Desalination and Water Treatment
www.deswater.com
doi: 10.1080/19443994.2014.979243

57 (2016) 2113–2124
January

Taylor & Francis
Taylor & Francis Group

The precipitation of fluoride, calcium and magnesium minerals from Egyptian Mediterranean Sea coast in relation to discharged waters

Ghada F. El-Said[a,*], Nayrah A. Shaltout[b], Abeer A. Moneer[a], Manal M. El-Sadaawy[a], Amal M.H. Morsy[a]

[a]*Marine Pollution Laboratory, Environmental Division, National Institute of Oceanography and Fisheries, Kayet Bay, El-Anfoushy, Alexandria, Egypt, Tel. +20 1220607816; Fax: +20 34801499; +20 34801553; +20 34801174; emails: ghadafarouk25@yahoo.com, gfarouk66@hotmail.com (G.F. El-Said), yrwah@yahoo.com (A.A. Moneer), manal_dn@yahoo.com (M.M. El-Sadaawy), amalmorsy2014@yahoo.com (A.M.H. Morsy)*

[b]*Marine Chemistry Laboratory, Environmental Division, National Institute of Oceanography and Fisheries, Kayet Bay, El-Anfoushy, Alexandria, Egypt, email: nshaltout@gmail.com*

Received 26 April 2014; Accepted 16 October 2014

ABSTRACT

The present study focuses on the effect of discharged wastes on the precipitation of some minerals (calcite, aragonite, dolomite, fluorite and sellaïte) as well as the chemical composition of seawater water columns along the eastern Egyptian Mediterranean Sea coast. This coast is subjected to different discharge waters containing agricultural, industrial, sewage and domestic wastes coming from the Nile River, the North Lakes as well as other different outlets. Variable levels of physicochemical parameters including temperature (*T*; 15.34–23.12°C), salinity (38.50–40.33‰), pH (8.05–8.31), bicarbonate (HCO_3; 63.73–147.22 mg/l), carbonate (CO_3; 10.01–23.34 mg/l), calcium (Ca; 263.68–791.05 mg/l), magnesium (Mg; 799.67–2452.32 mg/l) and fluoride (F; 0.56–4.76 mg/l) were measured. Amongst the mineral production values that were calculated by saturation index (SI), fluorite and sellaïte calculations almost showed values <1, especially in the Rosetta and Damietta sectors which are affected by the Nile River. Marine organisms were influenced by the change in the physicochemical parameters along the investigated coastal area and showed aragonite and high-Mg calcite formation. Obviously, the statistical analyses of correlation matrix, ANOVA: two-factor without replication and stepwise regression of the present data explored the effect of the discharged effluents on the minerals formation and the chemical composition of seawater along the studied area. Additionally, the results showed the possible public health hazard from marine organism's ingestion and seawater contact along the polluted areas. Accordingly, it seems advisable to reduce the pollution by discharged wastes into the Egyptian coastal ecosystems.

Keywords: Water columns; Physicochemical parameters; Molar Mg/Ca; Minerals; Saturation index; Eastern Egyptian Mediterranean Sea coast

*Corresponding author.

This article was originally published with errors. This version has been corrected. Please see Corrigendum (http://dx.doi.org/10.1080/19443994.2015.1014986).

1944-3994/1944-3986 © 2014 Balaban Desalination Publications. All rights reserved.