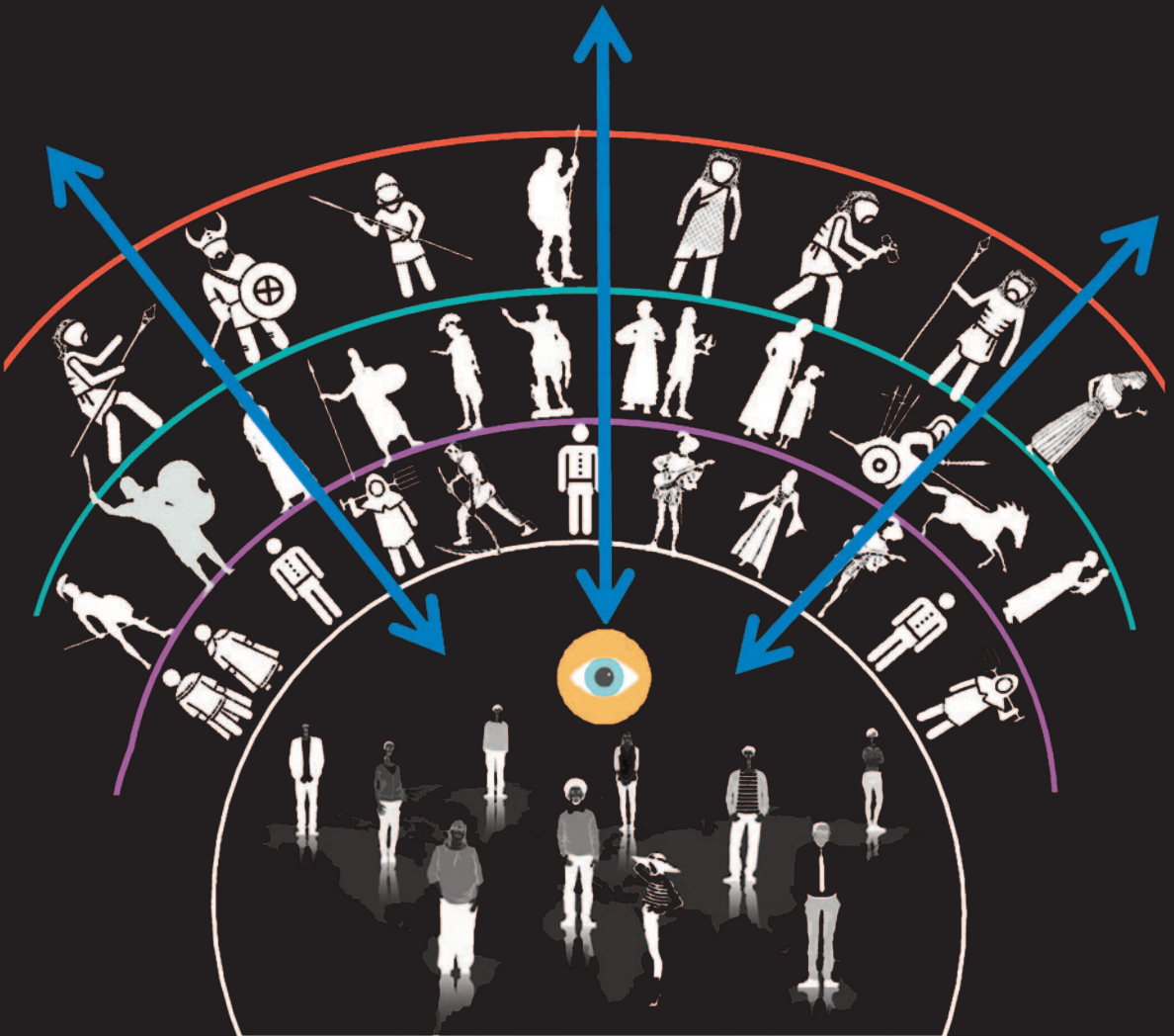


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Ravenna surrounded by waters. Landscape changes and urban transformations in Late Antiquity

Procopius describes Ravenna as “a strong city situated almost at the end of the Ionian Gulf” (Proc., *Bellum Gothicum*, III,2) (fig. 1). Among the coastal cities on the east coast of Italy, Ravenna and Classe, together with Caesarea are mentioned several times in *Ravennatis anonymi cosmographia et Guidonis geographica* (Pinder, Parthey 1860, pp. 258, 326, 461, 504, 508). However, Ravenna, unlike *Mediolanum* or Aquileia, is not included in Ausonius’ *Ordo Urbium Nobilium* of the 4th century, the list of cities that the author considered, subjectively, “most important”, although he did not even rank the cities that struck gold coins. The provincial character of Ravenna with an estimated population of 50.000 in the late 4th and early 5th century, comparable to other Aemilian cities, as it is mentioned in the *Itinerarium Antonini* (*It. Ant.* 126,5), prior to its status as *sedes imperii*, is evident when comparing its urban layout and infrastructure with, for example, Rome with 500.000 inhabitants, Milan, Trier, Arles with 75.000 inhabitants or Constantinople (Fischer, Lejdegård, Victor 2010, pp. 282-283; p. 287, Tab. II). The number of inhabitants in many Late Antique cities in the Mediterranean Sea decreased significantly, but this process varied greatly in different regions and micro-regions (Cameron 2012, p. 147). A great change has been observed after the Gothic wars, when Ravenna’s estimated population decrease to 9.000 or 10.000 inhabitants (Cosentino 2005, pp. 411-412), we see a radical change as a result of a prolonged crisis that has inevitably affected not only the economy of the region, but also the urban character of the city and the maintenance of its infrastructure. Its great urban growth took place at the beginning of the 5th century, when it became the seat of the imperial court of Honorius (395-423), replacing the previous imperial seat in Milan, which was threatened by Gothic raids. It is certain that by 402 at the latest, Ravenna had become the centre of the Emperor’s power, *sedes imperii* (Fischer, Lejdegård, Victor 2010, p. 283). Honorius de-

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Fig. 1. Ravenna with the port district of *Civitas Classis* (by H. Tůmová).

cision was guided by a number of factors: alongside political considerations, the strategic position near the coastline, the defensive nature of the lagoon-like and marshy terrain, in response to the threat of barbarian invasions and subsequent sieges of Trier, Milan, Rome, and Arles. The region's good infrastructure, including inland waterways, canals, ports, and its connections to other Adriatic and south-east Mediterranean city-ports, Constantinople not excluded, all played a significant role. On the other hand, the lagoon area around Ravenna as a supposed and strategic reason should be taken with a pinch of salt, as the marshy areas had already been partially drained by that time (Andragnetti 2007, p. 44). In a certain sense, Ravenna adhered to the tradition of temporary or "emergency" (Ward-Perkins 2000, p. 75, n. 17) imperial residences (Cirelli 2008, p. 29; Deliyannis 2010, pp. 1-5, 46-51; Herrin 2020). Pope Gelasius mentions Ravenna in the second half of the 5th century among other, temporary imperial residences, such as Milan, *Sirmium* and Trier, where the Emperor stayed many times '*multis temporibus... constitit imperator*' (Gelasius, *Epistolae et Decreta, Epistola XIII – Ejusdem Epistolae. Forma Brevior*). However, Ravenna served as the hub of administrative and managerial activities with great competence and continuity, attending as the seat of Western Roman emperors, Ostrogoth king Theoderic, and the Exarchate. Nonetheless, Procopius notes that Honorius relocated to Ravenna from Rome, where he had resided earlier, due to fears of being attacked by barbarians in Italy (Proc. *Bellum Gothicum*, III,2). It is widely acknowledged that the relocation of the imperial court and government offices brought about rapid

changes, marking a decisive turning point in the urban character of both Ravenna and its surroundings (Cirelli 2022, p. 66). What were the effects of the city's change to *sedes imperialis*, sometimes called "the main imperial centre in the west" (Cameron 2012, p. 18) or "political capital" (Schoolman 2016, p. 218)? However, Ravenna did not replace Rome when it became the new, in some periods only a temporary, alternative Imperial seat, differently from Rome, which remained the *caput imperii* or *caput orbis* in the 5th century even when it was dramatically depopulated after Alaric sack (Fischer, Lejdegård, Victor 2010, pp. 281, 283). How did this change impact urban diversity? The influx of new *élites* and the associated private construction (Cirelli 2008, p. 113), the release of funds for urban infrastructure and civil construction created favourable conditions for its urban and architectural development which has to be considered from two points of view: the public building activity directed by the new ruling *élites*, artificially introduced into the existing urban layout (Deliyannis 2010, p. 7) and the original urban structure with its more modest private buildings. These constructions promoted the development of the inner urban core and facilitated its subsequent expansion. It's worth mentioning, however, that most of the city's buildings were still constructed using perishable materials like wood and clay. The period from the early 5th to late 6th century, is widely recognized as the peak of construction activity in Ravenna's urban area, as evidenced by the large number of stone artefacts including sarcophagi, architectural elements and *ornatus basilicae*. The peak occurred, during Ostrogoth rule in the 5th and 6th centuries, followed by a period of stagnation for almost two centuries. A revival in the late 8th and 9th centuries can be observed with new actors and different patterns, centring the old fashion heritage as a new cultural input for northern Adriatic aristocracies (Cirelli 2023, p. 135). The 5th and 6th centuries, by the way, were evidently much more prosperous for urban life due to the presence of the imperial apparatus and its financial resources, but overall due to Theoderic investments in its attempt to create a new 'Byzantine culture' capital (Tůmová 2013, pp. 215-229).

In the search of the main factors that determined the development and territorial expansion of Ravenna with the area that surrounded the basilica of S. Lorenzo in Caesarea and the city of Classe¹ in Late Antiquity (fig. 2), we must take into account not only the political circumstances that determined its multiple expansion over the centuries, but also the geomorphological conditions, that is to say, in the case of Ravenna and the Aemilian area, "its changing hydrological situation" (Maioli, Stoppioni 1987, p. 21).

The paleohydrographic and paleoenvironmental evolution in the area of the present province of Emilia-Romagna is the subject of many contemporary stud-

¹ Jord., *Getica*, XXIX, 151: "Trino si quidem urbs ipsa vocabulo gloriatur trigeminaque positione exultat, id est prima Ravenna, ultima Classis, media Caesarea inter urbem et mare, plena mollitiae harenaque minuta vectationibus apta".



Fig. 2. Classe and Ravenna in Late Antiquity. Digital Reconstruction by Ravennantica Foundation.

ies, based on interdisciplinary field research compared with the testimony of ancient sources. Since the Paleolithic period, the whole area between the modern towns of Ravenna, Spina, Comacchio, Argenta and Bagnacavallo has been a lagoon, crossed by the ancient riverbeds of the Po (Padus = *Eridanus*)², Padovetere (*Padus vetus*)³, with tributaries rivers from the Alps and the Apennines: Bidente, Lamone, Montone (= *Bedesis*), Rasina, Santerno (= *Vatrenus*) and Senio, forming a navigable river network, that used to brought silt from the mountains and invade the land (*gravis terrae*)⁴. This character of the landscape continued north of Spina and Comacchio, with wider and deeper lagoons (Andrighetti 2007). The pinewood stretched between the urban area and the sea and was interwoven with a network of canals leading to the sea⁵, still visible in postmedieval maps (fig. 3). Due to the complex and changing paleohydrographic situation over the centuries, both in the arms of the Po river and in the individual streams that flow into the lagoon area from the Apennines, it is almost impossible

² Plin., *Nat. Hist.* III,20,16; Andreas Agnellus, *Lib. Pont. Ecc. Rav.* XXXVIII.

³ Andreas Agnellus, *Lib. Pont. Ecc. Rav.* XXII,53: "non longe ubi ecclesia beatae Mariae in Pado vetere". Identified by Holder-Egger as Volano in the 19th century (HOLDER-EGGER 1878, note 85).

⁴ Plin., *Nat. Hist.* III,20,16: "...tantum Appenninos Alpinosque navigabiles capiens, sed lacus quoque inmensos in eum sese exonerantes, omni numero XXX flumina in mare Hadriaticum deferit".

⁵ Dante Alighieri, in his *Divine Comedy*, portrays the landscape surrounding Ravenna: see Ricci 1906, pp. 46-48.



Fig. 3. A 16th century map with visualization of the network of rivers that surrounded Ravenna and the properties of the monastery of S. Vitale, including depictions of pine forests, valleys and port landings.

to identify not only the original river beds or arms of the Po, but also the streams mentioned by ancient authors such as Pliny and Martialis. For the knowledge of old river courses and waterways we should rely on old maps, even if we have only non-detailed, rather hypothetical maps for the Ravenna region with its waterways before the 16th century (Andraghetti 2007, p. 7). The watercourses in the Po Valley and in northern Italy, the modern provinces of Emilia-Romagna, Veneto-Friuli, Lombardy and Liguria, have been greatly altered by floods that have plagued the region for a long time and continue to do so today, as we unfortunately saw in Emilia-Romagna in May 2023. In Roman times were well aware of the dangers of flooding, calling them *vis maior*, or *v. divina, cui resisti non potest* (Maganzani 2023, p. 126). Paulus Diaconus describes in its 9th cent. book one of the most devastating floods that happened in AD 589, which destroyed many roads and paths (*Destructa sunt itinera, dissipatae viae...*) of this territory (Paulus Diaconus, *Hist. Lang.*, III,23). And alongside these changes, which included changes to the river courses, the character of settlements along major waterways also changed overall the area between Bagnacavallo, Russi and Godo (Fabbri 1991, p. 21), flat territories between Ravenna and *Faventia*. From Pliny's account, it is evident that the Po River and its tributaries had a dissimilar morphology in the past compared to the present-day area; even the mouth of the Po was originally more southerly, *Po di Primaro* or *Primarius*, modern Reno River, that now flows through Bologna and flowed into the Adriatic Sea about 20 km north of Ravenna. In the 19th cen-

tury the Reno was connected to the Primaro with a branch of the Po, later precisely called the Po the Primaro (Stauffer 2008, pp. 111-112, n. 6). However, over time, its mouth has shifted northwards (Plin. *Nat. Hist.* I.20 (15)), as registered by Lord Byron that indicated the distance of the coast from Ravenna in “four miles” (Stauffer 2008, p. 111), while the current course of the Po is quite different, flowing northwards from Brescello and reaching the sea in the Po Delta Park between Goro and Rosolina (Amorosi, Sammartino 2007, p. 392).

The geomorphology of the hinterland of Ravenna has been subject to the continuous effects of changes in the course of the rivers throughout history, as modern research has shown. These studies show the rapid socio-cultural adaptation of the inhabitants of Ravenna and its hinterland to the environmental changes, during the period when Ravenna was a *sedes imperii*, the seat of the Ostrogoth king Theoderic and during the Byzantine administration (Andrighetti 2007, p. 23).

Ravenna's urban development was closely linked not only to the geomorphological characteristics of its lagoon and marshy terrain, but also to the development of its infrastructure, waterways, fortifications and strategic points of public interest, such as the water supply. Ravenna was, from the very beginning – or rather, when it began to emerge from the mists of the unknown – a settlement surrounded by waterways and lagoons, intersected by a network of navigable or drainage canals, which linked the hinterland to the coast or the Po infrastructure, such as the *Fossa Augusta* and its course inside Ravenna (*Padenna* or *Padusa*), *flumisellum Lamone*, *Vatrenus* (probably modern Santerno), *Bidente* (modern Ronco), Montone (ancient *Bedesis* or *Vitis*) and others⁶. The geomorphological conditions became the strategic, added value of this “disembedded city” city of Ravenna in times of crisis, especially during the Gothic wars (Deliyannis 2010, p. 3). So that the entire surrounding landscape remotely resembled today's Venice lagoon or, rather, the Comacchio valleys, which corresponded to the general character of the lowland, lagoon landscape in the region of the eastern coast of the present Italian provinces of Emilia-Romagna and Veneto-Friuli. The local fertile soil in the floodplain certainly played a role in the settlement of the area. These circumstances were the result of a combination of the natural conditions of the Po Valley, in particular the phenomenon of floods that fertilised the soil, and human activity. The urban settlement grew gradually on the site of older settlements with a diversified population, which had the character of individual scattered settlements along the waterways, possibly at the beginnings of the 5th cent.

⁶ Plin., *Nat. Hist.*, III,20,16. Plinius the Elder mentions Ravenna in several chapters as one of the cities within the eighth region of Italy (as “town of the Sabines, with the river *Bedesis*”), together with the *Padus* (Plin. *Nat. Hist.* III,20,15). He describes also its hydromorphological and geomorphological landscape: “(Po) forms deep channels in its course: hence it is that, although a portion of its stream is drawn off by rivers and canals between Ravenna and Altinum, for a space of 120 miles, still, at the spot where it discharges the vast body of its waters, it issaid to form seven seas” (*Nat. Hist.*, III,20,16).

BC. The first written mention of the name Ravenna is dated to the 1st century BC. The city probably received the status of *civitas foederata* in the first half of the 3rd century BC. This could have occurred in either 266 BC, when Sarsina became an ally of Rome, or in 218 BC when the settlement was fortified during the Punic Wars (Beltrami 1791, p. 1).

Favourable circumstances, in particular the waterway infrastructure of the *Padus* and the presence of a natural harbour on the Adriatic Sea, mentioned as 'Port of Vatrenus', favoured the creation of the fortified permanent settlement⁷. According to Pliny, the wide bed of the Po (*Padus*), reinforced by the inflow from the Alps, allowed the creation of a system of "deep" channels and smaller riverbeds, which together form a kind of link within the region: from Ravenna to Altino and north to Venice⁸.

Ravenna was settled over a strategic position on the coast and the inner lagoon, where the military port and the seat of the Roman Fleet, the *classis*, were located, which facilitated the control of the northern Adriatic Sea (Montanari 1996, p. 241). According to early medieval historians the city was surrounded by rivers that flow to the sea on the east side (*habet ab oriente mare*), enclosing the city like an island (*in modum insulae*), and marshy land on the west side (*ab occidente vero habet paludes*) (Jord., *Getica*, XXIX, 146). The most important turning point in the city's development was the construction of the *Via Popilia* in 132 BC. The road was used as topographic base for the construction of the city, with an angle of 45° respect the straight road that connected *Hadria* to *Ariminum*. Along this road started to develop the suburbs of *Caesarea*, and the one around the port of the *civitas Classis* (fig. 4). The city was part of the Roman *cursus publicus* system since the beginnings, as can be seen on the *Tabula Peutingeriana* (fig. 5). In Ravenna's area, the 4th century route was used also in the 7th century and restored later to connect northern Adriatic emporia (Facella *et al.* 2021, pp. 80, 84, n. 12).

The urban development of Ravenna and its agglomeration in the republican period and then in the Roman Imperial period as *colonia* (fig. 6) was quite consistent in terms of the spatial arrangement of the city and its gradual expansion, always along natural, but also artificial waterways, navigable or drainage canals, *fossae*: the Lamone, the Padenna (*Flumen Padennae* and *Flumisellum Padennae*), but these watercourses, which crossed the city, only received their names in the Middle Ages. From the 1st century BC, also the *Fossa Amnis*, known as the *Fossa Lamisa* or *Fossa Lamises*, which had to cross the republican *oppidum* in a west-east direction, creating a waterway between the Lamone and the Paden-

⁷ The Roman assignment of the area is dated, on the basis of the archaeological evidence, to the end of the 3rd century BC, with the construction of a strength brick city wall. See MANZELLI 2000.

⁸ Plin. *Nat.* I.20,15; Cassiodorus mentions that the Venetic area was connected to Ravenna by a network of canals (CASSIOD., *Var.*, XII,24).



Fig. 4. Ancient *viae* in the Po Valley and in the Venetia-Histria region. 1. *via Popilia* (connecting Rimini and Adria); 2. *via Postumia* (passing through modern Genoa – Tortona – Piacenza – Cremona – Verona – Vicenza – Oderzo – Aquileia); 3. *via Aemilia*; 4. *via Annia* (passing through Adria – Padova – Altino – Concordia Sagittaria where it joined *via Postumia* and led to Aquileia). According to Google.com/maps.



Fig. 5. Ravenna on the *Tabula Peutingeriana* (according to Miller, Konrad; Castorius, 1887, CC0, via Wikimedia Commons; https://commons.wikimedia.org/wiki/File:Tabula_Peutingeriana-nc.tif; cit. 22-4-2023).

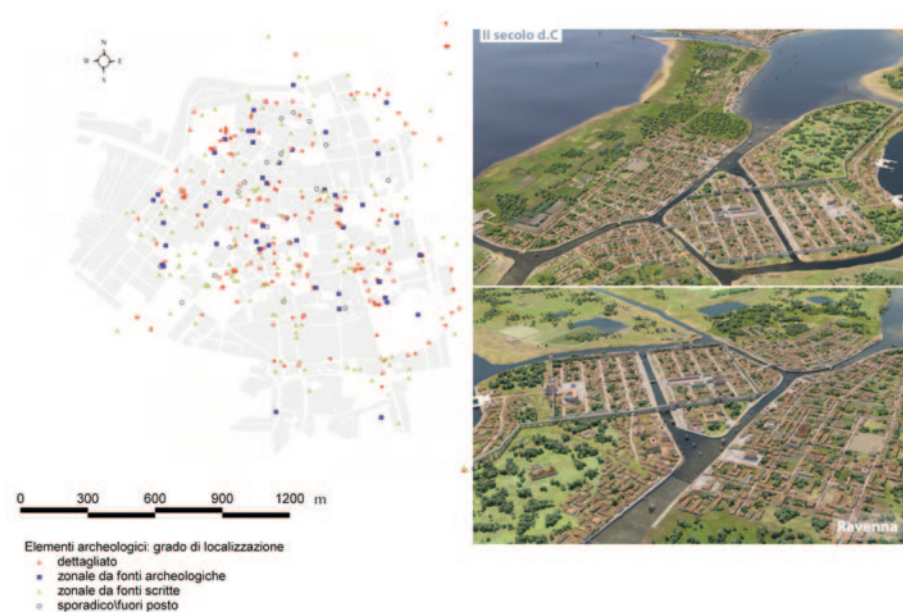


Fig. 6. Distribution map of the 2nd century archaeological evidence and reconstruction of the city landscape at the same time by Enrico Cirelli.

na, into which it flowed (Andragnetti 2007, p. 39). This canal (*Fossa Amnis*) is also mentioned in connection with the construction of bishop Ursus' church (*basilica Ursiana, Anastasis*), in *regione Herculana*, in the area of the old roman city, close to the bishop house (*Domus Ursi*), as seen in mostly every late roman episcopal church in urban settlements (Chavarría Arnau 2017, p. 372). The complex was built at the end of the 4th century in a region surrounded by canals and rivers, close to the bridge of the Bakers quarters (*sub pontem Pistorum*)⁹. The inhabited area of the roman town was clearly delimited both by the city walls, from the extent and the course of which we can get an idea of the size of the city at that time (Gelichi 2000, p. 115), and by the sea coast to the east, as it was throughout the entire period of the ancient city (fig. 7). The original fortification of the republican city centre, whose construction dates back to the second half of the 3rd century BC, are still recognisable in the later layout of the 5th century walls. The rectangular shape of Ravenna, is in line with the practice of establishing Roman colonies in the region of Gallia Cisalpina in the 3rd and 2nd centuries

⁹ Andreas Agnellus, *Lib. Pont. Ecc. Rav.* XVI,23: "Habitabat autem sanctissimus vir infra episcopium, qui est positus iuxta fossam amnis, qua egreditur de loco qui vocatur Organaria, emanans sub pontem Pistorum...".

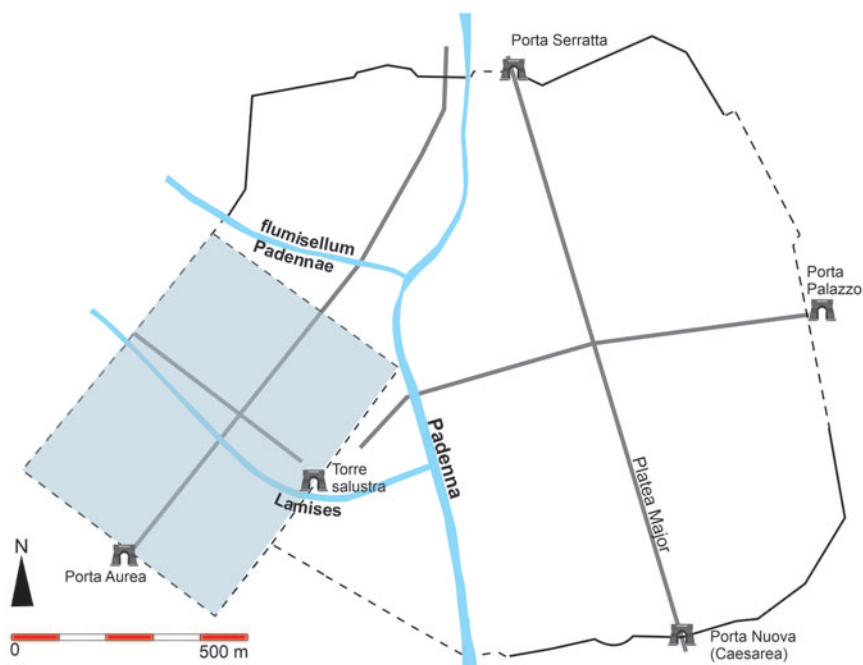


Fig. 7. Ravenna quadrata.

BC. In the first imperial Age, the city and its ports experienced a rapid growth and the development of neighbouring regions. Ravenna was also connected to the Po by an artificial canal called *Fossa Augusta*, an expansion and regularization of the *Padus/Padenna*; which course inside the city should have been called *Padusa*, formerly *Messanicus* (Plin. *Nat. Hist.* III,20,16). In the same times, a large number of artificial canals (*fossae*) were built within the valley to facilitate the transport of goods, the mobility of people and to prevent floods (Maganzani 2023, pp. 125-126). Pliny the Elder describes the system of artificial canals that created a network of waterways branches arms and islands between them, creating the “Seven Seas”. The waters of one of the Po’s smaller tributaries, the *Padusa*, were artificially diverted into the *Fossa Augusta*, providing a river link between Ravenna and the port of Classe and the Po’s infrastructure. The river transport infrastructure in the Ravenna region has changed over the centuries: just as it is uncertain when the *Fossa Augusta* was used. A new waterways appeared in the 6th century at the latest, called Padoreno, which connected Ravenna to the Po, and the *Fossa Asconis*¹⁰. This new canal is a modification of another

¹⁰ Part of the canal that crossed the city may have been filled during the 4th century: MAIOLI, STOPPIONI 1987, p. 30.

tributary of the Po, flowing to the north of the city¹¹, still used in the 19th century and mentioned as *fossa Sconii*¹².

We have minor archaeological evidence of the period before 402 AD, overall related to monumental building, with non-idea of the ludic spaces, forms and exact position of the temples, the Forum and other community dwellings, compared to Late Antique and Early Medieval periods, even if the prestigious architecture was developed before the city's status as *sedes imperii*, as can be seen from the imposing private houses (Cirelli 2008, p. 113). One of the reasons for this is the complete reconstruction of the old city core after the relocation of the Imperial court at the beginning of the 5th century. Despite the lack of material for this period, it is possible to trace the main residential areas, mainly urban dwellings and the road system, places of public interest, although most of the communitarian buildings had to be partially or completely dismantled for the construction of the new city infrastructure after 402 AD (Cirelli 2016, p. 219).

When Ravenna became the new seat of Honorius, it was also provided with re-inforced, solid city walls, integrating the previous republican form (Negrelli 2018, pp. 48-49, 54). The marshy biotope around the city of Ravenna also served as an extended city wall, providing a significant advantage compared, for example, to other 6th century Italian cities (Fischer, Lejdegård, Victor 2010, pp. 284, 286).

As the importance of Ravenna grew, so did the influence of its Bishop, while the expansion of the diocese greatly influenced the territorial reach, resulting in the creation of a forum for commercial and cultural interaction, including regions such as Bologna, Modena, Forlì, Imola, Ferrara, before and soon after its birth as military presidium, Comacchio (Zavagno 2022, p. 250), and the northern territories around Monselice, due to the growing significance of ecclesiastical power (Farioli 1977, p. 21). Its influence grew alongside the imperial building activity. If the administration of the construction work in Ravenna during the first half of the 5th century is viewed as an imperial matter, it subsequently became the primary concern of Ravenna's bishops after the transfer of the court of Valentinian III to Rome in the 440s and especially following his death in 455 (Deliyannis 2010, p. 104) which illustrates the increasing influence and financial stability of Ravenna's diocese. Also monasteries played a significant role in the economic dynamics of the whole region and in the consolidation of agricultural land use. During the

¹¹ Jordanes, *Getica*, XXIX, 148–149: "(148) Quae urbs inter paludes et pelago interque Padi fluenta unius tantum patet accessu, cuius dudum possessores, ut tradunt maiores, *ainetoi*, id est laudabiles, dicebantur. Haec in sino regni Romani super mare Ionio constituta ut in modum insulae influentium aquarum redundatione concluditur. (149) Habet ab oriente mare, (...). Ab occidente vero habet paludes, per quas uno angustissimo introitu ut porta relicta est. A septentrionale quoque plaga ramus illi ex Pado est, qui Fossa vocatur Asconis. (150) A meridie item ipse Padus, (...) qui septima sui alvei parte per mediam influit civitatem, ad ostia sua amoenissimum portum praebens".

¹² Andreas Agnellus, *Lib. Pont. Ecc. Rav.* XXVI,70: "... extra portas Sancti Victoris, non longe a fluvio qui vocatur Fossa Sconii." *Lib. Pont. Ecc. Rav.* XXVI,79: "... in loco qui dicitur Fossa Sconii iuxta fluvium...".

Early Middle Ages, these extraordinary new medieval settlements gradually increased their holdings of land, and served as 'élite safes' (Lazzari 2012, p. 25). To understand the overall transformation and specific cases of geomorphological changes in the northern Italian regions, specifically the Padua region and the Euganean Hills see Sarabia Bautista 2017, p. 85.

It is therefore necessary to imagine the city as two different entities, that functioned side by side: a city of the new imperial order, represented by the use of more expensive materials, ecclesiastical buildings and private buildings of the *élites*, for whose construction not only re-used but also newly ordered imported materials (especially marbles) were used. Speaking of *élites*, we must not forget the strong influence of the military "caste", present in the Ravenna area until the end of the Byzantine Exarchate (Schoolman 2016, p. 223). And on the other hand, it is necessary to see the other face of the city, represented by private construction of the lower and middle classes of the "old" city – which suffered the crisis of the 3rd and 4th century – were mostly wooden, with dwellings made of local, reused and perishable materials. Archaeological research in recent years, including GIS mapping of the archaeological potential, has resulted in a detailed map of the urban settlement up to the present day, based on a combination of archaeological evidence, written sources, superimposition of historical maps and topographical reconstructions (Cirelli 2016, pp. 217-218).

Despite the enormous change in the internal layout of the city after 402 AD, it is possible to see the continuity, despite the constant transformation, of the settlement since Roman times (Ferrerri 2014, p. 113). The restoration and maintenance of strategic buildings (aqueducts, roads and waterways, public buildings) were also a sign of prudent policy, such as that of the Ostrogoth king Theodoric (493-526), who actively pursued this policy not only in Ravenna but also in other cities of the Apennine Peninsula (Cirelli 2008, p. 112).

The urban development of Ravenna must obviously be seen in the context of the entire micro-region, since the artificial centralisation created in Ravenna has also influenced the construction and development of urban centres in the wider area of what is now Romagna, as evidenced by the construction of lavish elite palaces in the cities of Cesena, Faenza, Rimini and others (Negrelli 2018, p. 56). However, its urban development after 402 AD is an alternative case among other cities affected by the 4th century crisis, and respect other towns that maintained their original limits with new early medieval concepts of urban settlement (Brogiolo 2011, pp. 88-89).

Ravenna was well connected not only within the Po valley, within the Adriatic and the eastern Mediterranean, but also with Rome¹³. Its favourable position was strengthened by the construction of ports and wharves, and the city played a fun-

¹³ Cassiodorus mentions Theodoric's wish to transport various marbles from the Pincian Hill to Ravenna, where they were lying unused (CASSIOD., *Var.*, III,10).

damental role as a central hub for the exchange of goods across the Mediterranean Sea. In the Imperial period it served as a military base for the Roman fleet, but there is no archaeological evidence at the moment of the presence of military barracks. The area of the future urban settlement of Classe was also used as a burial ground, on the side of the main road leading north from Classe to Ravenna and on the sand dunes of the former coast, in the late Republican and especially in the early Imperial period, including the burials of Imperial sailors and soldiers (*classiarii*) (Ferrerri 2009). We can assume, not only from ancient sources and the archaeological evidence, the existence of ports as well as smaller harbour piers along navigable canals and riverbeds, as was the case in Ostia, Porto and Rome. The suburb and agriculture-dominated area of Classe, featuring *villae suburbanae*, experienced a period of prosperity attributed to its port and its correlation with the manufacturing districts and warehouses, especially after 402 AD, when the port canal at Podere Chiavichetta, along what is now Via Marabina, expanded alongside the transformation of the surrounding hinterland. This expansion aimed to meet the increasing demand for imported goods from all over the Mediterranean (Cirelli 2008, p. 130). Classe flourished especially in the 5th and at the beginnings of the 6th centuries. Commercial exchange and long-distance trade, including the importation of *amphorae*, precious stones and marble (Tůmová *et al.* 2016), and other commodities, and foodstuffs from the eastern Mediterranean and North Africa, persisted throughout the 7th century and with lower quantities also within the following centuries. Constantinople retained significant political influence in the West while endeavouring to maintain control over the Italian territories (Cameron 2012, pp. 101, 156-157). However, the city's water distribution system was renovated and maintained also during this period (Cirelli 2008, p. 112), which was an important prerequisite for maintaining its functionality. Classe did not lose completely its productive and commercial potential even during the 8th and 9th centuries, but its strength became much less impressive. The north-eastern region of Italy, spanning from Ravenna to Grado (Marano 2022), witnessed a decline in Byzantine control and Constantinopolitan influence, particularly following the Lombard conquest of Ravenna in 751 and subsequently the Carolingian political influence in northern Italy and into the Venetian lagoons (Cosentino 2016, pp. 133-149; Zavagno 2022, pp. 251, 249), with the birth of new regional productive input and the growth of a different economic system. This transformation of the city resulted in a new distribution of settlements, with new residential units constructed in the 8th and 9th centuries from reused materials sourced from abandoned buildings in Classe and Caesarea. These units are now concentrated around the surviving and most important ecclesiastical buildings (Giovannini, Ricci 1985, p. 38; Tůmová, Cirelli 2019, pp. 63-74). Comacchio became one of the main hub for Mediterranean trading networks and contacts with the Byzantine world, taking over the trade baton from the 8th century onwards (Zavagno 2022, pp. 249, 254; Luciano 2019, pp. 67-72), even if the several Ravenna's ports,

known by written sources, need new archaeological investigations to well define the value of their capability (Cirelli 2018). However, during the Carolingian and Ottonian *renovatio*, it shifted its orientation towards early medieval Europe, with some continuity on river and land transport used in Late Antiquity. When Ravenna and Classe were used as emperor's temporary residence (*mansio*) (Laszlovszky 2007, pp. 197-200) and the intellectual centre of theological and philosophical life in the Ottonian period, it was well connected with Pavia by the canal system and the river Po. During this period, Ravenna remained easily accessible also to Rome via the historical *Via Flaminia* (Urbini 2014, p. 55) and always opened to Mediterranean Sea routes.

The transport and waterway infrastructure, alongside drainage and sewage systems, have consistently featured as crucial components in the evolution of towns and settlements. Their development went hand in hand with the growth of urban settlements, it was a mutual interaction like "continuous vessels": one influenced the other without exception. Sidonius Apollinaris describes in his letter to Heronius, dated to AD 467, the method of civil transport from Lyon to Rome via northern Italy, through the cities of Ravenna, Pavia – ancient *Ticinium*, Cremona, Brescello and other ports, using the waterway of the Po. He mentions a turn to the right at Brescello, probably involving the Po River or one of its branches or canals, then a direct navigation to Ravenna and further south to Rome crossing the Rubicon river, Rimini, and Fanum. He describes the Caesar's road in Ravenna, connecting the old town and the port, and a system of "derived canals" from the Po, division of the Po "above the city" into two canals, as shown by recent geophysical and aerial surveys (Boschi 2012, pp. 220-224), which also involved comparing historical aerial photographs "part of which flowed through the city, part around the place"¹⁴.

The city's expansion after 402 AD followed the main communication roads and waterways mentioned by ancient authors. Identifying ancient river courses in the Ravenna area presents a challenge. The oldest maps of the region available date back to the 15th century. Despite the availability of more recent maps, streams and canals that once flowed through the city are not depicted in any of them; nev-

¹⁴ Sidonius Apollinaris, *Epistulae I, V*: "(...) The way led past Cremona (...). We just touched at Brescello to take on Aemilian boatmen in place of our Venetian rowers, and, bearing to the right, soon reached Ravenna, where one would find it hard to say whether Caesar's road, passing between the two, separates or unites the old town and the new port. The Po divides above the city, part flowing through, part round the place. It is diverted from its main bed by the State dykes, and is thence led in diminished volume through derivative channels, the two halves so disposed that one encompasses and moats the walls, the other penetrates them and brings them trade an admirable arrangement for commerce in general, and that of provisions in particular. But the drawback is that, with water all about us, we could not quench our thirst; there was neither pure-flowing aqueduct nor filterable cistern, nor trickling source, nor unclouded well. On the one side, the salt tides assail the gates; on the other, the movement of vessels stirs the filthy sediment in the canals, or the sluggish flow is fouled by the bargemen's poles, piercing the bottom slime." (Transl. by O. M. Dalton, 1915).



Fig. 8. Ravenna and the watercourses surrounding it. Unknown author (after 1457) (source: <http://www.visualizzaravenna.it/cartografia>).

ertheless, the rivers adjacent to the city walls are visible on them (fig. 8). One of the primary waterways referenced by historical writers is the Lamone River (or Fiume Amone) coming from the Appenine through Faenza, now flowing north of Ravenna, for which course, however, we have evidence only from the early Middle Ages. We have further uncertainties regarding the contemporary rivers Montone and Ronco. Montone is by some authors identified with an ancient *Bedesis* or in the forms of *Bedeso*, *Bedese* (Plin., *Nat. Hist.* III,20,15), and it was supposed to flow between the watercourses of *Bidente* and Lamone rivers, ultimately merging with them in the vicinity of Ravenna. Modern toponyms in Ravenna, such as *Via Fiume Montone Abbandonato*, are also reminiscent of the river's original course. River Montone has been also identified with the ancient *Vitis*, while the present-day river Ronco has been related to the ancient *Bedesis* or in its later form "Bedeso". In the case of the river *Bidente* – identified as the modern Ronco River – the original course remains unknown, but it is likely that it flowed in close proximity to the city, as evidenced by more recent maps of Ravenna and its hinterland¹⁵. Ronco and Montone now flow south of Ravenna, where their confluence is also located, and they continue to flow together as *Fiumi uniti* along via Marabina and flow into the sea north of Lido di Dante (figs. 9-10).

Giovanni Antonio Magini's map, which was published by Sebastiano Bononi in Bologna in 1620, illustrates the rivers Montone, flowing north of the city of Ravenna, *Lame f.*, and the "Bedese or Ronco", marked on the map as a river–

¹⁵ The river *Bidente* is mentioned by Andreas Agnellus (*Lib. Pont. Ecc. Rav.* XXXVIII). For its identification with the river Ronco see HOLDER-EGGER 1878, n. 166.



Fig. 9. Digital reconstructed aerial view of Ravenna and its surroundings, showing the amount of rivers located around and across the city during the Middle Ages (E. Cirelli, with *Ravennantica* and *tre.digital.srl*).



Fig. 10. Ravenna with the Montone and Ronco Rivers and their confluence as *Fiumi Uniti* on the map from 1904 (modified according to Wikimedia Commons, Public Domain, 3rd Military Mapping Survey of Austria-Hungary: Ravenna, sheet 30-44).

aqueduct (fig. 11). The map author's clear identification of ancient *Bedesis*, in this case shortened to *Bedese*, and the Ronco River is reiterated, but other authors identify *Bedesis* as Montone. The two rivers, *Lame f.* and *Bedese*, meet south-west of Ravenna, at the approximate, marked (but not correctly, given that this village is located east of the city) location of Santa Maria in Porto, and flow together into the sea. Also marked on this map is the canal (*Fossato grande*) south of Classe, which is no longer existing, into which the *Candiano fossa* flows.



Fig. 11. Detail of the rivers and waterways in the Ravenna region. Modified according to Giovanni Antonio Magini, *Romagna olim Flaminia*, publ. by Sebastiano Bononi, Bologna, 1620.

Even the map of the beginning of the 16th century (*Pianta del Territorio di Ravenna antica* dated 1604-1605) shows the rivers Montone to the north of the city and Ronco to the south, but no waterway within the city walls (fig. 12).

On the map of Ravenna and its hinterland (“Atlante Veneto”) made by Vincenzo Coronelli between 1691 and 1692 (fig. 13), the Montone River is also depicted north of the city. The River Ronco and its tributaries, or canals, such as “Canale del Molino” and “Lama Scolto” are displayed on the south side of the town. The canal, which is called “Lama Condotta”, and which was called “Lama fiume” on the previous map, is also depicted, flowing into the Ronco River, south-west of Ravenna. The two rivers, Ronco and Montone, converge also to the east of Ravenna on this map, before flowing together into the sea at a mouth called the “Bocca de’ fiumi”. However, even on this map, neither on a map from the second half of the 15th century (fig. 8), there is no more navigable canal or watercourse crossing the town itself. This map (fig. 13) also shows the numerous canals used for soil improvement, drainage of waterlogged soils or irrigation: these channels are marked on the map as Canale, Chiamica, Condotta, Fossato, Fosso. They formed a significant part of an extensive water system, not only in the region surrounding Ravenna. Local toponyms, for example, indicate the existence of water mills: the current street *Via Destra/Sinistra Canale Molinetto* follows the original course of the River Ronco before its diversion into *Fiumi uniti* (Canale Panfilio) and the canals that flew into it (*Canal Molino/Canale del Molino, Lama Condotta/Lama Scolto*), now covered by *Via Lametta*.



Fig. 12. *Pianta del Territorio di Ravenna antica*, unknown autor, dated between 1604 and 1605 (source: Wikimedia Commons, Public domain, an unknown author, https://commons.wikimedia.org/wiki/File:Territorio_Ravenna_1604-05.jpg; cit. 22-4-2023).



Fig. 13. Map of Ravenna and its hinterland "Atlante Veneto" by Vincenzo Coronelli, between 1691 and 1692 (source: Public domain, via Wikimedia Commons; https://commons.wikimedia.org/wiki/File:Atlante_Veneto_Volume_2_035.jpg; cit. 25-4-2023).



Fig. 14. Map of the proposed regulation of the Montone and Ronco Rivers, by Bernardino Zendrini, Eustachio Manfredi, 1731 (source: Public domain, via Wikimedia Commons; https://commons.wikimedia.org/wiki/File:Ronco_Montone_Ravenna.jpg, cit. 22-4-2023).

A 1731 map (fig. 14) depicts the proposed regulation of the Montone and Ronco Rivers to the south of Ravenna, creating a new canal (*Canale Panfilio*) that would have diverted water not only from the Montone River, but also from the Ronco River and other inflowing canals. The *Canale Panfilio* is already depicted on the previous map of Vincenzo Coronelli (1691/1692), flowing into the sea at a place called 'Porto del Candiano'. However, the Coronelli's map only displays the *Canale Panfilio* and does not illustrate the deviation of the Montone river and the diversion of the waters of both rivers (Ronco and Montone) into this canal. There is no indication of a watercourse crossing through the town neither on this map dated to 1731. The depiction of the river's courses from the map of 1731 to a contemporary satellite image (fig. 15) indicates the paleo-environmental and paleo-hydrological development of the area.

Central Italy was severely tested in the 6th century by the long and devastating Gothic wars (535-553) (Fischer, Lejdegård, Victor 2010. pp. 291-293). The devastating effects of the Gothic wars, climate change, plagues, famines completely changed the face of the political, senatorial and institutional, economic, agricultural and socio-political conditions in Italian landscape, as also contemporary historians wrote (Evagrius Schol., *Ecclesiastical History*, IV,29).



Fig. 15. The depiction of the river's courses from the map of 1731 to a contemporary satellite image, modified after Zandrini, Eustachio Manfredi.

The strong central power maintained under Theoderic, one of the prerequisites for urban sustainability, was now severely disrupted: no hegemony could be restored until 562. Rome itself lost its economic cohesion and suffered a gradual depopulation. Despite the decline of other cities, Ravenna is an extraordinary case of resilience and the city flourished also during this dramatic period (Cameron 2012, pp. 123, 147). New distribution of power, after Lombard conquest, sees the emergence of new *élites* recruited from the Lombards, and their “Romanization” (Schoolman 2016, p. 211), had an impact not only on the socio-economic situation in the micro-regions, but also on the continuity of effective measures which, for a long time under Roman administration, contributed to the gradual adaptation of the population to adverse conditions and events, represented not only by anthropogenic influences but also by natural disasters, such as repeated floods (Brogiolo 2015, p. 65). Even in this period, however, Ravenna’s development, marked by a slow process of social syncretism between the Roman, Ostrogothic, Lombard and Frankish *élites*, was different from that of most of the other cities of the Apennine Peninsula (Schoolman 2016, pp. 213, 215).

Massive changes in the geomorphological (paleoclimatic, paleoambient, paleohydrographic) conditions of the landscape, such as river deposits and especially floods (Paulus Diaconus, *Hist. Lang.*, III,23-24) occurred at the turn of Late Antiquity and the early Middle Ages, which had a significant impact on the reorganisation of rural settlements – or their adaptation to new conditions – and watercourses, e.g. the creation of a new branch of the Po, *Sandalo*; recent research suggests that these changes began before the Little Ice Age in Late Antiquity (6th-7th centuries): a radical change took place already at the end of the Roman climatic optimum or better in the 3rd century, when the previously open lagoon landscape north of Ravenna was closed. At the end of Late Antiquity and the beginning of the early Middle Ages, a new infrastructure of waterways connected to the main artery of the Po was created in the urban centres of the whole region. These alterations were influenced by both the socio-political situation previously discussed and the altering hydrological and waterway conditions, which led to a new urban arrangement, as exemplified, for example, by Forlì (*Forum Livii*).

The changes in the geomorphology of the land, the riverbeds and the torrents, together with the climatic changes: rainy and cold periods – “the little ice age” – almost in the 6th and 7th centuries have challenged the local population and its capacity for resilience, adaptation and, last but not least, prevention: canals dug around the fields and buildings built on wooden piles (Bassanelli Sommariva, Maganzani 2018; Maganzani 2023, pp. 125-128, 131). The changes and diversions of rivers and streams over the centuries, caused not only by natural disasters (floods) but also by the lack of maintenance of river banks and artificial canals (*munitio riparum*), have had a significant impact on the face of the landscape and the use of agricultural land throughout the Po valley (Sarabia Bautista 2017, pp. 78, 85, 88). Whatever the changes in settlement, discontinuity although the most affected area was the northern Adriatic crescent, with the birth of emporia, villages and preurban settlements such as Argenta, Comacchio, Ferrara and the various sites at the origin of Venice. Despite the changes in agricultural land use as a result of natural disasters, canals and rivers remained the main axes of logistics in the early medieval period, with the Byzantine efforts to maintain the control over the main river courses, being one of the key factors of socio-economic prosperity in the whole region (Brogiolo 2015, pp. 47-49, 53-56, 58).

In the cities the ground level was raised due to the accumulation of silt and alluvial debris, as can be seen in Ravenna, where the ground level has risen over the centuries, from about 1.5 to 3.5 m, in relation to the original surface. One of the phenomena that accompanied the floods, together with a complex problem of subsidence, is the advancement of the coastline, as we can see not only in Ravenna and Classe, now about 9 km from the Adriatic Sea, but also in other northern Italian cities such as Concordia or Adria, and the silting up of the ports and channels that connected the port to the city, such has happened in Aquileia (Brogiolo 2015, p. 50). As a result of subsidence and sand silting, numerous port

facilities and warehouses also required renovations already during Late Antiquity (Boschi 2012, p. 220). The effort given to the infrastructure, whether by land or by sea, navigable canals and rivers, has always been a priority and the main asset of the Ravenna area, so that – despite all the changes and transformations over the centuries – we can observe continuity in the operation and maintenance of these routes.

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Abstract

The article aims to examine the impact on urban development and infrastructure in the conurbation of Ravenna, Caesarea, and Classe following the establishment of the former provincial city of Ravenna as the *sedes imperialis*, the seat of the imperial court, in 402 AD. This involves examining factors that affect the current state of urbanization in these cities. The aim of this contribution is to employ socioeconomic approaches to trace the current progress of urban development, archaeological evidence, and ancient sources relating to late ancient settlement and historical maps. Additionally, it aims to establish a guideline for the development of Ravenna. This entails investigating how the city, along with its surrounding suburban area, transformed during the transitional period from Late Antiquity to the early Middle Ages. Furthermore, the study explores the role of the road and waterway network in this evolution.

Keywords: urban development, road network, waterways, Late Antiquity, early Middle Ages.

L'articolo indaga lo sviluppo urbano e le infrastrutture dell'agglomerato di Ravenna, Caesarea e Classe in seguito all'istituzione dell'ex città provinciale di Ravenna come sede della corte imperiale (sedes imperialis) nel 402 d.C. In particolare si esaminano i fattori che influenzano l'attuale stato di urbanizzazione di queste città. L'obiettivo di questo contributo è quello di utilizzare approcci socioeconomici per tracciare il progresso dello sviluppo urbano, le evidenze archeologiche e le fonti antiche relative all'insediamento tardoantico. Inoltre, si propone di stabilire una linea guida per lo sviluppo di Ravenna, indagando come la città, insieme all'area suburbana, si sia trasformata durante il periodo di transizione tra tarda antichità e alto medioevo. Infine, lo studio esplora il ruolo della rete stradale e fluviale in questa evoluzione.

Parole chiave: sviluppo urbano, viabilità, corsi fluviali, tarda antichità, alto medioevo.

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