

Cyprus Copper Itinerary

A tour through the heart of Cyprus

A Self-Drive Tour - Route 1



Cover: Rebuilt Copper Smelting Furnace No. 8 from Agia Varvara-Almyras. This is the best preserved copper production unit in the entire Near East.



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Copper: **its discovery and significance in shaping the history of the island of Cyprus**

Cyprus, the third largest island in the Mediterranean after Sicily and Sardinia, was for many centuries the largest producer and exporter of copper to the ancient world. Pure copper or its alloys were a basic material needed for the development of large civilisations around the island. Without doubt, Cyprus with its copper contributed to the technological progress of the entire Mediterranean world and beyond.

The creation of the island began approximately 90 million years ago in the sea floor of the ancient Tethys ocean. Extensive submarine volcanicity along the spreading axis of the sea floor permitted sea water to percolate into the deeper parts of the ocean floor close to magma and was as a consequence heated up to approximately 320 degrees celsius. This superheated water leached metallic elements from the rocks and was returned to the ocean through so called 'Black Smokers' where these elements were deposited to form the ore bodies, dominated by the copper and iron minerals we see now.

Fig. 1





Fig. 1: Troodos mountains

Fig. 2 : Colourful gossans

Over geological time the Troodos mountains rose out of the ocean exposing these deposits to weathering and gradual oxidation of the upper parts of the sulphide ore bodies. The minerals leached out during this process tended to percolate down towards the water table, forming the rich secondary enrichment zones seen in the mineral deposits. These ore bodies are found in the pillow lava areas located at the periphery of the Troodos ophiolite and are notable for the impressively coloured gossans covering them; these range in colour from red to yellow and doubtless helped ancient miners identify likely ore deposits.

The size of the copper ore-bodies ranges from 50,000 to 17 million tons. Chemically they consist mainly of iron, sulphur, copper and small amounts of zinc. Their average copper content ranges from 0.5 to 4.5 per cent; in some secondary enrichment zones, copper contents can be as high as 15 per cent (“Cyprus, Copper and the Sea” by G. Constantinou 1992).

Fig. 3



Fig. 3: Slag heaps

Fig. 4 : Wheeled copper stand

Some of the earliest references to Alashian/Cypriot copper export were found in cuneiform tablets from the ancient kingdom of Mari (modern-day Syria) and are dated to the 18th century BC.

It is well known that Kypros, Cyprus gave its name to copper. During the Roman period, copper was known as “Aes cyprium”, aes meaning copper or alloy and “cyprium” denoting its provenance. In other words copper is the metal from Cyprus. Eventually the term Cyprium was used alone and even later it was changed to cuprum. It is from this Latin word that the name for the metal in most western European languages is derived.

The most important evidence for the extent for the copper mining activity in antiquity is the number of slag heaps found scattered in the pillow lavas of the Troodos ophiolite – as many as 100 are known to exist. These heaps comprise an estimated 4 million tons of slag (fig.3). Slag is the waste product resulting from the smelting of copper ores and these deposits were produced over the course of approximately 3,000 years as a by-product of the extraction of 200,000 tons of copper.

Fig. 4





Fig. 5

The Troodos forests provided the large quantities of charcoal required for the metallurgical processes. For every kilo of copper produced, 300kg of charcoal are required. This resulted in the destruction of a large part of the island's forests in the pursuit of copper.

The prevailing opinion amongst archaeologists is that the copper extraction activity began as a by-product of ancient Cypriots' exploration of the valleys running down from the Troodos, already the source of natural pigments and picrolite, a soft light green stone used to produce figurines and jewellery. It is suggested that in their search for ever-larger pieces of picrolite, ancient Cypriots explored further up the valleys and eventually reached the areas of the brightly-coloured gossans which signify the presence of high concentrations of copper minerals. It is possible that at this time they would have discovered native (metallic) copper and been drawn to excavating further into the gossans until they found the shiny ore mineral. Archaeological excavations have brought to light copper objects including hair spirals, earrings, and tools such as chisels which are dated to the 4th millennium BC.

Fig. 5: Troodos mountains
Fig. 6: Skales needle



Fig. 6



Fig. 7



Fig. 7: Copper ingot in the shape of an oxhide, Bronze Age

Fig. 8: God of Ingot, Engomi Bronze Age

Fig. 8



Further experiments led to the development of the smelting and alloying processes and the large-scale production of copper began. Copper was discovered much earlier in other parts of the world but not in concentrations that would make its production and trade worthwhile. Cyprus was ideally located and Cypriots became experts in pyrometallurgy, alloying processes and seafaring thus becoming masters in the trade of copper in the ancient world. Cypriot coppersmiths produced some of the finest copper objects and bronze work in the Eastern Mediterranean in pre-historic times. Much research is still being carried out by the University of Cyprus, and others that will enable us to establish more of the details of the extraction and processing methods of the past.

In the Late Bronze age (1600 BC-1050 BC) copper was shipped from Cyprus in the form of 'ox hide' ingots of raw copper weighing between 22 kg and 29 kg .This shape of ingot was used for approximately 500 years between 1600 BC and 1100 BC. Hundreds of these copper ingots (fig. 7) have been found either in shipwrecks or at archaeological sites all over the Mediterranean and beyond.



Fig. 9

Fig. 9: Idalion tablet,
Classical Period
Fig. 10: Goddess, Engomi
Bronze Age

Tablets excavated at El Amarna, Egypt provide another significant source of information and describe in great detail the export of copper to Egypt by the kings of Cyprus during the 14th century BC.

The abundance of copper votive figures and statuettes of gods and goddesses (fig. 8) found in copper mines and temples at the archaeological sites of Kition and Engomi reflects the significance of copper to the Cypriot economy and religious culture. Many ancient trading civilisations came to the island because of its copper wealth, and colonisers such as the Phoenicians and Romans developed the mines at the archaeological sites of Tamasos and Soli.

A new wave of exploitation of the mineral resources started in the early 20th century with the arrival of people looking for undiscovered copper minerals. Some of the companies that operated copper mines in the 20th century are: Cyprus Mines Corporation, Hellenic Mining Company, Kampia Mines, Cyprus Sulphur and Copper Corporation, Hellenic Copper Mines and the Hellenic Company of Chemical Products and Fertilizers.



Fig. 10



Fig. 11: Skouriotissa copper mine

Fig. 12 : Copper cauldron, Archaic Period, Salamis

Currently, the only copper production comes from Skouriotissa copper mine controlled by The Hellenic Copper Mines who started the latest phase of production in 1996 (*look for more information at the Skouriotissa copper mine on page 18).

During the last decade, the international community has shown renewed interest in the country's mineral reserves. The Republic of Cyprus Mines Service has already issued 30 permits to prospectors for copper and gold on the island and more applications are under examination.



Fig. 12



Detailed itinerary

Fig. 13: Horned God, Engomi Bronze Age

- Lemesos to Lefkosia highway exit at Sia/Sha
- Sia/Sha to Sia gossans
- Sia/Sha to Mathiatis South Copper mine
- Mathiatis South to Mathiatis North Copper mine
- Mathiatis North Copper mine to Ayia Varvara Almyras copper mine and site
- Ayia Varvara Almyras to Katydata and Skouriotissa

***Side Trip:** Find the highway to Lefkosia for optional visit to the Cyprus Museum to admire some of the sculptures/artefacts in relation to copper and the Troodos geology.

Address: 1, Mouseiou street

Tel: +357 22865854 or +357 22865888

Opening hours: Tues, Thu, Fri: 8 -16hrs, Wed: 8-17hrs,

Sat: 9-16hrs, Sun: 10-13hrs, Mon: Closed



Fig. 13



Itinerary:

Start your journey in Lemesos or Larnaca

- Drive along the Lemesos – Nicosia/ Lefkosia highway (A1). Take the Sia/Sha exit.
- For visitors coming from Larnaca: Take the road to Kalo Horio village (E 104), then Psevdas, Mosfiloti and Sia/Sha villages.
- Drive along F104 from Sia /Sha to Mathiatis. A few kilometres outside Sia/Sha you can admire the bright yellow and brown gossans (iron cap), typical of the areas where there is copper mineralisation. Two open cast copper mines lie on the left-hand side of the road a short distance from each other but not easily accessible. Find a spot to park your car and walk around to study the rock formations. Later on you will have the chance to admire many gossans.

Village information:

Sia/Sha is a small settlement of a few hundred inhabitants which exists since at least the Byzantine period under the name of “Ossia” meaning shade in the Cypriot dialect. It appears on medieval maps as Sia or Saia.

Many old traditional buildings survive in the centre of the community and you may find it tempting to have a short walk and have a sip of Cypriot coffee.

Safety Advice: All abandoned copper mines have been out of operation for some time now but are more or less accessible. Make sure to stay a safe distance from steep and fragile edges and avoid entering any abandoned galleries and deep excavations as you may cause the collapse of the roof. It is not recommended to enter any of the lakes that form after the extraction of the mineral as the water is toxic and may cause allergic reactions. Particular attention is required if you have children with you. Also have in mind that most of the copper mines are accessible via loose surface roads for the last part of the journey (0.5-2 km) which may deteriorate during the winter/rainy season.

Starting your journey in Lemesos:



Starting your journey in Larnaca:



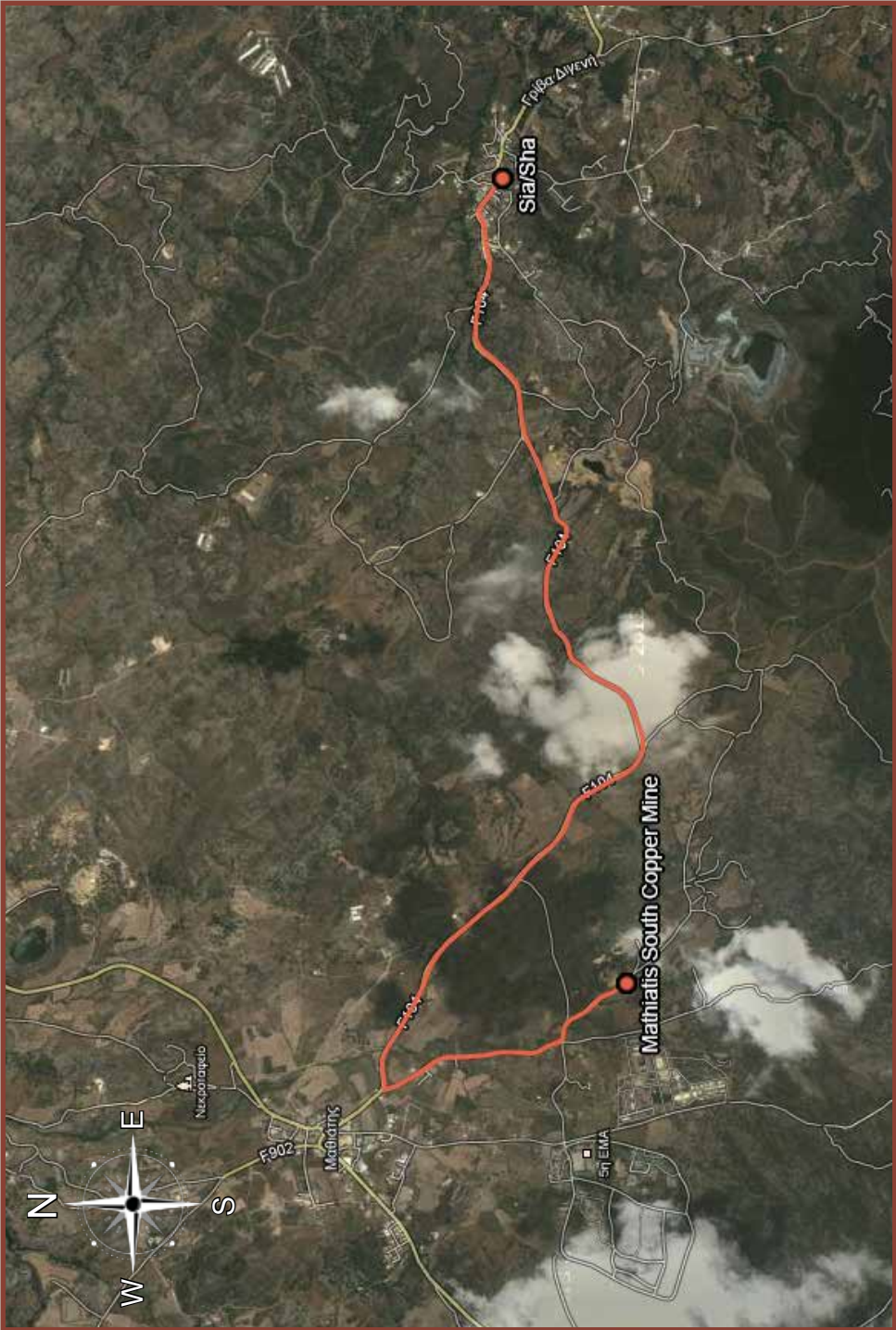


Fig. 14



- Drive towards Mathiatis village, after passing next to an old wind pump you will find a turning on your left with the sign of the church of Ayia Irini Chrysovalandou. Follow the dirt road for about 1 Km, then turn left and then take the first turning right. You are heading for the highest mountain of the area. Before reaching South Mathiatis copper mine there are pine trees and plenty of space to park and start your exploration. You will be guided by the bright colours of the gossans to find the lake of the copper mine. *

- Drive through Mathiatis village and drive in the Ayia Varvara direction. One and a half kilometres up the road there is partial view of the North Mathiatis open Cast Copper Mine on the right-hand side.

Fig. 14: South Mathiatis copper mine

Village information:

Mathiatis village appears on medieval maps as “Matiati”. Scholars N. Clerides and S. Menardos believe the name is derived from the name of settlers originating in Amathkies of Tylliria area.

The main church of the village is dedicated to Saint Paraskevi and dates to 18th century with 16th century elements. The village is home to 856 inhabitants.

***Mathiatis South Copper Mine** dates back to archaic period and provides excellent view of gossans and ancient galleries depending on the water level in the lake. In the deepest part of the lake there are many ancient galleries. In the upper part of the mine there are tunnels which give you a good idea of how the work was carried out in more recent years. Apart from the bright gossans (iron cap) you may come across small stones that look like crystals (gypsum) which occur naturally in such rock formations. The mine is thought to belong to at least the archaic period as a furnace discovered there was dated to that period. In recent history it was operated by CMC between 1934 and 1944 to produce copper and small amounts of gold and silver.



Fig. 15

The North Mathiatis Copper Mine: Colourful rock formations will help locate the mine which has left a deep lake after many years of mineral extraction. Visitors can park near the fenced entrance of the copper mine, open the gate and walk around the deep lake with great care. Recent investigation has shown that the copper mine dates back to second millennium BC. It is generally believed that the older slag has been removed, causing the destruction of inferior layers with older buildings and/or a settlement.

Research in modern times started in early 20th century under British rule. In 1965 The Cyprus Mines Corporation (CMC) gave its rights to The Hellenic Mining Company who continued the extraction of the mineral up to 1987 and produced approximately 70,000 tons of copper from the 2 million-tons of ore that was extracted from the area.

- Drive further North towards Ayia Varvara village. Coming from Mathiatis village, a kilometre before reaching Ayia Varvara village and near the olive oil factory, take a right turn towards a builder's yard concealed by the mountain on the right hand side, drive past the yard and follow the road to the 4 silos nearby. Take a right turn in front of the 4

Fig. 15: North Mathiatis copper mine

Fig. 16: South Mathiatis copper mine

Fig. 16





Fig. 17

silos. At the T-junction take a right turn again and drive for approximately 1 km. On the left hand side going upwards, there is a short track leading to a small valley where the Almyras copper mine and workshops are.

(If for any reason you are coming from Ayia Varvara going towards Mathiatis take a left turn after the brick factory and follow the instructions as above.)

Ayia Varvara Almyras Copper Mine and site:

Ayia Varvara Almyras is situated South of the village of Ayia Varvara in Lefkosia District in the pillow lavas of the eastern Troodos mountains. It is a unique archaeological site in Cyprus where all stages of the production of copper have been found: Many small veins of chalcopryite copper mineral were accessible via a shallow pit (which may be flooded in winter months), and the different types of furnaces, roasting pits, single and double smelting furnaces, were found as well as dwellings and a domestic oven where a small group of people could live and work. The discovery of a certain number of oil lamps may indicate the possibility of all night work on the copper production, the furnaces and the mine gallery, in order to accelerate production, although the site suggests a rather small scale operation.

Fig. 17: The shallow Almyras pit mine flooded during the winter months

Village information:

Ayia Varvara is a small but fast developing community due to its close proximity to Lefkosia/Nicosia. You can admire modern buildings but will be surprised to discover some very old traditional houses including the Proto-industrial workshop otherwise known as 'O mylos tou Mastre Gliori' on 28, G.Papaflessa street used for cultural events. It was once a most impressive workshop where all the machinery was designed by Mastre Glioris. For events and opening hours contact the community board on the following telephone numbers:

+357 22521715 or

+357 22441151

Address: 6, P.

Papagathangelou Street

2560 Ayia Varvara

E-mail: ayiavarvaranic@

cytanet.com.cy



Fig. 18

Additionally, the discovery of two human shape figurines may well be indicative of rituals to do with copper production as this was also evident in other areas of copper mines or copper workshops. All findings at Almyras date between 600 and 150 BC. The archaeological excavations between 1988 and 2001 were led by Walter Fasnacht from the University of Zurich, Switzerland.

Fig. 18: A reconstructed artistic view of the smelting site of Almyras, as operated around 400 BC.

Fig. 19: A reconstructed smelting furnace from Almyras approximately 1:1, ca. 90 cm high, with a pit in front for the tapped slag.



Fig. 19

The site is open to the public although the furnaces and dwellings are fenced off but visible from the path which leads to the copper workshop site and the mine. Outside the fenced area the remains of a reconstructed furnace can be seen so particular care is required when walking around that area.



Fig. 20



Fig. 20: Katydata mining museum (outside & inside view)

Village information:

Katydata village a small community of 114 inhabitants in the north west Troodos Range at an altitude of 275 m above sea level, in the valley of the Karkotis river. George Hill (1949) believes it was inhabited since early Bronze Age. Its name indicates the existence of abundant water flowing around it. Katydata is situated very close to Skouriotissa copper mine which is the site of an older copper mine by the name of Voucassa or Foucasa known to Homer in the 8th c. BC.

Charles Gunther looking for copper mines came through Katydata and discovered the old slag heaps in 1913 which he called "Katydata copper mine" which changed hands and names many times since.
<http://www.wikimapia.org/1714425/Katydata>

- To reach your next point of visit **Katydata village**, continue your journey by driving through Kotsiatis, Marki and Tseri villages (F103), then E 901 and then get on to the Lefkosia –Troodos road (A9) that goes in the direction of Kokkinotremithia and Akaki villages. Just before reaching Akaki at the roundabout get onto the B9 and go towards Peristerona and Astromeritis then follow signs to Evryhou. About 13 km after Astromeritis there is a junction to go to Linou and then Katydata village.

At Katydata village you can visit the Museum of Mining Heritage. **For visiting the museum you need to call Mr. Andreas on +357 99348013 at least one day before to book an appointment.**

The Museum of Mining Heritage in Katydata village
 1, Palaïou Scholiou Street Tel/Fax: 22932560

In the village the newly established Museum of mining heritage will give you a good idea about how copper mines looked, what the copper miner's tools were and what artefacts and sculptures were produced over a timeframe of 5000 years of copper history on the island. The museum is situated a short distance from the church of St John. It is housed in an old building that was originally used as the courthouse. Among the models of ancient



Fig. 21

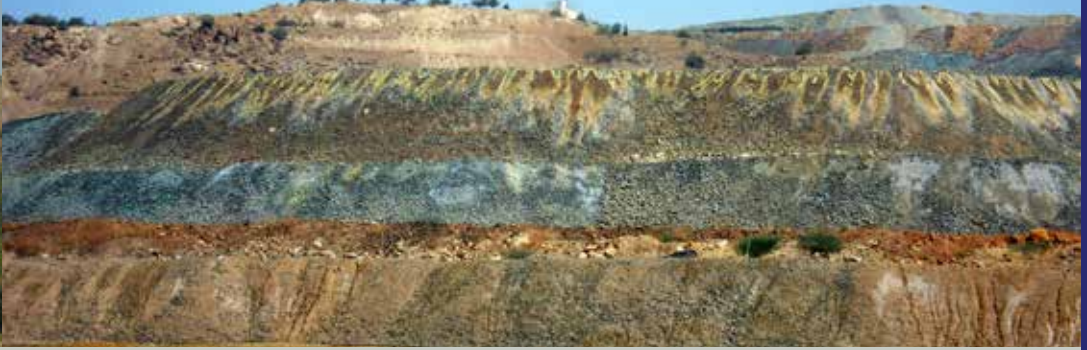
Fig. 21: Pillow lavas

Fig. 22: Skouriotissa copper mine

galleries you will be able to see samples of minerals as well as authentic copies of ancient objects and sculptures e.g.: Horned god Apollo, a copper ingot/talent with its peculiar ox hide shape produced only between 1600-1100 BC to facilitate transportation.

- The Skouriotissa copper mine and abandoned village is only 5 minutes' drive from Katydata. Follow the signs and once you are in front of the main entrance of the copper mine you may drive around. To the south west of the copper mine is the UNFICYP San Martin camp where one may visit the chapel of Panayia Skouriotissa: Our Lady of the Skouriotissa copper mine which dates back to around 16th century and houses some interesting icons. Permission needs to be obtained before entering the UNFICYP San Martin camp. You may park your car near the entrance of the camp. If you wish to drive on NW you will drive along the road where the abandoned houses are. The houses were built by the mining company (CMC) and were used by the miners until 1974. A newly established monastery is situated a few hundred metres from some of the abandoned houses.

Fig. 22



The Skouriotissa Copper Mine is surrounded by a 2 million ton pile of slag. Some of the slag was dated to 2000 BC. Later experiments, showed Roman and early Byzantine period pyrometallurgical activity as well. The top part of the slag dates to recent times and it is estimated that it covers the much older pile of slag as well as the ancient mine of Foukasa/ Voukasa later renamed to Phoenix copper mine.

Apparently Skouriotissa is the world's longest productive copper mine. Its exploration in recent times started in 1914 by The Cyprus Mines Corporation (CMC) and lasted up to 1974. Later it was taken over by The Hellenic Copper Mines Ltd. In 2010 around 13.1 million US\$ worth of copper was exported from the mine. A large percentage of the copper was produced by the reprocessing of waste material from previous mining operations as new methods used by the company make it economically viable.

The Hellenic Copper Mines is currently employing approximately 80 people and subcontracting many others. Their mining activities are carried out with respect to safety and health regulations as far as their employees are concerned as well as with great respect towards the environment. For both the above mentioned, the company has received several awards. The company is equipped with the latest technology to ensure maximum efficiency and productivity levels. Some of the methods used nowadays involve leaching, solvent extraction, electro-winning and the final result is in the form of metal sheets of copper. Since 2007 the amount of copper produced every year has ranged between 2.5-3.5 million tons. The company offers guided tours 3-4 times a year, the dates for which will be announced later on. For more information or for contacting the company you can visit the company website: <http://www.hcm.com.cy/site>

Safety Advice: Make sure you stay a safe distance from the Demarcation line that passes very close behind the copper mine and divides our island in two sectors: The free areas of the Republic of Cyprus and the Turkish occupied areas since 1974. There are signs indicating the demarcation line and roads leading to the north are usually blocked with barbed wires or other materials.



Route Information and timings

- Lemesos to Sia/Sha approximately 60 km, 45 minutes' drive
- Larnaca to Sia/Sha approximately 25 Km, 35 minutes' drive
- Sia/Sha to Mathiatis South approximately 6 km, 10 minutes' drive
- Mathiatis South to Mathiatis North copper mine approximately 7 km, 5-10 minutes' drive
- Mathiatis North copper mine to Ayia Varvara Almyras site 5-10 minutes' drive.
- Ayia Varvara Almyras to Katydata approximately 70 km, 70 minutes.
- Katydata to Skouriotissa copper mine 5 minutes

For the return trip:

- Skouriotissa to Lefkosia city centre 55-70 minutes
- Skouriotissa to Lemesos via Solea valley 80-90 minutes



Fig. 23: View of Skouriotissa mine, Katydata and Linou

- After finishing your tour you may decide to drive back to your hotel or find new accommodation in Agrotourism units in Kakopetria village in the Solea valley only 20 minutes drive from Katydata village or even Kalopanayiotis and Pedoulas villages in Marathasa valley approximately 30 minutes' drive from Katydata village.

For more information about Agrotourism visit the following website:

<http://www.agrotourism.com.cy>

- For further reading about copper mines in Cyprus visit the following webpage:

<http://www.moa.gov.cy/moa/mines/minesSrv.nsf/All/7E7B31A31B32C892C22574EA002D562F?OpenDocument>

While driving around if in doubt of your direction or if you have questions about places and museums you can call the Tourist information offices (Mon-Fri):

- Lemesos +357 25323211 or +357 25362756
- Larnaca +357 24654322
- Platres village +357 25813080
- Lefkosia +357 2269110.

You may also stop at the nearest police station, usually well signposted in the countryside or the village square and ask the locals.

Please note the main emergency number is now 112.



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4. The Development of the Cypriot Economy: From the Prehistoric Period to the Present Day - Edited by V. Karageorghis & D. Michaelides, published by the University of Cyprus and Bank of Cyprus Cultural Center
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Fig. 24: Colourful rocks in the Chrysochou bay





Cyprus Tourism Organisation
www.visitcyprus.com