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**Damage assessment and conservation
of underground spaces as valuable resources
for human activities in Italy and Japan**

Editors: R. Varriale, Chiaki T. Oguchi & M. Parise

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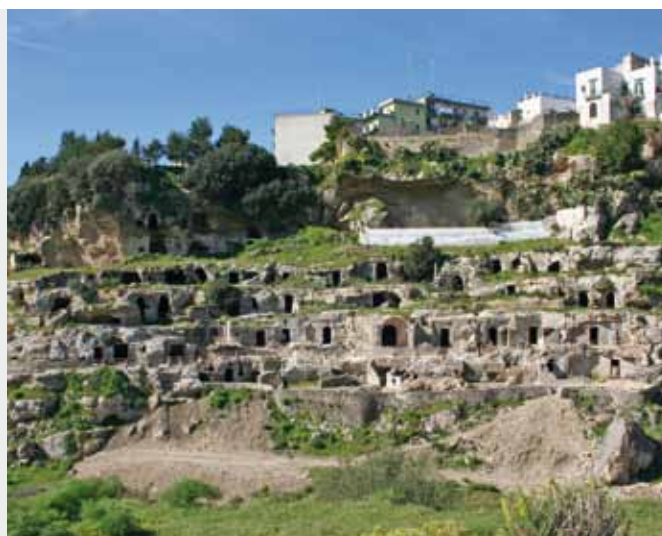
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Sede della Redazione / *Editorial office*
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Palombaro Lungo water tank in Matera, Basilicata, Italy (photo: Antros Archive – Matera)

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Underground built heritage (UBH) as valuable resource for sustainable growth

Il Patrimonio culturale sotterraneo come preziosa risorsa nello sviluppo sostenibile

Laura Genovese¹

Abstract

In recent years, in Naples there has been an exponential increase in tourist presences, thanks to a series of measures that have increased its attractiveness. The cultural offer is very varied, with sites of greater or lesser appeal, and particularly the underground landscape of the city has progressively gained the tourists appreciation. However, some critical issues still affect the take-off of an integrated tourist offer based on the underground built heritage and aimed at obtaining positive outcomes on economic development and on safeguarding local identity. The paper will focus on the preliminary results of a research conducted by the writer in the context of a bilateral Italy-Japan research project between the National Research Council and the Japanese Society for the Promotion of Science, entitled "Damage assessment and conservation of underground space as valuable resources for human activities use in Italy and Japan" (2018-2019).

Keywords: underground built heritage, enhancement, cultural tourism, local identity.

Riassunto

Negli ultimi anni a Napoli si è registrato un aumento esponenziale delle presenze turistiche, grazie ad una serie di misure che ne hanno aumentato l'attrattiva. L'offerta culturale è assai variegata, con siti di maggiore o minore richiamo e particolarmente il tessuto sotterraneo della città ha guadagnato progressivamente l'apprezzamento dei turisti.

La conoscenza di questa realtà è stata un'acquisizione lenta e recente da parte della cittadinanza, così come la presa di coscienza delle sue potenzialità turistiche. Nel processo di promozione di questi luoghi va riconosciuto il ruolo fondamentale delle associazioni culturali e di privati, protagonisti di numerosi progetti di riuso di spazi sotterranei abbandonati con finalità sia socio-culturali sia di rigenerazione urbana. Questo fermento dal "basso", che testimonia il forte legame identitario della cittadinanza con questi luoghi, ha pure trasformato la città in un vero e proprio living lab dove sono state sperimentate soluzioni variegata di valorizzazione del patrimonio underground. Tuttavia, alcune questioni critiche incidono ancora sul decollo di un'offerta turistica integrata basata sul patrimonio culturale sotterraneo e volto a ottenere risultati positivi sullo sviluppo economico e sulla salvaguardia dell'identità locale. L'analisi di queste criticità è stata una delle tappe fondamentali del progetto di ricerca bilaterale tra il Consiglio Nazionale delle Ricerche italiano e la Società giapponese per la promozione della scienza, intitolato "Valutazione dei danni e conservazione dello spazio sotterraneo come preziose risorse per l'utilizzo delle attività umane in Italia e Giappone" (2018-2019), di cui si presentano i risultati preliminari di seguito.

Parole chiave: patrimonio costruito in sotterraneo, valorizzazione, turismo culturale, identità locale.

The urban scenario

In recent years, in Naples there has been an exponential increase in tourist presences, thanks to a series of measures that have improved its attractiveness. The city has been gradually freed from the pre-eminent role of docking port for large cruise ships, gaining acclaim for its specificities and becoming a destination to stay and to visit. Consequently, the tourism and hospitality sector have grown strongly with posi-

tive relapses at both an economic and socio-cultural level. In the recovery of the centrality of Naples in the Mediterranean scenario, the very rich and varied historical and cultural urban heritage played a fundamental role, which concretely represented for the city a driver for the economic growth through tourism. In this urban scenario there are numerous attractions, such as the Chapel of St. Severo and the Archaeological Museum of Naples in the city centre, and others in the metropolitan area, such as the old and new exca-

¹ National Research Council (CNR) Institute of Sciences for Cultural Heritage (ISPC), Milan, Italy – laura.genovese@cnr.it

vations of *Pompeii* and *Herculaneum*. This has been possible thanks to a very favourable situation that has lasted for over ten years, made up of enlightened cultural policies at both the national and local level, huge economic and infrastructural investments, and innovative and dynamic sites management strategies. The result is a very rich and varied cultural offer which includes both monuments and entire urban districts, following recent trends of experiential tourism: to provide a few examples, the visit of the historic centre to the alley of St. Gregorio Armeno, on which insist the historical shops of the cribs, or those on which the *bassi* or *vasci* insist, that is, the typical folk housing characteristic of Naples and its surroundings where it is possible to appreciate the colourful and noisy life of the most authentic city¹.

Among the destinations that are progressively gaining the tourists appreciation there are also numerous underground sites. The offer is very varied: there are many archaeological sites, such as the Greco-Roman remains under the church of St. Lorenzo Maggiore, with access from via dei Tribunali; some sections of the so-called *Augusteo* Roman aqueduct in the Vergini and Sanità districts; the *Crypta Neapolitana* with access from piazza Piedigrotta, etc. In addition, there are dismissed tuff quarries, excavated in various epochs and used as an anti-aircraft shelter during World War II, such as the one known as Underground Naples, with access from Piazza St. Gaetano; that of St. Anna Palace, with access from the alley of the same name, or the so called *Bourbon Tunnel*, with access from the new parking in via Morelli (fig. 1).

Next to these typologies there are places of worship or burial, such as the *Fontanelle* Cemetery (fig. 2) or the Catacombs of St. Gennaro and St. Gaudioso in the Sanità district in the city centre. On the other hand, in the metropolitan area, the *Rione Terra* and the *Mirabilis* Pool in Pozzuoli, and the *Sibilla Cumana* cave in the archaeological area of *Cumae* are very popular, just to mention the most famous.

With the exception of a few cases, these are sites that have been discovered or rediscovered, as well as being opened to the public, only recently, and, in any case, that represent an infinitesimal percentage of the city's underground landscape.

Naples has the extraordinary characteristic of being a city on two different levels: the upper one is where life continues its course, rowdy and cheerful. The second is the place where environmental, social and political conflicts, such as communication, religious practice, and scarcity of resources, have historically been resolved. It remains silent and invisible, and despite the enormous cultural potential, largely unexplored, it is

¹ The *bassi* or *vasci* are the small houses at street level, so frequent in the alleys of the ancient districts of Naples, from the Virgins and the Sanità districts to the Quartieri Spagnoli. Sparsely large and without natural light sources, they have been home to the most unfortunate population for centuries, thus having being considered an example of degrading housing. Nonetheless, together with the clothes hung out to dry, the *bassi* formed part of the vernacular urban scenario.



Fig. 1 – The entrance to the underground *Bourbon Tunnel*, at the base of the Pizzofalcone hill (photo: L. Genovese).

Fig. 1 – Ingresso al percorso sotterraneo della Galleria Borbonica, alla base della collina di Pizzofalcone (foto: L. Genovese).

considered by decision-makers only for its potential 'space availability' when surface limitations force to use it, by locating there new urban functions.

These two levels were born together since the foundation of the city and are historically closely connected. This was possible thanks to the nature of the soil of the Neapolitan territory, characterized by the presence of lithoid tuff – a rock with characteristics of lightness, friability and very particular stability – of pumice, pozzolana and lapilli, which, in addition to representing an excellent soil of foundation, over the centuries have constituted an excellent building material, easily workable.

From 470 BC, the Greeks began the first excavations for the supply of construction material, and the cavities obtained were then used in various ways - such as road tunnels, aqueducts, cisterns, tombs, etc. The use of these tunnels and underground spaces has continued to the present day, changing the function from time to time, or simply being abandoned.

In recent history, the use of these spaces has remained private; in fact there are numerous underground spaces connected to the buildings of the historic centre, that can be accessed through wells and tunnels, which enter the belly of the city.

Consequently, although historically the citizenship was mostly aware of the existence of some underground cavities, an extensively awareness of the existence of an underground urban landscape has long escaped. This knowledge has been a slow and recent acquisition, as well as the awareness of its tourist potential.

The rediscovery of the underground city landscape

Between the end of the 19th century and the end of the Nineties of last century the main archaeological discoveries were done, identifying the remains of the Greek-Roman *Neapolis* in the central city core. Furthermore, between the 1990s and the first half of the 21st century, some sites were opened to the public, such as the Roman theatre and the Greek-Roman city centre remains under the church of St. Lorenzo Maggiore. Further, around the early years of this century, the first projects began aimed at the recovery, use and reuse of abandoned cultural heritage, social and urban regeneration. This is the case of the *Fontanelle* Cemetery (Piedimonte, 2003), that was a dismissed tuff cave re-used for food management, and turned into a public cemetery during the plague of 1654 (fig. 2). During the 19th century it became the place for pagan rituals, causing problems with local religious authorities and being abandoned since the beginning of the 21st century, when the site was reopened to the public

and reinvented as a cultural site thanks to the Municipal Council, with a positive impact on the social context of the urban area.

Between 1998 and 2001, the Cavity Project of the Metropolitan City of Naples began, thanks to an agreement between the Provincial Administration of Naples and the Interdepartmental Research - Environment Center (C.I.R.A.M.) of the University of Naples Federico II, with the purposes of better knowing the urban territory and to prevent risks connected to the presence of unknown cavities. In those municipalities affected by the presence of underground cavities and, consequently of some statics problems, thanks to this census it was possible to adapt the town planning instruments through the evaluation of appropriate measures for the construction and recovery of the overlying building heritage, to ensure stability and security.

The information collected and analysed so far has been merged into a database, still being updated, and on some thematic maps, including the Territorial Information System (S.I.T.).

Due to a static instability, in 2015, some branches of a Roman aqueduct, the so called *Augusteo*, have been rediscovered in the central area of the city, partially clarifying the urban path in the Neapolitan area and rekindling the interest of scholars and citizenship on this exceptional infrastructure (Colussi & Leggieri, 2016; Genovese, 2018). In the meantime, the investigation in the subsoil by speleologists or archaeologists has highlighted the presence of new cavities and testimonies of urban history.



Fig. 2 – The *Fontanelle* Cemetery, detail of the mixture of pagan and Christian cults linked to the bones deposited in the spaces of dismissed tuff mines (photo: L. Genovese).

Fig. 2 – Il Cimitero delle *Fontanelle*, particolare della mescolanza di culti pagani e cristiani associati nella deposizione di ossa, negli spazi delle dimesse cave di tufo (foto: L. Genovese).



Fig. 3 – Subway Line 1 at Naples, station *Toledo* (photo: L. Genovese).

Fig. 3 – *Metropolitana Linea 1 di Napoli, particolare della Stazione Toledo* (foto: L. Genovese).

In recent years, other scientific projects have focused on the cavities census, such as the one carried out in collaboration with the High-tech District for Sustainable Constructions (STRESS) with the Section of the National Institute of Nuclear Physics (INFN) of Naples, the company TECNO IN S.p.A, with the support of the “Associazione Borbonica Sotterranea”, for the testing of nuclear physics solutions to identify new cavities in the Pizzofalcone hill, more precisely at the *Bourbon Tunnel*².

This was a tunnel built in a Middle Age tuff cave by king Ferdinando II, between 1853 and 1855, and soon abandoned. The tunnel was used as bunker during World War II, and later as a waste site. It was opened to the public in 2011 and reinvented as a cultural site. In recent years, alongside scientific research, the knowledge of the subsoil has also taken place thanks to the incessant activity of urban infrastructure building, which has its field of action in the subsoil: this is the case of the construction of the subway line, that since the 2000s has been the occasion for extraordinary archaeological discoveries, particularly along the line 1 (fig. 3).

Recently, some of these findings have been exposed in the so-called *Art Stations* (Corbi, 2015): this project, still ongoing, has been promoted by the municipal administration to make the mobility places more attractive through the exhibition of installations of prestigious contemporary artists. The aim has been creating a sort of decentralized museum, both above and below ground, and distributed over the entire urban area, so as to make art accessible to everybody and working

as a driver for regeneration of vast urban areas. However, in the case of the Municipio station, which serves the areas of Piazza del Plebiscito and the Beverello marina, the remains of the ancient external fortifications of the Maschio Angioino castle and the Angioino pier, dating back to the Aragonese and Spanish viceroy periods, have been incorporated in the lard of the station and are immediately visible to those who disembark at the modern port.

The UBH enhancement process

As before said, an extensively awareness of the existence of an underground urban landscape has long escaped, and this knowledge was a slow and recent acquisition, as well as the awareness of its identity value and tourist potential.

It is difficult to assess to what extent the nomination of the Historic Centre of Naples in the list of UNESCO World Heritage, in 1995, influenced this process. In fact, in the Dossier, among the listing motivations, reference is made to the strategic position, at the centre of the Mediterranean sea, to the continuity of life, from the Greek era to the present, signalling that among the objectives of the Master Plan there is the preservation of the cultural heritage and of the stratified urban fabric, in order to raise awareness of heritage resources.

Apparently, the only references to the subsoil are about the historical, archaeologically documented, stratification, related to sections of the Greek town walls, the excavated remains of a Roman theatre, cemeteries and catacombs. Moreover, among the factors that characterize the vibrant continuity of life, reference is made to the use of local materials, as the basic yellow tuff, but not to the reuse of underground quarries which, over the centuries, have had a direct impact on the definition of the sense of identity of the urban context in which they are inserted, determining a close and vital relationship of both the above and underground levels.

Probably this omission was due to the circumstance that at the time of the nomination a large part of the underground heritage that is known and valued today, was still to be discovered.

Nonetheless, it is strongly hoped that, in a short time, the Municipality can work towards the disambiguation with respect to the inclusion or not of the underground landscape in the UNESCO site. In fact, this ambiguity has had direct impacts on the constraints to be applied to the central subsoil, on the faculty or not to transform hypogeum spaces – not of archaeological interest – with relapses not only on the safety and the static of what is found above ground, but also socio-cultural.

Moreover, the original registration of 1995 was extended, in 2011, to include also other minor metropolitan areas, precisely to place vulnerable archaeological areas under constraint, because they were not developed and not protected. Starting from the same need for protection, our suggestion is to formulate a specific

² <https://www.researchitaly.it/news/il-sottosuolo-di-napoli-svelato-dai-muoni/> (accessed on June 1, 2019). It was discovered in 2007 and opened to the public in 2011, forming part of an overall project of re-interpretation and enhancement of the whole medieval cave, converted into a public parking and a multifunctional space, called *Agorà Morelli*.

proposal for the inclusion of urban underground landscape within the UNESCO site.

Still today, only a minimal number of existing artificial cavities are currently known and, among these, very few have been opened to the public so far. In the process of promoting underground sites, cultural and private associations played a fundamental role, bearing witness to the strong identity link with these places. These have been the protagonists of several projects aimed at the use and re-use of underground spaces with socio-cultural purposes. As in the case of the socio-cultural regeneration and enhancement project in the Sanità district, with the opening to the public of the Catacomb of St. Gaudioso, in the Basilica of St. Maria della Sanità, and of those of St. Gennaro, and the case of fundraising for the restoration of the frescoes of St. Gennaro catacombs (Varriale, 2018).

This was the case of the redevelopment and reuse of underground spaces at the Pizzo Falcone hill, too, where in 2011 a multilevel parking lot was created in the dismissed quarries, with a capacity of 250 parking spaces. At the centre of the quarries a glass lift connects the parking area to Agorà Morelli, a multifunctional space, with an area of about 450 square meters, available for exhibitions and private events.

In the last decade, thanks to those actors, the underground city became a living-lab about sustainable development and contemporary use of the historical underground spaces and layers, even within contemporary networking. Therefore, the city can be considered a model for actions of social participation linked to the heritage promotion, impacting on sustainable economic development and on the regeneration of the socio-cultural context.

Nonetheless, many critical issues still remain, the analysis of which has been one of the fundamental stages of the present research aimed to evaluate how the UBH (Varriale, 2017; Genovese *et al.*, 2019) could represent a valuable resource for both local identity preservation and the economic growth.

As regards the cultural sites open to the public, including the project case studies, the analysis allowed us to deduce the main critical points and to proceed with some preliminary assessments for overcoming them.

In fact, it should be noted that with the exception of a few sites managed by the Ministry, the management of sites and underground routes is in the hands of cultural and/or private associations which, consequently, organize its promotion and use, thus determining a fragmentation of the offer. Alongside these, tour operators or tourist guides make up and propose different visiting solutions based on the market strategies. This has direct reflexes:

1. on management standards and service quality. From this point of view, there is also a discrepancy in the information on accessibility to disadvantaged groups of users and on services to the user;
2. on communication and heritage promotion. The communication of the cultural offer at an urban and regional scale is fragmented and, sometimes, the level of information is partial, rapid or generalist, because it is aimed at selling the product,

impacting negatively on the knowledge / perception of the heritage. In fact, while tourists are using communication tools that greatly simplify cultural information, they often lose the complexity of the relationship between the monument and its context. Moreover, the lack of coordination means that, due to the pressure of the tourist market, the most well-known sites throw a shadow over the less-promoted ones;

3. on the possibility of identifying the heritage on the territory. The identification of the sites is made mostly difficult by the heterogeneity of the tourist indications as well as by the location of the heritage. This is the case for those sites located in the basements of historic buildings still inhabited and sometimes inaccessible to strangers not accompanied by authorized guides, or in places of worship. Nor is there a single website from which to draw information on this type of heritage, as it is currently absent an urban map with the location of the main sites that can be visited and / or the tourist-cultural routes to follow. Nonetheless, there is the meritorious experience of social participation in the process of promoting heritage and reviving the urban sectors concerned, in full bottom-up logic, which rightly makes Naples an intervention model to promote sustainable economic growth thanks to the development of cultural tourism. Therefore, the evaluation of solutions is very complex.

In fact, although we want to express the hope for the creation or strengthening of a control room that coordinates and supports the meritorious action of associations and private individuals, not only on aspects of the enhancement of goods and on the socio-cultural promotion, but also to guarantee future sustainability and the growth of the tourism offer, a multi-level strategy is proposed within the project.

1. The punctual development of the site – This phase is particularly aimed at the cavities that are known, but have not yet become museums. In fact, in the panorama of cavities so far known, a very limited number has been made accessible and, even less, it is among the sites of potential cultural interest to be made available to the public. To return this heritage to sociality, opening it also to the tourist market, a careful selection is required, which can take place on the basis of the criteria of the UBH classification, able to extrapolate tangible and intangible values from the assets, critically valuing the identity component of the asset in its context;
2. The integration of the site into a network of appropriately designed itineraries – In fact, the proposed UBH method offers hints for an alternative interpretation of the heritage in relation to urban history, allowing to proceed with the systemization of the sites and their organization in thematic itineraries. This process also includes the integration of lesser known sites with the more famous ones that act as a reminder, composing a multitasking offer, which is an improvement on the current visit offer. In fact, this work step also

includes the study of visits suitable for disadvantaged groups of users, as well as experiential tourism solutions. Finally, the integration of the above and underground routes can provide a solution to mitigate the anthropic pressure caused by the rapid development of tourism in recent years and which, particularly important in certain periods of the year, has a negative impact on the quality of life of residents. From this point of view, the very recent project of Cultural Itineraries in UNESCO Heritage sites by the Metropolitan city of Naples is worth to be mentioned, which was born with the perspective of strategically orienting the enhancement of the cultural heritage of the Metropolitan City, promoting a network and a system of actions for culture and tourism. The methodology followed is to put the tangible and intangible heritage into a system, suggesting ways to manage and rationalize tourist flows. The path was started in 2015 thanks to a memorandum of understanding between the Metropolitan City, the municipalities of Naples, Herculaneum, Pompeii and Torre An-

nunziata together with the World Tourism Unesco - WTU of Padua, with the support of the Chamber of Commerce and establishing the Permanent Observatory for the Historic Centre of Naples - UNESCO Site. Among the proposed itineraries there is that dedicated to the Napoli Underground leading from the historical centre northward to the Posillipo hill (Coccia, 2019).

3. The role of Naples as a model for the development of a national network of underground itineraries – The positive experience of recognizing the value of goods, of social involvement and of developing cultural tourism and driving for social and urban redevelopment projects, support the promotion of Naples as a model for similar actions in other national and international contexts. In fact, like Matera, the city can aspire to become a node of a network of tourist-cultural itineraries of underground sites that might have positive repercussions on the cultural and, at the same time, economic growth of the locations concerned, on the model of the Cultural Routes of the European Council.

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