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Neo-Eneolithic settlement pattern and salt exploitation in Romanian Moldavia

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ABSTRACT

Romanian Moldavia is the focus of a study, initiated in 2005, on Neolithic-Eneolithic (6000–3500 BCE) settlement dynamics and salt exploitation. The underlying hypothesis is that exploitation of salt, along with that of copper and gold, contributed to the emergence of developed Eneolithic societies from the beginning of the 5th millennium BC. By approaching this process through its geographical dimension, from the beginning of the 6th millennium BC, one can measure the simultaneity of certain facts, be they social (the affirmation of elites), territorial (the appearance of controlling sites), or technical (first copper metallurgy, intensification of salt exploitation).

The sub-Carpathian region of eastern Romania is particularly interesting, as the density of salt springs is much higher than elsewhere, salt exploitation dating to the Early Neolithic (Criș) and the region subsequently develops into an Eneolithic cultural centre (Precucuteni and Cucuteni) of unequalled wealth and importance.

After a decade of research on the nature and use of the salt resources, together with the creation of an archaeological database covering the period from 6000 BCE to 3500 BCE, we can now undertake a preliminary assessment of the territorial strategies implemented by these societies in the eastern Carpathian region. Archaeological approaches are enhanced by use of powerful tools such as GIS and the application of spatial analysis methods thus enabling us to model settlement patterns and dynamics.

Following on from these analyses, several results emerge. A coherent settlement model is observed for the Early Neolithic: the sites, which are often grouped together and currently inter-visible, are located in valley zones and on modest terraces close to minor water courses. With the appearance of the Linearbandkeramik (LBK) culture, this situation evolves: now much more dispersed, the settlements are established in more open landscape.

In the first half of the 5th millennium, we witness a radical change in preferred topographical contexts: high- and mid-altitude terraces are favoured, a trend which is reflected in the establishment of settlements on open promontories which provide particularly commanding views over the wider area. Following a marked diversification in the forms of land use in the second half of the 5th millennium, the beginning of the 4th millennium is characterised by a densification of population centres and a strengthening of territorial control.

Analyses of the accessibility of salt springs allow these observations to be further developed. Firstly, we note a significant increase in sites located close to salt springs in the period spanning the second half of the 5th millennium and the first half of the 4th millennium. It is precisely during these two phases that the exploitation of salt appears to increase. Secondly, the numbers of important fortified sites and prestige goods (copper axes) occurring close to salt springs illustrates the polarising role of salt resources.

1. Introduction

The subject of this research is the pattern of land occupation and the dynamics of Neolithic and Eneolithic (c. 6000–3500 BCE) site networks in Romanian Moldavia. Using a comprehensive database and applying spatial analysis methods, the aim is to investigate how salt resources and their exploitation affected settlement strategies. Between 1950 and 2000, several researchers forwarded the hypothesis that salt resources promoted stability and the development of late prehistoric communities in the Carpathians (Nandriș, 1987; Harding and Kavruk, 2013; Lazarovici and Lazarovici, 2015), particularly in Moldavia where salt springs are plentiful and accessible (Ellis, 1984; Monah, 1991;

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Ursulescu, 1995). In the foothills of the Eastern Carpathians, excavation of the earliest salt exploitation sites (Ursulescu, 1977; Dumitroaia, 1987; Munteanu et al., 2007; Nicola et al., 2007; Weller and Dumitroaia, 2005; Weller et al., 2015) led on to use of Geographic Information System (GIS)-based spatial analysis, initially focusing on central Moldavia (Weller et al., 2011; Brigand and Weller, 2012; Brigand and Weller, 2013) and then on the region as a whole (Brigand and Weller, 2015).

Our research falls within the revival of the ecological paradigm within human and social sciences acknowledged since the appearance of the first studies dealing with the spatial relationships maintained by sites and site networks (Hodder and Orton, 1976). An initial overview of the use of GIS in archaeology (Allen et al., 1990), followed by specific applications particularly in continental Europe (Gaffney and Stančič, 1991) and then in southern France (ARCHAEOMEDES, 1998; Van der Leeuw et al., 2003), have provided a decisive boost to the development of spatial archaeology. Following these initial experiments, spatial analysis and modeling were widely developed in European archaeology. The publication of several manuals and text books (Wheatley and Gillings, 2002; Conolly and Lake, 2006; Rodier, 2011), and the multiplication of research programmes associating spatial analysis and remote sensing in a GIS environment have bolstered the development of spatial analysis in a region of Europe as yet little influenced by processual archaeology.

1.1. Study area

By focusing on the eight districts of Romanian Moldavia, a total area of 46,000 km^2 delimited on the west by the Eastern Carpathians and on the east by the River Prut (Fig. 1), the present study highlights, at a new scale, the territorial choices made by the first agro-pastoralists while also underlining the way in which nascent social complexification is reflected in specific forms of land occupation and resource exploitation.

The analysed area is covered by several distinct geographic areas: the Eastern Carpathians (external flysch) and the foothill glaz, the pre-Carpathian depression and the sub-Carpathian hills (Suceava plateau), the Siret corridor, the Moldavian plain and the Central plateau (Oncescu, 1960; Velcea and Savu, 1982). The boundary between the Eastern Carpathians and the pre-Carpathian depression is made visible in the West by the transition between the Oligocene and the Eocene levels on the one hand and the more recent ones from the Miocene on the other hand. Underlying salt levels originating from lagoon areas dating back from the Aquitanian and the Tortonian can be spotted in this very contact zone.

Romania has the most abundant and accessible salt resources in the whole of Europe. Saliferous deposits of lagoonal origin from the Aquitanian and the Tortonian appear as halite formations or saliferous clays, are distributed both along the outer and inside edge of the Carpathian range (Meruțiu, 1912; Velcea and Savu, 1982, pp. 239–243; Bąbel, 2004). Near the Curvature Carpathians, the tectonic dynamics and the interplay of differential erosions contributed to the low depths of these deposits and their recurrent outcrop. The availability of the salt resources (salt springs feeding by the groundwater that washes the saline bedrock; halite outcrops) puts the Subcarpathian region in direct opposition to the Moldavian lowlands.

1.2. Cultural periods (c. 6000–3500 BCE)

According to specialised publications and general literature on Neolithic and Eneolithic chronology (Mantu, 1998; Bem, 2001; Lazarovici and Lazarovici, 2006; Anthony and Chi, 2010), the chronological framework spans from 6000 to 3500 BCE. Romanian Moldavia's passage into the Neolithic is a result of the Criş culture, which originates from the Balkans (c. 6000–5300 BCE). A the beginning of the 6th millennium, population settlements intensified in Transylvania, in Oltenia and in the Banat region, before spreading some centuries later in Muntenia and beyond the Eastern Carpathians, up to Dniestr. Criş was then replaced by the culture of Linearbandkeramik (LBK) (c. 5300–5000 BCE) which left Transdanubia to reach Moldavia after going around the northern Carpathians.

The final phase of the Neolithic period is seen by some authors as a late Eneolithic period, characterised by the appearance of large regional syntheses, such as the one which could be found in Moldavia during Precucuteni (c. 5000–4600 BCE). A new development cycle started during this period, and it lasted until the second half of the 4th millennium. In the Easternmost regions (up to the River Dniepr), the last phase of Precucuteni is known as Trypillia A.

The Cucuteni-Trypillia culture that develops in the aftermath is known as the “last great Eneolithic civilisation of Old Europe” (Mantu, 1998; Lazarovici et al., 2009). It corresponds to a cultural complex which spreads from Eastern Transylvania to Western Ukraine. Its two faces (Cucuteni in Romania and Trypillia East to River Prut) have distinct periods. In Romanian Moldavia, one can separate between Cucuteni A (c. 4600–4100 BCE), Cucuteni A-B (c. 4100–3850 BCE) and Cucuteni B (c. 3850–3500 BCE). Its ceramics are found over some 3000 sites, highlands or valleys (Fig. 2, images 1 and 3), permanent or seasonal (salt exploitation sites e.g., (Fig. 2, image 2)). Cucuteni-Trypillia Cultural Complex is notably known as the most beautiful painted ceramics, with its geometrical patterns based on spirals, incised and painted in two or three colors.

These middle and final phases of East-European Eneolithic caused an intense and standardized production of large copper objects with a high social value, especially long pierced axes which are spread by these large fully-developed and consolidated cultural groups. In this context of a highly-structured population network, villages as large as 10 to 80 ha appeared in the Republic of Moldavia (more specifically on the shores of the Dniestr), and bigger than 300 ha in Ukraine (especially on the interfluve between Dniestr and Bug) (Videiko, 2011; Müller et al., 2016). Knowing that the apparition of these mega-sites seems to be correlated with an expansion of the populations in Eastern Romania, our aim is to characterize the settlement dynamics using for that purpose tools of spatial analysis.

2. Data acquisition

In order to map the ancient populations, an archaeological database has been built, and the elements of inventories have been georeferenced. Constructing and regularly updating these databases is a work in the long run, from the spreadsheet to its map transcription in a GIS. Because this project means to understand territorial choices in terms of the availability of salt resources as well as in terms of topographical context, a rich geographical documentation is required: especially salt resources and altimetric data.

2.1. Archaeological database

The construction of an archaeological map of the Neolithic and Eneolithic of North East Romania (6000–3500 BCE) has been made possible by the creation of a geo-referenced database which brings together available relevant archaeological documentation (Zaharia et al., 1970; Marinescu-Bîlcu, 1974; Chirica and Tanasachi, 1984–1985; Monah and Cucoş, 1985; Cucoş, 1999; Popovici, 2000; Văleanu, 2003; Boghian, 2004; Bem, 2007; Garvăn, 2013; Şovan, 2013; CCA, 2001–2015). Because not every article or book explicitly states the geographical localization, this work required an ongoing dialogue with the researchers, the prospectors and those in charge of the inventories.

The database contains a total of 2034 sites: 2013 of which are habitation sites and temporary settlement sites; 21 of which are certain and uncertain salt exploitation site. When duplications, uncertain and unlocated sites are excluded, there are 1658 sites (Fig. 1). Analysis of settlement dynamics can only be based on sites with a known, accurate chronology, i.e. 76% of the site corpus. Table 1 and Diagram 1