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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



*Reports - Open
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PRELIMINARY PROJECT REPORT
Oman Investigations
(IR)OM-2

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INTERPRETATION OF LANDSAT IMAGES, OMAN





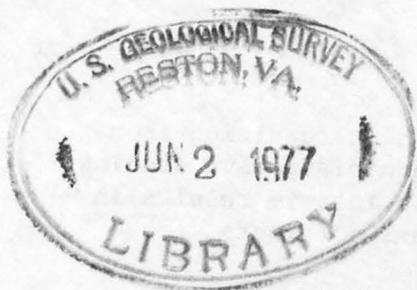
INTERPRETATION OF LANDSAT IMAGES, OMAN

By

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Maurice J. Grolier, 1918-
U. S. Geological Survey

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The project report series presents information resulting from various kinds of scientific, technical, or administrative studies. Reports may be preliminary in scope, provide interim results in advance of publication, or may be final documents.



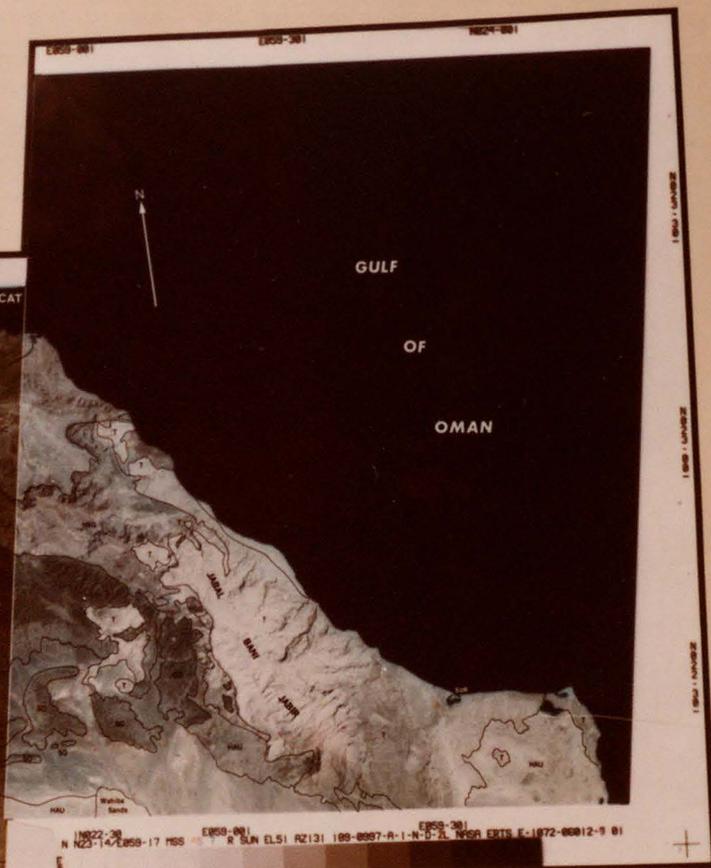
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OMAN

MAJOR IDENTIFIABLE FEATURES

- ASSYMETRIC ANTICLINE
- FOOTHILLS
- ROADS
- NATURAL VEGETATION
- COASTAL PLAIN
- NATURAL PASSAGEWAY
- PIEDMONT
- CITY OF MUSCAT



- | | |
|---------------------------|--|
| Cretaceous-Tertiary rocks | T=MAASTRICHTIAN TO OLIGO-MIOCENE AGE ROCKS |
| Ophiolite | SO=SEMAIL OPHIOLITES |
| Allochthonous | EX=OMAN EXOTICS; BLOCKS OF SHALLOW-WATER LIMESTONE |
| | HAU=HAWASINA ALLOCHTHONOUS UNIT |
| | HSG=HAJAR SUPER GROUP |
| Autochthonous | C to pC=CAMBRIAN TO PRECAMBRIAN ROCKS |

INTERPRETATION OF LANDSAT IMAGES, OMAN



INTERPRETATION OF LANDSAT IMAGES, OMAN

By Maurice J. Grolier, U. S. Geological Survey

Landsat images 1072-06012 and 1091-06074, 22 Oct. 1972

The part of northern Oman shown on this mosaic of two Landsat images extends from Ras al Hadd in the east to the village of Wudam Alwa on the coast of the Gulf of Oman. The mosaic consists of two Landsat images printed in false color on Cibachrome material.

The three major physiographic provinces of northern Oman are readily distinguished on the mosaic, through their peculiar tonal and textural characteristics: The coastal plain, known as the Batinah Coast, along the Gulf of Oman west-northwest of Muscat; the Oman Mountains; and the foothills in the southwestern part of the interior.

The Batinah Coast and the foothills of the interior stand out from the Oman Mountains, thanks to the light-toned channels of ephemeral streams (wadis), which extend across piedmont surfaces away from the base of the mountains. The tonal contrast between the various piedmont surfaces is related to the color of the rocks in the mountains, from which the alluvium deposited on the piedmont is derived.

The natural barrier between the coast and the interior is enhanced on the mosaic by the dominantly dark tone of the Oman Mountains. Variations in tone and texture allow recognition of some massifs, and identification of some of the major rock types exposed in the Oman Mountains. The darkest massifs consist of mafic and ultramafic rocks, collectively known as the Semail Ophiolite (labeled So on the mosaic). The Semail Ophiolite is one of the largest remnants of ancient oceanic crust exposed on land in the world. Its modes of formation and emplacement, therefore, are of considerable scientific interest. These, and factors

relating to ore deposition, are now under investigation by various geologic groups working on Oman.

West of the Semail Gap, the largest natural passageway across the Oman Mountains (in the western half of the mosaic), lies Jabal Akhdar, which is made up of rocks intermediate in tone between those of the Semail Ophiolite and the carbonate rocks exposed west of Ras al Hadd and on Jabal Bani Jabir. Some of the oldest rocks in Oman (belonging to the autochthonous unit of previous geologists) are exposed in the strongly eroded core of Jabal Akhdar. Some of the rocks exposed on the outer slopes of Jabal Akhdar are also exposed in the region of Saih Hatat, southwest of Muscat, and from smaller massifs that rise above the piedmont in the southwestern part of the mosaic. The extremely dissected and broken up massifs, which appear pistachio green south of the Oman Mountains, are made up of limestone and chert, considered a part of the Hawasina allochthonous unit in previous geologic work (labeled Hau on the mosaic).

In the extreme southwestern corner of the mosaic, light-toned layered rocks rising above the surface of the piedmont alluvium outline the Natih anticline, the site of one of Oman's oil fields. The asymmetry of the anticline, and the contrast between gently dipping beds on the south flank and steeply dipping beds on the north flank are plainly visible.

Growing vegetation appears in red color on the mosaic. Among the most conspicuous identifiable cultural features are some of the roads on the Batinah coast, and those leading toward the Natih anticline and through the Semail Gap.

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