

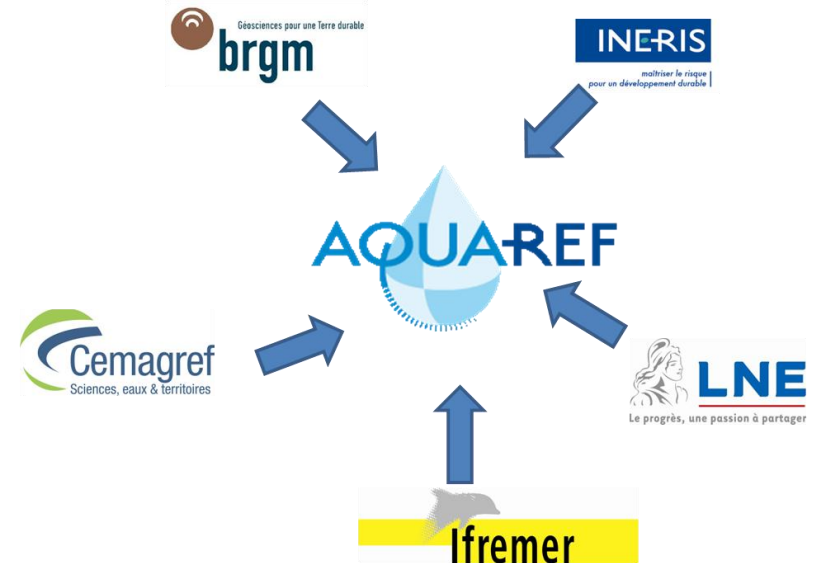
AQUAREF : National reference laboratory for the monitoring of aquatic environment (www.aquaref.fr)



> Assistance to public authorities in their policy for aquatic environment monitoring

- Improvement of sampling and analytical methods and practices
- Quality of monitoring data
- Assistance to public authorities
- Anticipation of future monitoring (emerging substances, new monitoring tools as for ex passive samplers, ...)
- ...

> Support of



Framework



> **Global Improvement of monitoring data quality for WFD**

- Taking into account the quality of sampling operation,
- Comparability, reliability of data
- Laboratories : availability of many tools for internal or external quality control
- Sampling teams : no tools, no intercomparison – no information on quality of sampling operations – no information on the part of data dispersion linked to sampling operations

> **Organisation by BRGM with collaboration of LNE for on site analysis (pH, conductivity, O2, temperature)**

> **Similar trial**

- 2007 : collaborative trial for sampling surface water (INERIS)
- JRC Trial (Po, Danube)



Objectives

- > **Observation and qualitative evaluation of ground water sampling practices**
 - Preliminary investigation of participants practices, structure, QAQC system, ...(questionnaire)
 - Presence of observers during the trial to register all the participants practices

- > Estimation of the effect of sampling operations on the variability of results
 - Quantitative objective

- > Accuracy of field measurements (pH, conductivity, dissolved oxygen, temperature).



Selection of site, parameters and participants



- Piezometer in La Chapelle Saint Luc (Aube)
 - Good water production with pumping
 - Presence of different parameters
 - Good accessibility, Historical data
- Parameters
 - NO₃, Cl, SO₄
 - Trichlorethylene et tetrachlorethylene
 - DIA, DEA, Simazine, Atrazine, DesethylTerbuthylazine, Terbuthylazine
 - Ti, V, Cr, Fe, Ni, Co, Cu, Zn, As, Se, B, Al, Mo, Cd, Sn, Sb, Ba, Pb, U
 - Ca, Mg, Na, K
- 9 participants selected mostly by water agency among their usual sampling teams (both sampling teams of big laboratories structure and small sampling companies)



Methodology



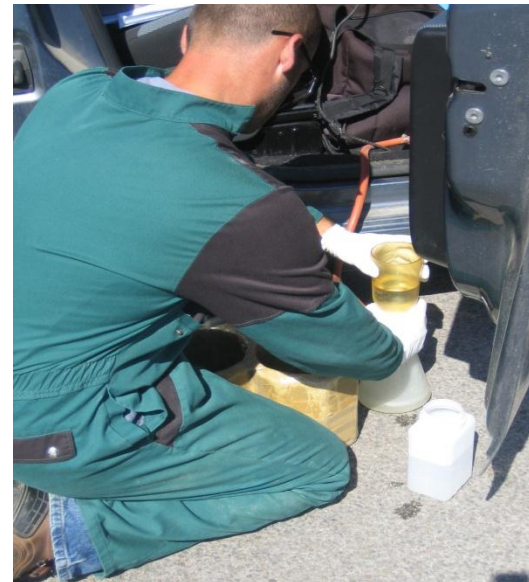
Day i			
	Pumping	Sampling	Analysis
8h-9h	BRGM control pumping	1 sampling	2 analysis by sample
9h-10h	Stop pumping		
10h-12h	Participant 1	2 independant sampling	2 analys by sample
13h-14h	BRGM control pumping	1 sampling	2 analysis by sample
14h-15h	Arrêt pompage		
15h-17h	Participant 2	2 independant sampling	2 analys by sample

- Free sampling protocol – no imposed protocol
- 5 days of field trial





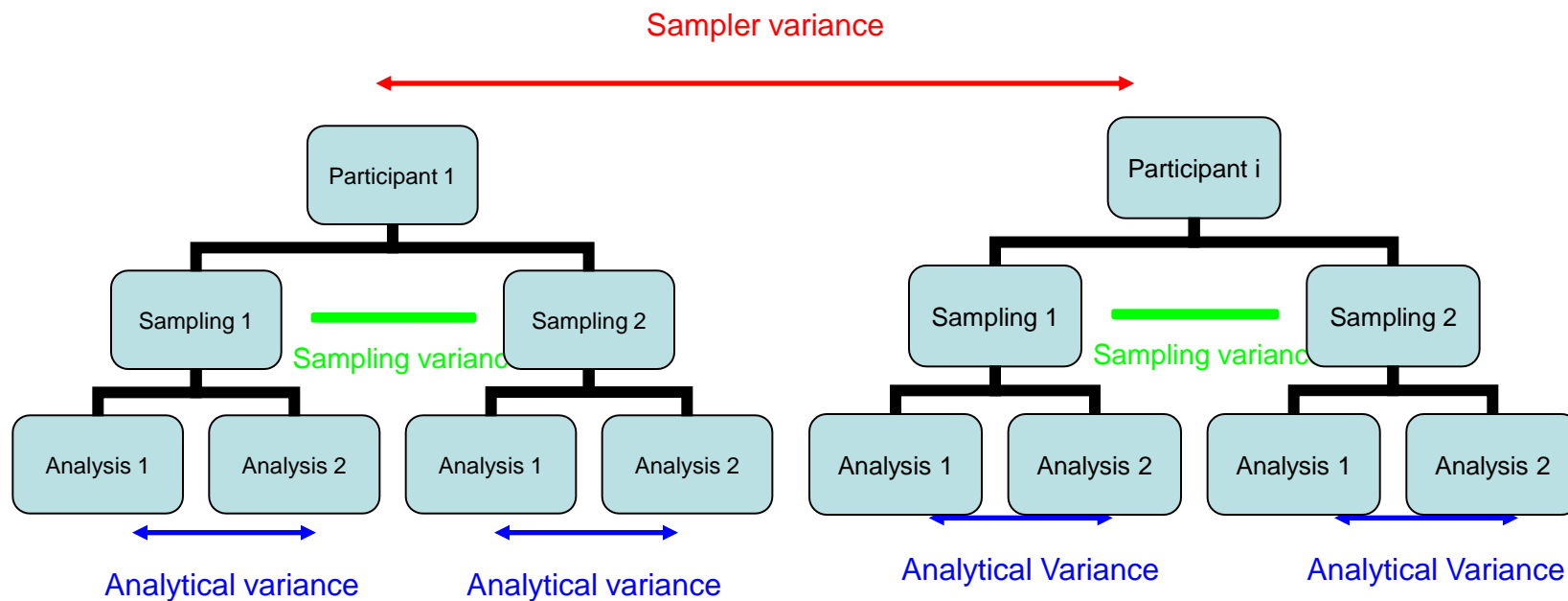
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Géosciences pour une Terre durable

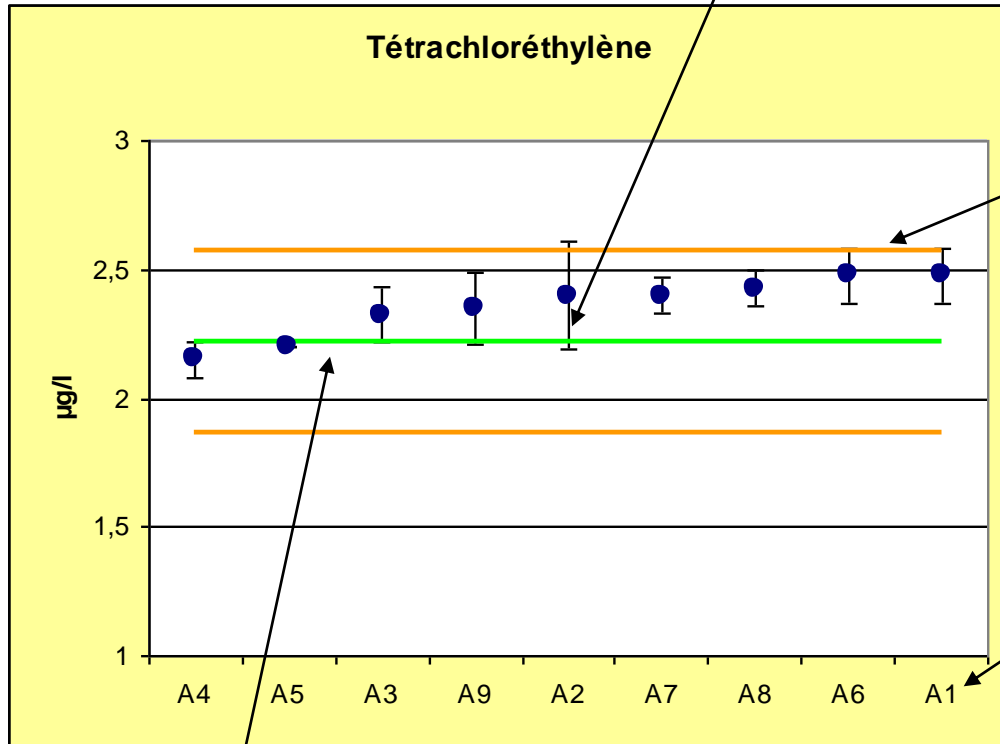
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Quantitative data treatment



Analytical variance : repeatability \neq Uncertainty

Two sampling range for part. 2

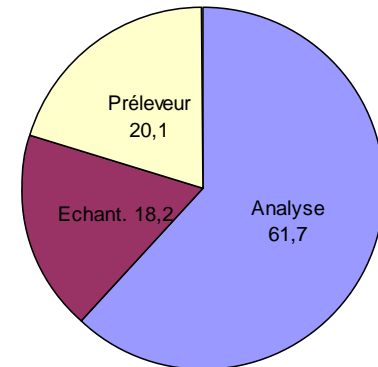


Confidence interval for analytical variability centered to mean brgm control

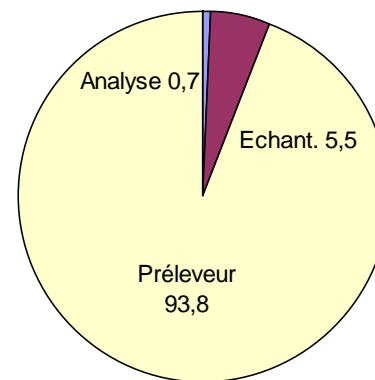
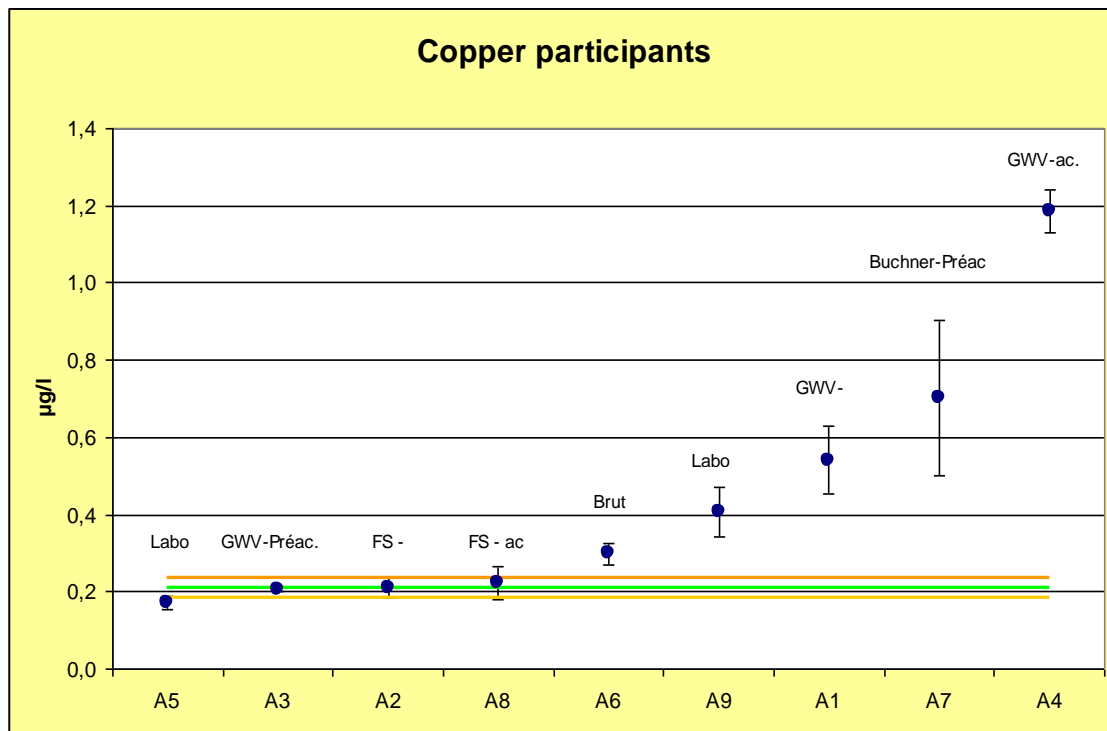
Sampler code

Mean BRGM control

	Estimated SD (%)
Analysis	5,9
Sampling repeat.	3,2
Sampler	3,4
TOTAL	7.6

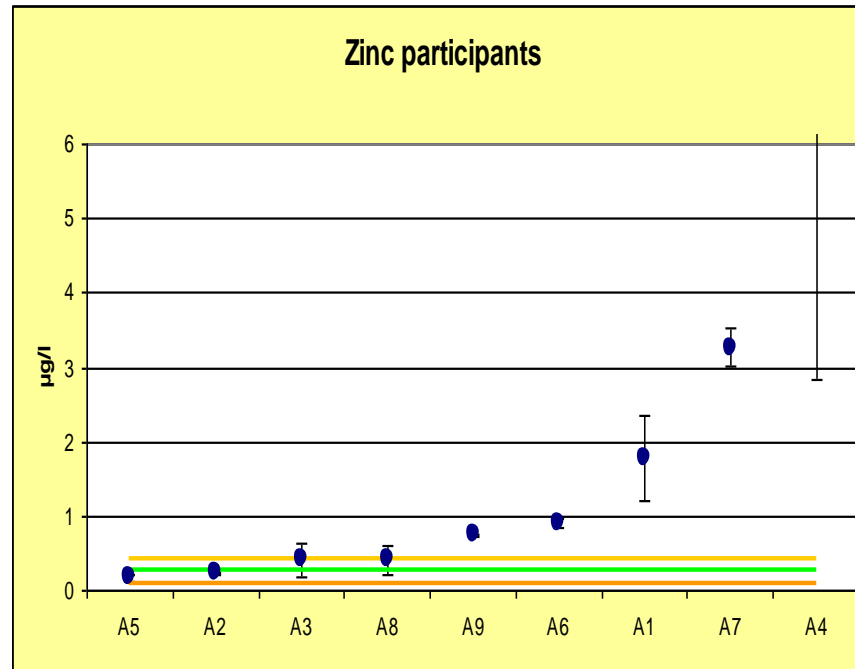


Copper (participants bottles)



	Estimated SD (%)
Analysis	5,0
Sampling repeat.	13,7
Sampler	56,6
TOTAL	58,4





	Estimated SD (%)
Analysis	3,7
Sampling repeat.	12
Sampler	72,4
TOTAL	73,4

Conclusions



> General

- First sampling collaborative trial for underground water
- Good feeling from participants
- Lot of exchanges, discussion : fruitful collaboration
- Not representative of all types of groundwater sites, of all sampling practices,
- Site/context relatively easy for this first event (in order to get interpretable data)
- Some new information emerged from this trial (quantitative evaluation of sampling effect)
- Statistics to be considered carefully (small number of participants)

> Qualitatively

- Various practices globally in good agreement with guidelines and standards
- Some practices not harmonized between participants due to imprecision in standards and guides
- Some prohibited practices



Conclusions



> Quantitatively

- For this trial, in this context and in a non expected way (for example for VOC) : low impact of sampling practices on variability of results except for some trace elements at low level
 - Rem : tetrachlorethylene is not the more volatile of VOC
- For some trace metal, problems of field contamination (recommandation of the generalisation of field blank practices)
- First information/data on global estimation of measurement uncertainty (sampling + analysis) excepted spatial and temporal variability

> Summary

- **The conclusion should not be that sampling has no impact**
- Such results could only be obtained with good practices observed in the context of this trial and with the implementation of further recommandations issued from the conclusions of this trial
- In this trial
 - Good practices : very low sampling variability compared to analytical variability
 - Bad practices : huge sampling effect regarding analytical variability





Thank you for your attention

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