INTRODUCTION

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General outline:

Nowadays, great attention is paid by the Egyptian authorities for the establishment of new settlements and land reclamation projects to overcome the over population problem. For these purposes, favorable effort has been given in several integrated fields of study. As Egypt is essentially a desert land (about 97%), great consideration is given for its reclamation and use. In the last two decades, studies have been conducted in the field of geology, geophysics, hydrology, and hydrogeochemistry for selected Egyptian desert areas by several governmental organizations and private sectors. These have been done to secure proper evaluation of new settlements. Examples of these new settlements around Cairo are Tenth of Ramadan and El-Salhia areas to the east of the Nile Delta.

The continuous development of human society as well as the side effects of land reclamation projects left negative impacts on soil and water resources. Such negative impacts are pronounced in water pollution and soil salinization as well. Moreover, the enormous groundwater withdrawal lead to a continuous groundwater depletion. Soil salinization is mainly attributed to the groundwater quality, irrigation systems, types of fertilizers used and the badness of drainage system too.

The area selected for the present investigation (Fig. 1) comprises part of the desert area to the east of the Nile Delta. This area lies to the north of El-Mokattam-Ataqa plateau and the south of El-Ismailia canal. It is bounded by El Gebel El Asfer and Abu Zaabal to the west and extended to km 70 along Cairo-Ismailia desert road. It is bounded by latitudes $30^{\circ}\ 5'$ & $30^{\circ}\ 25'$ and longitudes $31^{\circ}\ 20'$ & $31^{\circ}\ 55'$.

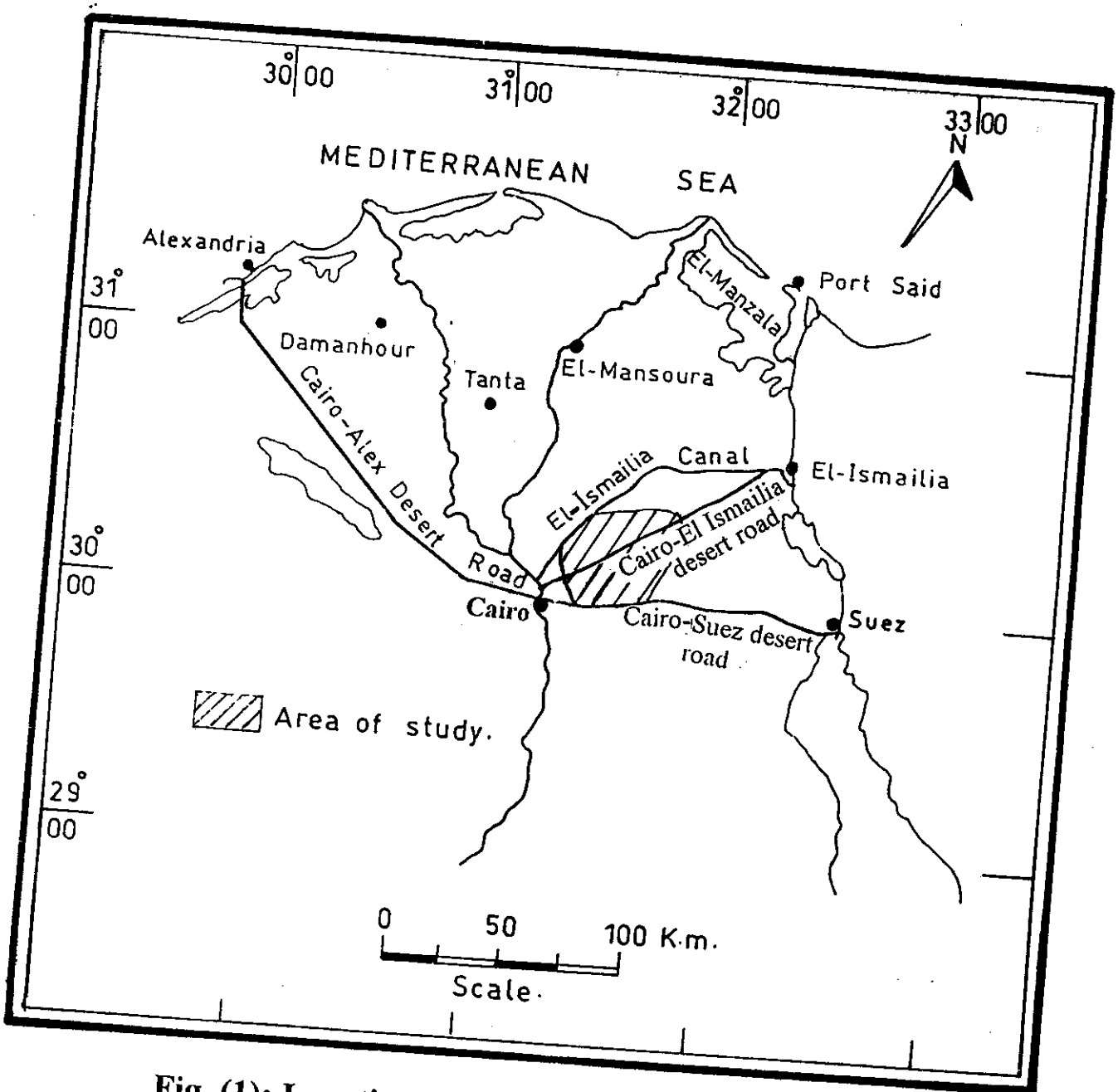

Fig. (1): Location map of the investigated area.

Previous work:

On the regional level much works have been carried out in the field of geology, hydrology and hydrogeochemistry in the area under investigation. Among these works the following are the most important, El-Fayoumy (1968)[1], El-Shazly et al. (1975)[2], RIGW (1980[3] and 1983[4]), Sallouma (1983)[5], Diab et al. (1984)[6], Ezz El-Deen (1993)[7], Gad (1995)[8], Shendi (1995)[9], El-Haddad (1996)[10], El-Shamy and Mohammed (1999)[11].

Few informations about hydrochemistry and isotopes in the study area are encountered in the works of Sallouma (1995)[12], Sallouma and Gomaa (1997)[13], Taha et al. (1997)[14] and Guindy et al. (1997)[15].

Scope of the present work:

The present thesis primarily introduce a comparison between groundwater conditions in the Miocene aquifers in some localities east of the Nile Delta (Cairo-Suez desert road, Heliopolis basin and Inshas area) from the hydrochemical and isotopic points of view. The study delineates the different aspects that are related to:

- Types of sediments in each locality.
- Groundwater quality to assess the hydrogeochemical processes affecting water quality (dissolution, ion exchange, --- etc).
- Estimation of the age, recharging sources as well as groundwater flow directions through the determination of the stable and radioactive isotopes (Oxygen-18, Deuterium, Tritium and Carbon-14) of sampled water.
- Also, the study includes evaluation of water for using in different purposes as drinking, agriculture and industry. To achieve the aim of this work, the author performed both field and laboratorial activities during the period from 1998 to 2001.

Field, laboratory and office works:

- Making an inventory of almost all water points in the area under consideration, (collection of fifty three sample representing Miocene aquifer, sixteen samples from Pleistocene aquifer, five representing mixed water and four samples representing El Ismailia canal at the front of the study area).
- Recording some chemical characters in field, such as hydrogen ion concentration (pH) and electrical conductivity (EC).
- Carrying out the chemical analysis for all the collected water samples (seventy eight) using modern technical instruments to determine the concentration of major constituents as Ca^{++}, Mg^{++}, Na^{+}, K^{+}, CO_3^{--} ,HCO_3^{-}, SO_4^{--}, Cl^{-} and SiO_2, as well as the estimation of minor constituents such as B^{+++}, PO_4^{---}, Fe^{++} and NO_3^{-} in the laboratory of Hydrogeochemistry Department, Desert Research Center.
- Determination of the stable isotopes (including Oxygen-18 and deuterium) as well as radioactive ones (including Tritium and Carbon-14) in the laboratory of National Center for Nuclear safety.
- Preparation all graphical representations of the analytical results and maps through using some computer programs.
- Interpretation the hydrochemical data with suggesting the proper recommendations.