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Optically Processed Seasat Radar Mosaic of Florida

The State of Florida was almost completely covered by Seasat synthetic aperture radar imagery.

THE SEASAT SATELLITE was launched on 29 June 1978, placed in a 108° inclination orbit at 800 km altitude, and continued operations until 10 October 1978. During that period radar imagery was collected on a total of 480 different occasions during 446 separate passes. Receiving stations for these data were located at Fairbanks, Alaska; Oakhanger, England; Shoe Cove, Newfoundland, Canada; Merritt Island, Florida; and Goldstone, California. Consequently, data were collected primarily for North America, Europe, and the adjacent oceanic areas. All available data are within the approximate latitude limits of 15°N and 73°N.

An uncontrolled mosaic of optically correlated radar imagery of Florida has been prepared to illustrate both the nature of the data and the large area synoptic coverage which is possible by combining several data sets. The images included in the mosaic of Florida were obtained from a total of twelve passes (Table 1, Figure 1) during a period of 33 days from 24 July 1978 to 27 August 1978. Because most of Florida is quite flat, the effect of look direction (i.e., using both ascending and de-

scending passes) for the composition of the mosaic did not pose any major problem (e.g., radar shadows). However, as has been discussed in the literature, the effect of orientation of some objects (e.g., raised Pleistocene shoreline, shorelines, powerlines, buildings, canals, row crops, dikes) are indeed noticeable when the overlapping images from ascending and descending passes are studied in concert.

The images used to compose the mosaic have not been reprocessed in the optical correlator, but

TABLE 1. SEASAT-A SYNTHETIC APERTURE RADAR L(HH) DATA USED IN CONSTRUCTING THE MOSAIC OF FLORIDA

Orbit	Direction*	Julian Day	Date
400	D	206	24 July 1978
522	A	214	2 August 1978
558	D	217	5 August 1978
565	A	217	5 August 1978
608	A	220	8 August 1978
723	A	228	16 August 1978
766	A	231	19 August 1978
802	D	234	22 August 1978
809	A	234	22 August 1978
845	D	237	25 August 1978
852	A	237	25 August 1978
874	D	239	27 August 1978

* D = descending satellite track; A = ascending satellite track.

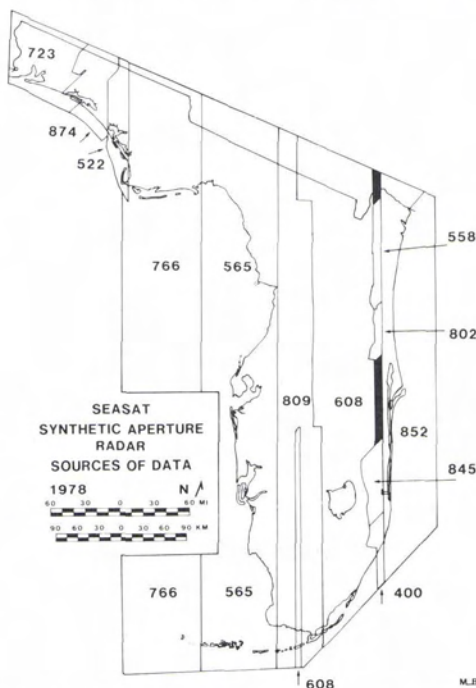


FIG. 1. Sketch map identifying the locations and pass numbers of individual data sets used to make the Seasat radar mosaic of Florida. Areas which were not imaged are indicated by the solid black tone.



FIG. 2. Seasat radar mosaic of the State of Florida.

some photographic dodging has been done to improve contrast. The images obtained during orbit 766 in the vicinity of Key West show a decided darkening from west to east in each of the four swaths (look direction was easterly). Also, the data from orbit 558, especially in the portion in the vicinity of the Florida-Georgia border, are considerably lighter in tone than the adjacent areas.

We thus note that the mosaic is uncontrolled in at least two ways: (a) geometrically and (b) with respect to image tone (which represents the radar backscatter).

Two small areas in the eastern portion of the state were not imaged, these being in the extreme north, at the border with Georgia, and in the central portion of the state immediately west of Cape Canaveral, Florida. These areas are indicated by the solid black tone in Figure 1. A very small portion west of Pensacola at the Alabama border was also not imaged.

All imagery data collected by the Seasat Synthetic Aperture Radar (SAR) were obtained at L-Band frequency (1.275 GHz, 23.5 cm) and in the HH (horizontal transmit, horizontal receive) mode. The depression angle of the antenna ex-

tended from 72° for the near range to 67° for the far range. The resolution of the optically correlated imagery is approximately 25 m in both azimuth (along track) and range (across track) and the swath width for the four sub-swaths which were collected simultaneously is 100 km.

Other areas for which mosaics have been prepared by the staff of the Planetology and Oceanography section of the Jet Propulsion Laboratory include the United Kingdom, the States of California and Pennsylvania, and some areas of the Caribbean (e.g., Jamaica). All of these mosaics are being studied for geologic, land-use, and data manipulation (e.g., registration to a geographic grid) purposes.

The mosaic is composed of the type of imagery which is available from

Environmental Data Information Service
National Climatic Center
Satellite Data Service Division
Room 100, World Weather Building
Washington, D.C. 20233
Telephone: (303) 763-8111

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