

THE “FLOWER WOMAN” FIGURINES
FROM THE FOCE SELE HERA SANCTUARY.
ANCIENT COROPLASTIC DIGITAL DATA MANAGEMENT,
ANALYSIS, AND SHARING

1. INTRODUCTION

This work focuses on a peculiar *corpus* of terracotta figurines, the “flower woman”, found in the excavations carried out by Paola Zancani Montuoro and Umberto Zanotti Bianco at the Foce Sele Hera Sanctuary and stored in the National Archaeological Museum of Paestum, in the South of Italy. In particular, the paper presents the digital strategies developed to support the study and the main results of the technology-enhanced workflow. “Flower woman” definition identifies the best known structure of the statuettes composed of a female bust supporting a flower; however, there is evidence of other configurations of the lower part as well: male busts, groups, cones (Fig. 1). Actually, a review of the scientific literature about these particular coroplastic artifacts reveals a diffused vagueness and ambiguity in naming, formalization, functional exegesis, and meanings; this status encouraged a new comprehensive study (CANTONE 2010b, 2014).

Indeed, reputation of the Foce Sele Heraion reports (Fig. 2) contributed to make the Paestum “flower woman” figurines the best acknowledged *corpus* over the years (ZANCANI MONTUORO, ZANOTTI BIANCO 1937, 1951-1954; STOOP 1960). Nevertheless, an accurate review of the literature reveals that the first citations and drawings of these peculiar objects date back to the 19th century, and that their diffusion is documented in a wide area from Magna Graecia and Sicily to the Black Sea Region.

Archaeological reports used different definitions, such as “flower woman”, “flower satyrs”, “flowers”, “flower thymiateria” and “flower figurines”. The figurines function was debated as well: the “flower woman” findings are generally interpreted as terracotta votive offerings or alternatively as thymiateria (incense-burners). The earliest and most diffused meaning interpretation of these peculiar figurines was related to the cult of Hera, attested at the Foce Sele Sanctuary. However, this certainty gradually faded in later literature, also due to the increasing amount of discoveries of “flower woman” in sanctuaries related to different divinities and in other kinds of contexts.

Indeed, in the last decades the ancient terracotta figurines study changed, due to the development of new methodological approaches. Furthermore, new documentation shows “flower woman” findings from many sites in the Mediterranean Sea and documents several local productions. Therefore, this



Fig. 1 – “Flower woman” figurines (photography by Vincenzo Passarella, Paestum National Archaeological Museum).

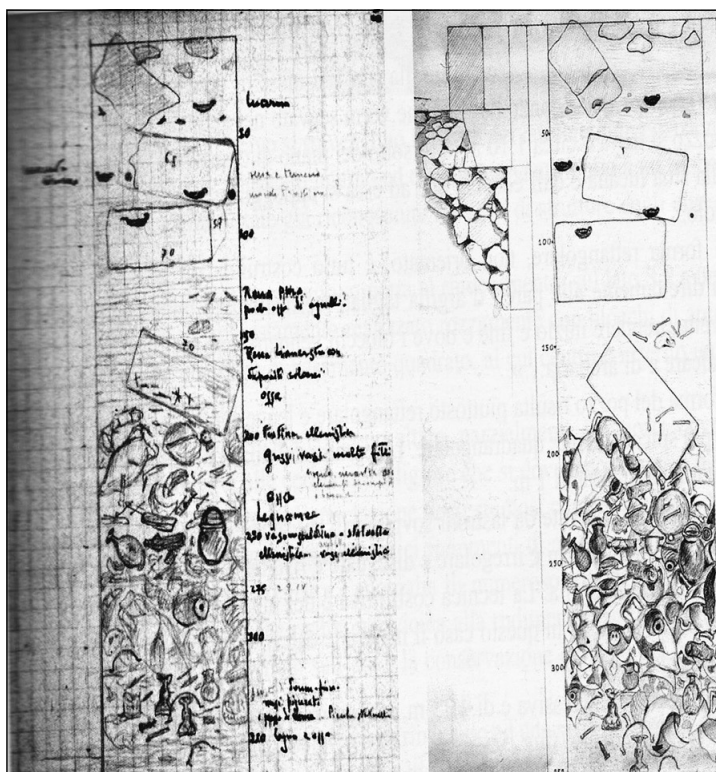


Fig. 2 – I *bothroi*, Umberto Zanotti Bianco drawing (ANIMI archive, U. Zanotti Bianco Fund).

research proposes a new complete study of the Foce Sele Hera Sanctuary findings and a screening of other evidence of “flower woman” fragments in the South of Italy and in the Mediterranean Basin; furthermore the study aims at exploring the features of the contexts where the figurines were found. The new analysis develops a whole technology-enhanced-chain, including multimedia data digital management and sharing, statistical techniques for the analysis of terracotta shrinkage in moulded coroplastic figurines seriations, webGIS visualization of archaeological documentation in the ancient Mediterranean Basin, and participated approaches to constructing and sharing archaeological knowledge¹.

2. DIGITAL APPROACHES IN THE ARCHAEOLOGICAL WORKFLOW AT THE FOCE SELE HERA SANCTUARY. THE METHODOLOGICAL BACKGROUND

New archaeological investigations have been exploring the Foce Sele Hera Sanctuary since 1987 (DE LA GENIÈRE, GRECO 2010) (Figs. 3-4). During these years, an interdisciplinary group of humanities and technology experts applied and tested a wide range of digital approaches and computational methods to the site, developing a peculiar digital archaeological workflow. The main experimentations included graphical and photographic documentation of findings; archaeometric analysis of fabrics; stereophotogrammetric recording of excavations (Variable Transparency Image Stacker); digital data management and standards (DATARCH); virtual museums, information sharing and communication in archaeology (Museo Narrante).

The “Museo Narrante” is one of the best known and earliest outcomes of this approach (CANTONE 2005, 2012a, b; GRECO *et al.* 2007, 2008). In the museum, the archaeological history of the Foce Sele Hera Sanctuary is independent from the materiality of objects and findings: an integrated multisensorial experience mixes voices, lights, sounds, videos, virtual three-dimensional reconstructions to support the narrative framework, in line with contemporary international trends about cultural dissemination (Fig. 5).

In the same scenario, the idea that information structure influences the production of knowledge encouraged the development of DATARCH system

¹ The methodological aspects of this work are part of the author’s research activities in the OR.C.HE.S.T.R.A (ORganization of Cultural HERitage and Smart Tourism and Real-time Accessibility) project, financed in the “Programma Operativo Nazionale Ricerca e Competitività 2007-2013, Smart Cities and Communities and Social Innovation, Asse II - Azioni integrate per lo sviluppo sostenibile, Ambito: Smart Culture e Turismo” with a partnership among Università degli Studi di Napoli “Federico II” (Centro Interdipartimentale di Ricerca LUPT, Dipartimento di Fisica, Dipartimento di Economia, Management e Istituzioni, Dipartimento di Studi Umanistici), CNR Consiglio Nazionale delle Ricerche (IRISS, Istituto di Ricerca su Innovazione e Servizi per lo Sviluppo; ICTP, Istituto di Chimica e Tecnologia dei Polimeri, IMCB, Istituto per i Materiali Compositi e Biomedici, ICAR, Istituto di Calcolo e Reti ad Alte Prestazioni), IBM Italia, Autostrade Tech, Lauro.it.



Fig. 3 – Foce Sele Hera Sanctuary. Archaeological excavation area (drawing by Ing. Pietro Cifone).

to manage and archive new excavation data (CANTONE 2007a, b; 2010a; FABRICATORE, CANTONE 2006a, b; 2008). In this system, an analysis of archaeological chain operations aims at defining standard intervention protocols (Fig. 6); furthermore, stereo-photogrammetric image plays a meaningful role as a cognitive structure and a hermeneutic support in 3D data interpretation².

The research on “flower woman” figurines starts from these experiences. Since it supports the peculiar coroplastic investigation requirements and the overall research workflow with ICT techniques and methodologies, its

² These digital approaches were developed under the scientific supervision of Prof. Giulio Fabricatore and Prof. Paola Moscati.

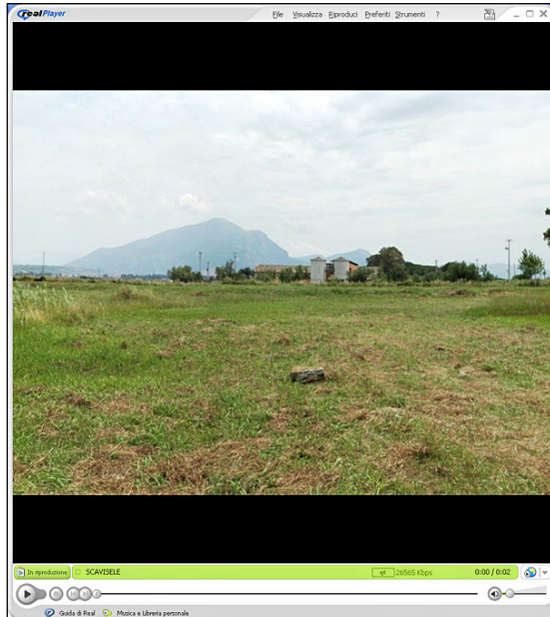


Fig. 4 – Foce Sele Hera Sanctuary. Panorama of the excavations area in 2004 (panoramic photo by Prof. Giulio Fabricatore).



Fig. 5 – “Museo Narrante di Hera alla Foce del Sele”. 3D reconstruction of the Sanctuary.

background integrates different multidisciplinary approaches developed over the years in the digital cultural heritage field of studies.

First, a key topic is the digital management of cultural data, with a particular attention to the relationship between data and their structure, and the crucial role of such a connection to achieve a proper interpretation



Fig. 6 – DATARCH. Archaeological data manager. Start panel (FABRICATORE, CANTONE 2008).

and analysis. Indeed this theme has been one of the main fields of interest in the studies on digital archaeology, with a renewal of attention in the semantic web context (historical overviews in MOSCATI 1990 and 2009, in particular CARVALE 2009; DALLAS 2009; SIGNORE 2009; a case study in GRUBER, LOCKYEAR in press). In this sector, even new contaminations derive from the raising knowledge society scenario, that promotes participated architectures where information is not only accessible, but also built up, enjoyable, reusable in a shared way (CANTONE 2005, 2012a, b; OLIMPO 2010). These impulses inspire international scientific community to support cultural data interoperability and to expand cultural digital archives including features to study, analyze, correlate data in cooperative knowledge networks (CAFFO 2013).

From a theoretical point of view, Paola Moscati stressed that procedures formalization and data systematization aim at achieving new archaeological results (MOSCATI 2001). The chain of an archaeological data computerization intervention usually involves defining research space and time limits, information sources and knowledge bases, operation scales, representation strategies, analysis goals, target users. In turn, Tito Orlandi pointed out the importance of these steps over software choices (ORLANDI 2009) and encourages adopting a relational structure for an archaeological database since it reflects the nature of the studied reality. Finally, according to Orlandi, multimedia collections (for example the *Corpus Vasorum Antiquorum* online: KURTZ 2009) are one of the main achievements of Archaeological Informatics.

Ancient coroplastic studies apply specific research requirements that can exploit the above approaches. Indeed, there is a growing interest about the possibility to build up online databases to collect and share the huge typo-

logical variety of ancient terracotta figurines produced in series with moulds (ALBERTOCCHI, HUyseCOM-HAXHI 2014). The establishment of international groups of experts supported by digital media (such as CSIG, Coroplastic Studies Interest Group: <http://www.archaeological.org/interestgroups/13366/>) can be another favorable precondition for scientific aggregation and shared construction of online terracotta figurines repertoires.

Digital approaches address also other usual topics in coroplastic studies such as the analysis of clay shrinkage in the production and the related reconstruction of moulds serialiations. These methodologies already proved effective application in typological studies, as shown in an experimentation of morphometric characterization of *thymiateria* in the form of female bust wearing *kalathos* (JAXA-CHAMIEC, TARONI 2008).

An additional area of ICT-supported investigation in coroplastic studies is the distribution and circulation of terracotta figurines and moulds; in this field, a fundamental value is the ability to manage localization information and to analyze spatial data.

Actually, in the last decades, archaeology was a scenario of intense experimentation of digital strategies to manage spatial data (MOSCATI 1999; DJINDJIAN *et al.* 2008; AZZENA 2009; GUERMANDI 2011; SERLORENZI *et al.* 2014). In particular, François Djindjian defines a typology of archaeological GIS applications. As part of cultural heritage survey, protection and risk prevention policies, they include cultural resource management actions, archaeological risk maps, tools to support census of existing realities and action planning, as well as the storage and management of excavation data; another group is aimed at studying the ancient landscape; furthermore there is the set of applications related to virtual archaeology and finally the historical buildings analysis (DJINDJIAN *et al.* 2008).

Besides, in a critical paper outlining computer management of archaeological spatial data, Giovanni Azzena further contributes to a sharper definition of this field of applications, proposing to distinguish among digital mapping, geographic information systems and spatial analysis (AZZENA 2009). Consequently, he separates the operation of “building” a Geographic Information System that includes historical and archaeological knowledge about the territory from the one of “using” a GIS application to process, for example, an ancient settlement model and to implement spatial analysis.

The emerging scenario of the 2.0 and 3.0 web intertwines also archaeological spatial data management, with a growing importance of systems that enable the creation of cooperative solutions, technologies and content by communities of experts/users (AUER 2011). Finally, the increasing technological convergence and the emerging transmediality trends blur the separation among different solutions (TORTORA 2012); ubiquitous computing disseminates technologies in mobile devices and sensors, integrating real and virtual worlds.

Ancient coroplastic study can make the most of such an integrated approach to digital management of localized data: the ability to relate evidence of finding to their position and context supports the analysis of cultural exchanges, contacts and markets. Also in this specific discipline the recent technological and methodological evolutions support a deeper interest for interdisciplinary and participated approaches.

3. THE FOCE SELE SANCTUARY “FLOWER WOMAN” FIGURINES DATABASE

The study of the “flower woman” terracotta figurines from the Foce Sele Heraion needed the definition of a digital strategy in order to systematize and standardize data acquisition; to support data management and analysis; to create both analytical reports (such as catalogues) and graphical visualization of quantitative data. The analysis focused on more than six hundred remains, stored at the Paestum Archaeological National Museum, almost completely unpublished. One of the fundamental steps of this analysis is the fragments classification, assisted by developing a relational database tailored to manage coroplastic data. Indeed coroplastic classification and terminology are widely debated, with many different approaches and lack of a universally acknowledged language (NICHOLLS 1952; BONGHI IOVINO 1965, 1980, 1990; CROISSANT 1983; BARRA BAGNASCO 1986; MULLER 1997).

The study on the “flower woman” classification matches the methodological aspects and terminology adopted in the comprehensive analysis of the finds from the Sanctuary at Foce Sele (DE LA GENIÈRE, GRECO 2010), that recognized in the coroplastic class a variety of “groups” of objects with common iconographic characteristics, each group including different “types”. Therefore, in the present research, the “type” concept frames the morphological characteristics arising from the use of a matrix, and all those derived from it (TOMEIO 2010 a, b). The “flower woman” combination was obtained by using two matrices, one for the base and the other one for the flower, with different possible outputs. Therefore, the new proposed classification system allows including and classifying incomplete combinations, even fragments of bases or fragments of flowers; furthermore, this scheme fits closely the ancient production processes.

The first step for the digitization process was the logical structuration of archaeological data (including normalization, redundancies management, vocabularies standardization, and information units and relations definition). Accordingly, the relational database, developed in Access environment, aggregates and stores data structured matching the designated research entities: Groups, Types, Catalogue, Photo repository, Measures, published Contexts and associated materials, Bibliography (Fig. 7). The relations among the tables match the links among the studied concepts, with a one-to-many relationship

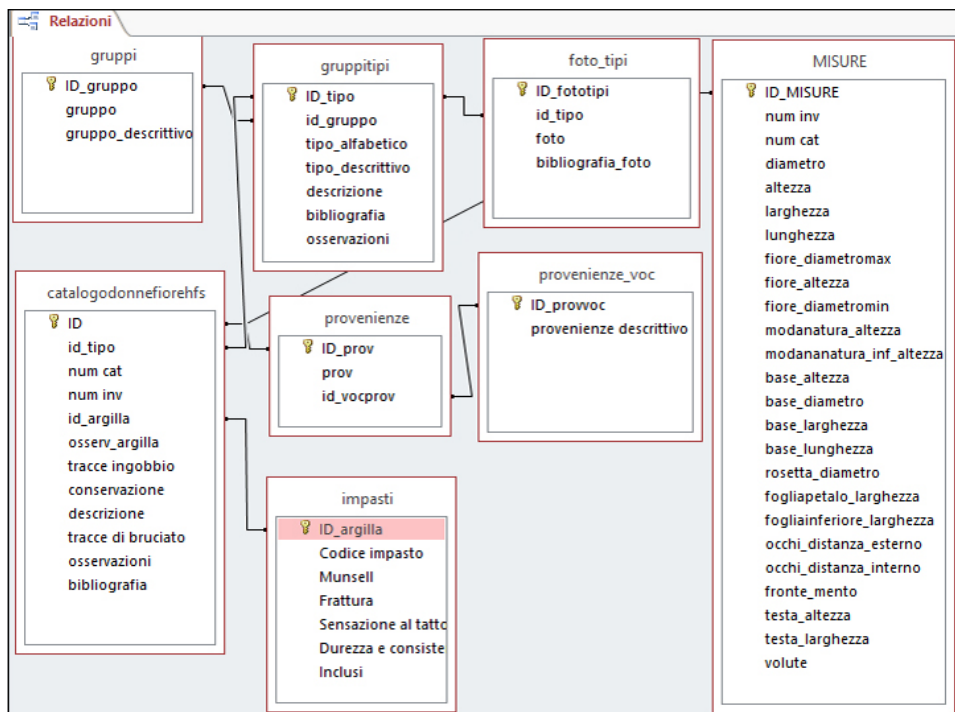


Fig. 7 – Structure of the database of the “flower woman” figurines from Foce Sele Sanctuary.

between each class and its groups, each group and its types, each type and its findings. This way, the digital support model fits the research approach of a classification based on the ancient craft production. Furthermore, the alphanumeric information is linked to the multimedia documentation and the bibliographic records, and the information on each figurine is related with the data about the context.

The study identifies forty-eight types of upper and lower parts of the “flower woman” combination. The database supports the easy identification of the various attested combinations of types of base and types of flower. The module for the management of coroplastic fragments is an expansion of the DATARCH system, developed to support archaeological excavation and interpretation workflow. Furthermore, the system is open and modular, so it is ready for further expansions to include the whole complex of the huge amount of coroplastic fragments found at the Foce Sele Hera Sanctuary or even to support other coroplastic productions data management.

4. “FLOWER WOMAN” PRODUCTION FEATURES ANALYSIS

Another peculiar issue to address is the reconstruction of seriations in the “flower woman” production. Studies on ancient coroplastic manufacture explain that moulded figurines were fabricated in large series and vast quantities. In this practice, artisans needed to replace repeatedly old moulds with fresh ones; this process determined a progressive change in the dimension of the items manufactured (CUOMO DI CAPRIO 1985; MULLER 1997; MILLER AMMERMAN 2002; TOMEO 2010a). Moreover, a secondary variation in dimensions is also documented in figurines of the same series; in this case the different measures can be due to changes in terracotta ingredients or diverse conditions in drying or cooking the objects (DEWAILLY 1992; TOMEO 2010 a, b).

Therefore, studying variations in dimensions can help reconstructing the seriations and assessing the average percentage of shrinkage may testify the progressive switches to new moulds. Therefore, the study of seriations in a coroplastic production gives more information about the production processes and the fortune and diffusion of types. In the “flower woman” figurines study, a peculiar quantitative approach supports the seriation analysis (MOSCATI 1990, 1995; WUNSCH 1996). For each coroplastic type the research identifies standard measures, most frequently documented, bearing in mind that the *corpus* is preserved in fragmentary status; correspondingly some types are documented only by few objects. Then the standard measures recorded on the fragments of each type are exported into a spread sheet and a scatter plot is generated to allow to graphically visualize the data and display variations in the production of each type (Fig. 8).

The graphic visualizations of the collected data show a progressive decrease in the standard measures, but, unexpectedly, the scatter plots do not reveal threshold levels that allow distinguishing among different typologies of variations (change of mould, terracotta ingredients, drying process, and cooking phase). This is particularly clear in analyzing the scatter plot of types documented by the highest number of fragments, where the values distribution is gradually decreasing in a very smooth graph.

Therefore, the proposed approach can be an appropriate support in the analysis of clay shrinkage and seriations, in particular in case studies, like the Foce Sele “flower woman” figurines, where the fragmentary state of findings makes it difficult to perform traditional investigations and to assess the relative weight and relevance of different elements in the seriation. In studying Foce Sele materials, this outcome is further explored by ongoing chemical analysis in order to acquire further elements by assessing the features of the fabrics used (GRECO, CICALA 2014).

Indeed a multidisciplinary analysis of ceramic fabrics supports these aspects of the overall research on the Foce Sele archaeological remains, in

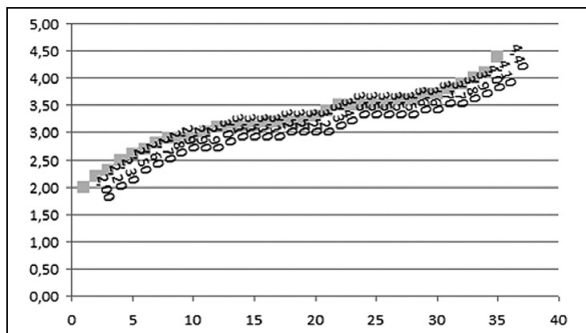


Fig. 8 – Scatterplot of dimensional variation of standard measure “petal width” for XLI type fragments (in centimeters).

order to identify the clay characteristics, to define a classification of the materials documented, to support the identification of the features of the local production of “flower woman” and to help investigating circulation and distribution of these peculiar coroplastic products.

The protocol consists of three phases of investigation: autoptic examination; comparison with the fabrics of the FACEM project database (<http://facem.at/>); instrumental analysis, both destructive and non-destructive (FERRARA, GIACCO 2010; GRECO, CICALA 2014; cfr. also other experiences in ZÖLDFÖLDI *et al.* 2010; VERGA, FABBRI 2011). The project will gradually involve all the material classes found at the Sanctuary, and the clay deposits in the Piana del Sele area. Accordingly, a first screening is performed on the basis of an autoptic inspection in fresh fracture, in order to recognize the main technical characteristics of the fabrics: color, identified according to the Munsell tables conventions (even if their use is debated in scientific literature); consistency; presence and size of inclusions; hardness; compactness.

Then the analysis goes on by comparing the samples recorded in the database developed in the FACEM project, an online archive of ceramic fabrics from Magna Grecia sites in the central Mediterranean area, complete with information on texture and inclusions features, and photographic documentation of samples. The last step is a description of the fabrics through mineral-petrographic methods, in order to detect macroscopic and microscopic features. The macroscopic analysis detects characteristics such as color, hardness, haptics, while the microscopic description is performed on thin sections with an optical petrographic microscope with transmitted polarized light (Laborlux 12 pol), in order to establish textural characteristics, optical properties, types of minerals present in the ceramic.

The most representative samples were further analyzed with EMPA (Electron Microprobe Analysis), chemical analysis of the mineralogical phases on thin section obtained by using an electronic microscope JEOL JSM-5310 equipped with an EDS INCA x-act detector and XRPD oXray powder diffraction, mineralogical analysis of dust samples obtained with a diffractometer (Philips PW1730/ 371016). Again, with the electronic microscope (attached to an EMPA microprobe) some areas of thin sections were analyzed in order to obtain an estimation of the mixture chemical composition. Chemical analyses performed confirm and define with additional information groupings obtained by optical microscopy.

In particular, the analysis of the whole *corpus* of Foce Sele “flower woman” fragments identifies the use of five types of ceramic fabrics, whose features confirm that these peculiar objects were manufactured locally. Surveys identified in the analyzed fragments characteristics comparable with the ones of clay deposits outcropping in the area of Piana del Sele and thus supported the identification of a local production.

5. “FLOWER WOMAN” FIGURINES IN THE ANCIENT MEDITERRANEAN BASIN

The second phase of the study deepens the analysis on the circulation and distribution of the “flower woman” typology in the ancient Mediterranean area. In order to support further quantitative and geographical analysis, the set of information related to the edited contexts was exported from the Access database to a Fusion Table, a promising Google cloud service, released in 2009 and aimed at managing, sharing, viewing and querying data in tabular form. The integration with Google Maps and Google Chart makes it possible to visualize georeferenced data and to create numeric explanatory diagrams of selected features.

Recent studies focus Gmaps API use in archaeology in the rich panorama of archaeological applications of spatial information systems (MARRAS 2013). The experimentation on the “flower woman” data combines different study requirements: on the one hand, visualization and analysis of spatial characteristics of archaeological information, on the other hand a novel attention to the possibility of sharing not only data but also the related management and analysis processes.

In the cultural scenario that focuses on open approaches and open data in archaeology, the recent raise of participatory approaches emphasizes features such as the ability to share knowledge (CANTONE, DE TOMMASI in press). This topic matches the emerging holistic approach to cultural heritage, considered as a network of values and information, highly heterogeneous in nature, but intrinsically interconnected in its cultural system (CANTONE 2012a). In the contemporary scientific debate, this concept intersects more

traditional disciplinary issues, such as the protection of archaeological data, the need of data quality control, the traceability of archaeological information sources, and the safety of Cultural Intellectual Property Rights (CANTONE 2005, 2012b; CHIANESE *et al.* 2010) and stresses the need for different levels of access to information (CANTONE 2005). Fusion Tables address such requirements by implementing features already available for the well-known Google Office-automation cloud tools.

Bearing in mind the possible critiques related to using proprietary tools to manage cultural data, the experimentation is aimed at testing sharing features, also moving forward future data exportations into open tools. Indeed this approach is congruent with the international interest for new shared research infrastructures and for good practices to share cultural data (such as, for instance, the locloud project: <http://www.locloud.eu/>; see also DI GIACOMO, SCARDOZZI 2014; CAFFO 2015).

In this context, Fusion Tables seem worthy of investigation to identify and test features and areas of interest useful for further developments and applications in archaeology. In particular, Fusion Tables allow using CSV or KML interchange formats, supporting rapid re-use of existing databases. With regard to the location, the system performs data geocoding by matching the location names (a column indicated by the user) with the Gmaps coding system. It is also possible to correlate, in the analysis, the characteristics collected in different tables, or even in other databases already online: this feature makes it possible to support shared archaeological databases, according to the international research trends about building up federations of independent but interoperable archaeological repositories (CANTONE, CHIANESE 2013).

For the data on the “flower woman” figurines, among the various typologies and uses identified by DJINDJIAN (2008) and AZZENA (2009), the main interest is related to the visualization features based on cartographic and charting data (Fig. 9). Further outcomes rely on the interaction with spatial and statistical analysis packages, assisted by the cited support for interchange formats.

The main outcomes of the “flower woman” typology study suggest that a number of the developed approaches and the chosen features can be effectively applied to other case studies. First of all the Google Map based visualization allows a clearer reading of the data available on the contexts where “flower woman” figurines were found. Georeferencing is quick and easy, fitting the needs of this study, based on published reports, but also setting a preliminary basis for further improvements by including GPS localizations. This approach makes it possible to blend and compare heterogeneous data derived from publications different in type (museum catalogues, excavation reports, preliminary news), and chronology (from 19th century to date).

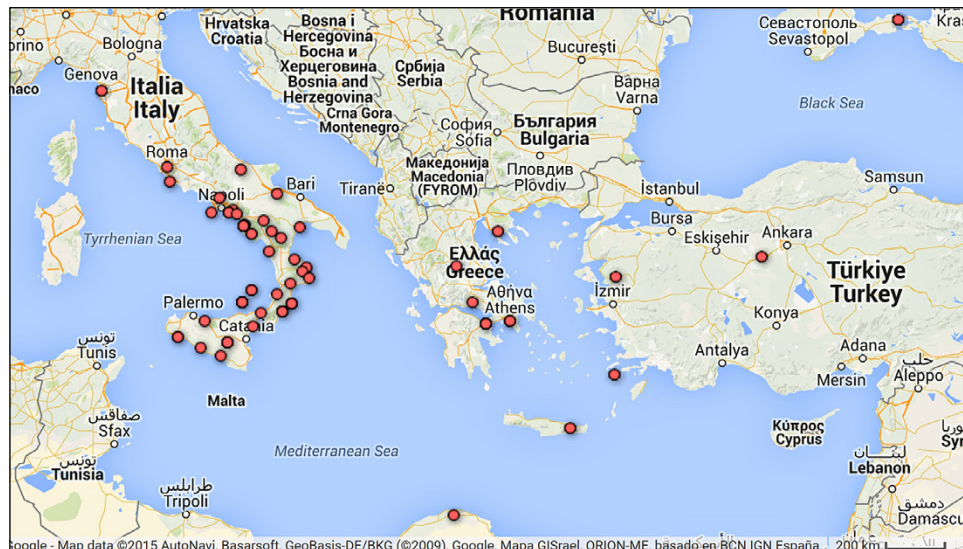


Fig. 9 – Fusion Tables visualization of alphanumeric data on contexts of “flower woman” findings.

Furthermore, the research on “flower woman” figurines is designed as a modular open system. The first set of data collected is expected to grow as the research activities go on, making the most of the possibility of constant updates and expansions of the system, in a shared, multidisciplinary environment constructed in a participated way by experts of various disciplines. The possibility of assigning different privileges to access, read and write database information deals with the issue of protecting collected data. The ability to correlate selected features of the sites makes it possible to support the research and to increase reading and interpreting archaeological evidence. In particular, the perspective of cross-analysis makes it possible to detect any recurrences in the associations of contexts and materials, defining a knowledge base for investigating the related ancient cultural systems.

First of all this study highlights that the traditional interpretation of the “flower woman” as a typology closely related to the cult of Hera has to be updated, since the new survey displays “flower woman” figurines in three different kinds of contexts: religious, domestic, funerary. Furthermore, these peculiar objects were found in association with different divinities, both male and female. Therefore, the meaning investigation has to be re-examined and performed by reading each context of use. As for the function, the presence of burnt traces in many finds supports an interpretation as incense-burners, but this conclusion is not necessarily applicable for all the findings.

To sum up, the “flower woman” study tested several features that can be useful for other archaeological case studies: quickly georeferenced visualization of terracotta findings; uniformity of scales of representation, based on standard Google cartography; easy geocoding, performed by the web service, avoiding typical problems related to nomenclature, language, toponymic change over time, and among different kinds of information sources (this information is still maintained in the descriptive card, while identifying a unique system for the location of sites and contexts); possibility of constant data updating; customizable map and charts, crossing data stored even in different databases; management of multiple accesses and privileges (similar free web services do not provide this feature; see, for instance, Tableau Public: <http://www.tableau.com/public/>).

In the experiments performed on the “flower woman” data, the Fusion Tables allowed displaying the circulation of the typology in the Mediterranean Basin, effectively highlighting the presence of a rather complex and extensive archaeological evidence, much more varied than traditionally recognized in the studies. The new scenario brings a reconsideration also about the interpretation of the statuettes as ritual tools used in different kind of contexts with different meanings.

6. CONCLUDING REMARKS AND FUTURE DIRECTIONS

The archaeological research carried on at the Foce Sele Hera Sanctuary has been supported in the last decades by digital approaches to enhance different aspects of the various phases of investigation, from data acquiring, to archiving, analyzing, disseminating and sharing. The study of the processes involved in the archaeological workflow has been the basis to develop a specific set of methods and tools to support the operating chain.

In the “flower woman” study, the main research goals were to manage and archive coroplastic data and to improve studying the typology in its formal, functional, and meaning aspects. Therefore, the coroplastic materials analysis is supported by developing a customized database that reflects the entities to study and facilitates the reconstruction of the rich figurines production at the Foce Sele Sanctuary and the analysis of seriations. The analysis of the Foce Sele Sanctuary “woman flower” *corpus* acquired further information in order to assess a local production that seems to be homogeneous but richly articulated. The typological analysis clarified the mechanism of production of this coroplastic group, and the functional organization of ancient workshops, that combine creativity and efficiency through a wise use of matrices and of their combinations. This is perfectly harmonious with the scientific acquisitions about the rich Hellenistic coroplastic production, and more specifically about the Paestum craft.

Furthermore, an easy quantitative method was proposed to investigate the clay shrinkage in *corpora* of very fragmented or poorly preserved objects. The analysis of the data collected on the process of shrinkage of the clay gives valuable information on the seriation of “flower woman” in a diversified production; the investigation of the standard-measures identified for each type highlights the fortune of the various figurines types. The study of the entire *corpus* of this particular coroplastic combination, due to the characteristics of the fragments preserved and their heterogeneity, brought to explore and propose new approaches to support this investigation. Through this quantitative data representation, the progressive reduction within the seriations shows a rather regular values distribution pattern and no percentage thresholds representative of changes of matrix or of differentiations in cooking or drying techniques.

The precise definition of the contexts within the Foce Sele Sanctuary fully confirmed the chronological distribution range of this peculiar Paestum production; all the reconstructed contexts date from the 4th to the half of the 3rd century a.C. One of the most interesting data is the deposit at S/E of the I *bothroi*, where the “flower woman” fragments prevail quantitatively over any other associated material.

Furthermore, more aspects about the evidence of “flower woman” findings in the ancient scenario were investigated by using Fusion Tables to display data localization and features. The analysis conducted on the materials in the ancient Mediterranean confirms the hypothesis that these special objects played an instrumental function in rituals, assuming heterogeneous connotations in different contexts of use. The circulation of the Paestum types is attested in a large surrounding area from Capua to Fratte, Pompei, Velia confirming the links among the different workshops that adopt a common style and welcome creative ideas circulation; it may be noted, moreover, that other types, like the well-known Paestum Hera, travel around together with the “flower woman”. Moreover, this analysis highlighted a plurality of production centers in the Mediterranean area, each of them showing peculiar characters, such as the types found in Gordion and in Athens. The typology is widespread in the West and, even in this area, the differentiation in formal features and stylistic languages displays the originality of the various production centers, in Lavinium, Locri-Vibo, Morgantina, Lipari and Stromboli.

It is not inconceivable that the idea of a new formal combination, where a floral corolla is supported by a configured base, can be attributed to several centers simultaneously creators, identifying in a rather different source of inspiration the basic elements of creation. For this reason, it is no longer possible to speak of a Paestum influence for all the discoveries of “flower woman” figurines. Conversely it is now essential to analyze the individual production areas, where, of course, there are the elements to evaluate them.

Computational approaches introduced in the study of the floral *thymia-teria* allowed, on the one hand, to systematize the investigation of the Foce Sele Sanctuary findings, and, on the other hand, to set up a dossier about the circulation of such a combination in the Ancient Mediterranean area. The research traced the methodological lines towards the creation of a shared and distributed repository of ancient coroplastic finds and of the related heterogeneous information. In this sense, the open structure of the database investigates a multidisciplinary approach to the archaeological research that, beyond the instrumental aspects, seems to push the architecture of shared construction of archaeological information in the contemporary scenario of social and participated knowledge.

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ABSTRACT

The paper focuses on the digital strategies developed in the study of the *corpus* of “flower woman” terracotta figurines found in the excavations carried out by Paola Zancani Montuoro and Umberto Zanotti Bianco at the Foce Sele Hera Sanctuary and stored in the National Archaeological Museum of Paestum. The “flower woman” definition identifies the best known structure of the statuettes composed of a female bust supporting a flower orthogonal to the base. Actually, the scientific literature about these peculiar artifacts reveals a diffused vagueness and ambiguity in the definition, formalization, and functional exegesis, encouraging a new comprehensive study. The main results come from: digital management of the information; seriation analysis supported by a quantitative approach; visualization of occurrences in the Mediterranean Basin based on Fusion Tables; testing of multidisciplinary approaches to cooperative content building in archaeology. The study developed a whole technology-enhanced workflow, including multimedia data digital management and sharing; statistical techniques for the analysis of terracotta shrinkage in moulded coroplastic figurines seriation; webGIS visualization of occurrences in the ancient Mediterranean Basin and their relations.