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Megalithic Skyscapes in Galicia

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Abstract: We present the results of our analysis of two singular Neolithic monuments and two prominent megalithic groups in Galicia. The two singular monuments are the dolmen of Dombate (Baio, Coruña county), perhaps the largest megalithic chamber in Galicia (or at least the most investigated and well-known) that houses an elaborate decorative program with engravings and paintings, and Forno dos Mouros (Bocelo mountains, Coruña county), also housing paintings and belonging to a bigger group aligned along an historical path following the mountain ridge. Both chambers house interesting illumination effects. The group analysis concerns the Barbanza (Coruña county) and Leboreiro, (Ourense county and borderland with Portugal) necropoleis. There, we find that apart from chamber orientation, location and spatial relations of the monuments within the landscape, the monuments incorporate skyscape associations that complemented and dialogued with that of the chamber orientations. Besides, if the particular directions that we find are related to the movements of the sun and/or moon they may indicate the appropriate ritual time for the dead. Of course, skyscape is not the only or the main factor to explain the location of the mounds within the necropolis but are part of a complex system of relations making those monuments part of a cultural landscape. When taking all factors into consideration a complex picture emerges where we can envisage the ways of construction of social time and space in the megalithic period.

Megalithic Astronomy has for a long time focused on analyzing the null hypothesis – do the megalithic monuments of a given area share a similar orientation pattern?¹ This approach was needed to break the resistance existing among the archaeological community and it showed that the orientation of megalithic monuments in particular regions and belonging to a similar culture tend to be coherent. In several instances, the simplest

¹ See for example, S. Iwaniszewski, ‘Por una astronomía cultural renovada’, *Complutum* 20, no. 2 (2009): pp. 23–38.

explanation for those trends is the orientation towards a heavenly body, perhaps in connection with particular topographic features.²

However, these data-driven analyses are restricted in nature, as they do not ask about the intent of megalith builders in using such orientations. In order to answer this question, we must contextualize those results within a number of other cultural and social elements of the megalithic builders.³

A number of previous works, both from the field of landscape archaeology and from archaeoastronomy, have highlighted the different relations of the megaliths with either moving strategies and/or visibility⁴ or the search for regions where prominent topographic features are spotted and interesting astronomical alignments occur.⁵ More recent works try to complement these early works to examine the connections between the landscape and the sky.⁶

² See for instance the now classic works by C. Ruggles, *Astronomy in Prehistoric Britain and Ireland* (New Haven, CT: Yale University Press, 1999) and M. Hoskin, *Tombs, Temples and their Orientations* (Bognor Regis: Ocarina Books, 2001).

³ For a recent critique on these themes see, for example, Fabio Silva, 'The Role and Importance of the Sky in Archaeology: An Introduction' in F. Silva and N. Campion, eds., *Skyscapes* (Oxford: Oxbow Books, 2015).

⁴ C. Tilley, *A Phenomenology of Landscape: Place, Paths and Monuments* (Oxford/Providence: Berg, 1994); M.O. Baldia, 'A Spatial Analysis of Megalithic Tombs', (Ph.D dissertation Southern Methodist University, Dallas, 1995); F. Criado-Boado and V. Villoch Vázquez, 'Monumentalizing Landscape: From Present Perceptions to the Original Meanings of Galician Megalithism (NW Iberian peninsula)', *Trabajos de Prehistoria* 55, no. 1 (1998): pp. 63–80; Q. Bourgeois, 'Monuments on the Horizon: The Formation of the Barrow Landscape through the 3rd and 2nd Millenium BC' (Leiden: Sidestone Press, 2013); J. A. Lozano, G. Ruiz-Puertas, M. Hódar-Correa, F. Pérez-Varela, A. Morgado, 'Prehistoric Engineering and Astronomy of the Great Menga Dolmen (Málaga, Spain). A Geometric and Geoarchaeological Analysis', *Journal of Archaeological Science* 41 (2014): pp. 759–71.

⁵ C.L.N. Ruggles and R.D. Martlew, 'The North Mull Project (3): Prominent Hill Summits and their Astronomical Potential', *Archaeoastronomy* 17 (JHA, xxiii, 1992): pp. S1–S13; Ruggles, *Astronomy*, pp. 112–24; J.A. Belmonte and M. Hoskin, *Reflejo del Cosmos* (Madrid: Equipo Sirius, 2002), pp. 69–72.

⁶ See F. Prendergast, 'Interpreting Megalithic Tomb Orientation and Siting within Broader Cultural Contexts', *Journal of Physics: Conference Series* 685 (2016) 012004; Gail Higginbottom and Roger Clay, 'Origins of Standing Stone Astronomy in Britain: New Quantitative Techniques for the Study of Archaeoastronomy', *Journal of Archaeological Science: Reports* 9 (2016): pp. 249–58 and references therein.

Our methodology in the last years has been to systematically analyze the visual features of megalithic mounds together with the scenery effects and features including the skyline.⁷ To do so we try to embed the possible astronomical relations within other spatial analysis including not only the orientation of the chambers but the visibility of one monument from the others and the orientation towards those defining the skyline horizon or towards prominent topographic features. This also includes the illumination effects at particular times of the year occurring both inside and outside of the chambers, perhaps indicating a moment for the dead.

Galicia houses a large number of megalithic monuments, being one of the hot spots for megalithism in the Iberian Peninsula. The most frequent megalithic monument is the dolmen or passage grave.⁸ Very similar to the Portuguese seven-stone antas, most of them are composed by a heptarthostatic chamber with a corridor that leads to the chamber. In general, a tumulus ('mamoá' in Galician) supports the megalithic structure, without covering it completely. Although weathering and erosion must have decreased the height somehow archaeologists are confident that in most investigated cases such erosion was not severe and hence the megalithic structure was visible above the mound. Therefore, although this erosion might affect the visibility of these mounds, in the cases investigated here, such factor is not crucial. Finally, the outer part of the mound display a cover of stones, usually quartz. This cover is usually more prominent next to the entrance to the corridor.

Dating of these monuments varies, although the range of dates indicates a period of use of the megalithic chambers in Galicia starting in the late fifth millennium BC until the end of the fourth millennium BC, in the regional Middle and Late Neolithic.⁹

⁷ F. Silva 'The Role ...' indicates that such term tries to comprehend the different skies 'seen' by different cultures under the same sky. However, here we do not know or we do not have direct access to the meaning of the sky for the megalithic builders. Instead by skyline we refer to the combination of landscape and sky, understanding by such the social construction behind such terms.

⁸ R. Garrido Peña, M.A. Rojo Guerra, C. Tejedor Rodríguez, I. García Martínez de Lagrán, 'Las máscaras de la muerte: ritos funerarios en el Neolítico de la Península Ibérica', in M.A. Rojo Guerra, R. Garrido Peña, I. García Martínez de Lagrán, eds., *El Neolítico en la Península Ibérica y su Contexto Europeo* (Madrid: Cátedra, 2012), pp. 143–71.

⁹ M.P. Prieto Martínez, P. Mañana Borrazás, M. Costa Casais, *et al.*, 'Galicia', in, Rojo Guerra, Garrido Peña, García Martínez de Lagrán, *El Neolítico en la Península Ibérica y su Contexto Europeo*, pp. 216–53.

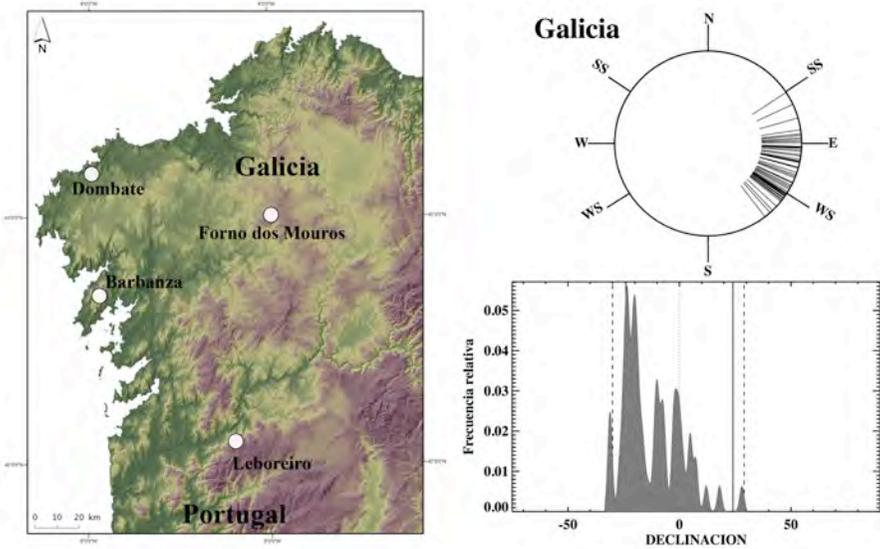


Fig. 1. Left, map with the different locations mentioned in the text. Right, orientation diagram (top) and declination histogram of the 62 megalithic chambers measured so far in Galicia. For details, see text.

Michael Hoskin and his collaborators measured the orientation of up to 32 passage graves in Galicia.¹⁰ In the recent years the members of our team have expanded such number, and we have verified and corrected a number of them, which will be published elsewhere.¹¹ Fig. 1 displays the orientation diagram and declination histogram for the 64 dolmens measured so far in Galicia.

All dolmens display orientations towards the eastern half of the horizon and, once the altitude of the horizon is considered, all measured dolmens so far are within the luni-solar limits, with several clear concentrations. We would like to highlight the most frequent towards declination -24° with a secondary maximum close to -20° and which could be connected to winter solstice sunrise, and the next two, towards -3° that we would name an equinoctial orientation and at a declination of approximately -12° . We will come back to these numbers later.

¹⁰ M. Hoskin *et al.*, ‘Studies in Iberian Arcaeoastronomy (5) Orientations of Megalithic Tombs of Northern and Western Iberia’, *Journal for the History of Astronomy*, Archaeoastronomy Supplement, 29 (1998): p. S39–S88.

¹¹ A.C. González-García, B. Vilas-Estévez, F. Criado Boado, ‘Skyscape of Galician Megalithism: The Celestial Dimensión of the Landscape’, in preparation.

Figure 1 also indicates that the probability to find an orientation near the winter solstice is six times higher than any other, indicating that such pattern is not random and therefore that intentionality is highly probable.

In the following sections we will analyze four cases, starting with singular chambers where the orientation follows the most common group of orientations for Galicia, i.e., they are oriented towards winter solstice sunrise, and where interesting illumination events occur. Then we will complement our approach by studying two necropolises to investigate if the location of the monuments within the landscape is also relevant from the point of view of archaeoastronomy.

1. Methodology

The methodology employed in the four cases is necessarily different but tries to go beyond the mere statistical treatment used until now. In all the four cases we explored how the location and orientation of chambers and mounds correlates with sunrise/sunset and conversely with moonrise/moonset. To do so we use the inspection of each site's landscape in search for the orientation of the megalithic chamber (when this was measurable) and the possible relation with other monuments (mounds) defining the local skyline. In such cases we will also measure the direction and horizon altitude of such mounds that define the skyline.

We employed two Suunto professional compass/clinometer tandems to perform these measurements. The nominal accuracy of each measurement in azimuth with this instrument is of $\frac{1}{4}^\circ$, while the accuracy in the vertical is of $\frac{1}{2}^\circ$. Azimuth readings are magnetic ones and were corrected either using triangulation of known topographic features or employing a magnetic declination model.¹² The actual errors in our measurements take into account also the variations introduced by the state of preservation, and the width of the window of visibility, when required, and the amplitude of horizon occupied by the mounds.

When curvigrams are used, we employ a Gaussian kernel for each individual measurement, with a bin-width of twice the estimated error of our measurement.¹³

¹² <http://www.ign.es/web/ign/portal/gmt-declinacion-magnetica>

¹³ For a detailed description of the procedure see, e.g., A.C. González-García, I. Sprajc, 'Astronomical Significance of Architectural Orientations in the Maya Lowlands: A Statistical Approach', *Journal of Archaeological Science: Reports* 9 (2016): pp. 191–202.

The hypothesis to test is if, apart from the orientation being possibly related with some astronomical phenomena, the location of these monuments in a particular spot in the landscape might also have something to do with how astronomical events are viewed from there.

We will finally interpret our results following the scheme proposed by Criado-Boado.¹⁴ This scheme proposes to go from a specific finding into a generalization, following several steps. Thus, the first case studied will be Dombate, arguably the best known megalithic monument in Galicia and one that has been excavated and therefore offers a wide range of possibilities to contrast our potential findings with the material culture. Dombate, especially the small chamber (see below) has offered a very early dating (c. 3900 cal BC) followed by, a few centuries later, the construction of the large monument (c. 3400 cal BC) setting the period of interest for our study in the middle Neolithic in the area in the fourth millennium BC.¹⁵ A second case studied is Forno dos Mouros, a monument similar to Dombate, where we may find a parallel to contrast our findings in a different monument more than 50 km away from the first one and where the actual landscape is possibly closer to the Neolithic one than in Dombate that has been largely altered, especially in the recent past due to its musealization. In this way, we may complement the findings in Dombate by including the relation to the environment. Finally, the Barbanza necropolis may allow us to expand to what level our finding at the micro scale of the mound could be generalized to the macro scale of the necropolis. The Leboreiro necropolis will allow us to see if any finds in Barbanza could be generalized, and how, to other necropoleis in Galicia.

2. Dombate

Dombate (Cabana de Bergantiños, A Coruña) is one of the most noteworthy Neolithic monuments in the Iberian Peninsula. Not only is it one of the most outstanding examples of Iberian passage graves but also one that illustrates the main structural, socioeconomic, territorial and symbolic dimensions of the Neolithic and Early Bronze Age megalithic phenomenon across the European Atlantic façade.¹⁶

¹⁴ F. Criado Boado *Arqueológicas: La razón Perdida* (Barcelona: Bellaterra, 2012).

¹⁵ Rojo Guerra, Garrido Peña, García Martínez de Lagrán, *El Neolítico en la Península Ibérica y su Contexto Europeo*, p. 586.

¹⁶ F. Cebrián del Moral & J. Yáñez Rodríguez, eds., *El dolmen de Dombate: arqueología, arquitectura y conservación* (A Coruña, Diputación de A Coruña: 2011).

A classical mound as those described above covers the large megalithic chamber. But the mound not only partially covered this monument but also an earlier one, making it invisible. Later research has confirmed that this phenomenon of *integration* was a quite recurrent trend of the funerary monument building tradition in this¹⁷ and in other European regions.¹⁸

All orthostats in the chamber and corridor of the passage grave are decorated with paintings – black and red linear motifs and dots over a white background – and engravings. These decorations seem to be contemporaneous with the date of construction of the monument (first half of the fourth millennium BC), as the preparation layers for the paintings and some ¹⁴C contexts suggest.¹⁹

Recent excavations have completed our vision of the monument's history and meaning. A most striking result of this recent work has been the identification of a series of idols placed in sockets especially made to locate them standing up at the entrance of the inclined passageway leading into the megalithic corridor, indicating the special nature of this area within the whole monument. A closing stone that presumably was open when needed blocked the entrance to the corridor.

Finally, we must note the identification of a series of hearths and ditches in close proximity to the monument.²⁰ While *ditch 2* and *ditch 3* might be contemporary to the Neolithic occupations of Dombate, *ditch 1* (ca. 1 km of estimated perimeter) seems to be later in date. The north-eastern limit of this ditch is located just 4 m south to the monument, and probably delimits a Bronze Age settlement area.

¹⁷ Patricia Mañana-Borrazás, 'Túmulo 5 de Forno dos Mouros (Ortigueira, A Coruña). Primeiros resultados', *Cuadernos de Estudios Gallegos* 52, no. 118 (2005): pp. 39–79.

¹⁸ R. Bradley, R. Williams, and H. Williams, eds., *The Past in the Past: The Reuse of Ancient Monuments*, special issue of *World Archaeology* 30, no. 1 (1998).

¹⁹ F. Carrera Ramírez, 'El arte prehistórico y su conservación. Pinturas y grabados en Dombate', in Cebrián del Moral and Yáñez Rodríguez, *El dolmen de Dombate*, pp. 229–66.

²⁰ M. Lestón Gómez, 'Las excavaciones arqueológicas' in Cebrián del Moral and Yáñez Rodríguez, *El dolmen de Dombate*, pp. 139–266.



Fig. 2. The dolmen of Dombate. Top: notice the prominence of the stone crust next to the entrance, the anthropomorphic idols next to this area and the closing stone of the corridor. Bottom, reproduction of the illumination event on Winter Solstice sunrise as simulated with a 3D model of Dombate and the Stellarium software. Note that the illuminated part never reaches further up than the red and white paintings.

Dombate presents an orientation of 126° and a horizon altitude of $2\frac{1}{2}^\circ$ that translates into a declination of -23.8° , compatible with the measurements given by Hoskin.²¹ Thus Dombate is oriented towards winter solstice sunrise at the time of construction. The result of this orientation is that the inner parts of the chamber are only lit by direct sunlight during the few days the sun rises close to its winter solstice position.

Given the orientation, the width of the entrance allows the direct illumination of the backstone and its paintings for only a small number of days around WS (Fig. 2). This effect is now precluded by the position of the closing stone at the entrance of the corridor. To verify the effect we built a 3D model of the megalith and uploaded it to the Stellarium planetarium software. A reconstruction of the effect is given in Fig. 2. It is interesting to note that, given the shape and structure of the corridor, the illuminated part never reaches beyond the painted red geometrical pattern

²¹ Hoskin, ‘Tombs’, p. 235.

of the back stone. After a first flash of light projecting from the entrance frame onto the red and white paintings, the trapezoidal frame shifts downwards to the right of the stone as the sun gains altitude above the horizon, following which the backstone returns to shadows after a while.



Fig. 3. Illumination of the Forno dos Mouros dolmen at the winter solstice sunrise. Note the projection of the shadow on the large boulder (Pena Moura) right behind the megalith.

3. Forno dos Mouros

A similar phenomenon can be observed at Forno dos Mouros (Toques, A Coruña). This site is located at 713 metres above sea level in the northern area of the Bocelo mountain range, at a small plateau next to the Pena Moura hill. Located next to a traditional route (part of the ancient Road to Santiago) it has a wide visibility with the distant horizon towards S and SE. Forno is part of a small necropolis of another four tumuli and a number of rocky outcrops, where the one known as Pena Moura is quite prominent and is located a mere 50 m behind Forno.

The chamber is of a very similar type, but slightly smaller in size, than that of Dombate. It is again located inside a tumulus that has been recently excavated and restored.²² The mound, with 20 m of diameter and 1.75 m of

²² Roberto Aboal and Yolanda Porto, eds., *Intervencións de conservación e*

height, although a bit eroded, mainly by the formation of the traditional route to its north side, would not have been significantly much larger than it is today. The chamber again houses a profuse decorative program with paintings in zigzag in red, white and black.

On winter solstice sunrise 2015 we went to Forno to witness the sunrise together with a Spanish national TV team. To our amazement we could verify the impressive light and shadow effects inside the chamber, although in this case the restoration works covered the chamber paintings with soil, and we were not able to verify if a Dombate-like effect happened with respect to the paintings. In this case, we witnessed a different effect: the projection of the shadow of the mound and especially the chamber over the large boulder of Pena Moura (see Fig. 3). It must be stressed that this short period of time around the solstice is the only time of the year when the megalith will overshadow this boulder. Pena Moura is a massive granite (ortogneis) formation of nearly five meters high and as much in diameter, weighing nearly 180 tons, so it seems highly probable that it was there when the monument was built although no archaeological or geological study has yet investigated this question.

4. Barbanza

The Barbanza peninsula is located at the Atlantic coast between two of the 'Rías', the sea arms that enter land following the river valleys and forming a characteristic part of the Galician seascape. An abrupt mountain range also named Barbanza crosses the peninsula. The sierra, with a highest altitude of 680 metres above sea level, has a flat plateau near the top at around 550 metres above sea level of nearly 5 km² with a characteristic vegetation, quite similar to that present 5000 years ago when the inhabitants of the peninsula built in this area over 30 mounds.²³

Based on the typology of the mounds, it has been argued that there were two moments of construction within the necropolis and it has been proposed that they were deliberately positioned in order to indicate the best route to cross the sierra.²⁴ Finally, it should be noted that the location of the

recuperación no xacemento de Forno dos Mouros (Toques, A Coruña) (Santiago: CSIC, 2012).

²³ For a recent review of the ideas sketched here see F. Criado-Boado, P. Mañana-Borrazás, C. Gianotti, 'A paisaxe monumental (4500–2500 a. C.)', in F. Criado Boado, C. Parceros Oubiña, C. Otero Vilariño, E. Cabrejas, eds., *Atlas Arqueolóxico da Paisaxe Galega* (Vigo: Xerais, 2016), pp. 99–144.

²⁴ F. Criado-Boado and V. Villoch-Vázquez, 'La Monumentalización del Paisaje: Percepción y Sentido Original en el megalitismo de la Sierra de Barbanza

mounds is such that the horizon is closer and higher towards West and North while it is lower and far towards East and South.²⁵

It is interesting to note that all the chambers that could be measured within the sierra are of the winter solstice sunrise type.²⁶ It is also noteworthy that a variable number of mamoas is always visible when one is located next to one of them, with only a few actually defining the skyline.

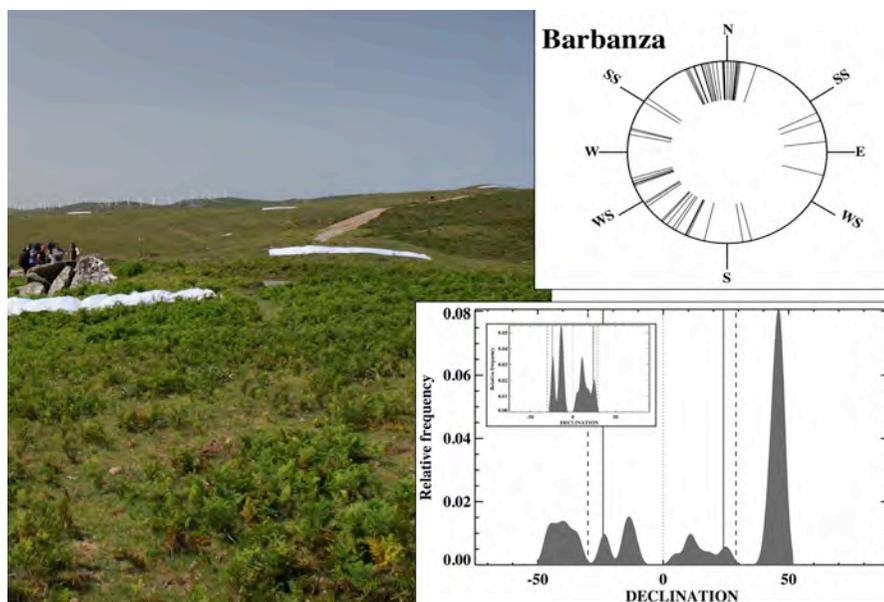


Fig. 4. Left, section of the Barbanza plateau with a number of mounds highlighted with white lines. Note the presence of one mound that defines the skyline as seen from this location. Right, orientation diagram and histogram of the prominent tumuli in Barbanza. For details, see text.

Thus, we visited all mamoas in the Sierra and inspected the visibility to all the rest, measuring the orientation towards those defining the skyline, as

(Galicia)', *Trabajos de Prehistoria* 55, no. 1 (1998): pp. 63–80; It is interesting that at the level of the whole peninsula the mounds and chambers are located in close relationship with the easiest routes to cross the peninsula, Marcos Llobera, 'Working the Digital: Some Thoughts from Landscape Archaeology', in R. Chapman and A. Wylie, eds., *Material Evidence: Learning from Archaeological Practice* (London: Routledge, 2015), pp. 173–88.

²⁵ Criado-Boado and Villoch-Vázquez, 'La Monumentalización del Paisaje'.

²⁶ González-García, Vilas Estévez, Criado Boado, in preparation.

explained above. To perform such measurements we located ourselves both at the top, bottom and sides of each mound. The readings vary, especially for those cases when the distance to the skyline mound is short, and then the error considered is accordingly larger. We have estimated a conservative error of 1.5° in azimuth. We do not give here a full account of the data, since it is described elsewhere,²⁷ but the main results are indicated in Figure 4.

We can see that most of the orientations indicate an area towards north, probably following the orientation of the sierra. However, a number of mounds, especially those located at junctions between different paths are located such that on the western part they define relevant astronomical positions, in particular close to declination -24° , winter solstice sunset, and at declination -12° , the same astronomical phenomena we had associated with the orientation of the chambers but now towards the setting part of the horizon.

5. Leboreiro

We wanted to see if the findings that emerged at Barbanza applied elsewhere in Galicia, so we began a similar research project at the Leboreiro necropolis. Leboreiro is located at an altitude of nearly 1200 metres above sea level and at the frontier between Spain and Portugal houses well over a hundred mounds in less than 20 km^2 being one of the densest concentrations of mounds in Iberia.

Given the sheer proportions, the strategy here has been different to that followed in Barbanza so far: instead of assessing the intervisibility between each mound we selected the most prominent, the mound called Mota Grande, and we checked whether it was intervisible with other monuments in the area. We checked for intervisibility by using LIDAR data with a density of 0.5 points/m and an altimetric precision of 20 cm. These data are freely available from the Spanish National Geographic Institute.²⁸ We used GIS software to work these data, namely QGIS.²⁹ Finally we verified that map work with a subsequent field survey.

Mota Grande is intervisible with 42 out of the 120 mounds identified within its vicinity. Thirty-eight of those monuments have Mota Grande on their skyline. This is a full 90% of the smaller intervisible sample. We again measured the orientation and altitude of the horizon of Mota Grande

²⁷ González-García, Vilas Estévez, Criado Boado, in preparation.

²⁸ <http://pnoa.ign.es/>

²⁹ <http://www.qgis.org/>

as seen from each of those thirty-eight mounds. The orientation is in most cases towards the western part of the horizon (Fig. 5).

It should be noted that in most cases, the monuments surrounding Mota Grande appear to use it as a horizon feature in order to align to either summer solstice sunset (or the major northern lunistice) or a setting at a declination between 10° to 12° . In other words, it is almost a mirror image of the most frequent orientations for the chambers in Galicia.

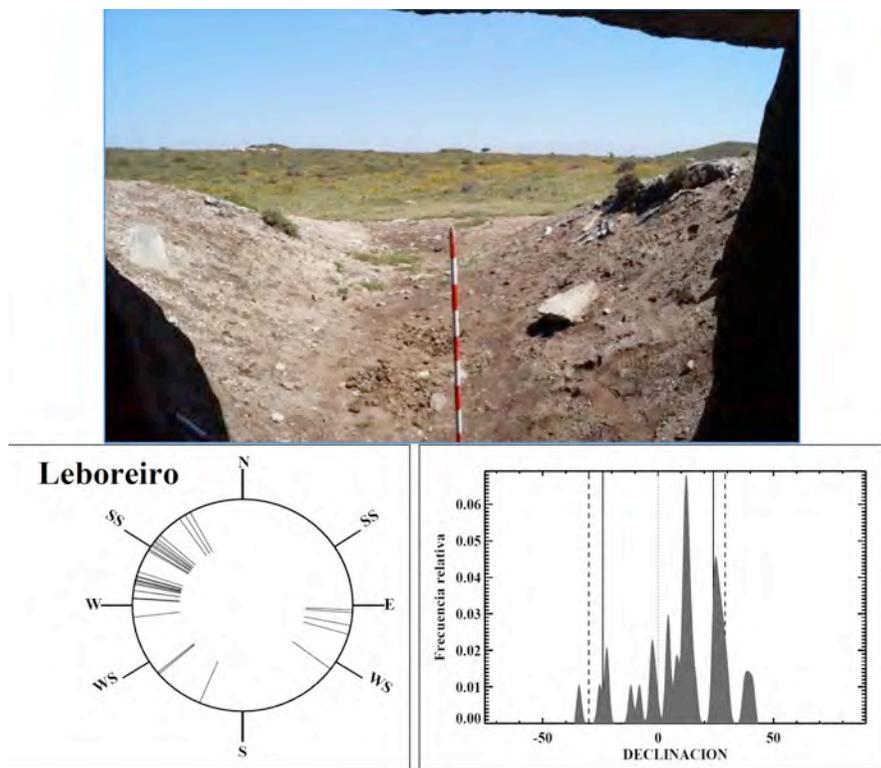


Fig. 5. Top, at the Leboreiro necropolis we measured the orientations towards the Mota Grande mound, when this is defining the skyline. Bottom, orientation diagram and declination histogram. For details, see text.

5. Discussion

The four cases described above present different ways on how the sky might have been incorporated in the building of the megalithic chambers and mounds apart from just their orientation. These include the use of light and shadow effects inside and outside the chambers and how the rise

and/or set of heavenly bodies might be seen with respect to other contemporary monuments in the vicinity.

In the cases of Dombate and Forno, it is clear that, if the orientations were connected to winter solstice sunrise, the inner parts of the chamber would be illuminated at that time of the year. It is difficult to know if the construction of the monuments with such orientation was meant to house such illumination events, as it seems clear in other cases within megalithic chambers.³⁰ However, we argue that the location of paintings and engravings is such that the light and shadow event seems part of the decorative program.

Further, previously existing features of the local landscape are integrated either by incorporating previous mounds within new ones or by including physiographic features such as prominent rocks where shafts of light or shadow might highlight the importance of the moment, in this case winter solstice. Furthermore, such integration of previous elements is done at the level of the whole necropolis as it is indicated by the results in Barbanza and Leboeiro. Whether this indicates that a new monument is located taking into account where the previous ones were or if larger schemes are at play is out of the scope of the present paper.

We do not pretend that the astronomical events are the only factor explaining the location of mounds within the necropolis. Mounds are located such that they follow the easiest route to cross the peninsula,³¹ and the horizons seen from them put at the large (macro) level something observed at smaller (micro) stages.

Their location along this route has an effect on the horizons one may find at the site of the mounds.³² There are clear differences between the horizons towards the east and south, open and distant, in contrast to those towards thenorth and west (that are closer and restricted). This dichotomy in spatial relation is also observed at the size of the mound, where the area close to the entrance is more elaborated, including a higher prominence of the stone cover and the placement of anthropomorphic idols next to the corridor entrance in Dombate. It is also observed within the megalithic

³⁰ R. Bradley, 'Darkness and Light in the Design of Megalithic Tombs', *Oxford Journal of Archaeology* 8, no. 3 (1989): pp. 251–59; D. Trevarthen, 'Illuminating the Monuments: Observation and Speculation on the Structure and Function of the Cairns at Balnuaran of Clava', *Cambridge Archaeological Journal* 10, no. 2 (2000): pp. 295–315.

³¹ Llobera 'Working the Digital'.

³² Criado-Boado and Villoch-Vázquez, 'La Monumentalización del Paisaje'.

structure itself, where there are differences in the location of the orthostats and the quality of them.³³

All these points seem to indicate a particular way to integrate the megalithic monuments within the landscape. Finally, when the orientations are considered and a connection with risings and settings of celestial bodies is done, they may also indicate a temporal fingerprint, a moment of importance for the megalith builders and users.

The importance of winter solstice in the region is indicated by the prominence of these orientations of the chambers and the directions indicated by the alignments. However, other concentrations appear towards equinox, taken in a broad sense,³⁴ as well as that elusive -12° of declination.

Concerning winter solstice, it is interesting to point that the orientation of the funerary monuments facing sunrise at the shortest days of the year is clearly an evocative image possibly symbolising rebirth in an area devoted to the dead. It is even more suggestive if we consider that possibly the chambers could have been open at those moments to perform whatever rituals and then the illumination of the inner parts of the chamber and the paintings could highlight that moment, as a time devoted to the dead or the ancestors.³⁵ The projection of shadows towards large boulders would also have highlighted such moments.

In this sense, this could be linked with the division of space at the macroscopic scale, where the illumination of boulders or the mound-to-mound alignments with astronomical events may occur, connecting it with

³³ F. Criado-Boado, 'El espacio en el Túmulo', in *La Arqueología en la gasificación de Galicia 3: Excavación del Túmulo nº 3 del Alto de San Cosme*, C. Parcero Oubiña, ed., *Trabajos en Arqueología del Paisaje* 5 (1997): pp. 17–19; F. Criado-Boado, C. Gianotti García, P. Mañana-Borrazás, 'Before the Barrows: Forms of Monumentality and Forms of Complexity in Iberia and Uruguay', in L. Smejda, ed., *Archaeology of Burial Mounds* (Plzen: University of West Bohemia, 2006). Something similar has recently been proposed for the Dolmen of Menga: Lozano *et al.*, 'Prehistoric Engineering and Astronomy of the Great Menga Dolmen (Málaga, Spain)', see note 4.

³⁴ C.L.N. Ruggles, 'Whose Equinox?', *Journal for the History of Astronomy, Archaeoastronomy Supplement* 28 (1997): pp. 45–50.

³⁵ L. Goodison, 'From Tholos Tomb to Throne Room: Perceptions of the Sun in Minoan Ritual', in R. Laffineur and R. Högg, eds., *POTNIA. Deities and Religion in the Aegean Bronze Age. The 8th international Aegean Conference* (Austin: University of Texas at Austin, 2001), pp. 77–88; Bradley, 'Darkness and Light in the Design of Megalithic Tombs'.

the meso and microscopic scale, where the orientation of the chambers and illumination inside the chambers happen.

In Dombate, but also at the Barbanza necropolis,³⁶ the areas connected with settlements are located towards the southeast of the monument. This sector of the landscape linked with the living is also connected with the distant and lower horizons, so the area connected with the sunrise, in particular winter solstice sunrise is the area connected with the living, while the opposite direction, would be connected with restricted horizons, the wild part of the landscape, sunset and, by opposition, with the dead.

In this sense, the projection of light inside Forno dos Mouros at winter solstice could be an evocative image of light entering the area of the dead within the chamber, perhaps bringing life to it or, alternatively entering the realm of the dead. But at the same time the projection of shadows towards the rock of Pena Moura could reinforce such image by projecting darkness into the wild uncultivated part of the landscape.

Although the location of mounds within the landscape, both in Barbanza and in Leboreiro, seems similar, the situation in both cases is not exactly the same. Clearly their locations must comply with the local topography but the spatial concepts and alignments in both cases are not identical. While in both cases there seems to be a preference to locate prominent mounds towards the west and in connection with astronomical referents, the details are different between the two locations. In Barbanza it seems that the setting positions correspond to the same objects seen rising in connection with the orientation of the chambers. However, in Leboreiro, Mota Grande could be indicating either summer solstice sunset or conversely the setting of the winter solstice full moon (if we consider this season as more relevant than others).

At this moment, it could be of interest a discussion on the secondary concentration towards -12° in the orientation of chambers and c. 12° in the alignment towards Mota Grande.

Until recent times the villages next to Leboreiro housed one of the later examples of seasonal house movement in the Iberian Peninsula.³⁷ At a time near mid-spring (i.e. end of April beginning of May) the peoples of the local parishes moved their houses towards the upper areas of the Sierra together with their flocks in order to secure the pastures for them in the heat of summer. The concentrations around -12° could have been

³⁶ Criado Boado *et al.*, 'A paisaxe...', p. 125.

³⁷ Orlando Ribeiro, 'Brandas e Inverneiras em Castro Laboreiro', *Revista da Faculdade de Letras* 6 (1939): pp. 297–302.

connected with sunrise around mid February or the end of October, while those towards 12° could be connected with sunset by the end of April and mid August. In this sense it is again of note that a double alignment could be happening in this last area, where one could be witnessing the full moon rise and sunset on the same spot and moment.

Here, at 1200 meters of altitude it would be difficult to imagine a relevant ritual at the harsh conditions of winter and the dates around the end of April and mid August should be preferred. It is clear that the situation has changed a lot in 6000 years, but this gives us a hint that possibly such orientations and alignments could be connected with the economy, social time and rituals of the ancient inhabitants of each area.

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