

LOST AND FOUND

Processes of abandonment of the architectural and urban heritage
in inner areas. Causes, effects, and narratives (Italy, Albania, Romania)

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Il territorio dell'abbandono tra grecanico e Locride attraverso la lettura della cartografia storica

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La cartografia storica è uno strumento utile per comprendere l'immagine che geografi, topografi e viaggiatori hanno tramandato di un territorio. L'uso della cartografia applicata allo studio del territorio non può prescindere dai metodi scientifici e dell'esogenesi di ciascun documento.

La complessità dei paesaggi contemporanei necessita la ricerca di nuove pratiche cartografiche, capaci di realizzare letture e rappresentazioni basate sulla interdisciplinarietà e sulla transcalarità sia spaziale sia temporale. In questo scritto l'utilizzo dei Geographic Information System (GIS) ha permesso di mettere in relazione la cartografia storica, ma anche fonti testuali e iconografiche, con le cartografie recenti, le foto aeree e satellitari, oltre ai dati vettoriali provenienti da banche dati implementabili e disponibili anche online.

Attraverso l'uso di queste strumentazioni è possibile una lettura geo-storica dei fenomeni di abbandono, mettendo in evidenza come geomorfologia, idrografia e accessibilità abbiano inciso sull'abbandono/ricollocazione degli abitati.

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aree interne. Cause, effetti, narrazioni (Italia, Albania Romania)

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A History-based Description of the Territories of Abandonment between Grecanico and Locride in Calabria

Marco Mareggi, Rosa Maria Rombolà

A recent study on Italy between crisis and opportunities, sketches a general map of the country that, albeit provisional, identifies six crisis and contraction typologies¹ utilizing two investigative approaches: the aerial view of the territory and the on-the-ground exploration, attempting to intertwine physical-morphological, demographic, and socio-economic data. In this interpretive geography of the *Bel Paese*, southern Calabria is highlighted for two typologies. On one hand, a line along the Ionian coast characterizes the coastline consumed by low-quality urbanization and sparse mass tourism exploitation, while on the other hand, internal mountainous areas denote a widespread phenomenon of abandonment of highlands and villages.

We will focus on this second territorial scope where, according to the authors, there is an ongoing crisis in the agro-silvo-pastoral economy. This prolonged economic condition is compounded by specific calamitous phenomena (earthquakes, floods, and historically, invasions or endemic factors)

1. The six typical situations of crisis and contraction on the map of the Italian peninsula, produced by A. Lanzani and F. Curci (2018) within the associative network Riabitale l'Italia, are as follows: abandoned hillside villages and lands (far from tourist excellences); saddened valley floors, foothills, and basins (after growth with little development); depopulated productive countryside (continuing depopulation); crisis-hit diffuse and district urbanizations (difficult to restructure); coast consumed by low-quality urbanization and mass tourist exploitation; fragile urban peripheries and interstices (small towns, industrial cities, peripheries of the South). LANZANI, CURCI 2018.

which are quite significant in the Calabrian context². Internationally, scholars³ consider the decades-long population decline as the predominant cause/effect of urban abandonment and shrinkage. From a spatial perspective, the progressive absence of humans leads to a gradual decline in caring for the territory, both in terms of crops and built heritage, both of which are underused or abandoned⁴. In Southern Italy, anthropological⁵ and territorial⁶ research vividly portrays this condition, particularly emphasizing the relevance within the Calabrian, especially southern, context. «Partially or completely abandoned cities exist in all Italian regions. In Calabria, the phenomenon is more extensive and more pronounced than elsewhere»⁷. According to Vito Teti⁸, «the abandonment of inner villages [...] is a constant in Calabrian history, well-documented in modern and contemporary times». This «historical constant» of the Calabrian territory «sometimes goes through periods of intensification: Roman conquest, the crisis of the 14th century, the earthquake of 1783, the era of major social transformations in the 20th century. But in some cases, the phenomena concentrate in specific areas. This is what is happening in the Grecanica area», which indeed «can be considered paradigmatic to illustrate the entire phenomenon of abandoned cities in Calabria»⁹.

Again in relation to this southern tip of the peninsula, a series of words emerge, labeling these smaller historic urban agglomerations as *presepi* (nativity scenes), ghost towns, villages, or more broadly, hamlets. This semantic delineation is significant, specifying both connotative aspects of the place and peculiar vocations. The first term, *presepi*, emphasizes both the physical-morphological characteristics of perching on mountains or hills and the spectacularization of the anthropic landscape¹⁰; the second, "ghost town", allusively evokes haunting places, a repository of remains and ruins, material remnants devoid of life¹¹. Lastly, villages underscores the value of memory and identity of a community settled in a place, enduring beyond continuous presence in the daily lives

2. COLISTRA 2001.

3. Among others: OSWALT 2005; PALLAGST, WIECHMANN, MARTINEZ-FERNANDEZ 2014; MAREGGI 2019.

4. GIOFFRÉ 2017.

5. CLEMENTE 1997; TETI 2004, 2017.

6. PEDIO 1990; COLISTRA 2001.

7. GIOVANNINI 2001, p. 7.

8. TETI 2017, p. 55.

9. ARENA 2001, p. 85.

10. SORIERO 1985.

11. BENGTSOON 1977.

of people¹². This is a rich lexical articulation that broadens the ongoing discussion in the political and media discourse, predominantly focused on the tourist valorisation of hamlets which, in common ground even in international contexts, characterizes “beautiful Italy”.

For the significance of the phenomenon and the astuteness of studies conducted over time, it is interesting in Calabria to highlight a less recurring and explicitly studied aspect of the village abandonment phenomenon. This aspect involves physical settlements relocating elsewhere from their original geographical location, carrying with them name, institutions, and memories. The focus here is not so much on the migration of individuals and families but on the “migration of physical settlements”. This is what central governments refer to as “relocation of settlements”, when they issue legislative decrees after catastrophic events such as earthquakes and floods. This peculiar “geographic mobility” of human settlements with their inhabitants, giving rise to new urban centers, is defined in Calabria as the phenomenon of “filiation” of new centers, also referred to as “twin” or “double”¹³. For example, on the Ionian coast facing Africa, Bova is situated in the heights and is the central place of the Greco-Byzantine culture, while its twin and subsequent counterpart, Bova Marina, is the settlement of seaside houses established since 1905¹⁴. The twin towns are not always necessarily the result of an abandonment of the old for the new; sometimes, they are a duplication that keeps both settlements functioning. This is true, for instance, in the case of the aforementioned Bova and Gioiosa, as well as for many others.

However, it should be noted that there is another meaning of duality. It relates to the mass emigration abroad of entire fragmented communities. V. Teti¹⁵ indeed points out that, in addition to internal to Calabria, there is a duality elsewhere, far away, where double of the original towns arise in the Americas, Australia, France, and Germany. The research conducted here remains within the Calabrian territory. The author believes that the geography of these relocations can be summarized

12. The reflection of anthropologists and researchers who have delved into this issue in Calabria anticipated by over twenty years the heated discussion that opened up in Italy around the 2020s, with the introduction of the term “*borgo*” (hamlet) in various public policies (for example, the *Bando Borghi*, “Hamlet call” funded through the Recovery plan) (MAREGGI 2023), where a prevailing interpretation sees small historic centers primarily as subjects of tourism valorisation policies, compared to a growing cultural and intellectual movement (BARBERA, CERSOSIMO, DE ROSSI 2022) that favours the use of the term *paese* (village) to enhance self-determination and living in the everyday life and continuity of the micro-centers spread across the territory. CLEMENTE 1997; TETI 2004; OTERI, SCAMARDÌ 2020.

13. MELELLI 2004.

14. CARIDI 2013.

15. TETI 2017.

in four modes of movement and geographical relationship between the old and new settlements.

Firstly, the predominant transfer is from the mountains to the sea, giving rise to the phenomenon of the “marine”¹⁶. It involves a “descent to the valley and along the coast of settlements”¹⁷ from the mountains due to a multitude of rapid and sudden factors (environmental or human-made catastrophes) or slow and long-term factors (when the land no longer produces enough, leading to endemic poverty and emigration, or due to inaccessibility of the areas)¹⁸. The exodus from the mountains in Calabria is a long-term phenomenon, as recalled by Marcello Sernini¹⁹ in the Itaten research on the transformations of the Italian territory conducted in the 1990s on behalf of the Italian Ministry of Public Works. These are transfers of settlements and populations named differently, referring to their transformative nature, by Lucio Gambi, in the XVI volume of the Utet *Le Regioni d'Italia* series, as «a descent toward the coast» or «a society descended from the mountains», or «a descent to the plain»²⁰. The proximity to the coast, in many cases, occurs along the same riverbed of a stream and within the same municipal territory. This duplication can be not far, as in the case of Brancaleone and its marina, or rather distant, as in the case of Gioiosa, where the center perched on Aspromonte sees its twin, Marina di Gioiosa, about 5 km away, at the end of the valley road.

As Vito Teti²¹ reminds us, «from the end of the 18th century, the slow repopulation of the marine areas, previously malarial and uninhabited», began creating the “twin towns” compared to the internal mountainous ones, which, definitively abandoned, transformed into “ghost villages”, “dead towns” and places of memory. The phenomenon intensified in the 20th century following the earthquakes at the beginning of the century in 1905 and 1908 and after the floods and hydrogeological disasters in 1951, 1953, and 1972-1973²².

At times, the transfer leads to the birth of new town founded kilometers away from the original locations, usually toward the coast and outside the administrative boundaries of the municipality

16. KISH 1953.

17. The expression is used by the geographer and politician Francesco Compagna (1960), as cited by A. Lanzani (2003), and pertains specifically to the context of Southern Italy and the rapid urbanization along the coast and in the valley floors.

18. NUCIFORA 2001.

19. SERNINI 1996.

20. GAMBÌ 1965, pp. 243-244.

21. TETI 2017, p. 125.

22. With various connotations and consistencies, including ruins, these are: Roghudi Vecchia, Africo Vecchia, Brancaleone Vecchia, Pentedattilo, Amendolea, Casalnuovo, and Bruzzano Vecchia.

to which the abandoned center belongs. A true relocation. This occurs in decisions that follow catastrophic events, such as floods, with the specific function of accommodating the relocation of the entire population from mountain villages, whose homes are declared uninhabitable or unsafe. A very well-known example – thanks to the investigations by Umberto Zanotti Bianco²³ and Corrado Staiano²⁴ and the novels by Costantino Criaco²⁵ – concerns the settlement of Africo Nuovo that arose starting from 1955 in the territory of the Municipality of Bianco. More recent is the case of Roghudi Nuovo, which was established only in 1988, 18 years after the evacuation of the old village perched on a ridge between two streams and almost inaccessible. The new settlement was built 40 km away from the old one, in the municipal territory of Melito di Porto Salvo, along the coast. In both cases, there were forced evacuations, decided following tragic floods and subsequent measures by the national government.

At other times, the transfer occurs near the old settlement, thus not leaving the mountain contexts, as in the case of Pentedattilo, which, already after the earthquake of 1786, saw the king approve a relocation project, but it was blocked by baronial families. The subsequent earthquakes of 1908 and the flood of 1951 decreed the progressive depopulation of the village, whose buildings were declared uninhabitable and unsafe in 1968. In 1971, it was abandoned in favour of Pentedattilo Nuova, built in a flat area, only a few hundred meters from the old center²⁶.

Lastly, it's worth mentioning the creation of twin settlements uphill. The new homes are placed on plateau terrains at a different orographic situation compared to the steep slopes typical of the old crib-like villages. The move to a “higher” location compared to the existing center is recognizable in the case of Nardodipace, which is moved to the Ciano plateau (1100 m.), more suitable for those who wanted to stay and continue farming, not too far from the old site. The new settlement is named Ciano di Nardodipace or Nardodipace Nuova or simply Ciano. The same choice of moving uphill was made for Canolo, which, after the flood of 1951, began the construction of the new town at around 900 m. in the Melia plains, in the mountains.

On this rich panel of experiences and reflections on the abandonment of small centers, the in-depth analysis conducted in relation to southern Calabria is superimposed and presented in this article, developed within the *Lost and Found* research funded by the Department of Architecture

23. ZANOTTI BIANCO 1959.

24. STAIANO 1979.

25. CRIACO 2002.

26. TETI 2014.

and Urban Studies (DASU) of Politecnico di Milano, within the Riba program (2021), which aims to investigate the processes of abandonment of architectural and urban heritage in inner areas, exploring their causes, effects, and narratives in three European countries (Italy, Albania, Romania).

As mentioned, this in-depth analysis interprets the history-based approach to the abandonment phenomenon proposed by the Riba *Lost and Found* research, focusing on documentation through cartographic images or accounts of experiences or direct drawings by those who have crossed or lived in these places. Methodologically, the territory or its portions are reinterpreted through historical geography, geostoric GIS systems, travel diaries and drawings, anthropological representations that also emphasize the oral transmission of stories, and to a partial extent, the history of the city and the territory. This sets it apart from historical approaches related to archival documentation or material traces (present in other contributions in this volume) and from approaches that draw general and large-scale maps of the layout and transformations of the territory, focusing on both physical forms and demographic and socio-economic aspects, as in the research on Italy in contraction mentioned at the beginning of this contribution.

The objective of the work presented here is not so much an original and systematic reading of the territory under consideration but rather to verify the effectiveness of the identified cartographic research and storytelling tools to deepen the understanding of the diachronic transformations of urban, rural, and infrastructural landscapes. The analyses conducted and subsequently presented in original cartographic elaborations and in the texts focus on southern Calabria, involving the Locride and the Grecanico area²⁷. The first area, the Locride, concerns the southeast coast and inland of the region and the city of Locri is its hub; while the second, the Grecanico area, is a triangle that touches the Ionian coast facing south and goes up the slopes, assuming the name in relation to the continued local use of the ancient Greek language in modern times. Both territorial areas are slopes of Aspromonte, which extends to the coast. The cartographic elaborations and reflections conducted focus on different portions of the territory, depending on the availability of cartographic documentation or historical accounts, and to emphasize specific themes.

27. The two territorial areas of Locride and Grecanico represent a geography that assumes different administrative boundaries depending on the governing tool being considered. They are indeed two territorial areas within the Metropolitan City of Reggio Calabria (2016), which the Statute of the entity names but does not delimit within a physical geography. Conversely, they are two fields of intervention within the European-relevant Leader program, which defines two specific Local Action Groups, LAG, one for each area (see: www.galareagrecanica.it; www.galterrelocridee.it). It's worth noting that at the national level, the Grecanico area is recognized as a strategic and project-funded area under the National Strategy for Inner Areas 2014-2020; www.comune.bagaladi.rc.it/index.php?action=index&p=1&art=440 (accessed 2 December 2024).

The following text first presents the working method that emphasizes the use of historical maps and diaries (text and sketches) and a georeferenced redesign of thematic maps. Subsequently, at the scale of southern Calabria, the research delves into, on the one hand, geomorphology and the water system starting from the Geographic Atlas of the Kingdom of Naples from 1788-1812 and, on the other hand, the landscapes traversed by the Englishman Edwar Lear (1847) in comparison with the Austrian map of the Kingdom of Naples from 1847. Lastly, the comparison between the aforementioned historical cartography and the Regional Technical Map, CTR, from 1954 allows for a reinterpretation of the genealogy of the road layout that reconnects the hill and mountain villages with the coast. In conclusion, the valuable aspects of historical GIS are emphasized.

1. Towards a Geo-Historical Understanding of Abandonment: From the Study of Historical Cartography and Travel Diaries to the Use of GIS Technologies

The study of the territory and landscape intertwines a broad range of disciplines, starting from history and geography to environmental, socioeconomic, urban planning, and engineering sciences. Specifically, historical cartography is a useful tool to understand the image that geographers, topographers, and travellers have transmitted of a territory. The use of historical cartography applied to the study of the territory cannot overlook scientific methods and research approaches such as critical examination, contextualization, and exegesis of each document, methods refined not only by historical sciences but also by geographical-historical sciences, starting from the fundamental contributions of Lucio Gambi²⁸. This presupposes the need to contextualize the cartographic document, the rejection of the evolutionary conception of the history of cartography, and the importance of studying the biographies of cartographers²⁹.

Up until the 17th century, there are cartographies that present significant geometric distortions resulting from empirical surveying methodologies, with surveys based on observations lacking the necessary mathematical requirements; «requirements that began to assert themselves in the Enlightenment and spread widely only from the Napoleonic era»³⁰.

The complexity of contemporary landscapes requires the experimentation of new cartographic practices capable of effectively implementing readings and representations based on

28. GAMBI 1987.

29. GUARDUCCI 2018.

30. ROMBAI 2018, p. 80.

interdisciplinarity and both spatial and temporal transcalarity³¹. Among them, the use of Geographic Information Systems (GIS) is now a consolidated practice in research for all disciplines dealing, in various capacities, with the study of spatial and territorial phenomena, as one of the most effective tools for data management and analysis³².

The advantages of using these technologies for history-based studies on the territory are evident in their ability to locate and relate historical, geographical, and socioeconomic phenomena that would otherwise be difficult to analyse due to their heterogeneity and distance, both physical and temporal. With this approach, it is possible to relate historical cartography, as well as textual and iconographic sources, to recent cartography, aerial and satellite photos, as well as vector data from implementable and also available online databases. Using these tools, it is possible to achieve a geo-historical understanding of abandonment phenomena, highlighting how geomorphology, hydrography, and accessibility have influenced the abandonment/relocation of settlements.

In summary,

«Historical GIS can be defined as interdisciplinary research projects that integrate the most advanced methods and tools of geographic information sciences with the sources and questions of geo-historical and historical research, in order to emphasize the importance of spatial contexts and relationships for understanding historical dynamics or for studying the landscape/territory as a product of relationships between the measurements of its space and the events of its past»³³.

In the research presented here, the historical cartographies and selected documents to analyse the described phenomena are: the Geographic Atlas of the Kingdom of Naples (1788-1812), the Austrian Map of the Kingdom of Naples (1812-1847), and the Diary of the journey on foot that Edward Lear undertook from July 25 to September 5, 1847.

1.1 Geomorphology and Water System in the Geographic Atlas of the Kingdom of Naples (1788-1812)

In April 1781, Ferdinand IV of Bourbon entrusted the Paduan military geographer Giovanni Antonio Rizzi Zannoni with the task of creating a systematic cartography of his kingdom³⁴. The Geographic Atlas of the Kingdom of Naples, published between 1788 and 1812, resulted from

31. DEMATTEIS 2010.

32. COPE, ELWOOD 2009.

33. GRAVA *et al.* 2020, p. 3.

34. VALERIO 1993, pp. 78-98.

angular and astronomical observations and the measurement of a geodetic baseline³⁵. It consists of 32 copper-engraved sheets at a scale of 1:110,000³⁶.

Calabria is included in sheets 25 to 31. The research focuses on the areas represented in the following sheets: 29_2; 31_1; 31_2; 31_3; 31_4; 31_5; 31_6; 31_7; 31_8; 31_9.

The Atlas allows for a detailed examination of the topographic features and hydrography of the study area. It provides intricate details about the territory's orography (mountainous and hilly regions) and the water system (rivers, streams, torrents, canals, and ditches). The Atlas stands out for its geometric content and the depiction of orography, which is represented through a perspectival shading technique achieved by alternating between oblique and zenithal light, integrating the scientific method of measurement with the artistic method of perspective³⁷.

The accompanying toponymy is highly detailed and highlights the complexity of the geomorphological system, distinguishing between mountains, hills, ridges, coasts, crests, and peaks. For example, "Cima di Monte Alto (1,955 m a.s.l.), the highest point in Aspromonte" is mentioned. The water system includes existing watercourses, lakes, and marshes. It depicts riverbeds, streams, and canals, often indicating their names, origins, tributaries, and mouths.

Concerning the representation of inhabited centers, it locates clusters comprising more than three houses, typically drawn according to their actual form, and indicates main roads, castles, and religious buildings. However, industrial facilities, commercial structures, and communication routes between different settlements are not represented. The only road depicted is the carriage road along the coast, punctuated by guard towers that have been in use since the 16th century for monitoring and signaling Turkish raids. Many areas near the coast are marked as marshland, evidently unhealthy areas requiring reclamation efforts.

Overall, the map describes a mountainous and hilly territory rich in hydrography, with very few carriage roads. Small inhabited centers conform perfectly to the terrain, clinging to hilltops or at the feet of hills and mountains. These are small communities practice pastoralism and rudimentary agriculture, with limited connections to neighbouring villages and facing inland, with their backs to the sea³⁸.

The map highlights the peculiarities of some inhabited centers of interest in the *Lost and Found* research. It reveals the specificity of Ferruzzano, located on the ridges. Bruzzano Vecchia, Motticella,

35. *Ivi*, pp. 124-147 and 211.

36. GAMBÌ 1965.

37. ROMBAI 2018, p. 83.

38. GAMBÌ 1965.

and Bruzzano Zeffiro are depicted near the Bruzzano riverbed and other small watercourses. Africo and Casalnuovo are enclosed/isolated by Mount Scapparone (1,058 m a.s.l.), the mountains of Previtoria (Aspromonte ridges), and Mount Verde, while an Aposcipo tributary flows through the valley. Further north, the Novito riverbed shapes the landscape around Canolo.

2.2 Landscapes Explored: A Comparison between Lear's Drawings and Travel Diary (1847) and the Austrian Map of the Kingdom of Naples (1847)

In 1821, Austrian troops occupied the Kingdom of Naples and remained there until 1826. During this period, Austrian officers carried out a revision of Rizzi Zannoni's map, adding original drawings on 76 sheets mounted on canvas at a scale of 1:121,000. Later, this map was updated with the road network until 1847.

Southern Calabria, the focus of this research, is present in the following sheets: Section 14 Column VIII. Portion of the Province of *Calabria ulteriore* I° and II°; Section 15 Column VI and VII. Portion of the province of Calabria ultra 1 and Valdemone; Section 15 Column VIII. Portion of the province of Calabria ultra 1°.

Compared to the previous version, the 1847 map includes roads and pathways, categorized into natural and navigable. The latter are further subdivided for horses, pedestrians, and sheep tracks. Regarding the agricultural landscape, the map depicts primary crops such as vineyards, meadows, forests, and olive groves.

In 1847, Edward Lear, an English traveller, embarked on a walking journey through Calabria from July 25 to September 5. In his diary, he describes the landscape and living conditions of the region's population. Lear, accompanied by a fellow traveler, a local guide, and a horse, started from Reggio Calabria, reached Bova, and proceeded to the convent of Santa Maria di Polsi.

Figure 1 depicts the route taken to Bruzzano, passing through Motta San Giovanni, Bagaladi, San Lorenzo, Condofuri, Amendolea, Bova, Palizzi, Staiti, Bruzzano, and Ferruzzano. While the descriptions of events are fictionalized, and the names of the encountered individuals are often altered, Lear's sketches are notable for representing entirely unknown places. This is because most Grand Tour travellers frequently bypassed Calabria, traveling directly from Naples to Sicily.

Analysing the views, the execution technique, and the perfect alignment with the diary's pages struck, in addition to the nearly "photographic" description of the places visited³⁹.

39. GAETANO 2023.



Figure 1. Edward Lear's walking path traced on the Austrian Map of the Kingdom of Naples, 1847; <https://anticabibliotecacoriglianorossano.it/mappe-e-carte-geografiche/carta-austriaca-del-regno-delle-due-sicilie> (accessed 2 December 2024) (elaboration by R.M. Rombolà).

Lear's descriptions and sketches, combined with the information provided by the Austrian map of the Kingdom of Naples in 1847, enable us to study and understand the mid-19th century landscape of the region. In various instances, the traveller emphasizes the isolation of the different villages, the orography of the territory, the difficulties of travel, the relationship with riverbeds as critical elements for crops and villages, and the backwardness and poverty characterizing the encountered villages (figs. 2-5).



Figure 2. Edward Lear's travel sketches, Motta San Giovanni (GAETANO 2023).



Figure 3. Edward Lear's travel sketches, Bova (GAETANO 2023).



Figure 4. Edward Lear's travel sketches, Palizzi (GAETANO 2023).



Figure 5. Edward Lear's travel sketches, Bruzzano Zeffirio (GAETANO 2023).

2.3 Abandonment and Relocation of Settlements in the Twentieth Century and Roadways in the CTR of 1954

The cartographic history of Calabria has another milestone in the last representation of the peasant society's territory before its transformation over the last sixty years. The entire territory of 1950s Calabria is accurately depicted in the Carta Tecnica Regionale (CTR), produced at a 1:10,000 scale between 1954 and 1958.

The 1954 map (fig. 6) highlights several phenomena that the research reflects upon. Firstly, following calamitous events, the new settlements of Africo, Casalnuovo, Ferruzzano, and Bruzzano were placed lower and closer to the coast than the original nuclei. In contrast, in the case of Canolo, the new settlement is positioned higher and upstream compared to the old settlement. Secondly, the road network system – hierarchically organized into paths, mule tracks, roads, and provincial roads – appears to be mostly a reclassification and technical adjustment to more efficient road categories (from path to mule track, from mule track to road) and the introduction of interventions (such as the construction of the bridge over the Trinca pass) that resolved the old interruptions in the routes. Thirdly, the map reveals two road systems representing different ways of inhabiting the territory. The first is made up of mule tracks and paths, which in some cases over time become roads. The other relates to the main mobility network in the valley/coast. This system is structured around the Taranto-Reggio Calabria railway and the old road along the coast that becomes State Road 106, established in 1928, with local roads ascending the valleys at certain points. Thus, focusing to the urban centers privileged in the *Lost & Found* research, the settlements of Africo and Casalnuovo correspond to the first road system, comprising mule tracks and branching paths in the mountains, following the contour lines, where watercourses represent a hurdle to overcome. For example, the Aposcipo stream constitutes a divide in the direction of Samo and thus towards the sea and Bianco, Gerace, and Locri. In the 1930s, the construction of a small bridge improved connections, and the path after Aposcipo transformed from a pedestrian path to a mule track. Conversely, for the settlements of Motticella, Ferruzzano, and Bruzzano, the road to the sea is already documented in the Napoleonic map of 1847, but the connections between the coastal road and the roads ascending the valleys are strengthened or newly built from the 1930s onwards, following the construction of Bruzzano Zeffiro and Africo Nuovo.

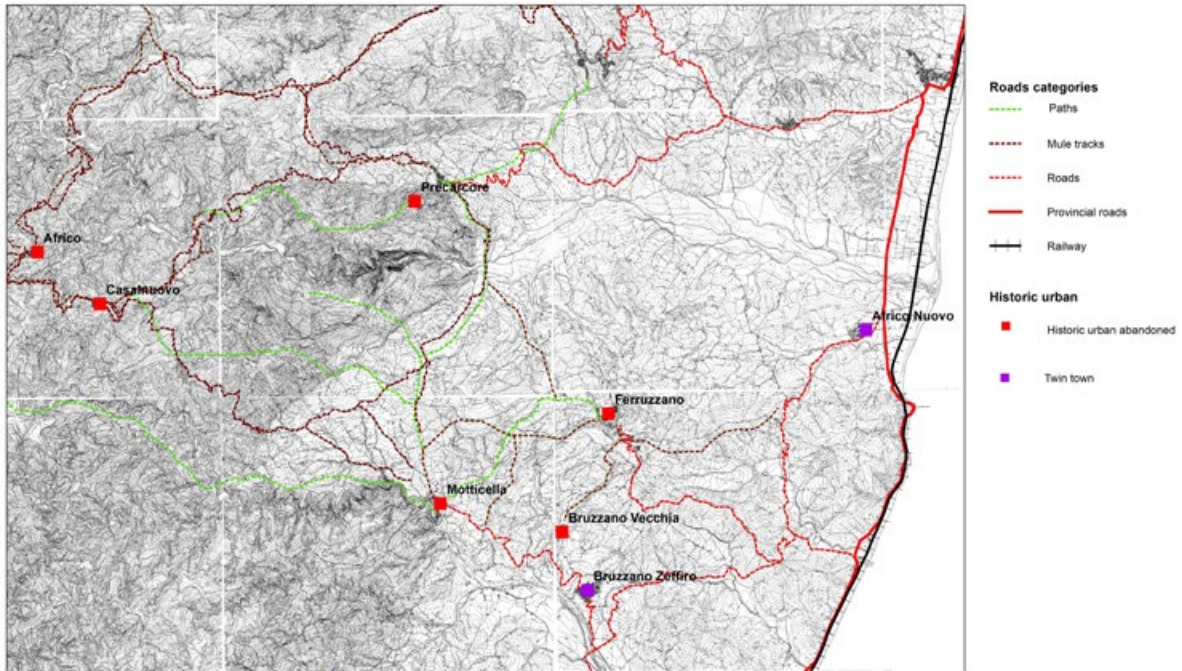


Figure 6. Roads and new locations in the 1954 map (elaboration by R.M. Rombolà).

3. Historical GIS to analyse phenomena of abandonment and relocation

In the research, digitally scanned images of historical maps were georeferenced on a recent digital geographic base. Georeferencing was possible because the two used maps have good geometric characteristics, maintaining a high degree of fidelity to the geographic reality. This allowed the matching of corresponding points (Ground Control Point, GCP) between the two images as required by the procedure.

The ability of geodatabases to store and georeference data from different sources and to compare different levels of information makes Historical GIS, HGIS, an ideal tool for studying the diachronic transformations of territorialization processes, material components of the landscape, and various socio-economic processes. This is due to the possibility of overlaying (and comparing) different informative layers corresponding to different periods⁴⁰.

Based on this observation, some themes from the Calabria Regional Information System were overlaid on historical maps to better study the relationship between past and present. The initially selected geodatabases were:

- Municipal Boundaries, obtained by extraction from the topographic database (DBT) and characterization of administrative units, Shapefile format;
- Hydrographic Basins, main and secondary, of watercourses draining into the sea with an area greater than or equal to 200 sq km. The dataset was extracted from the general one of the Italian territory (Source: Ministry of the Environment), Shapefile format;
- Water sources in the Calabrian territory. The dataset was extracted from the general one of the Italian territory (Source: Ministry of the Environment), Shapefile format;
- Surface Hydrography, Vector cartography of the hydrographic network. Representation of the course of a river/stream (permanent and/or seasonal) or a channel from start to finish and at intermediate confluences, Shapefile format;
- Geotopographic Database DBT 25,000, 2008. It was created by deriving from the Regional Technical Map 5K and the DBT 5K of the Calabria Region as provided in the document “1n1007_6-Content Specifications - DB25 derivation from the catalog of objects _ ver 3.3 dated April 25, 2006”, Shapefile format;

40. GRAVA *et al.* 2020.

- Urban Centers 1954, Manual demarcation of urban centers on historical maps from the Military Geographic Institute (IGM), Shapefile format;
- Regional Technical Map 1:10,000 produced on behalf of the Cassa per il Mezzogiorno (Special Law for Calabria of 11/26/1955, no. 1177) with technical assistance from the Military Geographic Institute. Aerial photographs from 1954, photogrammetric survey carried out in 1959, Geotiff format;
- Ortho Images for the year 2007/2008, Digital orthophotos at a scale of 1:5,000, in the reference system.

Using this information, it is possible to locate the four modes of relocation between old and new settlements, as mentioned in the first paragraph of this paper, on a georeferenced map.

Figure 7, *Map of abandonment*, and new locations documents the four modes of movement: 1. from mountains to the sea; 2. newly founded centers kilometers away from the original locations and outside the administrative boundaries of the municipality to which the abandoned center belongs; 3. near the old settlement; 4. twin settlements towards the mountains.

On the other hand, figure 8 documents how the historical information from the Rizzi Atlas was represented on actual or slightly distant geographic coordinates. The map can be considered a useful scientific tool in describing the geography of late 18th-century Calabria. In it, the riverbeds of streams and rivers largely correspond to current traces; the Amendola stream is represented with the old toponym “fiumara Piscopio”; the Bruzzano stream with the old toponym “torrente Landro”, the La Verde stream is indicated with the current toponym.

HGIS conceived in this way allows the study of the abandonment and transfers of minor centers in southern Calabria in relation to the history and physical geography of the places. In this paper, the main elements and some illustrative applications have been summarized. The goal of the research work was not so much an original and systematic reading of the territory under consideration, but rather an attempt to verify the effectiveness of cartographic, narrative, and iconographic research tools, re-read and interpreted, using new computer tools to deepen the understanding of diachronic transformations of urban, rural, and infrastructural landscapes.



Figure 7. Map of abandonment and new locations (elaboration by R.M. Rombolà).



Figure 8. Overlay of data from the Calabria Region Information System on the georeferenced sheets of the Geographical Atlas of the Kingdom of Naples, Rizzi Zannoni (1788-1812) (<https://anticabibliotecacoriglianorossano.it/mappe-e-carte-geografiche/la-calabria-del-cartografo-e-geografo-giovanni-antonio-rizzi-zannoni-padova-1736-napoli-1814>, accessed 2 December 2024) (elaboration by R.M. Rombolà).

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