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## Geomorphology and prehistory of Sai Island (Nubia): report on a current research project

Sai Island is situated between the second and the third cataract of the Nile, south of the Batn el-Hagar, the «belly of stones», a vast rocky area dividing the valley of the Middle Nile in two parts, now flooded in the southernmost part by Lake Nubia. It is a large island, extending about 12 km from north to south and 5,5 km from east to west, the centre is gravely and barren but the river banks include extensive patches of Nile alluvium suitable for cultivation where the present villages are located (Fig. 1).

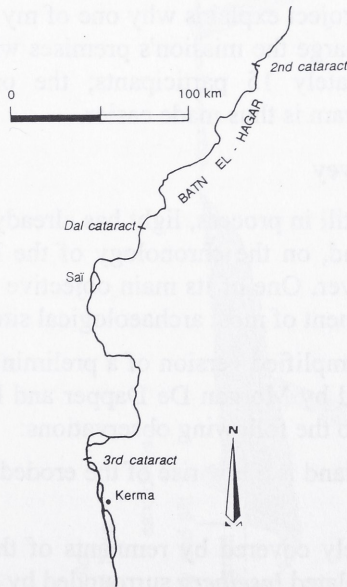


Fig. 1. Location of Sai Island.

Past archaeological work, carried out in the fifties and seventies by Jean Vercoutter (1958, 1972, 1985), was restricted by the license to specific areas. It involved mainly sites of the second millennium BC, including a Pharaonic walled town, two Pharaonic burial sites and an extensive Kerma cemetery, and thus it focused on artefactual and textual remains.

In 1993, when I was granted a license to excavate and survey the entire island, I started a new project which includes archaeological research of a global approach to the site (Geus 1994, 1995a, 1995b 1996). This seemed particularly suited to an island, as it is a closed and well defined unit and because its location south of Lake Nubia, hence close to an area that was explored in detail in the early sixties but without any possibility of further field control.

This is the reason why the new project includes a geomorphologic survey and research on the Palaeolithic and Neolithic occupation, organised in collaboration with the Departments of Geography and Geology of Ghent University (Paul De Paepe, Morgan De Dapper and Rudi Goossens), the Laboratory for Prehistory of the Catholic University in Leuven (Philip Van Peer and Frank Herman) and with the *Centre de Recherches Géophysiques* of the French *CNRS* in Garchy (Albert Hesse). This work was undertaken as a complement to the archaeological survey and the excavations of later sites which, for their part, were organised in collaboration with the Laboratory for Physical Anthropology of Bordeaux I University (Bruno Maureille) since Sai includes numerous burial sites. The extend of this project explains why one of my priorities during the former campaigns was to enlarge the mission's premises which can now accommodate teams of approximately 15 participants; the organisation of a multi-disciplinary research program is thus made easier.

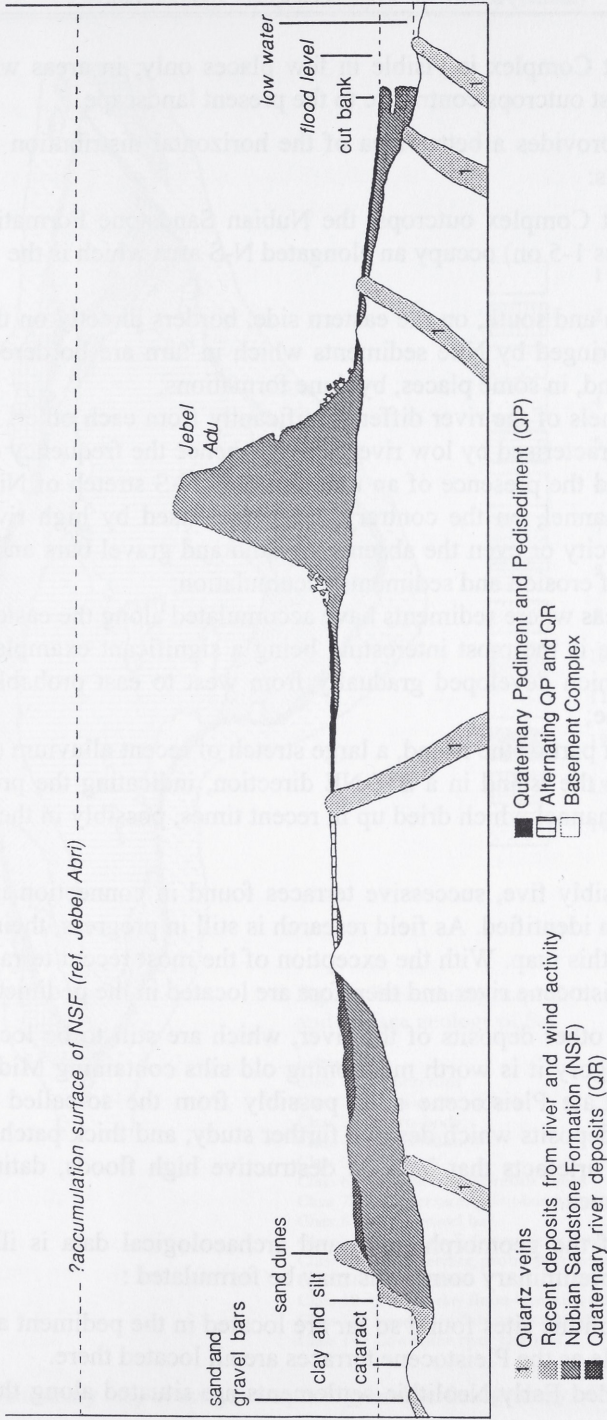
### **The geomorphologic survey**

Although work is still in process, light has already been shed on the origin and evolution of the island, on the chronology of the Nile terraces and on the recent behaviour of the river. One of its main objective is to understand the reason for the location/placement of most archaeological sites.

Figure 2 shows a simplified version of a preliminary geomorphologic section of the island designed by Morgan De Dapper and Rudi Goossens of Ghent University. It lends itself to the following observations:

1. The basal core of the island is a low rise of the eroded surface of the Basement Complex in this area;
2. The basal core is largely covered by remnants of the Nubian Sandstone, of which Jebel Adu, an isolated *inselberg* surrounded by a pediment, is the largest and most visible outlier on the island;





2. Preliminary section of Sai Island (simplified version).

3. The Basement Complex is visible in few places only, in areas where quartz veins and schist outcrops contribute to the present landscape.

Figure 3 provides a better idea of the horizontal distribution of the geological formations:

1. The Basement Complex outcrops, the Nubian Sandstone Formation and the pediment (class 1-5 on) occupy an elongated N-S area which is the visible core of the island;
2. The area north and south, on the eastern side, borders directly on the river but elsewhere is fringed by Nile sediments which in turn are bordered by recent alluvial clay and, in some places, by dune formations;
3. The two channels of the river differ significantly from each other: the western channel is characterised by low river activity, hence the frequency of sand and gravel bars and the presence of an uninterrupted N-S stretch of Nile deposits; the eastern channel, on the contrary, is characterised by high river activity, hence the scarcity or even the absence of sand and gravel bars and the alteration of areas of erosion and sediments accumulation;
4. Among the areas where sediments have accumulated along the eastern channel, the central one is the most interesting being a significant example of a point bar system which developed gradually from west to east probably since the Early Holocene;
5. In the northern part of the island, a large stretch of recent alluvium (class 10 on fig. 3) crosses the island in a SW-NE direction, indicating the presence of a former river channel which dried up in recent times, possibly in the 1st millennium BC.

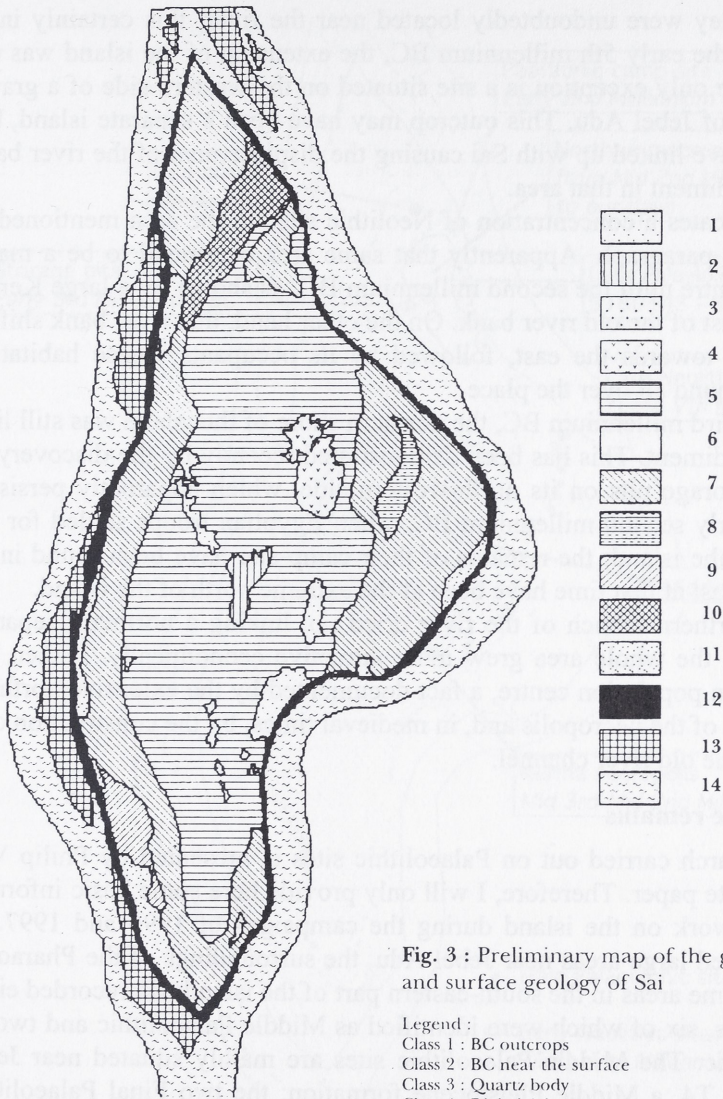
Four, possibly five, successive terraces found in connection in a few localities have been identified. As field research is still in progress, their location is not indicated on this map. With the exception of the most recent terrace, they are related to the Pleistocene river and therefore are located in the pediment area.

There are other deposits of the river, which are still to be located on the map. In this category it is worth mentioning old silts containing Middle Palaeolithic artefacts, Late Pleistocene silts, possibly from the so-called Wild Nile, Early Holocene deposits which deserve further study, and thick patches of sandy silts mixed with artefacts that indicate destructive high floods, dating possibly from medieval times.

A comparison of the geomorphologic and archaeological data is illustrated in Figure 4. A few preliminary comments may be formulated :

1. All the Palaeolithic sites found so far are located in the pediment area. This is understandable as the Pleistocene terraces are all located there.
2. All the recorded Early Neolithic settlements are situated along the pediment





**Fig. 3 :** Preliminary map of the geomorphology and surface geology of Sai

- Legend :
- Class 1 : BC outcrops
  - Class 2 : BC near the surface
  - Class 3 : Quartz body
  - Class 4 : Djebel Adou
  - Class 5 : Pediment
  - Class 6 : Superficial calcareous banks
  - Class 7 : River terrace, point-bar system
  - Class 8 : Major gravel bar
  - Class 9 : idem Class 7, but under cultivation
  - Class 10 : River terrace probably younger than Class 7
  - Class 11 : River dunes
  - Class 12 : Present-day flood-level silts under cultivation
  - Class 13 : Low-water bars and cataracts
  - Class 14 : Low-water river channel

3. Preliminary map of the geomorphology and surface geology of Saï Island.

outline. As they were undoubtedly located near the river, this certainly indicates that, in the early 5th millennium BC, the extension of the island was the pediment. The only exception is a site situated on the western side of a gravel outcrop, east of Jebel Adu. This outcrop may have been a separate island, but it may also have linked up with Sai causing the displacement of the river bank east of the pediment in that area.

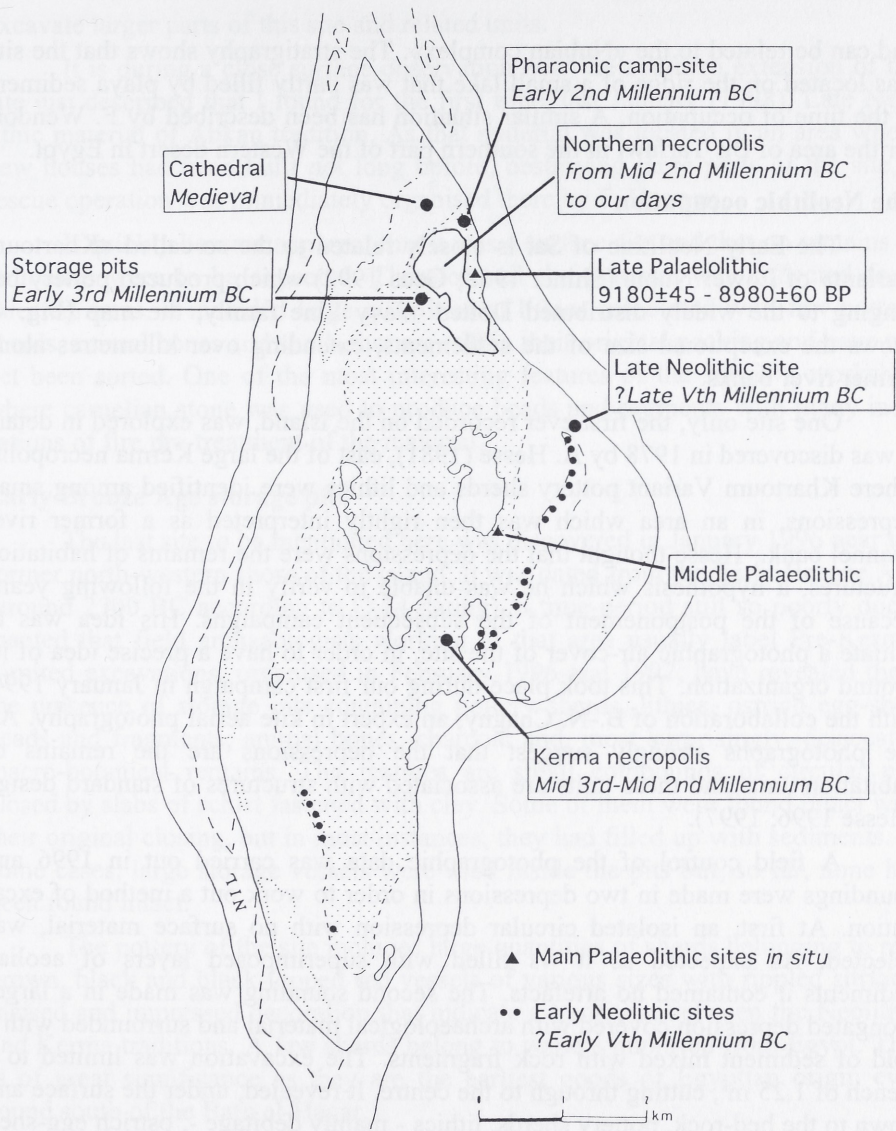
3. The map indicates a concentration of Neolithic sites in the area mentioned in the preceding paragraph. Apparently that same area continued to be a major population centre until the second millennium BC, as shown by a large Kerma necropolis west of the old river bank. On the other hand, that river bank shifted progressively towards the east, followed by its occupants whose habitation debris were found all over the place.
4. In the early third millennium BC, the northern shore of the island was still limited to the pediment. This has been demonstrated recently by the discovery of pre-Kerma storage pits on its north-western side, which apparently persisted during the early second millennium BC, when Egyptian troops settled for the first time on the island: the remains of their camp-site have been found in an area which must at that time have been at the extreme north of the island.
5. When the northern branch of the river dried up, linking a northern, separate island to Sai, the whole area grew more attractive economically. It then became the main population centre, a fact documented by the extensive northern burial ground of the necropolis and, in medieval times, by the construction of a cathedral in the old river channel.

### **The Palaeolithic remains**

The research carried out on Palaeolithic sites is presented by Philip Van Peer in a separate paper. Therefore, I will only provide here some basic information about his work on the island during the campaigns of 1996 and 1997. In 1996, he surveyed large areas near Jebel Adu, the surroundings of the Pharaonic town site and some areas in the south-eastern part of the island. He recorded eight Palaeolithic sites, six of which were identified as Middle Palaeolithic and two as Final Palaeolithic. The Middle Palaeolithic sites are mainly situated near Jebel Adu, on terrace T4, a Middle Pleistocene formation; the two Final Palaeolithic sites are found in black silt deposits near the Pharaonic town site. The last two have been C-14 dated to  $9180 \pm 45$  BP and  $8980 \pm 60$  BP, a time-period poorly documented in the Nile valley (Connor and Marks 1986).

One of the Middle Palaeolithic site found during the previous season in 1997, was selected for excavation. A total surface of 10 m<sup>2</sup> was excavated in an area where the remains of a hearth containing charcoal and burnt stones was partly cleared. The lithic industry, using almost exclusively quartz, is characterised by a high Levallois index, includes foliates, Levallois points and scrapers,





4. Distribution of the main archaeological sites on Sai Island.

and can be related to the «Nubian complex». The stratigraphy shows that the site was located on the ridge of a small lake that was partly filled by playa sediment at the time of occupation. A similar situation has been described by F. Wendorf for the area of Bir Tarfawi in the southern part of the Western desert in Egypt.

### **The Neolithic occupation**

The Early Neolithic of Sai is closely related to the so-called «Khartoum Variant» of Lower Nubia (Shiner 1968; Geus 1992) which produced pottery belonging to the widely distributed Dotted Wavy Line family; the map (Fig. 4) shows the exceptional size of the settlements, extending over kilometres along former river banks.

One site only, the first ever recorded on the island, was explored in detail. It was discovered in 1978 by A. Hesse (1981), east of the large Kerma necropolis, where Khartoum Variant pottery sherds and lithics were identified among small depressions, in an area which was then rightly interpreted as a former river channel bank. Hesse thought that the depressions were the remains of habitation structures, a hypothesis which he was unable to verify in the following years, because of the postponement of the subsequent campaigns. His idea was to initiate a photographic air-cover of the site, in order to have a precise idea of its ground organization. This took place during our first campaign in January 1994, with the collaboration of B.-N. Chagny, an expert in kite aerial photography. All the photographs strongly suggest that the depressions are the remains of habitation units and these units are associated with structures of standard design (Hesse 1996; 1997).

A field control of the photographic data was carried out in 1996 and soundings were made in two depressions in order to work out a method of excavation. At first, an isolated circular depression with no surface material, was selected. As expected as it was filled with superimposed layers of aeolian sediments it contained no artefacts. The second sounding was made in a larger elongated depression covered with archaeological material and surrounded with a fold of sediment mixed with rock fragments. The excavation was limited to a trench of 1.25 m<sup>2</sup>, cutting through to the centre. It revealed, under the surface and down to the bed-rock, pottery sherds, lithics - mainly debitage -, ostrich egg-shell beads and fragments, fish bones, fresh water molluscs and small pieces of burned clay. Unfortunately, possibly because of the limited extension of the test, the identification of the depression as an habitation structure could not be confirmed. Thus, the question of the nature of the remains is still opened to debate. A. Hesse, who is currently working on the material from his survey and soundings, plans new operations for a coming season and hopefully we will soon be able to



excavate larger parts of this site and related units.

It is during a close surface observation near the southern extension of the site just described that I found for the first time, last January (1998), Late Neolithic material of Abkan tradition. As that material was located in an area where new houses had been built not long before, destroying large parts of the site, a rescue operation was immediately organised there by F. Herman.

It quickly became apparent that it was a surface site and that no remains of structures were to be expected. Therefore all the material was collected from selected areas. It included large quantities of lithics associated with few pottery sherds, animal bones and shells that are still in their original packing and have not yet been sorted. One of the most interesting features of the site is a workshop where carnelian stone was used to produce beads and segments with many indications of fire pre-treatment of the material.

### Early Bronze Age storage pits

The last site to be mentioned here was discovered in January 1996 near the former north-western shore of the island. It was dated from the Early Bronze Age (around 2700 BC according to C-14 dating), a time-period still so poorly documented that field archaeologists working in that area usually label Pre-Kerma. Limited excavations, organised in February 1996 and 1997, have revealed there the presence of storage pits containing pottery sherds, lithics, ostrich egg-shell beads and fragments, animal bones, charcoal and, most surprisingly, desiccated macro-botanical remains. The features are small compounds of circular pits closed by slabs of schist fastened with clay. Some of them were found intact with their original closing, but in most instances, they had filled up with sediments. In some cases, large storage vessels were used inside the pits but, so far, none has been found intact.

The pottery of the site includes large quantities of sherds belonging to red, brown, black and black-topped red vessels of various sizes with rippled surface, incised and impressed decoration that indicate a transition between the Neolithic and Kerma traditions. A few sherds belong to vessels imported from Egypt. This is of great significance as they are the earliest goods of Egyptian origin ever found south of the Batn el-Hagar.

The vegetal remains, for their part, include leaves, stalks, thorns and seeds looking so fresh that we first thought that they were intrusive. Thanks to the collaboration of Katharina Neuman and Barbara Zach (*Seminar für Vor- und Frühgeschichte, Archäologie u. Archäobotanik Afrikas, Frankfurt*) all the samples collected so far, including charred material, are in the process of identification. First results indicate the presence of emmer wheat (*Triticum dicoccon*), barley (*Hordeum vulgare*), *Ziziphus* and acacia.

This quick survey of our current research at Saï shows that the island may be considered a major locality for the study of Nubian Prehistory and Environment in their continuity. A long-term multidisciplinary project is in the works; it has already led to the elaboration of a Sai Geo-archaeological Information System (SAIGAIS) which includes all available archaeological, geographical and topographic data (Goossens et al. 1997). In near term future, new surveys and excavations will be carried out which, I hope, will inspire further research for our next meeting.

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