IN SITU MUSEALIZATION AND PARTICIPATORY MANAGEMENT: THE GRADO 2 CASE (UNDERWATERMUSE PROJECT)

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ABSTRACT

The pilot action of the UnderwaterMuse project took place brilliantly between August and September 2021, leading to the in situ musealization of the wreck of the Roman merchant ship Grado 2 (III century BC), located 7 miles off the coast of Grado (Go) and at a depth of 19 m; the intervention was conducted by the Regional Body for the Cultural Heritage of Friuli Venezia Giulia - ERPAC, with the direction of the Superintendency and the scientific collaboration of the Ca' Foscari University (Department of Humanities), University of Salento (Department of Cultural Heritage) and University of Udine (Department of Humanities and Department of Cultural Heritage Studies). The containers, certainly wine, date back to the second half of the third century BC: it is the oldest cargo of amphorae in the central-northern Adriatic, prior to the foundation of the colony of Aquileia (181 BC), a significant indication of the presence of Rome on the Adriatic scene and its relations with local communities. The pilot action made it possible to highlight the entire load, accurately document it, reposition the existing grids and add numerous others, identical, in order to completely cover it, thus guaranteeing protection and accessibility to underwater tourists. Excavation tests were also carried out to verify the consistency of the deposit and the absence of wooden remains of the hull. The realization of the 3D model through the photogrammetric survey also allows those who cannot or do not want to dive to use the site remotely, thanks to the application that perfectly simulates a virtual dive on the reservoir. In parallel, good practices of "participatory management" have been developed - most recently diving training - to ensure that diving centers, diving clubs and other regional realities can collaborate with the competent bodies to enhance the site, through guided underwater visits, with modalities and protocols always developed within the UnderwaterMuse project.

Keywords: In situ musealization, participatory management, virtual reality, training, diving clubs.

1. Premise

The challenge of *UnderwaterMuse Project* was to implement joint strategies for the development of consistent and sustainable plans that can ensure knowledge and wider accessibility to the Underwater Cultural Heritage, in line with the principles of the 2001 UNESCO Convention [1].

The activities of the *UnderwaterMuse* project in Friuli Venezia Giulia focused on the wreck of a Roman merchant ship known as *Grado 2* (3rd century BC), located 7 miles off the coast of Grado at a depth of 19 m. The intervention, directed by the Soprintendenza (Archaeological Heritage Office), was carried out between August and September 2021 by ERPAC, with the scientific collaboration of Ca' Foscari University (Department of Humanities), the University of Salento (Department of Cultural Heritage) and the University of Udine (Department of Humanities and Cultural Heritage) [2].

The pilot project carried out the in situ enhancement of the amphora cargo of the wreck (figs. 1-4), in full

Fig. 1 - Grado 2 ***wreck. Greco-Italic amphorae cargo, second half of the 3rd century BC (ph. P. Marsich).***

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Fig. 2 - Grado 2 *wreck. Underwater visit tests (ph. M. Capulli).*

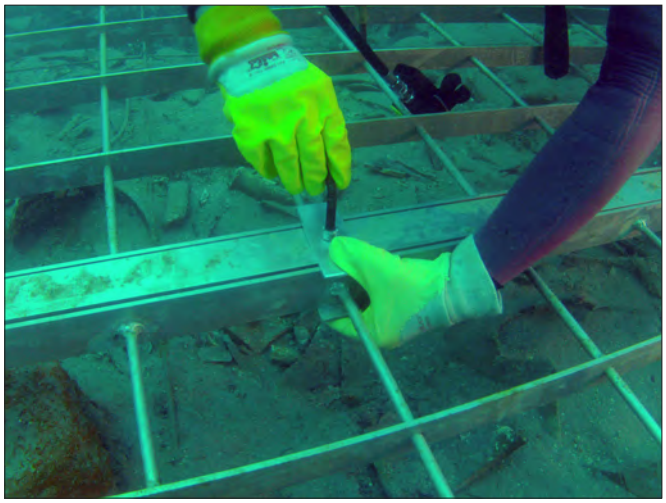

Fig. 3 - Grado 2 *wreck. Operations for closing a grid (ph. M. Capulli).*

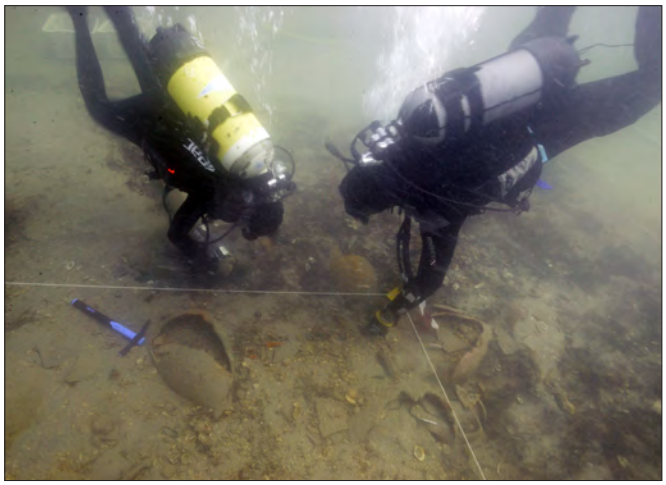

Fig. 4 - Grado 2 *wreck. Phases of the underwater investigation (ph. E. Costa).*

continuity with the earlier actions implemented between 2012 and 2015 by the same Soprintendenza (see above). The containers, most likely intended for wine storage, date back to the second half of the 3rd century BC making this load the oldest amphora cargo in the central-northern Adriatic that predates the founding of the colony of Aquileia (181 BC).

2. First *in situ* enhancement operations: the 2012 and 2015 works

As is often the case at sea, at the origin of the underwater archaeological investigation there was a report by a fisherman [3], who first informed the relevant authorities that not far from the Grado 1 wreck [4] there were the remains of another ancient shipwreck. Thus, in 2000, a preliminary survey campaign was started by a team from the University of Catania, headed by Edoardo Tortorici, with the aim of verifying that report and the actual size of the archaeological deposit at the new site [5]. After surface cleaning of the semi-surfaced amphoric material, graphic and photogrammetric documentation was produced [6]. However, despite the fact that at the end of the work the wreck was protected with wire mesh and concrete blocks [7], in the following years the site was damaged by professional fishing operations [8].

Pursuant to Article 2 of the UNESCO Convention for the Protection of Underwater Cultural Heritage [9], which states in Section 5, «The in situ conservation of underwater cultural heritage should be considered as the first option», the new work aimed to develop and implement an appropriate system of protection of the wreck that would also to some degree enable its enhancement [10]. Thus, the challenge was to meet the dual need for protection and use/enjoyment. Two needs that, for an underwater archaeological area, might seem at odds with each other [11].

The basic design idea, unlike the one already experimented in neighboring Croatia [12], was that of a modular load-bearing square, so as to allow its extension in every direction, on which to place removable grids. The system thus devised was supposed to allow each individual square to be "opened and closed" simply by selectively removing the protective grid as needed, e.g. for future maintenance/cleaning operations of the exposed load or deeper vertical excavations, all without jeopardizing its function in terms of protection and enhancement [13].

The grids were indeed designed to allow a not too overbearing view of the cargo (fig. 4), while at the same time preventing the removal of the amphorae [14].

Fig. 5 - Grado 2 *wreck. Phases of the underwater investigation (ph. E. Costa).*

Thus, two separate campaigns were conducted in 2012 and 2015 [15], the first of which focused on the design, construction and installation of the protection-enhancement grid system, while the second one resulted in the widening and refinement of the structure with the installation of a 50 cm solid frame.

More specifically, the installation included a 2 m square that serves as the load-bearing structure; each square consists of four horizontal tubular bars with a square cross-section, connected by a bayonet coupling. Each cross connection has four arms that intersect at right angles, allowing the square to be extended in any direction, and orthogonally with a height-adjustable foot with a wide resin tilting base to be placed on the bottom. Three protruding metal plates are also welded to each of the tubular bars forming the sides of the squares on the bottom surface, so that there are twelve points on which to internally rest the frame of the protective grids. These latter, on the other hand, consist of a single block made up as follows: a flat knife-positioned perimeter, subdivided on the inside by sub-squares of 20 x 20 centimeters on each side, formed by the intersection of flat bars similar to those of the perimeter in one direction and 12-millimeter rods in the other, welded together to stabilize the pitch. Because there is a through-hole at each of the support plates welded to the lower side face of the tubular bars, other metal plates can also be fastened by vertical screws to the upper sides. Since they are not welded, you only need to rotate them so that they are orthogonal to the tubular bars and tighten the fixing screws, thus locking the grid (fig. 5), or conversely loosen the screws and rotate them so that they are aligned with the tubular bars, allowing the grids to be removed. When the grids are closed, there is a total of twelve plates to lock them in place, and, instead of standard screws, there are screws that work only with a specially modified Allen wrench to form a kind of lock.

By the end of the work in 2015, a 32-square-meter portion of the cargo had been enhanced, with two explanatory panels to make it easier for underwater visitors to understand the site.

(M.C.)

3. The UnderwaterMuse pilot action on the *Grado 2* shipwreck: 2021 excavations

The project began with the removal of the pre-existing grids, covered and infested with marine organisms, which were moved from the site and cleaned with an underwater pressure washer; the underlying archaeological deposit was partially covered with sand and numerous shells of bivalve molluscs, concretions, sponges and calcareous algae, as well as with what remained of the metal grid placed during the 2000 operations and never fully removed. After video-photographic and photogrammetric documentation of the site as it appeared at that time, the edges of this latter were identified and the surface accumulation layer was removed with the help of two water pumps. After the first phase of uncovering the entire surface, a detailed cleaning of the cargo was carried out from the center outward, bringing to light the profiles of the amphorae and fragments thus allowing for a better photogrammetric rendering and understanding in terms of the distribution of the cargo as well as in terms of the dynamics underlying the formation of the site being studied (figs. 4-5).

The uniform stratigraphy of the area is characterized by the following layers: 1. surface layer of loose silty sand, 10-15 cm high, containing fragments of amphorae, remnants of the old wire mesh, shells of molluscs and sponges; 2. layer of dense and compact blackish-gray organic sand with shells and posidonia roots; 3. hard and cohesive

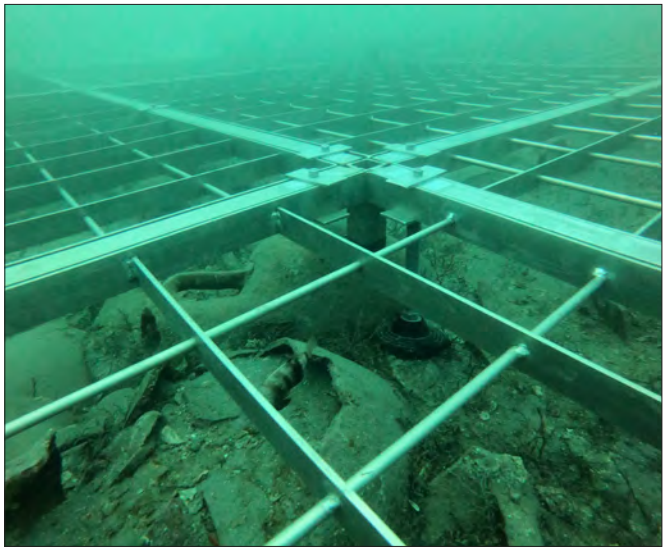

Fig. 6 - Grado 2 ***wreck. The underwater grids for covering, protecting and ensuring accessibility to the site (ph. M. Capulli).***

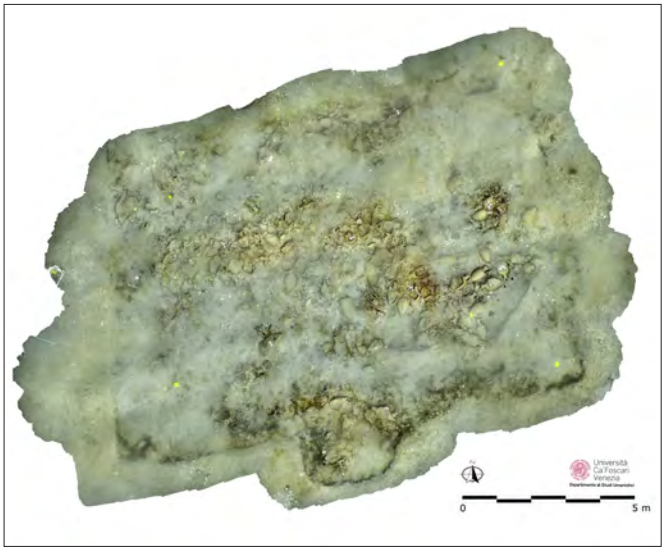

Fig. 7 - ***Ortophoto from photogrammetric survey of*** **Grado 2** ***shipwreck at the end of the excavation (elab. E. Costa).***

layer rich in organogenic concretions and malacofauna: dense and compact organic silt-sand matrix of blackish gray color with shells and posidonia roots; 4. amphora layer; 5. grayish silty sterile clay on which the amphorae were lying.

In the final phase of the intervention, some excavation assays were carried out by the University of Udine, which were positioned by photogrammetry, with sampling of organogenic materials, which further confirmed what had already been pointed out during the extensive survey: only one layer of amphorae and the lack of wooden remains of the hull.

After the operations were completed, the new grids were installed, the shape of which was adapted to the cargo dispersal area. The 28 modules (2m x 2m) modules that make it up are not encased in a rectangle, but have a "broken" perimeter to achieve full protection and visibility for future use (fig. 6).

(D.G.)

4. Research methodology: photogrammetry and 3D modelling

The photogrammetry-based survey and documentation phases of the site played an important role in the project. At the end of each day, a photogrammetric survey was carried out to update the progress report; first, to have a map of the site and to establish the timeline of operations and areas of intervention for the The following day, and then, in the final stage, to obtain an accurate and complete 3D model of the archaeological site.

Photogrammetry was performed with two cameras, a Nikon D610 SLR with a fixed 20 mm hemispherical dome lens, and a compact Nikon Coolpix W300; the choice of the two cameras was made in order to compare and analyze the models created through two different acquisition data. The acquisition phase followed the rules of multi-image digital photogrammetry, which is considered the best documentation technique for obtaining a detailed and accurate 3D model [16]: the photogrammetric surveys were carried out following parallel strips both longitudinal and transverse perpendicular to the seabed and some radial strips around the most significant amphora groups that required a more detailed survey, taking care to obtain a complete coverage of the archaeological objects with an image overlap of around 60 percent between photos and of 20 percent between strips. All the images were aligned with Agisoft Metashape software, making a singlewide photogrammetric block (fig. 7).

Multi-image photogrammetry needs to be supported by a topographic survey to acquire the 3D coordinates of the ground control points in order to scale the model, positioning it correctly in a local reference system, and to achieve the appropriate accuracy for documentation. W/B targets, the number of which was gradually increased as the archaeological excavation progressed, were placed on the bottom and surveyed using a trilateration calculated as a 3D topographic network, according to the Direct Survey Method (DSM) technique [17].

Experience shows that digital multi-image photogrammetry is an excellent solution for obtaining a three-dimensional model of underwater archaeological

Fig. 8 - ***VR/AR environment: Dive into* Grado 2 *shipwreck; follow the anchor chain (elab. E. Costa).***

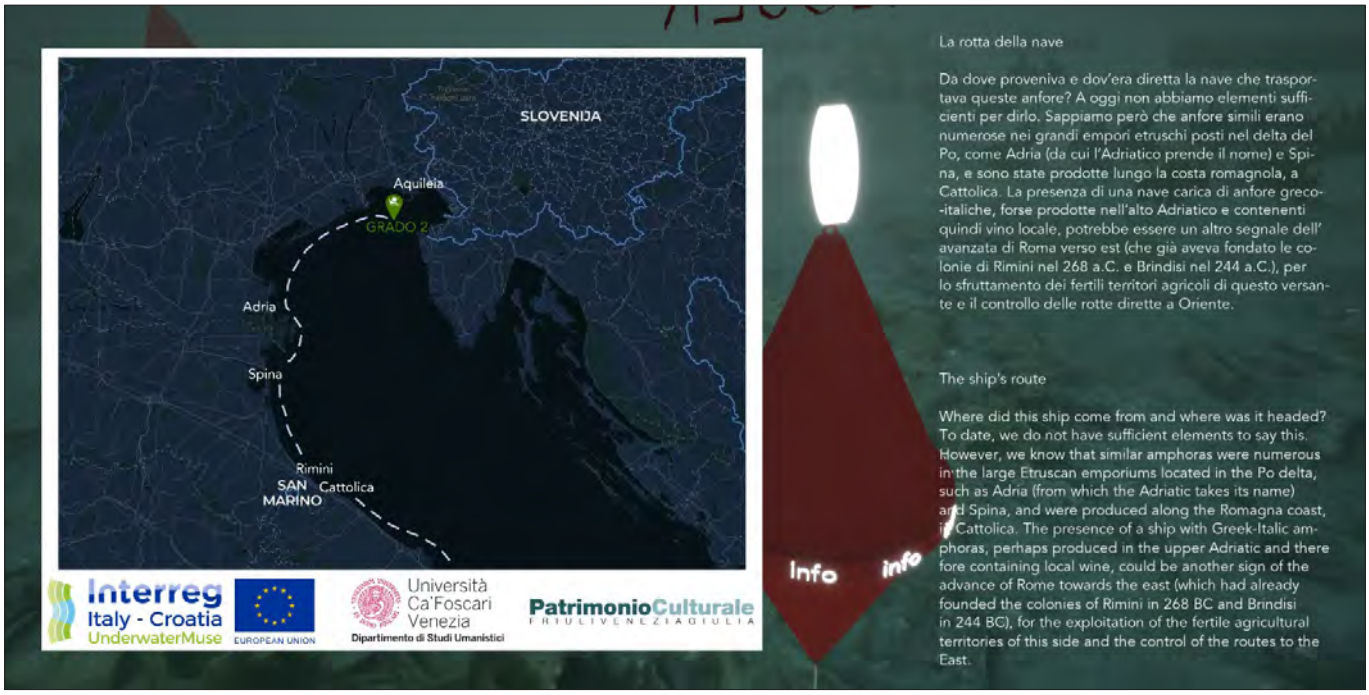

Fig. 9 - ***VR/AR environment: one of the info points of the immersive app (elab. E. Costa).***

sites. In addition to the importance of a digital artifact in scientific investigation, this type of representation of an archaeological site has been used to generate a virtual reality that promotes knowledge of the underwater cultural heritage to a wide audience. The generation of a 3D model allows those who cannot or do not want to dive to use an application that perfectly simulates what a virtual dive into the site looks like [18] (fig. 8).

The Unreal Engine software, a cross-platform software developed by Epic Games, was used to recreate the virtual reality of the archaeological sites. The first stage of the process involves loading the 3D photogrammetric model of the wreck and reconstructing the seabed: animated elements, such as fish, and static ones, such as native seagrass and algae flora and plants, were processed and textured using 3D CAD software, then uploaded in UE4 and scattered with the Foliage technique.

Then, several effects, such as refraction, fog, etc., were used to make the virtual underwater landscape more real from a visual point of view; in addition, water depth, water visibility, and diver's speed and movement were recreated in line with the real diving conditions to remain as close as possible to real-life diving: in fact, when diving with poor visibility, the diver has to follow the boat chain to reach the wreck, and this condition was also recreated in the virtual context [19].

A number of pop-ups and info points have been created within the virtual wreck to highlight special features of

the archaeological site and to make the virtual wreck dive more interesting and informative. The first info point is related to the cargo, and explains the type of amphorae we find on the wreck, the second is more general and is about the *Grado 2* underwater museum, the third is an answer to the important question «Where did the ship go?», the fourth is about the digital methodology used to document the site, and the last is about the route of the ship (fig. 9).

This type of interface can be uploaded to a website for public use and can be used to create multimedia-designed museum stations, as is the case of the Caorle Museum. The possibility of creating immersive experiences to be implemented in museum spaces makes it possible to share knowledge about places and the past, as has also been the case in the Kaštela Museum and the Castromediano Museum.

The VR also responds to the need for a broader inclusion of diverse groups of people who are able to make use of creative thinking and innovative ideas in exploitating traditional cultural content. An immersive VR approach makes underwater sites accessible to a wider audience, including people with different types of disabilities, in line with the project goals of transforming the sites into underwater archaeological parks or eco-museums through innovative and/or experimental methodologies and techniques, thereby reducing the loss of important cultural assets.

(E.C. - C.B.)

5. The cargo of *Grado 2* in the context of the Adriatic trade of the 3rd-2nd century BC

The Greco-Italic amphorae that make up the cargo have a triangular-section rim, with a more or less protruding beak profile, a cylindrical neck, vertical handles with an elliptical cross-section, an ovoid body with a carinated shoulder, and a base ending in a full cylindrical foot; despite the small number of specimens recovered and then submitted to typological analysis [20], at least two types can be identified which also include a certain morphological variety of some of their elements [21].

The first type, recognizable in the specimen with graffiti recovered during the first surveys (displayed at the exhibition «Into the sea of intimacy. Underwater archaeology tells of the Adriatic» [22]) has a rather prominent triangular rim, with the upper face sloping and the lower face flat, short neck and handles (the neck tends slightly to a truncated profile), broad shoulder and still heart-shaped body with distinct foot; the height is 77 cm, the maximum diameter 37 and the inner diameter of the rim 10 cm (figs. 10a-b); it seems to be ascribable to the Van der Mersch VI form, a link between the ancient and recent Greco-Italic forms, and datable to the middle decades of the 3rd century BC or better to the 2nd century BC or better to the second half of it [23].

Fig. 10a-b - Grado 2 ***wreck. a. Greco-Italic amphora type I. b.*** **Graffito** ***on the shoulder (courtesy SABAP FVG).***

It exhibits marked similarities with the Adria amphorae from tomb contexts of the first and second half of the 3rd century BC [24], with examples from Spina, of probable local production [25], and with the amphorae from the landfill brought to light in 2004 at the mouth of the Tavollo River, dated to the middle decades of the 3rd century BC, perhaps after the first half of the century [26]. The dimensions of the latter are similar to those of the Grado 2 amphorae; they range from 66-68 to 73-75 cm in height, 36-40 cm in maximum diameter; there are submodules of about 56 cm in height and 31 in diameter; the rim diameter measures from 10.8 cm to 13.4 cm (mostly within 12 cm, with the smallest between 9 cm and 10.4 cm); the capacity is 23.8 liters, but can be as high as 29.8 liters, while the submodule has a 12.5-liter capacity. Like the amphorae from Cattolica, those from Grado do not have stamps; it was not possible to verify the presence of digital impressions at the base of the handle, an element that characterizes several productions of this container (e.g., the one from Cattolica but also the one from Ischia). Another interesting comparison is that with amphorae from the wrecks of Cala Rossa (225-210 BC) and Tour d'Agnello (210-200 BC, where two different types of Greco-Italic amphorae that are very similar to those of Grado 2 appear) and from the last phase of the Pech Maho settlement, which Cibecchini and Capelli in their typological review classify as Amphoras Gr.-Ita Vc (partly equivalent to the MGS / RMR VI type, distinguished by Vandermersch, and to the Lyding Will 1b type), which bear stamps by this time almost exclusively in Latin or bilingual, produced and distributed in the years of the Second Punic War or at any rate in the last quarter of the century in question [27].

The recovered example bears on the shoulder a graffito that can be hypotetically interpreted as a numerical symbol, i.e., the archaic version of the numeral 50 (fig. 10b). In the indications of weight inscribed on amphorae found in northern Italy it appears frequently, occasionally also on imported containers. The archaic version of the numeral 50 derives from the Etruscan tradition and in graffiti with indication of weight it also appears in its intermediate versions characterized by a base with an arched or straight line, corresponding to the inverted T, to finally arrive at the letter L [28]. The number could correspond to the weight of content, expressed in *sextarii* (0.545 lt), equal to 27.25 lt (close to the real capacity of the amphora). On the other side, the number could also indicate a group of amphorae in count operations carried out right on the ship or during the loading, as in the famous case of the amphora Dressel 6A from S. Francesco al Deserto, which represents a real bill of lading or shipping note. This matter could explain the upside-down position of the symbol.

Fig. 11. - Grado 2 *wreck. The Greco-Italic amphora type II: ortophoto from photogrammetric survey (elab. E. Costa).*

The second type is represented by the footless specimen recovered during the 2021 campaign, which is preserved to a height of 72 cm, has a maximum diameter of 33 cm, neck diameter of 10.5 cm, rim diameter of 14.5 cm (outer) and 12.5 cm (inner); the handle is 4 cm wide. Capacity is about 20 liters, weight 11 kg (RA 3; figs. 11-12). In my opinion, it can be ascribed to the period of late or recent Greco-Italic amphorae; in fact, it presents some formal elements that will characterize the amphorae of the first half of the 2nd century: a slenderer body, less resembling a spinning top because of the less broad shoulder; neck and handles are elongated and the rim has a less pronounced profile. The lack of a foot, which should be longer and in continuity with the body, does not add other informative details, but this type seems similar-albeit not completely-to the amphorae classified by Cibecchini and Capelli as Gr.-Ita VI, particularly subtype a, and datable to the last years of the 3rd century: see in particular some examples from the already mentioned Tour d'Agnello cargo [29].

A wine content seems confirmed for both types, although other uses cannot be ruled out.

An amphora wheel-made stopper was also found, with a rather high and wide central grip (diam. 10.5 cm; thickness 0.6 cm; h with grip 3.8 cm). The fabric is creamy-pink, rich in inclusions, medium to large (*chamotte*) also visible on the surface and small gray, few vacuoles (RA 5; fig. 13). Traces of pitch are present on the inner surface.

The deposit appears to consist of a single order of amphorae; assuming about 9 amphorae per square meter,

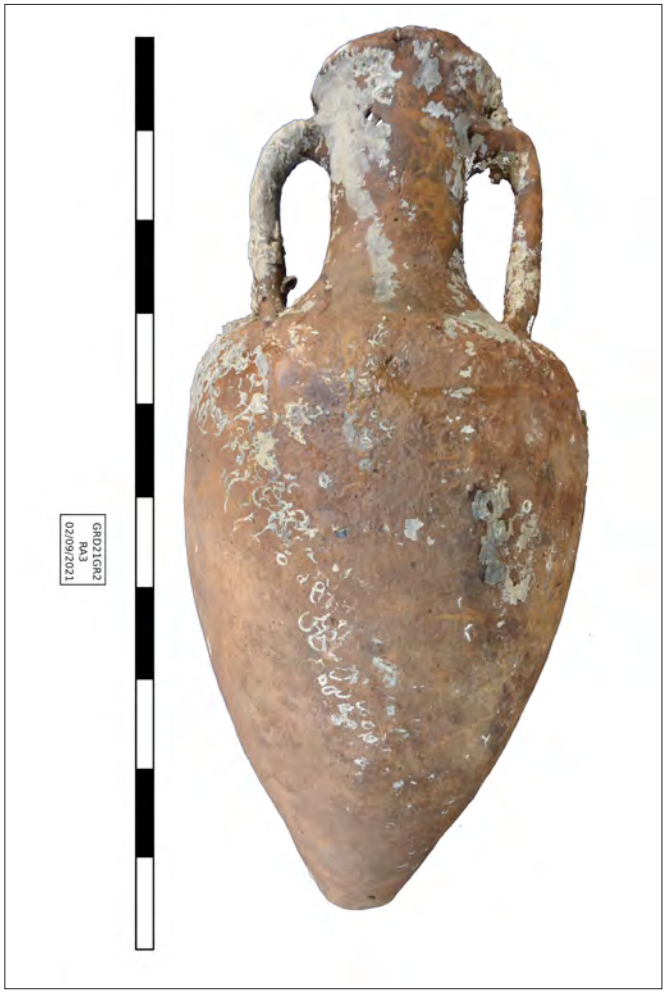

Fig. 12. - Grado 2 ***wreck. The Greco-Italic amphora type II: the recovered specimen (ph. E. Costa).***

Fig. 13. - Grado 2 ***wreck. Wheel-made amphora stopper (ph. E. Costa).***

and the area of the deposit being about 92.5 square meters (fig. 14), we would have an approximate number of 832 amphorae, but it should be considered that the visible area is the one corresponding to the dispersion of the load, also due to the "displacement" action of the vessels' turbo blowers; as a precautionary measure, we could estimate an initial area of about 80 square meters and thus 720 amphorae; the total weight – between content and containers – would be between 21.5 and 25 tons (considering that a liter of wine weighs about 990 g). This cargo-assuming there were no other perishable materials-seems to be that of a coaster, in any case a small-tonnage vessel engaged in short to medium-haul routes of regional interest [30].

Very few materials are presumably relevant to onboard equipment; an olpe or pitcher in common ware, a small single-handled vessel, of which only the globular body, with a flat annular bottom, is preserved [31] (RA 4; fig. 15). A fragment of very thin copper plate that has a "hinge" at one end, which probably must have joined this piece with another, could possibly refer to the same equipment [32] (RA 7; fig. 16).

Despite Van der Mersch's impressive collection and documentation work [33], we are still far from a classification of early and middle Hellenistic Italic productions; more recent investigations suggest a much more fragmentary picture, made up of a series of local, sometimes typologically distinct productions, which only by necessity can be grouped under a single label [34]. Evidence of production sites on the Adriatic coast is still elusive, probably due to the continuity of production and the appearance of later forms. Only a few kilns are known to have produced Greco-Italic amphorae from the 3rd century BC (Van der Mersch forms V-VI): certainly at Cattolica, already mentioned here, where, along with amphorae, by far the most prevalent, bricks, table and kitchenware, earthenware, dolia, loom weights, etc., were produced [35]. At Spina and Adria [36], perhaps in Silvi Marina, on the coast to the North of Pescara, near the mouth of the Piomba River (southern Picenum), which has yielded bricks, Late Greek-Italic, Lamboglia 2, flat-bottomed amphorae and Dr. 2-4 but also a hollow-bottomed one that may belong to an MGS V, thus 3rd century, thus indicating a remarkable production longevity [37]. Instead, the production sites

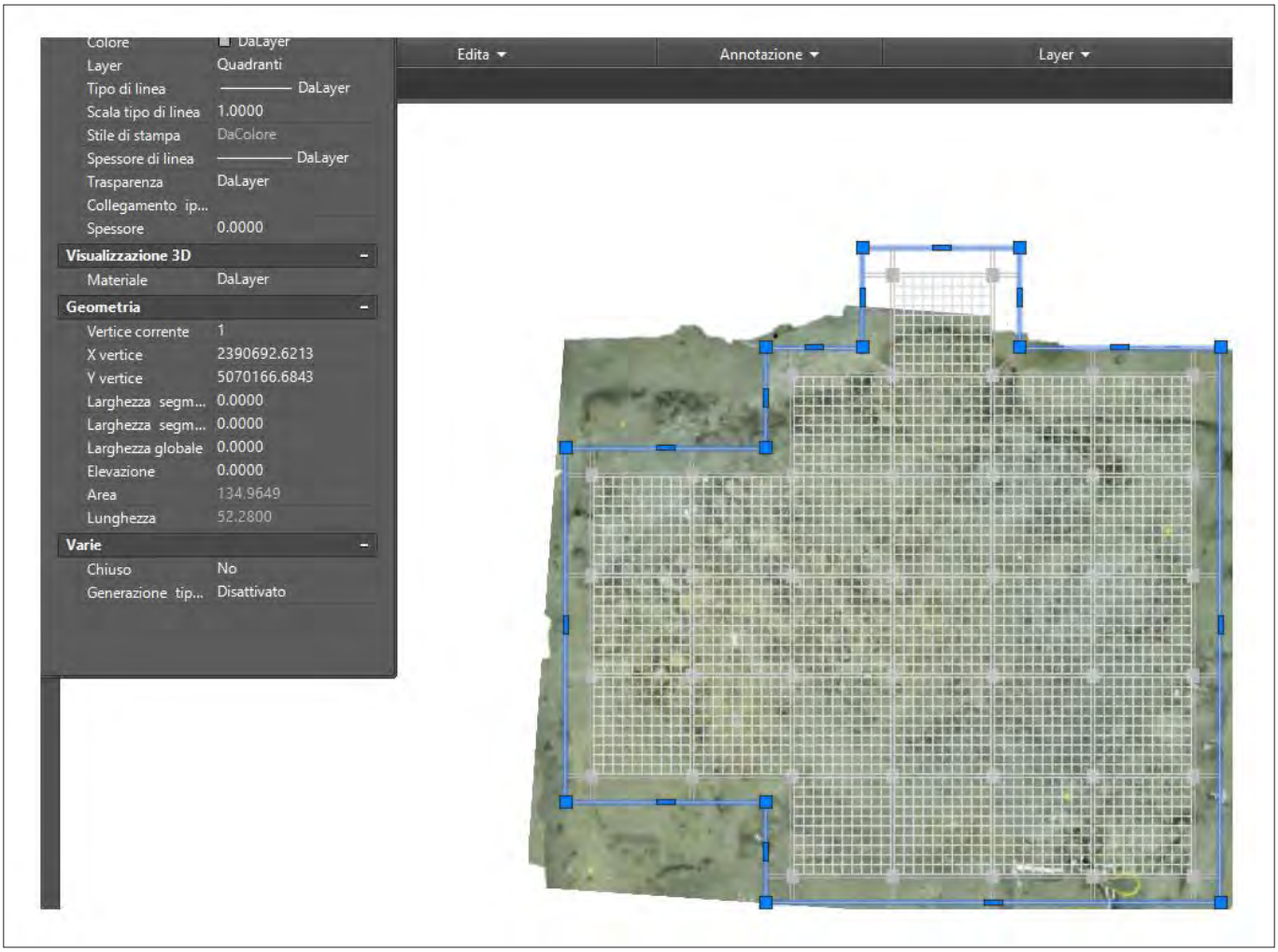

Fig. 14. - Grado 2 ***wreck. Site extent (ph. E. Costa).***

Fig. 15. - Grado 2 ***wreck. Common ware pitcher (ph. E. Costa).***

Fig. 16. - Grado 2 ***wreck. Copper sheet fragment (ph. E. Costa).***

of these containers are well known along the Tyrrhenian coast, between Etruria and Campania [38], in Magna Graecia and Sicily, areas to which reference is made by the Greek names but also by the Latin names written on some stamps, as well as by petrographic analyses [39].

These are, in fact, the first Italic amphorae to have a wide Mediterranean circulation, linked to the circulation they had while accompanying cargos of black luster pottery, and various imitations, both in Punic Sardinia and in Gallic, Hispanic, North African and Aegean areas [40]: «The widespread adoption in the third century of this type of amphora (from the Ionian to Sicily, from the Tyrrhenian to the Adriatic) shows the desire to conform to an immediately recognizable and universally accepted model on non-regional markets, also in reference to standardized systems of measurement» [41]. This is also attested to

by the number of wrecks: about fifteen between 300 and 200 including the Grado 2 wreck [42], of course about half of these were carrying the fully optimized, standardized and "Romanized" container, the late Greek-Italic amphora, from the beginning of the 2nd century until 125 BC [43], but it is certainly a significant number. The increase in the number of testimonies starts from 265 to 220-200 BC (the turning point being the First Punic War), which coincides with the chronology of the sinking of our cargo [44]. It must be said that this phenomenon mainly affects the western Mediterranean; the Adriatic side of the peninsula has essentially land-based finds and two wrecks: this one from Grado and the wreck from Mali Lošinj, presumably within the same time window or slightly earlier (second half of the 2nd century BC) [45]. Between the southern Adriatic and Ionian seas several isolated or decontextualized underwater finds have been discovered: from the Otranto Channel, Leuca, Torre dell'Orso, Torre S. Sabina, Taranto Luogovivo, Gallipoli, Torre S. Gregorio and others of unknown origin [46]. The significant presence of MGS V and VI along the Ionian coast could be related to Van der Mersch's hypothesis about their production in Taranto, which was put forward mainly on the basis of the conspicuous documentation offered by the urban center and its surrounding area, but unfortunately missing the irrefutable evidence of the kilns [47].

Now this is not the forum to discuss the definition of the term "Romanization" and the new prevailing meaning of the term interaction – rather than hegemony – between Rome and local communities as this would imply considering dynamics that should be examined from different points of view, not necessarily Roman-centric [48]. The historical framework that provides the backdrop for the Grado 2 cargo is certainly characterized by the arrival and establishment of Rome on the Adriatic scene, but also by the pre-existence of substantial trade connections between the north-central Adriatic area and Southern Italy.

For it is true that in the aftermath of the Battle of Sentinus in 295, a true watershed for the new policy of expansion of the Roman Republic in central and northern Italy and the Adriatic, after the elimination of the Gallic tribe of *Senones* from the political scene, in less than fifty years Rome established several civic colonies (certainly *Sena Gallica* / Senigallia between 290 and 283, probably *Castrum Novum Piceni* / Giulianova, between 290 and 288, and perhaps *Aesis* / Iesi, 247?) and four Latin colonies (*Hatria* / Atri between 290 and 288, *Ariminum* / Rimini in 268, *Firmum Picenum* / Fermo in 264, *Brundisium* / Brindisi in 241); after the victory over Taranto and Pirrhus in 272, the *bellum salentinum* of 267-266 and the foundation of the Latin colony of Brindisi, Rome seems to have full control the western Adriatic coast from the Po delta to Salento [49]. These colony settlements «developed or established ex novo contacts of various nature and extent, both among themselves and with the inhabitants of the opposite shore of the Adriatic» [50].

Underlying the use of the Greco-Italic amphora for the transport and trade of wine there must have been reasons similar to those that led to the adoption of the Roman-Campanian *pes* for the bronze coinage of *Ariminum*: the need for a container «corresponding to a system of measurement immediately recognizable and generally accepted in non-regional markets» [51]. It should be noted that trade routes between the Po Valley area and the southern part of the Peninsula had been used since at least the first decades of the 4th century BC: at Spina, for example, Magna Graecia or Sicilian amphorae from the 4th century BC have long been recognized [52]. The phase of dismantling of the palisade at the end of the 4th-early 3rd century BC, which preludes the final abandonment of the Po valley emporium, is confirmed by the analysis of figurative pottery, Etruscan, Upper Adriatic, and Magna Graecia, and amphorae, essentially Greco-Italic similar to Type I from the *Grado 2* wreck [53].

It should also be emphasized that, as recent research has clearly shown, the two large colonies in the north-central Adriatic, *Ariminum* and Aquileia, overlapped pre-existing settlements that were centers of trade certainly already attended by Hellenic and Italic peoples for commercial purposes.

This is confirmed by the pre-Roman context of the *Essiccatoio Nord* in Aquileia [54] and the remarkable size of the indigenous settlement of Rimini, only slightly smaller than that of the Roman city [55].

(R.A.)

6. Stakeholders' involvement and perspectives

During the 2021 operations, some diving sports clubs, particularly those aware of archaeological issues, visited the site and enthusiastically gave their support to the project, even providing a little technical support (fig. 17). The Municipality of Grado, for its part, supported the project by providing logistical support on land and organizing a promotional event (29.08.2021) to inform people of what kind of operations were taking place in their sea and what developments could result from these operations.

After the conclusion of the excavation of the *Grado 2* wreck and given the enthusiastic response of the diving clubs, the efforts to inform, raise awareness, and engage

Fig. 17. - *Grado. Stakeholders involved in* Grado 2 *pilot action (ph. L. Mestroni).*

our key stakeholders went on to hopefully achieve a model of participatory management in line with the project goals and the shared objective.

The first step to be made to engage local dive centers, whether sports clubs or tourist dive centers, is to educate/train them. Therefore, a "heritage education" project was carried out, aimed at acquainting diver members and other possible stakeholders with both the Grado 2 site and other underwater sites in the Friuli Venezia Giulia region and formulating a possible offer of use these sites through the clubs themselves. The beneficiaries of this training project were about 25 divers belonging to the sports clubs in the region (*Circolo Sommozzatori Trieste*, *Gradese sub*, *Centro Pordenonese subacqueo*, *CSU-Centro subacqueo Udine*, etc.), diving centers, and the *Miramare Marine Protected Area*; the participants were accompanied by two underwater archaeologists. Accompanying divers with a passion for archaeology or underwater tourists with high cultural interests allows them to learn about underwater sites and how to approach them properly. In addition, in line with the UnderwaterMuse vision of participatory management through specific agreements, the diving clubs and diving centers will also be involved in the maintenance of the sites, a task that requires targeted training.

Training included a series of modules:

- an initial theoretical workshop, hosted by university professors and professional underwater archaeologists;
- two days of diving on the *Grado 2* wreck;
- three more days designed to widen the regional offer, with visits to underwater sites, mainly those close to the coast, to be reached either by diving or snorkeling, including the small jetties of Muggia and other sites in the Grado and Marano lagoons.

Another project, *Boost 5* (funded by the same EU Italy-Croatia Programme), is underway, which is aimed at capitalizing on the experience of the UnderwaterMuse project and designing a model of participatory management of the site, based on a roadmap of agreements, thematic tables, as well as on the sharing of tasks and responsibilities among the actors involved.

(R.A. - C.P.)

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[*https://www.italy-croatia.eu/web/underwatermuse*]
[*https://www.facebook.com/Project-Underwater-Muse-106106884192806]*

Notes

[1] See in these Proceedings Auriemma, Del Bianco for the whole project and Auriemma *et al.*, *Puglia: a sea of resources* for the pilot action in Torre S. Sabina (Brindisi, Puglia).

[2] The project manager was Barbara Szolil (Informest). The technical plan was conceived by Andrea Cocetta (SERIN srl). The director of works was Simonetta Bonomi (SABAP FVG). The campaign took place from 13 August to 15 September 2021. The working group included Rita Auriemma (Department of Cultural Heritage, University of Salento, coordinator and scientific manager of the Underwater-Muse project) Carlo Beltrame and Elisa Costa (Department of Humanities, Ca' Foscari University, project partner), Massimo Capulli (Department of Humanities and Cultural Heritage, University of Udine), Claudia Pizzinato (Informest, technical-organizational support), Dario Gaddi (Archeotest srl, site manager), Francesco Dossola (supervisor, SABAP-FVG). The activities were attended also by underwater technical operators of the contracting companies (Archeotest srl, ESSETRE srls, Marine Innovation Tech srl), as well as students and doctoral students from the University of Udine and Venice. During the underwater work campaign, and in compliance with the ordinances in force, visits were made by members of the diving clubs of the Region (Circolo Sommozzatori of Trieste, Pordenone Sommozzatori Center, CSU-Diving Center, Gradese Sub; see below, par. 6).

[3] Capulli 2019.

[4] This is the so-called *Iulia Felix*: Operazione Iulia Felix 1999; Auriemma 2000; Capulli 2010.

[5] As is the practice, the new wreck was assigned the numeral 2, based on the date of discovery and not on its chronology: Capulli *et al.* 2016.

[6] Tortorici 2000, 91-98.

[7] These were supposed to act as bollards, tearing up any fishing nets pulled over the submerged archaeological area.

[8] During an inspection in mid-November 2008, I found that only shreds of the wire mesh cover remained and that numerous clay finds were without any protection.

[9] Garabello 2004.

[10] The Superintendency for Archaeological Heritage of Friuli Venezia Giulia decided not to protect the wreck by closing it as it was done in 2000, nor to recover the cargo, but to in situ preserve.

[11] Flatman 2009, 5-8.

[12] Jurišić 2006, 147-156.

[13] Capulli, Tortorici 2018.

[14] As a corollary to this project, a second one has been initiated by the University of Udine, which envisages the realization of a video surveillance system capable of continuously monitoring both the body of water above the submerged site and the underwater site (Capulli 2020). This second project was also partly tested on the wreck of II-I BC. *Caorle 1* (Capulli 2021a), it not only allows the site to be monitored during future underwater tourist visits, but also has the not insignificant objective of making the submerged site accessible to those who are unable to dive.

[15] This work was directed by the writer with the scientific coordination of the superintendent Dr. Luigi Fozzati and the technical support of the company Archeotecnica of Venice. For methodological aspects, see the chapter on the *Grado 2* shipwreck in Capulli 2021b, 47-61.

[16] Drap *et al.* 2007; McCarthy, Benjamin 2014.

[17] Rule 1989; Balletti *et al.* 2015; Beltrame, Costa 2017; Costa 2022.

[18] Costa, Manfio, Tusa 2020.

[19] Costa, Manfio, Tusa 2020.

[20] A more detailed morphological, metrological and archaeometric analysis will be conducted by the University of Udine, by virtue of a specific assignment by SABAP Friuli Venezia Giulia.

[21] The variants had also been noticed during the previous interventions: Capulli, Tortorici 2018, 90.

[22] Auriemma 2018, 163. Tortorici 2000.

[23] Van der Mersch 1994, 71-87; Van der Mersch 2001. I follow here the choice of C. Panella not to name the form either with the initials MGS (*magno-grecques et siceliotes*) or with RMR (*romaines medio-republicaines*) but from the author's name, to avoid the confusions inherent in the typological definition of forms V and VI; see the exhaustive discussion in Panella 2010, 13 and App. II and in Cibecchini, Capelli 2013, 423-424, with the scheme of equivalences in Fig. 1. I have not adopted the nomenclature of the new classification prop. posed in this contribution due to the confusion that generates the designation Gr-Ita VI for the specimens of the beginning of the second century BC, which instead are by now with good right "Late or Recent Greco-Italic".

[24] Toniolo 2000, type 4a.

[25] Sciortino 2012, Fig. 26. Inv. B.92, impasto Anf8; see also De Luca De Marco 1979, tav. V, nn. 14-16; Desantis 2017. A Spina production of Greco-Italic amphorae, starting from the end of the 4th century BC, is confirmed by the discovery of fragments of kiln's waste: Baldoni 1989. The wine production of the area is attested by paleobotanical studies and vine shoots used in the reclamation works of the town; the analyzes identified vitis vinifera pollen and also the presence of cherry trees, that in ancient times could be used as support for viticulture (Uggeri 1985, 42; Sciortino 2012, 169).

[26] Stoppioni 2007, 2008, 2009, 2011a, 2011b, 2013.

[27] Cibecchini, Capelli 2013, 439-440, Fig. 8, with previous references about the different contexts. Regarding the shipwreck of Tour d'Agnello (Northern Corsica) the chronology has been progressively lowered from the beginning to the end of the third century: Olcese 2012, p. 621 with references and 658, tav. 7. XXXV. For Cala Rossa see also Olcese 2012, p. 603-604 with references.

[28] Olmer 2001; Corti 2016.

[29] *Ibidem*, 440-442, Fig. 9.

[30] Nakos 2020: small capacity. The boats of Fiumicino 1 and 2, Grand Congloué B, Grand Ribaud D, and also Grado 1 belong to the same category. Tonnage is between 15-75 t, length 12-24 m, the main section 3.3-6 m, height under beam 1-2.5, draft 1.5-2.5, affected area 75-175 square meters. Our cargo is in the lower range of the category.

[31] Preserved height 21.5 cm; neck diam. 4.5 cm; foot diam. 9 cm; maximum diameter 19 cm.

[32] The hinge is formed with one end of the sheet that folds on itself and has two holes of 0.6 mm in diameter, at a distance of about 1.5 cm

[33] See above, note 23.

[34] See the Locri productions: Barra Bagnasco 1990 and 1992.

[35] See above, note 26.

[36] See above, note 25 for the production of Spina. Cibecchini, Capelli 2013 deduce a local production from the specificity of the evolution of the Greco-Italic amphorae of Adria. On the phase of demographic and commercial expansion of the city starting from the end of the 4th and especially in the 3rd century BC, which also sees the Greco-Italic amphorae as an indicator of commercial relations with Southern Italy, see Bonomi 1995.

[37] Staffa 2001, 401; Staffa 2003, 118-119, Fig. 2, 1-2; Panella 2010, 17, nt. 5, who refers to Staffa 2003, Fig. 2, 2.

[38] See the accurate review in Panella 2010, 13-14 and the various contributions in Olcese (a cura di) 2013.

[39] Van der Mesch 1994 with references.

[40] See for example the evidence in Cyrenaica: Göransson 2013. For the distribution framework, Panella 2010, 22-23, 30-32 and *passim*.

[41] Panella 2010, 13.

[42] Panella 2010 had already integrated the review into Cibecchini 2004; see also Cibecchini, Capelli 2013 (where, however, the wreck of Ilôts Bruzzi in Corsica, added by Panella, does not appear).

[43] Manacorda 1989, 443 note 2; Manacorda 1986, 582.

[44] Panella 2010: Period III, 29-40.

[45] Kapitän 1979; Radić 1991.

[46] Auriemma 2004, II, 153-154.

[47] Van der Mersch 1994, 80 and 86. Van der Mersch points out a certain concentration of these types in the artisanal neighborhoods.

[48] We refer to the recent accurate review by Bonetto 2022, which owes much to the analysis in Bandelli 2009.

[49] Bandelli 2001; Malnati, Stoppioni 2008.

[50] Bandelli 2001.

[51] Stoppioni 2008, 136-137.

[52] Desantis 1993, 161-163; Desantis 1996, 353-355; Desantis 2001, 106.

[53] Buoite *et al.* 2022, 298; Cremaschi 2017.

[54] Ventura, Degrassi 2022.

[55] Bondini *et al.* 2022.