

Interim report of the activities on Qaitbay site, Alexandria during the year 2017

In 2017, in common with other foreign research centres working in Egypt, the Centre d'Études Alexandrines (CEAlex) had to deal delays in the issuing of authorisations and no fieldwork was thus possible. Nevertheless office work continued during 2017 in the preparation of publications and we are readying ourselves to begin a campaign on the Qaitbay site after the end of the month of Ramadan, as from 17 June 2018.

1. Research on Qaitbay site

Up-dated digital surface model (DSM) of the underwater site

The photos that were taken in the south-east sector of the site in 2016 (**fig. 1**) were processed through photogrammetry and this new zone has been stitched in with the other previously captured surfaces of the DSM that have been presented in earlier reports. At the same time, the geo-referencing of zones processed in 2015 has been finalised by means of Ground Control Points (GCP) plotted across the site in accordance with a protocol established in 2014 and surveyed by direct line topography using a theodolite connected to the total station of the CEAlex. In a new sector, 13 GCPs were established before photography and seven were sufficiently precise to be used in the geo-referencing of the chosen surface. Currently, this is done at the same time as the processing of the photos by roto-translation in PhotoScan. The average Root Mean Square Error (RMSE) obtained using this method is 9.4 cm, the control being the ortho-photo integrated into the GIS. 4430 photos of the 5360 taken on the site have been used in the creation of the new zone, covering an area of roughly 904 m²

The geo-referencing of the zones captured in 2015 was redone after attaching to the new zone using nine reasonably precise points of the 14 plotted in the zone: the average RMSE in these cases is 13.5 cm.

Since 2013, 26 weeks have been dedicated to the photographic survey, with 50,152 photographs employed in the creation of the current DSM, covering an area of roughly 8,200 m² of the 13,000 m² of site formed by the ancient blocks (**fig. 2**)

Analysing anomalies recorded on the DSM of the underwater site

The integration of the latest 2016 zone into the GIS has revealed an area of overlap with the DSM in which anomalies have been noted, as was indicated in the report of 2016. Visually,

one notes the disappearance of some ten blocks in a quite restricted area. An analysis of this overlap on the ortho-images of 2014 and 2016 shows that this phenomenon is linked to the general silting of the site which has risen by 40 to 60 cm in the zone in question. The overlaying of the ortho-photo of the newly processed zone upon the chart of the blocks surveyed at the beginning of the 2000s shows that several dozen blocks have disappeared in roughly 15 years to the south of the lintel of the monumental entrance, which would suggest a much larger rise in the level of the sand than was recorded in two years (**fig. 3**). It is noteworthy that the photogrammetry investigation of Qaitbay site provides information that goes far beyond the site itself, and in this instance reveals the direct impact on the site of developments conducted elsewhere on the Alexandrian coast.

Creation of 3D models of the lifted blocks

Throughout 2017, 46 blocks were photographed and processed in PhotoScan in order to create digital copies of the blocks (see examples of digital copies in **fig. 4**). The aim is to conduct studies prior to virtual anastylosis. The fragments of a grey granite basin or *louterion* with an estimated diameter of 1.90 m are under analysis and have led to a partial reconstruction of the object (**fig. 5**). Its function is still to be determined but it is quite exceptional in its size.

2. Outreach

Conferences and exhibitions

An exhibition held in the Bibliotheca Alexandrina in autumn 2016, as part of the event entitled: “200 ans de relations franco-égyptiennes: une communauté de destins et des horizons partagés”, dedicated a large section to the photogrammetry of the Pharos of Alexandria site, with the screening of a 3D animated film of part of the Pharos site and 3D reconstructions of the monumental statues that once stood at the foot of the Pharos. This exhibition was also presented in 2017 to more than 1,000 pupils of Collège Saint-Marc in Alexandria during the months of February and March 2017, as well as in the Institut Français d’Égypte at Cairo during May 2017.

In May 2017, the CEAlex was selected to participate in the Salon Innovatives SHS (Sciences Humaines et Sociales) of the CNRS. It presented the results of the photogrammetry coverage of the Pharos site and the possible use of these within pedagogical activities

Isabelle Hairy and Jean-Yves Empereur took part in the conference entitled *Under the Mediterranean* organised by the HFF and the University of Cyprus that was held in Nicosia in October 2017. Their contributions were entitled:

“Honor Frost and the Alexandria Lighthouse”

“The Evolution of Survey Techniques on the Qaitbay Underwater Site at Alexandria, Egypt”.

Publications

Isabelle Hairy has also prepared an article entitled “Underwater excavation of the Qaitbay site. A chronicle of the ruins of the Pharos” to be published in the review *Égypte Nilotique et Méditerranée (EniM)*, and has published an article entitled “Iskenderiye Feneri” in an edition of the Turkish periodical *Aktüel Arkeoloji* (59, 2017, p. 92-103) dedicated to the Seven Wonders of the World; as well as the following article “La médiation du patrimoine sous-marin: les moyens d’une cyber exposition et d’une archéologie participative sur la fouille subaquatique de Qaitbay, Alexandrie, Égypte”, in G. Vertecchi and C. Virlovet (ed.), *City, River Littoral. The extension of Transportation in Delta Areas ; Special Issue of RIPARIA*, 2018, p. 83-94 on line <https://revistas.uca.es/index.php/sig>

Television programmes

The work of the CEALex on the site of the Pharos has been the subject of several television programmes. One of the best regarded documentary series of French television, *Des racines et des ailes*, of the FR3 channel, screened a programme entitled *Dans les secrets des Pharaons* on 13 September 2017. It featured a presentation of our underwater excavations with the focus on the photogrammetry of the site as well as a reconstruction of the Pharos and its environment that was developed by Isabelle hairy and the digital artist of the series.

Our work on the Pharos of Alexandria also featured on 17 October 2017 as part of the programme *Les Mystères du Proche-Orient* included in “The Journal de 13h00” on France 2 channel, as well as within the programme *Sur les traces de Cléopâtre* that was aired on 5 December 2017 by the RMC Découvertes channel.

In November 2017, a documentary team from Mallinson Sadler Productions, commissioned by National Geographic and directed by Sophie Elwin Harris, came to film an episode in the series *Drain*, which will appear in 2018.

Fig. 1 South East sector of the Site processed in 2017.

Fig. 2 Whole site of Qaitbay once processed in 2017 the fall campaign of 2016.

Fig. 3 Overlaying of the ortho-photo of the newly processed zone upon the chart of the blocks surveyed at the beginning of the 2000s showing the rise in the level of the sand.

Fig. 4 Examples of digital copies photographed and processed in 2017

Fig. 5 Partial reconstruction of a grey granite basin with an estimated diameter of 1.90 m