

## **Trace metal interactions with Fe(III) minerals formed in a mixed community of Fe(II)-oxidising bacteria**

C. L. LOCKWOOD<sup>1\*</sup>, F. ZEITVOGEL<sup>1</sup>, C. SCHMIDT<sup>1</sup>,  
M. OBST<sup>1</sup> AND A. KAPPLER<sup>1</sup>

<sup>1</sup>Center for Applied Geoscience, University of Tuebingen, Germany (\*correspondence: cindy-louise.lockwood@uni-tuebingen.de)

Biogenic Fe(III) minerals are formed in freshwater lake sediments via mixed communities of Fe(II)-oxidizing bacteria; microaerophilic, nitrate-reducing and phototrophic Fe(II)-oxidizing bacteria. However, the extent of how Fe(III) mineral formation in these mixed communities controls nutrient and metal cycling in these environments is not yet fully understood. The goals of this study are to examine the relationship between biogenic Fe(III) minerals produced in these systems by different Fe(II)-oxidizing bacteria and their potential for metal sequestration.

Biogenic iron minerals are well known scavengers of trace metals due to their large reactive surface area and their high sorption affinity to metal cations. Ni and Co are essential trace metals used by many microbes in key metabolic pathways, but are both harmful to microbes and humans in high concentrations.

To this end, we used spiked batch microcosms using freshwater lake sediment, to determine; Fe(III) mineralisation rates and Ni and Co uptake onto lake sediment minerals. The evolution of Ni and Co concentrations were determined by ICP-OES and acid extraction techniques. Finally, SEM/EDX mapping of the solid phase was used to examine changes in the relationship between Ni and Co with Fe over time.

These data provide insights into Fe(III) mineral formation in lake sediments with mixed communities and, the extent to which the different microbial communities control metal cycling during Fe(II) oxidation under differing geochemical condition.