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Combining photogrammetry and photographic enhancement techniques for the recording of megalithic art in north-west Iberia[☆]



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ABSTRACT

Photogrammetry is an indirect technique that allows one to obtain different recording products – orthophotographs, planimetries, 3D models, etc. – that are essential for the study of prehistoric rock art. We believe nonetheless that there is no single technique capable of effectively registering an entire rock art site, so it is highly recommended to use a combination of several systems – that is to say, the development of a specific recording methodology – in order to obtain a documentation which is as thorough as possible. In this regard, different possibilities of combination of photogrammetry with other photographic techniques have been analysed, with the aim of obtaining an accurate recording of the art and its support, seeking also to incorporate into this recording other essential data for the study of its state of preservation.

The use of photogrammetric techniques will be described, along with the tests carried out with photographic techniques such as polarised light photography or those that register images at both ends of the visible spectrum, both in the ultraviolet (UV) and in the infrared region (IR). These techniques enable the revelation of invisible details to clarify issues concerning technology and to explore scarcely noticeable forms of alteration. In some cases, these experiences have been complemented by the use of laser scanning in order to compare the effectiveness of both techniques.

With all the experience acquired, it is possible to propose a rather precise recording methodology that requires no specialised technical training and no complex equipment.

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1. Introduction

We are sure that any person who dares to read this article is more than aware of the complexity involved in trying to record a place where rock art is present, regardless of its characteristics. In trying to do so, we have all experienced the obstacles imposed by the task of recording items in a delicate state of preservation, on geometrically complex surfaces, with limited visibility and other problems that affect our work to a greater or lesser degree.

Megalithic art does not escape from those conditions. What is more, we dare suggest that its recording needs to be done under particularly complex conditions. Nonetheless, some clarification should be given to such an exaggerated statement. The prehistoric art that is contained in megalithic structures (Fig. 1) can be expressed with the aid of various technologies (Carrera, 2011). This is often achieved by using carving techniques (Fig. 2) which do not usually involve great difficulty. Another different technique is the one we have named “simple painting”, carried out by the

direct application of paint on the supporting stone, generally using white, black or red colours (Fig. 3). However, in North-West Iberia we often find a third technique that we have named “complex painting”: in order to reduce the irregularities of the stone's surface (caused by the grainy texture of the rocks employed: granite and similar), a layer of plaster created from whitish clay (generally rich in kaolin) was applied. Once hardened, this plaster became the surface to which paint (usually red and black) was applied (Fig. 4).

Finally, we should consider one more characteristic: the superimposition of creation stages, often found in other rock art sets too. These techniques are usually applied to the same surface one on top of the other, thus demanding identification and accurate separation from those researchers who intend to record the surface.

Our experience in recording megalithic art reaffirms all we have said: it can be very complicated to distinguish all the layers of the plaster, since its colours and textures often remind us of stone. Moreover, the frequent existence of several paint layers (with different plasters) makes it necessary to perform an accurate recording in order to distinguish each layer from the other, a task that, even *in situ*, can only be carried out with the aid of a

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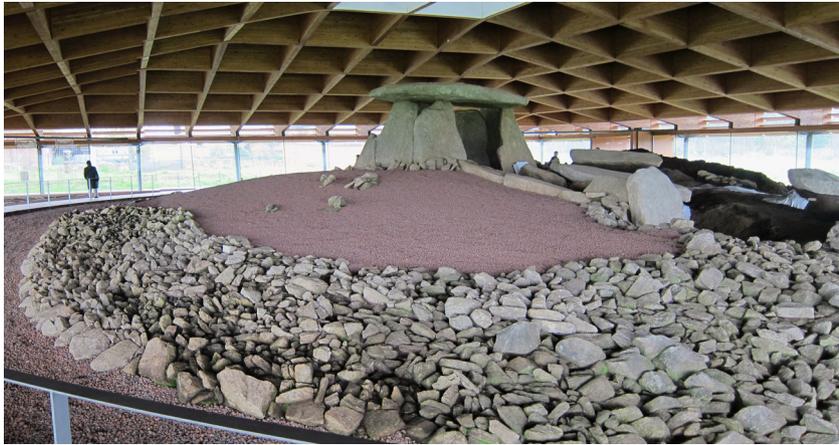


Fig. 1. Dolmen of Dombate (cabana, a coruña, Spain) in its current state.



Fig. 2. Petroglyph on one of the orthostats in dolmen of Dombate.



Fig. 4. Complex painting (Forno dos Mouros, Toques, A Coruña).



Fig. 3. Simple painting (Anta de Antelas, Oliveira, Portugal).



Fig. 5. Complex painting at the monument of Coto dos Mouros (Rodeiro, Pontevedra, Spain). Two layers of white plaster, as well as both red and black paint, can be appreciated. Paint is strongly detached and covered by compact soil.

magnifying glass (Fig. 5). Similarities in the colour palette (white, red and black) are an added difficulty, since these colours are used in all of the artistic techniques we have described. It might even be hard to distinguish between paint layer and supporting stone: e.g. in those areas where the stone (granite) shows chromatic alteration and can be mistaken for iron oxide-based pigments.

Finally, we must consider the delicacy and fragility of pictorial techniques. In addition to suffering very important losses, the paintings often show a marked tendency to pulverulency and, in

the case of those we find over a plaster, to the separation (and fall) of the supporting stone. In fact (and unfortunately), there are some dolmens whose paintings have completely disappeared because of their exposure to rain after excavation (Fig. 6), while other monuments are still suffering from active deterioration. This situation demands protection policies where, undoubtedly, the use of non-invasive recording techniques is considered a priority.

That weakness renders more difficult and inadvisable the cleaning work previous to recording, thus recommending the use of subtle recording techniques. Nevertheless, it is common to

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