

Laboratorio di Palinologia e Paleobotanica

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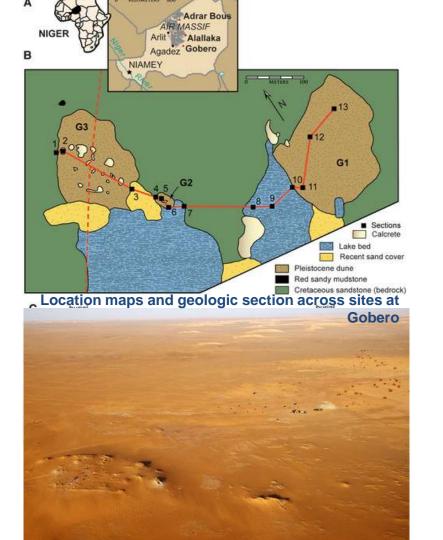
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Lessons from the Sahara desert: plants, human behaviour and

PLoS **on**e



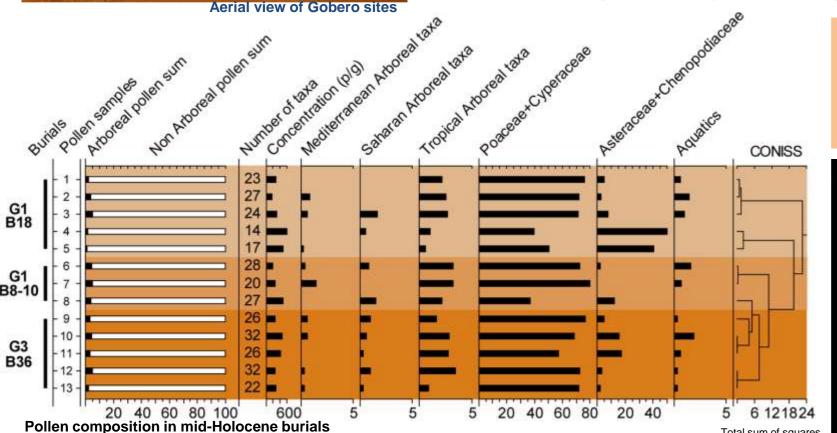


cultural evolution in expanding droughts

Lakeside Cemeteries in the Sahara: 5000 Years of Holocene Population and Environmental Change

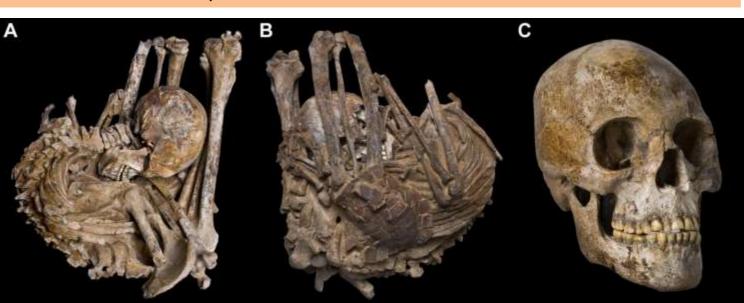
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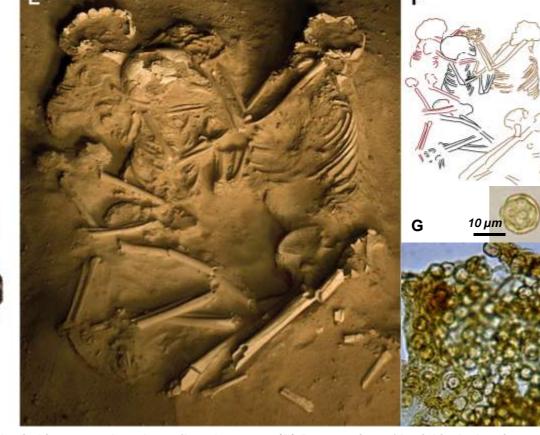


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Approximately two hundred human burials were discovered on the edge of a paleolake in Niger that provide a uniquely preserved record of human occupation in the Sahara during the Holocene (~8000 BC to the present). Called Gobero, this suite of closely spaced sites chronicles the rapid pace of biosocial change in the southern Sahara in response to severe climatic fluctuation.







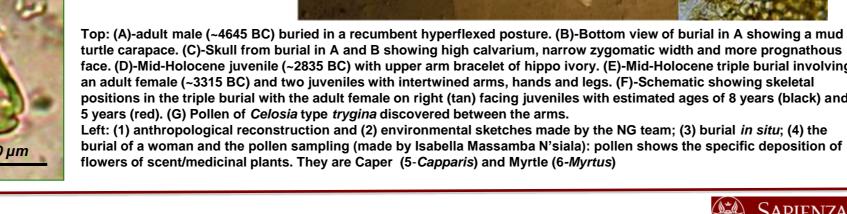
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Top: (A)-adult male (~4645 BC) buried in a recumbent hyperflexed posture. (B)-Bottom view of burial in A showing a mud turtle carapace. (C)-Skull from burial in A and B showing high calvarium, narrow zygomatic width and more prognathous face. (D)-Mid-Holocene juvenile (~2835 BC) with upper arm bracelet of hippo ivory. (E)-Mid-Holocene triple burial involving an adult female (~3315 BC) and two juveniles with intertwined arms, hands and legs. (F)-Schematic showing skeletal positions in the triple burial with the adult female on right (tan) facing juveniles with estimated ages of 8 years (black) and Left: (1) anthropological reconstruction and (2) environmental sketches made by the NG team; (3) burial in situ; (4) the

Inside the "African Cattle Complex": Animal Burials in

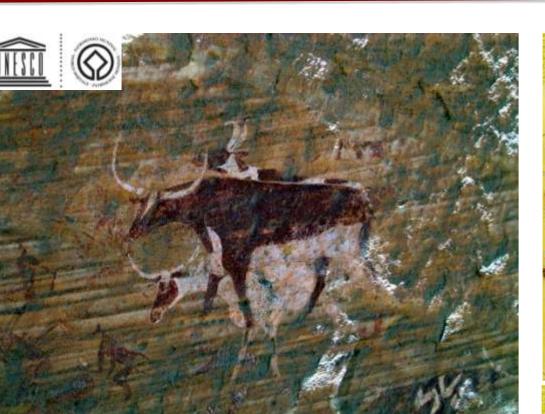
Savino di Lernia 1,2+, Mary Anne Tafuri 3,4, Marina Gallinaro 1, Francesca Alhaique 4,5, Marie Balasse 6,

Lucia Cavorsi¹, Paul D. Fullagar⁷, Anna Maria Mercuri⁸, Andrea Monaco¹, Alessandro Perego⁹,

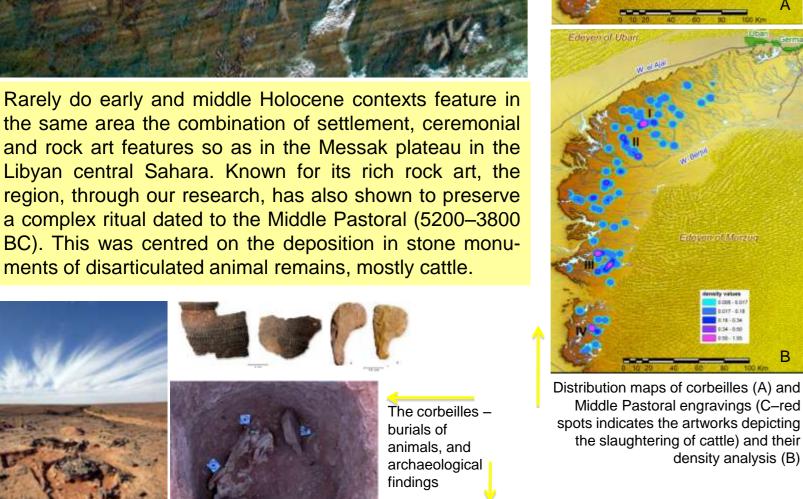


the Holocene Central Sahara

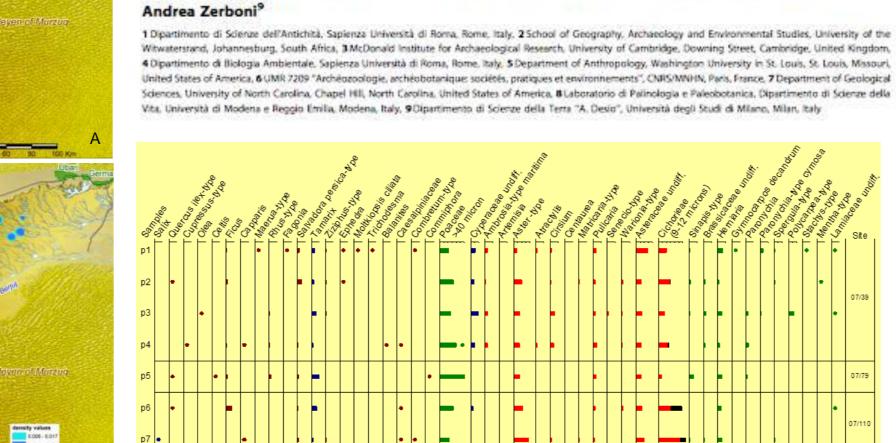
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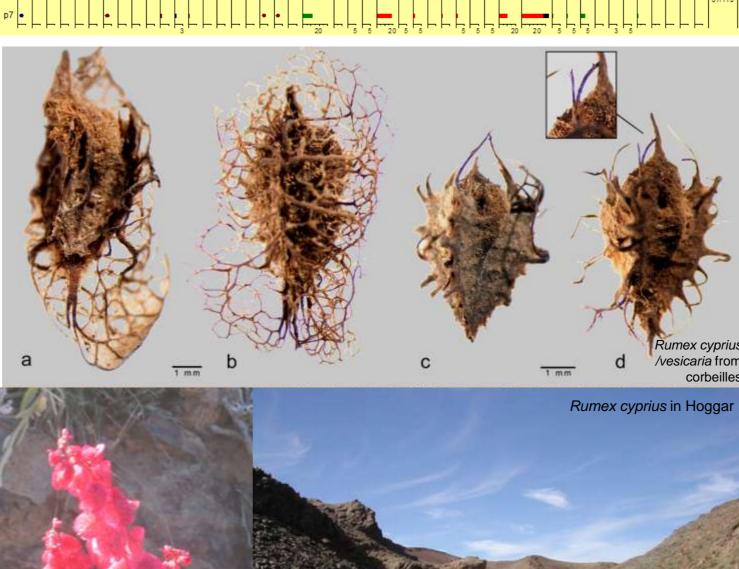


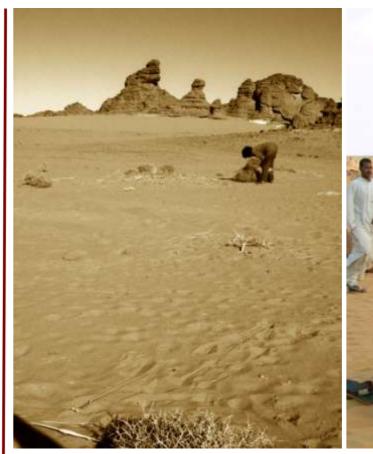
Rarely do early and middle Holocene contexts feature in the same area the combination of settlement, ceremonial and rock art features so as in the Messak plateau in the Libyan central Sahara. Known for its rich rock art, the region, through our research, has also shown to preserve a complex ritual dated to the Middle Pastoral (5200–3800 BC). This was centred on the deposition in stone monu-

















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Human influence, plant landscape evolution and climate inferences from the archaeobotanical records of the Wadi Teshuinat area (Libyan Sahara)

ARTICLE INFO



ABSTRACT Central Sahara rock shelters offer an early and middle Holocene environmental reconstruction. This paper summarises palynological research carried out within a multidisciplinary archaeological research project on the Wadi Teshuinat area (Tadrart Acacus Mts., in south-western Fezzan, Libya). The sites were occupied by hunter-gatherer and pastoralist cultures. On-site pollen data, treated as a single 'regional site', showed that different pollen stratigraphies and flora characterised the past phases. Plant macroremains also helped to understand local plant exploitation and landscape evolution Pollen spectra showed the following climate oscillations: wet and cool (approx. 8800-8250 cal. BC), dry and warm (approx. 7920-7520 cal. BC), wet (approx. 7550-7200 cal. BC), dry (approx. 6340-6210 cal. BC-geoarchaeological evidence), wet and warm (approx. 6250-4300 cal. BC, including a wetter and warmer phase at approx. 5500-4600 cal. BC): dry and warm (approx. 4250-2900 cal. BC): drier and warm (approx.

2900-1600 cal. BC, up to the present). Since the early Holocene, both climatic and anthropic factors have played an important and strictly interconnected role in

transforming the environment. Thus, while subsistence strategies were adjusting to climatic and environmental changes, the plant landscape was also being slowly and © 2008 Elsevier Ltd. All rights reserved.

SCIENCE



Plant exploitation and ethnopalynological evidence from the Wadi Teshuinat area (Tadrart Acacus, Libyan Sahara)

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Pollen analyses of 13 archaeological sites in the Wadi Teshuinat area, in southwestern Fezzan, Libya, were synthesised to explore the poential contribution of palynological investigation to archaeological research in this area. During the Holocene, the sites were occupied by pre-Pastoral (hunter-gatherers) and Pastoral (pastoralists) cultures. Different pollen stratigraphies and floras characterised the diverse sites and the relevant cultural phases. Pollen data were reported by discussing the sites separately, and by combining them to interpret the regional data set. Emphasis was made on the anthropogenic pollen indicators and grasses, including large grass pollen grains (>40 μm), which were considered evidence of plant transport into the site. These were ethnobotanical markers, human-made evidence of plant harvesting by hunter-gatherers, or of animal breeding by pastoralists. The disappearance of some wild cereals was also observed, consistent with increasing climate dryness and land exploitation. Macroremains were used as a parallel tool to better understand plant exploitation in the region. © 2007 Elsevier Ltd. All rights reserved.

Research Article



wileyonlinelibrary.com) DOI 10.1002/irs.2736 Surface-enhanced Raman spectroscopy (SERS) on silver colloids for the identification of ancient textile dyes. Part II: pomegranate

Silvia Bruni, a* Vittoria Guglielmi, a Federica Pozzia and Anna Maria Mercurib



he effectiveness of surface-enhanced Raman spectroscopy (SERS) spectrocsopy on Ag colloids has been successfully lemonstrated for the identification of a yellow dye in two ancient wool threads found in the Royal Tumulus of In Aghelachem, Libyan Sahara, belonging to the Garamantian period (2nd – 3rd century A.D.). High-performance liquid chromatography (HPLC) lighlighted the presence of ellagic acid in the extracts from the threads, excluding other chromophores. This result, togethe with the abundance of malic acid detected by gas chromatography-mass spectrometry (GC-MS), suggested the possible use of pomegranate rind or sumac berries as source of the yellow dye, both plants being documented in the Fezzan area during the Garamantian period. HPLC analyses and SERS spectra acquired on the extracts of the ancient threads were therefore compared with those obtained from pomegranate and sumac extracts of the corresponding fruits and reference dyed wool samples, allowing us to identify the yellow dye as deriving from pomegranate (Punica granatum L.). SERS spectra of ellagic acid and dyes extracted from pomegranate rind and sumac berries are reported here for the first time. A methodological improvement is also presented, based on the use of NaClO4 as aggregating agent, that leads to a significant increase of the signal-to-noise ratio in the SERS spectra. Copyright © 2010 John Wiley & Sons, Ltd. Supporting information may be found in the online version of this article.



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Sahara, Its well-preserved Holocene stratigraphy testifies to human occupations by foraging groups (Late Acacus culture; ca. 9000-7400 uncal years bp; ca. 8300-6100 BCE) and herders (Pastoral cultures; ca. 7400-4500 uncal years bp; ca, 6400-3000 BCE). The basketry collection includes 91 desiccated items. They have been divided into two distinct group sketry constructions and basketry elements (b-items: 53 fragments); ropes and other elements in the set of materials was used for ropes and other elements. In a few cases, mixed animal and plant materials were also employed. SEM analyses showed some diagnostic characteristics such as epidermal stomata, the site also seem to have been the main plants used to make basketry. The only wooden item was stributed to Vitex. The majority of the basketry is made using the twined technique Basketry remains were more common during the Late Acacus occupation of the site, possibly ass ciated with wild cereal processing and storage, reinforcing the idea of a re-organization of food security owards a delayed use of resources. The basketry material could be interpreted as remains of large and open baskets to collect and store seeds. Decreasing availability of wild cereals, changes in resource exploitation and the nomadic mobility pattern may explain why a smaller number of basketry items was ound in layers connected to the Pastoral phases of occupation.

Holocene palaeoclimate in the northern Sahara margin (Jefara Plain, northwestern Libya)

Carlo Giraudi, Anna Maria Mercuri² and Daniela Esu³



he palaeoclimatic evolution of northwestern Libya has been deduced from the study of the palastrine and aeolian sediments. The Holocene environments variations have been recognized through geological and stratigraphic surveys and by pollen analysis and malecofauna content of the sediments. Some higher humidity, which began around 9.4 ka BP and ended around 5.0 ka BP. From c. 5.0 ka BP up to about 4.4 ka BP, there was a simultaneous presence of marshes and vegetation of and climate as a consequence of rainfall in the mountains and/or a decrease in temperatures. The Holocene wet period was interrupted by two arid spells dated about 8.2 and 5.5-5.4 ka BP. The end of the wet phase must have been gradual. The climatic events that occurred in the Jefara plain seem to be well correlated with those identified in Saharan Africa even if the Mediterranean is only 100 km away,

Holocene, malacofauna, northwestern Libya, palustrine sediments, pollen, Sahara palaeoclimate