Geology and controls on the Houay Yeng Au deposit, Sepon district, Laos

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Background:

The Sepon Au-Cu deposit is located in Savannakhet province, southern Laos, approximately 40 kilometres north of the town of Sepon.

The deposit has combined resources and reserves of 1.5 million tonnes of Cu, 4.6 Moz Au, and 22.1 Moz Ag as at 30 June 2011 (http://www.mmg.com/en/Our-Operations/Mining-operations/Sepon.aspx). In addition to the large amount of resources, Sepon is also one of the world’s best examples showing deposit style zonation, from Mo-rich central porphyries to peripheral Cu-Au skarns and then distal Carlin-style mineralisation.

Houay Yeng is, however, an anomaly as it occurs away from the main structural trend, and occurs deeper in the stratigraphic sequence, at a contact between chert (possibly the product of alteration) and a recrystallised limestone – as oppose to the other “typical” Sepon deposits that occur in a calcareous shale at a contact with a recrystallised dolomite. Houay Yeng is an intriguing high-grade oxide Au deposit that is hosted in karstic collapse breccias. The breccias are composed of jasperoid clasts and brown Mn-rich clays. There is abundant mineralised and barren jasperoid in the area. It is well drilled (with core) and there is good pit exposures.

Aims:

This project will try to address the following questions to understand this deposit:

1. Are the breccias supergene or hypogene in origin?
2. And what are the structural and lithological controls on this deposit?
3. What is the difference between the barren and mineralised jasperoids?
4. Does Au occur as independent Au minerals such as native Au/electrum or in the lattice of other minerals? Is it mainly in the clasts or infill or both?
5. How did the deposit form?

Research methods:

The aims will be achieved through:

1. Surface investigation and particularly logging of ~1500 to 2000 m of drill core along a cross section, to document the spatial distribution of various geological bodies, structures, and the characteristics of the breccias.
2. Transmitted light and reflected light microscopy to identify ore and gangue minerals in clasts and matrix, and examine the textures and cross cutting relationships.
3. SWIR spectral analysis and/or XRD analysis of the material in the fill. If the deposit is supergene, the infill should be mainly composed of very low temperature minerals as products of weathering, e.g., smectite. If there are minerals that form only at temperatures > 50°C, e.g., illite, then there is at least a hypogene component.
4. SEM-BSE/EDS imaging and analysis to examine the textures and cross-cutting relationships
5. Electron microprobe analysis of various minerals to obtain the major element compositions
6. LA-ICP-MS analysis of various minerals to check the Au occurrences

**Company Support:**

In order to support the project the company will provide:

- Return economy class airfares for student and supervisors
- Accommodation, meals and OH&S while on site
- Sundry expenses associated with travel to site, including visas, transit accommodation, travel insurance
- Sample shipping from Sepon to JCU
- Financial support to cover the analytical cost
- Potentially some vocational work over the summer