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# Multiple tools for antibiotics and AMR characterisation in aquatic ecosystems

## a 2-years monitoring study

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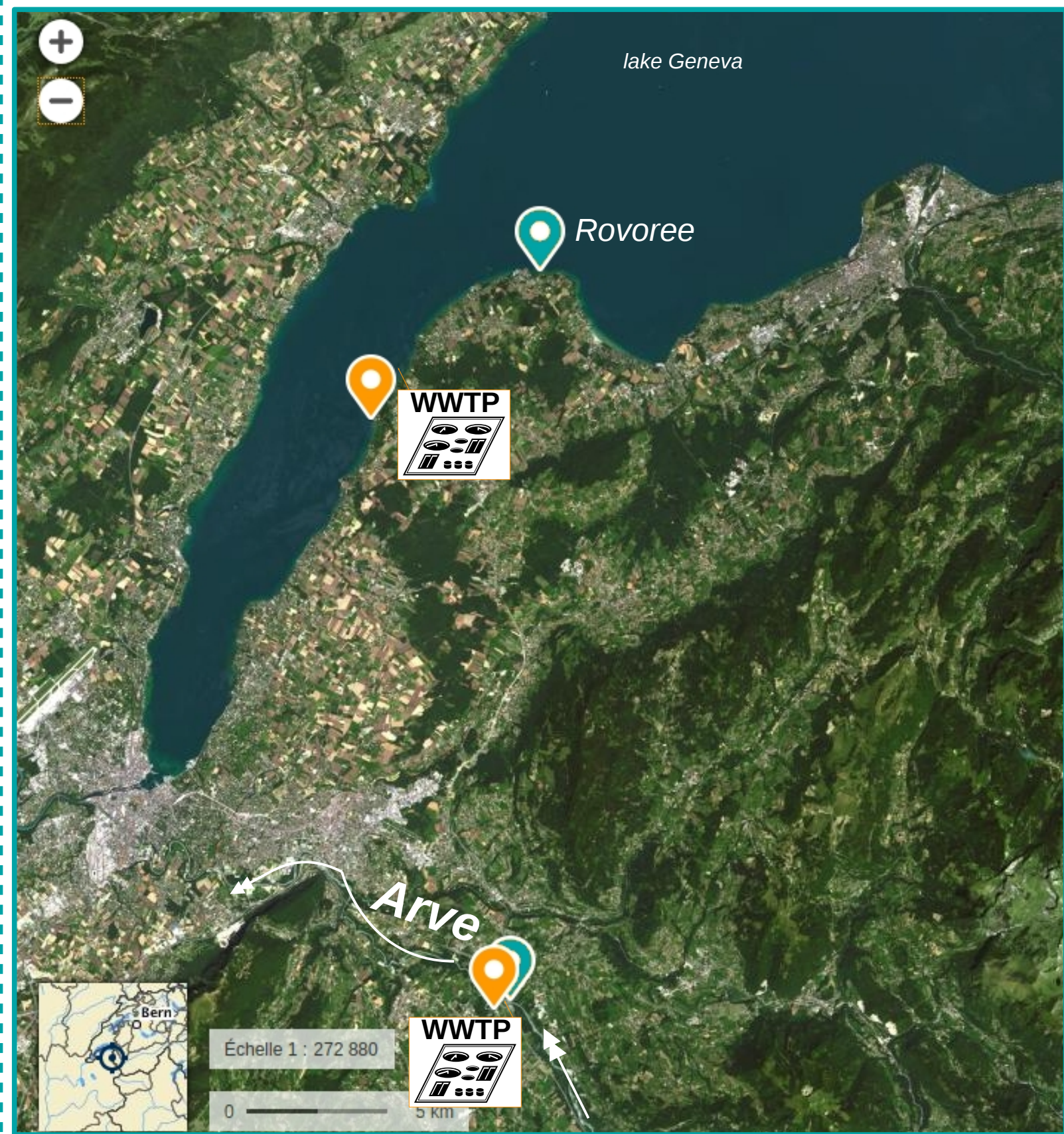
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### Where ?



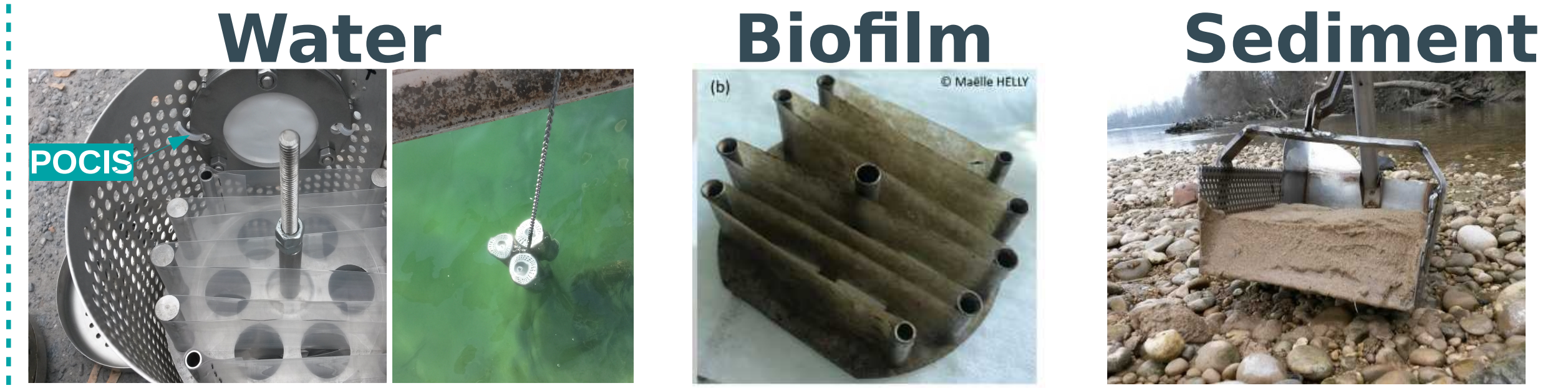
○ Preserved site ○ Site exposed to WWTP effluents

### Why ?

Investigate the fate and temporal dynamics of pharmaceutical residues in aquatic ecosystems

AMR & antibiotics: is community microbial tolerance to antibiotics correlated with exposure ?

### How ?

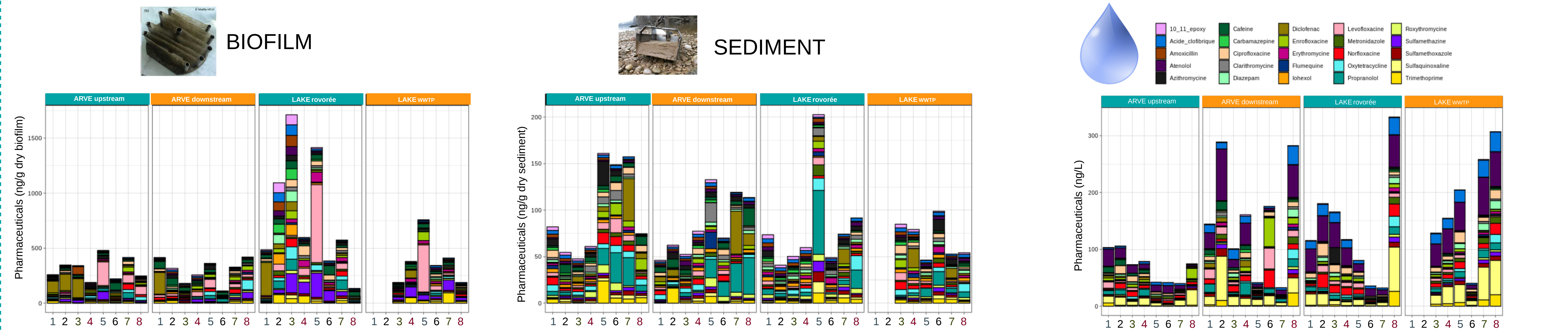


**8 field samplings** during 2 years :  
 1 - November 2018 2 - February 2019 3 - May 2019  
 4 - September 2019 5 - November 2019 6 - March 2020  
 7 - June 2020 8 - September 2020

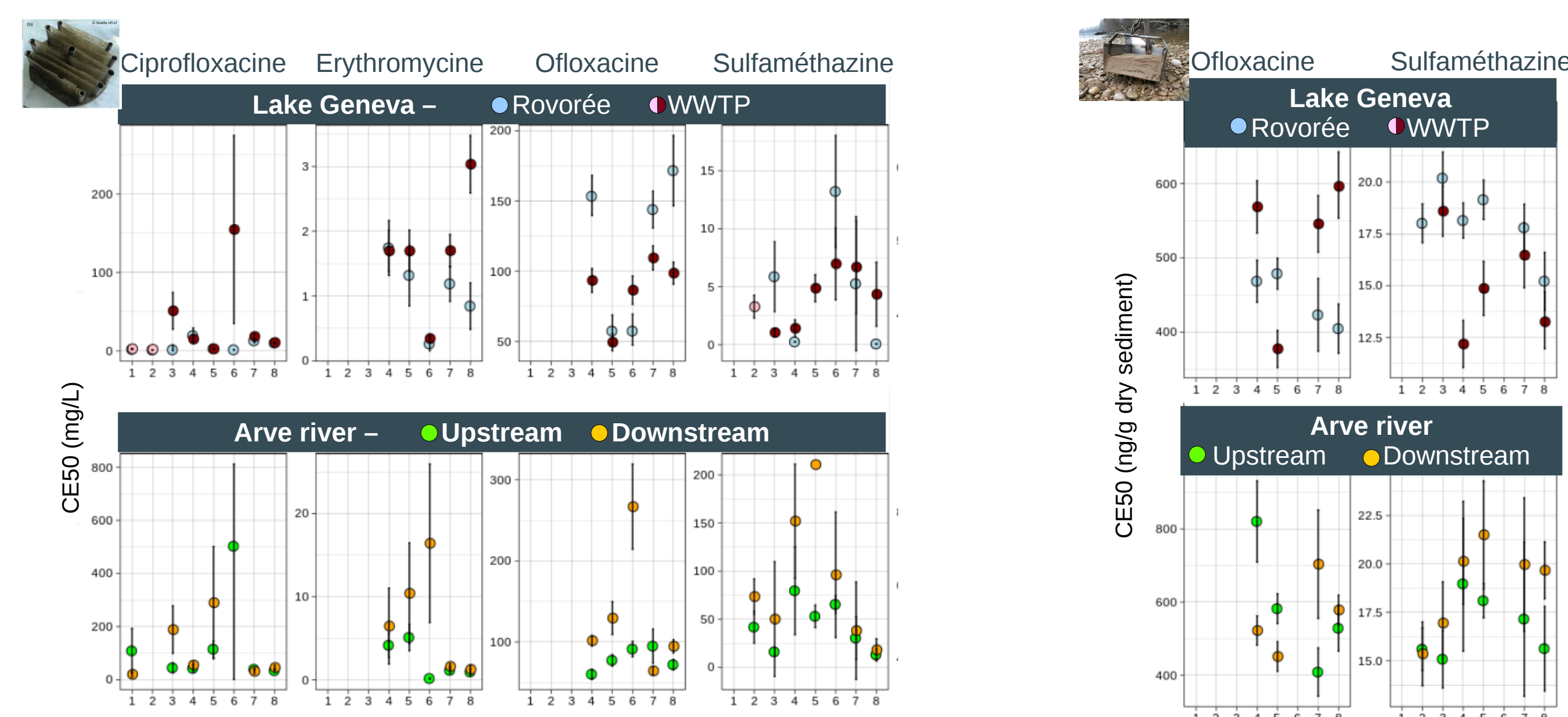
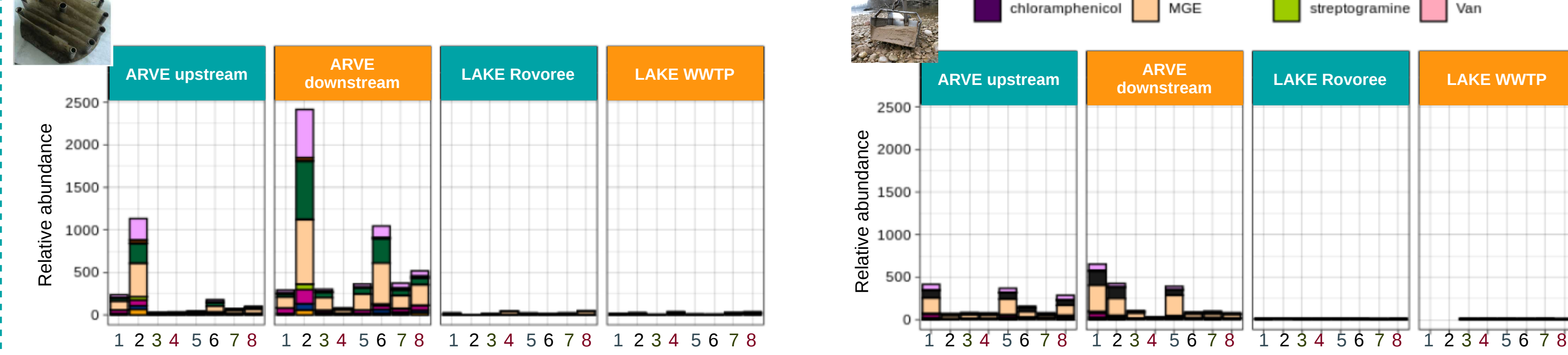
- Determination & quantification of pharmaceutical residues
- Antimicrobial resistance (AMR) characterisation in microbial communities
- Microbial potential for sulfonamides biodegradation



### What ? Distribution of pharmaceutical residues was specific of each compartment of the aquatic ecosystems studied



### High relative abundance of integrons & resistance genes in the Arve river



Microbial tolerance to antibiotics is variable over time.

Arve river : microbial tolerance to antibiotics is globally higher downstream WWTP

And so what ? Microbial exposure to pharmaceuticals is **different** in surface water, biofilm or sediment

**Biofilm** is a hotspot of pharmaceutical bioaccumulation

No clear linear correlations between pharmaceutical concentrations in the environment and antimicrobial resistance

And next ? Investigate the influence of other factors such as temperature, water flow, bacteria from WWTP on AMR dissemination & persistence in the aquatic environment

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