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A DIACHRONIC ANALYSIS OF ORIENTATION OF SACRED PRECINCTS ACROSS JORDAN

A. César González-García*[1], Juan A. Belmonte[2] and Andrea Polcaro[3]

[1]Instituto de Ciencias del Patrimonio, Incipit-CSIC, Santiago, Spain
[2]Instituto de Astrofísica de Canarias, Tenerife, Spain
[3]University of Perugia, Italy

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Corresponding author: (cesar.gonzalez-garcia@incipit.csic.es)

ABSTRACT

Located in the southern part of the Levant, the territory of present day Jordan functioned as a cultural crossroad since times immemorial. The state of preservation of the different remains and the quantity of the different stages makes Jordan a perfect area to perform a study on the evolution along time of the orientation customs. During our field campaign in December 2011, we collected data on a number of different cultic structures throughout the country, from Bronze Age temples, to megalithic monuments, Iron Age Nabataean monuments, Roman and Hellenistic cities and temples and Byzantine churches with a small number of Muslim mosques. This sample of over 300 structures of different periods allows a diachronic comparison of the orientation of cultic buildings for the last 5000 years in this area of the Levant. We find a consistency to orientate the cultic structures in accordance to similar areas of the horizon. This similarity is striking when comparing the megalithic monuments found along the whole country with the Nabataean monuments of nearly 2000 years later. This consistency appears despite the chronological gap, the cultural differences and also possibly the different ethnic components of these societies. The consistency seems to be broken after the Roman conquest, especially with the introduction of Christianity and definitely after the expansion of Islam. A comparison with other neighboring areas of the Near East is sketched in order to compare with contemporary monuments for each epoch.

KEYWORDS: Bronze Age Jordan, Iron Age Jordan, Nabataeans, Diachronic analysis, Temporality

1. INTRODUCTION

The study of the orientation of cultic structures provides relevant information on the spatial concepts of the societies that designed and built them. This is obviously part of a wider field of study, that of Landscape Archaeology, where the location and mutual relations of the different archaeological remains and natural features of a given area provide valuable input to testify the territory apprehension and space and time incorporation of a given society within its cultural mind-set (see, e.g. Ingold 1992; Tilley 1994; Criado-Boado 2012).

The orientation of cultic buildings has been demonstrated to be linked in many instances to the manifestation of heavenly bodies (see, for instance, several works at the Handbook for Archaeoastronomy and Ethnoastronomy, Ruggles 2015). Orientation, in this sense is somehow related to the spiritual regime but leaves a define fingerprint in the archaeological record that can be measured and compared for different epochs in a given region, as any other item in that record.

The present paper focuses on how the sky was materialized in the orientation of the cultic buildings of different epochs in Jordan. To do so, several different religious and funeral buildings are analyzed. The aim of the paper therefore is to investigate how the cultural and social changes were reflected in the orientation customs of their buildings.

The basic hypothesis behind that objective is that the architectural remains as part of the material record from those societies and thus socially constructed, can provide information on different aspects of the culture that built them. In particular, the location and orientation of the building is directly related with the spatial conceptions of such societies. In those cases where orientation can be safely related to the rise or set of heavenly bodies the rhythmic cycles of those bodies could be connected to specific moments and concepts of temporality in those societies. Then, orientation and perhaps also location could be connected to temporality. The concept of time, as socially understood is a cultural fingerprint (Gell 1992). In particular, given the material record we manage, such times are most probably related to cultic practices, and therefore to the religious sphere. Thus studying the persistence or change of orientation traditions we may follow the footsteps of possible changes and persistence in the religious sphere of a certain area through time.

The approach developed here has been tested and used before. On a pioneering work, González-García & Costa Ferrer (2011) studied the diachronic evolution of the orientation of a large number of monuments in the Spanish town of Mérida. This city is known for housing some of the most remarkable Roman remains in the Iberian Peninsula. Mérida was founded as a Roman settlement of army troops in the region after the conquest of the Iberian NW. However, the comparison showed that the orientation of the Roman city is not alien to what is was customary in the area centuries before its foundation. In particular this exercise could identify two moments of clear break with previous customs, being the clearest one the introduction of Christianity.

Further on, the method was applied to study the alleged persistence of orientation customs in the megalithic monuments of Sardinia (Hoskin 2001; González-García et al 2014). There, the comparative approach was expanded to include several statistical tools. The results verified the proposed shift from homogeneity of orientations along the island at an early stage in the late Neolithic, represented by the Domus de Janas, to a change in orientation customs after the introduction of classical megalithic monuments (dolmens), possibly following commercial routes from the northern and western shores of the Mediterranean. Thereafter, the orientation custom seems to divide the island into two at latitude of 40^{o}. Such systematic division appears even until the Phoenician colonization of the southern parts of the island.

Finally, González-García & Belmonte (2014) devised a diachronic comparison of the orientation of cultic structures throughout the Mediterranean from the Bronze Age until Roman times. They indicate that in the Mediterranean Iron Age there seems to be basically three orientation customs: one mostly related to equinoxes and solstices, with a predominance of the last. Such is mainly present in the Near East. A second group, with mostly Greek temples, included monuments with a larger appearance of equinoctial orientations (almost no solstice) and a third with orientations mostly in the meridian line, mostly towards south, appeared in the central Mediterranean. Some of the orientation groups seem to have an origin in certain areas in earlier times, like the solstitial group in Egypt and Anatolia, or the equinoctial on the Minoan cultic areas. In this last exercise, the authors included the Nabataean temples, and it appeared that they belonged to the first family that was apparently common in most of the Near East.

One of the motivations for the present study is therefore see if such scheme was present in previous epochs of Jordanian history. The territory occupied by present day Jordan has been a cultural cross-road and the cradle of different societies throughout history. Such fact resulted in the numerous and well preserved archaeological remains of the country (MacDonald, Adams and Bienkowski 2001).

During our field campaign in the area, at the end of December 2011, and in coincidence with Winter Solstice we collected measurements on over 300 cultic structures in the region and from different epochs. Ranging from late Neolithic, to Bronze Age (see Polcaro et al. 2013), megalithic monuments (Belmonte et al. 2013a), Iron Age Nabataean monuments (Belmonte et al. 2013b), Roman and Hellenistic cities (Rodríguez–Antón et al. this volume) and temples and Byzantine churches (González-García et al. in preparation) and a small number of Muslim mosques.

Data were collected using precision compasses and clinometers and corrected for magnetic declinations. Magnetic alterations are not expected in the Nabataean territory, where most of the terrain is limestone or sandstone. The individual measurements have an average error of ¼° in azimuth and ½° in horizon altitude, which translates into an error ~¾° in declination. The declination histograms used hereafter were calculated using a density distribution with an Epanechnikov kernel with a pass band of 1½°

In the following we show the orientation customs of the different structures studied so far trying to unveil the persistence and change along history. Section 2 includes a brief summary of the archaeology of the different sites explored in this campaign and provides the archaeoastronomical data, 3 presents our comparison and section 4 provides the discussion and conclusion of such analysis.

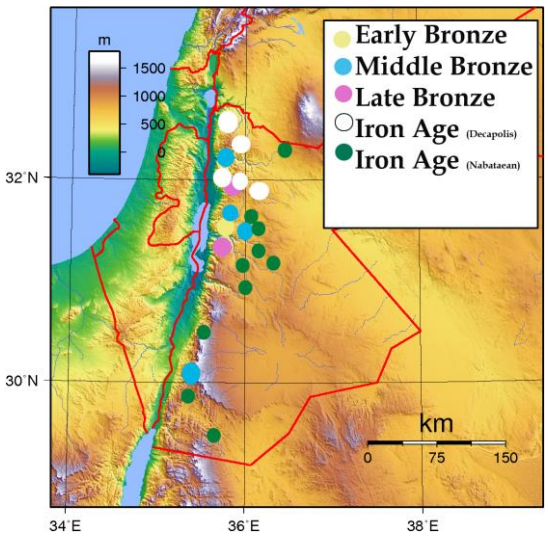


Figure 1. Location of the different sites referred to in the text. The colour coding presents the different periods (see legend). Besides these monuments, byzantine churches were measured in several sites widely similar in distribution to those of the Iron Age sites.

2. ARCHAEOLOGY AND ARCHAEO-ASTRONOMY OF JORDANIAN SITES

2.1. *Neolithic-Chalcolithic-EBA*

Neolithic and Chalcolithic sites are frequent in Jordanian lands, there are however few measurable remains. The earliest site we could measure was the Early Bronze Age (EBA) of Bab edh-Dhra (Southern Gor Region). The archaeological remains attest what has been interpreted as a pastoralist nomadic occupation for EBA IA (attested by a large funerary area) and a first settlement for the EBA IB – EBA II phases (strata III). The next phase, dated to the EBA III phase (strata II), witness the erection of large city walls encircling a large settlement. At the end of this phase there are remains of destruction and a different occupation for the last phase (EBA IV). The main temple, dated from 2900 to 2400 BC, has a typical plan of the Bronze Age, with a single rectangular pillar room and the entrance on the long side (Rast-Schaub 2003: 157-166). As many Chalcolithic and Bronze Age temples of Southern Levant, the temple of Bab edh-Dhra had an external circular altar in front of the door, used for animal sacrifices (the most impressive case is the round altar of Megiddo; Loud 1948). The temple is the last phase of different layers, testifying the first construction of the sanctuary at least in the 3100 BC, when the first permanent settlement was built on the Eastern side of the Dead Sea. We do not know the deity venerated in this temple, but from the decorated vessels and other templar paraphernalia recovered in the excavation area it is possible to presume a cult of a main Levantine deity similar to the one worshipped in other temples of Jordan in the Early Bronze Age (in particular, the cultic vessels decorated with applications of serpents recovered also in the sacred areas of Khirbet Zeraqon or Jebel al-Mutawwaq; Ajlouny et al. 2001; Polcaro et al. 2014).

The temple has an orientation compatible with the equinox (see Table I and Fig. 2). That orientation was also the orientation of the main entrance to the city walls. The altar in front of the temple had a small angle with respect to the orientation of the temple.

2.2. *EBA-Middle Bronze Age*

This period of Jordanian history is characterized by the appearance of large megalithic fields (see e.g., Scheltema 2008). Dolmens appear for the first time in the Southern Levant at the end of the Late Chalcolithic Period (c. 3800/3500 BC based on C14 date from the abandonment phase of the Tuleilat al Ghassul sacred area). During the Early Bronze Age I (EBA IB which ended between c. 3000 and 2900 BC) the pastoral and agricultural communities of the

Transjordan Plateau used these megalithic monuments for funerary purposes (large family tombs for primary or secondary depositions). This period was a critical moment in the urbanization process in the Levant, as mentioned earlier. Some populations settled in more fertile areas practicing horticulture and seasonal agriculture; meanwhile, especially in the semi-desert areas, there prevailed a pastoral style of life.

Table I. Measurements of several individual elements commented upon in the text. The first three lines are Bronze Age data. The next nine lines give the data for the Hellenistic/Roman temples and the last two are the orientation of the mosques. For the collective measurements of dolmens, the Nabataean structures, Roman cities and Byzantine churches see the references in the text. The columns provide the site or structure measured, the azimuth (A) and horizon altitude (h) measured with a tandem (error estimated to be ½°), and the calculated astronomical declination (δ).

Site	A	h	δ	Structure
Bab edh-Dhra	269½	0¾	−1	Temple
	261		−7¼	Altar
Deir Alla	91½	2	−0¼	Sanctuary
Amman	76	−0½	11¼	Hercules temple
Gadara	356	−0½	56	Temple
	195½	5½	−49½	Theatre temple
Madaba	216	blocked	−44	Roman temple
Pella	277½	−1	5¼	Acropolis temple
	340¾	0½	52¾	Small temple
Jerash	54	3½	31½	Zeus temple
	55½	3½	30½	Altar
	115½	1	−20½	Artemis temple
Amman	179¾	2½	−55¾	Umayad Mosque
Pella	163½	3½	−51	Mamluk Mosque

Dolmens are funerary monuments marking the landscape, both in fertile and in semi-desert areas, following the course of the seasonal rivers running across Jordan. The material culture from the dolmen fields and landscape analysis of the phenomenon indicate these monuments represent the creation of a communal ideology, connecting the ancestor cult with the territory, probably very useful as a social and political binding agent between different communities (Polcaro 2013).

In our campaign in 2011 we could measure the orientation of 185 dolmens in five necropolis: Juffain, Damiyeh, Wadi Jedid, Al Mureighat and Tawaniyeh (Belmonte et al. 2013a). The local sacred topography seems to play a relevant role in the location and orientation of several dolmens at some of the sites, with double topographic and astronomical orientations, and a tendency of several dolmens to be facing each other. But the basic result was that the overall distribution of the dolmens seemed astronomical (see Figure 3a). There are basically four main orientations. The largest concentration would be towards north, while the other three tend to be around the extreme positions of the sun and the moon and the equinoxes. Indeed, the astral relationships seem important, and could tell us something on the belief system of these communities.

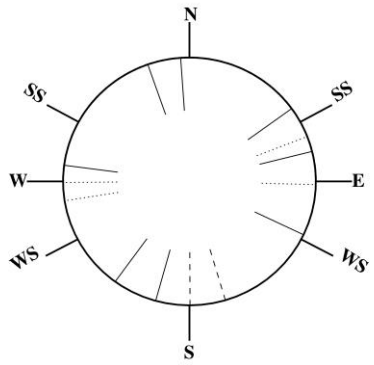


Figure 2. Orientation diagram for the temples in Table I. The circle indicates the horizon, and the short strokes outside label the cardinal directions and the solar extremes, marked as SS for summer solstice and WS for winter solstice. Each temple orientation is indicated by a short stroke inside the circle. Bronze Age sanctuaries are indicated by a dotted line. Hellenistic-Roman temples by a solid line and mosques by dashed strokes.

2.3. *Middle and Late Bronze Age*

We could measure two structures from this epoch: the sanctuary at Tell Deir Alla and the Baal temple at Pella.

Pella is famous for its Roman remains, but in the lower acropolis there are the remains of a large sacred building of the XIX century BC. This Middle Bronze Age temple was continuously used and restored until the Iron Age. The temple has a typical Southern Levant Bronze Age architectonic style with a single elongated room with the entrance on the short side flanked by two antis. The remains found in the temple point towards Baal as the possible deity worshiped there (Polcaro, González-García and Belmonte 2013).

The orientation of the building, consistent with summer solstice sunrise a moment that in Near East cultures was linked with the festivity of dying gods associated with harvesting and a moment of confluence of the underworld and the upper world (Polcaro et al. 2013).

Tell Deir Alla is famous for the collection of clay tables that had been recovered from the different rooms of the so called sanctuary. The sanctuary, dated from the XVI century BC to the XII century BC, consists on several rooms and a cella (Franken 1992). The complex was built on a high platform and the cella was located another meter above the other rooms. West of the rectangular cella, there was the complex of storerooms; in one of them were recovered the 12 clay tablets indicating that a temple ar-

chive had been recovered (Strange 2008: 297). During its last phase, the building was destroyed by an earthquake (Franken 1992). The entrance to the Templar complex has an almost perfect equinoctial orientation, in this case towards east (Table I).

2.4. *Iron Age: Hellenistic Period*

The Iron Age, from the turn of the first millennium is characterized by the establishment of several kingdoms in the area, more specifically those of Ammon, Moab and Edom, and the expansion of other regional powers such as the Assyrian, Neo-Babylonian and Persian empires. We could not measure any structures from these times, despite the fact that at the archaeological excavations of some of the temples of later times archaeologists testify earlier Iron Age occupations (see for instance, Najjar 1993, for the Hercules temple in Amman).

From the second half of the millennium, the whole Levant suffered a process of cultural influence from Greece especially after the expansion of the Macedonian troops of Alexander and the stablishing of the several Hellenistic kingdoms (Schmid 2008: 353). The northern part of Jordan, along with neighbouring areas in Syria and Israel were part of the Decapolis, a region of difficult definition, perhaps some sort of federation of ten cities with strong Greek influence (Schmid 2008; 353-360). We could measure eight temples from this period, possibly all of them re-erected at later Roman times, at the sites of Philadelphia, Jerash, Gadara, Abila and Pella. The number of temples is admittedly low but there seems to be no clear pattern (if any at all). It could be interesting, though, to comment some specific cases. Jerash is one of the best-preserved Hellenistic and Roman cities in Jordan, housing two magnificent temples that dominated the ancient city. The Zeus sanctuary (Raja 2013), on top of a hill, had several different phases and it is interesting that there seem to be a change in orientation. Its oldest phase presents an orientation whose perpendicular could be consistent with winter solstice sunrise. However, both the main axis of the temple and the altar located in front of it have an orientation that could be related either with some bright stars (such as Arcturus, Pollux or even Algol), or perhaps with the northern major lunistice. It is interesting that this temple could have later integrated the Roman imperial worship. The other temple of the city, the sanctuary of Artemis could be a different case. It appears that it was originally built as an extra mural complex that later became part of the Roman town (Raja 2015). It has an orientation that would not match any bright star at the time, but could be consistent with the rise of the lunar disk at the minor southern lunistice. It would therefore be interesting that the two main temples of the city, supposedly built at different times, could have been related with the moon.

2.5. *Iron Age: the Nabataeans*

The Nabataeans enter history in this region after the victory of Obodas I over the Seleucid Empire in the first century BC. Possibly originally a nomadic Arab people, they settled in the western part of present day Jordan and over the next couple of centuries controlled the caravan routes towards Arabia. They built several cities and temples along the country being those in Petra the most famous and best preserved (see, e.g. Belmonte et al 2013b). Their religion possibly with an animistic character had a strong astral flavour. The images of the gods were kept in baetylus stones. The principal male divinity was the god Dushara or Dushares, very probably an astral god with a hypothetical lunar or solar character. The main female divinity is much discussed as she is named Allat in the north while in the south appears as Al-Uzza. They could be identified both with Venus, perhaps in her aspect as evening star.

We could measure 50 sacred precincts throughout the country. The results are shown in Figure 3b. The main peaks in the histogram could be identified with those yielded by astral bodies, most notably the sun and perhaps the moon. We also witnessed and put forwards several illumination events at the interior of some of the most remarkable carved structures in Petra (Belmonte et al 2013b).

2.6. *Roman and Byzantine remains*

After the annexation of the Nabataean kingdom by Emperor Trajan on 104 AD, the country became part of the Roman province of Arabia. The *via nova Traiana* articulated the country from south to north, bringing the products of the Red Sea towards the Mediterranean. Beside, a number of military camps and garrisons were built at the *limes arabicus* to protect those cities from the nomadic tribes. We could measure the orientation of several cities and camps. They are not treated here (see however, Rodríguez Anton et al. this volume). The Roman temples of this time are treated under the Hellenistic part.

After the IV century AD, a large number of churches were built along those same cities. According to the church fathers, the priest and the community must face east when praying, and this premise has been mostly investigated in Mediterranean countries but little research has been devoted to such matters in the Holy Land (González-García 2015). We could measure 66 churches, concentrated mainly in several towns, as well as some eremitic monasteries (González-García et al. in prep.). The results are shown in Figure 3c. All churches but two are inside the solar range. In particular it is interesting to note

that most churches follow the urban grid of the cities they were built upon. This is at odds to what we have observed customary in the Christian west (for instance, in Mérida we see that the urban grid is broken by the eastern orientation of the churches very early on, González-García and Costa Ferrer 2011), but apparently it could be common in the East (see Dallas 2015 for the orientation of churches in Thessaloniki).

2.7. *Muslim mosques*

After the Yarmuk battle in 636 Jordan became part of the Muslim world. Islam expanded with its own particular orientation customs so that mosques must be orientated to the Sacred Mosque in Mecca (i.e. the Ka'aba) according to Quran (II, 19) prescriptions. However, this was not so easy to achieve and different approaches to the problem were accepted (Rius, 2000), including the possibility of orientating oratories like Ka'aba (Hawkins and King, 1982) instead than to Ka'aba.

We could measure two mosques from ancient times. They are the one at the acropolis of Amman, from Umayyad times, and the second from Pella, from the Mamluk period (Table I, Fig. 2). It is interesting that the first has an orientation almost perfectly towards due south, while the second is deflected several degrees from such orientation.

Perhaps an explanation for such difference may come from the periods of their construction. The first is from Umayyad period, an epoch when Muslim power resided in Damascus, in modern Syria. The people from Syria were known to orientate their mosques almost due south as this was an approximate orientation for the direction towards Mecca in Damascus and also of the rising position of Canopus ("like Ka'aba", King, 1995). However, the Mamluk domain was mostly connected with Egypt and Cairo, where the astronomical determination of the Qibla was almost a rule in that period. If we follow such prescription, the mosque at Pella should be facing an azimuth of 160º, in good agreement with its actual orientation.

3. A DYACHRONIC COMPARISON

3.1. *Within Jordan*

One of the most striking results is the consistency in orientations. If we directly compare the orientations in Figure 3, Bronze Age temples and dolmens share broad orientations towards the extreme positions of sun and moon and towards cardinal directions. This is strongly maintained in the Iron Age, especially during Nabataean times. In particular it is highly striking the similarity between the two histograms of the megalithic monuments and the Nabataean temples and shrines. Even more so if we consider that there is a span of more than 15 centuries in between!

The Hellenistic and Roman temples however do seem to break such consistency. This should not be surprising, as a large fraction of the population of those cities of the Decapolis were under a strong Hellenic cultural influence or were directly of Greek origin.

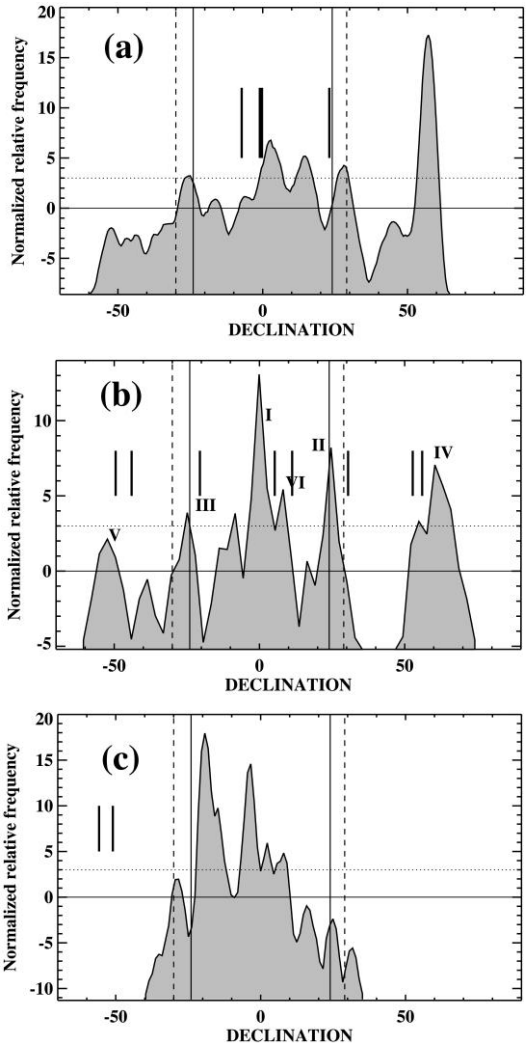


Figure 3. Declination histograms for three periods of Jordanian history. Vertical solid lines indicate the extremes of the solar range –the solstices- and dashed lines the extremes of the lunar movements. The horizontal dotted lines give the 3sigma value for each histogram. (a) Histogram for the Jordanian Bronze Age. The shaded curvigram indicates the dolmen KDE. The short vertical strokes are the BA temples in Table I plus the one at Pella. (b) Histogram for Nabataean monuments. The Roman numerals indicate the concentrations with significant astronomical targets. The vertical strokes are the 8 Hellenistic/Roman temples presented in Table I. (c) Histogram for Byzantine churches in Jordan. The two short vertical strokes are the orientation of the mosques indicated in Table I.

The Byzantine churches do not follow any of the above patterns, with a larger tendency to be oriented

according to the Roman city grids, and mostly inside the limits of the solar movements.

Finally the Muslim mosques tend to be oriented towards south, something practically alien to Jordan until this period, with just some exceptions in the Nabataean period (Belmonte et al. 2013b).

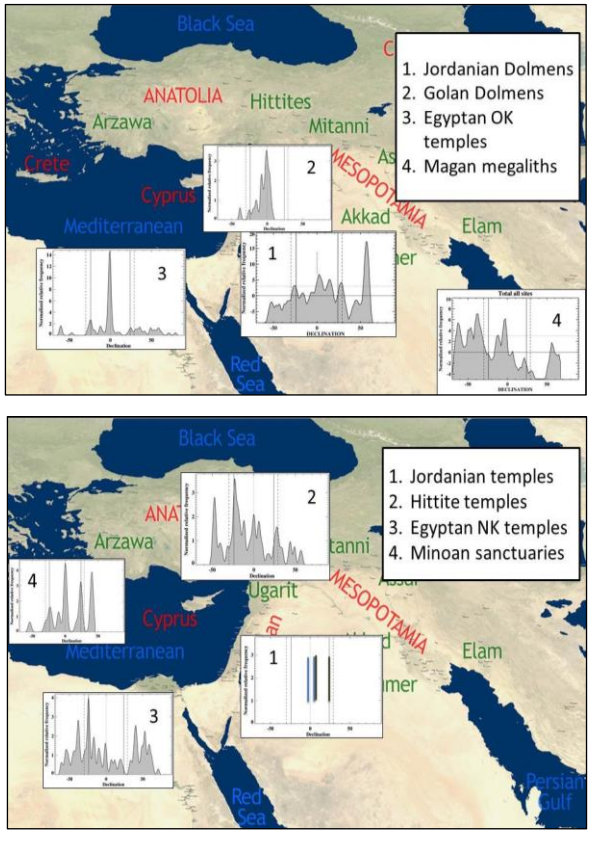
We thus find that persistence in orientation is a key feature of Jordan orientation, especially during Bronze and Iron ages. This is true that there could be a process of 'definition' of the targets: while in Bronze age megalithic monuments the orientation peaks seem rather broad and thus the orientations appear quite diffuse, these are better defined in the case of the Nabataean monuments. Such process has been suggested before for the Mediterranean (González-García 2013). We must bear in mind that this might be the result of the measurement process itself: the dolmens are rather small and thus the orientation might be less well defined than in the larger Nabataean temples. However, one could speculate if such could also have been the intention of the builders: to have a less defined orientation in the megaliths, where multiple relations appear, both topographic and astronomical with a much better one in the temples if only – or mainly − the astronomical target was the key. A way to achieve such is by erecting suitable buildings for such purpose.

The break of this custom comes first with an alien culture: the Hellenistic world and later with the Roman expansion. The pattern observed in the Hellenistic temples could be consistent with that found in other areas of the Greek world at the time (see, e.g. Boutsikas 2009; González-García and Belmonte 2014). Such break is further confirmed by the orientation of churches and mosques.

Does this exercise help us in determining the intent of the Bronze Age builders of megaliths? We could try an explanation for dolmens and the Bronze Age temples based on the similarities found with the Nabataean temples. For the Pella temple we observed that the orientation towards summer solstice could be connected with the death of a fertility god such as Baal (Polcaro et al. 2013). For Petra we saw that such kind of god was reborn at winter solstice (Belmonte et al. 2013b). In any of the two cases we see that the solstices are clearly a time related to death and the afterlife, resurrection and the end-beginning of cycles. This could also have been the case in Bronze Age. Dolmens are often located in hills and in many occasions overlooking a central structure that might have acted as a sanctuary or sacred area as in Al-Mureyghat. The central place is surrounded by liminal structures, boundaries with the after-world and the afterlife, places of ending and beginning, in close resemblance of the solstices. The centrality of some of those areas, though, could be indicated by the equinoctial/cardinal orientations of the temples perhaps as a way to connect with the cardinal directions and the ordered structuring of the world.

3.2. *Outside Jordan*

Figure 4 presents the orientation of several cultic structures in different areas of the Near East that have been collected from our previous works or from the literature. First we compare for the Early and Middle Bronze Age. We have data from Egyptian temples (Belmonte et al. et al. 2009), megalithic dolmens from the Golan Heights (González-García & Belmonte 2010) and the megalithic funerary structures from the land of Magan (present day UAE and Oman; Belmonte & González-García 2014). For all the four sites we observe that the equinoctial orientations are important. This is specially so for Egypt, where it is by far the most frequent orientation. We must remember all the mythology written in the Pyramid Texts and other sources regarding the journey of the sun and its resurrection in the East. This could, perhaps also explain the equinoctial orientation for instance in Tell Deir Alla, and the group found in the Jordanian and Golan megaliths. Magan presents also a peak that might be called equinoctial, but there cardinal orientations seem to be preferred, especially towards south.



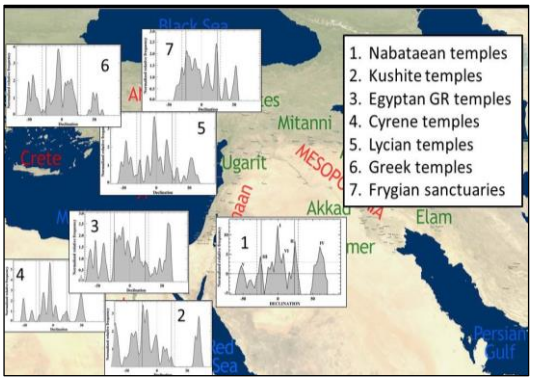


Figure 4. Comparison of the orientation of the different cultic structures in the Near East. Top panel includes data for the early Bronze Age. The middle panel includes the data for the middle and late Bronze Age. Lower panel includes the data for the Iron Age. For details see text.

Late Bronze Age presents results from Egypt (Belmonte et al. 2009), the Minoans (Henriksson & Blomberg 2008) and the Hittites (González-García & Belmonte 2011). We have included here the Jordanian temples from these periods for comparison. Egypt and the Hittites present a striking similarity that has been indicated before: both had religions whose deities presented a strong solar character, and both had the largest concentration of cultic orientations towards winter solstice.

There are other directions of interest such as the equinoxes and perhaps some stellar orientations as well. This is in contrast with Minoan sites, where the equinox is by far the most important orientation, perhaps – as it has been indicated - in relation to a luni-solar calendar. There is also a relation to summer solstice. In this sense the temples in Jordan do seem closer to the Minoan tradition, although the number is so low that no conclusive trend could be indicated here. In fact, given the tendencies observed for instance in the dolmens, the results for the temples are fully compatible with those results.

We have much more results to compare with for the Iron Age. There we have measurements from Egypt and Kush (Belmonte et al. 2010), Cyrene, Lycia (González-García & Belmonte 2014) and Phrygia (González-García & Belmonte 2011) and the Greek temples (Boutsikas 2009). Greek, Lycian and Cyrenean temples do present a similarity already put forward before (González-García & Belmonte 2014).

This is based on a concentration of orientation in the cardinal directions and the absence of significant numbers of temples towards the solstices. Phrygian temples present concentrations towards the solstices but there seems to be an absence towards the equinoxes, something that is observed also in the groups of temples from Kush and Egypt.

Interestingly, Nabataean temples do present characteristics from both groups. We cannot ascertain if such a result is the outcome of an aboriginal evolution or the syncretism of both Near Eastern and Hellenistic traditions. The fact that we had the clear similarity with previous orientations in Jordan may prompt us to favour the first choice but the second should not be overlooked. A third factor is that the influences from both sources could have been well received by a population already inclined to orient their cultic structures similarly to those from abroad.

ACKNOWLEDGEMENTS

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