Various epithermal precious metal systems in the Urumieh-Dokhtar magmatic assemblage, Iran

SUSAN EBRAHIMI[1], SAEED ALIREZAEI[1] AND YUANMING PAN[2]

[1]Faculty of Earth Sciences, University of Shahid Beheshti, Tehran, Iran

[2]Department of Geological Sciences, University of Saskatchewan, Saskatoon, S7N 5E2, Canada

The Urumieh-Dokhtar magmatic assemblage (UDMA) in west-central Iran is dominated by Cenozoic calc-alkaline volcanic, pyroclastic and shallow intrusive rocks. The development of UDMA is related to the evolution of the Neotethys in western Asia. The UMDA hosts numerous Cu±Mo±Au porphyry systems, including the world class Sarcheshmeh and Sungun. Several epithermal gold systems are recently discovered in northern UDMA, represented by Masjed-Daghi (MD), Sharafabad (SA), Zaglic (ZL) and Safikhanloo (SK) prospects. Mineralization is restricted to silica, silica- carbonate and silica- barite veins. Pyrite is the main sulfide, associated with minor chalcopyrite, sphalerite and galena. Gold occurs as fine particles in silica and in sulfides. The country rocks are medium- to high-K calc-alkaline and alkaline volcanic-pyroclastic rocks of dominantly andesitic composition with features typical of continental magmatic arcs. Alteration minerals vary from chlorite-carbonate-montmorillonite in SK and ZL, to kaolinite-illite in SA and alunite-kaolinite in MD. Fluid inclusions show a wide range of T_H (120-350°C) and salinity (<1-15 wt% NaCl equiv) (Alirezaei *et al.,* 2008, ACROFI-2, Kharagpur, India). A positive correlation exists between the salinity of the fluids and the base metal contents in the veins.

Considering the alteration assemblages, vein minerals and FI data, the epithermal systems vary from low-sulfidation (ZL and SK) to intermediate-sulfidation (SA) and high-sulfidation (MD). Sulfur isotope values for sulfides display a shift in $\delta^{34}S$ from around 0‰ in MD (1.2 to -1.1‰) to increasingly more negative values in SA (1.7 to -6.9‰) and ZL and SK (-2.9 to -7.6‰). The $\delta^{34}S$ values suggest a decreasing role for magmatic fluids, or increasing water/rock interaction, from HS- to IS- and LS- epithermal systems. This is consistent with the chemical and physical characteristics of the fluids involved in the formation of the epithermal gold systems.

Characterization of chemistry and microbial community in Lake Tranebärssjön - A former uranium open pit mine

F. EDBERG[1]*, A.F. ANDERSSON[2], A. HÄGGLUND[3] AND S.J.M. HOLMSTRÖM[3]

[1]ITM, Stockholm University, S-106 91, Stockholm, Sweden (*correspondence: frida.edberg@itm.su.se)

[2]Swedish Institute for Infectious Disease Control, Solna, Sweden and Department of Ecology and Evolution, Limnology, BMC, Uppsala University, Uppsala, Sweden (doubleanders@gmail.com)

[3]IGG, Stockholm University, S-106 91, Stockholm, Sweden (sara.holmstrom@geo.su.se, anth4698@student.su.se)

Aim, Site Description and Sampling

The aim of this study was to investigate the connection between biogeochemical functions and bacterial community composition in lakes with the focus on the consequenses for metal mobilisation and transport in mining areas.

As a study site Lake Tranebärssjön, the former open-pit mine in the closed uranium mine at Ranstad, Sweden was chosen.

The lake was sampled at stratified conditions in late summer at the deepest part of the lake at three dephts of the water column; surface water, thermocline and bottom water. Samples were analysed for chemistry, dissolved organic carbon and metals. The bacterial comunities of the samples were monitored by 454-pyrosequensing of 16SrRNA genes.

Results and Discussion

The oxygenated surface and thermocline water show pH 7.8 compared to 7 in the oxygen depleeted bottom water. The conductivity, alkalinity and the sulfate as well as several metals including Fe, U, Mn, Mo and Ni show higer levels in the oxygen depleeted bottom water compared to the oxygenated surface water.

As a result of the strong stratification in Lake Tranebärssjön precipitations of iron hydoxides with associated metals is deposited on the lake shores at spring and autum turn over. Other studies have implicated that this could be partly caused by microbial reduction in in the bottom water of the lake.

Several studies have shown that the geochemical environment controls the microbial populations but also that the microbes can control or influence the geochemsitry of elements. We hope that the results from the bacterial comunity analysis will shed more light on this and contribute to the understanding of the connections between geochemistry and microbial comunity in this environment.