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## Consequences of a dam flushing operation on concentration and fluxes of suspended sediment and associated contaminants in the Rhône River

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## Management of a sediment observatory : specific case of the Rhône River in France

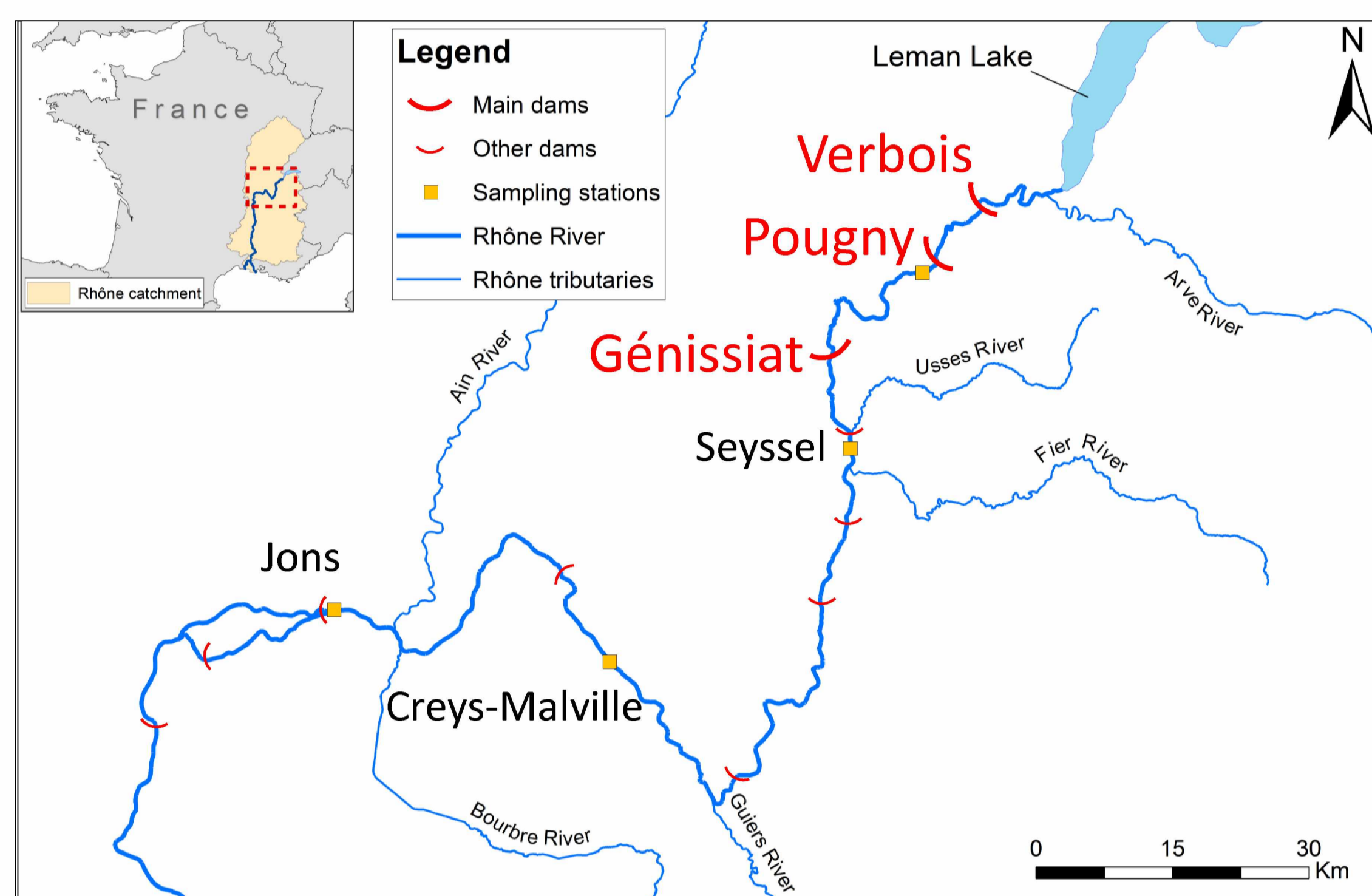
### Context

- **Rhône Sediment Observatory (OSR):** investigate the dynamics of sediments and quantify suspended particle matters (SPM) and the associated contaminant fluxes (metals, radionuclides, organic compounds...).
- **Rhône River:** from Lake Geneva to the Mediterranean Sea (~500 km); 21 dams impact sediment transport and **dam flushing operations are regularly organized to remove sediments stored in reservoirs.**

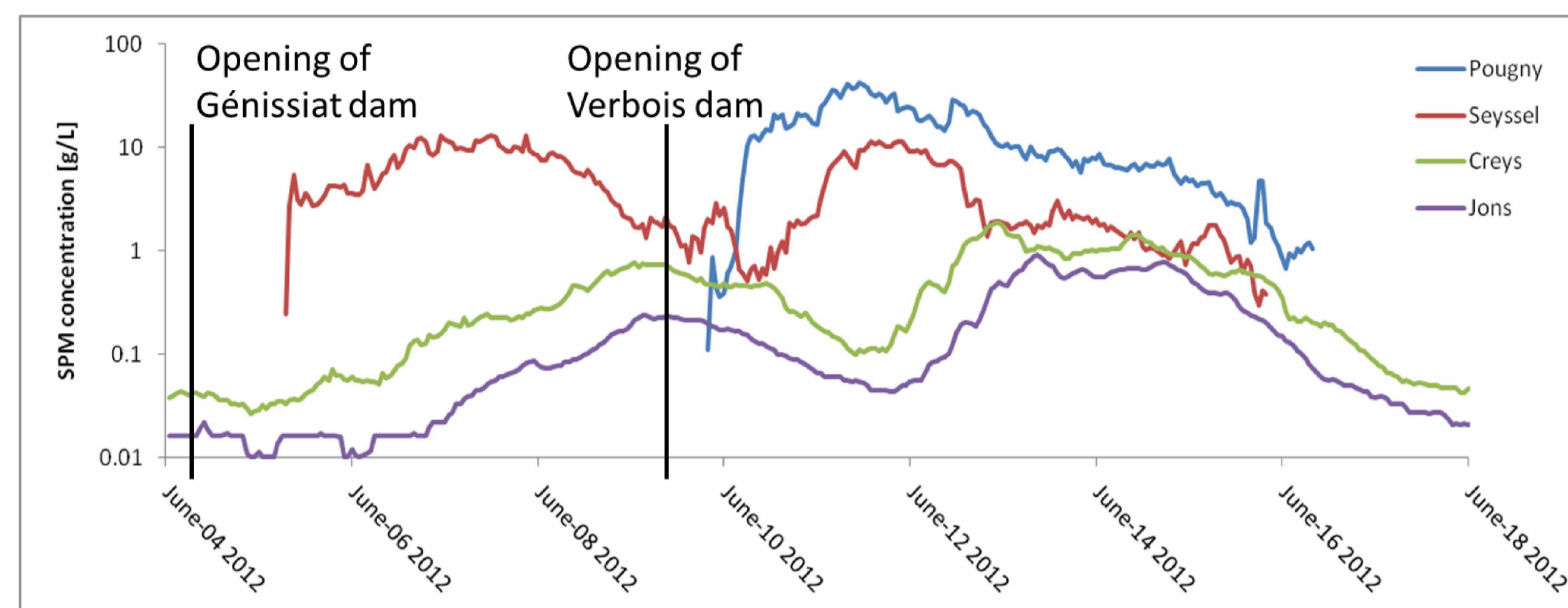
### Objectives

- ☐ Evaluate the impacts of dam flushing operations on concentrations and fluxes of SPM and associated contaminants
- ☐ Investigate the origins of spatial and temporal variations of concentrations observed during dam flushing events

## Flushing operations in June 2012



### Flushing process (2 weeks)



Submerged sediment trap

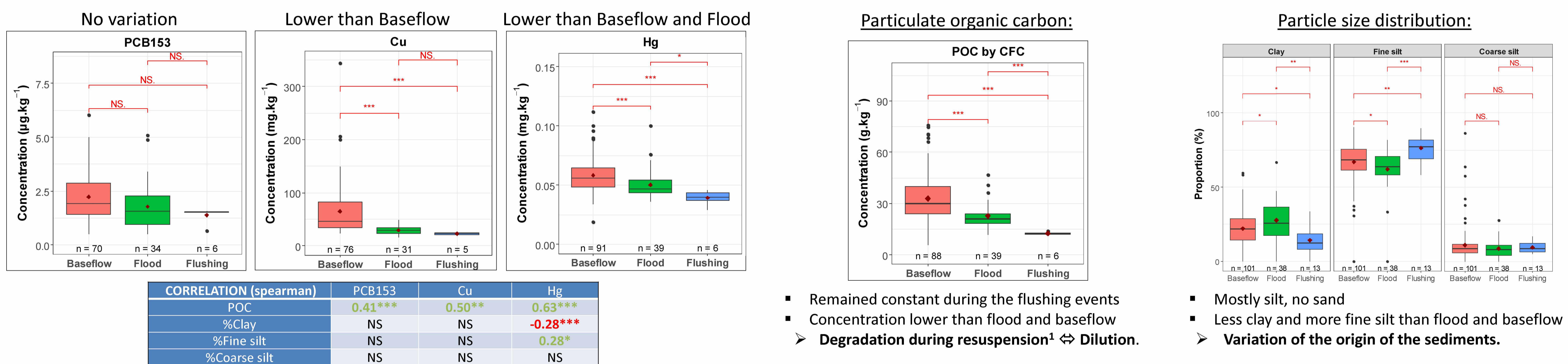


Continuous-Flow Centrifugation

### Monitoring operations

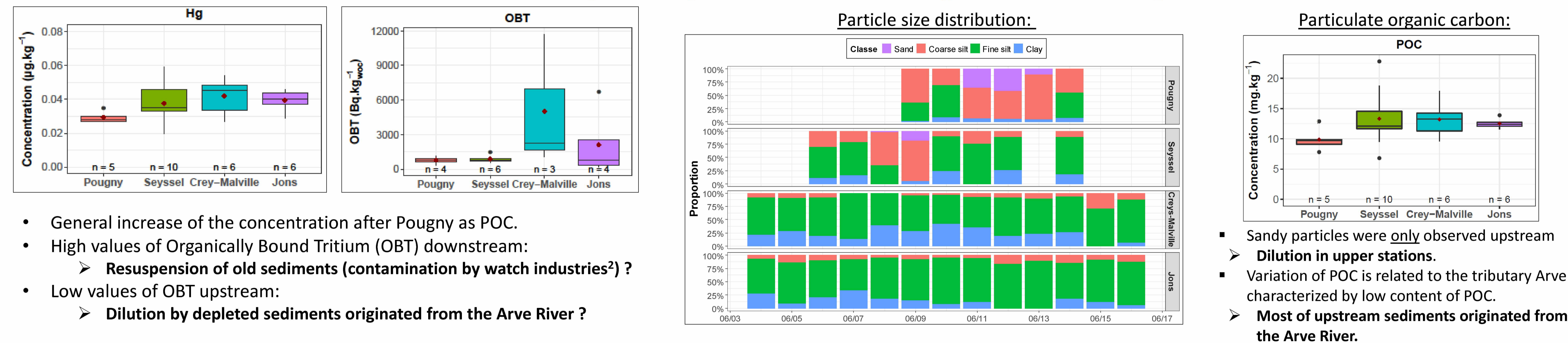
- Sampling location:**
- Near the dams : Pougny and Seysssel
  - Intermediate station : Creys-Malville
  - Permanent monitoring station : Jons
- Parameters measured:**
- Discharge
  - SPM content
  - Particle size
  - POC
- Contaminants characterized:**
- Heavy metals
  - Trace elements
  - Organic compounds
  - Radionuclides

## Are the contaminant concentrations different during dam flushing than during flood or baseflow ?



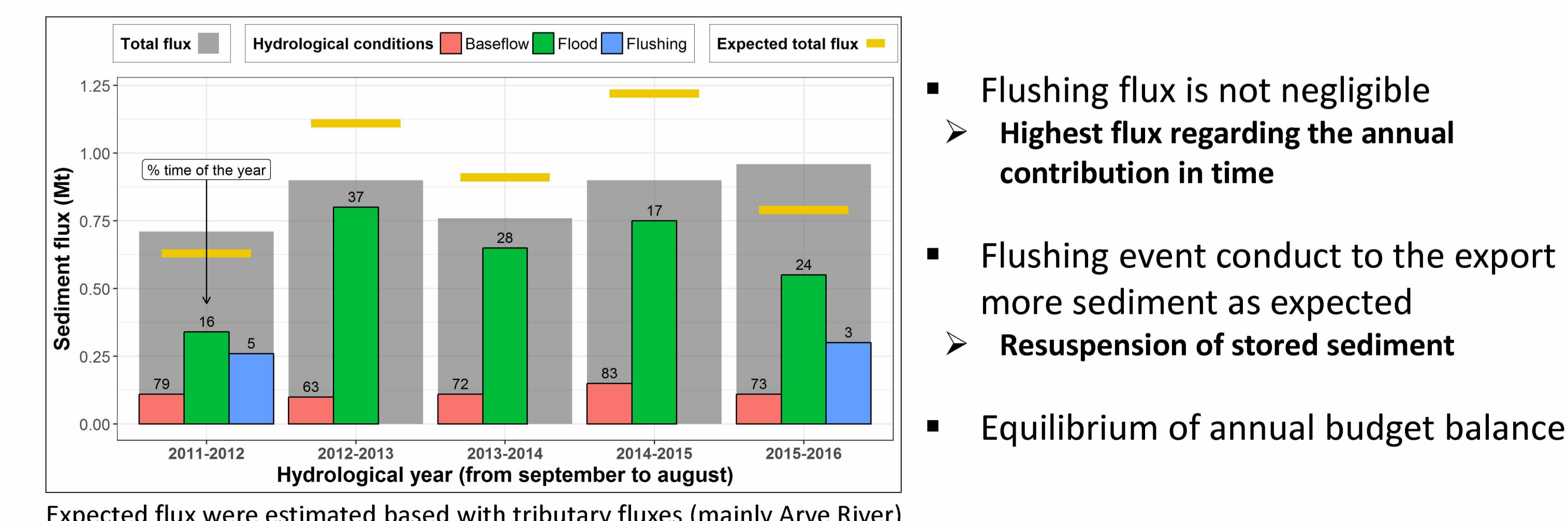
Most of the contaminant concentrations were constant or decreased during the flushing events. These variations are mainly related to POC content that were also lightly correlated with particle size.

## Are the contaminant concentrations spatially different during dam flushing ?



Lower contaminant concentrations upstream were related to coarse particles as sand. Most of them were also correlated with POC and were originate from the Arve River depleted in POC.

## What do dam flushes add to annual fluxes ?



## Highlights

- Monitoring flushing event is necessary to understand sediments and associated contaminants transport and behavior,
- Variation observed are mainly related to the POC concentration,
- Particle size correlations were only observed when studying the spatial variation,
- In the vicinity of the dams => sediments are mostly newly eroded but were rapidly stored in the upstream reservoirs,
- For downstream stations => old sediment previously stored and resuspended by high discharge,
- Fluxes during flushing crucial to balance the annual budget.