



## FIELD TRIP (2019)



Universidad de Concepción, Chile

## Field Trip

Activity date: from October 31 to November 1, 2019.

Of all the VMS deposits known in South America, Peru is the country that concentrates the largest amount of these. The origin of these deposits were in Cretaceous volcano-sedimentary submarine basins of the central coast (Casma Basin) and north coast (Lancones Basin) of Peru. In Casma Basin, specifically sub-basin Cañete, is located the largest amount of VMS deposits of this country, where is included Cerro Lindo, the biggest subterranean mine of Peru.

Cerro Lindo mine is located in Chincha province, in Ica department, 175 km southeast of Lima, also, is part of NW strike formed by volcano-sedimentary rocks of Huaranguillo Formation belonging in turn to Casma Group (Albian- Cenomanian). The principal hydrothermal alteration observed is a sericite- pyrite association surrounding massive sulfide bodies. In 2018th, Cerro Lindo produced about of 130,000 tons of Zn, 45,000 tons of Pb concentrate and 39,000 tons of Cu.

Our student chapter organized a meeting with the SEG student chapter of Universidad Nacional Mayor de San Marcos (UNMSM) between October 31 and November 3 (four days) in Lima, Peru, with the objective of exchange knowledge about VMS deposits, visit a prospect project and a mine which, in the present, is exploiting these deposit types.

The first day, a talk about VMS deposits, its genesis and their importance for Peru mining were realized in the UNMSM by MsC. Felix Abraham Cornelio Orbegoso, an engineer geologist graduate of this university and Jesus Trelles, a student and president of the student chapter of UNMSM. The second day a field trip was carried out to Punta Bermejo, a VMS deposit prospect which was lead by MsC. Felix Abraham Cornelio Orbegoso. This excursion had the goal of recognize VMS deposits on field. The third day was used to trip from Lima to Chincha, a locality that is about 4 hours from the capital town and is near to Cerro Lindo Mine, a VMS deposit which we wanted to visit. The fourth and last day, we visit Cerro Lindo Mine of NEXA company where an introductory and security talk was carried out, also we had the opportunity to visit the drill core library of this mine where we could see samples of rocks of the different mineralization zones of Cerro Lindo (Py ± Po, Py ± Cp ± Po, Py ± Cp, Py ± Sp ± Gn, Sp ± Gn ± Py ± Ba), their textures and alterations including also a summary stratigraphic column of Huaranguillo Formation.

All the activities described here were realized for both students chapters. The meeting between our countries were possible thanks to SEG resources (Stewart R. Wallace Fund 2018), the financing of each Nazca member that participated on this trip (6 members) and the organization and collaboration of SEG Student Chapter UNMSM. This activity allow us to meet VMS deposits which does not exist in Chile (or have not been discovered yet) and learn about its formation, exploration, exploitation and importance for Peru mining.



Figure 1: VMS talk dictated by MSc. Felix Abraham Cornelio Orbegoso.



Figure 2: Field trip to Punta Bermejo.



Figure 3: Introductory talk imparted by NEXA company geologist.

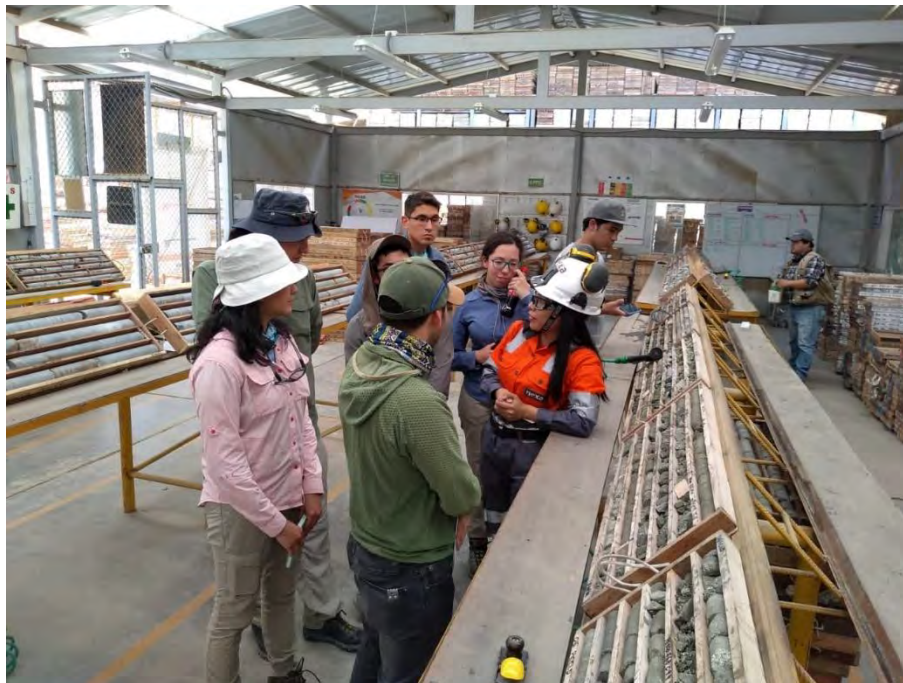


Figure 4: Drill-core library of Cerro Lindo Mine.



Figure 5: Summary of geology, textures , rocks, and stratigraphy of Cerro Lindo mine.



Figure 6: Nazca and UNMSM students chapters in Cerro Lindo Mine.



Figure 7: Nazca student chapter members with Jesus Trelles knowing Lima's Beach.

## Expense report detail

a. Table with conversion data from Chilean pesos to dollars according to dates:

date conversion	04-04-2019	15-05-2019	16-05-2019	25-09-2019	22-11-2019	28-05-2020
dollar	chilean pesos	chilean pesos	chilean pesos	chilean pesos	chilean pesos	chilean pesos
1	657	692,33	692,62	721,92	808,2	816,47

b. Tables with initial Status 2019 and final status 2020:

Date	Initial Status 2019	CHL	Dollars
04-04-2019	Stewart R Wallace Funds 2018	919800	1400
04-04-2019	Nazca savings	114494	174,3
04-04-2019	Initial Status 2019	1034294	1574,3

Date	Final status Nazca 2020	CHL	Dollars
28-05-2020	Total	45624	55,9

c. Tables with the details of income and expenditures. The expenditures of 22-11-2019 were paid with the Stewart R. Wallace funds 2018 and by 6 Nazca members.

Income			
Date	Reason	CHL	Dollars
08-05-2019	Initial Status 2019	1034294	1574,3
15-05-2019	donation from the udec earth science department (courses during 17th and 20th May)	165000	238,3
15-05-2019	payment of a fee by all Nazca members	137500	198,6
25-09-2019	selling food	29000	40,2
22-11-2019	payment of a fee by 6 Nazca members (Transportation in Perú)	73330	90,7
	Total	1439124	2142,1

Expenditures			
Date	Reason	CHL	Dollars
15-05-2019	courses during 17th and 20th May	330000	476,7
16-05-2019	Coffee break (courses during 17th and 20th May)	70370	101,6
22-11-2019	Tickets concepción-santiago	88000	108,9
22-11-2019	Tickets Chile-Perú (sky airlines)	656420	812,2
22-11-2019	lodgement in Perú	172560	213,5
22-11-2019	Transportation in Perú	76150	94,2
	Total	1393500	1807,1