

National College "Nicolae Balcescu", Braila, Romania



Co-funded by the
Erasmus+ Programme
of the European Union



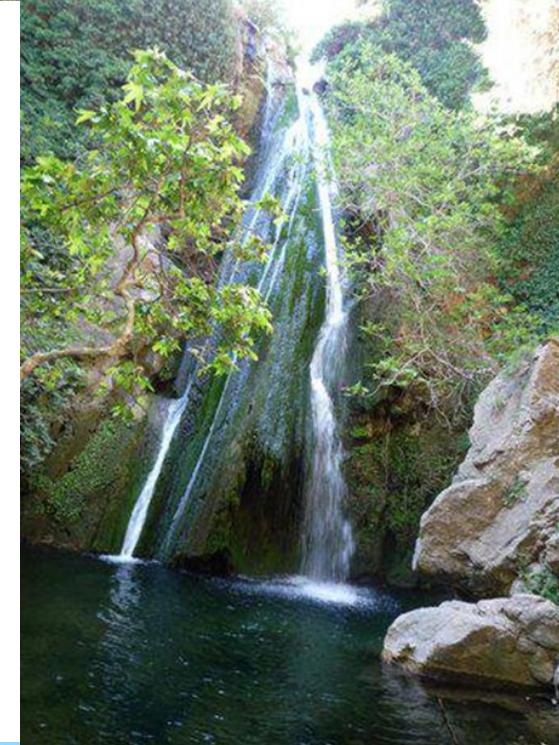
Geo—Explorers Geopark of Sitia—Crete

project no. 2018-1-CZ01-KA229-048000_2

Coordinator: Luminița Mocanu

Students: Irina Papuc, Ana Maria Balaban, Doroftei Rareș, Alexandru Chivu

Teachers: Danilescu Iulian, Cristian Toncea



This paper reflects the views only of the authors, and the Education, Audiovisual and Culture Executive Agency and the European Commission cannot be held responsible for any use which may be made of the information contained therein.

Other plants that grow in the ravines in the area of Zakros, where there is plenty of water, are **Oriental Planes** (*Platanus orientalis*), **Oleander** (*Nerium oleander*) and **Vitex** (*Vitex agnus castus*).

The region's canyons offer refuge to many important species of flora in the area. The canyons of Kato Zakros and Chochlakia, in particular, are home to a large number of plants and they attract many researchers and observers every year. Characteristic species that have found a home on the sheer limestone rocks and on the ravine, beds are **Aristolochia cretica**, **Delphinium staphisagria**, Wild **Carnations** (*Dianthus juniperinus*):



Euphorbia dendroides, the Lecokia cretica, Ephedra cambylopoda, Nepeta melissifolia , Capers (*Capparis spinosa*), the Dracunculus vulgaris, bluebells (*Campanula pelviformis* and *Campanula spatulata* ssp. *Filicaulis*), Jerusalem Sage (*Phlomis lanata*), Oregano (*Origanum onites*), Tulipa saxatilis and many orchid species.

Coastal areas are dominated exclusively by herbaceous plants, mainly Amaranth (*Limonium grecum*) and the endemic *Limonium sitiacum*, while on the beaches of Katsounaki and Argilos in Xerokambos, there are Sea Daffodil (*Pancratium maritimum*).

Information about the Geography of Crete island

Crete island is the largest and most mountainous of the Greek islands. It is located in the south part of the Aegean Sea and covers an area of 8,939 sq.km. The total population of Crete is 621,340 people. The island is characterized by its rocky spots and is surrounded by a beautiful mountain range including the White Mountains, Mount Psiloritis, and Dikty Mountain.

Crete lies at the spot where the continents of Europe, Africa and Asia meet and is divided into four regions: Chania, Rethymnon, Heraklion and Lassithi. The mountains of Crete draw the attention whether you look from the west, east, north or south. The famous White Mountains have more than 52 peaks and Mount Psiloritis is the highest peak in Crete.

In the east, the mountains of Dikty form a continuous chain from one end of Crete to the other. This creates impressive scenery which rises over the beautiful city of Sitia, in Lassithi. The mountains of Crete gifted the island with beautiful plateaus like Omalos. The sea currents have created impressive gorges, like the famous dramatic Gorge of Samaria and spectacular flourishing gardens with rare plant species that can not be found anywhere else in the world.

The geography of Crete has got a deep impact in the Greek civilizations since the ancient times. Crete is totally secluded from the other mainland regions of Europe, Asia and Africa, a fact that reflects upon the rich flora and fauna that grows in the area.

The island is blessed with a great variety of plant species, like the Cretan goat and others. Crete was the birthplace of Mycenaean civilization, one of the first European civilizations that prospered in the region between 3,000-1,400 BC. The island is characterized by mountains, valleys, natural bridges, stunning gorges and other features that make this place unique in all aspects. Above all, Crete is famous for the fertile land from where a great part of local production is based upon. It has been confirmed that the Cretan products are the healthiest products in the world.

Examples of geographical marvels:



The Gorge of Pefki

Zakros Gorge



On smaller expanses of land, taller bushes are encountered, forming maquis vegetation and consisting of **Mastic** (*Pistacia lentiscus*):



Rihtis Gorge



Spiny Broom (*Calicotome villosa*), **Wild Olives** (*Olea europaea* subsp. *Oleaster*), **Phoenician Juniper** (*Juniperus phoenicea*), **Kermes Oak** (*Quercus coccifera*), **Carob trees** (*Ceratonia siliqua*):



Caves near to Sitia's Geopark Info Center



Osyris alba, **oleander** (*Phlomis fruticosa*) and **Tree Spurge** (*Euphorbia*



Winter Savory (*Satureja thymbra*) and Greek Spiny Spurge (*Euphorbia peplis*)



They coexist with non-thorny bushes such as **Heather** (*Erica manipuliflora*), **Ballota acetabulosa**, **Greek Sage** (*Salvia fruticosa*):



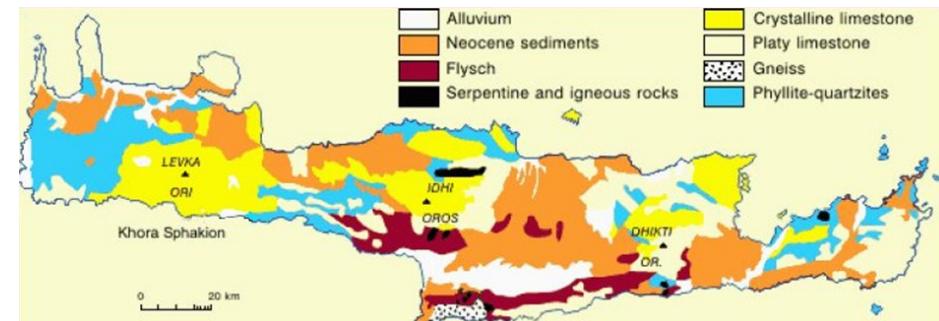
and the **Rock Rose** (*Cistus criticus* and *Cistus salviifolius*):



Paleontology

Paleontology is a scientific study of life of the geologic past that involves the analysis of plant and animal fossils, including those of microscopic size, preserved in rocks. It is concerned with all aspects of the biology of ancient life forms: their shape and structure, evolutionary patterns, taxonomic relationships with each other and with modern living species, geographic distribution, and interrelationships with the environment.

Paleontology being interdependent with geology here is a map of Crete's geology:



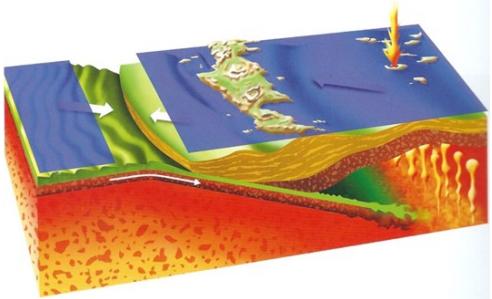
What is geology after all?

Geology is the study of the Earth, the materials of which it is made, the structure of those materials, and the processes acting upon them. It includes the study of organisms that have inhabited our planet. An important part of geology is the study of how Earth's materials, structures, processes and organisms have changed over time.

And here is a short story about the geology of Crete and how it was formed millions of years ago:

More than 500 million years ago, the area of Crete was submerged in Tethys Sea and life was only marine. The sediments moved by the rivers of the coasts of Pangaea and the wind, gathered and mixed with the shells of the sea organisms, forming layers of rocks. 70 to 55 million years ago the plates of Africa, India and Laurasia crashed violently and forced the bottom of Tethys to raise and form a chain of mountainous folds and sinkings from Atlas and the Pyrenees to the Alps and further to Caucasus and the Himalayas.

Current Crete was submerged at the centre of this arch of mountains. About 15 million years ago, Crete had totally been raised and formed a common coast with the Greek continent and Minor Asia. The united coast of the Greek continent, Crete and Minor Asia broke apart and Crete was eventually separated 8 million years ago.



This is a picture that shows how Crete submerged from the center of the arch of mountains.

Rocks

All these geological transformations formed a large variety of rock formations with rich geovariety. The Cretan grounds hosts rocks that were formed during the phase of Tethys Sea and were layered during the raising of the land. There are at least 7 types of these layers in Crete, the largest number in Greece, with the three of them dominating. Sorting these three according to the lowest position they are Platy limestone, the formation of Tripoli (limestone) and Phyllite-quartzite. Other formations, quite rare, are Asterousia formations and ophiolites (volcanic rocks).

Formation of the gorges in Crete

The majority of gorges in Crete (Gorge of Pefki and Richtis Gorge) are formed in carbonate rocks: limestone and marble, which can be easily seen in these pictures:



Flora in Sitia's Geopark

Sitia Natural Park presents great floral interest. Amongst the hundreds of plant species it hosts, there are many endemic species encountered throughout Crete, endemic to Crete and Kasos, as well as unique species, known only to the southeast Aegean. The region as a whole belongs to the Mediterranean Vegetation Zone, where brush vegetation prevails. Variations in the vegetation are small, with some exceptions in areas such as the Vai Palm Forest and the surrounding area, as well as in some canyons with an intense presence of water, at least during winter months (Zakros canyon, Xerokambos, Chochlakia). The existence of great expanses of olive trees, vineyards and other tree crops is also very important for the composition of the island's flora.



Thyme (*Coridothymus capitatus*)

Broom (*Genista acanthoclada*)



Broom (*Genista acanthoclada*)



Circus aeruginosus

Falco naumanni - a very rapid falcon that captures insects, birds or even bats in flight. It is a bird of open country such as farmland. It is widespread in lowlands with scattered small woods



Larus audouinii



Crex crex - It is not quail or partridge although it looks like. Unfortunately, while its total population is decreasing and the species is strictly protected by law, there are cases that have been shot as many hunters often confuse it with the common species, this was the individual pictured. It belongs to a family of aquatic and wading birds but lives in grasslands,



Lanius senator senator - Woodchat, have large head and curved bill to help them in catching large insects and birds as large as their size. They migrate to tropical Africa in autumn.



The Gorge of Pefki

The walk through the gorge starts at the eponymous picturesque village of Pefki via an old stone path. There are also impressive white rock formations on the sides with a height of more than 100 meters. The striking contrasts with the variety of colour combinations make this piece of nature unique to Southeast Crete. On the sides of the path, we can easily see the unique types of rocks representative for Crete. Here are some types of limestones:



Another type of rock that is rarely seen in this area is the purple phyllite, a type of foliated metamorphic rock



Richtis Gorge

This track is one of the most beautiful and difficult ones in the region of Sitia but the effort is worth it because of the incredible sights, landscapes and variety of rocks found there. Some of the most common rocks that can be found on this trail are the garnet schist and limestones.



The Geopark in Sitia

The Geopark in Sitia is a natural park that represents a labyrinth of caves, one of them being shown in this picture:



All around the caves can be seen different types of rocks, the most common being the quartzite and quartz:



Avifauna

Our interest in the avifauna in the northeast edge focuses on the Dionysades islands and Elasa where can be found enough evidence and sports as the Greek Ornithological Society has been recording useful facts for the last few years.

The Dionysades islands is an isolated island complex, low in vegetation and steep rocky slopes. Because of its geography, it is a very important position for migratory birds, which are in turn possible food for the newborn falcons.

It is a superb hunting place for the birds that nest on the island.

Our selection of birds to be presented is:

Egretta garzetta - Little Egret, nests in colonies in tall trees along rivers and estuaries in the Mediterranean. A common visitor to small wetlands in the islands where it sometimes overwinters.



Phalacrocorax Aristotelis - The Shag is a fish-eating bird that breeds on rocky coasts and islets. It is usually seen sunning when resting after fishing, a habit that helps it to digest its food.



Hydrobates pelagicus - the Storm Petrel remains the only representative of the family Hydrobatidae in Greek waters.