Todays slides can be viewed online at: https://docs.google.com/presentation/d/1BGYINGJ5-8Qlj3M3lm_cRy7bNfEY6tKzxCySh08-IsY/edit?usp=sharing

Slide 1: Thank you for coming to my lecture on the geology of Greece. I am Dr. William Schmachtenberg in

real life and Dae Miami in Second Life. You can email me : wschmachtenberg@gmail.com. Today, I will discuss the plate tectonics around Greece, Earthquakes, Volcanoes, and the rocks that were so important to Greece. I will also talk about the many fossils that have been found around Greece.

Slide 2: The upper surface of the Earth is broken into large slabs of rocks called plates that are driven over the interior. There are 7 major plates shown in this diagram and many smaller ones.

Slide 3: Plate tectonics around Greece. Greece is on the Eurasian plate, and it is colliding with the African plate shown at the bottom of this slide.

As the plates collide Earthquakes are triggered, and volcanoes erupt.

The plates are converging on each other at a rate of 34 mm/year. Africa and Greece (Crete) are about 100 miles apart, which means in about 4.7 million years, the Aegean Sea will vanish. With continued collision, a mountain range will be produced where the Aegean and Mediterranean Seas exist today. We know this will happen because the same processes produced the Himalayan Mountain range North of India.

Slide 4: This diagram shows a cross-section across a subduction zone that exists between Africa and Eurasian plates.

As the sea floor of the Aegean is forced below the Eurasian plate it descends and triggers Earthquakes. The descending plate takes down ocean water which lowers the melting point of the rock. Magma is produced which rises to the surface to form volcanoes around the Aegean Sea.

https://en.wikipedia.org/wiki/Geology_of_Greece

Slide 5: Santorini also known as Thera. It is located North of Crete.

Slide 6: The island of Santorini formed when a violent eruption occurred around 1600 BCE. What is left is called a Caldera.

The eruption may have produced a large wave called a tsunami that contributed to the decline of the Minoan civilization on Crete.

Slide 7: The Minoan civilization on Crete. The Minoan civilization began around c. 3500 BC, with the complex urban civilization beginning around 2000 BC, and then declining from c. 1450 BC until it ended around 1100 BC.

It represents the first advanced civilization in Europe, leaving behind several massive building complexes, sophisticated art, and writing systems. Its economy benefited from a network of trade around much of the Mediterranean.

Slide 8: The Aegean is an area with many Earthquakes as this map shows as it is tectonically active as the plates collide. Earthquake magnitude ranges from 1 to 9, so Greece has had some large as well as many smaller earthquakes.

The strongest earthquake in Greece happened on 07/09/1956 in the region Dodecanese with a magnitude of 7.8 on the Richter scale. The shifting of tectonic plates in a depth of 39 km resulted in 53 deaths. The earthquake also triggered a tsunami with further victims and destructions.

This proves that Greece is still a dangerous place geologically.

Slide 9: Gems of Greece

The geology of Greece is very complicated due to its existence in an active plate tectonic area. The map from https://www.mdpi.com/2075-163X/9/8/461/htm shows the distribution of gems in Greece. Because the Eurasian and Africa plates are colliding huge forces build up around Greece. This produces high pressures, which in turn produce metamorphic rocks and gems. Ancient Greeks had access to: rubies, sapphires, and tourmaline in addition to other materials.

Gems were imported into Greece from every location along the ancient Silk Road, from Asia Minor to the Indian Subcontinent, Sri Lanka, and the Far East. These jewels included such exotic materials as emerald, ruby and sapphire, as well as semi-precious gems from the Middle East, Egypt, and North Africa

Slide 10: Greek Amethyst. Amethyst is a variety of quartz that is purple in color. The name Amethyst comes from the Greek word αμέθυστος amethystos which means drunkenness. This slide shows a crystal of Amethyst and a neckless made made from the mineral. Necklesses of Amethyst were worn to ward off drunkenness, although I doubt it worked. Amethyst is not known to form in Greece and may have been imported from the far East.

Slide 11. Greek Jewelry

By 300 BC, the Greeks had mastered making colored gemstone jewelry and were using amethysts, pearls, and emeralds. The gold bracelets on the right also included garnets.

Slide 12. Greek Rocks.

Greece has a wide variety of rocks including granite, marble, conglomerate, sandstone, siltstone, tuff and limestone. This slide shows the beautiful Greece marble that they needed for their architecture and statues.

Slide 13: Greek Architecture: The Parthenon

Built in Athens from 447-432 BC, the Parthenon is one of the best known architectural symbols of any civilization. The main building material was Pentelic marble quarried from the flanks of Mt. Pentelikon, located about 10 mi/ 16 km from Athens. (The old Parthenon, the one destroyed by the Persians while it

was partway through construction was the first temple to use this kind of marble.) https://www.historymuseum.ca/cmc/exhibitions/civil/greece/gr1130e.html

Slide 14: Perhaps one of the most famous Greek Sculptures is the Cavalry from the Parthenon . The Greeks used a variety of materials for their large sculptures: limestone, marble (which soon became the stone of choice- particularly Parian marble), wood, bronze, terra cotta, chryselephantine (a combination of gold and ivory) and, even, iron.

Slide 15: Greek Iron and Copper

This Greek Iron sword is from the Metropolitian Museum of Art.

The Chalkidiki Peninsula has 15 million tons of copper.

Greece has 200 small "soft" iron deposits and iron-nickel laterite 130 kilometers north of Athens with 200 million tons of ore.

Fossils of Greece lecture notes

Slide 1: Greetings and welcome to the next presentation on the fossils of Greece. I am William Schmachtenberg (rl) and Dae Miami (sl). Feel free to email me: wschmachtenberg@gmail.com

Slide 2: Greece has a long geologic history of fossils. Over 10,000 fossils have been found and recorded from Greece! Some of the oldest fossils lived in Greece prior to the Dinosaurs during the Paleozoic (540 to 243 million years ago), and they increased in abundance during the age of dinosaurs known as the Mesozoic (243 to 66 million years ago). During the Paleozoic and Mesozoic, the seas covered the land and only marine organisms lived in Greece. Dinosaur fossils have not been found in Greece for this reason. During the Cenozoic era (66 to 0 million years ago) animals invaded the land in Cenozoic.

Slide 3: The oldest fossils ever found in Greece are these tooth-like fossils called conodonts. They lived around 430 million years ago. The are believed to have come from this eel like animal shown on the right.

Slide 4: By 270 million years ago, the first marine shelled animals called brachiopods appear in Greece.

Slide 5: By 245 million years ago, the oceans are teeming with microscopic life. Calcium carbonate Foraminifera and silica Radiolaria are found in the rocks in Greece

Slide 6: Also, around 245 million years ago, we see shelled brachiopods and snail shells appear in Greece.

Slide 7: The first of the ammonites appear 245 million years ago in Greece. These animals are related to the modern squid or more precisely the shelled Nautilus found in the deep oceans of the Pacific Ocean today.

Slide 8: Fish also appear from 245 to 66 million years ago in rocks in Greece. Notice the strange needle nose fish on the right.

Slide 9: After the mass extinction at the end of the Mesozoic, new animals appear both on land and in the water such as this fish.

Slide 10: From 5 to 14 million years, mollusks dominate the seas of the Aegean. Oysters, high spired snails, and scallops are particularly commons as fossils.

Slide 11: Conus shells appear 13 million years ago in Greece. Don't let the pretty colors of these cones shaped shells fool you. Modern ones can kill a human!

Slide 12: By 7 million years ago, mammals such as early giraffes, aardvarks, and Hyenas appear in Greece.

Slide 13: And my favorite animal the rhinoceros also appear in Greece as fossils by 7 million years ago.

Slide 14: By 2 million years ago, ice age animals roamed Greece including mammoths, deer with huge antlers, and Leptobolus, which was similar to modern day Bison.

Slide 15: During the Pleistocene or ice ages large cats like Meganthereon roamed Greece. These cats may have been the ancestors of saber toothed cats.

Slide 16: Colubrinae snakes shown on the left gave rise to modern forms which are powerful enough to kill a human The!

Slide 17: Other common forms of animals also appear during the ice age including horse, hippos, frogs, tortoises, cats, wolves, and the majestic Eagle!