

RECONNAISSANCE GEOLOGY OF THE WADI AMQ QUADRANGLE,  
SHEET 18/41 C,  
KINGDOM OF SAUDI ARABIA

by

Donald G. Hadley  
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The work on which this report was based was performed in accordance with a cooperative agreement between the U.S. Geological Survey and the Saudi Arabian Ministry of Petroleum and Mineral Resources.

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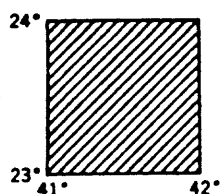
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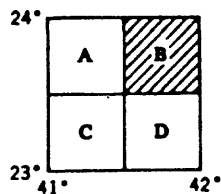
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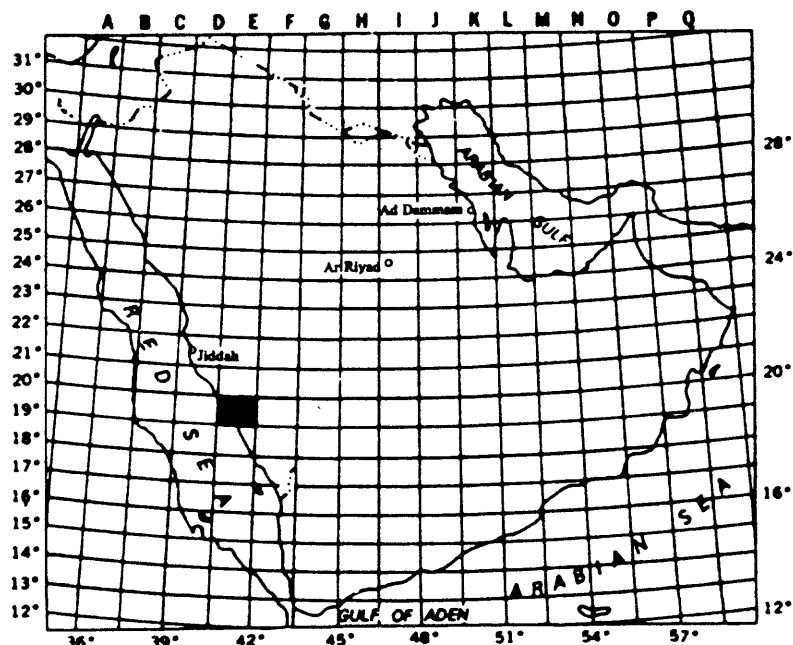
The quadrangle identification method used in U.S. Geological Survey Saudi Arabian Mission reports is shown below.



**23/41**  
**1-degree**  
**quadrangle**



**23/41 B**  
**30-minute**  
**quadrangle**



**19E**  
**1x1 1/2-degree**  
**quadrangle**

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ABSTRACT

The Wadi Amq quadrangle (sheet 18/41 C) lies between lat 18°00' and 18°30' N. and long 41°00' and 41°30' E. and encompasses an area of 2,937 km<sup>2</sup>, of which only about 150 km<sup>2</sup> is land; the remainder is covered by the Red Sea. The only geologic formations exposed in the quadrangle are Quaternary volcanic rocks and surficial deposits. Most of the volcanic rocks are basalt that was extruded during a continuation of the opening of the Red Sea rift. The Quaternary surficial deposits include those of shallow bank and coral reefs, carbonate sand, sabkhahs, pediment and plains, and alluvial sand and gravel. The coral reefs could possibly provide raw material for a cement industry if required, and the sabkhahs might yield useful salts; otherwise the quadrangle has no economic mineral potential.

INTRODUCTION

The Wadi Amq quadrangle (sheet 18/41 C) lies between lat 18°00' and 18°30' N. and long 41°00' and 41°30' E. (fig. 1). It encompasses an area of 2,937 km<sup>2</sup>, of which only about 150 km<sup>2</sup> is land; the remainder is covered by the Red Sea. The quadrangle is located about 380 km southeast of Jiddah and 220 km northwest of Jizan. The coastal road from Jizan to Al Qunfudhah passes through the town of Amq, near the mouth of the wadi of the same name.

The area is shown on the 1:500,000-scale map of the Tihamat ash Sham quadrangle by Brown and Jackson (1958), and the area and its surroundings are also shown on the 1:2,000,000-scale map of the Arabian Peninsula (U.S. Geological Survey-Arabian American Oil Company, 1963). Work on the following nearby quadrangles was started in 1970: Wadi Yiba, 19/41 D (Bayley, 1972); Jabal Sawdah, 18/42 C (Ratte and Andreasen, 1974); Al Qunfudhah, 19/41 C (Hadley, 1975a); Wadi Hali, 18/41 B (Hadley, 1975b); and Jabal 'Aya, 18/42 A (Prinz, 1975).

Fieldwork was done by the author in the Wadi Amq, Wadi Dhahaban (1982a), Jabal Hashahish (1982b), and Manjamah (1982c) quadrangles between mid-December 1973 and late March

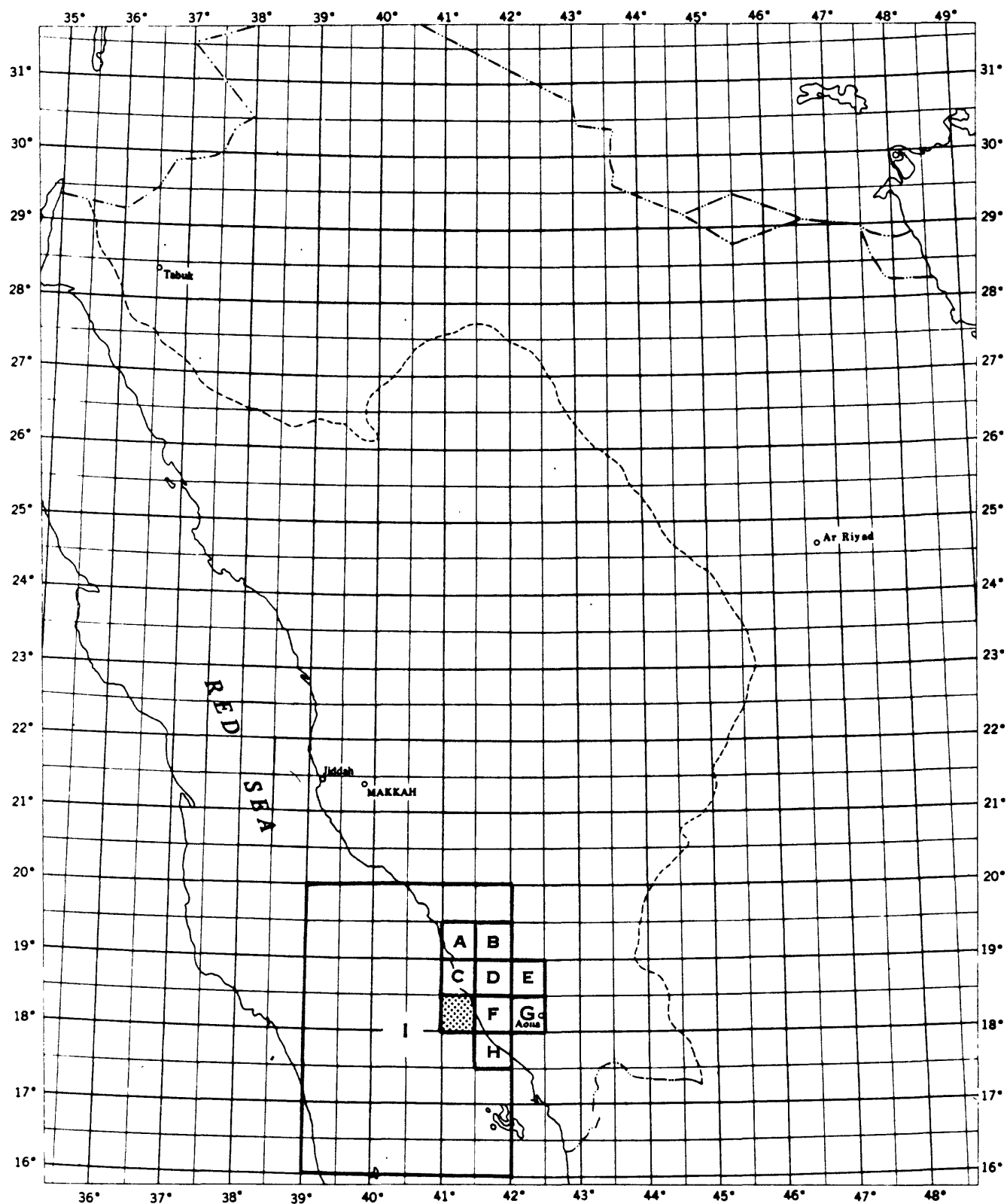


Figure 1.— Index map of western Saudi Arabia showing the location of the Wadi Amq quadrangle (shaded) and other quadrangles cited in this report: A, Al Qunfudhah (Hadley, 1975a); B, Wadi Yiba (Bayley, 1972); C, Manjamah (Hadley, 1981c); D, Wadi Hali (Hadley, 1975b); E, Jabal Aya (Prinz, 1975); F, Dhahaban (Hadley, 1981a); G, Jabal Sawdah (Ratte and Andreasen, 1974); H, Jabal Hashahish (Hadley, 1981b); I, Tihamat ash Sham (Brown and Jackson, 1958).

1974. He was assisted in the field and office by Ghanim Jeri Alharbi, Yacob Essa Takrony, Murshid Abdo Ahmad, and Saud Muslih Ashyabani. Logistic, drafting, and laboratory support were provided by the Directorate General of Mineral Resources.

All the work on the Wadi Amq quadrangle was done under an agreement between the Saudi Arabian Ministry of Petroleum and Mineral Resources and the U.S. Geological Survey.

## QUATERNARY ROCKS AND DEPOSITS

### Volcanic rocks

Basalt covers most of the small area of land in the Wadi Amq quadrangle; outcrops include one small cinder cone and part of another. Extrusion of the basalt resulted from continuation of the opening of the Red Sea rift after intrusion of Miocene gabbro dikes in quadrangles to the east.

The surfaces of the basalt outcrops are composed of angular blocks of lava as much as 40 cm in diameter. The flow rocks beneath the surfaces are vesicular columnar basalt. The basalt is unaltered and includes, in order of decreasing abundance, twinned labradorite laths, clinopyroxene, olivine, magnetite, iddingsite, and apatite; some of its very abundant vesicles are partly filled with white calcite.

### Surficial deposits

#### Shallow bank and coral reef deposits

Shallow banks and coral reefs are present along most of the coastline in the Wadi Amq quadrangle. The banks consist mainly of terrigenous mud, with some admixture of calcareous mud. The reefs consist of many kinds of coral, gastropods, brachiopods, and pelecypods, and are still being built by the living organisms on cemented accumulations of the skeletons and shells of former generations.

#### Carbonate sand deposits

Deposits of fine- to coarse-grained carbonate sand composed of broken shells, coral fragments, and subordinate amounts of eolian silt form islands within the areas of shallow banks and coral along the coast.

### Pediment and plains deposits

Pediment and derived deposits are present on the seaward side of the edge of the basalt outcrops. They consist of boulder- to cobble-sized material on the steep flanks of the basalt outcrops and of finer-grained material in flat areas below the steep slopes.

### Alluvial sand and gravel deposits

Sand and gravel deposits form the floors of the wadis in the quadrangle and consist of tan to brown, subangular to well-rounded, unstratified to well-stratified material that is commonly crossbedded and fills channels.

### Wadi flood-plain deposits

Extensive flood-plain deposits have formed along the wadis and are composed of tan silt with subordinate amounts of fine-grained sand and clay. New material is deposited during periods of intermittent flooding in the low-energy environments of high ground within the wadis and marginal to the main channels.

### Sabkhah deposits

The sabkhah deposits are present between the basalt outcrops and the sea in the southern part of the land area in the quadrangle, and between pediment and plains deposits and the sea in the northern part of the mapped area. They are flats composed of brown and white saline silt with partly indurated crusts 1 to 3 cm thick.

### ECONOMIC GEOLOGY

The coral reefs could possibly provide raw material for use in a cement industry, if any such industry were ever required in this region. The sabkhahs might yield useful salts; otherwise the quadrangle has no economic mineral potential.

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