YARMOUK UNIVERSITY

DEPARTMENT OF EARTH AND ENVIRONMENTAL SCIENCES

A Textural and Geochemical Study on The Reefal Sediments of The Gulf of Aqaba; and The Input of Airborne Dust to The Area

By

Firas Wajih Ibraheem Alfukaha

B. Sc. in Geology, Yarmouk University, 1991

Thesis Submitted in partial Fulfillment of the requirements for the degree of Master of Science, Faculty of Science-Yarmouk University

THESIS DEFENCE COMMITTEE

Dr. Nejem Aldeen Yusuf .................................. Advisor ..................................

Prof. Dr. Ali Jawad Ali .................................. Co. Advisor ..................................

Dr. Khaled Banat ......................................... Member ..................................

Dr. Hakam Mustafa ......................................... Member ..................................

August , 1994
Abstract

A Textural and Geochemical Study on The Reefal Sediments of The Gulf of Aqaba; and The Input of Airborne Dust to The Area

By
Firas Wajeh Alfukaha

Supervision
Dr. N. Yusuf
Prof. Dr. Ali Jawad Ali

Reefal sediments are abundant along the Gulf of Aqaba; a total of thirty one samples were collected from such sediments along three transects perpendicular to the Jordanian coast. These samples were subjected to textural and geochemical studies.

The role played by the prevailing wind systems in providing the area with airborne dust materials was also studied. Samples of eolian dusts were collected and subjected to grain size analysis. The mineralogical composition of the dust materials was studied by X-ray diffraction. The study included an estimation of the deposition rate of airborne dust in the area.
The texture of the reefal sediments was found to be useful to differentiate between the backreef zone, the reef flat zone, and the forereef zone. The sediments of the backreef zone are mostly medium to coarse sands, poorly to moderately sorted, and coarse to very coarse skewed. The reef flat sediments are coarse to very coarse sands, poorly to moderately sorted, and range from being symmetrical to very fine skewed. On the other hand, the forereef sediments are medium to coarse sands, mostly poorly sorted, and symmetrical to coarse skewed. The mean concentrations of the different chemical constituents were as follows: CaCO₃, 67.51%; Al, 7798 ppm; Fe, 4361 ppm; Sr, 2322 ppm; Zn, 18.31 ppm; Pb, 48.76 ppm; Cu, 8.2 ppm; and Cd, 3.35 ppm. The mean organic carbon content was 0.219%.

The mean grain sizes of the studied dust materials are within the silt grade. Airborne dust materials generally become finer southward. These materials are composed mainly of quartz, feldspars, calcite, dolomite, and apatites. The calcium carbonate content of these materials increases southward. The deposition rate of airborne dust on the area was estimated to be not less than 0.1 gm / m² / day.