UPatras S.E.G. Student Chapter

«UPatras Geo-Mining Field Workshop: Silesia Poland 2022» Report

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Silesia Poland 2022

Patras, September 2022

"UPatras Geo-Mining Field Workshop: Silesia Poland 2022"

The UPatras S.E.G. Student Chapter having been awarded by the Stewart R. Wallace Fund has managed to accomplish a 10-day field trip in Poland between 08 and 17th of July 2022. Nineteen members of the Student Chapter joined our filed trip including our academic advisor. The team visited many major cities of central and southern Poland including Warsaw, Katowice, Kielce (Chęciny) and Krakow, where our students were able to learn about and admire Poland's geological, mining and cultural heritage.

As far as geology is concerned, we managed to keep our team really busy on that. We visited for one day the Institute of Geosciences, University of Silesia, in Sosnowiec, and later spent 3 days in "Geonatura Kielce - The Centre of Geoeducation" at Chęciny with colleagues from the University of Silesia, conducting field-based geological exercises. In the following days we visited the Pb-Ag mine of Tarnowskie Gory and the Coking-Coal Guido mine in Zabrze, where we had the opportunity to observe and learn about mining techniques from the mediaeval times till recently. The pure educational program was concluded with a seminar to the Institute of Energy and Fuel Processing Technology in Zabrze, where we had the chance to visit laboratories up to a pilot scale for evaluating the properties of coke. Finally, the trip concluded with a visit to the famous Wieliczka Salt Mine, as well as to the Memorial Museum of Auschwitz-Birkenau.

Special thanks to Prof. Dr. Magdalena Misz-Kennan, Ass. Prof. Dr Krzysztof Szopa from Institute of Earth Sciences, University of Silesia, and Dr. Małgorzata Wojtaszek-Kalaitzidi, Institute of Energy and Fuel Processing Technology for their efforts in providing the seminars to our Team.

We would like to thank our Sponsors for contributed in the success of this Field Activity.

The UPatras S.E.G. Student Chapter

Friday 8th of July 2022

The UPatras S.E.G. Student Chapter began its journey to Poland on Friday 8th of July. The team flew from Athens International Airport "Eleftherios Venizelos" towards Warsaw, Poland.

Fig.1: *Snapshot from our flight from Athens to Warsaw.*

When we arrived we traveled by train to Katowice, where we spent the night at "Hotel Katowice". We had the opportunity to have a short walk downtown and have dinner all together before our night rest.

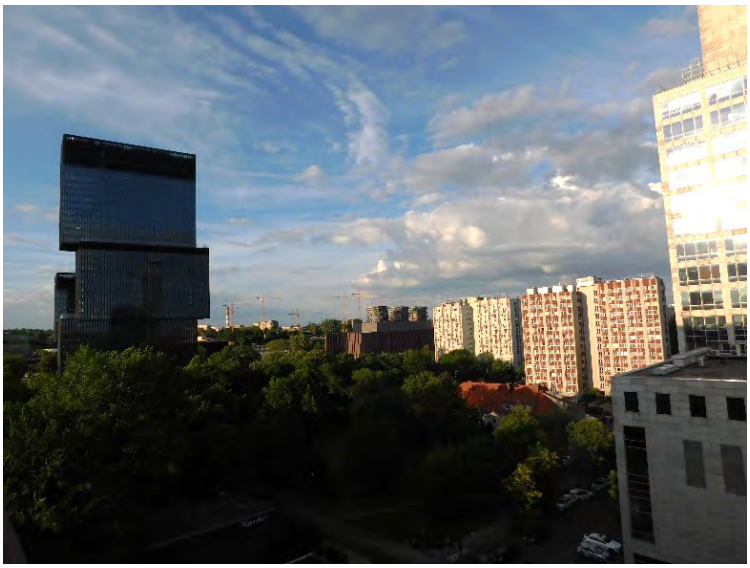

Fig2: *View of Katowice".*

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Saturday 9th of July 2022

The next morning, Saturday 9th of July, we visited the **University of Silesia** in Katowice, at the **Institute of Earth Sciences** in the Faculty of Natural Sciences. At our arrival, Ass. Prof. Dr Krzysztof Szopa and Prof. Dr Magdalena Misz-Kennan gave us a warm welcome.

Fig3: *External view of the Institute of Earth Sciences in the Faculty of Natural Sciences.*

Dr Krzysztof Szopa took over our visit almost all over the Institute, and particularly the Museum that is hosted within the Institute, showing and explaining us the different types of rocks that were exhibited at the exterior area of the University, coming from all over Poland, presenting dioramas of the geological history and evolution of the area of Silesia.

Fig4: *Dr Krzysztof Szopa as our guide during our visit at the Institute of Earth Sciences.*

Prof. Dr Magdalena Misz-Kennan gave a brief lecture over the general geology of Upper Silesia and focused on the coal mines of the area by giving us analytical

information on the genesis of those resources, as well as technical and economic data and their importance to the Polish economy as well.

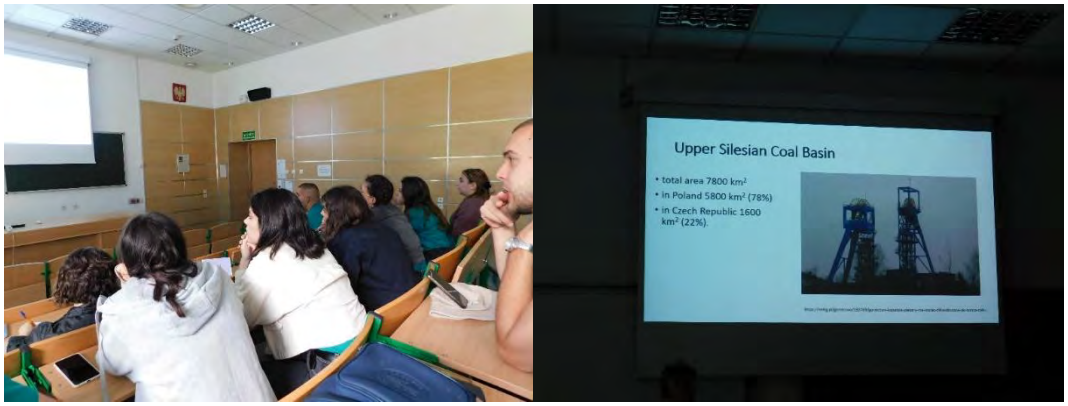

Fig5: *The UPatras S.E.G. Student Chapter during the lecture of Prof. Dr M. Misz-Kennan.*

Furthermore, it was more than pleasant having **Dr Tomasz Krzykawski** explaining to our Chapter basic info and operation standard principles of the X-Ray Diffractometer and Raman Spectrometry, during a lab visit. It was certainly a unique opportunity for all our students to come across modern facilities and established laboratories and have a good look at how geologists work properly at a laboratory. We also had the chance to visit the geological museum of the department, so we could assimilate different kinds of information and knowledge.

Fig6: *Dr Tomasz Krzykawski showing us the X-Ray Diffractometer.*

Before our departure, the president and treasurer of the UPatras S.E.G. Student Chapter handed gifts to our wonderful hosts including T-shirt and bucket hat of our Chapter, made especially for the field trip in Poland, and of course local products of Patras including tentura (greek liqueur) and sweet delights to promote our culture and folklore traditions.

Fig7: *UPatras S.E.G. Student Chapter executive committee (Treasure and President) with Dr Krzysztof Szopa and our academic advisor Dr Stavros Kalaitzidis.*

The educational part of this day closed with a magnificent visit at the **MUZEUM ŚLĄSKIE *(Silesian Museum).*** This visit aimed to acquaint the participants with the historical retrospective and folklore heritage of Silesia, with its significant mining history, as well as with modern art through the exhibits. The exhibition in its entirety covers a very wide range of the recent history of the region. At night we had a walk at the city of Katowice, where we enjoyed traditional Silesian cuisine.

Sunday 10th of July 2022

We seized the opportunity to take a closer look at Katowice, which is a beautiful place with so much to do and see and as in almost every town in Poland, there were bikes and electric scooters, which made our walks and rides more comfortable and adventurous at the same time.

At noon, the whole team was ready and packed to travel by bus to Kielce and more specifically to Chęciny, where we would stay at the **European Center for Geological Education** for 3 days along with students and academic staff from the Institute of the Earth Sciences of the University of Silesia, in order to join them at their geological field mapping activities.

Fig8: *The European Center for Geological Education at Chęciny.*

After our arrival at the European Centre for Geological Education, Dr Krzysztof Szopa gave us instructions regarding the place and a brief update for Monday's geological exercise and the general geological setup of the Holy Cross Mountains.

Fig9: *Dr Krzysztof Szopa briefing for the upcoming field-map exercise.*

Fig10: *The UPatras S.E.G. Student Chapter at the European Center for Geological Education.*

Monday 11th of July 2022

Our second day at the European Center for Geological Education began with a map exercise. The goal of this exercise was the familiarization of the students with topographical maps and finding points/spots, when given coordinates or azimuth information.

Fig11: *The UPatras S.E.G. Student Chapter at the European Center for Geological Education.*

This exercise lasted 4 hours and after that, all teams returned to the Geocentrum. A small break was necessary to refill our powers and the program included a subsequent visit to the local castle of the area, the **Royal Castle of Chęciny**, which is located a few hundred meters from Geocentrum.

The castle was built in the 13th century but only a small part from the original castle has been preserved and can be visited today. As visitors, we had the opportunity to admire the marvelous view from the top as well as numerous objects saved through the centuries when the castle was still active.

Fig12: *The Royal Castle of Chęciny and its geological bedrock along with some Devonian fossils.*

As we left the castle, we could have a closer look at the rocks on where the castle was built. The age of the rocks has been identified as Devonian, being affected intensively by tectonics. Moreover, the existence of fossils was more than obvious.

The day closed wonderfully with a delicious dinner at a local traditional tavern with traditional Polish meals.

Tuesday 12nd of July 2022

After our breakfast, the chapter put on appropriate outdoor clothing and followed our Polish colleagues on a hike of about 10 kilometers through the Holy Cross Mountains area, with the final destination being the **Paradise Cave (Jaskinia Raj)**. The Paradise Cave is a karst cavity in limestones that form 5 different chambers and 240 meters of routes. The cave was discovered in 1963 and apart from geological, it has archaeological and palaeontological interest as well.

Fig13: *Our Chapter on its way to Paradise Cave (Jaskinia Raj).*

After the end of the cave tour, which lasted about an hour, the group took a quick break and moved by public transport to **"Geonatura Kielce - The Centre of Geoeducation"**. This center is a Geology-based educational center and was founded in 2003 by the municipal community. It also belongs to the UNESCO Global Geoparks (UGGp) network and includes the Geoeducation center, a botanical garden, the creative employment center, as well as three very important natural heritage reserves. After the tour inside the museum, the group members had the opportunity to experience a 5D movie projector, which explained the evolution of species and important events that have taken place on earth and especially Poland within geological time. Also, there were various

interactive educational devices that facilitate the understanding of all geological phenomena.

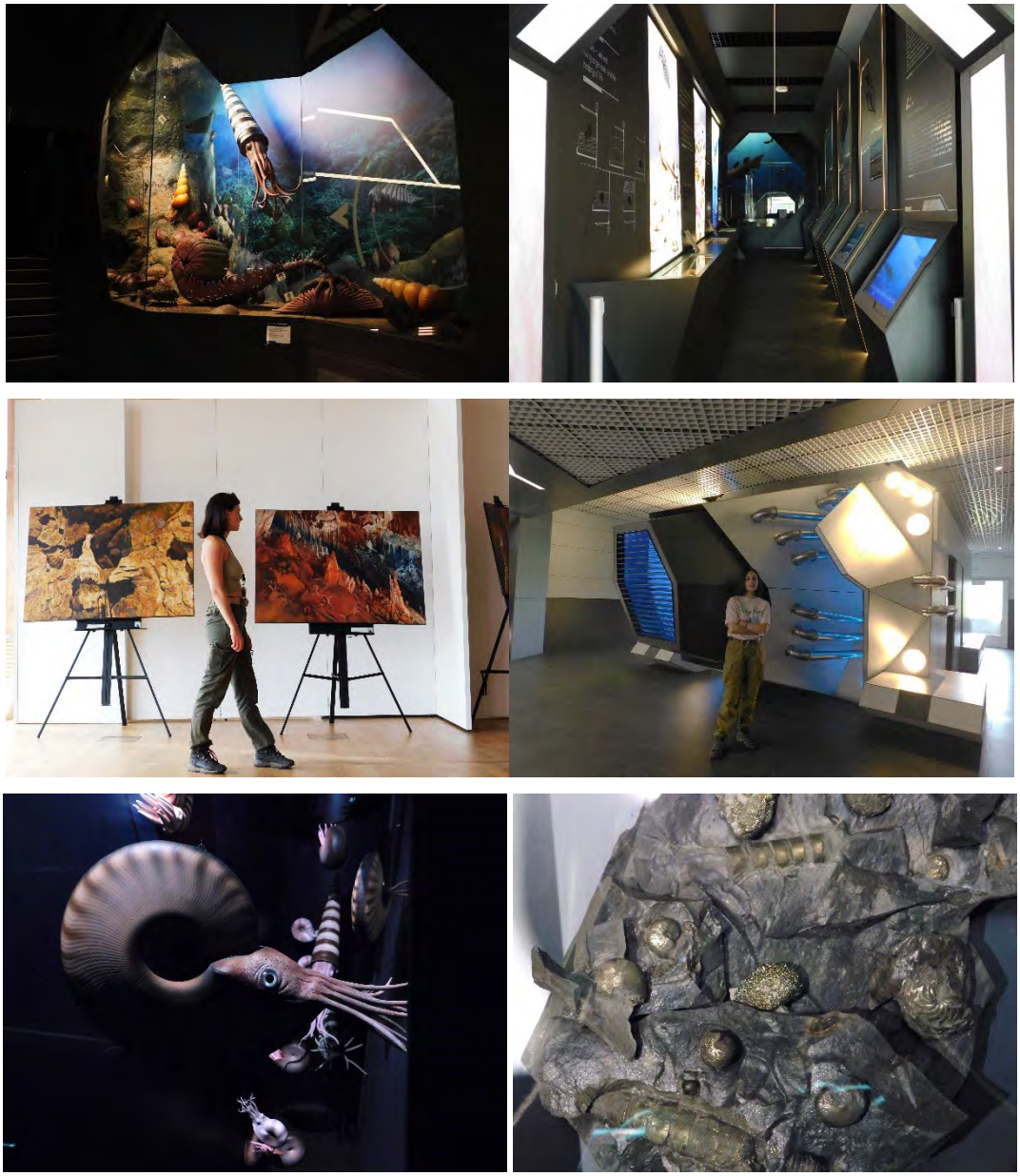

Fig14: *UPatras S.E.G. Student Chapter at the Geonatura Kielce - The Centre of Geoeducation.*

The day ended with a short visit to the city of Kielce and back to the city of Chęciny for dinner.

Wednesday 13th of July 2022

On the sixth day of our field trip, the UPatras S.E.G. Student Chapter visited the historic silver-lead and zinc mine in **Tarnowskie Góry** located in Silesia, Poland. The mine started operating in the 16th century and was one of the most important lead mines in the world for many centuries. The ore mined at Tarnowskie Góry was galena (PbS), which is a primary source of lead and silver as a byproduct as well. Sphalerite and wurtzite were also mined there, which are primary zinc sources.

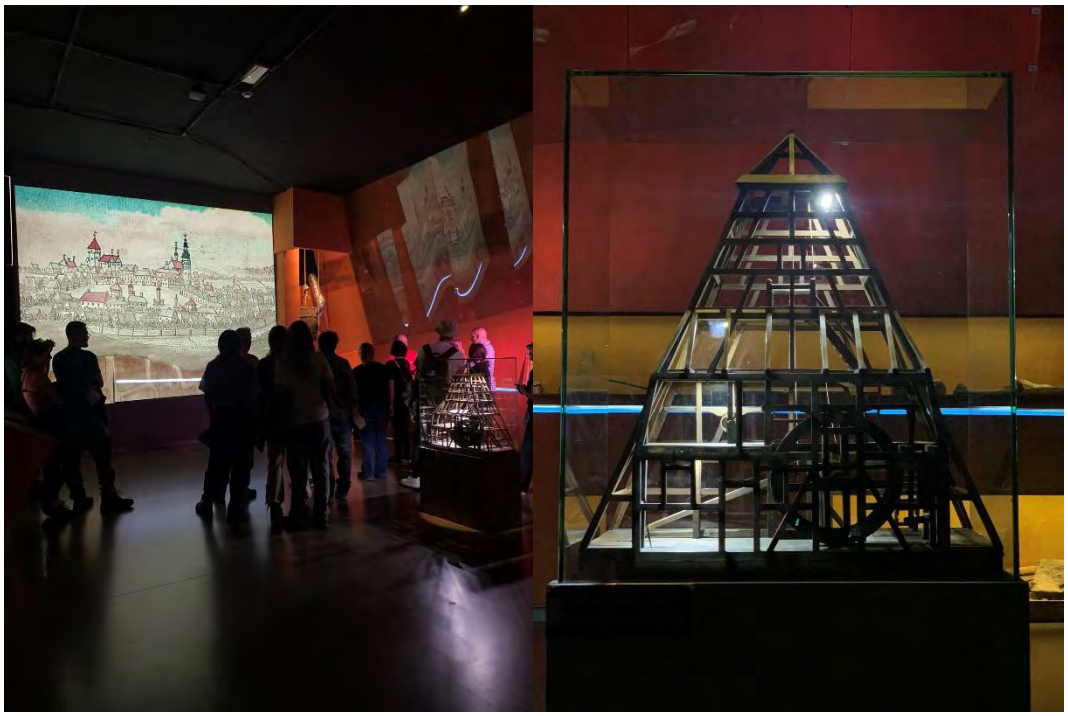

Fig15: *Our Chapter at Tarnowskie Góry museum.*

In the 17th century, miners started to work at greater depths, which created problems with water flooding the mine, while the draining methods were not very efficient. In the 18th century the underground system at Tarnowskie Góry began to be built, while the mine experienced up to three times the volume of water inflow compared to other major European mines at the time and eventually comprised a water catchment of over 50 km of main drainage tunnels and 150 km of secondary drainage adits, access tunnels, shafts and extraction areas. Tarnowskie Góry's underground drainage system is a marvel of mining architecture and on July 9, 2017, it was inscribed to the **UNESCO Heritage List**.

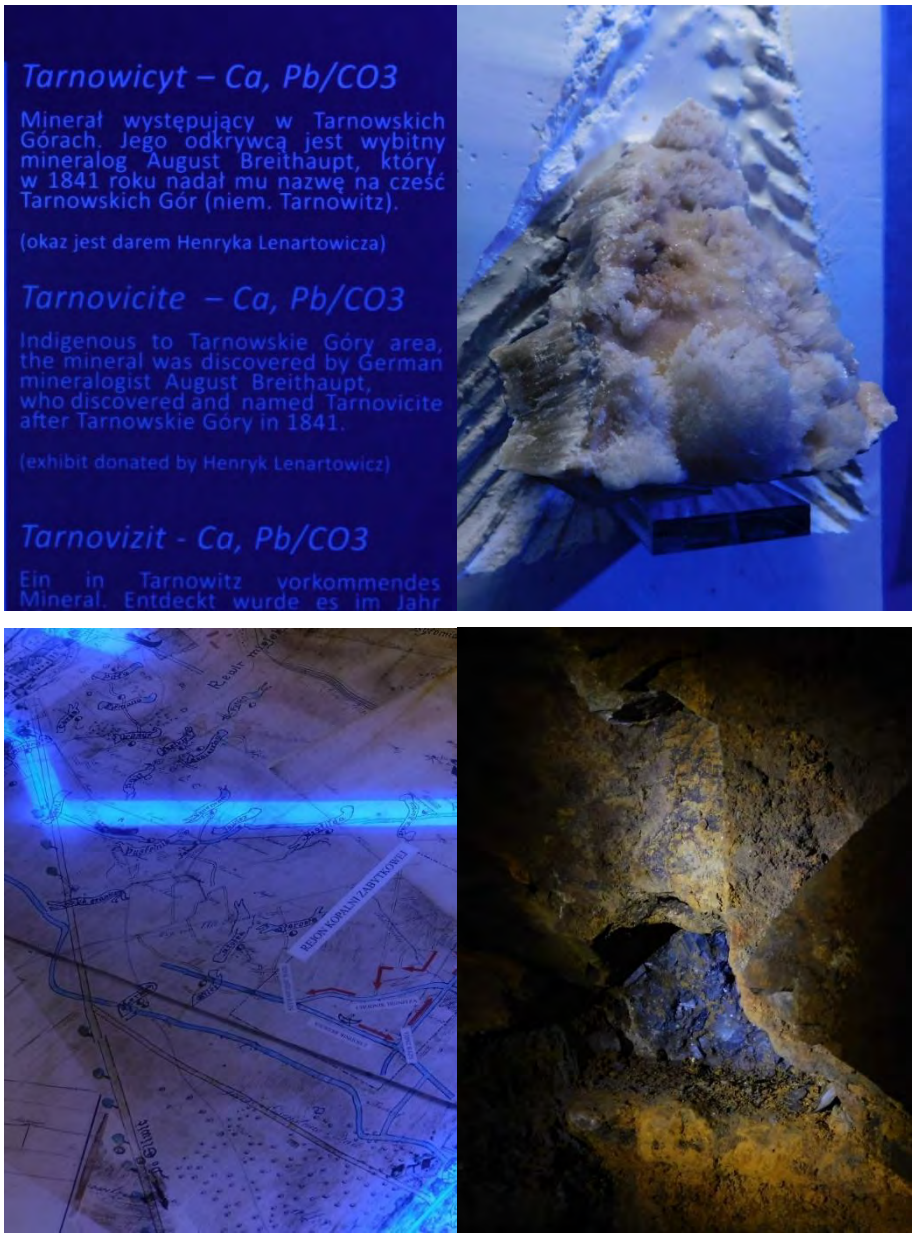

Fig16: *Tarnowskie Góry museum and Pb mineralization at the old mine.*

Our team's visit lasted for over 2 hours and helmets and equipment were provided as well. During that time the students were able to observe the lead ore in veins and lenses and had a great time learning about the history of the mine and its spectacular drainage system, as well the connection and combination between Engineering and Geology. Also, one of the most impressive experiences was the underground boat tour among some of the flooded floors that were there.

Fig17: *The UPatras S.E.G. Student Chapter at Tarnowskie Góry mine.*

After our wonderful visit at Tarnowskie Góry, we walked through the neighborhood of **Nikiszowiec**, which was the place where miners used to live, and the houses were built with a characteristic way with red frame on the windows.

Fig18: *Neighborhood of Nikiszowiec.*

Thursday 14th of July 2022

The seventh day of our field trip began with a visit to the **Institute of Energy and Fuel Processing Technology**, at Zabrze. Dr. Małgorzata Wojtaszek-Kalaitzidi welcomed the whole team and gave a short lecture about the history and the purposes of the Institute as far as the coke industry is concerned. Dr. Wojtaszek-Kalaitzidi also gave us a tour to almost every facility of the Institute, including lab and pilot-scale testing facilities, explaining clearly enough the importance of each sector. This visit was ideal in order to understand the importance of combining theoretical and technical engineering knowledge in order to serve the demands of the industry.

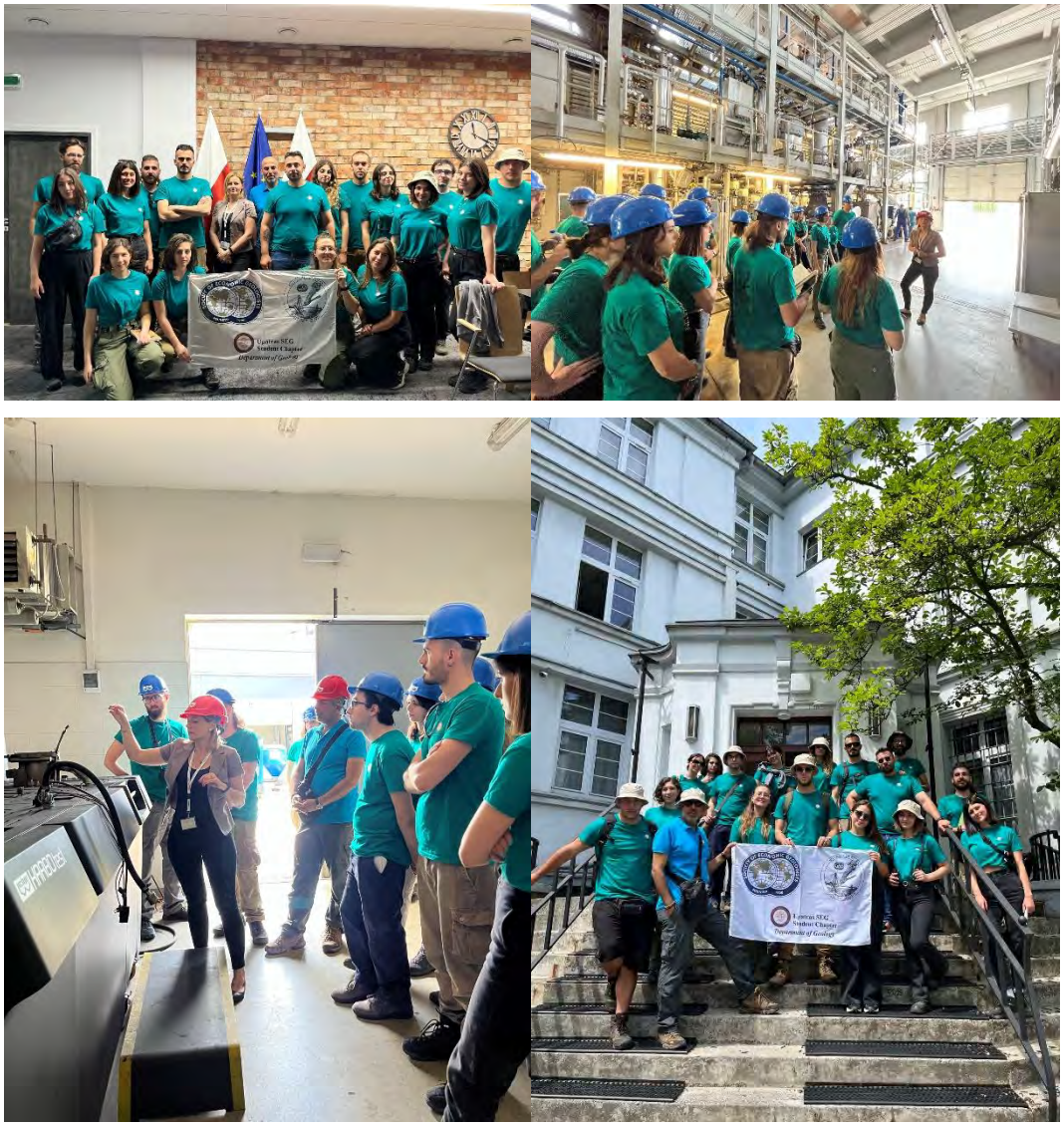

Fig19: *Our Chapter at the Institute of Energy and Fuel Processing Technology.*

The UPatras S.E.G. Student Chapter visited the **"Guido Mine and Coal Mining Museum"**, a historic metallurgical coal mine located in Zabrze of Silesia in Poland, part of which nowadays operates as a museum. The underground museum reaches 320m beneath the surface, which makes it the deepest visiting mine in Europe. The Guido mine was set up in 1855 by Guido Henckel von Donnersmarck to provide coal for the Donnersmarck mills. The mine closed in 1960 but reopened in 1967 as a test mine for colliery machines. In 1982, an open-air museum was set up on the surface site that closed in 1996. The current visitor mine museum opened to 170m in 2007 and to the full 320m in 2008.

Our team had to choose between different options provided by the museum for the visitors and by choosing "The Dark of the Mine" went down 320m into the earth and admired the coal mine preserved in the state it was left by miners over twenty years ago. There, the roof was supported by thickly placed props of Valent type and stone-dust barriers as well. At the floor and the sidewalls there were chain conveyors, pipelines used for pumping the filling and other machinery and special equipment used by the miners.

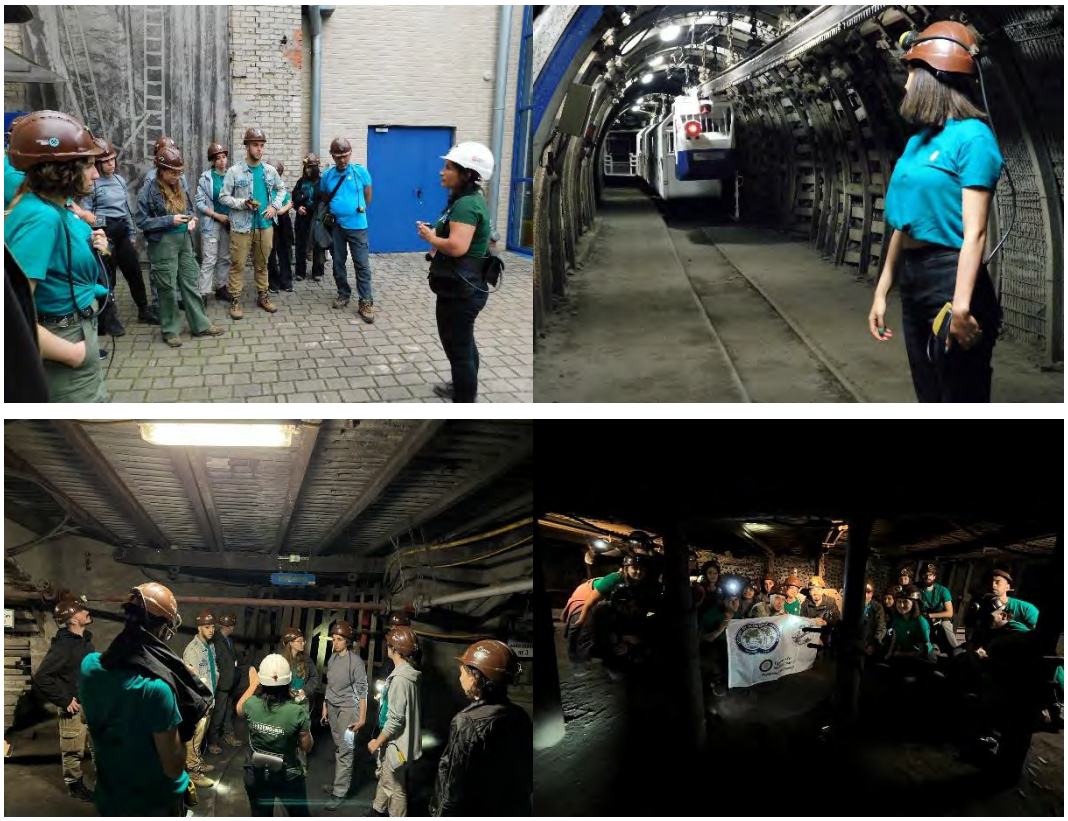

Fig20: *Our team at the Guido Mine and Coal Mining Museum.*

Deep down there the team took a firm grasp of what it means to be a miner as everybody was provided with special mining equipment such as helmets and personal mining lamps and had a good look of a miner's working conditions. We were able to observe the coal seam along our journey and learn a lot of interesting geological and mining facts by the mine guide and our academic advisor Dr. Kalaitzidis as well.

Friday 15th of July 2022

The whole team prepared for another heavy schedule day. First destination was the **"Memorial and Museum Auschwitz-Birkenau former German Nazi concentration and extermination Camp".**

Fig21: *Auschwitz I installations.*

This camp has become a symbol of terror and genocide. It was established by Germans in 1940, in the suburbs of Oswiecim, a Polish city that was annexed to the Third Reich by the Nazis becoming the concentration and extermination Camp of Auschwitz.

Fig22: *Our Chapter at the Auschwitz-Birkenau.*

After almost 3 hours at the Camp, time had come to get on the road again for our next destination, located a few kilometers outside Krakow.

The infamous ***"Wieliczka" Salt Mine*** is located 10 km south-east of Krakow city center. This mine consists of 9 levels and 245 km in total of galleries, where the deepest point is 327 meters beneath the surface. Over more than 700 years, 26 shafts were struck in Wieliczka and 9 million m^3 of post-excavation voids were drilled.

Fig23: "*Wieliczka" Salt Mine.*

During the Miocene the area extending along the present-day arc of the Carpathian Mountains from Silesia in Poland to the Iron Gate in Romania, was a shallow marine basin with very high salinity. Under these conditions slow precipitation of salts took place accompanied by evaporation caused by the dry climate. Due to the dry climate, the erosion of the coastal parts of the basin was more intense having as a result that more terrigenous material was supplied and precipitated along with the salts creating salt beds of different purity. The saline sedimentation in the Carpathian Foredeep probably lasted at least 200,000 years. Deposits that were formed in the Carpathian Foredeep extend over

a length of 300 km and width of 100 km. These also include the Wieliczka deposits, which stretch for 10 km in length, with a width from several hundred metres to 1.5 km.

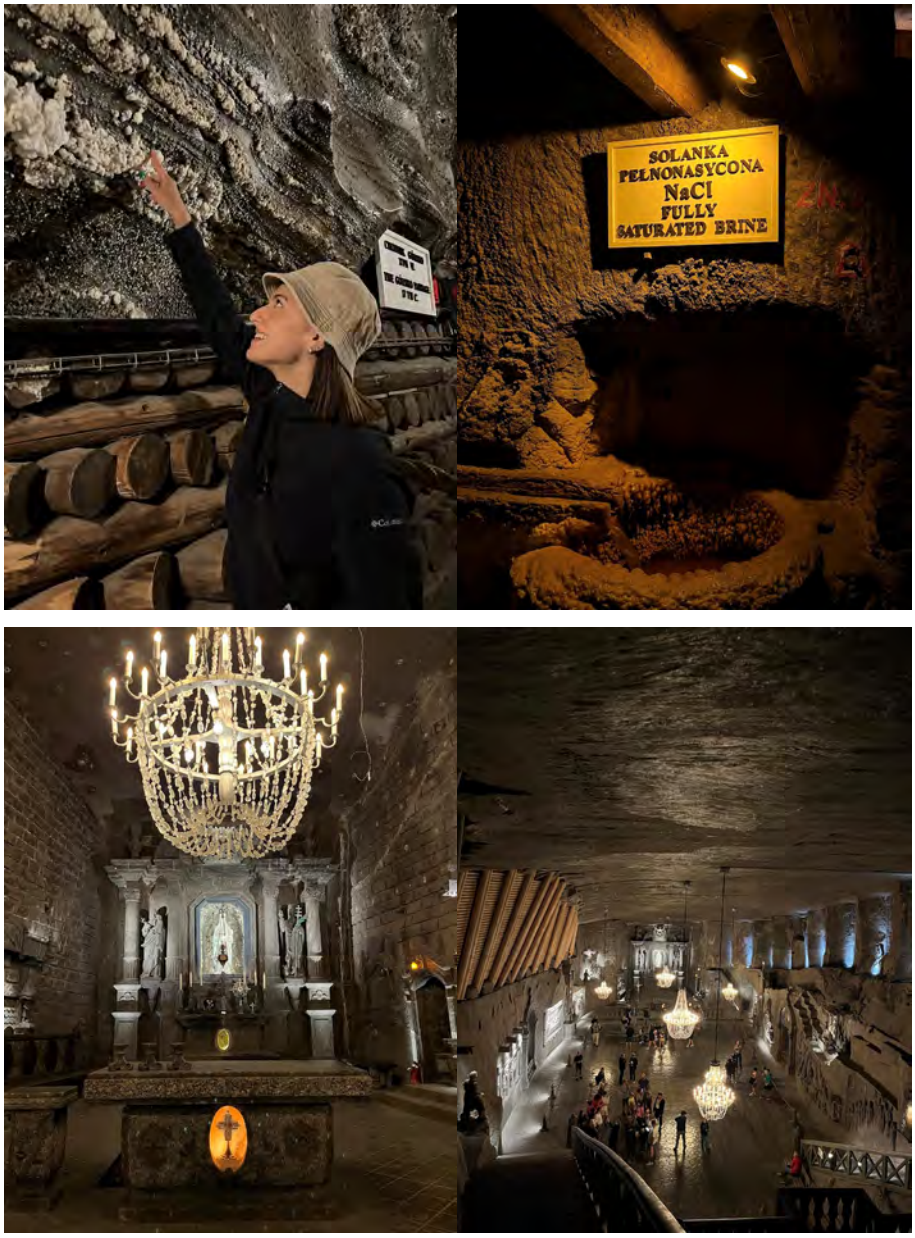

Fig24: *"Wieliczka" Salt Mine.*

Concluding, the UPatras Geo-Mining Field Workshop: Silesia Poland 2022 was a quite comprehensive field trip that fitted well with the curriculum of the Department of Geology. The covered subjects included Ore Geology, Exploration and Mining Geology, Metallurgical and Exploitation Principles, as well as Introduction to Mining Heritage and Geo-touristic management.

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