

—● WATER MONITORING SOLUTIONS



HYDREKA

Sequencing applied to polluted Sites



Préoccupations environnementales & préservation des ressources

EAU POTABLE



Sectorisation des réseaux

Qualité d'eau potable

Rendement réseau

ASSAINISSEMENT & INDUSTRIES



Impact des rejets sur le milieu naturel

Auto surveillance et protection des ouvrages

Surveillance des rejets industriels

Optimisation des procédés

MILIEUX NATURELS



Suivi des crues et de la qualité de l'eau

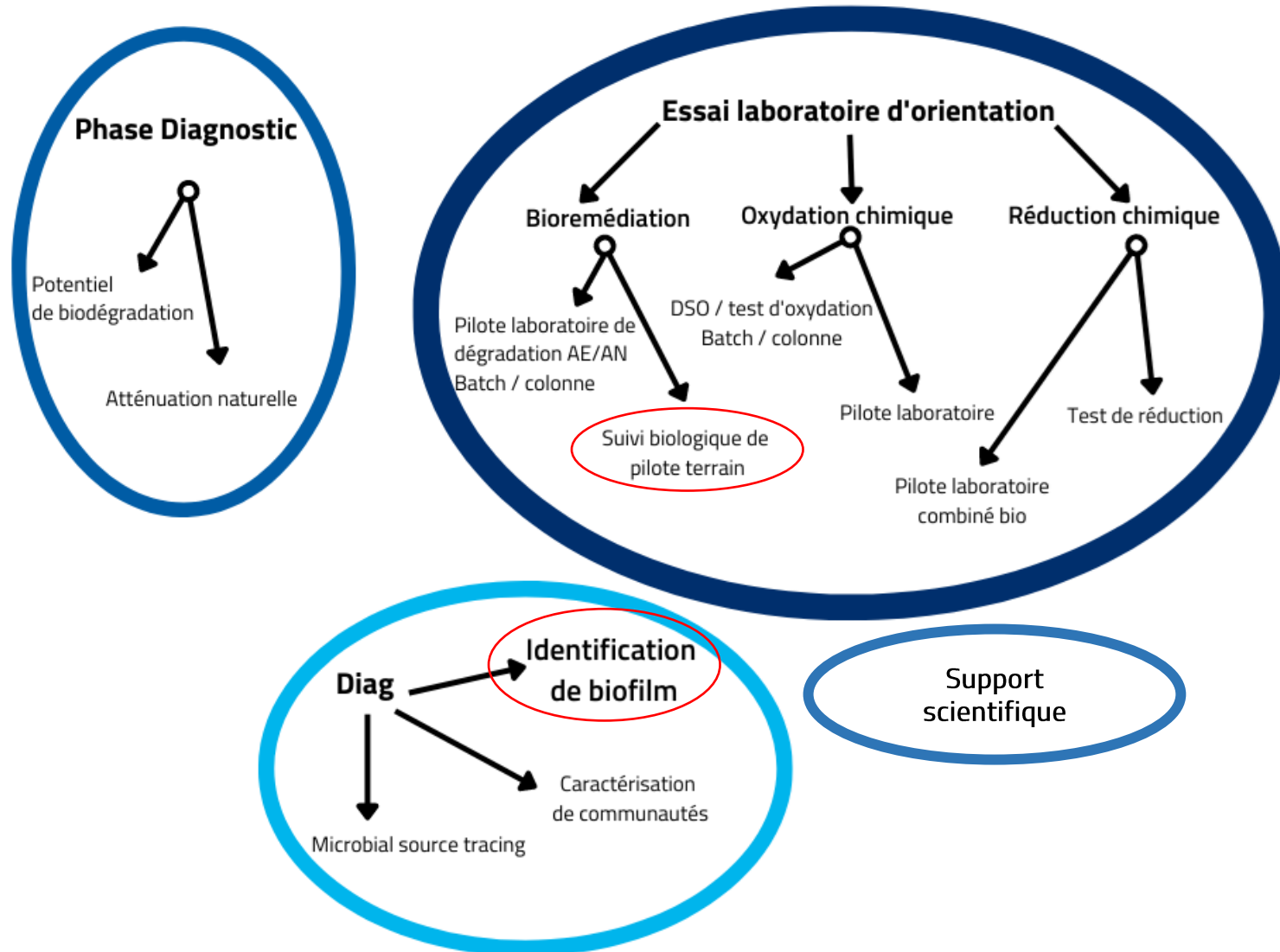
Protection des milieux naturels

Suivi des nappes et des ressources en eau

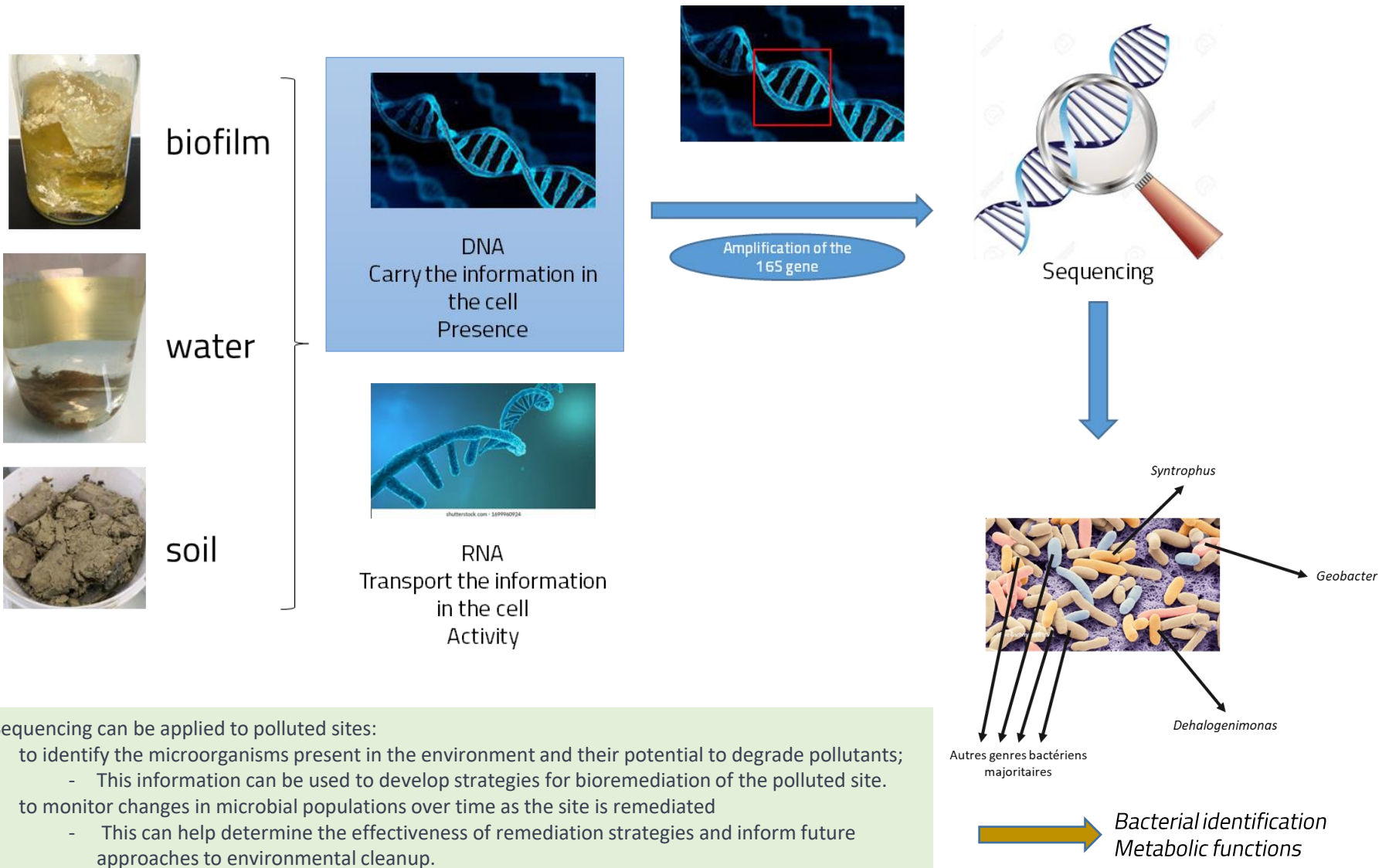
SITES & SOLS POLLUÉS



Suivi , protection et réhabilitation des nappes, aquifères, sols et des ressources en eau



Basics of sequencing



Identification of the cause of the biofilm



→ Which bacteria are present in the biofilm ?



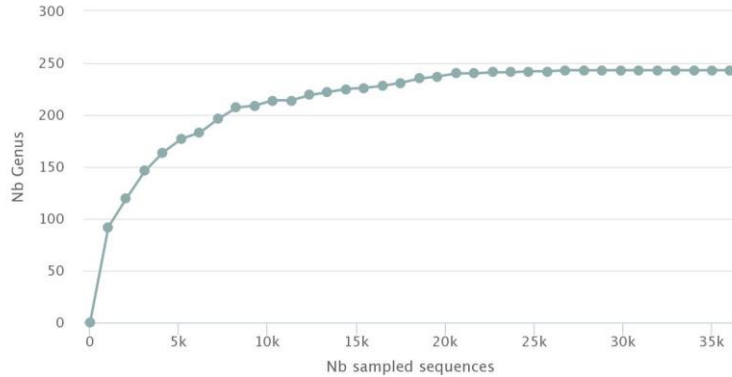
Which environment allows the development of this biofilm ?



How to avoid the biofilm formation ?

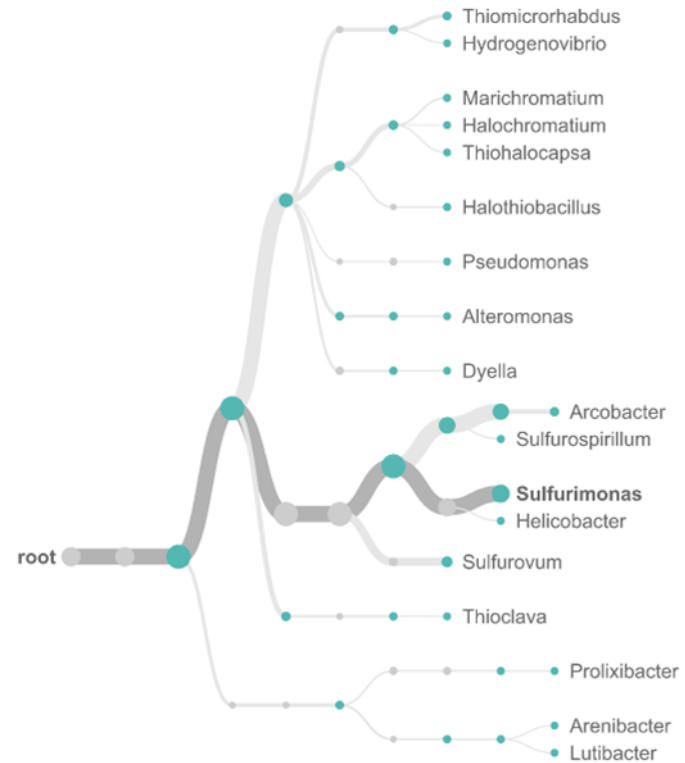
Sequencing results

Rarefaction curves



The shape of the curve indicate that most genii are identified

More than 200 genii identified
Few genii are the main bacteria in the biofilm



Sequencing generate a table of scientific names which are describing each version of the 16S gene.

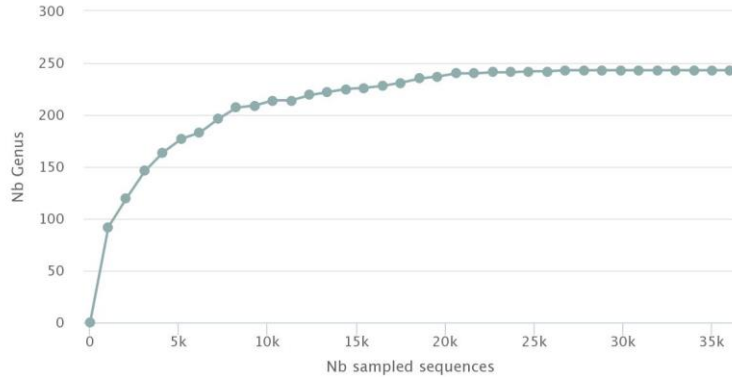
This sequence correspond to one genus/species.

One way to represent it is in the shape of a tree.

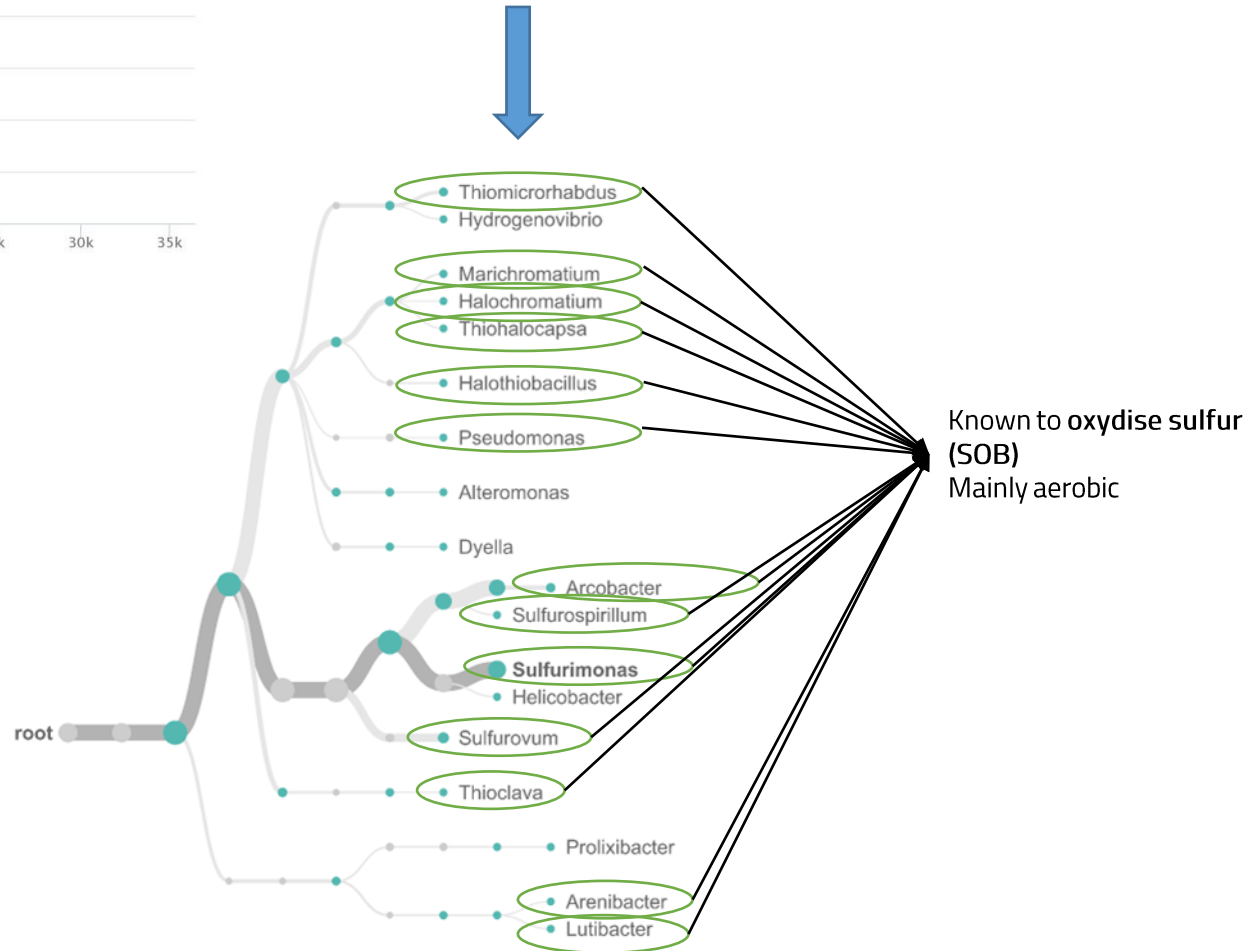
Based on the scientific name, metabolic capabilities can be inferred.

Sequencing results

Rarefaction curves



More than 200 genii identified
Few genii are the main bacteria in the biofilm



Most abundant bacteria characterised (>0,5%)



Which bacteria are present in the biofilm ?



A full array of SOB among which Sulfurimonas (main genus)

Which environment allows the development of this biofilm ?



Oxydisable sulfur source + oxygen available

How to avoid the biofilm formation ?

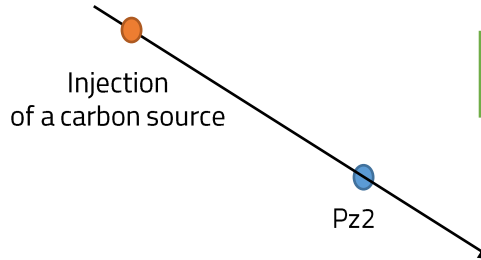
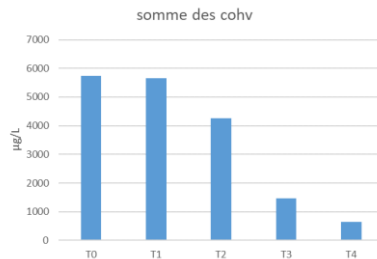
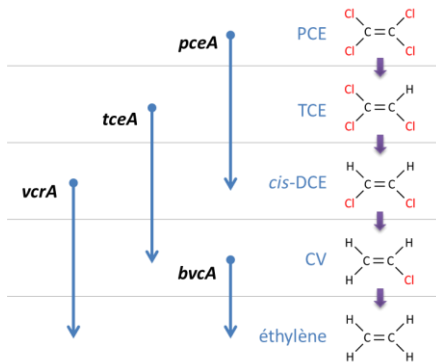


*Deplete sulfur availability => not feasible
Deplete oxygene availability => addition of carbon source to
bring strong anaerobic condition*

Bioremediation of VOHC: monitoring of a pilot test

Is bioremediation efficient and are all the conditions needed implemented during a pilot test to ensure lasting effects ?

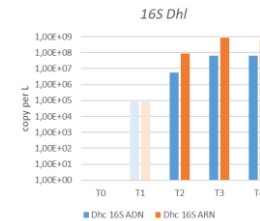
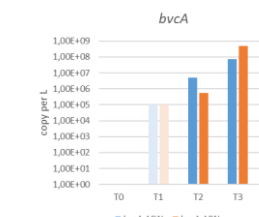
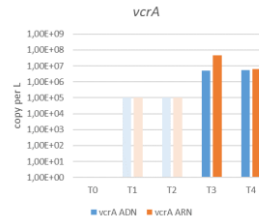
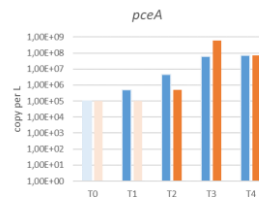
Chloroethene degradation



Labscale test were conclusive on the feasibility of a bioremediation of chloroethenes.

The in situ pilot was monitored chemically, by :

- qPCR
- Sequencing
- Chemicals



- At T0, degradation pathway is incomplete. =< only *pceA* and *tceA* were present.
- From T2, the full pathway gets involved and starts to get the job done.
- At T3 and T4 Dhl is installed and the full pathway is active.

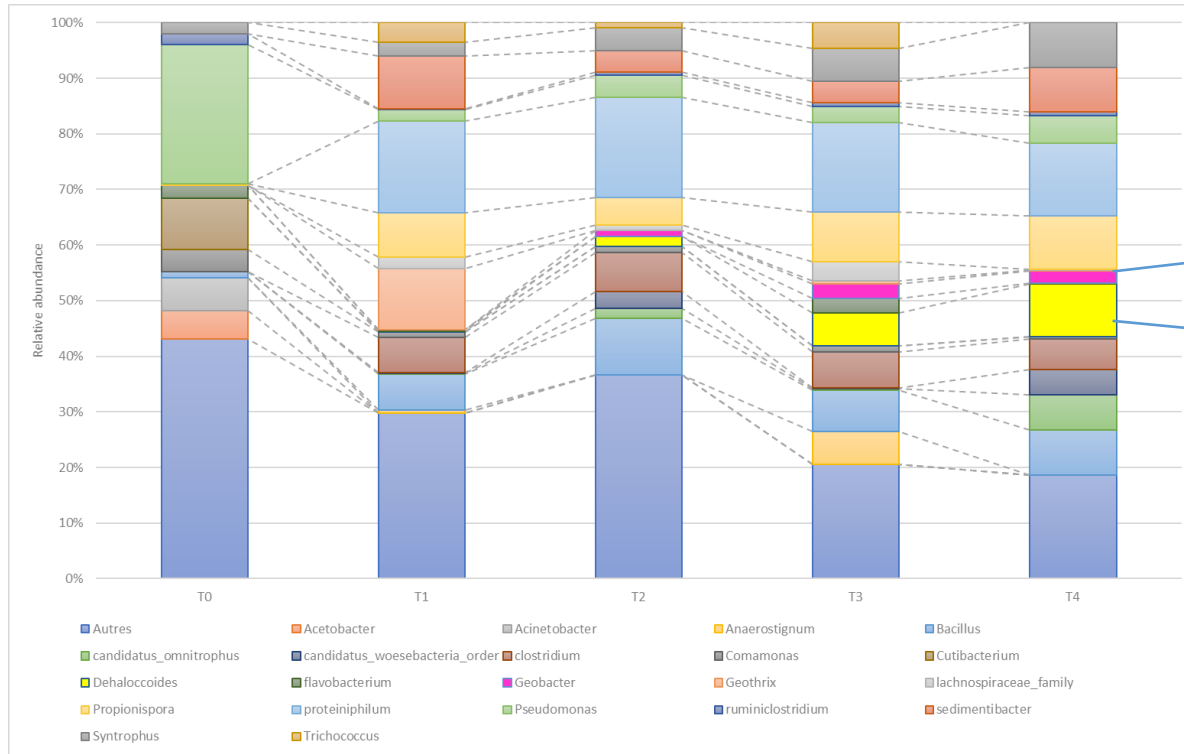
Treatment is working.
Are the changes induced going to last?



Only a view of the dechlorination functions.

Evolution of the communities

25 major genii



Geobacter abundance increases through time : *Geobacter* supplies an important cofactor to *Dehalococcoides* for chloroethenes degradation

Dehalococcoides relative abundance increases through time

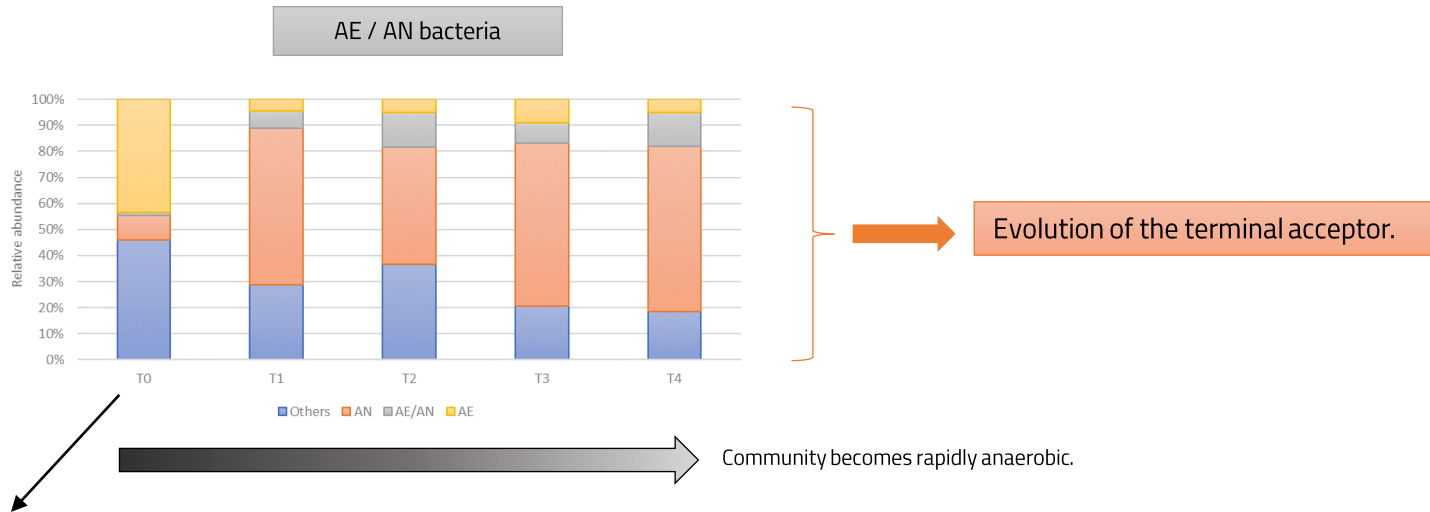


Dechlorinators and their needed partners are installed.
There is less evolution during the last two sampling points.

Strong evolution of the communities linked to the injection

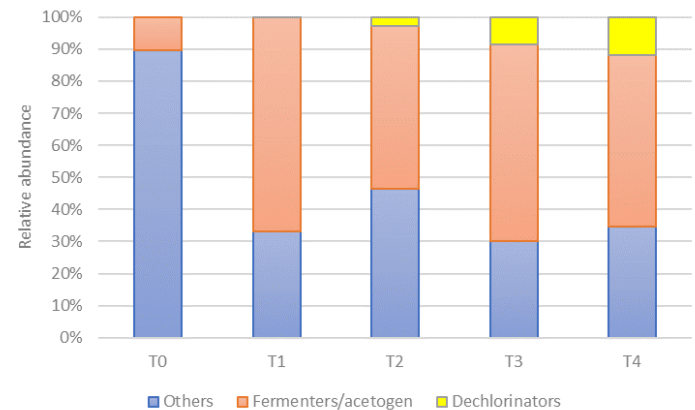
Sequencing allow a broader assessment of the impact of a treatment on community.

What else can we infer?



Community is more adapted to aerobic to slightly reducing conditions.

The community adapted to the fermentation and therefore created a niche to allow the dechlorinator to be active and efficiently treat the chloroethenes.



Important functions for dechlorination

Conclusion

This tool gives a broader view of the biological component to answer questions :



- Explanation of the development of a biofilm
- Identification of the cause for impaired processes
- Adaptation of the community to a substrate (potential for bioremediation, identification of potential pollutants, ...)
- ...

Can be used alone or in combination with other analyses depending of the question

⇒ Better comprehension of the biological processes / Improves the contextualisation of the samples

⇒ Improvement of the biostimulation processes, possibility to Improves the contextualisation of the samples

⇒ Adaptation of remediation strategies

⇒ Assess effect of the treatment on deep soil biodiversity (chemical

VISION

"GROWING A SAFER, CLEANER, HEALTHIER FUTURE FOR EVERYONE, EVERY DAY"

« CRÉER CHAQUE JOUR UN AVENIR PLUS SÛR, PLUS PROPRE ET PLUS SAIN POUR TOUS. »

MISSION

"WE ENABLE THE PROTECTION OF THE ENVIRONMENT AND THE OPTIMIZATION OF WATER RESOURCE THROUGH EXPERT METROLOGY SOLUTIONS AND SERVICES ."

« NOUS CONTRIBUONS À PRÉSERVER L'ENVIRONNEMENT ET À OPTIMISER LA GESTION DE LA RESSOURCE EN EAU AU MOYEN DE SOLUTIONS MÉTROLOGIQUES ET SERVICES EXPERTS. »

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