

18°0'

18°12'

18°24'

18°36'

18°48'

50°24'

50°17'

50°10'

50°2'

49°55'

49°48'

49°41'

49°34'

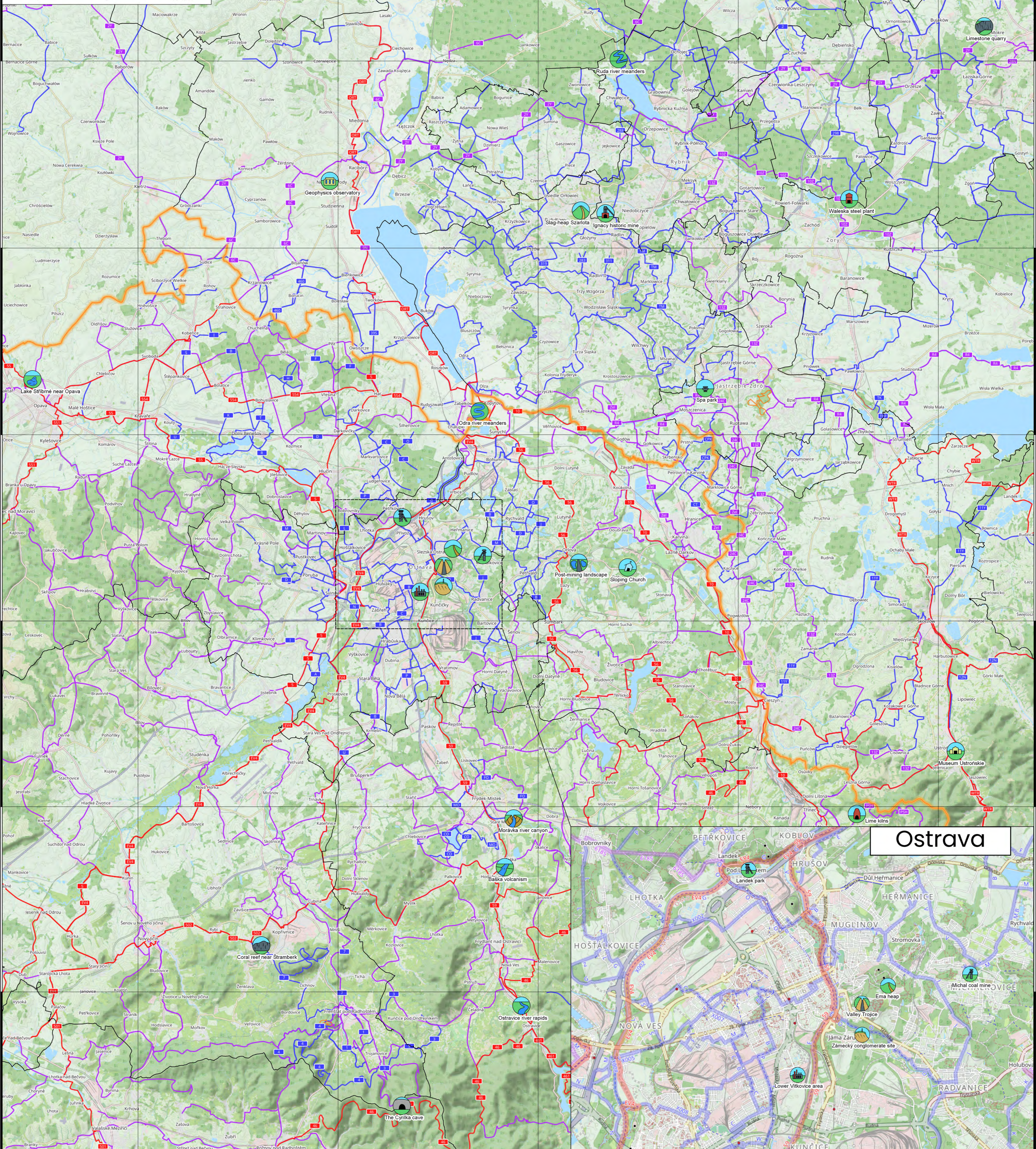
LEGEND

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- Cycle paths
- Local bike route
- National bike route
- Regional bike route
- State border
- First class road
- Highway
- Second class road
- District boundary

1:200 000

0 5 10 km



Ostrava

# GEO-MINING HERITAGE

of the  
Upper Silesian Coal Basin



## 1) Lake Stříbrné near Opava

One of the most popular tourist sites in the Opava region, the natural swimming pool Stříbrné jezero was created by flooding a gypsum quarry. It is located northwest of the town of Opava in its immediate vicinity, in the picturesque part of Kateřinky behind the left bank of the river Opava. The lake is almost 600 meters long, 200 meters wide, the maximum depth is 18 meters, the area is 6 hectares. For residents of Opava and its surroundings, it is a popular recreational location, which is located near Městské sady and is easily accessible by public transport. The lake is used for recreation, swimming and fishing. The shores of the lake form grassy beaches. There is a fenced asphalt playground and two beaches in the area of the swimming pool – one with a gravel entrance to the water, the other sandy near the restaurant. In these years, the entire area of the lake and the surrounding area will be revitalized, thanks to which it will turn into a modern recreational place. The lake awaits earthmoving works and landscaping, including modifications and strengthening of its shores, construction of the necessary distribution networks, such as sewage, water supply, public lighting, access sidewalks and water entrances. A new transport infrastructure will be created, the bridge over the Opava River with a footbridge will connect the flooded gypsum quarry with Městské sady, and an underpass will also be built under Řovníčků Street. At the water area itself, a children's area with a paddling pool and attractions for the little ones will grow up. A new cycle path is planned, too. Silver Lake is also used for sport fishing all year round. The quality of the water in the lake is monitored throughout the year by hygienists, who rate it as good.



## 2) Coral reef near Štramberk

From a paleontological point of view, the area of Štramberk represents one of the most significant European Mesozoic sites. From the geological point of view, it is a specific area formed by several tectonic fragments of the Štramberk Limestone (the bodies of Bláň Hora, Štramberk, Kotočův, Holivčák and Zentkova are distinguished) and occurrences of genetically related Cretaceous rocks. The Štramberk limestones (named after Štramberk) are limestones with high calcite content, that represent parts of the original reef complex. The Štramberk limestones are of Jurassic to Lower Cretaceous age. The limestones contain abundant fossils. Almost all the main groups of Mesozoic invertebrates have been found here, and more especially: brachiopods, corals, crinoids, crabs, gastropods, bivalves, cephalopods, brachiopods, crinoids, echinoids, teeth of fish-like vertebrates, etc.). More than 600 faunistic species have been described from the Štramberk limestone since the beginning of the 20th century.



## 3) Gliwice canal

The Kłodnicka Canal is one of the oldest inland canals, built in 1792–1822 and operating until 1937, when it was used to transport coal. Currently, the remains of this facility are practically inaccessible due to the construction of the Drozowa Trasa Średnicowa (central highway) in the channel bed. In the 1930s, a new Gliwice Canal was built, parallel to the Kłodnicka Canal, which was one of the tourist attractions on the Industrial Monuments Route.



## 4) Geophysics observatory

The observatory is located in a wooden building built in 1927 in a modernist style and is situated on a brick basement. The design of the building was made by Konrad Wachsmann, a well-known German architect of Jewish origin. The observatory has an exhibition part with the oldest measuring equipment (including seismometers constructed by Moink), pendulum clocks, galvanometers, paper tapes used in the oldest recorders (soot-covered and preserved in a spirit rosin solution) and archival seismological records from various sides of the world.



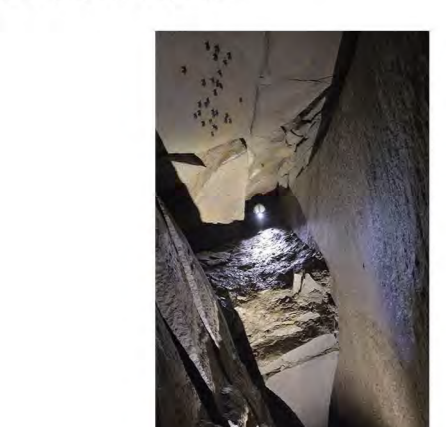
## 5) Landek park

The largest mining museum in the Czech Republic (the so-called Landek Park, operating since 1993) is located at the southeastern foot of the Landek Hill, which lies above the confluence of the Odra and Ostravice rivers. Landek Hill was declared a National Natural Monument in 1993. It is a world-famous locality in terms of geology (outcrops of carbonaceous coal seams to the surface), archaeology (Roman hunters' settlement, Venus Landek), history (Slavic fort, castle of Opava princes), natural sciences (Lilium martagon), spotted woodpecker (Dendrocopos sp. (Crex crex) and mining (Anselm Mine). The connections between the Mining Museum as a technical monument and the Landek Hill as a National Natural Monument with rich vegetation and animals gives this locality a unique opportunity. Unique mining exhibition is situated in adits driven in Albert and František layers of a real historical mine, where visitors dig a mining pit in the original mining cage. After digging underground (albeit only to a depth of 12 m) and disembarking from the cage, a quarter of kilometers of corridors await visitors. Methods of coal mining until 1990 contain, among other things, a demonstration of the operation of some mining machines in imitations of working workplaces. In life size they show the conditions under which the mines were working. The exposition of mining transport has also been open since 2012, which, among other things, offers a ride on an original mining train through the historic courtyard of the complex.



## 6) Cave Cyrilka

At 552 m in length, the Cyrilka Cave is the longest crevice-type cave and the second longest pseudokarst cave in Czechia (after the Teplička Cave in the Adršpach-Teplička Rocks with a length of 1095 m). It is located ~400 m from the Pustevny, a mountain saddle being part of the Radošov Ridge within the Moravosileské Beskydy Mts. As the most of the so called pseudokarst caves in this area, also the Cyrilka Cave was created due to slope deformations, i.e., sliding movements of rock blocks and soil. Therefore, its genesis represents completely different way from the karst processes that have created most of the caves in Czechia. The cave is developed within the headscarp area of extensive landslide, which affects a large part of the ridge and its eastern to southern slopes. Below the rocky outcrop, which is more than two meters high, lies a small entrance locked with bars protecting the wintering bats. The cave with a maximum depth of 160m is formed by a system of irregular corridors stretching in NNE–SSW direction and being perpendicular to the direction of the slope. A rarity of the cave is represented by the occurrence of several small stalactites, whose recent radiocarbon dating revealed a minimum age of the cave corresponding to almost 20,000 years.



## 7) Lower Vítkovice area

The largest industrial monument complex in the Czech Republic, the so-called Dolní Vítkovice (DOV) area, occupies almost 300 ha in Ostrava. The biggest technical attractions include Blast Furnace No. 1 with a modern extension of the Bell Tower, a former gas tank converted into a multifunctional hall called Gong, the former US power plant metamorphosed to the Little World of Technology Museum, the newly built extensive science and technology museum, the so-called Great World of Technology, the mining tower of the Hubina mine and the adjacent pit buildings. These are unique entertainment and educational exhibitions, where you will find only here in Ostrava. Everyone, regardless of age, can be convinced that science and technology can be both fun and creative. Gradually, a unique educational and cultural center for the entire Moravian-Silesian region is being established here.



## 8) Sand quarry Kotlarnia

The mine covers an area of over 1 000 ha. It exploits backfill sands for the needs of hard coal mining. Sands and gravels with localities during larger boulders are sediments of the Riss Glaciation. The pebbles and boulders found here are mainly igneous rocks. This material is not used for industrial purposes, it is only rarely used as ornaments in gardens or parks. An example of such a boulder is a large specimen of graniteid located in front of the Sand Mine in Kotlarnia. It was excavated from the mine excavate and transported to its current location. The boulder is 2.3 m high and 3.3 m long along its longest axis.



## 9) Valley Trojice

Trojice valley is the place where industrial hard coal mining began in the Ostrava region. The peak of the valley's industrialization in the 1930s, where there was not only a deep coal mine, but also a coke plant and related heavy chemical production. The decline in industrial activity at the site began in 1987 with the cessation of coal mining, and subsequently the related technologies were gradually stopped. The factory buildings were demolished, the construction debris was left in place and partially filled the originally narrow and steep profile of the valley. In addition to construction debris, the local morphology is also affected by landslides caused by long-term mining activities. The Burza stream, which originally flowed through the valley, was piped during industrial construction and is not visible in the terrain today. The entire length of the valley is overgrown with overgrown trees, in the part of the valley below the Ema heap there are still visible remains of steel and concrete structures and relics of industrial buildings. Parallel to the axis of the valley, the original 200-meter-high and first-meter-high brick wall, which serves as a supporting function for the terraces, is preserved. On the terraces there are torsos probably of cooling towers of the original coke plant. In this part of the complex there is also an old anti-aircraft shelter and a corridor of a water canal, most likely opening into one of the pits.



## 10) Zámecký conglomerate site

Almost in the city center of Ostrava, ~1 km southeast of the confluence of the Ostravice and Lučina rivers, there are remains of a small quarry, where sandstones were mined for the construction of the nearby Silesian Ostrava Castle. This is where the name of important rock sequence of the Upper Silesian Basin – the Castle Conglomerate Unit – is derived from and it is this unit that is very well exposed by the quarry on the right bank of the Lučina River. The discontinuous rock wall, which is ~10 m high and ~100 m long, exposes only the uppermost part of the Castle Conglomerate Unit. It consists mainly of coarse-grained sandstones with sporadic cobbles, in which quartz predominates. At the bottom of the outcrop, there is a thin coal seam accompanied by gray coal siltstones. The rock outcrops can be interpreted as sedimentary bodies of river channels and sandbars. The locality itself represents the most significant outcrop of the Castle Conglomerate Unit and one of the few outcrops of the Upper Silesian Basin in Czechia, since it is largely covered by Quaternary sediments.



## 11) Ema heap

Heap Ema (sometimes also written as Ema-Terezié or Terezié-Ema) is located in Ostrava on the territory of the Silesian Ostrava district on the right bank of the river Ostravice. It is a conical dump of the former Trojice mine and coke plant (formerly Ema), which is located at the end of the famous Trojice Valley between the former Petr Bezruč, Trojice and Michálka mines. Ema Heap is the only listed dump in the entire Ostrava-Karviná district. In total, the heap houses about 28 million cubic meters of extracted tailings, its area is 92 hectares. With an altitude of 915 m, it is a significant visual feature of the center of Ostrava and also a symbol of the former heavy industry of this city. The heap is a popular tourist destination for the people of Ostrava, even organized trips to it are arranged, for example, the mass New Year's climb to the top is very popular. From the top of the dump, in good weather, there is a beautiful view of the whole of Ostrava and the Pobeškydy Mountains. Thanks to the heat that springs from the mountain, thermophilic flora grows on the heap. There is also a steppe fauna. There is a dense forest on the northern side, the southern side (which is still burning) is still bare and has a subtropical climate, where there is no snow even in the winter months, but grass grows here all year round.



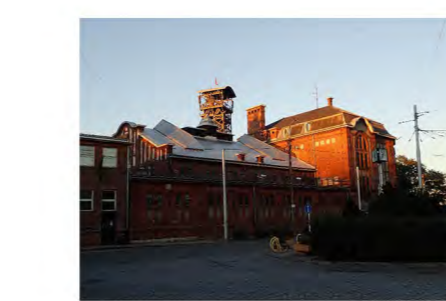
## 12) Odra river meanders

The described section of the Odra River is approximately 7 km long. It starts at the mouth of the Moravian Gate, near the village of Chalupky, and ends at the mouth of the Olza River. In this section, the Odra River marks the natural border between Poland and the Czech Republic. At this point, the river enters a basin stretching between the Eastern Sudetes in the west and a part of the Silesian Upland in the east. Flowing into the area of the Racibórz-Kozelska Valley, the river takes on the features of a typically lowland river, it flows here with a minimal slope, strongly meandering in the further course of the river, below the mouth of the Olza, most of its bends disappeared almost completely as a result of artificial shortening of the riverbed, and therefore the original character of the riverbed itself and the Odra valley changed.



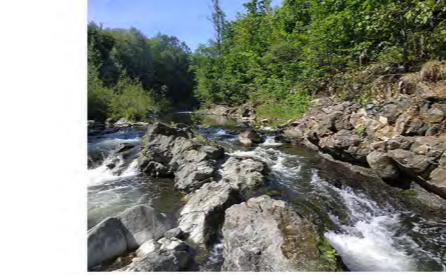
## 13) Michal coal mine

Michal Mine is the name of the now defunct hard coal mine (mining was terminated in 1993), which is located in Ostrava-Michálkovičky. The current appearance of the mine complex dates from 1912–1915, when the mine was fundamentally rebuilt according to the project of architect František Fiala. At the same time, the steam drive of mining machines was replaced by an electric drive. It was a revolutionary solution at the time, which now represents a unique set of electric mining machines and compressors from the beginning of electrification. The whole area was declared a national cultural monument in 1995. The extraordinary historical value of the Michal mine lies, in addition to the architectural quality of the original buildings, also in the original authentic preservation of the entire complex, including technical equipment and quality craft details. The mine is open to the public and is managed by the National Monuments Institute.



## 14) Baška volcanism

The site consists of two rock outcrops. The outcrops contain bodies of rocks of the teshchinite association penetrating clay sediments of the Lower Cretaceous Hradištská Formation of the Silesian Unit. The outcrops of the so-called teshchinite association can be observed mainly in the outer part of the Silesian Unit in a zone about 10 km wide, which stretches from Hanice in Moravia through Frydek-Místek, Český Tešín to the vicinity of Bielek-Blažka. The rocks of this association consist of bedded veins, effusions, and products of volcanic explosions. Their thickness varies from a few centimetres to a few tens of metres. Mineralogically and geochemically, they correspond to very diverse igneous rocks (picrite, teshchinite, and monchiquite) and are strikingly similar to basalts, basanitoides, and nephelinites. The composition of these rocks is influenced by admixed crustal material and magmatic differentiation. The volcanism, which probably originated in the upper mantle, reflects the early and short-lived formation of subsidence structures in the deep basin. Mineralogically, the described volcanites are interesting for the occurrence of cavity minerals (zeolites, calcite, barite, chalcocyanite, rarely also prehnite and pectolite).



## 15) Morávka river canyon

The locality called the Morávka Canyon can be found in the lower part of the Morávka river basin, in the Podbeskydská pahorkatina. The locality lies on the river kilometer 11–115 at altitudes of 298–380 m above sea level (between the city Frydek-Místek and the so-called Zármanický ležec). Morávka is a third-order watercourse flowing within the Odra river basin and the Baltic Sea basin. The total length of the stream is 29.4 km. The Morávka River drains the northwestern part of the Moravian-Silesian Beskydy Mountains, which belong to the flysch zone of the Outer Western Carpathians. The subsoil is built rhythmically with alternating positions of claystones and sandstones. The Morávka River creates extensive accumulations of gravel alluvium in its floodplain, in which, especially during major floods, it changes the course of its bed. The riverbed reaches a width of up to 150 m. The vegetation cover of the floodplain consists mainly of floodplain forests. In the more remote parts of the floodplain there are settlements and arable land.



## 16) Ostravice river rapids

The Ostravice riverbed represents a unique geological outcrop at the interface between the lower Sub-Silesian and the fossil overlying areas. 134 meters in the lower part, the contact between the Sub-Silesian and Silesian Nappas is exposed on both sides of the riverbed in the so-called Frydantský tectonic window. The contact zone (tectonic mélange) is clay-like, over 2 m wide. The Sub-Silesian Unit is represented by grey calcareous dusty claystones of the Frydek Formation (Upper Cretaceous).



## 17) Slag heap Szarlota

The pile of post-mining waste was created at the Rydlutovský hard coal mine. It is one of the highest slag heaps in Europe – from the base to the overlying approx. 134 meters in the lower summit is approx. 406 m above sea level. It covers an area of 37 hectares and has a volume of 13.3 million m<sup>3</sup>. It is partially covered with vegetation and is the dominant element of the landscape. The view from it is very extensive, however, entering the heap is forbidden due to the harmful vapors that come out of the waste material. By 2024, the lower part of the heap is to be removed.



## 18) Ignacy historic mine

The historic Ignacy Mine is a complex of buildings of the former Hoym mine, with the "Głowacki" and "Kosciuszko" shafts. There are two working steam engines from the years 1920 and 1920 in the facility. In addition, visitors can enter the water tower (46-meter-high) renovated thanks to the financial support of the European Union and the Regional Development Fund. It offers a magnificent view of the entire Rybník district. The historic Ignacy Mine is part of the Industrial Cultural Center in Rybník Nowiadom.



## 19) Ruda river meanders

The sources of the Ruda River are located in Baranowice near Żory, at an altitude of 235 m above sea level. The river, flowing through Rybník, collects waters from the Boguszowice, Nacyno and Przegorza streams. In the Rybník district of Stodoty, the waters of the Ruda River were dammed up for the needs of the Rybník Power Plant, forming a reservoir with an area of 4.6km<sup>2</sup>. After leaving the Rybník Reservoir, Ruda forms natural bands. The meanders are about 3 km long. You can see them about 300 meters from the road.



## 20) Sloping church

Church of St. Peter of Alcantara is known as the "sloping church". The exceptional object was created as a consequence of massive surface subsidence due to intensive mining activity. During about 150 years of mining activity, coal from 27 seams with a total thickness of 47 meters was mined in its subsoil and in the immediate vicinity. As a result, the original altitude of the church decreased by 36 meters and the church tilted 6.8 degrees south of the vertical axis.



## 21) Exploitation of siderites

The basis for the development of mining and iron ore metallurgy in the areas belonging to the Cistercians were Quaternary bog ores in the area of the Bělárvka and Ruda river valleys. These were accumulations of oxides and iron hydroxides (mainly ironite) of organic origin – quite poor ore, but easily available. What distinguishes the raw material mined in the vicinity of Stanica and Sošnicowice is its age and genesis. Here, the Miocene clay siderites were mined there. They appear in the form of lenses within the Upper Miocene sediments, formed as gray clays with sand inserts. The thickness of these sediments ranges from a few to several centimeters, with a total thickness of 10–40 cm. The iron content in the ores is 28–37%.



## 22) Post-mining landscape

The Upper Silesian coal basin has an approximately triangular shape, which extends with its southwestern promontory from Polish Silesia to the Czech Republic and has an area of approximately 1500 square kilometers. The total area of hard coal mining areas, i.e. the area potentially affected on the surface by the mining of this mineral, changes over time. However, it can be estimated that at least 300 km<sup>2</sup> will be significantly affected by mining activities. Mining affects the landscape not only through industrial facilities, such as the mines themselves and related infrastructure, but also through significant morphological changes, especially the creation of heaps and sinkholes. From this point of view, the most affected area within the original Ostrava-Karviná district is the Karviná sub-basin, where in some places they reach depths of up to 40 m against the original terrain. The reason is the recent cessation of mining activities at most mines, more than two hundred years of mining history and, last but not least, the thickness of the mined seams, which is significantly larger compared to the Ostrava part.



## 23) Spa park

The Dr Mikolaj Witczak Spa Park is the main attraction of Jastrzębie-Zdrój. The Park, founded by Count Felix von Königsdorff in the 1860s, was one of the most important elements of the resort. Spa Park was originally the central point of the Jastrzębie-Zdrój sanatorium. Currently, there are historic sanatorium facilities in the park, including a spa house, a concert bowl, bathrooms and a pump room. In the building of the former Łazienki, from 1912, there is now a City History Gallery (with a recreated Silesian hut with full equipment and a blacksmith's workshop, as well as numerous temporary exhibitions). Following the example of the former walking colonnade, the inhalatorium was rebuilt in 2015, resembling a characteristic wooden promenade. Today it uses brine from Zabłotice, where it has been extracted from the "Korona" borehole since 1892. In front of the inhalator there is a characteristic sculpture from the 1960s called "Duet".



## 24) Historic waterworks

Historic Water Supply „Zawada” in Karłowice is part of Górnośląskie Przedsiębiorstwo Wodociągów S.A. with headquarters in Katowice. It is a complex of steam pumping devices and boilers from the 1920s, entered in 1991 in the register of monuments of the Silesian Voivodeship. It is the oldest water supply station in Silesia. It was built on the initiative of the Prussian government in 1895 to help solve the pressing problem of drinking water supply to emerging plants and growing cities and settlements in the western part of the Upper Silesian Industrial District. The station was expanded and modernized many times, and until 1987 it was based on steam-driven pumping units produced in huge boilers. Today, crystal clear water is drawn from, among others, deep well bored in 1882, to a depth of approx. 200 m. Now water is pumped to recipients by modern electric units. By a happy coincidence and the efforts of successive generations of employees of Zawada Station, monumental historic devices from the steam era have survived to modern times and since 2004 are open to the public.



## 25) Waleska steel plant

The brick building with a square tower with four floors, preserved to this day, built in 1930, 15 meters high, is the hoist tower of the "Waleska" steelworks operating here in the first half of the 19th century. The tower, called the "gichta", was used to pull up, with a manual or horse crane, the raw material – i.e. bog iron, charcoal and fluxes – to the appropriate height to charge a nearby cylindrical blast furnace. The word "gichta" in the language of Żory founders meant a charge consisting of the above-mentioned ingredients. The building was erected in the 1830s on a square plan. The walls are almost a meter thick, and the dimensions inside the building are 810 by 775 cm.



## 26) Lime kilns

In the village of Vendryně, there is a technical monument of lime kilns. Their origin dates back to the beginning of the 19th century when a thorough geological survey of the Carpathian slopes was carried out to find iron ore deposits for the needs of local iron-works. Ore was mined in the territory of the village, first for the ironworks in Ustroń and later for the newly established ironworks in Třinec. Limestone was also mined in Vendryně in three quarries then and burnt in the two lime kilns mentioned above. The kilns were finally closed in 1985, and mining in the adjacent limestone quarries was also stopped at this time. The older stone kiln is more than 9 m high and is made of stone up to a height of 5 m, while the rest is made of bricks. The diameter at the base of the structure is almost 4 m, and three steel hoops ensure the stability of the kiln. The younger brick kiln is over 10 m high, with a diameter of over 3 m at the base, and ten steel cables provide stability. Unlike the older kiln, the approach ramp and the trolley have been preserved here.



## 27) Maciej shaft

The Maciej Shaft is a historic mining plant of the former Concordia Mine. The biggest attractions of the Maciej Shaft include: the preserved buildings and equipment of the former mining plant from the beginning of the 20th century, an exhibition of active devices and equipment of the former mine, and a viewing platform. The facility has been transformed into a tourist, recreational and cultural complex with a rich gastronomic offer. The tour is guided.



## 28) Queen Luise adit

The Queen Louise Adit is a combination of two historical mining sites: the Main Key Hereditary Adit (the longest hydraulic engineering building in the European coal mining) and the Queen Louise Mine. The attractions include: an underground park of mining machinery, located in the former mine workings, a water route and an extensive ground space with thematic amusement and educational parks. The Queen Louise Adit is part of the Coal Mining Museum in Zabrze. The adit is an outstanding engineering work that documents the level of technology development in the first half of the 19th century in the field of underground construction. Thanks to the appropriate availability, it is now possible to sail on boats for a distance of approx. 1100 m. In the underground loading part within the coal seam 509, tourists can see how the Adit was used in the past to transport coal by water.



## 29) Museum Ustrońskie

The Jan Jarocki Ustrońskie Museum in Ustroń is located in the historic building of the management of the former "Klemens" steelworks, dating from the turn of the 18th and 19th centuries. Since 1986, the Museum of Metallurgy and Forging has been operating here (Ustrońskie Museum since 2004). The museum is named after Jan Jarocki, a long-time director of Zakłady Kuznicze, who for many years secured the exhibits and documents for the collections. In addition to the technical exhibition, collections of culture and folk art of the region are presented here. There is a small industrial and agricultural open-air museum next to the museum building.



## 30) Limestone quarry

The name of the Violet Mountain (Fialkowa Góra) comes from the violets that bloom in spring. The hill is made of limestones of the Gogolin layers. These limestones were the raw material for lime burning, as evidenced by a large number (5) of limestone kilns preserved on the outskirts of the quarry. Limestone kilns are stone and brick buildings, used in the eighteenth and nineteenth centuries for calcinations of limestone, although until the early 1980s the exploitation continued. The quarry has an amphitheatrical shape. The walls are 20 meters high and are quite well preserved, especially the western wall. The workings are deserted and overgrown, but you can find fossils characteristic of Upper Triassic carbonate deposits (avonites, shells of corals, brachiopods, fish teeth, or small reptile bones). There are deposits of the Middle Triassic – lower Muschelkalk. The lower Muschelkalk consists of the Gogolin layers and ore-bearing dolomites. The Gogolin layers exposed in the quarry are composed of yellow-gray limestones, marly limestones and marls with a total thickness (in full profile) of 40–45 m and of not very high quality.

