The Early History of the Western Palmyra Desert region. The Change in the Settlement patterns and the Adaptation of subsistence Strategies to encroaching Aridity: a first Assessment of the Desert-Kite and Tumulus cultural Horizons

Daniele Morandi Bonacossi and Marco Iamoni

Mots-clés – Palmyrène, changements environnementaux, réponses adaptatives, desert-kite, tumuli.

Abstract – Palaeoenvironmental proxies from geoarchaeological survey work conducted by a Syrian-Italian mission in the Palmyra oasis and the desert areas to the south and west of it indicate a discontinuity between a wet Lateglacial/Early Holocene and a later dry period. The latter, which is presumed to have started during the final PPNB-early Pottery Neolithic, resulted in the progressive nucleation of the Palmyra oasis and in a major change in settlement patterns and the exploitation of natural resources on a regional scale. The paper explores this major adaptive shift in settlement patterns and economic strategies in the region, which is paralleled by the emergence of a distinctive archaeological landscape characterized by desert-kites and cairns.

Key-words – Palmyrena, environmental change, adaptive responses, desert-kites, tumuli.
FOREWORD

Notwithstanding the importance of the desert region surrounding Palmyra for the economic development of the oasis and the Bronze Age settlement, and especially of the great caravan city of the classical period, the Palmyra hinterland has never been the object of systematic and intensive archaeological research, with the only exception of the explorations conducted in the nineteen-thirties by D. Schlumberger to the Northwest, in any case exclusively directed at investigation of Palmyra’s territory at the time of the Roman Empire. The site of Palmyra has a long history of archaeological research from the 19th cent. onwards, but has been studied principally in its function as an important caravan city and, as such, effectively disembodied from its territorial and regional context and seen instead as part of a supra-regional socio-political, economic and cultural system.

Since 2008, a joint Italo-Syrian mission has been conducting geoarchaeological survey work in the Palmyra oasis and the desert areas to the south and west of the great Syrian caravan city of the Roman period (fig. 1); The purpose of the survey is to reconstruct the patterns of occupation and land-use for the desert landscape around Palmyra and the Palmyra oasis itself from prehistoric times until the present

Figure 1. Distribution map of sites found during survey work in the Palmyra oasis and desert (© GIS and map preparation A. Savioli).

4. SCHLUMBERGER 1951
day 6, and to study the relationship between human settlement dynamics, changes in climate and the ancient natural environment 7.

The preliminary results of our geoarchaeological research project, supported by palaeoenvironmental proxies from the Levant, suggest a climatic discontinuity between a wet Late Glacial/Early Holocene and a later dry period, which is presumed to have started during the final Pre-Pottery Neolithic B-early Pottery Neolithic 8. This climatic shift resulted in the progressive nucleation of the Palmyra oasis on one hand, and in a major change in settlement patterns and the exploitation of natural resources on a regional scale on the other: permanent settlement and agriculture were concentrated within the oasis, where water resources had survived despite reduced precipitation, whereas the surrounding dry steppe was exploited by mobile pastoral and specialized seasonal hunter communities.

The archaeological evidence gathered during the first survey campaigns shows the existence of a well-documented distribution of Mousterian, Epipalaeolithic and Pre-Pottery Neolithic open-air sites in the corridor connecting the lake basins of Abu Fawares and Palmyra and in the surrounding steppe during the period characterized by humid climate (fig. 2-3) 9.

6. With particular attention to the prehistoric, protohistoric and pre-classical epochs.
7. The Western Palmyra Desert Geoarchaeological Project is based upon the interpretation of Ikonos, Landsat and Corona satellite images and systematic geoarchaeological surface survey work (founded on a stratified systematic sample), integrated with excavation trenches in several selected sites. The sites identified during the survey were positioned with GPS, recorded, sampled, and inserted into a geographic information system (ArcGIS 9.2).
8. CREMASCHI & ZERBONI in course of publication.
9. Ibid.
The survey evidence concerning the following drier Pottery Neolithic, Chalcolithic and Bronze Age, however, is rather problematic and extremely scanty. A small tell (288) at the western fringes of the present-day Palmyra oasis has yielded evidence of occupation during the PPNB and Ceramic Neolithic and possibly also the Late Chalcolithic. However, materials indicating occupation during the Chalcolithic, Bronze and Iron Ages from other sites in the Palmyra desert region are very meagre and in the oasis are so far limited to the Late Chalcolithic (?), EBA IV, MBA, LBA and IA occupation layers uncovered in the ancient tell of Palmyra, which is buried underneath the Bel Temple temenos. Further evidence of Chalcolithic and Bronze Age settlement may perhaps be expected from within the Palmyra oasis, though its detection would appear problematic due to the high degree of fragmentation of the oasis into private gardens, orchards and fields, and the limited visibility of the archaeological surface record in these intensively cultivated areas.

As a result of the critical dearth of identifiable archaeological data concerning the 6th to 1st millennia BC, the long period from the Ceramic Neolithic to the Iron Age has at present a very limited archaeological documentation in the Palmyra oasis and desert region and its specific cultural processes and material culture assemblages are still largely undifferentiated.

10. Ibid.
11. Al-Maqdissi 2000; Al-Maqdissi et al. 2009; Bounni & Al-Maqdissi 2001; Mesnil du Buisson 1966, 1967; Will 1957. Mesnil du Buisson’s trial trenches a-c brought to light very substantial MBA levels more than 4 m thick (see also the remarks in Al-Maqdissi 2000: 146-148). This observation fits very well with the information we have from cuneiform sources on the important role played by the site of Tadmor at the border between the kingdoms of Qatna and Mari (Abdallah 1996; Durand 1987; Joannes 1997; Mar’i 1996).
This raises an important question: is this shortage of archaeological evidence related to the existence of real gaps in the occupation of the Palmyra region from the 6th to 1st millennium bc? Or could this apparently extremely feeble settlement pattern be rather due to the basic strong cultural continuity characterizing desert (at that time dry steppe) societies in terms of cultural processes and material culture, which constitutes an obstacle to the identification and precise dating of archaeological sites belonging to this period? Since the desert and arid steppes were less affected by the political, socio-economic and cultural processes that involved the 'sown lands', cultural changes in the material assemblages may also have followed different modes and rhythms than in the fertile areas.

If this hypothesis is tenable, the application of the chronological framework commonly used in the archaeology of Syria to the Palmyra Desert is of dubious usefulness. An attempt should instead be made to replace it by a separate cultural chronology for the desert, in order to avoid the possibility that difficulties in dating the sites should lead to a false reconstruction of desert history, suggesting the existence of artificial gaps in its occupation and cultural sequences. The challenge of building such a new cultural and chronological framework (relative and absolute) for the occupation of the Palmyra Desert through the integration of geoarchaeological surface survey data with limited excavations at significant sites, employing radiocarbon and luminescence dating methods, is one of the main objectives of our project.

In this first stage of our work, the archaeological survey of the region has revealed the existence of two (probably at least partially overlapping) cultural horizons, which appear in the already aridified steppe environment of the Palmyra region after the drop in the Palmyra and Abu Fawares lake levels and are distinguished by the presence of characteristic site/structure types: 'desert-kites' and cairns/tumuli.

We have already seen that during the 7th and 6th millennia bc the environmental changes registered seem to have favoured a major adaptive shift in settlement patterns and economic strategies and determined the emergence of communities whose subsistence was based on pastoralism and the specialized cooperative hunting of gazelles and possibly other large hoofed animals. These left their mark in the archaeological landscape of the Palmyra Desert in the form of isolated cairns or clusters of cairns, in some cases associated with small groups of huts, and desert-kites. At the moment it is still impossible to date these structures precisely and thus disentangle the complex pattern of chronological superimposition of these two structurally and functionally different cultural horizons, which were probably partially, or even largely, contemporaneous. The future task of our project will be to thoroughly investigate and better define the cultural phenomena hidden behind these stone-built structures and to ascertain the existence of systemic and chronological interconnections between the distinguishing features of both cultural horizons through the intensification of archaeological excavation of selected examples of desert-kites, tumuli and hut-sites and their absolute dating by means of C14 and luminescence determinations of associated sediments.

The ‘Desert-kite Cultural Horizon’

The desert-kites are large stone structures systematically located on top of the mountain chains and other high ground in the Palmyra hinterland. They are composed of two long dry-stone walls of middle-
sized stones which converge, funnel-like, on a large circular or polygonal enclosure equipped with small circular or large semicircular rooms around the perimeter (fig. 4). Similar constructions are known from many Near Eastern desert regions: Central and Southern Syria, North Jordan, Saudi Arabia, the Negev and Sinai, but their existence in the Palmyra desert ranges had not been noted by researchers until now.

Since O. G. S. Crawford published a brief note in the 1929 *Antiquity* commenting upon Rees’ study of desert-kites in the Trans-Jordan desert in the same volume of the periodical, most archaeologists had interpreted desert-kites as traps used in hunting gazelle or other large ungulates, which would have been driven into the large terminal enclosures by means of the long convergent walls, which continued across the desert for hundreds of metres or often kilometres.

As a result of the intense debate which developed between scholars in the nineteen-eighties and nineties, especially in the periodical *Paléorient*, Échallier & Braemer 1995 proposed an alternative functional interpretation of the desert-kites as enclosures in which flocks of sheep or goats living in a semi-free state on the dry steppe were gathered. As in present-day *mrgari* on the Croatian islands of Krk and Prvić, desert-kites may have been used to keep together flocks of sheep and goats which grazed in semi-liberty on the hills and mountains surrounding Palmyra. Similar constructions for enclosing, dividing and otherwise managing sheep are known from Wales and Iceland, and in Finland wooden structures and metal fences quite similar to desert-kites are still used for gathering together herds of reindeer which, for part of the year, graze freely.

The notable structural complexity of the desert-kites, making them difficult to justify as simple enclosures for flocks of ovicaprids, and the fact that in all the desert-kites recorded in the mountainous territory of Palmyra—as also on nearby high ground around the Qaryatein oasis—the large kite enclosures are always located

13. To the pilots of the Cairo-Baghdad postal service who, flying over the region in the nineteen-twenties, were the first to know of the existence of the desert-kites, these striking stone-built structures seemed like giant kites. They were initially interpreted as fortifications used by local peoples in the Roman period to defend their flocks from raids (Maitland 1927; Poidbard 1928, 1934; Rees 1929).


15. Enclosures similar to desert-kites are used to pen in and divide flocks which graze in a state of semi-liberty in shared grazing areas in the southern part of the isle of Krk (Horvatić 2009). The *mrgari* are dry-stone structures equipped with many side rooms (*mrgarići*) into which sheep are driven from the central enclosure so as to separate them. The largest of these structures can hold up to 1,500 animals.


17. Ingold 1993: 121, 123.

beyond watersheds or other breaks of slope, whereas the walls continue for hundreds of metres on the other side of the mountain ridges (fig. 5), would seem to suggest that it was absolutely necessary to conceal the central enclosure from the animals driven between the convergent kite walls.

This feature, shared by all the kites recorded to date in the Western Palmyrena (fig. 6) 19, both in the mountainous regions of Jebel Hayan (21), Jebel al-Khan (36) and Jebel al-Abtar (19) and on the plain south of the Sebkhat al-Muah (2), constitutes compelling evidence in favour of the interpretation of kites as traps used in the large-scale hunting of gazelle herds 20, and probably of other wild ungulates, such as the onager (*Equus hemionus*), oryx (*Orix leucoryx*) and perhaps also the ostrich (*Struthio camelus*)—all species of wild

---

19. The Syrian-Italian survey project has not yet completed its coverage of the region. Therefore the areas in fig. 6 where desert-kites have not been found should not necessarily be considered free of these constructions.

20. *Gazella subgutturosa*, known also as the Persian Gazelle, in the Jordan and Syrian deserts, *Gazella dorcas* and *Gazella gazella* in the Negev and Sinai deserts (Holzer et al. 2010; Nadel et al. 2010).
animal whose behaviour would make it appropriate to capture them using desert-kites, since they all live in groups, follow one another when in movement, make use of fixed migration routes and react to stress by running in the same direction 21.

Moreover, some rock engravings, such as those on the ‘Cairn of Hani’ in Jordan, dated by means of an accompanying Safaitic inscription to a period between the 1st cent. BC and the 2nd cent. AD 22, portray structures which are rather similar to the desert-kites. The ‘Cairn of Hani’ engravings depict human figures driving horned animals into an enclosure equipped with small rooms around the perimeter, and upon which two long walls converge. Externally, other human figures, one of whom is armed with a bow, hunt other animals, probably gazelles. Although many have interpreted this picture as an illustration of gazelle hunting in a kite 23, some scholars prefer to see it as two separate images, one of which represents a pastoral scene with a flock of caprids in an enclosure 24. However, other rock engravings from Burqu’ in Jordan 25 and the Hemma (Hassake) basalt formation in Northeastern Syria 26, clearly portray gazelles and other animals (equids) inside desert-kites, thus establishing an unambiguous association between traps similar to kites and gazelle hunting 27. The kites depicted in the Hemma engravings have been provisionally dated to the 4th and 3rd millennium BC, although an engraving from one site in the Hemma, ‘b n-Naga, shows a kite with what seem to be gazelles inside and a dromedary outside, which therefore suggests that these structures remained in use at least until the Iron Age 28.

The current state of knowledge, though, does not allow us to exclude the possibility that at least some desert-kites were multifunctional, being used—not necessarily contemporarily—both as hunting traps, especially for ungulates, and as semi-domesticated ovicaprid enclosures.

Studies conducted in the region between Damascus and Amman at the beginning of the last century, prior to the extinction of the Persian Gazelle, suggest that the gazelle herds reached maximum size after the birth of the young in April. During the dry season, in July, the herds moved from north to south along the Syrian Desert margin searching for grazing land. During the wet season, when the females were pregnant and had need of more water and richer grazing areas for milk production, the gazelles returned northwards in smaller herds to reach the more humid biotope of the Euphrates Valley 29.

There seem to have been two principal migration routes (fig. 7). The first led to the Damascus region from the north Syrian plains south of Aleppo, following paths which crossed the steppe east of the

Figure 7. Migration routes of the Persian Gazelle between Syria and Jordan: N-S during the dry season, S-N during the wet season (from AKKERMANS & SCHWARTZ 2003: fig. 2.13).

22. HARDING 1953; MACDONALD 2005.
27. The Hemma engravings also show dogs taking part in the hunt, driving the prey into the desert-kite enclosures (VAN BERG et al. 2004: 94).
Syria 89 (2012) DESERT-KITE AND TUMULUS CULTURAL HORIZONS 39

Orontes Valley, while the second went from the Euphrates Valley across the Jebel Bishri and Jebel Abu Rujmayn massifs and the mountain ranges around Palmyra, reaching the basaltic deserts of the Safa, Jebel al-'Arab and northern Jordan.

Recent studies conducted on gazelle bones recovered from sites in the Euphrates Valley, regarding the Late Natufian to PPNB of Mureybet, Jerf el-Ahmar and Dja’de al-Mughara 30, have yielded a more detailed picture and inspired a novel hypothesis with respect to gazelles’ migratory behaviour. Data regarding tooth eruption, the age estimates of young animals based on the wear of the fourth milk tooth (D4) and the formation of rings of cement in gazelle teeth allow an assessment of the season in which they were captured 31. The regression curves constructed indicate that between the late Epipalaeolithic and PPNB the gazelles were mostly caught during the wet season (especially in the autumn and winter) and to a lesser extent during the summer, but that they were hunted (and were therefore present) in the Upper Euphrates throughout the year. On this basis Gourichon and Helmer reject the reconstruction of large-scale migrations of gazelle herds between Northern Syria and Southern Jordan proposed by Legge and Rowley-Conwy 1987 and Moore et al. 2000 (:439-440), arguing rather in favour of more limited seasonal movements of the gazelle herds, fluctuating in size and composition according to resources availability.

One might wonder, though, whether the presence of gazelles in the Euphrates Valley throughout the year and their slaughter in greater numbers in the wet season, which caused Gourichon and Helmer to propose that, in particular during the Pre-Pottery Neolithic, groups of Gazella subgutturosa did not migrate, need or indeed ought to imply that the same circumstances pertained in the following Pottery Neolithic, Chalcolithic or Bronze Age as well. There is, in fact, a lack of detailed studies for these periods regarding estimates of the gazelles’ age at death carried out on bones from stratified archaeological contexts (that would be relevant to the question of whether these animals engaged in annual migrations or not) 32.

Palaeoenvironmental and archaeological evidence resulting from the work of the Italo-Syrian Mission in the Palmyrena 33 suggests that aggradation of aeolian sand in the Palmyra Oasis originating from the deflation of the freshly exposed Sabkhat al-Mouh surface as a consequence of a drop in the former Late Pleistocene and Early Holocene freshwater lake level occurred in the final PPNB-early Pottery Neolithic period, possibly in coincidence with the cooling episode during the world-wide breakdown of the Holocene climatic optimum at ca. 8,200 years BP 34. This phase led to the markedly cold and arid conditions that were observed in a number of high-resolution climate proxies in the eastern circum-Mediterranean region 35. Such a discontinuity has been recorded also elsewhere in the Levant 36.

It is possible that the increase in aridity during this period may have caused a progressive reduction in the availability of food on the Syrian steppe, compelling the gazelle herds to make ecological adaptations to changing resource patterns (mainly the availability of forage) and human interference, undertaking mass migrations in response to changes in seasonality and reductions in the amount of food present 37.

A hypothetical scenario of this sort would explain the widespread occurrence of kites in the Palmyrena and their distribution along a broad front clearly visible in satellite images, which would suggest the movement of significant quantities of animals in the region. It seems clear that desert-kites would be

32. For an exceptional case study from Tell Kuran in the Upper Khabur region of Northeastern Syria dating to the late 4th millennium BC, cf. BAR-ÖZ, ZEDER & HOLE 2011. However, the article does not present information concerning the estimation of the animal killing season.
33. CREMASCHI & ZUIRONI in course of publication.
34. ALLEY et al. 1997; WERSMA & RENSSEN 2006.
35. WENINGER et al. 2006; BERGER & GUILAINE 2009.
effective for capturing large groups of gazelles, but of little use for hunting small groups of animals 38. Migrations involving large herds of gazelles in the Pottery Neolithic and post-Neolithic times would better explain the huge numbers and large sizes of the kites present not only in the Palmyrena, but also in the nearby Qaryatein region, Southern Syria 39 and in Jordan. It should be noted, though, that the absence of a precise chronology for most of the kites currently known 40 and of killing-season estimates for gazelles in settlement sites dating from the Pottery Neolithic to the Bronze Age means that this hypothesis is not verifiable at present.

Various survey projects have identified hundreds of desert-kites along potential gazelle itineraries 41. In the region of our survey, they are particularly numerous in the mountainous strip south-west of Palmyra, along the lower slopes of Jebel Hayan and Jebel al-Abtar and the high ground of Jebel al-Khan which bounds the Wadi Surra to the south, separating it from the Wadi al-Hallabat.

In the course of the first three survey campaigns, the Italo-Syrian project has already identified 78 large traps built from unworked stones, which consisted of large circular (or, more often, polygonal) enclosures of average width 90-100 m, while the kites’ arms or antennae were sometimes more than a kilometre long.

The desert-kites’ location, probably most often on the animals’ migration routes or at crossing points of these, reflects the profound knowledge which the groups of specialized hunters who lived in the Palmyra hinterland had of the Syrian mountains and arid steppe and the animals’ migration paths. As mentioned above, this is also indicated by the fact that all of the desert-kites surveyed in the Western Palmyrena were built over mountain passes or crests, with arms on one side in the best possible position for trapping the advancing herds, which were probably driven forwards by groups of beaters; the large enclosures in which the gazelle were collected and slaughtered were hidden from the beasts on the other side of the watersheds (fig. 8-9). Furthermore, in several cases on the Jebel Hayan and Jebel

---

38. On the hunting strategies of post-Neolithic societies involving the overkilling of wild ungulates and their contribution to the eventual extirpation of a number of wild species, including *Gazella subgutturosa*, see Legge & Rowley-Conwy 1987, Bar-Oz, Zeder & Hole 2011 and Martin 2000.
40. Although most of the available archaeological evidence seems to indicate a concentration of this phenomenon in the Ceramic Neolithic, Late Chalcolithic and EBA (see below, p. 43-44).
al-Abtar kites were interconnected, forming complex and articulated systems of four or five structures joined together by long barrier walls which allowed large herds of animals to be intercepted 42.

Research conducted in the mountains west of Palmyra to date has led to the identification of five different types of kite: A. arrow-shaped, B. circular, C. ‘axe’-shaped, D. trapezoidal, E. star-shaped. Kites belonging to groups A and B are most numerous in the archaeological record of the region. Each group includes variants with respect to the shape of the central enclosure, the number and form of side cells distributed along the enclosure perimeter (fig. 10) and the installations present inside the structures.

This preliminary typological classification coincides with that already devised by Echallier and Braemer on the basis of a larger sample (1995: 42-47, 53): 174 kites, of which 153 are located in Southern Syria and 21 in Central Syria, in the Qaryatein region.

The marked typological uniformity and, especially, the great spatial and typological continuity shown by the kites in their distribution over such a vast area, which extends from the Palmyrena mountain ranges to the Safa and the Jebel al-‘Arab in Southern Syria, makes evident the essential unity of the desert-kite cultural phenomenon. This homogeneity also extends to the region of the northern Jordan basaltic desert, where Helms & Betts 1987 found similar kite types.

A further aspect of considerable interest in the study of desert-kites which the Italo-Syrian project has brought into clear focus, and upon which there has hitherto been little reflection during the scholarly debate, regards their orientation. In the centre (the region between Qaryatein and Dumeir) and south (between the Jebel al-‘Arab massif and the Southern Safa) of Syria, out of 174 desert-kites examined two prevailing kite-arm orientations are found: the first, most numerous, group is aligned to the east and east/southeast, whereas the second, less numerous, group opens to the west and west/northwest 43.

The same orientations are found in neighbouring Northern Jordan (ca 210 kites), although here the majority of kite-arms open to the southeast 44. Kites in the Sinai (around 30) exhibit the same preferred orientations towards the southeast and northwest 45.

Echallier & Braemer 1995 (: 54) determined this east/southeast and west/northwest bipolarism in kite orientation, associating it with the directions of the dominant winds in Southern Syria in spring and autumn and the animals’ migration routes.

The 75 desert-kites identified so far in the mountainous region west of Palmyra of which it is possible to determine the orientation with certainty, exhibit a significant pattern in the arrangement of their arms (fig. 11). Most of the kites spread along the eastern surveyed part of the Jebel al-Abtar range and the Jebel al-Khan have divergent antennae pointing southwards (37% of the total), while the traps located on the mountain slopes of the Jebel Hayan are mostly aligned towards east and southeast (29%), although a not insignificant number of kites (which appear to be concentrated on the southern slopes of the Jebel

42. This phenomenon has also been recorded in the Hemma and the North Jordan desert (Betts & Yagodin 2000: 40; Van Berg et al. 2004: 93).
44. Helms & Betts 1987: 43, fig. 2.
Hayan above the Wadi Surra valley) point northwards (28%). Very few kites, all in the Jebel al-Khan, open to the west (4%).

These topographic orientations of the kites cannot be considered chance occurrences. Even though they may probably be partly predetermined by the NNE-SSW orientation of the Palmyrena mountain ranges, comparison with the gazelle migration routes recorded in the early twentieth-century ethological literature suggests that the north-facing traps (21) might possibly have been used to capture animals arriving from the north during the dry season, when the gazelle herds were largest after the birth of the young. It is possible that the 50 kites which opened to the south and east/southeast were designed to intercept the smaller groups of animals which, during the wet season, travelled northwards from Southern Syria and Northern Jordan, towards the Euphrates. This would help to explain the clear disproportion between east and south/southeast facing kites (ca 67%) and those which opened northwards (ca 28%).

Although these preliminary observations need to be confirmed by future fieldwork and the analysis of a larger kite sample, the archaeological data collected so far would seem to indicate that in the mountainous territory of the Western Palmyrena specialized and (to some degree) controlled large-scale hunting was carried out, based on a profound knowledge of the mountain and arid steppe environments and the behaviour and migration routes of gazelle. Data regarding the orientation of desert-kite arms support the hypothesis that these hunts were conducted during two seasons of the year (summer and winter), but were perhaps concentrated above all in the humid season, when the gazelle migrated to northern Syria, passing through the Palmyra Desert.

This evidence might perhaps furnish some indication concerning the hunting strategies adopted in managing and selecting the gazelle herds, and thus avoiding their extinction, which was caused by
indiscriminate hunting using firearms during the 19\textsuperscript{th} and 20\textsuperscript{th} cent. In particular, the concentration of gazelle hunting in the rainy season, which brought smaller migrating herds to the vicinity of Palmyra (rather than during the summer migration, when the herds increased greatly in size due to the large number of animals born in the spring), would have meant the avoidance of large-scale killing of newborn animals and perhaps was part of a strategy designed to ensure the conservation of the species.

The mountains in the Palmyra region were hence home to well-organized and cooperative gazelle hunts, which must have involved the use of elevated numbers of efficiently coordinated beaters and specialized hunters. These groups of hunters probably made use of the large amounts of salt available in nearby Sebkhat al-Mouah to conserve the meat, in similar fashion to the semi-nomad gazelle-hunting and salt-gathering Solubba tribe, which peopled the Palmyrena during the 19\textsuperscript{th} and early 20\textsuperscript{th} cent. The salt economy thus most probably played a crucial role in the subsistence strategy based on the large-scale hunting of gazelle and other ungulates practiced by specialist hunter groups in the Palmyra region.

If the function of desert-kites is still a debated issue, a still more complex question which provokes greater discussion is that of their date. Kites are only rarely associated with archaeological materials and salt-gathering Solubba tribe, which peopled the Palmyrena during the 19\textsuperscript{th} period, as indicated by the ‘Cairn of Hani’ engraving.

Fitting the kites recorded by the survey of the mountains of the Western Palmyrena into a chronological framework is thus a complex operation, which may be attempted by means of the following steps:

a. systematically recording and classifying the different types of constructions found in the region (and their variants), together with a programme of archaeological trenches in kites belonging to the various types present.

b. an integrated programme of age determinations: radiocarbon for any organic material found in the trenches and IRSL (Infrared Stimulated Luminescence) for palaeosols preserved beneath the stone blocks composing the kite cells, which would furnish \textit{termini post quem} for the building of these hunting constructions. A similar multi-dating project recently conducted in the Negev and Sinai deserts...
established that the region’s kites were built between the late 4th and early 3rd millennium BC, were used intensively during the 3rd millennium, and fell into disuse before the mid-2nd millennium BC.

Similar attempts at absolute dating of the Western Palmyrena’s desert-kites may be supported and facilitated by relative chronological information obtainable from the archaeological record. In some cases, it may be seen that certain kites are cut by the construction of others, or covered by funerary tumuli, as at the great Rujem al-Majdur burial ground, a necropolis made up of more than thirty tumuli placed on the summit of a flat-topped limestone ridge which runs eastwards from the Jebel al-Abtar range and dominates the mouth of the Wadi al-Hallabat (fig. 1; cf. below, p. 46-49).

A few surface potsherds apparently datable to the second half of the 3rd millennium BC (Early Bronze Age IV) and a probably contemporary lithic industry were found scattered on the surface of the Rujem al-Majdur cairn field. In any case, pottery from the Roman and Islamic periods is also present, so the association between these surface finds and the funerary structures appears problematic.

Eight tumuli, two satellite burials associated with the tumuli and a separate grave were subjected to archaeological excavation by the Italo-Syrian mission in 2009 and 2010. In many cases the tumuli had been violated, probably in Antiquity, and yielded little identifiable material (cf. below, p. 48). Furthermore, the poor preservation state of the human bone makes C14 dating difficult; the cemetery is close to the Sebkhat al-Muah salt lake, which has led to the almost complete destruction of the osteological material in the tumuli.

At present, whilst waiting for the results of the radiocarbon determinations of the few organic finds recovered from two tumuli (charcoal fragments), it is only possible to speculate on the dating of the Rujem al-Majdur cemetery. The excavation of further tumuli and (where possible) their dating by means of radiocarbon will allow the establishment of a more precise chronological framework for this important burial ground.

In any case, for our present purposes it is important to take note that several tumuli were built on top of the arm of a desert-kite (fig. 14). In the future the absolute dating of these tumuli will provide us with a terminus ante quem for the construction of the Rujem al-Majdur kite.

There are thus many important questions still to be resolved, in particular with regard to the desert-kites’ chronology and typology, which must be addressed by future multidisciplinary fieldwork. The extraordinary concentration of kites in the mountains and high ground in the Western Palmyrena is destined to increase further as research using satellite images and on the ground continues. However, their different state of preservation (from heavily eroded to often rather good) and their relationships to the palimpsest of archaeological sites discovered in the region make it already possible to outline a complex and articulated situation regarding the exploitation of the mountain and arid steppe environments around Palmyra and the routes which crossed them in protohistoric and pre-classical times. The continuation of research in the directions described above will surely lead to considerable improvements in our understanding of the chronology and culture of the ‘Desert-kite Horizon’ and its relationship with the cultural horizon of the tumuli, as well as of our appreciation of the resource-use patterns and strategies employed in the Palmyrena region and the interaction processes between mobile groups of specialized dry steppe hunters, transhumant pastoral groups and the sedentary agricultural and trading communities of the nearby oases of Palmyra and Qaryatein.

56. HOLZER et al. 2010: 8; NADEL et al. 2010: 981-990.
57. Bones were probably almost completely destroyed by the chemical action of the saline aerosol present in the area; the salt was transported into the tumuli by the rain.
58. Many of the tumulus burials subjected to archaeological excavation in the Arabian peninsula, the southern Levant, Jordan and Syria have been dated to the late 3rd or early 2nd millennium BC (cf., e.g., FUR & ADACHI 2010; KEPINSKI 2006; NISHIKI 2010: 42-43; STEIMER-HERBERT 2004).
During the 2008-2010 survey seasons a number of cairns and tumuli were identified in the region located south-west of Palmyra (fig. 12) 59. The widespread occurrence of these structures in many of the surveyed areas is a key to understanding the importance of the phenomenon in a region where this kind of archaeological evidence was previously unknown.

Megalithic burial structures have been extensively studied in the Southern Levant, where research began in the early thirties, in particular thanks to the pioneering studies conducted by Stekelis 60. Detailed investigations have yielded typological and chronological frameworks regarding megalithic burials which constitute the best source of information for the study of “megalithism” in the Near East 61.

59. Philip and Bradbury have rightly questioned the use of the term “tumulus”, which, in their opinion, strongly connotes these structures with a funerary function that in many cases is not clearly demonstrated (Philip & Bradbury 2010: 141-142). Nevertheless for the present article we keep both definitions for those structures that have been only surveyed and not investigated in detail. On the other hand, we prefer to keep the “tumulus” definition for those located at the site of Rujem Al-Majdur since, to date, all of the structures examined are funerary in character.

60. Stekelis 1935; Steimer-Herbet 2004: 8-12.

61. Zohar 1992: 44-47; Steimer-Herbet 2004: 31. The research in the southern Levant recognised the “dolmen” as the most common type of megalithic burial in the region (Prag 1995), whereas the preliminary results from Palmyra seem to suggest a different typology in Central Syria. Future studies will need to focus on this aspect and verify the presence of a diverse tradition of megalithism (either in terms of chronology, burial culture and/or religious/tribal beliefs).
Northern Levant and Eastern Syria long remained *terra incognita* in this respect and although significant evidence was recorded during the fifties, only recently have projects started to conduct intensive surveys in the region. These have resulted in the discovery and investigation of several previously unknown megalithic cemeteries.

The preliminary results of this study are part of this piece of research, together with which they start to form a sizeable set of data that fills the gap in the northern Levant and extends the limit of current knowledge of the megalithic burials in the Near East.

The cairns/tumuli surveyed by the joint Italo-Syrian mission are located generally either on the top of mountains that cross the Western Palmyra region or (less frequently) on their slopes. They are usually in clusters of 4-5, thus representing in most cases a visible reference point for those travelling to or from Palmyra. This aspect is well known also from other regions of the Levant and particularly relevant, since it underlines the multiple roles that tumuli and cairns must have played in ancient nomadic societies as stable elements of the landscape.

A few of them are, however, clustered in the lower plain (fig. 12, nos. 186, 240, 251, 287, and 324): the reasons for this might lie in a different use of the landscape, with less need to “mark” it with structures visible from far away. Their location at the mouth of the Wadi Hallabat is, however, problematic: though also in this case similar evidence has been already recorded, a clear explanation has not yet been given. It has been suggested that the position of megalithic structures in the low plain might reflect ancient borders between the semi-arid steppe and the “green zone” covered with more vegetation, but such a correlation seems, in the case of Palmyra, still premature.

Within the surveyed area, a significant tumulus concentration has been observed on the top of the small hill called in Arabic Rujem al-Majdur, some 30 kilometres SW of Palmyra (fig. 13). At present, in the area 55 different structures are known, among which 33 are tumuli; the remaining are graves, funerary structures of different shapes and dimensions located nearby the tumuli, or other structure types like enclosures that have not yet been properly investigated.

Rujem al-Majdur is thus an important source of information for the understanding of the tumuli in the Palmyra region, since a few of them looked as if they were still “untouched”, that is not plundered as happens frequently with this kind of funerary structure, whereas others, albeit probably plundered, were apparently still well preserved. All of these structures are positioned on the top of the ridge; at present, no significant traces of settlement have been located in the surrounding plain.

Eight of the tumuli, together with a couple of peripheral structures located in their proximity have been excavated; among these, three tumuli have yielded significant information concerning funerary rituals, as well as on their role as megalithic structures in the landscape west of Palmyra. The following consists of a preliminary presentation of the results obtained; some hypotheses will then be put forward on the basis of this first available data.

63. See the recent work in the area of Jebel Bishri, Nishkay 2010; Lönqvist 2010 and Lönqvist & Lönqvist 2011; and in the Northern Levant, Philip & Bradbury 2010.
64. Steimer-Herbet 2004: 93.
65. More recently see also the case of the tumuli of the Bishri region (Oonuma & Al-Khabour 2010).
67. Ibid.
68. Preliminary results obtained by the geoarchaeological component of the Syrian-Italian mission stress the occurrence of a humid period followed by a dry period starting during the final PPNB-early Pottery Neolithic (see Cremaschi & Zerbini in course of publication). If the correlation between environmental change and the emergence of the ’Tumulus Cultural Horizon’ is accepted and the explanatory hypothesis of Steimer and Braemer is adopted, we should then assume a quite early dating for the tumuli located in the low plain. At present, however, these tumuli have not yet been the object of archaeological excavation.
69. The excavation was conducted by Y. Kanhouche, E. Sam’an, M. Hammoudi (DGAMS), G. Garna, F. Garbasi and M. Iamoni (Universities of Milan and Udine).
Figure 13. General view of Rujem al-Majdur from the north. Note the hilltop tumulus positions (© D. M. B.).

Figure 14. Surveyed structures at Rujem al-Majdur. Note the hilltop tumulus positions (© GIS and map preparation A. S.).
Tumulus 221 (T221, fig. 15-16) is thus far the largest tumulus investigated at Rujem al-Majdur: it describes a circle with a perimeter of roughly 10 m. The structure is organised with an external circle, which contains a fill of irregularly placed stones. The inner sector is formed by the cist of the tumulus, which was made up by positioning a large slab on the short side of the cist and placing big stones in order to create an irregular border. The cist would have been covered by other stone slabs that sealed the funerary chamber of the tumulus: of these, only one was still in situ, the others were probably removed in antiquity by the grave robbers that plundered the tumulus. However, the irregular disposition of the stones poses some questions about the real limits of the cist, since this is not as clear as has been reported, for example, with respect to other sites in Palestine. 

The later intrusion by plunderers might have indeed modified the position of the stones, thus modifying the original extent of the inner cist. The cist was filled with stones and earth as a consequence of the intrusive actions of the grave robbers. No artefacts were found in the excavation of T221 apart from a few intrusive Roman potsherds, which were recovered from the upper stone levels.

Unlike what was observed in other tumuli (see in particular Tumulus 213 below), no artificial flooring was detected at the bottom of the cist.

The external structure was well-organised: the stone rings were particularly well preserved on the northern side of the tumulus. A trench was dug in order to investigate the building technique: this has shown that a basic, but quite resistant mud “mortar” was used to fix the position of the stones. This particular technique has been observed in some other tumuli, but not in all: the remaining ones (which constitute at present the majority) were built with a dry-stone technique. A notable and very important
feature of T221 (that makes it unique among the surveyed tumuli of Rujem al-Majdur) is the presence of two vertical stones that seem to form a sort of marker on the southern side of the structure. Such features are not unknown among similar structures in the Levant, in particular in the Negev and Sinai Peninsula, where the presence of vertical stones in small groups has been generically interpreted as evidence of cult sites (Zohar 1992: 47). However, although the tumuli of Rujem al-Majdur are likely to have been associated with specific rituals or funerary cults, this phenomenon needs still to be more thoroughly investigated and any connection with the vertical stones of T221, though possible, is still to be demonstrated. For the time being, we merely observe that the vertical stones might more simply serve to emphasize the major importance of T221 among the many tumuli located at Rujem al-Majdur (this would be in agreement with T221’s monumental dimensions). Together with the vertical stones occurred a semi-round stone structure formed by irregular stone blocks. The nature and function of this structure is yet to be ascertained.

The second tumulus excavated was T213 (fig. 17-18). It is located in the central western side of Rujem al-Majdur and is one of the largest tumuli. The external limits are broadly square shaped with sides of about 5 m; its elevation above the surrounding plain is more than 1 m. Although a generic alignment is visible, the stones do not describe a precise perimeter: as in the case of Tumulus 221, only the external (and lower) stones are more regularly structured.

The inner part or cist of T213 was roughly oval and measured 2 x 1 m; the perimeter, formed by large stone slabs and massive stone blocks, is much clearer than that of T221. Stones of smaller dimensions formed an upper layer roughly 60 cm thick that sealed the top of the cist: the northwestern part of this layer was composed largely of earth, suggesting the presence of a robbing pit, through which T213 was probably plundered. At the bottom of the cist, a deposit of earth and stones covered a layer rich in ash and charcoal that lay directly above the tumulus floor and apparently extended beyond the limit of the cist. It yielded a number of human bones in a very poor state of preservation. No grave goods were found within the cist.

Next to the tumulus, at least one further funerary structure was observed, Grave 463: although the grave was empty, its presence is significant, as it highlights the pivotal role that T213 had as funerary structure. Although T213 cannot be compared to more monumental tumuli like those excavated at Rogem Hiri, Grave 463 is indeed a sign of the complexity of T213, shared with many other tumuli that cover the flat-topped hill of Rujem al-Majdur. The presence of peripheral structures might suggest that the tumuli functioned as funerary reference points for secondary graves, i.e. possibly for the burials of members of one or more families connected to a single ancestor.

The last interesting tumulus investigated was T302. Its excavation was only begun during the 2010 season and consequently the following results are provisional; however, it appears to be of paramount importance, since it confirms the archaeological information about the presence of funerary rituals and adds data that might be crucial for the chronology of the necropolis.

T302, like T213, is broadly square, with sides measuring ca 6 m (fig. 19-20); its perimeter, although less regular than that of T213, is well visible and formed by a line of large-sized stone blocks.
Figure 17. General view of Tumulus 213, from the east (© D. M. B.).

Figure 18. Plan of Tumulus 213 with satellite grave G 463 (© A. S.).
Figure 19. General View of Tumulus 302 with the excavated cist, north towards the upper right corner of the picture (© G. Garna).

Figure 20. Plan of Tumulus 302 (© A. S.).
(especially on the northern side). The internal structure of the tumulus, though, is less comprehensible, since it contained an irregular fill of smaller stones. Unlike the two previous tumuli, no clear traces of later intrusions were found. The internal cist of the tumulus was located approximately in the centre, with a perimeter larger than those excavated in T221 and T213.

The cist was trapezoidal and, as in T213, had a floor formed by a compact layer of reddish earth: the latter might have been the result of trampling activity, but one cannot rule out the possibility of an intentional floor laid in a coarse mud mortar 79. The most important feature of T302 was the presence of an ash layer with bone fragments 80 lying directly on the floor, concentrated in the northeastern sector of the cist. This phenomenon matches the evidence from T213, thus suggesting the possible existence of some sort of ritual activity in connection with the construction of the tumulus.

Ongoing C14 determinations of charcoal fragments from tumuli T213 and T302 will make it possible to obtain absolute dates for these structures and the Majdur cairn field.

To sum up, T221, T213 and T302 furnish significant data regarding the role of tumuli in the cultural horizon of nomadic pastoralism in the Western Palmyrena as well as on the funerary rituals that were performed at Rujem al-Majdur. Although the evidence is still limited, some conclusions can be put forward on the basis of the information gathered from the excavations, as well as from the general distribution of the tumuli at Rujem al-Majdur and in the surveyed region.

As emerged from the previous discussion, only a few words can be said at present about the chronology of the tumuli. The general chronology accepted for cairns and tumuli in the Levant and the Western Arabian Peninsula suggests their concentration in the Chalcolithic/EB/early MBA 81, although the occurrence of tumuli in the Negev and Northern Jordan already during the Late Neolithic has also been observed 82. The preliminary data available for the Palmyra region seem to agree with this framework.

At the same time the excavated tumuli stress once more the general fragility (attested also elsewhere 83) of the material evidence associated with the “Tumulus Cultural Horizon”, which often hinders a more precise dating of the tumulus remains. The different approach towards the chronology problem discussed above might open a new way of investigating the archaeological evidence in the region around Palmyra (see above, p. 39-40). The elaboration of a chronological model more suitable to the archaeology of the Palmyra Desert, based on the archaeological evidence from the region and not on superregional chrono-cultural schemes from Western or Eastern Syria 84, will be a key factor in the comprehension of the tumuli phenomenon 85. Further investigation of tumuli (through the study of the related material culture and C14 determinations) will give on its turn a significant contribution for the solution of this dating problem.

As for the function of the tumuli, in the first phase of our research two aspects can be highlighted on the basis of the available archaeological evidence: the landmark and funerary functions of these structures.

With reference to the former, we have already observed that all of the tumuli are located on the top of low or higher mountain ridges or, in only a few cases, on their slopes. This confirms a common

79. The compactness of the soil as well as its regularity suggests an artificial origin (although also in this case no vegetal inclusion has been observed).

80. Though some of these appeared to be animal bones (in particular of birds), their very bad state of preservation as well as their reduced dimensions (no complete bones have been found, in most cases they were only very small fragments) suggest extreme prudence; careful examination by an anthropologist and an archaeozoologist is required for precise identification.


83. STEINER-HERBET 2004: 22.

84. These are usually tell-based sequences that generate the commonly used Neolithic/Chalcolithic/Bronze/Iron Age chronological systems: these might not suit archaeological evidence from nomadic/pastoral modes of subsistence (in this regard, see also ZARINS 1986 and 1992 for the identification of a different cultural horizon — the so-called ‘pastoral technocomplex’— in the Arabian Peninsula, with a relative chronology).

85. On the other hand, it should not be forgotten that in some cases well-dated materials with clear parallels in the above-mentioned chrono-typological sequences have come from the excavation of some tumuli, (see for ex. HAIMAN 1992: 32; FUJI & ADACHI 2010: 68: fig. 7).
characteristic of tumulus and cairn distribution in the Levant, i.e. their importance as landmarks. The landmark function (albeit, as noted above, not universal, i.e. not applicable to all of the surveyed tumuli) is documented also by historical texts from Mari, where tumuli seem to be well known in the cultural horizon of the Mari Kingdom. They apparently mark the transhumance of tribal groups: although they are explicitly said to be funerary monuments (humusūm or rāmum) of ancestors (e.g. deceased leaders), their position also indicates the zone of control of each tribe.

The possibility of positioning a tumulus outside what were the normal boundaries of the tribe’s pasturelands did not represent necessarily an intrusion into the territory of another tribe, but was somehow tolerated, as textual evidence from Mari again suggests. This opens interesting perspectives for the future study of the tumulus phenomenon: their relevance as tribal points of reference in the landscape might reflect a more “fluctuating” situation, i.e. the borders as represented by tumuli distribution may not reflect rigid territorial subdivisions, rather simple areas of influence whose limits should be understood only as reference points for tribal transhumance/movements. The reasons for this lie firstly in the nomadic-pastoral world, where different tribes try periodically to extend their borders by positioning tumuli in frontier areas. Frontier zones are thus occupied by tumuli of different tribes, which, by their presence, underline the reciprocal limits of influence and/or pastureland use.

All of these hypotheses, however, cannot be demonstrated by solid archaeological evidence, since it is not possible, at present, to understand whether different tumulus types could be associated with diverse nomadic tribes or tribe segments. Several types of megalithic burials have been recorded and an attempt in this sense has been already made by Lönqvist, who has proposed a relationship between the tumuli located on the Jebel Bishri and the Suteans, basing her conclusion on historical data as well as on the occurrence of tumuli in non-arable lands. Recent research, however, has located similar structures also in regions suitable for agriculture, thus undermining Lönqvist’s conclusions and warning against making equations between material culture and ethnicity too easily and too fast.

A second aspect of the landmark function which is worthy of discussion concerns the visibility of the tumuli in the surrounding landscape. Cairns and tumuli are frequently positioned not only on the top of mountains and hills, but also on mountain valleys and river courses as well as in areas that are strategic key places for the overseeing/control of wider regions, like the high rocky terraces along the Euphrates that dominate the rivers and caravan routes.

The location of many of the surveyed cairns and tumuli on the top of Jebel Hayan, Jebel al-Khan and Jebel al-Abtar might thus also indicate the presence of ancient caravan routes going southwest from the Palmyra Oasis along the Wadi al-Hallabat. The presence of tumuli and cairns (and their visibility from the lower plain) could therefore signal an attempt to fix or mark the use of precise caravan ways directed to and from Palmyra. As has already been proposed, it is thus perhaps possible to interpret the tumulus positions not only as pastoral landmarks, but also as “routemarks/caravanmarks” for the desert. The latter might furthermore underline the control exerted by nomads on the commercial routes that crossed the desert.

87. Charpin 2010: 244.
88. Charpin 2010: 244-245.
94. Ibid.
96. The crossing could also have been difficult because of possible raiding between different tribes (Charpin 2010: 242).
Texts from Mari confirm the importance of pastoral groups for crossing the desert, due to their knowledge of this environment: in a reply letter to his father, Yasmakh Addu declares to have consulted the Uprapeans about the location of the wells across the desert 97. The Mari texts also report the transhumance of Benjaminite Bedouins from the Middle Euphrates to the kingdom of Qatna, in order to reach the grazing lands in Western Syria 98.

The historical sources thus demonstrate once more the importance of pastoral nomads for urban societies and the continuous interaction that must have occurred between them, especially after the development of long-distance trade during the 3rd and 2nd millennium bc 99. The absence of clear grave goods from the tumuli of Rujem Majdur does not allow us to go further with this analysis; it is however to be expected that the ongoing excavation of other megalithic structures with the recovery of more information will help in this respect.

Although the function as pastoral and tribal landmarks of the tumuli in our study area has to be more thoroughly investigated, their use as burial structures is clearly indicated by the recovery of human bone fragments from nearly all of the eight excavated structures. Nevertheless, the bones were never in anatomical position; rather, they came from the fill of the internal chambers of the tumuli (plundered burials). In the case of T213 and 302, they were recovered also from the ashy layers located at the bottom of the cist. As already noted, evidence of ash layers underneath tumuli has been recorded in the Sinai Peninsula 100. However, in all of these cases the tumuli were built in connection with a settlement located nearby and the ash has been recently interpreted as possible evidence of funerary activity contemporary with the occupation 101. As mentioned above, at Rujem al-Majdur no settlement has been yet uncovered; the presence of human bones suggests consequently a direct connection between funerary practices and the building of the tumuli.

In the absence of more precise information that anthropological and archaeozoological study of the excavated bones will furnish, we cannot propose precise interpretations at the moment. A ritual function with banquets and sacrifices for tumuli has been already suggested 102: the role that tumuli played in the visual memory of ancestors must have been crucial in a society based on family lineages. As Porter said “…not all the deceased become ancestors, and the process of becoming an ancestor involves protracted rites and stages in burial treatment that incur more than one inhumation” 103. From this perspective it is interesting to observe that only two tumuli at Rujem al-Majdur have so far revealed traces of ashes. Their accurate study will thus provide us with crucial evidence for the understanding of the complex phenomenon of mortuary rituals in the pastoral societies of the Western Palmyrena.

**Final remarks**

The present research in the Western Palmyra Desert has just begun and the evidence is still limited, but promising results have already allowed us to highlight a number of characteristics of the ‘Tumulus and Desert-kite Cultural Horizons’ at Palmyra. The combined presence of tumuli and desert-kites in the Western Palmyrena represents crucial evidence for a more detailed study of the human response to environmental changes that shaped the region from the final PPNB-early Pottery Neolithic onwards. The introduction of new subsistence strategies (specialized cooperative hunting and mobile pastoralism, represented by desert-kites and tumuli respectively) is thus the likely result of an adaptive response by

---

98. JOANNES 1997: 398.
100. HAIMAN 1992: 29.
101. Ibid.
103. PORTER 2002: 8.
human communities to encroaching aridity and mirrors the necessity of a new and more intensive tribal control of the territory and a new ideological perception of a changing landscape.

That this may be also interpreted as the sign of an increased level of social complexity would seem reasonable: the number and dimension of the kites and some of the tumuli and the organization of many kites in chains of interconnected traps and of many tumuli in extensive burial fields, such as in the case of the Rujem al-Majdur necropolis, can be explained only as the result of more intensive modes of cooperation 104.

The preliminary character of this study does not allow us to go much further in this direction, but it is expected that future research will make it possible to increase the precision of this reconstruction. It is hoped that the systematic survey of more desert-kites and tumuli, together with the excavation of a significant number of structures from different sites and of different types within our study region will offer rich archaeological data. The latter will allow a thorough investigation of the many aspects (chronological, functional, ideological and religious) of the “Tumulus and Desert-kite Cultural Horizons” that the scarcity of the information available at present permits us only to outline, and thus to better insert the ‘Palmyra pastoral and hunting techno-complex’ into the wider framework of the other Levantine desert societies of Syria, Jordan, the Negev and Sinai.

BIBLIOGRAPHY


AL-MAQDISSI (M.) 2000 “Note sur les sondages réalisés par Robert du Mesnil du Buisson dans la Cour du sanctuaire de Bêl à Palmyre”, Syria 77: 137-158.


104. See for ex. the case of the Negev, where the combined presence of desert-kites, tumuli, shrines, enclosures and attached-room architecture during the 6th millennium BC (‘Early Timnian pastoral complex’) has been interpreted as an evolution of a tribal society in comparison with earlier smaller-scale social formulations (ROSEN 2009: 61).
Betts (A. V. G.)

Betts (A. V. G.) & S. Helms

Betts (A. V. G.) & K. V. Russell

Betts (A. V. G.) & Y. Agodin

Blockley (S. P. E.) & R. Pinhasi

Blunt (A.) & W. S. Blunt
1879 Bedouin Tribes of the Euphrates, London.

Bounni (A.) & M. Al Maqdisi
2001 “Note sur un sondage dans la cour du sanctuaire de Bêl à Palmyre”, Topoi 11: 17-34.

Bradbury (J.) & G. Phillip

Braemer (F.), J. Échallier & A. Tariq
2004 Khirbet al Umbashi: Villages et campements de pasteurs dans le “désert noir” (Syrie) à l’âge du Bronze, Beyrouth. (BAH 171).

Buccellati (G.)

Burckhardt (J. L.)

Charpin (D.)
2010 “The Desert Routes around the Djezireh Bishri and the Sutean nomads according to the Mari archives”, Al-Rafidan 2010: 239-245.

Crawford (O. G. S.)
1929 “Note by editor”, Antiquity 3: 400-401.

Cremaschi (M.) & A. Zerroni
in course of publication “The prehistory of Palmyra (Tadmor, Central Syria): environmental changes and cultural dynamics between the late Pleistocene and the early Holocene”, F. Bertoncello et al. (dir.), XXXIes Rencontres internationales d’archéologie et d’histoire d’Antibes: Variabilités environnementales, mutations sociales: natures, intensités, échelles et temporalités des changements, Antibes.

Durand (J.-M.)

Échallier (J. C.) & Fr. Braemer

Fowden (G.)

Fuji (S.) & T. Adachi

Gourichon (L.)

Gourichon (L.) & D. Helmer

Haiman (M.)

Harding (G. L.)

Helmer (D.)

Helms (S.) & A. V. G. Betts

Holzer (A.) et al.

Horvatic (B.)

Ingold (T.)
Mediterranean from 25,000 to 5000 years BP: setting the environmental background for the evolution of human civilization", Quaternary Science Reviews 25: 1517-1541.


1997 Lithics after the Stone Age: A Handbook of Stone Tools from the Levant, Walnut Creek.


2006 “Climate forcing due to the 8200 cal BP event observed at Early Neolithic sites in the eastern Mediterranean”, Quaternary Research 6: 401-420.


WILL (E.) 1957 “Marchands et chefs de caravanes à Palmyre”, Syria 34: 262-277.

