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Humans and environmental sustainability:
Lessons from the past ecosystems of Europe and Northern Africa

14th Conference of Environmental Archaeology 2018

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UNDER THE PATRONAGE OF




CEA2018

This e-book includes the 61 long abstracts of oral presentations (41) and posters (20) presented at the three-day CEA2018, the 14th Conference of Environmental Archaeology. The LPP-Laboratory of Palynology and Palaeobotany of Department of Life Science, interdisciplinary biological center of the University of Modena and Reggio Emilia, organized the meeting in Modena (26-28 February 2018), in the historical and recently restored San Geminiano building.
The scientific contributions were presented in 8 talk sessions and one poster session. Multidisciplinary *ABG Archaeo-Bio-Geo* studies on environmental reconstructions and palaeoecological research involving analyses of archaeological survey, human and animal bones, sometimes integrated to isotopic or molecular data, remote sensing and GIS, are reported in this e-book. Botany is the prevalent biological field contributing to environmental reconstructions, with analyses on plant macroremains, non-pollen palynomorphs and pollen, and with studies on flora and vegetation changes. Study areas are mainly centered on European countries, Mediterranean and Northern Africa, including five abstracts on Sahara, while two contributions concern South America.

The 1st Conference, called "The Archaeobotanical work group", was organized in 2005, and was a working group round-table meeting between experts on environmental studies and archaeologists of the Czech Republic. Then, the meeting became an annual conference with more and more attendants from other countries. In 2017, the 13th CEA took place in Nitra, Slovakia, and was for the first time outside the Czech Republic. In Italy, the CEA2018 has been especially rich of presentations and interdisciplinary approaches, with many countries represented as study areas and participants coming to Modena. Titles and list of co-authors show an unexpectedly rich number of contributions to the Environmental Archaeology by Italian specialists joining colleagues from the Czech Republic, Poland, Norway, Sweden, Greece, Spain, France, Switzerland, Austria, Germany, Serbia, Slovakia, Republic of Macedonia, United Kingdom, United States of America, and other countries.
The congress was under the patronage of the project SUCCESSO-TERRA (on sustainability and the Bronze age in the Po plain-N Italy) and of the network BRAIN-Botanical Records of Archaeobotany Italian Network (*https://brainplants.unimore.it/*). Basic sponsorships were given by the Botanical Society of Italy, the Italian Institute of Prehistory and Protohistory, the scientific association Society of Naturalists and Mathematicians of Modena, the Superintendence of Bologna, Modena, Reggio Emilia and Ferrara, Civic Museum of Archaeology and Ethnology of Modena, with municipality of Modena and the Emilia Romagna Region. Besides the SUCCESSO-TERRA project mentioned above, financial support was provided by Fondazione Anna Maria Catalano ONLUS and CEDAD-Centro di DAtazione e Diagnostica. We acknowledge all the projects, institutions and associations, the international scientific committee, the local organization committee and the Centro Interateneo EDUNOVA - Centro E-learning di Ateneo who contributed to the success of the conference.

Anna Maria Mercuri
February 2018

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POSTER SESSION

Medieval environmental changes and flood management in the Central Po Plain (N Italy)

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Introduction

The Central Po Plain at the right side of the Po River is characterised by depressions that can be defined as floodplains or back swamps. In the Italian literature, they are also known as "*Valli*" (i.e.Valleys) or, before a few centuries of ground reclamation, as "*Valli-Paludi*" (i.e.Valley-Marshes). The *Valli* landscape has a long-lasting connection with the development of the Po Plain and the anthropic activities of land and water management for agricultural purpose. During the Roman times the Central Po Plain was a well organised cultivated land; but around the 5th century AD, in corresponding to a cooling climate phase, vast farming areas became marshy. The alluvial plain aggraded quickly, and Roman road and ditches were often buried under fluvial and palustrine sediments. The swamps dominated the landscape of the area until the Renaissance when large-scale land reclamation works started. This study aims to reconstruct the evolution of the palustrine environment and its mutual interaction with human activities during the Middle Ages.

Materials and Methods

The research area is located North of the city of Reggio Emilia, in Emilia Romagna region. Two backswamps called *Valle di Gualtieri*, and *Valle di Novellara* are located in this portion of the Central Po Plain (Fig. 1). This study has been performed using both geomorphological tools and archaeological-historical data. Making use of the software QGIS 2.18, we have elaborated a Digital Terrain Model (DTM) and a 3D model of the research area. The landforms detected have been dated and contextualised thanks to archaeological (Bottazzi et al. 1995) and historical records (Affò 1792; Cantarelli 1882).

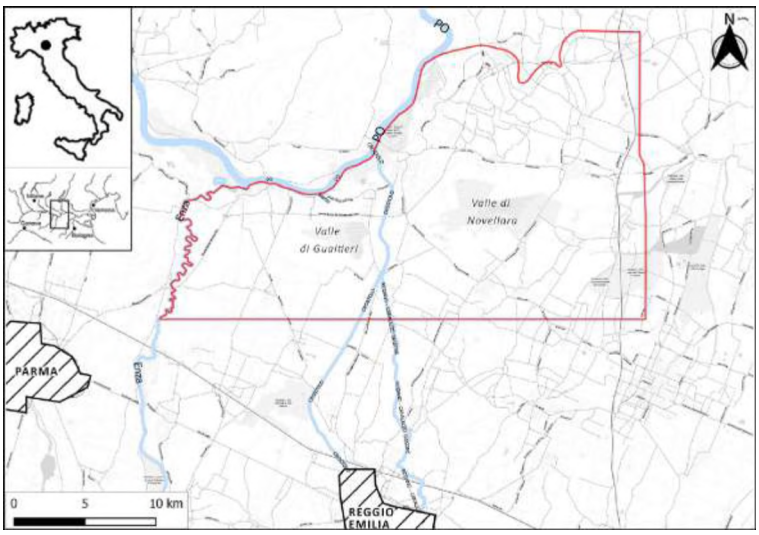

Figure 1 - Research area (OSM modified by F. Brandolini).

Results and Discussion

The multidisciplinary approach allowed us to shed new light on anthropogenic activities related to land and water management in the post-Roman landscape.

The historical documents report that local communities exploited the swamps as food resources (fishing and gathering) and waterway (commercial transports) between the 5th and 10th century AD. Nonetheless, their physical boundaries are not clear. The superimposition of the regional soil map to the 3D model shows that the clayey and silt-clayey soils are concentrated in the lowest areas detected in the DTM, giving us reasonable limits for the Medieval swamps. The most interesting data about anthropogenic activities in the Medieval environment concern the northern limit of the *Valle di Novellara*. According to the DTM, this backswamp is delimited at North by the ridge of the so-called Tagliata Canal. In the current literature (Cremaschi and Marchesini 1978; Castaldini 1989; Castiglioni et al. 1997; Castiglioni and Pellegrini 2001; Cremaschi and Nicosia 2012) the Tagliata Canal is considered as a Proto-historic Po ridge characterised by crevasse splays on both sides; but geomorphological, archaeological, and historical data suggest a fresh interpretation. First, the distribution of archaeological sites in the study area shows an absence of Bronze Age and Roman Era findings (Fig. 2). This suggests that the accretion of Tagliata Canal ridge occurred after the collapse of the Roman Empire. Historical chronicles report that the Tagliata Canal was artificially cut in 1218 for a commercial purpose; the new canal constituted a bypass of the Po River from Guastalla to Reggiolo for the city of Cremona. Moreover, medieval chroniclers reported that the opening of the Tagliata Canal had negative implications for the environment with frequent floods in the surrounding farmland between the 13th and 14th centuries AD (Cantarelli 1882). The geomorphological analyses show interesting details about the shape of the Tagliata Canal. In the new DTM, the morphology of Tagliata Canal ridge seems to be more complex than what represented in Castiglioni et al. (1997) (Fig. 3). The crevasse splays, in fact, show unusual elongated small ridges not compatible only with natural fluvial crevasse splays.

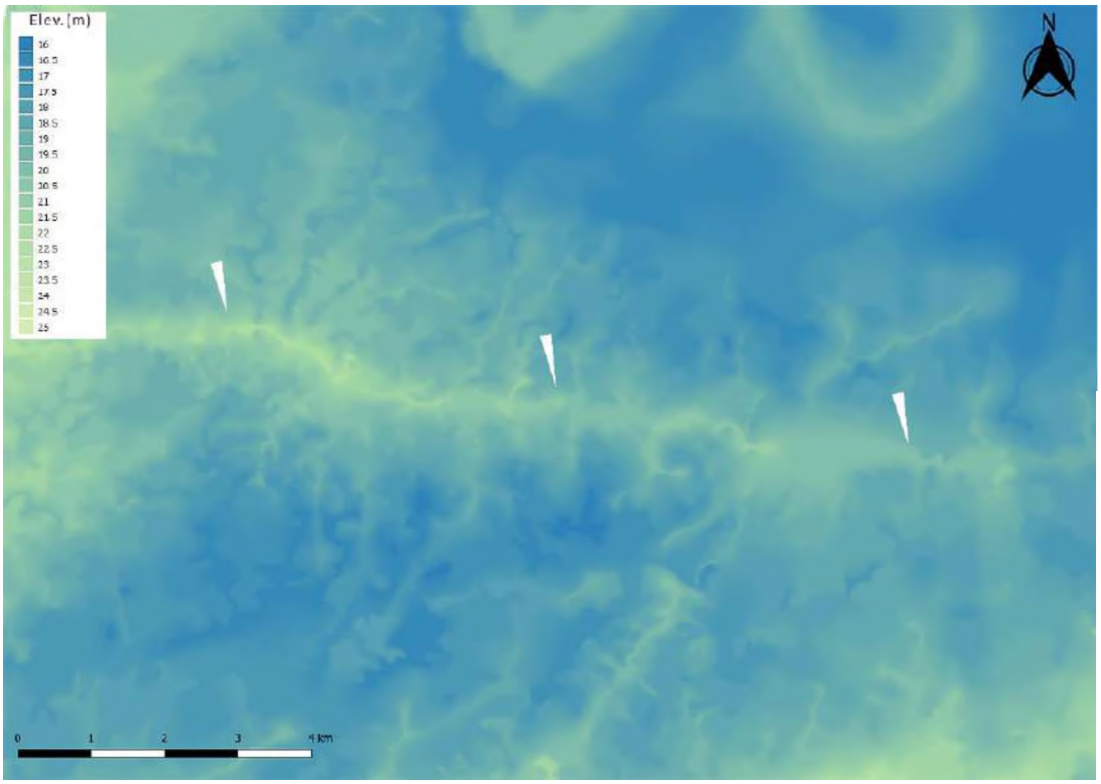

Figure 2 - Tagliata Canal ridge in the DEM (white arrows).

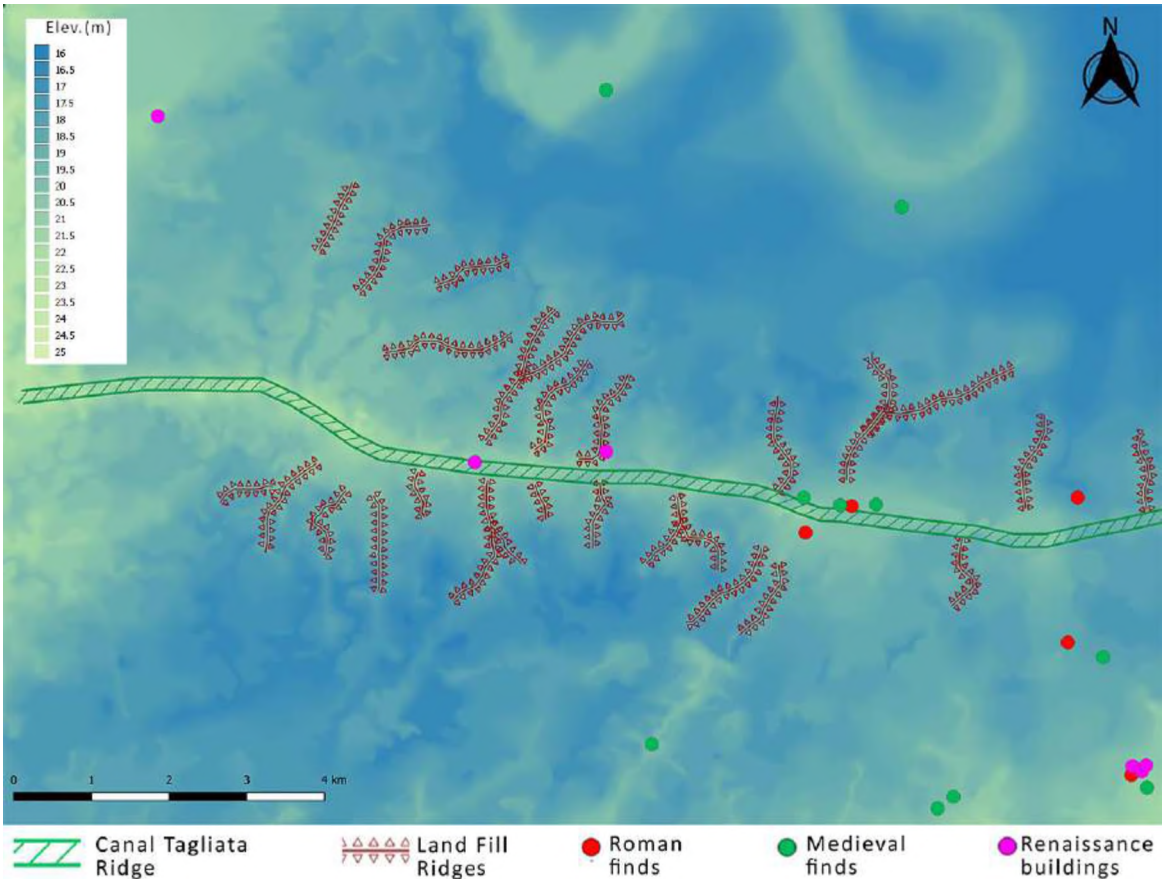

Figure 3 - Tagliata Canal ridge: archaeological data and geomorphological landforms.

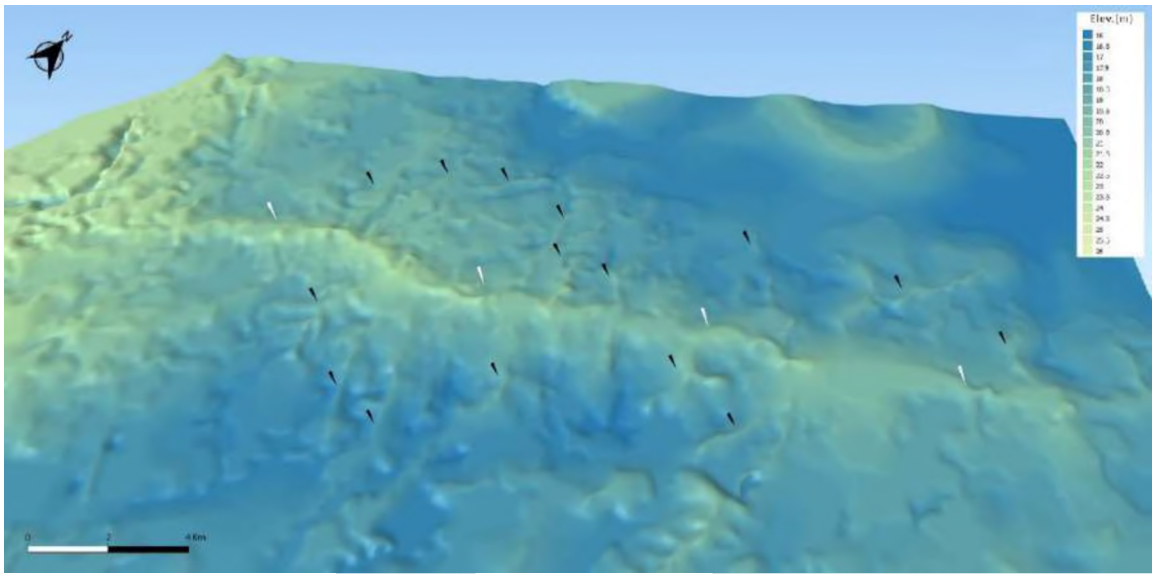

Figure 4 - Tagliata Canal in the 3D model: the Canal ridge (white arrows) and the land fill ridges (black arrows).

In historical documents there is a possible explanation for their genesis: the chronicler Affò (1792) reports that until the 16th century AD, people of Guastalla were allowed to breach the river and Canals levees in a situation of high, muddy discharge. This practice had the effect to fill the swamps with sediments obtaining new farmland. The elongated shape of those unusual landforms could be the results of the landfill reclamation practices described in the historical records. In the geomorphological literature, similar anthropogenic landforms have never been reported: we propose to define those elongate crevasse splays as "Land-fill Ridge" (in Italian, *dosso per colmata*) (Fig. 4). Those landforms are likely to be the results of flood management practices made by the local communities who exploited the fluvial sediments to reclaim new cultivable fields in place of swamps in Middle Ages and since Renaissance.

Conclusions

This study, supported by geomorphological, archaeological and historical data, identifies a new genesis for the Tagliata Canal ridge which landform shape developed in Middle Ages. First, the opening of this Canal had effects on the landscape evolution with frequent floods (crevasse splays), but later its sediments have been exploited by humans for land reclamation purpose (land fill ridges). The geomorphological landforms of the Tagliata Canal constituted an example of sustainable human land and water management in the Central Po Valley during Middle Ages.

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