

ASTRONOMICAL ORIENTATIONS OF NEOLITHIC TOMBS IN MONTE REVINCU

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Summary

This paper presents a study performed in the framework of an interdisciplinary project developed at the University of Corsica involving information technology researchers, anthropologists and people from the field of astronomy. In the first steps of the work which has to be done we have studied the link between megaliths and astronomy. In order to study the links between oral culture, megaliths and astronomy, we integrate modern information technology like GIS, database, GPS surveying, 3D mapping, statistical components and archeoastronomy field survey. The paper is organized as follows : after a summary of a legend from the north Corsica oral culture, we describe the megaliths involved in the legend ; in a following part of the paper we present the orientations of the different surveyed structures. The fourth part deals with the astronomical analysis of the different sites of the legend. Finally the last part deals with the perspectives and draws some conclusions.

1. Introduction.

This paper presents how legends, megaliths and astronomy [6] are linked in the Nebbiu Region in the north part of Corsica. From an oral story from north Corsica we first describe the megaliths involve in this story before presenting how the orientations of the megaliths seems to have astronomical reasons.

The megalithic culture of Corsica [1,2, 8,9,10,11,14,15] flourished in the first half of the fourth millennium B.C. As regards burials, there seem in early neolithic times to have different customs in the different regions of Corsica : Nebbiu, Alta Rocca, Purti Vecchju, Aiacciu, Sartè, Taravu.

In this paper we are interested in the megaliths of the Nebbiu Region [12,13,9] and specially those linked with the legend of the Lurcu situated around the Monte Revincu. One of our task here is to report the orientations that the builders selected for the megaliths which can be found near the Monte Revincu.

We desire : (i) to show that the orientations of these megalithic sepulchres are highly non-random, so that the range of orientations for each group of monuments represents a burial custom characteristic of the culture that built these particular monuments ; (ii) to show that we have to consider possible astronomical motives.

Although we are dealing with only less than 10 monuments, it is most unlikely that their orientations would be so similar purely by chance, and the signature in azimuth must result from some intention on the part of the builders.

The rest of the paper is organize as follows. In section 2 we briefly present the oral story issued from the Corsican culture : the legend of the Giant, u Lurcu. Section 3 describe the megaliths which are involved in the previous legend. In section 4 we present some aspects of methodology concerning megaliths orientations measurements. This section is also dedicated to the presentation and the analysis of the orientation measurements performed on the megaliths of the legend. Conclusion and perspectives are drawn in the last section.

2. The legend : a fola di u Lurcu

This legend is belonging to the North Corsica oral culture. It is a legend from the Nebbiu country and involves people from Santu Petru di Tenda village. The place of the legend is around a set of megaliths, which can be found near the Monte Revincu hill. The story as told by the people from Santu Petru di Tenda is described below. Near the place named Casta was living the Lurcu, a sheppard, giant, cyclop, with long hairs. He was living there alone with his mother. We have pointed out on figure 1 the places where they were living as it is said in the legend coming from centuries and centuries by oral transmission.

This giant was living in a house called a Casa di u Lurcu. It is a dolmen whose picture is given in Figure 1. Another dolmen where was living his mother according to the legend can be found 500m around the previous one. Figure 1 gives also a picture of this smaller one dolmen. The two dolmens are separated by a plateau named "Cima di Suarella" where a set of megaliths rectangular or circular structures can be found. In Figure 2 we present the northwest view from the plateau looking in direction of the Casa di u Lurcu. On the back of the picture one can see a sacred mountain called Monte Ghjenuva.

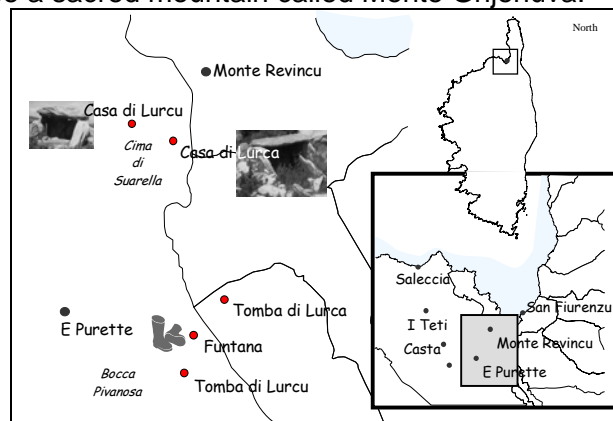


Figure 1 : the places of the legend

The giant was very clever. It is said that he knew everything that could be learned at the time. Furthermore he was very powerful so that the people from Santu Petru di Tenda village living near the place called Casta decided to kill him. But he was difficult to catch so that they had to draw the giant into a trap.

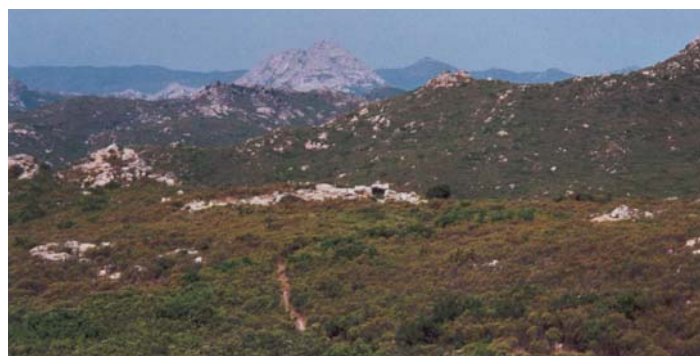


Figure 2 : northwest view from "Cima di Suarella"

There is a place near Bocca Pivanosa where the Lurcu was used to come to drink the water of a spring. At night they put a pair of shoes full of pitch in order to capture him. The next morning the Lurcu came to drink and tried the shoes. The people from the village took him easily because of the shoes he was not able to run away. They were going to kill him near the place where there was the water, when the Lurcu told them a secret in order not to be killed: how to do a special cheese (called Brocciu) with sheep milk. After telling them this secret, he was going to tell another secret: what to do with the rest of the milk when the Brocciu has been done. But the mother from the plateau shouted in Corsican language: “Ùn palisà, chì tantu s'è mortu” that means “Don't tell them anything because in any case they are going to kill you”. They killed both the Lurcu and his mother. They buried the Lurcu near Bocca Pivanosa and the mother near Bocca Murellu. In both places one can find two early non-dolmenic tombs.

As you read above this legend coming through ages by oral transmission is closely linked with the megaliths. In the next section we describe the megaliths of the legend around Monte Revincu.

3. The Megaliths around Monte Revincu

Different investigators of Corsican prehistory classify megalithic monuments according to datation, shape and functions [12,13,9] :

We give in figure 3 the positions of the two dolmens of the Monte revincu area and the two non dolmenic tombs (also called cists) associated with these dolmens. We pointed out the two dolmens of the legend (called Lurcu dolmen and Orca dolmen) and a third one on the top of Monte Revincu not involved in the legend (called Monte Revincu dolmen). We have also indicated in the figure the non-dolmenic tomb on Bocca Pivanosa and the one which has been destroyed named Tomba di Lurca.. We have also to mention two non-dolmenic tombs near the Capu Castincu area western than the Monte Revincu one's which will be measured and analysed in some future work.

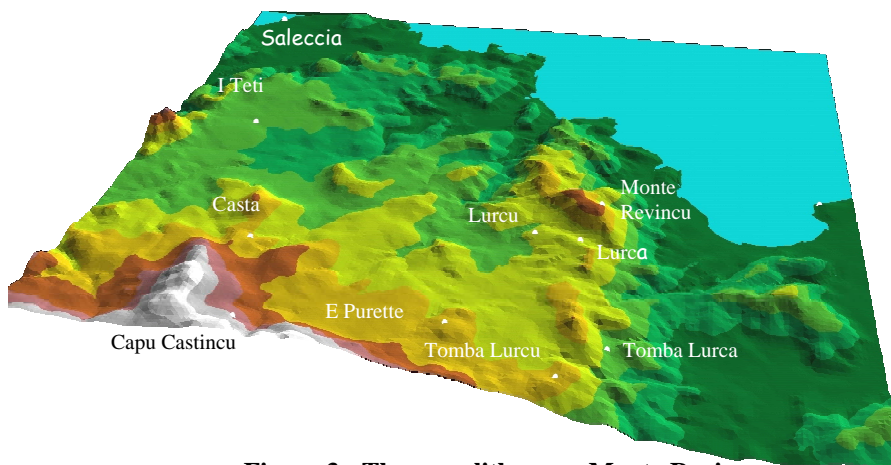


Figure 3 : The megaliths near Monte Revincu

The first writing about these megaliths can be found in [15]. Since 1995 the excavations are due to F. Leandri [12,13]. The following dating has been given by F. Leandri :

- Dolmens Lurcu and Orca, by 3000 BC
- Tombs near Lurcu Dolmen and orca dolmen , 4327-4044 BC
- Tomb on Bocca Pivanosa , 4094-3823 BC

The pictures of the two main dolmens of the legend are given in figure 4 : (a) Lurcu dolmen and (b) orca dolmen.



(a) Lurcu dolmen



(b) Orca dolmen

Figure 4 : dolmens involved in the legend

4. Orientations of the megaliths

In this section we present the orientations of the megaliths involved in the legend presented in section 2 and detailed in section 3. We first give in sub-section 4.1 some aspects of methodology about measuring orientation and astronomical concepts.

In sub-section 4.2 the results of the measurements are given while the analysis of the collected orientations are detailed in sub-section 4.3

4.1. Some aspects of methodology

Our task in this paper is to report the orientations that the builders selected for the megaliths of Monte Revincu. We define these orientations to be the azimuths of the principal axis of the rectangular chamber of the measured tombs, in the direction from the closed end to the entrance.

These directions (azimuths) were measured in June 2004 with compasses whose errors had already been established. In the case of dolmens there is no doubt that the relevant direction is from the interior towards the entrance [3]. However we have to precise our choice about the cists because the decision about which of the two directions of the principal axis of the cist becomes important. In the course of our fieldwork we also measured a number of additional non-dolmenic early tombs and the relevant data are also listed in sub-section 4.2. In this case we choose the direction which seems to be the most obvious for us.

If and this is no more than a possibility the intention of the builders was astronomical and the megalithic sepulchres were constructed to face the setting or rising points of celestial objects, then angular altitude of the skyline must of course be taken into account when we calculate the declinations corresponding to these azimuths. The angular altitude has been measured with a hand-held clinometer.

A third datum is needed for an astronomical interpretation : the latitude of the studied site. The use of a GPS is very useful for obtaining this last datum.

Given azimuth, angular altitude of the skyline, and latitude, the corresponding astronomical declination is easily found from a simple trigonometrical formula. In our case we used a computer program developed by C. Ruggles at the University of Leicester, England and which can be obtained using the web [17].

Our measurements of the dolmens and early non-dolmenic tombs (azimuth, angular altitude, latitude and corresponding declination) are set out in the next sub-section.

4.2. Orientations of the dolmens involved in the legend.

In our fieldwork we came across the measurements of the three dolmens and four early non-dolmenic tombs (cists) listed in section 3.. Their orientations are listed in Table 1 and Table 2. We have to point out that the dolmens 'Casa di u Lurcu' (Lurcu dolmen) 'Casa di l'Orca' (Orca dolmen) and involved two orientations because it has a clear defined entrance but also a clear defined passage with a different orientation.

Table 1 : Orientations of dolmens in Nebbiu zone

Az. °	Alt. °	Lat. °	Dec. °	Tomb
128	2	42.6	-25 1/2	Dolmen Monte Revincu
110	4	42.6	-12	Casa di u Lurcu – entrance (Lurcu dolmen)
130	4	42.6	-25 1/2	Casa di u Lurcu - passage
75	21/2	42.6	12 1/2	Casa di l'Orca entrance (Orca dolmen)
60	6°	42.6	25 ½	Casa di L'Orca- Passage

Table 2 : Orientation of early non-dolmenic tombs

Az. °	Alt. °	Lat. °	Dec. °	Tomb
87	3	42.6	5	Cist near u Lurcu
95	4	42.6	-1	Cist near l'Orca – Tozzola 1
108	4	42.6	-10 1/2	Cist near l'Orca – Tozzola 2
68	2	42.6	17	Tomba di u Lurcu – Pivanosa

Once the data have been collected, the first question we have to answer is whether the previous collected orientations fall within a range. After this first analysis we have consider whether or not the motivation originated in the sky or whether it was terrestrial or even meteorological.

4.3. Orientations Analysis

In this sub-section we detail that although we are dealing only with 7 monuments and nine orientations, it is most unlikely that their orientations would be so similar purely by chance, and the signature in azimuth must result from some astronomical intention on the part of the builders.

From the two tables we can see that the azimuth are highly non random (from 60° to 130°) measures about 1/6th of a circle (see figure 5). Such a concentration of axes cannot have come about by chance.

Furthermore the declination of the tables 1 and 2 show that all the nine orientations are in the correct range to face the rising sun or moon. The declinations are showed in figure 6 through an histogram pointed out clearly that all the declinations correspond to the rising of the sun or the moon.

We point out in this article that the orientations of the great majority of these dolmens confirm the conclusions already described by Michael Hoskin [4,5] and concerning the south Corsican dolmens. The orientation customs observed by builders of communal tombs in Corsica have been presented in detail in [3].

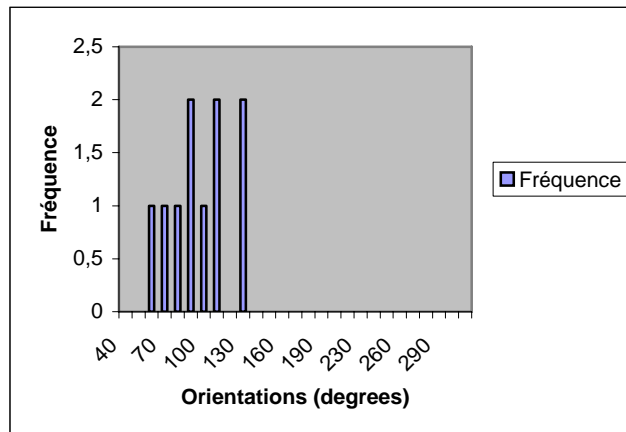


Figure 5 : Histogram of the orientations of tombs in Nebbiu Area

Eight dolmens of southern Corsica have been measured by Michael Hoskin [3,4,5]. He showed that these dolmens faced easterly or southerly except one facing west. Furthermore he gave the following classification when dealing with astronomical orientations of funerary tombs in the Mediterranean basin :

- SR (sun rising) :characterization of tombs having orientations within the range 60-130° or thereabouts.
- SR/SC (sun rising/ climbing) :characterization of tombs having a wider range , from 60° to due south or thereabouts,
- SS (sun setting) : characterization of tmbs facing the western half of the horizon within a range 240°-300°,
- SD/SS (sun descending-setting) : characterization of tombs having a wider range from due south to 300°.

The seven megalithic sepulchres of the Nebbiu region we investigated face roughly between north east and south east ; more exactly between azimuth 60° and 130° (see figure 5).

We already point out that the builders seems to orient these monuments for reasons of astronomy.

Furthermore we can deduce from figure 6 that all the tombs are SR according to Michael Hoskin classification.

We can also pointed out that the Lurcu dolmen is faced the rising sun around midwinter sunrise while the orca dolmen is facing the rising of the sun around the midsummer sunrise.

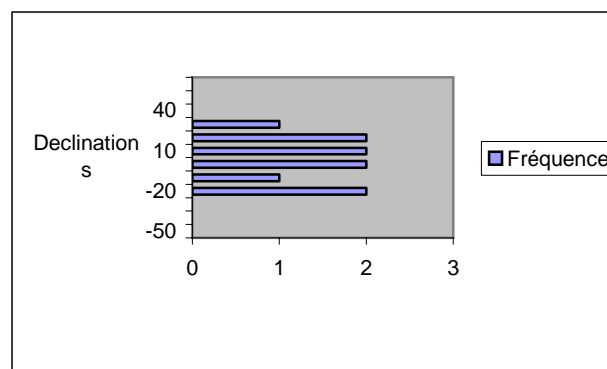


Figure 6 : Histogram of declination of tombs in Monte Revincu

Conclusions

We have presented in this paper how a legend of the Corsican oral culture is linked with Neolithic sites. Furthermore we have pointed out how these funerary sites have orientations which are in accordance with the orientations of most of the tombs in Mediterranean area [3]. Our current and future work concerns the following points :

- Development of a software based on a GIS (Geographic Information System) and dedicated to Archeoastronomy research. This software is based on original concepts of abstraction hierarchy developed at the university of Corsica and astronomy and geometry features which has to be added in the GIS [7].
- Measurement of the orientations of the Corsican dolmens : 8 dolmens have been already measured by Prof. M. Hoskin and the results of these measurements can be found in [3,4,5]. Furthermore 13 other dolmens have been measured since june 2004 by the authors. We plan to measure before the end of the first semester 2005 another set of twenty dolmens.
- Analysis of the previously measured orientations according to Mediterranean orientations [3,18] : after the survey of about thirty dolmens in Corsica we will try to compare the Corsican dolmen orientations with those in the Mediterranean area : south France, Sardegna, Menora and Majorca and south Iberia. Furthermore a comparison with dolmens in the north of Europe [16] is also envisioned.
- Other kinds of orientation measurement concerning coffers, menhirs alignment and Megalithic fortification in Corsica : three kinds of different fieldwork are also planned for 2005 ; the authors will work in measuring a complete set of coffers in Corsica like the one you can see on figure 7 which belongs to a circular structure of Monte Revincu which seems to correspond to a Neolithic tomb.



Figure 7 : Measurement of azimuth and angular altitude on Cima suarella

- Collaboration with University of Cambridge and University of Leicester on a comparison between orientations of Corsican dolmens and dolmens in Brittany, Minorca and Sardinia will be undertaken through a common fieldwork involving one week in each region in spring 2005.
- Collaboration with the DRAC of Corsica (Monte Revincu excavation by F. Leandri) : (i) Participation to the Summer 2005 Exposition in St Florent about Monte Revincu site organized by F. Leandri ; (ii) Definition of a common interdisciplinary project

around Nebbiu Megaliths involving archaeology, Anthropology, GIS, 3D modelling representation, astronomy, Geology) Furthermore we are performing a set of cross-analysis in order to study the links between the megaliths structures of the plateau, the megaliths evidence that archeologists found on the top of Monte Ghjenuva (see figure 2) , the menhirs of Mamucci and the legends around the two dolmens. We give figures 7 an example of a structure which can be found on the plateau. Figure 8 points out a rectangular structure which seems to be an habitation and found on Cima Suarella.



Figure 8 : Megalithic structure on Cima Suarella, Monte Revincu

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