



Field-trip to porphyry and related epithermal ore deposits in Timok Metallogenic Province, Serbia.

Introduction

On Friday 29th and Saturday 30th September 2017 the AUTH SEG Student Chapter organized a field trip around Bor area, at the Timok Metallogenic Province of Eastern Serbia, funded by the Society of Economic Geologists (SEG) and supported by Mundoro Capital Inc. Mundoro runs various exploration programs in Bor area and this the reason that we organized this excellent field trip. Twelve members of the student chapter, including under- and post-graduate students, accompanied by Assistant Professor Vasilios Melfos, the Academic Advisor of the chapter, travelled to the area using two vehicles. Part of the transportation to the ore deposits was held by Mundoro.

Objectives

The Cretaceous Timok Metallogenic Province belongs to the Western Tethyan Metallogenic Belt and hosts numerous small- and large-scale porphyry Cu-Au deposits associated with high sulfidation epithermal mineralizations. It is located in Eastern Serbia and is built on the edge of the Moesian continental margin. Some of these deposits are mined since 1903 for copper, gold and other metals. Several projects in the area focus on the exploration of new discovered mineralizations with drillings, geochemistry and other methods. This field trip was a great opportunity for the students of the AUTH SEG Student Chapter to get familiar with the regional geology and the methods used during extensive exploration programs in previously unexplored areas.

Activities Program

The departure from Thessaloniki (Greece) was on Thursday 28th September 2017 and after approximately 11 hours we arrived in Bor where we settled at the Hotel Albo. The field trip started early in the morning of Friday 29th September with Nikifor Reljic (Senior Consultant) at the offices of Mundoro. Nikifor made an extensive introduction (Fig. 1) about the geological background of the area, and presented in details the eleven exploration projects in Timok run by Mundoro. During this introduction we had the opportunity to learn about the procedures of exploration programs and get familiar with the local geology, the ore mineralization, the hydrothermal alterations and the reserves of each deposit. We also discussed the genetic models of these deposits and compared them with related mineralizations in Northern Greece. Timok hosts significant porphyry Au-Cu deposits and related high sulfidation epithermal Cu-Au deposits. The rocks of the area include mainly Paleozoic-Mesozoic gneisses and limestones intruded by Cretaceous subvolcanic and volcanic rocks, like diorite porphyries and andesites. Extensive soil geochemical anomalies and a dense lithocap distribution show that this area is very interesting for exploring porphyry type ore deposits. Before we start the field work we were informed about the safety rules we had to follow in the field and in the drill cores yard.

The drill cores can show us many details about an ore mineralization and so we started from this, looking at different mineralization types, their host rocks, the hydrothermal alterations, the ore minerals and the various textures, typical for porphyry and epithermal deposits. All those details were also discussed in the frame of the metallogenesis and the possibility of a near-future mining.



Then we moved, together with N. Reljic and V. Suluburic, close to the inactive open pit of Bor which operated by RTB since 1903. In this site we found representative samples with vuggy silica from an advanced argillic alteration, and discussed the metallogenic model of this porphyry type mineralization. After that we stopped to see from distance the mine of Veliki Krivelj, the flotation factory and the tailing ponds. We talked about the geology of the area with the three main rock types including limestones, schists and magmatic intrusions. In the end of this small tour around Bor, we visited an exposure of the Upper Cretaceous andesite with large hornblende phenocrysts (Fig. 2). This andesite was intruded by B-type veins which were re-opened by chalcopyrite and pyrite mineralization. The volcanic activity and the subsequent mineralization were discussed in details.

The last part of the first day included a visit at an on-going drilling project in Northern Timok. Following all the safety standards we approached the place (Fig. 3) and had the chance to observe the extract of a drill core from a depth of 200 m.

The second day started with a course on new drill cores (Fig. 4, 5) where we identified the rock types, the hydrothermal alterations, the ore mineralization and the related textures. We were practiced in distinguishing the alterations of porphyry type mineralizations (potassic, sericitic, propylitic and argillic) and the differences among A-, B- and D –type veins. A portable TerraSpec apparatus was also used and we could examine various samples we had collected during this field trip.

We finished this very interesting field trip with a visit at the Skorusa porphyry system (Fig. 6) which was identified through a systematic work completed by Mundoro. This system is characterized by an extensive zone with potassic alteration and associated stockwork mineralization at surface, extending NE-SW for about 200 m along strike. The mineralization exhibits high Au and Cu grades and is associated with a porphyry granodiorite. The related sericitic alteration did not give any high grades. We also stopped at a structurally controlled hydrothermal breccia (Fig. 7) which was possibly related to a high sulfidation epithermal system above the porphyry deposit of Skorusa. It was a very good opportunity for us to discuss with the exploration geologists whether an exploration program is successful or not, and when it may result in a mining operation. This was the best way for us to end this excellent field trip in Eastern Serbia (Fig. 8).

Acknowledgements

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Submitted on behalf of
the AUTH SEG Student Chapter Executive Committee by
the 2016-17 President, Margarita Melfou
and the 2016-17 Secretary Christina Mytigliaki.





Fig. 1. The students of the AUTH SEG student chapter discussing with Nikifor Reljic the details about the Mundoro exploration projects in Timok area, Sebia.



Fig. 2. The students looking at the andesite with the large hornblende phenocrysts.



Fig. 3. The students discussing the drilling procedure at an advanced argillic alteration lithocap above a porphyry system at Timok area.



Fig. 4. The members of the AUTh SEG Student Chapter with the staff of Mundoro.



Fig. 5. The students discussing the characteristics of a potassic zone and the related mineralization in a porphyry type deposit.



Fig. 6. The students at the potassic alteration of the Skorusa porphyry deposit.



Fig. 7. The students exploring a structurally controlled hydrothermal breccia.



Fig. 8. The members of the AUTH SEG student chapter with the academic advisor, V. Melfos, in the end of the field trip.