Discovery of the Loki's Castle vent field at the ultra-slow spreading Arctic mid-ocean ridge

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A black smoker field was discovered at the Mohn-Knipovich Ridge during a cruise with RV G.O Sars in July 2008. The vent field is located at the crest of a 30km long axial volcanic ridge (AVR) at around 73.2°N - where the Mohn Ridge passes into the Knipovich Ridge. The tectonic architecture of the ridge is here asymmetric with core complexes present on the western flank. The eastern flank of the ridge is buried by the distal parts of Bear Island fan, and sediments have spilled into the rift valley and filled half-grabens at the western side of the rift.

The vent field is located at the margin of a large fissure running along the crest of the AVR. Active venting from several, over 10 metres tall, chimneys occurs at the top of a large sulphide mound that appears to be approximately 200m in diameter. Based on the amount of hydrothermal deposits, venting appears to have been long-lived at this site. The vent fluids where measured to reach 320C, and fluids and gas compositions indicates a sedimentary source component. The AVR is unsedimented and the vent fied is clearly basalt-hosted, but geological observations and geophysical data suggest that sediments may be present below the AVR.

The role of iron –sulphur coupling in ground water geochemistry – revisited

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The interaction between sulphide and ferric oxides:

$$2\ FeOOH + H_2S \rightarrow S° + 2\ Fe^{2+} + 4\ OH^- \qquad (1)$$

is of paramount importance for the redox state of ground waters. In this presentation, recent findings will be discussed that underpin the relevance of iron-sulphur interaction for in anoxic environments. In particular the effect of iron-sulphur interaction will be addressed on
-anoxic sulphur cycling in weakly acidic environments [1],
-the formation of pyrite in sulfidic environments [2]
- dissimilatoric iron reduction

It appears that flow rates significantly reduced turnover of sulfide [3]

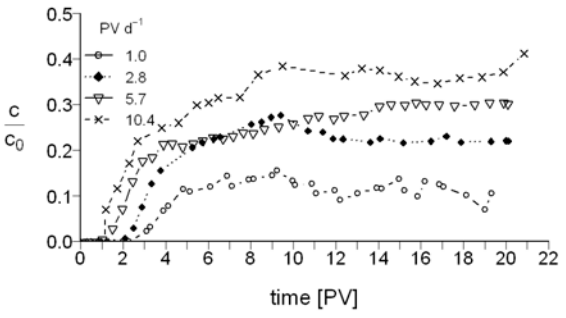

Figure 1: Turnover of sulfide (c_{in} = 10^{-4} mol/L) in a column containing quartz grains coated with goethite

Implication of these findings for the above mentioned processes and for the ground water geochemistry in general will be addressed

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[1] Blöthe M., Küsel K., Gade W., Peiffer S. (2009), Iron-Sulfur Cycle in an Acidic Mining Lake Sediment, in preparation [2] Hellige K., Larese-Casanova P., Pollok K., Peiffer S. Transformation of iron(oxyhydr)oxides in the presence of dissolved sulphide. *This volume*. [3] Kurtz W., Hellige K., Peiffer S., The effect of flow rate on iron oxide driven sulfide turnover in aquifers, *This volume*.