Supplement to
Arabian Sea Project of 4980
Composites of Infrared Images
ONRWest Report 81-5SUP
Best Available Copy
A technique was developed for determining the mesoscale features of the Arabian Sea, and reported on in ONRWEST Report 81-3. A method for assembling composites of images in mosaic form is presented. Enhanced images are presented with surface interpretations for the spring and fall transition periods related to the Northeast and Southwest Monsoons, respectively.

This supplement to ONRWEST Report 81-5 provides larger images for Figures 36 through 45.
SUPPLEMENT TO
ARABIAN SEA PROJECT OF 1980--COMPOSITES
OF
INFRARED IMAGES

This report was prepared by
Mr. Ben J. Cagle, ONRWEST
and
Mr. Robert Whritner, Scripps Institution of Oceanography.

Office of Naval Research
Western Regional Office
1030 East Green Street
Pasadena, CA 91106

December 1981

APPROVED:

LEWIS LARMORE
Scientific Director
EXPLANATION

It became apparent, by feedback from the distribution of ONRWEST Report 81-5, that the composites of infrared images of the Arabian Sea should be reproduced in a larger size. The larger size permits some improvement in spatial details. Also, an effort has been made to improve the contrast in grey shades representing the ocean features, which were the subject of the original report. Figures 1 and 36 through 45 of ONRWEST Report 81-5 are reproduced herein.

The reader is referred to ONRWEST Report 81-5 for explanations of the data contained herein.
The Arabian Sea is bounded on the west by the Arabian Peninsula, on the north by the coasts of Iran and Pakistan, and on the east by the coast of India. Bathymetry is provided down to 3000 meters to illustrate the rapid fall-off of the shelf in some areas. The Oman Basin is partially closed by the Murray Ridge with an opening to the Arabian Sea near the Arabian Coast.
ARABIAN SEA
MAR 28, 1980
SURFACE INTERPRETATION
Figure 36. Arabian Sea Mosaic with Interpretation, 28 March 1980.

The composite of enhanced images shown in Figure 26 is shown here with a composite of surface interpretations for each image. Relative flow is indicated by arrows, and strong and weak fronts are indicated by solid and dashed lines respectively. Shear flow is indicated by a series of "X's". Slicking from daytime heating appears, while there has been little surface mixing.
SATELLITE VIEW
Figure 37. Arabian Sea Mosaic with Interpretation, 15 April 1980.

The composite of enhanced images shown in Figure 27 is shown here with a composite of surface interpretations for each image. Relative flow is indicated by arrows, and strong and weak fronts are indicated by solid and dashed lines respectively. (A poor alignment of lines indicating fronts occurred in the printing process.)
SATELLITE VIEW
SURFACE INTERPRETATION

ENHANCED MOSAIC
Figure 38. Arabian Sea Mosaic with Interpretation, 21 May 1980.

The composite of enhanced images shown in Figure 28 is shown here with a composite of surface interpretations for each image. Relative flow is indicated by arrows, and strong and weak fronts are indicated by solid and dashed lines respectively. Shear flow is indicated by a row of "x's". Upwelling regions are designated.
ARABIAN SEA
MAY 30, 1980

SURFACE INTERPRETATION
Figure 39. Arabian Sea Mosaic with Interpretation, 30 May 1980.

The composite of enhanced images shown in Figure 29 is shown here with a composite of surface interpretations for each image. Relative flow is indicated by arrows, and strong and weak fronts are indicated by solid and dashed lines respectively. Shear flow is indicated by a row of "x's". Upwelling is designated. (A poor alignment of lines indicating fronts occurred in the printing process.)
OIL REFINERY FIRES AFTER BOMBING

POSSIBLE OIL SLICK

STG WK Significant Fronts

Relative Surface Flow

VERY WEAK TEMPERATURE CONTRAST

GENTLE SOUTHWARD DRIFT OF SFC WATERS

Significant Fronts

Relative Surface Flow

FRONTS THROUGHOUT PERSIAN GULF

SATELLITE VIEW
ARABIAN SEA

SEP 28, 1980

SURFACE INTERPRETATION
The composite of enhanced images shown in Figure 30 is shown here with a composite of surface interpretations for each image. Relative flow is indicated by arrows, and strong and weak fronts are indicated by solid and dashed lines respectively.
Figure 41. Arabian Sea Mosaic with Interpretation, 30 September 1980.

The composite of enhanced images shown in Figure 31 is shown here with a composite of surface interpretations for each image. Relative flow is indicated by arrows, and strong and weak fronts are indicated by solid and dashed lines respectively.
SATellite VIEW
Figure 42. Arabian Sea Mosaic with Interpretation, 26 October 1980.

The composite of enhanced images shown in Figure 32 is shown here with a composite of surface interpretations for each image. Relative flow is indicated by arrows, and strong and weak fronts are indicated by solid and dashed lines respectively. The interpretations in this mosaic are described in more detail in Figures 15 through 25.
ARABIAN SEA

NOV 25, 1980

INTERPRETATION
SURFACE INTERPRETATION
Figure 43. Arabian Sea Mosaic with Interpretation, 25 November 1980.

The composite of enhanced images shown in Figure 33 is shown here with a composite of surface interpretations for each image. Only weak surface features are indicated.
SATELLITE VIEW

SOME SLICKING
VERY WEAK GRA
WEAK FLOW
SHELF

WATER

\sim

\sim

CLDS

VE\sim\sim WEAK GRADIENTS

WEAK FLOW

SOME SLICKING

VER\sim\simY WEAK GRADIENTS

WEAK FLOW

SURFACE INTERPRETATION
ARABIAN SEA

NOV 27, 1980

INTERPRETATION
Figure 44. Arabian Sea Mosaic with Interpretation, 27 November 1980.

The composite of enhanced images shown in Figure 34 is shown here with a composite of surface interpretations for each image. Clouds dominate the field of view with some weak thermal features indicated on the ocean surface.
ARABIAN SEA

NOV 30.1980

SURFACE INTERPRE

WEAK FRONTAL BOUNDARIES

VERY WEAK SST CHANGES

CLOS

SLOW, SIGNIFICANT FRONTS

RELATIVE SURFACE FLOW
Figure 45. Arabian sea Mosaic with Interpretation, 30 November 1980.

The composite of enhanced images shown in Figure 35 is shown here with a composite of surface interpretations for each image. Relative flow is indicated by arrows, and strong and weak fronts are indicated by solid and dashed lines respectively. (A poor alignment of lines indicating fronts occurred in the printing process.)