Integration of geologic, geophysical, geochemical and remotely sensed datasets for mineral exploration in Pulang porphyry copper deposit, Yunnan, China

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The Pulang porphyry copper deposit which belongs to the typical Triassic porphyry copper deposit in the eastern Tibetan plateau is located at the southern end of Yidun island arc belt on the western margin of the Yangtze Platform, NW Yunnan, in the central part of the Sanjiang area, SW China. It shows the potential of super-large ore deposit and it is an important polymetallic enrichment zone in China.

For this work, geologic map, geochemical data, aeromagnetic data, EO-1 Hyperion hyperspectral remote sensing data and Landsat ETM+ imagery of Pulang were used. Hyperion hyperspectral remote sensing data and landsat ETM+ imagery were pre-processed by spectral matching techniques. All processed geologic, geochemical, geophysical, remotely sensed datasets and deposits training data were integrated into Arc-GIS platform. Then, a variety of geoscientific datasets were co-registered and analyzed using Arc-SDM software [1]. Arc-SDM is a collection of geoprocessing tools for spatial data modelling using weights of evidence, logistic regression, fuzzy logic and neural networks. Finally, mineral potential mapping was generated using weights of evidence model.

Integration of the various datasets will eventually provide a comprehensive character of mineral potential. Some new targets located at mineral potential mapping were validated. Future work will involve exploration of other targets of mineral potential mapping.

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[1] Sawatzky *et al.* (2008) http://arcscripts.esri.com

Iron reducing community in an acidic mining lake remediation experiment

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In the acidic mining lake 111 in Lusatia, Germany, a passive *in situ* remediation method was tested in a large scale experiment, in which microbial iron and sulfate reduction are stimulated by addition of organic matter and lime. The treated surface sediment consisted of three layers of different pH and geochemical composition. Aim of the study was to elucidate the relative importance of neutrophilic heterotrophic, acidophilic heterotrophic and acidophilic autotrophic iron-reducing microorganisms in each of the three layers. For this purpose the effect of their respective characteristic electron donors acetate, glucose and elemental sulfur on potential iron reduction rates was investigated. The three groups of Fe(III) reducers were quantified by most probable number (MPN) technique, and their community composition was analyzed by cloning and sequencing of 16S rRNA genes. In all layers, iron reduction was limited by the availability of Fe(III).

In the acidic surface layer (layer 1) none of the electron donors stimulated iron reduction, acetate even had an inhibiting effect. Iron reduction in the subjacent layers 2 and 3 was enhanced by glucose and acetate. Addition of elemental sulfur did not enhance iron reduction in either layer. Layer 2 exhibited the highest iron reduction rates and the highest cell numbers in MPN media. In MPN enrichments from all layers, *Acidithiobacillus*-like sequences were frequent. In addition, sequences related to *Fulvimonas* and *Clostridium* dominated in layer 1. Enrichments of layer 2 were diverse, containing *Rhodocyclaceae*-related sequences and surprisingly low numbers of *Geobacteraceae*. In layer 3, *Sulfobacillus* and *Trichococcus* spp. were also important.

We concluded that in the surface layer mainly acidophilic, probably autotrophic and heterotrophic, iron reducers were active, whereas in layers 2 and 3 mainly neutrophilic heterotrophs were important for iron reduction. The bacterial species found in this study differed from well-studied Fe(III) reducers in other environments.