

BATHYMETRIC CHART OF ALEXANDRIA EASTERN HARBOR

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ABSTRACT

Alexandria Eastern Harbor is a shallow, protected, semi-enclosed, circular basin. It is connected to the Mediterranean Sea through two openings: El-Boughaz (main) and El-Silsila. New data, from a recent bathymetric survey in the Harbor, is used to build up its bathymetric chart. The bottom of the Harbor slopes gradually seawards, with an average depth of 5m inside the Harbor. The study build up Alexandria Eastern Harbor new bathymetric chart, will be a useful tool to follow-up the problems of the harbor and to propose suitable solutions. Recommendations are set in the end of the study to activate the self recovery (by the Harbor water body) to preserve and recover the situation of Alexandria Eastern Harbor.

1. INTRODUCTION

Alexandria Eastern Harbor, Fig.(1), is a shallow, protected, semi-enclosed and circular basin. It covers an area of about 2.8 km² and occupies the central part of the coast of Alexandria (Said and Maiyza, 1987). The Harbor is connected to the Mediterranean Sea through two openings: El-Boughaz and El-Silsila. The bottom of the Harbor slopes gradually toward the center of the Harbor and El-Boughaz opening (Maiyza and Said, 1988).

The chemical composition of Alexandria Eastern Harbor was studied by El-Sayed, 1980 and Shriadah, 1982. The hydrography of the Harbor was studied by Said and Maiyza, 1987 and Maiyza and Said, 1988.

The present study aims to survey Alexandria Eastern Harbor to build up a new bathymetric chart, follow-up its problems and propose possible solutions.

2. PROCEDURES

In February 2005, From the highest point on the roof of the National Institute of

Oceanography and Fisheries, Alexandria (NIOF), which rises about 14m above Mean Sea Level (MSL), a general view for the Harbor was taken. The start point, the landmarks, the pathways and the procedures of the work were determined.

A motor boat, tested with marked iron bar and fitted with an echosounder (Laurance 52X) and two Magellan GPS (5000^{PRO} "on the institute's roof attached with a Laptop computer and Blazer-12 "in field") were used to carry out the "more or less" differential bathymetric survey.

Starting from the jetty of NIOF, the motorboat made pathways covering the whole Eastern Harbor in a net form. A total of 954 bathymetric points (Latitude, Longitude, Depth and Time) were recorded. Data was then loaded on computer (Microsoft EXCEL 2000) and reviewed 3 times to ensure correct entry and eliminate any human error. Time deviations from the known, marked, accurate NIOF roof point were eliminated. All depth data points were adopted to the LLW (Low Low Water level) by elimination of time elevation above that level (Port Affair Agency). Finally, using

SURFER7 program, the bathymetric chart of the Harbor was produced and presented (Fig. 2b).

3. GENERAL DESCRIPTION OF BOTTOM TOPOGRAPHY

The present depth in Alexandria Eastern Harbor reaches about 13m in the eastern corner of El-Boughaz. The depth is shallower (less than 10m) in its western side. Same as in the old bathymetric chart (Fig. 2a), the 10m depression is still observed in the inner entry of El-Boughaz. On the other hand, the inner depth near El-Silsila opening is relatively shallower, ranging between 5 and 6m. The depth near the main bar of the Harbor is 6m, increasing inwards to reach 9m.

Moving shoreward, the depth of Alexandria Eastern Harbor decreases gradually with 6m- and 7m- contours spreading west-east continuously. Compared to the old chart, the 5m contour line came closer to the shoreline in the eastern zone of the Harbor (erosion) and went further from the coastline in its western region (deposition).

Two head-like depressions are observed near the coastline, one of which is of 6m depth in the eastern part of the Harbor, while the other is of 3m in the southern region. The latter appears in the old chart at 2m depth.

Another small head-like depression tends to appear in the western area of Alexandria Eastern Harbor, increasing in depth from 1 to 3m seawards.

Due to the continuous sand feeding process, new recreational beaches have taken place in the western zone of the Harbor. These beaches extends from 0.5 to about 20m seawards.

Generally speaking, the eastern part of Alexandria Eastern Harbor tends to have much more irregularities in its depths than its western part. The latter shows gradual depth increase from the shore seawards.

4. CONCLUSION AND RECOMMENDATIONS

Fig. (3) shows the new, descriptive and detailed bathymetric chart of Alexandria Eastern Harbor.

The Eastern Harbour of Alexandria has the ability to recover the eastern side, meanwhile, the western side (of higher human activities) still suffering from accumulation of sand (man-made; brought from outside).

El-Geziry and Maiyza (2006) stated that: "the water volume of the Eastern Harbor of Alexandria is stabilized by two alternative flows: an inward flow near bottom (washing) and an outward surface one (carrying out), through the two openings of the Harbor. This system is nearly constant all the year round." Such process occurs now only after closing or reducing the sewage discharge into the harbor.

Based on the present bathymetric and hydrographic survey (El-Geziry and Maiyza ,2006) the following recommendations are put forward:

1. to stop feeding sand from outside for recreational purposes;
2. to attain the actual width of El-Boughaz; and
3. to remove the submersed ship in front of El-Boughaz to allow free circulation in order to facilitate the self recovery of the accumulated sand (and pollution) in the western side of the harbor.

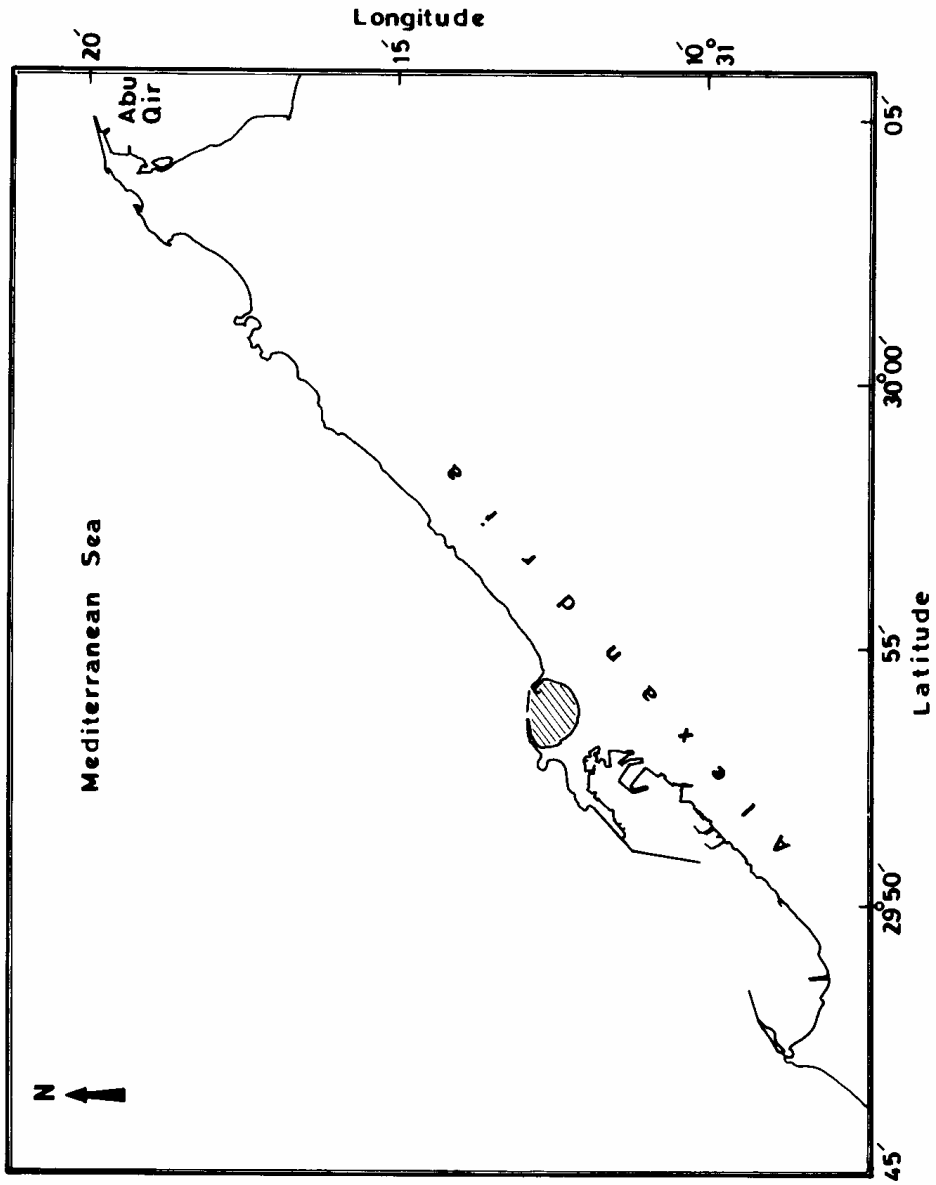


Fig.(1) Alexandria coast line and location of Alexandria Eastern Harbor

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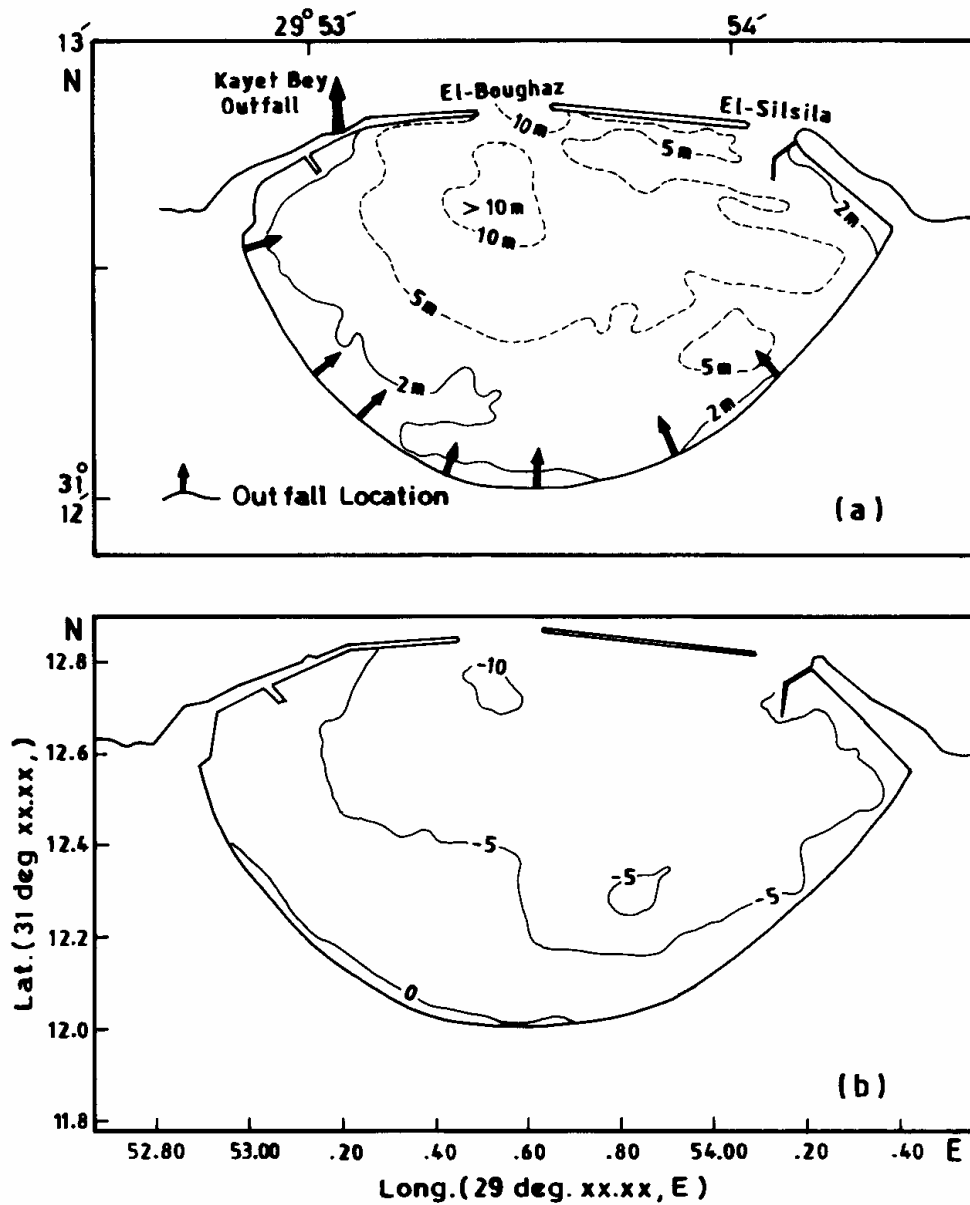


FIG. (2) ALEXANDRIA EASTERN HARBOR BATHYMETRIC CHART
(SIMPLE DRAFT: a.After Maiyza and Said, 1988; b.New draft, 2005)

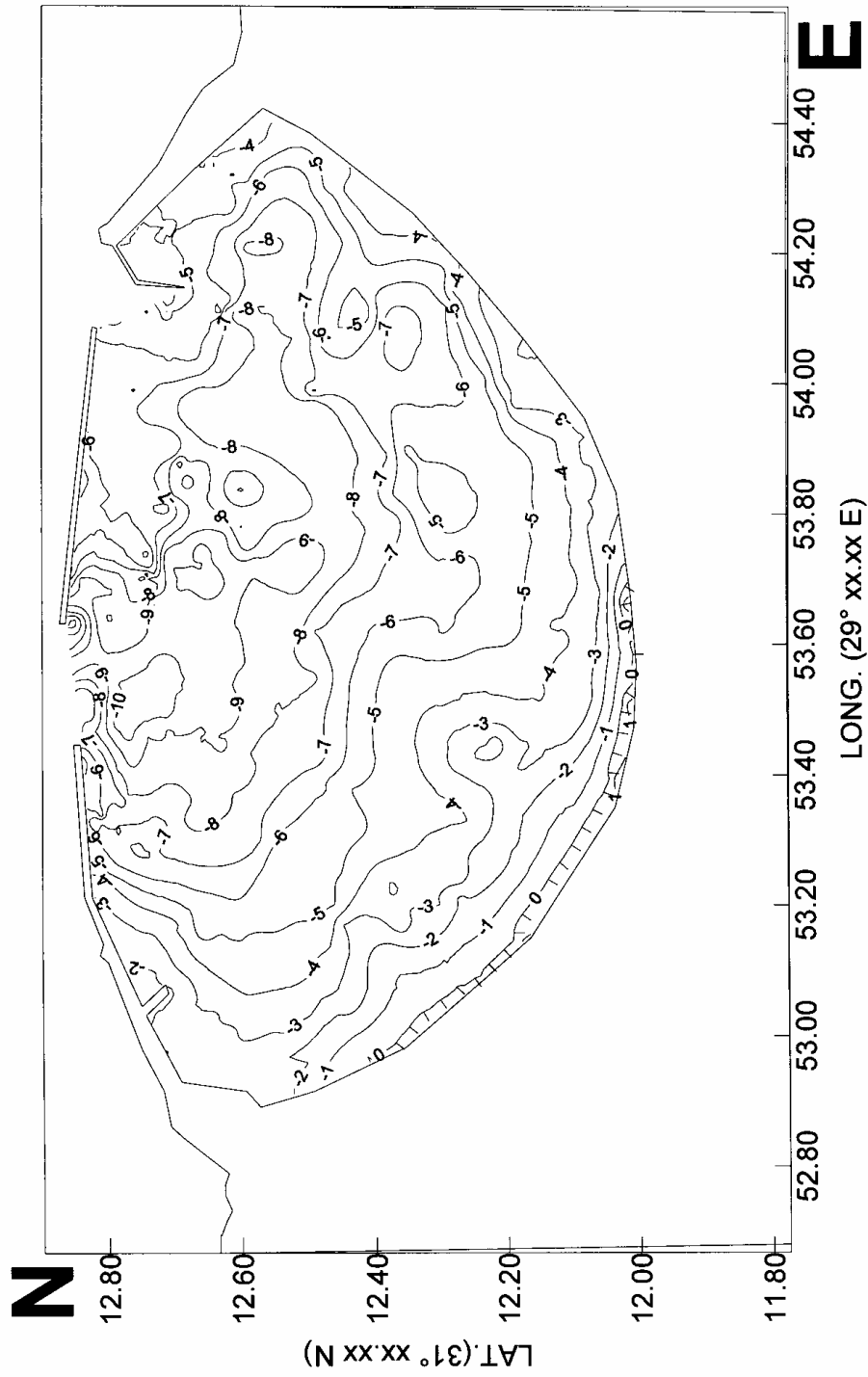


FIG.(3) NEW DETAILED BATHYMETRIC CHART OF ALEXANDRIA EASTERN HARBOR

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