

## 4.62.P03

### Fluxes of trace metals in agrosystems in the north of France

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Soils receive fluxes of trace metals by the atmosphere depositions and the agricultural entrants. Part of these elements is withdrawn on the soil, primarily by the transfer of water and from the harvests, for the cultivated ones. In the case of a positive trace metal balance, the accumulation of these elements in the agricultural soils can have an impact in the food chain. The objective of this work is to quantify the fluxes and the balances of trace metals in the cultivated horizon of three agro-systems situated in the north of France, under various conditions. For the quantification of the balances, it is needed the entering fluxes (atmospheric repercussion, agricultural entrants) and outgoing fluxes (harvests, draining water); there are other fluxes such as erosion, soil work etc that are neglected during the calculations. There are data provided by precedent and present scientific work on the same sites, and by the analysis of entrants, harvest and solution of the soil. Different methods were applied to collect the soil solution: ceramic cups, centrifugation of field-moist samples, percolation through columns of soil.

## 4.62.P04

### Arsenic reduction by dissolved sulfide

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During a tracer test in the Cape Cod aquifer, the reduction of As(V) to As(III) was observed under anoxic redox conditions. The observations led to the hypothesis that this reduction was caused by dissolved sulfide. Under field conditions As(V) might also be directly reduced by microorganisms serving as an electron acceptor [1]. In our case we could not support this process from microbial field results, whereas we observed sulfide production. Dissolved sulfide is known to be an abiotic reaction partner reducing As(V) [2]. The intention of this work is to study reaction pathways and rates of this redox reaction at the surfaces of iron and manganese minerals in batch and column experiments.

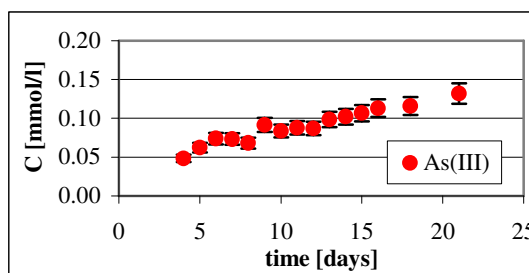


Fig. 1 Production of As(III) in a solution with 0.22 mmol H<sub>2</sub>S and 0.88 mmol As(V)

First batch experiments with As(V) and dissolved sulfide solutions were conducted in a glovebox. Different amounts of H<sub>2</sub>S gas were injected into glass bottles and sampled over a period of 4 weeks. In the samples As(III) as well as As(V) were separated by ion chromatography and analysed using an AAS coupled with a hydride unit. Sulfide and sulfate were measured using ion chromatography and a sulfide electrode. Fig. 1 shows an example of the As(III) production. It can be observed that the reaction is slow. The rates depend directly on the H<sub>2</sub>S concentration.

In order to simulate aquifer conditions oxic iron and manganese minerals like birnessite and goethite will be added to the solutions.

#### References

- [1] Oremland et al. (2000) *GCA* **64**, 3073-3084.
- [2] Rochette, E.A., Bostick, B.C., Li, G. and Fendorf, S. (2000) *EST* **34**, 4714-4720