Real Time Experiment of seasonal river flow forecast for dam management in France

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Météo-France's prototype in EUPORIAS

- **EUPORIAS (nov. 2012 – jan. 2017)**

  Aims at developing and assessing semi-operational prototypes of climate services at seasonal time scale.

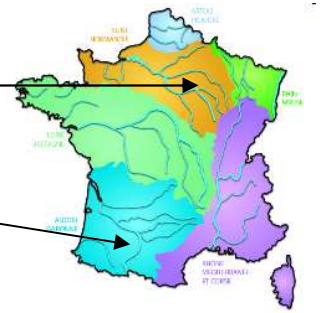
http://www.euporias.eu/

https://twitter.com/euporias

- **Météo-France prototype** http://riff.euporias.eu/

  Decision-making tool for dam managers

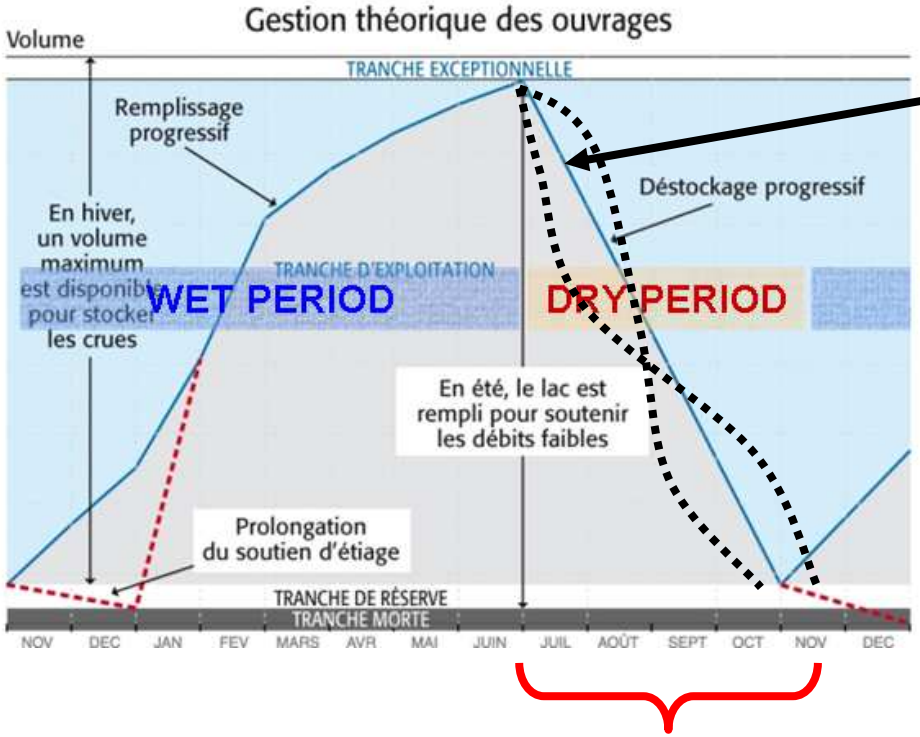
  ➔ co-development of products with EPTB Seine Grands Lacs (**SGL**) and SMEAG (Garonne)



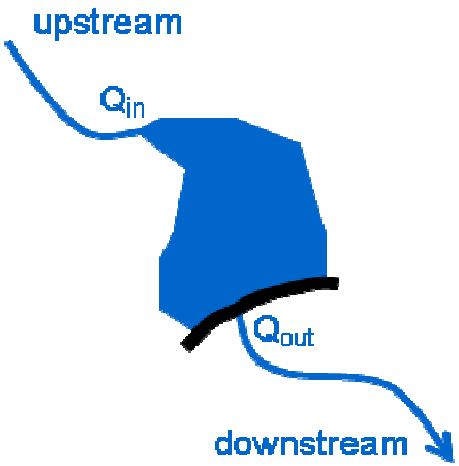
Outline

- EPTB Seine Grands Lacs (**SGL**): its interest/stake at seasonal timescale
- The technical solution proposed by Météo-France
- The Climate Service development
  - Co-design and evaluation over past situations
  - Real-time experiment

A decision making process: example of SGL



Reservoir level



$$Q_{out} = Q_{in} + Q_{reservoir}$$

During the dry period : flow release to sustain downstream flow

In May, SGL needs to program the release for the whole dry period

➔**This is the decision they want to improve**

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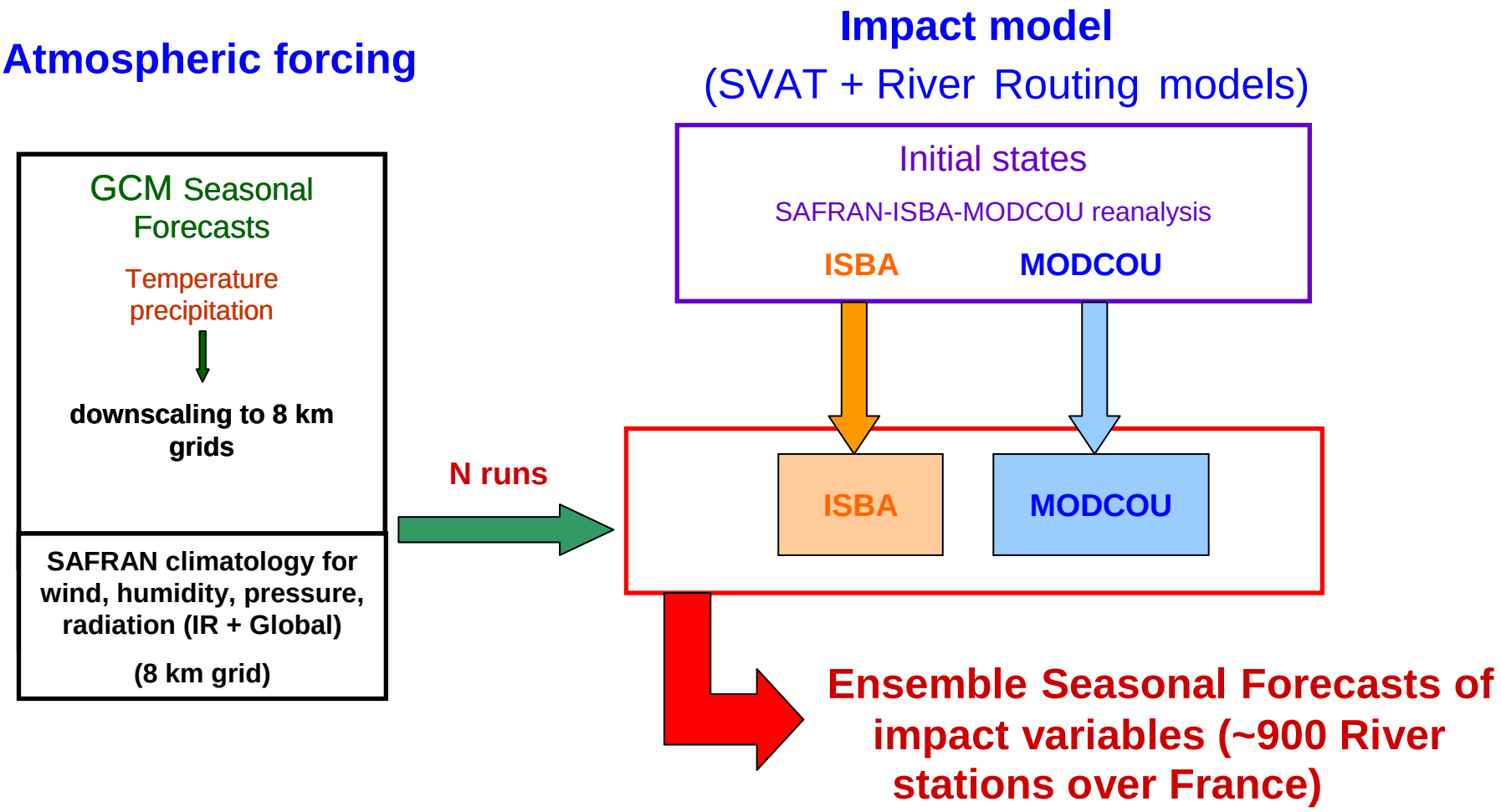
Impact prediction system



Prototype development

- **Phase 1 (2012-2015) : co-design and test with SGL**

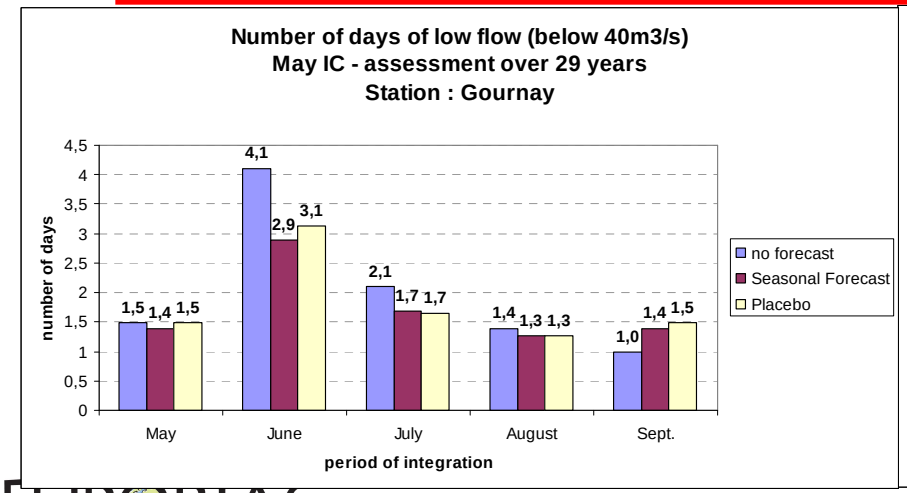
  Atm. forcing : - SF (Meteo-France ARPEGE-S3)

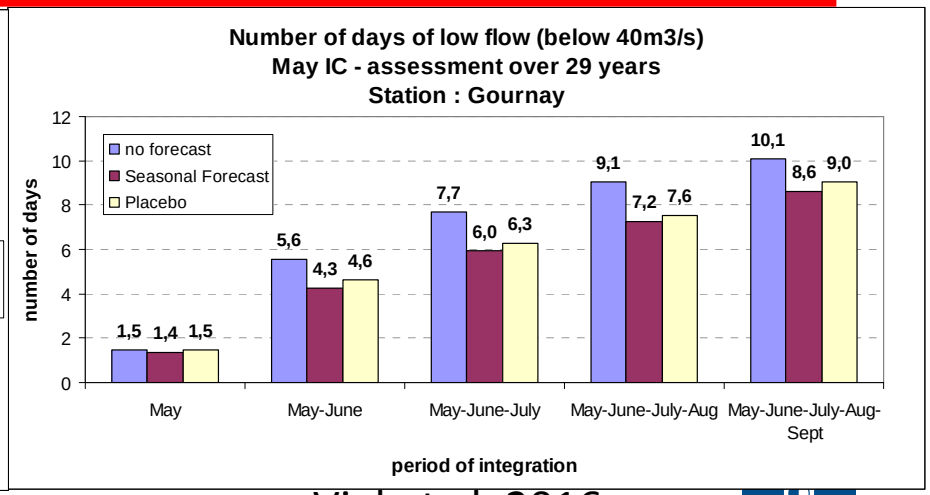
  - Historical Scenarios (placebo), i.e. same initial states

At Gournay (Seine basin, upstream from Paris) :

- With May IC, little added-value of SF versus placebo

- decisions made with “no forecast” (stakeholder current method) are significantly worse than SF and placebo





Viel et al, 2016

Prototype development

- **Phase 2 (2015-2017) : real-time experiment with SGL (and SMEAG)**

  Atm. forcing : - SF from MF ARPEGE-S5 (operational model), with a finer downscaling method

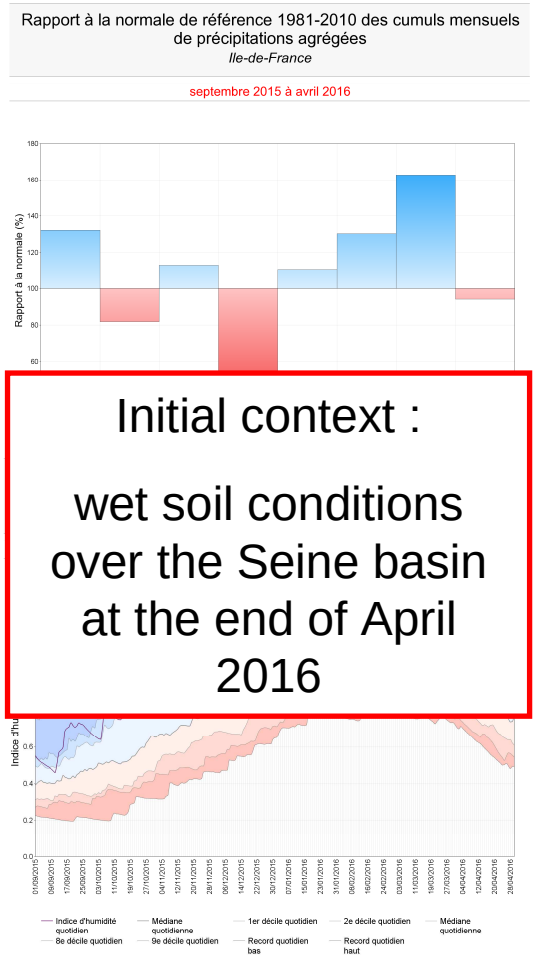
  - historical scenarios, i.e. same initial states (soil moisture, snow cover, river flows…) as the SF experiment, but atmospheric forcing is replaced by a set of past scenarios taken from reanalysis

  Impact model : SURFEX-MODCOU (new post-treatment of riverflow)

  Period : **May and June 2016 IC ➔** forecast May to November

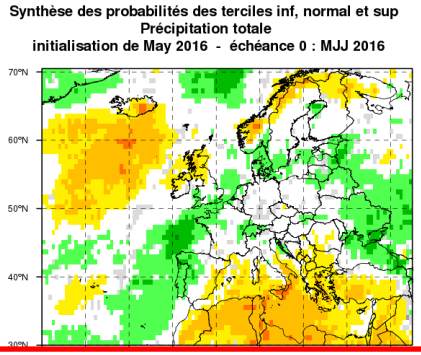
  Evolution of forecasting products (co-design) + new support products

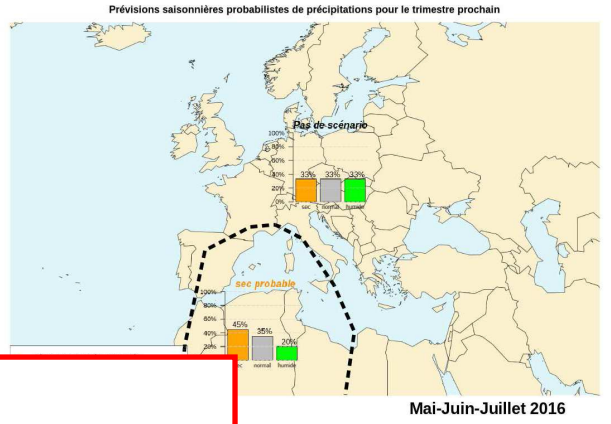
Decision support products – 2016 context & forecast



Initial context :

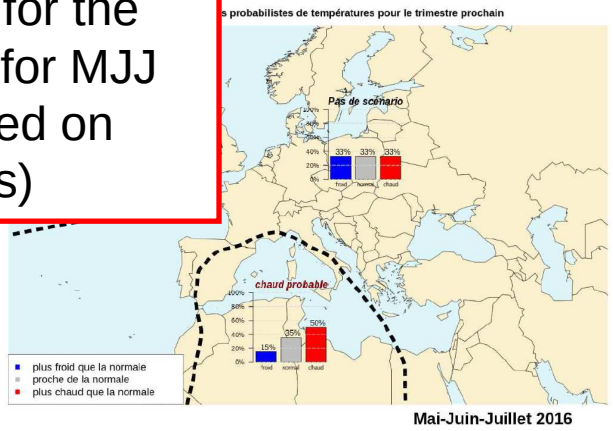
wet soil conditions over the Seine basin at the end of April 2016



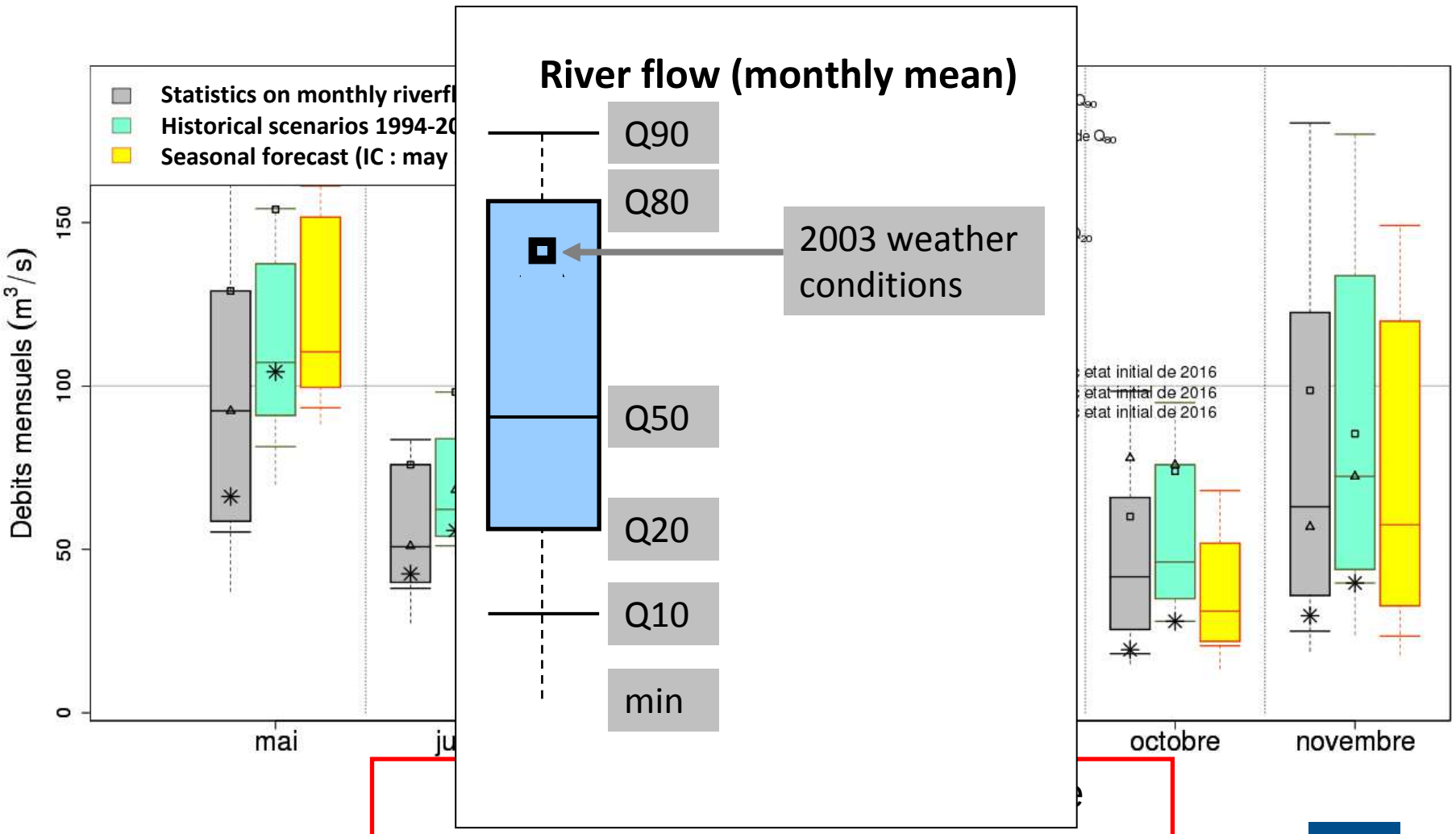


Forecast :

No privileged scenario for the northern part of France for MJJ 2016 (conclusion based on several SF models)



Decision support products – 2016 flow forecasts



Closer to normal over the following months

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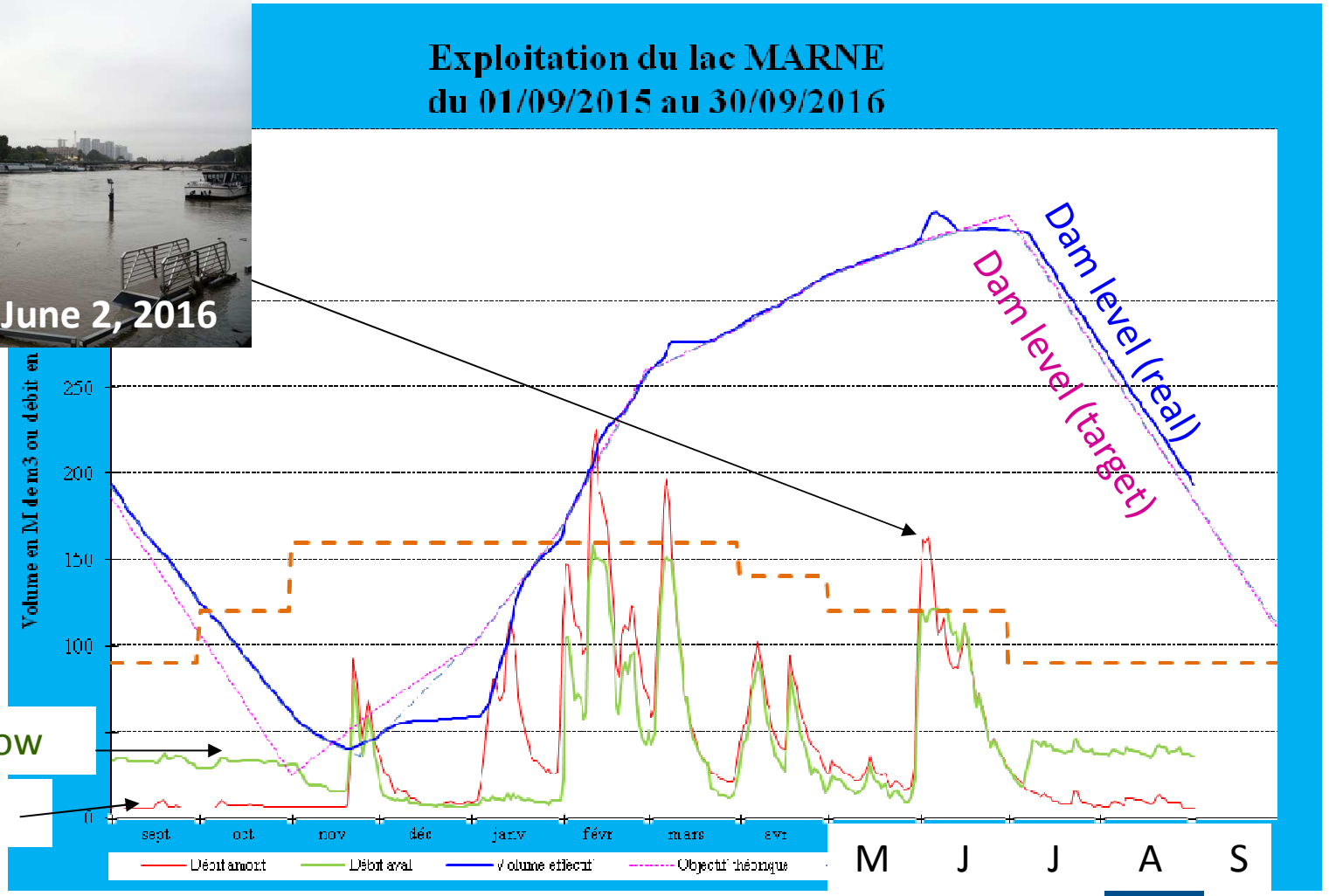
What happened in summer 2016?



Downstream riverflow

Upstream riverflow

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Conclusion and perspective

A long way toward an operational Climate Service :

- Understanding of DMP and user needs
- Development of a Seasonal Forecast integrated chain, with an impact model, post-processed with user's data
- Assessment of the CS value through the DMP ("*does it improve decisions*?") ➔ taking advantage of the availability of the hindcast period
- Building of a pre-operational CS ➔ real-time experiment

Perspective :

- Business opportunity for economic viability of this CS :
  - identification of new applications/users
  - Integration of this CS onto a broader service dedicated to water management (other variables, other time-scales…)
- Potential technical evolutions of the current forecasting chain :
  - Extension of the prototype to the whole Med. Region : the MEDSCOPE project (ERA4CS)

http://riff.predictia.es/en
http://riff.predictia.es/fr
http://www.euporias.eu/

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