



جامعة القاهرة
كلية العلوم
قسم الكيمياء

تقييم بيئي لمصادر المياه الجوفية لمنطقة شمال شرق القاهرة

رسالة مقدمة من الطالبة

فاتن عطية على محمد

بكالوريوس علوم الكيمياء والفيزياء ، كلية العلوم- جامعة القاهرة. ٢٠٠٣

لإستكمال متطلبات الحصول على درجة الماجستير فى العلوم الكيميائية

قسم الكيمياء

كلية العلوم - جامعة القاهرة

٢٠٠٩



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Cairo University
Faculty of Science
Chemistry Department

Environmental Assessment of Groundwater Resources at Northeast Cairo

A Thesis

By

Faten Attia Ali Mohamed

B. Sc. (2003)

For

Partial Fulfillment of Master Degree

(Analytical Chemistry)

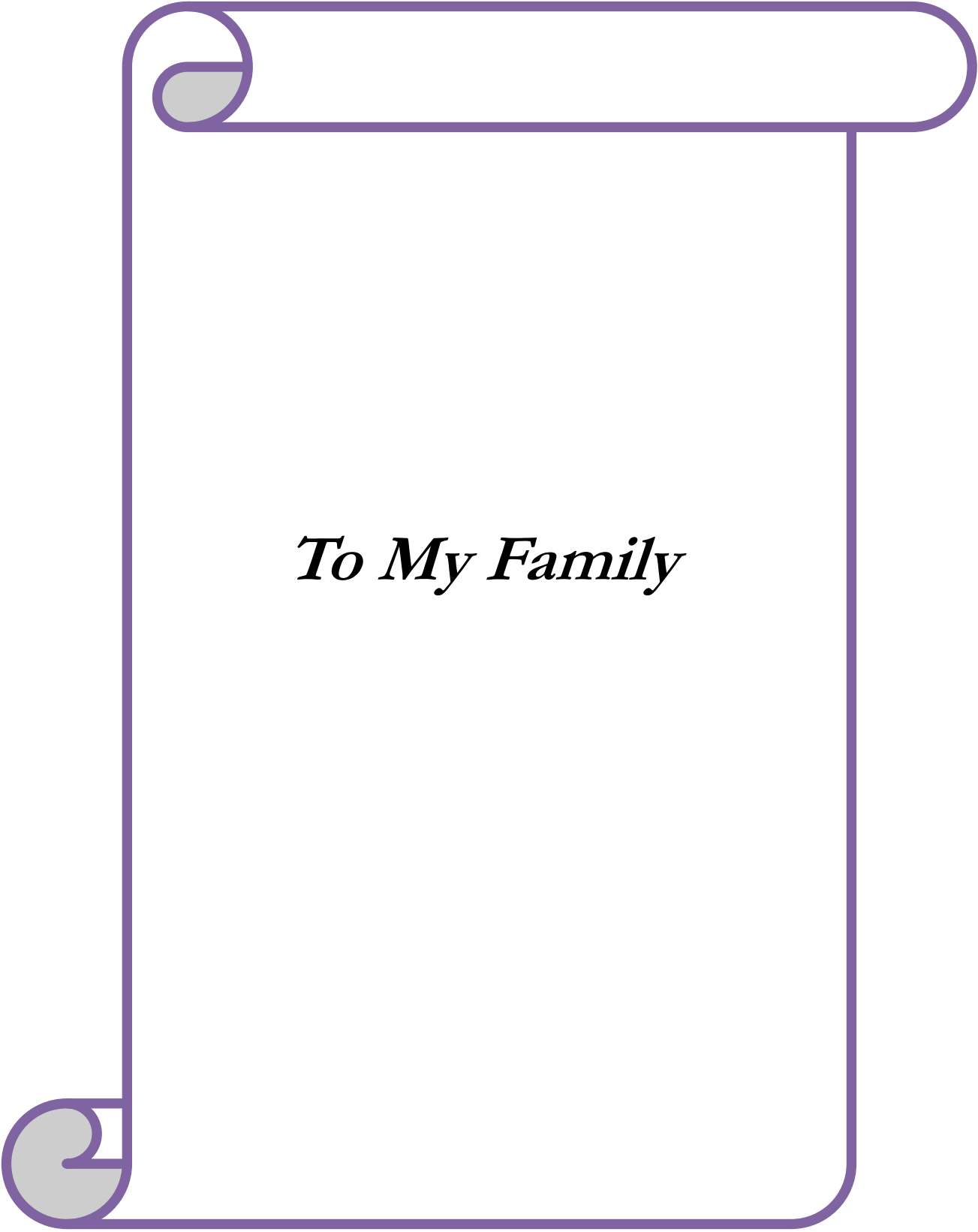
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To My Family

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ABSTRACT

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Title of Thesis:

Environmental Assessment of Groundwater Resources at Northeast Cairo

Degree: (M. Sc.), the degree of Master of Science in Analytical Chemistry,
Faculty of Science, Cairo University, 2009.

The aim of the present study is to evaluate the water quality of surface water and groundwater of the Northern east part of Cairo and to identify the sources of pollution (salinization, nutrients, and trace elements), also to simulate the hydrological system and its responses with regard to contaminant transport. The results are based on hydrochemical and isotopic analyses of sixty water samples collected from surface water and groundwater of the Quaternary and Miocene aquifers. This includes major cations (Na^+ , K^+ , Ca^{2+} and Mg^{2+}), major anions (Cl^- , SO_4^{2-} , HCO_3^-), minor ions (SiO_3^{2-} , PO_4^{3-} and NO_3^-), trace elements (Fe, Mn, Cu, Pb, Zn, Co, B and Al) and environmental isotopes, (^2H , ^{18}O , ^{13}C , ^3H , and ^{14}C).

The groundwater of the Quaternary aquifer is extremely less saline and less mineralogically developed than Miocene groundwater at the east of studied area. The variation in salt contents from one area to another depend on many factors; as the natural (evaporation, leaching, dissolution and cation exchange) and anthropogenic factors. Oxygen-18 and deuterium concentrations were used to identify the sources of recharge and renewability, as factors affecting the mineralization of the water resources in the studied area. The Quaternary aquifer is predominately affected by the continual recharge from present day Nile water while the Miocene aquifer is predominately affected by paleowater of pluvial times meteoric cycle, a zone of mixing occurs at some localities which are delineated in this work.

The results of analyses of trace elements in some of the collected samples show that only Fe and Pb in few samples of the Quaternary and Miocene aquifers are slightly exceed the recommended limits, also Mn in few samples of the Quaternary aquifer. On the other hand, nitrate gets high values in most of the groundwater samples which represents high hazard. The suitability of the investigated groundwater for drinking, domestic, agriculture and industrial purposes was evaluated by comparing the results of analyses with the limits of international standards.

Supervisors: **Prof. Dr. Motaza M. Khater**

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Statement

This thesis is submitted in partial fulfillment of the requirements of M.Sc. Degree.

In addition to the work carried out in this thesis, the candidate has accomplished with success the post graduate studies during the academic year 2005-2006 in the following topics:

1. Techniques of Molecular Structure.
2. Advanced Analytical Chemistry.
3. Quantum Chemistry.
4. Group Theory.
5. Surface Chemistry
6. Electrokinetic Phenomena.
7. Polymer Chemistry.
8. ElectroChemistry of Molten Salts and Metallurgy.
9. Nuclear Chemistry.
10. Chemistry of the Solar Cell.
11. Statistical Thermodynamics.
12. Advanced Inorganic Chemistry.
13. Polarography and Voltammetry.
14. Thermal analysis and X-ray.
15. Inorganic Reaction Mechanism.
16. Modern Electrochemistry.
17. Chelatimetry.
18. Catalysis.
19. Thermodynamics.
20. German Language.

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