

Geological setting, lithogeochemistry, and hydrothermal alteration in the Crni Vrh licence area, Late Cretaceous Timok belt, Eastern Serbia.

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- ✓ Geological setting
- ✓ Geochemistry of volcanic host rocks
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Introduction

The collaboration between Dundee Precious Metals Inc. of Serbia and the Department of Mineralogy of the University of Geneva, Switzerland in the Crni Vrh licence area. The licence area includes from north to south the Coka Kuruga, **Lipa** and Coka Kupjatra high-sulfidation type gold-copper prospects in the northwest of Bor (the Timok Magmatic Complex). Our study is aimed at:

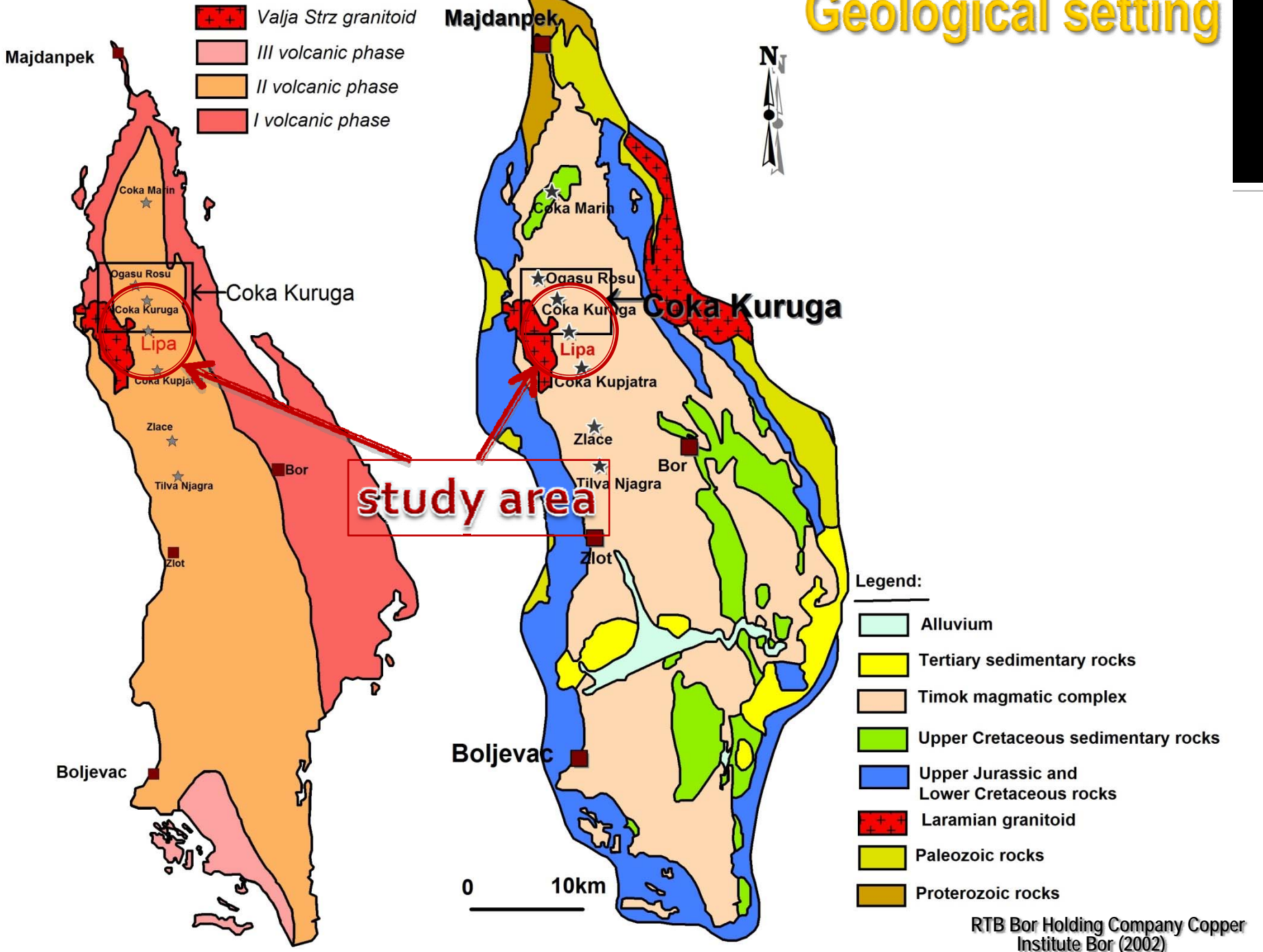
- Understanding the geochemistry of volcanic andesitic rocks.
- Identifying the alteration assemblages.
- Understanding the relationship of gold and other minerals contents with respect to hydrothermal alteration.
- Constraining the genesis of the mineralization.

Geographic location

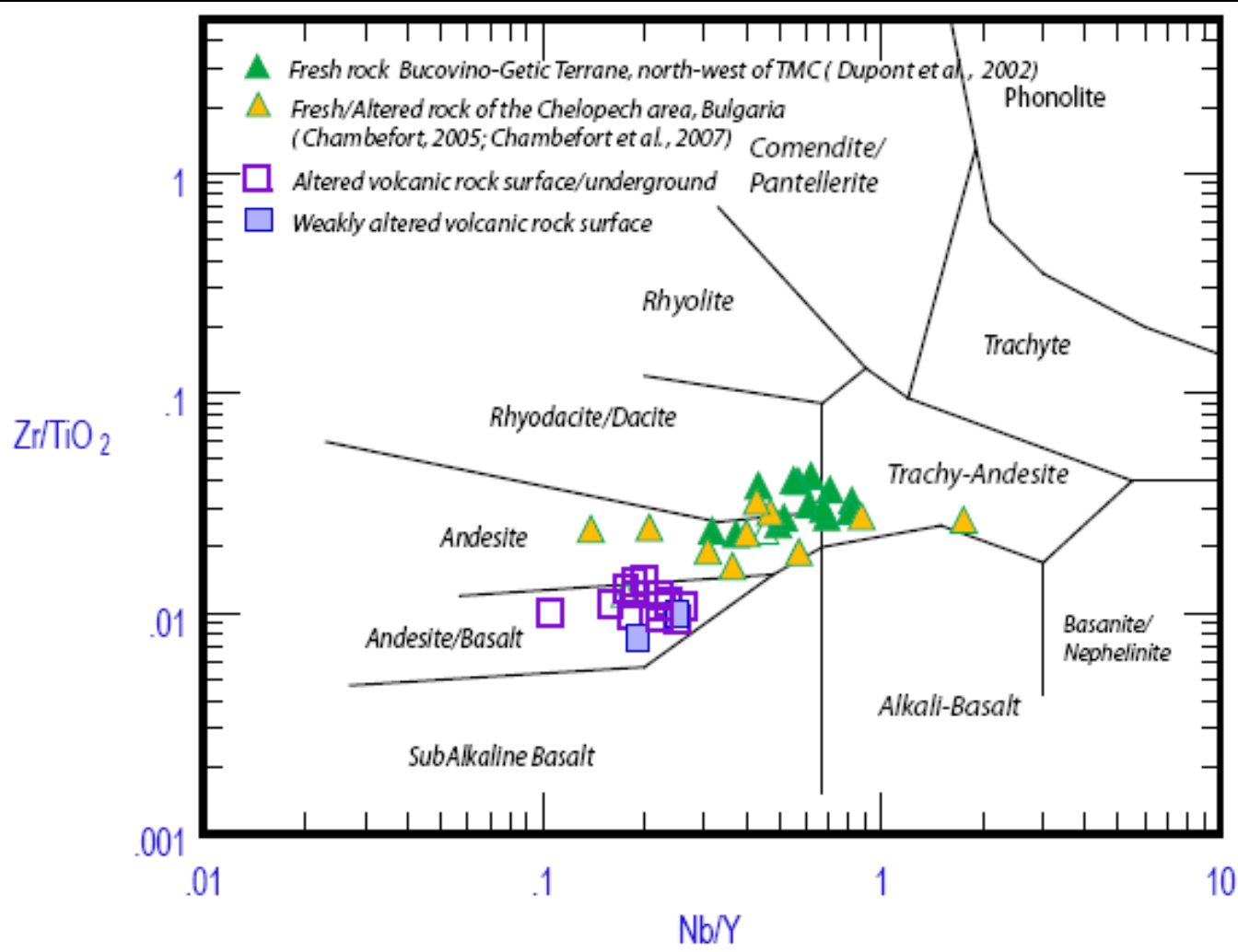


Location of Lipa, Eastern Serbia (study area)

Geological setting

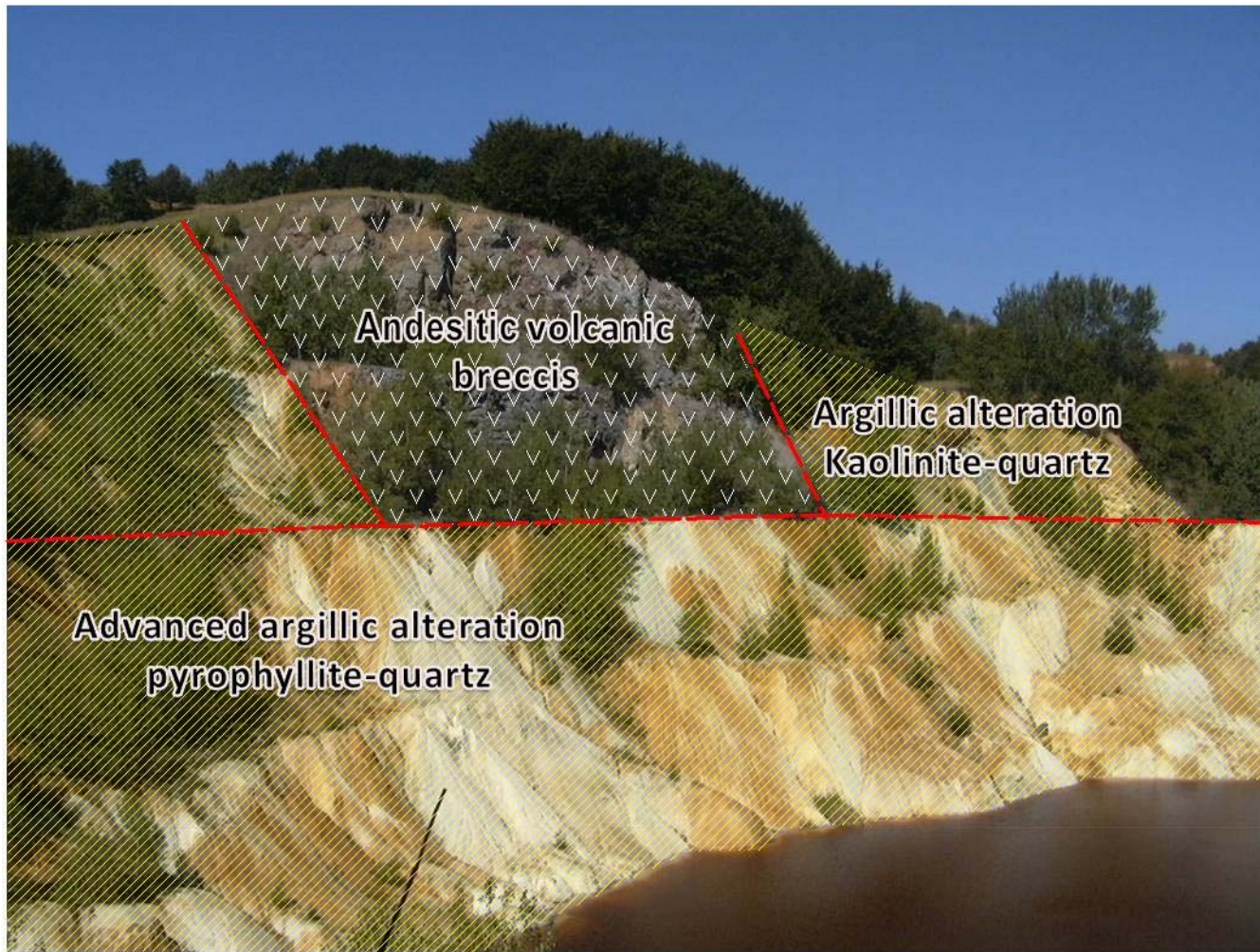


Geochemistry of volcanic host rocks



Geochemical composition of volcanic rocks at Lipa in comparison to Late Cretaceous volcanic rocks from the Banat belt, Romania (Dupont et al., 2002) and at Chelopech, Panagyurishte district, Sredgorie belt, Bulgaria (Chambefort, 2005; Chambefort et al., 2007). Data are presented in Zr/TiO₂ vs Nb/Y rock classification diagram.

Hydrothermal alteration



Alteration surface

Hydrothermal alteration



Silicificati



Mineralized veins







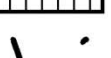





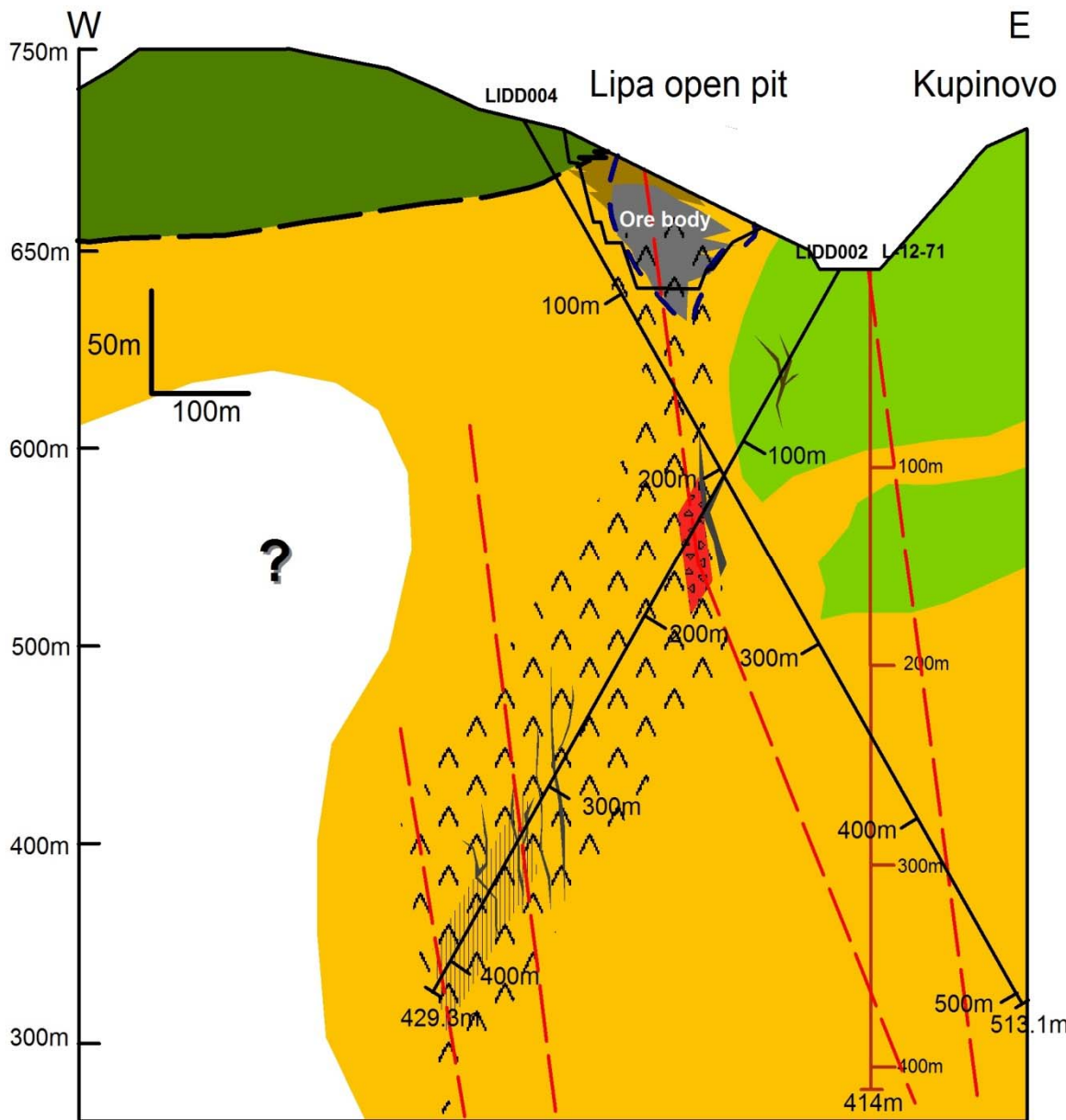
Volcanic breccia

Legend

Distribution of alteration zones at the Lipa open pit location based on surface mapping and drill holes LIDD002, LIDD004 and L_12_71

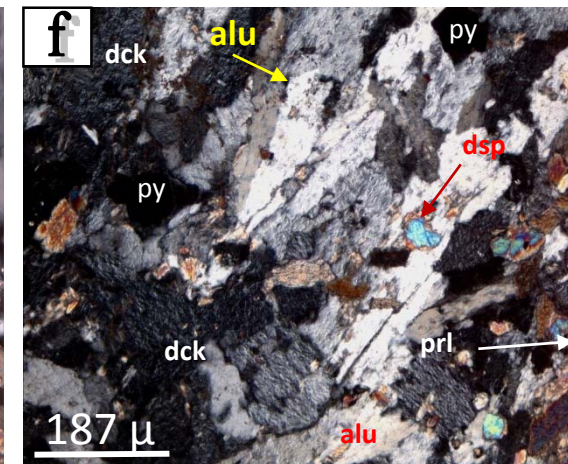
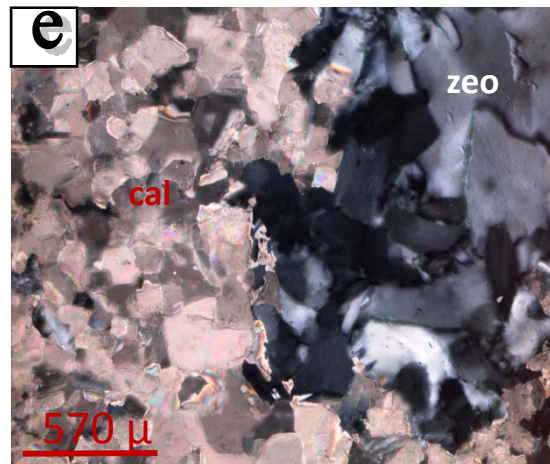
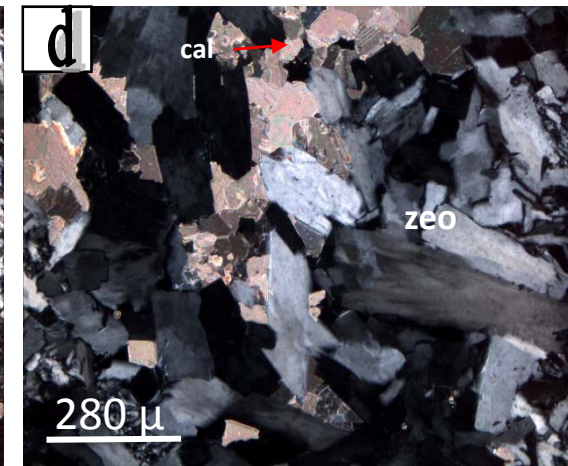
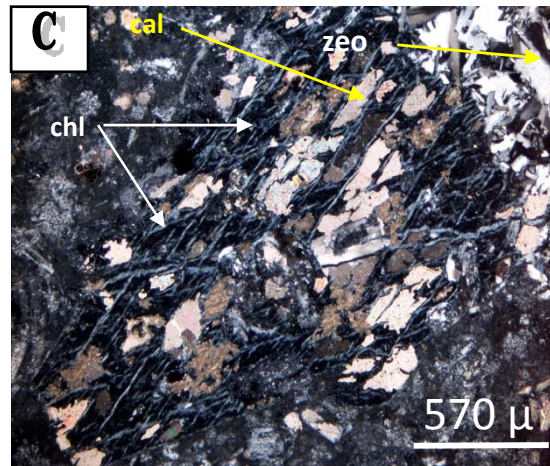
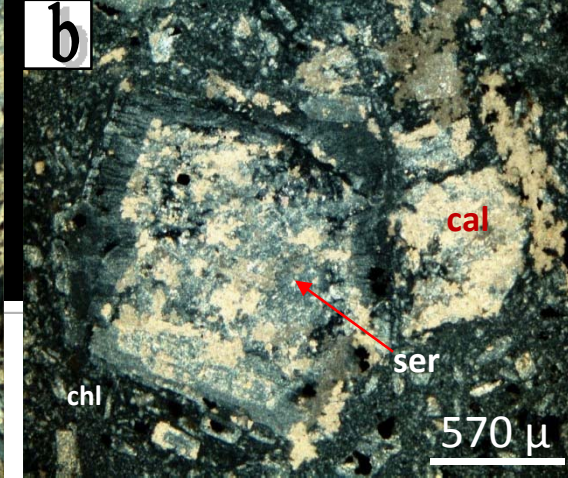
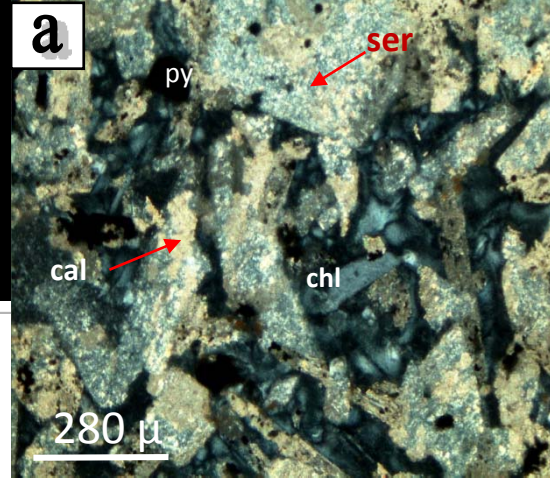
Hydrothermal alteration

-  Massive sulphide, pyrite-enaergite mineralizat with silicification, diaspore, dickite, anhydrite
-  Kaolinite and quartz
-  Chloritized, weakly pyritized and epidotized andesite breccia
-  Chlorite, calcite, sericite, epidote
-  pyrophyllite, diaspore, quartz pyritized zone
-  Anhydrite and gypsum
-  Brecciated massive pyrite body
-  Quartz, alunite, pyrophyllite, diaspore zone with silicification, anhydrite and pyrite
-  Silicification zone
-  Zeolite (Heulandite) and calcite in veins
pyrite and copper mineralization veins
-  Fault

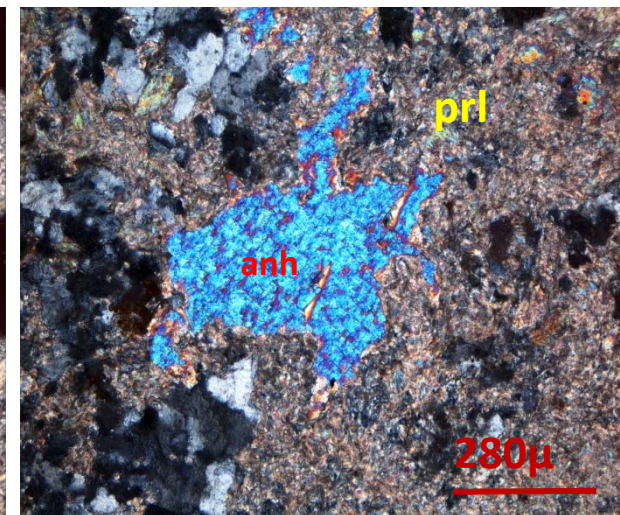
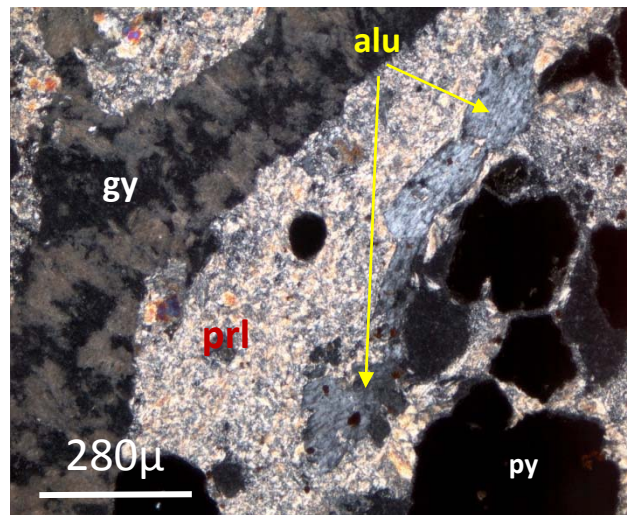
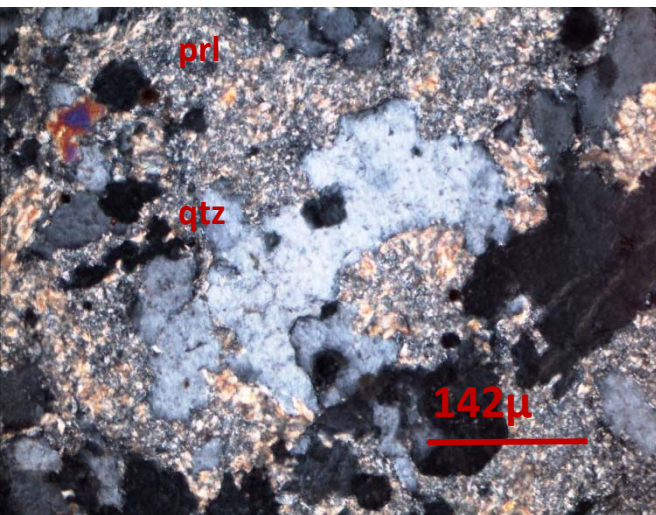
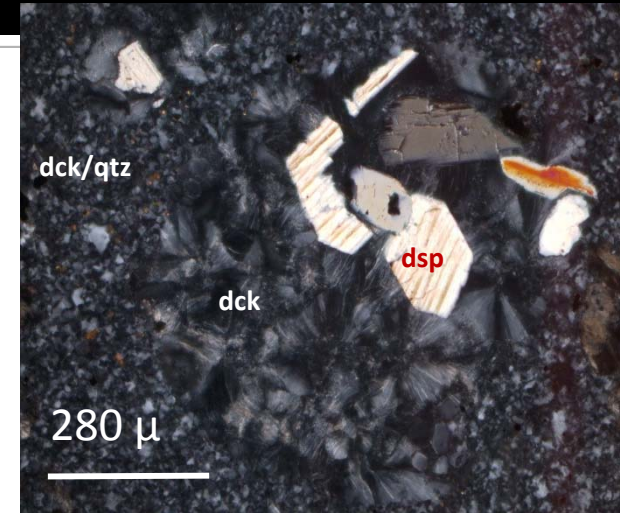
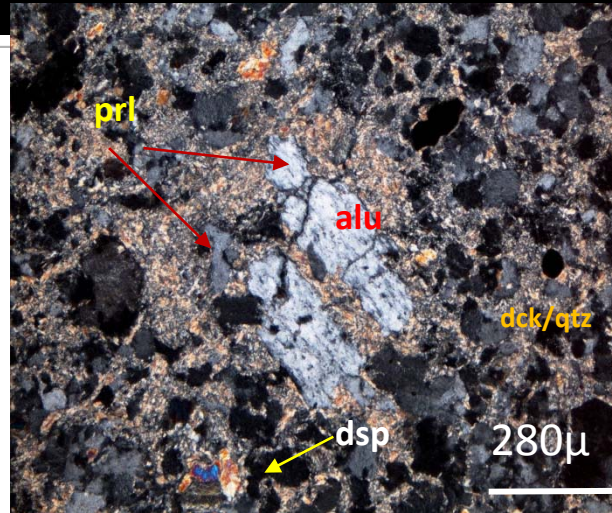
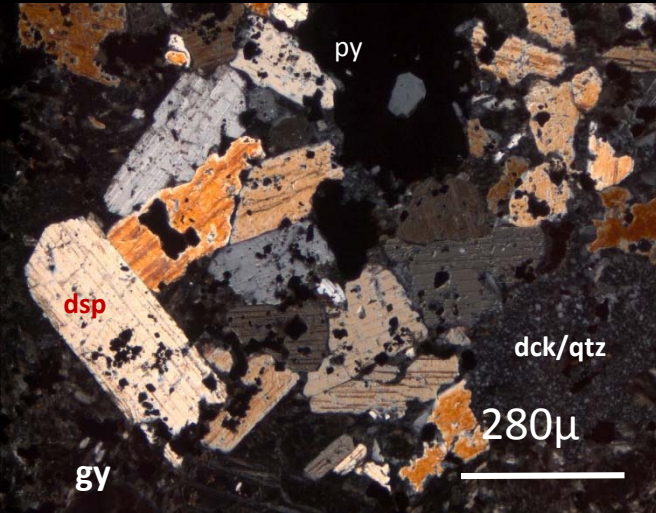


Hydrothermal alteration

- Propylitic alteration facies with zeolite group veins at the surface and in drill holes.
- Advanced argillic alteration facies.



Hydrothermal alteration

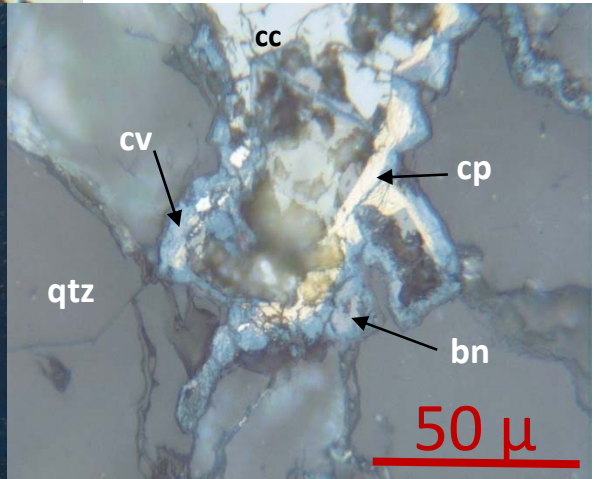
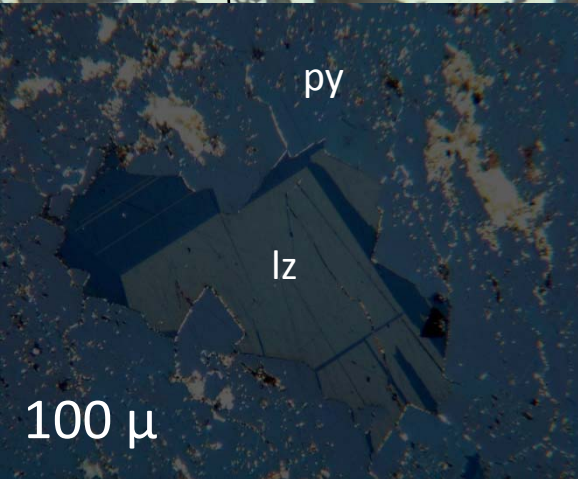
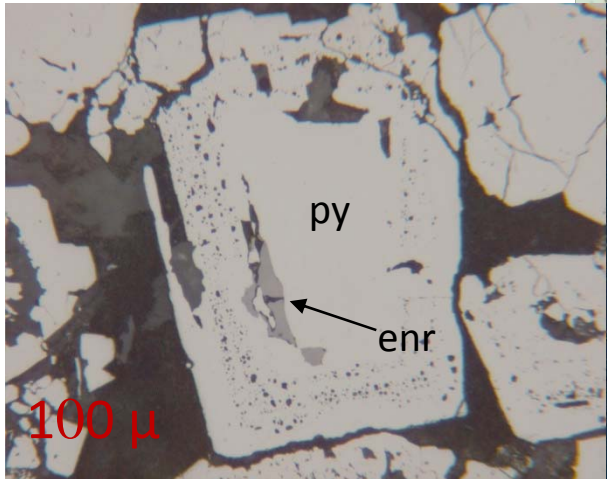
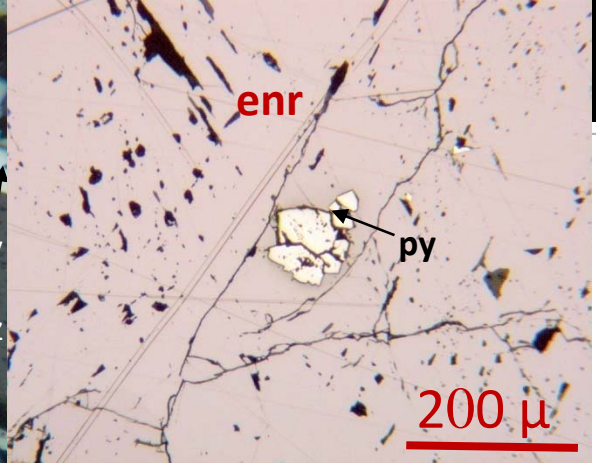
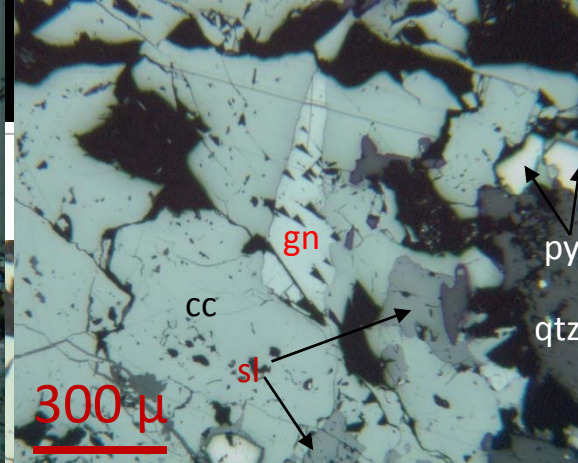
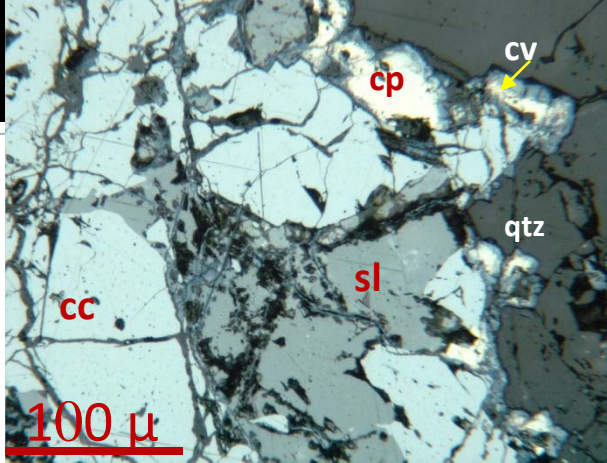


Alteration drill cores

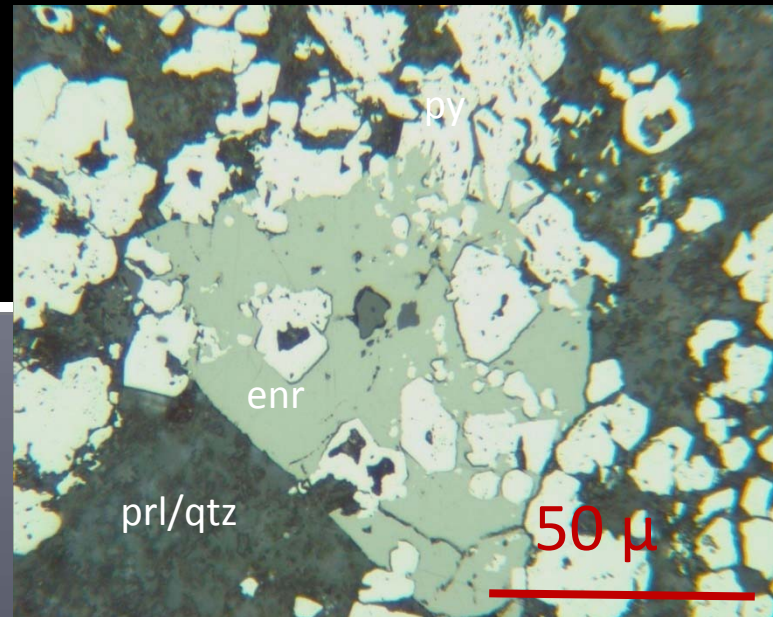
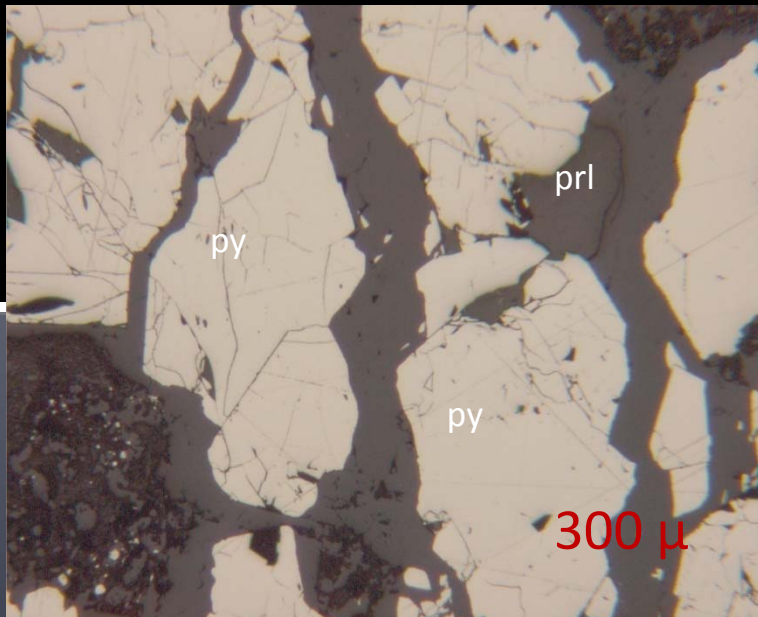
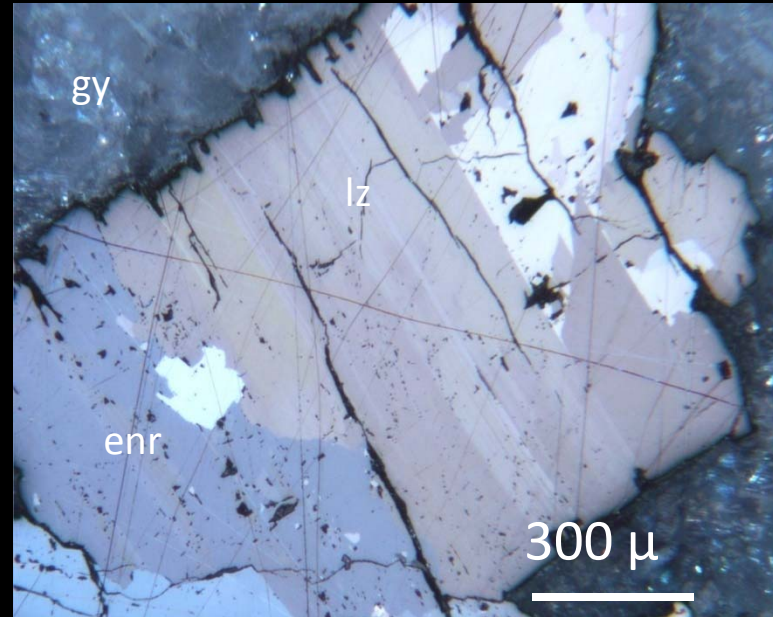
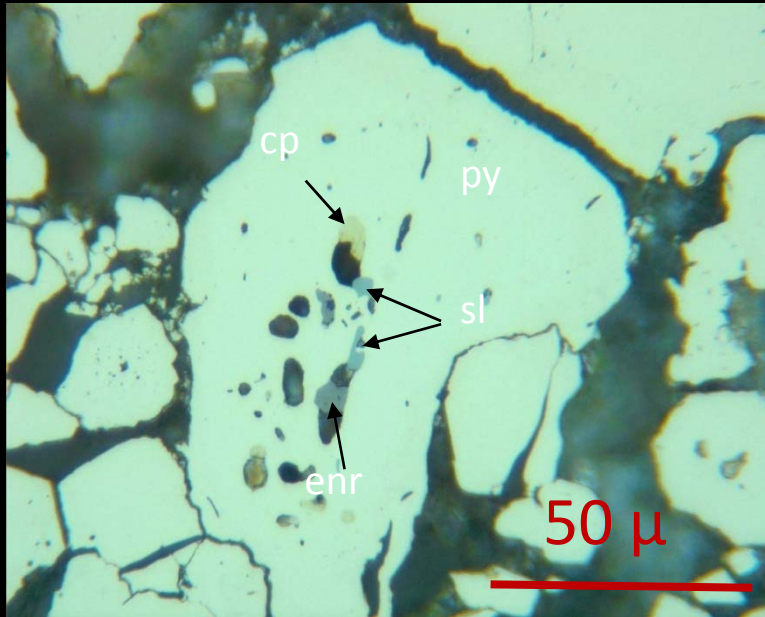
Mineralization



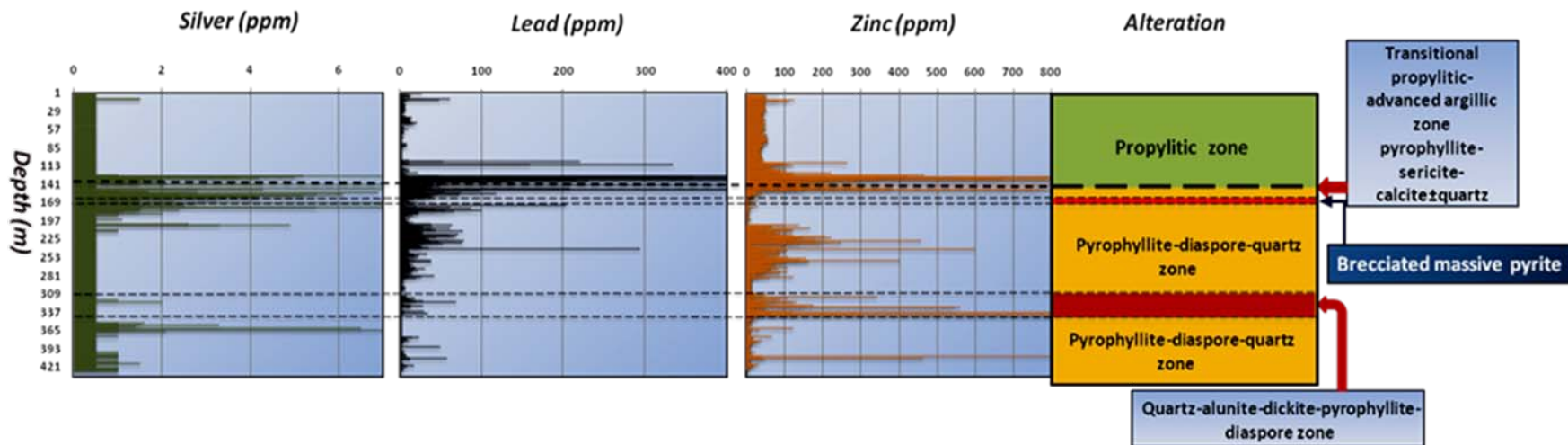
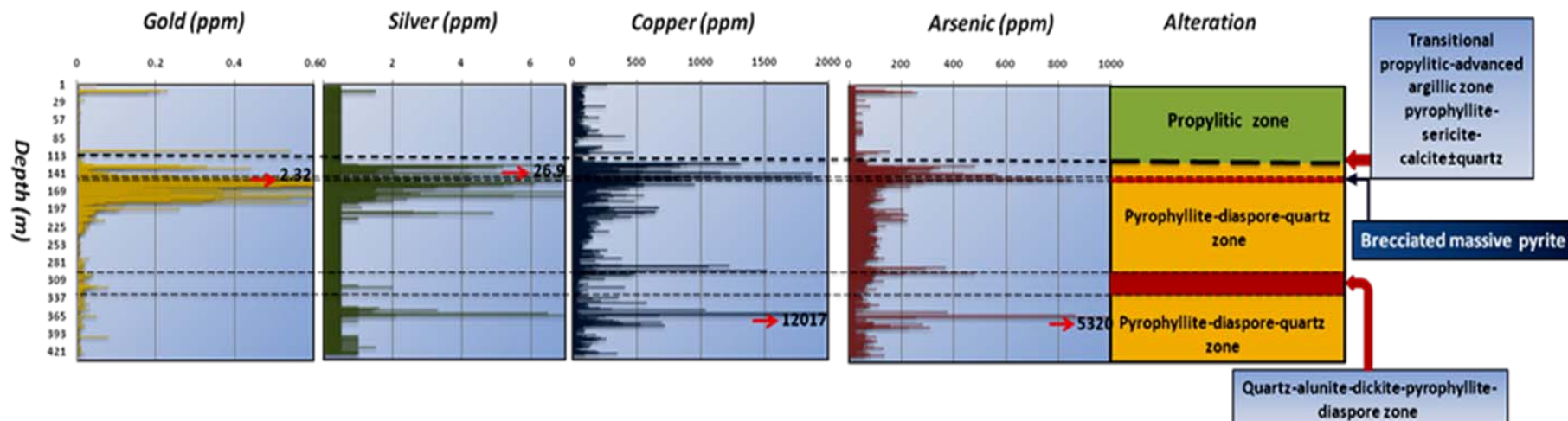
Mineralization



Mineralization



The distribution and relationship of gold and other elements with respect to hydrothermal alteration.



Conclusions

The mineralization and its associated hydrothermal alteration are characteristic of high-sulfidation epithermal $\text{Cu}\pm\text{Au}$ deposits. The main ore body at Lipa is controlled by a steeply dipping NNW- oriented fault.

- ✓ Two stages of advanced argillic alteration and associated with mineralization.
- ✓ **Stage one** is characterized by the complete replacement of the large area along the principal NNW- oriented fault, by zoned sequence of advanced argillic alteration consisting of **quartz-alunite-dickite** or **quartz-diaspore-dickite** on the surface in association with the massive sulphide $\text{Cu}\pm\text{Au}$ deposit, and at depth by **quartz-alunite-dickite-anhydrite-pyrite**.
- ✓ **Stage two** advanced argillic alteration, which characterized by widespread **pyrophyllite-diaspore-quartz** in depth and **pyrophyllite-quartz** on surface, has overprinted and replaced stage one alteration.
- ✓ The high **gold concentration** is especially within and both sides of the **brecciated massive pyrite body**, disseminated gold is associated with pyrite **in pyrophyllite-quartz-diaspore zone alteration**.