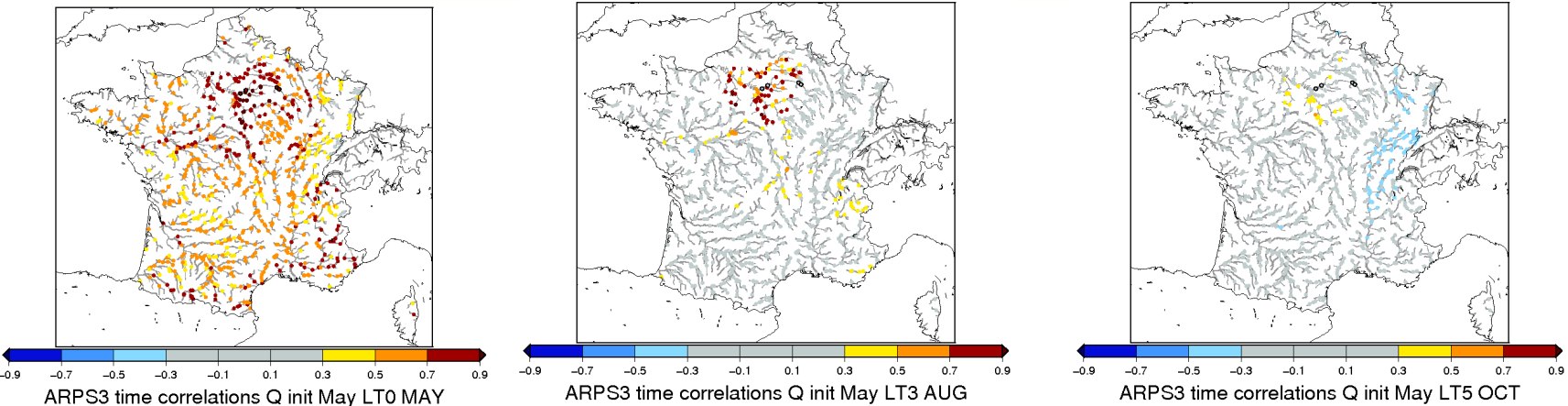
**Q10-Q90 daily intervals
(forecast and clim.)**

**Boxplots of monthly riverflow
(forecast and clim.)**

**Nb of days
below
threshold
(forecast
and clim.)**



2 : products assessment (objective SF scores over the hindcast period)



Recommendations for Gournay :

“Prefer integrated indices (monthly means, number of days below “vigilance” threshold) to daily indices (daily Q10-Q90 is to be taken with cautious).”

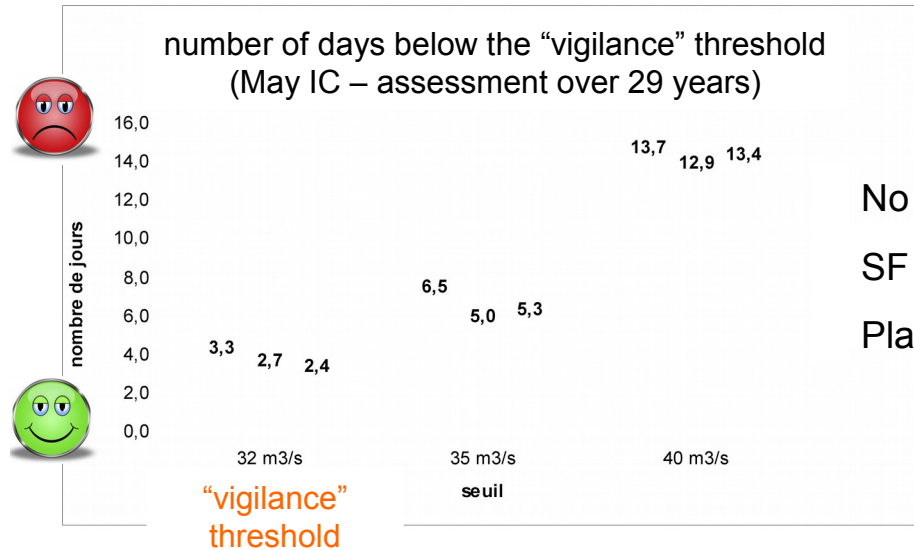
For the May initialisation, no significant information beyond August.”

3 : Usefulness assessment (effective impact on the DMP)

- “Placebo” protocol :
 - Provision of 2 hindcast sets : SF and RAF (placebo).
 - RAF is a Random Forecast, i.e. same initial states (soil moisture, snow cover, river flows...) as the SF experiment, but atmospheric forcing is replaced by a set of past scenarios taken from reanalysis
 - SF and RAF are indistinguishable, used in blind test
 - Years not in chronological order
 - Stakeholder “replaying” several years (the length of the hindcast, if possible) of decision
 - Issuing a comprehensive analysis of the Decision made, using a appropriate metric to measure decision quality
- Application of the placebo protocol to RIFF (**by the stakeholder**) :
 - 29 years, with SF and RAF + “no forecast” (usual method)
 - metric : number of days below the “vigilance” threshold (consequence of the decision made)

3 : Usefulness assessment

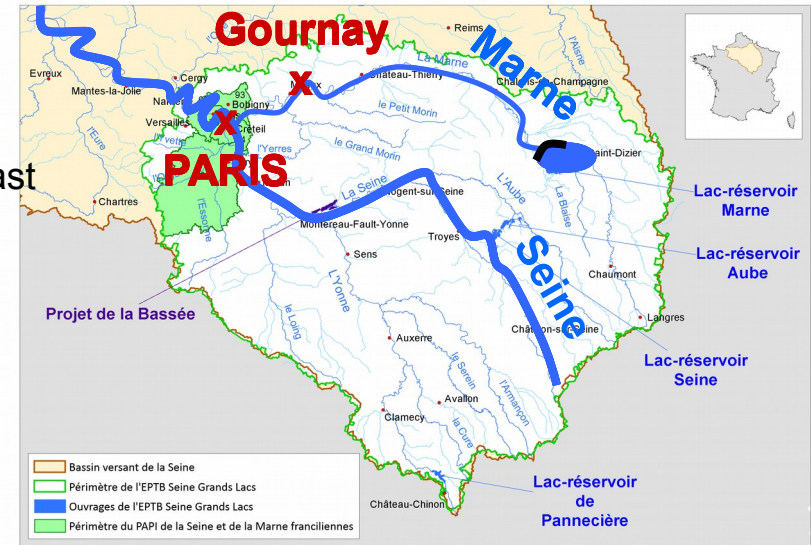
Preliminary results



No forecast

SF

Placebo



First results with May initial conditions at Gournay station :

- With May IC, no evidence of added-value of SF versus placebo
- consolation: decisions made with “no forecast” (stakeholder current method) are always the worst.

Conclusion and perspective

Conclusion :

- Proof of concept
 - Over the whole chain (from SF input, to products for decision)
 - Application of an original assessment protocol (“placebo”)

Perspective :

- Improvement and assessment
 - On the Seine basin, test other initial conditions (at least June)
 - Test other territories : Garonne basin (Stakeholder : SMEAG)
 - Test other parameters : SWI (stakeholder : institutional partner in charge of drought monitoring)
- Building of a pre-operational Climate Service
 - Using ARPEGE-S5 (operational SF model of Météo-France)
 - Development of a delivery platform

Thank you for your attention

<http://riff.predictia.es/en>

<http://riff.predictia.es/fr>

<http://www.euporias.eu/>

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