National Institute of Oceanography,

Wormley, Godalming, Surrey.

# RRS DISCOVERY CRUISE 52 REPORT

February - March 1973

Transatlantic section in 32°N and

Biological work in Ocean Acre.

NIO Cruise Report No. 59

1973

## ADDENDUM

Since this cruise took place the National Institute of Oceanography has been renamed Institute of Oceanographic Sciences (IOS).

Contents

## Scientific personnel

| | |
|---|---|
| R.G. Aldred | IOS |
| M.V. Angel | IOS |
| J.R. Badcock | IOS |
| A. de C. Baker | IOS joined Bermuda |
| F. Bilimoria | IOS |
| J. Craddock | Woods Hole Oceanographic Institution joined Bermuda |
| P.M. David | IOS (Principal Scientist from 10 March) |
| R. Gibbs | Smithsonian Institution joined Bermuda |
| M.J. Harris | IOS |
| P.J. Herring | IOS |
| P.T. James | IOS |
| M.J. McCartney | IOS left Bermuda |
| N.R. Merrett | IOS |
| N.C. Millard | IOS left Bermuda |
| J.A. Moorey | IOS joined Bermuda |
| G.K. Morrison | IOS left Bermuda |
| P. Pugh | IOS |
| C. Roper | Smithsonian Institution joined Bermuda |
| B. Robison | WHOI joined Bermuda |
| T. Sankey | IOS |
| D.M. Shale | IOS |
| J.C. Swallow | IOS (Principal Scientist to 10 March) |
| A Voss | IOS |
| R.A. Wild | IOS |

## Abbreviations

| | |
|---|---|
| RMT 1+8 | Standard combination of nets RMT 1 (Rectangular midwater trawl with sampling area of 1 sq m;mesh size 0.32mm) and RMT 8/5 (Rectangular midwater trawl with sampling area of 8 sq m; mesh size 4.5mm). |
| RMT 25 | Rectangular midwater trawl with a sampling area of 25 sq m. |
| NN | Neuston net. |
| TSD | Temperature, salinity, depth probe. |
| MS | Multiple water sampler. |
| WB | Water bottle (standard IOS). |
| LWB | 7 litre water bottle. |
| LHS | Longhurst Hardy Sampler. |

Introduction.

The Smithsonian Institution have for a number of years carried out a programme which sampled the macroplankton and micronekton in the vicinity of Bermuda. Their main collecting apparatus has been the Isaacs Kidd midwater trawl variously adapted to give discrete depth samples. The programme looked mainly at the seasonal variations in distribution. During a similar period our own programme of sampling in the Eastern North Atlantic using opening/closing Rectangular trawls has examined variations in distribution resulting from latitudinal differences. It was clear that both programmes would benefit greatly if the degree of comparability of the data was known. Discovery was due to participate in the Mid Ocean Dynamics Experiment in 1973 and was to operate from Bermuda, so by some rearrangement of the ship's programme it was possible to have three weeks for biological work off Bermuda before MODE. It had been planned that one of the ships used by the Smithsonian would operate off Bermuda at the same time as Discovery, but unfortunately this could not be arranged. However, U.S. scientists joined Discovery, and we were able to fish a series of net hauls at the particular depths they advised for comparison with their own hauls as well as fishing our own serial sampling for comparison with catches from other areas. The long passage from the N. African Coast to Bermuda provided an opportunity to make net hauls which linked our sampling in the Eastern Atlantic with that in the West.

Itinerary.

RRS Discovery sailed from Barry at 1600 hrs on the 17th February and proceeeded towards the N.W. African Coast in latitude 32°N. On the 19th the ship stopped to pay out and tension the main warp and to pressure test a glass reinforced plastic sphere.

The section off N.W. Africa began at 0600 on 22nd February and intensive hydrological stations were worked until 1500 hrs on the 24th. The section on 32°N then began and continued until the 9th March. The routine adopted on this part of the voyage consisted of a station each evening at which the TSD was used to 100m in conjunction with a multisampler. This was followed by an oblique net haul to 1000m, using the combined RMT 1 + 8. In the forenoon on most days tests of float circuits and other preparations for the MODE cruise were made.

Discovery arrived at St. Georges on 10th March. There was some change of personnel. Dr. Clyde Roper and Dr. Robert Gibbs from the Smithsonian Institution and Mr. James Craddock and Dr. Bruce Robison from Woods Hole Oceanographic Institution joined the ship which sailed from St. Georges at 1800 hrs on the 12th.

Discovery worked in the Ocean Acre position (a one degree square centred on 32°N 64°W) from 11th to 28th March. A vertical series of opening/closing RMT 1 + 8 nets was completed and a series of horizontal hauls at depths selected by Drs Gibbs and Roper for comparison with the Smithsonian collections was also made.

It had been planned that a series of RMT 25 hauls and some bottom net hauls would be done but a spell of bad weather cut short the RMT 25 series and in the time remaining no area of bottom could be found which was suitably flat for bottom nets.

The ship berthed in Ireland Island to take on fuel in the forenoon of the 28th and secured at St. Georges in the same afternoon.

The biologists left the ship to return to U.K. on the same day.

Physical Oceanography 1. STD and water bottle work

On leg 1 13 STD + water bottle stations were made in the first 300 miles out from the African coast on 32°N as a contribution to the CINECA (Co operative investigations of the North East central Atlantic) project and a further series of 13 stations (one each day) were made on the remainder of the 32°N section across to Bermuda. One station was taken on leg 2 in conjunction with the biological work.

The CINECA project has a biological and chemical emphasis in looking at the productive areas off NW Africa. Therefore a separate shallow water bottle cast was used to sample depths of 0-200m except on the first three stations which were on the continental shelf. Water bottles on the STD wire and, on three stations, the rosette multisampler were used for the remaining levels. Two stations were taken deep, the remainder to 1000m only. Nutrient samples (oxygen, phosphate, and silicate) were taken from all shallow cast bottles and roughly every other deep cast bottle.

The 32°N section stations were taken to 1000m, using the STD with one water bottle fired at 1000m and one at 10m. These provided an interesting repeat of the upper portion of one of the IGY sections in the Fuglister atlas. While the section was similar overall, significant differences were found notably in the sharpness of the boundaries of the 18°C water and the Mediterranean water influences.

Throughout the cruise, the model 9006 STD sea unit was used with the new temperature and pressure sensors and the old salinity sensor. The STD pressure sensor showed a 2 decibar offset at the surface; at greater depths the difference between the STD and the unprotected thermometers was not significant and so a zero correction was used. The temperature sensor read low relative to the deep sea reversing thermometers (DSRTs) by about 0.03°C at 18°C increasing to 0.09°C at 4°C. Both temperature and pressure calibrations are similar to those found on cruise 46 in May 1972 with the same sensors. However the results found on cruise 53 with the same DSRTs compared to some calibrated at Woods Hole Oceanographic Institution and to the CTD probe have indicated that much of the temperature differences may be due to errors in the thermometer calibration. The DSRT pairings were rotated but as the thermometers were used on relatively few stations and over a wide range of temperatures the analysis gave very scattered values for the relative differences between thermometers.

The salinity sensor read low relative to the water bottle salinities measured on the Cox thermostat salinometer by about 0.260% at the surface increasing to about 0.330% at 2500 decibars. A salinity correction as a function of pressure based on the CINECA section stations was used for calibration. However a plot of the correction against temperature gave a less scattered plot for the remainder of the section and it is proposed to rework the calibration applying a correction linear in temperature. After applying this correction the points fall into two groups from the CINECA section (up to Stn 8261) reading about 0.020% less low that the later stations.

The rosette mutlisampler and water bottles gave no trouble but the STD failed on the station on leg 2 due to a faulty plug on the temperature sensor unit and a blow decoupling capacitor in the mixer unit.

The STD data handling programs on the 1800 computer were used successfully. Some development work was carried out on the basic sampling suite and on some ancillary programs used for processing the data.

2. Testing acoustic equipment

During the westward passage between the end of the CINECA section and Bermuda, the transponder float circuits and acoustic release equipment intended for use in Cruise 53 were tested. Two float circuits were lowered with the STD to 1000m at each evening station, and extra tests were made as necessary during most forenoons. It was fortunate that these tests were made, since badly bonded seals were found on about one third of the 36 float transducers, and repairs could be made before they were needed for use.

Signal strengths could only be measured approximately because of the unfavourable directivity pattern of the transducers when lowered vertically, but the functioning of each transponder and release circuit was checked and minor adjustments made.

The temperature and pressure sensors of the acoustic net monitors were compared with the STD sensors by lowering each monitor in turn with the STD to 1000m. They agreed satisfactorily when allowance was made for the relatively slow thermal response of the net monitor.

Biological work

1. Siphonophora

A preliminary investigation of the series of oblique (0-1000m) hauls across the Atlantic at 32°N indicates that there may be some interesting changes in the species of siphonophores present. Rosacea species were commonest in the earlier hauls and there was a great deal of variation in the presence of Vogtia and Ceratocymba species. Chelophyes appendiculata appeared to be rarer in the more westerly hauls. An excellent specimen of the rare nectopyramid, Nectopyramis diomedeae was taken in one haul.

At Ocean Acre (32°N, 64°W; Stn 8281), two complete (?) specimens of Physophora hydrostatica were taken and one was relaxed in $MgCl_2$ before preservation. Several nectophores, with black pigmented straight radial canals, of Erenna richardi were found and in one haul two denuded stems also with black pigmentation were noted. The "Nectalia" post-larval stages of several Halistemma species were noted on several occasions although the adults were rarely taken. The pattern of the ridges on the nectophore of some of these specimens may indicate that they are a new species. Some isolated nectophores of the rare species, Halistemma striata were found in a RMT 25 sample.

2. Ostracoda

More time than usual was available for observation of live organisms on the first leg using material picked from the oblique hauls. Observations were made on the passive sinking velocity of several species and their behavioural response to sharp thermoclines and haloclines. Passive sinking velocities fell into three categories a) species with velocities of about 1cm/sec e.g. Conchoecia spinirostris, C. curta, C. imbricata, Halocypris brevirostris and Halocypria globosa, b) species with sinking velocities of about 2cm/sec e.g. Conchoecia secernenda, C. lophura, and C. rhynchena, c) species with sinking velocities of 5cm/sec e.g. Macrocypridina castanea. All the species in the first category showed the ability to reduce their sinking rate almost to nil i.e. neutral buoyancy.

Haloclines were set up by carefully pouring surface water ( 36.5‰) on top of 1000m water ( 35.5‰). One batch of water was marked with dilute fluorescein so that the position of the halocline could be observed visually. Experiments were carried out at laboratory temperatures (21-23°C) and in the cold room (8-9°C). No behavioural response was noted in animals sinking through this halocline.

Thermoclines were set up by immersing the bottom half of a 20cm tube in water cooled by Churchill cooler. The surface water remained at laboratory temperature and the thermocline was over a distance of about 2cm with decreases ranging from 5° to 10°C. No consistent response was noted on the experimental animals. However swimming was frequently initiated in sinking animals, and sinking behaviour in animals swimming upwards. Halocypria globosa was especially liable to oscillate within the region of the discontinuity, individuals staying up to five minutes within this zone.

Inspection of the hauls in the series confirmed the results of Deevey (1968) which showed that the Sargasso Sea area is rich in planktonic ostracods. One specimen from 3500-2500m haul of a new Halocypria species appeared to be brooding eggs. Only Euconchoecia species were previously known to brood. Gigantocypris dracontovalis was also caught in small numbers in the deepest hauls, confirming the suggestion made after cruise 51 that it may be widespread in the N. Atlantic at great depths.

3. Euphausiacea

Horizontal Distribution along 32°N

A feature of the euphausiid assemblage contained in the RMT 8 samples which were collected by 0-1000m oblique hauls at approximately 3°intervals along the 32°N parallel from 16° - 60°W, was the gradual appearance in the samples of more species from east to west; only one species however (Euphausia krohnii) was reasonably abundant at the eastern stations and totally absent from those to the west. The following mesopelagic species were common in all the transatlantic RMT 8 hauls. Nematobrachion flexipes, Euphausia hemigibba, Thysanopoda subaequalis, Stylocheiron elongatum, S. abbreviatum, Nematoscelis microps, N. atlantica and N. tenella.

33 species of euphausiacea were listed in all from the samples. The presence of Euphausia tenera, E. americana, E. mutica, Thysanopoda tricuspidata and the 1/2 ♂ form of N. microps at positions west of 47°W is of note. In the Eastern Atlantic the northern limit of these species is the boundary between the North and South Atlantic Central Water. Other aspects of zoogeographical interest include the presence of Meganyctiphanes norvegica at 32°N 27°W and of Thysanoessa gregaria in large numbers at 43°W 47°W and 50°W. In the fresh state the latter species displayed a previously unrecorded lilac hue particularly concentrated around the bases of the thoracic legs.

Since only aliquots of the RMT 8 samples were examined together with the fact that none of the RMT 1 samples were analysed, it is hoped that more detailed information on the horizontal distribution of the euphausiacea along 32°N will be obtained when the hauls have been analysed fully.

Vertical Distribution by Day at 32°N 64°W

As it was not possible on board ship to sort and examine the complete series of day and night hauls from the RMT 8 and RMT 1 at 32°N 64°W only approximately 1/2 aliquots of the day RMT 8 samples were looked at. In

the epipelagic zone down to 200m. Stylocheiron abbreviatum, S. carinatum, and Thysanoessa gregaria were very abundant. However it was in the deeper mesopelagic zone that the majority of euphausiids were distributed. Nematobrachion flexipes was by far the most common species and had an extensive vertical range of 200-600m with the maximum concentration between 500-600m. Nematoscelis microps, N. atlantica, and N. tenella also have a wide vertical range from 300-800m. Maximum concentrations of N. tenella were found between 400-700m and N. microps between 600-700m. The latter was far more abundant that its closely related counterpart N. atlantica corresponding with observations recently made on the vertical distribution of euphausiacea at 30°N 23°W. Euphausia hemigibba was another common species and was taken between 400-800m and in large numbers between 600-700m. Euphausia tenera, E. brevis and Stylocheiron elongatum were distributed in the upper part of the mesopelagic zone between 300-500m and in maximum numbers between 300-400m. Thysanopoda obtusifrons and T. subaequalis, on the other hand were distributed within a small vertical range in the deeper part of the mesopelagic zone between 700-800m for the former species and between 600-800m for the latter species. In general the daytime distribution of the mesopelagic species in the Western Atlantic tended to be 100-200m deeper than those found for the same species at approximately the same latitudes in the Eastern Atlantic in 1972; this is in agreement with the findings of other workers. Other species recorded in smaller numbers were:- Thysanopoda monocantha, T. pectinata, T. cristata, T. cornuta, T. tricuspidata, T. microphthalma, Euphausia americana E. mutica, E. gibboides, Nematobrachion boopis, Stylocheiron affine, S. longicorne, S. robustum, S. maximum and Bentheuphausia amblyops. More information about the distribution of these species will become known on complete analysis.

A previously unnoticed sexual dimorphism was noticed in N. flexipes in which the second and third abdominal photophores in females and third abdominal photophores in males were without red pigment and appeared to be undeveloped. These findings are now supported by recent examination of N. flexipes taken in the N.E. Atlantic in previous years.

4. Fish

Preliminary identification of the fishes of the transatlantic transect and of the vertical distribution collections off Bermuda was carried out on board. In the latter area this was facilitated by help from Drs Craddock, Gibbs and Robison. On the transatlantic leg almost 10,000 specimens were caught. They represented about 80 genera and 155 species. The most diverse family was the Myctophidae, but the most abundant species were Cyclothone braueri and C. microdon. Various longitudinal distributions were indicated. In the Gonostomatidae, for example, the abundance of the latter two species increased westwards, whilst Valenciennellus tripunctulatus decreased numerically in this direction. Vinciguerria attenuata was caught in the east and west but was absent between 34°W and 64°W, while Pollichthys mauli appeared only west of 34°W.

At Stn. 8281 about 5,300 specimens of at least 110 genera and 194 species were collected. This represented a greater faunal diversity than was found in 30°N 23°W on Cruise 45 in 1972. Again the Myctophidae was the most diverse family represented and C. braueri and C. microdon were the most abundant species. The depth of peak numerical abundance by day was 500-800m. Two peaks were apparent in the night catches, in the 0-100m layer, which was comprised mainly of migrant myctophids, gonostomatids and other stomiatoids, and between 500 & 800m, the layer of peak abundance of the non-migrant Cyclothone species.

## 5. Cephalopoda

Of the 335 cephalopods removed from the catch and examined during the cruise 172 were from the line of stations at 32°N and 79 were from the vertical series in Ocean Acre. The remaining 84 were from miscellaneous sampling mainly in the Bermuda area.

From the 12 stations on the east west line at 32°N the most numerous squid was Pyrgopsis pacifica (47), this species was absent only from 4 stations all of which were in the eastern Atlantic. The only other species present in reasonable numbers was Pyroteuthis margaritifera (21), this also was absent only from 4 stations. Of the 35 species identified there is no evidence to show that any of these live exclusively in either the east or west Atlantic. The vertical series in Ocean Acre produced very little cephalopod information. Of the 22 species caught the most numerous were Pyrgopsis pacifica (16) and Helicocranchia pfefferi (14). All other species were represented by less than 7 specimens.

Rare squid caught during the cruise included Cycloteuthis sirventi, Chiroteuthis veranyi, Mastigoteuthis glaukopsis, Taningia danae and Cternopteryx siculus.

## 6. Neuston

Thirteen standard neuston hauls were taken off the Northwest African coast as part of the C.I.N.E.C.A. project (Stations 8249-8261). These samples were not examined, but preserved in tact. Daily sampling, usually at night was done along the line 32°N. Hauls from stations 8261-8264, from the African coast to the Azores were all poor, the last of these only contained fish, one species of which was Hygophum reinhardti. Subsequent hauls showed a dominance of fish migrants in the surface, a feature which was also evident in Oxfam and NNP samples. Two other species of Hygophum (H. hygomi and H. benoiti) were taken in moderate numbers, as well as Astronethes niger and A. leucopogon, species of Myctophum and Symbolophorus, but none as numerous as Gonichthys coccoi. Samples from station 8272 and subsequent hauls contained an increasing amount of Sargassum weed which on occasions was extremely abundant and almost completely filled the net. Much of the typical sargassum fauna was also present, with the exception of the Sargassum fish, Histrio histrio. Station 8281 #21 was the only sample taken in Ocean Acre, the NN3 being used. The subsamples from the three layers showed distinct differences, the upper being dominated by Sargassum weed, whereas the two lower nets contained much smaller quantities, and consequently, different fauna.

## 7. Bioluminescence and pigments

Further investigations on the distribution and chemistry of luminescence in the decapod family Oplophoridae indicated that it is a universal phenomenon of this family and that the chemical systems involved are very similar, perhaps identical, in different species, as suggested by the success of luciferin-luciferase cross reactions. Interesting differences in the form of secreted and stored luciferin were apparent and are being investigated further. Among the squids several large active specimens of Bathothauma provided further valuable information on the structure and function of their light organs, and good specimens of Phasmatopsis and Chiroteuthis were particularly interesting. Further observations were made on Pyroteuthis and Pterygioteuthis, and it was especially gratifying to obtain several specimens of Lycoteuthis diadema.

Several species of Aristostomias were obtained, and their red emitting photophores examined in detail. A large specimen of Linophryne made it possible to extend observations of the photophores in the barbel of this genus, and oral luminescence was observed in a large and active Chaenophryne. Of the elasmobranchs an actively luminescing specimen of Squaliodus sarmenti was particularly interesting.

Further attempts were made to preserve the activity of luminescing Pyrosoma for chemical analysis of their systems, but all methods have so far proved unsuccessful. Bacteria were cultured from several specimens of Opisthoproctus and from a single specimen of the closely related Rhynchohyalus.

Material from a number of fish, squid and decapod crustaceans was, fixed for light or electron microscopy in conjunction with workers elsewhere.

A few specimens of histioteuthid squids were collected for the investigation of their photophore pigments, and specimens of several species of deep water medusae have been frozen for extraction and identification of their characteristic porphyrins.

## Gear

### 1. RMT Nets

#### RMT 1 + 8

The combination net was fished 62 times during the cruise, 48 of the hauls being opening and closing. This gave a total of 218 hours in the water, during 143 of which the net was open. Fifty-six of the hauls were completely successful and 4 were failures due to difficulties with the two new net monitors. On two of the hauls in upper 25m the depth trace from the monitor was unreliable but the hauls were continued estimating the depth by wire out. Two partial failures were experienced due to the cod-end of the net tearing, once on the RMT 1 and once on the RMT 8.

Trouble was experienced with the nylon inserts in the eyebolts of the RMT 8 opening bar, these were regularly being lost due to pressure from the norselinks and the closing bar before opening the net. A modification to the inserts was made after the twentieth haul and no further inserts were lost.

Experiments were made using Velcro to hold the flap over the opening and closing bars which stops leakage prior to opening. Although initially successful it was found that the Velcro quickly lost some of its strength and it was therefore difficult to assess how much could be used before the net was prevented from opening. After several hauls what seemed like an initial safe maximum amount was insufficient to hold the flaps in place.

The new flowmeter, first used on Cruise 45, was modified for this cruise by replacing the Plessey impeller by a Tufnol one designed and built by Mr. R.A. Wild. This new type has the advantages that the blades can be set, before calibration, to give the speed of rotation desired, they are considerably cheaper than Plessey impellers and damaged blades can be easily replaced. The new impellers were reliable and gave consistent results.

#### RMT 25

The RMT 25 was fished five times. During St. 8281*52 the netting caught round one of the weights during shooting and in retrieving the net the weight bar caught under the stern of the ship and was severely bent. The catches were in fairly good condition but were rather smaller than expected. Whether

this was due to the functioning of the net or to the size range of the organisms present is not clear.

## 2. Longhurst Hardy Plankton Recorder

A single haul was carried out at the surface, towing from the foreward boom. Stained dead plankton was introduced at the mouth of the net to try and assess the amount of hang up of organisms in front of the recorder. Although there were doubts that the organisms were not introduced into the net properly, hang up clearly occurred. The hang up was just in front of the recorder's opening and along a cross seam in the net. There was little evidence of hang up of living organisms with the exception of chaetognaths. Further experiments with live material will need to be carried out to assess the validity of previous sampling, despite there being no numerical or statistical evidence of this having occurred with previous samples. Similarly improvements must be made to optimise the passage of organisms into the recorder.

| STN. | DATE 1973 | POSITION LAT N | LONG W | GEAR | DEPTH (M) | FISHING TIME GMT | REMARKS | LOCAL TIME GMT |
|---|---|---|---|---|---|---|---|---|
| 8249 | 22/ 2 | 31 59.4 | 9 40.0 | TSD | 0- 31 | 0630-0642 | | CINECA 1 |
| # 0 | | 31 59.4 | 9 40.0 | | | | | |
| 8249 | 22/ 2 | 31 59.4 | 9 40.0 | WB | 1- 30 | 0639- | O2,PO4,SI | |
| # 0 | | | | | | | | |
| 8249 | 22/ 2 | 31 59.4 | 9 40.4 | NN | 0- 0 | 0654-0706 | SUNRISE 0715 | |
| # 0 | | 31 59.4 | 9 41.5 | | | DAWN | | |
| 8250 | 22/ 2 | 31 59.3 | 9 45.5 | TSD | 0- 41 | 0740-0757 | | CINECA 2 |
| # 0 | | 31 59.3 | 9 45.4 | | | | | |
| 8250 | 22/ 2 | 31 59.3 | 9 45.4 | WB | 1- 40 | 0754- | O2,PO4,SI | |
| # 0 | | | | | | | | |
| 8250 | 22/ 2 | 31 59.3 | 9 45.6 | NN | 0- 0 | 0805-0817 | SUNRISE 0716 | |
| # 0 | | 31 59.4 | 9 47.0 | | | DAWN | | |
| 8251 | 22/ 2 | 31 59.8 | 9 54.9 | TSD | 0- 200 | 0915-1003 | MS 1-195M.(O2,PO4,SI) | CINECA 3 |
| # 0 | | 31 59.6 | 9 55.3 | MS | | | | |
| 8251 | 22/ 2 | 31 59.7 | 9 56.0 | NN | 0- 0 | 1016-1028 | | |
| # 0 | | 31 59.8 | 9 57.3 | | | DAY | | |
| 8252 | 22/ 2 | 32 0.8 | 10 6.6 | TSD | 0-1000 | 1122-1245 | | CINECA 4 |
| # 0 | | 32 1.0 | 10 7.8 | | | | | |
| 8252 | 22/ 2 | 32 0.8 | 10 7.2 | WB | 250-1000 | 1211- | O2,PO4,SI | |
| # 0 | | | | | | | | |
| 8252 | 22/ 2 | 32 1.1 | 10 8.2 | WB | 1- 200 | 1306- | O2,PO4,SI | |
| # 0 | | | | | | | | |
| 8252 | 22/ 2 | 32 1.1 | 10 8.5 | NN | 0- 0 | 1322-1334 | | |
| # 0 | | 32 1.1 | 10 9.7 | | | DAY | | |

| STN. | DATE 1973 | POSITION LAT N | LONG W | GEAR | DEPTH (M) | FISHING TIME GMT | REMARKS | LOCAL TIME GMT |
|---|---|---|---|---|---|---|---|---|
| 8253 | 22/ 2 | 32 0.2 | 10 19.6 | TSD | 0-1000 | 1437-1552 | | CINECA 5 |
| # 0 | | 32 1.0 | 10 19.7 | | | | | |
| 8253 | 22/ 2 | 32 0.6 | 10 19.7 | WB | 250-1000 | 1519- | O2,PO4,SI | |
| # 0 | | | | | | | | |
| 8253 | 22/ 2 | 32 1.1 | 10 19.7 | WB | 1- 200 | 1612- | O2,PO4,SI | |
| # 0 | | | | | | | | |
| 8253 | 22/ 2 | 32 1.2 | 10 20.2 | NN | 0- 0 | 1633-1645 | | |
| # 0 | | 32 1.1 | 10 21.3 | | | DAY | | |
| 8254 | 22/ 2 | 32 1.3 | 10 36.5 | TSD | 0-1000 | 1811-1921 | | CINECA 6 |
| # 0 | | 32 1.5 | 10 36.3 | | | | | |
| 8254 | 22/ 2 | 32 1.4 | 10 36.4 | WB | 250-1000 | 1849- | O2,PO4,SI | |
| # 0 | | | | | | | | |
| 8254 | 22/ 2 | 32 1.5 | 10 36.3 | WB | 1- 200 | 1939- | O2,PO4,SI | |
| # 0 | | | | | | | | |
| 8254 | 22/ 2 | 32 1.6 | 10 36.6 | NN | 0- 0 | 1952-2004 | | |
| # 0 | | 32 1.4 | 10 37.8 | | | NIGHT | | |
| 8255 | 22/ 2 | 31 58.0 | 11 12.1 | TSD | 0-2800 | 2257-0200 | MS 250-2500M.(O2,PO4,SI) | CINECA 7 |
| # 0 | | 31 58.4 | 11 12.5 | MS | | | | |
| 8255 | 23/ 2 | 31 58.3 | 11 12.3 | WB | 2800-2800 | 0043- | | |
| # 0 | | | | | | | | |
| 8255 | 23/ 2 | 31 58.4 | 11 12.5 | WB | 1- 200 | 0218- | O2,PO4,SI | |
| # 0 | | | | | | | | |
| 8255 | 23/ 2 | 31 58.4 | 11 12.8 | NN | 0- 0 | 0233-0245 | | |
| # 0 | | 31 58.4 | 11 14.0 | | | NIGHT | | |

| STN. | DATE 1973 | POSITION LAT N | POSITION LONG W | GEAR | DEPTH (M) | FISHING TIME GMT | REMARKS | LOCAL TIME GMT |
|---|---|---|---|---|---|---|---|---|
| 8256 | 23/ 2 | 31 58.3 | 11 46.9 | TSD | 0-1000 | 0534-0722 | | CINECA 8 |
| # 0 | | 31 57.9 | 11 47.3 | | | | | |
| 8256 | 23/ 2 | 31 58.1 | 11 47.1 | WB | 250-1000 | 0643- | 02,P04,SI | |
| # 0 | | | | | | | | |
| 8256 | 23/ 2 | 31 57.9 | 11 47.4 | WB | 1- 200 | 0738- | 02,P04,SI | |
| # 0 | | | | | | | | |
| 8256 | 23/ 2 | 31 57.8 | 11 47.7 | NN | 0- 0 | 0751-0803 | SUNRISE 0723 | |
| # 0 | | 31 57.7 | 11 49.0 | | | DAWN | | |
| 8257 | 23/ 2 | 31 56.9 | 12 22.3 | TSD | 0-1000 | 1046-1156 | | CINECA 9 |
| # 0 | | 31 56.9 | 12 22.3 | | | | | |
| 8257 | 23/ 2 | 31 56.9 | 12 22.3 | WB | 250-1000 | 1120- | 02,P04,SI | |
| # 0 | | | | | | | | |
| 8257 | 23/ 2 | 31 56.9 | 12 22.4 | WB | 1- 200 | 1211- | 02,P04,SI | |
| # 0 | | | | | | | | |
| 8257 | 23/ 2 | 31 56.9 | 12 22.8 | NN | 0- 0 | 1227-1239 | | |
| # 0 | | 31 57.0 | 12 23.8 | | | DAY | | |
| 8258 | 23/ 2 | 32 0.4 | 12 57.9 | TSD | 0-1000 | 1543-1701 | | CINECA 10 |
| # 0 | | 32 0.5 | 12 57.9 | | | | | |
| 8258 | 23/ 2 | 32 0.6 | 12 57.6 | WB | 250-1000 | 1627- | 02,P04,SI | |
| # 0 | | | | | | | | |
| 8258 | 23/ 2 | 32 0.4 | 12 57.9 | WB | 1- 200 | 1720- | 02,P04,SI | |
| # 0 | | | | | | | | |
| 8258 | 23/ 2 | 32 0.4 | 12 58.3 | NN | 0- 0 | 1734-1746 | | |
| # 0 | | 32 0.4 | 12 59.6 | | | DAY | | |

| STN. | DATE 1973 | POSITION LAT N | LONG W | GEAR | DEPTH (M) | FISHING TIME GMT | REMARKS | LOCAL TIME GMT |
|---|---|---|---|---|---|---|---|---|
| 8259 | 23/ 2 | 31 59.3 | 13 36.8 | TSD | 0-1000 | 2107-2222 | | CINECA 11 |
| # 0 | | 31 59.3 | 13 37.2 | | | | | |
| 8259 | 23/ 2 | 31 59.4 | 13 37.0 | WB | 250-1000 | 2149- | O2,PO4,SI | |
| # 0 | | | | | | | | |
| 8259 | 23/ 2 | 31 59.4 | 13 37.3 | WB | 1- 200 | 2246- | O2,PO4,SI | |
| # 0 | | | | | | | | |
| 8259 | 23/ 2 | 31 59.3 | 13 37.7 | NN | 0- 0 | 2302-2314 | | |
| # 0 | | 31 59.2 | 13 38.9 | | | NIGHT | | |
| 8260 | 24/ 2 | 31 58.7 | 14 25.9 | TSD | 0-1000 | 0305-0422 | | CINECA 12 |
| # 0 | | 31 59.1 | 14 26.1 | | | | | |
| 8260 | 24/ 2 | 31 58.9 | 14 26.0 | WB | 250-1000 | 0349- | O2,PO4,SI | |
| # 0 | | | | | | | | |
| 8260 | 24/ 2 | 31 59.2 | 14 26.2 | WB | 1- 200 | 0437- | O2,PO4,SI | |
| # 0 | | | | | | | | |
| 8260 | 24/ 2 | 31 59.2 | 14 26.5 | NN | 0- 0 | 0451-0503 | | |
| # 0 | | 31 59.2 | 14 27.8 | | | NIGHT | | |
| 8261 | 24/ 2 | 31 58.0 | 15 21.5 | TSD | 0-3500 | 0936-1420 | MS 250-2500M,(O2,PO4,SI) | CINECA 13 |
| # 0 | | 31 58.2 | 15 22.5 | MS | | | | |
| 8261 | 24/ 2 | 31 58.3 | 15 21.9 | WB | 3000-3500 | 1213- | O2,PO4,SI | |
| # 0 | | | | | | | | |
| 8261 | 24/ 2 | 31 58.7 | 15 23.2 | WB | 1- 200 | 1503- | O2,PO4,SI | |
| # 0 | | | | | | | | |
| 8261 | 24/ 2 | 31 58.9 | 15 23.7 | NN | 0- 0 | 1517-1529 | | |
| # 0 | | 31 59.1 | 15 25.1 | | | DAY | | |

| STN. | DATE 1973 | POSITION LAT N | POSITION LONG W | GEAR | DEPTH (M) | FISHING TIME GMT | REMARKS | LOCAL TIME GMT |
|---|---|---|---|---|---|---|---|---|
| 8262 | 24/ 2 | 32 3.4 | 16 12.8 | TSD | 0-1000 | 1911-2041 | | |
| # 0 | | 32 4.0 | 16 12.9 | | | | | |
| 8262 | 24/ 2 | 32 3.4 | 16 12.6 | WB | 1000-1000 | 1957- | + WB AT 10M. | |
| # 0 | | | | | | | | |
| 8262 | 24/ 2 | 32 5.2 | 16 13.7 | RMT 1+8 | 0-1000 | 2111-2325 | OBLIQUE-SOME DIFFICULTY CLOSING NET | |
| # 0 | | 32 8.3 | 16 16.7 | | | NIGHT | FLOW DIST. 8.06 KM. | |
| 8262 | 25/ 2 | 32 7.8 | 16 17.6 | NN | 0- 0 | 0026-0038 | | |
| # 0 | | 32 8.3 | 16 18.1 | | | NIGHT | | |
| 8263 | 25/ 2 | 32 3.4 | 20 25.5 | TSD | 0-1000 | 2010-2150 | | -01 |
| # 0 | | 32 4.1 | 20 25.2 | | | | | |
| 8263 | 25/ 2 | 32 3.7 | 20 25.4 | WB | 990-1000 | 2052- | + WB & LWB AT 10M. | -01 |
| # 0 | | | | LWB | | | | |
| 8263 | 25/ 2 | 32 5.9 | 20 26.1 | RMT 1+8 | 0-1000 | 2236-0039 | OBLIQUE | -01 |
| # 0 | | 32 11.7 | 20 28.2 | | | NIGHT | FLOW DIST. 7.36 KM. | |
| 8263 | 26/ 2 | 32 14.5 | 20 28.9 | NN | 0- 0 | 0136-0148 | | -01 |
| # 0 | | 32 15.5 | 20 29.0 | | | NIGHT | | |
| 8264 | 26/ 2 | 32 9.0 | 23 48.0 | TSD | 0-1000 | 2016-2141 | | -01 |
| # 0 | | 32 9.4 | 23 48.1 | | | | | |
| 8264 | 26/ 2 | 32 9.2 | 23 48.0 | WB | 990-1000 | 2051- | + WB & LWB AT 10M. | -01 |
| # 0 | | | | LWB | | | | |
| 8264 | 26/ 2 | 32 9.8 | 23 48.4 | NN | 0- 0 | 2151-2203 | | -01 |
| # 0 | | 32 10.7 | 23 49.0 | | | NIGHT | | |
| 8264 | 26/ 2 | 32 11.2 | 23 49.2 | RMT 1+8 | 0-1000 | 2216-0019 | OBLIQUE | -01 |
| # 0 | | 32 17.0 | 23 49.7 | | | NIGHT | FLOW DIST. 7.09 KM. | |

| STN. | DATE 1973 | POSITION LAT N | POSITION LONG W | GEAR | DEPTH (M) | FISHING TIME GMT | REMARKS | LOCAL TIME GMT |
|---|---|---|---|---|---|---|---|---|
| 8264 | 27/ 2 | 32 20.0 | 23 50.0 | NN | 0- 0 | 0115-0127 | | -01 |
| # 0 | | 32 21.0 | 23 49.9 | | | NIGHT | | |
| 8265 | 27/ 2 | 32 0.1 | 27 13.1 | TSD | 0-1000 | 2001-2119 | | -01 |
| # 0 | | 32 0.4 | 27 12.2 | | | | | |
| 8265 | 27/ 2 | 32 0.3 | 27 12.8 | WB | 990-1000 | 2038- | + WB & LWB AT 10M. | -01 |
| # 0 | | | | LWB | | | | |
| 8265 | 27/ 2 | 32 1.0 | 27 12.1 | RMT 1+8 | 0-1000 | 2136-2329 | OBLIQUE | -01 |
| # 0 | | 32 6.8 | 27 11.5 | | | NIGHT | FLOW DIST. 7.80 KM. | |
| 8265 | 28/ 2 | 32 9.6 | 27 11.3 | NN | 0- 0 | 0023-0035 | | -01 |
| # 0 | | 32 10.5 | 27 11.2 | | | NIGHT | | |
| 8266 | 28/ 2 | 32 0.7 | 29 13.0 | WB | 3450-3450 | 1215- | + LWB AT 10M. | -01 |
| # 0 | | | | | | | | |
| 8267 | 28/ 2 | 32 4.0 | 30 39.7 | TSD | 0-1000 | 2008-2122 | | -01 |
| # 0 | | 32 3.9 | 30 39.5 | | | | | |
| 8267 | 28/ 2 | 32 4.0 | 30 39.7 | WB | 990-1000 | 2040- | + WB & LWB AT 10M. | -01 |
| # 0 | | | | LWB | | | | |
| 8268 | 28/ 2 | 32 4.4 | 30 50.0 | RMT 1+8 | 0-1000 | 2258-0053 | ABORTIVE-CATCH DISCARDED | -01 |
| # 0 | | 32 7.6 | 30 55.0 | | | NIGHT | | |
| 8268 | 1/ 3 | 32 9.0 | 30 57.3 | NN | 0- 0 | 0143-0155 | | -02 |
| # 0 | | 32 9.6 | 30 58.0 | | | NIGHT | | |
| 8269 | 1/ 3 | 32 0.9 | 32 58.5 | LWB | 2700-3700 | 1255- | LWB AT 2700, 3200, 3700M. | -02 |
| # 0 | | | | | | | | |
| 8270 | 1/ 3 | 32 0.0 | 34 22.5 | TSD | 0-1000 | 2103-2222 | | -02 |
| # 0 | | 32 0.1 | 34 22.6 | | | | | |

| STN. | DATE 1973 | POSITION LAT N | LONG W | GEAR | DEPTH (M) | FISHING TIME GMT | REMARKS | LOCAL TIME GMT |
|---|---|---|---|---|---|---|---|---|
| 8270 # 0 | 1/ 3 | 32 0.1 | 34 22.5 | WB LWB | 990-1000 | 2138- | + WB & LWB AT 10M. | -02 |
| 8270 # 0 | 1/ 3 | 32 0.5<br>32 6.4 | 34 22.7<br>34 21.9 | RMT 1+8 | 0-1000 | 2235-0045 NIGHT | OBLIQUE FLOW DIST. 7.98 KM. | -02 |
| 8270 # 0 | 2/ 3 | 32 8.4<br>32 9.3 | 34 21.7<br>34 21.4 | NN | 0- 0 | 0138-0150 NIGHT | | -02 |
| 8271 # 0 | 2/ 3 | 31 58.0<br>31 58.0 | 39 2.3<br>39 2.0 | TSD | 0-1000 | 2102-2239 | | -02 |
| 8271 # 0 | 2/ 3 | 31 58.2 | 39 2.2 | WB LWB | 990-1000 | 2149- | + WB & LWB AT 10M. | -02 |
| 8271 # 0 | 2/ 3 | 31 58.0<br>31 58.4 | 39 2.4<br>39 7.9 | RMT 1+8 | 0-1000 | 2256-0057 NIGHT | OBLIQUE FLOW DIST. 6.64 KM. | -02 |
| 8271 # 0 | 3/ 3 | 31 58.8<br>31 58.8 | 39 9.6<br>39 10.6 | NN | 0- 0 | 0150-0202 NIGHT | | -02 |
| 8272 # 0 | 3/ 3 | 31 58.6<br>31 58.2 | 43 38.0<br>43 37.7 | TSD | 0-1000 | 2129-2258 | | -02 |
| 8272 # 0 | 3/ 3 | 31 58.4 | 43 37.9 | WB LWB | 990-1000 | 2212- | + WB & LWB AT 10M. | -02 |
| 8272 # 0 | 3/ 3 | 31 57.7<br>31 50.5 | 43 37.4<br>43 35.0 | RMT 1+8 | 0-1000 | 2313-0127 NIGHT | OBLIQUE FLOW DIST. 8.87 KM. | -02 |
| 8272 # 0 | 4/ 3 | 31 48.9<br>31 48.9 | 43 34.1<br>43 35.0 | NN | 0- 0 | 0222-0234 NIGHT | | -02 |
| 8273 # 0 | 4/ 3 | 31 54.8 | 45 54.3 | LWB | 2700-3700 | 1403- | LWB AT 2700, 3200 & 3700M. | -03 |

| STN. | DATE 1973 | POSITION LAT N | POSITION LONG W | GEAR | DEPTH (M) | FISHING TIME GMT | REMARKS | LOCAL TIME GMT |
|---|---|---|---|---|---|---|---|---|
| 8274 | 4/ 3 | 31 57.7 | 47 17.9 | TSD | 0-1000 | 2211-2330 | | -03 |
| # 0 | | 31 58.2 | 47 18.1 | | | | | |
| 8274 | 4/ 3 | 31 57.8 | 47 18.0 | WB | 990-1000 | 2247- | + WB & LWB AT 10M. | -03 |
| # 0 | | | | LWB | | | | |
| 8274 | 4/ 3 | 31 58.2 | 47 18.5 | RMT 1+8 | 0-1000 | 2343-0150 | OBLIQUE | -03 |
| # 0 | | 31 57.1 | 47 25.6 | | | NIGHT | FLOW DIST. 7.98 KM. | |
| 8274 | 5/ 3 | 31 56.6 | 47 29.1 | NN | 0- 0 | 0246-0258 | | -03 |
| # 0 | | 31 56.7 | 47 30.3 | | | NIGHT | | |
| 8275 | 5/ 3 | 32 1.6 | 50 33.5 | TSD | 0-1000 | 2205-2325 | | -03 |
| # 0 | | 32 1.3 | 50 33.1 | | | | | |
| 8275 | 5/ 3 | 32 1.4 | 50 33.7 | WB | 990-1000 | 2240- | + WB & LWB AT 10M. | -03 |
| # 0 | | | | LWB | | | | |
| 8275 | 5/ 3 | 32 1.4 | 50 33.5 | RMT 1+8 | 0-1000 | 2339-0150 | OBLIQUE | -03 |
| # 0 | | 32 4.6 | 50 38.9 | | | NIGHT | FLOW DIST. 7.89 KM. | |
| 8275 | 6/ 3 | 32 5.8 | 50 41.2 | NN | 0- 0 | 0244-0256 | | -03 |
| # 0 | | 32 6.5 | 50 42.1 | | | NIGHT | | |
| 8276 | 6/ 3 | 31 56.0 | 54 4.6 | TSD | 0-1000 | 2202-2330 | | -03 |
| # 0 | | 31 55.9 | 54 4.6 | | | | | |
| 8276 | 6/ 3 | 31 56.0 | 54 4.6 | WB | 990-1000 | 2241- | + WB & LWB AT 10M. | -03 |
| # 0 | | | | LWB | | | | |
| 8276 | 6/ 3 | 31 55.8 | 54 5.0 | RMT 1+8 | 0-1000 | 2345-0148 | OBLIQUE | -03 |
| # 0 | | 31 55.5 | 54 11.4 | | | NIGHT | FLOW DIST. 7.40 KM. | |
| 8276 | 7/ 3 | 31 55.2 | 54 14.2 | NN | 0- 0 | 0245-0257 | | -03 |
| # 0 | | 31 55.1 | 54 15.4 | | | NIGHT | | |

| STN. | DATE 1973 | POSITION LAT N | POSITION LONG W | GEAR | DEPTH (M) | FISHING TIME GMT | REMARKS | LOCAL TIME GMT |
|---|---|---|---|---|---|---|---|---|
| 8277 | 7/ 3 | 32 4.7 | 57 38.9 | TSD | 0-1000 | 2202-2321 | | -03 |
| # 0 | | 32 5.1 | 57 38.5 | | | | | |
| 8277 | 7/ 3 | 32 4.8 | 57 38.8 | WB | 990-1000 | 2238- | + WB & LWB AT 10M. | -03 |
| # 0 | | | | LWB | | | | |
| 8277 | 8/ 3 | 32 5.4 | 57 40.0 | RMT 1+8 | 0-1000 | 0004-0225 | OBLIQUE | -03 |
| # 0 | | 32 5.4 | 57 47.5 | | | NIGHT | FLOW DIST. 8.69 KM. | |
| 8277 | 8/ 3 | 32 5.3 | 57 50.0 | NN | 0- 0 | 0321-0333 | | -03 |
| # 0 | | 32 5.3 | 57 51.2 | | | NIGHT | | |
| 8278 | 8/ 3 | 32 17.2 | 60 8.2 | RMT 1+8 | 505- 600 | 1810-2010 | | -03 |
| # 0 | | 32 22.2 | 60 8.4 | | | DAY | FLOW DIST. 7.22 KM. | |
| 8279 | 8/ 3 | 32 21.2 | 60 23.6 | TSD | 0-1000 | 2201-2320 | | -03 |
| # 0 | | 32 21.3 | 60 23.7 | | | | | |
| 8279 | 8/ 3 | 32 21.3 | 60 23.7 | WB | 990-1000 | 2236- | + WB & LWB AT 10M. | -03 |
| # 0 | | | | LWB | | | | |
| 8279 | 8/ 3 | 32 21.7 | 60 23.6 | RMT 1+8 | 0-1000 | 2336-0135 | OBLIQUE | -03 |
| # 0 | | 32 27.0 | 60 22.0 | | | NIGHT | FLOW DIST. 7.00 KM. | |
| 8279 | 9/ 3 | 32 29.5 | 60 21.0 | NN | 0- 0 | 0229-0241 | | -03 |
| # 0 | | 32 30.6 | 60 20.5 | | | NIGHT | | |
| 8280 | 9/ 3 | 32 18.4 | 62 10.3 | RMT 1+8 | 900-1000 | 1206-1406 | | -04 |
| # 0 | | 32 23.1 | 62 9.9 | | | DAY | FLOW DIST. 7.31 KM. | |

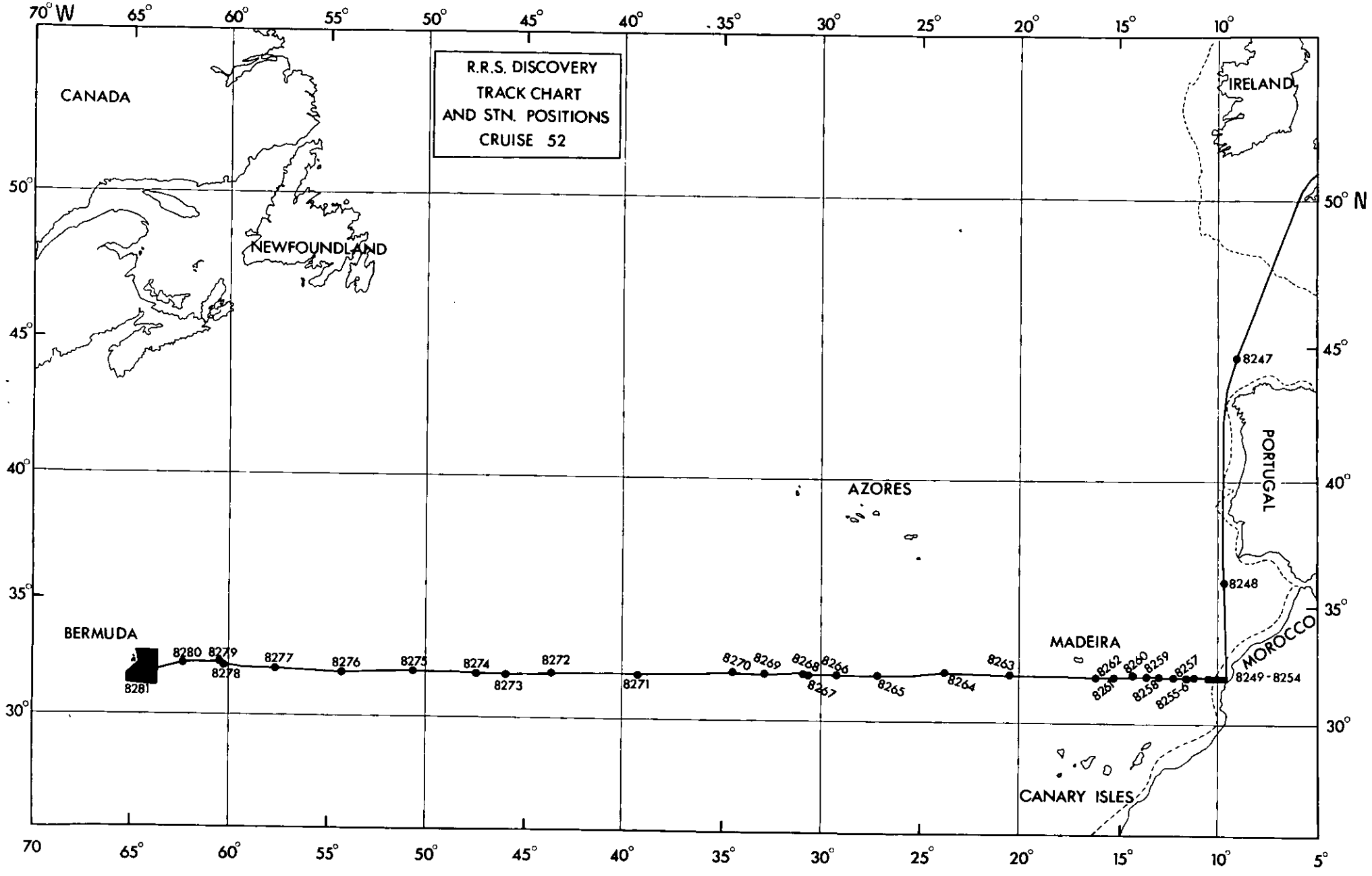
| STN. | DATE 1973 | POSITION LAT N | POSITION LONG W | GEAR | DEPTH (M) | FISHING TIME GMT | REMARKS | LOCAL TIME GMT |
|---|---|---|---|---|---|---|---|---|
| 8281 | 13/ 3 | 31 55.3 | 63 52.0 | RMT 1+8 | 905-1000 | 0405-0606 | | -04 |
| # 1 | | 31 52.4 | 63 47.5 | | | NIGHT | FLOW DIST. 7.00 KM. | |
| 8281 | 13/ 3 | 31 50.8 | 63 44.5 | RMT 1+8 | 295- 400 | 0722-0922 | | -04 |
| # 2 | | 31 48.0 | 63 39.2 | | | NIGHT | FLOW DIST. 8.38 KM. | |
| 8281 | 13/ 3 | 31 46.8 | 63 39.1 | RMT 1+8 | 910-1000 | 1156-1356 | | -04 |
| # 3 | | 31 51.1 | 63 40.3 | | | DAY | FLOW DIST. 6.38 KM. | |
| 8281 | 13/ 3 | 31 55.0 | 63 41.4 | RMT 1+8 | 0- 0 | 1539-1727 | MONITOR MALFUNCTION-HAUL ABORTIVE | -04 |
| # 4 | | 31 58.8 | 63 42.3 | | | DAY | | |
| 8281 | 13/ 3 | 31 57.7 | 63 45.6 | RMT 1+8 | 305- 400 | 1919-2120 | | -04 |
| # 5 | | 31 53.4 | 63 46.2 | | | DAY | FLOW DIST. 7.27 KM. | |
| 8281 | 13/ 3 | 31 48.6 | 63 43.7 | RMT 1+8 | 800- 900 | 2342-0142 | | -04 |
| # 6 | | 31 51.2 | 63 41.2 | | | NIGHT | FLOW DIST. 6.10 KM. | |
| 8281 | 14/ 3 | 31 53.6 | 63 40.0 | RMT 1+8 | 700- 800 | 0321-0522 | | -04 |
| # 7 | | 31 56.9 | 63 35.2 | | | NIGHT | FLOW DIST. 7.31 KM. | |
| 8281 | 14/ 3 | 31 58.0 | 63 34.5 | RMT 1+8 | 605- 700 | 0704-0904 | | -04 |
| # 8 | | 31 57.8 | 63 39.1 | | | NIGHT | FLOW DIST. 6.64 KM. | |
| 8281 | 14/ 3 | 31 56.8 | 63 44.1 | RMT 1+8 | 805- 900 | 1144-1344 | | -04 |
| # 9 | | 31 53.5 | 63 47.9 | | | DAY | FLOW DIST. 6.55 KM. | |
| 8281 | 14/ 3 | 31 51.6 | 63 49.3 | RMT 1+8 | 710- 800 | 1501-1701 | | -04 |
| # 10 | | 31 47.9 | 63 52.8 | | | DAY | FLOW DIST. 7.36 KM. | |
| 8281 | 14/ 3 | 31 49.0 | 63 53.6 | RMT 1+8 | 600- 700 | 1839-2039 | | -04 |
| # 11 | | 31 53.0 | 63 52.7 | | | DAY | FLOW DIST. 7.27 KM. | |
| 8281 | 14/ 3 | 31 51.9 | 63 51.6 | RMT 1+8 | 1000-1250 | 2357-0357 | | -04 |
| # 12 | | 31 42.1 | 63 48.4 | | | NIGHT | FLOW DIST. 15.43 KM. | |

| STN. | DATE 1973 | POSITION LAT N | POSITION LONG W | GEAR | DEPTH (M) | FISHING TIME GMT | REMARKS | LOCAL TIME GMT |
|---|---|---|---|---|---|---|---|---|
| 8281 | 15/ 3 | 31 41.0 | 63 48.0 | RMT 1+8 | 505- 600 | 0528-0728 | DSL 490-565 M. | -04 |
| # 13 | | 31 45.5 | 63 46.3 | | | NIGHT | FLOW DIST. 7.53 KM. | |
| 8281 | 15/ 3 | 31 51.0 | 63 44.3 | RMT 1+8 | 1010-1250 | 1200-1600 | | -04 |
| # 14 | | 31 57.5 | 63 36.8 | | | DAY | FLOW DIST. 16.14 KM. | |
| 8281 | 15/ 3 | 31 58.6 | 63 34.6 | RMT 1+8 | 510- 600 | 1753-1953 | | -04 |
| # 15 | | 31 54.4 | 63 35.7 | | | DAY | FLOW DIST. 7.27 KM. | |
| 8281 | 15/ 3 | 32 4.4 | 63 41.7 | RMT 1+8 | 102- 200 | 2331-0131 | | -04 |
| # 16 | | 32 1.0 | 63 40.7 | | | NIGHT | FLOW DIST. 7.04 KM. | |
| 8281 | 16/ 3 | 31 59.9 | 63 40.4 | RMT 1 | 0- 10 | 0205-0305 | | -04 |
| # 17 | | 31 58.3 | 63 39.9 | | | NIGHT | | |
| 8281 | 16/ 3 | 31 58.3 | 63 39.8 | RMT 1+8 | 25- 50 | 0308-0508 | DEPTHS EST.-MONITOR MALFUNCTION | -04 |
| # 18 | | 31 54.6 | 63 38.7 | | | NIGHT | FLOW DIST. 7.36 KM. | |
| 8281 | 16/ 3 | 31 53.6 | 63 38.5 | RMT 1+8 | 55- 100 | 0536-0736 | | -04 |
| # 19 | | 31 49.2 | 63 37.4 | | | NIGHT | FLOW DIST. 8.25 KM. | |
| 8281 | 16/ 3 | 31 47.7 | 63 37.3 | RMT 1+8 | 10- 25 | 0810-0910 | 1 HR. TOW - DEPTHS EST. | -04 |
| # 20 | | 31 45.9 | 63 37.0 | | | NIGHT | FLOW DIST. 3.23 KM. | |
| 8281 | 16/ 3 | 31 47.3 | 63 37.3 | NN3 | 0- 0 | 0824-0854 | 3 10CM.NETS DOWN TO 30CM. 2KT. TOW | -04 |
| # 21 | | 31 46.4 | 63 37.2 | | | NIGHT | | |
| 8281 | 16/ 3 | 31 56.6 | 63 48.9 | RMT 1+8 | 103- 200 | 1134-1334 | RMT 1 CATCH SUSPECT.-NET TORN | -04 |
| # 22 | | 31 52.5 | 63 46.2 | | | DAY | FLOW DIST. 7.71 KM. | |
| 8281 | 16/ 3 | 31 50.9 | 63 45.2 | RMT 1+8 | 12- 25 | 1424-1624 | | -04 |
| # 23 | | 31 47.0 | 63 42.9 | | | DAY | FLOW DIST. 7.27 KM. | |
| 8281 | 16/ 3 | 31 50.3 | 63 44.8 | RMT 1 | 0- 10 | 1443-1543 | FLOW EST.- FROM#23 | -04 |
| # 24 | | 31 48.3 | 63 43.7 | | | DAY | FLOW DIST. 3.68 KM. | |

| STN. | DATE 1973 | POSITION LAT N | LONG W | GEAR | DEPTH (M) | FISHING TIME GMT | REMARKS | LOCAL TIME GMT |
|---|---|---|---|---|---|---|---|---|
| 8281 | 16/ 3 | 31 46.1 | 63 42.4 | RMT 1+8 | 26- 50 | 1645-1845 | | -04 |
| # 25 | | 31 42.5 | 63 39.9 | | | DAY | FLOW DIST. 7.49 KM. | |
| 8281 | 16/ 3 | 31 41.9 | 63 39.5 | RMT 1+8 | 52- 100 | 1904-2104 | | -04 |
| # 26 | | 31 38.5 | 63 37.8 | | | DAY | FLOW DIST. 7.62 KM. | |
| 8281 | 16/ 3 | 31 37.7 | 63 37.8 | TSD | 0-1950 | 2126-0008 | INTERMITTENT FAULT ON PROBE | -04 |
| # 27 | | 31 35.9 | 63 38.0 | | | | | |
| 8281 | 16/ 3 | 31 36.1 | 63 38.1 | WB | 750- 750 | 2340- | | -04 |
| # 27 | | | | | | | | |
| 8281 | 17/ 3 | 31 36.6 | 63 38.7 | RMT 1+8 | 405- 505 | 0056-0256 | | -04 |
| # 28 | | 31 39.5 | 63 41.8 | | | NIGHT | FLOW DIST. 6.82 KM. | |
| 8281 | 17/ 3 | 31 42.5 | 63 43.6 | RMT 1+8 | 1250-1500 | 0452-0852 | | -04 |
| # 29 | | 31 50.9 | 63 46.8 | | | NIGHT | FLOW DIST. 13.72 KM. | |
| 8281 | 17/ 3 | 31 51.4 | 63 47.4 | RMT 1+8 | 1260-1500 | 1125-1526 | | -04 |
| # 30 | | 31 42.7 | 63 46.4 | | | DAY | FLOW DIST. 14.08 KM. | |
| 8281 | 17/ 3 | 31 43.3 | 63 49.9 | RMT 1+8 | 405- 500 | 1808-2008 | | -04 |
| # 31 | | 31 40.8 | 63 44.5 | | | DAY | FLOW DIST. 5.83 KM. | |
| 8281 | 18/ 3 | 31 35.5 | 63 32.5 | RMT 1+8 | 205- 300 | 0033-0233 | | -04 |
| # 32 | | 31 33.1 | 63 27.1 | | | NIGHT | FLOW DIST. 9.05 KM. | |
| 8281 | 18/ 3 | 31 30.2 | 63 20.6 | RMT 1+8 | 1490-2000 | 0500-0900 | | -04 |
| # 33 | | 31 25.4 | 63 9.8 | | | NIGHT | FLOW DIST. 18.02 KM. | |
| 8281 | 18/ 3 | 31 41.6 | 63 33.9 | RMT 1+8 | 208- 300 | 1238-1438 | RMT 8 CATCH SUSPECT.-NET TORN | -04 |
| # 34 | | 31 46.5 | 63 35.6 | | | DAY | FLOW DIST. 8.06 KM. | |
| 8281 | 18/ 3 | 31 51.5 | 63 39.7 | RMT 1+8 | 1520-2000 | 1724-2124 | | -04 |
| # 35 | | 31 53.7 | 63 41.2 | | | DAY | FLOW DIST. 14.67 KM. | |

| STN. | DATE 1973 | POSITION LAT N | POSITION LONG W | GEAR | DEPTH (M) | FISHING TIME GMT | REMARKS | LOCAL TIME GMT |
|---|---|---|---|---|---|---|---|---|
| 8281 | 19/ 3 | 31 52.2 | 63 40.4 | RMT 1+8 | 780- 810 | 0129-0329 | OCEAN ACRE COMPARATIVE HAUL | -04 |
| # 36 | | 31 51.5 | 63 40.0 | | | NIGHT | FLOW DIST. 8.78 KM. | |
| 8281 | 19/ 3 | 31 48.0 | 63 37.5 | RMT 1+8 | 1240-1265 | 0600-0900 | OCEAN ACRE COMPARAYIVE HAUL | -04 |
| # 37 | | 31 42.5 | 63 32.4 | | | NIGHT | FLOW DIST. 11.62 KM. | |
| 8281 | 20/ 3 | 31 34.9 | 64 2.4 | RMT 1+8 | 490- 510 | 0106-0306 | OCEAN ACRE COMPARATIVE HAUL | -04 |
| # 38 | | 31 39.3 | 64 2.6 | | | NIGHT | FLOW DIST. 7.27 KM. | |
| 8281 | 20/ 3 | 31 41.9 | 64 2.8 | RMT 1+8 | 89- 110 | 0406-0606 | OCEAN ACRE COMPARATIVE HAUL | -04 |
| # 39 | | 31 46.2 | 64 1.9 | | | NIGHT | FLOW DIST. 7.36 KM. | |
| 8281 | 20/ 3 | 31 47.1 | 64 1.4 | RMT 1+8 | 43- 55 | 0629-0829 | OCEAN ACRE COMPARATIVE HAUL | -04 |
| # 40 | | 31 50.2 | 63 57.8 | | | NIGHT | FLOW DIST. 7.80 KM. | |
| 8281 | 20/ 3 | 31 59.0 | 63 57.4 | RMT 1+8 | 190- 300 | 1128-1328 | | -04 |
| # 41 | | 31 54.6 | 63 57.7 | | | DAY | FLOW DIST. 7.98 KM. | |
| 8281 | 20/ 3 | 31 53.3 | 63 57.7 | RMT 1+8 | 102- 200 | 1402-1602 | | -04 |
| # 42 | | 31 48.7 | 63 57.7 | | | DAY | FLOW DIST. 7.36 KM. | |
| 8281 | 20/ 3 | 31 43.6 | 63 58.1 | RMT 1+8 | 1235-1260 | 1758-2058 | OCEAN ACRE COMPARATIVE HAUL | -04 |
| # 43 | | 31 37.2 | 63 57.8 | | | DAY | FLOW DIST. 10.67 KM. | |
| 8281 | 21/ 3 | 31 37.5 | 63 58.8 | RMT 1+8 | 144- 160 | 0002-0202 | OCEAN ACRE COMPARATIVE HAUL | -04 |
| # 44 | | 31 41.7 | 63 57.5 | | | NIGHT | FLOW DIST. 7.13 KM. | |
| 8281 | 21/ 3 | 31 46.2 | 63 55.7 | RMT 1+8 | 2005-2500 | 0425-1025 | | -04 |
| # 45 | | 31 58.1 | 63 51.1 | | | NIGHT | FLOW DIST. 21.17 KM. | |
| 8281 | 21/ 3 | 31 55.8 | 63 44.1 | RMT 1+8 | 990-1010 | 1456-1656 | OCEAN ACRE COMPARATIVE HAUL | -04 |
| # 46 | | 31 53.0 | 63 39.4 | | | DAY | FLOW DIST. 7.80 KM. | |
| 8281 | 21/ 3 | 31 50.7 | 63 34.8 | RMT 1+8 | 785- 810 | 1838-2041 | OCEAN ACRE COMPARATIVE HAUL | -04 |
| # 47 | | 31 48.6 | 63 29.9 | | | DAY | FLOW DIST. 7.53 KM. | |

| STN. | DATE 1973 | POSITION LAT N | POSITION LONG W | GEAR | DEPTH (M) | FISHING TIME GMT | REMARKS | LOCAL TIME GMT |
|---|---|---|---|---|---|---|---|---|
| 8281 | 21/ 3 | 31 47.2 | 63 30.9 | RMT 1+8 | 2500-3500 | 2323-0830 | | -04 |
| # 48 | | 31 46.4 | 63 53.2 | | | NIGHT | | |
| 8281 | 22/ 3 | 31 47.3 | 63 53.3 | RMT 1+8 | 490- 510 | 1148-1348 | OCEAN ACRE COMPARATIVE HAUL | -04 |
| # 49 | | 31 45.3 | 63 47.5 | | | DAY | FLOW DIST. 7.45 KM. | |
| 8281 | 22/ 3 | 31 43.4 | 63 42.2 | RMT 25 | 800-1000 | 1548-1828 | | -04 |
| # 50 | | 31 42.0 | 63 35.3 | | | DAY | FLOW DIST. 10.76 KM. | |
| 8281 | 25/ 3 | 32 12.1 | 64 18.8 | RMT 25 | 605- 800 | 1347-1747 | | -04 |
| # 51 | | 32 21.1 | 64 18.4 | | | DAY | FLOW DIST. 15.93 KM. | |
| 8281 | 25/ 3 | 32 23.2 | 64 16.9 | RMT 25 | 410- 600 | 1944-2344 | CREPUSCULAR - SUNSET 2231 | -04 |
| # 52 | | 32 32.2 | 64 15.9 | | | DUSK | FLOW DIST. 15.93 KM. | |
| 8281 | 26/ 3 | 32 16.4 | 64 17.3 | RMT 25 | 100- 205 | 0312-0712 | | -04 |
| # 53 | | 32 24.4 | 64 17.0 | | | NIGHT | FLOW DIST. 14.87 KM. | |
| 8281 | 26/ 3 | 32 25.0 | 64 15.7 | RMT 25 | 450- 600 | 0801-1125 | CREPUSCULAR - SUNRISE 1013 | -04 |
| # 54 | | 32 24.9 | 64 8.4 | | | DAWN | FLOW DIST. 12.62 KM. | |


R.R.S. DISCOVERY
TRACK CHART
AND STN. POSITIONS
CRUISE 52
CANADA
NEWFOUNDLAND
IRELAND
PORTUGAL
AZORES
MADEIRA
BERMUDA
CANARY ISLES
MOROCCO
8247
8248
8249 - 8254
8255-6
8257
8258
8259
8260
8261
8262
8263
8264
8265
8266
8267
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8276
8277
8278
8279
8280
8281
70° W
65°
60°
55°
50°
45°
40°
35°
30°
25°
20°
15°
10°
5°
50° N
45°
40°
35°
30°