



## POSSIBILITIES OF KRIGING SURFACES (ARCGIS TOOLBOX) FOR ANALYSES OF THE INSCRIBED INTO LANDSCAPE LANGUAGE OF PREHISTORIC LAND ART

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**ABSTRACT** - The present study explores the semantic structure of the spatial distribution of two groups of monuments in south-eastern Bulgaria: one of dolmens and the other of rock-cut tombs. The distribution of these types of monuments is mutually exclusive. This spatial characteristic was recognized long ago, but it is not sufficient for the creation of plausible explanatory hypotheses for the role these monuments played in the structuration of prehistoric and protohistoric societies. Criticism, from the point of view of the lack of any scientific evidence, of the mechanistic interpretations of the religious influences coming from Egypt, and the simplified analogies drawn from 19th-century ethnographic parallels, is directed towards the common faith-ritualism explanatory schemes. In this study I adopt an approach that focuses on empirical evidence and includes observation of the environment (natural and built) and analysis of the spatial distribution of these monuments. In the analyses of the natural environment and the spatial patterns these monuments form I use a GIS geodatabase with an Esri dynamic map, scale 1:200 000 and analytical procedure (kriging) of the transformation of surfaces created by the patterns of spatially distributed monuments as well as analysis of the stability of these surfaces (Gaussian simulation). Further I analyze these spatial patterns in terms of the transformation of human language. I explore two aspects of this language inscribed in the landscape. The first one is the ancient use of land art to eliminate the effect of subject on language. The second one concerns the transformation of language itself. This includes drawing a differentiation line between the role of the silent and arbitrary symbols played in the relationship between the signifier and the signified. Their effects on human cognitive capacity are assessed, as well as their role in creating possibilities for establishing a kind of proto-literary tradition. The latter includes the possibility of the existence of relatively coherent and unchangeable popular narratives, tales, mythologies that changed the iconography in the visual art of prehistoric and protohistoric peoples.

**RIASSUNTO** - Tale studio esplora la struttura semantica della distribuzione spaziale di due insiemi di monumenti nella Bulgaria sud-orientale: il primo composto da dolmen e il secondo da tombe scavate nella roccia. La distribuzione di questi tipi di monumenti si esclude a vicenda. Tale caratteristica spaziale è riconosciuta da molto tempo, ma non è sufficiente per suggerire ipotesi esplicative plausibili sul ruolo svolto dai monumenti in questione nella strutturazione delle società preistoriche e proto-storiche. I tradizionali schemi esplicativi basati su fede-ritualità sono stati sottoposti a varie critiche, che vertono soprattutto sulla mancanza di prove scientifiche, sul meccanicismo delle interpretazioni di influenze religiose provenienti dall'Egitto, e sulla semplificazione delle analogie basate su paralleli etnografici del XIX secolo. Nel seguente studio viene adottato un approccio focalizzato sulle prove empiriche e che implica l'osservazione dell'ambiente (naturale e costruito) e l'analisi della distribuzione di tali monumenti nello spazio. Nell'analisi dell'ambiente naturale e dei modelli spaziali formati dai monumenti, utilizzerò un sistema di geodatabase GIS con una mappa dinamica Esri in scala 1:200.000 e una procedura analitica (Kriging) di trasformazione delle superfici costituite dai modelli di distribuzione spaziale dei documenti, nonché l'analisi della stabilità di tali superfici (simulazione di Gauss). Inoltre, i modelli spaziali in questione sono analizzati in termini di trasformazione del linguaggio umano. Due aspetti di tale "linguaggio inciso nel paesaggio" saranno esplorati. Il primo è rappresentato dall'antico uso della Land Art per eliminare gli effetti del soggetto sul linguaggio. Il secondo riguarda la trasformazione del linguaggio stesso. Ciò implica la definizione di una linea di demarcazione del ruolo che i simboli "silenziosi" e "arbitrari" hanno svolto nella relazione tra il significante e il significato. Verranno valutati i loro effetti sulle capacità cognitive umane, e il loro ruolo nel generare possibilità di stabilire una sorta di tradizione proto-letteraria. L'ultimo punto in particolare implica la possibilità dell'esistenza di narrazioni, racconti e mitologie popolari relativamente coerenti e immutabili, che cambiarono l'iconografia dell'arte visiva dei popoli preistorici e proto-storici.

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### INTRODUCTION

There is no doubt that the geographic distribution of megaliths, rock-cut tombs, etc represents high-order semantic structures that are able to generate and convey a range of messages to close and distant communities. Misleadingly, from this general statement it is possible to draw a conclusion that these monuments acquire a kind of visual iconic dimension. If so, the analysis of these phenomena would be similar to the modern multi-modal analysis of human communication (Pantic et al. 2011). The problem with this type of analysis of prehistoric sacred spaces is that it is not possible to apply visual grammars because there is a lack of the important

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component of timing of signals. In turn, signals such as those generated and communicated by a person at the moment he/she speaks cannot be produced by silently distributed prehistoric monuments. A question arises: how is it possible to analyse the prehistoric stone structures? Modern humans tend to see information in highly discrete ways. This is because of historically accumulated literate knowledge. In prehistory the entire population was illiterate, with no other knowledge tradition but packaging information in a book of stone. Thus, it is possible to conclude that the spatial distribution of ancient monuments aims to pass information in a visual way across barriers of language and across time. These premises also define the most important feature needed in order to carry out a reasonable analysis of the social importance of these monuments: the average distance between monuments and to the surrounding settlements. Thus, distance replaces the timing of signals in the analysis of the semiotic structure of megaliths. Also through a special design of distances it will be possible to analyse the spatial logic that stands behind their geographic distribution. Simultaneously, this task requires clarification of the ideologies behind the creation of these monuments. It would be worth trying to answer the question who (what kind of communities) built and used these monuments.

#### DATA ORGANIZATION AND STUDY DESIGN

Despite the stable stone structure of megaliths they were subjected to destructive practices from ancient times. As a result many of them were completely destroyed, but most remain in ruins and still are visible. On the other hand the rock-cut tombs, as could be expected, are better preserved because they are cut into the solid rock and it is difficult to destroy them without a trace. From these reasons it can be concluded that the archeologically registered dolmens and rock-cut tombs constitute a fairly good representation of the spatial distribution of these monuments.

This defines the task to map out all the dolmens and rock-cut tombs published in the monograph 'Megaliths in Thrace' (Venedikov, Fol 1976). The data are based on an expedition that registered, documented and published all the then known megalithic structures in Thrace (*ibid.*). The data, however, do not have GPS coordinates. Instead, in the description of each monument, its location is presented with a fairly good approximation and directions from the nearest village. According to these descriptions the location of each monument was placed on an ESRI dynamic map of Bulgaria, scale 1:200 000. Once mapped (organized into a geo-database) two separate subsets appeared: the one with dolmens and the one of rock-cut tombs (Figs.1, 2). The group of dolmens has almost even in-group spatial distribution. The distribution of rock-cut tombs shows considerable variation, with two prominent sub-clusters located to the south-east.

From this point of view formal methods that increase the ability to predict the spatial distribution of megaliths or other archeological spatial data are very important. In order to be able to do this kind of analysis for each monument a value that consists of calculation of the average distance to the nearest modern villages has been assigned. It was based on the assumption that Iron and Bronze Age settlements exhibit similar distribution patterns to the modern villages. This assumption is further grounded later in the text.

Thus, for the purposes of this study, the simple Kriging method (ArcGIS 10 Toolbox) was applied. Two subsets of data have been analysed separately: (i) the distribution of rock-cut tombs and (ii) the distribution of dolmens. The Kriging surfaces obtained by this method have been subjected to Gaussian simulation in order to reveal the stability of these spatial structures. The appropriateness of this method for the analysis of archeological spatial data is that Kriging is a probabilistic predictor. Kriging surfaces have standard errors that quantify the uncertainty associated with the predicted values. Generally, this method belongs to regression models and minimizes the prediction error through the calculation of a semivariogram model (regression line/curve approximation).

The basic question that appears out of these premises is whether the Kriging surfaces and the subsequent Gaussian simulation are able to substantiate the different spatial logic that lies behind the distribution of the two empirical datasets of dolmens and rock-cut tombs or not. In order to answer this question it is necessary to compare the minimum and maximum values of the two transformations as well as their standard deviations. Thus the values for the dolmens vary between the minimum value of 26.903 and the maximum of 33.7981. The values for the tombs have a minimum at 7.5406 and a maximum at 27.6177. This is not a surprising result given the distribution of the two empirical subsets of data. Dolmens are concentrated on the slopes of a mountain and have greater distances from the nearby villages. With adding new data, it is expected that this pattern will change in the direction of increasing variation of the mean values. However, the real expectation is that with adding new data (dolmens) to this pattern the average distances to the nearby villages will remain constant and higher than the values of the rock-cut tombs. The next question is whether the Gaussian distribution can further support this line of reasoning. Formally, this question may be asked as what will happen with the standard deviation if the surface is transformed through this parameter. Through this procedure the limit values will be found. They define the limits within which the standard deviation will vary when the surface is subjected to simulation.

The results obtained by carrying out these procedures show that there is no surprise with the rock-cut tomb surfaces. The mean is 19.914 and STD dev. – 4.304. The limit values are 1.303 and 10.210 respectively. Because of the greater variation the upper and the lower limit values become extended on average about 2.5 times.

The surprise is with the dolmens. Their mean is 30.350, STD dev. – 1.552. The simulation of the surface, however, reduces the upper and the lower limit values to 0. This shows that the distances to the predicted points and the actual distances among dolmens are almost equal while the overall variation remains small.

#### SPATIAL LOGIC AND INTERPRETATIVE POSSIBILITIES

The common interpretation of rock-cut tombs and dolmens, apart from their obvious service as burial ground, is often perceived as a manifestation of the spiritual activities of ancestors and other religious rituals. Thus religion and ritual played a major role in their interpretation. They were often explained as representatives related to the world of primitive religion and to rites of passage: initiation and burial rites, healing practices, magic and mysteries carried out outside human settlements. Interpretations concerning specifically rock-cut tombs but also dolmens are intertwined into overall interpretations of the religious system of Iron Age and Thracian peoples (Fol 1979). I would like to note that beliefs like these (particularly the sun cult which is based on earlier Neolithic/Copper Age cultural traditions connected with sun- and moon-worshipping) cannot be ruled out. But the nature of these beliefs and how they would have inspired local people living in similar geographic settings but separated by long distances to create exactly these kinds of monuments are unclear. Despite these uncertainties, there are attempts to explain the appearance and spread of rock-cut tombs in the eastern Mediterranean exclusively on assumptions of faith-ritualistic practices and beliefs (Fol 2008). They are founded by accentuating religious influences coming from Egypt and represent the complex belief system of the great mother-goddess and her son-sun which the ruling dynasties at that time built their ideologies on. The geographic spread of this ideology is presented in a somewhat mechanistic way going from Egypt and through Crete, reaching the Mycenaean world: Boeotia, Thessaly, eastern Macedonia and Thrace. There is no doubt that this belief system contributed to a certain extent to the creation of this type of monuments. But the exclusive focus set on faith-ritualistic practices does not help to explain the widespread distribution of these monuments across the eastern Mediterranean and their appearance in small groups of rock-cut features isolated from one another. This cannot explain the appearance and spread of dolmens and why their spatial distribution is mutually exclusive to the spread of rock-cut tombs. This is one of a series of weaknesses of this explanatory model.

The second one is related to its scientific support. Archeoastronomical observations have been made on dolmens and rock sanctuaries. Certain regularities of the movement of celestial bodies have been registered but these cannot be exclusively assigned to Iron Age and Thracian peoples. Astronomical observations are vital for the survival of mankind and they are widely known from Middle/Upper Paleolithic to present-day illiterate peoples. To my knowledge other analyses, for example the differentiation of the techniques used for cutting stone or the intervisibility analysis, of groups of monuments have not been made.

The third weakness comes from the simplistic use of ethnographic analogy. This way of understanding interprets the participation of large numbers of participants in mystery rituals outside settlements in the light of 19th century ethnographic evidence from Thasos island (ibid.) or the known rituals of *nestinari*, people walking on burning charcoal. There is no doubt that these rituals go back to the deep past and even they may have been part of the rituals carried out at these monuments but this fact does not allow to draw a one-to-one analogy with protohistoric and prehistoric peoples. Generally this approach leaves no room for appreciating cultural particularities and different perspectives on the meaning of such monuments, since it accentuates the identification of mystery ritual practices as a single cause for the creation of dolmens and rock-cut tombs. It is also loose in its definition of mystery ritual practices which is confused with more precise community identification practices of different kinds of populations living around and using these monuments. Even if religion plays a role, other crucial aspects are involved in the creation of dolmens and rock-cut tombs. These have to do with issues of group identity, land ownership, boundaries and communication through land-art. From the recently accumulated considerable knowledge about Australian sacred places it is possible to interpret the creation of images in a given place as a record of clan myths and claims of both sacred locations and land resources through the idea of presence (Layton 1992:74). The idea of presence sheds light on one particularity of spatial distribution of dolmens and rock-cut tombs. Their in-group spatial variation tends to form small clusters at particular locations. Because of the screening effect the Kriging does not account for their presence. A closer look at the map, however, shows that both dolmens and particularly rock-cut tombs tend to form groups in separate environments. Thus it is possible to suppose that their religious significance may be ascribed to the separate acts of commissioning of building a monument in a particular place. It is obvious from the scale and the skill necessary for the execution of the required work that the makers of the monuments must have been



both devotees and specialists. Hence the monument's function may have been related to devotional practice, recording religious events and didactic narratives with mythical, legendary and historical content.

#### STRUCTURATED LANDSCAPES

Instead of 'structured' I use A. Giddens's term (Giddens 1984: 376) 'structurated' landscapes because the artificially created landscapes considered in this study seem to better correspond to the complex process of structuring social relations across time and space, as they were created in the action of production and reproduction of social systems. This approach is a way to go beyond the limitations imposed by the purely faith-ritualism explanatory model and focuses on empirical evidence. The latter includes observing the environment (natural and built) and the analysis of spatial distribution of monuments, and through this establishing likely social relationships and answering the questions why these monuments were built in such environments and why these monuments remain silent – there are no signs engraved (incised) on them.

The empirical evidence suggests that despite dolmens and to a much lesser extent rock-cut features being scattered over large parts of Thrace, they are concentrated on two mountains, eastern Rhodopes and Strandza. These massifs consist of hilly areas with an altitude of up to 1,000 m, with deep valleys with limited fertile strips of land on the valley bottoms. Today climate conditions are drier than in the past when valleys and mountain slopes were much more fertile. The foothills and plateau to the south of the Strandza mountain and to a lesser extent the southern parts of the eastern Rhodopes form steppe conditions that preserved steppe vegetation cover. These steppe-mountainous environments provided symbiotic conditions for developing both crop cultivation and animal breeding. Archeological evidence shows that there are numerous hill-top sites from the Copper Age. They are characterized by light wooden constructions and no stone architecture and the sites consist of numerous potsherds and flint tools. It is highly likely that they were seasonal camps of pastoralist groups. In most cases there are no water springs near the hill tops, which make these places inhospitable for long-term occupation. Instead the hill tops offer excellent strategic positions for protecting large herds of animals from predators and from attacks of hostile groups of people. Some of them may have served as sanctuaries where particular rituals were carried out. Caves were used also for sanctuaries. For example, the sanctuary in the cave Haramijskata Dupka, Trigrad, eastern Rhodopes is representative of these sacred places. The access to the cave is very difficult and impossible without ropes or modern rock-climbing gear. The number of fine pottery outnumbers the coarse and the forms of the pots do not correspond to the ordinary pottery used in settlements from the Copper Age. Thus the archeological evidence suggests that the particularity of place and the difficulty of access define the settlement pattern of this region from late prehistory onwards.

Archeological evidence from the Bronze and Iron Ages shows that exchange mechanisms between southern and northern Balkans were established. For example, the early Bronze Age site Mihalich located on the southern slopes of the Strandza mountain (on the Bulgarian–Turkish border) has a big stone building of a megaron type known from Troja and from the site Kanligecit, near the town of Kirklareli, Turkey. Numerous finds such as bronze symbolic axes, a mould for casting a bronze sceptre and several types of swords including two Mycenaean ones were found both to the north and to the south of the Balkan range (Exhibition of the National Institute of Archaeology and Museum – [www.naim-bas.com/arche](http://www.naim-bas.com/arche) – Thracians). The routes in the central Balkans played an important role but the communication routes through the Strandza and eastern Rhodopes mountains have also to be taken into account. Their networks of canyons and deep valleys were crucial for the local pastoralist populations engaged in exchange networks through establishing permanent places that marked their presence. The significant role these low mountainous massifs played as natural and perhaps symbolic borders should be underlined. They mark the long-term encounters and symbiotic way of life of pastoralist and agricultural communities. Unlike popular opinions of ever hostile relations between these two populations with quite different lifestyles, their contacts were constant and productive for both sides. Probably these symbiotic relationships accelerated the cultural developments of these populations. This could be observed through the intensive shaping of the landscapes by erecting stone marks placed on higher grounds. The areas these monuments were built constitute liminal or transient places that link both the contrasting physical (geographical) features of hills and fertile valley bottoms and the spiritual links with a complex cosmological order. Local people and particularly the seasonal migration of pastoralist groups needed permanent marks on their routes, places of habitation and symbolic marks of their presence even when they were absent during the cold seasons of the year. Ethnographic evidence from 18th and 19th centuries represents similar patterns of co-habitation of agricultural and pastoralist communities. This is the reason why I used average distances from each monument to the nearest modern villages. The assumption is that the settlement pattern in modern times did not change considerably from what it was in the past. The rigid geography of the region does not allow greater choice for the local populations in order to achieve success in their economic and community life.

LAND-ART AS A MEANS TO ELIMINATE THE EFFECT OF SUBJECT ON LANGUAGE

The above argument strongly suggests that on the erected dolmens and on the vertical rock surfaces near the rock-cut tombs there must have been placed not only images of foxes, fish and birds but also numerous engravings of signs, images and scenes of mythological, religious, etc character. In fact there are few such signs except for engraved circles (probably representing the sun disc). This is the most represented sign in the region (e.g. near the town of Topolovgrad there are engraved discs on the eastern part of the hilltop rock massif next to a Thracian fortress. Each morning the sun lights them up (photo on p.114 in *History of Bulgaria*, v. 1). These monuments, and generally most of the megaliths in Europe, Anatolia and the Caucasus region lack engraved signs, symbols and figures (Juri Trifonov, pers. comm.). Thus these monuments remain silent landmarks left on higher, sacred ground. They establish a kind of a paradox with earlier examples of stones raised by humans. The first ever erected stones in human history represent artistically shaped steles with beautifully carved images, scenes or sculptures of human and human-animal beings. These are the Lepenski Vir (Serbia) human-fish stone boulders and the similar symbols of the engraved figures on the steles from Gobekli-tepe and the human sculpture from Balıkligol, Sanlaurfa, Turkey. These images constitute the first explicit representation of the idea of stratified cosmological order. This is so because the most common depiction on the steles of Gobekli-tepe is the one of the fox, often combined with a representation of a snake or serpent-like signs. The other well-represented picture is that of vultures and the presentation of a symbolic scene of vultures eating the flesh of a human body exposed, probably on a platform on pales, at the top of the hill. The symbolism of the animals living in holes and tunnels in the earth or under water and that of vultures living in the sky represents an abstract way of presenting a stratified cosmological order. But the real paradox created by these images lies in the question whether these representations disappeared forever from the ways humans conceptualize themselves and the world they live in or they were transformed into another (non-material) cultural tradition. A satisfactory answer may be sought in the specific symbol these images represent. They may be considered as a focal point where two particularities of human cognitive capacity meet. The first one is related to artistic ways of representation of the world which has the typical human feature to exaggerate and thus accentuate specific elements of the signified. At the same time the combinations established between these representations form a kind of logically based syntax. Its role is to eliminate as much as possible the effect of the subject imposed on language (Lombardi 2005). Thus the logical syntax helps the combinations of these representations to convey a local narrative, mythical story, etc with as little contradiction as possible. It should be stressed that at the time Gobekli-tepe and Lepenski Vir were built and used these ideas must have been widespread among peoples from Eurasia and beyond. But these are not abstract representations but rather artistic depiction of choices of animals and their stylistic representation that create a specific syntax so that they would be understandable by the public that built and used these monuments on an everyday basis. Thus land-art created in a concrete way serves as an illustrative example deduced from an already established abstract reality. A question may be asked as what constitutes the evidence that supports this line of interpretation. The fact is that the depictions of fox, snake and fish are extremely rare in the whole of prehistory. To my knowledge the fox was never represented in Paleolithic art. It is not represented during the Neolithic, Copper, Bronze and Iron Ages. Serpent- and fish-like depictions are very rare during the entire prehistoric and protohistoric periods. Thus the depictions of fish, fox, snakes and vultures may be considered as uniquely represented in the Epipaleolithic. Even if new such images were discovered in the future their unique representation in time and space would be preserved. A further question may be asked why this particular symbolic appeared only in the Epipaleolithic. The answer is not a simple one and reaches beyond the archeological record. The absence of these once very popular representations of fox and snake is not due to radically changed mythologies, religion, belief systems. Rather their absence is a matter of the transformation of language into popular proto-literature. Material evidence supporting this explanatory hypothesis, apart from the striking absence of these images from prehistoric and protohistoric iconography, cannot be found. But the fox, snake and fish are the most popular characters in folk tales, narratives and mythologies in almost every community worldwide. They became part of human culture and with it they were incorporated into human non-material heritage and present early examples of the transformation of language into popular proto-literature. If there were a task to reduce the complex symbolism of the modern world to its most important essence then what would it be? The only certainty in solving this task is that this reduced reality will be confined into a concise symbolic representation. To my knowledge this task was uniquely and excellently performed by Antoinette Saint-Exupéry in his fiction novel, *The Little Prince*. The essence of the world is presented by the duality of human nature: the naïve little boy and the cunning (foxy) characters of the fox and the snake. The picture is rounded by the presence of a little planet threatened to be destroyed by a big baobab and the desert. If it is asked where the author takes the prototypes of his characters the answer will be easier, from the traditional well-thought and well-spoken popular sub-literary tradition. The symbolism of



the de Saint-Exupéry novel is strikingly similar to that of the representations of Gobekli-tepe and the sculpture of Balakligol. This was recognized by the Turkish Ministry of Culture and the Cultural Division of the local municipality that placed replicas of the most characteristic steles in Gobekli-tepe in the centre of the town of Sanlaurfa. Perhaps this is why these monuments rapidly gained popularity not only in Turkey but round the world and this place is crowded with tourists.

The time difference between the unique relief images and the sculpture from Sanlaurfa and the novel cannot be considered as a chance coincidence. Gobekli-tepe and Balakligol present the very beginning of a new cognitive behavior in humanity. The cultural evolution of human language turns into sensitive complex hierarchies that are able to capture and respond to any minor or bigger changes in the information environment. What is the remarkable achievement of the Gobekli-tepe symbolism is that here for the first time in human history the language acquires a new quality: its semantic structure is able to make a complete fold upon itself and remains the same (Foucault 1994: 344–386), creating a well-defined literary reality that is not a simple mirror of the physical world. It is a new abstract reality based on the syntax of combinations of several symbols, which is the necessary condition for the creation of logically coherent narratives that are able to remain almost unchanged over long periods of time, which in itself constitutes a kind of proto-literature. In contrast, everyday language is marked by numerous contradictions, not well-worded messages or misunderstandings that are known as effects of the subject on language (Lombardi 2005). On the other hand, the literary language, even the non-written one (e.g. the mastery of storytelling), requires the minimization of the generated by the subject misunderstandings. Perhaps this is the way the human characteristics that were once ascribed to the visual representations of animals such as fox, snake and fish entered into popular narratives, tales and mythological scenes and their depiction as silent symbols became obsolete and they disappeared from the later iconography of prehistoric and protohistoric peoples.

#### LIBERATION OF LANGUAGE FROM CONCRETE SEMANTIC THROUGH THE APPLICATION OF RIGOROUS SYNTAX

Ancient as well as modern societies live in a kind of a spoken reality that does not exactly match the physical world. Without any attempts to analyse this spoken reality paradoxes like the one presented below can never be solved. In this light a striking contradiction emerges: given the animal representations on Epipaleolithic and Mesolithic artistically carved steles and sculptures, why did symbols of animals disappear from monumental stones erected during later prehistory?

The answer may include two main topics: changes in ideologies and changes in the language itself. As to the first part of the answer, there are several points that have to be taken into account in order to better understand the changes in the overall ideological framework of Bronze and Iron Age peoples. They are detailed below as follows.

There was a radical change in the way people from late prehistory started to understand the physical world. The root metaphor of ‘ever giving nature’ (Bird-David 1999) is no longer valid. On the contrary, people were tempted to change the physical environment: they started successfully to manipulate various habitats in order to create better living conditions. The archeological record already testifies to human activities that induced changes in marshy areas, lakes and mountains. Thus the root metaphor that replaced the old environmentally friendly one became the ever increasing drive of the transformation of natural resources into power, prestige and personal wealth. In addition major changes in wider ecological systems were initiated by increasing human influence. Archeological evidence suggests that during the Copper Age the deforestation activities of humans became observable in the pollen record of the eastern Balkans (Bozilova & Atanassova 1989). Perhaps a new kind of ecological vision (attitudes and understanding of natural resources) became dominant among these societies. The extraction of new fertile lands and pastures from wild territories may have constituted the primary goal among collective behavior, which results in denying the high social status of old symbols of totemic animals and hybrid animal-human representations. In support of these considerations there are several other features.

General decline of taboos on eating totemic animals as well as the decline of the role animalistic ontologies played in the life of prehistoric communities (Tsonev 2012).

Animals, even the totemic ones, became ‘deanimalized’ in the sense that they were reduced to both carrying human features and meaning and simple material that was disposable in building any game/profit individual or group strategy.

High status may have been ascribed to male symbols made of iron, copper, gold and silver. Eastern Rhodopes and Strandza are rich in these metal ores. Probably during the Bronze and Iron Ages large groups of mineworkers, craftsmen and traders started to contest on equal grounds the lands already claimed by traditional communities of farmers and pastoralists. These contested landscapes must have additionally supported the

further decline of traditional taboos.

The second particularity that liberates language based on silent symbols from its concrete semantic concerns the transformation of the language itself. It should be stressed that there are other forms of written language based on sounds associated with arbitrary symbols, which despite their lack of the same rigour and precision may be more persuasive and all-encompassing, for instance the various arts which possess the ability to influence large groups of people and cross easily over language, social, religious and other barriers. On the other hand human artistic behaviour is diverse in the choices of objects of artistic creation. The erection of dolmens and cutting tombs in solid rocks may be considered as part of early human artistic behaviour that creates a specific language whose meaning is confined in stone. But there are two important aspects of this language that is frozen in stone. The first is that these stone monuments should not be considered either as signs or as symbols. Their meaning is confined in their composition within the space. They do not act as separate symbols but as a special composition of symbols that are not randomly dispersed within the landscape but form a complex syntax that is able to convey messages across different languages and reach distant communities. Only through this language written in the landscape is its unchangeable syntactic form able to include other symbols through joint attention and shared intentionality that are contained in each intersubjective action. Thus they are able to act in tune with basic human cognitive capabilities. Recent studies showed explicitly that human cognition is no longer characterized by understanding intentions but rather by a combination of motivational factors for sharing (from food to attention and knowledge) and a cognitive capacity for maintaining joint commitments (Tomasello 2008). The second particularity is that it is not possible to compare this unchangeable syntax of the language written in the landscape with a plot of a modern literary story, or even with mythical narratives from ancient times. Despite the lack of coherent plot this language written in the landscape is able to create formal communication that resembles a kind of proto-literature. This is because this language is able to provoke human imagination and picture consciousness. But they can turn into formal statement only through embodiment. Through it all the participants in a ritual or a ceremony can understand the fundamentally temporal nature of every human experience. Its participants have the opportunity only through ritual to achieve both individual and intersubjective new knowledge about fictitious beings through the acts of the unconscious and the opportunity to accumulate new rational knowledge about the social status of the existing legends and myths.

These theoretical premises are important for a better understanding of the formal results obtained by simple Kriging and Gaussian transformation of the two subsets' surfaces. The major analytical tool in these procedures is the distance between monuments and the distances to the nearest modern villages. It replaces the measure of timing of signals in the modern discourse analyses. As mentioned above, the greater surprise is offered by the spatial distribution of dolmens. The major result in its analysis is that the average distances between the monuments with which each monument is associated and the average distances from every monument to the nearest modern villages are the same. The extracted number of monuments is sufficient enough to represent one small coherent geographic region of a mountainous area. The precision is also good enough to represent their spatial distribution correctly. If newly discovered monuments (not very likely) are added to this sample and the precision of mapping is increased with GPS coordinates, the striking zero correlation of the Gaussian simulation may change to a small value. Such change, however, cannot undermine the overall pattern of spatial distribution of dolmens. Their main feature is that every dolmen is carefully placed in relation to its neighbours and they all are almost equally distanced from the nearby settlements. In fact their real value generated by their spatial distribution is that they act as a separate group of monuments or even as a single monument including the mountain itself in its monumentality. As such, their significance reaches larger territories and villages surrounding it. Perhaps they were included in a higher semantic order of intercommunication between different farming communities living in the surrounding valleys and in the Thracian plain.

The rock-cut tombs form a separate subset that is mutually exclusive with that of dolmens. Their spatial distribution shows a straight line which stretches from north-east to south-west. Their Kriging surface and Gaussian simulation surface takes the form of a wedge directed to the north-east. This transformed surface shows considerable variation between the separate small groupings of rock-cut tombs. There is one more important difference with the spatial distribution of dolmens. Most of the dolmens are situated on mountainous slopes and overlook the surrounding plains. The location of the rock-cut tombs is rather inscribed into the mountainous landscape. They face the hills and the adjacent valleys and the distances to the nearby villages vary significantly. All this evidence shows that rock-cut tombs had local meaning and were tightly related to the communities living in their immediate vicinities.

The interpretation of the social significance of both rock-cut tombs and dolmens may have two directions. The first is that dolmens and rock-cut tombs may visually represent the statement of a strong territorial claim.



The dolmens that face the surrounding plains may be interpreted as sacred places for community identification of populations living in the entire region surrounding these groups of monuments. From that point of view such monuments might have been more associated with farming communities that needed stable points of reference (situated on high rock massifs), through which it is possible to delineate with greater accuracy the territories and fertile lands in the plains over which they claimed primacy of resource exploitation. Contrary to this, rock-cut tombs are more inward-oriented (looking towards the mountain) monuments. They might have been associated with pastoralist communities that claimed the surrounding pastures for their seasonal camps. These places may have been also claimed by local groups of mineworkers, craftsmen and traders that exploited the mountains that were rich in metal ores and minerals. This division is not mutually exclusive and some tombs and dolmens may have served all types of communities living in these regions.

The second line of interpretation is associated with a fundamental change of language from silent symbols to a sound system indicated by arbitrary signs. Totemic animals and other animalistic characters entered into this sound-based language designation where there is no exact match between the signifier and the signified. Thus the pictorial symbolism of great narratives, mythologies and beliefs becomes archaic and is replaced by the monumental land art. The pictorial symbolism remains in the mobiliary art with pottery, starting at the Neolithic, as a reminder of the old beliefs and understandings of the social and natural worlds and as a traditional source of explanation of the origin of humankind.

#### DISCUSSION

It seems that humanity developed in parallel two different ways of communicating through symbols. In both ways the aim is through the elaboration of formal or less formal syntax to make languages and the messages built on them coherent and with as few contradictions as possible. The major difference between the two approaches is the level of abstraction and the way signs and symbols correspond to the entity or notion they stand for. Of these two the first and the oldest one is language based on silent symbols. It is flexible enough to serve people's everyday needs for unambiguous communication, but its strength lies in its possibility to represent complex ideas in a very concise way. Historically this silent language evolved through Paleolithic art, and was later represented by Epipaleolithic and Mesolithic monumental land-art forms. This is the language through which humans conceptualize the universe, the origins of humankind and mythologies, attitudes, belief systems related to these themes. With the developing of rational science in ancient Mesopotamia, Egypt, Greece and to the present day, this way of communicating became the abstract language of science. Scientific abstractions are based on symbols that stand for certain physical or logically based language phenomena that contain no or very few basic contradictions. This language, however, is not flexible enough for developing more rigorous ways of everyday communication such as literature and other art forms. Sign systems based on sounds that correspond to arbitrary symbols are more suitable for administrative purposes and for the development of human communication through notions conveyed by art. This fact lies not that much in the somewhat artificial contradiction between silent and sound-based symbols. Apart from this superficial opposition, the important role of these signs, whether silent or sound-based, is what they stand for. If a single symbol, no matter whether silent or sound, stands for a single entity or notion, then it is related to the more archaic but more abstract one. If it is an arbitrary symbol which permits through a combination of several such symbols (formal syntax) to convey in a diverse way one notion or several notions related to one another, then this is the language of communication, art and literature. In this case, however, the role of syntax is less rigorous. Every human language is full of contradictory rules and manners of expression but, at the same time, they are all rigorous enough and allow each language to be translated into another one, losing very little of its original logic and richness of notions.

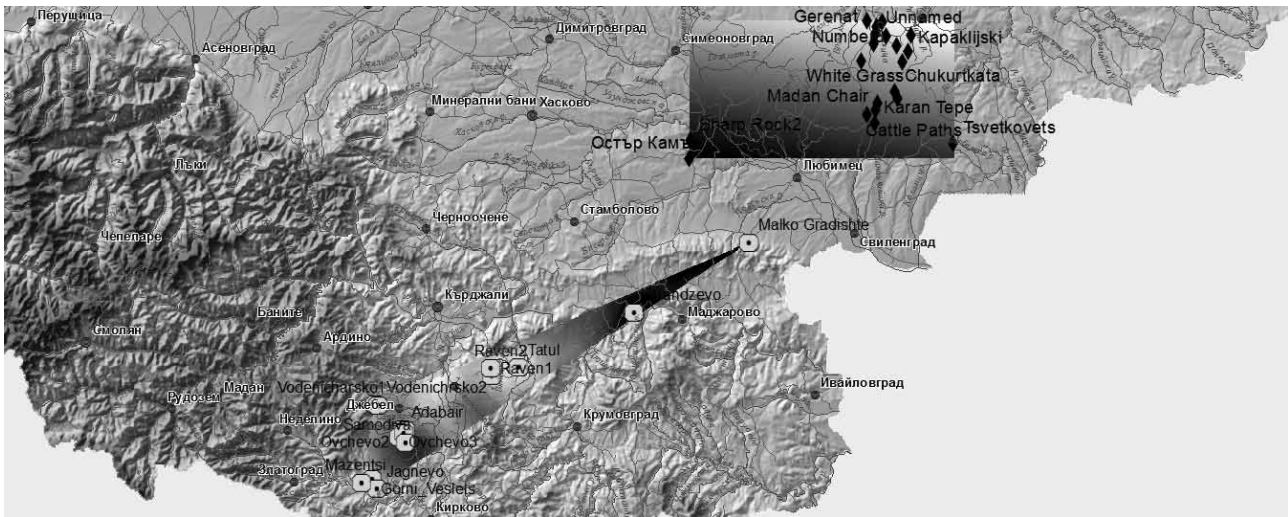
These theoretical premises allow a better understanding of the role megaliths played in prehistoric and protohistoric societies. Monumentality played an important role in the constitution of human societies long before the first monumentally erected and artistically shaped stone stele and boulders. For example, the Sandy islands with naturally raised stones in the area of Dikilitas, northeastern Bulgaria is the place with the greatest concentration of Paleolithic and Mesolithic sites in Bulgaria. Numerous sites in sandy areas known as sandy Paleolithic/Mesolithic in Western Europe also represent this human necessity to relate its everyday experience with the supernatural. But this natural world that stands for the human desire to relate its experience to the supernatural was not enough for these early communities. A growing number of sites with monumental architecture and art from around the 12th till the seventh millennium BC have been discovered. Among all the other things that are described and explained about these sites, they mark the beginning of the transformation of the human language and the appearance of early literary forms. This is based on the differentiation between the arbitrary signs that stand loosely for an idea or for several ideas related to one another and the silent symbols that take exactly the pictorial meaning of a given symbol. To a certain extent the latter is the language of Paleolithic



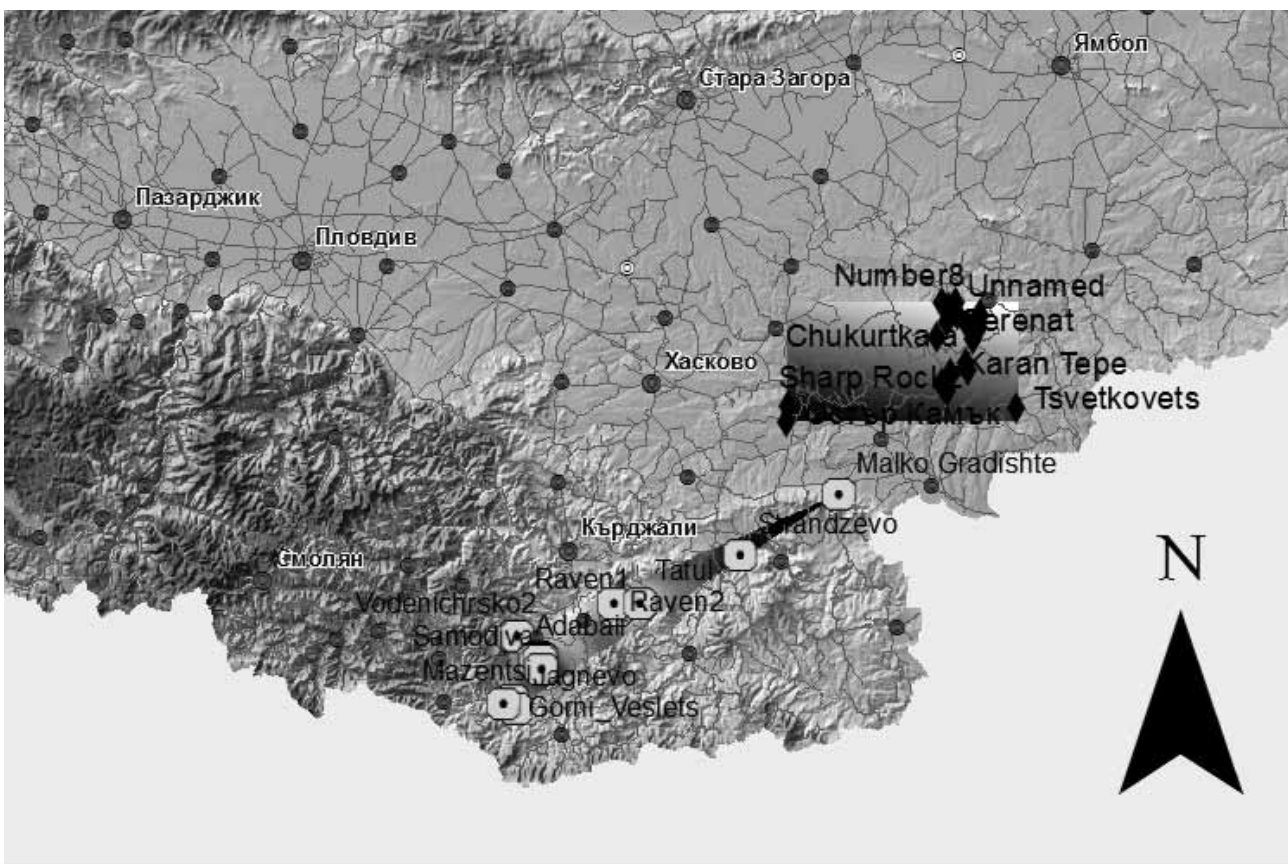
art. But the distinction between arbitrary and silent symbols is beginning to emerge as new research sheds light on Paleolithic signs (Petzinger 2009). Geometric and abstract symbols during the Middle and Upper Palaeolithic are as numerous and diverse as the Neolithic ones. Among them, however, only the unique pictorial representations of animals in Gobekli-tepe in combination with the human statue from Balakligol and the hybrid sculptures of human-fish in Lepenski Vir mark the transition to a language that is able to create a kind of literary tradition. This is a language that is prone to factual (lexical) and syntactic manipulations and changes but semantically remains the same. Its basic property, as Foucault described it (ibid.), is that the language is able to fold upon itself and remain the same. This folding allows a new syntax to be established that clears away the old semantic contradictions as much as possible and builds new ones. In fact all the knowledge of humankind is based on basic assumptions that smooth or eliminate particular contradictions in language. Thus human existence takes off the physical ground and evolves in a spoken reality with logic set in language, not in the exact match with physical world. For example, the analytical measure of distance I use to analyse the language of the dolmens inscribed in the landscape shows exactly this. Practically all the monuments are equidistant among themselves and they are situated at the same distance from the nearest villages. This is a stable pattern that will barely change if new data are included and the precision of mapping raised by using GPS coordinates. In other words, the space created by their distribution folds upon itself and remains virtually the same. This is a clear message created by a group of monuments that act as a single monument. The meaning in the message constructed in this way in the natural environment clears any contradiction and unequivocally states strong territorial claims. Rock-cut tombs, despite their seemingly local significance, also evoke unequivocal territorial claims. Rituals with their concrete semantic that may have been performed in these undoubtedly sacred places remain in second place. Social importance was put into the act of commissioning and actual building of these monuments but not into concrete ritual use afterwards. They remain up till now as unequivocal symbols of the presence of particular types of communities that claimed their share in the tense social environment of highly contested landscapes.

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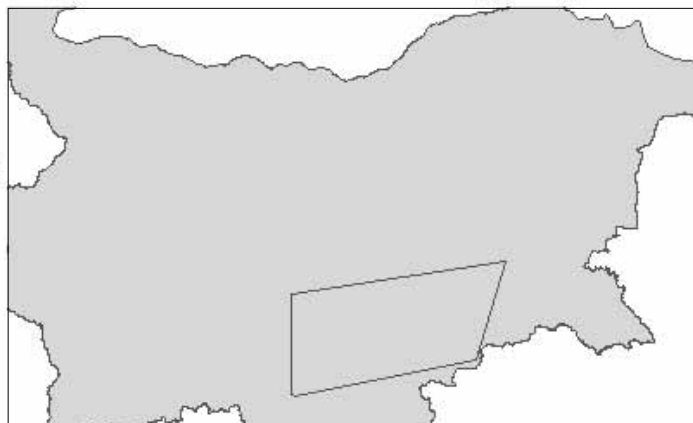


1. Fig. 1. Detailed map of spatial distribution of dolmens and rock-cut tombs.



## Legend

-  Rock-cut tombs
-  Dolmens



2. Fig. 2. General map of spatioan distribution of dolmens and rock-cut tombs.



3. Fig. 3. Dolmen near the village of Ostarkamak (Sharp Rock) and situated on the hill top called 'Ostarkamak'. On the photo's background the surrounding lowlands are visible. After Venedikov, Fol 1976, photos No 20-22.



4. Fig. 4. Rock-cut tomb near the village of Ovchevo. After Venedikov, Fol 1976, photos No 191-193. (nдр: framing of phots: sic!)

