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Insights to the Temporality of Cemetery 4 at medieval Makurian Ghazali

Excavations at Ghazali

The site of Ghazali (ca. 680-1275 CE) is located in the Wadi Abu Dom region of the Bayuda Desert, ca. 15 kms from the Nile River, within the great bend area, in what is today the Northern State of Sudan (18.441944, 31.931389; ca. 281 masl). Archaeological documentation of Ghazali was initiated by Peter Shinnie, Neville Chittick, and Sayed Nigm ed-Din Sherif in the 1950s (Shinnie and Chittick 1961) before later being resumed, beginning in 2012, by the Polish Centre of Mediterranean Archaeology, University of Warsaw (PCMA UW) under the Ghazali Archaeological Site Presentation Project (GASP), directed by Artur Obłuski in collaboration with the National Corporation for Antiquities and Museums (NCAM) of Sudan (Obłuski 2014, 2018; Obłuski et al. 2015, Obłuski et al. 2018). Though the Bayuda is an area defined by a stark, desertic landscape with a substantial volcanic field and limited water availability, this region has been variably inhabited and utilised since at least the Palaeolithic, notably as a key route between the cultural centres of Napata and Meroe (see Lohwasser et al. 2018; Karberg and Lohwasser 2021; Obłuski et al. 2021a; Żurawski 2021).

Medieval Nubia: A period of change

The medieval period in Nubia (ca. 6th to 15th c. CE) is roughly defined by two major processes: the adoption of Christianity as a primary religion, which would became a dominant social identity as well as a component of state authority; and the development of three kingdoms, Nobadia in the north, Makuria between the Third and Fifth/Sixth cataracts of the Nile River, and Alwa in the south (Adams 1977; Vantini 1981; Welsby 2002; Edwards 2014; Godlewski 2014; Welsby 2014). By the ca. 7th century CE, the Kingdom of Makuria, with capital at Old Dongola, had integrated Nobadia, effectively resulting in control of a territory roughly the size of modern Spain and France combined, about

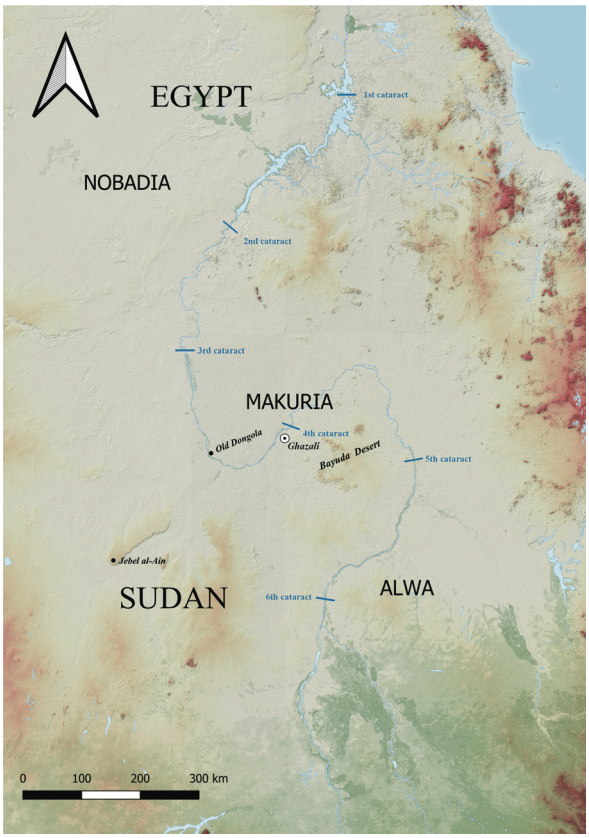

Fig. 1: Location of Ghazali in the Wadi Abu Dom region of the Bayuda desert (map: A. Chlebowski, R. J. Stark).

1,000,000 km^2 (238,095,238 feddan) (Fushiya 2021; Obłuski 2021b; Godlewski 2013, 2014). During this time, the monastic tradition also flourished within Nubia, with anchoritic, laurae, and coenobitic forms all evident; thus far, 20 monastic or likely monastic sites have been confidently identified in Nubian contexts, though many more are known to have existed (Obłuski 2019:129–203).

The inference that many monasteries existed within Nubia is borne out not only through archaeological evidence but also in contemporary accounts of the period, including the recording of 12,000 monks in the district of Tari, a location tentatively linked with the proposed monastery of Jebel al-Ain in the western desert of Sudan (Eger 2019), noted in the tenth century CE Hudud al-'alam; similarly, an account by Abū al-Makārim notes 400 churches as having been present in Alwa and provides the names of six

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monasteries (el-Maqrīzī, tr Bouriant 1900; Vantini 1975; Obłuski 2018:156). Such evidence, while quite likely hyperbolic, nonetheless supports the inference that monasticism and monasteries were widespread in medieval Nubia (see Adams 1977, Jeuté 1994; Anderson 1999; Welsby 2002; Obłuski 2019).

The site of Ghazali

Located within the Kingdom of Makuria, the site of Ghazali primarily comprises a ca. 5000 m^2 walled coenobitic monastery, occupied from ca. 680–1275 CE and being one of the most extensively preserved such monasteries in medieval Nubia, enclosing two churches, dormitory spaces, food preparation and refectory spaces, milling and associated storage spaces, a possible tannery and leather or rope manufacturing facilities, annexes and magazine spaces, as well as bathing and latrine areas (Obłuski 2018, 2019:64–69). Identified outside the monastery walls were the remains of iron smelting facilities, structural remains of a lay community, and four cemeteries, with Cemetery 2, directly south of the monastery, being identified with the monastic community, while Cemeteries 1, 3, and 4 have been identified with use by the lay population (Obłuski 2014, 2018, 2019; Ciesielska et al. 2018; Obłuski et al. 2018; Stark and Ciesielska 2018) (Figs. 1, 2).

Taking into account the number of dormitory, refectory, and latrine spaces available over the occupation of the monastery, it is evident that the number of monks residing at Ghazali varied, with ca. 18 monks in the 7th c. CE, climbing to around 70 monks during the mid-10th to mid-12th century CE, before declining to approximately 24 monks in the

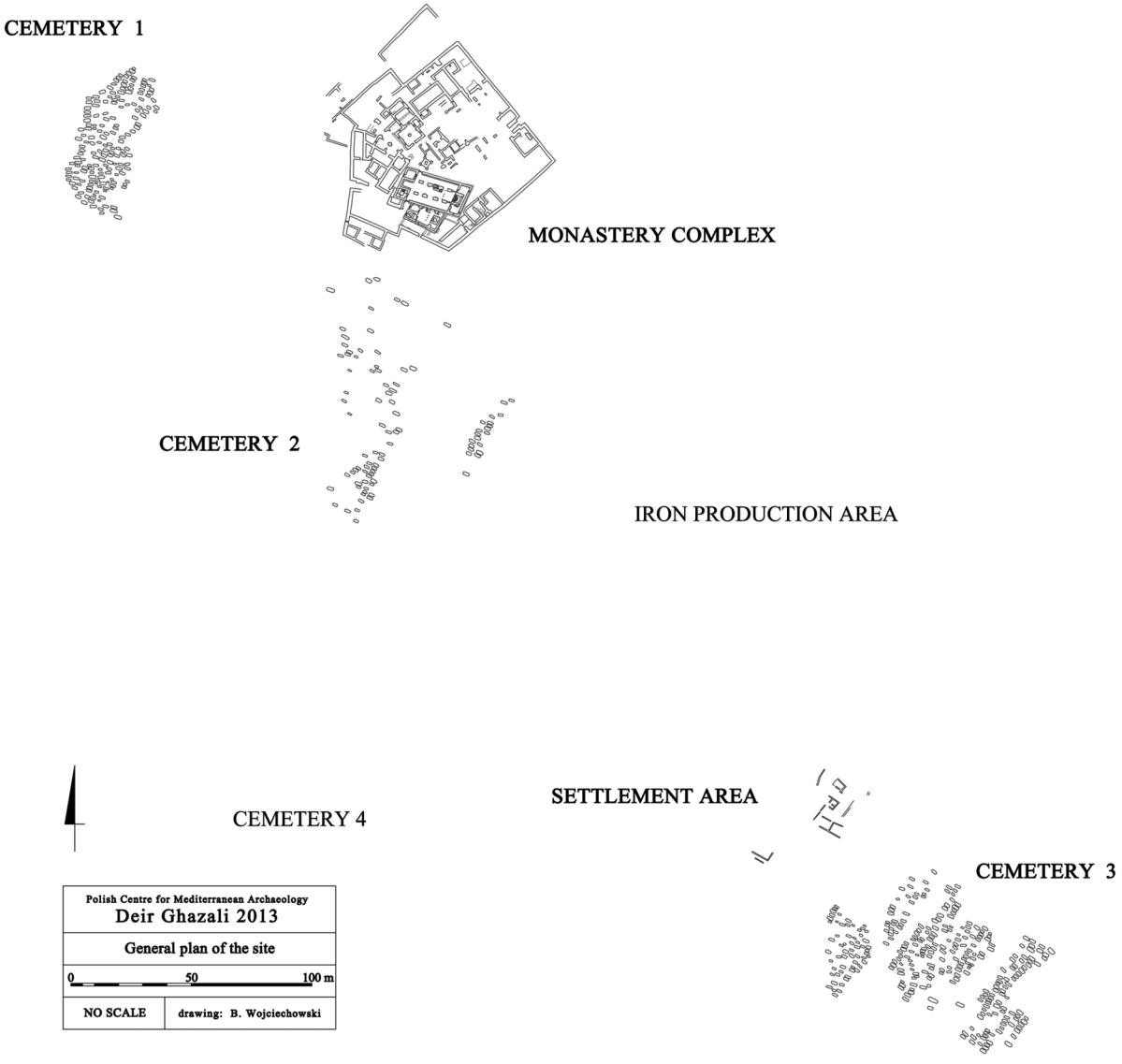

Fig. 2: Ghazali site components (plan: A. Chlebowski, B. Wojciechowski, R. J. Stark).

later years of occupation. Little is known about the monks themselves, with evidence preserved in tombstone epigraphs being a primary source of name, age, and social position data (see Ochała 2023). While an estimate for the number of monks can be reached, the size and population dynamics of the lay community at and around Ghazali remains unclear (Obłuski 2018, 2019, Obłuski and Korzeniowska 2018).

Burials in the Bayuda region

The four cemeteries at Ghazali reflect the largest concentration of medieval period burials identified to date in the Bayuda region, though numerous clusters of box graves of proposed medieval date have also been identified deeper within the Bayuda desert. Between 2009 and 2016, as part of the Wadi Abu Dom Itinerary (W.A.D.I.) project undertaken by researchers from Westfälische Wilhelms-Universität in Münster, the Wadi Abu Dom was surveyed in its entirety on foot along both banks up to 4 kms in the area between 18° 27' 00" N; 31° 53' 50" E to 18° 11' 28" N; 32° 58' 11" E (see Lohwasser et al. 2018). Within this surveyed area, only a few cemeteries, namely of tumuli and box graves, were identified, with at least some clusters being reported as large in size (Lohwasser 2012, 2013, Lohwasser et al. 2018; Karberg and Lohwasser 2021:18). It has been suggested that the absence of associated settlement structures for many of these identified Bayuda cemetery spaces may indicate that the individuals interred therein were involved with a non-sedentary lifestyle, though in the case of several box grave clusters, associated small structures were identified, which may indicate some level of sedentary habitation during the medieval period (Karberg and Lohwasser 2021:19).

Questions about the temporality and periodisation of burials in the Bayuda have previously arisen, particularly around the transition boundary from tumuli to box graves. This transition, in the Nile Valley at least, is associated with the advent of the medieval period and the adoption of Christianity, a process which is not so clearly defined and remains comparatively less well understood for the Bayuda region (Adams 1977; Edwards 2001; Welsby 2002; Karberg and Lohwasser 2018:105). To this end, Karberg and Lohwasser (2021) have proposed that, for the Wadi Abu Dom at least, a more neutral consideration of burial styles may be useful to adopt, namely a periodisation system using, ridge-tumulus period, terrace-tumulus period, and box-grave period. This call stems from the finding that, in areas of the Bayuda, a clear end of tumuli use transitioning into the adoption of box graves with the onset of the medieval period is not always evident or consistent.

Undertaking excavations in 2015 within two cemeteries in the middle Wadi Abu Dom near Bir Merwa, in proximity to the nearby structural remains at El-Tuweina, Eger and Kołosowska (2018) documented a number of proposed Late/Post-Meroitic tumuli and medieval period graves, stylistically most closely resembling the FF03a, FF03b, and FF03d types of Borcowski and Welsby (2012). Of note among the burials documented was the identification of two small, ca. 3–5 m in diameter, "Christian tumuli" at Site 5364. These two graves had tumuli superstructures, but with substructures and interments typical of the medieval period. Radiocarbon dating of a shroud recovered from this burial (Burial 5364.6) returned a date of 1185±30 BP, a 95.4% range of 725 to 949 cal AD, providing an 8th to 10thth c. CE terminus post quem medieval date for this burial (Karberg and Lohwasser 2018:70; Eger and Kołosowska 2018: 222–227; Eger et al. 2019). The presence of these tumuli amidst box-grave burials further suggests variable retention of tumuli use into the medieval period within the Wadi Abu Dom region.

Under the umbrella of the Gdańsk Archaeological Museum Expedition (GAME) mandate and as part of the 'Prehistoric Communities in the Bayuda Desert in Sudan — New Borders of the Kerma Kingdom' (NCN Grant No. 2016/23/B/HS3/00845) project, approximately 900 sites were identified from multiple periods within the northwestern region of the Bayuda, covering an area of ca. 25,000 km^2 (Paner 2021:25). In terms of the medieval period, most sites in the Bayuda have been identified along or in proximity to wadi courses. From the area assessed, a decline in settlement within the Bayuda was observed for the Medieval period, with the number of evident Christian graves amounting to approximately 15% of all the sites discovered. Of the 139 sites from the northwestern group dating to the medieval period, 110 had characteristic superstructures (e.g., box graves), with just over 30 sites having between 10 and up to 100 such graves, while some 30 to 40 small cemetery sites comprised only 1 to 6 graves. In terms of structural remains, only 34 sites were classified as settlement sites, with associated residential buildings and other structures, quite possibly for farm animals and/or economic activities; among the 200 sites identified in the southeastern area, medieval occupation was effectively absent, with only ephemeral traces of occupation, namely fragments of medieval pottery identified at three sites, and no box graves. Akin to the previously discussed research of the W.A.D.I project in the Wadi Abu Dom region of the Bayuda,

early Christian burials with tumuli style superstructures covered with small rock fragments were also identified by the GAME project at Site HP324 (see Paner and Borcowski 2005:103; see also Paner and Pudło 2010; Paner 2021).

The perceived ambiguity of burial style transition between tumuli and box graves in the Bayuda brings forth numerous questions about syncretism and preservation of burial traditions, cultural continuity, and rates of adoption of new social paradigms (viz., Christianity). It has been argued that for an extended period after the adoption of Christianity, traditional burial customs that had their roots in pre-Christian times remained in use in the peripheral regions of Nubia (Eger and Kołosowska 2018). Paner (2021:52) discusses how in terms of changes visible in approaches to burial, the appearance of new tomb forms, namely the box grave, is somewhat puzzling in the context of the Bayuda as, with the exception of the Ghazali monastery complex, no centres of Christian religious practice are evident in the Bayuda Desert (see also Eger 2019 and Eger et al. 2019 for discussion of the site of Jebel al-Ain, north of the Wadi Milik in the western desert). A cluster of sites ca. 30 km to the southwest of Jebel Burur, with five clusters of box graves in a relatively small area, comprising ca. 200 structures, along with Site BP813, where approximately 120 box graves have been identified, located approximately 6.5 km south of Salt Lake on the northwestern edge of the volcanic field, have also been proposed by Paner (2021:52) as possible locales of Christian worship. Such findings by the W.A.D.I and GAME projects have shed light on burial traditions in the Bayuda region and bring into question the nature of burial style adoption and perceptions about the temporality of burial style transitions in the Bayuda region compared to the Nile Valley.

Cemetery 4 at Ghazali

Among the lay cemeteries at Ghazali, Cemetery 4 is rather unique. Cemetery 1 is located in direct proximity to the monastery and may have been utilised for a mixture of local and potentially ad sanctos burials. Cemetery 3 is located in direct proximity to the structural remains of the lay settlement located southeast of the monastery, suggesting use of this cemetery space by this community. Cemetery 4, by contrast, is not in proximity to any structural remains and is located ca. 200 m south of Cemetery 2, being separated by an area of undeveloped land. Furthermore, while Cemeteries 1 and 3 contain a significant

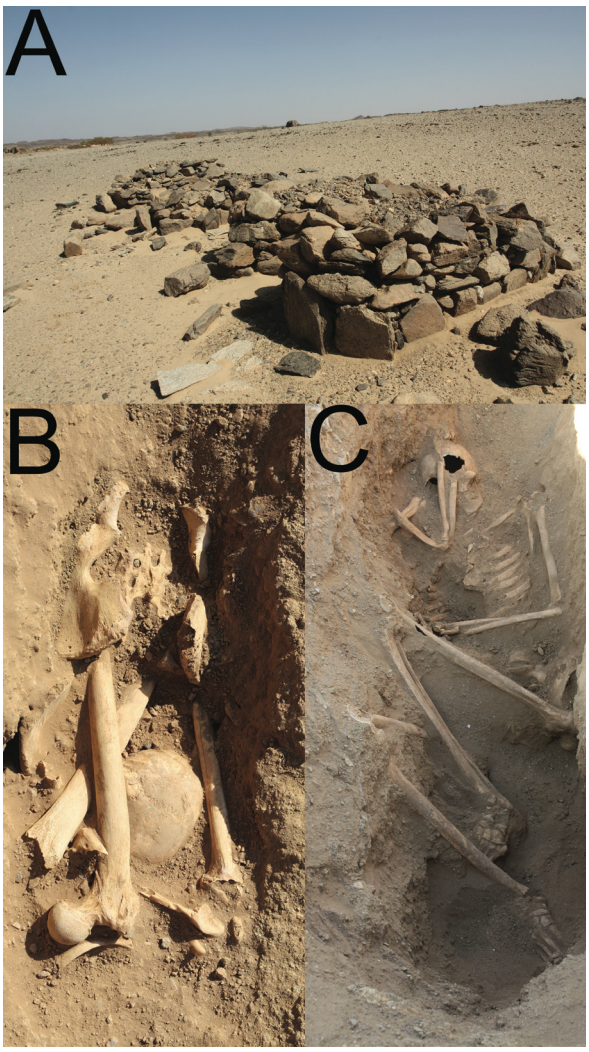

Fig. 3: Cemetery 4 at Ghazali, a.) box-graves in Cemetery 4, looking north towards the Ghazali monastery, b.) commingled burial of Ghz-4-009, c.) burial of Ghz-4-010 (photo: R. J. Stark, J. A. Ciesielska).

number of burials, only 15 graves are surficially evident in Cemetery 4 (see Stark and Ciesielska 2018) (Fig. 3).

The nature of Cemetery 4 as a burial space and the interments found therein has been previously addressed in the work of Stark and Ciesielska (2018), who undertook partial excavation of the cemetery in 2016 in cooperation with the Wadi Abu Dom Itinerary project (W.A.D.I), directed by Angelika Lohwasser. In total, 11 individuals were excavated and osteobiographic data established (see Stark and Ciesielska 2018: Tab. 1). At the time of initial documentation, however, the temporal affiliation and chronology of these burials, both within Cemetery 4 and in relation to the broader Ghazali community, was not entirely clear. Given the use of box-grave superstructures, east-west burial orientations, nature of interments, and the absence of grave goods,

these burials were identified as dating to the medieval period (see Welsby 2002; Stark and Ciesielska 2018).

Since the time of initial documentation, accelerator mass spectrometry (AMS) radiocarbon dating has been possible for five individuals from Cemetery 4, providing further insight to the temporality and chronology of this burial landscape. Initial AMS dating of individuals from Cemetery 4 was undertaken as part of a broader dietary study presented by Ciesielska and colleagues (2021: Table 1). More recently, as part of the National Geographic Exploration Grant project, "The People of Ghazali: Tracing the Human Experience in a Nubian Desert Monastic Community (680–1275 CE)" (NGS-67810R-20), AMS dates were undertaken for two additional individuals.

Age, sex, and stature estimations

Ageing and sexing of individuals was conducted utilising macromorphological skeletal features. Age estimations were established using auricular surface and pubic symphysis morphology in conjunction with cranial suture closure, while sex estimations were conducted utilising morphological features of the greater sciatic notch, ischiopubic ramus, ventral arc, subpubic concavity, and cranial morphology (Buikstra and Ubelaker 1994; Nikita 2017). Stature estimations were completed according to the method presented by Raxter and colleagues (2008).

Radiocarbon Dating

Bone collagen extraction and AMS dating of two individuals (Ghz-4-010 and Ghz-4-012) from Cemetery 4 was conducted at the Vilnius Radiocarbon Laboratory (Lab Code: FTMC). In Vilnius, all bone samples were initially ultrasonicated in ultrapure water, before being dried, ground, and sieved to obtain the intended sample fraction size of 0.5–1 mm. Bone collagen was extracted using an acid-alkali-acid procedure followed by gelatinization (Molnár et al. 2013, Brock et al., 2010). Samples were treated with 0.5M hydrochloric acid (HCl) for ca.18 hours, followed by 0.1M sodium hydroxide (NaOH) for 30 minutes, and subsequently 0.5M HCl for 1 hour. Gelatinization of bone collagen was performed in a pH 3 solution at 70°C for 20 hours. The resultant gelatin solution was then filtered using a cleaned Ezee-filter and freeze-dried.

The process of graphitization was undertaken using AGE-3 (IonPlus AG) Automated Graphitization Equipment (Switzerland). Radiocarbon was measured using a single stage National Electrostatics Corp. (NEC) accelerator mass spectrometer (USA). Background measurements was estimated to be 2.45×10^{-3} f_M (i.e., fraction of modern carbon) using phthalic anhydride. The IAEA-C2, IAEA-C3, IAEA-C7, IAEA-C9, NIST OXII, SIRI K (carbonate) standards were used as reference materials. The $^{14}C/^{12}C$ ratio was measured with an accuracy better than 0.3% (+/-30 years or better). The ratio of ^{13}C to ^{12}C was utilised for isotopic fractionation correction, with all dates being calibrated according to OxCal v4.4.2 (Bronk Ramsey 2009, 2020) with atmospheric data from Reimer and colleagues (2020).

Bone collagen for three individuals (Ghz-4-008.1, Ghz-4-008.2, and Ghz-4-009) from Cemetery 4 at Ghazali was previously analysed in the University of Oxford Research Laboratory for Archaeology and the History of Art, Oxford Radiocarbon Accelerator Unit (ORAU) (Lab Code: OxA) (see Ciesielska and colleagues 2021).

Radiocarbon (AMS) results

The five AMS dates of individuals from Cemetery 4 at Ghazali fall within a relatively tight cluster. The returned AMS dates from these individuals span from 670 (95.4%) 873 cal AD (Ghz-4-010) to 773 (95.4%) 980 cal AD (Ghz-4-012) (Table 1).

Cemetery 4 in relation to the broader Ghazali landscape

The contemporaneous dating of Cemetery 4 at Ghazali with the occupation of the Ghazali monastery and use of the associated monastic and lay Cemeteries (Cemeteries 1–3) places this cemetery of less clear function firmly within the realm of the wider lay and monastic community that would have been present at Ghazali, bringing forth further questions around the role of Cemetery 4 within the Ghazali community and the broader Bayuda region. As not all burials from Cemetery 4, nor from Cemeteries 1–3, have been excavated and radiocarbon dated, it remains unclear when each of the four cemeteries at Ghazali was first established. The small size of Cemetery 4 (n=15 evident graves) in comparison to the other three cemeteries at Ghazali, coupled with the identification of several arguably atypical burials within this cemetery, including the co-burial of the disarticulated remains of at least two individuals (Ghz-4-009 P.1 and P.2) and that of an

Individual	Age (Years)	Sex	Stature	BP Date	Cal AD Date	Lab Code
Ghz-4-008.1	20–35	Male	166.62±3.21 cm, ($femur_m$= 45.5 cm)	n/a	774 (95.4%) 886 cal AD	OxA-40009
Ghz-4-008.2	35–50	Female	156.14±2.51 cm, ($femur_m$= 42.5 cm)	n/a	772 (95.4%) 946 cal AD	OxA-40119
Ghz-4-009*	35–45	Male	n/a	n/a	676 (95.4%) 824 cal AD	OxA-40010
Ghz-4-010	35–50	Male	n/a	1258±27	670 (95.4%) 873 cal AD	FTMC-YN80-25
Ghz-4-012	4.5 (long bone); 5.5–6.5 (dental)	n/a	n/a	1150±27	773 (95.4%) 980 cal AD	FTMC-YN80-11

Table 1: Individuals AMS radiocarbon dated from Cemetery 4 at Ghazali, providing individual identifier, age, sex, stature, BP date, cal AD date, and analysing laboratory code. *The burial of Ghz-4-009 contained a minimum number of individuals (MNI) of two. Both evident individuals were male, with the estimated age for Person 1 (P.1) being 35–40 years old, while Person 2 (P.2) was 40–45 years old. Given uncertainties as to which individual the femur sampled for bone collagen belonged to, a maximum age range of 35–45 years has been presented herein. Radiocarbon dates for Individuals Ghz-4-008.1, Ghz-4-008.2, and Ghz-4-009 have be restated following their original presentation in Ciesielska and colleagues (2021).

individual who appears to have been haphazardly interred (Ghz-4-010), suggest that Cemetery 4 may have served a different purpose than Cemeteries 1–3 within the Ghazali community (see Stark and Ciesielska 2018; Ciesielska et al. 2018). While the nature of this inferred dissimilarity is not readily clear, the results of radiocarbon dating clarify that era of use does not appear to have been a factor in this perceived dissimilarity as all four cemeteries at Ghazali were in use during the medieval period.

Analyses focussing on DNA at Ghazali are currently underway. The pending results of this study will hopefully help to provide additional insights to the dynamics of Cemetery 4 in relation to the other three cemeteries identified at Ghazali. Such analyses will also help to situate the individuals interred within Cemetery 4 in relation to other individuals within the Bayuda (see Jugert et al. 2018), Nubia, and regional contexts more broadly (see Breidenstein 2019; Sirak et al. 2021, 2022).

While the nature and temporality of burial style transition in the Bayuda region remains challenging to define for the medieval period, the work of the W.A.D.I and GAME projects has made clear that the Bayuda region was a key area of importance within the Kingdom of Makuria, with Ghazali being among the most prominently developed locales in this region. The exceptional size of Ghazali contrasts with the more sporadic occupation of other, more distant, reaches of the Bayuda. The temporality of Cemetery 4 at Ghazali coupled with the small number of graves within Cemetery 4, arguably more typical of burial clusters seen deeper in the Bayuda, seem to situate this burial space between these two spheres: the largely sedentary landscape of Ghazali and the ostensibly more mobile nature typical of groups in the Bayuda, a region that functioned as an important transit corridor for population movements, pastoralism, and inter-regional trade (see Żurawski 2021 for broader discussion of travel and trade in the Bayuda).

Conclusions

Radiocarbon dating of individuals from Cemetery 4 has helped to clarify the era of use for this cemetery, situating it within the same timeframe of occupation as the Ghazali monastery and use of Cemeteries 1–3 at Ghazali. Such dating brings into further question the function of Cemetery 4 within the wider Ghazali sitescape. It is hoped that with additional analyses of individuals from the four Ghazali cemeteries, further insights will be gained about the nature of cemetery use and burial variation at this prominent medieval Makurian site in the Bayuda.

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Zusammenfassung

Das mittelalterliche makurianische Kloster Ghazali (ca. 680–1275 n. Chr.) befindet sich am Rande des Wadi Abu Dom in der Bayuda-Wüste und ist etwa 15 km vom Nil entfernt. Das Hauptmerkmal des Geländes besteht aus einem großen, von Mauern umgebenem Klosterkomplex, in dem sich unter anderem Schlafsäle, Latrinenräume, Kirchen, ein Refektorium sowie Räume für die Verarbeitung und Lagerung von Lebensmitteln befinden. Außerhalb der Klostermauern befinden sich Eisenproduktionsanlagen, ein nahegelegenes Gebiet mit baulichen Überresten, die mit der Laiengemeinschaft verbunden sind, und vier Friedhöfe (Friedhöfe 1–4). Friedhof 2 wurde offensichtlich hauptsächlich von der Klostergemeinschaft genutzt, da er sich direkt südlich des Klosters erstreckt. Der westlich des Klosters gelegene Friedhof 1 wurde höchstwahrscheinlich von lokalen Laiengemeinschaften und möglicherweise für Bestattungen „ad sanctos“ in der Nähe der Klosteranlage genutzt. Friedhof 3 befindet sich im Südosten, in unmittelbarer Nähe zu den bereits erwähnten Strukturresten der Laiengemeinschaft, und wurde wahrscheinlich vor allem von den Bewohnern dieses Siedlungsgebietes belegt. Friedhof 4 wurde in Zusammenarbeit mit dem Projekt „Wadi Abu Dom Itinerary“ (W.A.D.I.) unter der Leitung von Dr. Angelika Lohwasser vom Institut für Ägyptologie und Koptologie der Westfälischen Wilhelms-Universität Münster (WWU) ausgegraben. Im direkten Gegensatz zu den anderen drei Friedhöfen in Ghazali umfasst Friedhof 4 nur 15 oberflächlich sichtbare Gräber und liegt in einer Art Niemandsland, ca. 200 Meter südlich von Friedhof 2, was die Natur und den Zeitbezug dieses Friedhofs in Frage stellt. Anhand von fünf AMS-Radiokarbondaten, die aus Knochenkollagen gewonnen wurden, geht hervor, dass die Bestattungen auf Friedhof 4 ca. zwischen dem späten 7. Jh. n. Chr. und dem späten 10. Jh. n. Chr. stattfanden. Eine solche Datierung liefert zusätzliche Details über diesen Friedhof und stellt die Nutzung dieses Bestattungsareals während des Bestehens des zeitgleichen Ghazali-Klosters in Frage. Zusätzliche Radiokohlenstoffdatierungen anderer Individuen von Friedhof 4 könnten dazu beitragen, diese vorgeschlagene zeitliche Nutzung des Friedhofs weiter zu verfeinern.