Early herders and monumental sites in eastern Africa: dating and interpretation

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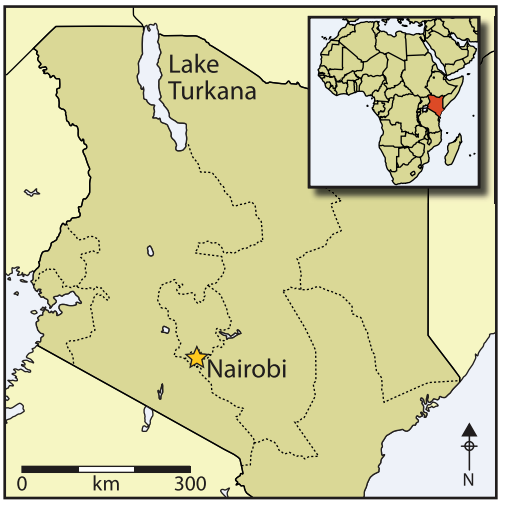

Using excavation and radiocarbon dating, the authors show that construction of megalithic pillar sites begins in eastern Africa by the fifth millennium BP, and is contemporary with the earliest herding in the region. Mobile herders and/or hunter-gatherers built and used these sites in a dynamic context of economic and social change. We are more familiar with monumentality as an adjunct of cereal cultivators—but this study demonstrates a relationship between early herding and monuments, with clear relevance to pre-cultivation monumentality of very much earlier periods elsewhere.

Keywords: sub-Saharan Africa, fifth millennium BP, herders, pillar sites, ostrich eggshells, radiocarbon

Introduction

Stone or earthen monuments are associated with early food production in many parts of the world, but their emergence is more evident among early cultivators than among groups focusing on livestock (Sherratt 1990; Solis *et al.* 2001; Johansen 2004; Wright 2007; Frachetti 2008). Determining why and how early herders built monumental sites is a compelling question, because their subsistence economies, mobility patterns and social institutions would have differed from those of sedentary farmers. Several parts of Africa offer the opportunity to study monumental architecture among prehistoric herders with no domestic plants.

During the Early Holocene, the Sahara, Sahel and portions of eastern Africa had high rainfall and lake levels (Owen *et al.* 1982; Goudie 1996). Humans living in these regions used aquatic resources and made barbed bone points and ceramics with wavy-line

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decoration (Robbins 1974; Phillipson 1977; Sutton 1977; Barthelme 1985; Close 1995; Yellen 1998; Holl 2005), but do not appear to have built monumental sites. Africa's first food production—herding—began in the eastern Sahara during the Early Holocene and initially spread west (Figure 1). As conditions became drier during the early Middle Holocene, Saharan sites were abandoned (Kuper & Kröpelin 2006). Herding spread south, and cattle and caprines were present in the Turkana Basin by 4000 ^{14}C BP (Marshall *et al.* 1984), long before evidence for plant food production in the region (Marshall & Hildebrand 2002).

New social institutions emerged as herding spread. In Egypt, herders erected standing stones at Nabta during the Early Holocene (Wendorf 1998). In Libya, mortuary evidence suggests they had 'cattle cults' 6400–6000 ^{14}C BP (di Lernia 2006). In Sudan, herders at Kadero buried their dead in distinct areas with different degrees of material cultural elaboration *c.* 5500 ^{14}C BP (Krzyzaniak 1991). Near the Middle Niger, ephemeral elites may have existed among mobile herding groups *c.* 5200–3650 ^{14}C BP (MacDonald 1998).

In north-west Kenya, several 'pillar sites' have standing stones, platforms and sometimes cairns and/or stone circles (Figure 2). Later herding sites in southern Kenya do not appear to have such complex architecture (Marshall *et al.* 2011), although cairn building is widespread. Preliminary studies have attributed north-west Kenyan pillar sites to a spatially extensive 'mortuary tradition' linked to the first herders around Lake Turkana (Koch 1994; Nelson 1995), but up to now few pillar sites have been radiometrically dated.

Establishing a definitive chronology for the construction and use of pillar sites can answer three questions crucial to both local culture history and larger processes of social change. Were pillar sites contemporary with early herding? Did the practice of monumental construction spread quickly, or gradually? Was the social significance of pillar sites ephemeral (a few generations) or long-term (many centuries)? In this article we examine existing chronological data for Middle Holocene sites around Lake Turkana, introduce new radiocarbon dates for five pillar sites and examine their social implications.

Early herding and pillar sites in north-west Kenya

Early herding in north-west Kenya is demonstrated by *c.* 4000 ^{14}C BP, when cattle and caprine bones appear at habitation sites Dongodien and GaJi2 in contexts securely dated via charcoal (Marshall *et al.* 1984). Several other habitation sites are regarded as Middle Holocene in age (Table 1), but have insecure dates based on aquatic shell (Broecker & Walton 1959) or bone (Collett & Robertshaw 1983).

Nine possible pillar sites have been recorded near Lake Turkana (Figure 3). Five of these—Jarigole, Lothagam North, Lothagam West, Kalokol and Manemanya—have massive pillars of columnar basalt and raised platforms. Each would have required coordinated labour by a large group to transport pillars up to 800kg in weight from sources up to 2km away, and to build platforms up to 500m^3 in volume that may have required perhaps 50 000 short trips carrying loads of rock and sediment in baskets or animal skin containers (Hildebrand *et al.* 2011).

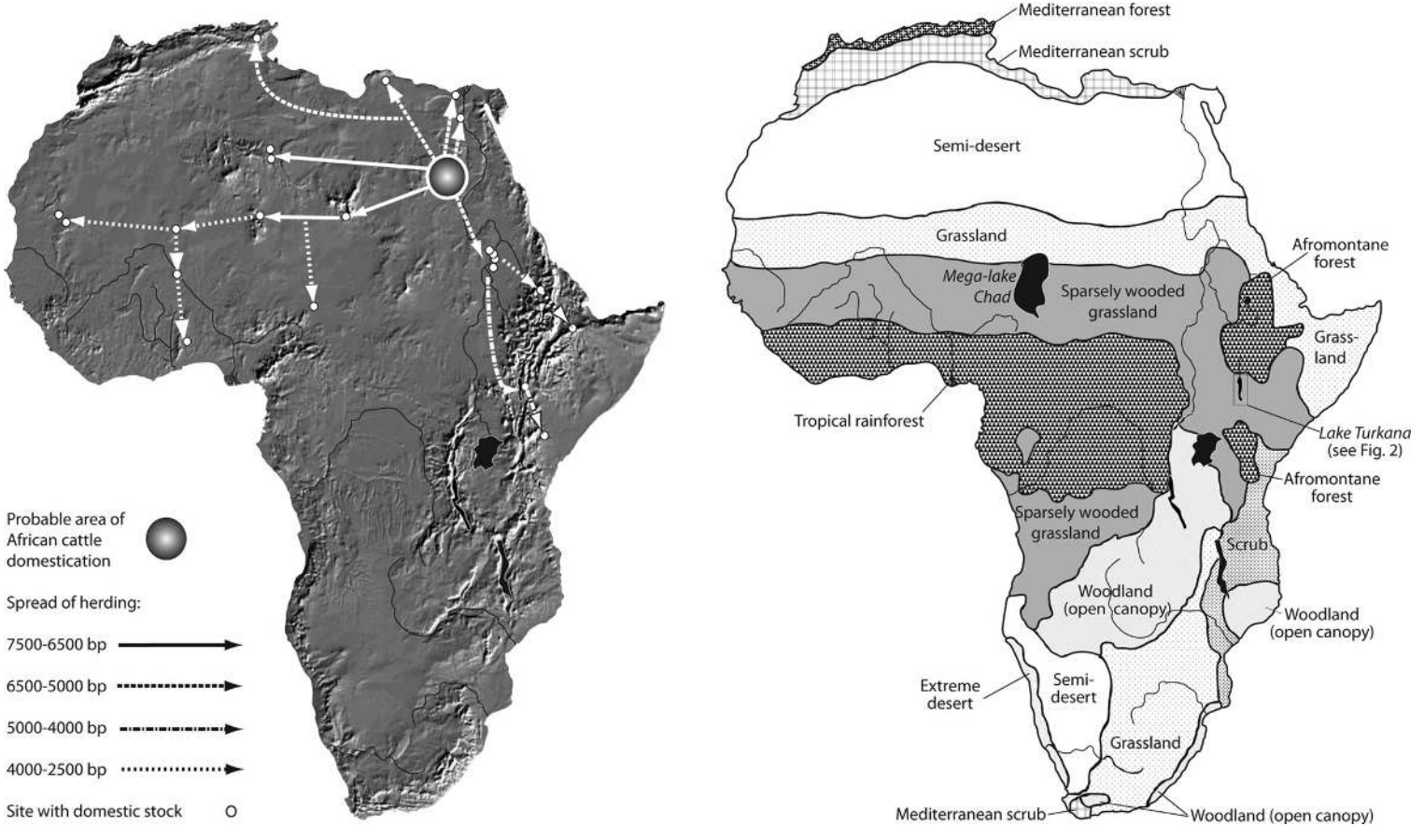

Figure 1. Left) the spread of herding through northern and eastern Africa before 2500 BP. African cattle were domesticated in the eastern Sahara during the Early Holocene, sheep and goats entered Africa slightly later, and herding spread west and then south (after Marshall & Hildebrand 2002: 110). Southern portions of the continent had no domesticates until after 2500 BP, and routes of spread are still under discussion. Right) distribution of the major vegetation types in Africa around 5000 BP (after Adams n.d.), around the time herding was spreading south from the Blue/White Nile confluence. During the next 1000 years, conditions would have become drier in most parts of northern and eastern Africa, causing these vegetation belts in these areas to shift toward the equator. Areas near Lake Turkana would have continued to harbour sparsely wooded grassland. The spread of herding into eastern (and later southern) Africa appears to have followed a grassland corridor between moist tropical rainforest, and rugged uplands with Afromontane vegetation.

Figure 2. Three pillar sites west of Lake Turkana: top left) distant view of GeJi10, taken from the west side of Lothagam Ridge; arrow points to site; top right) close view of GeJi10 (pillar extends >1m above ground); centre) aerial view of GeJi9; arrow points to the platform which is 30m across; 15 cairns and stone circles lie to the east (right); bottom left) main pillar area and adjacent cairn at GcJh3; bottom right) alignment of pillars at GcJh3. Local Turkana residents customarily place a small stone near a pillar when passing. Kalokol Road is visible behind the site.

Table 1. Prior dates obtained from possible Middle Holocene sites in the Turkana Basin, moving clockwise from the north end of Lake Turkana. Dates judged insecure are those from shell (due to the uptake of ancient carbon by aquatic organisms, Broecker & Walton 1959) and bone (Collett & Robertshaw 1983). Dates in bold (on charcoal) are deemed reliable and appear in Figures 4 & 5. Clear occurrences of Nderit pottery are indicated in bold in the comments column.

Site name (SASES #)	Provenience for dating material	Material dated: ^{14}C BP	Reference and comments
Stone Bowl site (FwJj5)	Unit B archaeological horizon	Mammal bone apatite: 4000±140	Barthelme 1985: 193–213 Site has Ileret pottery.
FxJj12N	Lower horizon	Human bone apatite: 3245±155	Barthelme 1985 regards human bone as possibly intrusive or contaminated. **Nderit** pottery found in Upper Horizon deposits.
GaJi3	Unit B	Fish bone: 4650±185	Barthelme 1985: 128–33 Associated with fish bones, bone harpoons.
GaJj9	Human bone, burial 2	Apatite: 3125±210	Barthelme 1985: 257–61 Pottery has possible Nderit affinities.
GaJi2	Lower horizon (single sample, subdivided)	**Charcoal: 3970±60** **Charcoal: 4160±110**	Barthelme 1985: 143 **Nderit** pottery is present in deposits.
Dongodien (GaJi4)	Unit 5C (single sample, subdivided) Unit 5C	**Charcoal: 3890±60** **Charcoal: 3945±135** Humic acid residue: 4100±125 Fish bone: 4580±170 Mammal bone: 3405±130	Barthelme 1985: 181 **Nderit** pottery is present in deposits. Barthelme 1985: 177
Il Lokeridede (GaJi23)	Not specified	**Charcoal: 4180±60**	Koch 1994; Koch *et al.* 2002 **Nderit** sherds are present on surface.
Lokori	Human bones (burials)	Apatite: 1200±140 Collagen: 2285±165	Lynch & Robbins 1979; Soper 1982
Bb9	Lakebeds	Shell: 8320±180 Burned earth: 2260±100	Phenice *et al.* 1980: 176 **Nderit** sherds are on surface.
Bb14	Charred clay is eroding from profile	Charred clay: 5020±220	Robbins 1972: 364 **Nderit** sherds are next to the charred clay.
Kangatotha	Palaeoshoreline surface	Shell: 4800±100	Thompson 1966: 9; Robbins 1972: 364 **Nderit** sherds are on surface.
Aipa (GdJi2)	Surface feature: burned earth, butchered bovid	Burned earth: 5420±80	Robbins 1980: 123, *pers. comm.* **Nderit** sherds are on surface.

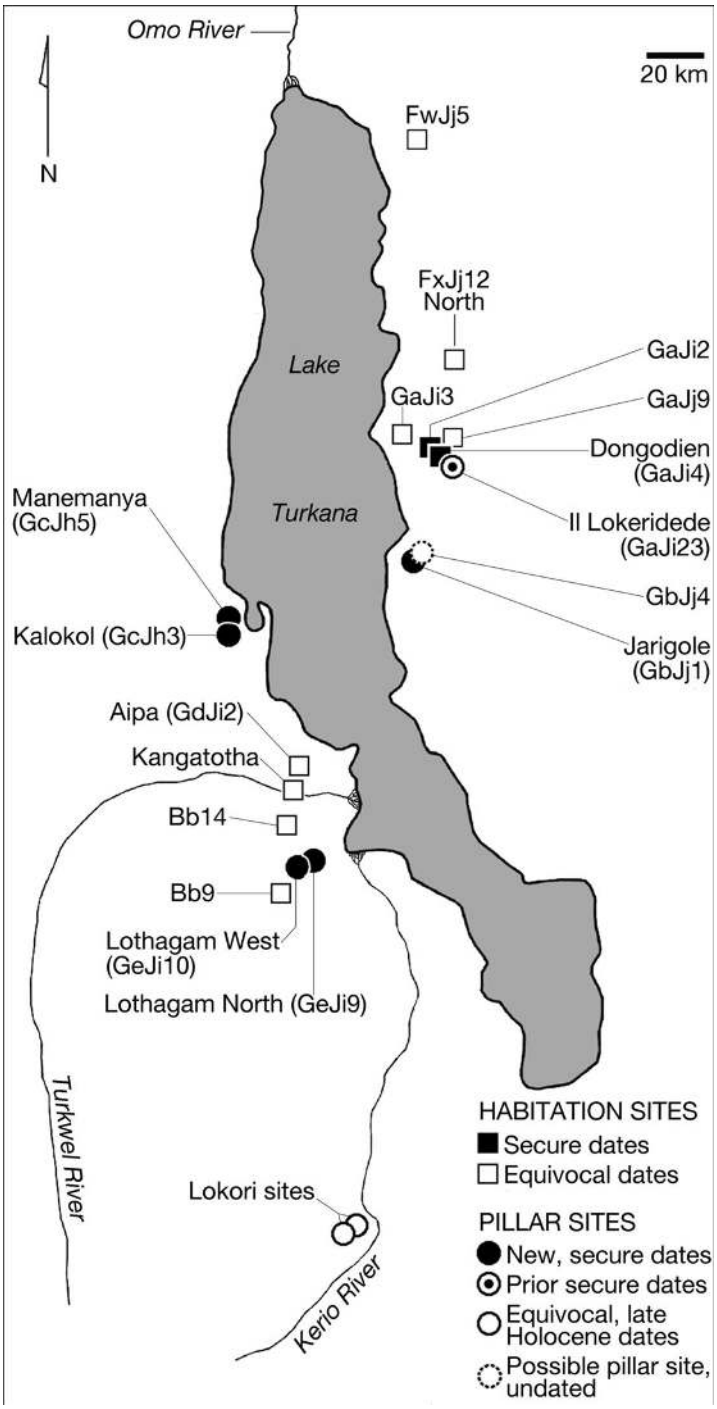

Figure 3. Sites near Lake Turkana. All are attributed to the Middle Holocene except lower FxJj12N and GaJi3 (Early Holocene) and Lokori (Late Holocene).

The status of four others as pillar sites is contestable. Il Lokeridede has sandstone (not basalt) slabs that may have served as upright pillars (Koch *et al.* 2002). Lokori lacks massive basalt pillars; dozens of stone circles—made of tabular lava slabs—typically contain one human inhumation each (Soper & Lynch 1977; Lynch & Robbins 1979). The remaining two possible pillar sites have less documentation: one is GbJj4, 500m from Jarigole (Kamau 1991), and another may lie in the Suguta Valley (Robbins *pers. comm.* 2010).

Only three of the nine possible pillar sites have seen excavation, and only two are radiometrically dated. Il Lokeridede's date of 4180±60 ^{14}C BP is based on surface charcoal. Lokori's dates of 1200±140 and 2285±165 ^{14}C BP (on bone, which is susceptible to diagenesis) are discordant and much younger than those from other sites considered in this report. Excavations at Jarigole, led by Merrick and Nelson in the late 1980s and early 1990s, did not reach bedrock or sterile deposits (Nelson 1995) and no radiometric dates were obtained.

Despite the tenuous nature of these radiometric indications, seven of these sites (shown in Figure 3) have been attributed to the Middle Holocene (Gifford-Gonzalez 2005: 208–209). This is largely due to the fact that Nderit pottery, which has distinctive 'cuneiform-like' impressions and internal scoring, is found at four pillar sites (Wandibba 1980; Nelson 1995) and at several habitation sites thought to be Middle Holocene in age (Table 1). However, the only Nderit finds from intact, securely dated sub-surface contexts in the Turkana Basin are at adjacent habitation sites GaJi2 and Dongodien, where Nderit appears with domestic cattle and caprine remains in contexts dated to *c.* 4000 BP (Barthelme 1985). These two cases are not sufficient basis to use Nderit as an 'index fossil' for Middle Holocene herders.

Another find suggesting links between early herders and pillar sites is a domestic cattle figurine from Jarigole (GbJj1) (Nelson 1995). However, architectural and artefactual differences among pillar sites suggest they may have been constructed at different times, for different purposes, or by different cultural groups.

New dates and studies

As this review shows, secure chronological information is lacking for most sites attributed to the Middle Holocene around Lake Turkana. This has made it difficult to evaluate contemporaneity between herding *vs* pillar sites, determine how quickly pillar site construction spread around the lake, and ascertain whether use of these monuments was a short- or long-term phenomenon. To investigate these questions we dated radiocarbon samples from previously excavated material at Jarigole and from four new excavations west of Lake Turkana in 2008. Lothagam North, Lothagam West, Kalokol and Manemanya saw initial test excavations by the Later Prehistory of West Turkana (LPWT) project under the direction of Hildebrand and Shea in 2008 and 2009. Excavations at each site (usually two 1m^2 units per site) reached bedrock and/or lacustrine deposits of probable Early Holocene age. Deposits rich in pebbles and cobbles indicated construction of platforms. Other features included burial pits, sandstone slab pavements, dense rock piles and pits for emplacement of pillars. The layout and material culture of the five dated sites vary considerably and are summarised in Table 2.

Table 2. Attributes of the five recently dated pillar sites: Jarigole (Nelson 1995; Hildebrand *pers. obs.* 2010), and those excavated by LPWT in 2009 (Hildebrand *et al.* 2011).

Trait	GbJj1 Jarigole	GeJi9 Lothagam North	GeJi10 Lothagam West	GcJh3 Kalokol	GcJh5 Manemanya
Unobstructed horizon views*	*c.* 270–140°	350–50°	185–360°	315–90°	315–135°
Platform	Large	Large	Small	Small	?
Pillars	31–36	48	30	19	13
Linear arrangements of pillars	?	3	2	3	? (displaced)
Additional pillars	N/A	16	5	4	3
Curb	+	+	–	+	–
Stone circles**	–	9	–	–	–
Cairns**	1	5	6	5	–
Cairns >30m from pillars	–	–	+	+	–
Nderit pottery	+	+	–	–	+
Human remains	+	+	–	–	+
Lithic raw materials	Mostly basalt	Mostly obsidian	Mostly chert	Mostly chert and basalt	Diverse
Beads	+	+	–	–	+

* 0° = north, 90° = east, 180° = south, etc.
** ⩽30m from pillars

All four newly excavated sites have datable material from layers that appear to be related to platform construction and use (Table 3). Charcoal was only found at Lothagam West, and furnished the sole date for that site. Ostrich eggshell (OES) was present at Lothagam North, Kalokol and Manemanya; as a medium for dating it is an attractive alternative to charcoal because it undergoes less diagenesis than other organic materials (e.g. bone, aquatic shell) (Brooks *et al.* 1990). The fifth site dated in this study, Jarigole, yielded more than 7000 OES beads during previous excavations by Merrick and Nelson (Nelson 1995), but no radiometric dates were obtained until Grillo's collections-based research in 2009. We compared dates from these five pillar sites to prior dates on charcoal from the habitation sites Dongodien and GaJi2, and the possible pillar site at Il Lokeridede.

Chronological relations among pillar sites

The calibrated dates for pillar sites fall into three distinct groups and two outliers (Figure 4). Group A consists of two dates from Jarigole and one from Lothagam North. Its range is 5270–4883 cal BP (387 years). Group B consists of one date each from Lothagam North, Lothagam West and Manemanya. Its maximum range is 4868–4825 cal BP (43 years). Date AA85132 indicates probable activity at Jarigole during this interval, but its larger lab error (±39 years) gives it a wider calibrated range of 4875–4630 BP. Group C consists of three dates, one each from Jarigole, Lothagam North and Il Lokeridede. Its range is 4849–4541 cal BP (320 years). More recent outliers are from Kalokol and Manemanya.

Table 3. Radiometric dates for pillar sites in the Turkana Basin. Dating for West Turkana sites by the Illinois State Geological Survey, and for Jarigole (GbJj1) by the NSF-Arizona AMS Laboratory. All employed $\partial^{13}C$ corrections; calibrations employ OxCal (Bronk Ramsey 2001).

Site	Radiocarbon sample number	Material dated	^{14}C BP	Calibrated age range BP (95.4%)
Lothagam North (GeJi9)	ISGS-A1491	OES-bead	4385±15	5033–4870
	ISGS-A1505	OES-bead	4165±20	4827–4618
	ISGS-A1492	OES-bead	4265±15	4855–4830
Lothagam West (GeJi10)	ISGS-A1494	Charcoal	4290±20	4868–4835
Kalokol (GcJh3)	ISGS-A1493	OES-fragment	3890±15	4413–4250
Manemanya (GcJh5)	ISGS-A1504	OES-bead	4255±20	4857–4825
	ISGS-A1490	OES-bead	3805±15	4241–4102
Jarigole (GbJj1)	AA85131	OES-bead	4381±39	5212–4853
	AA85132	OES-bead	4251±39	4875–4630
	AA85133	OES-bead	4401±39	5270–4857
	AA85134	OES-bead	4146±53	4829–4529

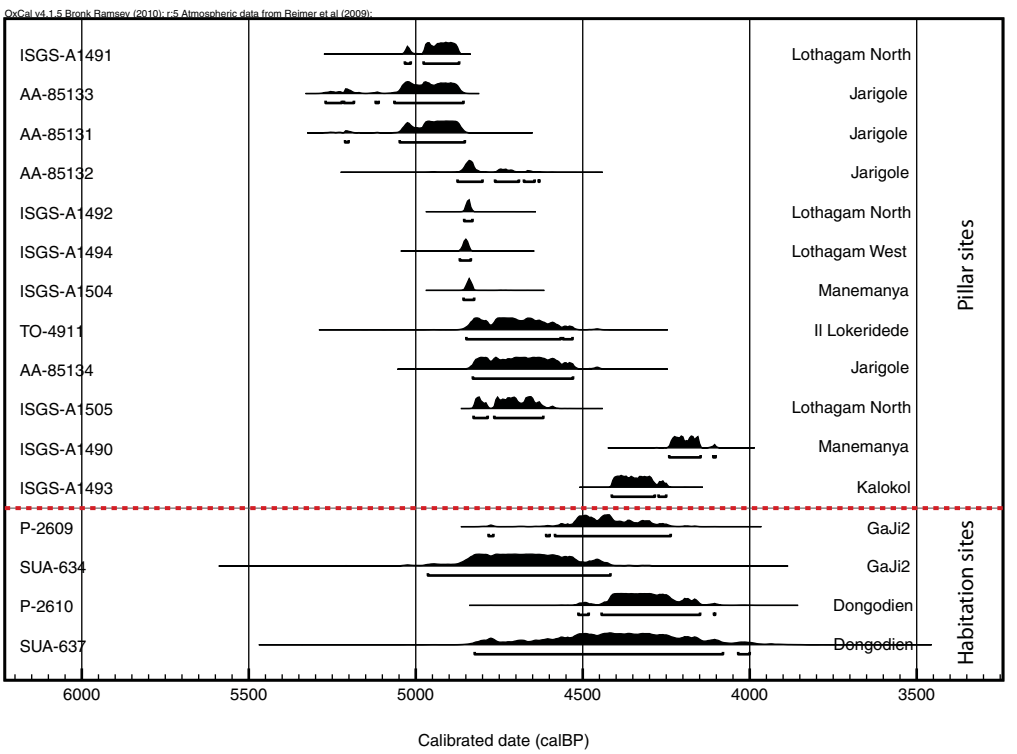

Figure 4. Probability distributions for calibrated radiocarbon dates presented in Table 3, plus dates obtained Il Lokeridede, Dongodien and GaJi2.

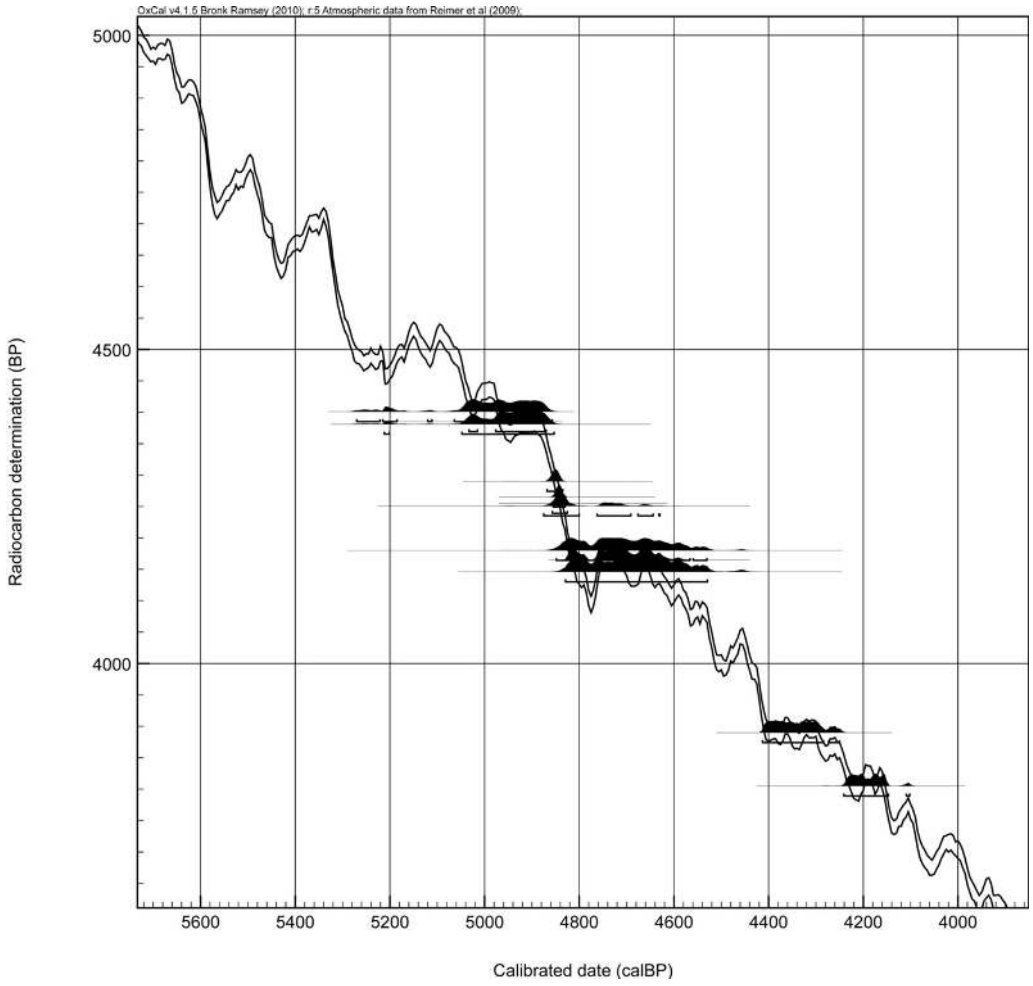

Figure 5. Calibration curve, showing the variation in precision due to cosmogenic nuclide activity.

The calibration curve (Figure 5) shows a variation in the precision possible between periods. Dates from Group A have a broad range of possible calendar dates, but the ranges are consistent across the group. Group B dates have a small range of possible calendar dates, and their tight overlap suggests that Lothagam North, Lothagam West and Manemanya were used within one or two human generations. Falling in another phase of high atmospheric radiocarbon fluctuation, Group C dates have calendar intervals that—like those of Group A—are large but mutually consistent.

Although samples from the base levels of all sites are needed to establish dates for initial construction, we propose the following sequence as a working hypothesis. By about 4883 cal BP, construction was advanced at the largest pillar sites: Jarigole and Lothagam North. Slightly later, during the interval 4868–4825 cal BP, people were using Lothagam North, Lothagam West and Manemanya; activity probably also continued at Jarigole. Between 4849 and 4541 cal BP, Lothagam North, Jarigole and Il Lokeridede all saw use.

Two later dates at Manemanya (A1490) and Kalokol (A1493) have several possible explanations. First, activities related to the original purposes of the pillar sites may have continued at all sites. Second, a later date might reflect a younger overall age for construction and use of that site. Third, it could indicate that use of that particular site continued after others were abandoned. Fourth, it might represent subsequent, intrusive activities unrelated to the initial uses of the pillar sites. At Manemanya, A1504 shows that its early use coincides with that of several other pillar sites. Manemanya's later sample, A1490, lay just above human bones within a pit intruding through the platform into lacustrine deposits of probable Early Holocene age (Hildebrand *et al.* 2011). Together, Manemanya's two dates eliminate the second explanation (later overall age) but are compatible with the third and fourth explanations (longer continued use, or subsequent intrusion). Kalokol's sole date is from a deep layer with no evidence for nearby intrusions. We can eliminate the fourth explanation (subsequent intrusion).

These five sites and the pillar site at Il Lokeridede are thus roughly contemporary, and have similar architectural elements whose construction would have required organised work by large groups. Nevertheless, their artefacts vary. Jarigole, Il Lokeridede, Lothagam North and Manemanya have all yielded OES beads, Nderit pottery and identifiable human remains, while Lothagam West and Kalokol have not (Table 2). It is possible that some were designated as mortuary sites, while others accommodated periodic meetings for non-mortuary activities such as initiations, social negotiation, exchange and/or loans of livestock or ceremonies. The appearance of pillar sites in proximate pairs suggests distinct but related functions. Ranges for calibrated dates from the pillar sites (5270–4102 cal BP) and the habitation sites (4964–4000 cal BP) overlap (Figure 4).

Discussion

These results help resolve the three chronological issues raised at the beginning of this paper. First, the dates show that pillar sites were contemporary with early herding. This suggests that the social institutions for which the pillar sites were constructed were linked somehow with either (a) a new population of herders moving into the area, (b) interactions between herders and fisher-hunter-gatherers, or (c) new social or economic needs among an indigenous population adopting domestic stock from nearby herders.

Second, the dates also suggest a rapid, not a gradual, spread for the practice of building pillar sites around Lake Turkana. Jarigole and Lothagam are chronologically close but geographically distant: Jarigole is more than 100km from Lothagam by water and 300km by land. Activities at the third locality (Kalokol/Manemanya) had begun by 150 radiocarbon years after the earliest Jarigole date.

Third, pillar sites appear to have held social significance for centuries after their construction began. Although it is possible that all the samples for Groups A, B and C were deposited between 4900 and 4700 cal BP, Kalokol and Manemanya have clear evidence for some form of use several centuries later. We have yet to determine whether these later activities were a continuation of original ones or reflect a co-opting of pillar sites for new social purposes.

Preliminary analyses of artefact assemblages hint at differences among contemporaneous pillar sites. Cattle and caprines at Dongodien and GaJi2 confirm herders were in the Turkana Basin when pillar sites were used, and a cattle figurine at Jarigole suggests people using pillar sites were aware of herding. However, unless domestic animals are positively identified at pillar sites, we cannot be sure that the builders of pillar sites kept herds or even derived much of their diet from domestic animal products. Near contemporaneous dates for Nderit pottery at four geographically distant mortuary sites is consistent with the 'ossuary complex' concept proposed by Koch (1994) and Nelson (1995). However, Nderit pottery is not ubiquitous across all pillar sites, and we have little understanding of the social or practical purposes of its many vessel types.

Pillar sites appear in distant locations around Lake Turkana within a short time as herding takes hold. Their use continues for centuries, but possibly not much past 4100 cal BP. The relatively brief use of pillar sites in north-west Kenya and the lack of parallel monumental constructions farther south (Marshall *et al.* 2011) together suggest that pillar sites were important in a particular situation of social contact and/or economic transformation. This leads us to consider the challenges of living on a socio-economic frontier, and the ways in which pillar sites might help people mediate those challenges (Lane 2004).

If the first herders in an area were immigrants, they would have had to learn a new landscape and negotiate with pre-existing populations for access to pasture and other resources. If they were longstanding residents, they would have had to juggle the needs of their stock against other opportunities for resource procurement. If human migrations and adoption of livestock by hunter-gatherers occurred in tandem, then two populations would have been grappling with these issues and with each other. Any of these challenges could have fostered the development of novel social institutions, some of which may have involved pillar sites as a form of monumental architecture.

Architectural data give us initial indications of *how* pillar sites were built. The amount of labour required for platform construction, the need to co-ordinate substantial numbers of people for the heavy but delicate task of pillar transport, and the presence of discrete stone pavements and cobble piles within pillar site deposits (see Hildebrand *et al.* 2011) all suggest that extended social groups assembled periodically to create, use, renovate and maintain spaces imbued with exceptional social meaning.

Discerning *why* pillar sites were built is a more complicated question. The main platforms at Lothagam North and Jarigole contain primary and secondary interments pointing to repeated mortuary use, while those at Lothagam West and Kalokol do not (Hildebrand *et al.* 2011). Artefact assemblages also vary among the pillar sites in terms of lithic raw material, and the presence/absence of Nderit pottery and beads. Nearby pillar sites therefore appear to have provided, within a short space of time, different settings for different kinds of social interaction. More specific interpretations await expanded excavations and larger artefact assemblages, but current data clearly establish that the first known public architecture in eastern Africa cannot be reduced to a single social purpose.

This finding echoes recent ethnographic observations in Kenya, where Samburu herders relate stone cairns to diverse purposes such as path marking, hunting and inhumations, and archaeological research suggests that some cairns were used repeatedly over extended periods (Lane *et al.* 2007). Other ethnographic and ethnohistoric accounts of eastern African

herders and hunter-gatherers are useful sources for developing hypotheses about the purposes of prehistoric pillar sites. Some accounts provide specific examples of public architecture and the motivations for construction: a Nuer prophet instigated construction of a 15m-high earthen pyramid that was used for large ceremonies (Evans-Pritchard 1956: 306). Prophets and military leaders can achieve high social status and respect, especially during times of conflict or social upheaval and may be accorded special mortuary rites and burial markers (for Maasai examples see Fox 1930; Berntsen 1979; Waller 1995). More generally, these accounts depict cultural and religious practices and events that involve gathering otherwise dispersed and/or mobile populations. Although such practices should not be uncritically projected onto the past, knowledge about important social events among mobile peoples in the region today can help archaeologists pose, and test, hypotheses about pillar site uses in prehistoric times.

Conclusion

Explanations of monumental constructions by sedentary farmers in other parts of the world emphasise territorial claims, social stratification and labour demands by elites (reviewed by Dillehay 1990: 224). We have demonstrated that pillar site construction in the Turkana Basin occurred under different circumstances: among non-sedentary people who were either adopting domestic stock or moving herds into unfamiliar terrain. These findings do not necessarily exclude hierarchy and/or territoriality as factors contributing to the genesis of pillar sites in the Turkana Basin. However, any invocation of these factors must address the question of how hierarchy and/or territoriality might arise—and find material expression—within highly mobile and ostensibly 'egalitarian' societies. Other explanations of pillar site construction, including those derived from knowledge of herders and hunter-gatherers in the region today, bear equal scrutiny.

The new data presented here should encourage researchers investigating pastoral frontiers in other parts of Africa, Asia and South America to consider a broad domain of possible explanations for monumental sites. Perspectives gained from these efforts will, in turn, enrich anthropological understanding of the many kinds of social innovations that occurred as food production spread through the world.

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