

DUPLICATE ALSO



THIRTY SIXTH QUARTERLY REPORT
ON DRIFTING BUOYS
IN THE NORTH ATLANTIC

25-60 deg N, 60 deg W to 10 deg E

OCTOBER TO DECEMBER 1995

Headquarters, Bracknell

ORGS UKMO Q

National Meteorological Library
FitzRoy Road, Exeter, Devon. EX1 3PB



THIRTY SIXTH QUARTERLY REPORT

ON DRIFTING BUOYS

IN THE NORTH ATLANTIC

25-60 deg N, 60 deg W to 10 deg E

OCTOBER TO DECEMBER 1995



3 8078 0002 4484 0

DISTRIBUTION LIST

Met. Office.

1. D(O)
2. Hd (OPR)
3. Hd (OL)
4. Mr.D.W.Jones & Mr.A.N.Bentley, (OL)1b
5. Captain Norwell. (OM)
6. Mr.J.S.Irvine, (OL)1b
7. Mr.S.G.Smith, (OPR)3a
8. Mr.B.Oatway, Operations Manager, CFO
9. Library (2)

International.

1. Mr.R.McGrath ECMWF
2. Mr.T.Kvinge, Norway
3. Mr.J.Keeley, Canada
4. Mr.E.Charpentier, USA
5. Mr.P.Blouch, France
6. Dr.T.Mohr, Germany
7. Mr.Giratys, Switzerland
8. Mr.V.Wagner, Germany
9. Mr.L.Burke, Ireland
10. Mr.G.Venendaal, The Netherlands
11. Mr.F.Sigurdsson, Iceland
12. Mr.K.Bjorheim, Norway
13. Mr.K.Hedeegaard, Denmark
14. Mr.P.O.Harsmar, Sweden
15. Mr.M.Lubben, Germany
16. Mr.B.Richter, Germany

CONTENTS

1. Introduction

Summary of :-

2. Pressure Performance
3. Air temperatures and sea surface temperatures
4. Winds
5. Explanatory Notes
6. Mean Positions of Buoys

- | | |
|---------|--|
| Annex A | - Table of Statistics |
| Annex B | - Time-series plots of pressure |
| Annex C | - Time-series plots of air temperature |
| Annex D | - Time-series plots of sea surface temperature |
| Annex E | - Time-series plots of wind speed |
| Annex F | - Time-series plots of wind direction |
| Annex G | - Summary table of operational drifting buoys |

Produced by

P.Ellis
Meteorological Office,
Met O (OPR) 3a, Room 129,
London Road,
Bracknell,
Berkshire, RG12 2SZ,
United Kingdom.

Tel - 01344 - 854446

23rd January 1996

This report has not been published.
Permission to quote from it should be obtained from the
Branch Director (Observations, Plans and Requirements).

1. INTRODUCTION

Drifting buoys operated by European countries, the United States, Canada and E.G.O.S. (European Group on Ocean Stations) provide valuable meteorological data in the North Atlantic Ocean. This report is a summary of the performance of these buoys giving information on the number of buoys operating, the accuracy of reported locations and data quality, timeliness and availability. It is compiled by looking at observations received in the Met. Office Meteorological Data Bank (Met.D.B.) and by comparisons of observations with background fields from the Met. Office forecast model. Additional information on buoy operations and data quality is extracted from E.G.O.S. Technical Secretariat reports.

2. SUMMARY OF PRESSURE PERFORMANCE

NOTE

Although buoys 44616, 44742, 44763 and 65594 were reporting at the beginning of the period, pressure data failed to reach the Observation Processing Databanks (OPD) until 5/10, 12/10, 4/10 and 12/10 respectively.

(a) Buoy deployments, etc.

North of 50deg N

There were 8 buoys reporting pressure at the beginning of the period (this figure excludes the buoys in the note above - all of which are north of 50 degN) and 14 at the end. This 8 at the beginning includes buoy 63661 which has drifted into the report area during this quarter. 5 new buoys were deployed during the period (44727, 44761, 44774, 62501 and 62694). 3 buoys ceased reporting (44764, 63661 and 65581).

South of 50deg N

There were 12 buoys reporting pressure at the beginning of the period and 8 at the end. (Buoy 44779 was mistakenly quoted as reporting at the end of the last period. Buoy 44613 drifted south of 50 degN during this quarter and is included in the statistics for the south.) 4 new buoys were deployed (61527, 62502, 62503 and 62504). 8 buoys ceased reporting (44546, 44547, 44548, 62502, 62511, 62517, 62519 and 62524).

(b) Location Accuracy

The location accuracy was better than last quarter with 30 out of 33 of the buoys reporting having a '% of observations with acceptable positions' greater than 95% (compared to 27 out of 35 last quarter). There were 3 gross errors in location during the quarter, compared with 21 last quarter (see under Data Quality).

(c) Data timeliness

(see note 9 of section 5 for definition of terms.)

Timeliness	Last quarter.	This quarter
Very Good	20	14
Good	4	6
Satisfactory	2	6
Poor	2	1
Very poor	7	6
Total no. of buoys	35	33

(d) Data availability

(see note 9 of section 5 for definition of terms.)

Availability	South of 50 deg N		North of 50 deg N	
	Previous Quarter	Present Quarter	Previous Quarter	Present Quarter
Very Good	1	1	15	12
Good	--	2	3	2
Satisfactory	9	8	2	2
Poor	3	5	1	1
Very Poor	--	--	1	--

The total number of buoy days in the quarter was 2,373 [obtained by summing the number of reporting days for each buoy] (last quarter the total was 2,496) and the number of 'buoy hours' with at least one observation was 37,850 (compared with 41,710 last quarter). Thus, the mean number of hours per day, for days with at least one observation (averaged over all buoys operating in the area) was 15.95 (last quarter the figure was 16.71).

(e) Data Quality - Pressure

Revised RMS Differences

The technique used to assess the quality of pressure data in this report is based on the Revised RMS differences between the observations and the background field from the Global Forecast Model (see note 8 in Explanatory Notes). For buoys south of 50 degN the Revised RMS differences should be less than 2.0 hPa and for buoys north of 50 degN they should be below 3.0 hPa. The buoys whose revised RMS difference were found to lie outside these limits have had their performance described as 'suspect' and are included in the section below. Examination of the time-series plots (see Annex B) indicates the performance of these buoys:-

- 44546 - This buoy showed a bias of +2.0 hPa from the beginning of the period to the end of the buoy's life on 29/11.
- 44547 - The buoy showed a bias of approximately +3.0 hPa throughout much of December.
- 44764 - Data from this buoy became totally erratic and produced a large number of gross errors from the start of the period until the end of the buoy's life on 29/11.
- 62511 - This buoy showed a slight pressure bias of +0.7 hPa throughout the early part of the period and the data became slightly erratic towards the end of the buoy's life on 26/11.

Biases

2 buoys (excluding those mentioned in the previous section) showed pressure biases greater than 0.5 hPa (pressure biases are determined using the mean value for unflagged data from Annex A). Those buoys whose pressure data showed a bias of greater than 0.5 hPa have also had their performance described as 'suspect'.

WMO No.	Position	Buoy bias (hPa)	Ship bias (hPa)	Period of reports
44548	W of SCOS	-1.0	-0.1	01/10 - 10/10
44616	SOBA	+0.9	+0.6	01/10 - 31/12

The ship bias represents the mean pressure biases reported from ships within a radius of 500 nautical miles of the mean position of each buoy.

Gross errors

The observations that appear to lie outside the expected distribution - the 'gross' errors (see Time-series graphs) - have been ringed. (The erroneous observations which occurred towards the end of the life of buoys 44546, 44764, 62502 and 62517 have not been included in this section.) The observations have been individually examined to see whether the errors lie with the pressure, location or the background field. Out of 120 occasions the results are as follows -

ERROR	NUMBER LAST QUARTER	NUMBER THIS QUARTER	COLLECTING CENTRE
bg field	0	0	-----
location	0	0	Oslo
location	3	3	Sondre Stromfjord
location	14	0	Paris
location	0	0	Unknown
location	4	0	US Air Force
pressure	49	84	Oslo
pressure	55	0	Sondre Stromfjord
pressure	42	33	Paris
pressure	20	0	US Air Force
pressure	0	0	Unknown
Total no. of buoy hours	41,710	37,850	

During the quarter 117 gross pressure errors were transmitted as compared to 166 last quarter. The number of gross location errors from the Local User Terminals was less than last quarter (3 compared to 21 last quarter).

(3) Air Temperatures and Sea Surface Temperatures

The following table shows the mean and standard deviation of observation minus background differences for air temperatures and sea surface temperatures. Figures in brackets are for the observations from voluntary observing ships within a radius of about 500 nautical miles of the mean position of each buoy.

(Note : The calculations below include gross errors. Therefore, in some instances, the figures may be slightly misleading.)

WMO No.	Air Temperature			Sea Surface Temperature		
	Mean	St. Dev	No. of Obs	Mean	St. Dev.	No. of Obs
25565	0.4(0.1)	1.4(1.8)	1870 (74)	---	---	---
44546	---	---	---	-0.1(0.2)	0.3(2.1)	598 (570)
44547	0.7(-0.1)	2.6(1.3)	812 (856)	-0.1(0.0)	0.8(3.1)	905 (616)
44548	0.6(-0.1)	1.2(1.6)	90 (854)	0.1(0.1)	0.2(3.0)	102 (585)
44613	-0.1(0.0)	1.2(1.2)	4178 (568)	-0.3(0.1)	0.7(1.9)	4306 (451)
44616	-0.1(-0.2)	1.5(1.1)	4950 (130)	-0.3(-0.3)	0.5(2.8)	5304 (75)
44727	-0.1(-0.2)	1.4(1.3)	3951 (322)	0.1(-0.3)	1.0(2.7)	4083 (257)
44728	-0.4(-0.1)	1.6(1.1)	4687 (119)	-0.1(-0.5)	0.6(3.1)	4824 (67)
44742	---	---	---	0.0(0.4)	1.0(0.8)	5969 (12)
44760	-0.2(-0.1)	2.1(1.2)	1508 (803)	-1.0(-0.2)	1.4(3.2)	1901 (594)
44761	---	---	---	-0.2(-0.1)	0.4(2.0)	908 (182)
44763	0.3(0.0)	1.3(1.7)	4958 (129)	-0.4(-0.3)	0.6(3.1)	5336 (87)
44764	1.1(0.5)	3.7(2.2)	2810 (367)	-0.5(-0.8)	1.4(3.0)	2851 (258)
44765	-0.3(-0.2)	2.2(1.1)	4844 (135)	-0.1(-0.3)	0.6(2.7)	3064 (81)
44769	---	---	---	-0.1(-0.1)	0.8(2.2)	5014 (201)
44770	0.0(-0.1)	1.4(1.2)	2191 (860)	-0.3(-0.1)	1.0(3.3)	2329 (626)
44773	-0.2(-0.2)	1.5(1.1)	3527 (300)	-0.1(-0.5)	1.1(2.7)	3659 (220)
44774	2.8(1.1)	5.2(2.7)	1616 (301)	0.4(0.0)	0.7(2.0)	1678 (243)
44777	---	---	---	0.1(-0.1)	0.5(3.1)	880 (666)

Statistics of (ob-bg) differences for buoys reporting this
quarter and all ships within 500 nautical miles

WMO No.	Air Temperature			Sea Surface Temperature		
	Mean	St. Dev	No. of Obs	Mean	St. Dev.	No. of Obs
61527	-0.1(1.0)	1.0(2.2)	529 (2177)	0.0(-0.2)	0.3(2.3)	656 (657)
62501	---	---	---	-0.1(0.3)	0.3(2.7)	1783 (694)
62502	---	---	---	-0.6(0.2)	0.7(2.4)	1105 (1516)
62503	---	---	---	0.1(0.2)	0.2(2.6)	1718 (1099)
62504	---	---	---	-0.1(0.2)	0.9(2.4)	1639 (1334)
62511	---	---	---	0.1(0.2)	0.5(2.3)	653 (1308)
62517	---	---	---	0.5(0.0)	0.7(2.3)	57 (689)
62518	---	---	---	-0.5(0.2)	0.3(2.4)	1747 (1730)
62519	---	---	---	-0.7(0.2)	0.9(2.7)	405 (993)
62524	---	---	---	0.1(0.1)	0.8(2.0)	787 (502)
62694	-0.4(-0.2)	1.1(1.2)	1813 (29)	-0.3(0.2)	0.5(0.9)	1170 (16)
63661	0.7(0.4)	2.3(0.4)	1724 (16)	---	---	---
65581	0.7(-0.1)	5.2(1.1)	921 (119)	0.4(-0.6)	1.4(3.2)	615 (72)
65594	0.2(-0.4)	1.5(0.8)	4963 (17)	-0.1(0.5)	0.9(0.7)	5822 (11)

Statistics of (ob-bg) differences for buoys reporting this
quarter and all ships within 500 nautical miles

Buoys 44764 (1.1) and 44774 (2.8) showed significant air temperature biases. The bias from buoy 44764 was largely the result of erroneous data being reported towards the end of the buoy's life. The significant bias reported from buoy 44774 was due to the Paris LUT intermittently reporting air temperatures which were approximately 12°C too high.

Buoy 44760 (-1.0) was the only buoy to show a significant sea surface temperature bias.

(4) Winds

The following table shows the mean and standard deviation of observation minus background differences for wind speed and direction. Figures in brackets are for the observations from voluntary observing ships within a radius of about 500 nautical miles of the mean position of each buoy (Note - it is not known what proportion of the ships' winds were measured rather than estimated visually using the Beaufort Scale). The statistics for this report can be compared with those for ships and the relative quality of the wind data from each buoy can be assessed.

WMO No	Period	Wind Speed (kn)		Wind Direction (deg)		No. of Obs
		Mean	St. Dev.	Mean	St. Dev.	
44613	01/10-31/12	-1.1(2.3)	5.0(6.5)	-0.1(-1.6)	23.7(27.5)	4016 (530)
44616	01/10-31/12	-18.0(3.8)	9.0(6.9)	20.7(-7.0)	64.1(25.9)	685 (123)
44742	01/10-31/12	-2.4(5.4)	4.9(5.2)	3.8(-4.6)	22.2(10.6)	4377 (17)
44764	01/10-29/11	-4.4(1.3)	6.1(8.4)	-11.0(-6.1)	31.1(34.5)	2203 (330)
62501	05/10-31/12	-0.1(2.3)	4.8(6.6)	-13.8(-3.2)	22.5(29.1)	1586 (789)
62502	04/10-01/12	1.3(2.1)	5.9(6.7)	-21.6(-2.8)	19.0(28.7)	946 (1627)
62517	01/10-03/10	40.9(1.9)	34.6(6.3)	-69.7(-1.2)	65.8(28.1)	3 (755)
62518	01/10-31/12	-0.1(2.0)	3.6(6.8)	1.3(-2.9)	20.2(29.2)	1540 (1872)

Statistics of (ob-bg) differences for buoys reporting this quarter and all ships within 500 nautical miles

Buoys 44613 (-1.1), 44616 (-18.0), 44742 (-2.4), 44764 (-4.4), 62502 (1.3) and 62517 (-40.9) all showed significant wind speed biases. However, only 3 observations were received from buoy 62517.

Buoys 44616 (20.7), 62502 (-21.6) and 62517 (-69.7) showed a significant wind direction bias. Buoys 44616 and 62517 also showed a larger than normal standard deviation of wind direction. However, only 3 observations were used in the calculation for buoy 62517.

5 EXPLANATORY NOTES

1. Buoy owners are as follows,

CA	- Canada	P	- Portugal
F	- France	UK	- United Kingdom
D	- Germany	US	- United States
N	- Norway	IC	- Iceland
NL	- Netherlands	EG	- EGOS
IR	- Ireland	??	- unknown

2. Number of observations received is the number received at Bracknell in the Meteorological Data Bank (Met.DB). If identical reports are received which have originated at different Collecting Centres, the earliest one received at Bracknell is stored in the Met.DB.
3. An observation with valid Time and Date is one that contains no coding errors in the Date/Time group.
4. An acceptable position for an observation is within a distance d of the last acceptable position where $d=vt$ and,
 v = maximum drift speed = 1/4 knot
 t = time between observations.
5. The percentage of elements present is calculated from the total number of observations received.
6. The delay is (Time of Receipt at Bracknell) - (Time of Observation).
7. The mean number of observations per day is calculated from the total number of observations received divided by the number of days in the period. It therefore includes 'quasi-identical' observations, i.e. those made within a few minutes of one another. For this reason the mean number of hours per day with at least one observation and the % of hour periods without an observation has been included, where an 'hour period' is defined as the period from HH-30 to HH+29 minutes.

8. Mean (OB-BG) is the mean value of (Observation-Background) Pressure, where the Background is the 6-hour forecast from the Global Forecast Model. RMS (OB-BG) is the Root Mean Square value of (Observation-Background) Pressure differences.

Unflagged data are those data used in model analyses.

Flagged data (i.e. unused observations) are those observations of suspect quality and all observations reported by a buoy at a frequency greater than 5 times every 6 hours, with accepted observations being at least one hour apart. Thus, those buoys which report most frequently have a higher percentage of flagged data.

The Mean calculated over Unflagged Data gives an indication of the instrument bias, since any gross errors have been excluded from the calculation.

The Revised RMS is based on all data except for the few that contain gross errors (as indicated on the time-series graphs - see Annex B).

9. The performance categories are defined in the table below.

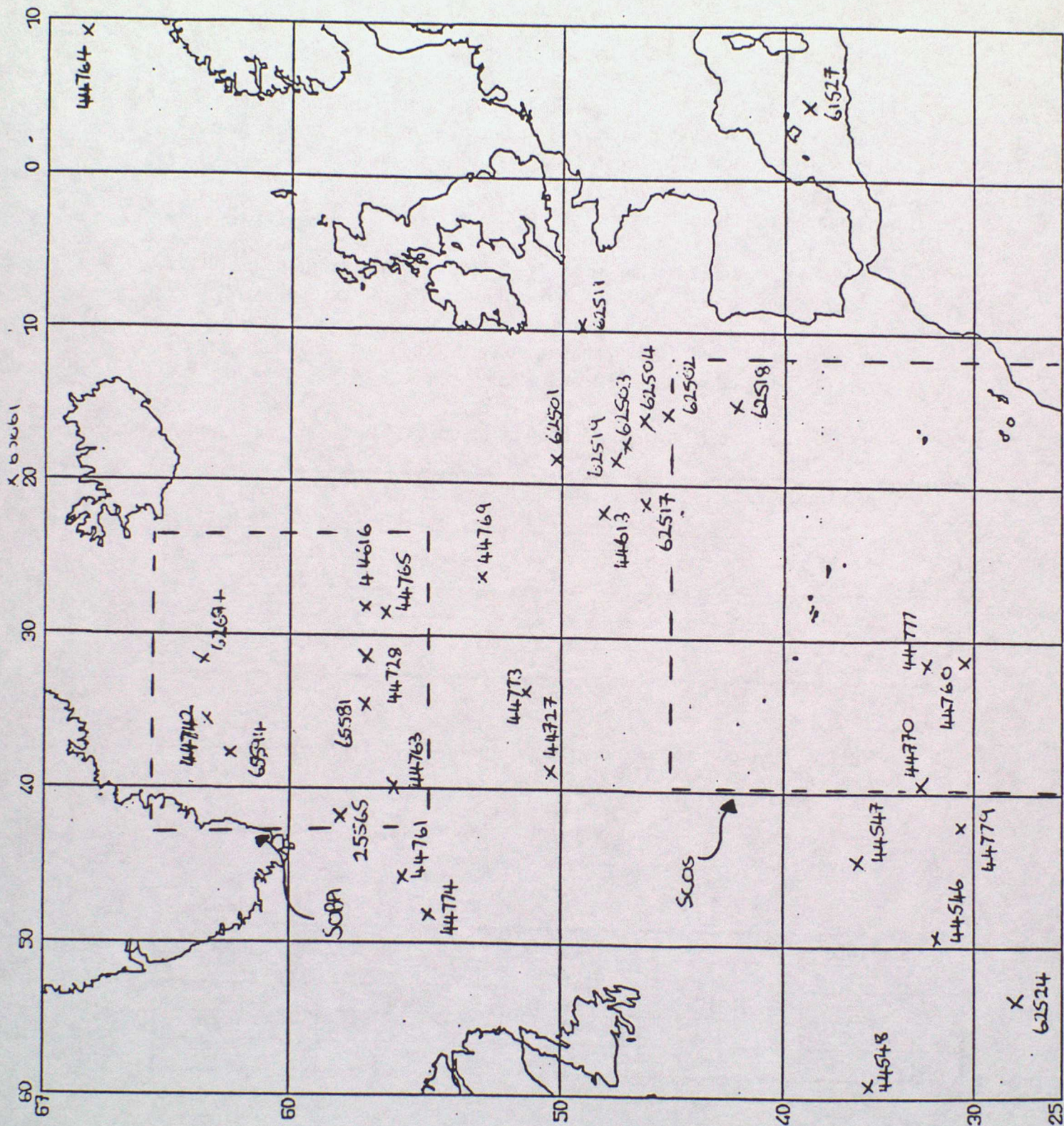
Performance	Availability (mean no. of obs/day)	Timeliness (median delay in mins)
Very Good	> 35	< 60
Good	25 - 35	60 - 119
Satisfactory	15 - 24	120 - 179
Poor	5 - 14	180 - 239
Very Poor	< 5	> 240

(N.B. WMO requirements state the need for only 4 observations per day from marine stations.)

The pressure quality is assessed from the Revised RMS and the Mean (for unflagged data).

Performance	Pressure Quality (in hPa)			
	North of 50 degN		South of 50 degN	
	RMS	MEAN	RMS	MEAN
Acceptable	< 3.0	< 0.5	< 2.0	< 0.5
Suspect	> 3.0	> 0.5	> 2.0	> 0.5

6. MEAN POSITION
OF BUOYS DURING
PERIOD OCTOBER TO
DECEMBER 1995



ANNEX A - TABLE OF STATISTICS

Wmo No. / Country ¹	25565/UK	44546/US	44547/US
Argos Id.No.	1639	8706	8707
Period within area	01/10-31/12	01/10-29/11	01/10-30/12
Area	SOBA	W of SCOS	W of SCOS
Mean Latitude	58.1	32.8	36.4
Mean Longitude	-41.7	-49.9	-44.6
No. of obs received ²	2087	571	851
% of obs with valid Time and Date ³	100.0	100.0	100.0
% of obs with acceptable Positions ⁴	99.7	99.8	99.4
% of Presents			
Pressure	93.0	94.9	96.4
P. Tendency	88.5	0.0	0.0
Air Temperature	92.1	0.0	96.1
Wind Speed/Dir.	0.0/0.0	0.0/0.0	0.0/0.0
Sea-surface temp.	0.0	95.1	96.7
Median delay (min) ⁶	135.0	36.0	262.0
Number of days	92.0	60.0	91.0
Mean no. of obs/day	22.7	9.5	9.4
No. of hours with obs	1481.0	554.0	533.0
Mean no. of hours/day with obs	16.1	9.2	9.2
% of hour periods without an ob ⁷	32.9	61.7	61.7
Mean (Ob-Bg)	-0.1	2.0	0.3
RMS (Ob-Bg)	1.6	2.3	1.9
unflagged data⁸			
Mean (Ob-Bg)	-0.1	1.3	0.5
RMS (Ob-Bg)	1.7	4.3	2.3
all data⁸			
Revised RMS (Ob-Bg) ⁸	1.7	2.4	2.3
% of data flagged ⁸	38.0	5.0	5.0
Operating at end of period	YES	NO	NO
Performances ⁹			
Availability	Satisfactory	Poor	Poor
Pressure Quality	Acceptable	Suspect	Suspect
Timeliness	Satisfactory	Very Good	Very Poor
Comments			

Wmo No. / Country ¹	44548/US	44613/UK	44616/UK
Argos Id.No.	10357	3324	3318
Period within area	01/10-10/10	01/10-31/12	01/10-31/12
Area	W of SCOS	N of SCOS	SOBA
Mean Latitude	35.7	48.2	57.1
Mean Longitude	-59.7	-21.9	-28.2
No. of obs received ²	97	4230	5349
% of obs with valid Time and Dates ³	100.0	100.0	100.0
% of obs with acceptable Positions ⁴	100.0	99.3	96.6
% of Presents			
Pressure	96.9	98.4	98.9
P. Tendency	0.0	97.7	96.2
Air Temperature	94.8	99.4	99.0
Wind Speed/Dir	0.0/0.0	99.1/98.6	29.1/45.7
Sea-surface temp.	96.9	99.8	99.3
Median delay (min) ⁶	34.0	207.0	321.0
Number of days	10.0	92.0	92.0
Mean no. of obs/day	9.7	46.0	58.1
No. of hours with obs	97.0	1670.0	1888.0
Mean no. of hours/day with obs	9.7	18.2	20.5
% of hour periods without an ob ⁷	59.6	24.2	14.6
Mean (Ob-Bg)	-1.0	0.0	0.9
RMS (Ob-Bg) unflagged data	1.6	1.6	1.8
Mean (Ob-bg)	-1.0	-0.1	0.7
RMS (Ob-Bg) all data	1.6	3.4	3.6
Revised RMS (Ob-Bg) ⁸	1.6	1.8	1.9
% of data flagged ⁸	0.0	67.0	72.0
Operating at end of period	NO	YES	YES
Performance ⁹			
Availability	Poor	Very Good	Very Good
Pressure Quality	Suspect	Acceptable	Suspect
Timeliness	Very Good	Poor	Very Poor
Comments			

Wmo No. / Country ¹	44727/UK	44728/UK	44742/UK
Argos Id.No.	2974	3024	2953
Period within area	07/10-31/12	01/10-31/12	01/10-31/12
Area	S of SOBA	SOBA	SOBA
Mean Latitude	50.3	57.1	62.2
Mean Longitude	-38.9	-31.1	-35.8
No. of obs received ²	4022	4812	5929
% of obs with valid Time and Dates ³	100.0	100.0	100.0
% of obs with acceptable Positions ⁴	98.8	99.2	94.6
% of Presents			
Pressure	99.2	98.5	99.4
P. Tendency	97.0	94.8	97.4
Air Temperature	99.2	98.4	0.0
Wind Speed/Dir.	0.0/0.0	0.0/0.0	98.6/98.6
Sea-surface temp.	99.5	98.7	99.4
Median delay (min) ⁶	113.0	131.0	21.0
Number of days	86.0	92.0	92.0
Mean no. of obs/day	46.8	52.3	64.4
No. of hours with obs	1581.0	1763.0	1894.0
Mean no. of hours/day with obs	18.4	19.2	20.6
% of hour periods without an ob ⁷	23.3	20.0	14.2
Mean (Ob-Bg)	-0.1	0.2	0.0
RMS (Ob-Bg)	1.6	1.6	1.6
unflagged data⁸			
Mean (Ob-bg)	-0.2	0.0	-0.1
RMS (Ob-Bg)	3.5	4.4	2.7
all data⁸			
Revised RMS (Ob-Bg) ⁸	1.6	1.6	1.6
% of data flagged ⁸	67.0	70.0	74.0
Operating at end of period	YES	YES	YES
Performance ⁹			
Availability	Very Good	Very Good	Very Good
Pressure Quality	Acceptable	Acceptable	Acceptable
Timeliness	Good	Satisfactory	Very Good
Comments			

Wmo No./ Country ¹	44760/UK	44761/UK	44763/UK
Argos Id.No.	2947	14736	3098
Period within area	01/10-31/12	23/11-31/12	01/10-31/12
Area	SCOS	W of SOBA	SOBA
Mean Latitude	30.9	55.8	56.1
Mean Longitude	-31.3	-46.9	-40.2
No. of obs received ²	1842	1218	5307
% of obs with valid Time and Dates ³	100.0	100.0	100.0
% of obs with acceptable Positions ⁴	97.8	97.9	98.5
% of Present ⁵			
Pressure	98.4	75.1	99.1
P. Tendency	95.1	47.0	96.8
Air Temperature	98.2	0.0	99.2
Wind Speed/Dir.	0.0/0.0	0.0/0.0	0.0/0.0
Sea-surface temp.	98.4	74.5	99.1
Median delay (min) ⁶	99.0	539.0	173.0
Number of days	92.0	39.0	92.0
Mean no. of obs/day	20.0	31.2	57.7
No. of hours with obs	1319.0	757.0	1834.0
Mean no. of hours/day with obs	14.3	19.4	19.9
% of hour periods without an ob ⁷	40.4	19.2	17.1
Mean (Ob-Bg)	-0.2	0.5	0.1
RMS (Ob-Bg)	1.1	2.0	1.5
unflagged data⁸			
Mean (Ob-bg)	-0.3	0.5	0.1
RMS (Ob-Bg)	1.5	2.0	4.0
all data⁸			
Revised RMS (Ob-Bg) ⁸	1.1	2.0	1.5
% of data flagged ⁸	36.0	48.0	72.0
Operating at end of period	YES	YES	YES
Performance ⁹			
Availability	Satisfactory	Good	Very Good
Pressure Quality	Acceptable	Acceptable	Acceptable
Timeliness	Good	Very Poor	Satisfactory
Comments			

Wmo No / Country ¹	44764/UK	44765/NL	44769/UK
Argos Id.No.	6306	4178	1253
Period within area	01/10-29/11	01/10-31/12	01/10-31/12
Area	N of Norway	SOBA	S of SOBA
Mean Latitude	66.0	56.7	53.0
Mean Longitude	9.1	-28.8	-26.2
No. of obs received ²	2843	5051	4960
% of obs with valid Time and Dates ³	100.0	100.0	100.0
% of obs with acceptable Positions ⁴	96.2	98.6	99.1
% of Presents			
Pressure	37.2	96.5	99.3
P. Tendency	99.2	94.3	96.7
Air Temperature	99.8	96.7	0.0
Wind Speed/Dir.	92.8/92.9	0.0/0.0	0.0/0.0
Sea-surface temp.	98.6	60.7	99.5
Median delay (min) ⁶	67.0	17.0	76.0
Number of days	60.0	92.0	92.0
Mean no. of obs/day	47.4	54.9	53.9
No. of hours with obs	1180.0	1830.0	1764.0
Mean no. of hours/day with obs	19.7	19.9	19.2
% of hour periods without an ob ⁷	17.9	17.1	20.0
Mean (Ob-Bg)	0.1	-0.2	0.2
RMS (Ob-Bg)	1.6	1.5	1.4
unflagged data⁸			
Mean (Ob-bg)	5.8	-0.4	0.1
RMS (Ob-Bg)	16.2	3.6	2.9
all data⁸			
Revised RMS (Ob-Bg) ⁸	4.9	1.5	1.4
% of data flagged ⁸	73.0	71.0	71.0
Operating at end of period	NO	YES	YES
Performance ⁹			
Availability	Very Good	Very Good	Very Good
Pressure Quality	Suspect	Acceptable	Acceptable
Timeliness	Good	Very Good	Good
Comments			

Wmo No. / Country ¹	44770/UK	44773 UK	44774/UK
Argos Id.No.	3035	3132	3162
Period within area	01/10-31/12	01/10-31/12	30/11-31/12
Area	SCOS	S of SOBA	SW of SOBA
Mean Latitude	33.0	51.1	54.3
Mean Longitude	-39.7	-33.6	-48.3
No. of obs received ²	2274	3614	1654
% of obs with valid Time and Date ³	100.0	100.0	100.0
% of obs with acceptable Positions ⁴	98.2	98.6	95.4
% of Presents			
Pressure	98.7	98.7	99.6
P Tendency	95.6	95.1	97.0
Air Temperature	98.5	98.9	99.6
Wind Speed/Dir.	0.0/0.0	0.0/0.0	0.0/0.0
Sea-surface temp.	98.7	99.0	99.5
Median delay (min) ⁶	15.0	263.0	23.0
Number of days	92.0	92.0	32.0
Mean no. of obs/day	24.7	39.3	51.7
No. of hours with obs	1342.0	1575.0	616.0
Mean no. of hours/day with obs	14.6	17.1	19.3
% of hour periods without an ob ⁷	39.2	28.8	19.6
Mean (Ob-Bg)	0.0	0.0	-0.1
RMS (Ob-Bg)	0.9	1.4	1.7
unflagged data⁸			
Mean (Ob-bg)	-0.1	0.0	-0.1
RMS (Ob-Bg)	2.9	2.6	3.2
all data⁸			
Revised RMS (Ob-Bg) ⁸	0.9	1.6	1.9
% of data flagged ⁸	48.0	63.0	71.0
Operating at end of period	YES	YES	YES
Performance ⁹			
Availability	Good	Very Good	Very Good
Pressure Quality	Acceptable	Acceptable	Acceptable
Timeliness	Very Good	Very Poor	Very Good
Comments			

Wmo No. / Country ¹	44777/UK	61527/US	62501/F
Argos Id.No.	14733	3749	10116
Period within area	01/10-31/12	09/12-31/12	05/10-31/12
Area	SCOS	E of Spain	N of SCOS
Mean Latitude	32.8	38.7	50.1
Mean Longitude	-31.6	4.9	-18.6
No. of obs received ²	1588	640	1774
% of obs with valid Time and Dates	100.0	100.0	100.0
% of obs with acceptable Positions ⁴	98.9	100.0	100.0
% of Presents			
Pressure	100.0	98.4	95.3
P. Tendency	55.6	0.0	89.3
Air Temperature	0.0	98.1	0.0
Wind Speed/Dir.	0.0/0.0	0.0/0.0	95.9/95.5
Sea-surface temp.	55.6	99.4	95.9
Median delay (min) ⁶	125.0	124.0	83.0
Number of days	92.0	23.0	88.0
Mean no. of obs/day	17.3	27.8	20.2
No. of hours with obs	1317.0	460.0	1318.0
Mean no. of hours/day with obs	14.3	20.0	15.0
% of hour periods without an ob ⁷	40.4	16.7	37.5
Mean (Ob-Bg)	-0.1	-0.5	0.3
RMS (Ob-Bg)	0.9	1.1	1.5
unflagged datas			
Mean (Ob-bg)	-0.1	-0.5	0.2
RMS (Ob-Bg)	1.0	1.2	1.6
all datas			
Revised RMS (Ob-Bg) ⁸	1.0	1.2	1.6
% of data flagged ⁸	22.0	28.0	35.0
Operating at end of period	YES	YES	YES
Performances ⁹			
Availability	Satisfactory	Good	Satisfactory
Pressure Quality	Acceptable	Acceptable	Acceptable
Timeliness	Satisfactory	Satisfactory	Good
Comments			

Wmo No. / Country ¹	62502/F	62503/F	62504/F
Argos Id. No.	????	????	????
Period within area	04/10-01/12	04/10-31/12	04/10-31/12
Area	N of SCOS	N of SCOS	N of SCOS
Mean Latitude	45.2	47.1	46.3
Mean Longitude	-15.5	-17.5	-16.1
No. of obs received ²	1091	1674	1586
% of obs with valid Time and Dates	100.0	100.0	100.0
% of obs with acceptable Positions ⁴	100.0	100.0	99.6
% of Presents			
Pressure	97.6	96.8	97.2
P. Tendency	92.2	91.3	92.6
Air Temperature	0.0	0.0	0.0
Wind Speed/Dir.	94.4/94.6	0.0/0.0	0.0/0.0
Sea-surface temp.	96.4	97.5	97.9
Median delay (min) ⁶	19.0	40.0	46.0
Number of days	59.0	89.0	89.0
Mean no. of obs/day	18.5	18.8	17.8
No. of hours with obs	847.0	1293.0	1255.0
Mean no. of hours/day with obs	14.4	14.5	14.1
% of hour periods without an ob ⁷	40.0	39.6	41.3
Mean (Ob-Bg)	0.4	0.3	0.3
RMS (Ob-Bg)	1.3	1.4	1.3
unflagged data			
Mean (Ob-bg)	0.3	0.4	0.3
RMS (Ob-Bg)	2.9	1.4	1.4
all data			
Revised RMS (Ob-Bg) ⁸	1.3	1.4	1.4
% of data flagged ⁸	31.0	35.0	31.0
Operating at end of period	NO	YES	YES
Performance ⁹			
Availability	Satisfactory	Satisfactory	Satisfactory
Pressure Quality	Acceptable	Acceptable	Acceptable
Timeliness	Very Good	Very Good	Very Good
Comments			

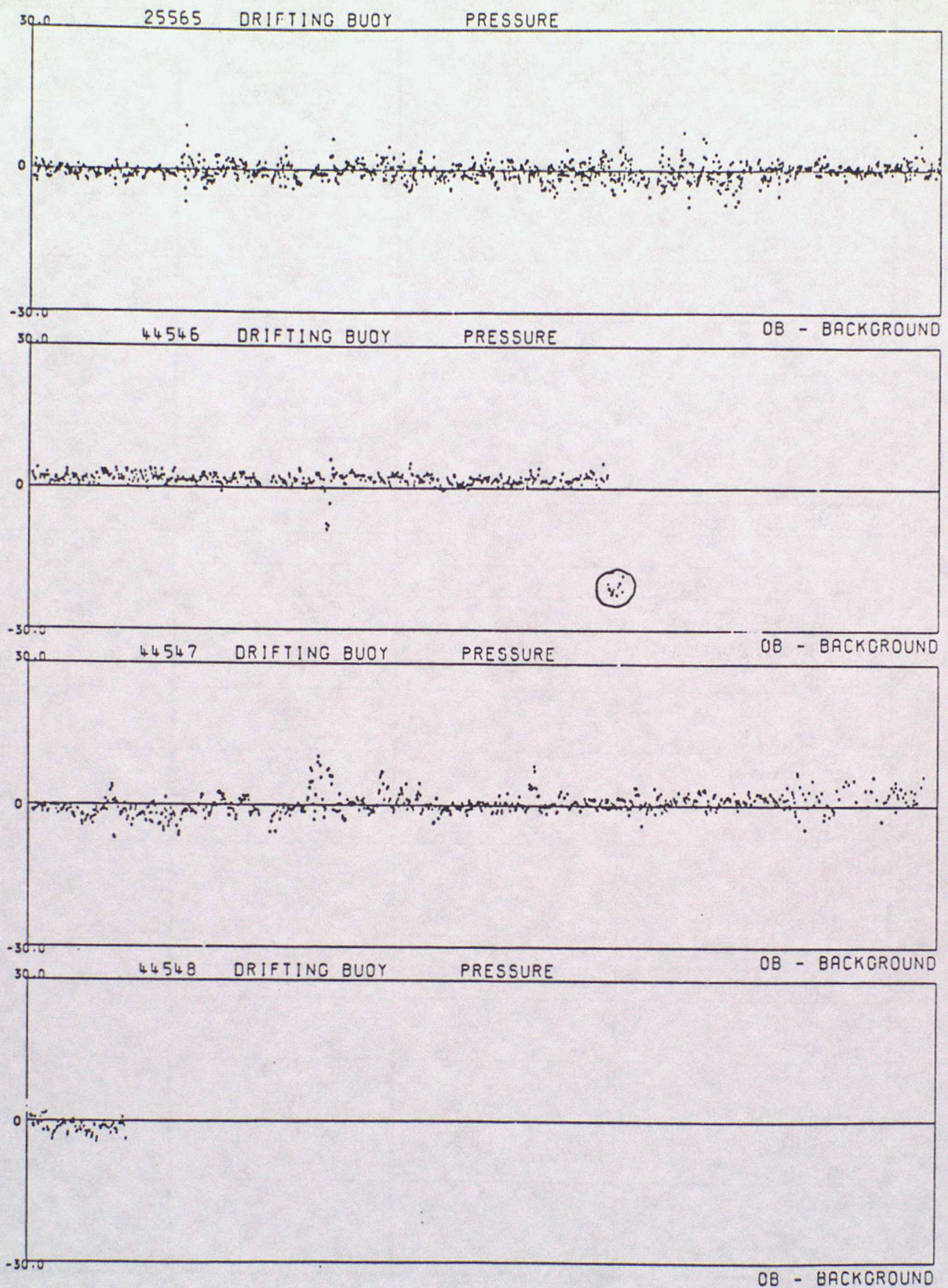
Wmo No. / Country ¹	62511/F	62517/F	62518/F
Argos Id.No.	14423	10120	14419
Period within area	01/10-26/11	01/10-03/10	01/10-31/12
Area	NE of SCOS	N of SCOS	SCOS
Mean Latitude	49.3	46.2	42.0
Mean Longitude	-10.0	-21.2	-14.8
No. of obs received ²	1143	64	1715
% of obs with valid Time and Dates ³	100.0	100.0	100.0
% of obs with acceptable Positions ⁴	95.4	100.0	100.0
% of Presents			
Pressure	100.0	96.9	97.1
P. Tendency	60.7	75.0	92.8
Air Temperature	0.0	0.0	0.0
Wind Speed/Dir	0.0/0.0	3.1/3.1	97.0/97.0
Sea-surface temp	60.9	95.3	96.9
Median delay (min) ⁶	960.0	133.0	39.0
Number of days	57.0	3.0	92.0
Mean no. of obs/day	20.1	21.3	18.6
No. of hours with obs	911.0	49.0	1340.0
Mean no. of hours/day with obs	16.0	16.3	14.6
% of hour periods without an ob ⁷	33.3	32.1	39.2
Mean (Ob-Bg)	0.7	0.3	-0.1
RMS (Ob-Bg)	1.4	1.0	1.2
unflagged data⁸			
Mean (Ob-bg)	0.7	-1.0	-0.1
RMS (Ob-Bg)	1.5	7.5	1.2
all data⁸			
Revised RMS (Ob-Bg) ⁸	2.7	1.1	1.2
% of data flagged ⁸	32.0	40.0	30.0
Operating at end of period	NO	NO	YES
Performance ⁹			
Availability	Satisfactory	Satisfactory	Satisfactory
Pressure Quality	Suspect	Acceptable	Acceptable
Timeliness	Very Poor	Satisfactory	Very Good
Comments			

Wmo No. / Country ¹	62519/F	62524/UK	62694/NL
Argos Id.No.	14421	4625	9306
Period within area	01/10-01/11	01/10-19/12	30/11-31/12
Area	N of SCOS	W of SCOS	SOBA
Mean Latitude	47.4	27.6	62.3
Mean Longitude	-18.2	-53.3	-31.3
No. of obs received ²	387	871	1879
% of obs with valid Time and Dates ³	100.0	100.0	100.0
% of obs with acceptable Positions ⁴	99.5	89.1	91.9
% of Presents			
Pressure	96.1	99.1	98.7
P. Tendency	92.2	70.4	95.3
Air Temperature	0.0	0.0	98.6
Wind Speed/Dir.	0.0/0.0	0.0/0.0	0.0/0.0
Sea-surface temp.	97.7	86.2	62.2
Median delay (min) ⁶	30.0	267.0	16.0
Number of days	32.0	80.0	32.0
Mean no. of obs/day	12.1	10.9	58.7
No. of hours with obs	353.0	603.0	713.0
Mean no. of hours/day with obs	11.0	7.5	22.3
% of hour periods without an ob ⁷	54.2	68.8	7.1
Mean (Ob-Bg)	-0.1	0.4	0.2
RMS (Ob-Bg)	1.5	1.2	1.8
unflagged data⁸			
Mean (Ob-bg)	-0.1	0.3	0.2
RMS (Ob-Bg)	1.7	2.1	2.1
all data⁸			
Revised RMS (Ob-Bg) ⁸	1.7	1.6	2.1
% of data flagged ⁸	17.0	44.0	70.0
Operating at end of period	NO	NO	YES
Performance ⁹			
Availability	Poor	Poor	Very Good
Pressure Quality	Acceptable	Acceptable	Acceptable
Timeliness	Very Good	Very Poor	Very Good
Comments			

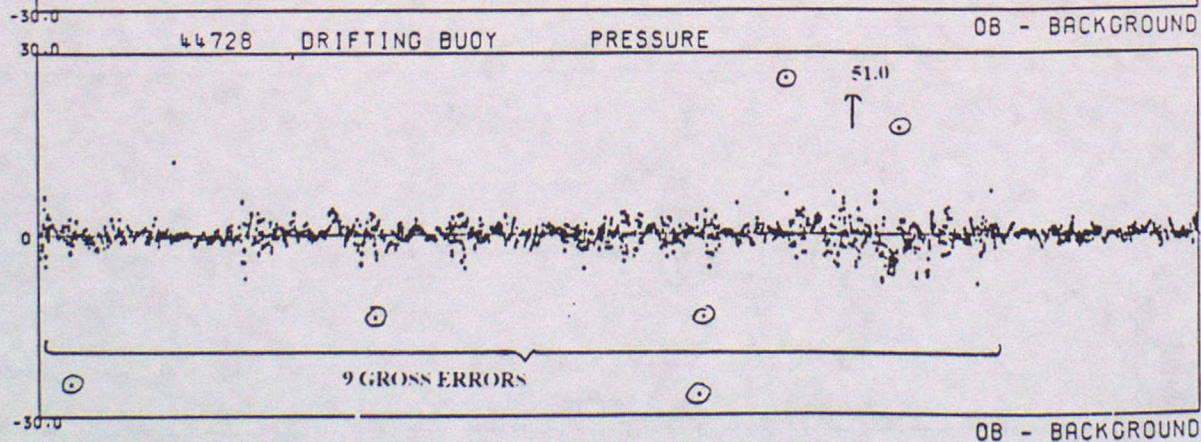
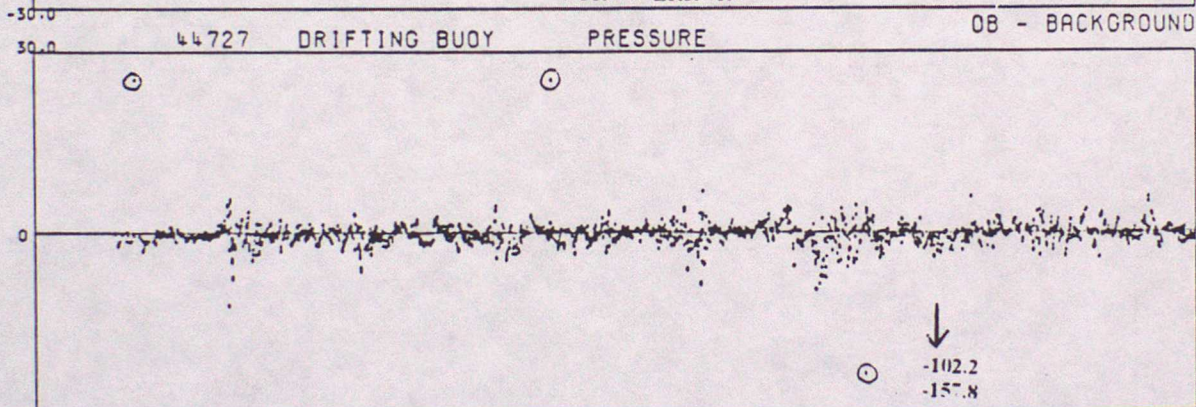
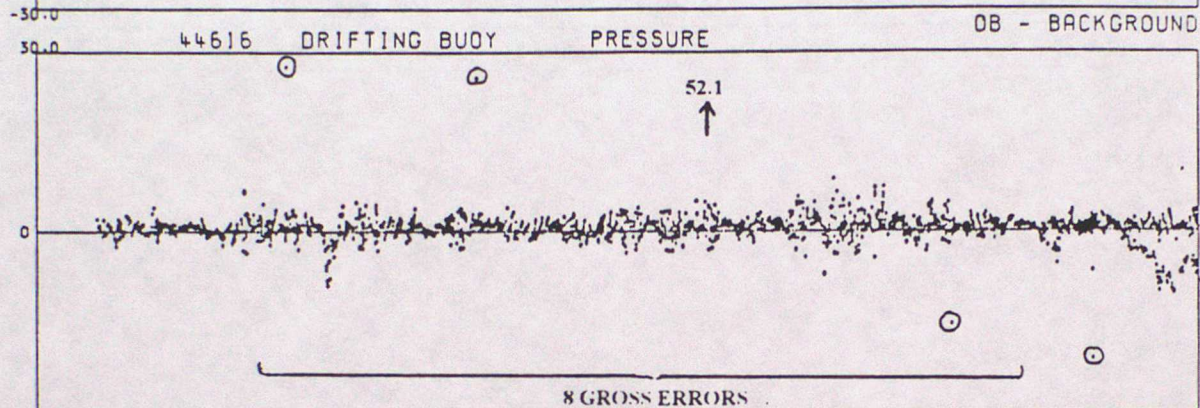
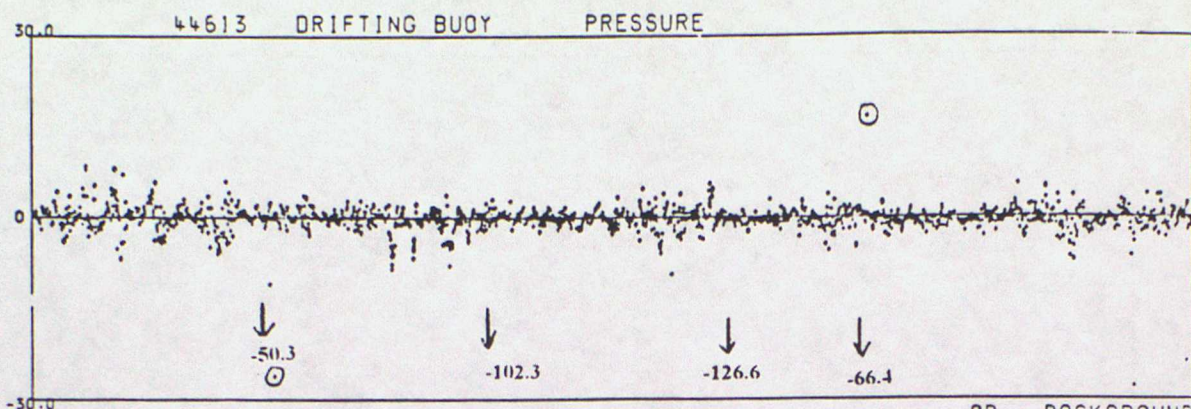
Wmo No. / Country ¹	63661/D	65581/IC	65594/UK
Argos Id.No.	8068	1299	1252
Period within area	01/10-09/12	01/10-24/12	01/10-31/12
Area	N of Iceland	SOBA	SOBA
Mean Latitude	68.6	57.1	61.7
Mean Longitude	-20.1	-34.5	-37.9
No. of obs received ²	1907	1092	5788
% of obs with valid Time and Dates	100.0	100.0	100.0
% of obs with acceptable Positions ⁴	99.7	96.7	99.2
% of Presents			
Pressure	92.8	93.2	99.2
P. Tendency	89.6	89.7	96.8
Air Temperature	92.5	85.9	99.2
Wind Speed/Dir.	0.0/0.0	0.0/0.0	0.0/0.0
Sea-surface temp.	0.0	56.4	99.3
Median delay (min) ⁶	93.0	22.0	24.0
Number of days	70.0	85.0	92.0
Mean no. of obs/day	27.2	12.8	62.9
No. of hours with obs	1312.0	521.0	1880.0
Mean no. of hours/day with obs	18.7	6.1	20.4
% of hour periods without an ob ⁷	22.1	74.6	15.0
Mean (Ob-Bg)	-0.1	0.0	0.2
RMS (Ob-Bg)	1.6	1.7	1.5
unflagged data⁸			
Mean (Ob-bg)	-0.4	-1.2	0.0
RMS (Ob-Bg)	2.5	10.2	2.5
all data⁸			
Revised RMS (Ob-Bg) ⁸	2.5	2.1	1.9
% of data flagged ⁸	45.0	65.0	74.0
Operating at end of period	NO	NO	YES
Performance ⁹			
Availability	Good	Poor	Very Good
Pressure Quality	Acceptable	Acceptable	Acceptable
Timeliness	Good	Very Good	Very Good
Comments			

ANNEX B - TIME SERIES PLOTS OF PRESSURE

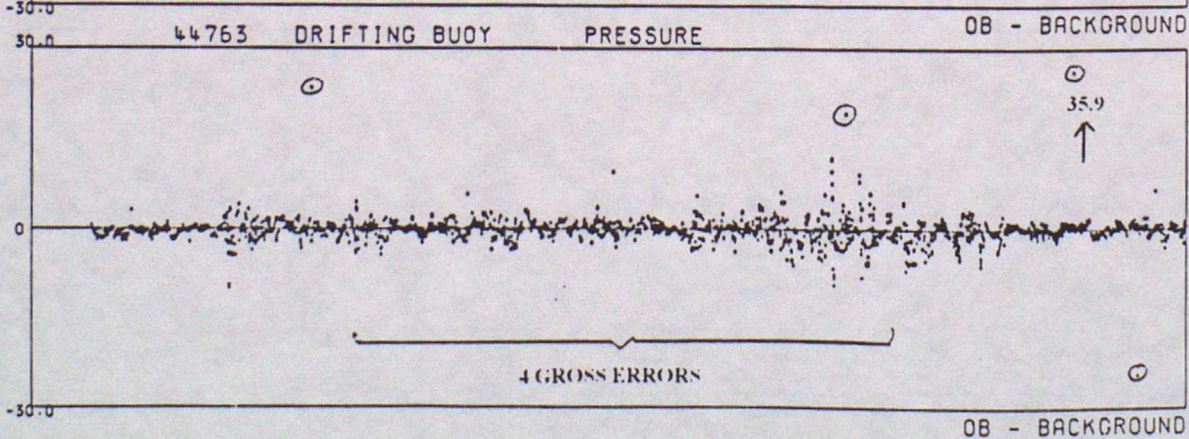
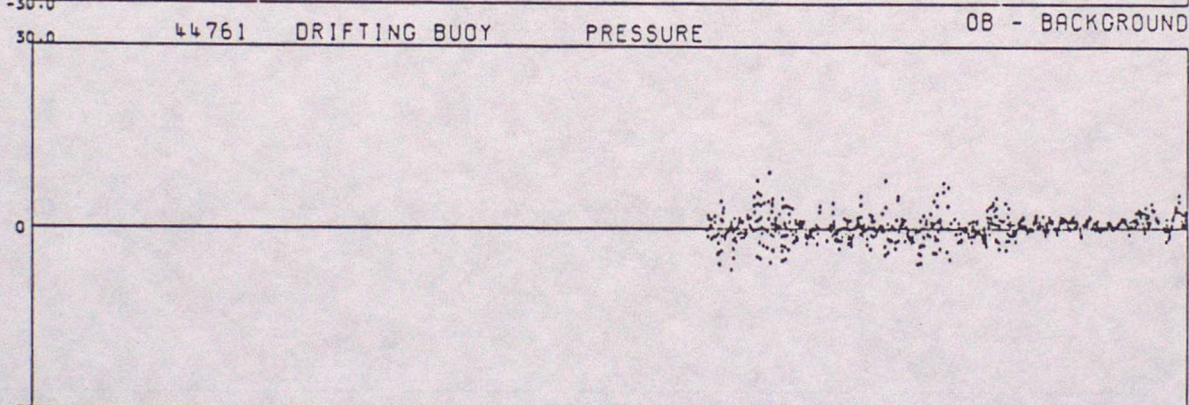
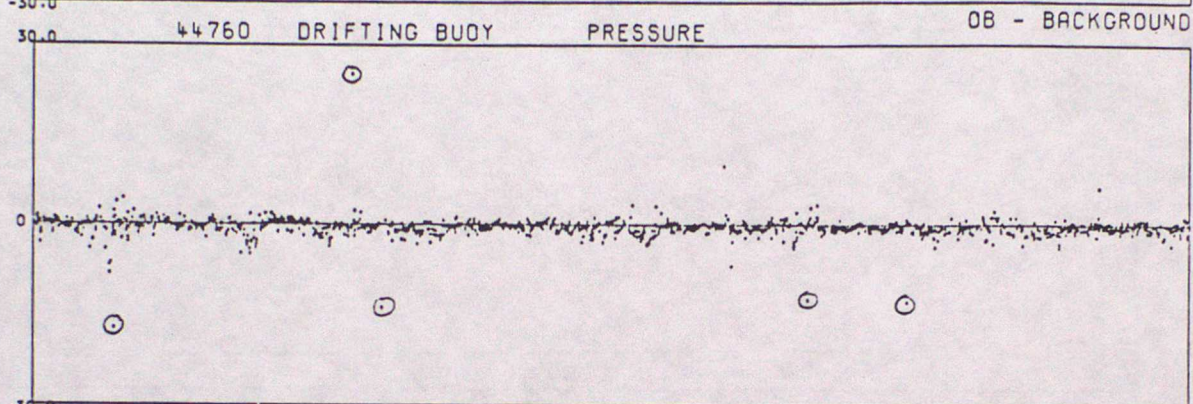
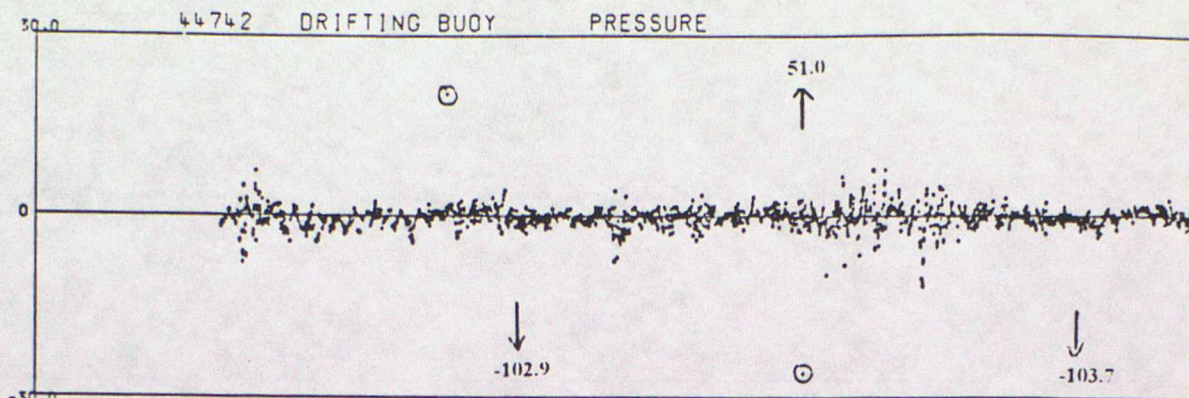
DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)



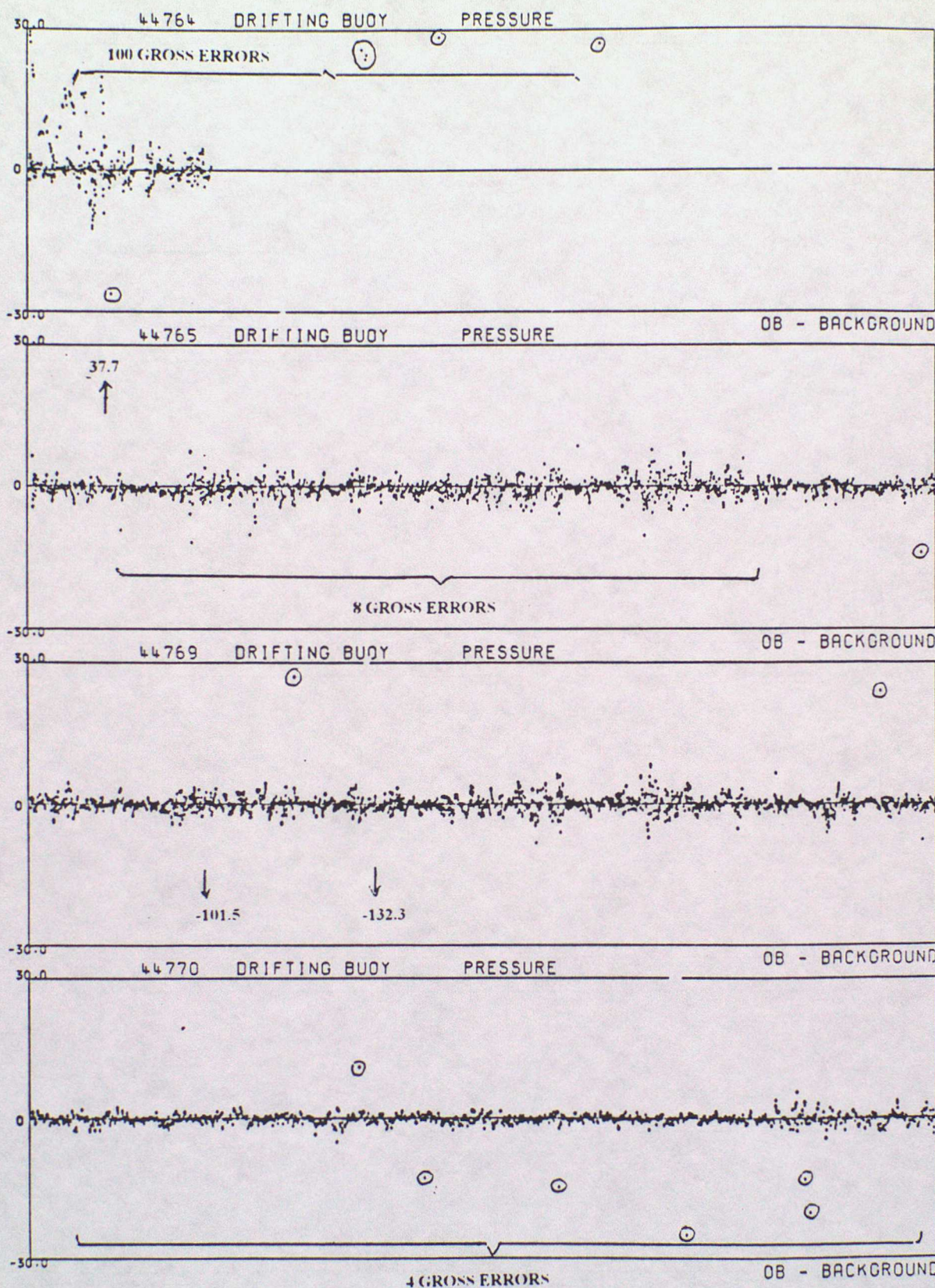
DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)



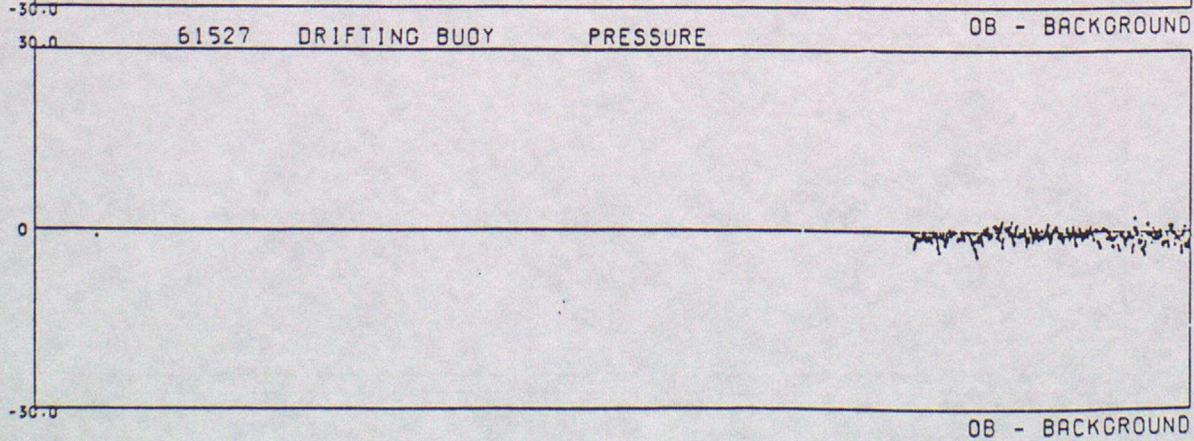
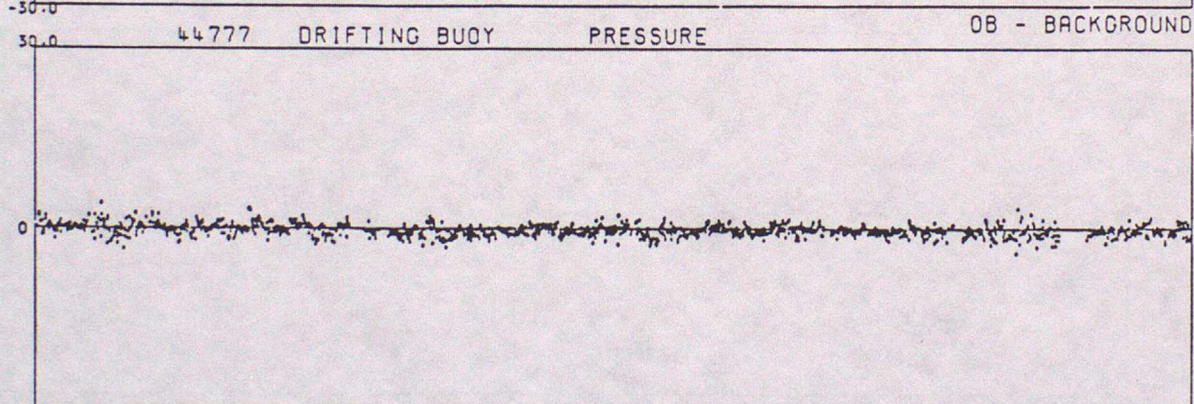
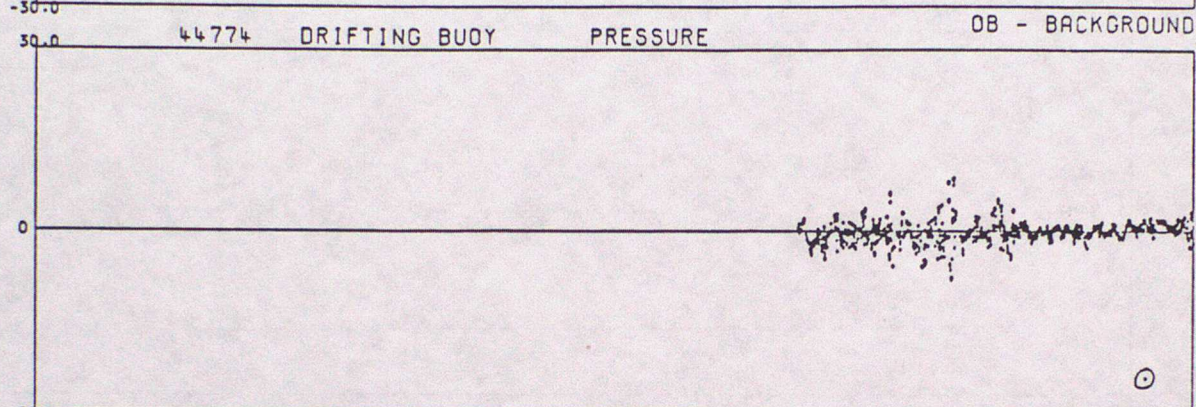
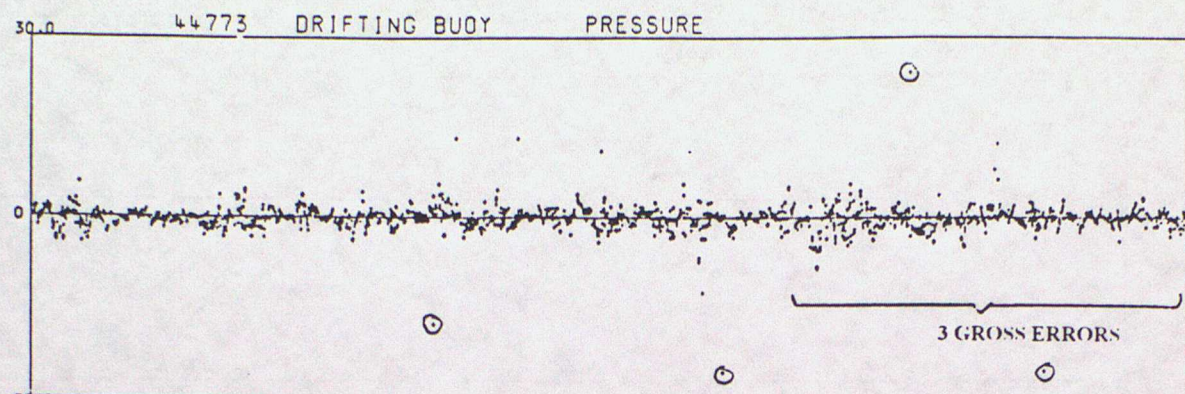
DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)



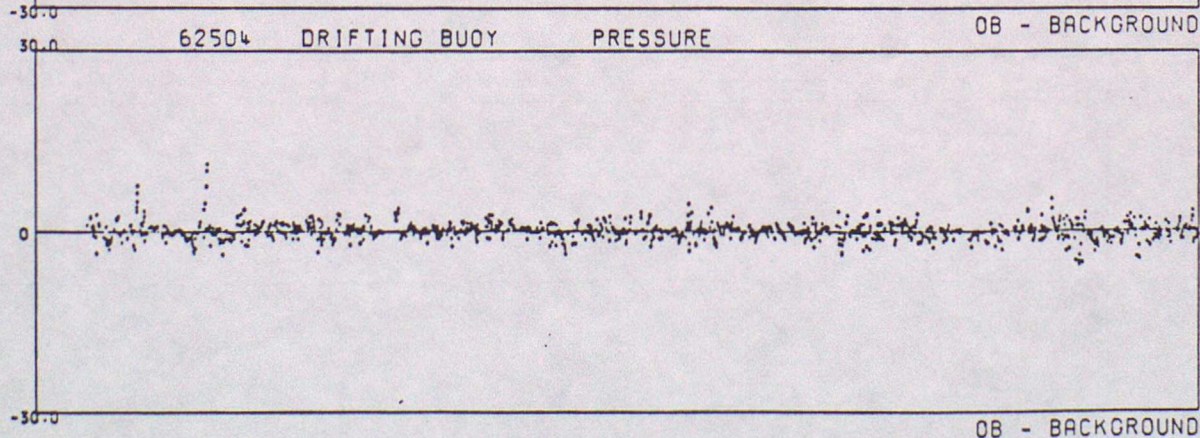
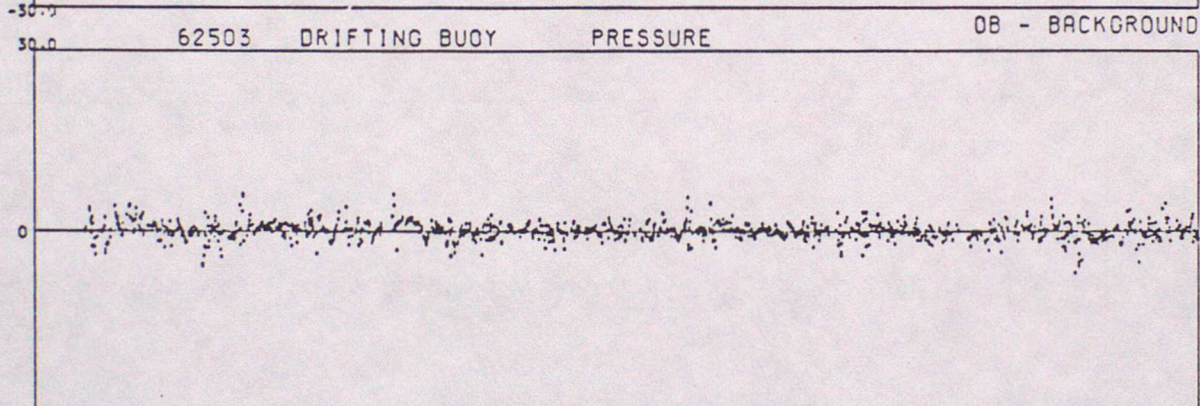
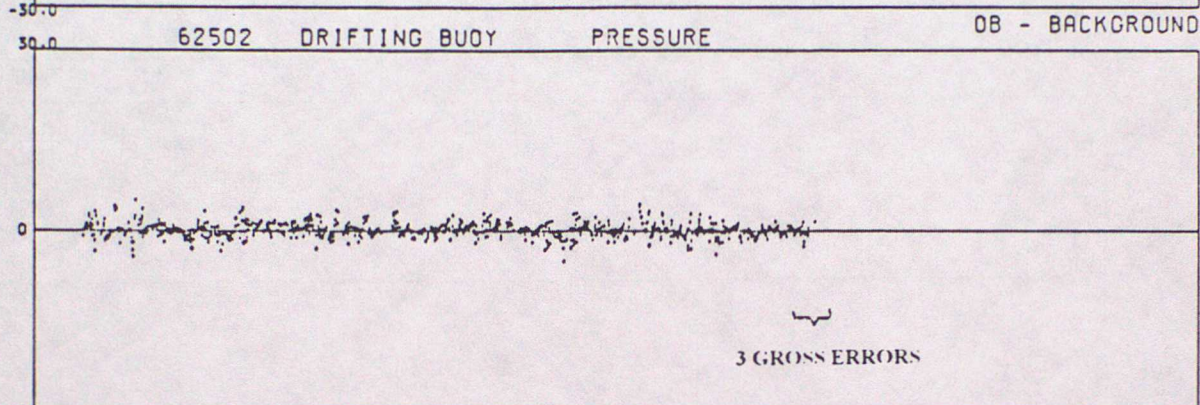
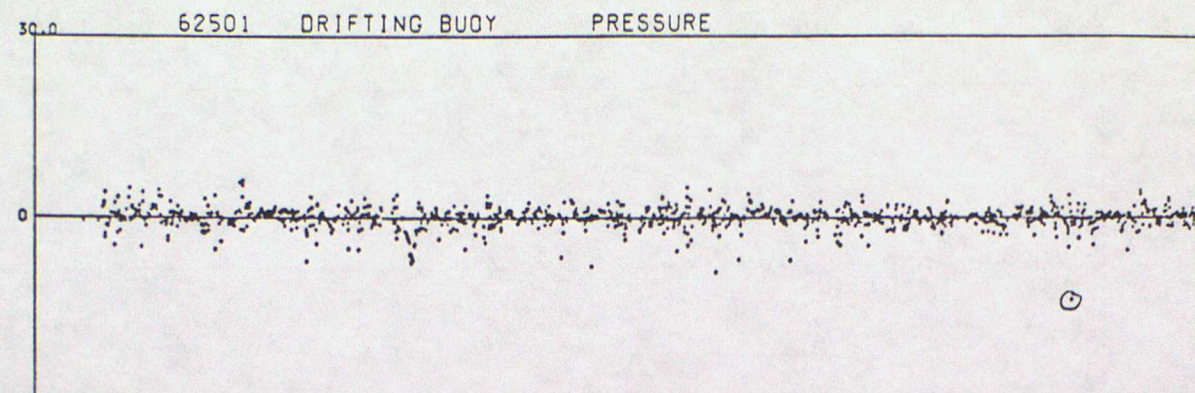
DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)



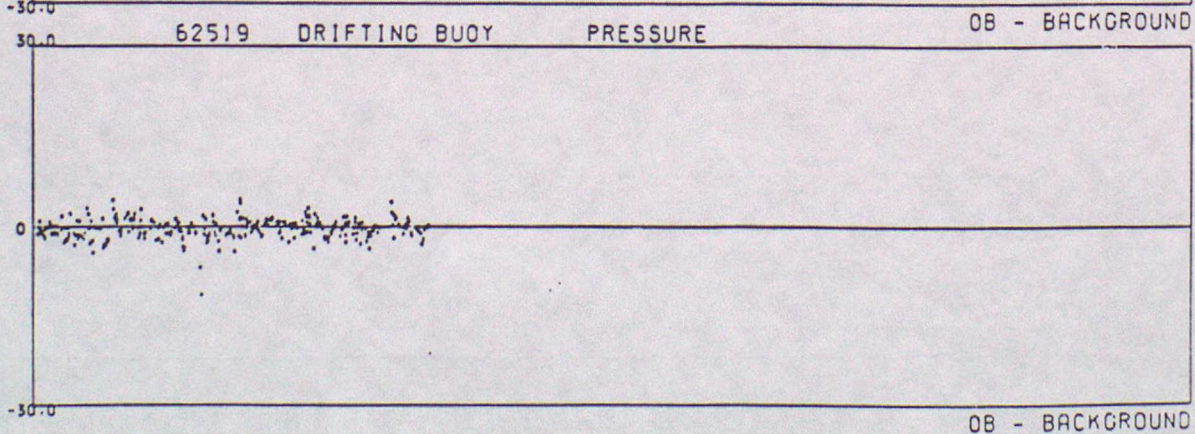
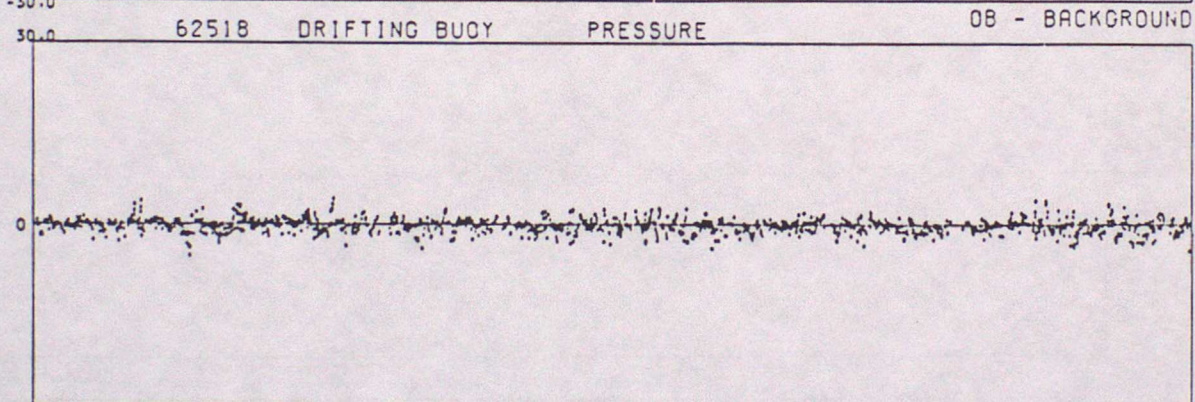
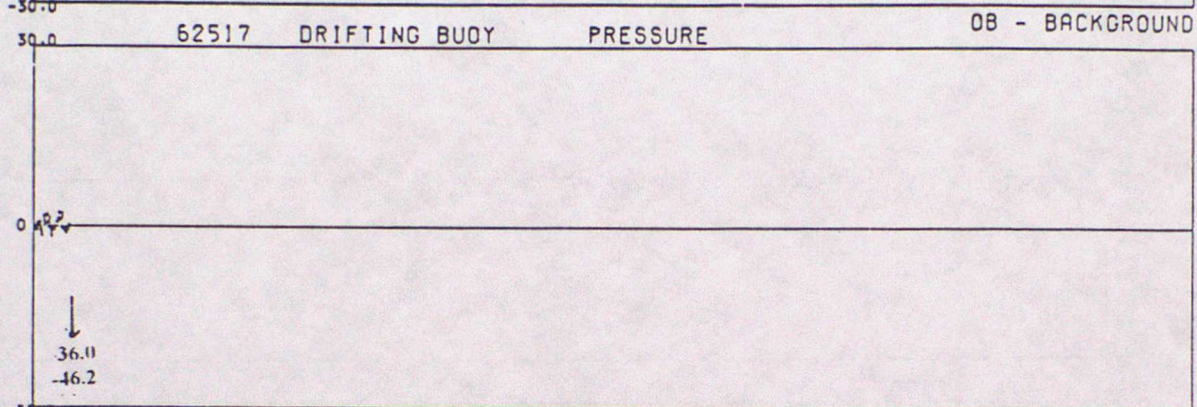
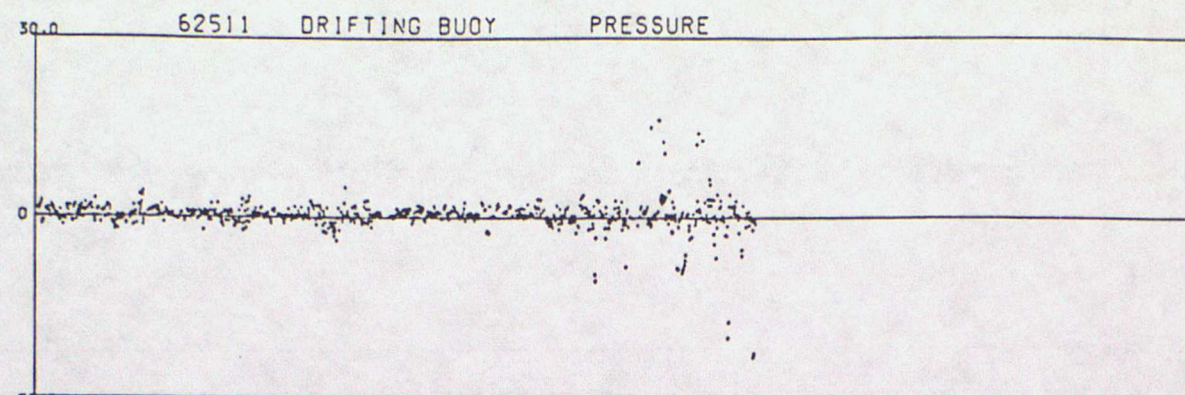
DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)



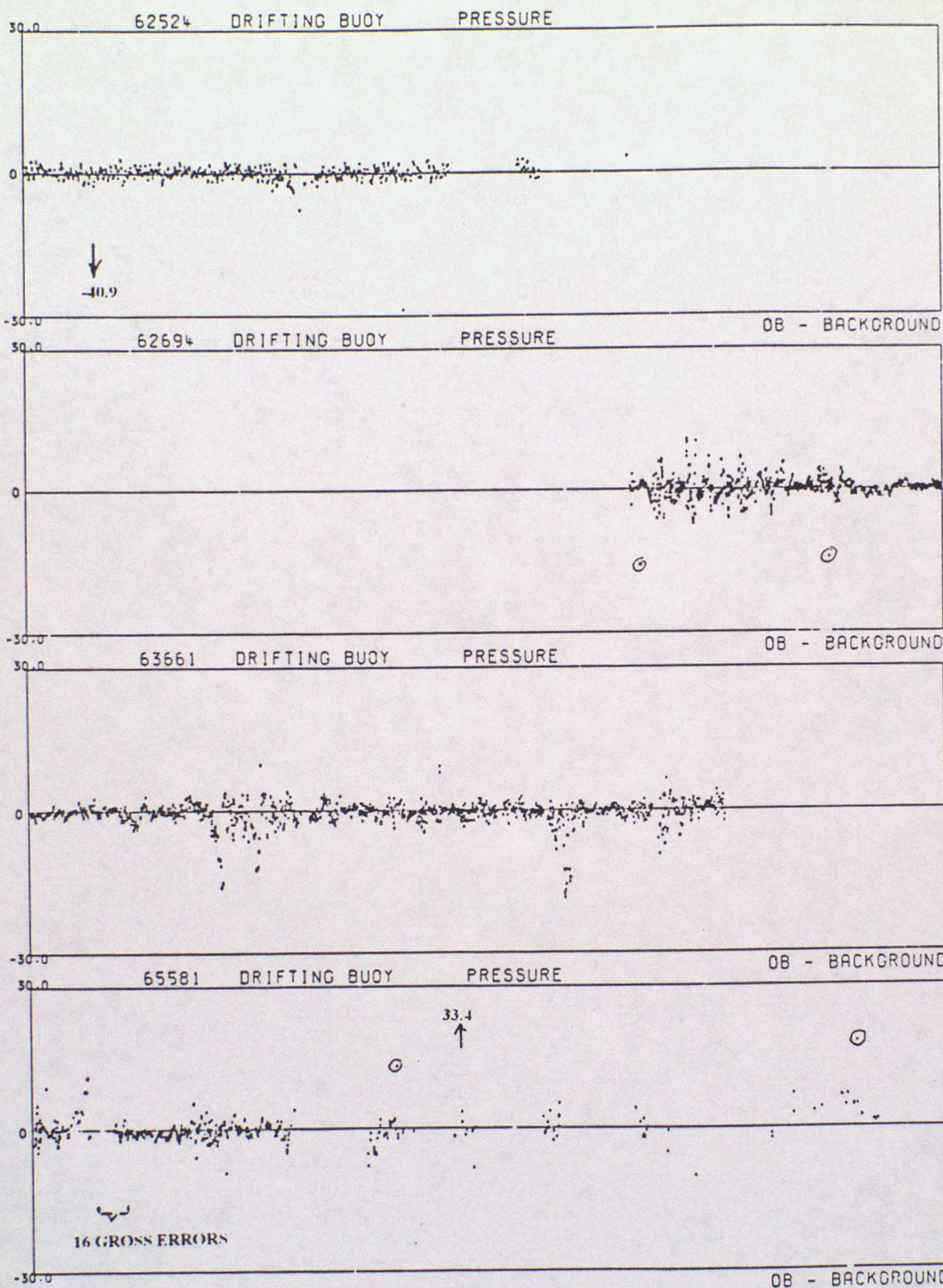
DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)

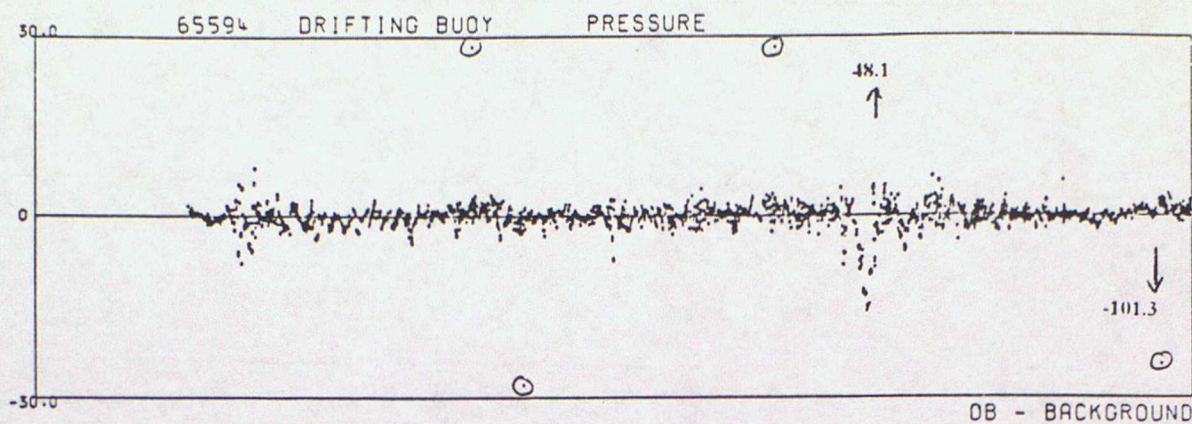


DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)



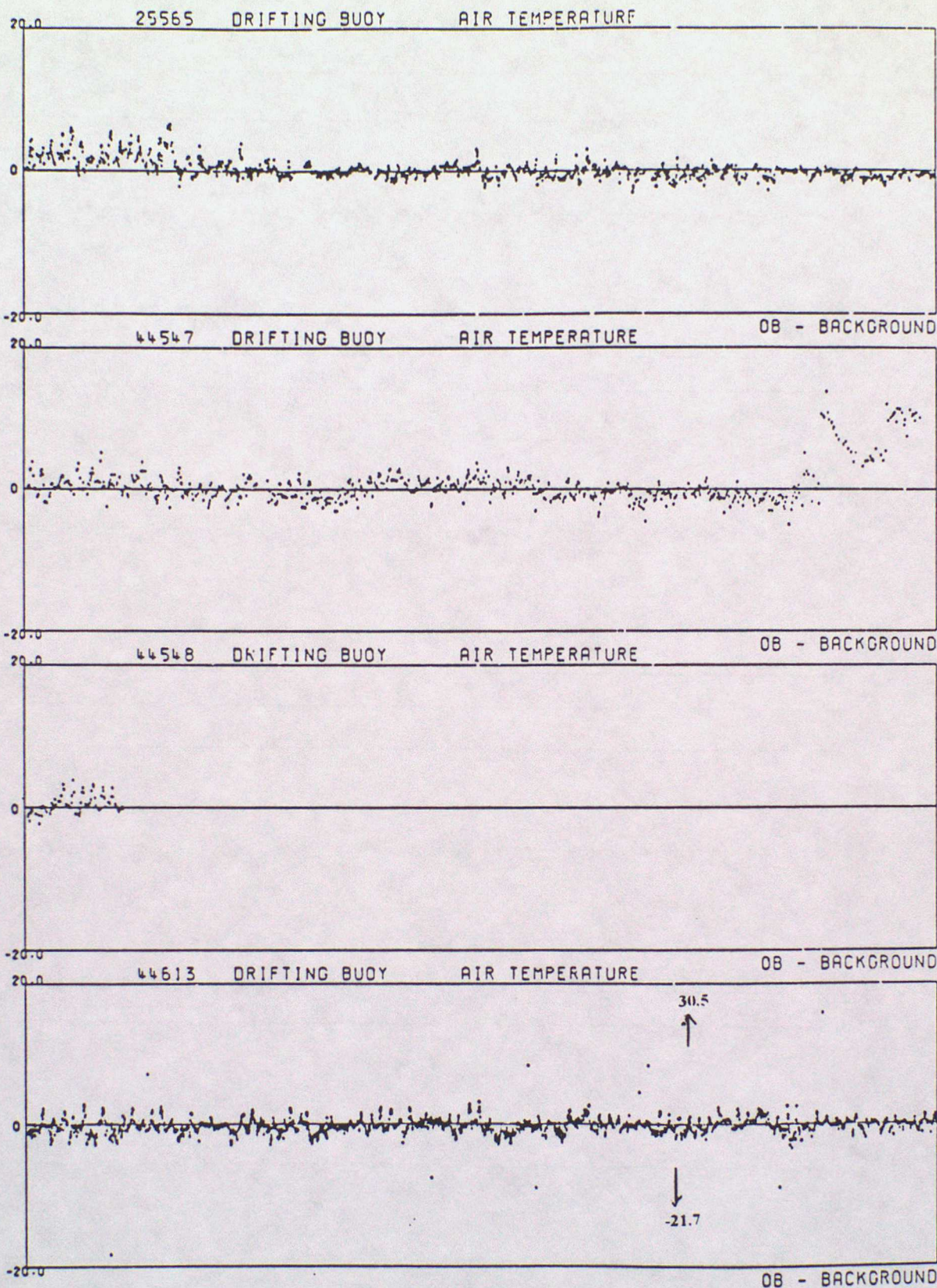
DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)



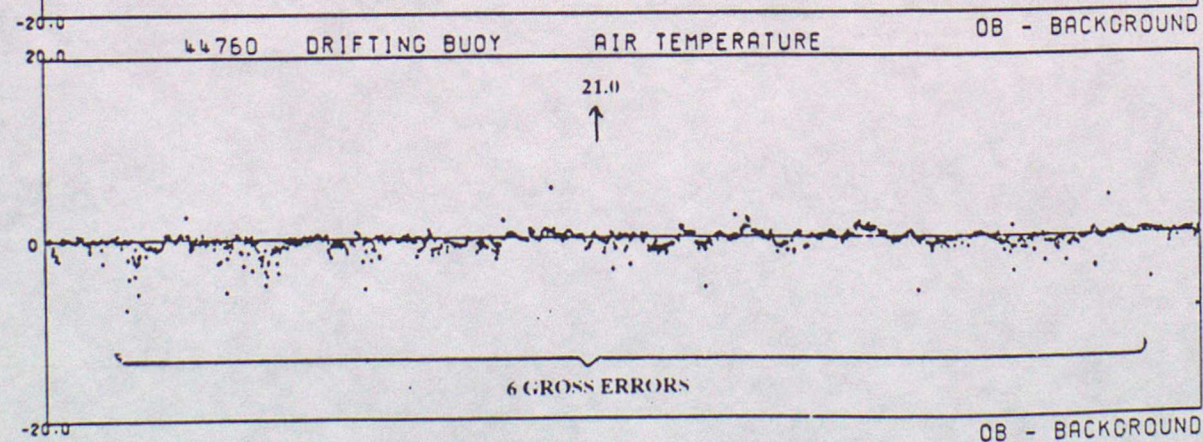
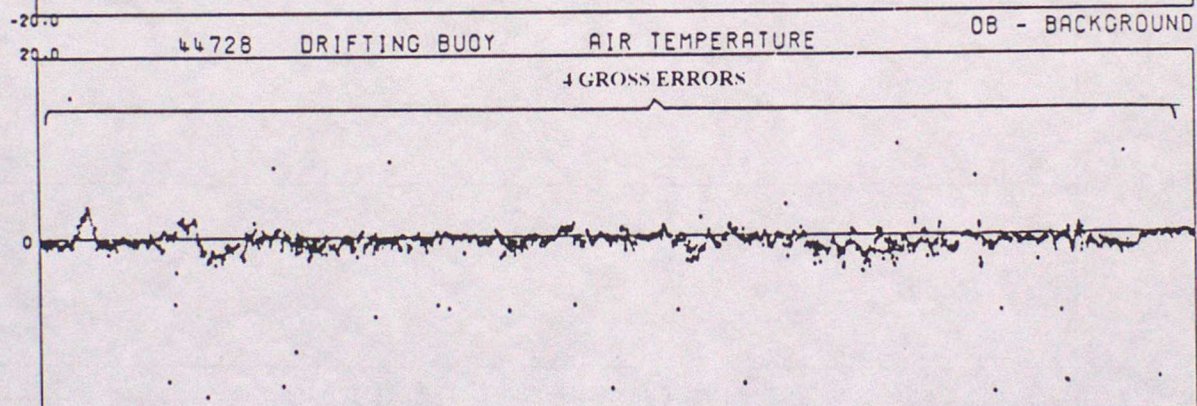
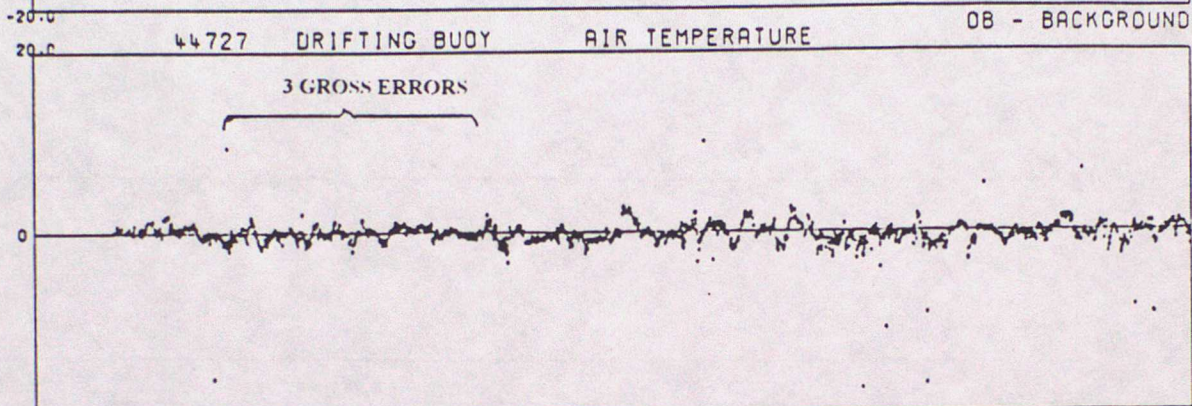
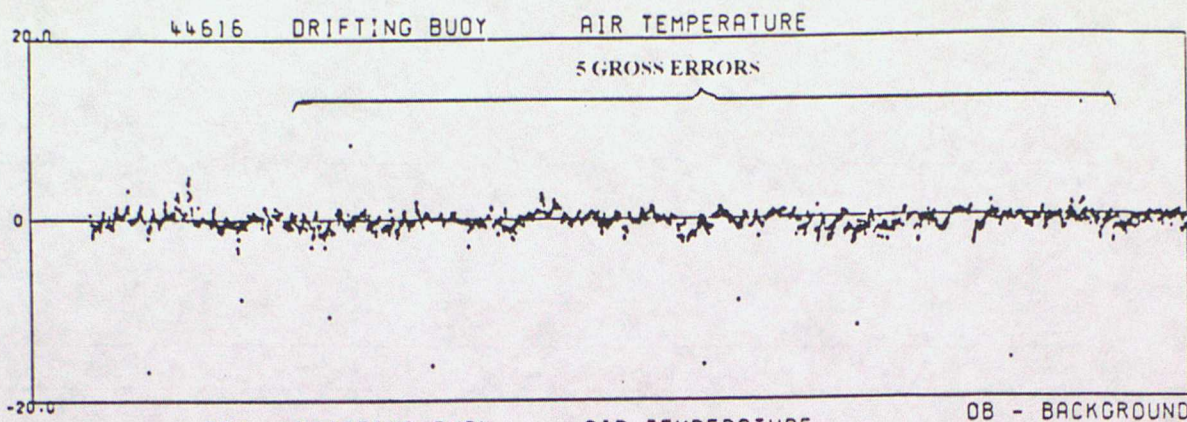


ANNEX C - TIME SERIES PLOTS OF AIR TEMPERATURE

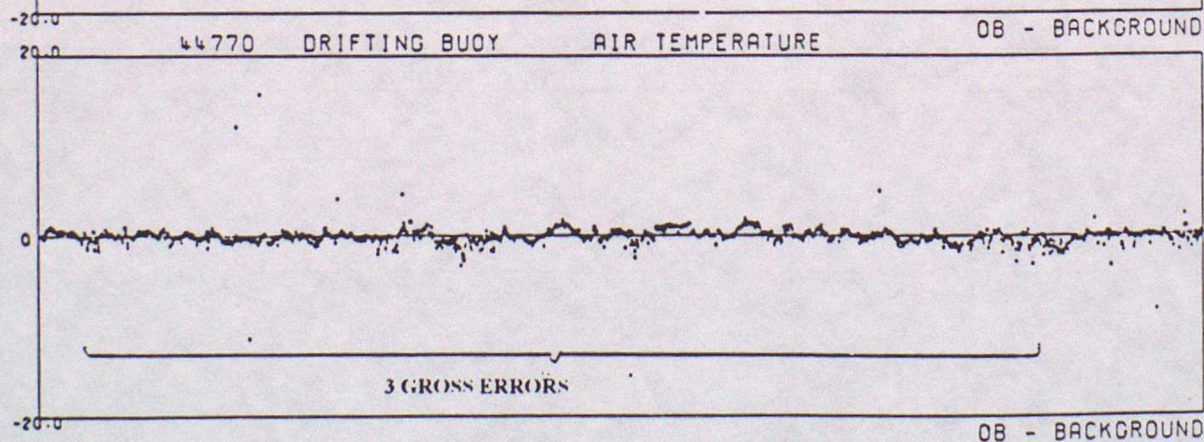
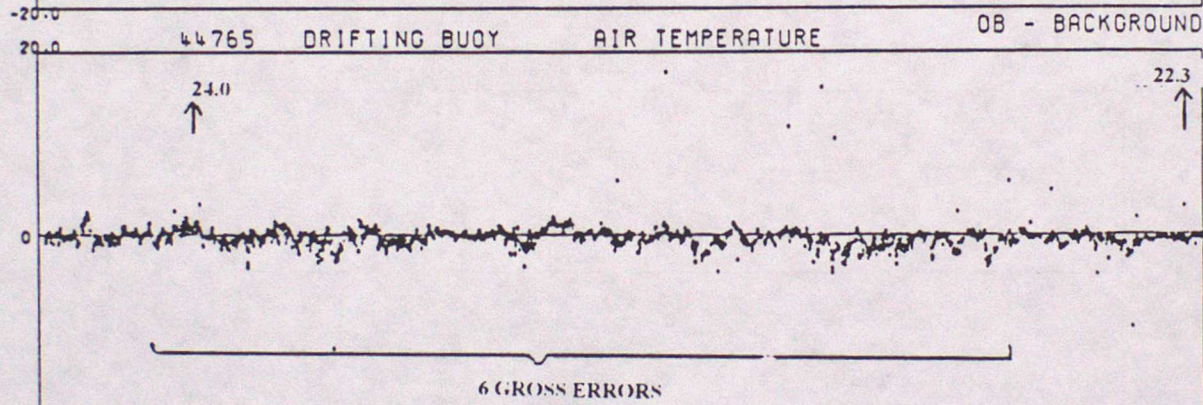
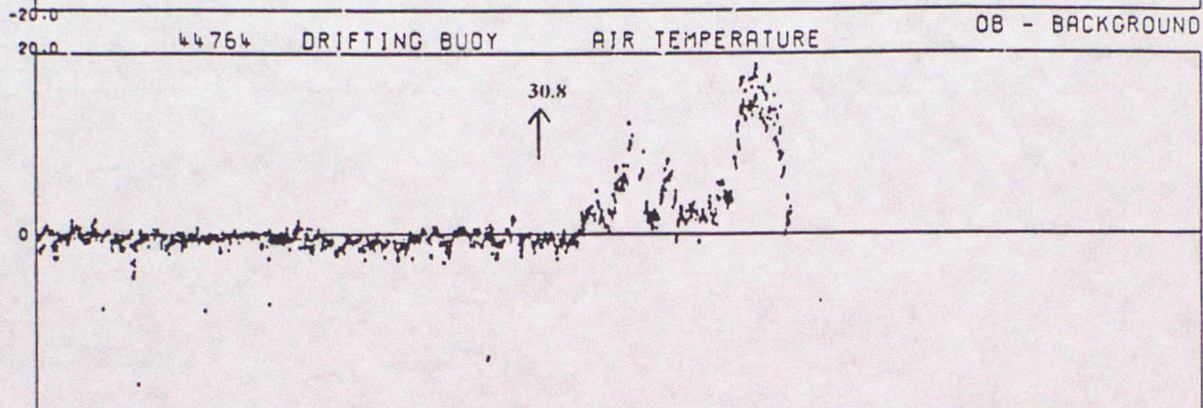
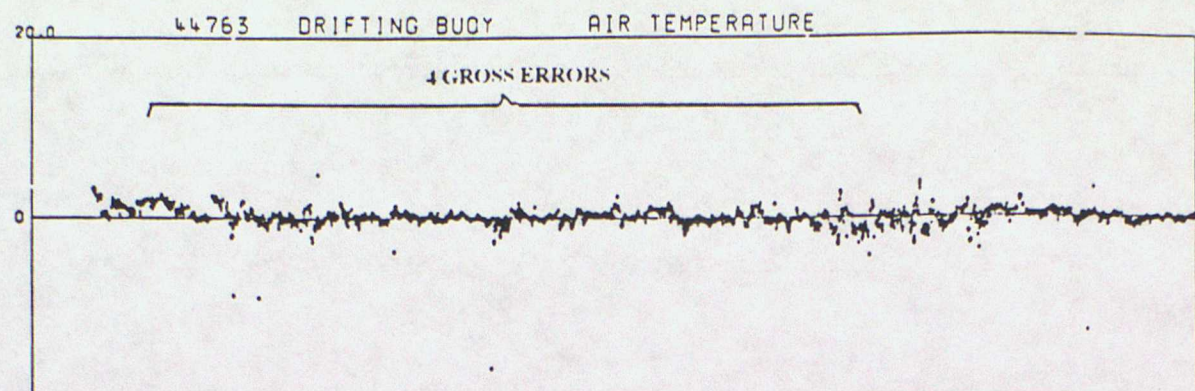
DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)



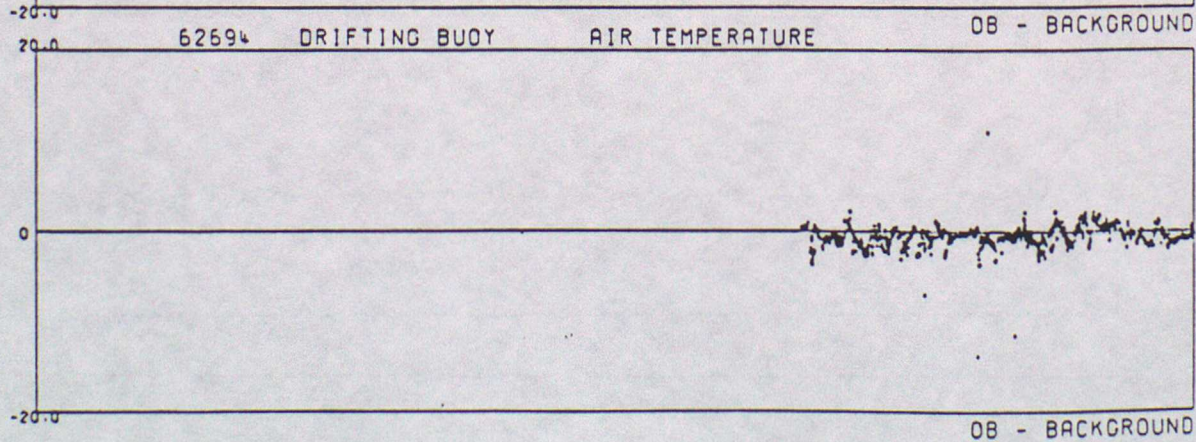
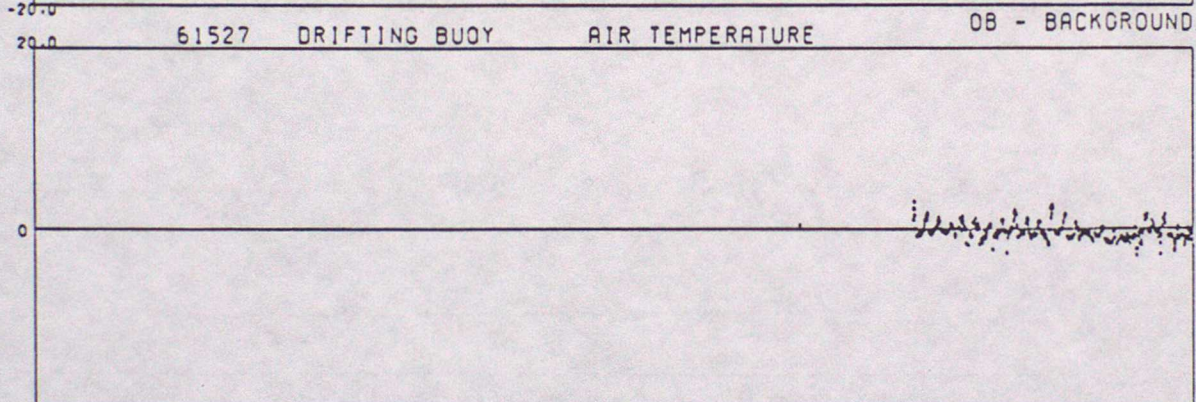
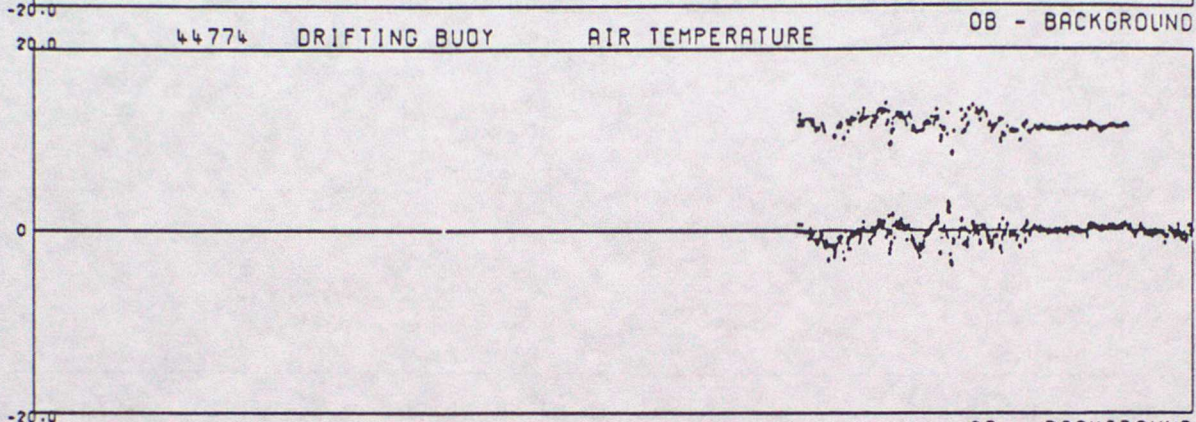
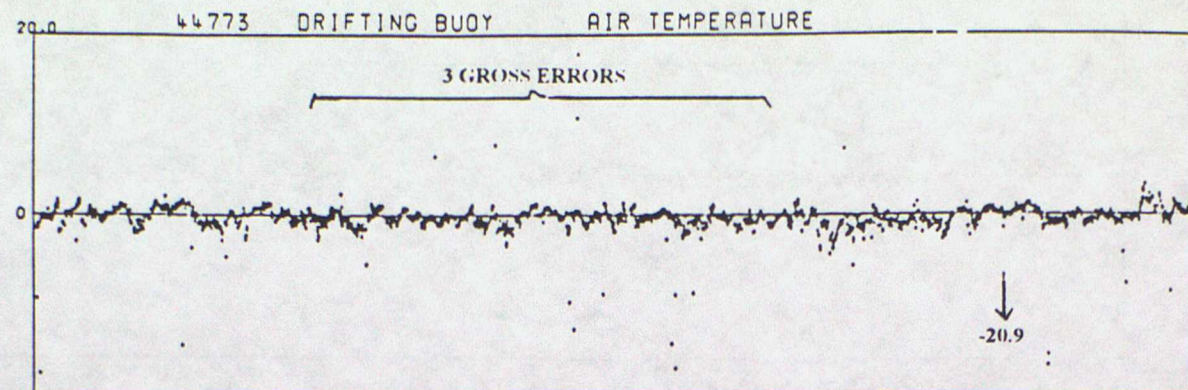
DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)



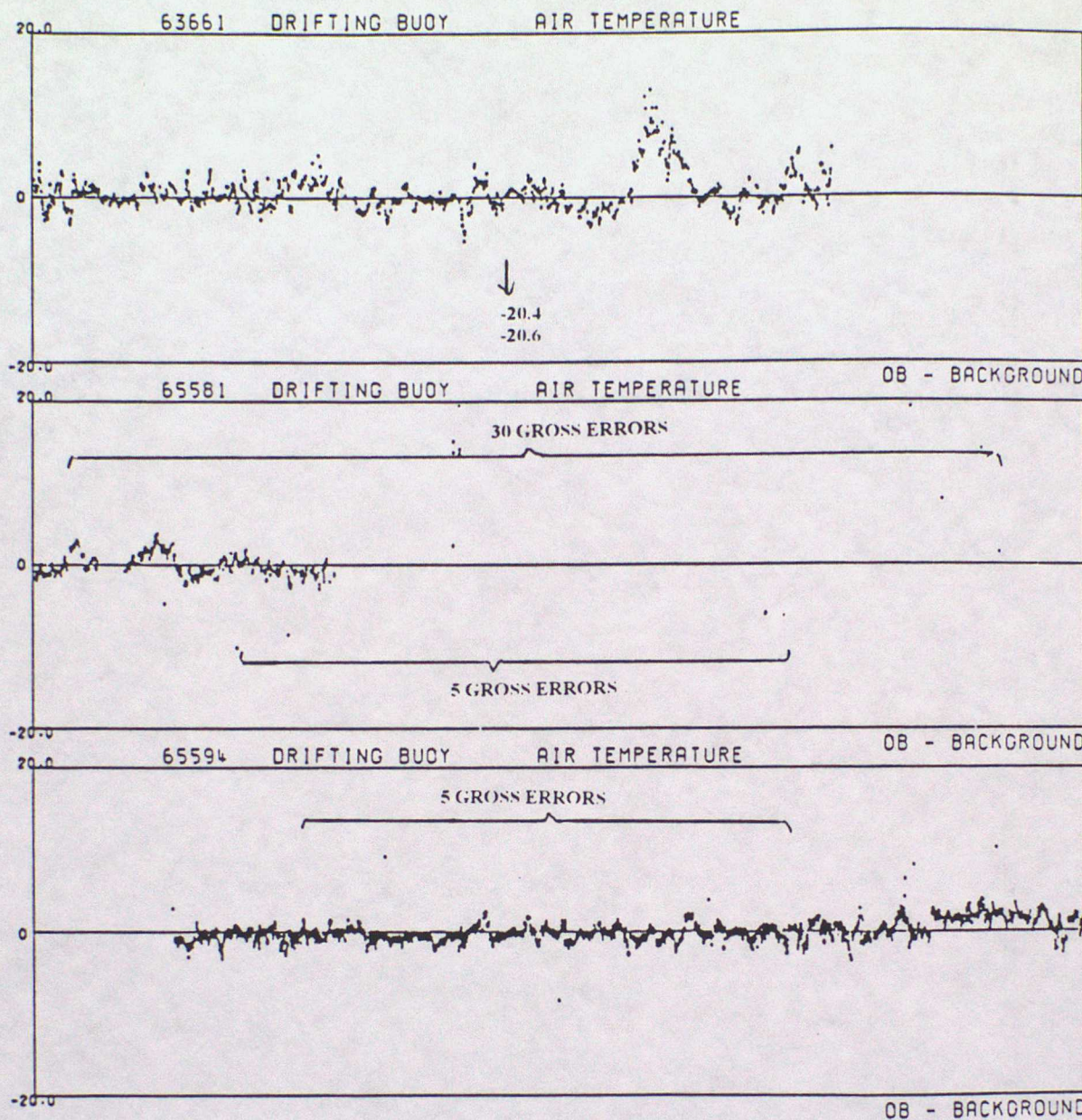
DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)



DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)

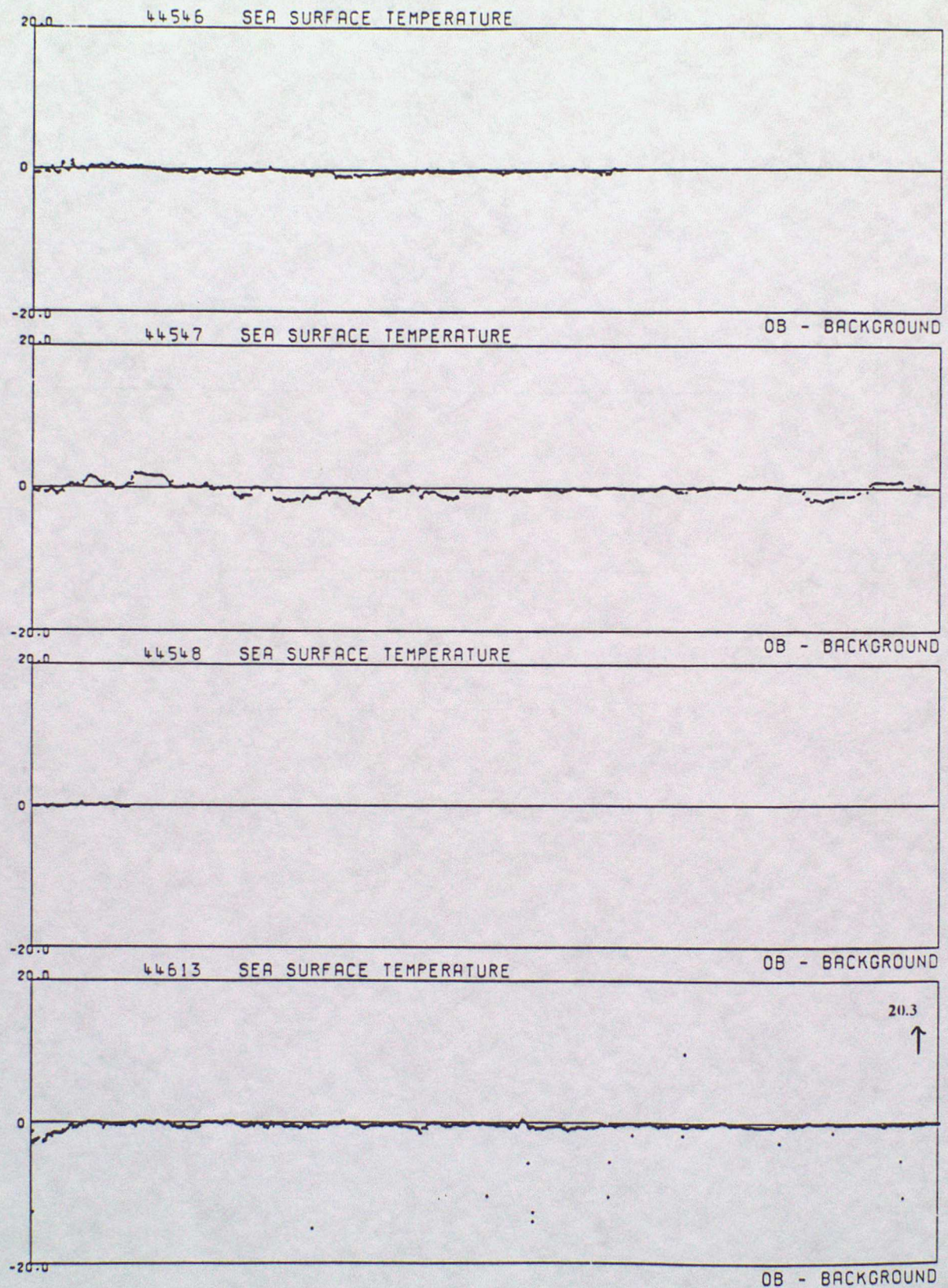


DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)

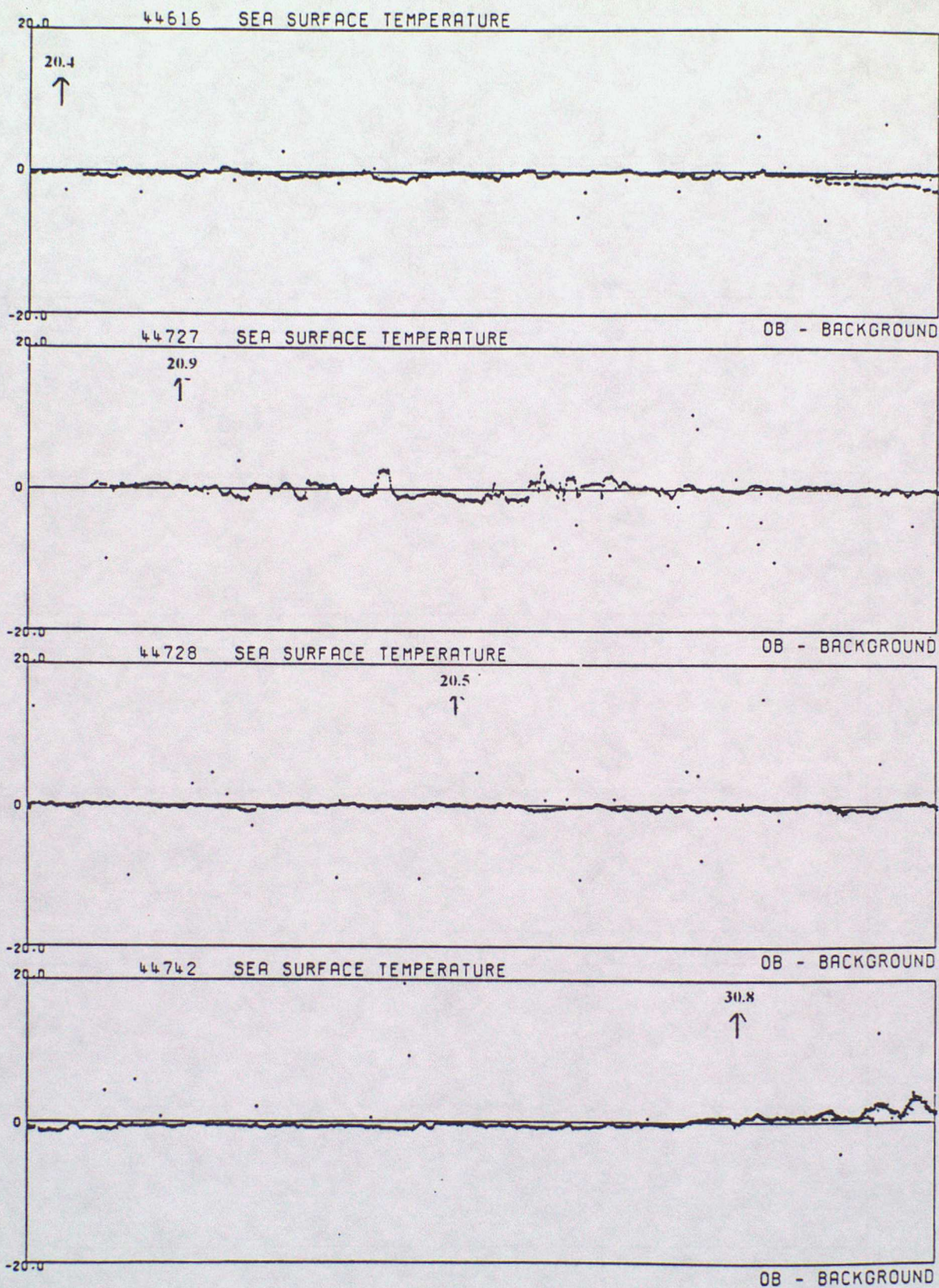


ANNEX D - TIME SERIES PLOTS OF SEA SURFACE TEMPERATURE

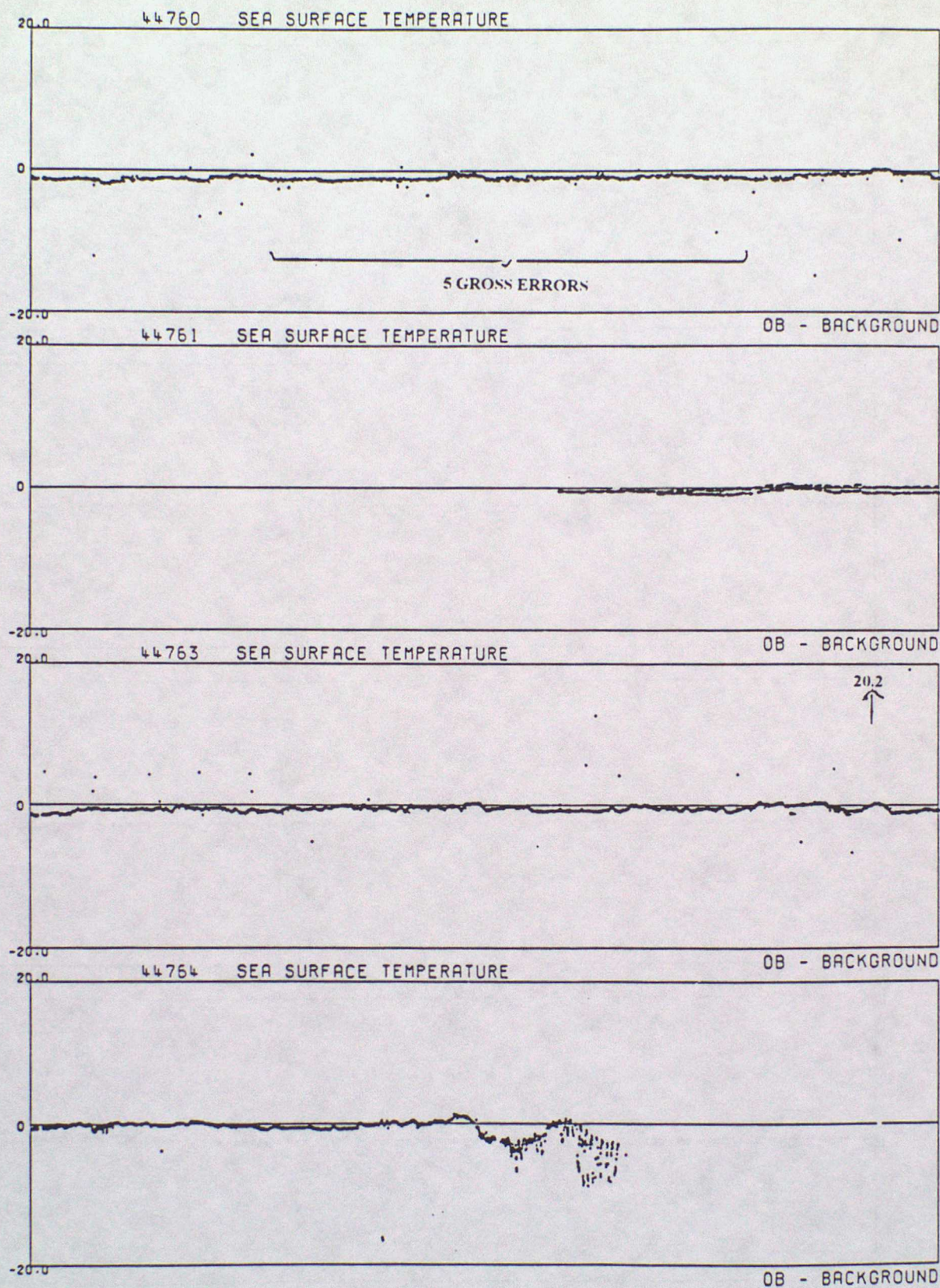
DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)



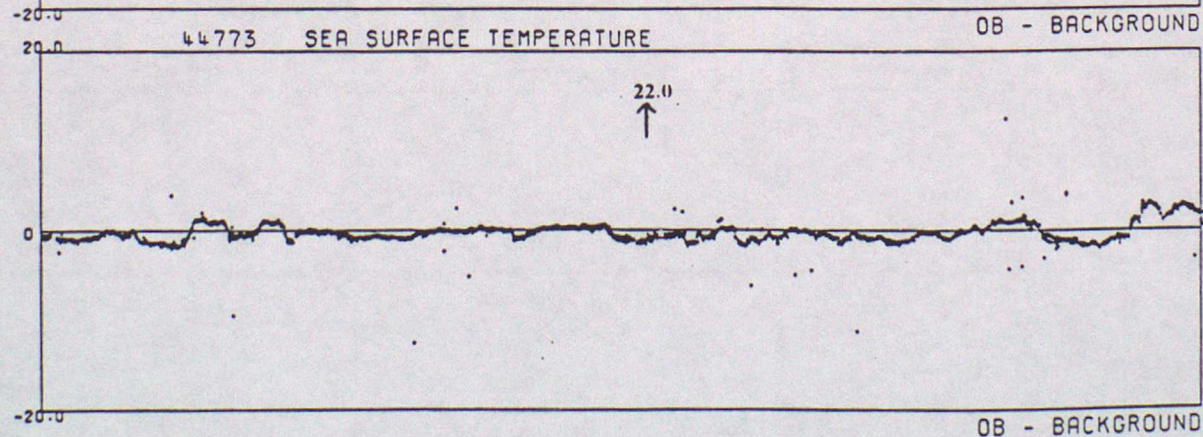
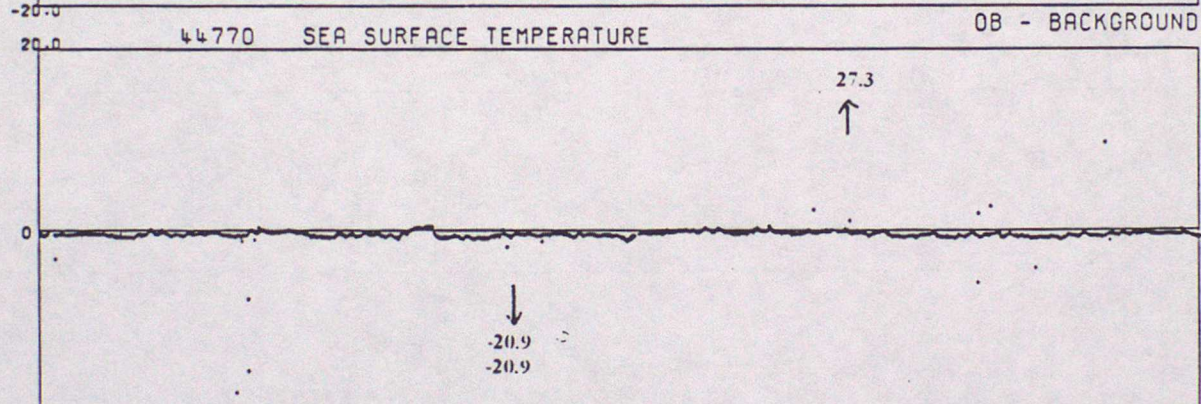
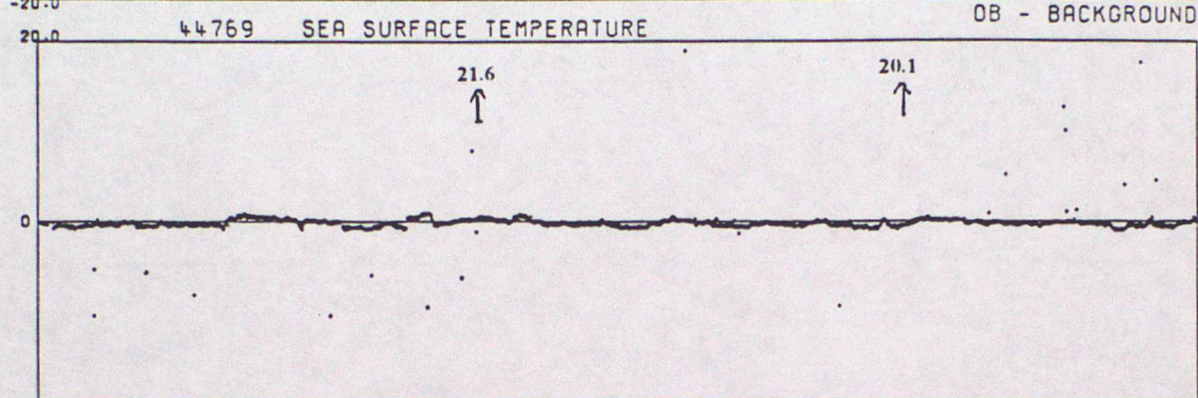
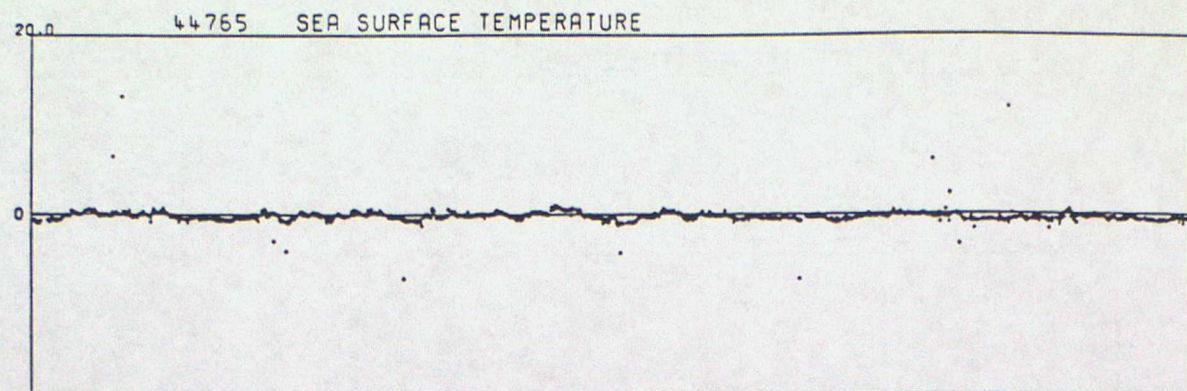
DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)



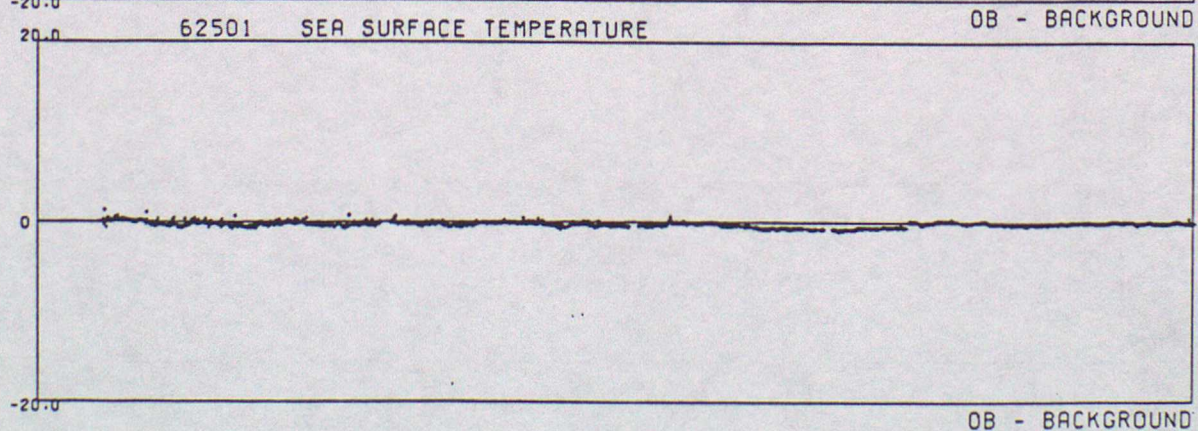
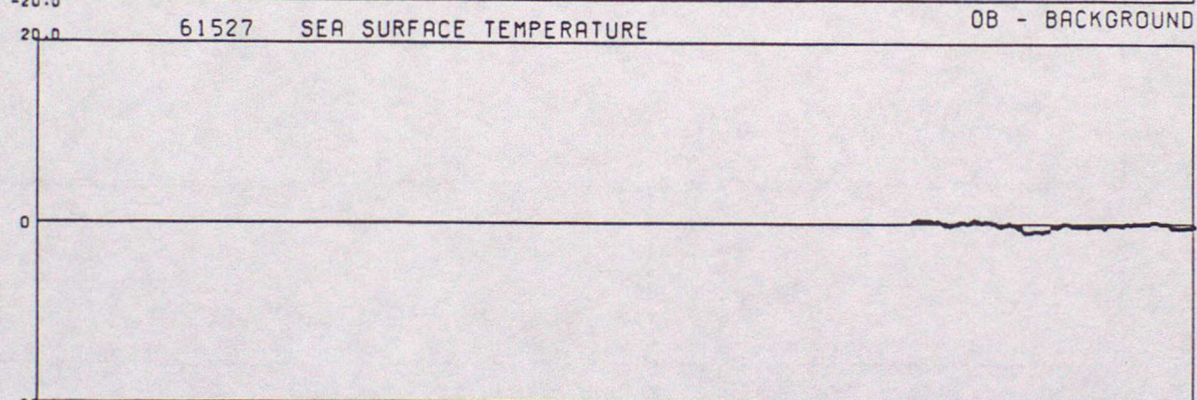
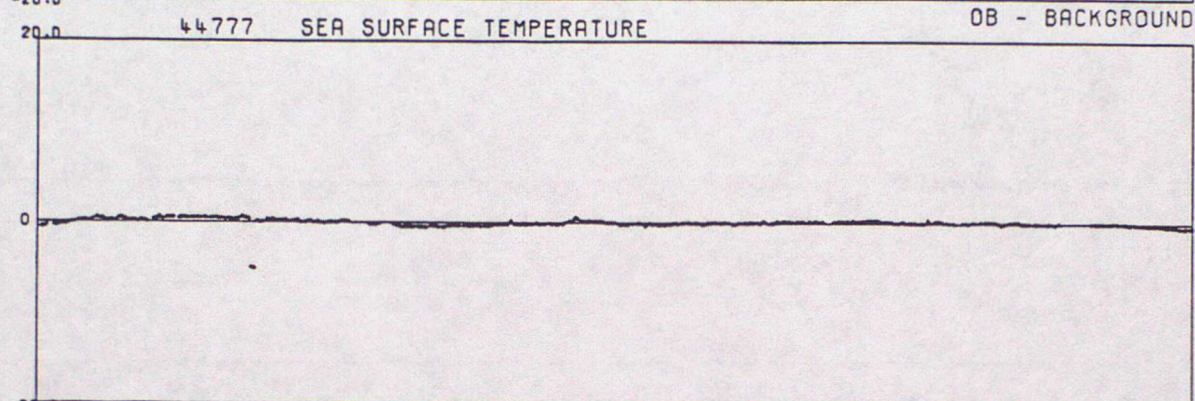
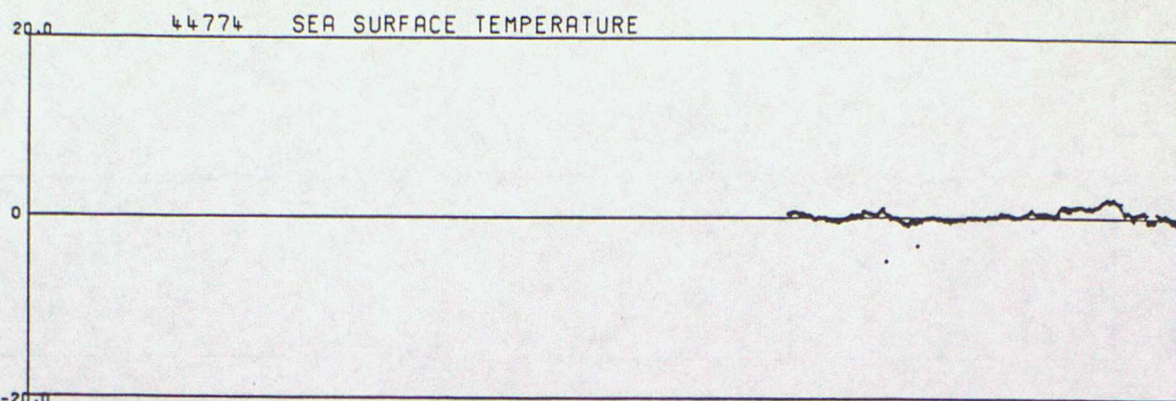
DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)



DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)

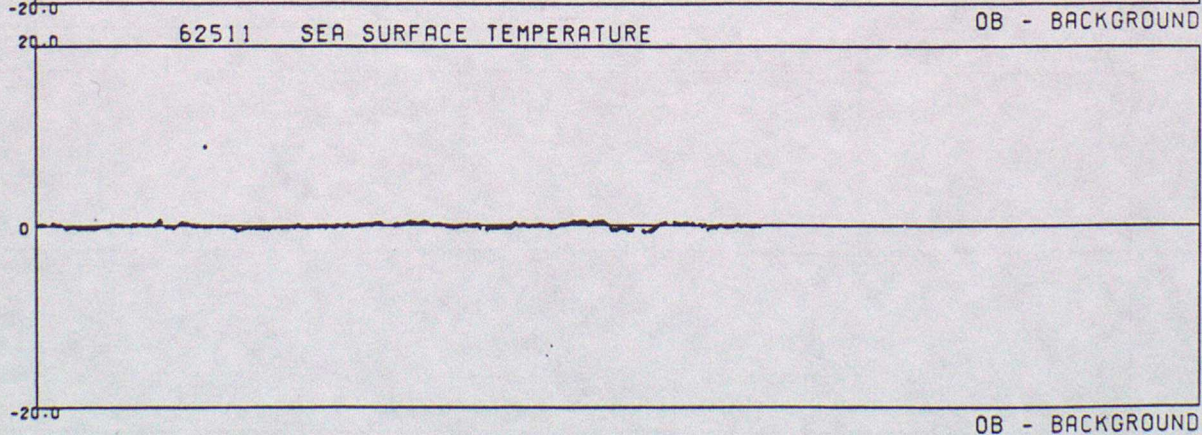
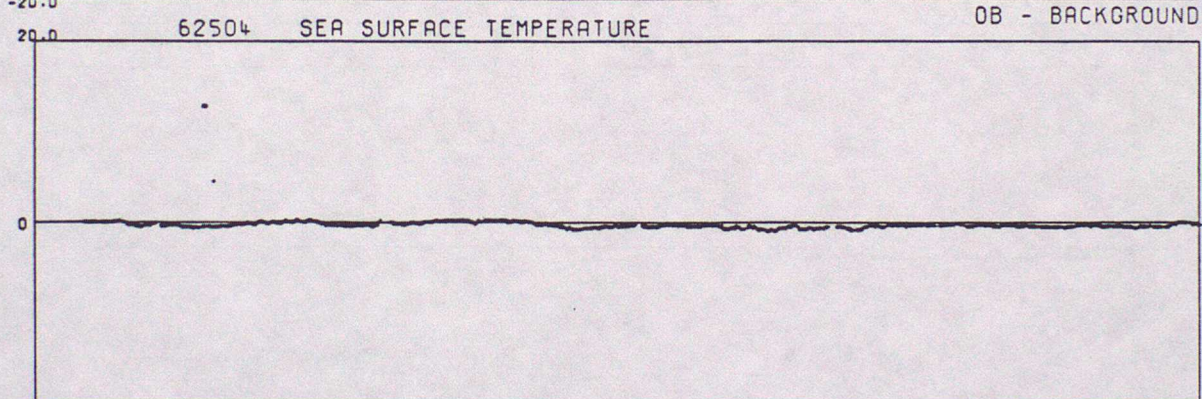
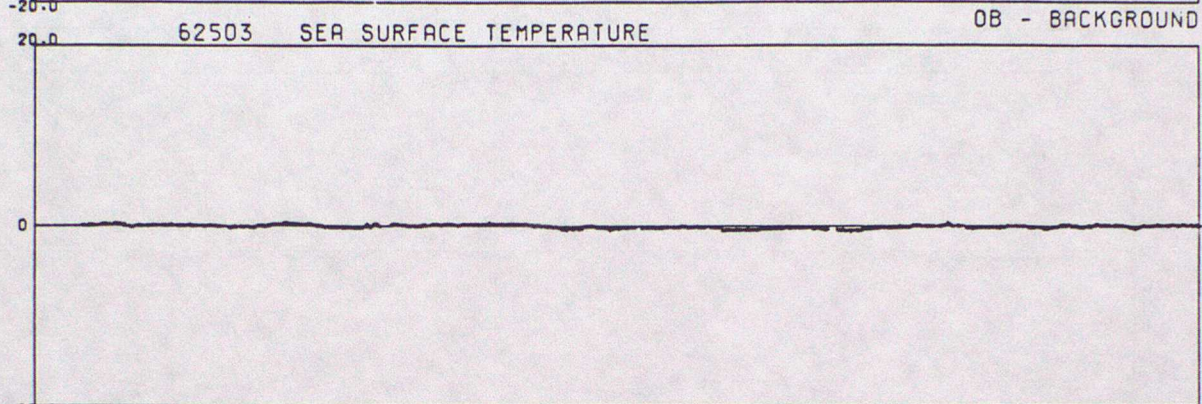
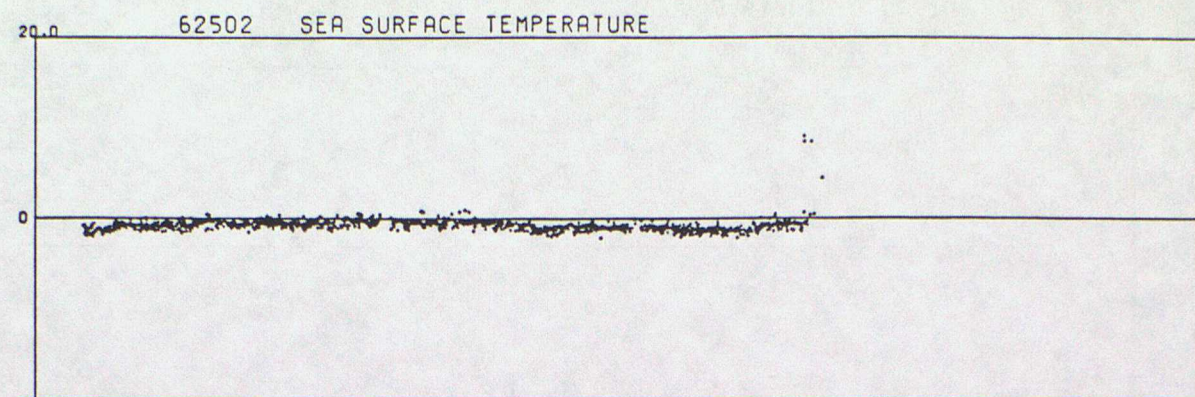


DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)

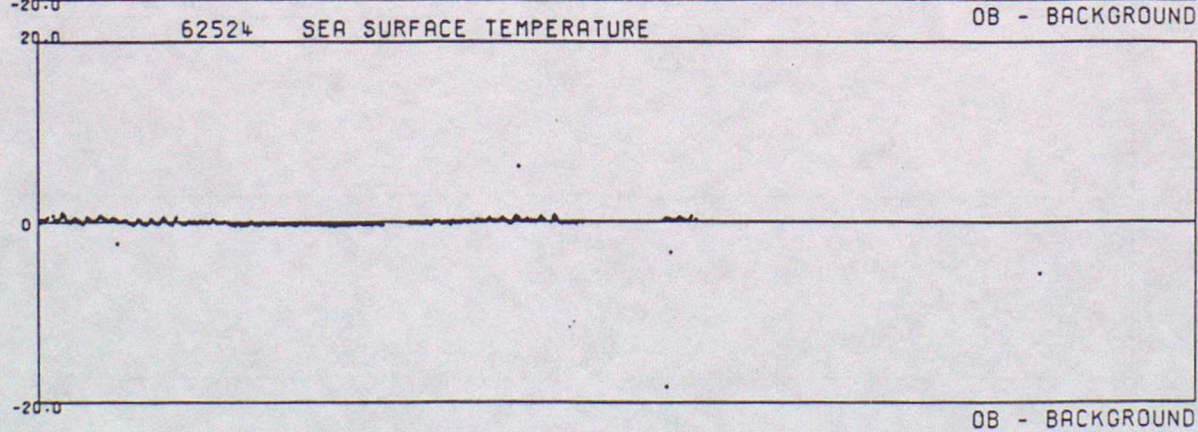
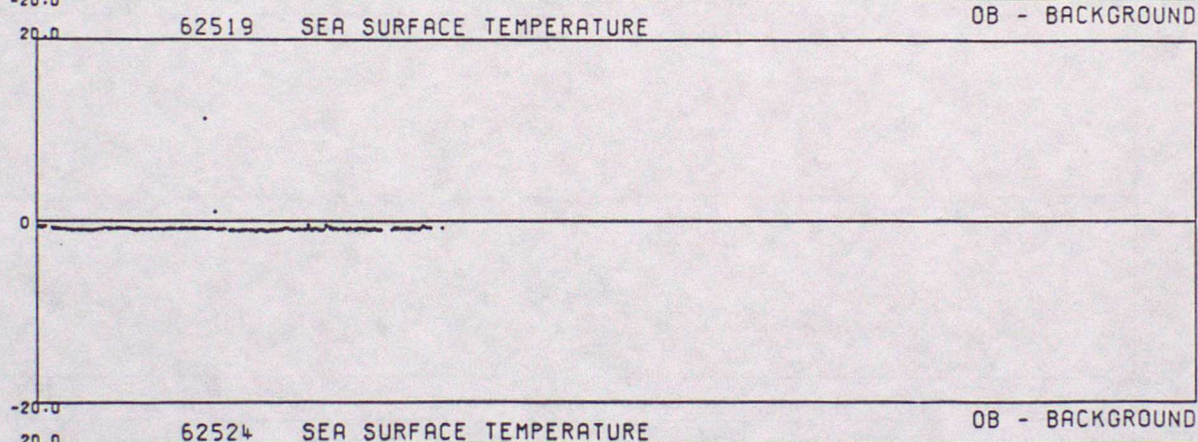
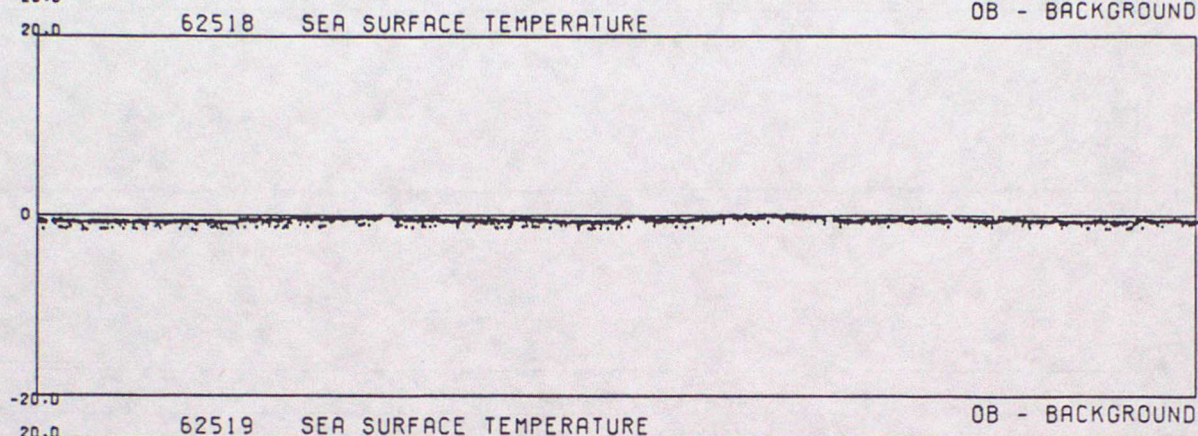
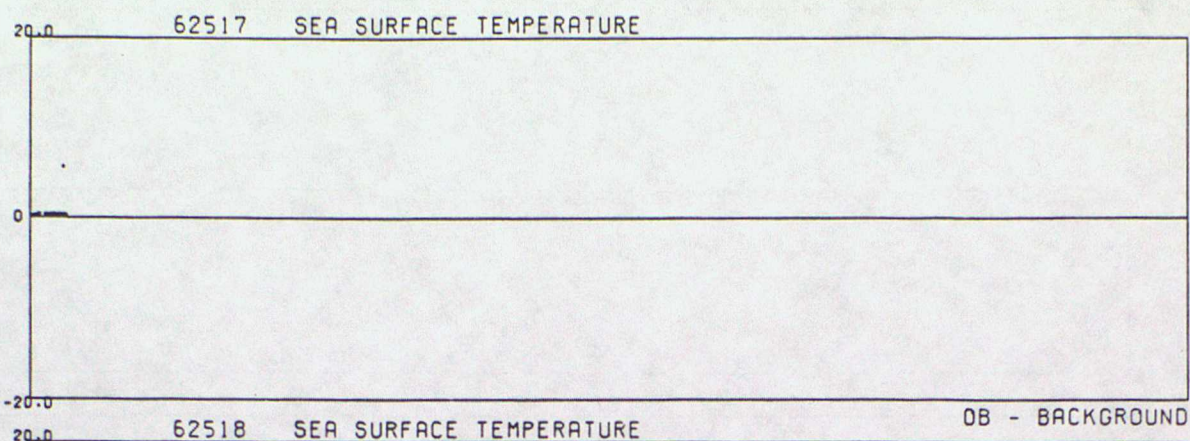


OB - BACKGROUND

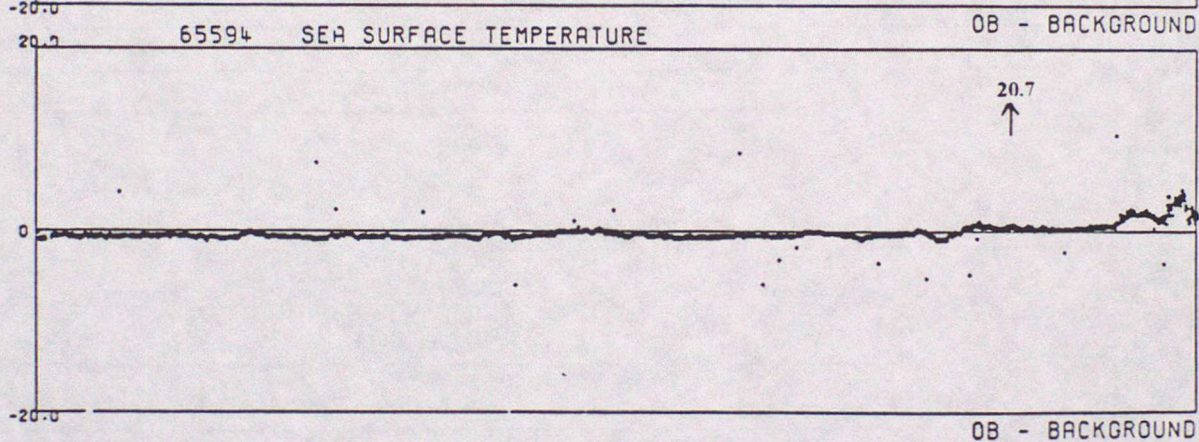
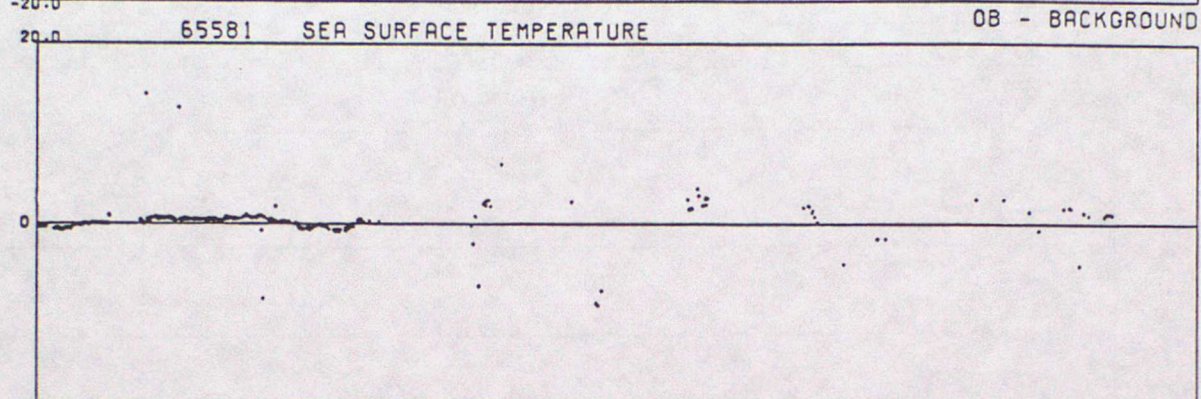
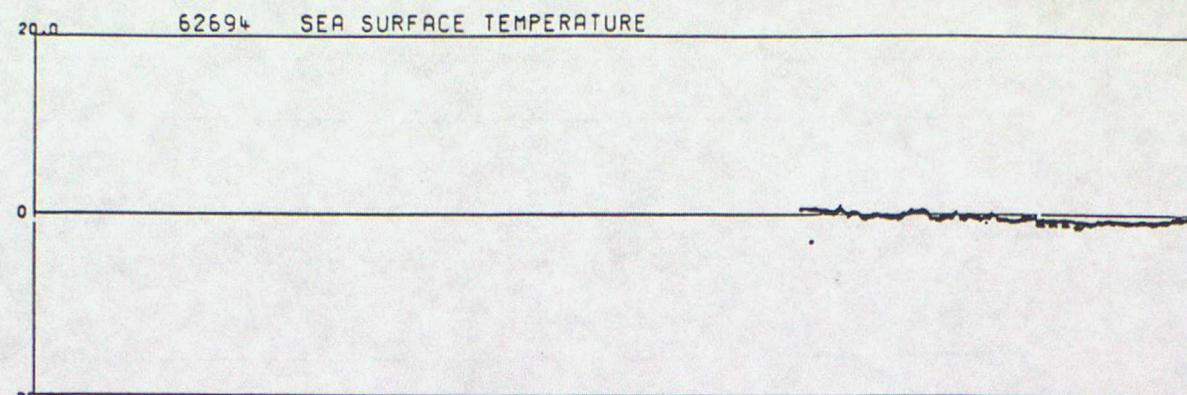
DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)



DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)

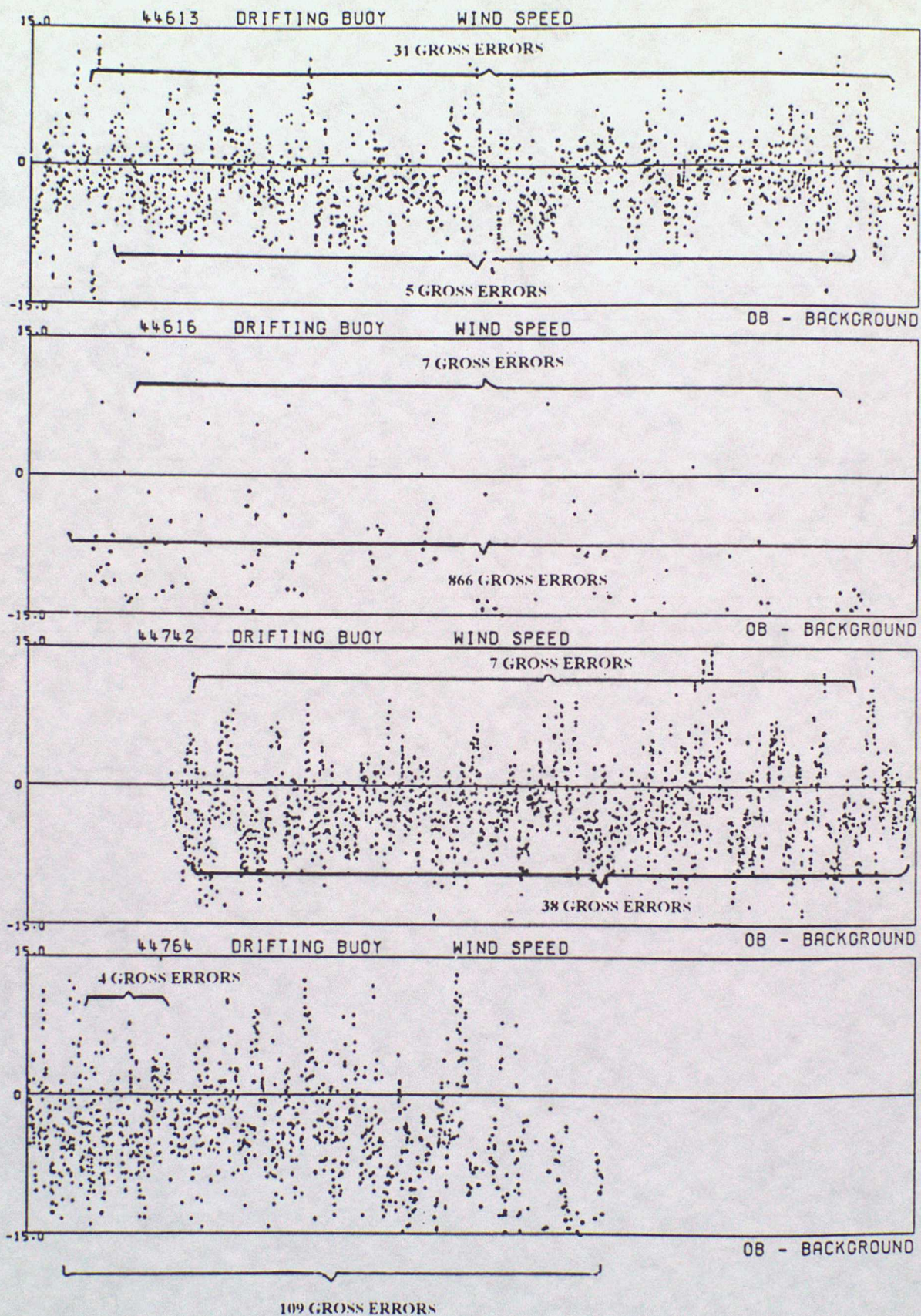


DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)

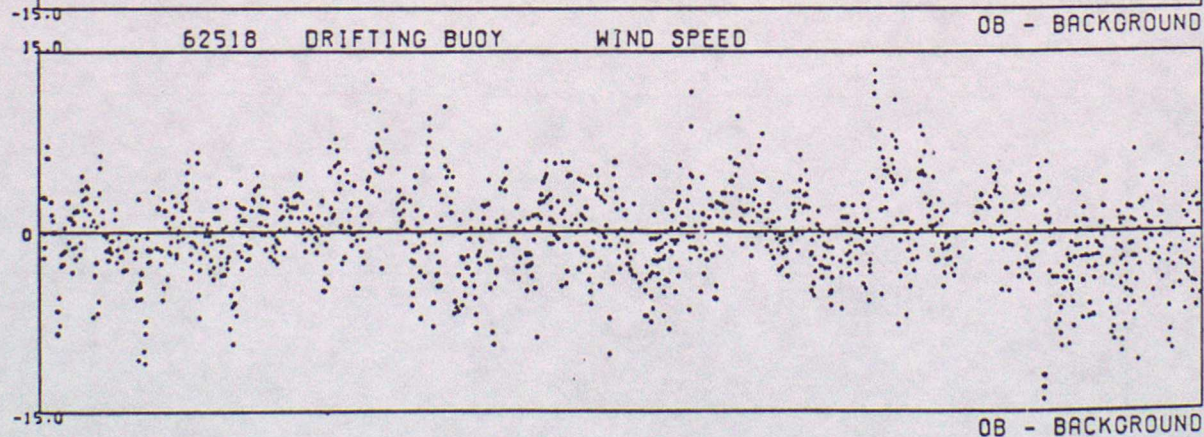
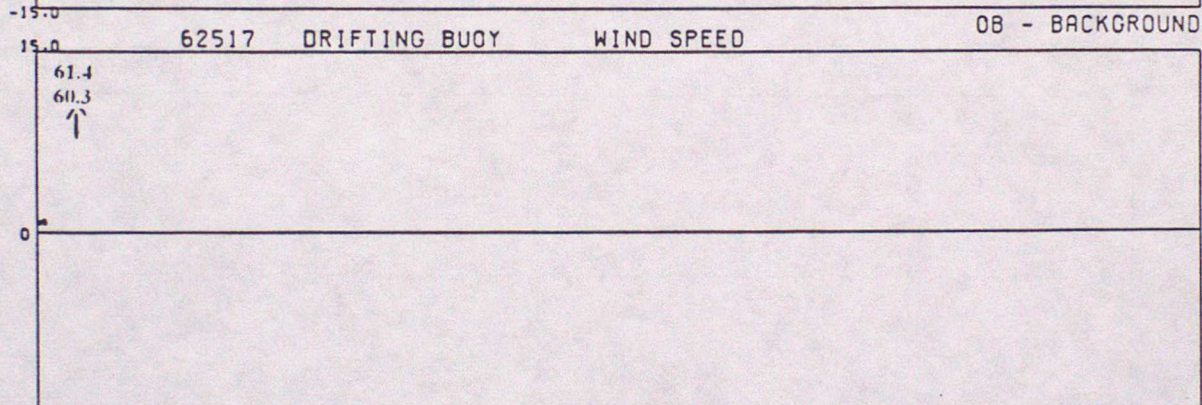
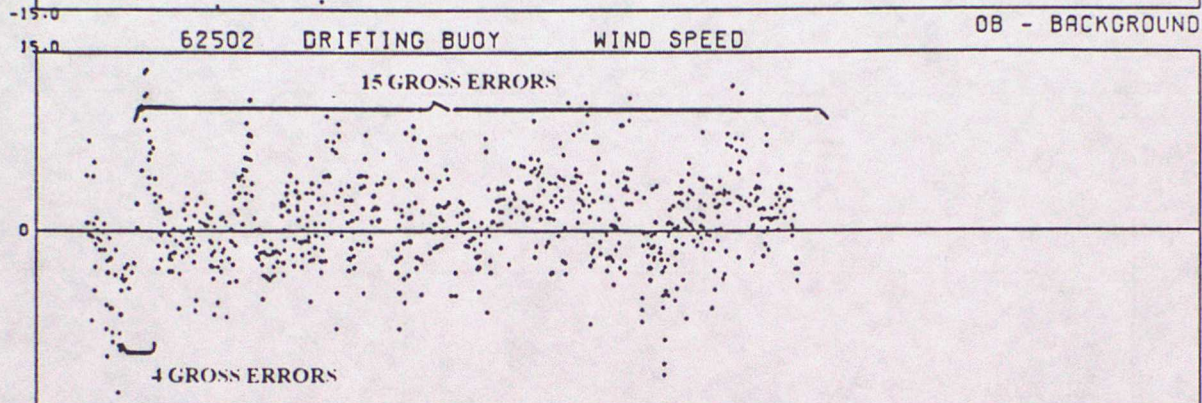
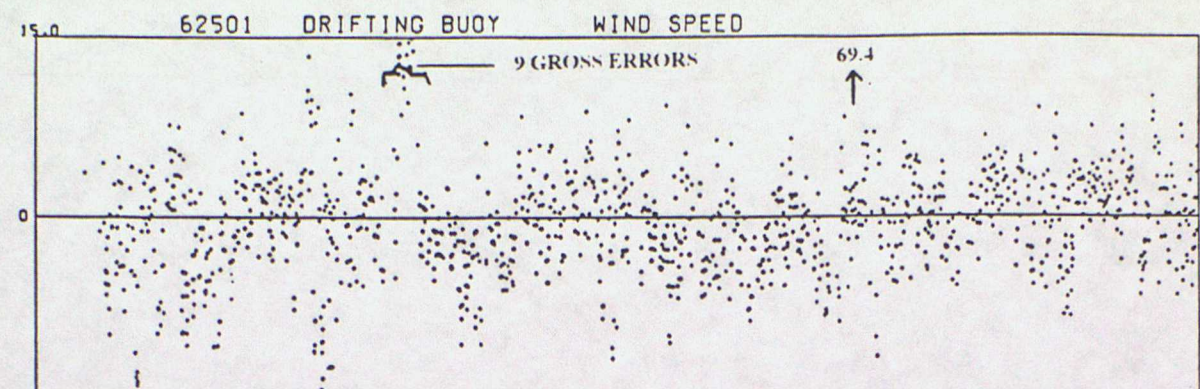


ANNEX E - TIME SERIES PLOTS OF WIND SPEED

DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)

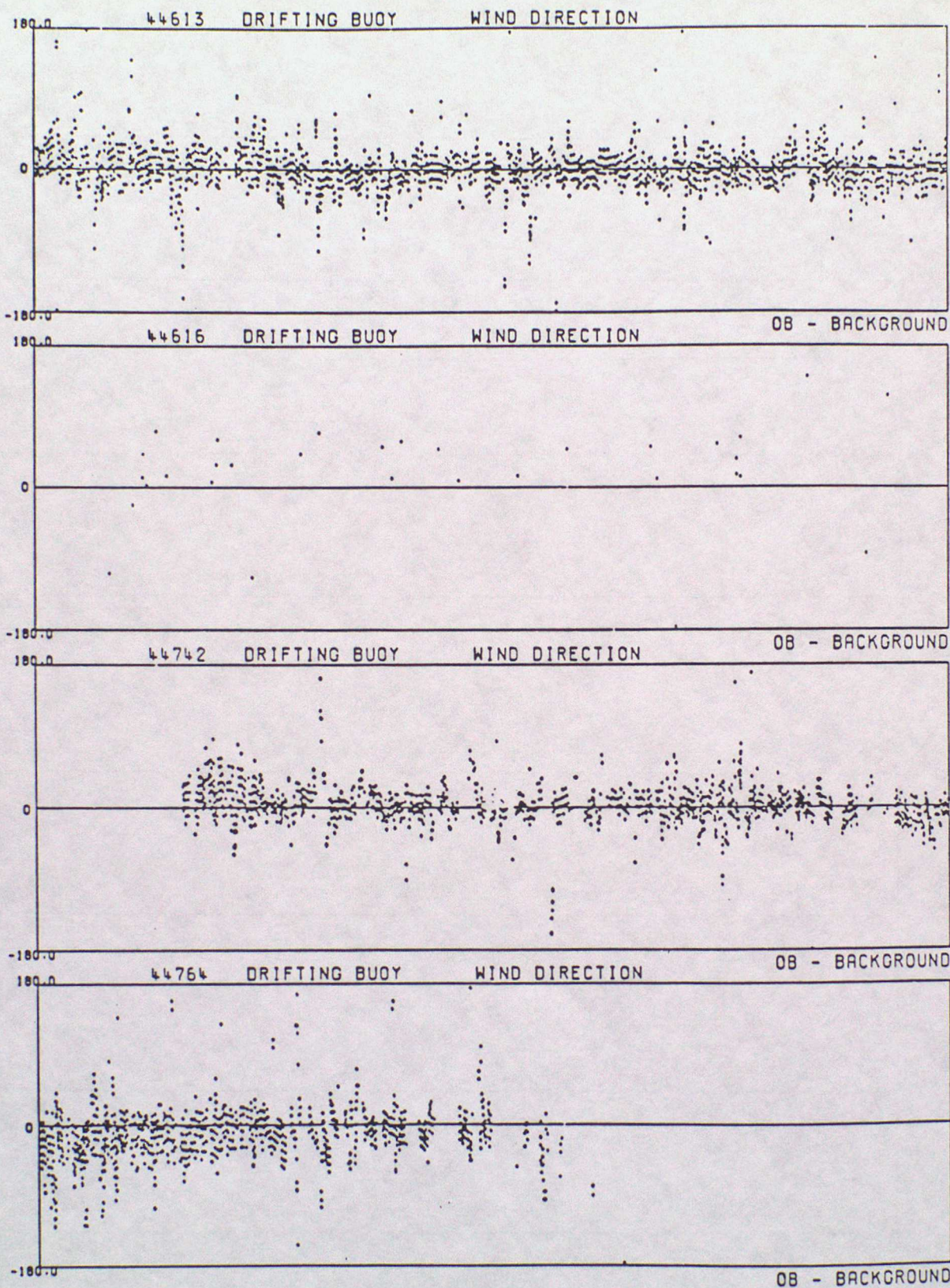


DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)

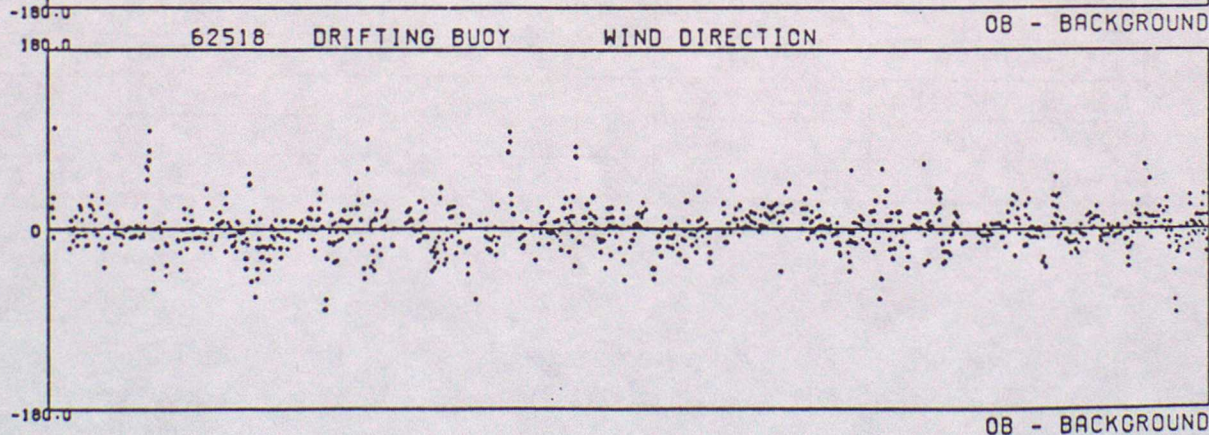
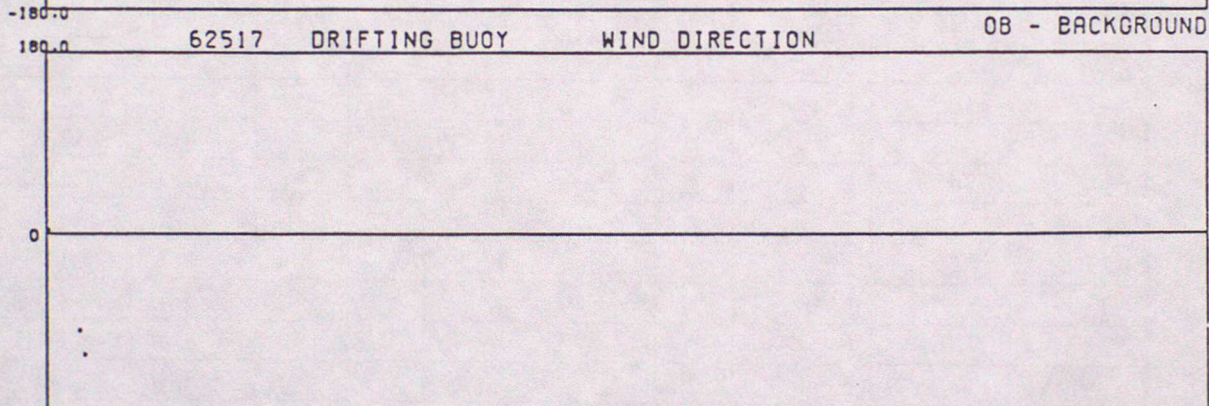
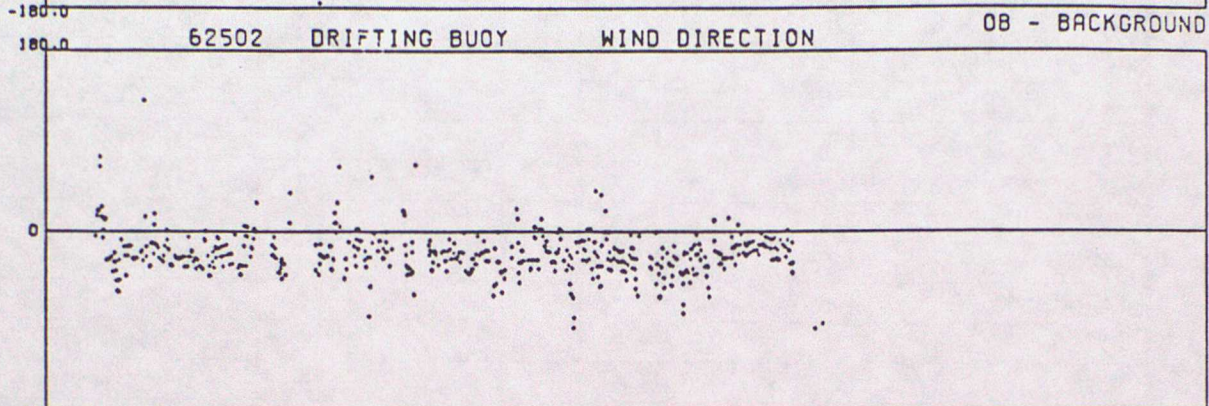
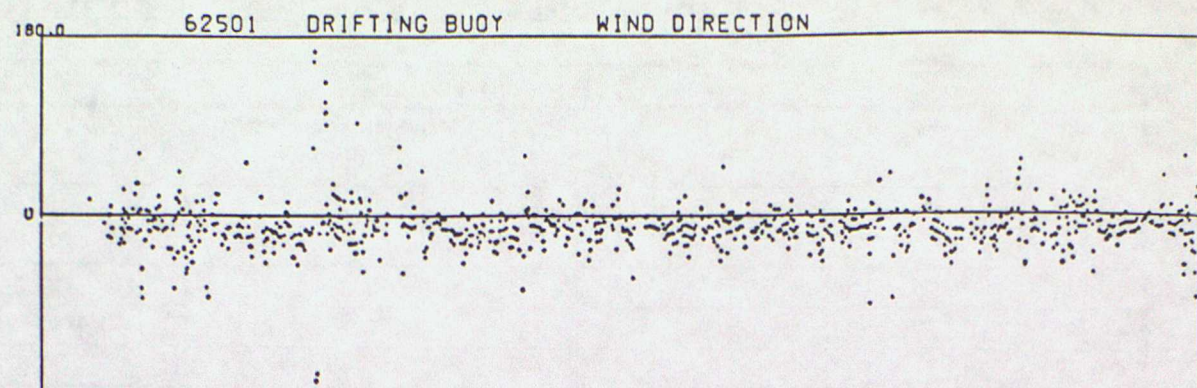


ANNEX F - TIME SERIES PLOTS OF WIND DIRECTION

DATA FROM 00Z UN 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)



DATA FROM 00Z ON 01/10/1995 TO 23Z ON 31/12/1995 (OBS - BACKGROUND FIELD)



ANNEX G - SUMMARY TABLE OF OPERATIONAL DRIFTING BUOYS

WMO No.	Argos No.	Owner	Elements Reported						Reporting Period
			PP	Pt	TT	FF	DD	SST	
25565	1639	UK	*	*	*				01/10 - 31/12
44546	8706	US	*					*	01/10 - 29/11
44547	8707	US	*		*			*	01/10 - 30/12
44548	10357	US	*		*			*	01/10 - 10/10
44613	3324	UK	*	*	*	*	*	*	01/10 - 31/12
44616	3318	UK	*	*	*	*	*	*	01/10 - 31/12
44727	2974	UK	*	*	*			*	07/10 - 31/12
44728	3024	UK	*	*	*			*	01/10 - 31/12
44742	2953	UK	*	*		*	*	*	01/10 - 31/12
44760	2947	UK	*	*	*			*	01/10 - 31/12
44761	14736	UK	*	*				*	23/11 - 31/12
44763	3098	UK	*	*	*			*	01/10 - 31/12
44764	6306	UK	*	*	*	*	*	*	01/10 - 29/11
44765	4178	NL	*	*	*			*	01/10 - 31/12
44769	1253	UK	*	*				*	01/10 - 31/12
44770	3035	UK	*	*	*			*	01/10 - 31/12
44773	3132	UK	*	*	*			*	01/10 - 31/12
44774	3162	UK	*	*	*			*	30/11 - 31/12
44777	14733	UK	*	*				*	01/10 - 31/12
61527	3749	US	*		*			*	09/12 - 31/12
62501	10116	F	*	*		*	*	*	05/10 - 31/12
62502	????	F	*	*		*	*	*	04/10 - 01/12
62503	????	F	*	*				*	04/10 - 31/12
62504	????	F	*	*				*	04/10 - 31/12
62511	14423	F	*	*				*	01/10 - 26/11
62517	10120	F	*	*		*	*	*	01/10 - 03/10
62518	14419	F	*	*		*	*	*	01/10 - 31/12
62519	14421	F	*	*				*	01/10 - 01/11
62524	4625	UK	*	*				*	01/10 - 19/12
62694	9306	NL	*	*	*			*	30/11 - 31/12

KEY

PP - Pressure Pt - Pressure tendency TT - Air temperature
 FF - Wind speed DD - Wind direction SST - Sea surface temperature

			Elements Reported						
WMO No.	Argos No.	Owner	PP	Pt	TT	FF	DD	SST	Reporting Period
63661	8068	D	*	*	*				01/10 - 09/12
65581	1299	IC	*	*	*			*	01/10 - 24/12
65594	1252	UK	*	*	*			*	01/10 - 31/12

KEY

PP - Pressure Pt - Pressure tendency
FF - Wind speed DD - Wind direction

TT - Air temperature
SST - Sea surface temperature

