INTENSIVE COURSE IN BIOLOGICAL ANTHROPOLOGY
1st Summer School of the European Anthropological Association
16–30 June, 2007, Prague, Czech Republic

EAA Summer School eBook 1: 11-18

SIGNALS OF EVOLUTION IN THE TERRITORY OF GREECE. PALEOANTHROPOLOGICAL FINDINGS

Christos Valsamis
Democritus University of Thrace, Komotini, Greece

Abstract

Greece is a country (Fig. 1), situated in South Eastern Europe and also a crossroad between East and West. In this country, the last 40 years have been discovered some significant paleoanthropological findings which I will try to present in this paper.

Figure 1: Greece.

Lakonis

Lakonis is a part of Mani peninsula and is located in Southern Greece, in Peloponese (Fig. 2). This peninsula is highly karstified with numerous fossil – bearing deposits. Other sites in the region, from Middle to Late Pleistocene, include position Apidima (where two fossil human crania were found, of possible Middle Pleistocene era) and positions Kalamakia and Elea (Middle Paleolithic sites).

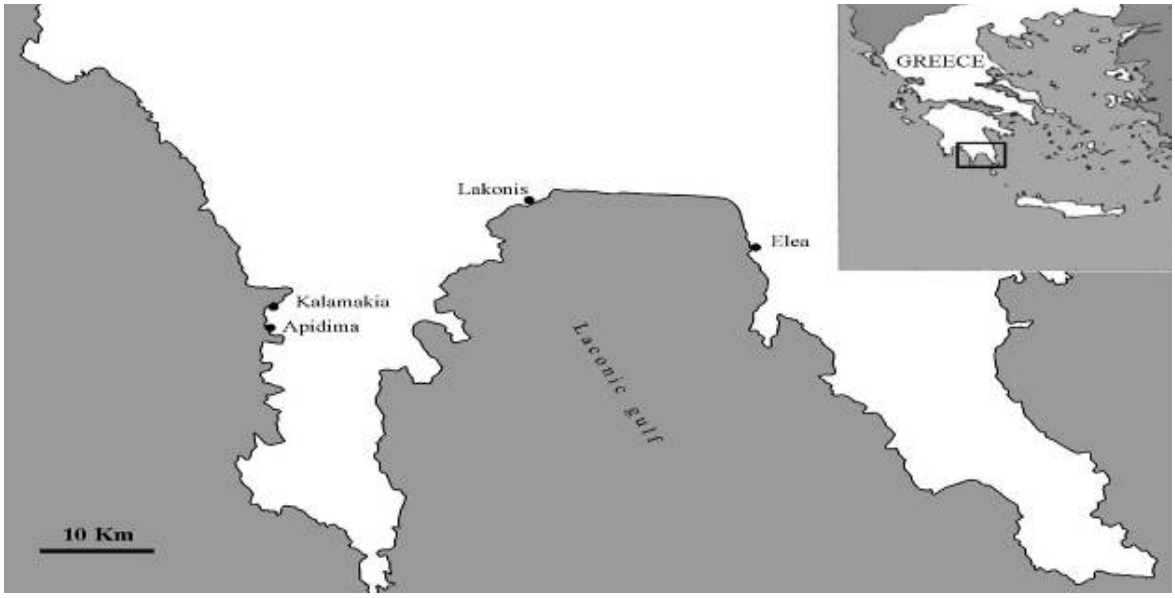

Figure 2: Lakonis.

Lakonis has been the focus of an interdisciplinary project of the Ephoreia of Palaeoanthropology-Speleology in collaboration with other Greek and international research institutions since 1999. Lakonis locality I is the longest stratigraphic sequence among the Lakonis localities (Fig. 3).

The Lakonis I sequence can be divided into five successive stratigraphic units (I – V). In these units scientists found very interesting tools such as blades, bladelets and also endscrapers. It is also present the distinctive “index Fossil” of comparable assemblages of the Eastern Mediterranean. This combination of features is also found in other cave sequences of the Near East (cf. Kuhn et al., 1999; Bar-Yosef and Kuhn, 2000) and south-eastern and central Europe (Kozlowski, 2001). But the most impressing finding was a well-preserved lower left molar, with the buccle part of its mesial root component missing. It shows no caries or other pathologies and wear facets are present on all cusps and a small area of exposed dentine is also present on the metaconid. If the attribution of this as a third molar is correct, then this individual would have been over 35 years old at death, and possibly older, based on the attrition scale developed by Miles (1963). In its crown dimensions it measures 11.55 mm in length (mesiodistal) and 10.90 mm in breadth (buccolingual). Aberrant root morphology as root fusion and accessory roots is relatively common in third molars (Scott and Turner, 1997). The fusion of the roots suggests taurodontism (Lebel et al., 2001; Lebel and Trinkaus, 2002) and a radiograph of the tooth reveals a slightly enlarged pulp cavity (Fig. 4).

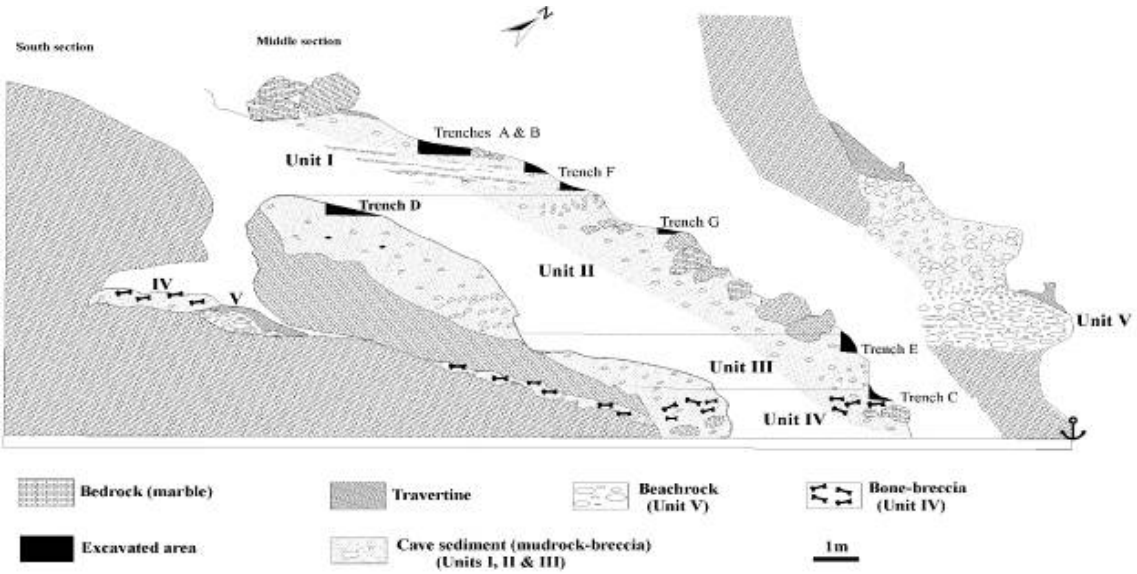

Figure 3: Lakonis localities.

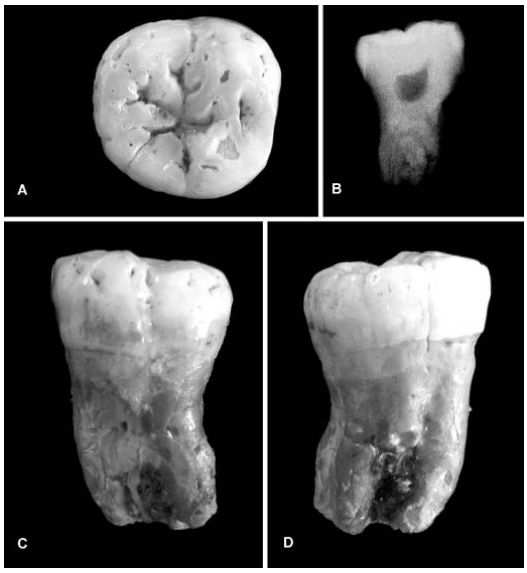

Figure 4: A Neanderthal left M3. (A), occlusal view; (B) radiograph of lateral view; (C) buccal view; (D) lingual view.

Moreover, the attribution of postcanine teeth to either Neanderthals or early modern humans is difficult, because the two fossil human groups are often thought that they overlap significantly in crown size and morphology of these teeth (Smith, 1976; Klein, 1999). This mission is further complicated due to the fact that this specimen is a third molar, a real variable tooth. However, some recent advances in the study of Neanderthal postcanine teeth permit to suppose that it's the tooth of Homo neanderthalensis.

In terms of the crown dimensions, it falls well within the relatively wide range of Neanderthal lower third molars and close to the Neanderthal average. In addition to its crowns morphology, it also shows slight taurodontism which is a distinctive Neanderthal trait (Keith, 1913). Concerning all these feautures, this molar is considerated to be as the first identified Neanderthal specimen to be recovered from Greece.

Apidima

Paleoanthropological research in the Mani peninsula, at southern Peloponese, began in 1978 when a research group under the direction of T. Pitsios started excavating in the area. The Apidima site, the most important site in the region, was first excavated the same year. It consists of four small caves, designated from A to Δ, and they were formed by erosion in the mainly Mesozoic limestone country-rock. The caves open on the face of a large sea cliff and are today only accessible by boat (Fig. 5).

Figure 5: The Apidima sea-cliff, showing the four cave openings and Professor T. Pitsios (seated farthest left) approaching the ‘‘bench.’’

Fossil bones and stone tools were found in all four caves. During the first season, a fossil hominin cranium (known as Apidima I) was observed in situ, and after removing of some of the material that it was surrounded in the rock, a second, better preserved, hominin cranium (Apidima II) was found adjacent to the first. Part of the removed block was mechanically prepared in 1985 in order to reveal this second cranium (Fig. 6). Moreover, upper Paleolithic artefacts and faunal remains have also been recovered from cave, as well as an almost complete human skeleton which is believed (Momferatou and Pitsios, 1995) to be a female burial.

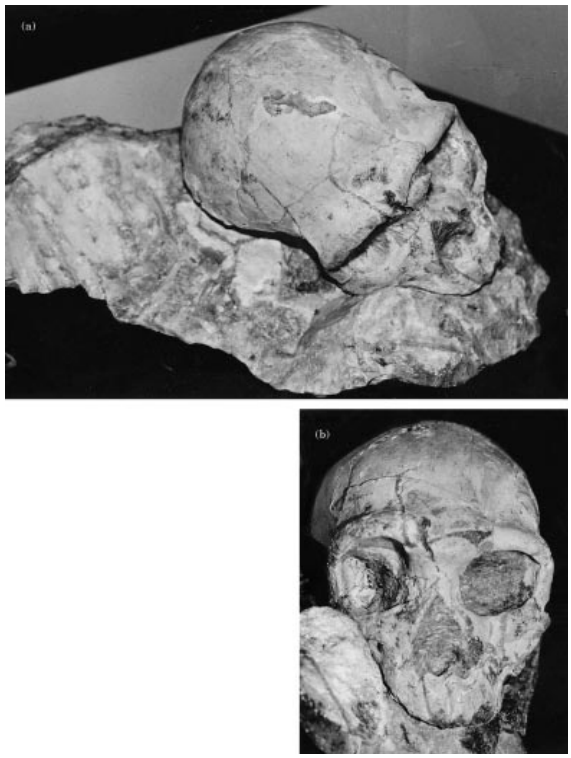

Figure 6: Cast of the Apidima II cranium (on exhibit in the AMUA).
(a) Oblique superior view showing cranium resting on smaller breccia block; (b) Frontal view.

The natural cross-section for the Apidima I cranium, sliced through the vault and perhaps could be seen on the surface of a larger block. Cranium II had been removed from a smaller block. The surface of the specimen was cracked but it appeared well-preserved. Most observers agreed that the inferior border of the nose, the brows and other aspects of the face appeared clearly Neanderthal – like. At first glance, the specimen appears to be either a late “pre-Neanderthal” or an early Neanderthal, stage 2 or 3 in the model developed by Dean (Dean et al., 1998).

Halkidiki

Halkidiki is located on the north-central part of Greece in the geographical area, called Central Macedonia (Fig. 7). In this beautiful place we have some of the most well known and famous paleoanthropological findings of the greek land.

According to mythology, Halkidiki was the place where a huge battle took place, opposing Zeus and the other Olympian Gods to the Giants, children of Gaea (Mother Earth) and Uranus. Enceladus, the Giant’s leader, was buried alive in Cassandra. Since he sometimes tries to break free from his tomb, he is the source of earthquakes in the whole region.The prong of Cassandra took its name from Cassandros, the king of Macedonia. Sithonia was named after Sithon, the son of the god of the sea, Poseidon, and Athos owes its name to the giant Athos, who threw an enormus rock at Zeus but he missed his target. Established organised societies flourished in the west and central Halkidiki around the 4th century BC, among which the city of Olynthos was the most important one. Its oldest inhabitants were the Thracians and the Pelasgoi.

During the 5th century, Halkidiki took part in the Persian Wars, which result in a siege of Olynthos which inhabitants were all killed by the Persians. After the victory of the Greeks in Salamina (in 480 BC), the inhabitants of the two big cities of Olynthos and Potidea revolted against the Persians and drove them out of their cities. After the Persian Wars, the big cities of Halkidiki became members of the Athenian Alliance and participated to the Peloponnesian Wars (431-404 BC). In 348 BC, Halkidiki became a part of the Macedonian kingdom, under Philip's control. With Alexander the Great, the cities of Halkidiki increased in number. Among the new cities was the city of Thessaloniki, the city of Cassandria, the city of Uranoupolis and the city of Antigonia, north of the present Nea Kallicrateia. In 168 BC, Halkidiki came under Roman domination. In the 9th century the first monastery was built on the peninsula of Athos. In the 11th century, the peninsula was given the name of "Holy Mountain" by a decree of a Byzantine emperor. In 1430, the Turks took Halkidiki from the Venetians. The first call for freedom was made on May in 1821 at Polygyros, at Caryes and at Cassandra. Some attempts of revolution took place in some parts of Halkidiki but were stopped by the Turks. Many of the inhabitants of Halkidiki joined the forces of Pavlos Melas and other fighters for freedom. Halkidiki was free from the Turks in 1912 and became part of the Greek province of Macedonia.

In 1921, refugees from Asia Minor (after the catastrophe), Eastern Thrace and Bulgaria moved to Halkidiki, bringing a new economic and political strength. They founded about 30 new villages and small towns such as Nea Fokea, Nea Skioni, Nea Moudania.

Figure 7: Halkidiki.

Ravin de la Pluie, Xirochori and Nikiti

In these three areas (De Bonis and Melentis, 1977) there were found remains of the Ouranopithecus macedoniensis (Graecopithecus freybergi). The type of this specimen is RPL 54, an adult female which can be dated with reasonable certainty, to the end of the Vallesian, about 9 Mya (Bonis et al., 1988*a*; Koufos, 1990; Mein, 1999; Steininger, 1999).

Ouranopithecus macedoniensis is known from a large number of jaws and teeth, and two unpublished phalanges. It was the largest hominoid from Europe, with the male in the size range of female gorillas. Male canines are tall and compressed, but small in cross-section compared to molar size. Female canines are very low-crowned and broad, almost premolariform (Koufos, 1995). Female mandibles tend to be robust and male mandibles tall, but nevertheless transversely more massive than in living hominids. A broad and long planum reinforces the mandibular symphysis, which shows a shallow genioglossal fossa. One specimen preserves a gonial region, which is extensive with strongly developed ridges for the medial pterygoid muscle. The same specimen preserves a condylar process and condyle, which, though damaged can be described as relatively large. Palates are relatively deep, broad anteriorly and parallel-sided. Unlike most hominids, the zygomatic roots apear to arise from a low position on the maxilla.

The midface is transversely flat and concave superoinferiorly, though less than in Asian great apes. The interorbital space is very thick, and the lateral orbital pillars are massive, with their surfaces oriented anterolaterally. The supraorbital tori are only modestly developed, again most like those of *Dryopithecus*. *Ouranopithecus* was a comparatively large great ape, possibly 50 to 70 kg in size, though because it is mostly known from jaw fragments and appears to have been megadont, estimates are difficult (Fig. 8).

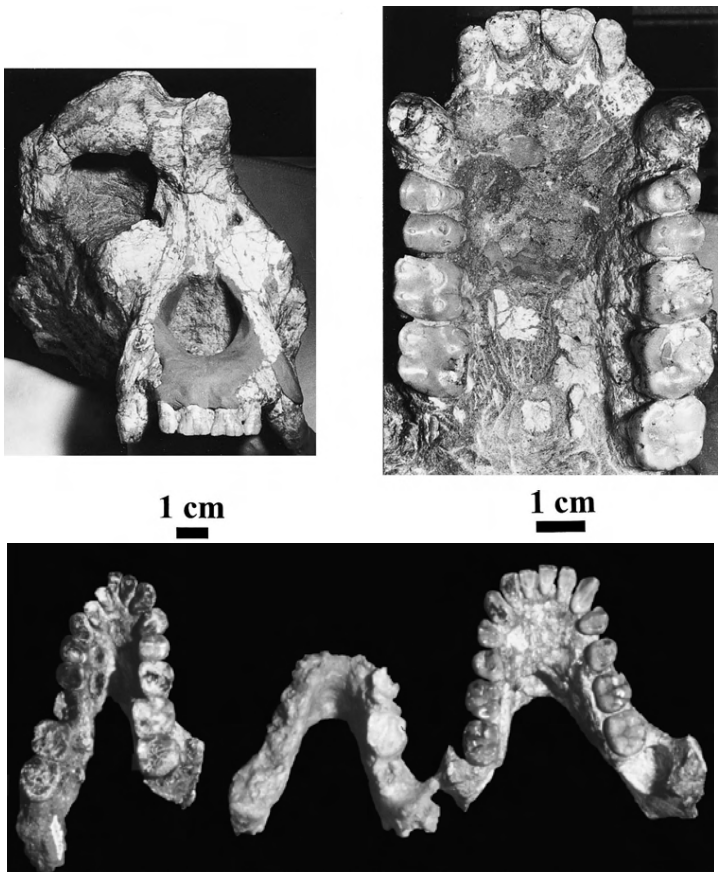

Figure 8: Ouranopithecus macedoniensis. (A) Frontal (left) and palatal (right) views of a male cranium (not to the same scale). (B) Three mandibles from Greece; the specimen in the middle is a cast of the type of Graecopithecus freybergi, between female mandibles from Nikiti to the left and Ravin de la Pluie (the type) to the right.

Petralona

In 1960 a hominid cranium and four additional isolated teeth were discovered in alime stone cave close to the village of Petralona on the Halkidiki peninsula in Greece (Fig. 9). These remains were discovered in a cave in the Katsika (Goat) Hill near the village of Petralona, Halkidiki in 1960 and in 1965 (Kokkoros & Kanellis, 1960; Marinos, Yannoulis and Sotiriadis, 1965). Analysis of the faunal material indicates that the hominid cranium was associated with cave deposits dating possibly to the Middle Pleistocene (Kretzoi, 1977; Kurten and Poulianos, 1977). It was encrusted by a brown calcite coating, which must have covered this well-preserved skull relatively soon after the hominid's death. Trace element patterns, as they were established via neutron activation analysis (NAA) as well as ESR-dating of 3 samples, prove that the calcite covering the cranium belongs to the same stratum as the top calcite layer covering the stalagmitic floor at the place of discovery (N.I. Xirotiris, 1980).

Since the discovery of fossil hominid cranium of Petralona cave in 1960, this surface finding caused much debate. After estimations, it is computed to a maximum age of 70.000 years to approximately 670.000 years B.P., between Neanderthalian and Homo erectus (N.I. Xirotiris, 1979). The most suitable technique that could be used for the absolute dating methods was ESR for the following reasons:

a) The presumed age would be beyond the limits of any radiocarbon dating technique.
b) The amount that was available and its low concentration in uranium made u-series dating ineffective.
c) The high opacity of the material would interfere with the TL-signal of calcite.

The period between the deposition of the skull and the beginning of its calcite encrustation must have been short, at most 1000 years (Xirotiris N. J., G.J. Hennig, E. Weber and W. Herr, 1980). Otherwise the bone material of the cranium would have mouldered away in the humid atmosphere of the cave. On the contrary the cranium is in an excellent state of preservation. However, there are two facts that indicate a short deposition period of 2.000 – 3.000 years at most:

a) The fragments of the calcite that were removed from the skull are only 1-2 mm in thickness and don't show any lamination.

b) Typical vertical growth rates for speleothem deposits like this and are in the order of 1-10 mm/1.000 y. For Petralona cave, growth speeds of 0.9mm/1000y and ~ 1mm /1.000 y were reported.

It can be concluded that the age of the Petralona hominid and the average formation age of the calcite layer encrusting the skull, should not differ by more than 3.000 – 4.000 years (N.I. Xirotiris, 1980)

The necessary proof was given only via ESR-age determination (Xirotiris N. J., G.J. Hennig, E. Weber and W. Herr, 1980), and by comparing the respective trace element patterns. There were used pieces of tree samples:

1. The calcite layer encrusting the skull
2. The top calcite layer of the adjacent travertine floor
3. The basal travertine of the travertine floor beneath

The trace element patterns were established via instrumental neutron activation (INAA) techniques, using 150 mg of each sample.

The data suggest a possible age interval of 150.000 to 250.000 y for the age of the Petralona hominid.

The isolated teeth that were found were originally described as: an upper right second premolar (RP), an upper right canine (RC), an upper left canine (RC) and a lower left canine (LC) – belonging to another individual (Xirotiris N., David G. Gantt, Bjorn Kurten and J.K. Melentis ,1980).

The four supposedly hominid teeth were obtained for SEM analysis but due to the methodology of preservation and the reconstruction of the left corner of the crown of the right upper second premolar with wax, the specimens had to be chemically treated to remove the wax and the preservatives. And as a result the roots have been smashed.

The analyses of all four teeth revealed an identical pattern, showing a walled hexagonal prism. This prism pattern is common among the carnivores. In addition to the four isolated teeth and a fragment from the skull, several late Pleistocene cave bear (Ursus spelaeus) teeth from caves near Odessa, similar to those from Petralona cave were studied.

Preliminary prism analysis of a premolar of Ursus deningeri from the Homo erectus site of Bilzingsleben shows an identical pattern to the cave bear of Petralona. After the analysis of the structure has been provided an important clue that the questionable specimen not only they were removed from the set which were previously described as hominid, but also they have been identified as part of the genus Ursus, probably Ursus deningeri (Xirotiris N., David G. Gantt, Bjorn Kurten and J.K. Melentis,1980).

Figure 9: A hominid cranium from Petralona.

Significance of the findings

All these paleoanthropological findings in the territory of Greece, have given us a lot of important information concerning our past, have answered questions that could not be explained and in addition, they were useful for the dating of other findings .Although there are many disagreements about some of these findings, the point is that each of these findings have led to different conclusions in regards to the past, and they demonstrate the need to reject or to accept numerous theories.

References

Bonis, L. de & Koufos, G. (1993). The face and mandible of *Ouranopithecus macedoniensis:* description of new specimens and comparisons. *Journal of Human Evolution*, **24**, 469–491.

David R. Begun (2002). The Primate Fossil Record, Cambridge University Press.

K. Harvati, Eleni Panagopoulou & Panagiotis Karkanas (2003). First Neanderthal remains from Greece: the evidence from Lakonis. Journal of Human Evolution 45, 465 – 473.

K.Harvati & E.Delson (1999). Conference Report: Paleoanthropology of the Mani Peninsula (Greece). Journal of Human Evolution 36, 343 – 348.

Koufos, G. D. (1995). The first female maxilla of the hominoid *Ouranopithecus macedoniensis* from the late Miocene of Macedonia, Greece. *Journal of Human Evolution*, **29**, 385–389.

Panagopoulou, E., Karkanas, P., Kotjabopoulou, E., Harvati, K., Tsartsidou, G., Ntinou, M. In review. Late Pleistocene archaeological and fossil human evidence from Lakonis cave, Southern Greece. J. Field Archaeol.

Pitsios, T. & Liebhaber, B. (1995). Research conducted in Apidima and the surrounding region 1/N TaenariosMan. *Acta Anthropologica* (Athens) **1**, 175– 179.

Tanya M. Smith, Lawrence B. Martin, Donald J. Reid, Louis de Bonis, George D. Koufos (2004). An examination of dental development in Graecopithecus freybergi (= Ouranopithecus macedoniensis). Journal of Human Evolution 46, 551 – 577.

Xirotiris N. J., G.J.Hennig, E. Weber and W. Herr (1980). ESR-dating of the Fossil hominid cranium of Petralona Cave, Greece.

Xirotiris N., David G. Gantt, Bjorn Kurten and J.K. Melentis (1980). The Petralona Dentition- Hominid or Cave Bear? Journal of Human Evolution 9, 483-487.

Mailing address: Christos Valsamis
Democritus University of Thrace
Department of History and Ethnology
Komotini, Greece