

# Cyprus geology, topography, and climate an overview



Seminar contribution to the module "Terrestrial Ecosystems" (2101-230)  
Institute of Botany (210a) · University of Hohenheim · Stuttgart  
presented by Daniel Bölli on January 15, 2019

# General overview of Cyprus

**Key data**

**Geology**

**Geography**

**Topography**

**Climate**

**Summary**

**Used references**

**Photo credits**



The Karpaz Peninsula covers with golden sandy finest beaches the northeastern shores of Northern Cyprus. [2]

# Basic information

The island Cyprus is the third largest island in the Mediterranean Sea, following Sicilia and Sardegna in size. It covers 9251 km<sup>2</sup>.

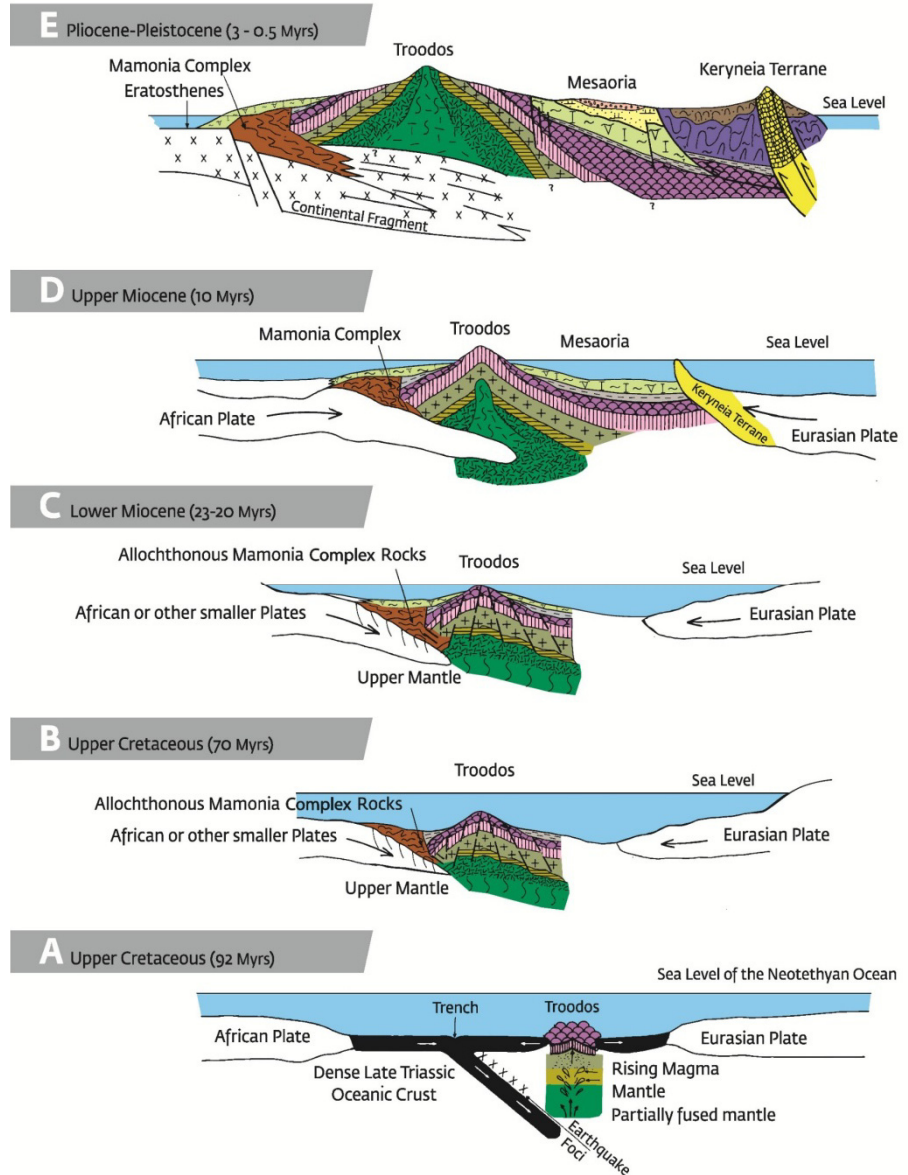
The maximum east-west extension is 225 km and the maximum north-south expansion is 90 km. The geographical location of Cyprus is 35° northern latitude and 31° eastern length.

Cyprus is divided into different zones: in the northern part (36.27% of the island), administrated by the Turkish Republic of North Cyprus and in the southern part (57.95%), the Republic of Cyprus. There are two British military bases (2.78%) and a buffer zone between South and North Cyprus.



**Map of Cyprus.**  
The island is divided into different zones [3].

# Evolution of Cyprus



The Genesis of Cyprus [4].

# Evolution of Cyprus

The geological genesis of the Cyprus island took place through a series of five main tectonic episodes:

1. 90 million years ago (Upper Cretaceous), the subduction of the African Plate under the Eurasian Plate began. Thereby, thrusting oceanic crusts formed the Troodos Ophiolite.
2. The elevation of the formed Troodos massif continued a long time, until eventually, the Troodos Massif emerged as an island out of the sea.
3. A long period of tectonic inactivity followed. During this time the sedimentary became gradually shallower by deposition of carbonate sediments.
4. Due to the continuous collision of the African and Eurasian Plates, the Kyrenia Range developed. At that time, the Miocene, today's Cyprus consisted of two visible islands. At the same time, Cyprus continued to rise from the sea.
5. In Pliocene the Tethys sea was closed. Here, marls and calcarenites were deposited. A short time later, there was the reopening of the Gibraltar Strait. This results in deposition of washed stone material. The uplift continued in the Pliocene and the island even raise above today's normal level. Erosion eroded the peaks of the island to their present height.

# Geology

The island of Cyprus is generally divided into four geological zones:

In the north, there is the Kyrenia area. This area consists of the Beşparmak Mountains and their surroundings. It is also known as Pentadaktylos.

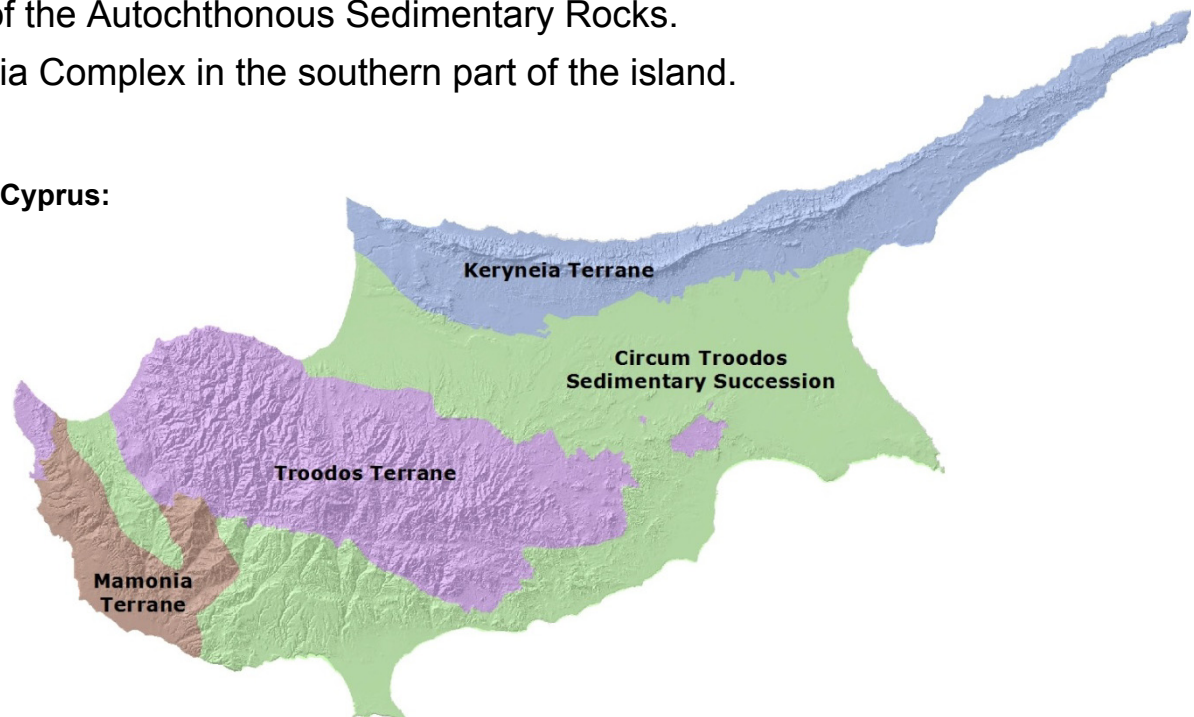
In the southern middle of the island, the Troodos Mountains are situated. This area covers the entire area of the Troodos Massif and its surrounding area. This zone is also known as Troodos Ophiolite.

The Troodos Massif is surrounded by the third geological area, the Circum Troodos Zone. This zone is also known as the Zone of the Autochthonous Sedimentary Rocks.

The last zone is the Mamonia Complex in the southern part of the island.

**Map of the geological regions of Cyprus:**

- 1: Kyrenia/Pentadaktylos,**
- 2: Troodos,**
- 3: Circum Troodos, and**
- 4: Mamonia) [5].**



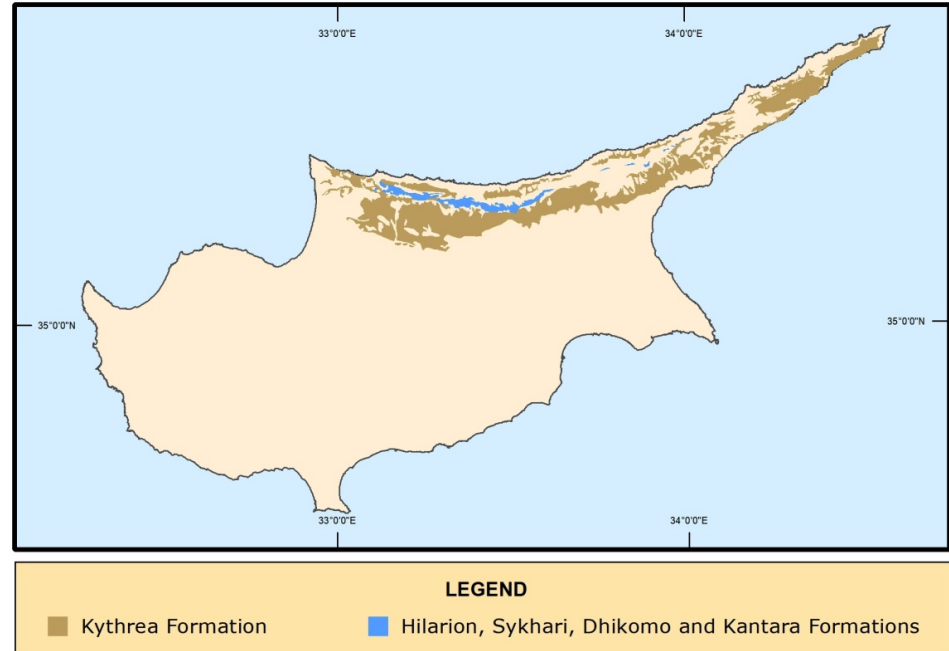
# Geology

## The Kyrenia zone

The Kyrenia/Pentadaktylos zone consists of the narrow coastal terrace in the north of the mountains, the Beşparmak mountains themselves, which then run into the Mesaoria plain. The coastal terrace consists mainly of marls and sandstones.

The Beşparmak mountains are limestone mountains with rugged towering peaks, with marl and sandstone added to the southern slopes to the Mesaoria plain.

The Terrane is structurally a complex assemblage of Permian to recent sedimentary, metamorphic, and igneous rocks. The main formations are the Hilarion, Sykhari, Dhikomo, and Kantara Formations. These form the main carbonate masses of the Beşparmak mountains.



**Map of the Kyrenia/ Pentadaktylos zone in the north of Cyprus: The main geological formations are the Kythrea (braun) and the Hilarion, Sykhari, Dhikomo and Kantara Formations (blue) [6].**

# Geology

## Troodos Zone

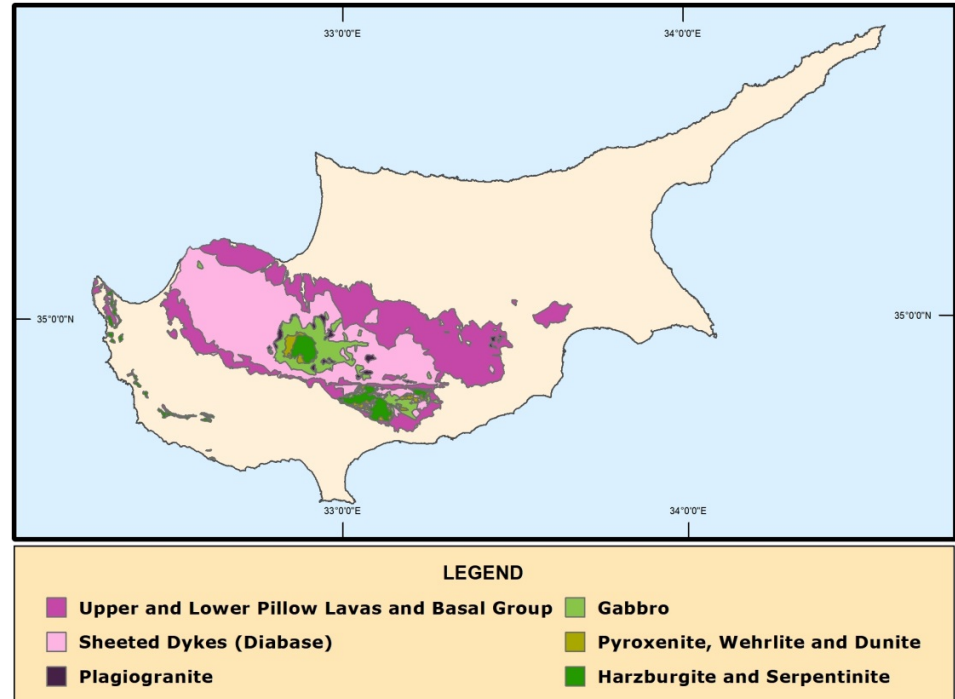
This zone dominates the central part of Cyprus.

It constitutes the geological core of the island and has a characteristic elongated dome structure.

The Troodos Zone was formed in the Upper Cretaceous (90 Ma) on the Neotethys sea floor.

Thus, it is a fragment of a oceanic crust which was fully developed.

The main consistence of these zone is plutonic, intrusive and volcanic rocks and chemical sediments.



**Map of the Troodos region in the center of the island:  
The zone consists of deep ophiolite, a magmatic deep rock with the main layers gabbro, diabas and pillow lava [7].**



# Geology

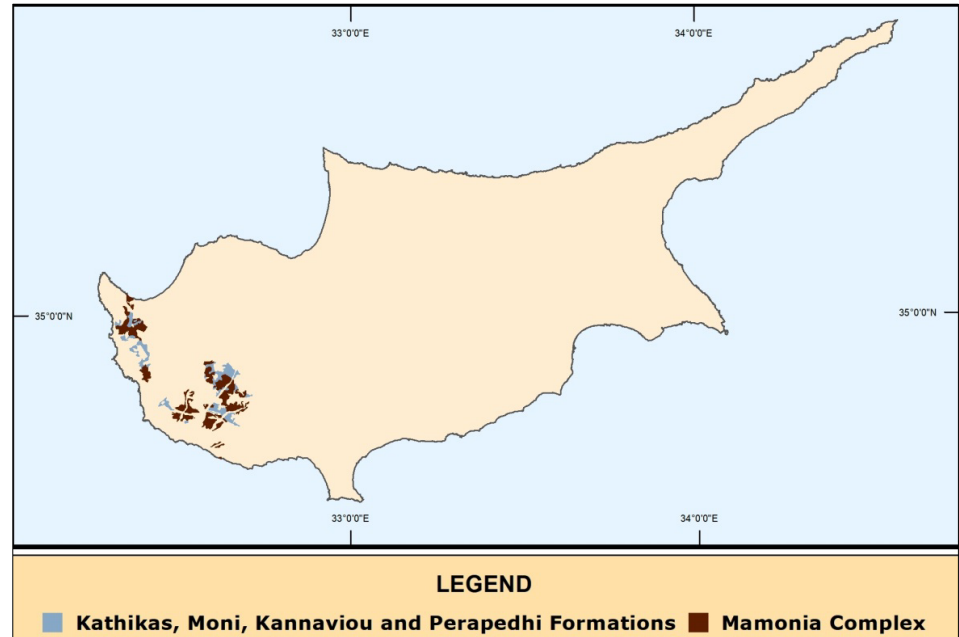
## Mamonia Zone

This zone consists of igneous, sedimentary and metamorphic rocks.

The age ranges from the Middle Triassic to the Upper Cretaceous (230-75 Ma).

These calcareous, allochthonous rocks are overlapped by autochthonous carbonates and Troodos ophiolite rocks.

The Mamonia Terrane can be divided into three groups: the Diarizos Group, the Agios-Fotios Group and the Agia-Varvara Formation.



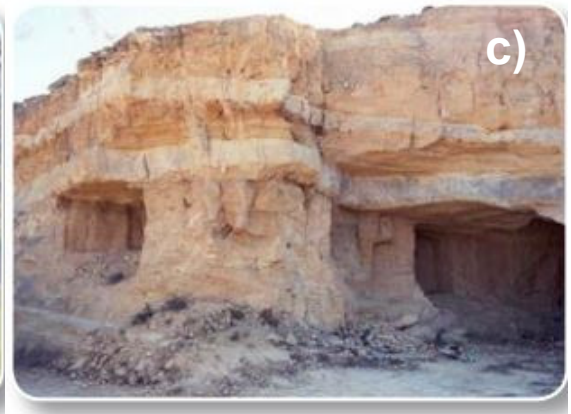
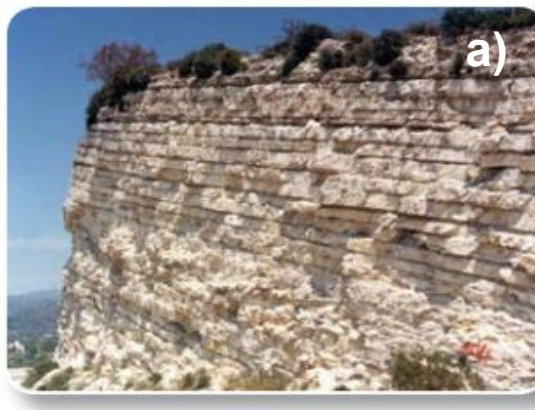
**Map of the Mamonia region in the southwest of the island: This zone constitutes a diverse and structurally very complex assemblage of igneous, sedimentary and also metamorphic rocks [8].**

# Geology

## Circum Troodos Zone

The age of the rocks in this area ranging from the Upper Cretaceous through the Pleistocene (67 Ma to recent years).

It covers the area between the Pentadaktylos and Troodos Zones as well as the southern part of the island. Rock types are bentonic clays, volcanic clastics, marls, chalks, cherts, limestones, calcarenites, evaporites and clastic sediments.



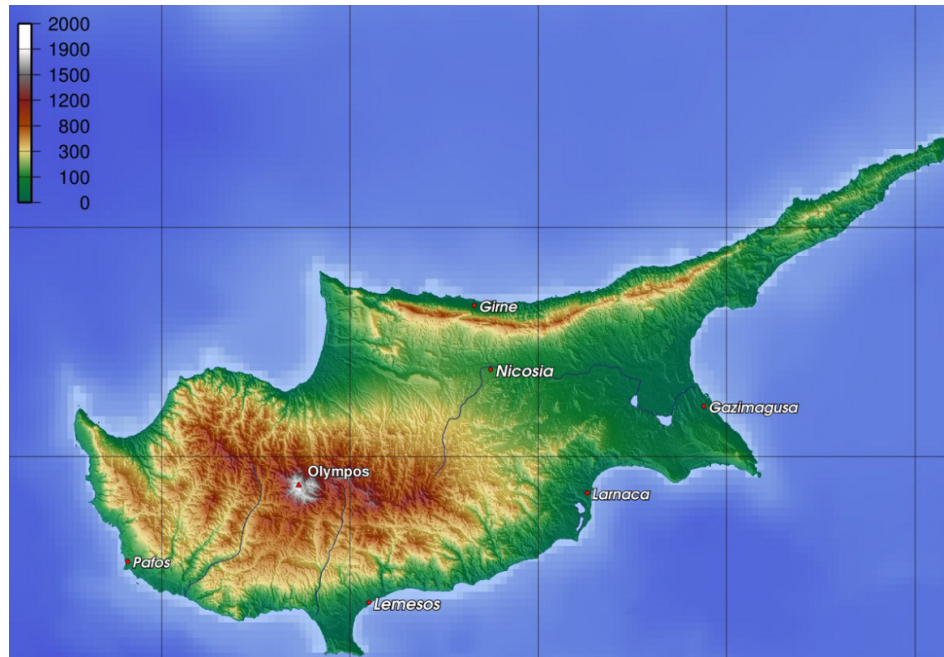
Photos of the autochthonous sedimentary rocks, located in the Circum Troodos Zone: Here we can see the Lefkara Formation (a) which includes pelagic marls and chalks and has a characteristic white colour. In the next Photo there is a Gypsum outcrop (b), and in (c) the Nicosia Formation which contains grey and yellow siltstones and layers of calcarenites and marls [9].



# Topography

The emergence of Cyprus with the mountain foldings and subsidence left five geographically and topographically distinguishable regional landscapes. All of them are different from each other. We have regions with forest, farmland and others with shrub land (macchia and phrygana):

The first is the Troodos massif, which extends over the whole southern part of Cyprus. Olympos is the highest peak (1952 m).



Topographic map of Cyprus [11].

The second mountain range is the Beşparmak mountains in the north of the island.

Both mountain ranges border the Mesaoria plain. Here is located the divided main city of both parts of Cyprus, the capital Nicosia/Lefkoşa.

In the south of the Troodos massif you can find hill country and long coast land.

The last is the landscape upstream the mountains in the north, which consists of narrow coastal terraces and the Karpaz Peninsula.

# Topography

## The Troodos massif

The Troodos massif is a big mountain chain. It is located in the center of the island and well known as the green lung of Cyprus. The area is home to lush plant life all year round. Besides the Olympos, which is the highest mountain in Cyprus at 1952 m a.s.l., the following peaks are to be mentioned: Mandari 1613 m, Papousta 1554 m, Kionia 1423 m, Tripylos 1362 m and Kykkos 1318 m a.s.l.

During the winter (January to March) snow is falling at the highest points of these mountain chain.



View from a mountain near Mitsero at the foot of the Troodos massif [12].



View over the Troodos mountains, in the background the Mediterranean Sea [13].

# Topography

## The Beşparmak mountains

The Beşparmak mountains are a narrow mountain chain in the northern part of Cyprus. They are also known as Kyrenia mountains or Pentadaktylos. The name Pentadaktylos originate from the most famous features, the "Five fingered" peak. Its largest east-west extention is about 90 km and the north-south is about 160 km. The highest mountain peak is the Selvili Tepe (1024 m a.s.l.), also known as Kyparissovouno.

Towards the east, the mountains level off and drain into the Karpaz Peninsula.



The famous mountain Pentadaktylos which is the eponym of these topographic region [14].



The Buffavento Castle is one of the great fortresses that are strung out along the Beşparmak mountains [15].

# Topography

## The Mesaoria plain

The Mesaoria plain is bounded north by the Beşparmak mountains and in the south by the Troodos massif. The name "Mesaoria" means "between the mountains". Here, the land is very flat, it only rises up to 325 m a.s.l. with an average elevation of 100 m. In the middle of this plain, the capital city Nikosia/Lefkoşa is located.

The Mesaoria plain has an area of around 1000 km<sup>2</sup>. In this area, the land is used for cultivation farming. So this plain is the main growing area of the whole island. Here are many citrus plantages, growing of cereals, and much more. It is the most important agricultural area of Cyprus. These plains are green in spring, dry and brown in summer (see above).



**Green grasslands and agriculture are the trademark of the Mesoria plain [16].**

# Topography

## The hill country and the coastland in the south of the Troodos mountains

In the south of the Troodos massif, the mountains run out into a hill country, which is beside the Mesaoria plain the most important agricultural area of Cyprus. In the west, south and east this region flattens in different broad coastal plains. The second largest city in Cyprus, Limassol, is located in this hill country area.



In the south of the Troodos massif are also agricultural sites and many fruit plantations [17].



These dry region is always yellowish brown in the summer months [18].



# Topography

## The narrow coastal terraces and the Karpaz Peninsula



The Karpaz Peninsula has golden sandy beaches, a big amount of Biodiversity with a significant amount of endemic species, historical and archaeological sites, Christian churches and traditional Cypriot villages. But there are also several small bays with pebble beaches in the North of the Beşparmak mountains.

Sunset at the Golden Beach, Karpaz Peninsula [19].



The bird's-eye view of the Karpaz Peninsula from the ruins of Kantara castle [20].

# Climate

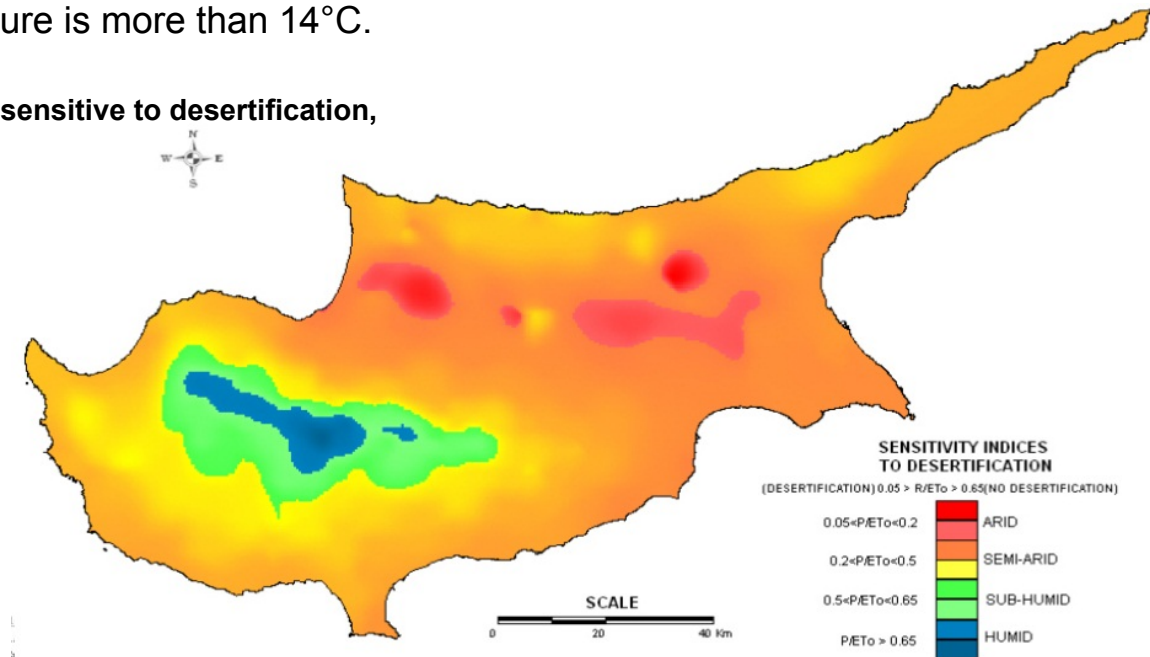
The climate of Cyprus is the Mediterranean climate.

This climate is characterized by typical seasonal rhythm, which is strongly marked in respect of the temperature, the rainfall and the general weather.

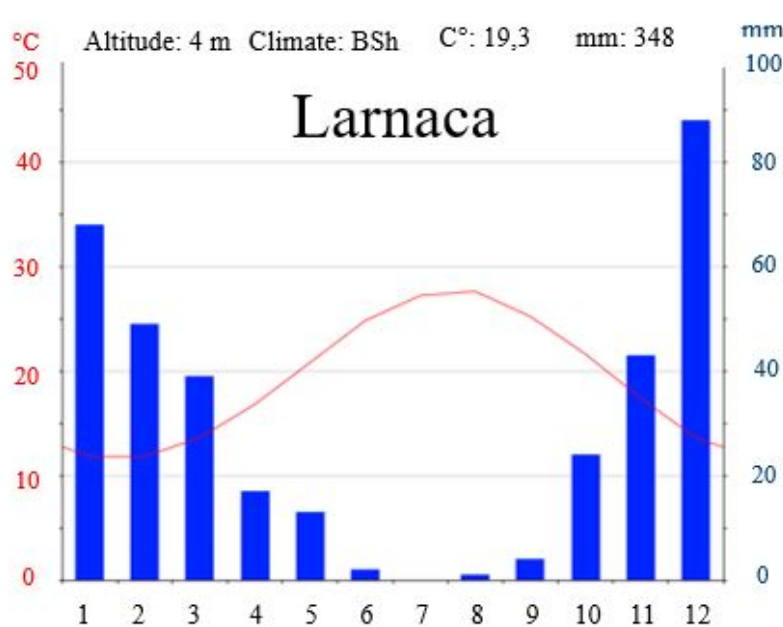
It is characterized by a long, hot and dry summer. In these months, the precipitation is very low or without precipitation. The short winter is wet and mild. Especially in December and January, the amount of rain is very high. In high mountains the rain falls as snow.

The main annual rainfall for the Mediterranean climate is between 400 and 1000 mm per m<sup>2</sup>. The annual average temperature is more than 14°C.

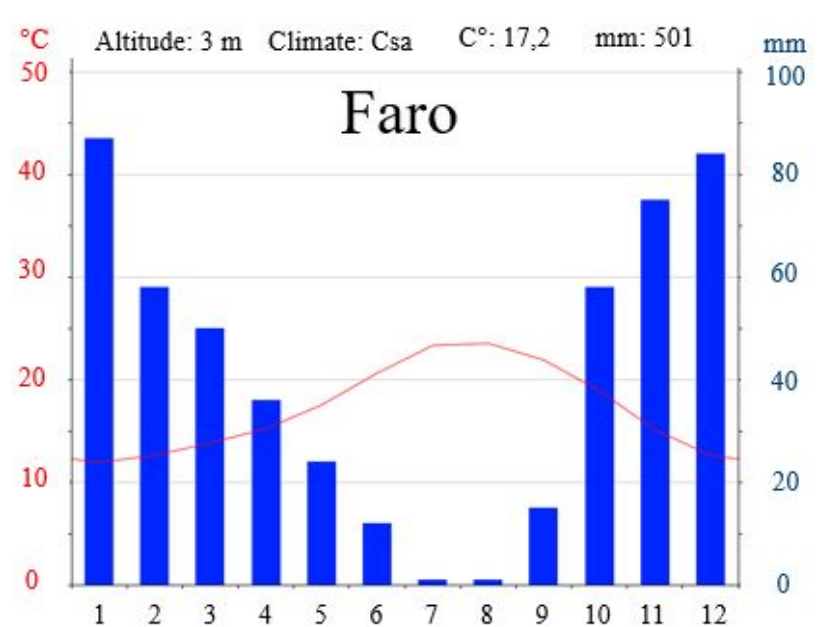
**Map of Cyprus relating to the sensitive to desertification, according IACO, 2007 [21].**



# Climate



Klimadiagramm from Larnaca [22].

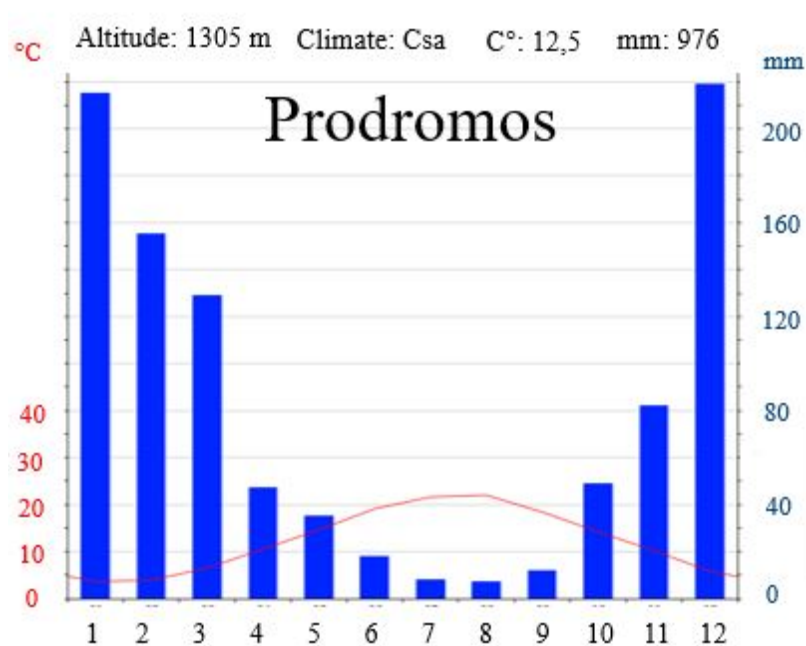


Klimadiagramm from Faro (Algarve) [23].

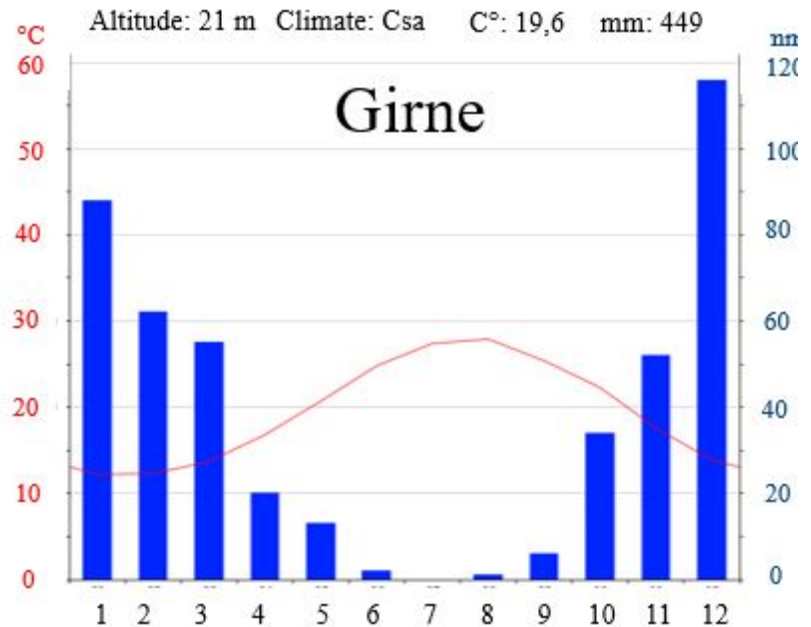
Cyprus belongs to the Mediterranean region and therefore to the subtropics.

Faro, capital city of the Algarve, belongs also to the same area. But the Algarve is in the western, and the island of Cyprus in the eastern Mediterranean region. In midsummer (July), there is no rain in Larnaca (Cyprus). Also the medium temperature in Larnaca is higher than in the Algarve. In the Algarve, the climate is affected by the Atlantic. Typical for the west Mediterranean region is that most of the precipitation falls in January whereas most of the precipitation in the eastern region falls in December.

# Climate



Klimadiagramm from Prodromos [24].

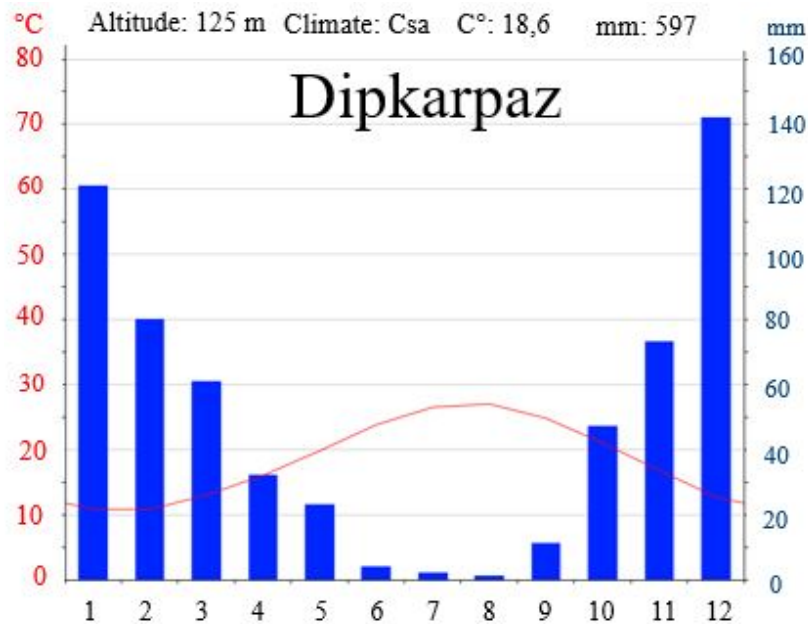


Klimadiagramm from Girne [25].

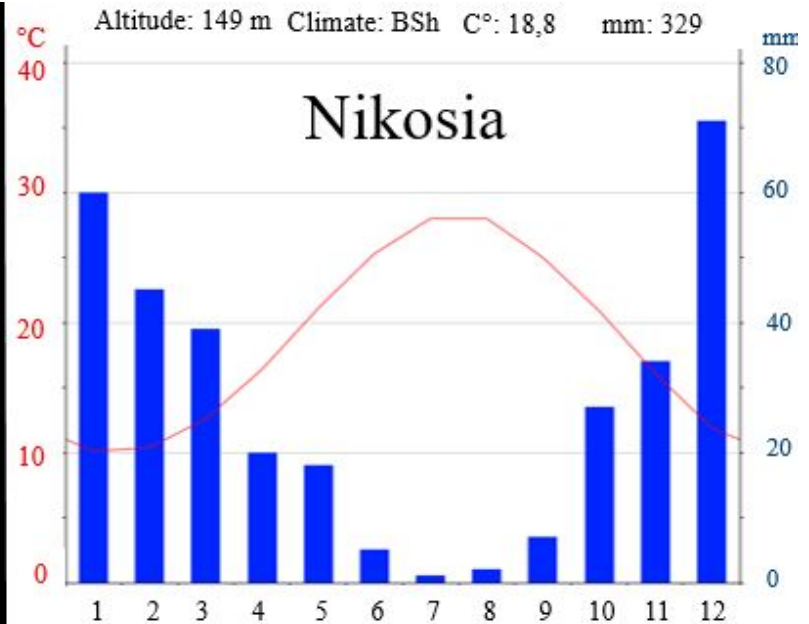
On Cyprus are a range of different climates with different climatic conditions:

The climate varies between the coast and the different mountainous locations. Prodromos in the Troodos mountains has therefore an high precipitation. There are steep slopes and typically in winter, the rain falls as snow. Girne is a city at the northcoast and has naturally less precipitation higher temperatures than villages in the mountains. For that all both places have a Mediterranean climate (Csa) according to the Köppen & Geiger classification.

# Climate



Klimadiagramm of Dipkarpaz [26].

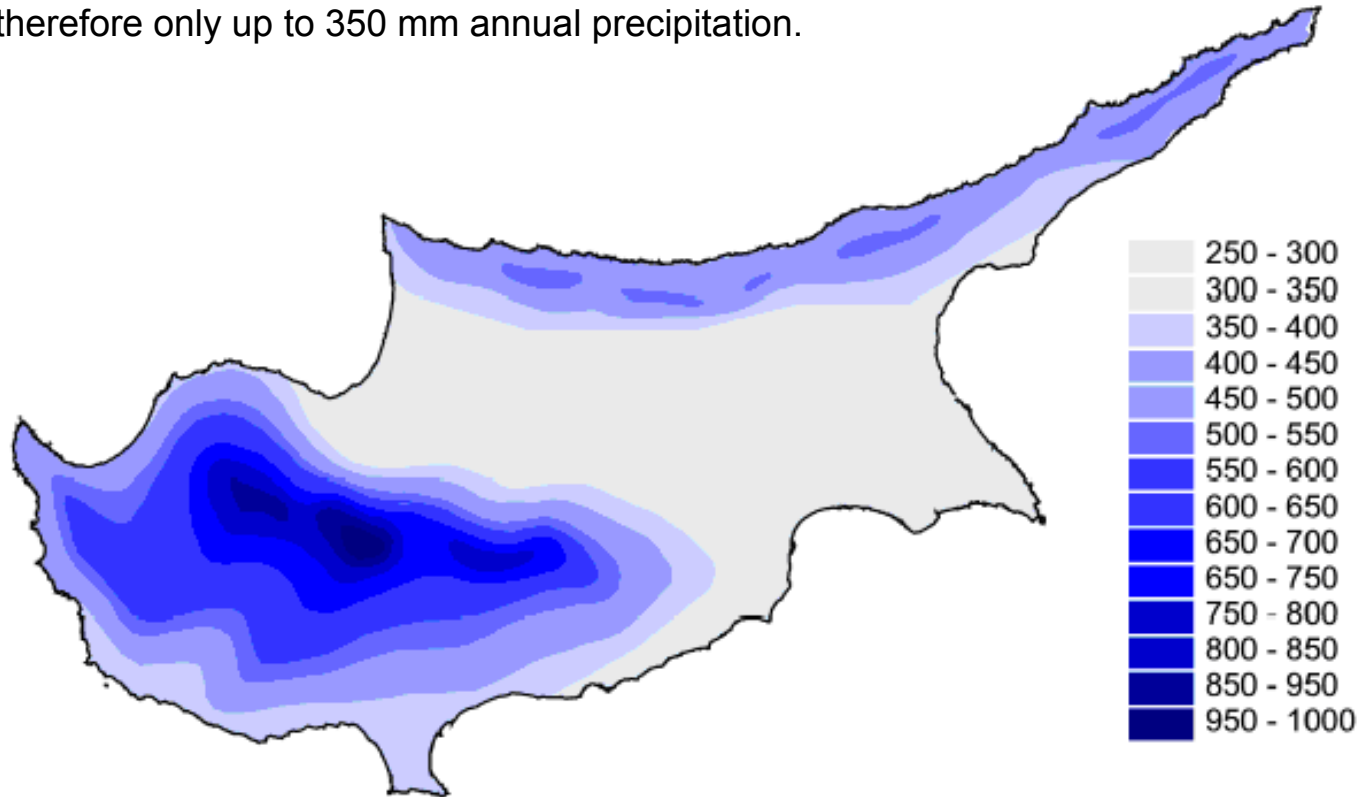


Klimadiagramm of Nikosia [27].

Another difference is recognizable between two places at nearby the same elevation: Dipkarpaz, a village on the Karpaz Peninsula and Nikosia, main city at the Mesoria plain. The climate varies between the northcoast and the Mesoria plain: The mean annual temperature is the same with about 18°C degree, but Dipkarpaz has a Mediterranean climate (Csa) like the other places at the coast and in the northern range, whereas Nikosia has a more continental climate like a steppe climate (Bsh).

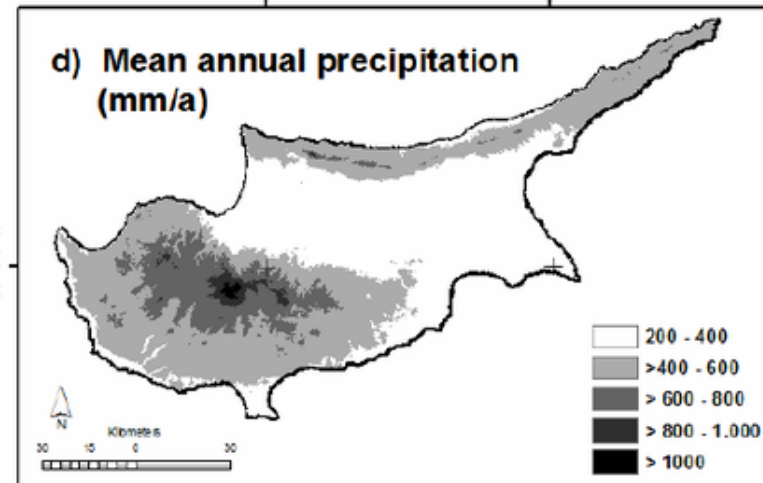
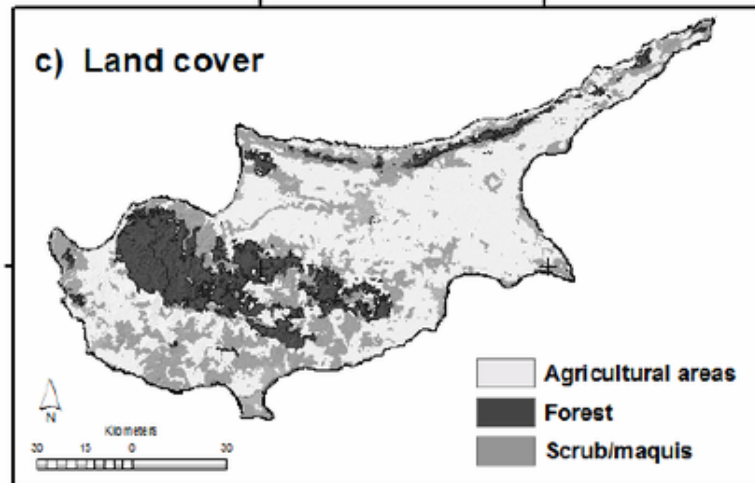
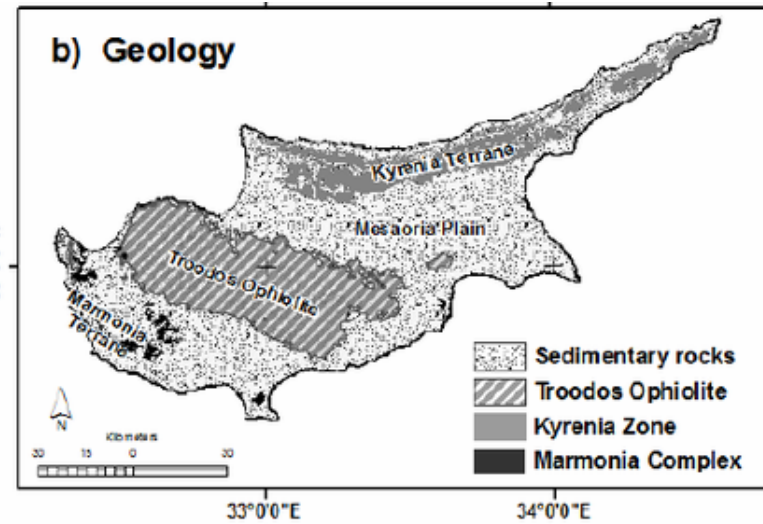
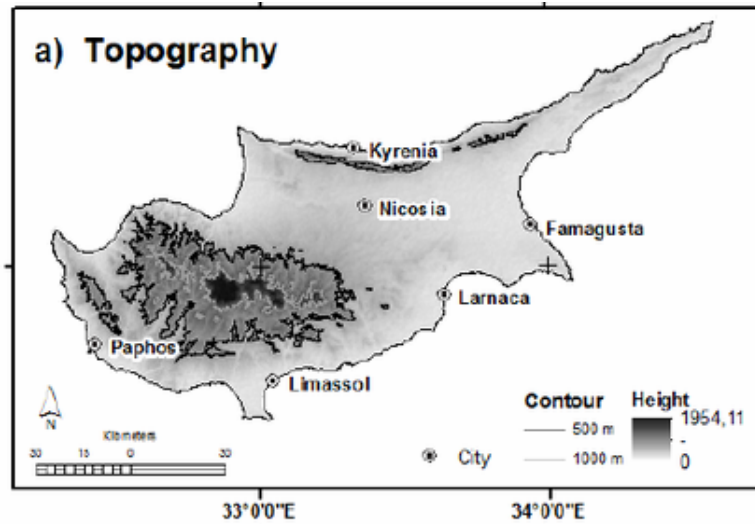
# Climate

Due to the altitude of the Troodos massif, it comes to the highest annual rainfall up to 1000 mm, whereas in the Beşparmak mountains, due to the lower altitude, the annual precipitation falls up to 500 mm. The Mesaoria plain lies between the mountains, thus in the "rain shadow", and reaches therefore only up to 350 mm annual precipitation.



Map of Cyprus, relating to the sensitive to desertification, according to IACO, 2007 [28].

# Summery



A topographical, a geological, a land cover map, and a map to the mean annual precipitation of Cyprus [29].

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