nordest *nuova serie*, 191

Volume pubblicato con il contributo di:

Scuola di Dottorato in Scienze Umanistiche
Università degli Studi di Verona

In copertina: Tom Colbie Art, *The Bridge*.

ISBN 978-88-5520-076-9

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Humanities: approaches, contamination and perspectives

Conference proceedings, Verona 17-18th October 2019

a cura di

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Introduction

The academic disciplines falling under the definition of Humanities are the product of a long historical reflection on both method and subject of studies. Over time, scholars have renewed the interest for new factual and control-factual insights on separate fields of research, which has resulted in an impetus for deeper understanding, controversial methodological debates, and enriching discoveries. The current research within the Humanities has therefore developed in various and autonomous fields of study, which are nevertheless organized around interconnected bunch of research. As a matter of fact, specific research agendas can often lead researchers to interdisciplinary considerations, which cover different domains of knowledge. On the basis of this awareness, the international conference Humanities in the Third Millennium: approaches, contaminations, and perspectives aims to be an opportunity for reflection and discussion on the current challenges of the Humanities among young scholars and researchers.

The different research approaches adopted within the fields of Humanities share the effort of exploring the human potential which can be expressed in various forms, ranging from the comprehension of manuscripts and trans-media to the critical evaluation of ancient authors; from the study of foreign languages and literatures to the investigation of psycho-behavioural phenomena; from the development of new challenging methods to explore human history to arts and archaeological studies.

Nowadays, the Humanities are experiencing a challenging condition, as in the global marketplace of higher education, the disciplines falling under this umbrella term are increasingly threatened by decreased funding. According to a report in Research Trends magazine, by Gali Halevu and Judit Bar-Ilan, international humanities funding has been in constant decline since 2009. In the United States, for instance, the financing for humanities research in 2011 was less than half of one percent of the amount dedicated to science and engineering research and development. Furthermore, in countries such as Japan, Australia, Italy and France a relative decline of about 25 percent of humanities degrees has been reported over the past few years (from Ella Delany, The New York Times 2013). Within this challenging academic framework, the international conference Humanities is the Third Millennium aims to provide young researchers with the opportunity to present their own work by encouraging interdisciplinary and transversal discussion which can lead to the evaluation of new approaches to conduct critical research in the fields of humanities.

At the beginning of 2019, the aim to create an opportunity for discussion for young PhD students of humanities disciplines has led to the organization of this conference. Under the supervision of the Doctoral School of Arts and Humanities of the University of Verona, we have assiduously worked as organizing committee to create an open, vibrant and stimulating floor for interdisciplinary discussions. This effort has resulted in the two-day international conference titled Humanities in the Third Millennium: approaches, contaminations, and perspectives: more than 30 speakers specialized in large number of disciplines have presented their work in front of a heterogeneous audience of students and researchers, providing important insights and food for thought on different subjects. Moments of discussion were organized in four broad thematic areas, which we believed to represent some of the cornerstones of the scientific research conducted in the fields of Humanities, namely: theoretical framework and methodology in human science; fragments and layers, hybridization and ambivalence. A call for papers organized in macro-thematic areas gave us the opportunity to encourage young PhD students to go beyond the traditional limits of their fields of research, and reflect on the interdisciplinarity and great potential of the humanities disciplines. The challenge has been enthusiastically accepted by many PhD students working in different fields of research:

arts, archaeology, philology, literature, performance studies, foreign literatures, languages, linguistics, education, philosophy and psychology. Two young researchers, Daniele Panizza and Caterina Previato, shared their experience with the audience of students and fellow researchers. This fruitful gathering of researchers coming from universities across different countries has led to the publication of the present volume, with the aim of leaving a trail of the experience lived in Verona on the 17th and 18th of October 2019.

The publication of these proceedings would not have been possible without the help and the suggestions of the Scientific Board of the conference: Professor Andrea Rodighiero, Professor Manuela Lavelli, Professor Attilio Mastrocinque, Professor Stefan Rabanus, and Professor Paolo Pellegrini. We also would like to thank our colleague Elia Marrucci as part of the Organizing Committee. A special expression of thanks is due to the reviewers who have kindly decided to take part at the blind peer-review process which have undergone the articles presented in this volume. We would also like to thank Mrs Catia Cordioli for her invaluable help throughout all the organizational steps of both the conference and the publication process and Mr Andrea Dilemmi who helped us with the design and layout of these proceedings. Lastly, particular thanks go to the all the authors and all the researchers who have attended the conference, who have made all this possible.

Francesco Tommasi
Marta Tagliani
Vittoria Canciani

From scattered data to palaeolandscape reconstruction: a case study from the Romagna plain, Italy

by Michele Abballe

Abstract: In this paper, I will present an approach to create digital elevation models of the palaeolandscape (palaeoDEMs) for a test area within the larger Romagna plain. The many landscape transformations that occurred in the area during the last few millennia greatly limit our archaeological knowledge and historical reconstruction of the human presence, so a better understanding of how the topography changed represents a fundamental step. However, relying only on the finite archaeological data would have greatly limited the level of accuracy of the reconstructions. To try to overcome these limitations, the archaeological data have been integrated with information regarding palaeosols identified both during targeted fieldwork campaigns and in pre-existing data collected by archaeological and geological investigations. The depths of archaeological sites and geological layers have been interpolated to produce palaeoDEMs for four different chronological periods, confirming the feasibility of this approach, that could potentially be enlarged to nearby areas or applied to other regions with similar characteristics. Furthermore, through the analysis of the models created, it has been possible to elucidate the evolution of the study area, confirming several previously expressed hypotheses but also to propose a new one.

Keywords: landscape archaeology, geoarchaeology, palaeogeography, palaeo-DEM, Ravenna, RA.LA. project

Archaeology in alluvial plains: a difficult relationship

The Romagna plain corresponds to the southeastern part of the Po Valley and is formed by hundreds or even thousands of meters of alluvial sediments, deposited and shaped by the northern Apennine rivers. Naturally, these processes would create an undulated land, with higher areas connected to (abandoned) fluvial ridges, alluvial fans and beach dunes, that alternate with depressions where wetlands and lagoons usually develop. Recently, these natural processes have been changed by the always more intense human interventions on the landscape, mainly through the construction of artificial embankments and large reclamation projects, that have caused a general flattening of the valley as we know it today (Bondesan, Favero & Viñals, 1995).

Since this kind of stasis has been the result of processes that lasted for centuries and were completed only at the beginning of the last one, many modifications have happened also in historical times leading to the burial of much of the palaeolandscape. This represents a huge limitation for archaeologists because it hinders our understanding of how past societies interacted with the environment, since the landscape we see today is very different from the one they were inhabiting. Furthermore, the presence of alluvial layers can hide archaeological sites, so that our understanding of past occupation patterns is fragmentary. For these reasons, it is essential to reconstruct the palaeolandscape and its evolution during different periods to be able to understand how people were living in the past (Wilson, 2011). Moreover, this could also have positive effects on cultural management practices, since a better preventive assessment of the archaeological potential of an area under development pressure would assure more precise planning and budgeting for any project (Danese, Masini, Biscione & Lasaponara 2014).

An approach to deal with these problems, that affect most of the lowland areas, is based on the creation of "digital elevation models" of the palaeolandscape (palaeoDEMs), starting from the depth of archaeological sites. This approach has seen a steady increase in the number of applications in the last few years also within the Italian Peninsula, where it has been applied to several urban contexts: Modena – Castaldini et al., 2007; Classe (Augenti, 2011); Pisa (Gattiglia, 2014); Senigallia (Silani et al., 2016); Comacchio (Rucco, Vianello & Vitelli, 2017); Padova (Mozzi et al., 2018). However, palaeoDEM applications in larger rural contexts are still lacking, while their number continues to rise in other countries like Belgium, the Netherlands, Germany and the United Kingdom, both in academic research (for a recent bibliographic review, see Schmidt, Werther & Zielhofer, 2018) and in commercial archaeology (see for example the guidelines developed by Historic England for the UK; Carey, Howard, Corcoran, Knight & Heathcote, 2019; Carey, Howard, Knight, Corcoran & Heathcote, 2020). Anyhow, applying this approach to rural areas in Italy is not straightforward, since our archaeological knowledge in alluvial landscapes is often strongly biased. Also, the few archaeological data cannot be combined with datings of geological deposits, which are rarely available. Therefore, any attempts will likely produce a not-very-reliable reconstruction, unless more data are collected.

Nevertheless, several palaeosurfaces have been identified within the Po Valley (e.g. an Iron Age/Roman palaeosol in Bologna, Bruno et al, 2013), including in the area selected for this paper. Indeed, the geologist Stefano Marabini already identified what he called Geosuolo Formellino, a large palaeosurface mostly buried by younger deposits that, thanks to archaeological data, has been correlated with the Bronze Age occupation of the area between Faenza and Lugo (Franceschelli & Marabini, 2007, pp. 104-107), therefore representing the (palaeo)sol on which people used to live around 3000-4000 years ago. The identification of these elements buried below the present-day ground level can provide additional data to model the evolution of the topography at least in terms of relative chronology.

Starting from the assumption that also the depth of recognizable palaeosurfaces and palaeosols can be integrated into the reconstruction, in this paper I will present an approach to use them in combination with the often-limited archaeological data. In particular, new data regarding the depth of palaeosols come from both targeted field campaigns carried out by the author and datasets produced in preventive archaeology, which usually end up in archives with no further exploitation. The integration of new and legacy data allowed to model the palaeotopography of a relatively large part of the territory of the Ravenna province, and to better understand how this changed during the last four thousand years.

The geoarchaeological setting of the southwest of Lugo

The study area, which lies at the border between the towns of Lugo, Bagnara di Romagna and Cotignola, has been chosen because the ongoing Ravenna Landscape project (RA.LA.) of the University of Bologna, through its sub-project "Bassa Romandiola", have been collecting new data during the last ten years. Most of these data come from archaeological fieldwalking carried out in 2009, while more detailed information was collected from the excavation of the Castle of Zagonara (2017-2019, Fiorotto, Cavalazzi & Carra, same volume). In particular, two hand augering campaigns by the author have allowed to record the geological sequence more deeply and to document a consistent stratigraphy below the site, where a succession of three palaeosurfaces is present:

0 – 0,65 m: clayey silt, modern soil, deposited after the abandonment of the site in 1424 (Mascanzoni, 2004);
0,65 – 1,40 m: sandy silt, palaeosol: medieval, occupation of the site partially destroyed by ploughing;
1,40 – 1,65 m: silty sand, palaeosol: Roman, thick brownish layer with ceramic fragments, $CaCO3 = 1/2$;
1,65 – 2,20 m: silty fine sand, pre-Roman layer, sterile alluvial layer deposited by nearby stream/river;
2,20 – 3,00 m: silty clay, pre-Roman layer, sterile alluvial layer deposited by remote stream/river;
3,00 – 3,65 m: clayey silt, palaeosol: protohistoric, mostly sterile layer completely decarbonated and with spherical iron-manganese nodules (0.6-0.7 cm), $CaCO3 = 0$.

These palaeosols are usually characterized by a darker colour, due to the growth and the following decay of vegetation, before that these geological layers were buried by more recent sediments. Furthermore, a useful method to verify in the field if a geological layer has been subject to pedological processes consists in observing the effervescence produced when applying hydrochloric acid (HCl) to the soil sample[1]. In this way is possible to roughly establish the amount of calcium carbonate (CaCO3) present, which naturally decreases with increasing exposure to weathering[2].

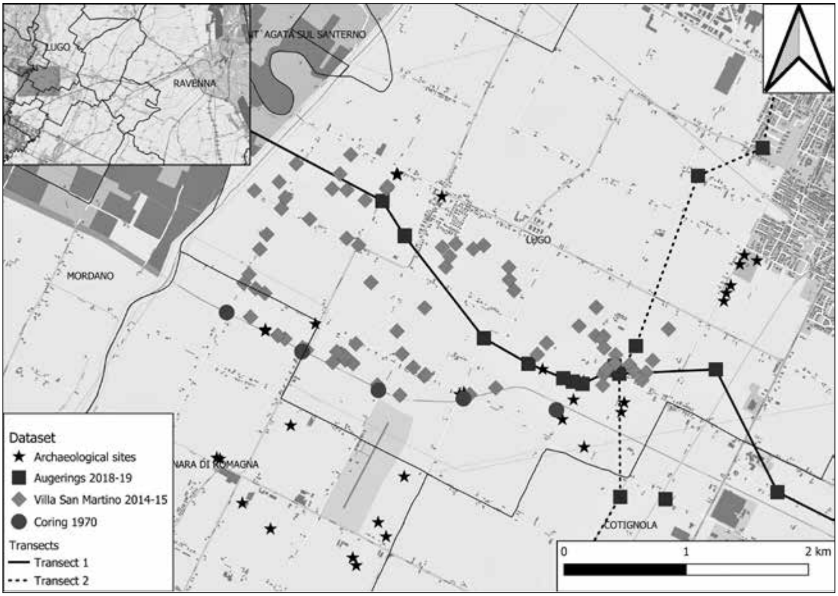
Based on their similar characteristics and related depth, two palaeosols interpreted as Roman and Protohistoric[3] have been identified in many other locations, also at a few kilometres distance from the site. In general, it has been more difficult to identify/recognize the more superficial and recent one (i.e. medieval), probably because it has often been destroyed by modern ploughing.

Integrating new and legacy geoarchaeological data

This research takes an innovative approach by integrating various datasets that, as explained before, are rarely combined to model palaeolandscape in Italy (see Fig. 1 and Table 1 for an overview of the data, classified based on the source and chronology respectively). In detail, the published archaeological sites (Franceschelli & Marabini, 2007) have been integrated with the results of the Bassa Romandiola sub-project (Cavalazzi et al., 2018) and other data coming from the archives of the Bologna's Soprintendenza which were reported in the local archaeological map (CPA-UBR).

Starting from these data with good chronological reliability, it has been possible to propose a relative chronology, mainly based on similar depth, to the several palaeosols identified during the hand augering campaigns carried out by the author in 2018-2019. In the beginning, the augers were mainly carried out around the site of Zagonara, where an archaeological excavation was taking place[4]. After having understood the local geological sequence, a precise strategy was developed to study: the evolution of plain between the Santerno e Senio rivers with a northwest-southeast transect (Fig. 1, transect 1); the trend of the Roman topography southern and northern of Zagonara, with a northeast-southwest transect (Fig. 1, transect 2).

The next step was the inclusion of an unpublished report, with the results of the archaeological watching brief carried out in 2014-2015 during the laying out of a water pipeline around Villa S. Martino, a hamlet of the town of Lugo (Casadio, 2015)[5]. Buried soils were documented in tens of archaeological sections during these works. In addition, four archaeological sites were identified and partially excavated,



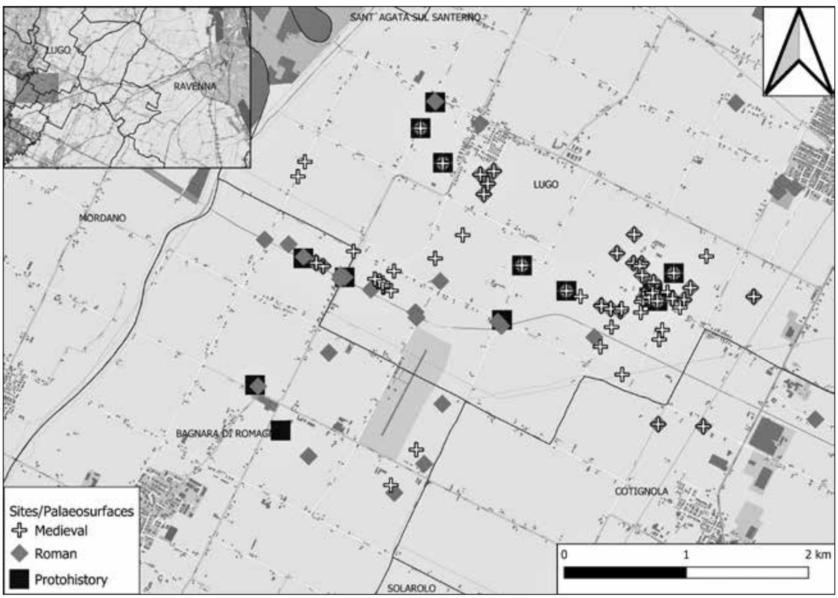


Fig. 1. Study area with all the data used in the paper, classified based on the dataset used; Fig. 2. Study area with all the data used in the paper, classified into three chronological periods (both images created by the Author using OSM as basemap).

which helped to confirm the dating of the medieval and Roman palaeosols identified during the hand augering campaigns.

Finally, once all these data were entered in an Excel file, 5 geological corings were also analysed. These were performed in 1970, before the construction of the local section of the Canale Emiliano-Romagnolo[6]. In this case, the discontinuity in the soil texture reported has been linked to the presence of the Roman palaeosols, based on the known depth of the same in the surrounding area. These are the least secure interpretations, but they represent additional information to be included for the modelling phase, which will now be explained.

All the data used for this paper have been entered in an Excel file (.xlsx), with some indispensable fields: Name, Easting, Northing, Elevation[7], Total depth, Depth to Top, Depth to Base, Lithology, Stratigraphy. The last field is the most important one because it stores the interpretation of the palaeosols, but also other intermediate layers to which a relative chronology was given. The complete classification used for this work is: 1. Modern layer; 2. Modern soil; 3. Post-medieval layer; 4. Medieval/modern layer; 5. Palaeosol: medieval; 6. Post-Roman layer; 7. Palaeosol: Roman; 8. Pre-Roman layer; 9. Palaeosol: Protohistory; 10. Pre-Bronze Age layer; 11. Undefined.

In total 61 soil layers have been interpreted as medieval palaeosols and the same number counted as palaeosurfaces used in Roman

Dataset	**Amount of data**	**Source**
Archaeological sites	31	Franceschelli & Marabini, 2007 CPA-UBR Cavalazzi et al., 2018
Augerings 2018-19	18	Author
Villa San Martino 2014-15	75	Casadio 2015
Coring 1970	5	Geoportale Emilia-Romagna

Table 1. List of all datasets considered.

times,while only 15 entries can be related to the Bronze Age. The area modelled for this paper measures 16,7 sq. km, so ca. 1 point every 0.3 sq. km for the two most recent periods, while only 1 point every 1.1 sq. km for the protohistoric one (Fig. 2).

All the data have been then used to model a continuous surface for each classification stored in the field Stratigraphy. To perform the interpolation of these scattered data ordinary kriging was used, a geostatistical method based on autocorrelation that offers good results when the distribution and density of the points are irregular (Goovaerts, 1997).

First results and further possibilities: Interpreting the results

In the last image (Fig. 3), four maps are presented showing palaeo-DEMs for different periods: Protohistory (Bronze Age), Roman period, medieval and Modern Age, with the last based on present topography but without human interferences. They are shown in greyscale and with contour lines to highlight differences in elevation, allowing some interpretations to be made.

First, in the Bronze Age (Fig. 3, top left), the western part was characterized by higher topography, which corresponds with the already identified Paleodosso di Bagnara (paleodosso = fluvial ridge; Franceschelli & Marabini, 2007, pp. 29-30), while the eastern part was lower in terms of elevation. The graphic result is quite poor due to the limited amount of available data, but all in all the picture is in accordance with our present data. Firstly, in this period settlements were usually located along rivers and indeed in the western part we have several mentions of protohistoric artefacts discovered in the last century. Secondly, archaeological remains have never been identified in the lower parts, not even in the several drillings carried out by the author. In fact, despite having been able to identify the Geosuolo Formellino in several cases, no pottery or other finds were ever recovered.

Later on, when the Romans started to occupy the area, its topography had already changed (Fig. 3, top right). Indeed, while in the western part a raised landform was still present (due to the Paleodosso di Bagnara), also in the south-eastern corner an area appears to be much higher than before (around 2 m). Although this is a hypothesis yet to be confirmed, before this period (or even during), a watercourse has flown in this area, leaving behind sandy and silty-sandy sediments that have been indeed identified in several drillings. This alluvial event, whose intensity is still difficult to estimate, has clearly raised this part of the landscape making it very suitable for human occupation.

For the Middle Ages (Fig. 3, bottom left), we already know that an important modification has changed the topography of the area that corresponds with the formation of the Paleodosso di Villa San Martino (Franceschelli & Marabini, 2007, p. 33)[8]. This event further raised the western part of the study area, as can also be seen in the left part of the respective palaeoDEM. Therefore, the central lower area looks "squeezed" between two higher landforms, but it was still characterized by the development of a dense settlement pattern during the Early and High Middle Ages, as the Bassa Romandiola Project has documented (see above, no. 2).

The north-eastern corner appears to be more depressed also in the last palaeoDEM, if compared to the surrounding areas (Fig. 3, bottom right). This is the result of previous alluvial activities identified in the other palaeoDEMs, but it also due to the stabilization of the course of the river Santerno, occurred at this latitude already at the end of the Middle Ages. Despite this stabilization, we know from the written sources that the Santerno caused several floods in the following centuries (e.g. Quadri 1909 mentions 14 floods between 1679 and 1778). This is also visible in the stratigraphy of several corings since the present soil is mostly made by clayish deposits, left most likely by the Santerno that flows still now around 2 km far away[9].

Methodological aspects and future developments

From a geoarchaeological point of view, the reconstruction of different palaeoDEMs has allowed to map the evolution of this part of the Romagna plain during different chronological periods. This has been achieved mostly using existing data, which nevertheless have been retrieved from different sources and then combined to new data collected by the author to create new original reconstructions.

Specifically, these have helped us to better understand what changes have interested this landscape in the last few millennia, making possible to hypothesize the presence of a possible buried fluvial ridge and to suggest a relative chronology for it. Indeed, the discovery of silty-sandy layers below the site of Zagonara, that started to be deposited already before the Roman period, already suggested that intense alluvial activities had occurred in the area. Modelling all the data available, it has been possible to map a higher landform that could correspond to the course of a river (or a secondary stream) that deposited those layers. This represents already a satisfactory result, but it could also be very useful to design further field activities to confirm this hypothesis and refining the chronology.

Regarding the chronology, two limits need to be stressed. First, this work relays mostly on relative chronology, but still based on a large number of archaeological data that increase the reliability of the results. Second, at the moment it has not been possible to present more precise chronological reconstructions, that could acknowledge transformations occurred within the same period. Highlighting these two limits, it soon becomes clear two possible directions to increase the quality of the models: to provide more absolute dates and to create more chronological periods when possible. In the meantime, given the promising results, it is worth to enlarge the study area. This is an easy task to perform in Excel since it allows to easily modify or add a large number of records. Furthermore, despite being proprietary software, it allows saving the data into text files, like .csv, which can be imported into an existing database, GIS or modelling software for further analyses. In the future, once larger and refined palaeoDEMs will be produced, archaeological data and palaeotopography could be combined to gain more insights into past settlement dynamics, also through the use of other modelling techniques, such as predictive modelling (Aballe, 2017).

For the moment, these results can already represent useful tools in preventive archaeology. For instance, subtracting the more ancient reconstructions to the modern one, it is possible to predict the depth of potential archaeological sites of a specific chronological period at a certain location, limiting the number of "unpleasant" discoveries.

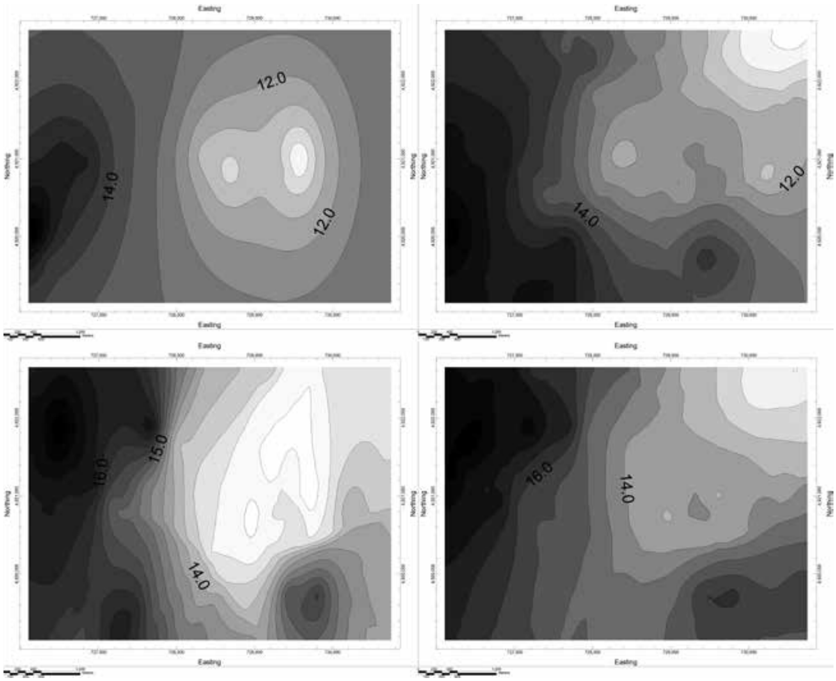


Fig. 3. PalaeoDEMs showing the evolution of the case study area (as shown in Figg. 1 and 2) during Protohistory (top left), the Roman period (top right), the Middle Ages (bottom left) and the Modern Age (bottom right).

To summarize, in this paper I have presented an approach to integrate archaeological, geological and pedological data to create digital elevation models of the paleosurfaces on which past human communities used to live. Different datasets already exist and more data are collected each day, whom access is unfortunately often limited by not being Open yet. However, combining these existing data but from different sources can already be enough to produce good results, useful to gain new insights about past landscapes and to better plan new research strategies to fill the existing gaps. The use of these methods becomes essential to investigate areas where alluvial activities have occurred until recent times, like most of the Po Valley, so there is a strong need for their diffusion also within the Italian Peninsula.

Notes

1. This was measured in a range of 0-4, following the guidelines developed for the CARG project (http://www.isprambiente.gov.it/it/progetti/suolo-e-territorio-1/progetto-carg-cartografia-geologica-e-geotematica/linee-guida).

2. A lower level of effervescence, usually between 0-2 testifies that pedological processes have affected the geological layer for at least several centuries.

3. The second corresponding to the already mentioned Geosuolo Formellino.

4. The site is located where the two transects cross each other.

5. Access granted by the Soprintendenza Archeologia, Belle Arti e Paesaggio per le province di Ravenna, Forlì-Cesena e Rimini (SABAP-RA) with authorization no. 9378557.

6. Source: Geoportale Emilia-Romagna: https://geo.regione.emilia-romagna.it/geocatalogo/ (Accessed on the 21/12/2018).

7. Calculated using the elevation points of the Emilia-Romagna region, retrieved from http://geoportale.regione.emilia-romagna.it/it/download/databasetopografico.

8. The author has identified several fluvial traces from the analysis of satellite images, correlated to this event, but a refined dating is not available yet.

9. These same deposits have likely covered also the site of Zagonara after its abandonment (see above).

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ottobre 2020

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