Spatial variation during the 2012 flushing operations:
- Increases of contaminant concentrations from Pougy to Seyssel are mostly related to the increase of the proportion of coarse particles:
  - Dilution of the contaminant concentration
- Variation from Seyssel to Jons is mostly related to the origin of the particles:
  - Resuspension of old sediment stored (contaminated in Benzo(a)pyrene and depleted in Pb)

Contaminant variation at Jons during 2011-2016 according to hydrological conditions:
- Contamination levels vary with hydrological conditions:
  - Particles that transited during flushing events were different than flood and baseflow

Proportion of annual contaminant fluxes in 2011-2012 at Jons
- Proportions are similar to SPM proportion:
  - Whatever the contaminant concentration, contaminant fluxes are more controlled by SPM concentration

This study was supported by the Rhône Sediment Observatory (OSR), a multi-partner research program partly funded by the Plan Rhône, and by the European Regional Development Fund (ERDF) allocated by the European Union.

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Contaminant concentrations were related to particle size (upstream) and SPM origins (downstream)

• Flushing triggered 37% of the annual sediment flux in 5% of 2011-2012
• Year without flush = annual output flux overestimated:
  - Storage of transported sediment
  - Year with flush = annual output flux underestimated:
  - Resuspension of stored sediment
• Unbalanced equilibrium over 5 years (±0.44 Mt):
  - Part of sediment remained stored despite flushing events

Mass distribution of sediments: average during 2011-2016 period

<table>
<thead>
<tr>
<th>Mass proportion (%)</th>
<th>Clay (µm)</th>
<th>Fine silt (1-15µm)</th>
<th>Coarse silt (&gt;15µm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseflow</td>
<td>23 ± 1</td>
<td>68 ± 11</td>
<td>12 ± 12</td>
</tr>
<tr>
<td>Flood</td>
<td>29 ± 1</td>
<td>64 ± 10</td>
<td>9 ± 6</td>
</tr>
<tr>
<td>Flushing (2012)</td>
<td>17 ± 1</td>
<td>76 ± 9</td>
<td>10 ± 4</td>
</tr>
</tbody>
</table>

• Flushing operations were also conducted in 2016 (different process with 1 period – only Q and [SPM] measured)
• For similar discharge, the SPM concentration is higher during flushing operations than flood events:
  - Different origins/sources of the particles

• Coarser particles than other hydrological conditions:
  - Various origins/sources of the particles

Particle size distribution: average during 2011-2016 period

SSPM release mitigated by Génissiat Dam operation

• Presence of other dams affect sediment flux:
  - Sediment transport is delayed
• Most of the sediments were rapidly deposited:
  - Effect of the particle size

Annual fluxes at Jons: output vs input (tributaries)

- Flushing triggered 37% of the annual sediment flux in 5% of 2011-2012
- Year without flush = annual output flux overestimated:
  - Storage of transported sediment
- Year with flush = annual output flux underestimated:
  - Resuspension of stored sediment
- Unbalanced equilibrium over 5 years (±0.44 Mt):
  - Part of sediment remained stored despite flushing events

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