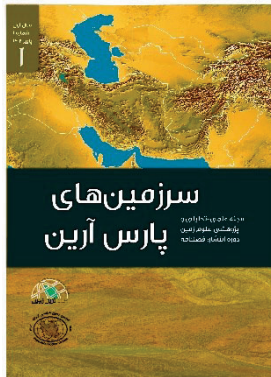


# مروری بر بادبادک صحرا: آخرین چشم انداز

حمید نظری<sup>۱</sup>

## چکیده

بادبادک‌های صحرا را می‌توان به‌عنوان یک کلید انتقال احتمالی از عصر شکارگری-جمع‌آوری غذا به دامداری نام برد که امروزه با توسعه روش‌های سن سنجی کاسموژنیک و لومینسانس می‌توان قدمت آن را تعیین کرد. ستره پراکنش شناخته شده بادبادک‌ها ی صحرا بسیار وسیع است، از عربستان و خاور نزدیک، تا ارمنستان در قفقاز و منطقه آرال - کاسپین، یعنی جنوب باختری قزاقستان و باختر ازبکستان). اگرچه اندک گزارشی از وجود بادبادک‌های صحرا و یا امکان وجود آن در فلات ایران در دست داریم اما با توجه به پراکندگی گسترده بادبادک‌های بیابانی از مصر در غرب تا قزاقستان در شرق، چندان دور از ذهن نیست که انتظار داشته باشیم این پدیده پیش از تاریخ را در خاک ایران نیز مشاهده کنیم. هنر صخره‌ای (سنگ‌نگاره‌ها) در نزدیکی برخی از بادبادک‌ها نشان می‌دهد که شکار می‌تواند نشان دهنده تلاش اجتماعی بزرگی باشد که توسط مردم چندین گروه با هم انجام می‌شود و گاه نشانگر مفاهیم مذهبی و آیینی روزگاران کهن نیز می‌باشند. «بادبادک‌های صحرائی» سازه‌های سنگی هستند که از دو دیوار بلند و کم ارتفاع به نام آنتن ساخته شده‌اند که در یک محفظه پایانی که گاه با چندین سلول کوچک کناری همگرا می‌شوند. شکل آنها و شواهد باستان‌شناسی نشان می‌دهد که این سازه‌های سنگی گسترده ممکن است به عنوان تله بازی عمل کرده باشند که برای گرفتن و کشتن تعداد زیادی از حیوانات وحشی طراحی شده‌اند. بادبادک نقطه عطفی است که روشی برای اشغال قلمرو را نشان می‌دهد. این یکی از ویژگی‌های معماری گروه‌های اجتماعی است که بازتابی از قلمرو خود را به جا می‌گذارد. با این حال، این افراد گاهی اوقات آثار بسیار کمی از خود بر جای گذاشته‌اند که امکان شناسایی آنها را بسختی فراهم می‌کند. با توجه به گستردگی و تراکم این سکونت‌گاه‌ها، بادبادک پدیده‌ای عظیم است که احتمالاً نقش آن در توسعه جوامع در مناطق خشک بسیار تعیین‌کننده بوده است. در باستان‌شناسی سنتی، گروه‌ها و جوامع انسانی نخستین اغلب با سکونت‌گاه‌ها و شیوه‌های معیشت تعریف و شناسایی می‌شوند بنابراین، بادبادک‌ها و کارکرد آنها در توسعه گروه‌های انسانی در گذر از عصر شکارگری به اهلی نمودن حیوانات و دامداری به عنوان یک پدیده، چالشی پیش روی باستان‌شناسی نوین است. بادبادک‌های صحرا از شرق مدیترانه تا شرق دریای کاسپین (خزر) با کمتر ساختار مشابهی در فلات ایران دیده و گزارش شده است! فلات ایران به عنوان تنها پیوندگاه مناسب سرزمین‌های دو سوی خاوری و باختری کاسپین در زمانی که سرزمین‌های شمالی تقریباً یخ زده و غیر قابل عبور و سکونت بوده‌اند دست کم در بخشی از گستره مرکزی خود با دریاچه‌ای کهن و سترگ در طی هولوسن پوشیده شده بود. وجود چنین دریاچه‌ای کهنی را در پهنه کویر مرکزی فلات ایران در ابتدای هولوسن می‌توان دلیلی بر نیافتن نشانه‌ای از بقایای بادبادک صحرا باشد، حداقل در سطح توپوگرافی پایین تر از ۸۵۰ متر باشد!

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# A review to the Desert Kite: State of the Art!

Hamid Nazari<sup>2</sup>✉

## Abstract

Although from the beginning of the historical period, known as the emergence of the writing, it has not passed more than several thousand years, but the history of human evolution can be rooted in an era much older than the one seen: in the age of the hunting-gathering culture! Hunter-gatherer culture was the way of life for early humans until around 11,000 to 12,000 years ago. The lifestyle of hunter-gatherers was based on hunting animals and foraging for food. Desert kites could be mentioned as a probable transition key from the age of hunting-gathering food to pastoralism, which can be dated today with the development of cosmogenesis and luminescence methods. 'Desert kites' are stone constructions made of two long low walls called antennae that converge into an enclosure flanked or not by several small cells. Their shape and archeological evidence suggest that these extensive stone structures may have functioned as game traps, designed to capture and kill large numbers of wild animals. The kite is a landmark that reveals a way of occupying territory. It is an architectural feature of social groups, which hence left a reflection of their territory and catchment. However, these people have sometimes left very few traces enabling their identification. Considering the extent and density of these settlements, the kite is a massive phenomenon whose role was probably crucial in the development of societies in arid regions. It has been seen from the eastern Mediterranean to the eastern Caspian, which suggested finding less of the same structure in the Iranian plateau, as the only suitable linkage, when the northern lands were nearly frozen! Thus, the perspective is reversed from traditional archaeological research, where groups are most often identified by their domestic settlements, with their still undefined modes of subsistence. Kites, as a phenomenon, are therefore a challenge for the archaeology that requires creative and novel approaches.

## Graphical Abstract



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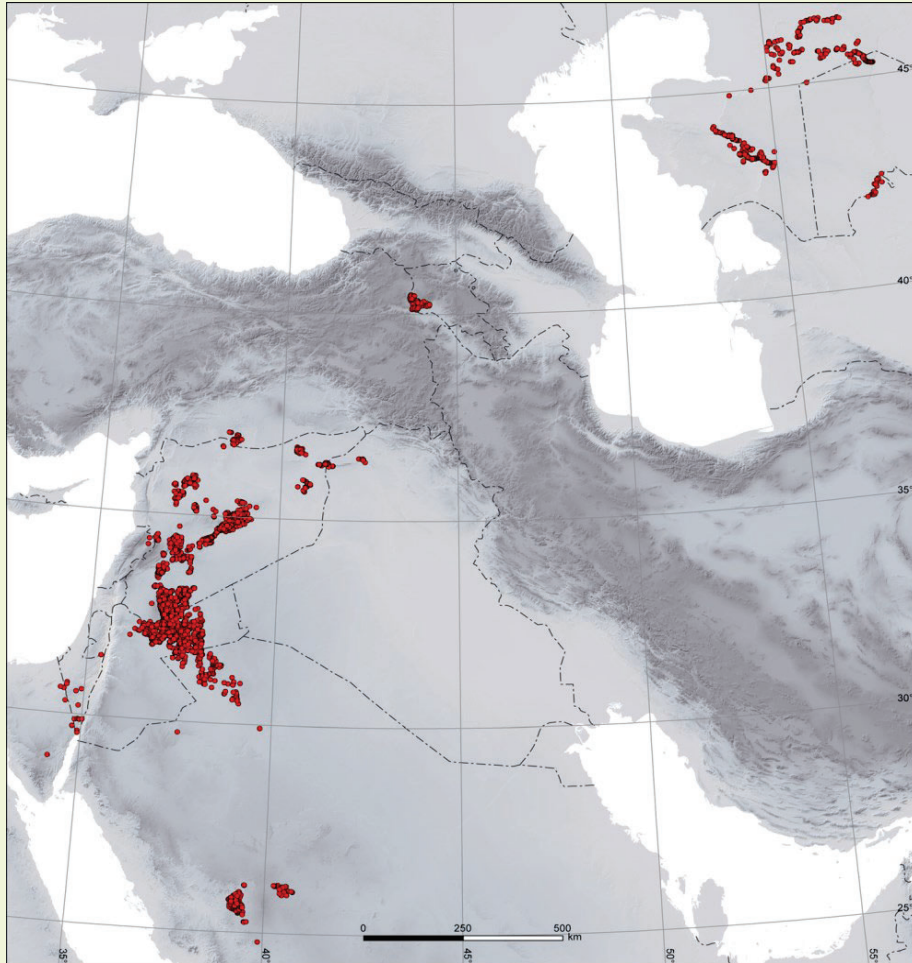


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## Geospatial Abstract



Declaration of Readiness for Cooperation

Yes  No

Prepare to share experiences

Yes  No



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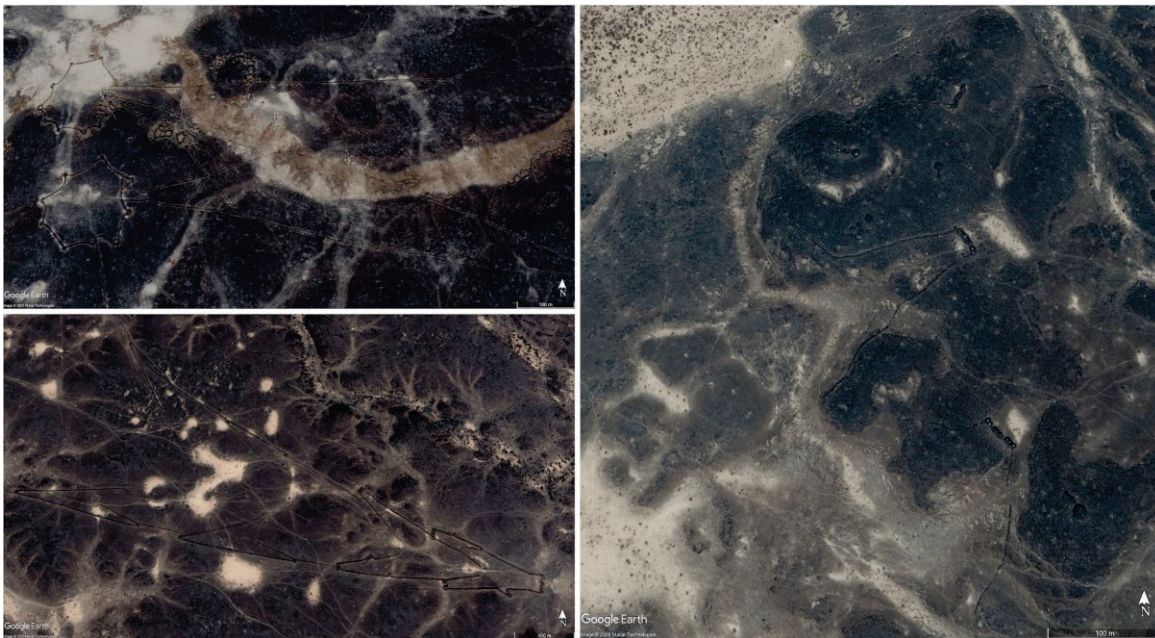
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## INTRODUCTION

'Desert kites' were discovered in the Near East and hence named by British aeroplane pilots who were flying over the Syrian– Jordanian desert. 'Desert kites' (or 'kites') are stone constructions made of two long low walls called antennae (also known as 'guiding walls' or 'tails') that converge into an enclosure (also known as a 'head') flanked or not by several small cells (or compartments, or logettes, also known as 'hides'). The form of the enclosures varies, the antennae can reach a length of several kilometers, while the size of the enclosure itself covers a surface of a few hundred square meters to several hectares (Fig. 1). Their distribution over the landscape appears to be discontinuous and their density is very variable: 0.1 kite per 100 km<sup>2</sup> in the Negev and Northern Sinai (Holzer et al., 2010) to 50 kites per 100 km<sup>2</sup> in some areas of Syria (Échallier & Braemer, 1995). An alternative, stricter, definition emphasizes the presence of small subsidiary enclosures (or 'cells') around the main enclosed area at the end of the converging walls. Some have viewed the presence of these cells as a hallmark of true desert kites and representative of a unique and relatively localized cultural phenomenon specific to a region stretching from northern Arabia to Kazakhstan (Barge et al., 2015a, 2015b, 2021). For proponents of this strict definition, true kites should be distinguished from 'kite-like' structures in areas such as Yemen and the Negev/Sinai that feature convergent walls but do not have cells around a terminal enclosure. Views somewhere between the tighter and looser definitions have also been offered (Crassard et al., 2015; Brunner, 2015b). Barge and his colleagues, (2015b), while emphasizing the importance of subsidiary cells in defining desert kites, suggest that there can be exceptions, namely where structures lacking cells are found near those that do match the tighter definition. Barge & colleagues (2020) discuss some central Arabian structure as 'pseudo-kites', which they suggest do not fully meet the criteria of kites in the strict sense, but are clearly a related phenomenon.



**Figure 1:** Examples of desert kites in Southwest Asia (after Groucutt & Carleton, 2021). Top left: Harrat al Sham, eastern Jordan. Bottom Left: Harrat Khaybar, northwest Saudi Arabia. Right: newly discovered kites in Harrat Nawasif, western Saudi Arabia (images: Google Earth).

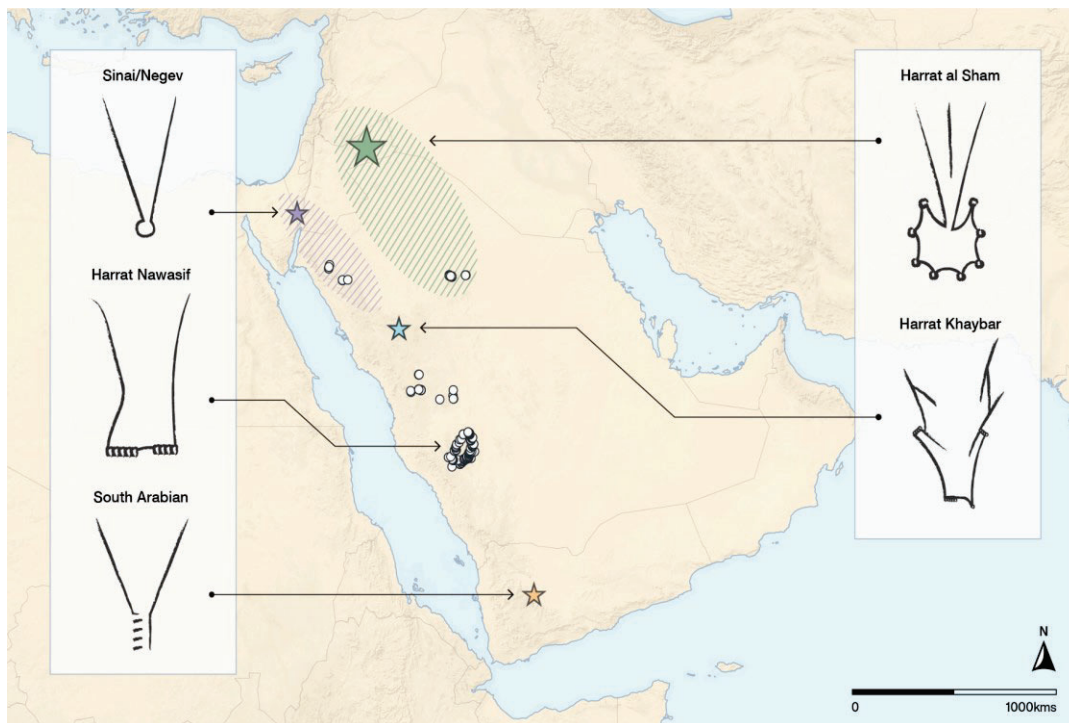
Around 6,000 of these structures have been reported (Malkinson et al., 2018). In the Harrat Al-Sham alone, it is estimated that kites collectively comprise nearly 4,000 km of stone walls (Kempe & Al-Malabeh, 2013). The desert kite phenomenon offers insights into a dramatic process of landscape modification, with cascading impacts on fauna, wider ecology, and human societies. Yet their distribution in the Arabian Peninsula has only become a focus of studies during the last few years (Brunner, 2008; Skorupka, 2010; Kennedy & Bishop, 2011). Kites even reach the confines of Uzbekistan (Betts & Yagodin, 2000) and the Caucasus (Barge & Brochier, 2011; Gasparyan et al., 2013; Brochier et al., 2014). Other types of trapping structures are known elsewhere: mainly funnel-shaped, lined with wood or stone-lined constructions are known from many parts of the world, including northern Europe (Barth 1983), central Asia (Yagodin, 1998), North America (e.g. Frison, 2004; Hockett & Murphy, 2009; O'Shea & Meadows, 2009) and South Africa (Coon, 1976). Thus, it has become accepted that the Near Eastern desert kites were used mainly for trapping wild ungulates (Rosen & Perevolotsky, 1998; Betts & Yagodin, 2000; Meshel, 2000; Holzer et al., 2010). It is also important to note that some desert kites were interpreted as systems used for corralling domestic herds (goats and sheep) at times of raids (Rees, 1929).

This 'kites phenomenon' was most probably not either a continuous or a simultaneous process; thus, it therefore covers a wide area. The range of our study is restricted to the Old World, and more precisely, to the Middle East and Central Asia. The notion that there is a 'true' desert kite phenomenon, best known from areas such as the Harrat Al Sham and other nearby harrats (lavafields), and that similar 'kite-like' structures from areas such as the Negev/Sinai and Yemen are independent phenomena, reflects a combined consideration of the morphology of structures and their spatial distribution. For instance, Barge and colleagues (2015b) argue that the 'south Arabian' form of kite/kite-like structure in Yemen (Brunner, 2015b) are not really kites because they are too far from the next closest area containing desert kites that fit the stricter definition (northern Arabia). Such notions suppose a reliable understanding of the distribution of desert kites across space, which, as we shall explore in this paper, is actually lacking. Analogously, recent research has identified desert kites (or at least 'kite-like' structures), in several areas of Africa, such as Libya (Giannelli & Maestrucci, 2018), the Nile Valley (Storemyr, 2011), and South Africa (Lombard et al., 2020). These findings again emphasize the need to re-evaluate the current consensus regarding the spatial distribution of desert kites. Spatial information is key to understanding the relationship between kites/kitelike structures in different regions, as well as the cumulative social and ecological impacts of their use.

Kites are highly regionalized in their morphology and other characteristics (Fig. 1&2) (see e.g., Barge et al., 2015a, 2015b). While there is variation within particular regions, there are regionally specific dominant tendencies in morphology. In the Harrat al Sham, for instance, 'starshaped' forms are ubiquitous (Betts, 1982; Barge et al., 2015a): with large kites, often occurring in connected chains, characterized by converging walls to star shaped chambers with cells around the margins. These kites also have a central wall between the two convergent guiding walls (Figure 0 &2). In contrast, kites located in the Saudi Arabian lavafield of Harrat Khaybar are less characterized by distal enclosures and tend to feature various barbs that protrude from the converging walls (Kennedy et al., 2015). In the Negev/Sinai, kites tend to be small and isolated, characterized by walls that converge to a simple pit/enclosure (Holzer et al., 2010; Nadel et al., 2010). Other examples could be given, but this striking regional variability is important for understanding the desert kite phenomenon.

The dominant view is that kites were used primarily, if not exclusively, as hunting traps (e.g., Helms & Betts, 1987; Rosen & Perevolotsky, 1998; Bar-Oz et al., 2011; Zeder et al., 2013; Betts & Burke, 2015; Barge et al., 2018, 2020). Similar to the drive lines constructed by indigenous people of the North American Great Plains, kites appear to have served as hunting traps by allowing hunters to control the

movements of herd animals. As the hunters pursued the herd, the animals would follow the stone walls of the kite, funnelling towards an enclosure. Other, less commonly invoked, explanations have ranged from kites being Roman defensive structures (Poidebard, 1934), religious sites (Eddy & Wendorf, 1999), or livestock corrals in pastoral societies (Echallier & Braemer, 1995). Independent categories of evidence regarding the function of kites – such as rock art – have proven ambiguous (Crassard et al., 2015; McDonald, 2005), and few kites have yet been excavated. For now, though, there seems to be no reason to doubt that the primary use of kites was for hunting. While gazelle – particularly *Gazella subgutturosa* – are often discussed in relation to kites, it is also possible that in Southwest Asia the Late Quaternary decline in various species such as ostrich, equid species, and hartebeest may reflect overhunting in part reflecting the use of kites. The propensity of *Gazella subgutturosa* to form dense groups, which run together and crucially, unlike other gazelles, do not jump (Kingswood & Blank, 1996), can be seen as behaviours facilitating the use of desert kites. It is, however, important to consider that taxa such as gazelles may have changed their behavior considerably over time (Martin, 2000). It has been proposed by several researchers that mass-kill hunting using desert kites may have led to the virtual extinction of some species. For instance, at Tell Kuran in Syria a large and dense assemblage of *Gazella subgutturosa* was recovered dating to ~5.5–5.1 ka, close to a concentration of desert kites (Bar-Oz et al., 2011; Zeder et al., 2013). The density of bones is so great that the authors interpret it as indicating “unsustainable hunting practices” on a dramatic scale (Bar-Oz et al., 2011).



**Figure 2:** The geography and variability of desert kites in the Levant and Arabia (after Groucutt & Carleton, 2021). Newly identified kites are shown by white dots. Coloured stars show simplified location of previous regional clusters. Insets show typical kite morphology in the different regions. Green and purple hashed area show hypothesised cultural spheres, where northern Arabian kites show close morphological parallels with kites to the north.

Dating kites in these particular regions is still difficult, as few remains were found in what were usually poorly stratified structures or on the surface. A long chronology suggests that desert kites were primarily



a Neolithic phenomenon and the dating of Near Eastern kite's ranges from the 7th millennium BC (Helms & Betts, 1987; Betts and Burke, 2015; Akkermans et al., 2014; Richter, 2014; Al Khasawneh et al., 2019a). Conversely, other researchers have argued that kites primarily date to the fourth and third millennia BC (Nadel et al., 2010; Zeder et al., 2013). Recent work in Armenia suggests that their use is more recent still, around 3.2–1.5 ka (Nadel et al., 2015). The accounts of western travellers in Southwest Asia describe the use of kites, or kite-like structures, into the last few hundred years (e.g., Burckhardt, 1831; Crassard et al., 2015). The very rare radiometric or relative age measurements are the most convincing span from the end of the Chalcolithic to the end of the Bronze Age (Échallier & Braemer 1995; Holzer et al., 2010).

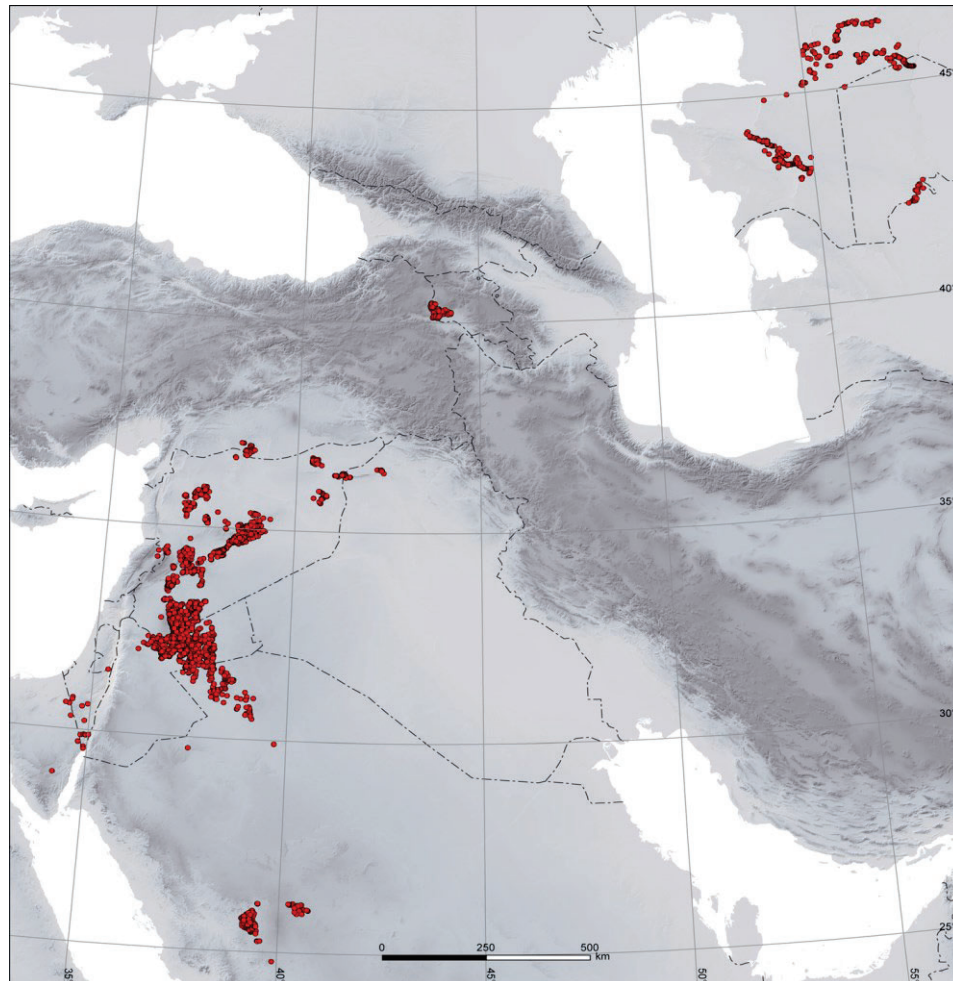
That desert kites may have had a significant ecological impact is implied by their high number, wide distribution, and long history. While a hunting use is the dominant interpretation, in the long run whether this was their exclusive use or whether they were also used for other functions (such as some kind of role within pastoralism) does not undermine their ecological and social significance. Both large-scale hunting and extensive pastoralism are parts of interlinked processes where the biology and ecology of the region were transformed across the Holocene with the spread of domesticated animals and the reduction of wild fauna. In this sense kites played an important role in long-term human ecosystem modification and niche construction (see also Boivin et al., 2016). Some have suggested that caprine domestication developed due to the depletion of wild fauna, such as gazelle, as a result of excessive hunting (Martin, 2000; Legge & Rowley-Conwy, 1987). Alternatively, it may be that kites were used for seasonal hunting by otherwise pastoralist societies (Wasse et al., 2020).

In fact, it may be that changes in wild animal behavior driven by the development of pastoralism made the use of desert kites an effective approach (Henton et al., 2018). The function of kites may also have changed over time (Bar-Oz et al., 2011; Hill et al., 2020). They may, for instance, have initially had a subsistence focus, took on an increasingly social/cultural role over time (such as for feasting), and then in some cases they may have been re-used for pastoralism. These various possible scenarios reflect different historic trajectories for the depletion of wild fauna and an increasing emphasis on domestic fauna which emerged in the Holocene, with further widespread impacts including overgrazing (Henry et al., 2017). While the extinction of large animals is a frequent topic of discussion, in the context of global Late Quaternary megafauna extinctions (Galetti et al., 2018; Rowan & Faith, 2019; Stewart et al., 2021), studies from southwest Asia emphasize the additional importance of changes in medium size animals.

Desert kites therefore offer a fascinating case study of interlinked human and ecological changes in the Holocene. While some major changes in animal demography may relate to climate change (e.g., Stewart et al., 2021), other aspects, seemingly including those relating to the kites discussed here, suggest a major human role in ecosystem modification. While the function and chronology of kites are important and continue to be key areas of research, the spatial distribution and geographical context of kites has been undervalued. Understanding their distribution is crucial for evaluating the ecological impacts, cultural context, and historical development of desert kites.

Although many decades have passed since desert kite discovery, and in spite of an important investment in field work, questions as basic as those which touch on chronology or use do not yet have fully satisfactory answers. The age of these constructions, whether relative or absolute, remains very difficult to establish in contexts in which archaeological material is either absent or rare and without any clear stratigraphic relation with the construction. From the few reliable data that are today available in the Near Eastern region, the kites would appear to date to the Chalcolithic and the Bronze Age periods (Échallier & Braemer 1995; Nadel et al. 2010, 2013). For some researchers, however, the oldest constructions probably precede the Pre-Pottery Neolithic (Helms & Betts, 1987; Betts, 1998), a view

supported by some archeozoological studies (Legge & Rowley-Conwy, 1987; Gourichon, 2004) which show that the gazelle remains found on some archaeological sites come from seasonal nonselective hunting. In other terms, the mortality profiles observed are compatible with those that would be observed at the end of a seasonal collective hunt of a herd in migration, with beaters, using a “demi-piège” of kite type (Téstart, 1984) as a hunting aid. They are also compatible with any other type of non-selective hunting, and thus do not necessarily imply the use of kites.



**Figure 3:** The inventory of kites at the scale of their distribution area; see also the Global kites Interactive Map freely accessible at [www.globalkites.fr](http://www.globalkites.fr)

The wide spread hypothesis of a unique use of the kites as “demi-pièges” for collective hunting of gregarious animal’s gazelles or oryx in the Near East, reindeer in Scandinavia, bison or pronghorn in North America, saiga antelope or urial in the Aralo-Caspian region—rests mainly on late historical accounts which there is no reason to doubt. The accounts of travellers who crossed the steppes and deserts of the Near East between the end of the 16th and the beginning of the 20th century are relatively few (Burckhardt, 1835; Barker, 1876; Mitford, 1884; Wright, 1895; Sinclair & Fergusson, 1902; Musil, 1928a & b; Aharoni, 1946). Except perhaps the oldest account, that of Pedro Teixeira (Sinclair & Fergusson, 1902), which mentions no enclosure and describes branches or antennae made of posts



topped with cloths flapping in the wind, all the accounts describe collective gazelle hunts using long continuous lines of blocks that cause the convergence of one or more herds of gazelles frightened by the beaters into enclosures, the local Syrian Arabic name for which is *masyada* (Burckhardt, 1835; Fowden, 1999). The kites of the archaeologists can be recognized in these descriptions. However, at closer inspection, all these accounts describe frightened animals which rush by means of gaps in the walls into pits dug on the exterior of the enclosure. Of the thousands of kites discovered in the Near East, none seems to present this characteristic, and it should be asked whether these particularly recent constructions can be considered to be a universal functional model.

Consequently, in the last few years, the number of inventoried kites has increased fivefold and the known distribution zone was greatly extended, suggesting some exceptional potential for in-depth study of this phenomenon (Figure 3). More can therefore be concluded regarding the use of kites across time and space. The main issues that the project concerned itself with relates to the kites' function and their dating: is it possible to distinguish kites used as hunting traps from those meant as corrals for domesticated animals or which are in the process of being used as such? Furthermore, what is the time frame of the use of the kites? Other fundamental issues were also the focus of the project such as the geographical spread and explanations for this extension: either cultural convergence or real interregional technical diffusion? Finally, the adaptive strategies by human groups must be addressed, as should issues of bio-economical regulations in a fragile environment context such as potential overexploitation of wild animal species and the ownership of an exclusive territory by humans.

### Desert Monoliths Reveal World's Oldest Architectural Plans

Desert kites are convergently shaped stone structures built by people, often of a vast size, known to occur between at least northern Arabia and western Central Asia (e.g. Groucutt & Carleton, 2021). The known area of distribution of kites is very large, from Arabia and the Near East, to Armenia in the Caucasus and the Aralo-Caspian region, namely south-western Kazakhstan and western Uzbekistan (e.g. Barge et al., 2015a,b). Engravings found in Jordan and Saudi Arabia appeared to match nearby ancient megastructures known as desert kites as seen from above. By Priyanka Runwal Massive prehistoric stone structures found in desert landscapes from Saudi Arabia to Kazakhstan have baffled archaeologists for decades. Each can stretch for up to a few miles, and resembles a kite with tail strings in overall shape.

Recent studies have built a consensus that the so-called desert kites were used to trap and kill wild animal herds. But how ancient hunters conceived and perceived these grandiose structures have remained a mystery. The kites, in their entirety, are “only visible from the air,” said Rémy Crassard, (see Crassard et al., 2014;2015) an archaeologist at the French National Center for Scientific Research. “Even with our modern ways of envisaging our landscape, it's still difficult for us archaeologists, scientists, scholars to make a proper map.”

Dr. Adams and his colleagues were overjoyed in 1977 when they found two stone monoliths with precise depictions of nearby desert kites in Jordan and Saudi Arabia. Engraved between 7,000 and 9,000 years ago, these representations are by far the oldest known to-scale architectural plans recorded in human history. They also highlight how carefully planned the desert kites may have been by the ancient peoples who relied on them.

“It's mind-blowing,” Dr. Crassard said, “to know and to show that they were able to have this mental conceptualization of very large spaces and to put that on a smaller surface.”

Over the last decade, as part of a project called Globalkites, Dr. Crassard and his colleagues have used satellite imagery to identify more than 6,000 desert kites of various shapes and sizes across the Middle East and West and Central Asia. Other researchers have uncovered stone engravings depicting these man-made enigmas while doing surveys and excavations.

At first, they noted the presence of three defining kite features. There were “tail strings,” which represent more or less contiguous lines of stones. These converge into a walled enclosure resembling the kite’s “body.” And along the body’s edges, pits had been dug. Archaeologists suspect that groups of animals such as gazelles followed these stone lines or were chased along them before being funneled into the enclosure, where hunters killed the animals, and used the strategically placed pits to trap those attempting to escape. Very quickly, the team recognized that these engravings matched the shape and structure of kites seen nearby. In Southeastern Jordan, for example, the tail lines of kite's curve as they converge into enclosures a peculiarity also visible on the engraved stone.

Mathematical models, too, indicated that the kites in the Jordan-Saudi region where the team worked were the closest match when researchers compared the geometry of the two engravings with a total of 69 kites from a variety of regions. Shape comparisons with such nearby kites also revealed that the depictions were to scale. The researchers inferred the ages of the engravings by using geological dating tools to determine how long ago the corresponding local kite structures were built.

What remains unknown is whether these depictions were prepared as blueprints to aid in the construction of the kites, or served as maps for hunters. The engravings could also be symbolic commemorations of the desert kites, which may have been an important part of the cultural identity of the ancient peoples who made and used them, said Wael Abu-Azizeh (2010; 2013 a,b; 2014), an archaeologist with The French Institute of the Near East in Jordan and an author of the study.

Jorke Rowan (see Rowan, J., & Faith, J. T., 2019), an archaeologist at the University of Chicago who was not involved in the study, said the engravings cited in the paper are a great find. He called it remarkable that people on the ground were precisely depicting things that can only be seen fully from above today. Finding this mental mastery of space opens a new window into the minds of these ancient hunters.

## DESERT KITES AND PREHISTORIC PERIODS IN IRANIAN PLATEAU

The known area of distribution of kites is very large, from Arabia and the Near East, to Armenia in the Caucasus and the Aralo-Caspian region, namely south western Kazakhstan and western Uzbekistan (e.g. Barge et al. 2015a;b). although still there is not any official report about its existence in Iranian plateau but regards to the vast distribution of desert kites from Egypt in west to Kazakhstan in east, it is not so worth if we expect to see this prehistoric phenomenon in Iranian territory also. Hunting and processing these animals must have involved a large number of people. Kites had to be constructed and maintained and migrating animals had to located and then be driven into the kites by people where hunters were waiting to slaughter them. Rock art (Petroglyphs) in the vicinity of some of the kites indicates that the hunt could represent a large social effort, done together by people from several settlements, and showing religious connotations (Figure4).



**Figure 4:** Petroglyphs, Teymarch, Iran, (after Nazari 2018) Petroglyphs are images created by removing part of a rock surface by incising, picking, carving, or abrading, as a form of rock art. The term petroglyph should not be confused with petrograph, which is an image drawn or painted on a rock face (Figure5).

During recent years a large number of rock carvings has been identified in different parts of Iran. The vast majority depict the ibex. Rock drawings were found in December 2016 near Khomeyn, Iran, which may be the oldest drawings discovered, with one cluster possibly 40,000 years old (Nazari, 2018; Nazari, 2023). One of the characteristics of Iran's petroglyphs is the continuity of existence of prehistoric marks on the ancient pottery and bronze sculptures that reveal the impressiveness of petroglyphs of the facades of caves and rocks reflected on ancient work of arts (Nazari, 2023)

#### **DESERT KITES IN IRANIAN PLATEAU: POSSIBLE DISTRIBUTION!**

As mentioned so far and in the previous chapters, desert kites are scattered in wide areas of western and central Asia (Figure 1); But the noteworthy point is how the knowledge of this type of hunting method was transferred between the western Caspian Sea and the central regions of Asia, because between these two parts of the Iranian plateau and the Caspian Sea, and in the northern parts, there were frozen lands. And in fact, the only dry land among them was the Iranian plateau. So, is it possible that there is evidence of the desert kite in Iran? In the following, we present pictures of possible places where desert kites exist in the central regions of Iran (Figure 2, 8 & 9).





Figure 5: Petroglyphs, Teymarch, Iran, (after Nazari 2018)

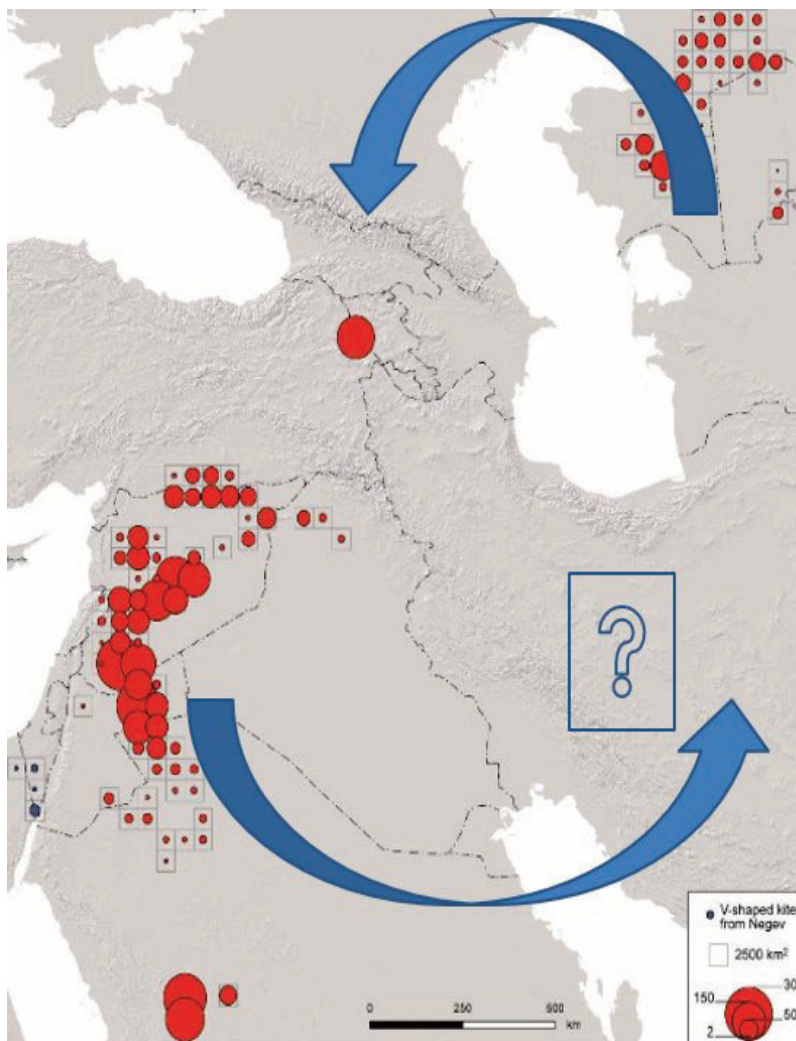


Figure 6: Desert kites in Western and Central Asia (modified after Barge et al.,2016).

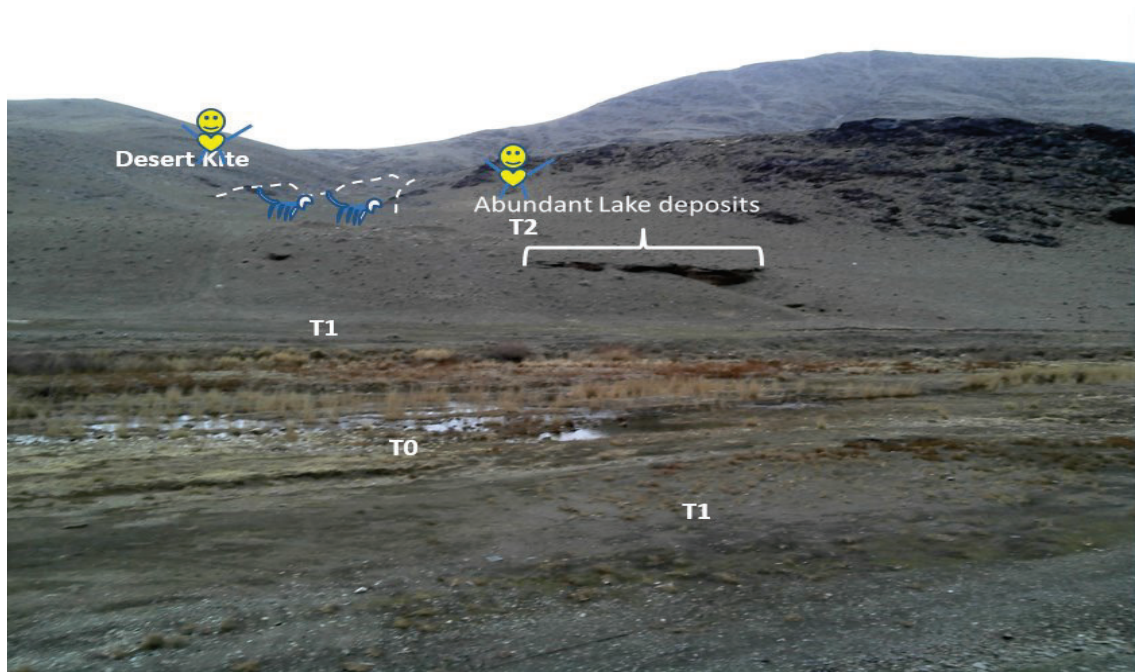


Figure 7: Teymarch, Iran (after Nazari 2018;2023)

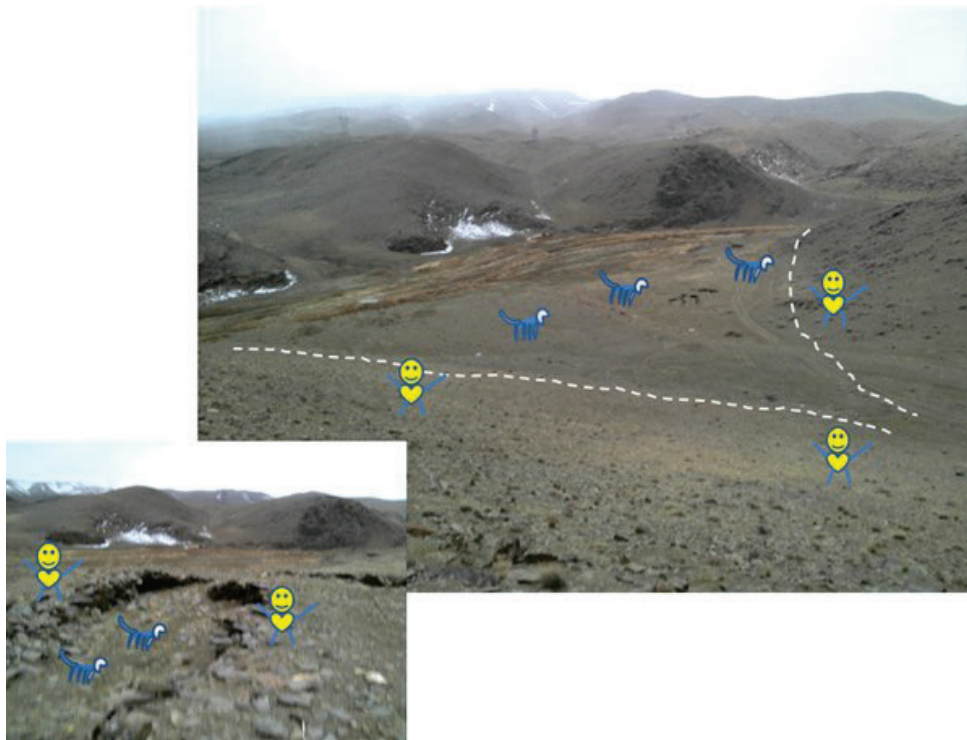


Figure 8: Probable Kite in Teymarch, Iran (after Nazari 2018; 2023)





Figure 9: Probable Kite in Teymarch, Iran (after Nazari 2018; 2023)

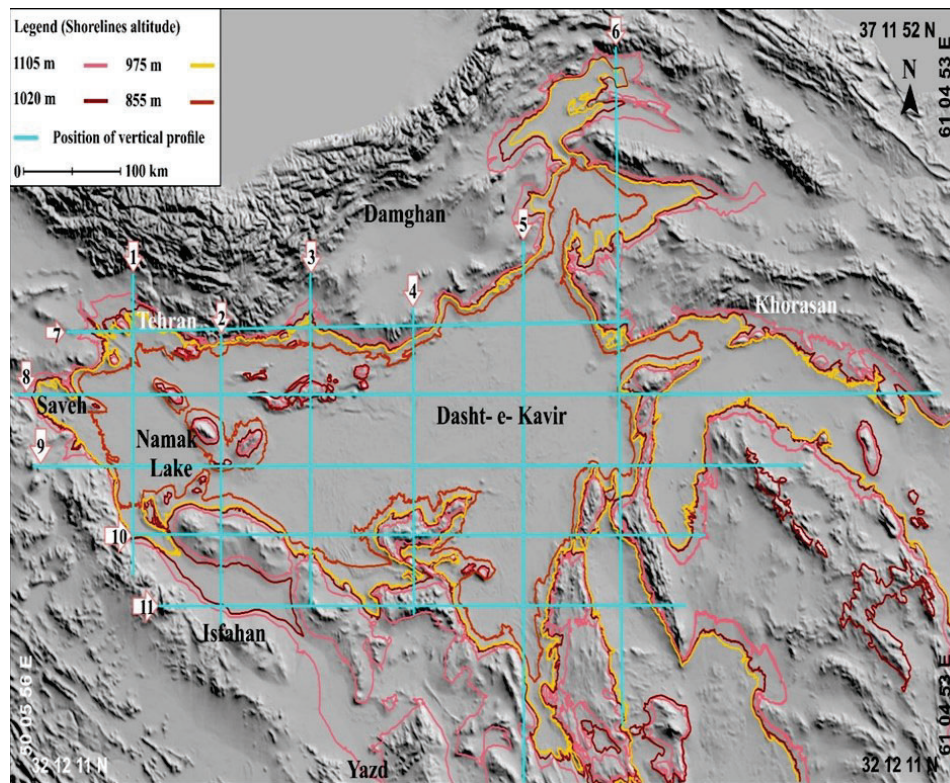


Figure 10: The existence of paleo lake in the central desert zone of the Iranian plateau (after Nazari et al.,2022)



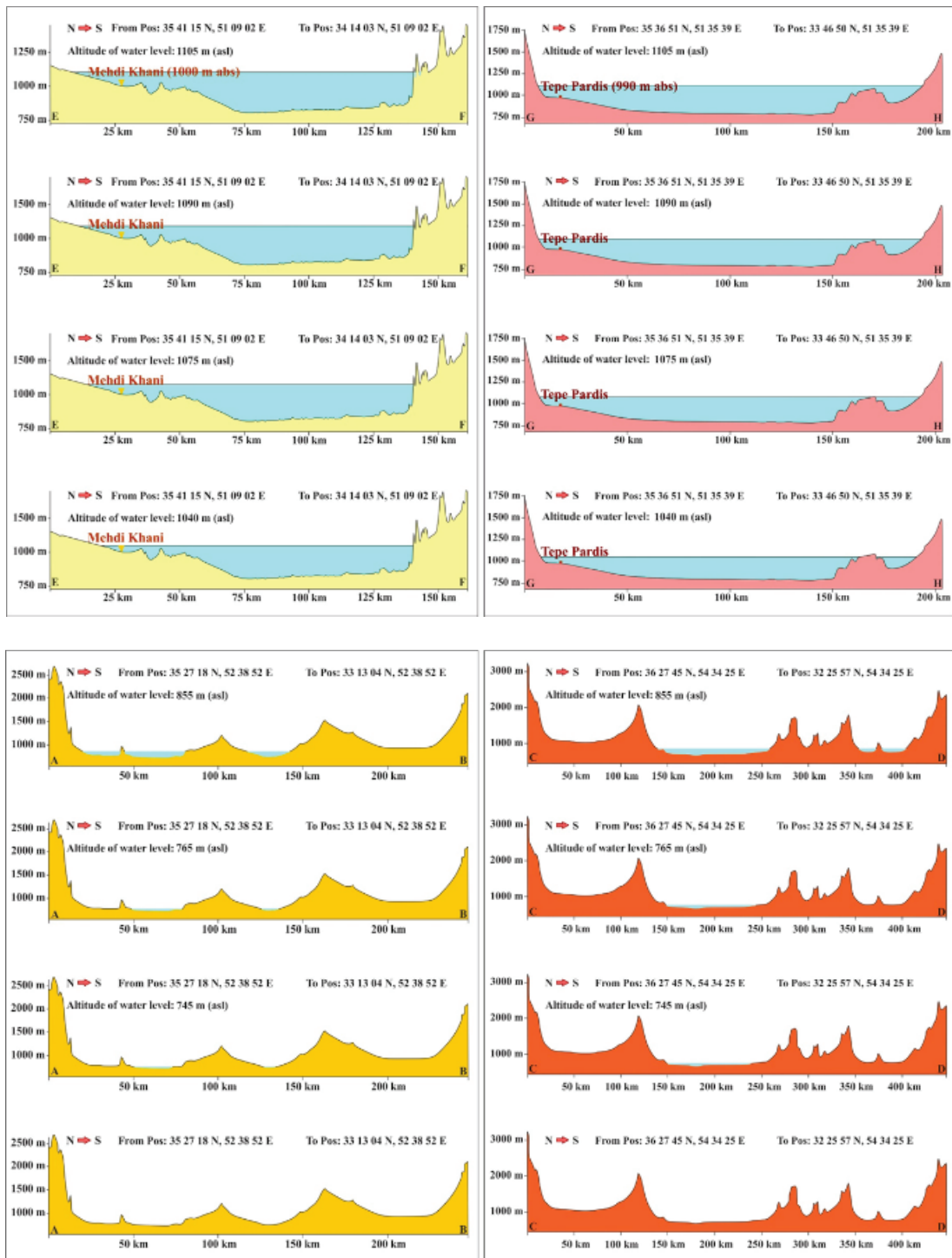


Figure 10: The existence of paleo lake in the central desert zone of the Iranian plateau (after Nazari et al.,2022)

## DISCUSSION AND CONCLUSION

Desert kite is seen from the eastern Mediterranean to the eastern Caspian, so it is not wrong to expect to find a sign of this structure in the Iranian plateau as the only possible linkage between the eastern and western Caspian, when the lands of North Caspian were almost frozen. The existence of such a

paleo lake in the central desert zone of the Iranian plateau at the beginning of the Holocene could be a reason for not finding any sign of the remnants of a Desert kite, at least in lower topographic level than 850 meters! (Nazari et al., 2022, 2023) (Figure 10).

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