FFIU/Oppdr 2775

Approved
Horten, 28 October 1993

Jarl Johnsen
Head of division

SIZEX 92 - AMBIENT NOISE MEASUREMENTS - DATA REPORT

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FFI/RAPPORT-93/2006

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NORWEGIAN DEFENCE RESEARCH ESTABLISHMENT (NDRE)
FORSVARETS FORSKNINGSINSTITUTT (FFI)

POST OFFICE BOX 25
N-2007 KJELLER, NORWAY

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE
(when data entered)

REPORT DOCUMENTATION PAGE

1) PUBL/REPORT NUMBER	2) SECURITY CLASSIFICATION	3) NUMBER OF PAGES
FFI/RAPPORT-93/2006	UNCLASSIFIED	111
1a) JOB REFERENCE	2a) DECLASSIFICATION/DOWNGRADING SCHEDULE	
FFIU/Oppdrag 2775		

4) TITLE

SIZEX 92 - AMBIENT NOISE MEASUREMENTS - DATA REPORT.

5) NAMES OF AUTHOR(S) IN FULL (surname first)

ENGELSEN, Ingjald

6) DISTRIBUTION STATEMENT

Approved for public release. Distribution limited.
(Offentlig tilgjengelig)

7) INDEXING TERMS

IN ENGLISH:	IN NORWEGIAN:
a) Underwater Acoustics	a) Undervannsakustikk
b) Ambient Noise	b) Bakgrunnsstøy
c) Sonobuoys	c) Sonobøyer
d) Barents Sea	d) Barentshavet
e) Marginal Ice Zone	e) Marginal issone

THESAURUS REFERENCE: NASA SP-7064

8) ABSTRACT (continue on reverse side if necessary)

The seasonal ice zone experiment SIZEX 92 was conducted in the Barents sea east of Hopen in the beginning of March 1992. The main objective of the experiment was to validate the SAR observations of the ice edge and the ice structure by comparison with in situ observations from ships, helicopter and aircraft. A programme of acoustic measurements in the marginal ice zone and outside the ice edge was included in the experiment. Measurements of ambient noise in the marginal ice zone and the study of propagation loss across the ice edge and across the polar front was carried out from different platforms: ships, helicopter and aircraft. This report presents the results of the ambient noise measurements. These were largly carried out with sonobuoys deployed from P-3 aircraft on two separate sorties March 6 and 9. In addition a limited experiment with a bottom mored buoy is also reported. The data set should give a good bases for correlation with environmental data in order to understand the various noise producing mechanisms.

9) DATE	AUTHORIZED BY This page only	POSITION
28 October 1993	J. Johnsen Jarl Johnsen	Head of division

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE
(when data entered)

FFI-B-22-1982

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SIZEX 92 - AMBIENT NOISE MEASUREMENTS - DATA REPORT

Summary

The seasonal ice zone experiment SIZEX 92 was conducted in the Barents sea east of Hopen in the beginning of March 1992. The main objective of the experiment was to validate the SAR observations of the ice edge and the ice structure by comparison with in situ observations from ships, helicopter and aircraft. A programme of acoustic measurements in the marginal ice zone and outside the ice edge was included in the experiment. Measurements of ambient noise in the marginal ice zone and the study of propagation loss across the ice edge and across the polar front was carried out from different platforms: ships helicopter and aircraft. This report presents the results of the ambient noise measurements. These were largly carried out with sonobuoys deployed from P-3 aircraft on two separate sorties March 6 and 9. In addition a limited experiment with a bottom moored buoy is also reported. The data set should give a good bases for correlation with environmental data in order to understand the various noise producing mechanisms.

1 INTRODUCTION

A post launch ERS-1 experiment was carried out in the Barents Sea in the first two weeks of March 1992. Several acoustic programs: ambient noise measurements and propagation loss studies were included in this experiment. The acoustic experiments were coordinated with the collection of environmental data obtained from meteorological and oceanographic measurements and SAR images. The latter provided ice parameters such as ice concentration, ice type and ice kinematics and were used to identify areas where the experiments were located.

The objectives are to correlate the acoustic data with the environmental data. The ERS-1 SAR data obtained during the experiment offers a unique opportunity to study variable ice conditions, eddies, surface waves, tidal currents and icebergs, all of which have a significant influence on the ambient noise and sound propagation conditions.

SIZEX 92 is an international cooperation where the main participants are:The Nansen Environmental and Remote Sensing Center (NERCS) in Bergen, Norwegian Defence Research Establisment (NDRE) in Horten, Defence Research Agency (DRA) in Portland, UK and Scott Polar Research Institute (SPRI) in Cambridge UK. A description of the planned acoustic programme was presented in the Experiment Plan (Johannessen et al, 1991). A narrative of events and locations of the various phases of the experiment have been reported in several cruise reports (Lane, 1992, Haigh, 1992, Engelsen, 1992 and JOHANNESSEN et.al. 1993).

The results of the propagation loss measurements have been reported previously (Burt, 1993, Engelsen, 1993). The present report describes the ambient noise measurements and presents the results of measurements with a bottom moored ambient noise buoy and with aircraft deployed sonobuoys. The results with the moored buoy is given in chapter 3, while chapter 4 presents the results of the sonobuoy measurements.

Ambient noise data were also obtained from a hydrophone array suspended from an ice flow in the vicinty of POLARSYSSEL. The array was monitored over a period of several days from POLARSYSSEL. The analysis and presentation of these data are the responsibility of DRA. In addition the ice array was also monitored by the P-3 aircraft and the results are included in the present dataset.

2 BRIEF DESCRIPTION OF EXPERIMENT

A description of the planned acoustic programme was presented in the experiment plan(Johannessen et.al. 1991). Due to changing weather and ice conditions and also due to the conditions of the measuring equipment, the plan had to be revised and updated continually. The details of the experiment are described in various post exercise cruise reports. (Johannessen et.al. 1993, Haig et.al. 1992, Lane 1992, Engelsen 1992, Turner 1992).

The experiment area was selected to be covered by the swath of the ERS-1 SAR. The swaths of orbits A8 and D17 are shown in figure 2.1. These orbits are repeated with an interval of 3 days. The position of the ice edge on March 6 is also indicated on the map.

2.1 Participating units

The field programme of SIZEX 92 was conducted east of Hopen in the Barents Sea using three surface vessels supported by helicopter and P-3 Maritime Patrol aircraft from the Royal Norwegian Airforce operating from Andøya air station. The participating vessels were:

- R/V POLARSYSSEL, an icebreaker suitable for operations within the marginal icezone (MIZ).This vessel carried out a number of tasks such as oceanographic and meteorological measurements, ice observations and deployment of acoustic receiving equipment. It carried a helicopter for deployment of sonobuoys and for carrying out aerial observations over the ice.

- R/V H U SVERDRUP II, a research vessel used for deployment of acoustic sources and for oceanographic measurements in the open ocean.

- R/V HÅKON MOSBY, open ocean research vessel for supporting oceanographic work.

2.2 DATOS - Bottom moored ambient noise buoy

Two bottom moored ambient noise buoys were deployed. These contain a digital audio tape recorder (DATOS) with a bandwidth of 3 - 20 000 Hz. An omnidirectional hydrophone sits on top of the buoy. The buoy is released from its mooring either after a preset time or by an acoustic command. The tape cassette will provide about two hours of recording time. In order to increase the recording time a cassette changing mechanism has been designed with a magazine which has a capacity of 19 cassettes. In this way a total of 38 hours of recording time is obtained. A control cicuit enables the system to be switched on and off at preset intervals. A recording time of 4 minutes every hour was choosen, thus providing for a total recording periode of 23 days or a little more than 3 weeks.

R/V POLARSYSSEL deployed the two DATOS buoys on March 1st at about 1700Z in the following positions east of Hopen:

Buoy 102	76,08,5'N 27,32,4'E	Depth 170 meters	south of ice edge
Buoy 103	76,29.6'N 26,00,2'E	" 85 "	at ice edge

It was intended that these buoys should provide a long term record of the ambient noise during the whole of the SIZEX periode. This would allow the influence of tidal currents as well as the change of ice cover over the sensors to be studied. The extention of the ice cover prevented the recovery of the buoys at the end of the experiment periode. It was not until later in the summer an attempt was made at recovering the buoys. Unfortunately only buoy no 103 was recovered. The other might have been lost as a consequence of trawling in the area. In the recovered buoy no 103 the tape changing mechanism had failed to operate. Only the first tape cassette had worked providing data for the following periode:

From March 1 at 1700Z
To " 2 at 2000Z

Although this is a very limited data set it does provide some interesting results.

2.3 Deployment of sonobuoys

Air deployed sonobuoys were used as the main system for recording ambient noise. The sonobuoys were deployed on two sorties with P-3 aircraft from the Royal Norwegian Airforce based on Andøya airstation. The sorties were flown on March 6 and March 9. A third sortie was started on March 11 where the intent was to study noise generated by icebergs in particular. Due to engine troubles the aircraft had to return to base before any measurements could be made. Attempts to repeat the flight was unsuccessful due to higher priority operations.

The March 6 sortie was designed for studying propagation loss as well as ambient noise. The propagation loss measurements were carried out between the two research vessels POLARSYSSEL acting as a receiving platform inside the pack ice, and H U SVERDRUP II operating south of the ice edge transmitting CW signals from a towed projector. Prior to the start of the propagation experiment POLARSYSSEL had deployed an ice array consisting of 6 sonobuoy hydrophones from an ice floe. The hydrophones were deployd in paires in an east-west direction at depths of 18 and 38 meters respectively. The horisontal separation between the paires were 20 meters approximately. The configuration is shown in figure 2.2. Buoy 11 turned out to be defective and was replaced with no 31 only after the aircraft had left the area. Modified sonobuoys were used as sensors in the ice array. Increased battery capacity ensured contineous operations over several days. The received signals were transmitted by radio link to a recording system on board the POLARSYSSEL. In addition the signals were also received and recorded on the aircraft recording system.

Although the two ships remained more or less stationary while the aircraft was in the area, their main engines were running most of the time. For this reason the sensors close to the ships recorded ship generated noise rather than ambient noise either all the time or part of the time.

In addition to the narrow band transmission experiment between the two ships, a broad band propagation loss experiment was also carried out. In this experiment modified desensitised sonobuoys were deployed by helicopter based on POLARSYSSEL while the P-3 aircraft were required to drop SUS charges Mk 82 along a north-south line starting in leads inside the ice and continuing out into open water. In this operation the P-3 was compelled to fly at a low altitude in order to hit the leads in the ice with the SUS charges and then make a steep climb to a high altitude were it could regain contact with the sonobuoys. Thus while the SUS charge experiment lasted, sonobuoy contact was frequently lost.

The sonobuoy pattern dropped by the P-3 is shown in figure 2.3 where the positions of ships, sonobuoys and other devices are superimposed on the SAR image of March 5. The pattern was choosen largely to accommodate the propagation loss experiment while the ambient noise considerations came secondary. The main engines on POLARSYSSEL were stopped at about 1300z and valuable ambient noise data where obtained from most of the locations in the time periode 1400z to 1620z. Figure 4.1 shows the positions of the sonobuoys used in the ambient noise study together with the positions of the two research ships.

The location and drop times for the ordinary sonobuoys deployed on March 6 is shown in table 2.1. The table also gives information on the sonobuoy type used and the type of area where the drop took place. The depth setting was 18 meters for all the sonobuoys.

The position of the ice array when deployed was:

77,17,0'N, 30,14.5'E.

The experiment on March 9 was dedicated to ambient noise measurements in the Marginal Ice Zone covered by the ERS-1 swath (D17) on March 8. The plan was to deploy 5 lines of sonobuoys across the swath from an area with dense ice consentration through grease ice into open water. The aircraft had difficulties deploying sonobuoys in the south-western corner of the experiment area. Some of the buoys became unserviceable. For this reason the aircraft was running short of SSQ 57B buoys and had to use SSQ 41N's and UK SSQ 905 buoys instead. This caused som added complexity in the data processing but the results are however comparable.

The deployment pattern is shown in figure 2.4. The positions of the sonobuoys are superimposed on the SAR image of March 8. Figure 4.2 shows a simplified map of the area giving the positions of all the serviceable sonobuoys as well as the position of POLARSYSSEL and the two serviceable AXBT's.

The position and deployment time for each sonobuoy are given in table 2.2. The table also gives information about the buoy type used and the type of drop area. Only the serviceable buoys are included in the table. A complete list of all the buoys dropped has been given in (5).

A number of environmental measurements were also made in connection with the acoustic experiments. SAR immages of the measurement area were obtained on March 5 and March 8 which helped in identifying the measurement area, AXBT's were deployed from the P-3 aircraft. XBT's, CTD profiles, meteorological observations as well as aerial photography and video films were obtained from the various participating platforms. The results of these measurements and observations have been reported elsewhere. (Johannessen et.al. 92) (9).

3 DATOS MEASUREMENTS

The bottom moored ambient noise recording system was deployed in order to obtain long-term ambient noise data from the area and to correlate these with environmental data such as tidal currents and ice cover. As explained in the previous paragraph only one instrument was recovcered and due to an unfortunate malfunction only 28 hours of data were recorded on this instrument. The recorded data covers the periode from March 1 at 1700Z to March 2 at 2000Z. SAR images from these two dates show a dramatic change in ice cover in the area which must be expected to cause a change in ambient noise level.

3.1 Data recording, calibration and analysis

The DATOS system consists of a hydrophone, preamplifier and a digital audio tape recorder type SONY TCD-D10. The sensitivity of the hydrophone and preamplifier is -127 dBV for a sound level of 1μPa. The system has a linear frequency response from 3 Hz to 20 KHz. It will also record time signals from an internal clock. An omnidirectional hydrophone is mounted on top of the buoy and is positioned about two meters above the sea bed. Figure 3.1 shows a block diagram of the DATOS buoy.

The data analysis was performed in the laboratory using an ONO SOKKI CF 920 FFT analysis system to obtain narrow band (resolution 6.25 Hz) frequency spectra for each of the recorded hourly time intervals. 256 samples were averaged, the averaging time being about 2 minutes. In addition some of the data were further processed on a PC system to show the data spreading in the form of 10, 50 and 90 percentile curves. Some averaging had to be performed in the frequency analyser before the computer program could handle the data. The lowest number of spectra to be averaged in the frequency analyser appeared to be 2. Further averaging and statistical analysis was performed on 50 spectra. Thus a total of 100 spectra was used in the computation with an averaging time of about 2 minutes. A block diagram of the analysis system is shown in figure 3.2.

A calibration signal of 1 volt rms (OdBV) at a frequncy of 630 Hz was applied at the input to the DAT recorder prior to deployment. Play back of the calibration signal showed a level of 4 dBV thus giving a total system sensitivty of -127+4 = -123 dBV ref 1 µPa. This sensitivity is applied to the frequency analyser and the output is read directly in dB rel 1 µPa.

3.2 Data presentation

The frequency spectra for each of the 4 min. time intervals are presented in figures 3.3 through 3.16. The levels at 20 selected frequencies are also given.

The frequency spectra showing the statistical spreading (10, 50 and 90 percentile curves) are presented in figures 3.17 through 3.19.

In order to show the change in noise level with time, the levels for 6 selected frequencies have been plotted as a function of time in figure 3.20

3.3 Environmental data

The most important environmental data are the two satellite images from March 1 and March 2 respectively. Figure 3.21 shows the image from the D8 orbit on March 1 at 1907 hours. Hopen island is seen at top of the picture. Figure 3.22 shows the image from D17 from March 2 at time 10.18 hours. The position of DATOS 103 is marked with a cross in both pictures. Figure 3.21 shows the ice edge close to Hopen with open water or very open drift ice at the position of the ambient noise buoy. In figure 3.22 the ice edge is seen to have reached the buoy position. The dark area is identified as grease ice. It is known that the ice edge moved moved east and south. The buoy position must have been completely covered by ice soon after the image was taken.

Wind obsevations from Hopen is available an are presented in table 3.1 for March 1 and 2. The wind is seen to come from the east or north- east with a speed of 12 knots at the start of the observation periode (March 1, 1800) gradually diminishing to calm conditions towards the end of March 2.

3.4 Preliminary discussion of results

It is evident from figure 3.20 which presents the noise level as a function of time for 6 selected frequencies, that there is a great variation with time. The dominating feature is an overall reduction in level from the start of the recording on March 1 at 1800z to the end on March 2 at 2000Z. The reduction in level during this time interval has been:

Frequency	Red. in level
37 Hz	2.5 dB
50 "	16.5 "
100 "	11.8 "
315 "	11.3 "
1000 "	15.2 "
3150 "	15.3 "

Most of the reduction in level has taken place before 1000Z on March 2, after this time there are only minor changes. The satellite images figure 3.21 and 3.22 shows that on March 1 at 1907Z there is open water at the buoy position with only patches of scattered ice. On March 2 at 1018 the buoy is about to be covered by ice. Later observations has shown the ice cover to extend further to the east and south. It can be assumed that by the end of this measurement series the location of the ambient noise buoy will be completely covered by ice. The ice type has been identified as grease ice.

Outside the ice edge the sea is fairly rough due to a 12 knot easterly wind. The wind turns more northerly and is also dropping on March 2. It is suggested that wind generated noise is dominating the picture in the beginning of the periode. The advancement of grease ice over the buoy location is seen to coinside very well with the drop in noise level between 0900 and 1000z. It is suggested that the grease ice damps out the wave action thereby reducing the noise level.

The level at 37.5 Hz is seen to vary much less than at the other frequencies. Also by looking at the frequency spectra one can notice an increase in level between 30 and 40 Hz. This discrepancy is thought to be cause by some artifact in the mechanical system within the buoy.

The peak in level at 0700Z is caused by the research ship HÅKON MOSBY which at this time passed very close to the buoy, probably within a distance of approximately 1 n mile. H M was doing oceanographic work in support of the SIZEX. A track chart of HÅKON MOSBYS run is shown in figure 4.49.

The 50 Hz curve show some erratic behaviour. The general tendency is towards reduced level with time in line with the higher frequencies. But in addition it displays som rather large short time variations which at the moment is unexplained.

The figures 3.17 through 3.19 presents the 10, 50 and 90 percentiles spectra at times 1700, 1800 and 2300 on March 1 and at 0300, 0700, 0800, 1400 and 1900 on March 2. The average spreading between the 10% and 90% curves at seven selected frequencies are shown in table 3.2. We find that the average spreading is fairly constant at a level of about 8 dB except at times when the noise is dominated by ship engines (March 1 at 1700 and March 2 at 0700 and 0800). In these cases the spreading is increased to more than 10 dB.

4 SONOBUOY MEASUREMENTS

The main part of the experiment took place during the P-3 sorties on March 6 and 9. Sonobuoys were deployed partly within the ice, partly at the ice edge and partly in open water. The areas were identified from satellite images produced on the previous days from swath A 8 on March 5 and from D17 on March 8.

4.1 Deployment on March 6

The deployment pattern for the sonobuoys on this day was determined by the requirements of the propagation loss experiment. (Engelsen 93, Burt 93). The deployment pattern for the ambient noise sonobuoys are shown in figure 4.1. As explained above, the area is partly covered by the satellite image from swath A8 of March 5. (See figure 2.3). The figure shows a few ambient noise buoys located inside the ice cover: no 19, 14 and 26. Buoys no 2, 17 and 18 are located in the grease ice at the ice edge while no 10, 58, 53, 82 and 30 are positioned on a straight north-south line in open water. A shallow depth setting of 18 meters were used for all sonobuoys. The figure also shows the position of POLARSYSSEL in the pack ice and H U SVERDRUP at the ice edge.

The positions and drop times for the ambient noise sonobuoys are listed in table 2.1, and table 4.1 lists the positions and drop times for the AXBT's. Table 2.1 also gives information on what types of sonobuoys have been used. The buoys deployed in open water are of the UK type SSQ 905. These are calibrated buoys for recording of CW signals transmitted from H U SVERDRUP as well as for recording of ambient noise. The ambient noise buoys used inside the ice are SSQ 57B's while the modified units in the ice array are of the type SSQ 57A.

4.2 Deployment on March 9

The sonobuoy deployment on this day was dedicated to ambient noise measurement in the MIZ in an area covered by the D17 SAR swath. The experiment area was selected from the satellite image obtained on March 8. 5 lines of sonobuoys were deployed across the swath from an area of dense ice consentration through grease ice and into open water. Figure

2.4 shows the deployment pattern superimposed upon the SAR image from March 8. In figure 4.2 the positions of the sonobuoys together with the position of POLAR SYSSEL and the two servicable AXBT's are shown. Except for buoy no 25, 58 and 82 which were dropped in open water, all the other buoys are located in ice covered waters in grease ice, broken up ice and in areas with larger ice floes and ice bergs. The radiated noise from POLAR SYSSEL did not appeaar to mask the ambient noise. After about 1130z the main engines of this ship were stopped, but even before this time engine noise was not detected on any of the sonobuoys. H U SVERDRUP II was during this experiment located south of the measurement area at a distance sufficiently great not to disturb the ambient noise measurements. Table 2.2 gives the positions and drop times for the sonobuoys, the table also gives information on the types of sonobuoys used. The aircraft had difficulties deploying sonbuoys in the south-western corner of the area. Many of the buoys were unserviceable presumably because they had not hit the leads between the ice floes. For this reason the P-3 was running short of SSQ 57B buoys and had to use SSQ 41N's and UK SSQ 905's instead. Only the serviceable buoys are listed in the table. A complete list of all the buoys droped is included in previous cruise reports (Sandven et al 93).

The deployment started at 0952Z and was completed at 1249Z. At 1500Z the P-3 was recalled to perform an operational task and had to leave the area. At 1515Z contact was lost on most of the sonobuoys and the operation was closed. During the deployment phase contact was frequently lost due to the fact the aircraft had to fly at a low altitude in order to hit the leads between ice floes. However even in this periode contact was maintained long enough to allow useful ambient noise data to be recorded.

4.3 Data recording, calibration and analysis

The sonobuoy data were received and recorded on analog 1 inch tape with the 28 track twin acoustic recording system aboard the P-3 aircraft. 16 tracks are available for sonobuoy signals on each recorder which means that 32 sonobuoys can be monitored at the same time. The receiving system was calibrated after returning to base after each sortie. A RF signal was transmitted simultaniously on all RF channels at 3 different levels (10, 19 and 75 KHz carrier deviation) at a signal frequency of 100 Hz. This calibration signal is recorded on all sonotracks of the recorder.

The original data tapes were sent to DRA for processing. Copies of all the P-3 data tapes were therefore made and used for processing at NDRE. The quality of the the data on the copies were checked against the original data, and it appears that the errors are insignificant.

The data has been analysed using a Honeywell 28 track tape machine and an ONO SOKKI frequency analyser. Averaged frequency spectra with a resolution of 6.25 Hz were obtained. 256 spectra were averaged over an averaging time of 2 minutes. Some of the data were further processed on a PC system to show the data spreading in the form of 10, 50 and 90 percentile curves. The same procedure for averaging were used as explained in chapter 3 for the processing the DATOS data. Figure 4.3 (p 40) shows a block diagram of the analysis system.

The SSQ 57 sonobuoys has a frequency response which equals 15 log f between 10 and 3000 Hz. 57B's have been calibrated individually, but unfortunately the calibration curves were not available. Therefore the generic response curve shown in figure 4.4 had to be used. In order to simplify the processing and compensate for the sonobuoy frequency response an equaliser has been designed with a frequency response of -15 log f. With this network inserted in front of the analyser, the overall frequency response becomes flat.

The generic frequency response of the SSQ 41N buoys is shown in figure 4.5. The slope of the response curve is also in this case 15 log f between 10 Hz and 1000 Hz. For higher frequencies corrections have been applied as shown in the figure. Thus the equalising network could be used also for these buoys with corrections applied to the measured values at frequencies above 1000 Hz.

The SSQ 905 is a UK calibrated F-size buoy. Individual calibration data were available for these buoys and were used for calculating the buoy sensitivities. The generic frequency response for the 905 buoys is shown in figure 4.6. The calibrated response for one buoy is also shown. In this case the slope of the curve is 20 log f and the equalising network could not be used in the data processing.

The recorded calibration signal established the gain factor for each track which had to be added to the sensitivity level given for the reference point for the particular type of buoy (116 dB rel 1µPa for the SSQ 57) to provide the overall sensitivity of the system.

4.4 Data presentation

The ambient noise from all the sonobuoys used on the 6th and 9th of March have been analysed as described in the previous paragraph at various time periodes. Attempt was made to perform the analysis at the same time periodes for all the buoys, but as explained above, this was not possible during the deployment phase due to the fact that the aircraft lost contact when deploying sonobuoys from a low altitude. In figures 4.7 and 4.8 the deployment times for the sonobuoys and the times at which frequency spectra are obtained, are indicated for March 6 and March 9 respectively.

On March 6 the recorded data was analysed and frequency spectra obtained at the following times: 1400Z, 1500Z and 1620Z. As explained earlier both POLARSYSSEL and H U SVERDRUP were operating in the area during the experiment. The engine noise from both ships contaminated the ambient noise on most of the sonobuoys. At about 1300Z the main engines on POLARSYSSEL were stopped and ambient noise measurements were possible on the sonobuoys within the ice cover. However the radiated noise from H U SVERDRUP II still masked the ambient noise from the sonobuoys outside the ice edge except from those furthest away from the ship. Noise spectra from all the buoys used are presented in figures 4.9 through 4.16. Only one set of spectra is included as there is very little change with time. In order to present the difference in noise level with time, the level at 5 selected frequencies (37.5, 100, 312.5, 1000 and 3150 Hz) have been plottet at times 1400z, 1500, and 1620z and are shown in figures 4.30 through 4.32. Lastly some examples of 10, 50 and 90 percentile statistics are shown in figures 4.42 and 4.43. The difference in level between the 10 and 90 percentile curves have been tabulated for 7 selected frequencies in table 4.6.

No disturbance by machinery noise was experienced on March 9. As shown in figure 4.8 the noise spectra are distributed over the monitoring periode. In the periode between 1100Z and 1245Z contact was lost on most of the buoys due to low altitude flying during the deployment phase. Two sonobuoys with the same RF channel number were deployed (4N and 4S). The aircraft had sometimes contact with one and sometimes with the other. As the noise level at the two positions were very different, it was no problem to discriminate between the two. A total of 138 spectra were obtained from this sonobuoy field. A set of the spectra from time 1400Z is presented in figures 4.17 through 4.28.

Note that the spectra from the SSQ 905 buoys are made without any frequency compensation. The levels are here given in dBV rather than in dB rel 1μPa as there was no easy means available to automatically convert the data to this unit. The convertion had to be done manually for each frequency using the calibration cards provided for each buoy. The noise levels rel 1μPa are presented in table 4.2 and 4.3 for the March 6 data and in tables 4.4 and 4.5 for the March 9 SSQ 905 data.

The shape of the spectra does not change appreciably with time, nor is there a great change in level. In order to illustrate the change in level with time the noise level for 5 different frequencies (37.5, 100, 312.5, 1000 and 3150 Hz) have been plotted as a function of time and are presented in figures 4.33 through 4.38.

The distribution of noise level in space is illustrated in figures 4.39 through 4.41 were the position of the different sonobuoys have been plotted and the noise levels for each sonobuoy in the field are marked off. The levels are given for 5 different frequencies at two different times: at 1245Z and 1400Z. (Only the 1400z data is presented here). An attempt has been made to contour the levels to indicate areas of high and low noise intensities.

Lastly som examples of 10, 50 and 90 percentile statistics are shown in figures 4.44 through 4.46. The difference between the 10 and 90 percentile curves gives an indication of the data spread. This difference has been tabulated in table 4.7 for 7 selected frequencies.

4.5 Environmental data

AXBT's were deployed both on March 6 and on March 9. Deployment times and positions of the serviceable AXBT's are given in table 4.1. The positions are shown in figures 4.1 and 4.2 respectively for the two days. The temperature profiles have been converted to sound speed profiles using a constant salinity of 35 per mille. The profiles are presented in figures 4.47 and 4.48.

R/V HÅKON MOSBY operated close to the position of DATOS 103 on March 2 taking Sea Soar sections. The sound speed section between 1800z on March 1 and 0600z on March 2 is shown in figure 4.50. This section stops just south of the position of Datos 103. It is seen that the water is very homogeneous down to a depth of about 90 meters in this area. It is assumed that it will not be very different also at the buoy position. This means that there is no marked surface channel in this area at least not to the indicated depth. A track chart of the run is shown in figure 4.49.

On the night of March 6 HÅKON MOSBY made a CTD run parallel to the line of open water sonobuoys deployed later that day. The CTD positions are marked on the map of figure 2.3 and the sound speed section of this run is presented in figure 4.51

Aerial photographs were taken during the deployment phase on both days. On March 6 we only have photos from 4 positions while on March 9 an attempt was made to take a photo of the ice condition at each sonobuoy position. The early deployments were covered successfully with photos, but severe icing on the windows of the aircraft prevented photography at the later deployments. A photolog from the P-3 flights on March 6 and 9 are given in table 5.1. A few samples of photos are presented in figure 4.52, further samples can be found in in (5).

SAR images were obtained from swath A8 and D17 every 3rd day. Images from March 1, 2, 5 and 8 are presented in figures 3.20, 3.21, 2.3 and 2.4.

Additional meteorological and oceanographic observations were made from the participating vessels and have been reported elsewhere (5).

4.6 Preliminary dicussion

March 6

Only a limited data set is available from this date as the main objective of this experiment was to study propagation loss. What useful ambient noise data were obtained can be regarded as a bonus. As explained earlier the main engines on the research vessels H U SVERDRUP II and POLARSYSSEL were running most of the time and masked out the ambient noise on most of the sonobuoys. At about 1300 the main engines on POLARSYSSEL were stopped and it was possible to obtain useful data from the buoys innside the ice cover. Figure 4.7 shows that analysis of the noise data were carried out at 1400, 1500 and at 1620z for all the buoys except 3 were the time had to be altered slightly. noise spectrum levels were obtained at these times and a spectrogram for each buoy at 1500z is reproduced in figures 4.9 through 4.16. The rest of the spectrograms are available upon request.

Perhaps the most interesting feature is the noise field at the ice array. The spectrograms taken at 1500z for the five serviceable buoys in the array are shown in figures 4.9 through 4.11. The shape of the spectrograms from all the buoys in the array are almost identical but there is a marked marked difference in level between the shallow and the deep buoys. This is particularly notiseable when comparing buoy 27 (deep) with 29 (shallow). The level at the deep buoy is 8 to 10 dB higher than at at the shallow buoy. For the other pair (15 and 13) the difference is only 2-3 dB. The level at buoy 9 is seen to be slightly less than at buoy 15.

The change in noise level with time is presented in figures 4.30 through 4.32 for five selected frequencies. It is seen that for the sonobuoys in the ice array there is no change from 1400 to 1500 while the level at 1620 has dropped about 5 dB at the lower frequencies and about 10 dB at the higher frequencies. This indicates that the noise field changes uniformly over the ice array apperture as expected.

The noise levels for the three other buoys located inside the ice cover are presented in figure 4.31. The levels at these positions are somewhat lower than at the ice array. The change with time is seen to be very small and follows a different pattern compared to the ice array. At buoy 26 week engine noise from H U SVERDRUP II could occationally be heard.

Figures 4.42 and 4.43 presents the 10, 50 and 90 percentile spectra from buoys no 27, 29 and 19 and 18, 26 and 17 respectively. The difference in level betweeen the 10 and 90 percentile spectra are presented in table 4.6 for seven different frequencies. It is seen that the buoys which are dominated by engine noise (17 and 18) has a somewhat broader data spread than the other buoys. This also applies to buoy no 26 which is an indication that this buoy also is affected by engine noise. This is in line with what was found for the noise recorded at the bottom moored DATOS buoy.

Spectrograms from the buoys located south of the ice edge are presented in figures 4.13 through 4.16. Except at the two buoys furthest away (82 and 30), a single peak is noticeable in the spectrograms at 100 Hz and a double peak shows up at 200 Hz. The main engine of H U SVERDRUP II is responsible for the 100 Hz peak while the double peak (188 and 200Hz) originates from the projector operated by H U SVERDRUP II. The noise level at buoys 17, 18, 2 and 10 are dominated by the main engine of H U SVERDRUP II all the time. Even at buoys 58 and 53 the engine noise can be heard occationally. Only buoy 82 and 30 are not contaminated by engine noise and therefore represents true sea noise.

<u>March 9</u>

The P-3 sortie on March 9 was dedicated the ambient noise experiment. The sonobuoy field, where only the serviceable buoys are inncluded, is shown in figure 4.2. Figure 4.8 shows the drop times for the sonobuoys. It also indicates the times at which frquency spectra were obtained. The frequency spectra are averaged over a 2 minute interval at a resolution of 6.25 Hz. A set of spectrograms taken at 1400z are presented in figures 4.17 through 4.28. Copies of the rest of the spectra are available upon request.

In order to determine whether the noise level changes with time, the level at five selected frequencies has been plotted on a time scale and are presented in figures 4.33 through 4.38. It appears to be no significant change with time. A maximum level at 1400z appears for buoy no 5, 12, and 23, while buoy 20 has a maximum at 1330z. The ice activity at these times might have increased.

In order to present the difference in noise level within the experiment area, the measured level at five frequencies have been plotted at the position of each sonobuoy and presented in figures 4.39 through 4.41. The figures also show contour levels with 5 dB intervals. It is evident that the highest levels are found in the eastern and middle part of the area. This includes buoy no 12, 23, 4N, 65 and 19. Buoy 18 also shows a high level noise. Buoy no 12 and 23 are located close to fairly large ice bergs (See photograph figure 5.6). Here the ice is pressed up against one side of the berg leaving open weater on the lee side. The noise at position 18 is largly due to animal activity. A large number of whales and seals were observed in the area, evidently comunicating with each other.

The noise level is seen to be reduced towards north as we move further into the pack ice, and particularly towards south-east. This area is largly covered by grease ice and pancake ice wich has a damping affect on waves and swell and thus tends to reduce noise. A similar plott has also been made at 1245z and shows the same pattern of contours. It is assumed that this pattern does not change appreciably during the experiment.

Lastly the 10, 50 and 90 percentile spectra have been obtained for all the sonbuoys. The spectra from buoys 5, 7, 8, 12, 23, 16, 18, 19 and 20 are presented in figures 4.44 through 4.46. The difference in level between the 10 and 90 percentile spectra are shown i table 4.7 for seven different frequencies. It appears that strong ice activity like breaking and thrusting perhaps shear movement (buoys 5 and 20) and also animal noise (buoys 8 and 18) result in an increased spread in noise level.

5 CONCLUSIONS

Ambient noise measurements have been carried out in 3 different phases during the SIZEX 92 experiment. In the first experiment two bottom mounted ambient noise buoys were deployed. These were programmed to make a 4 minute recording of the ambient noise at intervals of one hour. The total recording time was estimated to be 23 days. One buoy was never recovered, while the other buoy had a malfunction and only data from a 28 hour periode was available.

The level of the ambient noise recorded in this position is seen to decrease with time and reaches a more or less constant minimum level between 0900 and 1000z on March 2. This is seen to coinside with the time the ice cover reaches the position of the buoy. The ice cover consists of grease ice and pancake ice. The reduction in noise before this time could be caused by reduction in the wind force from about 12 to 8 knots.

The two other ambient noise experiments were performed with sonobuoys deployed from P-3 aircraft. The experiment on March 6 was of limited value as the propagation loss experiment had first priority during this flight. Engine noise from the two research vessels was the dominating noise source at many of the buoy positions most of the time. The last two or three hours of the sortie yielded useful data for the ice array and for the buoys located inside the ice cover. The radiated noise from H U SVERDRUP II located just south of the ice edge dominats the noise field over a large area. Only the two buoys located furthest away from the ship are not affected by the ship noise.

The noise field at the position of the ice array is not constant in space. The most noticeable feature is the difference in level between shallow (18 m) and deep (38 m) hydrophones. A similar difference in level was found in the propagation loss experiment indicating that the same mechanism is responsible. The sound speed profiles show a sharp surface duct with a depth varying from 50 to 100 meters. It is suggested that a propagation model could be applied or developed to explain the responsible mechanism. It is further noticed that the variation in noise level with time over the array apperture is constant indicating only large scale fluctuations.

The experiment on March 9 was dedicated to ambient noise measurements and was rather successful. Noise data were obtained over a periode of 5 hours from 24 sonobuoys spread over an area of roughly 100 x 100 km. A few of the buoys were located in open water while the majority were deployed inside the ice cover in areas of widely different ice structures: large ice floes, ice bergs, broken up ice and grease and pancake ice. Both spatial and time variations of the noise field are presented. The spatial variations indicate areas of very strong, moderat and week noise fields and should be a good bases for further analysis and correlation with the environmental parameters such as wind stress, ice structure and movement, current and swell.

The participating institutions will in the near future finish and distribute to the other institutions the last data reports both for the acoustic and environmental data. The environmental data will include ice information obtained from SAR images, from photographs taken from aircraft and helicopter, from videotape and from visual observations. In addition meteorological and oceanographic data including wave and current measurements will be available from the participating ships and from Hopen island. It is further the intention to hold a workshop in order to correlate the results of the acoustic measurements, propagation loss and ambient noise, with the environmental data in order to gain a better understanding of the mechanisms involved. The workshop will also discuss plans for joint publications of the results from SIZEX 92.

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Buoy no	Buoy type SSQ	Drop platform	Drop time	Area type	Location	Note
2	905	A/C	1009.00	Ice edge	77,06.35 N, 30,20.41 E	OK
10	905	"	1011.37	Open water	76,56.33 N, 30,21.01 E	OK
58	905	"	1014.15	" "	76,46.21 N, 30,21.15 E	OK
53	905	"	1016.28	" "	76,38.31 N, 30,31.29 E	OK
82	905	"	1018.42	" "	76,28.48 N, 30,30.58 E	OK
30	905	"	1129.22	" "	76,18.49 N, 30,33.11 E	OK
17	57-B	"	1052.07	" "	77,06.16 N, 30,14.51 E	OK
18	57-B	"	1055.11	Grease ice	77,09.48 N, 30,49.54 E	OK
19	57-B	"	1108.31	" "	77,24.36 N, 29,38.15 E	OK
26	57-B	Helo	1350.58	In lead	77,15 N, 31,00 E	OK
14	57-B	"	1419.29	" "	77,25 N, 31,00 E	OK

Table 2.1 Sonobuoys positions and deployment times on March 6

Buoy no	Buoy type SSQ	Drop time	Area type	Location	Note
5	57-B	0958.24	" "	77,28.23 N, 27,38.35 E	OK
7	57-B	1002.32	" "	77,24.46 N, 28,17.58 E	OK
8	57-B	1005.35	" "	77,24.19 N, 29,13.32 E	OK
10	57-B	1012.30	" "	77,22.22 N, 29,56.50 E	OK
11	57-B	1015.34	" "	77,24.48 N, 30,46.58 E	OK
12	57-B	1019.39	" "	77,11.03 N, 30,26.28 E	OK
15	57-B	1028.17	" "	77,15.39 N, 29,44.16 E	OK
16	57-B	1032.26	" "	77,13.14 N, 28,57.56 E	OK
19	57-B	1035.16	New ice	77,13.15 N, 28,10.25 E	OK
20	57-B	1040.00	In lead	77,12.45 N, 27,21.29 E	OK
21	57-B	1043.10	Narrow lead	77,05.27 N, 27,02.31 E	OK
22	57-B	1049.45	In lead	77,04.19 N, 27,52.37 E	OK
18	57-B	1056.55	" "	76,58.14 N, 28,50.16 E	OK
23	57-B	1113.54	" "	77,08.03 N, 30,15.14 E	OK
4	57-B	1119.36	" "	76,54.55 N, 29,52.26 E	OK
24	57-B	1128.44	" "	76,56.54 N, 28,04.30 E	OK
38	905	1152.35	" "	76,57.09 N, 26,36.09 E	OK
22	57-B	1204.36	" "	76,46.30 N, 27,51.47 E	OK
25	57-B	1207.32	Ice edge	76,45.33 N, 28,36.28 E	OK
58	905	1210.07	Open water	76,44.55 N, 29,17.59 E	OK
63	905	1216.50	Ice edge	76,36.09 N, 28,45.49 E	OK
1	41-N	1221.05	In lead	76,35.47 N, 28,15.28 E	OK
3	41-N	1232.23	" "	76,28.26 N, 26,38.25 E	OK
4	41-N	1235.36	" "	76,26.26 N, 27,31.26 E	OK
82	905	1241.33	Open water	76,25.53 N, 29,12.48 E	OK
65	905	1249.12	Ice edge	76,55.17 N, 30,09.13 E	OK

Table 2.2 Sonobuoy positions and deployment times on March 9

Date	Time	Air Temp. ,C	Wind speed knot	Wind Dir. deg.
March 1	0000Z	-1.5	11	60
" 1	0600"	-1.5	12	60
" 1	1200"	-1.6	12	90
" 1	1800"	-2.6	12	80
" 2	0000"	-4.1	10	50
" 2	0600"	-4.4	8	80
" 2	1200"	-4.5	9	30
" 2	1800"	-5.0	6	50
" 3	0000"	-7.3	0	0

Table 3.1 Wind force and direction measured at Hopen

Date	Time Freq	50 Hz dB	100 Hz dB	200 Hz dB	500 Hz dB	1000 Hz dB	2000 Hz dB	5000 Hz dB
1-3	1700 Z	15.5	11.6	12.2	11.1	11.0	11.4	10.0
"	1800 "	10.0	7.8	8.9	8.3	7.8	8.3	8.5
"	2300 "	9.4	8.9	8.9	8.5	8.8	8.5	8.8
2-3	0300 "	7.8	8.6	8.3	9.4	8.3	8.3	8.0
"	0700 "	7.8	7.8	10.0	10.3	10.6	11.7	10.5
"	0800 "	7.2	10.0	12.2	10.3	10.3	11.7	9.5
"	1400 "	7.0	8.3	8.9	8.3	8.3	8.3	8.3
"	1900 "	7.0	8.5	7.8	9.0	9.0	9.0	9.0

Table 3.2 Difference in level between 90% and 10% curves at selected frequencies for DATOS buoy.

Buoy no	Date	AXBT no	Drop time	Area type	Location	Note
14	6/3	1	1033.12	Open water	76,29.08 N, 30,31.54 E	OK
16	"	2	1041.37	" "	76,49.08 N, 30,32.22 E	OK
12	"	3	1050.16	Ice edge	77,08.52 N, 30,31.22 E	OK
14	"	4	1108.31	In lead	77,24.36 N, 29,38.15 E	OK
16	"	5	1526.50	Open water	76,44.33 N, 31,15.51 E	OK
12	"	6	1534.10	" "	76,35.26 N, 31,14.25 E	OK
16	"	7	1543.14	Ice edge	77,05.46 N, 30,28.58 E	OK
14	9/3	1	1017.36	In lead	77,18.12 N, 30,39.25 E	OK
16	"	2	1215.55	Open water	76,34.51 N, 29,07.41 E	OK

Table 4.1 Positions and deployment times for AXBT buoys

AMBIENT NOISE
AREA EAST OF HOPEN
DATE 6-3-1992
DEPTH 18 METERS

BUOY NO.	2	2	2	10	10	10	10	30	30	30	53	53	53
TIME	1400	1459	1620	1400	1459	1608	1612	1400	1531	1620	1400	1458	1620
FREQUENCY Hz													
12.5	93.0	91.0	91.7	90.3	96.0	118.9	112.9	90.0	88.9	94.7	94.1	93.1	93.6
25	89.0	87.1	88.4	82.5	88.1	110.5	100.4	77.9	77.1	83.3	77.6	78.9	79.3
40	20.1	90.1	87.1	86.0	86.0	102.8	100.4	71.5	71.2	74.1	74.5	76.1	75.9
50	86.8	86.2	85.7	83.1	85.6	97.1	85.9	70.8	68.5	71.5	72.5	72.4	71.2
63	85.8	84.9	84.5	84.5	86.0	93.2	85.5	72.5	72.8	71.5	74.2	72.3	71.8
80	86.2	84.6	84.8	84.3	85.7	89.8	83.5	72.4	71.7	72.0	73.6	74.1	72.3
100	96.6	89.0	91.2	94.7	91.4	91.2	89.5	80.7	77.4	80.4	83.3	80.3	83.3
125	84.5	84.0	85.6	88.2	83.7	85.2	87.5	75.3	73.9	72.0	75.5	73.6	72.9
160	87.8	81.7	82.6	82.8	86.2	85.9	82.4	76.4	72.5	73.3	74.3	75.3	74.1
200	93.0	87.2	89.4	86.7	93.1	94.7	87.0	77.5	76.8	74.8	80.0	76.7	78.0
250	84.8	83.6	83.0	86.0	85.9	82.4	78.9	76.7	72.1	71.8	79.5	73.4	72.1
315	81.9	80.7	77.6	80.3	83.5	83.9	78.3	75.6	71.9	70.9	74.4	75.1	71.5
400	82.5	75.6	78.8	79.4	81.7	80.1	77.6	73.6	70.7	69.9	71.2	71.0	69.6
500	82.3	78.4	77.8	74.3	80.0	75.8	73.6	72.3	69.4	69.4	70.5	69.5	68.8
630	73.8	73.4	73.8	74.7	79.9	75.5	72.5	70.5	67.3	68.0	67.7	67.2	68.2
1000	75.7	70.2	72.9	70.1	74.0	70.5	66.6	65.5	64.0	64.4	62.4	63.6	63.5
1600	69.8	70.0	72.9	66.7	69.8	66.5	63.2	61.8	61.4	61.5	59.4	60.5	60.8
2000	67.4	66.7	66.9	68.4	68.4	64.1	60.9	59.5	58.9	58.8	57.5	58.2	58.3
3150	60.5	59.1	59.8	58.3	60.7	56.6	54.1	53.8	52.6	51.7	51.9	53.5	52.9
5000	55.2	52.7	57.6	49.2	57.3	53.2	52.1	49.8	48.9	48.8	48.7	51.8	50.1

Table 4.2 Noise spectrum levels for AN/SSQ 905 sonobuioys. March 6.

AMBIENT NOISE
AREA EAST OF HOPEN
DATE 6-3-1992
DEPTH 18 METERS

BUOY NO.	58	58	58	82	82	82
TIME	1400	1458	1620	1400	1458	1620
FREQUENCY Hz						
12.5	93.7	91.9	90.5	98.3	94.0	98.9
25	81.7	82.2	81.5	86.5	80.2	83.7
40	80.7	81.9	80.6	78.2	78.6	79.7
50	78.1	78.9	77.7	74.7	78.0	72.6
63	79.0	77.9	77.4	73.5	78.4	71.5
80	77.4	79.6	78.3	73.8	74.8	71.8
100	84.2	83.6	82.8	79.9	80.5	77.6
125	78.9	76.5	76.4	76.1	75.0	72.7
160	77.5	77.8	77.1	75.0	73.1	72.6
200	84.8	85.3	82.9	79.1	74.7	72.3
250	78.0	77.6	75.6	78.5	73.1	71.5
315	74.8	78.4	74.1	74.1	71.3	70.6
400	72.5	75.2	74.3	74.1	71.7	70.0
500	71.5	75.0	71.8	72.3	71.0	69.2
630	68.0	71.7	71.4	70.2	69.4	67.1
1000	63.5	66.6	57.2	66.0	66.6	64.5
1600	60.3	62.2	64.1	63.1	62.3	61.3
2000	57.9	59.9	61.9	60.7	59.8	59.5
3150	51.7	53.3	55.1	54.3	55.1	53.7
5000	48.0	61.8	53.6	50.8	56.3	49.7

Table 4.3 Noise levels from AN/SSQ 905 sonobuoys on March 6

AMBIENT NOISE

AREA	N-E OF HOPEN
DATE	9-3-1992
DEPTH	18 METERS

BUOY NO.	65	65	65	65	82	82	82	82	21	22	24	25	4N	4N	4N
TIME	1252	1330	1400	1440	1245	1330	1400	1450	1400	1400	1400	1400	1120	1245	1400
FREQUENCY Hz															
12.5	98.3	103.3	94.4	96.6	92.6	89.5	98.6	98.3	77.9	73.0	78.0	72.5	82.8	83.4	82.6
25	92.6	93.1	89.8	89.8	76.1	73.8	81.0	81.3	73.4	65.4	79.5	71.8	89.0	89.6	88.9
40	91.8	90.3	89.8	90.5	73.8	70.1	75.3	73.9	74.0	66.1	79.0	75.4	89.8	89.3	89.1
50	89.6	87.9	87.9	88.9	70.9	69.2	71.4	71.1	75.5	66.8	76.8	76.3	88.2	87.5	86.8
63	87.8	86.2	86.2	86.7	69.9	68.8	70.3	69.7	75.4	67.9	75.9	76.1	87.4	86.3	86.1
80	86.5	84.1	84.2	84.8	70.0	69.0	70.1	70.1	75.8	68.5	76.4	76.0	85.7	85.1	84.9
100	84.9	82.9	83.7	84.3	70.4	69.7	70.2	70.4	76.3	69.4	76.3	75.4	84.8	83.6	82.6
125	83.1	81.2	81.4	82.5	70.5	70.4	70.6	71.7	76.5	68.8	78.4	74.2	83.0	81.8	80.6
160	80.5	79.4	80.2	80.9	70.5	70.5	70.4	71.0	76.7	68.0	75.1	72.6	80.7	79.0	79.1
200	78.9	77.8	78.5	79.1	70.7	70.0	70.1	69.8	76.0	68.5	74.9	71.3	79.4	77.5	77.9
250	77.9	76.0	76.8	77.8	69.2	68.5	68.6	68.6	74.8	67.8	73.4	69.9	77.0	75.3	75.4
315	76.4	74.2	74.9	75.6	68.1	66.5	67.7	68.0	73.6	66.7	71.8	68.2	75.0	74.0	74.2
400	74.9	72.8	73.8	74.3	64.8	65.4	65.9	67.8	71.9	65.3	70.8	66.4	73.1	71.5	72.1
500	73.3	70.6	71.5	72.2	62.6	62.6	63.9	66.7	69.9	64.1	69.0	63.7	71.1	69.9	70.8
630	71.5	68.6	70.9	71.5	60.3	61.4	62.9	64.0	67.9	63.1	67.1	61.9	69.5	68.8	69.4
1000	66.4	65.0	66.3	67.3	55.6	56.6	58.1	60.5	63.3	60.0	62.3	57.6	66.5	66.2	67.0
1600	63.9	63.4	64.8	65.8	52.1	53.3	55.2	57.8	58.1	55.4	56.2	51.6	63.6	63.1	62.2
2000	60.9	62.0	63.3	64.2	49.9	50.8	52.8	55.6	56.1	53.2	52.9	49.2	61.5	59.4	59.9
3150	55.2	57.1	58.8	59.2	42.7	44.8	46.1	48.3	49.2	49.3	47.6	44.6	56.8	54.5	55.1
5000	51.4	51.4	53.1	53.4	44.4	45.5	43.9	46.2	42.6	43.2	42.2	36.5	51.5	48.4	48.7

Table 4.4 Noise spectrum levels for AN/SSQ 905 sonobuoys. March 9.

AMBIENT NOISE
AREA N-E OF HOPEN
DATE 9-3-1992
DEPTH 18 METERS

BUOY NO.	38	38	38	38	38	58	58	58	58	58	63	63	63	63	63
TIME	1154	1245	1330	1400	1440	1211	1245	1330	1400	1450	1218	1245	1330	1400	1450
FREQUENCY Hz															
12.5	89.3	76.8	87.9	79.6	77.7	98.3	97.0	100.5	100.7	98.6	95.7	97.3	90.5	91.7	94.5
25	79.9	68.8	77.9	70.8	70.1	84.6	80.8	83.5	88.4	80.5	80.9	87.9	79.7	78.5	80.8
40	74.9	65.1	73.8	66.3	66.2	77.1	75.0	77.3	80.4	75.7	75.7	83.9	73.0	74.4	74.5
50	72.0	62.5	71.2	63.9	63.5	74.8	71.6	75.1	76.7	73.8	73.7	75.5	72.0	72.1	72.1
63	69.8	63.1	69.2	63.9	64.0	75.5	74.3	73.2	73.6	72.6	75.6	74.8	71.9	72.1	72.6
80	68.3	63.5	68.0	63.2	63.4	73.5	72.3	72.6	73.4	72.7	73.7	73.1	71.9	71.9	71.6
100	67.6	66.3	67.2	65.4	65.7	72.4	71.5	71.5	72.9	73.6	74.5	73.2	73.0	72.9	72.1
125	69.2	67.6	67.9	68.9	67.8	72.2	71.8	72.7	72.3	73.2	74.2	72.7	72.1	73.0	73.0
160	69.8	69.6	69.4	69.0	69.2	71.1	70.3	71.0	71.9	72.9	72.0	71.5	71.0	72.7	72.2
200	71.2	69.5	70.1	70.5	69.7	70.6	69.3	70.6	71.1	72.9	71.6	70.7	70.6	71.0	71.1
250	69.5	69.1	70.1	68.2	69.2	68.3	68.3	69.1	70.4	71.4	69.5	68.5	68.8	68.9	69.9
315	69.9	68.3	69.0	67.3	69.6	66.4	66.3	69.0	69.7	71.0	67.9	65.7	66.4	66.5	68.6
400	67.8	66.4	68.3	66.8	68.2	63.9	65.9	68.2	68.7	70.5	65.5	64.0	64.7	65.1	67.0
500	67.5	65.3	68.4	65.5	66.3	62.9	64.2	68.2	68.9	70.2	62.4	61.4	62.2	62.9	65.4
630	64.6	63.5	64.1	64.2	64.4	63.4	63.8	66.7	67.6	69.1	60.9	60.1	61.5	61.5	63.6
1000	60.1	57.9	54.6	57.4	57.6	55.8	60.8	63.8	65.1	65.7	57.4	54.7	55.2	56.5	59.4
1600	50.6	50.7	53.1	52.1	52.0	56.9	59.0	61.4	62.7	63.7	53.9	53.3	52.7	53.0	56.6
2000	47.2	48.5	50.4	48.8	49.5	50.4	57.1	59.6	60.9	62.4	50.6	49.3	50.1	51.9	53.9
3150	42.3	41.9	44.6	42.1	42.9	42.4	49.7	53.8	54.7	55.4	45.0	44.2	45.0	46.0	49.0
5000	41.6	39.8	44.2	40.8	41.9	40.7	44.3	48.7	49.1	50.8	42.3	41.6	43.3	43.2	44.5

Table 4.5 Noise spectrum levels for AN/SSQ 905 sonobuoys. March 9.

Buoy no.	50 Hz dB	100 Hz dB	200 Hz dB	500 Hz dB	1000 Hz dB	2000 Hz dB	5000 Hz dB	
9	8.2	10.0	8.2	8.2	9.8	10.0	10.5	
13	8.2	8.2	9.2	10.0	9.2	10.0	10.0	
15	8.5	9.2	8.0	8.8	10.0	9.2	10.0	
27	10.0	9.2	7.5	8.8	9.2	10.0	10.0	
29	9.2	8.5	10.2	8.8	8.2	10.0	9.2	
14	8.5	9.4	10.2	9.2	10.2	9.0	10.0	
19	11.5	7.8	8.2	9.2	8.5	9.0	10.0	
26	8.2	10.0	9.2	11.8	13.0	12.0	10.0	a)
17	8.5	9.5	9.2	13.0	11.0	12.0	11.5	a)
18	8.5	10.8	10.0	10.0	10.5	10.5	11.0	a)

Note: a) Ship radiated noise

Table 4.6 Difference in level between 10 and 90 percentile frequency spectra at selected frequencies. March 6 at 1500.

Buoy no	50 Hz dB	100 HZ dB	200 Hz dB	500 Hz dB	1000 Hz dB	2000 Hz dB	5000 Hz dB	
1	10.0	11.0	8.7	8.0	9.3	9.3	10.0	
3	8.7	9.3	7.3	8.3	10.0	9.3	9.5	
4S	12.0	9.0	9.3	7.7	9.3	8.0	9.7	
4N	9.0	8.7	10.0	9.0	9.0	10.0	9.3	
5	10.0	10.3	11.7	12.0	13.3	12.0	12.0	a)
7	9.0	9.0	11.3	8.0	9.0	9.3	10.0	
8	10.7	8.0	10.0	10.0	10.0	9.3	11.7	b)
10	8.0	10.0	8.7	9.0	9.0	9.7	9.3	
11	9.3	10.0	9.7	7.7	8.0	9.7	10.0	
12	9.4	7.5	9.8	9.0	9.0	9.4	11.3	
16	6.5	9.2	8.2	7.8	7.5	8.2	8.5	
18	8.2	6.9	8.5	9.5	10.5	11.1	11.0	b)
19	8.5	6.5	9.2	8.8	9.5	9.5	8.5	
20	10.0	7.5	10.8	9.8	11.2	11.2	11.8	a)
21	12.4	9.8	8.8	8.5	9.0	8.2	10.0	
22	11.0	7.2	9.5	7.8	8.5	8.5	10.0	
23	12.8	13.0	9.2	7.8	7.8	9.2	10.0	
24	7.3	9.8	8.2	9.8	9.5	10.0	10.0	
25	7.2	9.8	8.2	9.2	9.2	11.2	9.8	

Note: a) Strong ice activity
b) Biological noise

Table 4.7 Difference in level between 10 and 90 percentile frequency spectra at selected frequencies. March 9 at 1400

Date March	Time	Film no	Film type	Position	Note
6	0956	A-1, 1-10	Paper	77,10 N, 30,54 E	Grease ice
"	1000	A-1,11-17	copy	77,02 N, 30,02 E	" "
"	1010	A-1,18-21	"	77,24 N, 29,38 E	Hole in the ice
"	1132	B-1, 1-8	"	77,06 N, 30,30 E	Close to SVERDRUP
9	0956	A-2, 1	"	77,24 N, 27,40 E	At buoy 3 (def)
"	1001	A-2, 2-3	"	77,28 N, 27,39 E	" " 5
"	1004	A-2, 4	"	77,25 N, 28,18 E	" " 7
"	1008	A-2, 5-6	"	77,24 N, 29,14 E	" " 8
"	1010	A-2, 7	"	77,24 N, 29,53 E	" " 9 (def)
"	1014	A-2, 8	"	77,22 N, 29,57 E	" " 10
"	1018	A-2, 9	"	77,25 N, 30,47 E	" " 11
"	1024	A-2,10-13	"	77,11 N, 30,25 E	" " 12
"	1031	A-2,14	"	77,16 N, 29,44 E	" " 15
"	1035	A-2,15	"	77,14 N, 28,58 E	" " 16
"	1042	A-2,16	"	77,13 N, 27,21 E	" " 20
"	1045	A-2,17	"	77,05 N, 27,02 E	" " 21
"	1049	A-2,18-20	"	77,03 N, 27,49 E	Ice berg
"	1058	A-2,21-23	"		Polar bear, running
"	1059	A-2,24-25	"	76,58 N, 28,50 E	At buoy 18, grease ice
"	1106	A-2,26	"	77,05 N, 29,50 E	At "POLARSYSSEL"
"	1108	A-2,27-29	"	77,08 N, 30,15 E	At buoy 23, Iceberg
"	1123	A-2,30	"	76,55 N, 29,52 E	" " 4
"	1125	A-2,31-36	"	76,59 N, 28,45 E	Grease ice
"	1131	B-2, 1	"	76,57 N, 27,04 E	At buoy 24
"	1138	B-2, 2	"	76,56 N, 27,08 E	" " 26
"	1220	B-2, 3	"	76,35 N, 28,08 E	" " 1

Table 4.8 Photolog from P-3 sorties on March 6 and 9

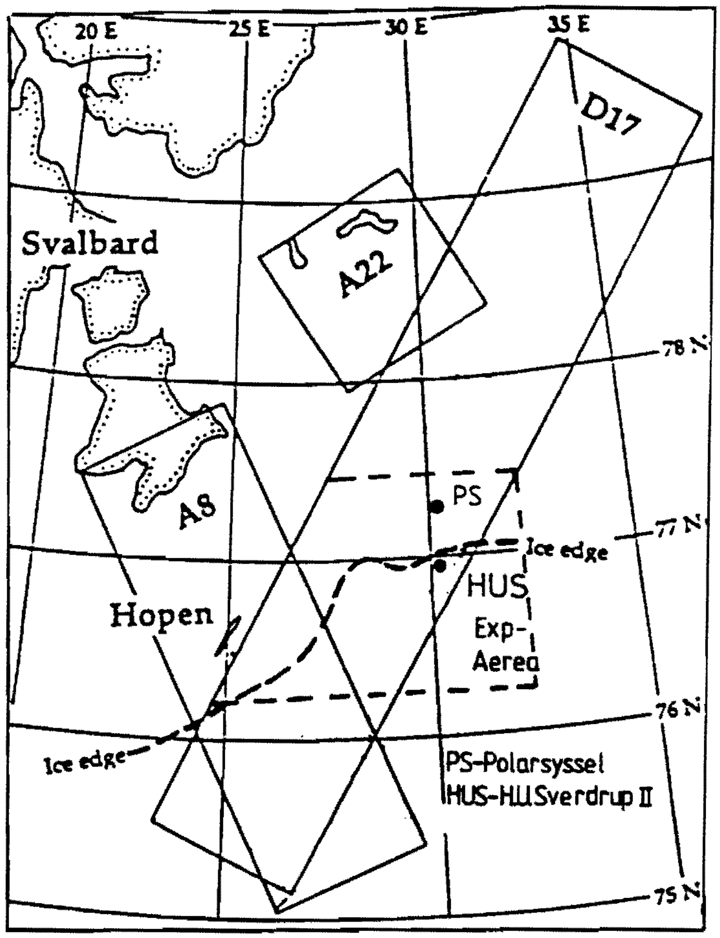


Figure 2.1 <u>Map of experiment area</u>

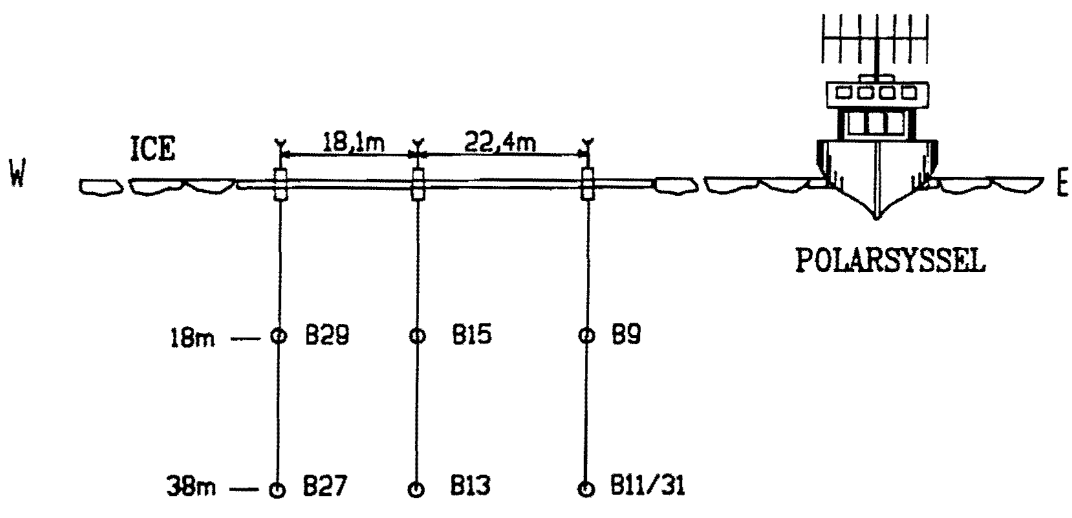


Figure 2.2 <u>Geometry of ice array</u>

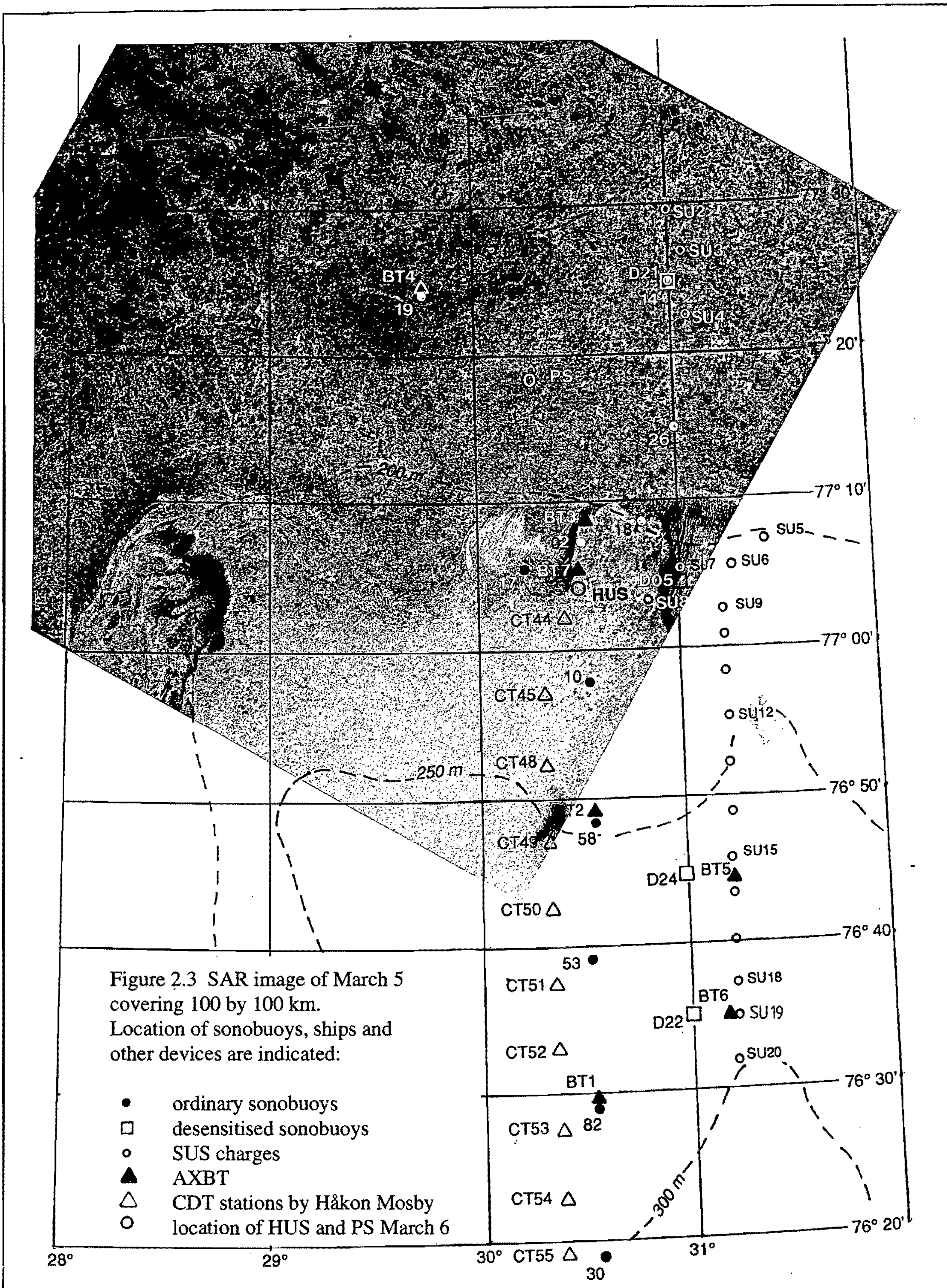


Figure 2.3 SAR image of March 5 covering 100 by 100 km. Location of sonobuoys, ships and other devices are indicated:

- ● ordinary sonobuoys
- □ desensitised sonobuoys
- ○ SUS charges
- ▲ AXBT
- △ CDT stations by Håkon Mosby
- ◯ location of HUS and PS March 6

Figure 2.4
Location of sono-
buoys on March 9
superimposed on the
SAR image of
March 8.

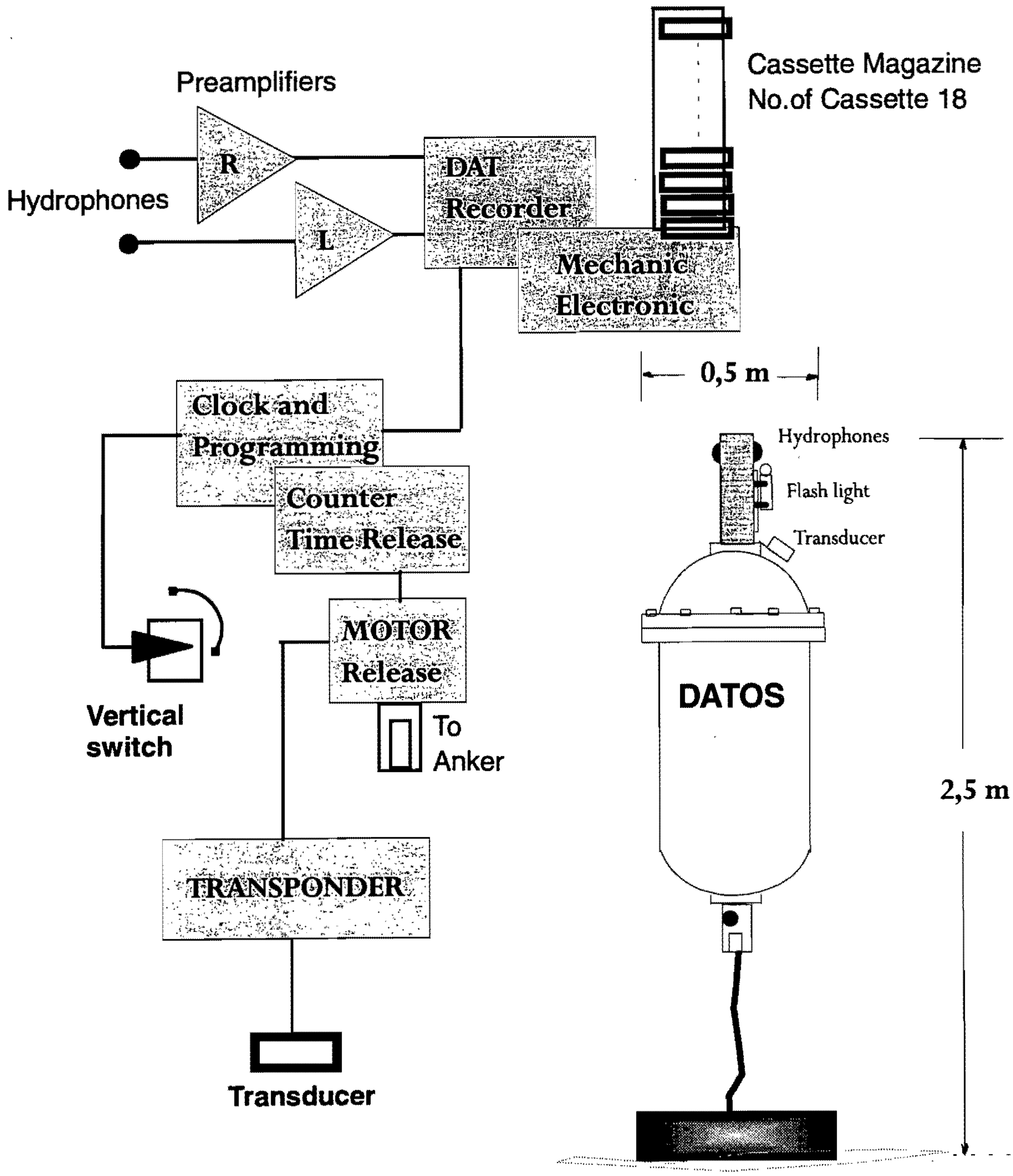


Figure 3.1 Block diagram of DATOS Buoy

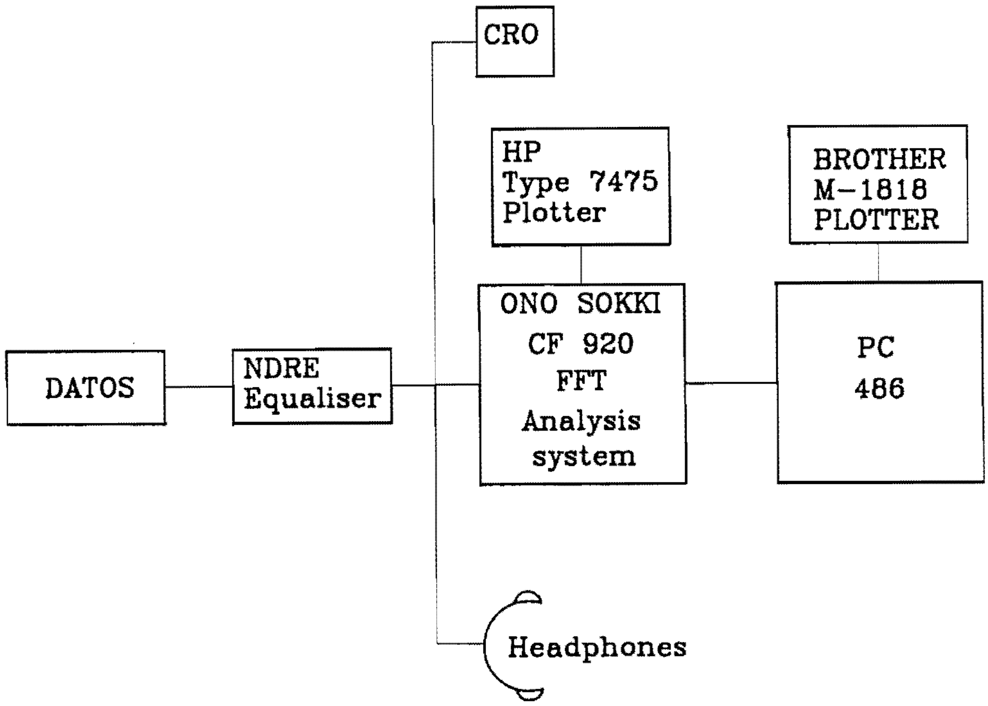


Figure 3.2 Block diagram of data analysis system for DATOS

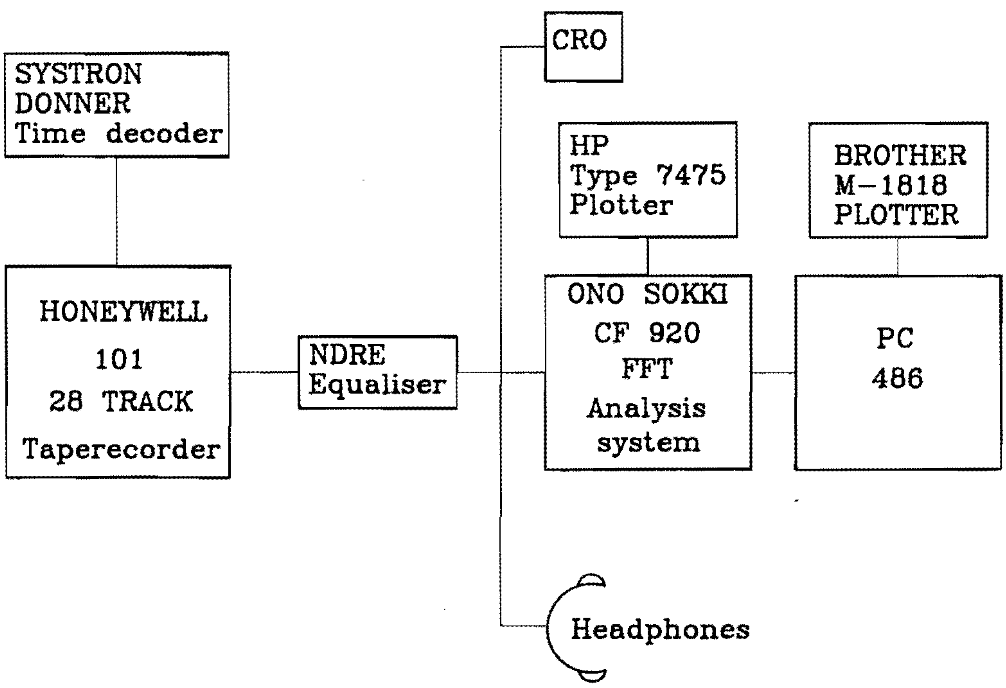
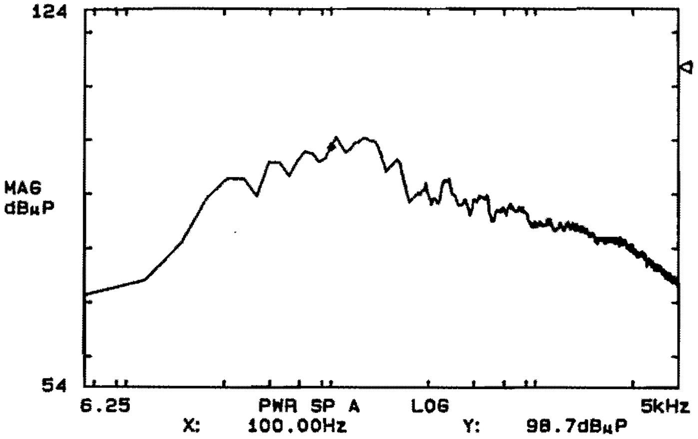
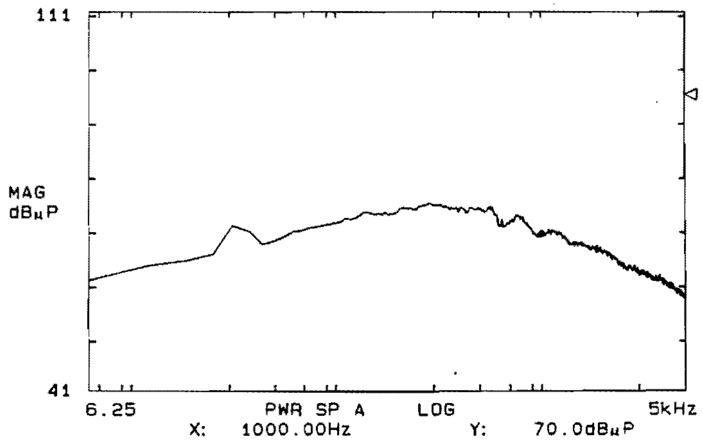


Figure 4.3 Block diagram of data analysis system for CW data

SIZEX 92 AMBIENT NOISE DATA 1-3-92 DATOS 1700
5kHz A: AC/ 5V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 1-3-92 DATOS 1800
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 1-3-92 DATOS
5kHz A: AC/ 5V B: AC/ 50V S.SUM 256/256 ChA 2k

	PWR SPECTRUM	ChA
1	12.50Hz	74.3dBuP
2	25.00	89.3
3	37.50	92.9
4	50.00	95.8
5	62.50	93.2
6	75.00	97.8
7	100.00	98.7
8	125.00	98.2
9	162.50	99.8
10	200.00	95.2
11	312.50	88.0
12	400.00	89.8
13	500.00	88.8
14	625.00	85.3
15	1000.00	84.9
16	1250.00	83.5
17	1600.00	84.5
18	2000.00	82.1
19	3150.00	78.4
20	5000.00	73.6

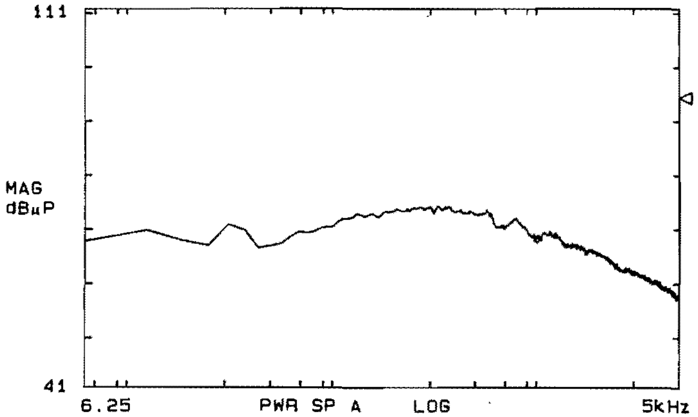
SIZEX 92 AMBIENT NOISE DATA 1-3-92 DATOS
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

	PWR SPECTRUM	ChA
1	12.50Hz	64.4dBuP
2	25.00	66.3
3	37.50	70.5
4	50.00	68.7
5	62.50	70.5
6	75.00	71.1
7	100.00	71.9
8	125.00	72.9
9	162.50	73.7
10	200.00	73.9
11	312.50	75.2
12	400.00	74.0
13	500.00	74.7
14	625.00	71.4
15	1000.00	70.0
16	1250.00	69.7
17	1600.00	67.8
18	2000.00	66.2
19	3150.00	62.4
20	5000.00	58.3

Figure 3.3 Frequency spectra from DATOS

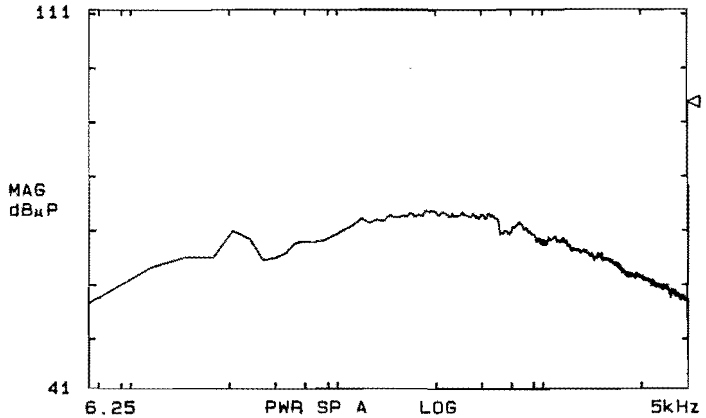
Figure

SIZEX 92 AMBIENT NOISE DATA 1-3-92 DATOS 1900
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



X: 1000.00Hz Y: 68.3dBμP

SIZEX 92 AMBIENT NOISE DATA 1-3-92 DATOS 2000
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



X: 1000.00Hz Y: 67.9dBμP

SIZEX 92 AMBIENT NOISE DATA 1-3-92 DATOS
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

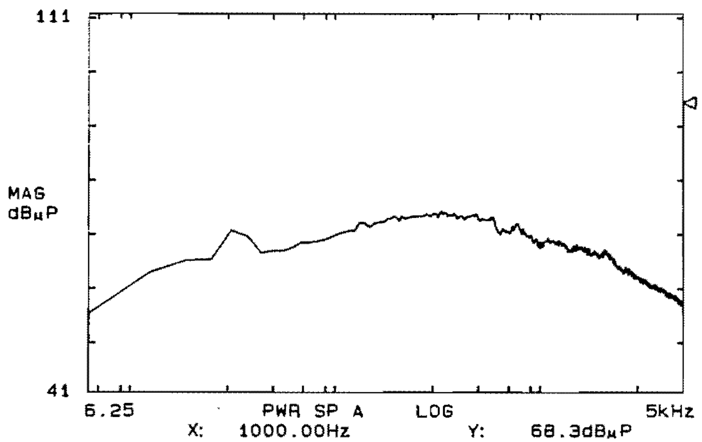
	PWR SPECTRUM	ChA
1	12.50Hz	70.0dBμP
2	25.00	67.1
3	37.50	70.0
4	50.00	67.3
5	62.50	69.0
6	75.00	69.6
7	100.00	70.7
8	125.00	72.5
9	162.50	72.6
10	200.00	73.5
11	312.50	73.0
12	400.00	73.4
13	500.00	72.9
14	625.00	70.9
15	1000.00	68.3
16	1250.00	68.6
17	1600.00	67.0
18	2000.00	65.8
19	3150.00	61.7
20	5000.00	57.5

SIZEX 92 AMBIENT NOISE DATA 1-3-92 DATOS
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

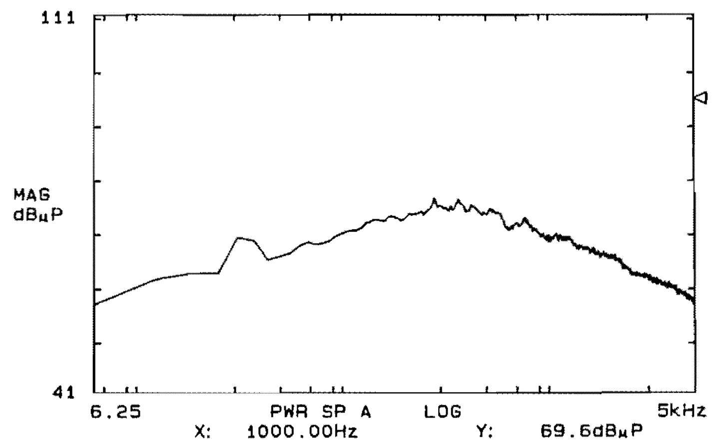
	PWR SPECTRUM	ChA
1	12.50Hz	63.4dBμP
2	25.00	65.1
3	37.50	68.7
4	50.00	65.2
5	62.50	67.8
6	75.00	68.1
7	100.00	69.6
8	125.00	71.7
9	162.50	72.0
10	200.00	72.6
11	312.50	72.9
12	400.00	73.1
13	500.00	73.1
14	625.00	69.6
15	1000.00	67.9
16	1250.00	68.1
17	1600.00	66.1
18	2000.00	65.1
19	3150.00	60.7
20	5000.00	57.6

Figure 3.4 Frequency spectra from DATOS

SIZEX 92   AMBIENT NOISE DATA   1-3-92   DATOS 2100
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256   ChA 2k



SIZEX 92   AMBIENT NOISE DATA   1-3-92   DATOS 2200
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256   ChA 2k



SIZEX 92   AMBIENT NOISE DATA   1-3-92   DATOS
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256   ChA 2k

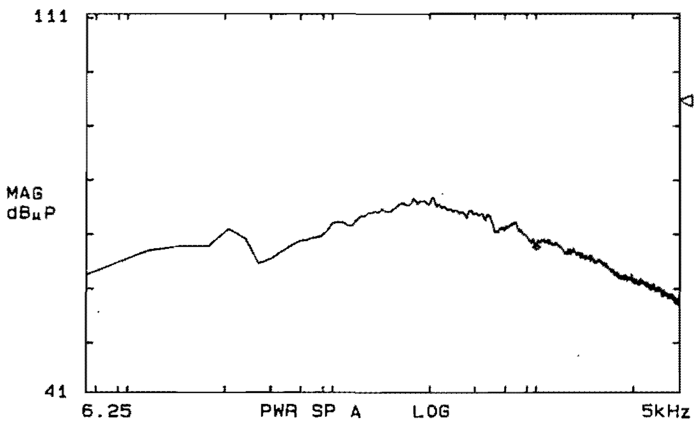
	PWR SPECTRUM	ChA
1	12.50Hz	63.2dBμP
2	25.00	65.7
3	37.50	69.7
4	50.00	67.2
5	62.50	67.8
6	75.00	68.7
7	100.00	69.9
8	125.00	70.9
9	162.50	72.4
10	200.00	73.2
11	312.50	73.9
12	400.00	73.0
13	500.00	73.0
14	625.00	70.4
15	1000.00	68.3
16	1250.00	68.8
17	1600.00	67.3
18	2000.00	66.4
19	3150.00	62.0
20	5000.00	57.0

SIZEX 92   AMBIENT NOISE DATA   1-3-92   DATOS
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256   ChA 2k

	PWR SPECTRUM	ChA
1	12.50Hz	62.2dBμP
2	25.00	63.3
3	37.50	69.1
4	50.00	66.3
5	62.50	68.1
6	75.00	68.4
7	100.00	70.5
8	125.00	71.6
9	162.50	72.9
10	200.00	73.1
11	312.50	75.1
12	400.00	74.3
13	500.00	74.1
14	625.00	71.8
15	1000.00	69.6
16	1250.00	69.1
17	1600.00	67.2
18	2000.00	65.9
19	3150.00	61.9
20	5000.00	57.4

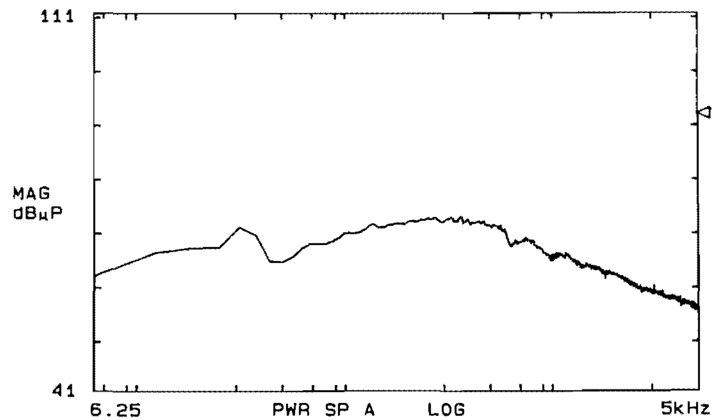
Figure 3.5   Frequency spectra from DATOS

SIZEX 92 AMBIENT NOISE DATA 1-3-92 DATOS 2300
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



X: 1000.00Hz Y: 67.8dBµP

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS: 0000
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



X: 1000.00Hz Y: 65.5dBµP

SIZEX 92 AMBIENT NOISE DATA 1-3-92 DATOS
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

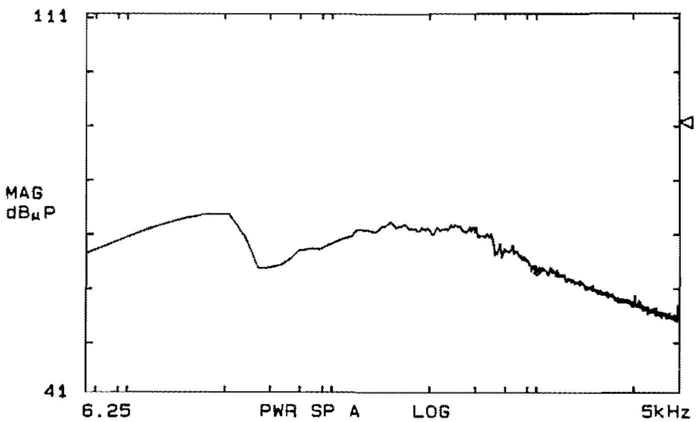
	PWR SPECTRUM	ChA
1	12.50Hz	67.1dBµP
2	25.00	68.0
3	37.50	69.4
4	50.00	65.6
5	62.50	68.1
6	75.00	69.0
7	100.00	72.1
8	125.00	71.8
9	162.50	74.3
10	200.00	74.9
11	312.50	77.0
12	400.00	74.6
13	500.00	74.0
14	625.00	70.5
15	1000.00	67.8
16	1250.00	68.7
17	1600.00	66.6
18	2000.00	65.5
19	3150.00	60.7
20	5000.00	58.1

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

	PWR SPECTRUM	ChA
1	12.50Hz	66.6dBµP
2	25.00	67.6
3	37.50	69.8
4	50.00	64.8
5	62.50	67.4
6	75.00	68.3
7	100.00	70.2
8	125.00	70.9
9	162.50	71.7
10	200.00	72.1
11	312.50	72.9
12	400.00	72.2
13	500.00	71.6
14	625.00	68.1
15	1000.00	65.5
16	1250.00	65.3
17	1600.00	64.1
18	2000.00	62.5
19	3150.00	59.1
20	5000.00	56.3

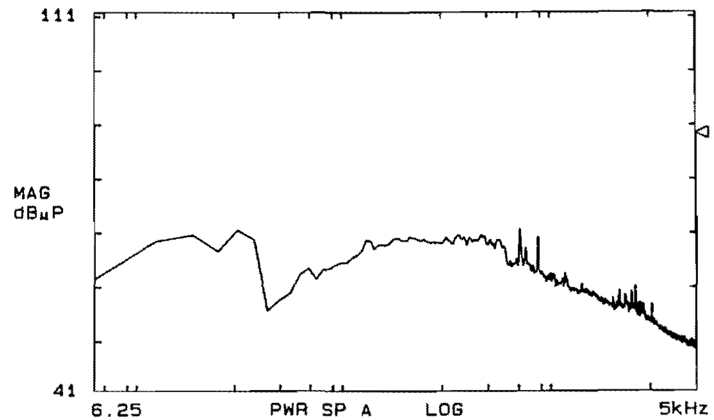
Figure 3.6 Frequency spectra from DATOS

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS: 0100
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



X: 1000.00Hz Y: 63.3dB$_\mu$P

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS: 0200
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



X: 1000.00Hz Y: 62.1dB$_\mu$P

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

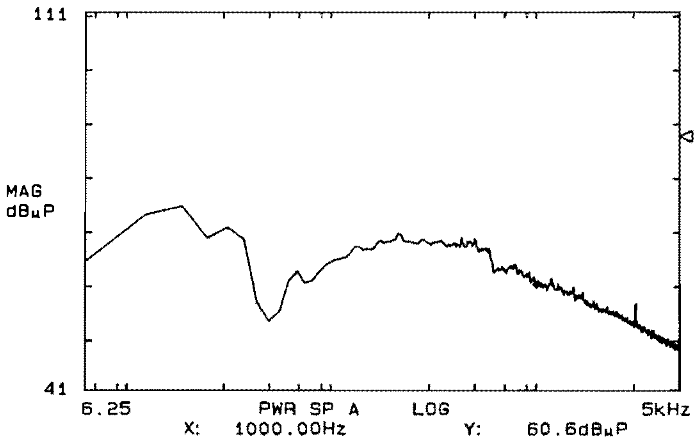
	PWR SPECTRUM	ChA
1	12.50Hz	71.2dB$_\mu$P
2	25.00	73.9
3	37.50	69.7
4	50.00	64.2
5	62.50	65.6
6	75.00	67.5
7	100.00	68.5
8	125.00	69.8
9	162.50	70.5
10	200.00	72.0
11	312.50	70.0
12	400.00	72.0
13	500.00	70.7
14	625.00	66.3
15	1000.00	63.3
16	1250.00	63.1
17	1600.00	61.1
18	2000.00	59.6
19	3150.00	56.6
20	5000.00	55.0

SIZEX 92 AMBIENT NOISE DATA 2-3-92
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

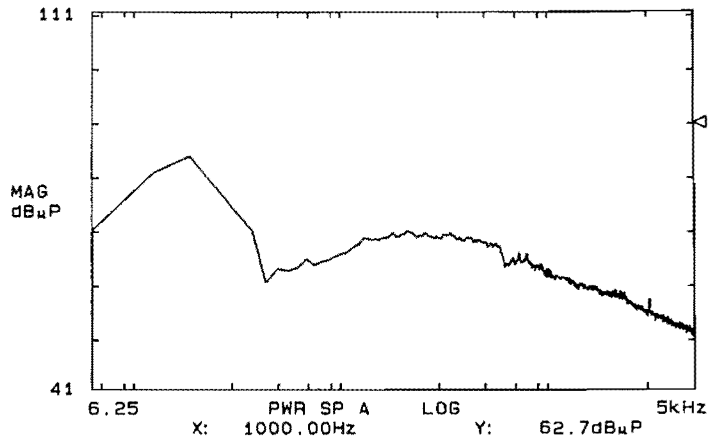
	PWR SPECTRUM	ChA
1	12.50Hz	68.7dB$_\mu$P
2	25.00	66.7
3	37.50	68.8
4	50.00	57.8
5	62.50	62.5
6	75.00	61.7
7	100.00	64.7
8	125.00	67.0
9	162.50	67.7
10	200.00	68.6
11	312.50	68.9
12	400.00	67.8
13	500.00	68.1
14	625.00	64.4
15	1000.00	62.1
16	1250.00	59.4
17	1600.00	58.9
18	2000.00	57.2
19	3150.00	54.3
20	5000.00	49.3

Figure 3.7 Frequency spectra from DATOS

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS: 0300
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS: 0400
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS:
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

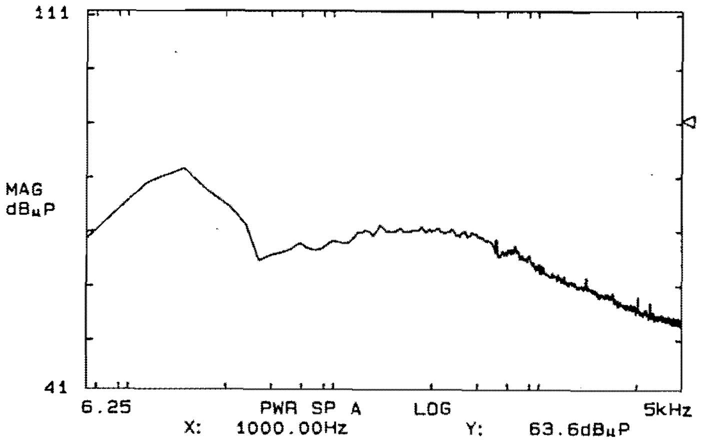
	PWR SPECTRUM	ChA
1	12.50Hz	73.6dBμP
2	25.00	69.0
3	37.50	68.9
4	50.00	53.8
5	62.50	61.2
6	75.00	60.9
7	100.00	64.8
8	125.00	66.6
9	162.50	67.3
10	200.00	68.7
11	312.50	68.2
12	400.00	68.3
13	500.00	69.0
14	625.00	62.9
15	1000.00	60.6
16	1250.00	59.6
17	1600.00	58.0
18	2000.00	56.4
19	3150.00	52.7
20	5000.00	49.4

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS:
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

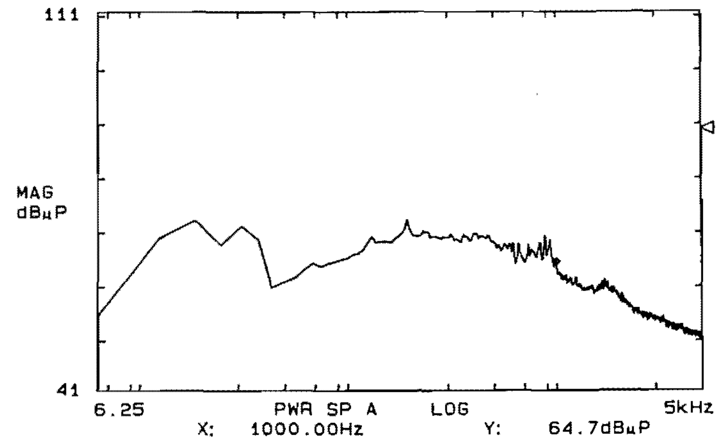
	PWR SPECTRUM	ChA
1	12.50Hz	81.1dBμP
2	25.00	78.5
3	37.50	70.5
4	50.00	63.5
5	62.50	63.6
6	75.00	64.1
7	100.00	66.2
8	125.00	68.0
9	162.50	69.2
10	200.00	69.9
11	312.50	69.0
12	400.00	68.5
13	500.00	68.3
14	625.00	63.7
15	1000.00	62.7
16	1250.00	61.3
17	1600.00	59.9
18	2000.00	58.4
19	3150.00	54.8
20	5000.00	51.7

Figure 3.8 Frequency spectra from DATOS

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS: 0500
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS: 0600
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS:
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

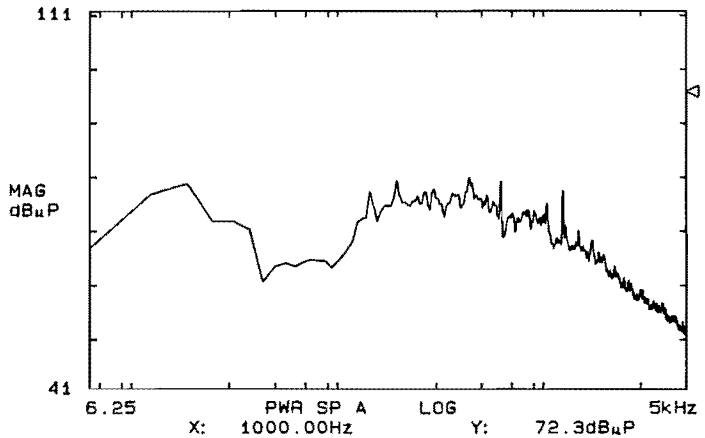
	PWR SPECTRUM	ChA
1	12.50Hz	79.2dBuP
2	25.00	77.5
3	37.50	71.5
4	50.00	65.8
5	62.50	66.9
6	75.00	67.1
7	100.00	68.5
8	125.00	68.9
9	162.50	70.3
10	200.00	70.3
11	312.50	70.4
12	400.00	69.4
13	500.00	69.5
14	625.00	68.6
15	1000.00	63.6
16	1250.00	62.1
17	1600.00	60.0
18	2000.00	58.1
19	3150.00	55.5
20	5000.00	53.1

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS:
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

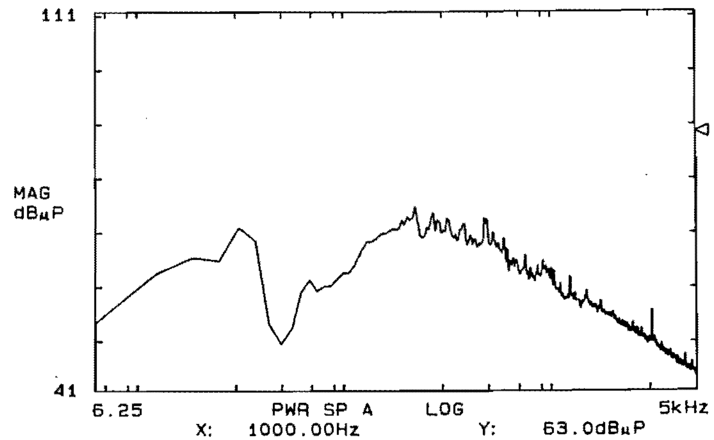
	PWR SPECTRUM	ChA
1	12.50Hz	69.1dBuP
2	25.00	67.7
3	37.50	69.0
4	50.00	61.1
5	62.50	63.5
6	75.00	63.9
7	100.00	65.5
8	125.00	68.3
9	162.50	68.2
10	200.00	70.7
11	312.50	69.7
12	400.00	69.6
13	500.00	68.5
14	625.00	68.0
15	1000.00	64.7
16	1250.00	61.6
17	1600.00	59.6
18	2000.00	58.6
19	3150.00	53.9
20	5000.00	50.8

Figure 3.9 Frequency spectra from DATOS

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS: 0700
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS: 0800
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS:
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

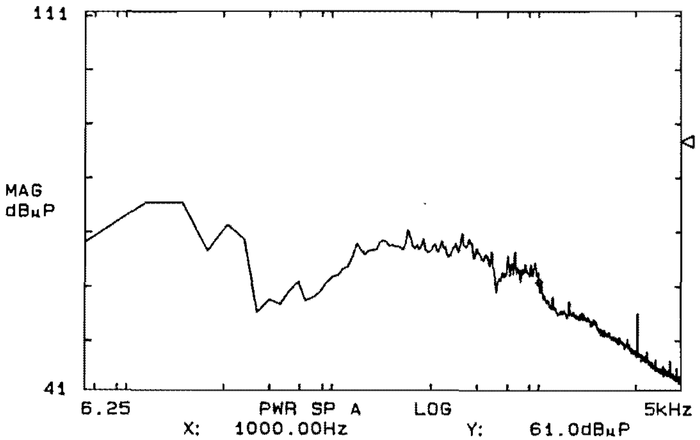
	PWR SPECTRUM	ChA
1	12.50Hz	76.9dBμP
2	25.00	72.1
3	37.50	70.5
4	50.00	63.7
5	62.50	63.6
6	75.00	64.9
7	100.00	64.5
8	125.00	71.8
9	162.50	73.7
10	200.00	76.9
11	312.50	75.3
12	400.00	74.4
13	500.00	76.2
14	625.00	79.4
15	1000.00	72.3
16	1250.00	77.6
17	1600.00	66.7
18	2000.00	65.1
19	3150.00	57.0
20	5000.00	51.3

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS:
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

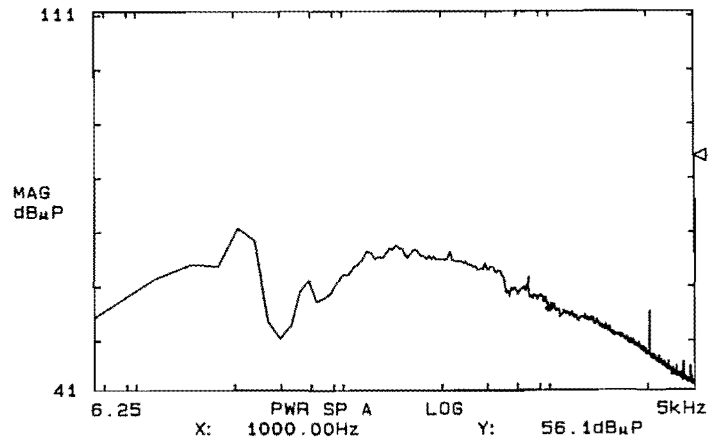
	PWR SPECTRUM	ChA
1	12.50Hz	62.9dBμP
2	25.00	65.0
3	37.50	68.7
4	50.00	49.6
5	62.50	59.2
6	75.00	59.5
7	100.00	62.9
8	125.00	67.3
9	162.50	70.0
10	200.00	71.5
11	312.50	70.3
12	400.00	67.7
13	500.00	71.2
14	625.00	66.8
15	1000.00	63.0
16	1250.00	59.6
17	1600.00	56.7
18	2000.00	55.1
19	3150.00	50.9
20	5000.00	44.0

Figure 3.10 Frequency spectra from DATOS

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS: 0900
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS: 1000
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS:
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

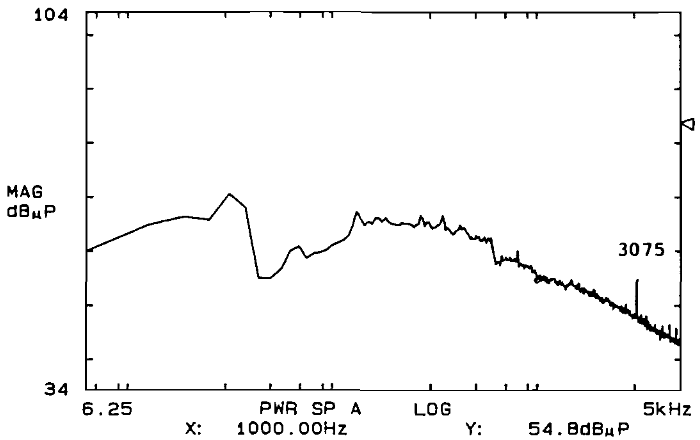
	PWR SPECTRUM	ChA
1	12.50Hz	75.6dBμP
2	25.00	66.8
3	37.50	69.0
4	50.00	57.8
5	62.50	59.4
6	75.00	57.6
7	100.00	61.9
8	125.00	65.6
9	162.50	67.0
10	200.00	67.6
11	312.50	68.0
12	400.00	67.2
13	500.00	67.2
14	625.00	59.2
15	1000.00	61.0
16	1250.00	55.0
17	1600.00	55.2
18	2000.00	52.1
19	3150.00	47.2
20	5000.00	42.6

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS:
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

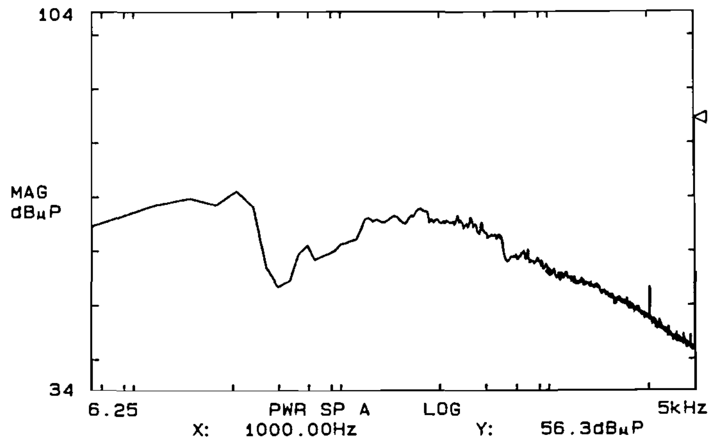
	PWR SPECTRUM	ChA
1	12.50Hz	61.6dBμP
2	25.00	64.0
3	37.50	68.7
4	50.00	50.5
5	62.50	59.3
6	75.00	57.4
7	100.00	62.3
8	125.00	65.2
9	162.50	66.3
10	200.00	66.1
11	312.50	65.1
12	400.00	64.4
13	500.00	63.4
14	625.00	59.1
15	1000.00	56.1
16	1250.00	55.1
17	1600.00	54.4
18	2000.00	51.8
19	3150.00	47.3
20	5000.00	42.3

Figure 3.11 Frequency spectra from DATOS

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS 1100
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS 1200
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k

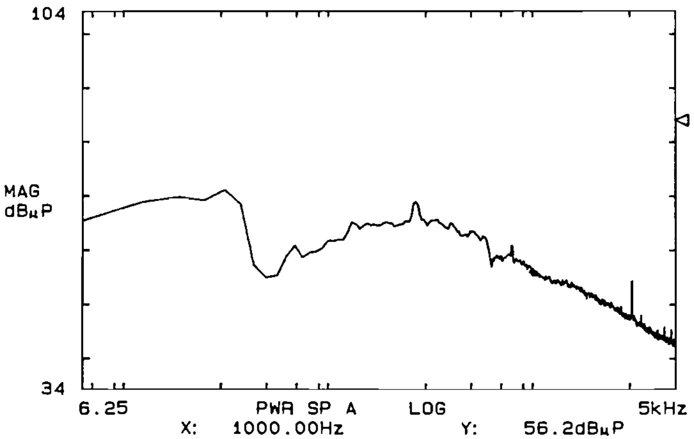
	PWR SPECTRUM	ChA
1	12.50Hz	64.8dBμP
2	25.00	65.7
3	37.50	68.2
4	50.00	55.2
5	62.50	60.1
6	75.00	58.8
7	100.00	61.1
8	125.00	64.4
9	162.50	66.1
10	200.00	65.2
11	312.50	64.5
12	400.00	63.7
13	500.00	62.8
14	612.50	59.2
15	1000.00	54.8
16	1250.00	54.5
17	1600.00	54.1
18	2000.00	51.5
19	3150.00	47.6
20	5000.00	43.9

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k

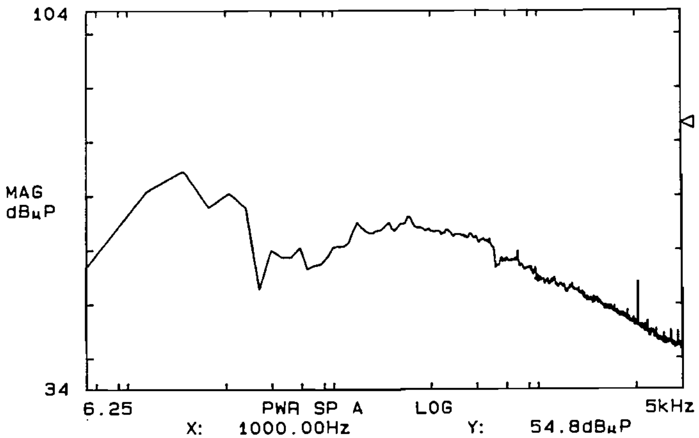
	PWR SPECTRUM	ChA
1	12.50Hz	68.5dBμP
2	25.00	68.6
3	37.50	68.4
4	50.00	53.5
5	62.50	59.7
6	75.00	58.6
7	100.00	61.4
8	125.00	64.0
9	162.50	65.4
10	200.00	65.4
11	312.50	65.5
12	400.00	64.8
13	500.00	63.4
14	612.50	59.6
15	1000.00	56.3
16	1250.00	55.3
17	1600.00	54.5
18	2000.00	51.9
19	3150.00	46.9
20	5000.00	42.0

Figure 3.12 <u>Frequency spectra from DATOS</u>

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS 1300
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS 1400
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k

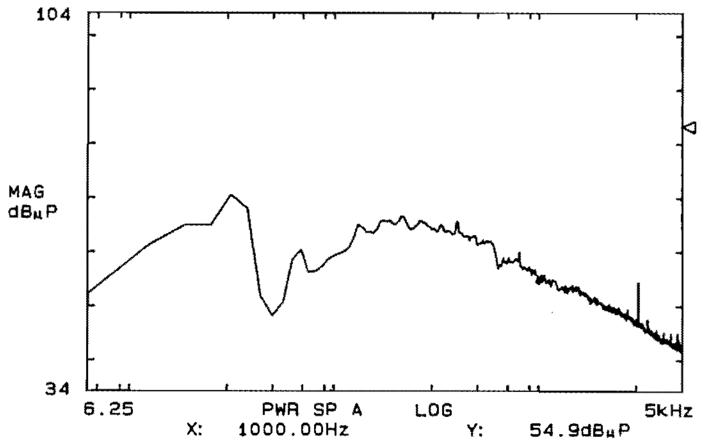
	PWR SPECTRUM	ChA
1	12.50Hz	69.1dBμP
2	25.00	69.2
3	37.50	68.6
4	50.00	55.1
5	62.50	59.0
6	75.00	58.7
7	100.00	61.9
8	125.00	63.4
9	162.50	64.7
10	200.00	65.1
11	312.50	65.1
12	400.00	65.1
13	500.00	63.4
14	612.50	59.8
15	1000.00	56.2
16	1250.00	53.9
17	1600.00	53.8
18	2000.00	51.8
19	3150.00	47.8
20	5000.00	42.4

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k

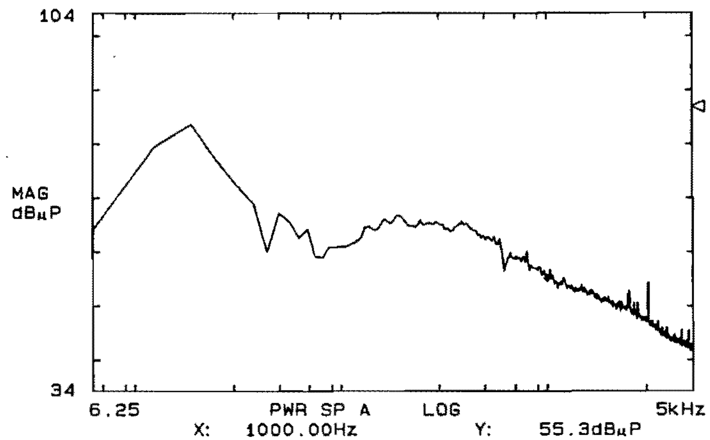
	PWR SPECTRUM	ChA
1	12.50Hz	71.0dBμP
2	25.00	67.9
3	37.50	67.9
4	50.00	60.1
5	62.50	58.7
6	75.00	56.6
7	100.00	60.4
8	125.00	63.5
9	162.50	63.6
10	200.00	63.5
11	312.50	63.4
12	400.00	63.0
13	500.00	62.7
14	612.50	59.6
15	1000.00	54.8
16	1250.00	53.4
17	1600.00	52.1
18	2000.00	50.8
19	3150.00	46.1
20	5000.00	41.7

Figure 3.13 <u>Frequency spectra from DATOS</u>

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS 1500
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS 1600
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k

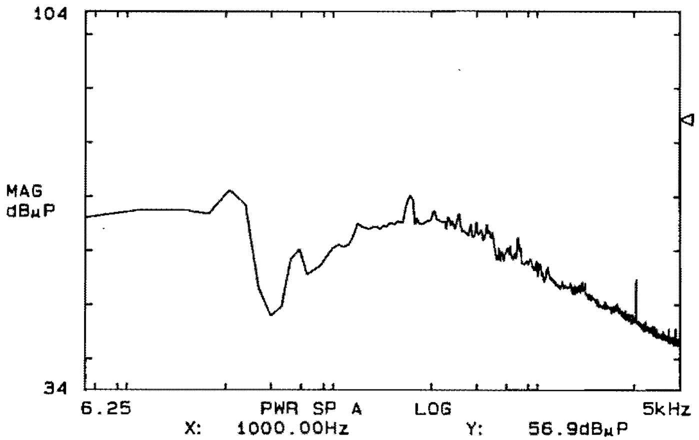
	PWR SPECTRUM	ChA
1	12.50Hz	61.4dBμP
2	25.00	65.0
3	37.50	68.2
4	50.00	48.3
5	62.50	58.8
6	75.00	56.4
7	100.00	59.4
8	125.00	62.6
9	162.50	64.4
10	200.00	65.0
11	312.50	64.1
12	400.00	65.8
13	500.00	61.5
14	612.50	59.4
15	1000.00	54.9
16	1250.00	53.1
17	1600.00	52.1
18	2000.00	50.9
19	3150.00	46.8
20	5000.00	41.9

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k

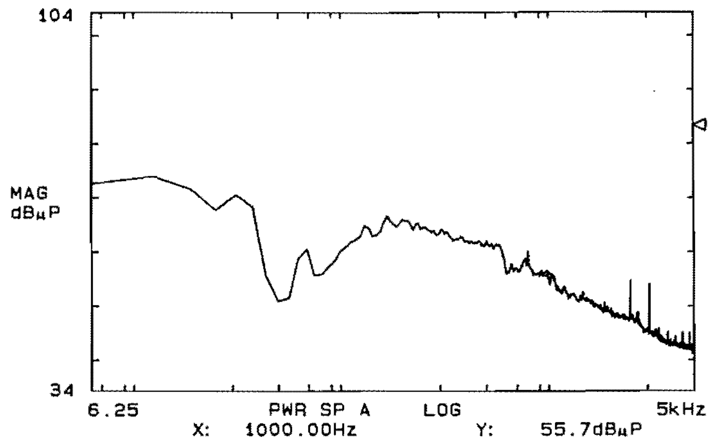
	PWR SPECTRUM	ChA
1	12.50Hz	79.5dBμP
2	25.00	76.9
3	37.50	68.9
4	50.00	67.2
5	62.50	62.6
6	75.00	59.2
7	100.00	61.3
8	125.00	62.6
9	162.50	66.1
10	200.00	66.5
11	312.50	65.0
12	400.00	65.1
13	500.00	62.9
14	612.50	59.1
15	1000.00	55.3
16	1250.00	53.2
17	1600.00	52.9
18	2000.00	51.2
19	3150.00	46.8
20	5000.00	42.8

Figure 3.14 Frequency spectra from DATOS

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS 1700
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS 1800
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k

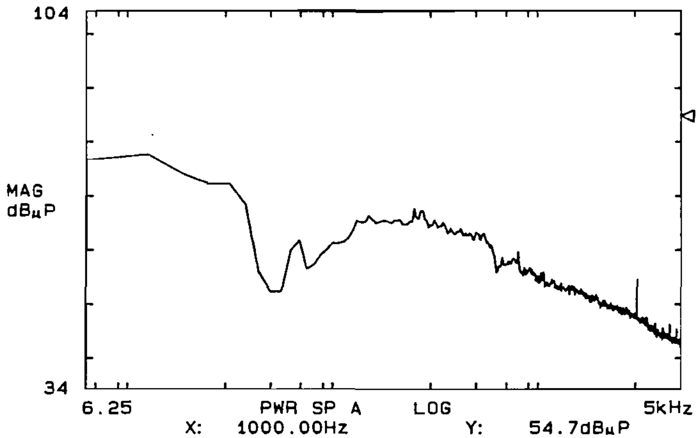
	PWR SPECTRUM	ChA
1	12.50Hz	67.7dBμP
2	25.00	66.8
3	37.50	68.6
4	50.00	48.0
5	62.50	58.5
6	75.00	55.7
7	100.00	60.6
8	125.00	62.7
9	162.50	64.4
10	200.00	65.0
11	312.50	67.3
12	400.00	64.9
13	500.00	65.3
14	612.50	60.6
15	1000.00	56.9
16	1250.00	53.7
17	1600.00	53.1
18	2000.00	50.6
19	3150.00	46.9
20	5000.00	43.0

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k

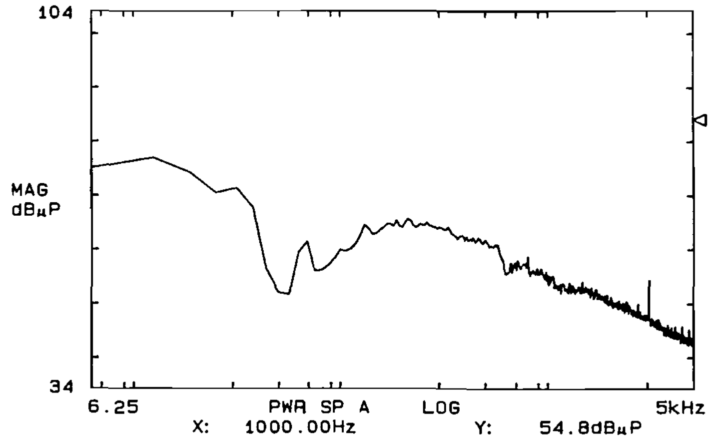
	PWR SPECTRUM	ChA
1	12.50Hz	74.1dBμP
2	25.00	67.8
3	37.50	68.3
4	50.00	51.0
5	62.50	58.8
6	75.00	55.7
7	100.00	60.0
8	125.00	62.9
9	162.50	65.6
10	200.00	66.1
11	312.50	64.0
12	400.00	61.8
13	500.00	61.3
14	612.50	58.7
15	1000.00	55.7
16	1250.00	51.7
17	1600.00	51.2
18	2000.00	49.6
19	3150.00	44.9
20	5000.00	42.3

Figure 3.15 <u>Frequency spectra from DATOS</u>

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS 1900
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS 2000
5kHz A: AC/0.5V B: AC/ 50V S.SUM 168/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k

	PWR SPECTRUM	ChA
1	12.50Hz	77.8dBμP
2	25.00	72.4
3	37.50	68.6
4	50.00	52.5
5	62.50	60.1
6	75.00	56.6
7	100.00	61.4
8	125.00	63.5
9	162.50	65.0
10	200.00	65.5
11	312.50	65.6
12	400.00	63.5
13	500.00	63.3
14	612.50	58.5
15	1000.00	54.7
16	1250.00	53.3
17	1600.00	52.1
18	2000.00	50.2
19	3150.00	46.9
20	5000.00	42.6

SIZEX 92 AMBIENT NOISE DATA 2-3-92 DATOS
5kHz A: AC/0.5V B: AC/ 50V S.SUM 168/256 ChA 2k

	PWR SPECTRUM	ChA
1	12.50Hz	77.0dBμP
2	25.00	70.6
3	37.50	68.0
4	50.00	52.2
5	62.50	59.7
6	75.00	56.1
7	100.00	60.1
8	125.00	62.7
9	162.50	64.3
10	200.00	64.2
11	312.50	63.9
12	400.00	61.9
13	500.00	61.8
14	612.50	57.8
15	1000.00	54.8
16	1250.00	52.4
17	1600.00	52.6
18	2000.00	50.6
19	3150.00	47.1
20	5000.00	43.0

Figure 3.16 Frequency spectra from DATOS

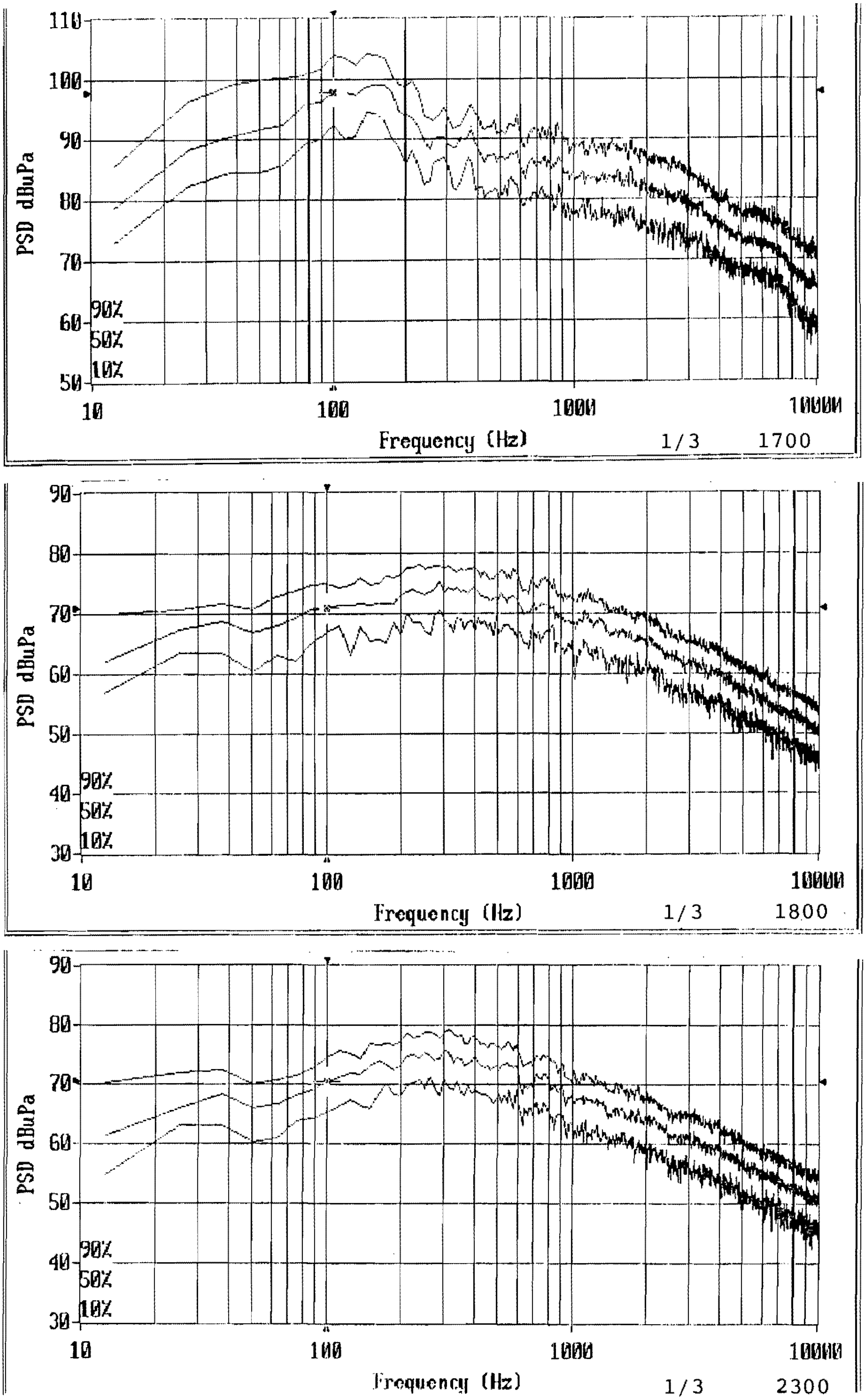


Figure 3.17 10, 50 and 90 percentile spectra from DATOS

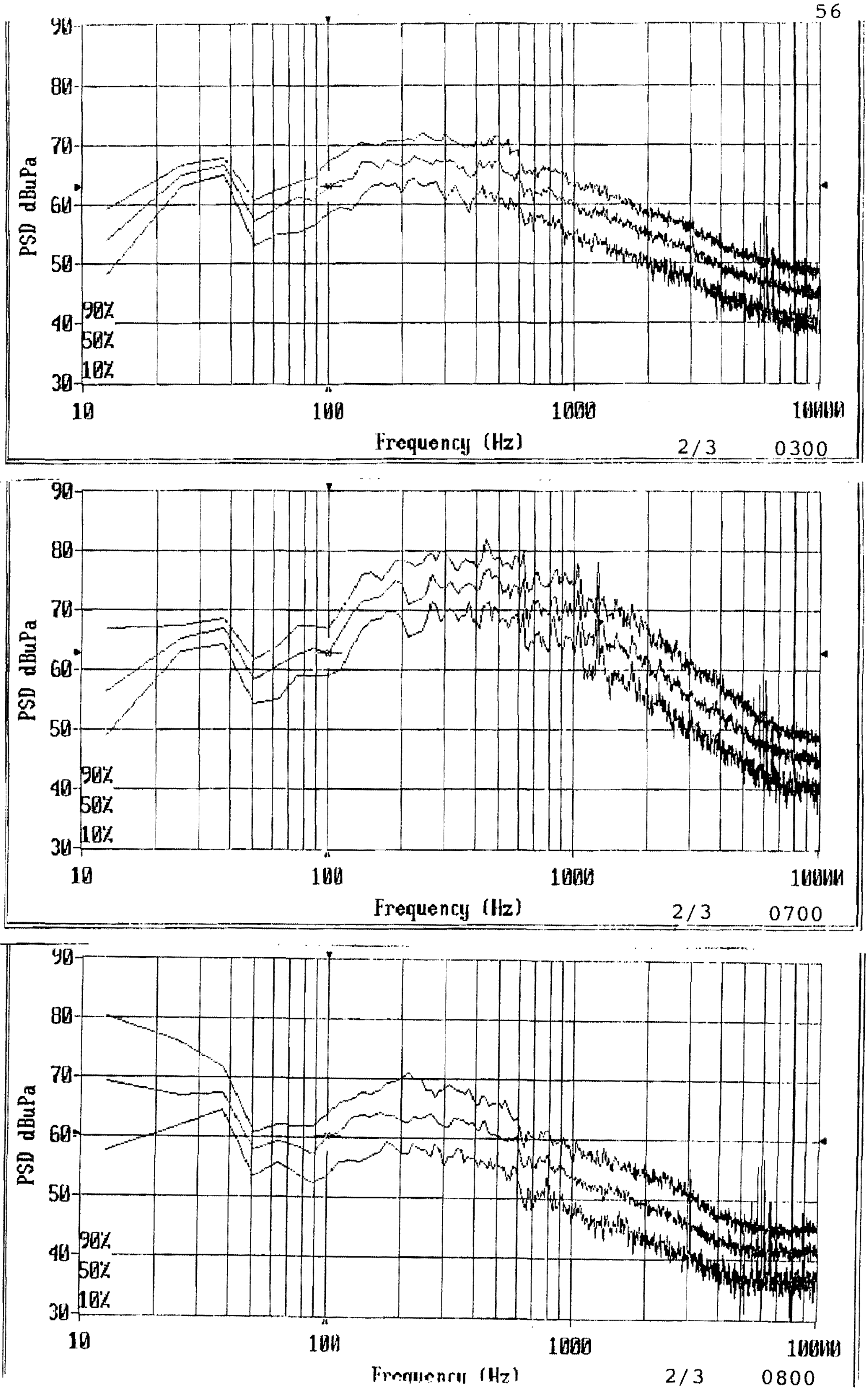
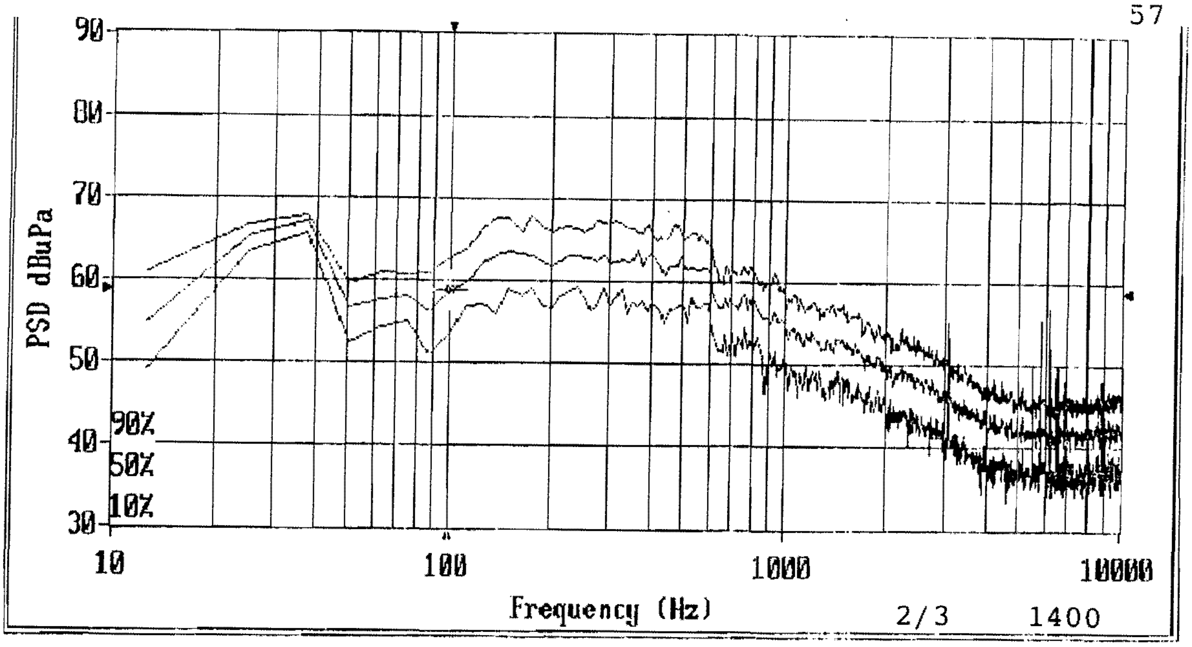


Figure 3.18 <u>10, 50 and 90 percentile spectra from DATOS</u>



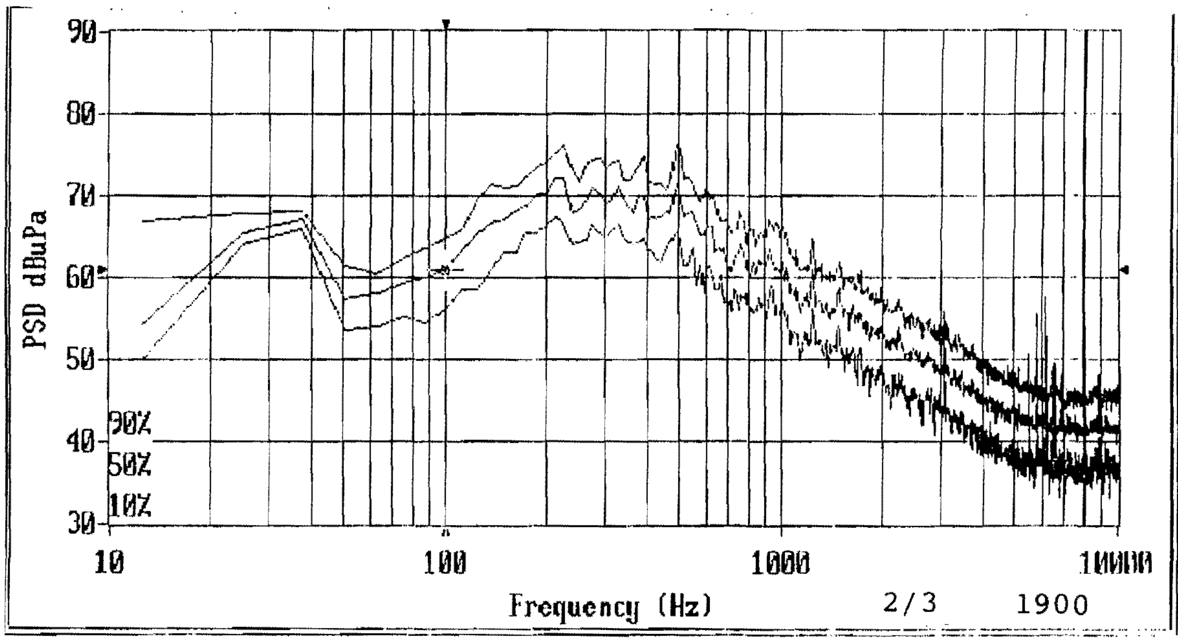


Figure 3.19 <u>10, 50 and 90 percentile spectra from DATOS</u>

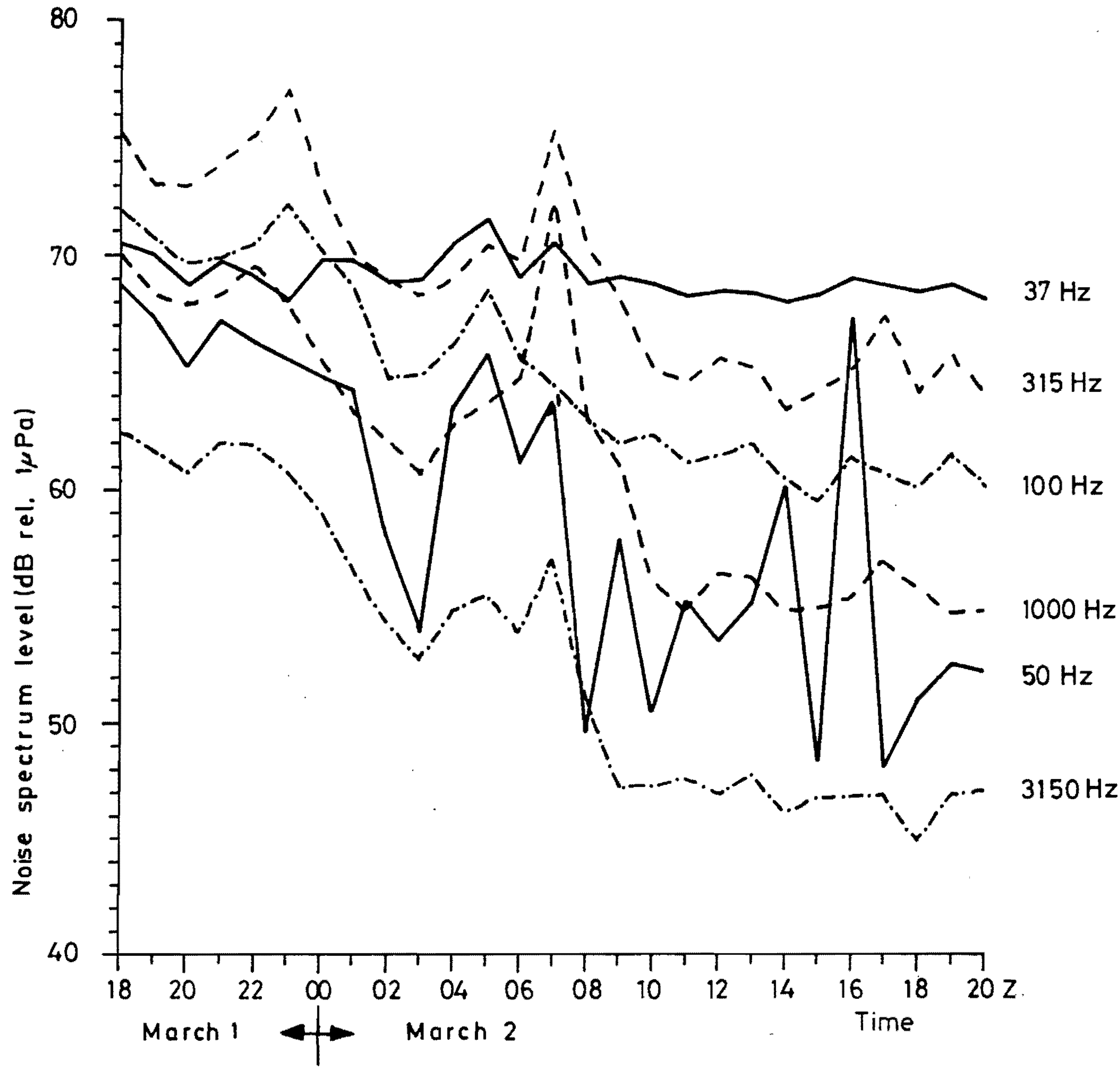
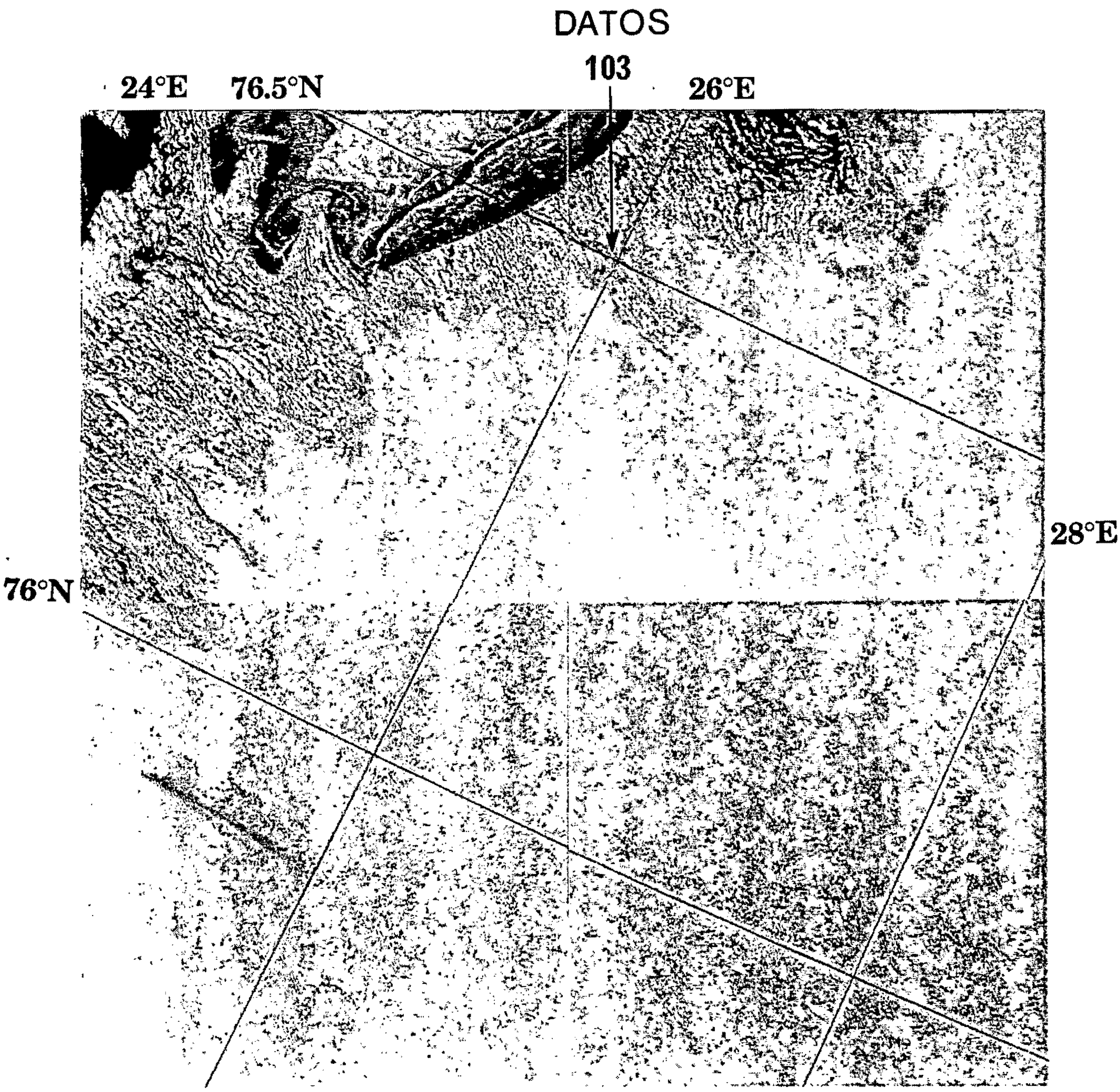


Figure 3.20 Noise levels as a function of time.

Barents Sea (A8)
from 01.03.92., 19:07:15 UTC



The images are received at Tromsø Satellite Station

Figure 3.21 <u>SAR image from March 1.</u>

Barents Sea (D17)

from 02.03.92., 10:18:34 UTC

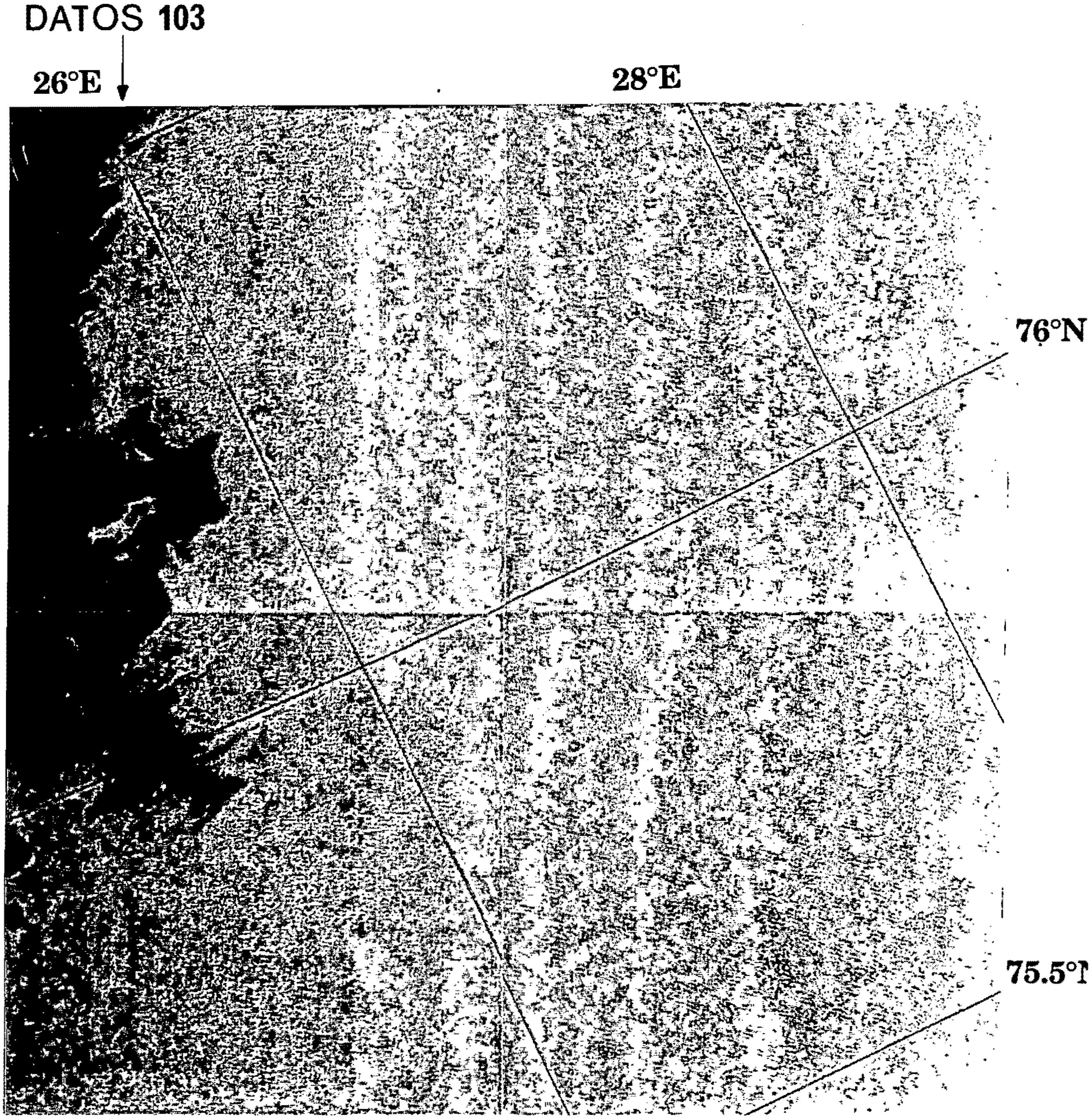


Figure 3.22 SAR image from March 2.

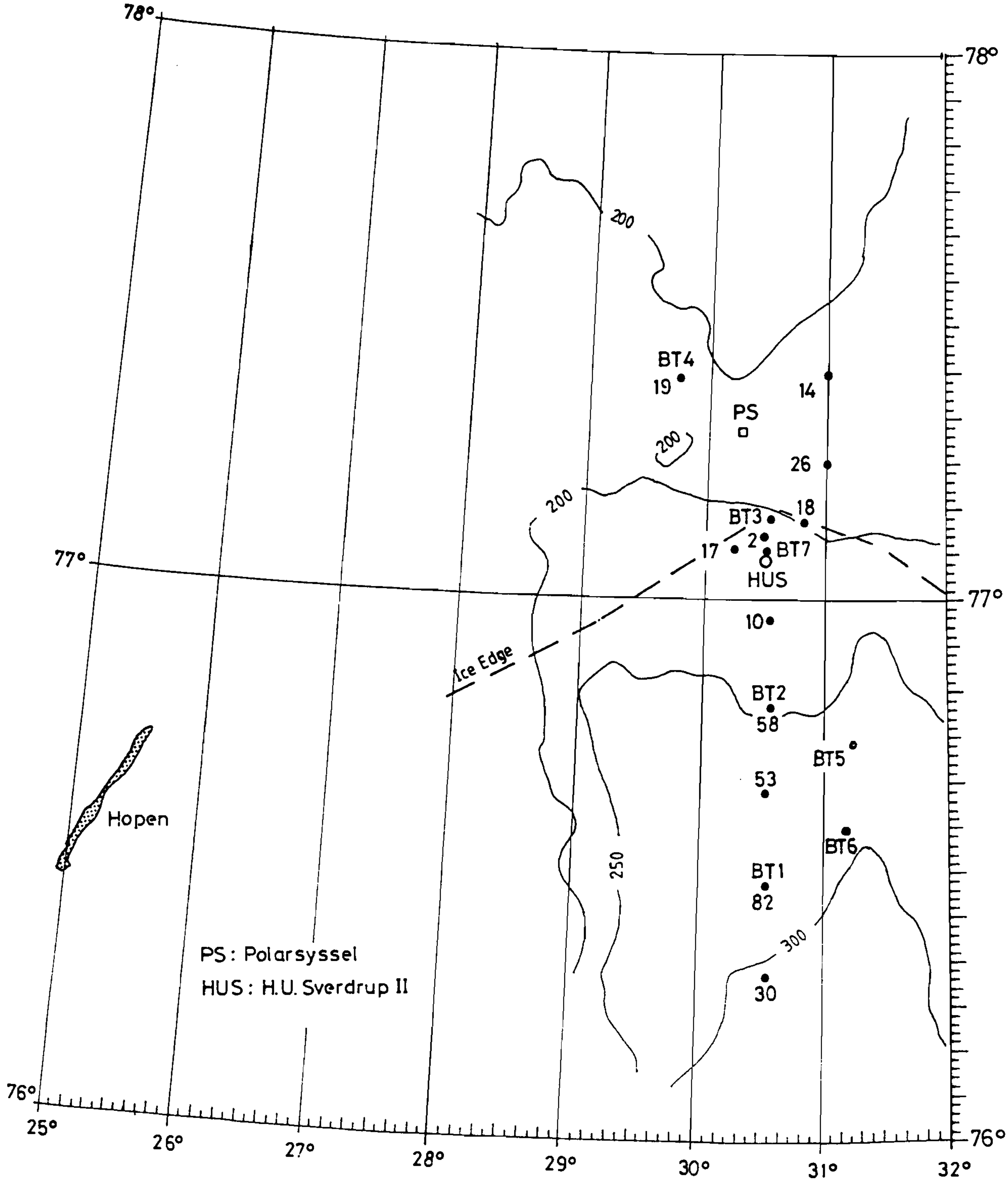


Figure 4.1 Sonobuoy deployment pattern on March 6.

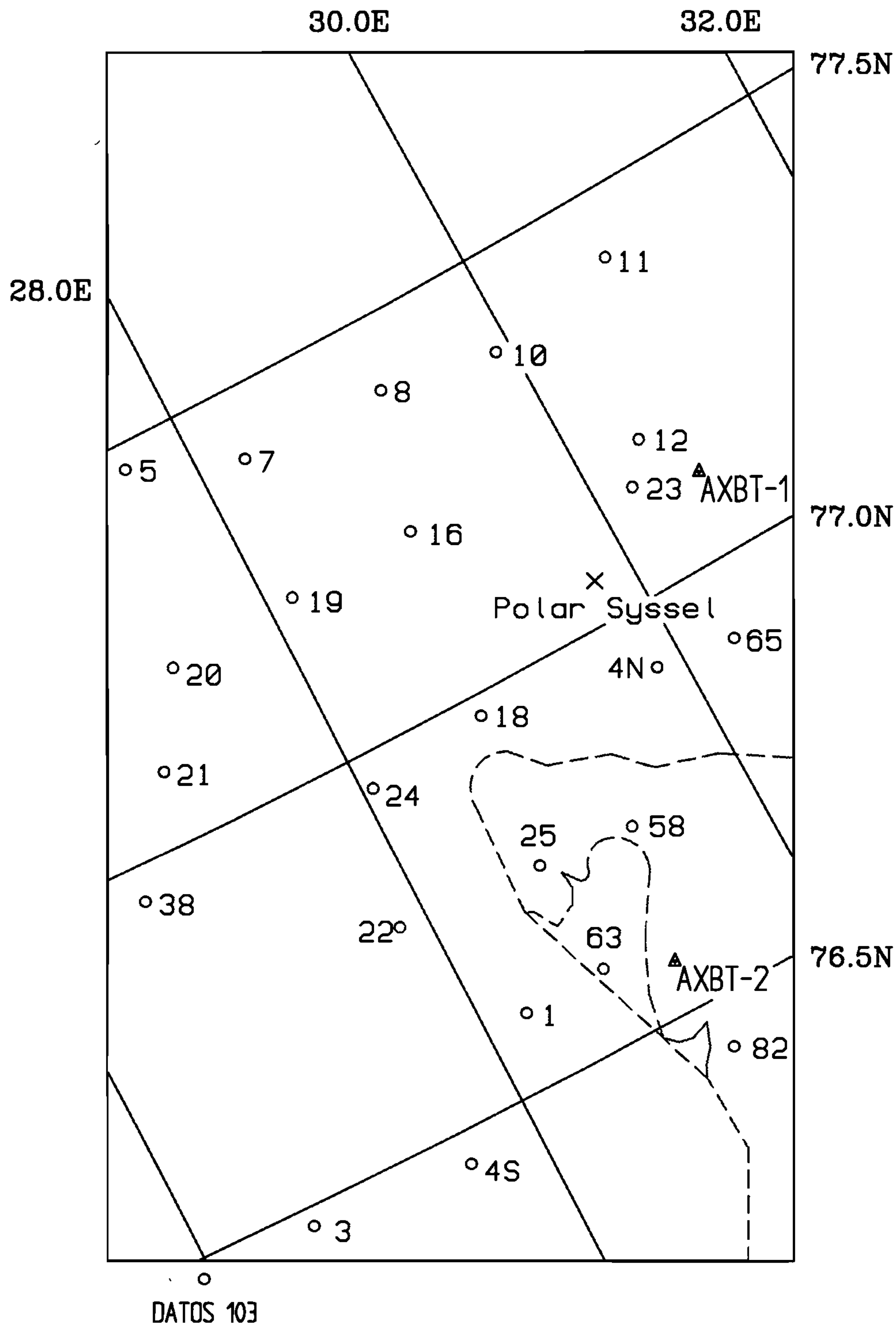


Figure 4.2 Sonobuoy deployment pattern on March 9.

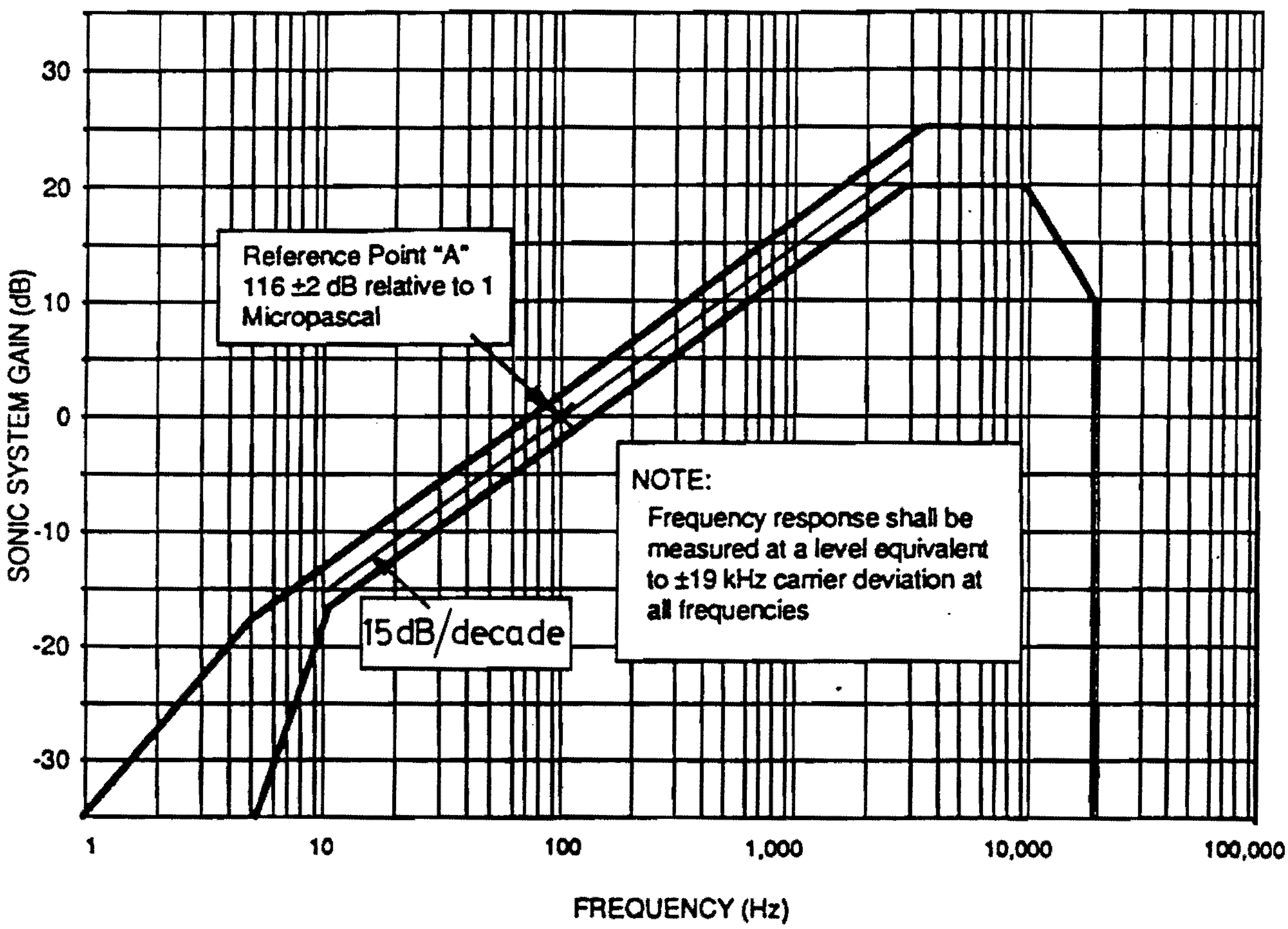


Figure 4.4 <u>Frequency response for AN/SSQ 57 sonobuoy.</u>

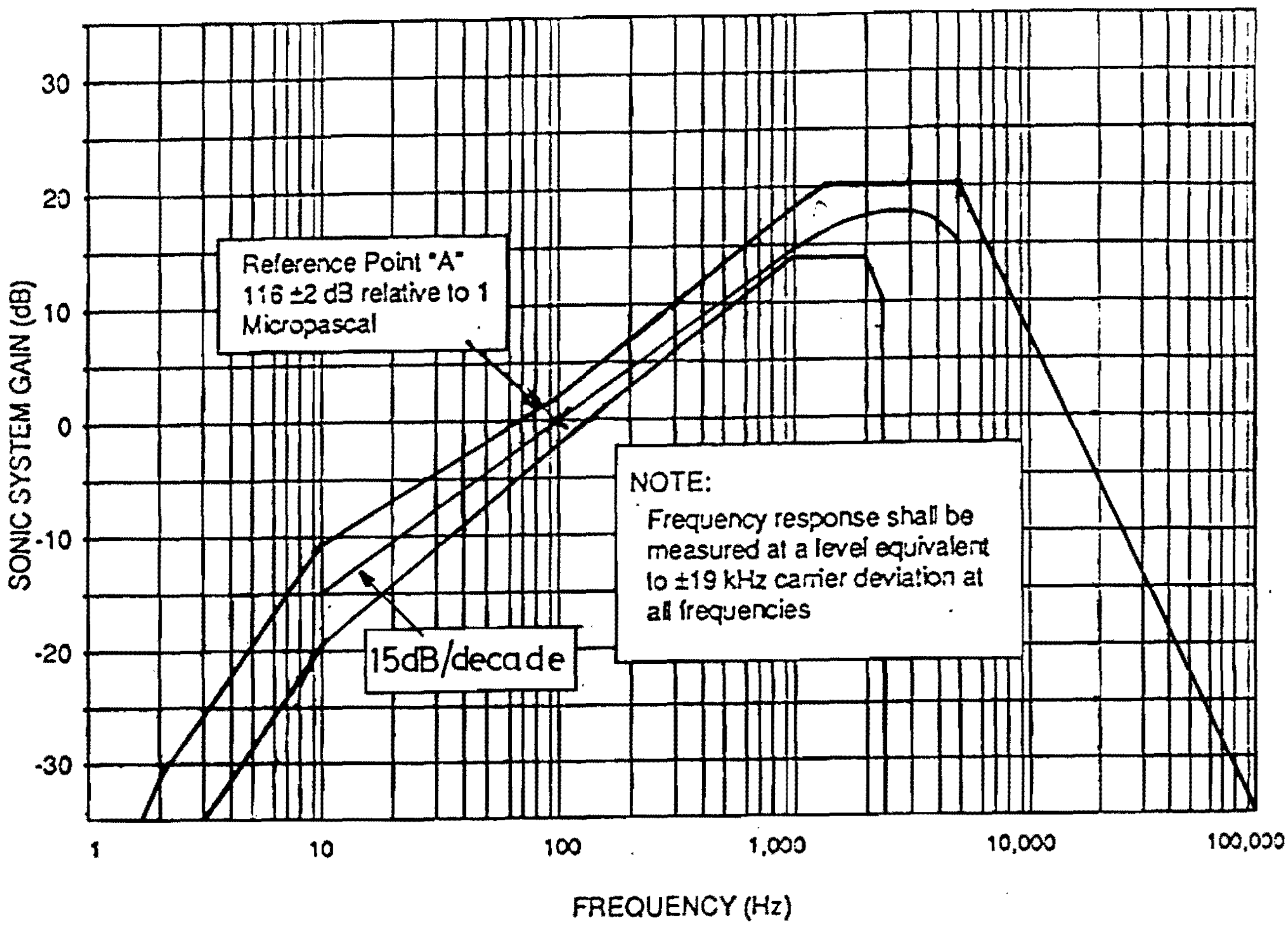


Figure 4.5 Frequency response for AN/SSQ 41N sonobuoy.

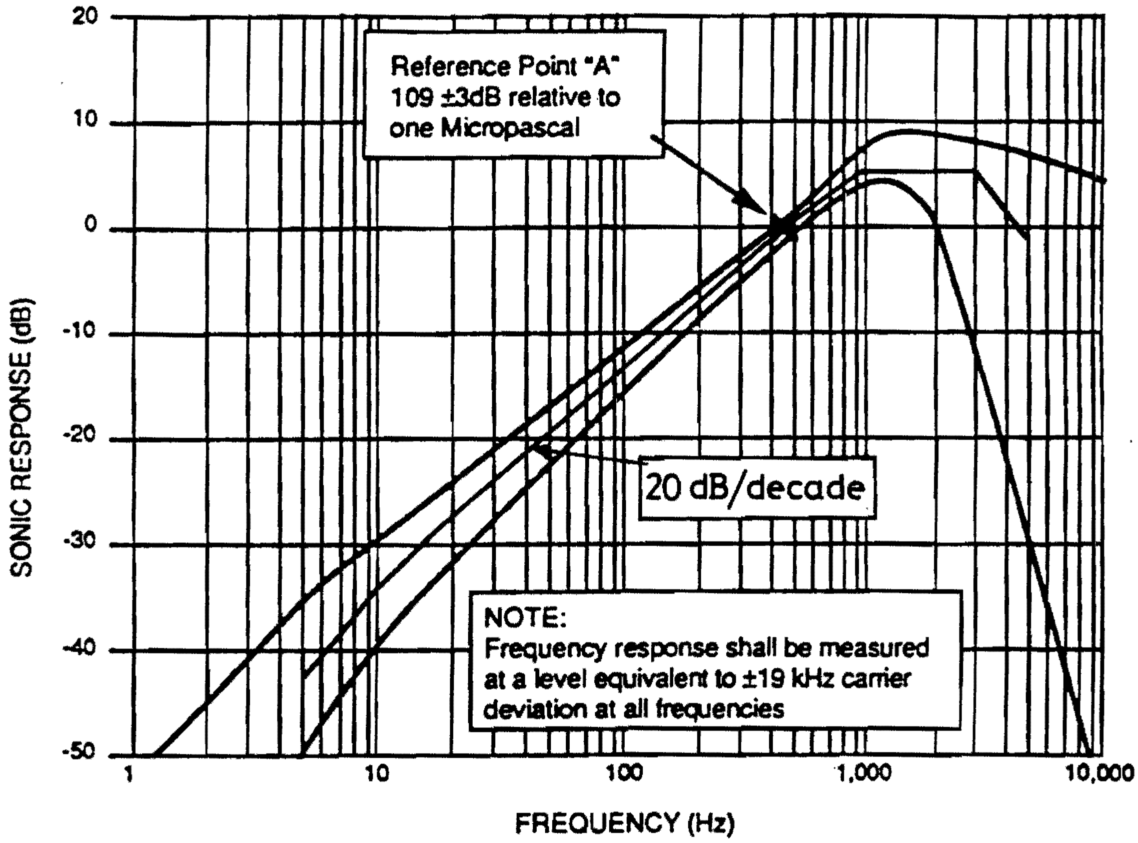


Figure 4.6 Frequency response for AN/SSQ 905 sonobuoy no 82, March 6.

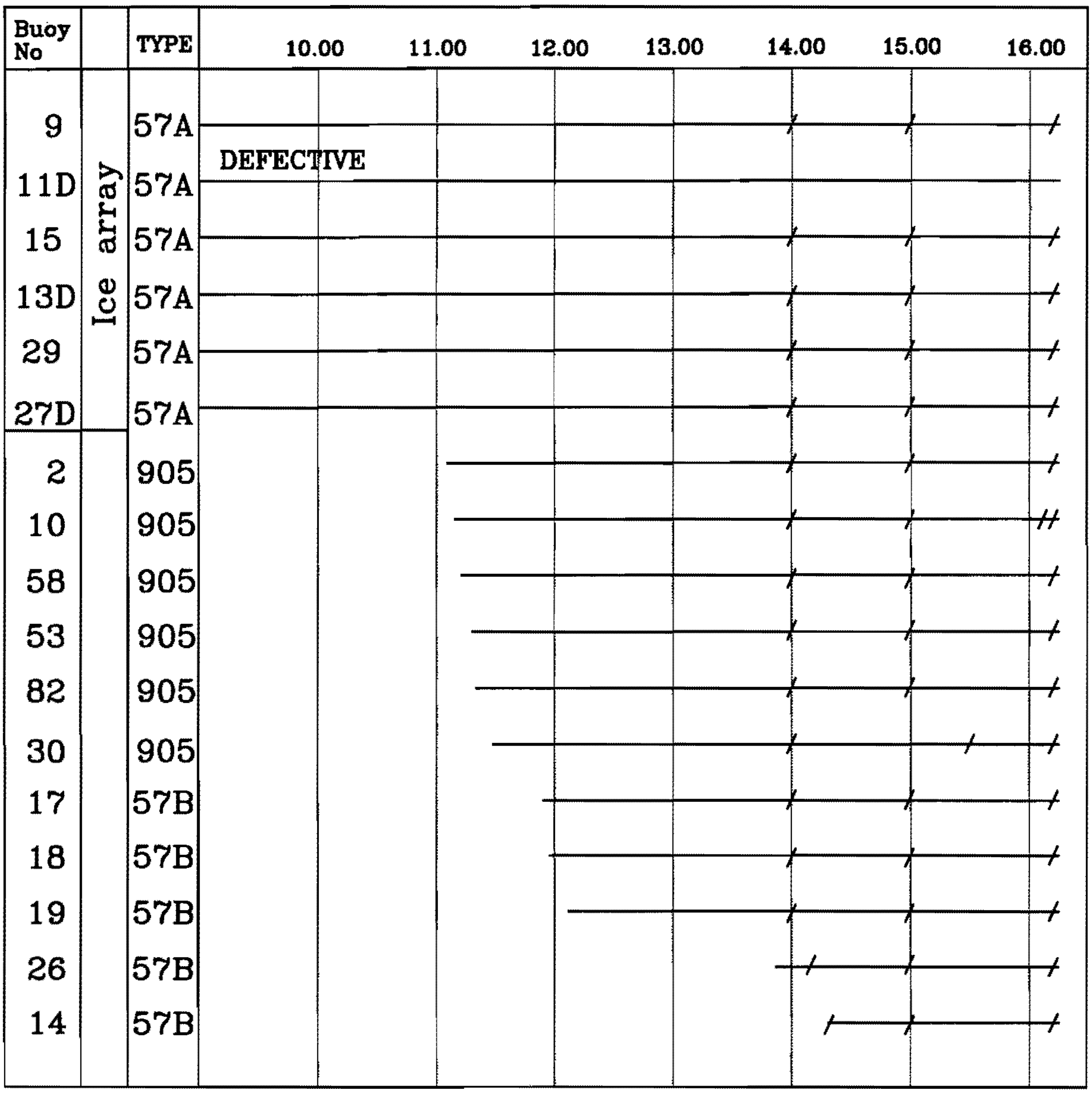


Figure 4.7 Monitoring periodes for sonobuoys on March 6.

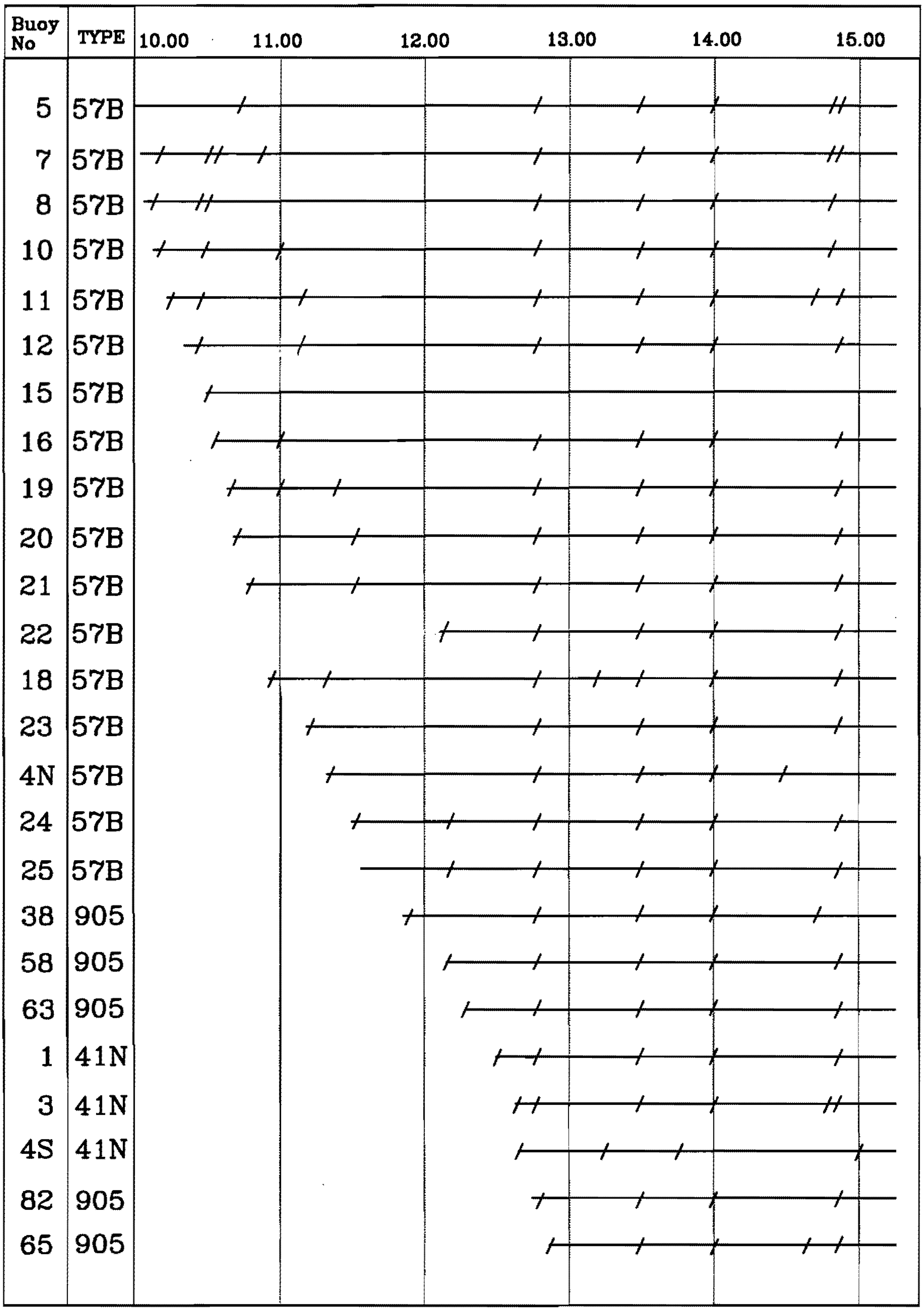
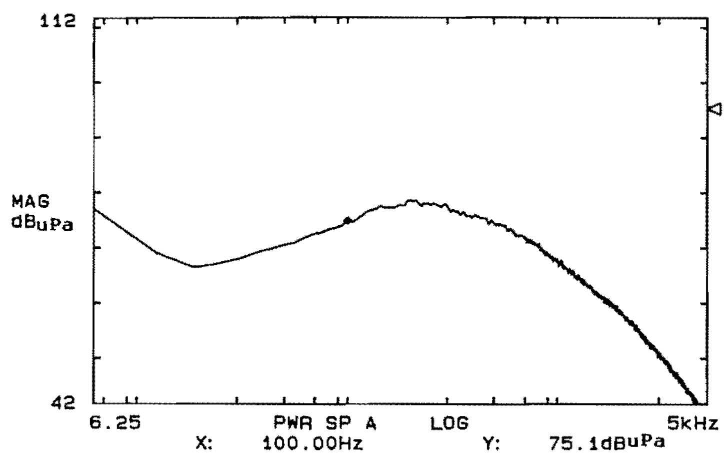
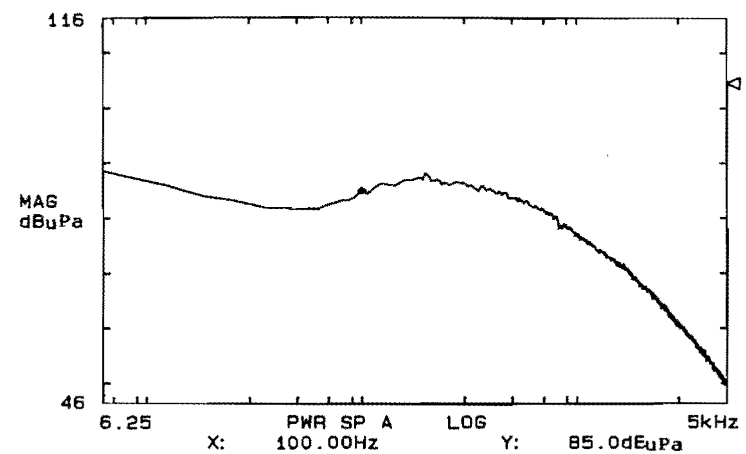


Figure 4.8 Buoy deployment and monitoring times on March 9.

SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-29 1500
5kHz A: AC/ 2V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-27 1459
5kHz A: AC/ 2V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-92 B-29
5kHz A: AC/ 2V B: AC/ 50V S.SUM 256/256 ChA 2k

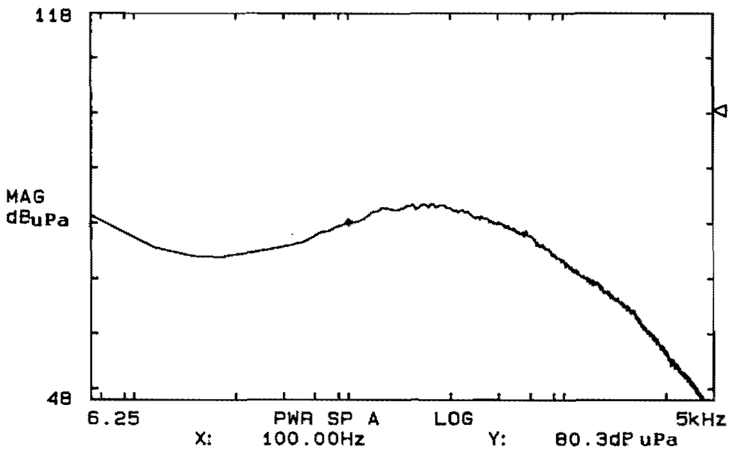
	PWR SPECTRUM	ChA
1	12.50Hz	69.3dBuPa
2	25.00	67.3
3	37.50	69.3
4	50.00	70.6
5	62.50	72.0
6	75.00	72.9
7	100.00	75.1
8	125.00	76.7
9	162.50	77.6
10	200.00	78.8
11	250.00	77.9
12	312.50	76.7
13	400.00	75.7
14	500.00	74.6
15	625.00	73.0
16	1000.00	68.2
17	1600.00	61.3
18	2000.00	58.5
19	3150.00	50.1
20	5000.00	39.3

SIZEX 92 AMBIENT NOISE DATA 9-3-92 B-27
5kHz A: AC/ 2V B: AC/ 50V S.SUM 256/256 ChA 2k

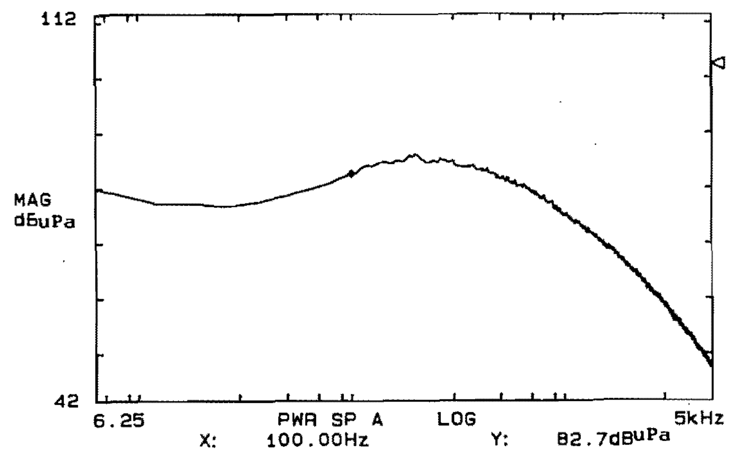
	PWR SPECTRUM	ChA
1	12.50Hz	86.0dBuPa
2	25.00	83.3
3	37.50	81.7
4	50.00	81.7
5	62.50	81.9
6	75.00	82.9
7	100.00	85.0
8	125.00	86.4
9	162.50	87.1
10	200.00	88.0
11	250.00	86.5
12	312.50	85.7
13	400.00	85.3
14	500.00	83.8
15	625.00	82.0
16	1000.00	76.9
17	1600.00	71.3
18	2000.00	68.1
19	3150.00	59.5
20	5000.00	49.9

Figure 4.9 <u>Noise spectrum level for B-29 and B-27</u>

SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-15 1459
5kHz A: AC/ 5V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-13 1459
5kHz A: AC/ 2V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-92 B-15
5kHz A: AC/ 5V B: AC/ 50V S.SUM 256/256 ChA 2k

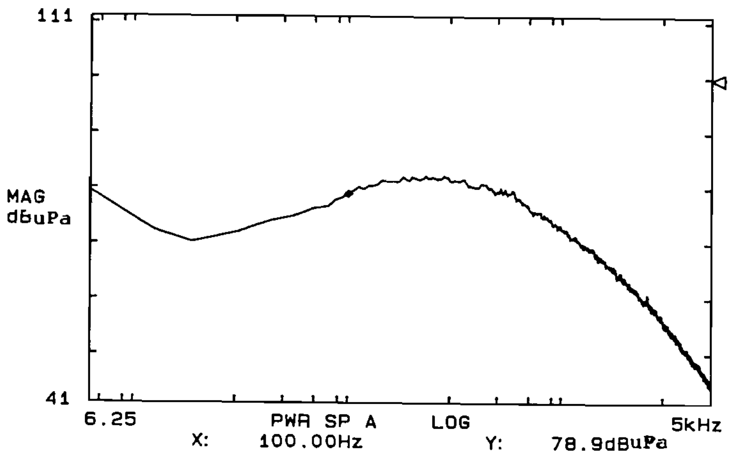
	PWR SPECTRUM	ChA
1	12.50Hz	75.7dB uPa
2	25.00	73.9
3	37.50	75.0
4	50.00	76.0
5	62.50	76.7
6	75.00	78.5
7	100.00	80.3
8	125.00	81.6
9	162.50	82.4
10	200.00	83.6
11	250.00	83.5
12	312.50	82.2
13	400.00	81.1
14	500.00	80.2
15	625.00	78.2
16	1000.00	73.3
17	1600.00	67.2
18	2000.00	64.8
19	3150.00	55.4
20	5000.00	45.1

SIZEX 92 AMBIENT NOISE DATA 9-3-92 B-13
5kHz A: AC/ 2V B: AC/ 50V S.SUM 256/256 ChA 2k

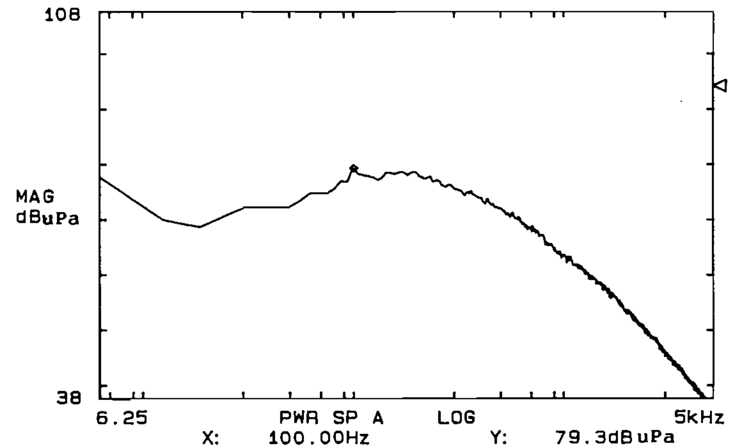
	PWR SPECTRUM	ChA
1	12.50Hz	77.2dBuPa
2	25.00	76.8
3	37.50	77.6
4	50.00	78.8
5	62.50	79.7
6	75.00	80.6
7	100.00	82.7
8	125.00	84.0
9	162.50	85.0
10	200.00	86.1
11	250.00	84.8
12	312.50	84.0
13	400.00	83.4
14	500.00	81.7
15	625.00	80.5
16	1000.00	75.2
17	1600.00	69.3
18	2000.00	66.0
19	3150.00	58.0
20	5000.00	47.9

Figure 4.10 Noise spectrum level for B-15 and B-13

SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-9 1459
5kHz A: AC/ 2V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-19 1500
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-92 B-9
5kHz A: AC/ 2V B: AC/ 50V S.SUM 256/256 ChA 2k

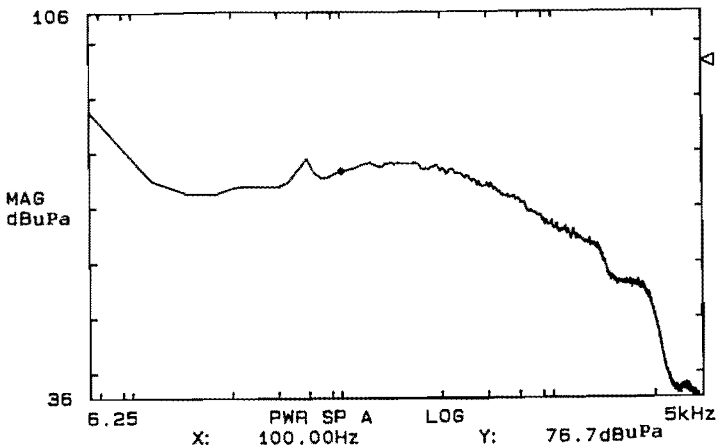
	PWR SPECTRUM	ChA
1	12.50Hz	72.5dBuPa
2	25.00	71.3
3	37.50	73.3
4	50.00	74.6
5	62.50	75.8
6	75.00	76.6
7	100.00	78.9
8	125.00	80.4
9	162.50	81.4
10	200.00	82.0
11	250.00	82.0
12	312.50	81.4
13	400.00	80.2
14	500.00	79.4
15	625.00	78.0
16	1000.00	72.7
17	1600.00	67.0
18	2000.00	63.1
19	3150.00	55.4
20	5000.00	44.2

SIZEX 92 AMBIENT NOISE DATA 9-3-92 B-19
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

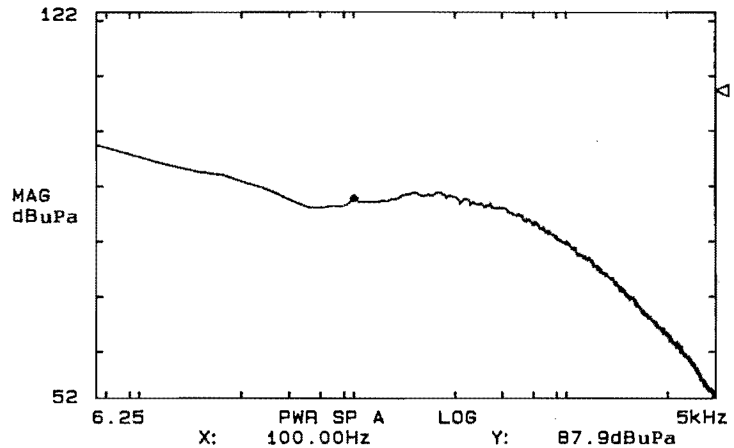
	PWR SPECTRUM	ChA
1	12.50Hz	70.0dBuPa
2	25.00	71.0
3	37.50	72.4
4	50.00	72.4
5	62.50	74.9
6	75.00	74.9
7	100.00	79.3
8	125.00	77.7
9	162.50	78.6
10	200.00	78.6
11	250.00	77.3
12	312.50	75.5
13	400.00	73.9
14	500.00	72.0
15	625.00	69.6
16	1000.00	63.5
17	1600.00	57.3
18	2000.00	53.3
19	3150.00	45.1
20	5000.00	36.1

Figure 4.11 Noise spectrum level for B-9 and B-19

SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-14 1500
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-26 1500
5kHz A: AC/ 5V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-92 B-14
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

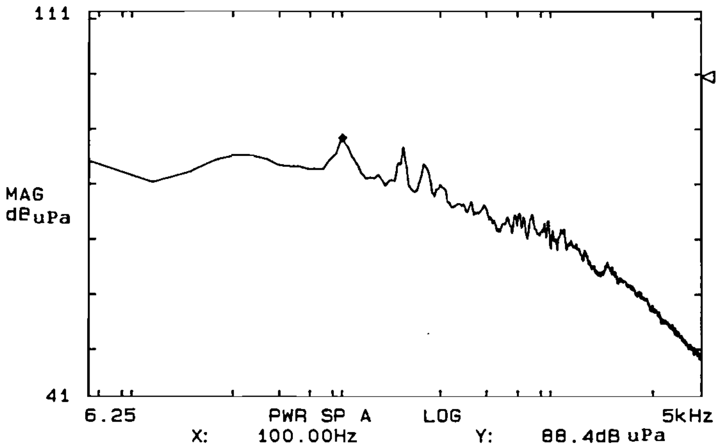
	PWR SPECTRUM	ChA
1	12.50Hz	75.0dBuPa
2	25.00	72.5
3	37.50	74.1
4	50.00	73.9
5	62.50	76.8
6	75.00	76.3
7	100.00	76.7
8	125.00	77.7
9	162.50	77.9
10	200.00	77.9
11	250.00	76.9
12	312.50	76.8
13	400.00	75.7
14	500.00	74.3
15	625.00	72.2
16	1000.00	67.6
17	1600.00	63.0
18	2000.00	56.6
19	3150.00	46.4
20	5000.00	33.8

SIZEX 92 AMBIENT NOISE DATA 9-3-92 B-26
5kHz A: AC/ 5V B: AC/ 50V S.SUM 256/256 ChA 2k

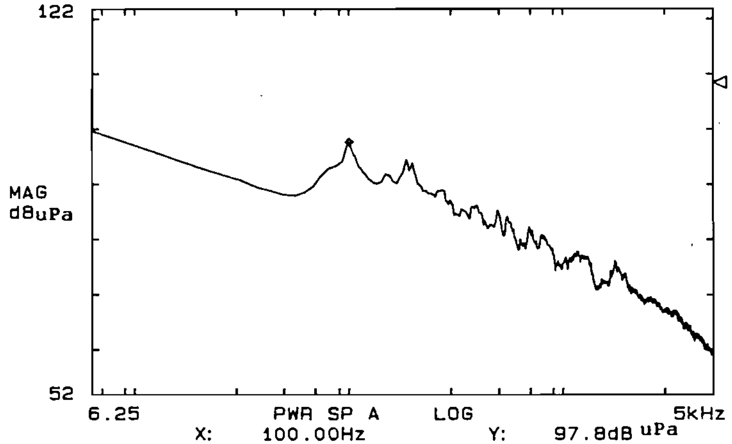
	PWR SPECTRUM	ChA
1	12.50Hz	94.4dBuPa
2	25.00	92.0
3	37.50	89.8
4	50.00	87.8
5	62.50	86.1
6	75.00	86.5
7	100.00	87.9
8	125.00	87.3
9	162.50	87.9
10	200.00	88.8
11	250.00	89.1
12	312.50	87.7
13	400.00	87.1
14	500.00	86.0
15	625.00	85.0
16	1000.00	79.5
17	1600.00	73.4
18	2000.00	69.8
19	3150.00	62.2
20	5000.00	51.8

Figure 4.12 Noise spectrum level for B-14 and B-26

SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-18 1459
5kHz A: AC/ 2V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-17 1459
5kHz A: AC/ 5V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-18
5kHz A: AC/ 2V B: AC/ 50V S.SUM 256/256 ChA 2k

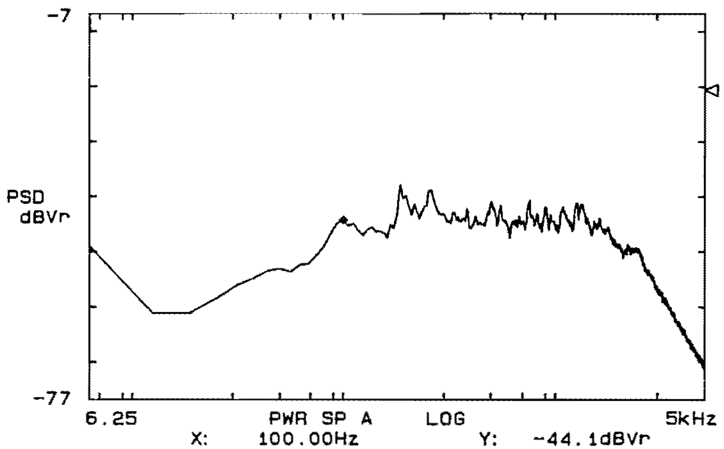
	PWR SPECTRUM	ChA
1	12.50Hz	80.3dBuPa
2	25.00	84.4
3	37.50	85.2
4	50.00	83.4
5	62.50	83.3
6	75.00	82.7
7	100.00	88.4
8	125.00	81.8
9	162.50	79.6
10	200.00	86.6
11	250.00	83.7
12	312.50	79.3
13	400.00	75.2
14	500.00	75.6
15	625.00	73.7
16	1000.00	68.9
17	1600.00	65.2
18	2000.00	64.1
19	3150.00	56.6
20	5000.00	49.0

SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-17
5kHz A: AC/ 5V B: AC/ 50V S.SUM 256/256 ChA 2k

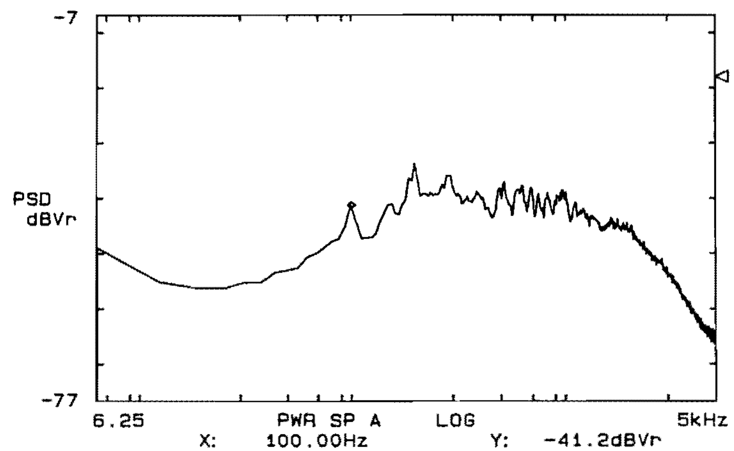
	PWR SPECTRUM	ChA
1	12.50Hz	95.9dBuPa
2	25.00	91.8
3	37.50	89.5
4	50.00	88.2
5	62.50	88.6
6	75.00	91.7
7	100.00	97.8
8	125.00	91.0
9	162.50	90.6
10	200.00	93.8
11	250.00	88.2
12	312.50	84.5
13	400.00	86.2
14	500.00	84.9
15	625.00	78.4
16	1000.00	75.5
17	1600.00	72.4
18	2000.00	71.7
19	3150.00	67.1
20	5000.00	59.7

Figure 4.13 Noise spectrum level for B-18 and B-17

SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-2 1459
5kHz A: AC/ 2V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-10 1459
5kHz A: AC/ 2V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-2
5kHz A: AC/ 2V B: AC/ 50V S.SUM 256/256 ChA 2k

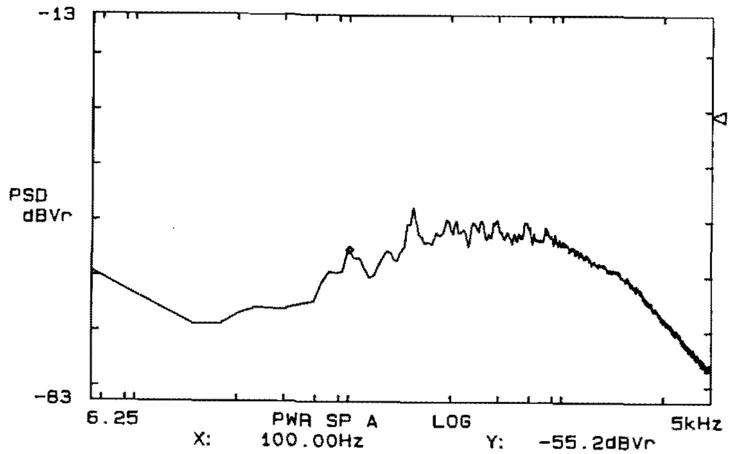
	PWR SPECTRUM	ChA
1	12.50Hz	-60.9dBVr
2	25.00	-58.3
3	37.50	-54.6
4	50.00	-52.9
5	62.50	-52.2
6	75.00	-50.5
7	100.00	-44.1
8	125.00	-47.1
9	162.50	-47.4
10	200.00	-39.9
11	250.00	-41.6
12	312.50	-44.5
13	400.00	-45.8
14	500.00	-41.5
15	625.00	-45.0
16	1000.00	-45.3
17	1600.00	-45.1
18	2000.00	-48.6
19	3150.00	-57.1
20	5000.00	-70.9

SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-10
5kHz A: AC/ 2V B: AC/ 50V S.SUM 256/256 ChA 2k

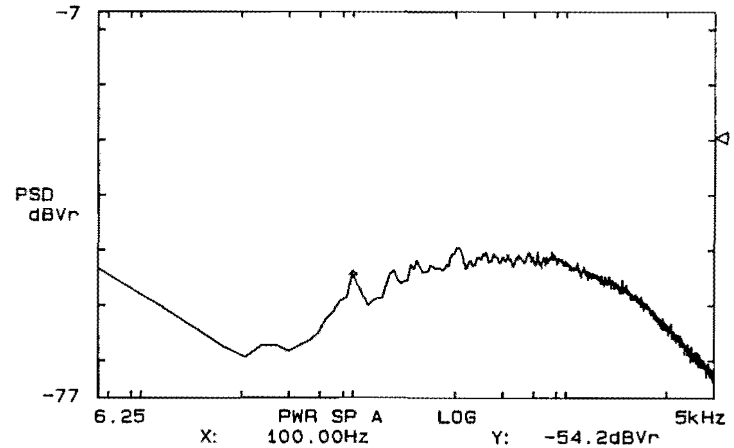
	PWR SPECTRUM	ChA
1	12.50Hz	-55.0dBVr
2	25.00	-56.3
3	37.50	-55.1
4	50.00	-52.8
5	62.50	-50.4
6	75.00	-48.7
7	100.00	-41.2
8	125.00	-46.9
9	162.50	-42.5
10	200.00	-33.7
11	250.00	-39.0
12	312.50	-39.5
13	400.00	-39.4
14	500.00	-39.3
15	625.00	-37.6
16	1000.00	-40.1
17	1600.00	-44.3
18	2000.00	-46.0
19	3150.00	-54.5
20	5000.00	-65.8

Figure 4.14 <u>Noise spectrum level for B-2 and B-10</u>

SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-58 1458
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-53 1459
5kHz A: AC/ 2V B: AC/ 50V S.SUM 102/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-58
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

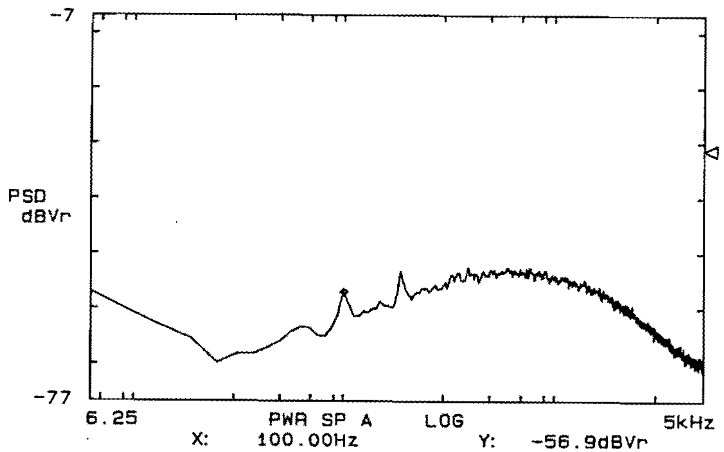
	PWR SPECTRUM	ChA
1	12.50Hz	-65.2dBVr
2	25.00	-68.6
3	37.50	-65.6
4	50.00	-65.9
5	62.50	-64.9
6	75.00	-61.2
7	100.00	-55.2
8	125.00	-60.3
9	162.50	-57.0
10	200.00	-47.5
11	250.00	-53.2
12	312.50	-50.4
13	400.00	-51.6
14	500.00	-50.3
15	625.00	-52.1
16	1000.00	-54.2
17	1600.00	-58.3
18	2000.00	-60.8
19	3150.00	-68.5
20	5000.00	-76.7

SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-53
5kHz A: AC/ 2V B: AC/ 50V S.SUM 102/256 ChA 2k

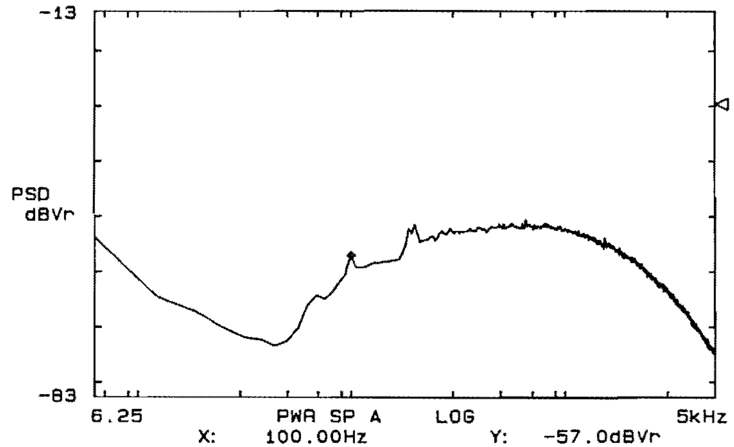
	PWR SPECTRUM	ChA
1	12.50Hz	-60.0dBVr
2	25.00	-67.6
3	37.50	-67.1
4	50.00	-68.1
5	62.50	-66.2
6	75.00	-62.3
7	100.00	-54.2
8	125.00	-58.9
9	162.50	-55.2
10	200.00	-51.8
11	250.00	-53.1
12	312.50	-49.4
13	400.00	-51.5
14	500.00	-51.3
15	625.00	-51.9
16	1000.00	-52.1
17	1600.00	-55.2
18	2000.00	-57.7
19	3150.00	-63.2
20	5000.00	-71.9

Figure 4.15 Noise spectrum level for B-58 and B-53

SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-82 1459
5kHz A: AC/ 2V B: AC/ 50V S.SUM 98/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-30 1531
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-82
5kHz A: AC/ 2V B: AC/ 50V S.SUM 98/256 ChA 2k

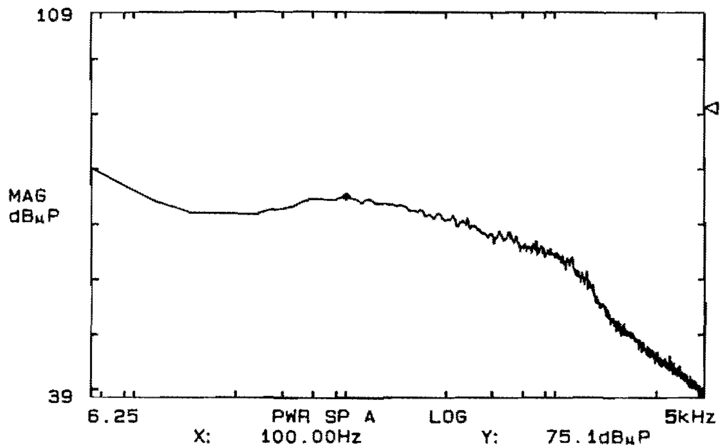
	PWR SPECTRUM	ChA
1	12.50Hz	-62.5dBVr
2	25.00	-69.7
3	37.50	-67.9
4	50.00	-65.7
5	62.50	-63.2
6	75.00	-64.7
7	100.00	-56.9
8	125.00	-60.4
9	162.50	-59.3
10	200.00	-56.7
11	250.00	-56.3
12	312.50	-56.1
13	400.00	-53.7
14	500.00	-52.9
15	625.00	-53.0
16	1000.00	-54.3
17	1600.00	-56.8
18	2000.00	-59.3
19	3150.00	-65.1
20	5000.00	-69.8

SIZEX 92 AMBIENT NOISE DATA 6-3-92 B-30
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

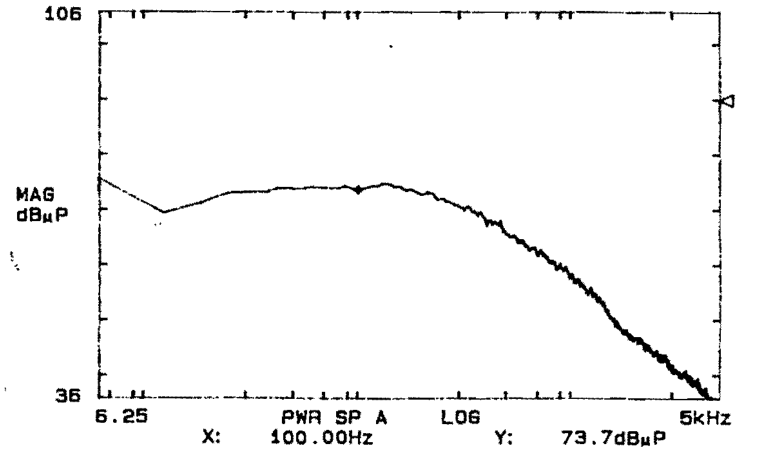
	PWR SPECTRUM	ChA
1	12.50Hz	-64.6dBVr
2	25.00	-70.0
3	37.50	-72.2
4	50.00	-72.3
5	62.50	-65.9
6	75.00	-64.8
7	100.00	-57.0
8	125.00	-58.5
9	162.50	-57.9
10	200.00	-51.6
11	250.00	-54.3
12	312.50	-52.6
13	400.00	-51.9
14	500.00	-51.6
15	625.00	-52.1
16	1000.00	-52.4
17	1600.00	-55.0
18	2000.00	-57.7
19	3150.00	-64.0
20	5000.00	-74.5

Figure 4.16 Noise spectrum level for B-82 and B-30

SIZEX 92 AMBIENT NOISE DATA 9-3-92 B 5 1400
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-7 1400
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-92 B 5
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

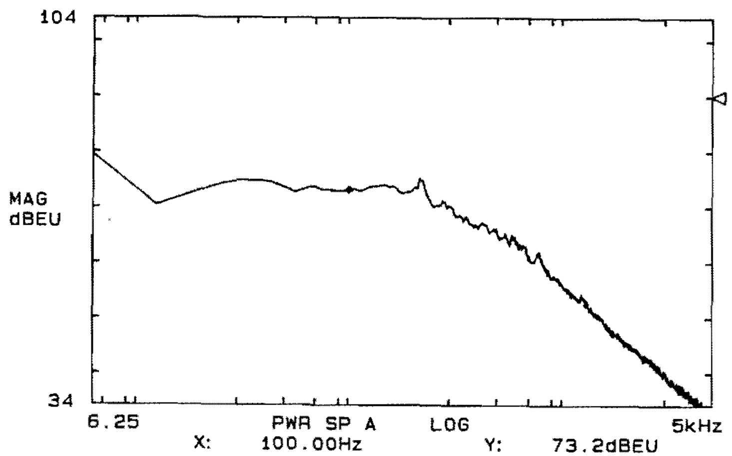
	PWR SPECTRUM	ChA
1	12.50Hz	74.2dBμP
2	25.00	72.0
3	37.50	71.8
4	50.00	73.0
5	62.50	74.2
6	75.00	74.7
7	100.00	75.1
8	125.00	74.5
9	162.50	73.6
10	200.00	72.4
11	312.50	70.8
12	400.00	69.8
13	500.00	68.4
14	625.00	67.1
15	1000.00	64.9
16	1250.00	61.0
17	1600.00	56.1
18	2000.00	51.1
19	3150.00	44.9
20	5000.00	38.6

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-7
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

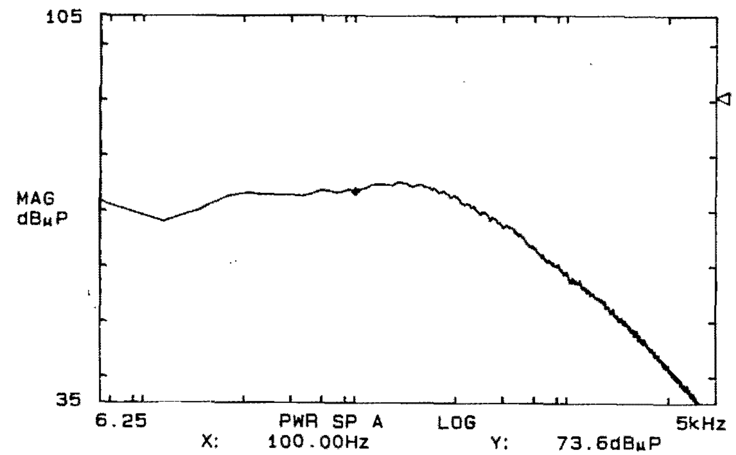
	PWR SPECTRUM	ChA
1	12.50Hz	69.3dBμP
2	25.00	73.0
3	37.50	73.2
4	50.00	73.6
5	62.50	74.2
6	75.00	73.8
7	100.00	73.7
8	125.00	74.4
9	162.50	73.8
10	200.00	72.8
11	250.00	71.9
12	312.50	70.4
13	400.00	67.9
14	500.00	65.6
15	625.00	63.4
16	1000.00	57.7
17	1600.00	50.4
18	2000.00	46.6
19	3150.00	41.0
20	5000.00	34.3

Figure 4.17 Noise spectrum level. March 9.

SIZEX 92 AMBIENT NOISE DATA 9-3-92 B-8 1400
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-10 1400
5kHz A: AC/0.5V B: AC/ 20V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-92 B-8
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k

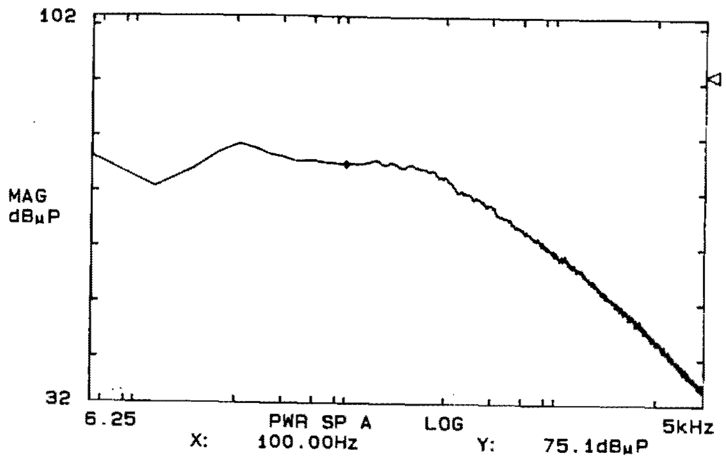
	PWR SPECTRUM	ChA
1	12.50Hz	70.3dBEU
2	25.00	74.3
3	37.50	75.0
4	50.00	73.7
5	62.50	73.5
6	75.00	73.3
7	100.00	73.2
8	125.00	73.7
9	162.50	73.9
10	200.00	73.0
11	250.00	70.7
12	312.50	70.0
13	400.00	66.8
14	500.00	66.3
15	625.00	63.7
16	1000.00	56.2
17	1600.00	48.4
18	2000.00	45.6
19	3150.00	38.6
20	5000.00	32.8

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-10
5kHz A: AC/0.5V B: AC/ 20V S.SUM 256/256 ChA 2k

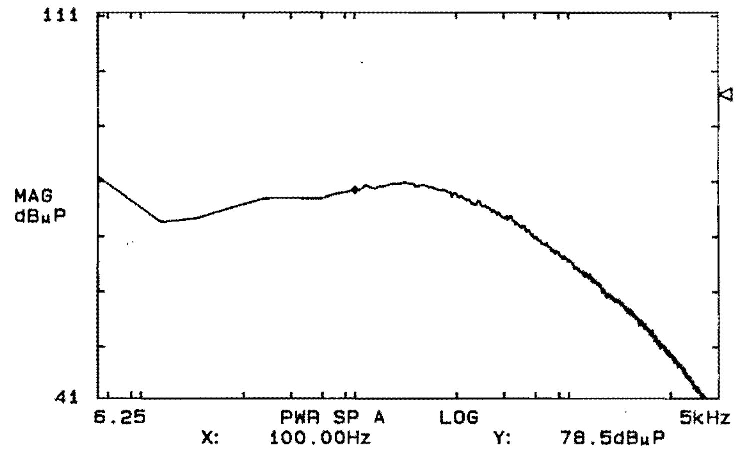
	PWR SPECTRUM	ChA
1	12.50Hz	68.2dBμP
2	25.00	72.6
3	37.50	73.0
4	50.00	72.9
5	62.50	73.2
6	75.00	73.9
7	100.00	73.6
8	125.00	74.9
9	162.50	75.3
10	200.00	74.9
11	250.00	73.3
12	312.50	72.2
13	400.00	69.9
14	500.00	67.2
15	625.00	65.2
16	1000.00	59.1
17	1600.00	51.7
18	2000.00	48.8
19	3150.00	40.7
20	5000.00	32.0

Figure 4.18 <u>Noise spectrum level. March 9.</u>

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-11 1400
5kHz A: AC/0.5V B: AC/ 20V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-16 1400
5kHz A: AC/ 2V B: AC/ 20V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-11
5kHz A: AC/0.5V B: AC/ 20V S.SUM 256/256 ChA 2k

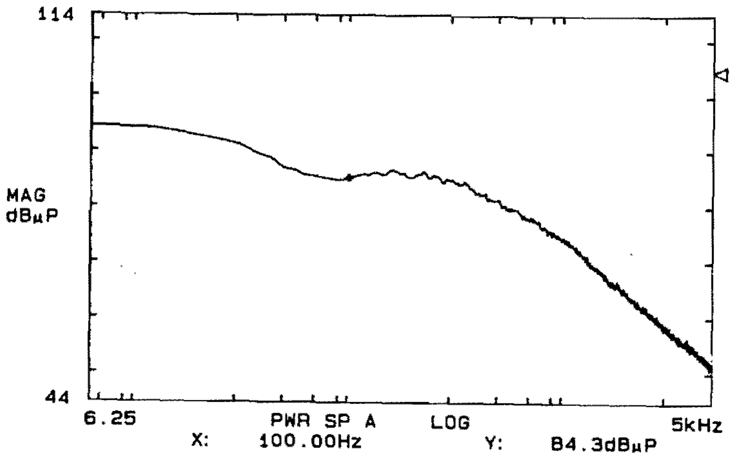
	PWR SPECTRUM	ChA
1	12.50Hz	70.9dBμP
2	25.00	77.2
3	37.50	77.8
4	50.00	76.3
5	62.50	75.4
6	75.00	75.5
7	100.00	75.1
8	125.00	75.3
9	162.50	75.2
10	200.00	74.8
11	250.00	73.8
12	312.50	71.9
13	400.00	69.7
14	500.00	67.8
15	625.00	64.6
16	1000.00	58.7
17	1600.00	52.6
18	2000.00	49.3
19	3150.00	42.7
20	5000.00	34.8

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-16
5kHz A: AC/ 2V B: AC/ 20V S.SUM 256/256 ChA 2k

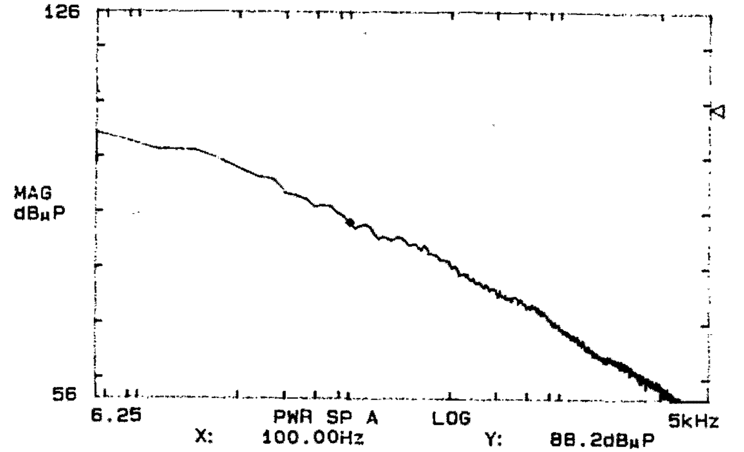
	PWR SPECTRUM	ChA
1	12.50Hz	72.6dBμP
2	25.00	75.0
3	37.50	77.0
4	50.00	76.9
5	62.50	76.9
6	75.00	77.3
7	100.00	78.5
8	125.00	78.8
9	162.50	79.7
10	200.00	79.2
11	250.00	78.6
12	312.50	77.2
13	400.00	75.5
14	500.00	73.4
15	625.00	72.0
16	1000.00	65.4
17	1600.00	59.0
18	2000.00	55.5
19	3150.00	47.2
20	5000.00	37.1

Figure 4.19 <u>Noise spectrum level. March 9.</u>

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-12 1400
5kHz A: AC/ 2V B: AC/ 20V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-23 1400
5kHz A: AC/ 10V B: AC/ 50V S.SUM 164/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-12
5kHz A: AC/ 2V B: AC/ 20V S.SUM 256/256 ChA 2k

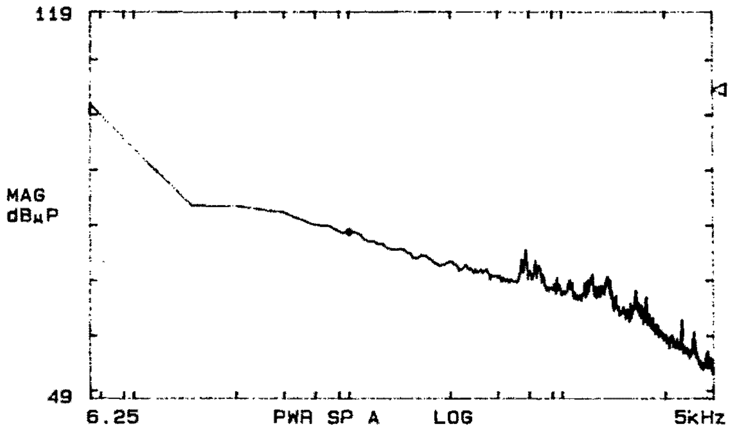
	PWR SPECTRUM	ChA
1	12.50Hz	93.0dBµP
2	25.00	91.1
3	37.50	88.7
4	50.00	86.0
5	62.50	84.6
6	75.00	84.2
7	100.00	84.3
8	125.00	84.7
9	162.50	85.6
10	200.00	84.3
11	250.00	84.8
12	312.50	83.6
13	400.00	81.5
14	500.00	80.2
15	625.00	78.3
16	1000.00	73.1
17	1600.00	67.0
18	2000.00	63.4
19	3150.00	56.8
20	5000.00	50.3

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-23
5kHz A: AC/ 10V B: AC/ 50V S.SUM 164/256 ChA 2k

	PWR SPECTRUM	ChA
1	12.50Hz	101.4dBµP
2	25.00	99.5
3	37.50	96.4
4	50.00	93.6
5	62.50	92.4
6	75.00	91.4
7	100.00	88.2
8	125.00	87.3
9	162.50	85.3
10	200.00	84.3
11	250.00	82.4
12	312.50	80.3
13	400.00	77.3
14	500.00	75.7
15	625.00	74.5
16	1000.00	69.0
17	1600.00	63.8
18	2000.00	62.5
19	3150.00	57.9
20	5000.00	51.3

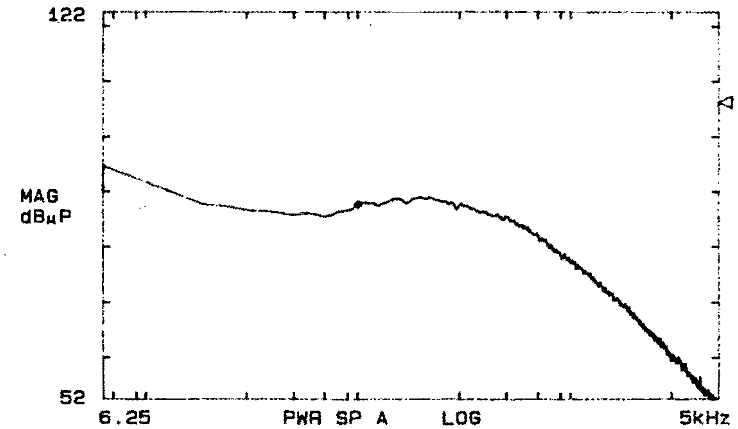
Figure 4.20 Noise spectrum level. March 9.

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 8-18 1400
5kHz A: AC/ 5V B: AC/ 50V S.SUM 256/256 ChA 2k



X: 100.00Hz Y: 78.8dBμP

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 8-19 1400
5kHz A: AC/ 5V B: AC/ 50V S.SUM 256/256 ChA 2k



X: 100.00Hz Y: 86.6dBμP

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 8-18
5kHz A: AC/ 5V B: AC/ 50V S.SUM 256/256 ChA 2k

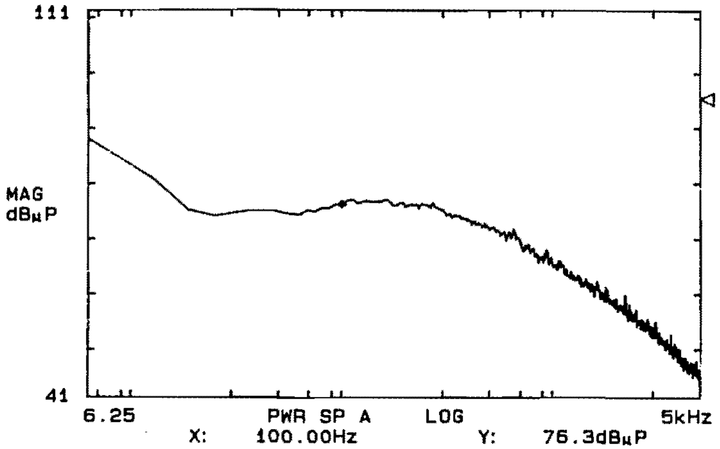
	PWR SPECTRUM	ChA
1	12.50Hz	90.1dBμP
2	25.00	83.4
3	37.50	83.0
4	50.00	82.2
5	62.50	80.8
6	75.00	80.0
7	100.00	78.8
8	125.00	77.1
9	162.50	75.6
10	200.00	74.3
11	250.00	73.4
12	312.50	72.9
13	400.00	71.6
14	500.00	70.6
15	625.00	70.0
16	1000.00	67.6
17	1600.00	68.9
18	2000.00	64.5
19	3150.00	58.2
20	5000.00	54.0

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 8-19
5kHz A: AC/ 5V B: AC/ 50V S.SUM 256/256 ChA 2k

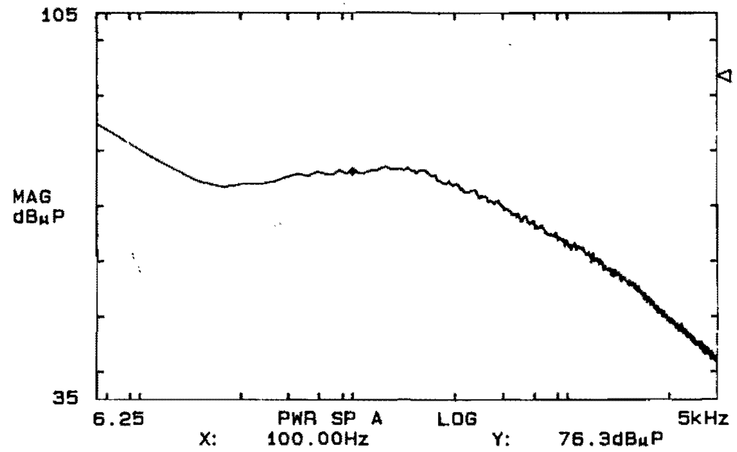
	PWR SPECTRUM	ChA
1	12.50Hz	89.2dBμP
2	25.00	86.1
3	37.50	85.4
4	50.00	84.8
5	62.50	84.9
6	75.00	84.7
7	100.00	86.6
8	125.00	86.4
9	162.50	87.3
10	200.00	88.0
11	250.00	87.2
12	312.50	86.4
13	400.00	85.5
14	500.00	84.4
15	625.00	82.0
16	1000.00	76.3
17	1600.00	69.6
18	2000.00	66.6
19	3150.00	58.2
20	5000.00	50.1

Figure 4.21 Noise spectrum level. March 9.

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-20 1400
5kHz A: AC/ 2V B: AC/ 20V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-21 1400
5kHz A: AC/ 1V B: AC/ 20V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-20
5kHz A: AC/ 2V B: AC/ 20V S.SUM 256/256 ChA 2k

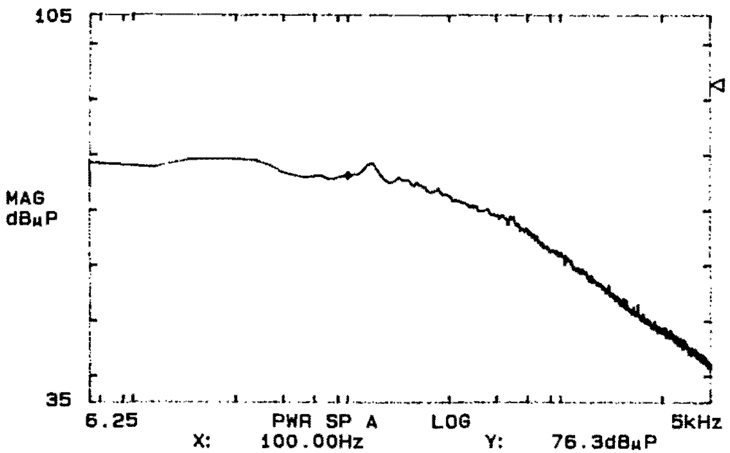
	PWR SPECTRUM	ChA
1	12.50Hz	81.1dBμP
2	25.00	74.1
3	37.50	75.2
4	50.00	75.1
5	62.50	74.3
6	75.00	75.0
7	100.00	76.3
8	125.00	76.8
9	162.50	77.1
10	200.00	76.0
11	250.00	76.0
12	312.50	74.3
13	400.00	73.4
14	500.00	71.7
15	625.00	71.1
16	1000.00	65.4
17	1600.00	61.3
18	2000.00	58.5
19	3150.00	52.7
20	5000.00	43.9

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-21
5kHz A: AC/ 1V B: AC/ 20V S.SUM 256/256 ChA 2k

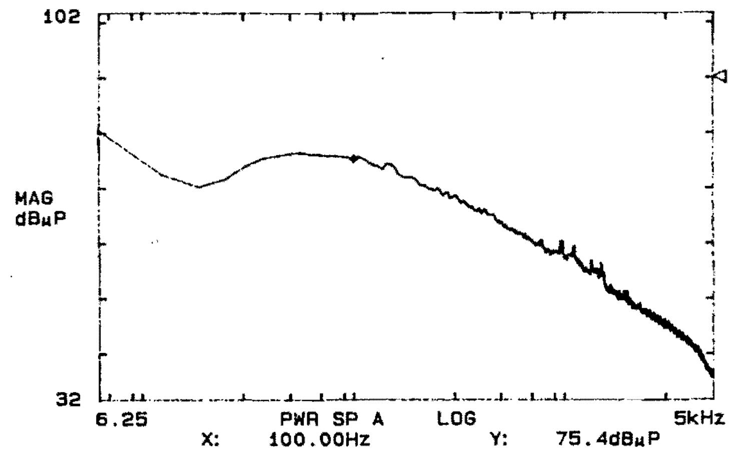
	PWR SPECTRUM	ChA
1	12.50Hz	77.9dBμP
2	25.00	73.4
3	37.50	74.0
4	50.00	75.5
5	62.50	75.4
6	75.00	75.8
7	100.00	76.3
8	125.00	76.5
9	162.50	76.7
10	200.00	76.0
11	250.00	74.8
12	312.50	73.6
13	400.00	71.9
14	500.00	69.9
15	625.00	67.9
16	1000.00	63.3
17	1600.00	58.1
18	2000.00	56.1
19	3150.00	49.2
20	5000.00	42.6

Figure 4.22 Noise spectrum level. March 9.

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-24 1400
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-25 1400
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-24
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

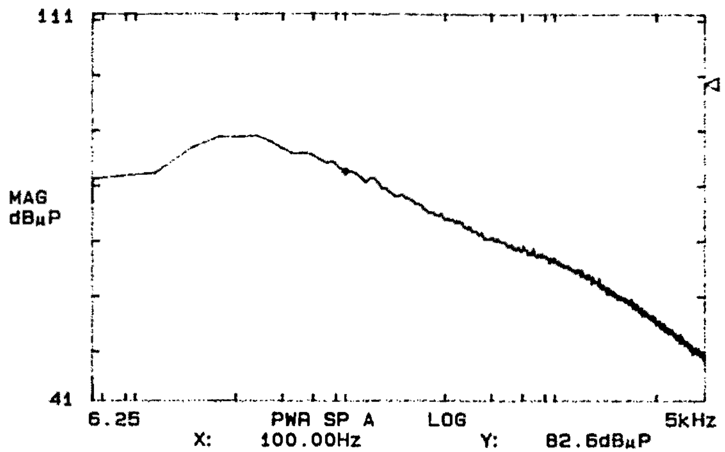
	PWR SPECTRUM	ChA
1	12.50Hz	78.0dBμP
2	25.00	79.5
3	37.50	79.0
4	50.00	76.8
5	62.50	75.9
6	75.00	76.4
7	100.00	76.3
8	125.00	78.4
9	162.50	75.1
10	200.00	74.9
11	250.00	73.4
12	312.50	71.8
13	400.00	70.8
14	500.00	69.0
15	625.00	67.1
16	1000.00	62.3
17	1600.00	56.2
18	2000.00	52.9
19	3150.00	47.6
20	5000.00	42.2

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-25
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k

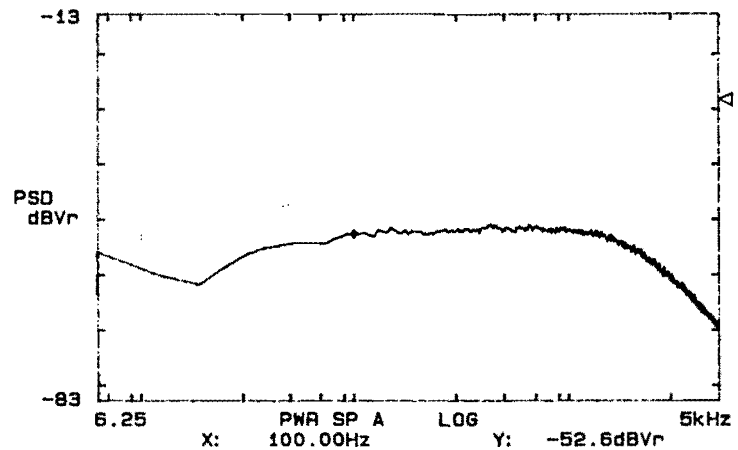
	PWR SPECTRUM	ChA
1	12.50Hz	72.5dBμP
2	25.00	71.8
3	37.50	75.4
4	50.00	76.3
5	62.50	76.1
6	75.00	76.0
7	100.00	75.4
8	125.00	74.2
9	162.50	72.6
10	200.00	71.3
11	250.00	69.9
12	312.50	68.2
13	400.00	66.4
14	500.00	63.7
15	625.00	61.9
16	1000.00	57.6
17	1600.00	51.6
18	2000.00	49.2
19	3150.00	44.6
20	5000.00	36.5

Figure 4.23 Noise spectrum level March 9.

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-4N 1400
5kHz A: AC/ 2V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-65 1400
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-4
5kHz A: AC/ 2V B: AC/ 50V S.SUM 256/256 ChA 2k

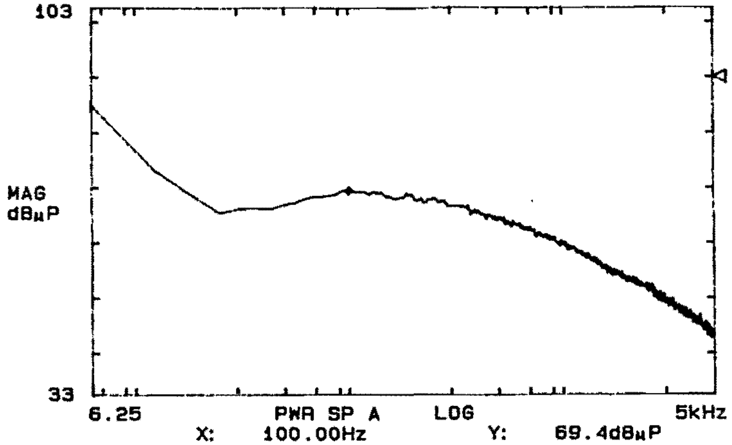
	PWR SPECTRUM	ChA
1	12.50Hz	82.6dBμP
2	25.00	88.9
3	37.50	89.1
4	50.00	86.8
5	62.50	86.1
6	75.00	84.9
7	100.00	82.6
8	125.00	80.6
9	162.50	79.1
10	200.00	77.9
11	250.00	75.4
12	312.50	74.2
13	400.00	72.1
14	500.00	70.8
15	625.00	69.4
16	1000.00	67.0
17	1600.00	62.2
18	2000.00	59.9
19	3150.00	55.1
20	5000.00	48.7

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-65
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

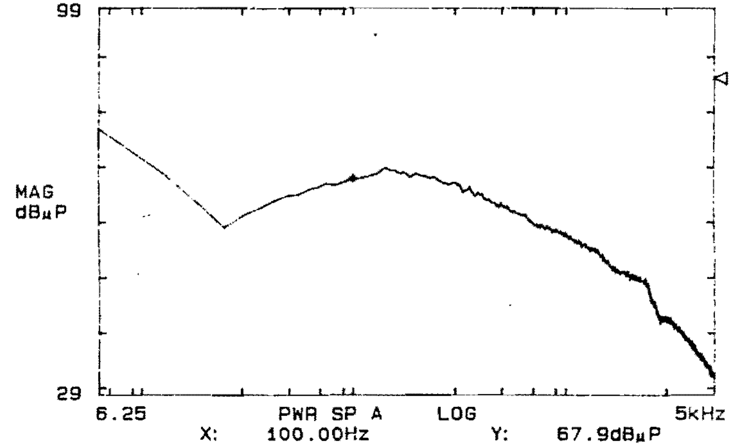
	PWR SPECTRUM	ChA
1	12.50Hz	-60.2dBVr
2	25.00	-58.5
3	37.50	-55.2
4	50.00	-54.4
5	62.50	-54.1
6	75.00	-54.1
7	100.00	-52.6
8	125.00	-53.0
9	162.50	-52.3
10	200.00	-52.2
11	250.00	-52.1
12	312.50	-52.2
13	400.00	-51.5
14	500.00	-52.0
15	625.00	-51.7
16	1000.00	-52.0
17	1600.00	-53.5
18	2000.00	-55.5
19	3150.00	-61.1
20	5000.00	-69.1

Figure 4.24 Noise spectrum level. March 9.

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 8-22 1400
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-1 1400
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-1992 8-22
5kHz A: AC/ 2V B: AC/ 50V S.SUM 256/256 ChA 2k

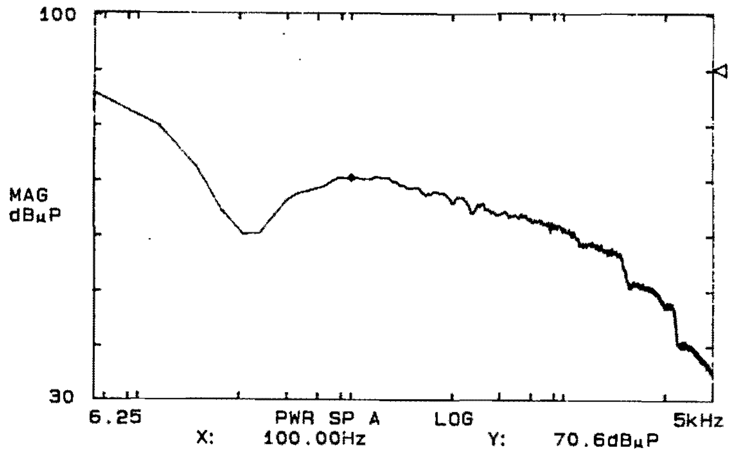
	PWR SPECTRUM	ChA
1	12.50Hz	73.0dBμP
2	25.00	65.4
3	37.50	66.1
4	50.00	66.8
5	62.50	67.9
6	75.00	68.5
7	100.00	69.4
8	125.00	68.8
9	162.50	68.0
10	200.00	68.5
11	250.00	67.8
12	312.50	66.7
13	400.00	65.3
14	500.00	64.1
15	625.00	63.1
16	1000.00	60.0
17	1600.00	55.4
18	2000.00	53.2
19	3150.00	49.3
20	5000.00	43.2

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-1
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k

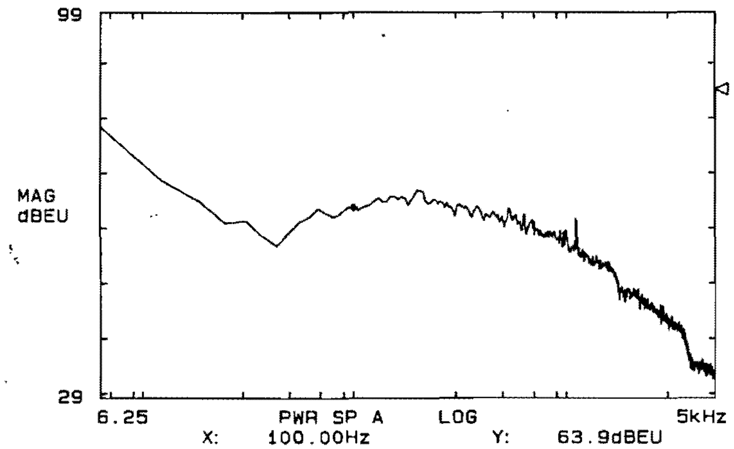
	PWR SPECTRUM	ChA		
1	12.50Hz	69.0dBμP		
2	25.00	59.0		
3	37.50	62.7		
4	50.00	64.9		
5	62.50	66.0		
6	75.00	67.1		
7	100.00	67.9		
8	125.00	68.6		
9	162.50	69.0		
10	200.00	68.9		
11	250.00	67.8		
12	312.50	66.7		
13	400.00	64.9		
14	500.00	63.5		
15	625.00	61.2		
16	1000.00	58.2	+ 1	= 59.2
17	1600.00	52.2	+ 2	= 54.2
18	2000.00	49.7	+ 3,5	= 53.2
19	3150.00	41.7	+ 6	= 47.7
20	5000.00	32.7	+ 10	= 42.7

Figure 4.25 <u>Noise spectrum level. March 9.</u>

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-3 1400
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-92 B-4S 1345
5kHz A: AC/0.5V B: AC/ 50V S.SUM 66/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-3
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k

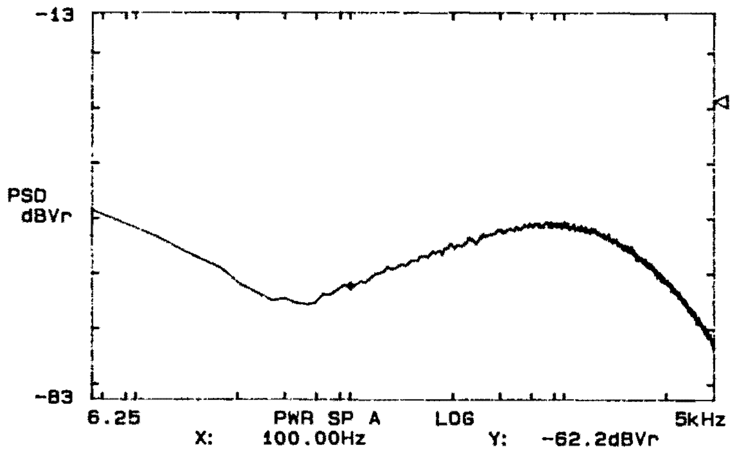
	PWR SPECTRUM	ChA		
1	12.50Hz	80.1dBµP		
2	25.00	64.5		
3	37.50	60.6		
4	50.00	66.4		
5	62.50	68.2		
6	75.00	69.0		
7	100.00	70.6		
8	125.00	70.4		
9	162.50	69.8		
10	200.00	68.7		
11	250.00	67.9		
12	312.50	66.8		
13	400.00	65.8		
14	500.00	63.9		
15	625.00	63.2		
16	1000.00	61.5	+ 1	= 62.5
17	1600.00	57.3	+ 2	= 59.3
18	2000.00	52.1	+ 3.5	= 55.6
19	3150.00	47.4	+ 6	= 53.4
20	5000.00	35.6	+ 10	= 45.6

SIZEX 92 AMBIENT NOISE DATA 9-3-92 B-4S
5kHz A: AC/0.5V B: AC/ 50V S.SUM 66/256 ChA 2k

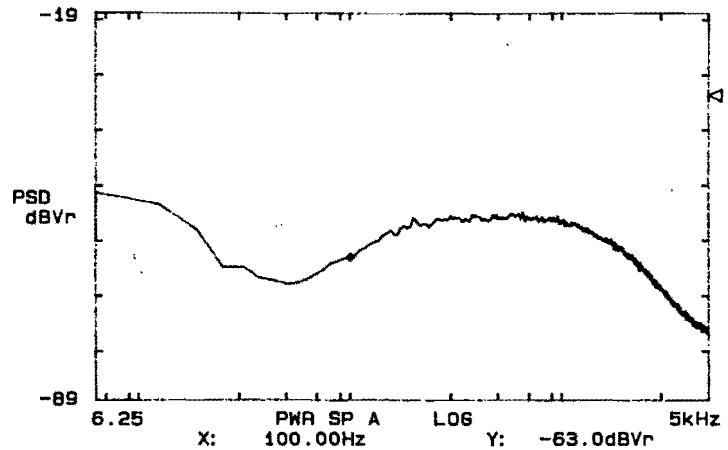
	PWR SPECTRUM	ChA		
1	12.50Hz	68.7dBEU		
2	25.00	60.9		
3	37.50	58.5		
4	50.00	59.3		
5	62.50	61.9		
6	75.00	62.6		
7	100.00	63.9		
8	125.00	64.9		
9	162.50	65.3		
10	200.00	66.8		
11	250.00	64.4		
12	312.50	64.3		
13	400.00	62.8		
14	500.00	62.0		
15	625.00	59.8		
16	1000.00	59.6	+ 1	= 60.6
17	1600.00	53.2	+ 2	= 55.2
18	2000.00	47.9	+ 3.5	= 51.4
19	3150.00	42.9	+ 6	= 48.9
20	5000.00	33.6	+ 10	= 43.6

Figure 4.26 Noise spectrum level. March 9.

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-58 1400
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-82 1400
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-58
5kHz A: AC/ 1V B: AC/ 50V S.SUM 256/256 ChA 2k

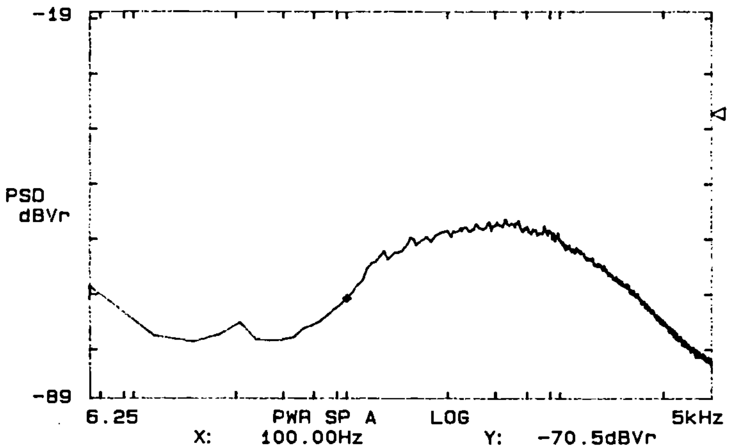
	PWR SPECTRUM	ChA
1	12.50Hz	-53.2dBVr
2	25.00	-58.8
3	37.50	-63.5
4	50.00	-64.4
5	62.50	-65.5
6	75.00	-63.7
7	100.00	-62.2
8	125.00	-60.7
9	162.50	-59.0
10	200.00	-57.7
11	250.00	-56.3
12	312.50	-55.0
13	400.00	-54.0
14	500.00	-52.2
15	625.00	-51.9
16	1000.00	-51.2
17	1600.00	-53.2
18	2000.00	-55.5
19	3150.00	-62.2
20	5000.00	-72.8

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-82
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k

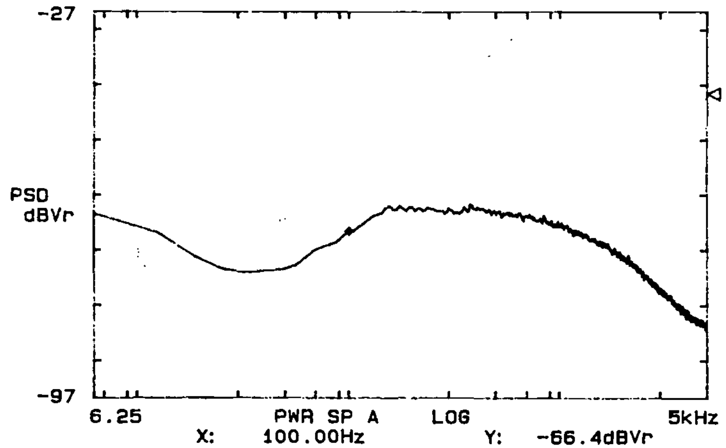
	PWR SPECTRUM	ChA
1	12.50Hz	-53.4dBVr
2	25.00	-64.6
3	37.50	-66.7
4	50.00	-67.9
5	62.50	-66.9
6	75.00	-65.1
7	100.00	-63.0
8	125.00	-60.6
9	162.50	-58.8
10	200.00	-56.1
11	250.00	-56.7
12	312.50	-55.7
13	400.00	-55.6
14	500.00	-55.9
15	625.00	-55.2
16	1000.00	-56.8
17	1600.00	-59.7
18	2000.00	-62.1
19	3150.00	-69.4
20	5000.00	-76.1

Figure 4.27 Noise spectrum level. March 9.

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-38 1400
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-63 1400
5kHz A: AC/0.2V B: AC/ 50V S.SUM 256/256 ChA 2k



SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-38
5kHz A: AC/0.5V B: AC/ 50V S.SUM 256/256 ChA 2k

	PWR SPECTRUM	ChA
1	12.50Hz	-77.3dBVr
2	25.00	-77.1
3	37.50	-78.0
4	50.00	-78.0
5	62.50	-76.1
6	75.00	-74.7
7	100.00	-70.5
8	125.00	-65.1
9	162.50	-63.1
10	200.00	-59.8
11	250.00	-60.3
12	312.50	-59.4
13	400.00	-58.1
14	500.00	-57.6
15	625.00	-57.1
16	1000.00	-60.1
17	1600.00	-64.7
18	2000.00	-68.5
19	3150.00	-76.1
20	5000.00	-82.5

SIZEX 92 AMBIENT NOISE DATA 9-3-1992 B-63
5kHz A: AC/0.2V B: AC/ 50V S.SUM 256/256 ChA 2k

	PWR SPECTRUM	ChA
1	12.50Hz	-66.7dBVr
2	25.00	-73.3
3	37.50	-73.8
4	50.00	-73.4
5	62.50	-71.3
6	75.00	-69.4
7	100.00	-66.4
8	125.00	-64.3
9	162.50	-62.6
10	200.00	-62.3
11	250.00	-62.4
12	312.50	-62.8
13	400.00	-62.5
14	500.00	-63.1
15	625.00	-63.4
16	1000.00	-65.8
17	1600.00	-69.3
18	2000.00	-70.9
19	3150.00	-77.9
20	5000.00	-83.6

Figure 4.28 Noise spectrum level. March 9.

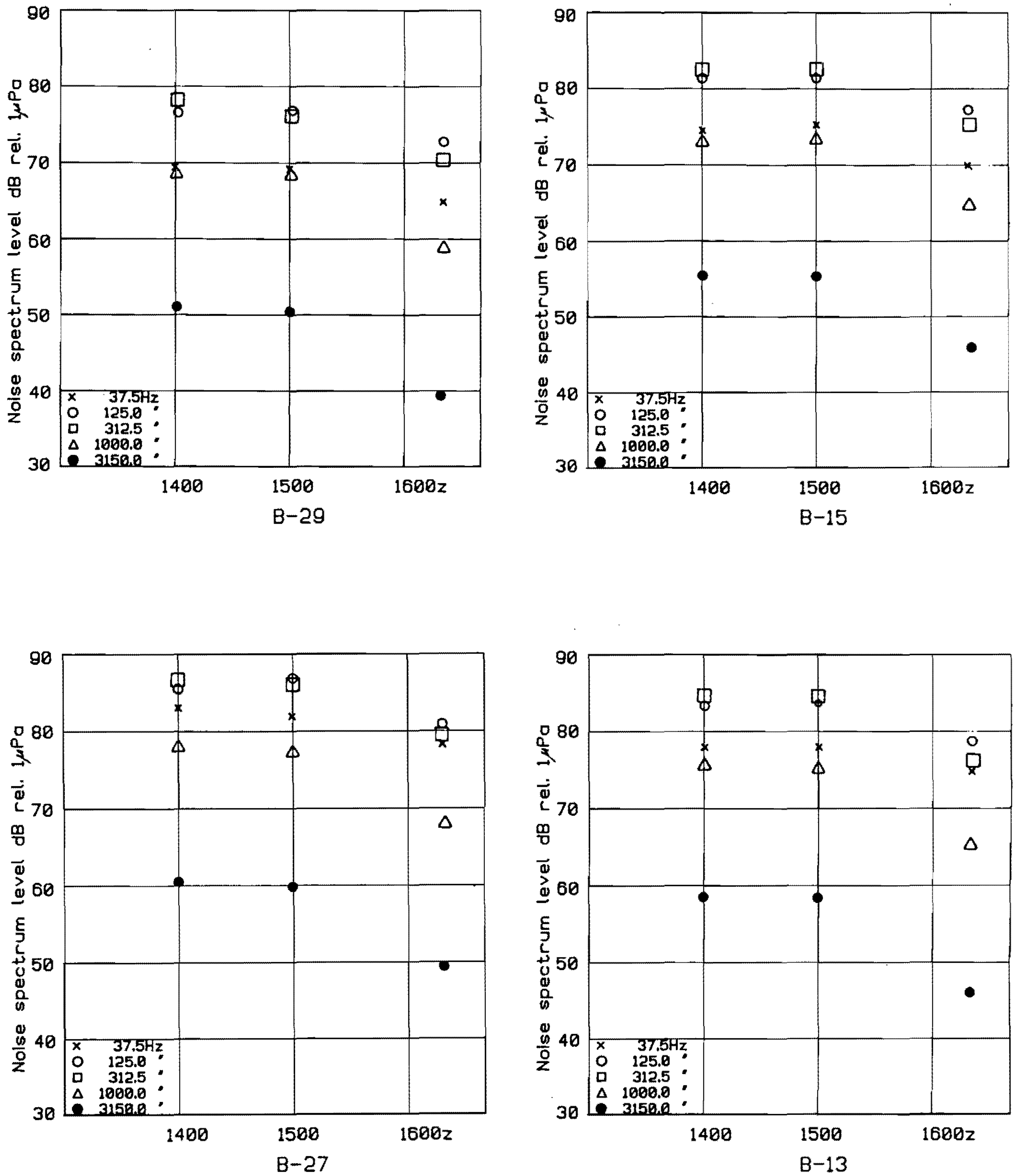


Figure 4.30 <u>Noise level as a function of time. March 6</u>

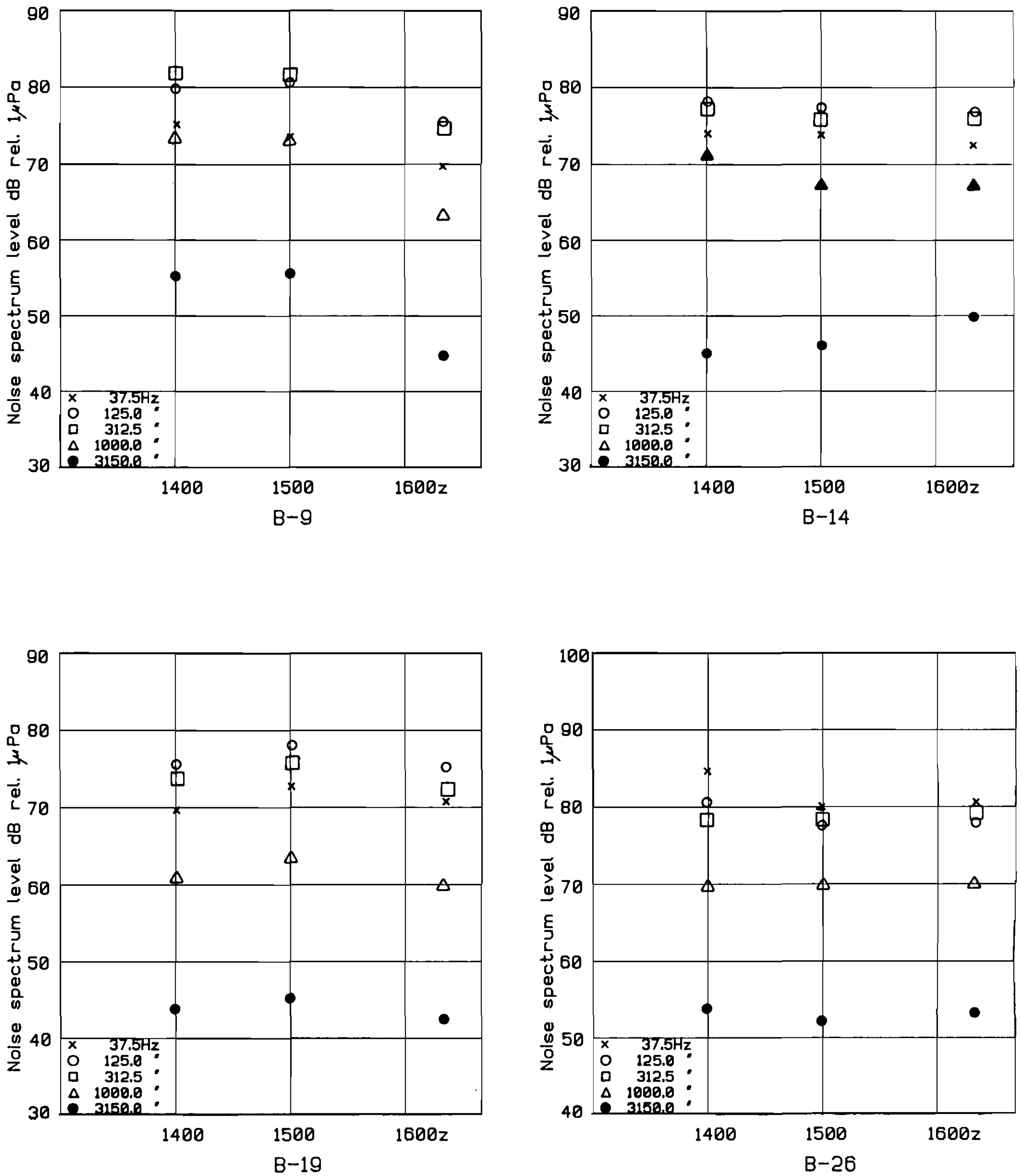


Figure 4.31 Noise level as a function of time. March 6.

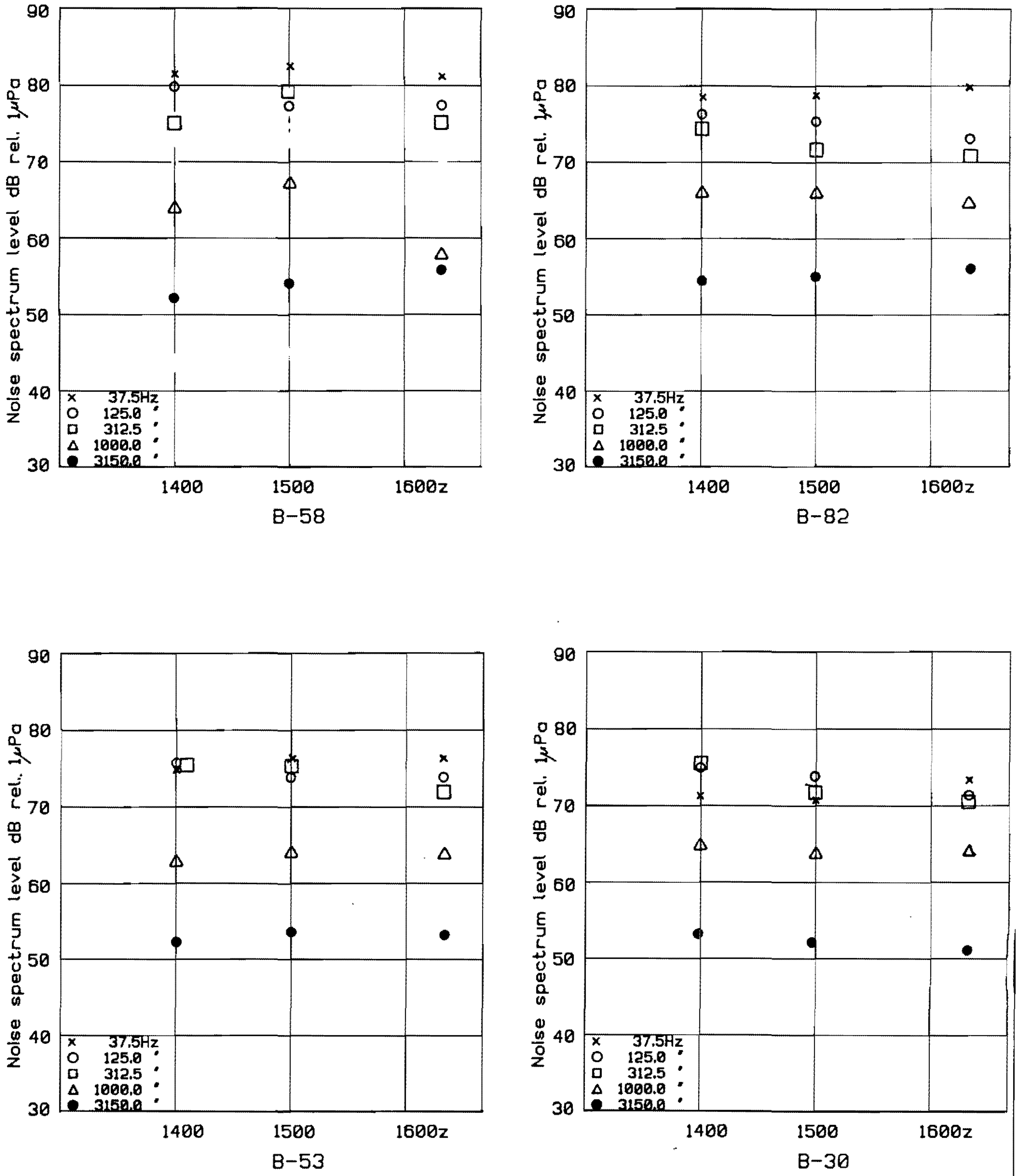


Figure 4.32 Noise level as a function of time. March 6.

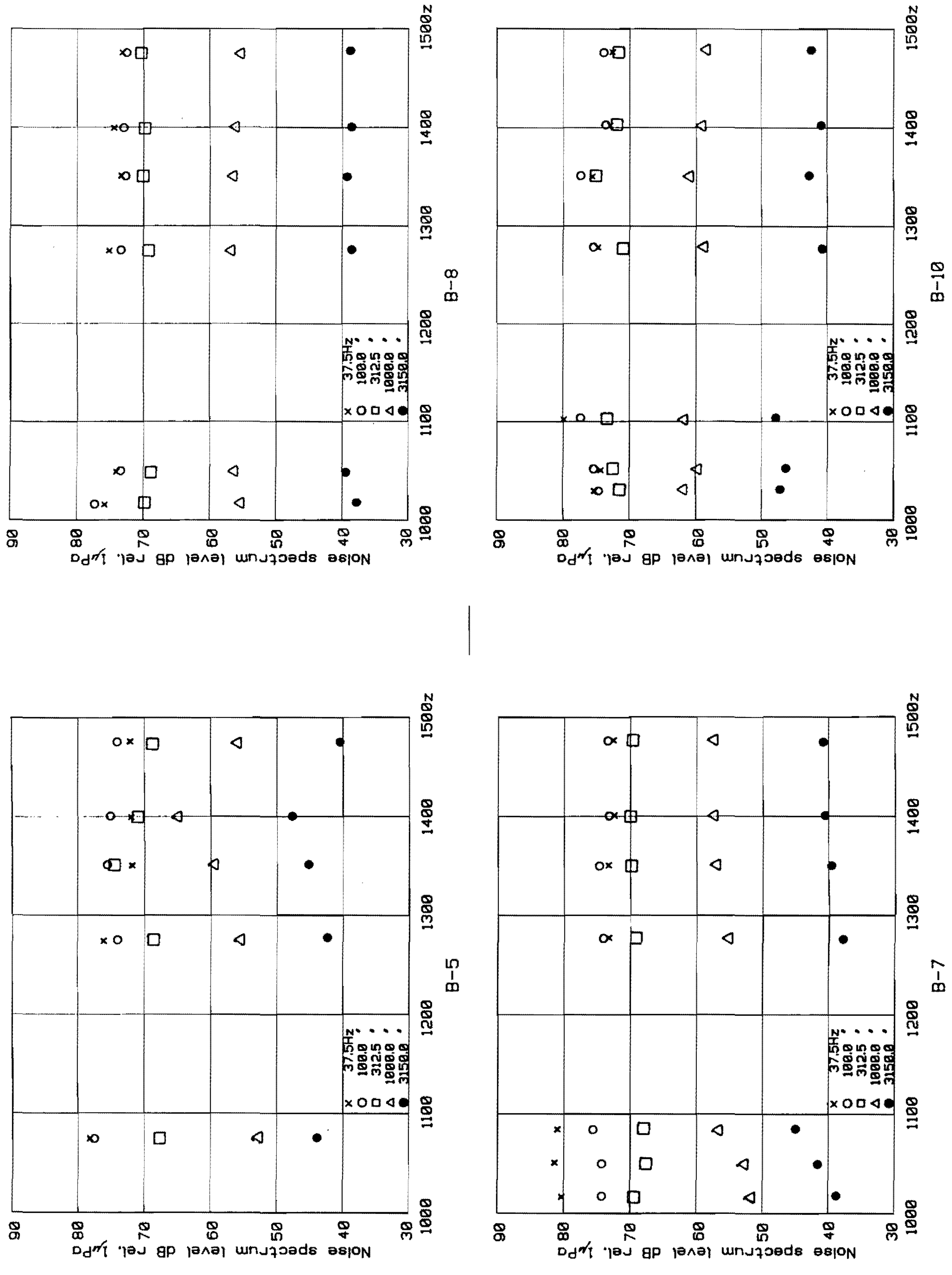


Figure 4.33 <u>Noise level distribution time B-5, 7, 8 and 10 March 9</u>

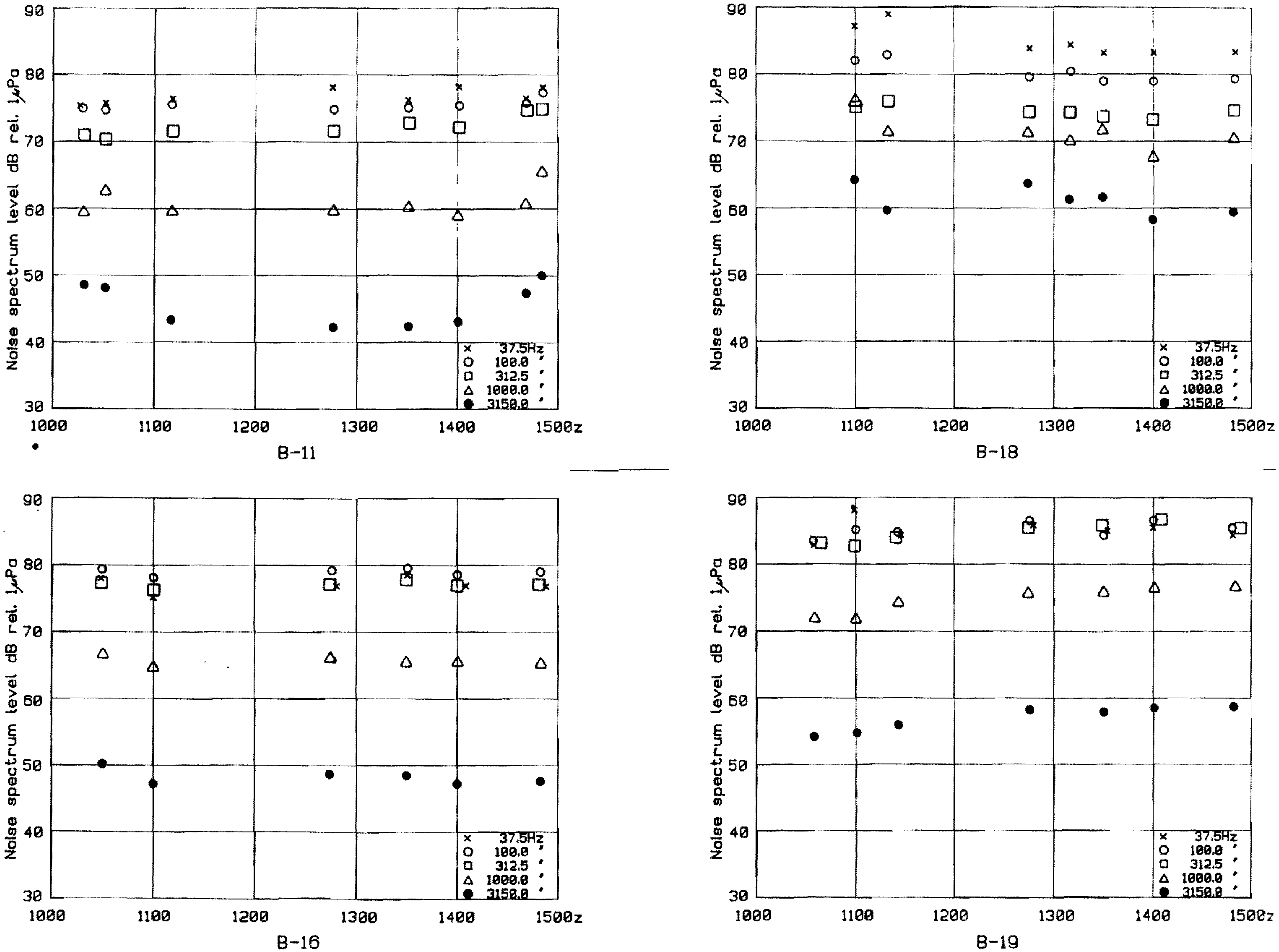


Figure 4.34 Noise level distribution time B-11, 16, 18 and 19
March 9

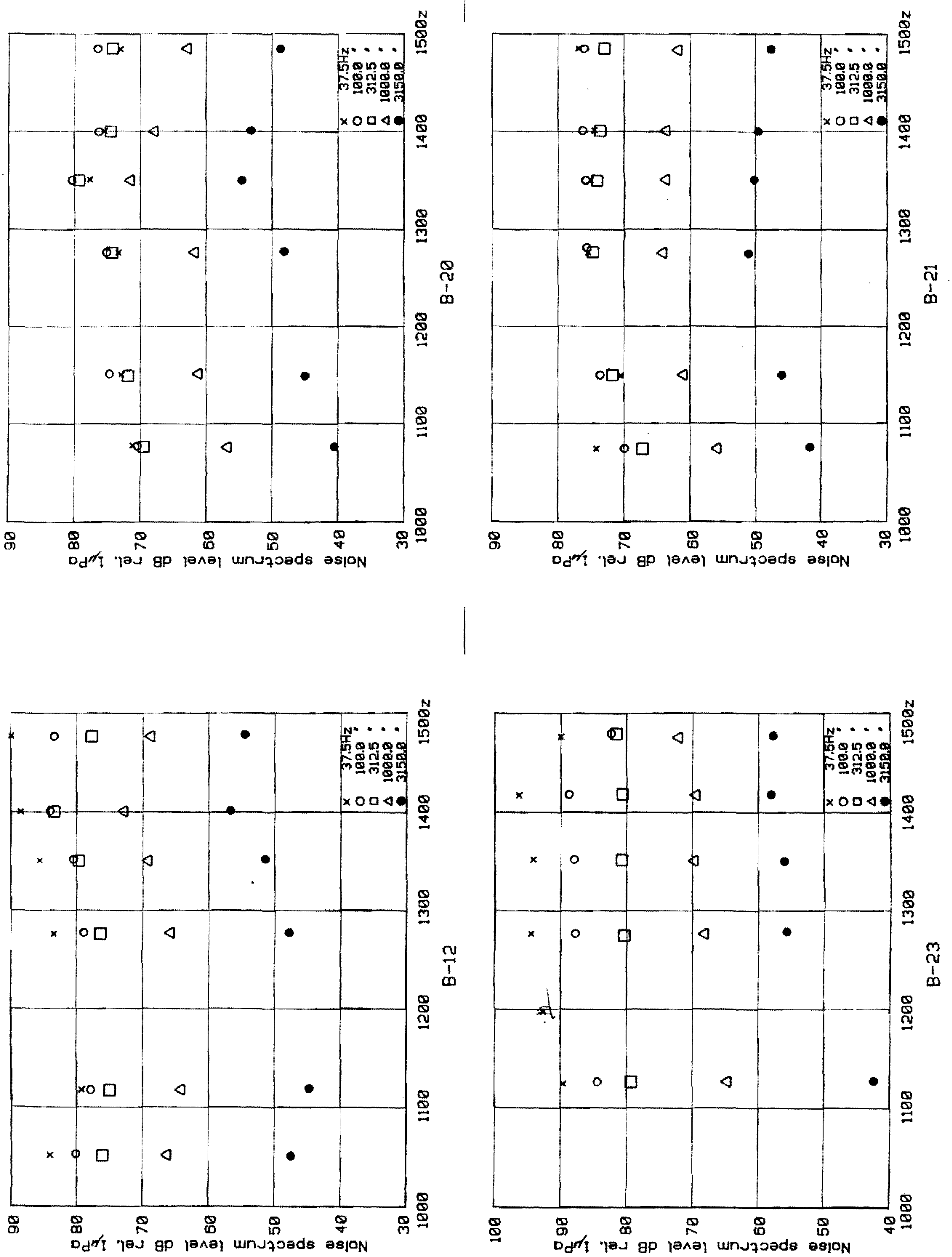


Figure 4.35 Noise level distribution time B-12, 23, 20 and 21 March 9

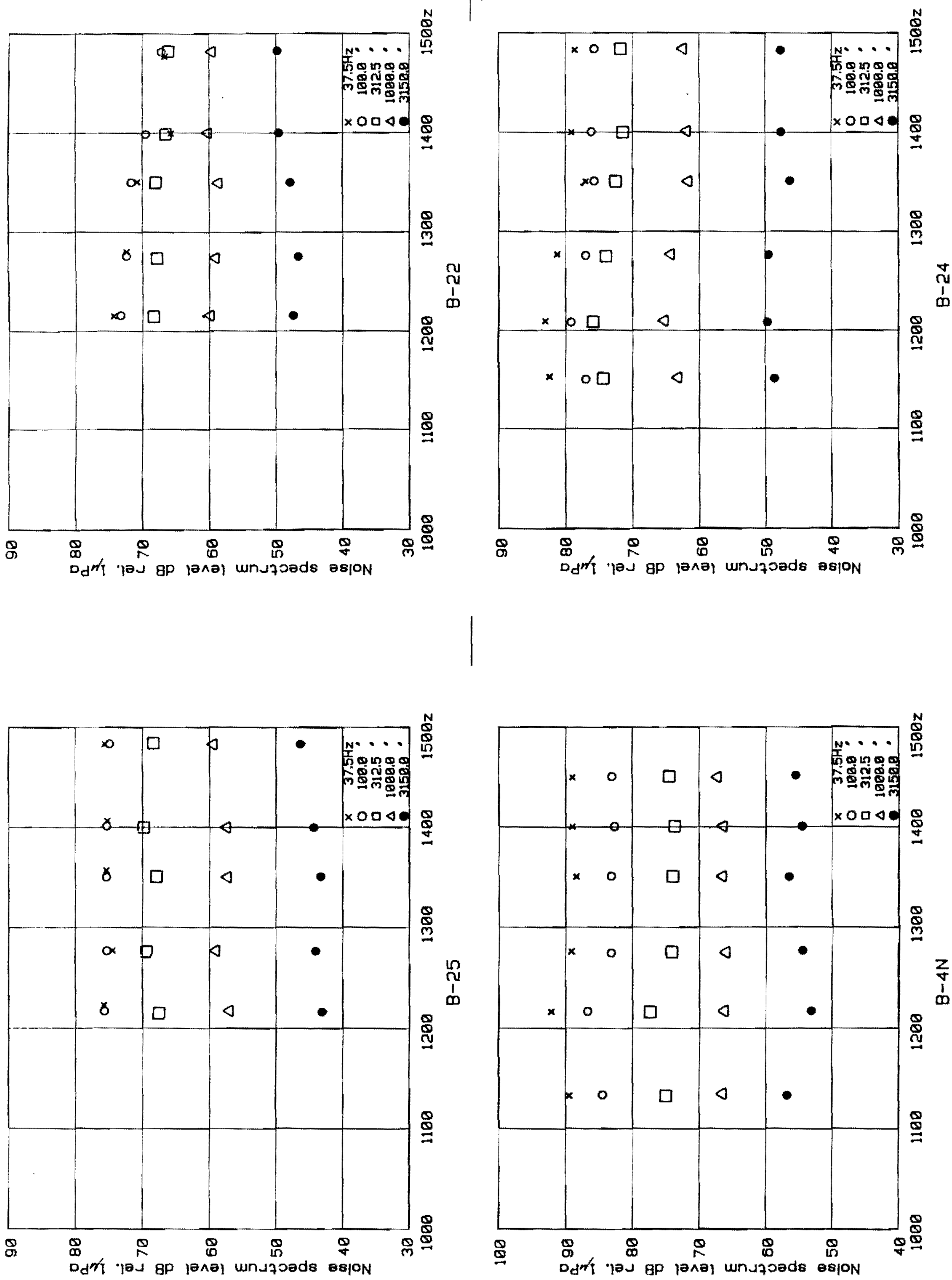


Figure 4.36 Noise level distribution time B-25, 4N, 22 and 24 March 9

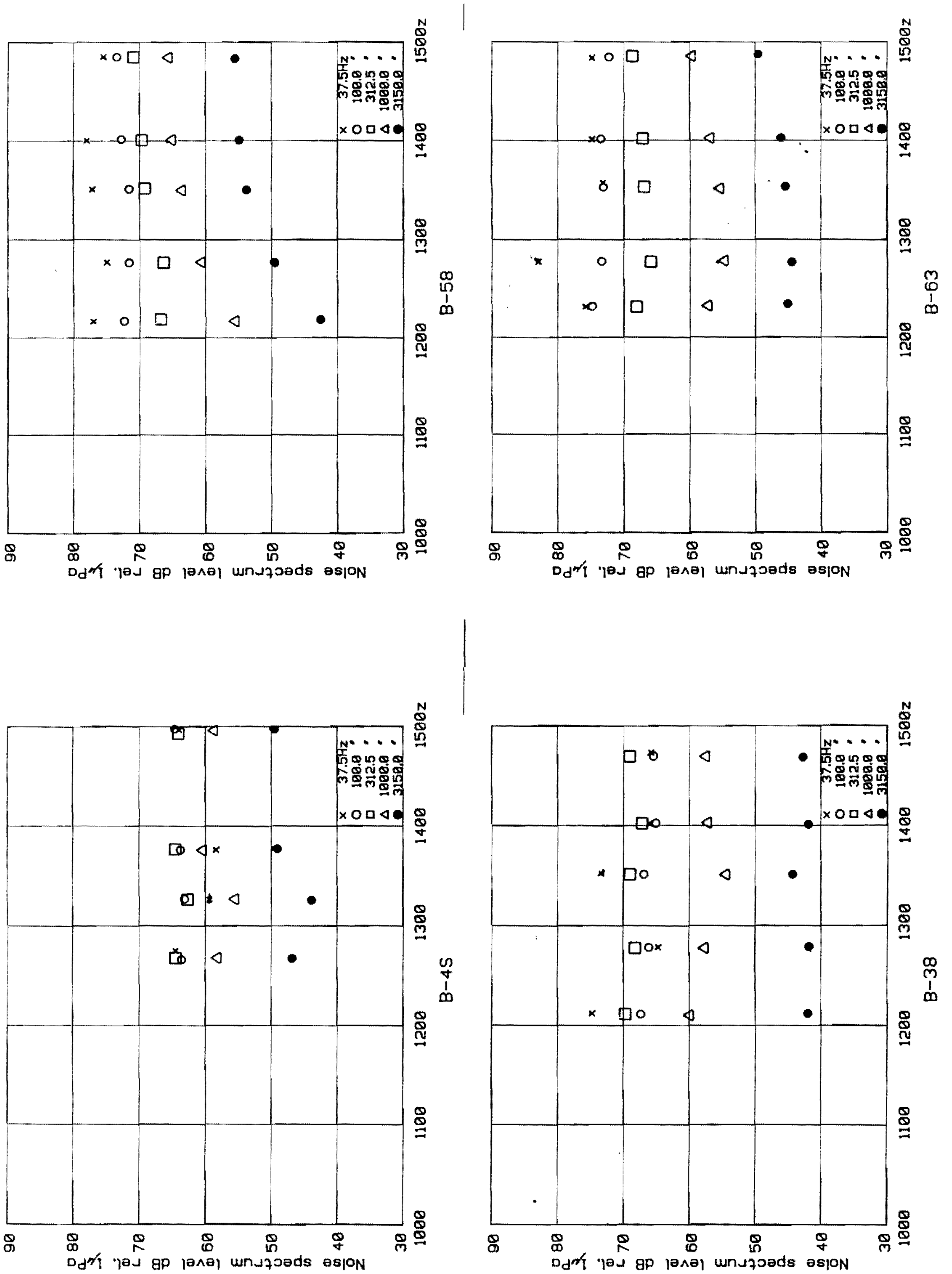


Figure 4.37 Noise level distribution time B-4S, 38, 58 and 63 March 9

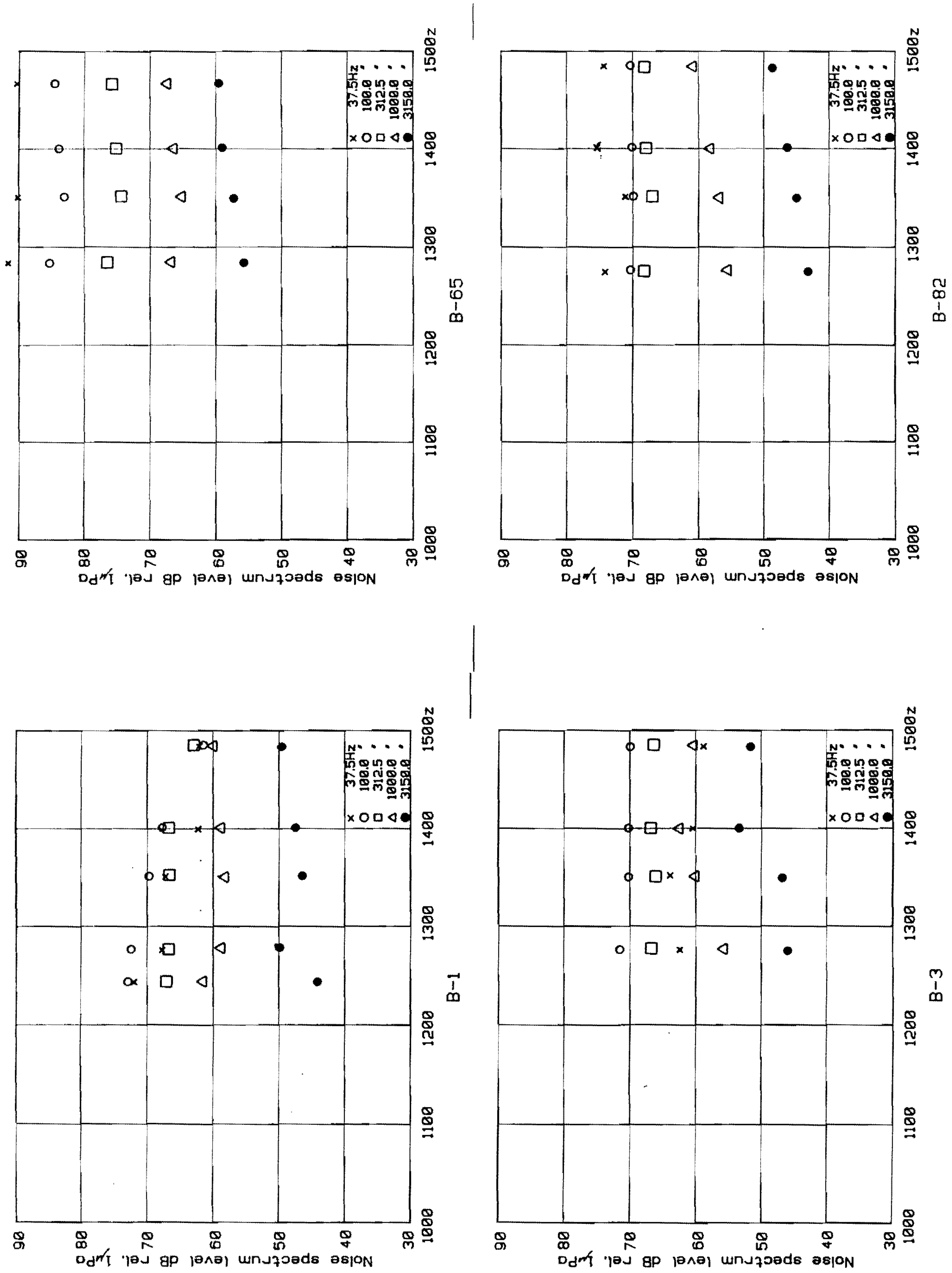


Figure 4.38 Noise level distribution time B-1, 3, 65 and 82 March 9

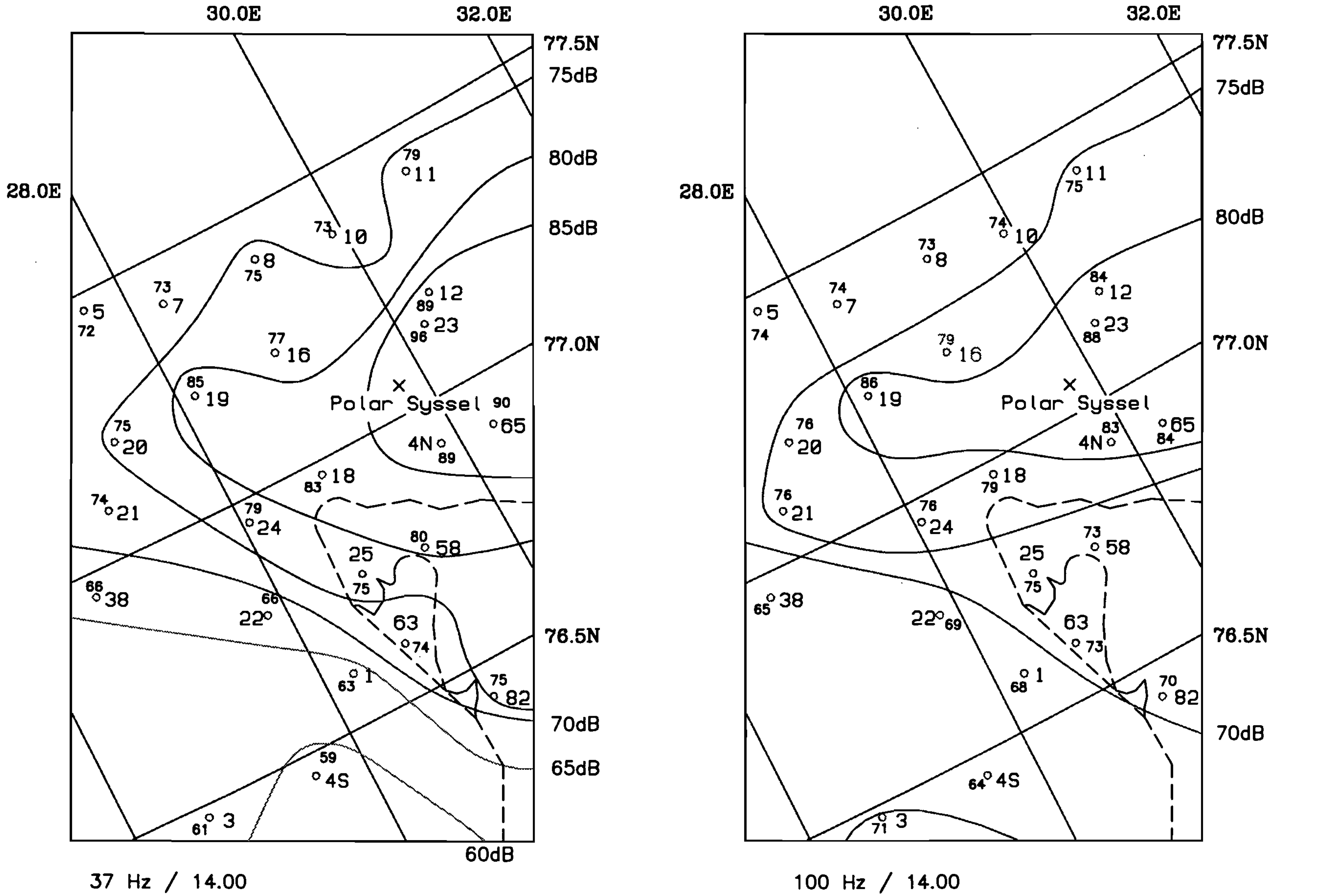
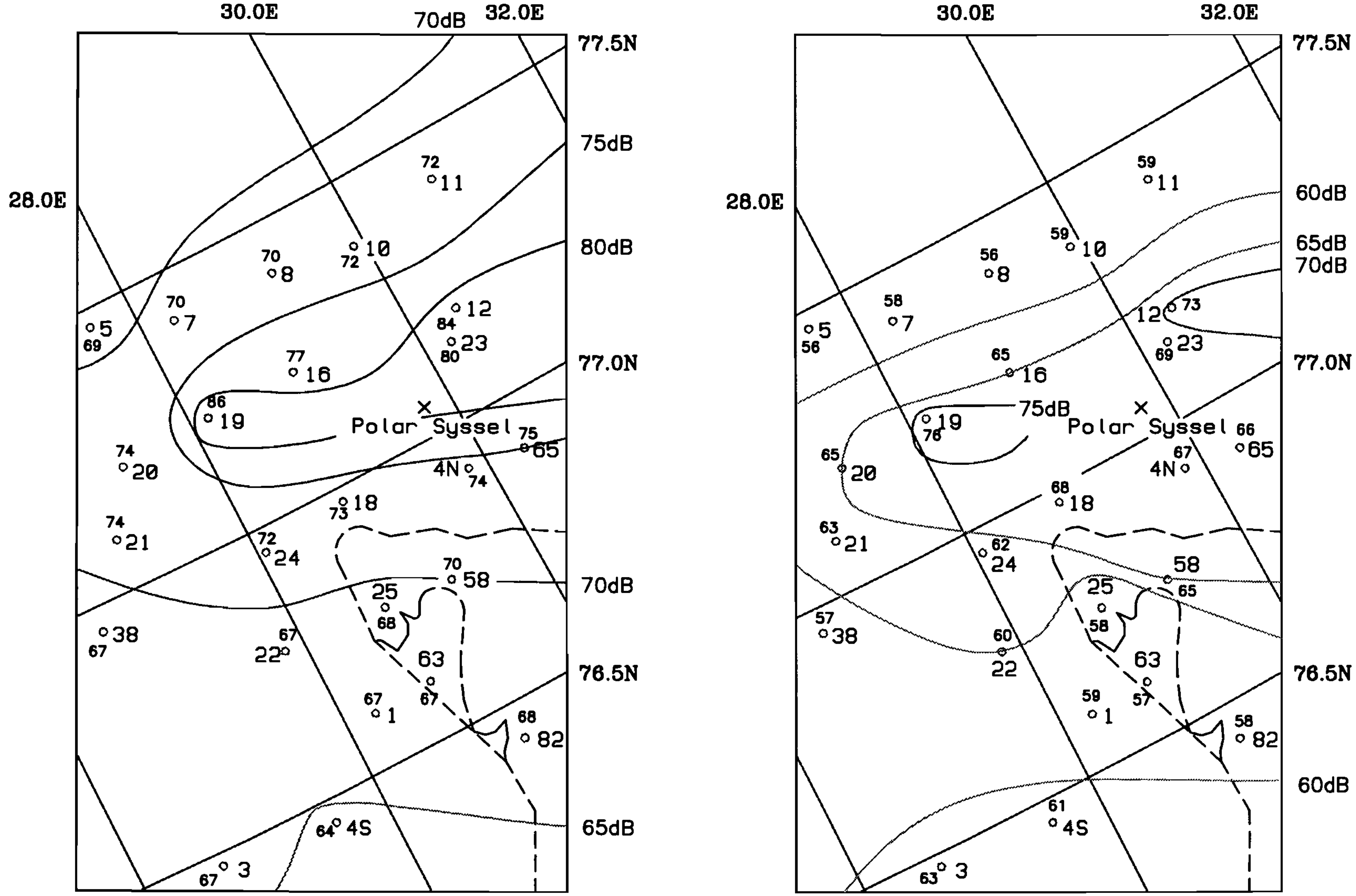


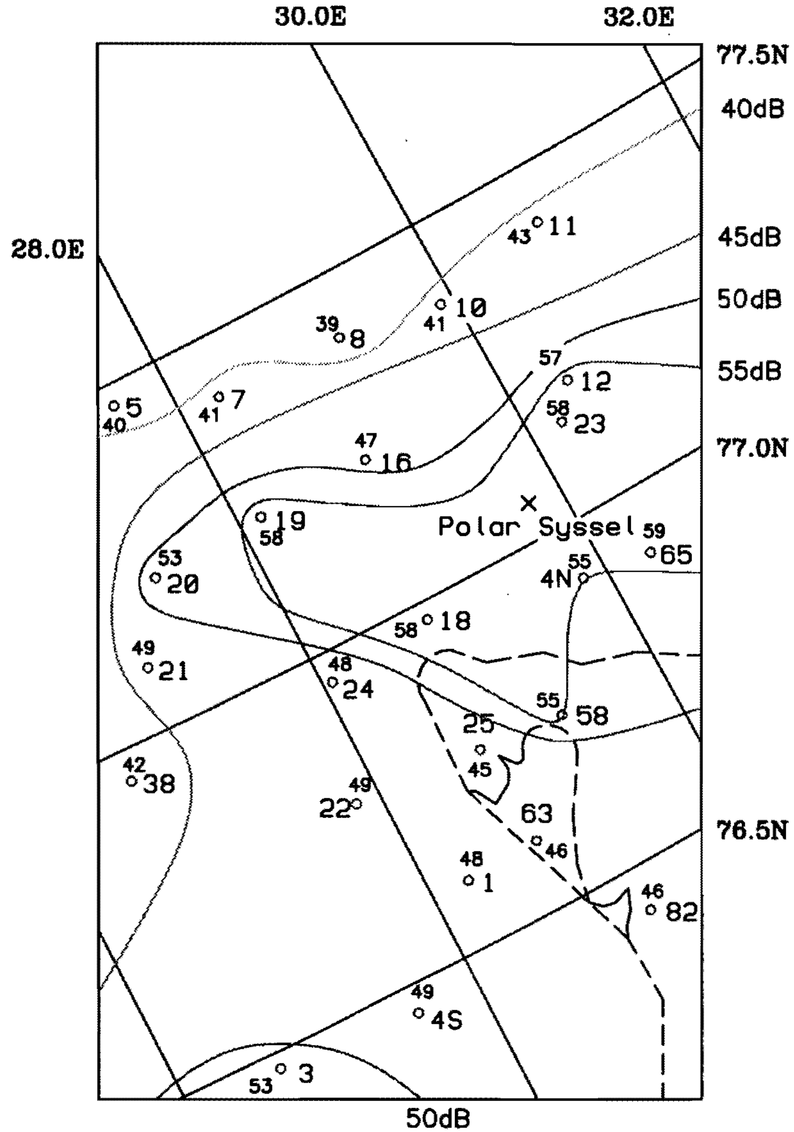
Figure 4.39 <u>Noise level distribution in space.</u>



315Hz kl.14.00

1000 Hz kl.14.00

Figure 4.40 <u>Noise level distribution in space.</u>



3150 Hz kl.14.00

Figure 4.41 <u>Noise level distribution in space.</u>

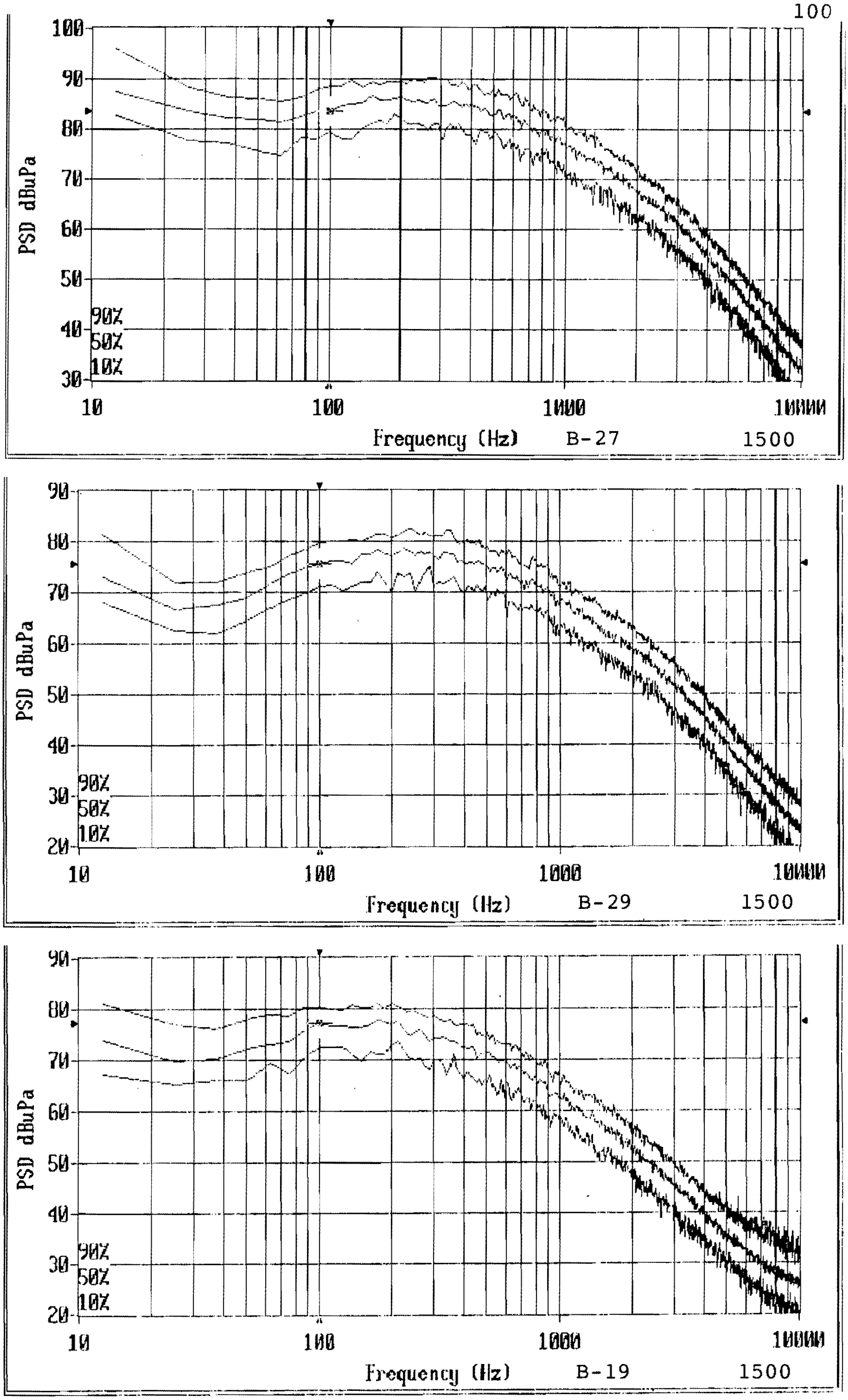


Figure 4.42 <u>10, 50 and 90 percentile spectra. March 6.</u>

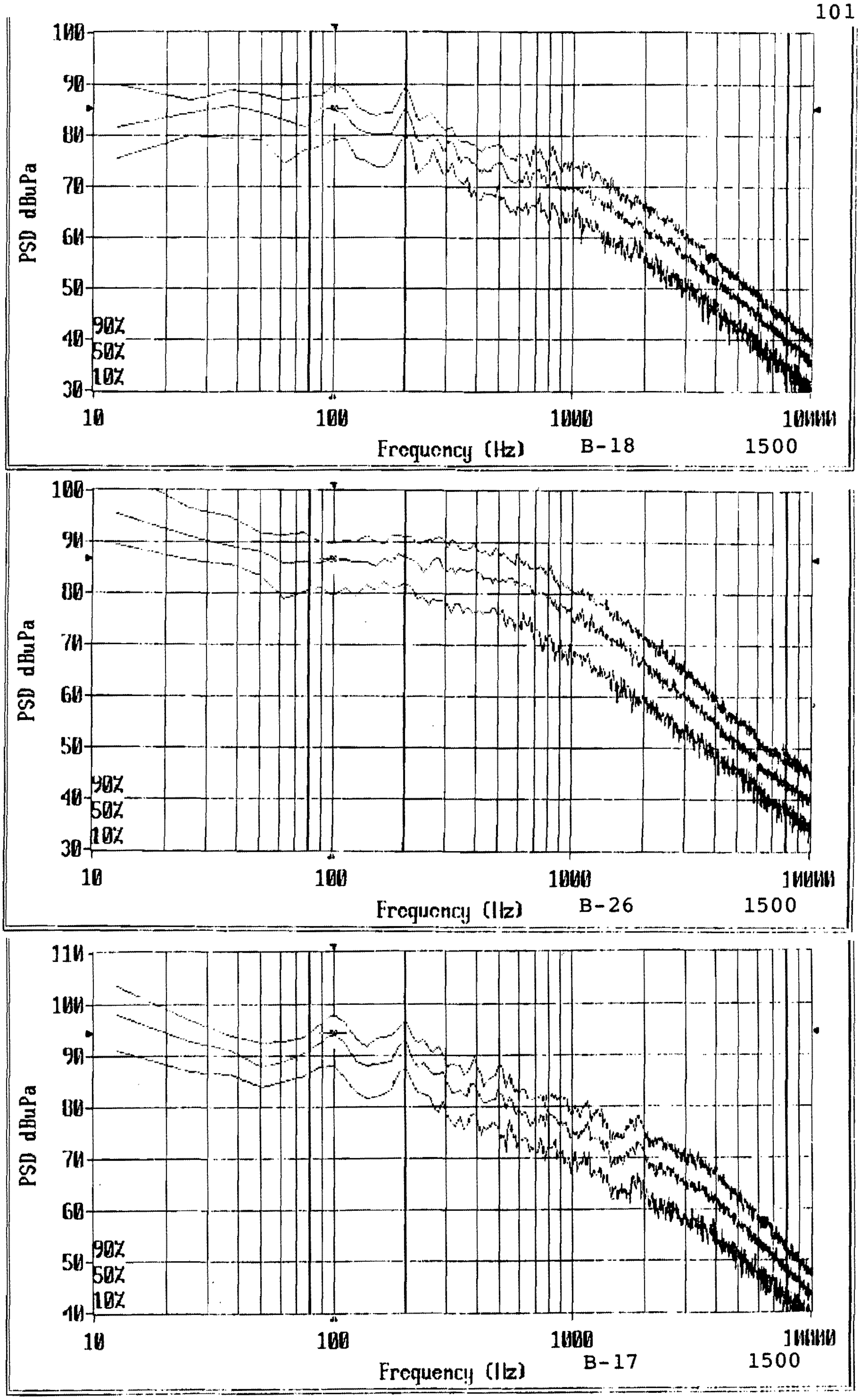


Figure 4.43 <u>10, 50 and 90 percentile spectra. March 6.</u>

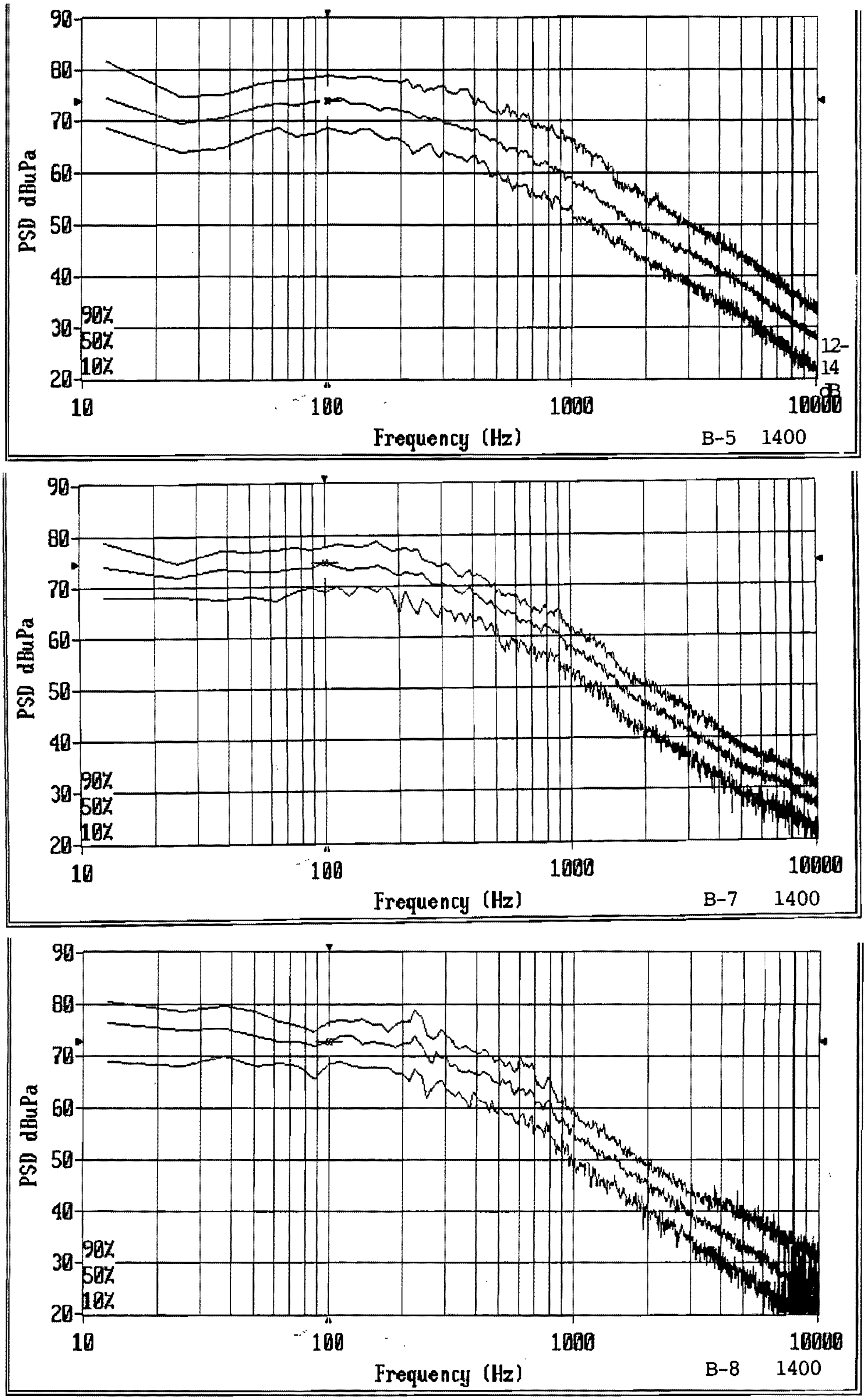


Figure 4.44 10, 50 and 90 percentile noise spectra. March 9.

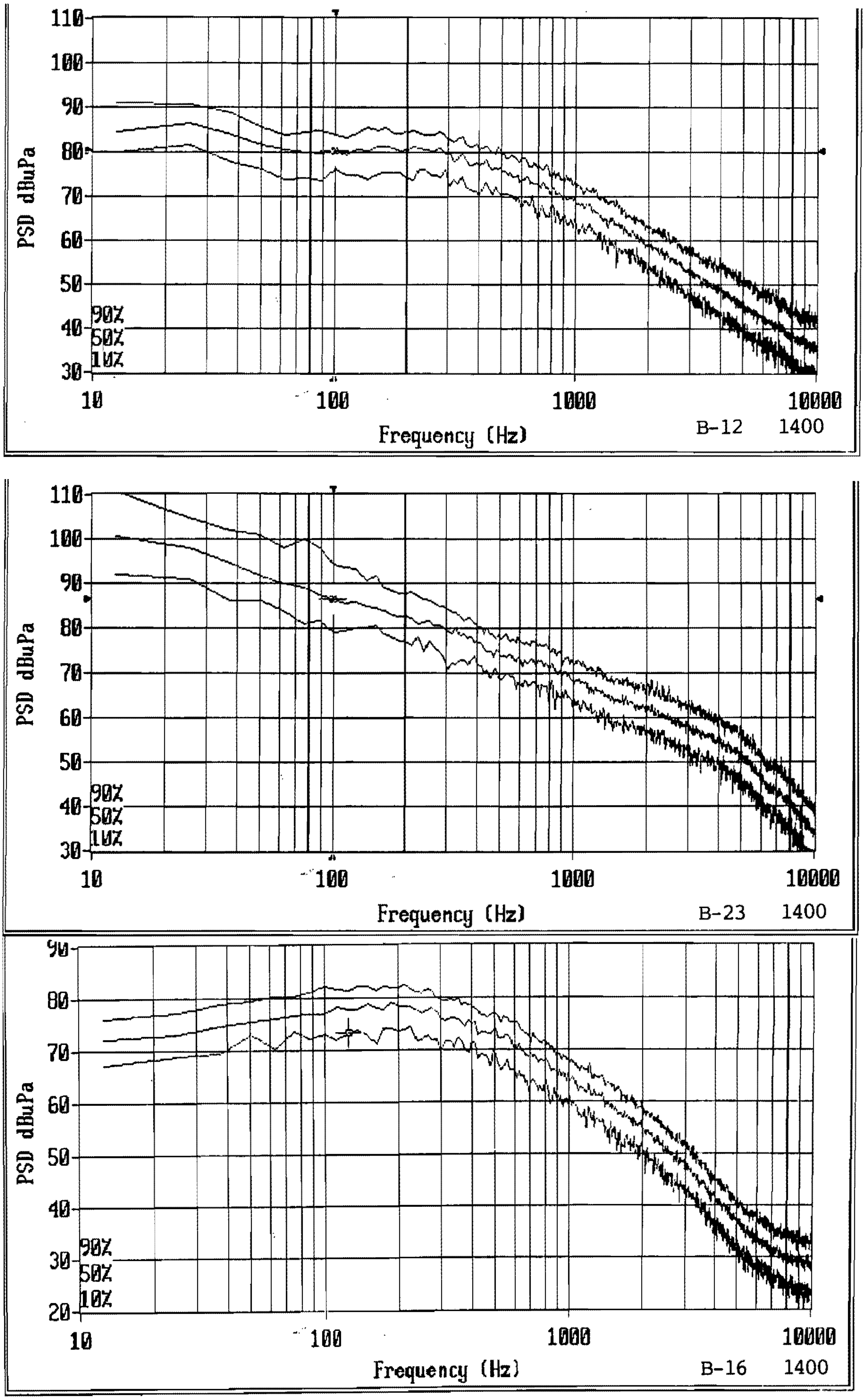


Figure 4.45 10, 50 and 90 percentile noise spectra. March 9.

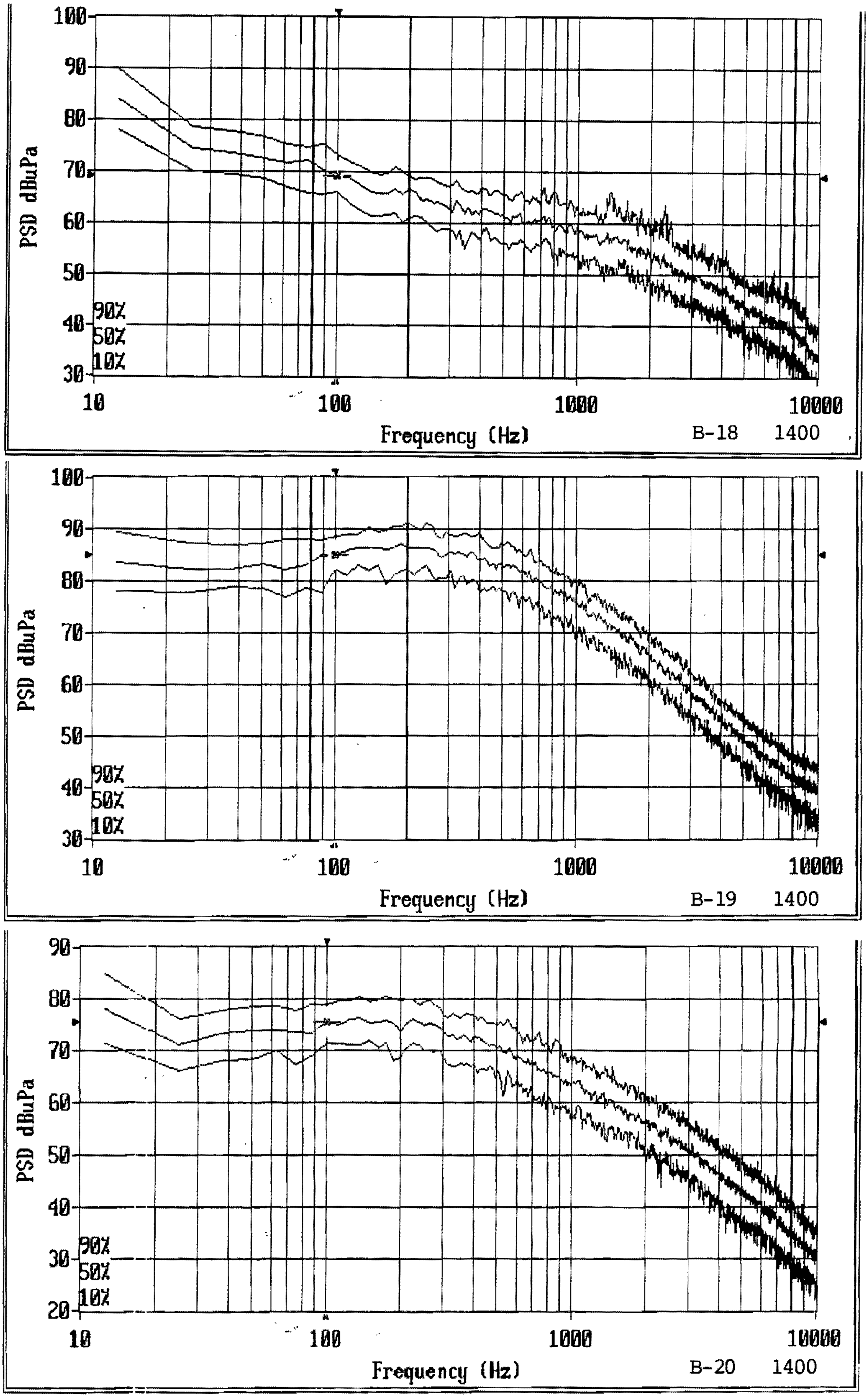


Figure 4.46 10, 50 and 90 percentile noise spectra. March 9.

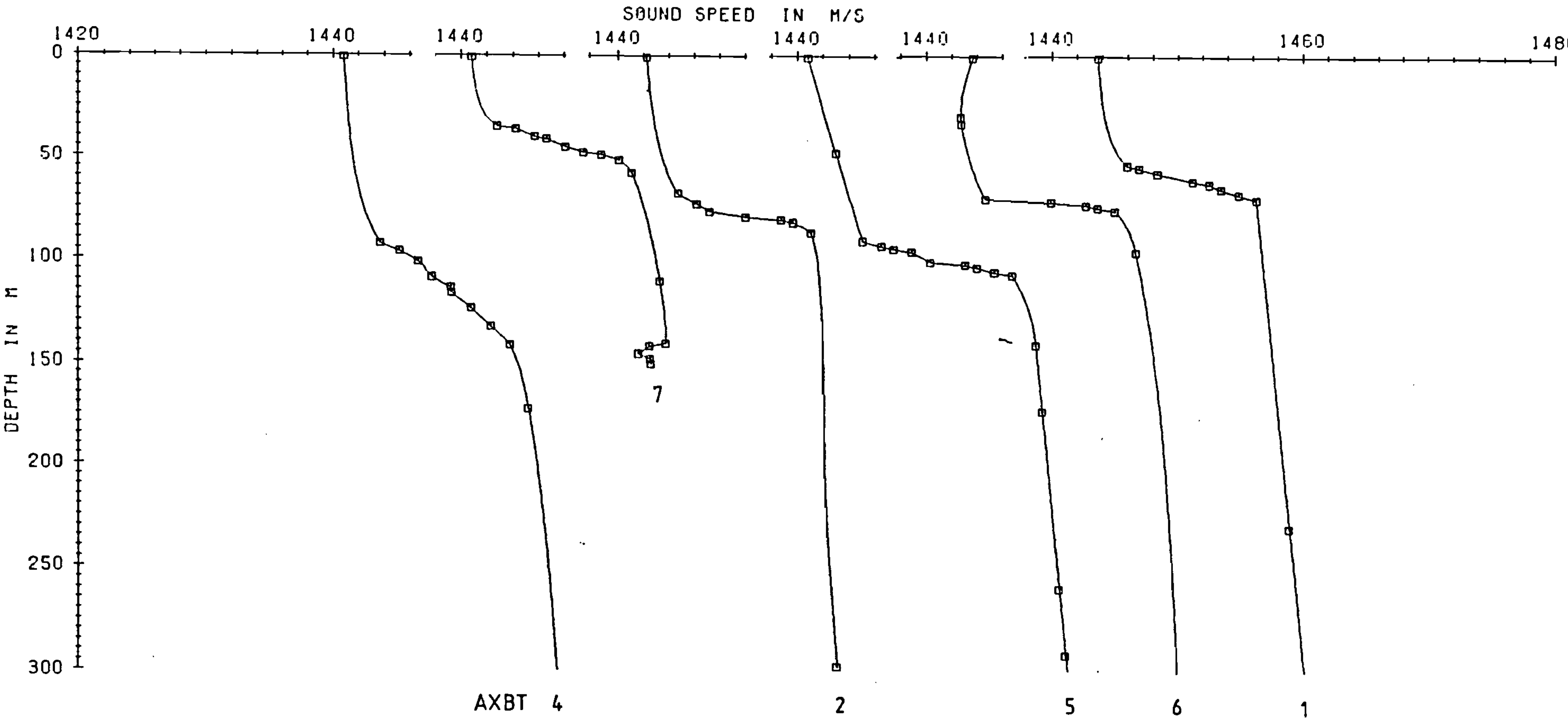


Figure 4.47 Sound speed profiles based on AXBT measurements, March 6.

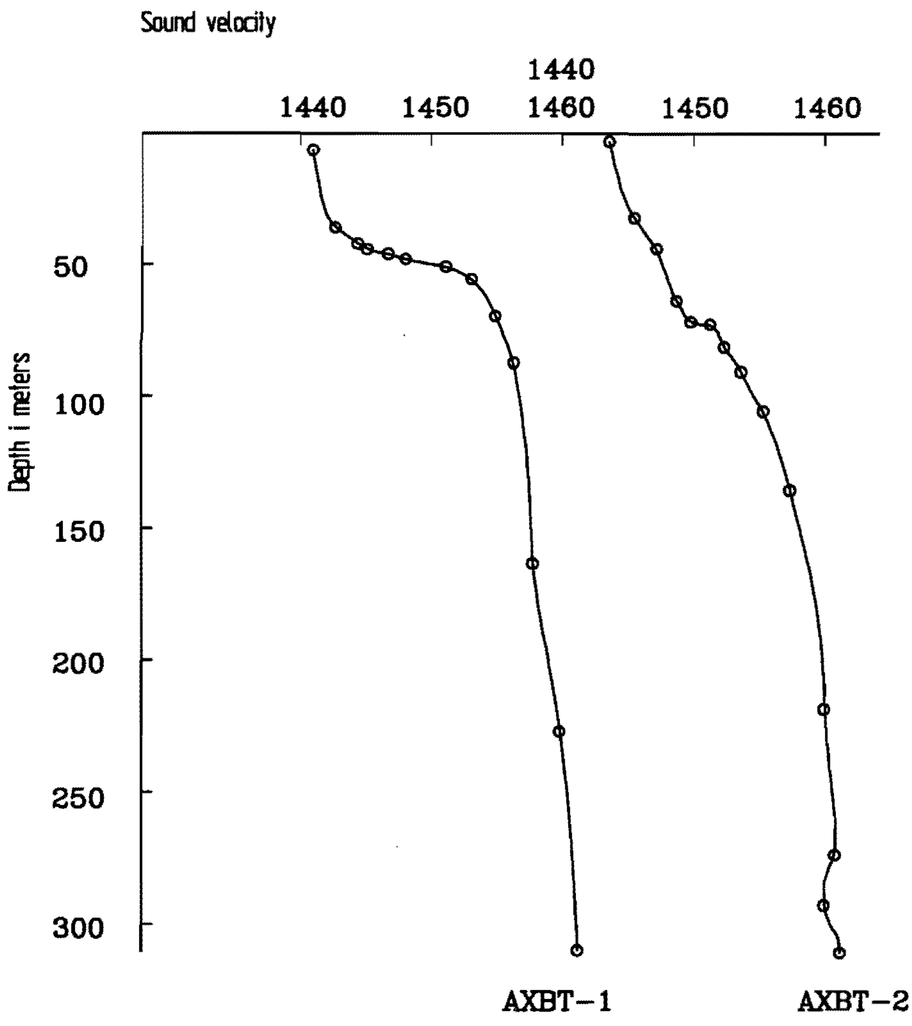


Figure 4.48 Sound speed profiles based on AXBT measurements. March 9.

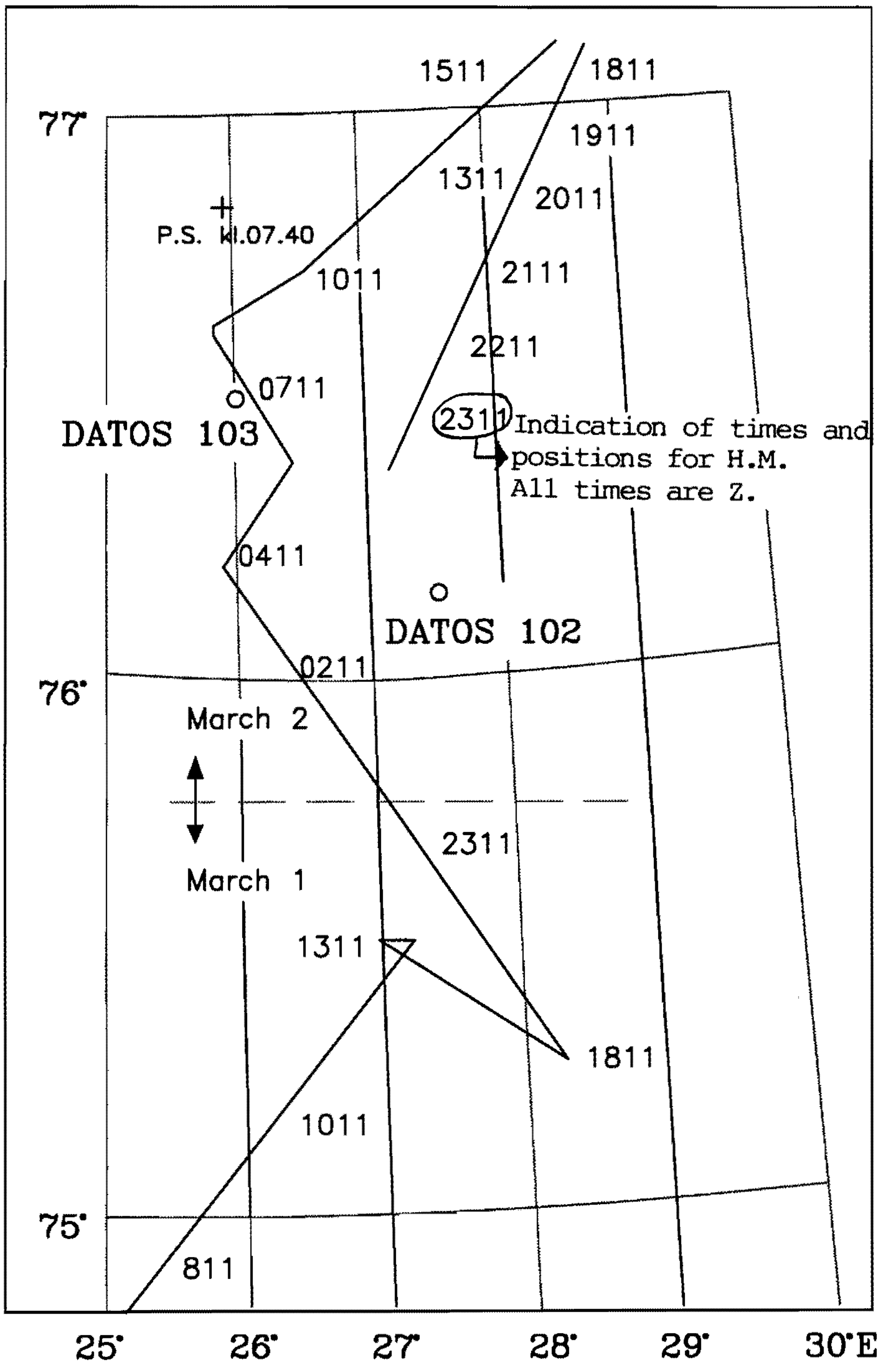


Figure 4.49 Track of Håkon Mosby March 1 & 2.

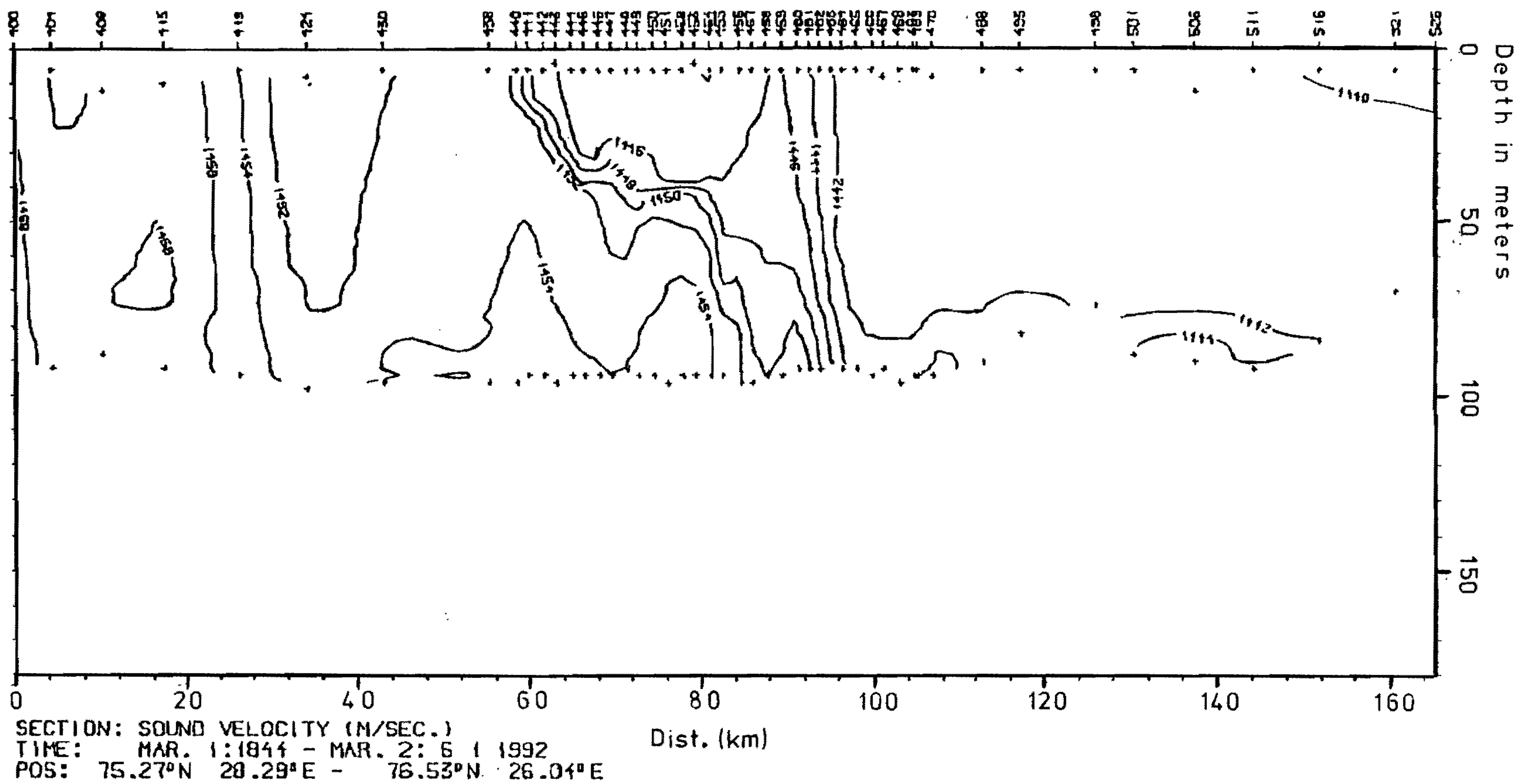


Figure 4.50 Sound speed section from March 1 and 2

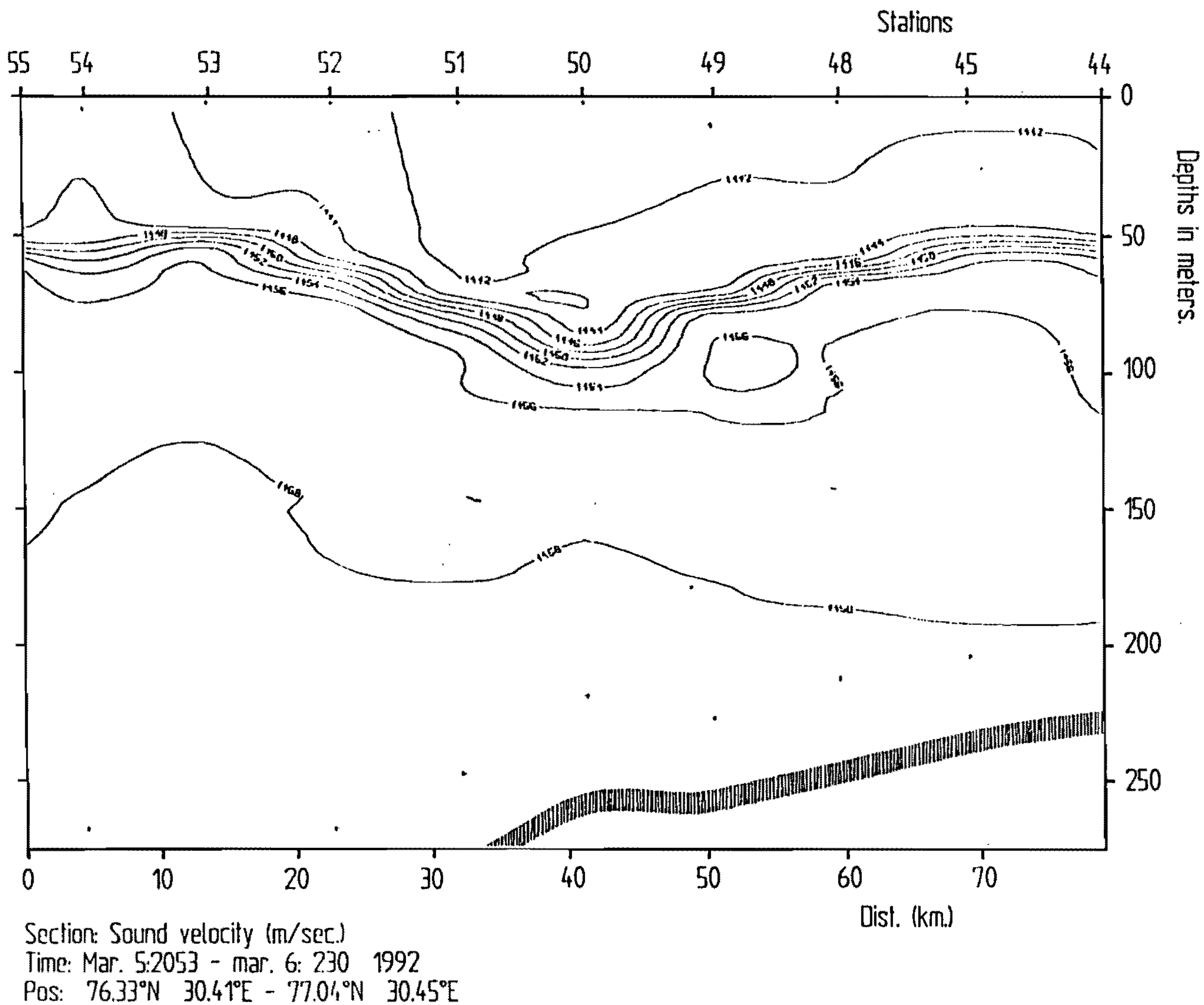


Figure 4.51 Sound speed section based on CTD run by Håkon Mosby, March 6.

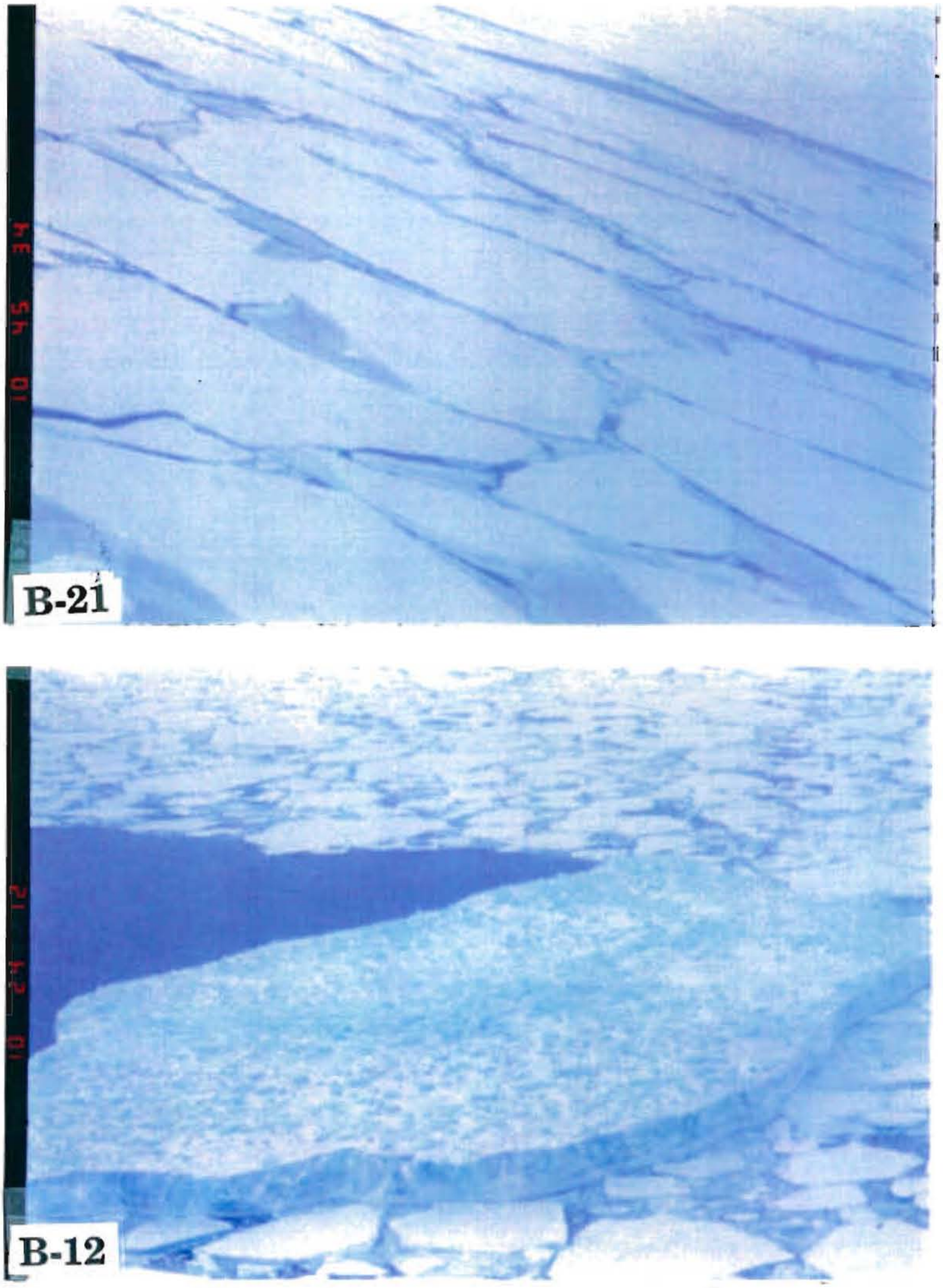


Figure 4.52 Aerial photos of ice conditions

FFIU

VÅR REFERANSE: 974
TIL SENTRALSTABEN
GJENPART: FFI-BIBL (MED VEDLEGG)

OVERSENDELSE AV RAPPORTER

DATO:

RAPPORT TYPE (KRYSS AV)	RAPPORT NR	REFERANSE	RAPPORTENS DATO	
X IR ☐ TN ☐ RR	93/2006	FFIU/Oppdr 2775	28 oktober 1993	
FYLLES BARE UT NÅR RAPPORTEN ER BESKYTTELSESGRADERT	RAPPORTENS BESKYTTELSESGRAD: UGRADERT		ANTALL EKS UTSTEDT: 35	ANTALL SIDER: 111

RAPPORTENS TITEL	FORFATTER (E)
SIZEX 92 - AMBIENT NOISE MEASUREMENTS - DATA REPORT.	ENGELSEN, Ingjald
GODKJENT AV FORSKNINGSSJEF: Jarl Johnsen	GODKJENT AV DIREKTØREN: [signature]

FORSLAG TIL EKSTERN FORDELING

ANTALL	EKS NR	TIL
3		Defence Research Agency Southwell, UK Portland, Dorset DT5 2JS Att: Dr G C Jackson
1		EASAM Ltd Lyon Way Frimley Rd, Camberley Surrey GU16 5EX, UK Att: Mr T Turner
3		Nansen Environmental Remote Sensing Centre Edv Griegsvei 3A N-5037 SOLHEIMSVIK
1		333 Skvadron Andøya
1		SFK/T-UVS
1		FO/E
1		KNM Tordenskjold/UVVS
2		Naval Oceanographic Office, Code N3 Stennis Space Center, Mississippi Att: Jerry Carrol
3		Naval Research Laboratory Code 7420 4555 Overlook Avenue Wash DC 20375-5000 Att: Henry Fleming

FORDELT INTERNT

ANTALL	EKS NR	TIL
1		FFIS (VEDLAGT)
11		FFI-BIBL
1		FFIS Botnan
6		FFIU

TIL FORDELING VEDLEGGES:

ANTALL: NR:

FFI-K1

AVDELINGENE FORETAR INTERN FORDELING AV RAPPORTENE
AVDELINGENE FORESLÅR EKSTERN FORDELING AV RAPPORTENE
BENYTT BAKSIDEN OM NØDVENDIG