The landscape and environment of Etruria

Book Section

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69 The landscape and environment of Etruria

Abstract: Etruria, homeland of the Etruscans, lies on the western coast of Italy to the north of Rome. Its approximate boundary to the south and west is the Tiber River, which flows from Monte Fumaiolo in the Casentino through northern Umbria past Perugia and Orvieto and then to Rome and the sea at Ostia. To the north, Etruria is approximately bounded by the Arno River flowing from Monte Falterona past Florence and Pisa to the sea. To the west, Etruria is washed by the Tyrrhenian Sea, part of the Mediterranean Sea enclosed between Italy and the large islands of Sardinia, Corsica, and Sicily. Off shore lies the Tuscan archipelago, an arc of small islands the largest of which are Giglio, Elba, and Capraia. These, along with Corsica, are all visible from the mainland.

Keywords: geology, mountain, river, drainage basin, enviroment

1 General location

Etruria, homeland of the Etruscans, lies on the western coast of Italy to the north of Rome (Fig. 69.1). Its approximate boundary to the south and west is the Tiber River, which flows from Monte Fumaiolo in the Casentino through northern Umbria past Perugia and Orvieto and then to Rome and the sea at Ostia. To the north, Etruria is approximately bounded by the Arno River flowing from Monte Falterona past Florence and Pisa to the sea. To the west, Etruria is washed by the Tyrrhenian Sea, part of the Mediterranean Sea enclosed between Italy and the large islands of Sardinia, Corsica, and Sicily. Off shore lies the Tuscan archipelago, an arc of small islands the largest of which are Giglio, Elba, and Capraia. These, along with Corsica, are all visible from the mainland.

In general terms, the sea level along the coast of Etruria over the past 4,000 years has been stable, with an estimated change in effective sea level from approximately –2.0 m to –1.0 m below present levels, between 4,000 and 2,000 years before the present.[1] Compared to the contemporary coastline, sea levels not much more than 1.0 m lower than present will have created only localized differences in the shoreline or susceptibility to inundation, given that the tidal range in the Tyrrhenian Sea is approximately 0.4 m. Sea currents tend to circulate clockwise around the Tyrrhenian Sea.

1 Lambeck, Antonioli, Purcell, and Silenzi 2004; Lambeck, Anzidei, Antonioli, Benini, and Esposito 2004; Antonioli et al. 2009; 2011; Biserni and Van Geel 2005.

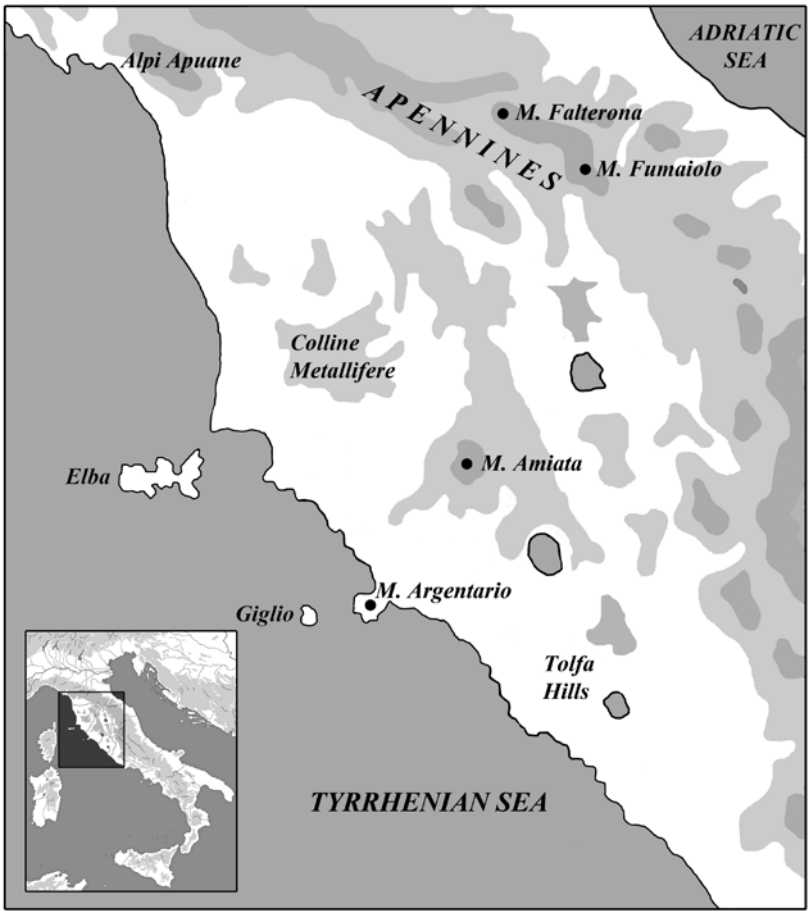

Fig. 69.1: Altitude and mountains in Etruria (drawing A. Blaickner).

2 Geology and Geomorphology

The northern part of the Italian peninsula was shaped by two ongoing geological processes. In the Mesozoic period (approximately 250 million–56 million years ago), sedimentary rocks formed in the Tethys Sea which lay between landmasses that were to become the continents of Europe and Africa. Toward the end of this period, the tectonic collision of the African and European plates caused these rocks to be formed into mountains, and a complex process of folding and faulting created the Apennine Mountains. As part of this process, the earth's crust to the west of the Apennines was stretched and fractured in a series of faults that created the northwest-to-southeast

ridges and valleys that provide structure to the Eastern parts of Etruria, through which now flow the Tiber, Arno, and the Val di Chiana. These separate the Apennine mountains from the mountains of Tuscany and Lazio that are sometimes called the Pre-Apennines or Anti-Apennines.

In the southern part of Etruria, this basic structure is overlaid by volcanic hills and plains created by a sequence of volcanic activity between 600,000 and 90,000 years ago. Although now extinct, the volcanoes are still visible in the landscape. The Alban hills south of Rome preserve the typical conical shape of volcanoes, and lakes now fill their calderas at the mountaintops. In southern Etruria, volcanic lakes and the remains of volcanoes punctuate the landscape at Lake Bracciano, Lake Vico and Lake Bolsena. These craters are surrounded by a thick layer of pyroclastic flows and ash deposits that have formed the *tufo* rock characteristic of the region that extends over most of the lower Tiber valley and southern Etruria as far north as the Fiora River.[2]

Farther to the north, in the center of Etruria but easily visible from Siena, is another older and larger extinct volcano, Monte Amiata, the highest point in Etruria (1,738 m). Yet older volcanism is responsible for the volcanic dome of the Tolfa Mountains (579 m) and the islands of Elba, Capraia, and granitic Giglio. Much of the remaining hilly areas of Tuscany are a complex mixture of Pliocene and Miocene clays, sandstones and marls, and Triassic schists. These were originally marine or lacustrine deposits, which were subsequently folded, faulted, and uplifted by tectonic activity.

The tectonic processes that have formed Etruria are still active, and earth tremors are common. However, in historic times, destructive tectonic activity (8+ on the Mercalli scale) has been rare outside the mountainous Apennine regions that form the boundaries of Etruria.[3] Less intense earth movements can cause severe damage in insubstantial stone and mud-brick Etruscan-type buildings and cause death and injury, but destructive or violent earthquakes are very unlikely to have been a significant cause of widespread devastation or socio-political change in Etruria.

The relatively soft geology of much of Etruria, along with torrential seasonal rainfall, has created a highly eroded landscape in many areas. Since the Pleistocene Period, ravines and canyons have formed in the relatively level volcanic *tufo* landscape of southern Etruria. In other parts of Tuscany, erosion and gullying of soft limestones, sandstones, clays, and marls, particularly when landscapes are deforested, has created steep V-shaped valleys and dissected ranges of hills. Nearer the coasts and in wider valley bottoms, the eroded material has accumulated as thick, level deposits of colluvium (hillwash) and alluvial deposits (river-borne silts). In many areas, mixed deposits of clays with other rock types create ideal conditions for landslips, particularly in areas of steep slopes or already eroded land. These actively

2 Narcisi and Anselmi 1998.

3 Guidoboni et al. 2007.

eroding landscapes have led to the filling of valley bottoms, so that they typically have steeply sloping sides and wide, flat bottoms. Repeated phases of deposition and down-cutting have often caused series of river terraces to be created on the flanks of the valleys. Such erosion has been accelerated over the past 5,000 years due to human action causing deforestation, which is often linked to agricultural activity or demand for timber. As a result, the presence of ancient sites in valley bottoms is highly likely to masked by later deposits that have prevented their discovery by techniques such as field survey and aerial photography. Landscape change of this type could well mean that sites from the early Etruscan period are underrepresented in the archaeological record because they have not been detected beneath thick layers of river sediment.[4] A further effect of this erosion has been the creation of small river deltas at the mouths of the Tiber, Ombrone, and Arno.

3 Environmental change and vegetation

The climate, environment and vegetation in the Etruscan period were generally similar to those of the present day. The most significant difference has been caused by extensive clearance of lowland forested areas for agricultural purposes in the Roman and especially recent periods. This has been followed by soil erosion on hills and slopes. Another important change has been the draining of coastal areas, in the first half of the twentieth century, which has dried up coastal lagoons and marsh land and enabled the cultivation of areas that were previously pasture or uncultivated land.

The Tuscan climate is characterized by its strong seasonality with hot dry summers and cooler humid winters and most rain in spring and fall, but it varies considerably, particularly with altitude.[5] Lower areas have a typical Mediterranean climate, but higher land has a more temperate climate (see Table 1).[6]

Evidence from lake cores, pollen records, and glacier advances suggests that Tuscany, in common with western Europe, experienced a cooler and wetter period in the first half of the first millennium BCE that was similar to current conditions and was followed by a warmer and dryer period until the third century CE.[7] This climatic variation drove changes in the natural vegetation in the Etruscan period with an increase in the proportion of turkey oaks (*Quercus cerris*) and pines (*Pinus sylvestris*) and a decrease in the proportion of the more drought-tolerant holm oaks (*Quercus ilex*) and downy oaks (*Quercus pubescens*). These changes need to be seen in the context of a

4 Hunt 1998; Sadori, Jahns and Peyron 2011.
5 Biondi and Baldoni 1994.
6 Adapted from Blasi et al. 1999.
7 Drescher-Schneider et al. 2007; Magny et al. 2007.

Table 1: Climatic and vegetation zones (adapted from Blasi et al. 1999, table 2 and Bartolini et al. 2008, table 1).

Zone	Mean temperature (°C)	Mean Summer temperature (°C)	Mean temperature in coldest month (°C)	Rainfall (mm)	Dry Period	Vegetation	Type
Coastal	15.5	26	3.5	616–826	3–6 months	Maquis, mixed oak / holm oak / cork oak woods	Mediterranean
Hilly areas near coast	15	28.5	3	813–1000	3 months	Maquis, turkey oak / mixed oak / holm oak / cork oak woods	Mediterranean
Hilly interior	14	26	1	962–1189	2 months	Chestnut woods, turkey oak / mixed oak / holm oak woods	Transitional
Higher hilly	13	26	1	1156–1397	1 month	Beech woods, chestnut woods, turkey oak / mixed oak / holm oak woods	Temperate
Lower mountain	11	21.5	1	1159–1447	0 months	Mixed deciduous woods, beech woods, chestnut woods, mixed oak / holm oak woods, spanish broom shrublands	Temperate
Upper mountain	7.5	21.5	–3	1430–1586	0 months	Beech woods, high altitude shrublands, mixed deciduous woods	Temperate

general reduction in tree cover that was caused by human activity from the Bronze Age onward. At the same time, there was an increase in the proportions of Mediterranean scrub (*maquis* / *macchia*) plants, such as juniper (*Juniperus*), and tree heather (*Erica arborea*), which are useful for making charcoal. Alongside these changes there was an increase in the proportion of economically important cultivated and wild plants, particularly the olive (*Olea europaea*), vines (*Vitis vinifera*), sweet chestnuts (*Castanea sativa*), walnuts (*Juglans*), and hazel (*Corylus avellana*), matched by an increase in weeds of cultivation.[8] Modern introductions, now common in Tuscany and Lazio, such as acacias, sunflowers, maize (corn), and tomatoes, would not have featured in the Etruscan landscape.

4 Regions, districts, and land forms

4.1 Coastal zone

The coast of Etruria forms a sub-region known as the Maremma. It is characterized by a low-lying coastal strip that rapidly transitions to steep hills, which would have been wooded, as most are now. Flatter areas of land only occur in the flanks of the river valleys where Pliocene or Pleistocene river terraces survive at a higher level than the contemporary river flood plains. Along the coastline, sea currents have created sandbars and coastal dunes parallel to the coast that caused lagoons to form. Together, in the Etruscan period, the river mouths and lagoons created an environment along the coast consisting of marshy areas and stretches of shallow brackish water that made the coastal strip narrower than at present. Few lagoons now survive, due to silting up as a result of soil erosion and human land drainage and reclamation activities. Only at Orbetello and Lake Massaciuccoli, near Pisa, are they of any size, but in Etruscan times the lagoons extended along much of the coast and were particularly extensive around the mouths of the Albegna and the Ombrone (ancient Lake Prile) and Pisa. At the mouth of the Ombrone, landscape change caused by the desiccation of Lake Prile has significantly affected the local environment of the hilltop Etruscan cities of Vetulonia and Roselle, which were formerly close to the shores of the extensive lagoon and are now much farther from access to the sea.[9] The low-lying coastal strip is divided into discrete areas at regular intervals where hills meet the sea directly. At Civitavecchia, the Tolfa hills close off the coastal strip that runs northward from the mouth of the Tiber. Continuing north,

8 Colombaroli, Marchetto, and Tinner 2007; Costantini et al. 2009; Drescher-Schneider et al. 2007; Mariotti Lippi et al. 2007; Sadori, Mercuri, and Mariotti Lippi 2010.
9 Bellotti et al. 2004.

Monte Argentario and Poggio di Léccio separate the coastal strip around Tarquinia and Vulci from the Albegna Valley, which in turn is separated from the Ombrone valley by the Monti dell'Uccellina, and the pattern of alternating stretches of flat coastland and hill continues up the coast of Tuscany.

4.2 Mountains

Other than the sea, the dominant geographic feature that defines Etruria is the arc of the Apennine mountains that encloses Etruria (Fig. 69.1). To the north and east, these high, rugged limestone mountains separate Etruria from the Po Valley and continental Europe and from the eastern coastline of Italy and the Adriatic Sea. To the south of the Tiber River, limestone mountains and the volcanic Alban Hills rise to between 1,000 and 2,000 m, completing the arc of mountains that surrounds Etruria. Although the Apennines rise to between 1,500 and 3,000 m, there are many passes below 1,000 m which provide crossing points in the mountain chain. Even if the Arno and Tiber Rivers form the traditional boundaries of Etruria, it is the mountains that define the region and ~~create a physical barrier to travel and define~~ local ecosystems.

In the northwest of Etruria, the Alpi Apuane rise steeply to nearly 2,000 m within 4 km of the sea. From there, the Apennines continue eastward, forming the northern flank of the Arno Valley. To the north of Florence, the upper reaches of the Sieve River form an upland basin, the Mugello, between the folds of the mountains, which creates a micro region between the Arno and the Po Valley to the north. Farther to the southwest, the upper reaches of the Arno Valley constitute the Casentino, a similar, inaccessible, mountain basin. The upper reaches of the Tiber, forming the traditional boundary of Etruria, also flow between high mountains. In contrast, Monte Amiata, in the center of Etruria, does not act in the same way as a barrier: river valleys tend to radiate from the mountain.

4.3 Drainage basins

Inland from the coast, Etruria is typically hilly. In southern Etruria the volcanic *tufo* created a level plateau that has subsequently been eroded by torrential rivers creating deep ravines leaving long, narrow, and flat fingers of land between (Fig. 69.2). This landscape is characteristic of the areas around Viterbo and to the north of Rome. Farther north, the hills are dissected by steep valley slopes, and the only flat areas are valley bottoms.

In Etruria, the major river valleys of the Tiber, Ombrone, and Arno define the topography and natural divisions of the land. The Tiber drainage basin dominates the territories of the ancient cities of Rome, Caere, Veii, Orvieto, and Perugia. Large stretches of the river were navigable, perhaps as far inland as Orvieto. On the Etrus-

Fig. 69.2: Drainage basins in Etruria (drawing A. Blaickner).

can bank of the river, a series of small rivers drains from the extinct volcanoes cutting across the *tufo* plateaus either into the Tiber to the east or into the sea. The largest of these, the Arrone River, flows from the caldera lake of Bracciano to the sea between the mouth of the Tiber and Caere. Farther north, the Marta River drains the lake of Bolsena, which is otherwise enclosed by the volcanic crater rim of the Volsini Mountains, into the sea near Tarquinia. Northeast of the lake, near Orvieto, the Paglia River, the largest tributary of the Tiber, flows from the slopes of Monte Amiata in the center of Etruria to join the Tiber. The Paglia Valley rapidly narrows as the terrain becomes more mountainous. The Tiber itself flows from the east, cutting down from its wide valley in the folds of the Apennines which cross Umbria from northwest to southeast (Fig. 69.3).

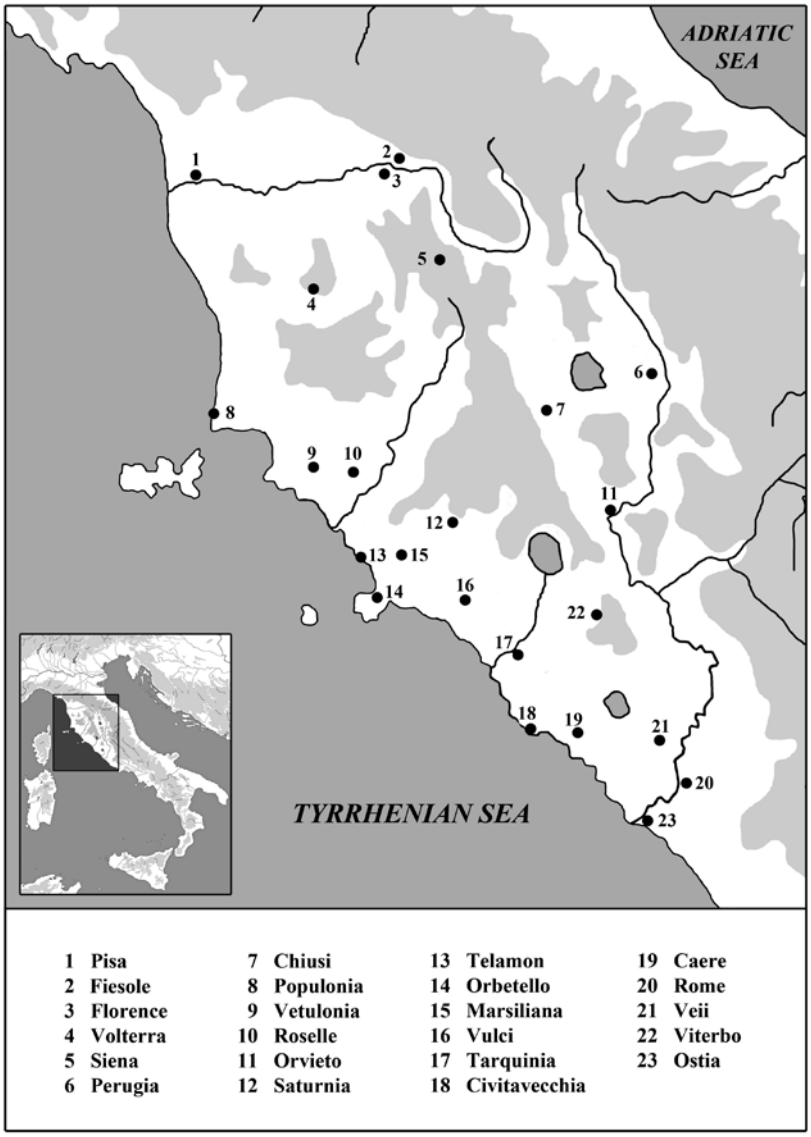

Fig. 69.3: Major sites in Etruria (drawing A. Blaickner).

To the, west the minor rivers flow from the volcanic mountains toward the sea in a generally northeast-to-southwest direction. The Fiora River rises on the southern slopes of Monte Amiata, flowing toward Vulci and the sea, approximately marking the boundary between the volcanic areas of southern and sedimentary areas of northern Etruria. Slightly farther west, the Albegna River flows from Monte Labbro to the

sea just to the north of the Lagoon of Orbetello. The Ombrone is much larger and in the Etruscan period drained much of northern Etruria into Lake Prile, now dry, which lay in the plains around Grosseto. The Ombrone rises deep in the interior of Etruria near Siena and takes a winding route through the dissected and eroded landscape of Etruria's interior. Its many tributaries drain the northern slopes of Monte Amiata, the hills of Chianti, and the Colline Metallifere, creating a very extensive but heterogeneous drainage basin that incorporates much of central Etruria.

Northern Etruria is defined by the Arno River. It rises in the Apennines and flows south, only to loop back toward the north enclosing the Prato Magno, a hilly area of woodlands and upland summer pastures. The river flows north through a wide and deep valley to the east of the Chianti hills. The convoluted course of the river was determined by a series of geomorphological changes in the drainage pattern of central Etruria. Initially, the Arno flowed south past Chiusi through the Val di Chiana to become a tributary of the Tiber flowing from the north of Etruria. In the Pleistocene, this route reversed due to silting, and the Arno subsequently flowed north toward Florence. The Val Di Chiana is still a significant valley in central Etruria, and in the Etruscan period it was marshy and contained shallow lakes; now only the small Lake Chiusi and Lake Montepulciano have survived modern drainage schemes. Slightly to the west, between the Val Di Chiana and Perugia, is Lake Trasimene. At over 125 km² it is the largest lake in peninsular Italy, but it is extremely shallow (4 m deep), and its level—and therefore its size—fluctuates with varying rainfall: it is likely to have been larger in the Etruscan period.

Returning to the Arno, at Florence the river flows into a wide, flat-bottomed rift valley which is now largely occupied by Florence, Prato, and Pistoia, but was, in Etruscan times, dominated by Fiesole in the east and the newly discovered urban settlement at Gonfienti in the center. To the southeast, the Arno cuts through the ridge of the Chianti hills and Monte Albano and flows east toward Pisa and the sea. This lower stretch of the Arno flows through a wide valley that in historic times has been susceptible to flooding. Between Empoli and Montecatini lie the Fucécchio marshes, a former lake, and in the Etruscan period a branch of the Sérchio River (the ancient Auser) flowed into the Arno near Biéntina, creating an extensive marshy area. The low-lying area around Pisa would have been marshy with coastal lagoons in the Etruscan period, and today only Lake Massaciuccoli survives to the west of Lucca, near where the Sérchio now flows into the sea. To the south of the Arno the parallel Era and Elsa Rivers flow from the southeast to the northwest, connecting Siena and Volterra to the Arno Valley.

To the East of Volterra, the Cécina River flows directly to the Tyrrhenian Sea. The Cécina, along with the smaller Córnia, Pécora, and Bruna, drain from the Colline Metallífere into the sea, rapidly transitioning from steeply sloped valleys to the flat coastal strip. In the Etruscan period, the Bruna flowed into Lake Prile, along with the Ombrone.

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