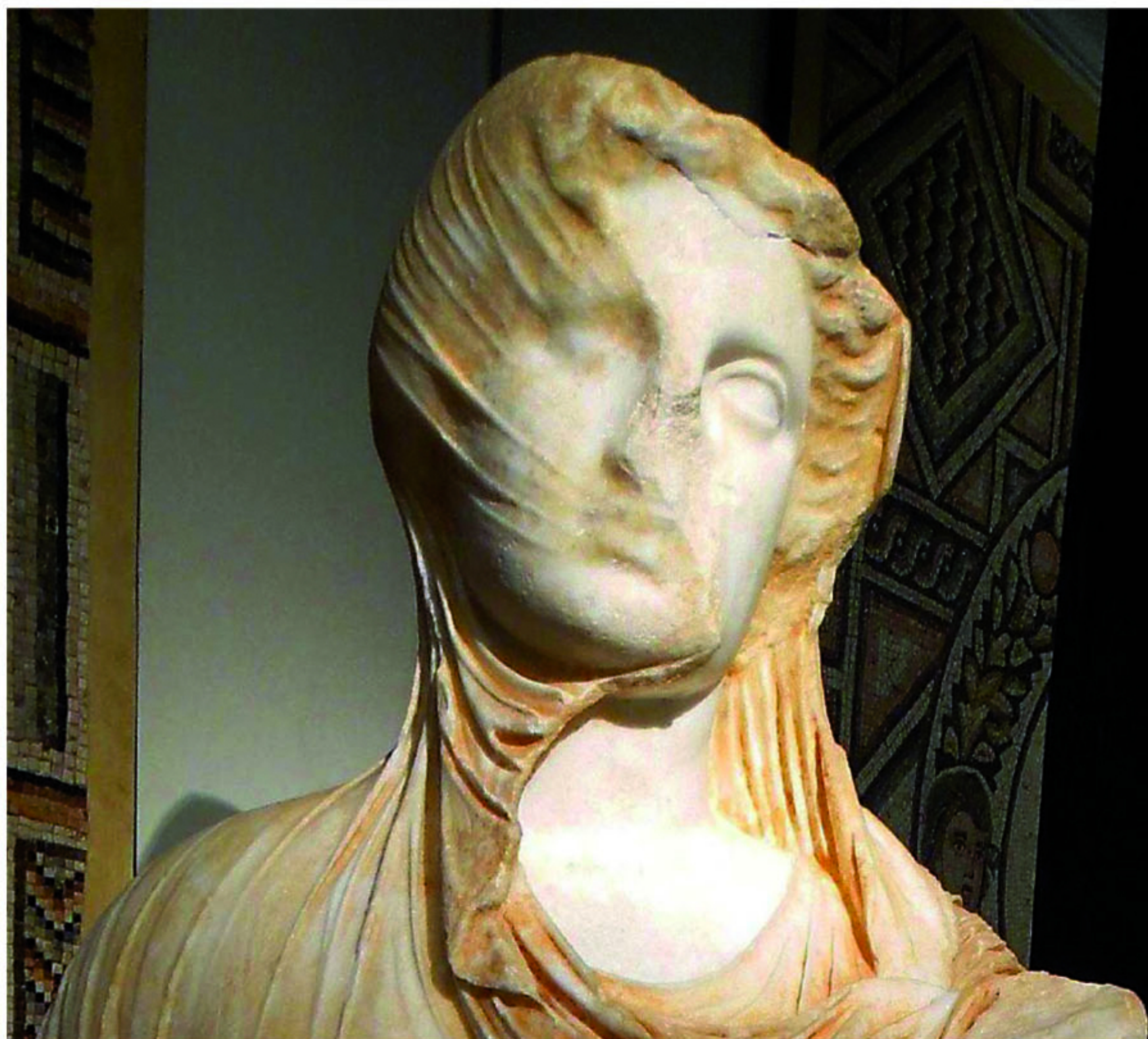


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**Archivi e Risorse Digitali
per il Patrimonio Storico e Archeologico
del Nord Africa**

a cura di Luisa Musso

The ASArt-DATA Project: Current Perspectives on Central Saharan Rock Art

Marina Gallinaro

Rock art is one of the most significant aspects of Saharan cultural heritage. The recent critical political developments determined the inaccessibility of many sites, raising the risk of destruction of the artworks, already significantly endangered by natural and anthropic threats. It is urgent to propose concrete actions to improve the understanding of this heritage and raise awareness of its extraordinary value, as a testimony of the past, as well as a resource for the future. The ASArt-DATA Project aims to contribute to these issues with a strict set of tasks addressed to strengthen the connection between anthropological research and cultural heritage.

Rock art represents an extraordinary window into the past. Paintings and engravings are often the most tangible remains of the social and symbolic world of ancient societies. Furthermore, the artworks can also provide remarkable insights about their materiality (e.g. raw materials, techniques of productions, etc.), revealing important information about the technical expertise of their creators and their knowledge of the surrounding resources and landscape.

Africa hosts dense concentrations of rock art galleries located all over the continent. A recent estimate featured more than 500,000 sites¹. This figure represents a minimum number; more sites remain unknown, and many sites are no longer visible. This impressive heritage is hampered by two main issues, one related to its extreme fragility, and the other due to its recurrent marginality in archaeological and anthropological research, as it has been the case in the Saharan area.

The Saharan massifs show significant concentrations of rock art sites, and the central massifs located

in Algeria and Libya specifically play a unique role. Here, in the 1980s, two of the main concentrations located in the adjacent massifs of Tassili n' Ajjer (Algeria) and Tadrart Acacus (Libya) were included in the UNESCO World Heritage List as the first African rock art sites, in 1982 and 1985 respectively. Others (9) were added many years later, however, only one of which is located in North Africa (i.e. the nearby Ennedi Massif: Natural and Cultural Landscape, in Chad, Fig. 1).

Rock art is mainly found in open-air contexts, ranging from isolated boulders to exposed cliffs and, in the most favourable cases, on the walls of rock shelters and caves, resulting in continuous exposure to atmospheric agents and millennia of dramatically changing environments. The collapse and degradation of cliffs due to thermoclastic processes, as well as other natural processes deriving from wind erosion and biochemical activities, have caused irreparable damage to the art (e.g. exfoliation and detachment of the painted surfaces, vaishing, etc.²). The fragility of the

¹ SMITH 2013.

² See for instance CREMASCHI, ZAMPETTI, ZERBONI. 2005; DI LERNIA 2005; DI LERNIA, GALLINARO 2011.

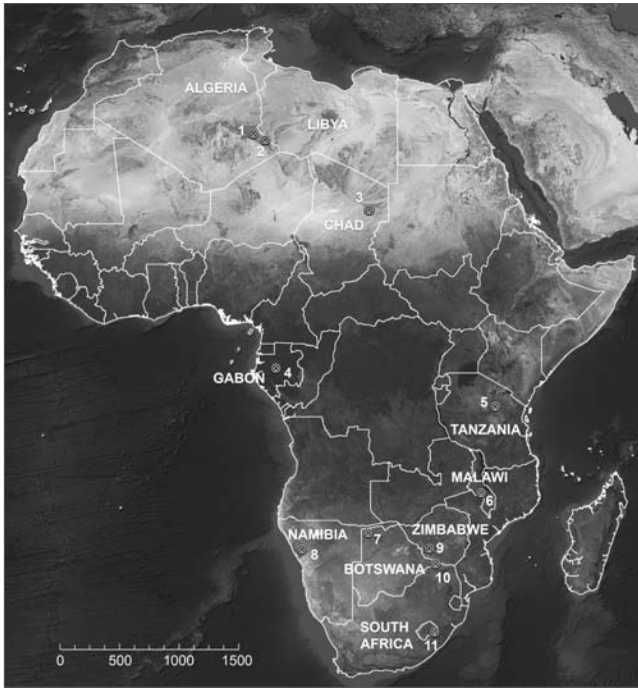


FIG. 1 - Map of Africa with the location of World Heritage Sites with rock art: 1. Tassili n'Ajjer; 2. Rock-Art Sites of Tadrart Acacus; 3. Ennedi Massif: Natural and Cultural Landscape; 4. Ecosystem and Relict Cultural Landscape of Lopé-Okanda; 5. Kondoa Rock-Art Sites; 6. Chongoni Rock-Art Area; 7. Tsodilo; 8. Twyfelfontein or /Ui-//Aes; 9. Matobo Hills; 10. Mapungubwe Cultural Landscape; 11. Maloti-Drakensberg Park.

rock art is further increased by anthropic causes related to: 1) programs of indiscriminate economic development (e.g. oil exploitation, building activities, mining, intensive agriculture programs and sudden intense fluxes of tourism); 2) involuntary damage due to the frequentation of the sites for pastoral activities, or due to invasive rock art-focused visits by autonomous tourists; 3) deliberate vandalism (e.g. graffiti, scratching, detachment and looting³).

³ See for instance Di LERNIA, GALLINARO, ZERBONI 2010.

⁴ *Report of the Decisions Adopted During the 40th Session of the World Heritage Committee (Istanbul/UNESCO, 2016)*: <https://whc.unesco.org/archive/2016/whc16-40com-19-en.pdf>.

⁵ According to the funding programme, the project includes a set of interconnected actions, here highly synthesized. The funding is granted to Sapienza - Università di Roma (specifically, to the Dipartimento di Scienze dell'Antichità); the Author is the Marie Skłodowska-Curie Researcher that designed the research and executes the project, with the main scientific supervision of Savino Di Lerna, Dipartimento di Scienze dell'Antichità, and Director of the Archaeological Mission in the Sahara, and Richard G. Lesure of the Cotsen Institute of Archaeology - UCLA for the outgoing phase in Los Angeles. I warmly thank: Giorgio Piras, Director of the Dipartimento

Additionally, the marginal role that the rock art research plays in the mainstream of archaeological and anthropological debate has reduced the strategic interest in this heritage and impedes a mature local and international awareness of its cultural value. The effort to integrate rock art within more general archaeological and anthropological work faces both methodological and theoretical challenges, the difficulty of dating and the frequent lack of the documentation necessary for systematic analysis of the massive quantity of represented motifs.

This state of the art has been dramatically impacted by the effects of the political and social crisis generated by the so-called Arab Springs since the early months of 2011. Since then, the region has become dangerous and abandoned, with the result that, in 2016, the World Heritage Site of the Rock-Art Sites of Tadrart Acacus has been included in the list of sites in danger, along with all the other Libyan World Heritage Sites⁴.

PROJECT BACKGROUND

“Ancient Saharan Art - Decoding Art through Theoretically-sounded Archive” (ASArt-DATA) is a three-year project, funded by the European Union's Horizon 2020 Research and Innovation programme under the Marie Skłodowska-Curie grant agreement No 795744 (H2020-MSCA-IF-2017 Global Fellowship). The project started in January 2019 and is structured into different phases conducted between the Sapienza - Università di Roma and the Cotsen Institute of Archaeology of the University of California Los Angeles (UCLA)⁵. The aim of the project is to propose a new theoretical and methodological approach to prehistoric rock art through an integrated

di Scienze dell'Antichità, and my supervisors for their continuous support and discussion; Willeke Wendrich, Director of the Cotsen Institute, for the kind welcome at the Cotsen Institute and for consultancy and discussions on Digital Humanities; and Deidre Whitmore, head of the Digital Archaeological Lab (DAL) of the Cotsen Institute, for the IT support for the building of the webAtlas. I also thank Donatella Calati, Adriana Ravenna, Anne-Michelle and Axel Van Albada for sharing their data, Roberta Simonis, Gianpaolo Rossi, Andras Zboray for their support to the project and future collaborations, and Giancarlo Buzzanca and Mario Santana Quinteiro for the discussions on technical and ethical issues. A particular thanks to the Department of Antiquities of Libya in Tripoli, represented by Dr Mohamed Faraj Mohamed al-Faloos, and to Mustafa Abdullah Turjman for his support.

study of the artworks, combining archaeology, anthropology, visual studies, digital humanities and cultural resource management.

The primary focus of the research is the Saharan rock art of the Tadrart Acacus and Messak Libyan massifs, located in the core of the Saharan desert (Fig. 2). The project is part of a larger body of archaeological research programmes and cultural resource management activities carried out by the Archaeological Mission in the Sahara of the Sapienza - Università di Roma (formerly Italo-Libyan Archaeological Mission in the Acacus and Messak), directed since 2003 by Savino Di Lernia, after Mario Liverani (1998-2002) and Fabrizio Mori (1955-1997)⁶.

Rock art covers in this area a long time period, spanning at least from the VIII mill. BCE to recent times, and it is characterised by different styles

(Fig. 3), subjects and techniques that have been tentatively correlated to the complex archaeological context reconstructed for the study area⁷. The first rock art evidence in the area was discovered in the Messak area in the second half of the 1800s⁸, and in the Tadrart Acacus only around the mid-1900s⁹. Since then rock art assumes a relevant role in the first exploration and archaeological research of the region, due to the impressive quality of the rock art galleries¹⁰. This research primarily focused on a few sites or delimited areas, due in part to technical and accessibility limitations¹¹, whereas from the 1990s extensive surveys resulted in the documentation of a large number of rock art sites all over the Tadrart Acacus and Messak massifs. These surveys were carried out by institutional archaeological missions, in particular, the Archaeological Mission of the Sa-

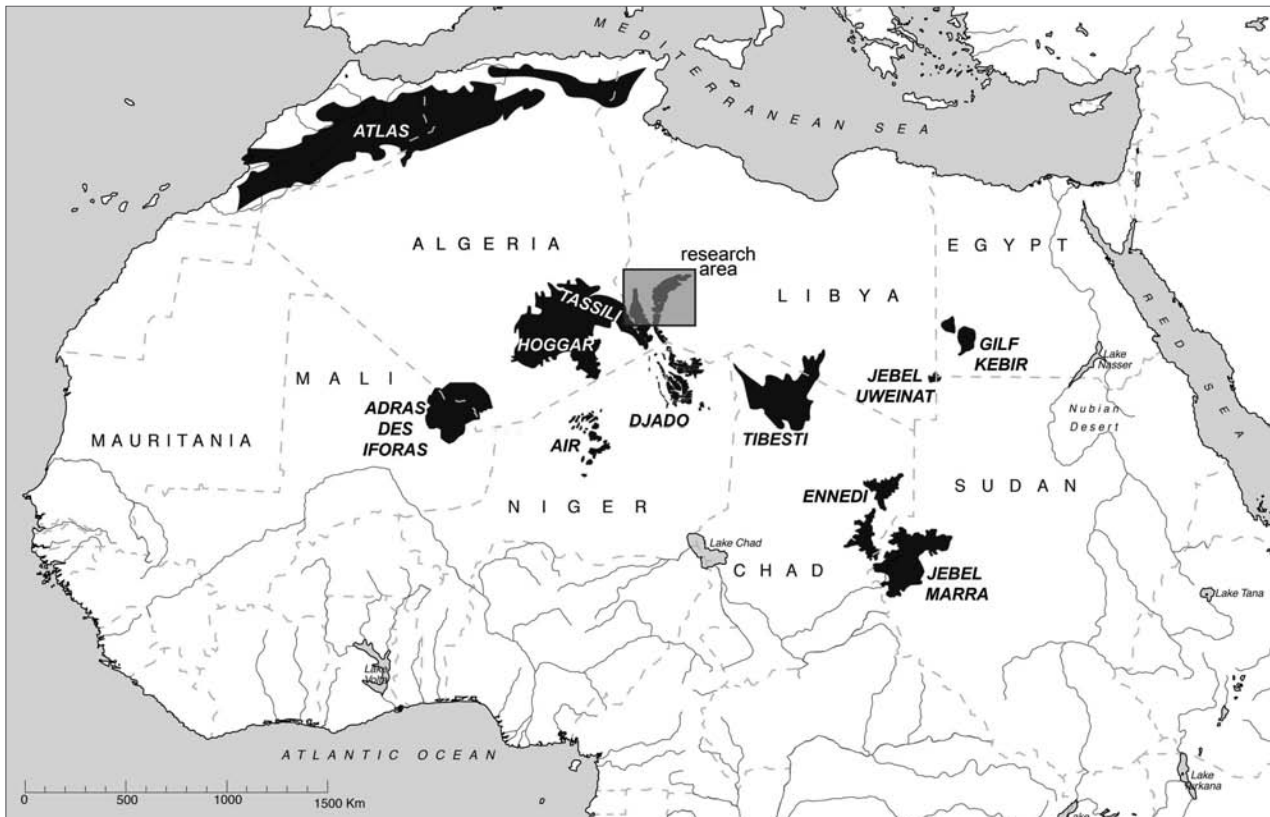


FIG. 2 - Map of North Africa with the Saharan massifs including the research area (gray square).

⁶ See more details in DI LERNIA 2005, and 2018a; DI LERNIA, GALLINARO 2011, and 2014, and references herein.

⁷ More detail in DI LERNIA, GALLINARO 2011; GALLINARO 2013; DI LERNIA 2017.

⁸ BARTH 1857-1858.

⁹ MORI 1965.

¹⁰ For a more detailed overview and analysis of the different stages of the rock art research in the area see DI LERNIA, ZAMPETTI 2008; GALLINARO 2013; DI LERNIA 2018b, and references herein.

¹¹ See for instance GRAZIOSI 1942; MORI 1965, and 1998; JELINEK 2004; GRAZIOSI 2005; MORI 2008.



FIG. 3 - Examples of styles of the Rock-Art Sites of Tadrart Acacus.

pienza - Università di Roma in the Tadrart Acacus and the Messak massifs¹², British research teams focused on the northeastern side of the Messak massif, mainly in the area of Wadi al-Ajal¹³, as well as by independent travellers both in the Tadrart Acacus and Messak¹⁴, in some cases with a remarkable care and systematicity¹⁵.

After the end of the embargo of the 1990s in Libya, the number of independent travellers and amateurs rapidly rose, with a consequent increase in the number of the recorded rock art sites. However, these materials are only partially published, often among a plethora of generic publications. The previously mentioned political turmoil started with the Arab Spring in Libya marked the end of fieldwork activities and the sudden interruption of many actions related to the preservation and sustainable management of cultural heritage in the area¹⁶. Among others, one of the targets of the then ongoing “Messak Project” was the creation of a comprehensive database and pilot studies on rock art¹⁷.

RESEARCH PROGRAMME

The ASArt-DATA research programme includes four principal objectives with archaeological research questions, as well as a more general interest in the role of the rock art study in the archaeological and anthropological research, and issues related to the dissemination and management of the rock art heritage. The different goals are intertwined and aimed to:

- 1) create a digital open access webAtlas of the Tadrart Acacus and Messak rock art;
- 2) trace a new theoretical framework for the interpretation of rock art produced by Saharan Pastoral Neolithic communities living in the area between the late VII and the I mill. BCE;
- 3) integrate rock art studies with archaeological and anthropological research;
- 4) raise the awareness on the preservation, promotion, and transmission of rock art heritage as a meaningful trans-cultural agent.

¹² CREMASCHI, DI LERNIA 1998; CREMASCHI, ZAMPETTI, ZERBONI 2005; DI LERNIA, ZAMPETTI 2008.

¹³ MATTINGLY 2003, and 2007; BARNETT 2019.

¹⁴ LUTZ, LUTZ 1995; GAUTHIER *et al.* 1996; LE QUELLEC 1998; CHOPPY

et al. 2002.

¹⁵ VAN ALBADA, VAN ALBADA 2000.

¹⁶ See more detail in DI LERNIA, GALLINARO 2014; DI LERNIA 2018a.

¹⁷ DI LERNIA 2011; GALLINARO *et al.* 2012; BIAGETTI *et al.* 2013.

The webAtlas

After many years of research in the Saharan massifs, the improvement of IT technologies and the diffuse use of online resources, now allow the management of a cross-checked list of sites, a digital webAtlas. Several web archives published in the last years include many materials on central Saharan rock art (e.g. the “South African Rock Art Digital Archive - SARADA”, published by the Rock Art Research Institute, University of the Witwatersrand, Johannesburg; or the recent archive by the British Museum in collaboration with the “Trust for African Rock Art - TARA”¹⁸). The existing archives, however, are non-systematic image repositories, without adequate environmental and archaeological contextual information on the rock art sites¹⁹. These archives focus, in fact, on the photos of artworks, selections of images on specific subject/style, or the publication of full archives, the aims of which are substantial different to be

useful as informative resources suitable for big data mining.

The webAtlas proposed here will be ‘site-oriented’ and based on an in-depth, theoretically framed logical and keyword organization. The database will hold general information about the sites, organized into five main blocks including position and geomorphology; type of site and landscape; main rock art features; other archaeological info; and data source. For each site, a synthetic description and a selection of images will be published as well. It will have an easy-to-use graphical interface and a flexible and modular structure that will be the key-tool to address the main issues of Saharan prehistoric art, including research, cultural heritage resource management, dissemination and communication. The Atlas will mainly rely on the archive of the rock art sites of the Archaeological Mission in the Sahara, and on other datasets from private archives and published data, for a total amount of more than 2,000 sites (Fig. 4; Table 1).

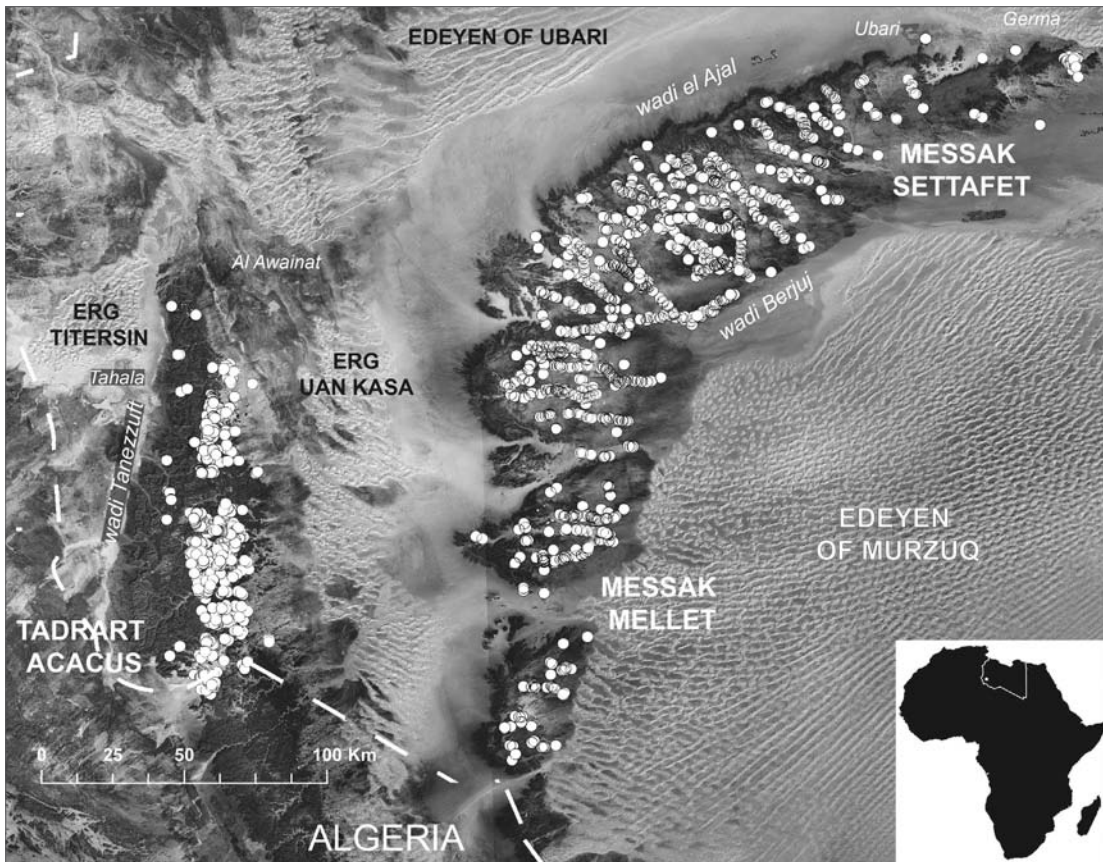


FIG. 4 - Detail of the research area licensed to the Archaeological Mission in the Sahara with the distribution of rock art sites included in the webAtlas.

¹⁸ <https://africanrockart.britishmuseum.org>.

¹⁹ See also DI LERNIA 2018a.

DATA SOURCE	AREA	PROJECT
The Archaeological Mission in the Sahara	Tadrart Acacus	<ul style="list-style-type: none"> ◦ First archaeological missions carried out in the massif by Fabrizio Mori between 1955 and 1990's (MORI 1965, and 1998) ◦ Geoarchaeological surveys carried out in the 1990s by Mauro Cremaschi and Savino Di Lernia (CREMASCHI, DI LERNIA 1998) ◦ Systematic rock art surveys developed between 2001 and 2008, carried out by Savino Di Lernia, Daniela Zampetti and colleagues (CREMASCHI, ZAMPETTI, ZERBONI 2005; DI LERNIA, ZAMPETTI 2008; ZAMPETTI 2008) ◦ "The Tifinagh Rock Inscriptions in the Tadrart Acacus Mountains (SW Libya): an Unknown Endangered Heritage (EAP265)" project, developed in 2009 (BIAGETTI <i>et al.</i> 2012) ◦ "Saharan Waterscapes" project, carried out between 2008 and 2010 (DI LERNIA <i>et al.</i> 2012)
	Messak	<ul style="list-style-type: none"> ◦ Rescue survey "Messak Settafet Road Survey - MSRS", carried out in 2000, in the central part of the massif, elicited by oil exploitation activities (CREMASCHI, DI LERNIA 2000) ◦ "Messak Ceremonial Monuments Project - MCMP", targeted research project undertaken between 2007 and 2010 (DI LERNIA, GALLINARO 2010; DI LERNIA <i>et al.</i> 2013; GALLINARO, DI LERNIA 2018) ◦ "Messak Project. Cultural and Natural Preservation and Sustainable Tourism - MP", undertaken between 2010 and 2011 (DI LERNIA 2011; GALLINARO <i>et al.</i> 2012; BIAGETTI <i>et al.</i> 2013)
Axel and Anne-Michelle Van Albada Archive	Messak	Independent surveys carried out between 1984 and 2001
Adriana Ravenna and Sergio Scarpa Falce Archive	Tadrart Acacus	Independent surveys carried out in the 1990's and 2000's
Donatella Calati and Aldo Boccazzi Archive	Tadrart Acacus	Independent surveys carried out in the 1990's

TABLE 1 - List of data included in the webAtlas of the ASArt-DATA Project.

It is important to bring attention to the 'ethical issues' related to the publication of digital open access archives, that will be constantly monitored and guaranteed in the ASArt-DATA Project. A specific Memorandum of Understanding (MoU), signed by the Department of Antiquities of Libya (DoA) and the Dipartimento di Scienze dell'Antichità - Sapienza - Università di Roma, establishes a formal agreement with the only Libyan institution devoted to safeguarding, conservation and management of the cultural heritage. The MoU regulates the ethical issues related to the dissemination of sensitive data (e.g. coordinates, accessibility, etc.) as well as the rules in terms of intellectual property.

The tracing of a new theoretical framework for the rock art produced by Saharan Pastoral Neolithic communities

After a long and heated debate on style and chronology²⁰, different approaches were adopted to the study of this rock art evidence, including structuralist perspectives, semiological-contextual analysis²¹, and ethnoarchaeological modelling²². The recent inaccessibility of many rock art sites has interrupted or partially hampered a new promising season of research, characterized by the development of indirect dating methods²³, wide integrated contextual approaches²⁴ and cognitive and phenomenological approaches²⁵.

The specific research focus of the ASArt-DATA is to propose a comprehensive archaeological and anthropological investigation of the rock art, focusing on those produced by the mobile pastoralists who inhabited this region from 6300 and 850 BCE, in more favourable environmental conditions than in subsequent periods (a greener Sahara). The research process will move from a specific and micro-/meso-regional scale of analysis of the represented figures (with the main focus placed on human representation), outlining variability and local sets of regularities, to a subsequent search for enforcing regularities at the macro-regional scale.

A corpus of the main pastoral rock art sites, selected from the webAtlas archive, will be digitally re-

corded from existing sources. Innovative techniques of image processing and digital enhancement techniques²⁶ will result in the ability to obtain high quality and accurate 2D recordings, coping with faint colours and vanishing and overlapping figures. The development of a 'theoretically-oriented database', built on the basis of an integrated theoretical background, combining anthropology, visual studies and digital humanities, will support a detailed iconographic analysis, favouring interpretative models of data patterning in order to reveal the ideological interactions of the Saharan region during the Pastoral Neolithic period from its formative phases.

The integration of rock art studies with archaeological and anthropological research

The European tradition of research has not adequately fostered the integration of archaeology and anthropology, and, in particular, rock art studies remained inadequately integrated and understood. The ASArt-DATA Project will adopt a transdisciplinary approach and help address this deficiency, using Pastoral Saharan communities as a case study for a comprehensive approach. The creation of an interdisciplinary and international working group involving colleagues and students in archaeology and anthropology, as well as the organization of specific workshops or thematic sessions in international conferences, will be additional tools used to foster a reassessment of disciplinary integration.

Raising awareness on the preservation, promotion, and transmission of rock art heritage as a meaningful trans-cultural agent

As briefly outlined in the introduction of this paper, rock art is one of the most fragile expressions of heritage, but at the same time, it could be one of the most powerful tools to raise the awareness of the cultural value of the remains of the past. Rock art, thanks to its immediate visual power, has an extraordinary emotional impact on contemporary observers. A specific objective of the ASArt-DATA Project is to exploit this underdeveloped potential, with the ultimate goal to strengthen the connection between

²⁰ See for instance GALLINARO 2013; LE QUELLEC 2013; DI LERNIA 2018b, and references herein.

²¹ STRIEDTER 1983; HOLL 2004.

²² SMITH 1993; DI LERNIA 2008.

²³ HUYGE *et al.* 2011; MERCIER *et al.* 2012.

²⁴ GALLINARO 2013; KUPER 2013; GALLINARO 2016; RIEMER, KRÖPELIN, ZBORAY 2017.

²⁵ HONORÉ 2019.

²⁶ For instance DStretch software: HARMAN 2008.

archaeological and anthropological studies and between academia and the general public. Combined sets of actions, including the online publication of the webAtlas, public lectures, the use of social media, as well as seminars and programmatic meetings, will be addressed to different stakeholders (e.g. local institutions, international bodies devoted to the management, conservation and promotion of rock art, and the general public) as first tangible steps toward this broad and inclusive perspective.

It is noteworthy that relevant parts of the webAtlas will be immediately available in Arabic, from the first on-line publication, and a specific effort will be devoted to a full translation by the end of the project, to guarantee the accessibility of the data to Libyans and other North African people. Furthermore, a simplified handbook with the basic instructions for the use and implement of the webAtlas will be shared (in English and Arabic) with the DoA, possibly followed by a training of selected personnel.

The ASArt-DATA Project will end in December 2021, but the webAtlas online access will be guaranteed for at least five additional years with continuous updating of the website²⁷, managed by Sapienza - Università di Roma. Hopefully, it will become a permanent online tool. All possible efforts will be devoted to the implementation of the webAtlas with the surrounding areas, involving further research groups, local institutions and international bodies focused on the preservation and dissemination of cultural heritage.

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