UBC SEG Student Chapter International Trip 2008: Eastern Europe

Introduction

Most of Europe's world-class ore deposits are located in Eastern Europe. The field trip will focus on Poland and Romania, which host several world-class copper, zinc, lead, gold and silver deposits of contrasting origin. Along the way of our travel through Eastern Europe, we will also have the opportunity to visit geological sites in the Czech Republic, Eastern Germany, Slovakia and Hungary. Besides fascinating geology, all these countries have a rich and diverse history, culture, and architecture reflecting influences of many empires, which alone is already worth a travel to this part of the world.

In Poland, we will visit sediment-hosted ore deposits in the mining district around Lubin where the world-class Kupferschiefer deposit is mined in three underground mines, and the world-class MVT Zn–Pb mining district of Upper Silesia near Krakow. The participants of the field trip will visit some of Europe's biggest porphyry Cu-Au and epithermal Au-Ag(-Te) deposits in Romania and explore a full range of mineralization styles from magmatic to high-temperature porphyry to low-temperature epithermal stages including high-, intermediate- and low-sulphidation systems.

The proposed field trip will focus on the following topics:

- Become familiar with the extensional tectonics and the timing of basin-hosted deposits in Europe
- Understand the formation of Late Paleozoic and Mesozoic world-class basin-hosted Cu(-Pb-Ag-Au) Kupferschiefer and MVT Zn-Pb deposits in Poland
- Learn about the formation of magmatic-hydrothermal systems explained by several classic and well-understood examples of porphyry Cu and epithermal deposits.
- Observe, characterize and compare styles of mineralization and alteration from all stages in a magmatic-hydrothermal environment.
- Gain insight in the tectonic position of the Romanian ore deposits in the convergent system of the Alpine orogeny.

Geological highlights

Eastern Germany:

- *Historic mine in the Eastern Erzgebirge:*
  The Erzgebirge hosts many historic mine sites of Sn, W, Li, Cu, Ag and U deposits that are related to the Variscan Orogeny during the late Paleozoic. Many of these mines were transformed into mining museums and tours are available. One option is to visit the Sn-W-Li deposit of Zinnwald near the Germany-Check Republic border.

Poland:

- *Kupferschiefer mineralization in SW Poland:*
  The Kupferschiefer deposits formed in a Permian basin along the redox-barrier between a sequence of sandstones, siltstones, rhyolitic volcanics and terrestrial redbeds and the overlaying transgressive marine Zechstein sequence of shale, carbonates and evaporates. Large-scale flow of oxidizing metalliferous brine concentrated metals in redox-type geochemical traps. The economic reserves of the district are 2.4 Gt of or at 1.3-2.6% Cu and 30-80 g/t Ag, with an annual production (2003) of >569 000 t Cu, 17 550 t Pb and 1561 t Ag. We plan to visit one underground mine with core examinations and surface visits.
- *Mississippi Valley-type Zn-Pb deposits in Upper Slesia:*
  The district has total resources (past and present) of 500 Mt of ore, current resources are 240 Mt at 4.2% Zn and 1.6% Pb. The tabular and irregular patchy and nest-like ore bodies are hosted by Middle Triassic dolomites where the dolomite was replaced by sulphides deposited from a migrating metal-bearing brine of debated age and origin. We will visit one of the two operating underground mines and have to opportunity to see drill cores.

Romania:

- *Rosia Montana epithermal Au-Ag deposit:*
  The Rosia Montana epithermal Au-Ag deposit is Europe's largest Au deposit with more than 2000 years of mining history. It shows the characteristics of a low- to intermediate-sulfidation mineralization formed during Miocene magmatic events. High-grade Au-Ag minera lization is restricted to a phreatomagmatic breccia pipe and veins. However, low-grade disseminated and stockwork mineralization will allow mining of the deposit in a large open pit project. The present small open pit nicely exposes the hydrothermal breccia body

and its contacts with the host rocks. The issues regarding large-scale mining and its environmental, social and historic impacts are another interesting aspect of the area.

- *Rosia Poieni porphyry Cu-Au deposit:*
  Romania's largest currently mined Cu deposit is just 3 km away form the Rosia Montana deposit. The Rosia Poieni open pit shows a large variety of different types of porphyry-stage veins, disseminated sulphides and alteration, as well as an overprinting low-temperature epithermal high-sulphidation system.
- *Certej area:*
  A series of Miocene andesite necks and associated lava flows host steeply dipping, mineralized epithermal Au-Ag-Te veins with vuggy texture and well-developed crystals. The mines are a type locality for several telluride minerals.

Proposed Itinerary (April 29 - May 14, 2008)

The timeline of the final itinerary may differ from the here proposed itinerary due to flight schedule, car rentals, and availability of mine tours.

Day 1…… Flight Vancouver – Prague, Czech Republic
Day 2…… Arrival in Prague, pick up rental cars
Day 3…… Sightseeing in Prague
Day 4…… Drive from Prague to Lubin, Poland (~370 km), visit a historic mine site in the Erzgebirge (e.g. Zinnwald Sn-W-Li deposit)
Day 5…… Kupferschiefer deposit in Lubin area, underground mine tour
Day 6-8… Drive to Krakow area (~300 km), MVT deposits with one underground mine tour, UNESCO World Heritage sites of Auschwitz concentration camp and Wieliczka Salt Mine
Day 9…… Drive from Krakow through Slovakia to Budapest, Hungary (~400 km), return rental cars
Day 10…. Sightseeing in Budapest
Day 11…. Charter bus, drive from Budapest to the Apuseni Mountains, Romania (~400 km)
Day 12-14 Epithermal and porphyry deposits in the Apuseni Mountains (~100 km), mine tour atRosia Montana epithermal Au-Ag deposit, mine tour at Rosia Poieni porphyry Cu-Au deposit, mine tour at Certej epithermal Au-Ag-Te deposit
Day 15…. Drive from Apuseni Mountains to Budapest (~400 km)
Day 16…. Flight back to Vancouver