PETROLEUM SYSTEMS OF EGYPT

REGIONAL PETROLEUM GEOCHEMISTRY OF CRUDE OILS FROM THE GULF OF SUEZ, THE WESTERN DESERT AND THE NILE DELTA

GEOMARK
RESEARCH, INC.

A PROSPECTUS

EXECUTIVE SUMMARY

GeoMark Research, Inc. has completed a regional crude oil study of the Mediterranean. This study consists of the detailed geochemical analysis of 300 oil samples located throughout southern Europe and North Africa. The study is being offered on a non-exclusive basis to participating companies. Due to the large size of the Mediterranean Study we have elected to offered the Egyptian portion of the study as a separate report. We ask that you review the following proposal and consider participation in all or part of the study.

Each of the oils have been characterized by a detailed analytical program which includes quantitative biomarker analysis of terpanes and steranes and determination of stable carbon isotope composition of both saturate and aromatic hydrocarbon fractions. This information, integrated with the source rock data, should allow us to accomplish the following:

- Determine the number of genetically distinct oil families in each producing region.
- Map the stratigraphic and geographic distribution of the oil families and distinguish areas with single oil families (single sources) from those with multiple oil families (multiple sources).
- Utilize geochemical characteristics of the oil families to deduce their source facies, thermal maturity level, and degree of preservation.
- Determine the most likely source unit(s) in each area by comparing the distribution of oil families and their inferred source facies with regional stratigraphy, burial history, and source rock data.
- Estimate migrational directions by comparing oil family distributions with the location of known oil kitchens.
- Utilize the geographic, stratigraphic, and structural distribution of oils to identify, map, and rank the petroleum systems in each basin and in the region as a whole.

The cost of the Egypt portion of the study is US $18,500. The cost of the entire Mediterranean Study is $ 52,000. The reports are complete and available for immediate delivery.

INTRODUCTION

The purpose of the study was to geochemically evaluate crude oil samples from Egypt in order to predict source rock depositional environments, related oil families, thermal histories, and probable subsurface migrational directions. The field locations of the sixty-three (63) crude oil samples included in this study are shown in Figure 1. A detailed sample list is presented in Appendix A.

The samples analyzed for this study represent the end products of hydrocarbon generation, migration, and entrapment which has occurred within this which is one of the most prolific hydrocarbon-bearing regions in North Africa. A further understanding of the region, specifically the multiple petroleum systems operating in the area, is essential to future successful exploration efforts.

METHODOLOGY AND EXPLORATION APPLICATIONS

Crude oils from the entire region were geochemically evaluated in order to 1) determine the number and members of genetically related families: 2) predict the depositional environment and/or other characteristics of the corresponding source rock units, and 3) determine the thermal history of oils within each family. All the oils were analyzed with respect to bulk (e.g., API Gravity, % Sulfur, metal content), molecular (e.g., n-paraffin, sterane, and terpane biomarkers) and stable carbon isotopic parameters. The results were assessed using multivariate techniques including cluster and principal component analyses.

The results of this study have enabled us to develop an understanding of the source history of this portion of North Africa. This new understanding will enhance future exploration efforts in the region, and we feel confident, become the basis for the future development of the region.

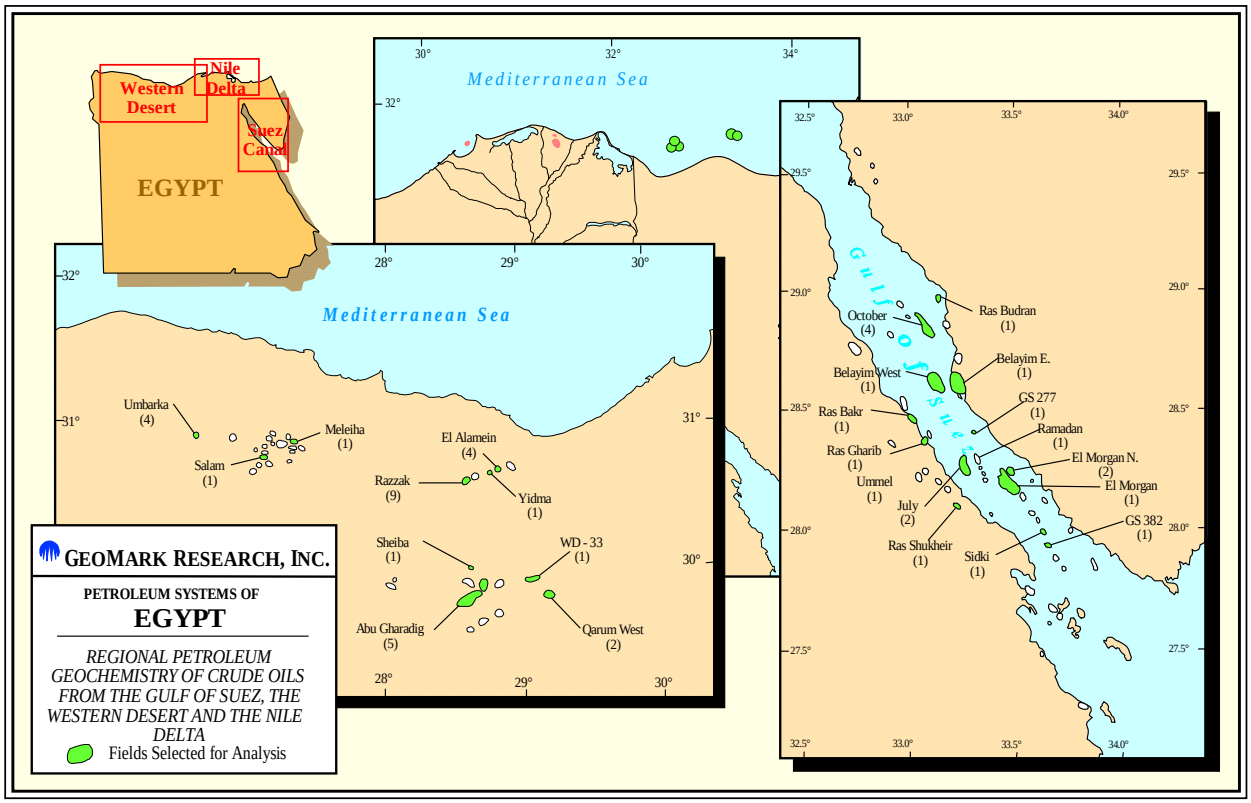

Figure 1. Location of samples in the Gulf of Suez, Western Desert and Nile Delta Regions.

ANALYTICAL PROGRAM

The following techniques were employed on each of the oil samples:

- API Gravity
- % Sulfur
- C15+ vs. <C15+
- Deasphalting
- Liquid Chromatography (%Sat %Aro %NSO)
- Capillary GC of Whole Crudes
- Stable Carbon Isotopes for both Sat and Aro Hydrocarbon Fractions
- GC/MS of Saturates for Terpane/Sterane Distributions (quantitative)

PRESENTATION OF RESULTS

Results of the study are presented in both analytical and interpretive formats to insure that all findings are readily accessible to explorationists and research personnel. All of the analytical data are provided in hard copy and on personal computer disks. Raw data results of the whole oil chromatographic and gas chromatographic/mass spectrographic results are available on mini-tape cassettes.

Analytical data are presented within **Section Data Volumes,** and include the following:

- physical property data
- liquid chromatographic data
- gas chromatographic results
- stable carbon isotope data
- GC/MS mass chromatograms

A synthesis and interpretation of all information is presented in a comprehensive **Final Report**. For each of the areas studied, the **Final Report** includes sections for:

- regional geology
- differentiation of oil families by multivariate statistics
- inferred oil/source correlations
- oil generation and migration,
- interpretation of oil characteristics
- overall exploration potential

PARTICIPATION

The cost of the study is US $18,500. The reports are completed and available for immediate delivery.

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APPENDIX A
Samples Analyzed for this Study

Basin	Well	Basin	Well
Gulf of Suez	Ras Bakr-24	Western Desert	Umbaraka-8X
Gulf of Suez	Umm el Yusr-25	Western Desert	Yidma-5
Gulf of Suez	E. Belayim-33	Western Desert	Alamein
Gulf of Suez	W. Belayim-4	Western Desert	Umbaraka-3X
Gulf of Suez	Gharib-97	Western Desert	Umbaraka-7X
Gulf of Suez	July-16	Western Desert	Alamein-1X
Gulf of Suez	Ramadan 6-13	Western Desert	Umbaraka
Gulf of Suez	El Morgan-64	Western Desert	Razzak
Gulf of Suez	Shuheir Bay-1	Western Desert	El Alamein
Gulf of Suez	GS-382-1B	Western Desert	Salam-3X
Gulf of Suez	Ras Budran	Western Desert	33-4
Gulf of Suez	Amal-6	Western Desert	Abu Gharadig-1
Gulf of Suez	GS277-1	Western Desert	Abu Gharadig-3
Gulf of Suez	July-1	Western Desert	Abu Gharadig-3
Gulf of Suez	El Morgan-1	Western Desert	Razzak-1
Gulf of Suez	El Morgan-1	Western Desert	Razzak-1
Gulf of Suez	Ramadan-1	Western Desert	Razzak-1
Gulf of Suez	Sidki-1	Western Desert	Razzak-1
Gulf of Suez	October A1	Western Desert	Razzak-1
Gulf of Suez	October A1	Western Desert	Razzak-15
Gulf of Suez	October F1	Western Desert	Razzak-13
Gulf of Suez	October J-4B	Western Desert	Razzak-13
Gulf of Suez	July-5	Western Desert	19-2
Gulf of Suez	GM-404 Hilal A2	Western Desert	9-13-1
Gulf of Suez	GS-315 (Badri) C1	Western Desert	Sheiba 18-1
Nile Delta	Tineh-1	Western Desert	Qarum West 34/15 W1
Nile Delta	Tineh-1	Western Desert	Qarum West 34/15 W1
Nile Delta	Mango-1	Western Desert	33-1
Nile Delta	Mango-1	Western Desert	Abu Gharadig-5
Nile Delta	Mango-1	Western Desert	Abu Gharadig-12
Nile Delta	Mango-1	Western Desert	Meleiha-10X
Western Desert	Alamein-7		