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Survey grid and airborne ortho-photographic images: Stremke Archaeology, F. Stremke, Bremen/Germany; **3D-Documentation of pyramids and reliefs:** Zamani, H. Ruther, University of Cape Town/South Africa and TrigonArt, T. Bauer and M. Praus, Berlin/Germany; **Geophysical prospection:** Eastern Atlas, B. Ullrich and team, Berlin/Germany, and Dongola University, Faculty of Earth Sciences and Mining, Mohammed A. M. Ali, Dongola/ Sudar; **Damage catalogue and mapping, conservation tests:** RaO (Restaurierung am Oberbaum), Berlin/ Germany, J. Hamann and team; **Tourism Planning:** Cultural Site Research and Management (CSRM), D. Comer and team, Baltimore/USA; **Digitization of the F.W. Hinkel-Research Archive:** S. Lawrenz, M. Düntzer and team under the direction of R. Förtsch and F. Fless, DAI Berlin/Germany; **Installation of vegetation-belt:** N. Munro and team, Institute of Climate & Society, Mekelle University, Ethiopia.

# MEROE, SUDAN

Archaeological Investigation, Conservation and Site Management at the Meroe Royal Cemeteries/Sudan – The Qatari Mission for the Pyramids of Sudan

The years 2015 and 2016

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e-FORSCHUNGSBERICHTE DES DAI 2018 · Faszikel 2

In 2014, Qatar Museums started the Qatari Mission for the Pyramids of Sudan (QMPS) initiated by HE Sheikh Hassan bin Mohamed bin Ali Al-Thani. The QMPS is Qatar's archaeological mission in Sudan. It is embedded in the framework of the Qatar-Sudan Archaeological Project (QSAP), a joint initiative of Qatar and the Sudan with the objective of promoting the rich archaeological heritage in the Republic of the Sudan. The mission's objectives comprise archaeological, architectural and culture-historical research on the pyramid necropolises of the Kingdom of Kush as well as their preservation and presentation in accordance with international guidelines. A holistic approach to the sustainable development of the pyramid sites involves all stakeholder groups, including local communities. To achieve its goals, the QMPS closely cooperates with the National Corporation for Antiquities and Museums (NCAM) in Khartoum and the German Archaeological Institute (DAI) in Berlin. Since 2014 an interdisciplinary team and an international expert network has been established in order to master the complex objectives of QMPS. Work concentrated on the royal pyramid cemeteries of



1 View of Begrawiya North, the northern royal cemetery of Meroe. (photo: P. Wolf, © QMPS, 2015) Begrawiya North and South at Meroe, where fieldwork between spring 2015 and spring 2016 has already yielded impressive results.

The pyramids of Meroe belong to Sudan's most important pre-Islamic sites and are its most prominent tourist attraction (fig. 1). Together with Meroe City, Musawwarat es-Sufra and Naqa, they have been recognised as a joint UNESCO World Heritage Site in 2011. The three pyramid cemeteries of Meroe, Begrawiya North, South and West, comprise more than 50 royal and non-royal pyramid tombs, many mastabat and tumulus graves of most of the rulers and of many royal officials of the Meroitic period of the Kushite kingdom from the 3rd century BC until its end in the 4th century AD. It is not only the impressive architecture of the sandstone pyramids, originally measuring up to 30 m in height, which makes this funerary landscape unique. Also the relief decoration of the pyramid chapels represents the most comprehensively preserved iconographic programme of that period. Its originally decorated subterranean burial chambers once held a large collection of grave goods.

The cemeteries were excavated between 1921 and 1923 by the Harvard University-Boston Museum of Fine Arts Egyptian Expedition under the direction of G.A. Reisner. New research and large scale conservation work was started by NCAM in 1975, directed by the East German architect F.W. Hinkel (1925–2007) and was revived in 2014/2015 by the QMPS. A basic project infrastructure was established and work began in order to fill research and documentation gaps and to provide a basis for further archaeological research, conservation and site management, the key aspects of the mission's programme, including:

- 1) an evaluation of previous records, particularly those in the Friedrich-Hinkel-Archive at the DAI in Berlin;
- 2) a systematic documentation of the preserved monuments;
- 3) a survey of ancient and modern graffiti;



2 Documentation work in the burial chambers of pyramid Beg. S. 503. (photo: P. Wolf, © QMPS, 2016).

- 4) geodetic and archaeological reconnaissance surveys;
- 5) geophysical prospection;
- 6) archaeological prospection in the area of the royal cemeteries.

In addition to these systematic and large-scale work strategies, modern high-tech methods were introduced into the fieldwork such as archaeometric analyses of artefacts and samples recovered. A highlight of the first project year was the re-excavation and comprehensive documentation of Queen Khennuwa's tomb below pyramid Beg. S. 503 (fig. 2). Preservation work commenced by cataloguing and mapping damage types and patterns with the aim of establishing a comprehensive conservation plan. First site management steps comprised:

- 1) sand removal from selected parts of the Begrawiya North cemetery and a study of the regional sand dune movement;
- 2) the renovation of the NCAM rest house (which was constructed by F.W. Hinkel);
- 3) the development of a sustainable tourism concept for the World Heritage Site 'Island of Meroe'

Two sub-projects were additionally integrated into the concept of QMPS:

- 1) the digitization of the Hinkel-Research Archive, which aims at opening access to his extensive documentation for research and cultural heritage preservation,
- 2) the installation of a vegetation-belt in the vicinity of the royal cemeteries to reduce further sand accumulation and abrasion of the pyramids.

## Archive Research and Documentation of the Monuments

A survey grid and airborne ortho-photographic images were produced to establish a geodetic and cartographic base for new site maps, which will incorporate G. Reisner's excavation plans and data assembled by F.W. Hinkel. At the same time, a detailed documentation of the pyramids started with the laser-scanning of 28 pyramids and their chapels to create accurate 3D-models



**3** Two architectural plans of pyramid Beg. N. 1 made using ortho-projections of 3D-models. (fig.: Zamani and TrigonArt, © QMPS, 2016).



4 Magnetometer data plot of the surveyed area. (fig.: Eastern Atlas, © QMPS, 2015)

of these monuments. In addition, the preserved mortuary chapel reliefs were recorded with a structured light scanner and by high resolution orthophotography. The data will subsequently be merged with the archival material on the pyramids to form a complete set of architectural plans (fig. 3).

### Reconnaissance Survey and Geophysical Prospection

For the first time, a systematic surface documentation survey and noninvasive geophysical prospection of the cemeteries and their surroundings were undertaken to relocate new structures. Covering 125 ha, the survey assembled a site gazetteer of known and newly identified sites comprising eleven tumulus cemeteries, nine occupation sites, eleven sandstone quarries as well as one potential iron ore mining place. While the focus was laid on archaeological remains, also recent features such as the remains of G.A. Reisner's dig houses, the unfinished Wadi Tarabil Museum and the NCAM rest house were also recorded. In addition, the team catalogued 150 features deriving from former archaeological and conservation activities.

The magnetometry covered a contiguous area of 25 ha in the large valley between the both cemeteries and included the northern part of the Begrawiya South cemetery (fig. 4). Ground penetrating radar clearly located the staircase leading down to the tomb under pyramid Beg. S. 503 and thus confirmed the effectiveness of the method in revealing backfilled grave shafts and robber trenches. Electrical Resistivity Tomography aimed at the visualisation of the sub-ground geology and the verification of structures below a depth of 2 m.

## Archaeological Prospection

More than two dozen test trenches were excavated in and around the necropoleis of Begrawiya North and South to test specific spots with magnetic anomalies, to search for as yet unknown tombs and a mortuary temple as well as to recover datable evidence from some of the burials beneath tumuli located during the reconnaissance survey (fig. 5).



5 Test excavation around pyramid Beg. N. 22. (photo: P. Wolf, © QMPS, 2016)



6 Detailed damage mapping at pyramid Beg. N. 9 using an ortho-projection of its 3D-model derived from laser scanning. (© QMPS, Restaurierung am Oberbaum, Zamani, 2015)

Both geophysical prospection and archaeological soundings identified large areas void of archaeological remains and thus systematically delimited the areas of interest for future archaeological studies. Some examples demonstrate, however, that intact tumulus graves and – albeit only a few– unexcavated archaeological remains do exist. They encourage further geophysical and archaeological tests within and around the royal necropolises, especially the area east of Begrawiya North, which unfortunately is buried under debris and sand dunes measuring several metres in depth. Therefore, the removal of the sand dunes is one of the most important tasks also from an archaeological point of view. Another important future task is the clearing of areas already excavated by G.A. Reisner in order to re-document previously recorded cemetery structures more thoroughly and with new methods.

#### Damage Documentation and Preventive Conservation

Publications like Hinkel 2000 and the UNESCO World Heritage nomination file for the 'Island of Meroe' with the combined management plan for the serial nomination by S. el-Masri point out that the site of Meroe is adversely affected by various climatic and manmade threats such as destruction caused by desertification (shifting sand dunes, sand erosion), destruction by rain water (structural deterioration of pyramid and chapel walls), salt crystallization, general degradation of construction materials, improper repairs, as well as physical damage by visitors, animals and vehicles. Furthermore, the UNESCO/ICOMOS recommendations stress the general need for a coordinated conservation plan and an overall strategy with policies that follow international best practice examples and guidelines.

Considering these recommendations, the first project year of QMPS focused on an assessment of the threats to the cemeteries, accompanied by conservation tests and preventive preservation measures aiming at the development of a general conservation plan. All types of damage at the cemetery structures were identified and recorded in an overall catalogue. Two pyramids with representative damage schemes (Beg. N. 2 and Beg. N. 9) were thereafter chosen for detailed damage record (fig. 6) and the develop-

ment of a workflow that can be applied to other pyramids. In the same time, first conservation and preservation measures commenced.

#### Site Management at Meroe

The absence of regular fieldwork at the pyramids of Meroe for more than a decade after F.W. Hinkel's death and the resulting neglect of the site and its infrastructure were very obvious at the start of the QMPS. The NCAM rest house was in a state of disrepair, most of the rebuilt doors to the pyramid chapels were broken or had vanished and the visitor tracks were covered by sand dunes. Therefore, the QMPS and NCAM decided on a new overall site development approach. Besides the documentation of former work spots, block deposits and pathways in the framework of the reconnaissance survey, the existing site infrastructure left by F.W. Hinkel was reviewed. The NCAM rest house with its storage facilities was rehabilitated in order to accommodate workgroups and expert teams as well as to establish storerooms, offices and workshops to facilitate conservation measures. Not least, the protection of the site was improved by new fences and the safety of tourists enhanced by temporary closing and signposting dangerous areas.

A 'Sustainable Tourism Plan for Meroe including a Regional Approach to the Island of Meroe' was initiated to develop a general tourism concept that integrates all stakeholders and their various visions regarding tourism and its socio-economic benefits. Until its completion and its step-by-step implementation, the QMPS will improve the situation at the site by necessary enhancements for visitors, guards and local vendors. For example, the present site entrance was enlarged by a second building with logistic improvements and an exhibition room.

### Bibliography

For more information on the QSAP and the work of the QMPS see http://www.qsap.org.qa/en/ <sup>¬</sup>

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