Escuela Superior Politécnica del Litoral

Melanie Menoscal
mmenosca@espol.edu.ec
FICT – ESPOL

Pierina Mendoza
piemarte@espol.edu.ec
FICT – ESPOL

Erwin Larreta
elarreta@espol.edu.ec
FICT - ESPOL

Anna Gioncada
anna.gioncada@unipi.it
UNIPI, Pisa, Italy

Paolo Fulignati
paolo.fulignati@unipi.it
UNIPI, Pisa, Italy

Paola Romero
plromero@espol.edu.ec
FICT – ESPOL

Michelle Villalta
michelle.villalta@alumnos.ucn.cl
UCN, Antofagasta, Chile

Maurizio Mulas
mmulas@espol.edu.ec
FICT – ESPOL

# THE PROPYLITIC ALTERATION IN THE PONCE ENRIQUEZ GOLD MINING DISTRICT, AZUAY PROVINCE, ECUADOR: GENETIC CONSTRAINTS FROM A MINERAL CHEMISTRY AND FLUID INCLUSIONS STUDY

## PROBLEM

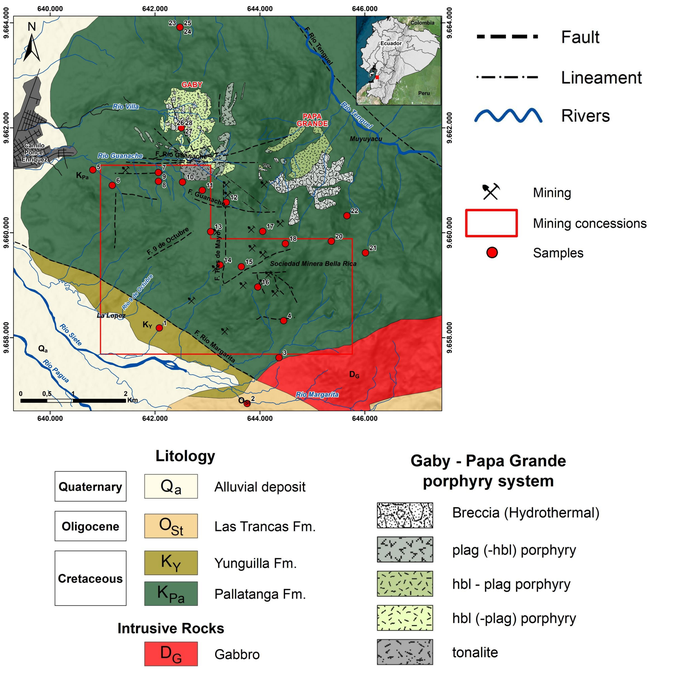
Bella Rica (Ponce Enriquez mining district - PEMD, southern Ecuador) is a gold mining area since 1980's. Gold hydrothermal mineralization is hosted within Cretaceous mafic volcanic rocks of Pallatanga Unit (Pratt et al., 1997), covered by Miocene ignimbrite (Shutte et al., 2012).

The presence of potentially toxic elements (PTEs) in the mining district has been considered as due to the superposition of geogenic sources and mining activity.

## MAIN GOAL

The studies on the origin of the Au mineralization of this area are still limited. With the aim to shed light on the origin and genetic mechanisms of PEMD mineralization, a new petrographic and geochemical characterization of the host rocks and of the hydrothermal alteration paragenesis was carried out.

The results will contribute to understanding the ore-forming processes and the geogenic sources of geochemical anomalies in volcanic environment.



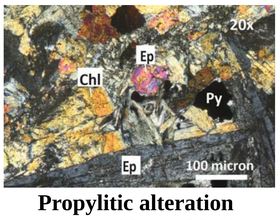




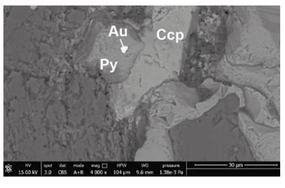
## METHODOLOGY

1. **Field planning**
2. **Sample collection and preparation**
3. **Laboratory Analisys** (petrography, geochemistry and microthermometry )
4. **Results**

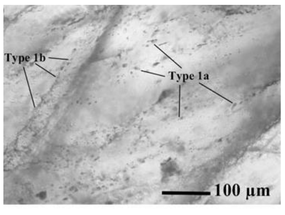
## RESULTS



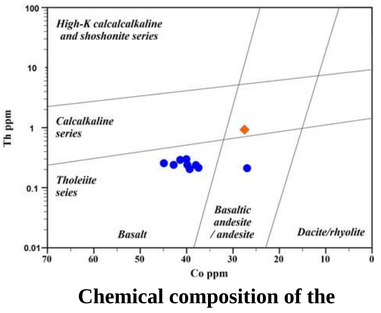

**Propylitic alteration (quartz, epidote, chlorite)**



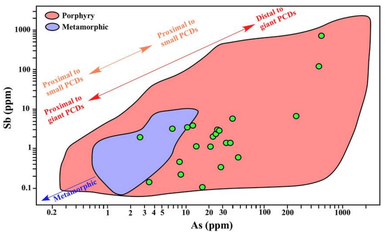

**Gold in veins**



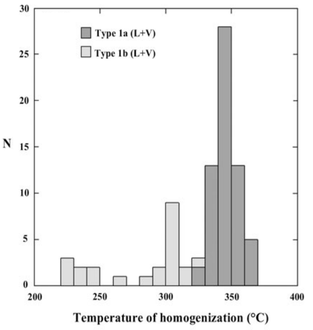

**Liquid-rich fluid inclusions (LV)**

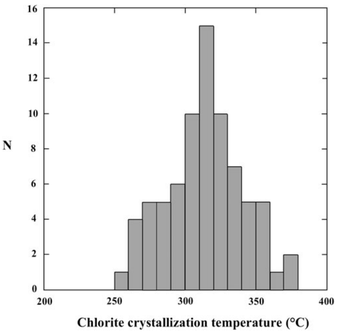



**Chemical composition of the samples: toleitic basalts**




**As-Sb content in epidote corresponds to porphyry deposits.**




## CONCLUSIONS

The trace elements analysis in epidote and chlorite, along with the study of fluid inclusions, proved to be a useful tool for mineral exploration. This allows for discrimination between propylitic alteration halos formed by porphyry systems and other similar mineralogical assemblages that form through regional metamorphic processes.

Chlorite geothermometry, using Cathelineau (1988), in three different sites gives very constant T in the range 265 – 300 °C

Università di Pisa

Universidad Católica del Norte Chile