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PART II

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COMPENDIUM OF MARINE LUMINESCENCE SIGNATURES

(Appendix C)

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March 1973

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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1. INTRODUCTION

A principal goal of this project was the collection of a large body of excitation/emission spectra on representative seawater samples. These data have been assembled in this Compendium of Spectral Data, which forms Appendix C of the Final Report.

1.1 Plan of Compendium

The spectra are ordered under the following general headings:

Chlorophyll in Seawater

Chlorophyll in Algal Cultures

Gelbstoff in Seawater

Additional Algal Culture Spectra

1.1.1 Chlorophyll in Seawater (Figures 1-70)

In this section are to be found separate excitation and emission spectra of natural water samples, excited in the neighborhood of 460 nm and monitored in the region of 680 nm. The emission is due to chlorophyll a. The spectra are ordered in geographic groups according to site. Thus, Figures 1-10 have spectra from Cape Ann, Massachusetts. Figures 11-20 are from Gloucester Point, Virginia, etc. There are no spectra of Pacific waters because on-site measurements were not made.

1.1.2 Chlorophyll in Algal Cultures (Figures 71-91)

These laboratory cultures are excited and monitored in the same spectral regions as the seawater samples of the previous section. They are inserted here to allow comparison with the seawater spectra.

1.1.3 Gelbstoff in Seawater (Figures 92-182)

In this section are to be found separate excitation/emission spectra of natural water samples, excited in the region of 350 nm and monitored at approximately 440 nm. This emission is primarily due to Gelbstoff, the

soluble decaying organic matter in natural waters. Pollutants may also contribute in this region. Samples mailed from the West Coast and Hawaii are included.

1.1.4 Additional Algal Culture Spectra (Figures 183-196)

In this section are to be found separate excitation/emission spectra of algal cultures excited and monitored at other wavelengths than in 1.1.2. The higher concentration of the samples allows observation of secondary spectra.

1.2 Instrumentation

All data were taken on a modified Baird-Atomic Fluorescence Spectrophotometer, Model SF-100. The standard instrument incorporates a 150-watt xenon source, two double monochromators and an RCA 1P28 detector. Modification consisted of the remounting of the 1P28 together with an RCA C31025C in an external tube, which allows choice of detector. The C31025C, with a GaAs photocathode, allows efficient detection in the 680 nm region without cooling. The standard wavelength range of the instrument, 220-700 nm, has been modified by the addition of a cam-spacer, located in the sample compartment. When the spacer is inserted, the wavelength range is changed to 420-900 nm.

All chlorophyll spectra were taken using the C31025C detector, emission spectra using the 420-900 nm range and excitation spectra the normal wavelength range. All gelbstoff spectra used the 1P28 and normal wavelength range.

All spectra in the compendium are uncorrected for instrumental dependence on wavelength. This correction applies mainly to the wavelength region below 300 nm on excitation and to peaks in the lamp spectrum, principally at 470 nm, also seen in excitation.

The short wavelength cut-off of emission spectra corresponds to the onset of first order scattering. The cut-off on excitation spectra corresponds to second order scattering. In some cases this was removed with a filter.

For chlorophyll spectra the bandpass on excitation and emission was usually set at maximum, or 24 nm. For Gelbstoff spectra bandpass on excitation and emission was set at about 17 nm.

1.3 Site Descriptions

Samples from nine different geographic sites were measured and included in the Compendium of Data. The first five of these, covering the Atlantic and Gulf coasts, were covered on-site. Here measurements were made on chlorophyll and Gelbstoff, and on several algal cultures supplied by laboratories. The remaining four sites included three off the west coast and one several hundred miles north of Hawaii. Lack of time and funding made it impossible to monitor these on-site; therefore samples were mailed to Bedford, and only Gelbstoff was monitored. The sites will be described in some detail in the following subsections. They are indicated on Map A.

1.3.1 Site A: Cape Ann, Massachusetts (University of Massachusetts Marine Station)

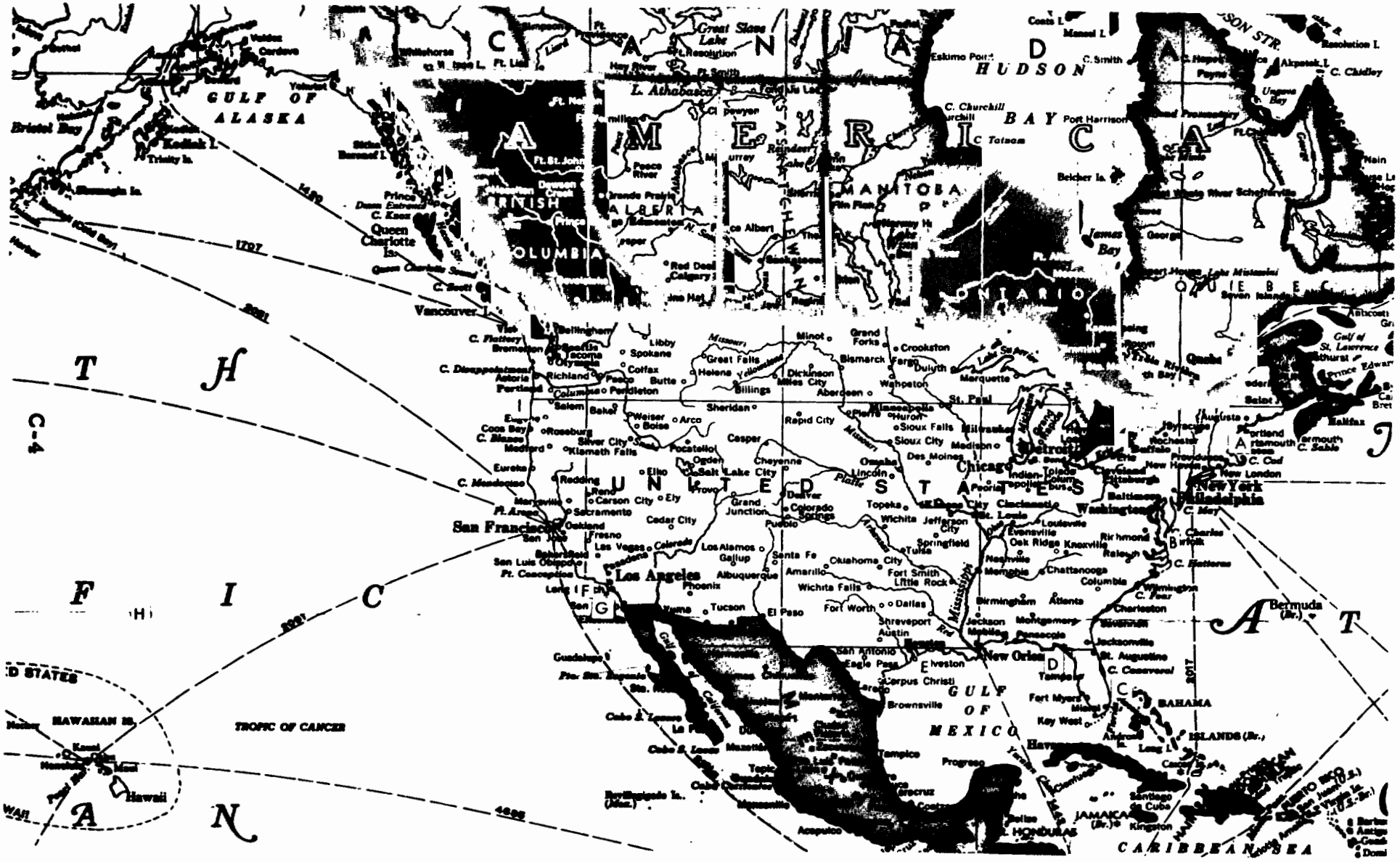
The laboratory is located on the western side of Cape Ann at Hodgkins Cove. Numerous measurements were conducted at the laboratory throughout the project. Representative data from several dates are included in the report.

The data of Figures 1, 2, 92 and 93 were taken on 2 March 1972 on water piped into the laboratory from Hodgkins Cove, a clean representative body of water. The water temperature was 0.9°C, salinity 31.6 ppth, chlorophyll content 0.5 g/l.

The data of Figures 3 and 4 were taken on 4 December 1971, also on laboratory seawater. The water temperature was 6.1°C, the salinity 29.8 ppth, and the chlorophyll content 0.74 g/l.

The data of Figure 94 were taken on 30 May 1972 on laboratory seawater.

The data of Figures 5-10 and 95-97 were taken on 18 August 1972 on samples collected by boat and returned to the laboratory for immediate


GULF OF ALASKA
HUDSON BAY
NORTH AMERICA
UNITED STATES
GULF OF MEXICO
CARIBBEAN SEA
PACIFIC OCEAN
ATLANTIC OCEAN
TROPIC OF CANCER
HAWAIIAN IS.
BAHAMA ISLANDS (Br.)
Bermuda (Br.)
San Francisco
Los Angeles
New York
Philadelphia
Washington
Chicago
Detroit
New Orleans
Vancouver
Great Slave Lake
L. Athabasca
Great Bear Lake
Great Slave Lake
Lake Winnipeg
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
Gulf of St. Lawrence
Hudson Bay
James Bay
Ungava Bay
Mississippi
Missouri
Colorado
Columbia
Rio Grande
Red River
Platte
Yukon
Mackenzie
Saskatchewan
Athabasca
Peace River
Hay River
Great Slave Lake
Ft. Resolution
Ft. Smith
Ft. Nelson
Ft. St. John
Dawson Creek
Prince Rupert
Queen Charlotte Is.
Vancouver
Victoria
Bellingham
Seattle
Tacoma
Olympia
Spokane
Libby
Cottage Grove
Portland
Astoria
Coos Bay
Roseburg
Medford
Klamath Falls
Eureka
Redding
Marysville
Sacramento
Oakland
San Jose
Fresno
Bakersfield
San Luis Obispo
Pt. Conception
Los Angeles
San Diego
Yuma
Tucson
Phoenix
Albuquerque
Los Alamos
Gallup
Santa Fe
Amarillo
Wichita Falls
Fort Worth
Dallas
El Paso
Lubbock
Abilene
Austin
San Antonio
Corpus Christi
Brownsville
Laredo
Eagle Pass
Galveston
Houston
Shreveport
Jackson
Mobile
Montgomery
Pensacola
Tampa
Miami
Key West
Jacksonville
St. Augustine
Charleston
Wilmington
Raleigh
Richmond
Norfolk
Knoxville
Nashville
Memphis
Little Rock
Fort Smith
Oklahoma City
Tulsa
Springfield
Jefferson City
Wichita
Topeka
Kansas City
St. Louis
Cincinnati
Louisville
Evansville
Indianapolis
Columbus
Toledo
Cleveland
Pittsburgh
Buffalo
Rochester
Syracuse
Albany
Boston
Portland
Augusta
Halifax
Quebec
Montreal
Ottawa
Toronto
Kingston
Sudbury
Winnipeg
Regina
Saskatoon
Edmonton
Calgary
Banff
Jasper
Prince Albert
Churchill
Port Harrison
Eskimo Point
Coats I.
Mansel I.
Resolution I.
Akpatok I.
C. Chidley
Nain
Belcher Is.
Moosonee
Schefferville
Seven Islands
Lake Mistassini
Abitibi
Sept Iles
Gaspe
Bathurst
Moncton
Saint John
Halifax
C. Sable
C. Cod
C. Hatteras
C. Fear
C. Charles
C. May
Cape Cod
Cape Hatteras
Cape Fear
Cape Charles
Cape May
Cape Sable
Cape Breton

study. The water temperature was 10.8°C, the salinity 30.9 ppth, and the chlorophyll content 1.44 g/l. This sampling was undertaken near the end of a "red tide episode which had been quite severe. Figures 5 and 6 represent waters near the laboratory at the entrance to Hodgkins Cove. Figures 7 and 8 represent the water of Rockport Harbor. Figures 9 and 10 represent water at a dredge dumping site which had been noted for the strong red tide. No visible red tide was detected on the day of sampling. (Unfortunately the instrument was inoperative during the height of the episode.) This last sampling date was noteworthy for another reason: the water was unseasonally cold due to upwelling. By the 24th of August the temperature had reached 20°C.

Laboratory space and assistance in all phases of our work were provided by Dr. Charles Yentsch, Director of the Marine Station. Dr. Clarice Yentsch provided the majority of the algal cultures documented in the Compendium.

1.3.2 Site B: Gloucester Point, Virginia (Virginia Institute of Marine Science)

The Virginia Institute of Marine Science (VIMS) is located at Gloucester Point on the York estuary of Chesapeake Bay. This was the site of successful measurements on an institute boat.

Measurements were made on 15 and 16 February 1972. Figures 11, 12, 98 and 99 describe data on water taken off the VIMS pier on 15 February. The data of Figures 13-20 and 100-103 were taken on 16 February at four sites ranging from the mouth of the York River up into Mobjack Bay. The sites are marked on Map B.

Station A is located at the head of Mobjack Bay, the confluence of several small rivers. There is no known source of pollution, and the bay is shallow (6 m). The water temperature was 6.7°C, the salinity 18.9 ppth, and the chlorophyll 12 g/l at the surface.

Station B is located at the mouth of Mobjack Bay on the north side of an underwater bar, York Spit. It is located in a fairway channel and has a

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Map B: Sample Collection Sites Near Gloucester Point, Virginia

depth of 8 m. The water temperature was 5.5°C, the salinity 19.06 ppth, and the chlorophyll 112.5 g/l (surface).

Station D is located in the York River channel with a depth of 11 m. The water temperature was 5.8°C and the salinity 19.51 ppth. Unfortunately the chlorophyll measurements were not made.

Station E is located in the same channel further up the York River and has a depth of 20 m. The York River has a paper pulp mill twenty-five miles up at its head, two naval installations, a power plant, and an oil refinery. Thus, Station E and perhaps D are expected to have the greatest environmental strain. The water temperature was 6.0°C, the salinity 19.64 ppth, and the chlorophyll content 39.7 g/l.

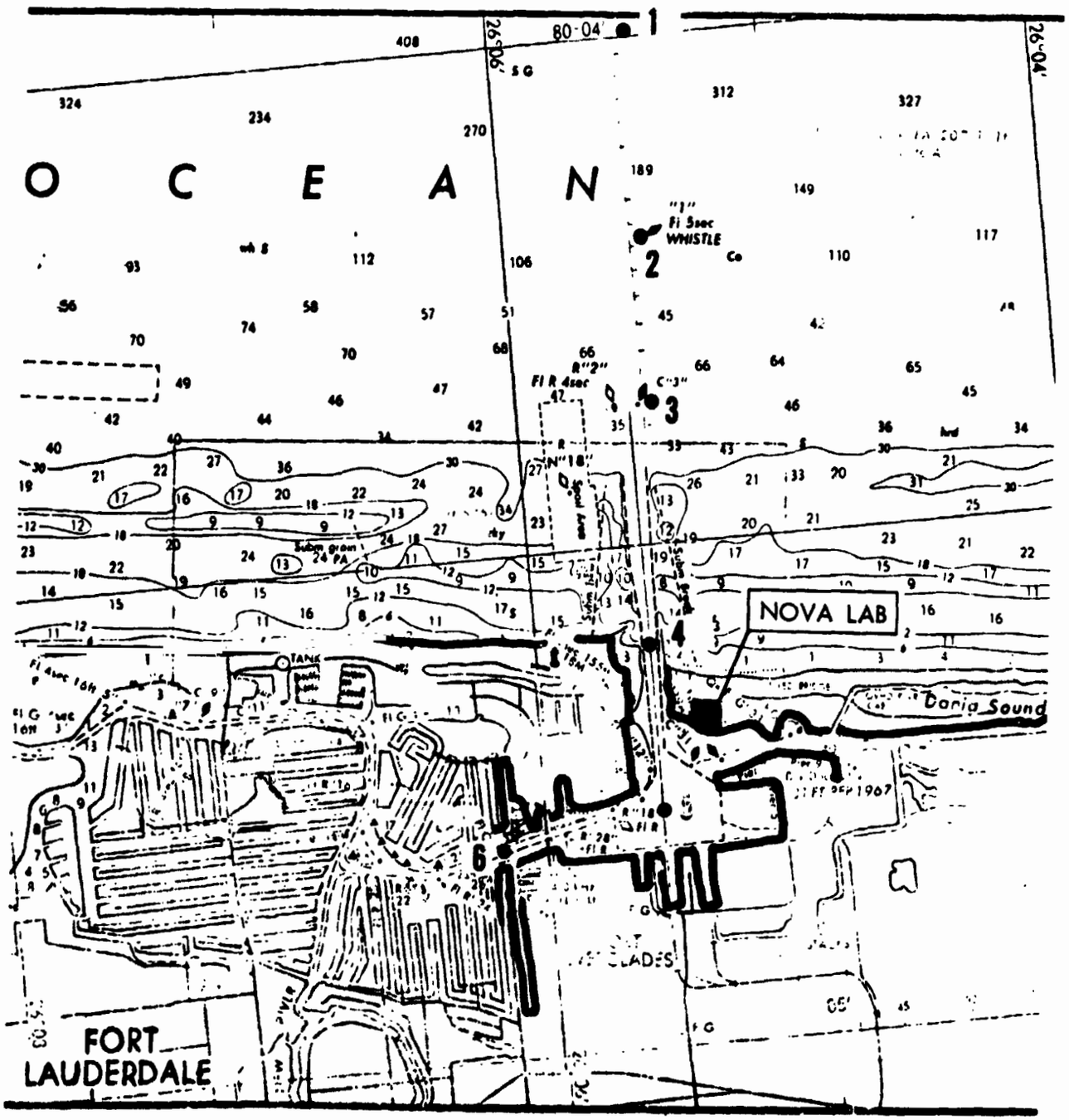
For other parameters see section 3.3.3 of the body of this Final Report.

The on-site measurements were arranged through the cooperation of Dr. Paul Zubkoff, Chairman of the Department of Physiology. Mr. J. Ernest Warinner III assisted in collecting samples. He also provided mailed samples for an earlier study. The VIMS staff also provided several algal cultures for measurement in their laboratories.

1.3.3 Site C: Fort Lauderdale, Florida (Nova University Physical Oceanographic Laboratory)

This laboratory is located just south of Fort Lauderdale near the Atlantic Ocean. Samples were gathered and 3 and 4 April 1972 and measured at the Oceanographic Laboratory.

The data of Figures 21-32 and 104-114 were taken at a series of stations numbered 106 from out in the Gulf Stream into Port Everglades, as indicated on Map C. Stations 1-3 have typical near-shore Gulf Stream water with low productivity and high clarity. Stations 306 have increasing turbidity due to yellow humic acids draining out of Port Everglades via New River. The source of these yellow acids is the Everglades, through the drainage system. Productivity of these latter stations is high as a result of domestic pollution



Map C: Sample Collection Sites Near Fort Lauderdale, Florida

(eutrophication) along the drainage basin. The water temperature at the dock was 20°C; it was not measured in the Gulf Stream where it was certainly much lower. No salinity measurements were made. The chlorophyll content in the Gulf Stream was 0.19 g/l, while at the dock it was 2.9 g/l.

The data of Figures 115-122 were taken at four stations (designated 01-04) from beyond a sewage outfall, in toward the coast. This course is off Map C to the south. Only Gelbstoff measurements were made to determine if the outfall was visible. The outfall was never visible to the eye, so perhaps it was not operating.

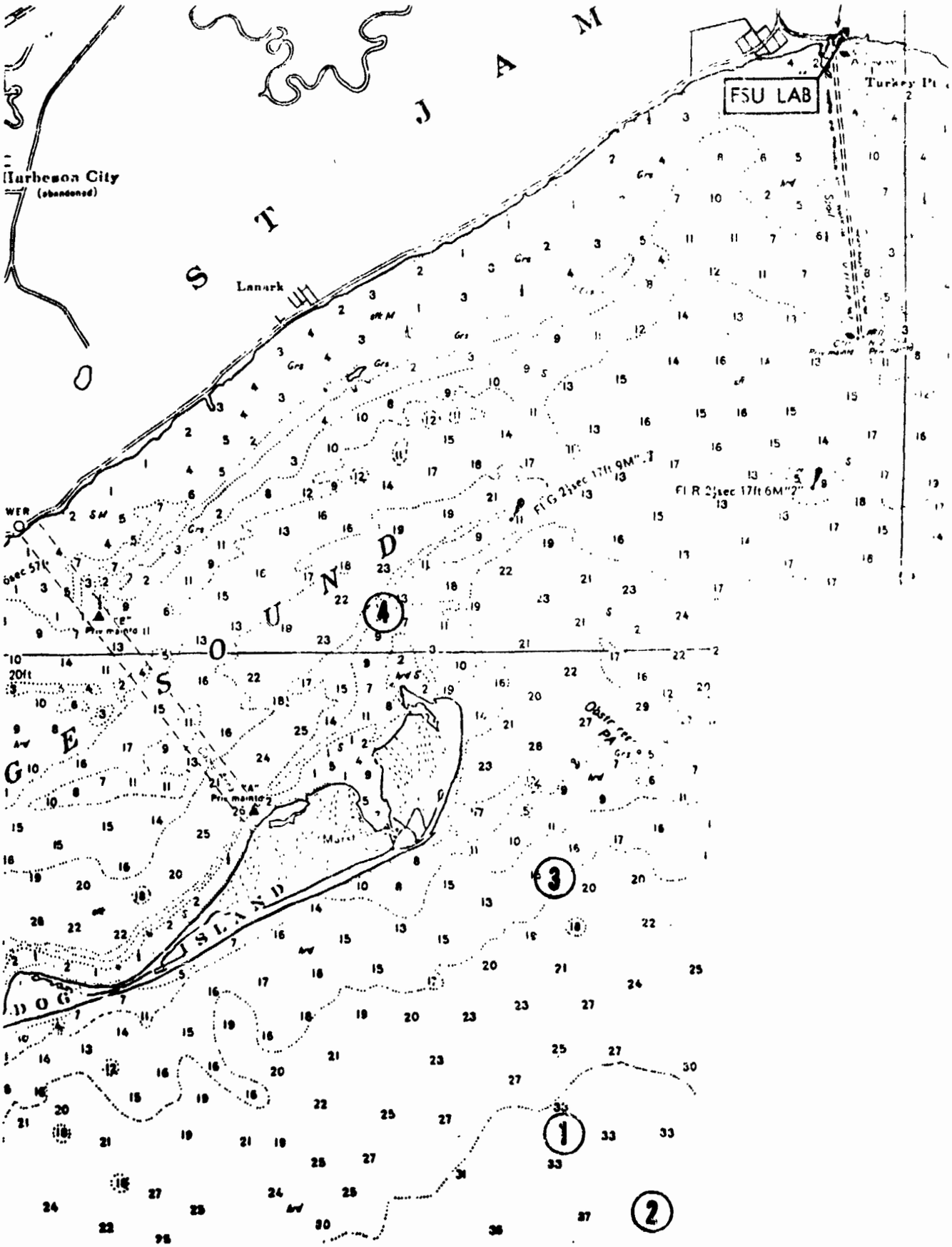
Arrangements for these measurements were made by C. Yentsch, with the kind assistance of Dr. W. Richardson, Laboratory Director. C. Yentsch assisted in obtaining samples.

1.3.4 Site D: Carrabelle, Florida (Florida State University Marine Station)

The marine station is located in the panhandle of Florida on the Gulf of Mexico at Turkey Point, near Carrabelle. The water is sedimentary and shallow. Measurements were made in mid-April 1972.

The data of Figures 33-38 and 123-130 and 137 were made on 11 April 1972 from water collected from eight stations (designated 1 . . . 8) on a transect extending out from the marine station along a ship channel. Station 1 was about four miles out, and the remainder were spaced evenly to the dock. Station 3 was at the end of the marked channel, and Station 8 was at the pier. Because the instrument was not functioning well due to power supply instability, not all samples were measured. Chlorophyll measurements were made only on samples from Stations 1, 2 and 8. No temperature, salinity or chlorophyll data are available.

The data of Figures 39-52 and 131-136 were made from water collected 13 April 1972 on a trip around Dog Island. Nine stations are designated 31 . . . D9. All stations are indicated on Map D. Because of the poor instrumental behavior, all chlorophyll measurements were made by front-surface



Map D: Sample Collection Sites Near Carrabelle, Florida

measurements on filtered particulates. Gelbstoff measurements were made on the filtrate. Again, not all samples were measured.

Arrangements for these measurements were made through Dr. Jack Winchester, Head of the Department of Oceanography at Florida State University in Tallahassee.

1.3.5 Site E: Galveston Bay (National Marine Fisheries Laboratory)

The Fisheries Laboratory is located near Galveston Bay. Laboratory measurements were made on samples collected from nine stations in the bay, as designated on Map E. Measurements on 20 June 1972 at the entrance of Galveston Bay showed a water temperature of 30.0°C, and a salinity of 23.0 ppth. No chlorophyll measurement was available. These measurements are covered in Figures 53-70 and 139-147. The following station descriptions were furnished by Frank Marullo of NMFS/Galveston.

Station 1, Swan Lake, is an ideal nursery area with a depth of four feet. There is a ditch leading from a chemical plant into Swan Lake. The sample was taken near the entrance to Campbell Bayou.

Station 2 is near the ditch.

Station 3 is in Campbell Bayou, which is ten feet deep.

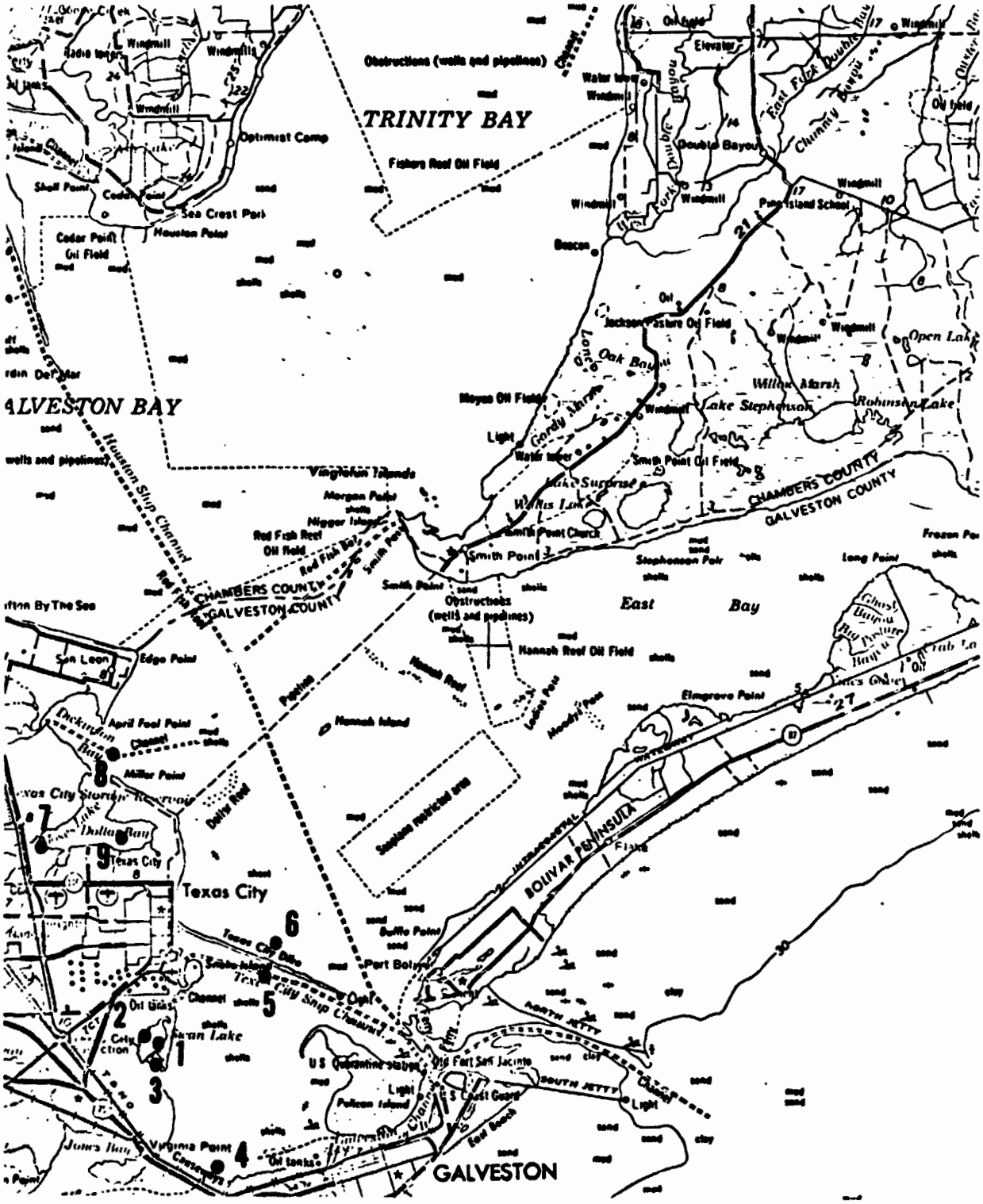
Station 4 is in the Intercoastal Canal, depth 12 feet.

Station 5 is in the Texas City Ship Channel near the Monsanto chemical plant and barge dock. The depth is 38 feet.

Station 6 is on the opposite side of the Texas City dike. No chemical pollution, good shrimp area, depth eight feet.

Station 7 is in Moses Lake, a good nursery area. This station is near a G.A.F. film plant where the channel is 12 feet deep.

Station 8 is located in the bay outside Moses Lake, where the depth is 12 feet.



Map E: Sample Collection Sites Near Galveston, Texas

Station 9, in Dollar Bay, has a depth of four feet.

Arrangements for the use of laboratory facilities and a boat to collect samples was made by Mr. Robert Temple, Assistant Director of the Laboratory. Mr. Frank Marullo collected samples, and Mr. Neil Baxter provided the data on temperature and salinity.

1.3.6 Site F: Pacific Ocean--Southern California (University of California at Santa Barbara Marine Science Institute)

For this and the following three sites the samples were mailed to Bedford for delayed examination. Because we feel such measurements on chlorophyll are invalid, only Gelbstoff measurements were made.

Samples were collected on 12 September 1972 from five stations, labeled A-E, with the following descriptions:

Station A: Surface sample one-half mile off the beach, outside a kelp bed, with a slight oil slick on the surface. (Oil slick extends 2 miles off shore.) Temperature 17.0°C, salinity 33.6 ppth.

Station B: Same as A, except one meter depth. Temperature 17.0°C, salinity 33.6 ppth.

Station C: Surface sample, beyond the oil slick, about three miles offshore. Temperature 17.0°C, salinity 33.6 ppth.

Station D: Surface sample 100 m offshore and in front of Goleth Slough mouth. Water brownish and somewhat turbid. Temperature 16.7°C, salinity 33.6 ppth.

Station E: Surface sample in the kelp beds of Hendry's Beach. Depth here about 30 feet. Temperature 16.9°C, salinity 33.6 ppth.

No chlorophyll data are available.

The sample collection was arranged by Dr. Robert Holmes, Director of the Institute.

1.3.7 Site G: Pacific Ocean--LaJolla, California (Scripps Institution of Oceanography)

Mr. Frautschy, Assistant Director of Scripps, kindly arranged to have samples sent from the ship E. B. Scripps while on a cruise near San Clemente Island. Eight samples were taken on 12 September 1972 and ten samples on 21 and 22 September 1972 at the following locations:

Sample	1	33°22.0'N 118°11.0'W	Sample	9	32°38.0'N 117°15.0'W
	2	33°17.0'N 118°14.0'W		10	32°41.0'N 117°39.0'W
	3	33°19.0'N 118°14.0'W		11	32°41.7'N 117°59.0'W
	4	33°21.8'N 118°17.0'W		12	32°44.0'N 118°21.3'W
	5	33°22.0'N 118°17.0'W		13	32°48.3'N 118°44.2'W
	6	33°21.5'N 119° 2.3'W		14	32°53.0'N 119°05.5'W
	7	33°21.5'N 119° 2.5'W		15	32°57.0'N 119°22.0'W
	8	33°22.5'N 118°35.1'W		16	33°02.0'N 119°43.3'W
				17	33°05.0'N 120°05.0'W
				18	33°32.0'N 122°02.0'W

Only standard Gelbstoff measurements were made on these samples because they were old when they arrived.

1.3.8 Site H: Hawaii (University of Washington Department of Oceanography)

Dr. J. Thomas arranged to have samples sent from a cruise of the R. V. Thompson in the North Pacific, at about 32°N, 155°W, several hundred miles north of Hawaii.

The exact location of the sampling positions and supporting information on chlorophyll, temperature, salinity, etc., have not been available at the writing of this report. Only Gelbstoff spectra were taken. This information will be added in the form of a replacement page when the information becomes available.

1.3.9 Site I: Corvallis (Oregon State University Department of Oceanography

Dr. H. Curl of Oregon State University arranged to have a sample of water sent from off the Oregon Coast. This sample was collected in late October 1972. Only Gelbstoff were taken. The exact location of sampling and other parameters are unknown.

2. COMPENDIUM OF MARINE LUMINESCENCE SIGNATURES

2.1 List of Figures

CHLOROPHYLL IN SEAWATER

Cape Ann, Massachusetts
(University of Massachusetts Marine Station)

Figure		
1	Laboratory Water:	Emission Excited at 476 nm
2		Excitation Monitored at 686 nm
3	Laboratory Water:	Emission Excited at 560 nm
4		Excitation Monitored at 685 nm
5	Hodgkins Cove Site:	Emission Excited at 458 nm
6		Excitation Monitored at 678 nm
7	Rockport Harbor Site:	Emission Excited at 458 nm
8		Excitation Monitored at 678 nm
9	Dredge Dumping Site:	Emission Excited at 458 nm
10		Excitation Monitored at 678 nm

Gloucester Point, Virginia
(Virginia Institute of Marine Science)

11	Gloucester Point Seawater:	Emission Excited at 470 nm
12		Excitation Monitored at 680 nm
13	Chesapeake Bay, Station A:	Emission Excited at 458 nm
14		Excitation Monitored at 682 nm
15	Chesapeake Bay, Station B:	Emission Excited at 458 nm
16		Excitation Monitored at 682 nm
17	Chesapeake Bay, Station D:	Emission Excited at 458 nm
18		Excitation Monitored at 682 nm
19	Chesapeake Bay, Station E:	Emission Excited at 458 nm
20		Excitation Monitored at 682 nm

CHLOROPHYLL IN SEAWATER (Continued)

Fort Lauderdale, Florida
(Nova University Physical Oceanographic Laboratory)

Figure		
21	Atlantic Ocean, Station 1:	Emission Excited at 458 nm
22		Excitation Monitored at 678 nm
23	Atlantic Ocean, Station 2:	Emission Excited at 458 nm
24		Excitation Monitored at 675 nm
25	Atlantic Ocean, Station 3:	Emission Excited at 468 nm
26		Excitation Monitored at 675 nm
27	Atlantic Ocean, Station 4:	Emission Excited at 460 nm
28		Excitation Monitored at 679 nm
29	Atlantic Ocean, Station 5:	Emission Excited at 468 nm
30		Excitation Monitored at 677 nm
31	Atlantic Ocean, Station 6:	Emission Excited at 440 nm
32		Excitation Monitored at 677 nm

Carrabelle, Florida
(Florida State University Marine Station)

33	Gulf of Mexico, Station 1:	Emission Excited at 440 nm
34		Excitation Monitored at 678 nm
35	Gulf of Mexico, Station 2:	Emission Excited at 440 nm
36		Excitation Monitored at 678 nm
37	Gulf of Mexico, Station 8:	Emission Excited at 458 nm
38		Excitation Monitored at 678 nm

CHLOROPHYLL IN SEAWATER (Continued)

Galveston Bay, Texas
(National Marine Fisheries Service)

Figure		
39	Gulf of Mexico, Station D1:	Emission Excited at 464 nm
40		Excitation Monitored at 682 nm
41	Gulf of Mexico, Station D2:	Emission Excited at 460 nm
42		Excitation Monitored at 682 nm
43	Gulf of Mexico, Station D1, Filtered Particulates:	Emission Excited at 459 nm
44		Excitation Monitored at 769 nm
45	Gulf of Mexico, Station D2, Filtered Particulates:	Emission Excited at 458 nm
46		Excitation Monitored at 680 nm
47	Gulf of Mexico, Station D3, Filtered Particulates:	Emission Excited at 465 nm
48		Excitation Monitored at 679 nm
49	Gulf of Mexico, Station D4, Filtered Particulates:	Emission Excited at 458 and 545 nm
50		Excitation Monitored at 607 and 678 nm
51	Gulf of Mexico, Station D5 Filtered Particulates:	Emission Excited at 462 nm
52		Excitation Monitored at 679 nm
53	Gulf of Mexico, Station 1:	Emission Excited at 458 nm
54		Excitation Monitored at 680 nm
55	Gulf of Mexico, Station 2:	Emission Excited at 460 nm
56		Excitation Monitored at 680 nm

CHLOROPHYLL IN SEAWATER (Continued)

Galveston Bay, Texas
(National Marine Fisheries Service)

Figure		
57	Gulf of Mexico, Station 3:	Emission Excited at 460 nm
58		Excitation Monitored at 680 nm
59	Gulf of Mexico, Station 4:	Emission Excited at 460 nm
60		Excitation Monitored at 680 nm
61	Gulf of Mexico, Station 5:	Emission Excited at 460 nm
62		Excitation Monitored at 680 nm
63	Gulf of Mexico, Station 6:	Emission Excited at 460 nm
64		Excitation Monitored at 680 nm
65	Gulf of Mexico, Station 7:	Emission Excited at 460 nm
66		Excitation Monitored at 680 nm
67	Gulf of Mexico, Station 8:	Emission Excited at 460 nm
68		Excitation Monitored at 680 nm
69	Gulf of Mexico, Station 9:	Emission Excited at 460 nm
70		Excitation Monitored at 680 nm

CHLOROPHYLL IN ALGAL CULTURES

71	Nannochloris Atomus, Green Alga:	Emission Excited at 440 nm
72		Excitation Monitored at 682 nm
73	Nannochloric Oculata, Green Alga:	Emission Excited at 468 nm
74		Excitation Monitored at 683 nm
75	Dunaliella, Green Alga:	Emission Excited at 440 nm
76		Excitation Monitored at 687 nm

CHLOROPHYLL IN ALGAL CULTURES (Continued)

Figure		
77	Dunaliella, Green Alga:	Emission Excited at 401 nm
78		Excitation Monitored at 742 nm
79	Dunaliella, Green Alga:	Emission Excited at 471 nm
80	Skeletonema Costatum, Diatom:	Emission Excited at 450 nm
81		Excitation Monitored at 680 nm
82	Thallassiosira Fluviatilis, Diatom:	Emission Excited at 440 nm
83		Excitation Monitored at 680 nm
84	Phaeodactylum Tricornutum, Diatom:	Emission Excited at 462 nm
85		Excitation Monitored at 710 nm
86		Excitation Monitored at 693 nm
87	Cochlodinium Heterolobatum, Dinoflagellate:	Excitation Monitored at 683 nm
88	Isochrysis Galbana, Golden Brown Alga:	Emission Excited at 460 nm
89		Excitation Monitored at 688 nm
90	Schizothrix, Blue-Green Alga:	Emission Excited at 402 nm
91		Excitation Monitored at 616 and 666 nm

GELBSTOFF IN SEAWATER

Cape Ann, Massachusetts
(University of Massachusetts Marine Station)

Figure		
92	Laboratory Water:	Emission Excited at 300 nm
93		Excitation Monitored at 430 nm

GELBSTOFF IN SEAWATER (Continued)

Cape Ann, Massachusetts
(University of Massachusetts Marine Station)

Figure		
94	Laboratory Water:	Emission Excited at 350 nm Excitation Monitored at 440 nm
95 96	Hodgkins Cove Site:	Emission Excited at 350 nm Excitation Monitored at 440 nm
96	Dredge Dumping Site:	Emission Excited at 458 nm
97	Rockport Harbor Site:	Emission Excited at 350 nm Excitation Monitored at 440 nm

Gloucester Point, Virginia
(Virginia Institute of Marine Science)

Figure		
98 99	Gloucester Point Water:	Emission Excited at 340 nm Excitation Monitored at 450 nm
100	Chesapeake Bay, Station A:	Emission Excited at 350 nm Excitation Monitored at 440 nm
101	Chesapeake Bay, Station B:	Emission Excited at 350 nm Excitation Monitored at 440 nm
102	Chesapeake Bay, Station D:	Emission Excited at 350 nm Excitation Monitored at 440 nm
103	Chesapeake Bay, Station E:	Emission Excited at 350 nm Excitation Monitored at 440 nm

GELBSTOFF IN SEAWATER (Continued)

Fort Lauderdale, Florida
(Nova University Physical Oceanographic Laboratory)

Figure		
104	Atlantic Ocean, Station 1:	Emission Excited at 340 nm
105		Excitation Monitored at 440 nm
106	Atlantic Ocean, Station 2:	Emission Excited at 340 nm
107		Excitation Monitored at 450 nm
108	Atlantic Ocean, Station 3:	Emission Excited at 340 nm
109		Excitation Monitored at 440 nm
110	Atlantic Ocean, Station 4:	Emission Excited at 340 nm
		Excitation Monitored at 440 nm
111	Atlantic Ocean, Station 4:	Emission Excited at 340 nm
112	Atlantic Ocean, Station 5:	Excitation Monitored at 440 nm
113	Atlantic Ocean, Station 6:	Emission Excited at 340 nm
114		Excitation Monitored at 450 nm
115	Atlantic Ocean, Station 04:	Emission Excited at 340 nm
116		Excitation Monitored at 340 nm
117	Atlantic Ocean, Station 03:	Emission Excited at 340 nm
118		Excitation Monitored at 440 nm
119	Atlantic Ocean, Station 02:	Emission Excited at 340 nm
120		Excitation Monitored at 450 nm
121	Atlantic Ocean, Station 01:	Emission Excited at 340 nm
122		Excitation Monitored at 440 nm

GELBSTOFF IN SEAWATER (Continued)

Carrabelle, Florida
(Florida State University Marine Station)

Figure		
123	Gulf of Mexico, Station 1:	Emission Excited at 280 and 340 nm
124		Excitation Monitored at 440 nm
125	Gulf of Mexico, Station 4:	Emission Excited at 280 and 360 nm
126		Excitation Monitored at 440 nm
127	Gulf of Mexico, Station 5:	Emission Excited at 280 and 360 nm
128		Excitation Monitored at 440 nm
129	Gulf of Mexico, Station 6:	Emission Excited at 280 and 360 nm
130		Excitation Monitored at 440 nm
131	Gulf of Mexico, Station D1, Filtered Particulates:	Emission Excited at 280 and 360 nm
132		Excitation Monitored at 440 nm
133	Gulf of Mexico, Station D2, Filtered Particulates:	Emission Excited at 380 and 360 nm
134		Excitation Monitored at 440 nm
135	Gulf of Mexico, Station D4, Filtered Particulates	Emission Excited at 380 and 465 nm
136		Excitation Monitored at 440 nm
137	Gulf of Mexico, Station 7:	Emission Excited at 280 and 360 nm
138		Excitation Monitored at 300 nm

GELBSTOFF IN SEAWATER (Continued)

Galveston Bay, Texas
(National Marine Fisheries Service)

Figure		
139	Gulf of Mexico, Station 1:	Emission Excited at 280 and 350 nm Excitation Monitored at 440 nm
140	Gulf of Mexico, Station 2:	Emission Excited at 280 and 350 nm Excitation Monitored at 440 nm
141	Gulf of Mexico, Station 3:	Emission Excited at 280 and 350 nm Excitation Monitored at 440 nm
142	Gulf of Mexico, Station 4:	Emission Excited at 280 and 350 nm Excitation Monitored at 440 nm
143	Gulf of Mexico, Station 5:	Emission Excited at 280 and 350 nm Excitation Monitored at 440 nm
144	Gulf of Mexico, Station 6:	Emission Excited at 280 and 350 nm Excitation Monitored at 440 nm
145	Gulf of Mexico, Station 7:	Emission Excited at 280 and 350 nm Excitation Monitored at 440 nm
146	Gulf of Mexico, Station 8:	Emission Excited at 280 and 350 nm Excitation Monitored at 440 nm
147	Gulf of Mexico, Station 9:	Emission Excited at 280 and 350 nm Excitation Monitored at 440 nm

GELBSTOFF IN SEAWATER (Continued)

Santa Barbara, California
(University of California Marine Science Institute)

Figure		
148	Pacific Ocean-Southern California, Station A:	Emission Excited at 350 nm Excitation Monitored at 440 nm
149	Pacific Ocean-Southern California, Station B:	Emission Excited at 350 nm Excitation Monitored at 440 nm
150	Pacific Ocean-Southern California, Station C:	Emission Excited at 350 nm Excitation Monitored at 440 nm
151	Pacific Ocean-Southern California, Station D:	Emission Excited at 350 nm Excitation Monitored at 440 nm
152	Pacific Ocean-Southern California, Station E:	Emission Excited at 350 nm Excitation Monitored at 440 nm

LaJolla, California
(Scripps Institution of Oceanography)

153	Pacific Ocean-Southern California, Station 1:	Emission Excited at 290, 350 nm
154		Excitation Monitored at 440 nm
155	Pacific Ocean-Southern California, Station 2:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm
156	Pacific Ocean-Southern California, Station 3:	Emission Excited at 290, 350 nm
157		Excitation Monitored at 440 nm

GELBSTOFF IN SEAWATER (Continued)

LaJolla, California
(Scripps Institution of Oceanography)

Figure		
158	Pacific Ocean-Southern California, Station 4:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm
159	Pacific Ocean-Southern California, Station 5:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm
160	Pacific Ocean-Southern California, Station 6:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm
161	Pacific Ocean-Southern California, Station 7:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm
162	Pacific Ocean-Southern California, Station 8.	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm
163	Pacific Ocean-Southern California, Station 9:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm
164	Pacific Ocean-Southern California, Station 10:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm
165	Pacific Ocean-Southern California, Station 11:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm
166	Pacific Ocean-Southern California, Station 12:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm

GELBSTOFF IN SEAWATER (Continued)

LaJolla, California
(Scripps Institution of Oceanography)

Figure		
167	Pacific Ocean-Southern California, Station 13:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm
168	Pacific Ocean-Souterhn California, Station 14:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm
169	Pacific Ocean-Southern California, Station 15:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm
170	Pacific Ocean-Southern California, Station 16:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm
171	Pacific Ocean-Southern California, Station 17:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm
172	Pacific Ocean-Southern California, Station 18:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm

Hawaii
(University of Washington Department of Oceanography)

173	Pacific Ocean-Hawaii, Station 1:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm
174	Pacific Ocean-Hawaii, Station 2:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm

GELBSTOFF IN SEAWATER (Continued)

Hawaii
(University of Washington Department of Oceanography)

Figure		
175	Pacific Ocean-Hawaii, Station 3:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm
176	Pacific Ocean-Hawaii, Station 4:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm
177	Pacific Ocean-Hawaii, Station 5:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm
178	Pacific Ocean-Hawaii, Station 6:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm
179	Pacific Ocean-Hawaii, Station 7:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm
180	Pacific Ocean-Hawaii, Station 8:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm
181	Pacific Ocean-Hawaii, Station 9:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm

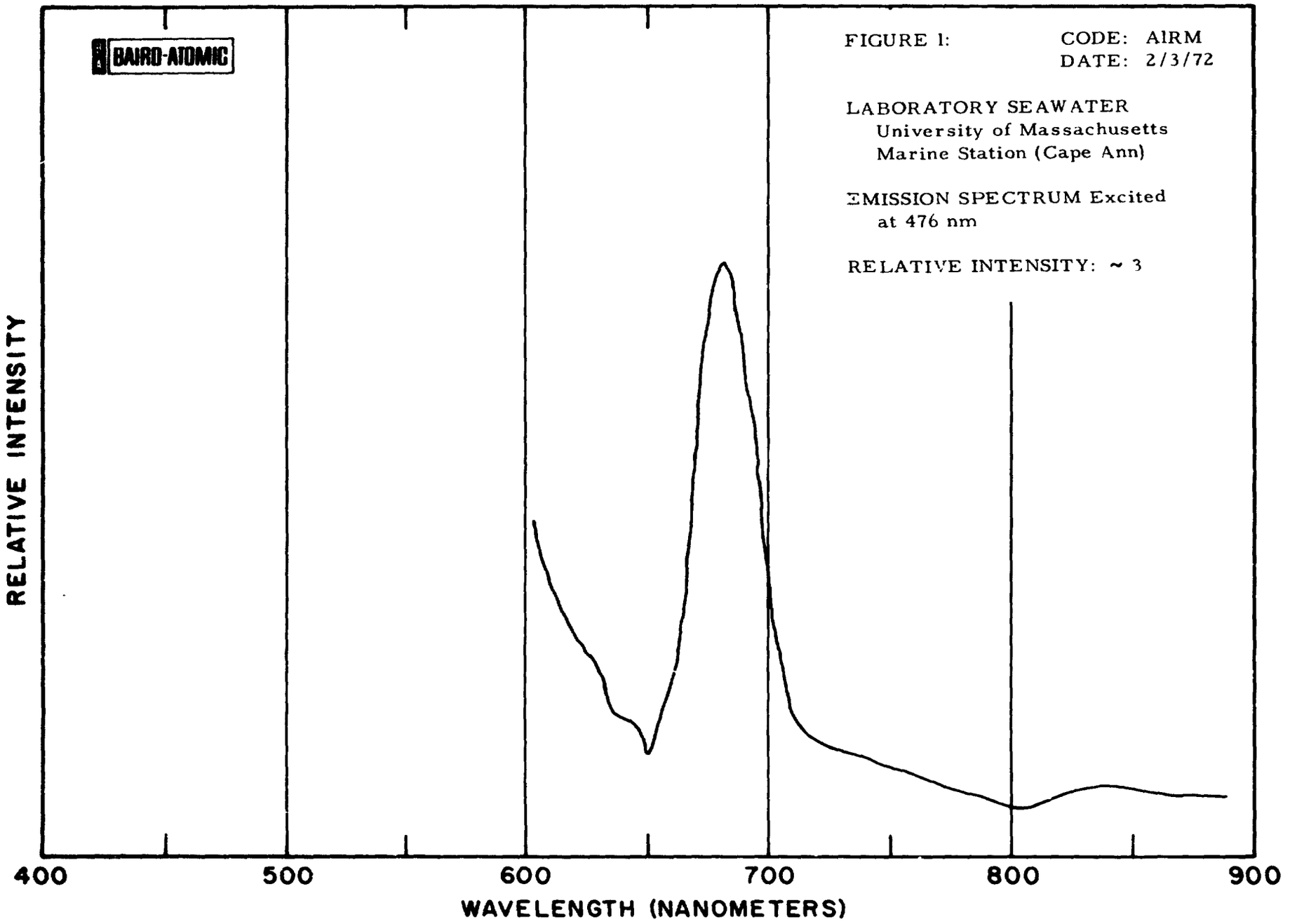
Corvallis
(Oregon State University Department of Oceanography)

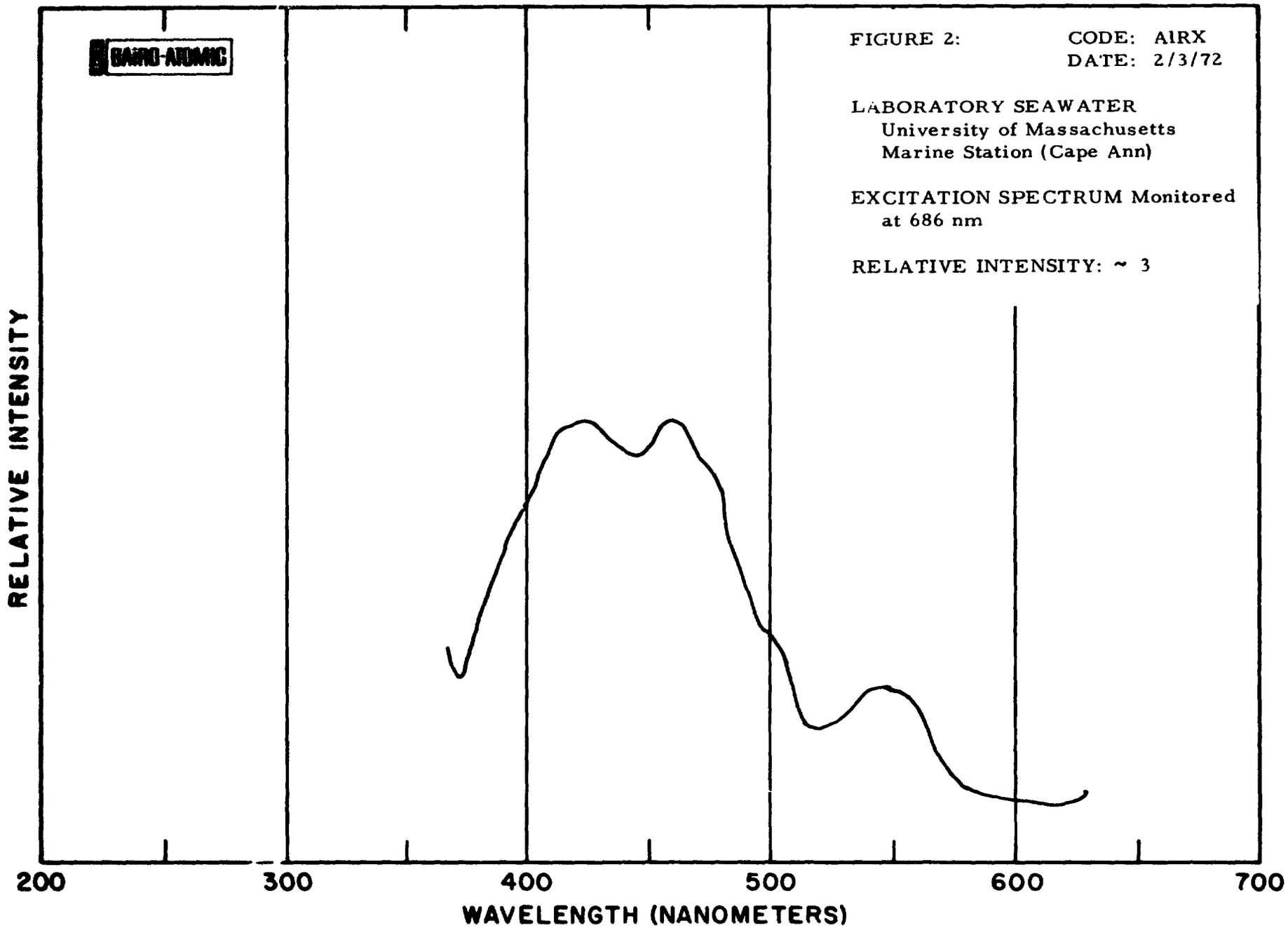
182	Pacific Ocean-Oregon:	Emission Excited at 290, 350 nm Excitation Monitored at 440 nm

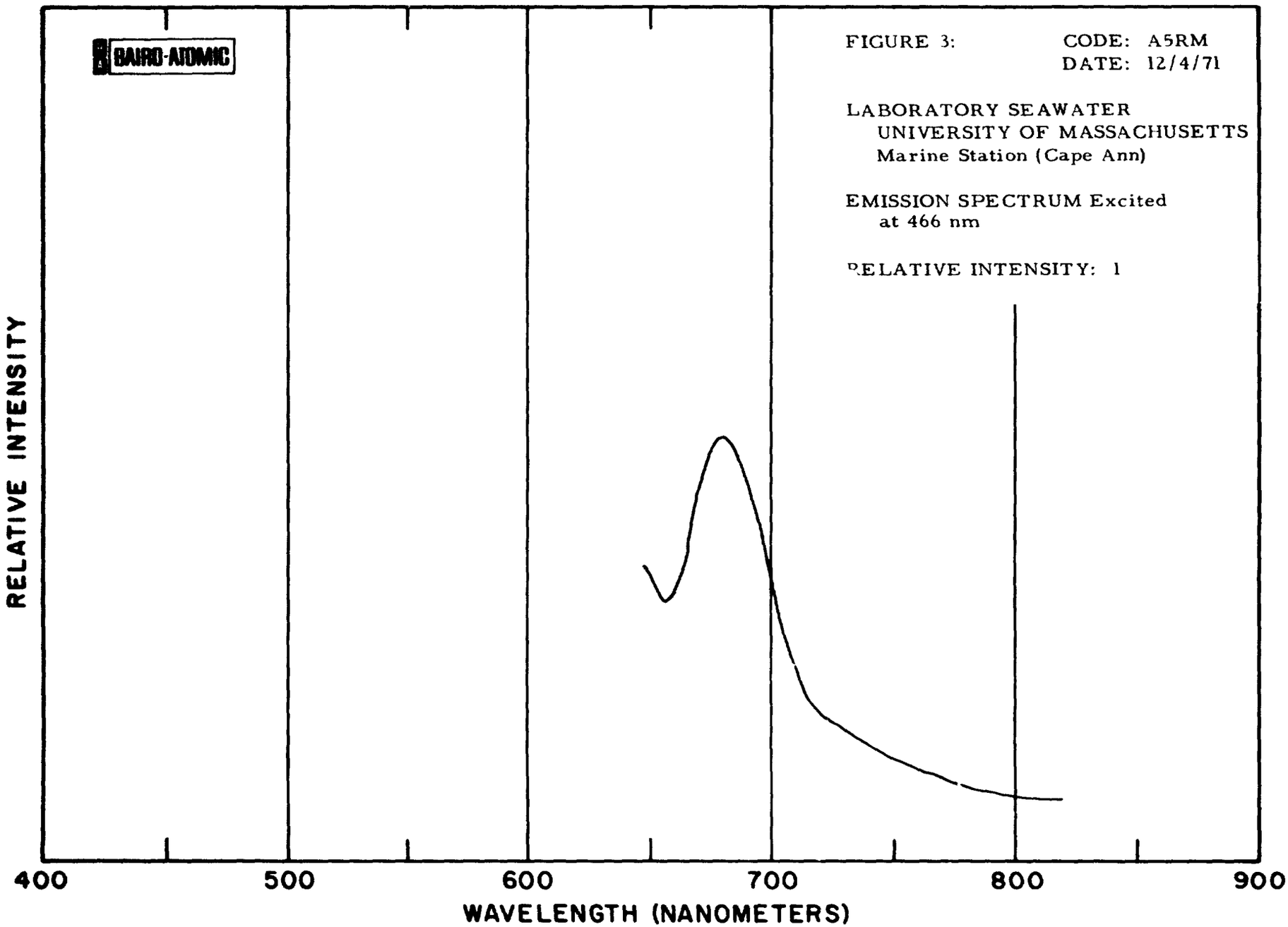
ADDITIONAL ALGAL CULTURE SPECTRA

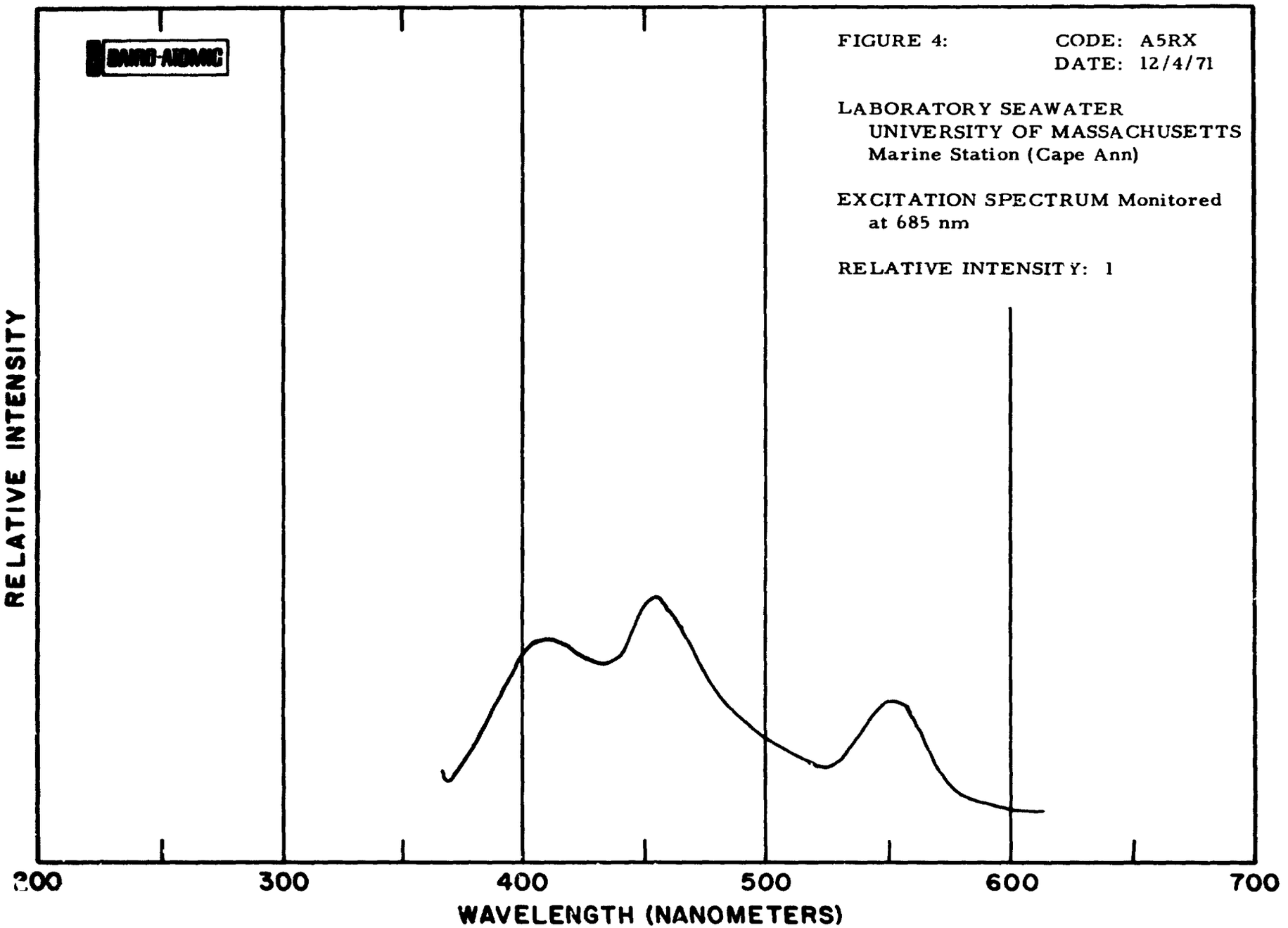
Figure		
183	Nannochloris Atomus-Green Alga:	Emission Excited at 440 nm
184		Excitation Monitored at 280 nm
185	Nannochloris Atomus-Green Alga:	Emission Excited at 290 nm
		Excitation Monitored at 280 nm
186	Nannochloris Atomus-Green Alga:	Emission Excited at 370 nm
		Excitation Monitored at 450 nm
187	Dunaliella-Green Alga:	Emission Excited at 288 nm
		Excitation Monitored at 351 nm
188	Dunaliella-Green Alga:	Emission Excited at 351 nm
		Excitation Monitored at 441 nm
189	Skeletonema Costatum-Diatom:	Emission Excited at 290 nm
		Excitation Monitored at 354 nm
190	Skeletonema Costatum-Diatom:	Emission Excited at 390 nm
		Excitation Monitored at 480 nm
191	Thalassiosira Fluviatilis-Diatom:	Emission Excited at 290, 354 nm
		Excitation Monitored at 440 nm
192	Thalassiosira Fluviatilis-Diatom:	Emission Excited at 375 nm
		Excitation Monitored at 450 nm
193	Gonyaulax Polyhedra-Dinoflagellate:	Emission Excited at 370, 390 nm
194	Gonyaulax Polyhedra-Dinoflagellate:	Emission Excited at 360 nm
		Excitation Monitored at 480 nm
195	Gonyaulax Polyhedra-Dinoflagellate:	Emission Excited at 390 nm
		Excitation Monitored at 440 nm
196	Gymnodinium Nelsoni-Dinoflagellate:	Emission Excited at 365 nm
		Excitation Monitored at 456 nm

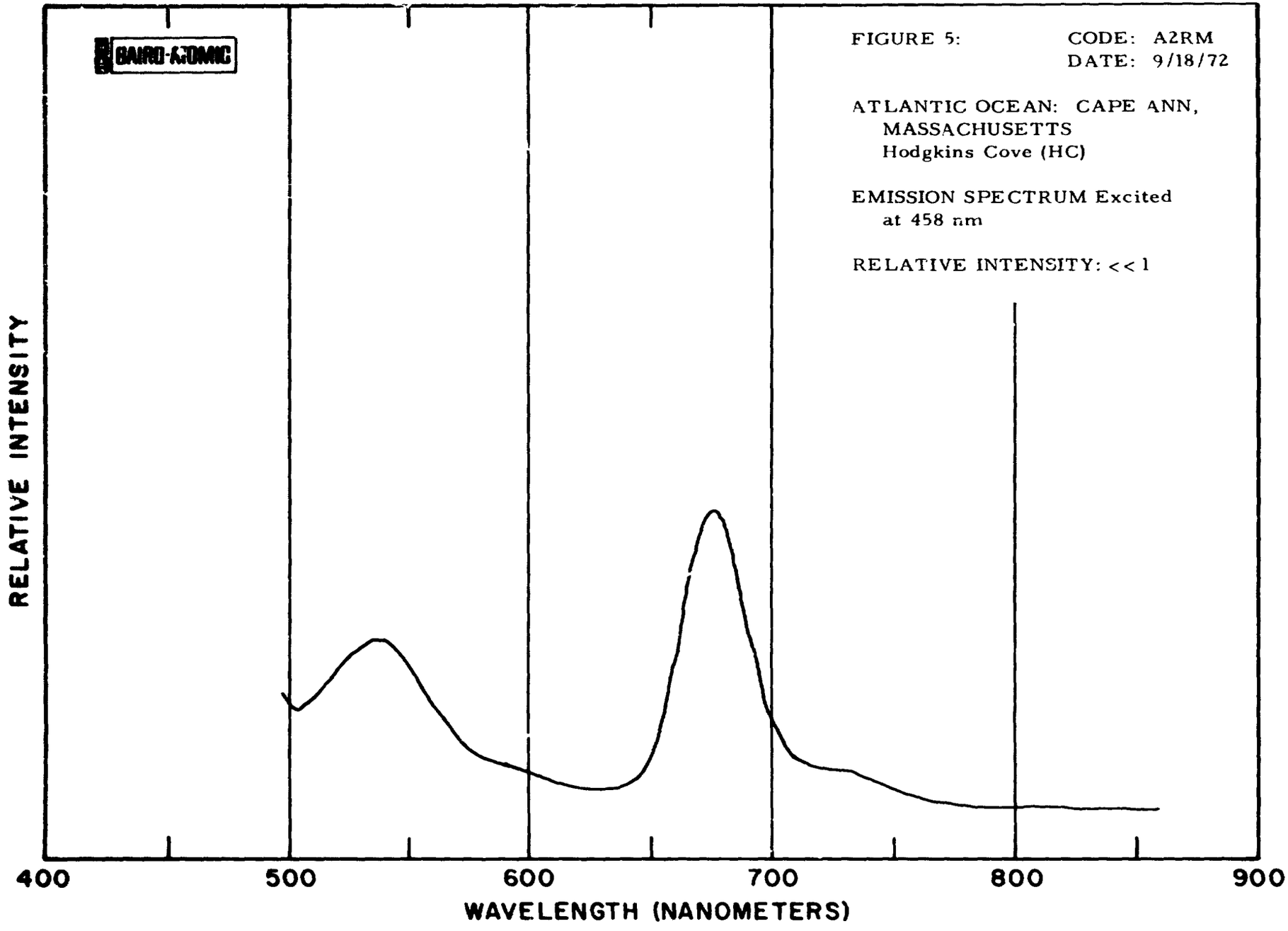
2.2 Spectral Data

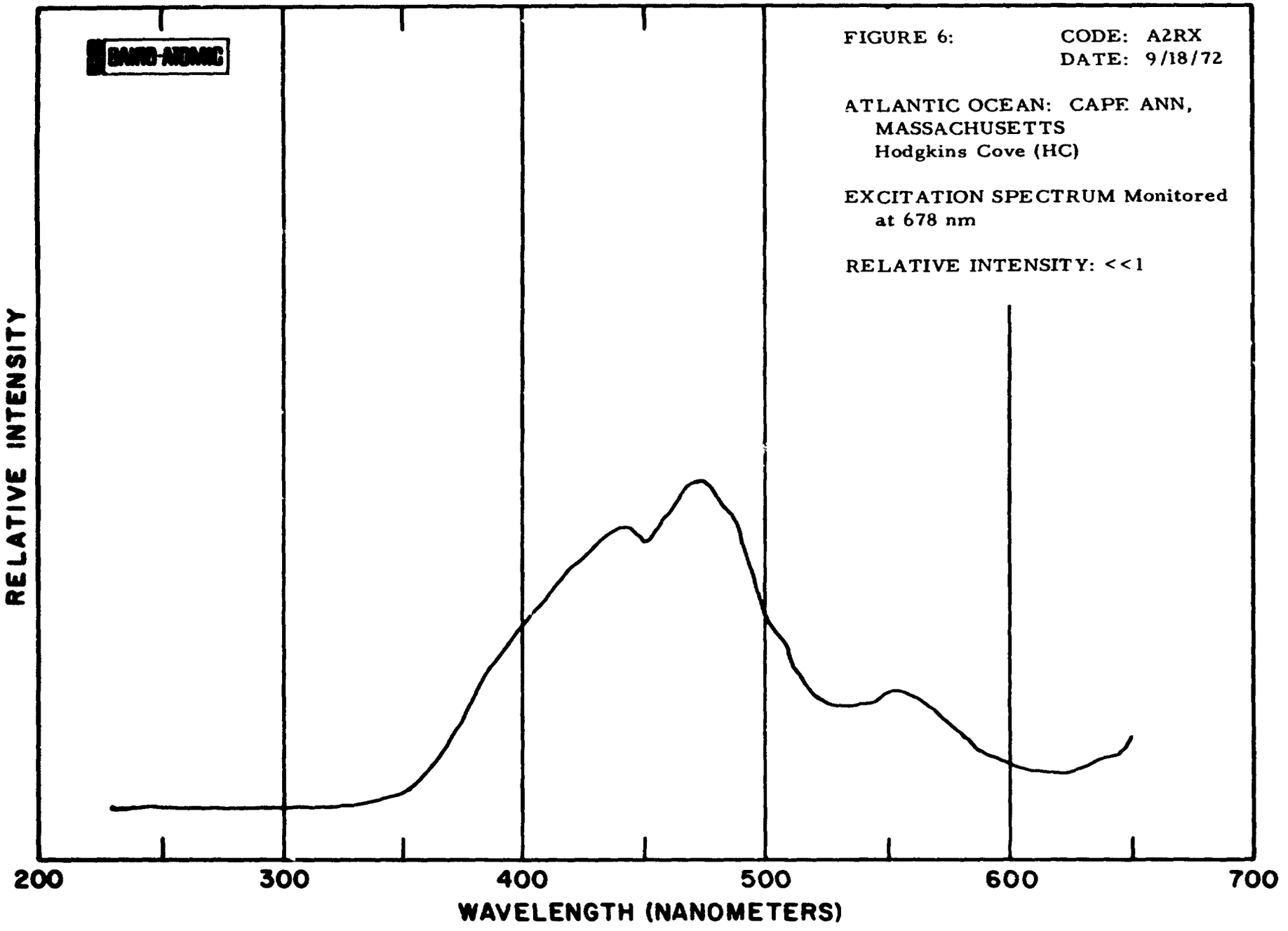

BAIRD-ATOMIC
FIGURE 1:
CODE: AIRM
DATE: 2/3/72
LABORATORY SEAWATER
University of Massachusetts
Marine Station (Cape Ann)
EMISSION SPECTRUM Excited
at 476 nm
RELATIVE INTENSITY: ~ 3
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

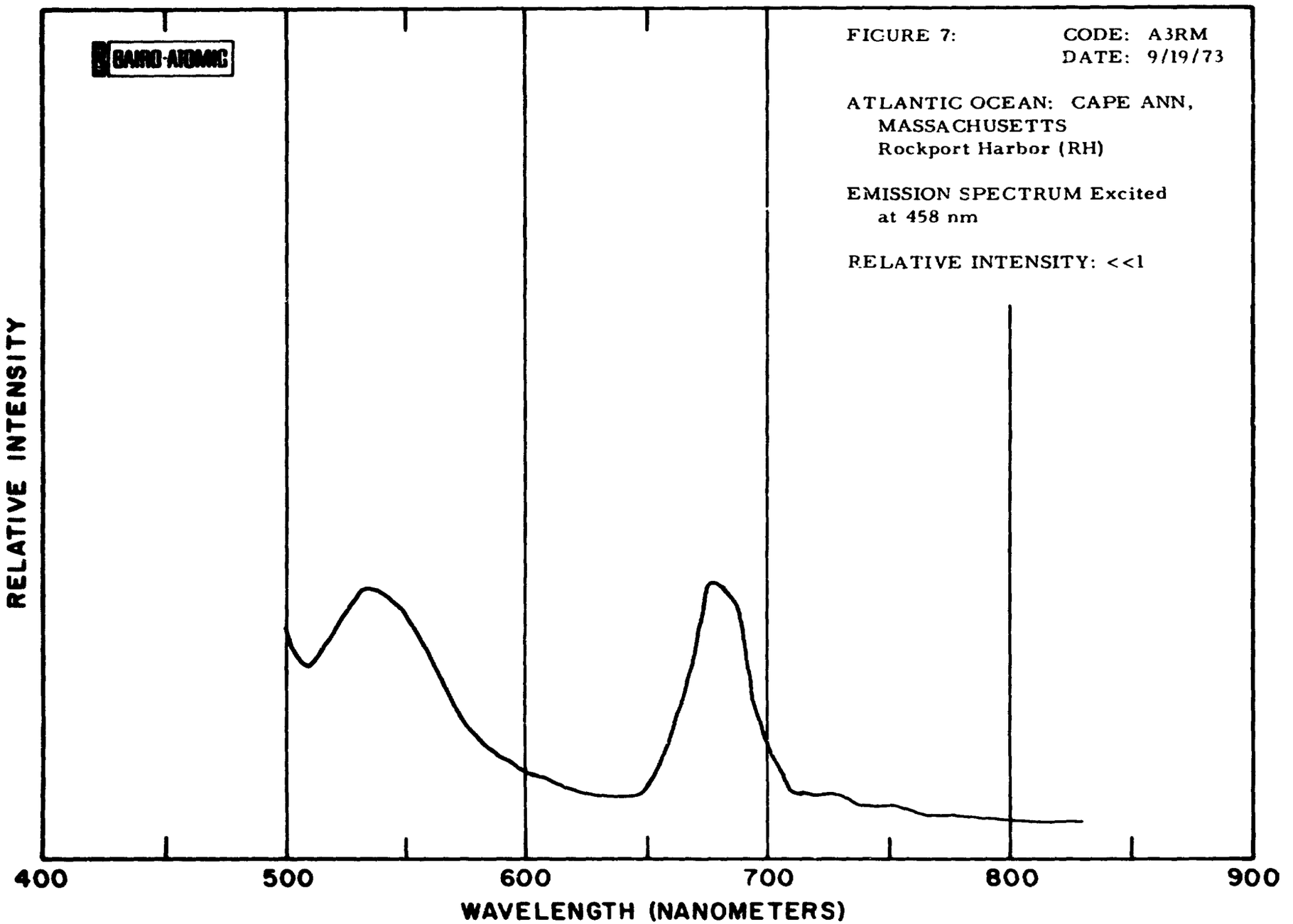

BAIRD-ATOMIC
FIGURE 2:
CODE: AIRX
DATE: 2/3/72
LABORATORY SEAWATER
University of Massachusetts
Marine Station (Cape Ann)
EXCITATION SPECTRUM Monitored
at 686 nm
RELATIVE INTENSITY: ~ 3
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

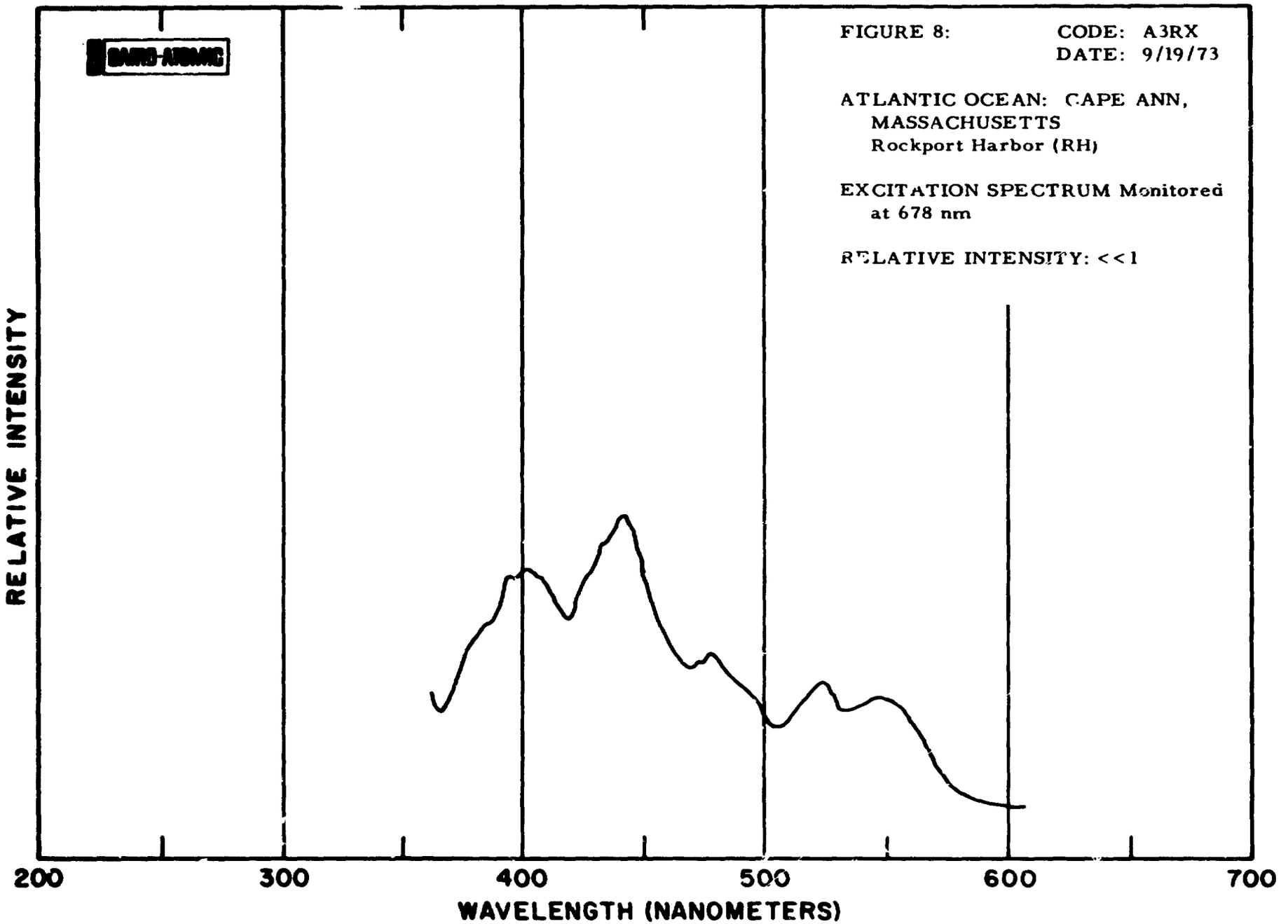

BAIRD-ATOMIC
FIGURE 3:
CODE: A5RM
DATE: 12/4/71
LABORATORY SEAWATER
UNIVERSITY OF MASSACHUSETTS
Marine Station (Cape Ann)
EMISSION SPECTRUM Excited
at 466 nm
RELATIVE INTENSITY: 1
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

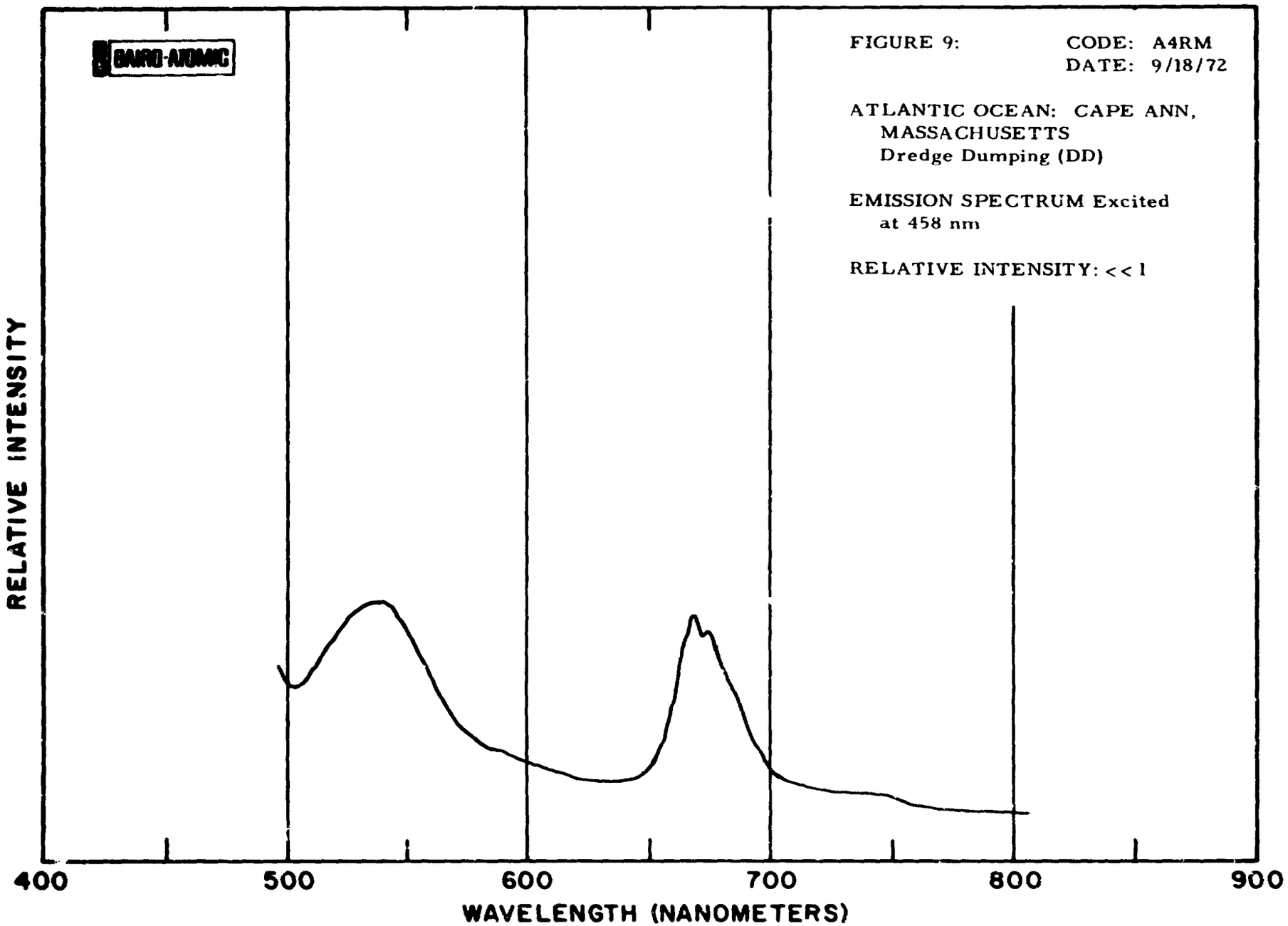

BAIRD-ATOMIC
FIGURE 4:
CODE: A5RX
DATE: 12/4/71
LABORATORY SEAWATER
UNIVERSITY OF MASSACHUSETTS
Marine Station (Cape Ann)
EXCITATION SPECTRUM Monitored at 685 nm
RELATIVE INTENSITY: 1
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

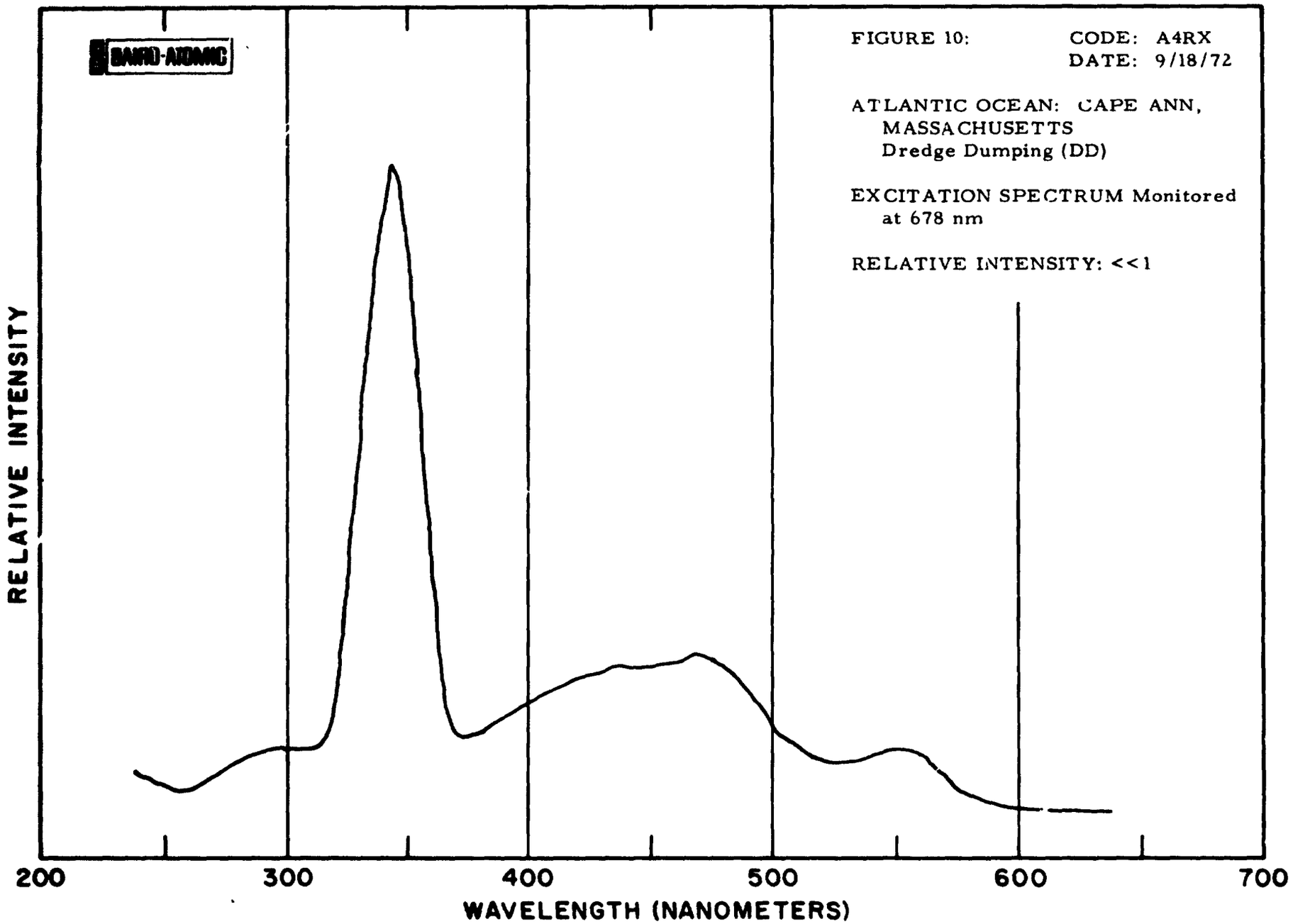

BAIRD-ATOMIC
FIGURE 5:
CODE: A2RM
DATE: 9/18/72
ATLANTIC OCEAN: CAPE ANN, MASSACHUSETTS
Hodgkins Cove (HC)
EMISSION SPECTRUM Excited at 458 nm
RELATIVE INTENSITY: << 1
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

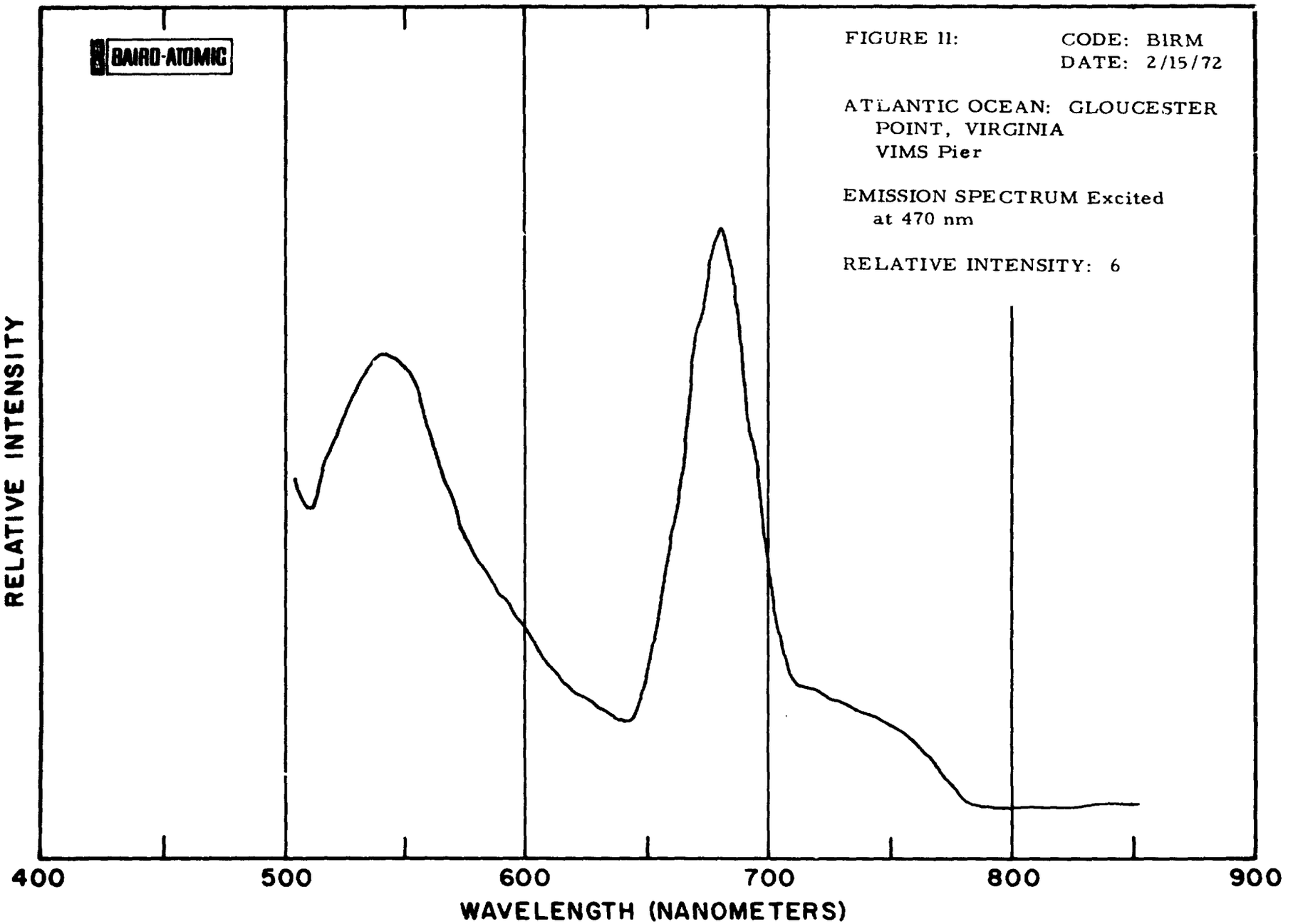

BAIRD-ATOMIC
FIGURE 6:
CODE: A2RX
DATE: 9/18/72
ATLANTIC OCEAN: CAPE ANN, MASSACHUSETTS
Hodgkins Cove (HC)
EXCITATION SPECTRUM Monitored at 678 nm
RELATIVE INTENSITY: <<1
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

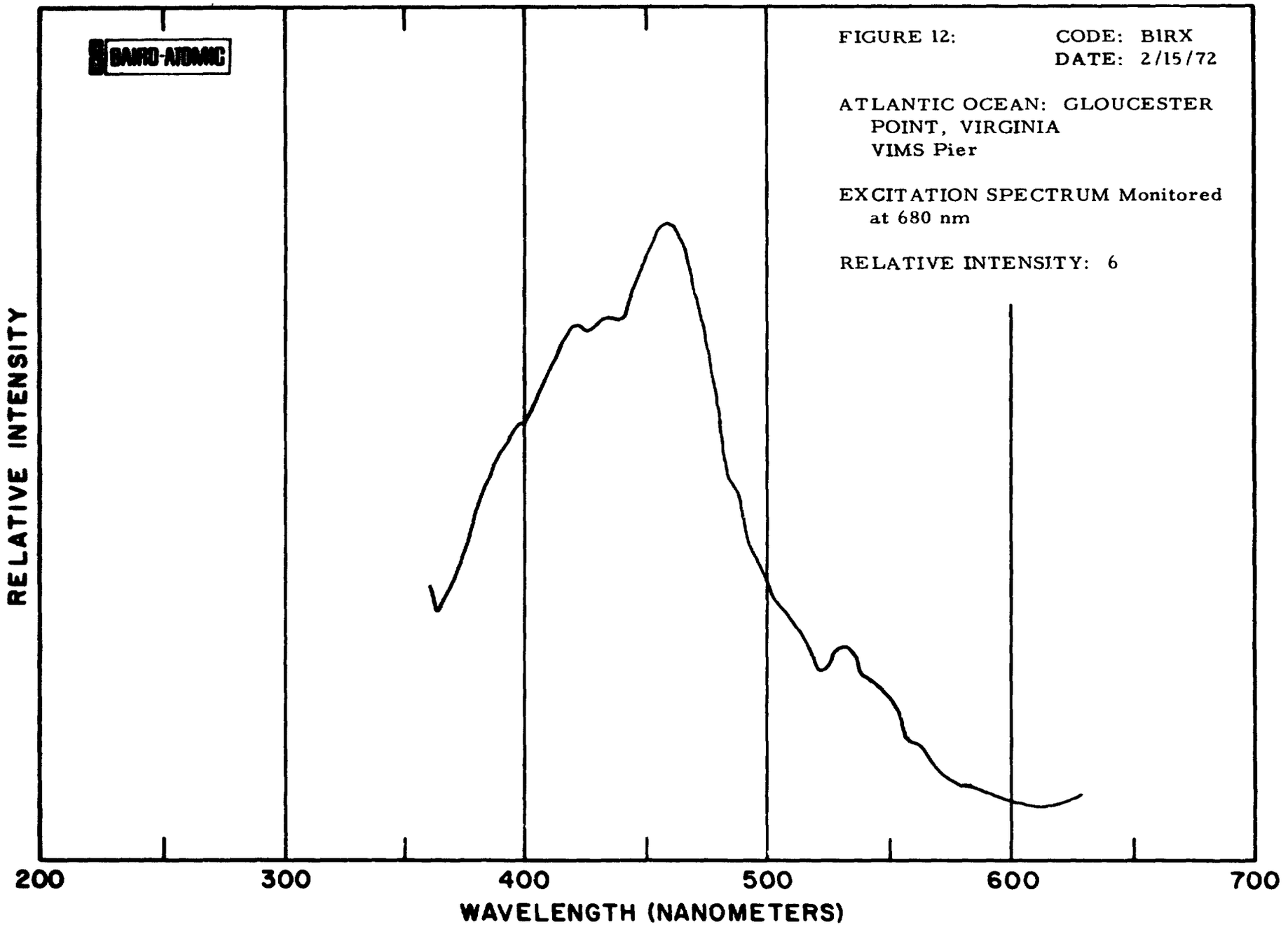

BAIRD-ATOMIC
FIGURE 7:
CODE: A3RM
DATE: 9/19/73
ATLANTIC OCEAN: CAPE ANN, MASSACHUSETTS
Rockport Harbor (RH)
EMISSION SPECTRUM Excited at 458 nm
RELATIVE INTENSITY: <<1
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

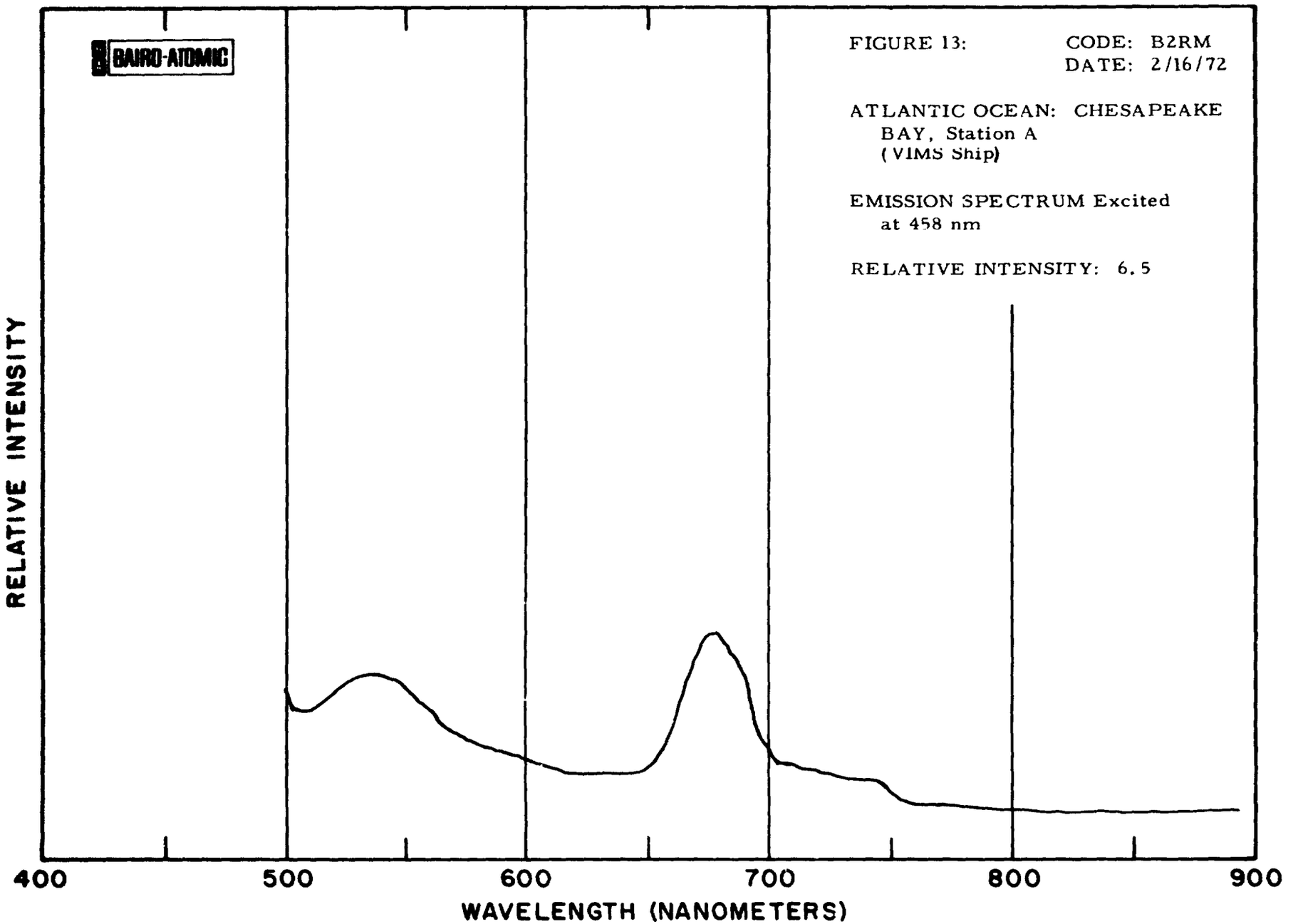

BAIRD-ATOMIC
FIGURE 8:
CODE: A3RX
DATE: 9/19/73
ATLANTIC OCEAN: CAPE ANN, MASSACHUSETTS
Rockport Harbor (RH)
EXCITATION SPECTRUM Monitored at 678 nm
RELATIVE INTENSITY: <<1
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

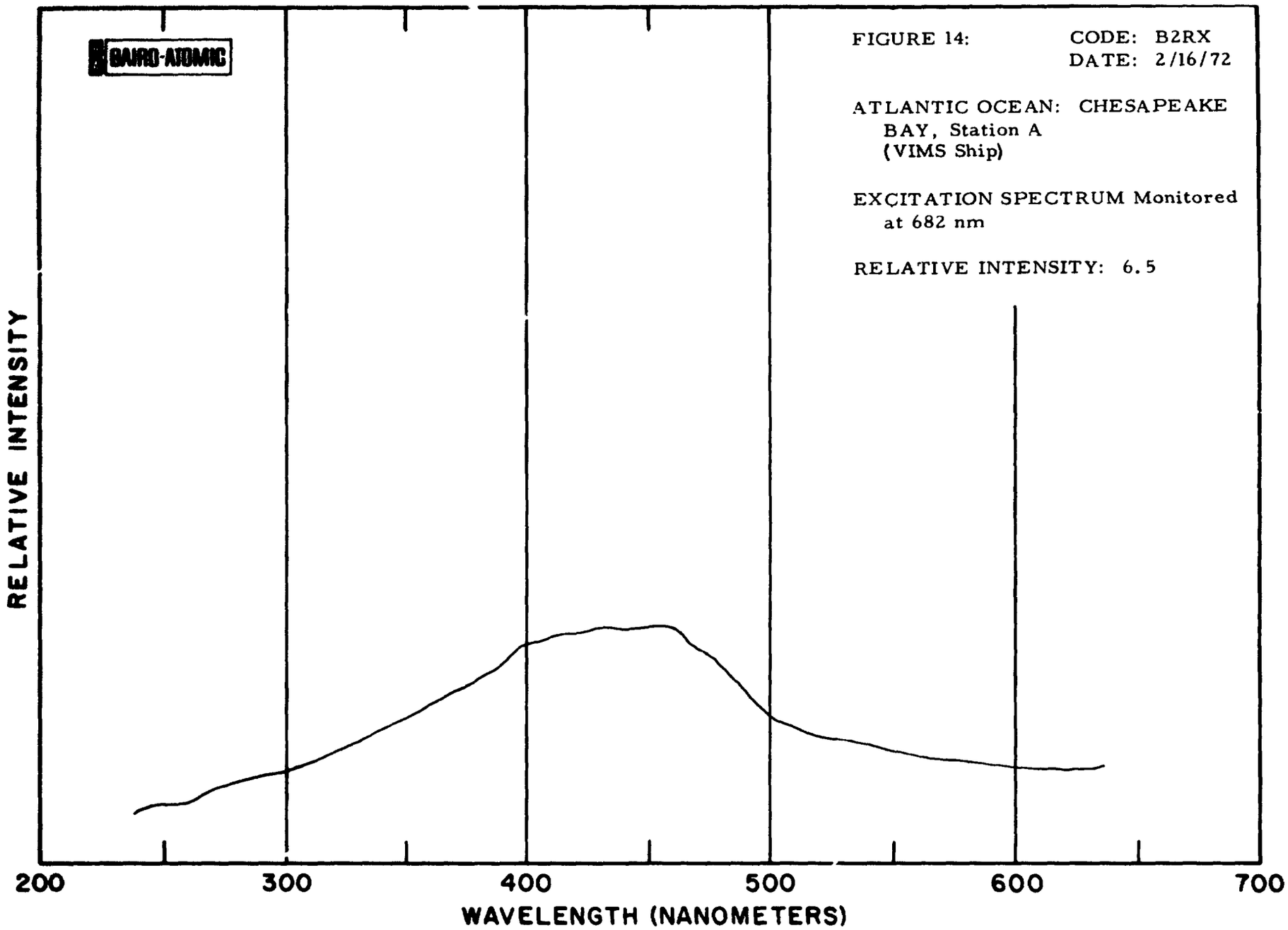

BAIRD-ATOMIC
FIGURE 9:
CODE: A4RM
DATE: 9/18/72
ATLANTIC OCEAN: CAPE ANN, MASSACHUSETTS
Dredge Dumping (DD)
EMISSION SPECTRUM Excited at 458 nm
RELATIVE INTENSITY: << 1
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

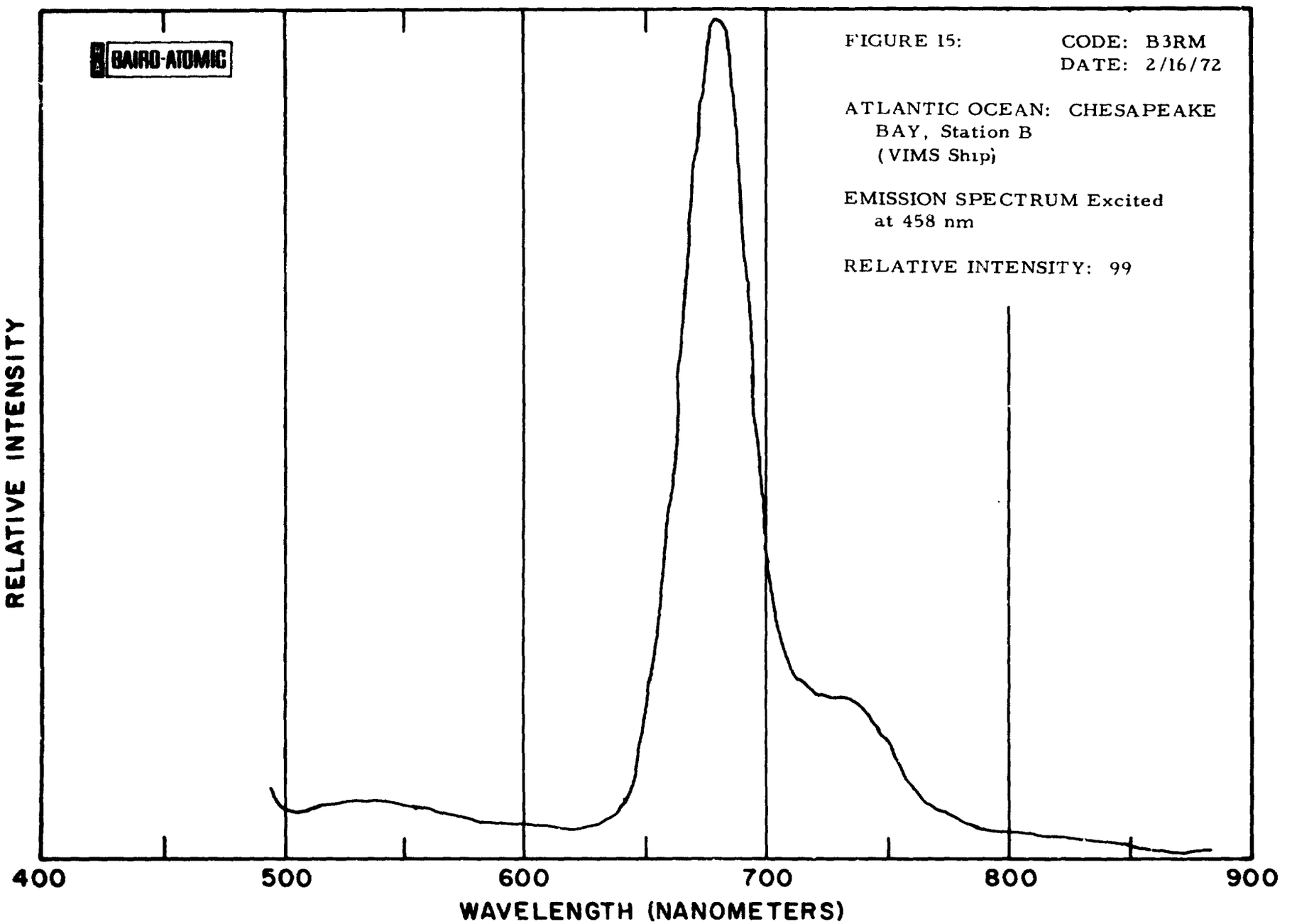

BAIRD-ATOMIC
FIGURE 10:
CODE: A4RX
DATE: 9/18/72
ATLANTIC OCEAN: CAPE ANN, MASSACHUSETTS
Dredge Dumping (DD)
EXCITATION SPECTRUM Monitored at 678 nm
RELATIVE INTENSITY: <<1
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

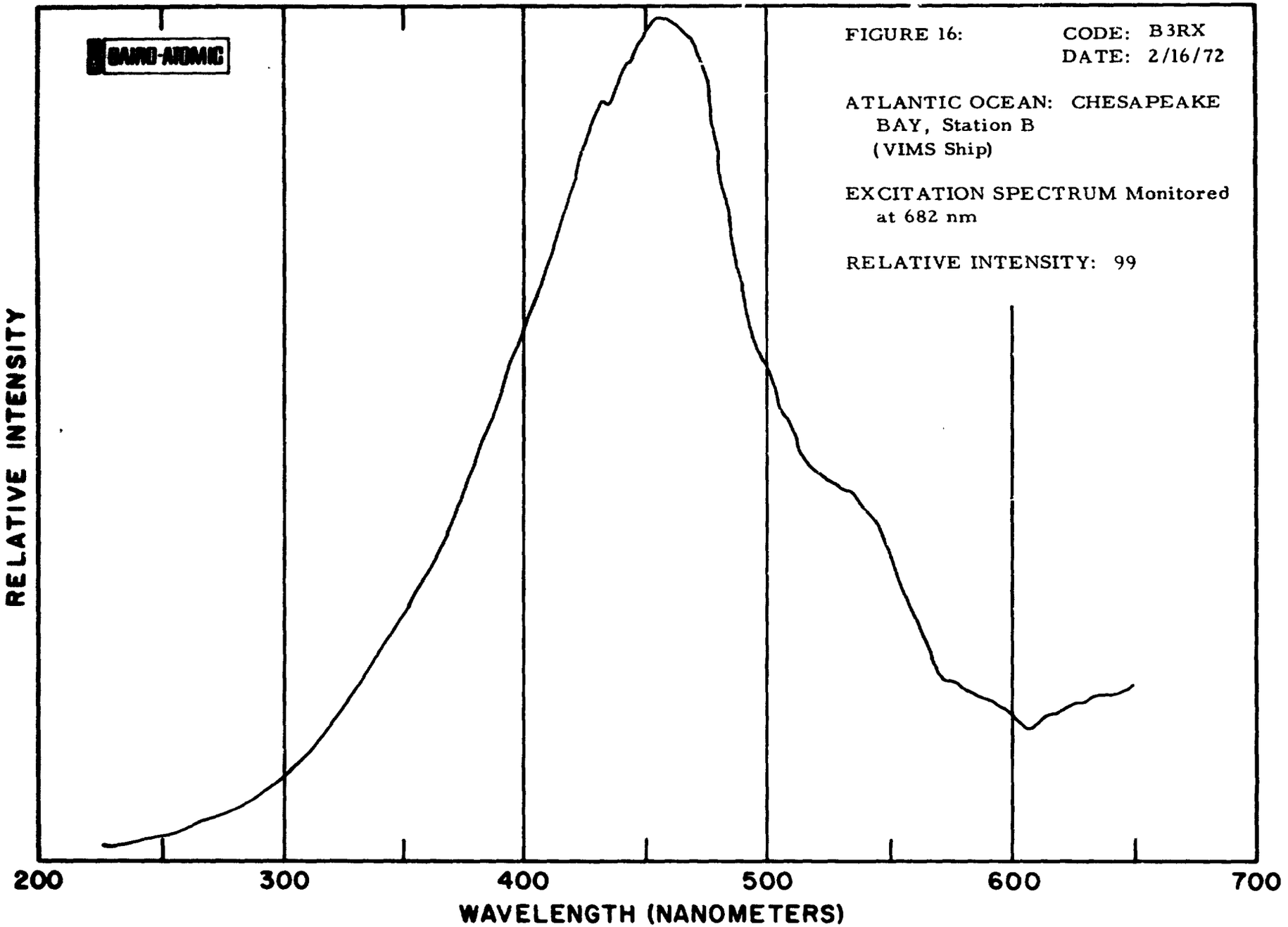

BAIRD-ATOMIC
FIGURE 11:
CODE: BIRM
DATE: 2/15/72
ATLANTIC OCEAN: GLOUCESTER POINT, VIRGINIA
VIMS Pier
EMISSION SPECTRUM Excited at 470 nm
RELATIVE INTENSITY: 6
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

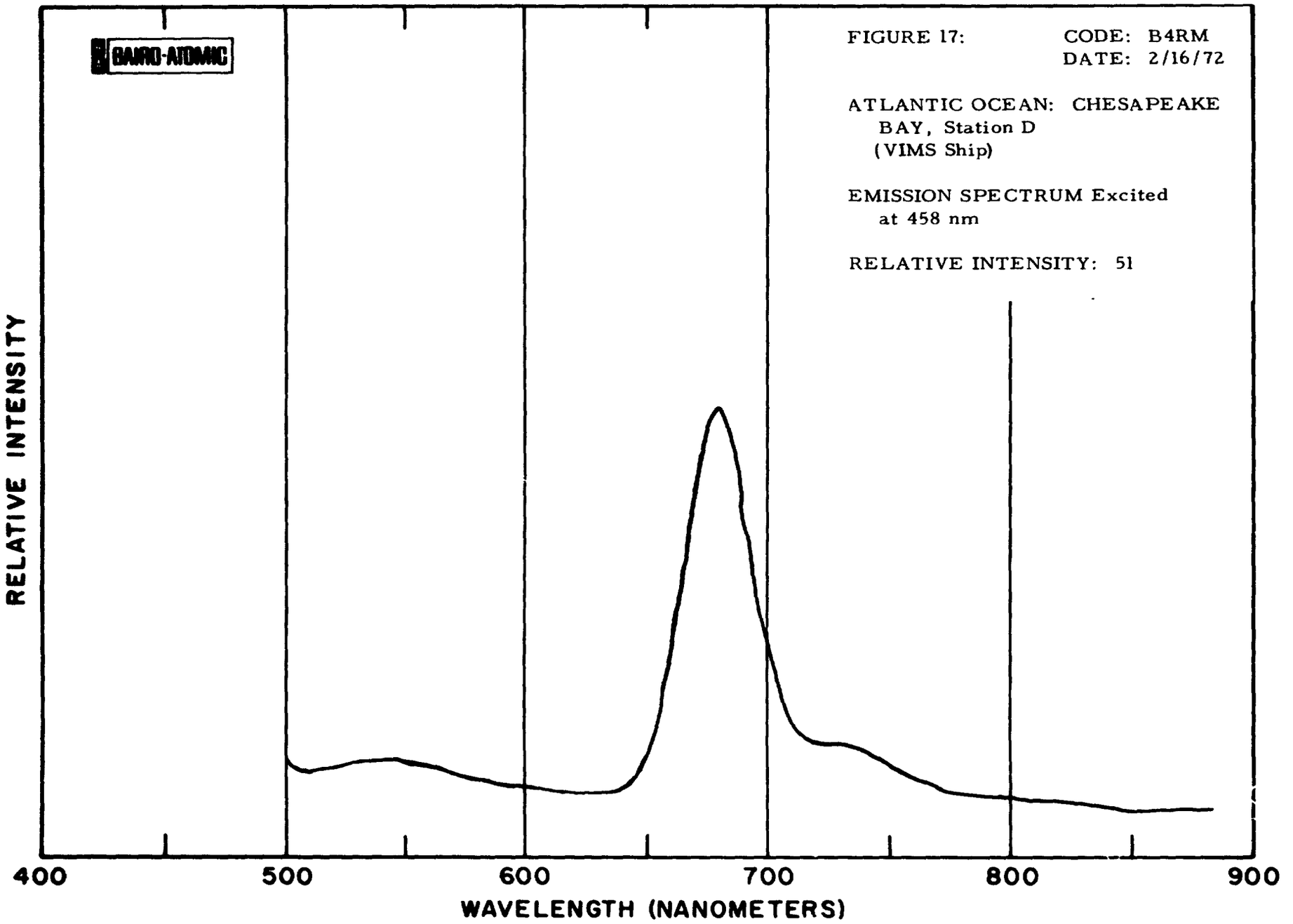

BAIRD-ATOMIC
FIGURE 12:
CODE: B1RX
DATE: 2/15/72
ATLANTIC OCEAN: GLOUCESTER POINT, VIRGINIA
VIMS Pier
EXCITATION SPECTRUM Monitored at 680 nm
RELATIVE INTENSITY: 6
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

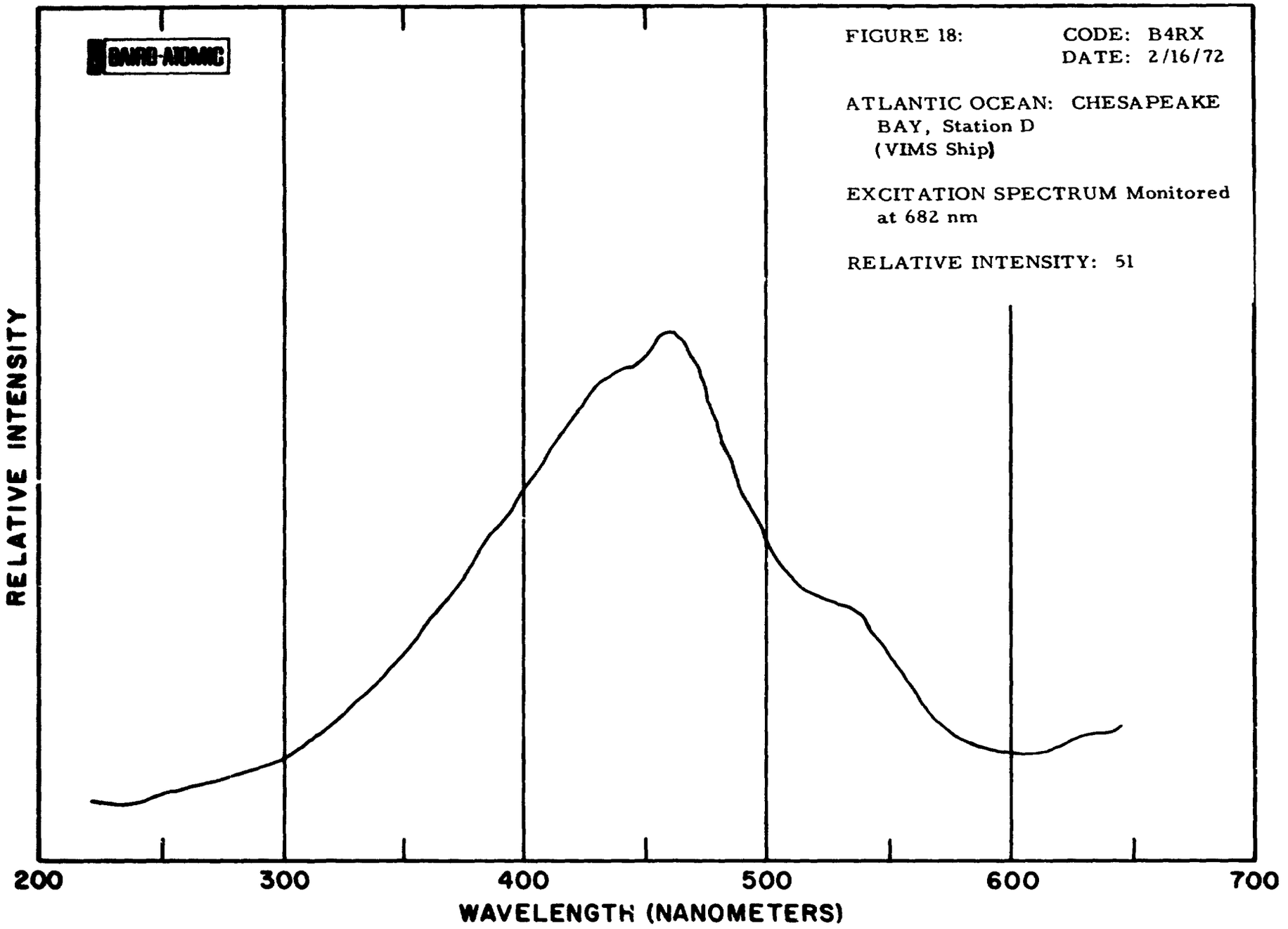

BAIRD-ATOMIC
FIGURE 13:
CODE: B2RM
DATE: 2/16/72
ATLANTIC OCEAN: CHESAPEAKE BAY, Station A (VIMS Ship)
EMISSION SPECTRUM Excited at 458 nm
RELATIVE INTENSITY: 6.5
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

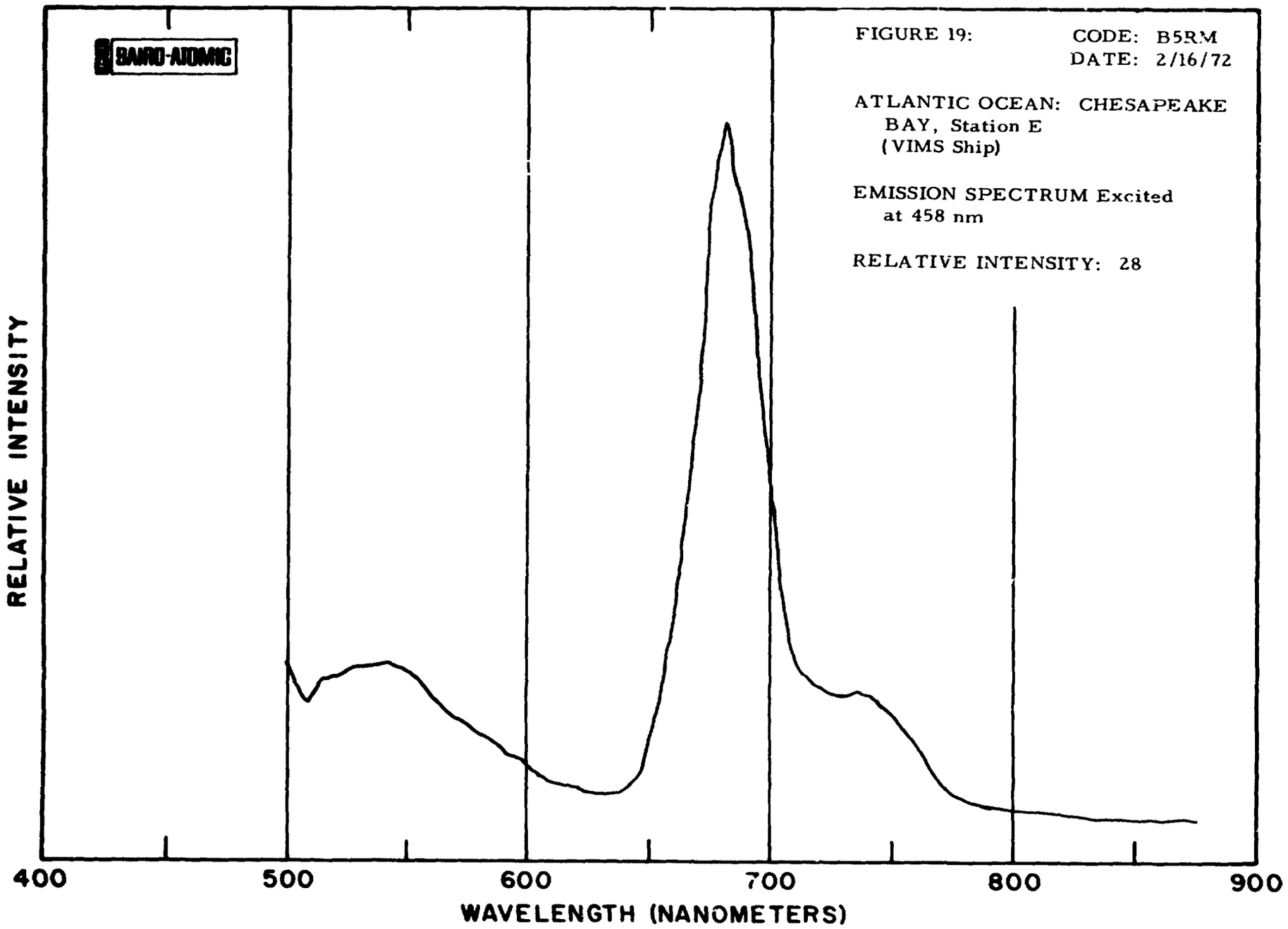

BAIRD-ATOMIC
FIGURE 14:
CODE: B2RX
DATE: 2/16/72
ATLANTIC OCEAN: CHESAPEAKE BAY, Station A (VIMS Ship)
EXCITATION SPECTRUM Monitored at 682 nm
RELATIVE INTENSITY: 6.5
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

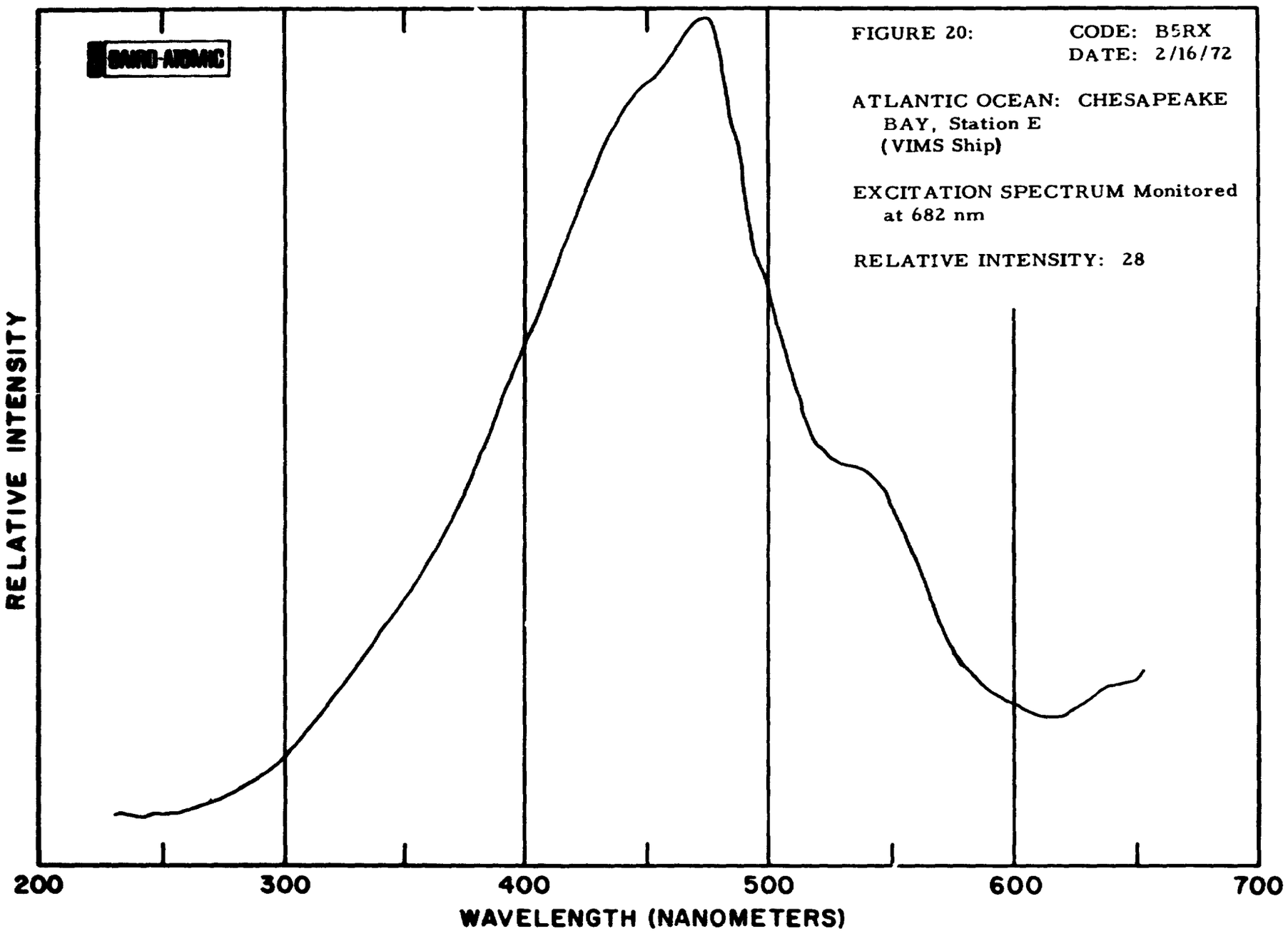

BAIRD-ATOMIC
FIGURE 15:
CODE: B3RM
DATE: 2/16/72
ATLANTIC OCEAN: CHESAPEAKE BAY, Station B (VIMS Ship)
EMISSION SPECTRUM Excited at 458 nm
RELATIVE INTENSITY: 99
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

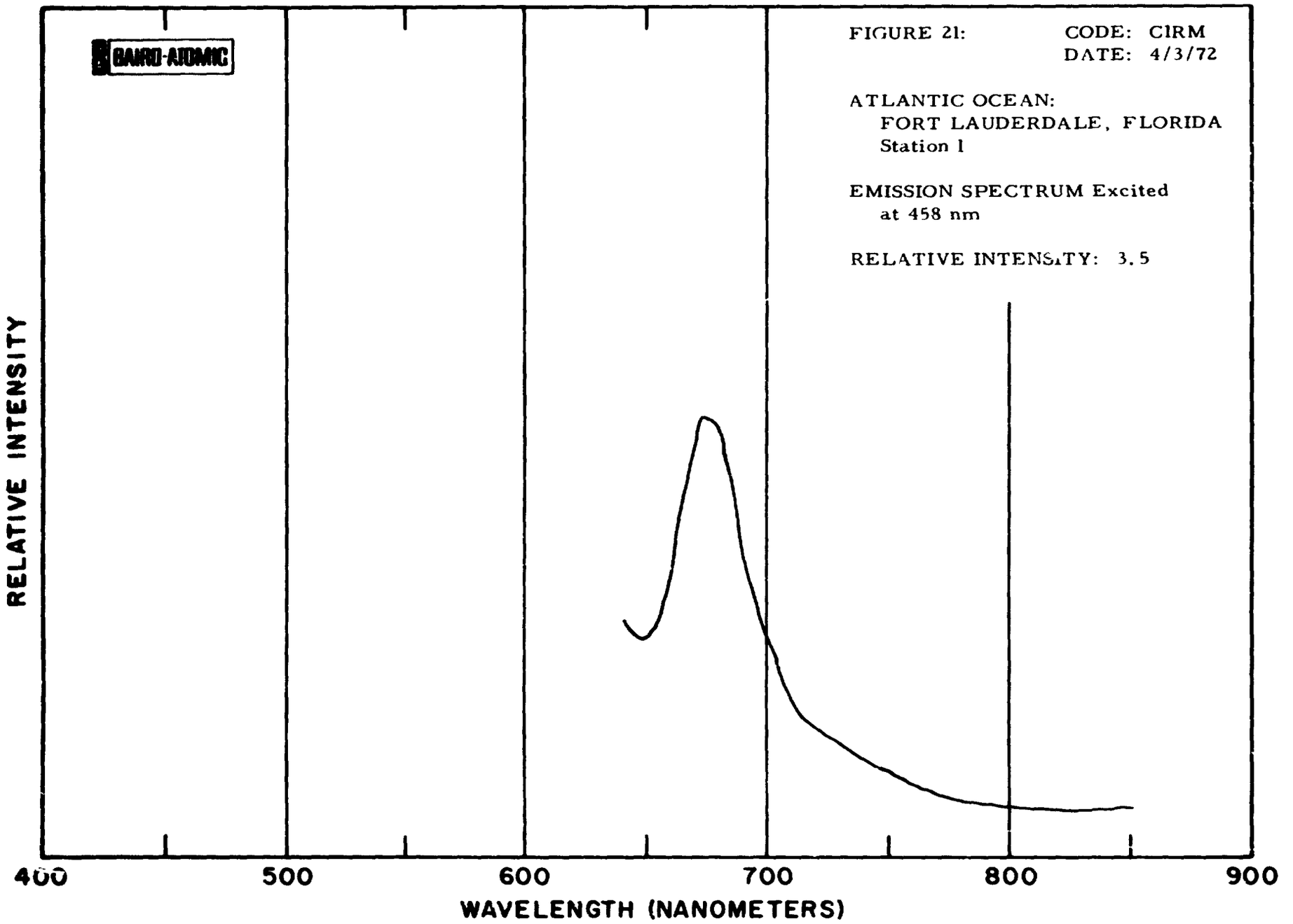

BAIRD-ATOMIC
FIGURE 16:
CODE: B3RX
DATE: 2/16/72
ATLANTIC OCEAN: CHESAPEAKE BAY, Station B (VIMS Ship)
EXCITATION SPECTRUM Monitored at 682 nm
RELATIVE INTENSITY: 99
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

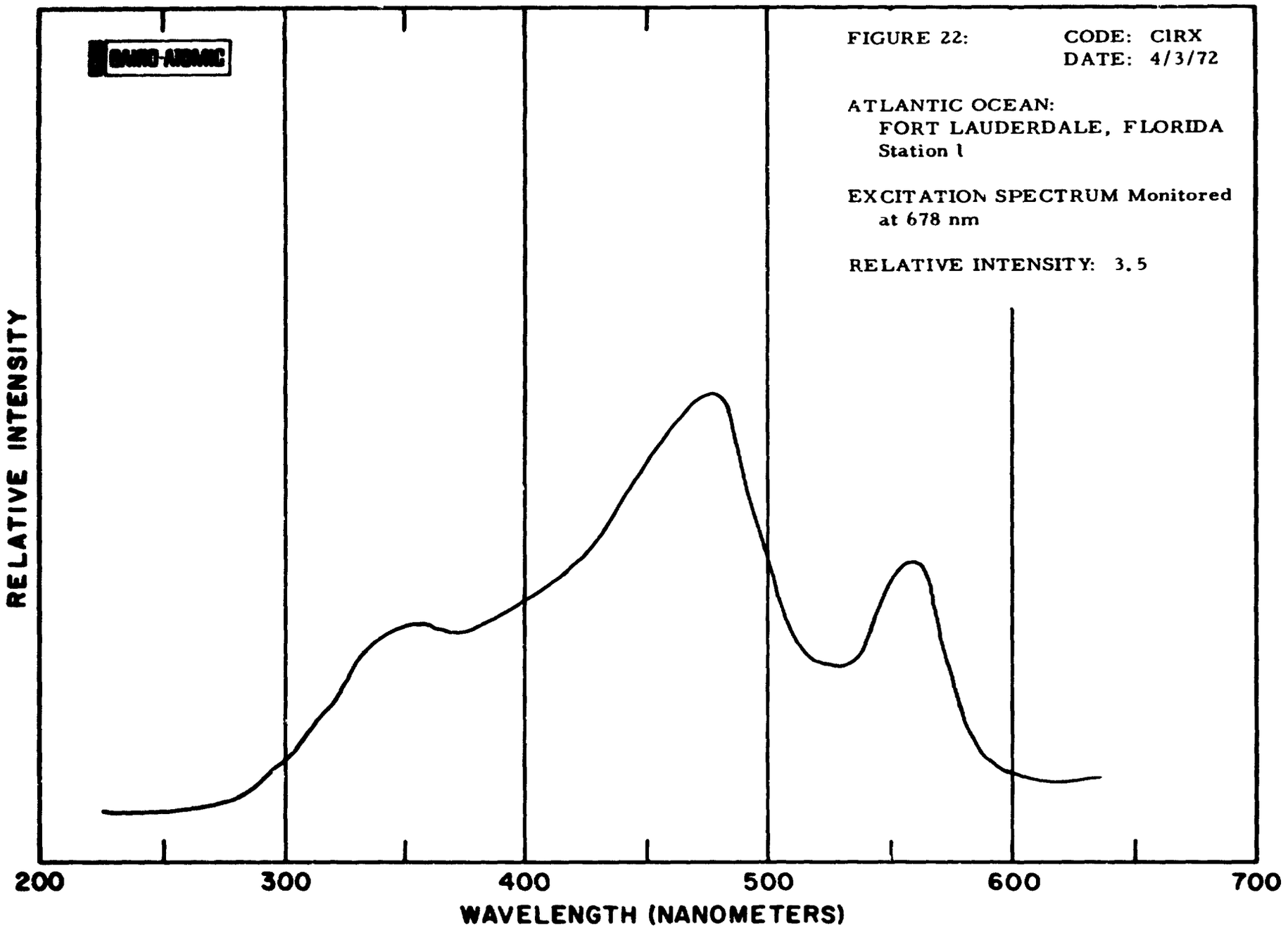

GAIRO-ATOMIC
FIGURE 17:
CODE: B4RM
DATE: 2/16/72
ATLANTIC OCEAN: CHESAPEAKE BAY, Station D (VIMS Ship)
EMISSION SPECTRUM Excited at 458 nm
RELATIVE INTENSITY: 51
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

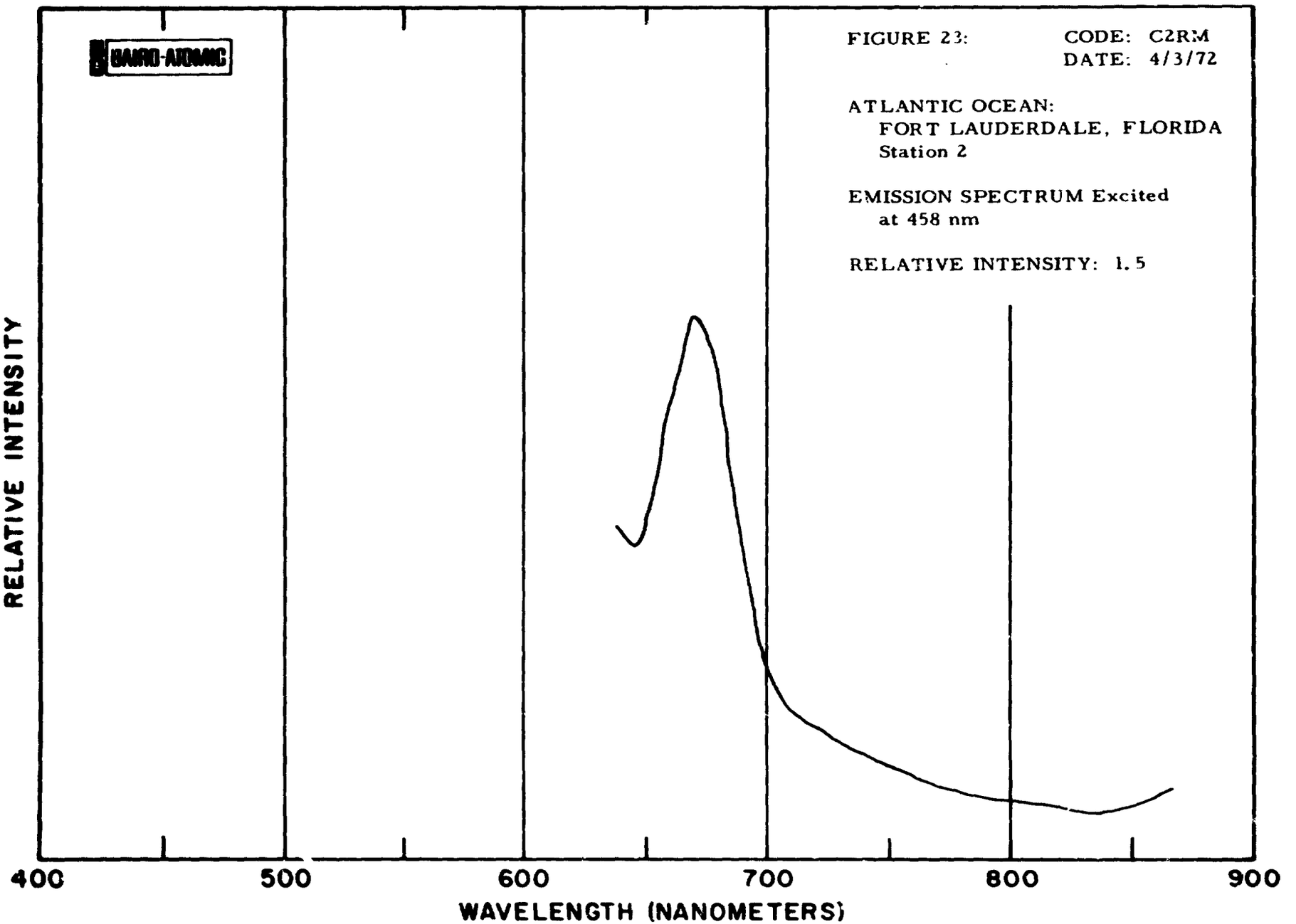

BAIRD-ATOMIC
FIGURE 18:
CODE: B4RX
DATE: 2/16/72
ATLANTIC OCEAN: CHESAPEAKE BAY, Station D (VIMS Ship)
EXCITATION SPECTRUM Monitored at 682 nm
RELATIVE INTENSITY: 51
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

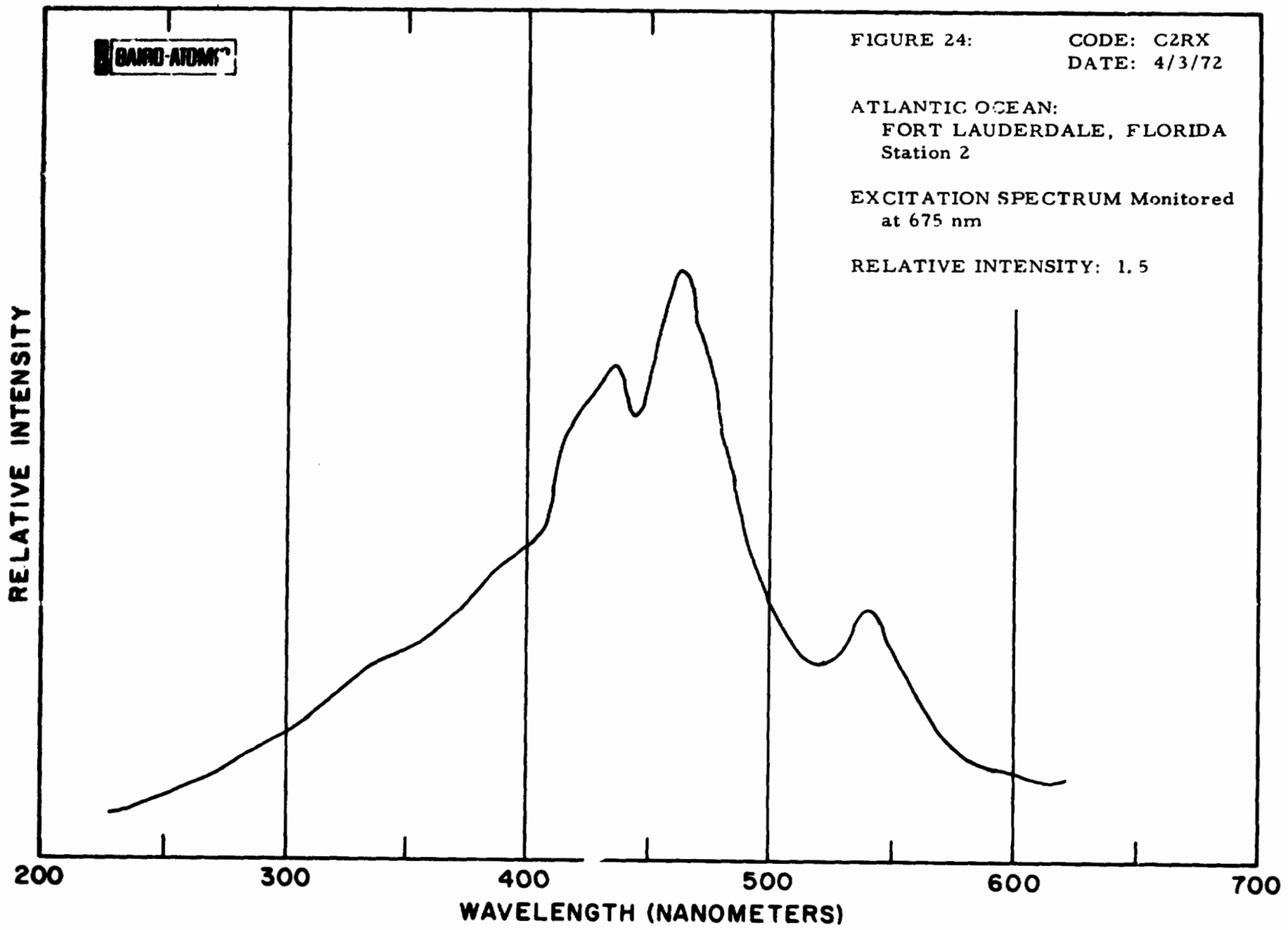

BAIRD-ATOMIC
FIGURE 19:
CODE: B5RM
DATE: 2/16/72
ATLANTIC OCEAN: CHESAPEAKE BAY, Station E (VIMS Ship)
EMISSION SPECTRUM Excited at 458 nm
RELATIVE INTENSITY: 28
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

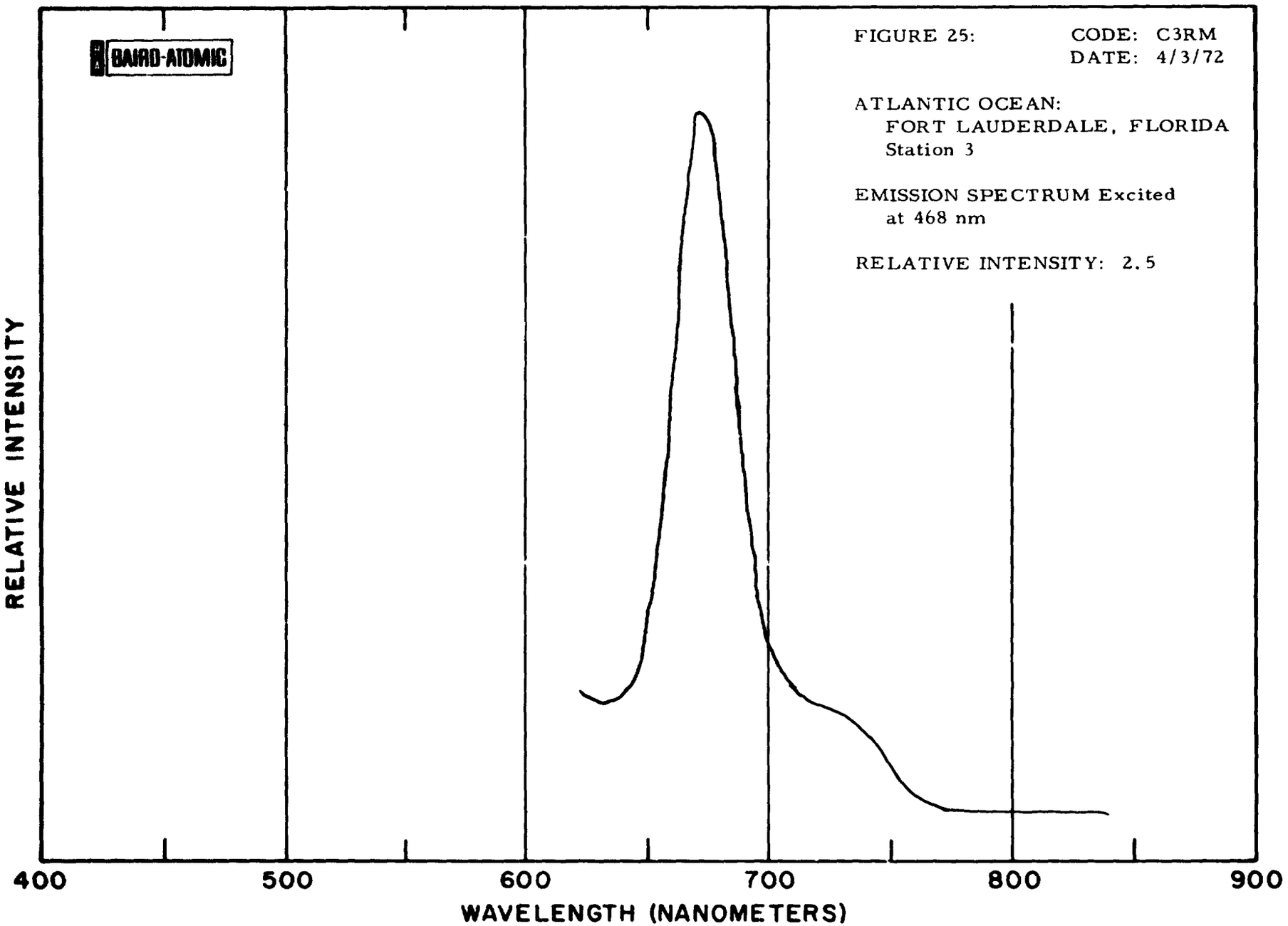

BAIRD-ATOMIC
FIGURE 20:
CODE: B5RX
DATE: 2/16/72
ATLANTIC OCEAN: CHESAPEAKE BAY, Station E (VIMS Ship)
EXCITATION SPECTRUM Monitored at 682 nm
RELATIVE INTENSITY: 28
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

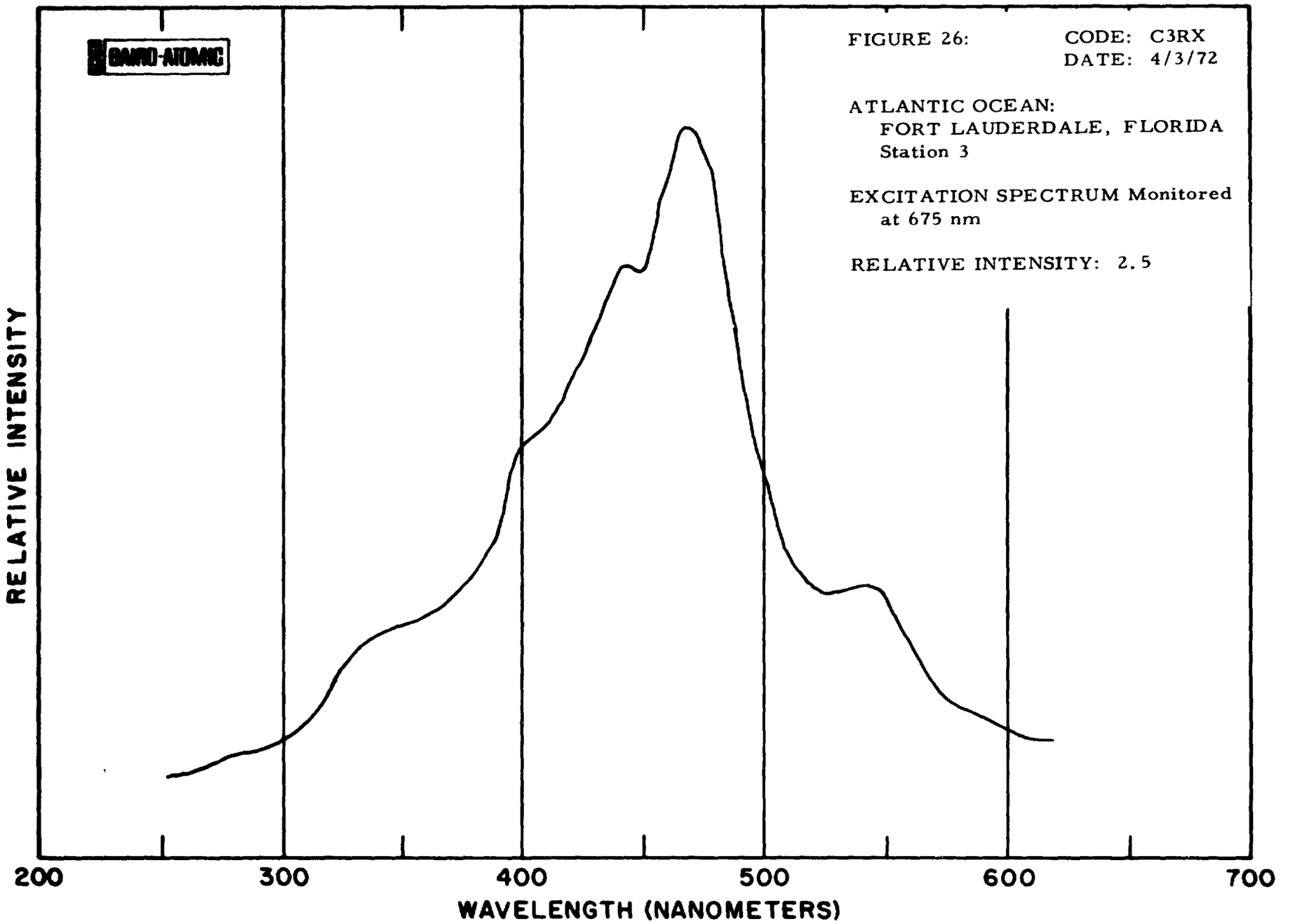

BAIRD-ATOMIC
FIGURE 21:
CODE: CIRM
DATE: 4/3/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 1
EMISSION SPECTRUM Excited
at 458 nm
RELATIVE INTENSITY: 3.5
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

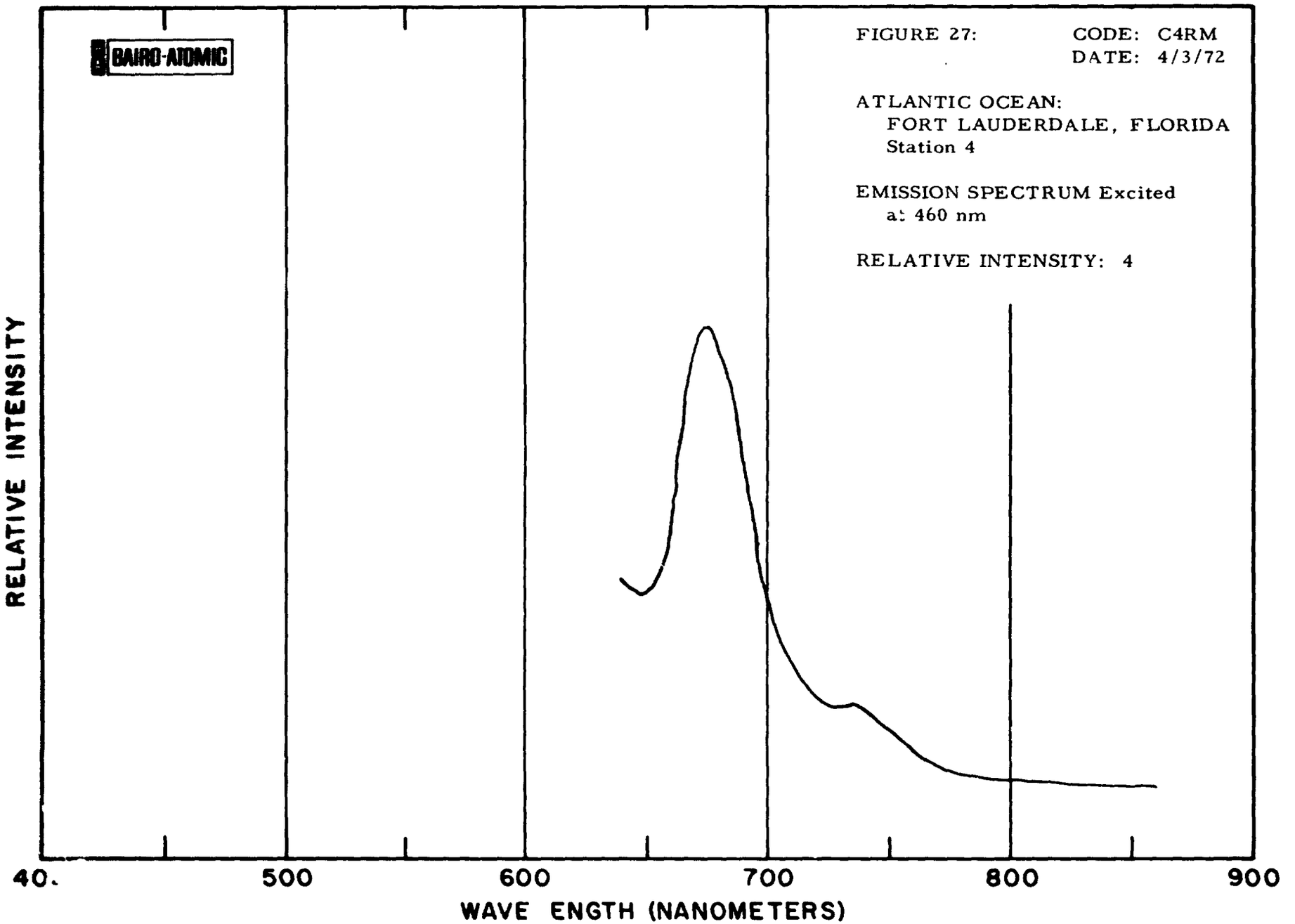

BAIRD-ATOMIC
FIGURE 22:
CODE: CIRX
DATE: 4/3/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 1
EXCITATION SPECTRUM Monitored at 678 nm
RELATIVE INTENSITY: 3.5
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

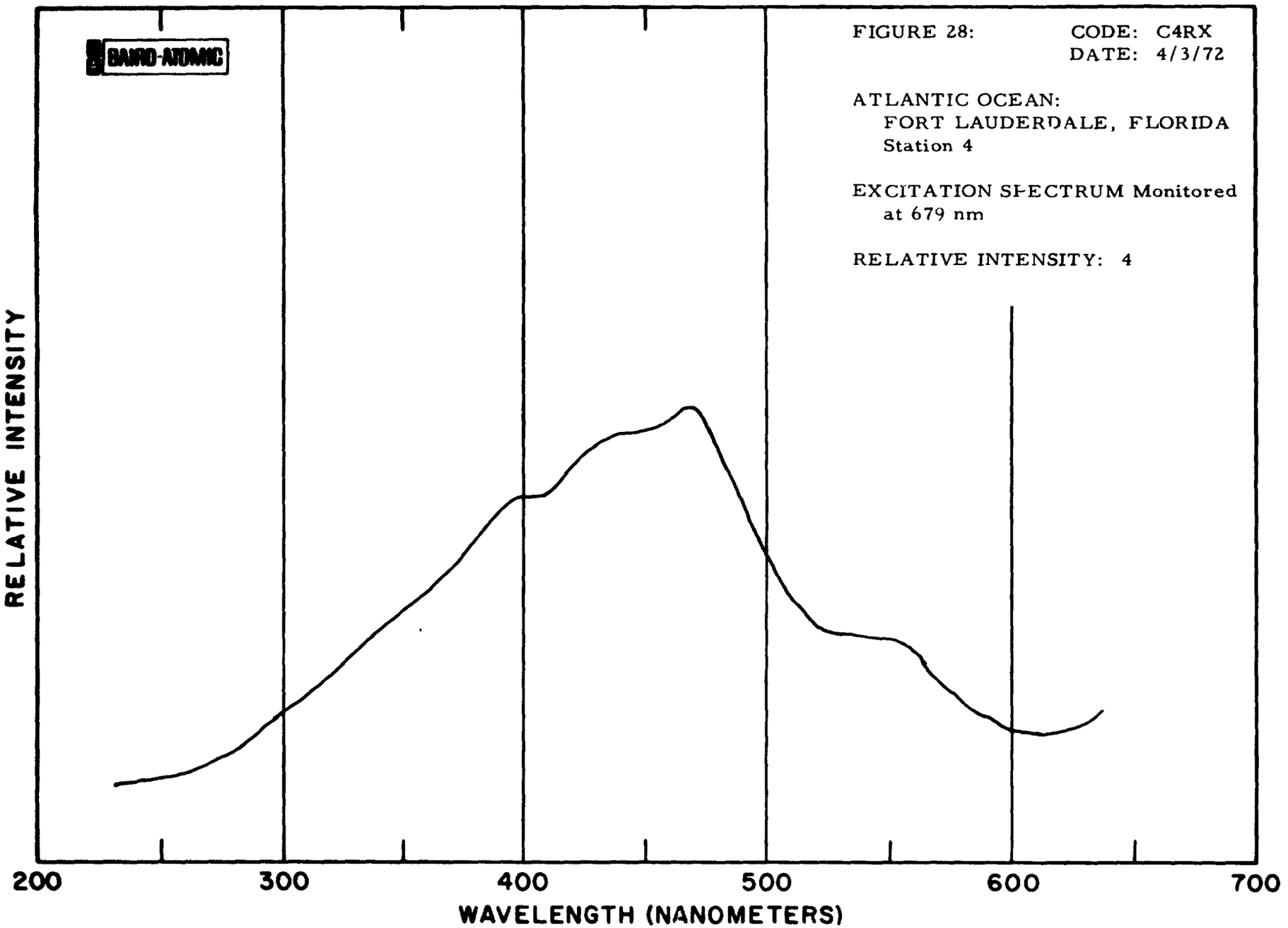

BAIRD-ATOMIC
FIGURE 23:
CODE: C2RM
DATE: 4/3/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 2
EMISSION SPECTRUM Excited
at 458 nm
RELATIVE INTENSITY: 1.5
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

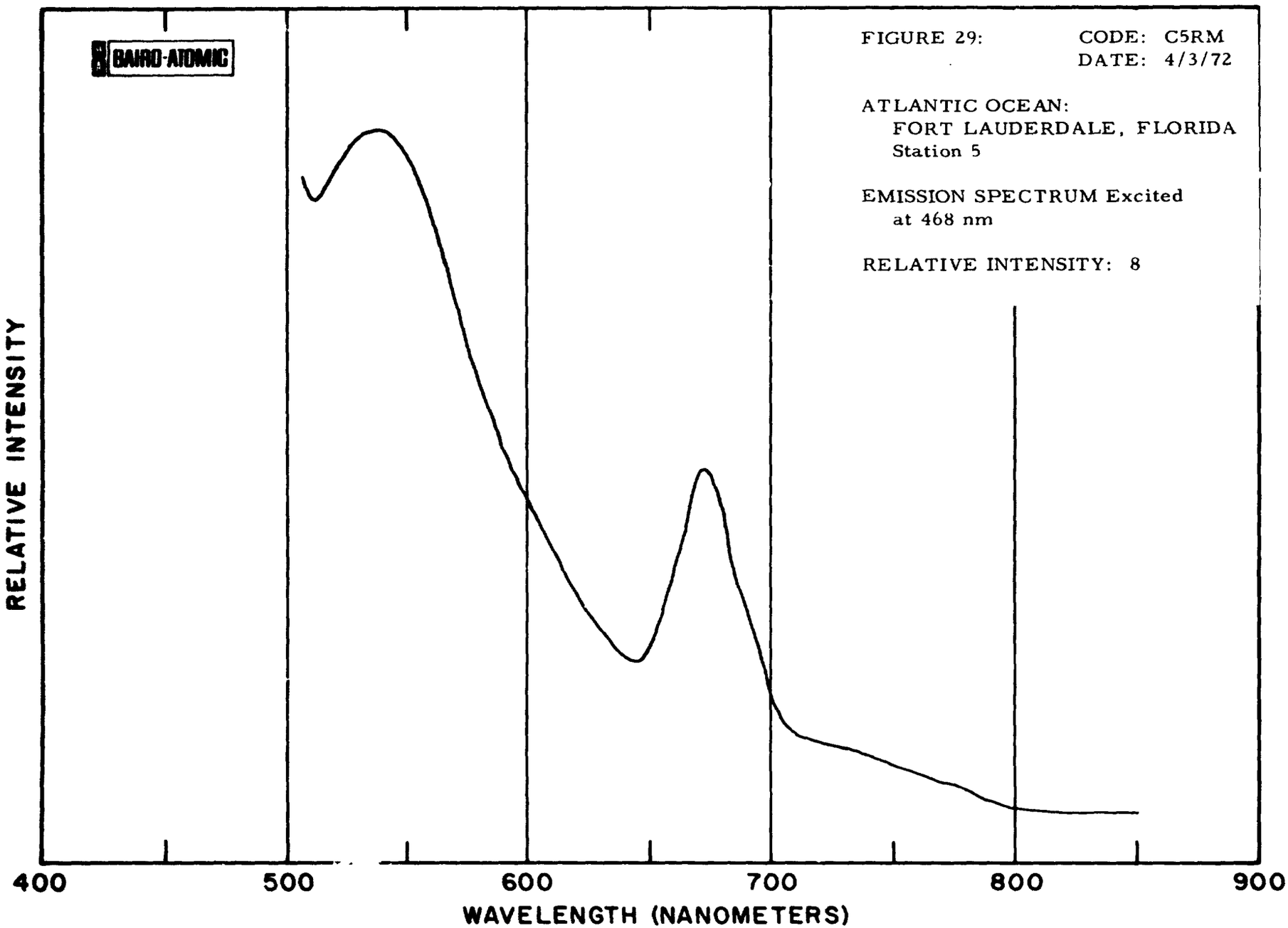

BAIRD-ATOMIC
FIGURE 24:
CODE: C2RX
DATE: 4/3/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 2
EXCITATION SPECTRUM Monitored at 675 nm
RELATIVE INTENSITY: 1.5
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 25:
CODE: C3RM
DATE: 4/3/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 3
EMISSION SPECTRUM Excited
at 468 nm
RELATIVE INTENSITY: 2.5
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 26:
CODE: C3RX
DATE: 4/3/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 3
EXCITATION SPECTRUM Monitored at 675 nm
RELATIVE INTENSITY: 2.5
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 27:
CODE: C4RM
DATE: 4/3/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 4
EMISSION SPECTRUM Excited
at 460 nm
RELATIVE INTENSITY: 4
RELATIVE INTENSITY
40.
500
600
700
800
900
WAVE ENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 28:
CODE: C4RX
DATE: 4/3/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 4
EXCITATION SPECTRUM Monitored at 679 nm
RELATIVE INTENSITY: 4
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 29:
CODE: C5RM
DATE: 4/3/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 5
EMISSION SPECTRUM Excited
at 468 nm
RELATIVE INTENSITY: 8
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

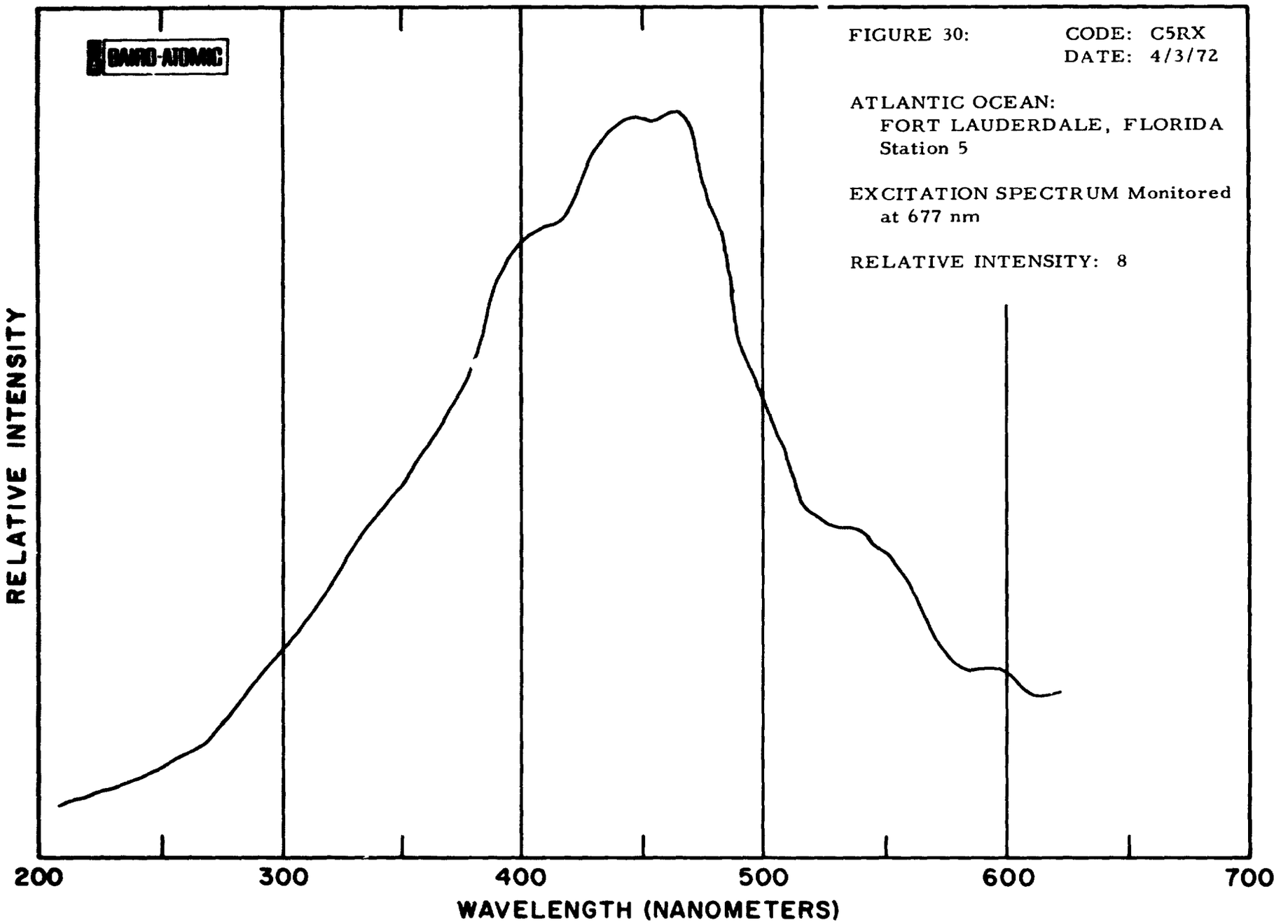
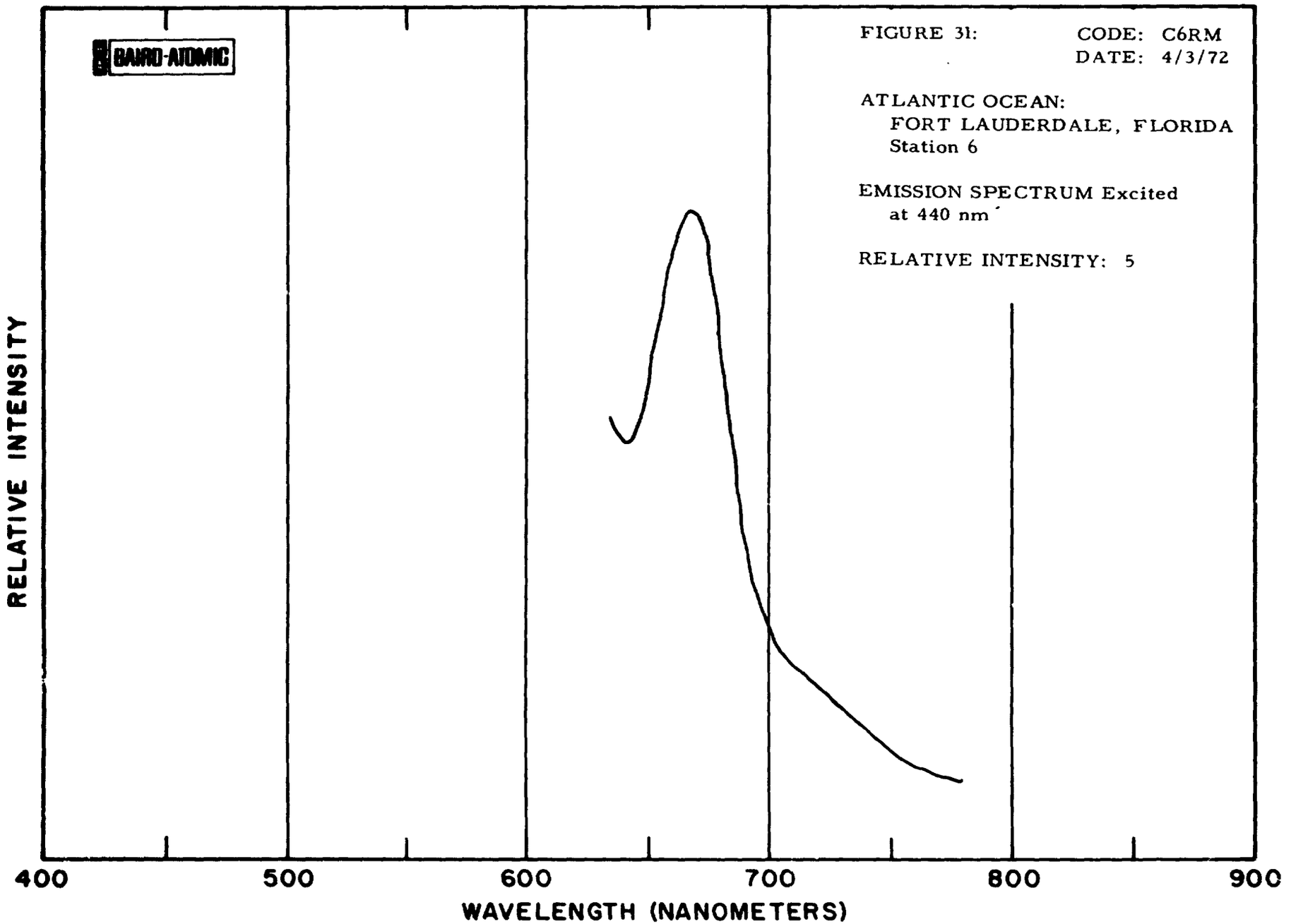


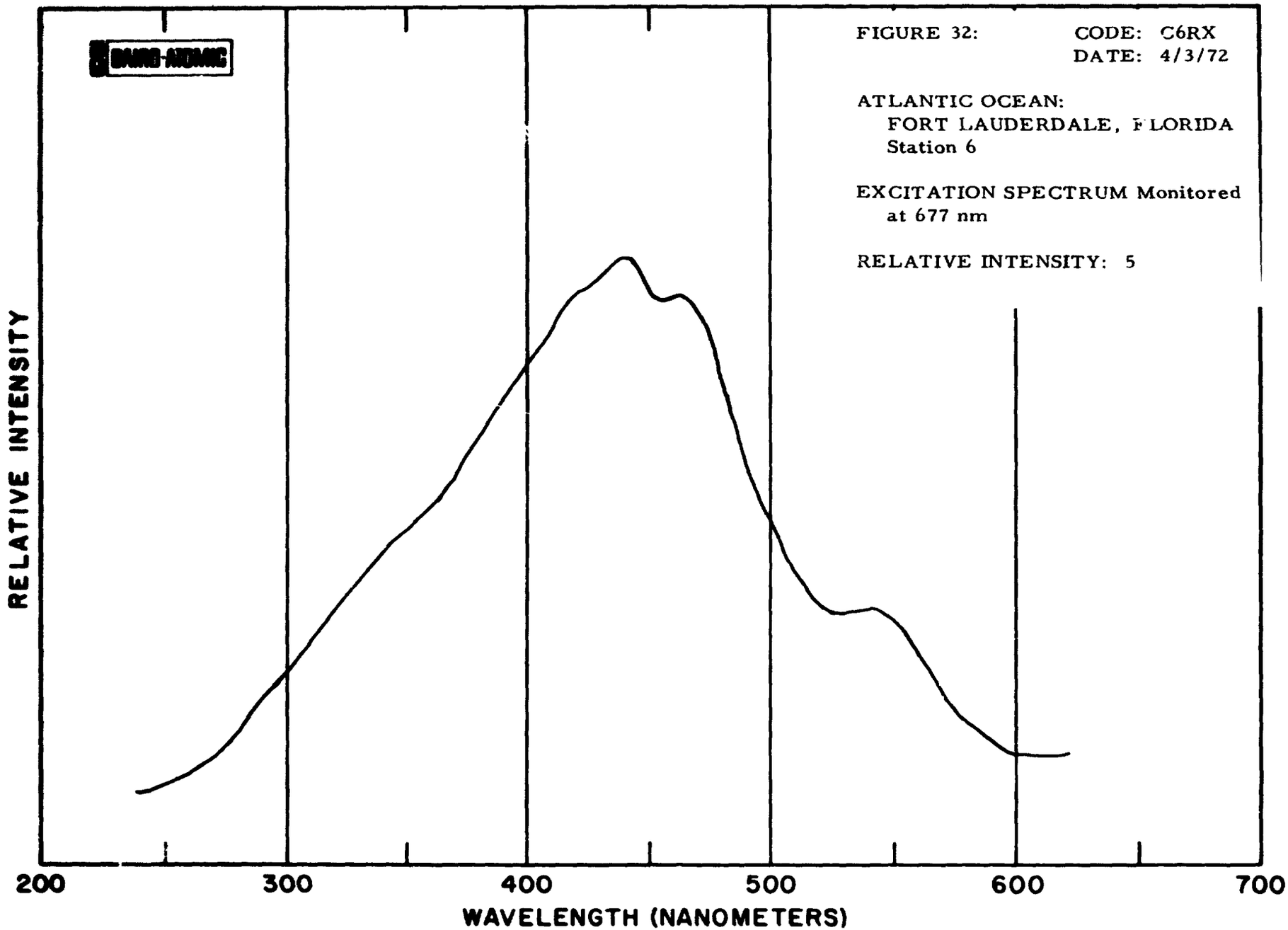
FIGURE 30: CODE: C5RX
DATE: 4/3/72

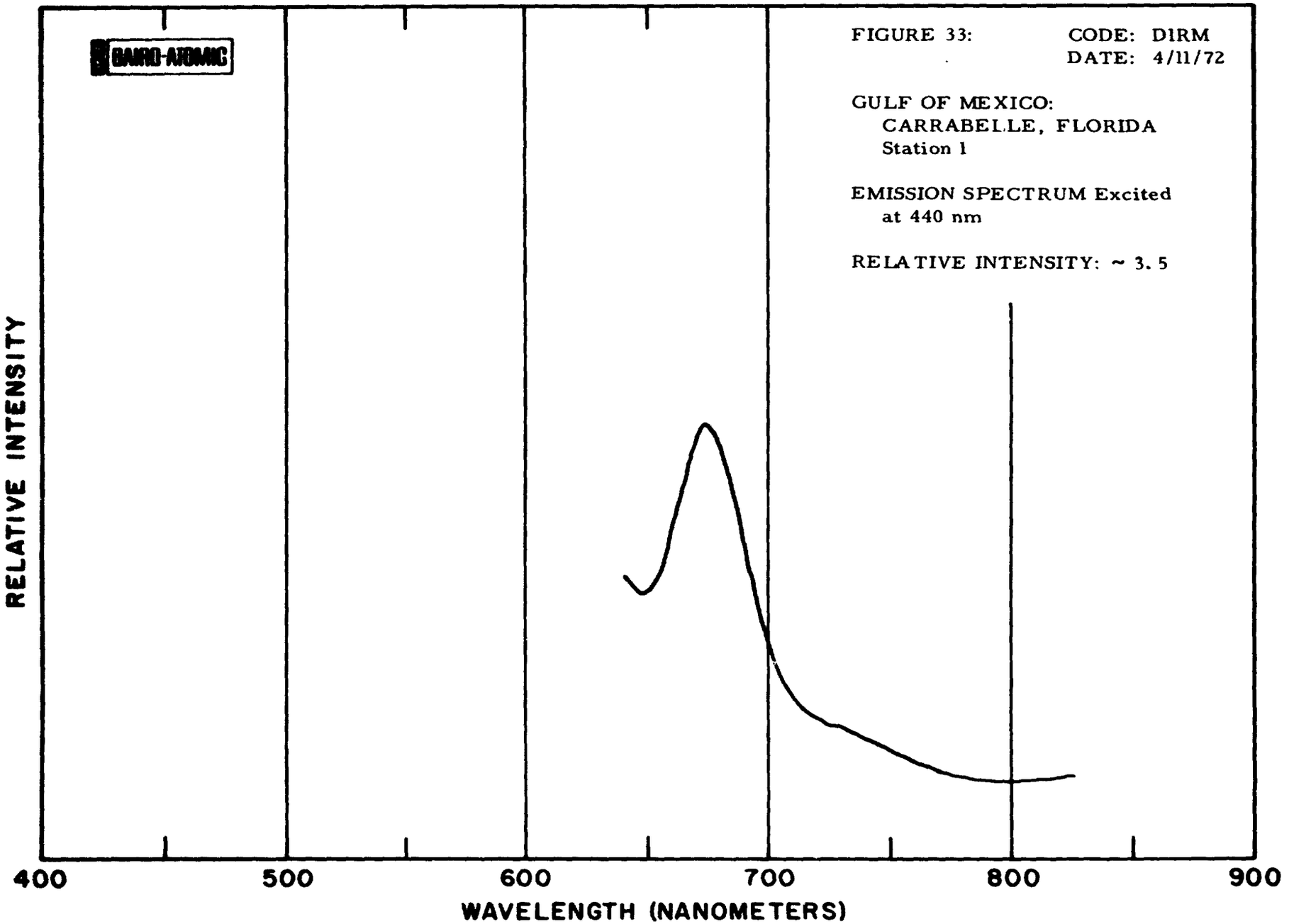
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 5

EXCITATION SPECTRUM Monitored at 677 nm

RELATIVE INTENSITY: 8


BAIRD-ATOMIC
FIGURE 31:
CODE: C6RM
DATE: 4/3/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 6
EMISSION SPECTRUM Excited
at 440 nm
RELATIVE INTENSITY: 5
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)


BAUSCH & LOMB
FIGURE 32:
CODE: C6RX
DATE: 4/3/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 6
EXCITATION SPECTRUM Monitored at 677 nm
RELATIVE INTENSITY: 5
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 33:
CODE: DIRM
DATE: 4/11/72
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station 1
EMISSION SPECTRUM Excited at 440 nm
RELATIVE INTENSITY: ~ 3.5
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

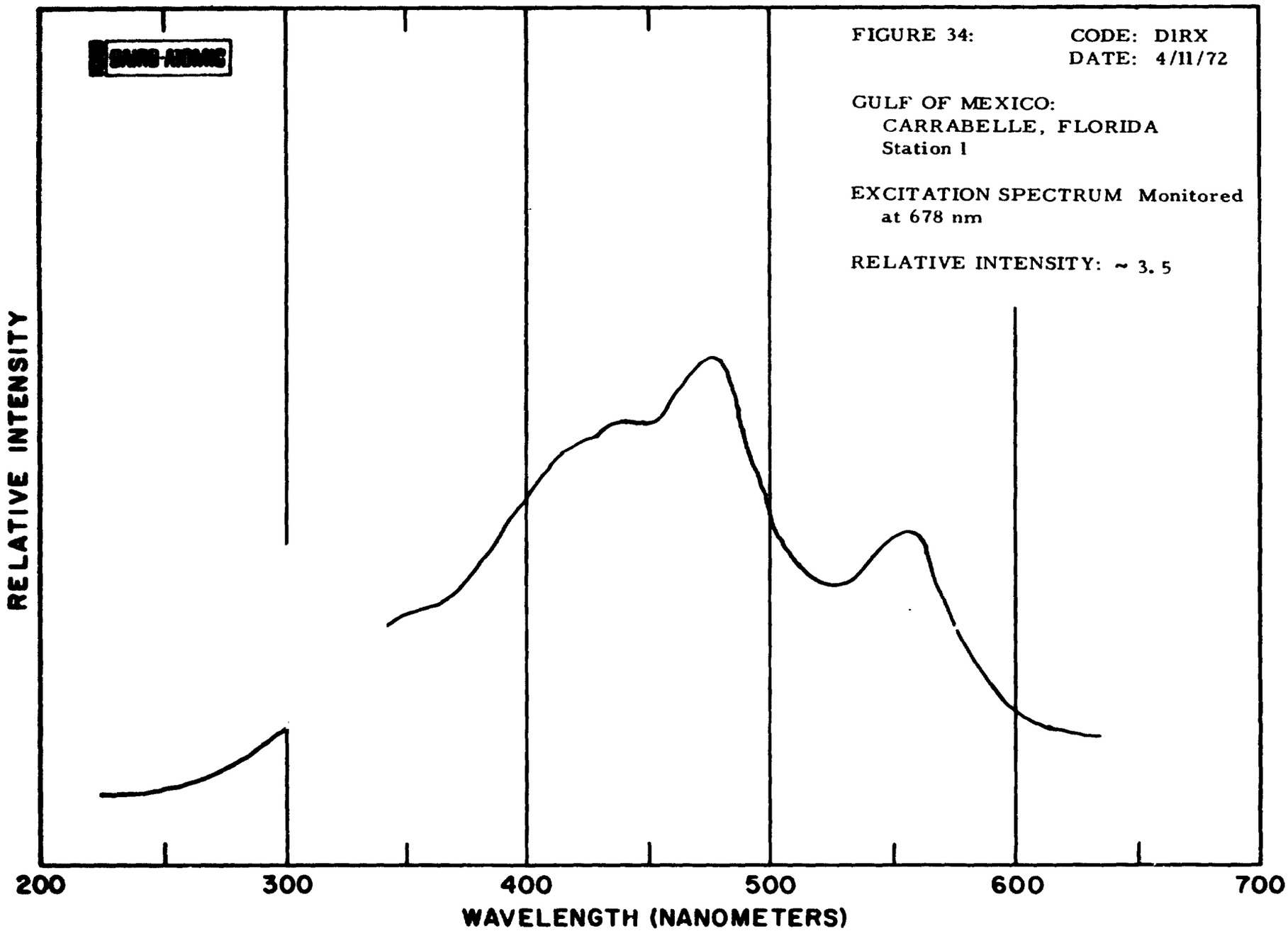
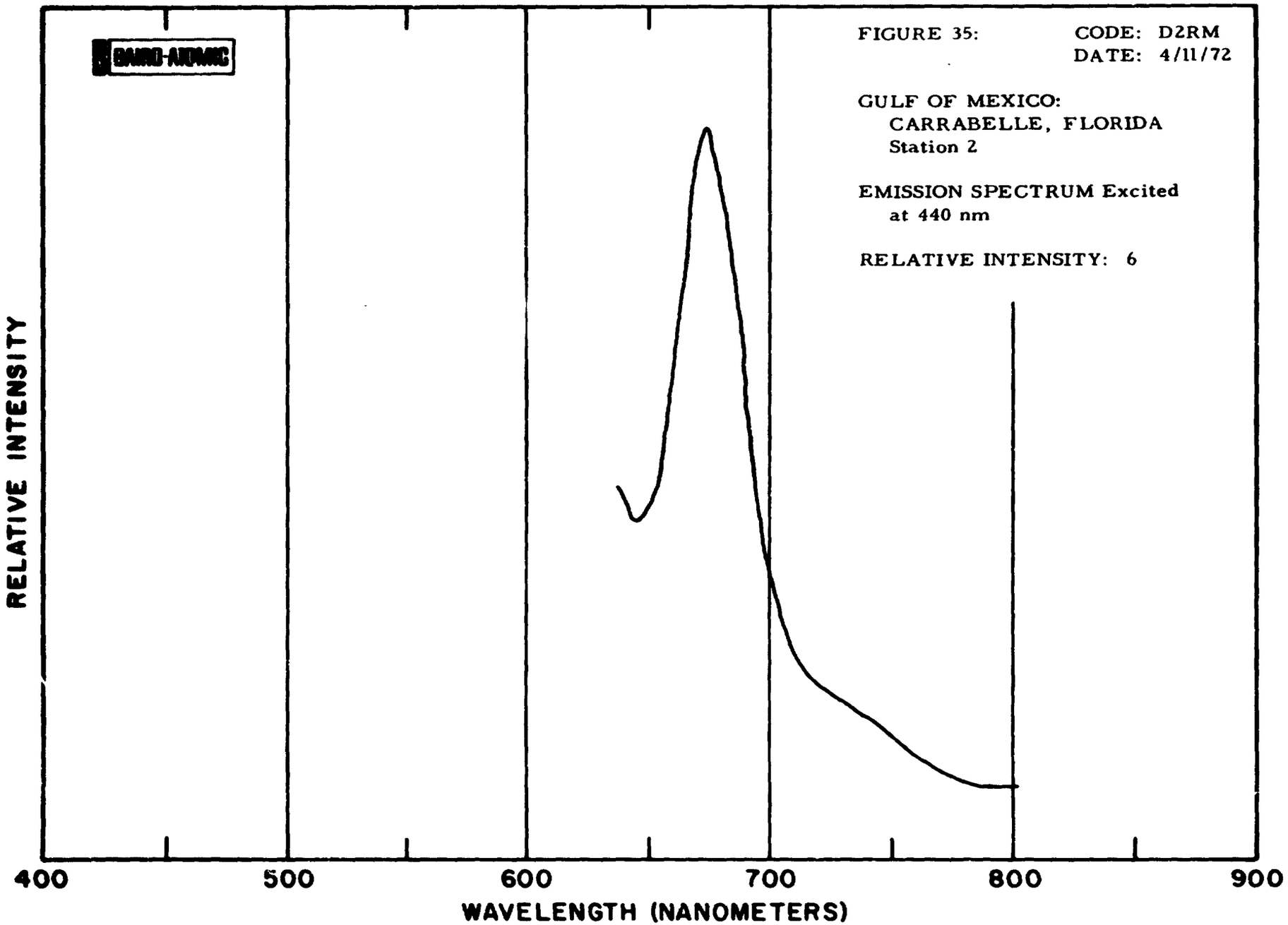


FIGURE 34:
CODE: D1RX
DATE: 4/11/72
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station 1
EXCITATION SPECTRUM Monitored at 678 nm
RELATIVE INTENSITY: ~ 3.5
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 35:
CODE: D2RM
DATE: 4/11/72
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station 2
EMISSION SPECTRUM Excited
at 440 nm
RELATIVE INTENSITY: 6
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

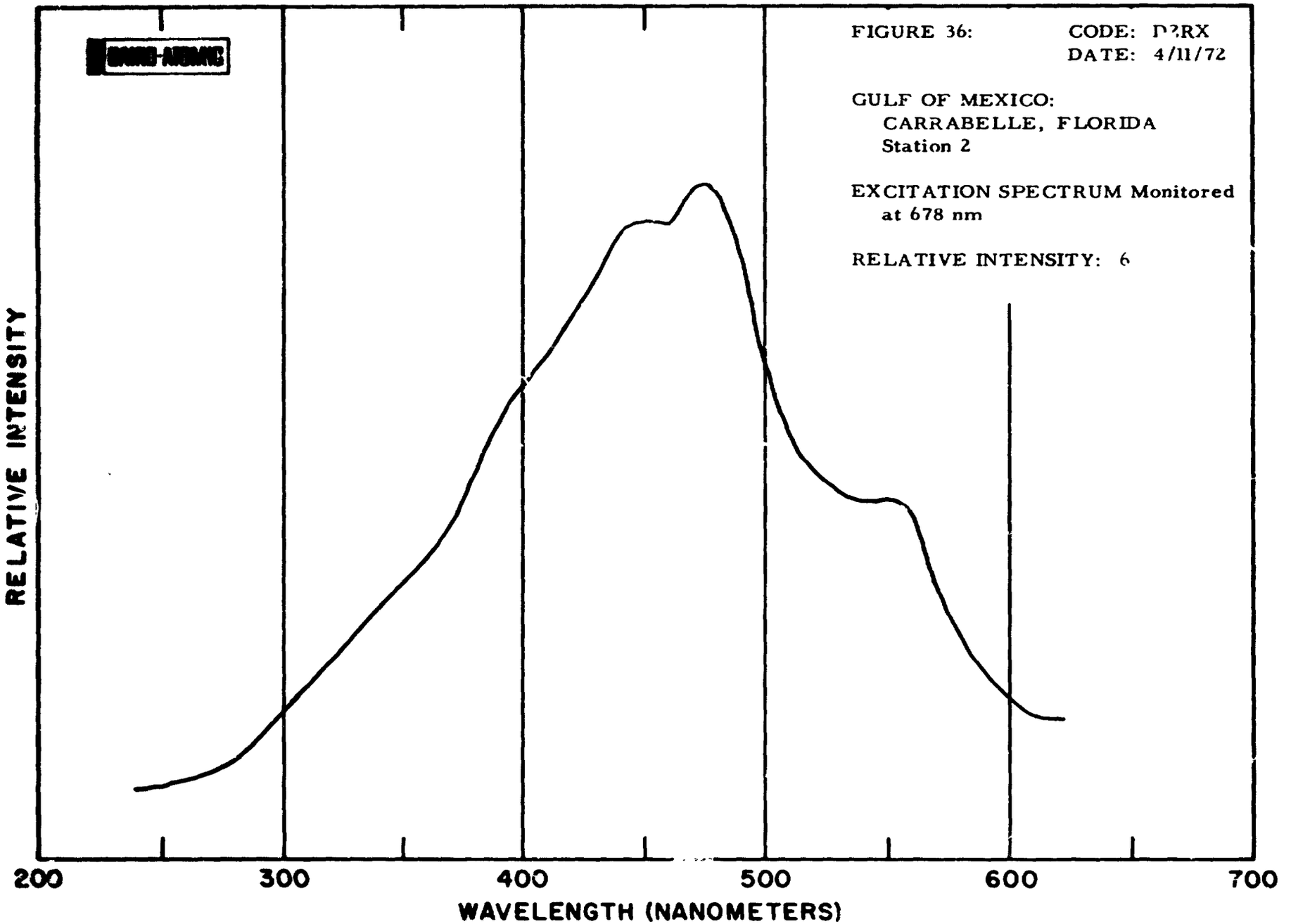
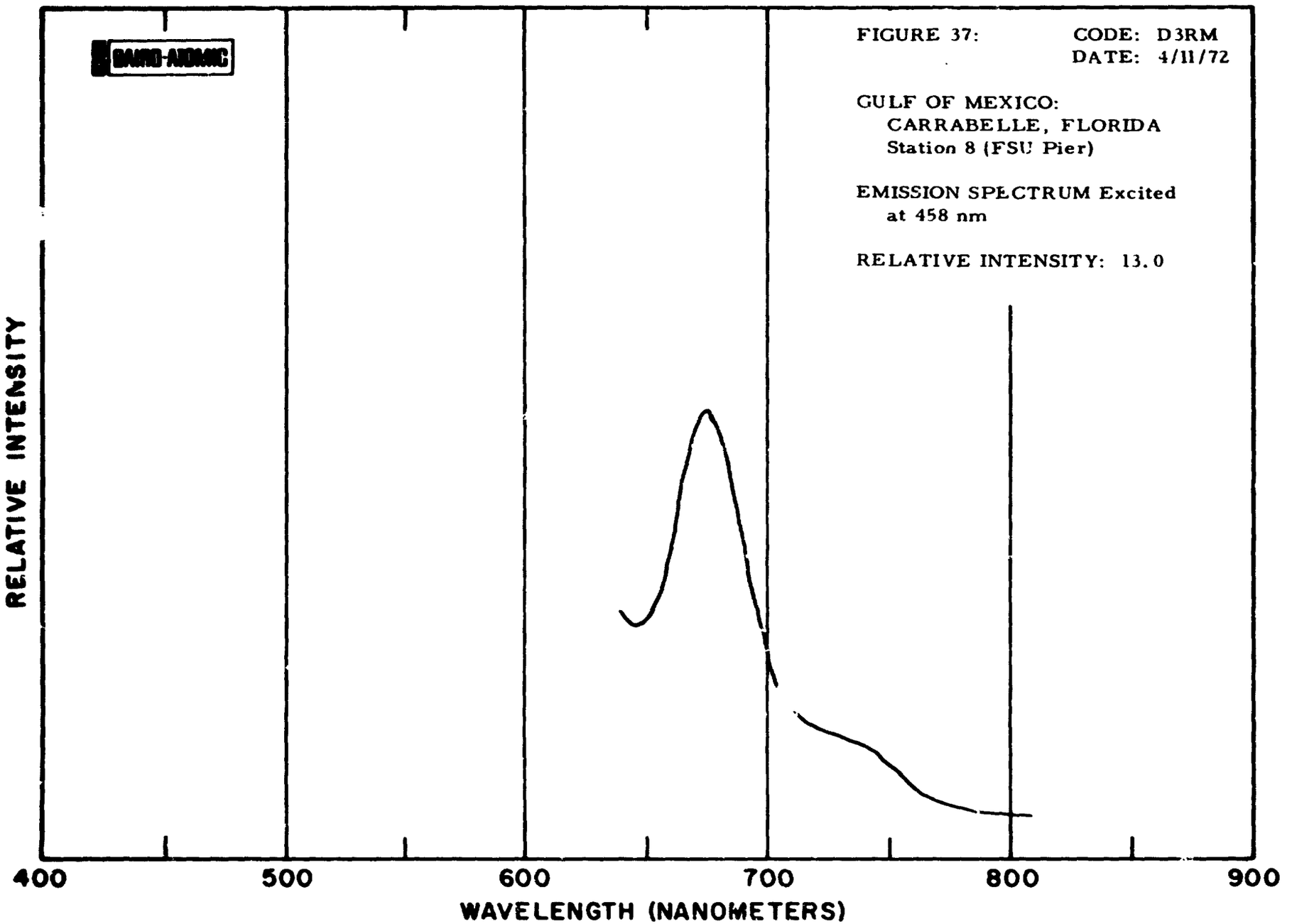
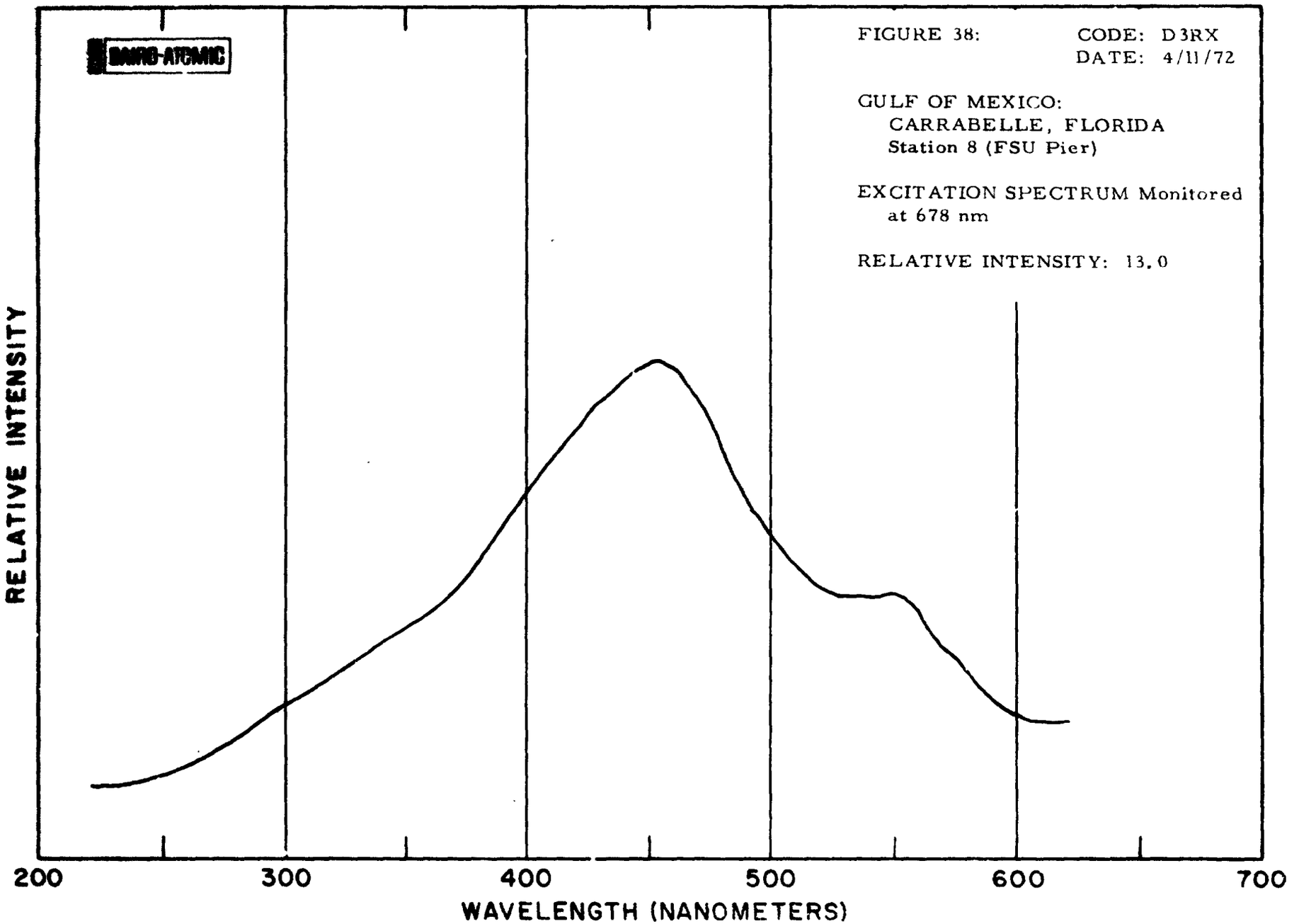
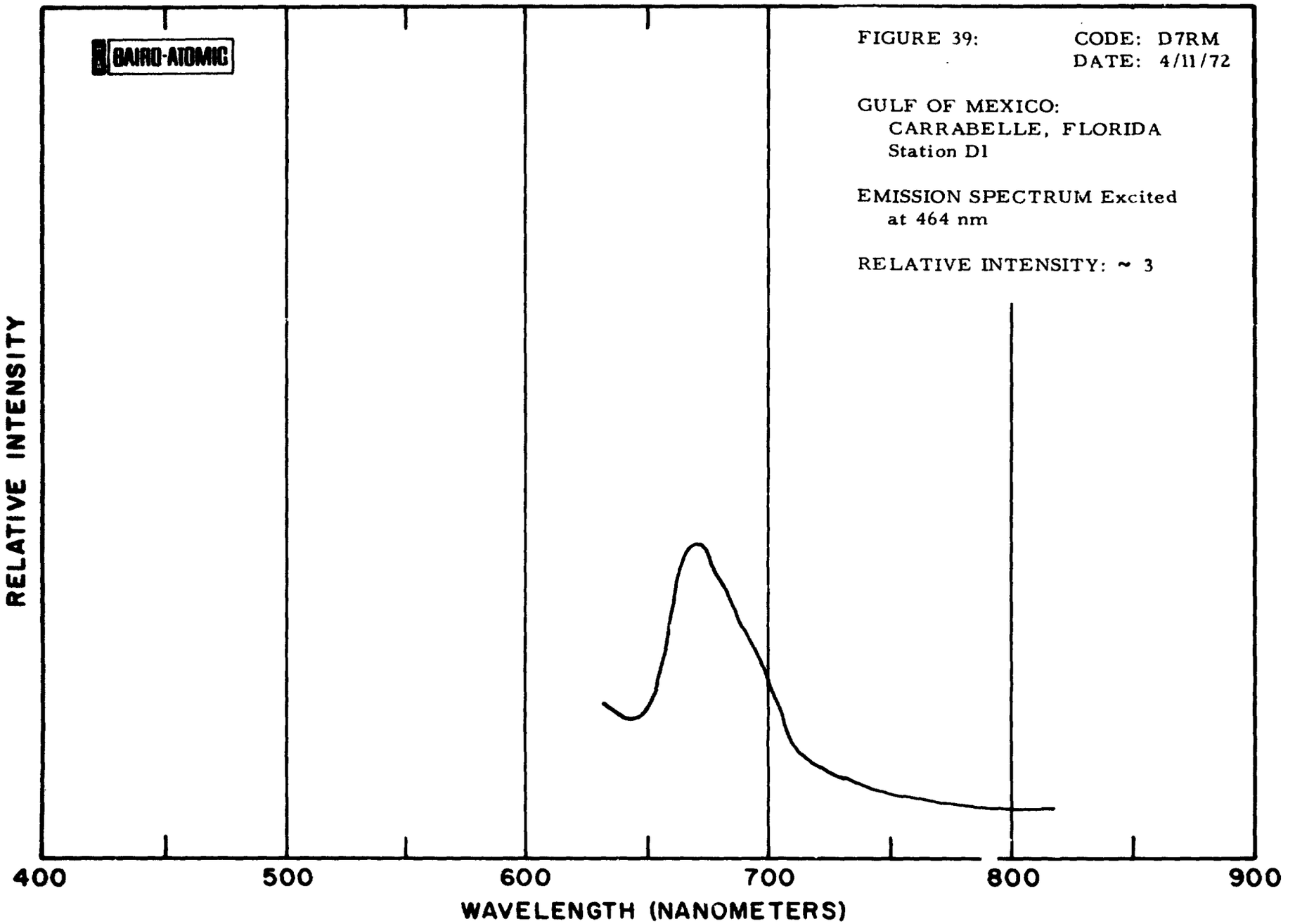
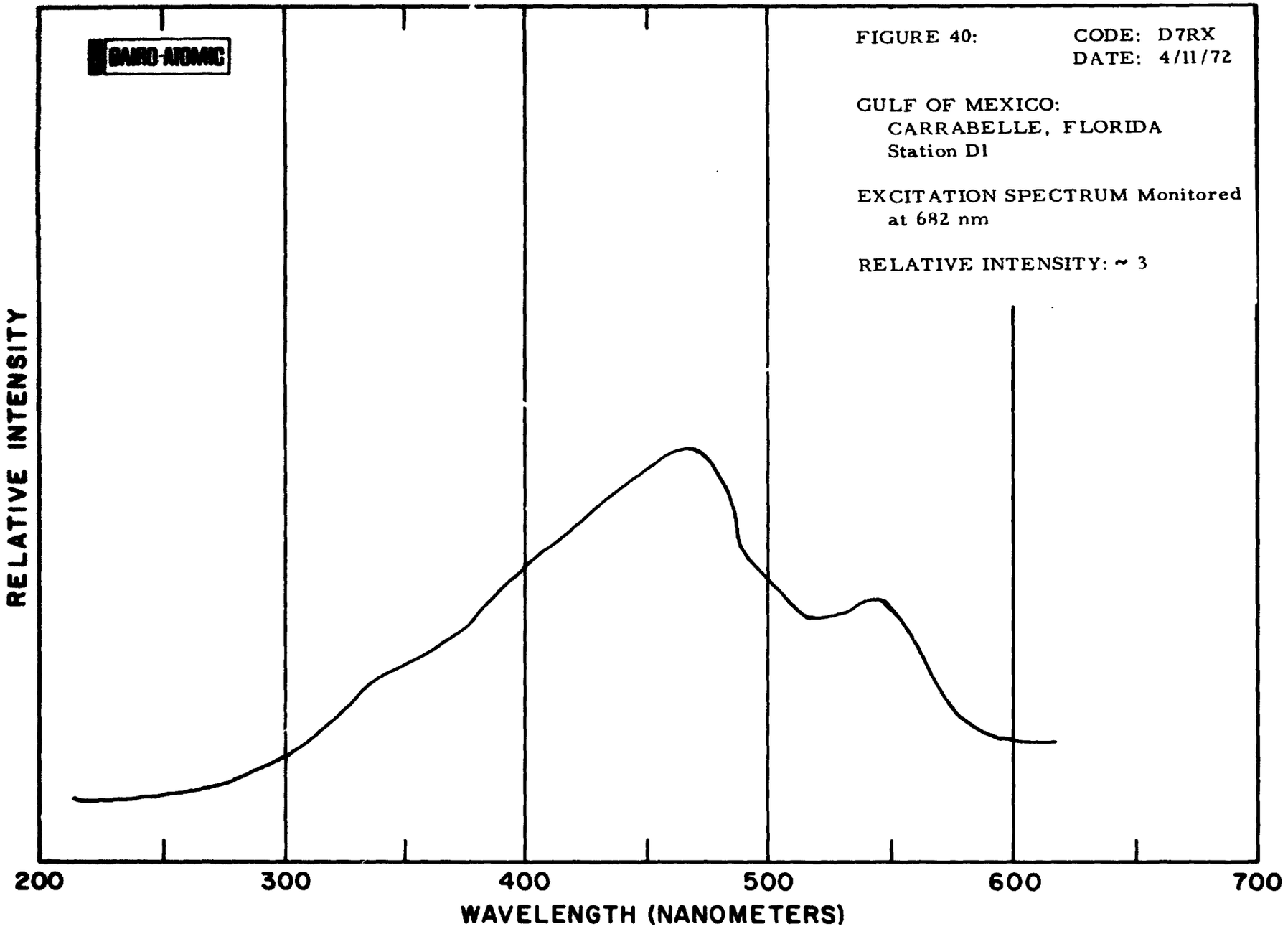


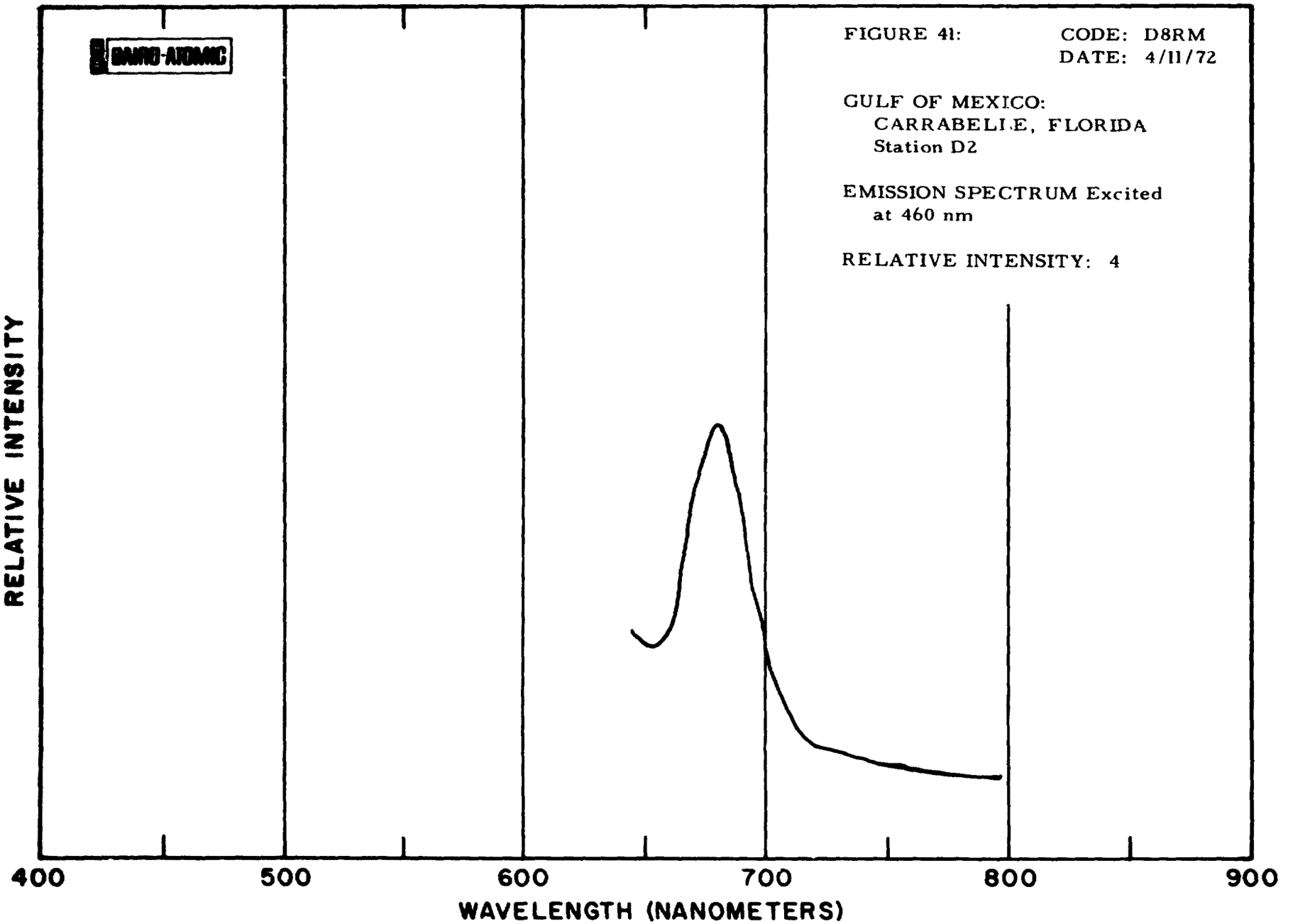
FIGURE 36:
CODE: D?RX
DATE: 4/11/72
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station 2
EXCITATION SPECTRUM Monitored at 678 nm
RELATIVE INTENSITY: 6
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

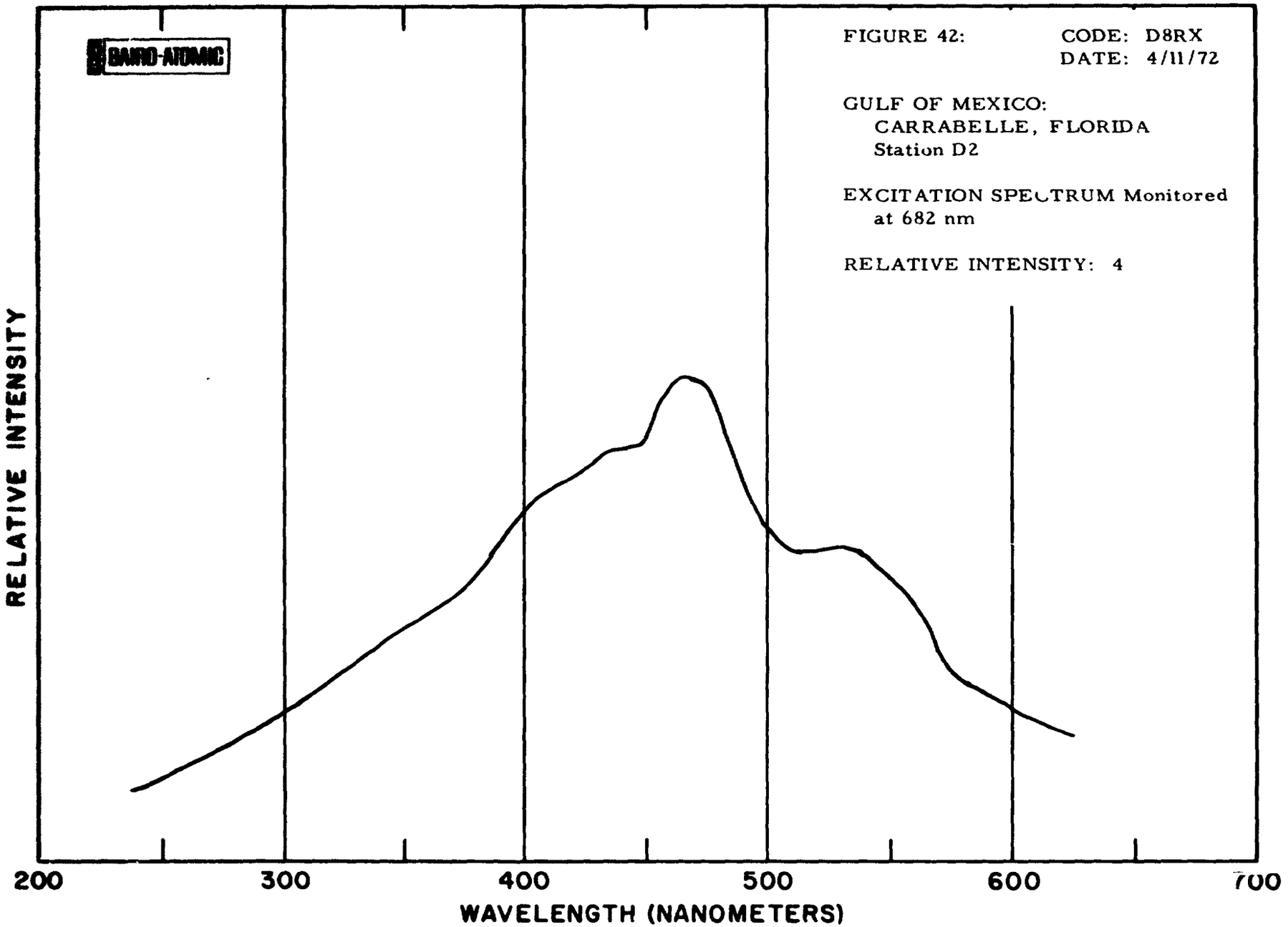

BAIRD-ATOMIC
FIGURE 37:
CODE: D3RM
DATE: 4/11/72
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station 8 (FSU Pier)
EMISSION SPECTRUM Excited at 458 nm
RELATIVE INTENSITY: 13.0
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

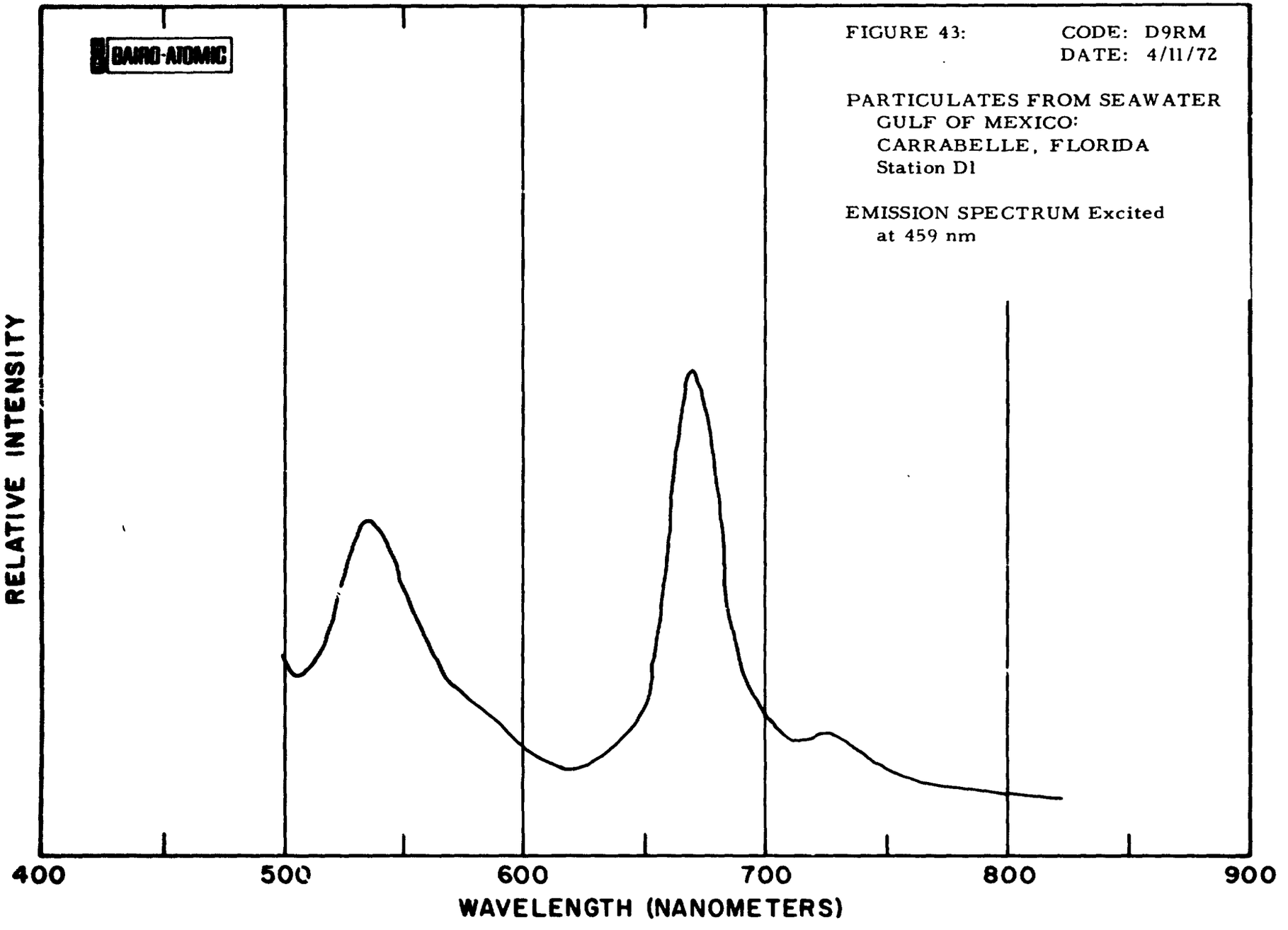

BARRO-ATOMIC
FIGURE 38:
CODE: D3RX
DATE: 4/11/72
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station 8 (FSU Pier)
EXCITATION SPECTRUM Monitored at 678 nm
RELATIVE INTENSITY: 13.0
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

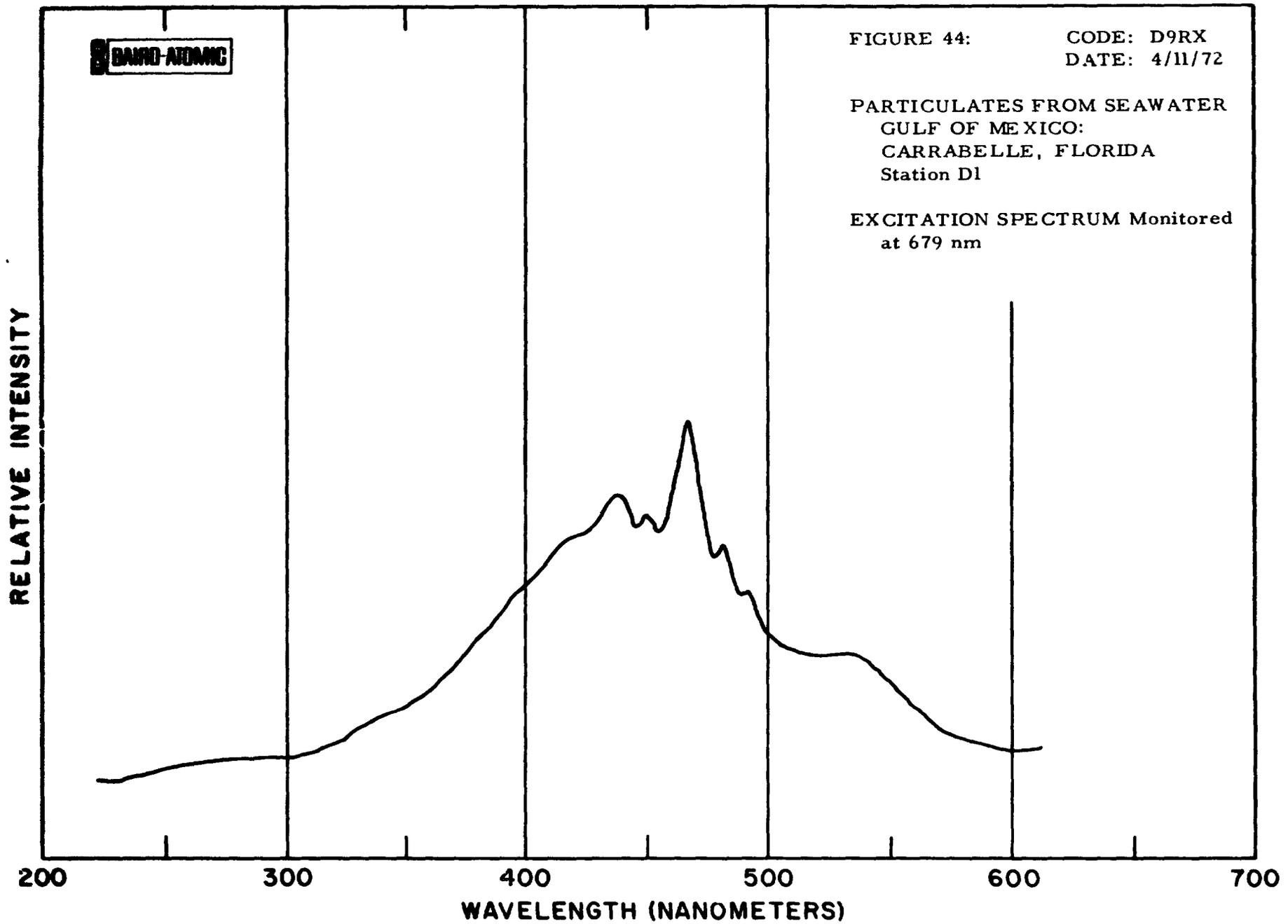

BAIRD-ATOMIC
FIGURE 39:
CODE: D7RM
DATE: 4/11/72
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station D1
EMISSION SPECTRUM Excited at 464 nm
RELATIVE INTENSITY: ~ 3
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 40:
CODE: D7RX
DATE: 4/11/72
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station D1
EXCITATION SPECTRUM Monitored at 682 nm
RELATIVE INTENSITY: ~ 3
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 41:
CODE: D8RM
DATE: 4/11/72
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station D2
EMISSION SPECTRUM Excited
at 460 nm
RELATIVE INTENSITY: 4
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 42:
CODE: D8RX
DATE: 4/11/72
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station D2
EXCITATION SPECTRUM Monitored at 682 nm
RELATIVE INTENSITY: 4
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 43:
CODE: D9RM
DATE: 4/11/72
PARTICULATES FROM SEAWATER
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station D1
EMISSION SPECTRUM Excited
at 459 nm
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 44:
CODE: D9RX
DATE: 4/11/72
PARTICULATES FROM SEAWATER
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station D1
EXCITATION SPECTRUM Monitored
at 679 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

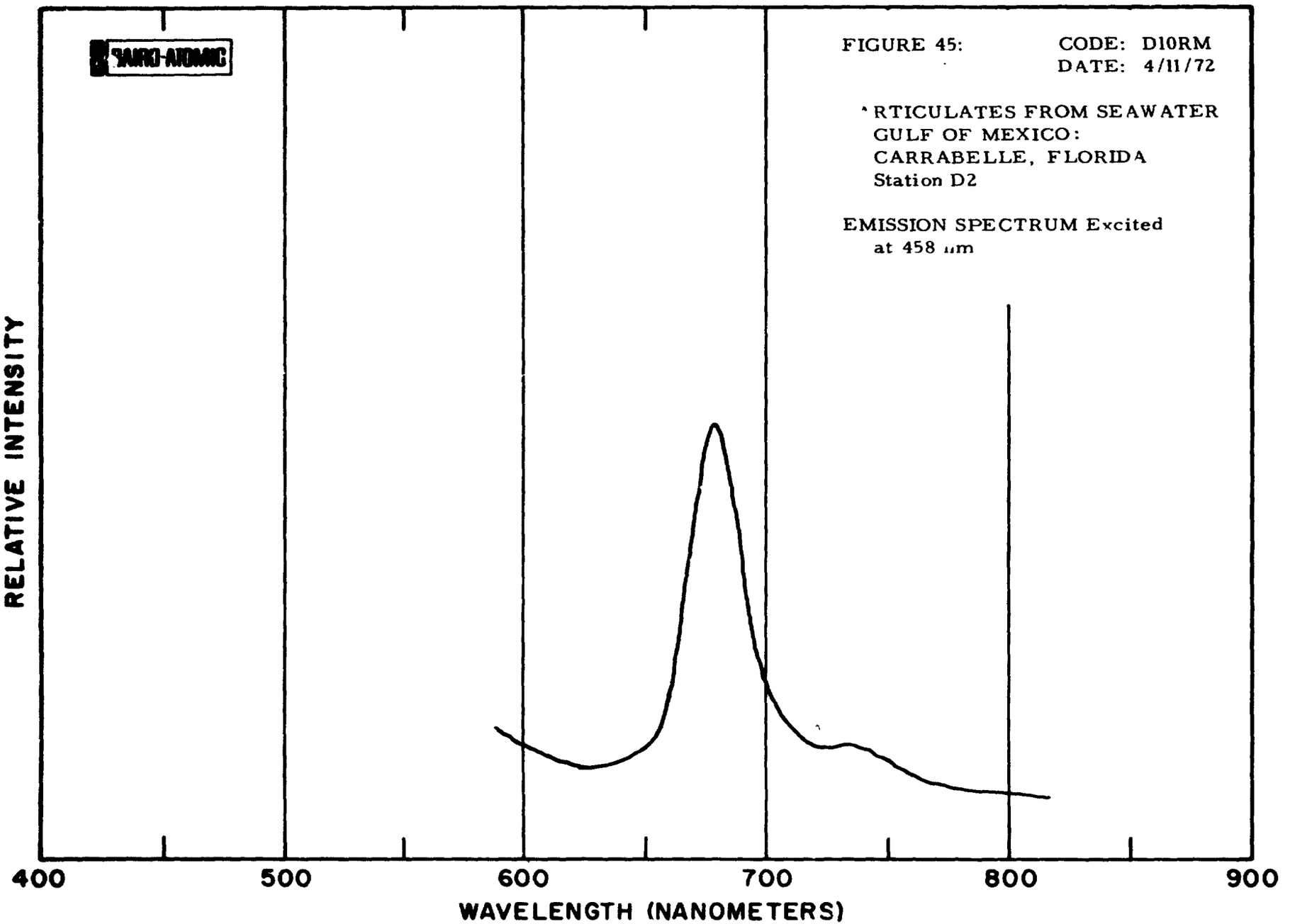
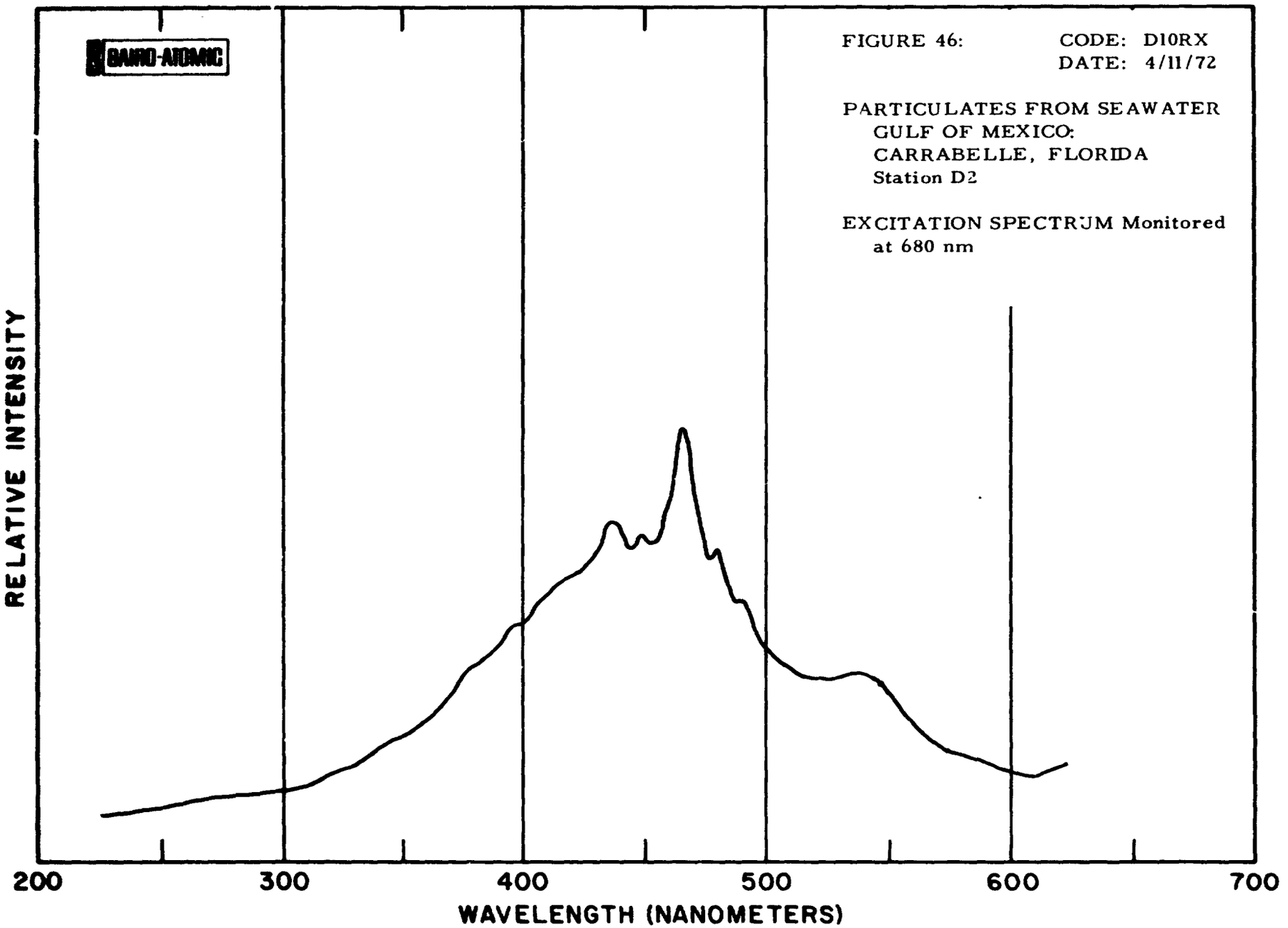
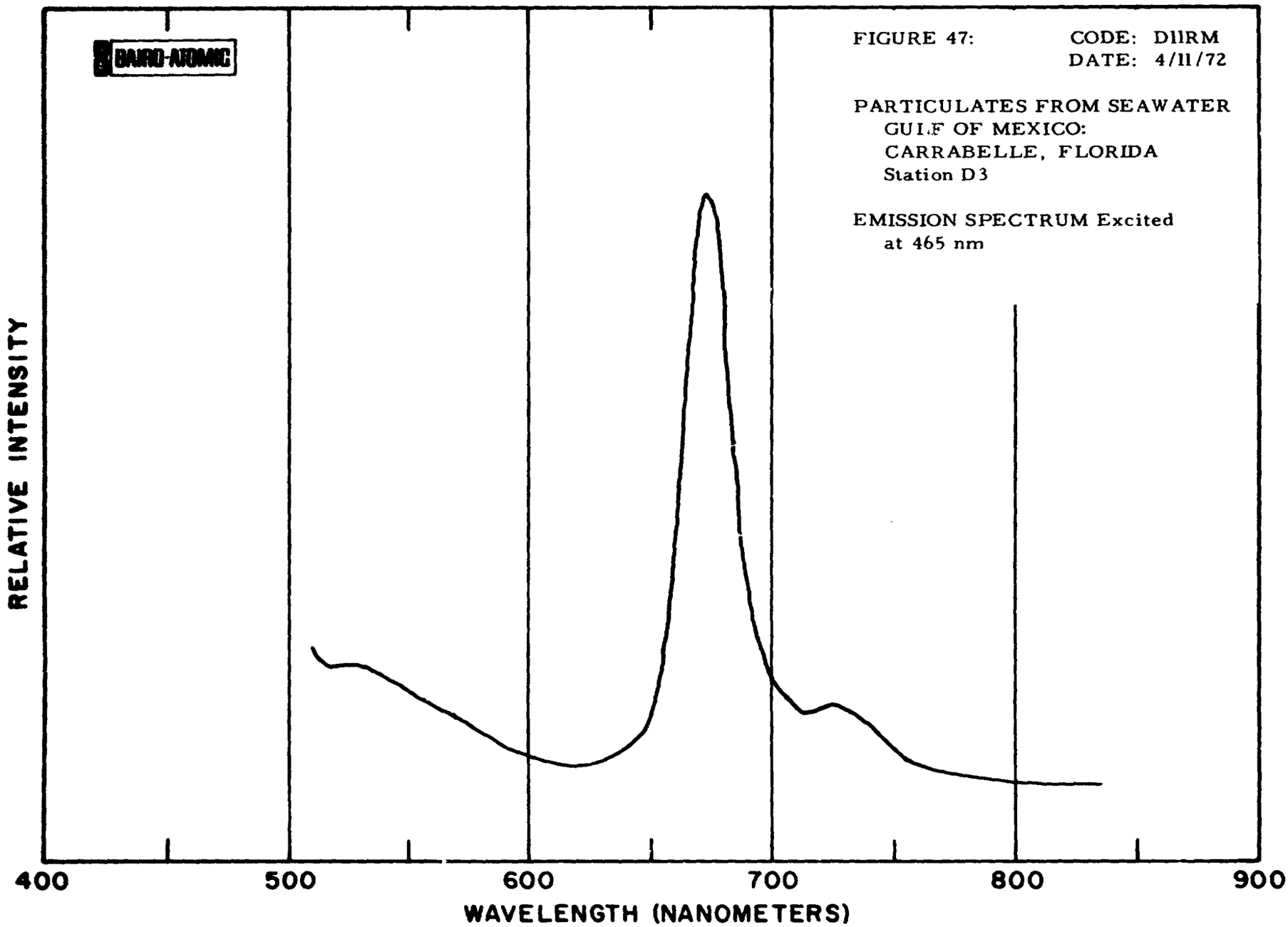
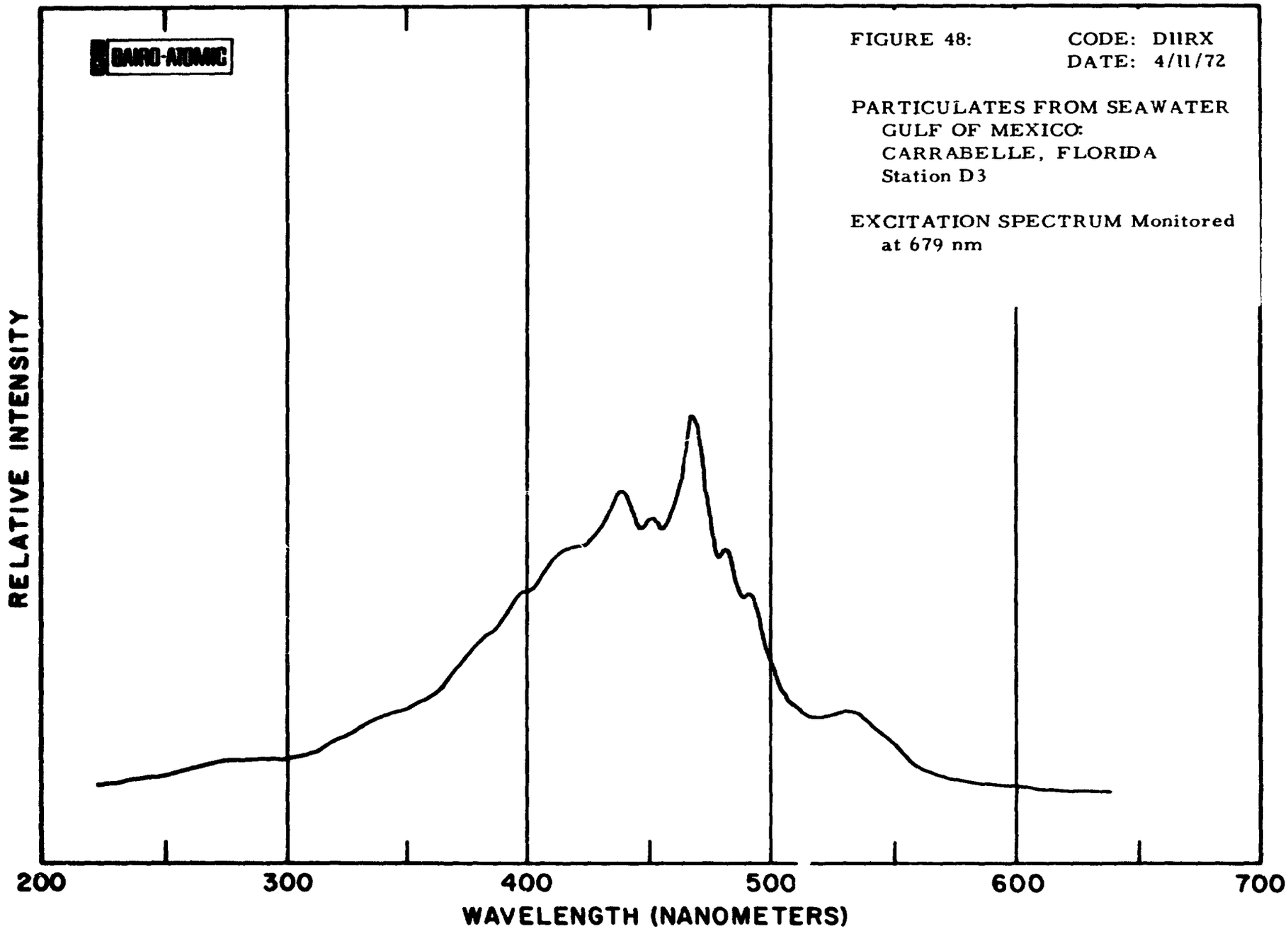
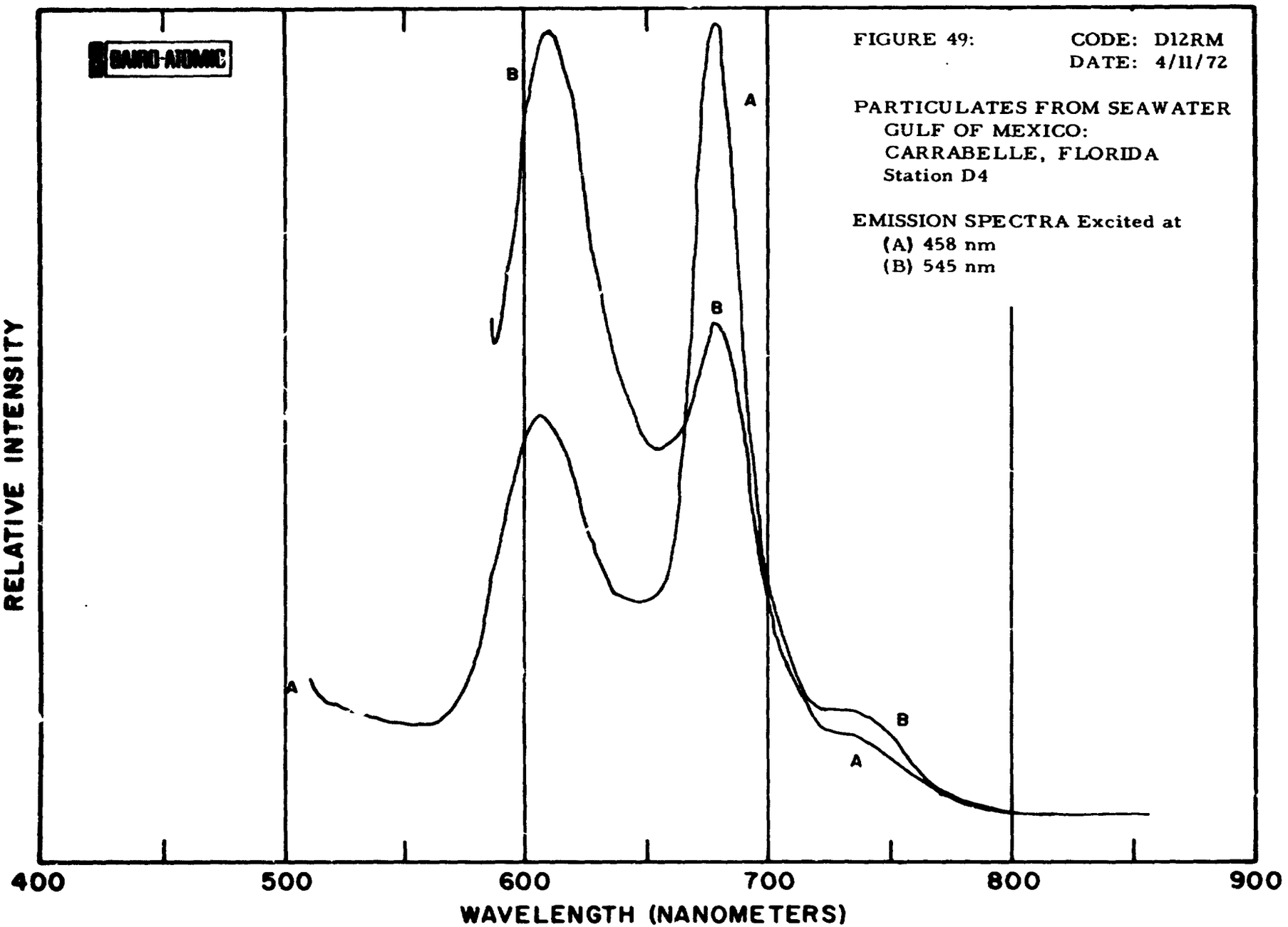


FIGURE 45:
CODE: D10RM
DATE: 4/11/72
RTICULATES FROM SEAWATER
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station D2
EMISSION SPECTRUM Excited
at 458 μm
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 46:
CODE: D10RX
DATE: 4/11/72
PARTICULATES FROM SEAWATER
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station D2
EXCITATION SPECTRUM Monitored
at 680 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 47:
CODE: D11RM
DATE: 4/11/72
PARTICULATES FROM SEAWATER
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station D3
EMISSION SPECTRUM Excited
at 465 nm
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 48:
CODE: D11RX
DATE: 4/11/72
PARTICULATES FROM SEAWATER
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station D3
EXCITATION SPECTRUM Monitored
at 679 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 49:
CODE: D12RM
DATE: 4/11/72
PARTICULATES FROM SEAWATER
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station D4
EMISSION SPECTRA Excited at
(A) 458 nm
(B) 545 nm
RELATIVE INTENSITY
WAVELENGTH (NANOMETERS)
400
500
600
700
800
900
A
B

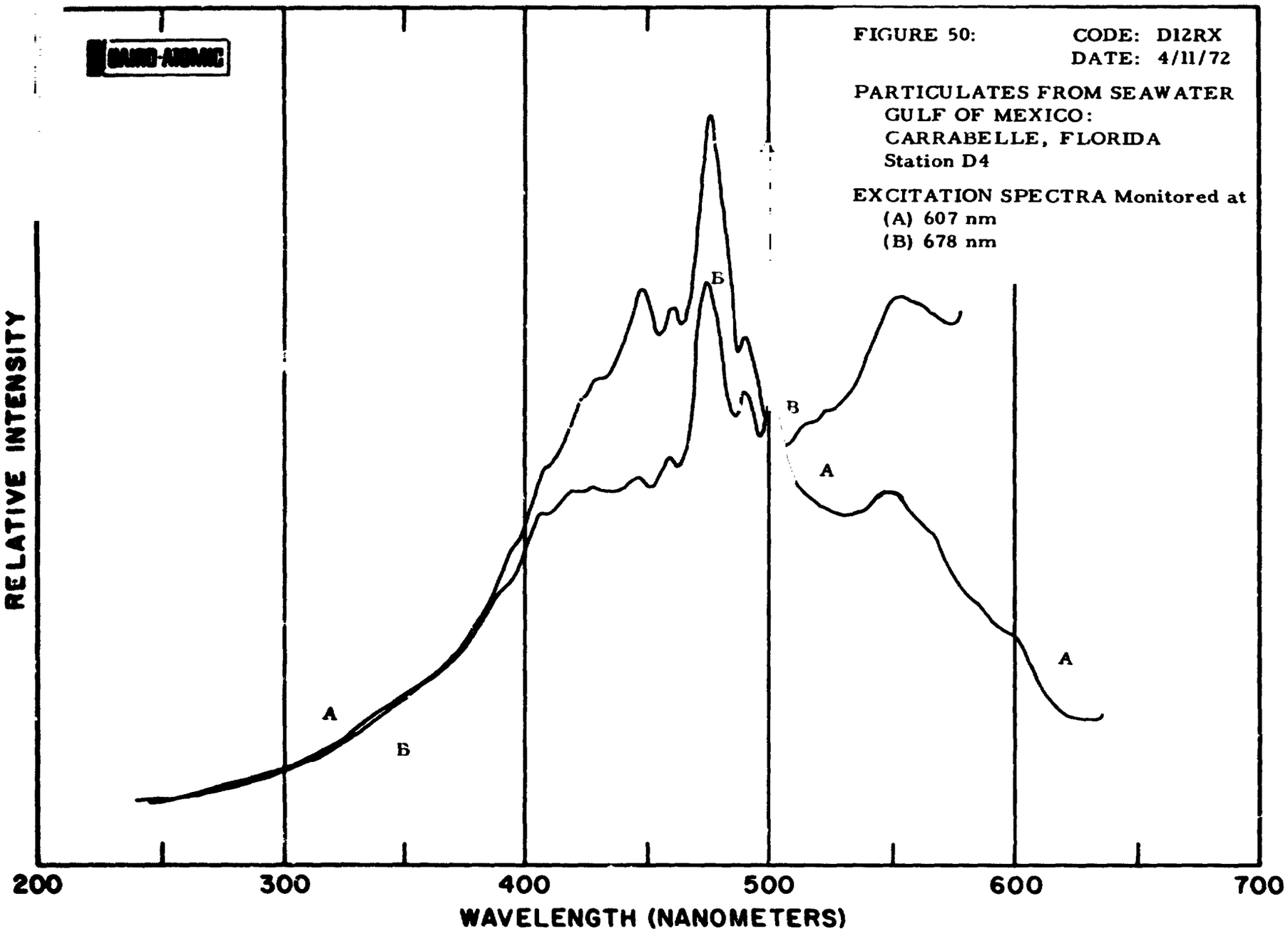
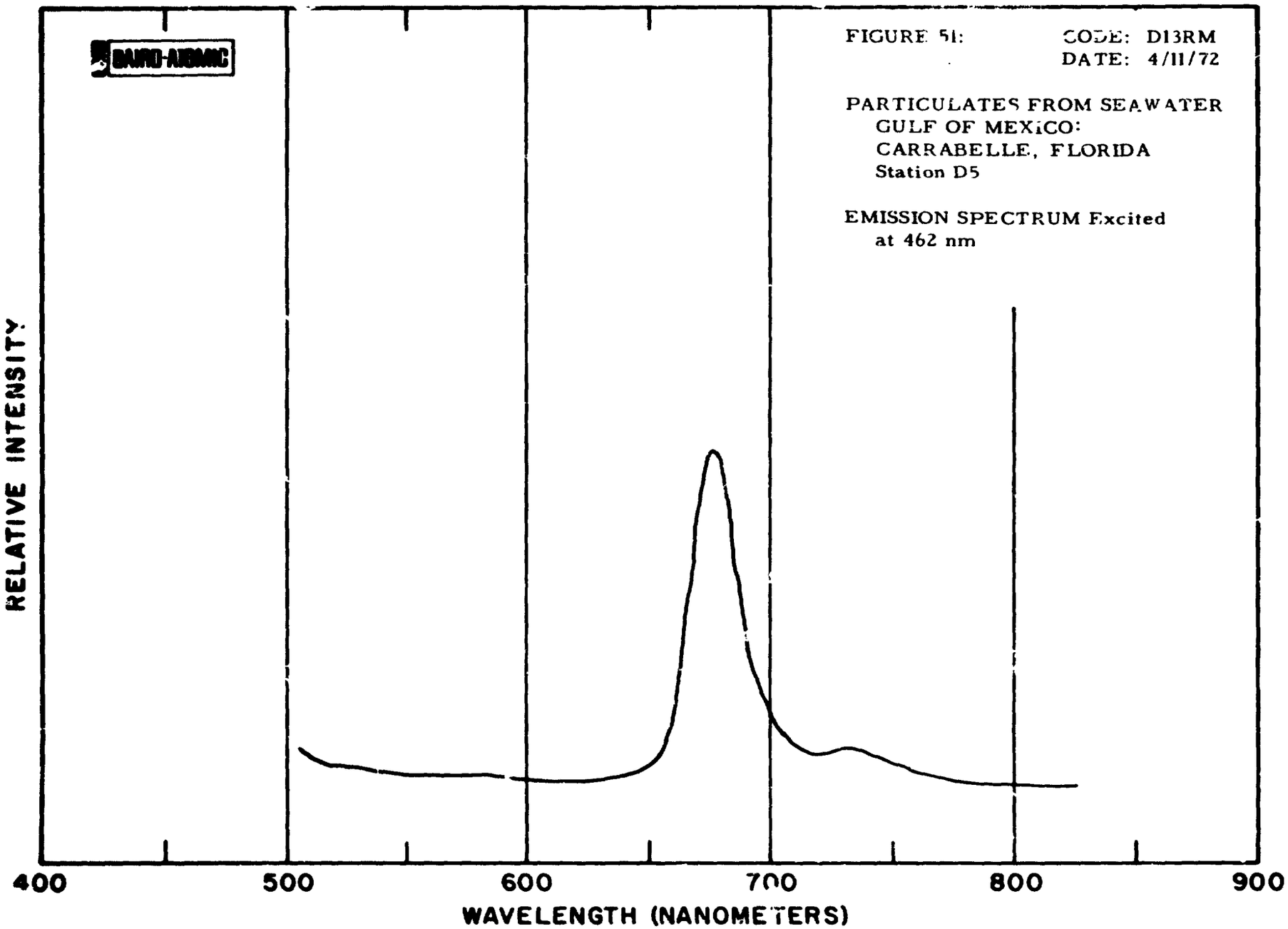
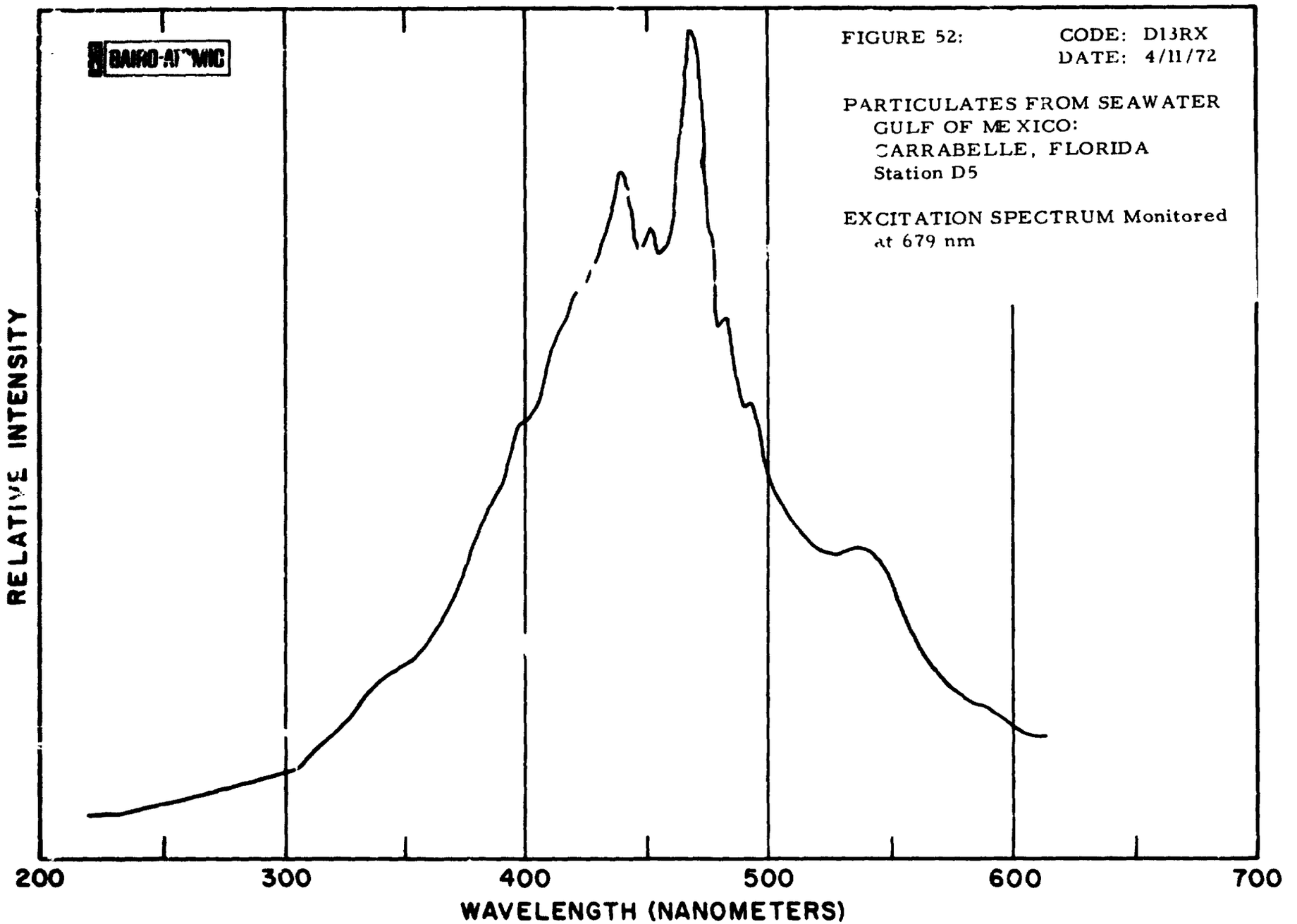
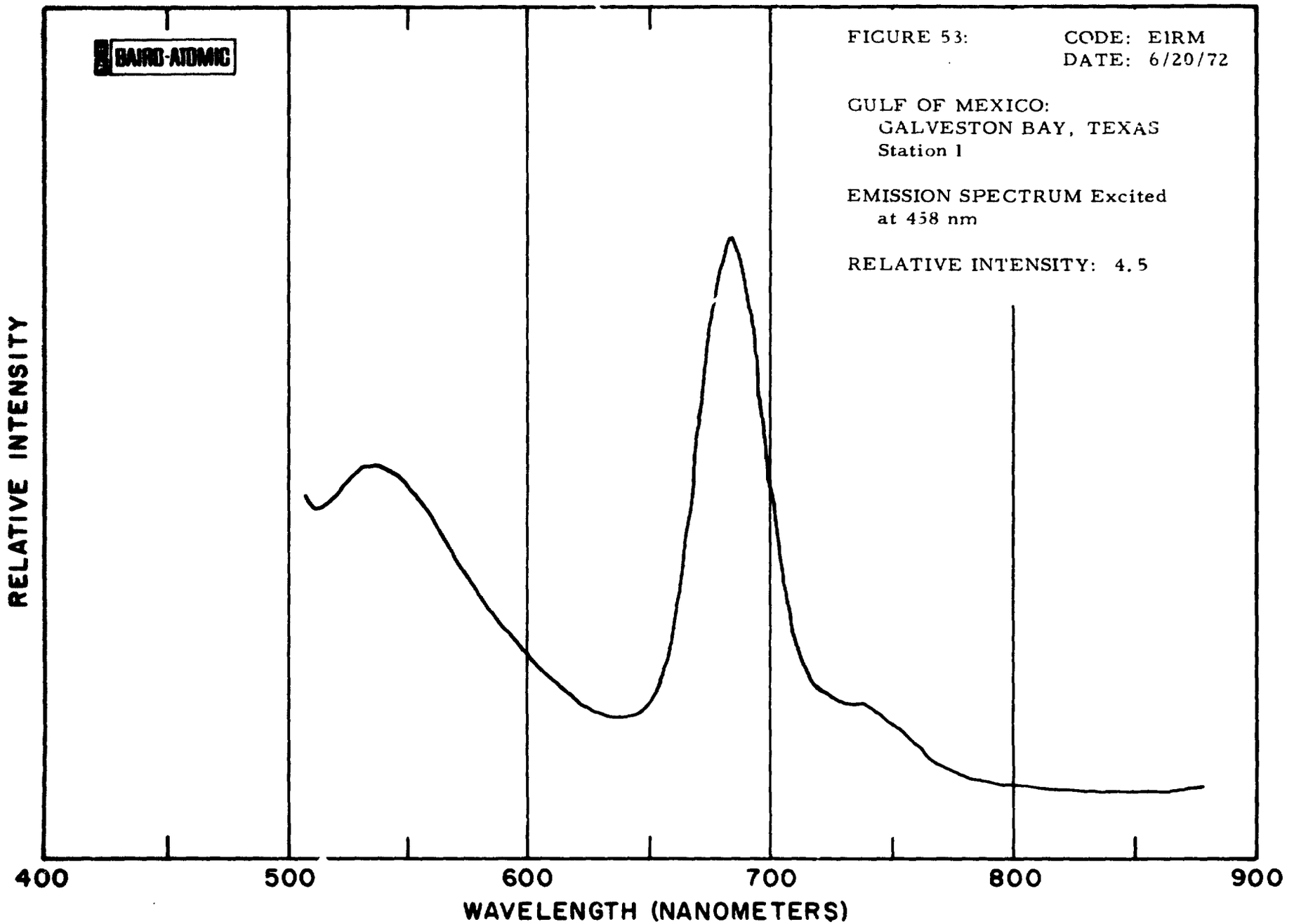
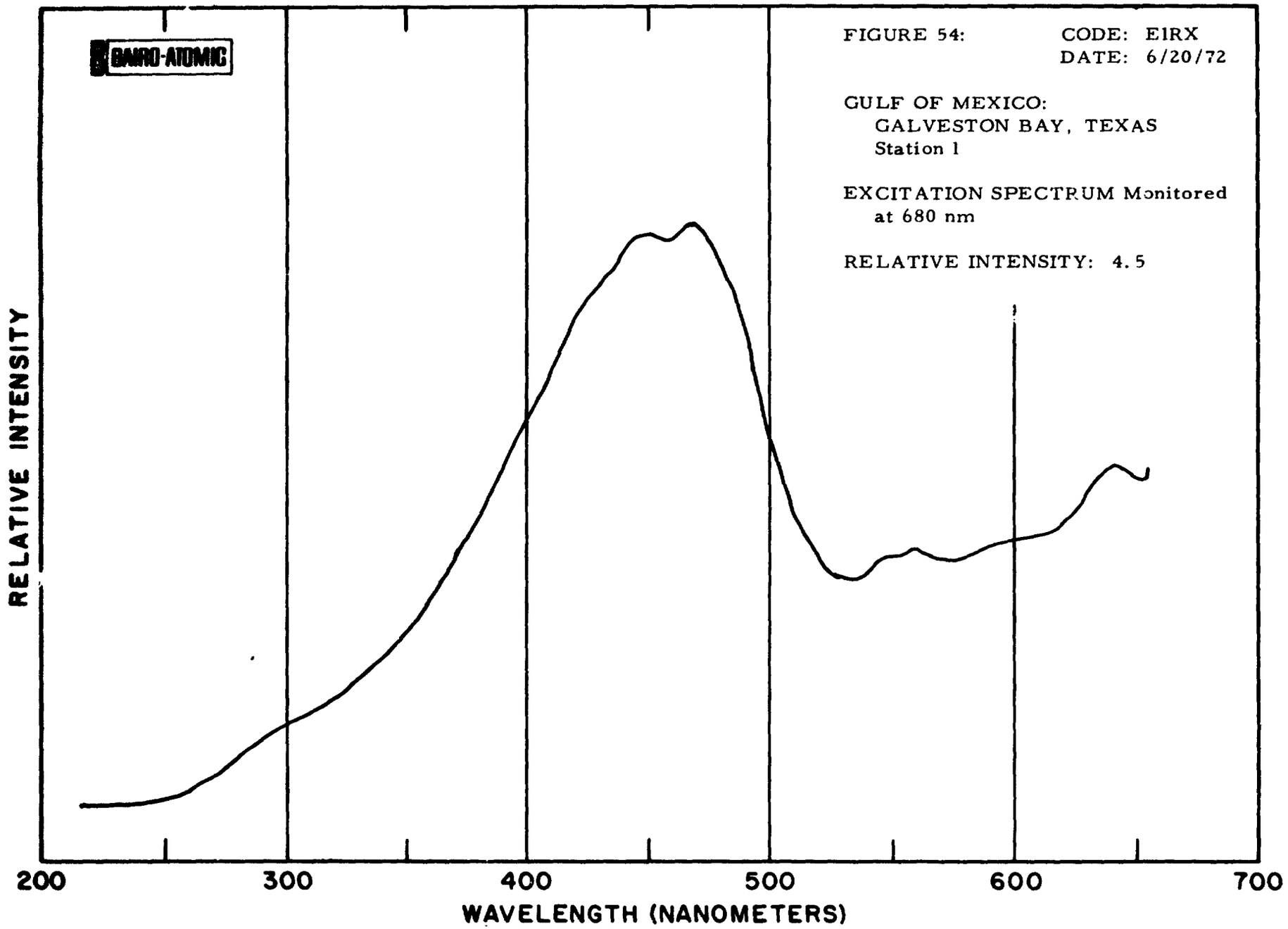


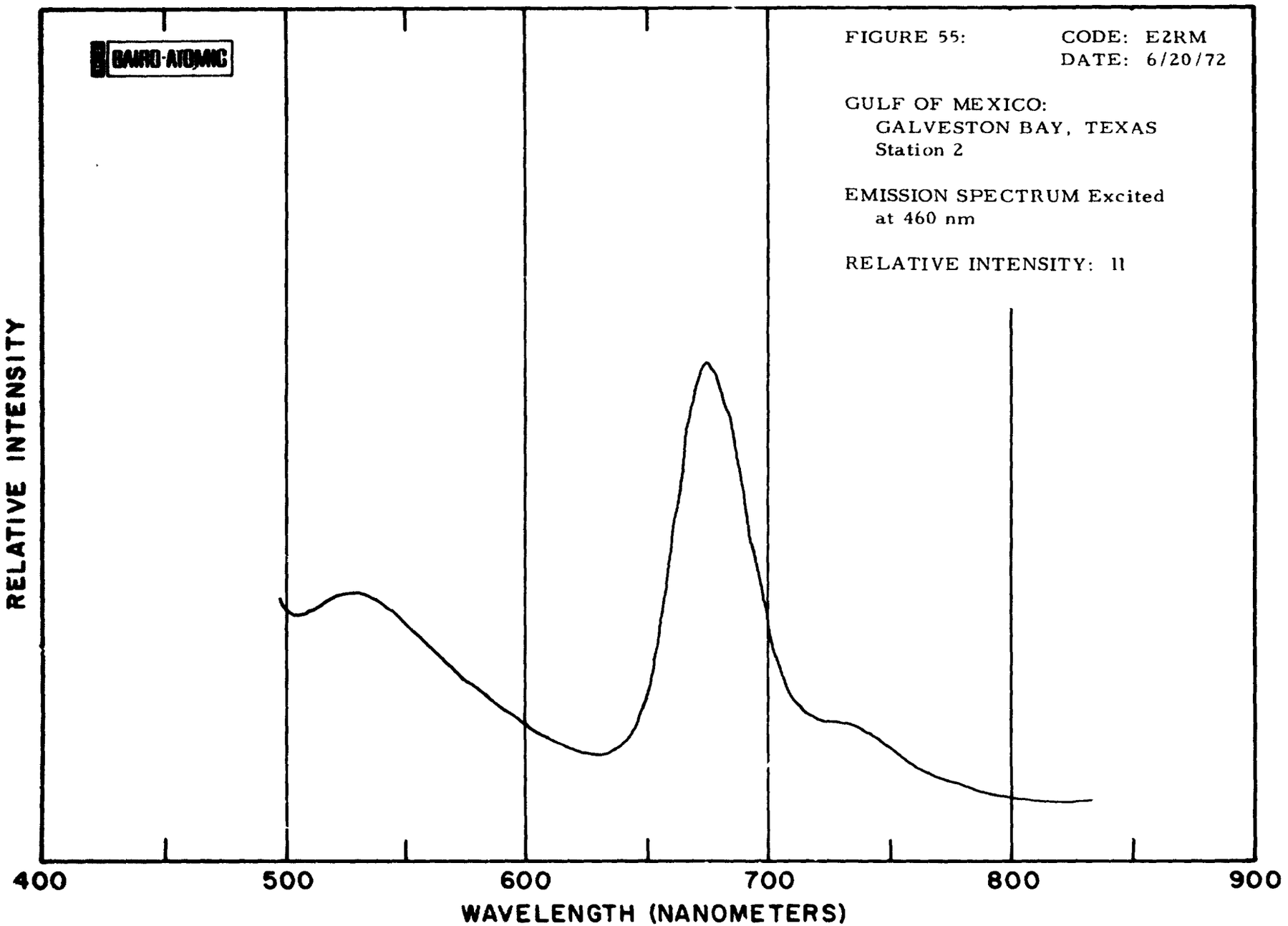
FIGURE 50:
CODE: D12RX
DATE: 4/11/72
PARTICULATES FROM SEAWATER
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station D4
EXCITATION SPECTRA Monitored at
(A) 607 nm
(B) 678 nm
RELATIVE INTENSITY
WAVELENGTH (NANOMETERS)
200
300
400
500
600
700
A
B
B
B
A
A

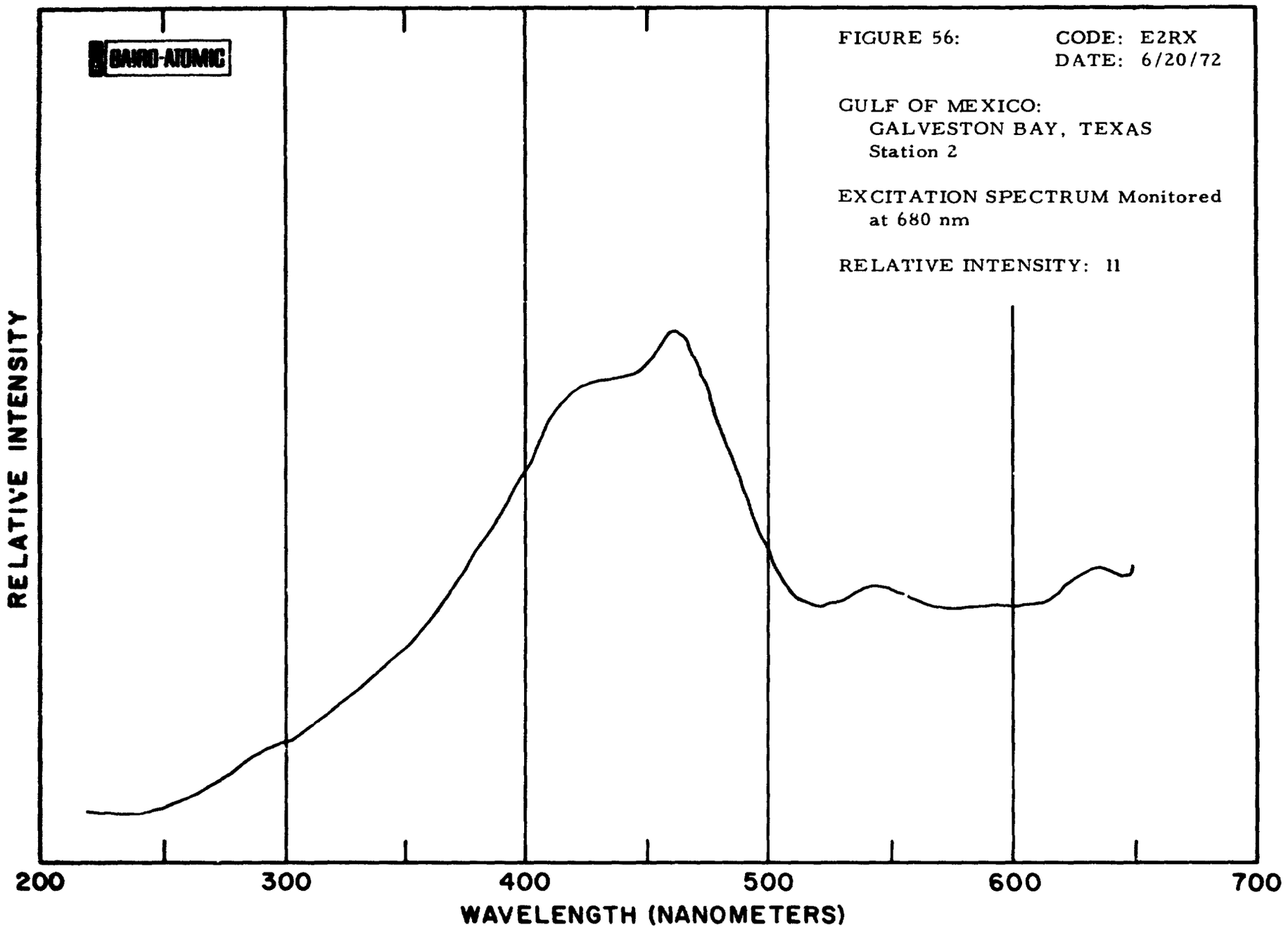

BAIRD-ATOMIC
FIGURE 51:
CODE: D13RM
DATE: 4/11/72
PARTICULATES FROM SEAWATER
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station D5
EMISSION SPECTRUM Excited
at 462 nm
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

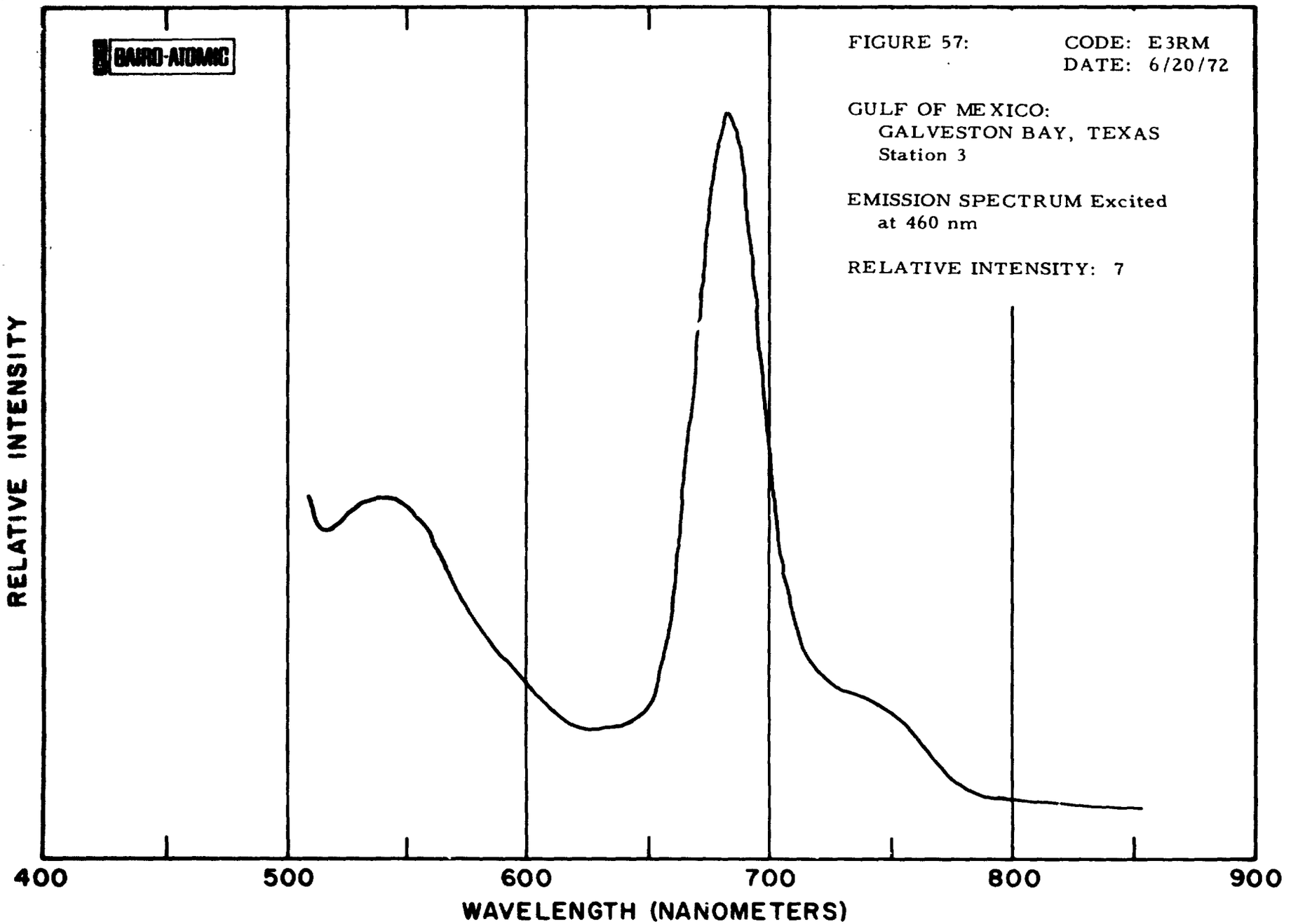

BARRO-ATOMIC
FIGURE 52:
CODE: D13RX
DATE: 4/11/72
PARTICULATES FROM SEAWATER
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station D5
EXCITATION SPECTRUM Monitored
at 679 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

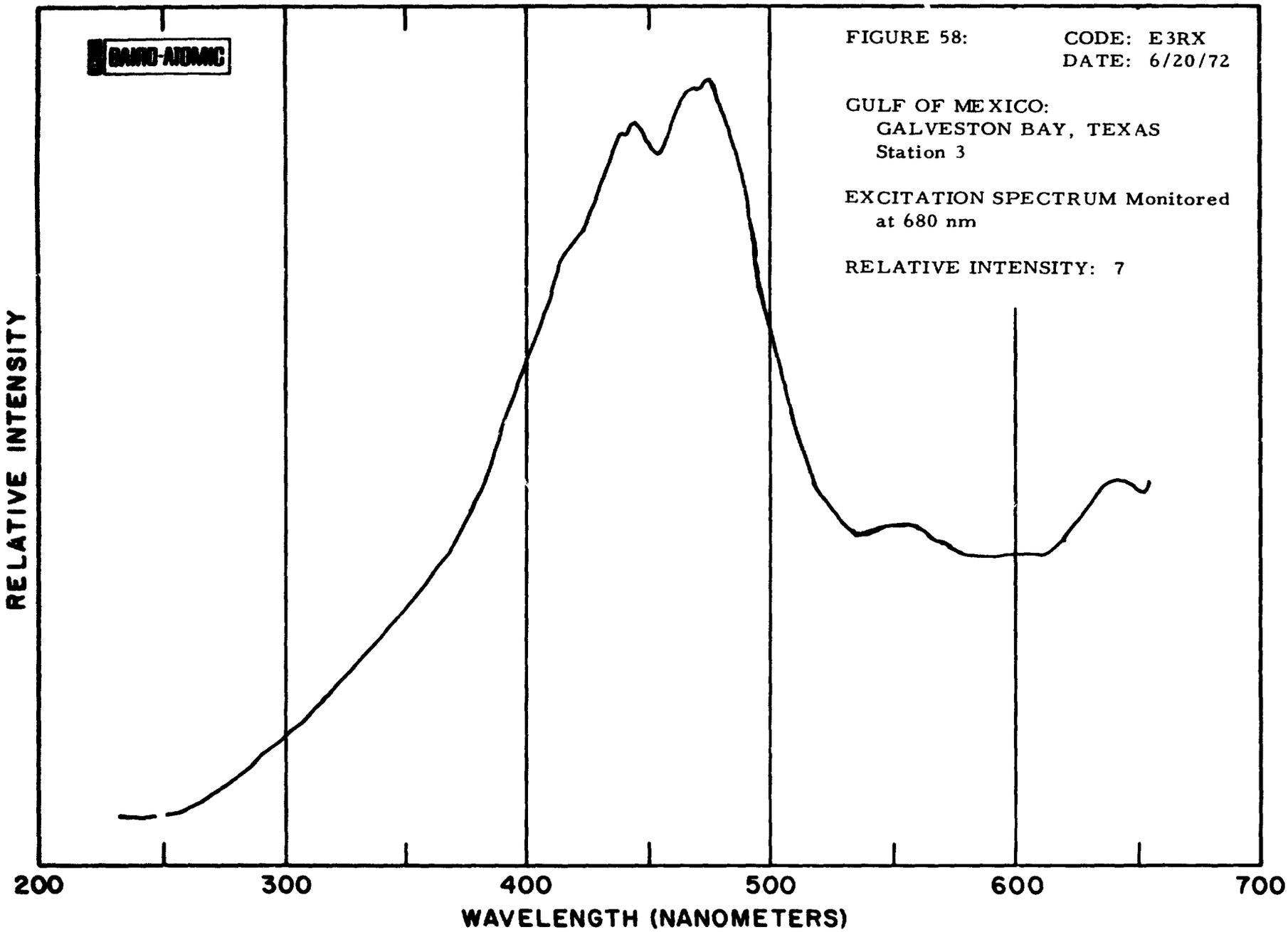

BAIRD-ATOMIC
FIGURE 53:
CODE: E1RM
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 1
EMISSION SPECTRUM Excited at 458 nm
RELATIVE INTENSITY: 4.5
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

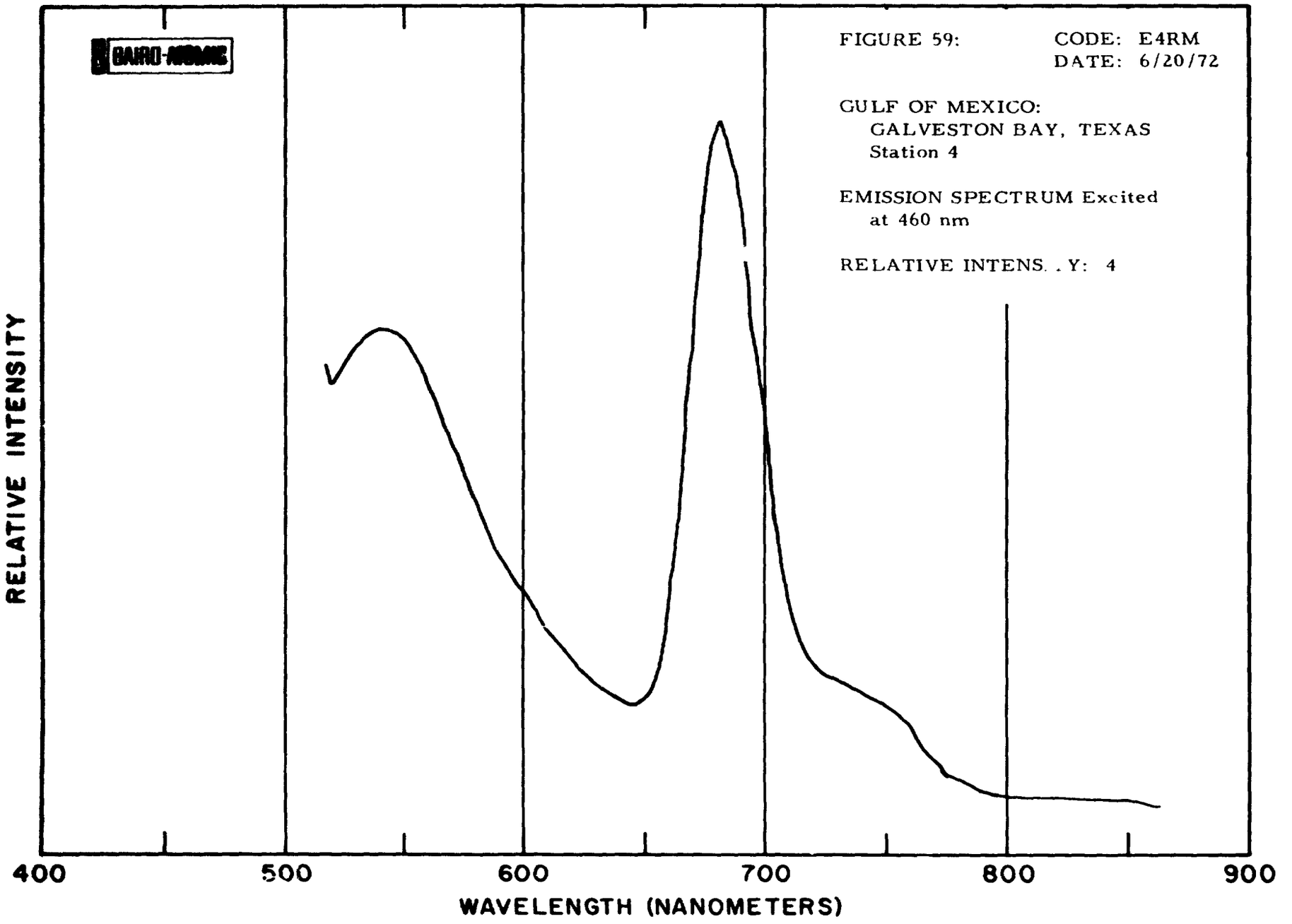

BAIRD-ATOMIC
FIGURE 54:
CODE: E1RX
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 1
EXCITATION SPECTRUM Monitored at 680 nm
RELATIVE INTENSITY: 4.5
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

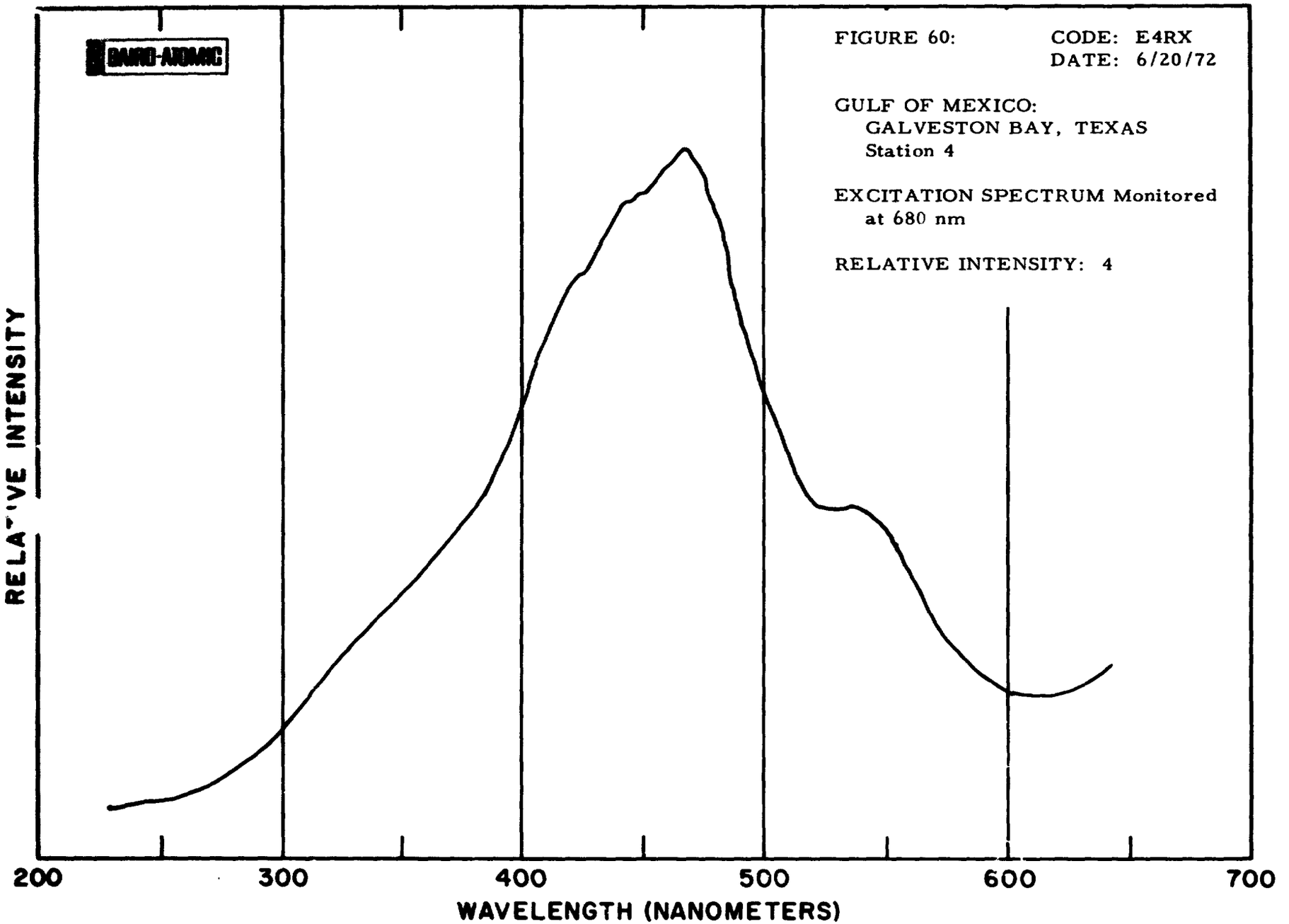

BAIRD-ATOMIC
FIGURE 55:
CODE: E2RM
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 2
EMISSION SPECTRUM Excited
at 460 nm
RELATIVE INTENSITY: 11
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

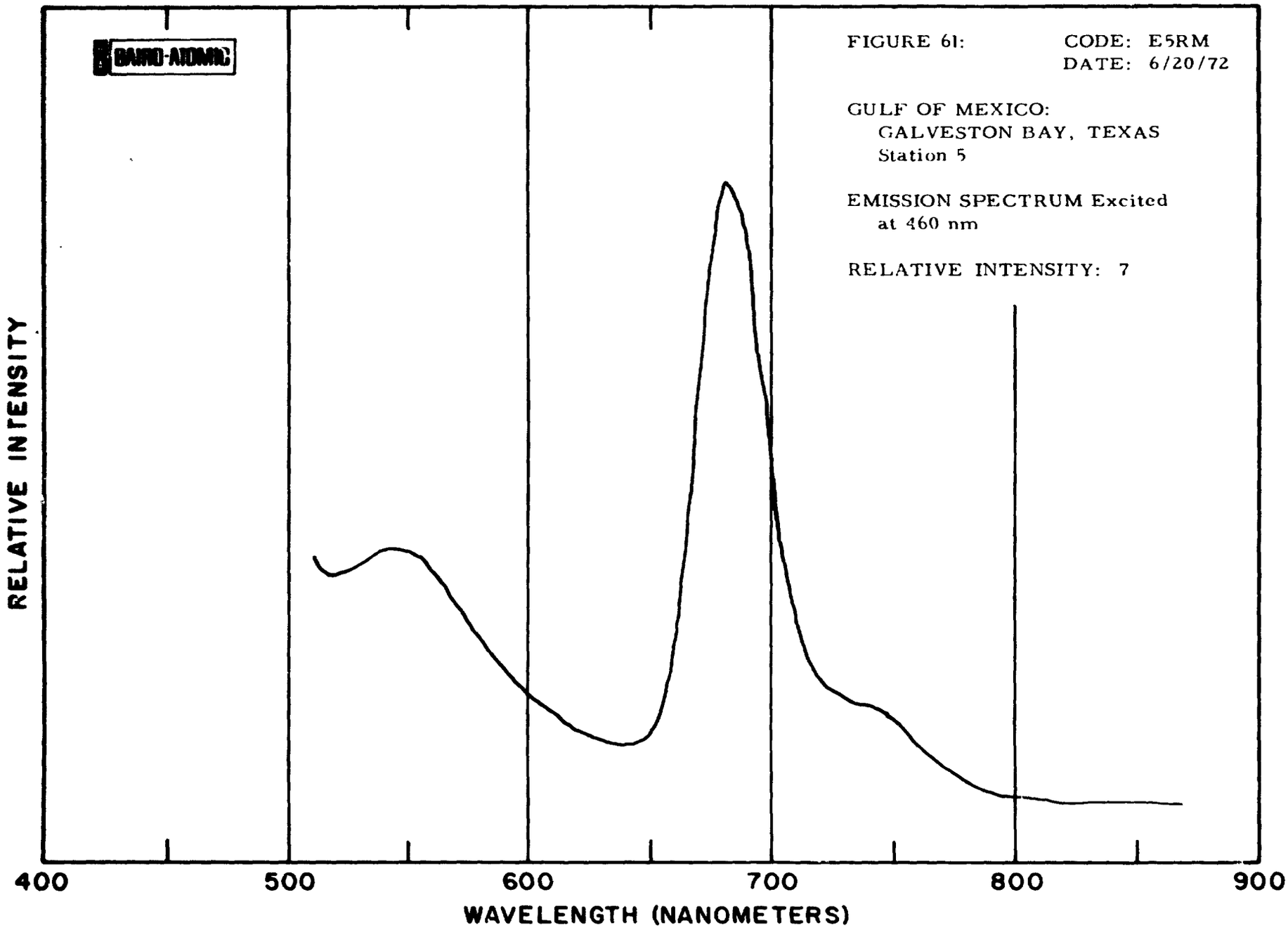

BAIRD-ATOMIC
FIGURE 56:
CODE: E2RX
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 2
EXCITATION SPECTRUM Monitored at 680 nm
RELATIVE INTENSITY: 11
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

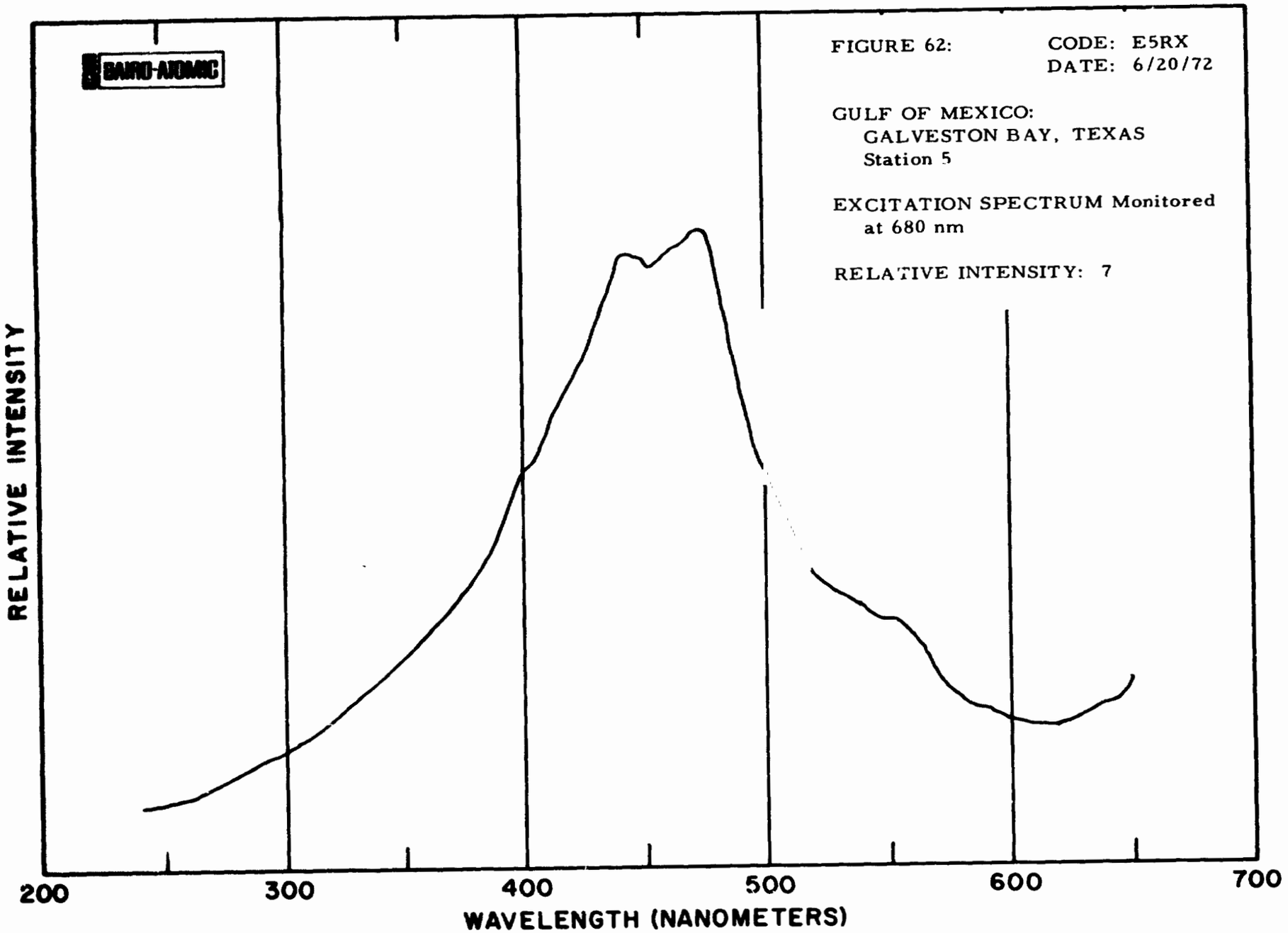

BAIRD-ATOMIC
FIGURE 57:
CODE: E3RM
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 3
EMISSION SPECTRUM Excited at 460 nm
RELATIVE INTENSITY: 7
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

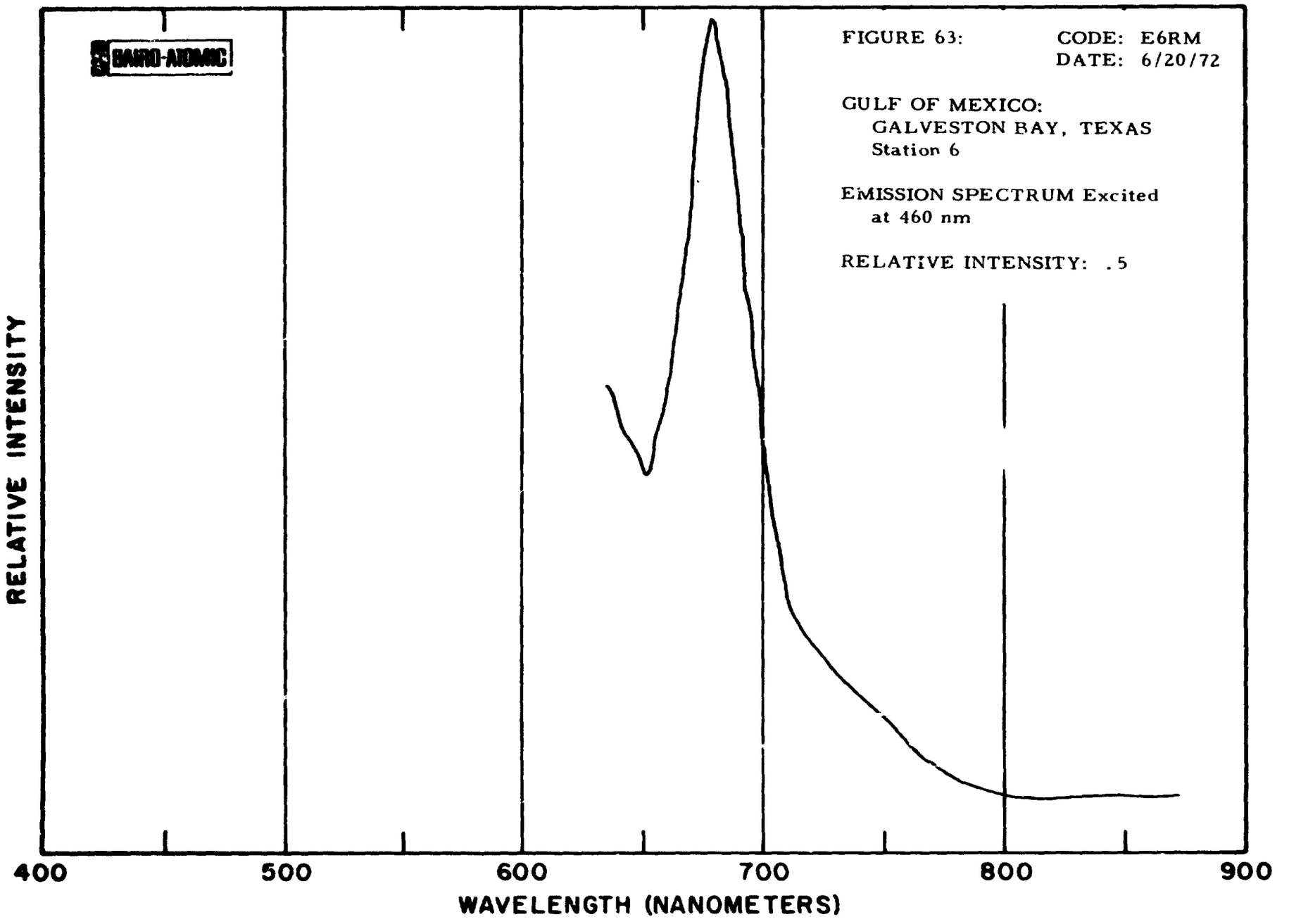

BAIRD-ATOMIC
FIGURE 58:
CODE: E3RX
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 3
EXCITATION SPECTRUM Monitored at 680 nm
RELATIVE INTENSITY: 7
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

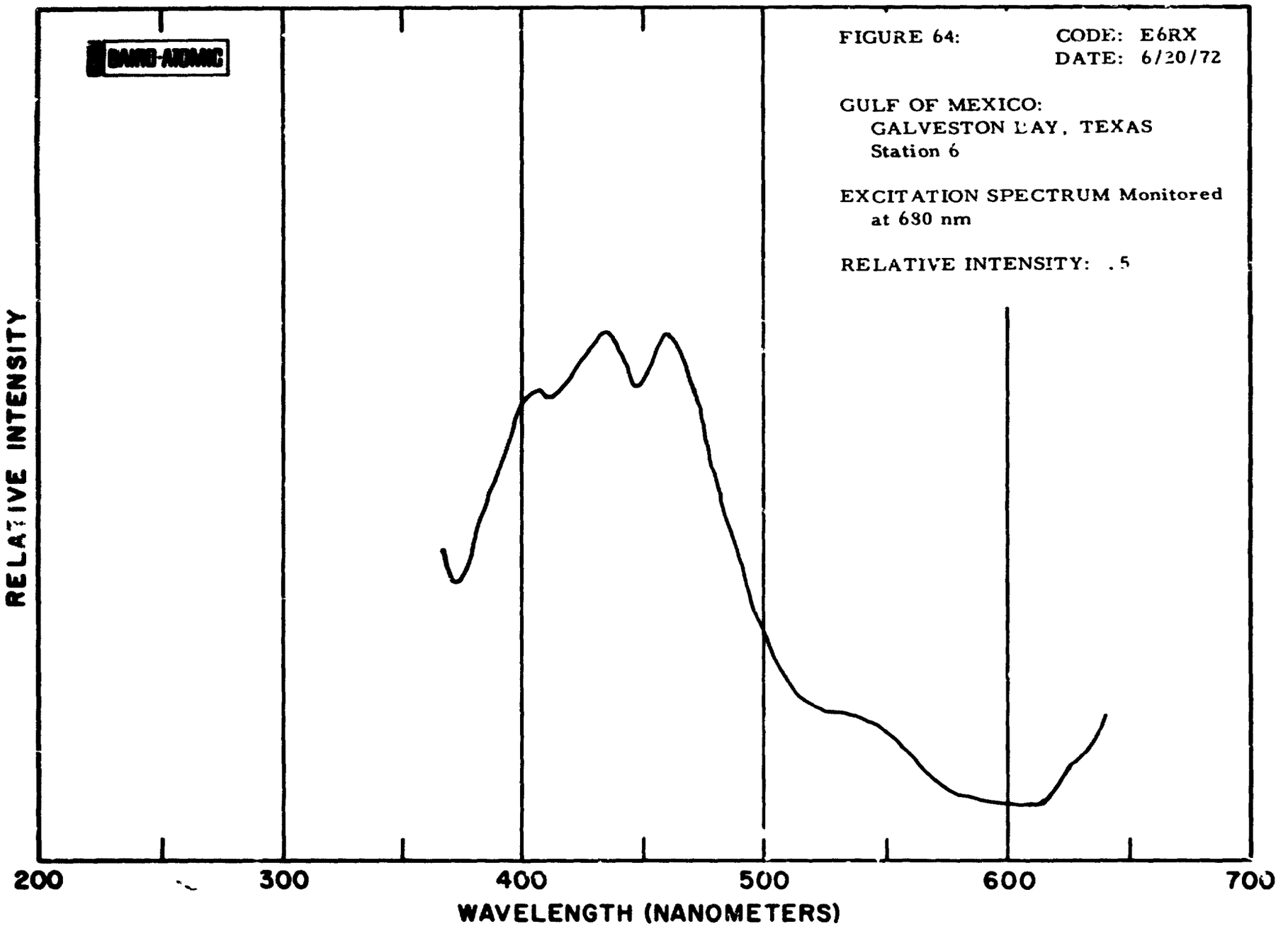

BAIRD-ATOMIC
FIGURE 59:
CODE: E4RM
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 4
EMISSION SPECTRUM Excited
at 460 nm
RELATIVE INTENS. . Y: 4
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

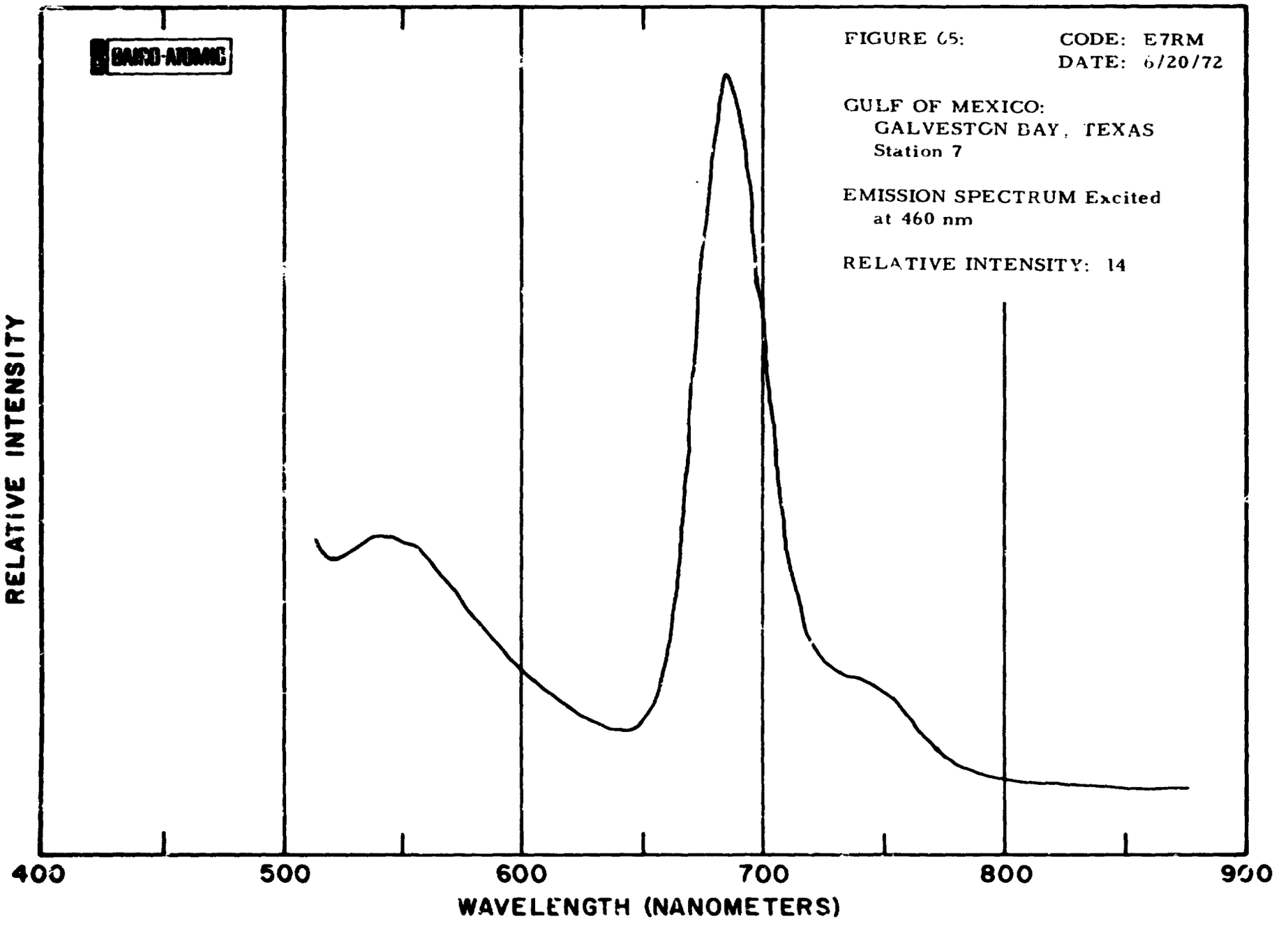

BAIRD-ATOMIC
FIGURE 60:
CODE: E4RX
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 4
EXCITATION SPECTRUM Monitored at 680 nm
RELATIVE INTENSITY: 4
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

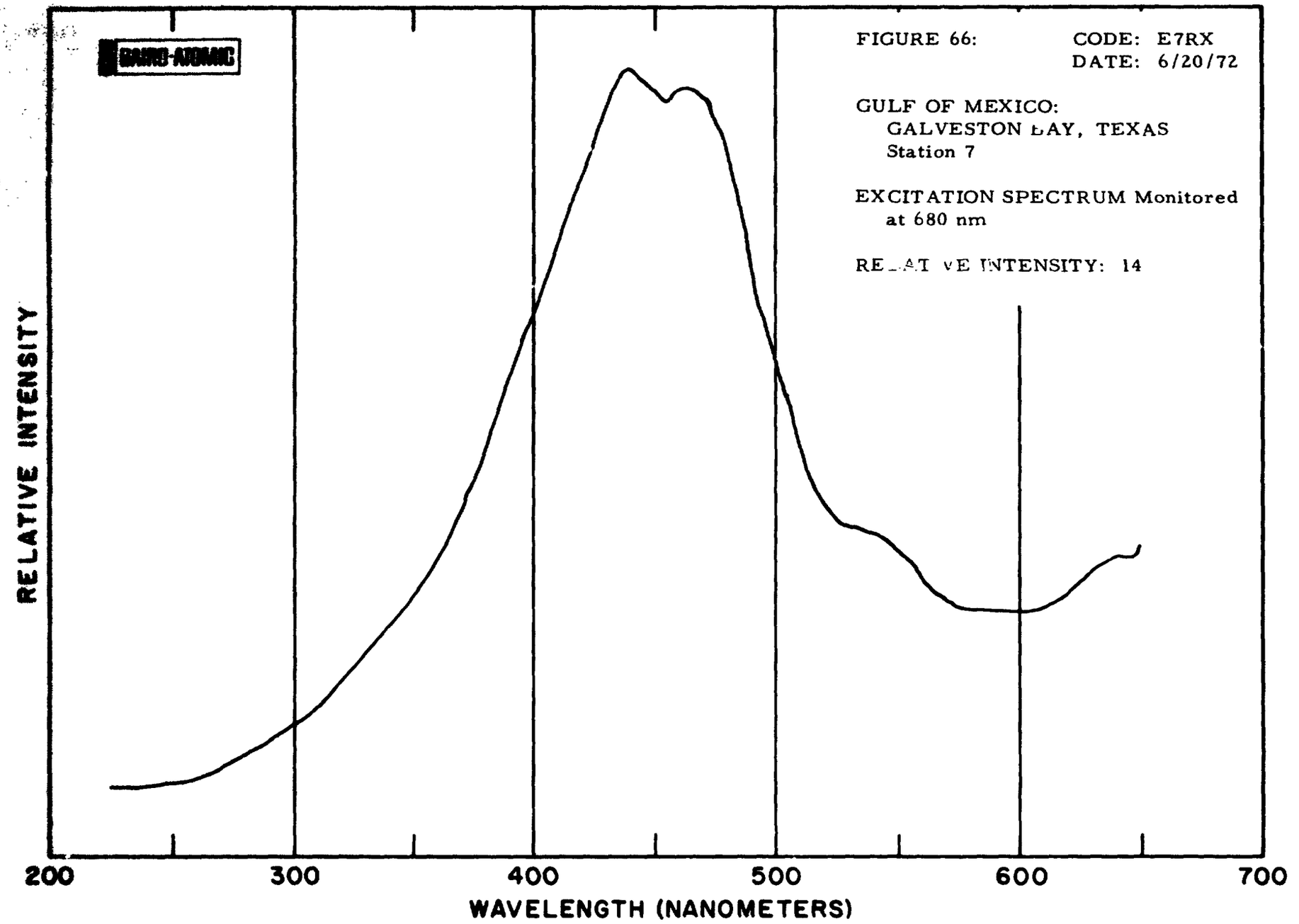

BAIRD-ATOMIC
FIGURE 61:
CODE: E5RM
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 5
EMISSION SPECTRUM Excited at 460 nm
RELATIVE INTENSITY: 7
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

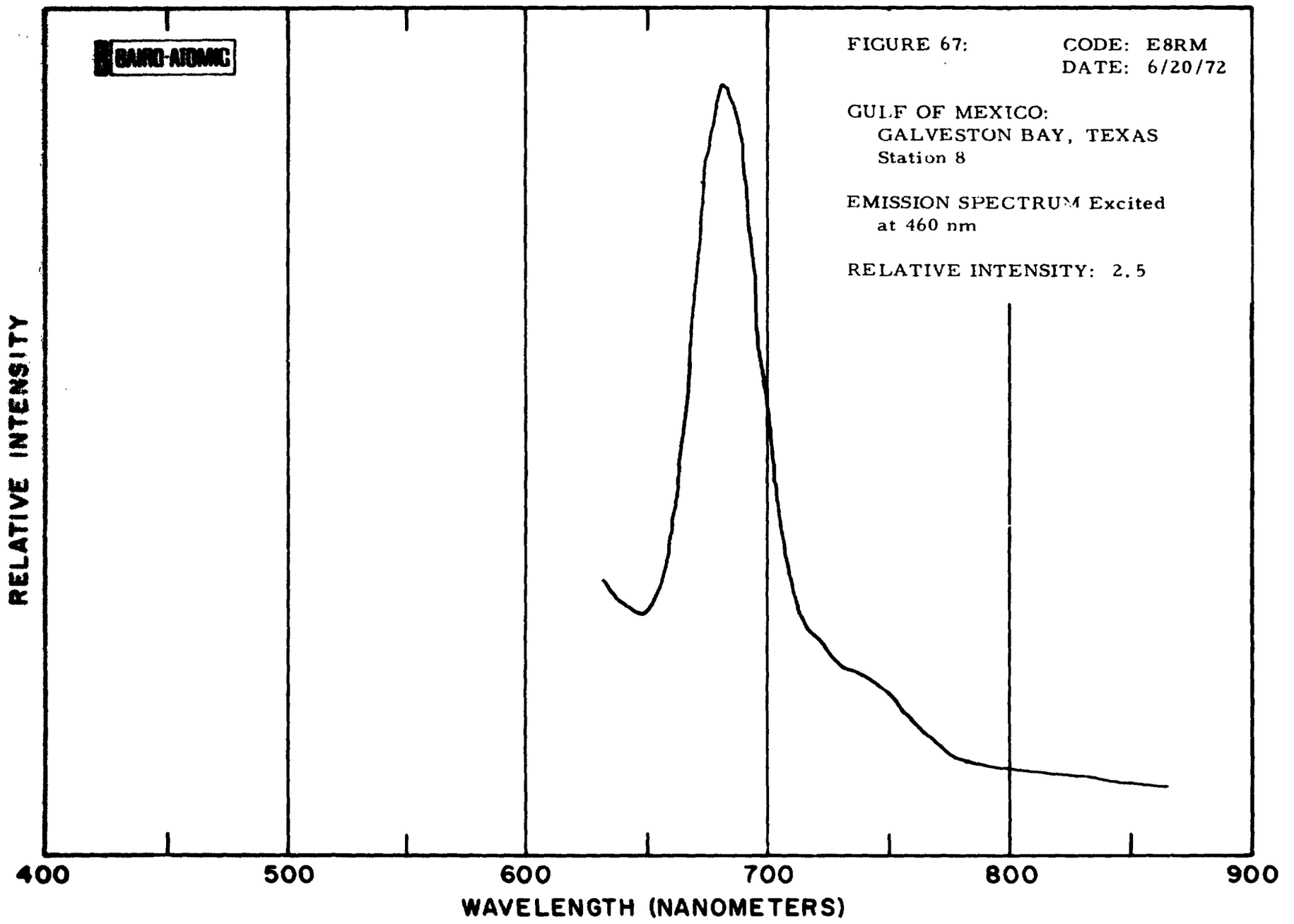

BAIRD-ATOMIC
FIGURE 62:
CODE: E5RX
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 5
EXCITATION SPECTRUM Monitored at 680 nm
RELATIVE INTENSITY: 7
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

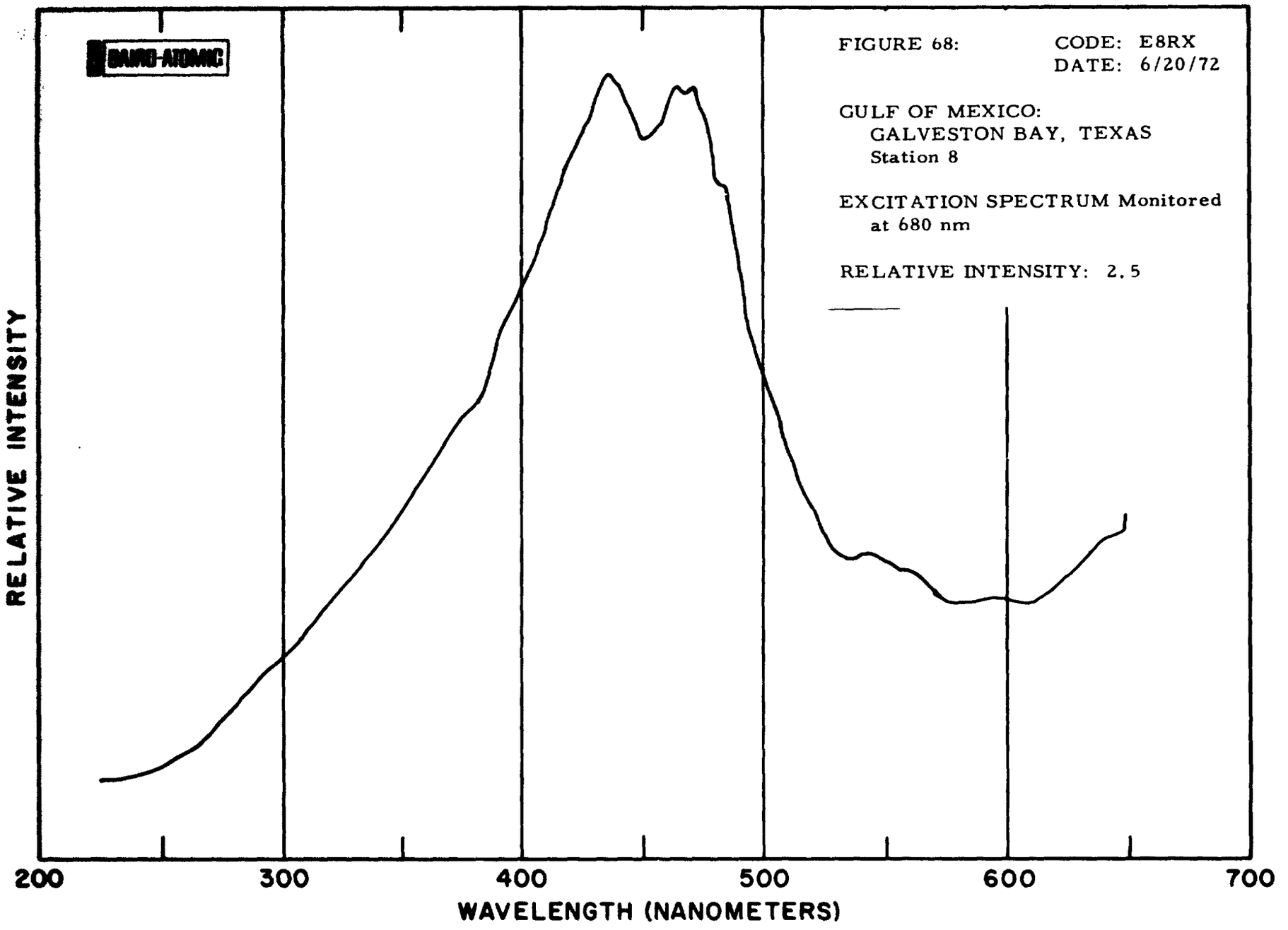

BAIRD-ATOMIC
FIGURE 63:
CODE: E6RM
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 6
EMISSION SPECTRUM Excited
at 460 nm
RELATIVE INTENSITY: .5
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

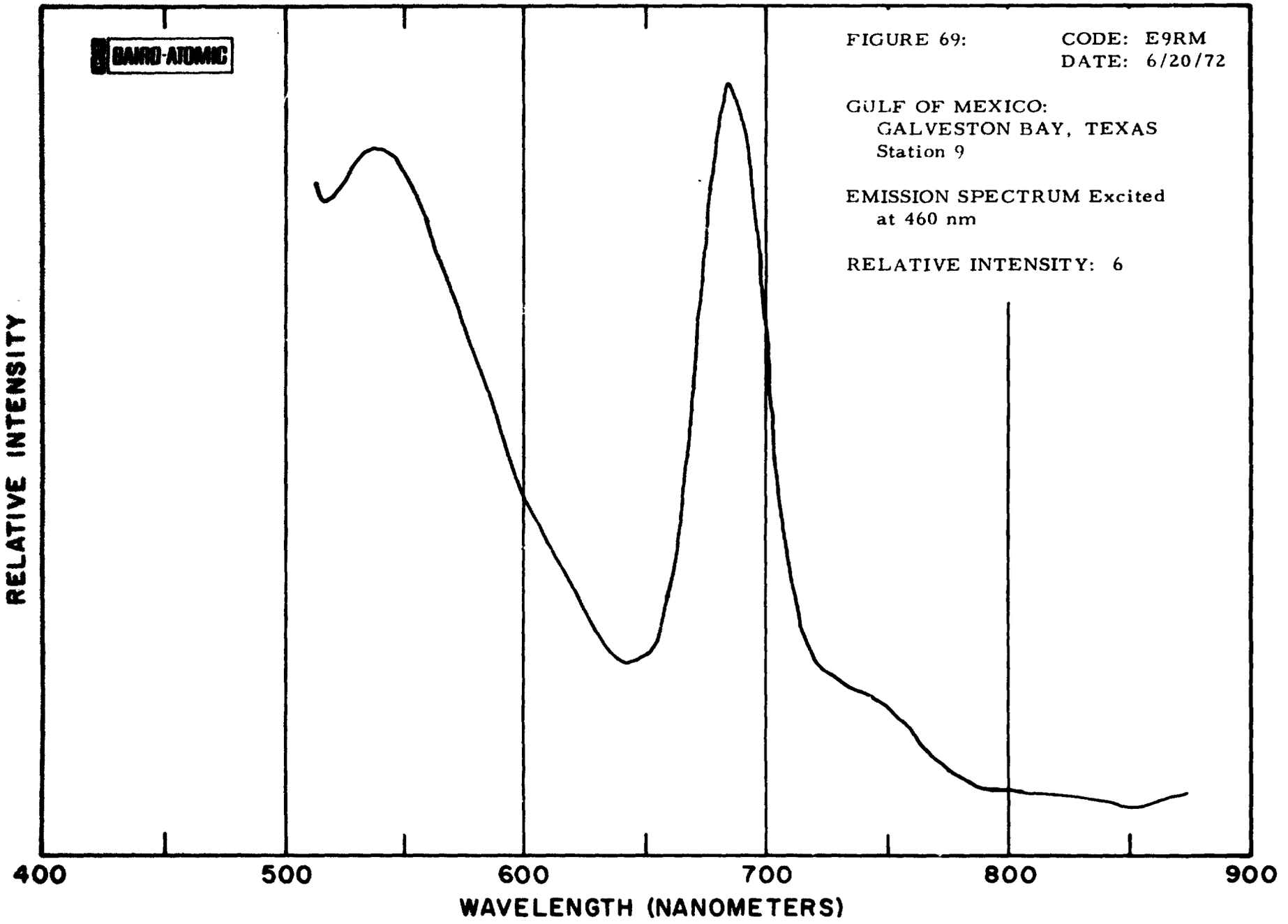

BAUSCH & LOMB
FIGURE 64:
CODE: E6RX
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 6
EXCITATION SPECTRUM Monitored at 680 nm
RELATIVE INTENSITY: .5
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

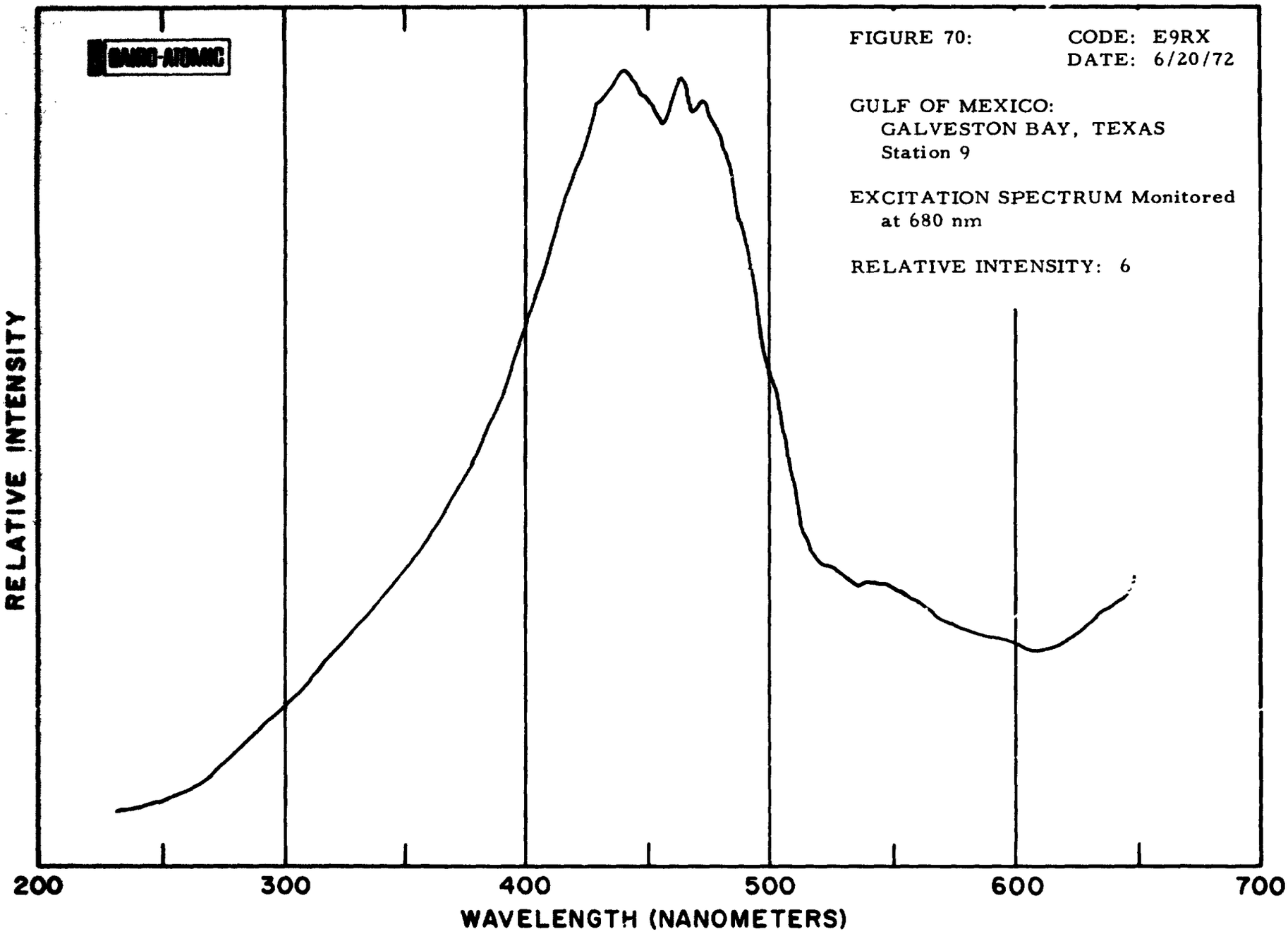

BARCO-ARDMAC
FIGURE 65:
CODE: E7RM
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 7
EMISSION SPECTRUM Excited at 460 nm
RELATIVE INTENSITY: 14
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

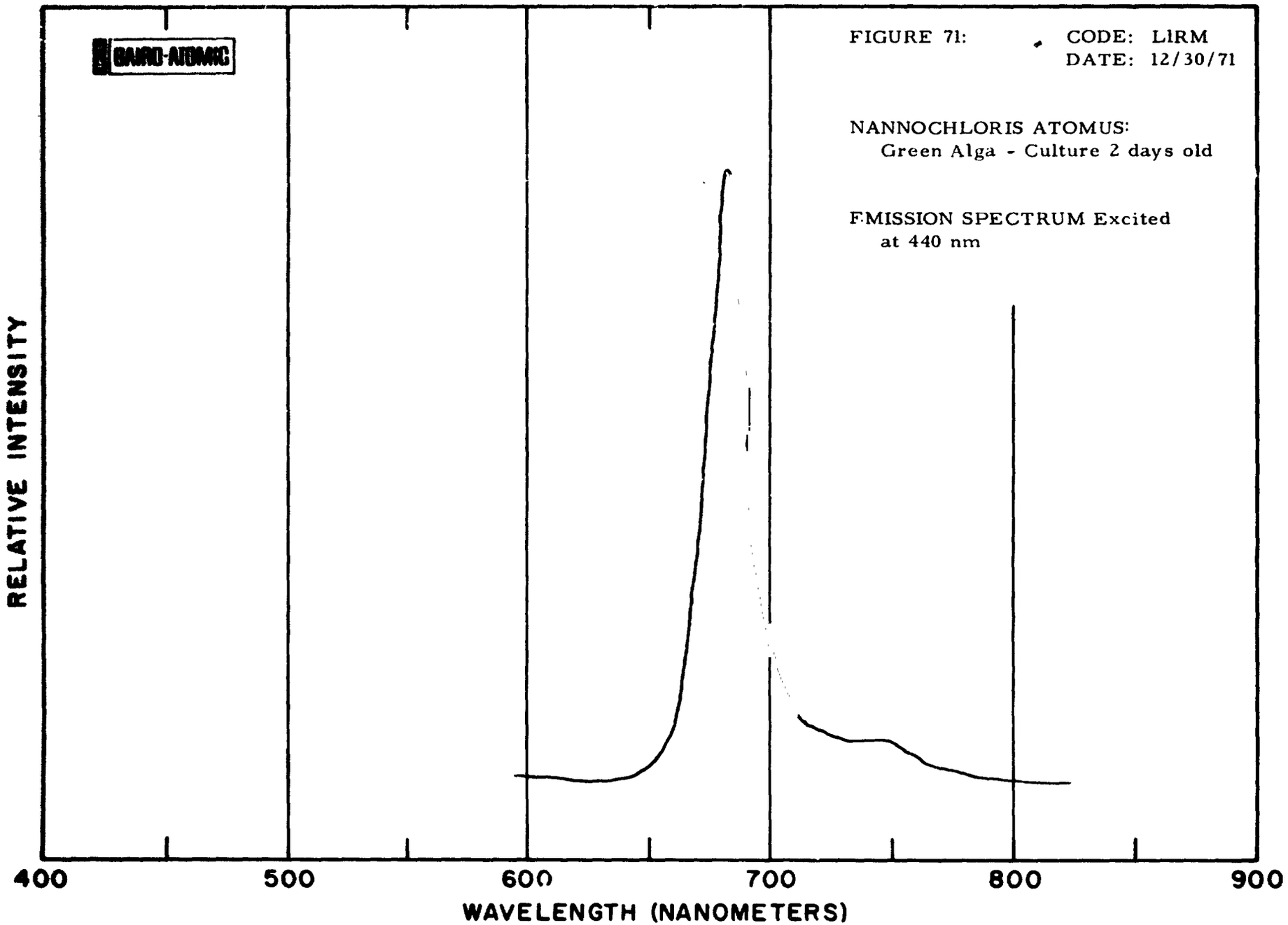

BAIRD-ATOMIC
FIGURE 66:
CODE: E7RX
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 7
EXCITATION SPECTRUM Monitored at 680 nm
RELATIVE INTENSITY: 14
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

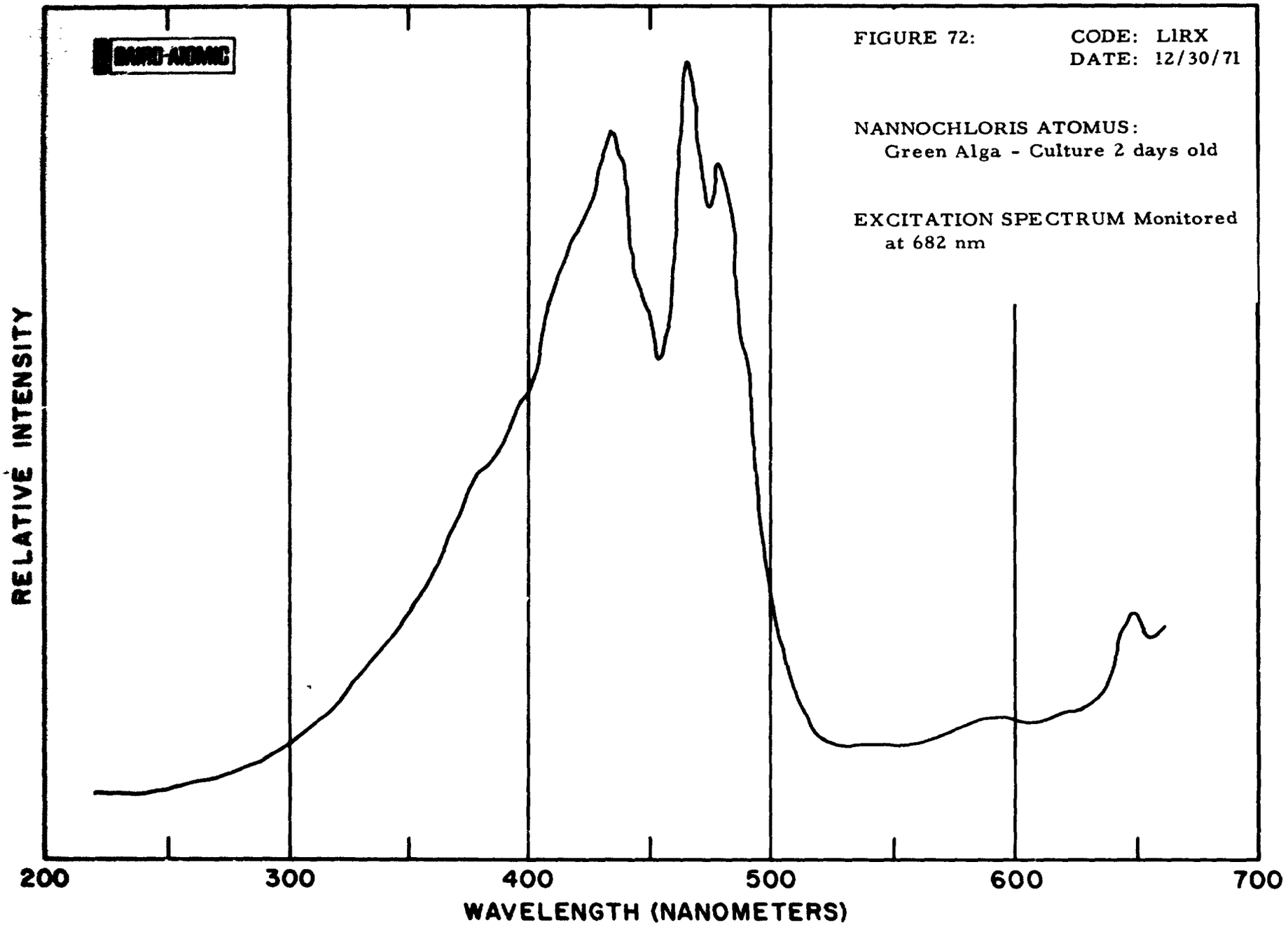

BAIRD-ATOMIC
FIGURE 67:
CODE: E8RM
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 8
EMISSION SPECTRUM Excited
at 460 nm
RELATIVE INTENSITY: 2.5
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

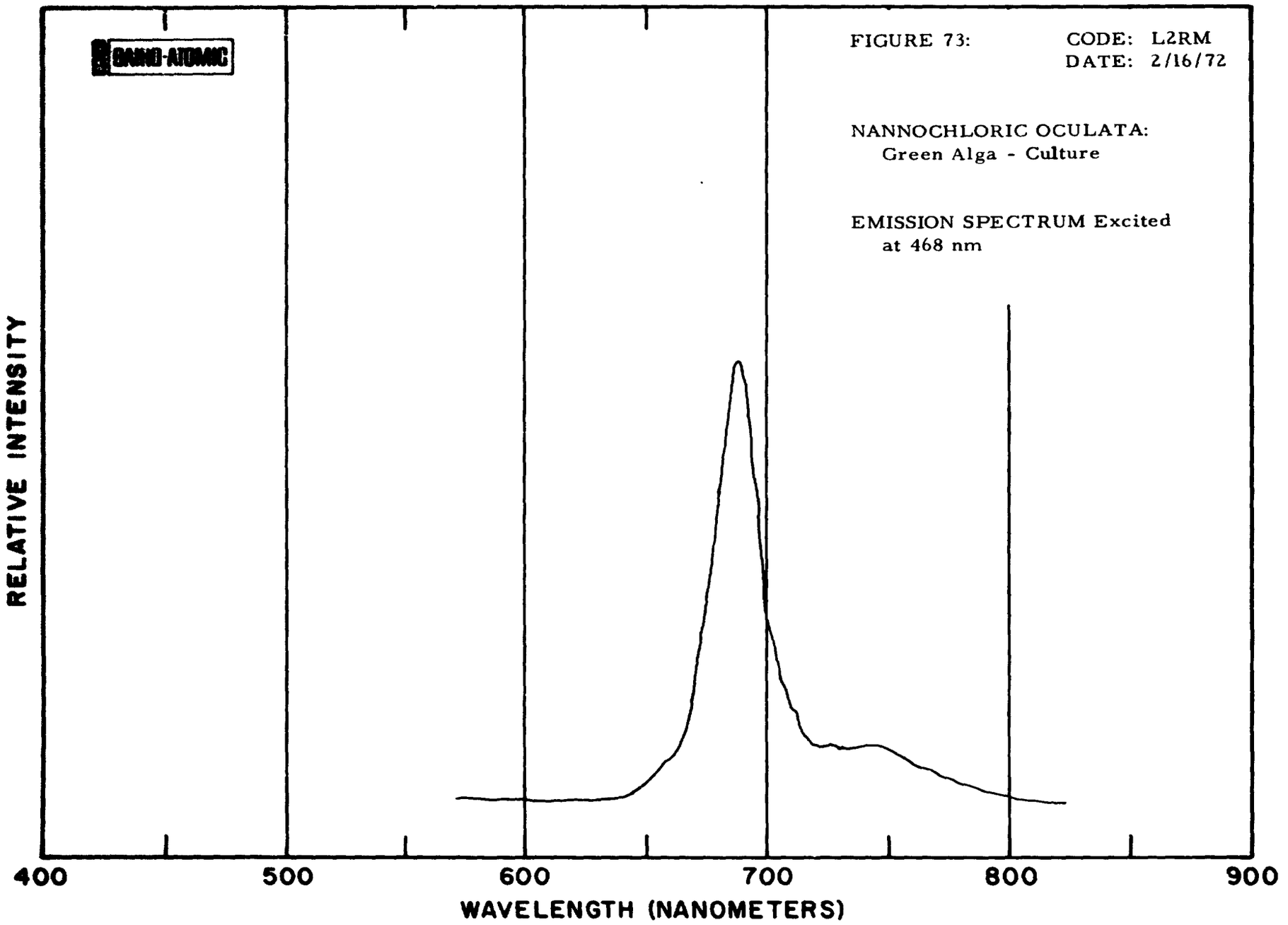

BAIRD-ATOMIC
FIGURE 68:
CODE: E8RX
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 8
EXCITATION SPECTRUM Monitored at 680 nm
RELATIVE INTENSITY: 2.5
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 69:
CODE: E9RM
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 9
EMISSION SPECTRUM Excited at 460 nm
RELATIVE INTENSITY: 6
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)


BARIO-AUDIANC
FIGURE 70:
CODE: E9RX
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 9
EXCITATION SPECTRUM Monitored at 680 nm
RELATIVE INTENSITY: 6
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 71:
CODE: LIRM
DATE: 12/30/71
NANNOCHLORIS ATOMUS:
Green Alga - Culture 2 days old
EMISSION SPECTRUM Excited
at 440 nm
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 72:
CODE: L1RX
DATE: 12/30/71
NANNOCHLORIS ATOMUS:
Green Alga - Culture 2 days old
EXCITATION SPECTRUM Monitored
at 682 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 73:
CODE: L2RM
DATE: 2/16/72
NANNOCHLORIC OCULATA:
Green Alga - Culture
EMISSION SPECTRUM Excited
at 468 nm
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

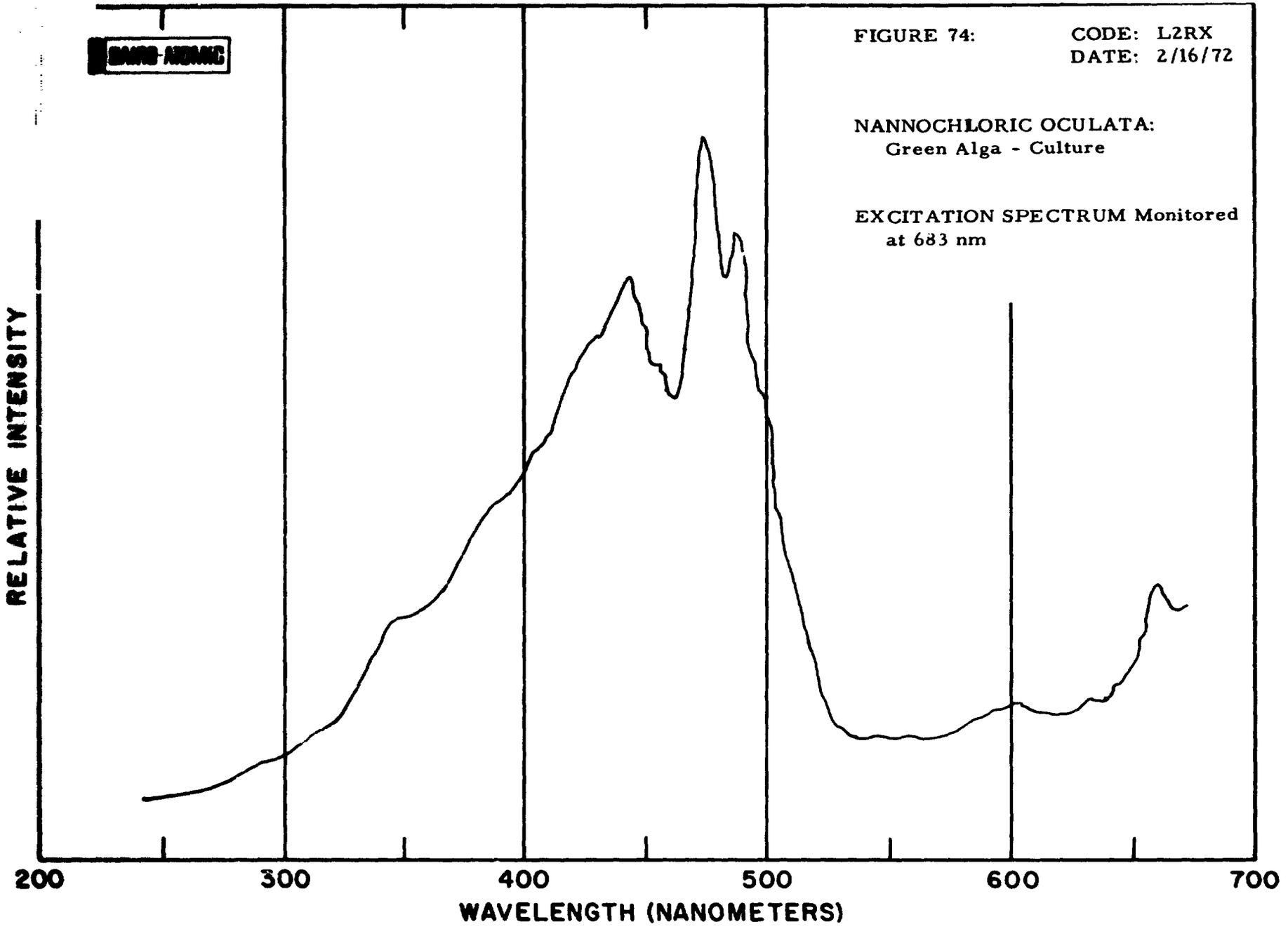
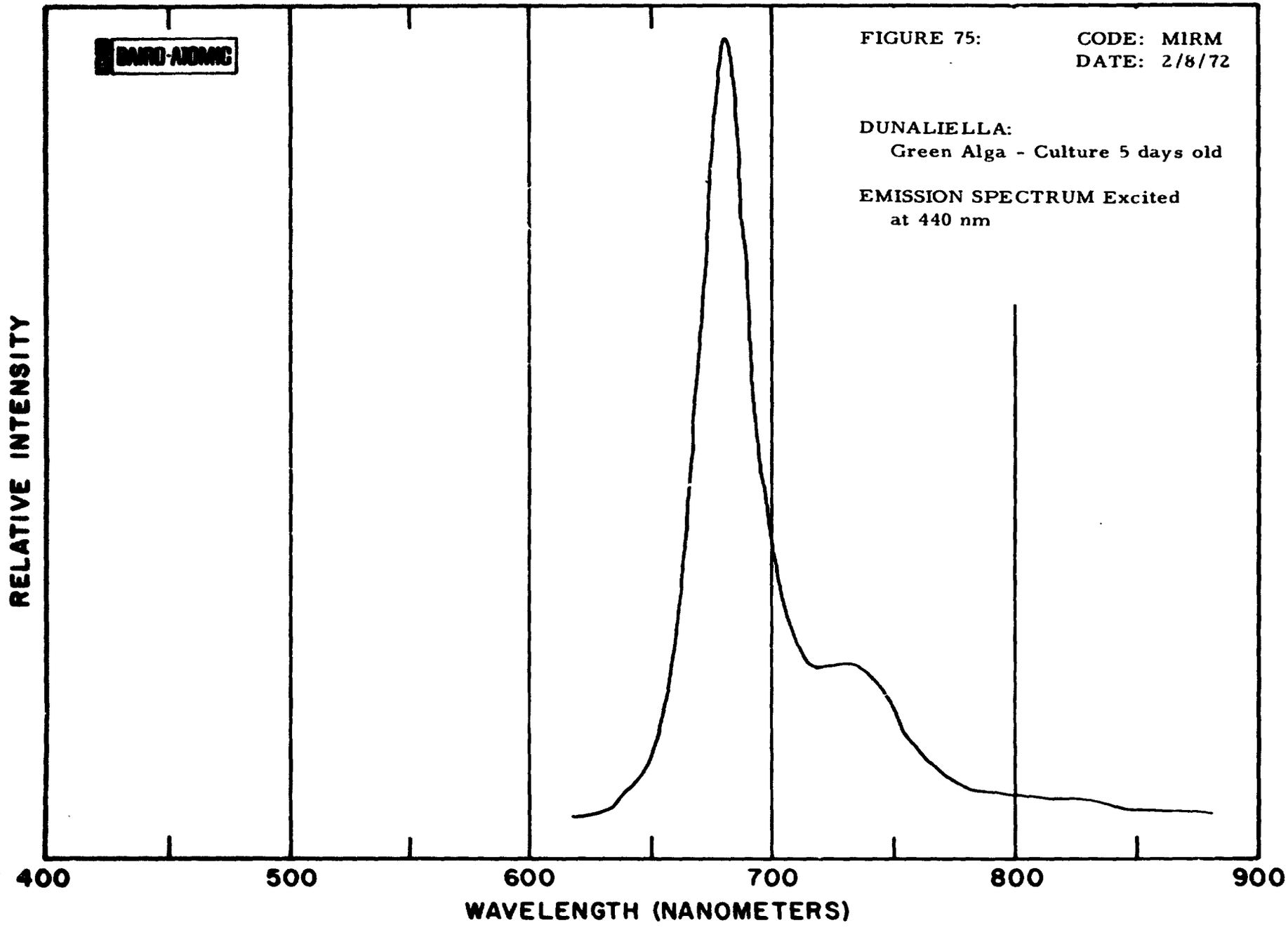


FIGURE 74:
CODE: L2RX
DATE: 2/16/72
NANNOCHLORIC OCULATA:
Green Alga - Culture
EXCITATION SPECTRUM Monitored at 683 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BARD-ADMC
FIGURE 75:
CODE: MIRM
DATE: 2/8/72
DUNALIELLA:
Green Alga - Culture 5 days old
EMISSION SPECTRUM Excited
at 440 nm
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

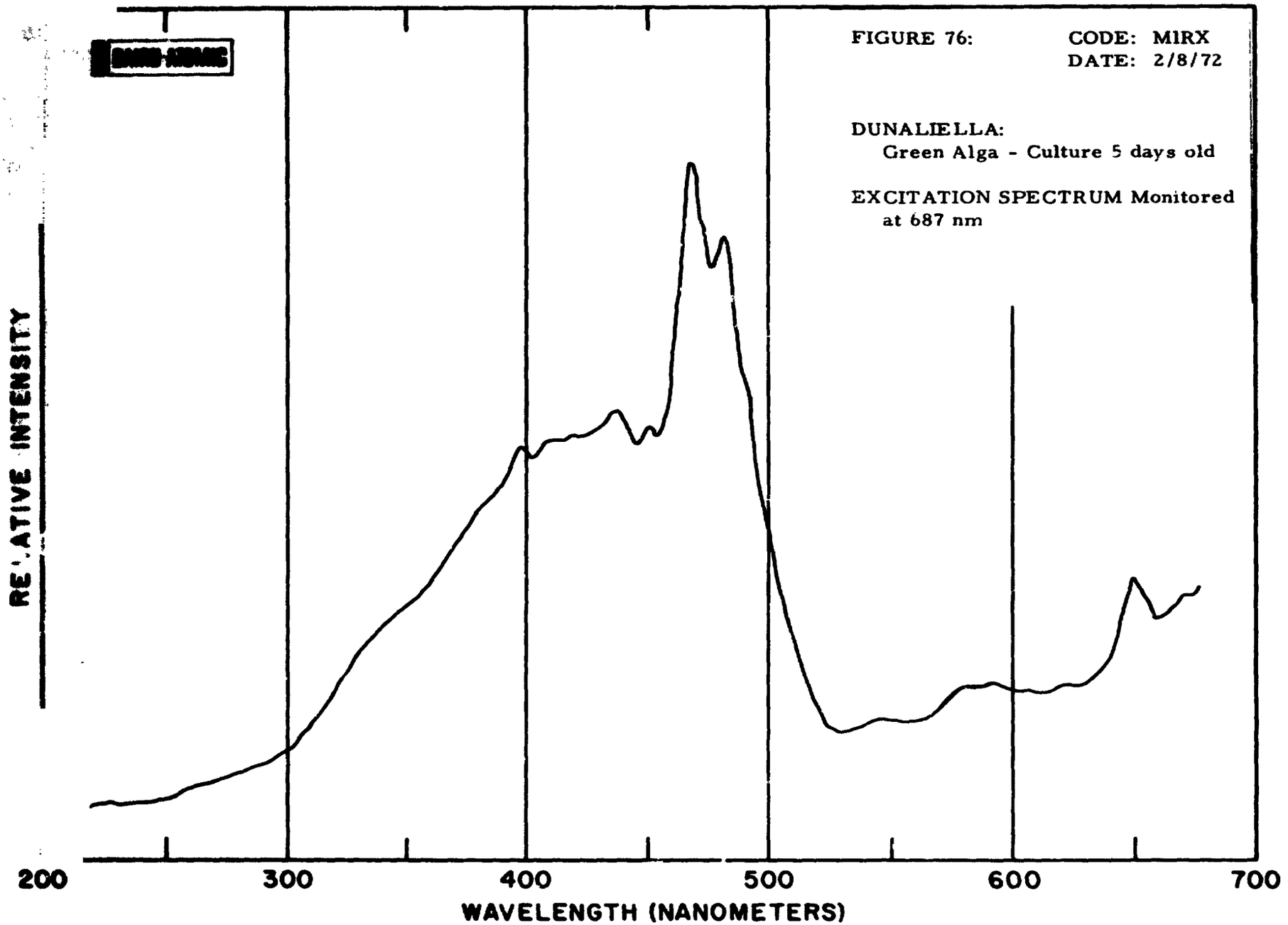
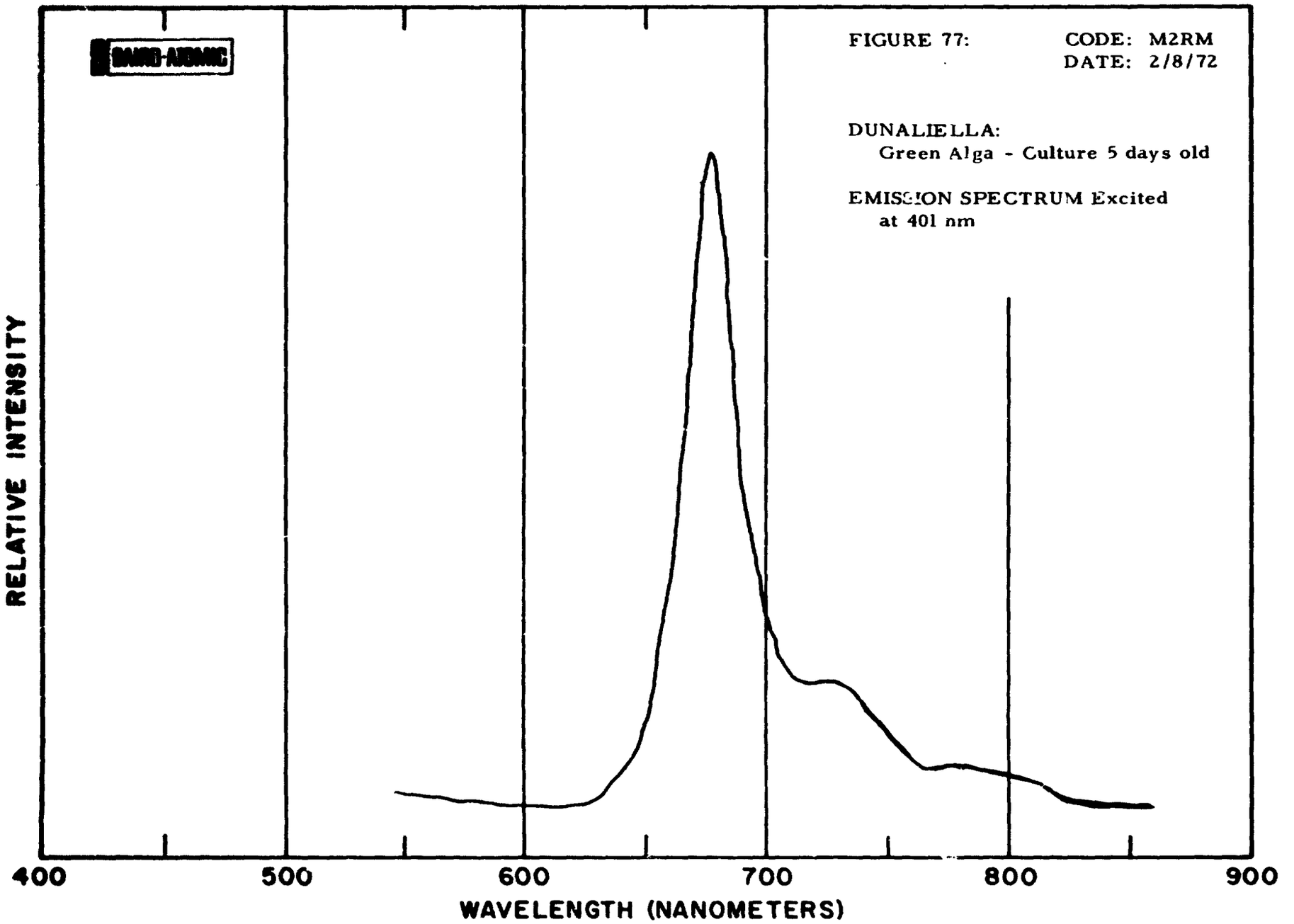


FIGURE 76:
CODE: MIRX
DATE: 2/8/72
DUNALIELLA:
Green Alga - Culture 5 days old
EXCITATION SPECTRUM Monitored at 687 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 77:
CODE: M2RM
DATE: 2/8/72
DUNALIELLA:
Green Alga - Culture 5 days old
EMISSION SPECTRUM Excited
at 401 nm
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

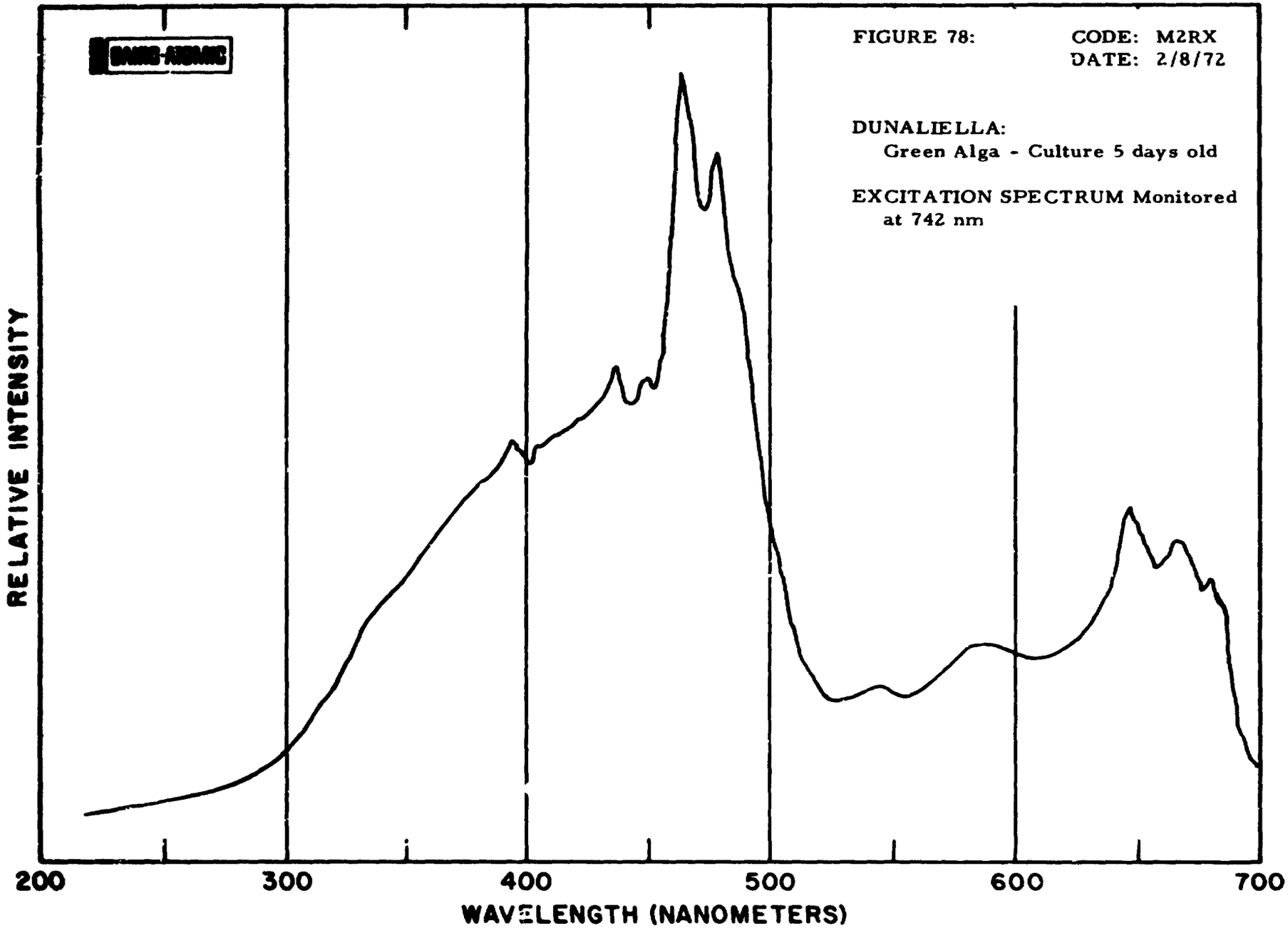
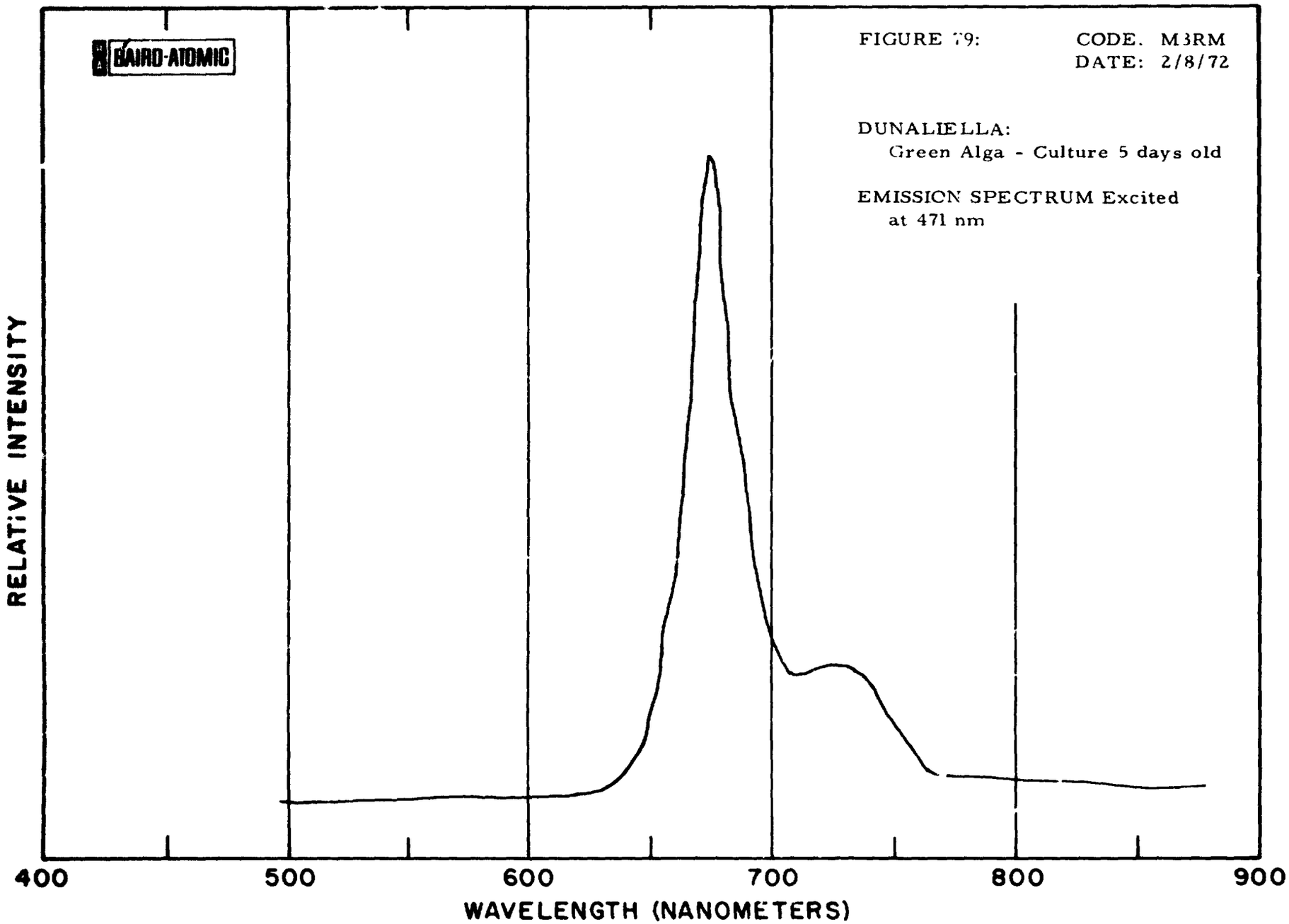
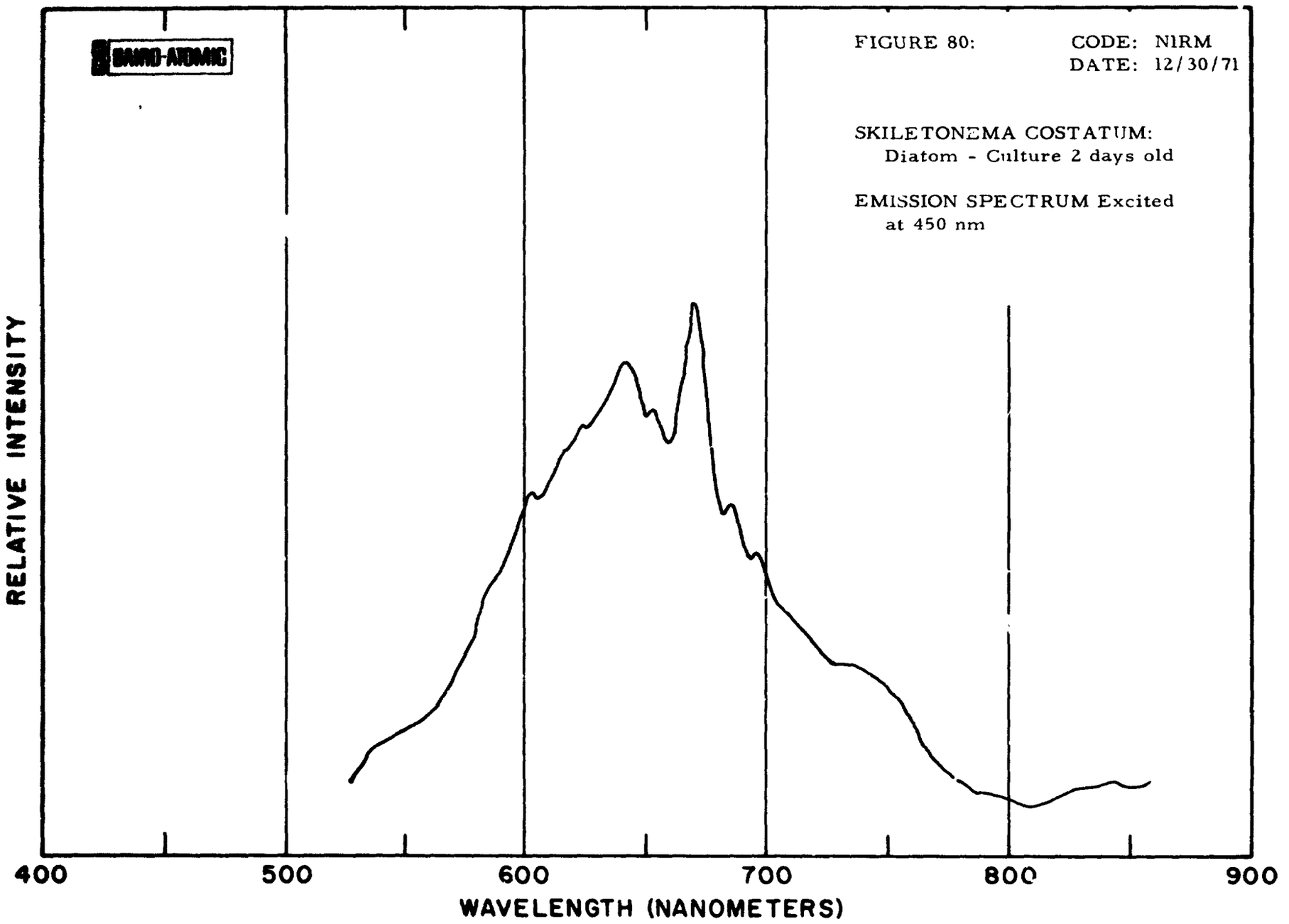
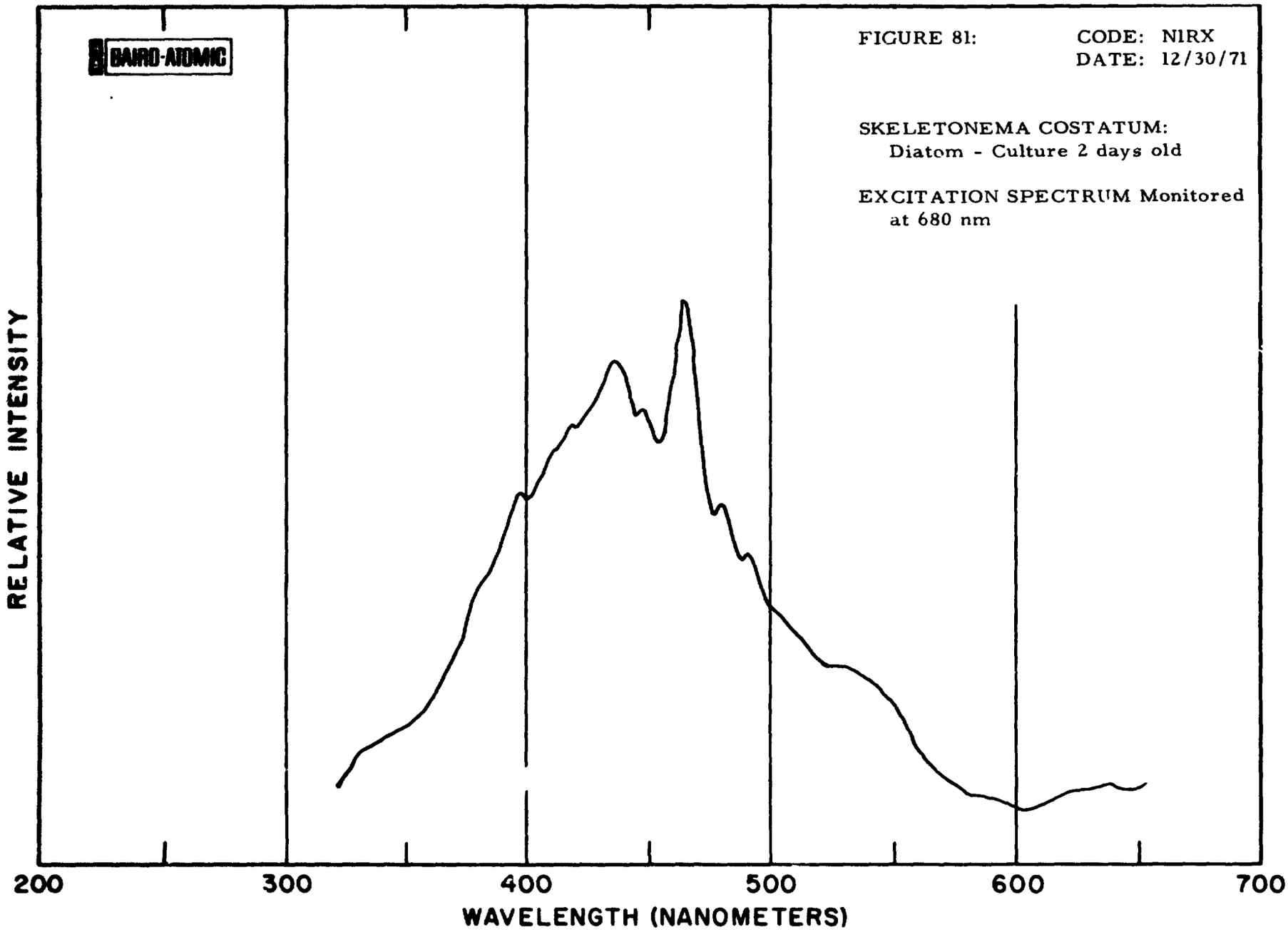
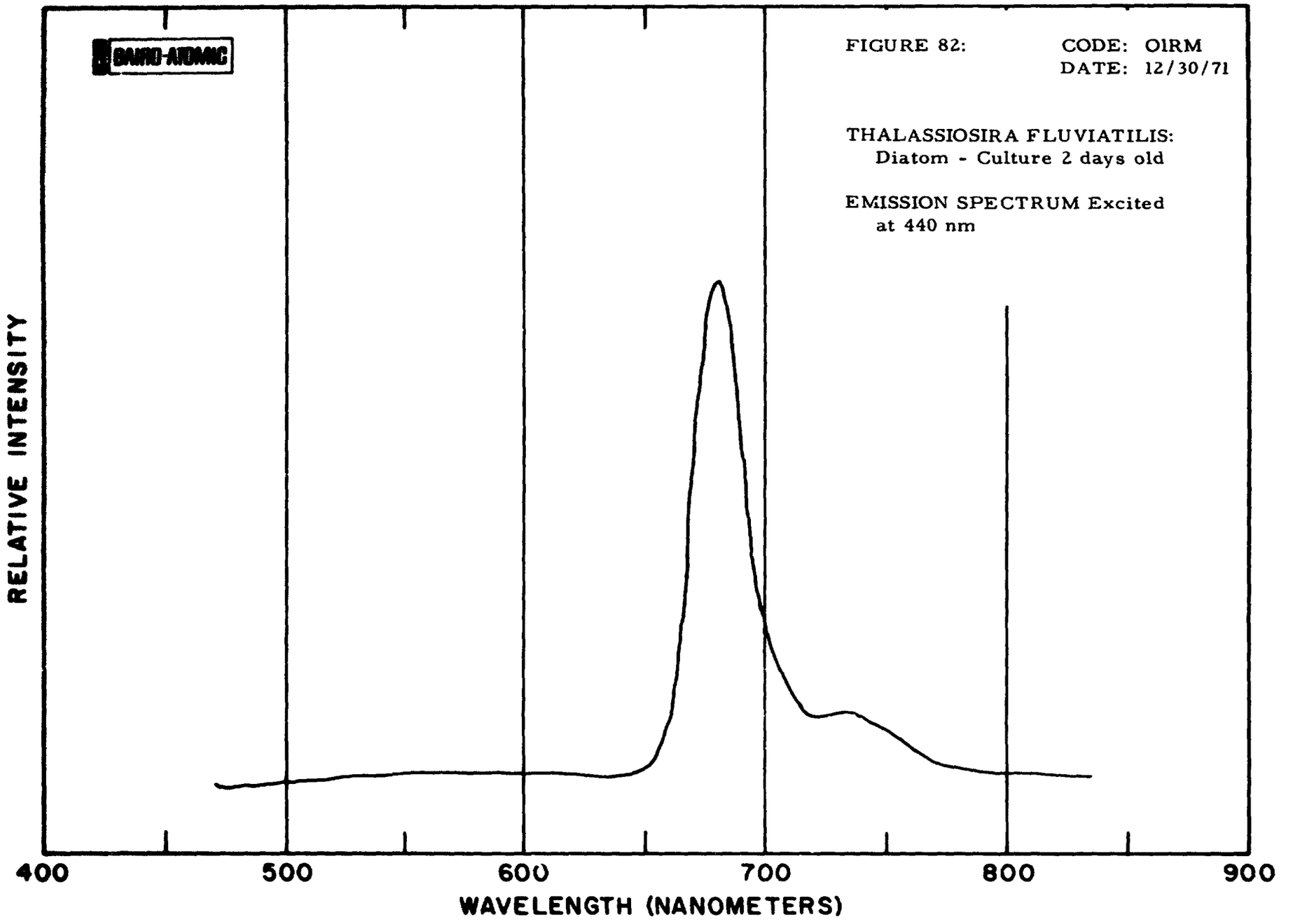


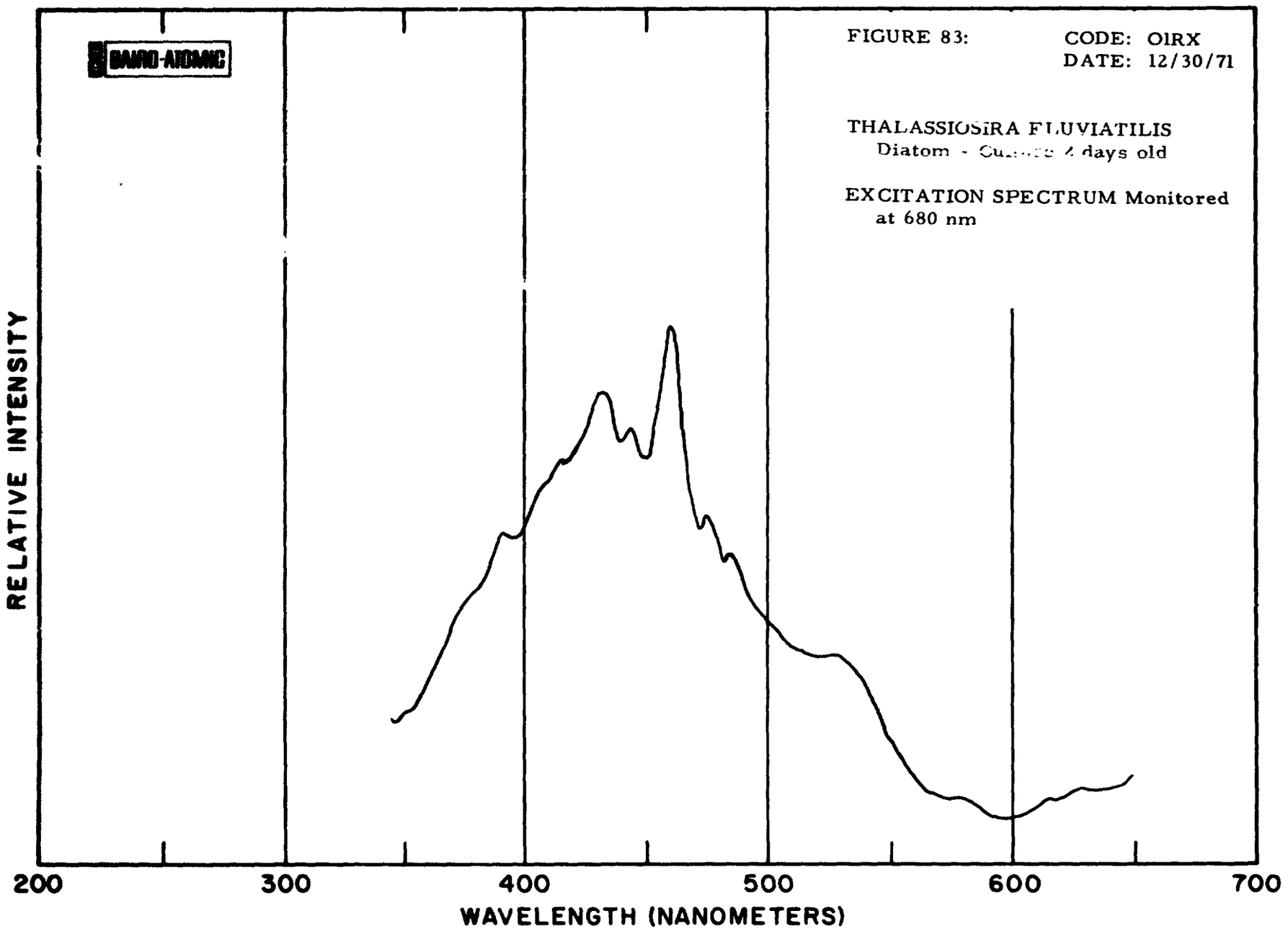
FIGURE 78:
CODE: M2RX
DATE: 2/8/72
DUNALIELLA:
Green Alga - Culture 5 days old
EXCITATION SPECTRUM Monitored at 742 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

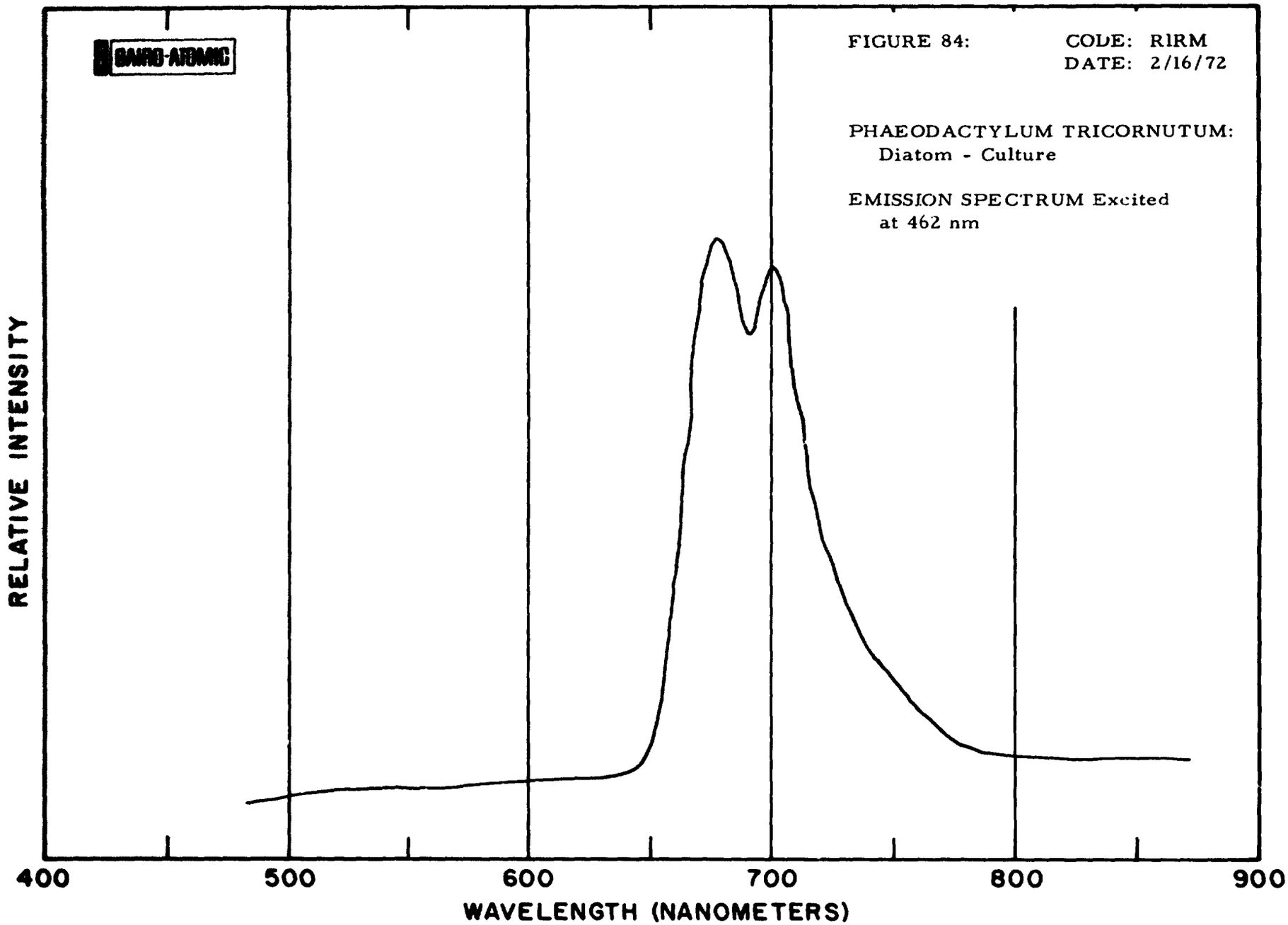

BAIRD-ATOMIC
FIGURE 79:
CODE. M3RM
DATE: 2/8/72
DUNALIELLA:
Green Alga - Culture 5 days old
EMISSION SPECTRUM Excited
at 471 nm
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

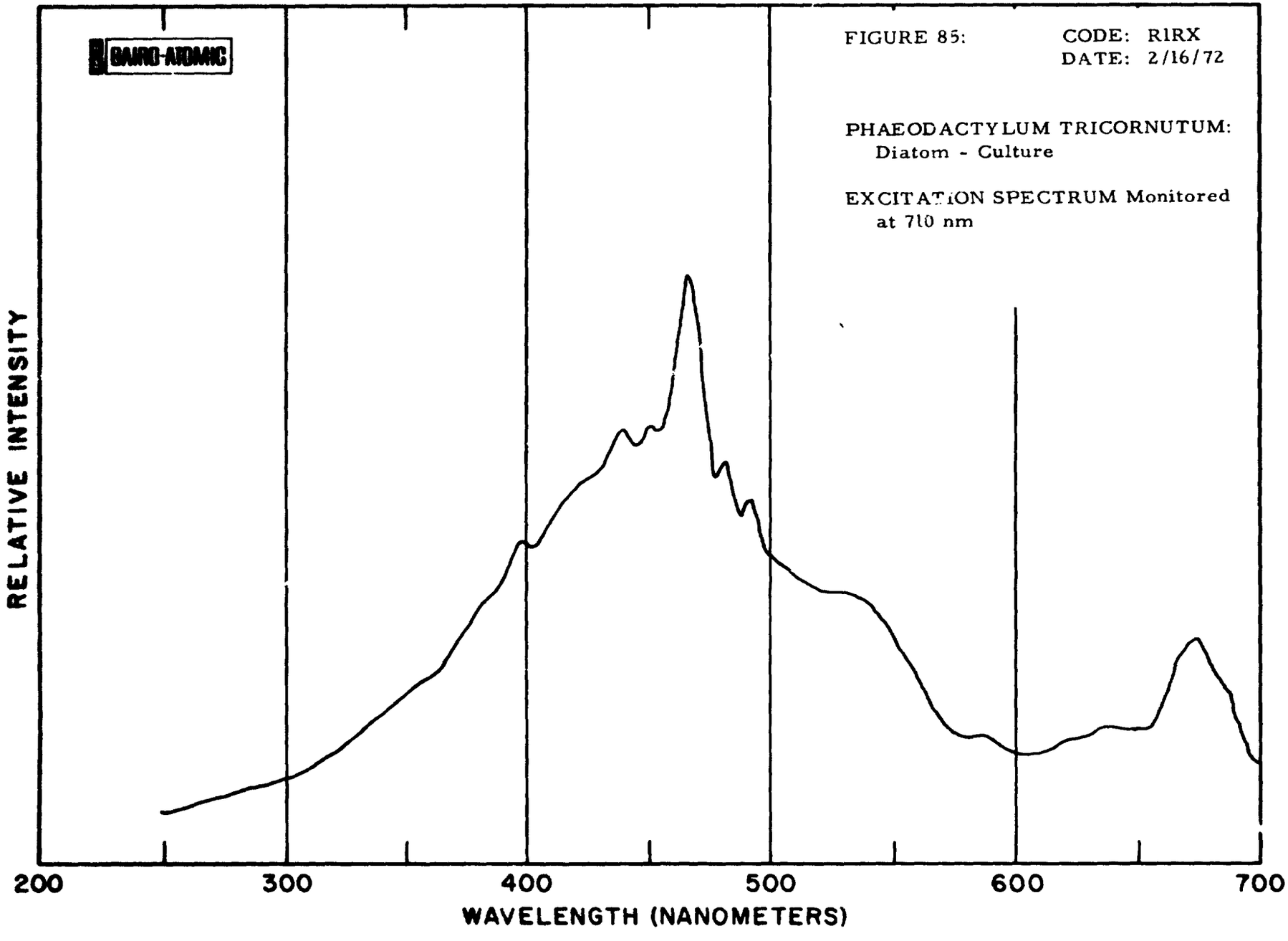

BAIRD-ATOMIC
FIGURE 80:
CODE: NIRM
DATE: 12/30/71
SKILETONEMA COSTATUM:
Diatom - Culture 2 days old
EMISSION SPECTRUM Excited
at 450 nm
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

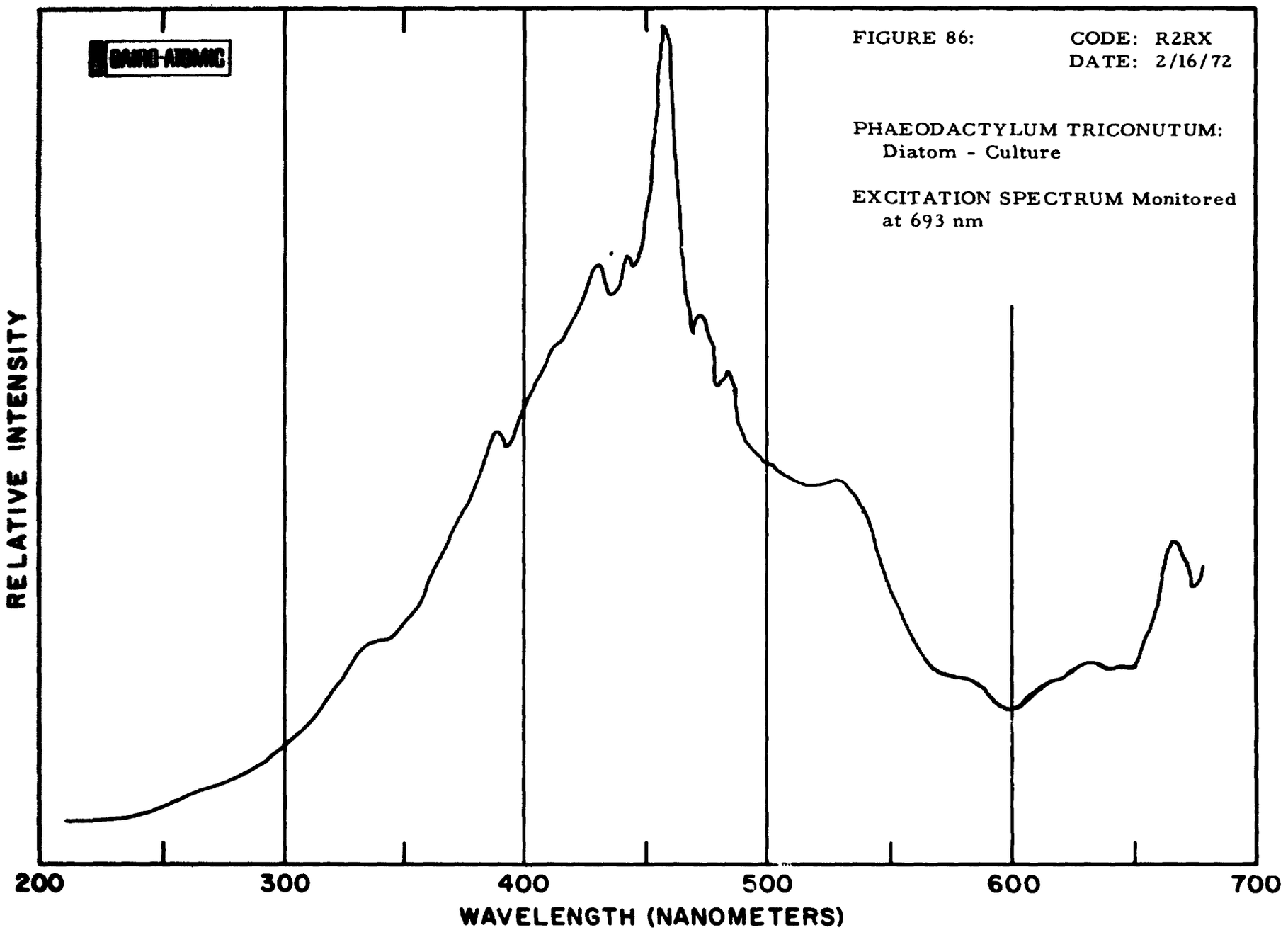

BAIRD-ATOMIC
FIGURE 81:
CODE: N1RX
DATE: 12/30/71
SKELETONEMA COSTATUM:
Diatom - Culture 2 days old
EXCITATION SPECTRUM Monitored
at 680 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

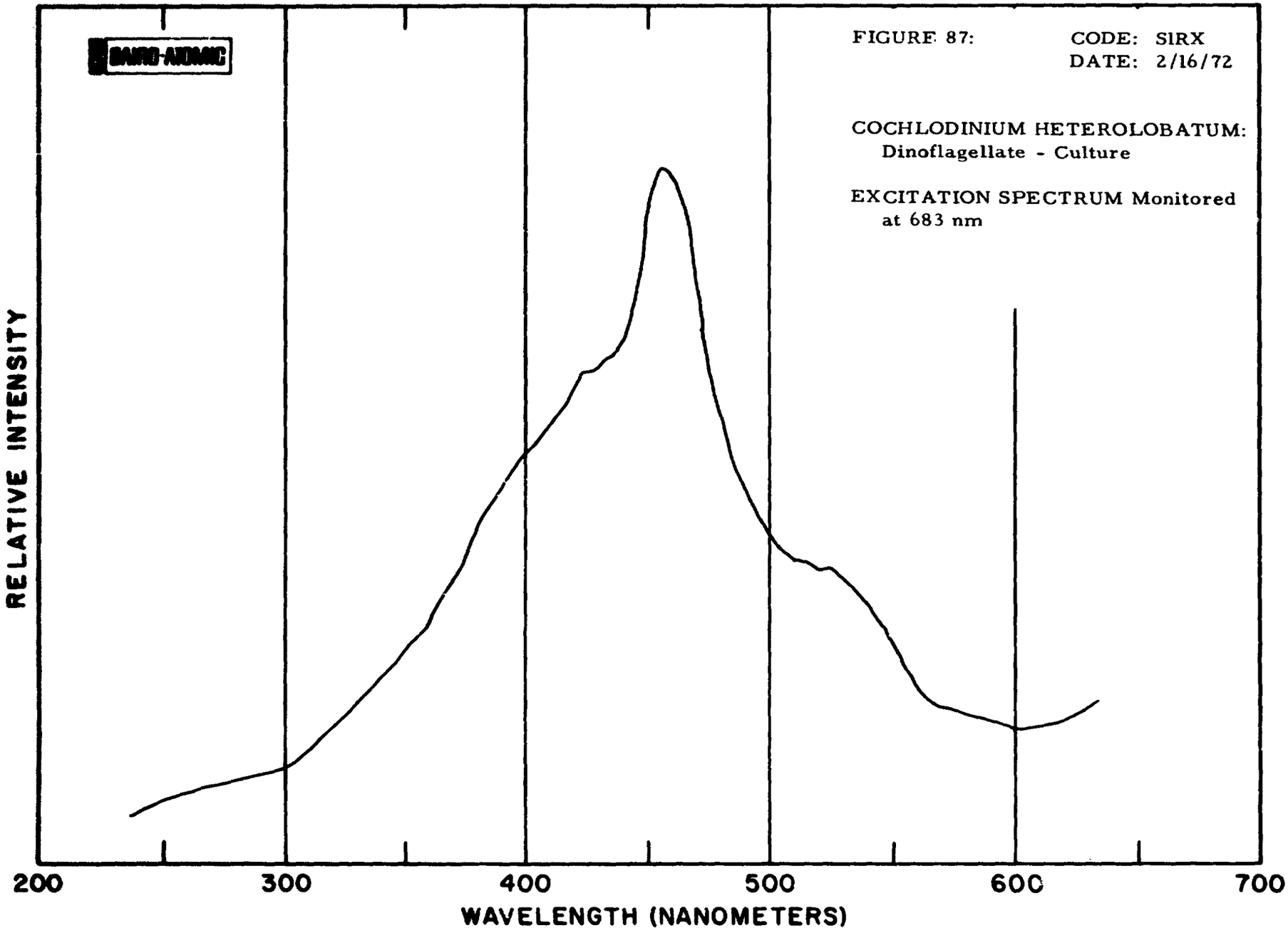

BAIRD-ATOMIC
FIGURE 82:
CODE: O1RM
DATE: 12/30/71
THALASSIOSIRA FLUVIATILIS:
Diatom - Culture 2 days old
EMISSION SPECTRUM Excited
at 440 nm
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

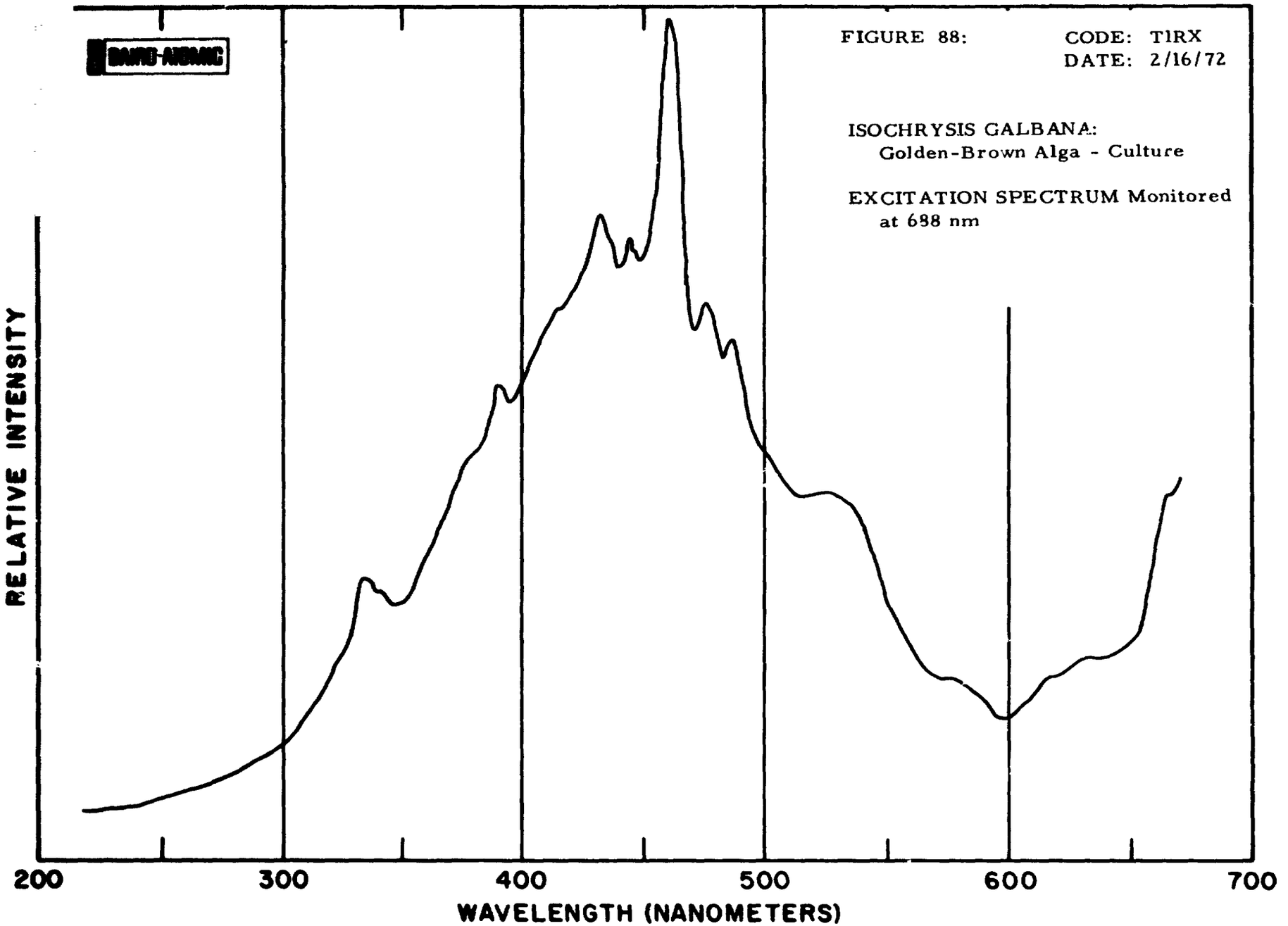

BAIRD-ATOMIC
FIGURE 83:
CODE: O1RX
DATE: 12/30/71
THALASSIOSIRA FLUVIATILIS
Diatom - Culture 4 days old
EXCITATION SPECTRUM Monitored at 680 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

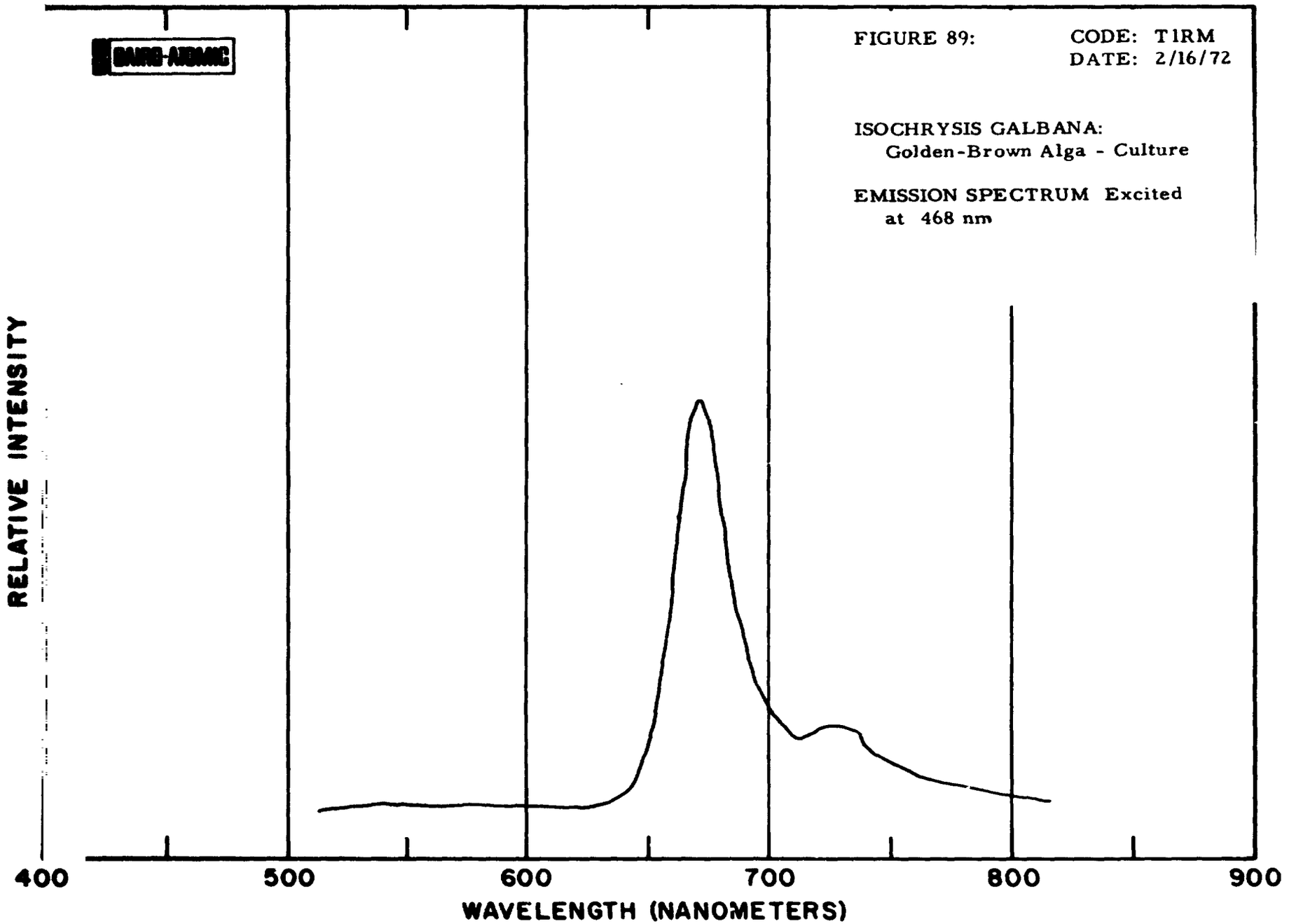

BAIRD-ATOMIC
FIGURE 84:
CODE: RIRM
DATE: 2/16/72
PHAEODACTYLUM TRICORNUTUM:
Diatom - Culture
EMISSION SPECTRUM Excited
at 462 nm
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

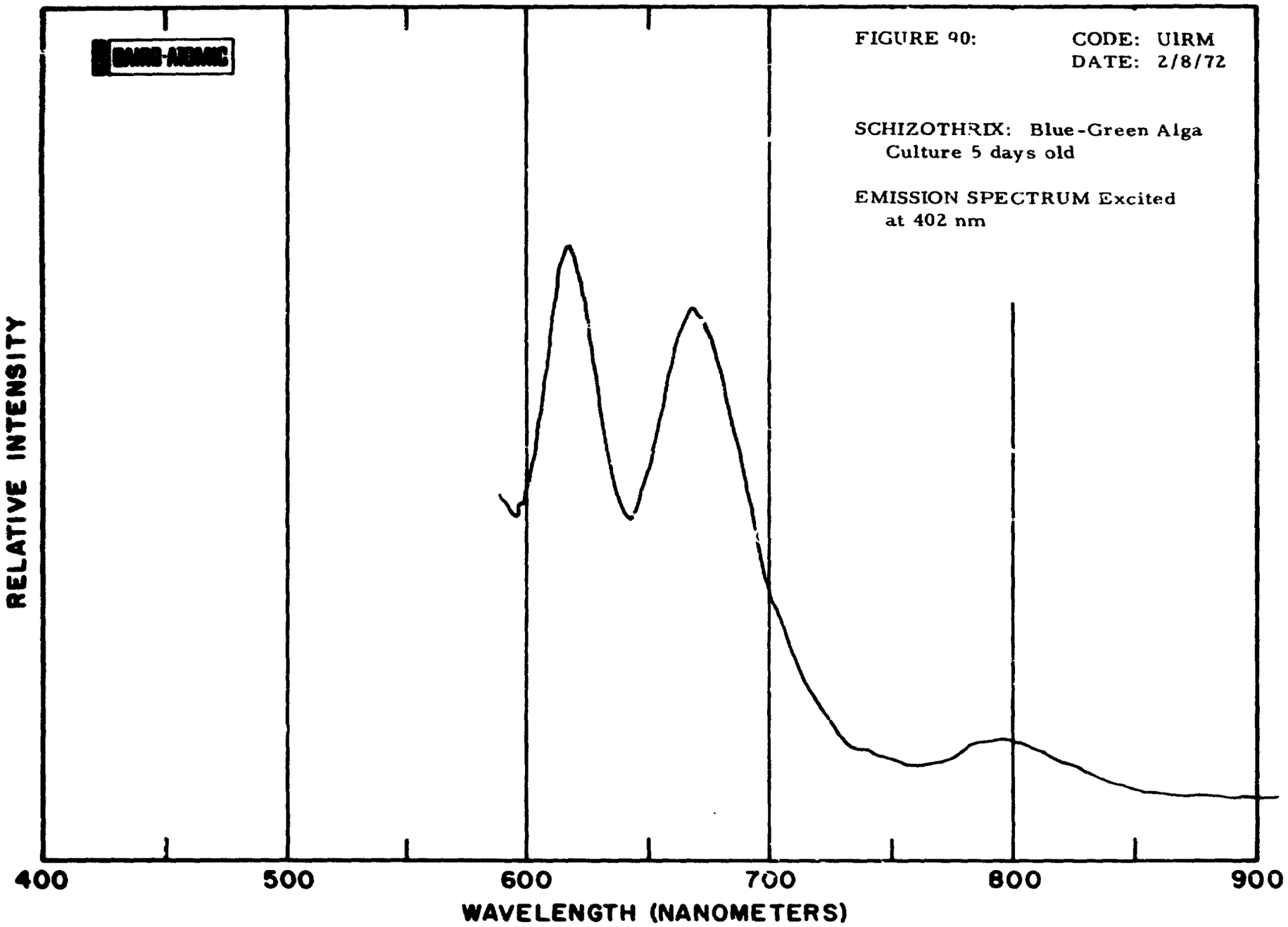

BAIRD-ATOMIC
FIGURE 85:
CODE: R1RX
DATE: 2/16/72
PHAEODACTYLUM TRICORNUTUM:
Diatom - Culture
EXCITATION SPECTRUM Monitored
at 710 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BARNS-AIRMAC
FIGURE 86:
CODE: R2RX
DATE: 2/16/72
PHAEODACTYLUM TRICONUTUM:
Diatom - Culture
EXCITATION SPECTRUM Monitored
at 693 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 87:
CODE: SIRX
DATE: 2/16/72
COCHLODINIUM HETEROLOBATUM:
Dinoflagellate - Culture
EXCITATION SPECTRUM Monitored
at 683 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 88:
CODE: T1RX
DATE: 2/16/72
ISOCHRYSIS GALBANA:
Golden-Brown Alga - Culture
EXCITATION SPECTRUM Monitored
at 688 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 89:
CODE: T1RM
DATE: 2/16/72
ISOCHRYSIS GALBANA:
Golden-Brown Alga - Culture
EMISSION SPECTRUM Excited
at 468 nm
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 90:
CODE: UIRM
DATE: 2/8/72
SCHIZOTHRIX: Blue-Green Alga
Culture 5 days old
EMISSION SPECTRUM Excited
at 402 nm
RELATIVE INTENSITY
400
500
600
700
800
900
WAVELENGTH (NANOMETERS)

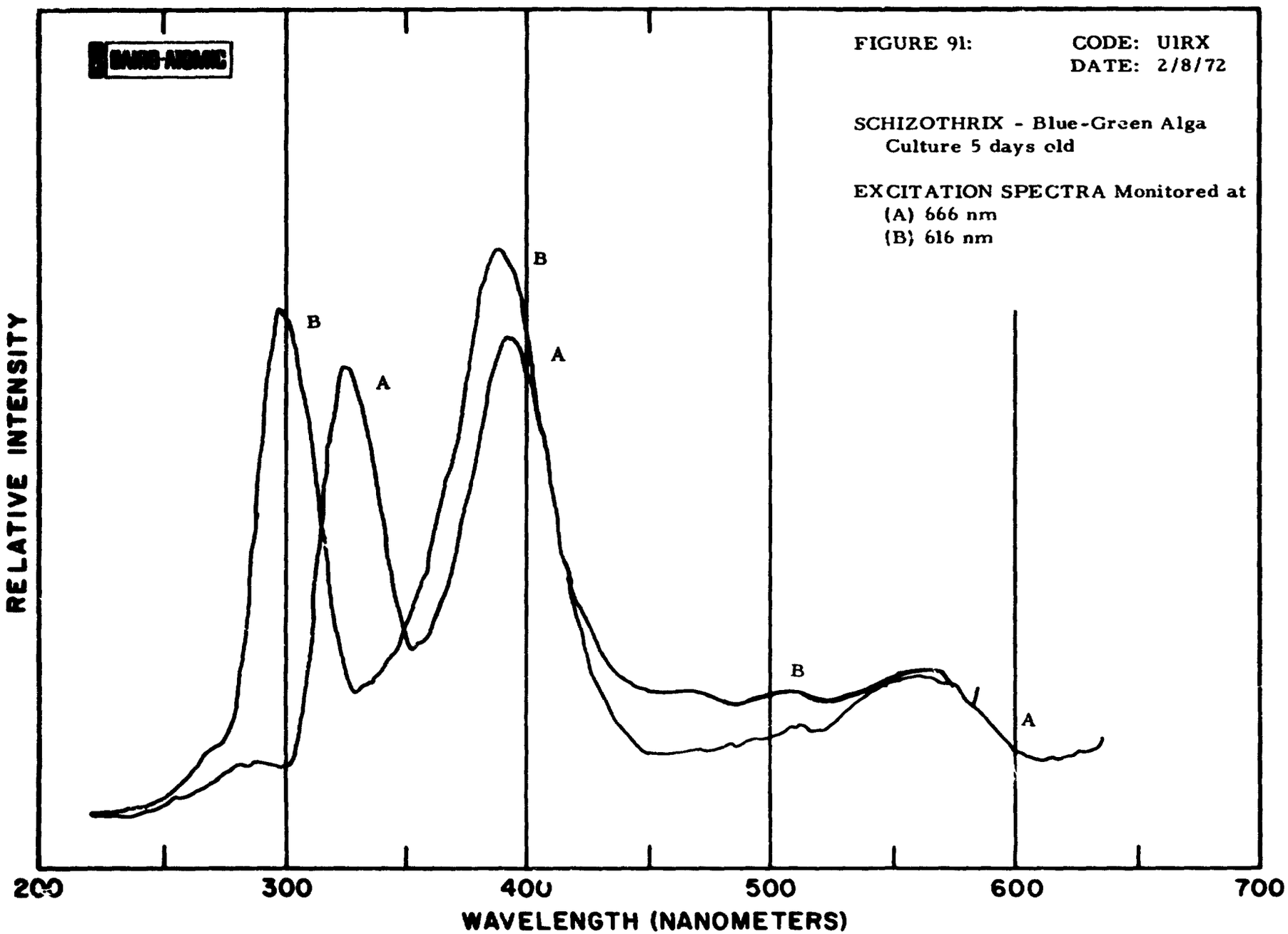
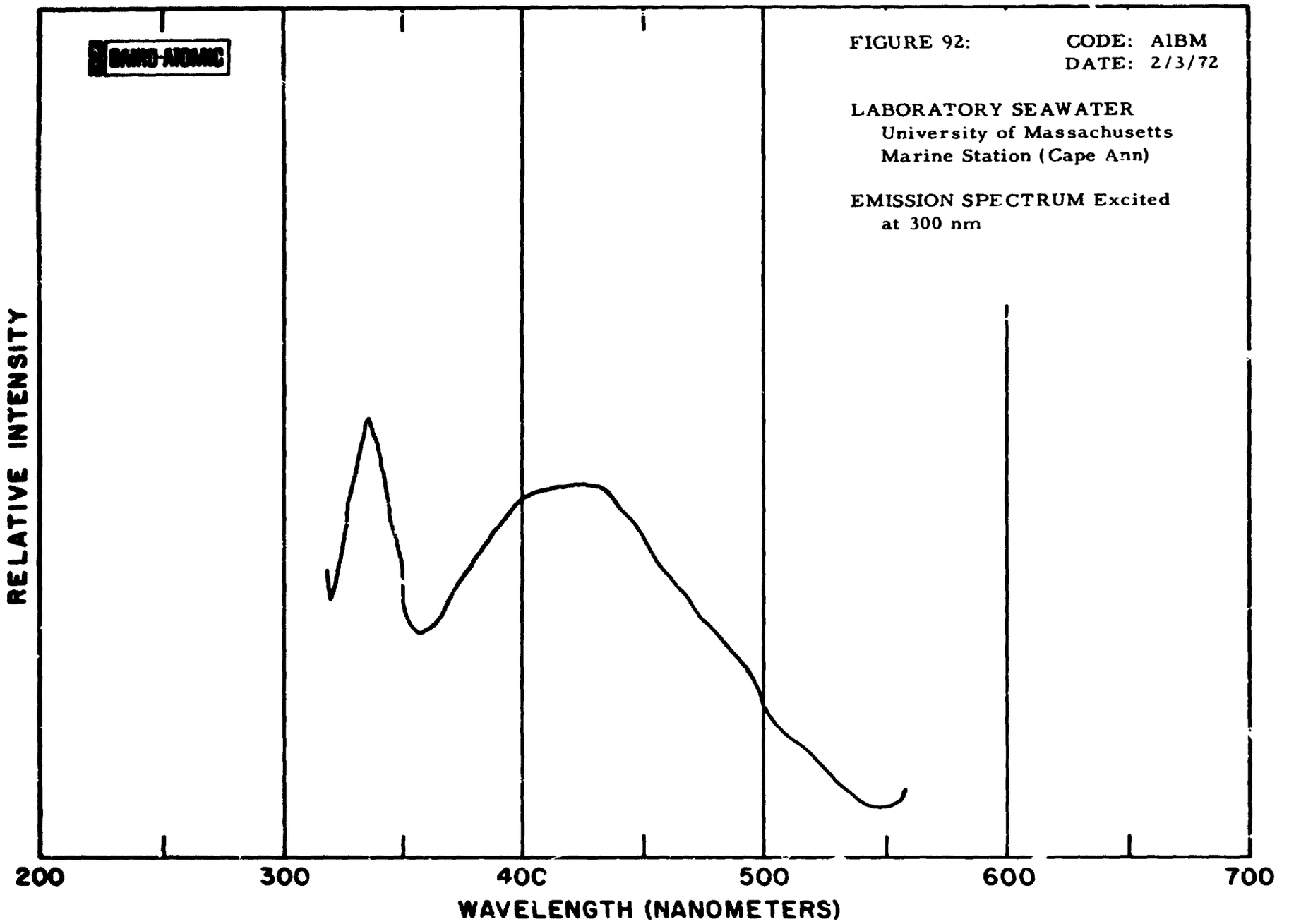
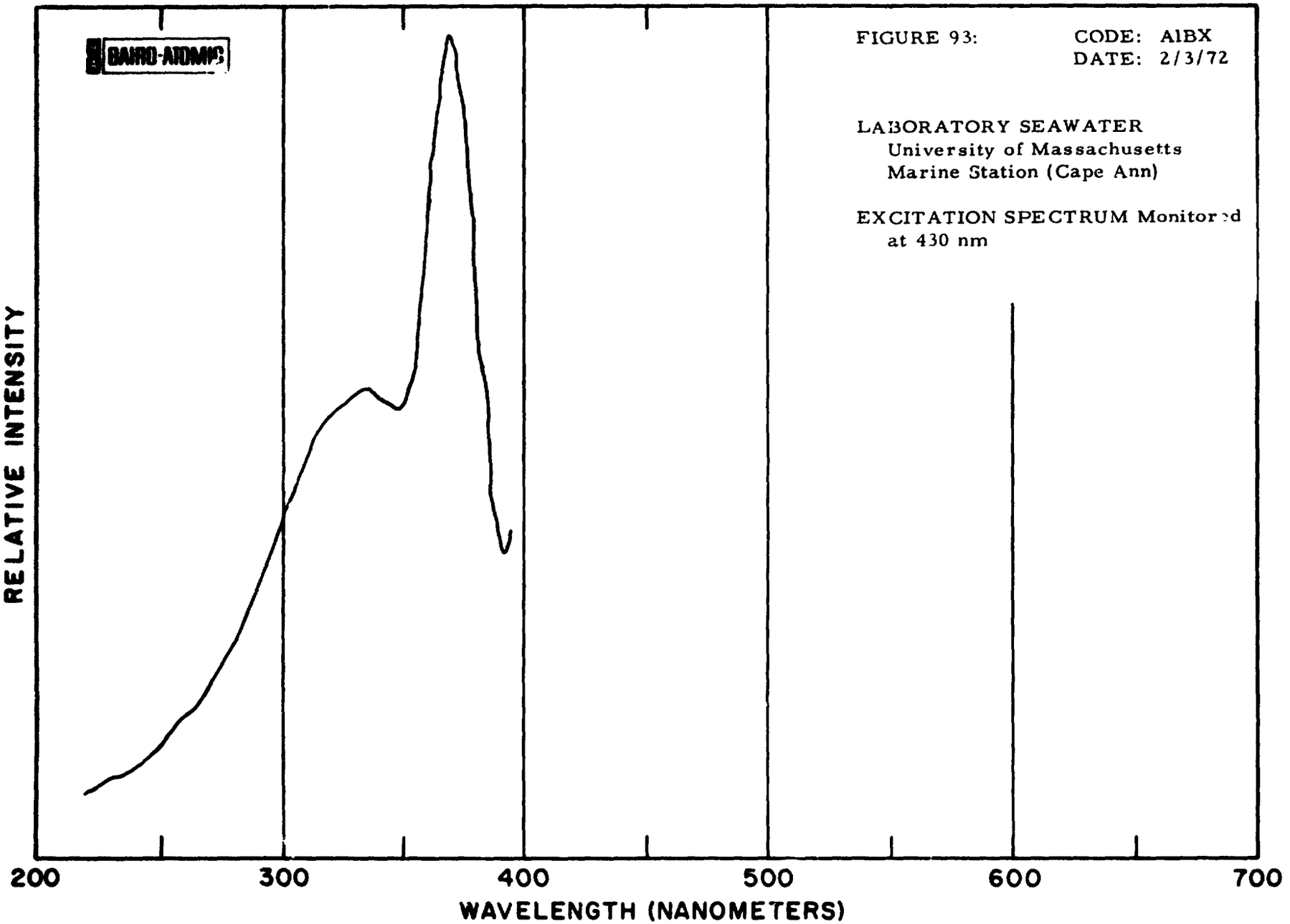
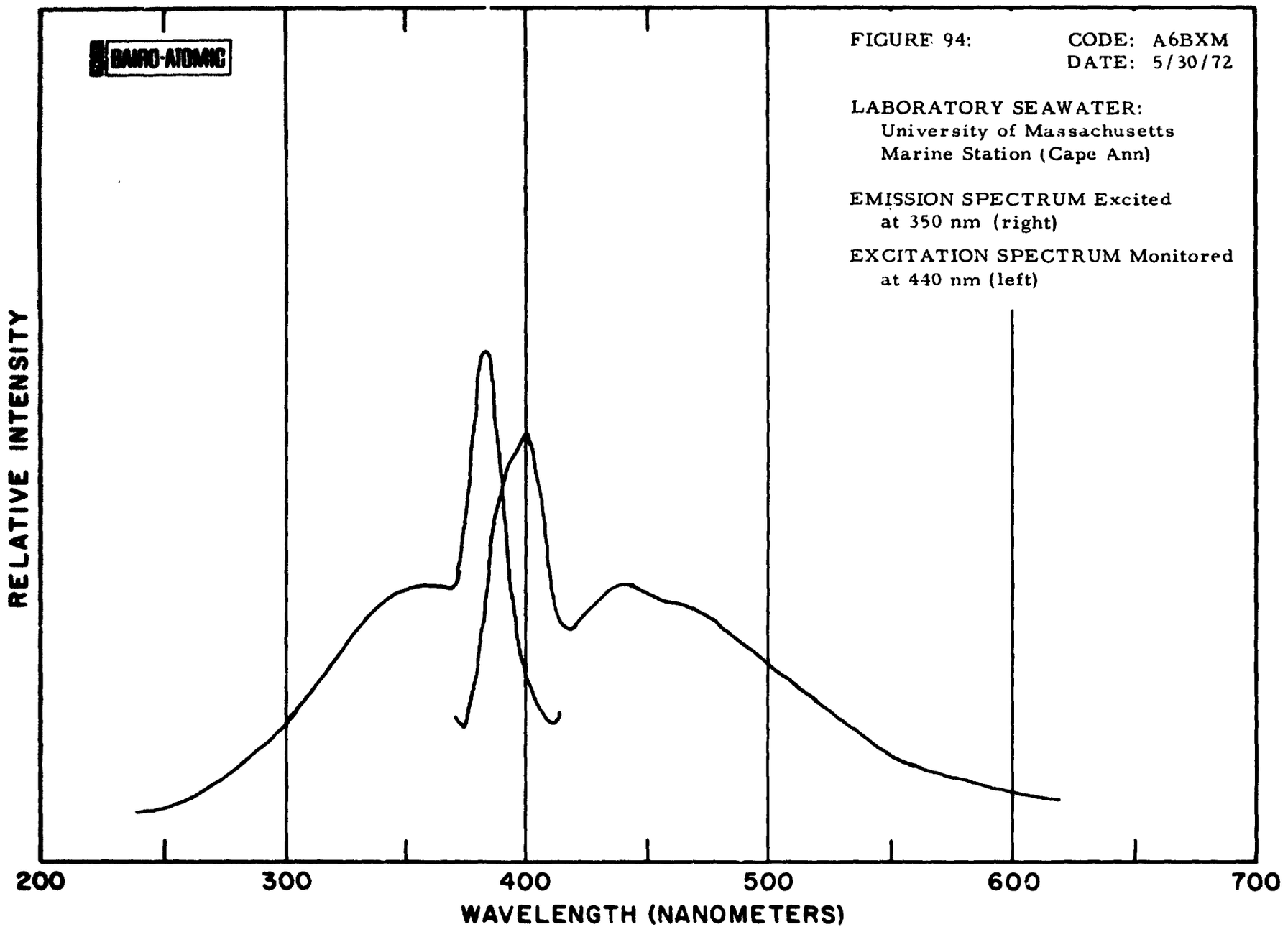
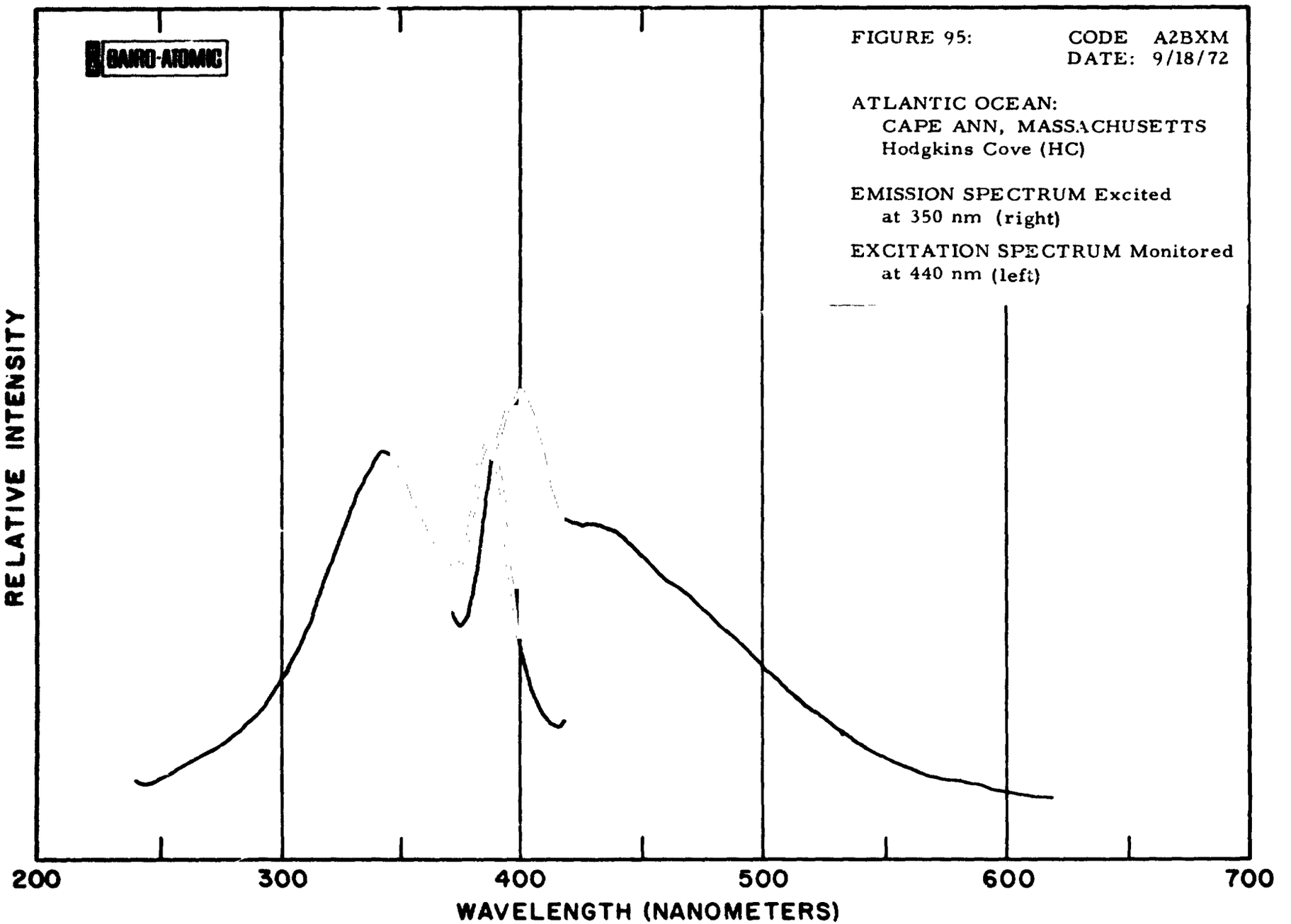


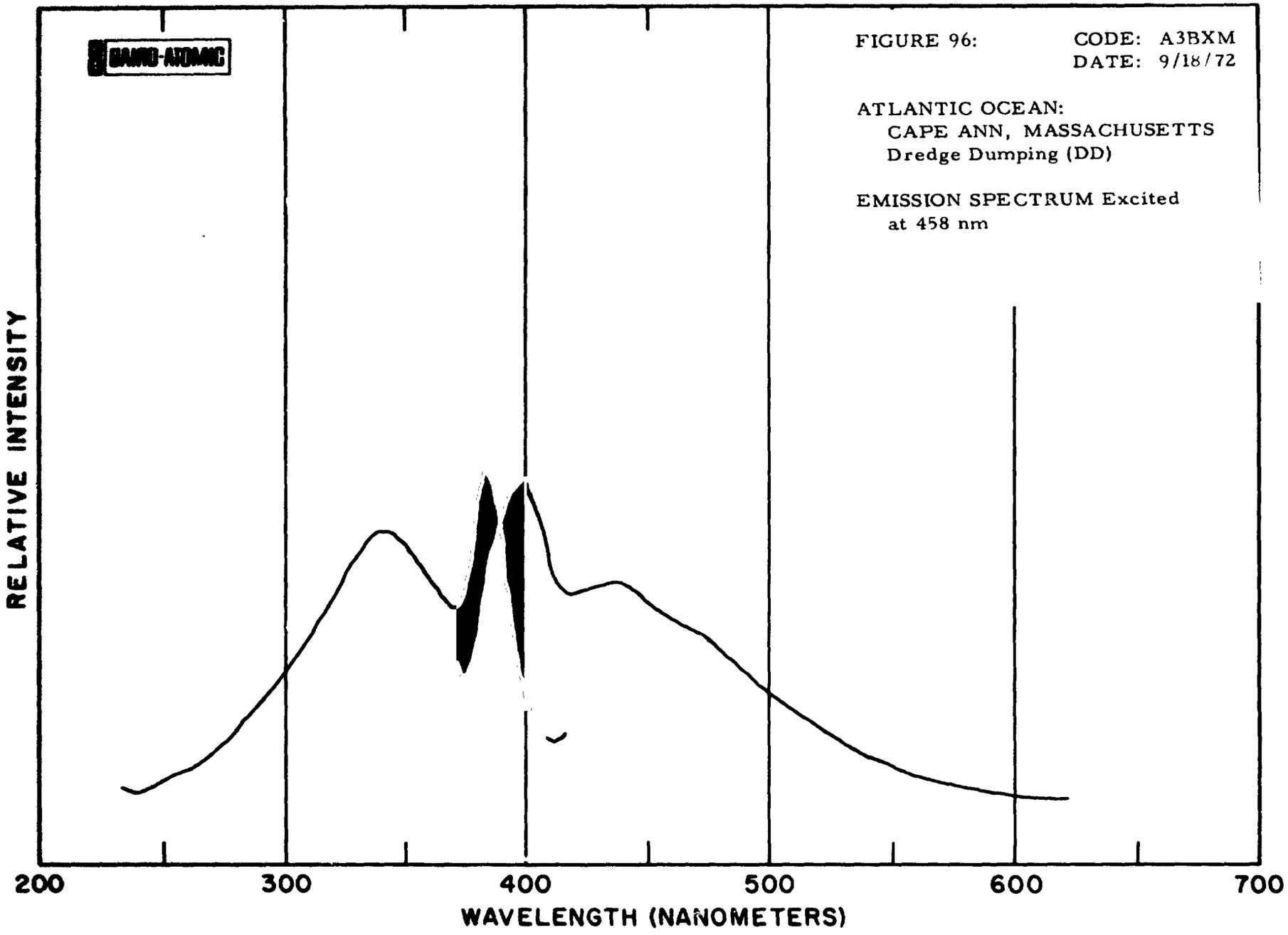
FIGURE 91:
CODE: U1RX
DATE: 2/8/72
SCHIZOTHRIX - Blue-Green Alga
Culture 5 days old
EXCITATION SPECTRA Monitored at
(A) 666 nm
(B) 616 nm
B
A
B
A
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

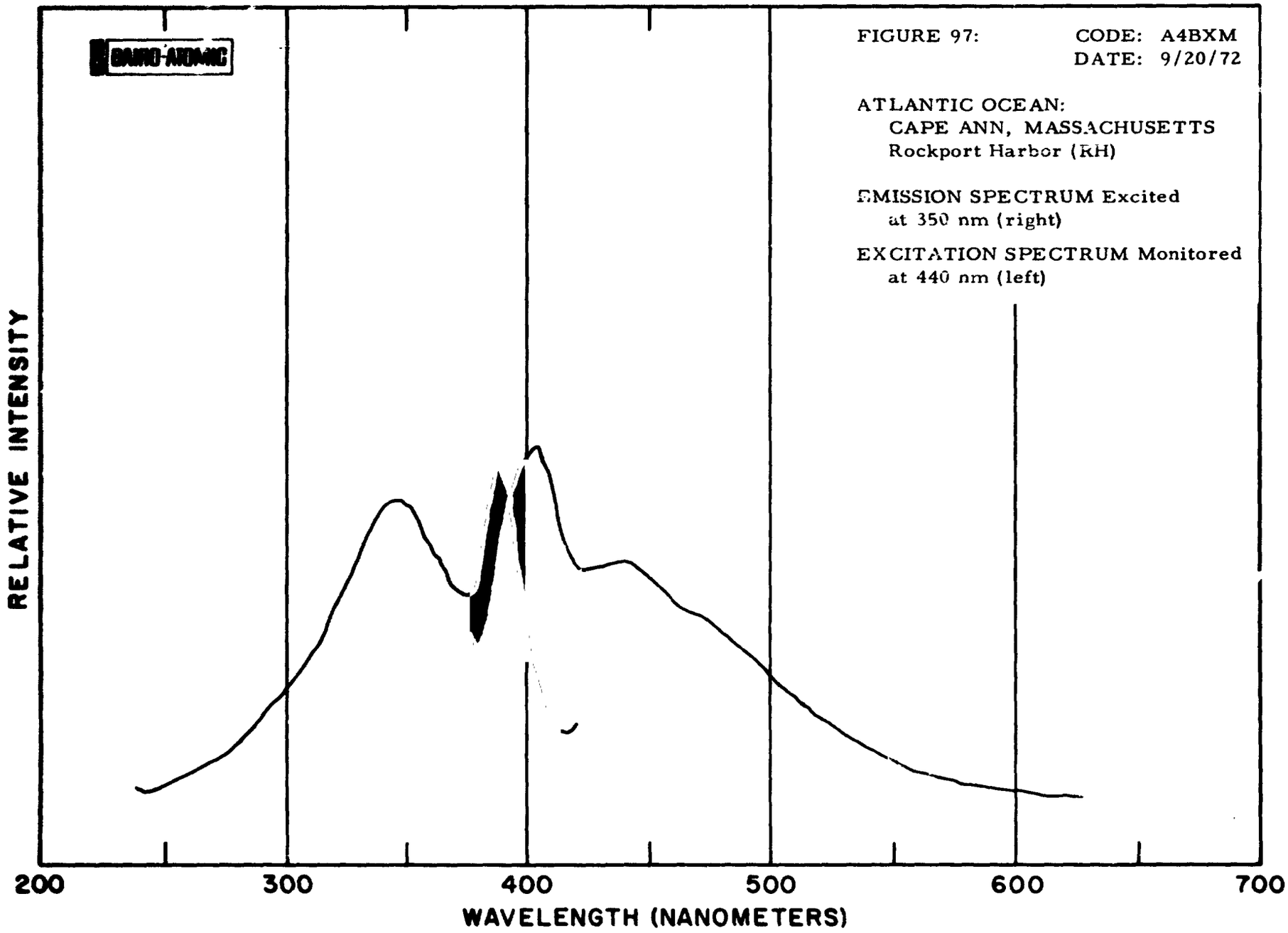

BAIRD-ATOMIC
FIGURE 92:
CODE: A1BM
DATE: 2/3/72
LABORATORY SEAWATER
University of Massachusetts
Marine Station (Cape Ann)
EMISSION SPECTRUM Excited
at 300 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

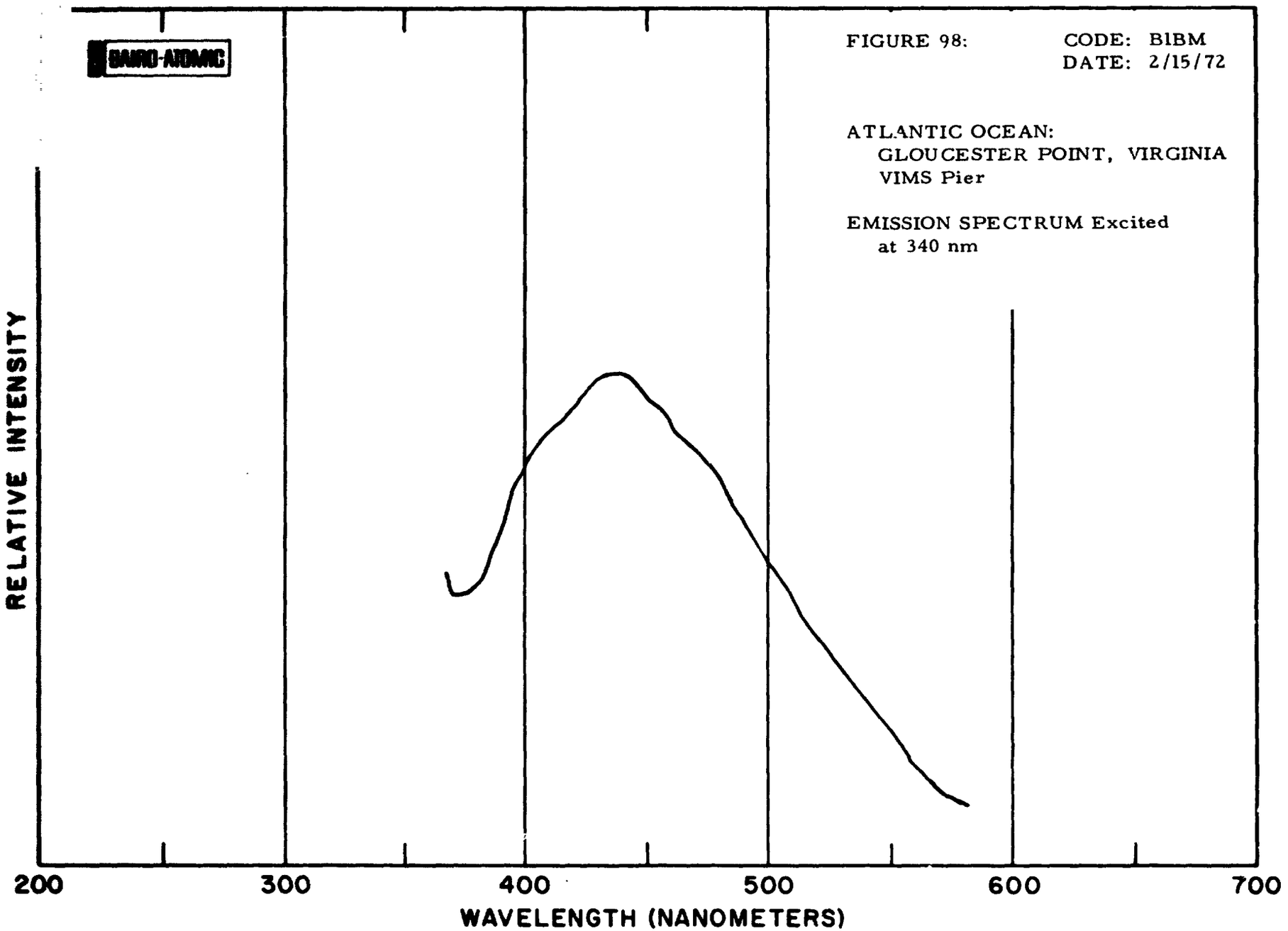

BAIRD-ATOMIC
FIGURE 93:
CODE: AlBX
DATE: 2/3/72
LABORATORY SEAWATER
University of Massachusetts
Marine Station (Cape Ann)
EXCITATION SPECTRUM Monitored
at 430 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

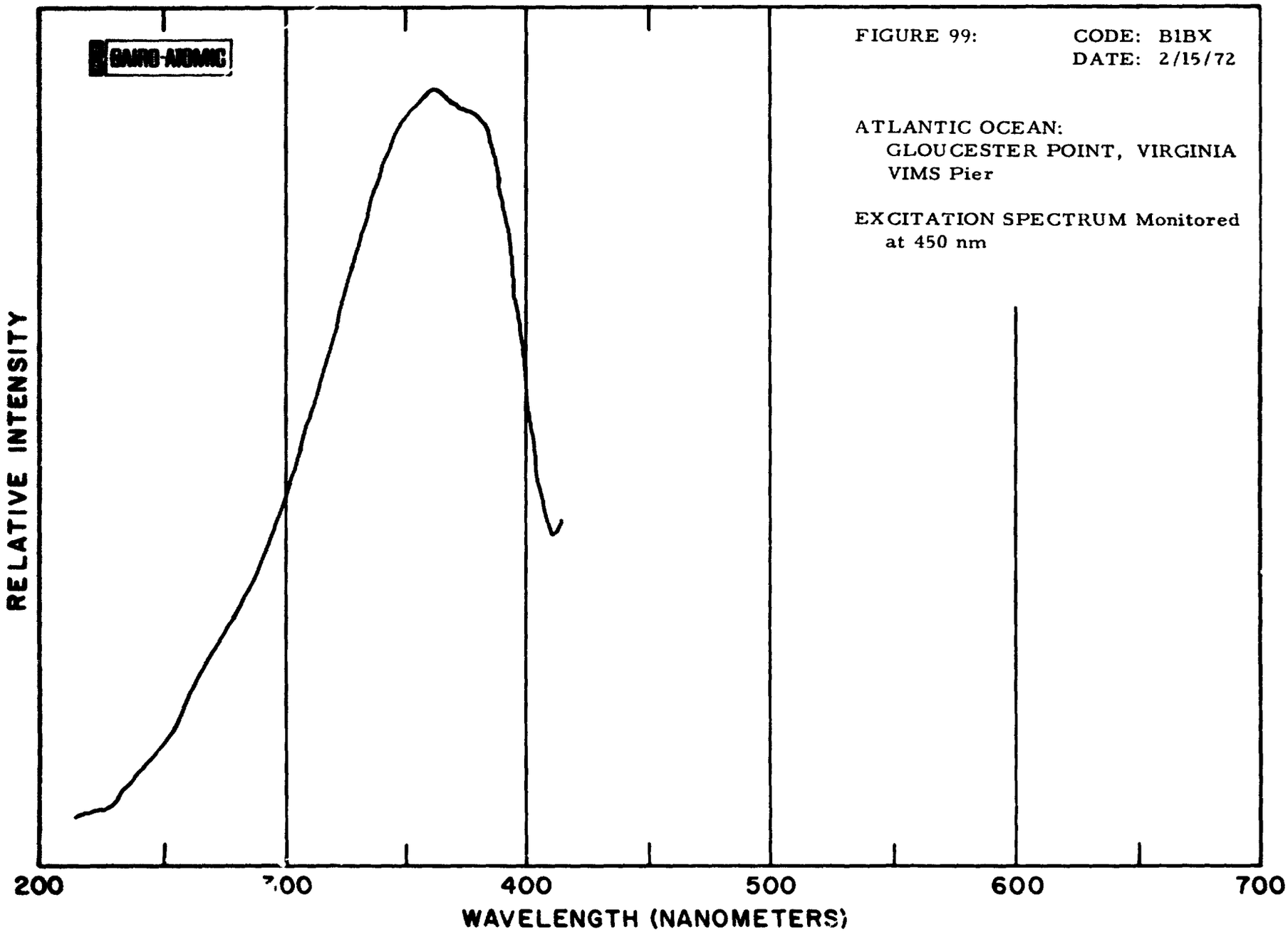

BAIRD-ATOMIC
FIGURE 94:
CODE: A6BXM
DATE: 5/30/72
LABORATORY SEAWATER:
University of Massachusetts
Marine Station (Cape Ann)
EMISSION SPECTRUM Excited
at 350 nm (right)
EXCITATION SPECTRUM Monitored
at 440 nm (left)
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

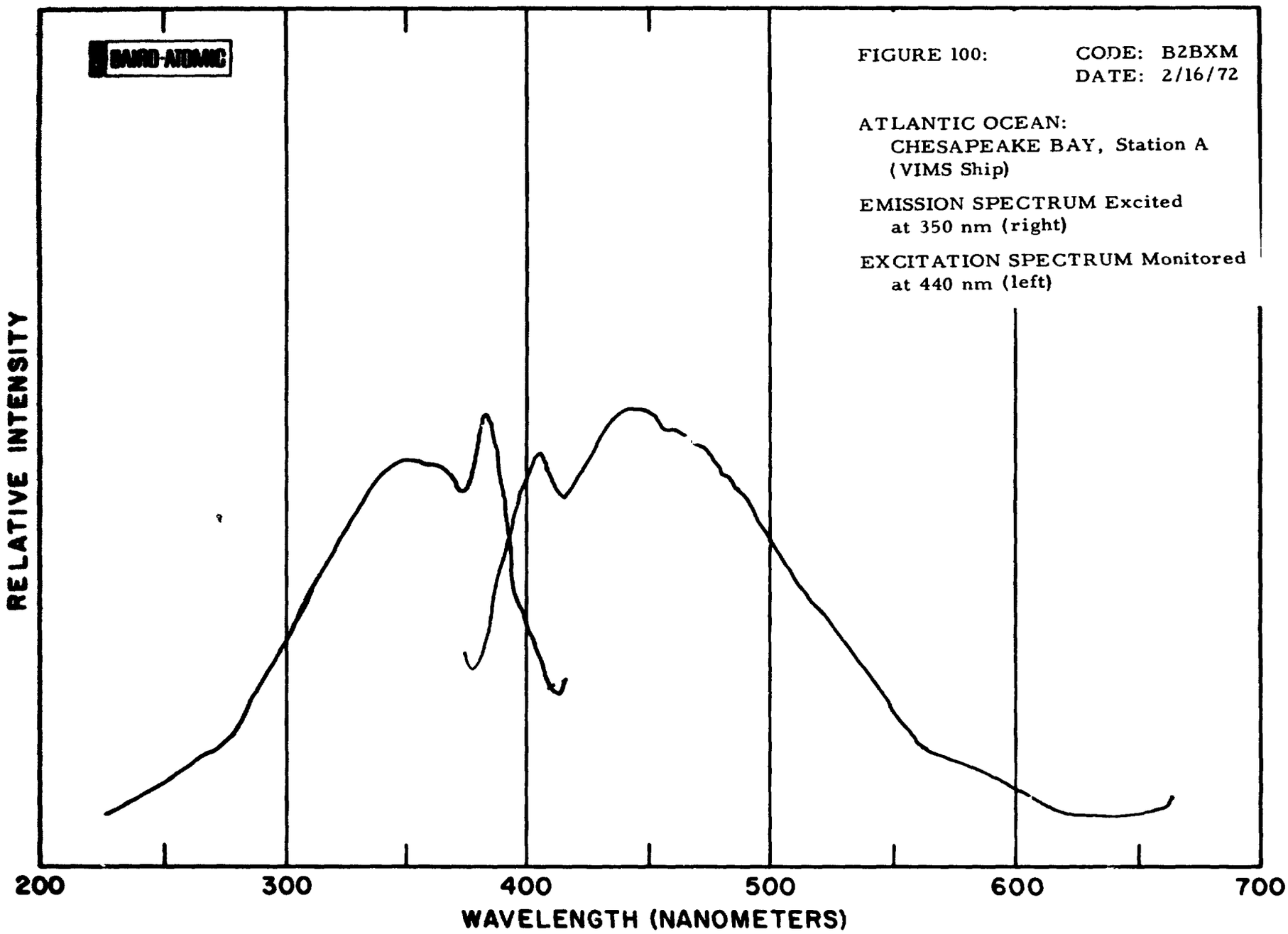

BAIRD-ATOMIC
FIGURE 95:
CODE A2BXM
DATE: 9/18/72
ATLANTIC OCEAN:
CAPE ANN, MASSACHUSETTS
Hodgkins Cove (HC)
EMISSION SPECTRUM Excited at 350 nm (right)
EXCITATION SPECTRUM Monitored at 440 nm (left)
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

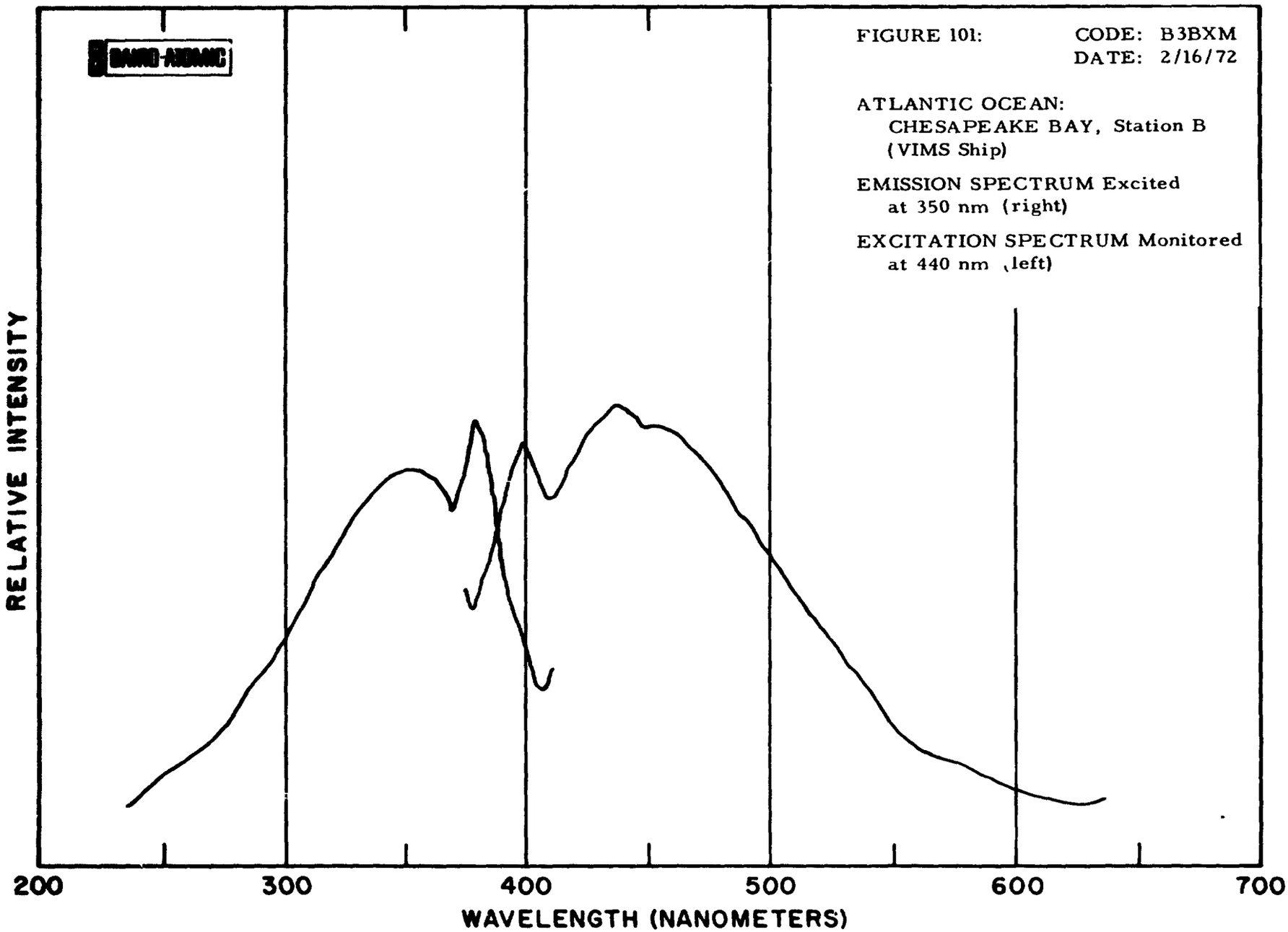

BAND-ATOMIC
FIGURE 96:
CODE: A3BXM
DATE: 9/18/72
ATLANTIC OCEAN:
CAPE ANN, MASSACHUSETTS
Dredge Dumping (DD)
EMISSION SPECTRUM Excited
at 458 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 97:
CODE: A4BXM
DATE: 9/20/72
ATLANTIC OCEAN:
CAPE ANN, MASSACHUSETTS
Rockport Harbor (RH)
EMISSION SPECTRUM Excited at 350 nm (right)
EXCITATION SPECTRUM Monitored at 440 nm (left)
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 98:
CODE: B1BM
DATE: 2/15/72
ATLANTIC OCEAN:
GLOUCESTER POINT, VIRGINIA
VIMS Pier
EMISSION SPECTRUM Excited
at 340 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 99:
CODE: B1BX
DATE: 2/15/72
ATLANTIC OCEAN:
GLOUCESTER POINT, VIRGINIA
VIMS Pier
EXCITATION SPECTRUM Monitored at 450 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 100:
CODE: B2BXM
DATE: 2/16/72
ATLANTIC OCEAN:
CHESAPEAKE BAY, Station A
(VIMS Ship)
EMISSION SPECTRUM Excited
at 350 nm (right)
EXCITATION SPECTRUM Monitored
at 440 nm (left)
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 101:
CODE: B3BXM
DATE: 2/16/72
ATLANTIC OCEAN:
CHESAPEAKE BAY, Station B
(VIMS Ship)
EMISSION SPECTRUM Excited
at 350 nm (right)
EXCITATION SPECTRUM Monitored
at 440 nm (left)
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

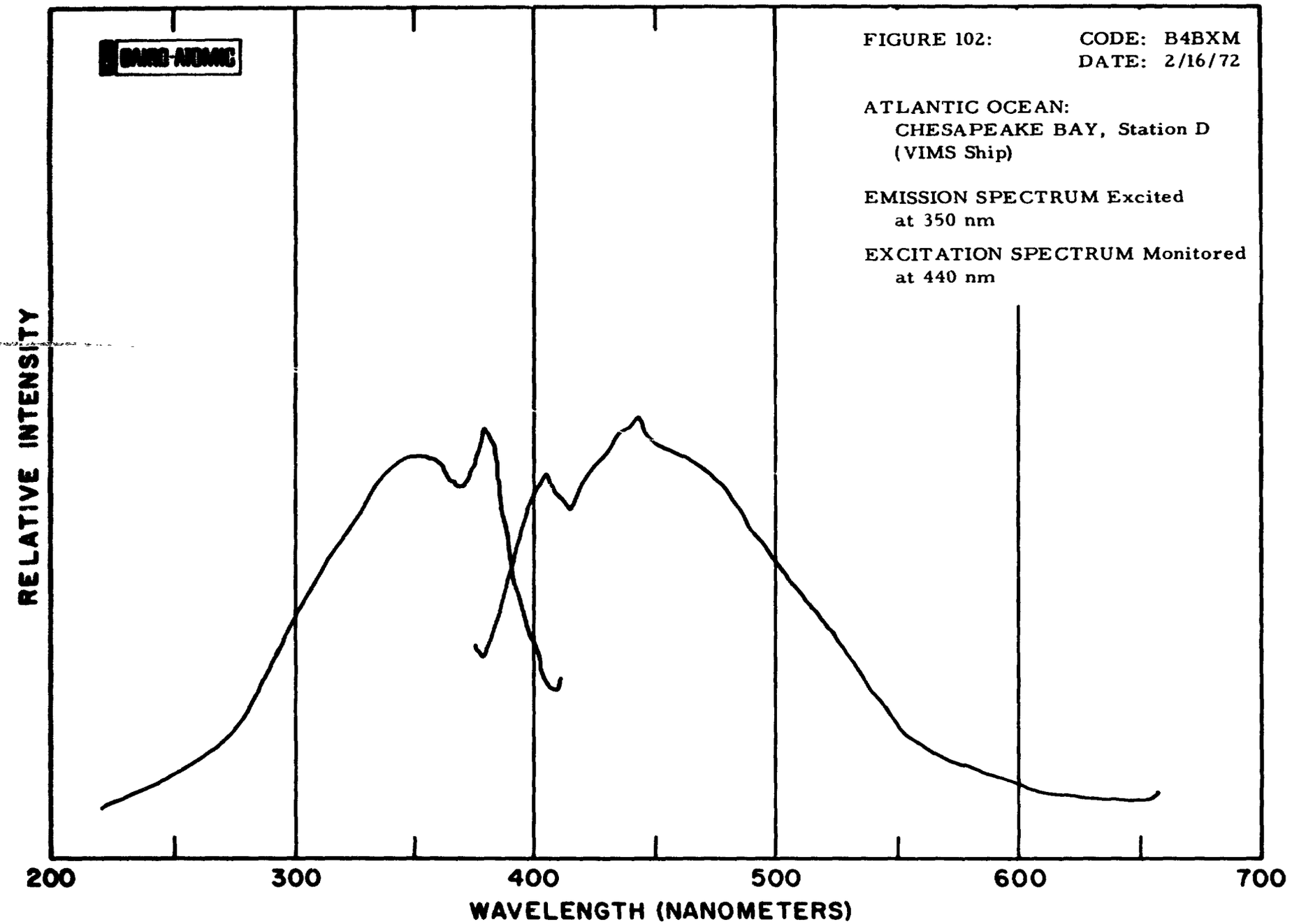
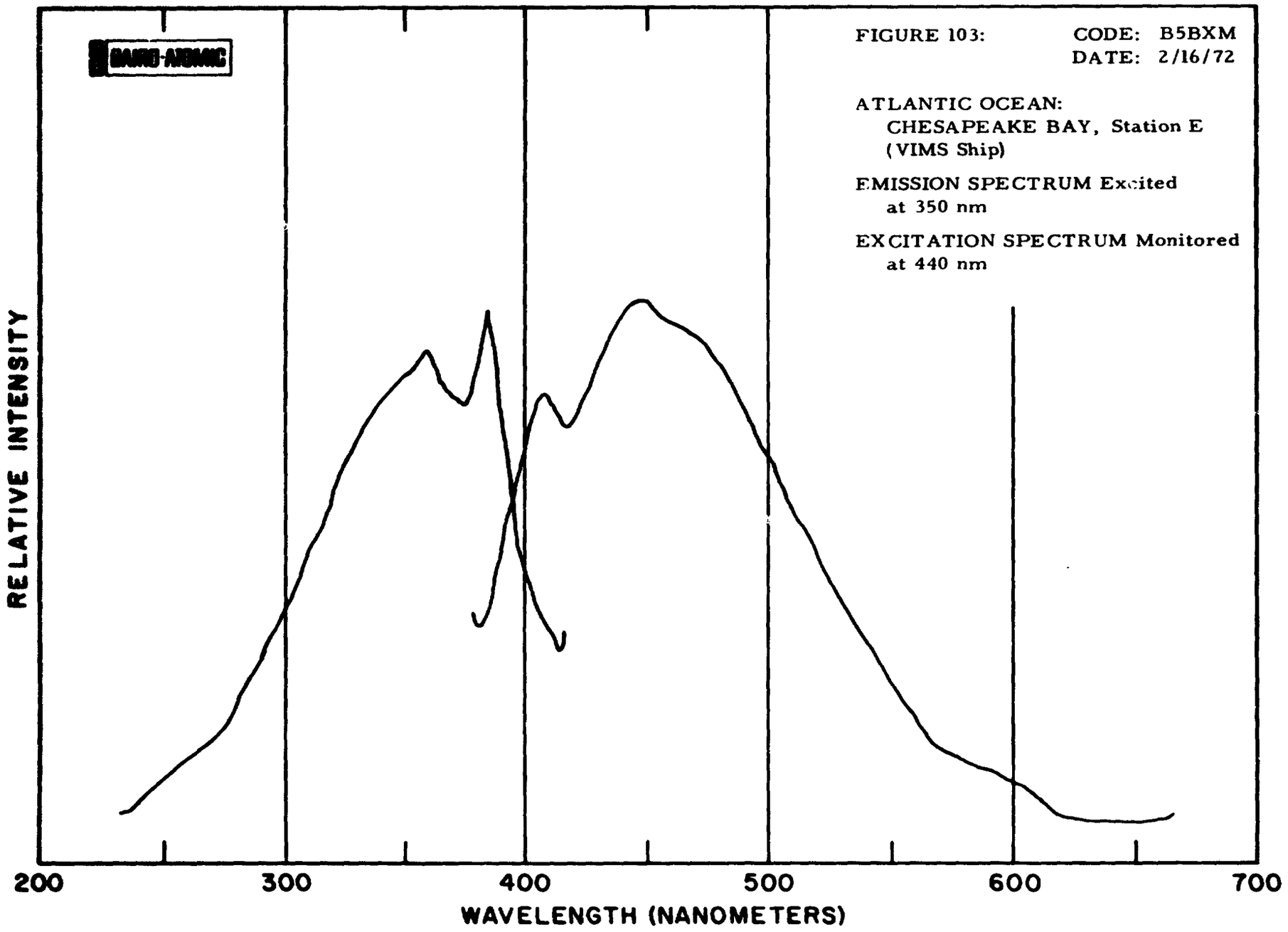


FIGURE 102:
CODE: B4BXM
DATE: 2/16/72
ATLANTIC OCEAN:
CHESAPEAKE BAY, Station D
(VIMS Ship)
EMISSION SPECTRUM Excited
at 350 nm
EXCITATION SPECTRUM Monitored
at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 103:
CODE: B5BXM
DATE: 2/16/72
ATLANTIC OCEAN:
CHESAPEAKE BAY, Station E
(VIMS Ship)
EMISSION SPECTRUM Excited
at 350 nm
EXCITATION SPECTRUM Monitored
at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

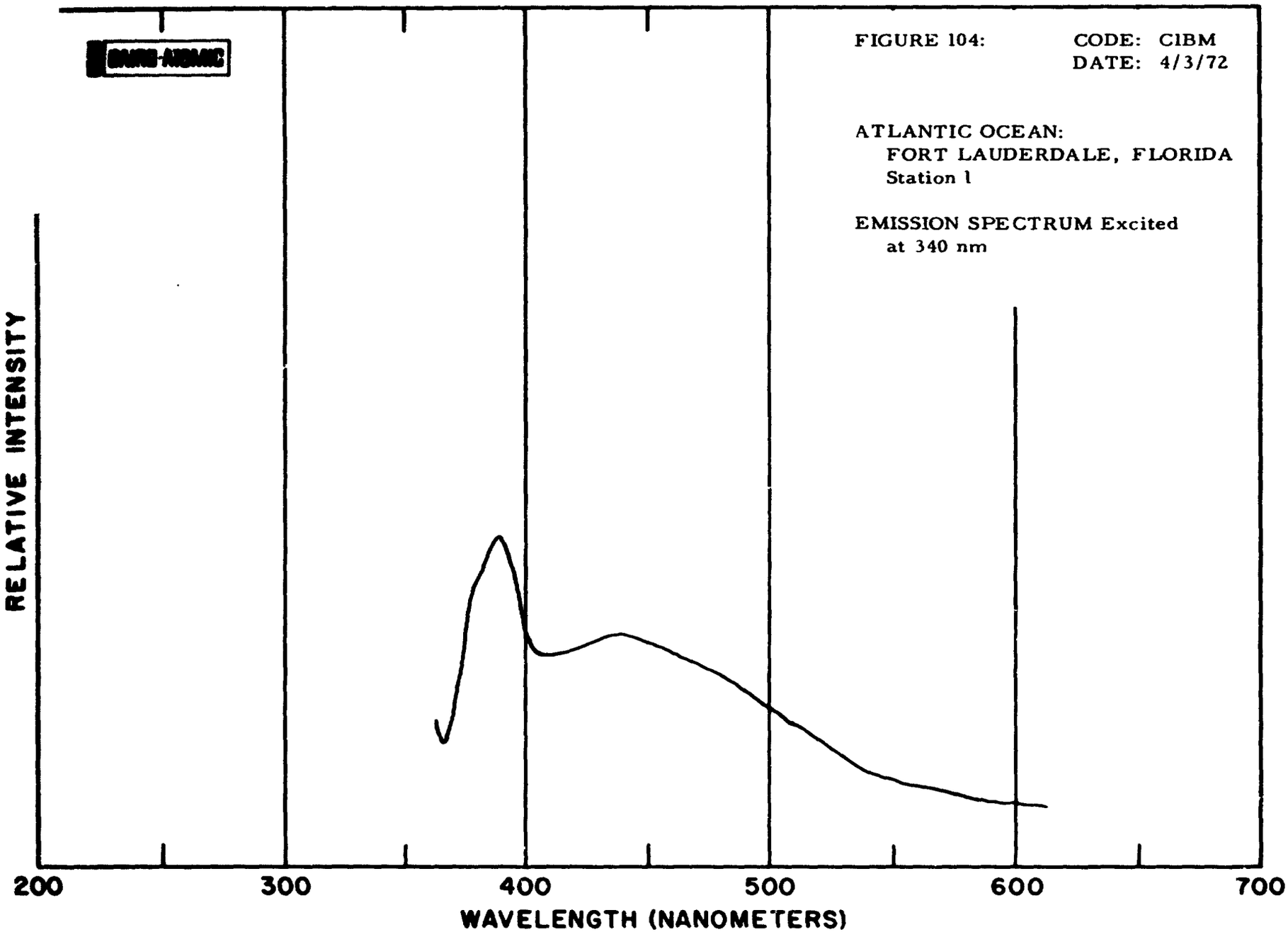
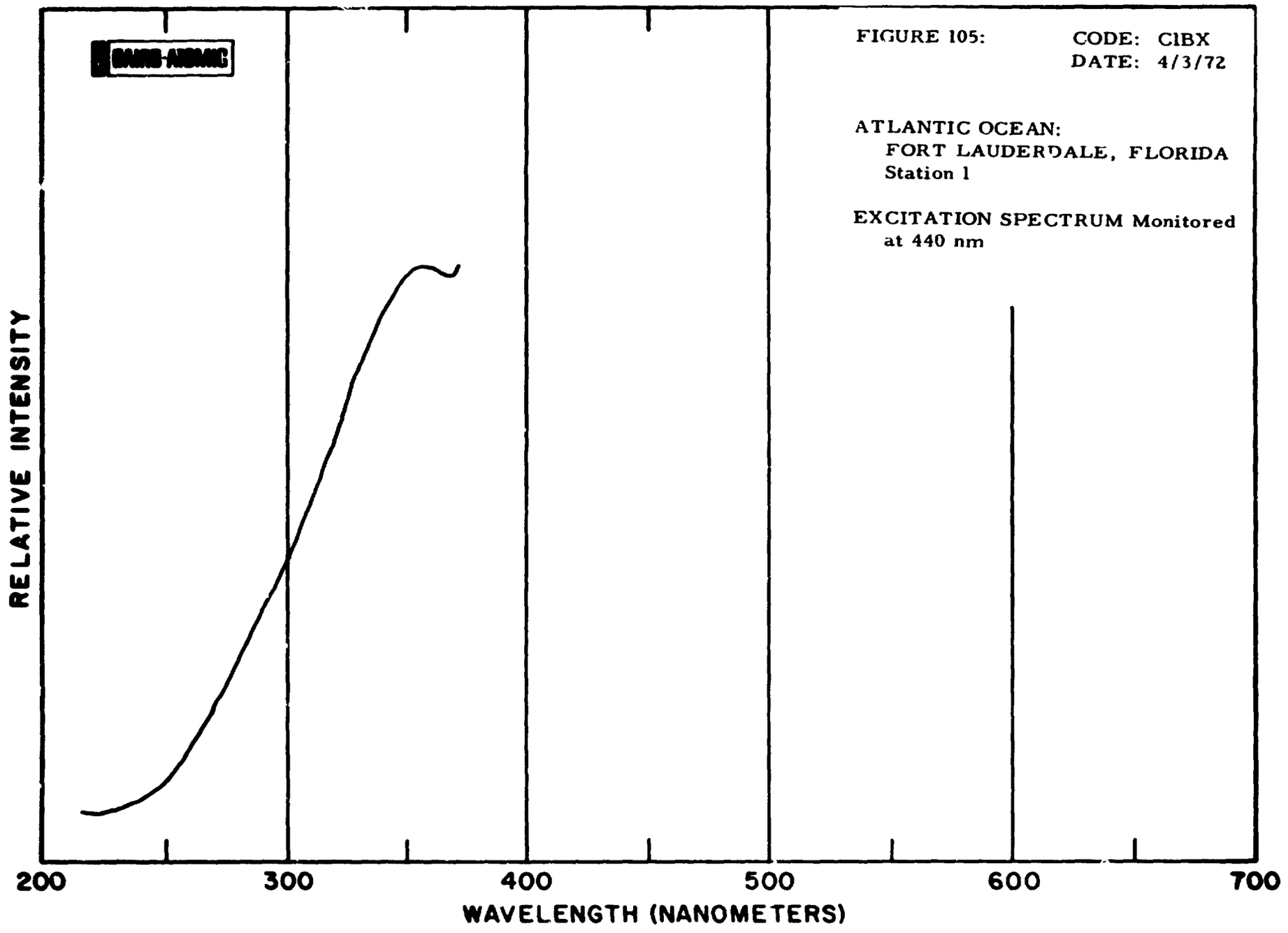
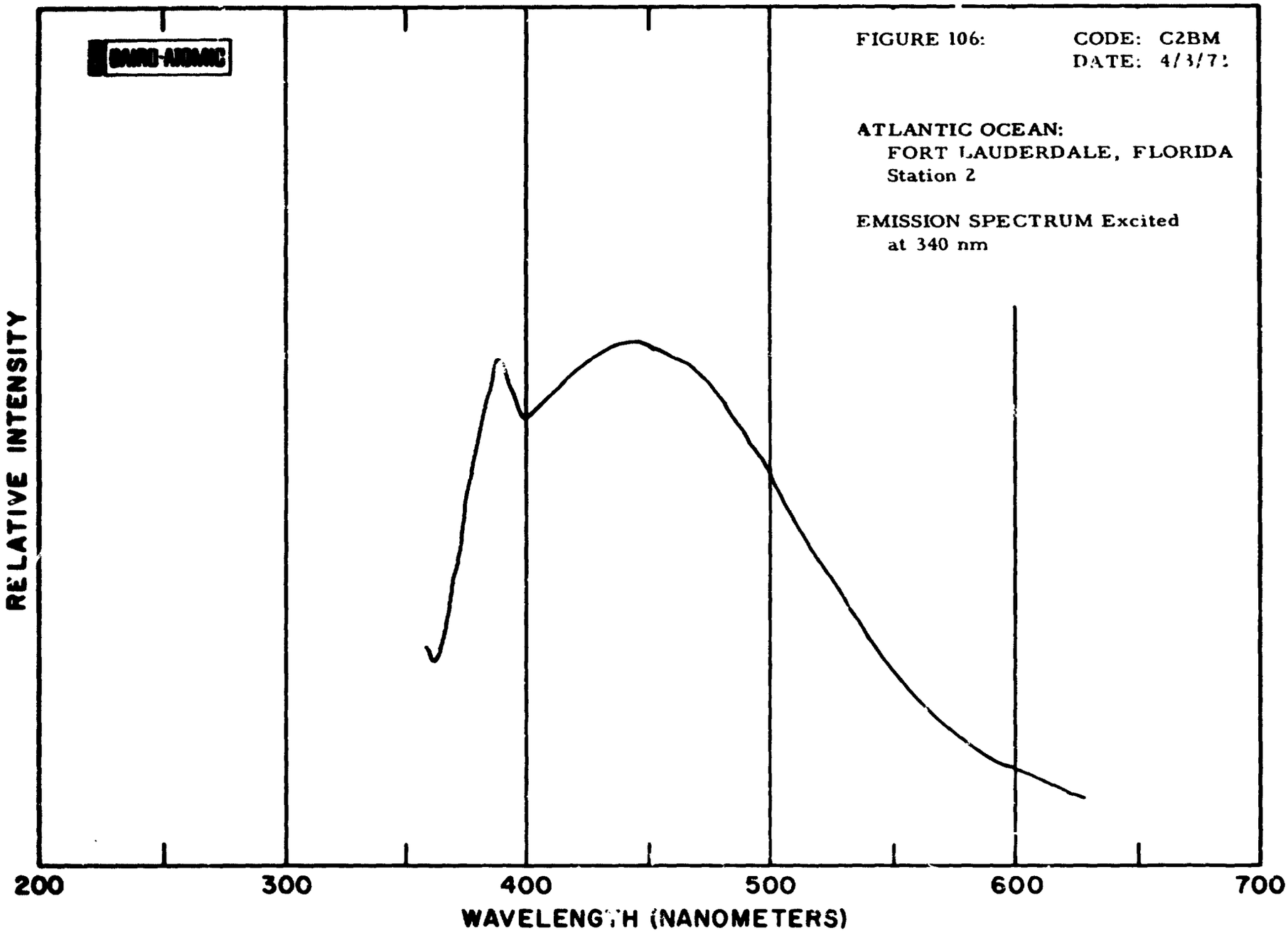
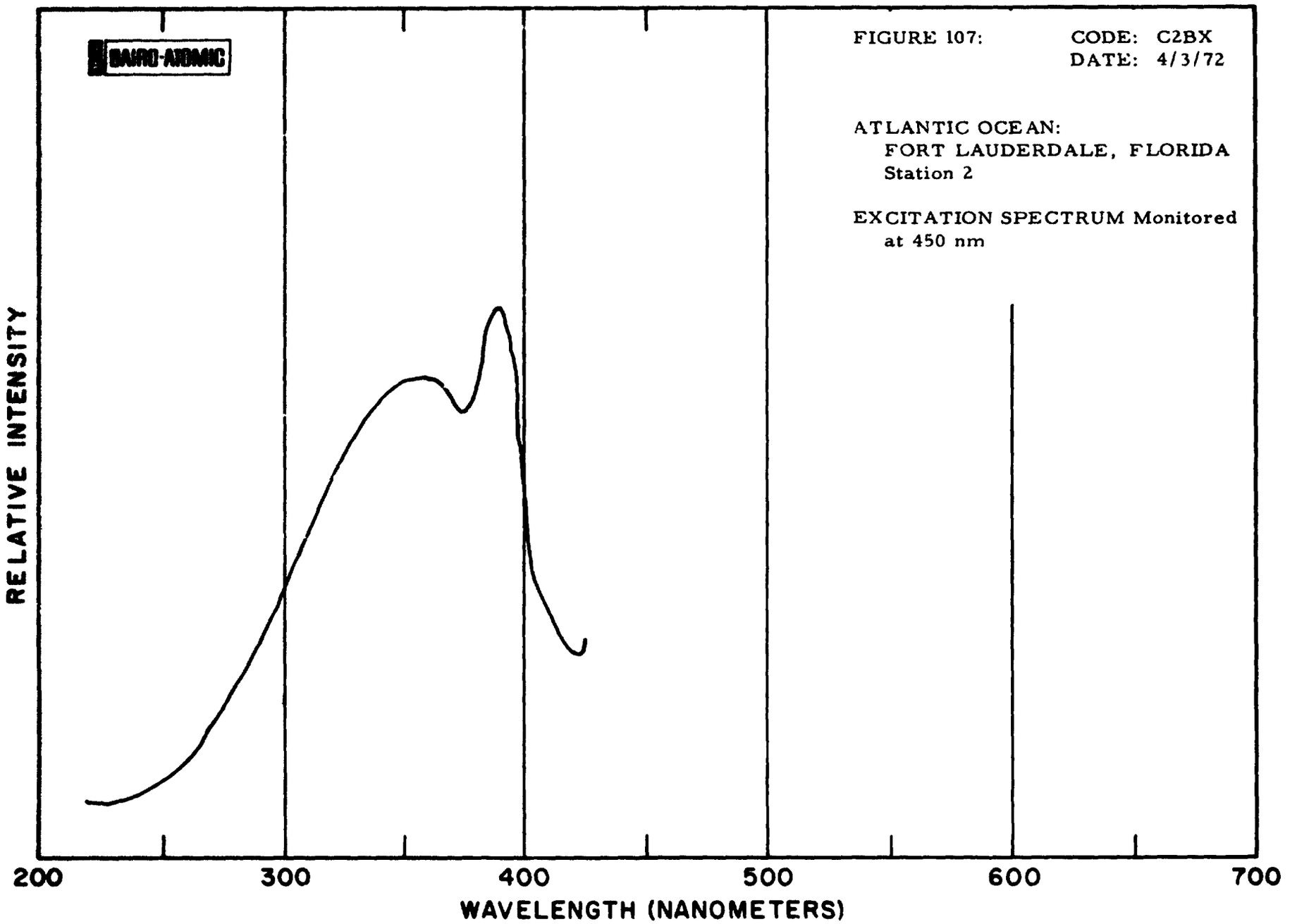
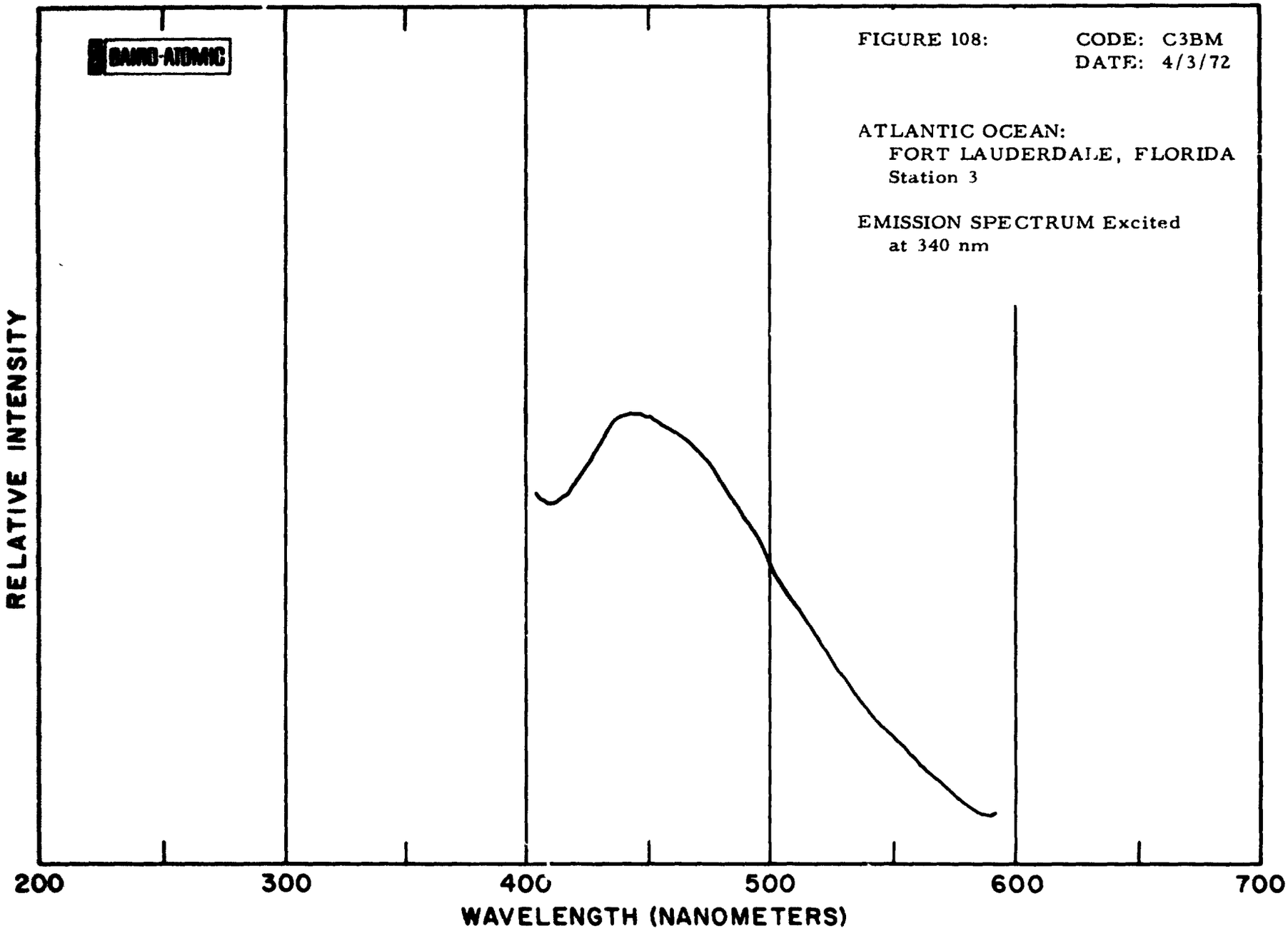


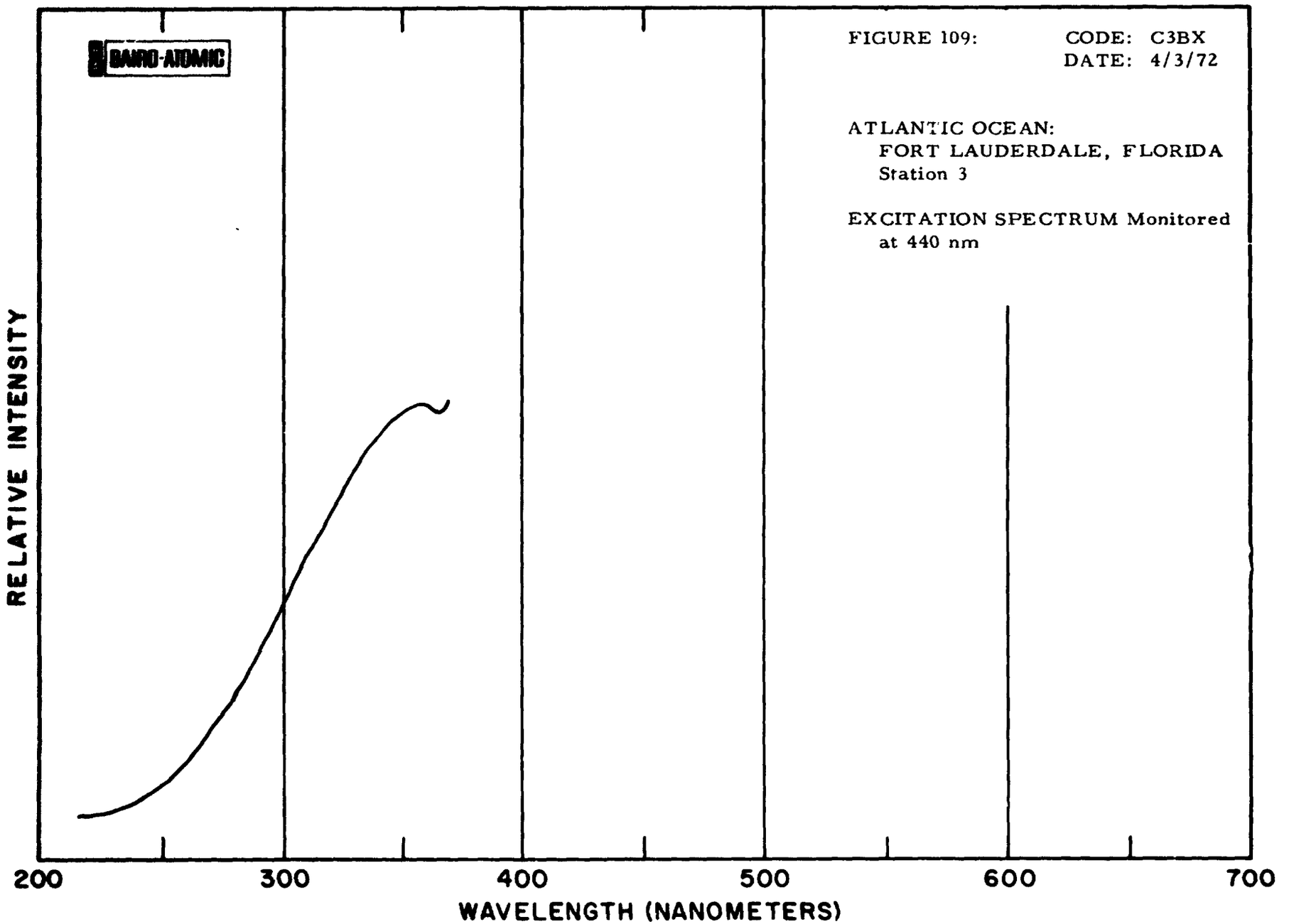
FIGURE 104:
CODE: CIBM
DATE: 4/3/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 1
EMISSION SPECTRUM Excited
at 340 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

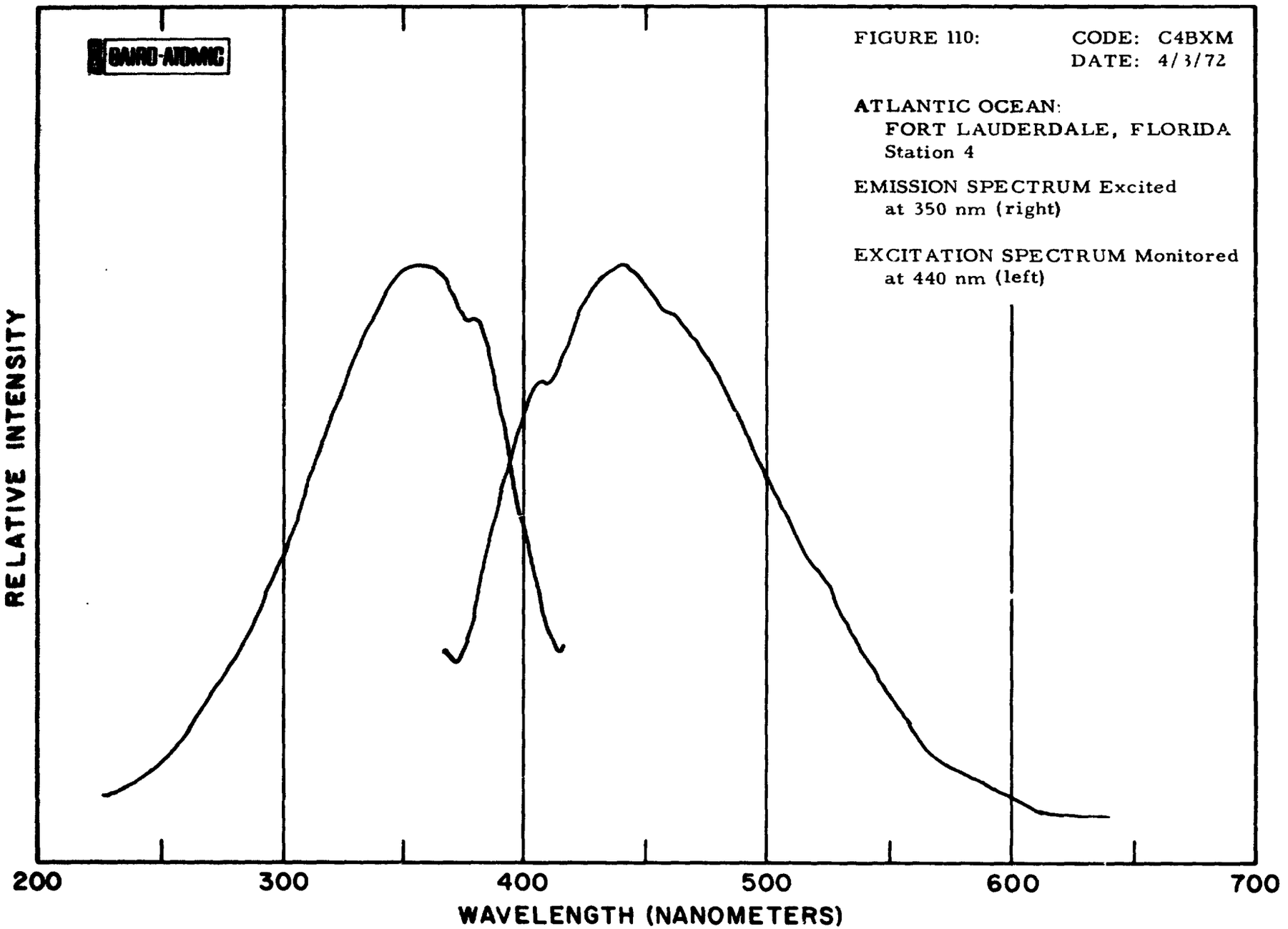

BAIRD-ATOMIC
FIGURE 105:
CODE: C1BX
DATE: 4/3/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 1
EXCITATION SPECTRUM Monitored at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

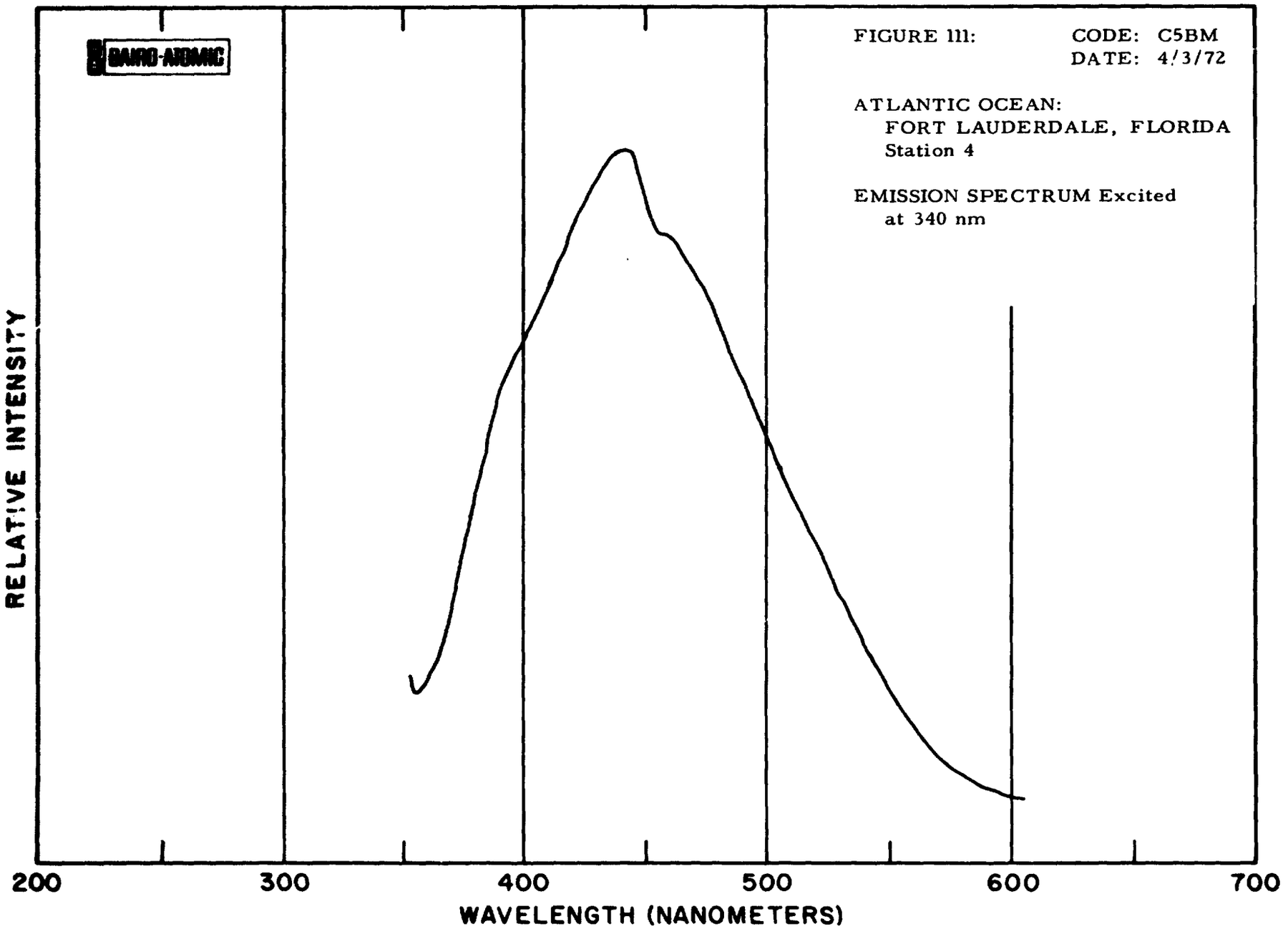

BARNES-ARDMAC
FIGURE 106:
CODE: C2BM
DATE: 4/3/7:
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 2
EMISSION SPECTRUM Excited
at 340 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

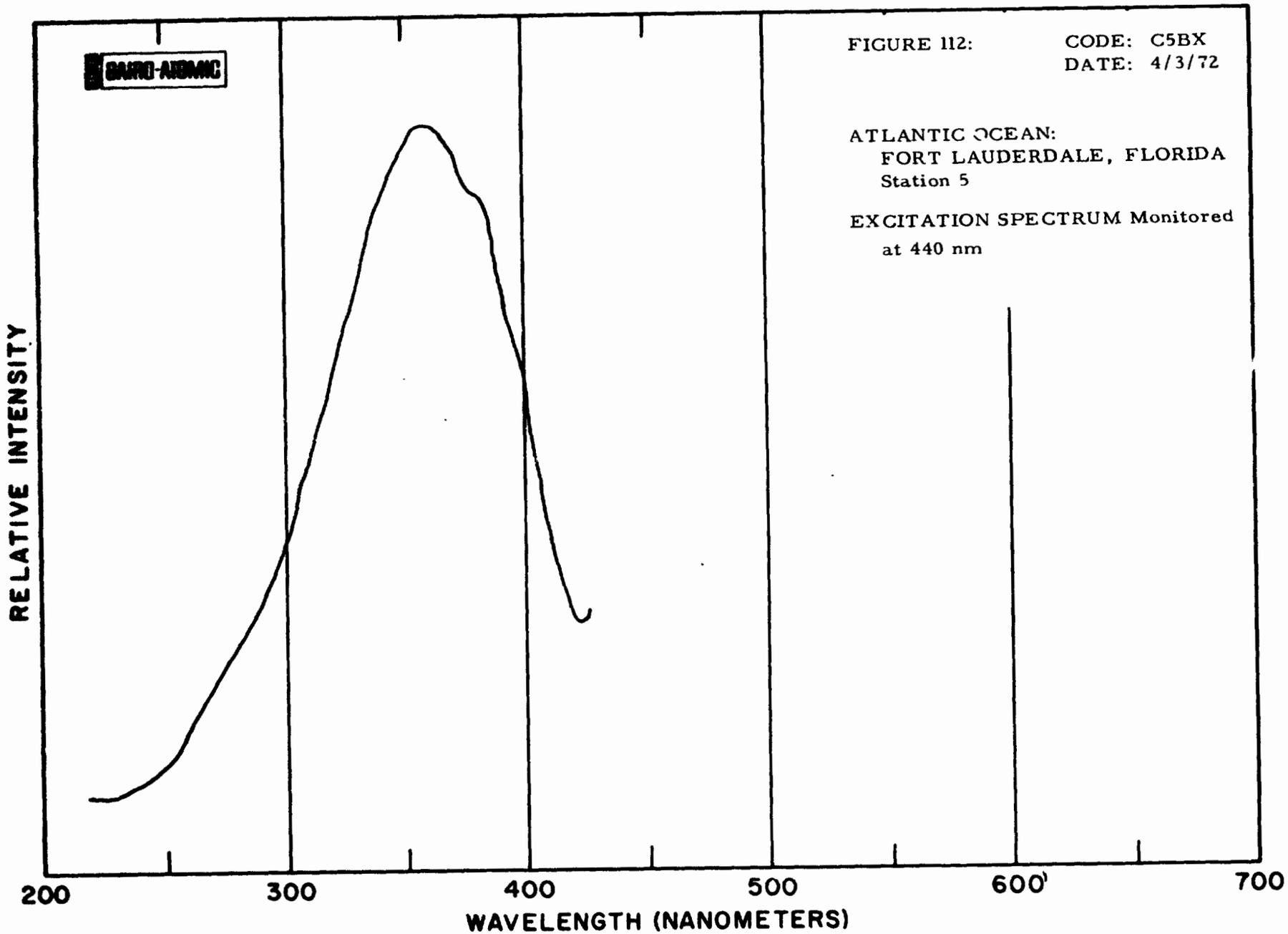

BAIRD-ATOMIC
FIGURE 107:
CODE: C2BX
DATE: 4/3/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 2
EXCITATION SPECTRUM Monitored at 450 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

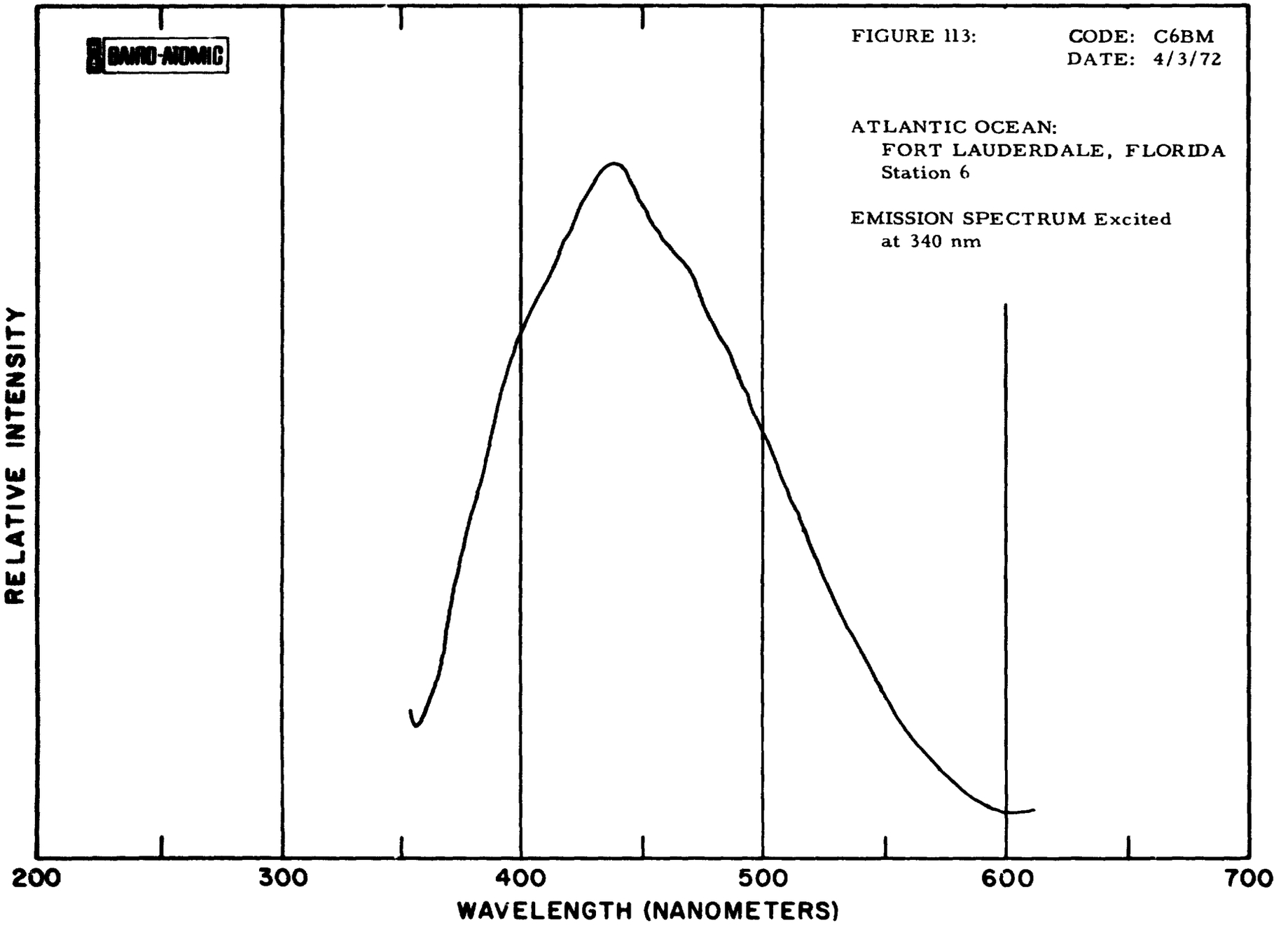

BAIRD-ATOMIC
FIGURE 108:
CODE: C3BM
DATE: 4/3/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 3
EMISSION SPECTRUM Excited
at 340 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

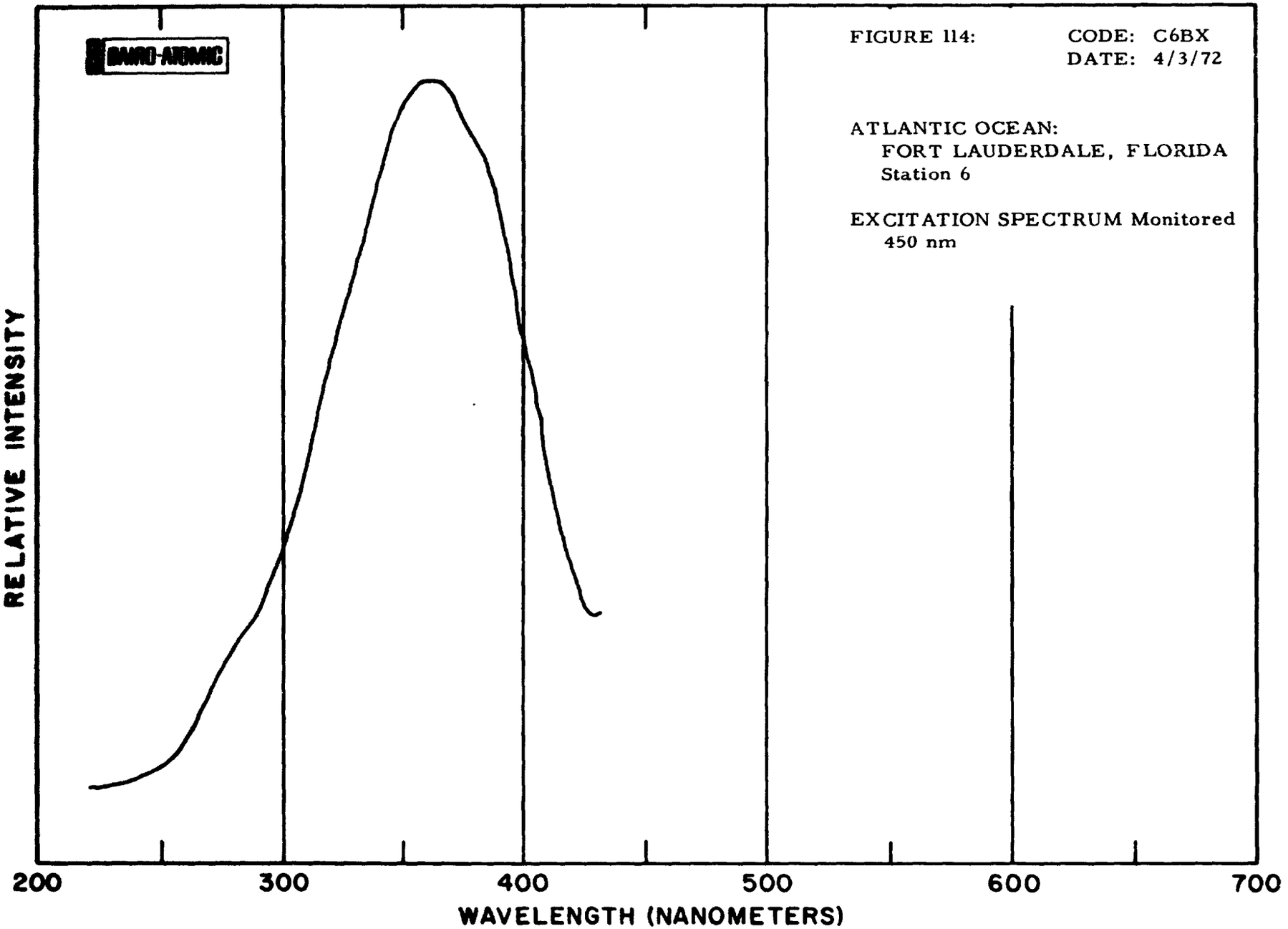

BAIRD-ATOMIC
FIGURE 109:
CODE: C3BX
DATE: 4/3/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 3
EXCITATION SPECTRUM Monitored at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

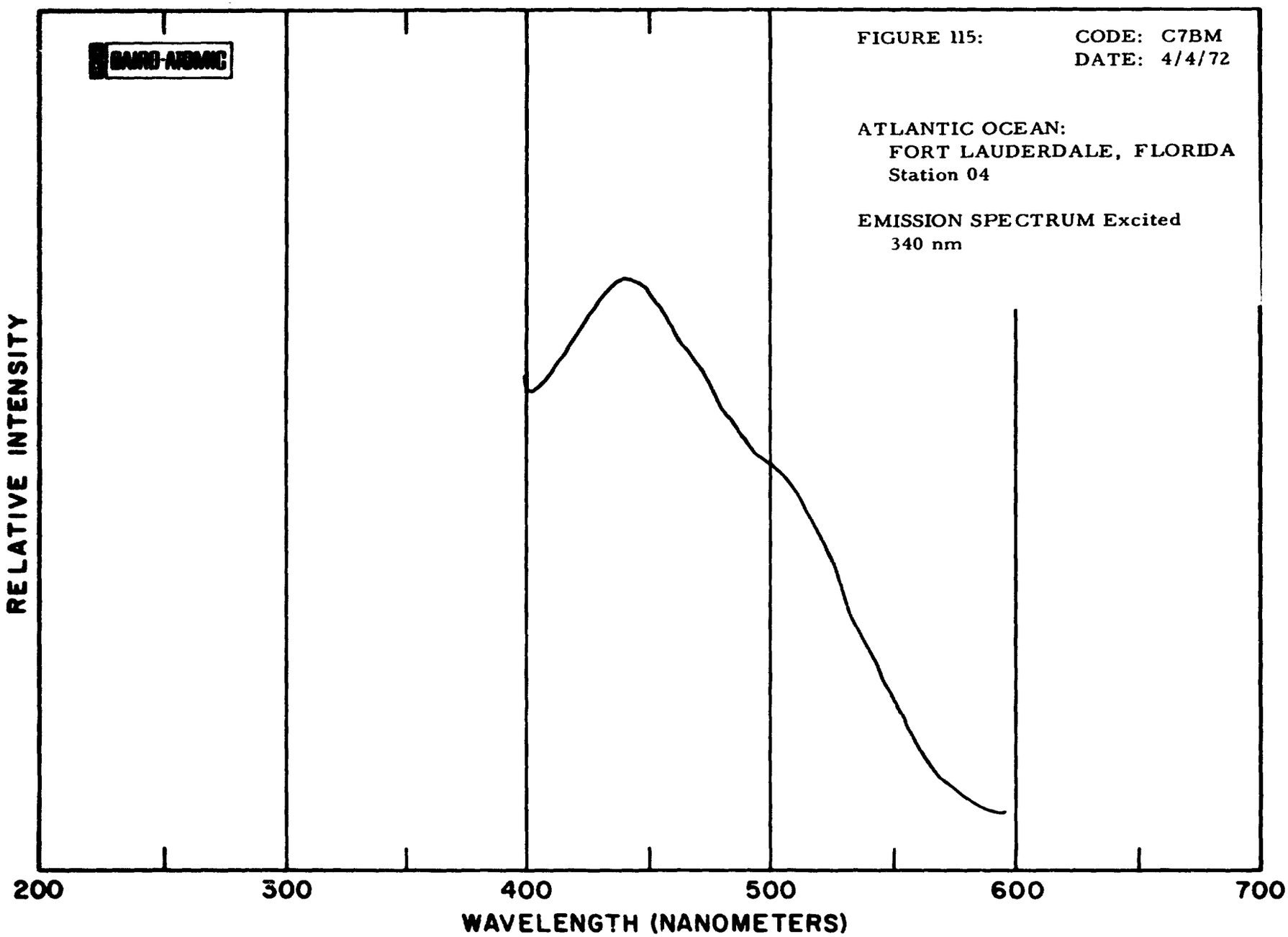

BAIRD-ATOMIC
FIGURE 110:
CODE: C4BXM
DATE: 4/3/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 4
EMISSION SPECTRUM Excited at 350 nm (right)
EXCITATION SPECTRUM Monitored at 440 nm (left)
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

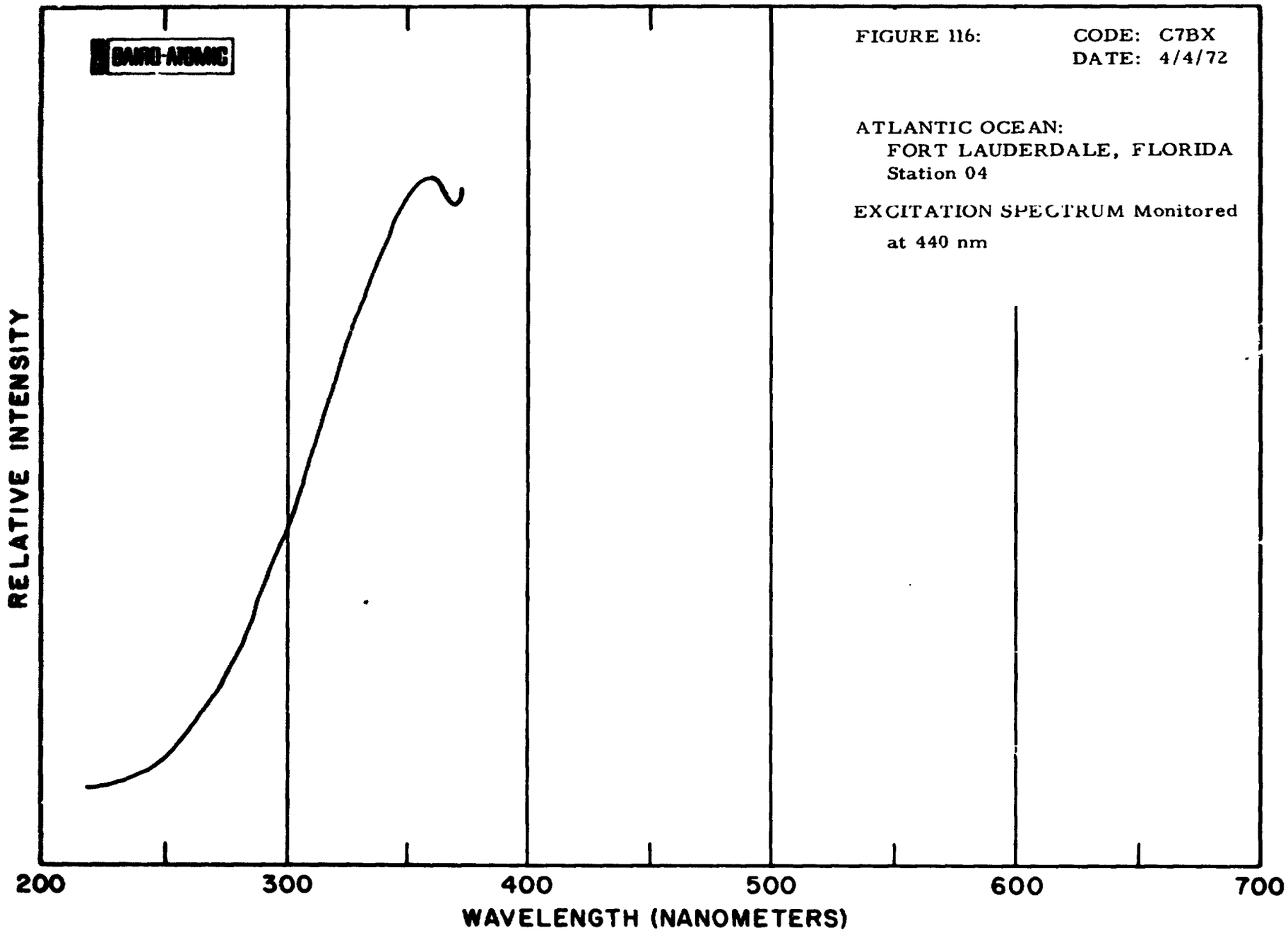

BAIRD-ATOMIC
FIGURE 111:
CODE: C5BM
DATE: 4/3/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 4
EMISSION SPECTRUM Excited
at 340 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

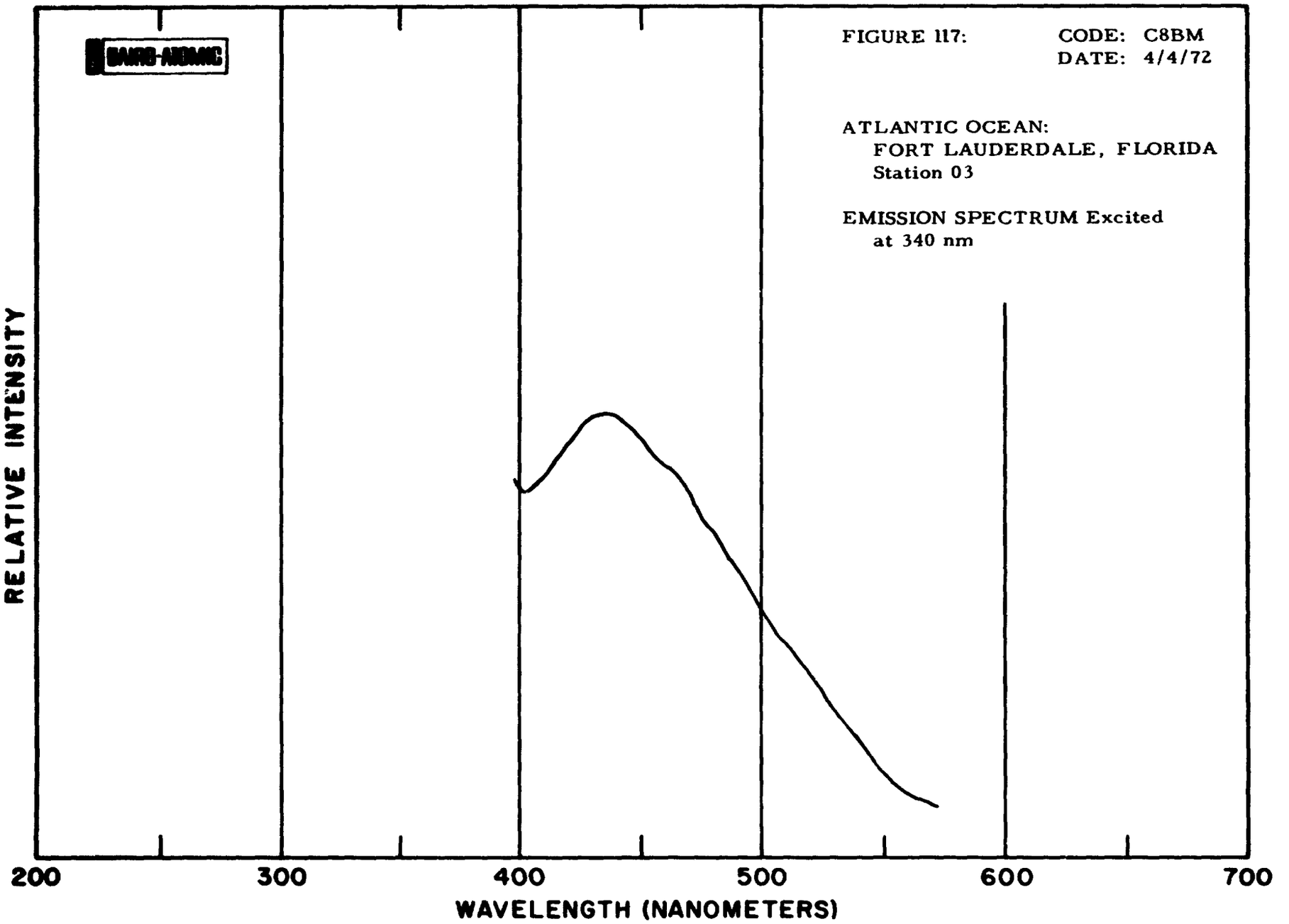

BAIRD-ATOMIC
FIGURE 112:
CODE: C5BX
DATE: 4/3/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 5
EXCITATION SPECTRUM Monitored
at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 113:
CODE: C6BM
DATE: 4/3/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 6
EMISSION SPECTRUM Excited
at 340 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 114:
CODE: C6BX
DATE: 4/3/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 6
EXCITATION SPECTRUM Monitored
450 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 115:
CODE: C7BM
DATE: 4/4/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 04
EMISSION SPECTRUM Excited
340 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 116:
CODE: C7BX
DATE: 4/4/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 04
EXCITATION SPECTRUM Monitored
at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 117:
CODE: C8BM
DATE: 4/4/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 03
EMISSION SPECTRUM Excited
at 340 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

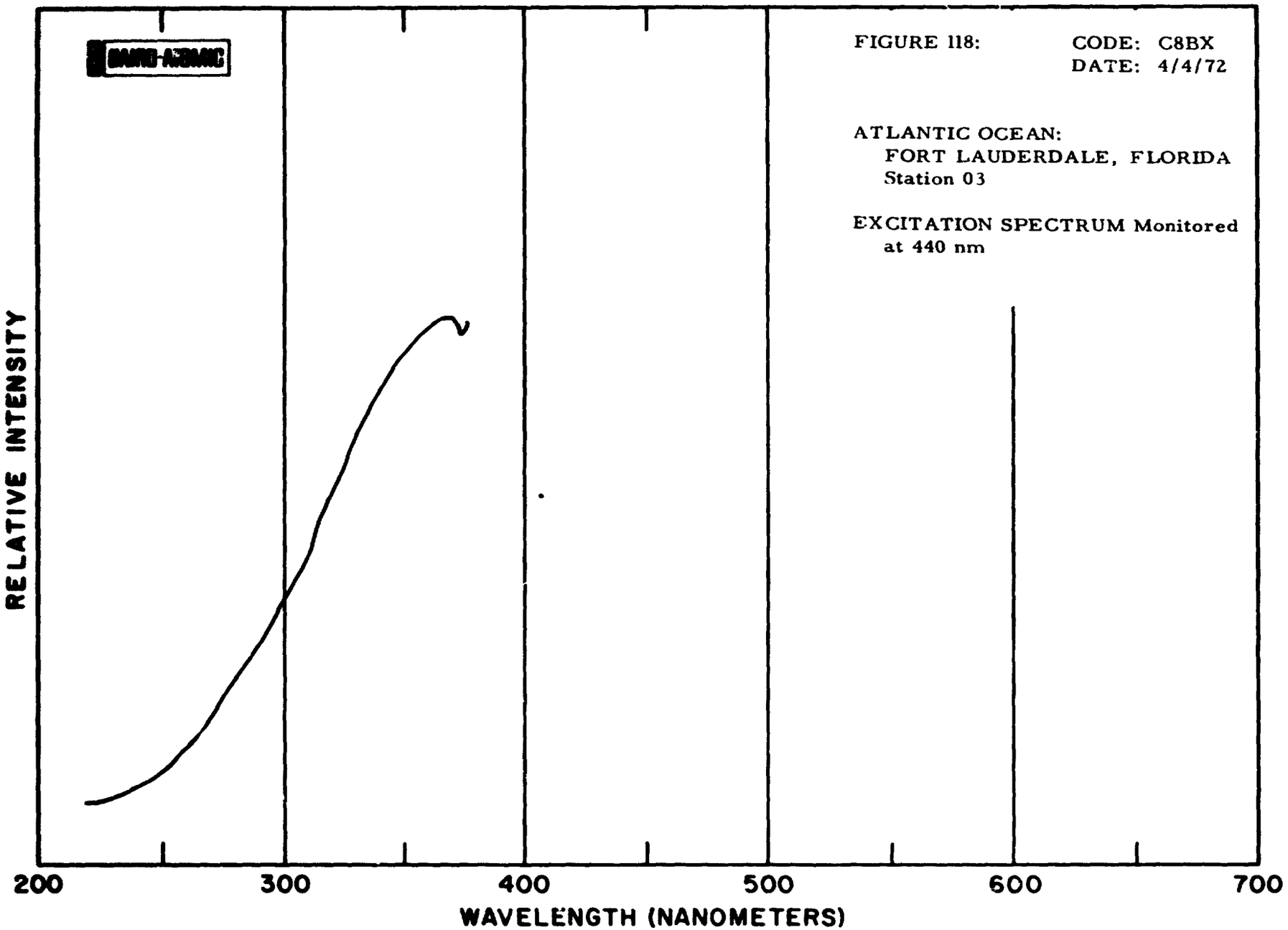
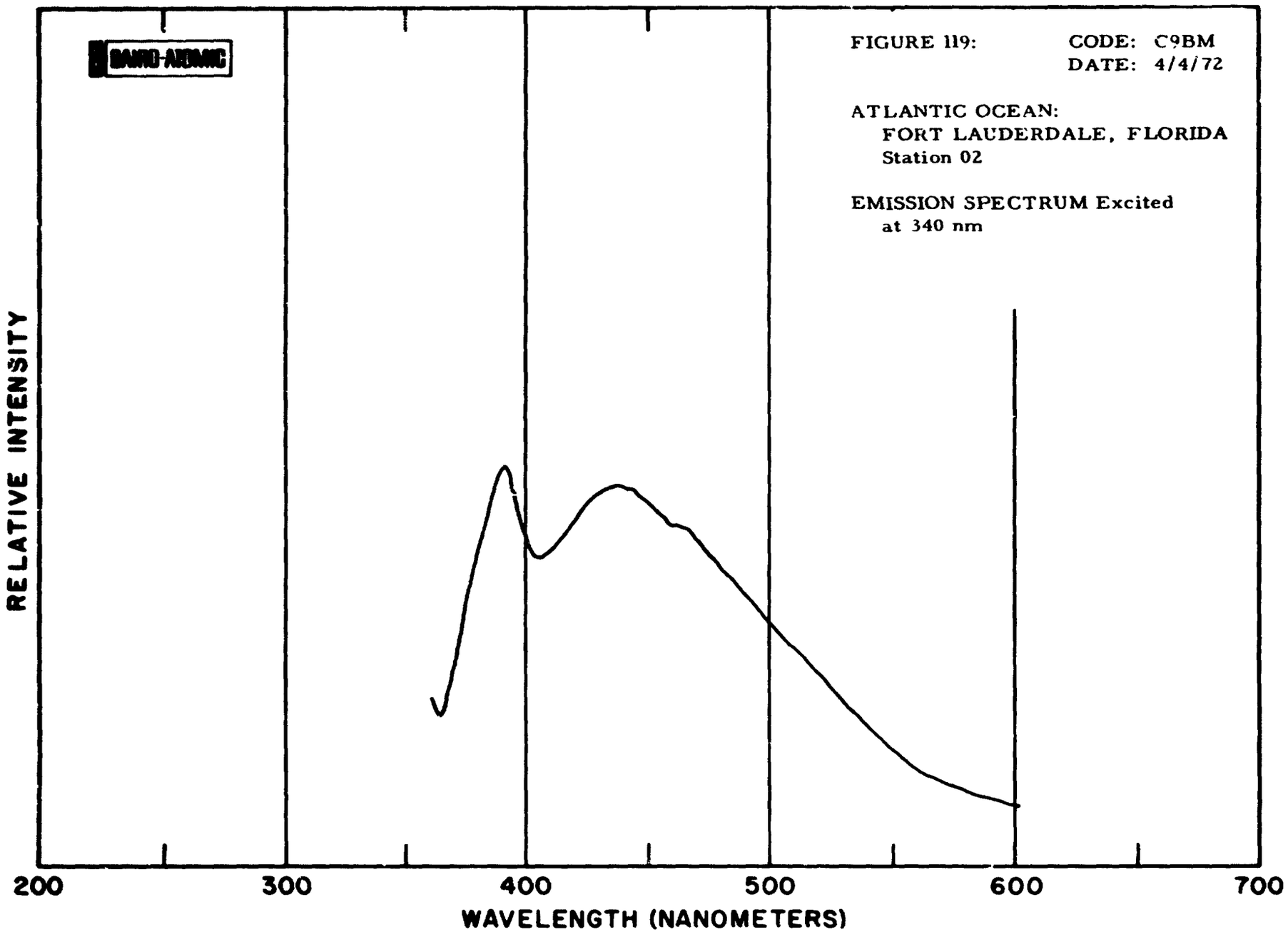


FIGURE 118:
CODE: C8BX
DATE: 4/4/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 03
EXCITATION SPECTRUM Monitored at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 119:
CODE: C9BM
DATE: 4/4/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 02
EMISSION SPECTRUM Excited
at 340 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

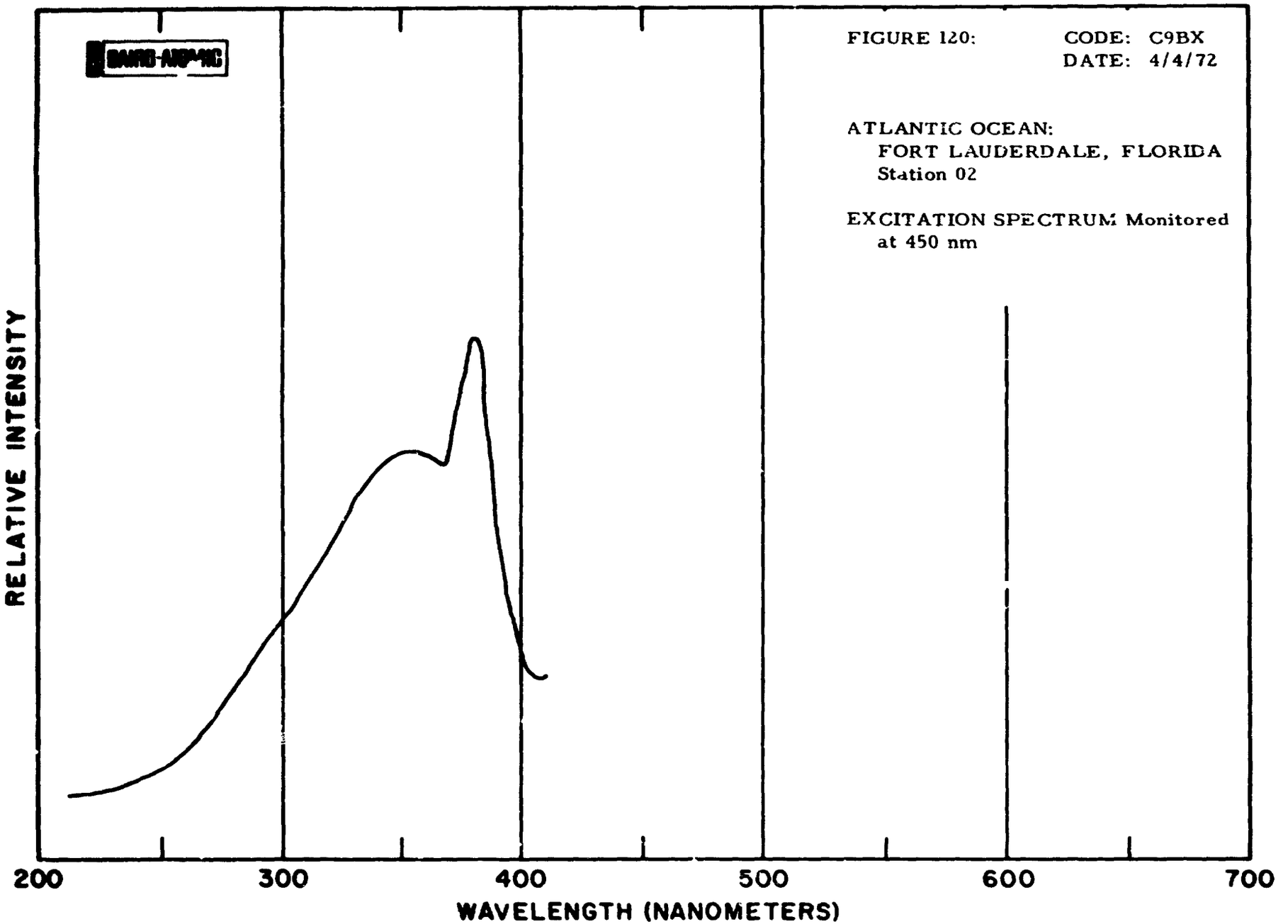
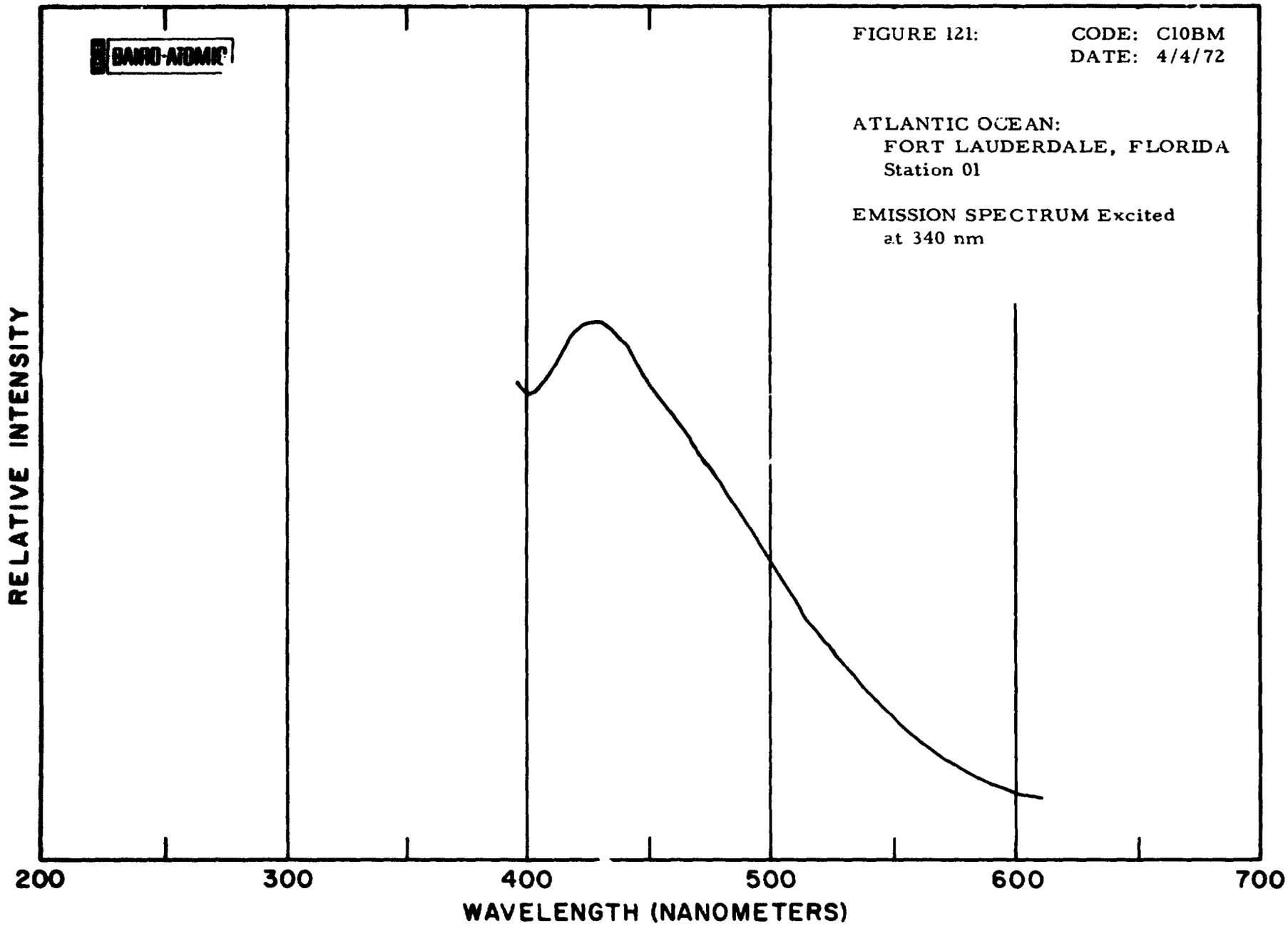
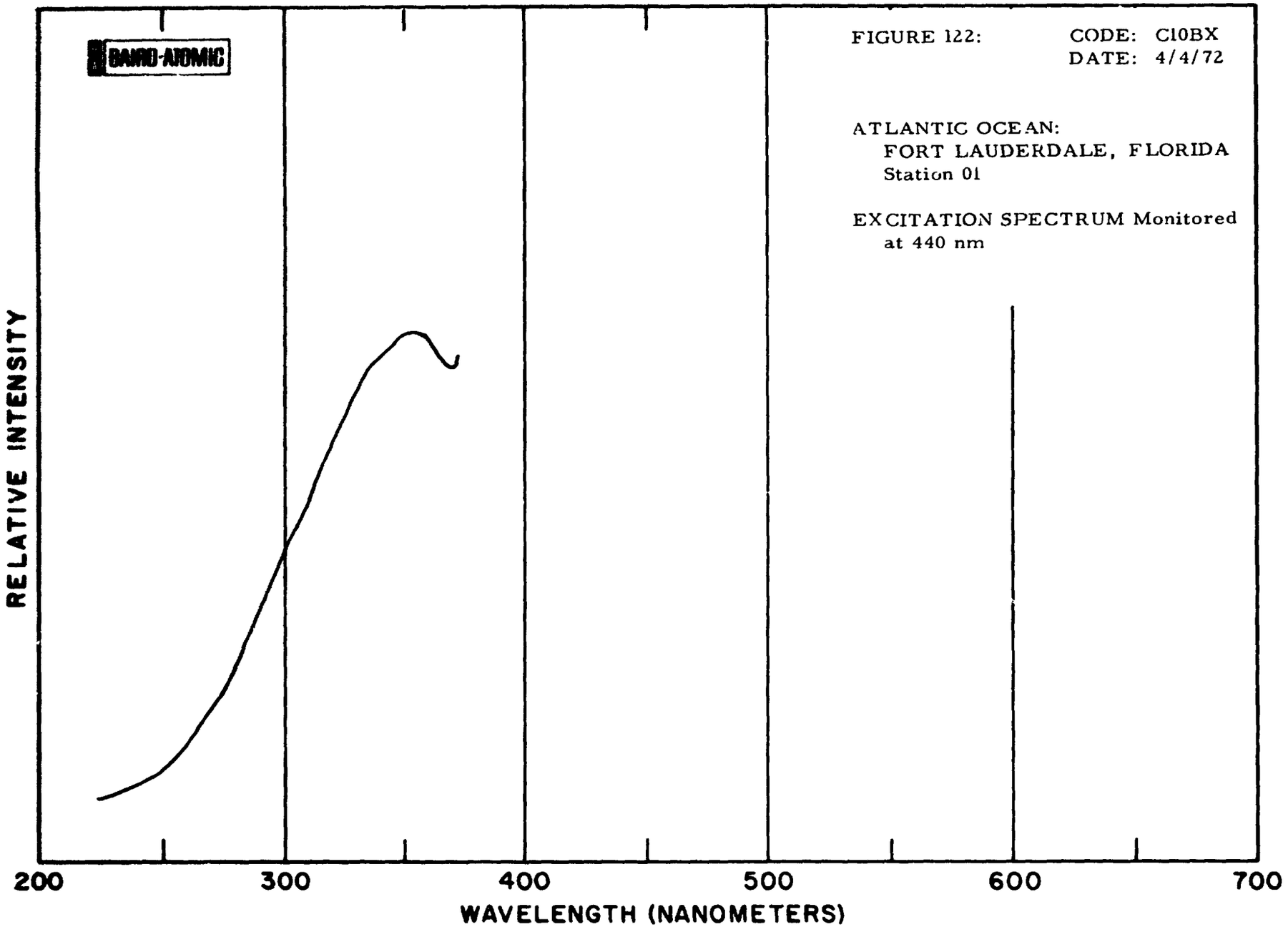
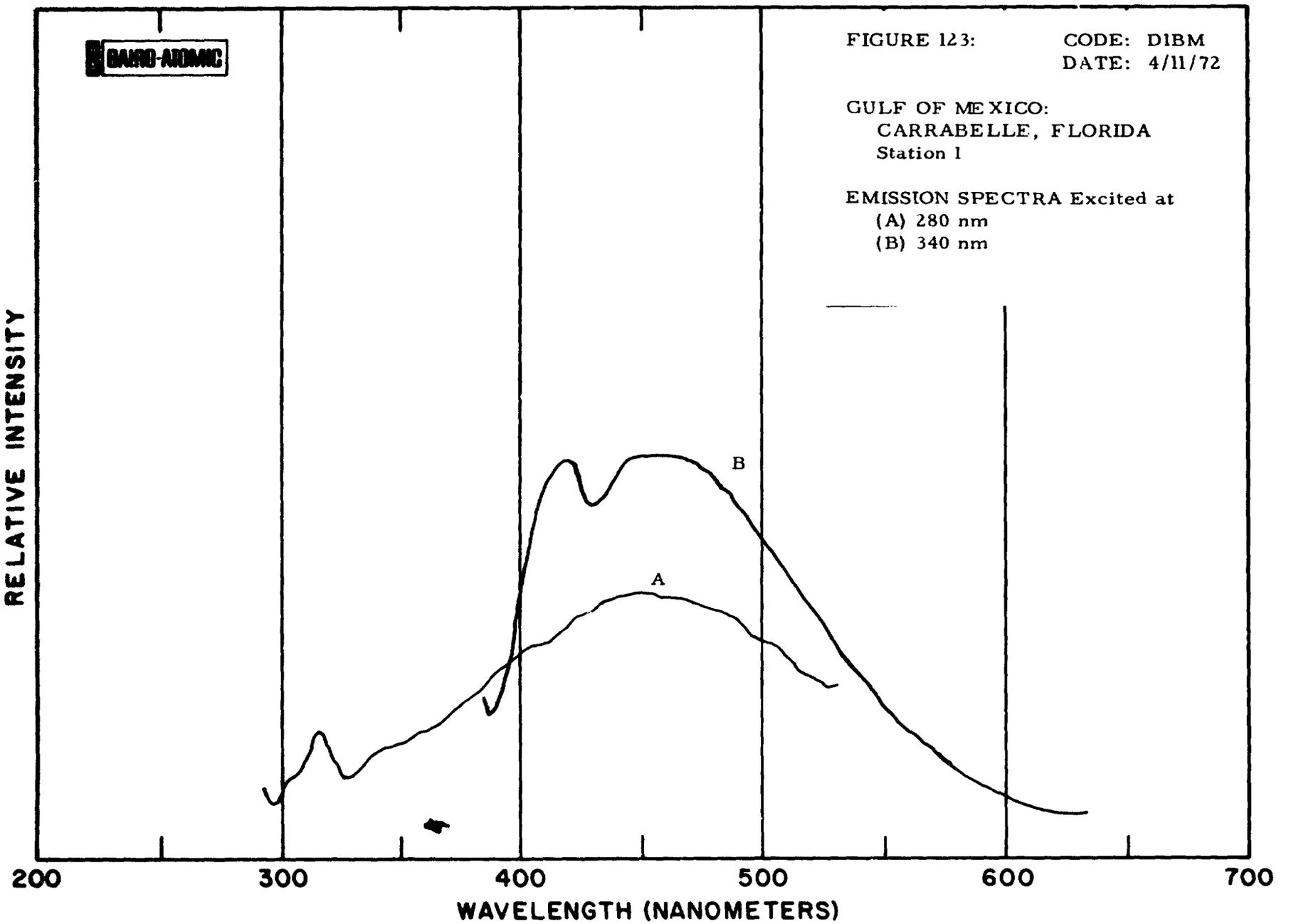
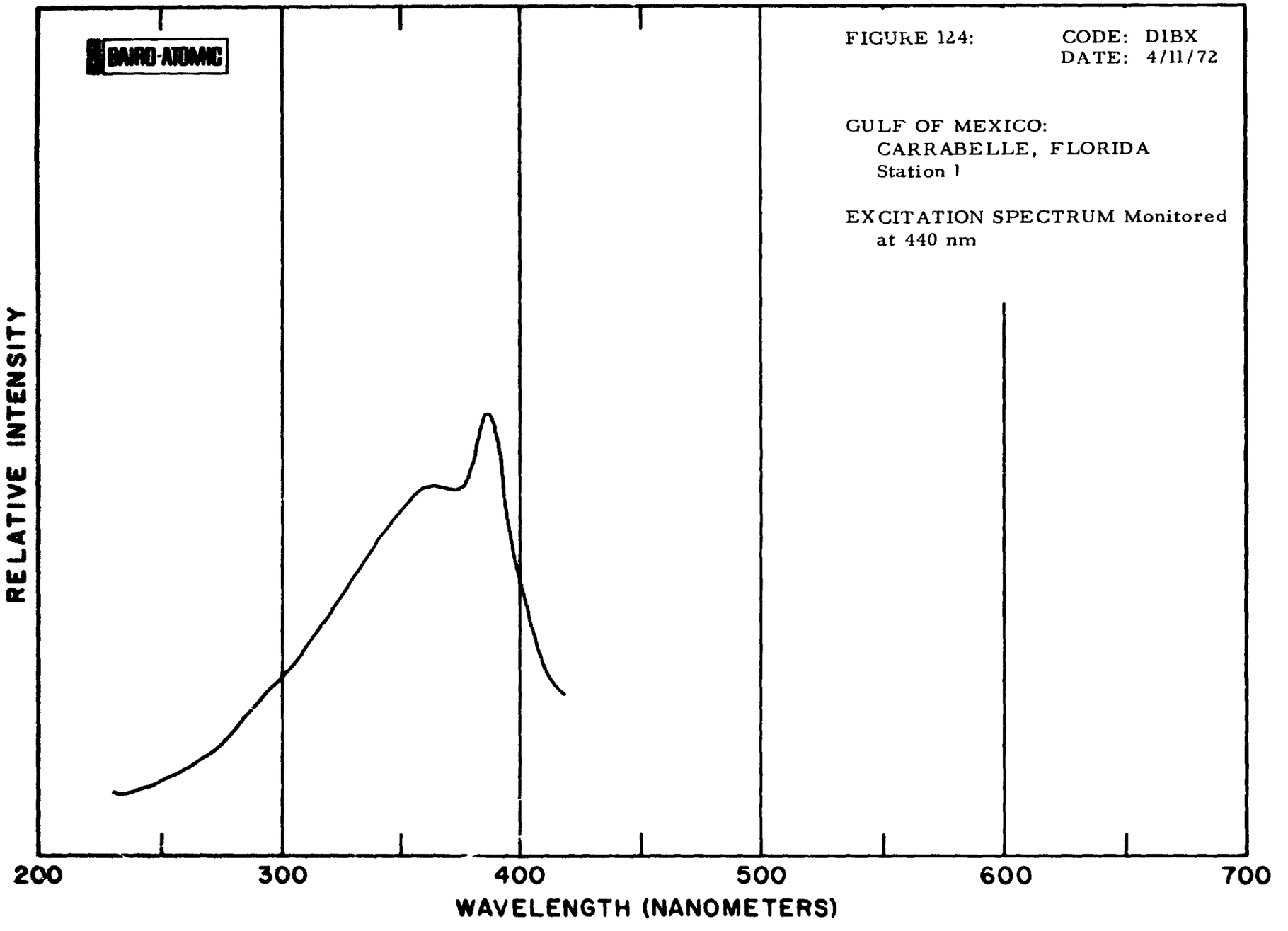


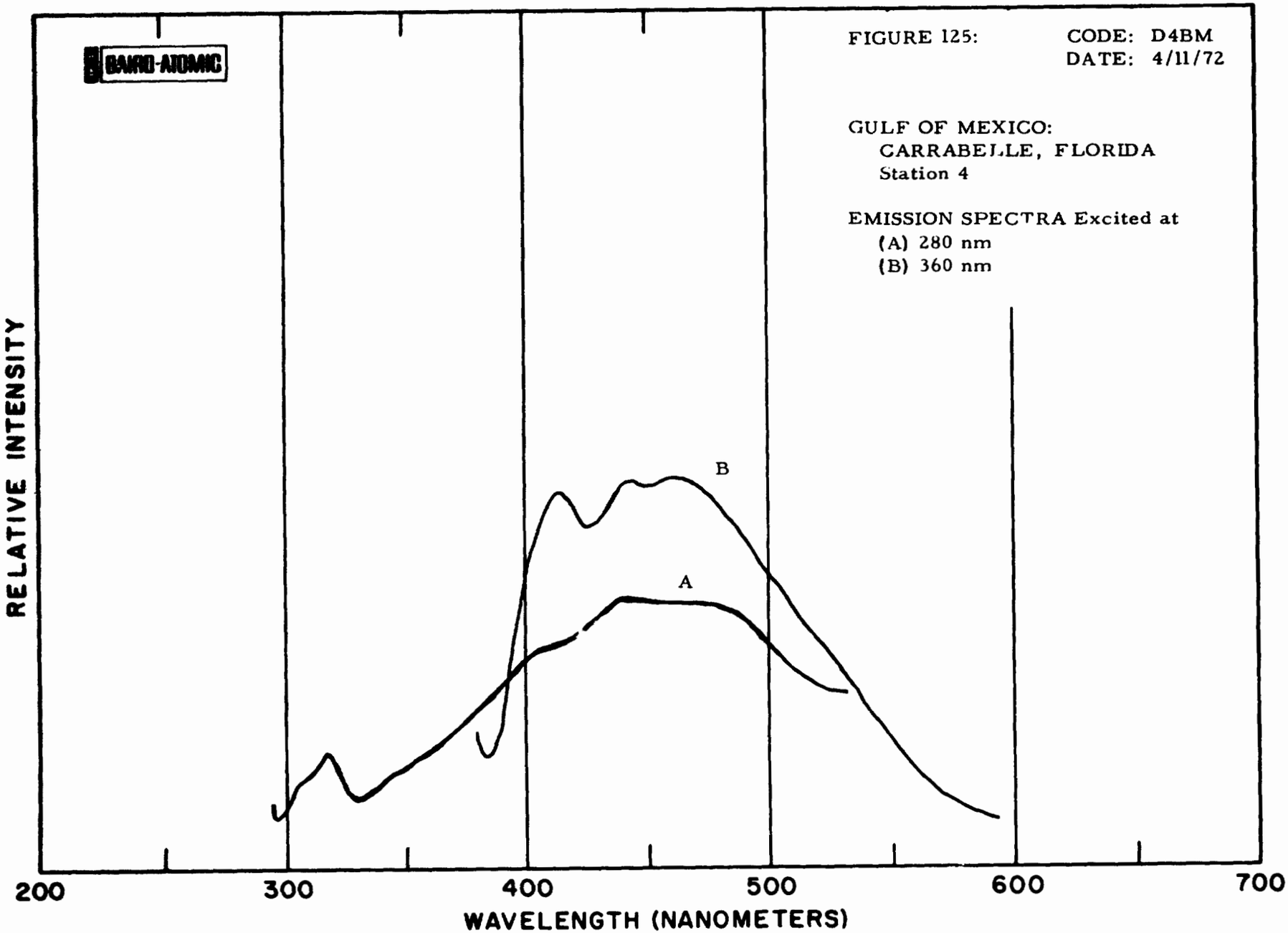
FIGURE 120:
CODE: C9BX
DATE: 4/4/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 02
EXCITATION SPECTRUM Monitored at 450 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

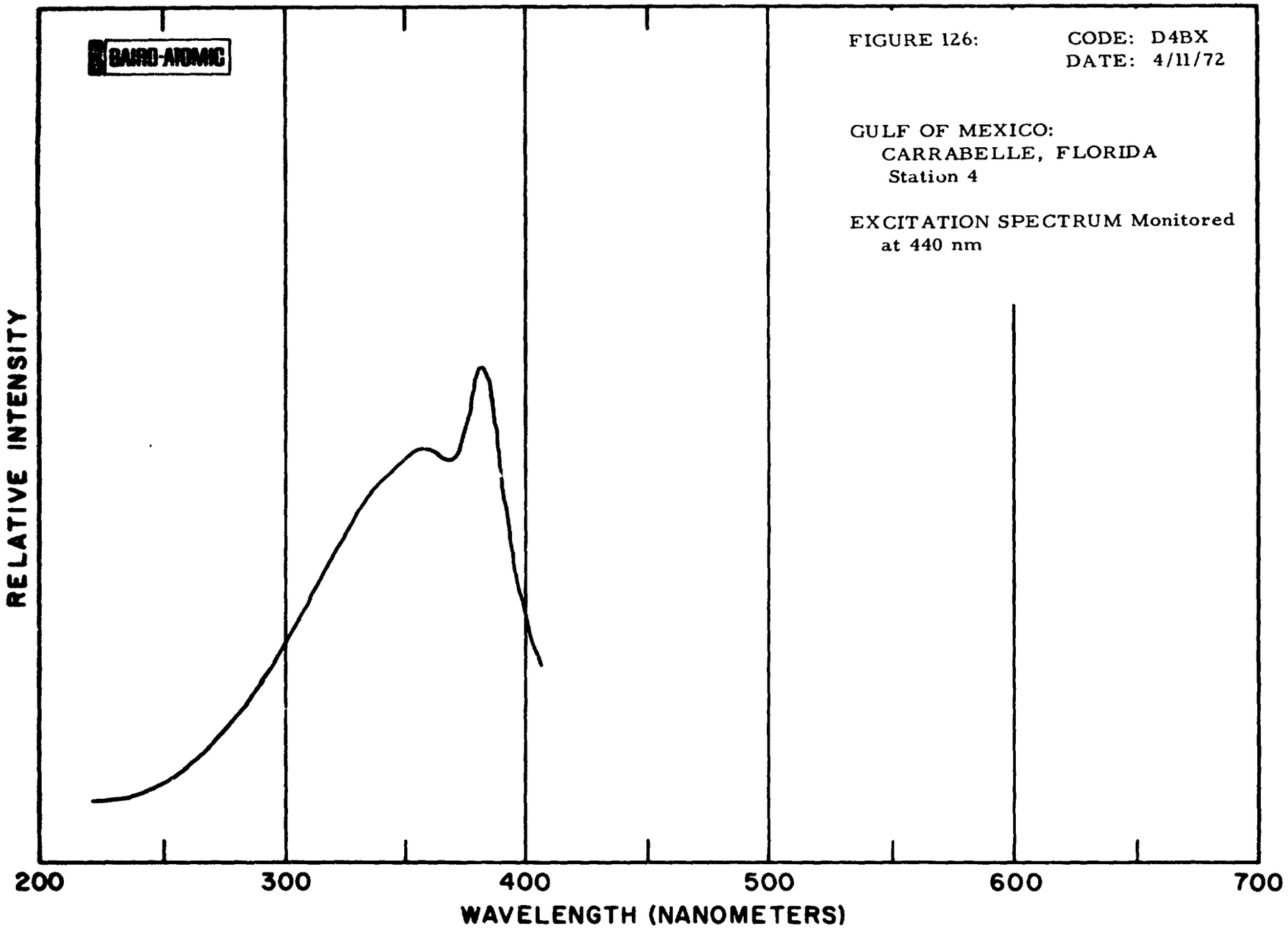

BAIRD-ATOMIC
FIGURE 121:
CODE: C10BM
DATE: 4/4/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 01
EMISSION SPECTRUM Excited
at 340 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

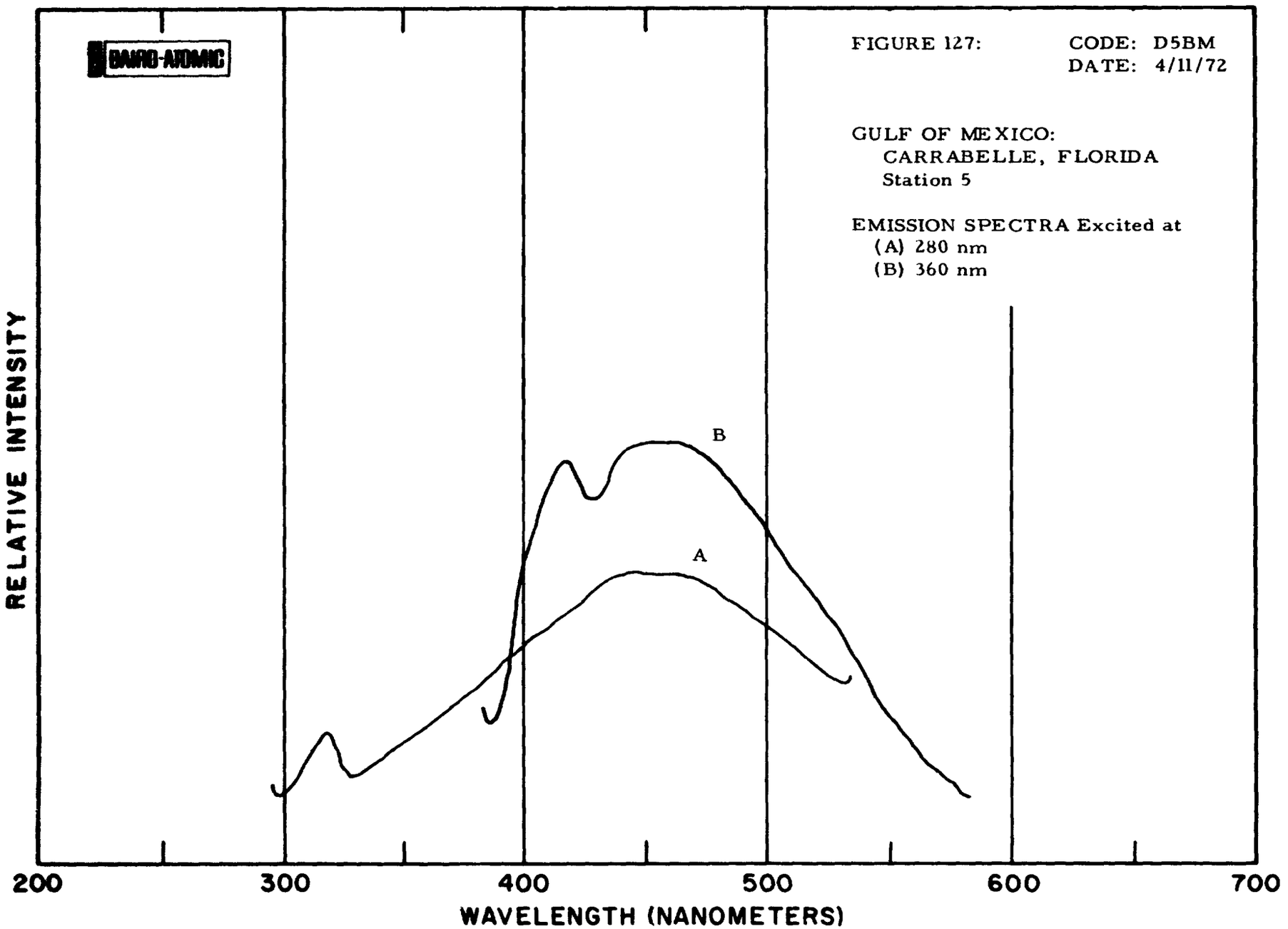

BAIRD-ATOMIC
FIGURE 122:
CODE: C10BX
DATE: 4/4/72
ATLANTIC OCEAN:
FORT LAUDERDALE, FLORIDA
Station 01
EXCITATION SPECTRUM Monitored
at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

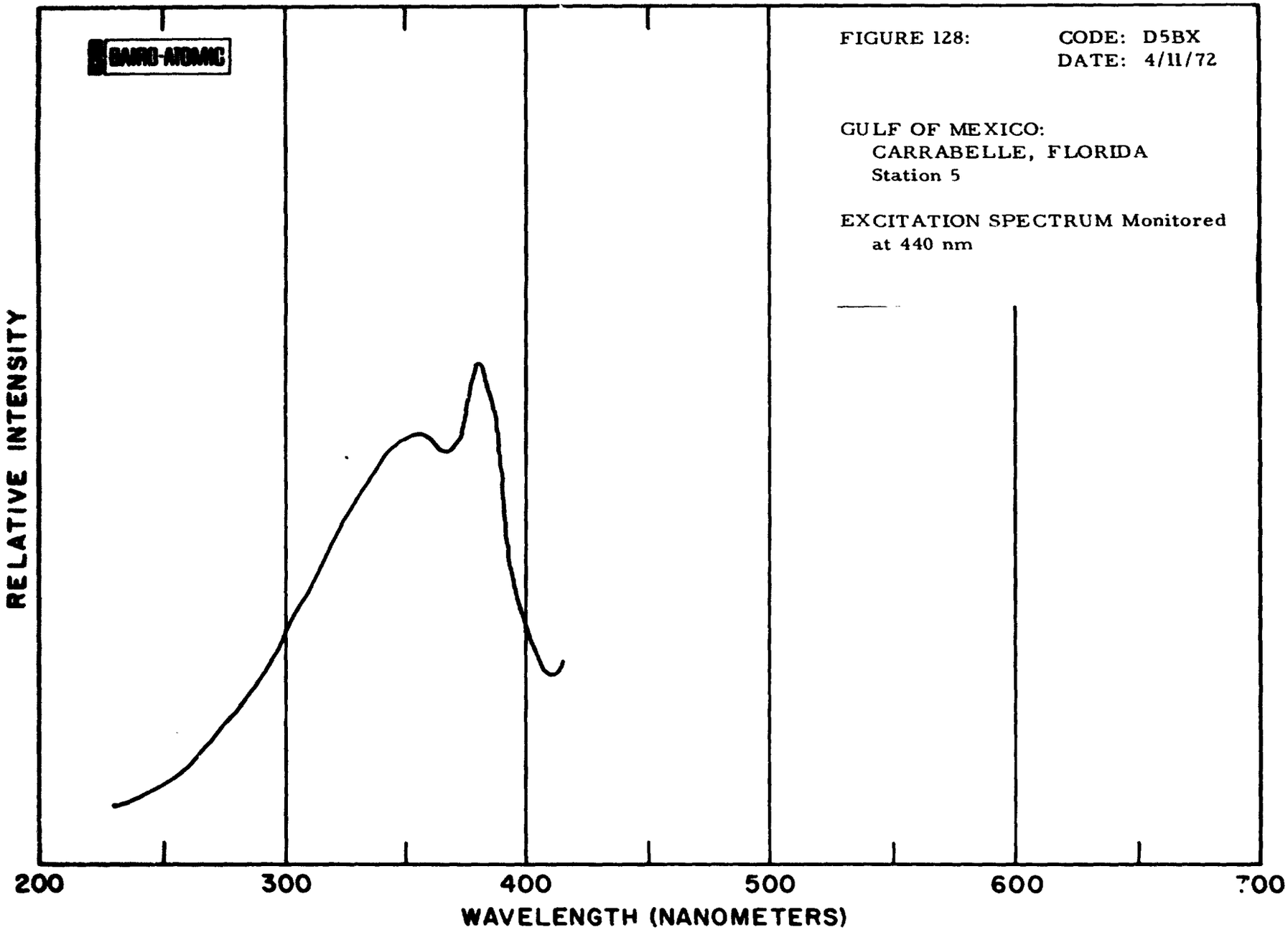

BAIRD-ATOMIC
FIGURE 123:
CODE: DIBM
DATE: 4/11/72
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station 1
EMISSION SPECTRA Excited at
(A) 280 nm
(B) 340 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

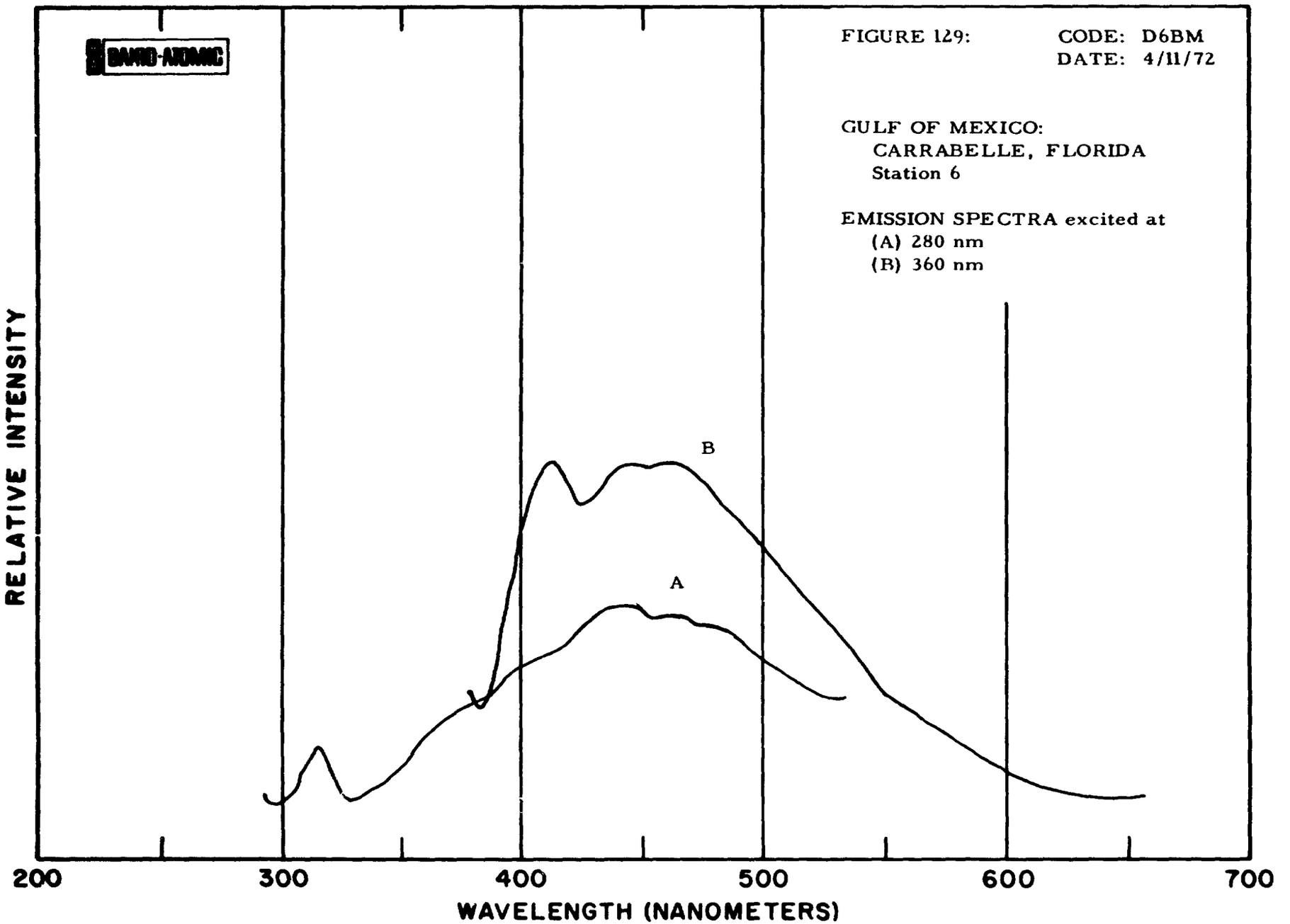

BAIRD-ATOMIC
FIGURE 124:
CODE: D1BX
DATE: 4/11/72
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station 1
EXCITATION SPECTRUM Monitored at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

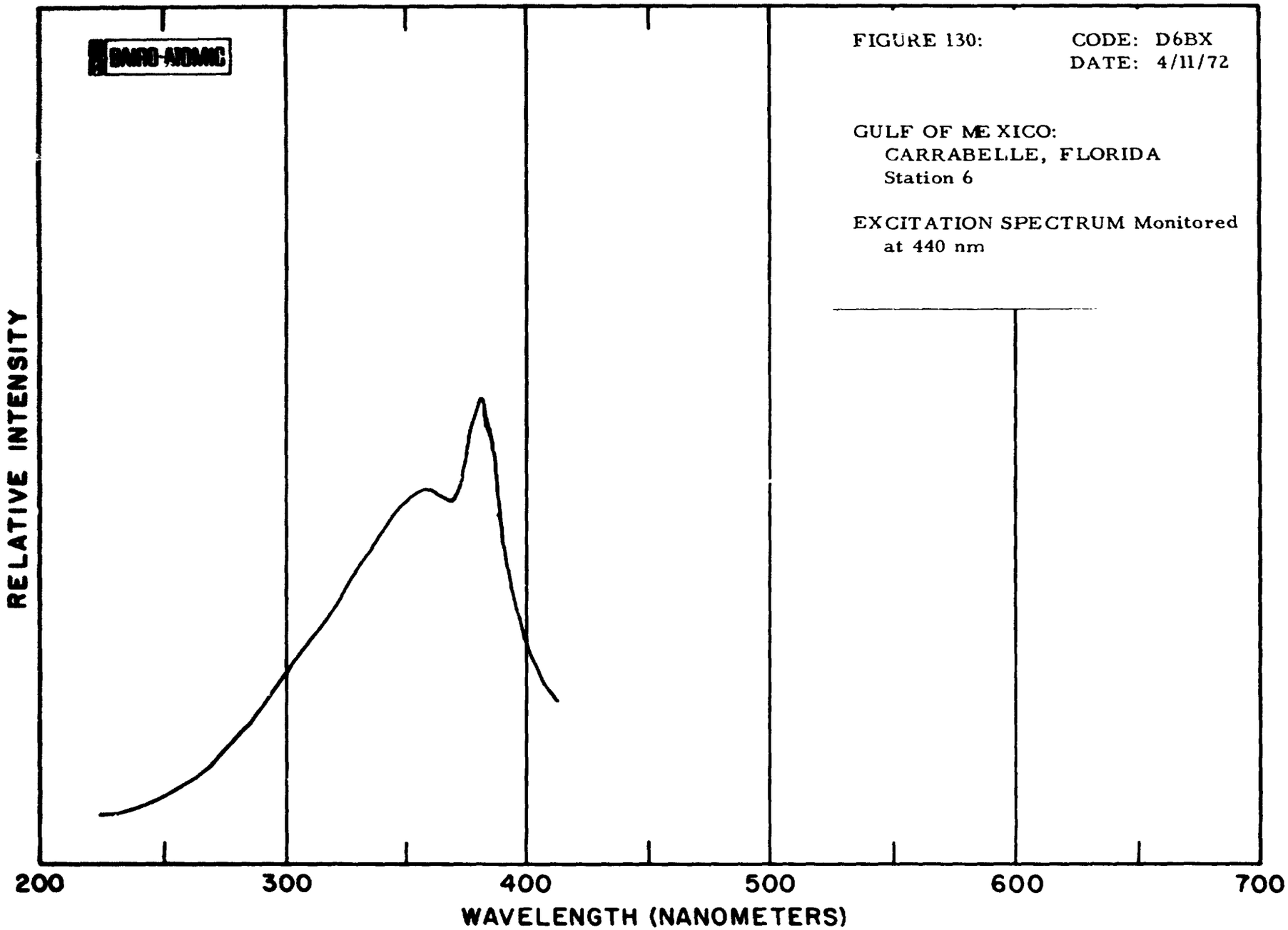

BAIRD-ATOMIC
FIGURE 125:
CODE: D4BM
DATE: 4/11/72
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station 4
EMISSION SPECTRA Excited at
(A) 280 nm
(B) 360 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

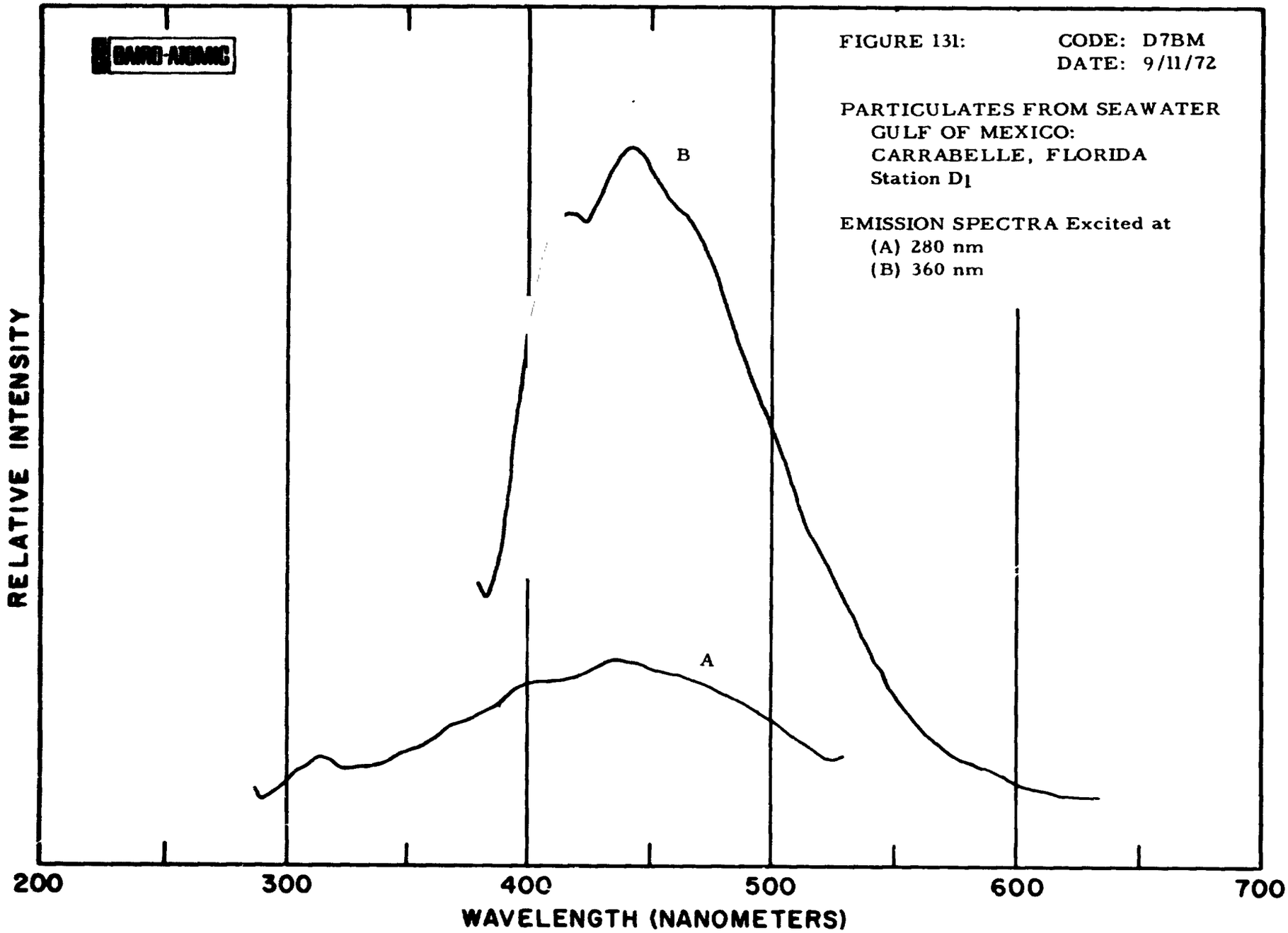

BAIRD-ATOMIC
FIGURE 126:
CODE: D4BX
DATE: 4/11/72
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station 4
EXCITATION SPECTRUM Monitored
at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 127:
CODE: D5BM
DATE: 4/11/72
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station 5
EMISSION SPECTRA Excited at
(A) 280 nm
(B) 360 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 128:
CODE: D5BX
DATE: 4/11/72
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station 5
EXCITATION SPECTRUM Monitored
at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 129:
CODE: D6BM
DATE: 4/11/72
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station 6
EMISSION SPECTRA excited at
(A) 280 nm
(B) 360 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 130:
CODE: D6BX
DATE: 4/11/72
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station 6
EXCITATION SPECTRUM Monitored at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 131:
CODE: D7BM
DATE: 9/11/72
PARTICULATES FROM SEAWATER
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station D1
EMISSION SPECTRA Excited at
(A) 280 nm
(B) 360 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

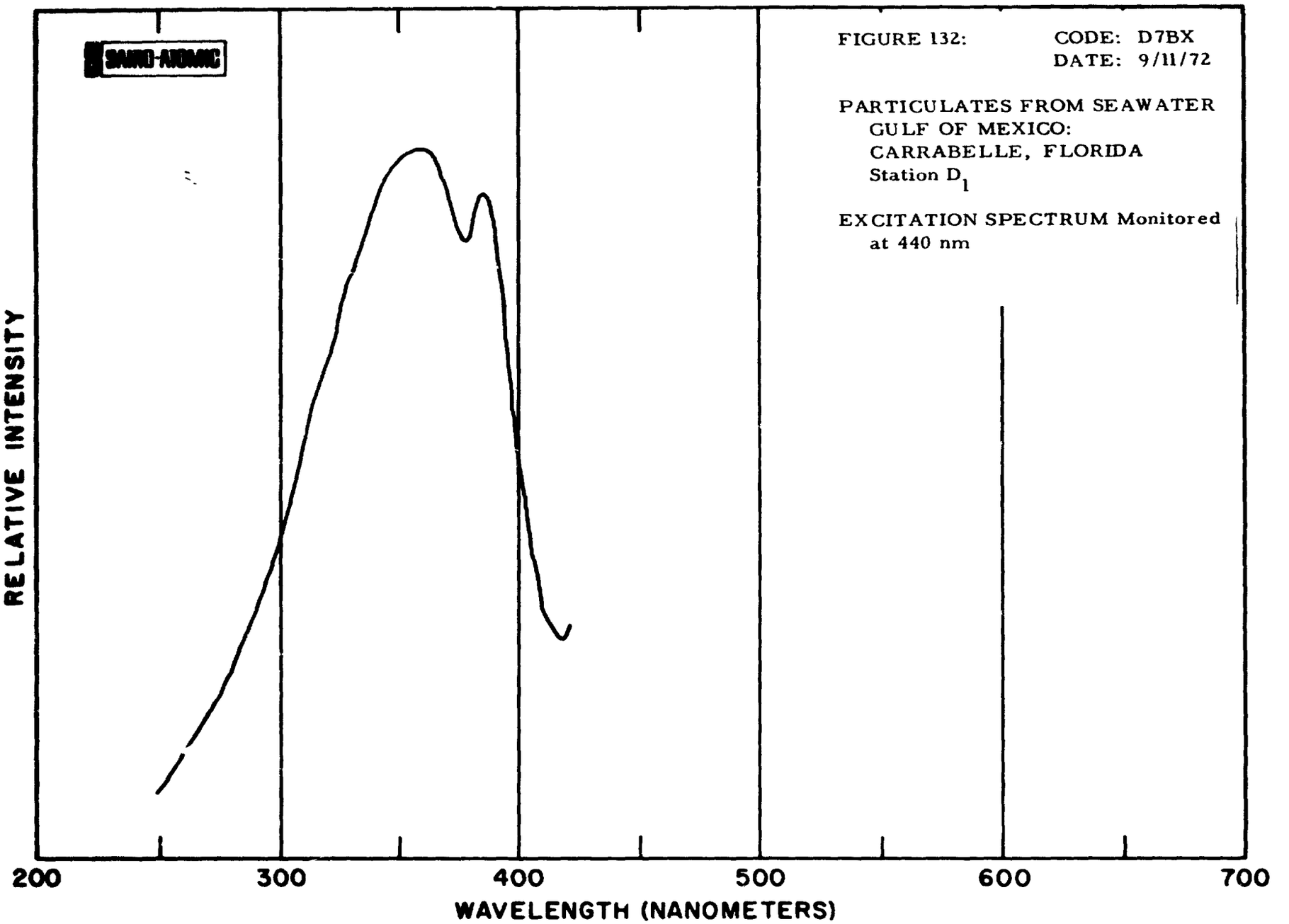


FIGURE 132: CODE: D7BX
DATE: 9/11/72

PARTICULATES FROM SEAWATER
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station D_1

EXCITATION SPECTRUM Monitored
at 440 nm

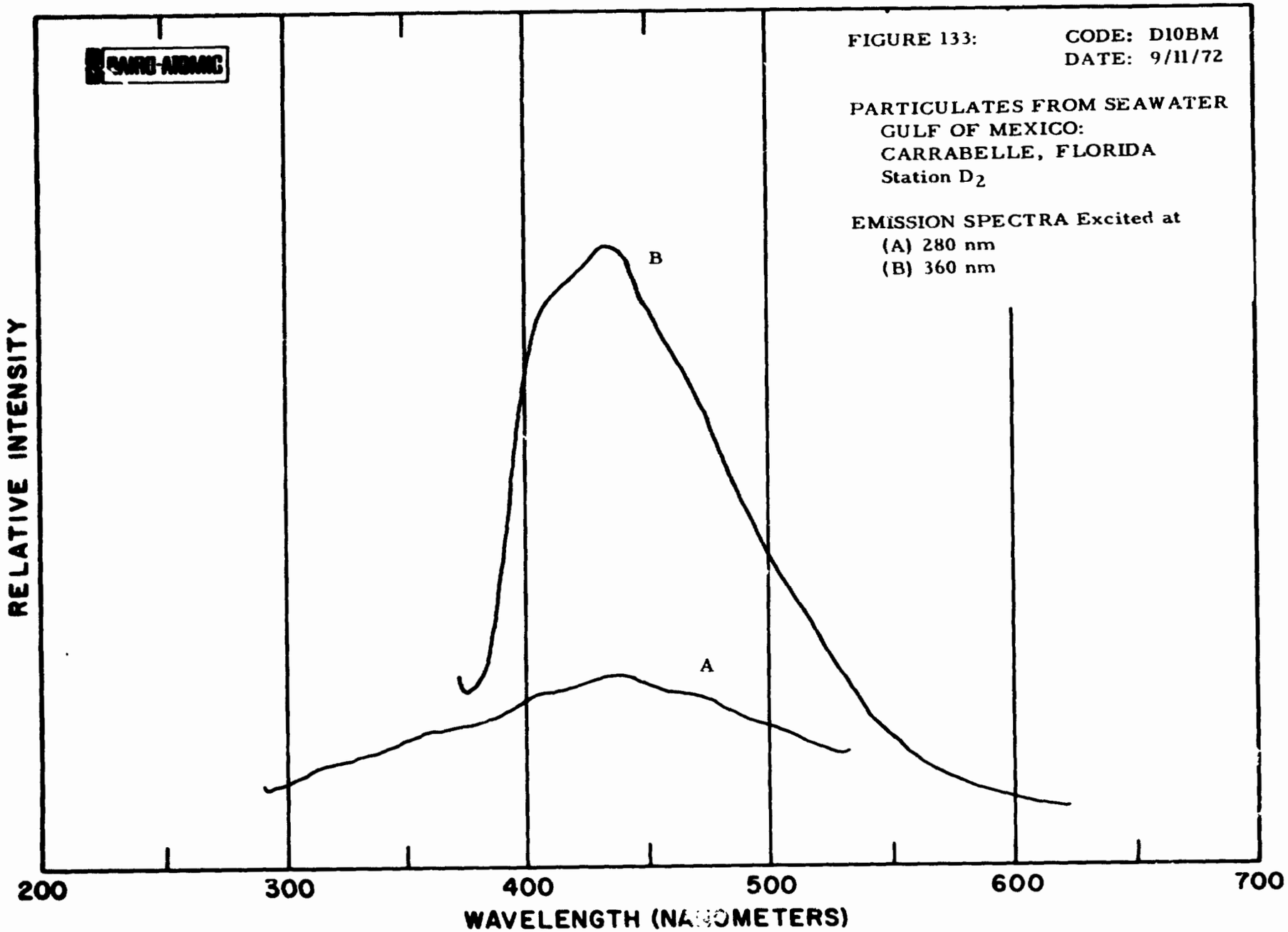


FIGURE 133:
CODE: D10BM
DATE: 9/11/72
PARTICULATES FROM SEAWATER
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station D_2
EMISSION SPECTRA Excited at
(A) 280 nm
(B) 360 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

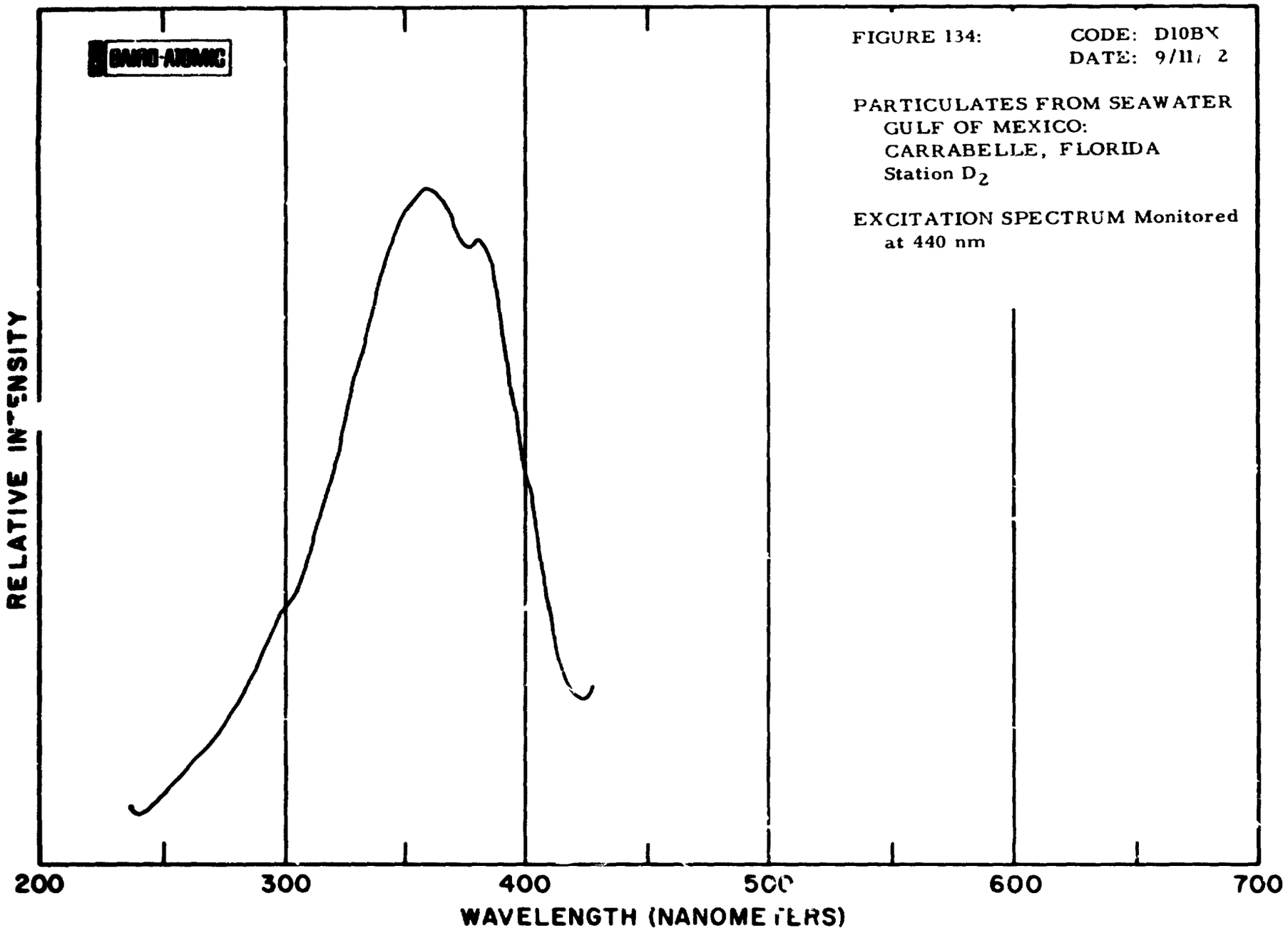
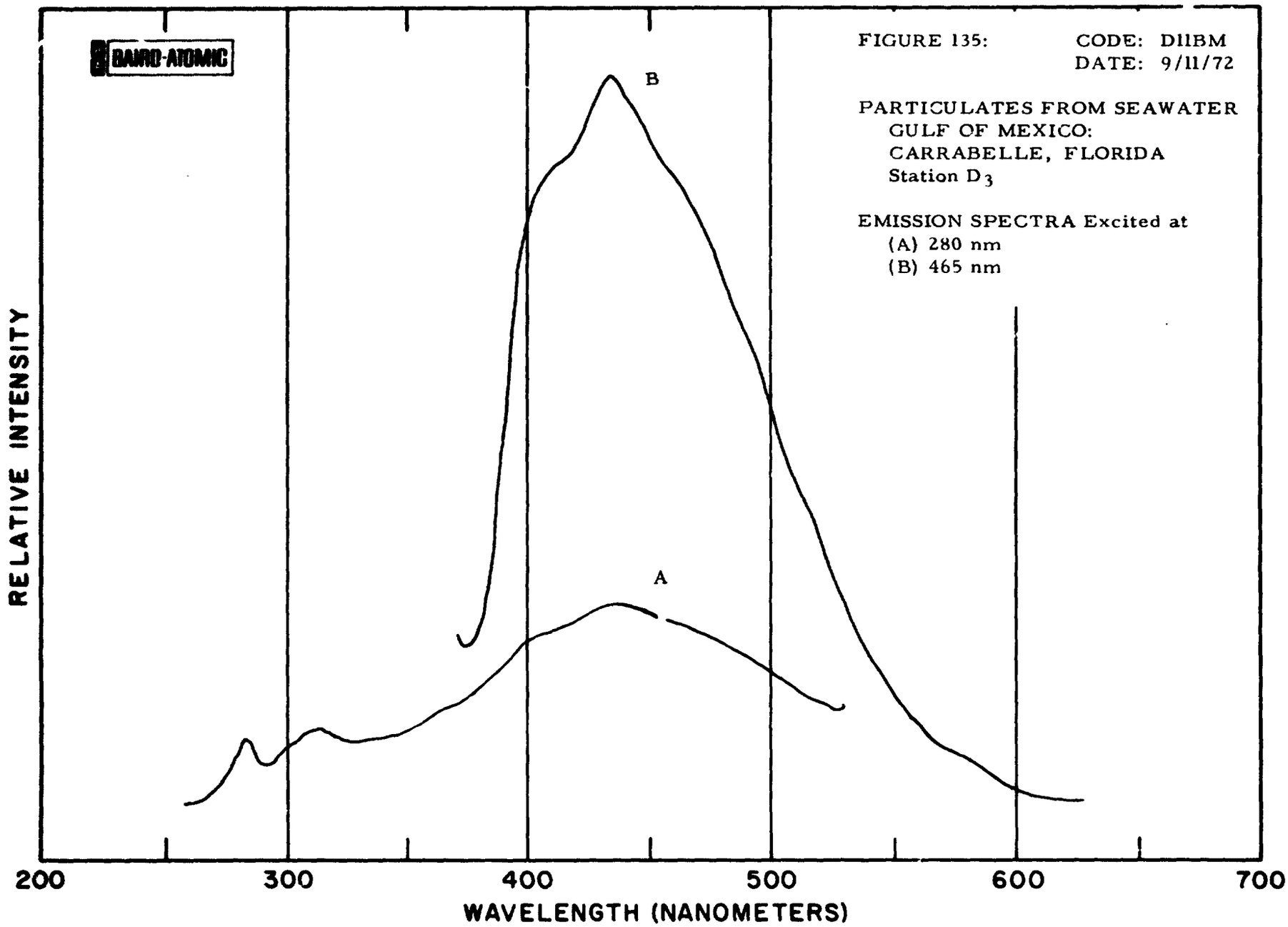


FIGURE 134: CODE: D10BX
DATE: 9/11/ 2

PARTICULATES FROM SEAWATER
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station D_2

EXCITATION SPECTRUM Monitored
at 440 nm


BAIRD-ATOMIC
FIGURE 135:
CODE: D11BM
DATE: 9/11/72
PARTICULATES FROM SEAWATER
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station D3
EMISSION SPECTRA Excited at
(A) 280 nm
(B) 465 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

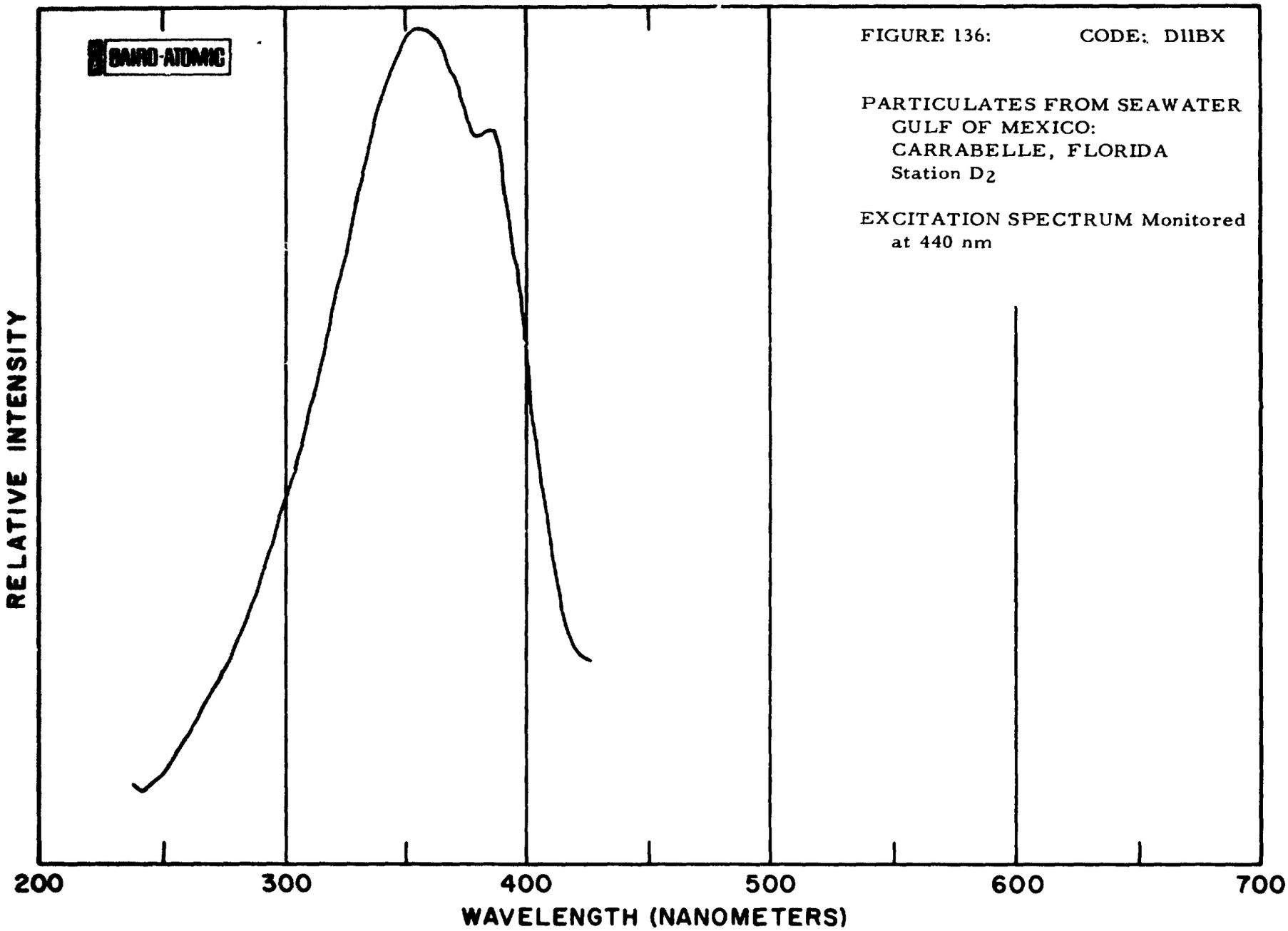
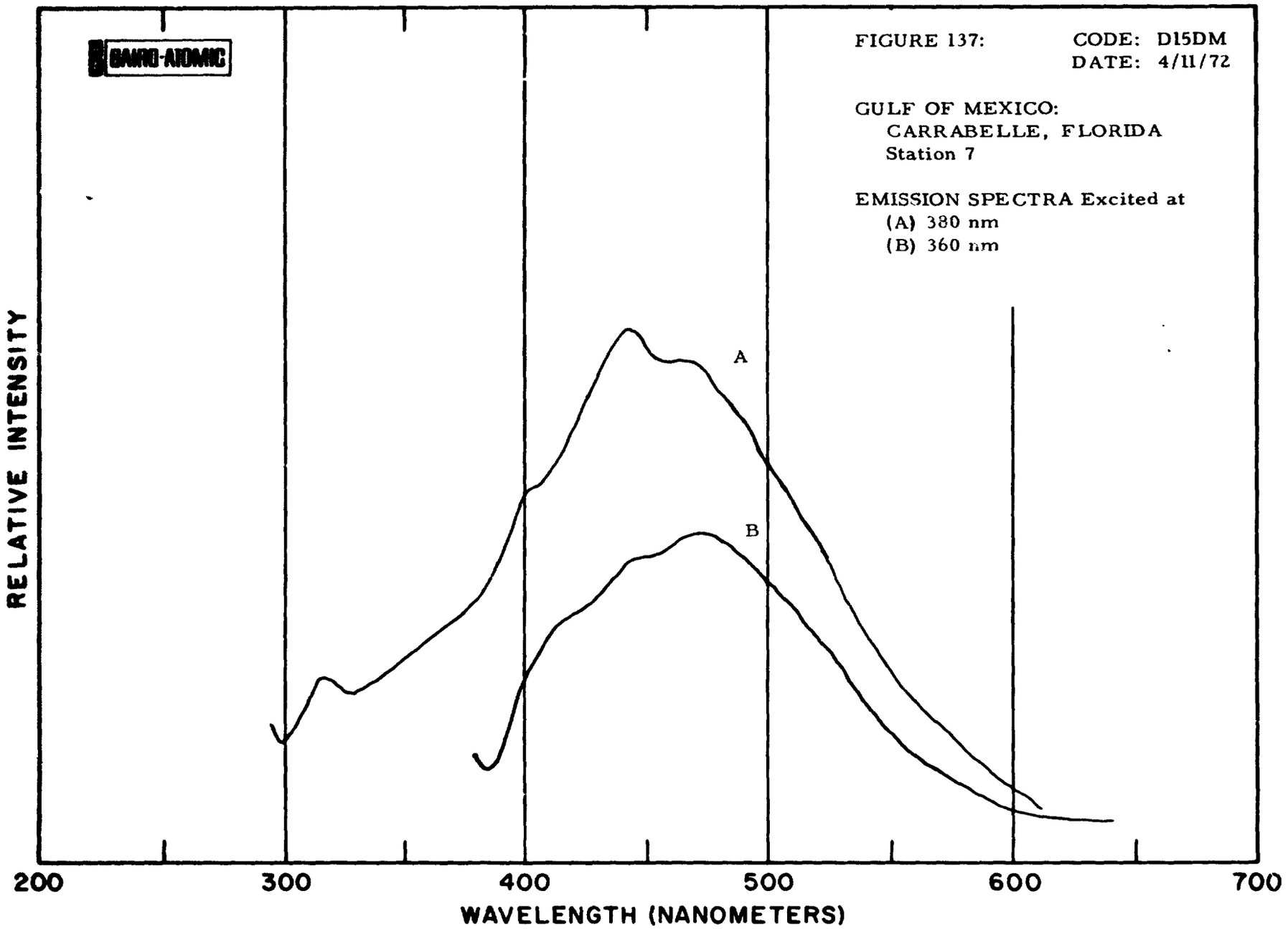
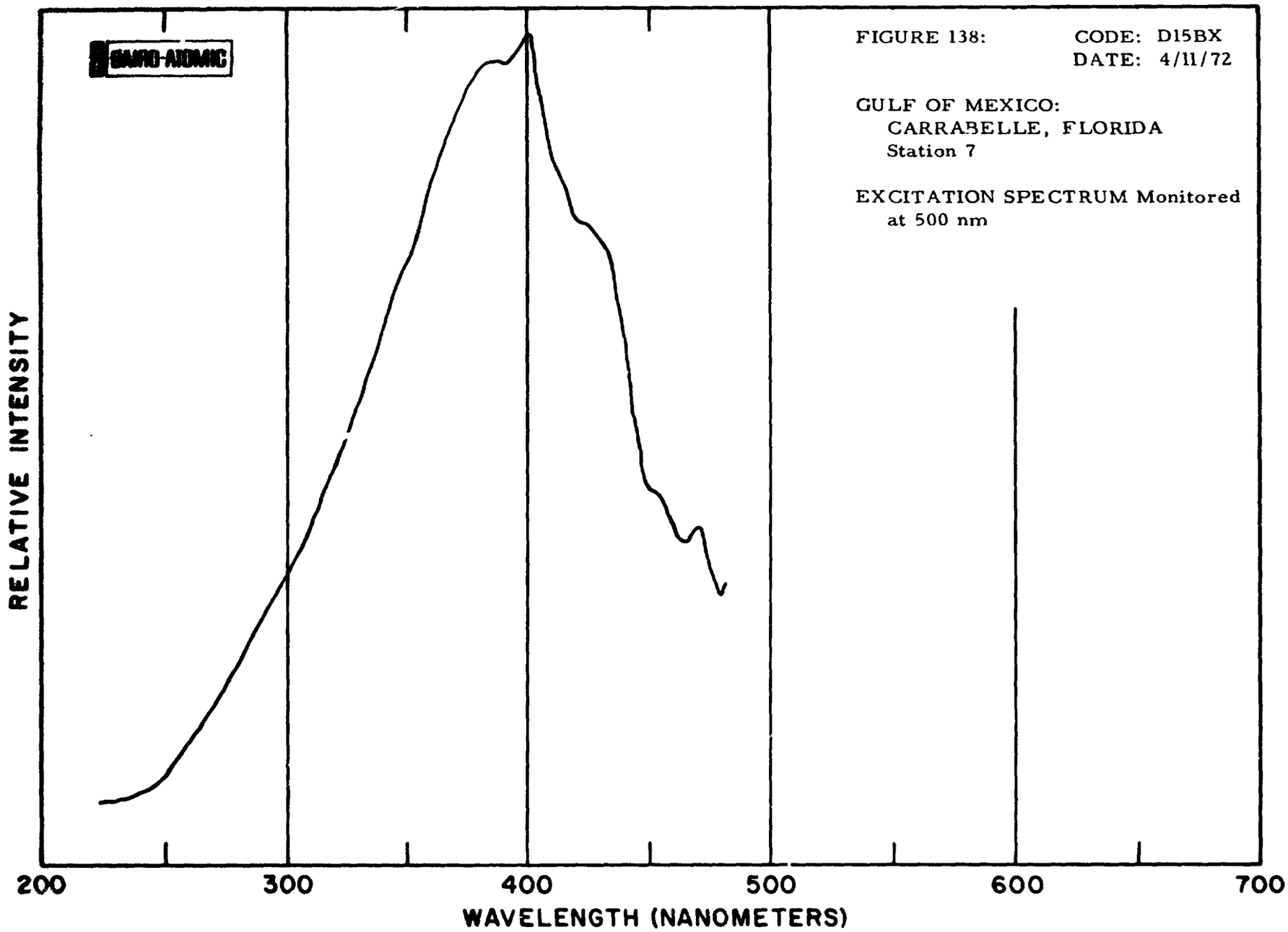


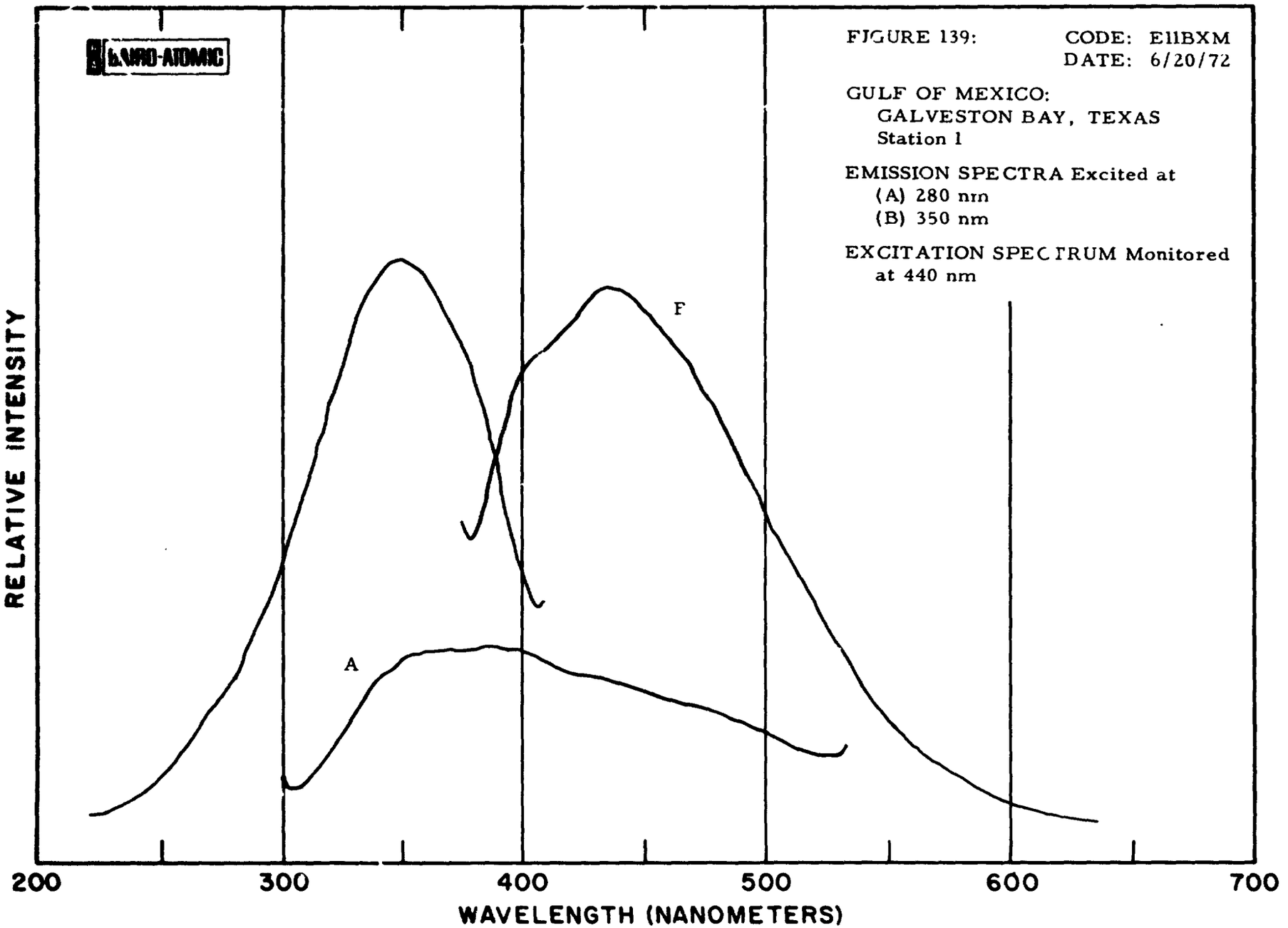
FIGURE 136: CODE: D11BX

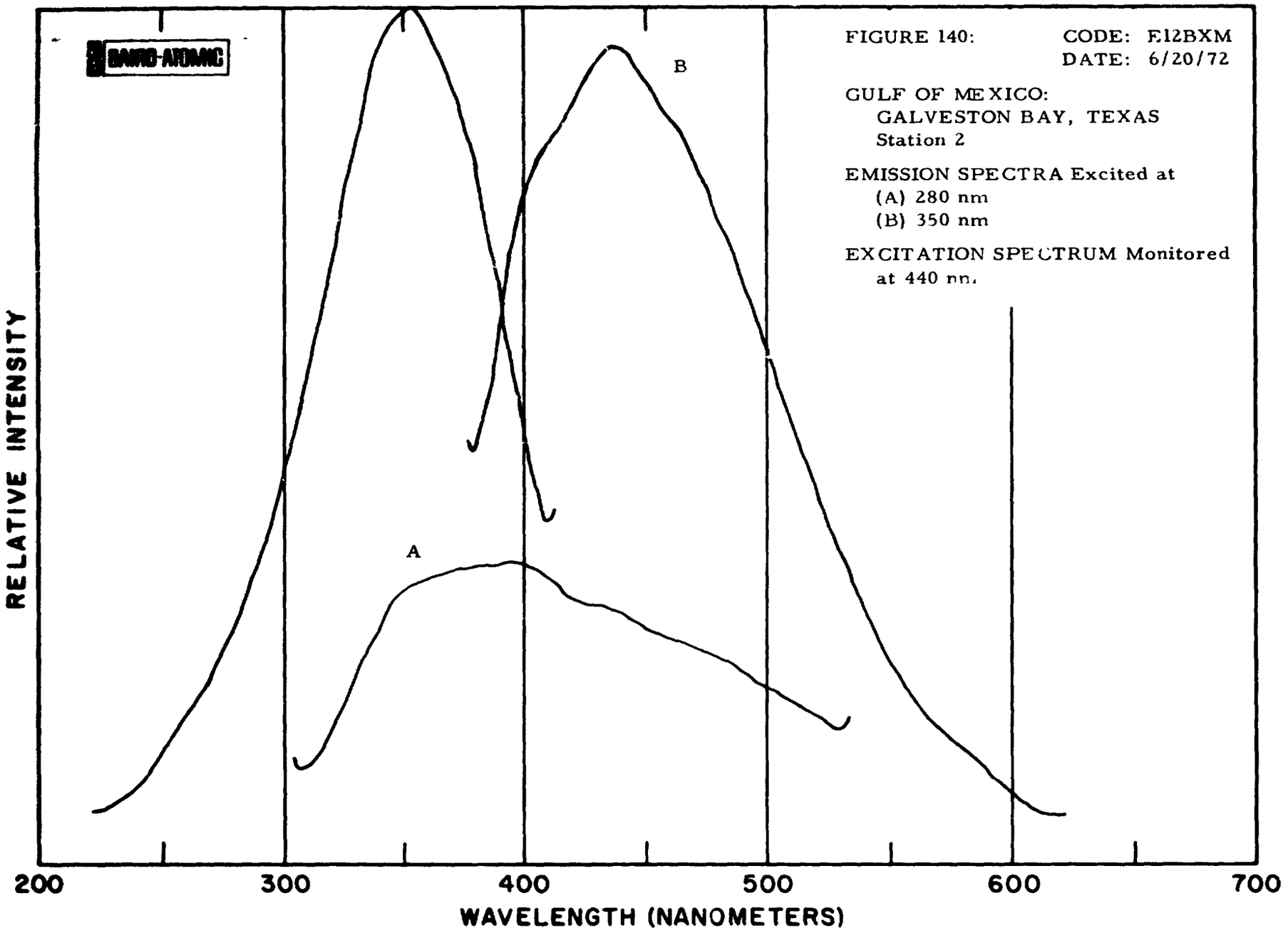
PARTICULATES FROM SEAWATER
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station D_2

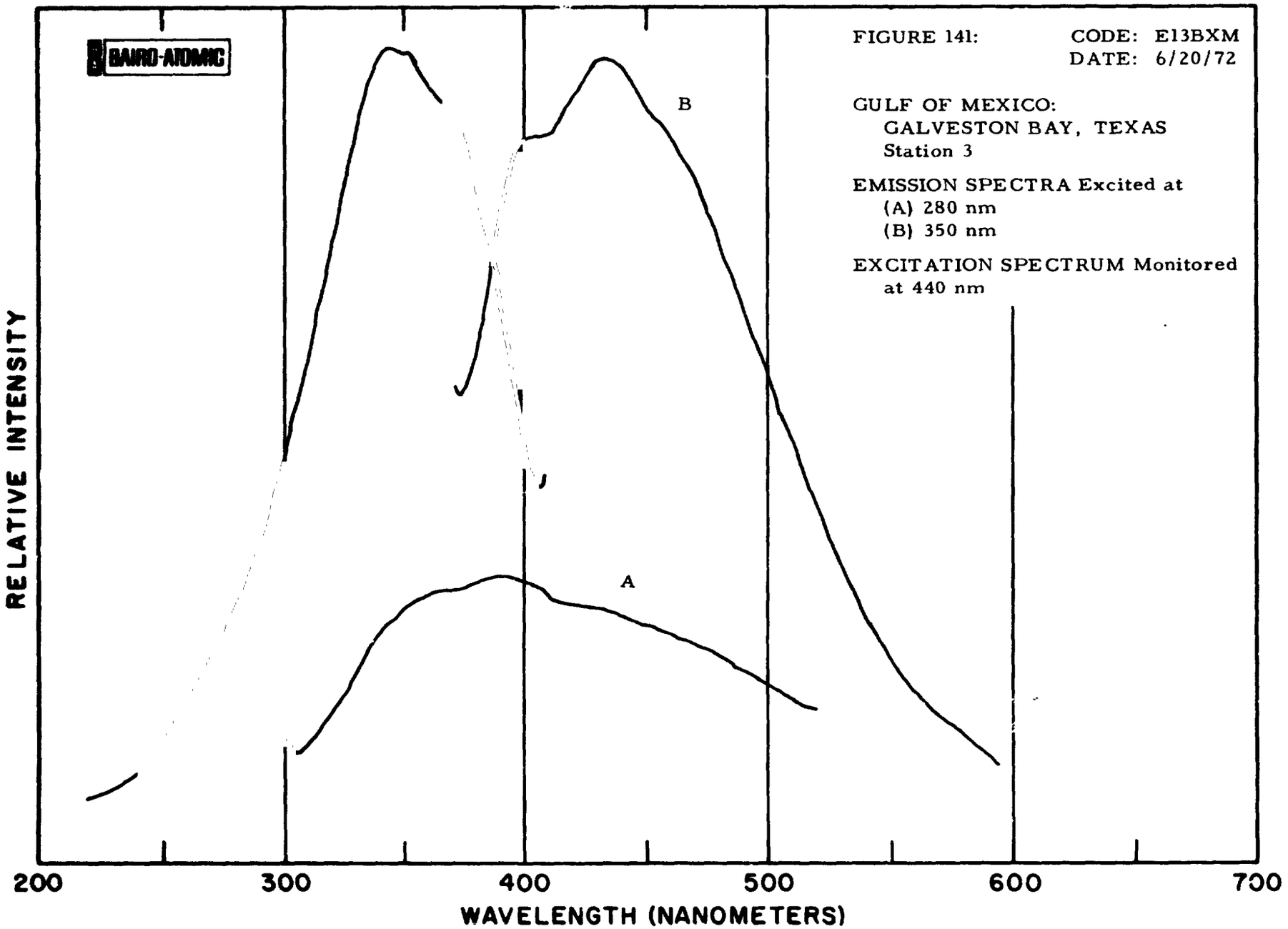
EXCITATION SPECTRUM Monitored at 440 nm

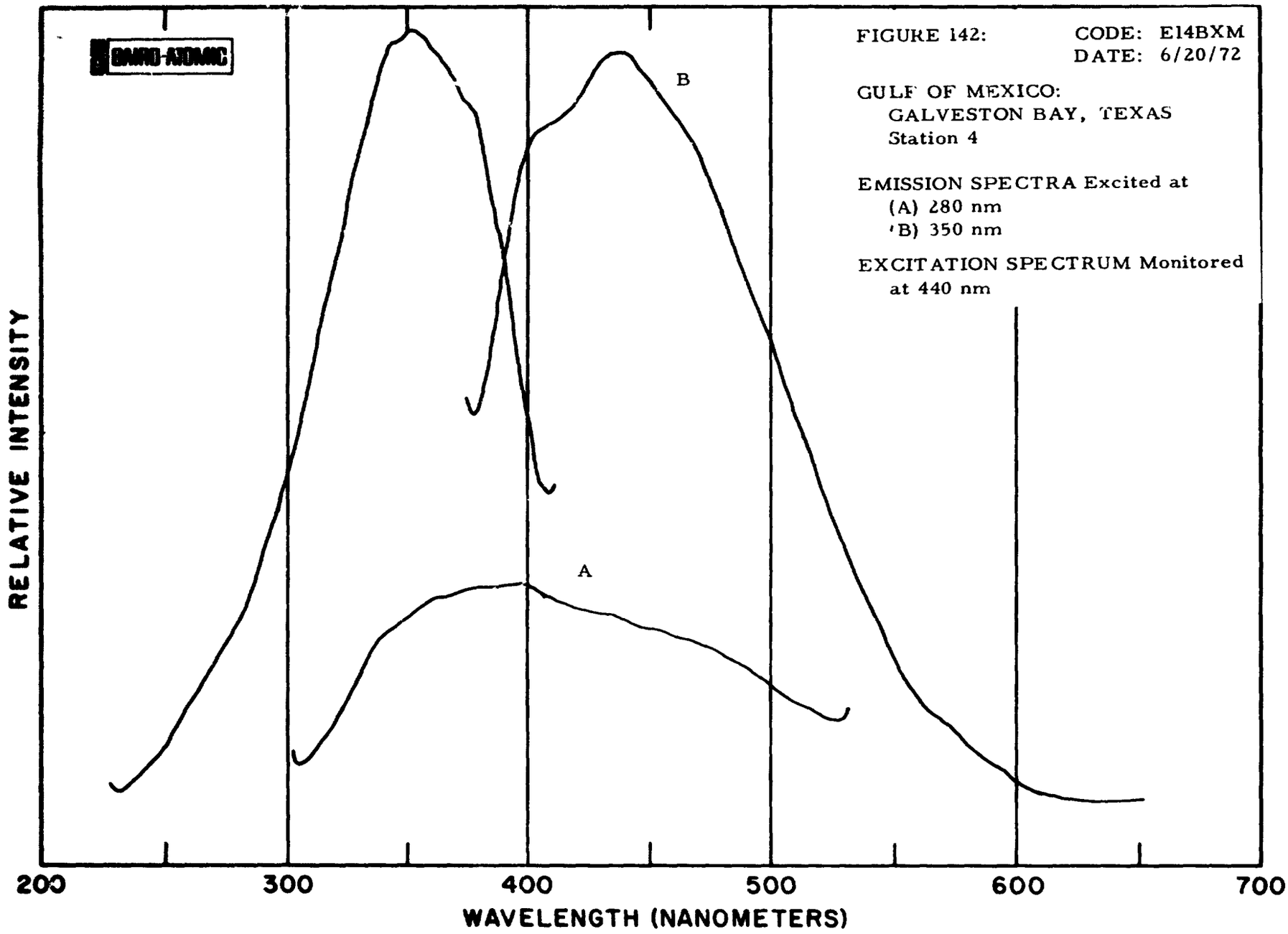

BAIRD-ATOMIC
FIGURE 137:
CODE: D15DM
DATE: 4/11/72
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station 7
EMISSION SPECTRA Excited at
(A) 380 nm
(B) 360 nm
A
B
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

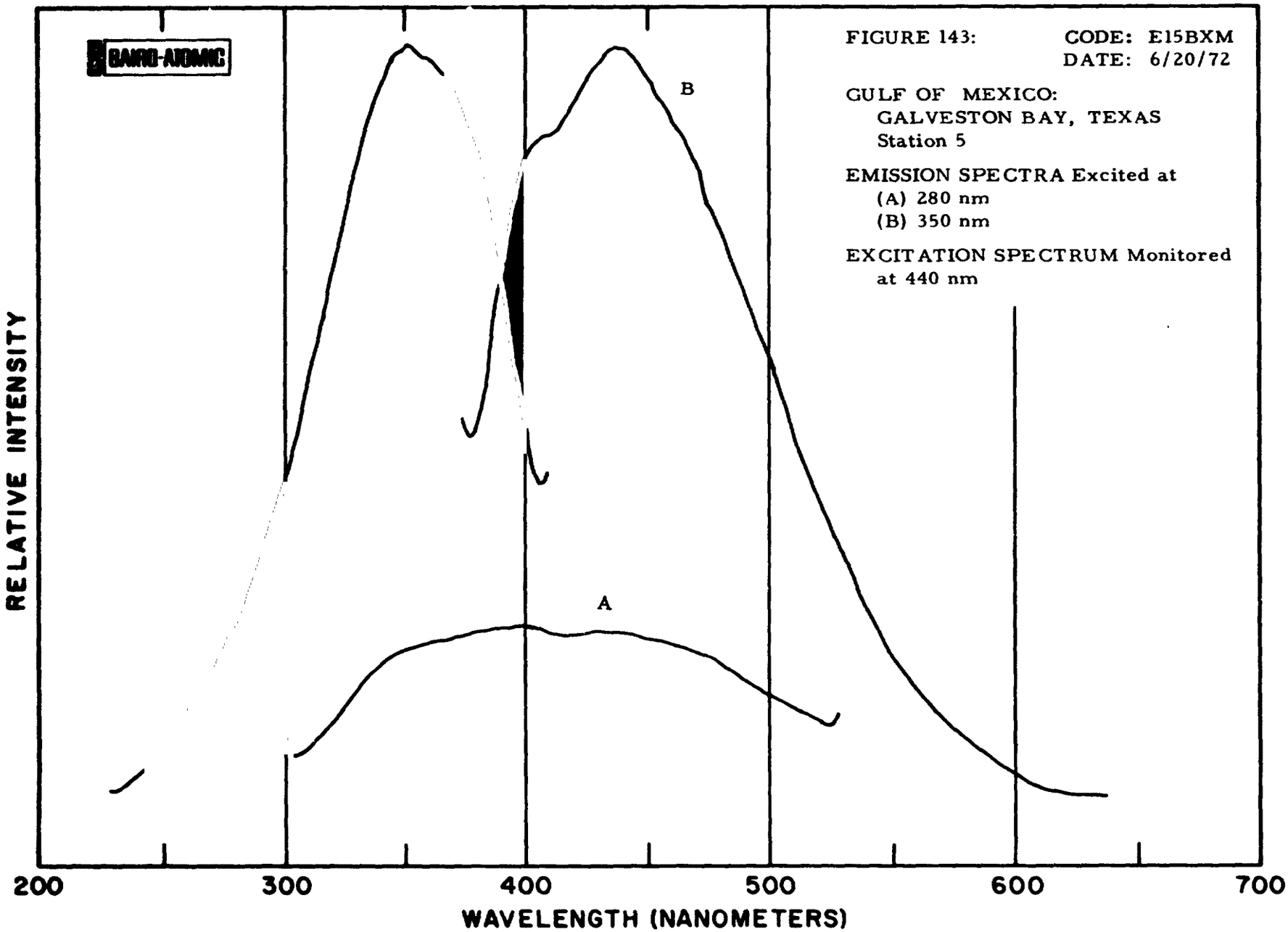

SHARP-ATOMIC
FIGURE 138:
CODE: D15BX
DATE: 4/11/72
GULF OF MEXICO:
CARRABELLE, FLORIDA
Station 7
EXCITATION SPECTRUM Monitored at 500 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

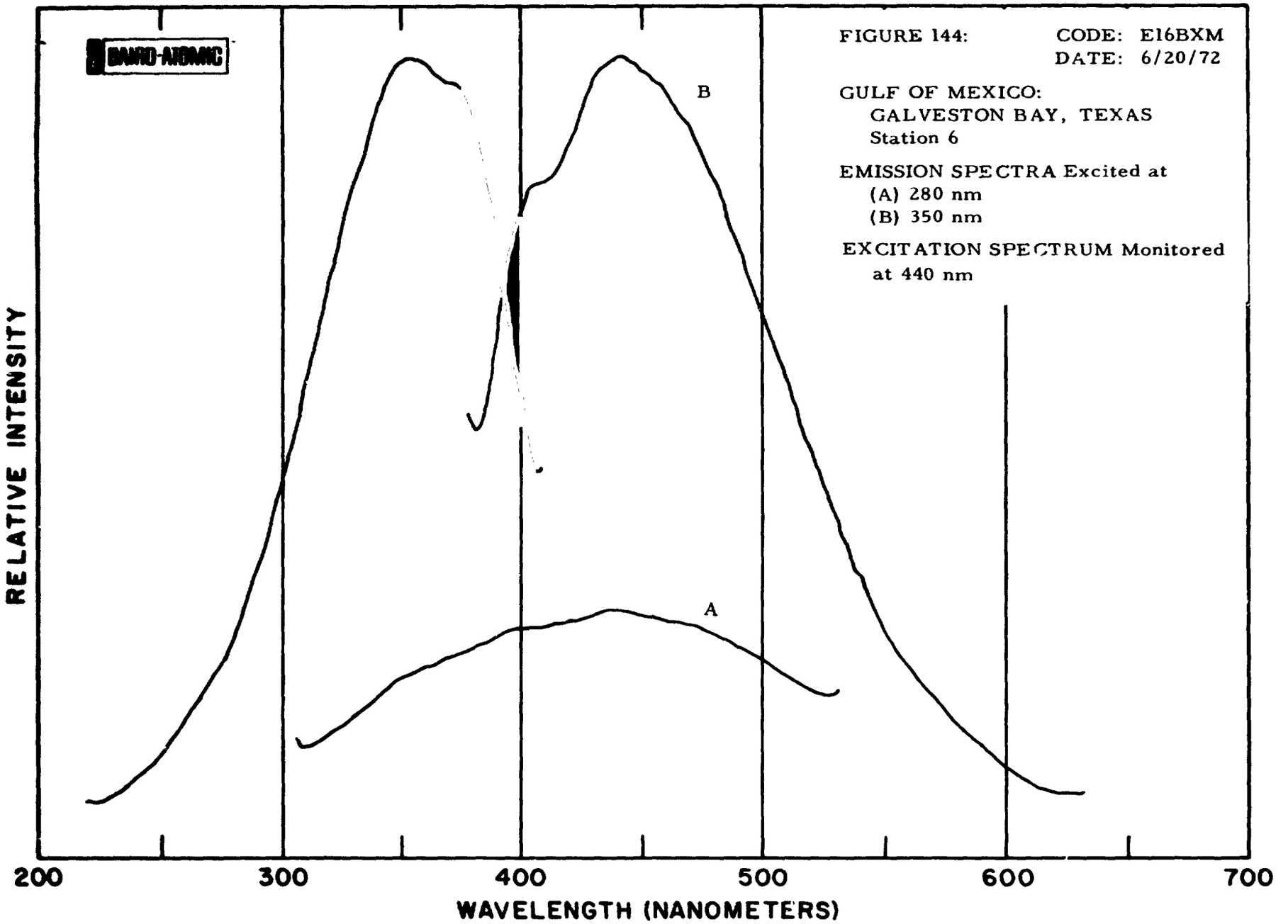

LAMBDA-ATOMIC
FIGURE 139:
CODE: E11BXM
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 1
EMISSION SPECTRA Excited at
(A) 280 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored at 440 nm
F
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 140:
CODE: E12BXM
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 2
EMISSION SPECTRA Excited at
(A) 280 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored
at 440 nm.
A
B
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 141:
CODE: E13BXM
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 3
EMISSION SPECTRA Excited at
(A) 280 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 142:
CODE: E14BXM
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 4
EMISSION SPECTRA Excited at
(A) 280 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 143:
CODE: E15BXM
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 5
EMISSION SPECTRA Excited at
(A) 280 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 144:
CODE: E16BXM
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 6
EMISSION SPECTRA Excited at
(A) 280 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored
at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

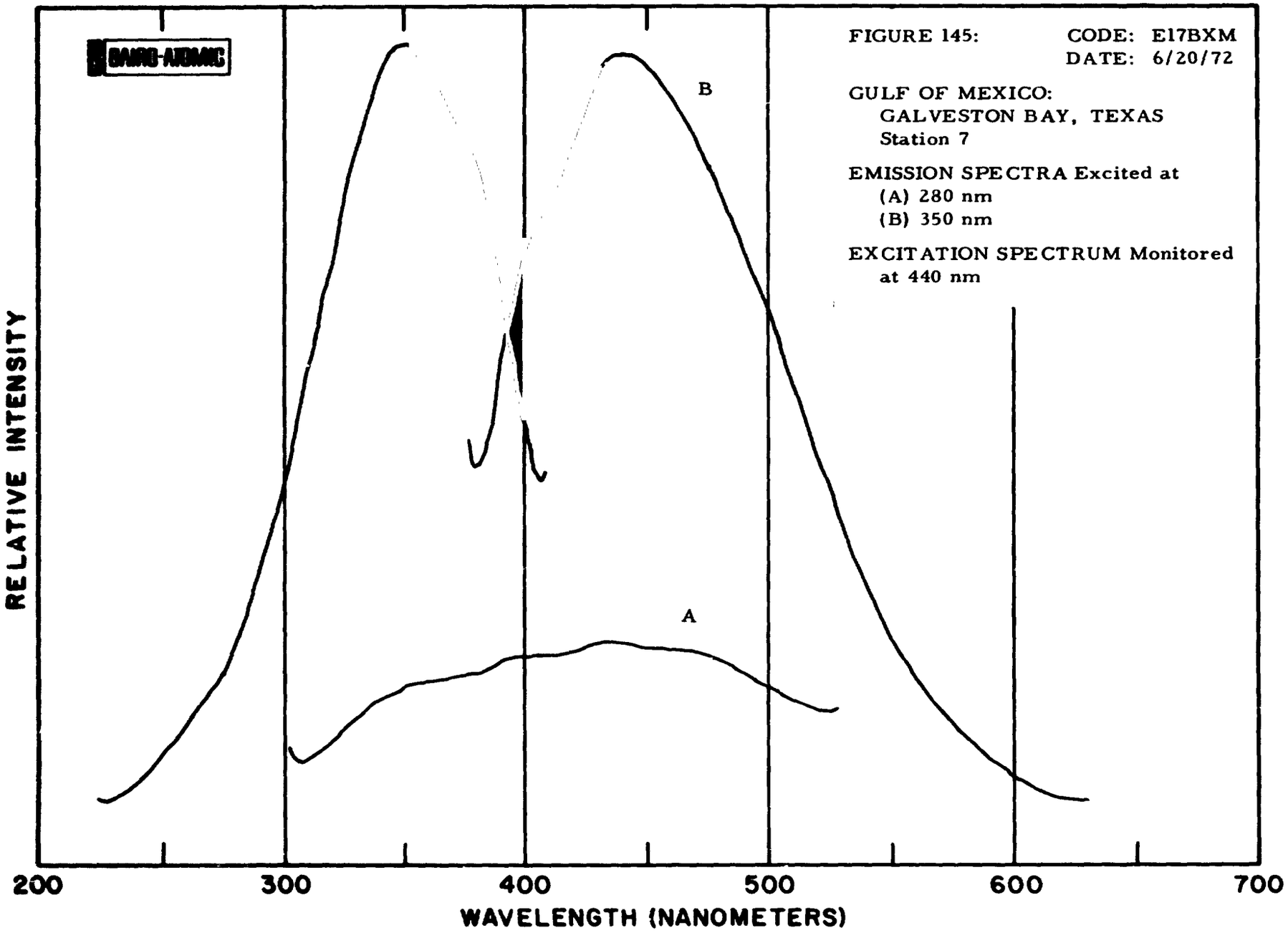


FIGURE 145: CODE: E17BXM
DATE: 6/20/72

GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 7

EMISSION SPECTRA Excited at
(A) 280 nm
(B) 350 nm

EXCITATION SPECTRUM Monitored at 440 nm

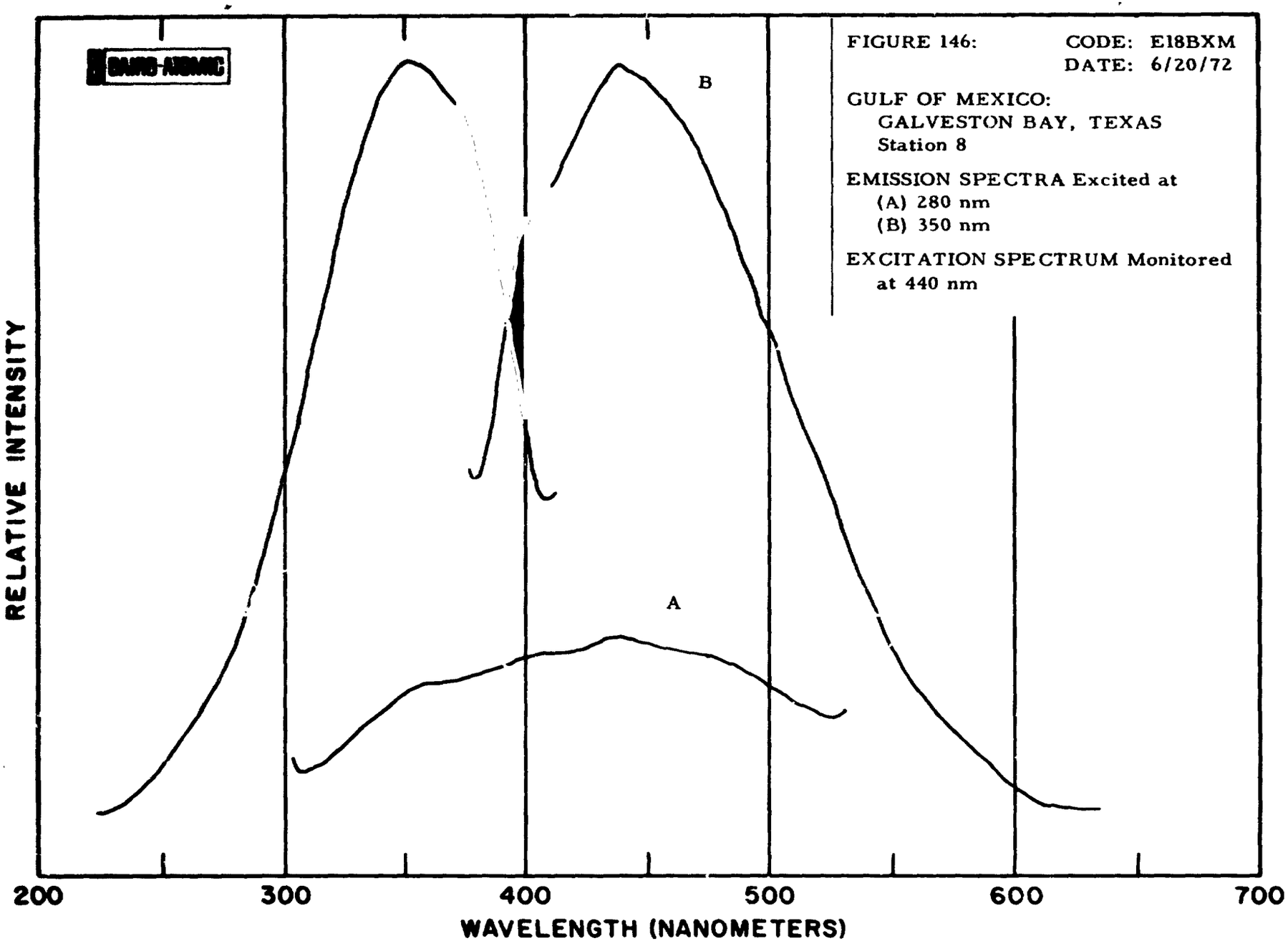
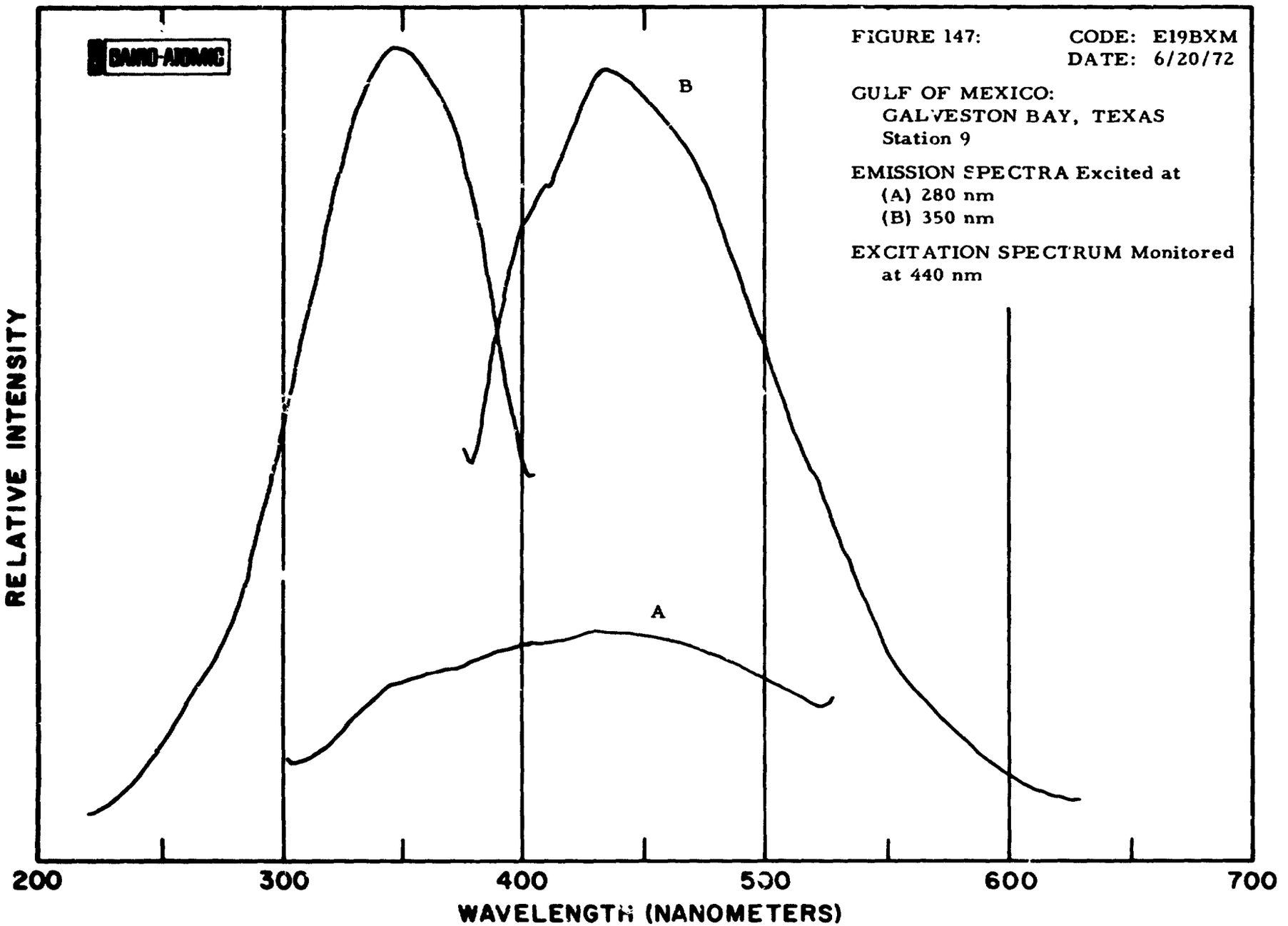


FIGURE 146: CODE: E18BXM
DATE: 6/20/72

GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 8

EMISSION SPECTRA Excited at
(A) 280 nm
(B) 350 nm

EXCITATION SPECTRUM Monitored at 440 nm


BAIRD-ATOMIC
FIGURE 147:
CODE: E19BXM
DATE: 6/20/72
GULF OF MEXICO:
GALVESTON BAY, TEXAS
Station 9
EMISSION SPECTRA Excited at
(A) 280 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

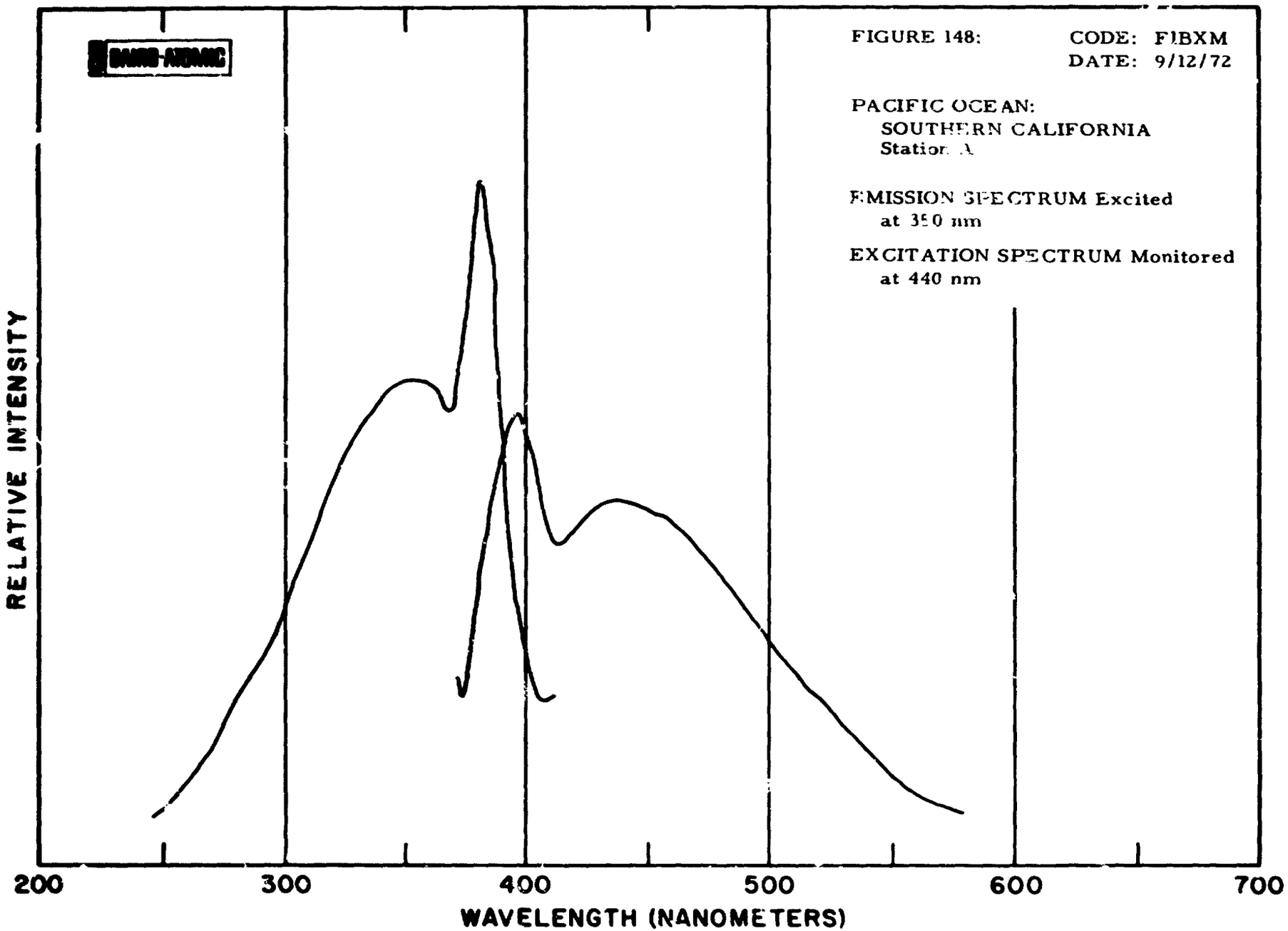
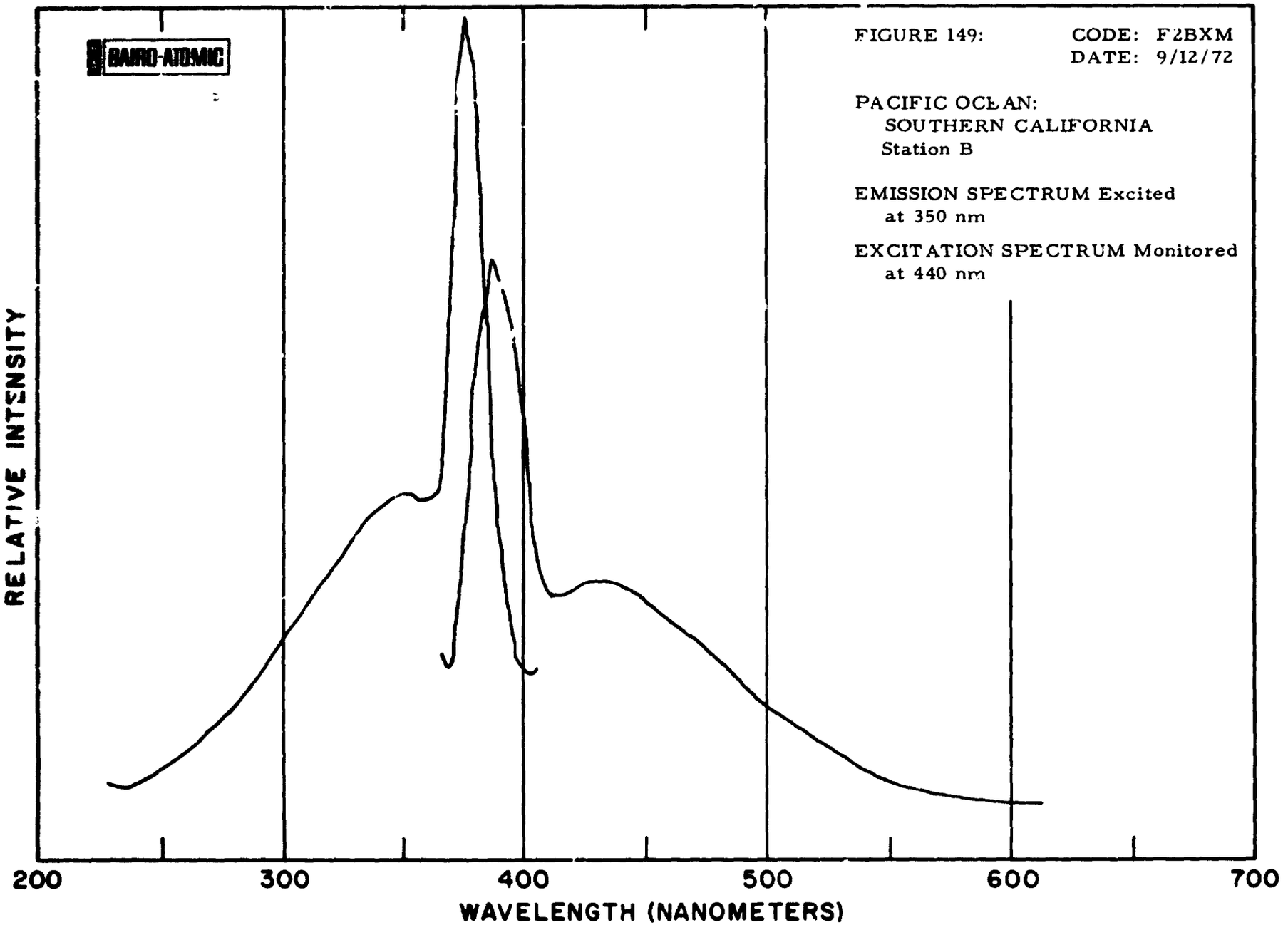
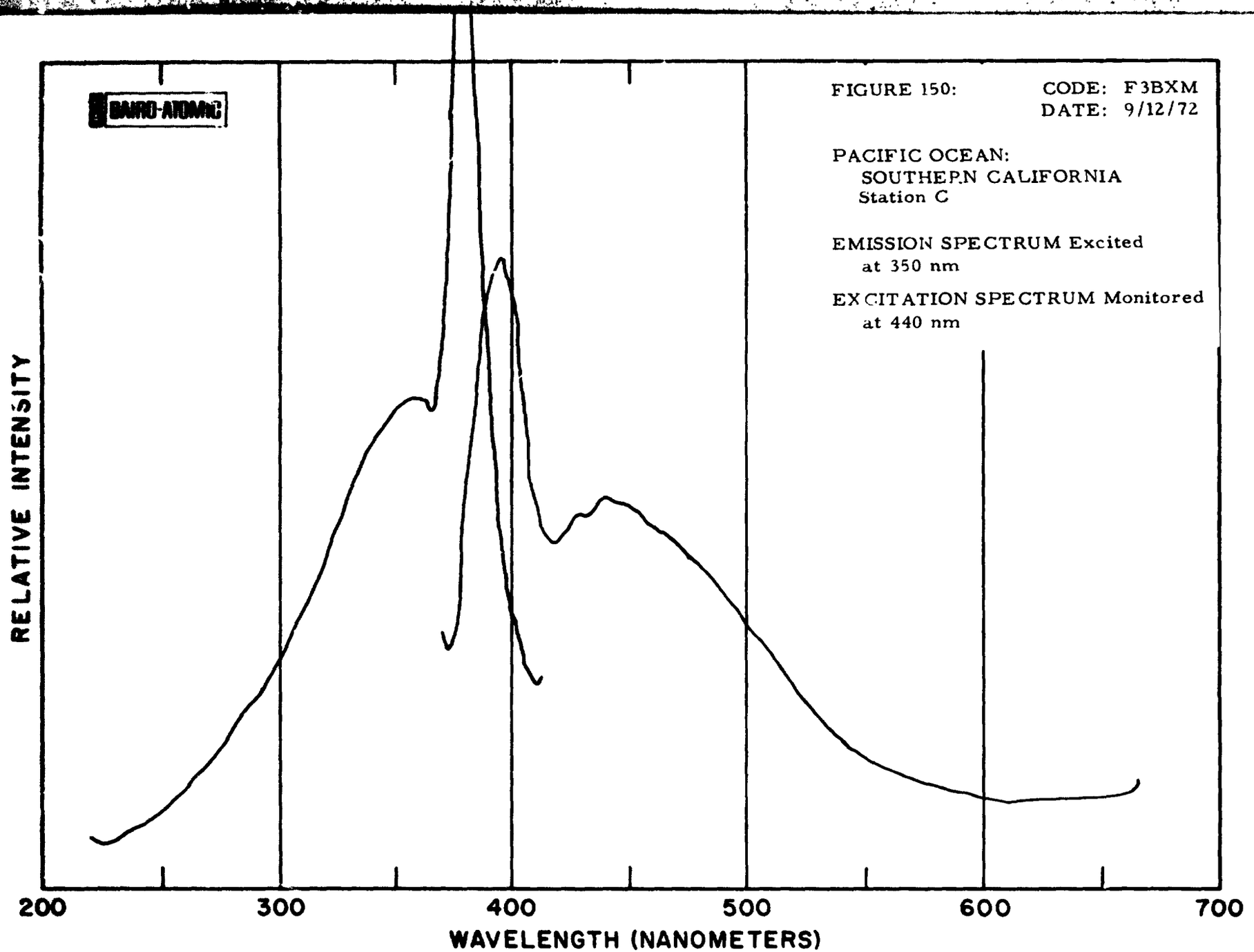
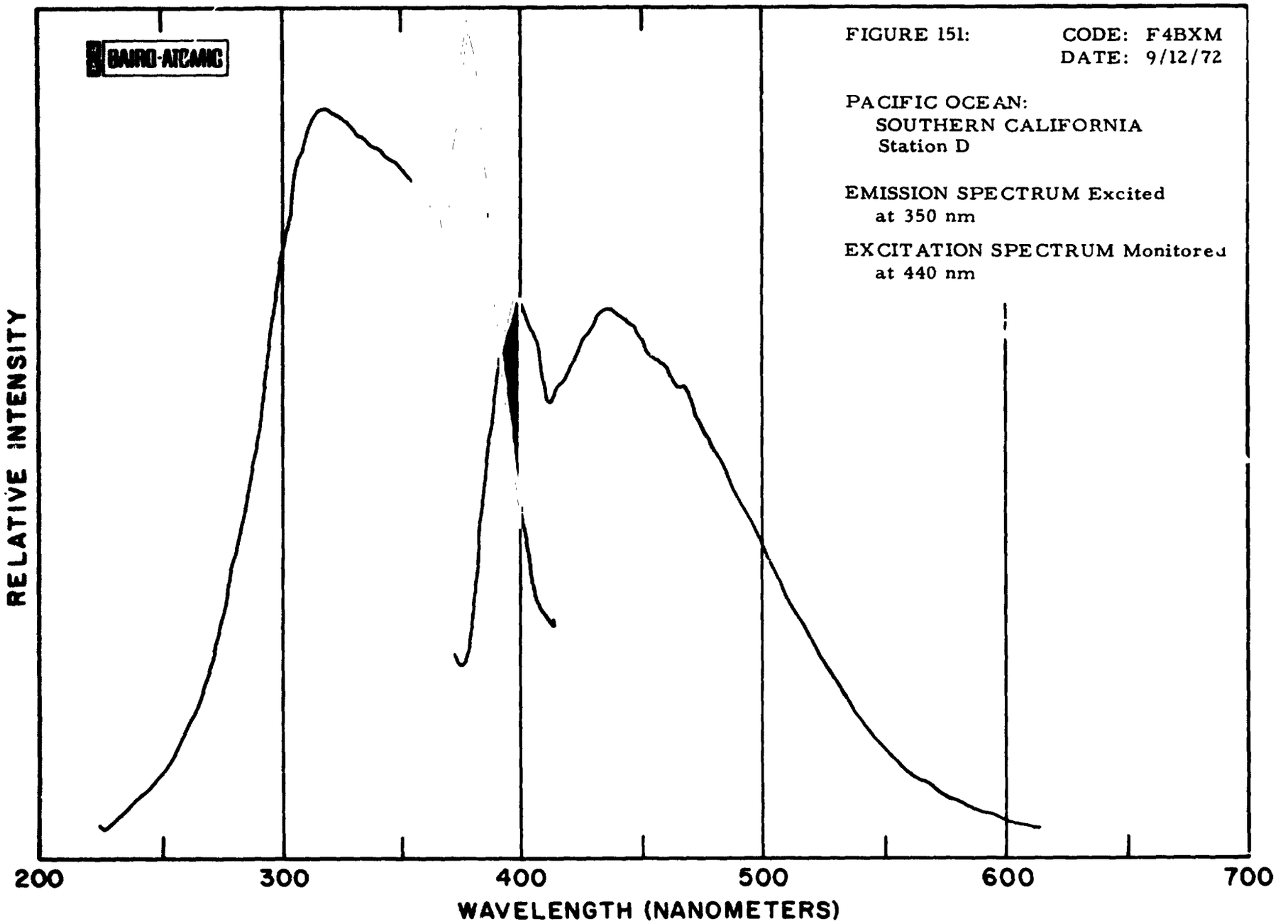
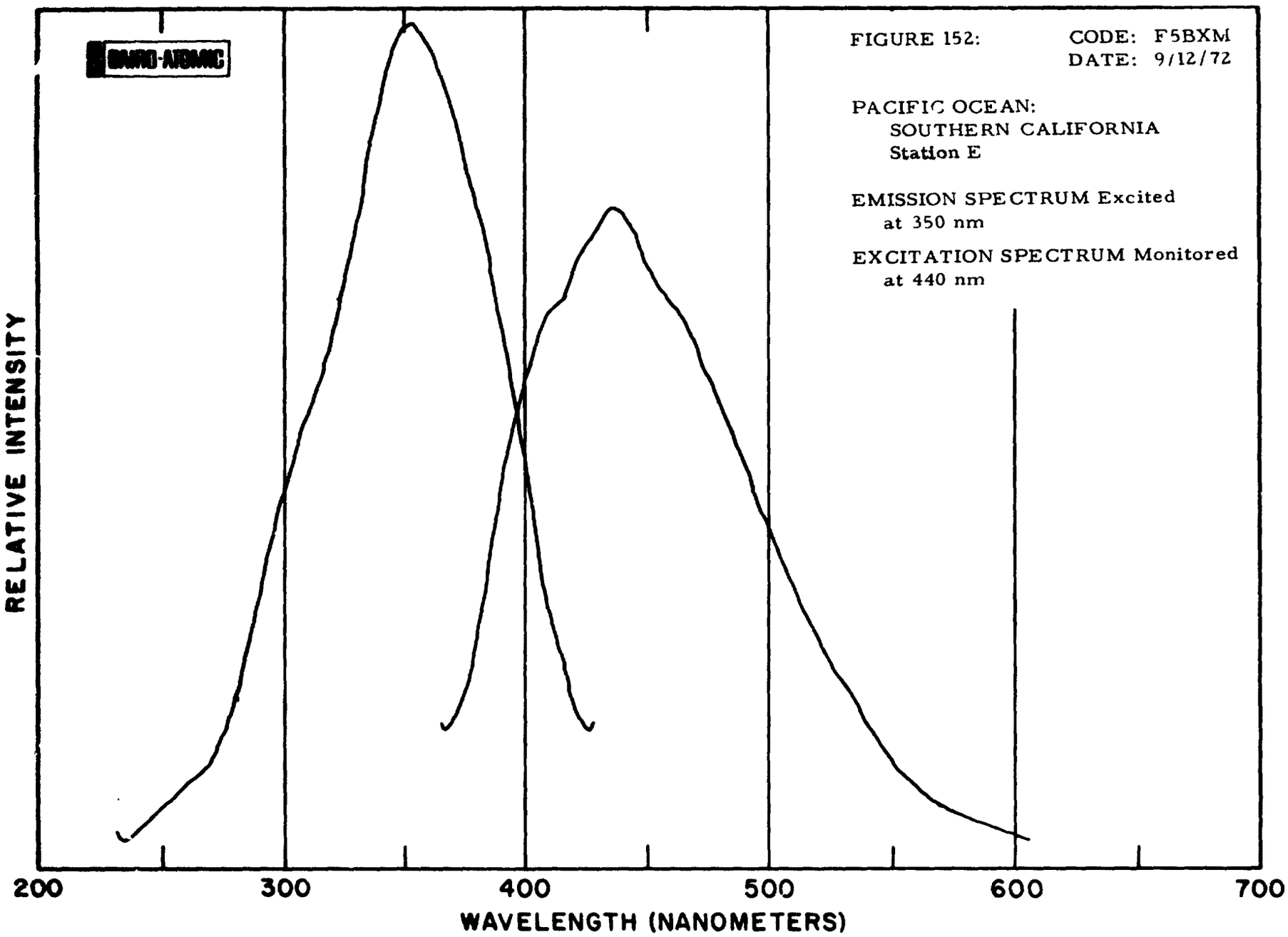


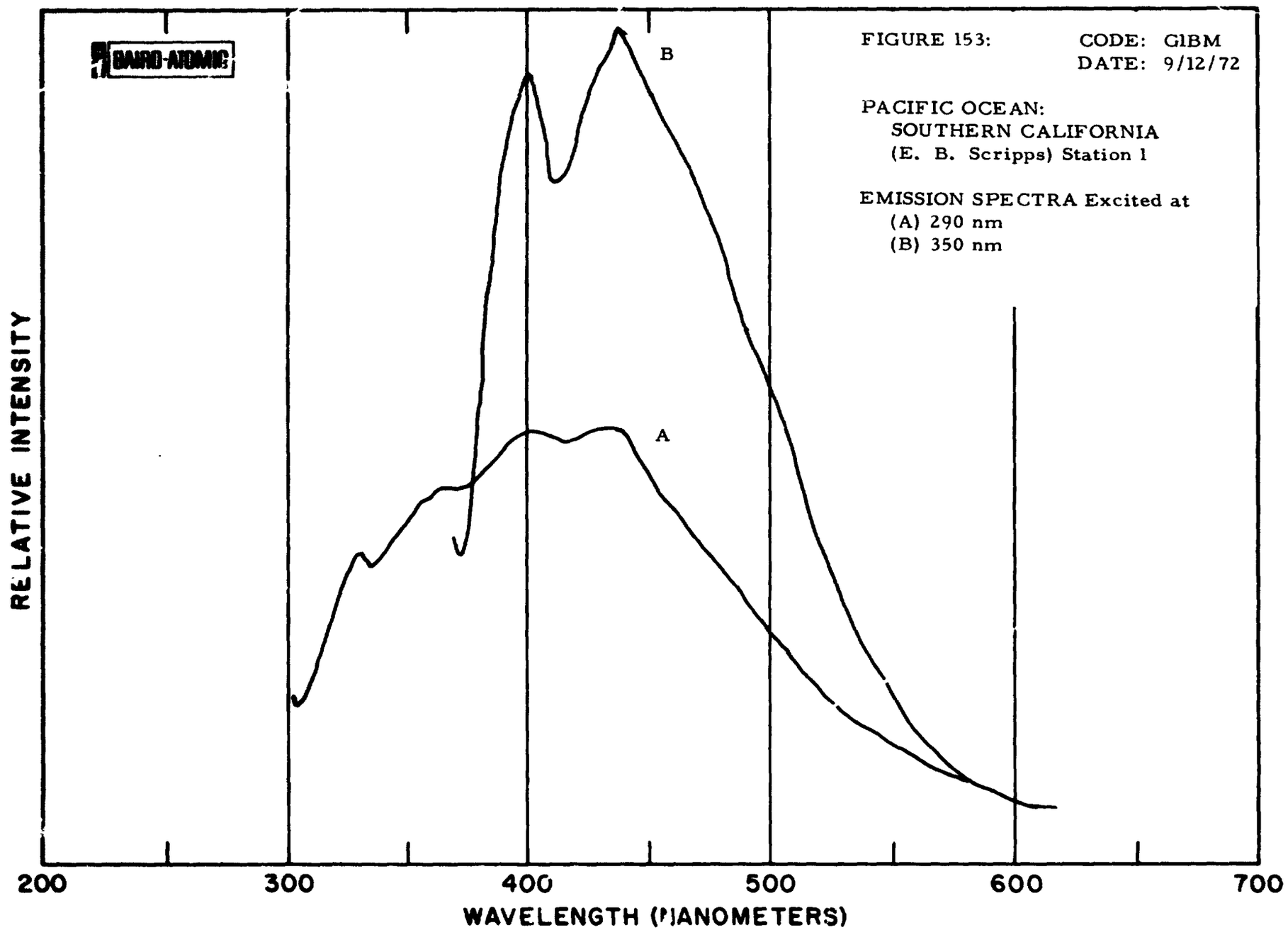
FIGURE 148:
CODE: FIBXM
DATE: 9/12/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
Station A
EMISSION SPECTRUM Excited at 350 nm
EXCITATION SPECTRUM Monitored at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

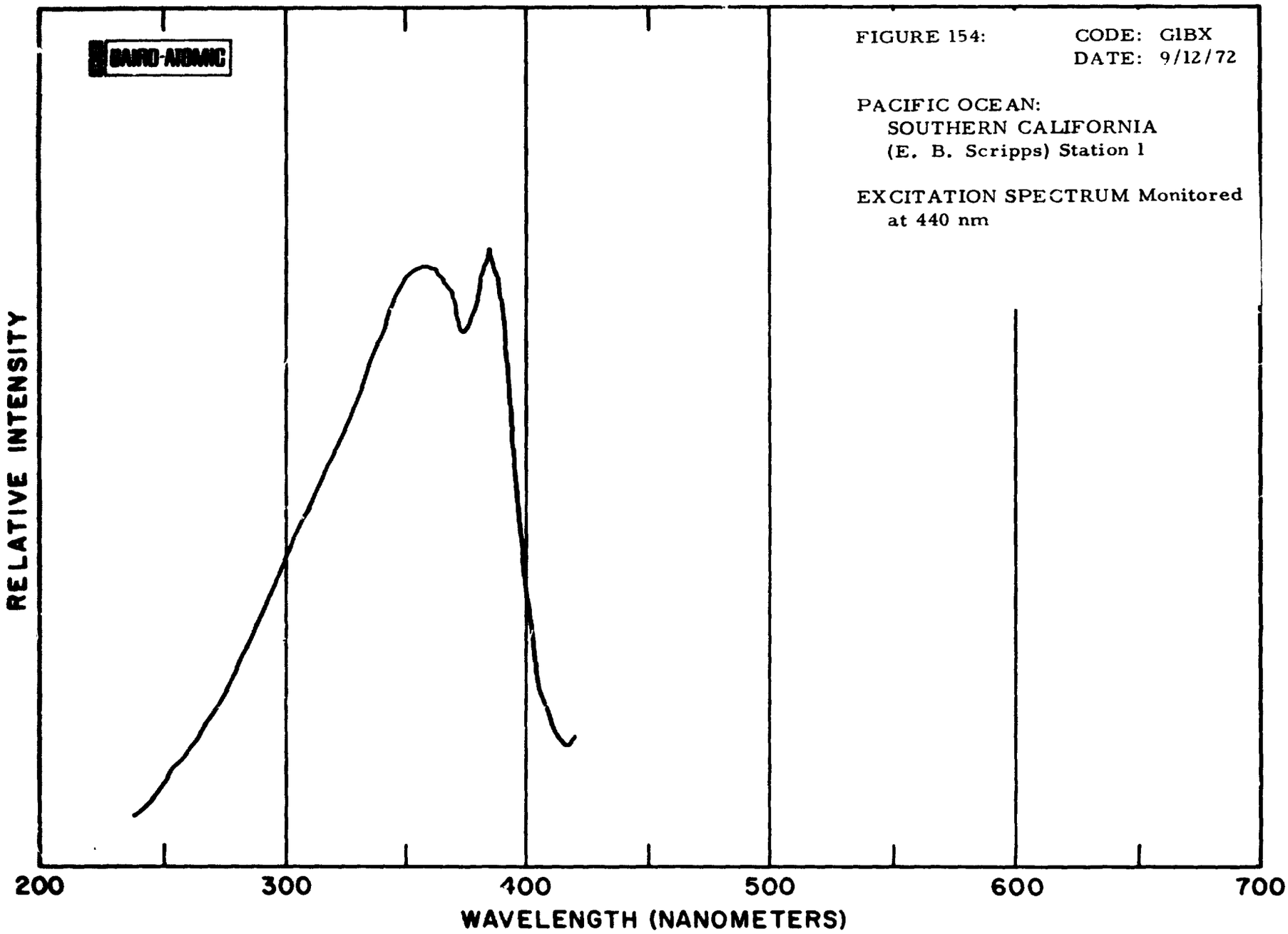

BAIRD-ATOMIC
FIGURE 149:
CODE: F2BXM
DATE: 9/12/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
Station B
EMISSION SPECTRUM Excited at 350 nm
EXCITATION SPECTRUM Monitored at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

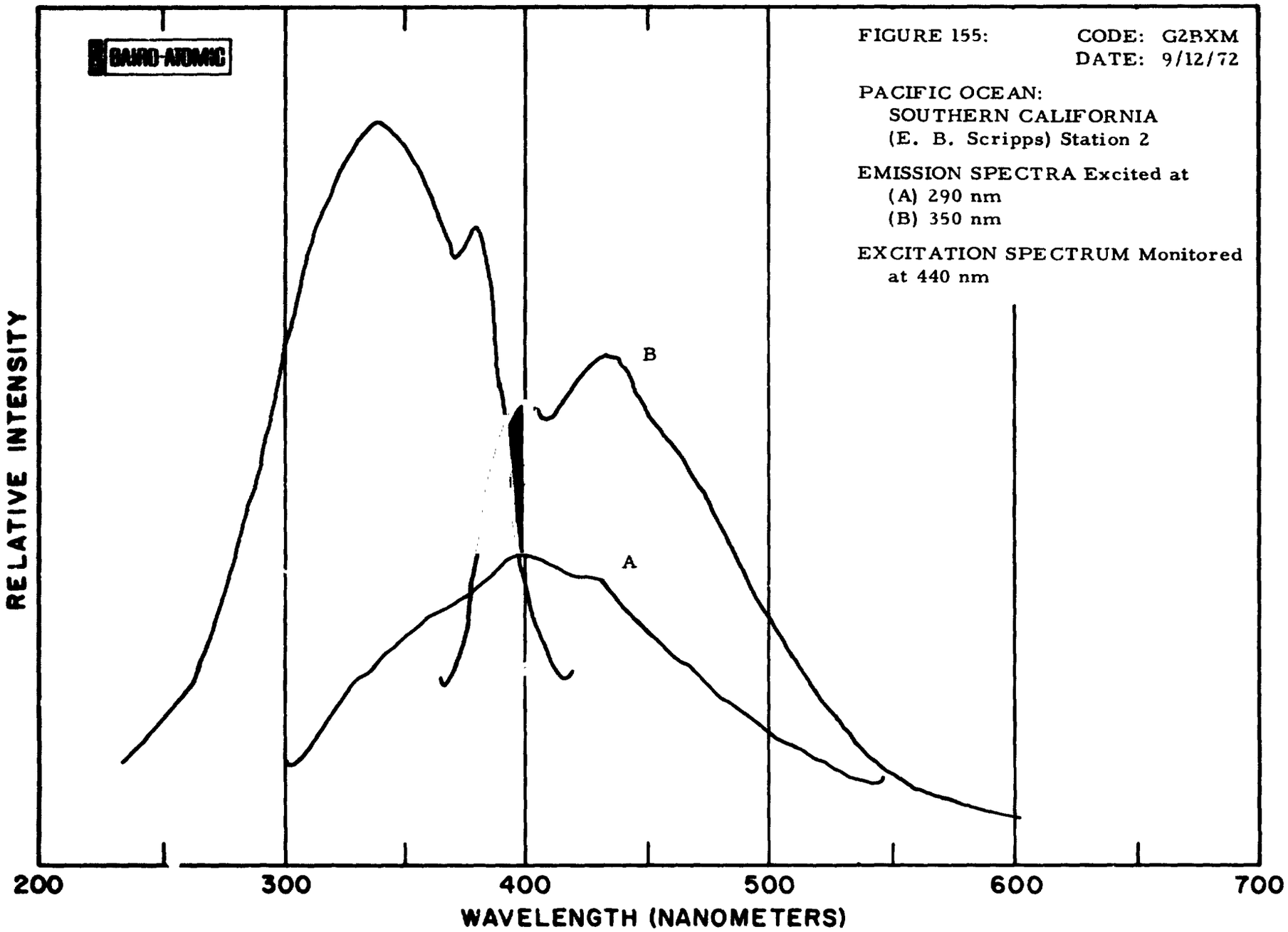

BAIRD-ATOMIC
FIGURE 150:
CODE: F3BXM
DATE: 9/12/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
Station C
EMISSION SPECTRUM Excited
at 350 nm
EXCITATION SPECTRUM Monitored
at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

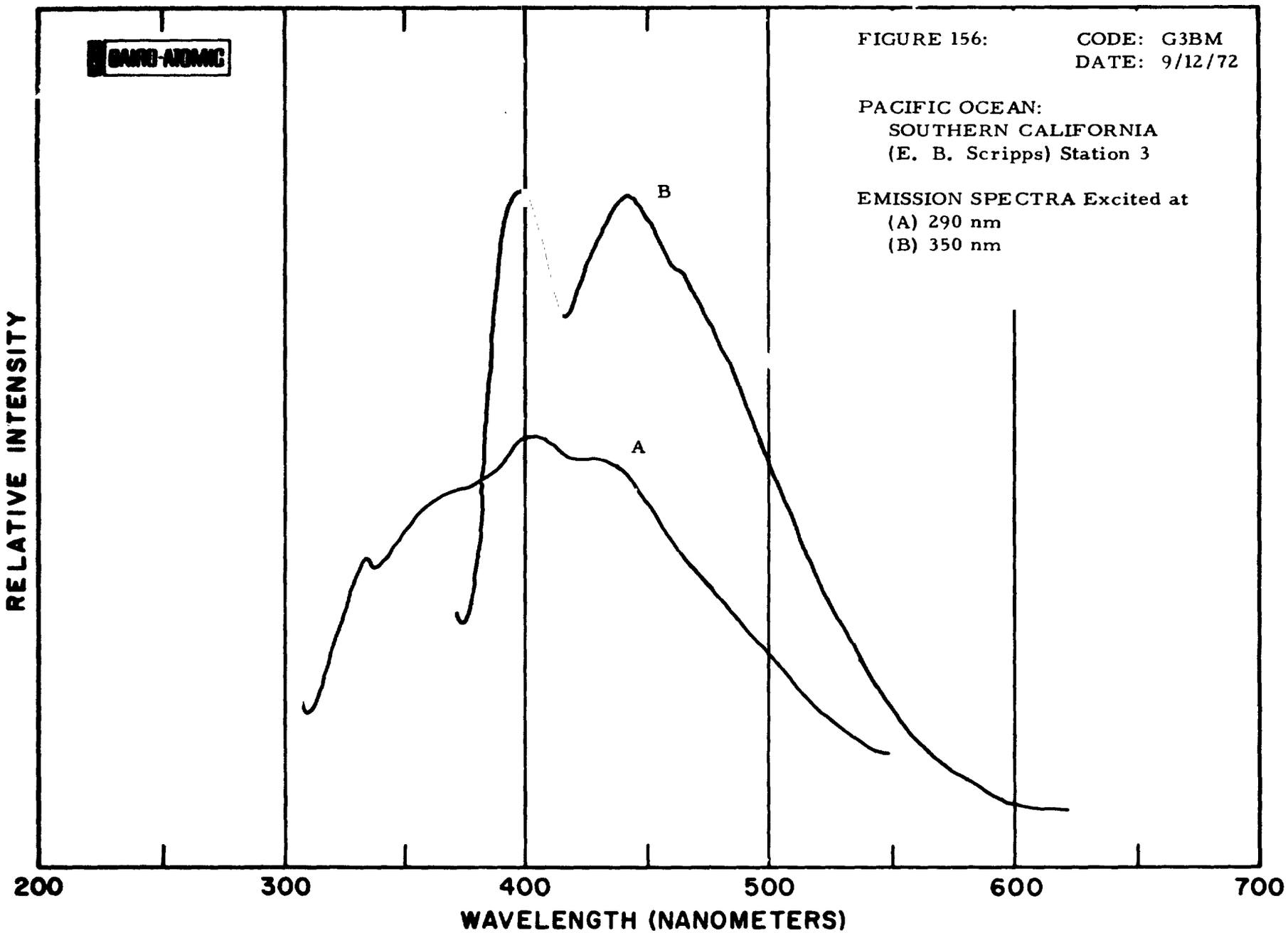

BAIRD-ATOMIC
FIGURE 151:
CODE: F4BXM
DATE: 9/12/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
Station D
EMISSION SPECTRUM Excited at 350 nm
EXCITATION SPECTRUM Monitored at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

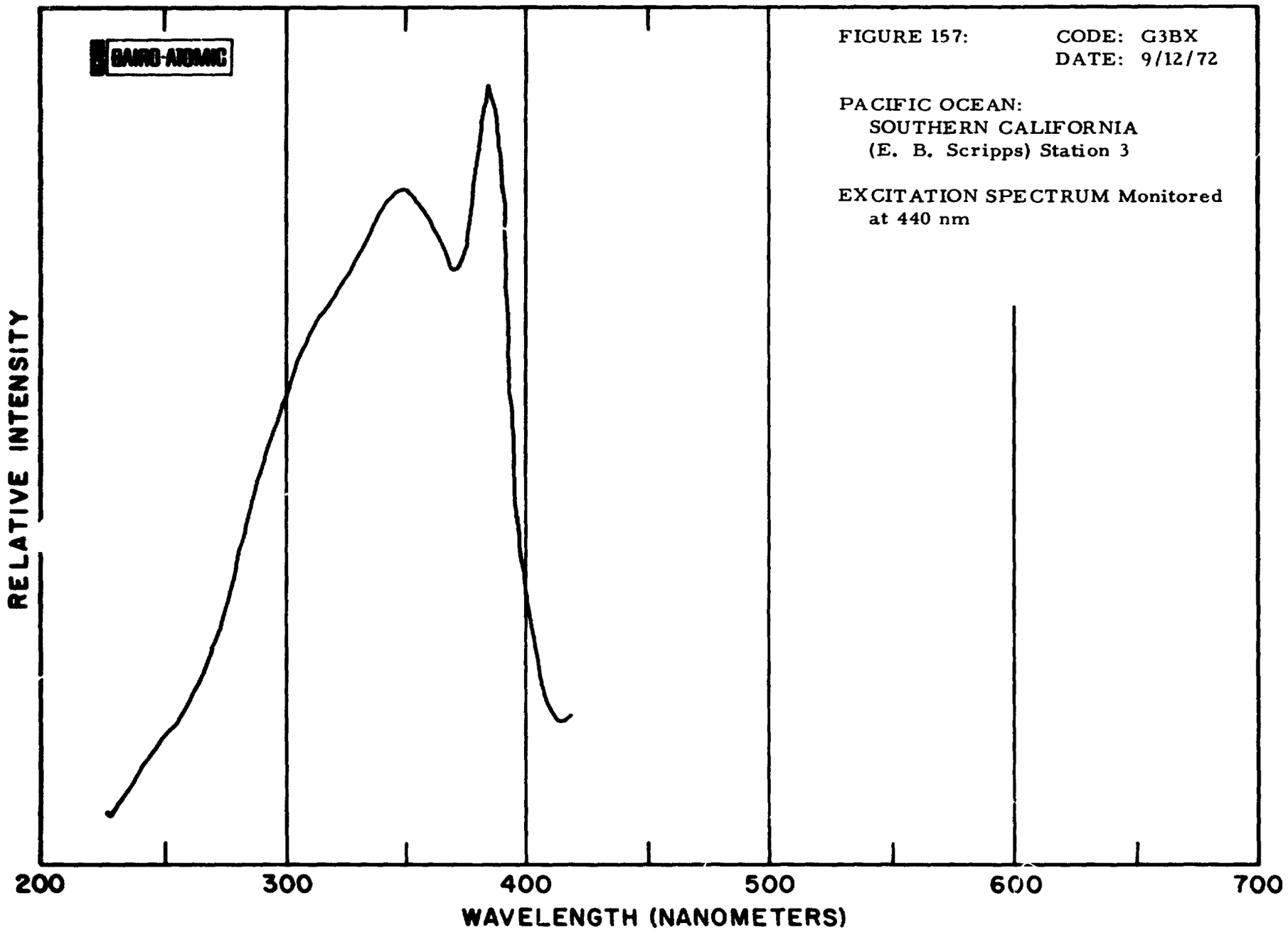

BAIRD-ATOMIC
FIGURE 152:
CODE: F5BXM
DATE: 9/12/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
Station E
EMISSION SPECTRUM Excited at 350 nm
EXCITATION SPECTRUM Monitored at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

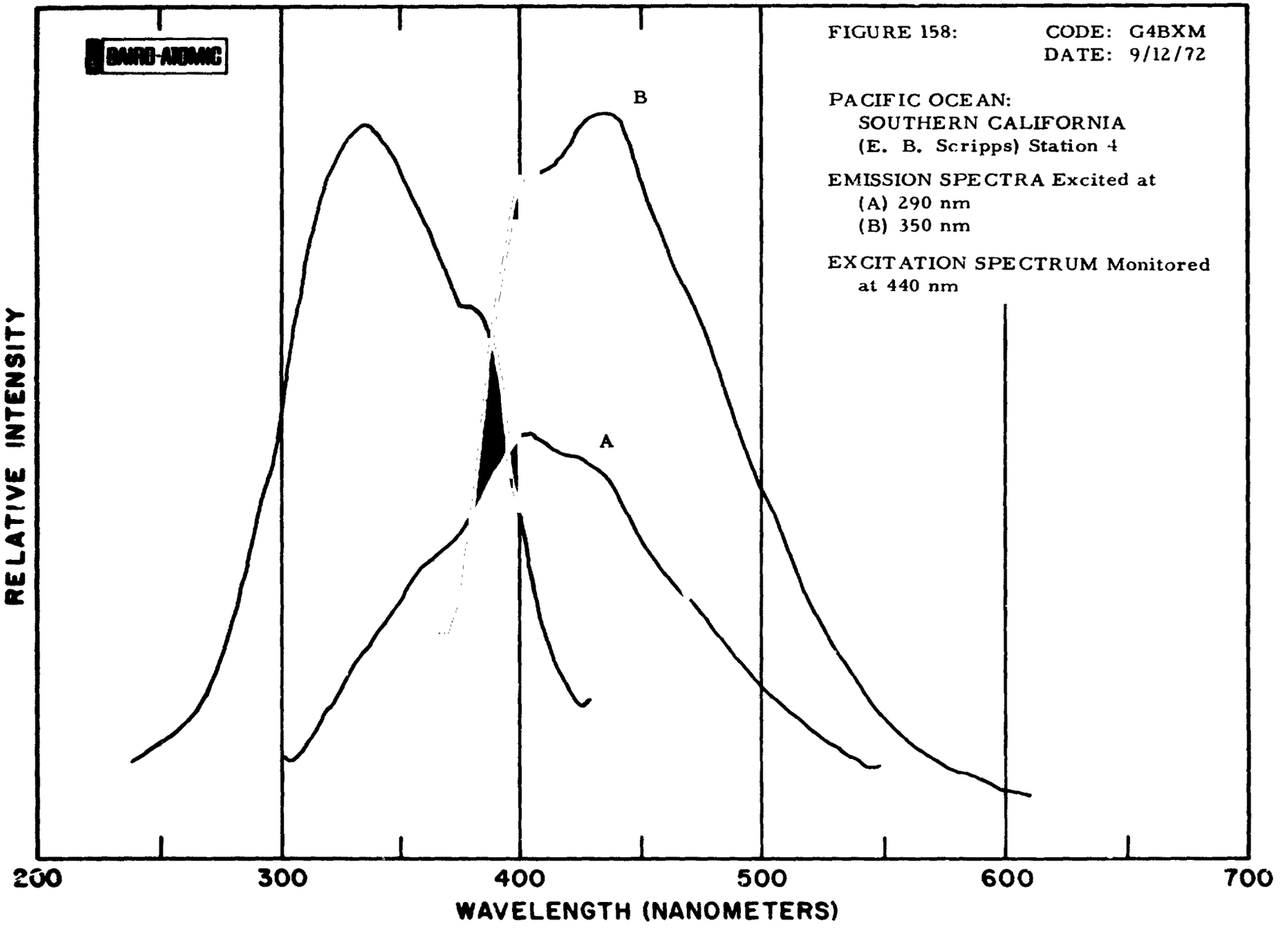

BAIRD-ATOMIC
FIGURE 153:
CODE: G1BM
DATE: 9/12/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
(E. B. Scripps) Station 1
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 154:
CODE: G1BX
DATE: 9/12/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
(E. B. Scripps) Station 1
EXCITATION SPECTRUM Monitored at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 155:
CODE: G2BXM
DATE: 9/12/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
(E. B. Scripps) Station 2
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 156:
CODE: G3BM
DATE: 9/12/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
(E. B. Scripps) Station 3
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 157:
CODE: G3BX
DATE: 9/12/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
(E. B. Scripps) Station 3
EXCITATION SPECTRUM Monitored
at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 158:
CODE: G4BXM
DATE: 9/12/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
(E. B. Scripps) Station 4
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored
at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

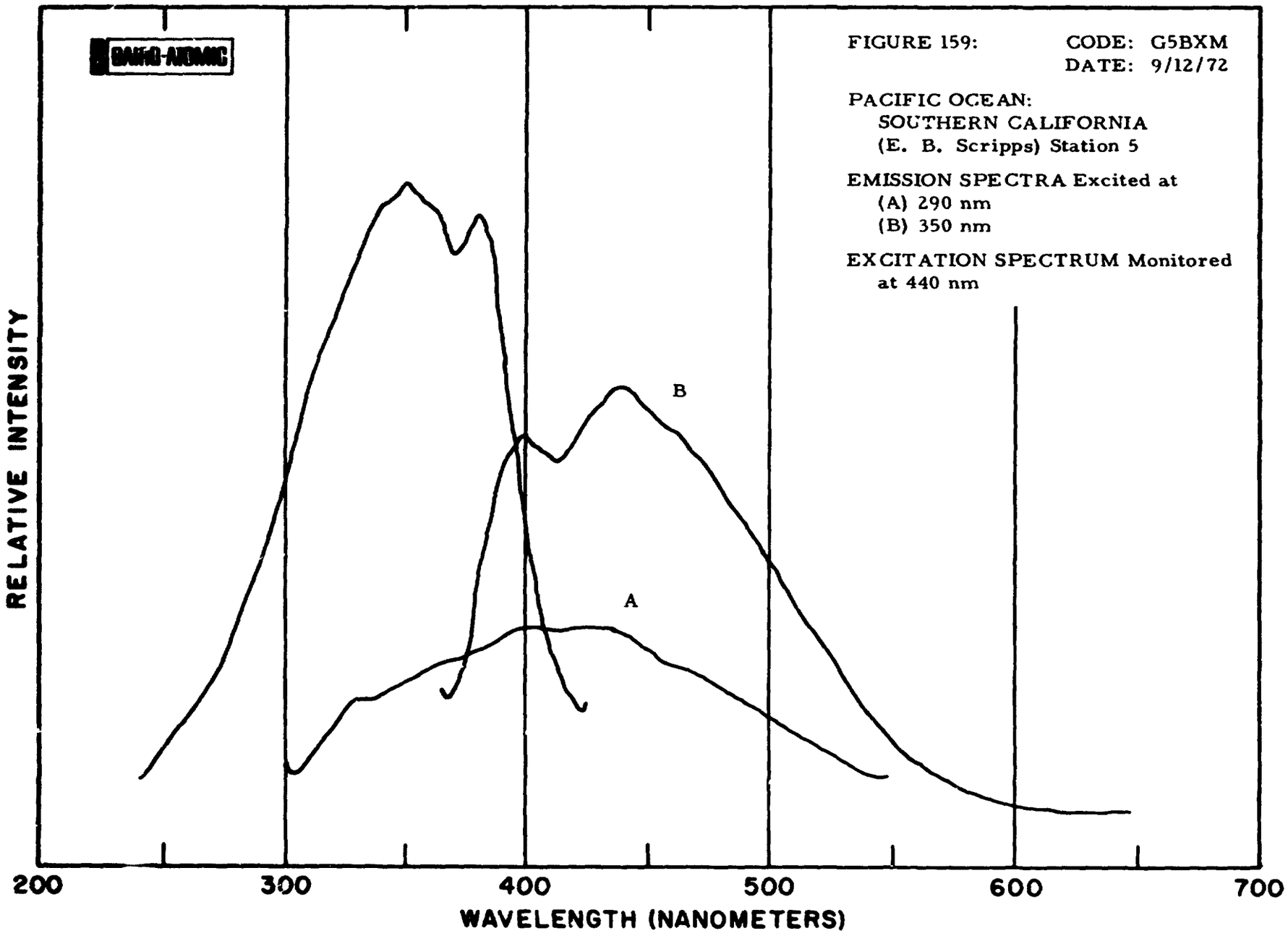


FIGURE 159:
CODE: G5BXM
DATE: 9/12/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
(E. B. Scripps) Station 5
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

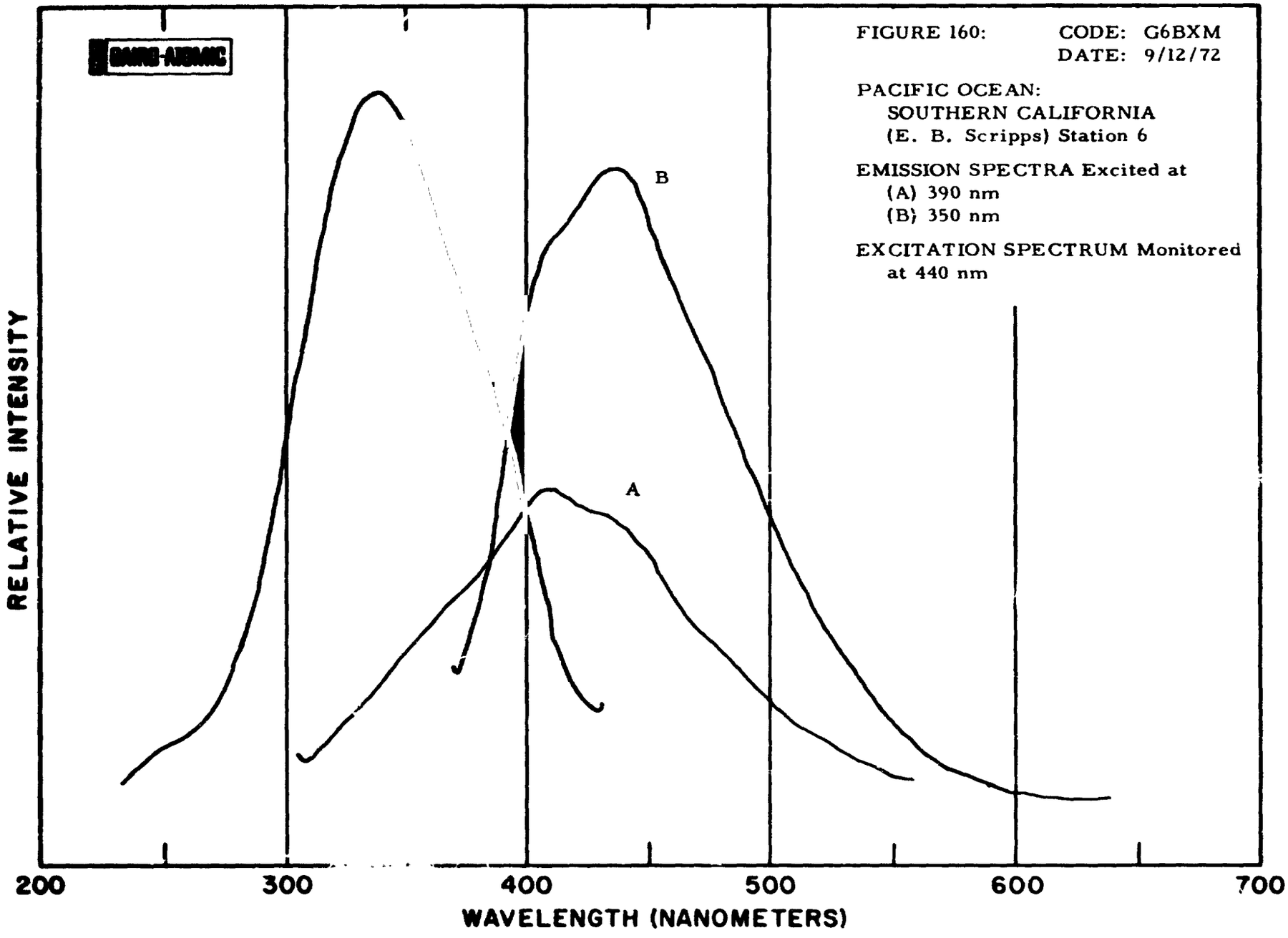
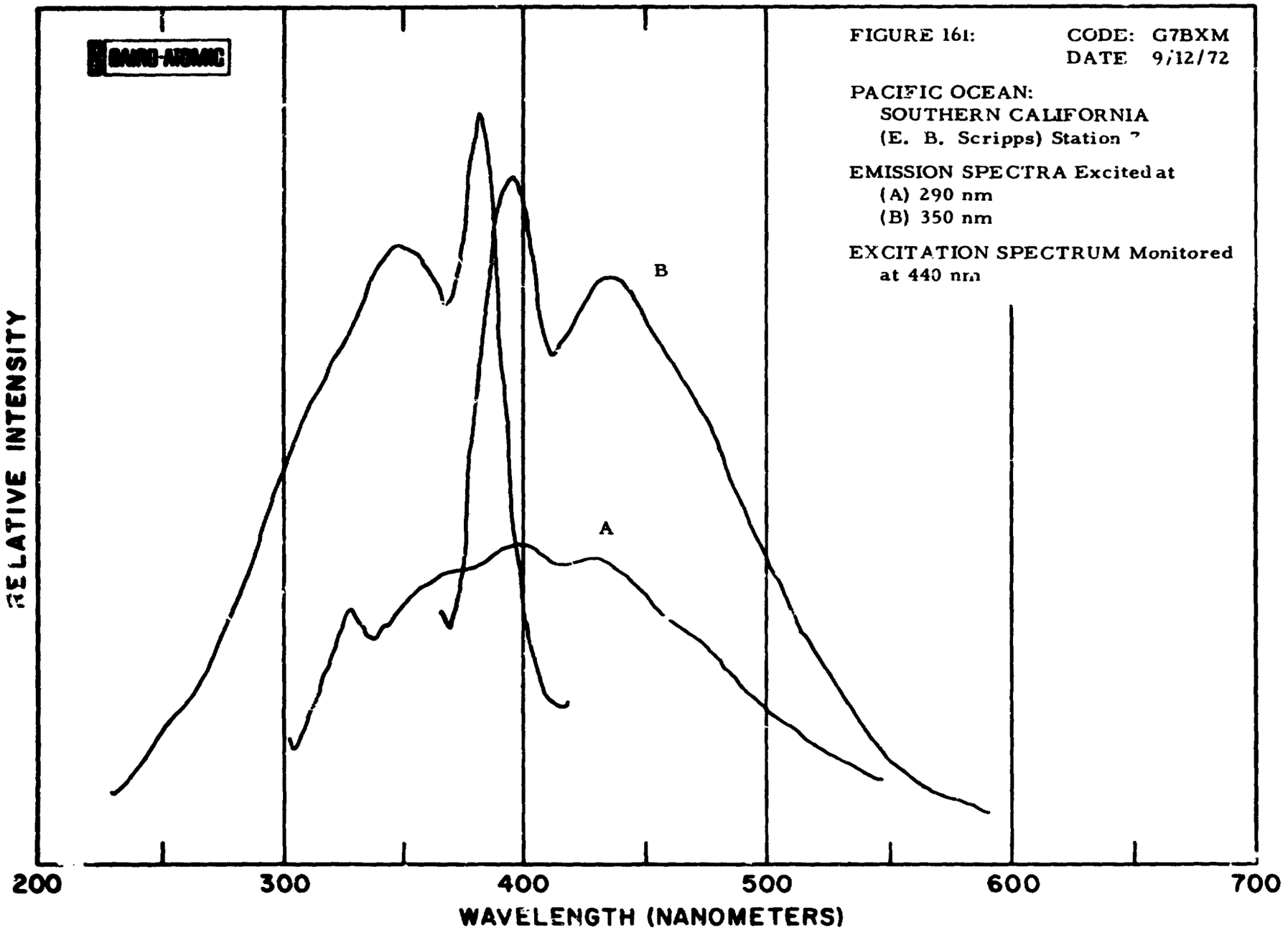


FIGURE 160:
CODE: G6BXM
DATE: 9/12/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
(E. B. Scripps) Station 6
EMISSION SPECTRA Excited at
(A) 390 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 161:
CODE: G7BXM
DATE 9/12/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
(E. B. Scripps) Station 7
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored
at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

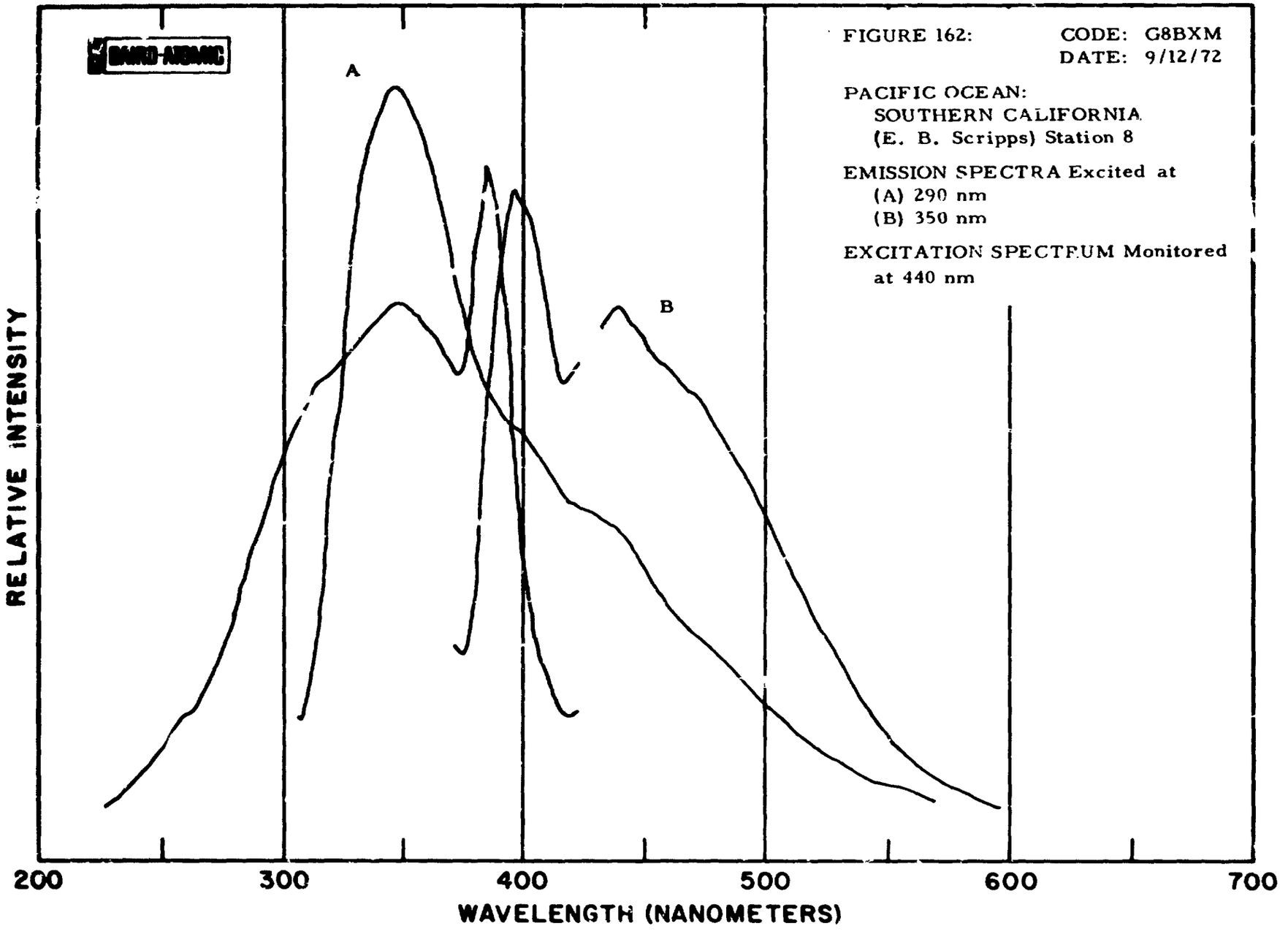
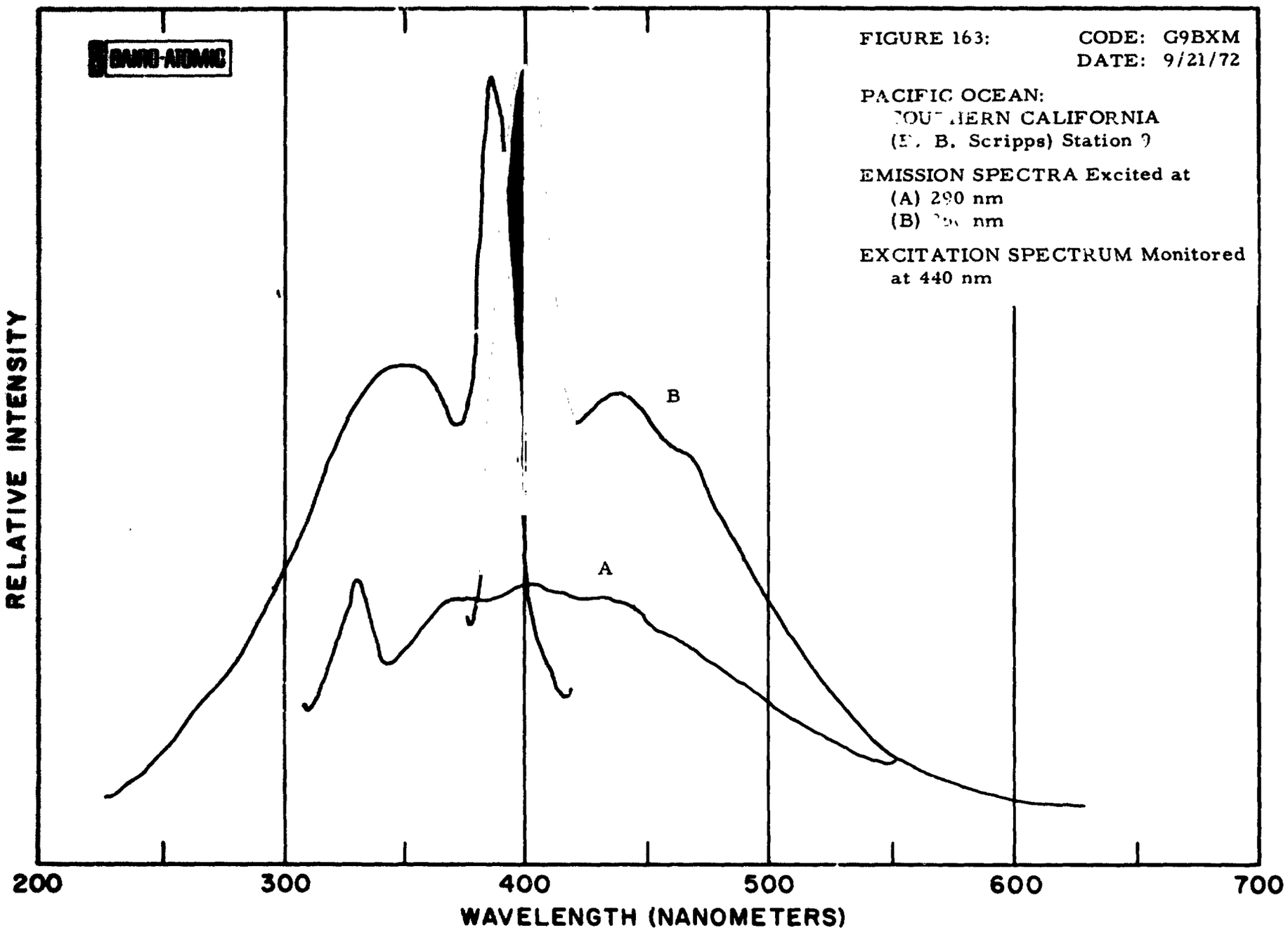


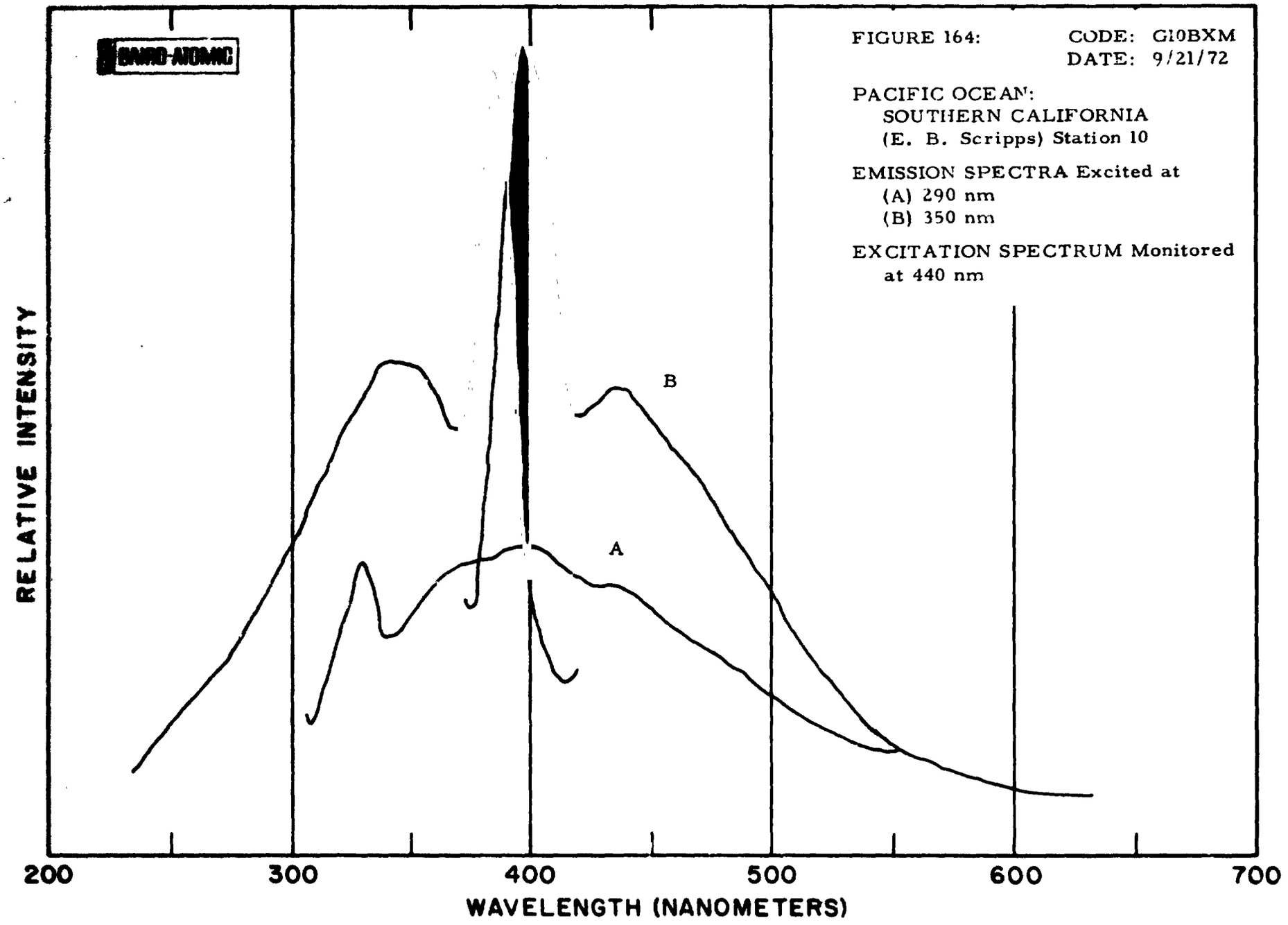
FIGURE 162: CODE: G8BXM
DATE: 9/12/72

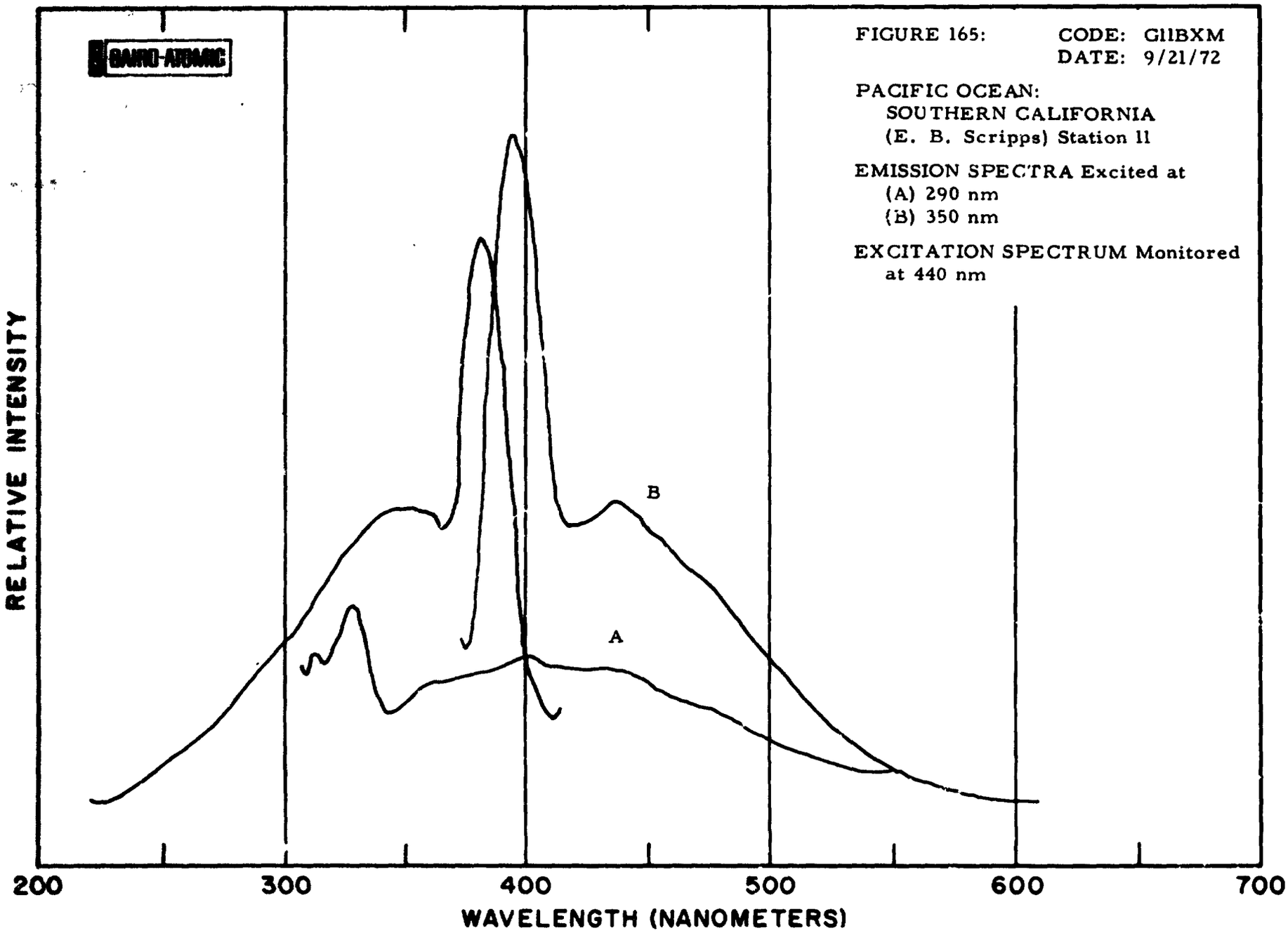
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
(E. B. Scripps) Station 8

EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm

EXCITATION SPECTRUM Monitored at 440 nm


BAIRD-ATOMIC
FIGURE 163:
CODE: G9BXM
DATE: 9/21/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
(E. B. Scripps) Station 9
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 290 nm
EXCITATION SPECTRUM Monitored
at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BARRO-ATOMIC
FIGURE 164:
CODE: G10BXM
DATE: 9/21/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
(E. B. Scripps) Station 10
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored
at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 165:
CODE: G11BXM
DATE: 9/21/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
(E. B. Scripps) Station 11
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored
at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

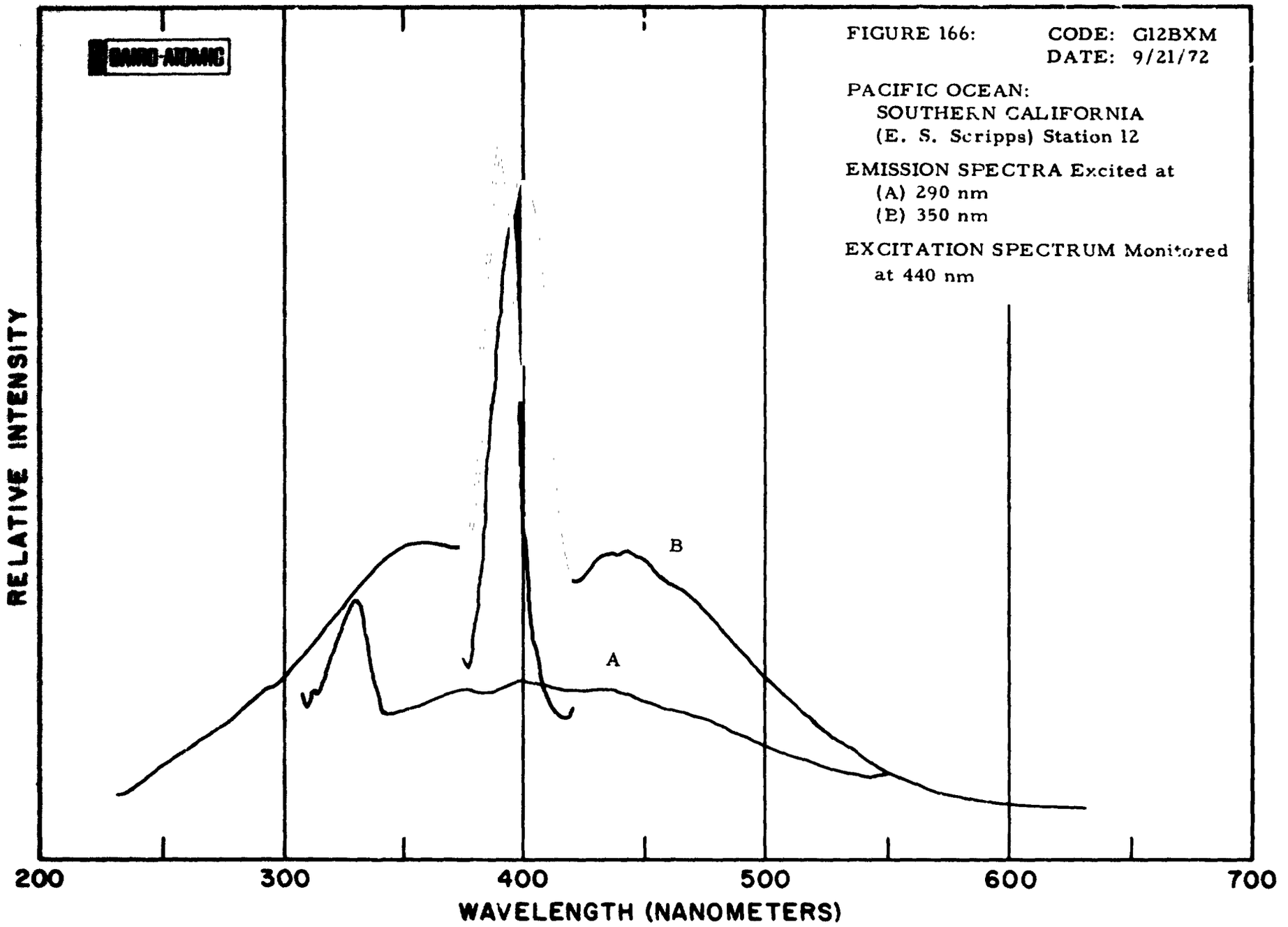
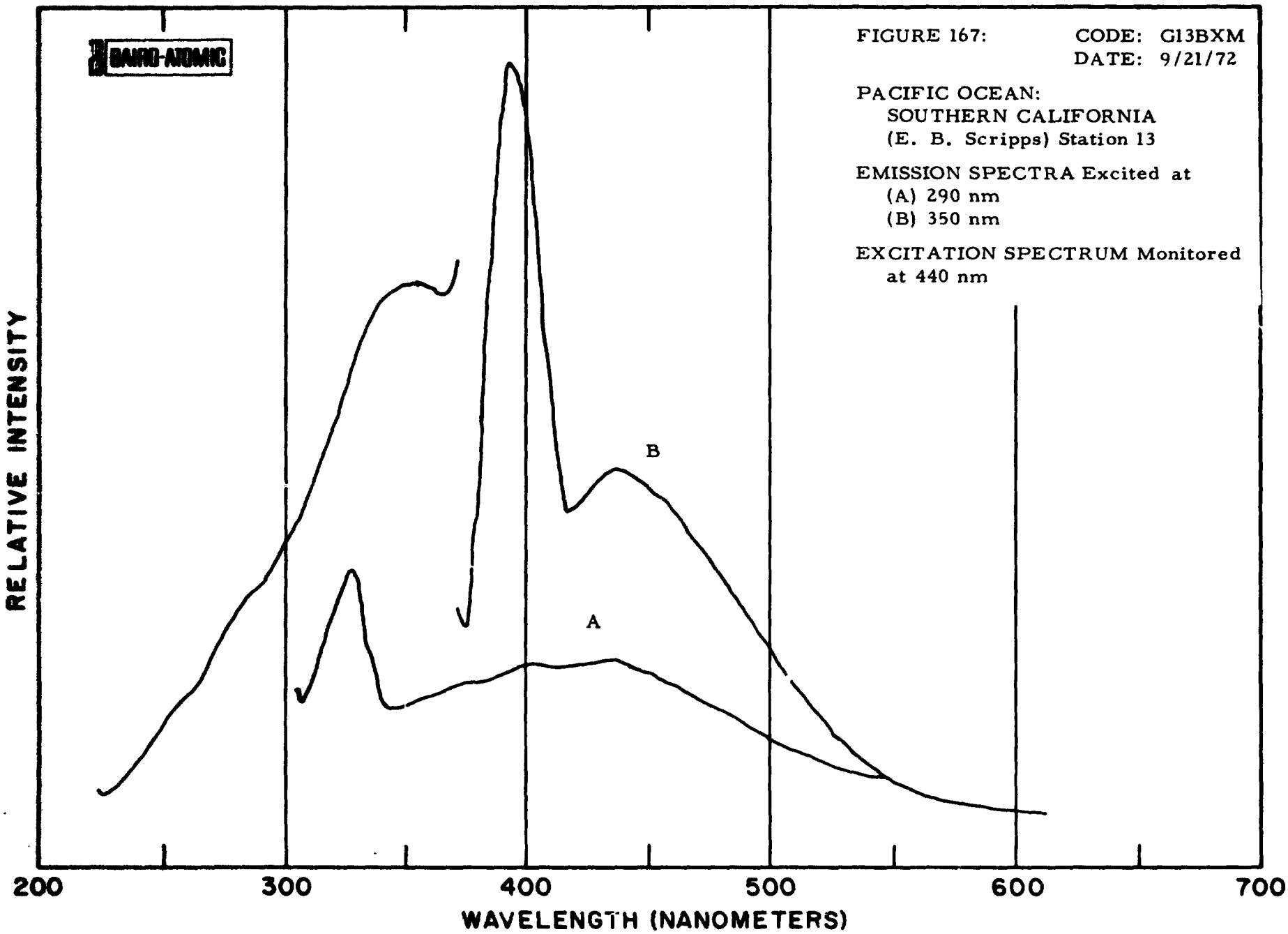
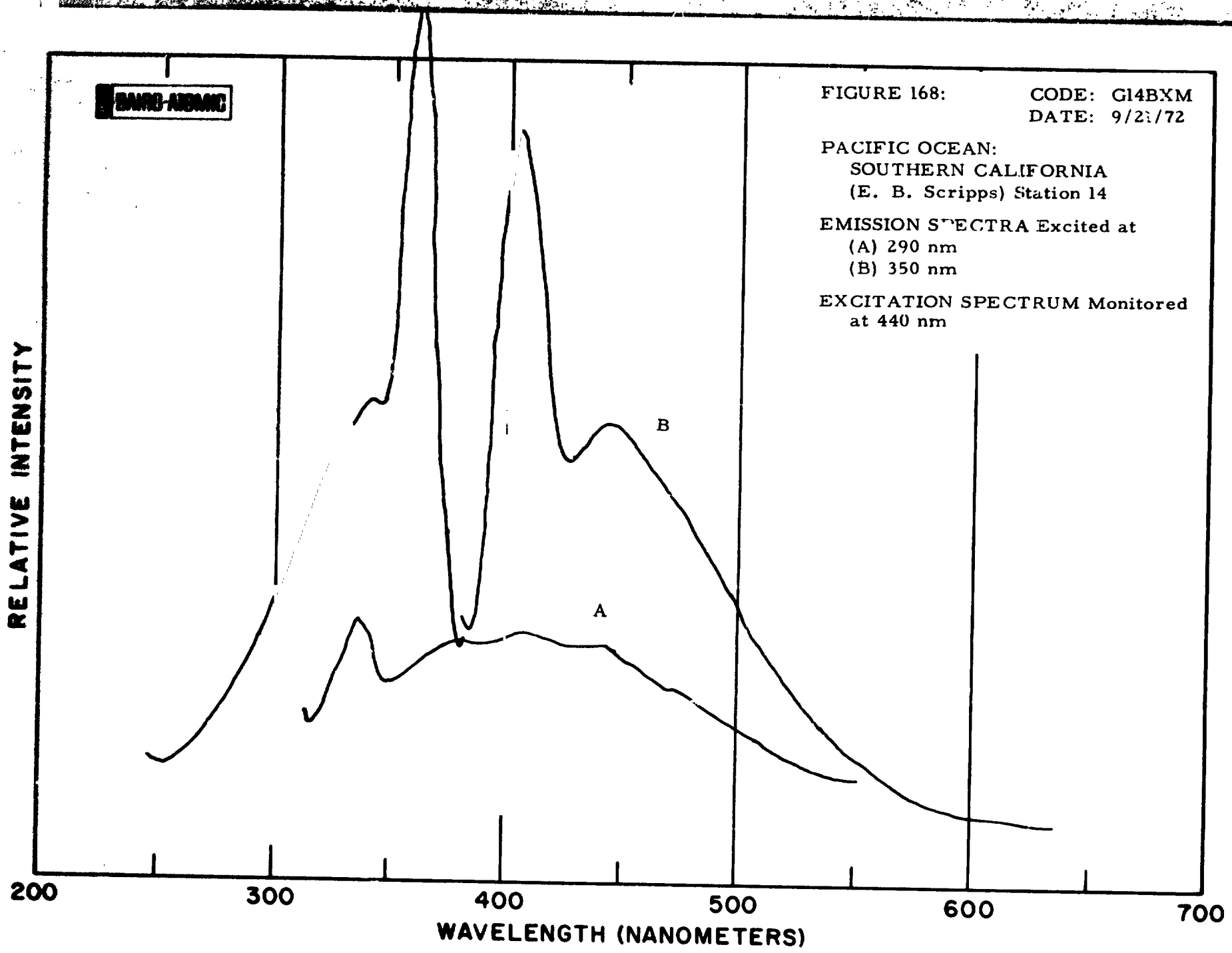
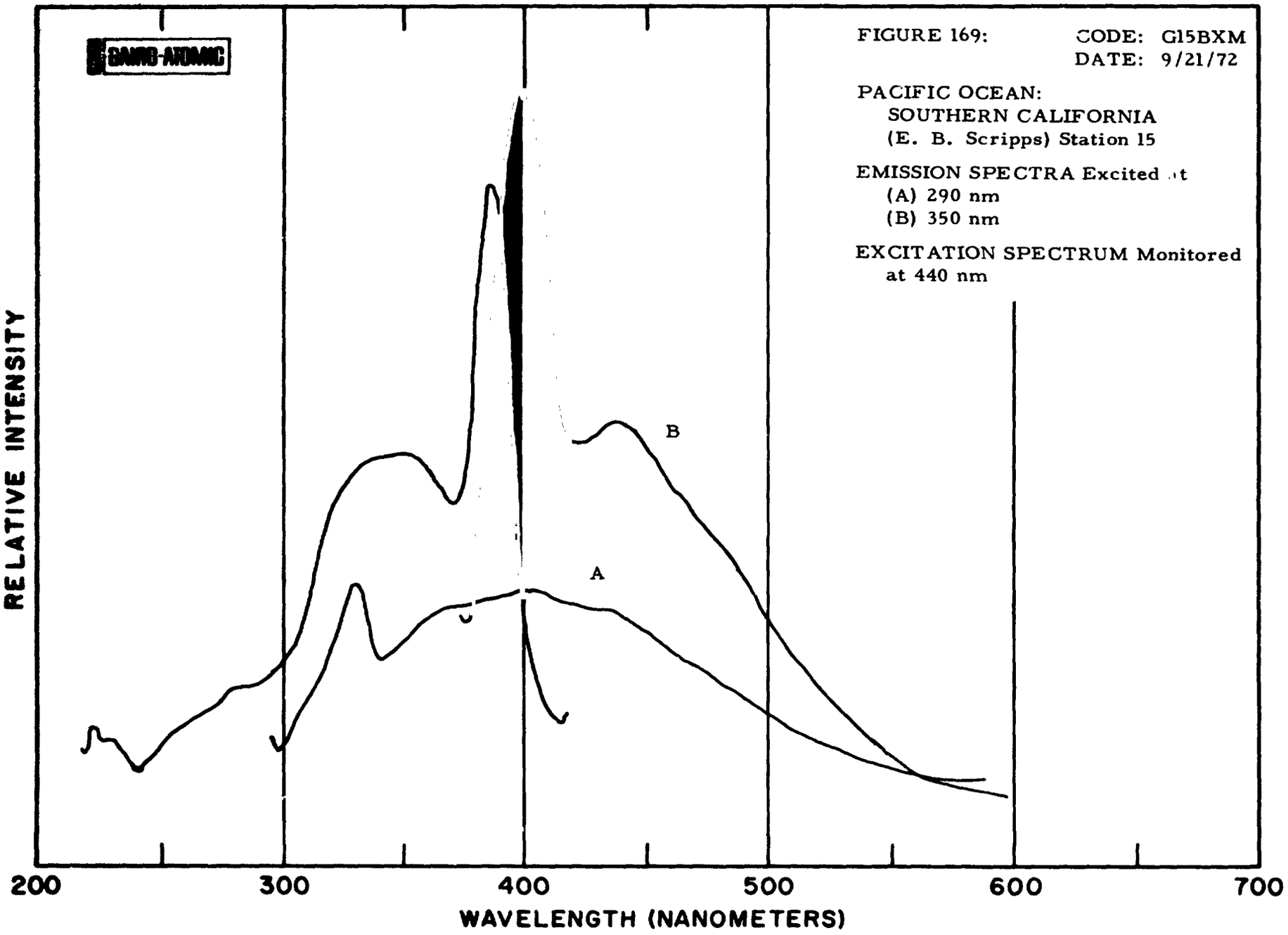
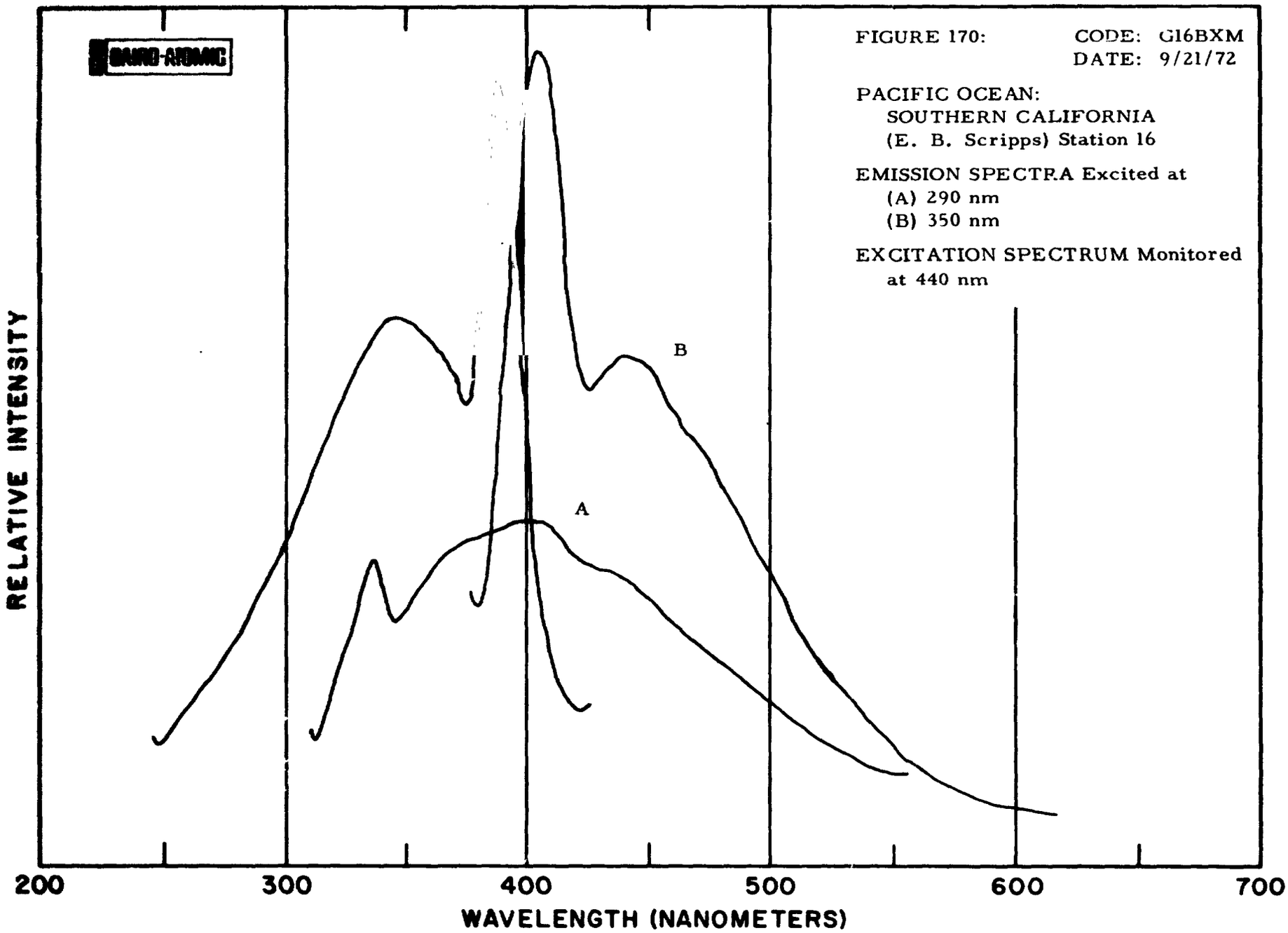


FIGURE 166:
CODE: G12BXM
DATE: 9/21/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
(E. S. Scripps) Station 12
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored
at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 167:
CODE: G13BXM
DATE: 9/21/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
(E. B. Scripps) Station 13
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 168:
CODE: G14BXM
DATE: 9/21/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
(E. B. Scripps) Station 14
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored
at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


GAMMA-ARDAMC
FIGURE 169:
CODE: G15BXM
DATE: 9/21/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
(E. B. Scripps) Station 15
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 170:
CODE: G16BXM
DATE: 9/21/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
(E. B. Scripps) Station 16
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored
at 440 nm
A
B
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

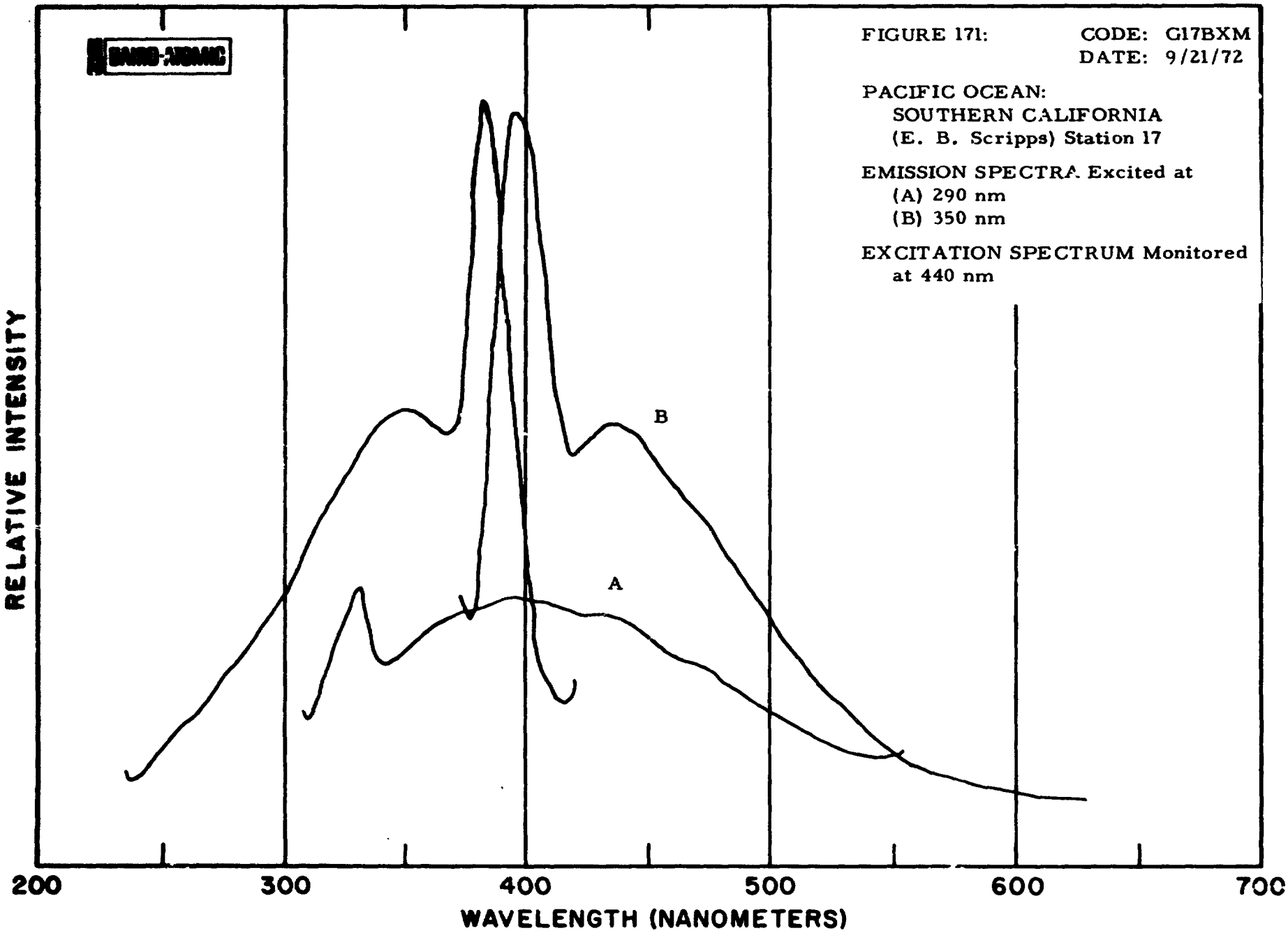


FIGURE 171:
CODE: G17BXM
DATE: 9/21/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
(E. B. Scripps) Station 17
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

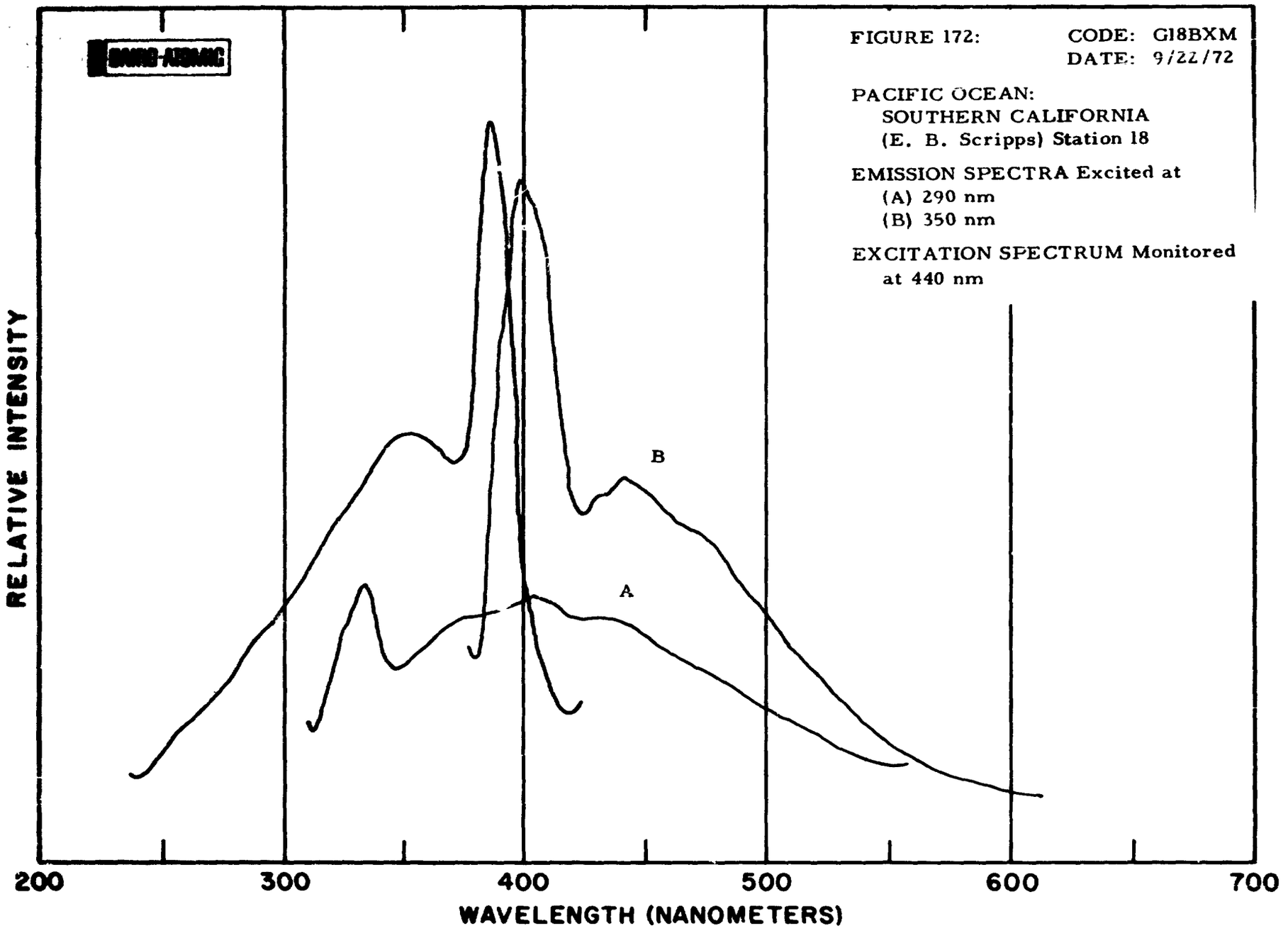
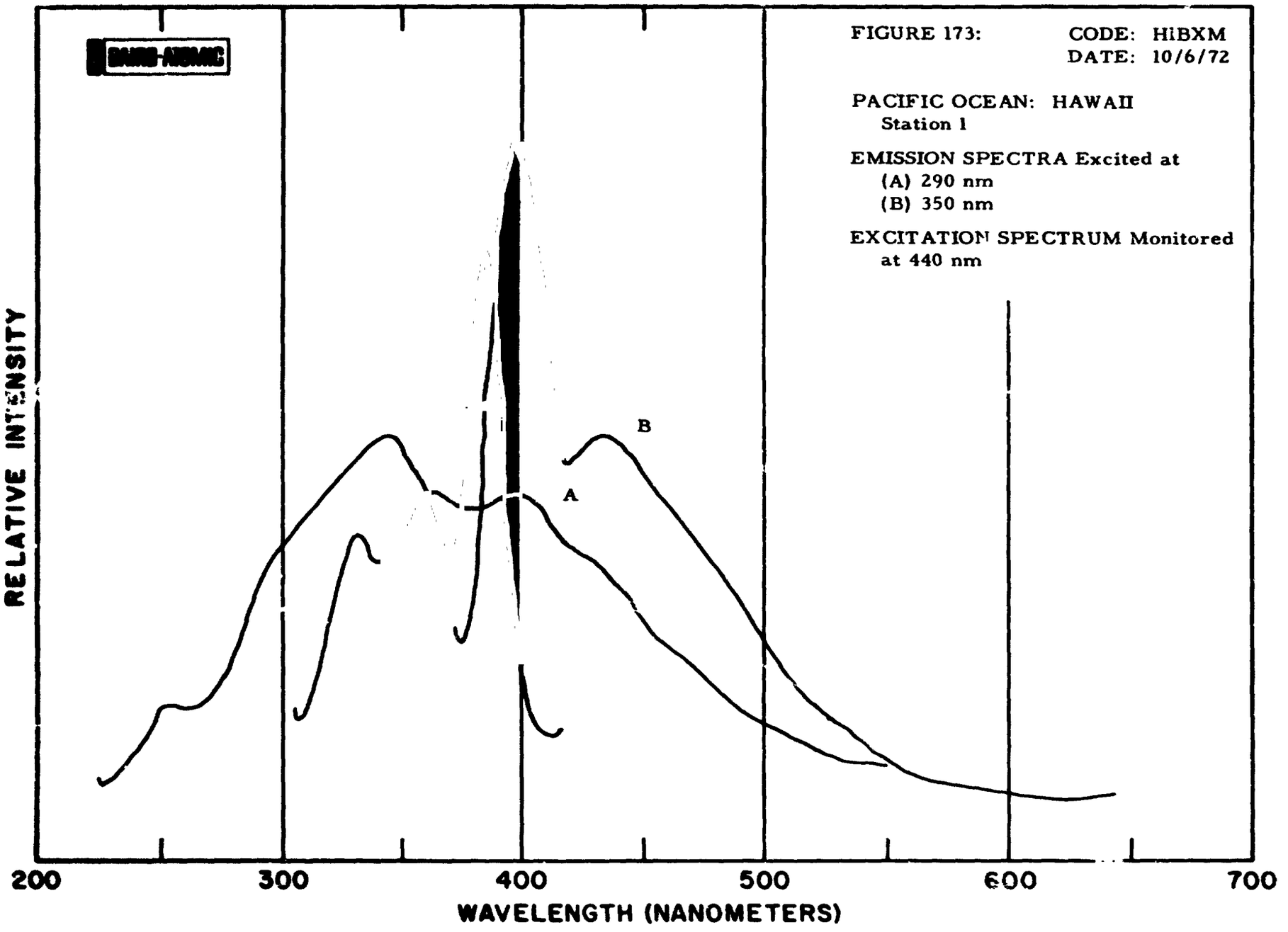


FIGURE 172:
CODE: G18BXM
DATE: 9/22/72
PACIFIC OCEAN:
SOUTHERN CALIFORNIA
(E. B. Scripps) Station 18
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored
at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 173:
CODE: HIBXM
DATE: 10/6/72
PACIFIC OCEAN: HAWAII
Station 1
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored
at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

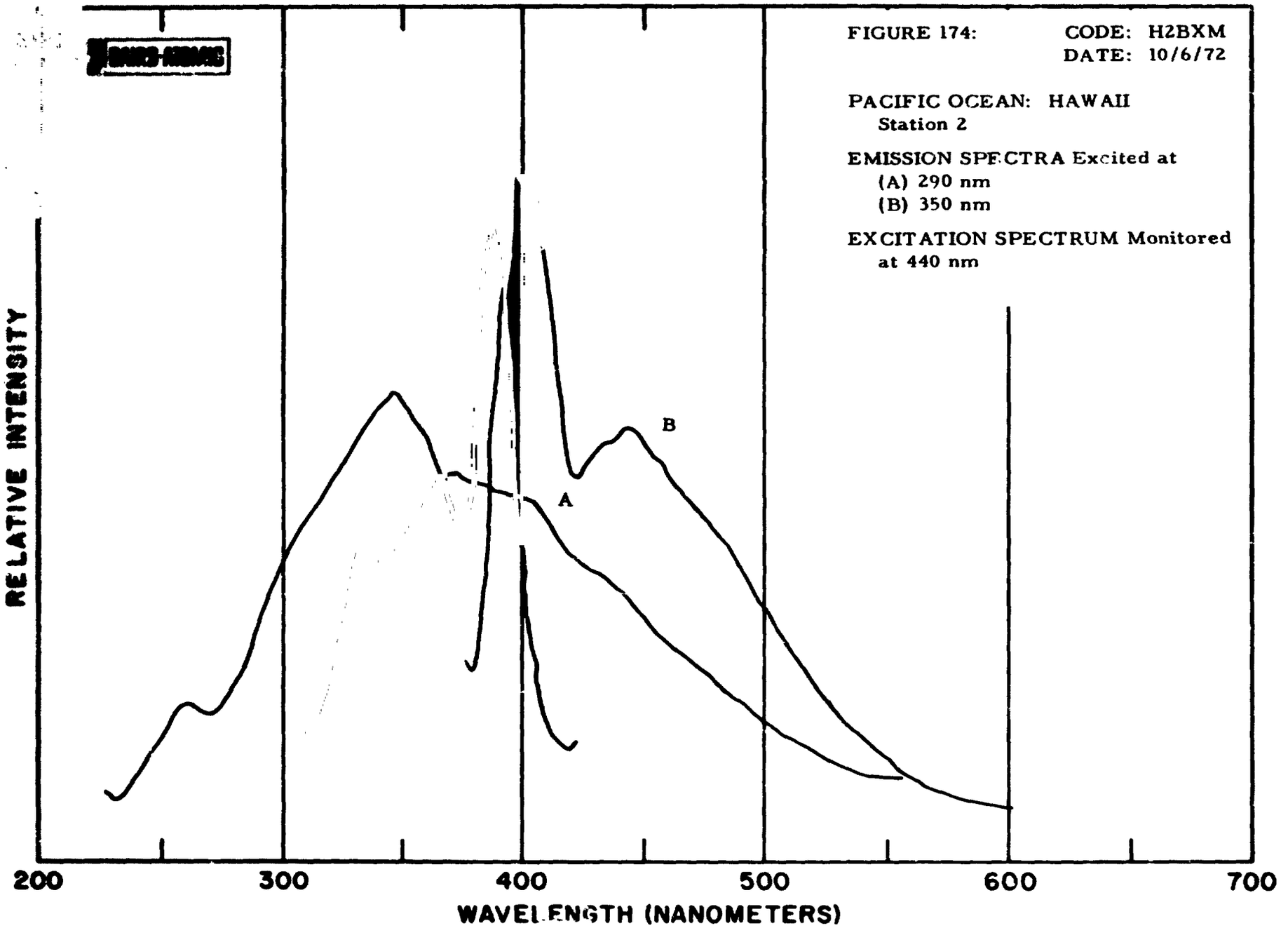


FIGURE 174:
CODE: H2BXM
DATE: 10/6/72
PACIFIC OCEAN: HAWAII
Station 2
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored at 440 nm
A
B
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

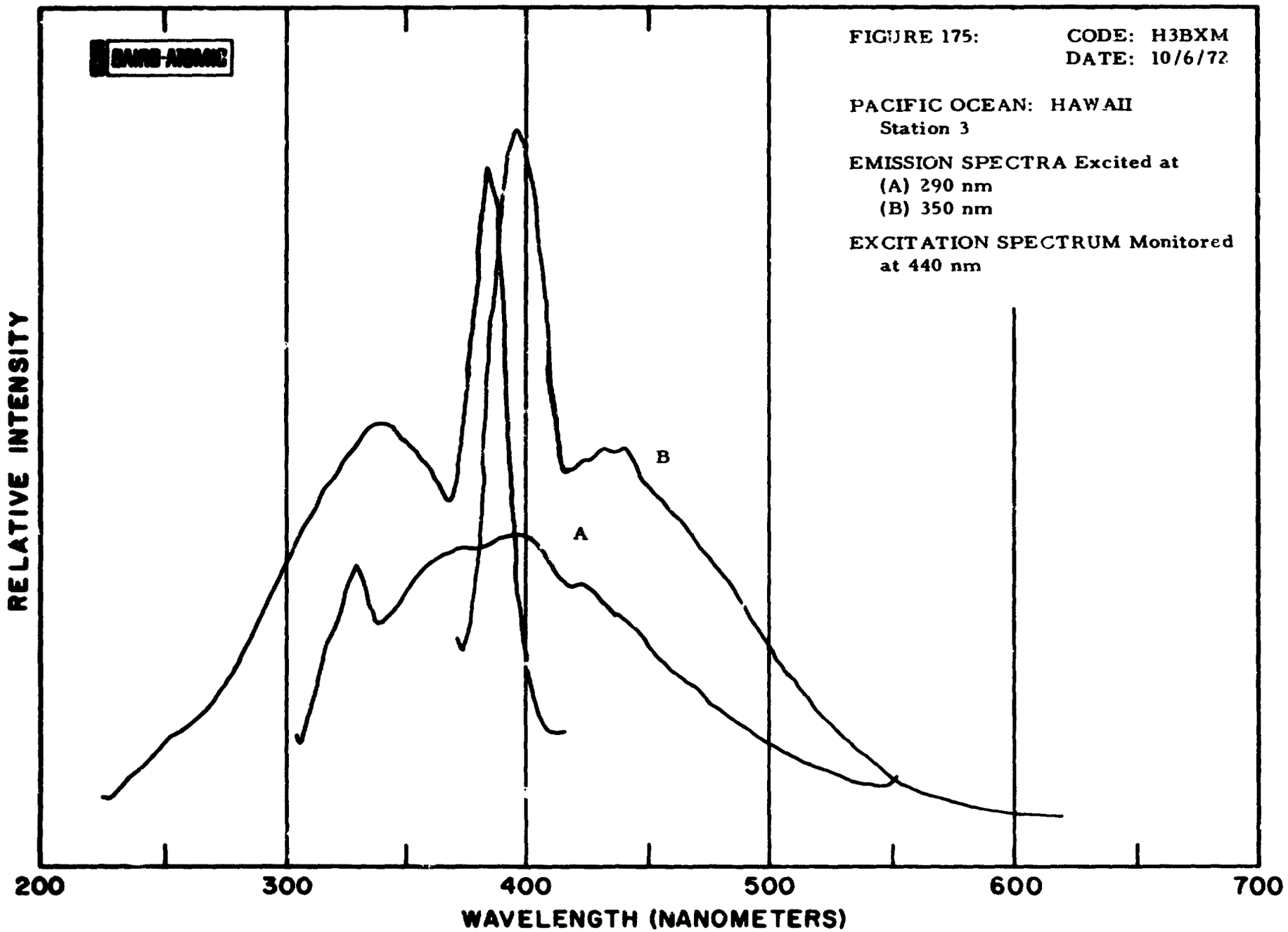
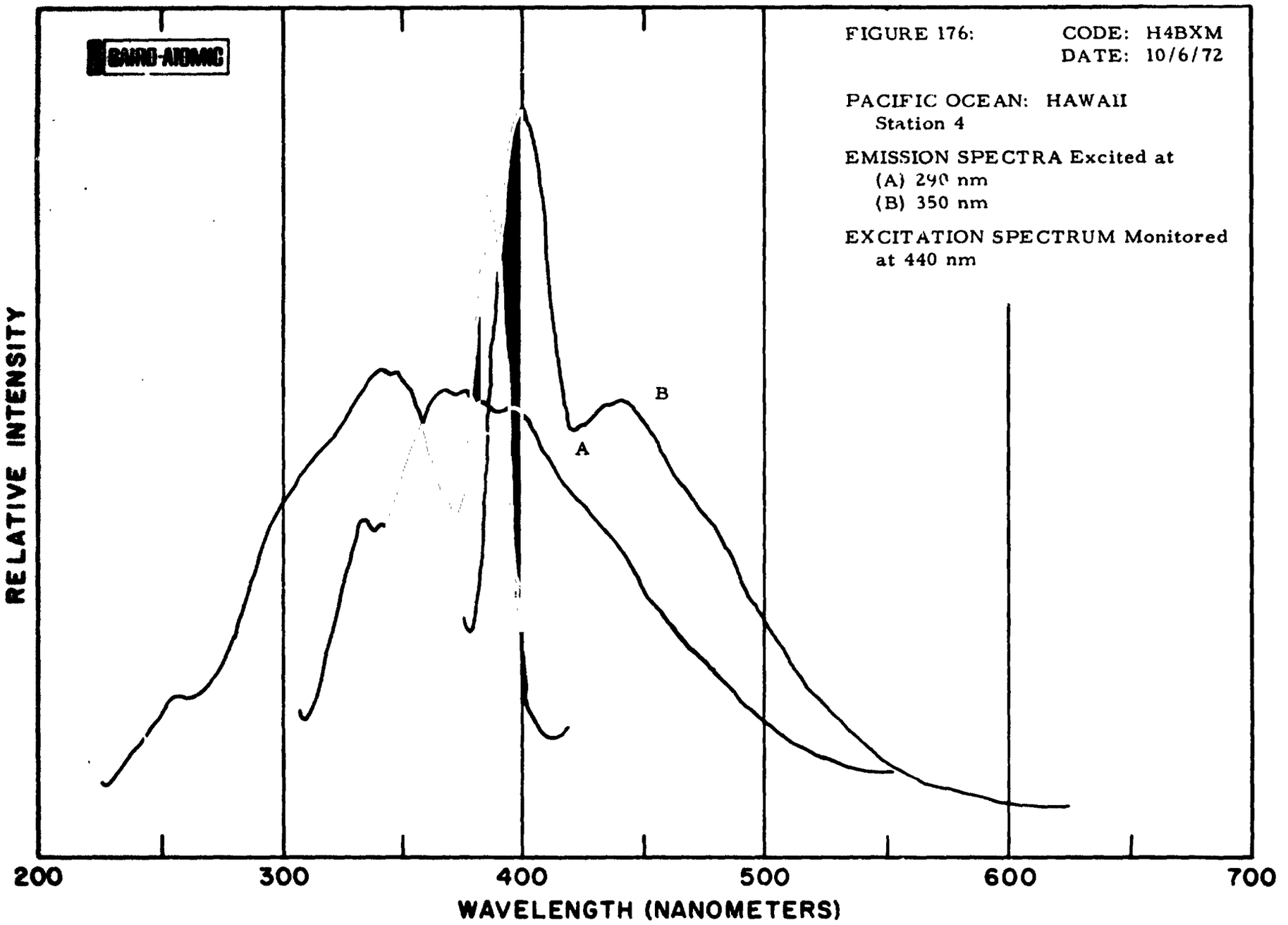
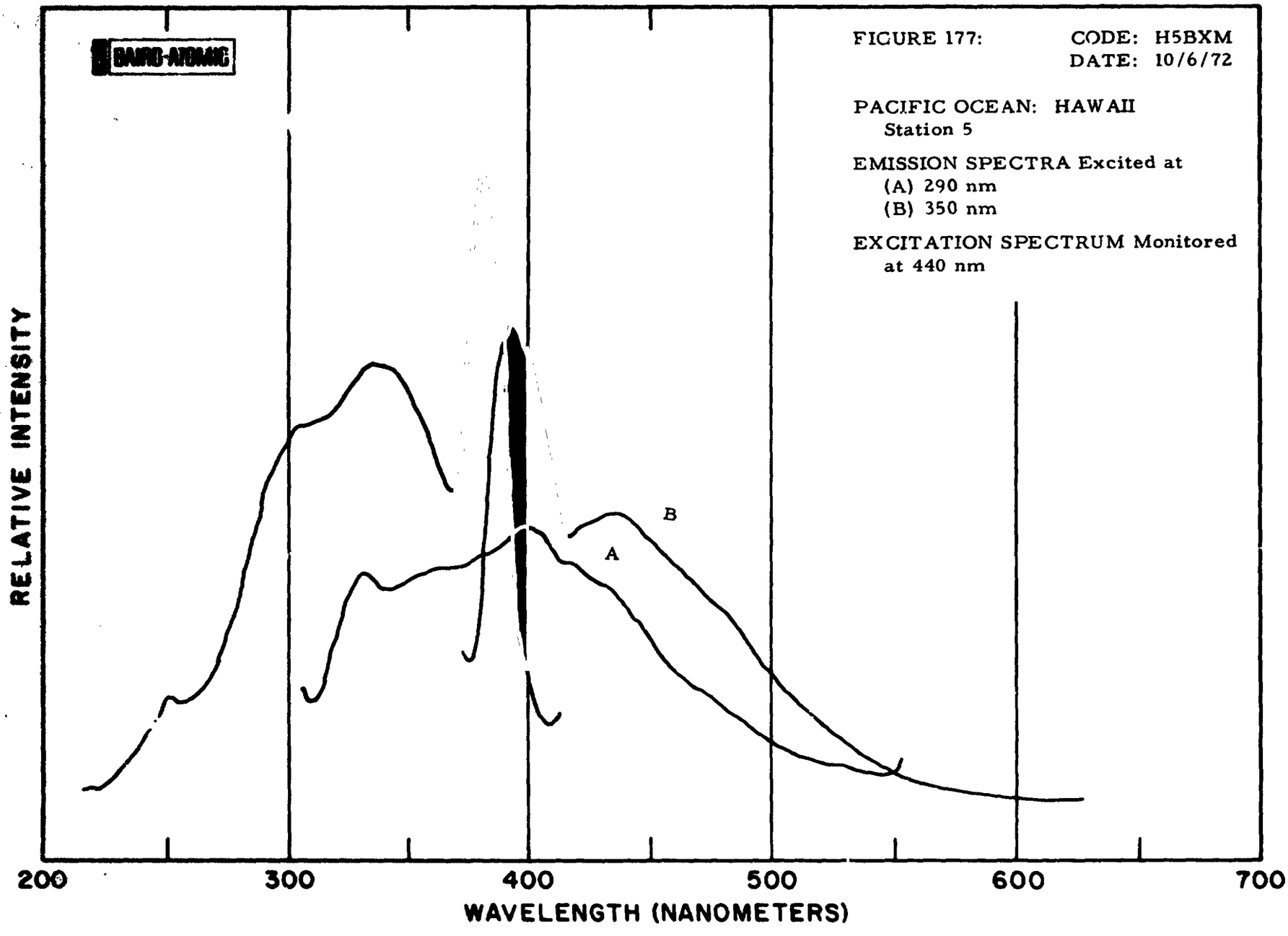
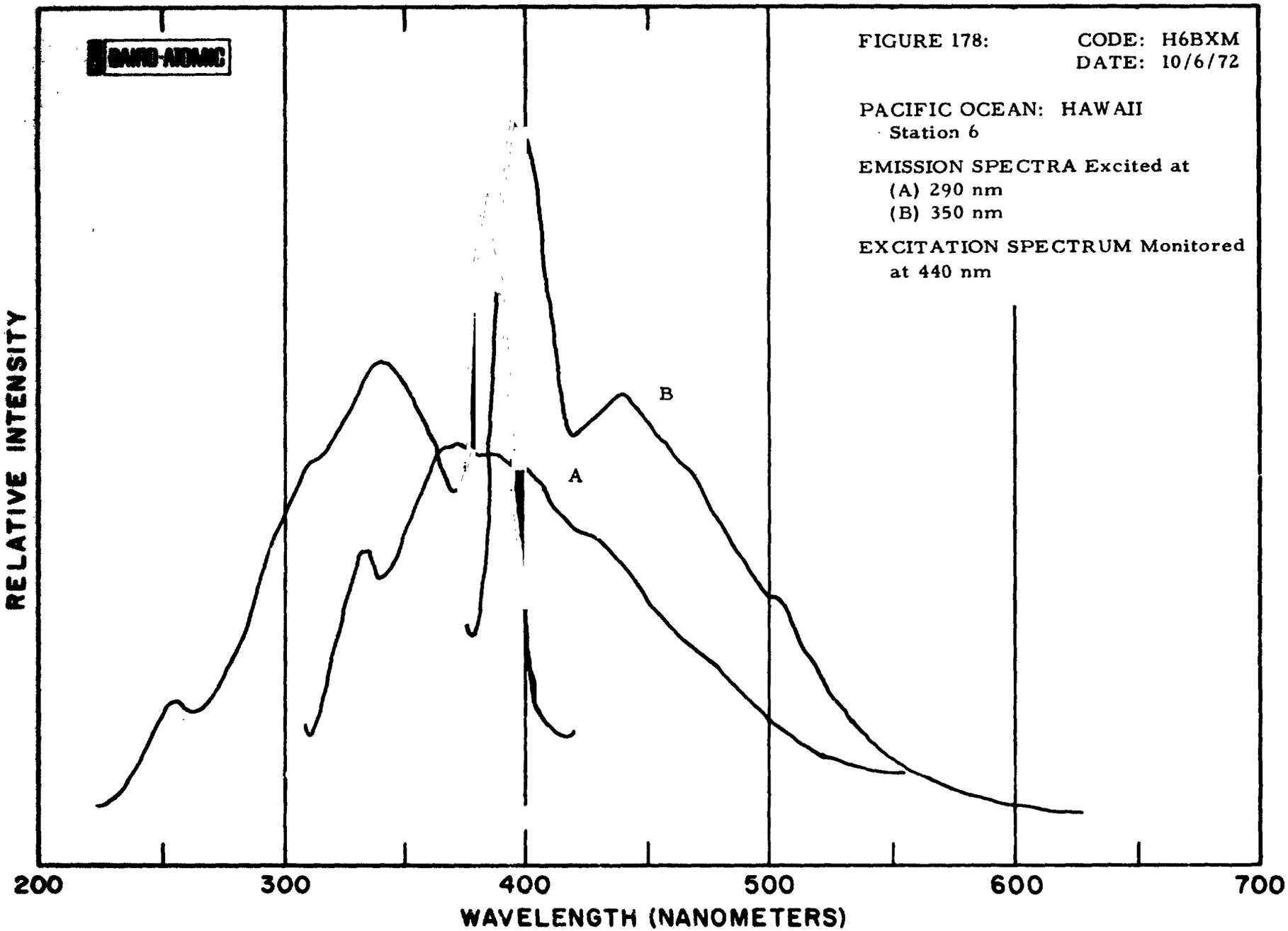
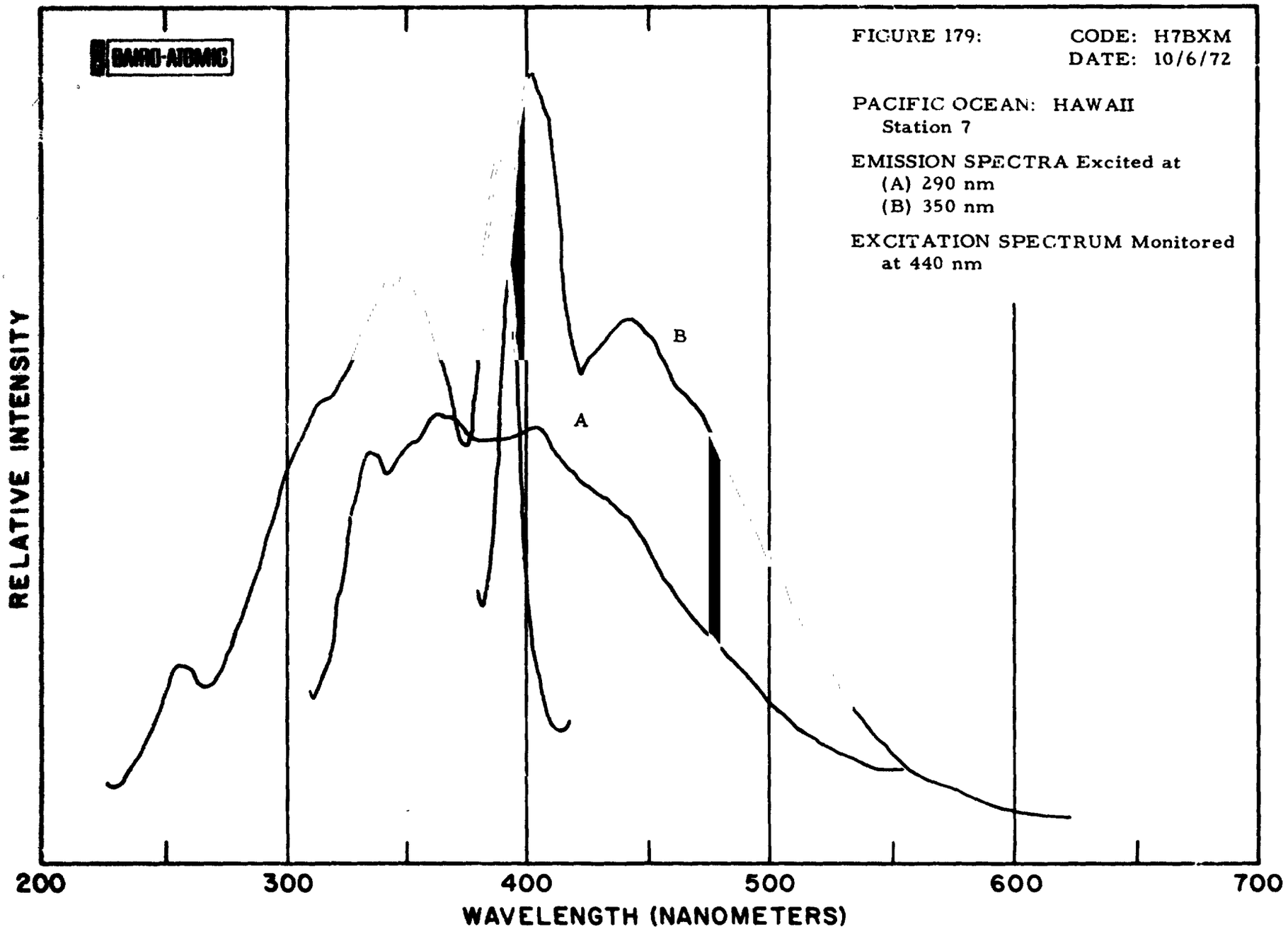


FIGURE 175:
CODE: H3BXM
DATE: 10/6/72
PACIFIC OCEAN: HAWAII
Station 3
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored
at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 176:
CODE: H4BXM
DATE: 10/6/72
PACIFIC OCEAN: HAWAII
Station 4
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored
at 440 nm
A
B
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 177:
CODE: H5BXM
DATE: 10/6/72
PACIFIC OCEAN: HAWAII
Station 5
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored
at 440 nm
RELATIVE INTENSITY
A
B
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 178:
CODE: H6BXM
DATE: 10/6/72
PACIFIC OCEAN: HAWAII
Station 6
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored at 440 nm
A
B
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 179:
CODE: H7BXM
DATE: 10/6/72
PACIFIC OCEAN: HAWAII
Station 7
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored
at 440 nm
A
B
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

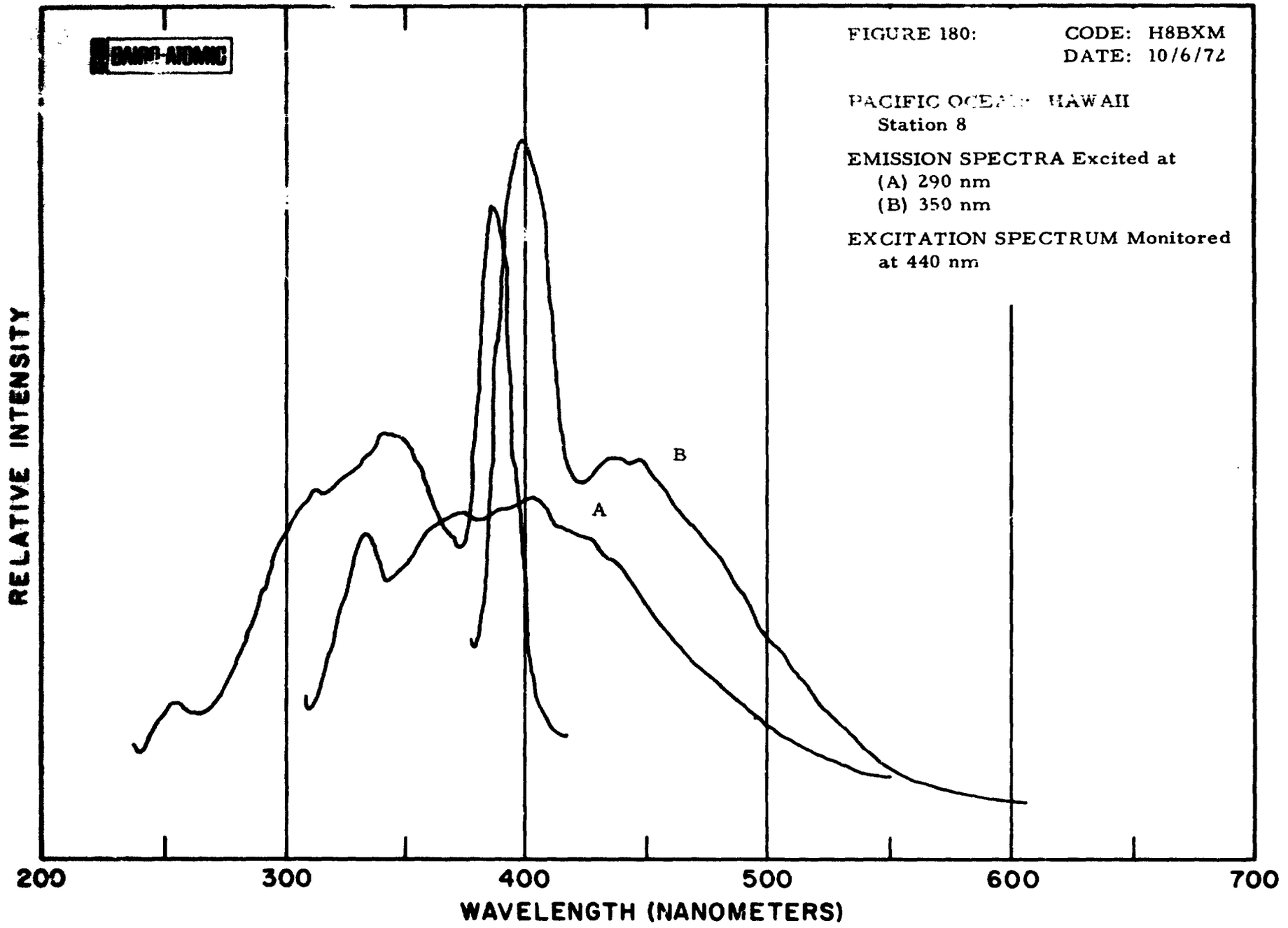
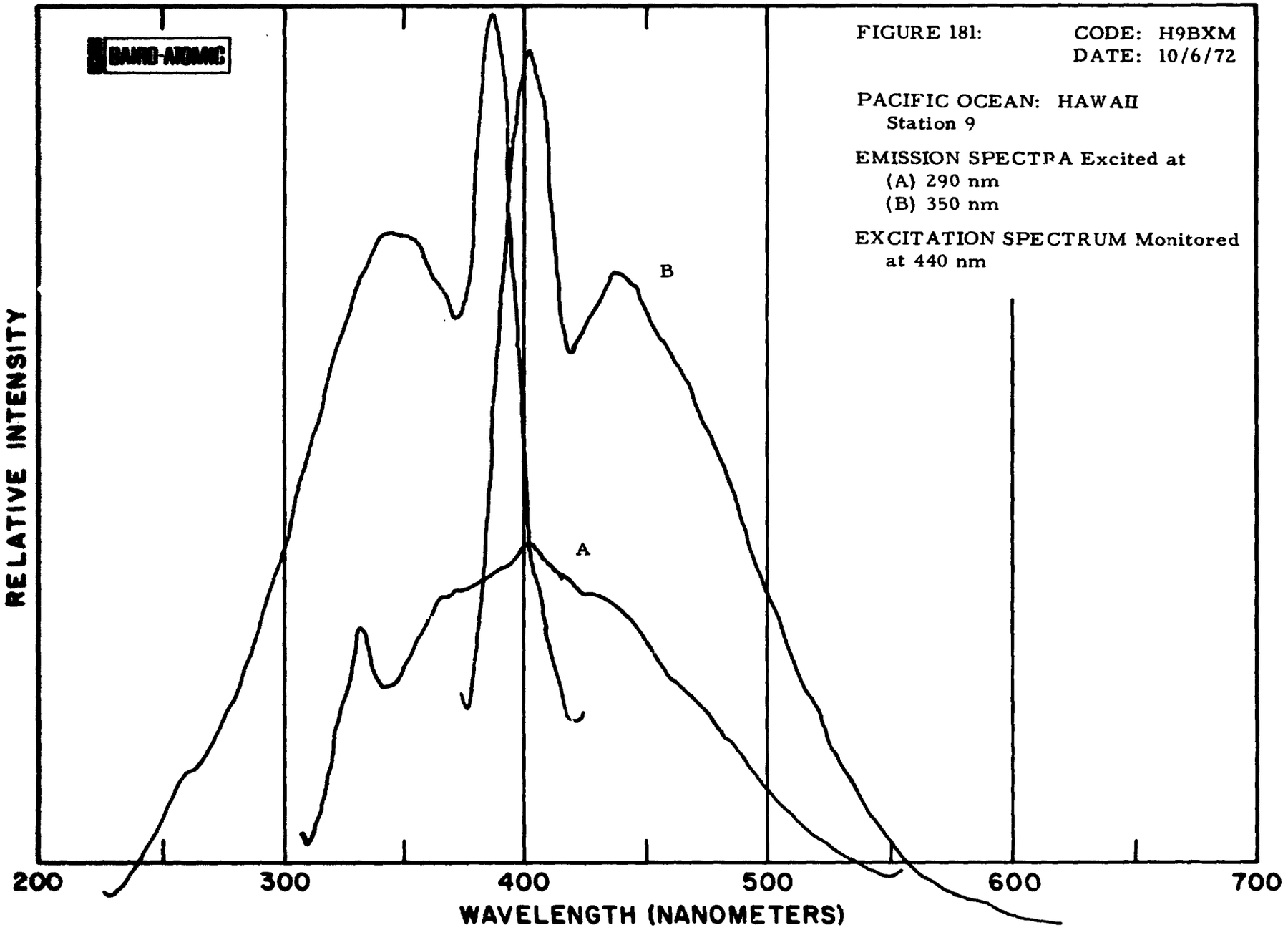
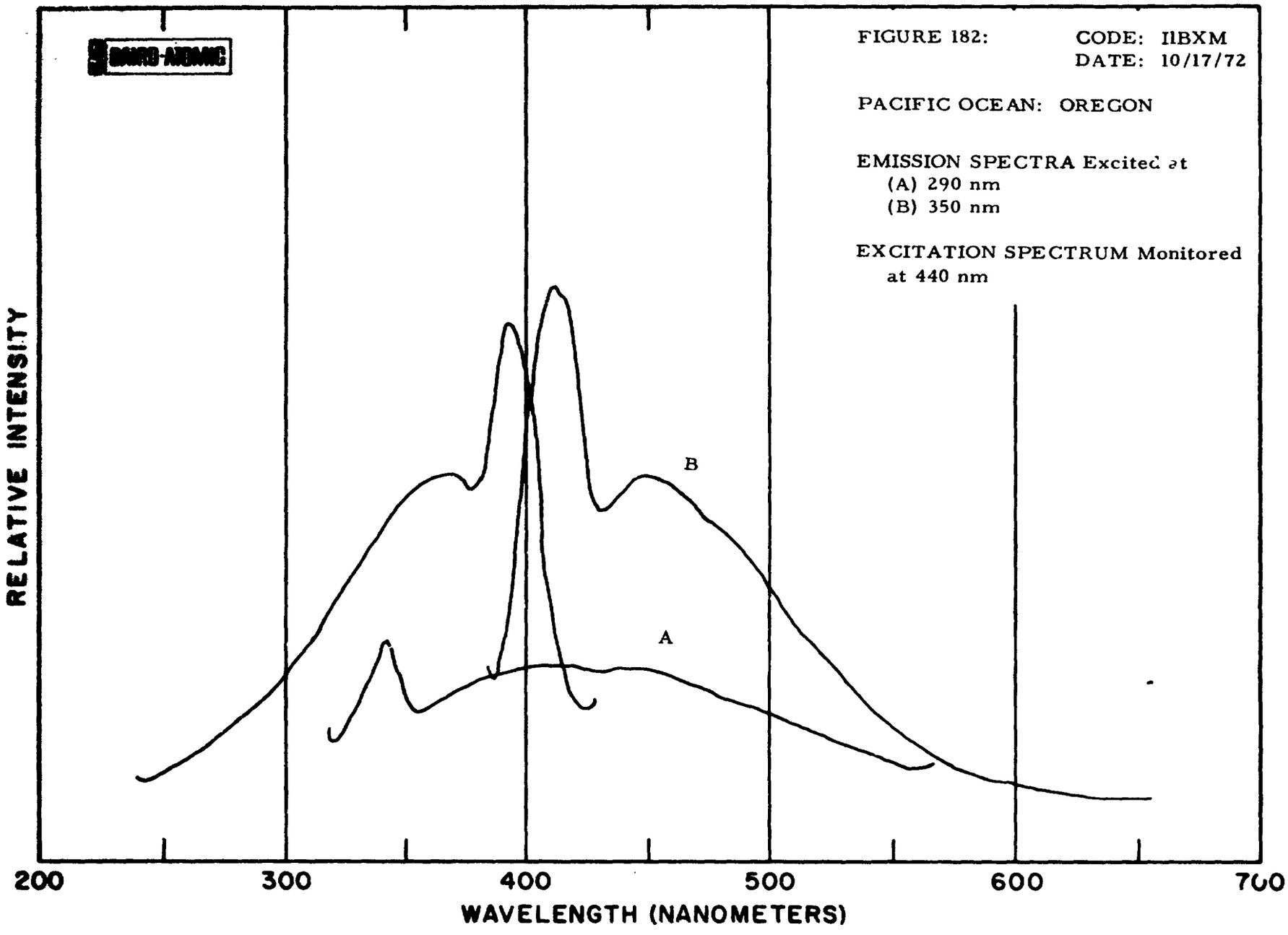


FIGURE 180:
CODE: H8BXM
DATE: 10/6/72
PACIFIC OCEAN HAWAII
Station 8
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored at 440 nm
A
B
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 181:
CODE: H9BXM
DATE: 10/6/72
PACIFIC OCEAN: HAWAII
Station 9
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored
at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 182:
CODE: IIBXM
DATE: 10/17/72
PACIFIC OCEAN: OREGON
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 350 nm
EXCITATION SPECTRUM Monitored at 440 nm
B
A
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

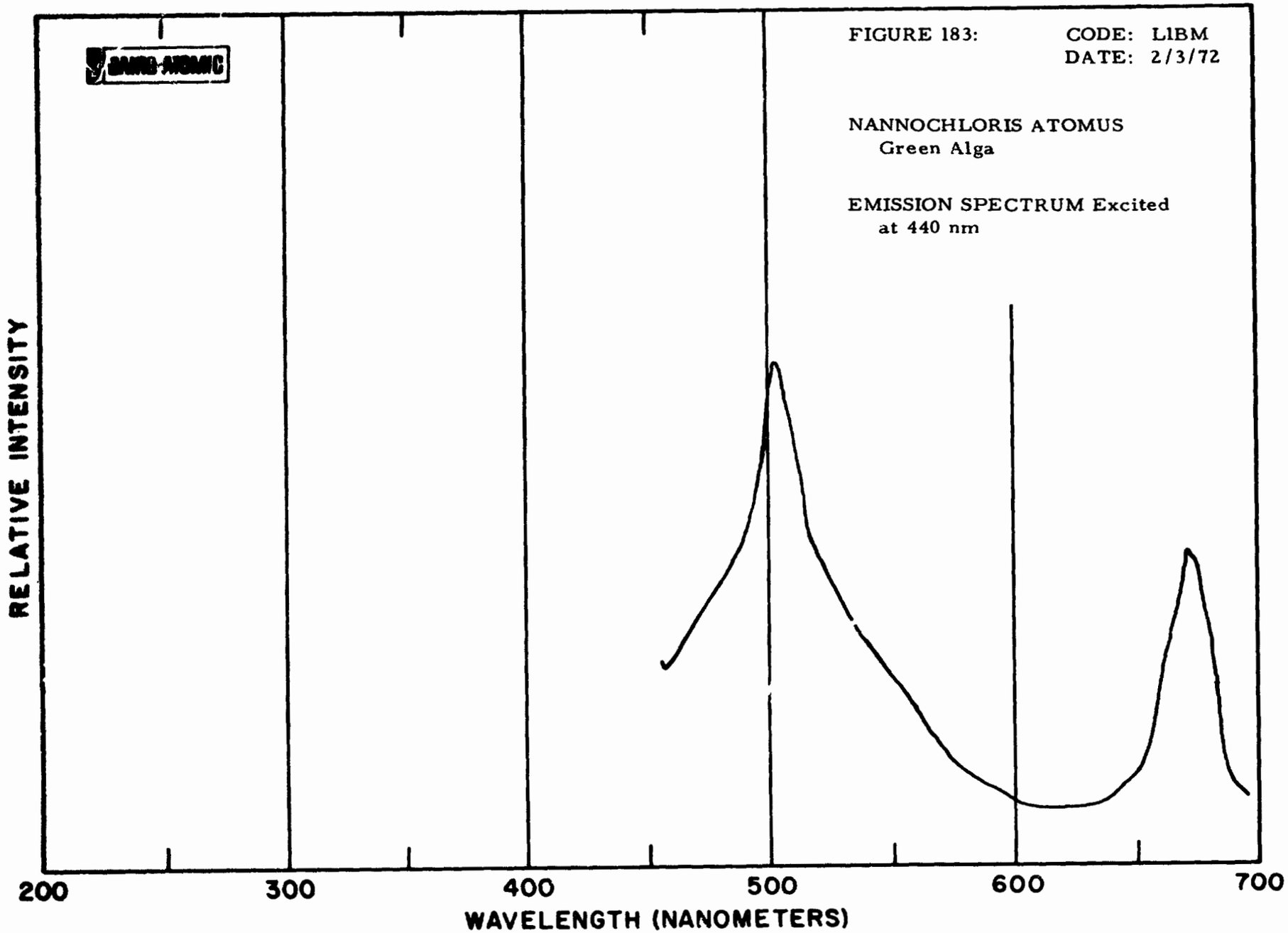
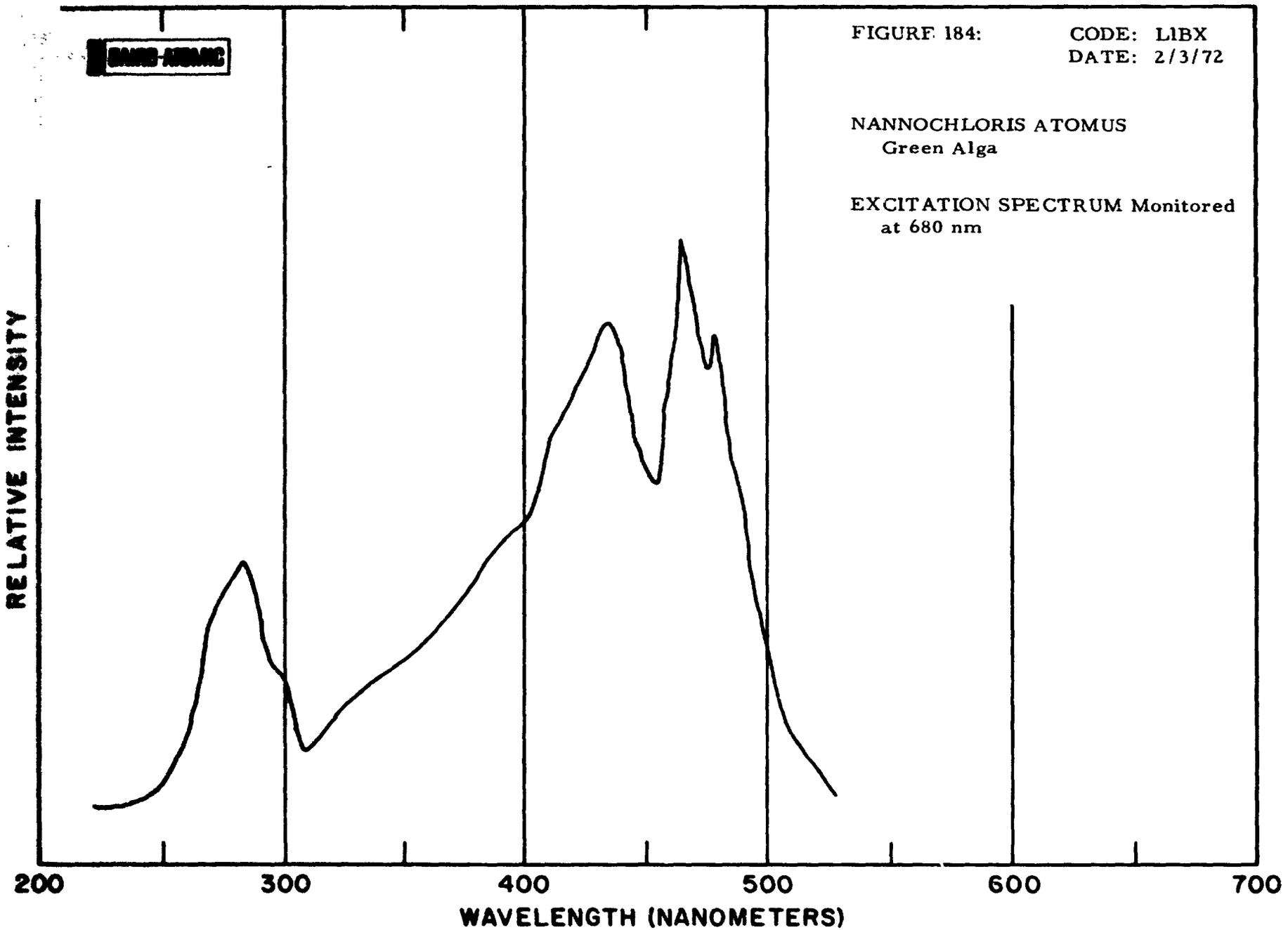
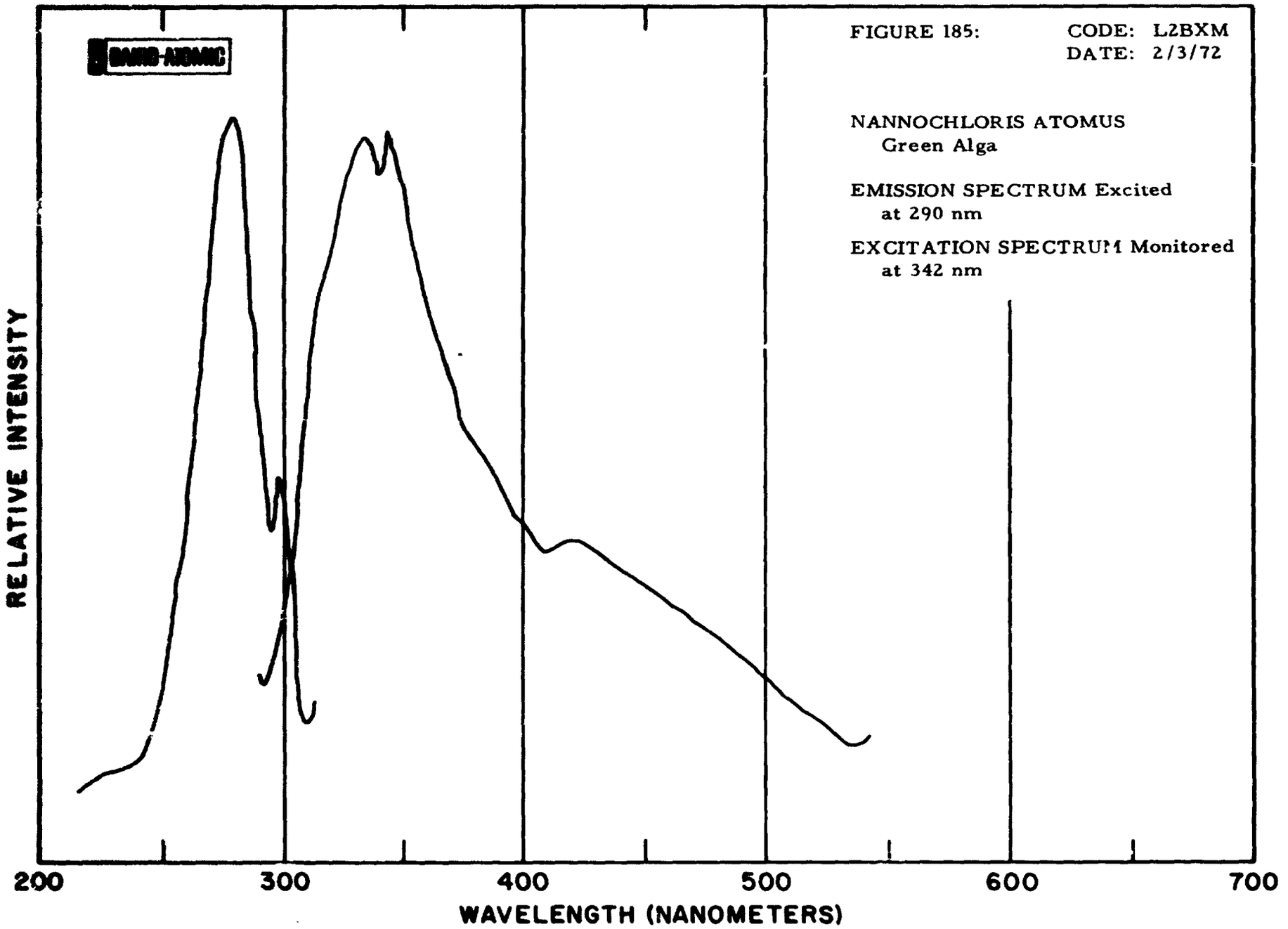
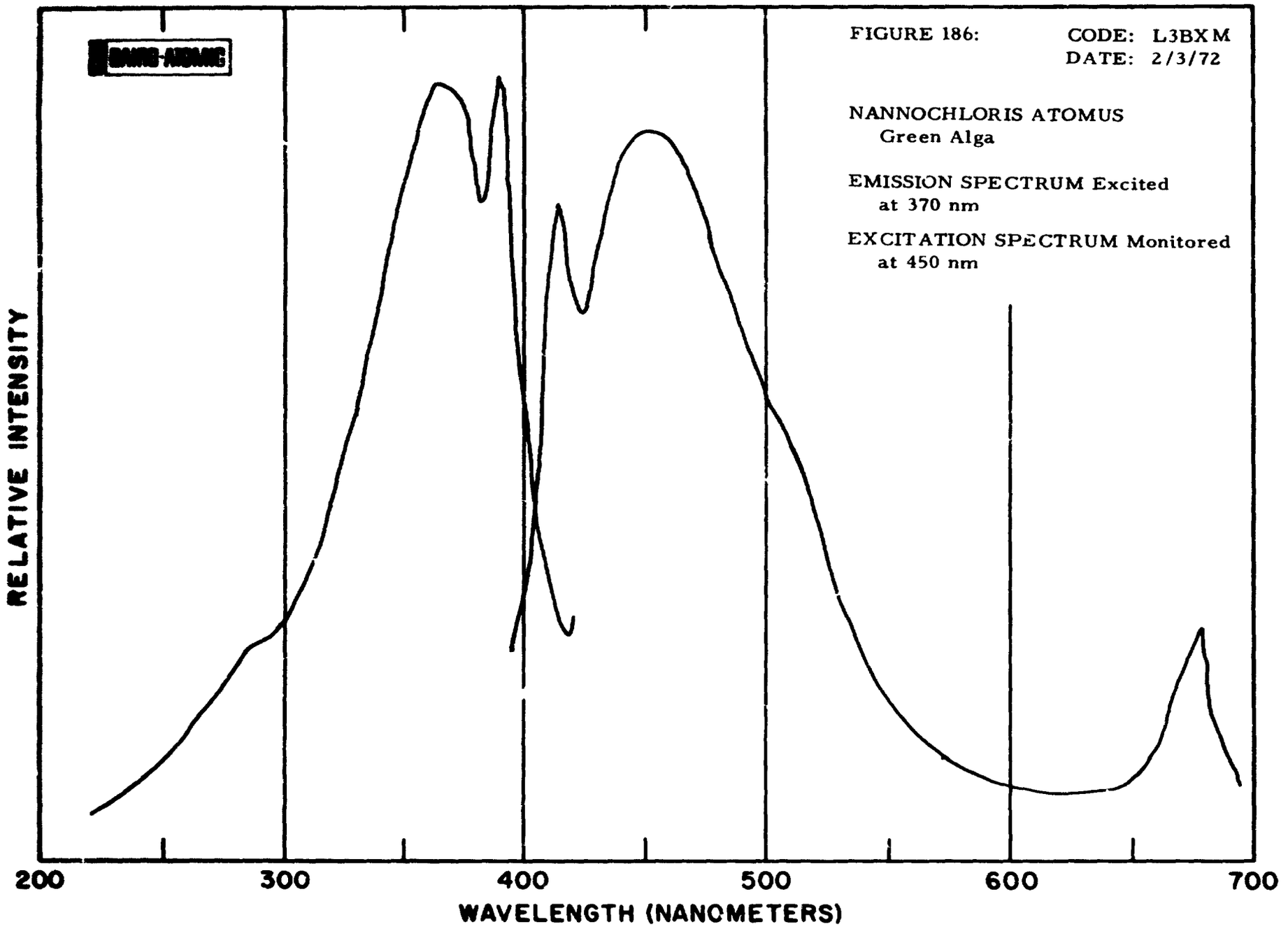


FIGURE 183:
CODE: L1BM
DATE: 2/3/72
NANNOCHLORIS ATOMUS
Green Alga
EMISSION SPECTRUM Excited
at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 184:
CODE: LIBX
DATE: 2/3/72
NANNOCHLORIS ATOMUS
Green Alga
EXCITATION SPECTRUM Monitored
at 680 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 185:
CODE: L2BXM
DATE: 2/3/72
NANNOCHLORIS ATOMUS
Green Alga
EMISSION SPECTRUM Excited
at 290 nm
EXCITATION SPECTRUM Monitored
at 342 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 186:
CODE: L3BXM
DATE: 2/3/72
NANNOCHLORIS ATOMUS
Green Alga
EMISSION SPECTRUM Excited at 370 nm
EXCITATION SPECTRUM Monitored at 450 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

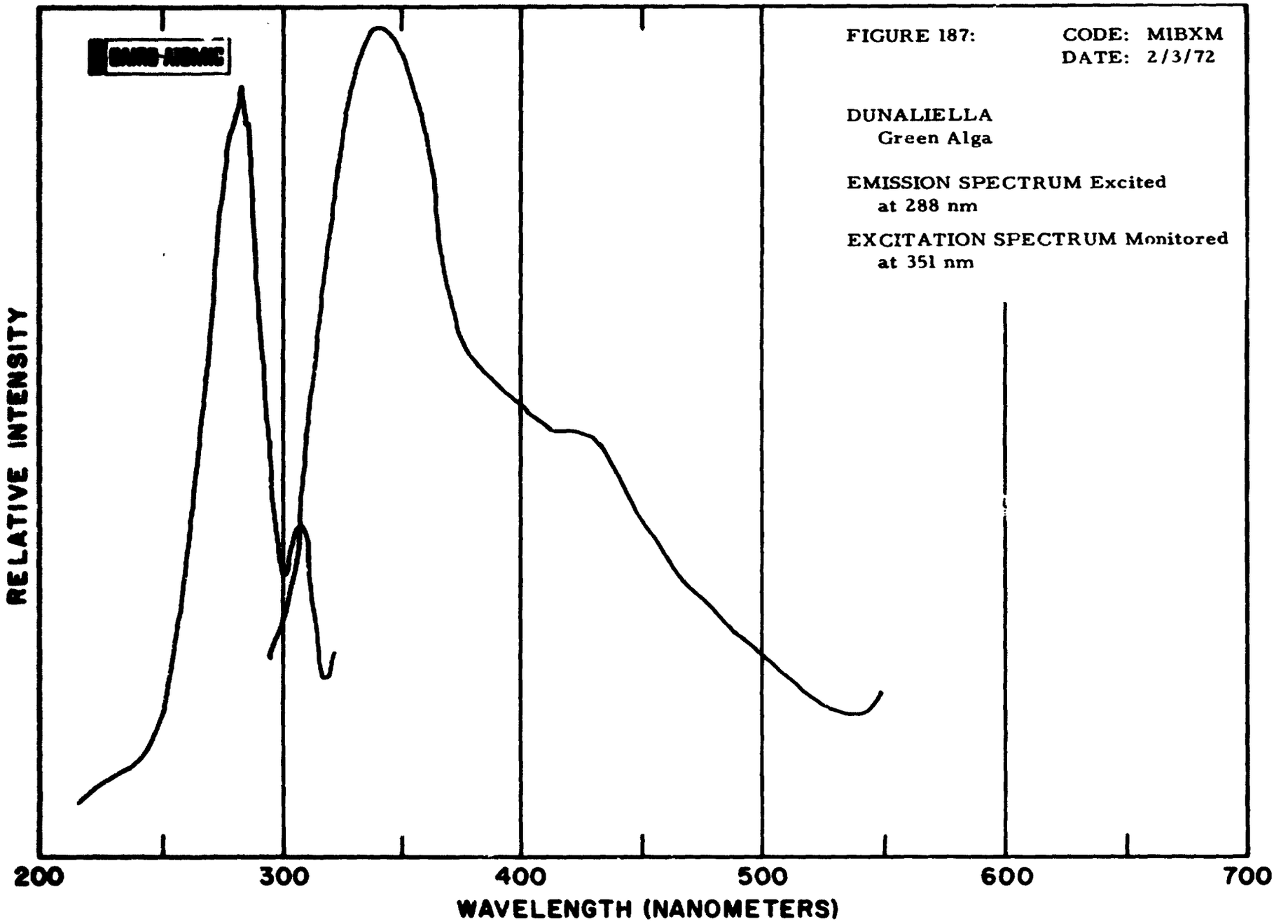


FIGURE 187:
CODE: MIBXM
DATE: 2/3/72
DUNALIELLA
Green Alga
EMISSION SPECTRUM Excited at 288 nm
EXCITATION SPECTRUM Monitored at 351 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

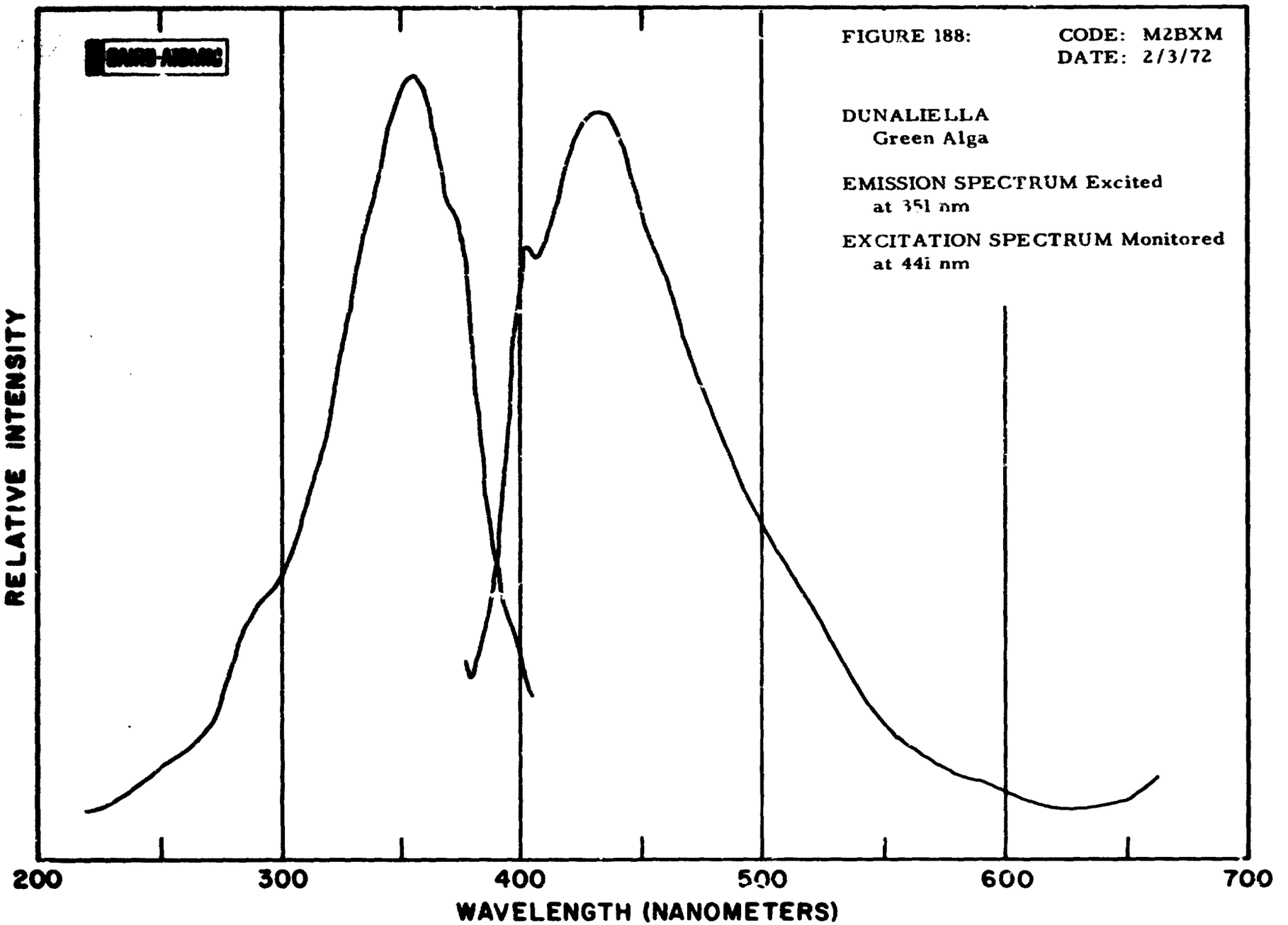


FIGURE 188:
CODE: M2BXM
DATE: 2/3/72
DUNALIELLA
Green Alga
EMISSION SPECTRUM Excited at 351 nm
EXCITATION SPECTRUM Monitored at 441 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

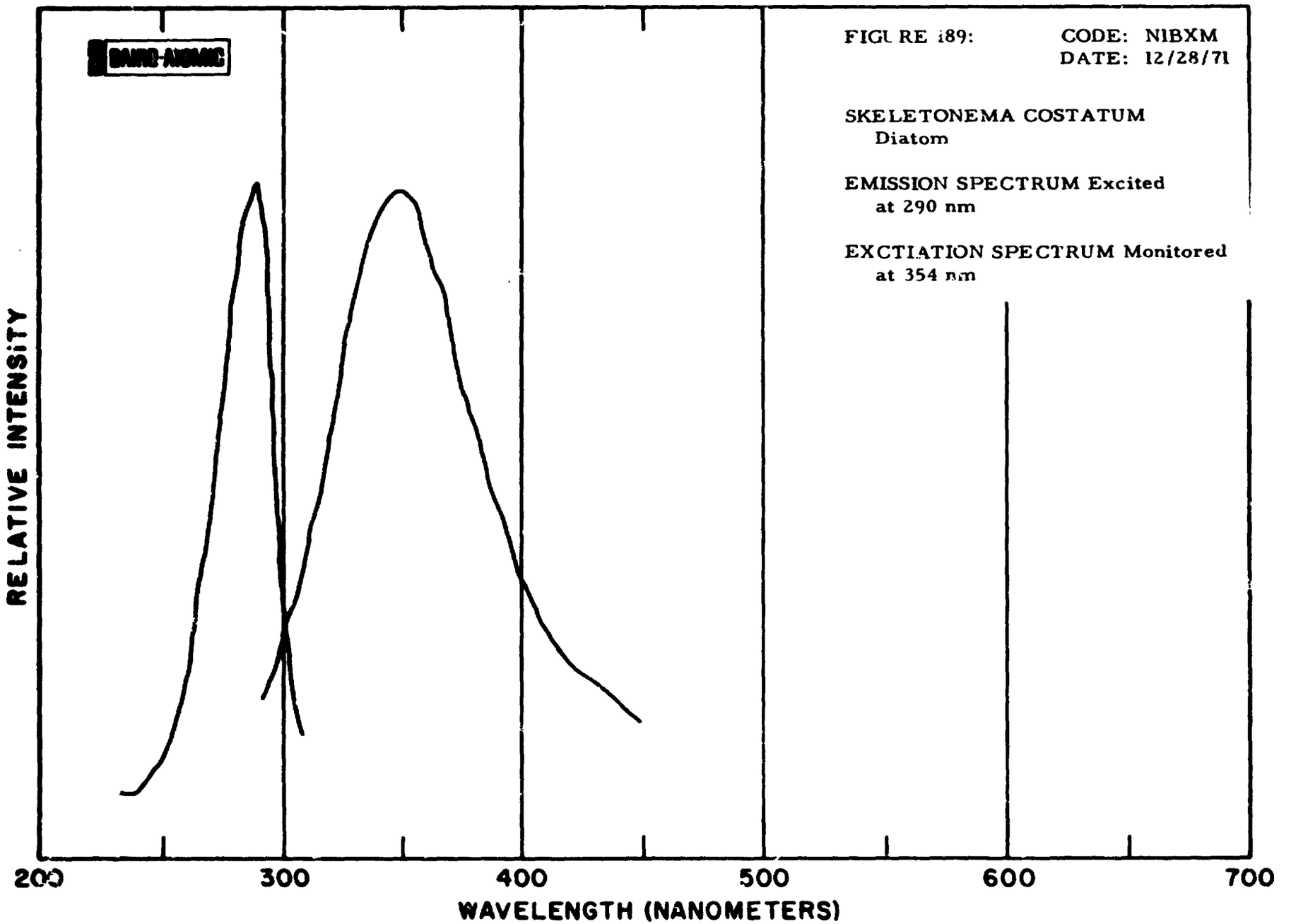
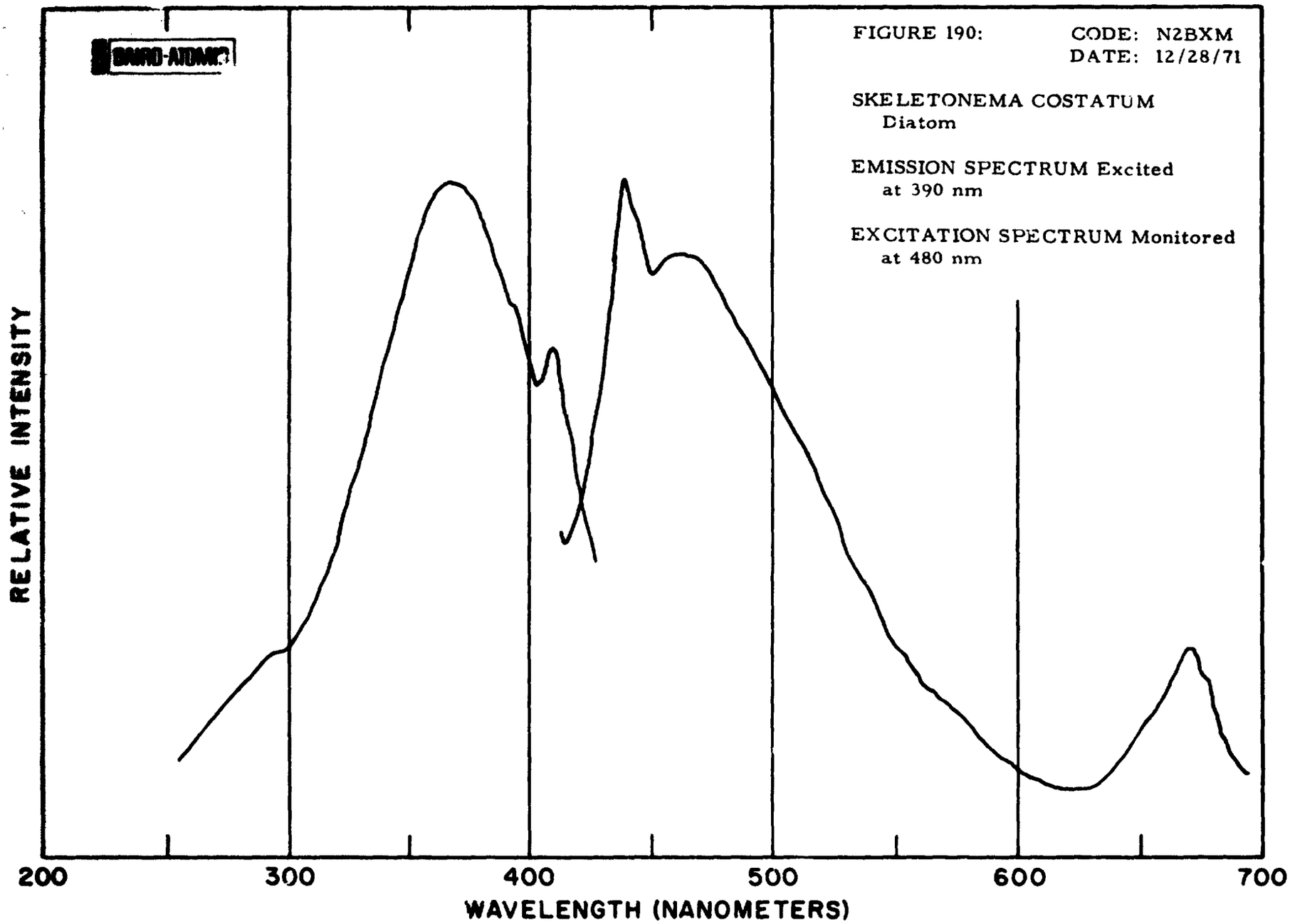


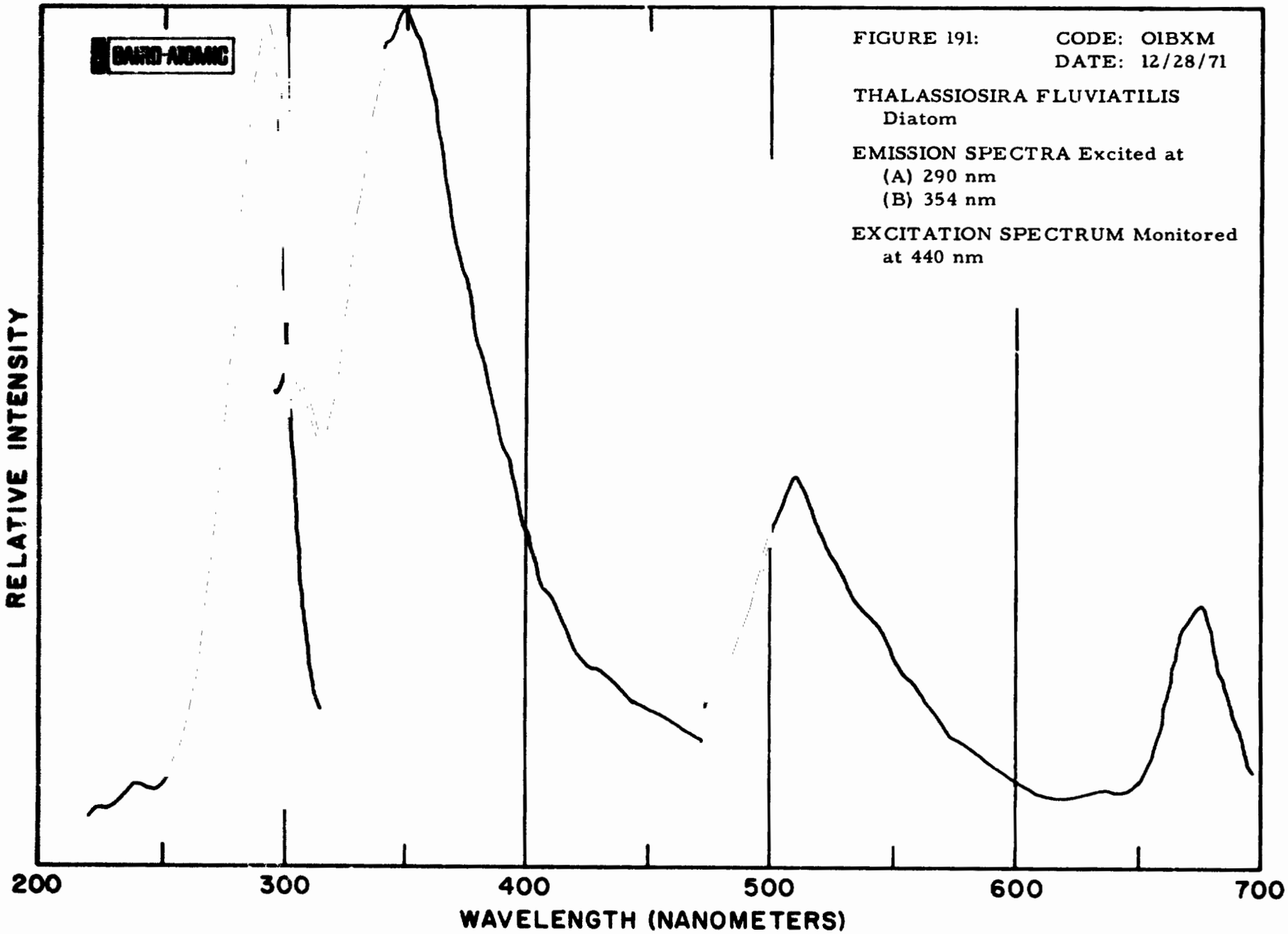
FIGURE 189: CODE: N1BXM
DATE: 12/28/71

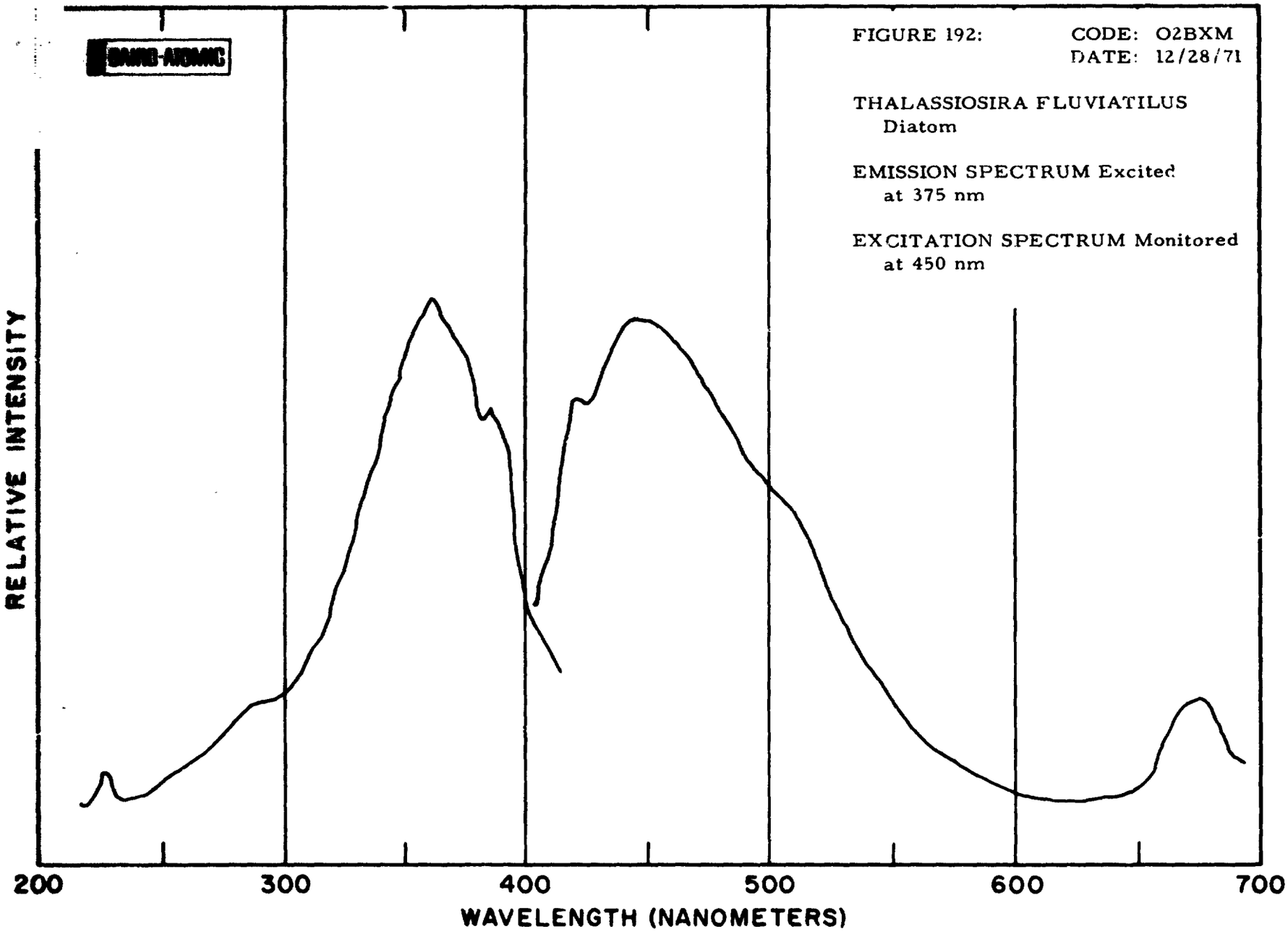
SKELETONEMA COSTATUM
Diatom

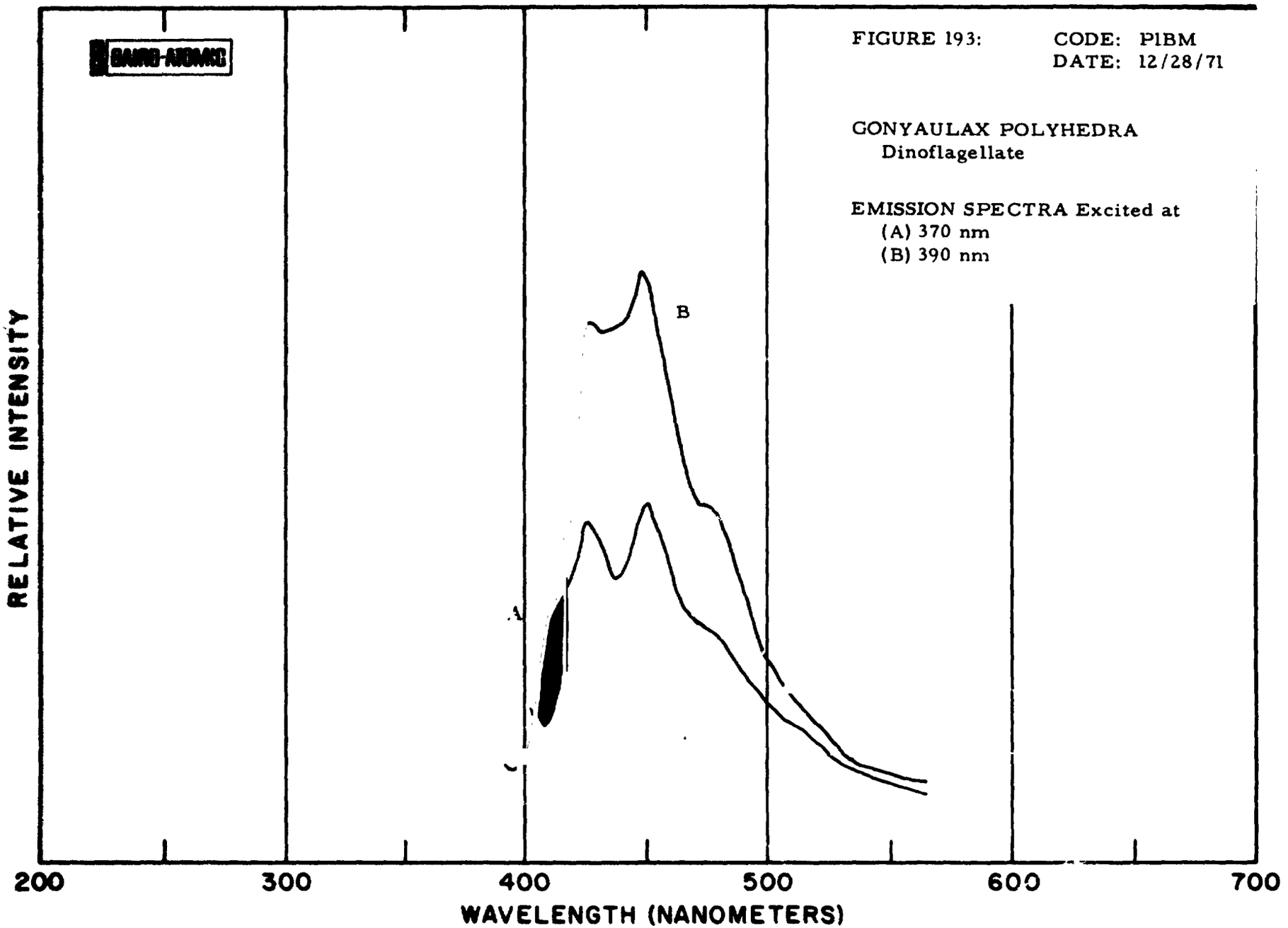
EMISSION SPECTRUM Excited
at 290 nm

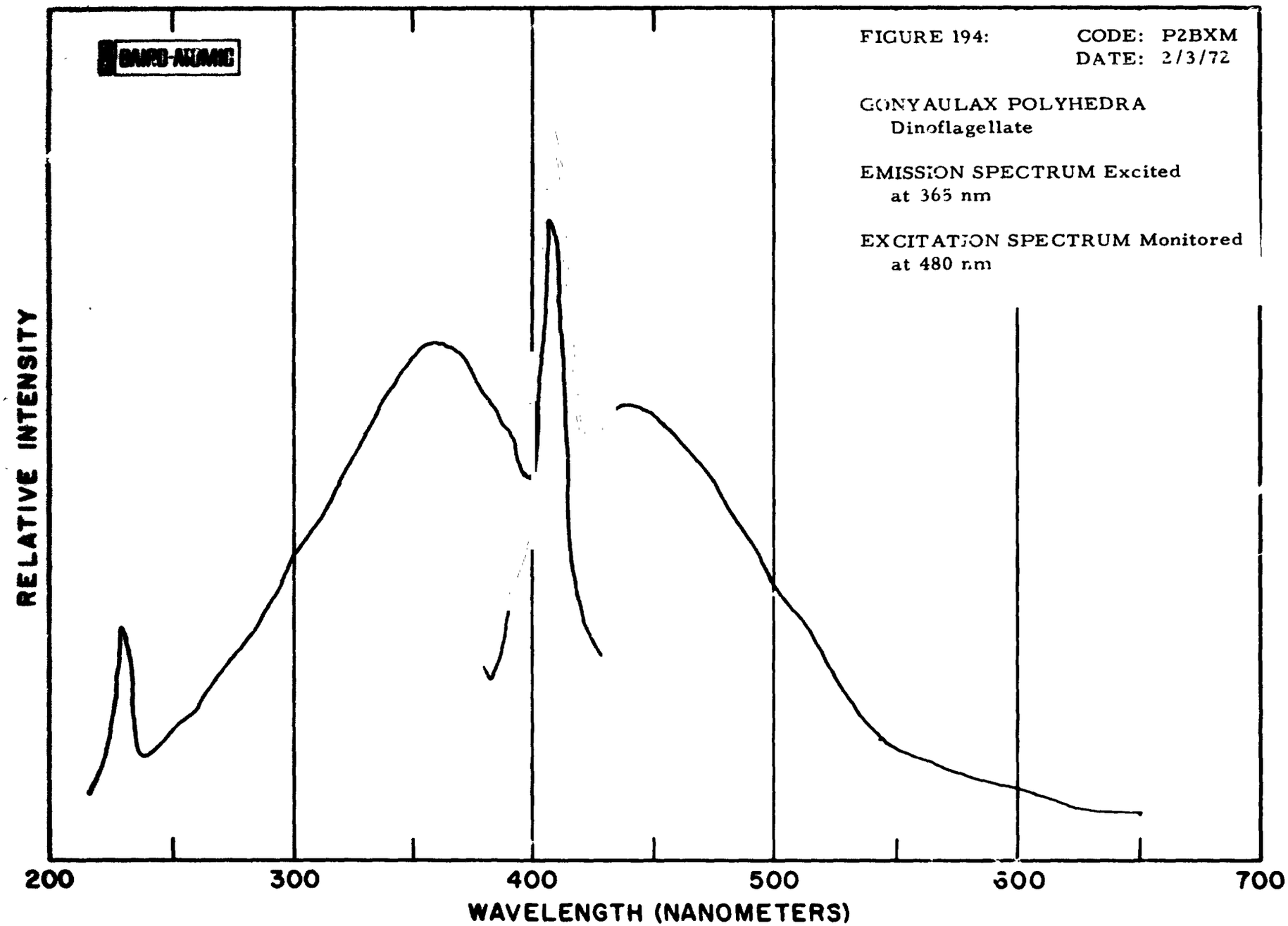
EXCTIATION SPECTRUM Monitored
at 354 nm

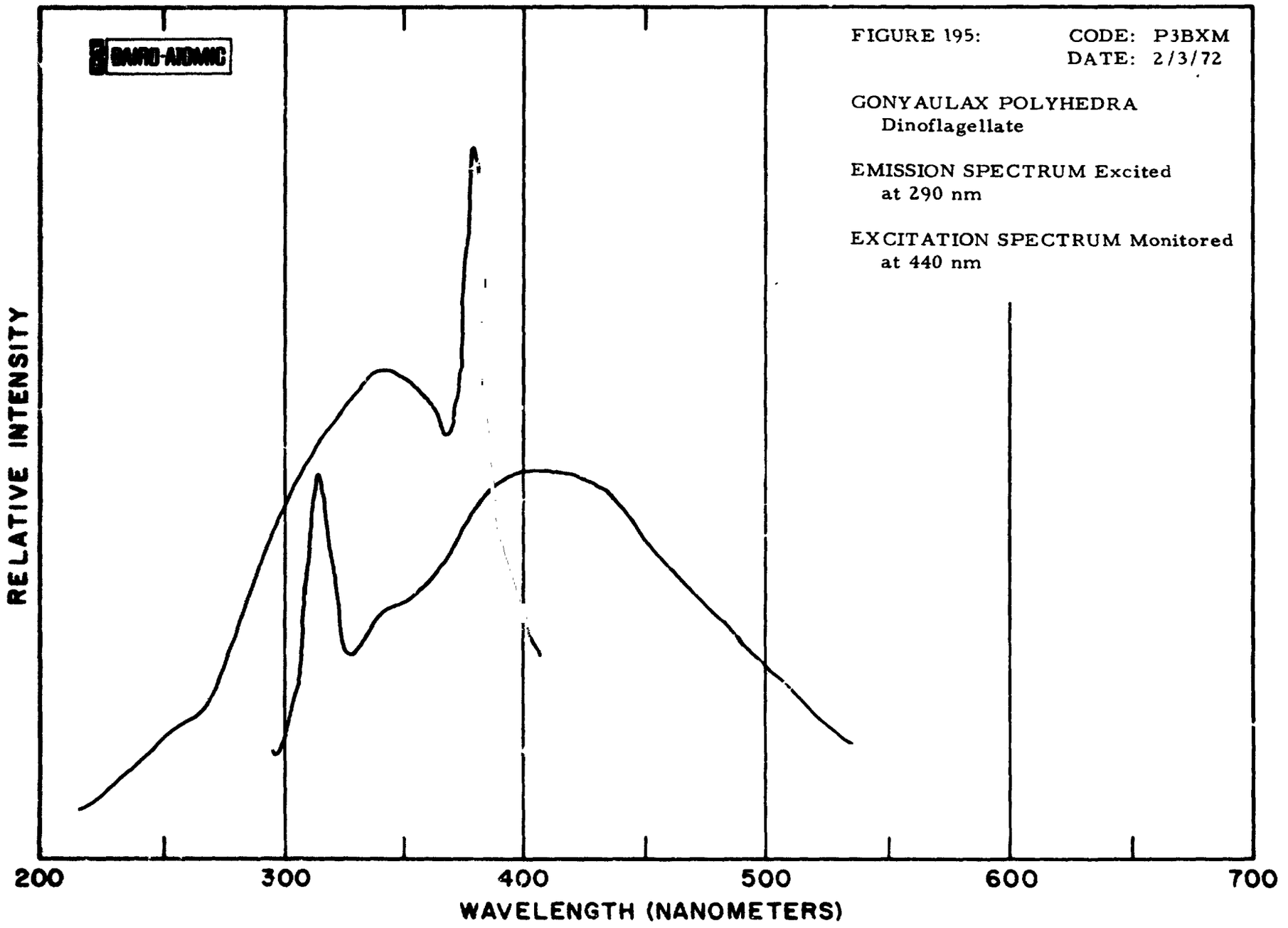

BAIRD-ATOMIC
FIGURE 190:
CODE: N2BXM
DATE: 12/28/71
SKELETONEMA COSTATUM
Diatom
EMISSION SPECTRUM Excited
at 390 nm
EXCITATION SPECTRUM Monitored
at 480 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)

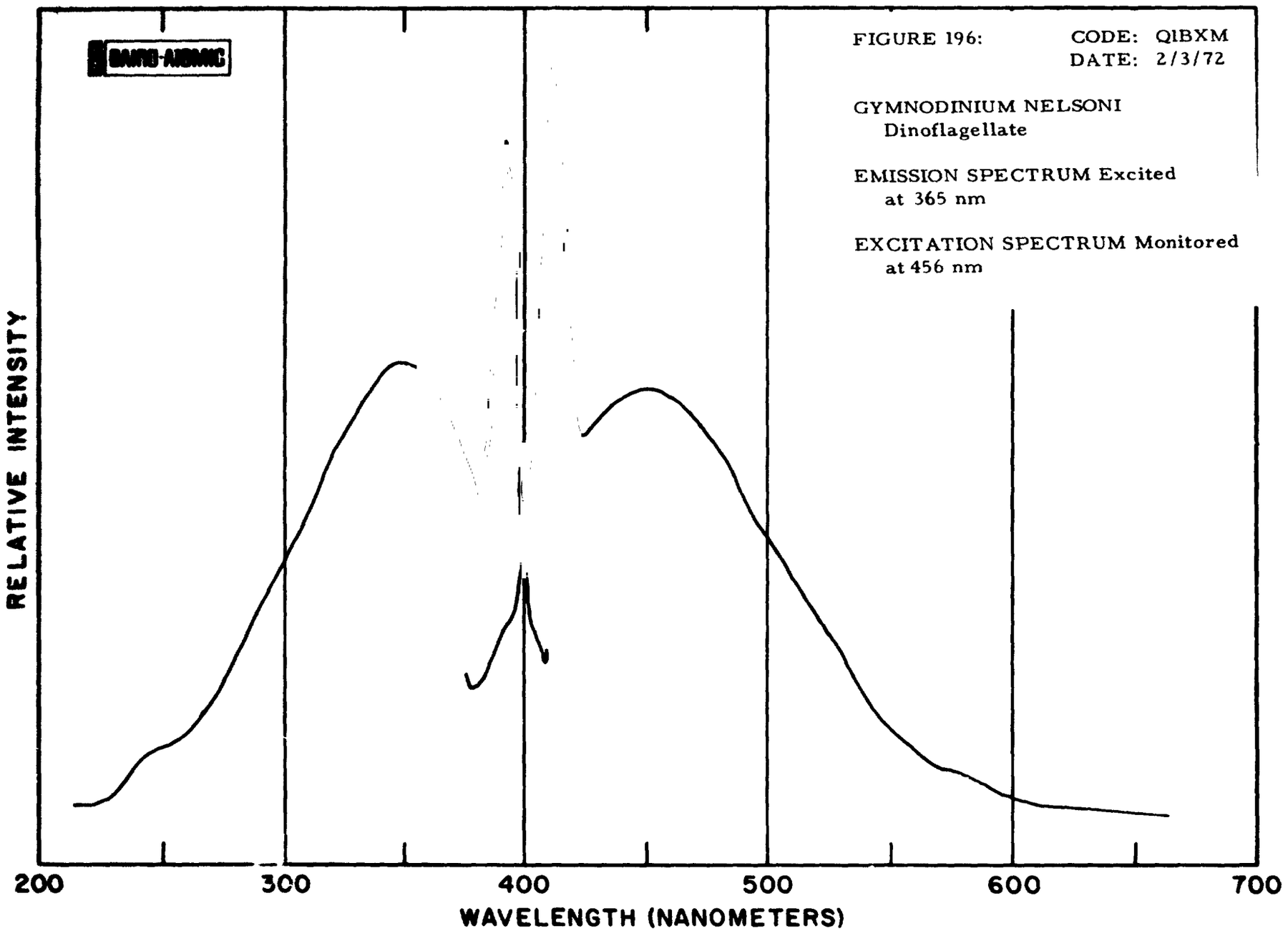

BAIRD-ATOMIC
FIGURE 191:
CODE: OIBXM
DATE: 12/28/71
THALASSIOSIRA FLUVIATILIS
Diatom
EMISSION SPECTRA Excited at
(A) 290 nm
(B) 354 nm
EXCITATION SPECTRUM Monitored
at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 192:
CODE: O2BXM
DATE: 12/28/71
THALASSIOSIRA FLUVIATILUS
Diatom
EMISSION SPECTRUM Excited
at 375 nm
EXCITATION SPECTRUM Monitored
at 450 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 193:
CODE: P1BM
DATE: 12/28/71
GONYAULAX POLYHEDRA
Dinoflagellate
EMISSION SPECTRA Excited at
(A) 370 nm
(B) 390 nm
B
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 194:
CODE: P2BXM
DATE: 2/3/72
GONYAULAX POLYHEDRA
Dinoflagellate
EMISSION SPECTRUM Excited at 365 nm
EXCITATION SPECTRUM Monitored at 480 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 195:
CODE: P3BXM
DATE: 2/3/72
GONYAULAX POLYHEDRA
Dinoflagellate
EMISSION SPECTRUM Excited at 290 nm
EXCITATION SPECTRUM Monitored at 440 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)


BAIRD-ATOMIC
FIGURE 196:
CODE: QIBXM
DATE: 2/3/72
GYMNODINIUM NELSONI
Dinoflagellate
EMISSION SPECTRUM Excited
at 365 nm
EXCITATION SPECTRUM Monitored
at 456 nm
RELATIVE INTENSITY
200
300
400
500
600
700
WAVELENGTH (NANOMETERS)