SEG Student Chapter Freiberg

Field Trip Report 2022-2023

SEG Student Chapter TU Bergakademie Freiberg

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Introduction

This year, the SEG Student Chapter Freiberg organized four field trips. The first field trip was a two-days field trip at the Sn-W-Li greisen deposit of Zinnwald-Cínovec (Germany-Czech Republic). Then, we organized a one-day field trip to the Pitzschebach creek (Zellwald, Freiberg), a three-days field trip to the Sn greisen deposits of western Erzgebirge (Germany-Czech Republic) and a one-week field trip to the tertiary hydrothermal deposits of NE Greece. To enable all motivated students to participate at our field trips, we tried to keep the participation fees as low as possible.

1. Field trip to the Sn-W-Li greisen of Zinnwald-Cínovec

Participants: **14 SEG SC Freiberg** + 14 SGA SC Prague

1.1 Geology

The Sn-W-Li mineralization of the Erzgebirge was historically mined for Sn until the last mine closed in 1990. Present-day, Zinnwald Lithium and European Metals are exploring for Li in Zinnwald and the surroundings (Germany). Geomet is exploring for Li in Cínovec (Czech Republic).

The greisen-type Zinnwald ore deposit is located in the eastern part of the Erzgebirge region, at the border between Germany and Czech Republic. The Zinnwald granite (dimensions of 3 x 1 km) intruded during the post-collisional stage of the late-Variscan (Permo-Carboniferous) magmatic evolution, ascending along deep-reaching fault zones into crystalline basement rocks and into the rhyolites of the Altenberg-Teplice caldera. The greisen bodies predominantly consist of quartz, Li-Rb-Cs-bearing mica (named zinnwaldite), topaz, fluorite and accessory cassiterite and wolframite (Nessler, 2017).

The participants had the chance to visit the historic mine ”Vereinigt Zwitterfeld zu Zinnwald“ in Zinnwald, guided by Prof. Dr. Thomas Seifert, who worked for several years on this deposit. Students were introduced to the regional geology of the East Erzgebirge as well as the characteristics of greisen deposits, the nature of the related magmatic intrusion and the ore forming processes. The historic underground mine provided the chance to walk along the endo- and exo-contacts of a greisen body within the granite. Furthermore, the students got an exclusive look on greisen alteration and typical greisen minerals (e.g., cassiterite, zinnwaldite, wolframite).

1.2 Itinerary

Date	Location	Guide	Activity
24/11/2022	Dubí (Czech Republic)	Thomas Verbicky (Geomet)	Students attended a presentation of the Cínovec Li project by the main geologist and then visited the Geomet core shed
	Zinnwald district	Johannes Remhof (Zinnwald Lithium)	Visit of Zinnwald Lithium drilling sites
	Zinnwald mine	Prof. Dr. Thomas Seifert	Visit of the Zinnwald visitor mine
25/11/2022	Freiberg	Prof. Dr. Thomas Seifert	Visit of the Ore Deposit collections of the TU Bergakademie Freiberg

1.3 Visit of the Geomet facilities in Dubí, the drilling sites of Zinnwald Lithium and the historic Zinnwald Sn mine (24/11/2022)

On the first day, we visited the Geomet core shed in Dubí. Thomas Verbicky introduced the Cínovec Li exploration project through a presentation of the geology of the deposit, the nature of the mineralization as well as the plans for the future mine. Then, some drill cores representative of the rhyolite host rock and of the Li mineralization drill were showed. This way, students familiarized themselves with the mineralogy of the deposit and the related alteration. In the afternoon, we visited two drilling sites of the new exploration campaign of Zinnwald Lithium in the surroundings of the Zinnwald deposit. Finally, we visited the Zinnwald historic visitor mine under the lead of Prof. Dr. Thomas Seifert (**Error! Reference source not found.**). In the mine, we could walk through a transect from the greisenized and unaltered granite contact to the cassiterite-wolframite veins that were previously mined for Sn and W.

Figure 1: Underground outcrops in the Zinnwald mine.

1.4 Visit of the Ore Deposit collections of the TU Bergakademie Freiberg (25/11/2022)

On the second day, Prof. Dr. Thomas Seifert gave an introduction to the ore deposit of the Erzgebirge region and the metallogenic processes related to their formation. This introduction talk was followed by the visit of the ore deposits collections of the university. The focus of the visit was mostly on mineralization of the Erzgebirge region such as Sn-W, Pb-Zn skarn, Ag-epithermal and U mineralization. In the afternoon, we visited the Terra Mineralia mineral museum of Freiberg.

2. Heavy Mineral prospection in Zellwald

Participants: 5 (**4 SEG SC Freiberg members**)

2.1 Geology and activities

The one-day field trip took place in the Zellwald forest (~20 km away from Freiberg). Here, the geology consists mostly of basement metamorphic rocks including phyllites, gneisses, and meta-conglomerates, with younger and scarce basalts and gabbroic rocks. Gold mineralization is not typical for the Erzgebirge, but small gold grains do accumulate in creeks throughout Saxony. During the first mining rush in the 11th Century, gold was panned at several places in the Erzgebirge. Students got the opportunity to learn the techniques to prospect for heavy minerals (e.g., cassiterite) and gold (Figure 2). They were introduced to the theory of placer formation as well as panning techniques in the Pitzschebach creek, which is the main stream in the morphological depression of the Zellwald.

Figure 2: Practise of heavy mineral panning.

2.2 Itinerary

Date	Location	Guide	Activity
22/04/2023	Zellwald, Freiberg	M.Sc. Dino Leopardi and M.Sc. Marie Guilcher (SEG Student Chapter Freiberg)	Heavy mineral prospecting

3. Field trip to the West Erzgebirge Sn deposits

Participants: **6 SEG SC Freiberg** + 3 SEG SC Brno + 2 Halle University students

3.1 Geology

The western part of the Erzgebirge massif is located between Germany and the Czech Republic and consists of Proterozoic and Paleozoic phyllites, schists, gneisses and migmatites. These lithologies were intruded by several pulses of late Variscan S-type granitoids. Many Sn-W-Mo deposits (greisen, skarns and veins) are spatially associated with these Variscan granites (Romer and Kroner, 2016).

The NW-SE-striking Gera-Jáchymov fault zone represents the main structure in the area. Many U vein deposits (including the Jáchymov district) are located within and in the vicinity of this fault system (e.g., Ondruš et al. 2003; Figure 3). On the Czech Republic side, many thermal and radon-bearing springs occur throughout the region and are assumed to be linked to the ~40 Ma Eger graben rifting event (Weinlich et al., 1999).

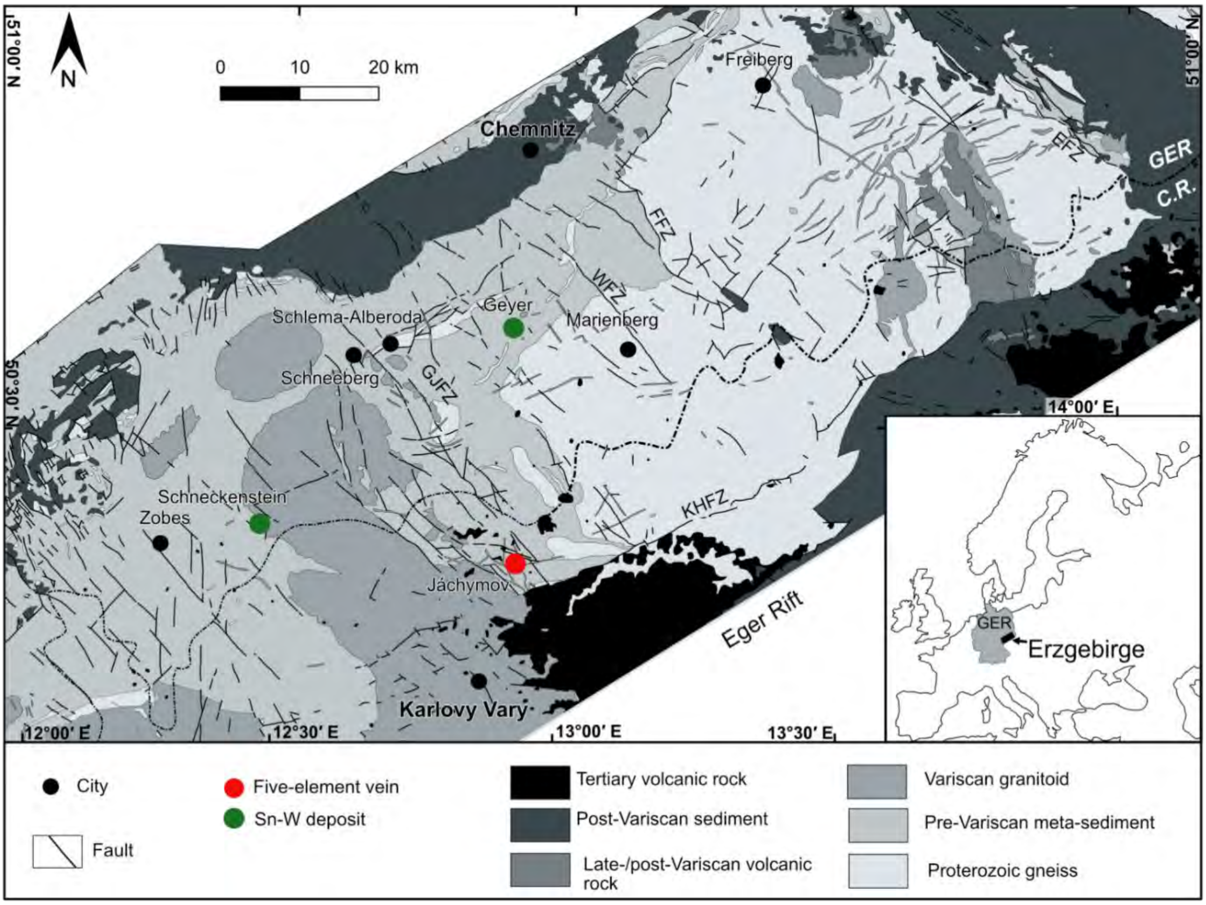

Figure 3: Simplified geological map of the Erzgebirge metallogenic province in Germany showing the location of visitor mines and surface outcrops (modified after Hoth et al. 1980). Abbreviations: C.R: Czech Republic, EFZ: Elbe fault zone, FFZ: Flöha fault zone, GJFZ: Gera-Jáchymov fault zone, GER: Germany, KHFZ: Krušné Hory fault zone, WFZ: Wiesenbad fault zone.

3.2 Itinerary

Date	Location	Guide	Activity
15/06/2023	Geyer (Germany)	M.Sc. Dino Leopardi	Visit to the Sn-W-Mo vein-hosted Geyer deposit
16/06/2023	Jáchymov (Czech Republic)		Visit of the Svornost underground U and five-element mine

	Krasnó (Czech Republic)	M.Sc. Dino Leopardi	Hub stock intrusion and related Sn-W deposit
17/06/2023	Tannenberg-Schneckenstein	Visitor mine guide	Tannenberg Sn visitor mine
	Tannenberg-Schneckenstein		Schneckestein breccia outcrop

3.3 Introduction to Sn-W greisen deposits in the Erzgebirge and the Geyer Sn-W deposit (15/06/23)

On the afternoon of the first day, we drove from Freiberg to the Geyer district in the Central Erzgebirge, Germany. The Geyer Sn-W greisen deposit in the Central Erzgebirge. Previous mining in the 18th and the 19th Century produced the collapse pit that has now been transformed into a park (Figure 4). After an introduction to the regional geology, the participants explored the remaining parts of the granite-hosted quartz stockwork that hosts cassiterite-wolframite±molybdenite mineralization. Further, we discussed the genesis of Sn-W granite hosted deposits, the causes of their characteristic greisen alteration, and implication of magmatic breccias for their depth of emplacement (Figure 4). Afterwards, we continued our drive to the town of Jáchymov (Czech Republic) were we spent the night.

Figure 4: (Left) View of the Geyer collapse pit. (Right) Participants looking at the Geyersberg granite.

3.4 Jáchymov mine and the Sn-W Hub Stock deposit (16/06/23)

The next day, we headed in the morning to the Svornost (Jáchymov) mine. The U-Ag-Bi-Co-Ni-As deposit (five-element vein), was mined for Ag (16-19th Century) and then for U during the 19th and 20th Century. It is now effectively a “water-mine”, were the interaction of the U-mineralization with groundwater produces radon-bearing waters which are extracted and used in nearby wellness centers. We descended through the original mine shaft (Figure *5*) into the 12th level where we got a tour of the current water management operations. Afterwards, we continued through the historical drives that follow the mineralized carbonate vein structures. Although, most of the mineralization was extracted during the mine life, secondary U and Co minerals (Figure *5*) are indication of the characteristic mineralogy of the site.

Figure 5: (Upper left) Participants of the field trip in front of the Svornost shaft in Jáchymov. (Lower left) Secondary Co-bearing mineral (pink) and U-bearing minerals (yellow) on the wall of the mine gallery. (Right) View of the Svornost shaft inside the historic mine facility.

Following the underground mine visit, we drove towards the southwest to the Sn-W Hub Stock (Figure *6*). Like the Geyer deposit, the collapsed pit exposes the mineralization and internal structure of a Sn-W greisenized granitic stock. However, unlike the Geyer deposit, the level of erosion is greater and therefore provides a great opportunity to look into the deeper parts of the Sn-W greisen in systems in the Erzgebirge. Here, participants had a look into the greisenized granitic cupola and the wolframite-cassiterite-rich mineralization. The visit finished with a discussion comparing both the Geyer and Hub Stock deposits.

On our way back to the town of Jáchymov, we stopped at the Karlovy Vary city –best known for its hotsprings. Karlovy Vary is located at the crossing of the Gera-Jáchymov fault zone and the Eger graben (Figure 3). The participants were able to see an active hydrothermal system related to rifting in the area mostly active during the Alpine orogeny. Through a walk in the city, we could see the aragonite-calcite-hematite-goethite mineralization formed from the spring water resurgence (Figure *6*). The water composition consists mainly on carbon dioxide-sulfate-sodium and sodium chloride with enrichment of Ca, K, Fe, Li and its temperature varies between 30 to 75°C.

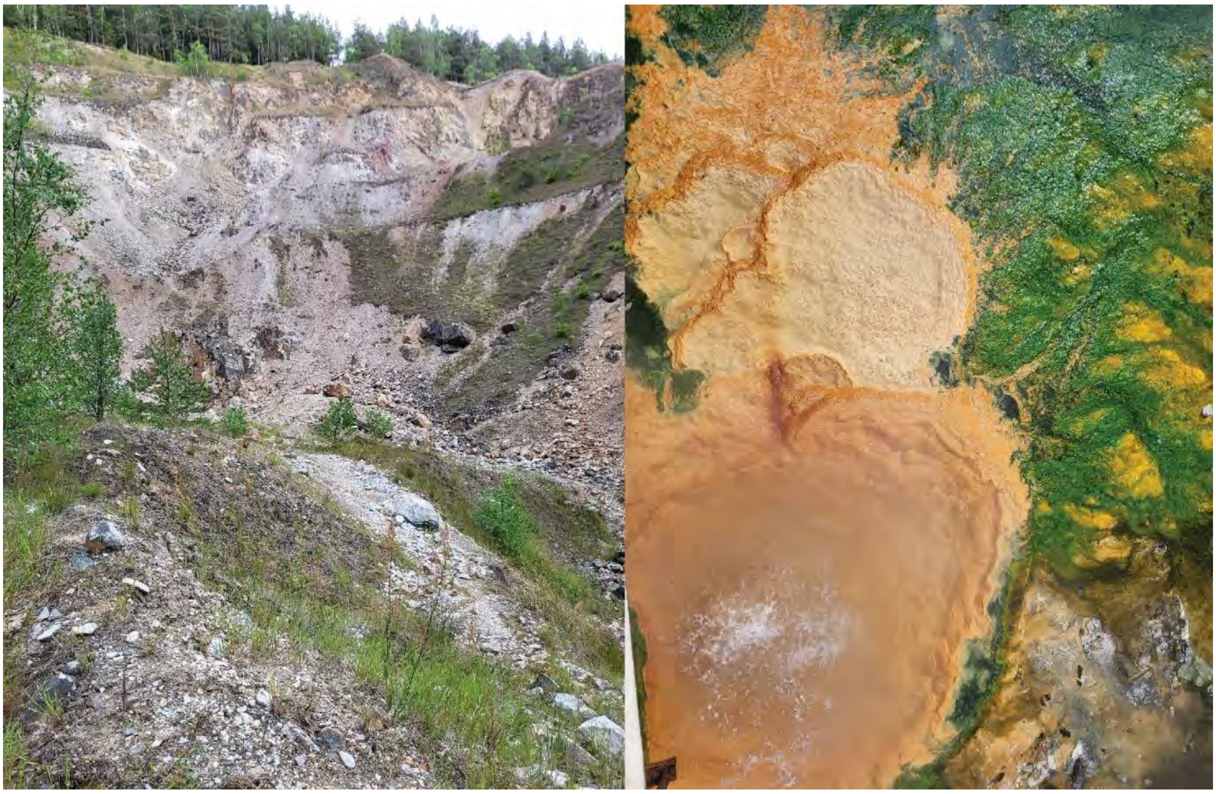

Figure 6: (Left) View of the Hub Stock pit. (Right) Resurgence of the hot spring in the city center of Karlovy Vary associated with aragonite-calcite-Fe oxides precipitations.

3.5 Tannenberg Sn mine and Schneckenstein quartz-topaz-tourmaline breccia (17/06/23)

In the last day, we headed back to Germany to visit the Tannenberg Sn visitor mine on the border of the Eibenstock granite. Although most of the ore is gone, the participants were able to see the transition between the greisenized and unaltered granite. Nearby on the surface, we visited the Schneckenstein or "Snail Rock" (Figure *7*). The outcrop consists of a hydrothermal explosive breccia composed of gneiss clasts replaced and cemented by quartz-tourmaline-topaz. We discussed the effects of the elements F and B in evolved magmatic-hydrothermal systems.

Figure 7: (Left) Participants at the top of the 23 meters high Schneckenstein topaz-bearing breccia. (Right) Students searching for topaz in old mine dumps further away from the breccia.

4. Tertiary hydrothermal deposits of NE Greece Field Trip

Participants: Participants: 8 (**5 SEG SC Freiberg members**, 2 students from SGA SC Prague, 1 student from the SEG SC Thessaloniki)

4.1 Geology

A series of metamorphic core complexes form the basement of the eastern Macedonian and Thrace region in Greece (Figure 8). These core complexes are part of the North Aegean Domain and can be subdivided in three subunits: 1) Southern Rhodope Core Complex, 2) Northern Rhodope complex, and 3) Chalkidiki Block. North trending subduction under the Aegean Sea from the Late Cretaceous to the Early Cenozoic resulted in SW synmetamorphic thrusting and the exhumation of the metamorphic units and core complexes. Early synorogenic exhumation started during the Maastrichtian and lasted until the Middle Eocene. Two later exhumation periods occurred between 40-30 Ma and 24-12 Ma and are thought to be linked to back-arc extension due to slab roll-back (Bonev et al., 2006a, b; Marton et al., 2010; Kilias et al., 2013). In the Northern Rhodope domain, metamorphic domes were progressively exhumed along ductile to brittle shear zones, whereas in the Southern Rhodope domain, the ductile Kerdylion detachment fault controlled the exhumation (e.g., Brun and Sokoutis, 2007). The exhumation of core complexes was accompanied by the development of sedimentary basins from the Maastrichtian to the Miocene (e.g., Bonev et al., 2006a, b).

Magmatism in the Rhodope Massif is thought to be related to either slab break-off and delamination or post-collisional extension (e.g., Jones et al., 1992; Christofides et al., 1998). Paleocene to Eocene magmatism was characterized by adakitic intrusions emplaced along thrust faults. In comparison, the Late Eocene-Oligocene magmatic rocks range from calc-alkaline, shoshonitic to ultra-potassic, with basic-intermediate and acid compositions (e.g., Christofides et al., 2004; Perugini et al., 2004; Marchev et al., 2004, 2005, 2013; Ersoy and Palmer, 2013). Several plutons intruded along coeval detachment zones and show evidence of deformation (e.g. mylonitic textures; Hahn et al., 2012). Early Miocene magmatism was characterized by calc-alkaline to shoshonitic intrusions and associated volcanic rocks (Kroll et al., 2002.). Magmatic-hydrothermal mineralization is associated to the different magmatic episodes and is widespread in NE Greece ranging from porphyry and skarn deposits to high-intermediate sulfidation Au-Ag-Te deposits (e.g., Melfos et al. 2002; Siron et al. 2016; Melfos and Voudouris 2017).

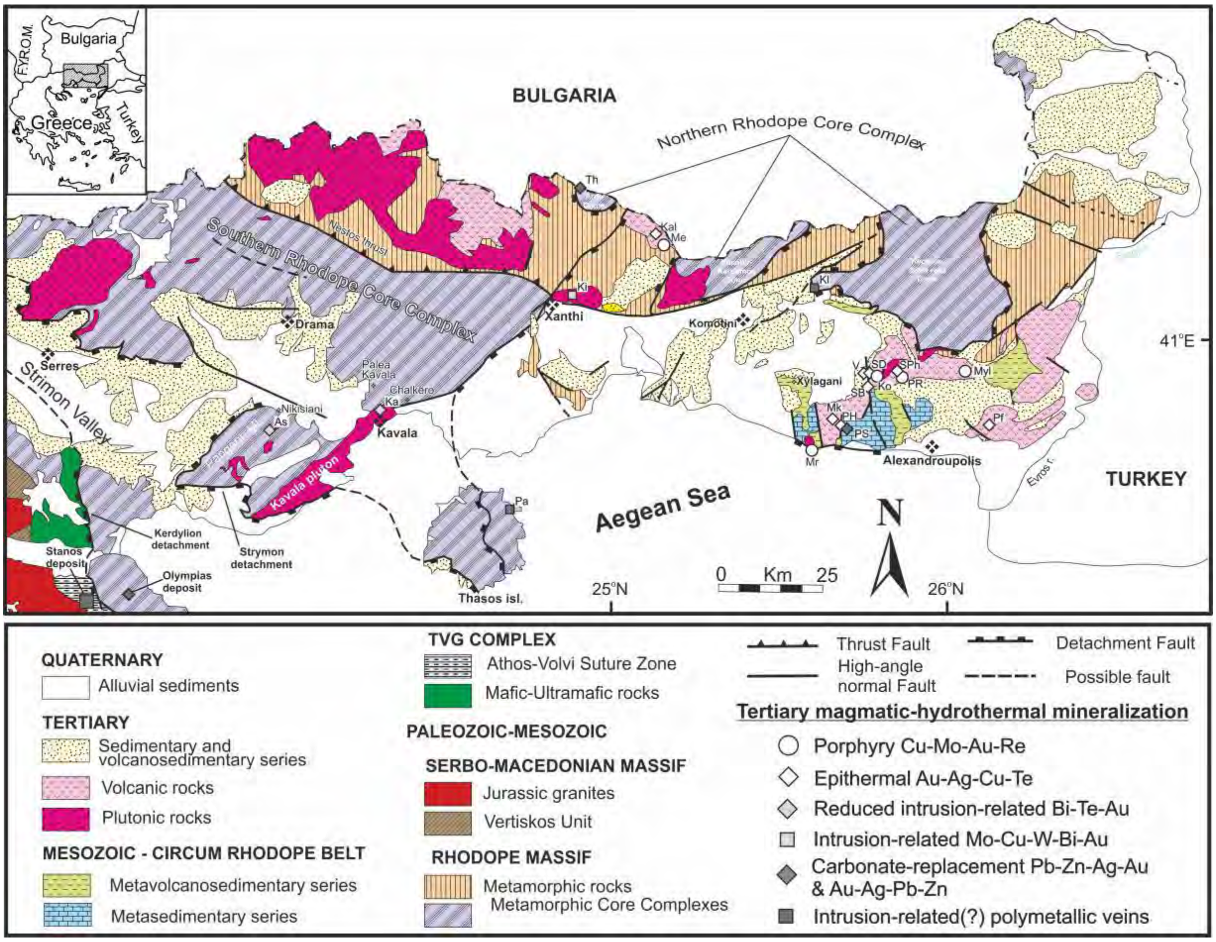

Figure 8: Simplified geological map of the Rhodope metallogenic province in Greece showing the location of mineral deposits and prospects (Voudouris & Melfos, 2022).

4.2 Itinerary

Date	Location	Guide	Activity
09/10/2023	Thessaloniki		Meeting at Thessaloniki international Airport drive to Stavros at 18:00

10/10/2023	Stavros and Alexandroupoli	M.Sc. Dino Leopardi	Stratoni fault carbonate-replacement, and Aspra Chomata porphyry-epithermal systems, afternoon drive to Alexandroupolis
11/10/2023	Sapes and Konos Hill area	Prof. Dr. Panagiotis Voudouris (National and Kapodistrian University of Athens)	Sapes stratovolcano and porphyry Konos Hill and HS-IS epithermal systems (alunite, adularia bearing veins)
12/10/2023	Sapes, Perama Hill area, Mavrokoryfi area	Prof. Dr. Panagiotis Voudouris (National and Kapodistrian University of Athens)	Visit to Eldorado Gold (i.e. Thracean Gold) facilities at Perama Hill. Perama Hill HS-IS epithermal system. Mavrokoryfi HS epithermal.
13/10/2023	Maronia area	Prof. Dr. Panagiotis Voudouris (National and Kapodistrian University of Athens)	Maronia porphyry-epithermal and skarn system
14/10/2023	St Philippos and Pagoni Rachi area	Prof. Dr. Panagiotis Voudouris (National and Kapodistrian University of Athens)	St Philippos HS-IS epithermal system and Pagoni Rachi Cu-Au porphyry-epithermal system
15/10/2023	Kallintiri area and Thessaloniki	Prof. Dr. Panagiotis Voudouris (National and Kapodistrian University of Athens)	Kallintiri detachment related stibnite-realgar-galena mineralization (Carlin style?), drive back to Thessaloniki, and meeting with the SEG SC Thessaloniki
16/10/2023	Thessaloniki		Return to Freiberg

4.3 Arrival in Thessaloniki and drive to Stavros (09/10/23)

On the afternoon of the first day of the excursion, participants from different European countries met at the Thessaloniki international airport followed by a short drive towards the coastal town of Stavros on the eastern side of the Chalkidiki peninsula where we spent the night.

4.4 Stratoni Fault carbonate replacement deposits and Aspra Chromata porphyry-style mineralization (10/10/23)

In the morning, we drove south from Stavros to the Stratoni Fault known to host several carbonate replacement occurrences and deposits, such as, the now inactive Madem Lakkos deposit. The ductile-brittle fault contains a series of carbonate lenses that have been replaced by Ag-Pb-Zn sulphides. After a brief introduction of the geology and mineralization events of

NE Greece, we look at the gossan oxidation area of one of these mineralized occurrences along the fault exposure (Figure *9*). Whereas the majority of the mineralization has been oxidized and remobilized, leaving only abundant Fe oxides and residual quartz, some of the original carbonate and Pb-Sn mineralization is preserved (Figure *9*). During the visit we discussed the processes leading to mineralization and the effect of supergene alteration in the deposit.

Figure 9: (Left) Participants looking for sulfides mineralization in the oxidized cap. (Upper right) Close-up of the quartz-sulfides veinlets highly leached. (Lower right) Close-up of the carbonate replacement sphalerite and galena mineralization.

Afterwards, we drove along the fault to the Aspra Chromata occurrence where along a series of road-cuts the quartz-pyrite stock in the Stratoni granodioritic intrusion is exposed (Figure *10*). Although most of the previous Cu mineralization has been removed, secondary Cu-minerals indicate their former presence (Figure *10*). After lunch, we drove toward the city of Alexandropouli in the Thrace region that would serve as our base camp for the next couple of days.

Figure 10: (Left) Exposure of the quartz-pyrite stockwork in the sericitic-altered granodiorite along the road. (Right) Secondary Cu-bearing minerals on a fracture plane.

4.5 Konos Hill, Viper and Sta. Barbara porphyry and HS-IS epithermal deposits (11/10/23)

On the third day, we were joined by Prof. Dr. Panagiotis Voudouris from the National and Kapodistrian University of Athens who was our guide for the rest of the excursion. We drove in the morning to the Konos Hill prospect near the town of Sapes. At the top of the hill, he introduced us to the geology of the Thrace region and the different styles of mineralization in the region. Here, we could also see the top of a high sulfidation (HS) epithermal system where the original volcanic rocks are completely altered to fine-grained alunite. Following the alteration zone towards one of the creeks, the participants could see the transition from a HS system telescoped into a porphyry-style mineralization characterized by B-type quartz-pyrite veins in a quartz-sericite alteration (Figure *11*).

Figure 11: (Left) Advanced argillic alteration containing quartz and diaspore. (Right) Porphyry-style quartz stockwork crosscut by pyrite-bearing B-veins in the sericitic altered hornblende-biotite intrusion at Konos Hill.

After lunch, we continued to the Viper prospect which is a similar HS epithermal system. Here, we were able to recognize changes in the alteration which is characterized by vuggy quartz with diaspore crystals. We discussed how that related to the position within the porphyry epithermal system model. Afterwards, we hiked down the hill to see the system being overprinted by a later intermediate sulfidation (IS) epithermal mineralization. Although not exposed, the mineralization is recognized by the waste piles containing abundant vein-like Au-bearing chalcedony material.

The last stop of the day was the nearby Sta. Barbara prospect, where unlike the previous localities, the HS mineralization is hosted in barite-alunite veins in an advanced argillic alteration. Here, we discussed the structural controls and the differences in the style of mineralization.

4.6 Perama Hill HS project, Mavrokoryfi HS prospect and Galaxy target (12/10/23)

On the morning of the fourth day, we visited the core shed of the Perama Hill exploration project, owned by Eldorado Gold (Figure *12*). The project is a HS epithermal Au deposit hosted by oxidized and silicified sandstone and andesite that contains proven reserves of ~1 Moz Au. The lead geologist introduced us to the project and showed us cores from the main Perama Hill project and the adjacent Perama South prospect. The Perama South prospect, unlike the Perama Hill project, contains a series of carbonate replacement ore bodies. After looking at the cores from both prospects, we went to the discovery outcrop nearby (Figure *12*). The exposure of silicified sandstones is crosscut by a series quartz-barite Au-bearing veins with boiling textures.

Figure 12: (Left) Participants looking at the mineralogy of the Au-rich horizons in the drill cores of the Perama Hill project in the Eldorado Gold facilities. (Right) Participants on the way to the Perama Hill discovery outcrop (on the background) where quartz-barite veins and breccias were visible.

From the Perama Hill area, we drove to the close-by Mavrokoryfi HS epithermal deposit. The participants were able to observe some typical HS epithermal massive mineralization containing abundant Ag-Au-Te sulfosalts (Figure *13*). We then had a look stratigraphically above the mineralization, where the host rocks are opalized and we discussed how the interaction of magmatic-derived vapors with groundwater produced this horizon. In the afternoon, we returned to the Sapes area and visited the Galaxy target where the HS event, represented by the residual vuggy quartz, is overprinted by IS Au-bearing amethysts veins (Figure *13*).

Figure 13: (Upper left) Outcrop containing massive sulfides and Ag-Au-Te sulfosalts that are part of the HS mineralization. (Lower left) Close-up of the sulfosalt-rich HS mineralization. (Right) Au-bearing amethyst vein (IS) crosscutting the HS hydrothermal event represented by vuggy quartz.

4.7 Maronia Mo-Re-Au porphyry and skarn (13/10/23)

On the fifth day, we headed to the coast to the Maronia area. Along the coast, it is possible to transect the entire porphyry system. The porphyry is characterized by the Maronia pluton, monzogabbro and a later quartz-feldspar microgranitic intrusion. On the monzograbbro, we could see the mineralization hosted as disseminations within aplitic dikes, miarolitic cavities and lesser quartz veins, as well as the pervasive potassic alteration (Figure *14*). The contact between both intrusions is associated to a shear zone visible along the coast.

Figure 14: (Left) Participants with Prof. Voudouris discussing on the formation of the aplitic dikes. (Upper right) Participants searching for molydenite-bearing veins. (Lower right) Close-up on the grossular-rich exoskarn at Maronia.

The microgranitic intrusion is affected by quartz-pyrite-molybdenite stockwork and here the students learn the differences between the different types of veins and their implications for temperature and ductile-brittle regimes.

In the afternoon, we transacted the contact between the monzograbbro and the marble host rock. On the intrusive side, we found and followed the endoskarn contact characterized by alkaline minerals including albite, arfvedsonite and schorlomite (Ti-rich garnet). Transitioning outwards into the marble host rocks, we looked into the mineralogy of garnet-rich exoskarn (Figure *14*: (Left) Participants with Prof. Voudouris discussing on the formation of the aplitic dikes. (Upper right) Participants searching for molydenite-bearing veins. (Lower right) Close-up on the grossular-rich exoskarn at Maronia.Figure *14*), conformed by prograde garnet overprinted by retrograde vesuvianite and chlorite.

4.8 Pagoni Rachi Cu-Au porphyry and St. Philippos HS-IS epithermal deposits (14/10/23)

After a short drive to the north of Alexandropouli, we arrived to the Pagoni Rachi porphyry prospect which had been unfortunately part of the earlier wildfires affecting NE Greece. After leaving our vehicles at the bottom of the hill, we walked along one of the creeks were we explored the base of the porphyry systems characterized by sodic-(calcic) alteration and magnetite veins (M-type). We then hike towards the top of the hill, which is characterized by extremely dense quartz-pyrite stockwork with sericitic alteration (Figure *15*). Walking towards the other side of the hill, we could observe the late overprint in the system characterized by pyritic (D-type) veins with sericite-pyrite alteration associated to them. The D-type veins are crosscut by late IS Ag-Zn-Pb carbonate veins along NNW-SSE trending structure that we encountered as we walked down the creek on the way back.

Figure 15: (Left) Participants looking at the quartz vein stockwork (the outcrop is very dark due to carbon coating after the summer wildfires). (Upper right) Close-up of the quartz vein stockwork where erosion highlight the quartz veins. (Lower right) Participants on the top of the hill hosting the quartz stockwork. The extend of the wildfires can be seen in the background.

Following the visit to Pagoni Rachi, we drove along strike of these late IS mineralization and we reached the now abandoned St. Philippos mine. Inside the open pit, we looked at the fault-controlled HS mineralization composed of massive Cu-Au-Ag-Sn-Te-Bi sulfosalts (Figure *16*) and sulfides, which are overprinted by a late IS event composed of Cu-Pb-Zn veins and breccias (Figure *16*).

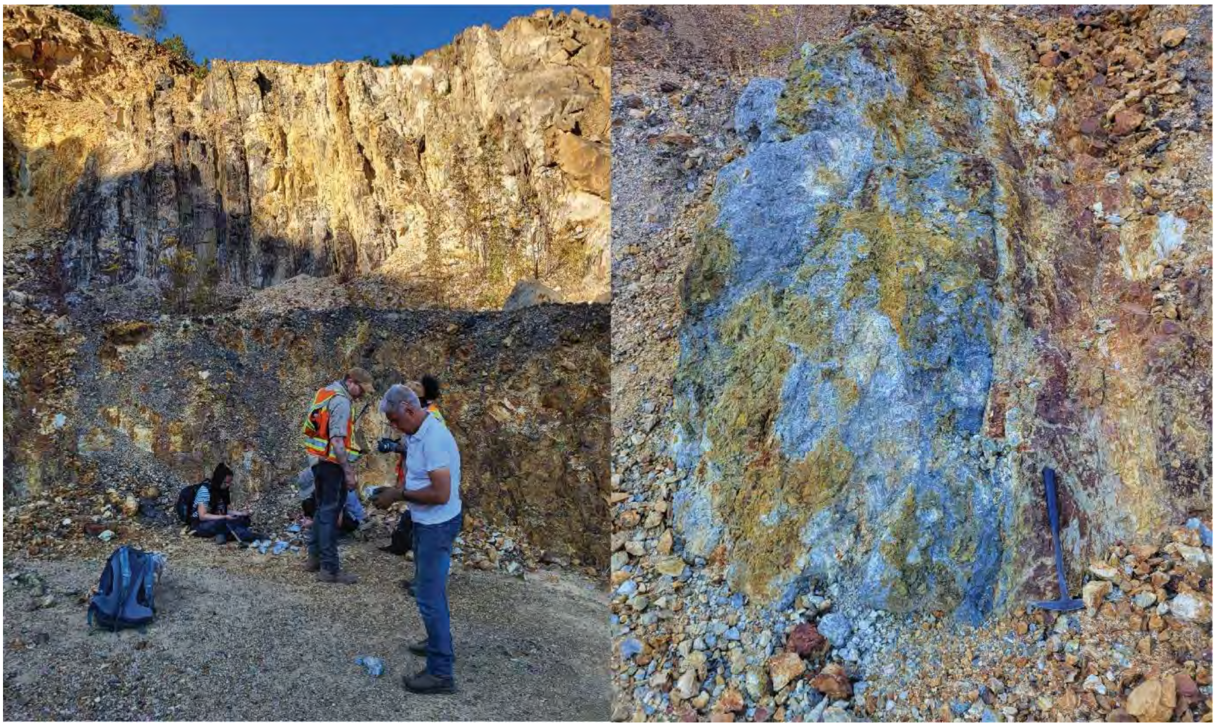

Figure 16: (Left) Participants looking at the HS-IS mineralization. The vertical sandstones crosscut by the silicified and mineralized fault hosting the massive sulfide mineralization (visible in the front) are visible in the background. (Right) Close-up at the Cu-Au-Ag-Sn-Te-Bi sulfosalts and sulfides mineralization that was exploited in the St. Philippos mine.

4.9 Kallintiri Sb-Au mineralization and meetup with the Thessaloniki SEG Student Chapter (15/10/23)

On the last day of the field, we drove north towards the town of Kallintiri. Geologically, this area is at the border of the North Rhodope core complex and is structurally characterized by a series of detachment faults associated to the exhumation of the metamorphic core complex. Here, we hiked along the creek and followed one of these detachment faults that host Pb-Zn mineralization within veins and breccias along the detachment. As we hiked up the hill, we could recognize the transition to Sb-As mineralization where stibnite-realgar-barite-calcite subvertical veins can be seen within old mine working and in the waste piles associated to them (Figure *17*). At the end, we discussed the spatial relationship of the mineralization with the magmatism in the area and concluded the field part of the excursion with a discussion about the porphyry-epithermal model.

Figure 17: (Left) Participants discussing in the creek the origin of the mineralization formation. (Right) Close-up of the stibnite mineralization with the occurrence of realgar (red).

We then drove back to Thessaloniki where we meet with the students from the SEG Student Chapter from the Aristoteles University Thessaloniki. It was a great opportunity to meet so many B.Sc., M.Sc. and PhD students from Thessaloniki in a casual meeting with a lot of exchange.

4.10 Departure (16/10/23)

On the last day, the participants returned to their home countries.

5. Finances

5.1 Zinnwald-Cinovec field trip

Expenditure	EUR	USD[1]	Revenue	EUR	USD[1]
Transportation	-135.00	-147.15	Participation fees	0.00	0.00
Entrance fees	-156.00	-170.04			
	EUR	**USD[1]**			
Sum	**-291.00**	**-317.19**			
Balance	**-291.00**	**-317.19**			

[1] calculation based on the exchange rate on 17.11.2023 (1 EUR = 1.09 USD)

5.2 Heavy mineral prospection in Zellwald field trip

Expenditure	EUR	USD[1]	Revenue	EUR	USD[1]
Transportation and gas	-30.34	-33.07	Participation fees	0.00	0.00

	EUR	USD[1]
Sum	**-30.34**	-33.07
Balance	**-30.34**	-33.07

[1] calculation based on the exchange rate on 17.11.2023 (1 EUR = 1.09 USD)

5.3 West Erzgebirge field trip

The Steward R Wallace Fund received in September 2023 was used to finance the field trips.

Expenditure	EUR	USD[1]	Revenue	EUR	USD[1]
Accommodation	-630.00	-686.70	Participation fees	356.00	388.04
Transportation and gas	-289.76	-315.84	Steward R Wallace Fund	1,324.73	1,443.96
Entrance fees	-48.99	-53.40			

	EUR	USD[1]	Revenue	EUR	USD[1]
Sum	**-968.75**	**-1,055.94**		**1,680.73**	**1,832.00**
Balance	**711.98**	**776.06**			

[1] *calculation based on the exchange rate on 17.11.2023 (1 EUR = 1.09 USD)*

5.4 NE Greece field trip

Expenditure	EUR	USD[1]	Revenue	EUR	USD[1]
Accommodation	-935.00	-1,019.15	Participation fees	1,020.00	1,111.80
Transportation	-336.00	-366.24	Steward R Wallace Fund (leftover)	711.98	776.06
Gas	-370.16	-403.47	FuF fund for students	336.00	366.24
Toll	-19.70	-21.47			
Public transportation	-2.70	-2.94			
Field trip Leader	-466.78	-508.79			
Printed guide	-48.00	-52.32			

	EUR	USD[1]		EUR	USD[1]
Sum	**-2,178.34**	**-2,374.39**		**2,067.98**	**2,254.10**
Balance	**-110.36**	**-120.29**			

[1] *calculation based on the exchange rate on 17.11.2023 (1 EUR = 1.09 USD)*

The cost of the field trip per student is 363.06 € (395.74 USD). The expenditure and revenue in this table concern only the student participants.

5.5 Final balance field trips for the year 2022/2023

	EUR	USD[1]
Final balance	**-431.70**	**-470.55**

[1] *calculation based on the exchange rate on 17.11.2023 (1 EUR = 1.09 USD)*

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