

## SEVENTH EXCAVATION SEASON AT ABU ERTEILA: PRELIMINARY REPORT

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The seventh season of the Italian-Russian mission at Abu Erteila (Sudan)<sup>1</sup> lasted from 18<sup>th</sup> November to 24<sup>th</sup> December 2014. In addition to co-directors Eugenio Fantusati (ISMEO) and Eleonora Kormysheva (IOS RAS) the campaign was attended by Richard Lobban (SSA), Maria Rita Varriale and Sergey Vetokhov (architects), Marco Baldi, Silvia Dall'Armellina, Maxim Lebedev, Sergey Malykh and Mikhail Yakomulskiy (archaeologists), Svetlana Malykh (ceramologist), Angel Marie Des Marais and Irina Reshetova (physical anthropologists), Emily O'Dell (assistant). NCAM was represented by inspector Tysser Mohamed (fig. 1).

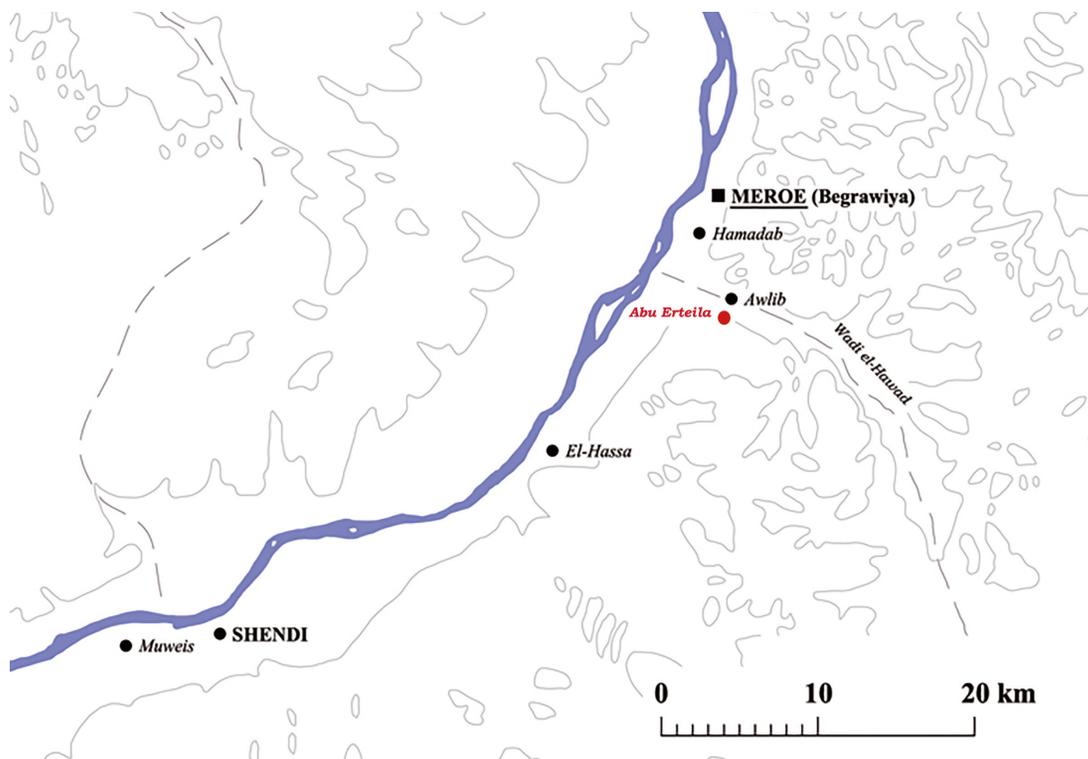
**Excavation work on kom II**

Figure 1. Abu Erteila in the island of Meroe (drawn by Baldi)

During the seventh season, the mission saved its attention for kom II, where a rectangular survey sized 13 m EW x 5 m NS was made to the north of the previously excavated area. Excavation work yielded several occupation phases of the area, confirming and enriching the evidence brought to light in the course of the previous seasons (fig. 2).

1 Abu Erteila project is the result of an international agreement between IsIAO ("Istituto Italiano per l'Africa e l'Oriente"), actual ISMEO ("Associazione Internazionale di Studi sul Mediterraneo e l'Oriente"), and IOS RAS ("Institute for Oriental Studies – Russian Academy of Sciences"). Excavation license is granted by NCAM ("National Corporation for Antiquities and Museums of Sudan"). The mission highly thanks Gianluigi Croce and Piera Muretti for the economic support assured to the seventh campaign.

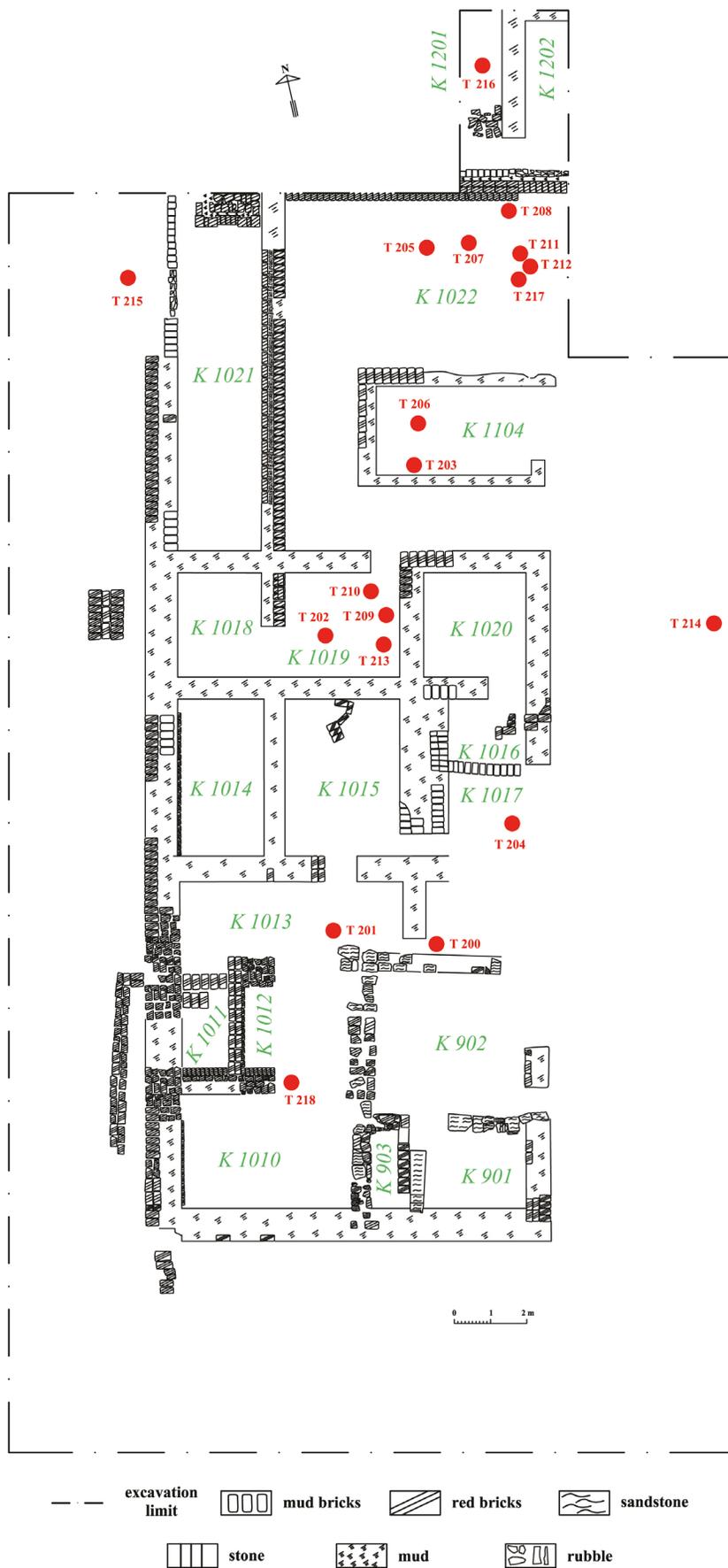


Figure 2. Abu Erteila, Kom II, General view of the excavated area. Red circles and numbers show the position of the burials brought to light at Abu Erteila until now (drawn by Varriale and Baldi).

The more ancient visible anthropization presents its structural remains in clay materials walls of K 1021, a room which has been already recognized during the sixth excavation season (Fantusati and Kormysheva 2014, fig. 4), and of northern limit of K 1022. The western limit of K 1021 can be hypothetically interpreted as perimeter wall of the building K 1000, as previously suggested for its southern extent (Fantusati and Kormysheva 2014, 15, fig. 9). Nevertheless, its northernmost tract suffered a deep destruction that does not allow to confirm its original width and composition. An *adobe* masonry, made from mud bricks sized 36 x 17 x 7 cm, is partly preserved for four courses 40 cm wide as a maximum.

According with its southern tract, which followed a very common Meroitic custom for perimeter walls, an external red bricks facing strengthened and protected the wall, but it has almost entirely disappeared. The very few collapsed red bricks to the west of the masonry suggest that the damages of the facing were mainly due to the reemploying of materials in other structures rather than a deep collapse. The nature of clay mortar, that allowed a very good adhesion of *adobe* but was unable to assure a durable bond among red bricks and with mud ones<sup>2</sup>, probably helped looters' work.

The internal wall, 60 cm wide, which closed K 1021 to the east, appeared better preserved. As for its already known southern extent, an *adobe* structure supported upper courses from burnt materials, following the alternation of stretcher and header courses laying in a clay mortar unusually spread in only horizontal layers. A few irregularly set red bricks strengthened the *adobe* fitting, whereas the only survived red bricks course<sup>3</sup> was made from a stretcher and a header rows in addition to rubble as filling material.

Both walls intersect the northern limit of the survey, as well as an enigmatic red bricks structure brought to light inside the room. A middle single-course body is flanked by two slightly projected two-courses same-sized wings. The uninterrupted plaster from external to internal sides of both wings, and the symmetrical arrangement of same painted motifs, make this structure as original making. A probably later red bricks masonry, a course survives of, surmounts it.

A red bricks wall runs parallel to the northern limit of the survey, projecting 21 cm from<sup>4</sup>; its erection would seem coeval to K 1021 and to the first recognizable occupation of the area. This wall, 7,5 m long, leads off the eastern side of K 1021 and intersects the eastern limit of the survey, closing to the north the room K 1022. Well-preserved painted plaster entirely covers the visible facing of the wall with the exception of great part of the header upper course<sup>5</sup>. The survived covering is 30 cm high as a maximum, nevertheless the irregular break of its ends and the painted themes suggest an original greater extension of the plaster.

The mission brought to light, among collapsed materials, red bricks having a corner that was round in shape and projected outwards<sup>6</sup>, in addition to right angle-shaped bricks and other ones having a concave corner that was covered by painted plaster. Such bricks, well attested in Egyptian and Nubian architecture, were usually employed for exterior and interior corners of official monuments.

The chronology of this phase was suggested by the radiocarbon exam of charcoal found in the north-eastern corner of K 1022, dated to 20-140 AD in calibrated age<sup>7</sup>.

2 For the case of Awlib see Baldi 2014b: 51.

3 Red bricks size 32 x 16 x 7 cm.

4 The survey was enlarged in correspondence of the easternmost tract of this wall, but a superimposed masonry does not allow a complete visibility of it.

5 The upper course, the only visible one, is made from bricks 17 cm wide and 7 cm high, whereas it could not verify their length.

6 One of them was included in the masonry made from re-employed materials surmounting the enigmatic structure found inside K 1021.

7 The exam was made by prof. Gilberto Calderoni on laboratory Rome-2299 of University La Sapienza in Rome.

A later ephemeral occupation of the area was suggested from the finding of sandstone architectural elements, scattered in K 1022<sup>8</sup>. The room yielded seven column drums (fig. 3)<sup>9</sup>, two fragmented decorated lintels (fig. 4)<sup>10</sup> and an unidentified piece<sup>11</sup>, in addition to other big fragments; they had come from a temple context and had been clearly brought here to be re-employed in masonries; work was not made and this pieces were left.

Although the distance between the two areas cannot confirm the suggestion, according to the stratigraphical inquiry this phase was coeval with the erection of K 900, that was made from re-employed materials and is datable to the AD second century<sup>12</sup>. New masonries from re-employed materials, that should have completed the survived walls, were evidently to give new life to the abandoned building, but the project was only partly realized.



Figure 3. Abu Erteila, Kom II, Building K 1000, Column drums (photo Fantusati).

- 8 A hypothetically coeval small amount of charcoal, probably as result of a hearth rather than a fire event, was noticed to the north-eastern corner of K 1021.
- 9 Columns B and D contain big traces of kaolin, visible to the naked eye; this could suggest the sandstone quarry for making them.
- 10 One of them shows a solar disk flanked by uraei, according to a very recurrent theme in Nubian and Egyptian temple architecture and already known in Abu Erteila: see Fantusati 2013, fig. 14. The other one, partially plastered, shows badly preserved sunbeams made in relief.
- 11 It could be part of an original lintel. Eight engraved shallow holes on a side probably indicate its re-use for some game similar to draughts. See also Woolley 1911, 19, pl. 15 nn. 9123, 9127, 9129; Frend 1974, 39; Näser 2004, 220. For an early 20<sup>th</sup> century example see Budge 1907, 433.
- 12 Radiocarbon dating of charcoal, probably result of a fire event: Fantusati 2013, 235.

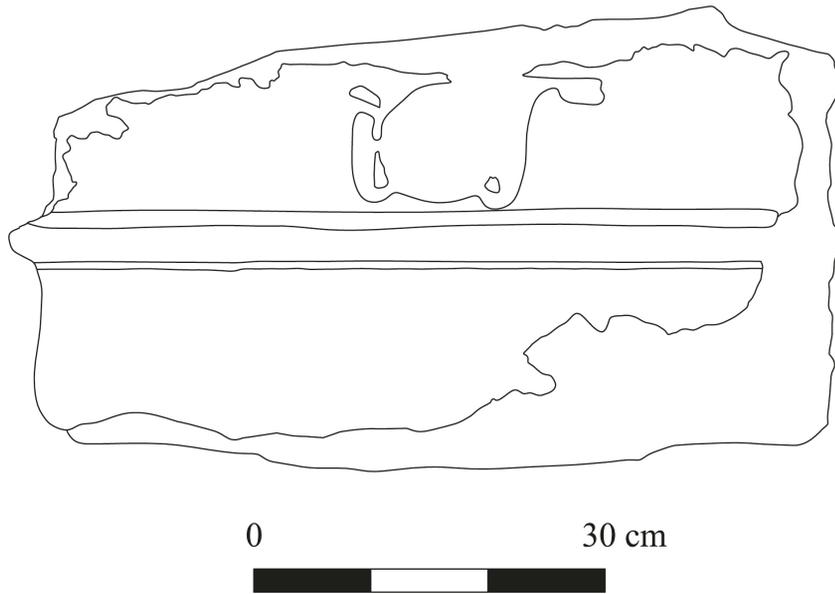


Figure 4. Abu Erteila, Fragment of a temple lintel (drawn by Varriale).

An eighth drum, set on the western wall of K 1022, confirms the discontinuity respect to the previous anthropization.

The eight drums, from 12 to 38 cm high according to the dissimilar conservation, have a diameter varying between 43 and 50 cm. Very differently preserved traces of plaster are on all of them, whereas only a column (the closer one to the southern limit of the survey in fig. 3) shows decorative motifs, as eight sorghum plant pictures made in relief (fig. 5)<sup>13</sup>. Moreover, a hole having diameter of 11 cm pierces this drum in the middle for its entire preserved height. The making time of this hole is not sure, nevertheless, according to the ephemeral nature of the building project from re-employed materials, it was probably made in connection with the original manufacture of the drum. Its function is unclear; it could have held a wooden pole, which was used, usually in addition to another one, as mark in some Nubian temples; this poles were often set outside buildings<sup>14</sup>.

Another anthropic phase was identified after an enlargement of the survey towards north to its north-eastern end, that led to excavate a further area sized 5 m NS x 3 m EW. The found structural remains are very probably later than K 1000, whereas it is unclear the relation with the attempt for erecting new structures of re-employed materials. The stratigraphical observation could suggest the simultaneous nature of them, but the very different character of building projects and works indicate a chronological discontinuity.

A wall intersecting the opposite western and eastern limits of the enlargement, in axis with the northern limit of the original survey, was found. It is made from mixed clay materials: an *adobe* core was strengthened by a red bricks southern facing, in addition to rubble as filling material, giving the preserved width of 60 cm<sup>15</sup>. Six courses of the facing are preserved; bricks were laid according to the usual alternation of header and stretcher courses.

The employ of red bricks screens strengthening an *adobe* core was very common in the Meroitic architecture, especially in monumental buildings; the stronger facings of burnt material made both sides or only external one of perimeter walls<sup>16</sup>, but never only internal side. Upper wall, closing to the south K 1201 and K 1202, was therefore for sure the southern perimeter wall of a new building: K 1200.

13 For a similar picture see the rock carving at Jebel Qeili: Welsby 1996, fig. 68.

14 For the case of el-Hassa see Grimal & Adly 2004, 144.

15 Red bricks size 32 x 18 x 7 cm, whereas the damages the *adobe* core suffered – it would seem to have been cut along its northern face – do not allow to verify the dimensions of the mud bricks.

16 The use of masonries having red bricks facings is rare for internal walls, although known: for the Hamadab temple see Wolf 2002, farbabb.3; Baldi 2014c: 71; for the building M 998 in Meroe see Török 1997, 227-32, fig. 10, pl.183.

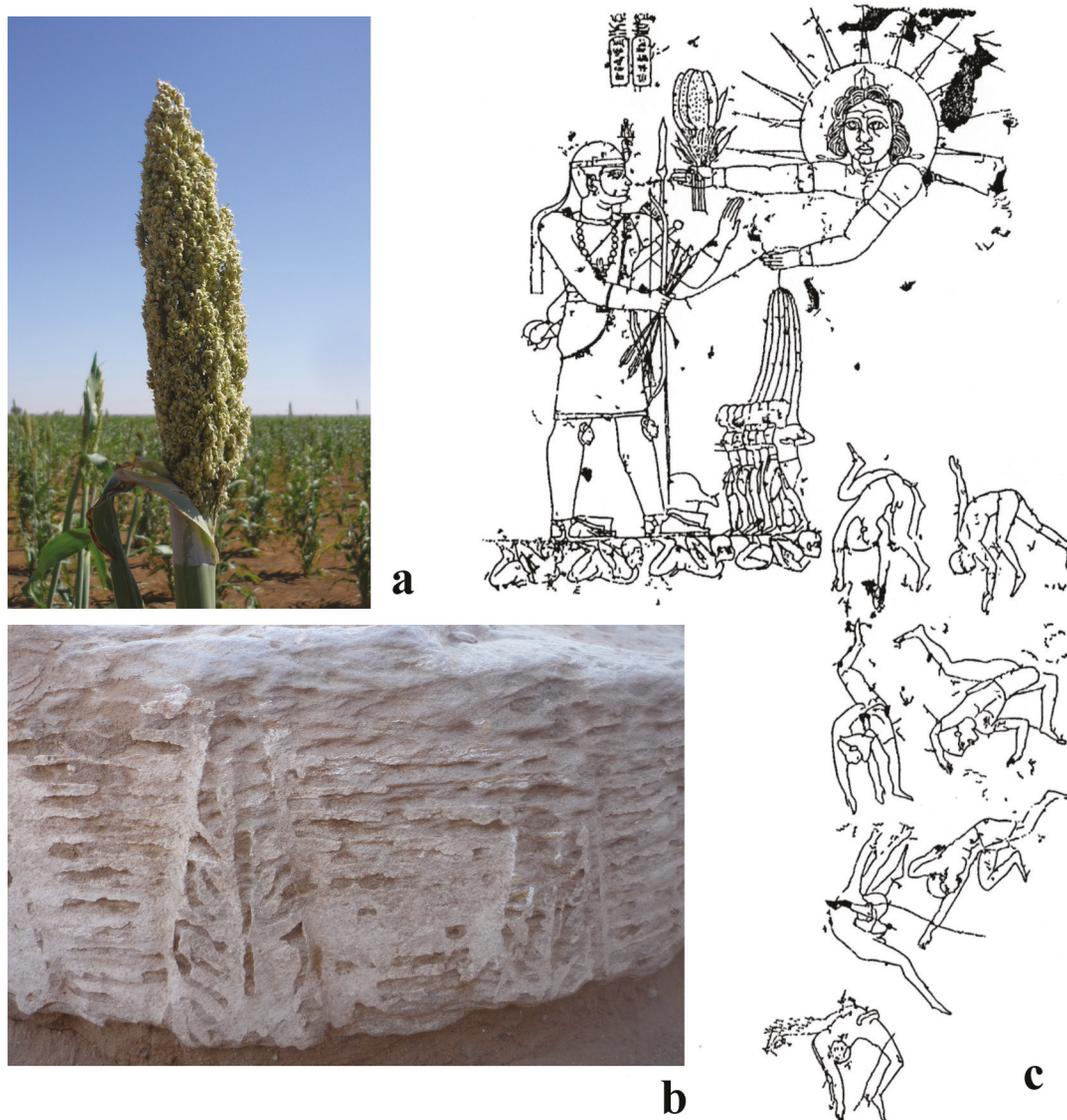


Figure 5. a. Basa, Sorghum plant (photo Fantusati). b. Abu Erteila, Kom II, Room K 1022, Detail of the decoration on a column drum. Sandstone (photo Fantusati). c. Gebel Qeili, Rock relief by king Sherkarer. AD 20-30 (after Welsby 1996, fig. 68).

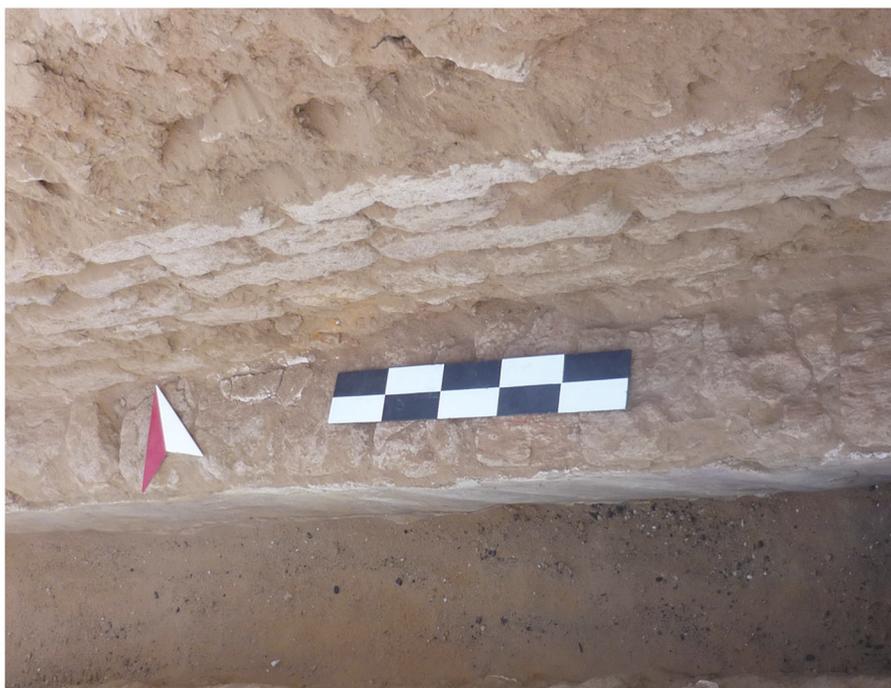
The artefact, corresponding to the southern perimeter of a building, lied on a basement protruding 21 cm from the wall, and entirely covered by a layer of painted plaster: a masonry analogous to the wall realized in Naga Amun temple by the royal couple Natakamani and Amanitore (fig. 6).

The fresco, till now brought to light for a length of 3 m, appeared depicted on a white plaster surface, stressing sunbeams and ring-shaped forms achieved with brilliant colours (fig. 7).

Even if this excavation needs to be deepened in the future, all the data at our disposal, combined with the close concentration of column drums, allow our hypothetical preliminary interpretation glimpsing since now how this masonry could have been part of a temple.

To the actual evidence, K 1200 is made from two rooms, partly recognizable, set to the north-eastern corner of the excavated area. They are separated by a north-south adobe wall, 64 cm wide and made from mud bricks sized 30 x 15 x 7 cm, laying in mortar clay according to the usual alternation of stretcher and header courses; six courses are still preserved. In the southern end of this wall an opening links the two environments.

A mud bricks masonry closing K 1202 can be seen on the north-eastern section of the enlargement of the survey. Traces of a possible irregular red bricks floor inside K 1201 highlight an occupation phase of this building; although this floor has an upper level respect the foot of the



**a**



**b**

Figure 6. a. Abu Erteila, Kom II, Building K 1000, Masonry from a Temple structure (photo Fantusati). b. Naga, Amun temple, Masonry (photo Baldi).



0 30 cm

Figure 7. Abu Erteila, Kom II, Building K 1000, Detail of the painted wall (photo Fantusati; drawing Baldi).

southern perimeter wall of K 1200, the actual evidence does not allow to recognize two different phases. A grindstone found to the south-eastern corner of K 1202 could suggest, as in the case of the others buildings set on kom II, a very late domestic occupation of the room.

At a distance of 5 m south respect K 1200, a closer new building, K 1100, has been brought to the light during the same campaign. It is an one-roomed rectangular (5,50 x 3,50 m) construction, characterized by an entrance facing east and red bricks walls: future researches on the field will contribute to specify its role as well. At the moment, on the basis of its orientation and proximity to K 1200, this little room may have been linked to the religious sphere of the site during the Meroitic age.

### Burials

During excavation work, fourteen burials were found in 2014 on Kom II. Some of them in good conditions, others badly preserved. All the burials brought to light in the site are simple little-deep pit graves; the bodies, differently oriented and generally deprived of goods, were laid in elongated position, on back or side, and were originally wrapped in woollen shrouds (Baldi 2012; Giuliani 2013). The concentration of bodies in this area confirms that the place, in the course of its latest period of life, was transformed in a cemeterial space (fig. 2).

Even if the rarity of grave goods and the observed millenary longevity of similar funerary customs do not permit a precise dating of the bodies, we are equally allowed to consider them coeval to the similar samples found on Kom I between 2010 and 2011 and submitted to radiocarbon analysis, giving a dating between twelfth and thirteenth century (Fantusati, 2013, 248).

### Findings

A bronze ring, found in K 1104, is decorated by the image of a gryphon or a winged sphinx, according to an iconography well diffused in the Meroitic jewellery production (fig. 8)<sup>17</sup>.

Among the fourteen burials brought to light, only two yielded grave goods. In T 215 it was noticed a total of 106 perforated disk-shaped beads of white-milk ostrich shell, originally making necklaces or bracelets; the beads have a diameter of 0.4 - 0.5 cm and are ca. 0.15 cm thick. T 216 was accompanied by eleven perforated different-sized beads from various materials, as glass, carnelian and ostrich shell.

### Archaeometrical inquiries

Fieldwork at Abu Erteila has been being supported and enriched by lab analyses on excavation materials<sup>18</sup>. Following X-Ray Diffraction (XRD) of all selected pieces<sup>19</sup>, able to reveal their physical composition, the thin-sections of seven samples – five potsherds and two plaster pieces – were observed under Cross Polarized Light (XPL) and Scanning Electron Microscope (SEM).

In its salient features, pottery of Abu Erteila embraces the ceramic tradition of Meroitic Butana. A great amount of domestic pots for cooking and storage needs represents the most of the local collection, in addition to finer wares including the typical Meroitic egg-shell made from kaolin. The production was mainly wheel-made, whereas the hand-made manufacture was limited to humbler pots and to specific typologies, as sherds by a fine burnished black production as result of firing in a reducing atmosphere.

According to our observations of Meroitic pieces coming from excavation on kom II, in addition to the very common use of quartz, mica, k-feldspar and plagioclase, the inclusion of organic matters, as dung and grass, strengthened the tempering compound of the fabric, used by potters in order to give a strong skeleton to wares, reducing the shrinkage of clay and therefore the risk of cracks. The very variable grain-size and the angular shape of many quartz crystals, maybe after grinding, suggest additional

17 Cf. Wildung 1996, cat. 341.

18 Archaeometrical inquiries have been made in laboratories of the University Roma 3.

19 The research regarded pottery and building materials as sandstone, bricks and plaster.



Figure 8. Abu Erteila, Kom II, Room K 1104, Ring. Bronze. Meroitic (photo Lebedev).

inclusions by potters, although its occurrence has been noted in the supposed raw material, recognized in Wadi el-Hawad clay, examined as well<sup>20</sup>. The tempering function was sometimes increased by adding of kaolin, that absorbs little water and has little shrinkage during cooling. In some pots so-called chamotte, as fragments of crushed pottery, had been used because having same properties.

Other elements, as iron and titanium oxides, were able to consolidate the clay by binding its components and by giving mechanical strength to the pot. They were already present in the raw material and were sometimes added by potters to the fabric; moreover, iron and titanium oxides could lower the melting point of the ware during firing (fig. 9). A poor quantity of iron has been recognized in the cooking pots, it occurring only in the few oxides that were already in the source clay; a greater inclusion would have made the wares non-fireproof, bringing to rapid cracks in direct contact with fire or embers. Furthermore, our observation has showed that potters usually made cooking pottery more porous than other production, by including in the fabric greater temper grains and plentiful organic materials, which absorb much water during both drying and cooling, producing voids in the wares. High porosity assured thermal strength to the pots, the voids allowing with no cracks expansion when cooking food and shrinkage during cooling (fig. 10).

Furthermore, Raman spectroscopy was carried on twelve painted ceramic fragments, with the aim to characterize the red and white pigments and the composition of the engobe layers. Raman spectroscopy is a vibrational spectroscopy technique that provides the molecular structural information, useful for sample identification. This technique is based on inelastic scattering of

20 By Mario Gaeta (Dipartimento di Scienze della terra, University of Rome “La Sapienza”): see Baldi 2014a, 21-22, nota 19, fig. 12.

monochromatic light (Raman effect), where the incident photons exchange part of their energy activating molecular vibration modes in the sample. The shift in wavelength of the scattered photons with respect to the incident light provides the chemical and structural information.

Raman measurements have been performed by using a Labram Micro-Raman spectrometer by Horiba, equipped with a He-Ne laser source at 632.8 nm (nominal output power 18 mW). The backscattered light is dispersed by a 1800 line/mm grating and the Raman signal is detected by a Peltier cooled (-70° C) 1024 X 256 pixel CCD detector. Nominal spectral resolution was about 1 cm<sup>-1</sup>. Spectral acquisitions (3 accumulations, 10 s each, in the range 100-2000 cm<sup>-1</sup>) were performed with 20x, 50x and 100x objectives.

Some examined pieces have showed specific composition and making conditions for engobe (fig. 11), that contains calcium, never found in paste. This indicates for coating a firing temperature lower than 800 °C, at which the decomposition of carbonates occurs. Moreover, the spectra of all twelve potsherds undergone Raman analysis<sup>21</sup> have showed in the engobe, in addition to quartz<sup>22</sup>, the presence of anatase, a titanium oxide that is transformed in rutile at 600 °C (fig. 12). Although further inquiries are necessary, the preliminary analyses could therefore suggest the engobe was cold-applied in some cases.

Raman spectroscopy also offered data on pigments for decorating pottery. All red pigments, used on the nine examined egg-shell sherds, are composed by hematite, whereas the white decoration observed in the fragment from a cooking-pot has showed the only presence of anatase, suggesting the use of a white clay (kaolin?) as pigment.

In a preliminary way, X-Ray Diffraction and SEM images have showed a lime-based quartz-rich composition of the two samples of plaster, decorated by blue and yellow pigments, coming from the reported painted wall<sup>23</sup>. According to Raman spectroscopy, the blue pigment is a so-called “Egyptian blue”, produced by firing a mixture of quartz, lime, a copper compound and an alkali flux to a temperature in the range between 850 and 1000 °C. It was mainly used for decorating small objects. In Egypt the earliest surviving use of Egyptian blue is dated to the reign of ‘Ka-sen’ (i.e. 2900 BC) (Hatton et al. 2008). Finally, the yellow pigment was obtained from a yellow earth (goethite).

21 Among them nine samples were Meroitic kaolin egg-shell fragments.

22 The occurrence of quartz was probably associated to impurities present in the clay used in the engobe material. Unfortunately, from Raman spectroscopy it is not possible to obtain more information on the clay material of the engobe layer, because clay minerals as kaolin give a very weak Raman spectrum, that could be mask by the strong Raman signal of the anatase.

23 According to the common making of plaster covering Meroitic monuments: see Hinkel 1989; Bouchar 2010 for El-Hassa; Letourneux & Feneuille 2010 for Doukki-gel and Gebel Barkal; Sweek, Anderson & Sanimoto 2012, 13-15 for Dangeil.

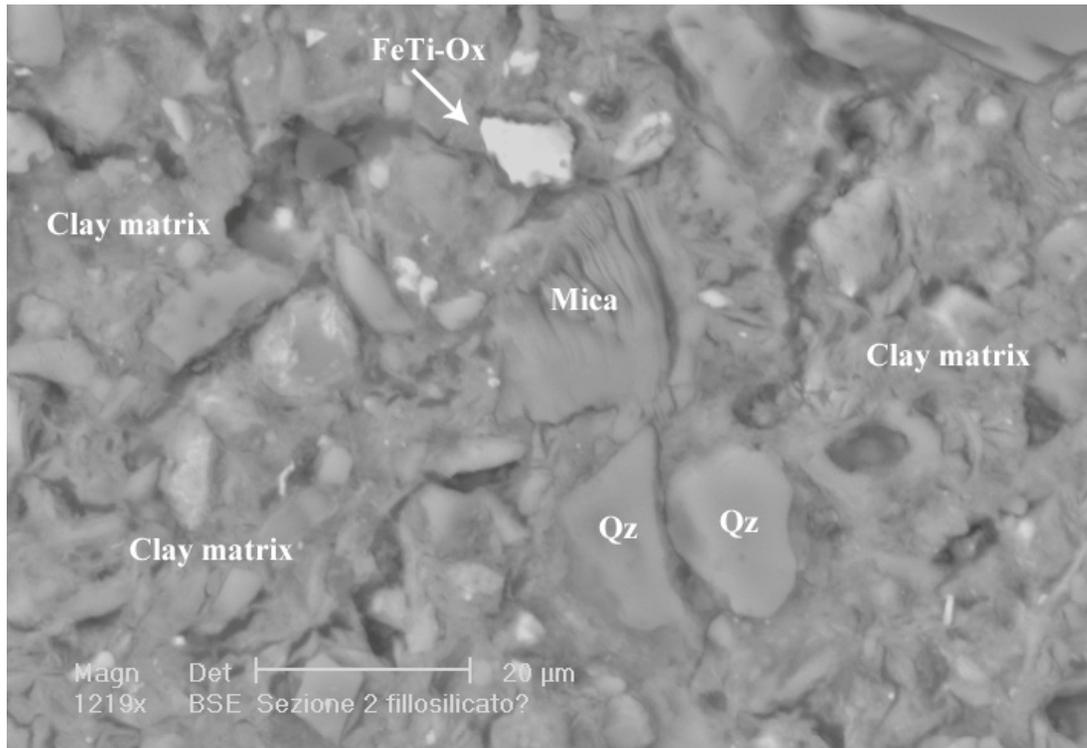


Figure 9. Abu Erteila, Ceramic sample C2, SEM image (by Bellatreccia).

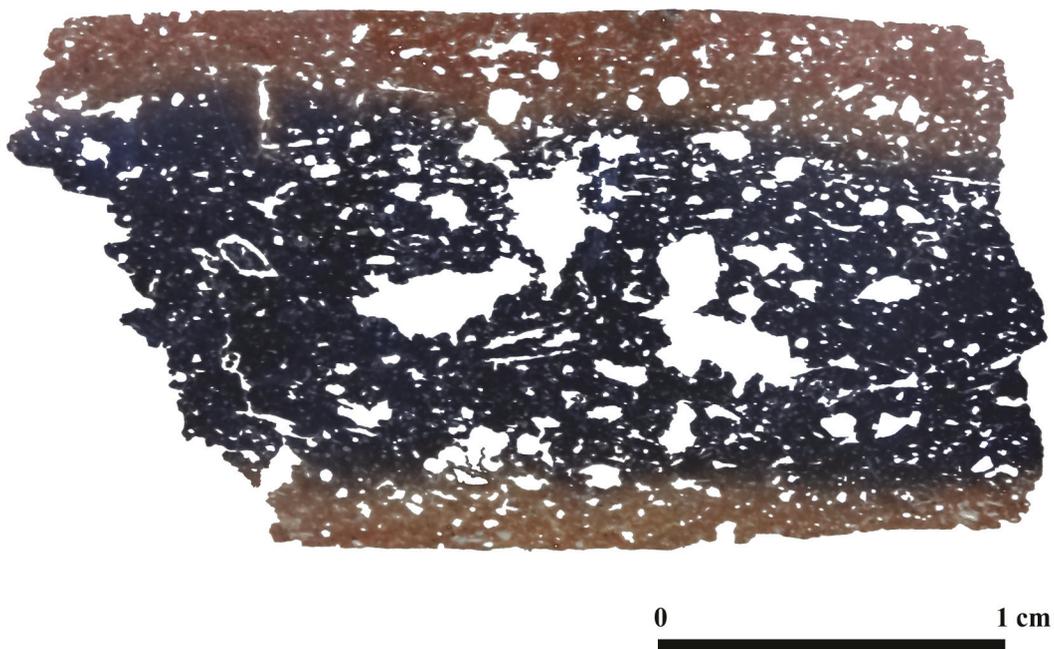


Figure 10. Abu Erteila, Ceramic sample C2, Thin section.

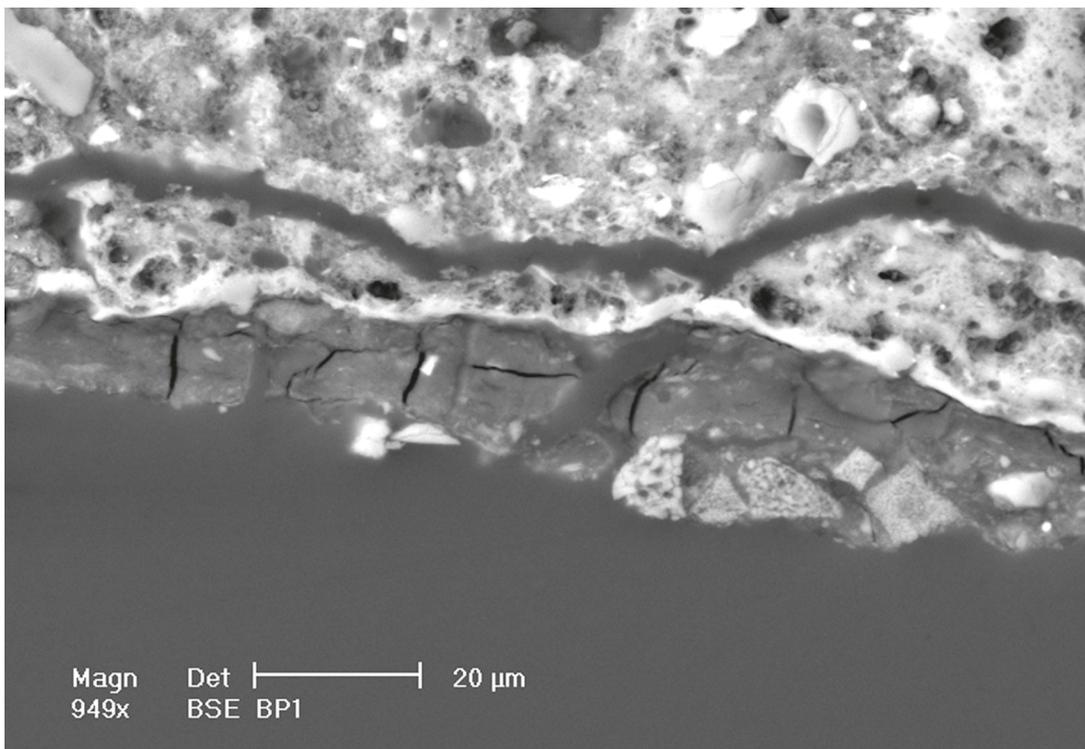


Figure 11. Abu Erteila, Ceramic sample BPI, Paste and engobe layers (SEM image) (by Bellatreccia).

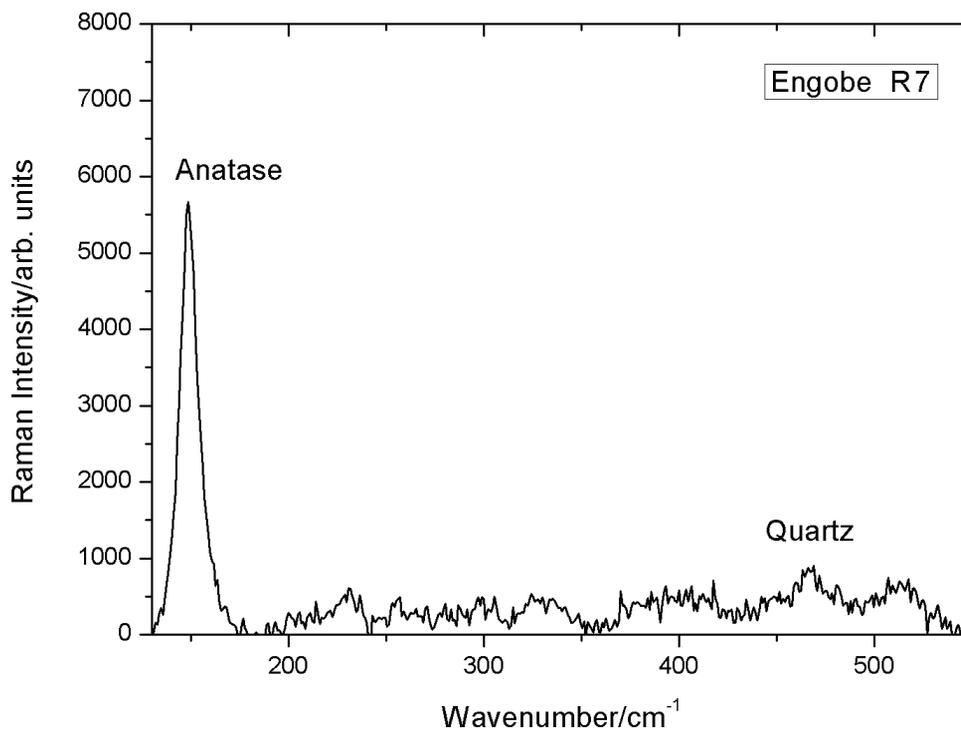


Figure 12. Abu Erteila, Ceramic sample R7, Raman spectrum (by Sodo & Casanova Municchia).

**Bibliography**

- Baldi, M.** 2012. "Textiles." In E. Fantusati, E. Kormysheva and S. Malykh. "Abu Erteila. Preliminary results of the Italian-Russian archaeological mission excavations, seasons 2009-2011." *Beiträge zur Sudanforschung* 11: 52-53.
- Baldi, M.** 2014a. "La ceramica." In E. Fantusati and E. Kormysheva, "Quinta e sesta campagna di scavo ad Abu Erteila: rapporto preliminare." In *Atti della Quarta Giornata di Studi nubiani - A Tribute to the Nubian Civilization*, edited by M. Baldi and E. Fantusati, 20-33. Rome: Scienze e Lettere.
- Baldi, M.** 2014b. "The Awlib Temple Complex: a Review." In *Atti della Quarta Giornata di Studi nubiani - A Tribute to the Nubian Civilization*, edited by M. Baldi and E. Fantusati, 49-66. Rome: Scienze e Lettere.
- Baldi, M.** 2014c. "Il tempio di Hamadab: evidenza ed ipotesi interpretative." In *Atti della Quarta Giornata di Studi nubiani - A Tribute to the Nubian Civilization*, edited by M. Baldi and E. Fantusati, 67-86. Rome: Scienze e Lettere.
- Bouchar, M.** 2010. "Petrographical Study of Meroitic Mortars from an Amun Temple (el-Hassa)". In *2nd Conference on Historic Mortars - HMC 2010 and RILEM TC 203-RHM final workshop, 22-24 September 2010, Prague, Czech Republic*, edited by J. Válek, C. Groot and J.J. Hughes, 55-63.
- Budge, E.A.W.** 1907. *The Egyptian Sudan. Its History and Monuments*. London: Kegan Paul, Trench, Trübner & Co.
- Fantusati, E.** 2013. "Terza e quarta campagna di scavo ad Abu Erteila: risultati e prospettive." *Rivista degli Studi Orientali* LXXXV, 1-4: 221-56.
- Fantusati, E., and E. Kormysheva.** 2014. "Quinta e sesta campagna di scavo ad Abu Erteila: rapporto preliminare." In *Atti della Quarta Giornata di Studi nubiani - A Tribute to the Nubian Civilization*, edited by M. Baldi and E. Fantusati, 1-48. Rome: Scienze e Lettere.
- Frend, W.H.C.** 1974. "The Podium Site at Qaṣr Ibrīm." *The Journal of Egyptian Archaeology* 60: 30-59.
- Giuliani, M.R.** 2013. "I tessuti." In E. Fantusati. "Terza e quarta campagna di scavo ad Abu Erteila: risultati e prospettive." *Rivista degli Studi Orientali* LXXXV, 1-4: 248-50.
- Grimal, N., and E. Adly.** 2004. "Fouilles et travaux en Égypte et au Soudan, 2002-2003." *Orientalia* 73: 1-149.
- Hatton, G.D., A.J. Shortland and M.S. Tite.** 2008. "The production technology of Egyptian blue and green frits from second millennium BC Egypt and Mesopotamia." *Journal of Archaeological Science* 35, 6: 1591-604.
- Hinkel, F.W.** 1989. "Examination of the Meroitic Mortar and Plaster". In *International Conference for Meroitic Studies (5th), 1984: Rome, Italy. Studia Meroitica 1984. Proceedings of the Fifth International Conference for Meroitic Studies*, Meroitica 10, edited by S. Donadoni and St. Wenig, 827-33. Berlin: Akademie-Verlag.
- Letourneux J.-P., and S. Feneuille.** 2010. "Mineralogical and Microstructural Analysis of Mortars from Kushite Archaeological Sites. In *2nd Conference on Historic Mortars - HMC 2010 and RILEM TC 203-RHM final workshop, 22-24 September 2010, Prague, Czech Republic*, edited by J. Válek, C. Groot and J.J. Hughes, 247-55.
- Näser, C.** 2004. "The Small Finds." In *The Capital of Kush 2. Meroë Excavations 1973-1984*. Meroitica 20, edited by P.L. Shinnie and J.R. Anderson, 215-350. Wiesbaden: Harrassowitz.
- Sweek, T., J.R. Anderson and S. Tanimoto.** 2012. "Architectural Conservation of an Amun Temple in Sudan." *Journal of Conservation and Museum Studies* 10(2): 8-16.
- Török, L.** 1997. *Meroe City, an Ancient African Capital. John Garstang's Excavations in the Sudan*. 2 vols. London: Egypt Exploration Society.

- Welsby, D.** 1996. *The Kingdom of Kush. The Napatan and Meroitic Empires*. London: Trustees of the British Museum by British Museum Press.
- Wildung, D.** 1996. *Soudan. Royaumes sur le Nil*. Paris: Institut du Monde Arabe, Flammarion.
- Wolf, P.** 2002. "Die Ausgrabungen in Hamadab bei Meroe - Erste Kampagne, Frühjahr 2001." *Der antike Sudan. Mitteilungen der Sudanarchäologischen Gesellschaft zu Berlin* 13: 92-104.
- Woolley, C.L.** 1911. *Karanog, the town*. Philadelphia: University Museum.