Diversity and vertical distribution of cultured SRB in an intertidal bog of the coastal mangrove from Hainan island

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In the Eastern Hainan province, the mangrove bog (modern to 10,000 years) are strongly affected by tidal fluctuations, and contain anoxic environments where sulfate reduction is an important microbial metabolic process. The objective of this study was to characterize the sulfate-reducing bacteria community in the profiles of the mangrove peat based on a phylogenetic analysis of sulfate-reducing bacteria.

There are several tens species of main advantage germ (SRB) clusters above 80cm in the depth profile of the bog sample. With the burial depth increasing, generally, the species and the cell number decrease. The results can be explained by the long periods of flooding to which these substrates are subjected every day which cause, different redox conditions in the subsurface and surface layers. But there exist high concentrations of cells correlated positively with the pyrite-sulfur, which belong to the boundary between the pedoenesis and the diagenesis of mangrove bog (Fig. 1. the highlight data points, approximately depth 30cm). This layer contains relatively stable redox condition, giving rise to the formation of polysulphides that allow rapid formation of pyrite.

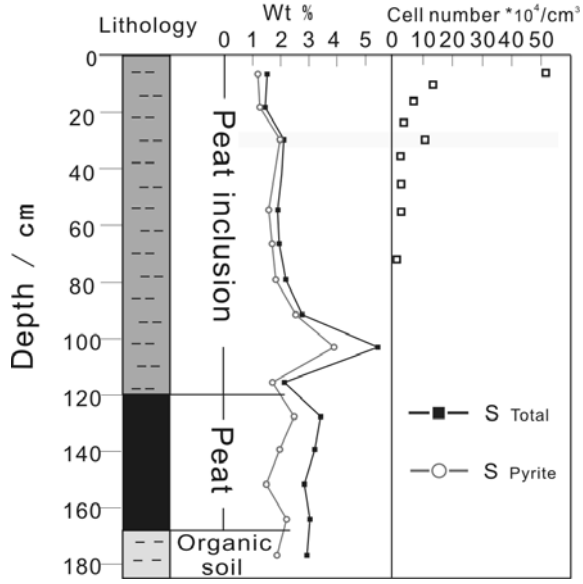

Figure 1: Depth profiles of the S values and cell (SRB) number in the mangrove bog from Hainan island.

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Sedimentary brines in ore deposits and basement rocks

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A wide range of low temperature Pb-Zn deposits, including both sediment-hosted and basement-hosted examples, have formed from saline fluids which are close to salt-saturation at surface temperatures (equivalent salinities c.21 - 24% NaCl). Similar fluids are also found in basement rocks without mineralisation, and likewise are bittern brines with Br:Cl ratios greater than seawater. The frequent occurrence of brines of this salinity suggests an origin at the surface, where they would be close to salt-saturation. Such bittern brines have a higher geological preservation potential than their associated evaporites. In addition to Br-enrichment, they commonly show evidence for extensive fluid-rock interaction with elevated levels of Ca and transition metals relative to evaporated seawater.

Brines formed in the sub-surface may be more saline, reflecting the higher temperature at which salt-saturation was attained. Those produced by dehydration of crustal fluids due to the growth of hydrous minerals have a wide spectrum of salinities up to a maximum corresponding to local salt saturation.

Brines formed by dissolution of halite are known from sedimentary and low grade metamorphic settings, and in addition to lower Br:Cl ratios, they typically have very high Na:Ca because the Na-content of the pore water exceeds the available Ca from mineral alteration. Such brines have the potential to equilibrate with rocks and play a role in metal transport, but are normally low in most metals other than Na.

We conclude that, directly or indirectly, surface evaporation is the principal process leading to the development of saline fluids in the crust and is the primary control on many types of ore body.