

Zamani Project: report from Meroe, Sudan



Since 2004 the **Zamani project**, based in the **Geomatics Division** at the **University of Cape Town**, has been documenting African historical sites (over 40 areas rich in buildings, rock art works and cultural landscapes) with the aim of creating accurate digital records for future generations and of increasing the awareness of Africa's architectural and cultural heritage. Led by **Prof. Heinz R  ther**, the project has been producing results of interest for the education, research, restoration and archaeological site management sector.

In **March 2015** the Zamani partners went back to **Sudan**, where they had previously been to document the temple complex of Musawwarat es-Sufra. Objective of the new mission was to digitally record the **Pyramids of Meroe** (Begarawiyah), recognised as **UNESCO World Heritage**.

«The Meroe site contains three pyramid fields ? Prof. Heinz R  ther tells.

«North and South fields are the burial grounds of members of royal families from the **Meroitic period** of the **Kingdom of Kush**. The West cemetery field was reserved for non-royal burials.

The burial chambers, long since robbed of their content, are not located inside the pyramids, as it is the case with their famed Egyptian peers, but below the chapels in front of these. The pyramids were constructed **between 300 BC and 300 AD** as single or multiple layered stone shells, filled with gravel and rocks.



Pyramids in the North and South area, partly ruined and partly reconstructed (only in very few case almost completely) were built around 5 km east of the Nile, 200 km north-east of Khartoum. Treasure hunting and vandalisms, in addition to natural processes of erosion by windborne sand, daily temperature changes and other natural phenomena, caused severe damage to the pyramids. Especially changes in wind patterns and climate over the past 50 years are reported to have accelerated the degradation of the structures significantly. A conservation intervention, funded by the **Qatar-Sudan archaeological project** and implemented by the **German Archaeological Institute**, is currently underway for the pyramids' preservation».

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«**Zamani** cooperated with the Qatar-Sudan project and the German Archaeological Institute ? Heinz R  ther goes on - attending to the **digital 3D reproduction** of the pyramids and creating a **GIS model** of the **Meroe site**, for a full spatial record of the area. Data were acquired through **laser scanning photography**, **panorama photography** and **GPS** surveys; acquired data were employed for the creation of textured 3D computer models, ortho-images of facades, photographic 360-degree full-dome panoramas, panorama tours and a site GIS.

The team acquired laser scanned 23 pyramids in the northern and 10 pyramids in the southern field. More than 6000 photographs were captured for texturing the final 3D models and creating **panorama tours** and a **Virtual World**.

It was the beginning of summer and the 47 degrees in the shade made the fieldwork demanding. The pyramids' scan was a challenge, as most of their sides are jagged, which made it impossible to scan parts of the vertical and horizontal step surfaces from the ground level. Where possible the laser scanner was placed on top of a neighbouring pyramid to capture these occluded zones.

Now, the data processing is well advanced. The pyramids' **ortho-images** produced will be used to establish a **database of individual stones** with information on their position, dimensions, conditions and intervention needs».

For further info see the [Zamani project's website](#)