

The Islands of the Saronic Gulf, and Methana

The Saronic Gulf is, for the most part, a Neogene graben. It is closely related to the Gulf of Corinth graben on the other side of the isthmus of Corinth (Fig. 5.1). Both are similar in age and both are still actively forming today, although the rate of movement on the Gulf of Corinth graben is greater.

Two of the islands of the Saronic Gulf, Poros and Aegina, together with the peninsula of Methana, are partly volcanic (Fig. 5.1), and are the northernmost major expressions of the South Aegean volcanic arc. The ultimate origin of the volcanism is the subduction of the African plate beneath the Aegean plate. Earthquake locations show that the slab of old oceanic floor and its underlying crust lie at a depth of 200 km. Volcanism occurs here because of the deep graben faults of the Saronic Gulf, which have guided the magmas produced in the mantle through the crust to the surface.

Aegina

Aegina is a dry, infertile island, relying on wells for its water. While the interior is mountainous, much of the north-western part consists of a plain, producing chiefly pistachio nuts. For long the inhabitants have lived by seafaring, manufacturing, sponge-fishing and, recently, tourism.

Aegina has a long history of settlement, starting in the Neolithic, about 3500 BC. Around 2000 BC, at the start of the Middle Bronze Age, the island was enriched by two further waves of invaders: Mycenaean Greeks from mainland Greece and Minoans from Crete. They seem to have settled down happily together near the present town of Aegina,

where the Temple of Apollo would be built, and above the Bay of Ayia Marina, where the Temple of Aphaia was to stand. About 1000 BC there was a further settlement of Greeks – Dorians from Epidauros in the Argolid – who established their capital, Aegina, where the town of Aegina stands today. By 600 BC they possessed the finest fleet in Greece, had founded many colonies, and struck the first coinage in Greece west of the Aegean. But by the middle of the fifth century BC their greatness was over, and they were subjugated in succession to Athens, Macedonia, Pergamon, Rome, Constantinople, Venice and Turkey. In 1826 the town of Aegina had its last brief hour of glory, when it became, for two years, the first capital of liberated Greece.

Aegina lies in the Sub-Pelagonian zone and much of the basement of the island is made of the characteristic Triassic-Cretaceous limestones of this zone (Figs. 4.1, 5.1).⁶⁰ However, these rocks are only exposed on a series of low hills in the north-central part of the island. Elsewhere in the northern part of the island they are covered with a layer of Pliocene marine marl and limestone, with minor andesite lavas and tuffs (see below).

In the southern and eastern parts of the island volcanos erupted large quantities of dacite tuffs, breccias and lavas about four million years ago.^{205, 60} Following this event there was a pause until the end of the Pliocene, about two million years ago, when volcanism recommenced for a brief, but important, period. Initially, a small lava flow was erupted in the south-west and flowed into the bay of Marathon. Activity then shifted to the centre of the island: andesite lavas flowed from vents on

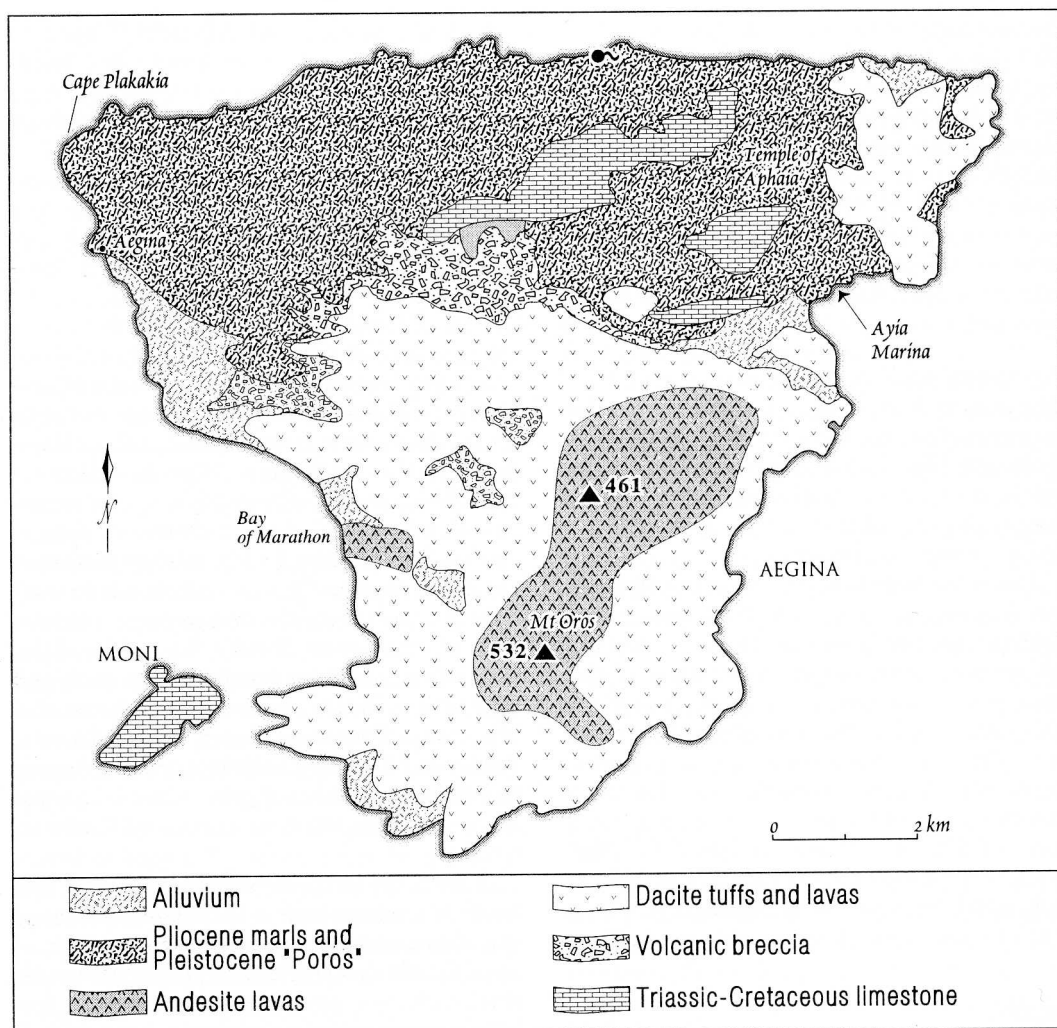


Fig. 4.1. Aegina (after 60 and other sources).

Oros and Lazarides to build the present edifices, now 532 and 461 m high. Since then volcanism has ceased on Aegina and appears to have migrated to Methana, 10 km to the south-west.

During the Pliocene, following the volcanism, much of the northern part island was submerged and yellow sandy marls and impure limestones were deposited. Relative sea-level fell during the Pleistocene, exposing wide beaches. Winds transported the exposed calcareous sands inland, and deposited them

at elevations up to 180 m, in a layer less than 10 m thick. Percolating rainwater dissolved part of the sand and cemented the rock to form a porous light-weight rock locally called Poros. This rock was widely exploited here, as elsewhere in the Aegean, for rough construction and sub-structures of buildings. That used in Athens may have come from quarries near Cape Plakakia.²¹⁷

There is a warm spring (25°C) on the north coast of Aegina. This is not directly related to the volcanism, which is much too old, but may

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be controlled by the same fault system that guided the magmas towards the surface.

The town of Aegina

The town of Aegina is constructed on Pliocene marly limestones that have been exposed where a small stream cut down through the Pleistocene Poros sandstone that covers Cape Colona, just to the north of the town, and much of the north-west of the island.

Ayia Marina and Temple of Aphaia

The bay of Ayia Marina was formed by the erosion of softer Late Pliocene sediments between two headlands of more resistant volcanic rocks. Above the bay lies the Temple of Aphaia, which was constructed on a ridge between low hills of hard limestone to the west and dacite lavas to the east. The oldest rock exposed here is a pale grey, hard limestone of Triassic age, which was covered with a thin layer of soft, porous, shelly yellow limestone during the Pliocene. In places both these rocks are covered with Pleistocene marls and limestone called Poros.

The temple was constructed largely of the local soft yellow Pliocene limestones. This rock has few joints, as it has never been deeply buried, hence many of the columns are monolithic. It was covered in stucco, partly for decoration and partly to protect the surface from erosion. The sculpture was carved from marble from Paros. Blocks of dacite were also used in the construction of the priests' houses. A well or cistern has been excavated through the Poros into the underlying Pliocene limestone. As on Delos the Poros layer is less permeable and reduces evaporation of groundwater from the underlying limestones.

Poros

The island of Poros, some 15 km south of Aegina, is separated from the Argolid by a narrow channel (Figs. 4.2, 5.1). Known in antiquity as Kalauria, it is composed of low rocky hills covered with pines, and is a popular holiday place for Athenians.

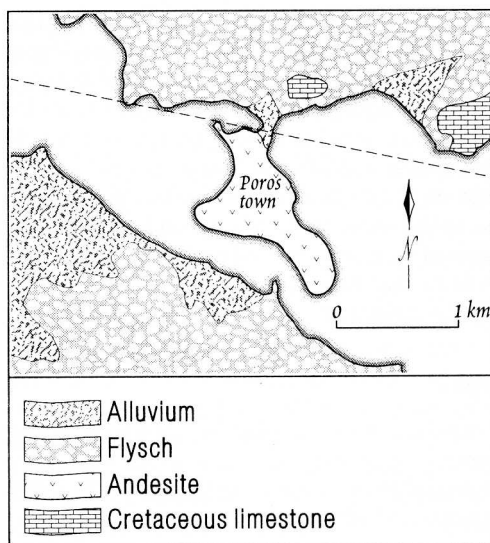


Fig. 4.2. Poros town.

The channel separating Poros from the mainland is 1-2 km wide, except where the town of Poros almost blocks it. It was formed by erosion of rocks adjacent to a fault running parallel to the coast. It continues to the west under the lowland that separates Mt Aderos (south of Methana) from the mainland and along the south coast of the Saronic Gulf to Palaia Epidauros (near Epidauros). This fault is part of a series which produced the Corinthian and Saronic Gulfs in geologically recent times (see Corinth).

The main part of the island of Poros has a very different geological history from that of the peninsula on which the town of Poros stands. The western and north-eastern coasts are made up of Mid-Cretaceous limestones (Fig. 5.1). Above these rocks, and exposed in the centre of the island, is a series of flysch sediments. Fragments of ophiolite suite rocks, now metamorphosed into serpentinite and other rocks, were incorporated into the flysch during closure of an ocean. The mainland opposite Poros is made up of similar flysch.

The town of Poros is built on a small ancient volcano connected to the mainland by a low isthmus. The rocks here are andesites with abundant phenocrysts of plagioclase and am-

phibole. The matrix is grey, except where the rocks were originally close to the surface. Here, loss of water has produced oxidation of the iron minerals which gives a pink matrix. The rocks formed as a series of lava domes, one of which developed a small flow to the south-east. These rocks were extruded about three million years ago, at the same time as lavas on Aegina.⁹⁴ The magmas were channelled to the surface along the fault that runs between the island of Poros and the mainland.

Hydra

Hydra is a long, narrow island south of the western tip of the Argolid (see Fig. 5.1). It is inhospitable, waterless, and infertile. For this reason the Hydriotes took to the sea in Turkish times and became famous mariners. During the Greek War of Independence they earned great renown for their feats of bravery.

The island of Hydra is almost completely made up of Triassic and Jurassic limestones, similar to those in the Argolid peninsula to the north (see Fig. 5.1). The massive and thickly-bedded limestones are resistant to erosion and make up the spine of the island. Permian and older sedimentary rocks occur sparsely on the south coast. Most rocks on Hydra have been tilted 20-30 degrees to the north to north-west, giving an elongation at right angles to this of the outcrops of the different rocks, the topography of the hills and indeed the island itself.

Methana

The peninsula of Methana is linked to the Peloponnese by an isthmus only 300 m wide (Figs. 4.3, 5.1). Unlike many narrow isthmuses this one is made of rock, a limestone, which continues to the first hill of the peninsula. The interior rises up to the barren volcanic slopes of Mt Chelona (742 m). The ancients were probably attracted to Methana for its hot springs.

Most of the rocks exposed on the peninsula are volcanic in origin, but this volcano, like the others in the Aegean, was constructed on a foundation of non-volcanic rocks: Mid-Cretaceous limestones and minor conglomerates of the basement are exposed on the isthmus and

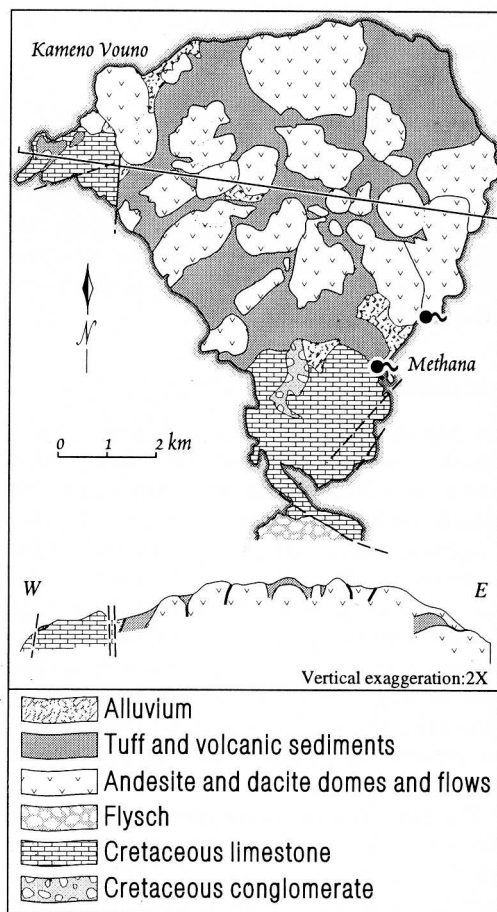


Fig. 4.3. Methana peninsula.

on the hill of Asprovouni to the north, whereas Triassic to Jurassic limestones occur in the western part of the peninsula. The latter are exposed here because they have been uplifted by movements of a fault since the volcanism started.

Volcanism started on Methana about a million years ago. Magmas rose up from the mantle and were guided by faults of the Saronic graben. The volcanic rocks of the peninsula are andesites and dacites, some with phenocrysts of plagioclase, amphibole and pyroxene. They occur as a series of domes and short lava flows which stand high above the minor ashes produced by these eruptions.²⁰⁶

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They appear to have been extruded from a series of different fissures around the central peak of Chelona.

The last eruption was of andesite from a vent near the north-west coast of the peninsula, Kamenó Vouno.¹¹⁹ This eruption is thought to have occurred sometime between 276 and 239 BC.²⁵⁸ Initially the magma formed a dome, which collapsed to give a crater after it was drained by a lava flow. The flow went towards the coast and into the sea, to give a lava field 2 km long and up to 1 km wide with a total thickness between 150 metres and 70 metres. Small amounts of ash from this eruption have been preserved on the limestones to the west. These young volcanic rocks can be seen clearly from the village of Driopi on the mainland.

Despite the small size of this eruption, it may have had a important effect on the atmosphere by the emission of large amounts of the gas sulphur dioxide. Layers of ice drilled from

deep in the glaciers of Greenland are rich in sulphuric acid during the period 260 BC, with an error of 30 years, and this may be due to this eruption (see Thera). Also the winter of 270/269 BC was noted in Rome to be particularly cold. However, both these effects may have been produced other eruptions elsewhere.

There are hot springs on the north and south-west coasts as well as the well-known springs around the town of Methana, which issue at 34 and 41°C.¹ The largest spring issues south of Methana through the limestone near its contact with the volcanic rocks. All these springs may be related to the volcanism as the geologically recent eruption indicates that magma is present beneath the peninsula. However, it is also possible that they originate by circulation of rain and sea water down deep faults where they are heated by the normal increase in temperature with depth and rise towards the surface.