

La rétention de l'eau dans le sol est le principal contributeur de l'interception des flux polluants dans les ouvrages d'infiltration à la source

*Soil water retention is the primary mechanism for
contaminant trapping in source-control infiltration systems*

Garnier Robin¹, Tedoldi Damien¹, Castebrunet Hélène², Barraud Sylvie¹

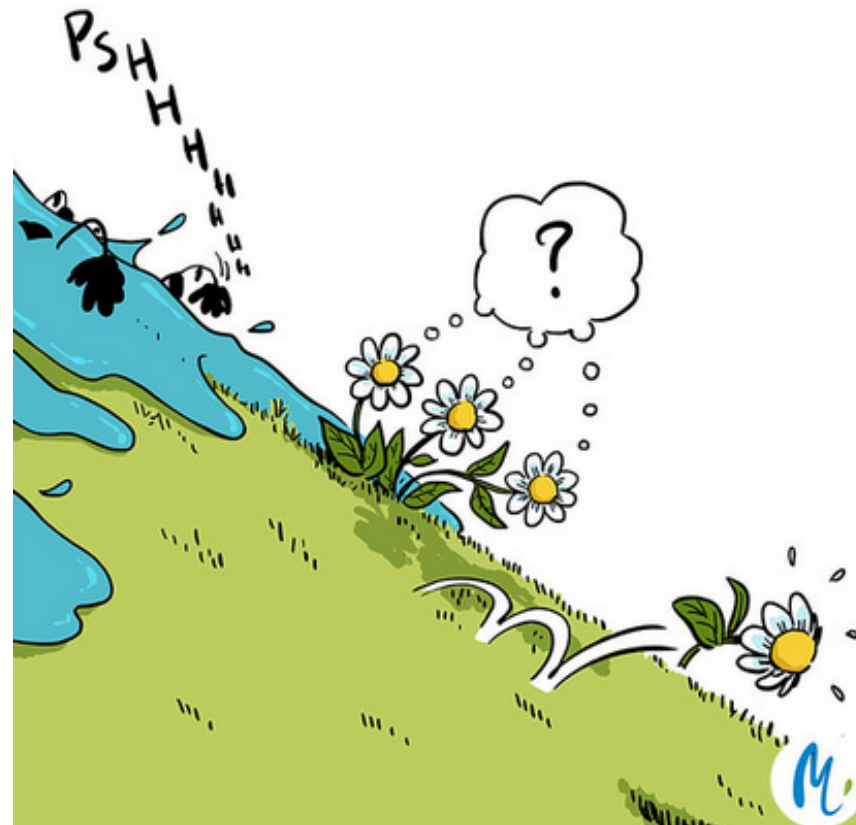
¹Univ Lyon, INSA Lyon, DEEP, EA7429, F-69621, Villeurbanne Cedex, France

²Univ Grenoble Alpes, CNRS, IRD, Grenoble INP, IGE, 38000 Grenoble, France

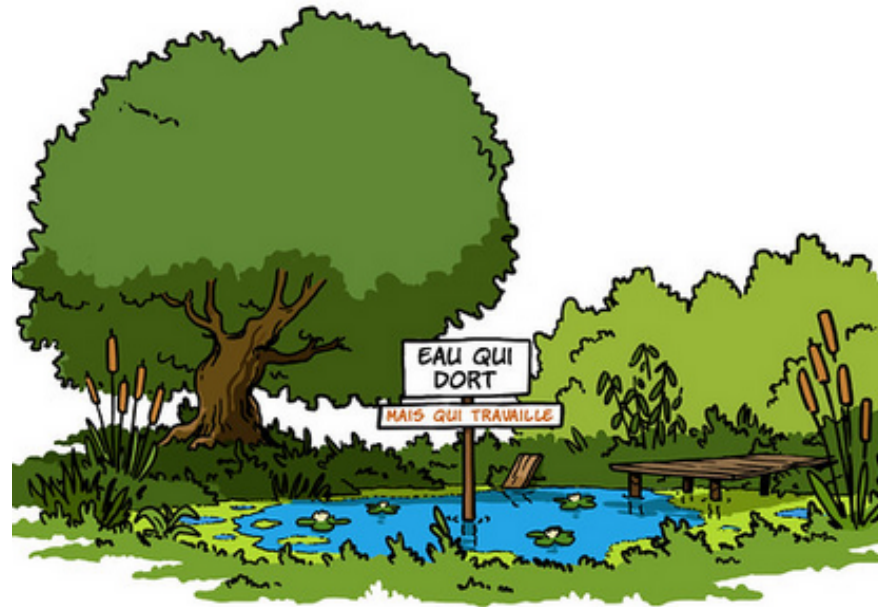
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What about water retention as a contributor to pollution removal?

Sites



Porous Pavement with Reservoir Structure



Vegetated Infiltration Swale



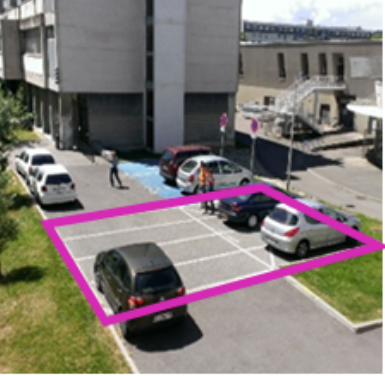
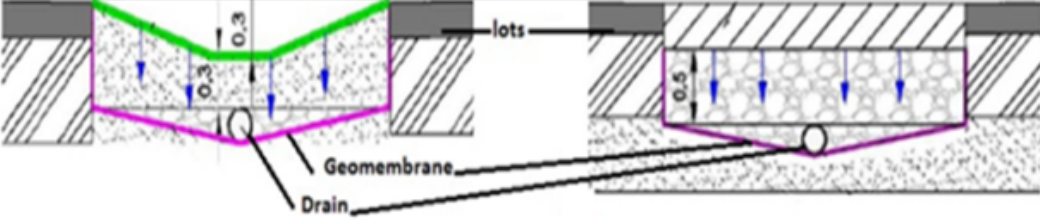
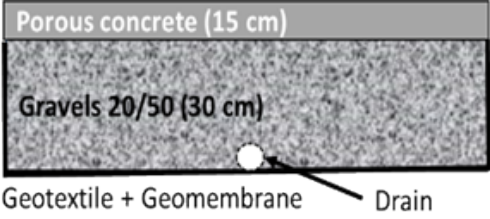




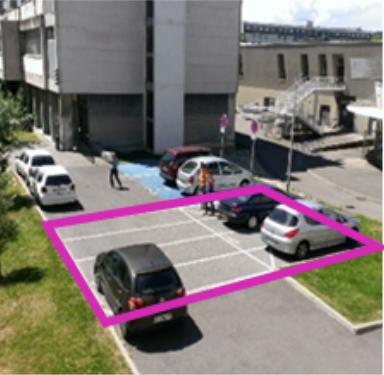
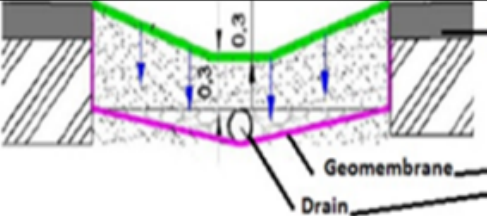
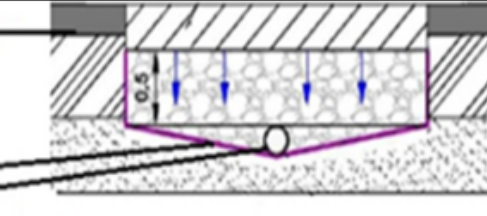
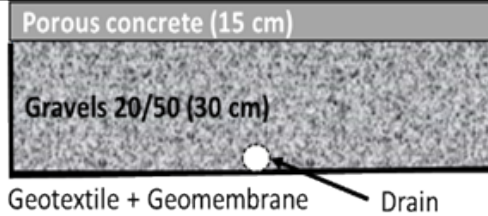
Infiltration Trench



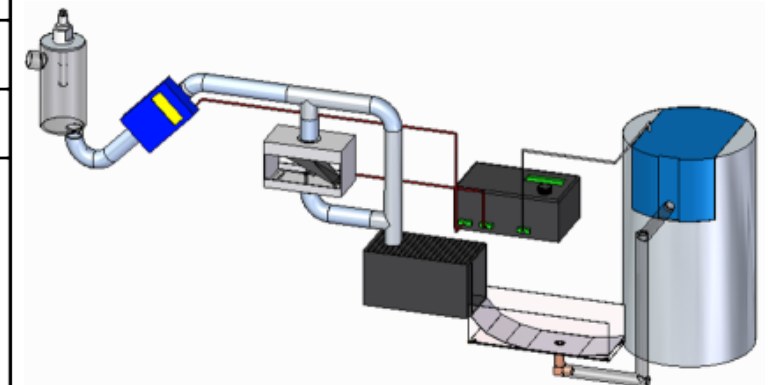
Metropolis of Lyon

Sites



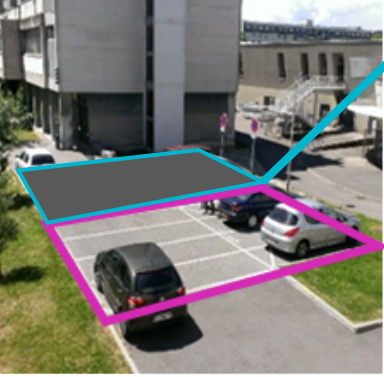
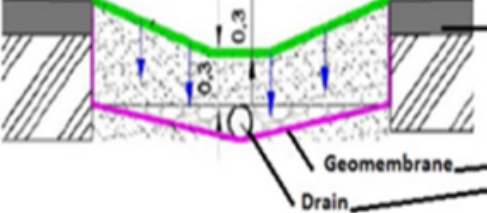
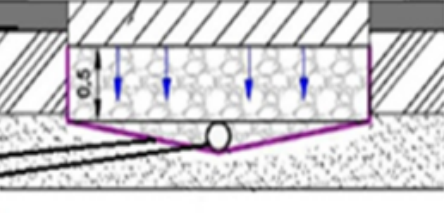
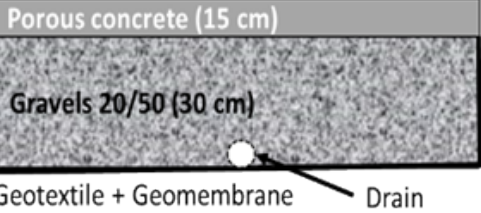
Vegetated Swale	Infiltration Trench	Porous Pavement and Reservoir Structure
		
<i>Catchment area – Infiltration area</i>		
$302\text{m}^2 - 30\text{m}^2$	$260\text{m}^2 - 26\text{m}^2$	$94\text{m}^2 - 94\text{M}^2$
<i>Cross section</i>		
		

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Monitoring and sampling devices for 54 micropollutants + TSS



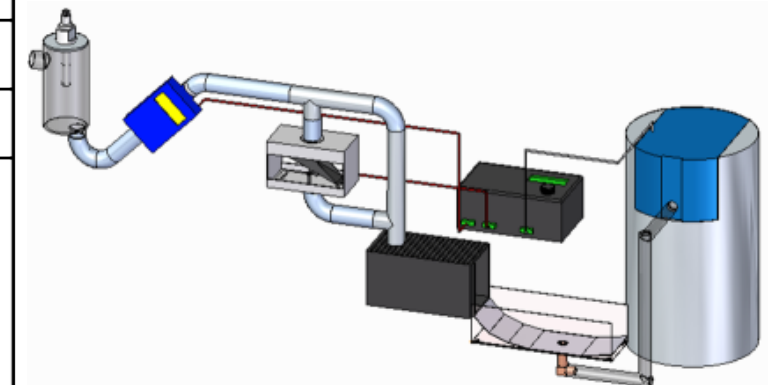
Sites

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**Water quality reference :
Asphalted Impervious area (ASP)**

**Water quantity reference :
Rainfall measurements**

**Monitoring and sampling devices
for 54 micropollutants + TSS**



Event base performance

- Micropollutant fluxes reduction (mass reduction) :

$$\text{Removal}_M = \frac{M_{\text{in}} - M_{\text{out}}}{M_{\text{in}}}$$

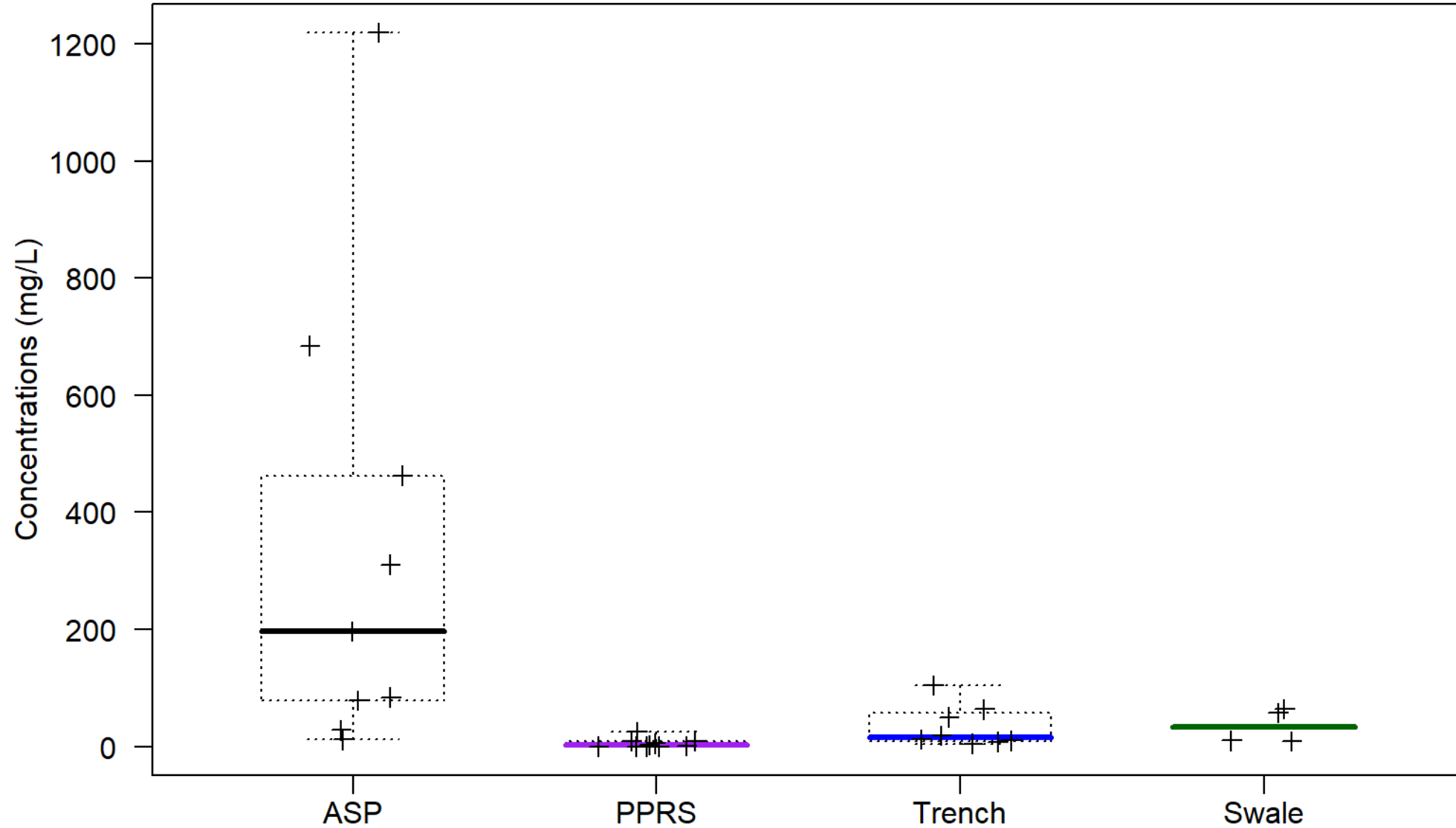
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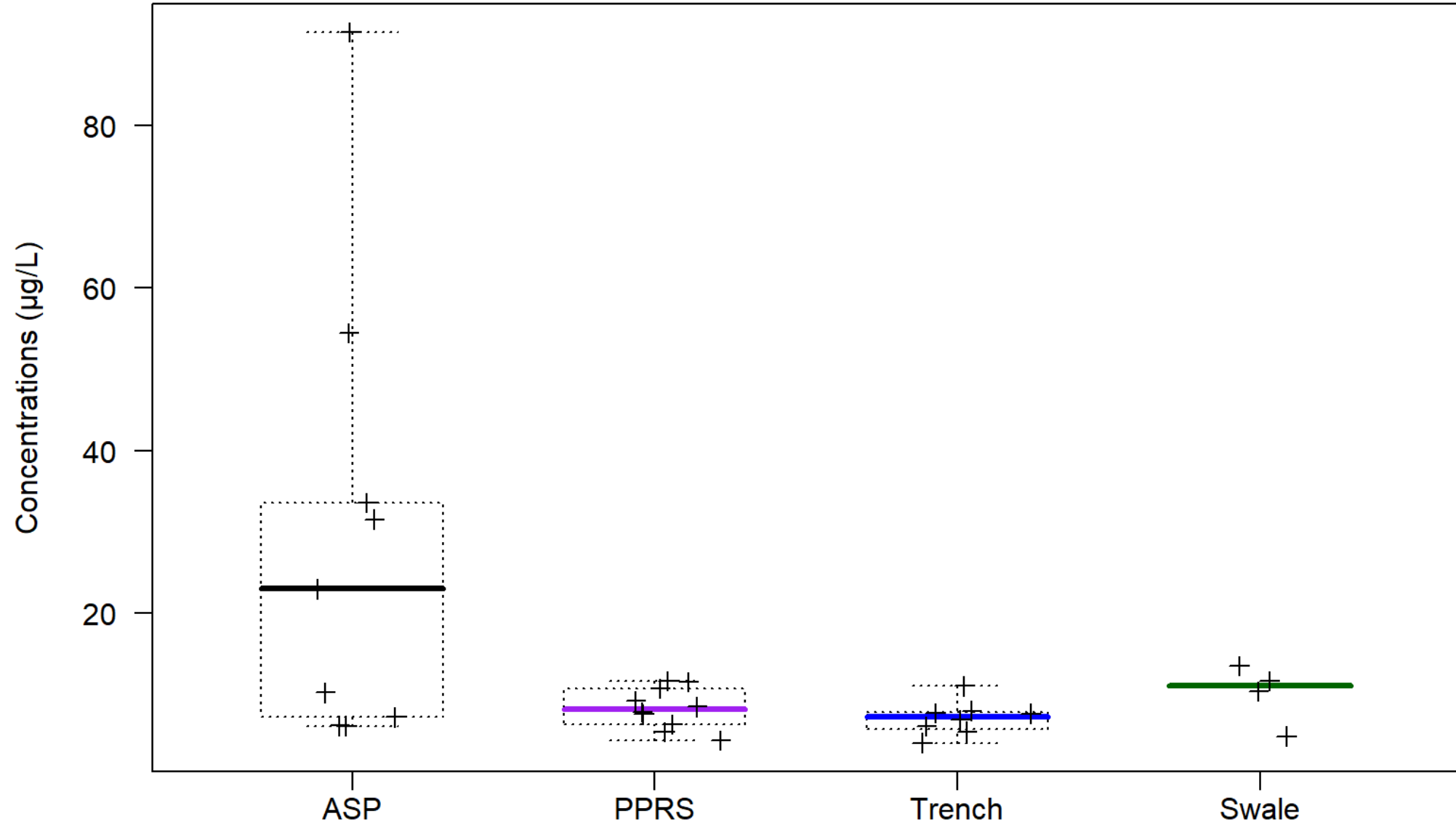
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with $M = C \times V$

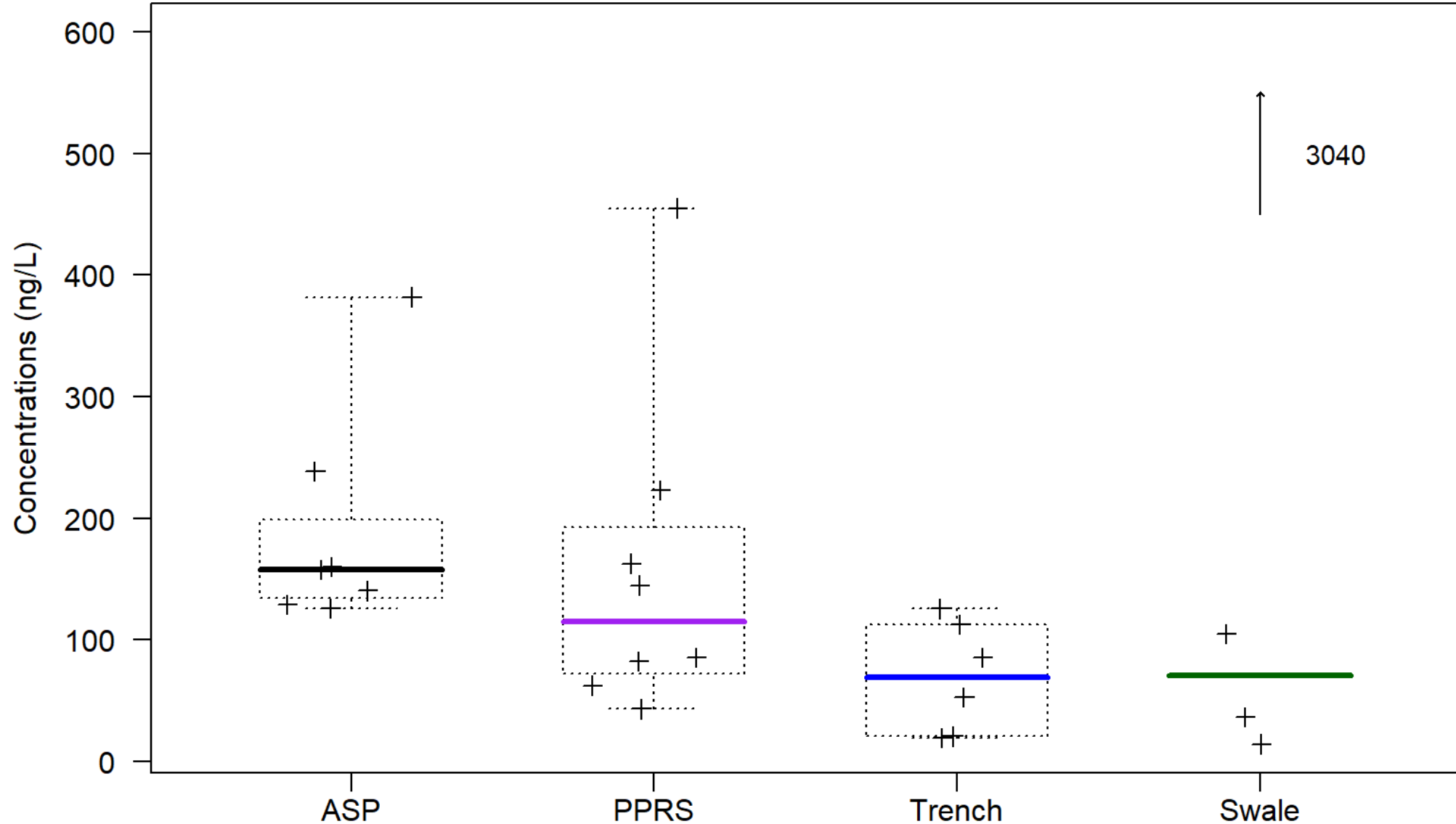
Concentration (TSS)



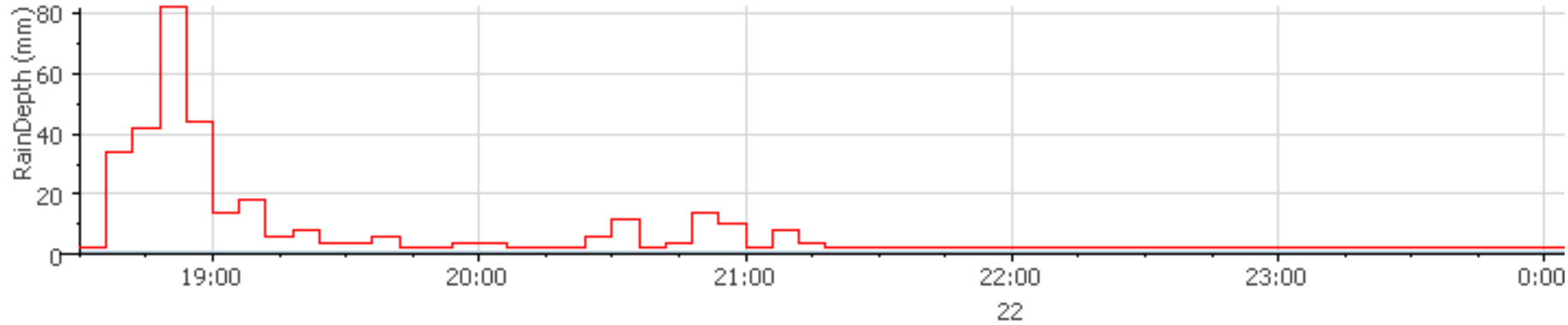
Concentration (Cu)



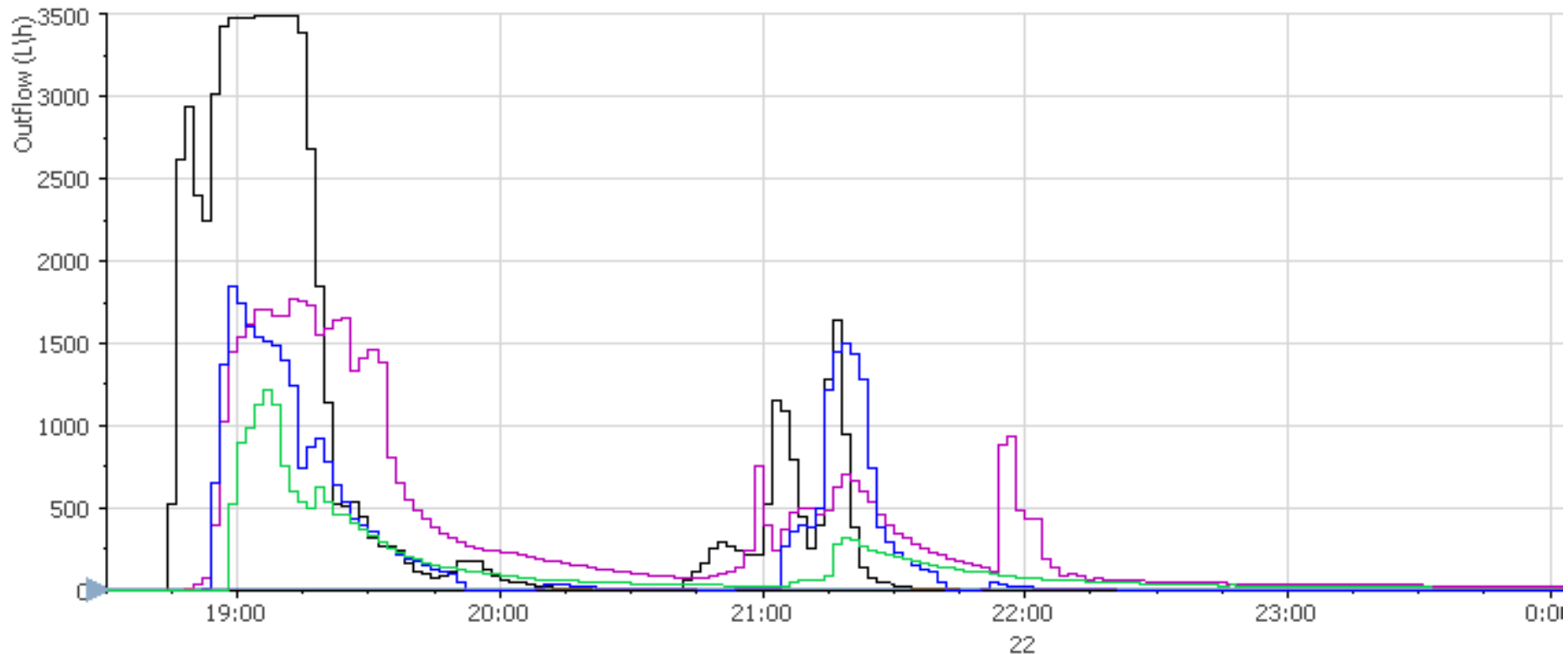
Concentration (BPA)



Volume Reduction



Rain



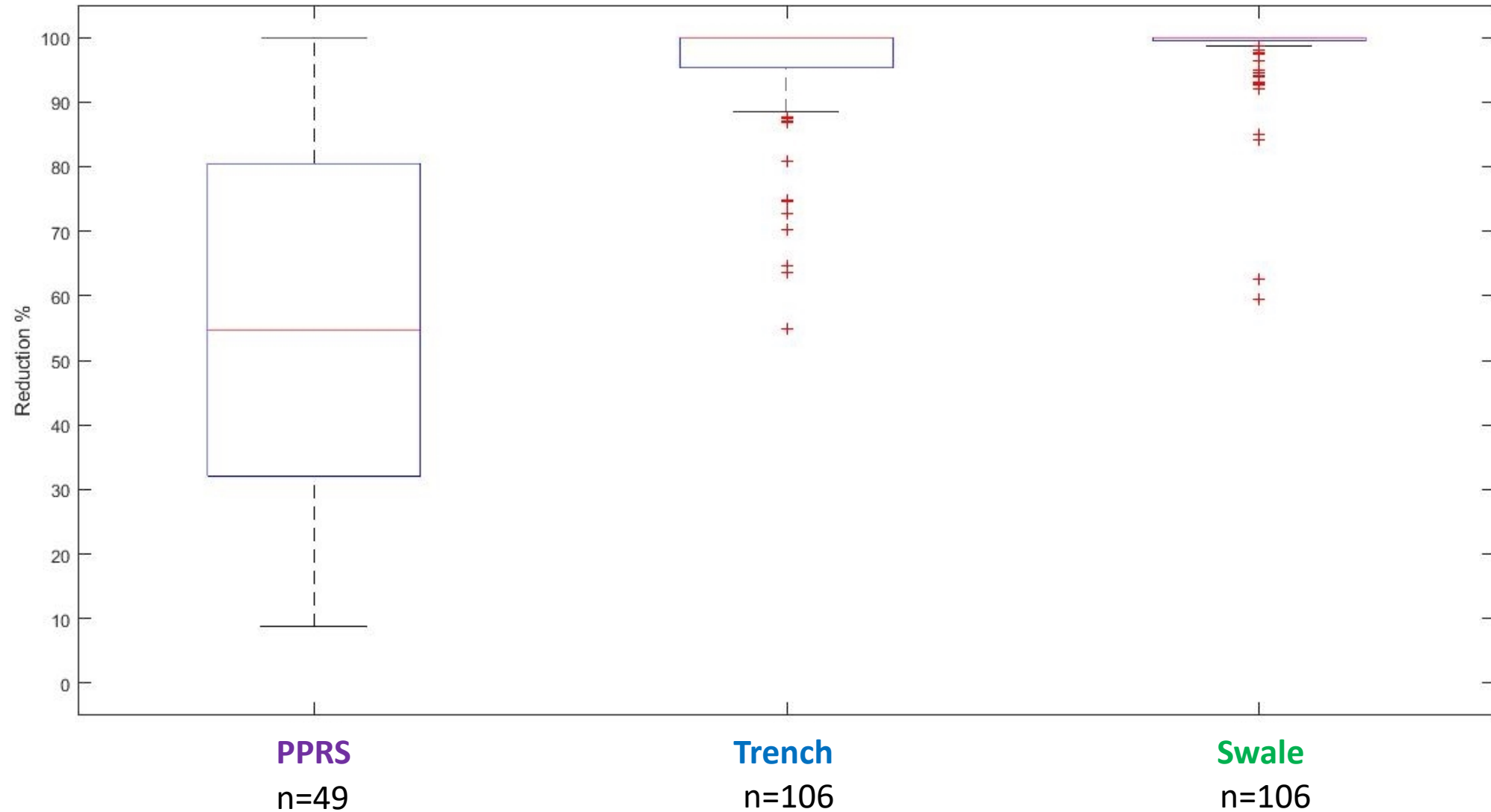
ASP

PPRS

Trench

Swale

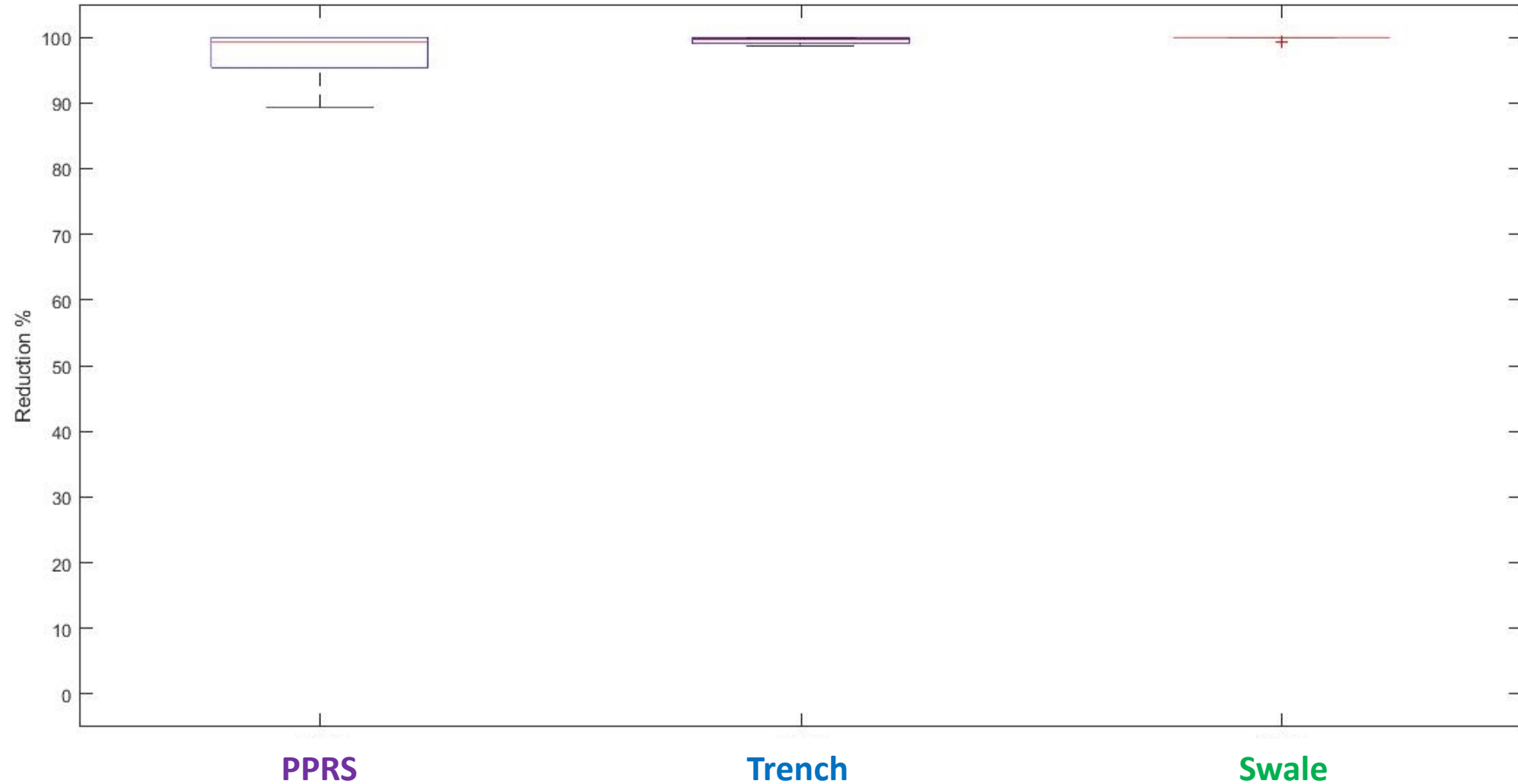
Volume Reduction



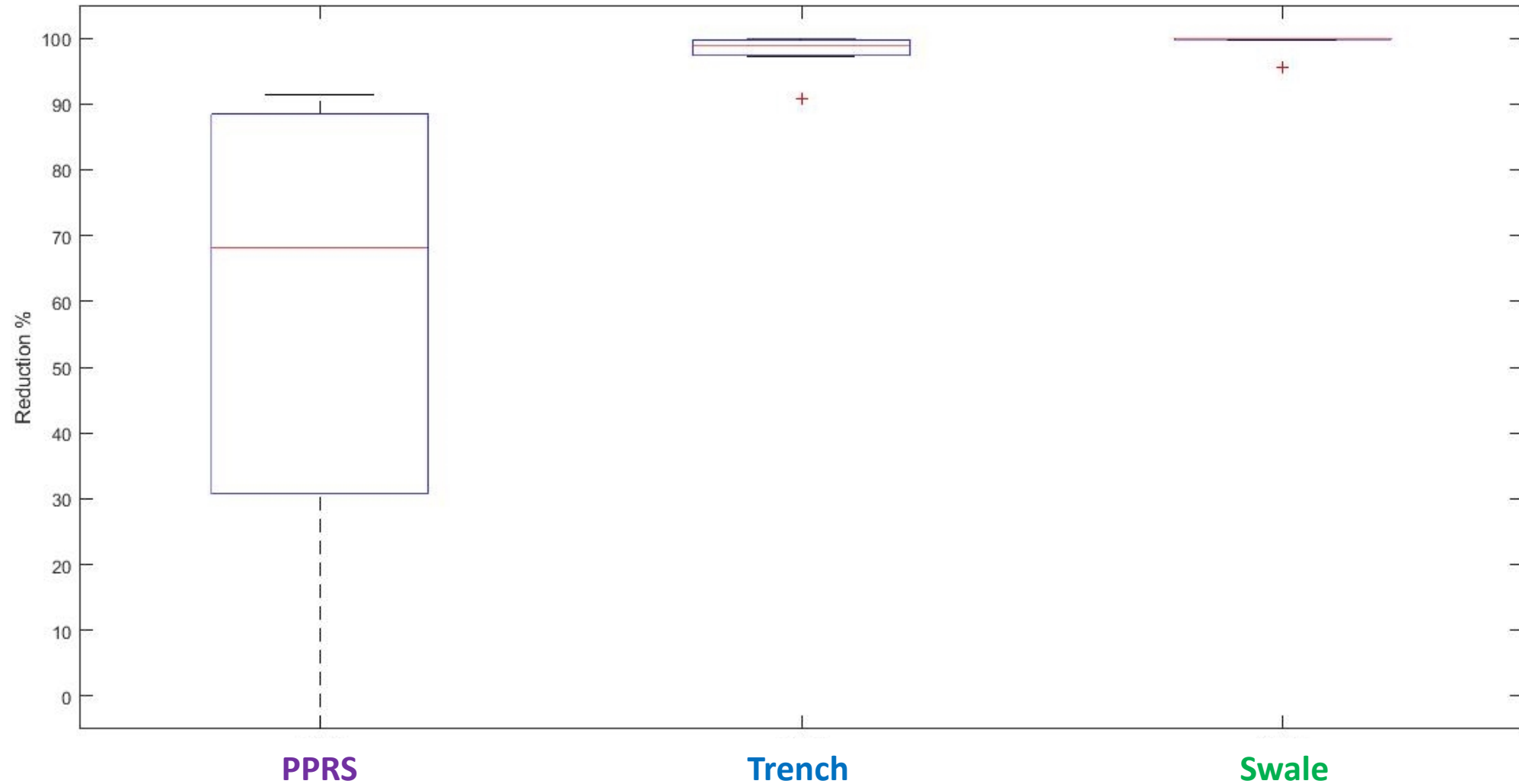
Volume Reduction

- PPRS : Volumetric efficiency = 55%
but quasi-systematic outflow
- Trench : Volumetric efficiency = 97%
52% of events without outflow
- Swale : Volumetric efficiency = 99%
64% of events without outflow

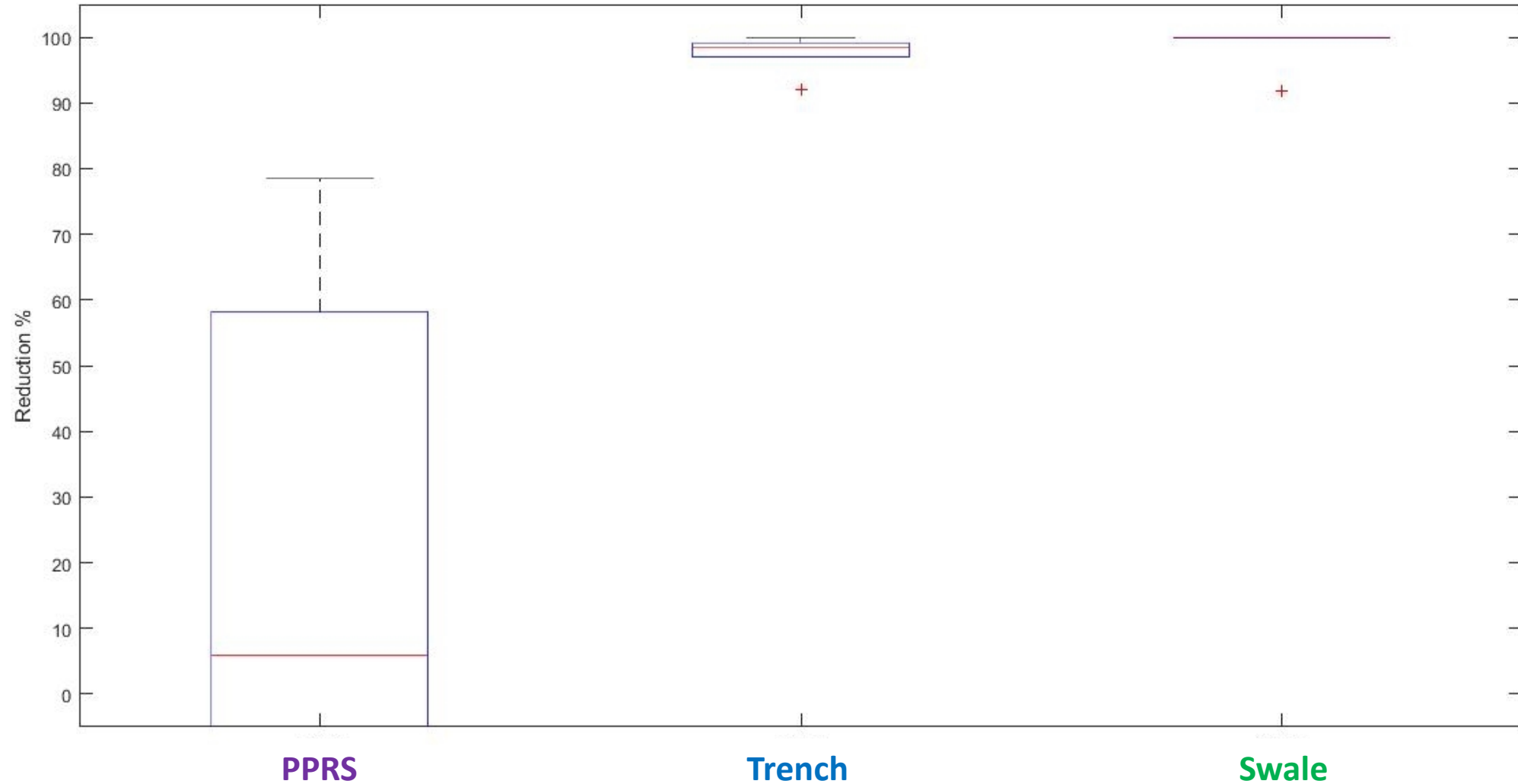
Total Fluxes Reduction (TSS)



Total Fluxes Reduction (Cu)



Total Fluxes Reduction (BPA)



Conclusion 1

- SUDS are efficient regarding runoff water quantity management
- SUDS show good performances regarding runoff water quality management (particulate phase +)

Conclusion 2

- Promising propensity of SUDS to reduce pollutants discharges (particulate and dissolved)

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- Analyzes and deconvolution of the processes involved in stormwater management in SUDS is important
- Don't forget that SUDS are hydraulic structures → main contribution to pollution management is water retention capacity

Thank you.