

The Debre Gergis archaeological site: Ethio-Polish research in the Tigray region of Ethiopia (preliminary results)



Abstract: A new Polish project, the first to be carried out in Ethiopia by the PCMA University of Warsaw jointly with Mekelle University, focused on the excavation of the ruins of a church tentatively dated to the Late Aksumite period (6th–8th centuries AD). The site, which is located in the northern region of Tigray in Ethiopia, was chosen for multiple reasons, not the least because of its location on ancient trade routes and because the surviving ruins offered the advantage of immediate visual impact. The work was unexpectedly interrupted by the global Covid-19 pandemic and recent political turbulences in the Tigray region. The paper discusses the early findings, providing, among others, a full description of the PolART excavations in the southeastern part of the church and the discovery of a rock shelter with an ancient inscription and painted pictograms.

Keywords: Tigray region, Ethiopia, Late Aksumite period, excavation, survey, digital documentation, decorrelation stretch

INTRODUCTION AND HISTORICAL BACKGROUND

With almost a century of expertise in the archaeology of Northeast Africa, the Polish Centre of Mediterranean Archaeology, University of Warsaw (hereafter

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Team

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Acknowledgments

This paper is dedicated to our family in Debre Gergis and all our friends and colleagues in Tigray. We warmly hope to return as soon as the political and epidemiological circumstances permit.

We are grateful to Prof. Mulugeta Feseha, General Director of the Authority for Research and Conservation of Cultural Heritage, and Ato Demerew Dagne, Director of Cultural Heritage Research Directorate. We would like to thank W/ro Birkti Gebremedhin and W/ro Zenebu Halefom, Head and Deputy Head, respectively, of the Tigray Culture and Tourism Bureau, for permission to work at the site and for their continued help and interest in our project. We also thank the PCMA UW co-partner, the University of Mekelle and the Paleo-environment and Heritage Conservation office (IPHC). PCMA UW has generously funded the fieldwork.

We are deeply grateful to the representatives of the Ethiopian authorities, Mr. Wosemsegged Kidane (ARCCH) and Mr. Guesh Tsehay (TCTB), as well as our colleague and Head of the Archaeological Department at Mekelle University, Kibrom Kebede, and our driver Sisay Degu for supervising the closing of the site following the importune Covid-pandemic-related termination of the season. They were left with the thankless task of supervising the building of a wall around the mound of ruins and transporting the archaeological finds to a secure location at the Tourism Office in Sinq'ata. For their understanding of the situation and their dedication to completing the essential work, as well as for care for their archaeological heritage, we thank our tireless laborers: Abadi G/Mariam and Aftway G/Egziabher (Debre Gergis landowners), Ametemariam Atshba, Ashenafi Tsegay, Legesse G/Meskel, Netsanet G/Mehdin, Negsti Weldeselassie, Tsegay Hailemariam, Tsegabu G/Ntsae, Ngsti G/Egziabher, Kindeya Haileselassie, Mulugeta Berhe, Brhane G/Egziabher, Haile Berhe, Makelesh Tekla. Last but not least, heartfelt thanks to the PAM editorial team for their help in preparing the manuscript for publication.

PCMA UW) set out on including an archaeological project in Ethiopia. Thus, the Polish Archaeological Research in Tigray (PolART) initiated in early 2020 excavations at the site of Debre Gergis. Ethiopia is a natural extension to the south of the Nile Valley countries, Egypt and Sudan. The Ethiopian northern region of Tigray, along with the southern part of Eritrea, have witnessed more than a millennium of short- and long-distance contacts, mutual relations and shared interests with the northern African civilisations and the opposite shore of the Red Sea. These connections took place at the time that the first societies settled in the area in the 1st millennium BC (Phillipson 2014: 71, Fig. 20) and under the Aksumite kingdom, from the 4th century BC to the 9th century AD (Fattovich 2019: 256).

An exploratory visit in May–June 2019 included eight particularly interesting archaeological sites (Gaudiello 2020b), including the Aksumite Hēnzat and Feres May¹ (Gaudiello 2020b: 4–5, 8–9, Figs 2, 5; Zerue and Beldados 2017). However, since most of the research in Tigray to date has been focused on the metropolis of Aksum and the main flourishing periods of the Aksumite kingdom located mainly in central and eastern Tigray, it was decided to opt for those subregions of Tigray and those periods of Aksumite history that are less well explored [Fig. 1].

Five main periods have been established in Aksumite history, based upon archaeological studies supported by radiocarbon dating of the site in Bieta Giyorgis overlooking the capital of Aksum. The Italo-American project excavating this hill site distinguished the following episodes in the history of the settlement corresponding to the main historical periods (Bard et al. 2014):

1) Proto-Aksumite, 360?–120/40 BC: an early community, predecessor of the kingdom, settled on the Bieta Giyorgis hill;

2) Early Aksumite, 120/40 BC–AD 130/190: a community living in the area of the new capital, with the same burial features as in Bieta Giyorgis (Phillipson 2014: 69);

3) Classic Aksumite, AD 130/190–360/400: large decorated stelae and large underground monumental burials in the Stele Park; first Aksumite coins minted in the late 3rd century AD; several inscriptions commemorated king Ezana's military victories over people inhabiting the peripheries of the kingdom and the Noba living in Sudan (about AD 330–360); Ezana's conversion to the Christian faith about AD 340 (Phillipson 2014: 98);

4) Middle Aksumite, AD 360/400–550/610: Cosmas Indicopleustes reported on king Kaleb's fleet in the port of Adulis just before the royal military expedition to Himyar in defence of the Christian

1 Most of the Ethiopian and Tigrigna words, as well as Debre Gergis and Ketema Ra'isi, are written in a simplified manner readable for non-specialists in Ethiopian languages. Indeed, the correct transliteration for Debre Gergis (ደብረ ገርጊ) should be Däbrä Gärgiš (EAE III: 469a), while Ketema Ra'isi (ክተማ ራእሲ) has to be Kätäma Ra'äsi. The correct transcription of Tigräi is Təgray: EAE IV: 888a–895a. However, the toponyms in Fig. 1 follow the so-called *fidäl* transliteration system adopted by the *Encyclopaedia Aethiopica* (EAE I: xx–xxi, Table 2).

communities there persecuted by the Jewish king Dhū-Nuwās (Gaudiello 2019);

5) Late Aksumite, AD 550/610–800/850: decline of the kingdom centered in the city of Aksum; king Armah the last to issue coinage at the beginning of the 7th century; the capital transferred to an unknown location (Phillipson 2014: 191, 209–212).

The large number of built and rock-hewn churches (see Phillipson 2010: 51) in the Eastern Tigray, especially in the Hawzien district, from the mid-7th century, has persuaded several scholars

to consider this area as a new center of religiosity. However, despite the alleged coeval growth in “density and prosperity of settlement” (Phillipson 2014: 212), no other clearly Late Aksumite settlements—except for Waqarida (see Gajda et al. 2015)—have been either located or excavated so far. In choosing to explore the Debre Gergis area, PolART aimed to study the settlement network in the eastern subregion and to search for links with the Aksumite empire in decline and the flourishing Eastern Tigray during the Late Aksumite period.



Fig. 1. Map of the Tigray region with most of the known archaeological sites and the nearest towns; top left, the region contextualized in Ethiopia and the Horn of Africa (Editing M. Gaudiello)

DEBRE GERGIS ARCHAEOLOGICAL SITE

The site of Debre Gergis had been visited previously by other scholars. Ethnologist and archaeologist Antonio Mordini passed through Debre Gergis in his capacity as a scientific official of the Italian Ministry of East Africa, during a visit to Ethiopia in 1939–1944 following the Italian occupation of the country. He did not mention the site by name but reported Aksumite ruins near the church (Endā Qirqos), on the road from Endā Takla Hāaymānot to Hauzén. The ruins, he wrote, comprised “various columns and capitals, numerous pointed stelae, not squared, amongst them a beautiful one still standing about 5 m high, which Pace had discovered in 1935”. The area was worth excavating because of a “vast graveyard from the Christian Aksumite period” (Mordini 1944–1945: 151; translation M.G.). The ethiopist Conti Rossini, whose work Mordini cites, recalled that Pace had told him about “Aksumite ruins, with many columns-pillars with rounded corners, some of them standing, located some few hundred meters from the road from Endā Tacla-Haimanòt, in the Enderta, to Hauzién” (Conti Rossini 1937–1939: 405, Note 3; translation M.G.). The Italians failed to give a toponym but described the archaeological context—columns and/or pillars and several stelae—well enough, dating it to the Aksumite period and situating it in relation to a well-known northeast–southwest road, starting roughly north of Sinq’ata and moving southwest [see *Fig. 1*; *Fig. 2* top]. About 30 years later, archaeologist Francis Anfray provided detailed information of the ruins now

referred to as the ‘Debra-Ghiorghis’ site: “... near the church of Tcherqos, a mound of ruins can be seen ... two rows of three pillars that are part of a church. ... These pillars ... are similar to those of Quiha. The site does not yield any ceramic sherds from the surface. Is it dated to the post-Aksumite period?... Near the church of Tcherqos stands a pillar similar to the pillars of Haousien, about 5 m high” (Anfray 1973: 17; translation M.G.). Last but not least, ethnohistorian Wolbert Smidt, who accompanied PCMA archaeologists during the first visit in 2019, presented his historical reconstruction of the area around it and the ancient ethnical group which the Debre Gergis people belonged to (Smidt 2007). According to Smidt, stones scattered around the mound of ruins could have belonged to some ancient residential complexes surrounding the church or former palace, the ground plans of which had been ploughed under. Smidt did not think these could be burial places because there were no bones to be seen, while the black pottery suggested a settlement (Smidt 2007: 112). In addition to the parallels cited for the pillars from Kwiha (corresponding to Anfray’s Quiha; see *Fig. 1*) and Qohayto, Smidt also recounted a story told by the elders that an inscription “of unknown content” had once been found at the top of a standing stele, which he measured to be 0.53 m wide, from 0.19 to 0.21 m deep, and 5.75 m high. The top of the stele is broken and Smidt reported that it had been removed “perhaps for use as a doorstep or decoration either in a neighboring *hadmo*, or in a more distant town” (Smidt 2007: 109;

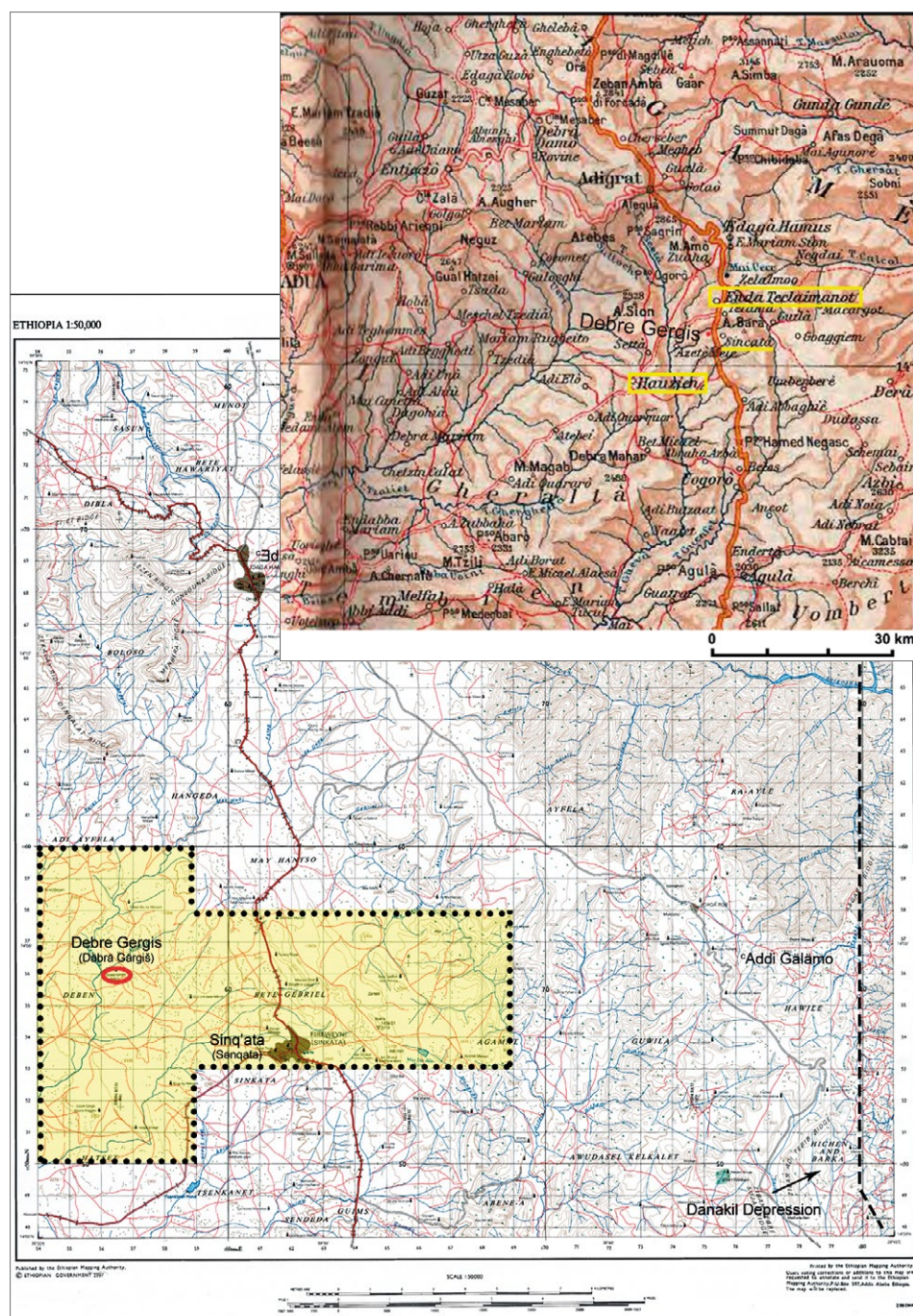


Fig. 2. Topographic map showing the location of Debre Gergis and the outline of the PolART concession around the site (EMA 1997: 1439 D3, Fireweyni (Sinkata), 1:50 000); top, blow-up of a geographical map of Tigray in the area of the site (After Africa Orientale Italiana | editing M. Gaudiello)

translation M.G.). The present author was told by the landowners that their grandfathers had told them of an inscription that was carved on the top of the stele but was removed by the Italians (Haftay Gebregziaber and Abedy Gebremariam, personal communication, 5 May 2019).

The concession given the PolART project by the Authority for Research and Conservation of Cultural Heritage (ARCCH, Addis Ababa) and the Tigray Culture and Tourism Bureau (TCTB, Mekelle) is for archaeological fieldwork and research in Debre Gergis and an archaeological survey in an area 100 km² in size in the Agamè district. The PolART project aims to search for ancient trails leading to the capital city of Aksum, then north in the direction of Endā Takla Hāymānot on the Edaga Hāmus–Addigrat road, or south to the district of the Hāwzen and GERALTA

churches [see Fig. 2]. West of Debre Gergis, the search is for connections with the millennia-old ‘salt caravan routes’, crossing the Eastern Tigray, moving from the eastern Danakil Desert through southern Tigray to the southern regions (O’Mahoney 1970; Woldekiros 2019).

The village of Debre Gergis is located in the subregion of Eastern Tigray, about 8 km northwest of Sinq’ata, and it is part of the administrative subdistrict (*wäräda*) of Sa’əsə’ Sa’əda ‘əmba (EAE V: 632 Map 32). The landscape is very rocky and, geologically, it is part of the so-called Enticho sandstone facies of the Adigrat group rocks, dated to the Upper Palaeozoic–Mesozoic (Garland 1980: 16–19, Geological map ‘Adigrat’, ND37-7). Hence the commonness of sandstone used as architectural building elements of the church in Debre Gergis.



Fig. 3. The Debre Gergis landscape, with the church of Qirqos on the right, the mound of ruins on the left and the Adwa mountain chain in the background, viewed from the east (Photo M. Gaudiello, 2019)



Fig. 4. The mound of ruins in Debre Gergis, viewed from the south (PCMA UW | photo M. Mackiewicz)

The site itself lies south of the Church of Qirqos. It is a mound of ruins some 3 m high, 20 m by 30 m in size [Fig. 3], with the ruins of a presumed Late Aksumite church (AD 550/610–800/850; Fattovich 2019: 256), consisting of a standing monolithic pier² and a total of eight fragments of five pilasters that are found either standing, sloping or lying down [Fig. 4]. A blackish stele 6 m high dominates the rocky highland and the lower green valley of the Hangeda stream about 150 m west of the church mound [Fig. 5]. The presence of the stele, an evident pre-Christian symbol, suggests possible occupation of the Debre Gergis area before the introduction of the Christian faith and the construction of the church. It could be a monolithic marker of an underground burial(s), as



Fig. 5. The black stele at Debre Gergis, viewed from the southeast (PCMA UW | photo M. Mackiewicz)

2 The words 'pier', 'pillar' and 'pilaster' stand for a square pillar or pilaster, as opposed to the circular-section 'column' (OED: p. 840/2169: Architecture and Building).

at Bieta Giyorgis, Aksum, and other pre-Christian Aksumite sites, but it could also be a territorial marker as suggested by Smidt.

DIGITAL DOCUMENTATION

The first season in Debre Gergis required the preparation of a local geodetic network. The local geodetic benchmark: 1000/1000/100 (East/North/Elevation), was established in an arbitrary spot on the mound. The X/Y axes were aligned with the geographical directions checked with a hand-held GPS. Four durable

measuring points were placed around the site, allowing to work in the same coordinates in the next seasons. Local coordinates will be recalculated to one of the global reference systems in order to be able to combine the small and large scale GIS projects (see below). However, this part of the process was interrupted by the unexpected termination of work due to external circumstances. The essential time-consuming series of static measurements, taken using a GNSS receiver, will be completed when the opportunity presents itself.

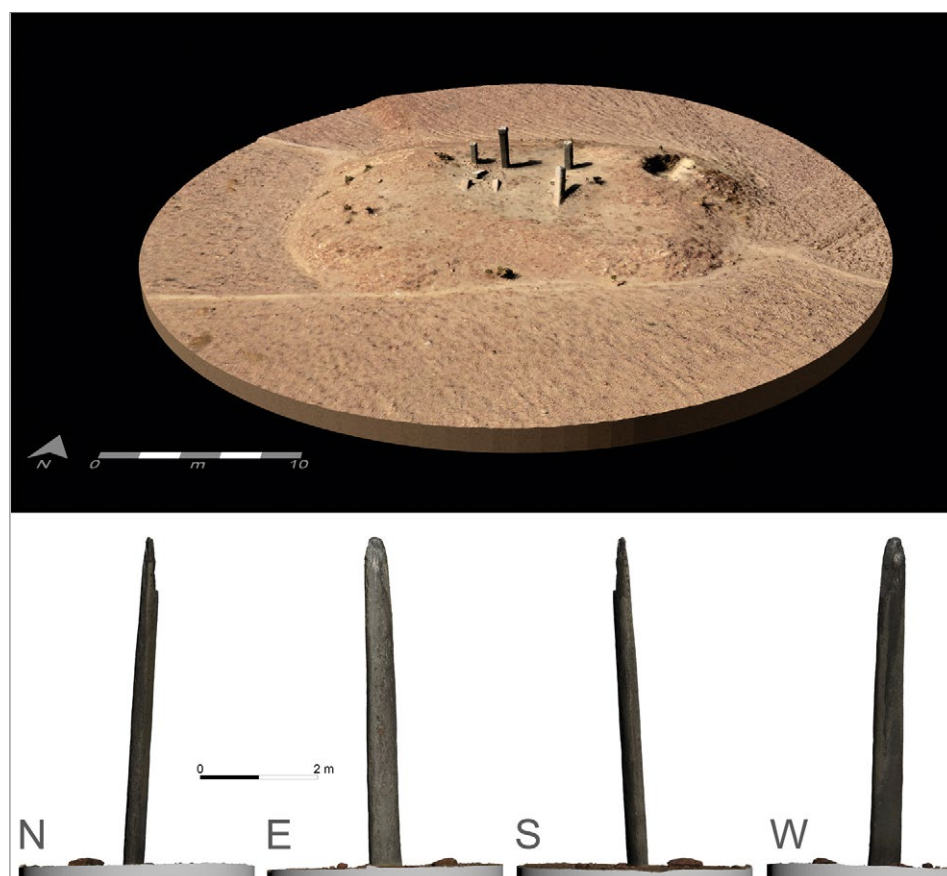


Fig. 6. Photogrammetric models: top, the church mound and, bottom, the solitary stile (PCMA UW | photo and processing M. Mackiewicz)

The other principal objective is obtaining the necessary base data for recording the current state of the site and for illustrating future fieldwork. The documentation took advantage of time-effective and highly accurate digital techniques. To record the topography, a drone-based photogrammetry approach was applied. An UAV (Unmanned Aerial Vehicle, in this case: consumer drone DJI Mavic 2 Pro), guided by a mission planner Pix4D Capture, was used to collect aerial photos. Ground control points were marked on the surface and measured in the local grid with a TST. The data were processed in Agisoft Metashape to produce 3D models as well as a GIS-ready orthophoto and digital elevation model [Fig. 7] of the mound of ruins and its immediate environs. Afterwards, the data were processed in QGIS to generate shaded relief visualizations, contour lines and final base-maps.

In addition to the common photographic archaeological documentation

and the TST recording, photogrammetry was used to document archaeological levels during the excavations. The final and detailed 3D model of the excavated trenches aided in the interpretation of architectural features and their mutual relations [see below, Fig. 18]. The 3D models of the church and stela [Fig. 6 on the previous page] were prepared and are ready for sharing on the Web as part of a program to appeal to the non-expert public with immediate - impact 3D visualization.

The digital products retain the metric scale and orientation of the local grid. Field drawings, especially plans, were prepared using AutoCAD software, based on theodolite measurements and photogrammetric orthophotos. Spatial datasets were managed and processed in a GIS environment, using the open-source QGIS 3 package. Two types of maps were produced. The 'small scale' data, that is, products related mainly to the excava-

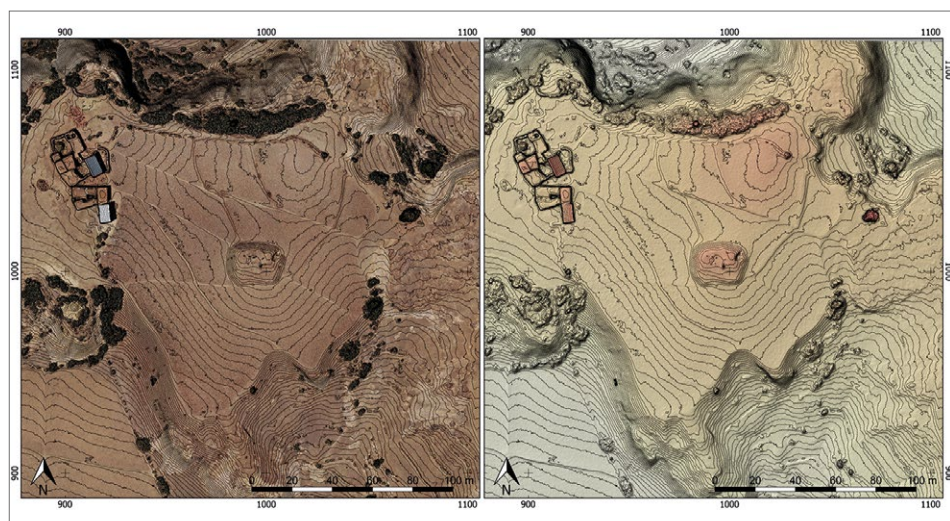


Fig. 7. Photogrammetric orthophoto (left) and digital elevation model (right) of the plateau with the Debre Gergis site (PCMA UW | photo and processing M. Mackiewicz)

tions (photogrammetric DEM of the area, orthophotos of the trenches), were stored using a local grid reference system. ‘Large area’ datasets, like georeferenced maps, satellite-born DEMs and data collected

during the survey, were stored in an additional project using an Adindan/UTM zone 37N metric CRS (EPSG: 20137) or angular WGS84 Latitude/Longitude system (EPSG: 4326).

EXCAVATIONS OF THE CHURCH SITE

The first objective of the excavation was to prove Anfray’s initial identification of the structure as a church (see above) and to date the remains: either Late Aksumite as suggested by a comparison with coeval churches or post-Aksumite (Gaudiello 2020b: 7; forthcoming). The fieldwork was designed to recognize the extent and internal layout of the structure, and to document the building materials and techniques.

The mound was subrectangular in shape, approximately 20 m by 30 m [Fig. 8], the long axis oriented north-west–southeast. The direction of the stone pillars permits the assumption that the structure had the same alignment, the entrance being from the west and the *sancta sanctorum* to the east, in keeping with the canons of Christian basilica architecture (Di Salvo 2017). Two trenches, T1 and T2, were traced

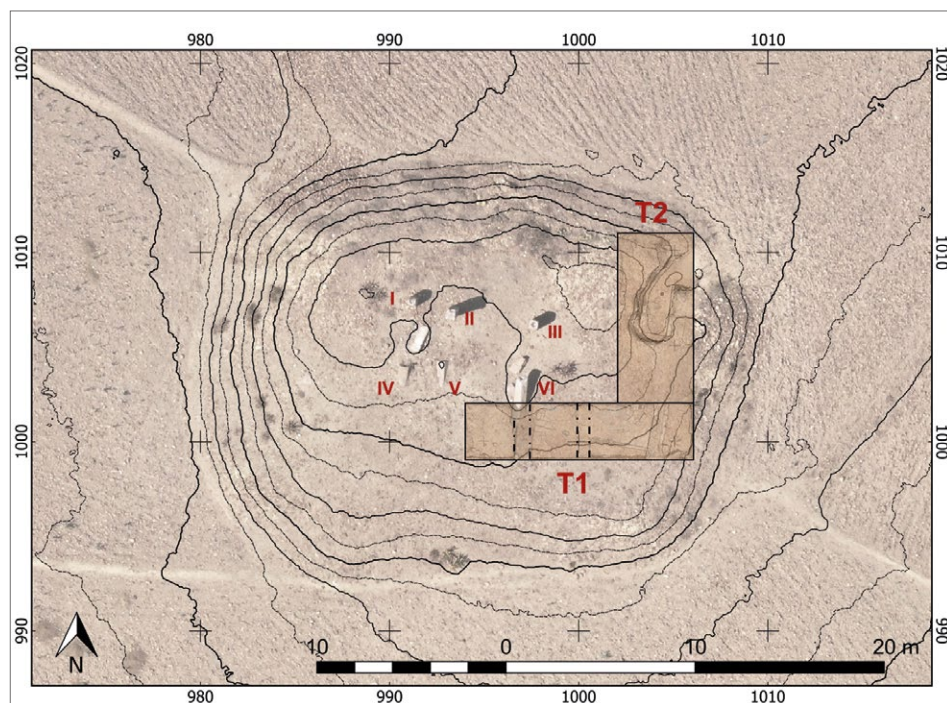


Fig. 8. Orthophoto of the Debre Gergis mound, showing the setting of the trenches and the numbering of the pillars (PCMA UW | photo and processing M. Mackiewicz, editing M. Gaudiello)

southeast and east of the standing pillars. T1 (approximately 11 m by 3 m) was opened on the extreme southeastern corner of the mound, where the apsidal section of the building was expected. It was divided into three parts (T1-W, 2.70 m long; T1-C, 2.50 m long; and T1-E, 4.50 m long), the western baulk being wider than the eastern one (0.80 m and 0.50 m, respectively) in view of the presence of the foundation of Pillar VI. T2 was set up in a dump area where a wall had been uncovered by earlier illicit digging by the local farmers. The trench was originally 4 m by 6 m in area (extended to 9 m in length). Before the season was terminated so unexpectedly, the two trenches were extended, T1 to the east and T2 to the south, in order to join the two into an L-shaped cut.

The first wall discovered under the topsoil in T1-E was a roughly north-south wall (W1), about 0.50 m wide. A section about 2 m long was exposed, revealing a typical 'sandwich' masonry

technique, with a fill of mud-and-rubble between two faces of fairly smoothed, yellowish and reddish stones [Fig. 9]. The southern end projected about 0.20 m to the east. It lies on a footing of oblong 'dressed' slabs (for a description, see below). The projections and the stepped plinth are characteristic elements of the 'Aksumite architectural style'. The articulation of the projections and recesses is typical of the outer walls, the lower part of which consists of courses of stones stepped back presumably in order to increase stability (see below and Phillipson 2014: 121–132).

Wall W2 in trench T2 was the northern continuation of W1. It is constructed in the same technique and, like W1, on a step of 'dressed' slabs of sandstone. The upper courses are poorly preserved, so it could be measured as about 0.80 m thick in the middle of the exposed northern face. Remains of timbers inserted in the stone masonry were observed in the western face: a horizontal beam parallel to the wall and



Fig. 9. Wall W1 in trench T1-E: detail of the sandwich masonry technique and the eastern step made of dressed stone slabs; on the left, corner of the southern projection of the perimeter wall. View from the east (PCMA UW | photo P. Zakrzewski)

fragments of another piece that could have “passed through the wall” (Phillipson 2014: 122, Fig. 36) [Fig. 10 top]. This is another typical element of Aksumite architecture, implying the use of a stone-and-timber framework in building construction. A metal object resembling a bent spoon was found in the topmost yellowish loamy soil of the dump. The lower courses of another wall (W4), perpendicular to and abutting W2, were cleared and remains of a wooden beam were also detected in the structure [Fig. 10 bottom].

In trench T1, the abandonment strata of the destroyed church (Contexts 8, 9, 11, 12) lay under 30–40 cm of topsoil (Contexts 1–4). The destruction layer was composed of densely compacted brownish soil mixed with a substantial amount of stone rubble and debris [Figs 11, 13]. Several ‘dressed’ stones with moldings were found in the debris in trenches T1-C and T1-E. They were probably connected with the elevations and the decorated basement of the building [see Figs 11, 12] as well as with the decorated lower course of

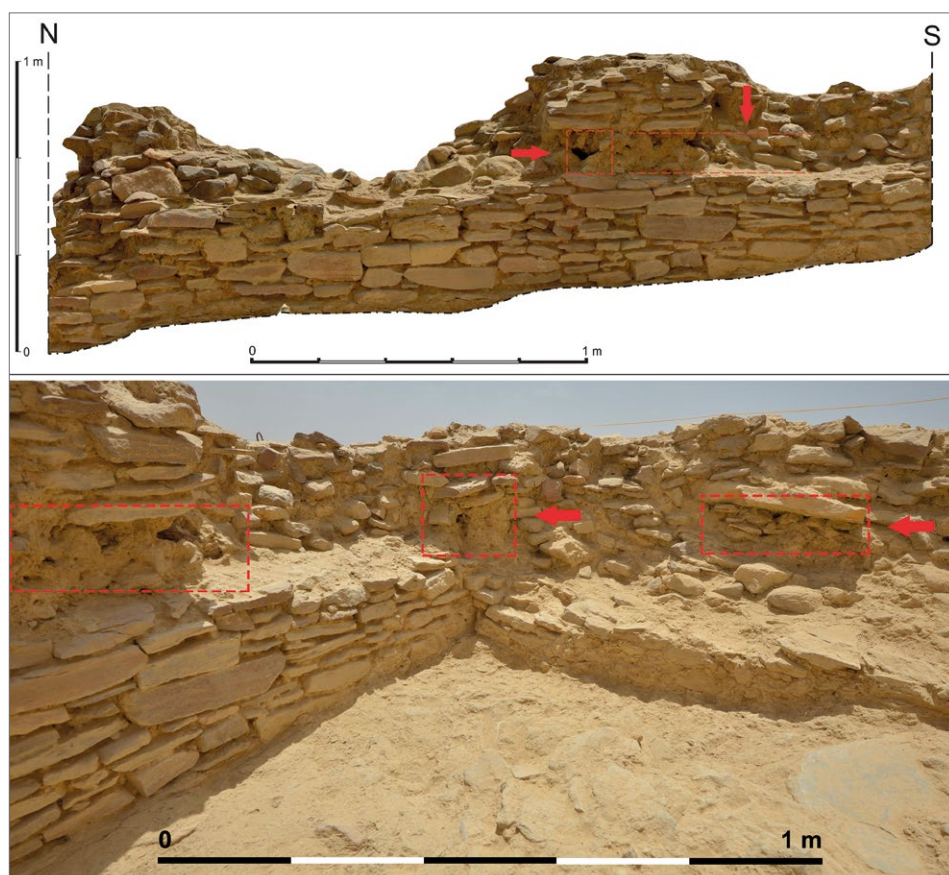


Fig. 10. Inner faces of walls W2 and W4; arrows indicate location of remains of timber in the masonry. Top, orthorectified image of the western face of W2; bottom, the room limited by W2 and W4 (PCMA UW | photo M. Mackiewicz, editing P. Zakrzewski [top] and M. Gaudiello)



Fig. 11. Trench T1-W with remains of a destruction layer (Context 9), viewed from the west (PCMA UW | photo P. Zakrzewski)



Fig. 12. Trench T1-W with the exposed base of Pillar VI and the 'dressed stones' collapse from a possible wall or door jamb; arrows point to a stone with moldings and some timber remains (PCMA UW | photo M. Mackiewicz, editing M. Gaudiello)

the apsidal part [see Fig. 13]. The ‘dressed’ stones in T1-W appear to be the tumbled remains of the elevation of a wall or pillar, or even a door jamb [see Fig. 12]. A piece of a wooden beam was located stuck deep down into the layer in the southeastern part of the trench [marked with an arrow in Fig. 12]. Small fragments of *Pinctada Margaritifera* (Dance 2008: 220, note 970), the pearl oyster typical of the Indo-Pacific ecosystem, were found near this particular piece of timber.

Removal of the destruction layer (Context 8) in trench T1-E [see Fig. 13] uncovered more of wall W1, a walking surface next to it (Context 13), a floor paved with bluish-grey sericite slate slabs (Context 15) and another wall (W3) running in a semicircle around the paved area. Only three stones making

up this wall were still in place, the rest preserved as imprints in the soil. The stones were about 0.20 m wide and were aligned in a single row. To the south of the apse and the walking surface, a step was discovered, buried under a layer of much looser soil with several smaller stones and debris, yielding several potsherds with black surfaces (Context 10) [Fig. 14]. It turned out to be an integral part of a raised platform, on which the sub-circular apse was constructed, separating it from the lowered floor in the southern aisle. The western sides of this platform and step were evidently destroyed or dismantled at an unspecified time [see Fig. 15]. The tumbled stones on the paving of the apse, also seen in the northern section of the trench, included uncommon reddish stones,



Fig. 13. Abandonment/destruction layer (Context 8) in trench T1-E; stones with moldings recognizable on the surface and in the northern section (PCMA UW | photo P. Zakrzewski)



Fig. 14. Trench T1-E: unexcavated Context 20 to the left of wall W1, the platform (Context 13), paved apse (Context 15) and Context 10 south of the platform (PCMA UW | photo P. Zakrzewski)



Fig. 15. Trench T1-E: stepped platform (Context 13) after partial removal of Context 10; the paved apse (Context 15), walls W1, W3 and architectural elements left *in situ*; viewed from the south (PCMA UW | photo M. Mackiewicz)

stones with a hole cut in the middle or with an indentation, most likely used to fix a wooden structural framework [see *Figs 15, 16*]. A burnt sub-rectangular wooden beam was observed still in place, laid on the apse pavement (Context 19) [see *Fig. 16*].

Bluish sericite slabs, similar to the ones in the apse, were found under the abandonment layer also in trench T1-C, in proximity to Pillar VI (Context 16). This paving was more or less on the same level as the slabs in the apse in trench T1-E. A reused sandstone stone, with Ge'ez letters incised on the top face (SF-12) [*Fig. 19*], was found embedded in the bluish floor. A step made up of two large slabs was discovered south of the paved floor, and another one further to

the south (Context 18) [*Fig. 17*]. Whether they are a continuation of the platform steps in T1-E remains to be verified.

In spite of the fact that the excavation in the trenches was interrupted midway (the eastern baulk had just started to be removed when the expedition had to leave; *Fig. 18:A,B*), and the archaeological data (e.g., TST measurements of elevations and context or perimeter areas) has yet to be analyzed, some preliminary conclusions can still be drawn and conjectures can be made regarding the church plan. The steps to the south of the inscribed stone (Context 18) appeared to be aligned with the stepped platform (Context 13) of the apse [*Fig. 18:A*], but orienting the 3D model along the line of Context 13 showed that the two steps



Fig. 16. Trench T1-E: detail of the paved apse, architectural elements and wall W3; arrow points to the remains of a burnt wooden post (PCMA UW | photo and editing M. Mackiewicz)

in T1-C lay at a lower level [Fig. 18:B]. It is plausible, therefore, that the western step(s) of the platform are still concealed in the baulk between the two parts of the trench. At the junction of the two trenches, faint traces of a connection between walls W₁ and W₂ started to be visible practically subsurface [see Fig. 18:A]. Judging from the western inner face of walls W₁ and W₂ [Fig. 18:C], the two appeared to be built in line and formed the easternmost wall of the church behind the apse. It can be inferred that they represent a niche in the perimeter wall, a single recess that is present behind apses in all the other ancient basilicas, apparently following a general planning rule in Aksumite religious buildings (Di Salvo 2017: 21, Figs I-7–I-17). Assuming the paved floor lined with wall W₃ is the apse of the

church, then the combined walls W₁–W₂ enclose the raised platform built under the apse. It makes this a unique solution as far as church planning in this period is concerned. The interpretation of W₁ as part of the eastern recess of the church is partly confirmed by the shape of the southernmost ending of W₁ and the step on the eastern side, the projection to the east creating a clear overhang of about 0.50 m [see Fig. 18:A,C]. It could be representing the northern corner of the southern projection of the wall.

Part of one surface of the base of Pillar VI was cleared [see Fig. 12]. It measured 0.55 m in width and was 0.45 m high. All the pillars are square in section, the shafts being 0.50 m to the side. They are organized in two rows of three pillars each. The northern pillars appeared to be in



Fig. 17. Trench T1-C: paving of bluish slabs in the northern part, inscribed stone (SF-12) in the middle, and the two steps in the south (PCMA UW | photo M. Mackiewicz)

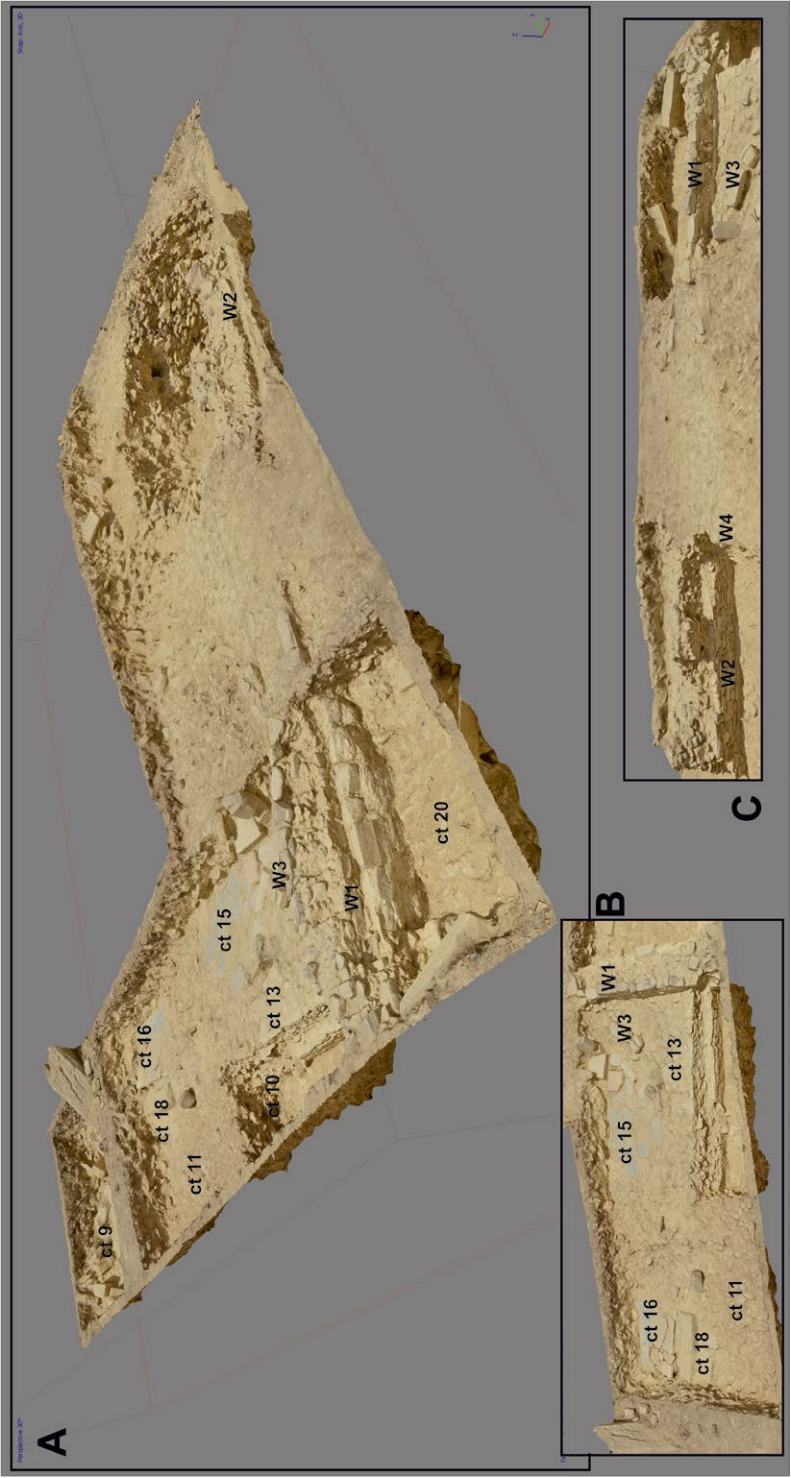


Fig. 18. Photogrammetric models of the excavated trenches: A – trenches T1 and T2 at the end of the excavation, viewed from the southeast; B – detail of T1-C and T1-E (almost connected), viewed from the south; C – detail of T2 and T1-E (almost connected), viewed from the west (PCMA UW | photo and processing M. Mackiewicz, editing M. Gaudiello)

their original position (the ones in the southern row were all disturbed one way or another), the distance between Pillars I and II being about 1.80 m and between Pillars II and III approximately 3.80 m. Pillar II is a monolith, while the others are built of two large sandstone blocks joined in a mortise-and-tenon technique. The full length of the tenons could not be established because they were either missing, broken or hidden in the topsoil [see Fig. 4], but the measured depths of the mortises suggest tenon dimensions around 0.20–0.30 m. Mortises are always carved in the lower stone block, corresponding to pier shafts, while the tenons are in place on the bottom surfaces of the pier parts with the capitals. The pillars have squared sections with chamfered corners, if the rel-

evant preserved parts of Pillars II and IV, and the lower parts of the other piers are anything to go by. The height of the shafts of Pillars I and III, measured from the topsoil, is, respectively, 1.50 m and 2 m. The preserved height of the monolithic Pillar II is 5.10 m, of which 4.70 m correspond to the shaft. The observed height of the southern piers, from Pillar IV to Pillar VI are: 1.00 m, 1.45 m and 6.10 m (in the latter case not including 0.45 m of the base [see Figs 4, 8]). The measurements of the upper part of the piers have been recorded as well, but only the northwestern one with the *gābāta*-game board carved on one face of the capital is preserved well enough to be described: the part of the shaft is 1.10 m long and 0.45 m wide, while the capital is 0.35 m high and 0.50 m wide.

FINDS FROM THE CHURCH AND SURVEY

The excavation yielded stone and wooden architectural elements: timber beams and some dressed blocks and elements of architectural decoration, most of the latter from building collapse, but some also reused in parts of the church structure. When the team was evacuated due to the Covid-19 pandemic, all the finds had to be packed within hours. The boxes, 10 in all, were placed in safe storage at the Tourist Office in Sinq'ata. The following is a fairly limited record of the objects that the team managed to document in the course of the fieldwork.

A reused sandstone stone with an inscription is one of the most important objects. The stone, SF-12, was found embedded between the sericite slabs of the church floor (T1-C, Context 16) [Fig. 19; see Fig. 17]. Measured in the field, the

stone is about 48 cm long, 30 cm wide and 8 cm high. The left and bottom sides of the stone were intact, while the top and right sides had been cut and smoothed to better fit the stones in the floor. The upper surface bears some letters of the ancient Ethiopian alphabet, Ge'ez, inscribed between two sets of parallel grooves, straight above the letters and slightly curved below. They are, from the left: “**h**: [...] . **h**”, “k (space) [...] (space?) z”. The letter in the middle, the upper part of which is damaged, could be any one of a number of different Ge'ez letters: l, s, b and 'a. Another letter, “**m**”, ‘m’, was engraved on the other original surface of the stone [see Fig. 19 top]. This side is curved, matching the curved lines under the inscription on the front.

Altogether six stones with architectural decoration were recorded in T2 and the easternmost trench T1-E. Additional worked stones and slabs, found in the collapse lying on the paved floor of the apse and extending north, into the trench section, were left *in situ* [see Figs 15, 16]. The stones must have been part of the

architectural decoration of the apse. They display two deep grooves on the rounded face of the stones, articulating three convex moldings with a semi-circular profile (resembling the *torus* from Greek classical architecture), with the central one being almost double the size of the others. The dimensions of these stones vary from



Fig. 19. Inscribed sandstone stone (SF-12) embedded in the floor (Context 16); top, detail of the curved side with another engraved letter (not to scale) (PCMA UW | photos M. Mackiewicz [bottom], M. Gaudiello; editing M. Gaudiello)

a minimum of 15 cm (SF-4) to a maximum of 28 cm (SF-6) in length, and between 12 cm (SF-13) and 21 cm (SF-1) in width; the thickness is 7–9 cm. A decorated stone was cleaned and left *in situ* in T1-W [see Fig. 12] and several carefully ‘dressed’ stones came from all surfaces [an example is illustrated in Fig. 21]. These stones were most probably part of a collapsed architectural structure, a pillar or doorframe, which was only partly exposed in Context 9 and left *in situ* [see Figs 11, 12]. The dimensions of these blocks are about 20/30 cm in length and 30/40 cm in width; the height being 12/15 cm.

The excavation yielded small stone artifacts, like grinding and pounding stones, collected from the topsoil, on

the mound with the ruins of the church, but also, and mainly, from the survey [Fig. 22]. The bulk of these finds is made from local sandstone, but obsidian is also represented. Three fragments were of either alabaster or marble, and represented most probably imported goods. Two had either a number of shallow squared grooves or a single deep groove; these are probably the shattered remains of revetment of some kind [Fig. 23 left]. The third fragment, SF-15, unfortunately not photographed, bears floral decoration in bas-relief comparable to the decoration found in the ancient churches at Adulis in Eritrea, e.g., two marble fragments from the ‘Oriental Church’ in Adulis (Castiglia 2019: 115, Fig. 19) [Fig. 23 center]. These two are also most like SF-15 in terms of overall appearance and color of the material. The decoration on this last fragment recalls that of an “alabaster fragment in relief” found by Paribeni (1907: 467) in the so-called ‘Ara Solis Adulitana’,

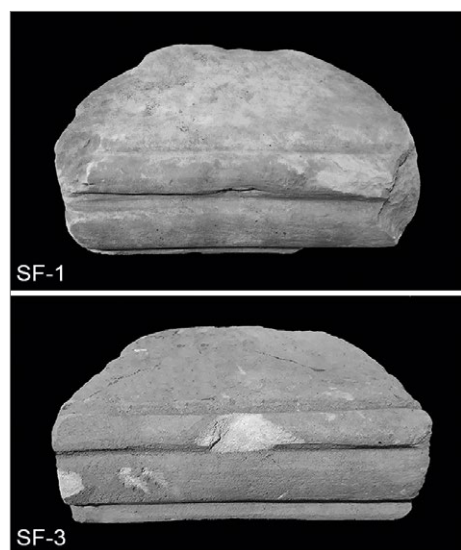


Fig. 20. Stones with architectural moldings (SF-1 and SF-3) from the area of the apse (Context 8), not to scale (PCMA UW | photo and editing M. Gaudiello)



Fig. 21. ‘Dressed’ stone from upper layers in trench T1-W; not to scale (PCMA UW | photo and editing M. Gaudiello)

- 3 Similar ‘dressing’ with the chisel is found on the massive stones of the monumental underground structures in the Aksum Stele Park, e.g. the portal of the Mausoleum, hence the use of ‘dressed’ for stones of this kind from Debre Gergis. See Phillipson 2000: 166–170.

a church located in the northern district of Adulis [Fig. 23 right]. Paribeni reported several other alabaster fragments collected in the room behind the apse and in the narthex of the church, as well as in the so-called 'Palace of Adulis' (Paribeni 1907: 505–506, Fig. 31; see also Sundström 1907: 180). The fragment SF-15 is carved with a representation of grapes and vine leaves in relief. It will be interesting to perform an isotope analysis to establish

the provenance of this fragment; analyses of the five Adulitane samples showed that the white marble had been quarried at Proconnesus and Dokimeion in Asia Minor and in the Aegean islands (Peacock and Blue 2007: 122–124; Giostra 2017: 257).

The pottery finds from the church excavation (mostly from T1-E) and the survey could not be processed, hence all that can be said is that the blackish surface and some geometric incised patterns



Fig. 22. Stone tools: (from the left) grinding and pounding stones collected from the survey (A34, A16), and a grinding stone from the topsoil in T1-E (SF-9) (not to scale) (PCMA UW | photo and editing M. Gaudiello)

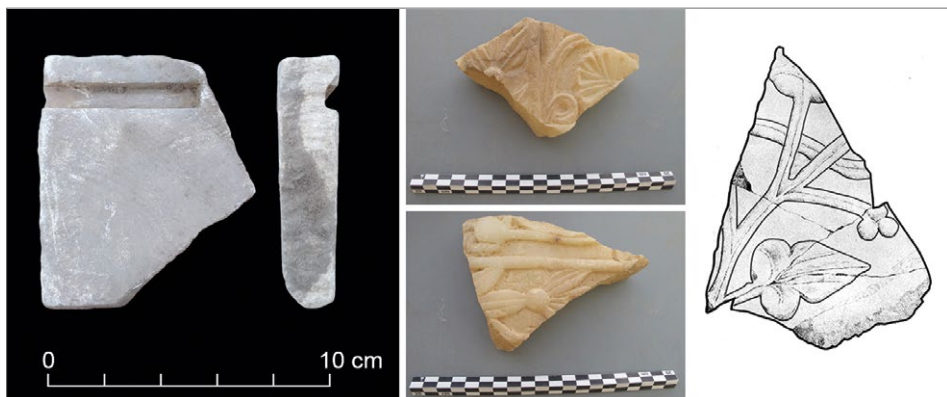


Fig. 23. Decorated marble/alabaster fragments: left, grooved fragment from topsoil at Debre Gergis; center, marble fragments from the 'Oriental Church' in Adulis; right, alabaster fragment from the 'Ara Solis Adulitana' (left, PCMA UW | photo M. Gaudiello, editing M.R. Mackiewicz; center, after Castiglia 2019: 115, Fig. 19; right, after Paribeni 1907: 505, Fig. 31, retracing M. Gaudiello)

on the surface suggest a date in the Late and post-Aksumite periods. Nevertheless, stylistic features of this kind are typical of the Eastern Tigray pottery tradition from the 1st millennium BC until today (Gaud-

iello 2020a: Figs 7–8; in preparation).

Other small finds from the excavation included fragments of marine shells, one metal object in the form of a spoon, pieces of wood and a few bones.

AREA SURVEY

The area survey was aimed at tracking ancient settlement patterns and establishing the research potential of this cultural landscape. Specific objectives included:

- 1) registering the location, determining tentative extent, chronology and nature of archaeological sites based on surface material;

- 2) recognizing the geological situation on a basic level, description of the observed features, types of rock, and anthropic use of resources, e.g., modern quarries;

- 3) documenting old architecture, especially abandoned buildings and farms;

- 4) documenting ancient or modern methods of land management, agro- and hydrotechnical infrastructure;

- 5) acquiring ethno-data from the surrounding areas, e.g., local names of hamlets and natural sources, types of crafts and local traditions.

The objectives of the survey determined the methodology. Individual tracks were recorded using hand-held GPS receivers (Garmin Montana 680 and Garmin eTrex 10). The location of individual finds was recorded as a 'waypoint' with 3–5 m accuracy. Diagnostic pieces of pottery (rims, bases, handles, decoration) and all the lithics were placed in separate string bags and described by the waypoint number.

Non-diagnostic fragments (body sherds) were collected in one bag as a unique assemblage. Data from GPS receivers (tracks and waypoints) were imported into GIS (QGIS 3). Based on distribution of registered points, the extent of sites was manually overlined and a unique 'DGS' (Debre Gergis Survey) number was assigned [Fig. 24]. Only clear clusters of surface finds were recorded as 'sites'; single pieces of pottery found near contemporary buildings were ignored. Other archaeological features, which could be restricted spatially to a unique location, were recorded with a single waypoint and not as assemblages of scattered material culture. This is the case of the rock art shelters, which have a precise location, marked with the code DGSO (Debre Gergis Survey Observation). Waypoints were also registered to mark the location of various other activities described in the field notes, e.g., quarries and agrotechnical systems. However, these anthropic activities were not included in the final evidence and map of 'archaeological sites'.

The survey lasted just a few days before the termination of the expedition and hence the coverage was neither systematic nor dense. However, the results give a general idea of the situation. The first pedestrian survey

was focused on the closest surroundings of the excavated site. Then the surveyors moved out to prospect the neighboring valleys, *amba*⁴ slopes, plateaus, and other dominant landforms for identifying various habitat zones. The final total length of a single surveyor's path was approximately 30 km. In the course of the survey, nine sites were registered as area features (DGS; see *Table 1*) and two as point features (DGSO; see *Table 2*). Potsherds, as well as lithics and

obsidian artifacts, were considered as the chief archaeological sources attesting possible ancient human presence and/or occupation. Based on a dense traverses-prospection coverage, a more detailed surface collection pattern, showing a concentration of surface material, was obtained for two plateaus adjacent to the mound of Debre Gergis with its pillars and stela [see *Fig. 24*]. The chronology of the finds, especially ceramics, awaits further study.

Table 1. List of DGS sites recorded as area features (M.R. Mackiewicz)

DGS_No	Latitude (North)	Longitude (East)	Elevation (GPS based)	Area (hectares)	Landscape position	Source of evidence
DGS_0	14.07648	39.52409	2374	1.4	plateau	pottery
DGS_1	14.07721	39.52544	2367	0.2	soft valley slope	pottery
DGS_2	14.08018	39.52405	2347	0.2	soft valley slope	pottery
DGS_3	14.08033	39.52105	2348	0.3	soft valley slope	pottery
DGS_4	14.07549	39.52137	2356	0.6	valley slope	pottery
DGS_5	14.07219	39.51448	2350	0.2	terrace above the valley	pottery
DGS_6	14.08474	39.52065	2365	0.05	terrace above the valley	pottery
DGS_7	14.08339	39.51934	2370	0.3	plateau	pottery, lithics, obsidian
DGS_8	14.07660	39.52250	2363	1	plateau	pottery
DGS_9	14.07570	39.52345	2358	0.6	slope	pottery

Table 2. List of DGSO sites recorded as point features (M.R. Mackiewicz)

DGSO_No	Latitude (North)	Longitude (East)	Elevation (GPS based)	Landscape form	Description
DGSO_1	14.08204	39.52891	2363	rock shelter	red paintings and engravings
DGSO_2	14.08572	39.51852	2341	rock shelter	traces of red pigments, possible paintings

4 *EAc* I: 217b, s.v. *amba*: "... word for a mountain, usually difficult of access, and the site of a town, group of villages, or military camp". It is a flat-topped mountain typical of the Ethiopian-Eritrean Plateau, often chosen as a place for settlement and later as church sites.

The registered sites were located in various topographic positions: near the valleys close to seasonal streams and on the higher terraces as well, at the foot of the hills and

on their tops, seemingly in a less accessible and habitable area [see Fig. 24]. Their location, quality and quantity of surface finds, and relation to the modern settlement pat-



Fig. 24. Map of the surveyed area. Red lines indicate surveyors' paths; DGS_0 marks the immediate environs of the Debre Gergis site, other DGS numbers with black overlays indicate archaeological sites; the rock-art shelters are marked as DGSO points (black dots) (PCMA UW | processing M. Mackiewicz)

tern was certainly related to some functional differentiation, which seems to be an important goal for further considerations.

Many ceramic concentrations were recorded near modern buildings, which could indicate relatively contemporary use of different spaces or the presence of dumps nearby (DGS_2, DGS_4, DGS_6). In a broader chronological frame, it may be an indication of long-term settlement in a given space. In other places, such as DGS_3 and DGS_5, the archaeological assemblage was collected from areas completely devoid of any kind of building remains and not connected to any housing structures. Buildings could have been lost or intentionally dismantled. Or the nature of a settlement did not require any 'fixed structures', or even the building materials were of a kind that easily decayed, leaving no traces on the surface. An interesting situation was observed on one of the plateaus, where remnants of buildings were clearly visible *in situ*, although severely damaged. The surface collection included lithic and obsidian tools, and the density was such that the site is definitely worth a more thorough exploration when circumstances allow (DGS_7) [Fig. 25:A]. Ruins of traditional houses of unknown date were quite common [Fig. 25:A,B]. These were inspected only briefly at this point. House plans consisted of either a single space or several rooms of different size, sometimes with an attached courtyard (DGS_7). The building material was stone, showing an irregular bondwork and sometimes coated with plaster; the roofs made of wooden beams. At quick glance, this is a fairly classic type of rural architecture present in the Tigray region. It would

be interesting in the future to compare these ruins with the results achieved by Diane E. Lyons in her ethnoarchaeological study of the vernacular architecture in Tigray (Lyons 2007; 2009). Although these anthropic features are expected to be relatively recent, they are an interesting research topic on the border of archaeology and landscape ethnology, as well as important comparative material.

Several modern engraved motifs have also been recorded. A carved game board, called *gābāta*, was documented on the western slopes of a hill with the Church of Qirqos [Fig. 25:G], and another one was recorded engraved on the side of a stone capital in Debre Gergis (Smidt 2007: 111, Fig. 6). Gaming boards of this kind are so ubiquitous over time and space that it is not easy to date them without additional material. Indeed, it seems that local shepherds or workers placed at the higher points of observation or near the shelters tend to spend their leisure time playing various games. Several modern examples of such activity were documented in the course of the survey.

Modern agrotechnical infrastructure was also recorded [Fig. 25:C,E,F]. The Debre Gergis area, and the Tigray and northwestern Ethiopia in general, are characterized by a dynamically changing environment throughout the year including high rainfall variation. In the winter season, the valleys dry out and the plateaus are subject to desertification, while from June to September—which is the main rainy season, also called the 'big rain', *kərāmt* (E Ae I: 755a), in opposition to the so-called 'little rains', *bālg*, which "occur in spring, autumn, or winter" (E Ae I: 755a)—the climate becomes wetter, water fills the



Fig. 25. Different types of structures and activities recorded during the area survey: A–B – old and abandoned buildings; C – water reservoir; D – stone quarry; E–F – agrotechnical infrastructure, that is, soil slide and water loss prevention systems; G – game board carved in rock; H – basket weaving site (PCMA UW | photo M. Mackiewicz)

valleys and the higher areas turn green. During the said ‘big rain’, rainfall is rapid and intense, which causes soil erosion. Currently, the construction and maintenance of systems preventing soil slide and water loss is organized by the local authorities of the district or sub-district (Hurni et al. 2016). Some technical expedients, such as water reservoirs [see *Fig. 25:C*], terraces, or stone dams, may be of older date and highlight places formerly used for crops or pasture. An interesting recent study of the water management system in Tigray, carried out by a team from the John Hopkins University (Harrower et al. 2020), has been adopted by PolART as a model for future investigations.

The survey of the geological landscape was supercilious at best, the first intent being to recognize and record the stone quarries in particular, identifying as far as possible the rock therein extracted [*Fig. 25:D*]. The surveyors also made note of the kinds of stone used for the church pillars and the stelae, although this in itself did not turn out to be conclusive in any way because the entire Debre Gergis area lies on a sandstone geological formation. Indeed, no other rocks were identified anywhere in the neighborhood. This issue requires the involvement of specialist geologists as the current determinations were made in a semi-amateurish way.

The fieldwalking survey also served to establish relations with the local community, acquiring local knowledge about names, crafts and traditions, and inspiring trust in the researchers and respect for the local archaeological heritage in the process [*Fig. 25:H*]. The maps

on hand for the survey were relatively poor in detail (1:50 000; see *Fig. 2*) with only the names of the main topographic features indicated. Open-ended conversations with the local people provided additional, more detailed information on local names used for particular rivers, valleys, hills and other landscape elements. Some differences appeared already on a general level. For example, a major river mapped as ‘Midhats’ is locally known as ‘May Tsedo’. Similarly, the river ‘Hangeda’ is called ‘May Ayni’. The local inhabitants also pointed out potential archaeological features, including a second stele, which, however, was not confirmed during the survey.

Traces of rock art were labelled separately as a special group of finds. Their presence under rock overhangs suggests the use of these sites as shelters [*Fig. 26 top*]. The conditions in these locations were conducive to the preservation of the paintings, hence one cannot rule out more finds of the kind. What appeared as shapeless outlines to the naked eye was enhanced with the application of the decorrelation stretch technique [*Fig. 26 bottom*]. The method was initially developed to improve the readability of satellite multispectral images, but it can be applied for regular 3-band digital photos; it is currently gaining popularity, especially in the documentation of cultural heritage, such as painting and rock art (Defrasne 2014; Jalandoni 2021). To put it simply, the technique is based on extending the contrast of individual bands within the possible range of color space. Depending on the set parameters, the obtained image is usually overly contrasting, in false colors, however



Fig. 26. Rock shelter DGSO_1: top, rock shelter area, white arrow pointing to the location of the faded pictograms and the Ge'ez inscription; bottom, details of selected images showing the results of decorrelation stretch enhancement (PCMA UW | photo and processing M. Mackiewicz)

enhancing the visibility of subtle color differences, thus supporting an analysis of shapes and contours. The input photograph was taken with a regular digital SLR camera. A 'DStretch' algorithm developed by Jon Harman, distributed as a plugin to ImageJ, was used (Harman 2006). However, algorithms available for other environments, e.g., Matlab, can also be applied, as well as dedicated

applications for mobile phones. At the DGSO_1 site, the outlines of a human figure and cattle, as well as various geometric motifs, were recognized. The lower part of the rock shelter and therefore some of the images of oxen were later covered with an engraved inscription in the Ge'ez language. Further documentation and analysis will be carried out when the circumstances permit.

SOME PRELIMINARY CONSIDERATIONS IN LIEU OF CONCLUSIONS

A decade of field experience and knowledge of Tigrigna archaeology, history and culture as well as personal observation of numerous remains of Late and post-Aksumite churches, the first archaeological impression and assessment of the site (Gaudiello 2020b) and a prior bibliographical query have guided the archaeological activities of the first Ethio-Polish mission to Tigray. Gaudiello's involvement in the excavation of the Late Aksumite church of Mifsas Bahri (Gaudiello and Yule 2017), as well as in the Canadian ETAP project led by Catherine D'Andrea in the area of the Late Aksumite ruins of Menebeyti (Leclant and Miquel 1959: 108, Pls XLVIII–XLIX), plus the examination of pottery collected from the area of Kwiha, followed by a visit to the ruins of a church from a contemporary period (Breton and Aytenew Ayele 2019), suggested the choice of the site at Debre Gergis for the PolART excavation project.

Most of the ancient built-churches of Tigray feature a rectangular plan, with partition walls or pillars dividing up the interior into a nave and aisles (Phillipson

2010: 29–50; 2014: 126–132; Di Salvo 2017: 2–32). The apse that was cleared in the first trenches excavated at Debre Gergis turned out to be semicircular, flanked by two or three rectangular rooms making up the so-called 'sanctuary' (Phillipson 2010: 26, 195–196, 208; Di Salvo 2017: 16 Fig. I-12–17). According to Di Salvo (2017: 25), the evolution of the sanctuary into a horseshoe form started from the second half of the 6th century; however, in light of so few early churches having been properly excavated to date, this assumption still needs to be verified. Two other important characteristics of early churches from the 4th to the 7th centuries are the shape of the outer wall and the masonry techniques in line with what was used in Aksumite palatial architecture. The characteristics of the so-called 'Aksumite architectural style' consist of the use of large dressed blocks complemented by small stones, often also incorporating wooden components to strengthen walls and ensure stability. The wooden framework inserted in the stone masonry consists of timbers set parallel to

the line of the wall and horizontal beams passed through it, the external rounded projections of these beams commonly called “monkey-heads” (Phillipson 2010: 17, Fig. 20; 2014: 122–123). Walls were constructed in the ‘sandwich’ technique: stones and large blocks with dressed faces and the core between the two courses of stones filled with small stone rubble and mud. Moreover, the outside perimeter of a building was articulated with alternating projections and recesses. The stone courses of a wall foundation or a plinth on which a monumental building was set, were stepped incrementally a few centimeters inwards in ascending fashion (Phillipson 2010: 15–17; 2014: 121–123, Fig. 36). Despite not having analyzed the pottery assemblages and not being able to determine the exact chronology, whether Late or post-Aksumite, it can still be said based on the architectural data—the apse, internal plan divided by means of stone pilasters, wooden framework in the masonry, the southern projections of the outer wall—that the Debre Gergis church fits into the large category of Aksumite church ruins known from Tigray (Phillipson 2010: 29–50; Di Salvo 2017: 2–32).

After just one season of work, the researchers are not even close to tracing possible connections between the site and the ‘Salt Route’ to the east. However, the piece of marble/alabaster with decoration similar to that of the churches of Adulis places Debre Gergis along the most famous ancient route that connected the Aksumite capital to its harbor located in present-day Eritrea.

The preliminary results from the fieldwalking survey were also optimal. Local strategies for managing water resources to avoid landslides and floods during the rain seasons were observed. Crafts commonly practiced in the area were also noted, and the practice of building modern houses taking advantage of abandoned ruins was documented for future reference, comparing modern and ancient building techniques. The data collected on local toponymy, of natural sources as well as different territorial administrative subdivisions (from big district to small village or individual plot), will support a future juxtaposition of modern toponymies in geographical and topological maps with ancient names recalled in Aksumite inscriptions.

Perhaps the most important result of the survey was the discovery (and successful documentation by practical recognition and decorrelation stretching techniques) of prehistoric pictograms in rock shelters, significantly backdating the first occupation of the area. Pictograms that were classified at the two sites in the Debre Gergis area will soon be compared with other rock art images from the Tigray (e.g., Tesfay 2000; Hagos 2011; Negash 2018), while an upcoming short note in *Rassegna di Studi Etiopici* (Gaudiello forthcoming) is aimed at attracting Ge’ez language and palaeography experts to analyze the inscription overlapping the pictograms and to decipher the meaning of the letters engraved on stone SF-12.

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Abbreviations

<i>EAc</i>	<i>Encyclopaedia Aethiopica</i> , 5 vols. Wiesbaden: Harrassowitz, 2003–2014
<i>EMA</i>	<i>Ethiopian Mapping Authority</i> (1980–2018). Addis Ababa, Ethiopia
<i>OED</i>	<i>Oxford English Dictionary</i> (R. Burchfield, ed.), 2 vols. Oxford: Oxford University Press, 1971

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