Metrology from the field to the laboratory

Metrology as an aid to the characterization of a landscape

What is Metrology?
Where to start ?

Metrology corresponds to the science of measurement, it ensures the comparison, validation and interpretation of measured results.

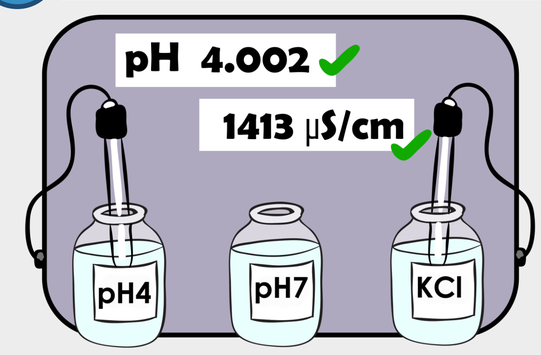
1 Choice of sampling site

OBSERVE !
- ✓ Structures in the surrounding area
- ✓ The watercourse

WHY ?
- ✓ Understanding a phenomenon
- ✓ Found a pollution
- ✓ Collect data

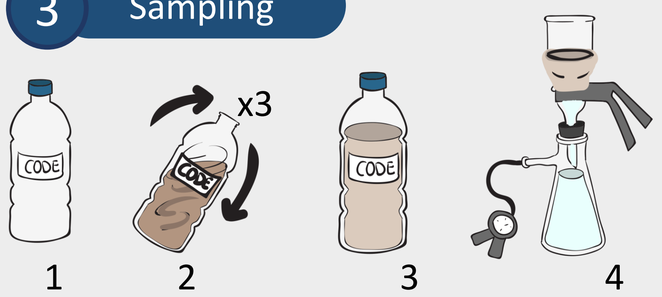
WHICH CONDITIONS ?
- ✓ Pollution
- ✓ Hazardous area
- ✓ Climate

2 Equipment verification/Calibration



3 Sampling

To be able to analyse solutions, it is necessary to follow a protocol to avoid uncertainties.



1. Codification
2. Rinsing the container
3. Simpling
4. Filtration
5. Acidification of certain samples
6. Refrigeration / Freezing

CONDUCTIVITY

WHAT IS IT ?
Measurement of the capacity of water to conduct an electric current

WHY ?
Detects the presence of dissolved substances in water

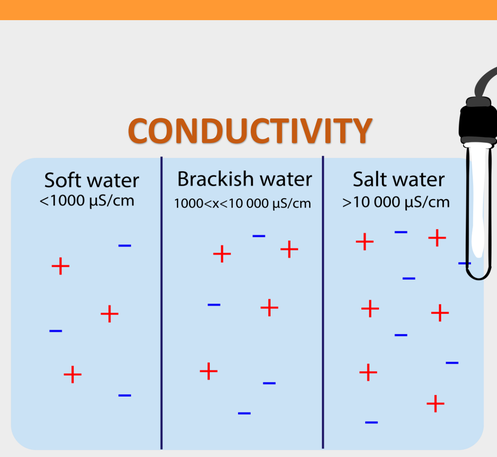
pH

WHAT IS IT ?
Measures the degree of acidity or basicity of an aquatic environment.

WHY ?
Qualify the aquatic environment

HOW ?

The pH measurement is based on the transformation of the electrical signal obtained with a glass electrode (indicator) and a reference electrode.
For pH : This signal is proportional to the activity of the H+ ions.
For conductivity : This signal is proportional to the activity of cations and anions.



The limits
- Interferences
- Precipitations
- Deposit
- Contaminations
- Malfunctioning
- Internal reactions

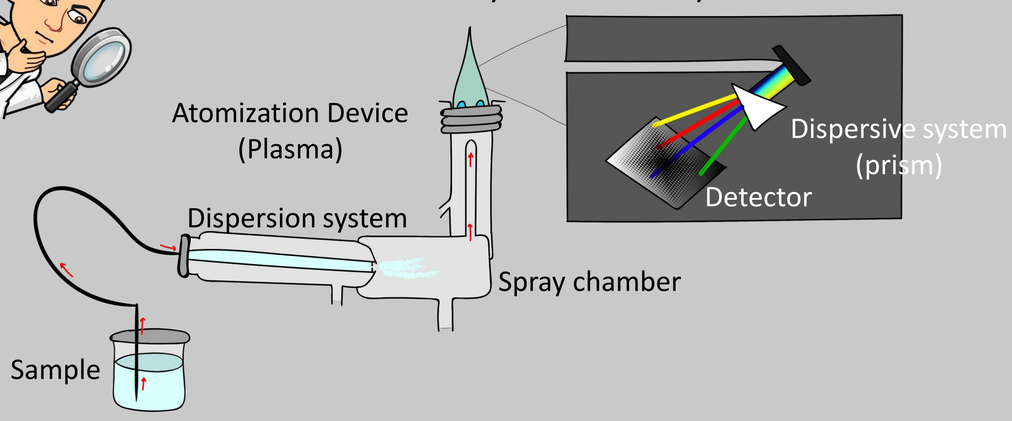
And now what do we do ?

LABORATORY

We will have to analyse our samples !

ICP - OES

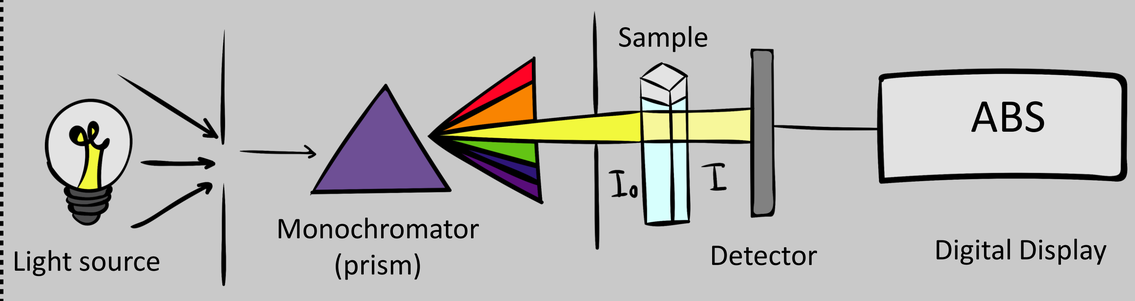
Elementary solution analysis



Sample → Dispersion system → Atomization device → Dispersive system → Radiation detector

Spectrophotometer

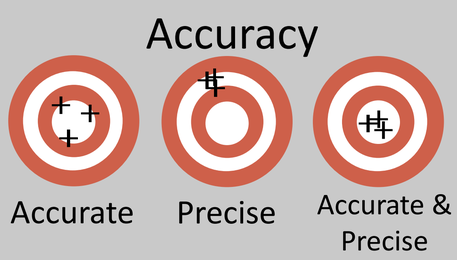
Measures the absorbance of a solution in order to define its concentration.



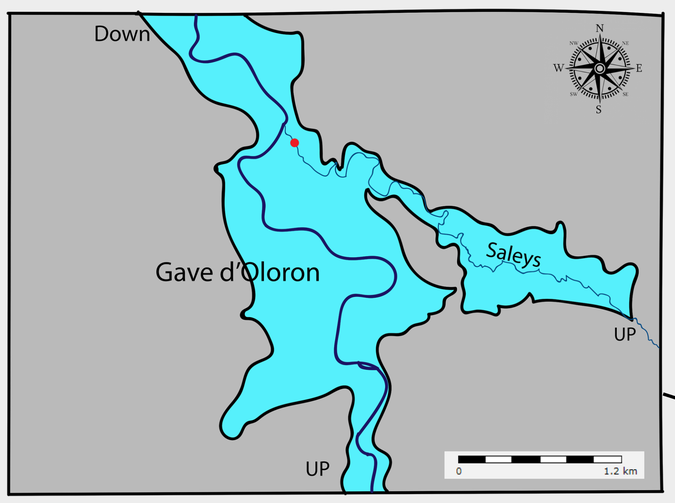
Light source → Monochromator (Prism) → Wavelength selector → Sample → Detector → Digital display

But you know it's not because the machine gives a result that it's reliable… Here's what you need to do to get the best possible results !

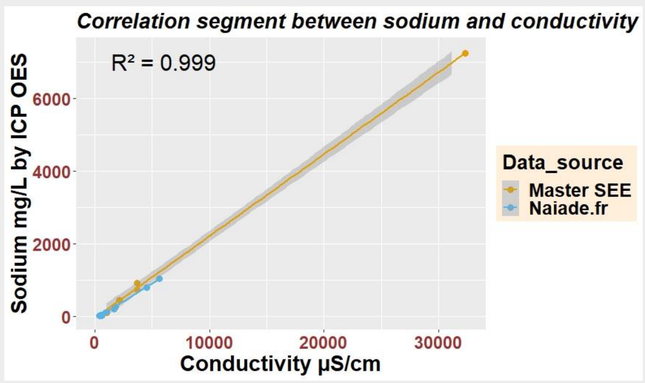
Standard Range $R^2 > 0.990$ > Relative Gap ER ≤ 6% > Accuracy > Precision CV ≤ 6% > LOD/LOQ* > Interference



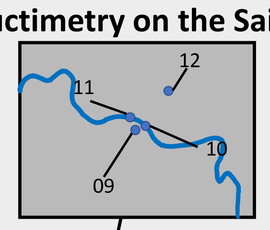
*LOD : Limit Of Detection / LOQ : Limit Of Quantification

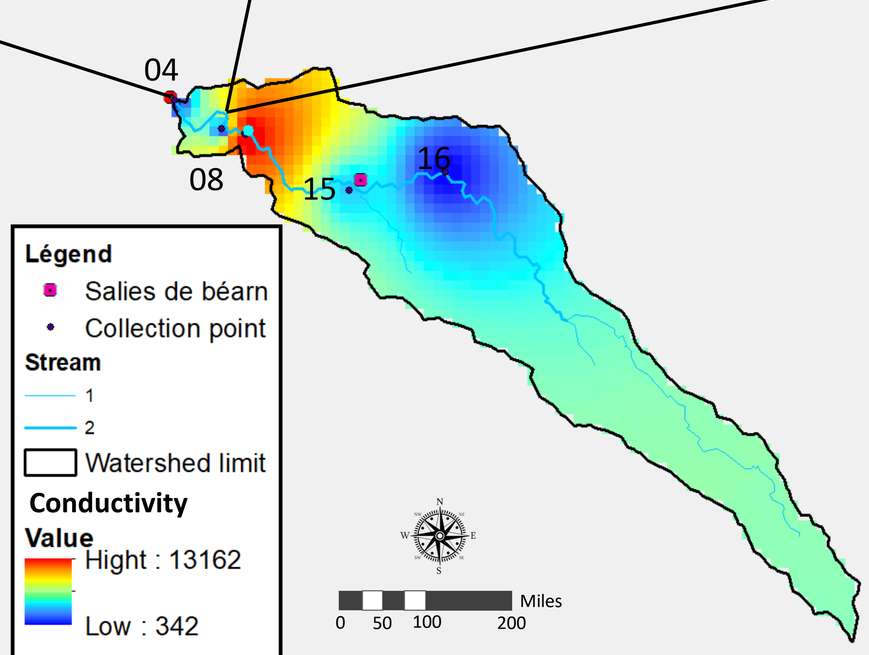


The low downstream conductivity can be explained by a mixing of groundwater (Gave d'Oloron and le Saleys) within the same alluvial groundwater.

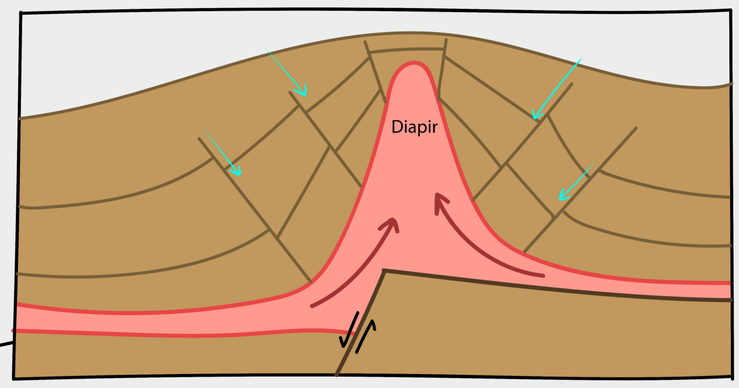


Conductimetry on the Saillies-de-Béarn watershed





Data Source : Master SEE



The conductivity peak at point 09 could be due to the presence of diapirs that would be altered by water. The latter being loaded with mineral salts explains the presence of the salt source.

Conclusion

- ✓ **Through this poster, we were able to see the importance of the science of measurement. The reliability of our results revealed, on the one hand, the presence of slides dating from the Triassic period responsible for the salinity of the famous Salies-de-Béarn water and, on the other hand, the presence of a mixture of water close to the outlet.**
- ✓ **Metrology is a fundamental discipline that has allowed us to appreciate results in order to characterize the Aquitaine landscape.**

Adrien GARNIER **Showna NZIOU** **Ambrine HAMLA**
Master SEE

Source :https://www.suezwaterhandbook.fr | https://www.persee.fr | https://www.cpepesc.org |http://www.eau-loire-bretagne.fr | https://www.aquaref.fr | https://www.lachimie.fr | https://crelaurentides.org