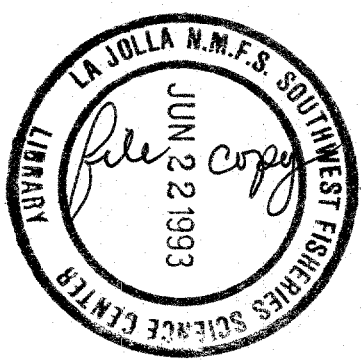
NOAA Technical Memorandum NMFS

MAY 1993

SUMMARY OF CETACEAN SURVEY DATA COLLECTED BETWEEN THE YEARS OF 1974 AND 1985

Timothy Lee



NOAA-TM-NMFS-SWFSC-181

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southwest Fisheries Science Center

NOAA Technical Memorandum NMFS

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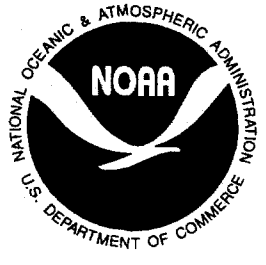

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INTRODUCTION

In this paper presents marine mammal ship survey results are presented from cruises conducted by the Southwest Fisheries Science Center (SWFSC) between the years of 1974 and 1985. This study was undertaken to allow a comparison of cetacean distribution and abundance between these older and current.

To make such a comparison, the data from the older ship surveys were converted into the format that is being used currently. Older data are in 2 different formats. That collected before the year of 1982 was in the "M" format, and that collected from 1982 to 1985 was in "R" format (Appendix 1). Conversion programs were written in Fortran 77 (Appendices 2 and 3).

After the data were converted, the cruise tracks were plotted. Sightings of the common cetacean species were also plotted. Summary information is presented on the number of sightings and the number of animals seen per survey mile for all of the cetacean species.

METHODS

The data collected before 1989 were stored in two separate files, a sighting file and an effort file (Appendix 1). The sighting file contained information such as the position of the marine mammals, time of sighting, species identification, "best" "high" and "low" school size estimates, etc. The effort file contained information pertaining to the time and position of observational effort, the weather condition, the ship's course and speed, etc. The new format has all the sighting and effort information integrated into one file (Appendix 4). Each line of information has a letter code in the fourth data column describing the type of event. For instance, a sighting event has an "S" code followed by time and position of sighting, the sight number, the observer ID, cue code, etc. A guide for converting data from old to new format is given in Appendix 6.

Each of the species stocks has a two digit number assigned to it by the SWFSC (Appendix 5). This number is used in the observer data forms as a species identification code. Once a school of marine mammals has been spotted, the observers identify the species as best they can and estimate school size. It is not always possible to identify the animals to the species or subspecies

level, so there are also codes for "unidentified" species sightings. For example code "05" is used for unidentified Delphinus, meaning the observers were unable to discern whether this was a school of long beaked or short beaked Delphinus. "49" is the code used when a beaked whale is sighted but it is not possible to determine what species of beaked whale it is. "78" is used for an unidentified small whale, etc.

Not all data were recorded for all years. For example, previous to 1979, Beaufort sea state, horizontal sun position, and vertical sun position were not recorded, and previous to 1991 there were no independent observers.

The number of sightings while on effort was tallied for each species. The estimated total number of animals seen was calculated as the sum of the "best" estimates of abundance from the consensus of all observers (pre-1982) or as the sum of the average "best" estimates from each individual observer who made an estimate (1982 and later). A school size was not included in the tally if no "best" estimate was available. The encounter rates were calculated as the number of sightings (or number of individuals) seen per nautical mile of survey effort. The length of survey effort was calculated as the great circle distance between the beginning and ending positions or, if the beginning or ending positions were missing, as the product of the vessel speed times the difference between the beginning and ending times.

In all, there were seventeen different cruises whose data were analyzed and cruise tracks mapped. The objectives pertaining to marine mammals, and itineraries of each cruise are summarized in the following section.

CRUISE SUMMARIES

Cruise 0084 (Jan-Feb 1974): The objective of this cruise was to conduct a school density survey of delphinids independent of the fishing fleet. The DAVID STARR JORDAN left San Diego January 2, 1974 and arrived at Rodman Naval Base, Panama on January 20. It departed Rodman Naval base January 26 and arrived in San Diego February 26, 1974.

Cruise 0168 (Jan-Mar 1976): The objective of this cruise was to survey the eastern tropical Pacific for suspected boundaries of offshore dolphin populations. It was conducted in coordination with the DAVID STARR JORDAN (cruise 169). The TOWNSEND CROMWELL departed from Honolulu January 5, 1976, and arrived in San Cristobal, Wreck Bay, Galapagos Islands, January 30, 1976. It then sailed to Chatham Bay, Cocos Island, and then to Puntarenas, Costa Rica, before sailing for San Diego, where it arrived March 3, 1976.

Cruise 0169 (Jan-Mar 1976): The objectives of this cruise were to survey the eastern tropical Pacific for suspected boundaries of offshore dolphin populations, and to find any correlation between distribution of marine mammals and environmental factors. It was

conducted in coordination with the TOWNSEND CROMWELL (cruise 168). The DAVID STARR JORDAN departed San Diego January 5, 1976 and arrived in San Cristobal, Wreck Bay, Galapagos Islands, January 30, 1976. It then sailed to the Cocos Island and then to Puntarenas, Costa Rica, before sailing for San Diego, where it arrived March 2, 1976. Neither a table of on effort sighting frequencies, nor a map of tracklines could be generated because no effort data was recorded during this cruise.

Cruise 212 (Nov-Dec 1976): The objectives of this cruise were to compare ship based counts of dolphin schools to counts from aerial photographs, and to determine if there is a relationship between the distribution of dolphins and environmental factors. The SURVEYOR left Seattle November 15, 1976, and arrived in San Diego, December 9, 1976, where the cruise ended. A table of on effort sightings could not be generated because all sightings were made by a combination of shipboard observers and observers in a helicopter, therefore the on effort sightings are not comparable to those made on other cruises.

Cruise 213 (Jan-Mar 1977): The objective of this cruise was to conduct a dolphin survey in the eastern tropical Pacific. This survey was coordinated with an aerial survey, and a TOWNSEND CROMWELL survey (cruise 214) being conducted simultaneously. The DAVID STARR JORDAN left San Diego January 4, 1977, and arrived in Callao, Peru February 4. It then returned to San Diego March 8, 1977, where the cruise ended.

Cruise 214 (Jan-Mar 1977): The objective of this cruise was to conduct a dolphin survey in the eastern tropical Pacific. This survey was coordinated with an aerial survey and a DAVID STARR JORDAN survey (cruise 213) being conducted simultaneously. The TOWNSEND CROMWELL departed Honolulu January 6, 1977, and arrived in Papeete, Tahiti February 2, 1977. It then sailed to Taiohae Bay, Nuku Hiva and back to Papeete, before arriving in Honolulu March 25, 1977, where the cruise ended.

Cruise 216 (Jul-Aug 1976): The objective of this cruise was to conduct a survey of marine mammals in the tropical Pacific. The OCEANOGRAPHER departed Honolulu July 29, 1976 and returned to Honolulu August 20, 1976. The cruise ended early because of a medical emergency. Neither a table of on effort sighting frequencies, nor a map of tracklines could be generated because no effort data was recorded during this cruise.

Cruise 232 (Mar-Apr 1977): The objective of this cruise was to survey the tropical Pacific to determine the behavior, distribution, and population density of marine mammals. The OCEANOGRAPHER departed from Seattle March 24, 1977, and returned to Seattle April 15, 1977, where the cruise ended.

Cruise 310 (Jun-July 1977): The objective of this cruise was to survey the eastern tropical Pacific for distribution and density of marine mammals. The OCEANOGRAPHER left San Diego June 27, 1977

of marine mammals. The OCEANOGRAPHER left San Diego June 27, 1977 and arrived in Seattle July 29, 1977 where the cruise ended.

Cruise 0319 (Oct-Nov 1977): The objectives of this cruise were to determine how the distribution of dolphins is affected by the intensification of the Peru current and the north equatorial countercurrent, and to search the equatorial front to determine dolphin distribution in this region. The DAVID STARR JORDAN left San Diego October 3, 1977, docked in Callao, Peru October 26, before returning to San Diego where it arrived Nov 21, 1977.

Cruises 412 (Feb-May 1978): No documentation was available on this cruise as it was not a designated marine mammal cruise. Marine mammal observers were allowed to survey on a noninterference basis only and no effort records were recorded. Because of this, it was not possible to generate a table of on effort sightings.

Cruise 428 (Aug-Sept 1978): No documentation was available on this cruise as it was not a designated marine mammal cruise. Marine mammal observers were allowed to survey on a noninterference basis only.

Cruise 0463 and 0464 (Jan-Mar 1979): The objective of these cruises was to conduct a calibration study off southern Mexico and Central America to make a comparison of the dolphin density estimates obtained from two ships and an aircraft surveying the same area. The two ships, the DAVID STARR JORDAN and the TOWNSEND CROMWELL, began their surveys on January 3, 1979, and returned to port in mid March 1979.

Cruise 0564 (Sept-Oct 1979): There were six objectives of this cruise pertaining to marine mammals.

1. To study marine mammal movement between inshore and offshore regions of the California Current.
2. To study the relationship between populations in the California Current to those in the south that are involved with tuna fishing.
3. To determine if certain areas or times should be given special consideration in assessments of population status.
4. To study aspects of species interaction that relate to time and area.
5. To study the relation between time, area, and school size.
6. To study influence of upwelling, convergences, shear zones, currents, and sea floor topography on marine mammals in the California Current.

The DAVID STARR JORDAN left the port of San Diego on September 27, 1979 and arrived back in San Diego on October 24, 1979. The results of this cruise are discussed in a paper on the relationship between cetaceans and sea-surface chlorophyll concentrations in the California Current (Smith et al 1986).

Cruise 0598 and 0599 (Jan-Mar 1980): The objectives of these cruises were to investigate density gradients of dolphins, to study

school structure of dolphins, and to study the affects of environment in different portions of the dolphins habitats. The DAVID STARR JORDAN left San Diego January 3, 1980 and headed south to Rodman, Panama where it arrived January 28. It then made a stopover in Manzanillo, Mexico February 13, before returning to San Diego March 5, 1980. The TOWNSEND CROMWELL departed Honolulu on January 3,1980 and arrived in Panama on January 29, where it rendezvoused with the DAVID STARR JORDAN. It then made a stopover in Acapulco, Mexico on February 11, before returning to Honolulu on March 5, 1980.

Cruise 0642 (Mar-Apr 1980): There were four objectives of this cruise that pertain to marine mammals.

1. To gather information on the species composition and abundance of marine mammals.
2. To gather data on oceanographic correlates of marine mammal distribution.
3. To study population abundance, species composition, and stock ranges of dolphins.
4. To study the interactions of dolphins with fish and seabirds.

The OCEANOGRAPHER left San Diego on March 21, 1980 to survey the Eastern Tropical Pacific. It arrived in Kwajelein, Marshall Islands on April 19, 1980, where the cruise ended.

Cruise 0646 (June-July 1980) : The major objectives of this cruise were to study movements of marine mammals in nearshore and offshore areas of the California Current, and to assess the importance of coastal features, currents, and other processes to marine mammals. The DAVID STARR JORDAN left San Diego on June 17, 1980, and returned to San Diego on July 11, 1980. The results of this cruise are discussed also by Smith et al. (1986).

Cruise 0648 (July-Sept 1980): The primary objective of this cruise was to obtain certain physical oceanographic measurements for the Eastern Pacific Ocean Climate Study. On a noninterference basis, SWFSC observers were allowed to obtain information on cetaceans along the cruise track. The RESEARCHER left Miami on July 21 1980, surveyed the Caribbean, passed through the Panama Canal, surveyed the Tropical Pacific and returned to Miami in Sept 25, 1980.

Cruise 0687 (Jan-Apr 1981): This cruise was conducted primarily to collect information to support the Eastern Pacific Ocean Climate Study. However, SWFSC observers were allowed to collect information on cetaceans on a noninterference basis. The OCEANOGRAPHER left Seattle January 20, 1981, surveyed southward to approximately 8 degrees south of the equator, then returned to Seattle April 1, 1981.

Cruise 0716 (May-July 1981): This cruise was conducted to obtain oceanographic measurements to support the Eastern Pacific Ocean Climate Study. On a noninterference basis SWFSC observers

were allowed to collect information on cetaceans. Their objectives were

1. To gather data on seasonal aspects of cetacean distribution.
2. To obtain data on correlations between oceanographic features and cetacean communities.
3. To gather further data on the association of tuna and dolphins.

The OCEANOGRAPHER departed Seattle May 19, 1981 and arrived in San Diego on May 23. It sailed south to Panama where it arrived June 23, and then made its way back north reaching Seattle on July 29,1981.

Cruise 0798 (April 1982): This cruise was conducted to survey marine mammals in the Southern California Bight and to calibrate density estimates of pilot whales made from ship sightings and aerial sightings. The DAVID STARR JORDAN left Tiburon April 5, 1982 and returned to San Diego April 21, 1982.

Cruise 0801 (May-Aug 1982): The objectives of this cruise were to investigate the density gradients of dolphin populations in areas that are impacted by dolphin-tuna fishing, and to examine the variability in dolphin school size estimates among the various observers. The DAVID STARR JORDAN left San Diego May 13, 1982 and arrived in Honolulu, Hawaii July 7,1982, with one stopover in Manzanillo, Mexico on June 4. The cruise then continued to San Diego arriving there August 3, 1982.

Cruise 0843 (Jan-Apr 1983): This cruise was conducted to survey density, size, and species composition of dolphin schools in the area south of the Galapagos Islands. The DAVID STARR JORDAN departed San Diego on January 12, 1983 and returned to San Diego on April 13, 1983.

Cruise 0852 (Mar-Apr 1983): The objectives of this cruise were to determine if cetaceans react to the ship prior to their detection by shipboard observers, and to photograph and film dolphin schools. The SURVEYOR departed Seattle March 3, 1983 and arrived in Manzanillo Mexico March 18, 1983. After departing Manzanillo on March 25, it rendezvoused with the DAVID STARR JORDAN on March 26 and arrived in San Diego on April 11, 1983.

Cruise 0874 (Dec 1983): This cruise was undertaken to conduct a survey of short-finned pilot whale abundance in the Southern California Bight. The DAVID STARR JORDAN left San Diego on December 5, 1983, surveyed areas around the Channel Islands, and returned December 11, 1983.

Cruises 895, 942, and 970: These three cruises were conducted on the DAVID STARR JORDAN to survey harbor porpoise densities on the west coast of the USA. None of their data was analyzed because all of their survey effort was highly specialized search for harbor porpoise.

pilot whales in the Southern California Bight. The DAVID STARR JORDAN left San Diego on December 5, 1984, surveyed the area around the Channel Islands, and returned to San Diego on December 19, 1984.

Cruise 0910 (Jan-Feb 1985): This cruise was undertaken both to make population size estimates and study the seasonal distribution of harbor porpoises. The McARTHUR left Seattle on January 24, 1985, and arrived in San Diego on February 9, 1985. There was one circumnavigation of Santa Catalina Island to search for pilot whales and a specialized study of harbor porpoise along inshore areas of the California coast.

RESULTS

Cruise tracks and distributions of sightings of the common cetacean species are illustrated in Figures 1 to 89 for each of the SWFSC cruises from 1974 to 1985. The total on-effort distances surveyed for each of the cruises are given in Table 1. Encounter rates of the number of groups seen and the estimated number of individuals seen of each species are given for each cruise in Tables 2 to 27.

ACKNOWLEDGEMENTS

This report was made possible through the work of many dedicated individuals. I'd like to give special thanks to Al Jackson for all the help with understanding the original data formats, Jim Carretta, Karin Forney, and Fred Julian for their help with the computer work. Special thanks also to Jay Barlow whose programs and programming assistance made all the figures and tables in this report possible.

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Smith, R.C., P. Dustan, D. Au, K.S. Baker, and E.A. Dunlap. 1986. Distribution of cetaceans and sea surface chlorophyll concentrations in the California Current. Marine Biology 91: 385-402.

Table 1. Summary marine mammal cruise information for cruises from 1974-85

CRUISE NUMBER	DATE	AREA SURVEYED	TOTAL DISTANCE ON EFFORT (NMI)
84	Jan-Mar 1974	ETP	3752
168	Jan-Mar 1976	ETP	5421
169	Jan-Mar 1976	ETP	0
207	Oct-Nov 1976	ETP	475
212	Nov-Dec 1976	ETP	2396
213	Jan-Mar 1977	ETP	6040
214	Jan-Mar 1977	ETP	7537
216	Jul-Aug 1976	ETP	0
232	Mar-Apr 1977	ETP	1981
310	Jun-Jul 1977	ETP	2029
319	Oct-Nov 1977	ETP	4896
412	Feb-May 1978	ETP	0
428	Aug-Sept 1978	ETP	1371
463	Jan-Mar 1979	ETP	6124
464	Jan-Mar 1979	ETP	5988
564	Sept-Oct 1979	W. Coast	2302
598	Jan-Mar 1980	ETP	5319
599	Jan-Mar 1980	ETP	5250
642	Mar-Apr 1980	ETP	2467
646	Jun-Jul 1980	W. Coast	2155
648	Jul-Sept 1980	ETP	2625
687	Jan-Apr 1981	ETP	3059
716	May-Jul 1981	ETP	4510
798	Apr 1982	W. Coast	1173
801	May-Aug 1982	ETP	6028
843	Jan-Apr 1983	ETP	6561
852	Mar-Apr 1983	ETP	588
874	Dec 1983	W. Coast	425
905	Dec 1984	W. Coast	767
910	Jan-Feb 1985	W. Coast	50

Table 2. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

Cruise 0084

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Stenella attenuata A (02)*	10	5858	0.00267	1.56130
Stenella longirostris (03)	6	4833	0.00160	1.28811
Delphinus sp. (05)	7	2180	0.00187	0.58102
S. longirostris o. (10)*	3	1057	0.00080	0.28172
S. longirostris hybrid (11)	3	994	0.00080	0.26479
S. coeruleoalba (13)	9	490	0.00240	0.13060
Tursiops truncatus (18)	1	15	0.00027	0.00400
Grampus griseus (21)	1	1	0.00027	0.00027
Lagenodelphis hosei (26)	2	251	0.00053	0.06690
Pseudorca crassidens (33)	1	101	0.00027	0.02679
Unident. Pilot Whale (34)	1	1	0.00027	0.00027
Orcinus orca (37)	1	1	0.00027	0.00027
Physeter macrocephalus (46)	6	42	0.00160	0.01119
Unidentified Rorqual (70)	5	6	0.00133	0.00160
B. acutorostrata (71)	1	1	0.00027	0.00027
Unidentified delfinid (77)	19	514	0.00506	0.13699
Unidentified sm. whale (78)	7	31	0.00187	0.00826
Unidentified lg. whale (79)	19	19	0.00506	0.00506
Unid S. attenuatta (90)	1	20	0.00027	0.00533
Total Distance On Effort:	3751.58			

* Stenella attenuata subsp. A (offshore spotted dolphin)
* S. longirostris orientalis

Table 3. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

Cruise 0168

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Stenella attenuata A (02)*	6	1560	0.00111	0.28777
Stenella longirostris (03)	1	15	0.00018	0.00277
Delphinus sp. (05)	6	635	0.00111	0.11714
S. longirostris hybrid (11)	2	1160	0.00037	0.21398
S. coeruleoalba (13)	17	711	0.00314	0.13116
Tursiops truncatus (18)	6	72	0.00111	0.01328
Grampus griseus (21)	2	21	0.00037	0.00387
Lagenodelphis hosei (26)	1	200	0.00018	0.03689
Unident. Pilot Whale (34)	9	169	0.00166	0.03118
Orcinus orca (37)	1	2	0.00018	0.00037
Physeter macrocephalus (46)	5	48	0.00092	0.00885
Unidentified Ziphiid (49)	4	8	0.00074	0.00148
Unidentified Rorqual (70)	10	18	0.00184	0.00332
B. musculus (75)	3	6	0.00055	0.00111
Unidentified delfinid (77)	11	950	0.00203	0.17524
Unidentified sm. whale (78)	4	5	0.00074	0.00092
Unidentified lg. whale (79)	10	13	0.00184	0.00240

Total Distance On Effort: 5421 NMI

* Stenella attenuata subsp. A (offshore spotted dolphin)

Table 4. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

Cruise 0207

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Stenella attenuata A (02)*	1	60	0.00211	0.12632
Delphinus sp. (05)	1	14	0.00211	0.02947
S. longirostris o. (10)*	1	240	0.00211	0.50526
S. coeruleoalba (13)	2	118	0.00421	0.24842
L. obliquidens (22)	1	6	0.00211	0.01263
Unidentified Rorqual (70)	1	1	0.00211	0.00211
Unidentified sm. whale (78)	2	2	0.00421	0.00421
Unidentified lg. whale (79)	1	1	0.00211	0.00211
Unid S. attenuatta (90)	1	40	0.00211	0.08421

Total Distance On Effort: 475 NMI

* Stenella attenuata subsp. A (offshore spotted dolphin)
* S. longirostris orientalis

Table 5. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

Cruise 0213

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Stenella attenuata A (02)*	18	4239	0.00298	0.70182
Delphinus sp. (05)	12	2316	0.00199	0.38344
S. longirostris o. (10)*	2	245	0.00033	0.04056
S. longirostris hybrid (11)	19	5878	0.00315	0.97318
S. coeruleoalba (13)	19	1912	0.00315	0.31656
Steno bredanensis (15)	3	48	0.00050	0.00795
Tursiops truncatus (18)	6	345	0.00099	0.05712
Grampus griseus (21)	14	201	0.00232	0.03328
Lagenodelphis hosei (26)	3	444	0.00050	0.07351
Pseudorca crassidens (33)	4	92	0.00066	0.01523
Unident. Pilot Whale (34)	24	284	0.00397	0.04702
Orcinus orca (37)	2	13	0.00033	0.00215
Physeter macrocephalus (46)	17	115	0.00281	0.01904
Unidentified ziphiid (49)	7	26	0.00116	0.00430
Ziphius cavirostris (61)	3	6	0.00050	0.00099
Unidentified Rorqual (70)	11	17	0.00182	0.00281
B. physalus (74)	1	2	0.00017	0.00033
B. musculus (75)	1	2	0.00017	0.00033
Unidentified delfinid (77)	35	1009	0.00579	0.16705
Unidentified sm. whale (78)	29	737	0.00480	0.12202
Unidentified lg. whale (79)	31	40	0.00513	0.00662
Unidentified cetacean (96)	2	8	0.00033	0.00132

Total Distance On Effort: 6040 NMI

* Stenella attenuata subsp. A (offshore spotted dolphin)
* Stenella attenuata graffmani
* S. longirostris orientalis

Table 6. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

Cruise 0214

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Stenella attenuata A (02)*	8	460	0.00106	0.06103
Stenella longirostris (03)	3	322	0.00040	0.04272
Delphinus sp. (05)	1	500	0.00013	0.06634
S. longirostris hybrid (11)	1	70	0.00013	0.00929
S. coeruleoalba (13)	4	228	0.00053	0.03025
Steno bredanensis (15)	1	12	0.00013	0.00159
Tursiops truncatus (18)	3	25	0.00040	0.00332
Lagenodelphis hosei (26)	3	2500	0.00040	0.33170
Feresa attenuata (32)	1	8	0.00013	0.00106
Pseudorca crassidens (33)	4	43	0.00053	0.00571
Unident. Pilot Whale (34)	4	39	0.00053	0.00517
Orcinus orca (37)	1	4	0.00013	0.00053
Physeter macrocephalus (46)	6	33	0.00080	0.00438
Unidentified ziphiid (49)	3	11	0.00040	0.00146
Unidentified Rorqual (70)	1	2	0.00013	0.00027
B. edeni (72)	1	1	0.00013	0.00013
Sei Whale (73)	2	3	0.00027	0.00040
B. physalus (74)	1	1	0.00013	0.00013
M. novaeangliae (76)	2	3	0.00027	0.00040
Unidentified delfinid (77)	4	466	0.00053	0.06183
Unidentified sm. whale (78)	14	341	0.00186	0.04524
Unidentified lg. whale (79)	11	21	0.00146	0.00279

Total Distance On Effort: 7537 NMI

* Stenella attenuata subsp. A (offshore spotted dolphin)

Table 7. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

Cruise 0232

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Grampus griseus (21)	1	10	0.00050	0.00505
Lagenodelphis hosei (26)	1	375	0.00050	0.18930
Phocoenoides dalli (44)	1	12	0.00050	0.00606
Physeter macrocephalus (46)	1	8	0.00050	0.00404
Unidentified Zyphiid (49)	1	2	0.00050	0.00101
Ziphius cavirostris (61)	1	1	0.00050	0.00050
Unidentified Rorqual (70)	2	3	0.00101	0.00151
Unidentified delfinid (77)	5	634	0.00252	0.32004
Unidentified sm. whale (78)	1	1	0.00050	0.00050
Unidentified cetacean (96)	2	4	0.00101	0.00202

Total Distance On Effort: 1981 NMI

Table 8. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

Cruise 0310

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Delphinus sp. (05)	1	40	0.00049	0.01971
Grampus griseus (21)	3	35	0.00148	0.01725
L. obliquidens (22)	1	170	0.00049	0.08379
Unidentified Ziphiid (49)	1	1	0.00049	0.00049
Unidentified delfinid (77)	6	101	0.00296	0.04978
Unidentified sm. whale (78)	1	2	0.00049	0.00099
Unidentified lg. whale (79)	2	3	0.00099	0.00148
Unidentified cetacean (96)	1	5	0.00049	0.00246

Total Distance On Effort: 2029 NMI

Table 9. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

Cruise 0319

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Stenella attenuata A (02)*	25	5354	0.00511	1.09346
Delphinus sp. (05)	10	2596	0.00204	0.53019
S. longirostris o. (10)*	4	470	0.00082	0.09599
S. longirostris hybrid (11)	11	2292	0.00225	0.46810
S. coeruleoalba (13)	13	1373	0.00266	0.28041
Steno bredanensis (15)	1	12	0.00020	0.00245
Tursiops truncatus (18)	10	232	0.00204	0.04738
Grampus griseus (21)	19	139	0.00388	0.02839
Peponcephala electra (31)	3	306	0.00061	0.06249
Pseudorca crassidens (33)	2	79	0.00041	0.01613
Unident. Pilot Whale (34)	15	146	0.00306	0.02982
G. macrorynchus (36)	2	25	0.00041	0.00511
Orcinus orca (37)	3	18	0.00061	0.00368
Physeter macrocephalus (46)	12	100	0.00245	0.02042
Unidentified ziphiid (49)	6	16	0.00123	0.00327
Unidentified Rorqual (70)	8	13	0.00163	0.00266
B. edeni (72)	2	4	0.00041	0.00082
Balaenoptera borealis (73)	1	1	0.00020	0.00020
Unidentified delfinid (77)	12	385	0.00245	0.07863
Unidentified sm. whale (78)	13	25	0.00266	0.00511
Unidentified lg. whale (79)	14	14	0.00286	0.00286
Unidentified cetacean (96)	5	17	0.00102	0.00347
Unidentified object (97)	1	2	0.00020	0.00041
Unidentified whale (98)	1	1	0.00020	0.00020

Total Distance On Effort: 4896.4 NMI

* Stenella attenuata subsp. A (offshore spotted dolphin)
* S. longirostris orientalis

Table 10. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

Cruise 0428

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Stenella attenuata A (02)*	1	10	0.00073	0.00729
Stenella longirostris (03)	2	23	0.00146	0.01678
Delphinus sp. (05)	4	551	0.00292	0.40190
Stenella attenuata g. (06)*	1	238	0.00073	0.17360
S. longirostris hybrid (11)	1	190	0.00073	0.13858
S. coeruleoalba (13)	1	150	0.00073	0.10941
Tursiops truncatus (18)	6	123	0.00438	0.08972
Grampus griseus (21)	2	131	0.00146	0.09555
Pseudorca crassidens (33)	1	2	0.00073	0.00146
G. macrorynchus (36)	2	25	0.00146	0.01823
Orcinus orca (37)	2	5	0.00146	0.00365
Physeter macrocephalus (46)	2	3	0.00146	0.00219
Unidentified Rorqual (70)	2	3	0.00146	0.00219
Unidentified delfinid (77)	13	205	0.00948	0.14953
Unidentified sm. whale (78)	10	31	0.00729	0.02261
Unid S. attenuata (90)	1	500	0.00073	0.36470
Unidentified whale (98)	1	1	0.00073	0.00073

Total Distance On Effort: 1371 NMI

* Stenella attenuata subsp. A (offshore spotted dolphin)
* Stenella attenuata graffmani
* S. longirostris orientalis

Unidentified whale (98)	5	8	0.00082	0.00131

Total Distance on Effort 6124.15 NMI

* Stenella attenuata subsp. A (offshore spotted dolphin)
* Stenella attenuata graffmani
* S. longirostris orientalis

Table 11. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

Cruise 0463

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Stenella attenuata A (02)*	37	6994	0.00604	1.14204
Stenella longirostris (03)	5	672	0.00082	0.10973
Delphinus sp. (05)	26	2652	0.00425	0.43304
S. longirostris o. (10)*	17	2349	0.00278	0.38356
S. longirostris hybrid (11)	4	396	0.00065	0.06466
S. coeruleoalba (13)	60	2821	0.00980	0.46064
Steno bredanensis (15)	22	299	0.00359	0.04882
Tursiops truncatus (18)	43	1637	0.00702	0.26730
Grampus grisius (21)	45	714	0.00735	0.11659
L. obliquidens (22)	2	11	0.00033	0.00180
Lagenodelphis hosei (26)	1	150	0.00016	0.02449
Lissodelphis borealis (27)	0	0	0.00000	0.00000
Feresa attenuata (32)	3	145	0.00049	0.02368
Pseudorca crassidens (33)	1	50	0.00016	0.00816
Unident. Pilot Whale (34)	0	0	0.00000	0.00000
G. macrorynchus (36)	35	687	0.00572	0.11218
Orcinus orca (37)	1	9	0.00016	0.00147
Phocoena phocoena (40)	0	0	0.00000	0.00000
Phocoenoides dalli (44)	0	0	0.00000	0.00000
Physeter macrocephalus (46)	10	108	0.00163	0.01764
Kogia simus (48)	3	7	0.00049	0.00114
Unidentified Ziphiid (49)	9	14	0.00147	0.00229
Mesoplodon sp. (51)	8	21	0.00131	0.00343
Ziphius cavirostris (61)	11	26	0.00180	0.00425
Unidentified Rorqual (70)	12	26	0.00196	0.00425
B. acutorostrata (71)	0	0	0.00000	0.00000
B. edeni (72)	2	3	0.00033	0.00049
B. borealis (73)	3	9	0.00049	0.00147
B. musculus (75)	6	13	0.00098	0.00212
M. novaeangliae (76)	0	0	0.00000	0.00000
Unidentified delfinid (77)	87	1791	0.01421	0.29245
Unidentified sm. whale (78)	40	238	0.00653	0.03886
Unidentified lg. whale (79)	12	18	0.00196	0.00294
Unid S. attenuatta (90)	10	2127	0.00163	0.34731
Unidentified cetacean (96)	6	29	0.00098	0.00474

Table 12. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

Cruise 0464

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Stenella attenuata A (02)*	42	7460	0.00701	1.24576
Stenella longirostris (03)	3	814	0.00050	0.13593
Delphinus sp. (05)	9	1052	0.00150	0.17568
S. longirostris o. (10)*	17	1398	0.00284	0.23346
S. longirostris hybrid (11)	5	105	0.00083	0.01753
S. coeruleoalba (13)	10	415	0.00167	0.06930
Steno bredanensis (15)	10	92	0.00167	0.01536
Tursiops truncatus (18)	22	259	0.00367	0.04325
Grampus griseus (21)	16	90	0.00267	0.01503
Pseudorca crassidens (33)	2	9	0.00033	0.00150
Unident. Pilot Whale (34)	1	2	0.00017	0.00033
G. macrorynchus (36)	11	77	0.00184	0.01286
Orcinus orca (37)	1	5	0.00017	0.00083
Physeter macrocephalus (46)	8	37	0.00134	0.00618
Unidentified Zyphiid (49)	2	2	0.00033	0.00033
Mesoplodon sp. (51)	4	10	0.00067	0.00167
Unidentified Rorqual (70)	7	12	0.00117	0.00200
B. acutorostrata (71)	0	1	0.00000	0.00017
B. edeni (72)	1	2	0.00017	0.00033
B. borealis (73)	1	1	0.00017	0.00017
B. musculus (75)	3	6	0.00050	0.00100
M. novaeangliae (76)	1	2	0.00017	0.00033
Unidentified delfinid (77)	27	452	0.00451	0.07548
Unidentified sm. whale (78)	27	96	0.00451	0.01603
Unidentified lg. whale (79)	5	8	0.00083	0.00134
Unid S. attenuata (90)	3	691	0.00050	0.11539
Unidentified cetacean (96)	3	6	0.00050	0.00100
Unidentified object (97)	2	1	0.00033	0.00017
Unidentified whale (98)	8	9	0.00134	0.00150

Total Distance on Effort 5988.29 NMI

* Stenella attenuata subsp. A (offshore spotted dolphin)
* S. longirostris orientalis

Table 13. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

Cruise 0564

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Delphinus sp. (05)	42	8215	0.01824	3.56848
S. coeruleoalba (13)	1	3	0.00043	0.00130
Tursiops truncatus (18)	6	93	0.00261	0.04040
Grampus griseus (21)	10	200	0.00434	0.08688
L. obliquidens (22)	7	984	0.00304	0.42744
Lissodelphis borealis (27)	5	825	0.00217	0.35837
Unident. Pilot Whale (34)	8	141	0.00348	0.06125
Orcinus orca (37)	1	2	0.00043	0.00087
Phocoenoides dalli (44)	28	151	0.01216	0.06559
Physeter macrocephalus (46)	2	13	0.00087	0.00565
Kogia breviceps (47)	4	6	0.00174	0.00261
Unidentified Ziphiid (49)	5	8	0.00217	0.00348
Mesoplodon sp. (51)	6	15	0.00261	0.00652
Ziphius cavirostris (61)	7	14	0.00304	0.00608
Berardius bairdii. (63)	2	8	0.00087	0.00348
Unidentified Rorqual (70)	4	6	0.00174	0.00261
B. acutorostrata (71)	2	2	0.00087	0.00087
B. edeni (72)	2	4	0.00087	0.00174
B. physalus (74)	3	6	0.00130	0.00261
B. musculus (75)	18	35	0.00782	0.01520
M. novaeangliae (76)	4	7	0.00174	0.00304
Unidentified delfinid (77)	8	41	0.00348	0.01781
Unidentified sm. whale (78)	5	7	0.00217	0.00304
Unidentified lg. whale (79)	1	1	0.00043	0.00043
Unidentified cetacean (96)	1	2	0.00043	0.00087
Unidentified whale (98)	1	1	0.00043	0.00043

Total Distance on Effort 2302.1 NMI

Table 14. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

Cruise 0598

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Stenella attenuata A (02)*	47	5082	0.00884	0.95553
Stenella longirostris (03)	2	100	0.00038	0.01880
Delphinus sp. (05)	12	1161	0.00226	0.21829
Stenella attenuata g. (06)*	2	88	0.00038	0.01655
S. longirostris o. (10)*	4	457	0.00075	0.08593
S. longirostris hybrid (11)	13	749	0.00244	0.14083
S. coeruleoalba (13)	41	1723	0.00771	0.32396
Steno bredanensis (15)	12	129	0.00226	0.02425
Tursiops truncatus (18)	19	220	0.00357	0.04137
Grampus griseus (21)	24	163	0.00451	0.03065
Feresa attenuata (32)	1	37	0.00019	0.00696
Pseudorca crassidens (33)	4	37	0.00075	0.00696
Unident. Pilot Whale (34)	11	110	0.00207	0.02068
G. macrorynchus (36)	2	36	0.00038	0.00677
Orcinus orca (37)	2	15	0.00038	0.00282
Physeter macrocephalus (46)	9	64	0.00169	0.01203
Kogia simus (48)	12	20	0.00226	0.00376
Unidentified ziphiid (49)	3	5	0.00056	0.00094
Hyperoodon planifrons (50)	1	6	0.00019	0.00113
Mesoplodon sp. (51)	12	30	0.00226	0.00564
Eschrictius robustus (69)	1	2	0.00019	0.00038
Unidentified Rorqual (70)	8	8	0.00150	0.00150
B. acutorostrata (71)	1	2	0.00019	0.00038
B. edeni (72)	5	8	0.00094	0.00150
B. musculus (75)	1	1	0.00019	0.00019
Unidentified delfinid (77)	56	642	0.01053	0.12071
Unidentified sm. whale (78)	24	89	0.00451	0.01673
Unid S. attenuata (90)	3	306	0.00056	0.05754
Unidentified cetacean (96)	13	14	0.00244	0.00263
Unidentified whale (98)	5	5	0.00094	0.00094

Total Distance on Effort: 5318.5 NMI

* Stenella attenuata subsp. A (offshore spotted dolphin)
* Stenella attenuata graffmani

Table 15. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

Cruise 0599

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Stenella attenuata A (02)*	24	1848	0.00457	0.35200
Stenella longirostris (03)	2	7	0.00038	0.00133
Delphinus sp. (05)	6	227	0.00114	0.04324
S. longirostris o. (10)*	13	1113	0.00248	0.21200
S. longirostris hybrid (11)	1	42	0.00019	0.00800
S. coeruleoalba (13)	3	127	0.00057	0.02419
Steno bredanensis (15)	1	27	0.00019	0.00514
Tursiops truncatus (18)	12	100	0.00229	0.01905
Grampus griseus (21)	3	18	0.00057	0.00343
Lagenodelphis hosei (26)	1	124	0.00019	0.02362
Pseudorca crassidens (33)	4	104	0.00076	0.01981
Unident. Pilot Whale (34)	6	101	0.00114	0.01916
Physeter macrocephalus (46)	8	101	0.00152	0.01924
Mesoplodon sp. (51)	4	11	0.00076	0.00210
Ziphius cavirostris (61)	2	2	0.00038	0.00038
Unidentified Rorqual (70)	4	6	0.00076	0.00114
B. borealis (73)	1	1	0.00019	0.00019
B. musculus (75)	3	4	0.00057	0.00076
M. novaeangliae (76)	1	2	0.00019	0.00038
Unidentified delfinid (77)	28	369	0.00533	0.07030
Unidentified sm. whale (78)	21	39	0.00400	0.00743
Unidentified lg. whale (79)	9	12	0.00171	0.00229
Unid S. attenuata (90)	2	102	0.00038	0.01943
Unidentified cetacean (96)	2	2	0.00038	0.00038
Unidentified whale (98)	2	2	0.00038	0.00038

Total Distance On Effort: 5250 NMI

* Stenella attenuata subsp. A (offshore spotted dolphin)
* S. longirostris orientalis

Table 16. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

Cruise 0642

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Stenella attenuata A (02)*	3	176	0.00122	0.07134
Stenella longirostris (03)	1	115	0.00041	0.04662
Delphinus sp. (05)	1	75	0.00041	0.03040
S. longirostris hybrid (11)	1	104	0.00041	0.04216
S. coeruleoalba (13)	7	191	0.00284	0.07742
Steno bredanensis (15)	5	66	0.00203	0.02675
Grampus griseus (21)	8	61	0.00324	0.02473
Lagenodelphis hosei (26)	7	1218	0.00284	0.49372
P. electra (31)	3	613	0.00122	0.24848
Pseudorca crassidens (33)	4	42	0.00162	0.01702
Unident. Pilot Whale (34)	19	335	0.00770	0.13579
Physeter macrocephalus (46)	8	63	0.00324	0.02554
Kogia simus (48)	9	16	0.00365	0.00649
Unidentified ziphiid (49)	7	15	0.00284	0.00608
Mesoplodon sp. (51)	2	4	0.00081	0.00162
Ziphius cavirostris (61)	6	16	0.00243	0.00649
Unidentified Rorqual (70)	14	17	0.00567	0.00689
B. musculus (75)	1	1	0.00041	0.00041
Unidentified delfinid (77)	32	1277	0.01297	0.51763
Unidentified sm. whale (78)	11	252	0.00446	0.10215
Unidentified lg. whale (79)	4	4	0.00162	0.00162
Unidentified cetacean (96)	18	98	0.00730	0.03972
Unidentified object (97)	3	4	0.00122	0.00162
Unidentified whale (98)	6	9	0.00243	0.00365

Total Distance On Effort: 2467 NMI

* Stenella attenuata subsp. A (offshore spotted dolphin)

Table 17. Number of sightings and number of individuals seen while on **effort. Sighting rates** per nautical mile are based on these numbers **divided by the number** of on-effort survey miles. SWFSC codes are in **parentheses.**

Cruise 0646

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Delphinus sp. (05)	30	3553	0.01392	1.64872
Grampus griseus (21)	18	267	0.00835	0.12390
L. obliquidens (22)	13	296	0.00603	0.13735
Lissodelphis borealis (27)	4	287	0.00186	0.13318
Unident. Pilot Whale (34)	1	10	0.00046	0.00464
Phocoena phocoena (40)	1	1	0.00046	0.00046
Phocoenoides dalli (44)	13	38	0.00603	0.01763
Physeter macrocephalus (46)	1	1	0.00046	0.00046
Unidentified ziphiid (49)	3	6	0.00139	0.00278
Mesoplodon sp. (51)	1	2	0.00046	0.00093
Ziphius cavirostris (61)	2	3	0.00093	0.00139
Berardius bairdii. (63)	2	26	0.00093	0.01206
Unidentified Rorqual (70)	0	1	0.00000	0.00046
B. acutorostrata (71)	2	2	0.00093	0.00093
B. edeni (72)	2	3	0.00093	0.00139
B. physalus (74)	5	13	0.00232	0.00603
B. musculus (75)	12	24	0.00557	0.01114
M. novaeangliae (76)	3	5	0.00139	0.00232
Unidentified delfinid (77)	7	38	0.00325	0.01763
Unidentified sm. whale (78)	1	1	0.00046	0.00046
Unidentified lg. whale (79)	2	3	0.00093	0.00139
Unidentified cetacean (96)	1	1	0.00046	0.00046
Unidentified whale (98)	6	6	0.00278	0.00278

Total Distance On Effort: 2155 NMI

Table 18. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses. Unidentified species may have more sightings than animals because not all sightings had a best estimate of school size.

	Cruise 0648			
	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Stenella attenuata A, offshore (02)	6	716	0.00229	0.27276
Stenella longirostris (03)	3	167	0.00114	0.06362
Delphinus sp. (05)	9	634	0.00343	0.24152
Stenella longirostris orientalis (10)	1	313	0.00038	0.11924
Stenella longirostris, white-belly (11)	2	235	0.00076	0.08952
Stenella coeruleoalba (13)	12	299	0.00457	0.11390
Steno bredanensis (15)	4	64	0.00152	0.02438
Tursiops truncatus (18)	2	50	0.00076	0.01905
Grampus griseus (21)	3	20	0.00114	0.00762
Lagenodelphis hosei (26)	1	450	0.00038	0.17143
Feresa attenuata (32)	2	62	0.00076	0.02362
Unident. Pilot Whale (34)	8	187	0.00305	0.07124
Orcinus orca (37)	1	2	0.00038	0.00076
Physeter macrocephalus (46)	3	11	0.00114	0.00419
Kogia simus (48)	2	4	0.00076	0.00152
Unidentified ziphiid (49)	3	3	0.00114	0.00114
Mesoplodon sp. (51)	5	7	0.00190	0.00267
Ziphius cavirostris (61)	2	2	0.00076	0.00076
Unidentified Rorqual (70)	1	3	0.00038	0.00114
Unidentified delfinid (77)	35	1671	0.01333	0.63657
Unidentified sm. whale (78)	1	1	0.00038	0.00038
Unidentified lg. whale (79)	3	4	0.00114	0.00152
Unid Stenella attenuata (90)	1	49	0.00038	0.01867
Unidentified cetacean (96)	3	5	0.00114	0.00190
Unidentified object (97)	3	41	0.00114	0.01562
Unidentified whale (98)	6	6	0.00229	0.00229
Total Distance On Effort:	2625 NMI			

Table 19. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

Cruise 0687

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Stenella attenuata A (02)*	10	1088	0.00327	0.35567
Stenella longirostris (03)	2	45	0.00065	0.01471
Delphinus sp. (05)	8	1262	0.00262	0.41255
S. longirostris o. (10)*	2	237	0.00065	0.07748
S. coeruleoalba (13)	14	429	0.00458	0.14024
Steno bredanensis (15)	3	14	0.00098	0.00458
Tursiops truncatus (18)	1	2	0.00033	0.00065
Grampus griseus (21)	19	173	0.00621	0.05655
L. obliquidens (22)	1	75	0.00033	0.02452
Lagenodelphis hosei (26)	3	579	0.00098	0.18928
Lissodelphis borealis (27)	3	103	0.00098	0.03367
Feresa attenuata (32)	3	90	0.00098	0.02942
Pseudorca crassidens (33)	3	20	0.00098	0.00654
Unident. Pilot Whale (34)	5	77	0.00163	0.02517
Phocoenoides dalli (44)	1	1	0.00033	0.00033
Physeter macrocephalus (46)	16	77	0.00523	0.02517
Kogia simus (48)	2	4	0.00065	0.00131
Unidentified ziphiid (49)	1	7	0.00033	0.00229
Mesoplodon sp. (51)	11	23	0.00360	0.00752
Ziphius cavirostris (61)	1	1	0.00033	0.00033
Eschrictius robustus (69)	3	5	0.00098	0.00163
Unidentified Rorqual (70)	7	8	0.00229	0.00262
Unidentified delfinid (77)	63	1496	0.02059	0.48905
Unidentified sm. whale (78)	13	19	0.00425	0.00621
Unidentified lg. whale (79)	3	3	0.00098	0.00098
Unidentified cetacean (96)	2	7	0.00065	0.00229
Unidentified whale (98)	12	16	0.00392	0.00523

Total Distance On Effort: 3059 NMI

* Stenella attenuata subsp. A (offshore spotted dolphin)
* S. longirostris orientalis

Table 20. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

Cruise 0716

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Stenella attenuata A, offshore (02)*	6	457	0.00133	0.10133
Stenella longirostris (03)	3	27	0.00067	0.00599
Delphinus sp. (05)	30	2891	0.00665	0.64102
Stenella attenuata g. (06)*	1	150	0.00022	0.03326
S. longirostris o. (10)*	1	1	0.00022	0.00022
S. longirostris hybrid (11)	2	83	0.00044	0.01847
S. coeruleoalba (13)	23	591	0.00510	0.13104
Steno bredanensis (15)	2	46	0.00044	0.01020
Tursiops truncatus (18)	11	176	0.00244	0.03902
Grampus griseus (21)	11	94	0.00244	0.02093
L. obliquidens (22)	4	22	0.00089	0.00488
Lagenodelphis hosei (26)	1	100	0.00022	0.02217
Lissodelphis borealis (27)	1	10	0.00022	0.00222
Peponocephala electra (31)	1	90	0.00022	0.01996
Pseudorca crassidens (33)	3	26	0.00067	0.00576
Unident. Pilot Whale (34)	18	168	0.00399	0.03725
Orcinus orca (37)	1	3	0.00022	0.00067
Physeter macrocephalus (46)	31	144	0.00687	0.03193
Kogia simus (48)	5	5	0.00111	0.00111
Unidentified ziphiid (49)	6	9	0.00133	0.00200
Mesoplodon sp. (51)	5	11	0.00111	0.00244
Ziphius cavirostris (61)	4	12	0.00089	0.00266
Unidentified Rorqual (70)	14	17	0.00310	0.00377
B. edeni (72)	2	2	0.00044	0.00044
B. musculus (75)	2	4	0.00044	0.00089
Unidentified delfinid (77)	80	2666	0.01774	0.59113
Unidentified sm. whale (78)	9	30	0.00200	0.00665
Unidentified lg. whale (79)	9	14	0.00200	0.00310
Unidentified cetacean (96)	4	13	0.00089	0.00288
Unidentified whale (98)	17	24	0.00377	0.00532

Total Distance On Effort: 4510 NMI

* Stenella attenuata subsp. A (offshore spotted dolphin)
* Stenella attenuata graffmani

Table 21. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

Cruise 0798

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Delphinus sp. (05)	19	5769	0.01620	4.91757
Tursiops truncatus (18)	7	118	0.00597	0.10058
Grampus griseus (21)	15	141	0.01279	0.12019
L. obliquidens (22)	8	58	0.00682	0.04944
Lissodelphis borealis (27)	11	1031	0.00938	0.87884
Unident. Pilot Whale (34)	3	75	0.00256	0.06393
Orcinus orca (37)	1	2	0.00085	0.00170
Phocoenoides dalli (44)	14	51	0.01193	0.04347
Physeter macrocephalus (46)	6	14	0.00511	0.01193
Eschrictius robustus (69)	1	1	0.00085	0.00085
Unidentified Rorqual (70)	1	1	0.00085	0.00085
B. acutorostrata (71)	1	1	0.00085	0.00085
B. physalus (74)	1	1	0.00085	0.00085
M. novaeangliae (76)	2	4	0.00170	0.00341
Unidentified delfinid (77)	8	27	0.00682	0.02302
Unidentified sm. whale (78)	3	5	0.00256	0.00426
Unidentified whale (98)	1	3	0.00085	0.00256
Total Distance On Effort:	1173.14			

Table 22. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

	Cruise 0801			
	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Stenella attenuata A (02)*	39	5309	0.00647	0.88073
Stenella longirostris (03)	3	107	0.00050	0.01775
Delphinus sp. (05)	8	3138	0.00133	0.52057
Stenella attenuata g. (06)*	1	225	0.00017	0.03733
S. longirostris o. (10)*	15	1493	0.00249	0.24768
S. longirostris hybrid (11)	17	1820	0.00282	0.30193
S. coeruleoalba (13)	21	1243	0.00348	0.20621
Steno bredanensis (15)	12	163	0.00199	0.02704
Tursiops truncatus (18)	17	218	0.00282	0.03616
Grampus griseus (21)	10	40	0.00166	0.00664
Feresa attenuata (32)	1	20	0.00017	0.00332
Pseudorca crassidens (33)	3	24	0.00050	0.00398
Unident. Pilot Whale (34)	17	157	0.00282	0.02605
Orcinus orca (37)	3	11	0.00050	0.00182
Physeter macrocephalus (46)	2	8	0.00033	0.00133
Kogia breviceps (47)	1	1	0.00017	0.00017
Kogia simus (48)	8	18	0.00133	0.00299
Unidentified Ziphiid (49)	11	21	0.00182	0.00348
Mesoplodon sp. (51)	5	12	0.00083	0.00199
Ziphius cavirostris (61)	4	9	0.00066	0.00149
Unidentified Rorqual (70)	5	5	0.00083	0.00083
B. edeni (72)	3	5	0.00050	0.00083
Unidentified delfinid (77)	75	1065	0.01244	0.17668
Unidentified sm. whale (78)	28	50	0.00465	0.00829
Unidentified lg. whale (79)	8	8	0.00133	0.00133
Unid S. attenuata (90)	10	1102	0.00166	0.18282
Unidentified cetacean (96)	10	28	0.00166	0.00465
Unidentified object (97)	1	43	0.00017	0.00713
Unidentified whale (98)	12	15	0.00199	0.00249
Total Distance On Effort:	6027.95			

* Stenella attenuata subsp. A (offshore spotted dolphin)
* Stenella attenuata graffmani

Table 23. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

Cruise 0843

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Stenella attenuata A (02)*	35	2027	0.00533	0.30879
Stenella longirostris (03)	4	286	0.00061	0.04357
Delphinus sp. (05)	28	4239	0.00427	0.64575
S. longirostris o. (10)*	14	1334	0.00213	0.20322
S. longirostris hybrid (11)	4	284	0.00061	0.04326
S. coeruleoalba (13)	24	1326	0.00366	0.20200
Steno bredanensis (15)	10	45	0.00152	0.00687
Tursiops truncatus (18)	13	129	0.00198	0.01965
Grampus griseus (21)	21	167	0.00320	0.02544
L. obliquidens (22)	5	37	0.00076	0.00564
Lagenodelphis hosei (26)	1	209	0.00015	0.03184
Pseudorca crassidens (33)	1	1	0.00015	0.00015
Unident. Pilot Whale (34)	10	119	0.00152	0.01813
Orcinus orca (37)	1	2	0.00015	0.00030
Physeter macrocephalus (46)	10	52	0.00152	0.00792
Kogia breviceps (47)	1	2	0.00015	0.00030
Kogia simus (48)	9	12	0.00137	0.00183
Unidentified ziphiid (49)	9	19	0.00137	0.00289
Mesoplodon sp. (51)	10	24	0.00152	0.00366
Ziphius cavirostris (61)	6	10	0.00091	0.00152
Eschrictius robustus (69)	1	5	0.00015	0.00076
Unidentified Rorqual (70)	10	14	0.00152	0.00213
B. edeni (72)	2	3	0.00030	0.00046
B. musculus (75)	3	23	0.00046	0.00350
M. novaeangliae (76)	2	3	0.00030	0.00046
Unidentified delfinid (77)	70	753	0.01066	0.11471
Unidentified sm. whale (78)	18	136	0.00274	0.02072
Unidentified lg. whale (79)	7	9	0.00107	0.00137
Unid S. attenuatta (90)	4	331	0.00061	0.05042
Unidentified cetacean (96)	11	29	0.00168	0.00442
Unidentified whale (98)	9	12	0.00137	0.00183

Total Distance On Effort: 6561 NMI

* Stenella attenuata subsp. A (offshore spotted dolphin)

Table 24. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

	Cruise 0852			
	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Stenella attenuata A (02)*	7	533	0.01190	0.90622
S. longirostris o. (10)*	5	406	0.00850	0.69029
S. longirostris hybrid (11)	1	372	0.00170	0.63248
S. coeruleoalba (13)	1	77	0.00170	0.13092
Tursiops truncatus (18)	5	24	0.00850	0.04081
Grampus griseus (21)	1	8	0.00170	0.01360
Kogia simus (48)	1	1	0.00170	0.00170
Unidentified Ziphiid (49)	2	3	0.00340	0.00510
Unidentified delfinid (77)	7	155	0.01190	0.26353
Unidentified sm. whale (78)	7	13	0.01190	0.02210
Unidentified cetacean (96)	4	9	0.00680	0.01530
Unidentified object (97)	3	4	0.00510	0.00680
Unidentified whale (98)	2	3	0.00340	0.00510
Total Distance On Effort:	588.16			

* Stenella attenuata subsp. A (offshore spotted dolphin)
* S. longirostris orientalis

Table 25. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

Cruise 0874

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Delphinus sp. (05)	18	1680	0.04229	3.94746
Tursiops truncatus (18)	2	53	0.00470	0.12453
Grampus griseus (21)	6	70	0.01410	0.16448
L. obliquidens (22)	16	295	0.03759	0.69316
Phocoenoides dalli (44)	4	27	0.00940	0.06344
Eschrictius robustus (69)	1	1	0.00235	0.00235
Unidentified delfinid (77)	2	2	0.00470	0.00470
Unidentified lg. whale (79)	2	3	0.00470	0.00705
Unidentified cetacean (96)	1	1	0.00235	0.00235
Unidentified object (97)	1	1	0.00235	0.00235

Total Distance On Effort: 425 NMI

Table 26. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses. Unidentified species may have more sightings than animals because not all sightings have a best estimate of school size.

	Cruise 0905			
	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Delphinus sp. (05)	45	5781	0.05864	7.53323
Tursiops truncatus (18)	4	38	0.00521	0.04952
Grampus griseus (21)	15	165	0.01955	0.21501
Lagenorhyncus obliquidens (22)	10	237	0.01303	0.30884
Lissodelphis borealis (27)	1	5	0.00130	0.00652
Pseudorca crassidens (33)	1	23	0.00130	0.02997
Globicephala macrorynchus (36)	1	10	0.00130	0.01303
Phocoenoides dalli (44)	3	12	0.00391	0.01564
Unidentified Rorqual (70)	1	1	0.00130	0.00130
Balaenoptera acutorostrata (71)	1	1	0.00130	0.00130
Balaenoptera physalus (74)	3	5	0.00391	0.00652
Megaptera novaeangliae (76)	1	1	0.00130	0.00130
Unidentified delfinid (77)	10	50	0.01303	0.06516
Unidentified sm. whale (78)	1	2	0.00130	0.00261
Unidentified lg. whale (79)	4	7	0.00521	0.00912
Unidentified cetacean (96)	3	3	0.00391	0.00391
Unidentified whale (98)	7	9	0.00912	0.01173
Total Distance On Effort:	767.4 NMI			

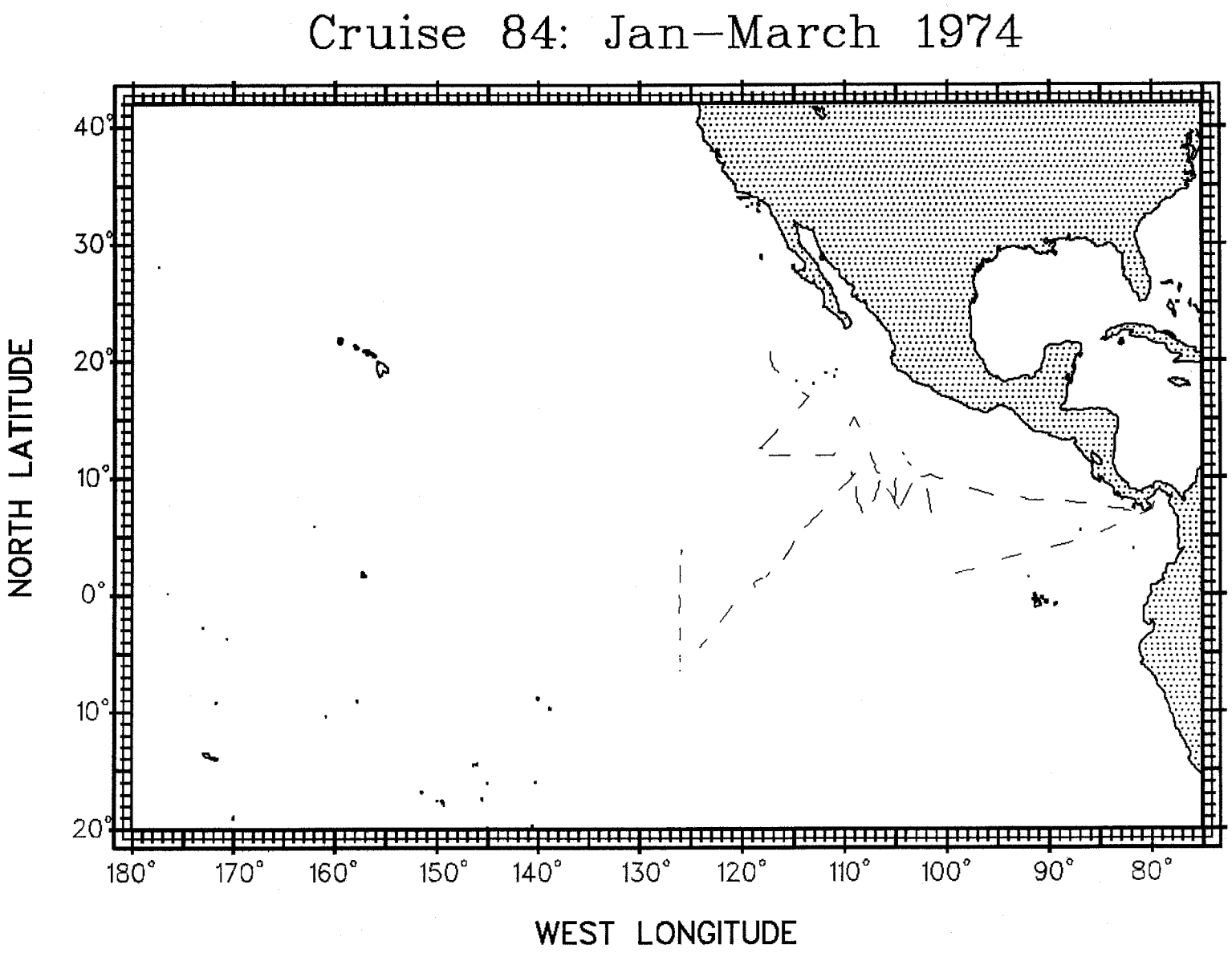
Table 27. Number of sightings and number of individuals seen while on effort. Sighting rates per nautical mile are based on these numbers divided by the number of on-effort survey miles. SWFSC codes are in parentheses.

Cruise 0910

	SIGHTINGS	ANIMALS	SIGHT/NM	ANMLS/NM
Delphinus sp. (05)	3	202	0.06042	4.06848
Tursiops truncatus (18)	3	18	0.06042	0.36254
Grampus griseus (21)	2	36	0.04028	0.72508
Eschrichtius robustus (69)	1	4	0.02014	0.08056
Unidentified delfinid (77)	3	4	0.06042	0.08056

Total Distance On Effort: 49.65 NMI

Figure 1.


Cruise 84: Jan–March 1974
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

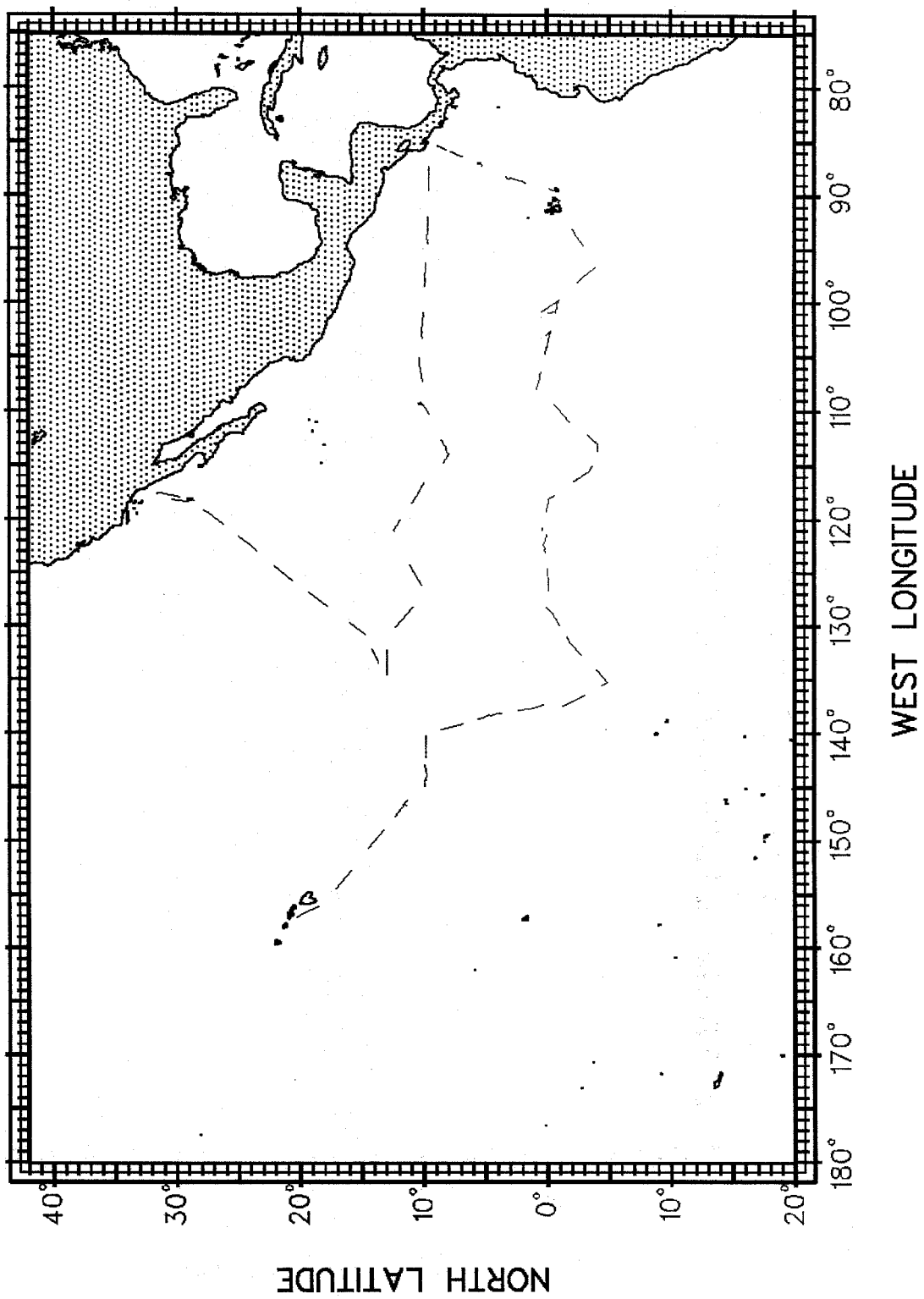

Cruise 168: Jan–March 1976
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
WEST LONGITUDE
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°

Figure 2.

Figure 3.

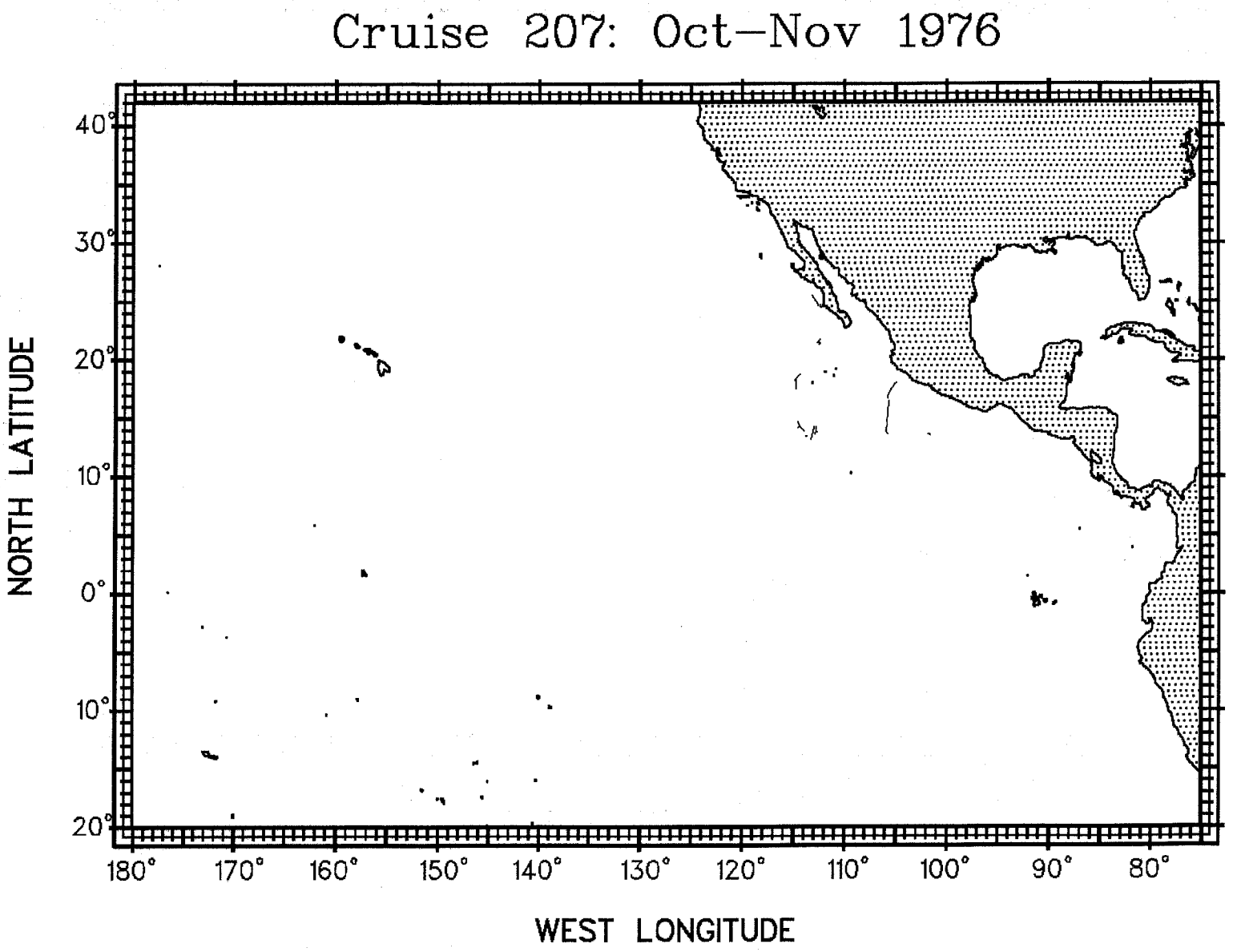

Cruise 207: Oct–Nov 1976
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 4.

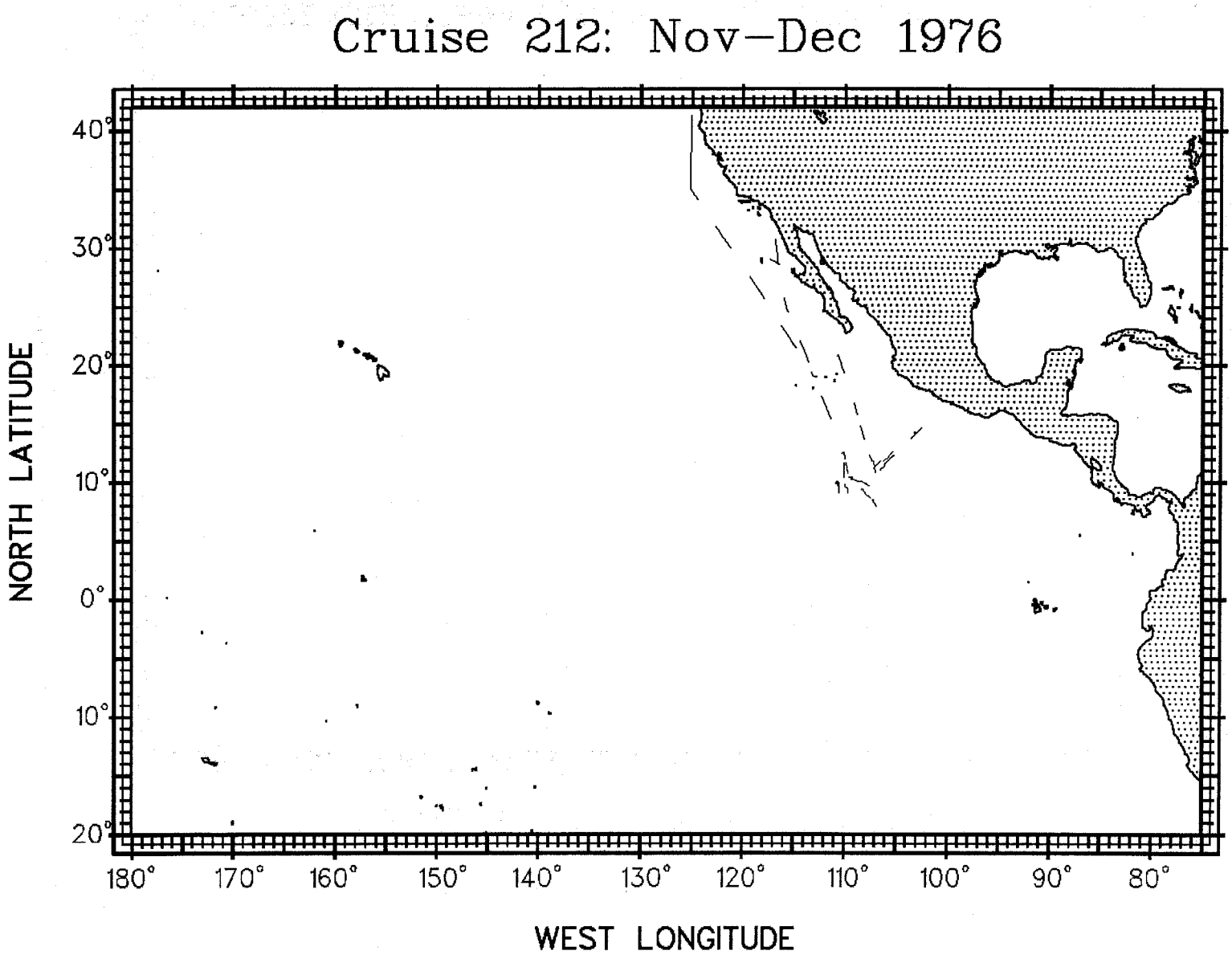

Cruise 212: Nov–Dec 1976
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 5.

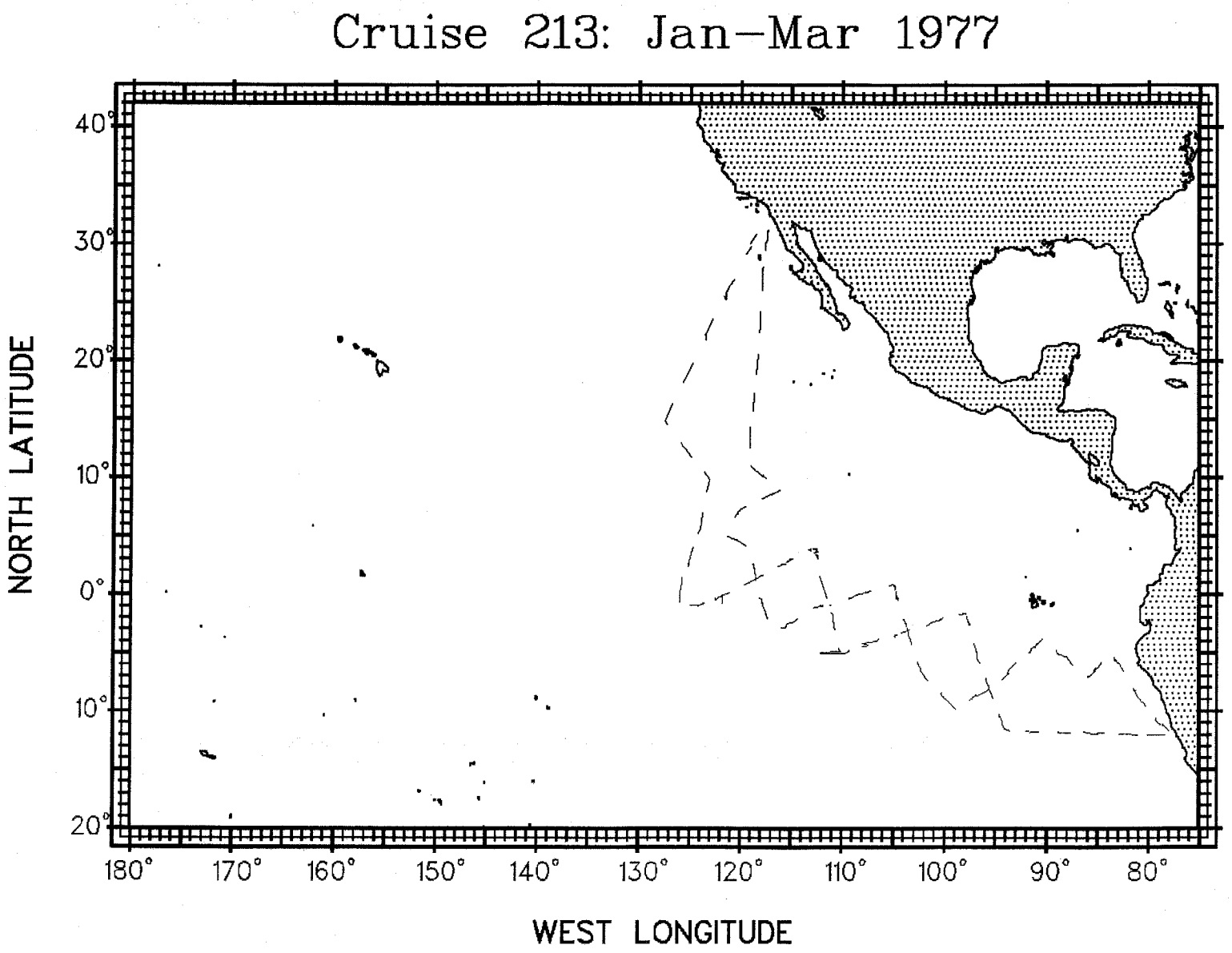

Cruise 213: Jan–Mar 1977
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 6.

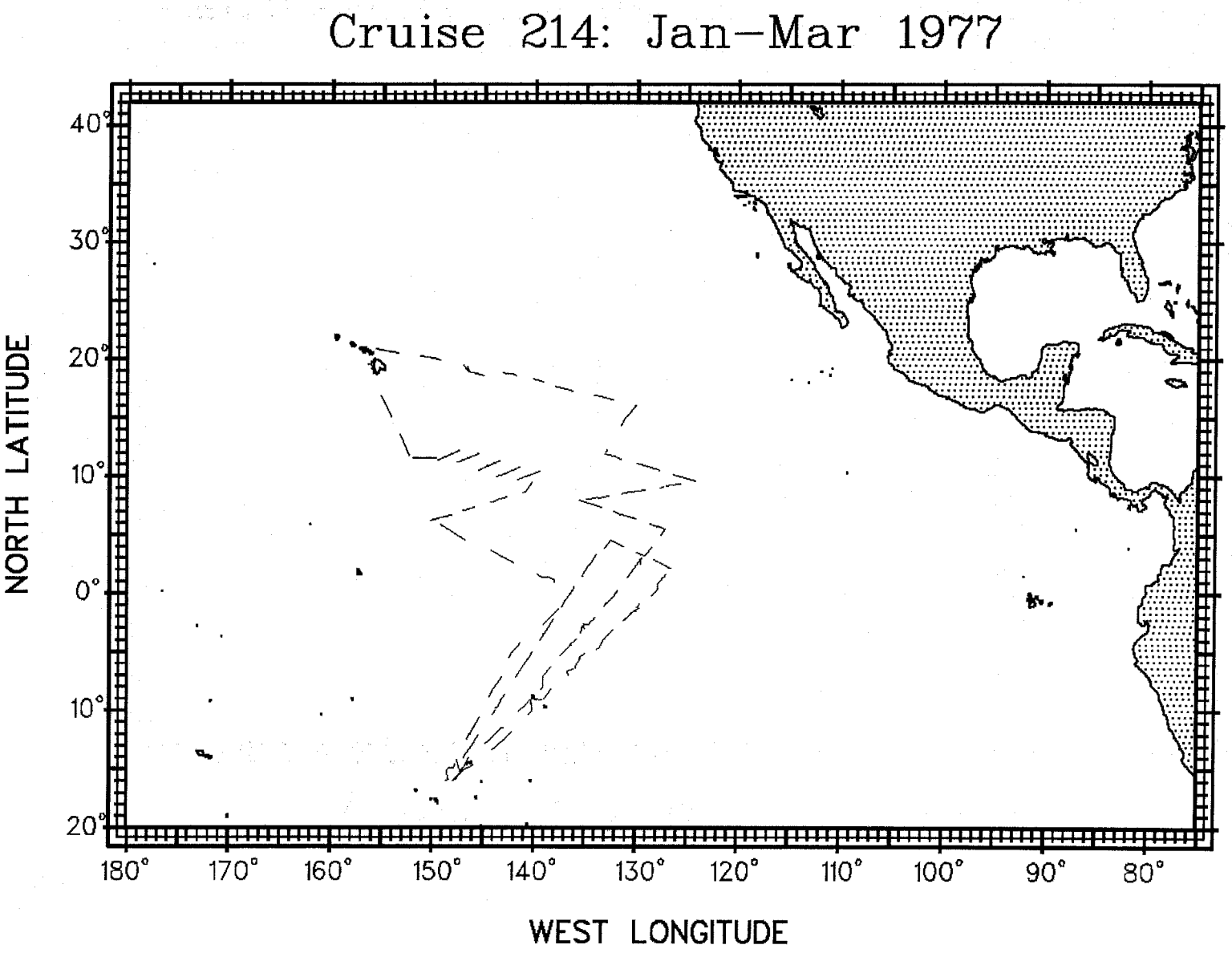

Cruise 214: Jan–Mar 1977
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 7.

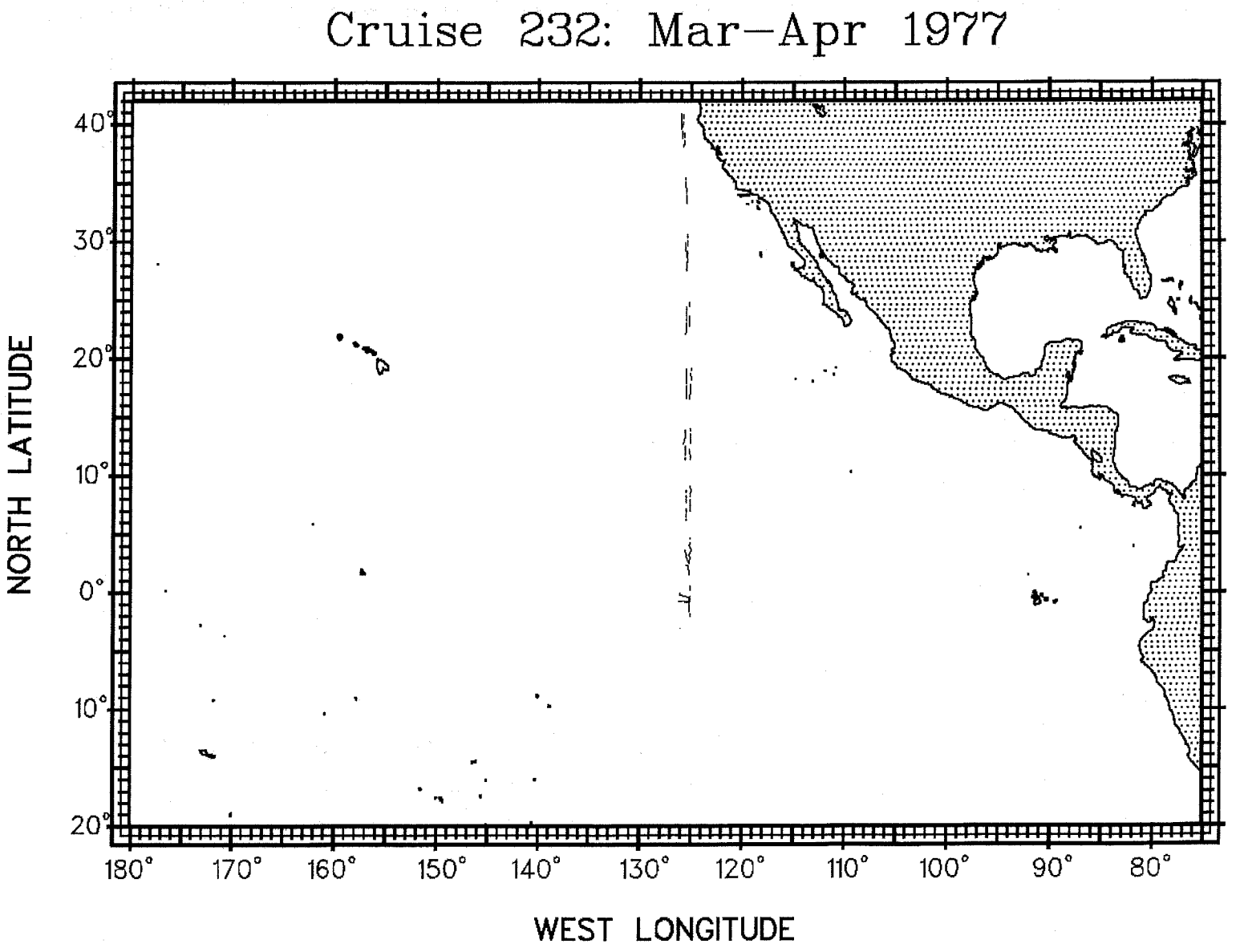

Cruise 232: Mar–Apr 1977
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 8.

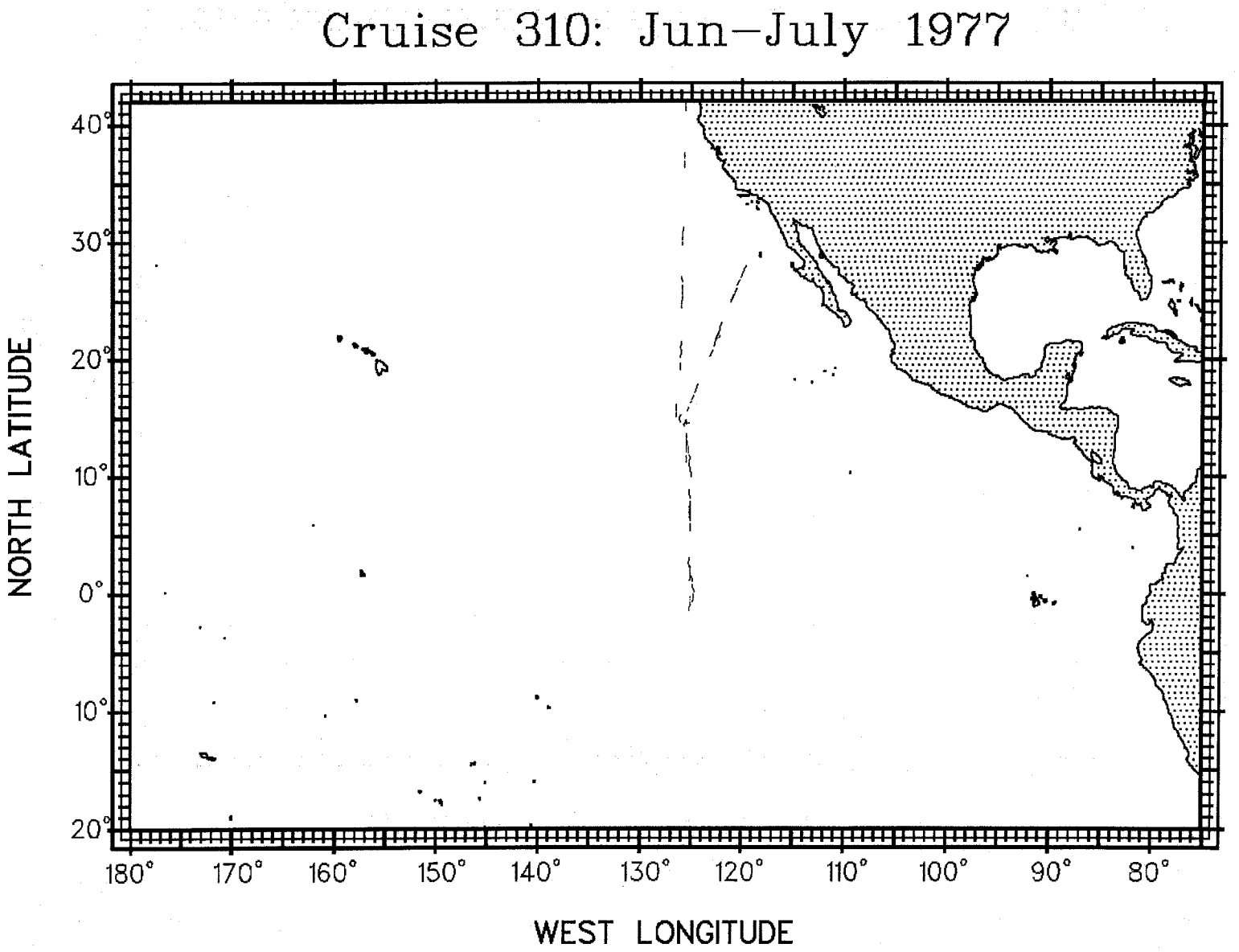

Cruise 310: Jun–July 1977
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 9.

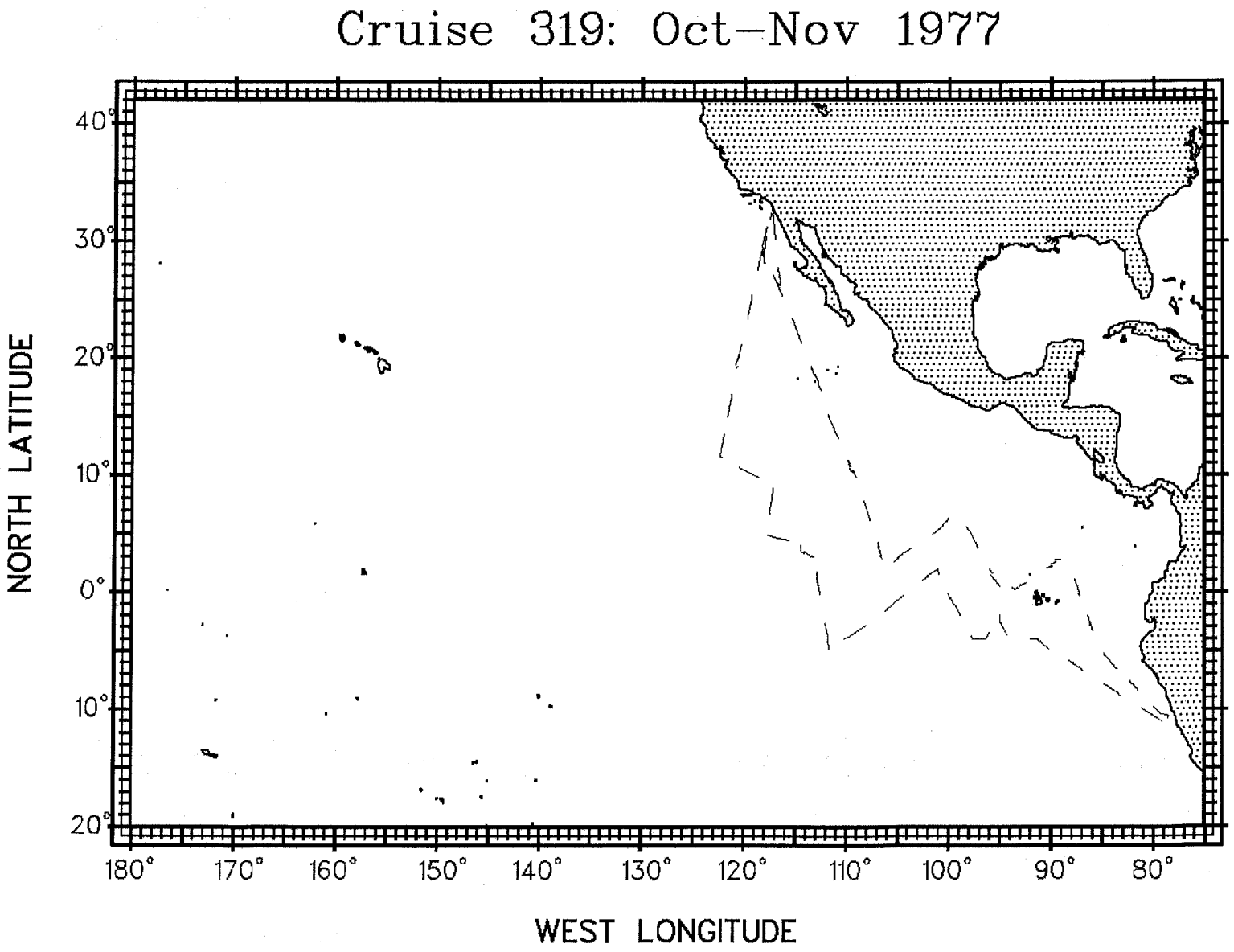

Cruise 319: Oct–Nov 1977
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 10.

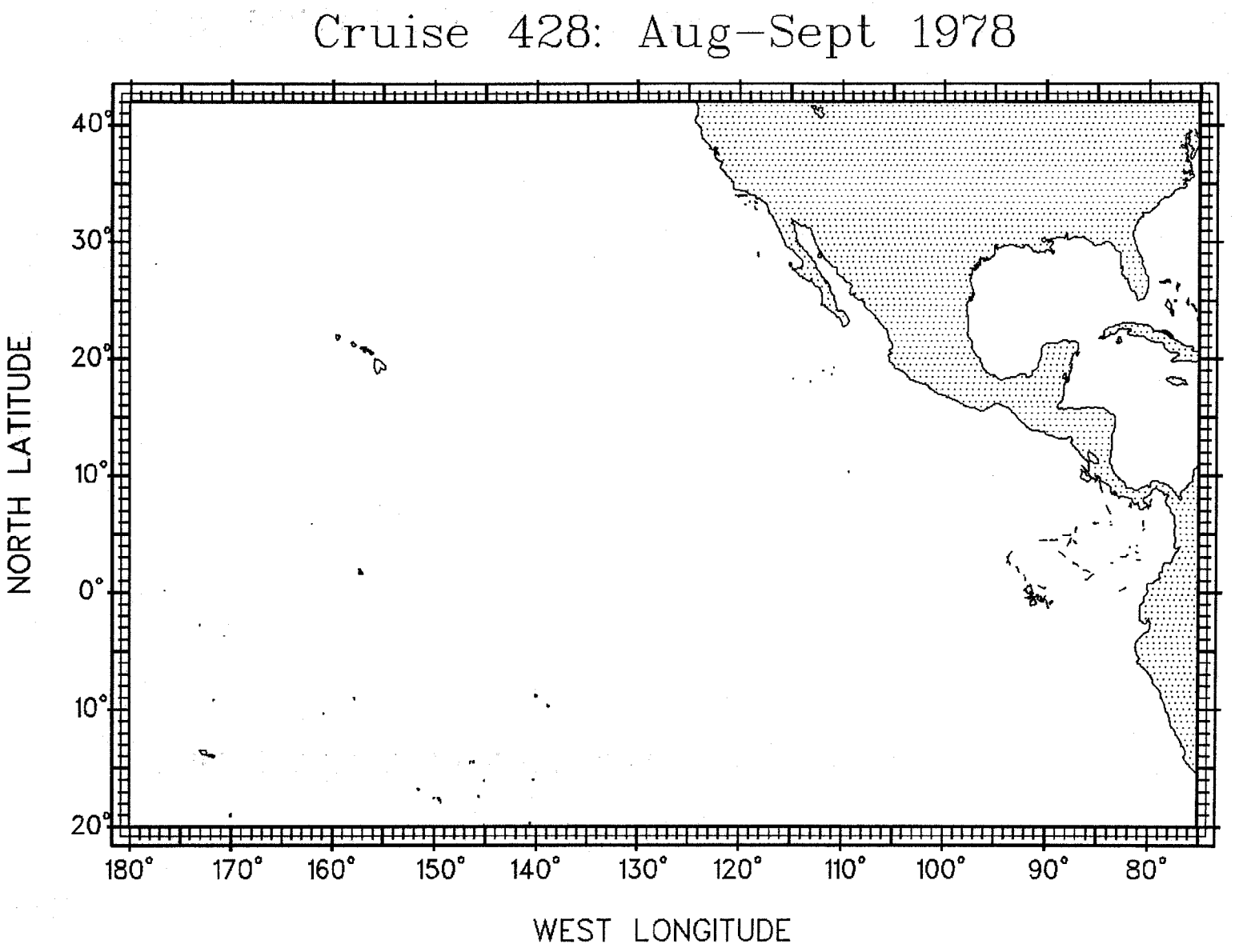

Cruise 428: Aug–Sept 1978
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 11.

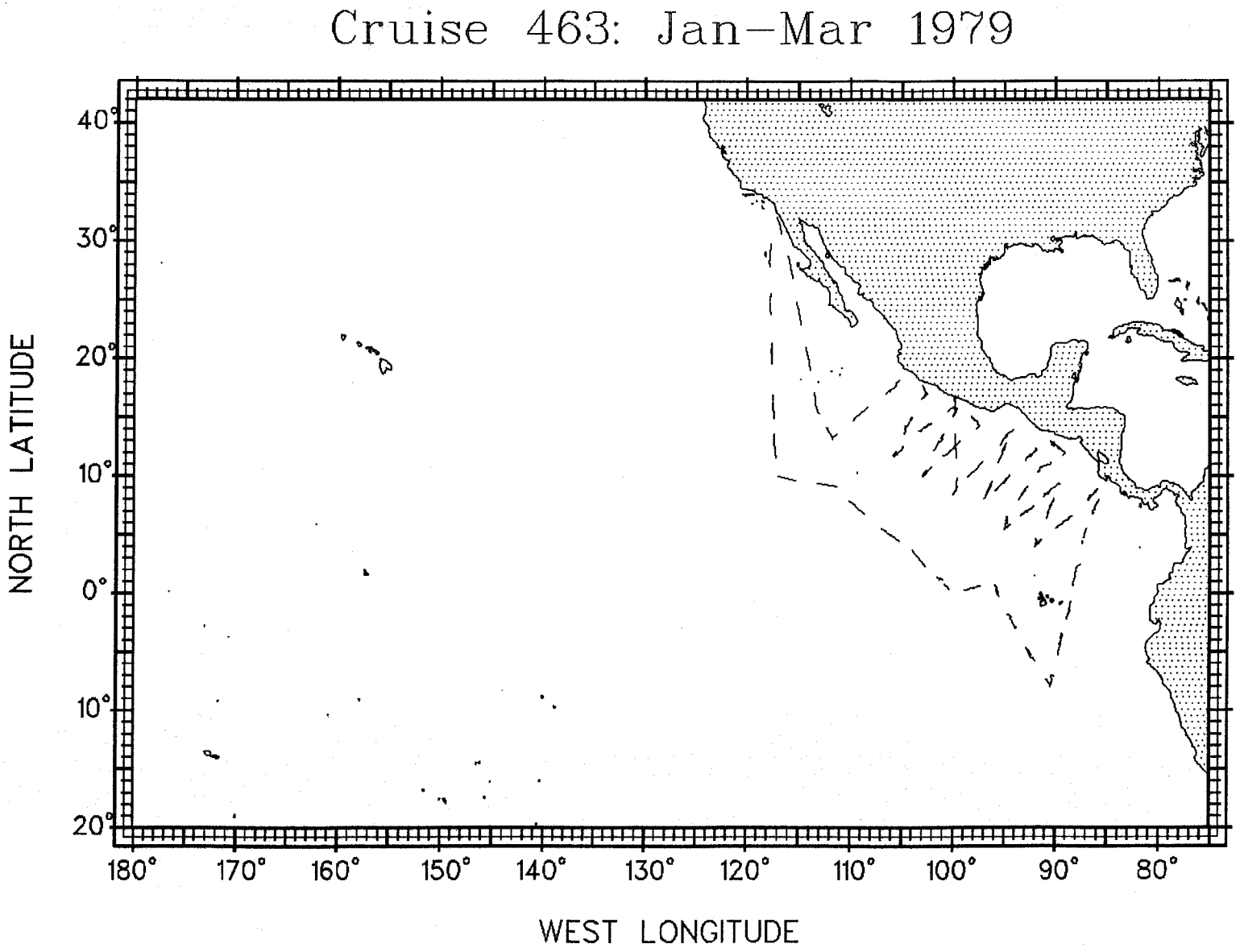

Cruise 463: Jan–Mar 1979
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 12.

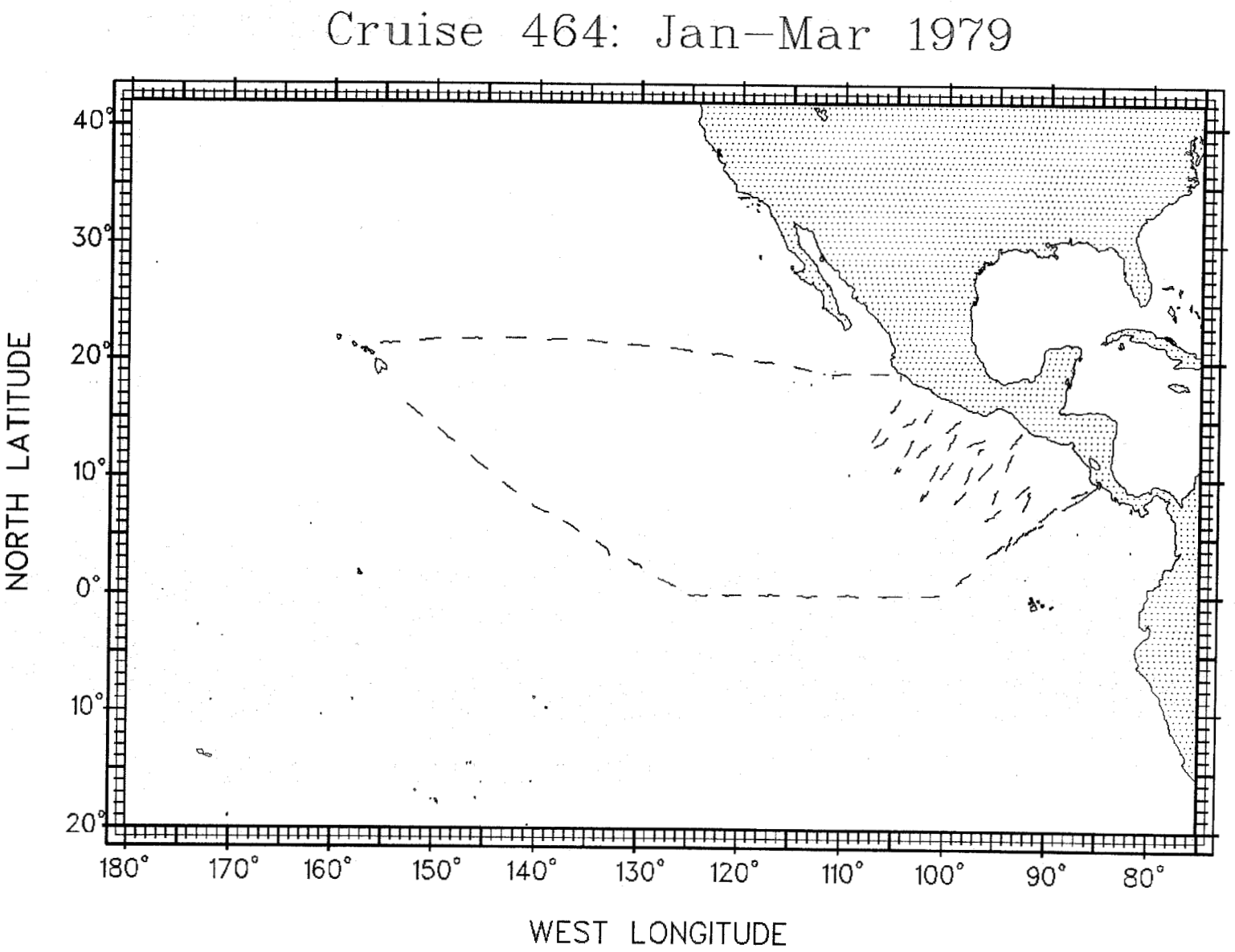

Cruise 464: Jan–Mar 1979
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 13.

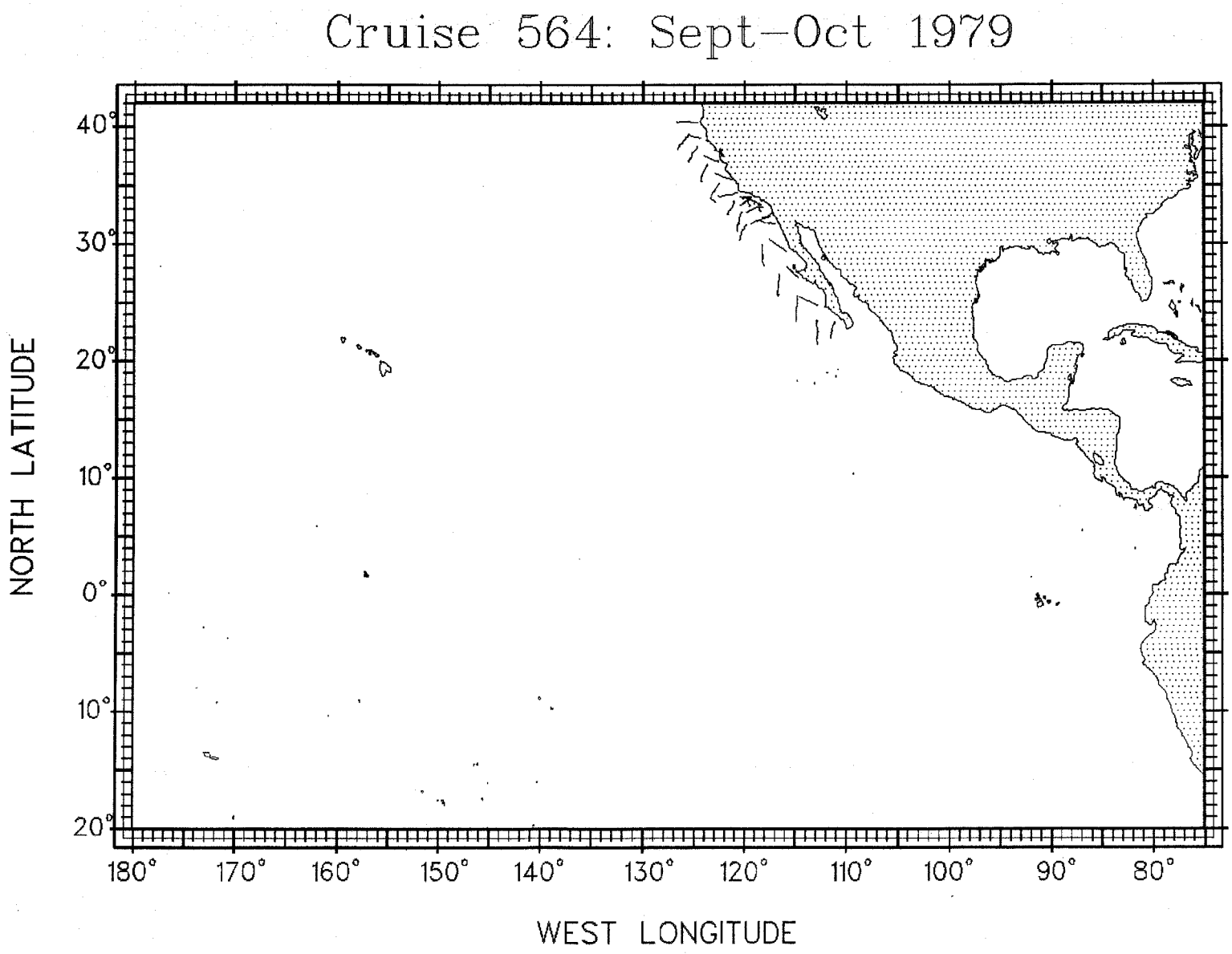

Cruise 564: Sept-Oct 1979
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 14.

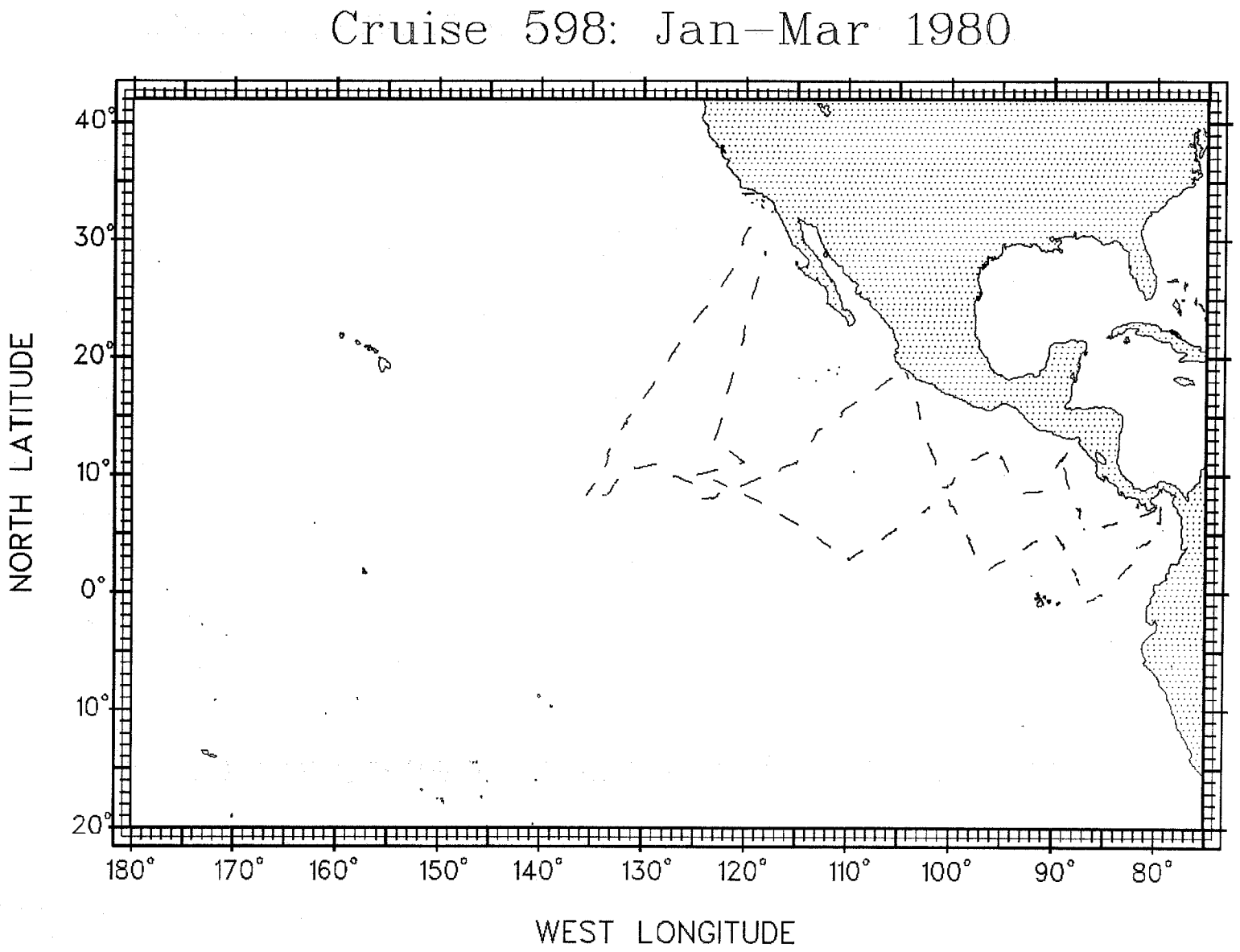

Cruise 598: Jan–Mar 1980
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 15.

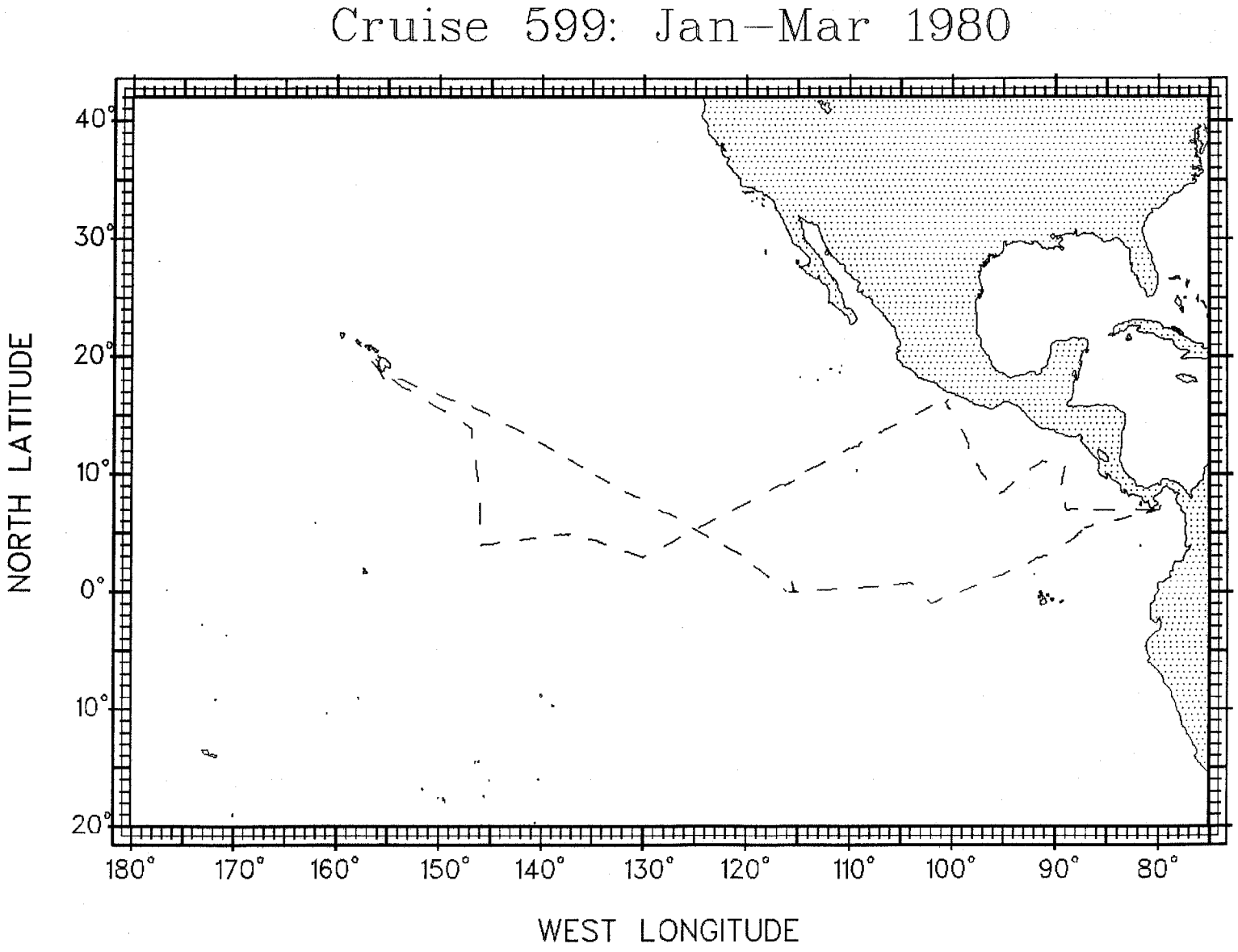

Cruise 599: Jan–Mar 1980
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 16.

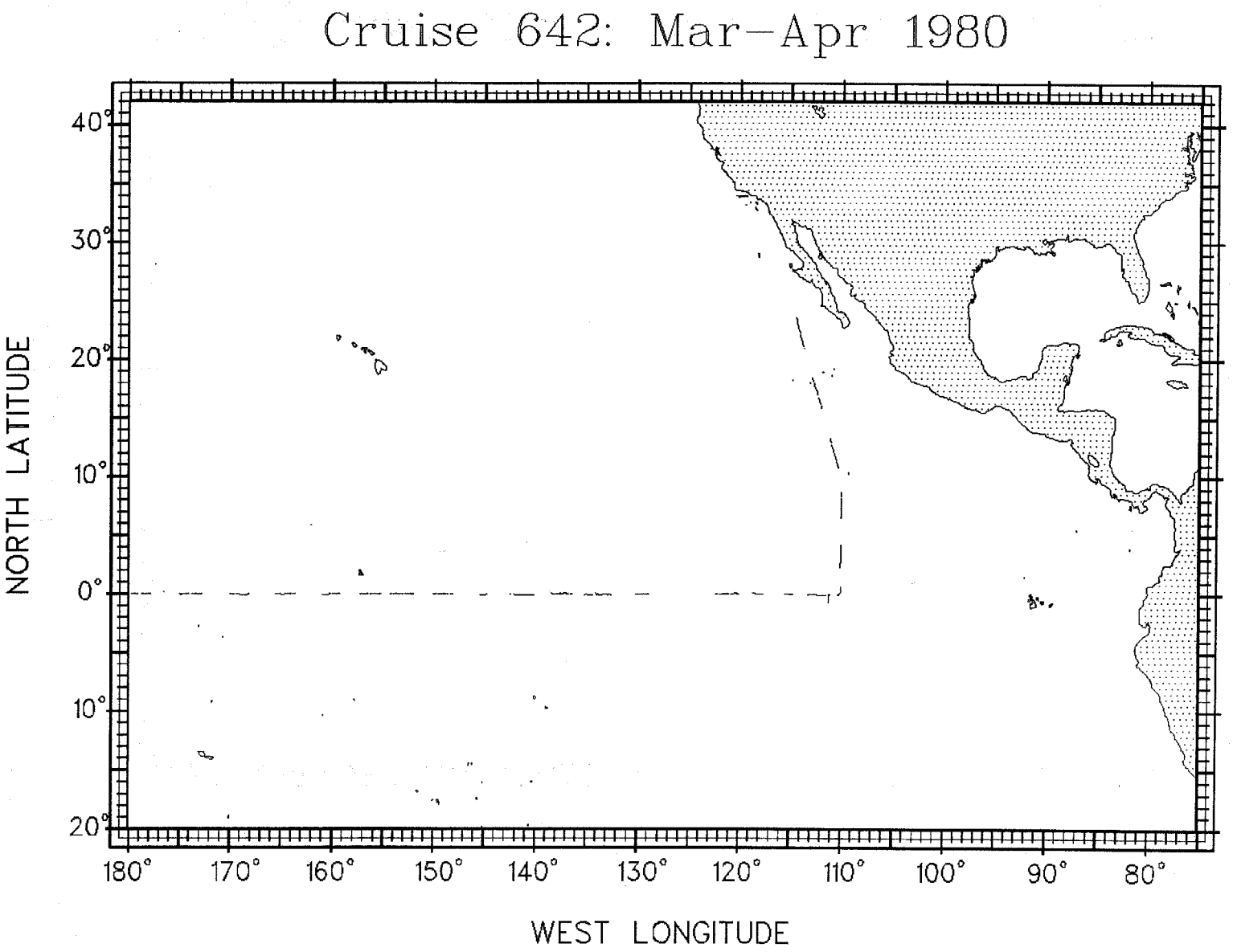

Cruise 642: Mar–Apr 1980
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 17.

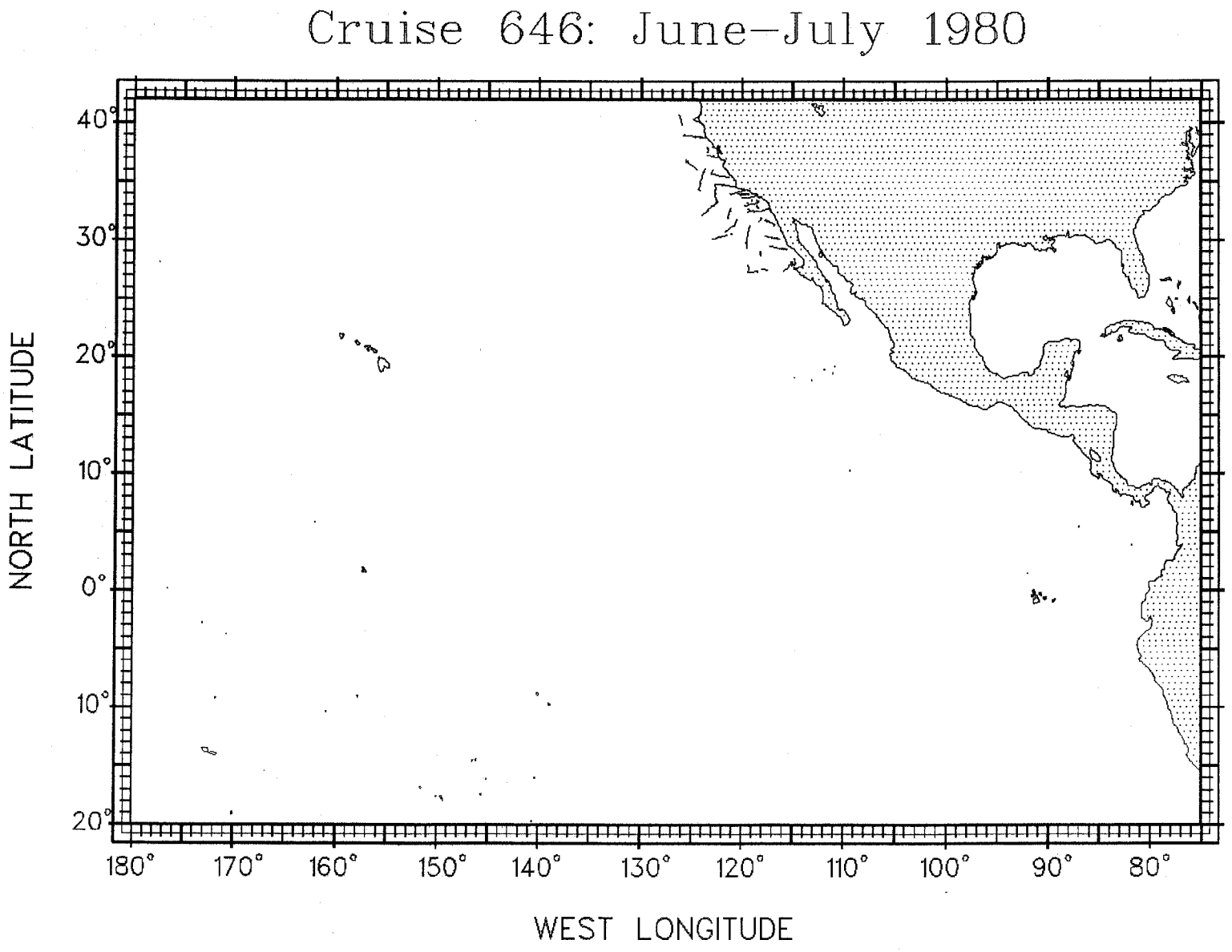

Cruise 646: June–July 1980
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 18.

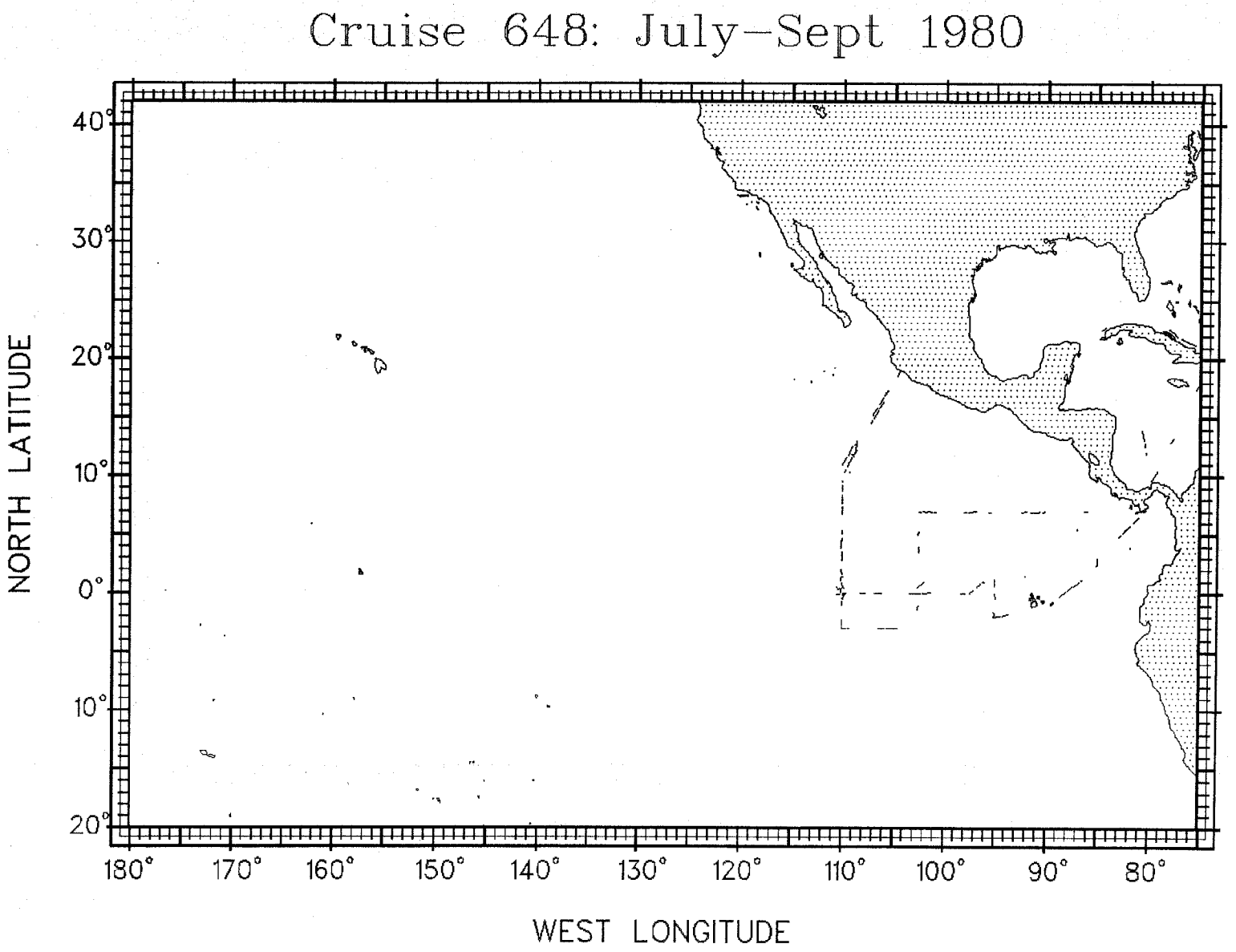

Cruise 648: July–Sept 1980
40°
30°
20°
10°
0°
10°
20°
NORTH LATITUDE
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 19.

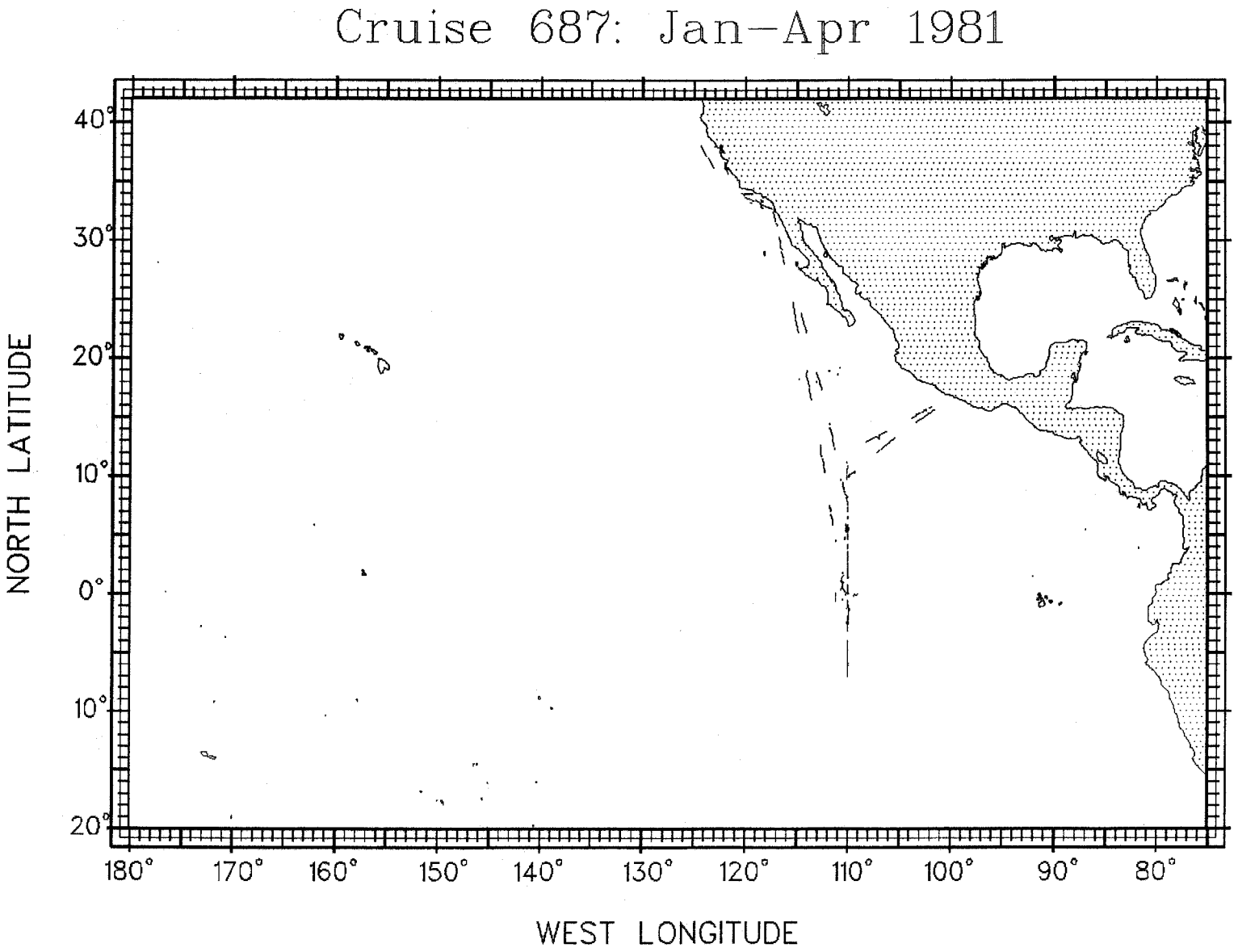

Cruise 687: Jan–Apr 1981
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 20.

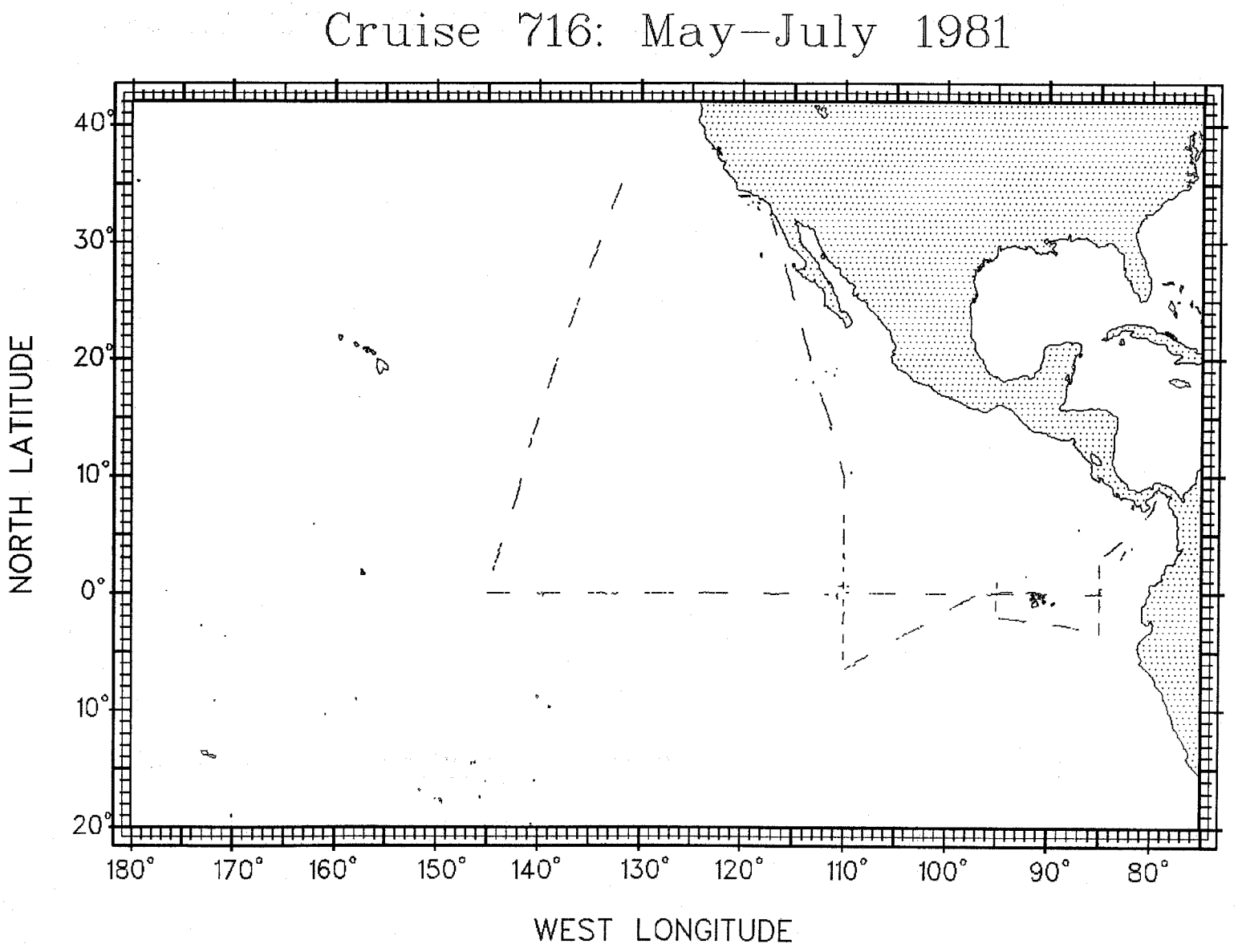

Cruise 716: May–July 1981
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 21.

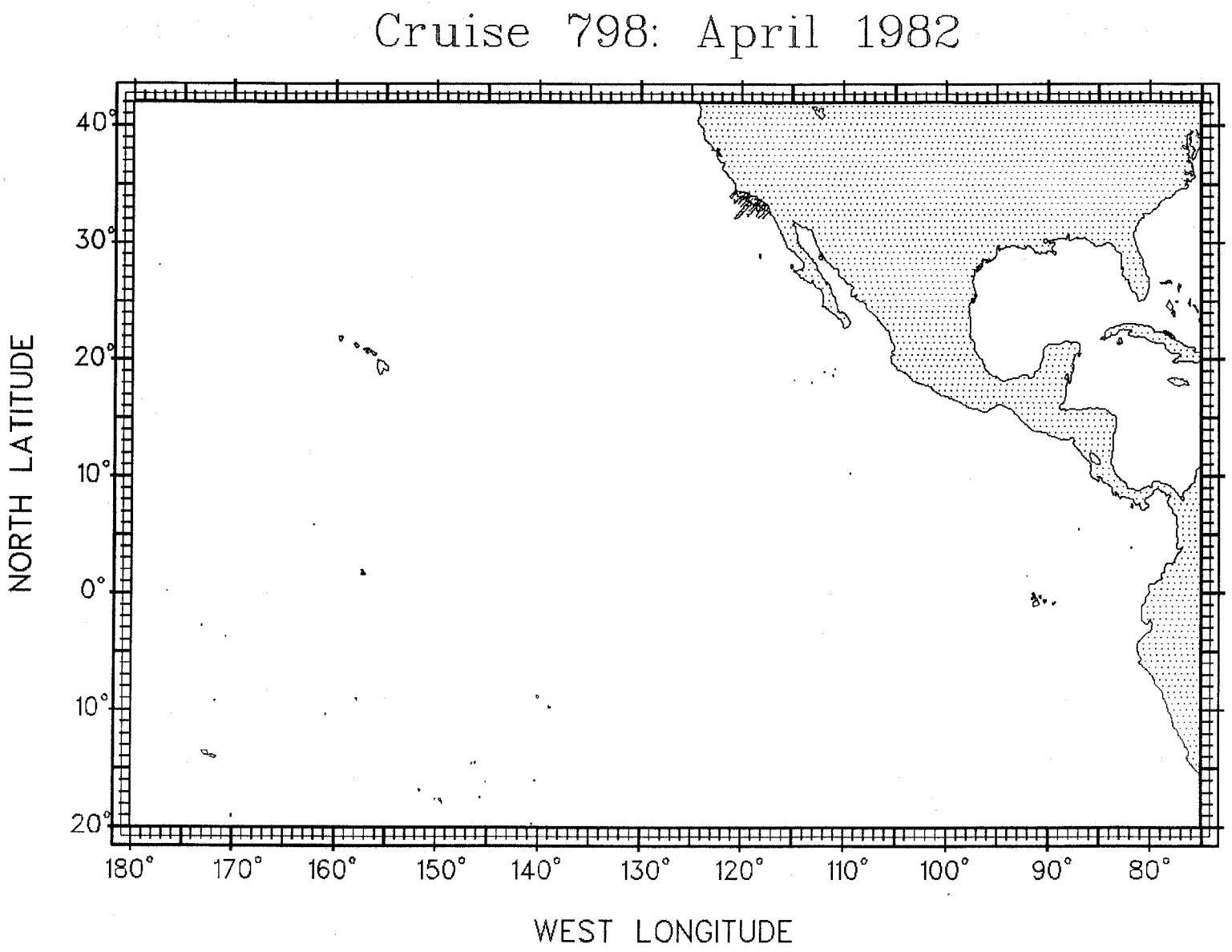

Cruise 798: April 1982
40°
30°
20°
10°
0°
10°
20°
NORTH LATITUDE
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 22.

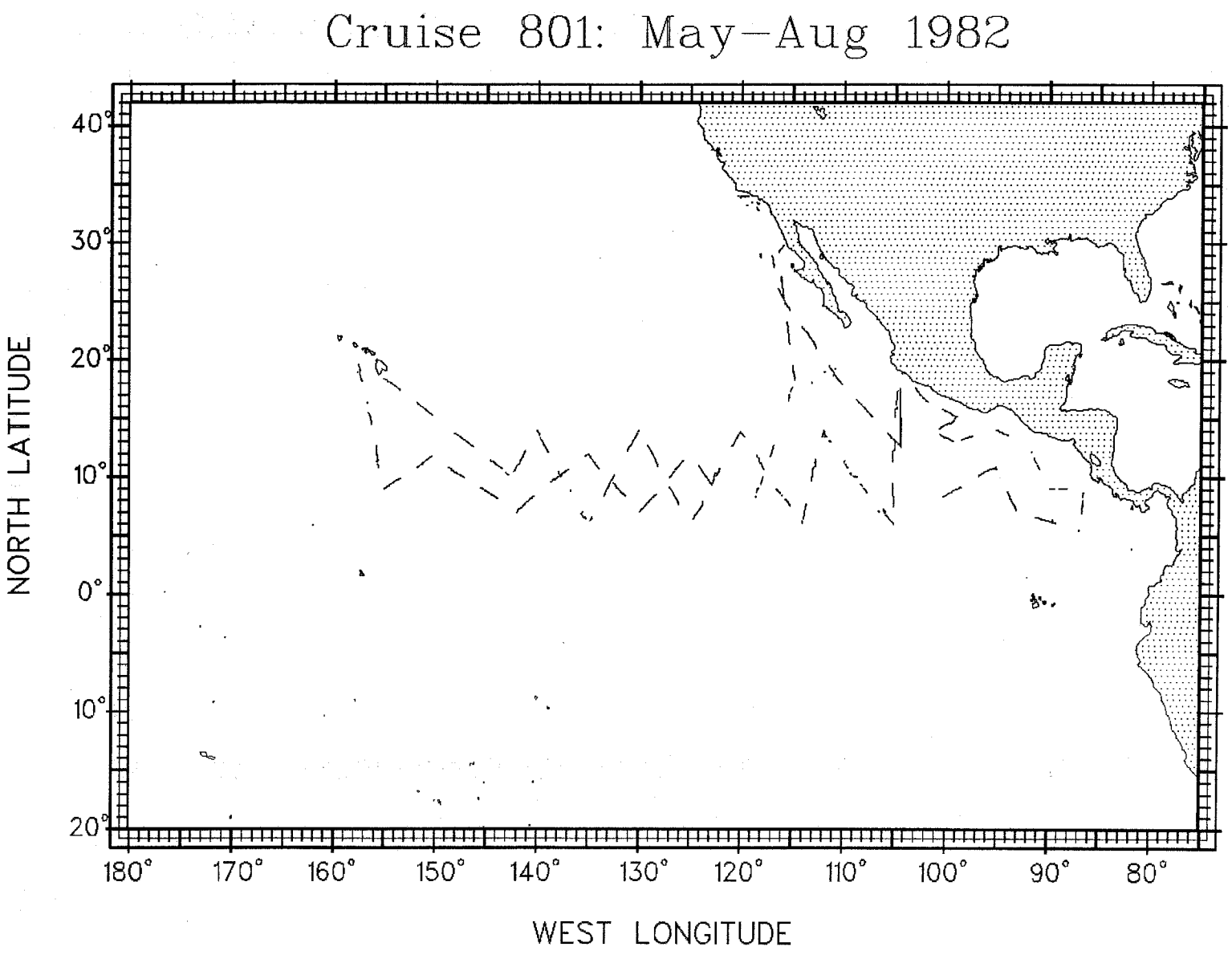

Cruise 801: May–Aug 1982
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 23.

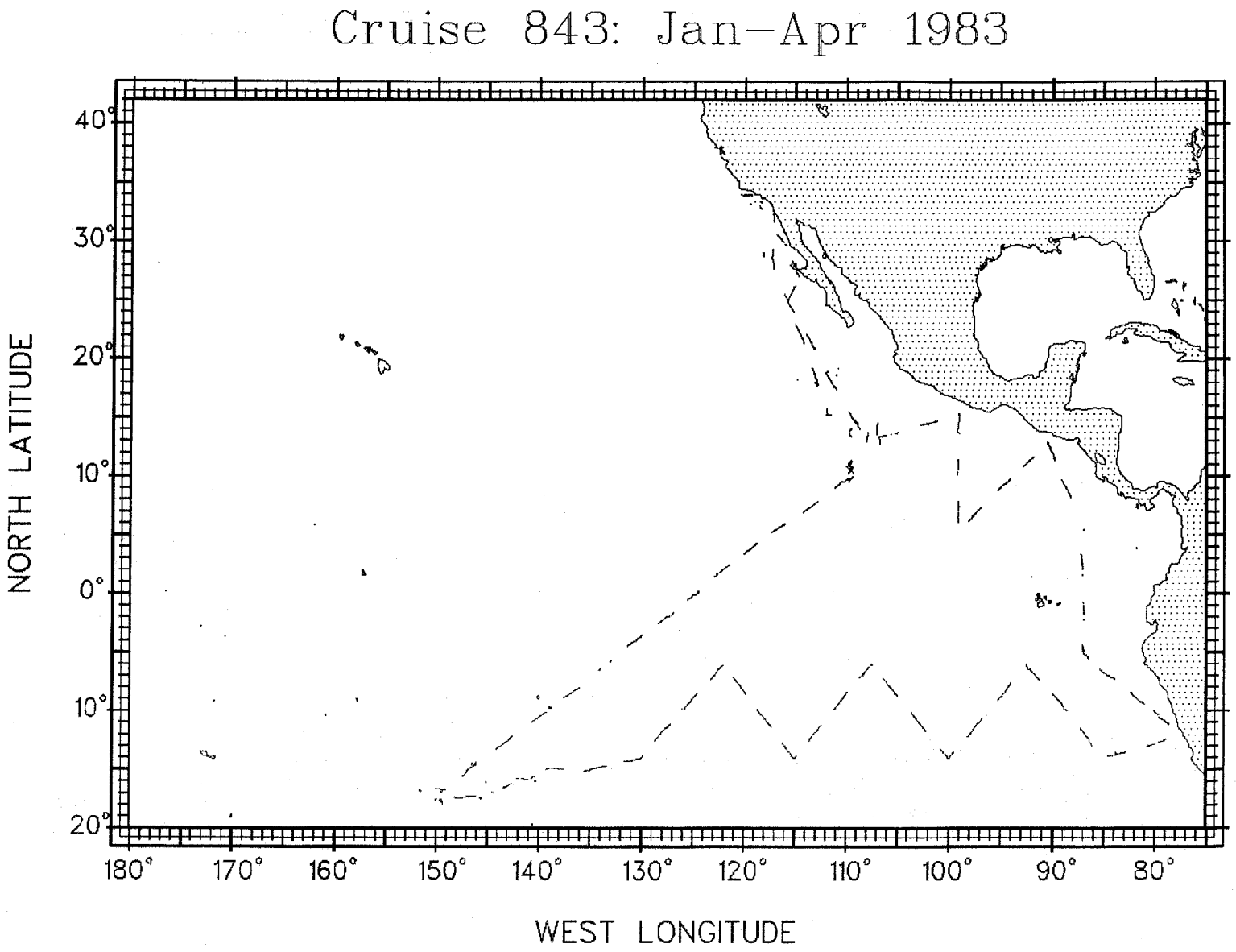

Cruise 843: Jan–Apr 1983
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 24.

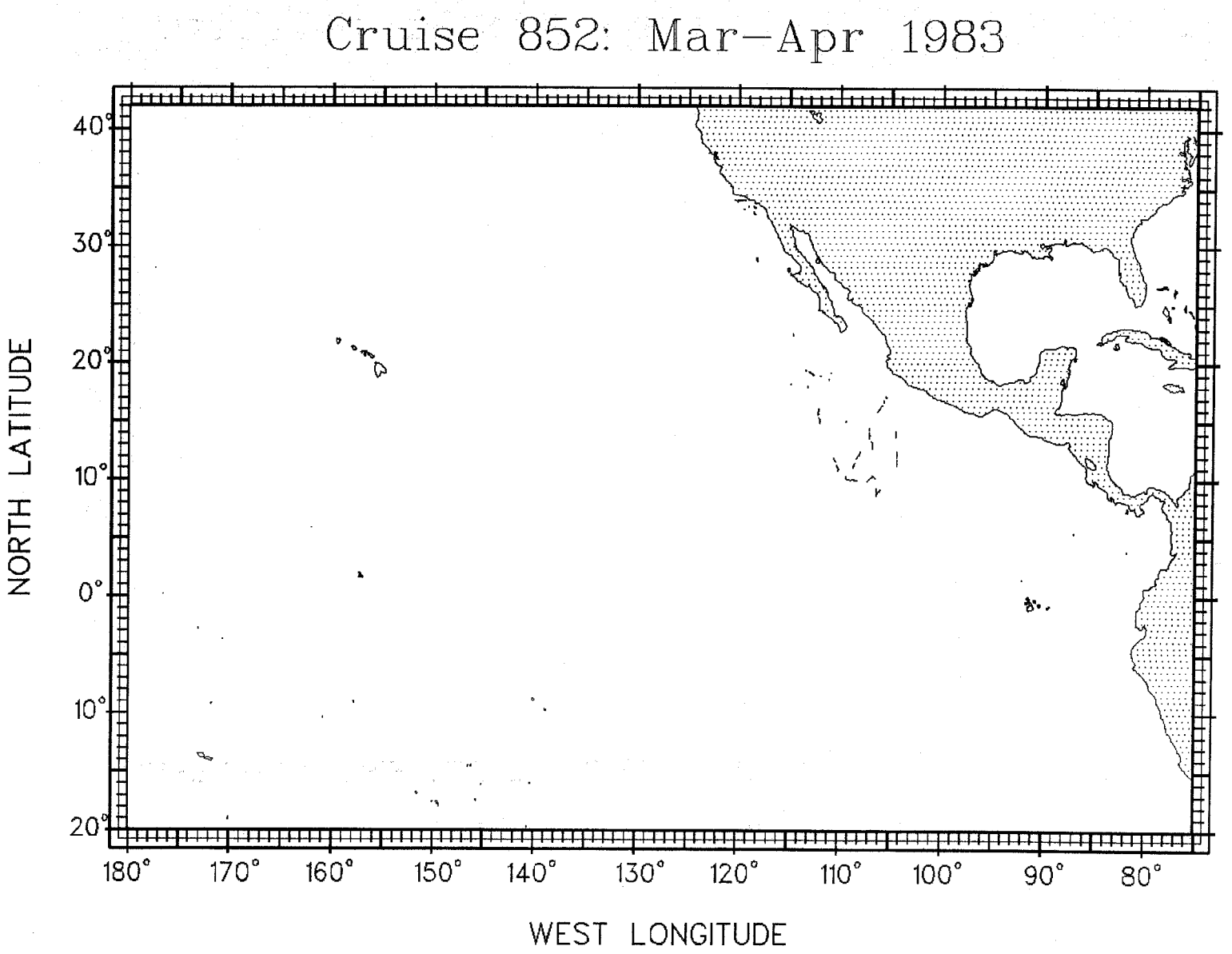

Cruise 852: Mar–Apr 1983
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 25.

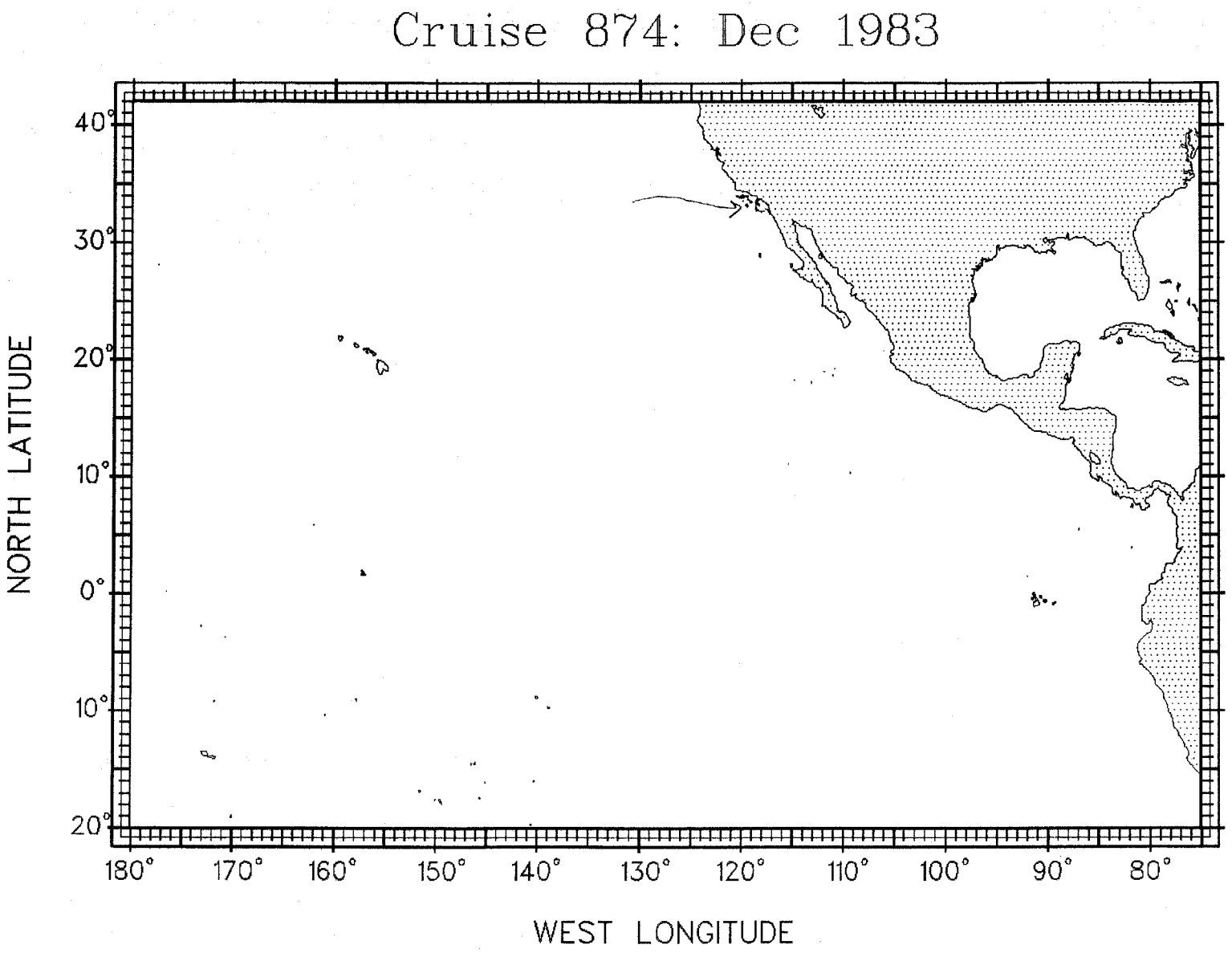

Cruise 874: Dec 1983
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 26.

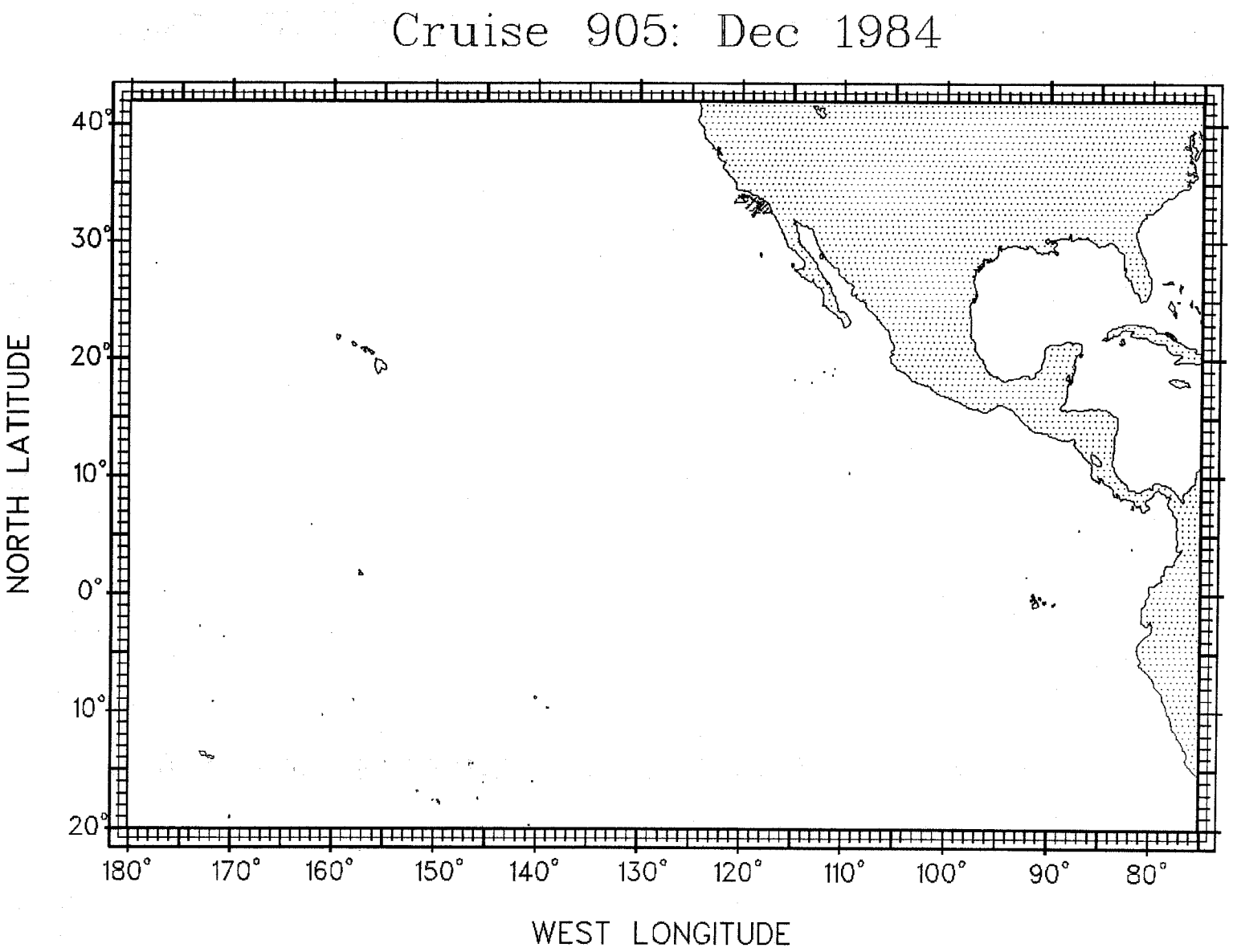

Cruise 905: Dec 1984
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 27.

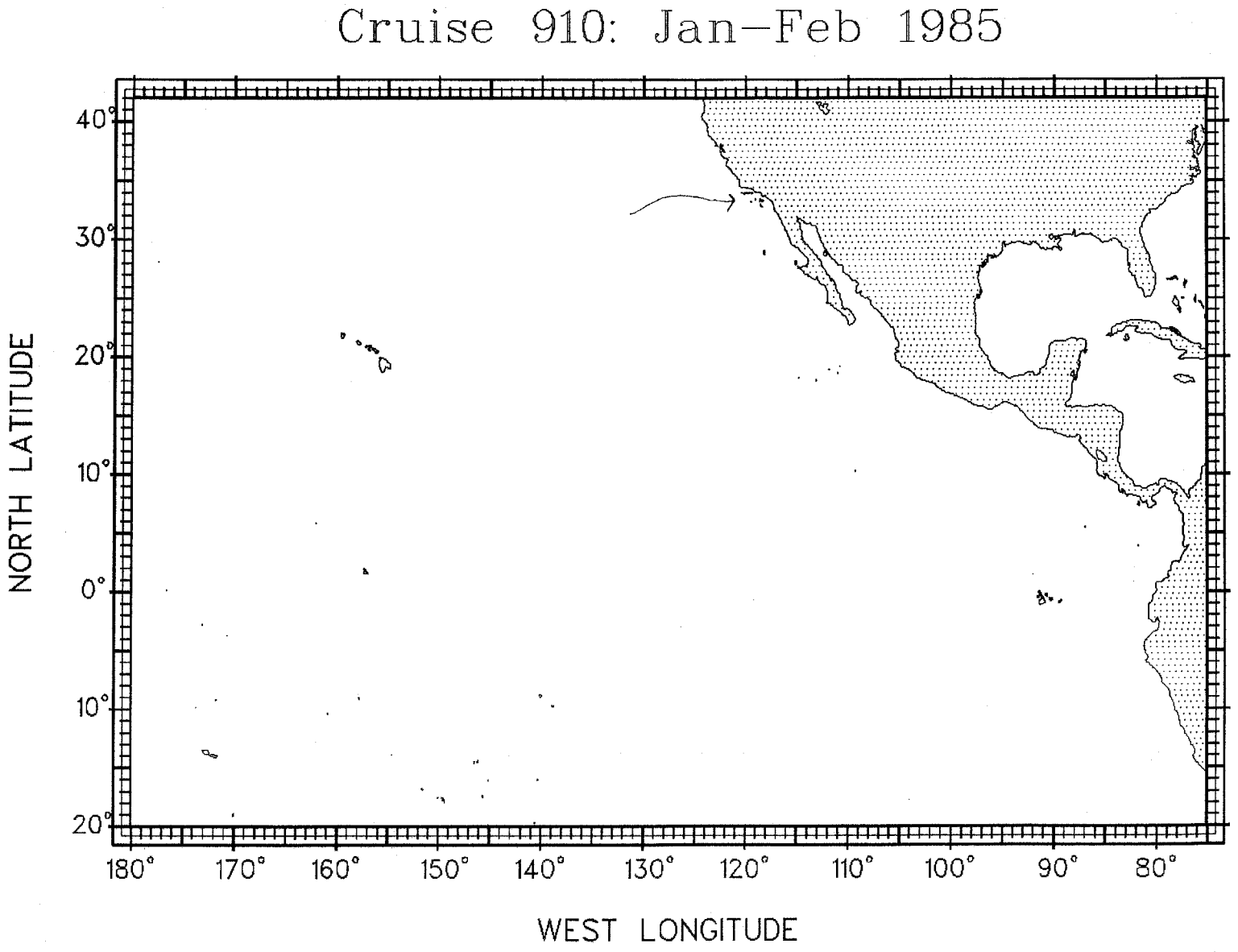

Cruise 910: Jan–Feb 1985
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
20°
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 28.

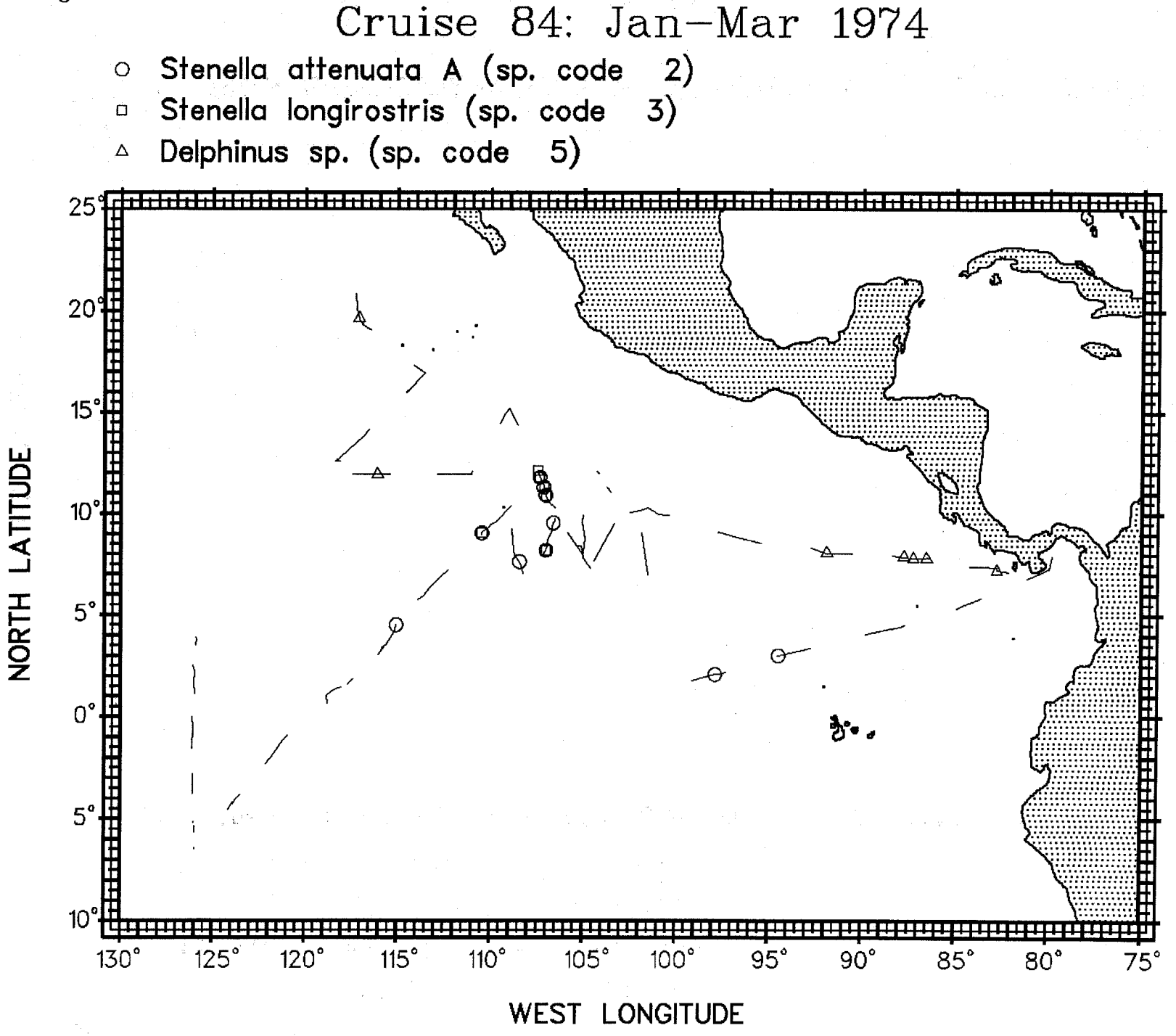

Cruise 84: Jan–Mar 1974
Stenella attenuata A (sp. code 2)
Stenella longirostris (sp. code 3)
Delphinus sp. (sp. code 5)
NORTH LATITUDE
25°
20°
15°
10°
5°
0°
5°
10°
130°
125°
120°
115°
110°
105°
100°
95°
90°
85°
80°
75°
WEST LONGITUDE

Figure 29.

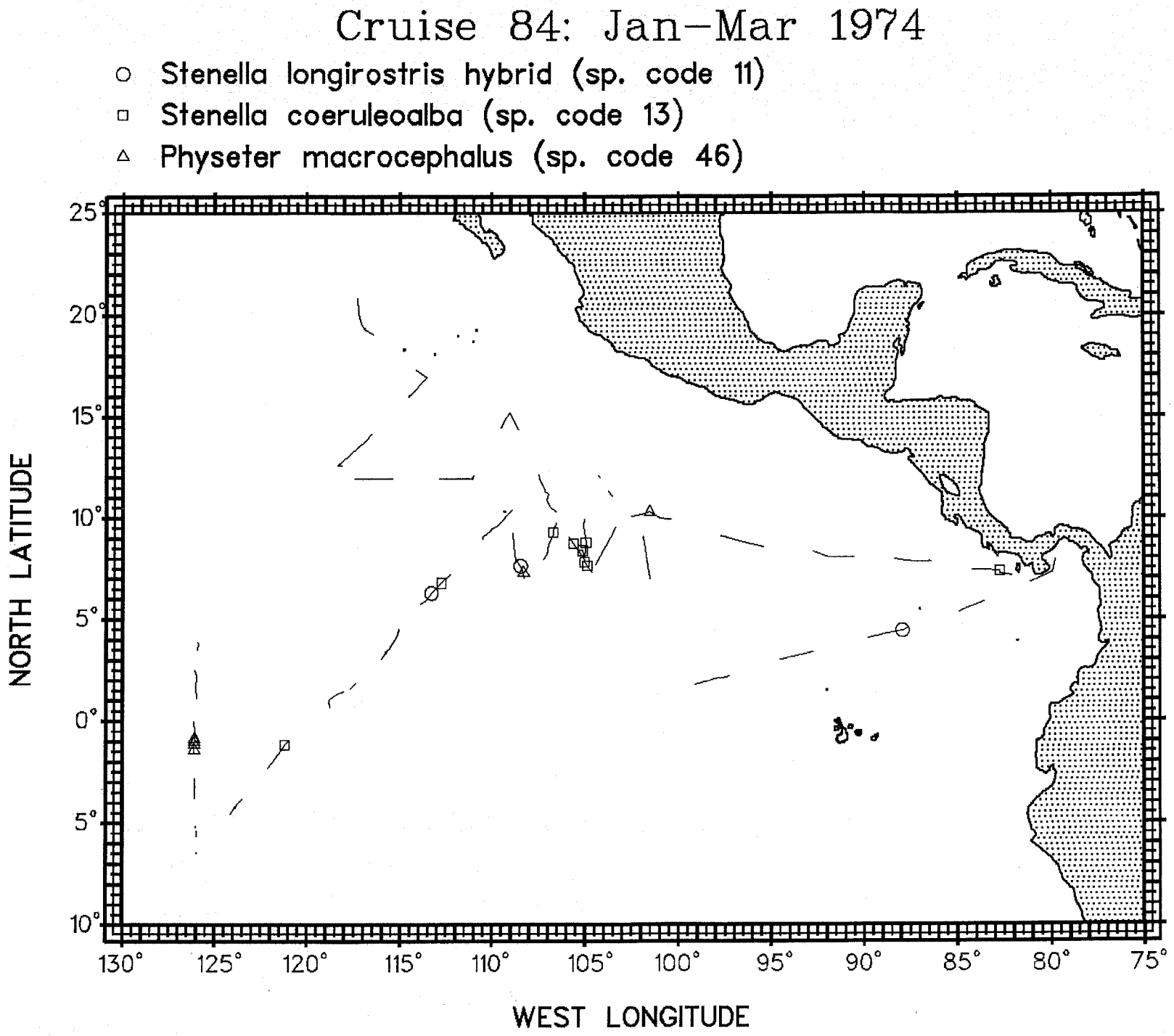

Cruise 84: Jan–Mar 1974
Stenella longirostris hybrid (sp. code 11)
Stenella coeruleoalba (sp. code 13)
Physeter macrocephalus (sp. code 46)
NORTH LATITUDE
25°
20°
15°
10°
5°
0°
5°
10°
130°
125°
120°
115°
110°
105°
100°
95°
90°
85°
80°
75°
WEST LONGITUDE

Figure 30.

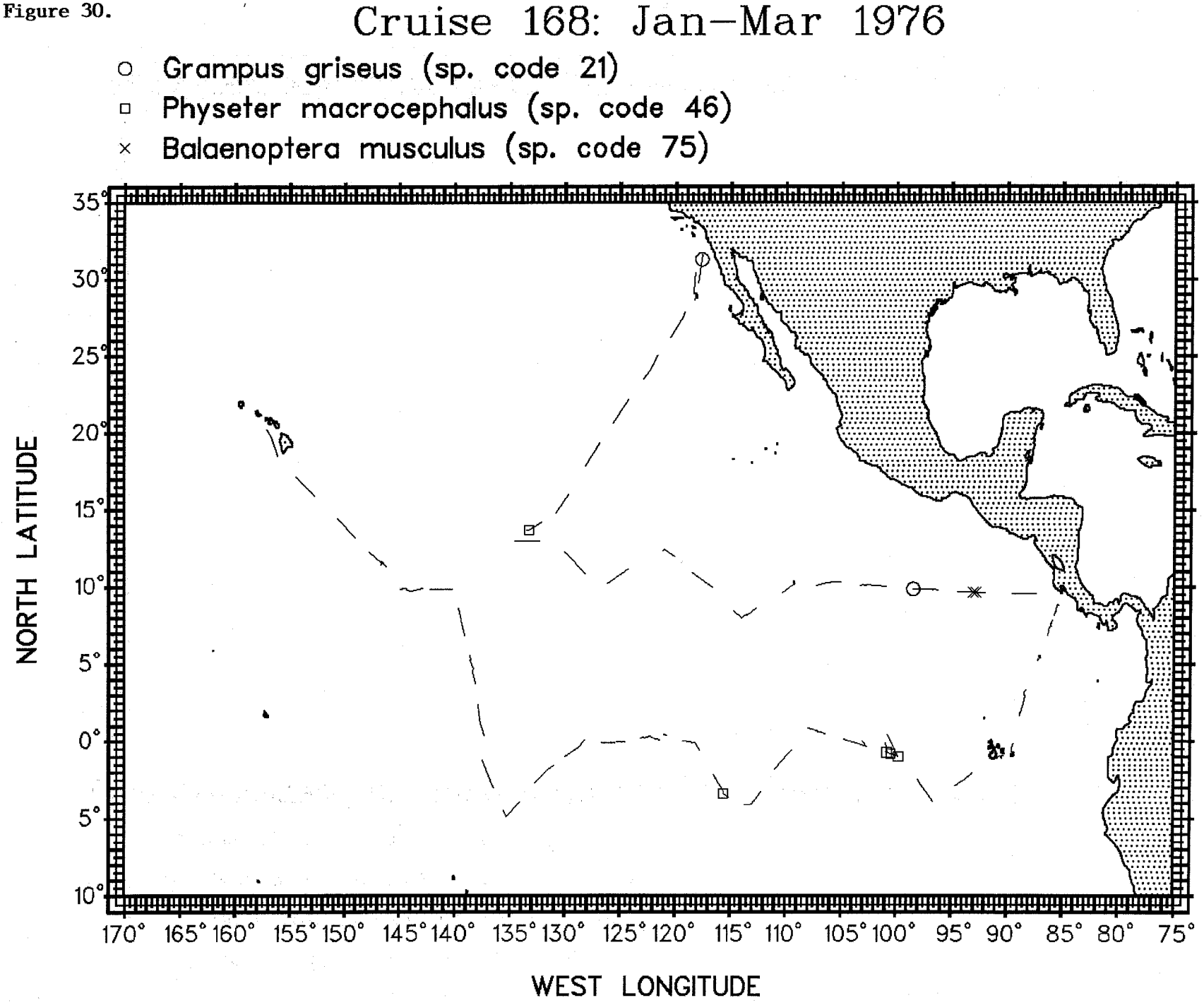

Cruise 168: Jan–Mar 1976
Grampus griseus (sp. code 21)
Physeter macrocephalus (sp. code 46)
Balaenoptera musculus (sp. code 75)
NORTH LATITUDE
35°
30°
25°
20°
15°
10°
5°
0°
5°
10°
170° 165° 160° 155° 150° 145° 140° 135° 130° 125° 120° 115° 110° 105° 100° 95° 90° 85° 80° 75°
WEST LONGITUDE

Figure 31.

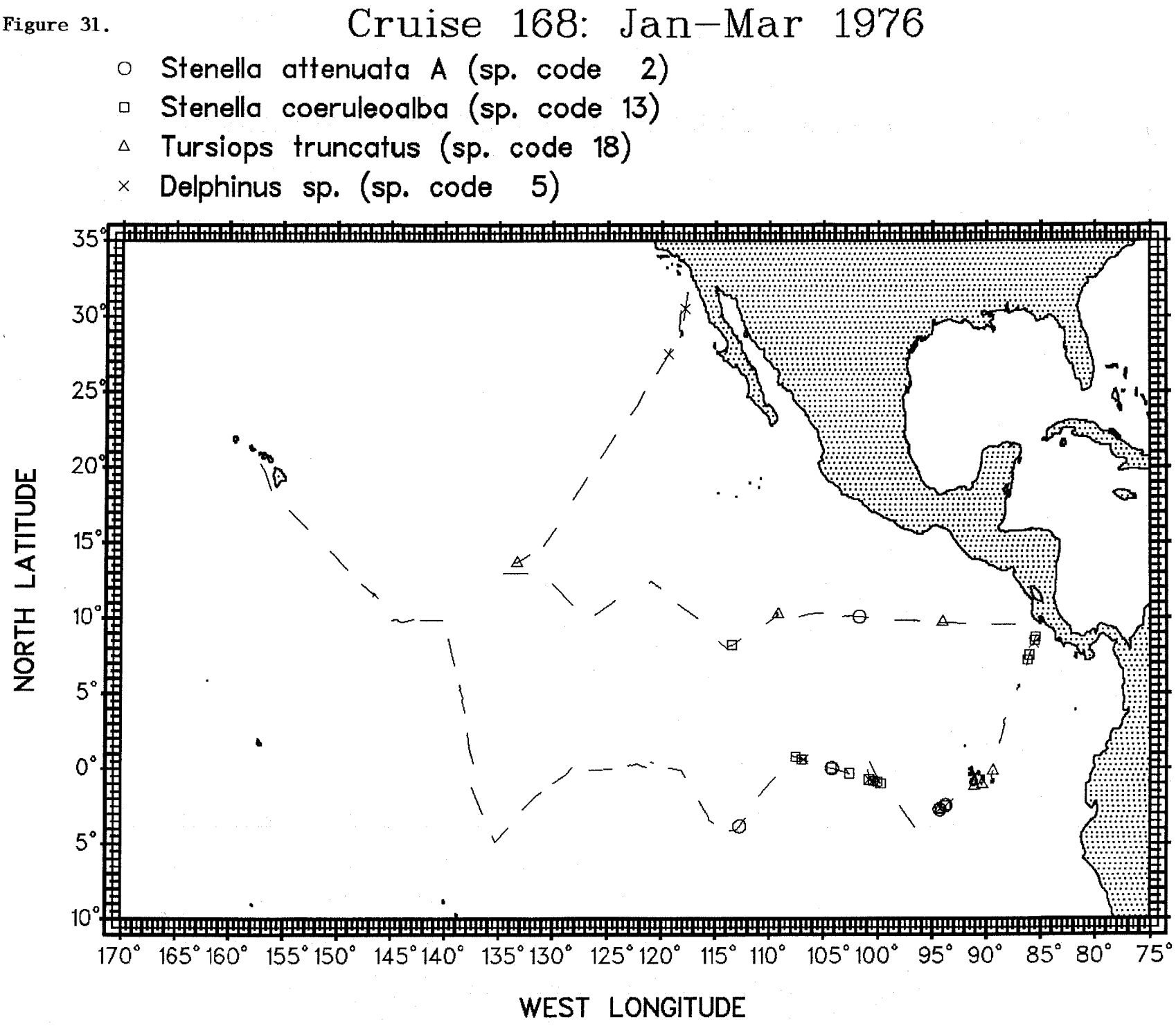

Cruise 168: Jan–Mar 1976
Stenella attenuata A (sp. code 2)
Stenella coeruleoalba (sp. code 13)
Tursiops truncatus (sp. code 18)
Delphinus sp. (sp. code 5)
NORTH LATITUDE
35°
30°
25°
20°
15°
10°
5°
0°
5°
10°
170° 165° 160° 155° 150° 145° 140° 135° 130° 125° 120° 115° 110° 105° 100° 95° 90° 85° 80° 75°
WEST LONGITUDE

Figure 32.

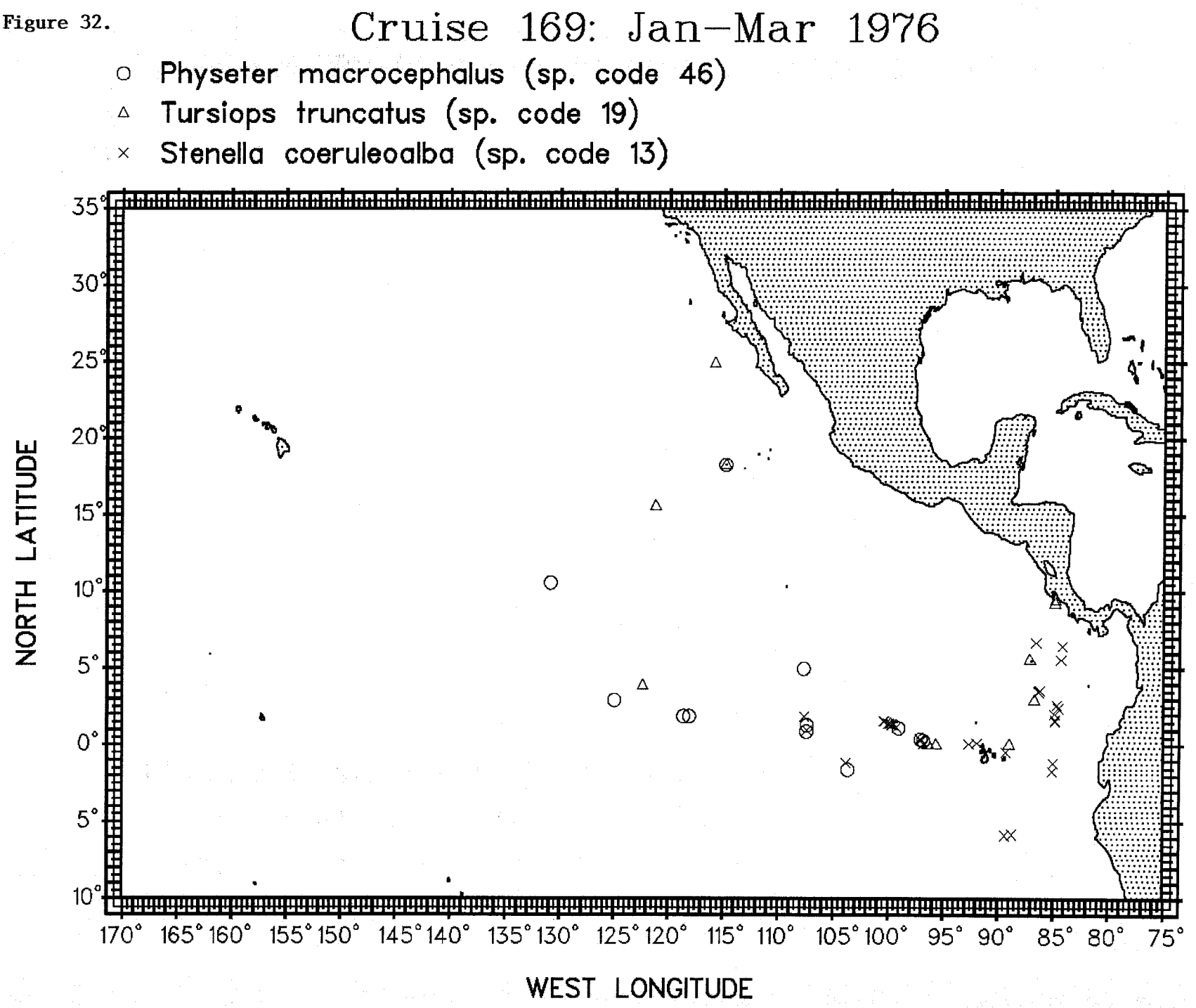

Cruise 169: Jan–Mar 1976
Physeter macrocephalus (sp. code 46)
Tursiops truncatus (sp. code 19)
Stenella coeruleoalba (sp. code 13)
NORTH LATITUDE
35°
30°
25°
20°
15°
10°
5°
0°
5°
10°
WEST LONGITUDE
170° 165° 160° 155° 150° 145° 140° 135° 130° 125° 120° 115° 110° 105° 100° 95° 90° 85° 80° 75°

Figure 33.

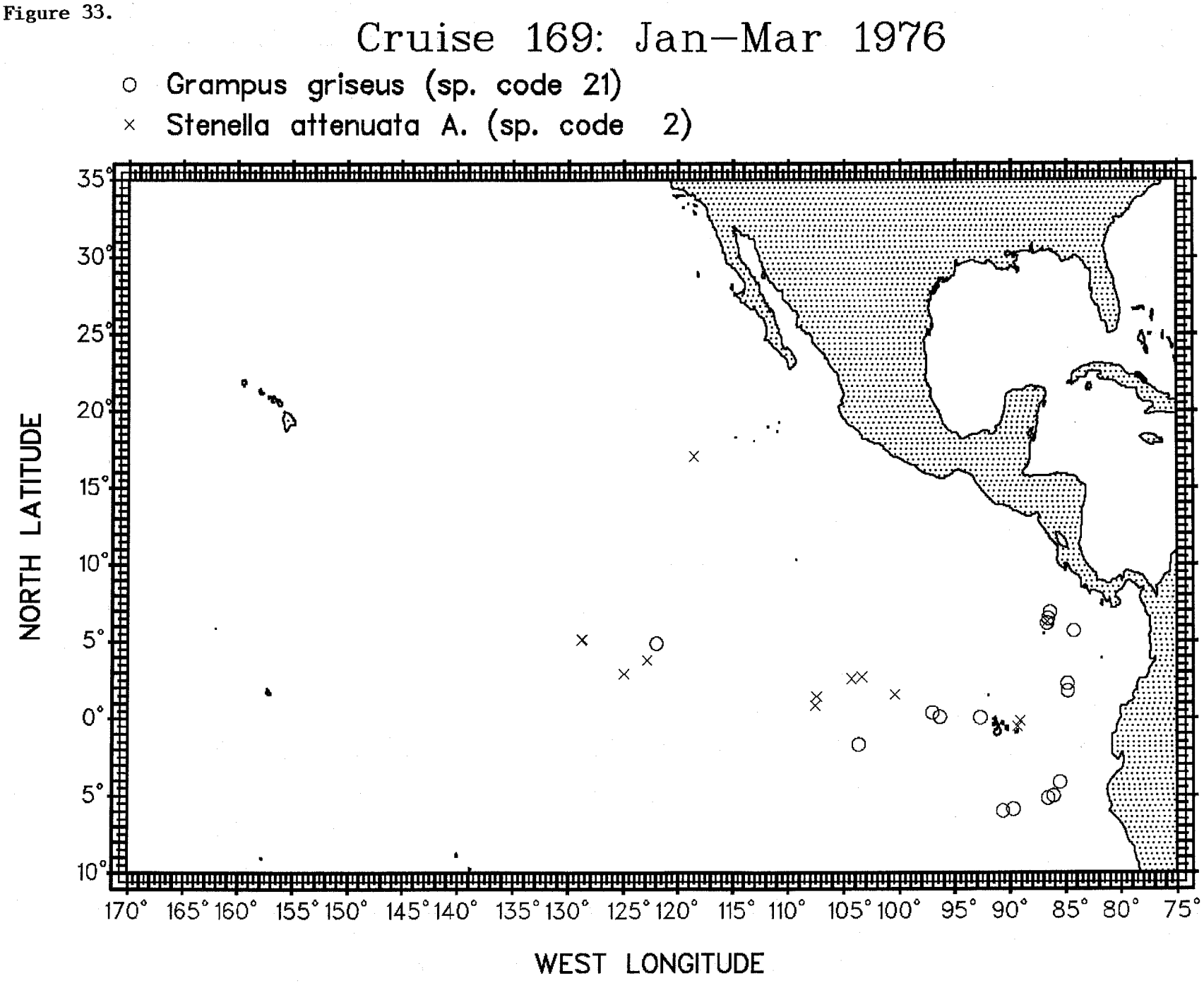

Cruise 169: Jan–Mar 1976
Grampus griseus (sp. code 21)
Stenella attenuata A. (sp. code 2)
NORTH LATITUDE
35°
30°
25°
20°
15°
10°
5°
0°
5°
10°
170° 165° 160° 155° 150° 145° 140° 135° 130° 125° 120° 115° 110° 105° 100° 95° 90° 85° 80° 75°
WEST LONGITUDE

Figure 34.

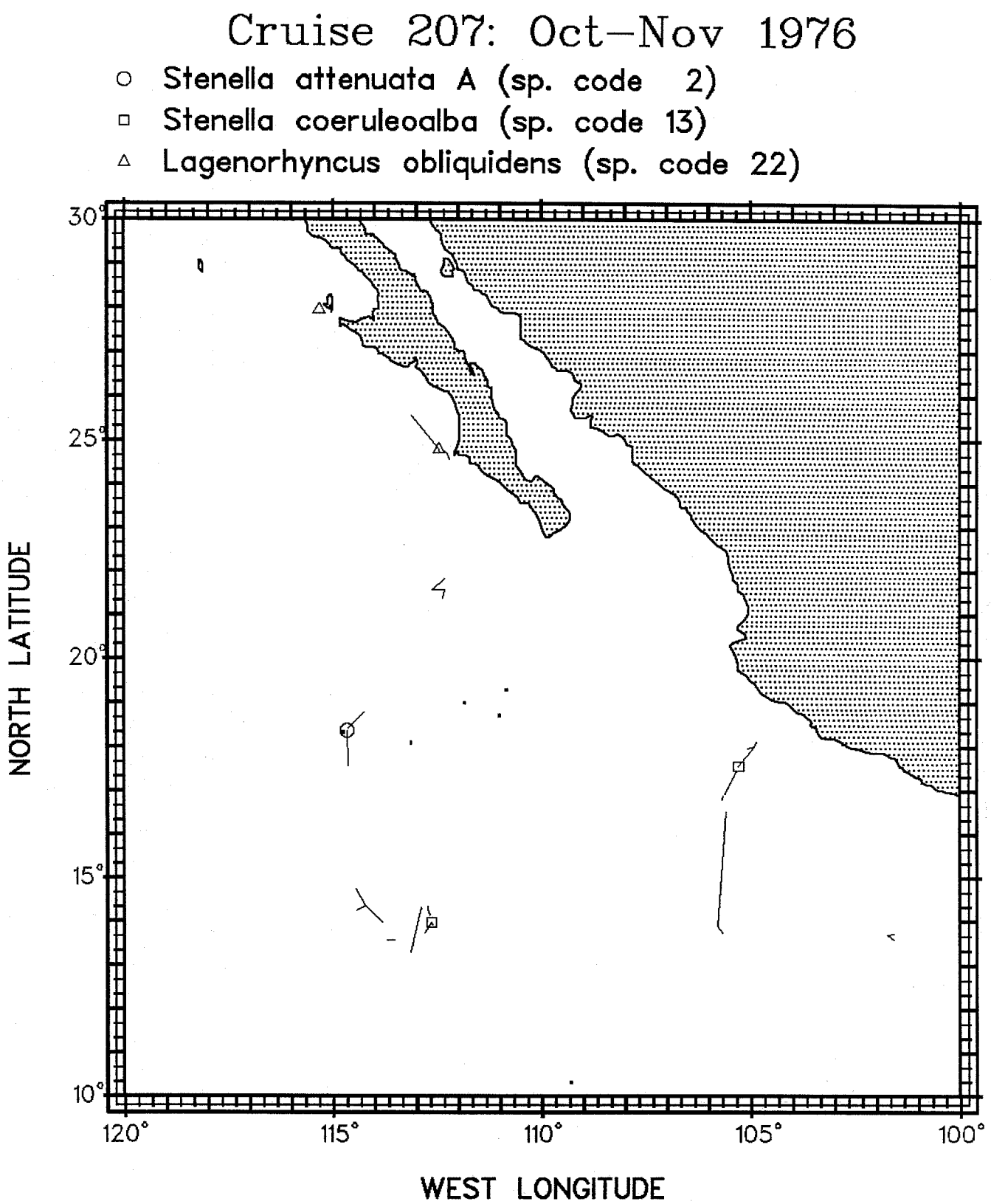

Cruise 207: Oct–Nov 1976
Stenella attenuata A (sp. code 2)
Stenella coeruleoalba (sp. code 13)
Lagenorhyncus obliquidens (sp. code 22)
30°
25°
20°
15°
10°
120°
115°
110°
105°
100°
NORTH LATITUDE
WEST LONGITUDE

Figure 35.

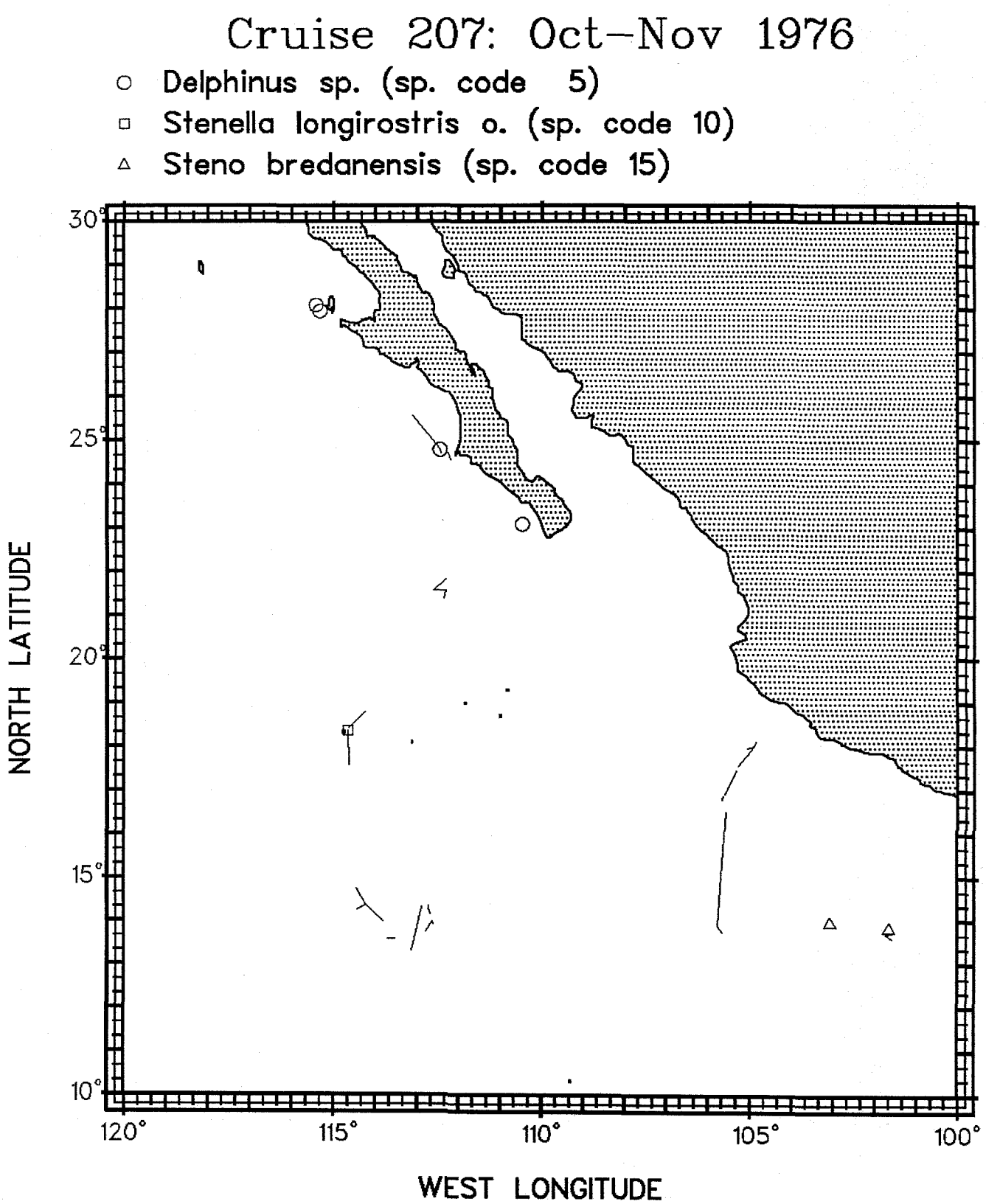

Cruise 207: Oct–Nov 1976
Delphinus sp. (sp. code 5)
Stenella longirostris o. (sp. code 10)
Steno bredanensis (sp. code 15)
30°
25°
20°
15°
10°
NORTH LATITUDE
120°
115°
110°
105°
100°
WEST LONGITUDE

Figure 36.

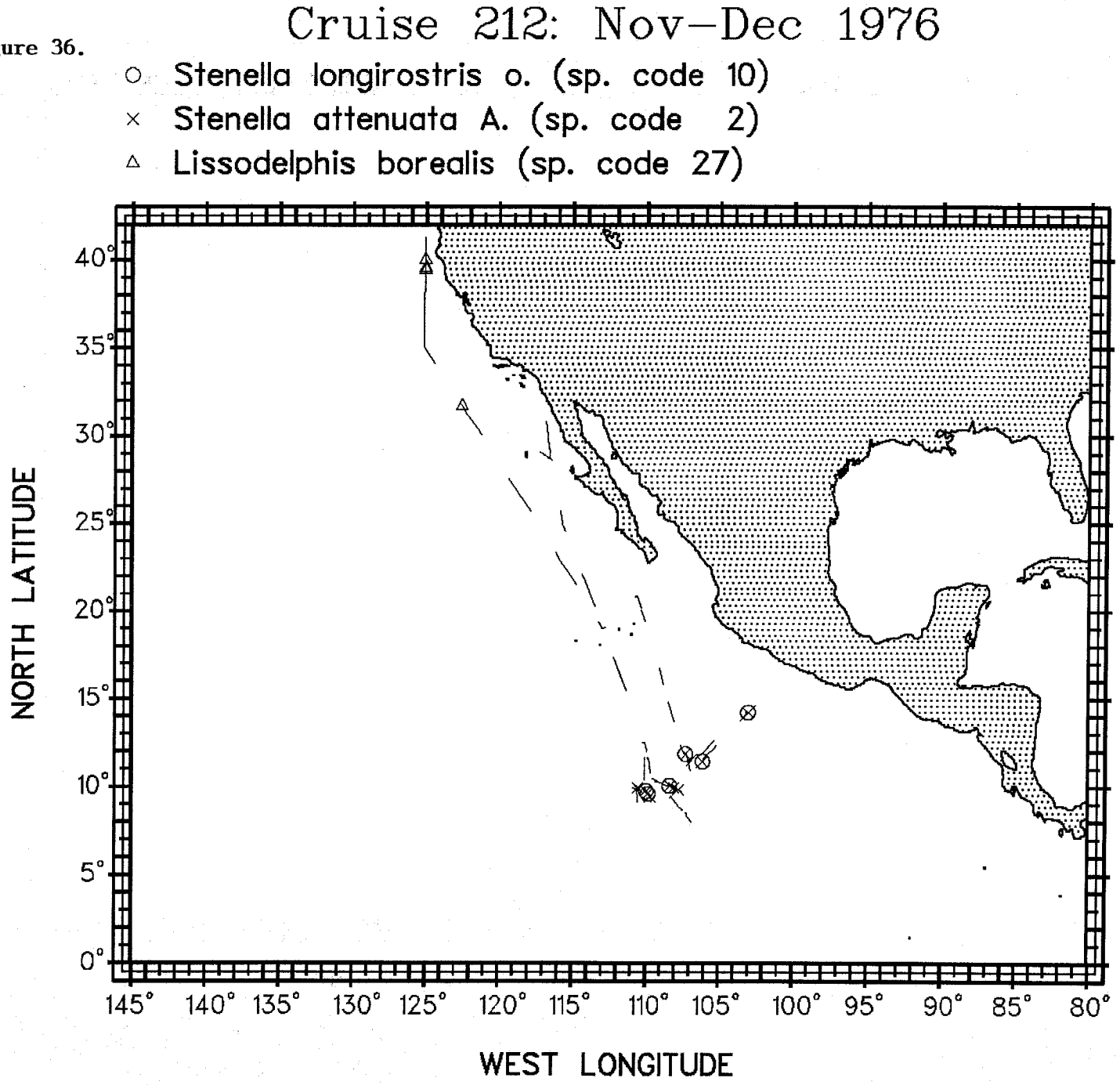

Cruise 212: Nov–Dec 1976
Stenella longirostris o. (sp. code 10)
Stenella attenuata A. (sp. code 2)
Lissodelphis borealis (sp. code 27)
NORTH LATITUDE
40°
35°
30°
25°
20°
15°
10°
5°
0°
145° 140° 135° 130° 125° 120° 115° 110° 105° 100° 95° 90° 85° 80°
WEST LONGITUDE

Figure 37.

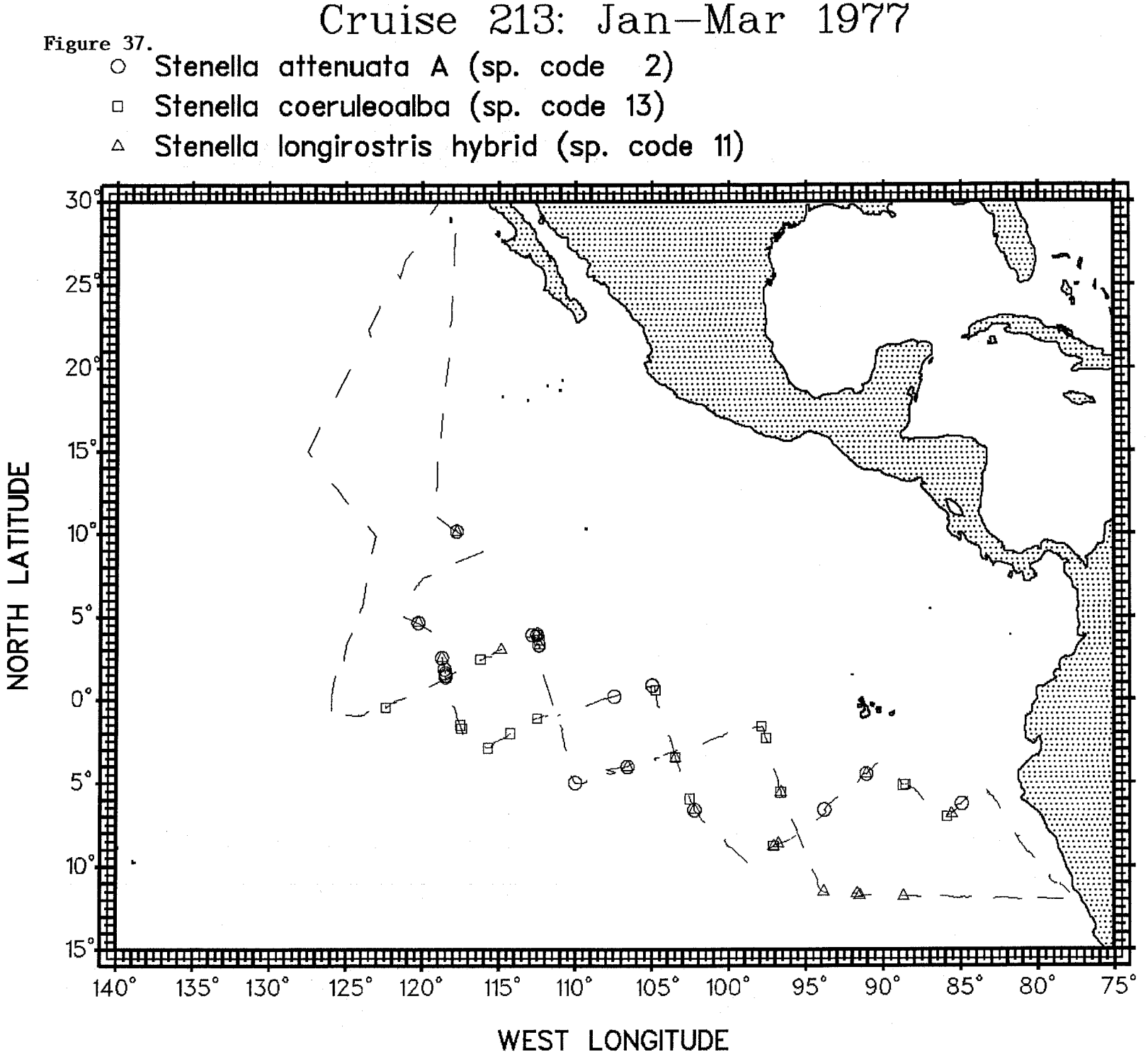

Cruise 213: Jan–Mar 1977
Stenella attenuata A (sp. code 2)
Stenella coeruleoalba (sp. code 13)
Stenella longirostris hybrid (sp. code 11)
30°
25°
20°
15°
10°
5°
0°
5°
10°
15°
NORTH LATITUDE
140°
135°
130°
125°
120°
115°
110°
105°
100°
95°
90°
85°
80°
75°
WEST LONGITUDE

Figure 38.

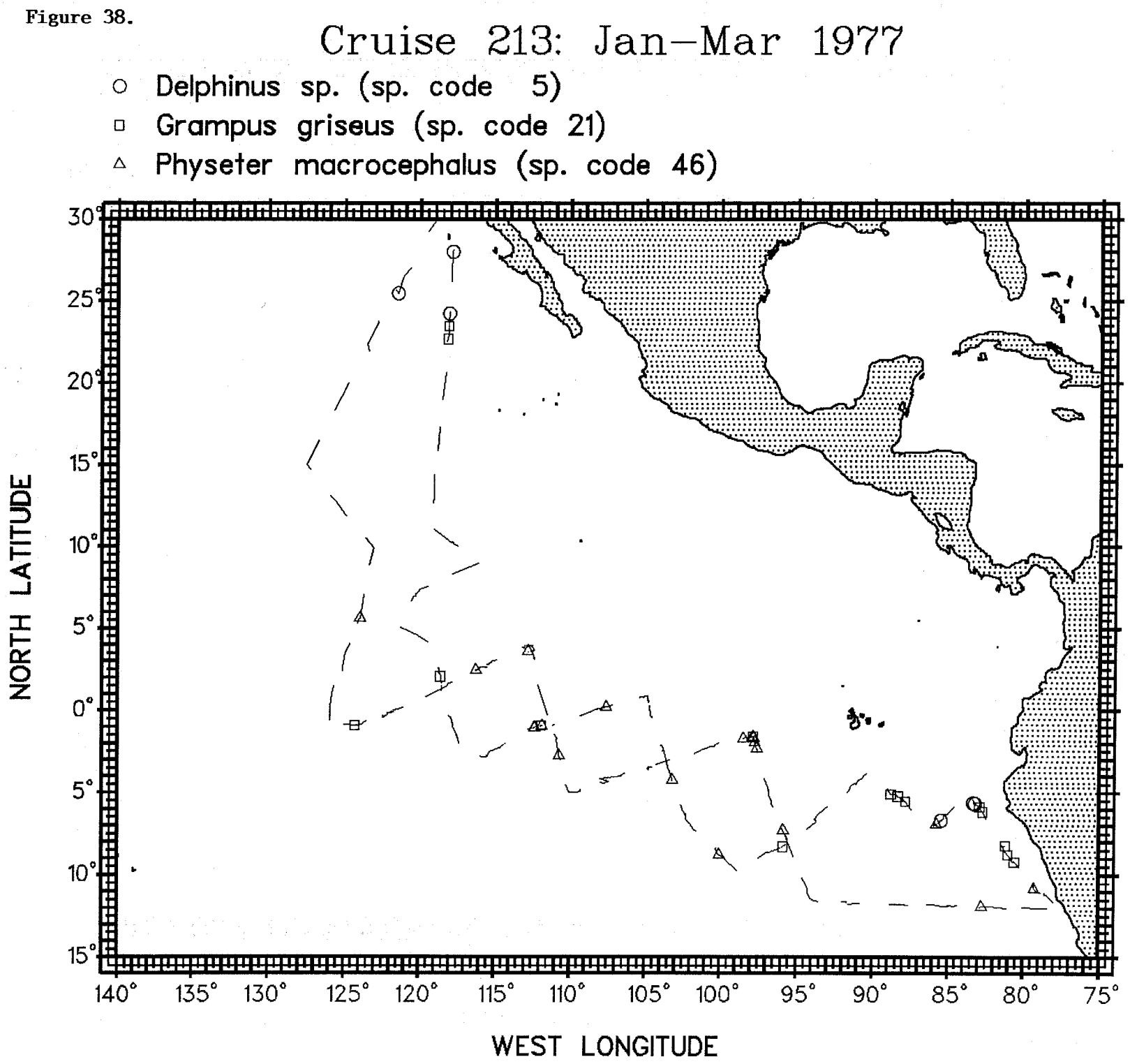

Cruise 213: Jan–Mar 1977
Delphinus sp. (sp. code 5)
Grampus griseus (sp. code 21)
Physeter macrocephalus (sp. code 46)
30°
25°
20°
15°
10°
5°
0°
5°
10°
15°
NORTH LATITUDE
140°
135°
130°
125°
120°
115°
110°
105°
100°
95°
90°
85°
80°
75°
WEST LONGITUDE

Figure 39.

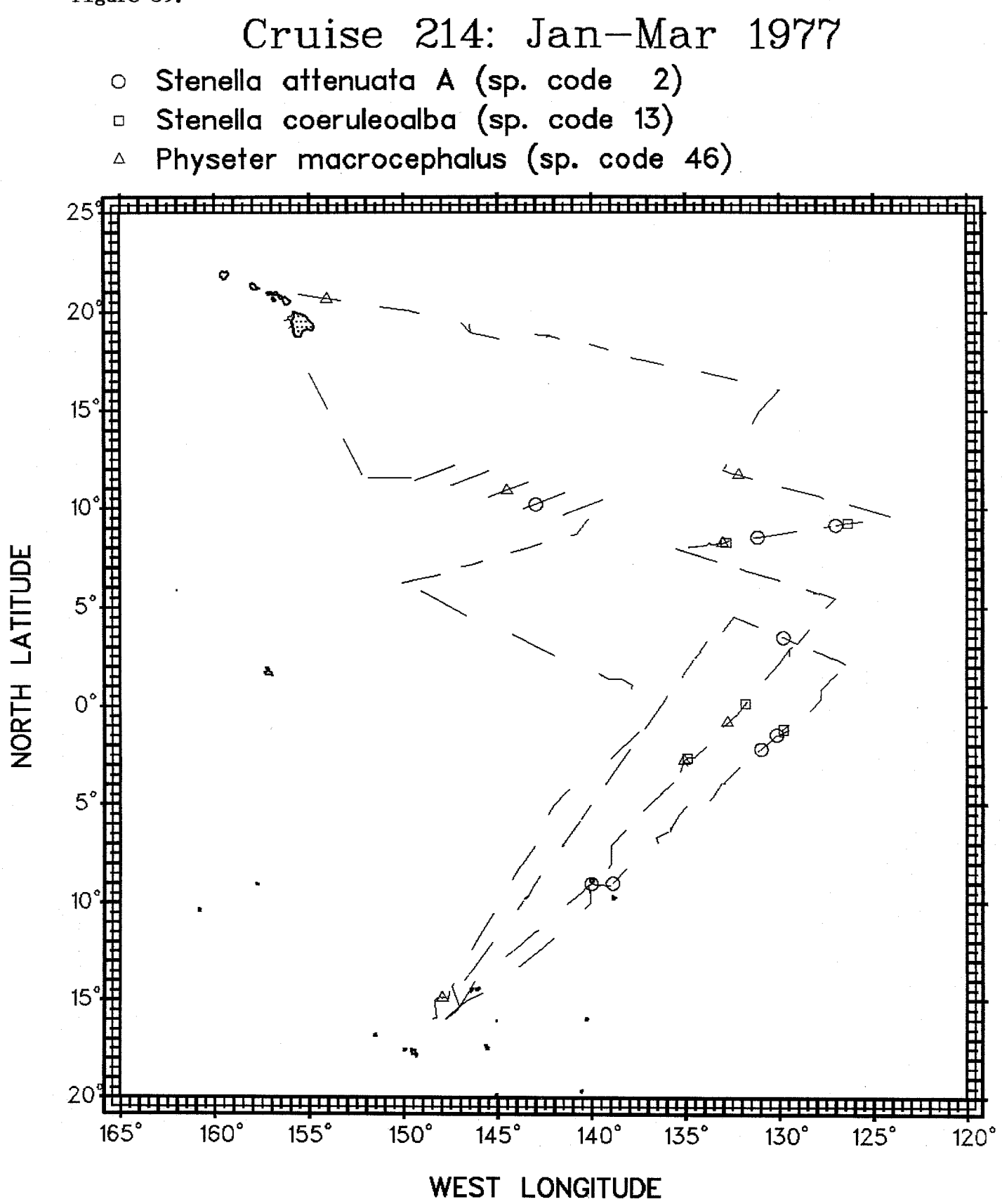

Cruise 214: Jan–Mar 1977
Stenella attenuata A (sp. code 2)
Stenella coeruleoalba (sp. code 13)
Physeter macrocephalus (sp. code 46)
25°
20°
15°
10°
5°
0°
5°
10°
15°
20°
NORTH LATITUDE
165°
160°
155°
150°
145°
140°
135°
130°
125°
120°
WEST LONGITUDE

Figure 40.

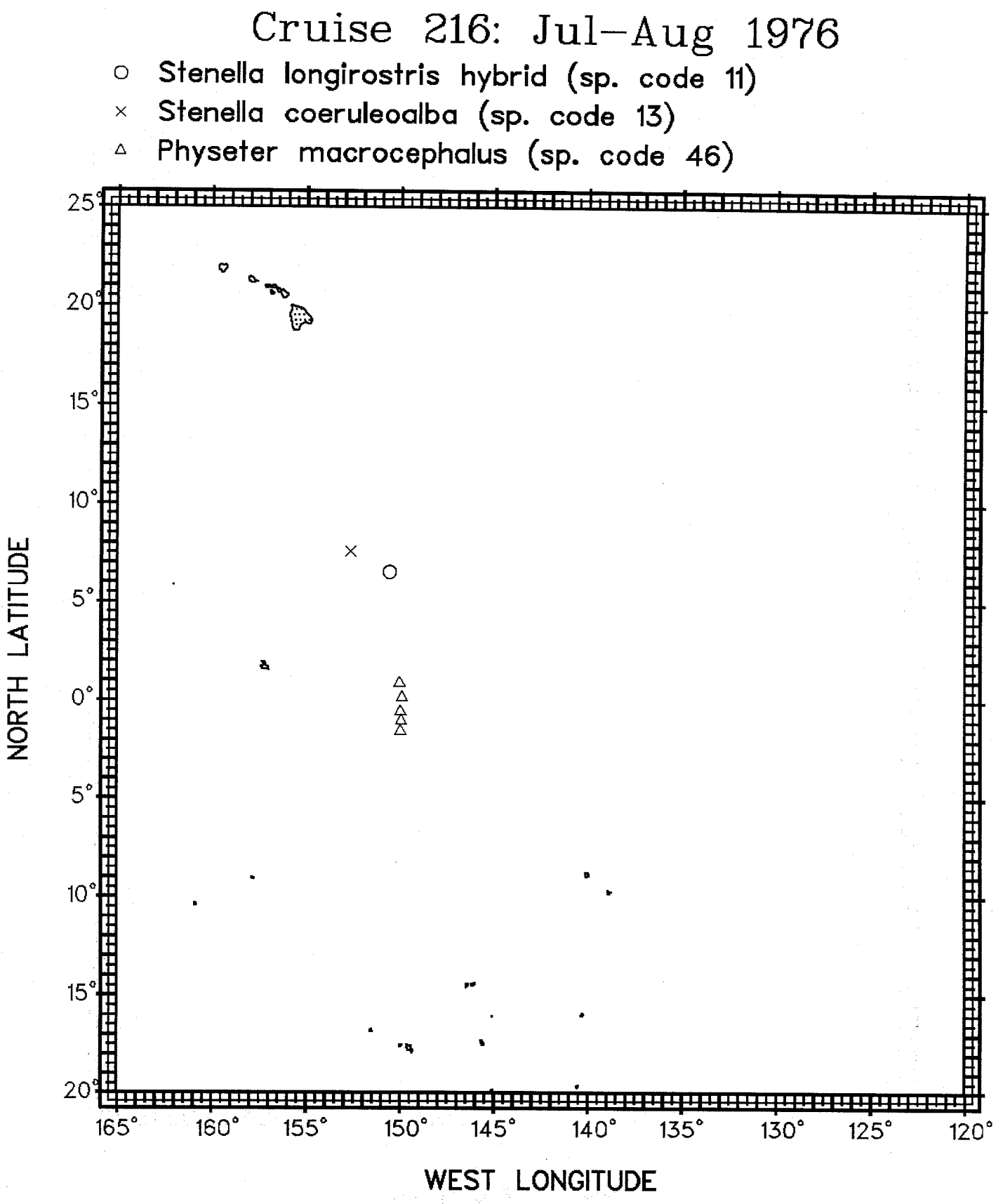

Cruise 216: Jul–Aug 1976
Stenella longirostris hybrid (sp. code 11)
Stenella coeruleoalba (sp. code 13)
Physeter macrocephalus (sp. code 46)
25°
20°
15°
10°
5°
0°
5°
10°
15°
20°
NORTH LATITUDE
165°
160°
155°
150°
145°
140°
135°
130°
125°
120°
WEST LONGITUDE

Figure 41.

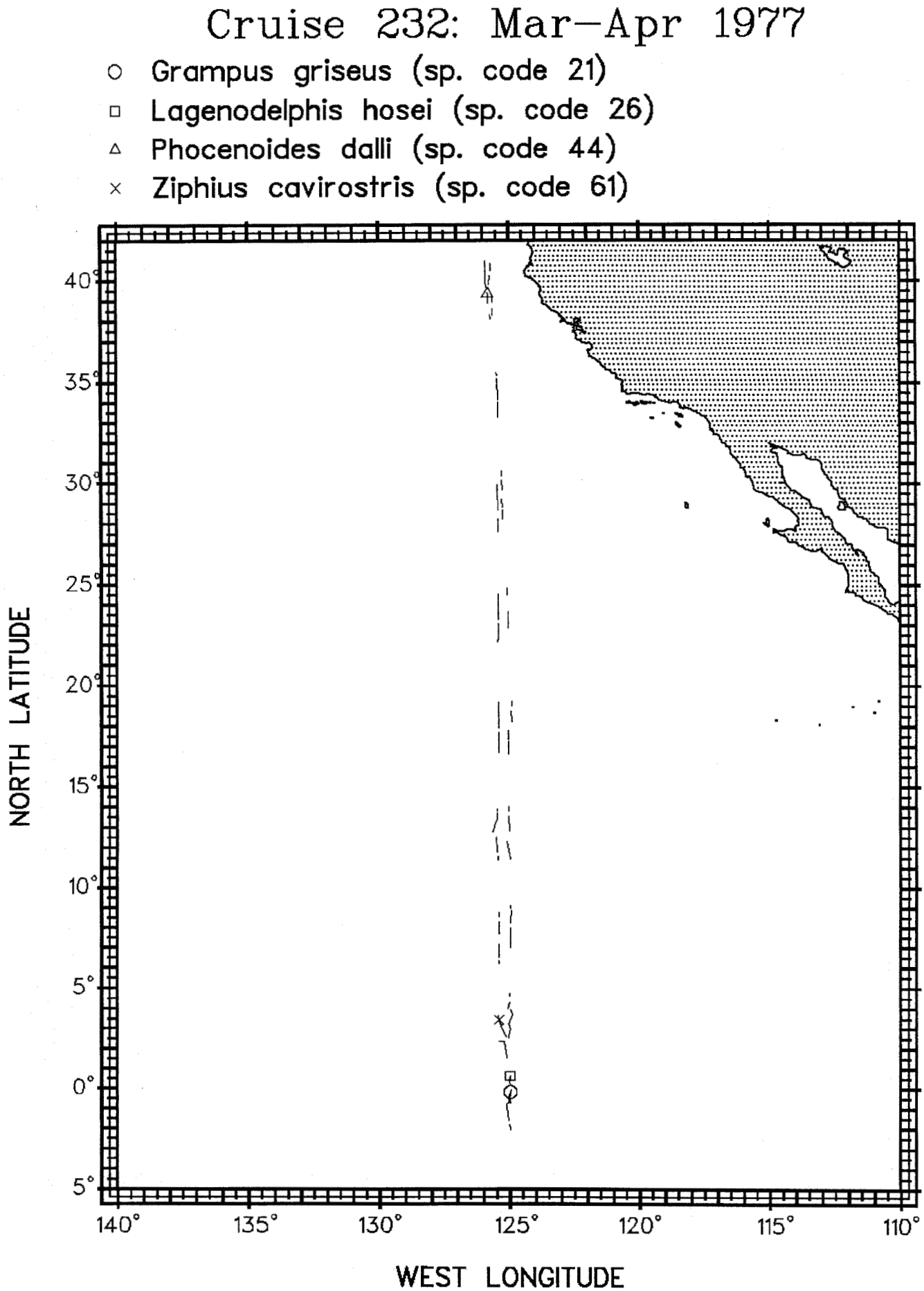

Cruise 232: Mar–Apr 1977
Grampus griseus (sp. code 21)
Lagenodelphis hosei (sp. code 26)
Phocenoides dalli (sp. code 44)
Ziphius cavirostris (sp. code 61)
40°
35°
30°
25°
20°
15°
10°
5°
0°
5°
NORTH LATITUDE
140°
135°
130°
125°
120°
115°
110°
WEST LONGITUDE

Figure 42.

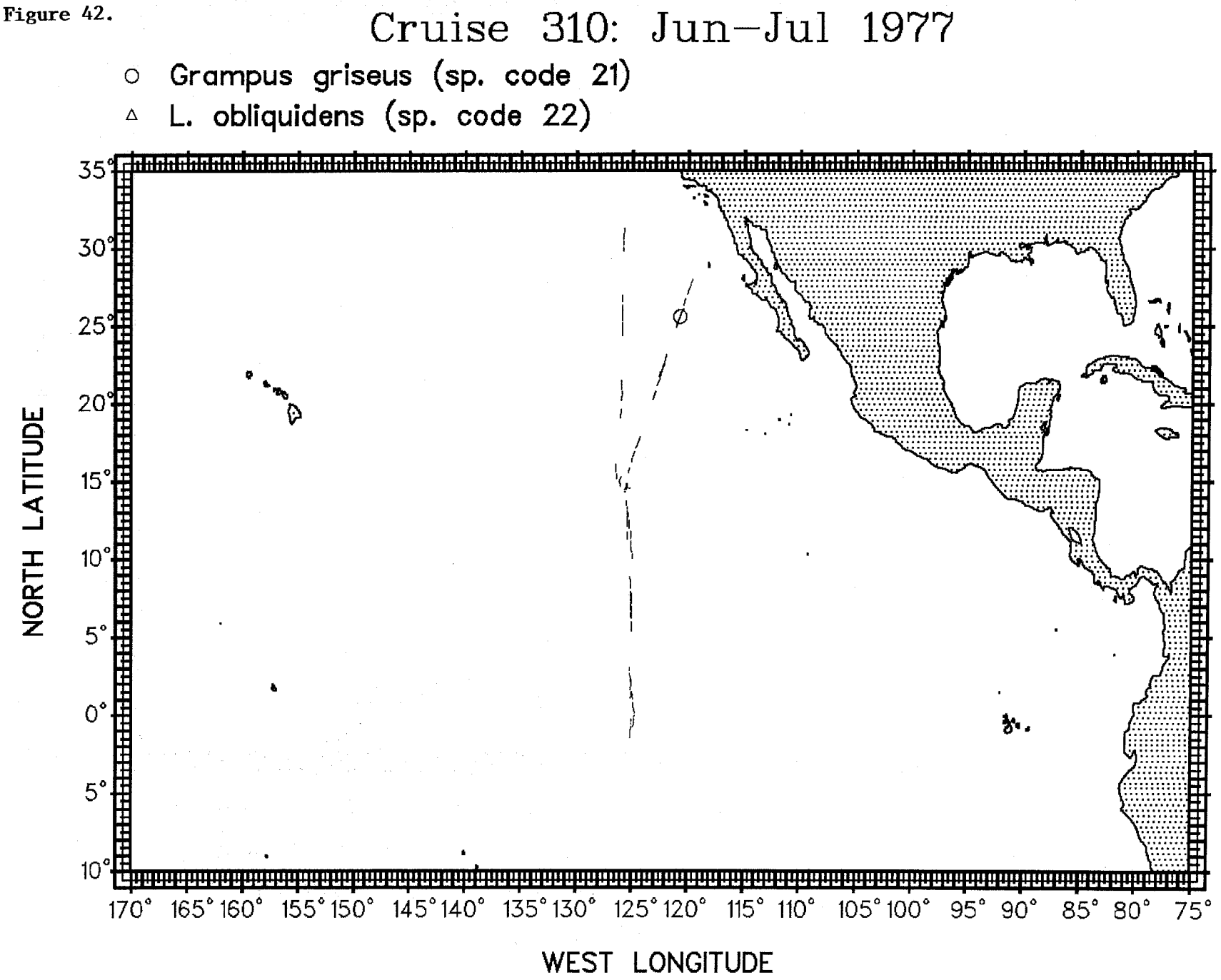

Cruise 310: Jun–Jul 1977
Grampus griseus (sp. code 21)
L. obliquidens (sp. code 22)
NORTH LATITUDE
35°
30°
25°
20°
15°
10°
5°
0°
5°
10°
170° 165° 160° 155° 150° 145° 140° 135° 130° 125° 120° 115° 110° 105° 100° 95° 90° 85° 80° 75°
WEST LONGITUDE

Figure 43.

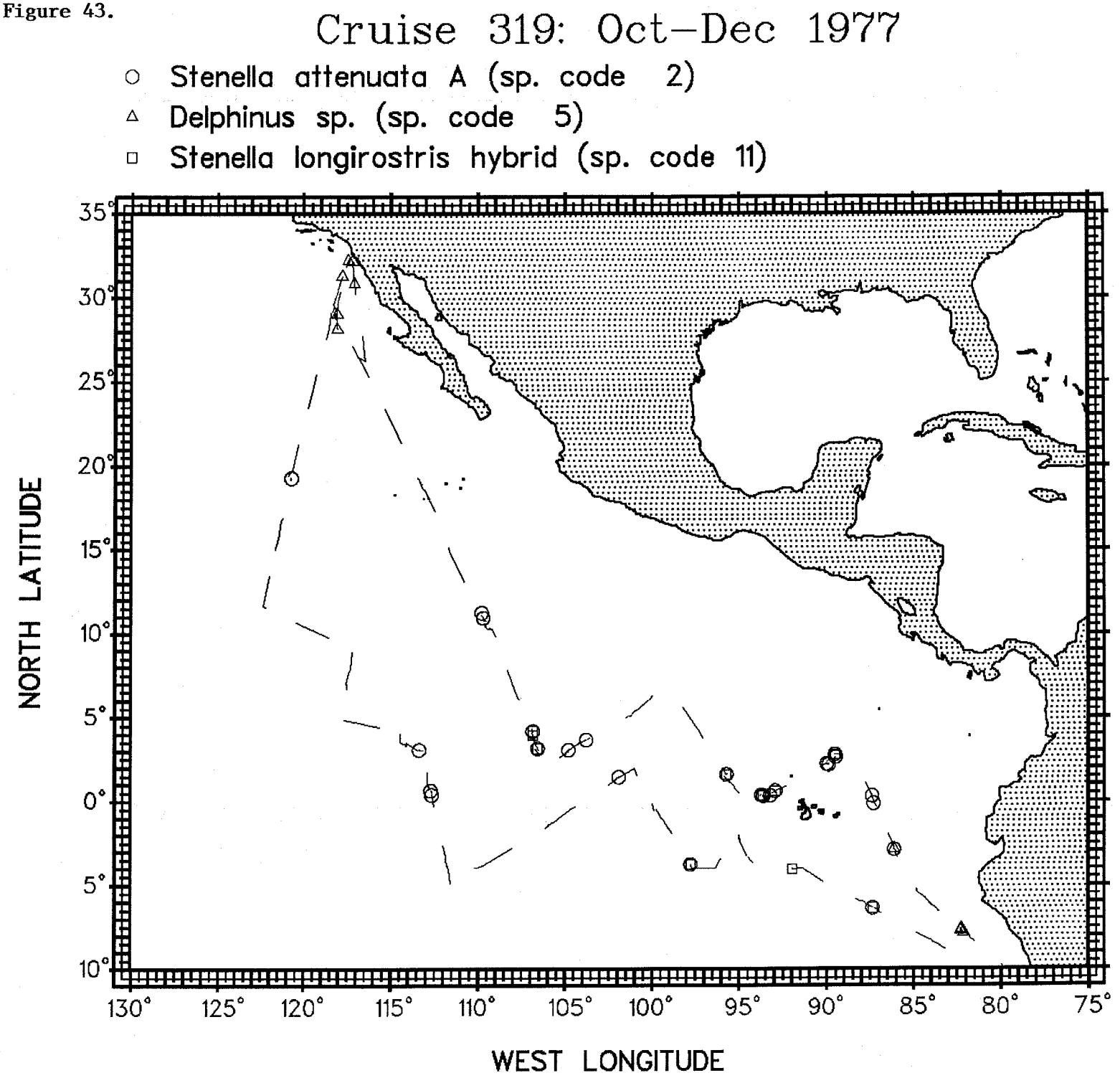

Cruise 319: Oct–Dec 1977
Stenella attenuata A (sp. code 2)
Delphinus sp. (sp. code 5)
Stenella longirostris hybrid (sp. code 11)
NORTH LATITUDE
35°
30°
25°
20°
15°
10°
5°
0°
5°
10°
130°
125°
120°
115°
110°
105°
100°
95°
90°
85°
80°
75°
WEST LONGITUDE

Figure 44.

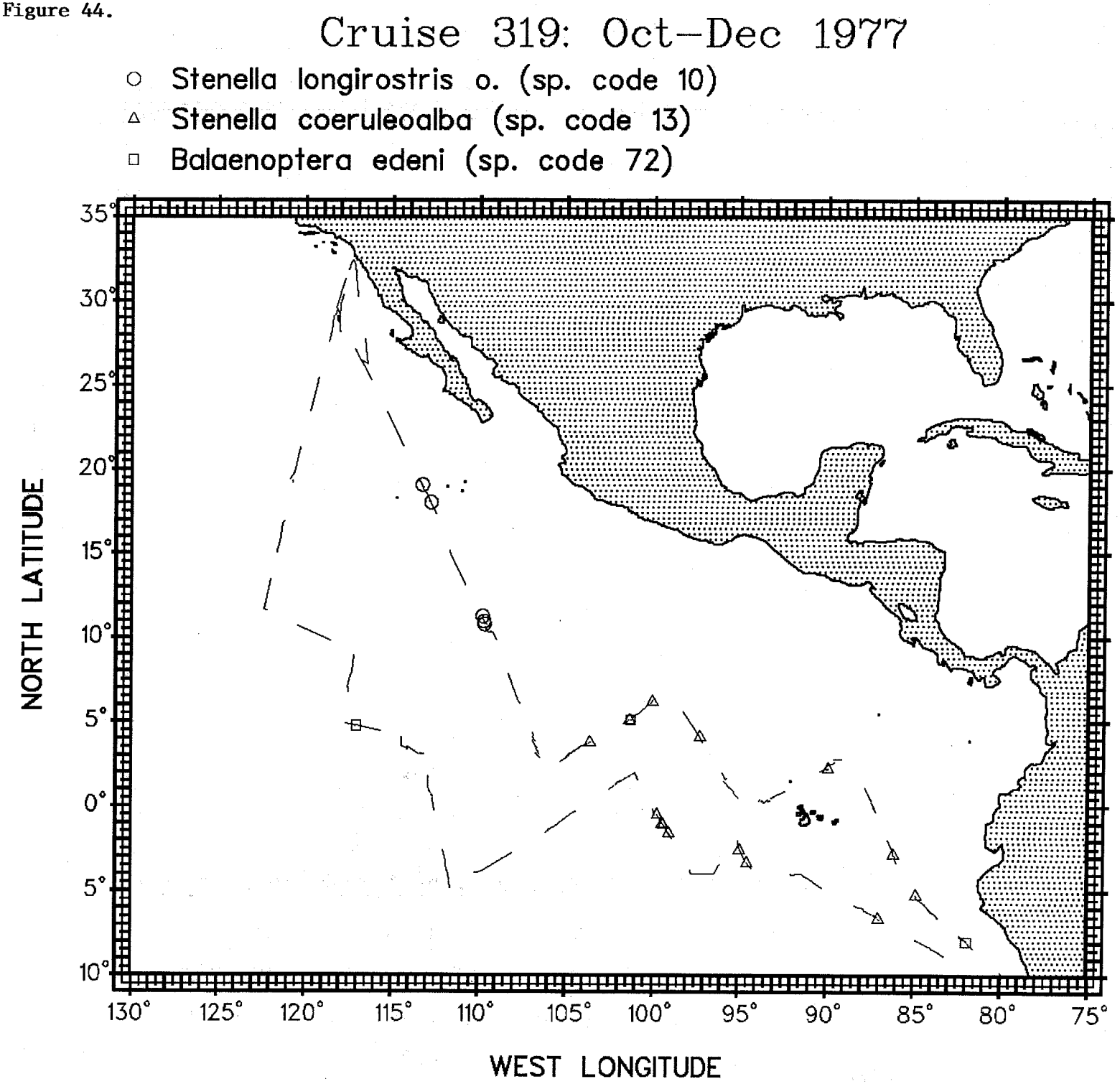

Cruise 319: Oct–Dec 1977
Stenella longirostris o. (sp. code 10)
Stenella coeruleoalba (sp. code 13)
Balaenoptera edeni (sp. code 72)
NORTH LATITUDE
35°
30°
25°
20°
15°
10°
5°
0°
5°
10°
130°
125°
120°
115°
110°
105°
100°
95°
90°
85°
80°
75°
WEST LONGITUDE

Figure 45.

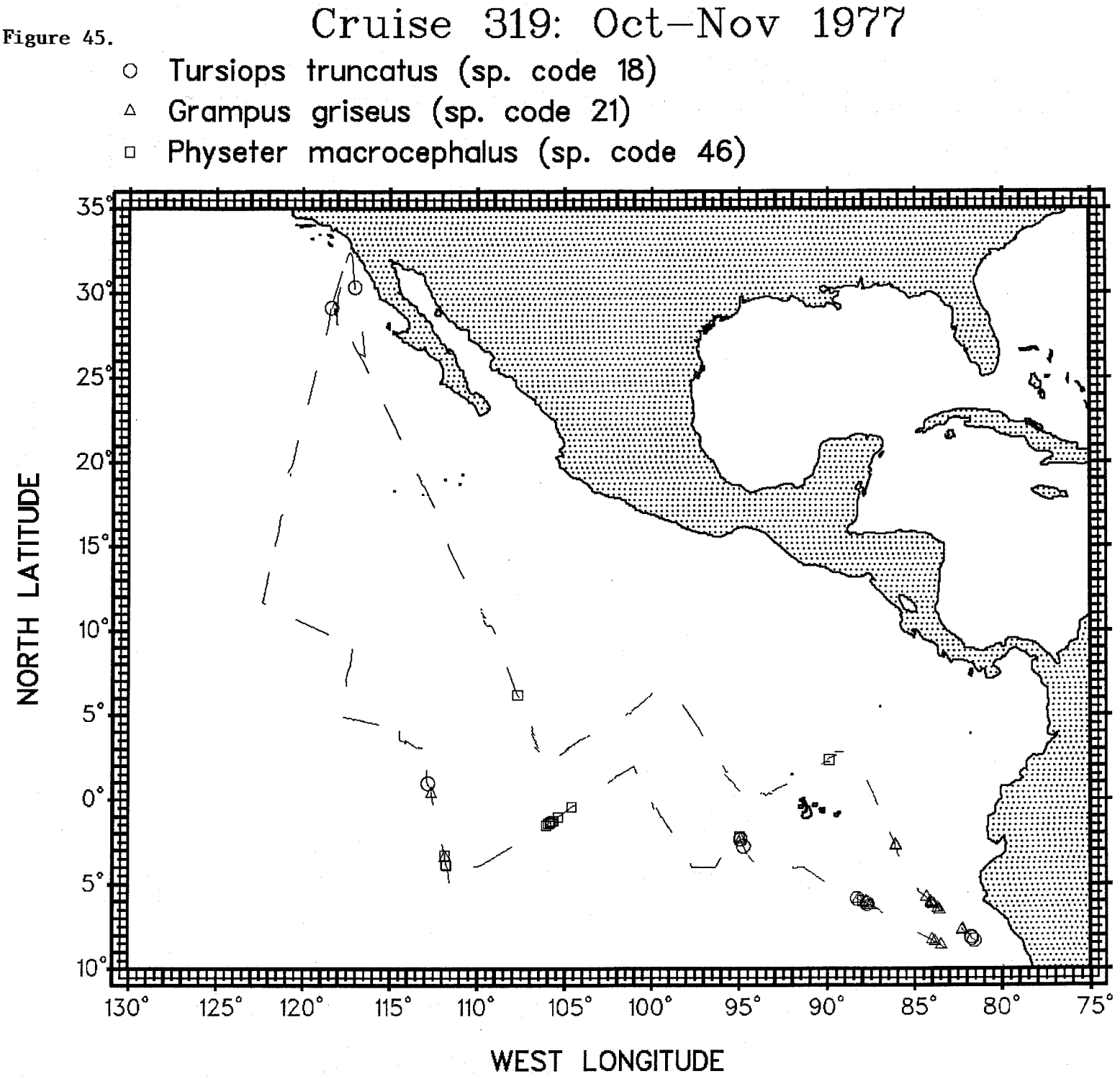

Cruise 319: Oct–Nov 1977
Tursiops truncatus (sp. code 18)
Grampus griseus (sp. code 21)
Physeter macrocephalus (sp. code 46)
NORTH LATITUDE
35°
30°
25°
20°
15°
10°
5°
0°
5°
10°
130°
125°
120°
115°
110°
105°
100°
95°
90°
85°
80°
75°
WEST LONGITUDE

Figure 46.

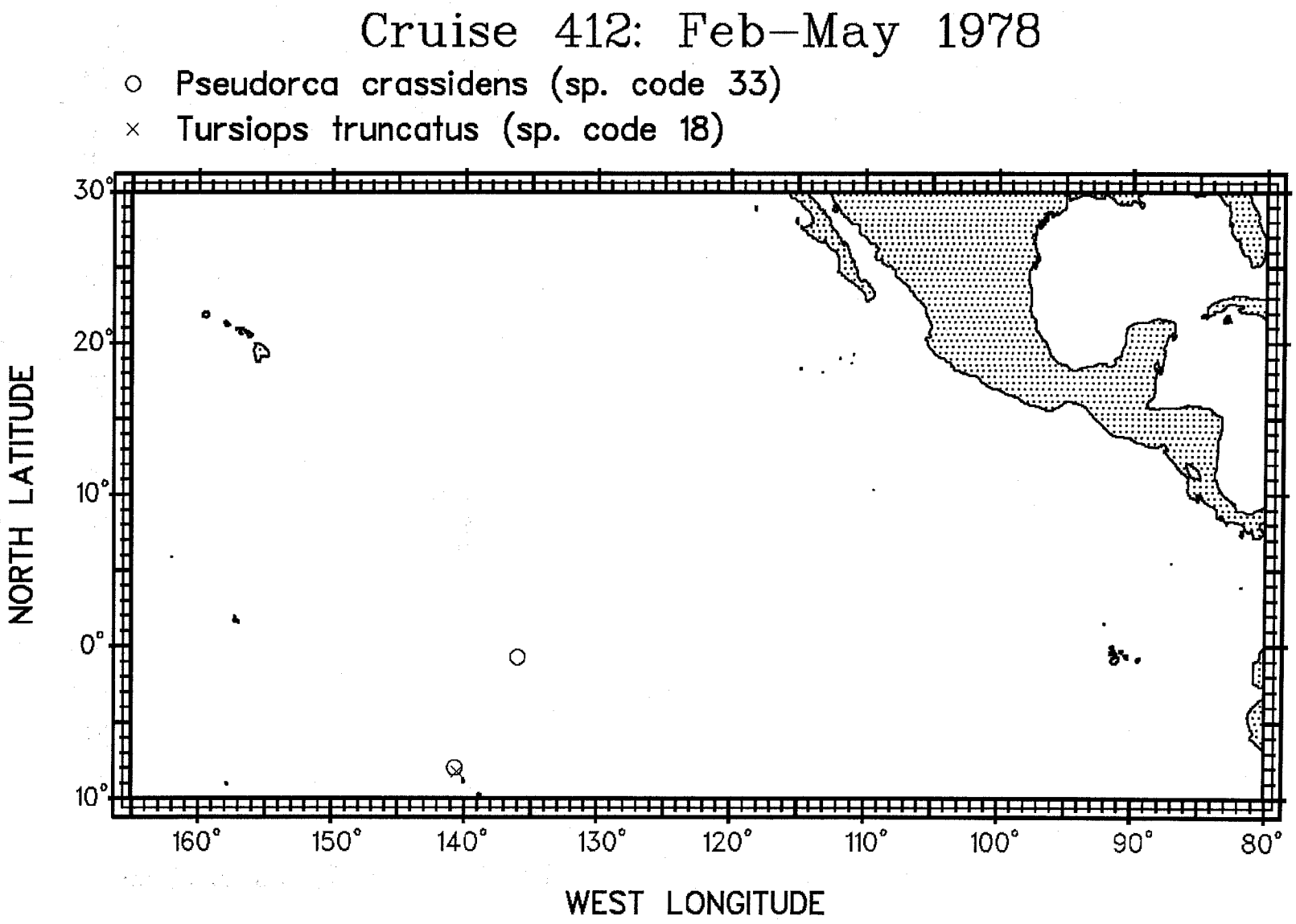

Cruise 412: Feb–May 1978
○ Pseudorca crassidens (sp. code 33)
× Tursiops truncatus (sp. code 18)
30°
20°
10°
0°
10°
NORTH LATITUDE
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 47.

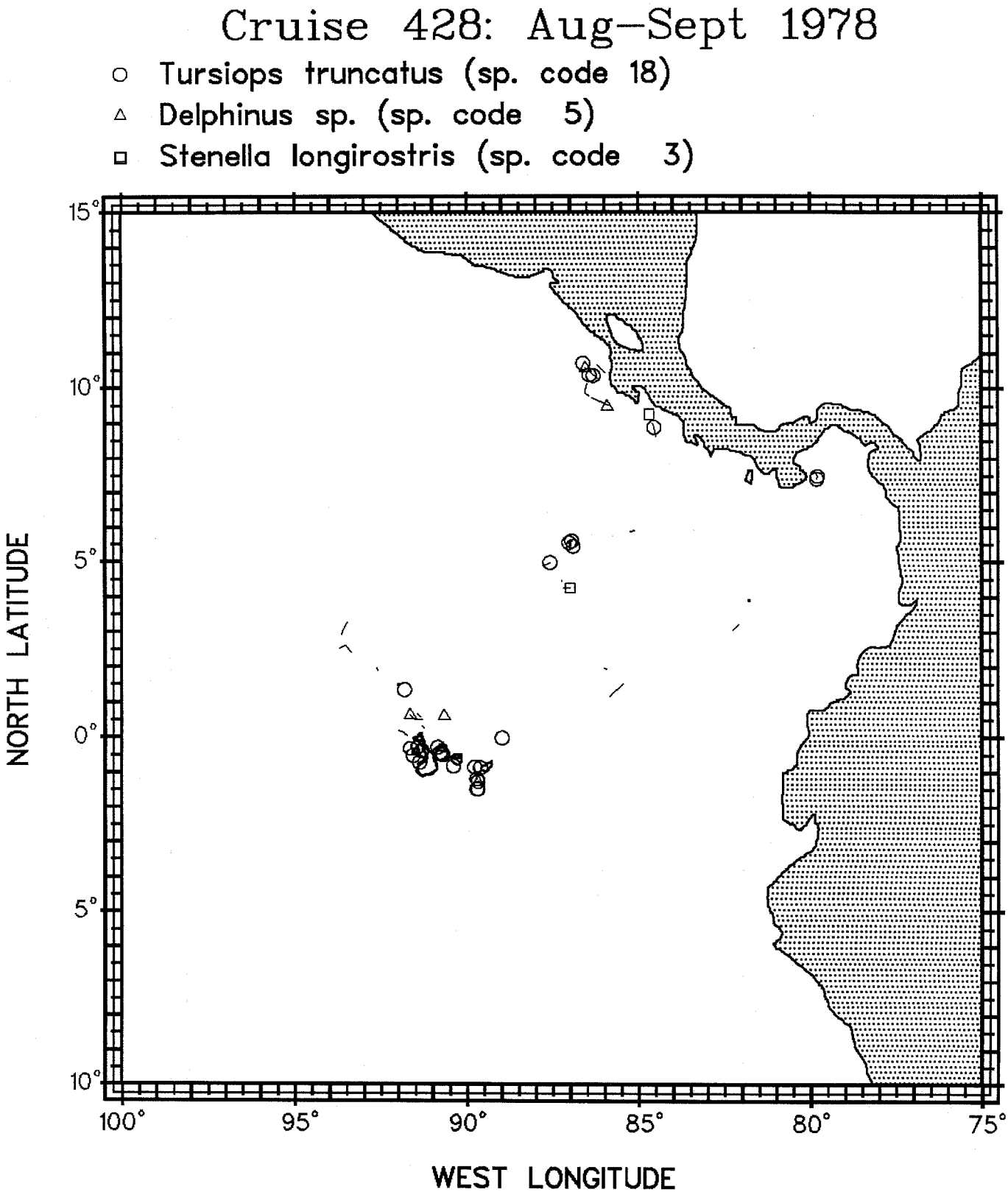

Cruise 428: Aug–Sept 1978
Tursiops truncatus (sp. code 18)
Delphinus sp. (sp. code 5)
Stenella longirostris (sp. code 3)
15°
10°
5°
0°
5°
10°
NORTH LATITUDE
100°
95°
90°
85°
80°
75°
WEST LONGITUDE

Figure 48.

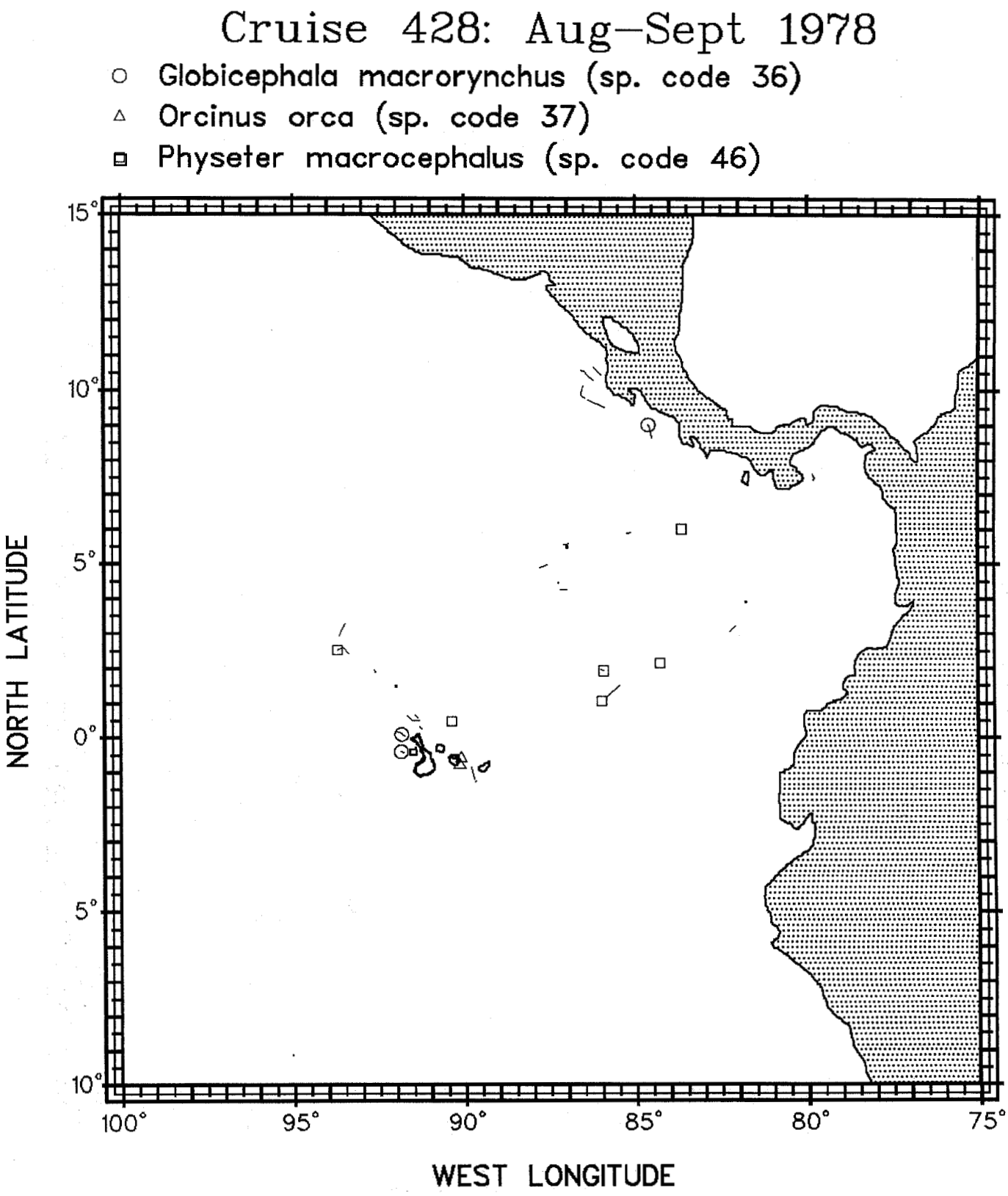

Cruise 428: Aug–Sept 1978
Globicephala macrorynchus (sp. code 36)
Orcinus orca (sp. code 37)
Physeter macrocephalus (sp. code 46)
15°
10°
5°
0°
5°
10°
NORTH LATITUDE
100°
95°
90°
85°
80°
75°
WEST LONGITUDE

Figure 49.

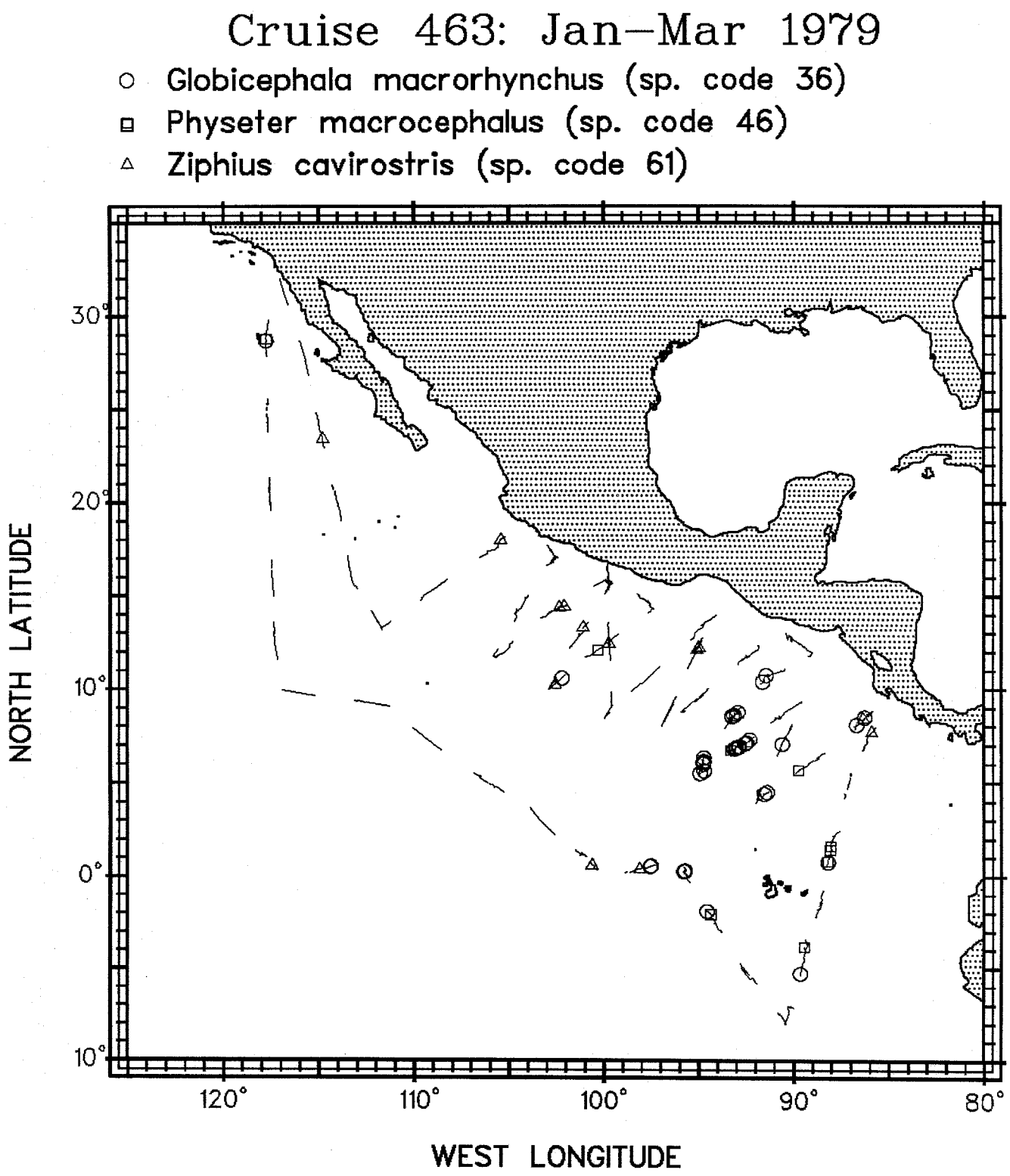

Cruise 463: Jan–Mar 1979
Globicephala macrorhynchus (sp. code 36)
Physeter macrocephalus (sp. code 46)
Ziphius cavirostris (sp. code 61)
30°
20°
10°
0°
10°
120°
110°
100°
90°
80°
NORTH LATITUDE
WEST LONGITUDE

Figure 50.

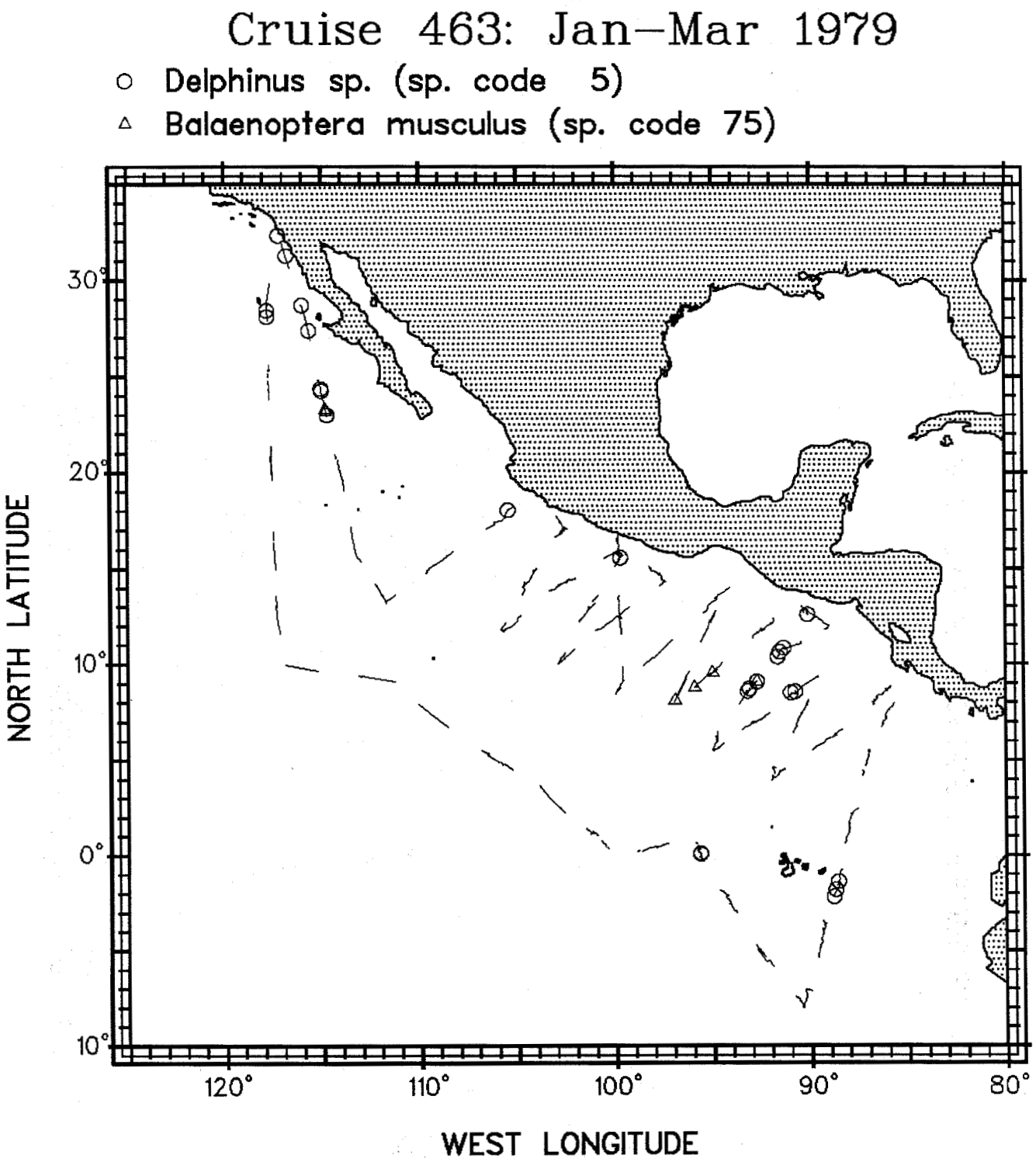

Cruise 463: Jan–Mar 1979
Delphinus sp. (sp. code 5)
Balaenoptera musculus (sp. code 75)
30°
20°
10°
0°
10°
120°
110°
100°
90°
80°
NORTH LATITUDE
WEST LONGITUDE

Figure 51.

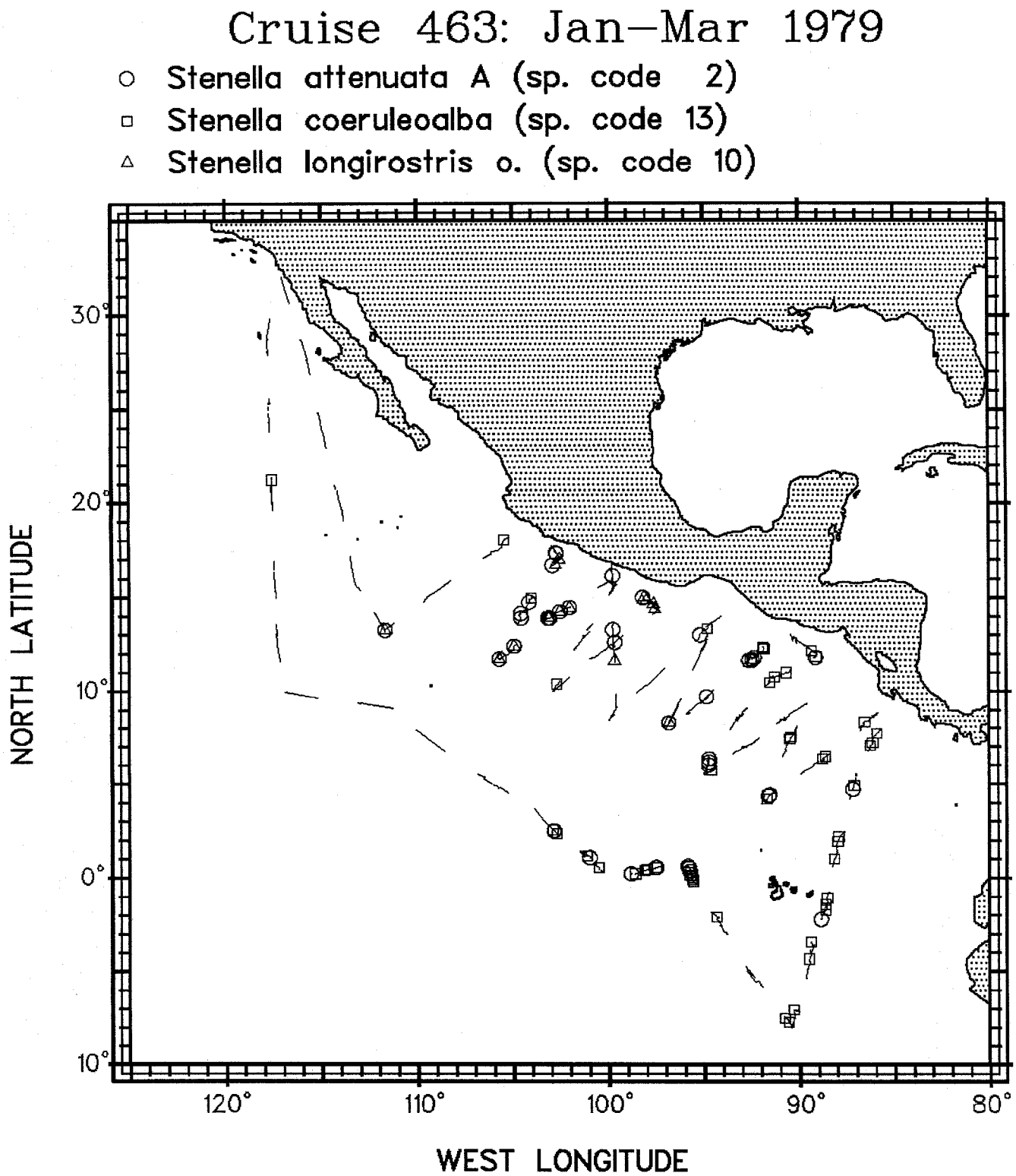

Cruise 463: Jan–Mar 1979
Stenella attenuata A (sp. code 2)
Stenella coeruleoalba (sp. code 13)
Stenella longirostris o. (sp. code 10)
30°
20°
10°
0°
10°
120°
110°
100°
90°
80°
NORTH LATITUDE
WEST LONGITUDE

Figure 52.

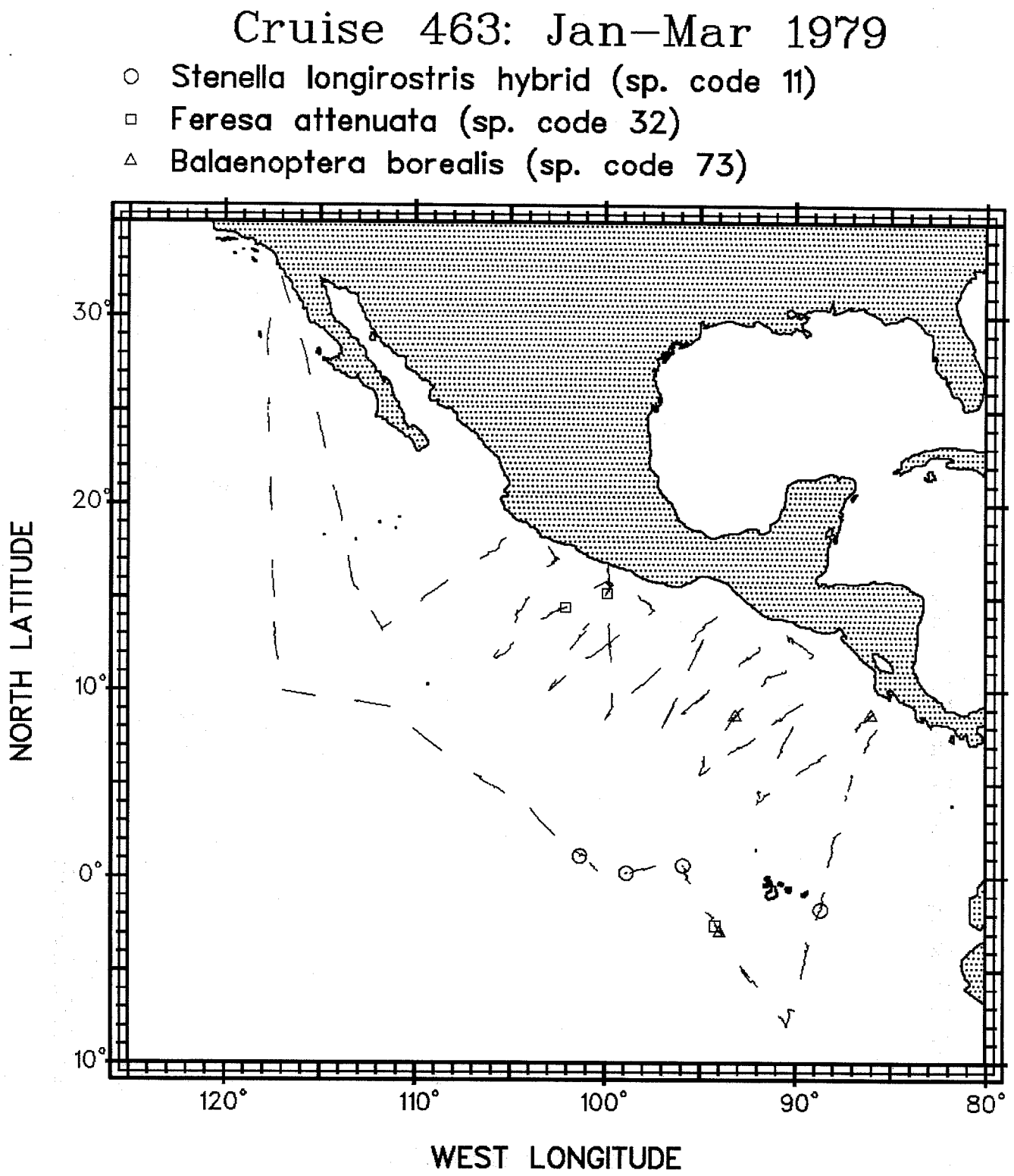

Cruise 463: Jan–Mar 1979
Stenella longirostris hybrid (sp. code 11)
Feresa attenuata (sp. code 32)
Balaenoptera borealis (sp. code 73)
30°
20°
10°
0°
10°
120°
110°
100°
90°
80°
NORTH LATITUDE
WEST LONGITUDE

Figure 53.

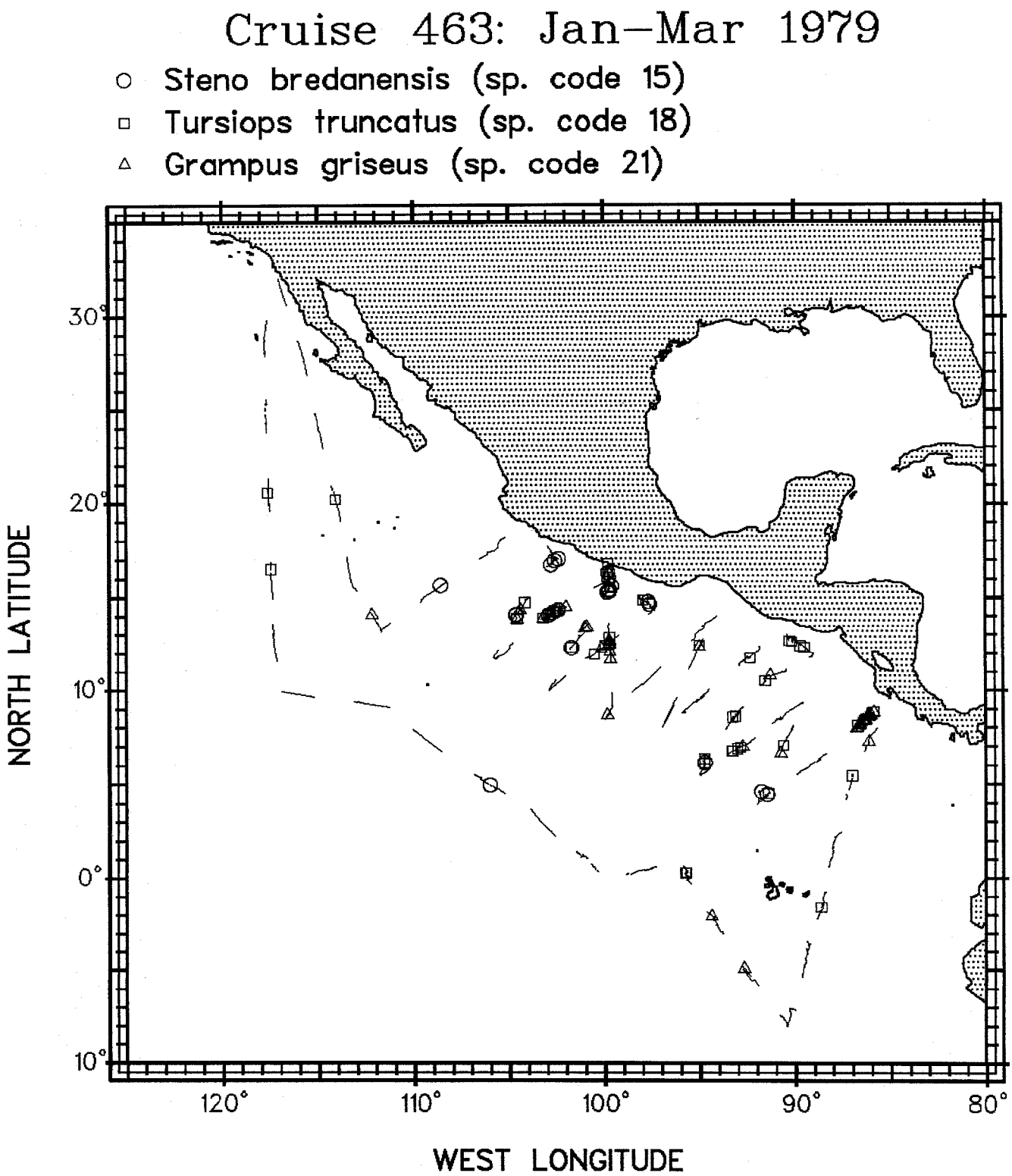

Cruise 463: Jan–Mar 1979
Steno bredanensis (sp. code 15)
Tursiops truncatus (sp. code 18)
Grampus griseus (sp. code 21)
30°
20°
10°
0°
10°
120°
110°
100°
90°
80°
NORTH LATITUDE
WEST LONGITUDE

Figure 54.

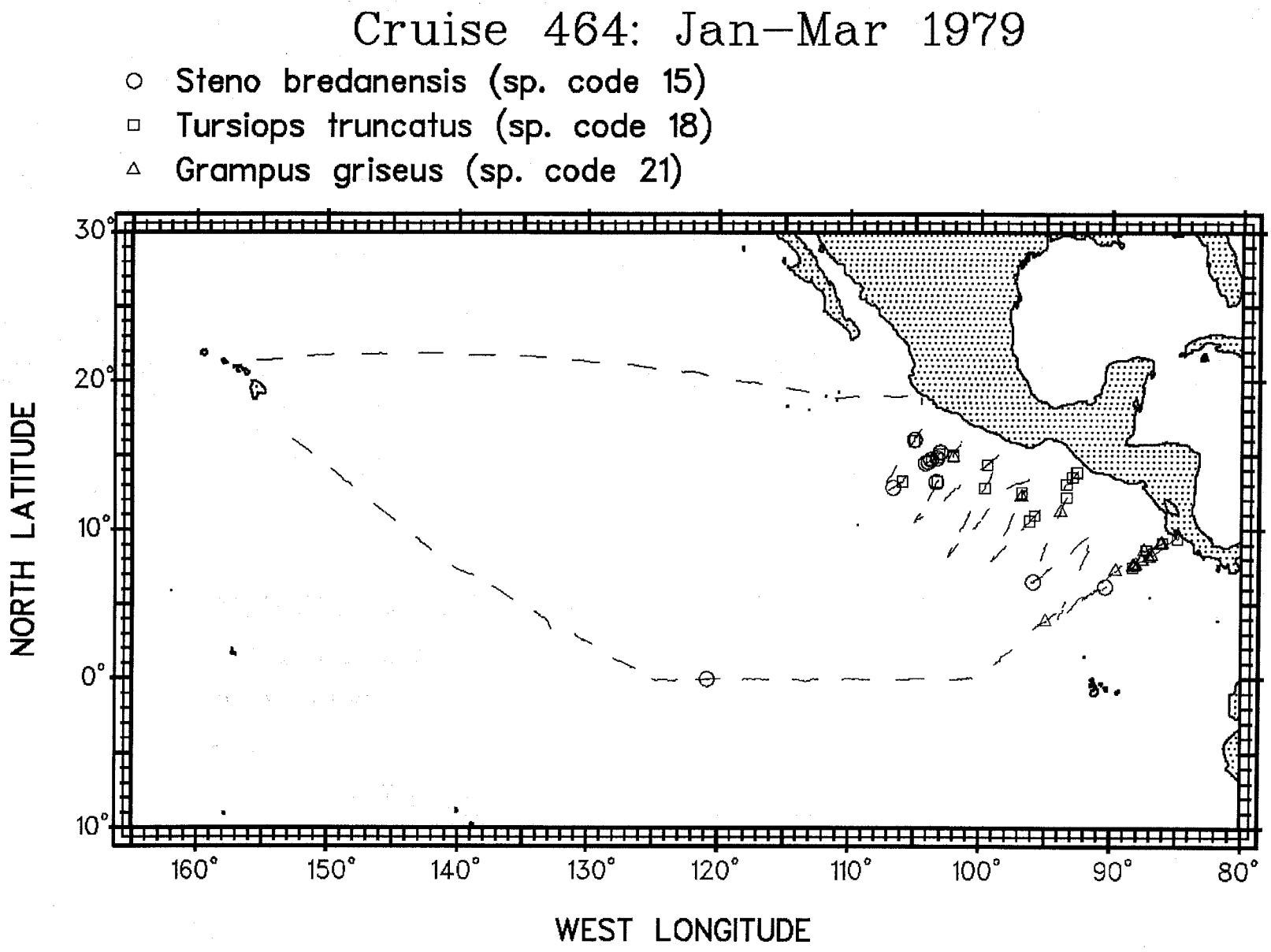

Cruise 464: Jan–Mar 1979
Steno bredanensis (sp. code 15)
Tursiops truncatus (sp. code 18)
Grampus griseus (sp. code 21)
30°
20°
10°
0°
10°
NORTH LATITUDE
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 55.

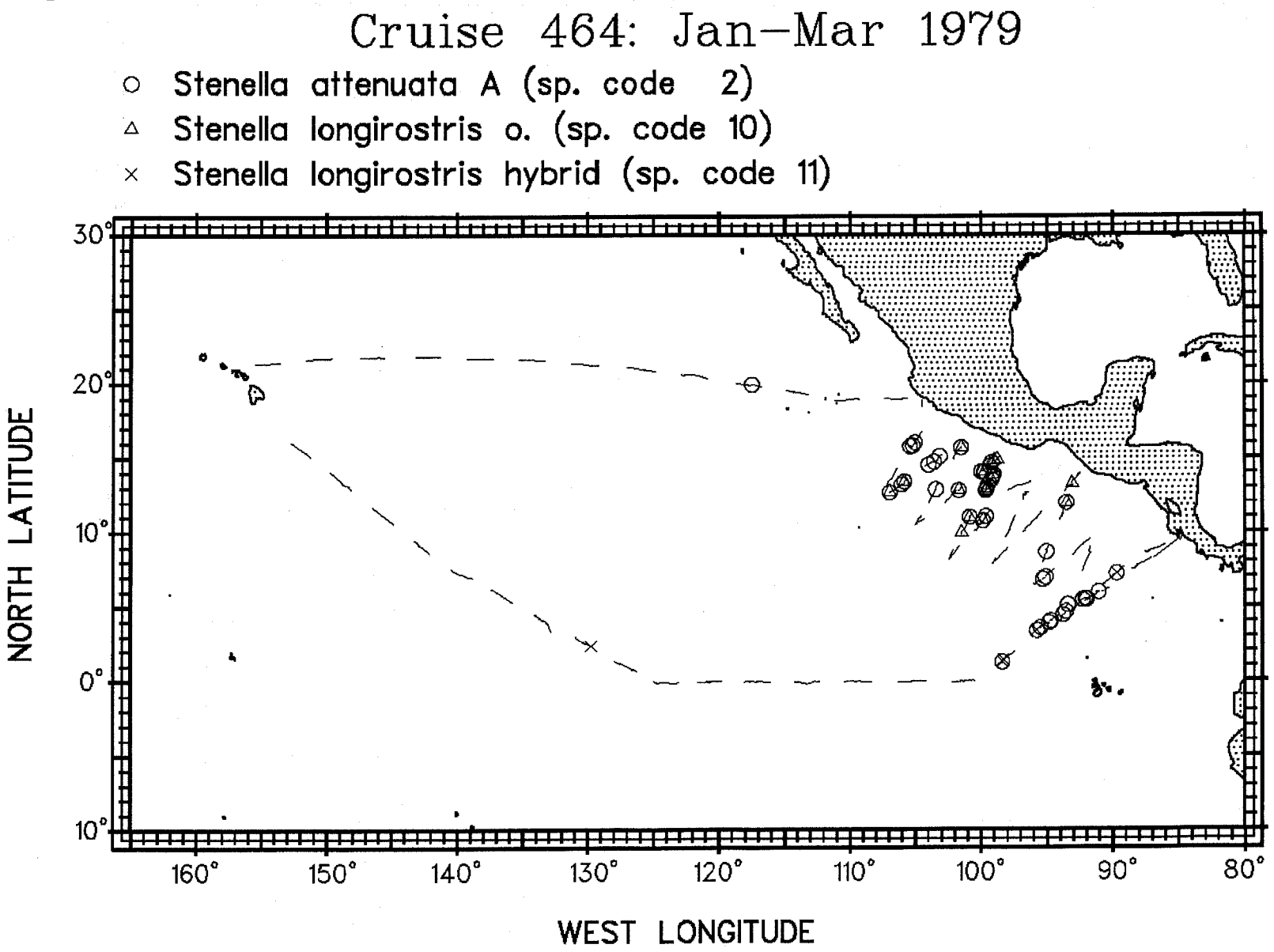

Cruise 464: Jan–Mar 1979
Stenella attenuata A (sp. code 2)
Stenella longirostris o. (sp. code 10)
Stenella longirostris hybrid (sp. code 11)
NORTH LATITUDE
30°
20°
10°
0°
10°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 56.

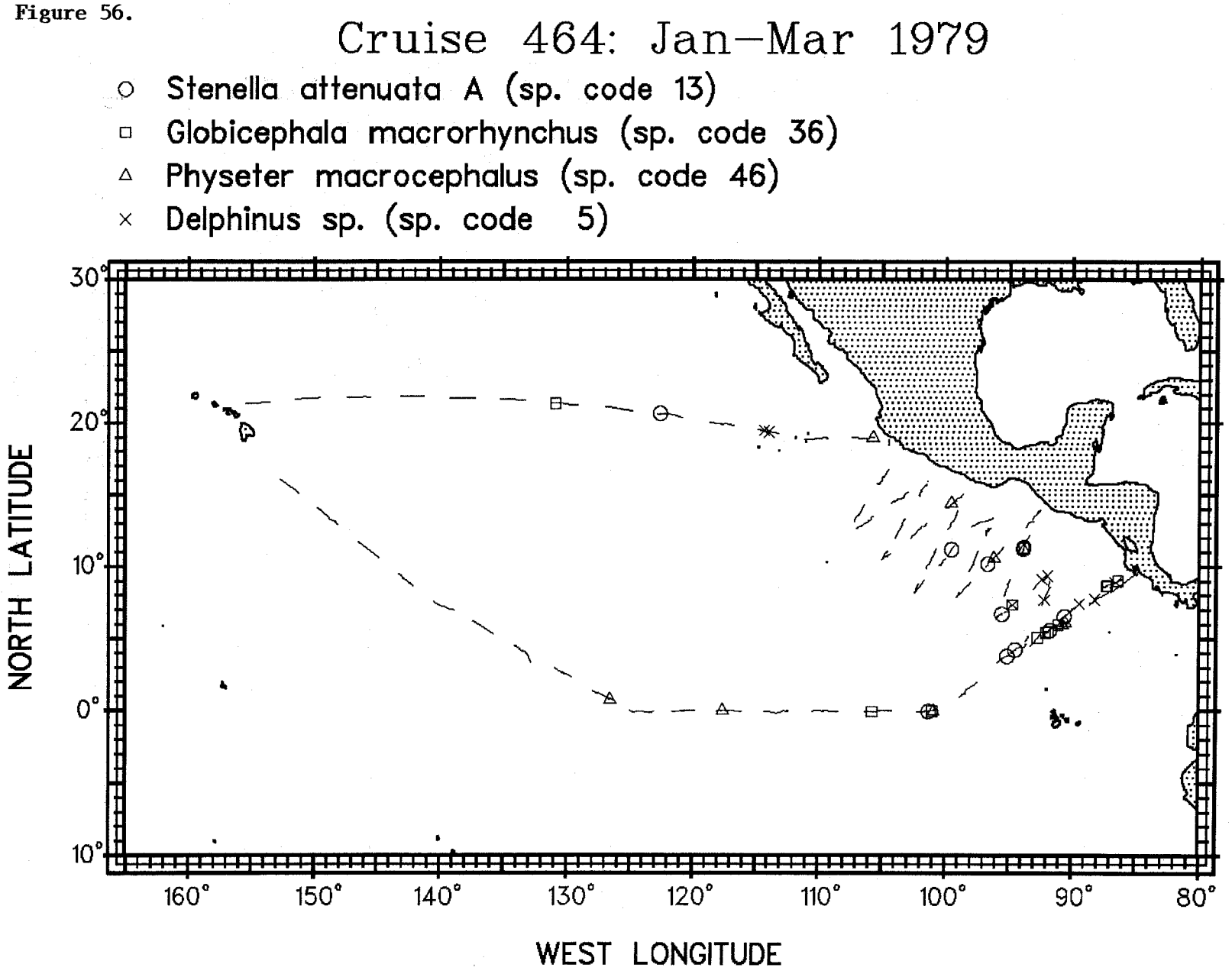

Cruise 464: Jan–Mar 1979
Stenella attenuata A (sp. code 13)
Globicephala macrorhynchus (sp. code 36)
Physeter macrocephalus (sp. code 46)
Delphinus sp. (sp. code 5)
30°
20°
10°
0°
10°
NORTH LATITUDE
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 57.

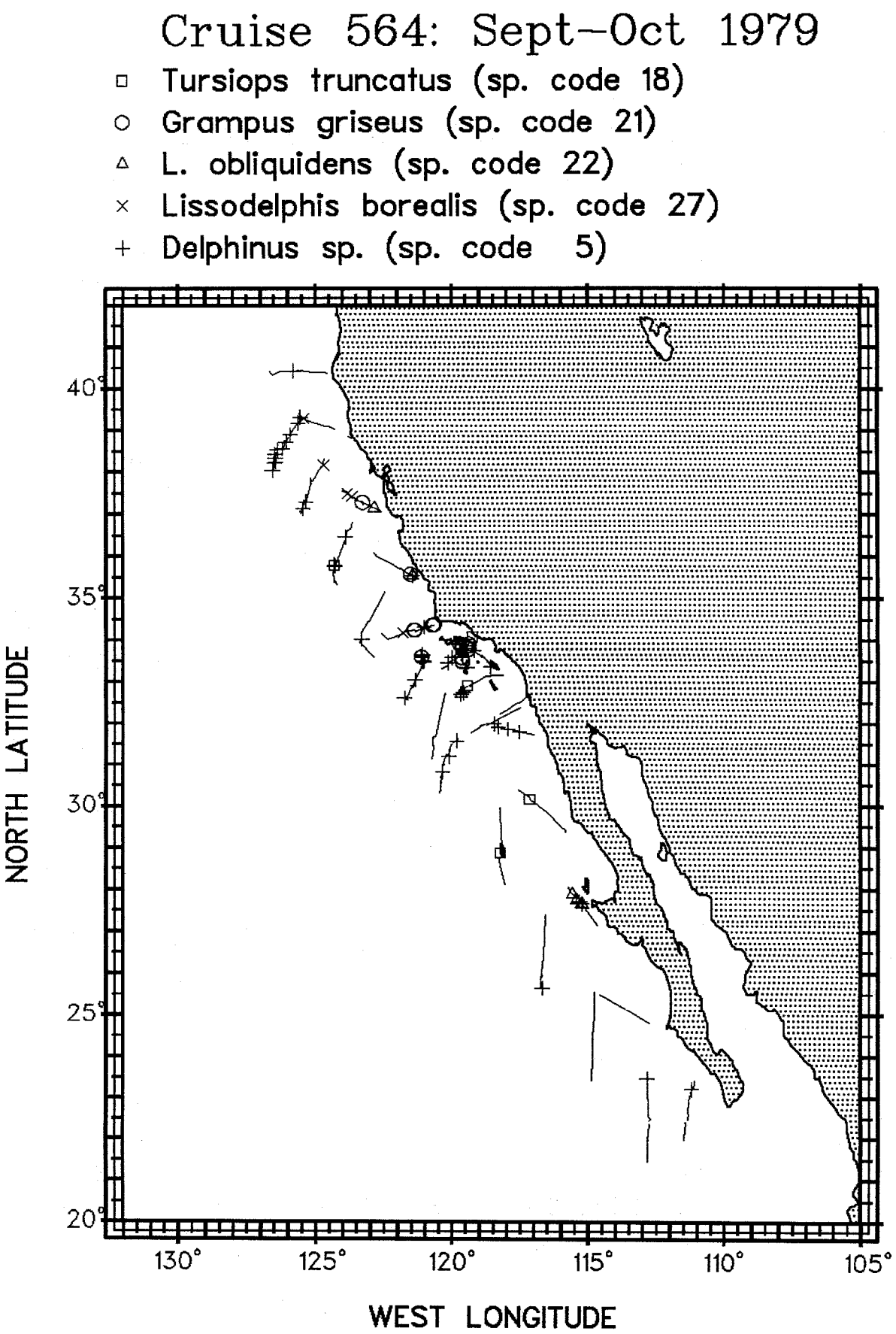

Cruise 564: Sept–Oct 1979
Tursiops truncatus (sp. code 18)
Grampus griseus (sp. code 21)
L. obliquidens (sp. code 22)
Lissodelphis borealis (sp. code 27)
Delphinus sp. (sp. code 5)
40°
35°
30°
25°
20°
NORTH LATITUDE
130°
125°
120°
115°
110°
105°
WEST LONGITUDE

Figure 58.

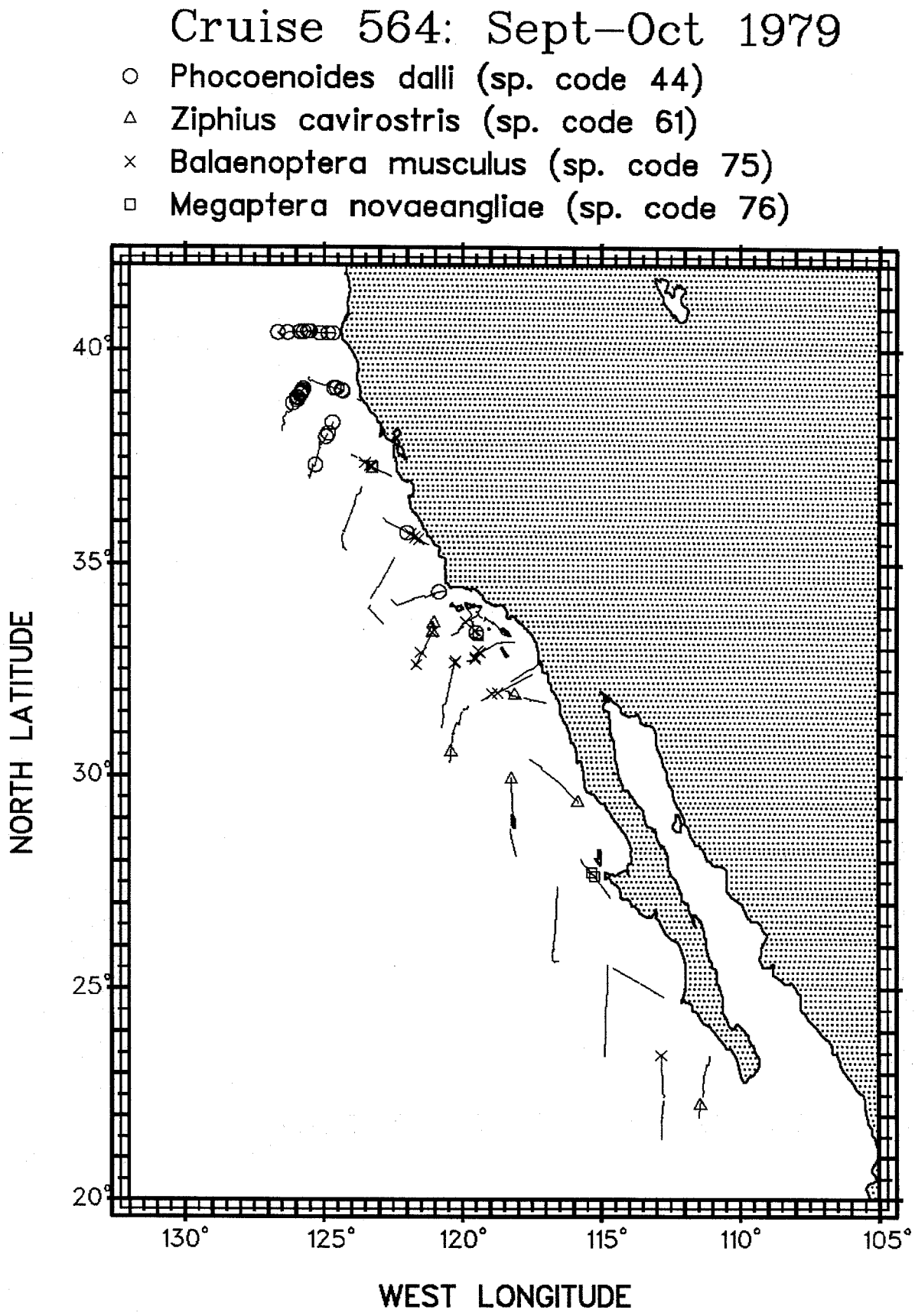

Cruise 564: Sept–Oct 1979
Phocoenoides dalli (sp. code 44)
Ziphius cavirostris (sp. code 61)
Balaenoptera musculus (sp. code 75)
Megaptera novaeangliae (sp. code 76)
40°
35°
30°
25°
20°
NORTH LATITUDE
130°
125°
120°
115°
110°
105°
WEST LONGITUDE

Figure 59.

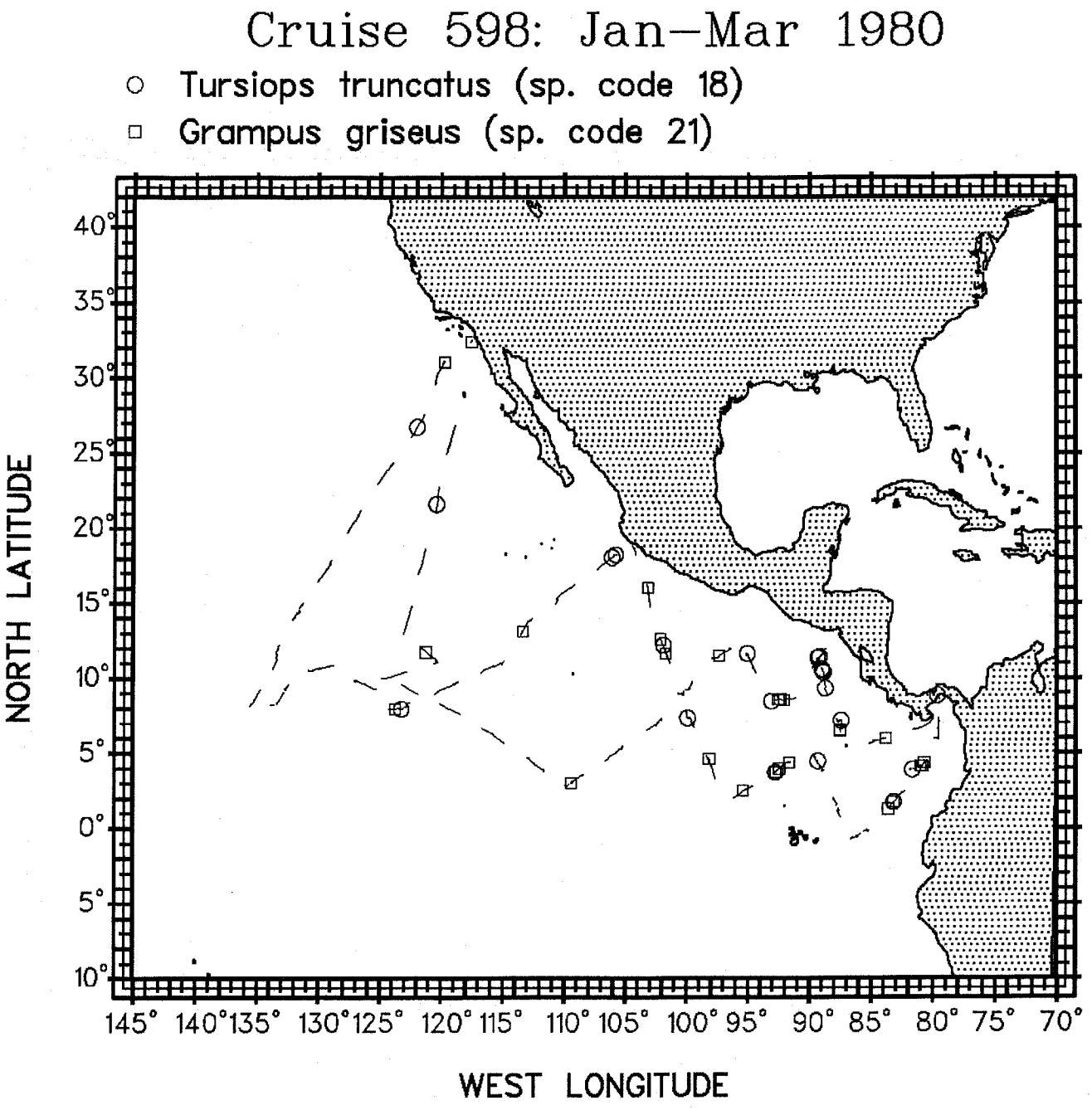

Cruise 598: Jan–Mar 1980
Tursiops truncatus (sp. code 18)
Grampus griseus (sp. code 21)
NORTH LATITUDE
40°
35°
30°
25°
20°
15°
10°
5°
0°
5°
10°
145° 140° 135° 130° 125° 120° 115° 110° 105° 100° 95° 90° 85° 80° 75° 70°
WEST LONGITUDE

Figure 60.

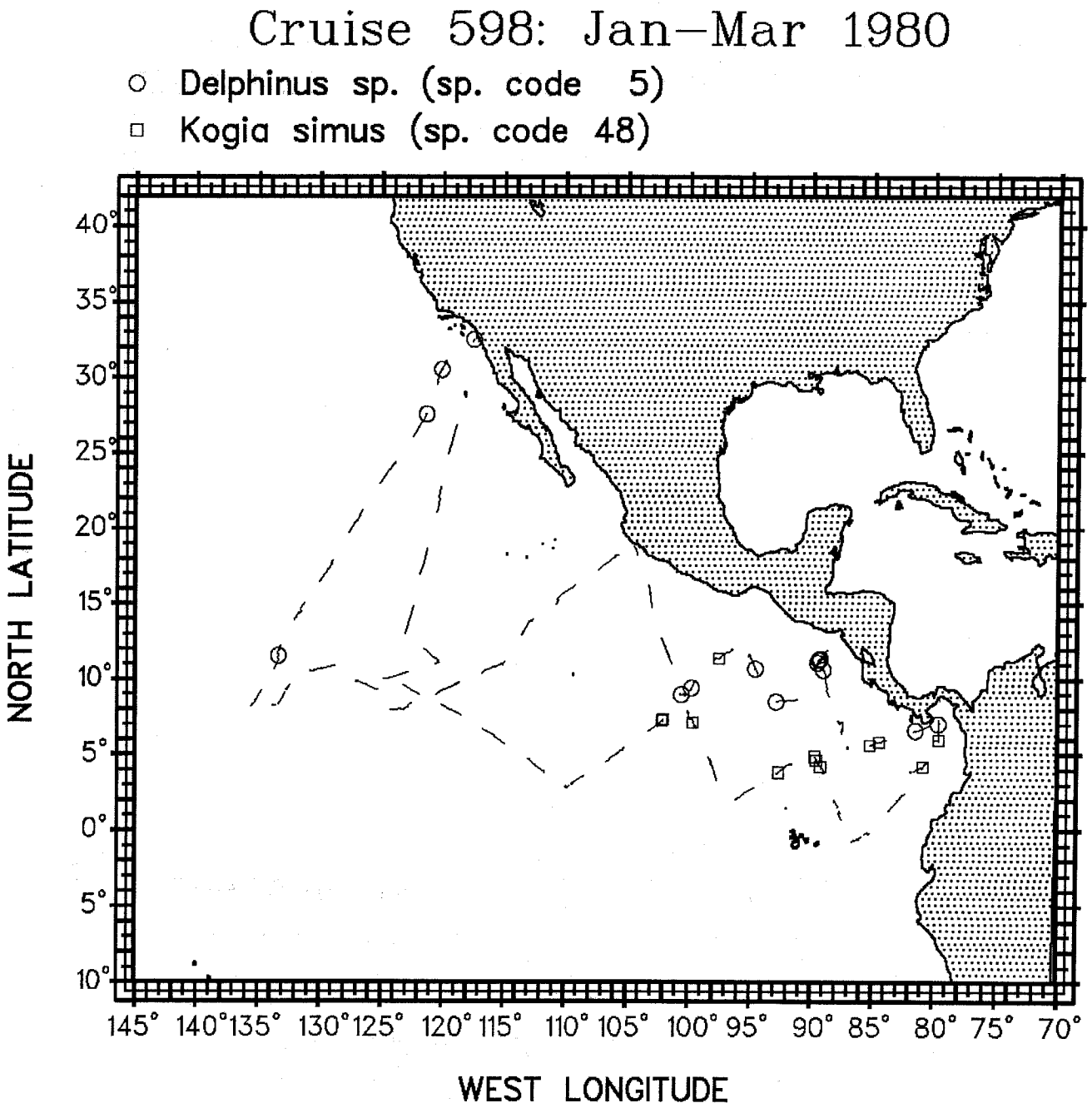

Cruise 598: Jan–Mar 1980
Delphinus sp. (sp. code 5)
Kogia simus (sp. code 48)
NORTH LATITUDE
40°
35°
30°
25°
20°
15°
10°
5°
0°
5°
10°
145° 140° 135° 130° 125° 120° 115° 110° 105° 100° 95° 90° 85° 80° 75° 70°
WEST LONGITUDE

Figure 61.

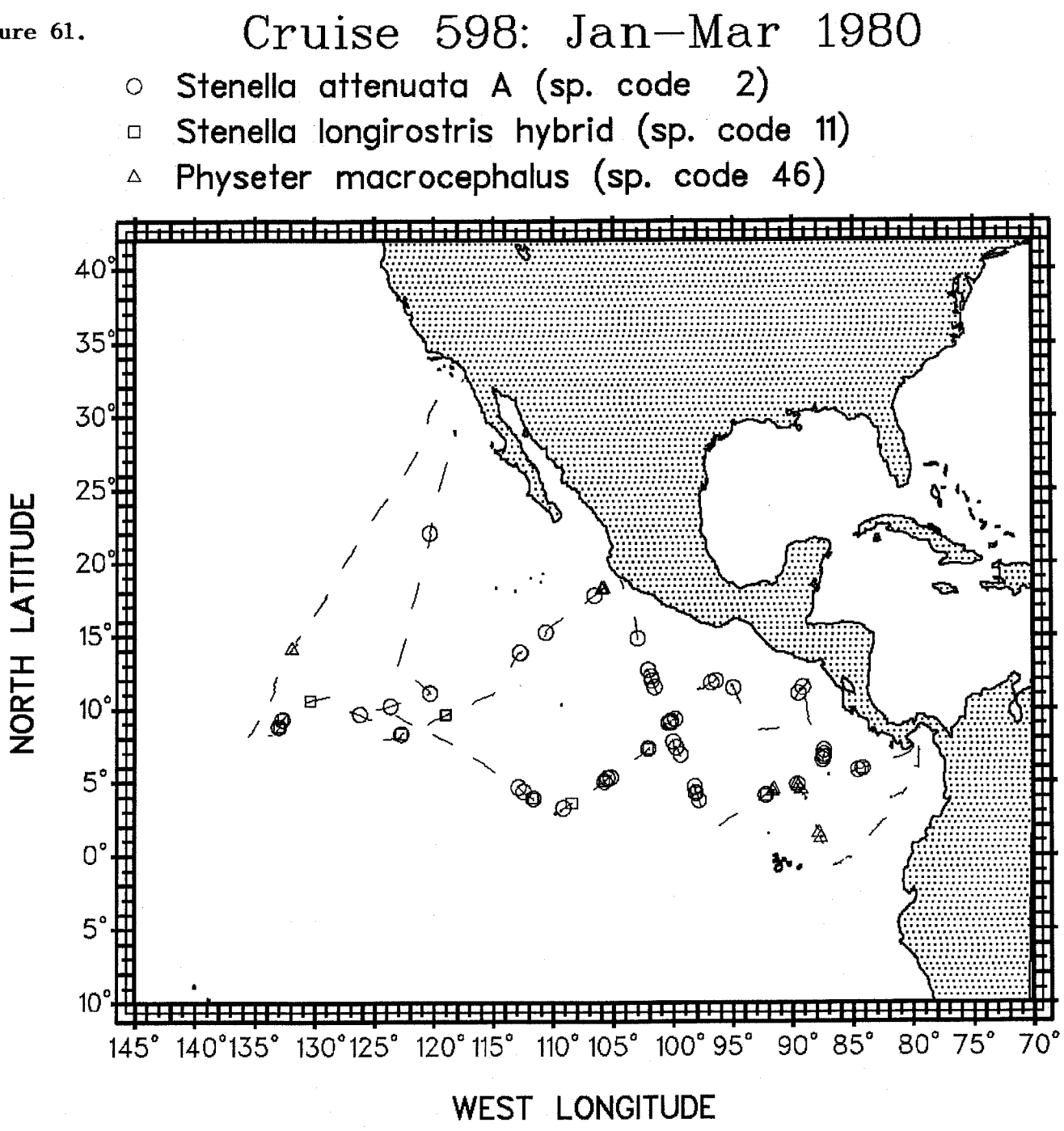

Cruise 598: Jan–Mar 1980
Stenella attenuata A (sp. code 2)
Stenella longirostris hybrid (sp. code 11)
Physeter macrocephalus (sp. code 46)
NORTH LATITUDE
40°
35°
30°
25°
20°
15°
10°
5°
0°
5°
10°
145° 140° 135° 130° 125° 120° 115° 110° 105° 100° 95° 90° 85° 80° 75° 70°
WEST LONGITUDE

Figure 62.

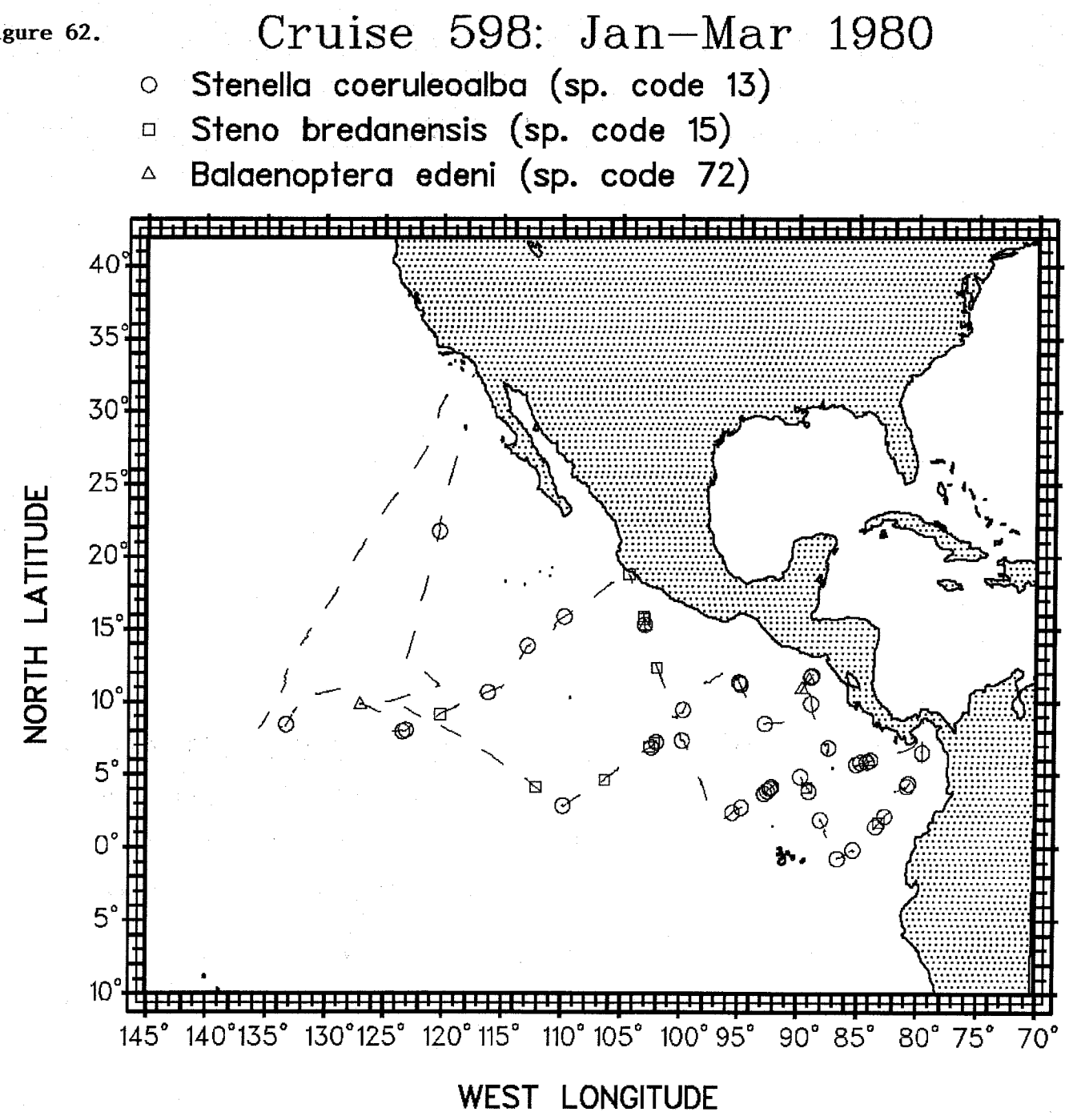

Cruise 598: Jan–Mar 1980
Stenella coeruleoalba (sp. code 13)
Steno bredanensis (sp. code 15)
Balaenoptera edeni (sp. code 72)
NORTH LATITUDE
40°
35°
30°
25°
20°
15°
10°
5°
0°
5°
10°
145° 140° 135° 130° 125° 120° 115° 110° 105° 100° 95° 90° 85° 80° 75° 70°
WEST LONGITUDE

Figure 63.

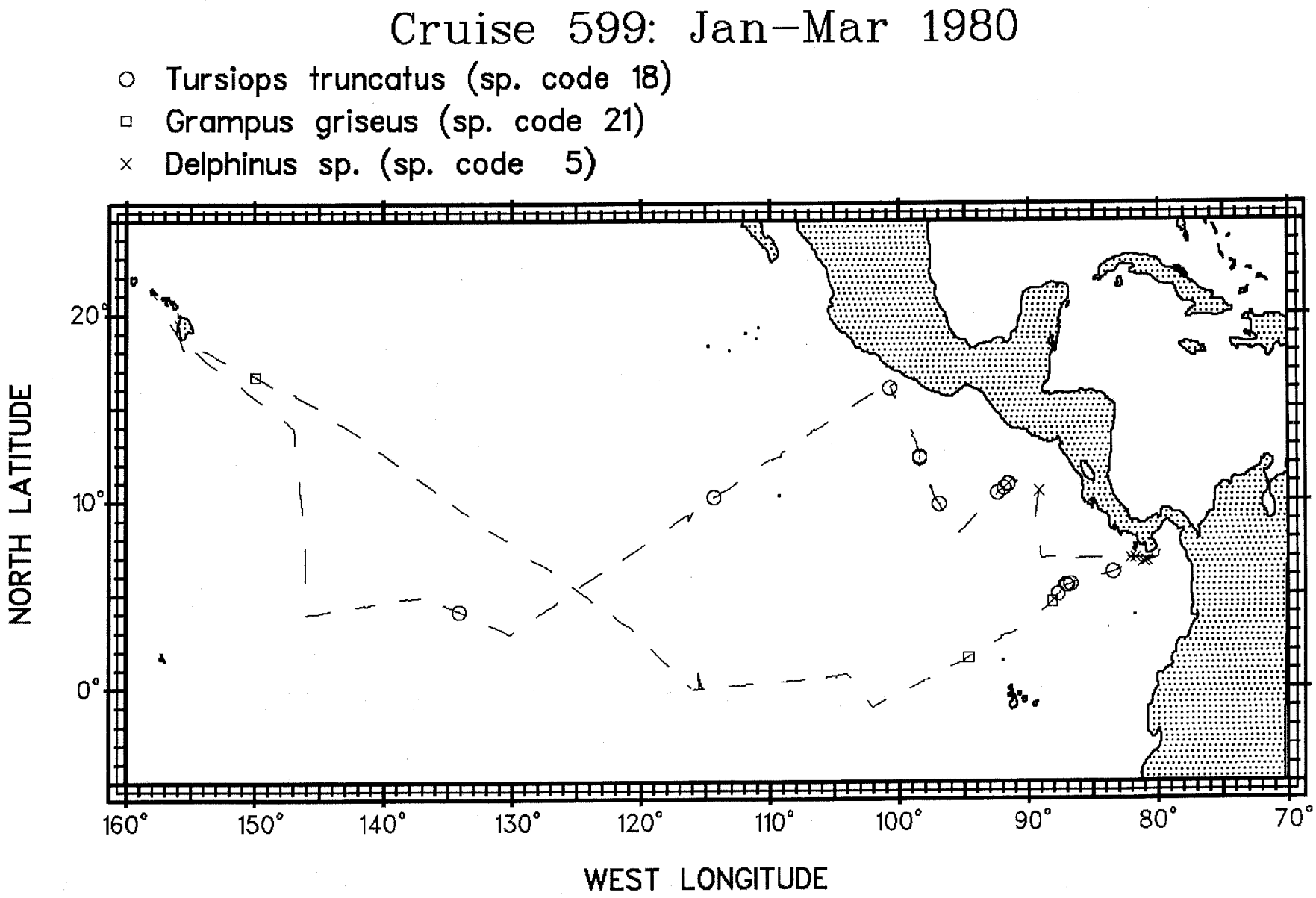

Cruise 599: Jan–Mar 1980
Tursiops truncatus (sp. code 18)
Grampus griseus (sp. code 21)
Delphinus sp. (sp. code 5)
NORTH LATITUDE
20°
10°
0°
160°
150°
140°
130°
120°
110°
100°
90°
80°
70°
WEST LONGITUDE

Figure 64.

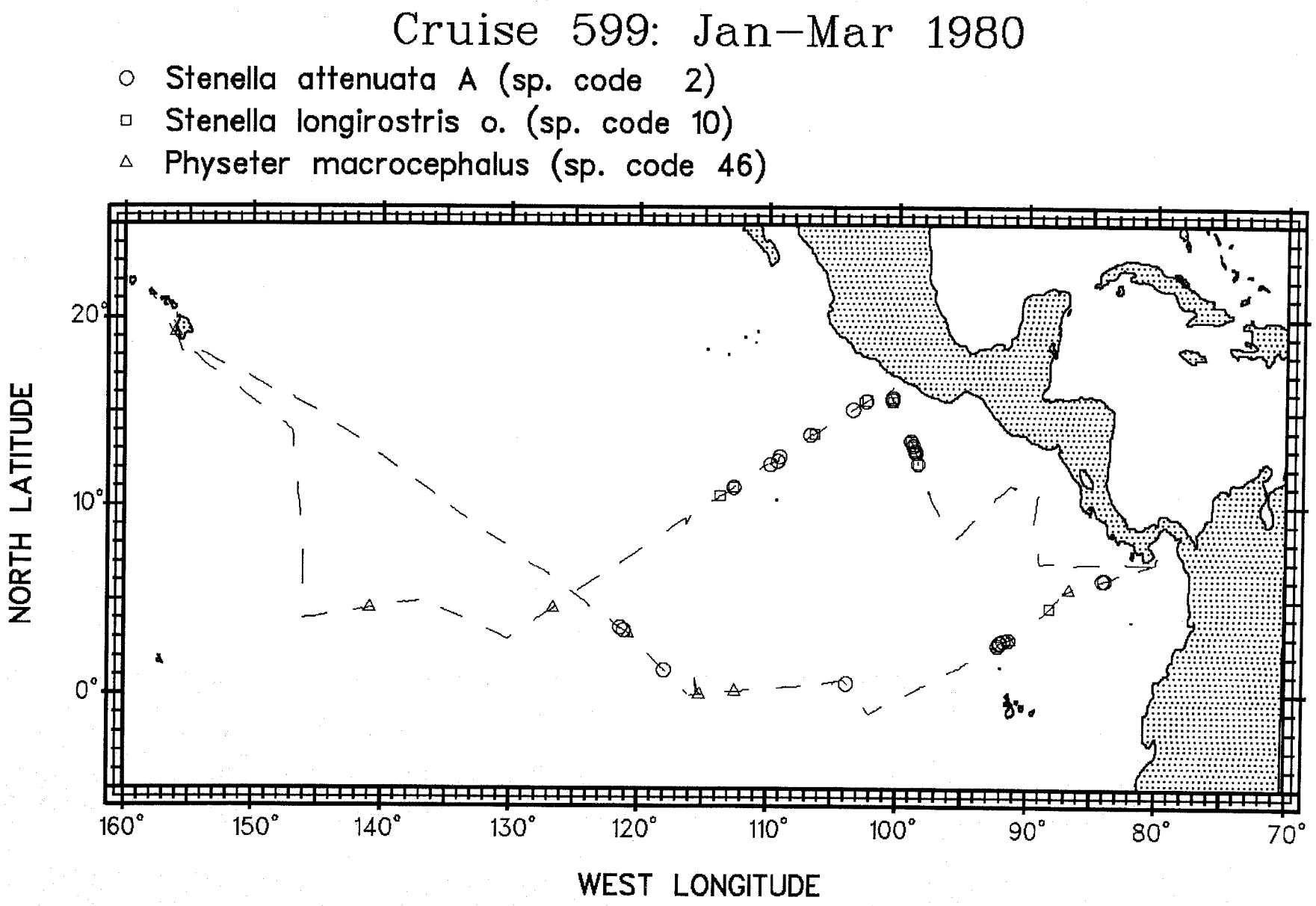

Cruise 599: Jan–Mar 1980
Stenella attenuata A (sp. code 2)
Stenella longirostris o. (sp. code 10)
Physeter macrocephalus (sp. code 46)
NORTH LATITUDE
20°
10°
0°
160°
150°
140°
130°
120°
110°
100°
90°
80°
70°
WEST LONGITUDE

Figure 65.

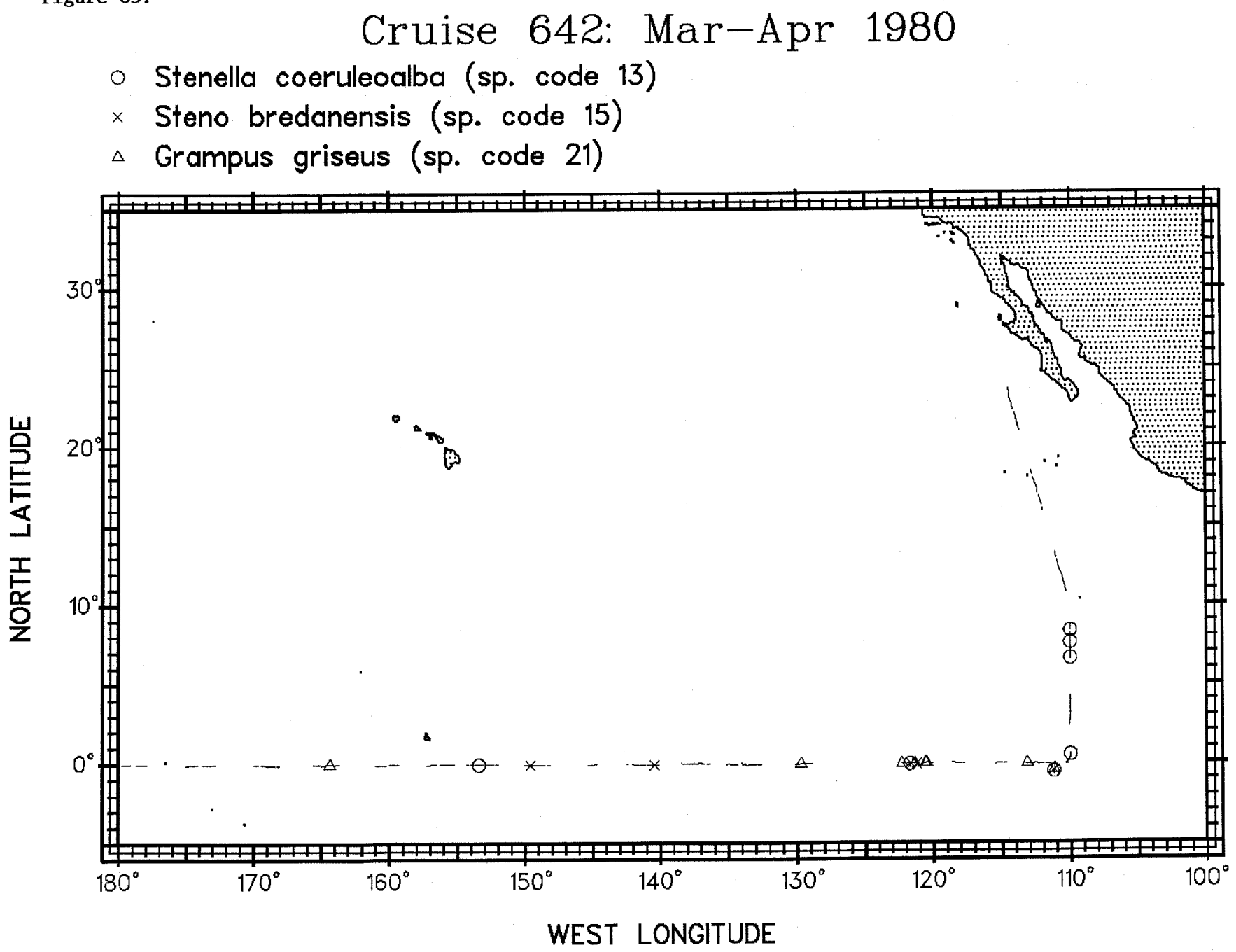

Cruise 642: Mar–Apr 1980
Stenella coeruleoalba (sp. code 13)
Steno bredanensis (sp. code 15)
Grampus griseus (sp. code 21)
NORTH LATITUDE
30°
20°
10°
0°
180°
170°
160°
150°
140°
130°
120°
110°
100°
WEST LONGITUDE

Figure 66.

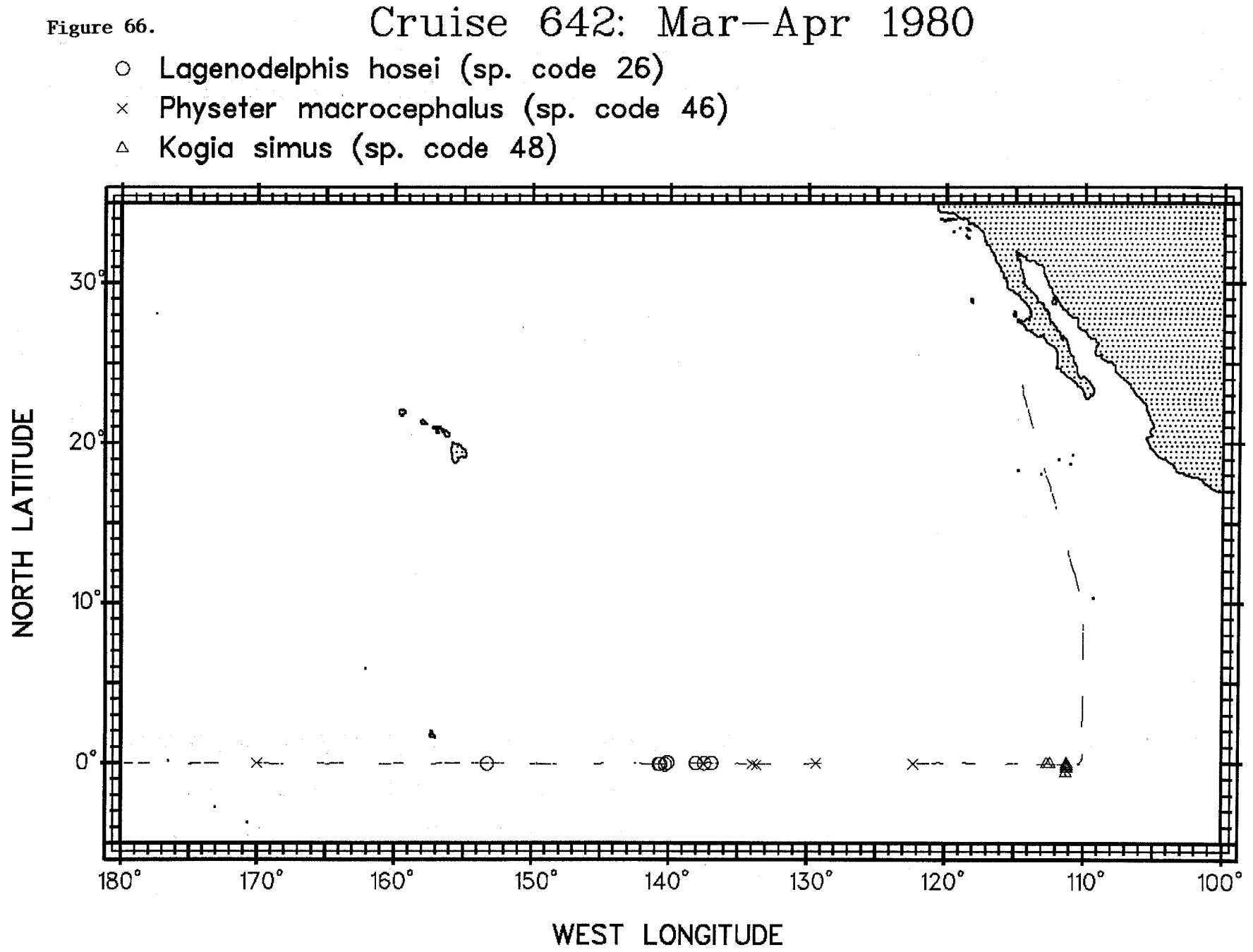

Cruise 642: Mar–Apr 1980
Lagenodelphis hosei (sp. code 26)
Physeter macrocephalus (sp. code 46)
Kogia simus (sp. code 48)
30°
20°
10°
0°
NORTH LATITUDE
180°
170°
160°
150°
140°
130°
120°
110°
100°
WEST LONGITUDE

Figure 67.

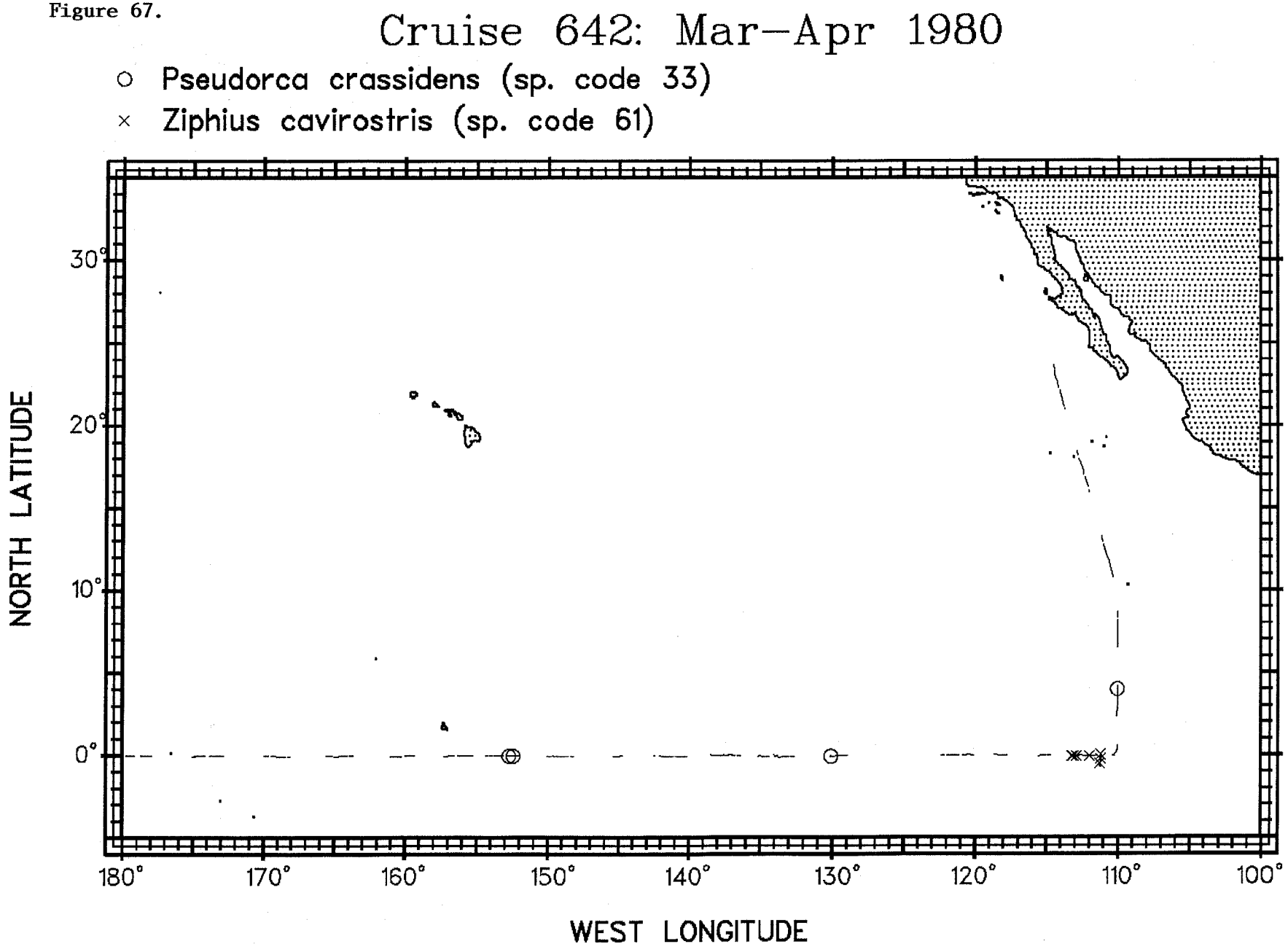

Cruise 642: Mar–Apr 1980
Pseudorca crassidens (sp. code 33)
Ziphius cavirostris (sp. code 61)
30°
20°
10°
0°
NORTH LATITUDE
180°
170°
160°
150°
140°
130°
120°
110°
100°
WEST LONGITUDE

Figure 68.

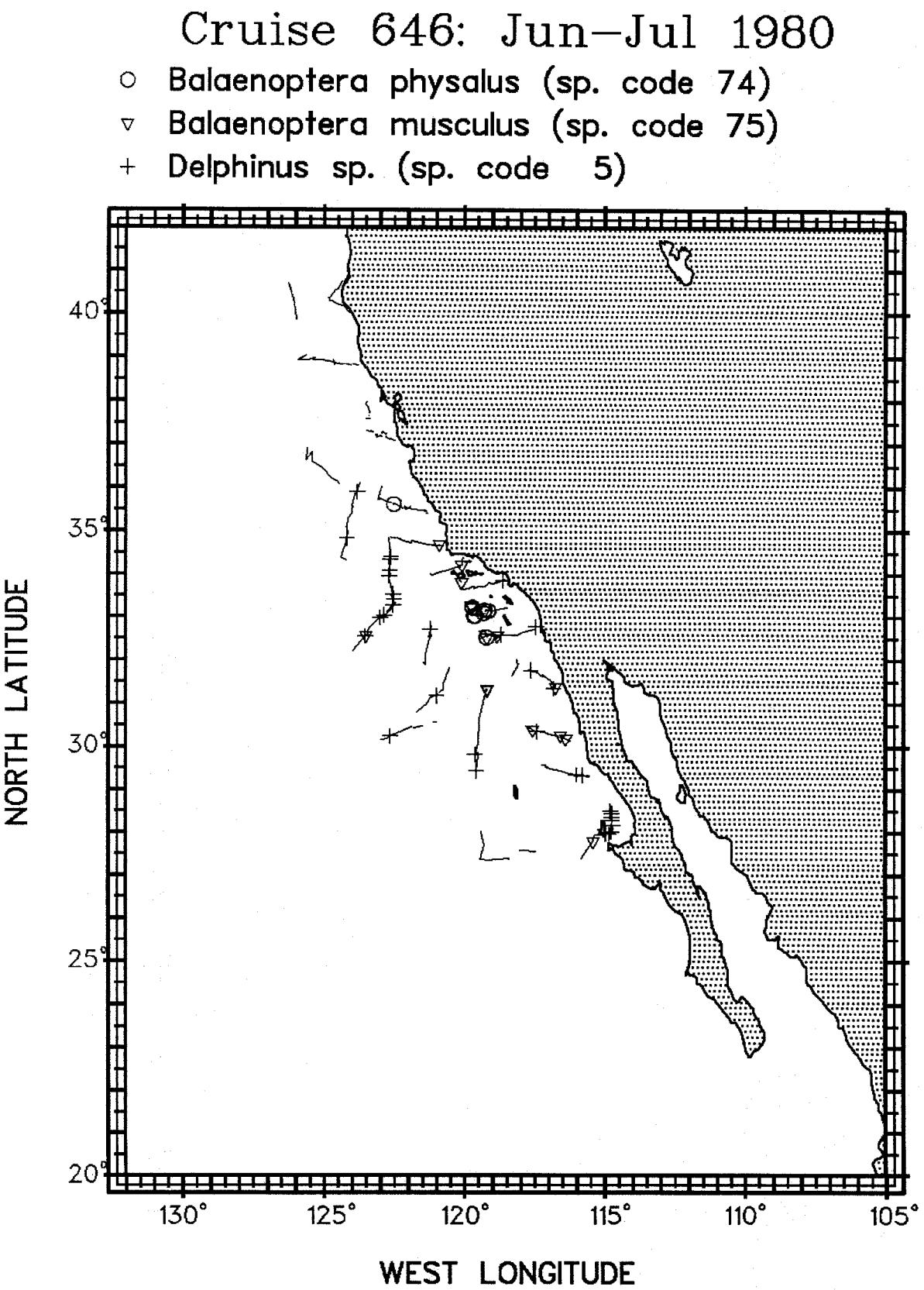
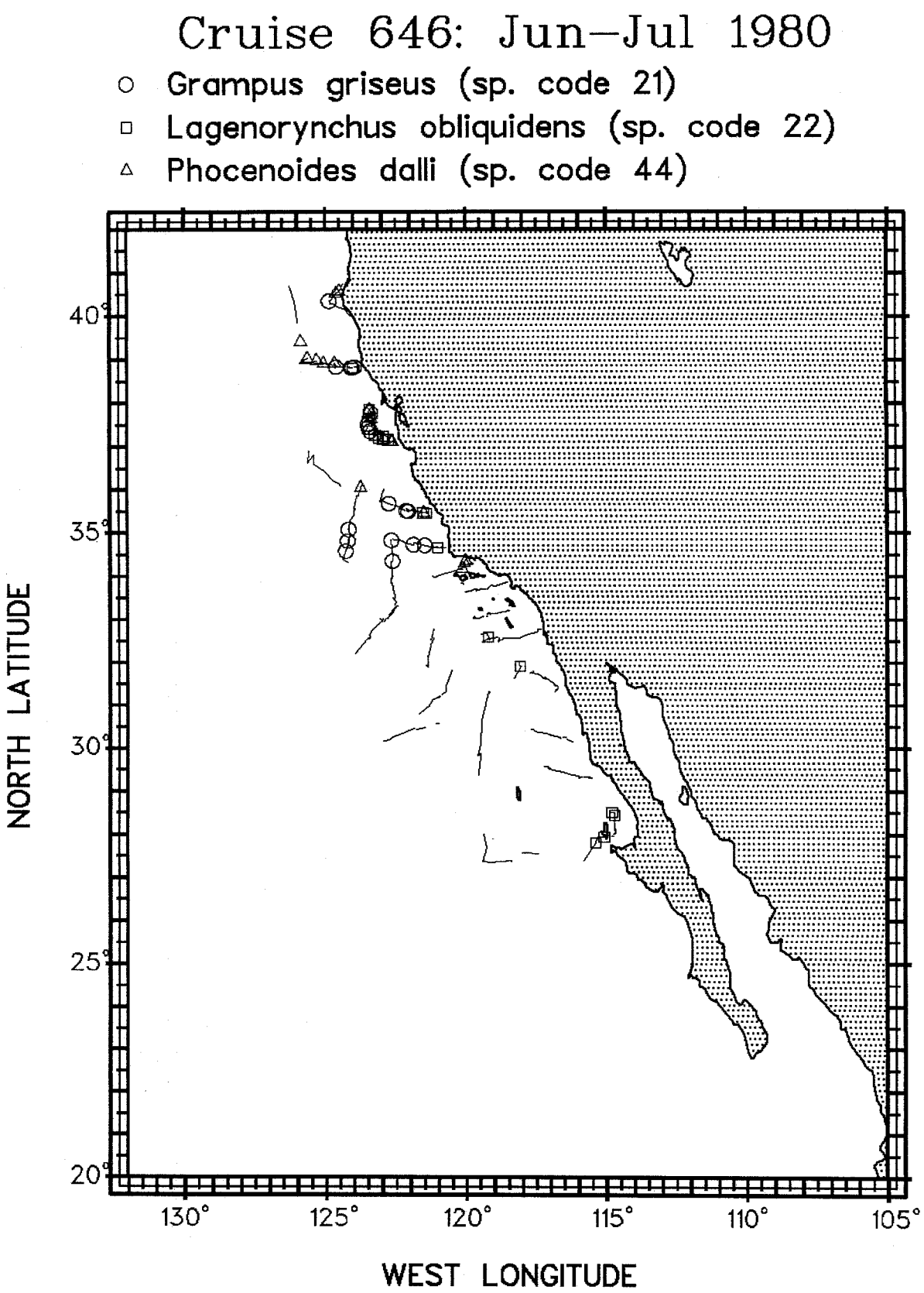

Cruise 646: Jun–Jul 1980
Balaenoptera physalus (sp. code 74)
Balaenoptera musculus (sp. code 75)
Delphinus sp. (sp. code 5)
40°
35°
30°
25°
20°
NORTH LATITUDE
130°
125°
120°
115°
110°
105°
WEST LONGITUDE

Figure 69.


Cruise 646: Jun–Jul 1980
Grampus griseus (sp. code 21)
Lagenorynchus obliquidens (sp. code 22)
Phocenoides dalli (sp. code 44)
40°
35°
30°
25°
20°
NORTH LATITUDE
130°
125°
120°
115°
110°
105°
WEST LONGITUDE

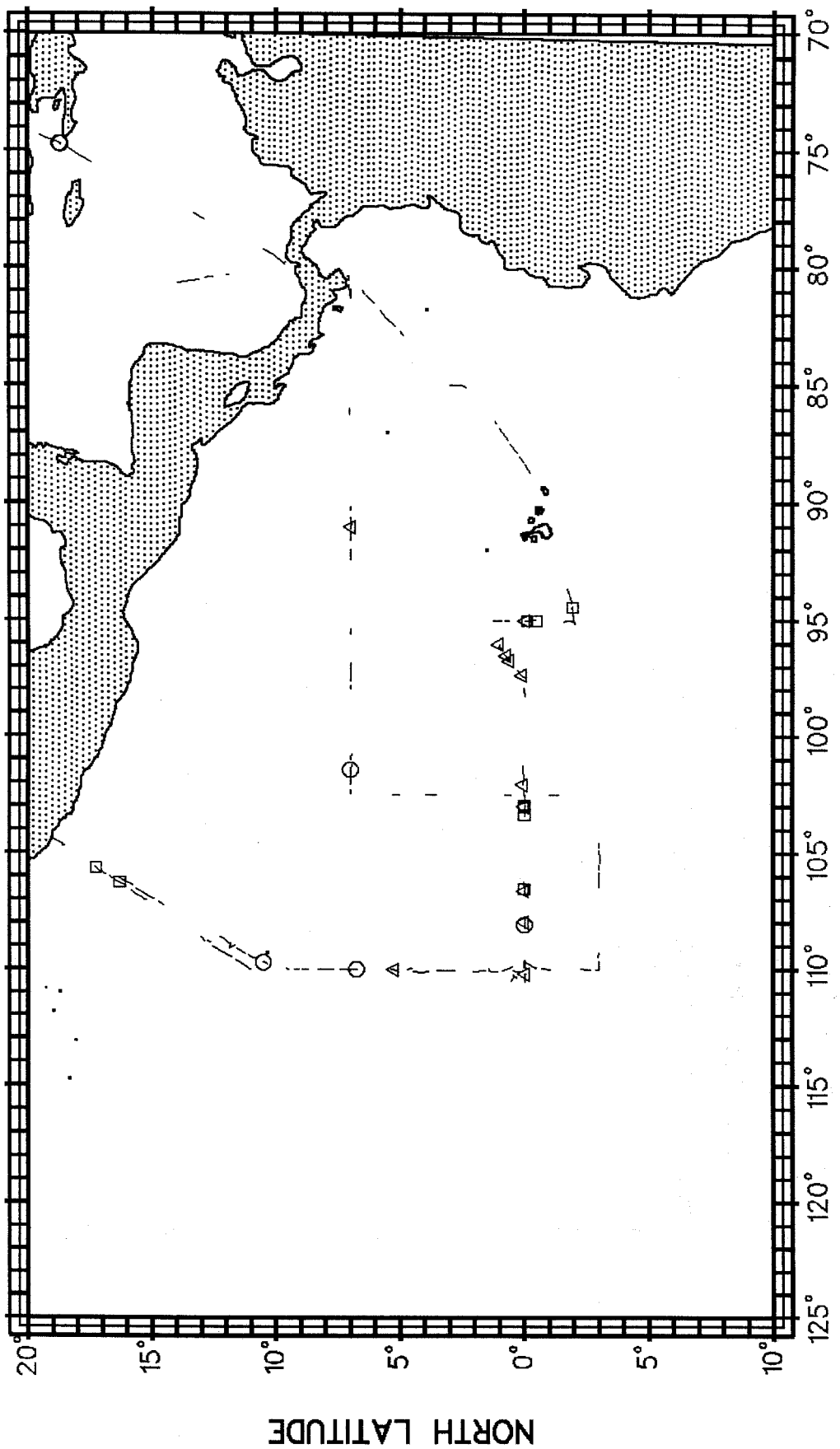

Cruise 648: Jul–Sept 1980
○ Stenella attenuata A (sp. code 2)
△ Stenella coeruleoalba (sp. code 13)
□ Delphinus sp. (sp. code 5)
NORTH LATITUDE
20°
15°
10°
5°
0°
5°
10°
WEST LONGITUDE
125°
120°
115°
110°
105°
100°
95°
90°
85°
80°
75°
70°

Figure 70.

Figure 71.

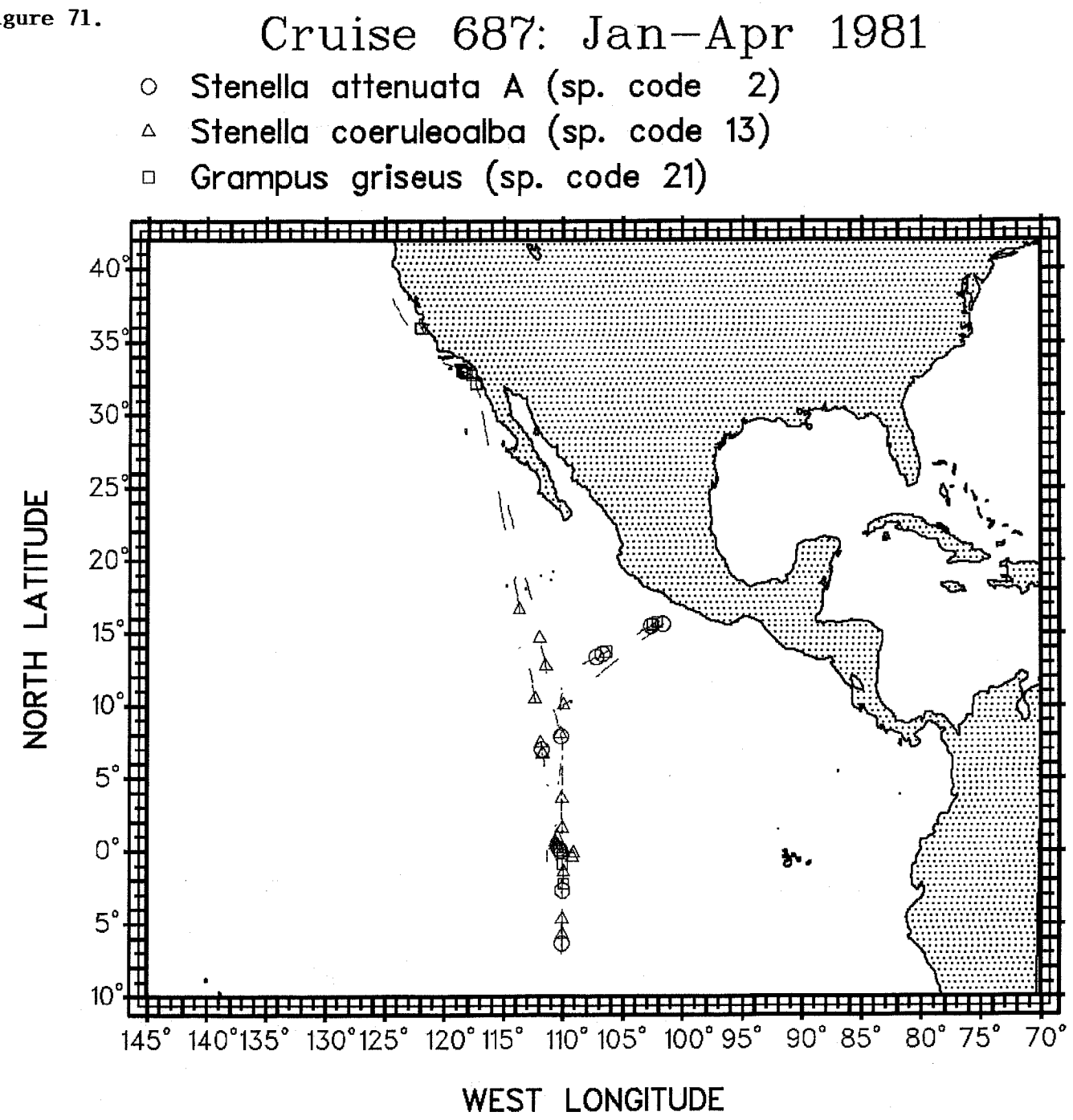

Cruise 687: Jan–Apr 1981
Stenella attenuata A (sp. code 2)
Stenella coeruleoalba (sp. code 13)
Grampus griseus (sp. code 21)
NORTH LATITUDE
40°
35°
30°
25°
20°
15°
10°
5°
0°
5°
10°
145° 140° 135° 130° 125° 120° 115° 110° 105° 100° 95° 90° 85° 80° 75° 70°
WEST LONGITUDE

Figure 72.

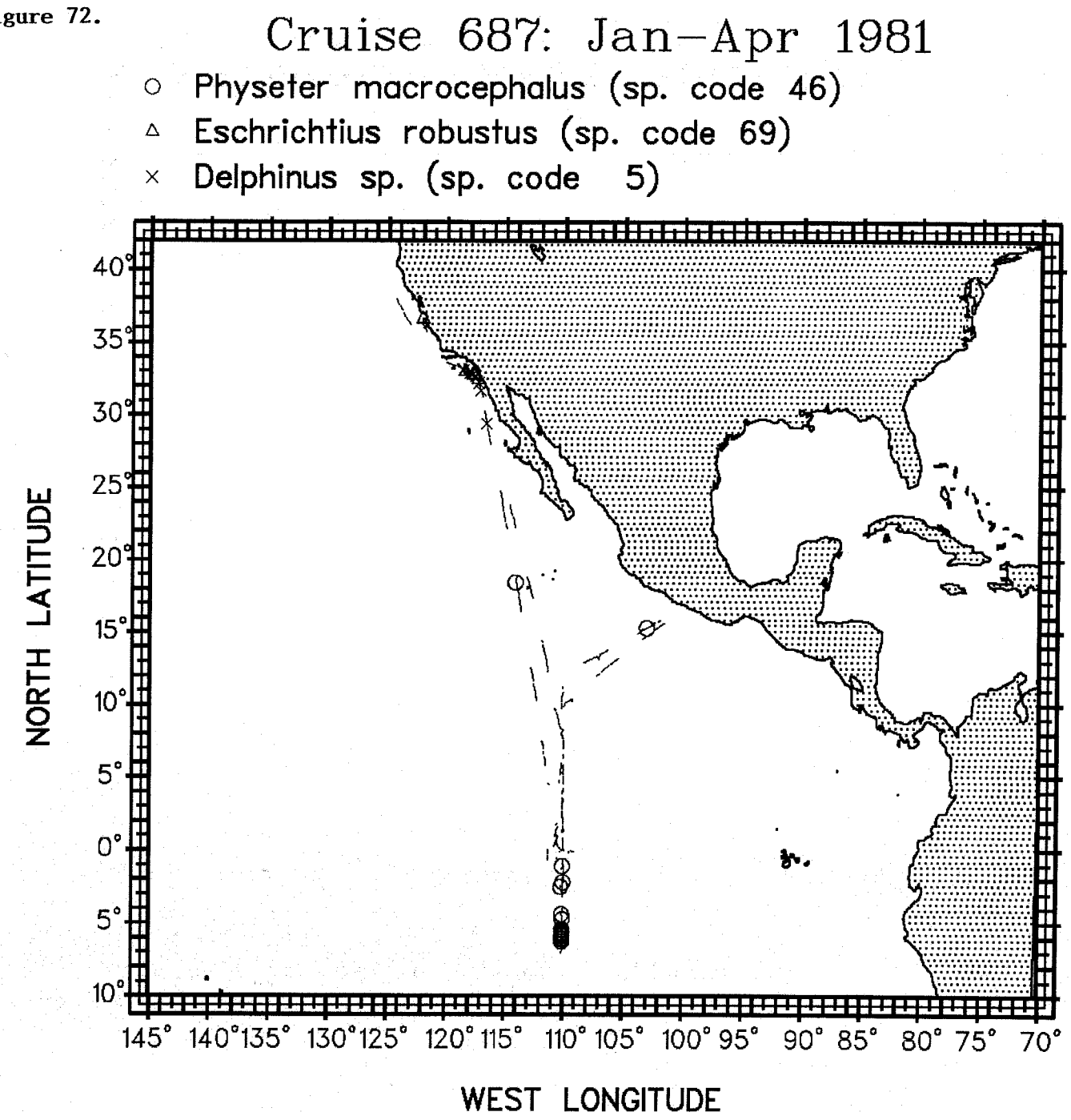

Cruise 687: Jan–Apr 1981
○ Physeter macrocephalus (sp. code 46)
△ Eschrichtius robustus (sp. code 69)
× Delphinus sp. (sp. code 5)
NORTH LATITUDE
40°
35°
30°
25°
20°
15°
10°
5°
0°
5°
10°
145° 140° 135° 130° 125° 120° 115° 110° 105° 100° 95° 90° 85° 80° 75° 70°
WEST LONGITUDE

Figure 73.

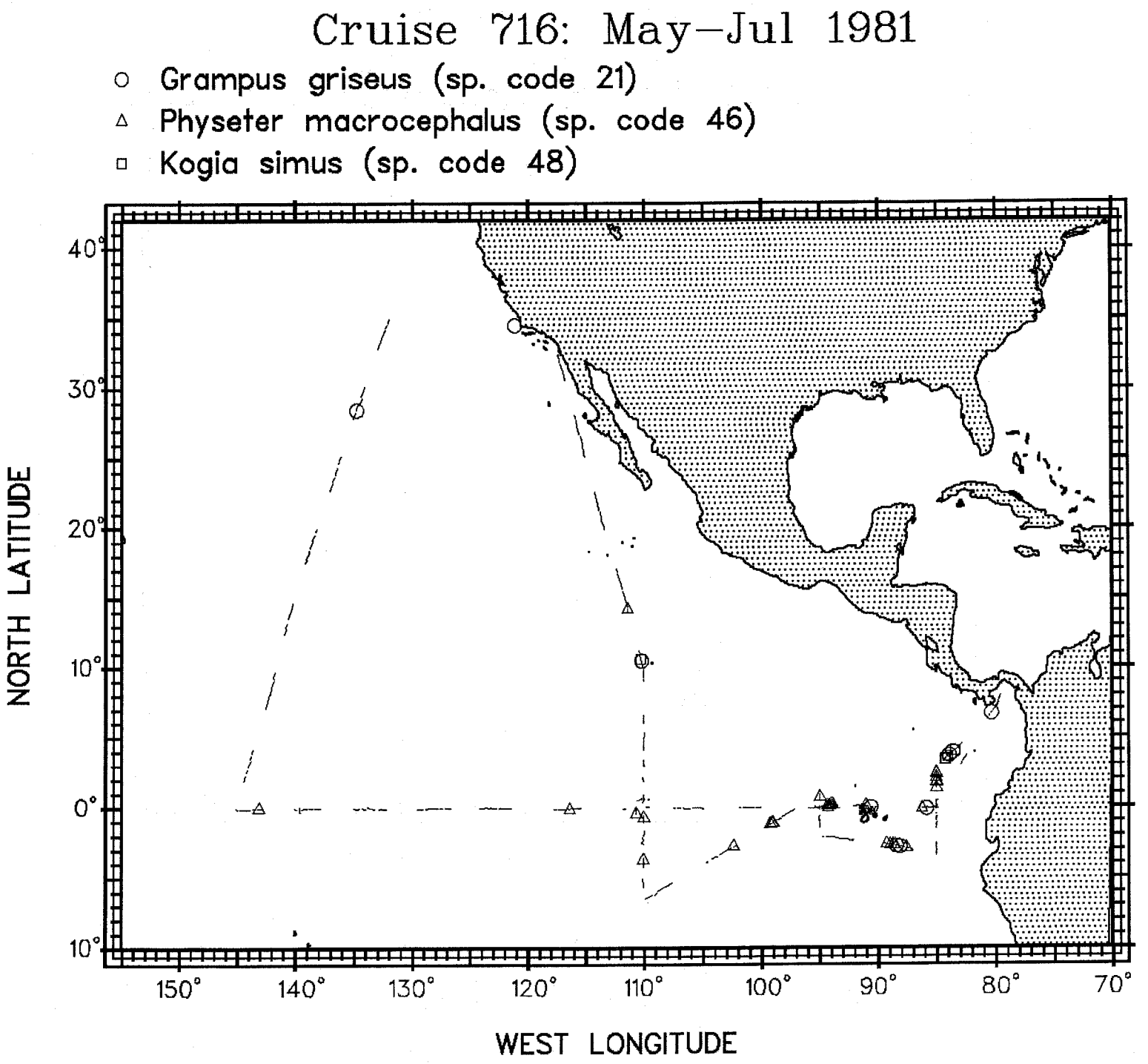

Cruise 716: May–Jul 1981
Grampus griseus (sp. code 21)
Physeter macrocephalus (sp. code 46)
Kogia simus (sp. code 48)
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
150°
140°
130°
120°
110°
100°
90°
80°
70°
WEST LONGITUDE

Figure 74.

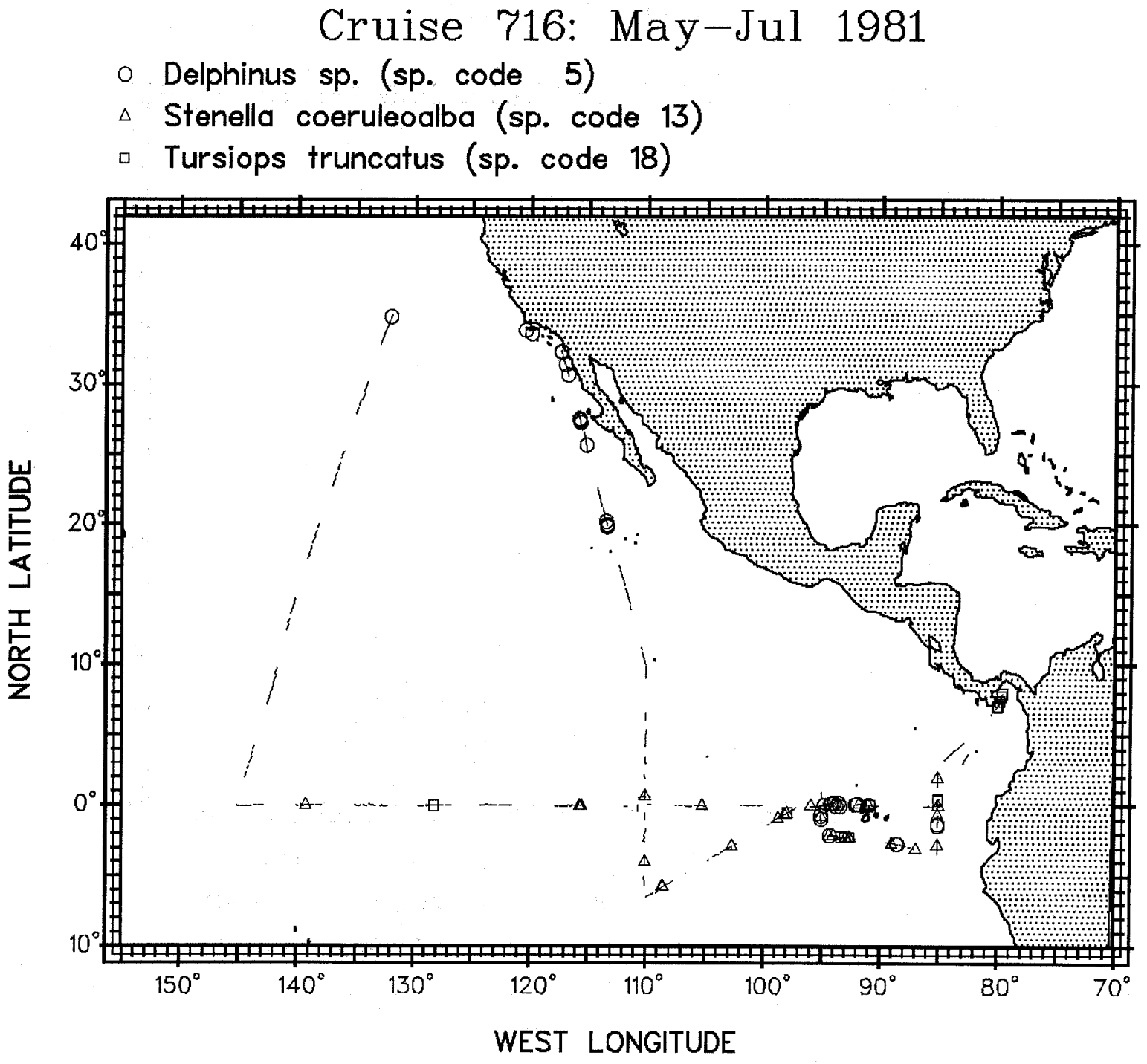

Cruise 716: May–Jul 1981
Delphinus sp. (sp. code 5)
Stenella coeruleoalba (sp. code 13)
Tursiops truncatus (sp. code 18)
NORTH LATITUDE
40°
30°
20°
10°
0°
10°
150°
140°
130°
120°
110°
100°
90°
80°
70°
WEST LONGITUDE

Figure 75.

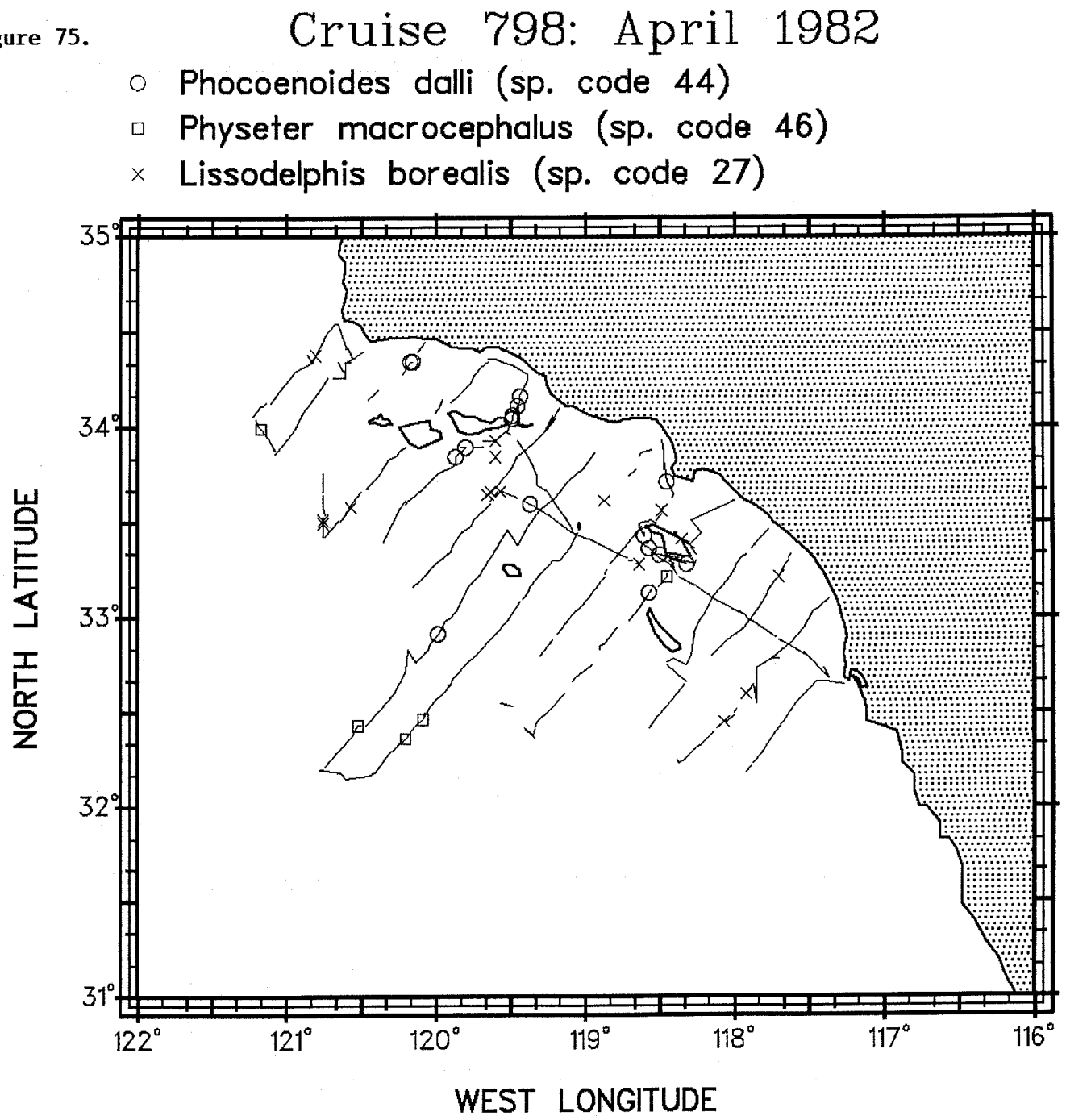

Cruise 798: April 1982
Phocoenoides dalli (sp. code 44)
Physeter macrocephalus (sp. code 46)
Lissodelphis borealis (sp. code 27)
35°
34°
33°
32°
31°
NORTH LATITUDE
122°
121°
120°
119°
118°
117°
116°
WEST LONGITUDE

Figure 76.

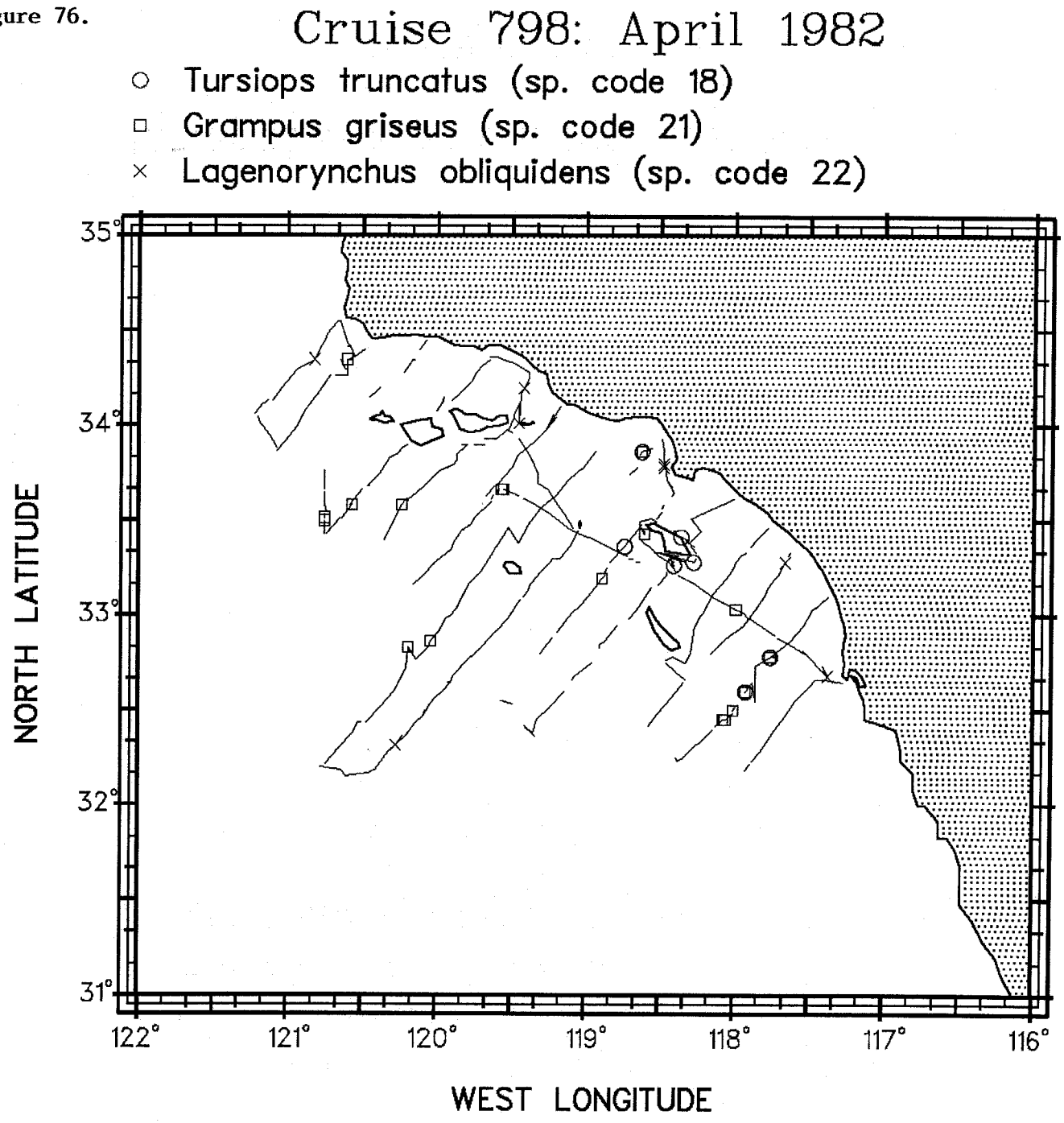

Cruise 798: April 1982
Tursiops truncatus (sp. code 18)
Grampus griseus (sp. code 21)
Lagenorynchus obliquidens (sp. code 22)
35°
34°
33°
32°
31°
NORTH LATITUDE
122°
121°
120°
119°
118°
117°
116°
WEST LONGITUDE

Figure 77.

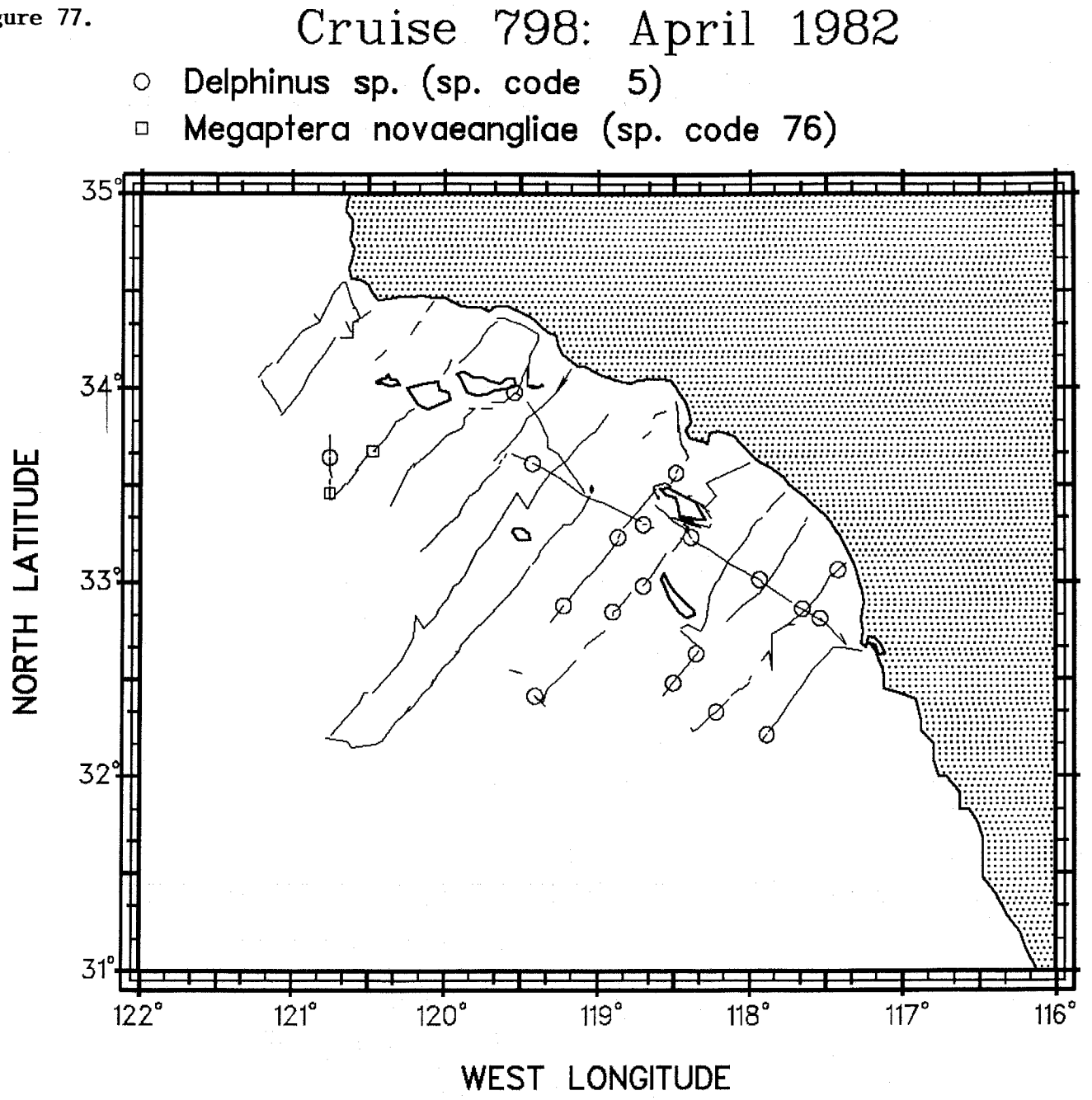

Cruise 798: April 1982
Delphinus sp. (sp. code 5)
Megaptera novaeangliae (sp. code 76)
35°
34°
33°
32°
31°
NORTH LATITUDE
122°
121°
120°
119°
118°
117°
116°
WEST LONGITUDE

Figure 78.

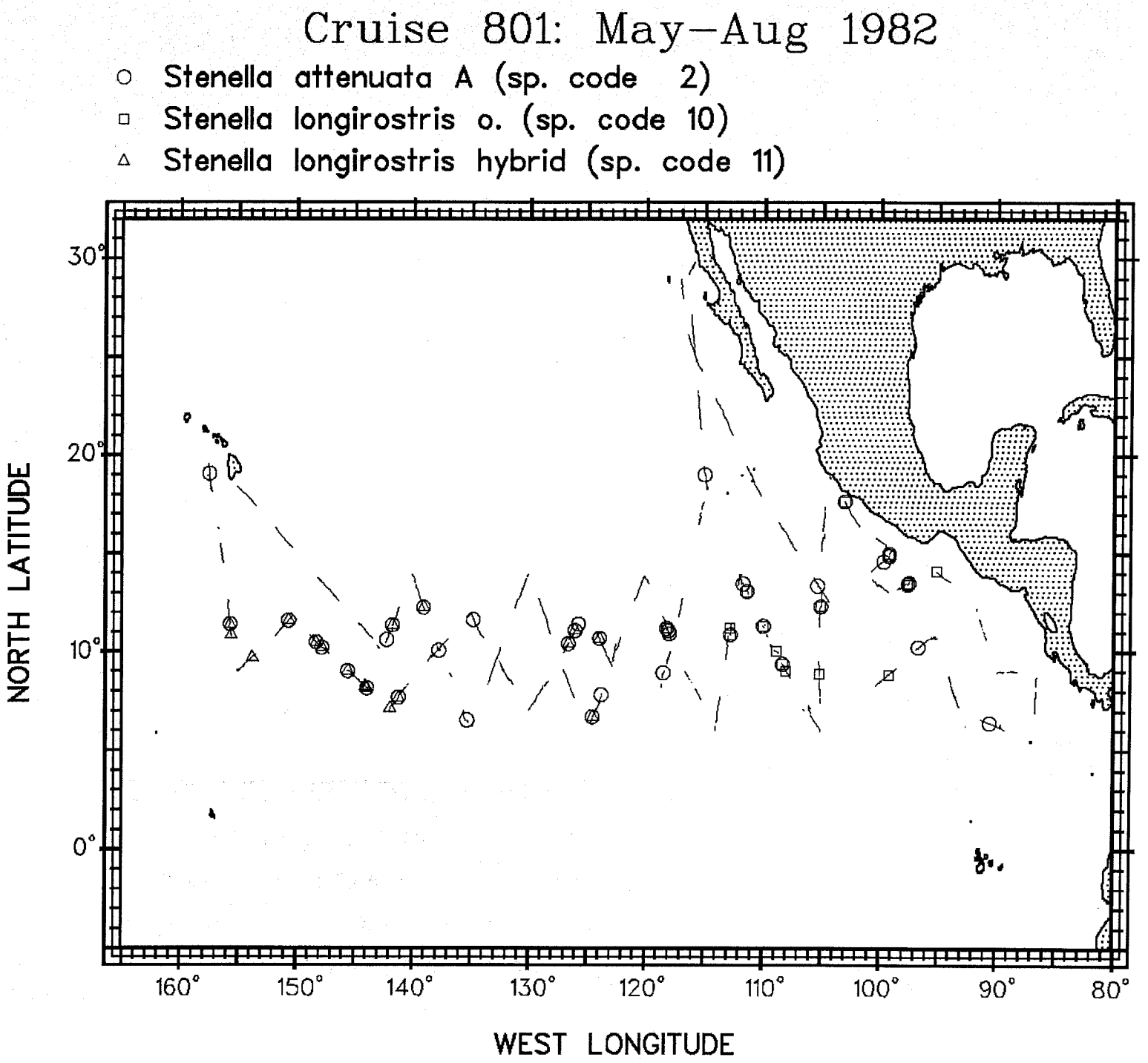

Cruise 801: May–Aug 1982
Stenella attenuata A (sp. code 2)
Stenella longirostris o. (sp. code 10)
Stenella longirostris hybrid (sp. code 11)
NORTH LATITUDE
30°
20°
10°
0°
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 79.

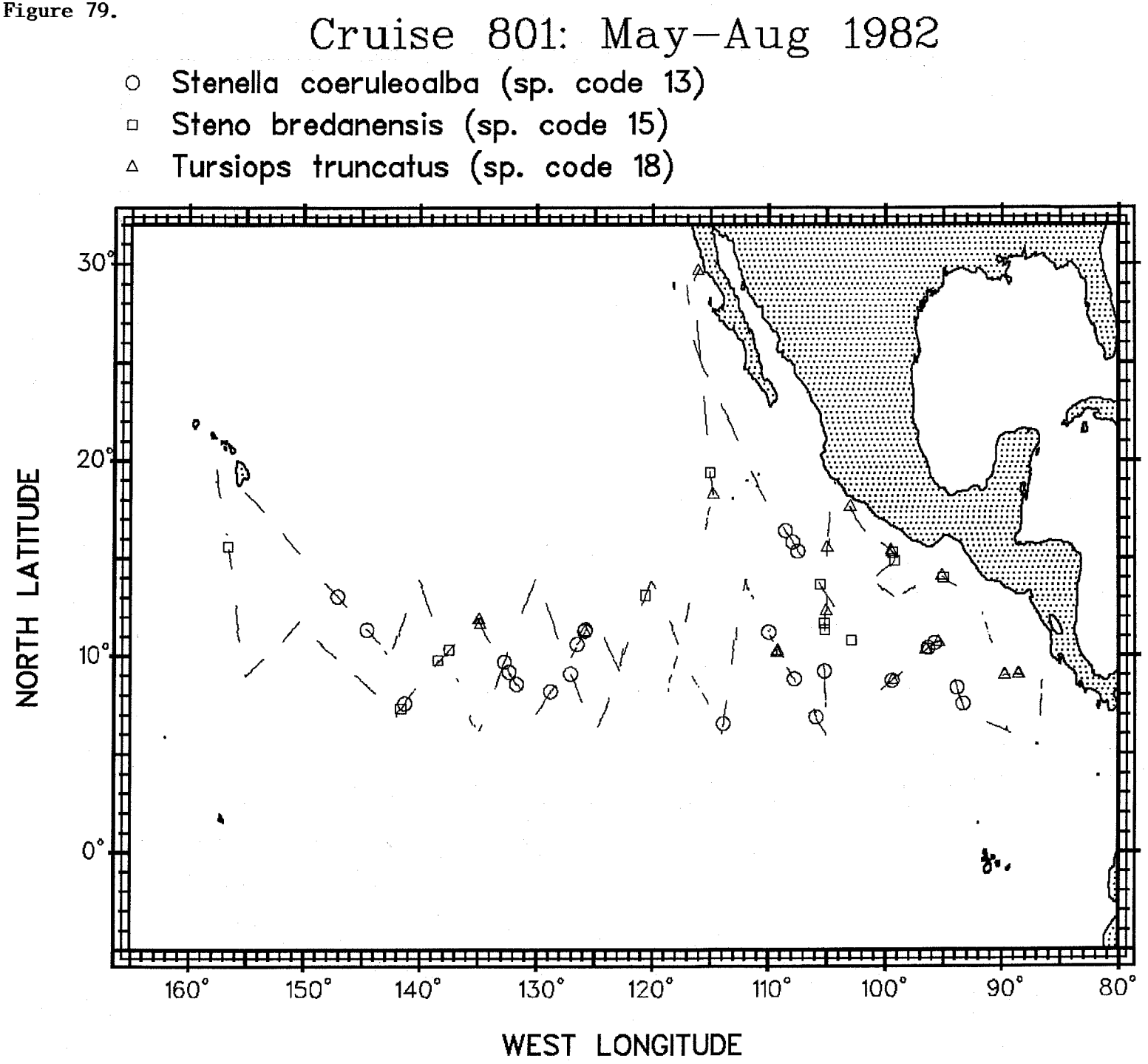

Cruise 801: May–Aug 1982
Stenella coeruleoalba (sp. code 13)
Steno bredanensis (sp. code 15)
Tursiops truncatus (sp. code 18)
30°
20°
10°
0°
NORTH LATITUDE
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 80.

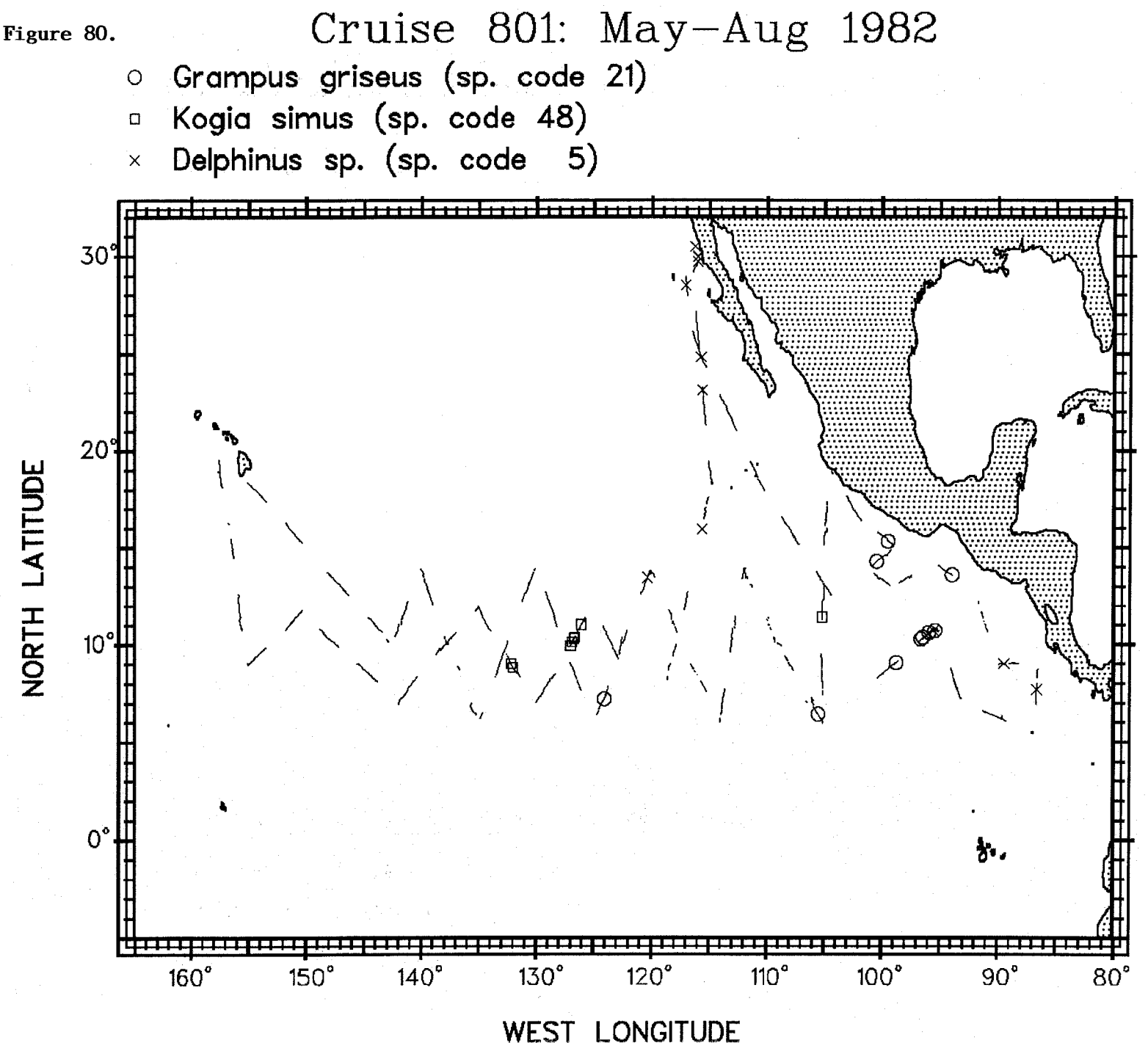

Cruise 801: May–Aug 1982
Grampus griseus (sp. code 21)
Kogia simus (sp. code 48)
Delphinus sp. (sp. code 5)
30°
20°
10°
0°
NORTH LATITUDE
160°
150°
140°
130°
120°
110°
100°
90°
80°
WEST LONGITUDE

Figure 81.

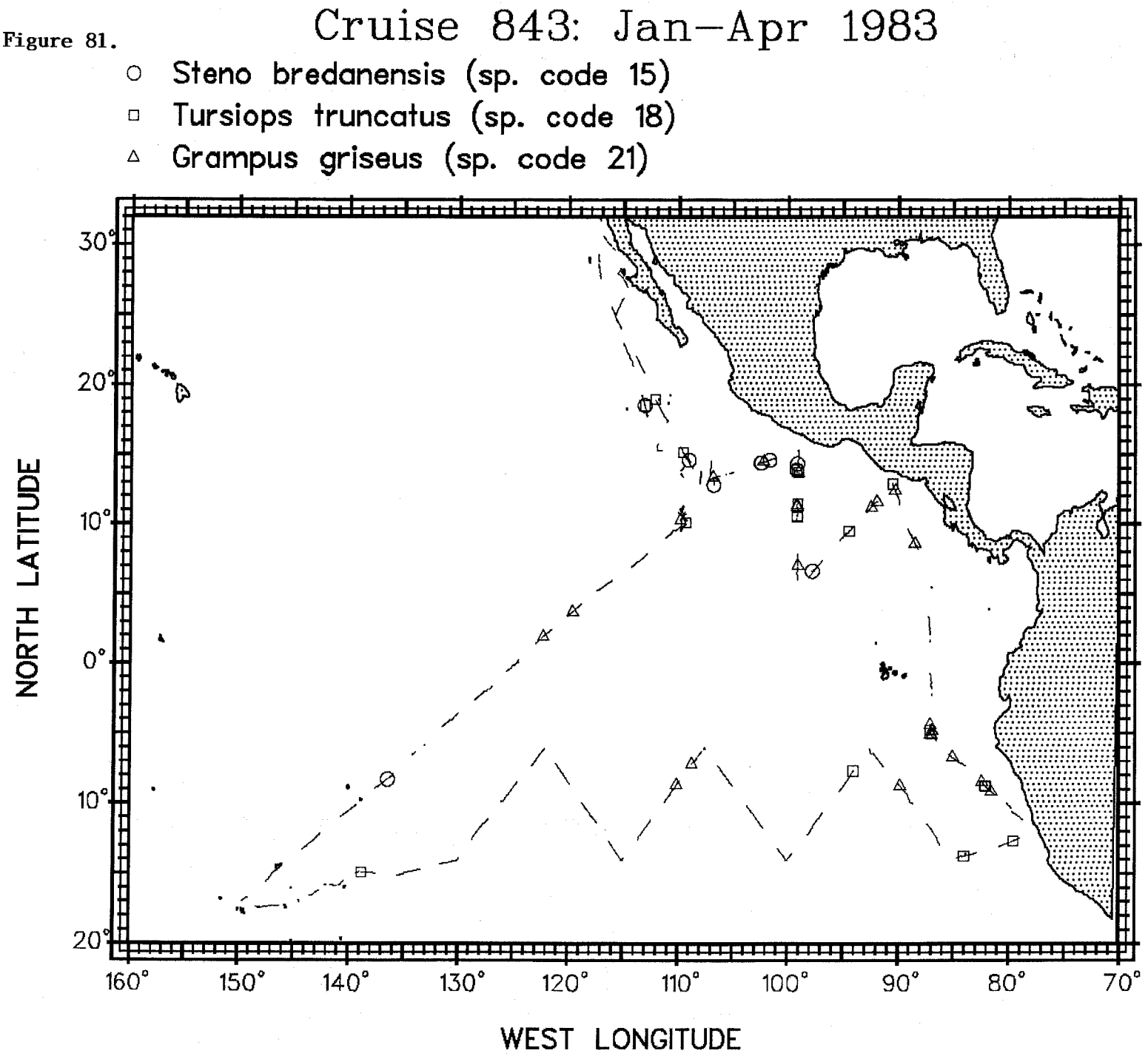

Cruise 843: Jan–Apr 1983
Steno bredanensis (sp. code 15)
Tursiops truncatus (sp. code 18)
Grampus griseus (sp. code 21)
30°
20°
10°
0°
10°
20°
NORTH LATITUDE
160°
150°
140°
130°
120°
110°
100°
90°
80°
70°
WEST LONGITUDE

Figure 82.

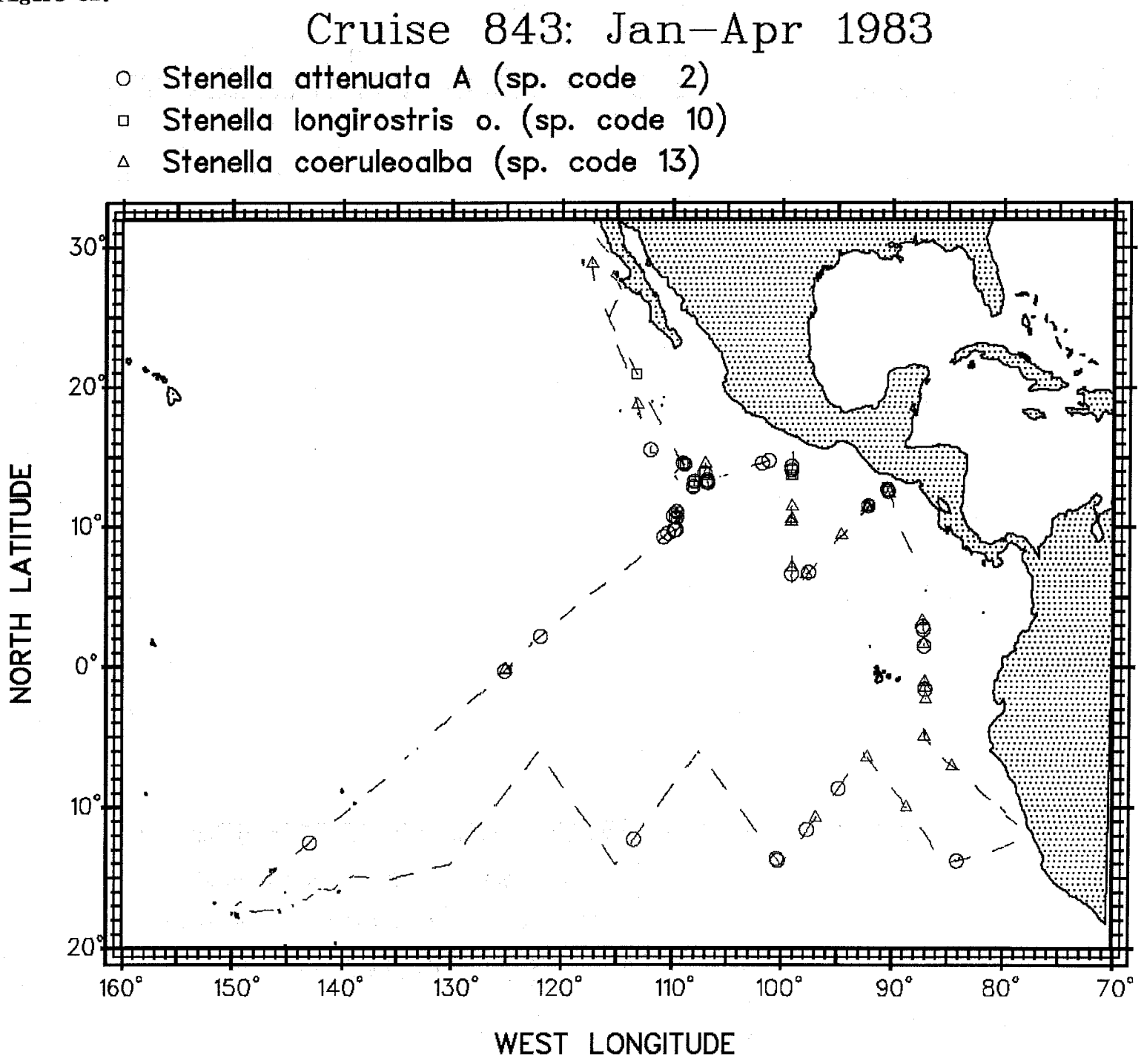

Cruise 843: Jan–Apr 1983
Stenella attenuata A (sp. code 2)
Stenella longirostris o. (sp. code 10)
Stenella coeruleoalba (sp. code 13)
NORTH LATITUDE
30°
20°
10°
0°
10°
20°
160°
150°
140°
130°
120°
110°
100°
90°
80°
70°
WEST LONGITUDE

Figure 83.

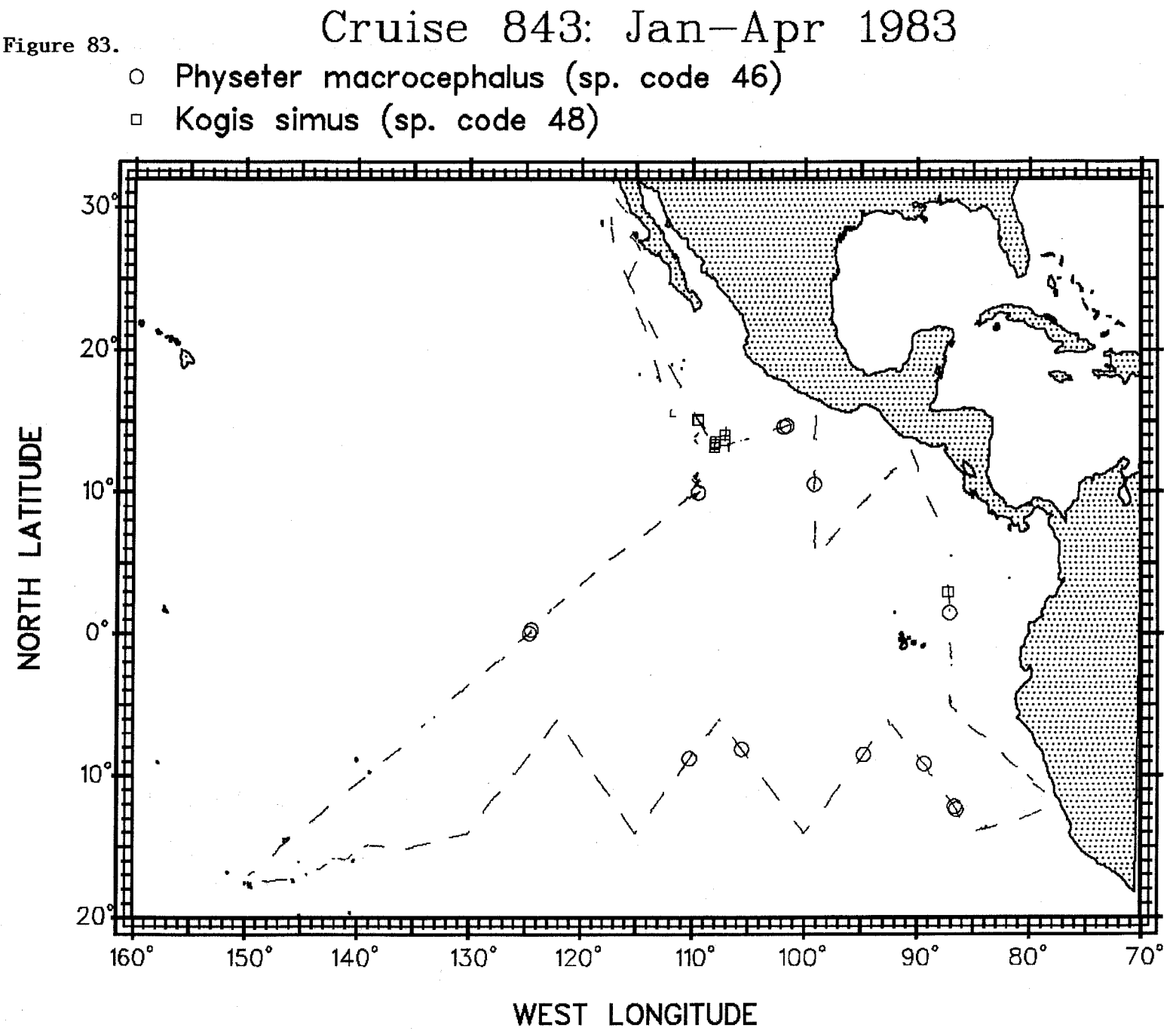

Cruise 843: Jan–Apr 1983
Physeter macrocephalus (sp. code 46)
Kogis simus (sp. code 48)
30°
20°
10°
0°
10°
20°
NORTH LATITUDE
160°
150°
140°
130°
120°
110°
100°
90°
80°
70°
WEST LONGITUDE

Figure 84.

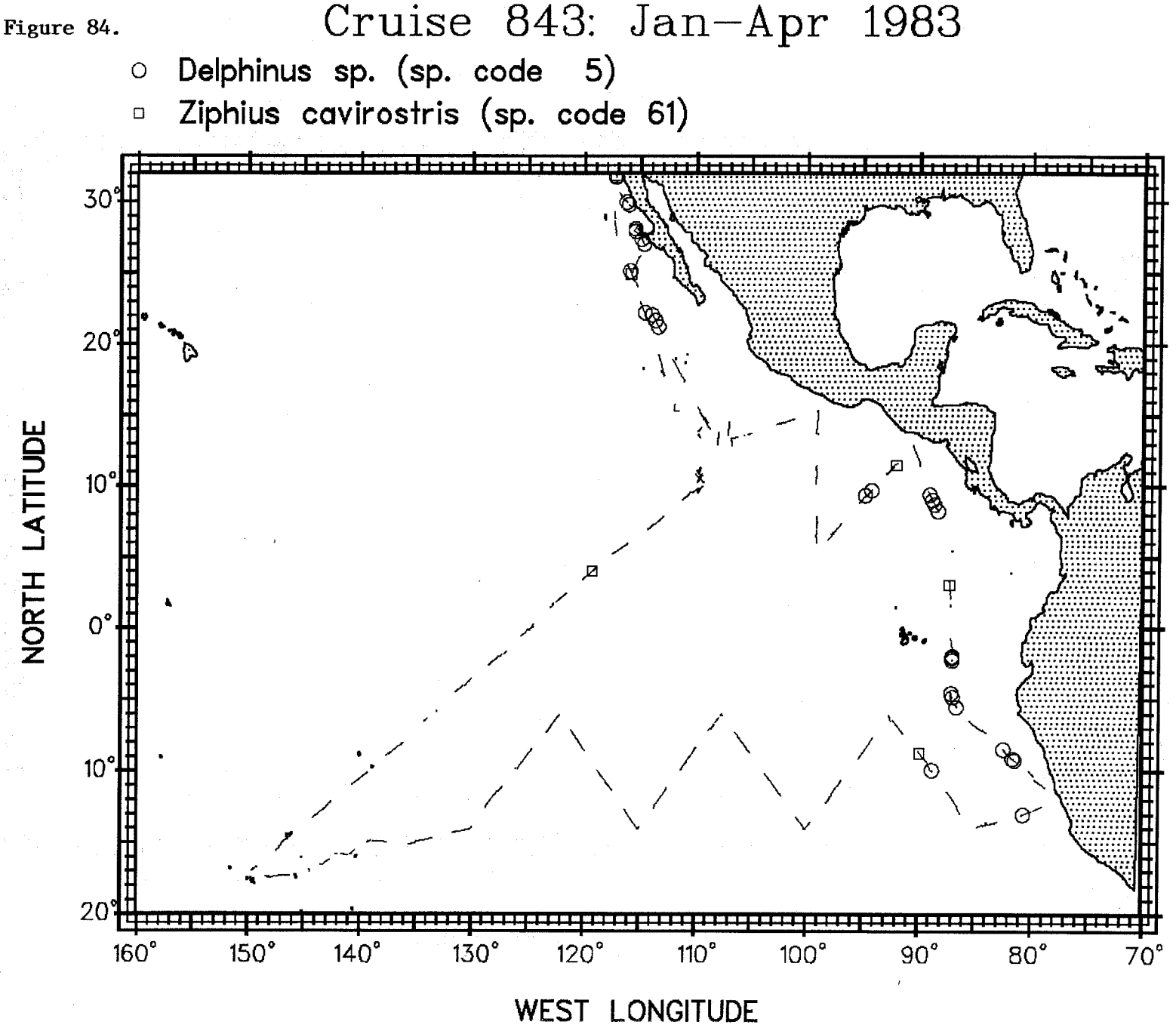

Cruise 843: Jan–Apr 1983
Delphinus sp. (sp. code 5)
Ziphius cavirostris (sp. code 61)
30°
20°
10°
0°
10°
20°
NORTH LATITUDE
160°
150°
140°
130°
120°
110°
100°
90°
80°
70°
WEST LONGITUDE

Figure 85.

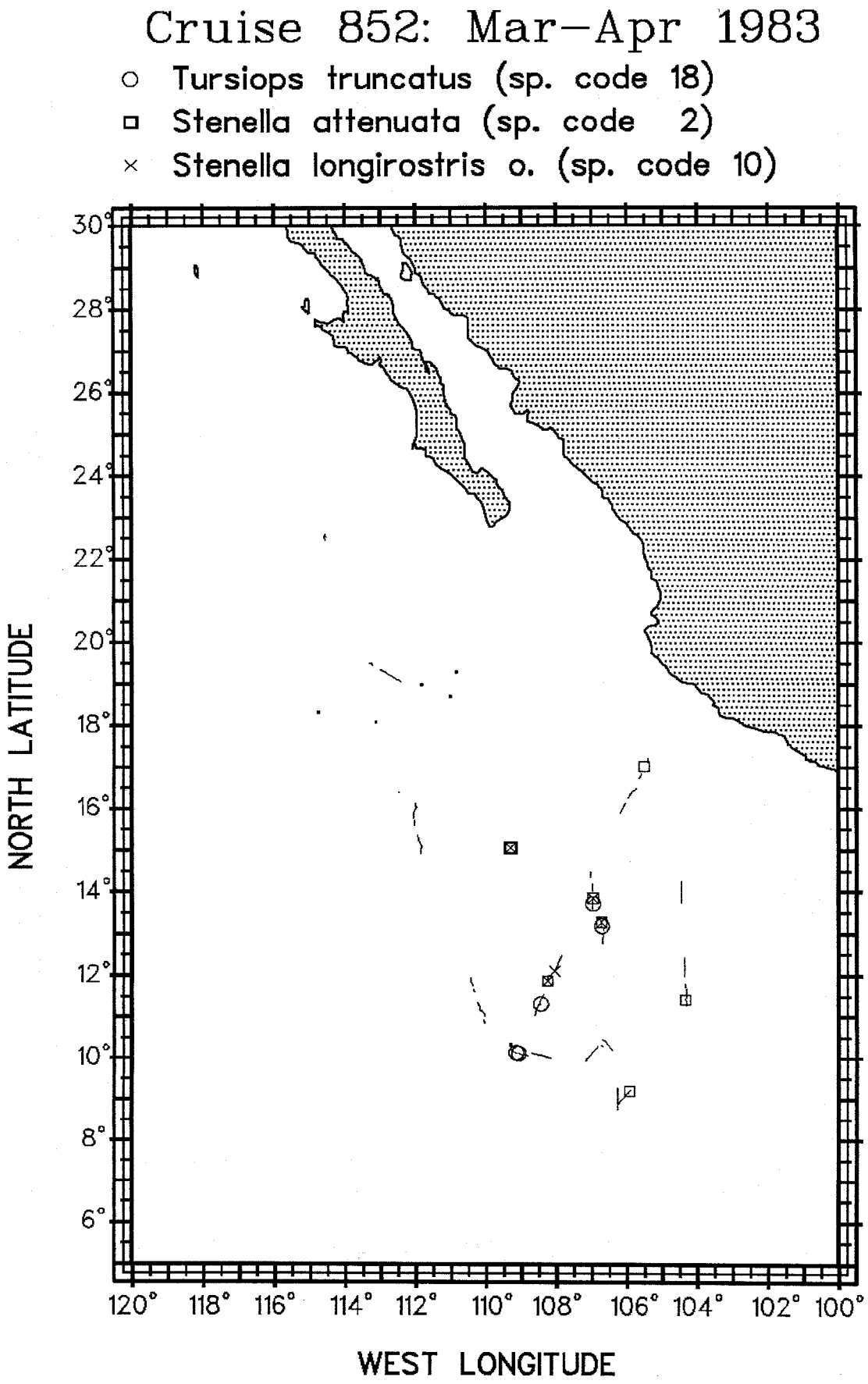

Cruise 852: Mar–Apr 1983
Tursiops truncatus (sp. code 18)
Stenella attenuata (sp. code 2)
Stenella longirostris o. (sp. code 10)
30°
28°
26°
24°
22°
20°
18°
16°
14°
12°
10°
8°
6°
NORTH LATITUDE
120° 118° 116° 114° 112° 110° 108° 106° 104° 102° 100°
WEST LONGITUDE

Figure 86.

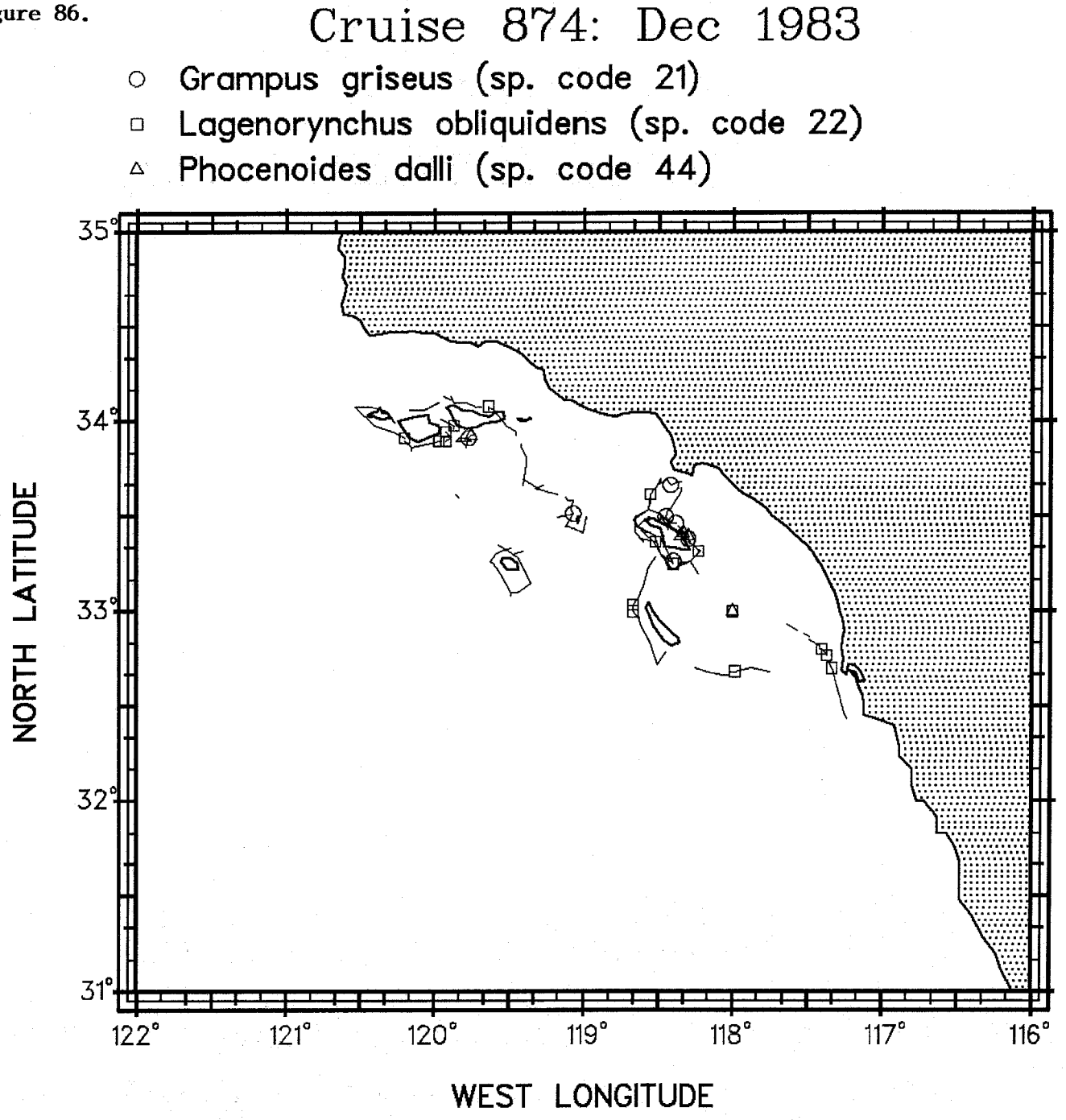

Cruise 874: Dec 1983
Grampus griseus (sp. code 21)
Lagenorynchus obliquidens (sp. code 22)
Phocenoides dalli (sp. code 44)
35°
34°
33°
32°
31°
NORTH LATITUDE
122°
121°
120°
119°
118°
117°
116°
WEST LONGITUDE

Figure 87.

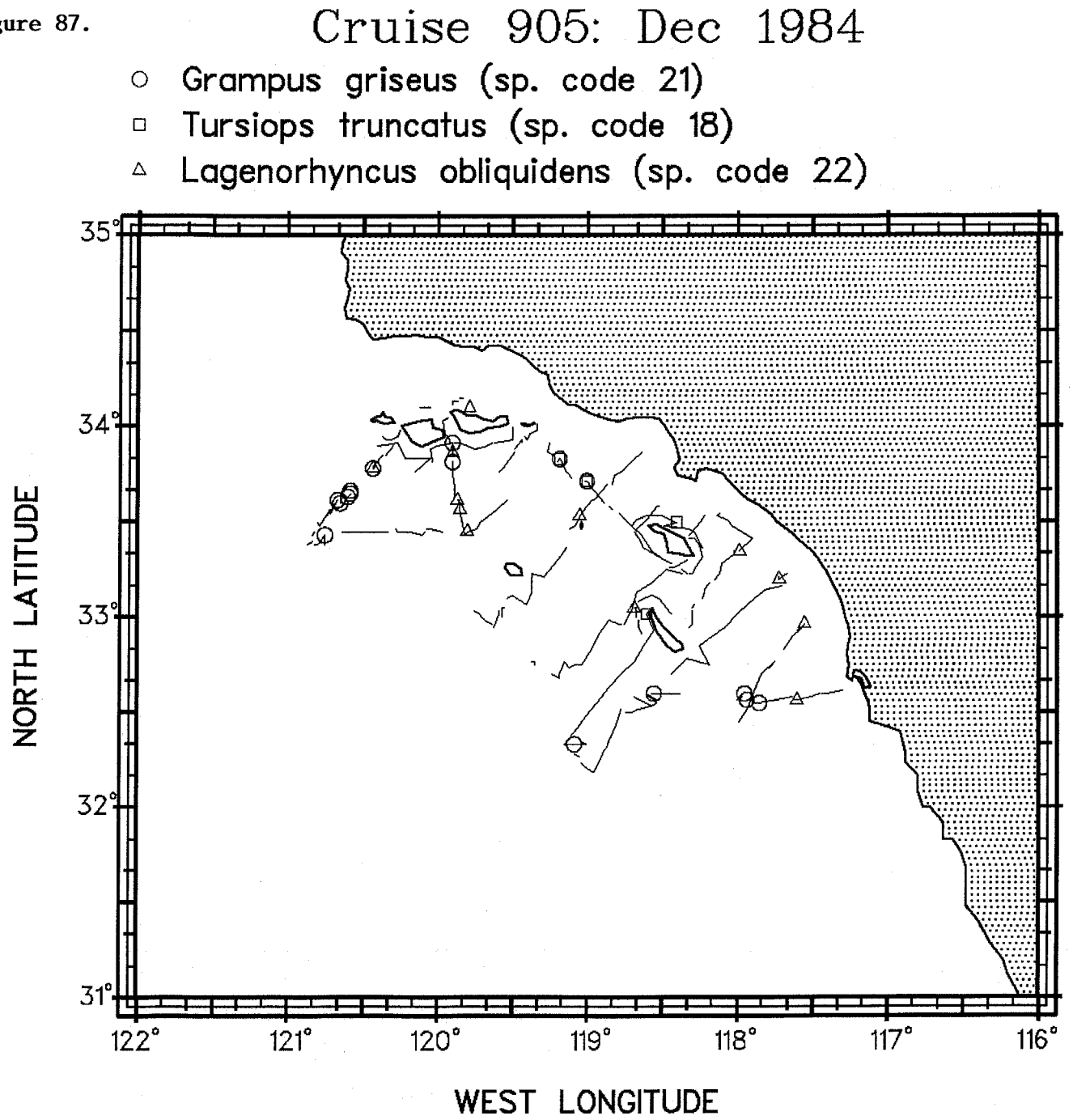

Cruise 905: Dec 1984
Grampus griseus (sp. code 21)
Tursiops truncatus (sp. code 18)
Lagenorhyncus obliquidens (sp. code 22)
35°
34°
33°
32°
31°
NORTH LATITUDE
122°
121°
120°
119°
118°
117°
116°
WEST LONGITUDE

Figure 88.

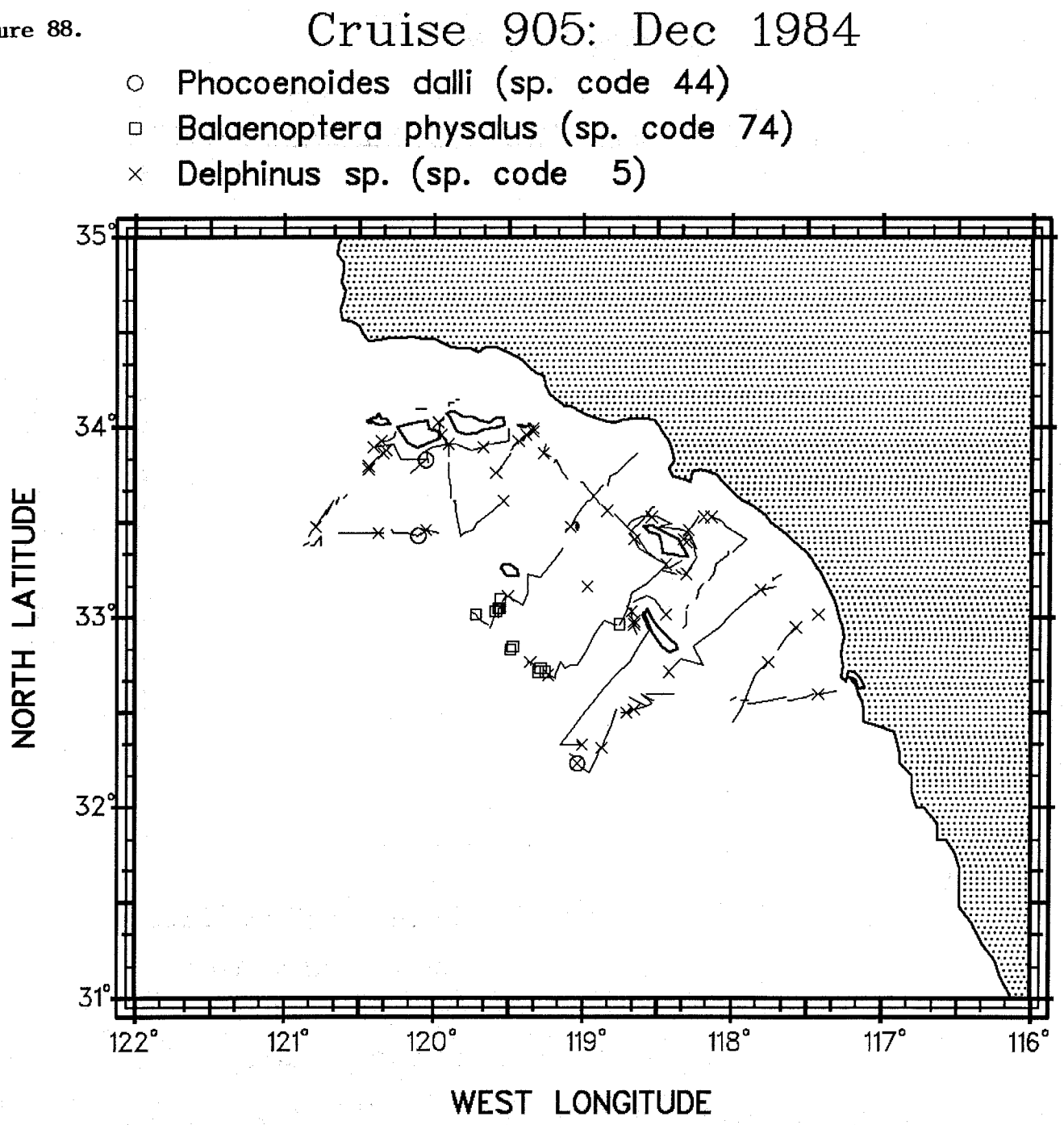
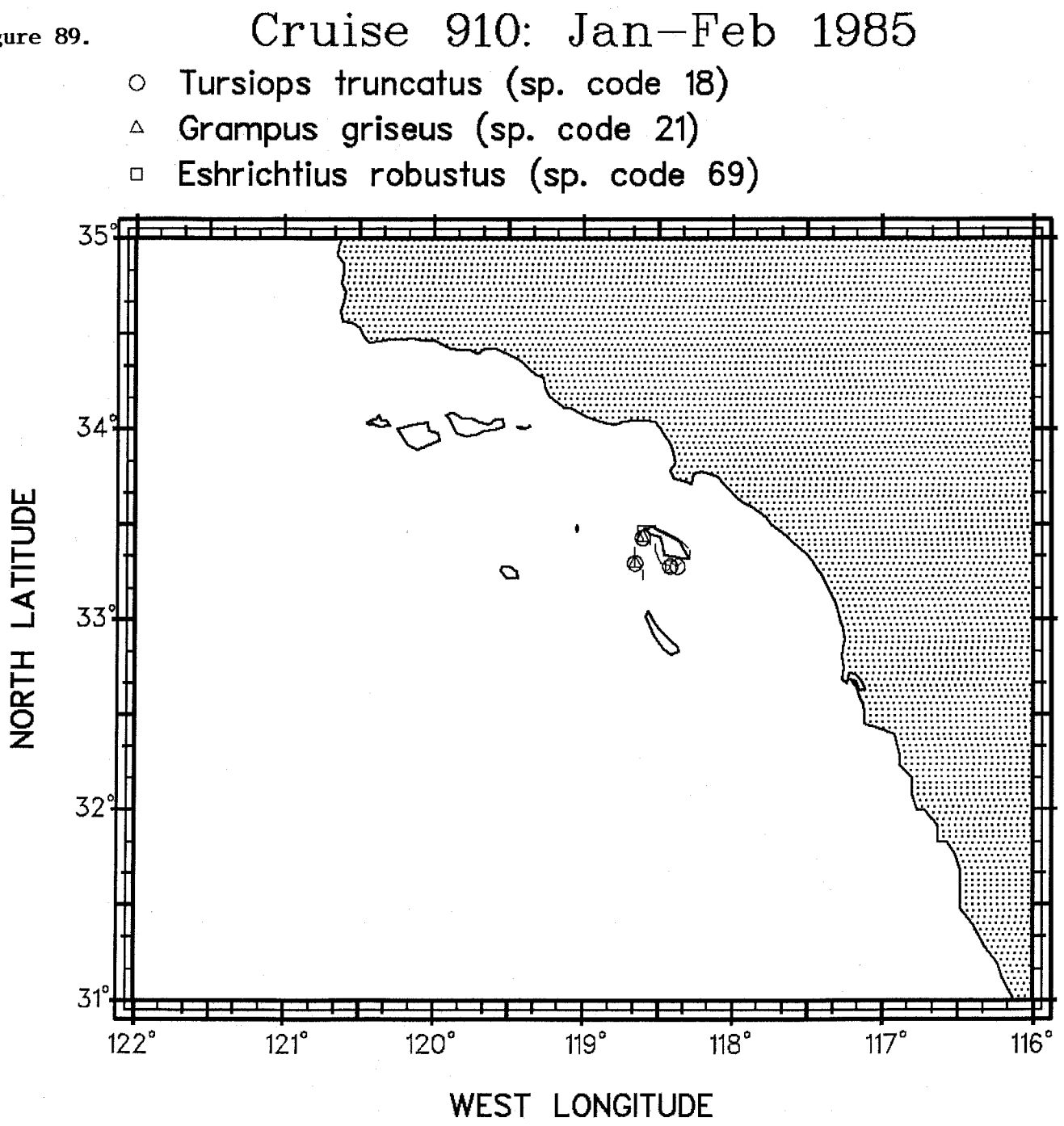

Cruise 905: Dec 1984
Phocoenoides dalli (sp. code 44)
Balaenoptera physalus (sp. code 74)
Delphinus sp. (sp. code 5)
35°
34°
33°
32°
31°
NORTH LATITUDE
122°
121°
120°
119°
118°
117°
116°
WEST LONGITUDE

Figure 89.


Cruise 910: Jan–Feb 1985
Tursiops truncatus (sp. code 18)
Grampus griseus (sp. code 21)
Eshrichtius robustus (sp. code 69)
35°
34°
33°
32°
31°
NORTH LATITUDE
122°
121°
120°
119°
118°
117°
116°
WEST LONGITUDE

APPENDIX 1

Prior to '82

Format of MEyrDB
standardized format
1 of 2

RECORD NAME	FROM		TO	WIDTH
MEyrDB	1	-	59	59

ELEMENT NAME	FROM	TO	WIDTH
CRUISE	1	4	4
DATE-	5	10	6
YEAR	5	6	2
MONTH	7	8	2
DAY	9	10	2
SERIES	11	12	2
SURF_TEMP_END	13	15	3
REPEAT_OCCURRENCES	16	17	2
LEG	18	19	2
TIME_START_LEG-	20	23	4
HR_START_LEG	20	21	2
MIN_START_LEG	22	23	2
SURF_TEMP_START	24	26	3
BEAUFORT_START	27	27	1
HORIZ_SUN	28	29	2
VERT_SUN	30	31	2
FOG_OR_RAIN	32	32	1
HELICOPTER_UP	33	33	1
TIME_END_LEG-	34	37	4
HR_END_LEG	34	35	2
MIN_END_LEG	36	37	2
COURSE	38	40	3
SPEED	41	43	3
POSITION-	44	54	11
LATITUDE-	44	47	4
LATD	44	45	2
LATM	46	47	2
N_OR_S	48	48	1
LONGITUDE-	49	53	5
LONGD	49	51	3
LONGM	52	53	2
E_OR_W	54	54	1
SIGHTINGS	55	55	1
LEG_END_CODE	56	56	1
SET	57	59	3

THE FOLLOWING DATABASE ELEMENTS REPEAT UP TO 60 TIMES, WITH MAXIMUM RECORD SIZE OF 2537 BYTES. THE NUMBER OF REPEAT GROUPS, EQUIVALENT TO THE NUMBER OF LEGS, FOR A UNIQUE RECORD IS INDICATED BY THE ELEMENT 'REPEAT_OCCURRENCES'. (REFERENCE POSITION 16, SIZE 2)

ELEMENT NAME	WIDTH
LEG	2
TIME_START_LEG	4
SURF_TEMP_START	3
BEAUFORT_START	1
HORIZ_SUN	2
VERT_SUN	2
FOG_OR_RAIN	1
HELICOPTER_UP	1
TIME_END_LEG-	4
COURSE	3
SPEED	3
POSITION-	11
SIGHTINGS	1
LEG_END_CODE	1
SET	3
	--
	42

1982-85

Format of REyrDB version 1

1 of 2

DATABASE NAME	FROM		TO	WIDTH	
RE(82-)DB	1	-	66	66	
ELEMENT NAME	**FROM**	**-**	**TO**	**WIDTH**	**YEARS**
CRUZ-DATE-SERIES -	1		12	12	82-
- CRUISE	1		4	4	
- DATE -	5		10	6	
- YEAR	5		6	2	
- MONTH	7		8	2	
- DAY	9		10	2	
- SERIES	11		12	2	
REPEAT-OCCURRENCES	13		14	2	82-
LEG	15		16	2	82-
TIME-START-LEG -	17		20	4	82-
- HR-START-LEG	17		18	2	
- MIN-START-LEG	19		20	2	
SURF-TEMP-START	21		23	3	82-
BEAUFORT-START	24		24	1	82-
FOG-OR-RAIN	25		25	1	82-
HORIZ-SUN	26		27	2	82-
VERT-SUN	28		29	2	82-
WIND-DIR	30		32	3	88-
SWELL-DIR	33		35	3	88-
SWELL-HT	36		37	2	88-
TIME-END-LEG -	38		41	4	82-
- HR-END-LEG	38		39	2	
- MIN-END-LEG	40		41	2	
COURSE	42		44	3	82-
SPEED	45		47	3	82-
POSITION -	48		58	11	82-
- LATITUDE -	48		51	4	
- LATD	48		49	2	
- LATM	50		51	2	
- N-OR-S	52		52	1	
- LONGITUDE -	53		57	5	
- LONGD	53		55	3	
- LONGM	56		57	2	
- E-OR-W	58		58	1	
LEFT-BINO	59		60	2	82-
RIGHT-BINO	61		62	2	82-
REC	63		64	2	82-
SIGHTINGS	65		65	1	88-
LEG-END-CODE	66		66	1	82-

THE FOLLOWING GROUP OF ELEMENTS REPEAT UP TO 60 TIMES :
(TOTAL # OF REPEAT GROUPS = # OF 'REPEAT OCCURRANCES')
(REFERENCE ELEMENT AT POSITION 13, SIZE 2.)

ELEMENT NAME	WIDTH	YEARS
LEG	2	82-
TIME-START-LEG -	4	82-
- HR-START-LEG	2	
- MIN-START-LEG	2	
SURF-TEMP-START	3	82-
BEAUFORT-START	1	82-
FOG-OR-RAIN	1	82-
HORIZ-SUN	2	82-
VERT-SUN	2	82-
WIND-DIR	3	88-
SWELL-DIR	3	88-
SWELL-HT	2	88-
TIME-END-LEG -	4	82-
- HR-END-LEG	2	
- MIN-END-LEG	2	
COURSE	3	82-
SPEED	3	82-
POSITION -	11	82-
- LATITUDE -	4	
- LATD	2	
- LATM	2	
- N-OR-S	1	
- LONGITUDE -	5	
- LONGD	3	
- LONGM	2	
- E-OR-W	1	
LEFT-BINO	2	82-
RIGHT-BINO	2	82-
REC	2	82-
SIGHTINGS	1	88-
LEG-END-CODE	1	82-

Prior to '82

---------- Format of MSyrDB ----------

---------- 1 of 2 -

RECORD NAME	FROM		TO	WIDTH
MSyrDB.DAT	**1**	**-**	**140**	**140**

ELEMENT NAME	FROM		TO	WIDTH
CRUZ_DATE_SIGHT -	**1**	**-**	**12**	**12**
- CRUISE	1	-	4	4
- DATE -	5	-	10	6
- YEAR	5	-	6	2
- MONTH	7	-	8	2
- DAY	9	-	10	2
SIGHT	**11**	**-**	**12**	**2**
SERIES	**13**	**-**	**14**	**2**
LEG	**15**	**-**	**16**	**2**
FILLER	**17**	**-**	**18**	**2**
TIME_OF_SIGHTING -	**19**	**-**	**22**	**4**
- HR_OF_SIGHTING	19	-	20	2
- MIN_OF_SIGHTING	21	-	22	2
SIGHTING_Q	**23**	**-**	**23**	**1**
INITIAL_SIGHTING	**24**	**-**	**24**	**1**
BEARING	**25**	**-**	**27**	**3**
DISTANCE	**28**	**-**	**30**	**3**
BEAUFORT	**31**	**-**	**31**	**1**
SURF_TEMP	**32**	**-**	**34**	**3**
POSITION -	**35**	**-**	**45**	**11**
- LATITUDE -	35	-	38	4
- LATD	35	-	36	2
- LATM	37	-	38	2
- N_OR_S	39	-	39	1
- LONGITUDE -	40	-	44	5
- LONGD	40	-	42	3
- LONGM	43	-	44	2
- E_OR_W	45	-	45	1
SOURCE_OF_POSIT	**46**	**-**	**46**	**1**
TIME_MM_SIGHTED -	**47**	**-**	**50**	**4**
- HR_MM_SIGHTED	47	-	48	2
- MIN_MM_SIGHTED	49	-	50	2
SET	**51**	**-**	**53**	**3**
BIRDS	**54**	**-**	**54**	**1**
CREW_MN_EST_SCHL	**55**	**-**	**58**	**4**
CREW_HI_EST_SCHL	**59**	**-**	**62**	**4**
CREW_LO_EST_SCHL	**63**	**-**	**66**	**4**
OBS_BST_EST_SCHL	**67**	**-**	**70**	**4**
OBS_HI_EST_SCHL	**71**	**-**	**74**	**4**
OBS_LO_EST_SCHL	**75**	**-**	**78**	**4**
FILLER	**79**	**-**	**83**	**5**
CREW_SP1_PERCENT	**84**	**-**	**86**	**3**
CREW_SP1_CODE	**87**	**-**	**88**	**2**

Prior to '82

---------- Format of MSyrDB ----------

---------- 2 of 2 -

ELEMENT NAME	FROM		TO	WIDTH
OBS_SP1_PERCENT	89	-	91	3
OBS_SP1_CODE	92	-	93	2
CREW_SP2_PERCENT	94	-	96	3
CREW_SP2_CODE	97	-	98	2
OBS_SP2_PERCENT	99	-	101	3
OBS_SP2_CODE	102	-	103	2
CREW_SP3_PERCENT	104	-	106	3
CREW_SP3_CODE	107	-	108	2
OBS_SP3_PERCENT	109	-	111	3
OBS_SP3_CODE	112	-	113	2
CREW_SP4_PERCENT	114	-	116	3
CREW_SP4_CODE	117	-	118	2
OBS_SP4_PERCENT	119	-	121	3
OBS_SP4_CODE	122	-	123	2
GBU	124	-	124	1
TOTAL_TIME	125	-	128	4
ENVIR_COND	129	-	129	1
CLOSEST_DISTANCE	130	-	131	2
TIME_CLOSE	132	-	135	4
TAGS	136	-	136	1
OBS_METHOD	137	-	137	1
DIRECTION	138	-	140	3

---------- Format of RSyrDB ----------
Reformat - 1989
---------- 1 of 3 -

DATABASE NAME	FROM	-	TO	WIDTH
RS(82-)DB	1	-	336	336

ELEMENT NAME	FROM	-	TO	WIDTH	YEARS
CRUISE	1	-	4	4	82-
YEAR	5	-	6	2	82-
MONTH	7	-	8	2	82-
DAY	9	-	10	2	82-
SIGHT	11	-	12	2	82-
SERIES	13	-	14	2	82-
LEG	15	-	16	2	82-
FILLER	17	-	18	2	82-
TIME-OF-SIGHTING	19	-	22	4	82-
SIGHTING-Q	23	-	23	1	82-
INITIAL-SIGHTING	24	-	24	1	82-
BEARING	25	-	27	3	82-
DISTANCE	28	-	30	3	82-
BEAUFORT	31	-	31	1	82-
SURF-TEMP	32	-	34	3	82-
HORIZ-SUN	35	-	36	2	82-
VERT-SUN	37	-	38	2	82-
LATITUDE	39	-	42	4	82-
N-OR-S	43	-	43	1	82-
LONGITUDE	44	-	48	5	82-
E-OR-W	49	-	49	1	82-
SOURCE-OF-POSIT	50	-	50	1	82-
TIME-MM-SIGHTED	51	-	54	4	82-
BIRDS	55	-	55	1	82-
LEFT-BINO	56	-	57	2	82-
RIGHT-BINO	58	-	59	2	82-
REC	60	-	61	2	82-
DETEC-BY	62	-	63	2	82-
OBS-CODE-1	64	-	65	2	82-
OBS1-BST-EST-SCHL	66	-	69	4	82-
OBS1-HI-EST-SCHL	70	-	73	4	82-
OBS1-LO-EST-SCHL	74	-	77	4	82-
FILLER	78	-	82	5	
OBS1-SP1-PERCENT	83	-	85	3	82-
OBS1-SP1-CODE	86	-	87	2	82-
OBS1-SP2-PERCENT	88	-	90	3	82-
OBS1-SP2-CODE	91	-	92	2	82-
OBS1-SP3-PERCENT	93	-	95	3	82-
OBS1-SP3-CODE	96	-	97	2	82-
OBS1-SP4-PERCENT	98	-	100	3	82-

Format of RSyrDB
Reformat - 1989
2 of 3

ELEMENT NAME	FROM	-	TO	WIDTH	YEARS
OBS1-SP4-CODE	101	-	102	2	82-
OBS-CODE-2	103	-	104	2	82-
OBS2-BST-EST-SCHL	105	-	108	4	82-
OBS2-HI-EST-SCHL	109	-	112	4	82-
OBS2-LO-EST-SCHL	113	-	116	4	82-
OBS2-SP1-PERCENT	117	-	119	3	82-
OBS2-SP1-CODE	120	-	121	2	82-
OBS2-SP2-PERCENT	122	-	124	3	82-
OBS2-SP2-CODE	125	-	126	2	82-
OBS2-SP3-PERCENT	127	-	129	3	82-
OBS2-SP3-CODE	130	-	131	2	82-
OBS2-SP4-PERCENT	132	-	134	3	82-
OBS2-SP4-CODE	135	-	136	2	82-
OBS-CODE-3	137	-	138	2	82-
OBS3-BST-EST-SCHL	139	-	142	4	82-
FILLER	143	-	146	4	
OBS3-HI-EST-SCHL	147	-	150	4	82-
OBS3-LO-EST-SCHL	151	-	154	4	82-
OBS3-SP1-PERCENT	155	-	157	3	82-
OBS3-SP1-CODE	158	-	159	2	82-
OBS3-SP2-PERCENT	160	-	162	3	82-
OBS3-SP2-CODE	163	-	164	2	82-
OBS3-SP3-PERCENT	165	-	167	3	82-
OBS3-SP3-CODE	168	-	169	2	82-
OBS3-SP4-PERCENT	170	-	172	3	82-
OBS3-SP4-CODE	173	-	174	2	82-
OBS-CODE-4	175	-	176	2	82-
OBS4-BST-EST-SCHL	177	-	180	4	82-
OBS4-HI-EST-SCHL	181	-	184	4	82-
OBS4-LO-EST-SCHL	185	-	188	4	82-
OBS4-SP1-PERCENT	189	-	191	3	82-
OBS4-SP1-CODE	192	-	193	2	82-
OBS4-SP2-PERCENT	194	-	196	3	82-
OBS4-SP2-CODE	197	-	198	2	82-
OBS4-SP3-PERCENT	199	-	201	3	82-
OBS4-SP3-CODE	202	-	203	2	82-
OBS4-SP4-PERCENT	204	-	206	3	82-
FILLER	207	-	210	4	
OBS4-SP4-CODE	211	-	212	2	82-
OBS-CODE-5	213	-	214	2	82-
OBS5-BST-EST-SCHL	215	-	218	4	82-
OBS5-HI-EST-SCHL	219	-	222	4	82-
OBS5-LO-EST-SCHL	223	-	226	4	82-
OBS5-SP1-PERCENT	227	-	229	3	82-
OBS5-SP1-CODE	230	-	231	2	82-

Format of RSyrDB
Reformat - 1989
3 of 3

ELEMENT NAME	FROM	-	TO	WIDTH	YEARS	
OBS5-SP2-PERCENT	232	-	234	3	82-	
OBS5-SP2-CODE	235	-	236	2	82-	
OBS5-SP3-PERCENT	237	-	239	3	82-	
OBS5-SP3-CODE	240	-	241	2	82-	
OBS5-SP4-PERCENT	242	-	244	3	82-	
OBS5-SP4-CODE	245	-	246	2	82-	
OBS-CODE-6	247	-	248	2	82-	
OBS6-BST-EST-SCHL	249	-	252	4	82-	
OBS6-HI-EST-SCHL	253	-	256	4	82-	
OBS6-LO-EST-SCHL	257	-	260	4	82-	
OBS6-SP1-PERCENT	261	-	263	3	82-	
OBS6-SP1-CODE	264	-	265	2	82-	
OBS6-SP2-PERCENT	266	-	268	3	82-	
OBS6-SP2-CODE	269	-	270	2	82-	
FILLER	271	-	274	4		
OBS6-SP3-PERCENT	275	-	277	3	82-	
OBS6-SP3-CODE	278	-	279	2	82-	
OBS6-SP4-PERCENT	280	-	282	3	82-	
OBS6-SP4-CODE	283	-	284	2	82-	
RC1	285	-	285	1	82-	
RC2	286	-	286	1	82-	
RC3	287	-	287	1	82-	
RC4	288	-	288	1	82-	
RC5	289	-	289	1	82-	
RC6	290	-	290	1	82-	
CON-BST-EST-SCHL	291	-	294	4	82-83	*
CON-HI-EST-SCHL	295	-	298	4	82-83	*
CON-LO-EST-SCHL	299	-	302	4	88-83	*
CON-SP1-PERCENT	303	-	305	3	82-83	*
CON-SP1-CODE	306	-	307	2	82-83	*
CON-SP2-PERCENT	308	-	310	3	82-83	*
CON-SP2-CODE	311	-	312	2	82-83	*
CON-SP3-PERCENT	313	-	315	3	82-83	*
CON-SP3-CODE	316	-	317	2	82-83	*
CON-SP4-PERCENT	318	-	320	3	82-83	*
CON-SP4-CODE	321	-	322	2	82-83	*
CRC	323	-	323	1	82-83	*
TOTAL-TIME	324	-	327	4		#
ENVIR-COND	328	-	328	1		#
CLOSEST-DISTANCE	329	-	330	2		#
TIME-CLOSE	331	-	334	4		#
TAGS	335	-	335	1		#
OBS-METHOD	336	-	336	1		#

LEGEND : * - Research ETP Cruises 0801, 0843, and 0852 only.
- Non-coded, continuation sheet notes only, 1982 -

```
*****************************************************************
*                                                               *
* This program takes SWFSC Marine Mammal Survey data from cruises  *
* made from 1982-1990 and converts it into the format used      *
* presently (1992). The sighting and effort files which were    *
* recorded seperately in the old format are combined into a single  *
* file. The input sighting file is in the "R" format. The "R" format*
* effort file must be run through the effrec and readdpos programs  *
* before it is used as an input file for this program.          *
*                                                               *
*       Written by Timothy Lee                                  *
*       July 7, 1992                                            *
*****************************************************************
*                                                               *
* The following changes/corrections were made to TIM's original     *
* program:                                                      *
*   1)  The subroutine REDUCE to eliminate trailing blanks from the *
*        output files did not work and was replaced by another    *
*        method                                                   *
*   2)  The subroutines V, W, N, and P were changed so as to only   *
*        output a new data line IF conditions had changed, thereby  *
*        reducing the size of the output file.                    *
*   3)  The program was modified to correctly deal with sightings   *
*        with 4 species present.                                  *
*   4)  If an off-effort sighting is made while on-effort, the      *
*        sighting code is changed to 6 to indicate "other".  This   *
*        case is flagged by the absence of series and leg codes   *
*   5)  Added a decimal point to water temperature in subroutine V  *
*        as was already done in subroutine ANCILLARY              *
*                                                               *
*        Modified by Jay Barlow, 4 Dec 1992                       *
*****************************************************************
*                                                               *
* The program starts by converting the old sighting data into the new*
* format. It then converts the old effort data into the new format. *
* Once both files have been converted, the two are combined into one*
* file that is sorted in date time order.                       *
*****************************************************************
*                                                               *
* There is an error check at the end of the main                *
* program. The error check calculates the distance between two      *
* recorded postions, change in time, then calculates velocity.     *
* If the velocity of the ship is greater than twenty knots, an error*
* is flagged.                                                   *
*****************************************************************
* The program was changed again so that the New_eff.out and         *
* New_sight.out created previously are now 'scratch' files and exist*
* only for the duration of the program.                         *
*                                                               *
*     Tim Lee                                                   *
*   April 1993                                                  *
*****************************************************************
*    Variable ID Block                                          *
*                                                               *
* Variable      Description                                     *
*                                                               *
* PSS           sight string read in from old sighting file     *
* PES           effort string read in from old effort file      *
* NEW           reformatted string                              *
```

```
* EFFORT         string read from reformatted effort file              *
* SIGHT          string read from reformatted sight file               *
* EFFDT          date and time on the reformatted effort string        *
* SIGHTDT        date and time on the reformatted sight string         *
* BLANKSTRING    an empty string used for formatting purposes          *
* B$             an empty string used for formatting                   *
* SPPCODE        the species code of the marine mammals sighted        *
* IERR           used with the iostat function. if there is an error  *
*                in reading the data, the IERR gets a value other thn*
*                zero.                                                 *
* DATE           the date on the string in the new format              *
* P$             position shift for the effort file. each leg of a     *
*                series is recorded on the same string, so info from  *
*                leg 1 is in collumns 1-66,leg 2 66-119 etc.           *
**********************************************************************

        PROGRAM REFORMAT POST 82
        CHARACTER*2 SPPCODE(6,4)
        CHARACTER*6 DATE(2)
        CHARACTER*400 PSS
        CHARACTER*80 NEW,new1,new2,EFFORT,SIGHT,OLDN,OLDP,OLDW,OLDV
        character cd1*1,cd2*1,CODE*1
        CHARACTER*10  EFFDT,SIGHTDT
        CHARACTER*30 OLD_SIGHT,OLD_EFF,NEW_COMB,NEW_ERR
        CHARACTER BLANKSTRING*80,B$*2,PES*3134,LATHEM*1,LONGHEM*1
        INTEGER SERNUM,RO,k,DGLAT,DGLONG,DATE1,DATE2,HR1,HR2
        LOGICAL NEWEFF
        COMMON NEW,BLANKSTRING,B$,PSS,SPPCODE
        WRITE(BLANKSTRING,17)

        B$=' '
*module for opening output files

        OPEN(UNIT=10,FILE='RDATA.INP',FORM='FORMATTED',STATUS='OLD')
        PRINT*,'OPEN'
2       READ (10,'(A30)',END=805) OLD_SIGHT
        PRINT*,'OLDSIGHT READ '//OLD_SIGHT
        READ (10,'(A30)',END=805) OLD_EFF
        PRINT*,'OLDEFF READ '//OLD_EFF
        READ (10,'(A30)',END=805) NEW_COMB
        PRINT*,'NEWCOMB READ '//NEW_COMB
        READ (10,'(A30)',END=805) NEW_ERR
        PRINT*,'NEWERR READ '//NEW_ERR

        OPEN(UNIT=1,FILE=OLD_SIGHT,STATUS='OLD')
        OPEN(UNIT=2,FILE=OLD_EFF,STATUS='OLD')
        OPEN(UNIT=11, FORM='FORMATTED',
     *       STATUS='SCRATCH')
        OPEN(UNIT=12, FORM='FORMATTED',
     *       STATUS='SCRATCH')
        OPEN(UNIT=13,FILE=NEW_COMB, FORM='FORMATTED', STATUS='UNKNOWN')
        OPEN(UNIT=14,FILE=NEW_ERR, FORM='FORMATTED', STATUS='UNKNOWN')
        PRINT*,'FILES OPENED'

* module for opening sight data and testing the data read in

5        READ(1,15,IOSTAT=IERR1,END=50) PSS
        IF (IERR1.NE.0) PRINT*,'ERROR IN READING THE DATA'
**********************************************************************
13      FORMAT(2(A7,F5.2),2(A7,I8))
```

```
14       FORMAT(2(A7,F7.2))
15       FORMAT(A)
16       FORMAT(I2)
17       FORMAT(80(' '))
18       FORMAT(A25,I5,A15)
19       FORMAT(A4,F10.2)
20       FORMAT (A)
*************************************************************************
*reading in the species code
            SPPCODE(1,1)=PSS(86:87)
            SPPCODE(1,2)=PSS(91:92)
            SPPCODE(1,3)=PSS(96:97)
            SPPCODE(1,4)=PSS(101:102)
            SPPCODE(2,1)=PSS(120:121)
            SPPCODE(2,2)=PSS(125:126)
            SPPCODE(2,3)=PSS(130:131)
            SPPCODE(2,4)=PSS(135:136)
            SPPCODE(3,1)=PSS(158:159)
            SPPCODE(3,2)=PSS(163:164)
            SPPCODE(3,3)=PSS(168:169)
            SPPCODE(3,4)=PSS(173:174)
            SPPCODE(4,1)=PSS(192:193)
            SPPCODE(4,2)=PSS(197:198)
            SPPCODE(4,3)=PSS(202:203)
            SPPCODE(4,4)=PSS(211:212)
            SPPCODE(5,1)=PSS(230:231)
            SPPCODE(5,2)=PSS(235:236)
            SPPCODE(5,3)=PSS(240:241)
            SPPCODE(5,4)=PSS(245:246)
            SPPCODE(6,1)=PSS(264:265)
            SPPCODE(6,2)=PSS(269:270)
            SPPCODE(6,3)=PSS(275:276)
            SPPCODE(6,3)=PSS(278:279)
            SPPCODE(6,4)=PSS(283:284)
         DO 12 I=1,6
           DO 10 J=1,4
            IF ((SPPCODE(I,J)(1:1).EQ.' ').AND.(SPPCODE(I,J)(2:2).NE.' '))
     *    SPPCODE(I,J)(1:1)='0'
10          CONTINUE
12       CONTINUE

*reformatting the sight string info into new format
           CALL POSITION
C           PRINT*,NEW
C           CALL LENGTH(NEW,LENTH)
C           WRITE(UNIT=11,FMT=15,IOSTAT=IERR10)NEW(1:LENTH)
C          IF (IERR10.NE.0) PRINT*,'ERROR IN WRITING TO SIGHT SCRATCH'

           CALL SIGHTING
*            PRINT*, NEW
            CALL LENGTH(NEW,LENTH)
            WRITE(UNIT=11,FMT=15,IOSTAT=IERR11)NEW(1:LENTH)
           IF (IERR11.NE.0) PRINT*,'ERROR IN WRITING TO SIGHT SCRATCH'

           CALL ANCILLARY
*            PRINT*,NEW
            CALL LENGTH(NEW,LENTH)
            WRITE(UNIT=11,FMT=15,IOSTAT=IERR12)NEW(1:LENTH)
            IF (IERR12.NE.0) PRINT*,'ERROR IN WRITING TO SIGHT SCRATCH'
*
```

```
*Checking for obs ID code. There can be up to six observers in the
*sighting data. If code is recorded in the nth field(ie its not blank) then
*there was an nth observer. Each obsever gets their own line in the new forma
*therefore the numbers one through six
           IF (PSS(64:65).NE.'  ') THEN
                I=1
                CALL NUMBER(I)
*                PRINT*,NEW
                CALL LENGTH(NEW,LENTH)
                WRITE(UNIT=11,FMT=15,IOSTAT=IERR13)NEW(1:LENTH)

           ENDIF

           IF (PSS(103:104).NE.'  ') THEN
                I=2
                CALL NUMBER(I)
*                PRINT*,NEW
                CALL LENGTH(NEW,LENTH)
                WRITE(UNIT=11,FMT=15,IOSTAT=IERR13)NEW(1:LENTH)
           ENDIF

           IF (PSS(137:138).NE.'  ') THEN
                I=3
                CALL NUMBER(I)
*                PRINT*,NEW
                CALL LENGTH(NEW,LENTH)
                WRITE(UNIT=11,FMT=15,IOSTAT=IERR13)NEW(1:LENTH)
           ENDIF

           IF (PSS(175:176).NE.'  ') THEN
                I=4
                CALL NUMBER(I)
*                PRINT*,NEW
                CALL LENGTH(NEW,LENTH)
                WRITE(UNIT=11,FMT=15,IOSTAT=IERR13)NEW(1:LENTH)
           ENDIF

           IF (PSS(213:214).NE.'  ') THEN
                I=5
                CALL NUMBER(I)
*                PRINT*,NEW
                CALL LENGTH(NEW,LENTH)
                WRITE(UNIT=11,FMT=15,IOSTAT=IERR13)NEW(1:LENTH)
           ENDIF

           IF (PSS(247:248).NE.'  ') THEN
                I=6
                CALL NUMBER(I)
*                PRINT*,NEW
                CALL LENGTH(NEW,LENTH)
                WRITE(UNIT=11,FMT=15,IOSTAT=IERR13)NEW(1:LENTH)
           ENDIF

         IF (IERR13.NE.0) PRINT*,'ERROR IN WRITING TO SIGHT SCRATCH'

        GOTO 5
50        PRINT*,'END OF SIGHTING FILE REACHED'

**********************************************************************
**********************************************************************
```

```
* opening the effort file
51      CONTINUE
*reading the record onto a string
        READ(2,15,IOSTAT=IERR2,END=60) PES
        IF (IERR2.NE.0) PRINT*,'ERROR IN READING OLD EFFORT FILE'
*reading the series number and number of repeat occurences (legs).
        READ(PES(11:12),16) SERNUM
        READ(PES(15:16),16) LEG
        READ(PES(50:53),'(i4)') IPOS1
        READ(PES(55:59),'(i5)') IPOS2
         POS=IPOS1+IPOS2

         IF(PES(50:53).NE.'    ') THEN
          IF(PES(50:50).EQ.' ') PES(50:50)='0'
          IF(PES(51:51).EQ.' ') PES(51:51)='0'
          IF(PES(52:52).EQ.' ') PES(52:52)='0'
         ENDIF

         IF(PES(55:59).NE.'     ') THEN
          IF(PES(55:55).EQ.' ') PES(55:55)='0'
          IF(PES(56:56).EQ.' ') PES(56:56)='0'
          IF(PES(57:57).EQ.' ') PES(57:57)='0'
          IF(PES(58:58).EQ.' ') PES(58:58)='0'
         ENDIF

         IF ((SERNUM.EQ.1).AND.(LEG.EQ.1))THEN
          NEWEFF=.TRUE.
          CALL B(PES,POS)
*          PRINT*,NEW
          CALL LENGTH(NEW,LENTH)
          WRITE(UNIT=12,FMT=15,IOSTAT=IERR20)NEW(1:LENTH)

          CALL R(PES,POS)
*          PRINT*,NEW
          CALL LENGTH(NEW,LENTH)
          WRITE(UNIT=12,FMT=15,IOSTAT=IERR20)NEW(1:LENTH)

         ELSEIF((SERNUM.GT.1).AND.(LEG.EQ.1)) THEN
          NEWEFF=.TRUE.
          CALL R(PES,POS)
*          PRINT*,NEW
          CALL LENGTH(NEW,LENTH)
          WRITE(UNIT=12,FMT=15,IOSTAT=IERR20)NEW(1:LENTH)
         ENDIF

             NEW(1:80)=BLANKSTRING(1:80)
*time
             IF(PES(17:17).EQ.' ') PES(17:17)='0'
             NEW(6:12)=PES(17:20)//'  '//B$
*date
             NEW(13:19)=PES(7:10)//PES(5:6)
*position

          IF((POS.EQ.0).AND.(PES(100:100).NE.'1')) THEN

           IF(PES(69:72).NE.'    ') THEN
            IF(PES(69:69).EQ.' ') PES(69:69)='0'
            IF(PES(70:70).EQ.' ') PES(70:70)='0'
            IF(PES(71:71).EQ.' ') PES(71:71)='0'
```

```
          ENDIF

          IF(PES(74:78).NE.'      ') THEN
           IF(PES(74:74).EQ.' ') PES(74:74)='0'
           IF(PES(75:75).EQ.' ') PES(75:75)='0'
           IF(PES(76:76).EQ.' ') PES(76:76)='0'
           IF(PES(77:77).EQ.' ') PES(77:77)='0'
          ENDIF

           IF (PES(73:73).EQ.'1') THEN
                 LATHEM='N'
           ELSEIF (PES(73:73).EQ.'2') THEN
                 LATHEM='S'
           ELSE
                 LATHEM=' '
           ENDIF

          IF (PES(79:79).EQ.'1') THEN
                LONGHEM='E'
          ELSEIF (PES(79:79).EQ.'2') THEN
                LONGHEM='W'
          ELSE
                LONGHEM=' '
          ENDIF
            NEW(20:40)=LATHEM//PES(69:70)//':'//
*           PES(71:72)//'.   '//LONGHEM//PES(74:76)
*           //':'//PES(77:78)//'.  '

        ELSEIF(PES(90:90).EQ.'1') THEN
           NEW(20:40)=' '//'  '//':'//
*           '  '//'.   '//' '//'  '
*           //':'//'  '//'.  '

        ELSE

          IF (PES(54:54).EQ.'1') THEN
                LATHEM='N'
          ELSEIF (PES(54:54).EQ.'2') THEN
                LATHEM='S'
          ELSE
                LATHEM=' '
          ENDIF

          IF (PES(60:60).EQ.'1') THEN
                LONGHEM='E'
          ELSEIF (PES(60:60).EQ.'2') THEN
                LONGHEM='W'
          ELSE
                LONGHEM=' '
          ENDIF

            NEW(20:40)=LATHEM//PES(50:51)//':'//
*           PES(52:53)//'.   '//LONGHEM//PES(55:57)
*           //':'//PES(58:59)//'.  '
        ENDIF
              CALL P (PES,NEWEFF,OLDP)
              CALL LENGTH(NEW,LENTH)
              IF (LENTH .GT. 41) THEN
*                PRINT*,NEW(1:LENTH)
                 WRITE(UNIT=12,FMT=15,IOSTAT=IERR20)NEW(1:LENTH)
```

```
                ENDIF

              CALL V (PES,NEWEFF,OLDV)
                 CALL LENGTH(NEW,LENTH)
                 IF (LENTH .GT. 41) THEN
*                   PRINT*,NEW(1:LENTH)
                   WRITE(UNIT=12,FMT=15,IOSTAT=IERR20)NEW(1:LENTH)
                 ENDIF

              CALL N (PES,NEWEFF,OLDN)
                 CALL LENGTH(NEW,LENTH)
                 IF (LENTH .GT. 41) THEN
*                   PRINT*,NEW(1:LENTH)
                   WRITE(UNIT=12,FMT=15,IOSTAT=IERR20)NEW(1:LENTH)
                 ENDIF

              CALL W (PES,NEWEFF,OLDW)
                 CALL LENGTH(NEW,LENTH)
                 IF (LENTH .GT. 41) THEN
*                   PRINT*,NEW(1:LENTH)
                   WRITE(UNIT=12,FMT=15,IOSTAT=IERR20)NEW(1:LENTH)
                 ENDIF

              IF (PES(15:16).EQ.PES(13:14)) THEN
                  CALL E (PES)
*                 PRINT*,NEW
                 CALL LENGTH(NEW,LENTH)
                 WRITE(UNIT=12,FMT=15,IOSTAT=IERR20)NEW(1:LENTH)
                 ENDIF
        IF (IERR20.NE.0) PRINT*,'ERROR IN WRITING TO EFFORT SCRATCH'
        NEWEFF=.FALSE.
        GOTO 51

60      REWIND(11)
        REWIND(12)
        PRINT*,'END OF EFFORT FILE REACHED'

*****************************************************************
*
* opening the reformatted files and combining them into one new file
* that is sequenced in date time order.
*
* sorting the files into date time order
        READ(UNIT=11,FMT=15,IOSTAT=IERR3)SIGHT
        IF (IERR3.NE.0) PRINT*,'ERROR IN READING SIGHT SCRATCH'
        READ(UNIT=12,FMT=15,IOSTAT=IERR4)EFFORT
        IF (IERR4.NE.0) PRINT*,'ERROR IN READING NEW_EFF.OUT'
        DATE(1)='      '
        k=0
*reading in the datetime from the strings(yymmdd/hhmm)
100      EFFDT=EFFORT(17:18)//EFFORT(13:16)//EFFORT(6:9)
        SIGHTDT=SIGHT(17:18)//SIGHT(13:16)//SIGHT(6:9)
        CODE=SIGHT(4:4)

*comparing the datetime to determine the order
       IF ((EFFDT.LT.SIGHTDT).OR.
     *    ((EFFDT.EQ.SIGHTDT).AND.(EFFORT(4:4) .NE. 'E'))) THEN
           DATE(2)=EFFDT(1:6)
*reading in the date to determine the sequence number, at the beginning
*of each day the sequence number goes back to 1.
```

```
            IF (DATE(2).NE.DATE(1))  K=0
            K=K+1
*writing the sequence number onto the string
220         WRITE(EFFORT(1:3),'(I3)')K
*writing the string onto a new output file
          CALL LENGTH(EFFORT,LENTH)
          WRITE(UNIT=13,FMT=15,IOSTAT=IERR30) EFFORT(1:LENTH)
          IF(IERR30.NE.0) PRINT*,'ERROR IN WRITING TO'//NEW_COMB
*          PRINT*,EFFORT
          DATE(1)=DATE(2)
*reading in the next string
          READ(UNIT=12,FMT=15,IOSTAT=IERR5,END=710) EFFORT
          IF (IERR5.NE.0) PRINT*,'ERROR IN READING EFFORT SCRATCH'
          GOTO100
       ENDIF

       IF (SIGHTDT.LE.EFFDT) THEN
          DATE(2)=SIGHTDT(1:6)
*reading in the date to determine the sequence number, at the beginning
*of each day the sequence number goes back to 1.
            IF (DATE(2).NE.DATE(1))  K=0
            IF ((CODE.EQ.'1').OR.(CODE.EQ.'2').OR.(CODE.EQ.'3').OR.
     *  (CODE.EQ.'4').OR.(CODE.EQ.'5').OR.(CODE.EQ.'6')) GOTO 310
            K=K+1
          WRITE(SIGHT(1:3),'(I3)')K
310       CALL LENGTH(SIGHT,LENTH)
          WRITE(UNIT=13,FMT=15,IOSTAT=IERR30) SIGHT(1:LENTH)
          IF(IERR30.NE.0) PRINT*,'ERROR IN WRITING TO'//NEW_COMB
*          PRINT*,SIGHT
          DATE(1)=DATE(2)
          READ(UNIT=11,FMT=15,IOSTAT=IERR6,END=610) SIGHT
          IF (IERR6.NE.0) PRINT*,'ERROR IN READING SIGHT SCRATCH'
          GOTO 100
       ENDIF

600        READ(UNIT=12,FMT=15,IOSTAT=IERR7,END=850) EFFORT
          IF (IERR7.NE.0) PRINT*,'ERROR IN READING EFFORT SCRATCH'
           DATE(2)=EFFDT(1:6)
*reading in the date to determine the sequence number, at the beginning
*of each day the sequence number goes back to 1.
610         IF (DATE(2).NE.DATE(1))  K=0
            K=K+1
          WRITE(EFFORT(1:3),'(I3)')K
          CALL LENGTH(EFFORT,LENTH)
          WRITE(UNIT=13,FMT=15,IOSTAT=IERR30) EFFORT(1:LENTH)
          IF(IERR30.NE.0) PRINT*,'ERROR IN WRITING TO INTEG.OUT'
          DATE(1)=DATE(2)
*          PRINT*,EFFORT
          GOTO 600

*reading from the new format sight file
700        READ(UNIT=11,FMT=15,IOSTAT=IERR8,END=850) SIGHT
          CODE=SIGHT(4:4)
          IF (IERR8.NE.0) PRINT*,'ERROR IN READING SIGHT SCRATCH'
*reading in the date to determine the sequence number, at the beginning
*of each day the sequence number goes back to 1
710          DATE(2)=SIGHTDT(1:6)
            IF (DATE(2).NE.DATE(1))  K=0
            IF ((CODE.EQ.'1').OR.(CODE.EQ.'2').OR.(CODE.EQ.'3').OR.
     *  (CODE.EQ.'4').OR.(CODE.EQ.'5').OR.(CODE.EQ.'6')) GOTO 711
```

```
            K=K+1
          WRITE(SIGHT(1:3),'(I3)')K
711       CALL LENGTH(SIGHT,LENTH)
          WRITE(UNIT=13,FMT=15,IOSTAT=IERR30) SIGHT(1:LENTH)
          IF(IERR30.NE.0) PRINT*,'ERROR IN WRITING TO INTEG.OUT'
*          PRINT*,SIGHT
          DATE(1)=DATE(2)
          GOTO 700
*
*checking the data
*
850     REWIND(13)
851     Print*,'Checking the data for position errors'
        I=0
        READ(13,15)NEW1
        I=I+1
        IF (NEW1(20:20).EQ.' ') GOTO 851
        READ(NEW1(13:18),'(I6)')DATE1
        new1(4:4)=cd1
*reading the minutes & degrees, converting them to degrees & decimal
* degrees

        READ(NEW1(24:35),'(I2)')MINLAT
        READ(NEW1(35:36),'(I2)')MINLONG
        READ(NEW1(21:22),'(I2)')DGLAT
        READ(NEW1(31:33),'(I3)')DGLONG

        DECLAT=(FLOAT(MINLAT))/60
        DECLONG=(FLOAT(MINLONG))/60
        RLAT1=FLOAT(DGLAT) + DECLAT
        RLONG1=FLOAT(DGLONG)+ DECLONG
        IF (NEW1(20:20).EQ.'S') RLAT1= -1*RLAT1
        IF (NEW1(30:30).EQ.'E')RLONG1= -1*RLONG1

        READ(NEW1(6:7),'(I2)')HR1
        READ(NEW1(8:9),'(I2)')MIN1
        DECTIME1=(FLOAT(MIN1))/60
        TIME1=FLOAT(HR1)+DECTIME1

855     read(UNIT=13,FMT=15,END=800)NEW2
        I=I+1
*checking to see if any position was recorded
        IF (new2(20:20).EQ.' ') GOTO 855
         cd2=new2(4:4)
        if(cd2.eq.'P') goto 855

* calculating the time in hrs and decimal hours
        READ(new2(6:7),'(I2)')HR2
        READ(new2(8:9),'(I2)')MIN2
        DECTIME2=(FLOAT(MIN2))/60
        TIME2=FLOAT(HR2)+DECTIME2
* checking for a time change (no time change, no need to calculate dist.)
        IF(TIME2.EQ.TIME1) GOTO 855

        READ(new2(24:35),'(I2)')MINLAT
        READ(new2(35:36),'(I2)')MINLONG
        READ(new2(21:22),'(I2)')DGLAT
        READ(new2(31:33),'(I3)')DGLONG

        DECLAT=(FLOAT(MINLAT))/60
```

```
        DECLONG=(FLOAT(MINLONG))/60
        RLAT2=FLOAT(DGLAT) + DECLAT
        RLONG2=FLOAT(DGLONG)+ DECLONG
        IF (new2(20:20).EQ.'S') RLAT2= -1*RLAT2
        IF (new2(30:30).EQ.'E')RLONG2= -1*RLONG2

*checking the dates. if different days dont calculate speed
        READ(new2(13:18),'(I6)')DATE2
        IF (DATE1.NE.DATE2) THEN
         TIME1=TIME2
         DATE1=DATE2
         RLAT1=RLAT2
         RLONG1=RLONG2
         cd1=cd2
         new1=new2
         GOTO 855
        ENDIF



*using the grcirc subroutine to calculate distance between points
          CALL GRCIRC(RLAT1,RLONG1,RLAT2,RLONG2,DIST)
        IF (DIST.GT.20) THEN
         VEL=DIST/(TIME2-TIME1)
         DTIME=(TIME2-TIME1)
*         PRINT*,VEL
         IF((VEL.GT.20).OR.(VEL.LT.0)) THEN
          PRINT*,'POSSIBLE ERROR IN LINE.',I,' UNLIKELY VEL. '
          WRITE(14,15)' '
          WRITE(14,18)'POSSIBLE ERROR IN LINE.',I,' UNLIKELY VEL. '
          WRITE(14,19)'VEL=',VEL
          WRITE(14,14)'DTIME=',DTIME

*determining which file the positions came from
            if((cd1.eq.'B').OR.(cd1.EQ.'R').OR.(cd1.EQ.'V').OR.(cd1.EQ.
     *       'N').OR.(cd1.EQ.'W').OR.(CD1.EQ.'E')) THEN
              WRITE(14,15) 'POSITION1 FROM EFFORT FILE'
            elseif (cd1.eq.'P') then
              Write(14,15)'position1 from effort or sight not known'
            else
               write(14,15)'POSITION1 FROM THE SIGHTING FILE'
            endif
              WRITE(14,15) 'TIME, DATE, AND POS ', new1(6:40)
              write(14,15) ' '

            if((CD2.eq.'B').OR.(CD2.EQ.'R').OR.(CD2.EQ.'V').OR.(CD2.EQ.
     *       'N').OR.(CD2.EQ.'W').OR.(CD2.EQ.'E')) THEN
              WRITE(14,15) 'POSITION2 FROM EFFORT FILE'
            elseif (cd2.eq.'P') then
              Write(14,15)'position2 From effort or sight not known'
            else
               write(14,15)'POSITION2 FROM THE SIGHTING FILE'
            endif
              WRITE(14,15) 'TIME, DATE, AND POS ', new2(6:40)
              write(14,15) ' '
           ENDIF
         ENDIF
         TIME1=TIME2
         DATE1=DATE2
         RLAT1=RLAT2
```

```
        RLONG1=RLONG2
        cd1=cd2
        new1=new2
        GOTO 855

800     CLOSE(1)
        CLOSE(2)
        CLOSE(11)
        CLOSE(12)
        CLOSE(13)
        CLOSE(14)
        PRINT*, NEW_COMB//' HAS BEEN PROCESSED'
        PRINT*,' '
        GOTO 2
805     PRINT*,'ALL FILES HAVE BEEN PROCESSED'
        END
*************************************************************************
        SUBROUTINE LENGTH(NEW,LENTH)
*
* This subroutine estimates the length of a character string excluding
*     the trailing blanks
        CHARACTER*80 NEW
         LENTH= 80
         DO 10 I=80,1,-1
          IF(NEW(I:I).EQ.' ')THEN
           LENTH=I-1
          ELSE
           RETURN
          ENDIF
10      CONTINUE
        RETURN
        END

*************************************************************************
      SUBROUTINE GRCIRC(RLAT1,RLONG1,RLAT2,RLONG2,DIST)
C
C...THIS PROGRAM COMPUTES GREAT CIRCLE DISTANCES BETWEEN TWO COORDINATES
C       USING ALGORITHM TAKEN FROM KEN WALLACE'S PROGRAM (REPUTED TO HAVE
C       BEEN LIFTED FROM H.P. PROGRAM MANUAL).  COORDINATES ARE EXPRESSED
C       AS DEGREES, AND ARE ASSUMED TO BE IN NORTHERN HEMISPHERE, WEST
C       LONGITUDE IF POSITIVE.
C
      IMPLICIT DOUBLE PRECISION (B-H, O-Z)
      DOUBLE PRECISION LAS,LAC,LAF
      real*4 RLAT1,RLONG1,RLAT2,RLONG2,DIST
      DACOS(X)= (3.1415926535 / 2.0) - DATAN( X / DSQRT(1.0 - X*X) )
      DIST= 0.0
      PI= 3.141592653589793
      R= PI / 180.0
      D= 180.0 / PI
C
C...COMPUTE GREAT CIRCLE DISTANCE
      LAS= (DSIN(RLAT1*R)) * (DSIN(RLAT2*R))
      LAC= (DCOS(RLAT1*R)) * (DCOS(RLAT2*R)) *
     1     (DCOS((RLONG1 - RLONG2)*R))
      LAF= LAS + LAC
      IF (LAF .GT. 1.0) LAF=  1.0
      IF (LAF .LT.-1.0) LAF= -1.0
      IF (LAF .EQ. 1.0) GO TO 999
      DIST= (DACOS(LAF)) * D * 60.0
```

```
 999  CONTINUE
      RETURN
      END

*****************************************************************
        SUBROUTINE E (PES)
*
* This subroutine creates an end of effort event.
*
        CHARACTER PES*3134,NEW*80,BLANKSTRING*80
        CHARACTER LATHEM*1,LONGHEM*1,B$
        COMMON NEW,BLANKSTRING,B$,PSS, SPPCODE
* initializing new part of string
        NEW(20:80)=BLANKSTRING(20:80)
* event type
        NEW(4:4)='E'
        NEW(5:5)=' '
*time
        IF (PES(40:40).EQ.' ') PES(40:40)='0'
        NEW(6:12)=PES(40:43)//'  '//B$
*position
            IF (PES(84:84).EQ.'1') THEN
                  LATHEM='N'
            ELSEIF (PES(84:84).EQ.'2') THEN
                  LATHEM='S'
            ELSE
                  LATHEM=' '
            ENDIF

           IF (PES(90:90).EQ.'1') THEN
                 LONGHEM='E'
           ELSEIF (PES(90:90).EQ.'2') THEN
                 LONGHEM='W'
           ELSE
                 LONGHEM=' '
           ENDIF

           IF(PES(80:83).NE.'    ') THEN
            IF(PES(80:80).EQ.' ') PES(80:80)='0'
            IF(PES(81:81).EQ.' ') PES(81:81)='0'
            IF(PES(82:82).EQ.' ') PES(82:82)='0'
           ENDIF

           IF(PES(85:89).NE.'     ') THEN
            IF(PES(85:85).EQ.' ') PES(85:85)='0'
            IF(PES(86:86).EQ.' ') PES(86:86)='0'
            IF(PES(87:87).EQ.' ') PES(87:87)='0'
            IF(PES(88:88).EQ.' ') PES(88:88)='0'
           ENDIF

             NEW(20:40)=LATHEM//PES(80:81)//':'//
     *          PES(82:83)//'.   '//LONGHEM//PES(85:87)
     *          //':'//PES(88:89)//'.  '

        RETURN
        END
*****************************************************************
        SUBROUTINE V (PES,NEWEFF,OLDV)
*
*This subroutine creates a viewing condition event
```

```
*
        CHARACTER PES*3134,NEW*80,BLANKSTRING*80,OLDV*80
        CHARACTER LATHEM*1,LONGHEM*1,B$
        LOGICAL NEWEFF
        COMMON NEW,BLANKSTRING,B$,PSS, SPPCODE
* initializing new part of string
        NEW(41:80)=BLANKSTRING(41:80)
* event type
        NEW(4:4)='V'
        NEW(5:5)='.'
* beaufort
        NEW(41:45)='   '//PES(24:24)//B$
* swell ht
        NEW(46:50)=BLANKSTRING(46:50)
* swell dir
        NEW(51:55)=BLANKSTRING(51:55)
* water temp
        NEW(56:60)=' '//PES(21:22)//'.'//PES(23:23)//B$

        IF (((NEW(41:80) .NE. OLDV(41:80)).OR.(NEWEFF))) THEN
           OLDV(41:80)= NEW(41:80)
        ELSE
           NEW= NEW(1:40)
        ENDIF
        RETURN
        END

**********************************************************************
        SUBROUTINE W (PES,NEWEFF,OLDW)
*
*This subroutine creates a change in weather event.
*

        CHARACTER PES*3134,NEW*80,BLANKSTRING*80,OLDW*80
        CHARACTER LATHEM*1,LONGHEM*1,B$
        LOGICAL NEWEFF
        COMMON NEW,BLANKSTRING,B$,PSS, SPPCODE
*initializing new part of string
        NEW(41:80)=BLANKSTRING(41:80)
* event type
        NEW(4:4)='W'
        NEW(5:5)='.'
* rain or fog code
        NEW(41:45)='   '//PES(25:25)//B$
* horizontal sun
        NEW(46:50)='  '//PES(26:27)//B$
* vertical sun
        NEW(51:55)='  '//PES(28:29)//B$
*wind direction
        NEW(56:60)=BLANKSTRING(56:60)
*visibilty
        NEW(61:65)=BLANKSTRING(61:65)

        IF (((NEW(41:80) .NE. OLDW(41:80)).OR.(NEWEFF))) THEN
           OLDW(41:80)= NEW(41:80)
        ELSE
           NEW= NEW(1:40)
        ENDIF
        RETURN
        END
```

```
*****************************************************************
        SUBROUTINE N (PES,NEWEFF,OLDN)
*
*This subroutine creates a navigation information event.
*

        CHARACTER PES*3134,NEW*80,BLANKSTRING*80,OLDN*80
        CHARACTER LATHEM*1,LONGHEM*1,B$
        LOGICAL NEWEFF
        COMMON NEW,BLANKSTRING,B$,PSS, SPPCODE
*initializing new part of string
        NEW(41:80)=BLANKSTRING(41:80)
*event type
        NEW(4:4)='N'
        NEW(5:5)='.'
* course
        NEW(41:45)=' '//PES(44:46)//B$
* speed
        NEW(46:50)=PES(47:48)//'.'//PES(49:49)//B$

        IF (((NEW(41:80) .NE. OLDN(41:80)).OR.(NEWEFF))) THEN
           OLDN(41:80)= NEW(41:80)
        ELSE
           NEW= NEW(1:40)
        ENDIF
        RETURN
        END
*****************************************************************
        SUBROUTINE B(PES,POS)
*
*This subroutine creates a beginning of effort event.
*

        CHARACTER PES*3134,NEW*80,BLANKSTRING*80
        CHARACTER LATHEM*1,LONGHEM*1,B$
        COMMON NEW,BLANKSTRING,B$,PSS, SPPCODE
        NEW(1:80)=BLANKSTRING(1:80)
        NEW(4:4)='B'
        NEW(5:5)='.'
*time
             IF(PES(17:17).EQ.' ') PES(17:17)='0'
             NEW(6:12)=PES(17:20)//'  '//B$
*date
             NEW(13:19)=PES(7:10)//PES(5:6)
*position
         IF((POS.EQ.0).AND.(PES(100:100).NE.'1')) THEN

           IF(PES(69:72).NE.'    ') THEN
            IF(PES(69:69).EQ.' ') PES(69:69)='0'
            IF(PES(70:70).EQ.' ') PES(70:70)='0'
            IF(PES(71:71).EQ.' ') PES(71:71)='0'
           ENDIF

           IF(PES(74:78).NE.'     ') THEN
            IF(PES(74:74).EQ.' ') PES(74:74)='0'
            IF(PES(75:75).EQ.' ') PES(75:75)='0'
            IF(PES(76:76).EQ.' ') PES(76:76)='0'
            IF(PES(77:77).EQ.' ') PES(77:77)='0'
           ENDIF
```

```
            IF (PES(73:73).EQ.'1') THEN
                  LATHEM='N'
            ELSEIF (PES(73:73).EQ.'2') THEN
                  LATHEM='S'
            ELSE
                  LATHEM=' '
            ENDIF

           IF (PES(79:79).EQ.'1') THEN
                 LONGHEM='E'
           ELSEIF (PES(79:79).EQ.'2') THEN
                 LONGHEM='W'
           ELSE
                 LONGHEM=' '
           ENDIF
             NEW(20:40)=LATHEM//PES(69:70)//':'//
     *          PES(71:72)//'.    '//LONGHEM//PES(74:76)
     *          //':'//PES(77:78)//'.  '

          ELSEIF(PES(90:90).EQ.'1') THEN
             NEW(20:40)=' '//  '//':'//
     *          '  '//.   '//' '//   '
     *          //':'//'  '//'.  '

          ELSE

           IF (PES(54:54).EQ.'1') THEN
                 LATHEM='N'
           ELSEIF (PES(54:54).EQ.'2') THEN
                 LATHEM='S'
           ELSE
                 LATHEM=' '
           ENDIF

           IF (PES(60:60).EQ.'1') THEN
                 LONGHEM='E'
           ELSEIF (PES(60:60).EQ.'2') THEN
                 LONGHEM='W'
           ELSE
                 LONGHEM=' '
           ENDIF

             NEW(20:40)=LATHEM//PES(50:51)//':'//
     *          PES(52:53)//'.    '//LONGHEM//PES(55:57)
     *          //':'//PES(58:59)//'.  '
          ENDIF
*cruise number
               NEW(41:44)=PES(1:4)
        RETURN
        END
*****************************************************************
        SUBROUTINE R(PES,POS)
*
*This subroutine creates a resume effort event.
*

        CHARACTER PES*3134,NEW*80,BLANKSTRING*80
        CHARACTER LATHEM*1,LONGHEM*1,B$
        COMMON NEW,BLANKSTRING,B$,PSS, SPPCODE
        NEW(1:80)=BLANKSTRING(1:80)
```

```
        NEW(4:4)='R'
        NEW(5:5)='.'
*time
             IF(PES(17:17).EQ.' ') PES(17:17)='0'
             NEW(6:12)=PES(17:20)//'  '//B$
*date
             NEW(13:19)=PES(7:10)//PES(5:6)
*position
         IF((POS.EQ.0).AND.(PES(100:100).NE.'1')) THEN

           IF(PES(69:72).NE.'    ') THEN
            IF(PES(69:69).EQ.' ') PES(69:69)='0'
            IF(PES(70:70).EQ.' ') PES(70:70)='0'
            IF(PES(71:71).EQ.' ') PES(71:71)='0'
           ENDIF

           IF(PES(74:78).NE.'     ') THEN
            IF(PES(74:74).EQ.' ') PES(74:74)='0'
            IF(PES(75:75).EQ.' ') PES(75:75)='0'
            IF(PES(76:76).EQ.' ') PES(76:76)='0'
            IF(PES(77:77).EQ.' ') PES(77:77)='0'
           ENDIF

            IF (PES(73:73).EQ.'1') THEN
                  LATHEM='N'
            ELSEIF (PES(73:73).EQ.'2') THEN
                  LATHEM='S'
            ELSE
                  LATHEM=' '
            ENDIF

           IF (PES(79:79).EQ.'1') THEN
                 LONGHEM='E'
           ELSEIF (PES(79:79).EQ.'2') THEN
                 LONGHEM='W'
           ELSE
                 LONGHEM=' '
           ENDIF
             NEW(20:40)=LATHEM//PES(69:70)//':'//
     *          PES(71:72)//'.   '//LONGHEM//PES(74:76)
     *          //':'//PES(77:78)//'.  '

          ELSEIF(PES(90:90).EQ.'1') THEN
             NEW(20:40)=' '//'  '//':'//
     *          '  '//'.   '//' '//'  '
     *          //':'//'  '//'.  '

          ELSE

           IF (PES(54:54).EQ.'1') THEN
                 LATHEM='N'
           ELSEIF (PES(54:54).EQ.'2') THEN
                 LATHEM='S'
           ELSE
                 LATHEM=' '
           ENDIF

           IF (PES(60:60).EQ.'1') THEN
                 LONGHEM='E'
           ELSEIF (PES(60:60).EQ.'2') THEN
```

```
                LONGHEM='W'
            ELSE
                LONGHEM=' '
            ENDIF

              NEW(20:40)=LATHEM//PES(50:51)//':'//
     *           PES(52:53)//'.   '//LONGHEM//PES(55:57)
     *           //':'//PES(58:59)//'.  '
          ENDIF

        RETURN
        END
*****************************************************************
        SUBROUTINE P (PES,NEWEFF,OLDP)
*
*This subroutine creates an observer position change event.
*
        CHARACTER PES*3134,NEW*80,BLANKSTRING*80,OLDP*80
        CHARACTER LATHEM*1,LONGHEM*1,B$
        LOGICAL NEWEFF
        COMMON NEW,BLANKSTRING,B$,PSS,SPPCODE
*initializing new part of string
        NEW(41:80)=BLANKSTRING(41:80)
*event type
        NEW(4:4)='P'
* on/off effort(./ )
        NEW(5:5)='.'
* lt obs ID
        NEW(41:45)='  '//PES(61:62)//B$
*recorder ID
        NEW(46:50)='  '//PES(65:66)//B$
* rt obs ID
        NEW(51:55)='  '//PES(63:64)//B$

        IF (((NEW(41:80) .NE. OLDP(41:80)).OR.(NEWEFF))) THEN
           OLDP(41:80)= NEW(41:80)
        ELSE
           NEW= NEW(1:40)
        ENDIF
        RETURN
        END
*****************************************************************

*****************************************************************

*****************************************************************
        SUBROUTINE SIGHTING
*
* This subroutine creates creates a primary sighting event.
*
        CHARACTER*400 PSS
        CHARACTER*80 NEW
        CHARACTER BLANKSTRING*80,B$*2,LATHEM*1,LONGHEM*1
        COMMON NEW,BLANKSTRING,B$,PSS,SPPCODE
*initializing the "NEW" string
        NEW(1:80)=BLANKSTRING(1:80)
*filling in the string piece by piece
         NEW(1:3)=BLANKSTRING(1:3)
*event type
         NEW(4:4)='S'
```

```
*on or off effort
           IF (PSS(13:14).NE.'  ') THEN
            NEW(5:5)='.'
           ELSE
            NEW(5:5)=' '
           ENDIF
*time of sighting
          NEW(6:12)=PSS(19:22)//'  '//B$
*date
          NEW(13:19)=PSS(7:10)//PSS(5:6)//B$
*position of sighting
           IF (PSS(43:43).EQ.'1') THEN
                LATHEM='N'
           ELSEIF (PSS(43:43).EQ.'2') THEN
                LATHEM='S'
           ELSE
                LATHEM=' '
           ENDIF
           IF (PSS(49:49).EQ.'1') THEN
                LONGHEM='E'
           ELSEIF (PSS(49:49).EQ.'2') THEN
                LONGHEM='W'
           ELSE
                LONGHEM=' '
           ENDIF

          NEW(20:40)=LATHEM//PSS(39:40)//':'//PSS(41:42)//'.   '
     *               //LONGHEM//PSS(44:46)//':'//PSS(47:48)//'.  '
     *               //B$
*sighting#
          NEW(41:45)='  '//PSS(11:12)//B$
*observer ID
**if no number fill in obs code 99
        IF(PSS(62:63).EQ.'  ')  PSS(62:63)='99'
**if less than 10,  code must begin with 0
        IF(PSS(62:62).EQ.' ') PSS(62:62)='0'

          NEW(46:50)='  '//PSS(62:63)//B$
*cue
          NEW(51:55)='   '//PSS(23:23)//B$
*site code
           NEW(56:60)='   '//PSS(24:24)//B$
*if no series/leg number, sighting is off effort and is attributed to "crew"
           IF (PSS(13:14).EQ.'  ') THEN
            NEW(56:60)='   '//'6'//B$
            ENDIF
*bearing
          NEW(61:65)=' '//PSS(25:27)//B$
*reticle
          NEW(66:70)='    '//B$
*distance in NMI
          NEW(71:74)=PSS(28:29)//'.'//PSS(30:30)
        RETURN
        end
*****************************************************************
        SUBROUTINE ANCILLARY
*
* This subroutine creates creates an ancillary sighting event.
*
```

```
        CHARACTER*2 SPPCODE(6,4)
        CHARACTER*5 NSC(4)
        CHARACTER*400 PSS
        CHARACTER*80 NEW
        CHARACTER BLANKSTRING*80,B$*2,LATHEM*1,LONGHEM*1
        INTEGER O,SC
        COMMON NEW,BLANKSTRING,B$,PSS,SPPCODE
*initializing the variables
        NEW(1:80)=BLANKSTRING(1:80)
         do 100 i=1,4
          NSC(i)='  '
100     CONTINUE


*sequence #
        NEW(1:3)=BLANKSTRING(1:3)
*type of event
        NEW(4:4)='A'
*determining whether or not the sighting was on effort
         IF (PSS(13:14).NE.'  ') THEN
          NEW(5:5)='.'
         ELSE
          NEW(5:5)=' '
         ENDIF
*time
        NEW(6:12)=PSS(19:22)//'  '//B$
*date
        NEW(13:19)=PSS(7:10)//PSS(5:6)//B$
*position of sighting
           IF (PSS(43:43).EQ.'1') THEN
                LATHEM='N'
           ELSEIF (PSS(43:43).EQ.'2') THEN
                LATHEM='S'
           ELSE
                LATHEM=' '
           ENDIF
           IF (PSS(49:49).EQ.'1') THEN
                LONGHEM='E'
           ELSEIF (PSS(49:49).EQ.'2') THEN
                LONGHEM='W'
           ELSE
                LONGHEM=' '
           ENDIF

          NEW(20:40)=LATHEM//PSS(39:40)//':'//PSS(41:42)//'.    '
     *               //LONGHEM//PSS(44:46)//':'//PSS(47:48)//'.  '
     *               //B$
*sight number
          NEW(41:45)='  '//PSS(11:12)//B$
*water temp
          NEW(46:50)=PSS(32:33)//'.'//PSS(34:34)//B$
*photo y/n not recorded
          NEW(51:55)='    '//B$
*birds y/n
           IF (PSS(55:55).EQ.'1') NEW(56:60)='   Y '
           IF (PSS(55:55).EQ.'2') NEW(56:60)='   N '
*do loop to check which observers species codes were used
             DO 20 O=1,6
                DO 19 SC=1,4
                 IF (SPPCODE(O,SC).EQ.'  ') THEN
```

```
                GOTO 19
               ELSE
                NSC(SC)='  '//SPPCODE(O,SC)//B$
               ENDIF
19      CONTINUE
        IF(NSC(1).NE.'     ') GOTO 25
20      CONTINUE
25      CONTINUE
        NEW(61:65)=NSC(1)
        NEW(66:70)=NSC(2)
        NEW(71:75)=NSC(3)
        NEW(76:80)=NSC(4)
        RETURN
        END

*****************************************************************
        SUBROUTINE NUMBER(I)
*
*This subroutine creates an observer school size estimate event.
*
        CHARACTER*400 PSS
        CHARACTER*80 NEW
        CHARACTER BLANKSTRING*80,B$*2,LATHEM*1,LONGHEM*1
        COMMON NEW,BLANKSTRING,B$,PSS,SPPCODE
15      FORMAT(A)
*initializing the variables
        NEW(1:80)=BLANKSTRING(1:80)

*leaving the sequence numbers blank
        NEW(1:3)=BLANKSTRING(1:3)
*type of event code
        WRITE(NEW(4:4),'(I1)')I
*on or off effort
           IF (PSS(13:14).NE.'  ') THEN
            NEW(5:5)='.'
           ELSE
            NEW(5:5)=' '
           ENDIF
*time of sighting
          NEW(6:12)=PSS(19:22)//'  '//B$
*date
          NEW(13:19)=PSS(7:10)//PSS(5:6)//B$
*position of sighting
           IF (PSS(43:43).EQ.'1') THEN
                 LATHEM='N'
           ELSEIF (PSS(43:43).EQ.'2') THEN
                LATHEM='S'
           ELSE
                LATHEM=' '
           ENDIF
           IF (PSS(49:49).EQ.'1') THEN
                LONGHEM='E'
           ELSEIF (PSS(49:49).EQ.'2') THEN
                LONGHEM='W'
           ELSE
                LONGHEM=' '
           ENDIF

          NEW(20:40)=LATHEM//PSS(39:40)//':'//PSS(41:42)//'.    '
     *              //LONGHEM//PSS(44:46)//':'//PSS(47:48)//'.   '
```

```
     *                //B$

           IF (I.EQ.1) THEN
*obs ID number
**if no number fill in obs code 99
        IF(PSS(64:65).EQ.'  ')  PSS(64:65)='99'
**if less than 10,  code must begin with 0
        IF(PSS(64:64).EQ.' ') PSS(64:64)='0'

            NEW(41:45)='  '//PSS(64:65)//B$
*best school size est.
            NEW(46:50)=PSS(66:69)//B$
*high school size est.
            NEW(51:55)=PSS(70:73)//B$
*low school size est.
            NEW(56:60)=PSS(74:77)//B$
* % spp 1
            NEW(61:65)=' '//PSS(83:85)//B$
* % spp 2
            NEW(66:70)=' '//PSS(88:90)//B$
* % spp 3
            NEW(71:75)=' '//PSS(93:95)//B$
* % spp 4
            NEW(76:80)=' '//PSS(98:100)//B$

           ENDIF

           IF (I.EQ.2) THEN
*obs ID number
            NEW(41:45)='  '//PSS(103:104)//B$
*best school size est.
            NEW(46:50)=PSS(105:108)//B$
*high school size est.
            NEW(51:55)=PSS(109:112)//B$
*low school size est.
            NEW(56:60)=PSS(113:116)//B$
* % spp 1
            NEW(61:65)=' '//PSS(117:119)//B$
* % spp 2
            NEW(66:70)=' '//PSS(122:124)//B$
* % spp 3
            NEW(71:75)=' '//PSS(127:129)//B$
* % spp 4
            NEW(76:80)=' '//PSS(132:134)//B$

           ENDIF


           IF (I.EQ.3) THEN
*obs ID number
            NEW(41:45)='  '//PSS(137:138)//B$
*best school size est.
            NEW(46:50)=PSS(139:142)//B$
*high school size est.
            NEW(51:55)=PSS(147:150)//B$
*low school size est.
            NEW(56:60)=PSS(151:154)//B$
* % spp 1
            NEW(61:65)=' '//PSS(155:157)//B$
* % spp 2
```

```
            NEW(66:70)=' '//PSS(160:162)//B$
* % spp 3
            NEW(71:75)=' '//PSS(165:167)//B$
* % spp 4
            NEW(76:80)=' '//PSS(170:172)//B$

           ENDIF


           IF (I.EQ.4) THEN
*obs ID number
            NEW(41:45)='  '//PSS(175:176)//B$
*best school size est.
            NEW(46:50)=PSS(177:180)//B$
*high school size est.
            NEW(51:55)=PSS(181:184)//B$
*low school size est.
            NEW(56:60)=PSS(185:188)//B$
* % spp 1
            NEW(61:65)=' '//PSS(189:191)//B$
* % spp 2
            NEW(66:70)=' '//PSS(194:196)//B$
* % spp 3
            NEW(71:75)=' '//PSS(199:201)//B$
* % spp 4
            NEW(76:80)=' '//PSS(204:206)//B$

           ENDIF


           IF (I.EQ.5) THEN
*obs ID number
            NEW(41:45)='  '//PSS(213:214)//B$
*best school size est.
            NEW(46:50)=PSS(215:218)//B$
*high school size est.
            NEW(51:55)=PSS(219:222)//B$
*low school size est.
            NEW(56:60)=PSS(223:226)//B$
* % spp 1
            NEW(61:65)=' '//PSS(227:229)//B$
* % spp 2
            NEW(66:70)=' '//PSS(232:234)//B$
* % spp 3
            NEW(71:75)=' '//PSS(237:239)//B$
* % spp 4
            NEW(76:80)=' '//PSS(242:244)//B$

           ENDIF


           IF (I.EQ.6) THEN
*obs ID number
            NEW(41:45)='  '//PSS(247:248)//B$
*best school size est.
            NEW(46:50)=PSS(249:252)//B$
*high school size est.
            NEW(51:55)=PSS(253:256)//B$
*low school size est.
            NEW(56:60)=PSS(257:260)//B$
```

```
* % spp 1
            NEW(61:65)=' '//PSS(261:263)//B$
* % spp 2
            NEW(66:70)=' '//PSS(266:268)//B$
* % spp 3
            NEW(71:75)=' '//PSS(275:277)//B$
* % spp 4
            NEW(76:80)=' '//PSS(280:282)//B$

          ENDIF
        RETURN
        END
*****************************************************************
        SUBROUTINE POSITION
*
*This subroutine creates a change in observer position event.
*

        CHARACTER*400 PSS
        CHARACTER*80 NEW
        CHARACTER BLANKSTRING*80,B$*2,LATHEM*1,LONGHEM*1
        COMMON NEW,BLANKSTRING,B$,PSS, SPPCODE
*initializing the variables
        NEW(1:80)=BLANKSTRING(1:80)

*leave the sequence number blank for now
         NEW(1:3)=BLANKSTRING(1:3)
*event type
          NEW(4:4)='P'
*on or off effort
           IF (PSS(13:14).NE.'  ') THEN
            NEW(5:5)='.'
           ELSE
            NEW(5:5)=' '
           ENDIF
*time of sighting
          NEW(6:12)=PSS(19:22)//'  '//B$
*date
          NEW(13:19)=PSS(7:10)//PSS(5:6)//B$
*position of sighting
           IF (PSS(43:43).EQ.'1') THEN
                 LATHEM='N'
           ELSEIF (PSS(43:43).EQ.'2') THEN
                LATHEM='S'
           ELSE
                LATHEM=' '
           ENDIF
           IF (PSS(49:49).EQ.'1') THEN
                LONGHEM='E'
           ELSEIF (PSS(49:49).EQ.'2') THEN
                LONGHEM='W'
           ELSE
                LONGHEM=' '
           ENDIF

          NEW(20:40)=LATHEM//PSS(39:40)//':'//PSS(41:42)//'.   '
     *               //LONGHEM//PSS(44:46)//':'//PSS(47:48)//'.  '
     *               //B$

*left obs ID number
```

```
        NEW(41:45)='  '//PSS(56:57)//B$
*record ID
        NEW(46:50)='  '//PSS(60:61)//B$
*right obs ID number
        NEW(51:55)='  '//PSS(58:59)//B$
        NEW(56:80)=BLANKSTRING(56:80)
        RETURN
        END
*****************************************************************
        SUBROUTINE WEATHER
* This subroutine never called because the information recorded on the
*sighting record for weather was not considered appropriate. Only weather
*recorded on the effort file was used.
        CHARACTER*400 PSS
        CHARACTER*80 NEW
        CHARACTER BLANKSTRING*80,B$*2,LATHEM*1,LONGHEM*1
        COMMON NEW,BLANKSTRING,B$,PSS, SPPCODE
*initializing the variables
        NEW(1:80)=BLANKSTRING(1:80)

*leave the sequence number blank for now
         NEW(1:3)=BLANKSTRING(1:3)
*event type
          NEW(4:4)='W'
*on or off effort
           IF (PSS(13:14).NE.'  ') THEN
            NEW(5:5)='.'
           ELSE
            NEW(5:5)=' '
           ENDIF
*time of sighting
          NEW(6:12)=PSS(19:22)//'  '//B$
*date
          NEW(13:19)=PSS(7:10)//PSS(5:6)//B$
*position of sighting
           IF (PSS(43:43).EQ.'1') THEN
                 LATHEM='N'
           ELSEIF (PSS(43:43).EQ.'2') THEN
                LATHEM='S'
           ELSE
                LATHEM=' '
           ENDIF
           IF (PSS(49:49).EQ.'1') THEN
                LONGHEM='E'
           ELSEIF (PSS(49:49).EQ.'2') THEN
                LONGHEM='W'
           ELSE
                LONGHEM=' '
           ENDIF

          NEW(20:40)=LATHEM//PSS(39:40)//':'//PSS(41:42)//'.   '
     *               //LONGHEM//PSS(44:46)//':'//PSS(47:48)//'.  '
     *               //B$

*rain or fog not recorded
          NEW(40:45)=BLANKSTRING(40:45)
*horizontal sun
          NEW(46:50)='  '//PSS(35:36)//B$
*verical sun
          NEW(51:55)='  '//PSS(37:38)//B$
```

```
*wind direction not recorded
          NEW(56:80)=BLANKSTRING(56:80)
        RETURN
        END
```

```
************************************************************************
* This program reformats data from the marine mammal cruises done     *
* before 1982. It takes in an M format sighting file, and an effort    *
* file that has been run through Msep and Maddpos programs.            *
*   Written by Timothy Lee          July 14,1992                       *
*                                                                      *
*                                                                      *
*   Revised:to match the changes made by Jay Barlow to Rdata.for       *
*           Jan, 1993                                                  *
*   Revised: So that the files which were created by the program as    *
*           New_eff.out and New_sight.out are now scratch files and    *
*           exist only for the duration of the program.                *
*           April 1994                                                 *
*                                                                      *
************************************************************************

************************************************************************
*    Variable ID Block                                                 *
*                                                                      *
* Var.           Description                                           *
*                                                                      *
* PSS            sight string read in from old sighting file           *
* PES            effort string read in from old effort file            *
* NEW            reformatted string                                    *
* EFFORT         string read from reformatted effort file              *
* SIGHT          string read from reformatted sight file               *
* EFFDT          date and time on the reformatted effort string        *
* SIGHTDT        date and time on the reformatted sight string         *
* BLANKSTRING    an empty string used for formatting purposes          *
* B$             an empty string used for formatting                   *
* SPPCODE        the species code of the marine mammals sighted        *
* IERR           used with the iostat function. if there is an error  *
*                in reading the data, the IERR gets a value other thn  *
*                zero.                                                 *
* DATE           the date on the string in the new format              *
************************************************************************
      PROGRAM  PRE82 PLUS POSITIONS
      CHARACTER*6 DATE(2)
      CHARACTER*400 PSS
      CHARACTER*80 NEW,new1,new2,EFFORT,SIGHT,OLDN,OLDW,OLDV
      character cd1*1,cd2*1,CODE
      CHARACTER*10  EFFDT,SIGHTDT
      CHARACTER*30 OLD_SIGHT,OLD_EFF,NEW_COMB,NEW_ERR
      CHARACTER BLANKSTRING*80,B$*2,PES*100,LATHEM*1,LONGHEM*1
      INTEGER SERNUM,POS,k,DGLAT,DGLONG,DATE1,DATE2,HR1,HR2
      LOGICAL NEWEFF
      COMMON NEW,BLANKSTRING,B$,PSS,SPPCODE
      WRITE(BLANKSTRING,17)
      WRITE(OLDW,17)
      WRITE(OLDN,17)
      WRITE(OLDV,17)

      B$=' '
************************************************************************
13    FORMAT(2(A7,F5.2),2(A7,I8))
14    FORMAT(2(A7,F7.2))
15    FORMAT(A)
16    FORMAT(I2)
17    FORMAT(80(' '))
```

```
18      FORMAT(A25,I5,A15)
19      FORMAT(A4,F10.2)
*****************************************************************
*module for opening files

        OPEN(UNIT=10,FILE='MDATA.INP',FORM='FORMATTED',STATUS='OLD')
        PRINT*,'OPEN'

2       READ (10,'(A30)',END=805) OLD_SIGHT
        PRINT*,'OLDSIGHT READ '//OLD_SIGHT
        READ (10,'(A30)',END=805) OLD_EFF
        PRINT*,'OLDEFF READ '//OLD_EFF
        READ (10,'(A30)',END=805) NEW_COMB
        PRINT*,'NEWCOMB READ '//NEW_COMB
        READ (10,'(A30)',END=805) NEW_ERR
        PRINT*,'NEWERR READ '//NEW_ERR

        OPEN(UNIT=1,FILE=OLD_SIGHT,STATUS='OLD')
        OPEN(UNIT=2,FILE=OLD_EFF,STATUS='OLD')
        OPEN(UNIT=11, FORM='FORMATTED',
     *       STATUS='SCRATCH')
        OPEN(UNIT=12, FORM='FORMATTED',
     *       STATUS='SCRATCH')
        OPEN(UNIT=13,FILE=NEW_COMB, FORM='FORMATTED', STATUS='UNKNOWN')
        OPEN(UNIT=14,FILE=NEW_ERR, FORM='FORMATTED', STATUS='UNKNOWN')
        PRINT*,'FILES OPENED'
* reformatting sighting data and saving it to a scratch file


        CALL COMMENT
         PRINT*,NEW
         CALL LENGTH(NEW,LENTH)
         WRITE(UNIT=11,FMT=15,IOSTAT=IERR10)NEW(1:LENTH)
         IF (IERR10.NE.0) PRINT*,'ERROR IN WRITING TO SIGHT SCRATCH'

5        READ(1,15,IOSTAT=IERR1,END=50) PSS
        IF (IERR1.NE.0) PRINT*,'ERROR IN READING THE DATA'

        CALL SIGHTING
*         PRINT*,NEW
         CALL LENGTH(NEW,LENTH)
         WRITE(UNIT=11,FMT=15,IOSTAT=IERR10)NEW(1:LENTH)
         IF (IERR10.NE.0) PRINT*,'ERROR IN WRITING TO SIGHT SCRATCH'

        CALL ANCILLARY
*         PRINT*,NEW
         CALL LENGTH(NEW,LENTH)
         WRITE(UNIT=11,FMT=15,IOSTAT=IERR10)NEW(1:LENTH)
         IF (IERR10.NE.0) PRINT*,'ERROR IN WRITING TO SIGHT SCRATCH'

        CALL NUM
*         PRINT*,NEW
         CALL LENGTH(NEW,LENTH)
         WRITE(UNIT=11,FMT=15,IOSTAT=IERR10)NEW(1:LENTH)
         IF (IERR10.NE.0) PRINT*,'ERROR IN WRITING TO SIGHT SCRATCH'
        GOTO 5
*****************************************************************

*****************************************************************
*****************************************************************
```

```
* opening the effort file
50      PRINT*,'END OF SIGHTING FILE REACHED'
51      CONTINUE
*reading the record onto a string
        READ(2,15,IOSTAT=IERR2,END=60) PES
        IF (IERR2.NE.0) PRINT*,'ERROR IN READING OLD EFFORT FILE'
*reading the series number and number of repeat occurences (legs).
        READ(PES(11:12),16) SERNUM
        READ(PES(15:16),16) LEG
        READ(PES(41:44),'(i4)') IPOS1
        READ(PES(46:50),'(i5)') IPOS2
         POS=IPOS1+IPOS2

         IF(PES(41:44).NE.'     ') THEN
          IF(PES(41:41).EQ.' ') PES(41:41)='0'
          IF(PES(42:42).EQ.' ') PES(42:42)='0'
          IF(PES(43:43).EQ.' ') PES(43:43)='0'
         ENDIF

         IF(PES(46:50).NE.'      ') THEN
          IF(PES(46:46).EQ.' ') PES(46:46)='0'
          IF(PES(47:47).EQ.' ') PES(47:47)='0'
          IF(PES(48:48).EQ.' ') PES(48:48)='0'
          IF(PES(49:49).EQ.' ') PES(49:49)='0'
         ENDIF

         IF ((SERNUM.EQ.1).AND.(LEG.EQ.1))THEN
          NEWEFF=.TRUE.
          CALL B(PES,POS)
*          PRINT*,NEW
          CALL LENGTH(NEW,LENTH)
          WRITE(UNIT=12,FMT=15,IOSTAT=IERR20)NEW(1:LENTH)

          CALL R(PES,POS)
*          PRINT*,NEW
          CALL LENGTH(NEW,LENTH)
          WRITE(UNIT=12,FMT=15,IOSTAT=IERR20)NEW(1:LENTH)

         ELSEIF((SERNUM.GT.1).AND.(LEG.EQ.1)) THEN
          NEWEFF=.TRUE.
          CALL R(PES,POS)
*          PRINT*,NEW
          CALL LENGTH(NEW,LENTH)
          WRITE(UNIT=12,FMT=15,IOSTAT=IERR20)NEW(1:LENTH)
         ENDIF

              NEW(1:80)=BLANKSTRING(1:80)
*time
              IF(PES(17:17).EQ.' ') PES(17:17)='0'
              NEW(6:12)=PES(17:20)//'  '//B$
*date
              NEW(13:19)=PES(7:10)//PES(5:6)
*position

           IF((POS.EQ.0).AND.(PES(90:90).NE.'1')) THEN

            IF(PES(59:62).NE.'     ') THEN
             IF(PES(59:59).EQ.' ') PES(59:59)='0'
             IF(PES(60:60).EQ.' ') PES(60:60)='0'
```

```
          IF(PES(61:61).EQ.' ') PES(61:61)='0'
         ENDIF

         IF(PES(64:68).NE.'     ') THEN
          IF(PES(64:64).EQ.' ') PES(64:64)='0'
          IF(PES(65:65).EQ.' ') PES(65:65)='0'
          IF(PES(66:66).EQ.' ') PES(66:66)='0'
          IF(PES(67:67).EQ.' ') PES(67:67)='0'
         ENDIF

          IF (PES(63:63).EQ.'1') THEN
                LATHEM='N'
          ELSEIF (PES(63:63).EQ.'2') THEN
                LATHEM='S'
          ELSE
                LATHEM=' '
          ENDIF

         IF (PES(69:69).EQ.'1') THEN
               LONGHEM='E'
         ELSEIF (PES(69:69).EQ.'2') THEN
               LONGHEM='W'
         ELSE
               LONGHEM=' '
         ENDIF
           NEW(20:40)=LATHEM//PES(59:60)//':'//
*           PES(61:62)//'.   '//LONGHEM//PES(64:66)
*           //':'//PES(67:68)//'.  '

        ELSEIF(PES(90:90).EQ.'1') THEN
           NEW(20:40)=' '//  '//':'//
*           '  '//'.   '//' '//'  '
*           //':'//'  '//'.  '

        ELSE

         IF (PES(45:45).EQ.'1') THEN
               LATHEM='N'
         ELSEIF (PES(45:45).EQ.'2') THEN
               LATHEM='S'
         ELSE
               LATHEM=' '
         ENDIF

         IF (PES(51:51).EQ.'1') THEN
               LONGHEM='E'
         ELSEIF (PES(51:51).EQ.'2') THEN
               LONGHEM='W'
         ELSE
               LONGHEM=' '
         ENDIF

           NEW(20:40)=LATHEM//PES(41:42)//':'//
*           PES(43:44)//'.   '//LONGHEM//PES(46:48)
*           //':'//PES(49:50)//'.  '
        ENDIF

           CALL V (PES,NEWEFF,OLDV)
              CALL LENGTH(NEW,LENTH)
              IF (LENTH .GT. 41) THEN
```

```
*                  PRINT*,NEW(1:LENTH)
                  WRITE(UNIT=12,FMT=15,IOSTAT=IERR20)NEW(1:LENTH)
                ENDIF

             CALL N (PES,NEWEFF,OLDN)
                CALL LENGTH(NEW,LENTH)
                IF (LENTH .GT. 41) THEN
*                  PRINT*,NEW(1:LENTH)
                  WRITE(UNIT=12,FMT=15,IOSTAT=IERR20)NEW(1:LENTH)
                ENDIF

             CALL W (PES,NEWEFF,OLDW)
                CALL LENGTH(NEW,LENTH)
                IF (LENTH .GT. 41) THEN
*                  PRINT*,NEW(1:LENTH)
                  WRITE(UNIT=12,FMT=15,IOSTAT=IERR20)NEW(1:LENTH)
                ENDIF

             IF (PES(15:16).EQ.PES(13:14)) THEN
                 CALL E (PES)
*                PRINT*,NEW
                CALL LENGTH(NEW,LENTH)
                WRITE(UNIT=12,FMT=15,IOSTAT=IERR20)NEW(1:LENTH)
                ENDIF
          IF (IERR20.NE.0) PRINT*,'ERROR IN WRITING TO EFFORT SCRATCH'
          NEWEFF=.FALSE.
          GOTO 51

60        REWIND(11)
          REWIND(12)
          PRINT*,'END OF EFFORT FILE REACHED'
*****************************************************************
*
* opening the reformatted files and combining them into one new file
* that is sequenced in date time order.
*
* sorting the files into date time order
          READ(UNIT=11,FMT=15,IOSTAT=IERR3)SIGHT
          IF (IERR3.NE.0) PRINT*,'ERROR IN READING SIGHT SCRATCH'
          READ(UNIT=12,FMT=15,IOSTAT=IERR4)EFFORT
          IF (IERR4.NE.0) PRINT*,'ERROR IN READING EFFORT SCRATCH'
          DATE(1)='      '
          k=0
*reading in the datetime from the strings(yymmdd/hhmm)
100        EFFDT=EFFORT(17:18)//EFFORT(13:16)//EFFORT(6:9)
          SIGHTDT=SIGHT(17:18)//SIGHT(13:16)//SIGHT(6:9)
          CODE=SIGHT(4:4)

*comparing the datetime to determine the order
         IF ((EFFDT.LT.SIGHTDT).OR.
     *     ((EFFDT.EQ.SIGHTDT).AND.(EFFORT(4:4) .NE. 'E'))) THEN
             DATE(2)=EFFDT(1:6)
*reading in the date to determine the sequence number, at the beginning
*of each day the sequence number goes back to 1.
              IF (DATE(2).NE.DATE(1))  K=0
              K=K+1
*writing the sequence number onto the string
220           WRITE(EFFORT(1:3),'(I3)')K
*writing the string onto a new output file
            CALL LENGTH(EFFORT,LENTH)
```

```
          WRITE(UNIT=13,FMT=15,IOSTAT=IERR30) EFFORT(1:LENTH)
          IF(IERR30.NE.0) PRINT*,'ERROR IN WRITING TO'//NEW_COMB
*          PRINT*,EFFORT
          DATE(1)=DATE(2)
*reading in the next string
          READ(UNIT=12,FMT=15,IOSTAT=IERR5,END=710) EFFORT
          IF (IERR5.NE.0) PRINT*,'ERROR IN READING EFFORT SCRATCH'
          GOTO100
       ENDIF

       IF (SIGHTDT.LE.EFFDT) THEN
          DATE(2)=SIGHTDT(1:6)
*reading in the date to determine the sequence number, at the beginning
*of each day the sequence number goes back to 1.
            IF (DATE(2).NE.DATE(1))  K=0
            IF ((CODE.EQ.'1').OR.(CODE.EQ.'2').OR.(CODE.EQ.'3').OR.
     *  (CODE.EQ.'4').OR.(CODE.EQ.'5').OR.(CODE.EQ.'6')) GOTO 310
            K=K+1
          WRITE(SIGHT(1:3),'(I3)')K
310       CALL LENGTH(SIGHT,LENTH)
          WRITE(UNIT=13,FMT=15,IOSTAT=IERR30) SIGHT(1:LENTH)
          IF(IERR30.NE.0) PRINT*,'ERROR IN WRITING TO'//NEW_COMB
*          PRINT*,SIGHT
          DATE(1)=DATE(2)
          READ(UNIT=11,FMT=15,IOSTAT=IERR6,END=610) SIGHT
          IF (IERR6.NE.0) PRINT*,'ERROR IN READING SIGHT SCRATCH'
          GOTO 100
       ENDIF

600        READ(UNIT=12,FMT=15,IOSTAT=IERR7,END=850) EFFORT
          IF (IERR7.NE.0) PRINT*,'ERROR IN READING EFFORT SCRATCH'
           DATE(2)=EFFDT(1:6)
*reading in the date to determine the sequence number, at the beginning
*of each day the sequence number goes back to 1.
610         IF (DATE(2).NE.DATE(1))  K=0
            K=K+1
          WRITE(EFFORT(1:3),'(I3)')K
          CALL LENGTH(EFFORT,LENTH)
          WRITE(UNIT=13,FMT=15,IOSTAT=IERR30) EFFORT(1:LENTH)
          IF(IERR30.NE.0) PRINT*,'ERROR IN WRITING TO INTEG.OUT'
          DATE(1)=DATE(2)
*          PRINT*,EFFORT
          GOTO 600

*reading from the new format sight file
700        READ(UNIT=11,FMT=15,IOSTAT=IERR8,END=850) SIGHT
          IF (IERR8.NE.0) PRINT*,'ERROR IN READING SIGHT SCRATCH'
*reading in the date to determine the sequence number, at the beginning
*of each day the sequence number goes back to 1
710       DATE(2)=SIGHTDT(1:6)
            IF (DATE(2).NE.DATE(1))  K=0
            IF ((CODE.EQ.'1').OR.(CODE.EQ.'2').OR.(CODE.EQ.'3').OR.
     *  (CODE.EQ.'4').OR.(CODE.EQ.'5').OR.(CODE.EQ.'6')) GOTO 711
            K=K+1
          WRITE(SIGHT(1:3),'(I3)')K
711       CALL LENGTH(SIGHT,LENTH)
          WRITE(UNIT=13,FMT=15,IOSTAT=IERR30) SIGHT(1:LENTH)
          IF(IERR30.NE.0) PRINT*,'ERROR IN WRITING TO INTEG.OUT'
*          PRINT*,SIGHT
          DATE(1)=DATE(2)
```

```
          GOTO 700
*
*checking the data
*
850       REWIND(13)
          PRINT*,'Checking the data for position errors'
851       I=0
          READ(13,15)NEW1
          I=I+1
          IF (NEW1(20:20).EQ.' ') GOTO 851
          READ(NEW1(13:18),'(I6)')DATE1
          new1(4:4)=cd1
*reading the minutes & degrees, converting them to degrees & decimal
* degrees

          READ(NEW1(24:35),'(I2)')MINLAT
          READ(NEW1(35:36),'(I2)')MINLONG
          READ(NEW1(21:22),'(I2)')DGLAT
          READ(NEW1(31:33),'(I3)')DGLONG

          DECLAT=(FLOAT(MINLAT))/60
          DECLONG=(FLOAT(MINLONG))/60
          RLAT1=FLOAT(DGLAT) + DECLAT
          RLONG1=FLOAT(DGLONG)+ DECLONG
          IF (NEW1(20:20).EQ.'S') RLAT1= -1*RLAT1
          IF (NEW1(30:30).EQ.'E')RLONG1= -1*RLONG1

          READ(NEW1(6:7),'(I2)')HR1
          READ(NEW1(8:9),'(I2)')MIN1
          DECTIME1=(FLOAT(MIN1))/60
          TIME1=FLOAT(HR1)+DECTIME1

855       read(UNIT=13,FMT=15,END=800)NEW2
          I=I+1
*checking to see if any position was recorded
          IF (new2(20:20).EQ.' ') GOTO 855
           cd2=new2(4:4)
          if(cd2.eq.'P') goto 855

* calculating the time in hrs and decimal hours
          READ(new2(6:7),'(I2)')HR2
          READ(new2(8:9),'(I2)')MIN2
          DECTIME2=(FLOAT(MIN2))/60
          TIME2=FLOAT(HR2)+DECTIME2
* checking for a time change (no time change, no need to calculate dist.)
          IF(TIME2.EQ.TIME1) GOTO 855

          READ(new2(24:35),'(I2)')MINLAT
          READ(new2(35:36),'(I2)')MINLONG
          READ(new2(21:22),'(I2)')DGLAT
          READ(new2(31:33),'(I3)')DGLONG

          DECLAT=(FLOAT(MINLAT))/60
          DECLONG=(FLOAT(MINLONG))/60
          RLAT2=FLOAT(DGLAT) + DECLAT
          RLONG2=FLOAT(DGLONG)+ DECLONG
          IF (new2(20:20).EQ.'S') RLAT2= -1*RLAT2
          IF (new2(30:30).EQ.'E')RLONG2= -1*RLONG2

*checking the dates. if different days dont calculate speed
```

```
          READ(new2(13:18),'(I6)')DATE2
          IF (DATE1.NE.DATE2) THEN
           TIME1=TIME2
           DATE1=DATE2
           RLAT1=RLAT2
           RLONG1=RLONG2
           cd1=cd2
           new1=new2
           GOTO 855
          ENDIF



*using the grcirc subroutine to calculate distance between points
            CALL GRCIRC(RLAT1,RLONG1,RLAT2,RLONG2,DIST)
          IF (DIST.GT.20) THEN
           VEL=DIST/(TIME2-TIME1)
           DTIME=(TIME2-TIME1)
*           PRINT*,VEL
           IF((VEL.GT.20).OR.(VEL.LT.0)) THEN
            PRINT*,'POSSIBLE ERROR IN LINE.',I,' UNLIKELY VEL. '
            WRITE(14,15)' '
            WRITE(14,18)'POSSIBLE ERROR IN LINE.',I,' UNLIKELY VEL. '
            WRITE(14,19)'VEL=',VEL
            WRITE(14,14)'DTIME=',DTIME

*determining which file the positions came from
             if((cd1.eq.'B').OR.(cd1.EQ.'R').OR.(cd1.EQ.'V').OR.(cd1.EQ.
     *        'N').OR.(cd1.EQ.'W').OR.(CD1.EQ.'E')) THEN
               WRITE(14,15) 'POSITION1 FROM EFFORT FILE'
             elseif (cd1.eq.'P') then
               Write(14,15)'position1 from effort or sight not known'
             else
                write(14,15)'POSITION1 FROM THE SIGHTING FILE'
             endif
               WRITE(14,15) 'TIME, DATE, AND POS ', new1(6:40)
               write(14,15) ' '

             if((cd1.eq.'B').OR.(cd1.EQ.'R').OR.(cd1.EQ.'V').OR.(cd1.EQ.
     *        'N').OR.(cd1.EQ.'W').OR.(CD1.EQ.'E')) THEN
               WRITE(14,15) 'POSITION2 FROM EFFORT FILE'
             elseif (cd2.eq.'P') then
               Write(14,15)'position2 From effort or sight not known'
             else
                write(14,15)'POSITION2 FROM THE SIGHTING FILE'
             endif
               WRITE(14,15) 'TIME, DATE, AND POS ', new2(6:40)
               write(14,15) ' '
            ENDIF
          ENDIF
          TIME1=TIME2
          DATE1=DATE2
          RLAT1=RLAT2
          RLONG1=RLONG2
          cd1=cd2
          new1=new2
          GOTO 855


800       CLOSE(1)
```

```
        CLOSE(2)
        CLOSE(11)
        CLOSE(12)
        CLOSE(13)
        CLOSE(14)
        PRINT*, NEW_COMB//' HAS BEEN PROCESSED'
        PRINT*,' '
        GOTO 2
805     PRINT*,'ALL FILES HAVE BEEN PROCESSED'
        END
*****************************************************************
        SUBROUTINE LENGTH(NEW,LENTH)
*
* This subroutine estimates the length of a character string excluding
*     the trailing blanks
        CHARACTER*80 NEW
         LENTH= 80
         DO 10 I=80,1,-1
          IF(NEW(I:I).EQ.' ')THEN
           LENTH=I-1
          ELSE
           RETURN
          ENDIF
10      CONTINUE
        RETURN
        END

*****************************************************************
      SUBROUTINE GRCIRC(RLAT1,RLONG1,RLAT2,RLONG2,DIST)
C
C...THIS PROGRAM COMPUTES GREAT CIRCLE DISTANCES BETWEEN TWO COORDINATES
C       USING ALGORITHM TAKEN FROM KEN WALLACE'S PROGRAM (REPUTED TO HAVE
C       BEEN LIFTED FROM H.P. PROGRAM MANUAL).  COORDINATES ARE EXPRESSED
C       AS DEGREES, AND ARE ASSUMED TO BE IN NORTHERN HEMISPHERE, WEST
C       LONGITUDE IF POSITIVE.
C
      IMPLICIT DOUBLE PRECISION (B-H, O-Z)
      DOUBLE PRECISION LAS,LAC,LAF
      real*4 RLAT1,RLONG1,RLAT2,RLONG2,DIST
      DACOS(X)= (3.1415926535 / 2.0) - DATAN( X / DSQRT(1.0 - X*X) )
      DIST= 0.0
      PI= 3.141592653589793
      R= PI / 180.0
      D= 180.0 / PI
C
C...COMPUTE GREAT CIRCLE DISTANCE
      LAS= (DSIN(RLAT1*R)) * (DSIN(RLAT2*R))
      LAC= (DCOS(RLAT1*R)) * (DCOS(RLAT2*R)) *
     1     (DCOS((RLONG1 - RLONG2)*R))
      LAF= LAS + LAC
      IF (LAF .GT. 1.0) LAF=  1.0
      IF (LAF .LT.-1.0) LAF= -1.0
      IF (LAF .EQ. 1.0) GO TO 999
      DIST= (DACOS(LAF)) * D * 60.0
 999  CONTINUE
      RETURN
      END

*****************************************************************
*****************************************************************
```

```
        SUBROUTINE E (PES)
*
* This subroutine creates an end of effort event.
*
        CHARACTER PES*3134,NEW*80,BLANKSTRING*80
        CHARACTER LATHEM*1,LONGHEM*1,B$
        COMMON NEW,BLANKSTRING,B$,PSS, SPPCODE
* initializing new part of string
        NEW(20:80)=BLANKSTRING(20:80)
* event type
        NEW(4:4)='E'
        NEW(5:5)=' '
*time
        IF (PES(31:31).EQ.' ') PES(31:31)='0'
        NEW(6:12)=PES(31:34)//'  '//B$
*position
            IF (PES(74:74).EQ.'1') THEN
                  LATHEM='N'
            ELSEIF (PES(74:74).EQ.'2') THEN
                  LATHEM='S'
            ELSE
                  LATHEM=' '
            ENDIF

           IF (PES(80:80).EQ.'1') THEN
                 LONGHEM='E'
           ELSEIF (PES(80:80).EQ.'2') THEN
                 LONGHEM='W'
           ELSE
                 LONGHEM=' '
           ENDIF

           IF(PES(70:73).NE.'    ') THEN
            IF(PES(70:70).EQ.' ') PES(70:70)='0'
            IF(PES(71:71).EQ.' ') PES(71:71)='0'
            IF(PES(72:72).EQ.' ') PES(72:72)='0'
           ENDIF

           IF(PES(75:79).NE.'     ') THEN
            IF(PES(75:75).EQ.' ') PES(75:75)='0'
            IF(PES(76:76).EQ.' ') PES(76:76)='0'
            IF(PES(77:77).EQ.' ') PES(77:77)='0'
            IF(PES(78:78).EQ.' ') PES(78:78)='0'
           ENDIF

             NEW(20:40)=LATHEM//PES(70:71)//':'//
     *          PES(72:73)//'.   '//LONGHEM//PES(75:77)
     *          //':'//PES(78:79)//'.  '

        RETURN
        END
*****************************************************************
        SUBROUTINE V (PES,NEWEFF,OLDV)
*
*This subroutine creates a viewing condition event
*
        CHARACTER PES*3134,NEW*80,BLANKSTRING*80,OLDV*80
        CHARACTER LATHEM*1,LONGHEM*1,B$
        LOGICAL NEWEFF
        COMMON NEW,BLANKSTRING,B$,PSS, SPPCODE
```

```
* initializing new part of string
        NEW(41:80)=BLANKSTRING(41:80)
* event type
        NEW(4:4)='V'
        NEW(5:5)='.'
* beaufort
        NEW(41:45)='   '//PES(25:25)//B$
* swell ht
        NEW(46:50)=BLANKSTRING(46:50)
* swell dir
        NEW(51:55)=BLANKSTRING(51:55)
* water temp
        NEW(56:60)=' '//PES(22:23)//'.'//PES(24:24)//B$

        IF (((NEW(41:80) .NE. OLDV(41:80)).OR.(NEWEFF))) THEN
           OLDV(41:80)= NEW(41:80)
        ELSE
           NEW= NEW(1:40)
        ENDIF
        RETURN
        END

*********************************************************************
        SUBROUTINE W (PES,NEWEFF,OLDW)
*
*This subroutine creates a change in weather event.
*

        CHARACTER PES*3134,NEW*80,BLANKSTRING*80,OLDW*80
        CHARACTER LATHEM*1,LONGHEM*1,B$
        LOGICAL NEWEFF
        COMMON NEW,BLANKSTRING,B$,PSS, SPPCODE
*initializing new part of string
        NEW(41:80)=BLANKSTRING(41:80)
* event type
        NEW(4:4)='W'
        NEW(5:5)='.'
* rain or fog code
        NEW(41:45)='   '//PES(26:26)//B$
* horizontal sun
        NEW(46:50)='  '//PES(27:28)//B$
* vertical sun
        NEW(51:55)='  '//PES(29:30)//B$
*wind direction
        NEW(56:60)=BLANKSTRING(56:60)
*visibilty
        NEW(61:65)=BLANKSTRING(61:65)

        IF (((NEW(41:80) .NE. OLDW(41:80)).OR.(NEWEFF))) THEN
           OLDW(41:80)= NEW(41:80)
        ELSE
           NEW= NEW(1:40)
        ENDIF
        RETURN
        END
*********************************************************************
        SUBROUTINE N (PES,NEWEFF,OLDN)
*
*This subroutine creates a navigation information event.
*
```

```
        CHARACTER PES*3134,NEW*80,BLANKSTRING*80,OLDN*80
        CHARACTER LATHEM*1,LONGHEM*1,B$
        LOGICAL NEWEFF
        COMMON NEW,BLANKSTRING,B$,PSS, SPPCODE
*initializing new part of string
        NEW(41:80)=BLANKSTRING(41:80)
*event type
        NEW(4:4)='N'
        NEW(5:5)='.'
* course
        NEW(41:45)=' '//PES(35:37)//B$
* speed
        NEW(46:50)=PES(38:39)//'.'//PES(40:40)//B$

        IF (((NEW(41:80) .NE. OLDN(41:80)).OR.(NEWEFF))) THEN
           OLDN(41:80)= NEW(41:80)
        ELSE
           NEW= NEW(1:40)
        ENDIF
        RETURN
        END
*****************************************************************
        SUBROUTINE B(PES,POS)
*
*This subroutine creates a beginning of effort event.
*

        CHARACTER PES*3134,NEW*80,BLANKSTRING*80
        CHARACTER LATHEM*1,LONGHEM*1,B$
        COMMON NEW,BLANKSTRING,B$,PSS, SPPCODE
        NEW(1:80)=BLANKSTRING(1:80)
        NEW(4:4)='B'
        NEW(5:5)='.'
*time
             IF(PES(17:17).EQ.' ') PES(17:17)='0'
             NEW(6:12)=PES(17:20)//'  '//B$
*date
             NEW(13:19)=PES(7:10)//PES(5:6)
*position
         IF((POS.EQ.0).AND.(PES(90:90).NE.'1')) THEN

           IF(PES(59:62).NE.'    ') THEN
            IF(PES(59:59).EQ.' ') PES(59:59)='0'
            IF(PES(60:60).EQ.' ') PES(60:60)='0'
            IF(PES(61:61).EQ.' ') PES(61:61)='0'
           ENDIF

           IF(PES(64:68).NE.'     ') THEN
            IF(PES(64:64).EQ.' ') PES(64:64)='0'
            IF(PES(65:65).EQ.' ') PES(65:65)='0'
            IF(PES(66:66).EQ.' ') PES(66:66)='0'
            IF(PES(67:67).EQ.' ') PES(67:67)='0'
           ENDIF

            IF (PES(63:63).EQ.'1') THEN
                  LATHEM='N'
            ELSEIF (PES(63:63).EQ.'2') THEN
                  LATHEM='S'
            ELSE
```

```
                LATHEM=' '
             ENDIF

             IF (PES(69:69).EQ.'1') THEN
                   LONGHEM='E'
             ELSEIF (PES(69:69).EQ.'2') THEN
                   LONGHEM='W'
             ELSE
                   LONGHEM=' '
             ENDIF
               NEW(20:40)=LATHEM//PES(59:60)//':'//
      *           PES(61:62)//'.   '//LONGHEM//PES(64:66)
      *           //':'//PES(67:68)//'.  '

            ELSEIF(PES(90:90).EQ.'1') THEN
               NEW(20:40)=' '//'  '//':'//
      *           '  '//'.   '//' '//'  '
      *           //':'//'  '//'.  '

            ELSE

             IF (PES(45:45).EQ.'1') THEN
                   LATHEM='N'
             ELSEIF (PES(45:45).EQ.'2') THEN
                   LATHEM='S'
             ELSE
                   LATHEM=' '
             ENDIF

             IF (PES(51:51).EQ.'1') THEN
                   LONGHEM='E'
             ELSEIF (PES(51:51).EQ.'2') THEN
                   LONGHEM='W'
             ELSE
                   LONGHEM=' '
             ENDIF

               NEW(20:40)=LATHEM//PES(41:42)//':'//
      *           PES(43:44)//'.   '//LONGHEM//PES(46:48)
      *           //':'//PES(49:50)//'.  '
            ENDIF
*cruise number
                NEW(41:44)=PES(1:4)
          RETURN
          END
*****************************************************************
          SUBROUTINE R(PES,POS)
*
*This subroutine creates a resume effort event.
*

          CHARACTER PES*3134,NEW*80,BLANKSTRING*80
          CHARACTER LATHEM*1,LONGHEM*1,B$
          COMMON NEW,BLANKSTRING,B$,PSS, SPPCODE
          NEW(1:80)=BLANKSTRING(1:80)
          NEW(4:4)='R'
          NEW(5:5)='.'
*time
               IF(PES(17:17).EQ.' ') PES(17:17)='0'
               NEW(6:12)=PES(17:20)//'  '//B$
```

```
*date
              NEW(13:19)=PES(7:10)//PES(5:6)
*position
         IF((POS.EQ.0).AND.(PES(90:90).NE.'1')) THEN

            IF(PES(59:62).NE.'    ') THEN
             IF(PES(59:59).EQ.' ') PES(59:59)='0'
             IF(PES(60:60).EQ.' ') PES(60:60)='0'
             IF(PES(61:61).EQ.' ') PES(61:61)='0'
            ENDIF

            IF(PES(64:68).NE.'     ') THEN
             IF(PES(64:64).EQ.' ') PES(64:64)='0'
             IF(PES(65:65).EQ.' ') PES(65:65)='0'
             IF(PES(66:66).EQ.' ') PES(66:66)='0'
             IF(PES(67:67).EQ.' ') PES(67:67)='0'
            ENDIF

             IF (PES(63:63).EQ.'1') THEN
                   LATHEM='N'
             ELSEIF (PES(63:63).EQ.'2') THEN
                   LATHEM='S'
             ELSE
                   LATHEM=' '
             ENDIF

            IF (PES(69:69).EQ.'1') THEN
                  LONGHEM='E'
            ELSEIF (PES(69:69).EQ.'2') THEN
                  LONGHEM='W'
            ELSE
                  LONGHEM=' '
            ENDIF
              NEW(20:40)=LATHEM//PES(59:60)//':'//
     *           PES(61:62)//'.   '//LONGHEM//PES(64:66)
     *           //':'//PES(67:68)//'.  '

           ELSEIF(PES(90:90).EQ.'1') THEN
              NEW(20:40)=' '//'  '//':'//
     *           '  '//'.   '//' '//'   '
     *           //':'//'  '//'.  '

           ELSE

            IF (PES(45:45).EQ.'1') THEN
                  LATHEM='N'
            ELSEIF (PES(45:45).EQ.'2') THEN
                  LATHEM='S'
            ELSE
                  LATHEM=' '
            ENDIF

            IF (PES(51:51).EQ.'1') THEN
                  LONGHEM='E'
            ELSEIF (PES(51:51).EQ.'2') THEN
                  LONGHEM='W'
            ELSE
                  LONGHEM=' '
            ENDIF
```

```
              NEW(20:40)=LATHEM//PES(41:42)//':'//
     *           PES(43:44)//'.    '//LONGHEM//PES(46:48)
     *           //':'//PES(49:50)//'.  '
            ENDIF
          RETURN
          END
*****************************************************************
          SUBROUTINE P (PES,NEWEFF,OLDP)
*
*This subroutine creates an observer position change event.
*
          CHARACTER PES*3134,NEW*80,BLANKSTRING*80,OLDP*80
          CHARACTER LATHEM*1,LONGHEM*1,B$
          LOGICAL NEWEFF
          COMMON NEW,BLANKSTRING,B$,PSS,SPPCODE
*initializing new part of string
          NEW(41:80)=BLANKSTRING(41:80)
          print*,'in P suroutine 1'
*event type
          NEW(4:4)='P'
* on/off effort(./ )
          NEW(5:5)='.'
* lt obs ID
          NEW(41:45)='  '//PES(52:53)//B$
*recorder ID
          NEW(46:50)='  '//PES(56:57)//B$
* rt obs ID
          NEW(51:55)='  '//PES(54:55)//B$
          print*,'in P suroutine 2'
          IF (((NEW(41:80) .NE. OLDP(41:80)).OR.(NEWEFF))) THEN
             OLDP(41:80)= NEW(41:80)
          ELSE
             NEW= NEW(1:40)
          ENDIF
          RETURN
          END

*****************************************************************
          SUBROUTINE NUM
          CHARACTER*400 PSS
          CHARACTER*80 NEW
          CHARACTER BLANKSTRING*80,B$*2,LATHEM*1,LONGHEM*1
          COMMON NEW,BLANKSTRING,B$,PSS, SPPCODE
*initializing the "NEW" string
          NEW(1:80)=BLANKSTRING(1:80)
*filling in the string piece by piece
*event type
            NEW(4:4)='1'
*on or off effort (if no series number, off effort)
             IF (PSS(13:14).NE.'  ') THEN
              NEW(5:5)='.'
             ELSE
              NEW(5:5)=' '
             ENDIF

*time
           NEW(6:12)=PSS(19:22)//'  '//B$
*date
           NEW(13:19)=PSS(7:10)//PSS(5:6)//B$
*position of sighting
```

```
            IF (PSS(39:39).EQ.'1') THEN
                 LATHEM='N'
            ELSEIF (PSS(39:39).EQ.'2') THEN
                 LATHEM='S'
            ELSE
                 LATHEM=' '
            ENDIF
            IF (PSS(45:45).EQ.'1') THEN
                 LONGHEM='E'
            ELSEIF (PSS(45:45).EQ.'2') THEN
                 LONGHEM='W'
            ELSE
                 LONGHEM=' '
            ENDIF

           NEW(20:40)=LATHEM//PSS(35:36)//':'//PSS(37:38)//'.   '
     *                //LONGHEM//PSS(40:42)//':'//PSS(43:44)//'.  '
     *                //B$

* obs ID
        NEW(41:45)=BLANKSTRING(41:45)
* best ss
        NEW(46:50)=PSS(67:70)//B$
* high ss
        NEW(51:55)=PSS(71:74)//B$
* low ss
        NEW(56:60)=PSS(75:78)//B$
* % spp 1
        NEW(61:65)=' '//PSS(89:91)//B$
* % spp 2
        NEW(66:70)=' '//PSS(99:101)//B$
* % spp 3
        NEW(71:75)=' '//PSS(109:111)//' '
* % spp 4
        NEW(76:80)=' '//PSS(119:121)//B$
        RETURN
        END
*****************************************************************************
        SUBROUTINE SIGHTING
        CHARACTER*400 PSS
        CHARACTER*80 NEW
        CHARACTER BLANKSTRING*80,B$*2,LATHEM*1,LONGHEM*1
        COMMON NEW,BLANKSTRING,B$,PSS, SPPCODE
*initializing the "NEW" string
        NEW(1:80)=BLANKSTRING(1:80)
*filling in the string piece by piece
*event type
          NEW(4:4)='S'
*on or off effort
           IF (PSS(13:14).NE.'  ') THEN
            NEW(5:5)='.'
           ELSE
            NEW(5:5)=' '
           ENDIF
*time of sighting
          NEW(6:12)=PSS(19:22)//'  '//B$
*date
          NEW(13:19)=PSS(7:10)//PSS(5:6)//B$
*position of sighting
           IF (PSS(39:39).EQ.'1') THEN
```

```
              LATHEM='N'
            ELSEIF (PSS(39:39).EQ.'2') THEN
                 LATHEM='S'
            ELSE
                 LATHEM=' '
            ENDIF
            IF (PSS(45:45).EQ.'1') THEN
                 LONGHEM='E'
            ELSEIF (PSS(45:45).EQ.'2') THEN
                 LONGHEM='W'
            ELSE
                 LONGHEM=' '
            ENDIF

           NEW(20:40)=LATHEM//PSS(35:36)//':'//PSS(37:38)//'.   '
     *                //LONGHEM//PSS(40:42)//':'//PSS(43:44)//'.  '
     *                //B$
*sighting#
           NEW(41:45)='  '//PSS(11:12)//B$
*observer ID
           NEW(46:50)=BLANKSTRING(46:50)
*cue
           NEW(51:55)='   '//PSS(23:23)//B$
*site code
            IF (PSS(24:24).LT.'3') THEN
             NEW(56:60)='   '//' '//B$
            ELSE
             NEW(56:60)='   '//PSS(24:24)//B$
            ENDIF

*if no series/leg number, sighting is off effort and is attributed to "crew"
            IF (PSS(13:14).EQ.'  ') THEN
             NEW(56:60)='   '//'6'//B$
             ENDIF
*bearing
           NEW(61:65)=' '//PSS(25:27)//B$
*reticle
           NEW(66:70)=BLANKSTRING(66:70)
*distance in NMI
           NEW(71:74)=PSS(28:29)//'.'//PSS(30:30)
         RETURN
         end
*****************************************************************
         SUBROUTINE ANCILLARY
         CHARACTER*400 PSS
         CHARACTER*80 NEW
         CHARACTER BLANKSTRING*80,B$*2,LATHEM*1,LONGHEM*1
         COMMON NEW,BLANKSTRING,B$,PSS, SPPCODE
*initializing the "NEW" string
         NEW(1:80)=BLANKSTRING(1:80)
*filling in the string piece by piece
*event type
           NEW(4:4)='A'
*on or off effort
            IF (PSS(13:14).NE.'  ') THEN
             NEW(5:5)='.'
            ELSE
             NEW(5:5)=' '
            ENDIF
*time of sighting
```

```
          NEW(6:12)=PSS(19:22)//'  '//B$
*date
          NEW(13:19)=PSS(7:10)//PSS(5:6)//B$
*position of sighting
           IF (PSS(39:39).EQ.'1') THEN
                LATHEM='N'
           ELSEIF (PSS(39:39).EQ.'2') THEN
                LATHEM='S'
           ELSE
                LATHEM=' '
           ENDIF
           IF (PSS(45:45).EQ.'1') THEN
                LONGHEM='E'
           ELSEIF (PSS(45:45).EQ.'2') THEN
                LONGHEM='W'
           ELSE
                LONGHEM=' '
           ENDIF

          NEW(20:40)=LATHEM//PSS(35:36)//':'//PSS(37:38)//'.   '
     *               //LONGHEM//PSS(40:42)//':'//PSS(43:44)//'.  '
     *               //B$
*sighting#
          NEW(41:45)='  '//PSS(11:12)//B$
*water temp
          NEW(46:50)=' '//PSS(32:34)//B$
*photo y/n (not recorded)
          NEW(51:55)='    '//B$
*birds y/n
           IF (PSS(54:54).EQ.'1') NEW(56:60)='   Y '
           IF (PSS(54:54).EQ.'2') NEW(56:60)='   N '
* spp1 code
           IF ((PSS(92:93).NE.'  ').AND.(PSS(92:92).EQ.' '))
     *        PSS(92:92)='0'
           NEW(61:65)='  '//PSS(92:93)//B$
* spp2 code
           IF ((PSS(102:103).NE.'  ').AND.(PSS(102:102).EQ.' '))
     *        PSS(102:102)='0'
           NEW(66:70)='  '//PSS(102:103)//B$
* spp3 code

           IF ((PSS(112:113).NE.'  ').AND.(PSS(112:112).EQ.' '))
     *        PSS(112:112)='0'
           NEW(71:75)='  '//PSS(112:113)//B$
* spp4 code

           IF ((PSS(122:123).NE.'  ').AND.(PSS(122:122).EQ.' '))
     *        PSS(122:122)='0'
           NEW(76:80)='  '//PSS(122:123)//B$
        return
        end
*****************************************************************
        SUBROUTINE COMMENT
        CHARACTER*80 NEW
        CHARACTER BLANKSTRING*80,B$*2,LATHEM*1,LONGHEM*1
        COMMON NEW,BLANKSTRING,B$,PSS, SPPCODE

        NEW(1:80)=BLANKSTRING(1:80)
        NEW(4:4)='C'
        NEW(41:80)='SPP CODE & SCHL SZ ARE CONSENSUSES'
```

```
        RETURN
        END


*************************************************************************
        SUBROUTINE WEATHER
* This subroutine never called because the information recorded on the
*sighting record for weather was not considered appropriate. Only weather
*recorded on the effort file was used.
        CHARACTER*400 PSS
        CHARACTER*80 NEW
        CHARACTER BLANKSTRING*80,B$*2,LATHEM*1,LONGHEM*1
        COMMON NEW,BLANKSTRING,B$,PSS, SPPCODE
*initializing the variables
        NEW(1:80)=BLANKSTRING(1:80)

*leave the sequence number blank for now
         NEW(1:3)=BLANKSTRING(1:3)
*event type
          NEW(4:4)='W'
*on or off effort
           IF (PSS(13:14).NE.'  ') THEN
            NEW(5:5)='.'
           ELSE
            NEW(5:5)=' '
           ENDIF
*time of sighting
          NEW(6:12)=PSS(19:22)//'  '//B$
*date
          NEW(13:19)=PSS(7:10)//PSS(5:6)//B$
*position of sighting
           IF (PSS(43:43).EQ.'1') THEN
                 LATHEM='N'
           ELSEIF (PSS(43:43).EQ.'2') THEN
                LATHEM='S'
           ELSE
                LATHEM=' '
           ENDIF
           IF (PSS(49:49).EQ.'1') THEN
                LONGHEM='E'
           ELSEIF (PSS(49:49).EQ.'2') THEN
                LONGHEM='W'
           ELSE
                LONGHEM=' '
           ENDIF

          NEW(20:40)=LATHEM//PSS(39:40)//':'//PSS(41:42)//'.    '
     *               //LONGHEM//PSS(44:46)//':'//PSS(47:48)//'.  '
     *               //B$

*rain or fog not recorded
          NEW(40:45)=BLANKSTRING(40:45)
*horizontal sun
          NEW(46:50)='  '//PSS(35:36)//B$
*verical sun
          NEW(51:55)='  '//PSS(37:38)//B$
*wind direction not recorded
          NEW(56:80)=BLANKSTRING(56:80)
        RETURN
        END
```

DESCRIPTION OF DATA OUTPUT FORMAT FOR FILES DAS* AND BAK*

COLUMNS

1-3 3-digit sequence number for the given event. Sequence starts anew each day.

4 1-digit code to indicate the type of event.

S	marine mammal sighting
B	begin effort for the day
t	turtle sighting
R	resume effort
E	end effort
V	sea state viewing conditions
N	navigation information
W	weather information
C	comment
P	observer positions
A	auxiliary sighting information
s	sighting position update
*	automatic position record (every 10 minutes)
1,2,3,4,5,or 6	school size and species proportions

5	period . to indicate on-effort event, otherwise blank	
6-11	time (HHMMSS)	
12	blank	
13-18	date (MMDDYY)	
19	blank	
20-39	position, latitude and longitude	
40	blank	
41-44	data field 1	contents of data fields 1-7 depends on type of event (see column 4)
45	blank	
46-49	data field 2	
50	blank	
51-54	data field 3	
55	blank	
56-59	data field 4	
60	blank	
61-64	data field 5	
65	blank	
66-69	data field 6	
70	blank	
71-74	data field 7	

Event	Data Field Number 1	2	3	4	5	6	7
B	Cruise#						
t	ObsID	Spp	Bearing	DistNMI	#turtles	AssocJFR	
R							
E							
V	Beauf	SwHght	SwDir	W.Temp.			
N	Course	Speed					
W	Rain/Fog	HorzSun	VertSun	WindDir	Visibility		
P	Lt/~~Rt~~ObsID	RecordID	~~Lt~~ObsID	IndObsID			
s	Course	Bearing	Rt/Reticle	DistNMI			
*							
S	Sight#	ObsID	Cue	SCode	Bearing	Reticle	DistNMI
A	Sight#	W.Temp	PhotoY/N	BirdsY/N	Spp1Code	Spp2Code	Spp3Code
1,2,3,4, 5, or 6	ObsID	BestSS	HighSS	LowSS	%Spp1	%Spp2	%Spp3

C C Comments are continuous lines across all the data fields and may wrap around to subsequent comment lines.

Event	Description
B	begin effort for the day
t	turtle sighting
R	resume effort
E	end effort
V	sea state viewing conditions
N	navigation information
W	weather information
C	comment
P	observer positions
S	marine mammal sighting
A	auxilary sighting information
s	sighting position update
*	automatic position record (every 10 minutes)
1,2,3,4,5,or 6	school size and species proportions for up to 6 observers

APPENDIX 5

C O D E T A B L E 4 b
- - PROPOSED - -
CETACEAN SPECIES CODES

SPEC CODE	SCIENTIFIC NAME	STANDARD COMMON NAME, OTHER COMMON NAMES....
77		Unidentified dolphin or porpoise
78		Unidentified small whale
79		Unidentified large whale
96		Unidentified cetacean
97		Unidentified object, possible marine mammal
98		Unidentified whale
09	Australophocaene dioptrica	Spectacled porpoise
70	Balaenoptera sp.?	Unidentified Rorqual
71	Balaenoptera acutorostrata	Minke whale
73	Balaenoptera borealis	Sei whale
99	Balaenoptera borealis/edeni	Rorqual identified as a Sei or Bryde's whale
72	Balaenoptera edeni	Bryde's whale
75	Balaenoptera musculus	Blue whale
74	Balaenoptera physalus	Fin whale
67	Balaena mysticetus	Bowhead whale
62	Berardius arnuxii	Arnoux's beaked whale, Southern giant bottlenose whale
63	Berardius bairdii	Baird's beaked whale, Nouthern giant bottlenose whale
68	Caperea marginata	Pygmy right whale
30	Cephalorhynchus commersonii	Commerson's dolphin, Piebald dolphin
29	Cephalorhynchus eutropia	Black dolphin, Chilean dolphin
19	Cephalorhynchus heavisidii	Heaviside's dolphin
20	Cephalorhynchus hectori	Hector's dolphin, Pied dolphin, White front dolphin
45	Delphinapterus leucas	White whale, Beluga, Belukha, Sea canary
05	Delphinus delphis subsp.?	Unidentified common dolphin, Saddleback dolphin, Whitebelly porpoise
17	Delphinus delphis subsp._	Offshore common dolphin, Shortbeaked common dolphin
16	Delphinus delphis subsp._	Baja neritic common dolphin, Longbeaked common dolphin
69	Eschrichtius robustus	Gray whale
86	Eubalaena australis	Southern right whale
66	Eubalaena glacialis	Northern right whale
32	Feresa attenuata	Pygmy killer whale, Slender blackfish
34	Globicephala sp.?	Unidentified pilot whale
36	Globicephala macrorhynchus	Short-finned pilot whale, Blackfish, Pothead
35	Globicephala melas	Long-finned pilot whale, Atlantic pilot whale, blackfish, pothead
21	Grampus griseus	Risso's dolphin, Gray grampus
50	Hyperoodon planifrons	Southern bottlenose whale, Flathead bottlenose whale
84	Hyperoodon ampullatus	Northern Bottlenose, North Atlantic Bottlenose Whale
94	Inia geoffrensis	Boto, Amazon river dolphin
47	Kogia breviceps	Pygmy sperm whale
48	Kogia simus	Dwarf sperm whale
80	Kogia simus/breviceps	Unidentified Kogia - Dwarf or Pygmy sperm whale
26	Lagenodelphis hosei	Fraser's dolphin, Sarawak dolphin
14	Lagenorhynchus acutus	Atlantic white-sided dolphin
12	Lagenorhynchus albirostris	White-beaked dolphin
23	Lagenorhynchus australis	Peale's dolphin, Blackchin dolphin
24	Lagenorhynchus cruciger	Hourglass dolphin
22	Lagenorhynchus obliquidens	Pacific white-sided dolphin, Lag, Hookfin porpoise
25	Lagenorhynchus obscurus	Dusky dolphin
95	Lipotes vexillifer	Baji, Chinese river dolphin, Whitefin dolphin
27	Lissodelphis borealis	Northern right whale dolphin
28	Lissodelphis peronii	Southern right-whale dolphin

C O D E T A B L E 4 b
- - PROPOSED - -
CETACEAN SPECIES CODES

SPEC CODE	SCIENTIFIC NAME	STANDARD COMMON NAME, OTHER COMMON NAMES....
76	Megaptera novaeangliae	Humpback whale
51	Mesoplodon sp.?	Unidentified Mesoplodon
56	Mesoplodon bidens	Sowerby's beaked whale
54	Mesoplodon bowdoini	Andrew's beaked whale, Deepcrest whale
52	Mesoplodon carlhubbsi	Hubb's beaked whale, Archbeak whale
59	Mesoplodon densirostris	Blainevilleʻs beaked whale, Dense-beaked, tropical beaked whale
55	Mesoplodon europaeus	Gervais' beaked whale, Antillean beaked whale
57	Mesoplodon ginkgodens	Ginkgo-toothed beaked whale
58	Mesoplodon grayi	Gray's beaked whale
53	Mesoplodon hectori	Hector's beaked whale
60	Mesoplodon layardii	Strap-toothed whale
65	Mesoplodon pacificus	Longman's beaked whale, Indo-Pacific beaked whale
01	Mesoplodon peruvianus	
82	Mesoplodon mirus	True's Beaked Whale
81	Mesoplodon stejnegeri	Steinger's Beaked Whale, Sabertooth, Bering Sea Beaked Whale
83	Mesoplodon sp.A	Unnamed beaked whale
85	Monodon monoceros	Narwhal, Sea unicorn
43	Neophocaena phocaenoides	Black finless porpoise
08	Orcaella brevirostris	Irrawaddy dolphin, Lumbalumba
37	Orcinus orca	Killer whale
31	Peponocephala electra	Melon-headed whale, Hawaiian/Many-toothed blackfish, Electra dolphin
40	Phocoena phocoena	Harbor porpoise, Herring hog
41	Phocoena sinus	Vaquita, Gulf of California harbor porpoise
42	Phocoena spinipinnis	Burmeister's porpoise, Black porpoise
44	Phocoenoides dalli	Dall's porpoise
46	Physeter macrocephalus	Sperm whale
92	Platanista gangetica	Ganges susu, Ganges dolphin
93	Plantanista minor	Indus susu, Indus dolphin
87	Pontoporia blainvillei	Franciscana, La Plata dolphin
33	Pseudorca crassidens	False killer whale
07	Sotalia fluviatilis	Tucuxi, Guiana dolphin
38	Sousa chinensis	Indo-Pacific hump-backed dolphin, White dolphin
39	Sousa teuszii	Atlantic hump-backed dolphin
02	Stenella attenuata subsp.A	Offshore pantropical spotted dolphin, Offshore spotter
90	Stenella attenuata subsp.?	Unidentified pantropical spotted dolphin, Spotter porpoise
06	Stenella attenuata graffmani	Coastal spotted dolphin, Spotter, Silverbacks
89	Stenella attenuata/plagidon	Unidentified Atlantic spotted dolphin
91	Stenella frontalis	Atlantic spotted dolphin, Spotter porpoise
04	Stenella clymene	Clymene dolphin, Short-snouted spinner dolphin
13	Stenella coeruleoalba	Striped dolphin, Streaker porpoise, Euphrosyne dolphin
11	Stenella longirostris hybrid	Whitebelly spinner dolphin
88	S. longirostris centroamericana	Central American spinner dolphin, Costa Rican spinner dolphin
10	S. longirostris orientalis	Eastern spinner dolphin
03	Stenella longirostris subsp.?	Unidentified spinner dolphin, Spinner porpoise
15	Steno bredanensis	Rough-toothed dolphin, Steno
64	Tasmacetus shepherdi	Shepherd's beaked whale
18	Tursiops truncatus	Bottlenose dolphin, Black porpoise, Common porpoise
49	Ziphiid ?	Unidentified beaked whale
61	Ziphius cavirostris	Cuvier's beaked whale, Goose-beaked whale

GUIDE TO CONVERTING PRE-1991 DATA TO NEW FORMAT

This is a description of how to change data in old formats (M and R formats) into data in the current format (1991 and later). Unfortunately, as a vestige of the way the software was developed, the data files have to be run through three separate processing programs. The first programs turn the old format effort data into strings of even length. This had to be done to please the Cray computer that the programs were originally run on. The second programs fill in dead reckoned positions for missing positions in the effort data. The third programs (which I wrote) take in 'M' or 'R' format sighting data, along with processed effort data, and convert them into the new DAS format.

The process for converting 'M' format data is as follows.

1. Open the msep.inp file.

2. On the first line of the file place the name of the effort file to be processed. For example, if the cruise number is 207, the first line of would be 'ME207.DAT'.

3. On the second line of the file place the name of the output file. You are free to name this file anything you would like, but Something like 'SEP207.DAT' is recommended, where 207 indicates the cruise number.

This is what the msep.inp file described above will look like:

```
**************************************************************
ME207.DAT                              INPUT EFFORT FILE
SEP207.DAT                             OUTPUT FILE
**************************************************************
```

In this program you can list multiple files to be processed. To do so just add the proper file names to the input file. For example, if you want to process both cruise 207 and cruise 310, simply modify the msep.inp file to look like this.

```
**************************************************************
ME207.DAT                              INPUT EFFORT FILE
SEP207.DAT                             OUTPUT FILE
ME310.DAT                              INPUT EFFORT FILE
SEP310.DAT                             OUTPUT EFFORT FILE
**************************************************************
```

4. Run the msep program.

5. Open the maddpos.inp file

6. On the first line place the name of the processed effort file. This is the output file from msep.

7. On the second line place the name of the output file. Again you are free to name it anything you like, but something like POS207.OUT is recommended, where POS indicates positions have been added, and 207 is the cruise number.

For example, the maddpos.inp file might look like this.

```
*****************************************************************
SEP207.DAT                          INPUT FILE (PRODUCT OF MSEP)
POS207.DAT                          OUTPUT FILE
*****************************************************************
```

The maddpos program is not capable of processing multiple files so only one input and one output file can be listed.

8. Run the maddpos program.

9. Open the mdata.inp file.

10. On the first line place the name of the sighting file.

11. On the second line place the name of the processed effort file. This is the output file from maddpos.

12. On the third line place the name of the output file.

13. On the fourth line place the name of the error output file, for example 207.err. This file will contain error messages related to the data conversion.

For example the mdata.inp file might look like this.

```
*****************************************************************
MS207.DAT                           SIGHTING FILE
POS207.DAT                          INPUT EFFORT FILE
DAS207.DAT                          OUTPUT FILE
207.ERR                             ERROR FILE
*****************************************************************
```

Multiple files can be processed by MDATA by modifying the input file. For example if you would like to process both cruise 207 and cruise 310 your input file would look like this.

```
*****************************************************************
MS207.DAT                           INPUT SIGHTING FILE
POS207.DAT                          INPUT EFFORT FILE
DAS207.DAT                          OUTPUT FILE
207.ERR                             ERROR FILE
MS310.DAT                           SIGHTING FILE
POS310.DAT                          INPUT EFFORT FILE
DAS310.DAT                          OUTPUT FILE
310.ERR                             ERROR FILE
```

14. Run the mdata program

15. The process is finished. The das207.dat file is the data in the new format.

The process for converting 'R' format data is nearly identical. The only difference is the name of the files. For example, instead of msep there is rsep, instead of maddpos there is raddpos, and instead of mdata there is rdata; otherwise the process is the same.

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