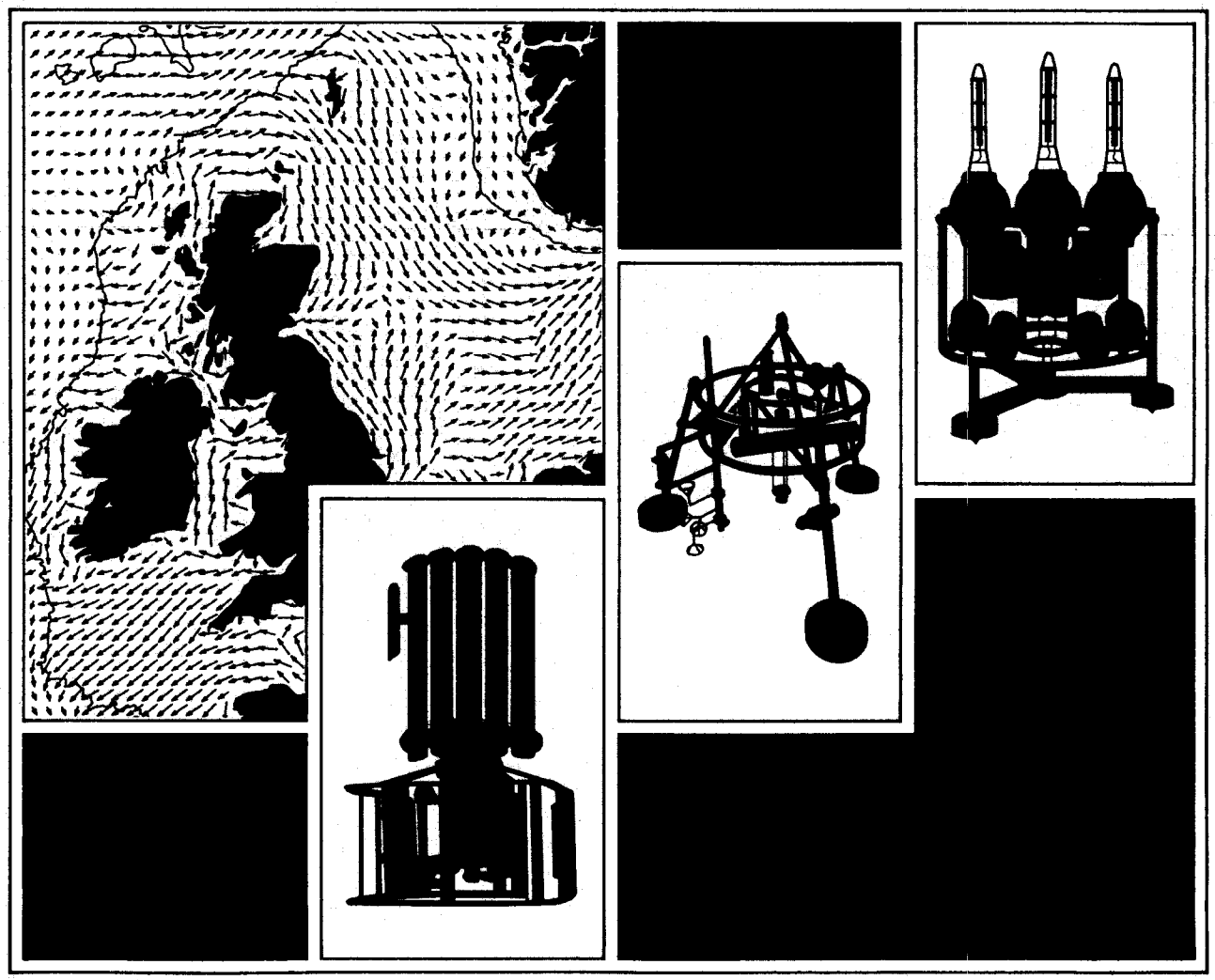
Proudman
Oceanographic
Laboratory

Class A Network Dataring gauges

1992 data processing and analysis

SM Shaw
Report No 30 1993



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PROUDMAN OCEANOGRAPHIC LABORATORY
REPORT No.30

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S.M.Shaw

1993

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ABSTRACT

This report presents a summary of still water sea level data processing for 1992 from 36 modernised Dataring sites around the UK coast.

Details of geographic position*, reference levels, processing, statistics and analyses are included.

*** With the exception of St. Helier in Jersey which was based on the 1:25000 Official Leisure Map 1988, outlines of harbour and coastal sites are based on Ordnance Survey 1:50 000 Landranger series with the permission of the Controller of Her Majesty's Stationery Office, © Crown copyright.**

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CONTENTS

1. Introduction

This report is the sixth in an annual series presenting statistical results from tide gauge sites on the modernised U.K. Class-A network interrogated with the Data Acquisition for Tidal Applications for the Remote Interrogation of Network Gauges (DATARING).

A total of 37 Class-A sites had undergone modernisation as 1992 ended, (Figure 1) although rebuilding of the Holyhead installation has yet to begin. New to the network are the installations in Workington, Cumbria which came on-line 5 February, Port Erin on the Isle of Man (20 May) and St.Helier in Jersey (26 November).

Figure 1. Class A Tide Gauge sites operational in 1992.

2. General description of sites and processing

All installations which have undergone modernisation are interrogated weekly from the Proudman Oceanographic Laboratory. Raw values thus collected undergo a vigorous checking and editing procedure before being filtered to hourly values at intervals of approximately a calendar month. Every effort is made to retrieve a maximum number of values from each site, and some interpolation over short periods takes place where considered to be a safe exercise in terms of accuracy.

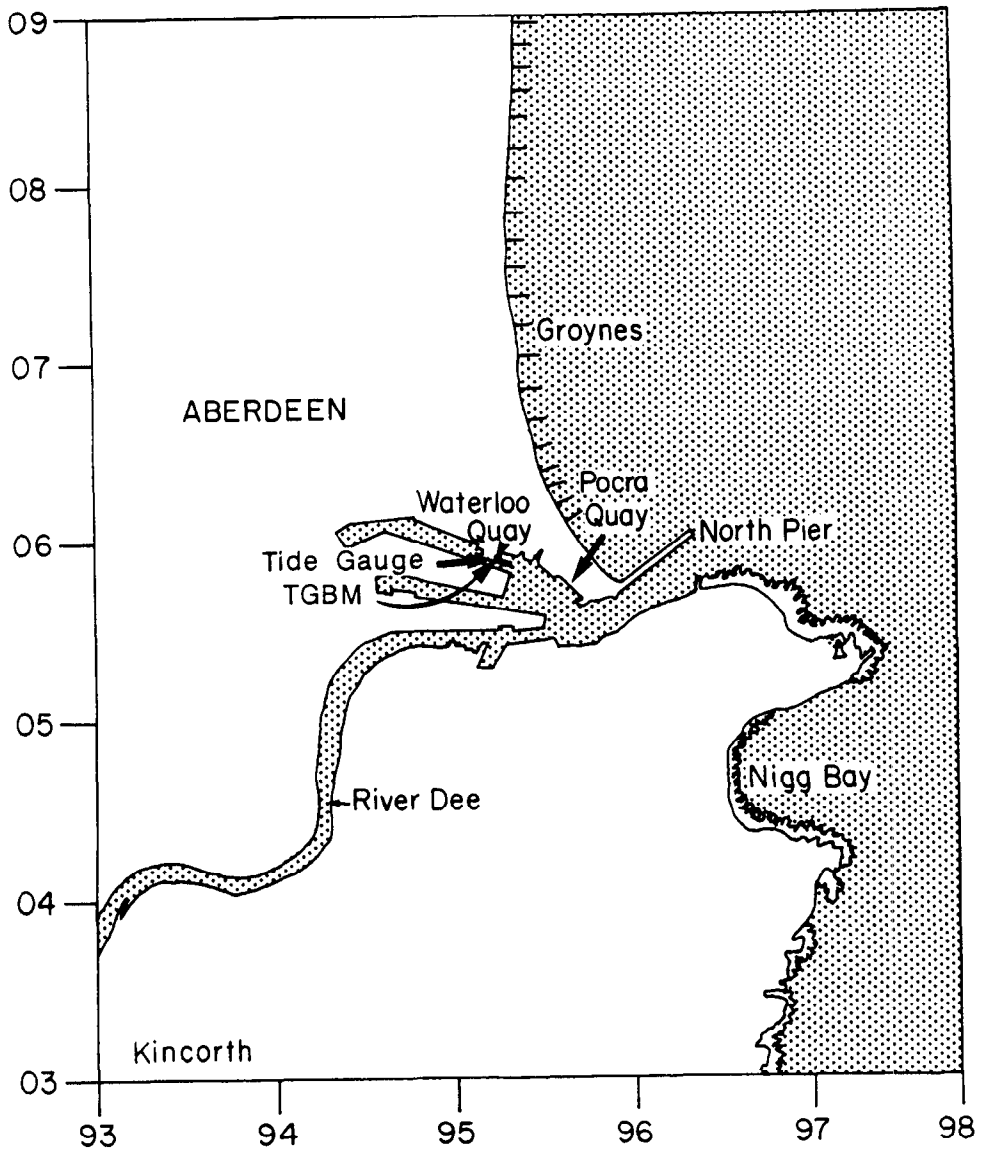
Although all sites have a minimum of two recording 'channels' of data these are frequently from differing instruments. Elevations obtained from these, unless within a very few millimetres of one another are not mixed in the reduction process. For 'new' sites, a complete year's record from each channel is analysed before a decision is taken to adopt a 'Class-A' channel for continuing processing. The second channel of data is retained as a back-up series in its raw form.

Where suitable analyses of data exist, the processed hourly values are compared with predicted levels and storm surge 'residuals' are extracted for continual monitoring of storm surge model data.

Aberdeen

Latitude 57° 08' 38.9"N Longitude 02°04' 43.2"W
National Grid reference NJ 9524 0590

Recording zero = Chart Datum = 2.25m below Ordnance Datum Newlyn
Recording zero = 6.091m below Tide Gauge Bench Mark



Based upon the 1979 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Marks	NG co-ords	Description
TGBM	NJ 9524 0590	NBM OSBM bolt SE face of tide gauge housing.
Aux1	NJ 9572 0593	Public convenience east side of esplanade W face SW angle.

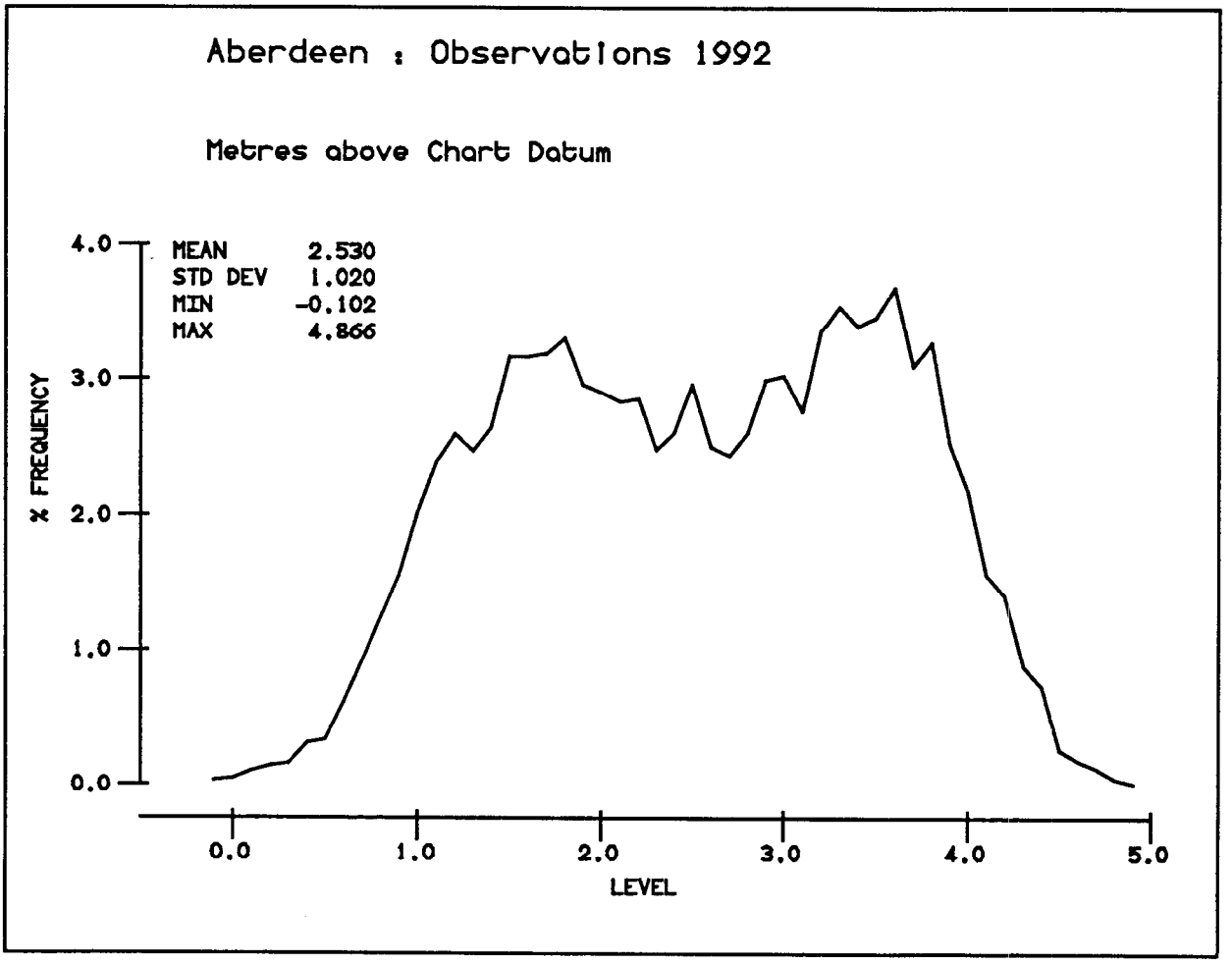
Values from the digiquartz sensor on the channel 2 pneumatic bubbler system were fully processed for 1992.

Spurious values and isolated missing scans were edited at the raw stage for the following dates: 21,22 Jan; 22(4),24(3) Feb; 3,6 Mar; 13 Apr; 20 May; 5,6,18,19 Jun; 15 Jul; 5,26 30 (2) Aug; 4,6(2),25 Sep; 4,21 Oct; 18,25 Nov; 31 Dec. Scans integrated at 1 7/8 minute over the TGI visit of 26 October were edited to 15 minute interval.

This visit was made to conduct general maintenance and discuss the impending resiting of the underwater equipment due to harbour works.

Gaps in final filtered hourly levels

Nil gaps.



Harmonic Tidal Analysis.

Port: Scotland, East Coast - Aberdeen

Latitude: 57 08' 38.9" N
Longitude: 2 04' 43.2" W

Time Zone: GMT

Length: 366 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 2.531

Hourly data from digiquartz sensor

Datum of Observations = ACD : 2.25 Metres below Ordnance Datum (Newlyn)

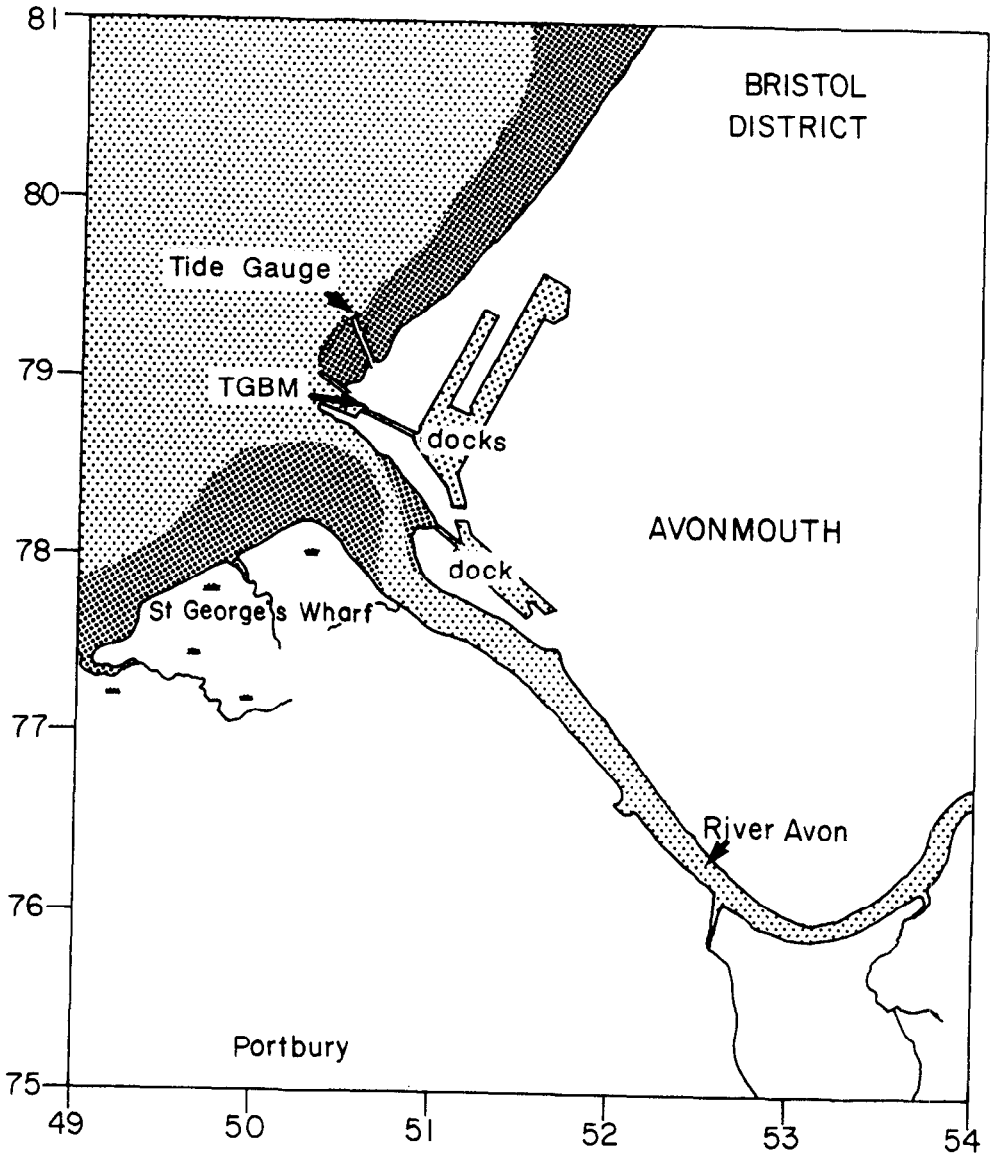
Observation Mean =	0.2532D+01	Residual Mean =	0.2760D-06
Std Dev =	0.1017D+01	Std Dev =	0.1510D+00

Constituent	h	g
Q1	0.034	350.62
O1	0.126	46.09
P1	0.034	181.96
K1	0.116	205.49
J1	0.008	212.21
2N2	0.030	346.83
N2	0.254	0.83
M2	1.303	24.55
S2	0.441	63.27
K2	0.124	60.37
M3	0.013	323.65
M4	0.033	167.99
MS4	0.030	244.18
M6	0.007	110.04

Avonmouth

Latitude 51° 30' 36.9"N Longitude 02° 42' 50.7"W
National Grid reference ST 5045 7933

Recording zero = Chart Datum = 6.5m below Ordnance Datum Newlyn
Recording zero = 15.711m below Tide Gauge Bench Mark



Based upon the 1974 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©*Crown copyright*

Bench Marks	NG co-ords	Description
TGBM	ST 5057 7881	OSBM bolt at base of bollard.
Aux1	ST 5072 7859	Rivet adjacent to transit shed NW face W angle.

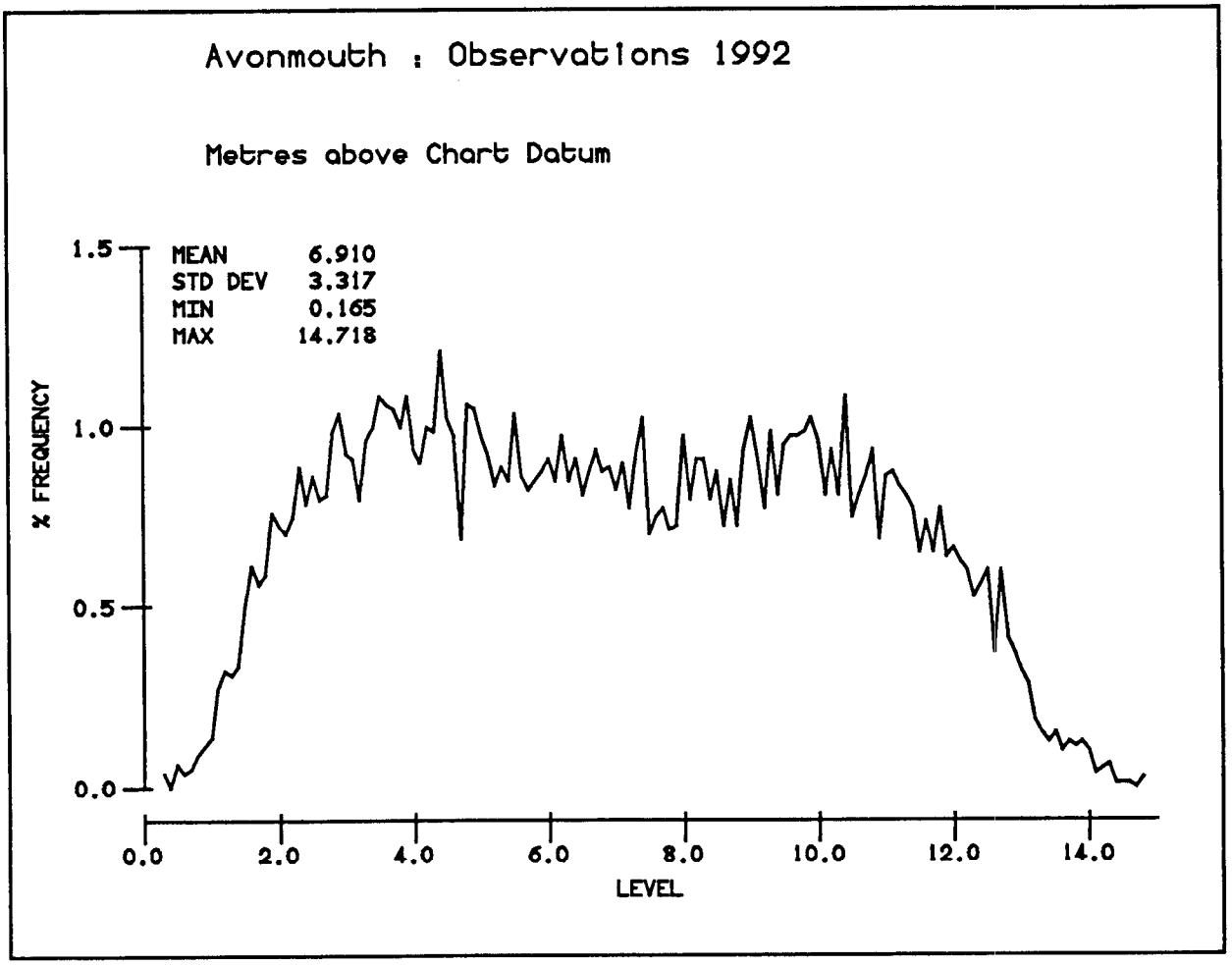
Values from the digiquartz sensor on channel 1 pneumatic bubbler system were processed to hourly levels for 1992.

Isolated missing and spurious scans in the raw values were edited for the following dates: 5(2),7, 30 Jan; 7,21 Feb; 3,20 Mar; 4,15,20,26,29 Apr; 8,11,28,29 May; 18 Jun; 1,16,28,30 Jul; 1,3,12,26 Aug; 13,25,29 Sep; 6,14,18 Oct; 18 Nov; 14,21 Dec.
Values for 0745-1000 GMT 20 February revealed an apparent loss of pressure over high water and were interpolated at the raw stage.

New pneumatic lines were fitted for both recording channels on 13 November. Until this date, the back-up channel 2 had been unserviceable since April 1991. The TGI also visited the site 7 January and 28 July.

Gaps in final filtered hourly levels

0700 GMT 21 January	-1200 GMT 24 January	System frozen.
2300 GMT 28 January	-1100 GMT 29 January	System frozen.
2300 GMT 25 October	-1400 GMT 13 November	Pneumatic lines severed.
2300 GMT 22 December	-End of year.	System frozen, then suspect readings deleted.



Harmonic Tidal Analysis.

Port: England, West Coast - Port of Bristol (Avonmouth)

Latitude: 51 30' 36.9" N
Longitude: 2 42' 50.7" W

Time Zone: GMT

Length: 361 Days

From: 1st January, 1992 To: 31st January, 1993

Units: Metres A0: 6.928

Hourly data from digiquartz sensor 1

Datum of Observations = ACD : 6.50 Metres below Ordnance Datum (Newlyn)

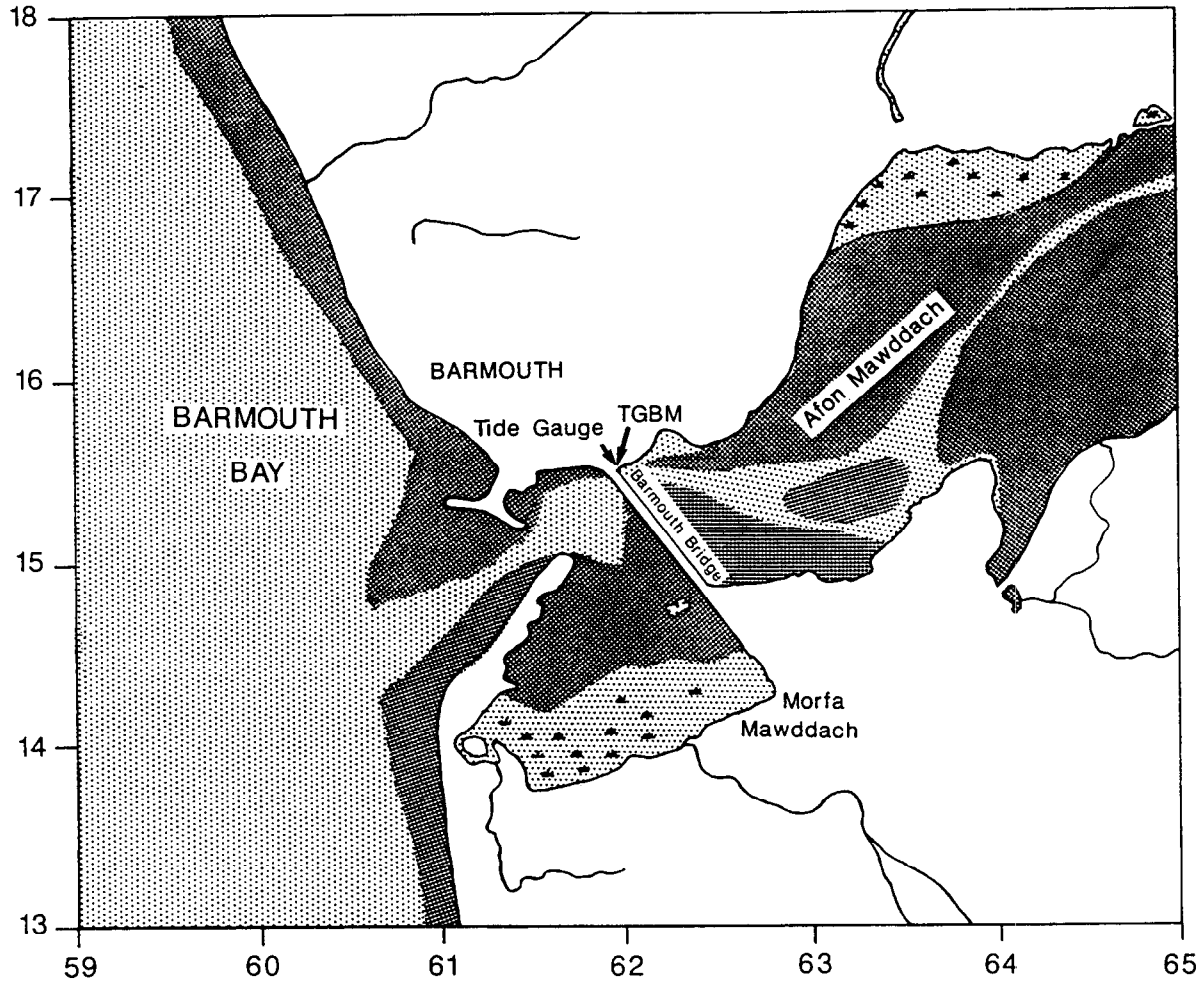
Observation Mean =	0.6921D+01	Residual Mean =	0.6134D-07
Std Dev =	0.3315D+01	Std Dev =	0.2259D+00

Constituent	h	g
Q1	0.017	300.54
O1	0.067	354.57
P1	0.021	136.95
K1	0.078	143.35
J1	0.005	183.65
2N2	0.074	173.39
N2	0.748	186.89
M2	4.275	201.47
S2	1.505	262.06
K2	0.429	258.06
M3	0.056	210.95
M4	0.271	350.83
MS4	0.254	24.17
M6	0.117	274.44

Barmouth

Latitude 52° 43' 8.4"N Longitude 04° 02' 37.8"W
National Grid reference SH 6197 1548

Recording zero = Chart Datum = 2.44m below Ordnance Datum Newlyn.
Recording zero = 10.363m below Tide Gauge Bench Mark.



Based upon the 1984 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Marks	NG co-ords	Description
TGBM	SH 6197 1548	NBM Rivet in concrete 2.9m NE of wall junction.
Aux1	SH 6173 1558	Rivet on step NE side of road NW of entrance to path.

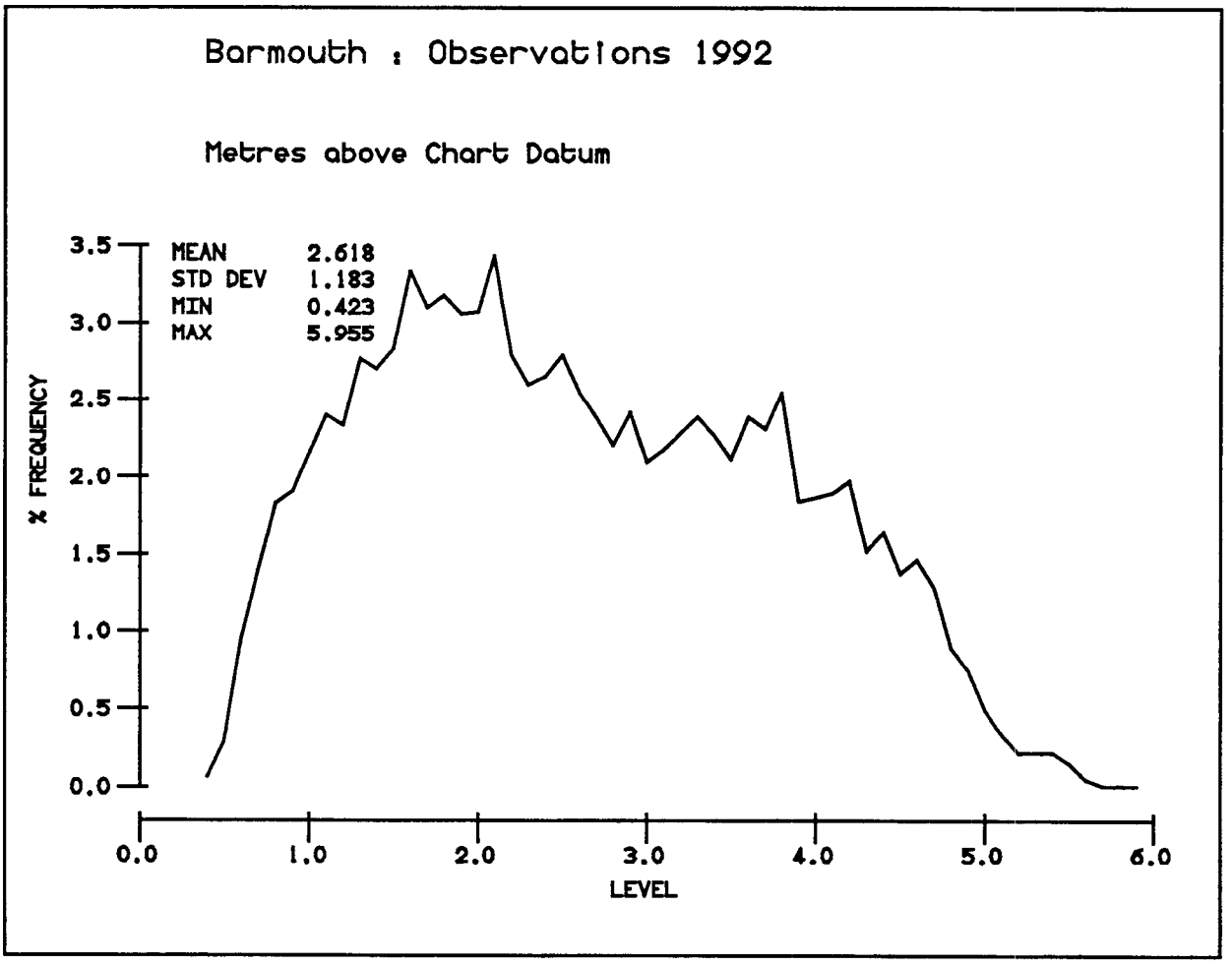
This site was furnished with two digiquartz sensors attached to pneumatic bubbler system outlets in **October 1991**. Values from both sensors were fully processed for 1992, but the frequency distribution curve shown below and the statistics presented in sections 3 and 4 are from channel 2 only.

Isolated spurious and missing scans were edited for the following dates : 7,22 Jan; 20 May; 2,4,5,23,24 Jul; 7,8,18,19,20,25,28,29,30,31 Aug; 1,2,2,4,7,12,13,25,27 Sep; 29,30 Nov. Many problems with corruption of memory store (see details of final gaps below).

The TGI visited the site 8 June to fit a new processor board and modem, 18 September to fit new memory boards and 1 October to replace a faulty modem. Scans integrated at 1 7/8 minute were edited to 15 minute interval.

Gaps in final filtered hourly levels

0000 GMT 17 February	-1700 GMT 17 February	On-site memory loss.
1800 GMT 8 June	-1300 GMT 13 June	Memory corrupted.
1900 GMT 16 June	-1600 GMT 29 June	Memory overwritten.
2200 GMT 27 July	-1700 GMT 05 August	Memory corrupted.
1900 GMT 10 August	-1700 GMT 18 August	Memory corrupted.
1900 GMT 07 September	-1500 GMT 11 September	Data lost from memory.
1900 GMT 14 September	-1300 GMT 18 September	Data lost from memory.
0600 GMT 22 September	-1300 GMT 23 September	Data lost from memory.



Harmonic Tidal Analysis.

Port: Wales, West Coast - Barmouth

Latitude: 52 43' 08.4" N
Longitude: 4 02' 37.8" W

Time Zone: GMT

Length: 396 Days

From: 11th October, 1991 To: 31st December 1992

Units: Metres A0: 2.617

Hourly data from digiquartz sensor 2

Datum of Observations = ACD : 2.44 Metres below Ordnance Datum (Newlyn)

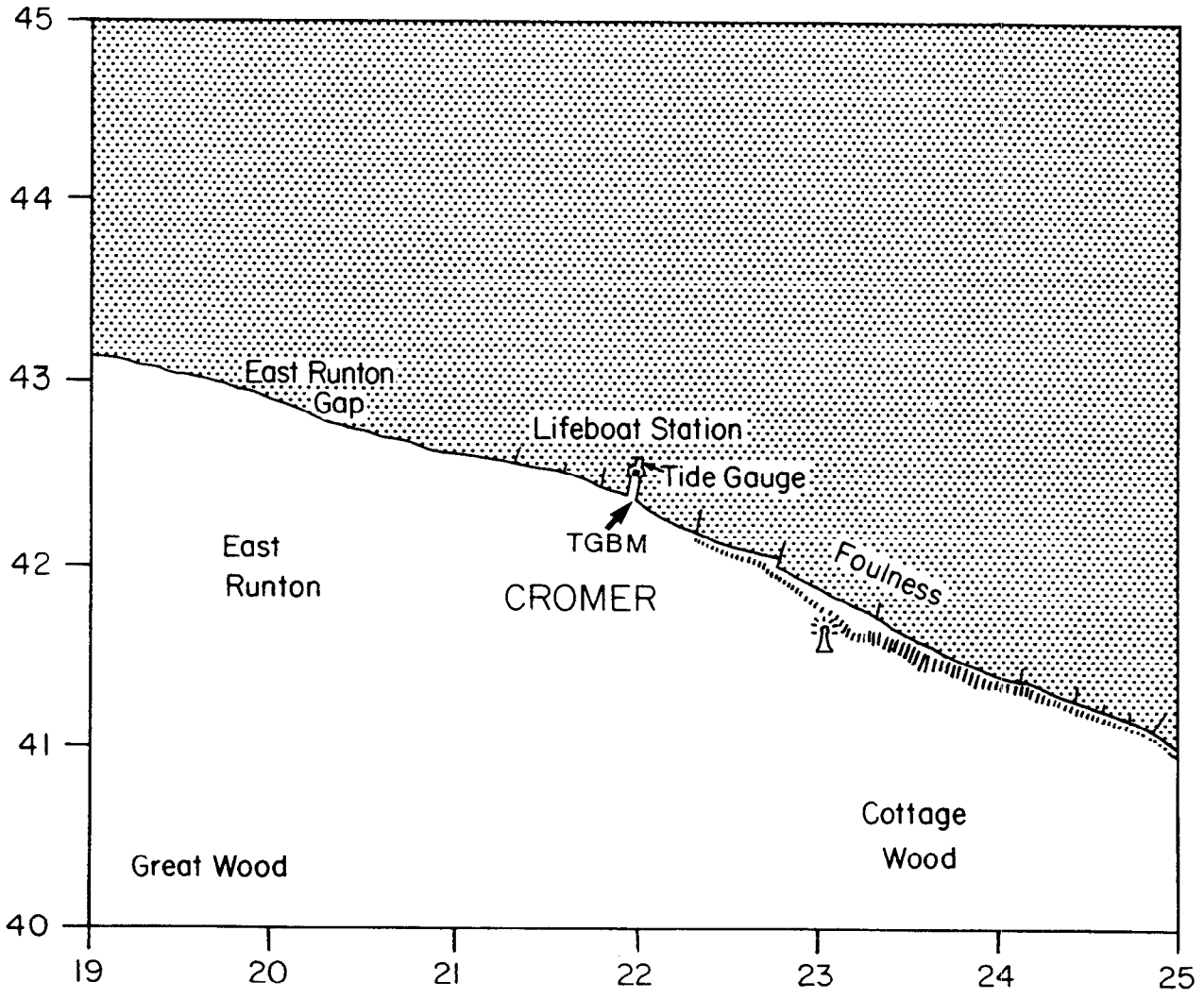
Observation Mean =	0.2629D+01	Residual Mean =	0.6778D-06
Std Dev =	0.1174D+01	Std Dev =	0.1931D+00

Constituent	h	g
Q1	0.016	320.87
O1	0.079	19.18
P1	0.031	158.77
K1	0.087	164.92
J1	0.002	297.36
2N2	0.038	202.42
N2	0.290	218.16
M2	1.474	238.63
S2	0.555	277.65
K2	0.155	275.59
M3	0.021	226.56
M4	0.248	65.66
MS4	0.136	116.77
M6	0.008	140.97

Cromer

Latitude 52° 56' 1.9"N Longitude 01° 18' 12.5"E
National Grid reference TG 2198 4253

Recording zero = Chart Datum = 2.75m below Ordnance Datum Newlyn
Recording zero = 10.117m below Tide Gauge Bench Mark



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Bench Marks	NG co-ords	Description
TGBM	TG 2193 4233	Stainless steel bolt on top of wall opposite E. side of pier.
Aux1	TG 2198 4253	Rivet on steps of C catwalk NE angle of Lifeboat Station.

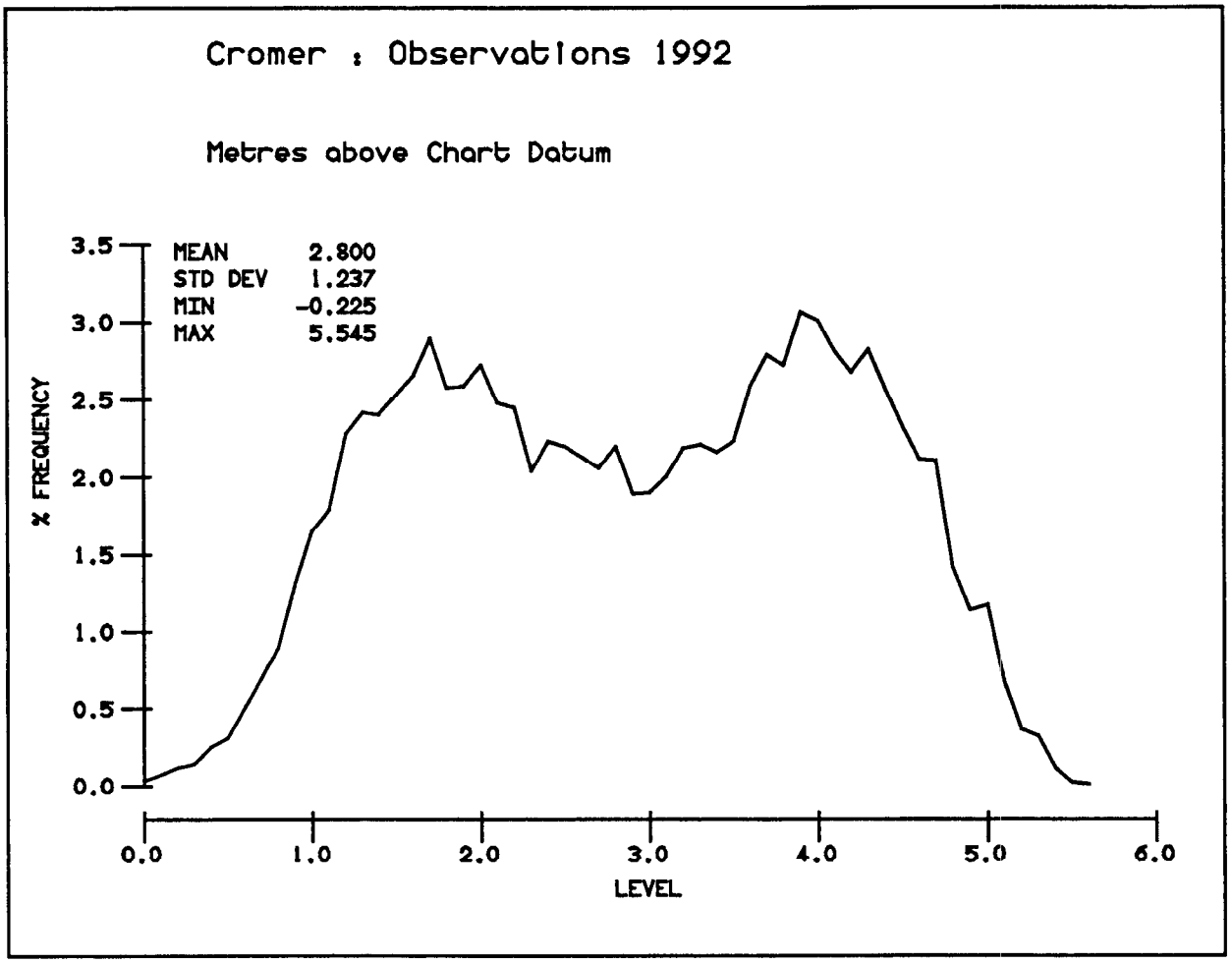
Of the two recording channels, both with digiquartz transducers, Channel 2 is the designated Class-A channel. The back-up channel 1 continued to record low values with an apparent small timing error until the TGI visit of 6 October.

Isolated missing and spurious values in the raw data from channel 2 were edited for the following dates: 13 Feb; 13,19 Mar; 2,14,15,22 Apr; 6 May; 18 Jun; 8,20 Aug; 3,5,16,24 Dec.

Scans integrated at 1 7/8 minute over the visit by TGI 6 October were edited to 15 minute interval.

Gaps in final filtered hourly levels

Nil gaps.



Harmonic Tidal Analysis.

Port: England, East Coast - Cromer

Latitude: 52 56' 01.9" N
Longitude: 1 18' 12.5" E

Time Zone: GMT

Length: 366 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 2.802

Hourly data from digiquartz sensor 2

Datum of Observations = ACD : 2.75 Metres below Ordnance Datum (Newlyn)

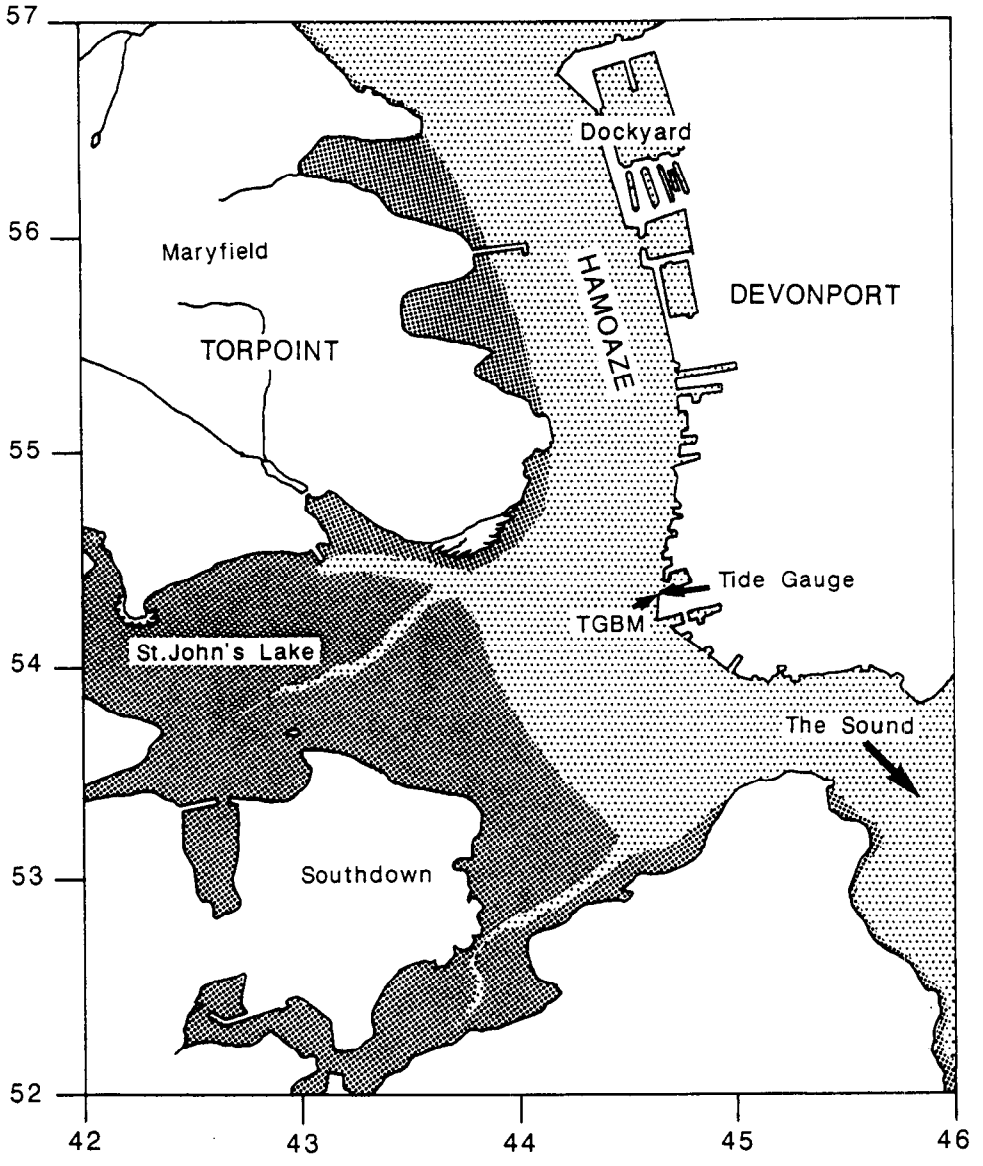
Observation Mean =	0.2802D+01	Residual Mean =	0.2091D-05
Std Dev =	0.1237D+01	Std Dev =	0.2057D+00

Constituent	h	g
Q1	0.042	70.02
O1	0.159	126.98
P1	0.042	284.31
K1	0.151	303.66
J1	0.007	339.09
2N2	0.038	162.07
N2	0.297	164.01
M2	1.576	188.37
S2	0.532	235.27
K2	0.150	233.46
M3	0.015	240.23
M4	0.089	281.90
MS4	0.073	327.99
M6	0.026	38.68

Devonport

Latitude 50° 22' 4.2"N Longitude 04° 11' 3.3"W
National Grid reference SX 4468 5434

Recording zero = Chart Datum = 3.22m below Ordnance Datum Newlyn
Recording zero = 7.631m below Tide Gauge Bench Mark



Based upon the 1980 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Marks	NG co-ords	Description
TGBM	SX 4468 5434	Bolt on jetty wall 6.6m from NW angle of tide gauge building.
Aux.1	SX 4471 5433	On building, N.face NE angle.

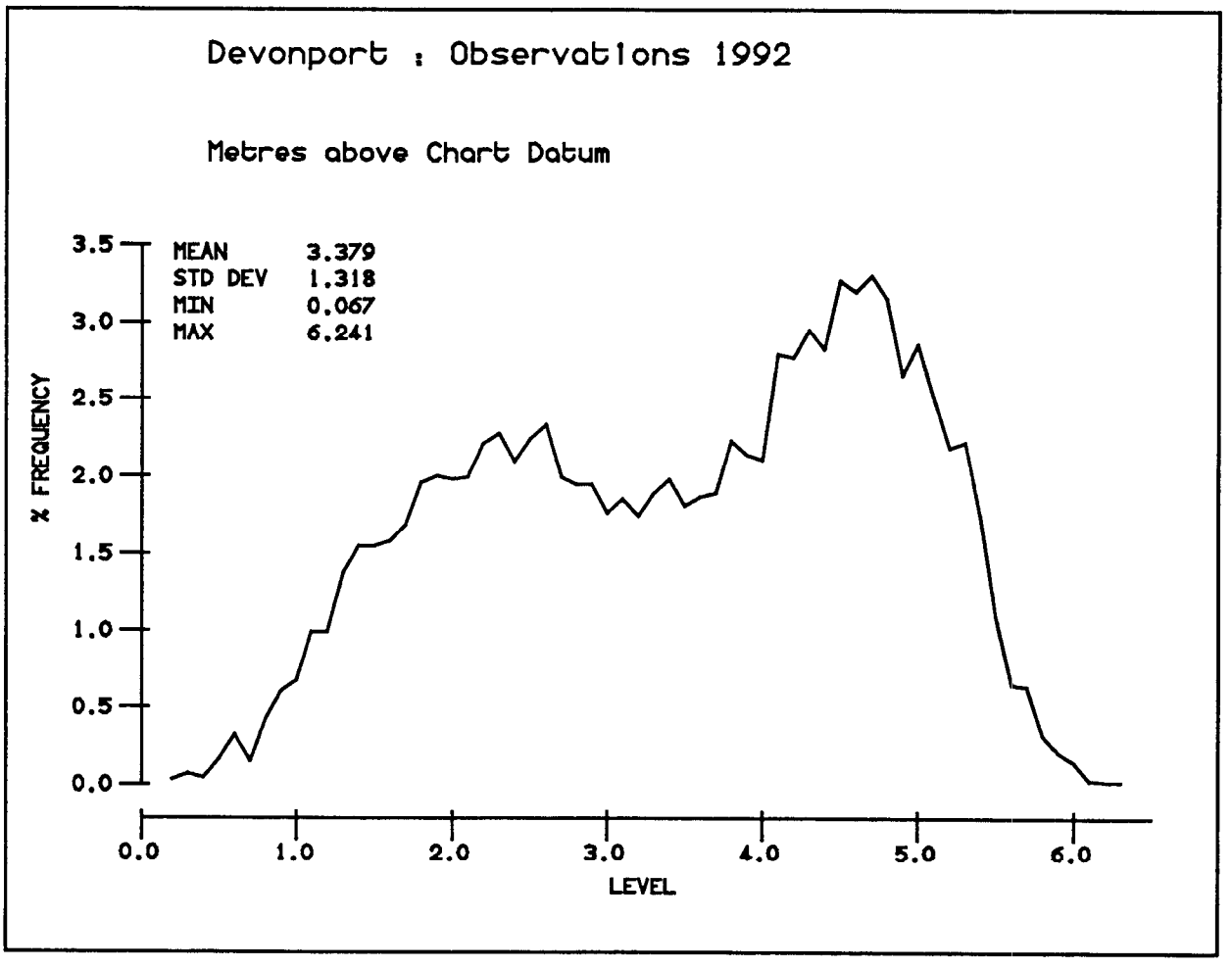
This site was modernised to accommodate Dataring **13 March 1991** with two pneumatic bubbler systems connected to digiquartz sensors. Full processing of the designated back-up channel 1 series ceased on **April 1992.**

Isolated missing and spurious values in the raw data for channel 2 were edited for the following dates : 23 Jan; 11 Feb; 5,27 Mar; 10,14,22 Apr; 6,27 May; 16 Jun; 5,18,19,30 Jul; 31 Aug; 29 Sep; 3,12,13,18,22 Oct; 2,5,13,15,17,18 Nov; 2,9 Dec.

Scans integrated at 1 7/8 minute interval during the TGI visit of 30 July were edited to 15 minute interval.

Gaps in final filtered hourly levels

Nil gaps.



Harmonic Tidal Analysis.

Port: England, South Coast - Devonport

Latitude: 50 22' 4.2" N
Longitude: 4 11' 3.3" W

Time Zone: GMT

Length: 366 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 3.380

Hourly data from digiquartz sensor 2

Datum of Observations = ACD : 3.22 Metres below Ordnance Datum (Newlyn)

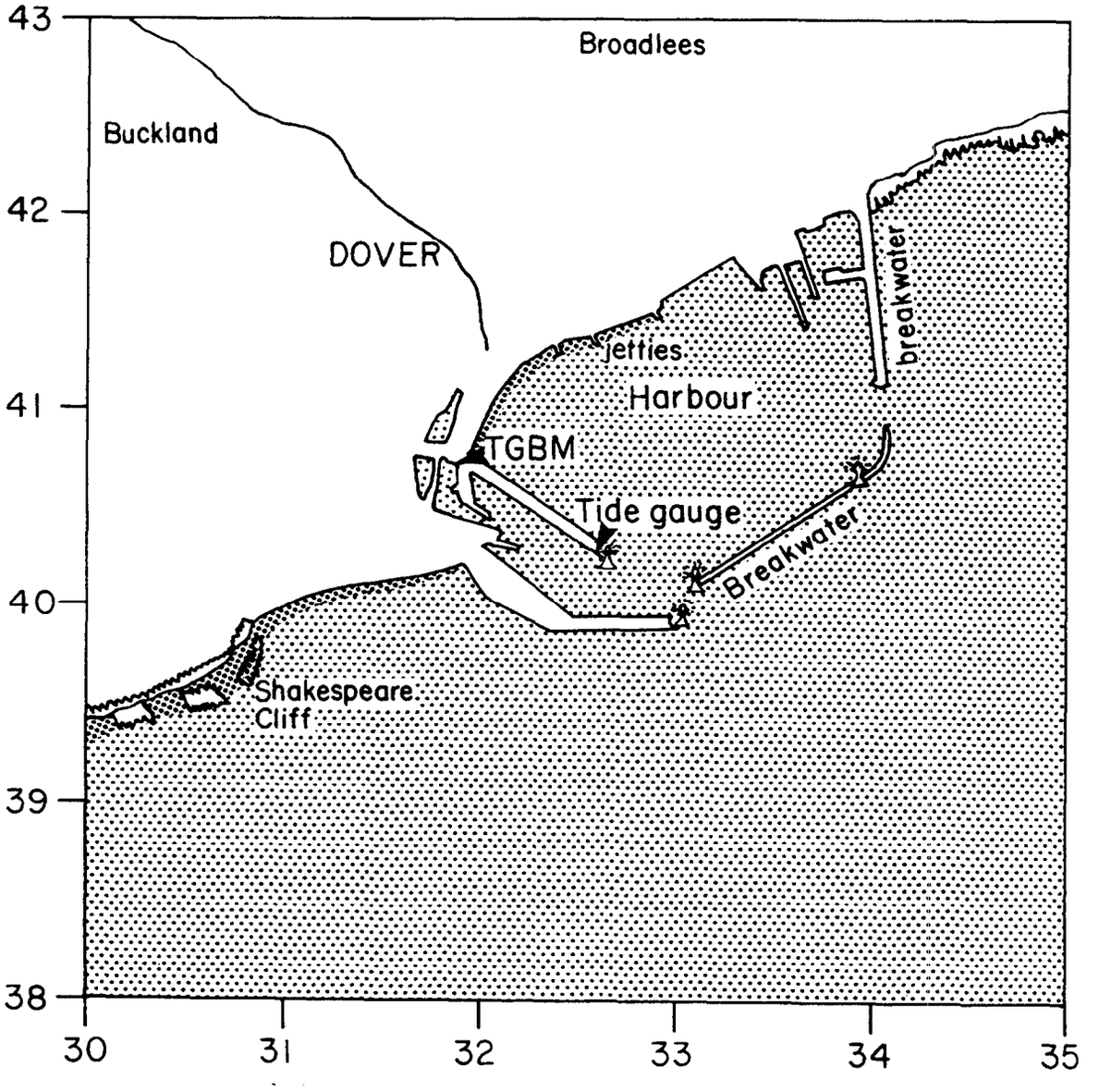
Observation Mean =	0.3380D+01	Residual Mean =	0.3377D-05
Std Dev =	0.1320D+01	Std Dev =	0.1164D+00

Constituent	h	g
Q1	0.011	297.15
O1	0.055	344.32
P1	0.027	108.36
K1	0.079	113.31
J1	0.002	104.02
2N2	0.067	133.58
N2	0.314	136.71
M2	1.690	153.69
S2	0.608	207.15
K2	0.173	204.21
M3	0.004	132.39
M4	0.140	134.91
MS4	0.096	190.54
M6	0.025	172.45

Dover

Latitude 51° 06' 59.7"N Longitude 01° 19' 5.4"E
National Grid reference TR 3220 4055

Recording zero = Chart Datum = 3.67m below Ordnance Datum Newlyn
Recording zero = 10.491m below Tide Gauge Bench Mark



Based upon the 1974 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Marks	NG co-ords	Description
TGBM	TR 3193 4074	Flush Bracket G4868 on building E.side of entrance to works.
Aux1	TR 3195 4095	No.29 Waterloo Crescent, SW face S angle.

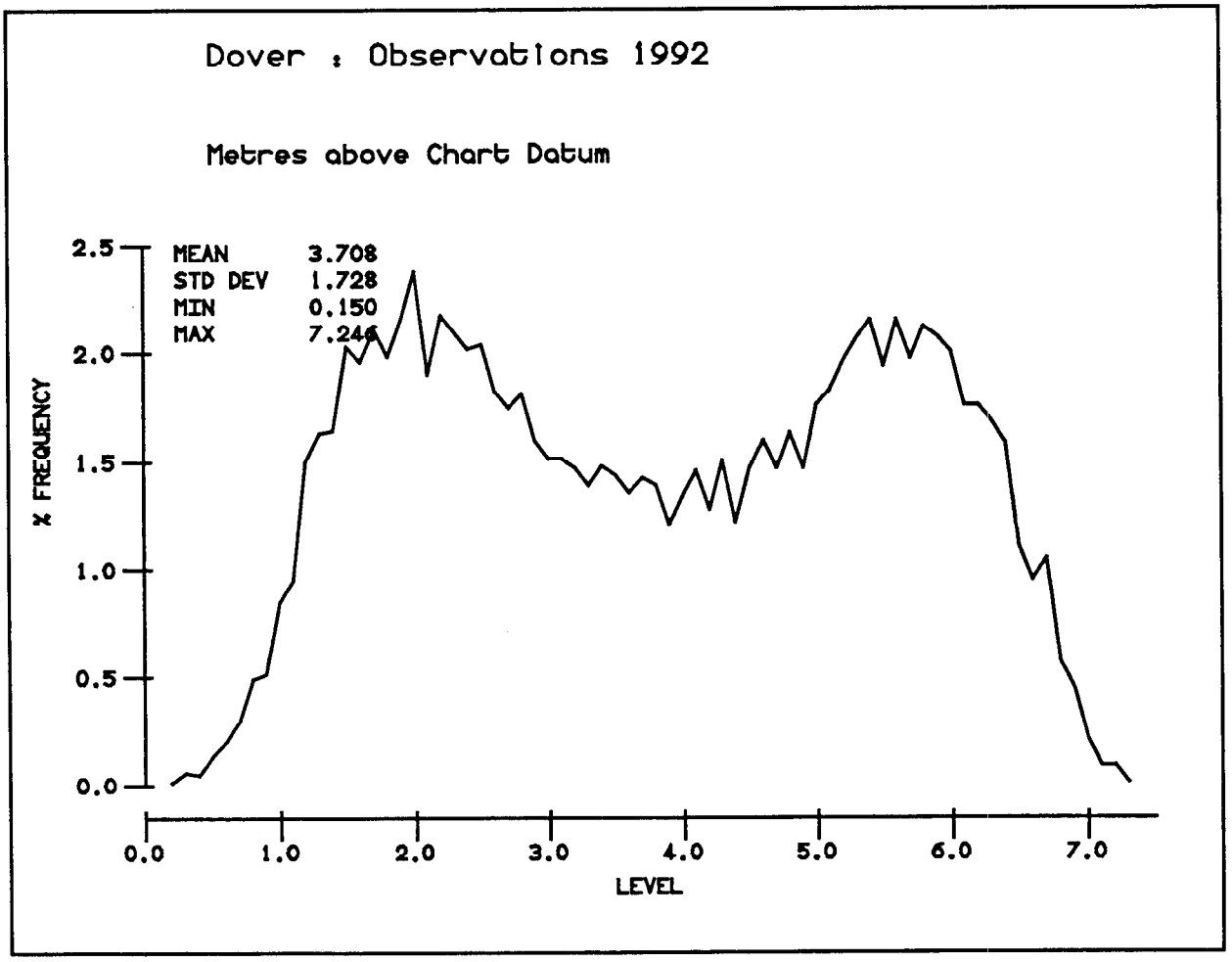
Hourly levels were filtered from the channel 2 potentiometer attached to the Munro gauge.

Isolated spurious and missing values in the raw elevations for channel 2 were edited for the following dates: 9,29 Jan; 19,24 Feb; 7,10,25,27 Mar; 1,11,14,18,20,22,28 Apr; 3,12,19,21,24,25,28 May; 1,8,10,13,15,18,23,24,26,27,29 Jun; 7,8,9,14,16,22,23,27,28,31 Jul; 1,12,21,25,27 Aug; 2,16,18,25,29 Sep; 6,11,21 Oct; 5,13,14,25 Nov; 10,12,31 Dec.

A timing error of 2 minutes was detected on the system and corrected by TGI 5 June.

Gaps in final filtered hourly levels

Nil gaps.



Harmonic Tidal Analysis

Port : England, South Coast - Dover

Latitude: 51 06' 59.7" N
Longitude: 1 19' 05.4" E

Time Zone: GMT

Length: 366 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 3.711

Hourly data from potentiometer sensor 2

Datum of Observations = ACD : 3.67 Metres below Ordnance Datum (Newlyn)

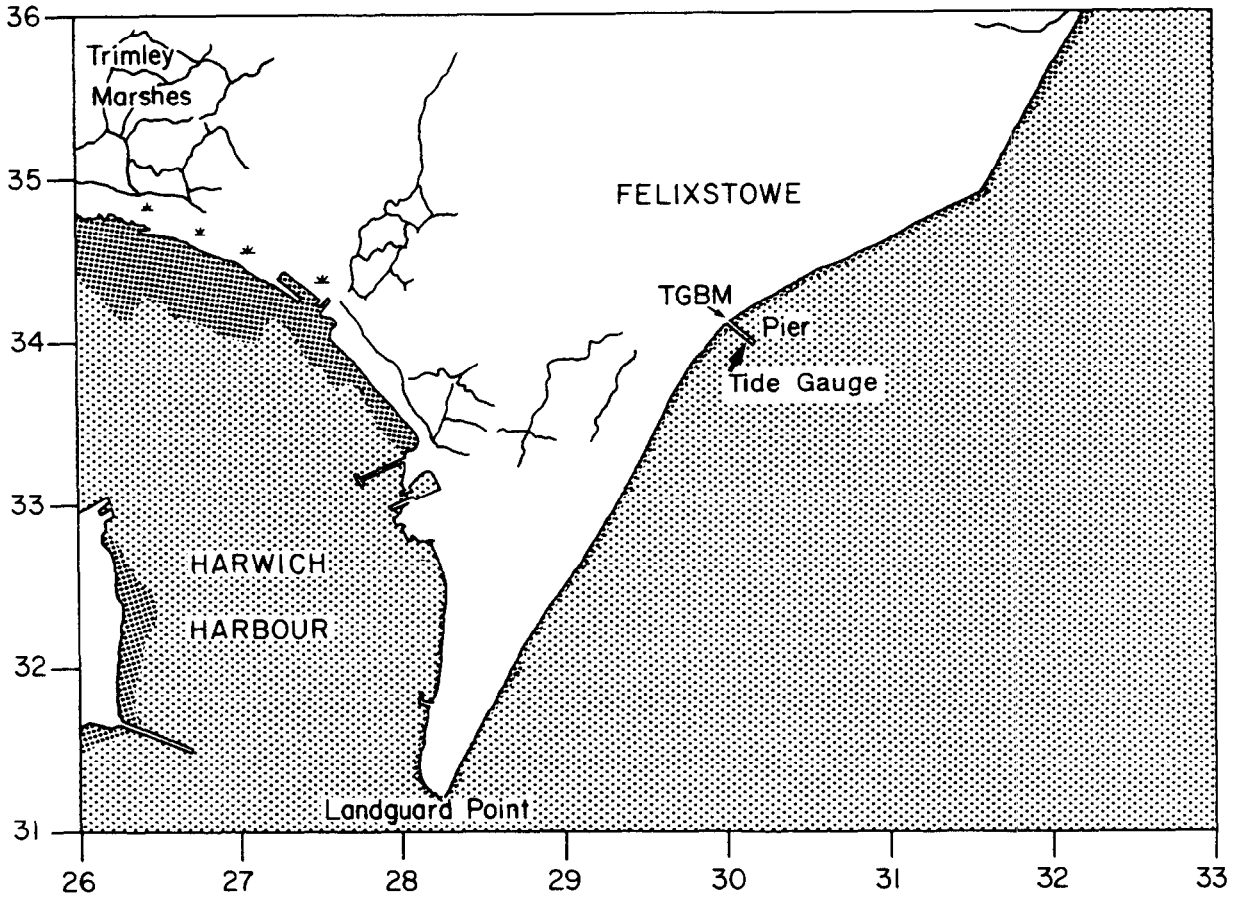
Observation Mean =	0.3710D+01	Residual Mean =	-0.3037D-05
Std Dev =	0.1729D+01	Std Dev =	0.1700D+00

Constituent	h	g
Q1	0.017	101.92
O1	0.060	171.93
P1	0.017	38.58
K1	0.053	43.36
J1	0.002	149.63
2N2	0.050	282.30
N2	0.403	308.86
M2	2.244	332.14
S2	0.701	24.71
K2	0.201	23.32
M3	0.012	23.87
M4	0.263	221.86
MS4	0.170	274.89
M6	0.066	105.38

Felixstowe

Latitude 51° 57' 22.8"N Longitude 01° 21' 0.0"E
National Grid reference TM 3015 3400

Recording zero = Chart Datum = 1.95m below Ordnance Datum Newlyn
Recording zero = 5.690m below Tide Gauge Bench Mark



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Bench Marks	NG co-ords	Description
TGBM	TM 3001 3414	Bolt on SE side of promenade production on NE face of arcade.
Aux1	TM 2956 3393	Flush Bracket 2071 on No.25 Langer Road W angle NW face.

Values from the pneumatic bubbler system on channel 2 were fully processed for 1992.

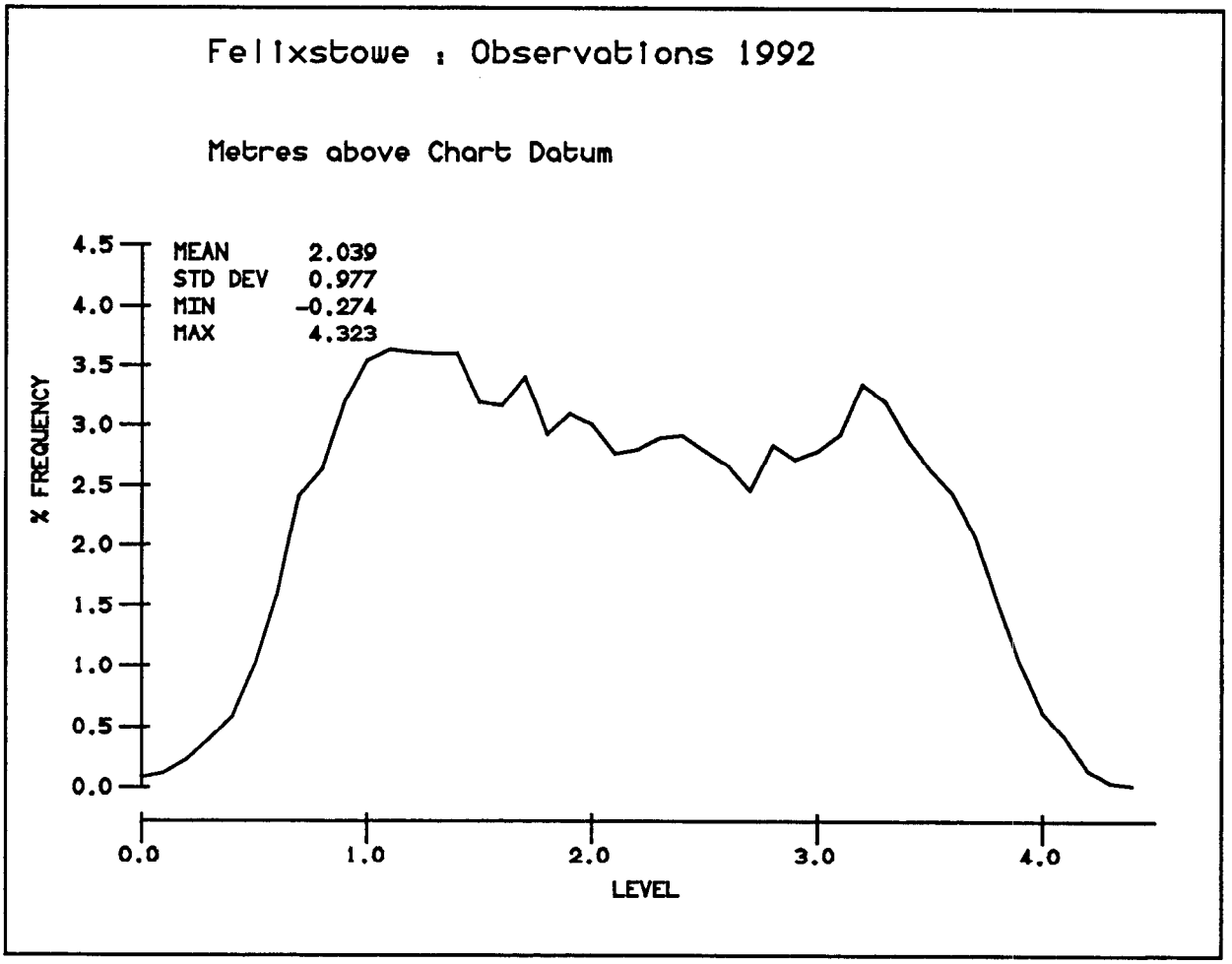
Spurious and missing scans in the raw elevations were interpolated for the following dates : 22,25 Jan; 21 Mar; 2,18,19 Apr; 23,29 May; 23 Jun; 11,30 Jul; 11,27 Aug; 4,5 Oct; 10 Nov; 2,11 Dec.

There were three periods during the year where the channel 2 values appeared to be in error, and figures from channel 1 were substituted : 1400 GMT - 2030 GMT 9 January; 0001 GMT 4 October - 0001 GMT 6 October and 2015 GMT - 2345 GMT 6 December.

The TGI visited the site 6 October to fit a new compressor and undertake general maintenance. Scans integrated at 1 7/8 minute were edited to 15 minute interval.

Gaps in final filtered hourly levels

Nil gaps.



Harmonic Tidal Analysis.

Port: England, East Coast - Felixstowe

Latitude: 51 57' 22.8" N
Longitude: 01 21' 00.0" E

Time Zone: GMT

Length: 366 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 2.041

Hourly data from digiquartz sensor 2

Datum of Observations = ACD : 1.95 Metres below Ordnance Datum (Newlyn)

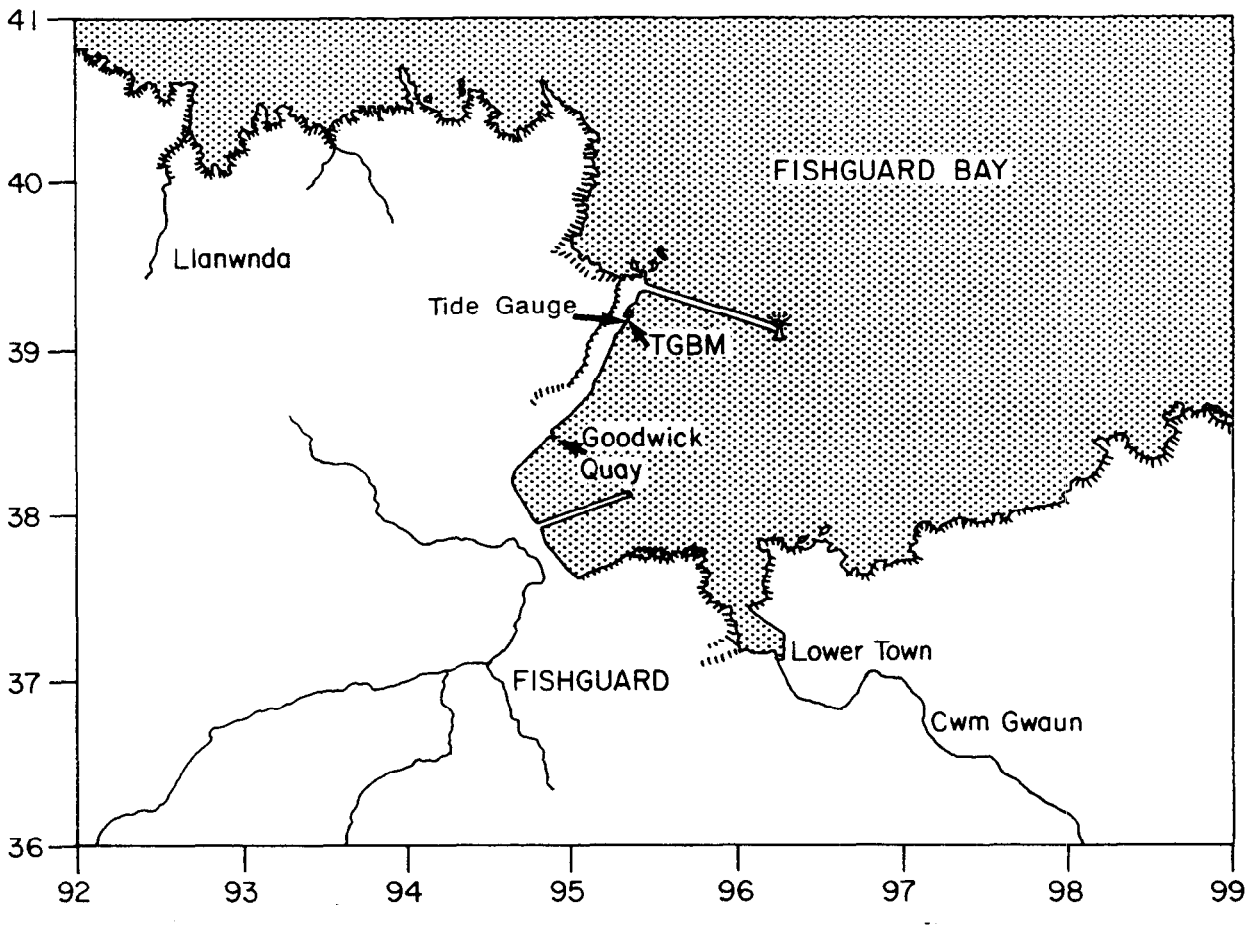
Observation Mean =	0.2041D+01	Residual Mean =	-0.2110D-05
Std Dev =	0.9750D+00	Std Dev =	0.1953D+00

Constituent	h	g
Q1	0.035	107.50
O1	0.132	168.13
P1	0.033	333.67
K1	0.113	352.44
J1	0.004	71.43
2N2	0.029	316.71
N2	0.209	294.84
M2	1.253	321.63
S2	0.346	14.38
K2	0.099	14.36
M3	0.007	36.87
M4	0.077	323.48
MS4	0.049	35.21
M6	0.054	271.92

Fishguard

Latitude 52° 00' 46.2"N Longitude 04° 58' 57.5"W
National Grid reference SM 9534 3918

Recording zero = Chart Datum = 2.44m below Ordnance Datum Newlyn
Recording zero = 7.88m below Tide Gauge Bench Mark



Based upon the 1980 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Marks	NG co-ords	Description
TGBM	SM 9534 3918	OSBM bolt on quay 3.6m NE end of railings.
Aux1	SM 9513 3874	OS bolt in concrete base of railings 6.4m NW angle of tide gauge hut.

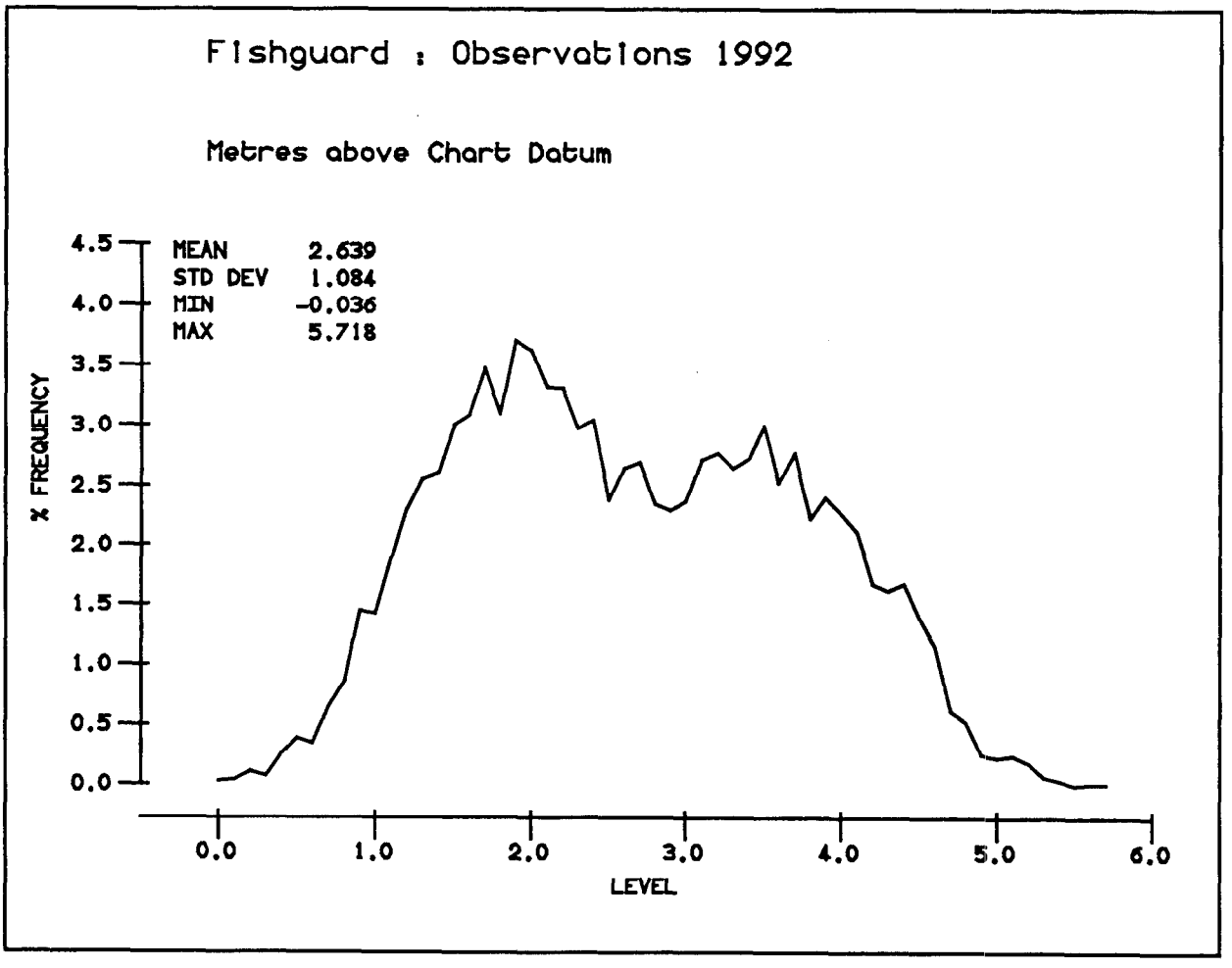
Values from the pneumatic bubbler system on channel 2 were fully processed for 1992.

Missing and spurious values in the raw elevations were edited for the following dates: 23,27 Jan; 9,11,25 Feb; 3 Mar; 9,15,29 Apr; 8,21 May; 6,7 Jun; 1,13 Jul; 4,5,18 Aug; 2,3,23 Sep; 7 Oct; 13,14,25,29 Nov.

The TGI visited the site 21 January to replace the compressor and carry out general maintenance.

Gaps in final filtered hourly levels

Nil gaps.



Harmonic Tidal Analysis.

Port: Wales - Fishguard

Latitude: 52 00' 46.2" N
Longitude: 4 58' 57.5" W

Time Zone: GMT

Length: 366 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 2.641

Hourly data from digiquartz sensor 2

Datum of Observations = ACD : 2.44 Metres below Ordnance Datum (Newlyn)

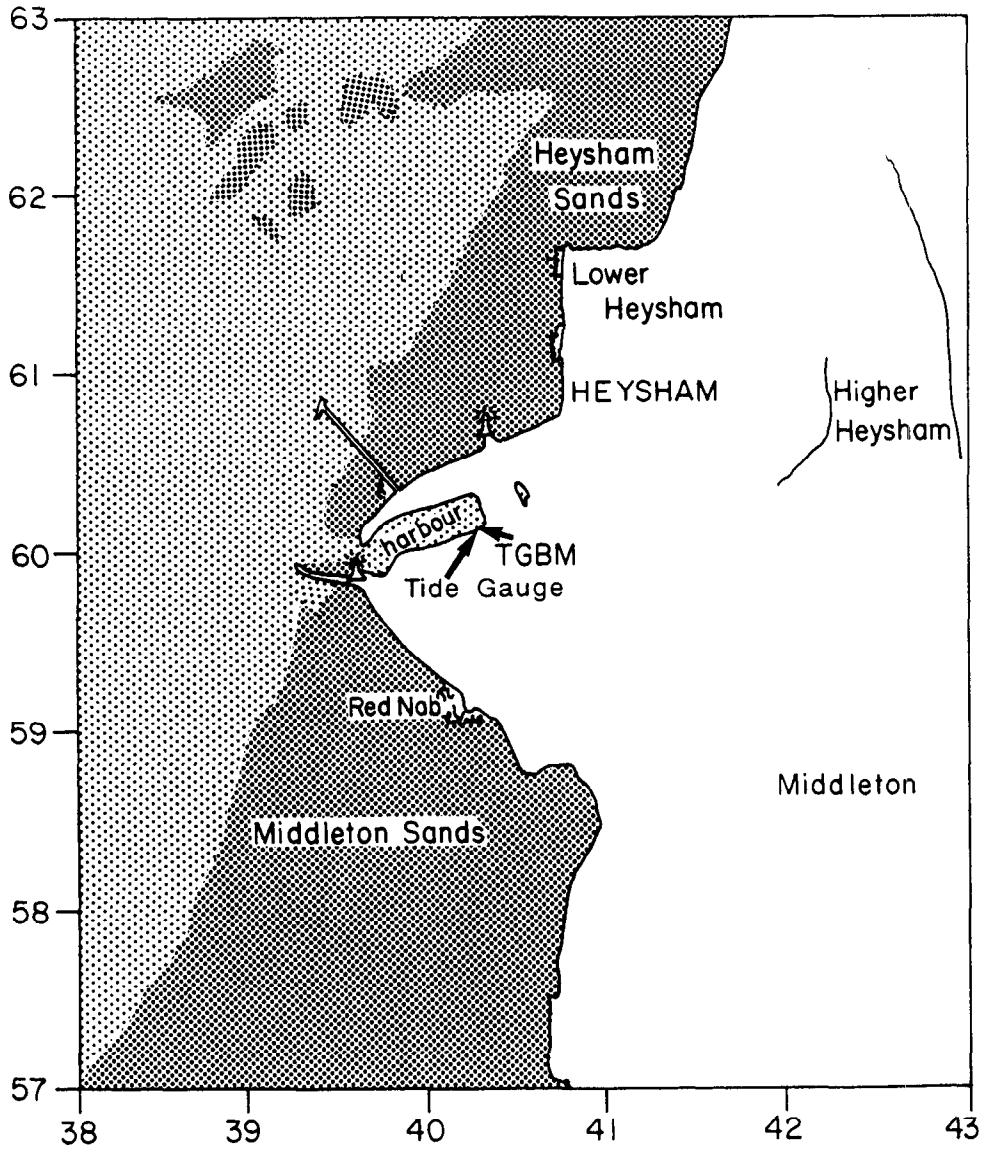
Observation Mean =	0.2641D+01	Residual Mean =	0.2120D-05
Std Dev =	0.1082D+01	Std Dev =	0.1324D+00

Constituent	h	g
Q1	0.021	312.47
O1	0.075	6.07
P1	0.025	148.95
K1	0.080	151.29
J1	0.002	311.09
2N2	0.040	167.19
N2	0.279	187.77
M2	1.366	207.54
S2	0.533	249.13
K2	0.151	246.50
M3	0.013	187.37
M4	0.115	20.96
MS4	0.055	65.71
M6	0.001	47.91

Heysham

Latitude 54° 02' 0.3"N Longitude 02° 54' 41.7"W
National Grid reference SD 4030 6012

Recording zero = Chart Datum = 4.90m below Ordnance Datum Newlyn
Recording zero = 12.095m below Tide Gauge Bench Mark



Based upon the 1980 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Marks	NG co-ords	Description
TGBM	SD 4030 6012	OSBM bolt S quay 40.8m SW angle of dock.
Aux1	SD 4141 6005	Bridge parapet 3.4m North of fence at junction E side of road W face.

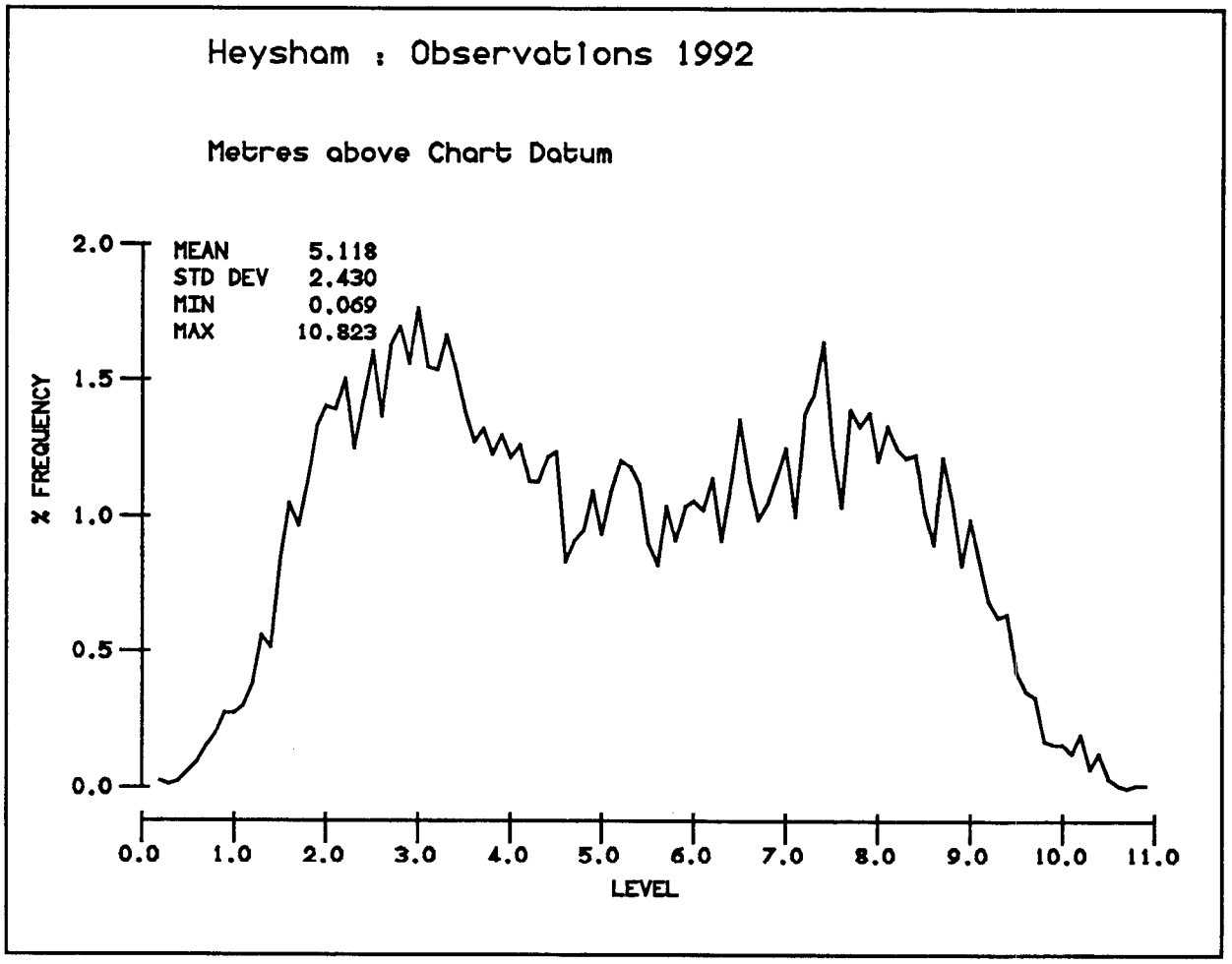
Values from the channel 2 digiquartz on a pneumatic bubbler system were fully processed for 1992.

Spurious and missing scans in the raw elevations were edited for the following dates : 4 Feb; 17 Mar; 2 Apr; 7,18 May; 8 Jul; 2 Aug; 1,5,6,21,31 Oct; 5,15,18 Nov; 3,17,31 Dec.

The TGI visited the site 18 May to replace the compressor and carry out general maintenance.

Gaps in final filtered hourly levels

Nil gaps.



Harmonic Tidal Analysis.

Port: England, West Coast - Heysham

Latitude: 54 02' 0.3" N
Longitude: 2 54' 41.7" W

Time Zone: GMT

Length: 366 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 5.121

Hourly data from digiquartz sensor 2

Datum of Observations = ACD : 4.90 Metres below Ordnance Datum (Newlyn)

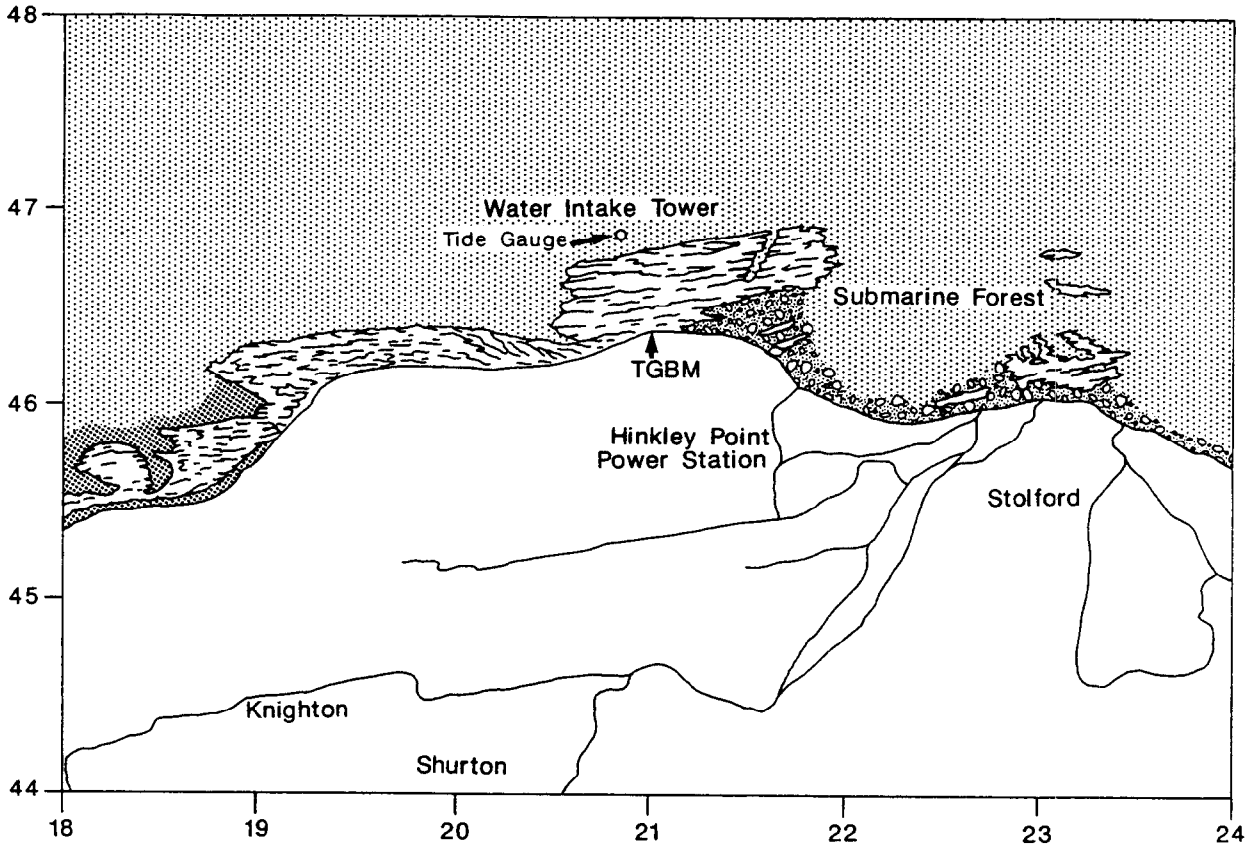
Observation Mean =	0.5120D+01	Residual Mean =	-0.2186D-05
Std Dev =	0.2432D+01	Std Dev =	0.2071D+00

Constituent	h	g
Q1	0.033	339.73
O1	0.107	40.16
P1	0.041	192.78
K1	0.128	191.59
J1	0.005	306.46
2N2	0.079	300.91
N2	0.603	300.98
M2	3.173	325.71
S2	1.026	9.24
K2	0.289	7.16
M3	0.036	311.11
M4	0.203	249.28
MS4	0.117	300.59
M6	0.013	51.06

Hinkley Point

Latitude 51° 12' 54.1"N Longitude 03° 07' 59.0"W
National Grid Reference ST 2087 4687

Recording zero = Chart Datum = 5.90m below Ordnance Datum Newlyn
Recording zero = 14.739m below Tide Gauge Bench Mark



Based upon the 1982 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Marks	NG co-ords	Description
TGBM	ST 2104 4634	Bolt on wall 0.962m NE of SE corner of steps.
Aux1	ST 2078 4626	Rivet on sea wall 41.28m SW of corner of outfall.
Aux2	ST 2091 4630	Bolt on sea wall 31.245m SW of end of railings.

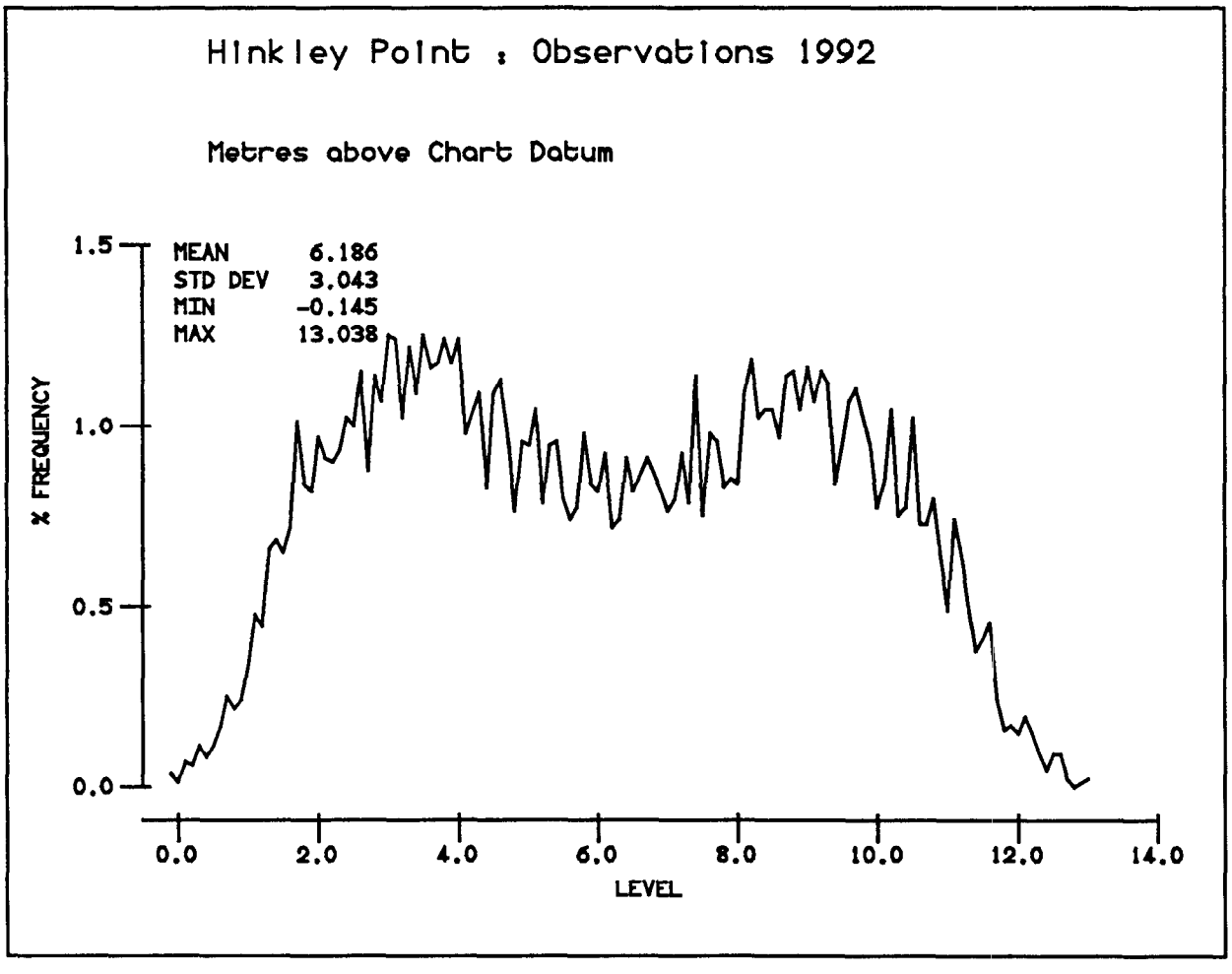
Values from channel 2 digiquartz pressure transducer were fully processed for 1992. The back-up channel 1 with a similar system was repaired and fully serviceable from 20 February. However, the recordings continued to drift from those of channel 2 throughout the year, particularly on low water spring tides.

Isolated spurious and missing values in the raw series were interpolated for the following dates: 13 Feb; 12,23 Apr; 6,7 May; 21,23 Jul; 2,24 Aug; 7,19 Oct; 30 Nov; 10 Dec.

The TGI visited the site to repair the channel 1 outlet 20 February. Scans integrated at 1 7/8 minute on channel 2 were edited to 15 minute interval.

Gaps in final filtered hourly levels

Nil gaps.



Harmonic Tidal Analysis.

Port: England, West Coast - Hinkley Point

Latitude: 51 12' 54.1" N
Longitude: 3 7' 59.0" W

Time Zone: GMT

Length: 366 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 6.187

Hourly data from digiquartz sensor 2

Datum of Observations = ACD : 5.90 Metres below Ordnance Datum (Newlyn)

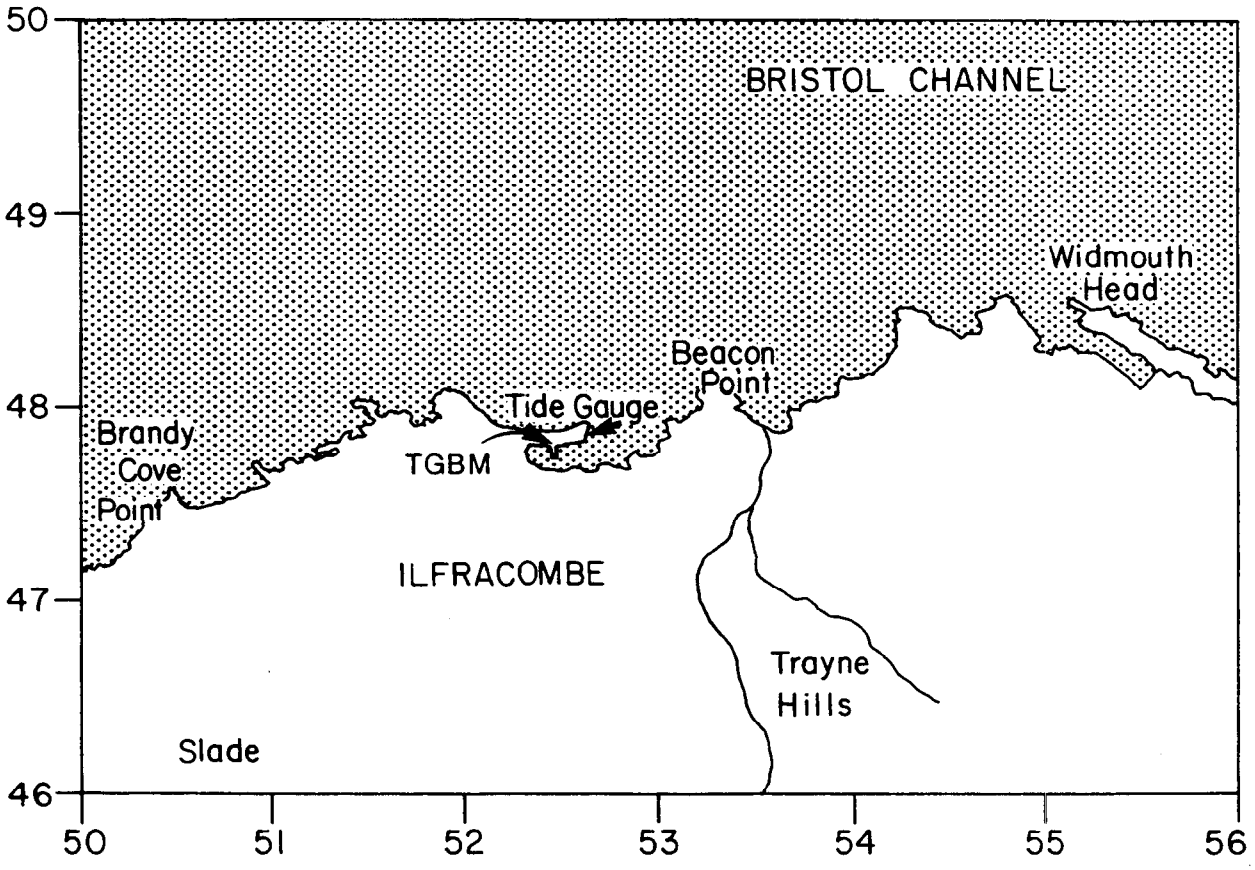
Observation Mean =	0.6188D+01	Residual Mean =	0.1934D-05
Std Dev =	0.3044D+01	Std Dev =	0.1700D+00

Constituent	h	g
Q1	0.018	291.71
O1	0.068	349.45
P1	0.022	127.88
K1	0.073	135.53
J1	0.001	229.08
2N2	0.165	169.58
N2	0.709	167.12
M2	3.933	183.09
S2	1.402	238.07
K2	0.397	235.39
M3	0.047	176.97
M4	0.099	19.98
MS4	0.030	17.90
M6	0.040	216.98

Ilfracombe

Latitude 51° 12' 39.0"N Longitude 04° 06' 36.3"W
National Grid reference SS 5263 4791

Recording zero = Chart Datum = 4.8m below Ordnance Datum Newlyn.
Recording zero = 12.379m below Tide Gauge Bench Mark.



Based upon the 1980 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Mark	NG co-ords	Description
TGBM	SS 5263 4791	OSBM Bolt on concrete pier S.angle of tide gauge hut.
Aux1	SS 5245 4782	Pier Hotel, The Quay.

Values from the channel 2 digiquartz were processed for 1992. The back-up channel 1 was unserviceable until the TGI made repairs in September.

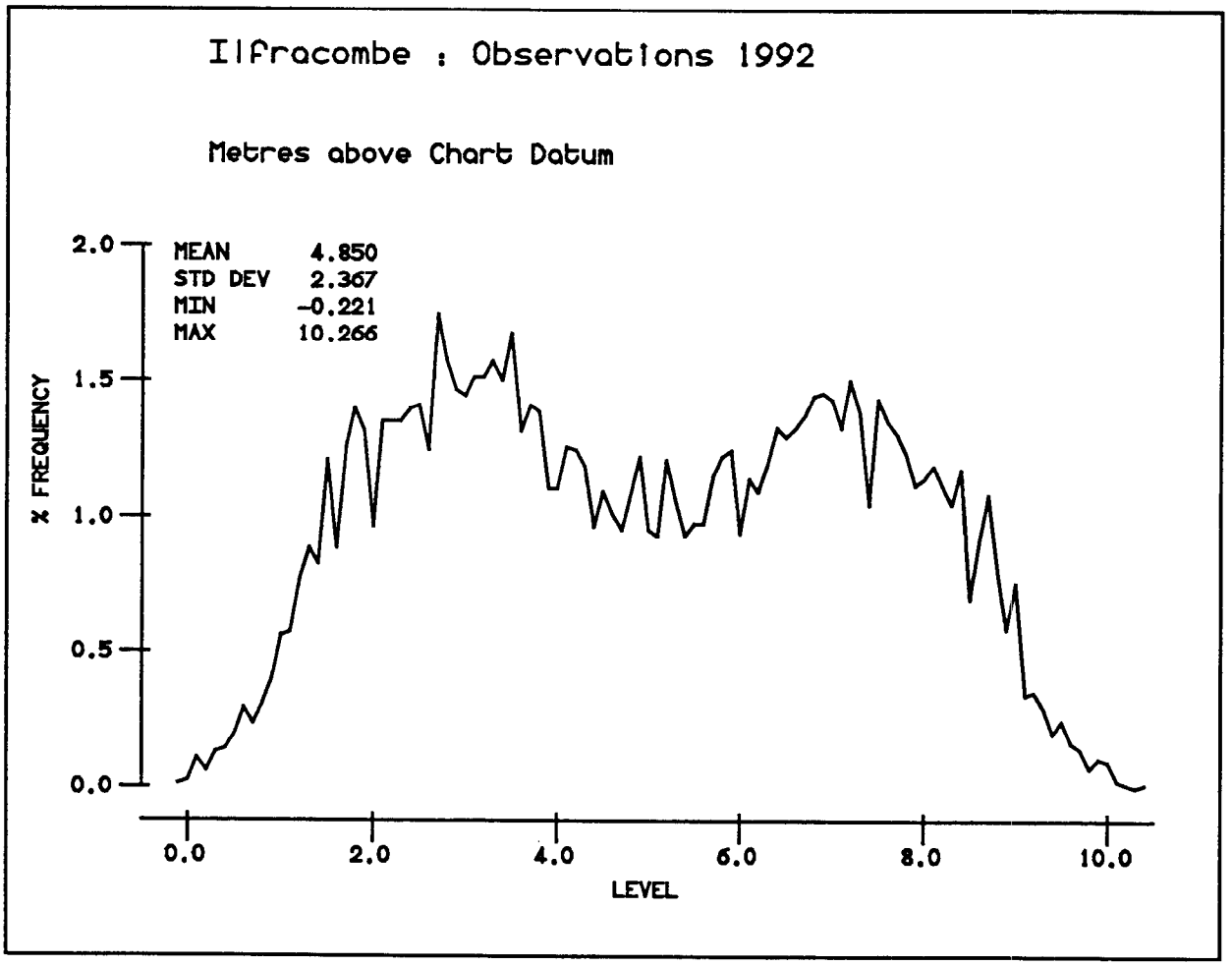
Isolated spurious and missing scans were edited for the following dates : 22,28 Feb; 20 Mar; 9 May; 15 Sep; 14 Dec.

The TGI visited the site 10 January after contact was lost from the central site. A short period of data was lost but later interpolated in the reduction process for the period 1100 GMT to 2200 GMT on the 10 January.

On their visit in September, the TGI fitted a mid-tide datum probe as an extra channel of data. Scans integrated at 1 7/8 minute on 25 September were edited to 15 minute interval.

Gaps in final filtered hourly levels

2100 GMT 8 June -	0001 GMT 12 June	Telephone fault.
0400 GMT 27 July -	2200 GMT 27 July	TGI visit.
2100 GMT 21 September -	0001 GMT 25 September	TGI visit.
1500 GMT 29 November -	2100 GMT 30 November	Loss of pressure- power supply switched off.



Harmonic Tidal Analysis.

Port: England, West Coast - Ilfracombe

Latitude: 51 12' 39.0" N
Longitude: 4 06' 36.3" W

Time Zone: GMT

Length: 353 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 4.851

Hourly data from digiquartz sensor

Datum of Observations = ACD : 4.80 Metres below Ordnance Datum (Newlyn)

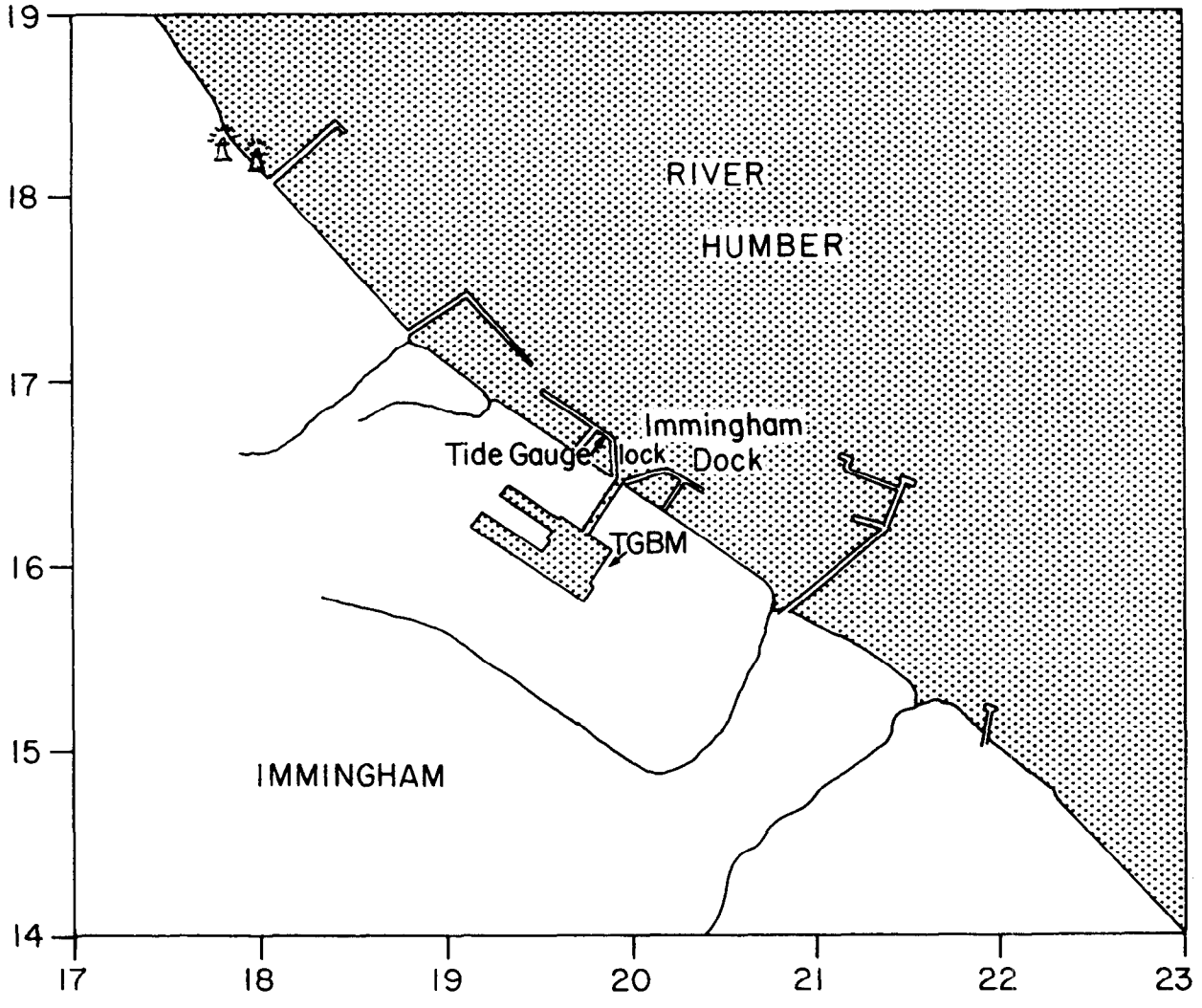
Observation Mean =	0.4852D+01	Residual Mean =	-0.2840D-06
Std Dev =	0.2368D+01	Std Dev =	0.1377D+00

Constituent	h	g
Q1	0.016	286.93
O1	0.065	344.25
P1	0.021	120.54
K1	0.069	124.75
2N2	0.077	118.59
N2	0.572	143.41
M2	3.053	162.57
S2	1.103	210.28
K2	0.313	207.94
M3	0.032	127.25
M4	0.108	350.53
MS4	0.060	53.09
M6	0.018	342.60

Immingham

Latitude 53° 37' 58.9"N Longitude 00° 11' 13.0"W
National Grid reference TA 1987 1672

Recording zero = Chart Datum = 3.9m below Ordnance Datum Newlyn
Recording zero = 9.131m below Tide Gauge Bench Mark



Based upon the 1987 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

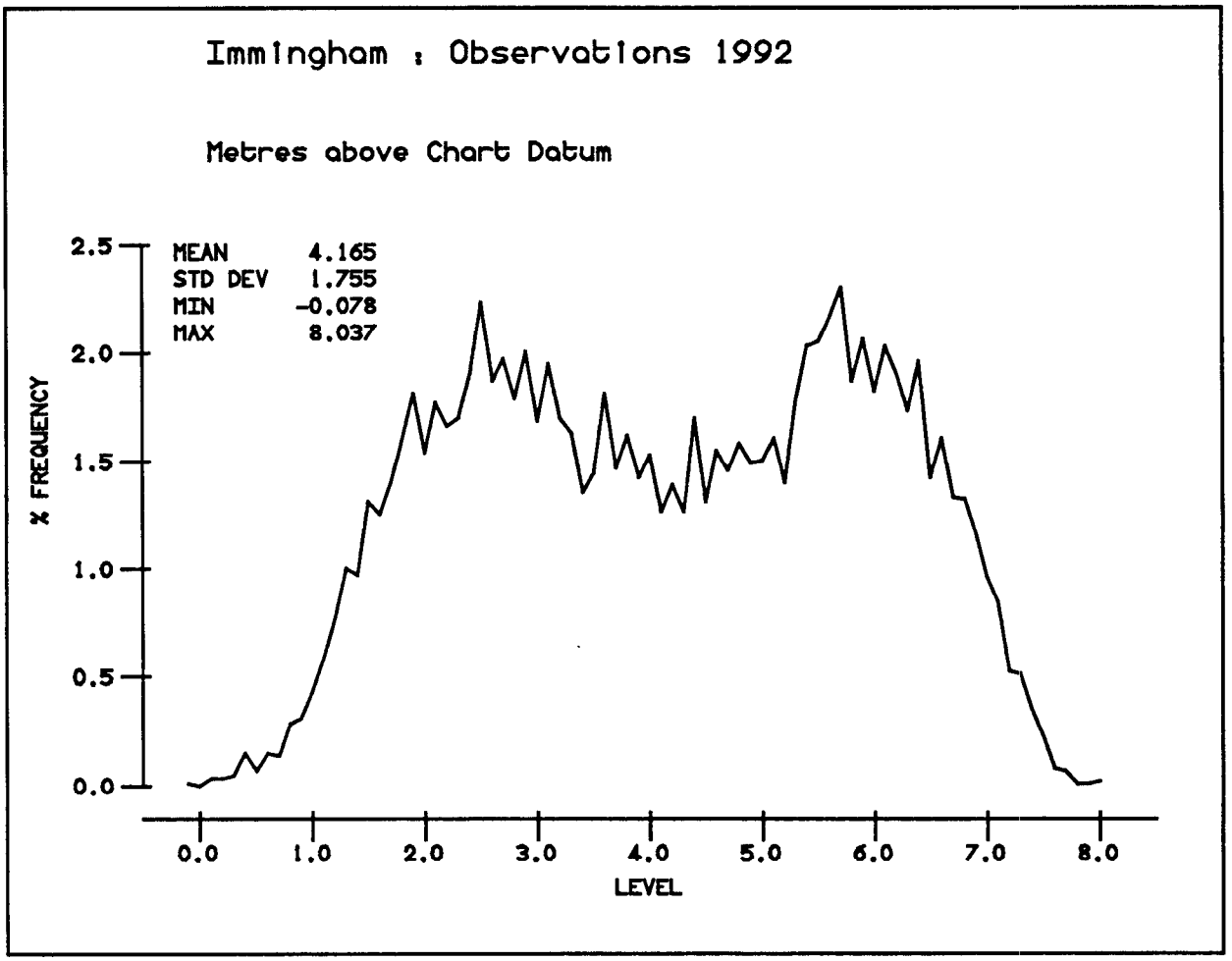
Bench Mark	NG co-ords	Description
TGBM	TA 1989 1630	Flush Bracket G4658 off building NE face,N angle.
Aux1	TA 2005 1631	Building,SW side of road NE face E angle.

Hourly levels were filtered from the channel 2 digiquartz sensor on a pneumatic bubbler system.

Isolated spurious and missing values in the raw series were interpolated for the following dates in 1992: 10 Feb; 3,19 Mar; 9,10 Apr; 8,29 May; 9,10,24 Jun; 8,22 Jul; 4,12,26 Aug; 8,9,23,25 Sep; 7,31 Oct; 26 Nov; 22 Dec.

Gaps in final filtered hourly levels

Nil gaps.



Harmonic Tidal Analysis.

Port: England, East Coast - Immingham

Latitude: 53 37' 58.9" N
Longitude: 0 11' 13.0" W

Time Zone: GMT

Length: 366 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 4.165

Hourly data from digiquartz sensor

Datum of Observations = ACD : 3.90 Metres below Ordnance Datum (Newlyn)

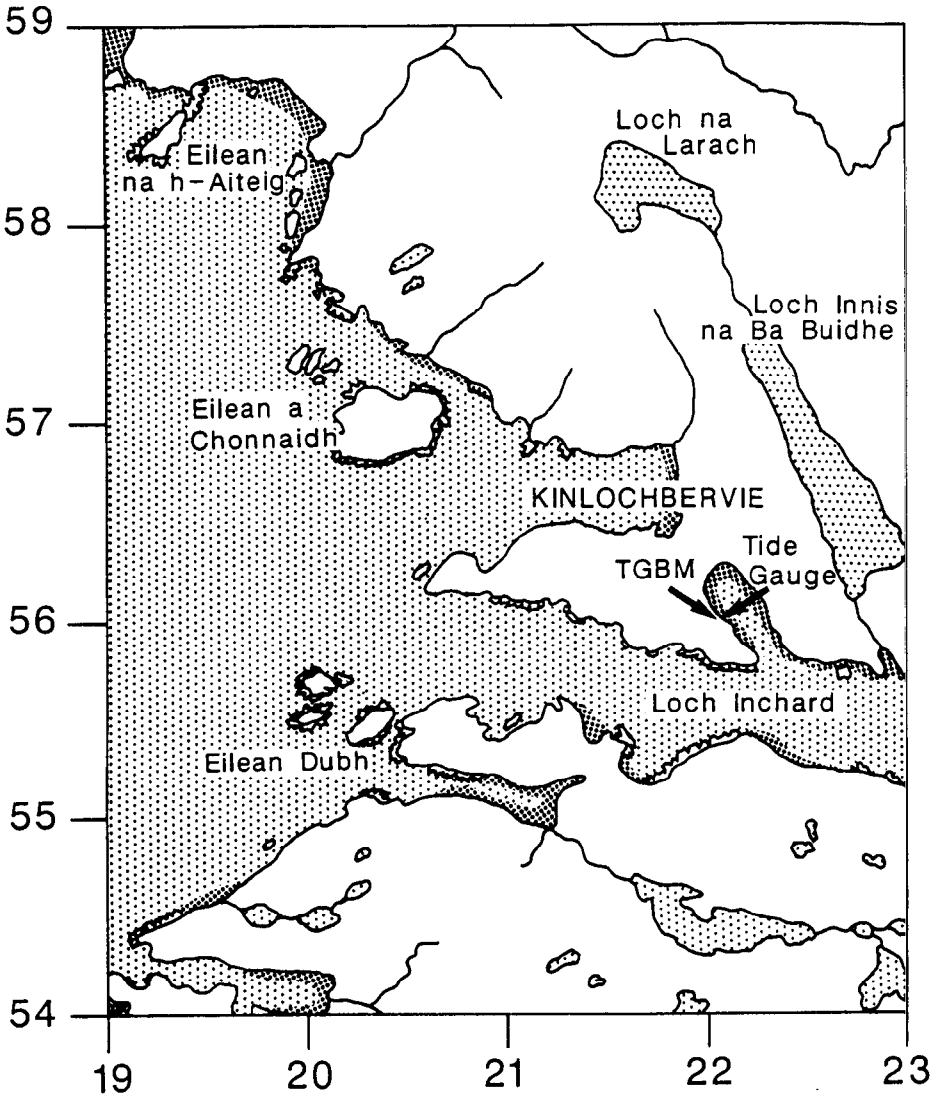
Observation Mean =	0.4166D+01	Residual Mean =	0.4439D-05
Std Dev =	0.1757D+01	Std Dev =	0.1814D+00

Constituent	h	g
Q1	0.044	56.89
O1	0.173	108.59
P1	0.046	259.86
K1	0.160	282.78
J1	0.009	306.11
2N2	0.069	146.82
N2	0.417	139.99
M2	2.280	162.00
S2	0.749	213.15
K2	0.213	210.75
M3	0.020	215.24
M4	0.022	205.26
MS4	0.035	256.55
M6	0.015	147.73

Kinlochbervie

Latitude 58° 27' 22.6"N Longitude 05° 02' 58.2"W
National Grid reference NC 221 560

Recording zero = Chart Datum = 2.5m below Ordnance Datum Newlyn
Recording zero = 7.213m below Tide Gauge Bench Mark



Based upon the 1984 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

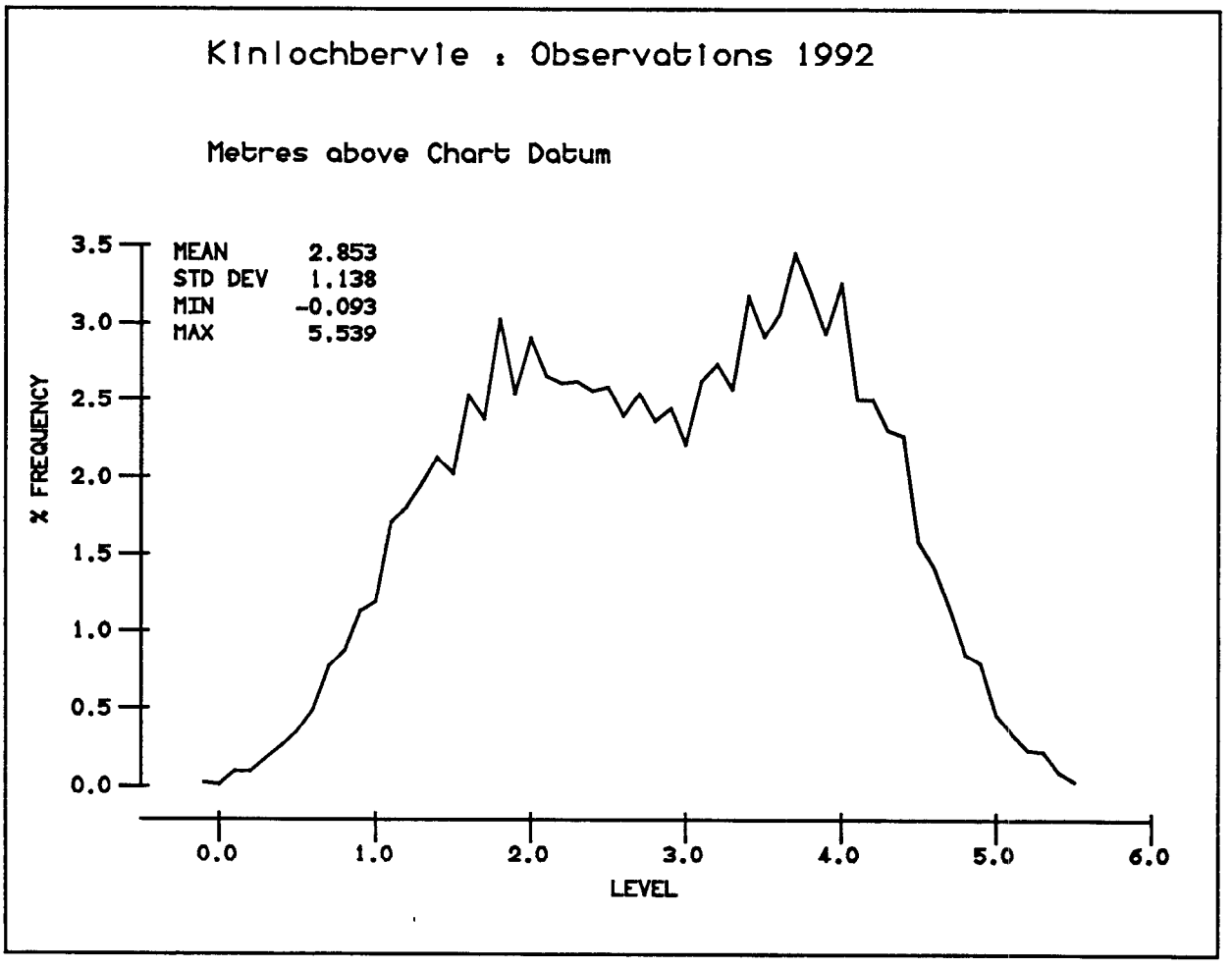
Bench Mark	NG co-ords	Description
TGBM	NC 2206 5613	Bolt south side of harbour 19.5m SE angle of building.
Aux1	NC 2210 5612	Rivet on ice plant 7.45m from S. angle of building.

Values from both digiquartz channels were fully processed for 1992. Whilst the pneumatic line for channel 2 was severed and data for early January subsequently lost, a complete series for the year was collected from the back-up channel 1.

Isolated spurious and missing scans in the raw values for channel 2 were interpolated for the following dates: 24 Jan; 4 Feb; 5,21 Mar; 11,15,26 May; 22 Sep; 7,14,26 Oct; 2,5,24,26 Nov; 24 Dec.

Gaps in final filtered hourly levels

0001 GMT 1 January -	1700 GMT 8 January	Pneumatic line severed.



Harmonic Tidal Analysis.

Port: Scotland, West Coast - Kinlochbervie

Latitude: 58 27' 22.6" N
Longitude: 5 02' 58.2" W

Time Zone: GMT

Length: 358 Days

From: 9th January, 1992 To: 31st December, 1992

Units: Metres A0: 2.856

Hourly data from digiquartz sensor 2

Datum of Observations = ACD : 2.50 Metres below Ordnance Datum (Newlyn)

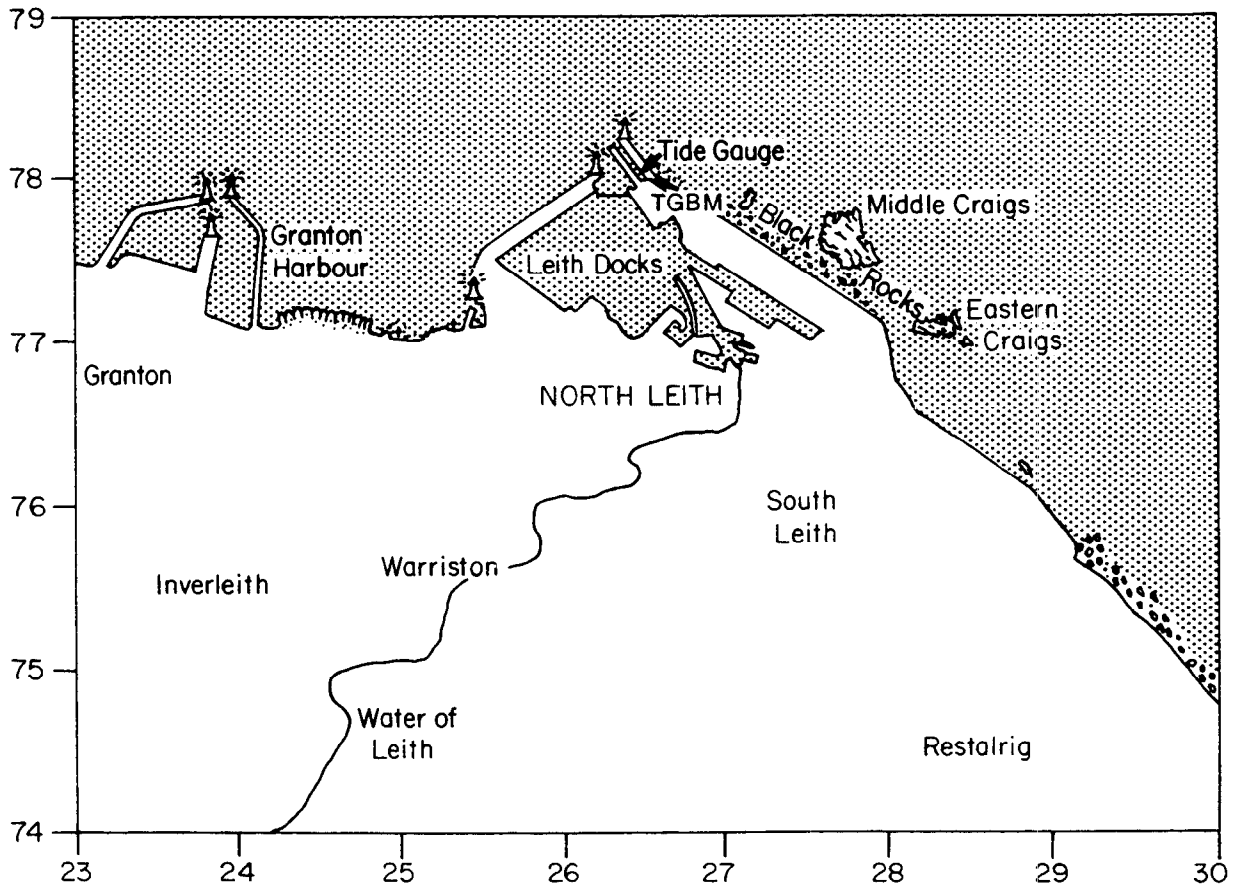
Observation Mean =	0.2854D+01	Residual Mean =	-0.2231D-05
Std Dev =	0.1138D+01	Std Dev =	0.1827D+00

Constituent	h	g
Q1	0.022	284.20
O1	0.077	338.35
P1	0.033	112.67
K1	0.124	125.48
J1	0.006	128.75
2N2	0.036	158.16
N2	0.288	185.08
M2	1.436	208.14
S2	0.548	242.51
K2	0.155	239.69
M3	0.023	127.33
M4	0.043	248.87
MS4	0.050	312.21
M6	0.002	63.57

Leith

Latitude 55° 59' 23.3"N Longitude 03° 10' 48.9"W
National Grid reference NT 2638 7805

Recording zero = Chart Datum = 2.9m below Ordnance Datum Newlyn
Recording zero = 7.8395m below Tide Gauge Bench Mark



Based upon the 1987 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

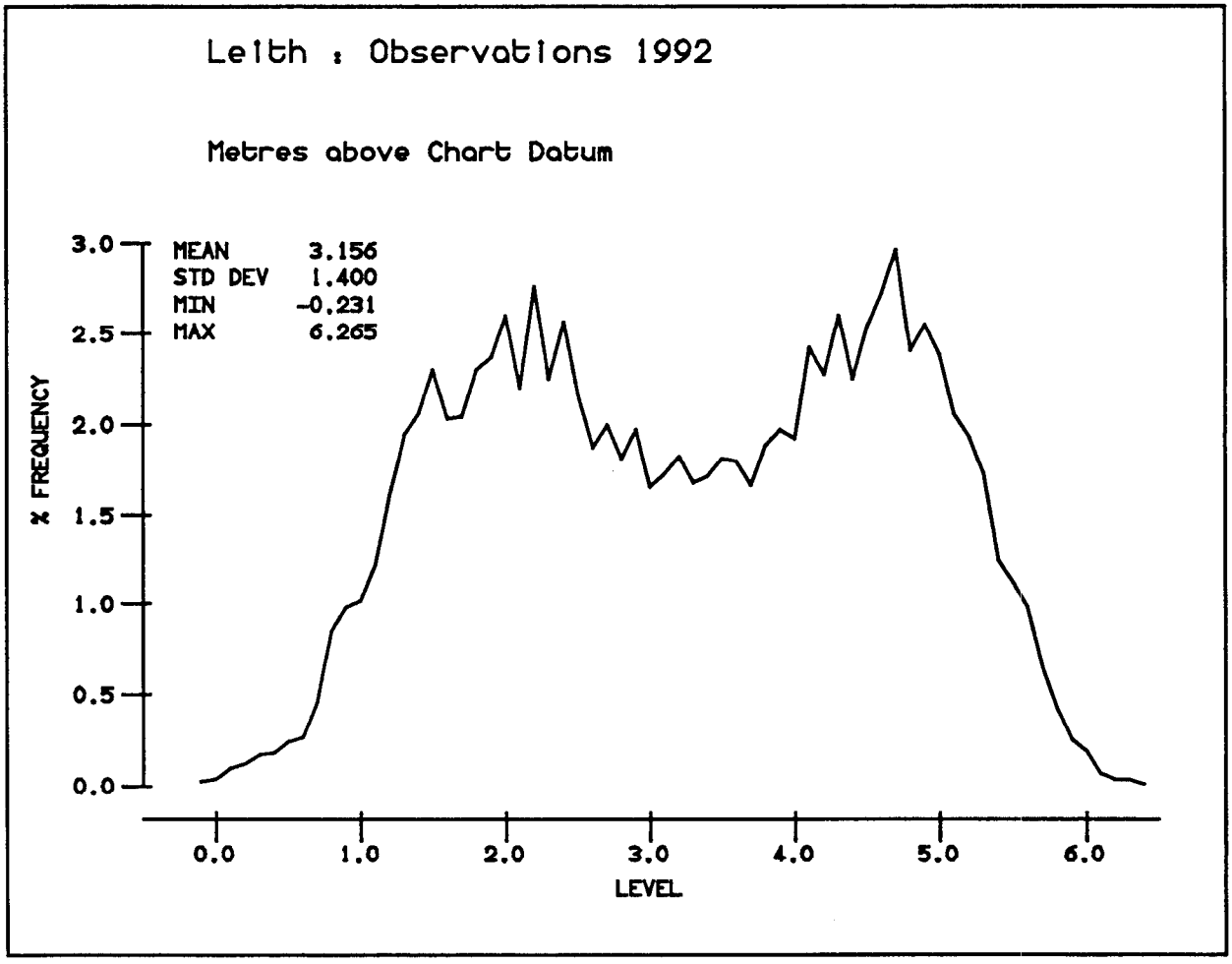
Bench Mark	NG co-ords	Description
TGBM	NT 2643 7797	OSBM Bolt SE end of TG pier 0.9m N angle of pier.
Aux1	NT 2648 7797	Rivet on top step SW side of road 1.6m S angle of building.

Hourly levels were filtered from the channel 2 potentiometer connected to a well-head unit.

Isolated spurious and missing scans in the raw values were interpolated for the following dates : 26 Feb; 15 Apr; 2,30 Jul; 26 Sep; 11,14 Oct; 13,17 Nov.

Gaps in final filtered hourly levels

2100 GMT 3 August - 0400 GMT 25 August	Modem fault



Harmonic Tidal Analysis.

Port: Scotland, East Coast - Leith

Latitude: 55 59' 23.3" N
Longitude: 3 10' 48.9" W

Time Zone: GMT

Length: 374 Days

From: 1st January, 1992 To: 31st January, 1993

Units: Metres A0: 3.163

Hourly data from potentiometer sensor 2

Datum of Observations = ACD : 2.90 Metres below Ordnance Datum (Newlyn)

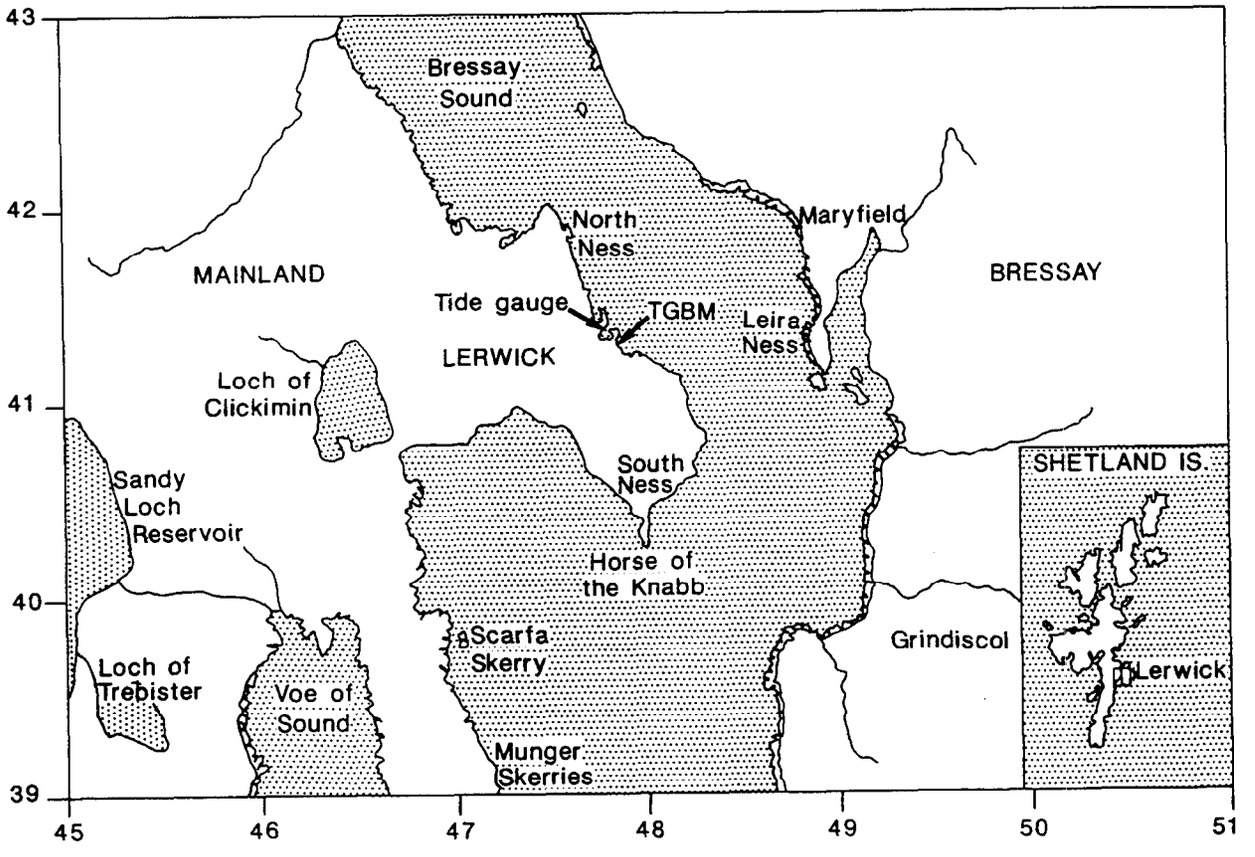
Observation Mean =	0.3167D+01	Residual Mean =	0.2682D-06
Std Dev =	0.1399D+01	Std Dev =	0.1778D+00

Constituent	h	g
Q1	0.042	1.17
O1	0.147	59.66
P1	0.038	190.77
K1	0.127	222.08
J1	0.007	297.50
2N2	0.041	20.87
N2	0.343	31.23
M2	1.795	55.40
S2	0.612	96.37
K2	0.175	93.81
M3	0.023	13.12
M4	0.078	184.45
MS4	0.069	300.30
M6	0.047	288.91

Lerwick

Latitude 60° 09' 13.8"N Longitude 01° 08' 18.2" W
National Grid Reference HU 4783 4129

Recording zero = Chart Datum = 1.22m below Ordnance Datum Local
Recording zero = 4.57m below Tide Gauge Bench Mark



Based upon the 1987 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Mark	NG co-ords	Description
TGBM	HU 4783 4129	OSBM bolt on breakwater wall.
Aux1	HU 4784 4125	Queen's Hotel 7.5m SW face south angle.
Aux2	HU 4777 4110	Lerwick Parish Church North face NW angle.

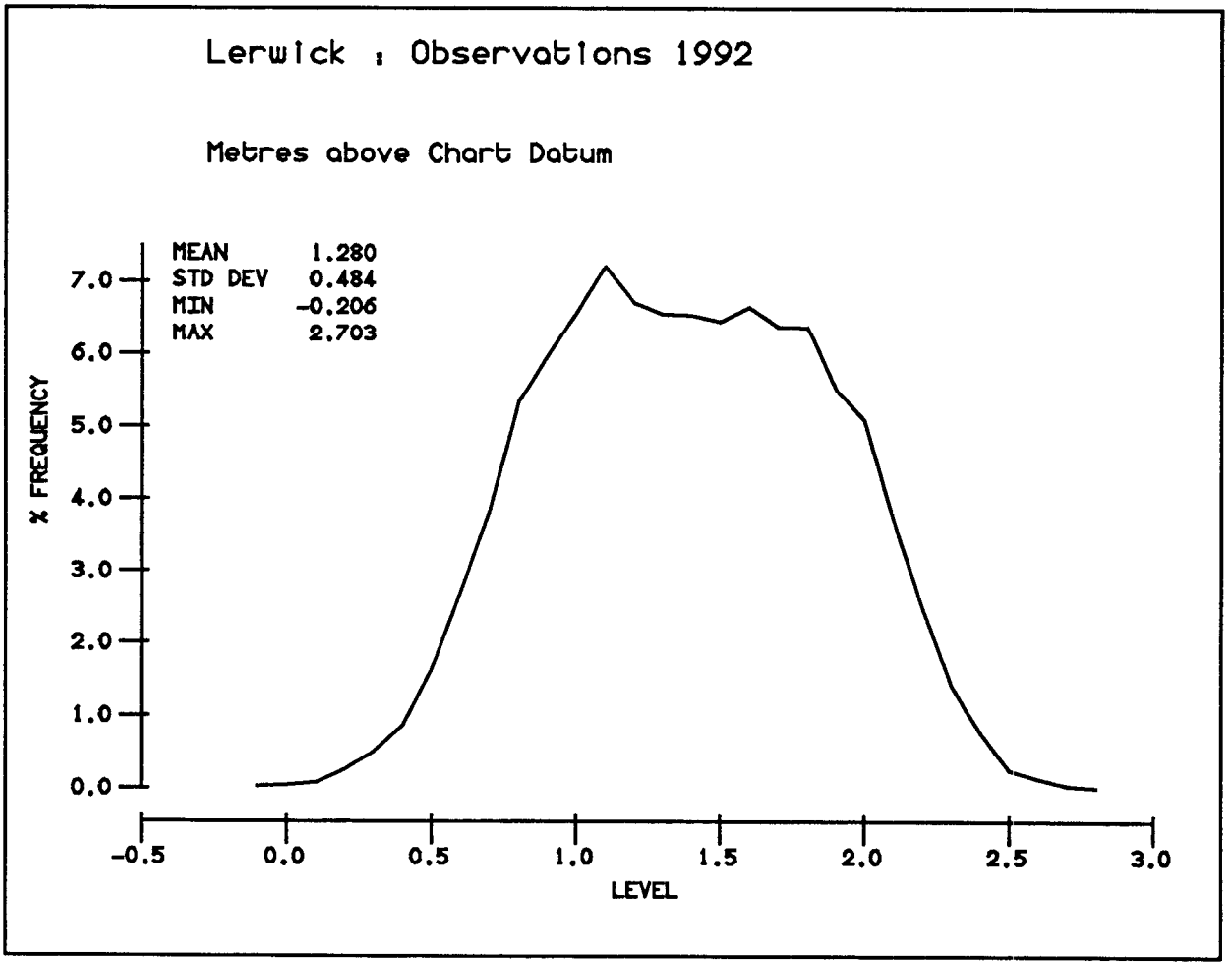
Hourly levels for 1992 were filtered from the channel 2 digiquartz connected to a pneumatic bubbler system.

Spurious and missing scans in the raw values were interpolated for the following dates: 3,30 Jan; 18 Feb; 24 Mar; 22 Apr; 7 May; 19 Jul; 18 Aug; 1 Oct; 14 Dec.

Scans integrated at 1 7/8 minute during the visit by T.G.I to replace the compressor, 28 October were edited to 15 minute interval.

Gaps in final filtered hourly levels

Nil gaps.



Harmonic Tidal Analysis.

Port: Shetland Islands - Lerwick

Latitude: 60 09' 13.8" N
Longitude: 1 08' 18.2" W

Time Zone: GMT

Length: 366 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 1.281

Hourly data from digiquartz sensor

Datum of Observations = ACD : 1.22 Metres below Ordnance Datum (Local)

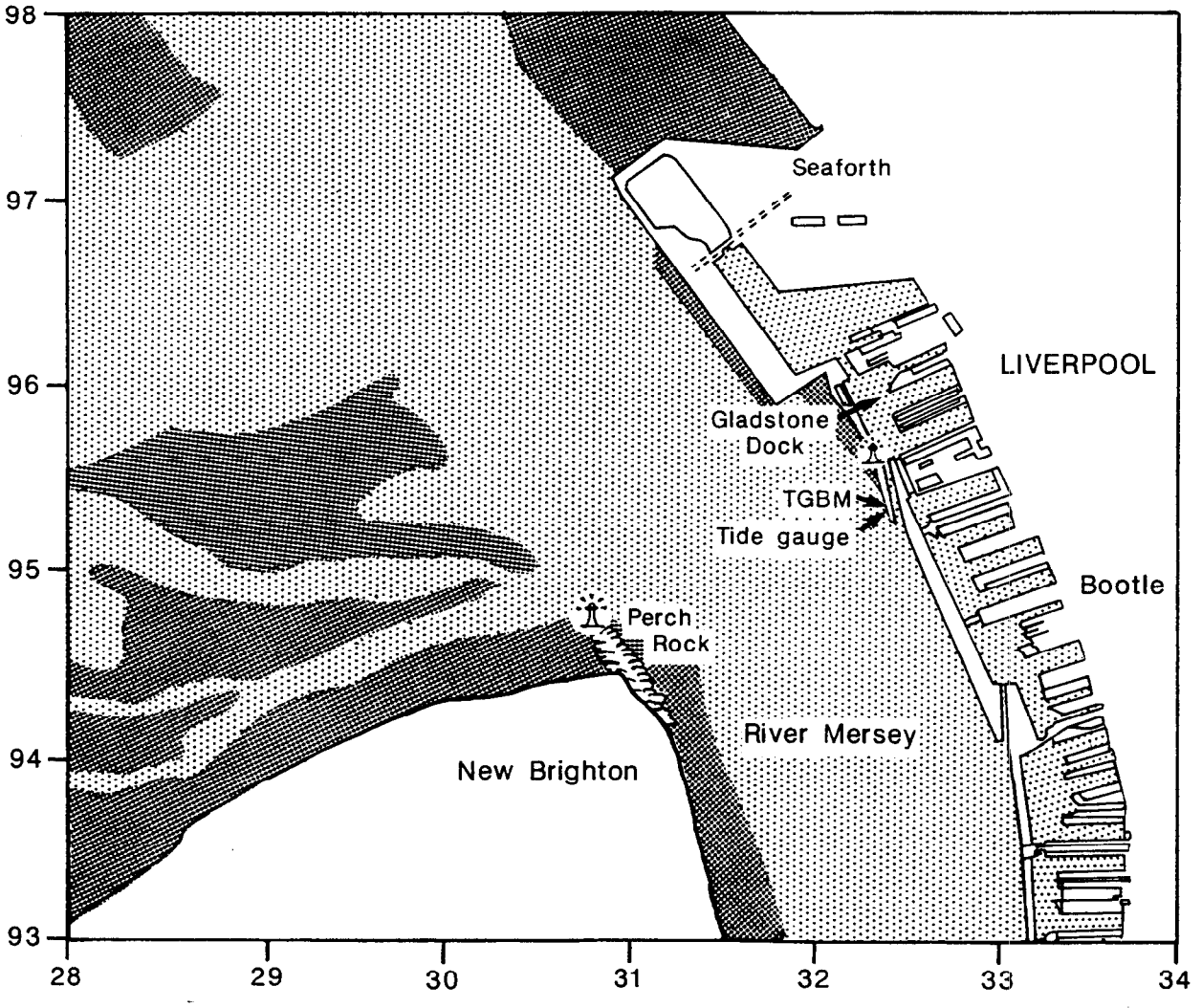
Observation Mean =	0.1282D+01	Residual Mean =	0.4436D-07
Std Dev =	0.4832D+00	Std Dev =	0.1380D+00

Constituent	h	g
Q1	0.023	334.08
O1	0.078	28.52
P1	0.023	145.93
K1	0.078	163.82
J1	0.006	184.66
2N2	0.017	266.95
N2	0.119	291.20
M2	0.582	311.92
S2	0.211	347.65
K2	0.059	343.03
M3	0.007	198.55
M4	0.016	277.66
MS4	0.013	4.06
M6	0.012	224.25

Liverpool, Gladstone Dock

Latitude 53° 26' 57.9"N Longitude 03° 01'00.0"W
National Grid reference SJ 3249 9525

Recording zero = 4.93m below Ordnance Datum Newlyn.
Recording zero = 14.475m below Tide Gauge Bench Mark.



Based upon the 1988 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Mark	NG co-ords	Description
TGBM	SJ 3249 9525	NBM Rivet NE face E angle base of building.
Aux1	SJ 3250 9523	Rivet E side of quay above hinge SW dock gate.

Hourly levels for 1992 were filtered from the channel 2 digiquartz pneumatic bubbler system. Problems with the pressure point nozzles blocking were encountered from early June onwards.

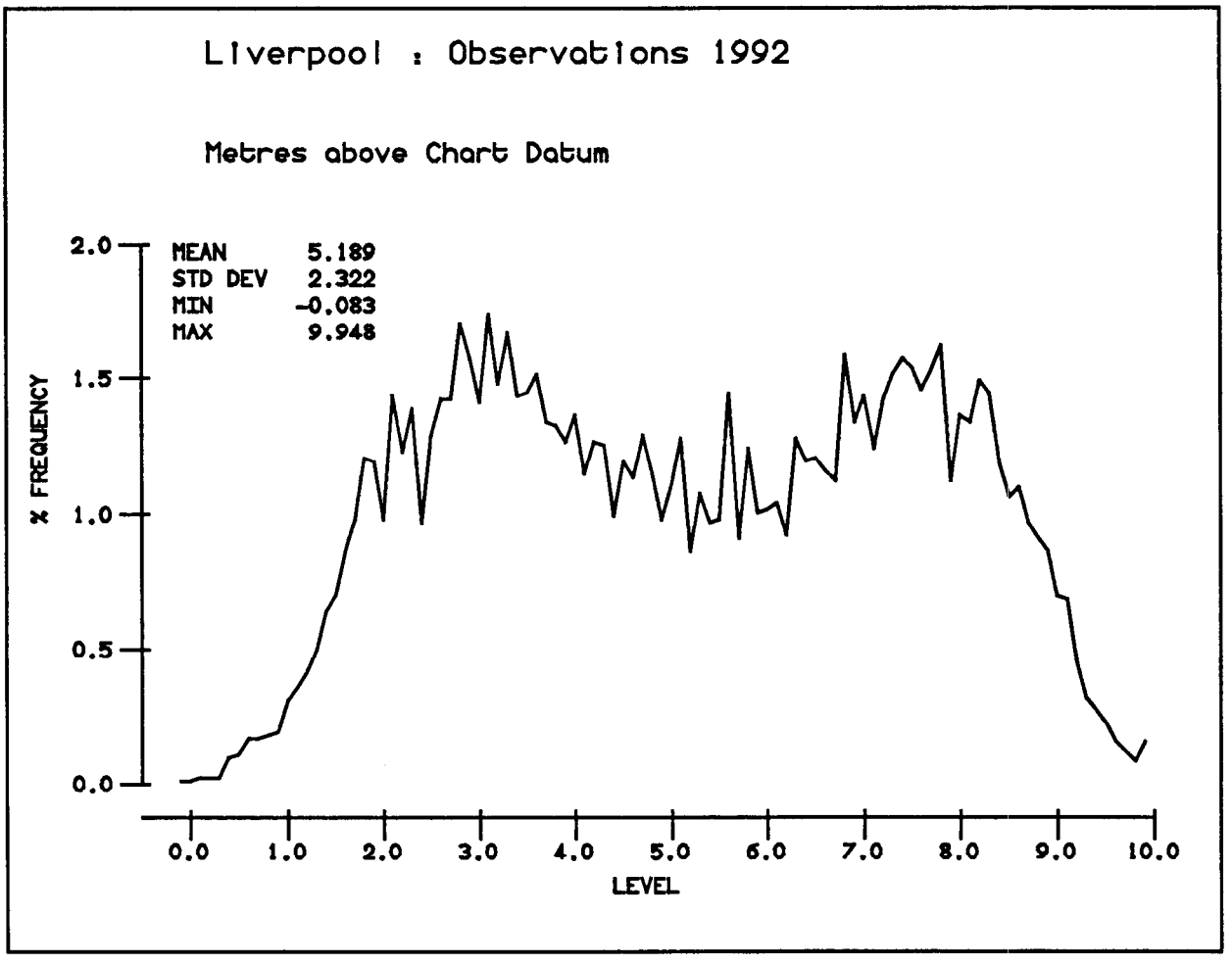
Isolated spurious and missing scans were edited for the following dates : 30 Jan; 20 Feb; 3,12,24 Apr; 11 May; 19 Jul; 1,2,4 Aug; 24,25 Nov; 8 Dec.

For the period 14 August to 14 September the number of missing scans in the raw series rose to as many as 25 per day, making interpolation very subjective. There were also periods when the series were lost altogether (see below).

Scans integrated at 1 7/8 minute during the TGI visits of 7 April, 8 June, 9 July were edited to 15 minute interval.

Gaps in final filtered hourly levels

2100 GMT 24 August -	1600 GMT 04 September	Processor board fault.
1900 GMT 06 September -	2000 GMT 07 September	Processor board fault.
2100 GMT 14 September -	1600 GMT 16 September	Processor board fault.Repairs made by TGI.



Harmonic Tidal Analysis.

Port: England, West Coast - Liverpool, Gladstone Dock

Latitude: 53 26' 57.9" N
Longitude: 3 01' 0.0" W

Time Zone: GMT

Length: 349 Days

From: 1st January 1992 To: 31st December, 1992

Units: Metres A0: 5.192

Hourly data from digiquartz sensor 2

Datum of Observations = ACD : 4.93 Metres below Ordnance Datum (Newlyn)

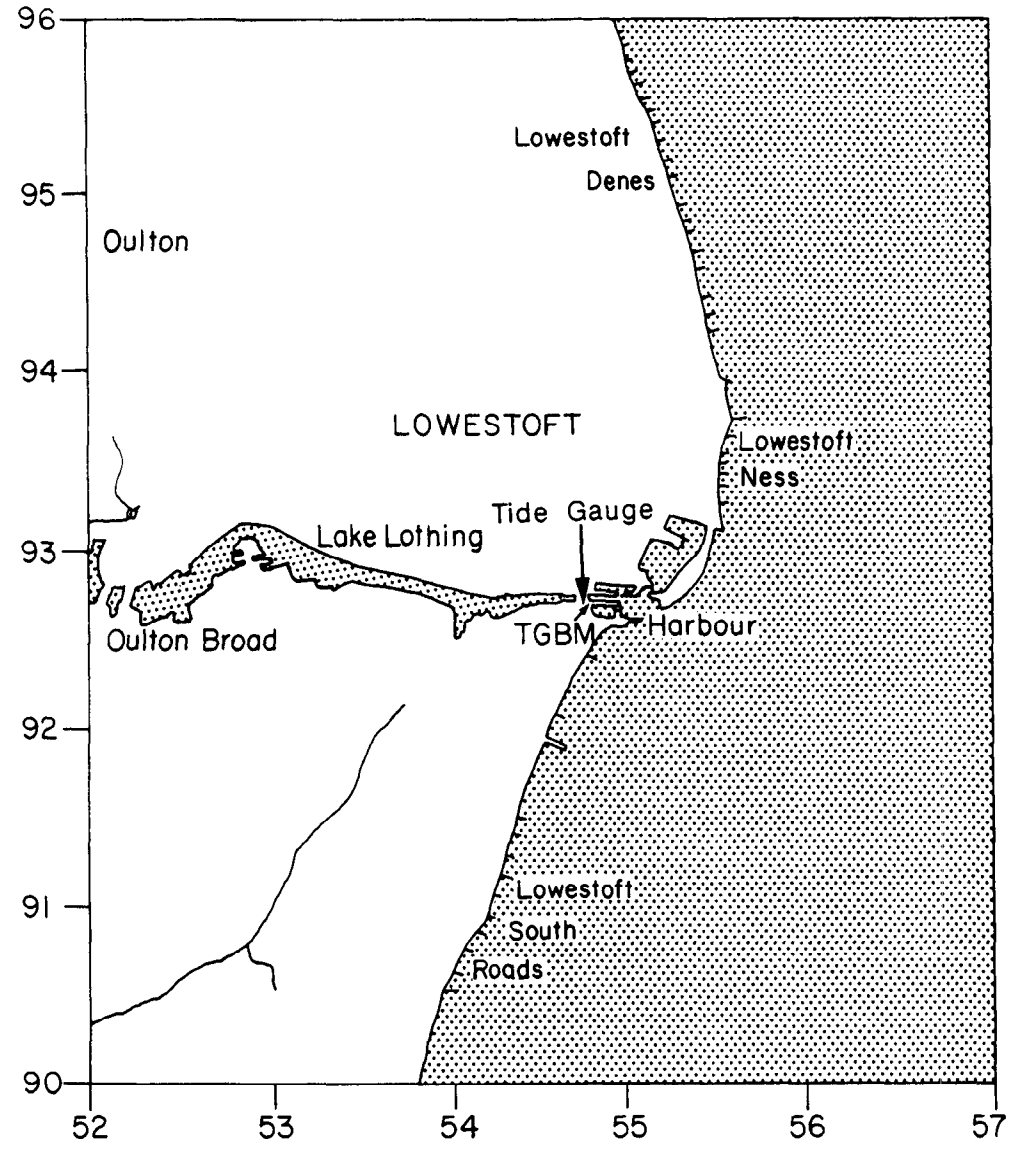
Observation Mean =	0.5190D+01	Residual Mean =	-0.3851D-05
Std Dev =	0.2324D+01	Std Dev =	0.1860D+00

Constituent	h	g
Q1	0.032	338.64
O1	0.112	38.33
P1	0.039	190.92
K1	0.127	190.91
J1	0.004	287.76
2N2	0.077	298.91
N2	0.577	297.45
M2	3.046	321.24
S2	0.981	5.89
K2	0.281	4.30
M3	0.037	304.31
M4	0.246	204.33
MS4	0.150	247.15
M6	0.053	349.06

Lowestoft

Latitude 52° 28' 20.9"N Longitude 01° 45' 6.4"E
National Grid reference TM 5477 9272

Recording zero = Chart Datum = 1.5m below Ordnance Datum Newlyn
Recording zero = 4.485m below Tide Gauge Bench Mark.



Based upon the 1980 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Mark	NG co-ords	Description
TGBM	TM 5482 9273	Bolt on quay wall S. side of pier.
Aux1	TM 5477 9272	Bolt on concrete jetty at SW corner of automatic TG building.

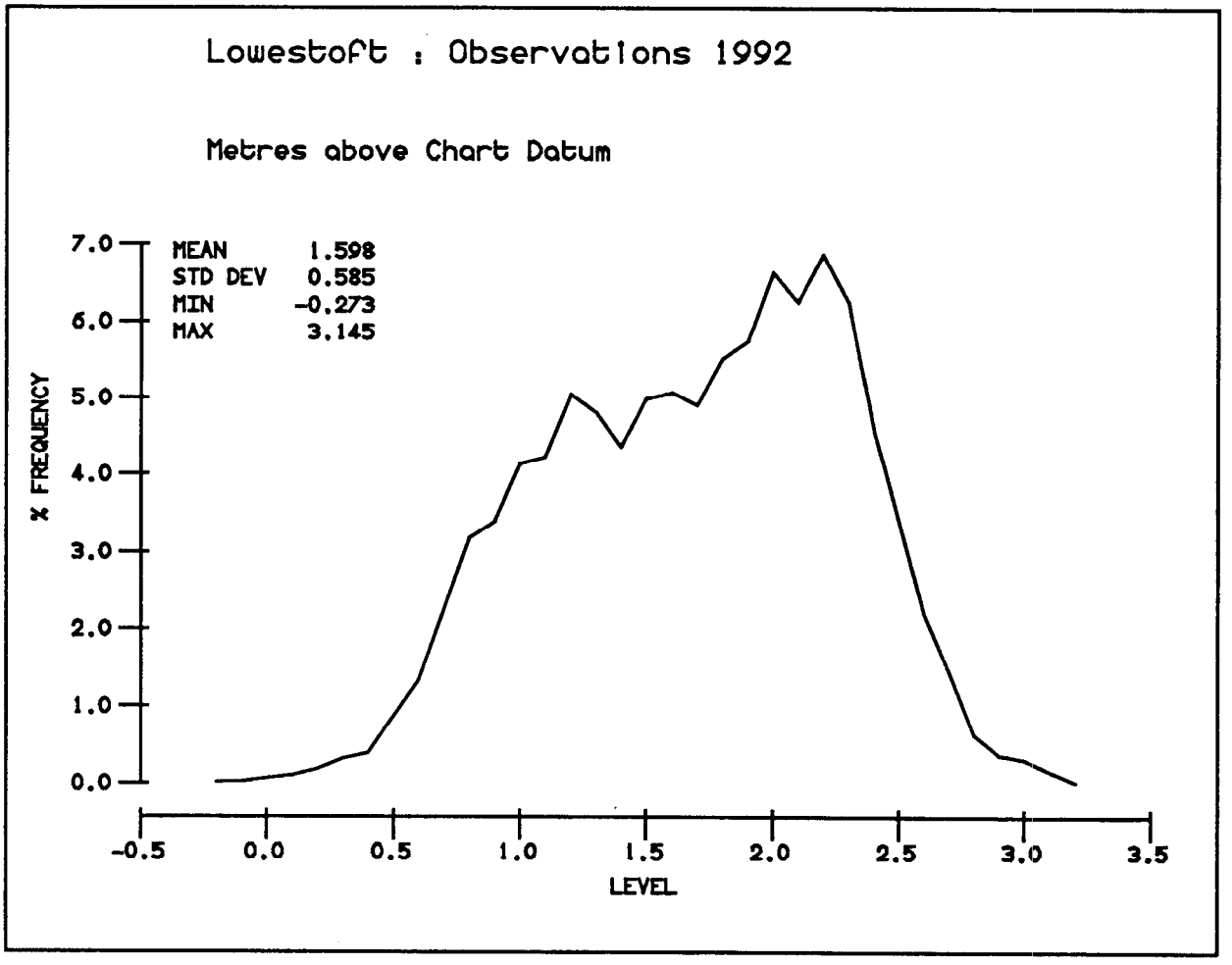
Hourly levels were filtered from the channel 2 potentiometer attached to the Munro gauge.

Isolated spurious and missing scans in the raw elevations were interpolated for the following dates in 1992: 5,20,23 Jan; 18 Feb; 4,20 Mar; 9,16,28 Apr; 7,14,29 May; 9,14,24 Jun; 16,21,29,30 Jul; 12,27 Aug; 3,15 Sep; 1,4 Oct; 14 Nov.

Scans integrated at 1 7/8 minute during the 6 October visit by TGI, when both channels were recalibrated, were edited to 15 minute interval.

Gaps in final filtered hourly levels

Nil gaps.



Harmonic Tidal Analysis.

Port: England, East Coast - Lowestoft

Latitude: 52 28' 20.9" N
Longitude: 1 45' 6.4" E

Time Zone: GMT

Length: 366 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 1.600

Hourly data from potentiometer sensor 2

Datum of Observations = ACD : 1.50 Metres below Ordnance Datum (Newlyn)

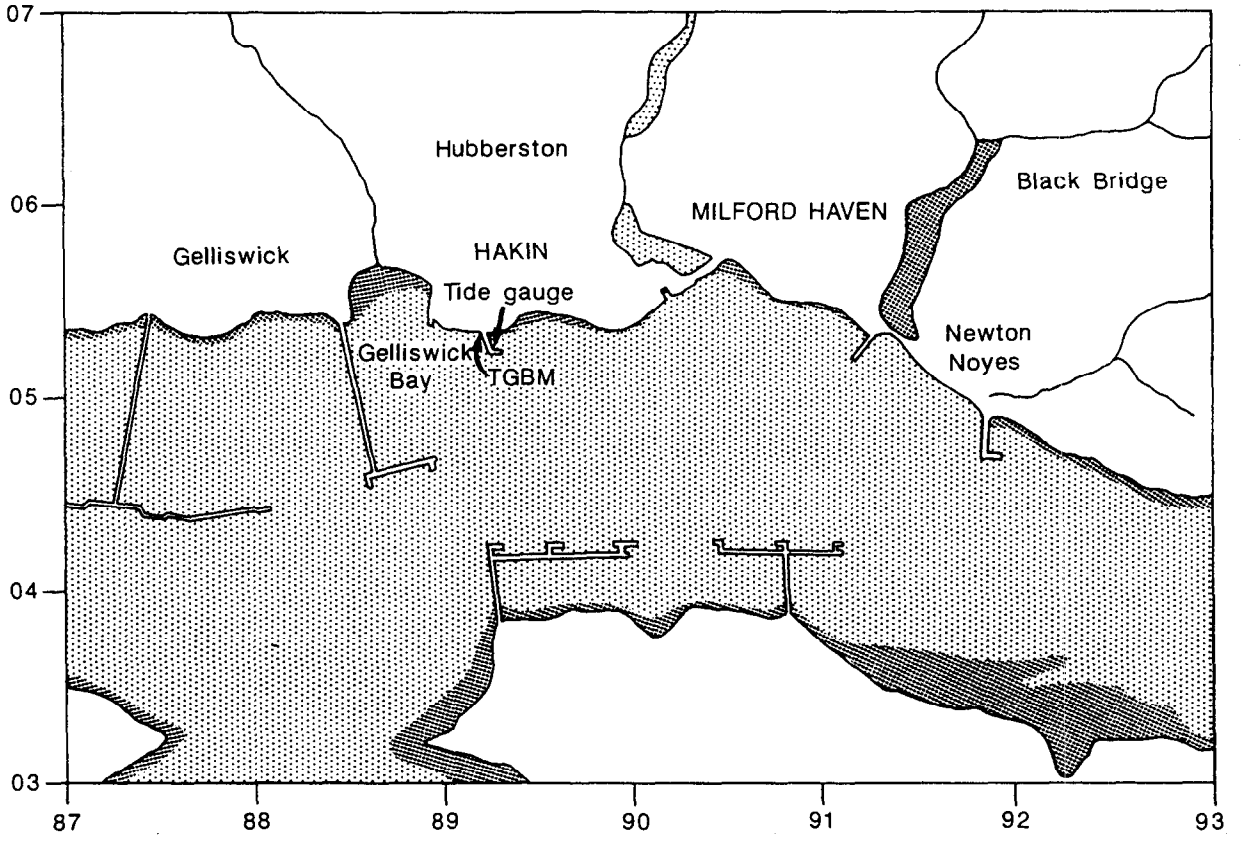
Observation Mean =	0.1600D+01	Residual Mean =	0.7833D-07
Std Dev =	0.5832D+00	Std Dev =	0.1985D+00

Constituent	h	g
Q1	0.036	95.52
O1	0.138	154.49
P1	0.035	314.44
K1	0.124	333.43
J1	0.004	25.57
2N2	0.012	234.65
N2	0.131	229.66
M2	0.692	259.36
S2	0.208	299.32
K2	0.058	298.55
M3	0.006	298.09
M4	0.050	335.22
MS4	0.041	27.41
M6	0.041	119.79

Milford Haven

Latitude 51° 42' 21.5" N Longitude 05° 03' 2.1" W
National Grid Reference SM 8925 0526

Recording zero = Chart Datum = 3.71m below Ordnance Datum Newlyn
Recording zero = 16.734m below Tide Gauge Bench Mark



Based upon the 1980 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

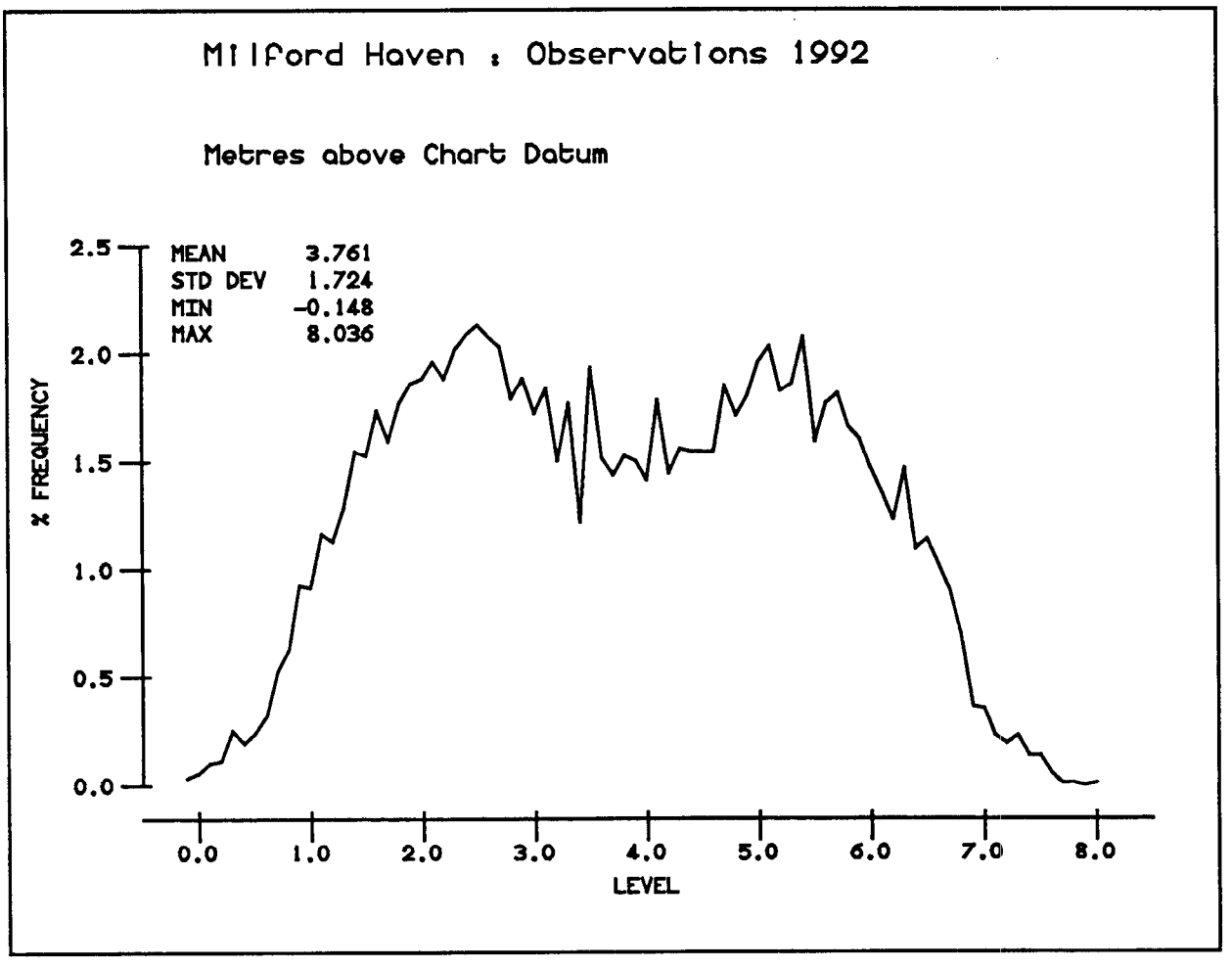
Bench Mark	NG co-ords	Description
TGBM	SM 8921 0536	OSBM bolt on wall West side of entrance to jetty.
Aux1	SM 8918 0541	Flush Bracket G4977 office building, SW face, NW angle.

Hourly levels were filtered from the channel 2 digiquartz on a pneumatic bubbler system. From 20 August onwards, values from the two channels showed a drift of up to 4cm difference with the second channel suspected as recording low. No corrections have been applied to take this into account.

No problems were detected or reported by TGI by way of explanation when visiting the site, although a large number of missing scans occurred in the year's series: 5, 8, 14, 28 Jan; 3, 8, 27 Feb; 4, 6, 9, 13, 27 Mar; 1, 8, 15, 16, 17, 18, 23, 24 Apr; 1, 11, 12, 17, 27 Jun; 8, 16, 21, 22 Jul; 11, 16, 20, 31 Aug; 13, 15, 17, 18, 22, 23 Sep; 8, 11, 19, 20, 29 Oct; 4, 5, 13, 14, 20, 23 Nov; 3, 10, 22, 23, 26 Dec.

Gaps in final filtered hourly levels

Nil gaps.



Harmonic Tidal Analysis.

Port: Wales - Milford Haven

Latitude: 51 42' 21.5" N
Longitude: 5 03' 2.1" W

Time Zone: GMT

Length: 366 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 3.762

Hourly data from digiquartz sensor 2

Datum of Observations = ACD : 3.71 Metres below Ordnance Datum (Newlyn)

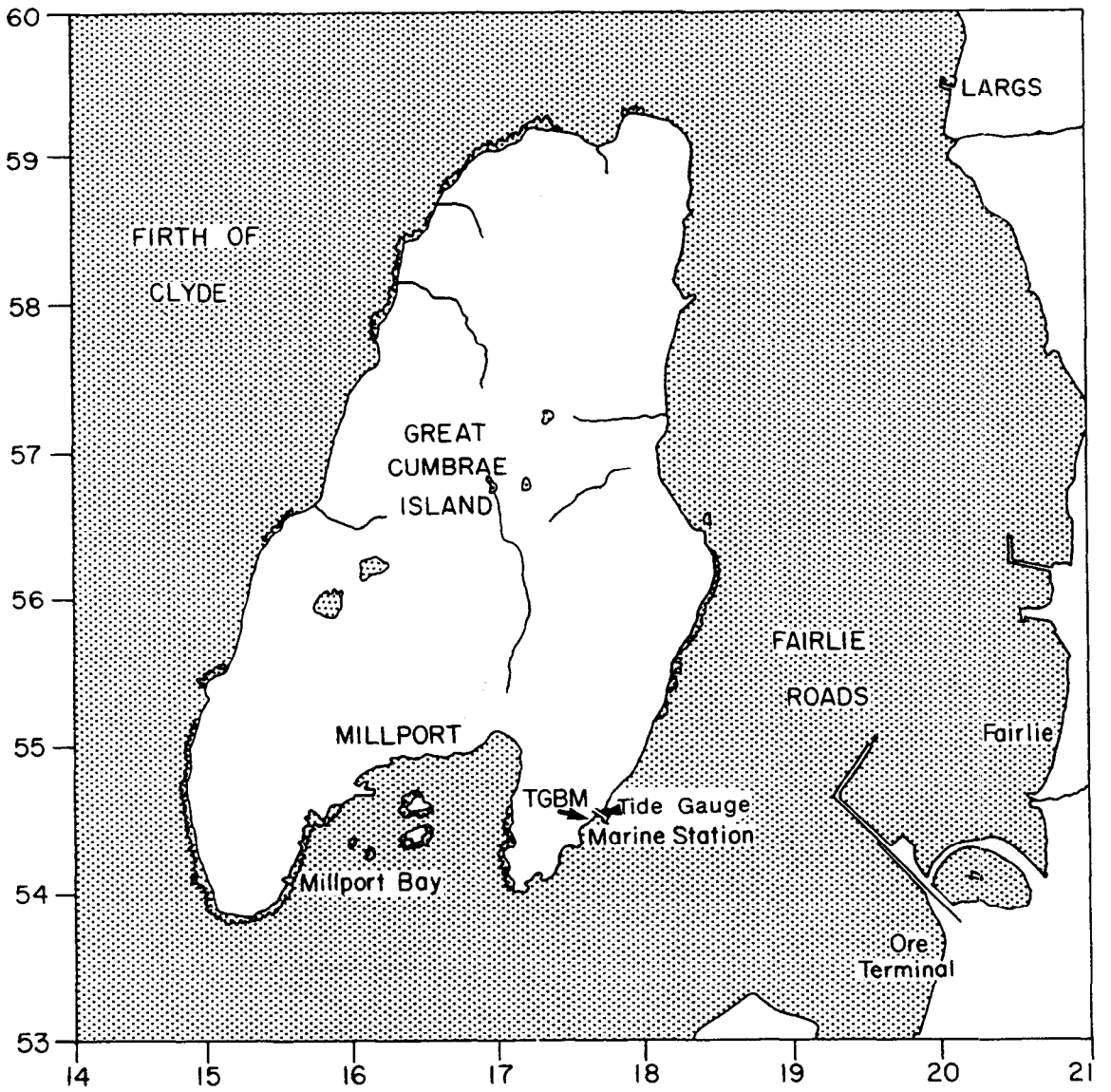
Observation Mean =	0.3763D+01	Residual Mean =	0.3206D-05
Std Dev =	0.1726D+01	Std Dev =	0.1374D+00

Constituent	h	g
Q1	0.016	295.87
O1	0.062	350.77
P1	0.021	127.09
K1	0.067	129.94
2N2	0.059	132.06
N2	0.431	152.71
M2	2.229	172.94
S2	0.807	218.12
K2	0.228	215.71
M3	0.017	126.03
M4	0.066	307.15
MS4	0.033	357.58
M6	0.015	151.47

Millport

Latitude 55° 44' 58.2"N Longitude 04° 54' 17.9"W
National Grid reference NS 1770 5450

Recording zero = Chart Datum = 1.62m below Ordnance Datum Newlyn
Recording zero = 7.825m below Tide Gauge Bench Mark.



Based upon the 1980 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Mark	NG co-ords	Description
TGBM	NS 1757 5449	Flush Bracket G4602 on Marine Station.
Aux1	NS 1772 5457	OSBM bolt on rock SE side of road 5m from NE end of wall.

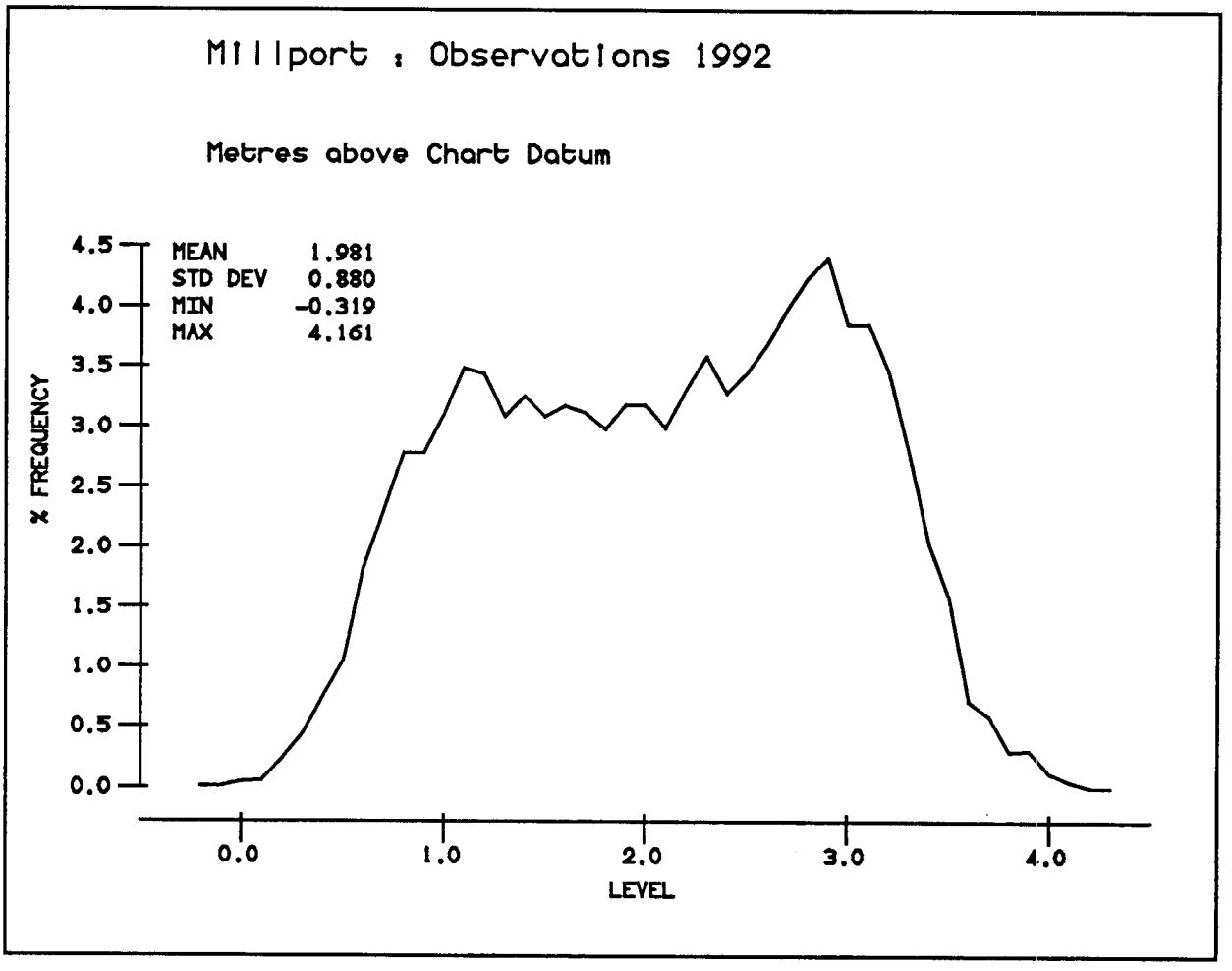
Hourly heights were filtered from the channel 2 digiquartz on a pneumatic bubbler system.

Spurious and missing scans in the raw values for 1992 were edited for the following dates : 5 Jan; 4,15,20 Feb; 19 Mar; 22 Apr; 7,12,13,26,29 May; 11 Jun; 2,25,31 Jul; 4 Aug; 3,8,15,24 Sep; 24,28 Oct; 25 Nov; 8,9 Dec.

The back-up channel 1 was unserviceable from 14 January to 25 February when TGI visited to make repairs. The equipment was resited on this visit.

Gaps in final filtered hourly levels from Channel 2

2300 GMT 24 February - 2200 GMT 25 February	Equipment moved to new position on completion of building work.



Harmonic Tidal Analysis.

Port: Scotland, West Coast - Millport

Latitude: 55 44' 58.2" N
Longitude: 4 54' 17.9" W

Time Zone: GMT

Length: 364 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 1.983

Hourly data from digiquartz sensor

Datum of Observations = ACD : 1.62 Metres below Ordnance Datum (Newlyn)

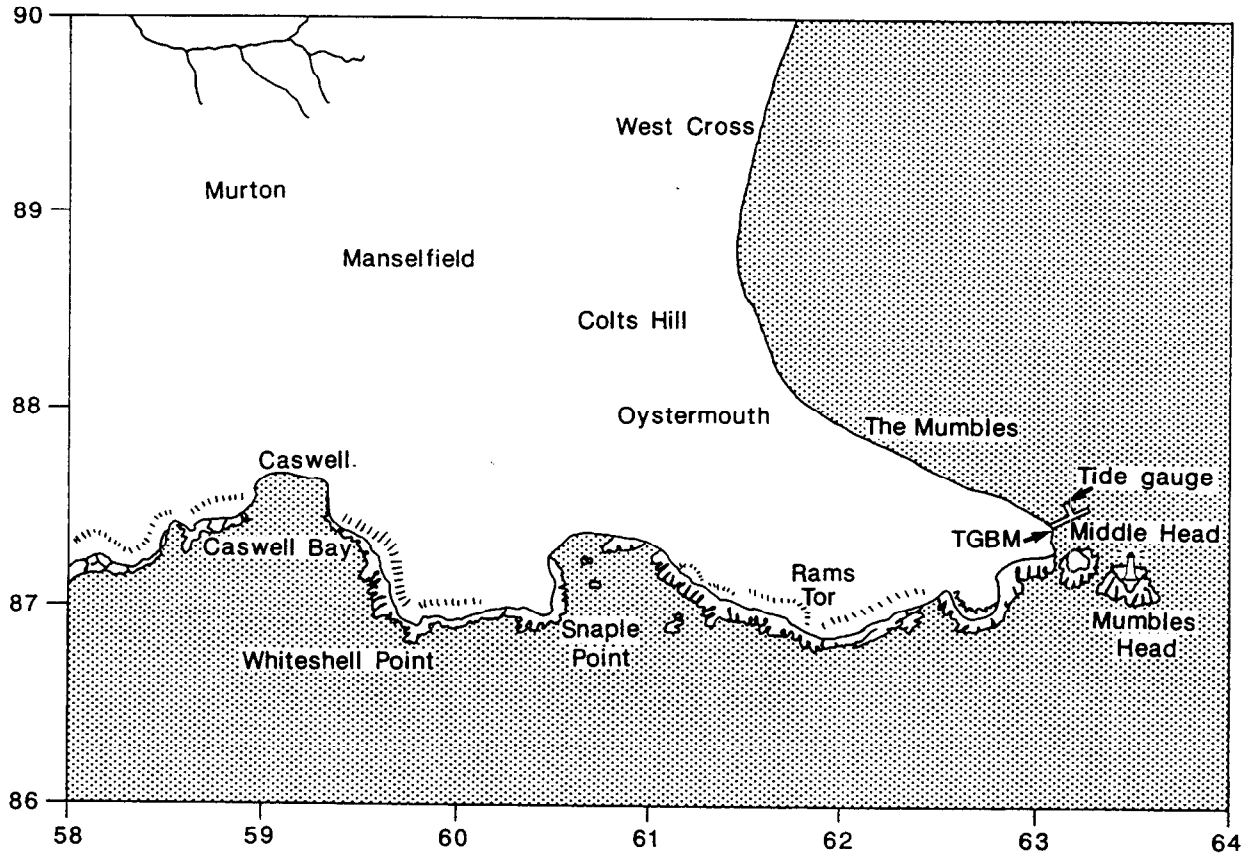
Observation Mean =	0.1983D+01	Residual Mean =	-0.7120D-06
Std Dev =	0.8778D+00	Std Dev =	0.1953D+00

Constituent	h	g
Q1	0.030	339.04
O1	0.092	43.19
P1	0.035	193.12
K1	0.111	190.94
J1	0.004	308.73
2N2	0.029	286.38
N2	0.212	314.87
M2	1.120	343.06
S2	0.293	36.13
K2	0.083	34.51
M3	0.053	106.72
M4	0.090	91.14
MS4	0.087	118.06
M6	0.025	304.55

Mumbles

Latitude 51° 34' 10.0" N 03° 58' 28.3" W
National Grid Reference SS 6317 8752

Recording zero = Chart Datum = 5.0m below Ordnance Datum Newlyn
Recording zero = 13.821m below Tide Gauge Bench Mark



Based upon the 1980 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

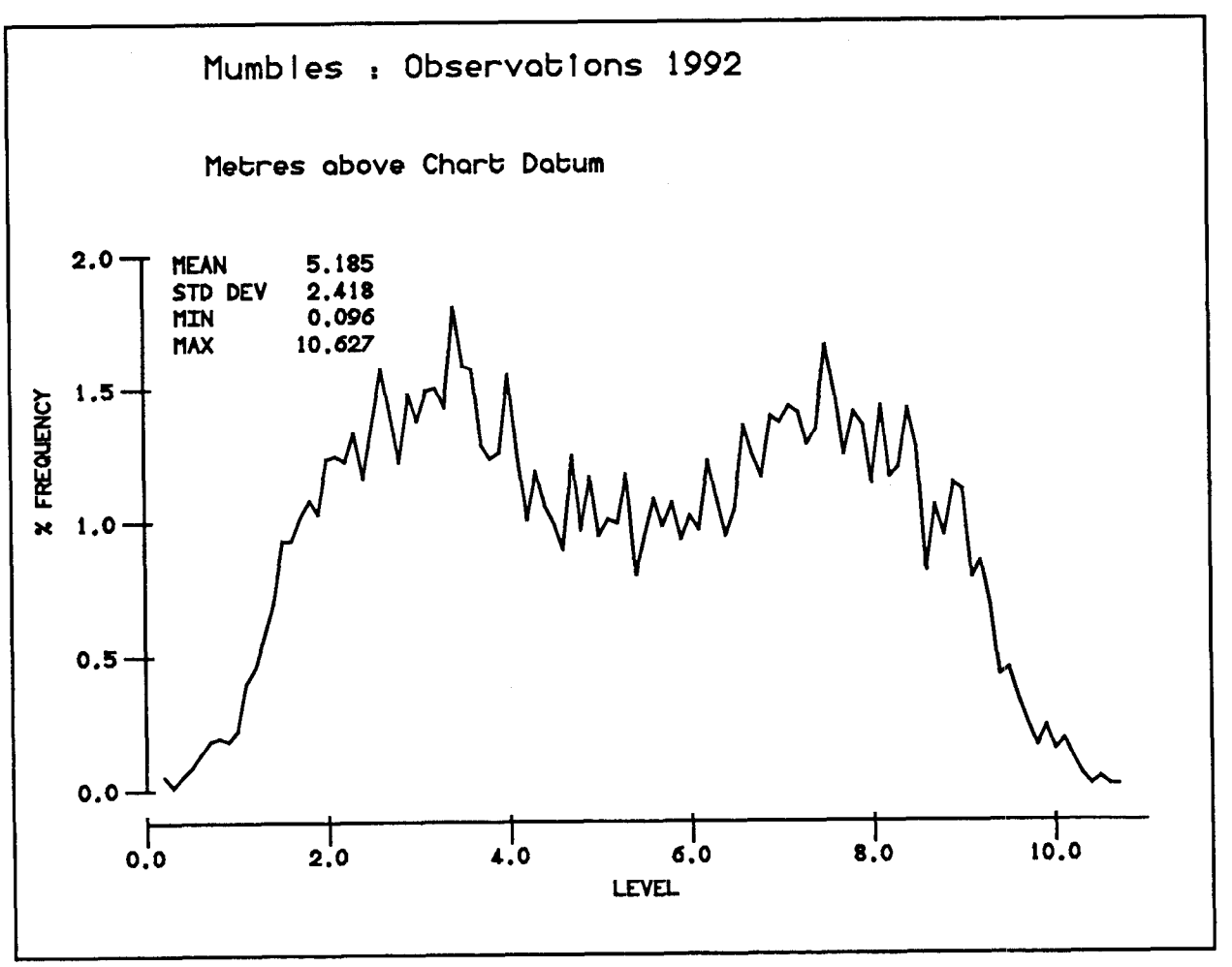
Bench Mark	NG co-ords	Description
TGBM	SS 6298 8743	OSBM bolt Living Rock South side of road.
Aux1	SS 6317 8752	OSBM bolt Lifeboat Station Mumbles Pier.

Hourly levels were filtered from the channel 2 digiquartz with pneumatic bubbler system.

Spurious and missing scans in the raw values were edited for the following dates : 22 Jan; 9 Feb; 4,25 Mar; 2,17,31 May; 9 Nov.

Gaps in final filtered hourly levels from channel 2

0000 GMT 1 January - 1900 22 January	Compressor fault.



Harmonic Tidal Analysis.

Port: Wales - Mumbles

Latitude: 51 34' 10.0" N
Longitude: 3 58' 28.3" W

Time Zone: GMT

Length: 375 Days

From: 23rd January, 1992 To: 31st January, 1993

Units: Metres A0: 5.195

Hourly data from digiquartz sensor 2

Datum of Observations = ACD : 5.00 Metres below Ordnance Datum (Newlyn)

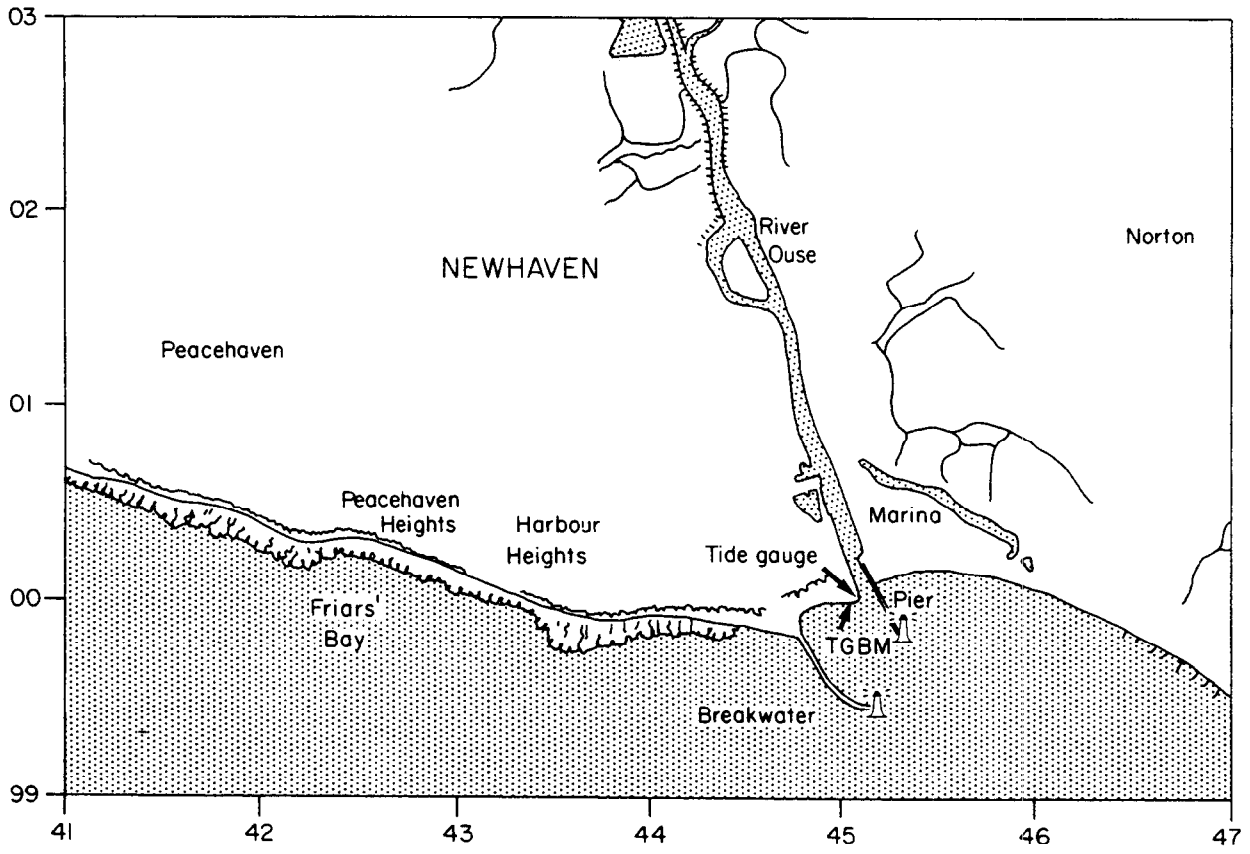
Observation Mean =	0.5194D+01	Residual Mean =	-0.2246D-05
Std Dev =	0.2417D+01	Std Dev =	0.1532D+00

Constituent	h	g
Q1	0.016	286.81
O1	0.065	349.13
P1	0.022	126.95
K1	0.069	129.41
J1	0.002	130.03
2N2	0.101	153.75
N2	0.584	154.07
M2	3.135	172.92
S2	1.120	221.34
K2	0.319	219.37
M3	0.032	143.11
M4	0.072	12.87
MS4	0.036	85.37
M6	0.036	7.08

Newhaven

Latitude 50° 46' 52.6"N Longitude 00° 03' 30.0"E
National Grid Reference TQ 4509 0005

Recording Zero = 0.265m above Chart Datum = 3.255m below Ordnance Datum Newlyn
Recording Zero = 8.571m below Tide Gauge Bench Mark



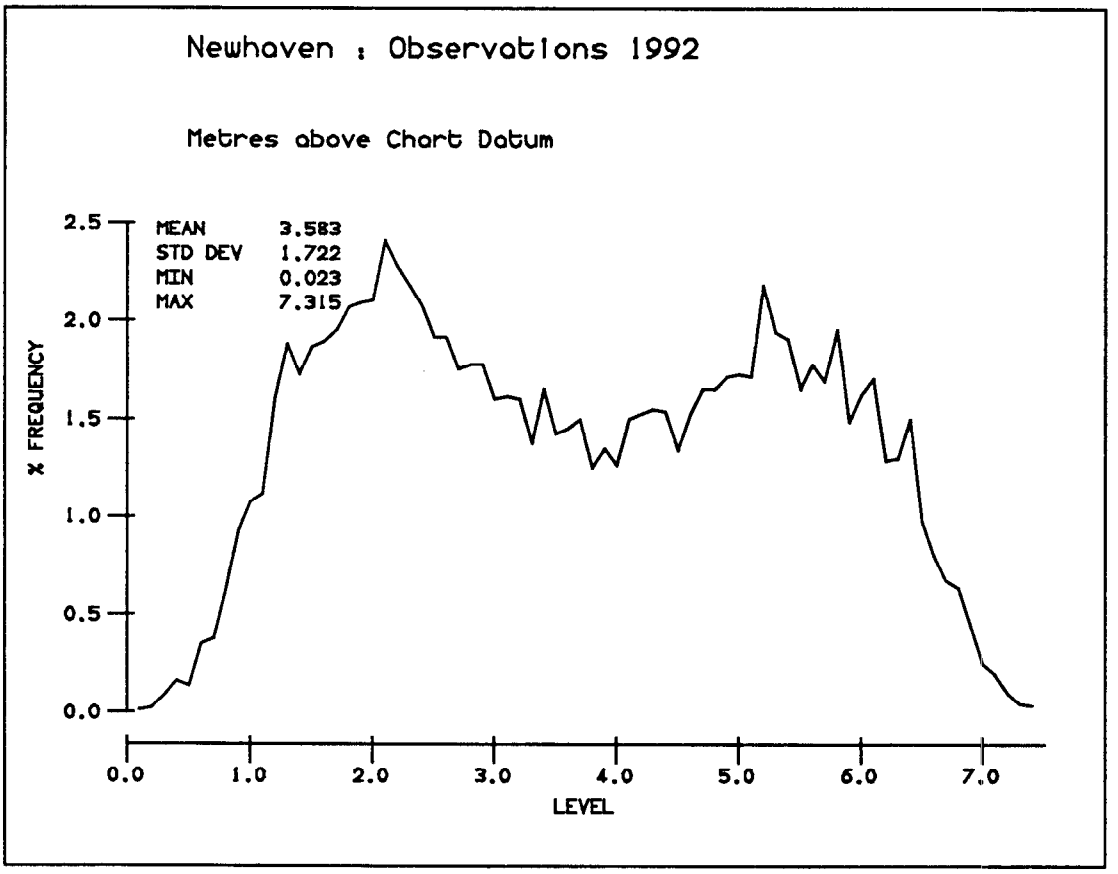
Based upon the 1980 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Mark	NG co-ords	Description
TGBM	TQ 4510 0003	OSBM bolt on concrete surround 7.4m SW of SW angle of tower.
Aux1	TQ 4495 0001	OSBM bolt on concrete sea wall 154.3m SW of tower.

Hourly levels were filtered from the channel 2 digiquartz on a pneumatic bubbler system. From the reinstatement of the system on 12 January, it was found that there was an error in the levelling of the site. This was ascertained to be caused by the tide staff being placed at an incorrect height and damage to the TGBM. Further checks in June were made, both at the site and by comparison of levels recorded at Portsmouth and Dover. These showed that corrections made were again in error. Correct values for the pressure point level to Chart Datum were finally applied in January 1993. Thus the 1992 series is referenced to a level 0.265m above Chart Datum. For statistical and analytical purposes for this report the difference has been applied to the hourly levels. Comparisons with other sites and by satellite altimetry now show good agreement.

Gaps in final filtered hourly levels

0000 GMT 01 Jan -	0400 GMT	12 Jan	Major harbour works.
2300 GMT10 Aug -	0300 GMT	25 Aug	Digital read-out failure.
0200 GMT 09 Oct -	0400 GMT	17 Oct	Dataring fault.



Harmonic Tidal Analysis.

Port: England, South Coast - Newhaven

Latitude: 50 46' 52.6" N
Longitude: 0 03' 30.0" E

Time Zone: GMT

Length: 360 Days

From: 13th January, 1992 To: 31st January, 1993

Units: Metres A0: 3.597

Hourly data from digiquartz sensor 2

Datum of Observations = ACD : 3.52 Metres below Ordnance Datum (Newlyn)

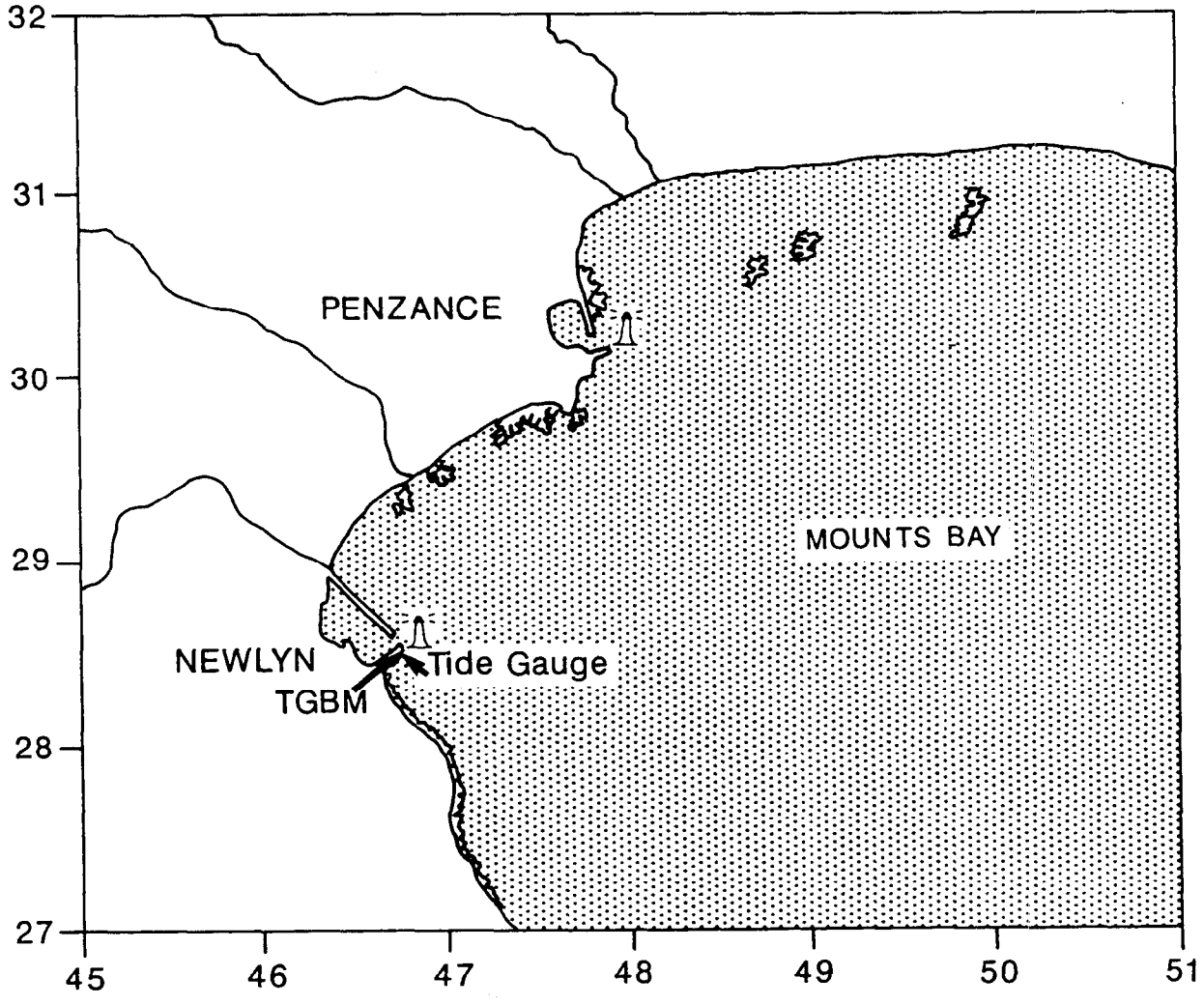
Observation Mean =	0.3593D+01	Residual Mean =	-0.1911D-04
Std Dev =	0.1724D+01	Std Dev =	0.1472D+00

Constituent	h	g
Q1	0.008	70.51
O1	0.004	336.01
P1	0.025	113.60
K1	0.078	104.50
J1	0.007	185.27
2N2	0.060	302.95
N2	0.425	298.44
M2	2.252	321.23
S2	0.726	11.55
K2	0.206	9.16
M3	0.008	346.85
M4	0.089	249.52
MS4	0.057	308.02
M6	0.021	162.97

Newlyn

Latitude 50° 06' 8.4"N Longitude 05° 32' 30.6"W
National Grid Reference SW 4676 2855

Recording zero = Chart Datum = 3.05m below Ordnance Datum Newlyn
Recording zero = 7.8012m below Tide Gauge Bench Mark



Based upon the 1974 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Mark	NG co-ords	Description
TGBM	SW 4676 2855	OSBM bolt inside hut adjacent to well.
Aux1	SW 4673 2851	Flush Bracket 1565 on wall S. pier NW face 17.8m SW.

Hourly levels for 1992 were filtered from the pneumatic bubbler system on channel 2.

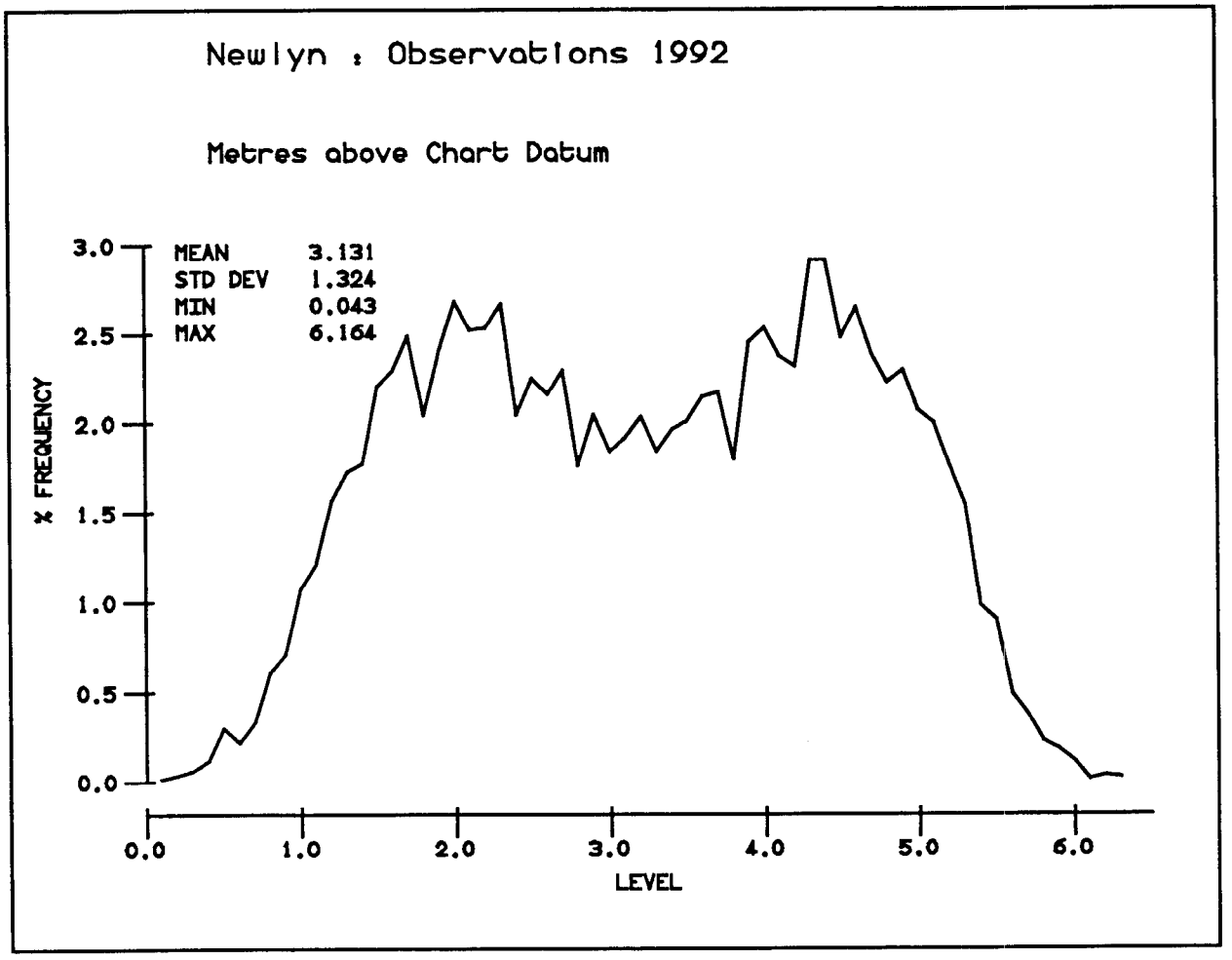
A power cut caused a loss of data on the 2 June from 0130 GMT to 1030 GMT. This was followed by a loss of recording of approximately 2 hours 45 minutes on 21 June which 'righted itself' 23 June. The intervening recordings were edited to the correct times and the 2 hours 45 minutes interpolated. The resultant hourly series may therefore still contain an error in timing.

The Tide Gauge Inspectorate visited the site over the period 28 to 29 July. For the 28th values from the channel 1 back-up system were substituted for 1200 GMT to 1745 GMT. On the 29th, values were interpolated for 1200 GMT and 1730 GMT.

Spurious and missing scans were edited in the raw series for: 9,18,23 Jan; 5,24 Feb; 4,6,17(2),30 Mar; 2,14,22,28 Apr;14,15 May; 14,23 Jul; 26 Aug; 2,18 Sep; 4,6,21,29 Oct; 5,18,28 Nov; 2,16,31 Dec.

Gaps in final filtered hourly levels

2000 GMT 1 June - 1400 GMT 2 June	Power cut during storm.



Harmonic Tidal Analysis.

Port: England, South Coast - Newlyn

Latitude: 50 06' 08.4" N
Longitude: 5 32' 30.6" W

Time Zone: GMT

Length: 364 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 3.131

Hourly data from digiquartz sensor

Datum of Observations = ACD : 3.05 Metres below Ordnance Datum (Newlyn)

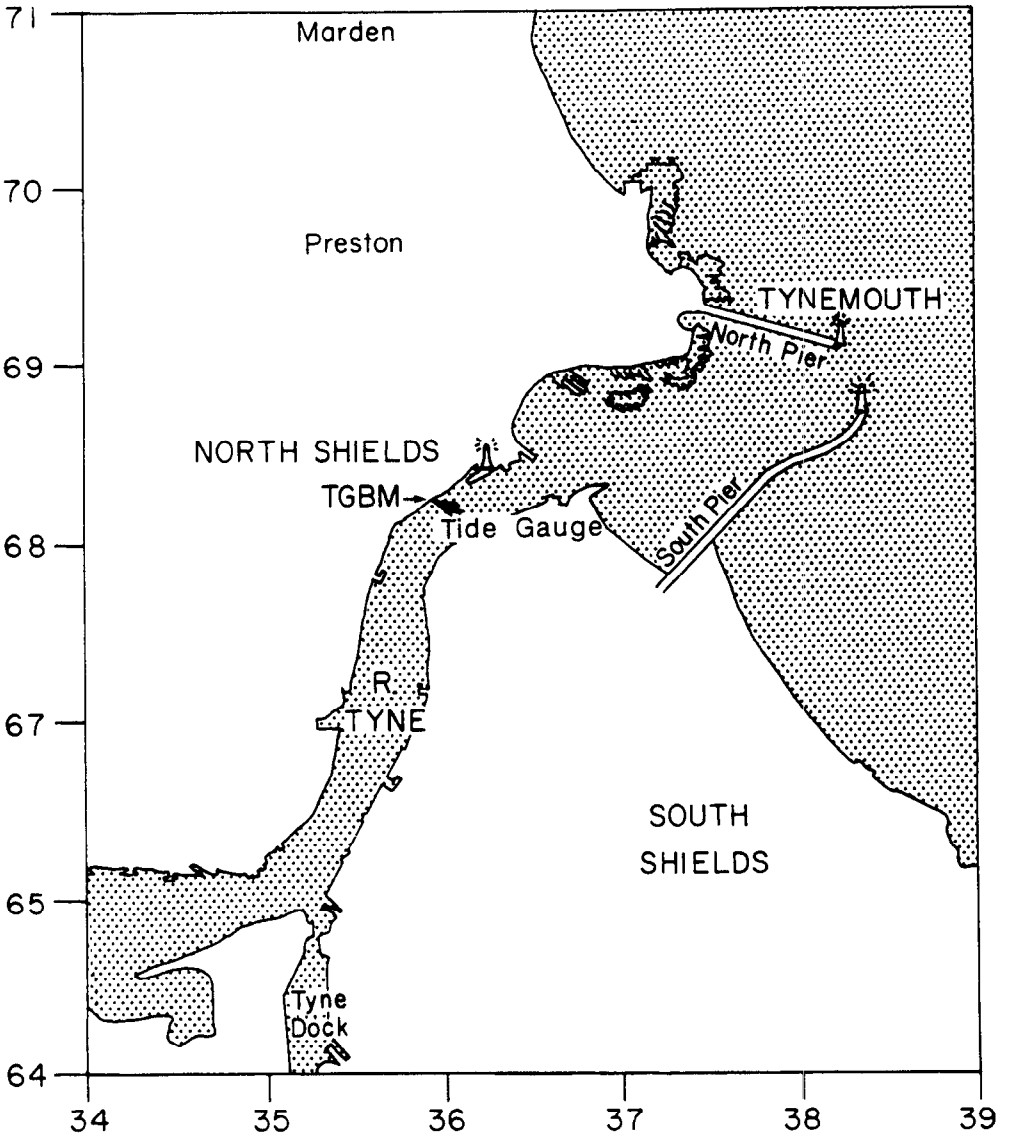
Observation Mean =	0.3132D+01	Residual Mean =	-0.2233D-05
Std Dev =	0.1325D+01	Std Dev =	0.1101D+00

Constituent	h	g
Q1	0.011	288.73
O1	0.052	338.78
P1	0.021	102.73
K1	0.065	109.43
J1	0.002	67.65
2N2	0.052	108.58
N2	0.329	112.74
M2	1.722	133.51
S2	0.575	178.39
K2	0.162	175.83
M3	0.011	28.32
M4	0.115	166.78
MS4	0.075	219.10
M6	0.009	329.40

North Shields

Latitude 55° 00' 26.1"N Longitude 01° 26' 17.9"W
National Grid Reference NZ 3592 6823

Recording zero = Chart Datum = 2.6m below Ordnance Datum Newlyn
Recording zero = 6.515m below Tide Gauge Bench Mark



Based upon the 1979 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Mark	NG co-ords	Description
TGBM	NZ 3592 6823	OSBM bolt in TG building.
Aux1	NZ 3626 6842	PA bolt low light house W face SW angl

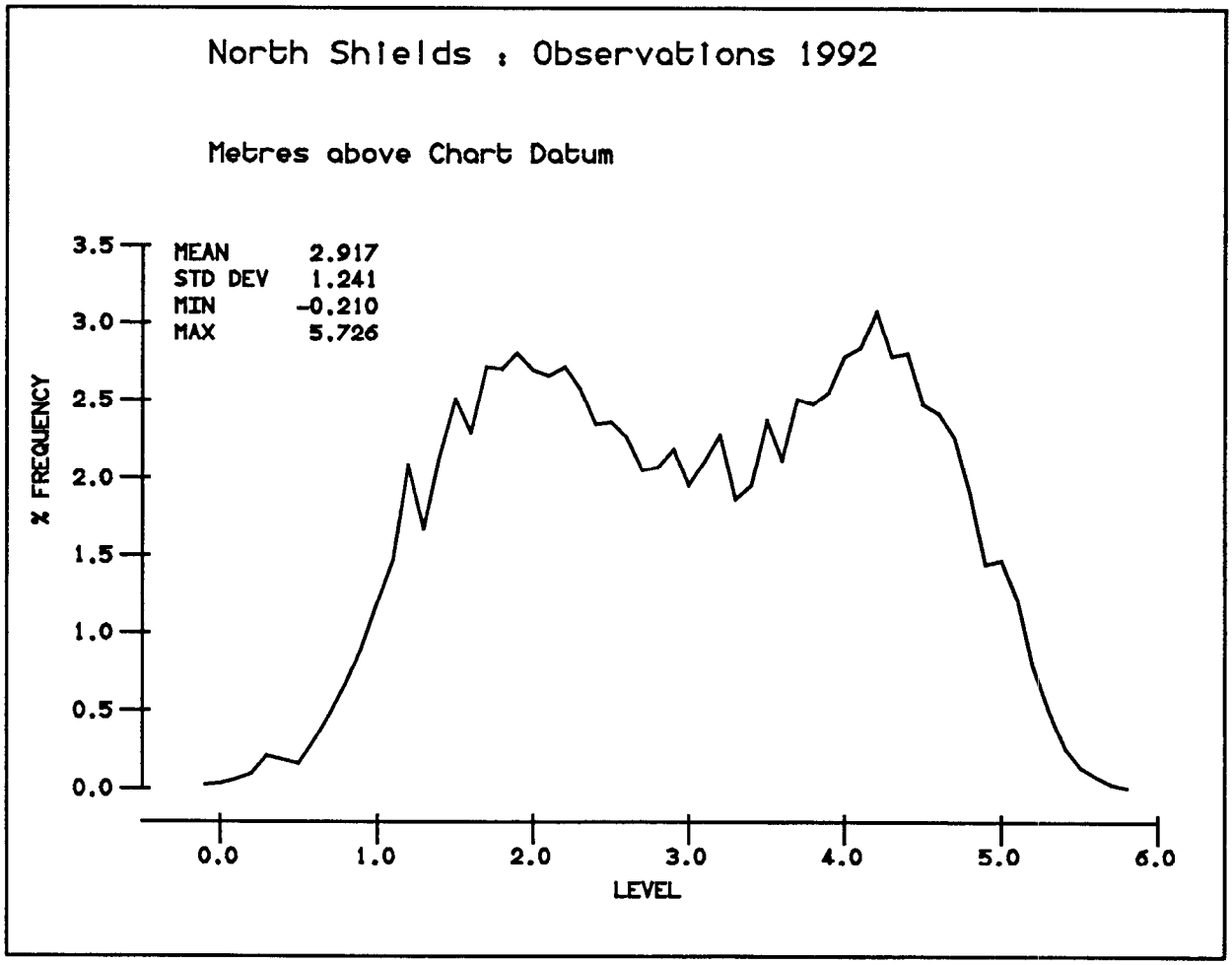
Hourly heights were filtered from the Class A channel 2 data series.

Isolated spurious and missing scans were edited in the raw values for the following dates :- 25 Jan; 23 Feb; 1 Mar; 16 Apr; 23 Sep; 13 Nov; 13 Dec.

Scans integrated at 1 7/8 minute interval during the TGI visit of 9 September were edited to 15 minutes.

Gaps in final filtered hourly levels

Nil gaps.



Harmonic Tidal Analysis.

Port: England, East Coast - North Shields

Latitude: 55 00' 26.1" N
Longitude: 1 26' 17.9" W

Time Zone: GMT

Length: 366 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 2.918

Hourly data from potentiometer sensor 2

Datum of Observations = ACD : 2.60 Metres below Ordnance Datum (Newlyn)

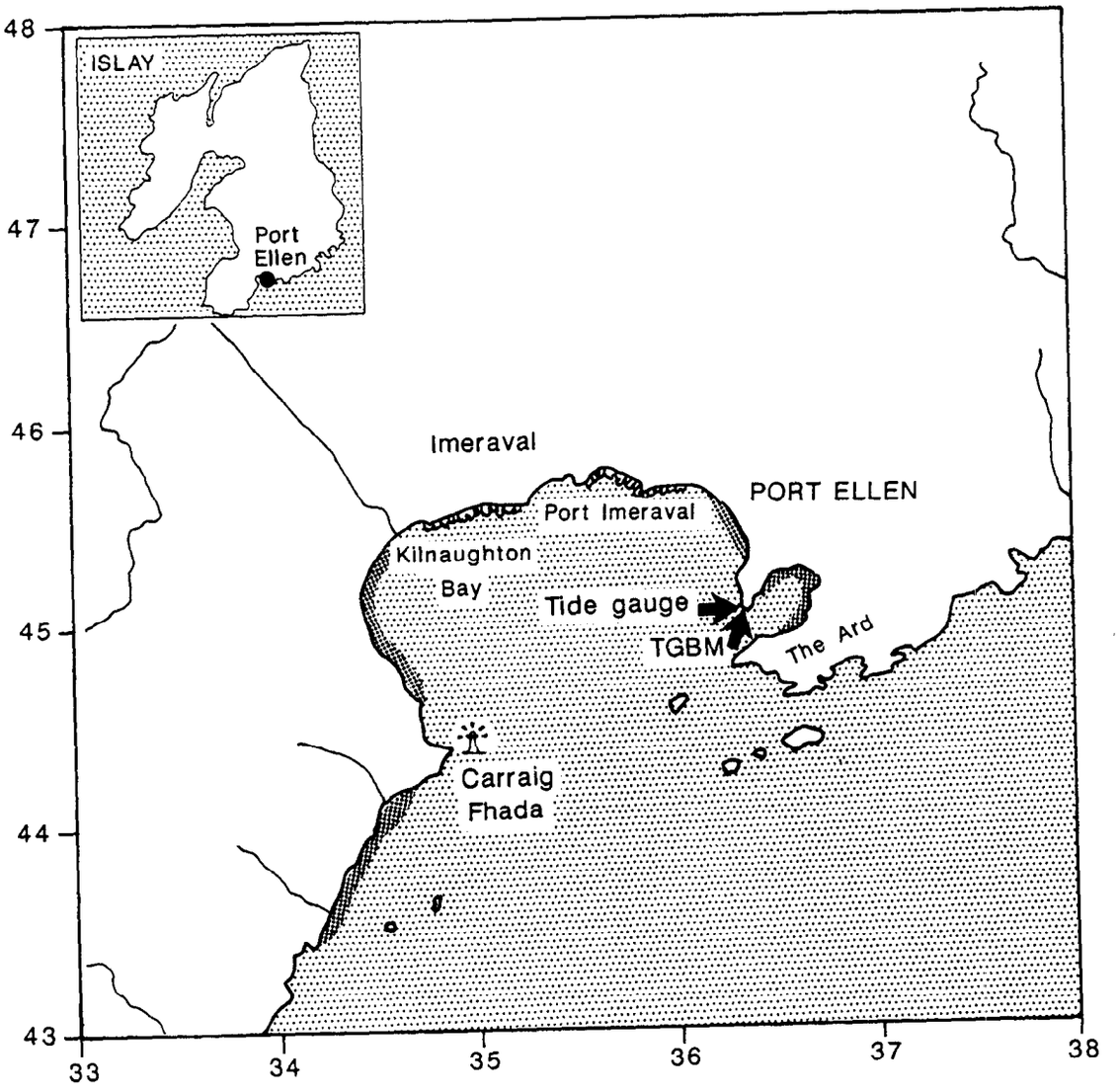
Observation Mean =	0.2918D+01	Residual Mean =	0.2922D-05
Std Dev =	0.1241D+01	Std Dev =	0.1555D+00

Constituent	h	g
Q1	0.037	23.54
O1	0.139	76.21
P1	0.035	216.61
K1	0.125	243.61
J1	0.008	252.73
2N2	0.038	57.17
N2	0.307	64.84
M2	1.602	89.10
S2	0.538	131.69
K2	0.152	129.24
M3	0.015	65.44
M4	0.023	108.11
MS4	0.018	90.61
M6	0.007	21.95

Port Ellen

Latitude 55° 37' 39.2"N Longitude 06° 11' 20.1"W
National Grid Reference NR 3635 4507

Recording zero = Chart Datum = 0.19m below Ordnance Datum Newlyn.
Recording zero = 2.839m below Tide Gauge Bench Mark.



Based upon the 1976 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Mark	NG co-ords	Description
TGBM	NR 3635 4507	Bolt SE side Booking Office.
Aux1	NR 3642 4515	Rivet on angle of wall NW side of entrance to pier.

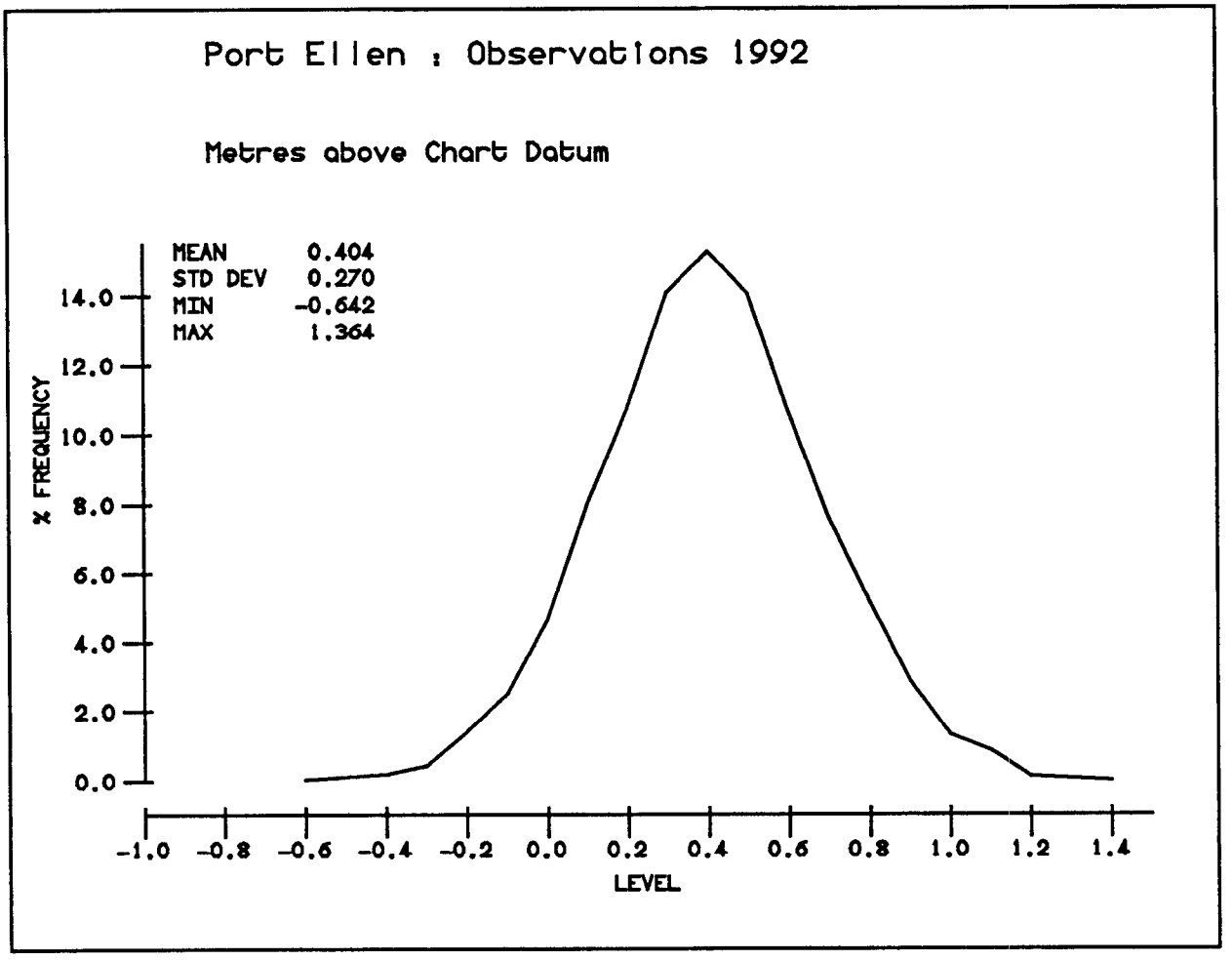
Hourly levels were filtered from the Class A channel 2 series. Due to the very small tidal range and the marked meteorological influence, many of the original recordings were below Chart Datum. Values recorded at the zero level were edited at the raw stage to be plus or minus 10mm to facilitate the subsequent filtering process.

Isolated missing and spurious values were also edited for the following dates: 18 Jan; 2,12 Apr; 25 May; 8,22,23 Jul; 5 Aug; 13,19 Sep; 18,22,30 Oct; 30 Nov; 29 Dec.

Scans integrated at 1 7/8 minute during the TGI visit of 30 October for general maintenance were edited to 15 minute interval.

Gaps in final filtered hourly levels

Nil gaps.



Harmonic Tidal Analysis.

Port: Scotland, Islay - Port Ellen

Latitude: 55 37' 39.2" N
Longitude: 6 11' 20.1" W

Time Zone: GMT

Length: 366 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 0.404

Hourly data from digiquartz sensor 2

Datum of Observations = ACD : 0.19 Metres below Ordnance Datum (Newlyn)

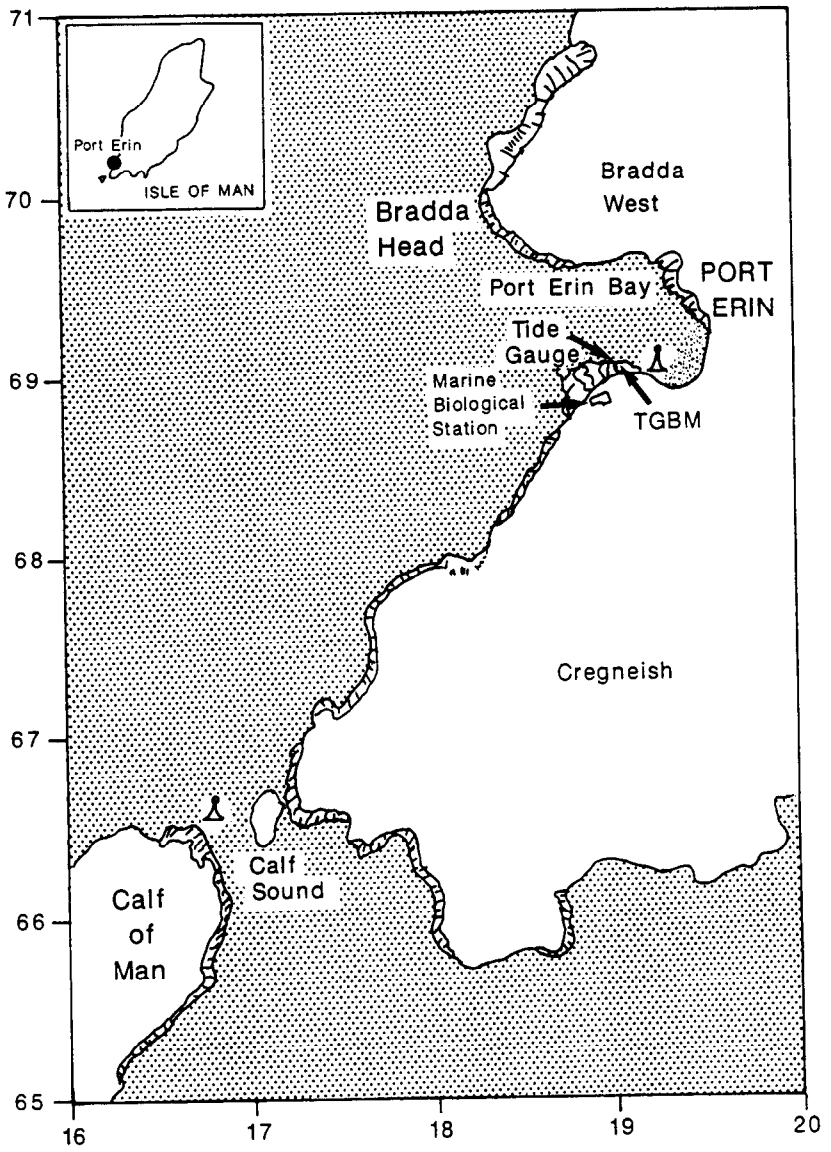
Observation Mean =	0.4043D+00	Residual Mean =	0.1957D-06
Std Dev =	0.2714D+00	Std Dev =	0.1784D+00

Constituent	h	g
Q1	0.027	330.25
O1	0.079	38.26
P1	0.028	190.82
K1	0.093	186.64
J1	0.001	341.32
2N2	0.010	54.44
N2	0.023	75.64
M2	0.163	89.00
S2	0.144	155.21
K2	0.041	153.45
M3	0.039	105.34
M4	0.021	67.28
MS4	0.013	70.99
M6	0.026	115.55

Port Erin

Latitude 54° 05' 07"N Longitude 04° 45' 55" W

Recording zero = Chart Datum = 2.75m below Ordnance Datum Local
Recording zero = 5.58m below Tide Gauge Bench Mark



Based upon the 1980 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Mark	Height above ODL	Description
TGBM	2.830m	Bolt East side of Lifeboat Station.
Aux1	5.186m	Bolt on rocks West of jetty.
Aux2	7.751m	Bolt NW of Marine Biological Station.
Aux3	5.856m	Bolt at base of light tower, Raglan Pier.

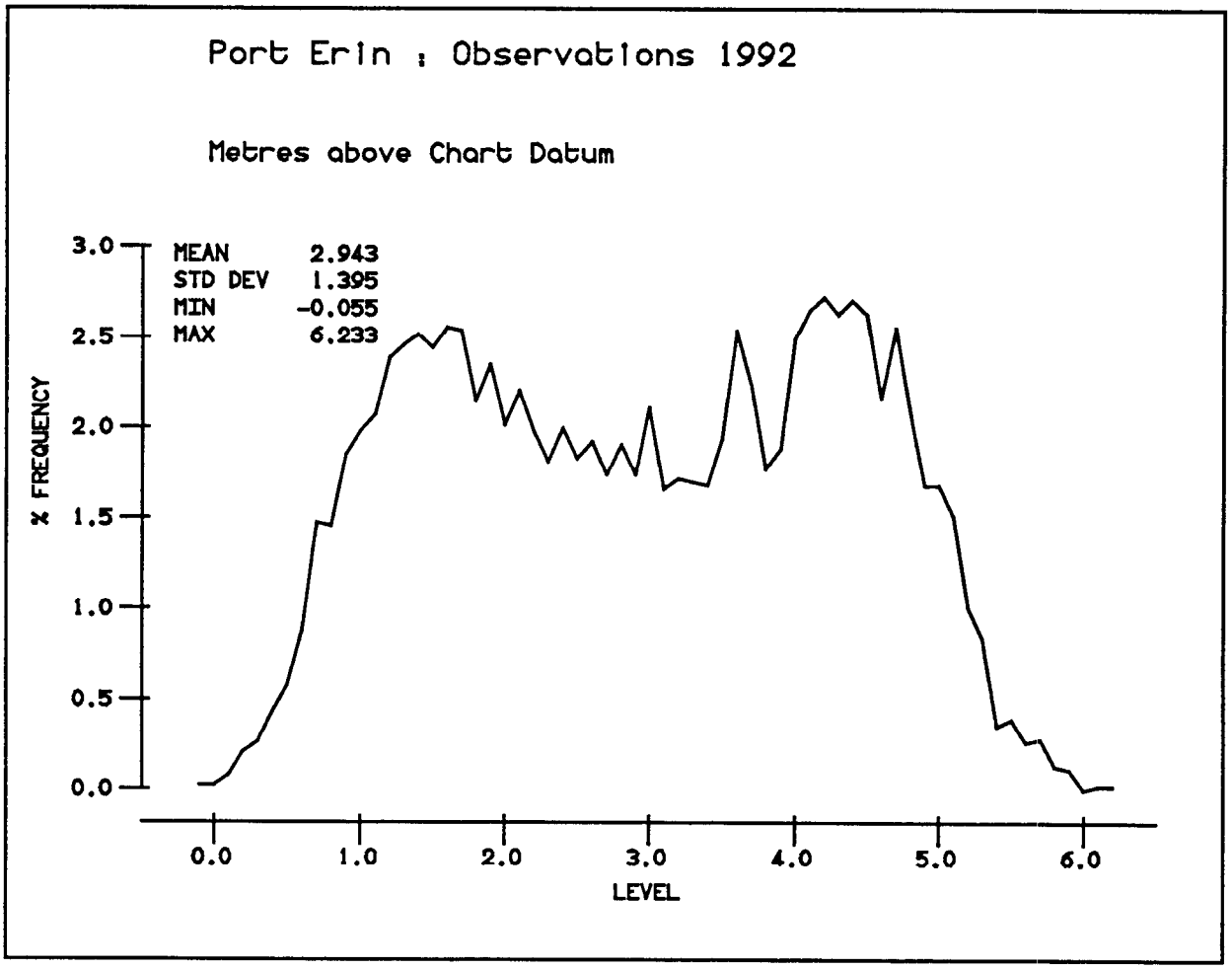
This completely new site in the Isle of Man for the Class-A network became fully operational on **20 May 1992** with two digiquartz transducers attached to pneumatic bubbler system outlets. Elevations were processed for both channels for the year with figures and statistics presented in this report for channel 2.

In the first week of operation, to 28 May, there were a large volume of spurious and missing scans in the raw values - up to 16 in one day. This situation later improved to a more acceptable level, vis: 6(2),9,21,26,27 Jun; 1,4,23,31(2) Jul; 4,5,19,25 Aug; 3,14,22,30 Sep; 1,3,18,28,31 Oct; 5,11,16,19,30 Nov; 8(2),9(3),11,13,15,19,21(2),27 Dec.

Gaps in final filtered hourly levels

Records begin 2200 GMT 20 May -

1300 GMT 6 December - 0700 GMT 8 December Data lost at source.



Harmonic Tidal Analysis.

Port: Isle of Man - Port Erin

Latitude: 54 05' 07" N
Longitude: 4 45' 55" W

Time Zone: GMT

Length: 177 Days

From: 21st May, 1992 To: 13th November, 1992

Units: Metres A0: 2.915

Hourly data from digiquartz sensor 2

Datum of Observations = ACD : 1.429 Metres below Ordnance Datum (Local)

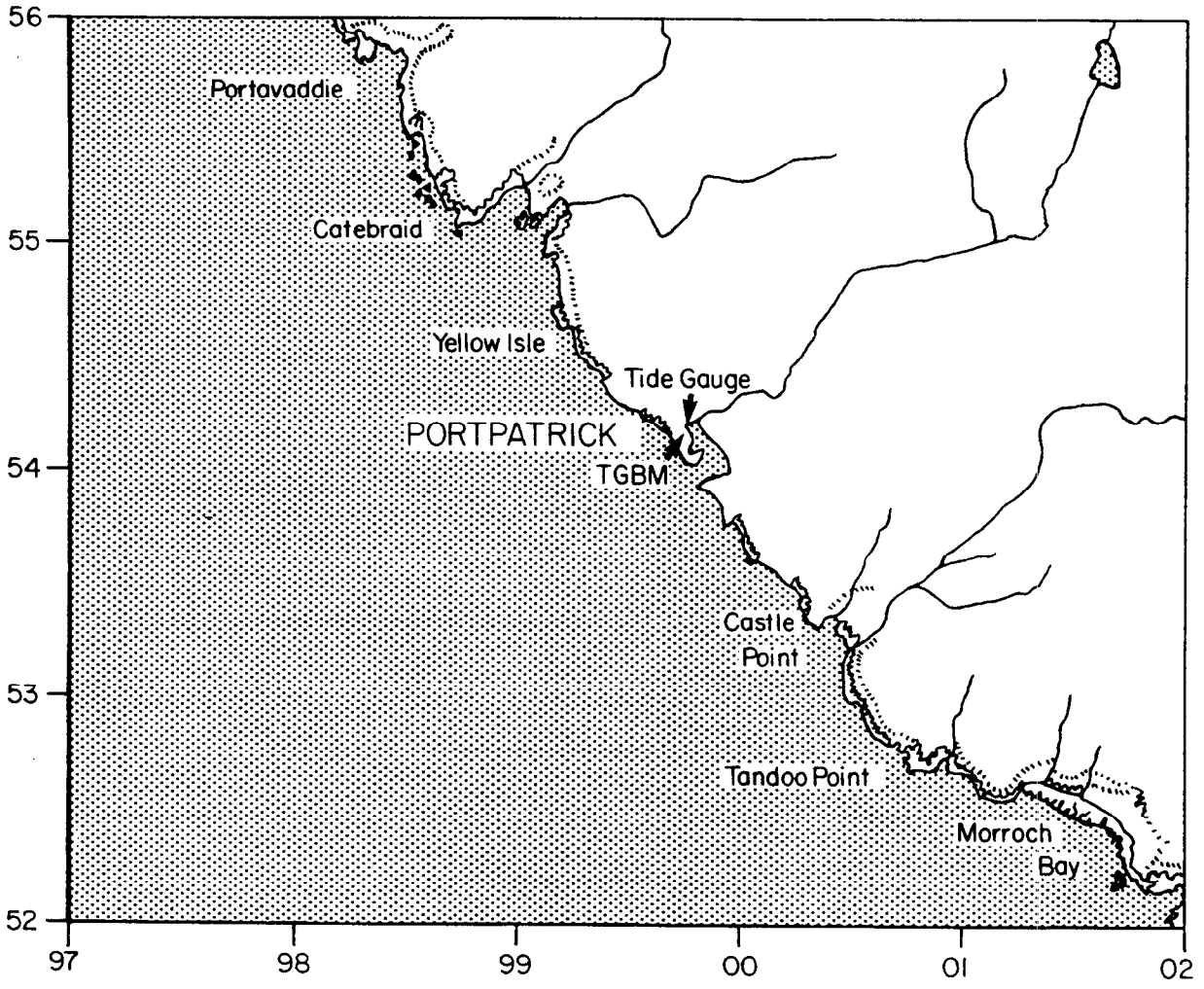
Observation Mean =	0.2917D+01	Residual Mean =	-0.2106D-05
Std Dev =	0.1390D+01	Std Dev =	0.1263D+00

Constituent	h	g
Q1	0.029	336.05
O1	0.097	43.02
P1	0.043	191.02
K1	0.110	185.96
J1	0.003	238.60
2N2	0.029	287.60
N2	0.356	295.17
M2	1.830	321.88
S2	0.554	1.59
K2	0.154	0.41
M3	0.004	256.55
M4	0.014	86.64
MS4	0.011	134.94
M6	0.011	278.70

Portpatrick

Latitude 54° 50' 32.7"N Longitude 05° 07' 08.0"W
National Grid Reference NW 9976 5420

Recording Zero = Chart Datum = 1.8m below Ordnance Datum Newlyn
Recording Zero = 6.827m below Tide Gauge Bench Mark



Based upon the 1979 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Mark	NG co-ords	Description
TGBM	NW 9976 5421	Bolt on harbour wall 13.84m NE angle of building.
Aux1	NW 9977 5411	Rivet on E side of jetty wall 16.6m SE angle of Life Boat headquarters
Aux2	NW 9995 5412	Rivet S angle of No.53 Main St.

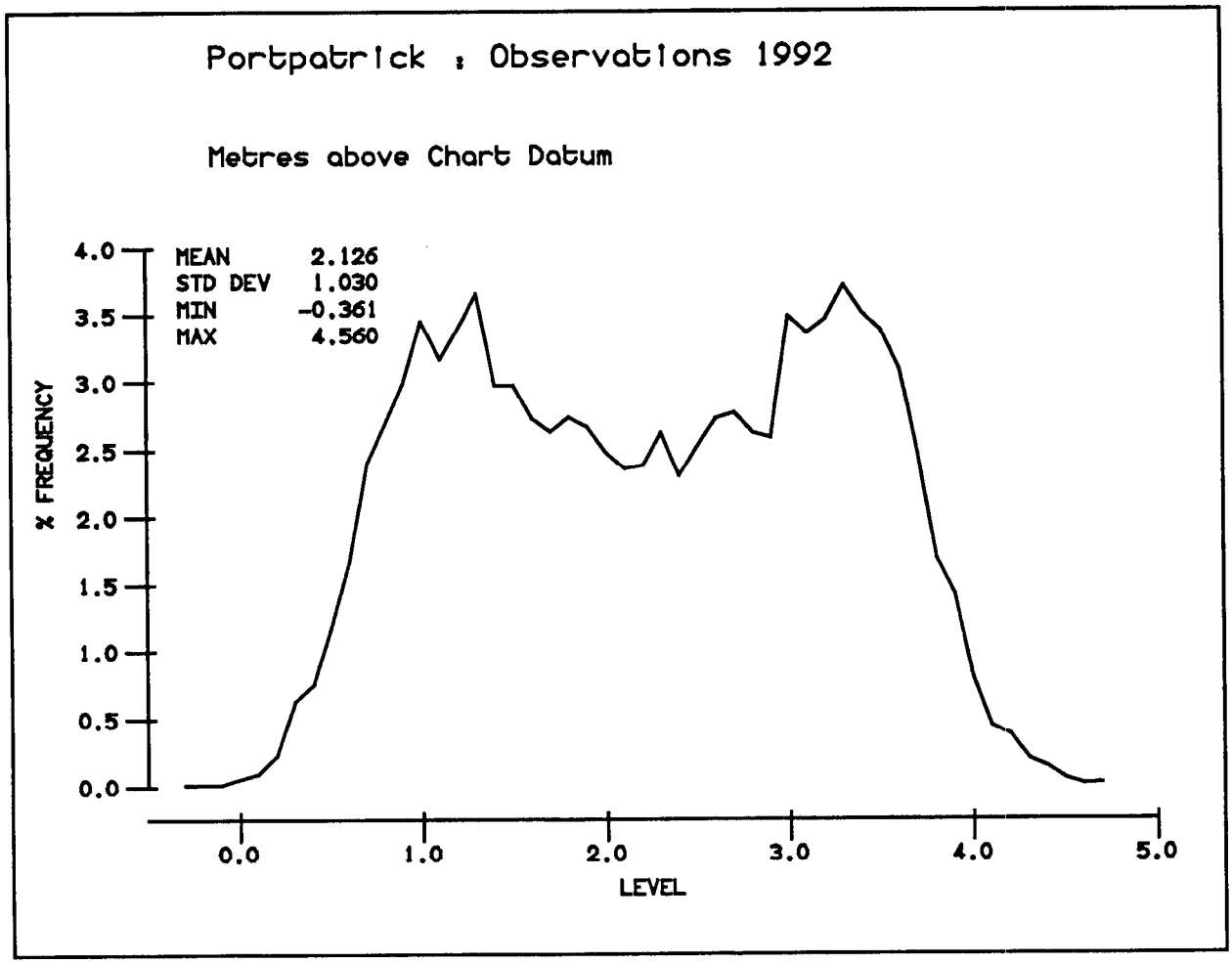
This installation was modernised to accommodate Dataring in July 1990 with a potentiometer linked to a new Munro gauge (channel 1 back-up) and a pneumatic bubbler system with digiquartz transducer (channel 2).

Isolated spurious and missing values in the raw elevations were edited for the following dates in 1992: 20,21 Jan; 4 Feb; 4,14,17 Mar; 2,14,18,23 Apr; 7,20,29 May; 10,16,24 Jun; 1,8,22 Jul; 4,15,20,30 Aug; 3,17,30 Sep; 13,14,27 Oct; 6,18,26 Nov; 3,16 Dec.

Scans integrated at 1 7/8 minute during the visit by TGI 24 and 25 February were edited to 15 minute interval.

Gaps in final filtered hourly levels

Nil gaps.



Harmonic Tidal Analysis.

Port: Scotland, West Coast - Portpatrick

Latitude: 54 50' 32.7" N
Longitude: 5 07' 08.0" W

Time Zone: GMT

Length: 366 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 2.127

Hourly data from digiquartz sensor

Datum of Observations = ACD : 1.80 Metres below Ordnance Datum (Newlyn)

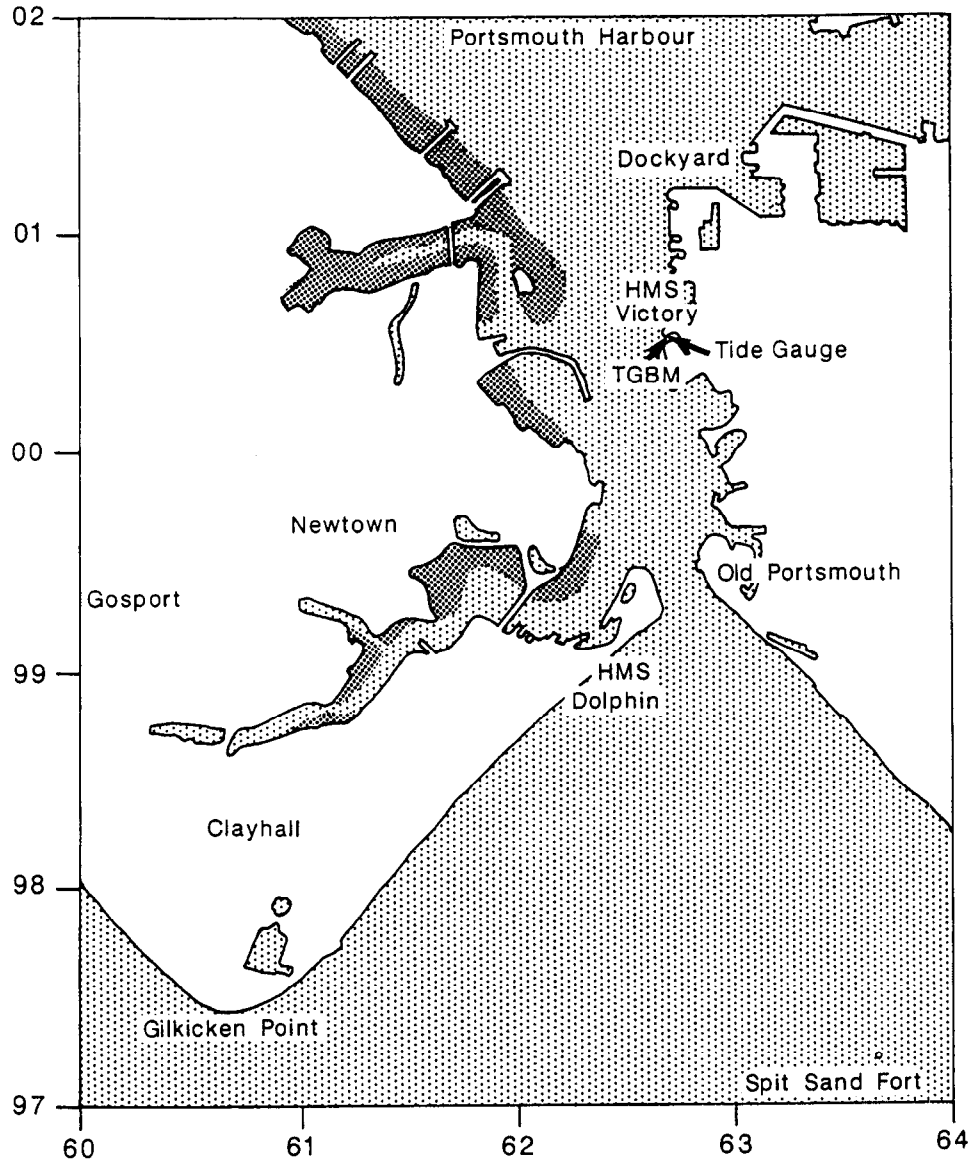
Observation Mean =	0.2127D+01	Residual Mean =	-0.7434D-06
Std Dev =	0.1028D+01	Std Dev =	0.1761D+00

Constituent	h	g
Q1	0.030	339.03
O1	0.093	41.11
P1	0.035	191.20
K1	0.110	189.35
J1	0.003	316.47
2N2	0.024	307.09
N2	0.256	304.75
M2	1.337	332.24
S2	0.372	17.06
K2	0.104	14.68
M3	0.021	99.76
M4	0.003	15.83
MS4	0.009	81.57
M6	0.004	228.16

Portsmouth

Latitude 50° 48' 1.3"N Longitude 01° 06' 37.1"W
National Grid Reference SU 6269 0053

Recording zero = Chart Datum = 2.73m below Ordnance Datum Newlyn
Recording zero = 6.007m below Tide Gauge Bench Mark



Based upon the 1980 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Mark	NG co-ords	Description
TGBM	SU 6269 0053	Bolt on concrete jetty by tide gauge building S angle.
Aux1	SZ 6330 9996	Gate Post N. side of entrance to H.M.S.Vernon.

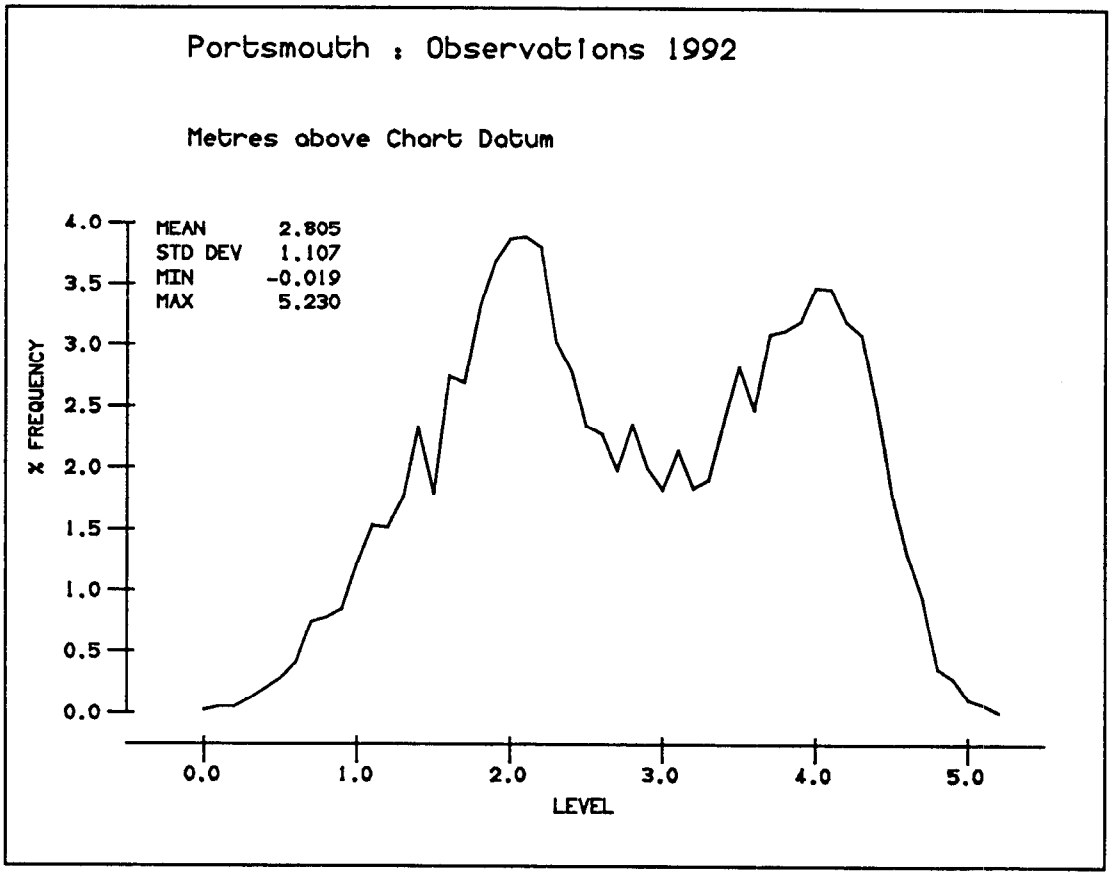
This class-A site was modernised to accommodate dataring in January 1991 with two digiquartz transducers connected to pneumatic bubbler systems. Values from channel 2 were fully processed as the class A channel for 1992.

Isolated spurious and missing scans were edited for the following dates: 29 Feb; 14 Apr; 14 May; 16 Jul; 3,17 Sep; 9 Nov.

In addition to the visits made to make repairs in January as detailed below, the TGI also attended the site 17 September to change the compressor.

Gaps in final filtered hourly levels

0000 GMT 1 Jan -	0700 GMT	8 Jan	Memory board fault, repaired by TGI.
0100 GMT 28 Jan -	1400 GMT	19 Feb	Memory board failure, new unit fitted by TGI.
0100 GMT 8 Dec -	2300 GMT	31 Dec	Dataring unit failure.



Harmonic Tidal Analysis.

Port: England, South Coast - Portsmouth

Latitude: 50 48' 01.3" N
Longitude: 1 06' 37.1" W

Time Zone: GMT

Length: 177 Days

From: 14th June, 1992 To: 7th December, 1992

Units: Metres A0: 2.864

Hourly data from digiquartz sensor 2

Datum of Observations = ACD : 2.73 Metres below Ordnance Datum (Newlyn)

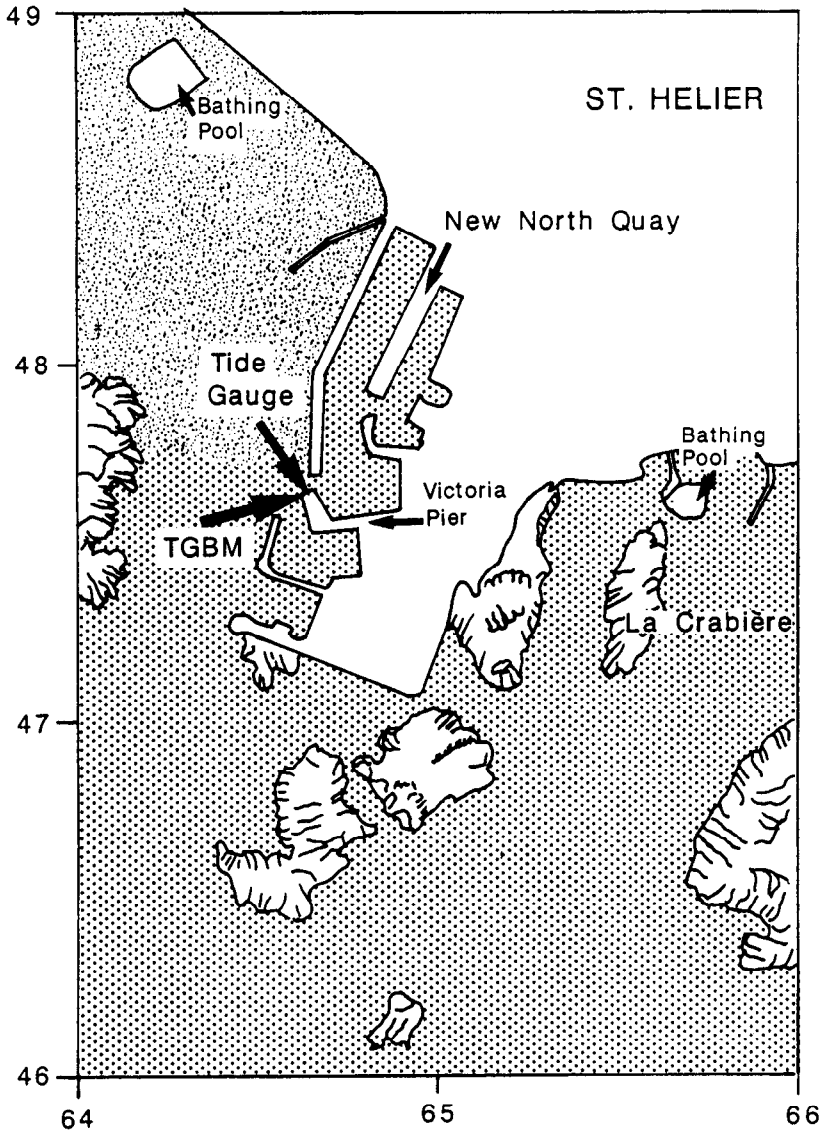
Observation Mean =	0.2862D+01	Residual Mean =	-0.3298D-05
Std Dev =	0.1092D+01	Std Dev =	0.1351D+00

Constituent	h	g
Q1	0.007	204.28
O1	0.029	341.02
P1	0.031	123.15
K1	0.095	113.65
J1	0.005	312.59
2N2	0.030	306.57
N2	0.277	302.96
M2	1.404	326.68
S2	0.435	14.15
K2	0.120	14.25
M3	0.002	200.69
M4	0.190	12.78
MS4	0.123	68.81
M6	0.111	148.35

St. Helier

Latitude 49° 11'N Longitude 02° 07'W

Recording zero = Chart Datum = 5.88m below Ordnance Datum Local
Recording zero = 13.658m below Tide Gauge Bench Mark



Based upon the 1988 Ordnance Survey 1:25 000 Official Leisure map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Mark	Level to O.D.L.	Description
TGBM	07.778m	Concrete bollard on Victoria Pier.
Aux1	24.748m	Cut Mark on Mount Bingham Road.
Aux2	32.802m	Top of 'J' stone in play area car park, South Hill.
Aux3	33.495m	Cut Mark South Hill.

This site on the island of Jersey, new to the Class-A network, became operational **26 November 1992** with two pneumatic bubbler systems connected to digiquartz sensors.

Spikes in the raw elevations were edited for 26 November and 5 December and missing scans were interpolated for the 3,4,5,6,8,12,19 and 20 December before filtering to hourly levels.

Gaps in final filtered hourly levels

Records begin 2000 GMT 26 November, thereafter no gaps.

Harmonic Tidal Analysis.

Port: Jersey, Channel Islands - St. Helier

Latitude: 49 11' N
Longitude: 2 07' W

Time Zone: GMT

Length: 29 Days

From: 3rd December, 1992 To: 31st December, 1992

Units: Metres A0: 5.962

Hourly data from digiquartz sensor 2

Datum of Observations = ACD : 5.88 Metres below Ordnance Datum (Local)

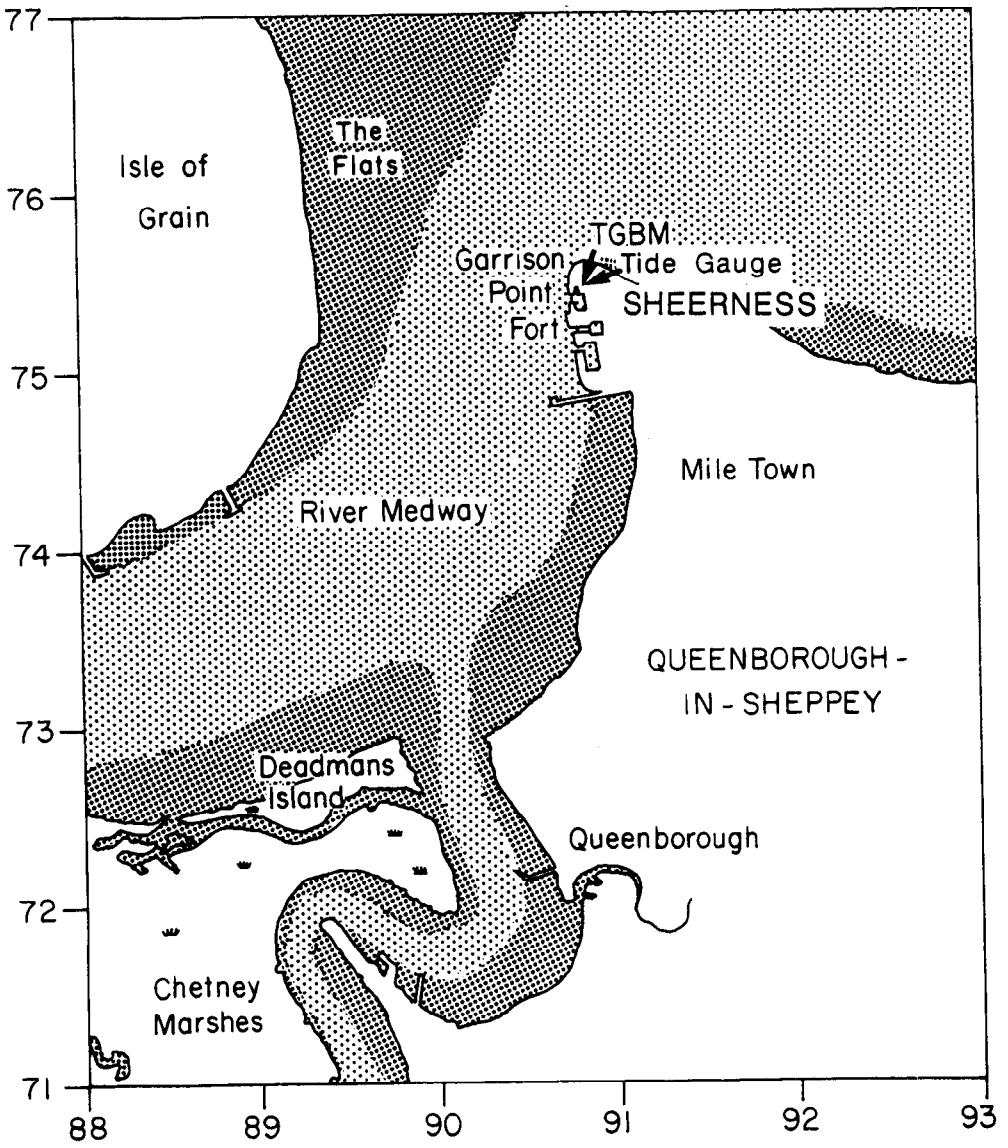
Observation Mean =	0.5966D+01	Residual Mean =	-0.2688D-05
Std Dev =	0.2558D+01	Std Dev =	0.1250D+00

Constituent	h	g
Q1	0.016	345.60
O1	0.086	343.88
P1	0.032	91.69
K1	0.095	104.99
J1	0.005	354.16
2N2	0.075	144.23
N2	0.631	164.23
M2	3.360	181.65
S2	1.335	231.88
K2	0.390	229.08
M3	0.024	165.78
M4	0.203	296.91
MS4	0.118	359.73
M6	0.012	6.22

Sheerness

Latitude 51 deg 26' 42.4"N Longitude 00 deg 44' 41.9"E
National Grid Reference TQ 9073 7542

Recording zero = Chart Datum = 2.9m below Ordnance Datum Newlyn
Recording zero = 7.532m below Tide Gauge Bench Mark

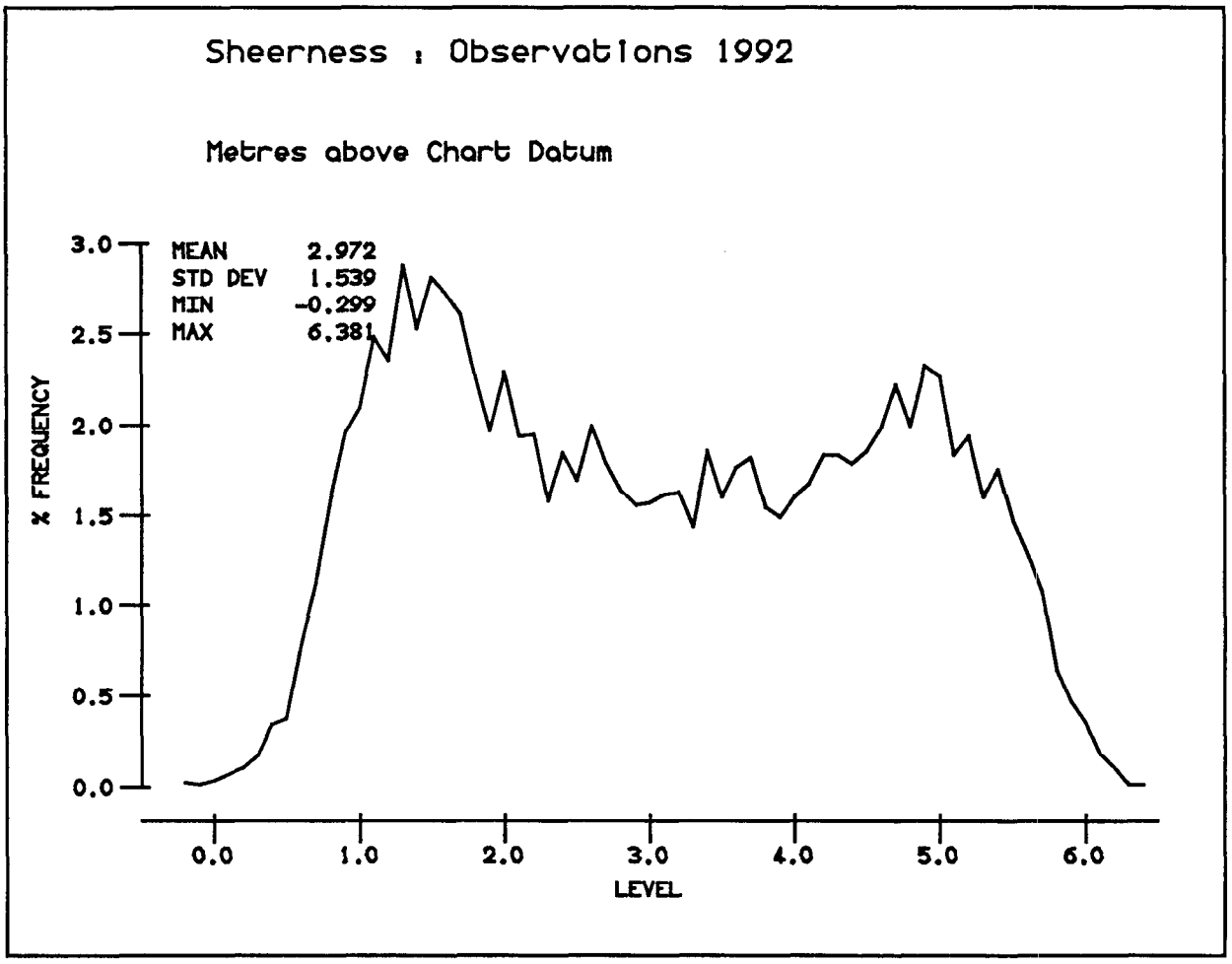


Based upon the 1974 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Mark	NG co-ords	Description
TGBM	TQ 9080 7549	Flush Bracket 11859 Garrison Point Fort E. junction of flood gate.
Aux1	TQ 9133 7523	Flush Bracket G4790 Dockyard Cottages.

Hourly levels for 1992 were filtered from the pneumatic bubbler system recording on the channel 2 digiquartz.

Isolated spurious and missing scans were edited at the raw stage for the following dates: 5,22 Jan; 26 Feb; 4 Mar; 3,28 Apr; 15,29 May; 14 Jun; 1,29 Jul; 26 Aug; 25 Sep; 21 Oct; 2,19 Nov; 25 Dec.



Harmonic Tidal Analysis.

Port: England, East Coast - Sheerness

Latitude: 51 26' 42.4" N
Longitude: 0 44' 41.9" E

Time Zone: GMT

Length: 366 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 2.974

Hourly data from digiquartz sensor 2

Datum of Observations = ACD : 2.90 Metres below Ordnance Datum (Newlyn)

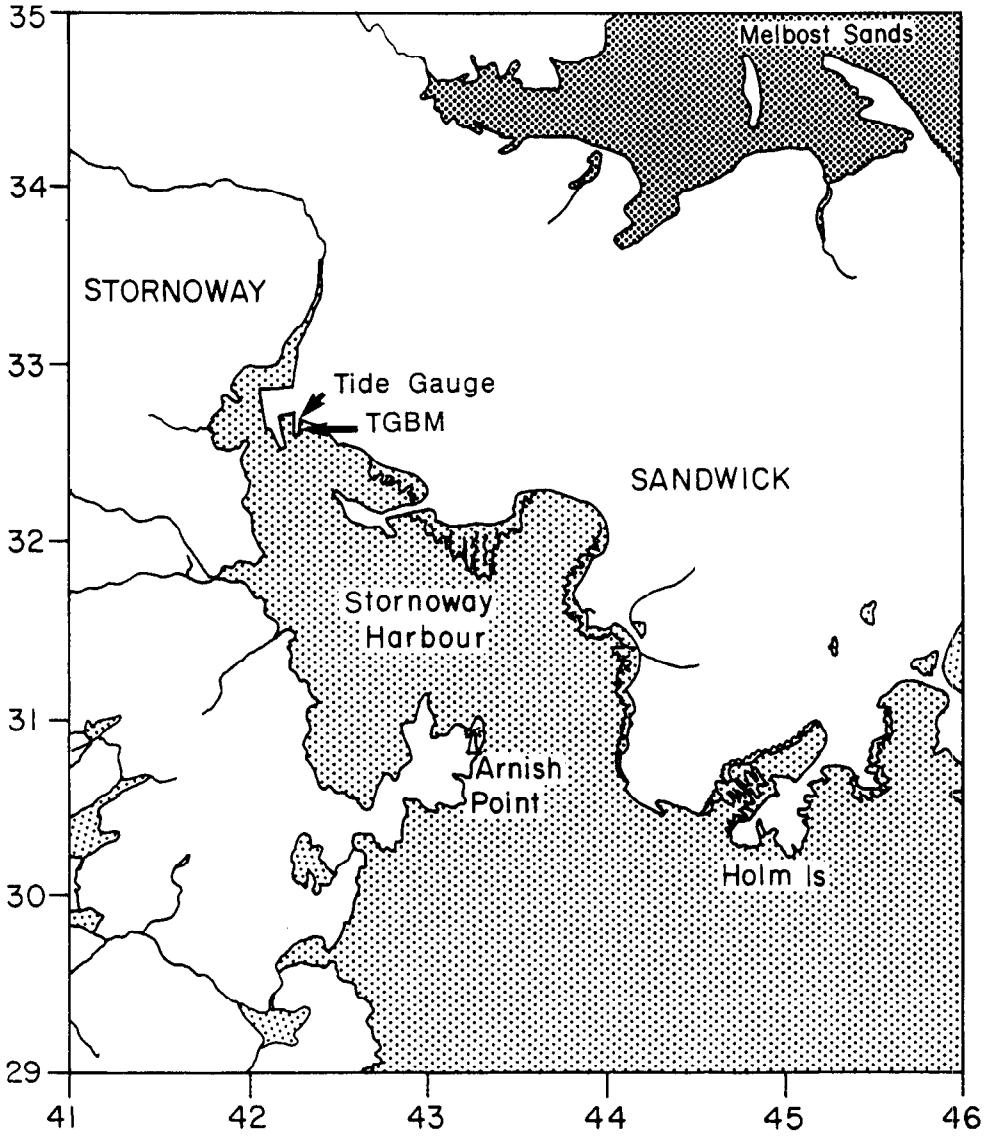
Observation Mean =	0.2973D+01	Residual Mean =	-0.1907D-05
Std Dev =	0.1540D+01	Std Dev =	0.2165D+00

Constituent	h	g
Q1	0.035	120.97
O1	0.136	184.19
P1	0.032	355.85
K1	0.119	13.38
J1	0.006	101.00
2N2	0.057	348.65
N2	0.332	329.40
M2	2.011	354.23
S2	0.573	52.18
K2	0.165	51.90
M3	0.015	100.41
M4	0.113	11.01
MS4	0.045	78.96
M6	0.053	39.12

Stornoway

Latitude 58° 12' 28.6"N Longitude 06° 23' 17.5"W
National Grid Reference NB 4226 3271

Recording zero = Chart Datum = 2.71m below Ordnance Datum Local
Recording zero = 6.368m below Tide Gauge Bench Mark



Based upon the 1976 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Mark	NG co-ords	Description
TGBM	NB 4228 3264	OSBM Bolt E. side No.2 Wharf.
Aux1	NB 4215 3271	OSBM Bolt on steps NE angle King Edward Wharf.

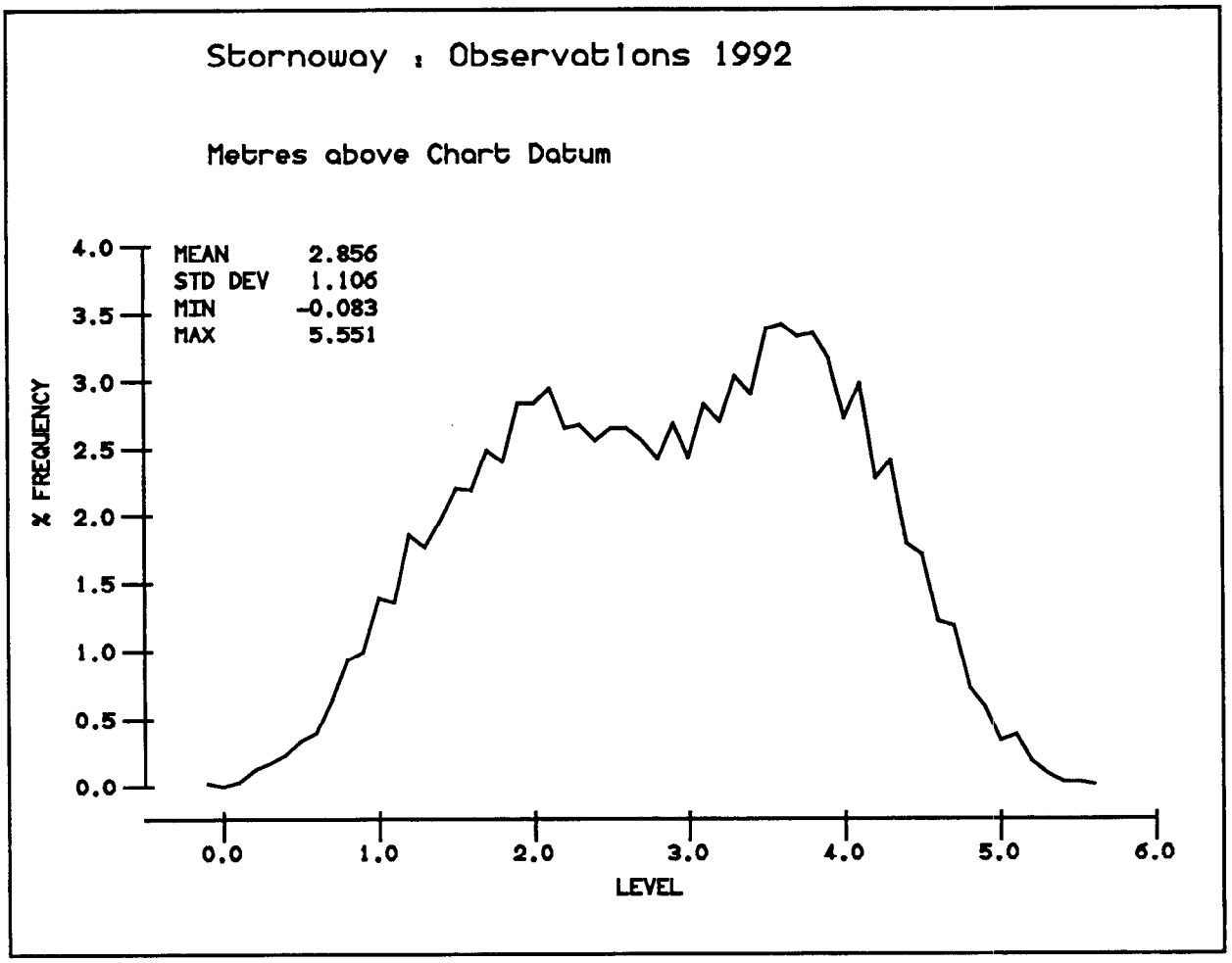
Hourly levels were filtered from the channel 2 digiquartz on a pneumatic bubbler system.

Isolated spurious and missing scans in the raw series from channel 2 were edited for the following dates: 10,15 Jan; 5 Feb; 4 Mar; 21 May; 27 Aug; 27,28 Oct; 12,27 Nov; 15 Dec; On the 23 December, 16 hours of recordings were lost - reason not known.

Scans integrated at 1 7/8 minute during the visit by TGI 9 January were edited to 15 minute interval.

Gaps in final filtered hourly levels

0100 GMT	7 Jan -	2100 GMT	9 Jan	Compressor switched off in error.
1900 GMT	22 Dec -	2000 GMT	23 Dec	Memory failure.



Harmonic Tidal Analysis.

Port: Scotland, West Coast - Stornoway

Latitude: 58 12' 28.6" N
Longitude: 6 23' 17.5" W

Time Zone: GMT

Length: 361 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 2.857

Hourly data from digiquartz sensor

Datum of Observations = ACD : 2.71 Metres below Ordnance Datum (Local)

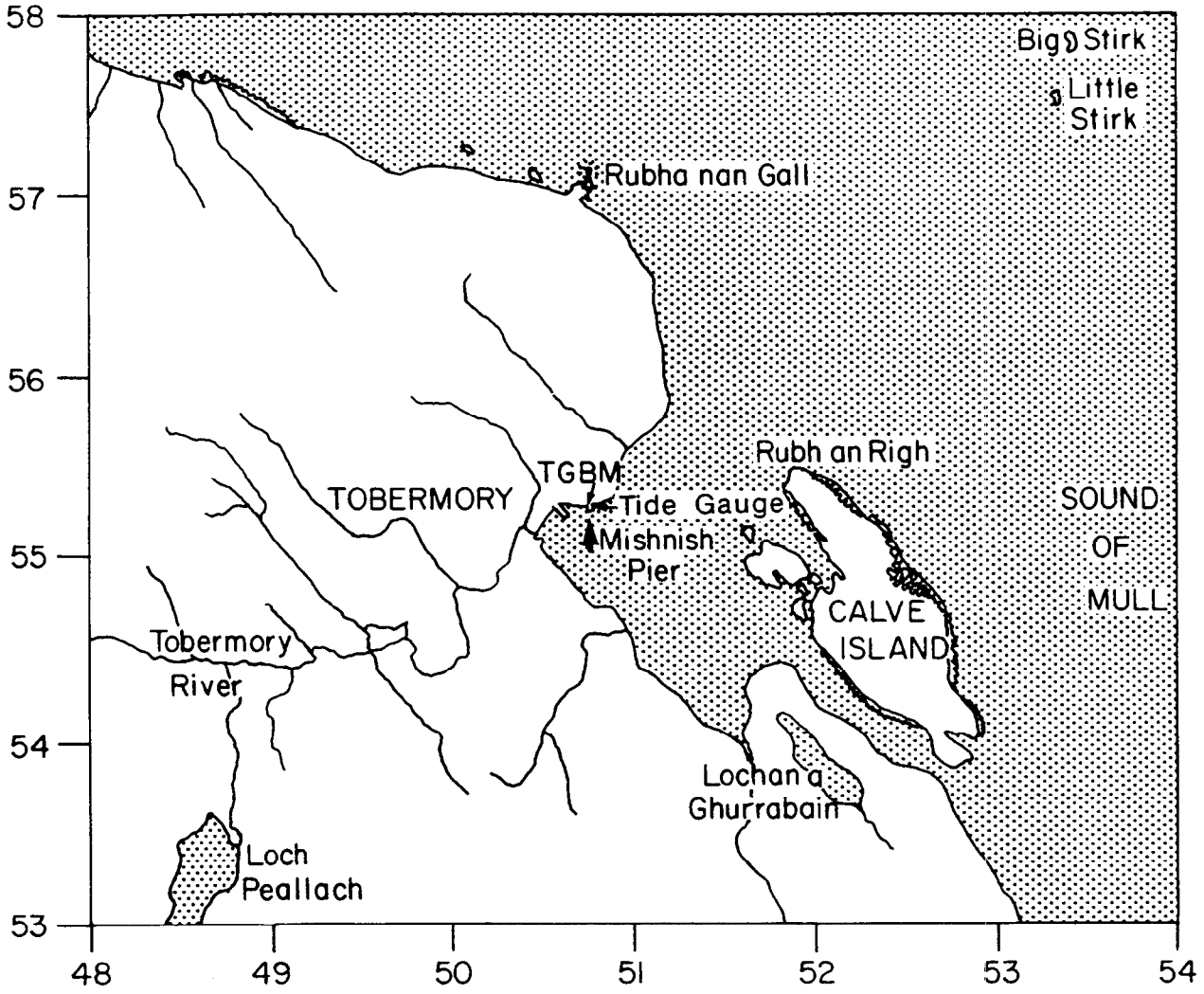
Observation Mean =	0.2857D+01	Residual Mean =	0.2809D-05
Std Dev =	0.1106D+01	Std Dev =	0.1630D+00

Constituent	h	g
Q1	0.028	290.94
O1	0.089	348.77
P1	0.036	125.74
K1	0.134	134.99
J1	0.007	136.11
2N2	0.036	149.23
N2	0.279	175.57
M2	1.392	197.91
S2	0.545	231.95
K2	0.156	229.43
M3	0.031	114.36
M4	0.060	221.51
MS4	0.071	297.41
M6	0.007	191.87

Tobermory

Latitude 56° 37' 23.3"N Longitude 06° 03' 46.1"W
National Grid reference NM 5081 5529

Recording zero = Chart Datum = 2.39m below Ordnance Datum Newlyn
Recording zero = 6.856m below Tide Gauge Bench Mark



Based upon the 1976 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Mark	NG co-ords	Description
TGBM	NM 5069 5530	Flush Bracket G5186 SW angle Royal Buildings.
Aux2	NM 5077 5529	NBM Rivet on sea wall Mishnish Pier.

This site on the Island of Mull was modernised to accommodate dataring in August 1987. Hourly levels for 1992 were filtered from the channel 2 digiquartz recordings.

Missing scans in the raw values were interpolated for 2 Jan; 24 Feb; 4 Mar; 3,14,18 Apr; 29 May; 17 Jun; 22 Jul; 30 Aug; 15 Sep; 21,28 Oct; 11,13 Nov.

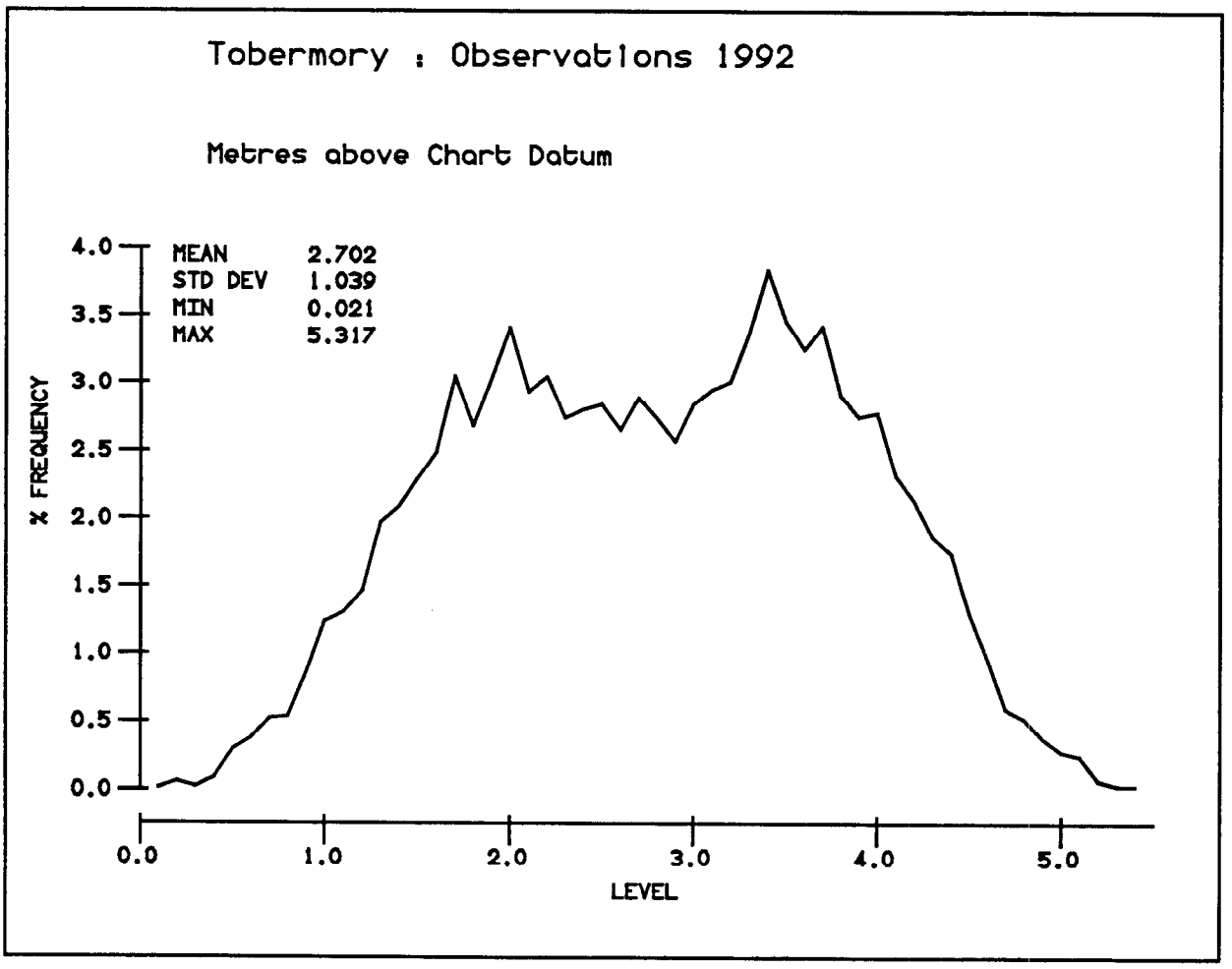
Spurious scans were edited for 14 Apr; 18 Jul.

Scans integrated at 1 7/8 minute during the visit by TGI 29 October were edited to 15 minute interval.

The instrumentation was removed in early December to allow refurbishment of the building.

Gaps in final filtered hourly levels

Nil gaps until records end 0400 GMT 8 December.



Harmonic Tidal Analysis.

Port: Scotland, West Coast - Tobermory

Latitude: 56 37' 23.3" N
Longitude: 6 03' 46.1" W

Time Zone: GMT

Length: 373 Days

From: 1st December, 1991 To: 7th December, 1992

Units: Metres A0: 2.702

Hourly data from digiquartz sensor 2

Datum of Observations = ACD : 2.39 Metres below Ordnance Datum (Newlyn)

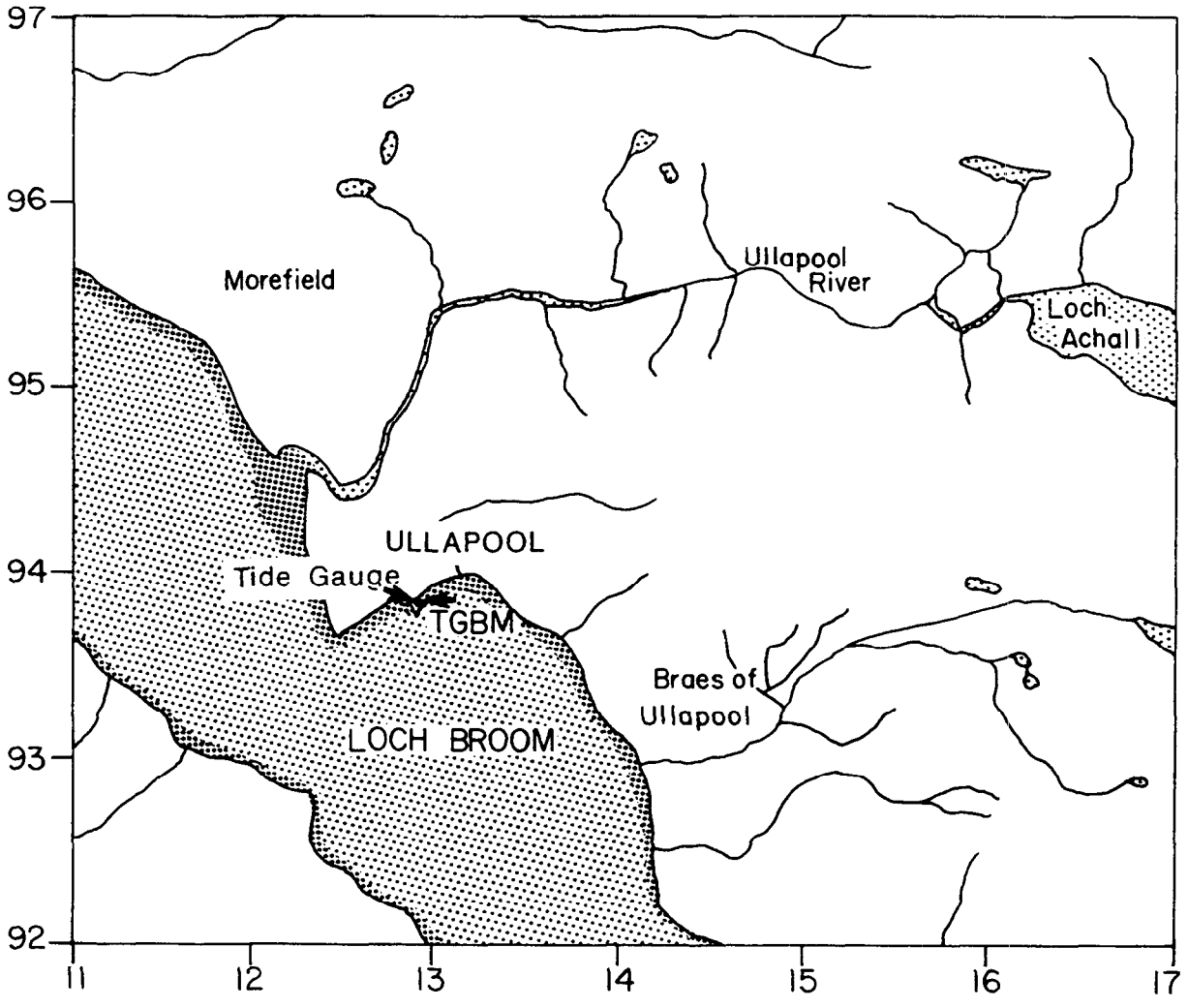
Observation Mean =	0.2704D+01	Residual Mean =	0.9997D-06
Std Dev =	0.1033D+01	Std Dev =	0.1773D+00

Constituent	h	g
Q1	0.023	315.74
O1	0.061	23.70
P1	0.015	169.10
K1	0.064	167.01
J1	0.003	96.57
2N2	0.038	123.51
N2	0.260	147.54
M2	1.299	168.61
S2	0.529	205.45
K2	0.150	203.09
M3	0.041	109.09
M4	0.047	180.02
MS4	0.037	289.35
M6	0.013	8.90

Ullapool

Latitude 57° 53' 44.0"N Longitude 05° 09' 26.9"W
National Grid Reference NH 1288 9391

Recording zero = Chart Datum = 2.75m below Ordnance Datum Newlyn
Recording zero = 7.155m below Tide Gauge Bench Mark



Based upon the 1976 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Mark	NG co-ords	Description
TGBM	NH 1288 9391	OSBM on pier NW parapet 8.2m NE of steps.
Aux1	NH 1303 9425	PA Bolt on church SW side of road NE face N. angle.

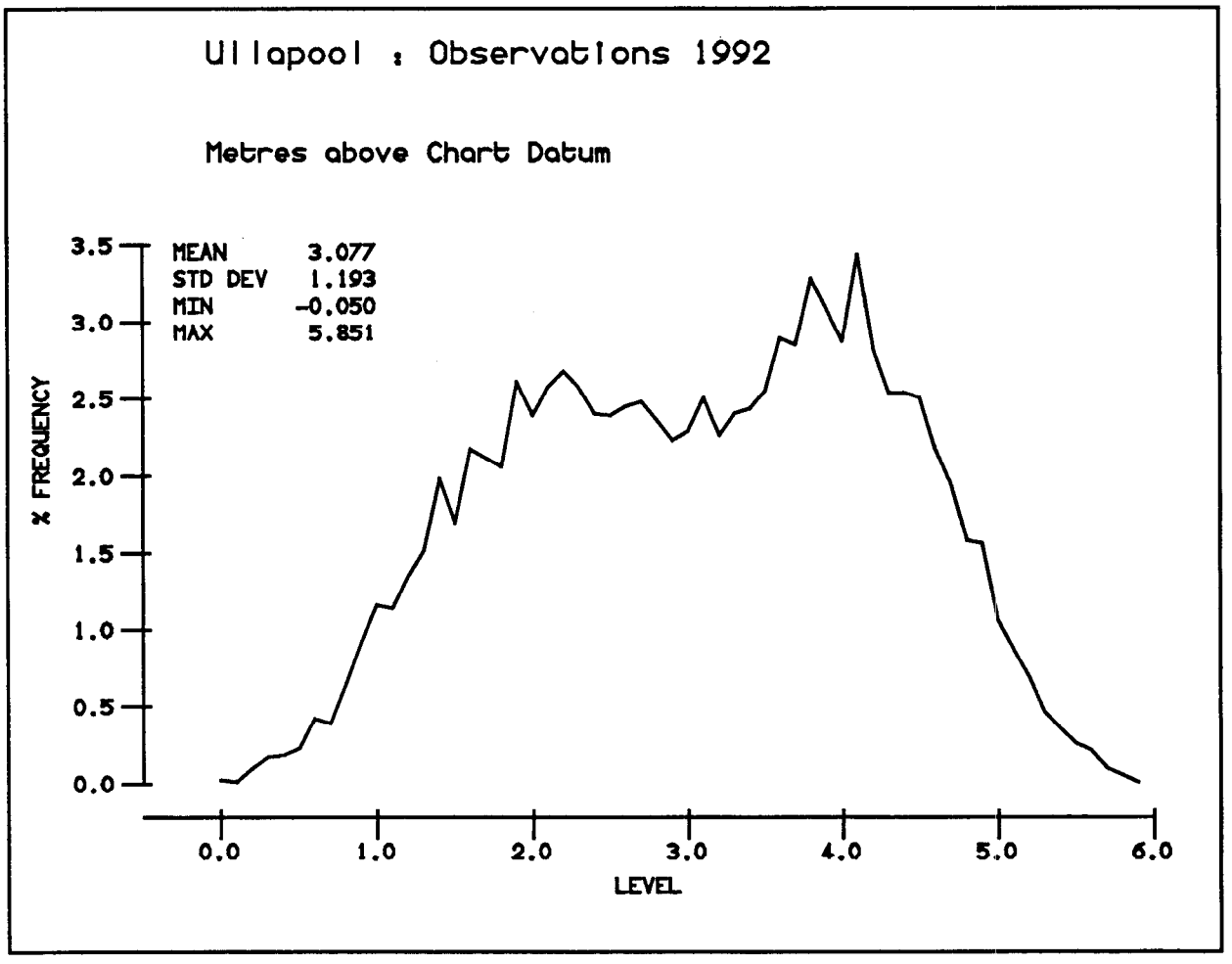
Hourly levels were filtered from the channel 2 digiquartz for 1992.

Missing and spurious scans in the raw elevations were interpolated for the following dates : 22 Jan; 4 Mar; 15 Apr; 29 May; 22,26 Jul; 27 Aug; 3 Sep; 7 Oct; 26 Nov.

Scans integrated at 1 7/8 minute during the TGI visit 25 October were edited to 15 minute interval.

Gaps in final filtered hourly levels

Nil gaps.



Harmonic Tidal Analysis.

Port: Scotland, West Coast - Ullapool

Latitude: 57 53' 44.0" N
Longitude: 5 09' 26.9" W

Time Zone: GMT

Length: 366 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 3.078

Hourly data from digiquartz sensor

Datum of Observations = ACD : 2.75 Metres below Ordnance Datum (Newlyn)

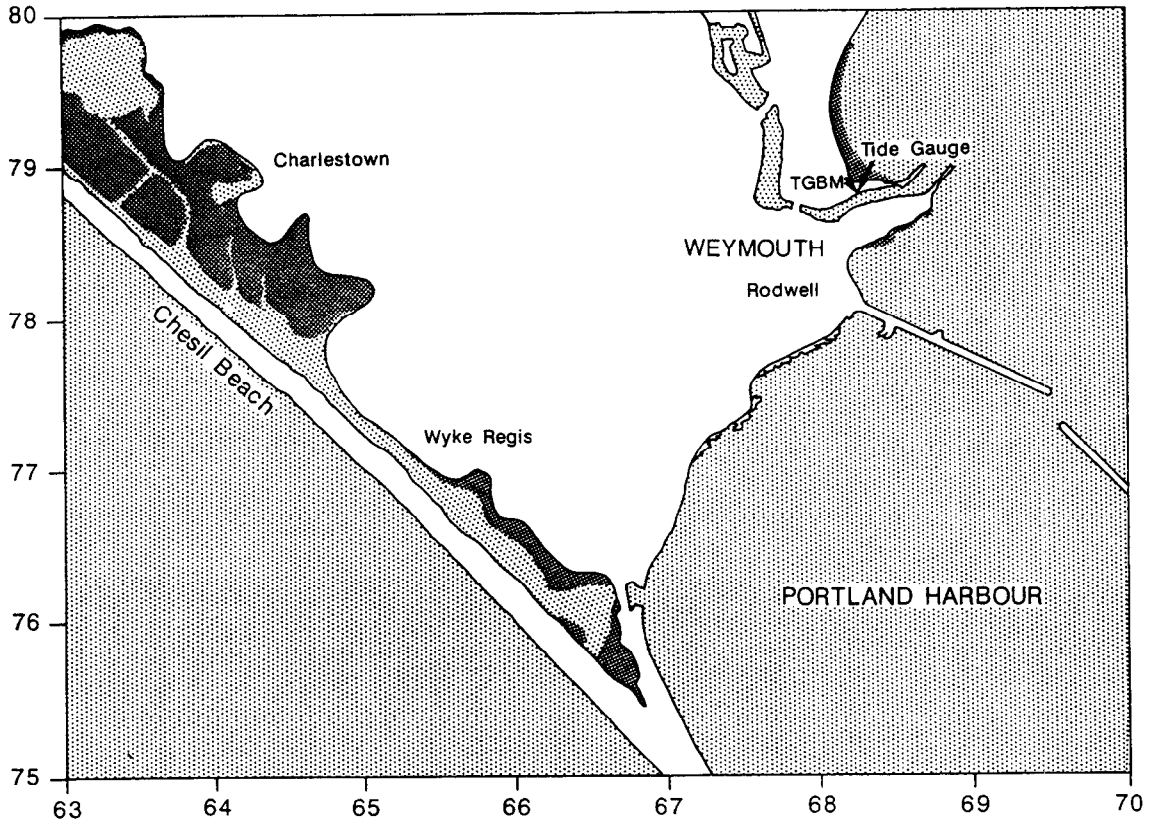
Observation Mean =	0.3079D+01	Residual Mean =	0.2220D-05
Std Dev =	0.1193D+01	Std Dev =	0.1817D+00

Constituent	h	g
Q1	0.024	292.66
O1	0.073	344.30
P1	0.030	112.70
K1	0.113	127.74
J1	0.007	129.57
2N2	0.038	152.47
N2	0.301	178.10
M2	1.505	200.89
S2	0.584	235.51
K2	0.165	232.89
M3	0.031	121.86
M4	0.065	231.02
MS4	0.075	304.78
M6	0.007	200.49

Weymouth

Latitude 50° 36' 27.8"N Longitude 02° 26' 55.0"W
National Grid Reference SY 6826 7883

Recording zero = Chart Datum = 1.02m below Ordnance Datum Newlyn
Recording zero = 4.334m below Tide Gauge Bench Mark



Based upon the 1979 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Mark	NG co-ords	Description
TGBM	SY 6826 7882	Bolt on corner of quay wall NW side N angle.
Aux1	SY 6822 7886	Bolt on sea wall 5.5m W of steps.

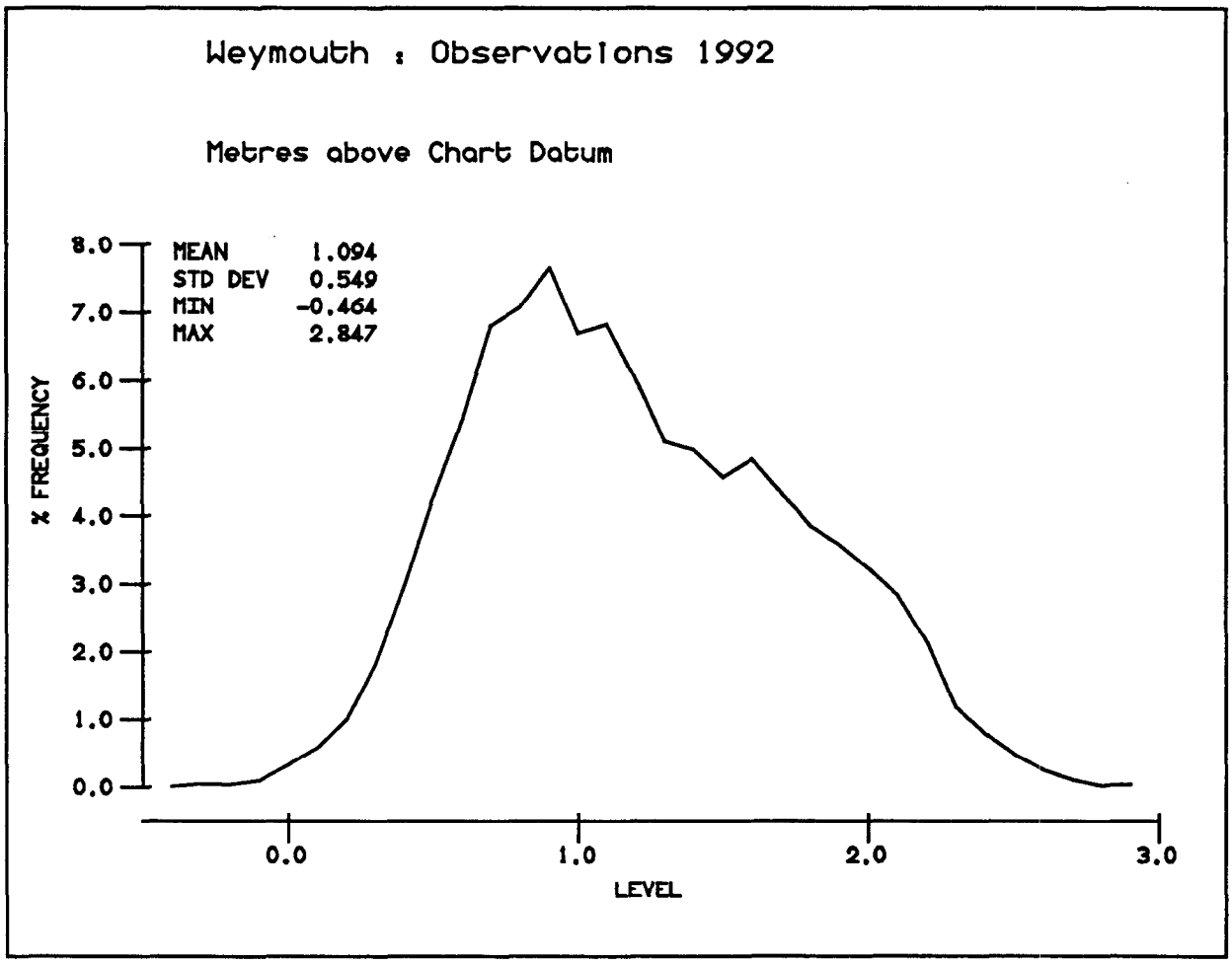
Hourly levels were filtered for both recording channels on pneumatic bubbler systems until 1 March 1992. Thereafter only readings from channel 2, the designated class-A channel, were fully processed for statistical and analytical purposes.

Isolated missing and spurious scans were interpolated for the following dates in 1992: 5,8,9,16,20,21,23,26,31 Jan; 1,2,6,7,15,18,25,27,28,29 Feb; 3,5,7,11,17,20,23,25,26,31 Mar; 1,2,3,14,16,21,22,24,29 Apr; 4,17,19,24,25,26,28 May; 3,4,6,710,13,1518,19,20,2127,29 Jun; 1,3,17,21,23 Jul; 2,6,17,18,23,24,25,27 Aug; 1,3,8,9,11,15,16,27 Sep; 4,5,15,17,19 Oct; 1,3,9,11,15,16,17,21,26 Nov; 3,15,25,30 Dec.

Visits by TGI to the installation were made on 19 February and 16 September.

Gaps in final filtered hourly values for Channel 2

Nil gaps.



Harmonic Tidal Analysis.

Port: England, South Coast - Weymouth

Latitude: 50 36' 27.8" N
Longitude: 2 26' 55.0" W

Time Zone: GMT

Length: 366 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 1.095

Hourly data from digiquartz sensor 2

Datum of Observations = ACD : 1.02 Metres below Ordnance Datum (Newlyn)

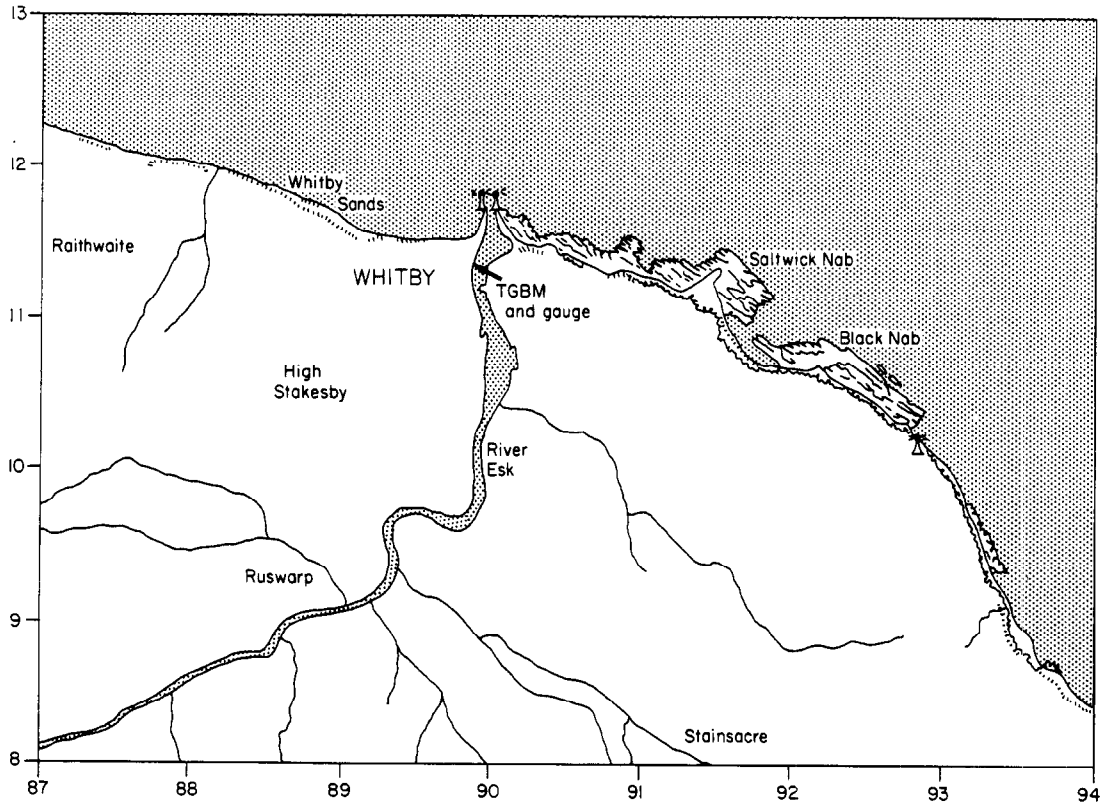
Observation Mean =	0.1095D+01	Residual Mean =	0.9785D-06
Std Dev =	0.5491D+00	Std Dev =	0.1223D+00

Constituent	h	g
Q1	0.008	311.49
O1	0.047	347.99
P1	0.033	111.06
K1	0.094	113.37
J1	0.003	151.36
2N2	0.040	151.34
N2	0.132	184.39
M2	0.603	191.28
S2	0.313	243.15
K2	0.088	238.65
M3	0.011	178.22
M4	0.148	26.09
MS4	0.088	83.09
M6	0.063	64.68

Whitby

Latitude 54° 29' 23.7"N Longitude 00° 36' 45.4"W
National Grid Reference NZ 8986 1141

Recording zero = Chart Datum = 3.00m below Ordnance Datum Newlyn
Recording zero = 9.107m below Tide Gauge Bench Mark



Based upon the 1976 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Mark	NG co-ords	Description
TGBM	NZ 8986 1141	East side of Pier Road.
Aux1	NZ 8992 1105	Bolt on buttress of Whitby Bridge.
Aux2	NZ 8985 1134	Rivet on quayside SE side of Pier Road.

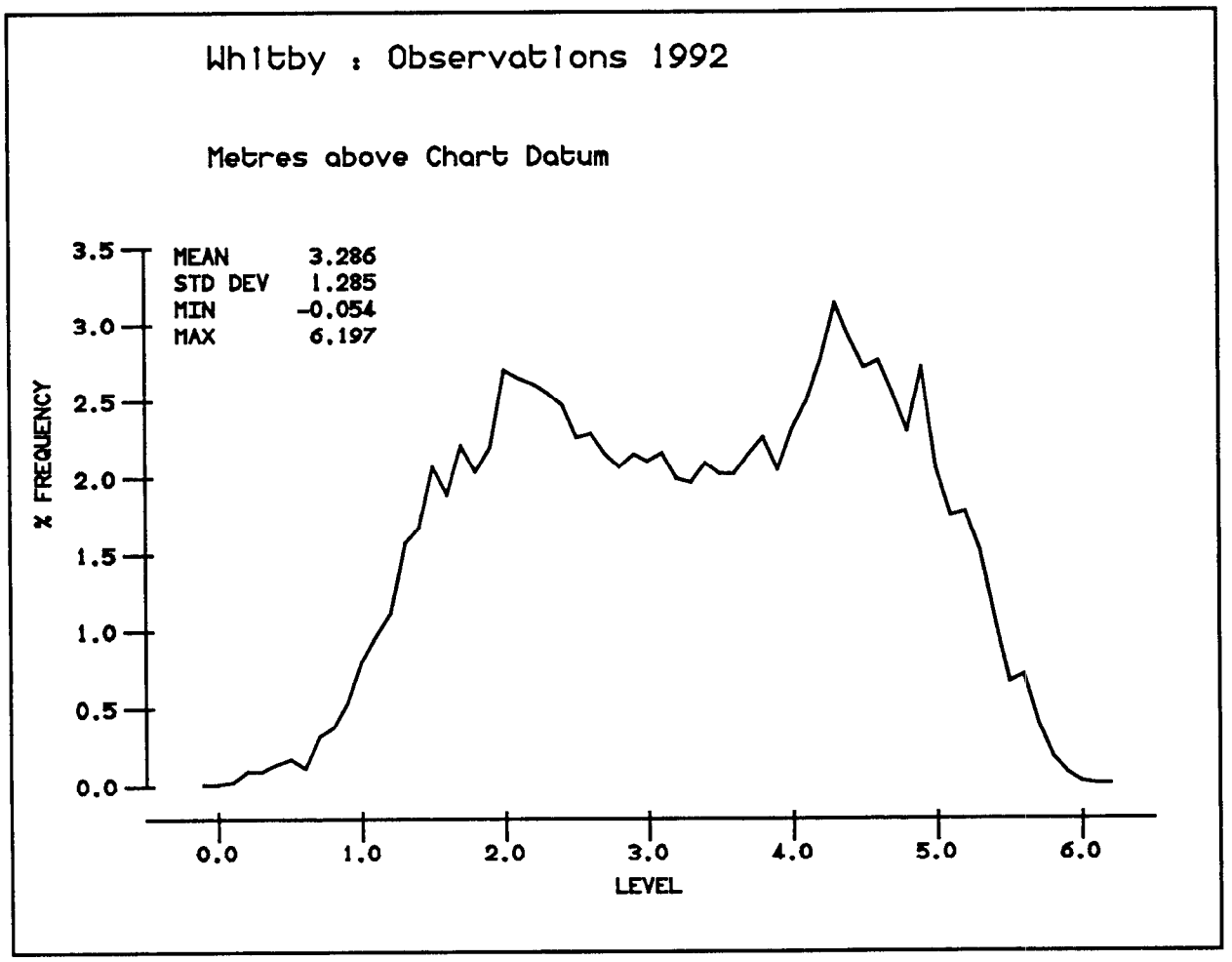
Values from the channel 2 digiquartz on a pneumatic bubbler system were fully processed for 1992.

Isolated spurious and missing scans were interpolated for the following dates : 6 Jan; 15 Apr; 6 May; 5 Jun; 15 Jul; 27 Aug; 18 Sep; 18 Oct.

Scans integrated at 1 7/8 minute during the visit by TGI 9 September to change the compressor, were edited to 15 minute interval.

Gaps in final filtered hourly levels

Nil gaps.



Harmonic Tidal Analysis.

Port: England, East Coast - Whitby

Latitude: 54 29' 23.7" N
Longitude: 0 36' 45.4" W

Time Zone: GMT

Length: 366 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 3.287

Hourly data from digiquartz sensor 2

Datum of Observations = ACD : 3.00 Metres below Ordnance Datum (Newlyn)

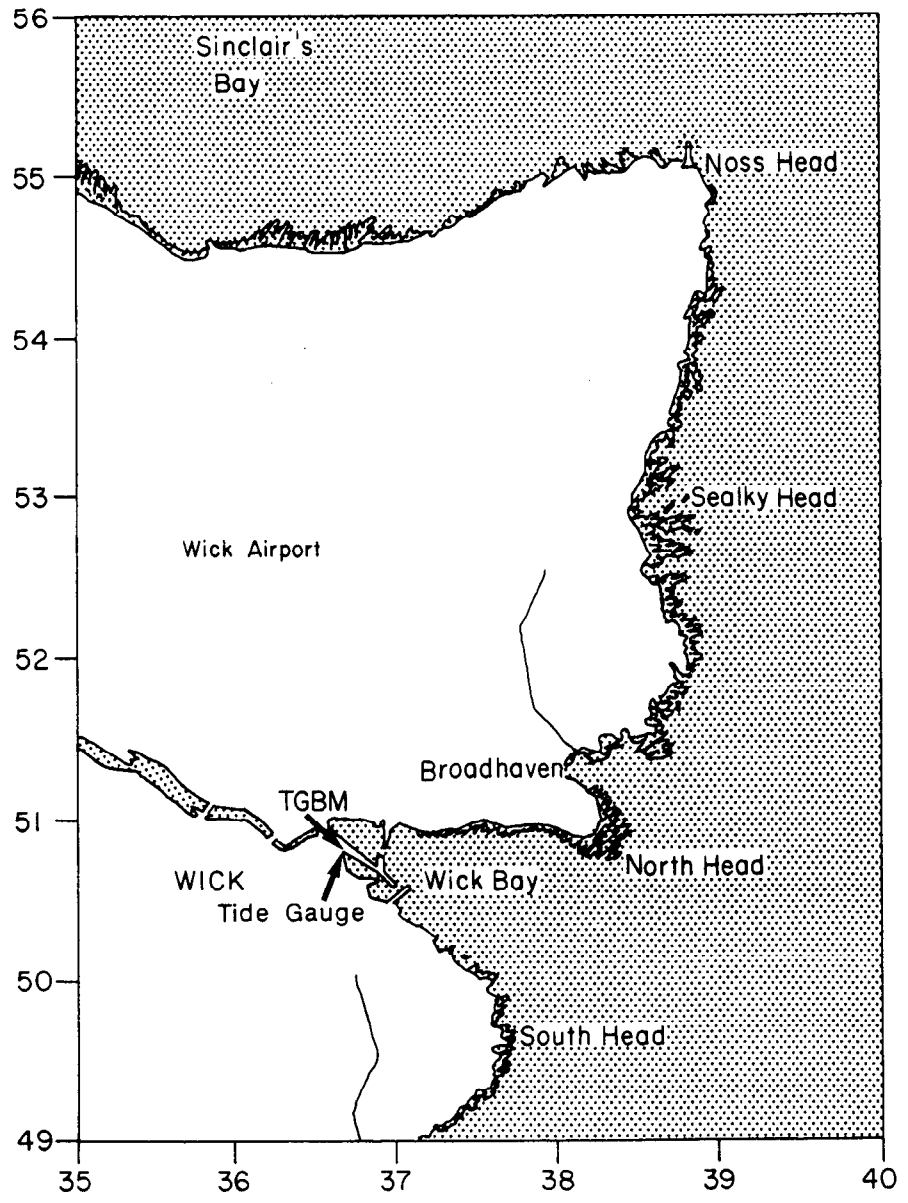
Observation Mean =	0.3288D+01	Residual Mean =	0.3251D-05
Std Dev =	0.1287D+01	Std Dev =	0.1640D+00

Constituent	h	g
Q1	0.039	28.94
O1	0.145	82.36
P1	0.036	227.10
K1	0.133	252.37
J1	0.009	261.15
2N2	0.039	71.70
N2	0.318	79.69
M2	1.660	104.21
S2	0.558	147.53
K2	0.159	145.32
M3	0.014	90.02
M4	0.030	72.96
MS4	0.032	102.17
M6	0.011	0.26

Wick

Latitude 58° 26' 28.5"N Longitude 03° 05' 5.7"W
National Grid reference ND 3667 5080

Recording zero = Chart Datum = 1.71m below Ordnance Datum Newlyn
Recording zero = 5.077m below Tide Gauge Bench Mark



Based upon the 1976 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Mark	NG co-ords	Description
TGBM	ND 3667 5081	OSBM Bolt in quay E angle of tide gauge building.
Aux1	ND 3670 5084	Rivet at base of wall 15.5m NE angle of building.

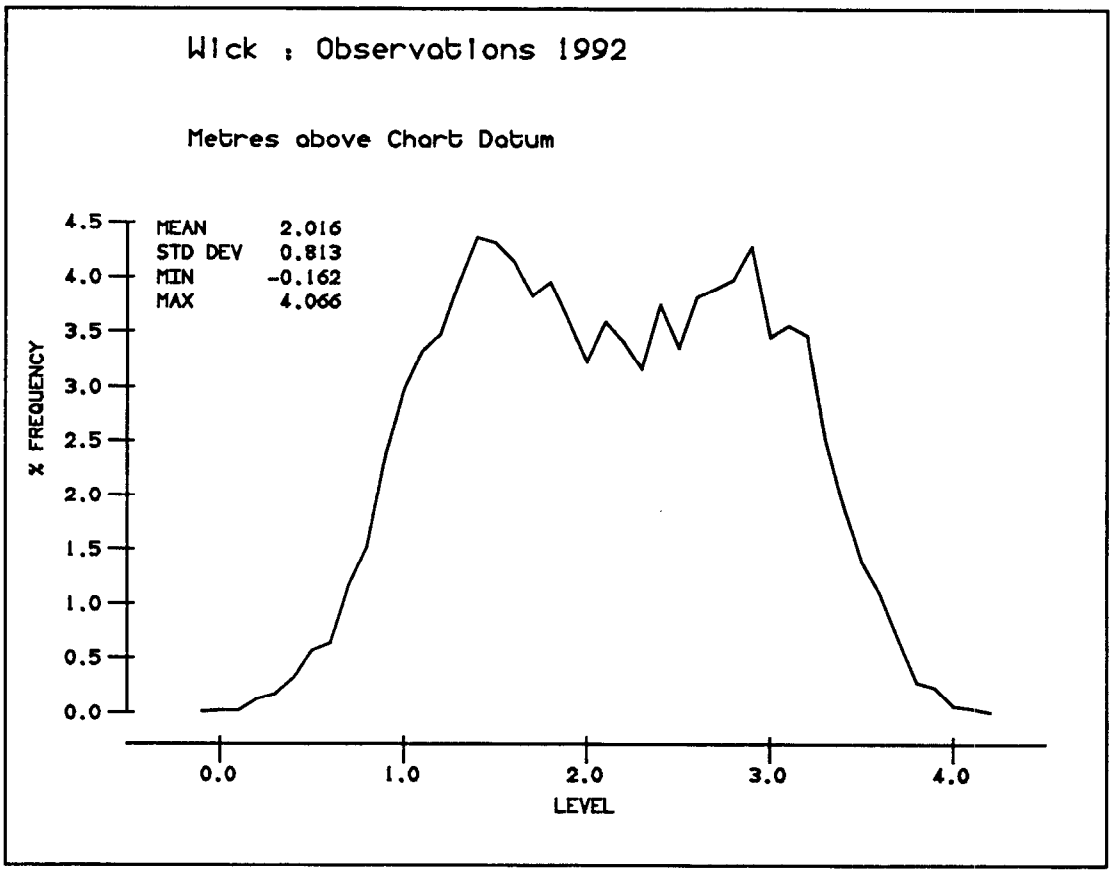
Hourly levels were filtered from the channel 2 digiquartz for 1992.

Isolated missing and spurious values were edited in the raw values from channel 2 for the following dates : 3 Jan; 14 Jul; 19,20,21,22 Aug; 6,25 Nov; 9,24 Dec.

Scans integrated at 1 7/8 minute during the visit by TGI 27 October were edited to 15 minute interval before filtering to hourly levels.

Gaps in final filtered hourly levels

0300 GMT 07 Jul - 1600 GMT 09 Jul	Power failure and clock problems.
0300 GMT 21 Aug - 2200 GMT 24 Aug	Severe clock problems.



Harmonic Tidal Analysis.

Port: Scotland, East Coast - Wick

Latitude: 58 26' 28.5" N
Longitude: 3 05' 5.7" W

Time Zone: GMT

Length: 359 Days

From: 1st January, 1992 To: 31st December, 1992

Units: Metres A0: 2.018

Hourly data from digiquartz sensor

Datum of Observations = ACD : 1.71 Metres below Ordnance Datum (Newlyn)

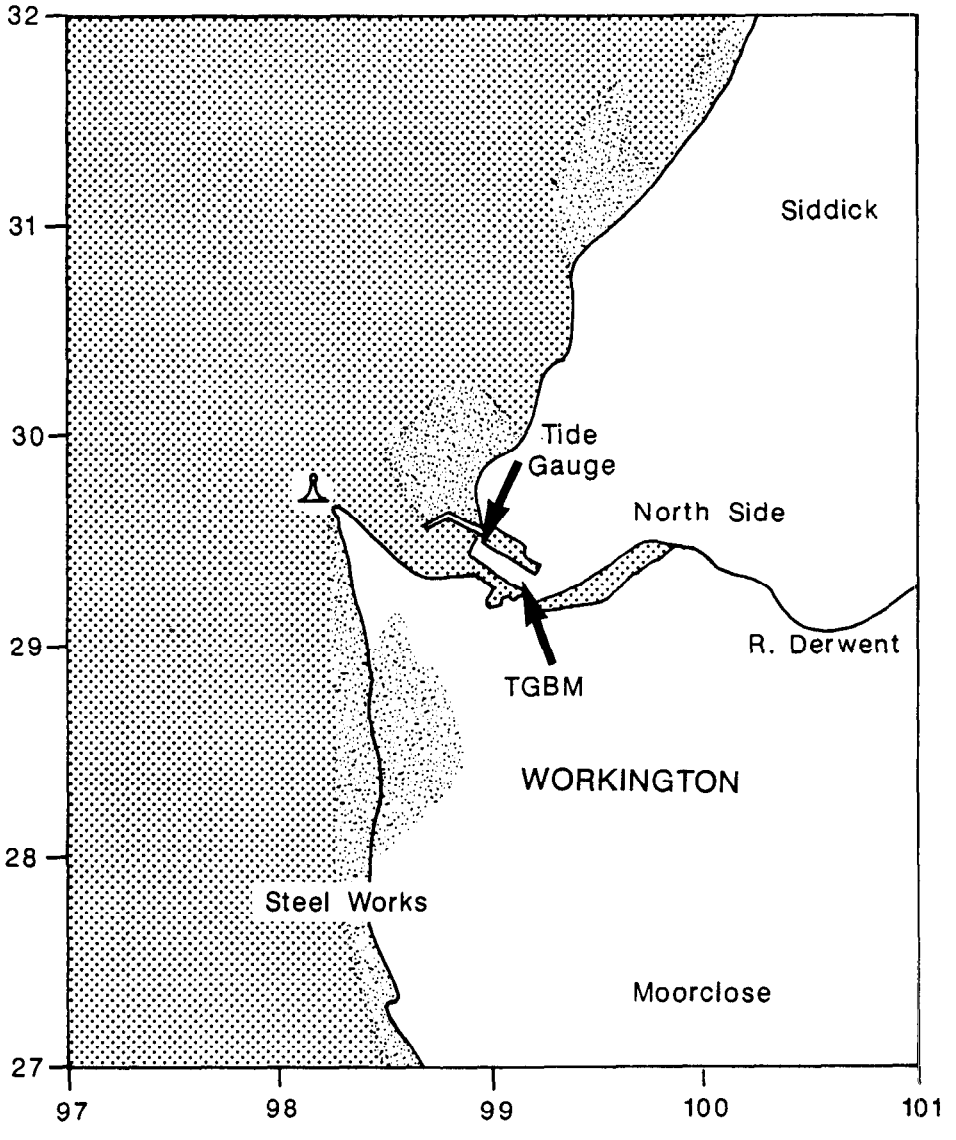
Observation Mean =	0.2018D+01	Residual Mean =	-0.4028D-06
Std Dev =	0.8110D+00	Std Dev =	0.1612D+00

Constituent	h	g
Q1	0.031	327.44
O1	0.112	23.89
P1	0.033	157.48
K1	0.112	176.17
J1	0.007	186.52
2N2	0.029	290.24
N2	0.199	301.99
M2	1.017	322.61
S2	0.349	0.96
K2	0.099	357.30
M3	0.013	235.51
M4	0.037	318.75
MS4	0.019	53.46
M6	0.006	227.66

Workington

Latitude 54° 39' 1.9" N Longitude 3° 33' 57.6" W
National Grid Reference NX 9897 2952

Recording zero = Chart Datum = 4.2m below Ordnance Datum Newlyn
Recording zero = 11.59m below Tide Gauge Bench Mark



Based upon the 1982 Ordnance Survey 1:50 000 Landranger map with the permission of the Controller of Her Majesty's Stationery Office ©Crown copyright

Bench Mark	NG co-ords	Description
TGBM	NX 9917 2928	SW face of building, 3.7m from S. angle Workington dock.
Aux1	NX 9948 2967	NBM on N face NE angle of works building, S side of road.

This new site on the Class-A network came on stream **5 February 1992** with two pneumatic bubbler systems connected to digiquartz transducers.

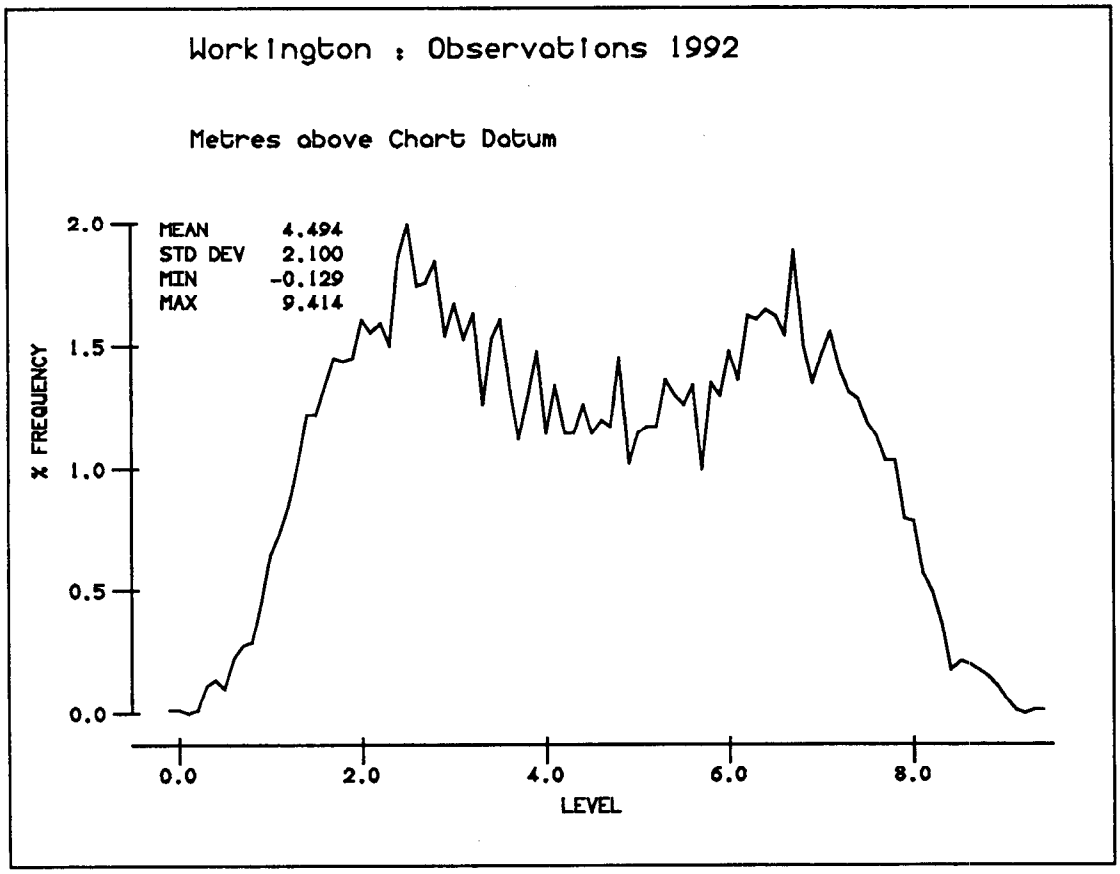
Isolated missing and spurious scans in the raw elevations for channel 2 were edited for the following dates: 17,20 Feb; 1,8 Mar; 7,9,10 Apr; 5,11 May; 11 Jun; 4 Jul; 13,16 Aug; 4,26 Sep; 17,24,29 Oct; 1 Nov; 26 Dec.

The designated 'back-up' channel 1 series developed a fault 30 May which was diagnosed as electrical. A new digiquartz was fitted 20 August, causing 1 7/8 minute integrations on channel 2 which were edited to 15 minute interval prior to filtering.

New pressure points for both channels were fitted by TGI on 14 and 16 July. Scans integrated at 1 7/8 minute were edited to 15 minute interval.

Gaps in final filtered hourly levels from channel 2

Recordings begin 2100 GMT 5 February, thereafter no gaps.



Harmonic Tidal Analysis.

Port: England, West Coast - Workington

Latitude: 54 39' 1.9" N
Longitude: 3 33' 57.6" W

Time Zone: GMT

Length: 361 Days

From: 6th February 1992 To: 31st January, 1993

Units: Metres A0: 4.521

Hourly data from digiquartz sensor 2

Datum of Observations = ACD : 4.20 Metres below Ordnance Datum (Newlyn)

Observation Mean =	0.4520D+01	Residual Mean =	0.6274D-05
Std Dev =	0.2102D+01	Std Dev =	0.2247D+00

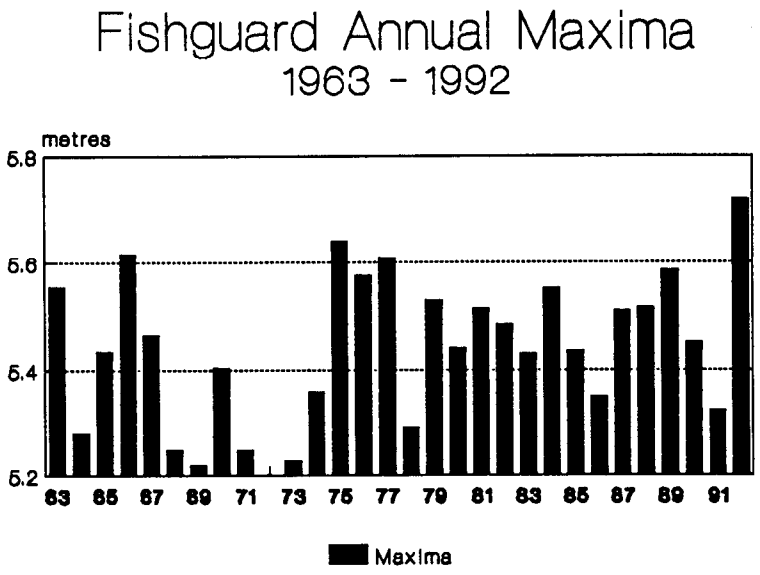
Constituent	h	g
Q1	0.027	339.78
O1	0.105	41.72
P1	0.042	197.22
K1	0.122	193.37
J1	0.005	234.14
2N2	0.061	304.18
N2	0.522	307.77
M2	2.741	332.51
S2	0.871	16.56
K2	0.245	15.68
M3	0.019	338.02
M4	0.136	254.45
MS4	0.069	303.01
M6	0.013	282.16

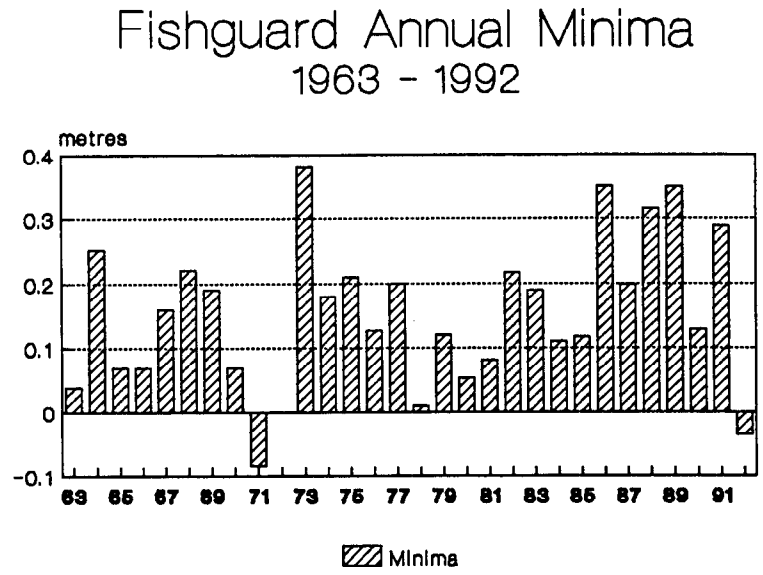
3. Analysed data statistics

3.1 Extreme Level Statistics

Tables of the highest and lowest values from the filtered hourly levels for each month at each of the 36 sites are shown in alphabetical order on the following pages.

In the majority of cases, the extreme still water recordings for the year coincided with the predicted extreme astronomical tides for the periods 18-19 February and 29-30 August. Few records were broken. An exception was at Fishguard, where the annual maximum level on 29 August was the highest since records began in 1963. The annual minimum level recorded on 18 February was, with the exception of 1971, the lowest since records began.





Aberdeen Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
4.579	11.	Jan	01	-.023	21.	Jan	21
4.651	16.	Feb	22	**-.103**	20.	Feb	19
4.695	14.	Mar	20	-.034	20.	Mar	19
4.558	14.	Apr	18	.225	19.	Apr	16
4.185	01.	May	16	.486	19.	May	16
4.244	02.	Jun	03	.429	10.	Jun	5
4.450	02.	Jul	31	.079	8.	Jul	31
4.866	02.	Aug	30	.120	9.	Aug	1
4.637	02.	Sep	28	.127	7.	Sep	26
4.560	01.	Oct	26	.390	7.	Oct	26
4.805	13.	Nov	25	.677	6.	Nov	23
4.451	02.	Dec	11	.425	21.	Dec	26

Avonmouth Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
13.399	20.	Jan	20	.393	03.	Jan	21
14.072	08.	Feb	19	**.165**	15.	Feb	19
14.152	20.	Mar	19	.421	03.	Mar	20
13.551	07.	Apr	17	.730	14.	Apr	17
12.856	08.	May	04	.956	15.	May	04
13.167	20.	Jun	02	1.228	03.	Jun	03
13.869	20.	Jul	31	.657	03.	Jul	31
14.718	20.	Aug	29	.679	15.	Aug	29
14.380	20.	Sep	27	.481	03.	Sep	28
14.214	06.	Oct	25	1.113	01.	Oct	25
13.557	19.	Nov	24	1.532	14.	Nov	24
13.124	20.	Dec	11	1.204	03.	Dec	12

Barmouth Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
5.331	10.	Jan	22	.446	17.	Jan	21
5.423	11.	Feb	22	**.423**	16.	Feb	18
5.501	09.	Mar	20	.508	16.	Mar	19
5.081	09.	Apr	18	.474	15.	Apr	16
4.796	21.	May	04	.526	05.	May	5
5.019	21.	Jun	02	.619	07.	Jun	6
5.254	22.	Jul	03	.580	07.	Jul	5
5.955	21.	Aug	29	.598	04.	Aug	29
5.548	21.	Sep	27	.546	03.	Sep	26
5.759	07.	Oct	25	.643	03.	Oct	26
5.488	20.	Nov	24	.813	16.	Nov	12
5.037	10.	Dec	13	.689	17.	Dec	12

Cromer Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
5.198	22.	Jan	25	-.109	03.	Jan	22
5.342	20.	Feb	20	-.080	04.	Feb	22
5.335	19.	Mar	20	-.213	02.	Mar	20
5.265	19.	Apr	18	.063	01.	Apr	17
4.927	06.	May	16	.469	01.	May	17
4.916	08.	Jun	4	.641	16.	Jun	5
5.221	09.	Jul	4	.181	15.	Jul	31
5.545	07.	Aug	29	**-.225**	15.	Aug	30
5.340	07.	Sep	28	.197	14.	Sep	27
5.295	06.	Oct	26	.221	14.	Oct	27
5.250	08.	Nov	13	.410	01.	Nov	25
5.224	20.	Dec	12	.324	08.	Dec	18

Devonport Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
5.803	08.	Jan	23	.183	14.	Jan	22
5.804	07.	Feb	20	**.067**	13.	Feb	19
5.763	07.	Mar	20	.221	13.	Mar	20
5.539	06.	Apr	03	.384	12.	Apr	17
5.413	19.	May	18	.697	02.	May	06
5.631	19.	Jun	03	.894	02.	Jun	04
5.873	19.	Jul	31	.454	01.	Jul	31
6.241	19.	Aug	29	.381	02.	Aug	02
5.998	18.	Sep	27	.382	13.	Sep	28
5.887	6.	Oct	27	.730	12.	Oct	26
5.823	18.	Nov	24	.945	23.	Nov	23
5.533	07.	Dec	12	.803	14.	Dec	13

Dover Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
6.866	01.	Jan	23	.205	08.	Jan	22
7.010	01.	Feb	21	**.150**	08.	Feb	20
7.088	00.	Mar	21	.159	07.	Mar	20
7.103	22.	Apr	15	.349	06.	Apr	17
6.573	23.	May	2	.672	07.	May	04
6.694	13.	Jun	4	.890	20.	Jun	03
6.982	12.	Jul	31	.432	20.	Jul	31
7.246	12.	Aug	29	.237	20.	Aug	30
7.135	12.	Sep	28	.409	19.	Sep	27
7.067	11.	Oct	26	.628	19.	Oct	27
7.012	00.	Nov	26	.797	17.	Nov	23
6.908	12.	Dec	12	.836	21.	Dec	13

Felixstowe Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
4.010	11.	Jan	04	-.140	07.	Jan	22
4.197	15.	Feb	23	-.237	08.	Feb	22
3.980	12.	Mar	19	-.231	06.	Mar	20
4.096	10.	Apr	15	-.090	05.	Apr	17
3.830	03.	May	8	.207	04.	May	15
3.924	02.	Jun	5	.345	19.	Jun	17
4.074	00.	Jul	31	.102	19.	Jul	31
4.236	00.	Aug	29	**-.274**	19.	Aug	30
4.078	00.	Sep	28	.084	17.	Sep	26
4.323	23.	Oct	25	.076	18.	Oct	27
4.250	12.	Nov	26	.023	06.	Nov	25
4.224	13.	Dec	12	.032	12.	Dec	18

Fishguard Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
5.101	09.	Jan	22	.165	15.	Jan	21
5.119	08.	Feb	19	**-.036**	14.	Feb	18
5.187	08.	Mar	20	.208	14.	Mar	19
4.815	07.	Apr	17	.354	13.	Apr	16
4.549	20.	May	17	.625	03.	May	05
4.818	20.	Jun	2	.775	04.	Jun	04
5.180	20.	Jul	31	.394	03.	Jul	31
5.718	20.	Aug	29	.430	03.	Aug	01
5.356	20.	Sep	27	.431	02.	Sep	28
5.263	08.	Oct	27	.554	01.	Oct	26
5.152	19.	Nov	24	.869	15.	Nov	12
4.761	09.	Dec	13	.733	15.	Dec	12

Heysham Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
10.052	13.	Jan	22	.193	19.	Jan	21
10.377	14.	Feb	22	**.069**	18.	Feb	18
10.315	00.	Mar	20	.502	19.	Mar	20
9.843	12.	Apr	18	.625	17.	Apr	16
9.283	12.	May	04	1.012	07.	May	05
9.543	00.	Jun	03	.938	08.	Jun	04
9.877	00.	Jul	31	.493	07.	Jul	31
10.823	01.	Aug	31	.554	06.	Aug	29
10.367	00.	Sep	28	.440	06.	Sep	27
10.292	12.	Oct	27	.792	05.	Oct	25
10.065	23.	Nov	24	1.330	05.	Nov	24
9.638	13.	Dec	13	1.226	19.	Dec	12

Hinkley Point Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
12.281	09.	Jan	23	.090	14.	Jan	21
12.599	08.	Feb	20	**-.145**	02.	Feb	20
12.517	08.	Mar	20	.100	01.	Mar	19
12.071	19.	Apr	17	.419	13.	Apr	17
11.407	20.	May	4	.805	13.	May	3
11.617	20.	Jun	3	1.059	14.	Jun	3
12.579	20.	Jul	31	.299	14.	Jul	31
13.038	08.	Aug	30	.312	14.	Aug	29
12.734	19.	Sep	27	.150	14.	Sep	28
12.689	06.	Oct	25	.700	13.	Oct	26
11.907	07.	Nov	25	1.203	02.	Nov	13
11.616	20.	Dec	11	1.081	02.	Dec	12

Ilfracombe Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
9.523	7.	Jan	21	.079	13.	Jan	21
9.771	7.	Feb	20	**-.221**	01.	Feb	20
9.739	7.	Mar	20	.013	00.	Mar	19
9.242	18.	Apr	17	.229	12.	Apr	17
8.818	19.	May	4	.679	12.	May	3
9.078	19.	Jun	2	.910	13.	Jun	3
9.774	19.	Jul	31	.213	13.	Jul	31
10.266	19.	Aug	29	.277	14.	Aug	1
9.948	18.	Sep	27	.199	13.	Sep	28
9.886	5.	Oct	25	.644	12.	Oct	26
9.503	18.	Nov	24	1.155	01.	Nov	13
9.112	8.	Dec	13	1.001	13.	Dec	12

Immingham Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
7.531	20.	Jan	22	.144	02.	Jan	22
7.692	19.	Feb	20	.133	03.	Feb	22
7.813	19.	Mar	20	**-.078**	01.	Mar	20
7.468	19.	Apr	18	.341	00.	Apr	17
7.169	05.	May	16	.848	00.	May	17
7.266	07.	Jun	3	1.018	13.	Jun	2
7.585	08.	Jul	4	.451	13.	Jul	31
8.037	07.	Aug	30	.123	14.	Aug	30
7.705	07.	Sep	28	.386	12.	Sep	26
7.523	06.	Oct	26	.626	13.	Oct	27
7.603	07.	Nov	26	.855	11.	Nov	23
7.425	06.	Dec	11	.994	14.	Dec	13

Kinlochbervie Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
5.394	9.	Jan	23	.139	15.	Jan	21
5.412	8.	Feb	20	**-.093**	14.	Feb	18
5.324	8.	Mar	20	.096	14.	Mar	19
4.988	19.	Apr	17	.199	13.	Apr	16
4.816	18.	May	15	.489	13.	May	2
4.888	20.	Jun	2	.455	04.	Jun	5
5.264	20.	Jul	31	.114	02.	Jul	31
5.539	20.	Aug	29	.222	02.	Aug	29
5.271	20.	Sep	27	.123	02.	Sep	28
5.308	8.	Oct	27	.360	01.	Oct	26
5.492	7.	Nov	25	.792	03.	Nov	13
5.136	10.	Dec	14	.664	15.	Dec	12

Leith Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
5.702	17.	Jan	23	-.183	22.	Jan	21
5.918	16.	Feb	20	-.134	21.	Feb	18
5.905	16.	Mar	20	**-.231**	21.	Mar	19
5.724	15.	Apr	18	.204	20.	Apr	16
5.457	02.	May	16	.599	10.	May	5
5.615	16.	Jun	3	.613	11.	Jun	4
5.829	16.	Jul	31	.089	10.	Jul	31
6.265	04.	Aug	30	.006	11.	Aug	31
6.006	03.	Sep	28	.088	9.	Sep	27
5.924	02.	Oct	26	.449	8.	Oct	26
5.979	03.	Nov	26	.695	7.	Nov	23
5.723	03.	Dec	11	.578	22.	Dec	26

Lerwick Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
2.357	13.	Jan	23	-.123	18.	Jan	21
2.505	14.	Feb	22	**-.206**	17.	Feb	18
2.325	12.	Mar	20	.074	17.	Mar	19
2.284	11.	Apr	18	.059	16.	Apr	16
2.065	01.	May	7	.254	17.	May	2
2.175	00.	Jun	3	.127	8.	Jun	5
2.226	23.	Jul	30	.054	6.	Jul	31
2.555	00.	Aug	30	.158	6.	Aug	1
2.385	01.	Sep	1	.029	4.	Sep	26
2.366	00.	Oct	28	.285	5.	Oct	26
2.703	11.	Nov	25	.485	19.	Nov	13
2.399	14.	Dec	14	.214	19.	Dec	27

Liverpool Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
9.673	13.	Jan	22	.066	19.	Jan	21
9.895	12.	Feb	20	**-.083**	19.	Feb	19
9.948	12.	Mar	20	.447	19.	Mar	20
9.528	11.	Apr	17	.588	17.	Apr	16
9.079	00.	May	5	.999	7.	May	5
9.329	23.	Jun	30	.953	8.	Jun	4
9.574	01.	Jul	4	.398	7.	Jul	31
9.945	01.	Aug	2	.545	8.	Aug	2
9.936	23.	Sep	26	.315	7.	Sep	28
9.906	23.	Oct	26	.594	5.	Oct	25
9.804	23.	Nov	24	1.278	5.	Nov	24
9.420	13.	Dec	13	1.226	19.	Dec	12

Lowestoft Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
3.145	19.	Jan	1	-.113	5.	Jan	22
2.969	21.	Feb	3	-.157	6.	Feb	22
2.883	23.	Mar	21	-.179	4.	Mar	20
3.032	20.	Apr	15	-.008	3.	Apr	17
2.583	9.	May	16	.275	2.	May	15
2.608	12.	Jun	5	.361	19.	Jun	5
2.795	12.	Jul	4	.090	17.	Jul	31
2.948	10.	Aug	29	**-.273**	17.	Aug	30
2.920	11.	Sep	16	.142	16.	Sep	27
2.986	08.	Oct	9	.214	16.	Oct	27
3.014	17.	Nov	19	.136	4.	Nov	25
3.060	04.	Dec	19	-.072	10.	Dec	18

Milford Haven Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
7.341	08.	Jan	22	.081	14.	Jan	22
7.387	07.	Feb	19	**-.148**	14.	Feb	20
7.462	07.	Mar	20	.017	13.	Mar	19
7.033	06.	Apr	17	.281	01.	Apr	18
6.695	18.	May	16	.617	01.	May	4
6.998	19.	Jun	2	.767	02.	Jun	4
7.430	19.	Jul	31	.218	01.	Jul	31
8.036	19.	Aug	29	.253	02.	Aug	1
7.629	19.	Sep	27	.149	01.	Sep	28
7.529	05.	Oct	25	.413	00.	Oct	26
7.345	18.	Nov	24	.910	13.	Nov	12
6.887	08.	Dec	13	.726	14.	Dec	12

Millport Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
3.924	15.	Jan	23	-.080	19.	Jan	21
4.161	15.	Feb	22	**-.319**	18.	Feb	18
3.802	12.	Mar	18	.057	10.	Mar	24
3.552	02.	Apr	6	-.100	16.	Apr	15
3.451	04.	May	8	.140	05.	May	16
3.403	05.	Jun	8	.091	09.	Jun	6
3.635	02.	Jul	18	-.022	09.	Jul	5
4.126	02.	Aug	31	.139	08.	Aug	2
3.950	03.	Sep	1	.104	05.	Sep	26
3.837	00.	Oct	27	.168	05.	Oct	26
4.024	13.	Nov	25	.395	04.	Nov	8
3.843	15.	Dec	14	.271	20.	Dec	27

Mumbles Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
9.857	09.	Jan	23	.507	02.	Jan	23
10.010	08.	Feb	20	**.096**	13.	Feb	19
10.070	07.	Mar	20	.318	13.	Mar	19
9.607	07.	Apr	18	.574	12.	Apr	17
9.230	18.	May	16	.932	13.	May	4
9.490	19.	Jun	2	1.162	02.	Jun	4
10.037	19.	Jul	31	.545	13.	Jul	31
10.627	19.	Aug	29	.513	13.	Aug	29
10.354	19.	Sep	27	.431	13.	Sep	28
10.144	07.	Oct	27	.731	00.	Oct	26
9.800	18.	Nov	24	1.324	12.	Nov	24
9.379	08.	Dec	13	1.174	02.	Dec	13

Newhaven Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
6.812	01.	Jan	23	.121	19.	Jan	22
6.963	01.	Feb	21	**.023**	18.	Feb	19
7.032	01.	Mar	22	.236	6.	Mar	20
6.876	00.	Apr	19	.336	5.	Apr	17
6.515	23.	May	2	.517	6.	May	4
6.678	23.	Jun	30	.708	7.	Jun	4
6.974	12.	Jul	31	.464	6.	Jul	31
7.315	12.	Aug	29	.343	7.	Aug	1
7.152	12.	Sep	28	.418	6.	Sep	28
7.207	10.	Oct	25	.668	17.	Oct	26
7.083	00.	Nov	26	.852	5.	Nov	24
6.800	12.	Dec	12	.637	20.	Dec	13

Newlyn Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
5.788	7.	Jan	23	.204	13.	Jan	22
5.803	6.	Feb	20	**.043**	12.	Feb	19
5.685	6.	Mar	20	.238	12.	Mar	19
5.509	5.	Apr	3	.332	11.	Apr	17
5.344	18.	May	18	.637	01.	May	6
5.597	18.	Jun	3	.829	01.	Jun	4
5.865	18.	Jul	31	.373	00.	Jul	31
6.164	17.	Aug	29	.409	01.	Aug	1
6.053	17.	Sep	27	.373	00.	Sep	28
5.900	5.	Oct	27	.584	23.	Oct	25
5.691	16.	Nov	24	.838	12.	Nov	12
5.383	7.	Dec	13	.729	12.	Dec	11

North Shields Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
5.271	13.	Jan	1	-.192	23.	Jan	21
5.438	17.	Feb	20	-.119	23.	Feb	19
5.474	16.	Mar	20	**-.210**	22.	Mar	19
5.370	16.	Apr	18	.222	21.	Apr	16
4.996	03.	May	16	.589	21.	May	16
5.036	04.	Jun	2	.569	12.	Jun	4
5.319	06.	Jul	4	.104	11.	Jul	31
5.726	04.	Aug	30	.038	11.	Aug	1
5.492	04.	Sep	28	.077	10.	Sep	27
5.394	03.	Oct	26	.408	9.	Oct	26
5.472	04.	Nov	26	.676	8.	Nov	23
5.308	04.	Dec	11	.585	23.	Dec	26

Port Ellen Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
1.151	06.	Jan	7	-.347	00.	Jan	21
1.128	17.	Feb	22	**-.642**	23.	Feb	18
.952	07.	Mar	7	-.622	12.	Mar	24
1.048	06.	Apr	24	-.522	21.	Apr	15
.906	22.	May	11	-.326	22.	May	15
.749	18.	Jun	2	-.254	11.	Jun	18
.925	18.	Jul	31	-.373	14.	Jul	5
1.274	19.	Aug	30	-.168	13.	Aug	2
1.091	22.	Sep	6	-.234	10.	Sep	26
1.067	06.	Oct	27	-.183	01.	Oct	4
1.364	05.	Nov	25	-.095	00.	Nov	13
1.214	19.	Dec	17	-.219	23.	Dec	27

Port Erin Extreme Levels to Chart Datum
(Records begin 20 May)

Max	Hr	Mon	Day	Min	Hr	Mon	Day
5.138	23.	May	31	.756	08.	May	21
5.372	23.	Jun	30	.253	07.	Jun	4
5.563	01.	Jul	3	**-.055**	06.	Jul	31
6.233	00.	Aug	30	.135	07.	Aug	1
5.776	00.	Sep	28	-.011	06.	Sep	28
5.815	23.	Oct	26	.157	05.	Oct	26
5.859	23.	Nov	24	.591	18.	Nov	12
5.461	13.	Dec	13	.376	19.	Dec	12

Portpatrick Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
4.245	14.	Jan	23	-.131	19.	Jan	21
4.353	14.	Feb	22	**-.361**	18.	Feb	18
4.187	11.	Mar	18	.080	9.	Mar	24
3.885	12.	Apr	18	-.108	16.	Apr	15
3.817	10.	May	15	.156	7.	May	5
3.903	00.	Jun	2	.164	9.	Jun	6
4.117	02.	Jul	4	-.008	6.	Jul	31
4.560	01.	Aug	31	.116	8.	Aug	2
4.317	02.	Sep	1	.095	5.	Sep	26
4.304	00.	Oct	27	.135	5.	Oct	26
4.380	12.	Nov	25	.445	19.	Nov	12
4.115	17.	Dec	17	.270	19.	Dec	12

Portsmouth Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
4.729	02.	Jan	09	.045	18.	Jan	21
4.660	01.	Feb	21	**-.019**	18.	Feb	20
4.840	01.	Mar	22	.167	17.	Mar	19
4.671	00.	Apr	19	.338	16.	Apr	16
4.509	23.	May	31	.465	5.	May	04
4.722	23.	Jun	30	.653	7.	Jun	05
4.781	14.	Jul	04	.388	5.	Jul	31
5.230	00.	Aug	30	.267	6.	Aug	01
4.942	12.	Sep	27	.426	5.	Sep	28
5.058	10.	Oct	25	.649	5.	Oct	13
5.063	01.	Nov	26	.825	4.	Nov	24
4.402	06.	Dec	03	1.721	15.	Dec	07

St.Helier Extreme Levels to Chart Datum
(Records begin 26 November)

Max	Hr	Mon	Day	Min	Hr	Mon	Day
10.483	08.	Nov	27	1.815	02.	Nov	27
10.762	08.	Dec	12	**1.340**	14.	Dec	12

Sheerness Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
6.046	13.	Jan	20	.100	9.	Jan	23
6.087	16.	Feb	23	-.203	10.	Feb	22
6.024	15.	Mar	22	-.259	8.	Mar	20
6.143	11.	Apr	15	.045	6.	Apr	17
5.673	12.	May	16	.366	19.	May	03
5.831	03.	Jun	05	.494	22.	Jun	05
6.075	01.	Jul	02	.162	20.	Jul	31
6.282	01.	Aug	29	**-.299**	21.	Aug	30
6.101	01.	Sep	28	.191	20.	Sep	28
6.381	00.	Oct	26	.040	20.	Oct	27
6.108	14.	Nov	13	.072	7.	Nov	25
6.052	14.	Dec	12	.288	14.	Dec	18

Stornoway Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
5.348	09.	Jan	23	.120	14.	Jan	21
5.397	08.	Feb	20	**-.083**	14.	Feb	19
5.224	08.	Mar	20	.233	13.	Mar	18
4.939	10	Apr	17	.244	12.	Apr	16
4.688	18.	May	15	.534	13.	May	02
4.833	20.	Jun	02	.534	4.	Jun	05
5.311	20.	Jul	31	.173	2.	Jul	31
5.551	20.	Aug	30	.254	2.	Aug	30
5.304	19.	Sep	27	.105	1.	Sep	27
5.259	07.	Oct	27	.377	1.	Oct	26
5.435	07.	Nov	25	.775	2.	Nov	13
4.976	10.	Dec	14	.755	15.	Dec	12

Tobermory Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
5.025	08.	Jan	23	.282	01.	Jan	21
5.081	07.	Feb	20	**.021**	00.	Feb	19
4.984	07.	Mar	20	.237	00.	Mar	19
4.642	18.	Apr	17	.295	23.	Apr	15
4.569	05.	May	15	.580	23.	May	15
4.554	19.	Jun	02	.588	14.	Jun	04
5.020	19.	Jul	31	.329	13.	Jul	31
5.317	19.	Aug	30	.448	14.	Aug	01
5.057	18.	Sep	27	.272	13.	Sep	28
5.013	06.	Oct	27	.376	00.	Oct	26
5.252	06.	Nov	25	.767	01.	Nov	13
4.229	15.	Dec	06	1.272	22.	Dec	07

Ullapool Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
5.708	09.	Jan	23	.181	14.	Jan	21
5.759	08.	Feb	20	**-.050**	14.	Feb	19
5.622	08.	Mar	20	.231	14.	Mar	19
5.342	19.	Apr	17	.317	13.	Apr	16
5.113	18.	May	15	.589	13.	May	02
5.160	20.	Jun	02	.568	04.	Jun	05
5.656	20.	Jul	31	.191	02.	Jul	31
5.851	20.	Aug	30	.289	02.	Aug	30
5.649	19.	Sep	27	.157	01.	Sep	27
5.713	07.	Oct	27	.397	01.	Oct	26
5.840	07.	Nov	25	.965	02.	Nov	13
5.420	10.	Dec	14	.834	15.	Dec	12

Weymouth Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
2.367	09.	Jan	23	-.428	16.	Jan	21
2.346	08.	Feb	20	**-.464**	16.	Feb	19
2.340	08.	Mar	20	-.237	15.	Mar	19
2.228	09.	Apr	07	-.070	15.	Apr	17
2.131	18.	May	31	.033	12.	May	03
2.312	19.	Jun	30	.184	05.	Jun	04
2.472	20.	Jul	31	-.072	03.	Jul	31
2.847	08.	Aug	30	-.127	04.	Aug	01
2.596	20.	Sep	27	.027	02.	Sep	26
2.566	06.	Oct	25	.160	00.	Oct	13
2.552	19.	Nov	24	.300	02.	Nov	24
2.346	08.	Dec	12	.138	01.	Dec	27

Whitby Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
5.684	14.	Jan	01	.097	23.	Jan	21
5.857	17.	Feb	20	.037	23.	Feb	19
5.948	17.	Mar	20	**-.054**	23.	Mar	19
5.809	17.	Apr	18	.437	22.	Apr	16
5.463	03.	May	16	.779	22.	May	16
5.572	05.	Jun	03	.835	12.	Jun	04
5.804	06.	Jul	04	.265	11.	Jul	31
6.197	05.	Aug	30	.232	12.	Aug	01
5.861	05.	Sep	28	.283	10.	Sep	27
5.746	03.	Oct	26	.544	10.	Oct	26
5.794	16.	Nov	25	.769	09.	Nov	23
5.668	04.	Dec	11	.740	00.	Dec	27

Wick Extreme Levels to Chart Datum

Max	Hr	Mon	Day	Min	Hr	Mon	Day
3.800	14.	Jan	23	-.042	18.	Jan	21
3.972	14.	Feb	22	**-.162**	17.	Feb	18
3.811	12.	Mar	20	.122	18.	Mar	19
3.627	12.	Apr	18	.160	16.	Apr	16
3.437	10.	May	15	.394	17.	May	02
3.451	00.	Jun	03	.259	08.	Jun	05
3.593	00.	Jul	31	.061	06.	Jul	31
3.986	00.	Aug	30	.203	07.	Aug	01
3.782	02.	Sep	01	.109	05.	Sep	27
3.813	00.	Oct	28	.342	05.	Oct	26
4.066	11.	Nov	25	.660	19.	Nov	13
3.696	14.	Dec	14	.358	19.	Dec	26

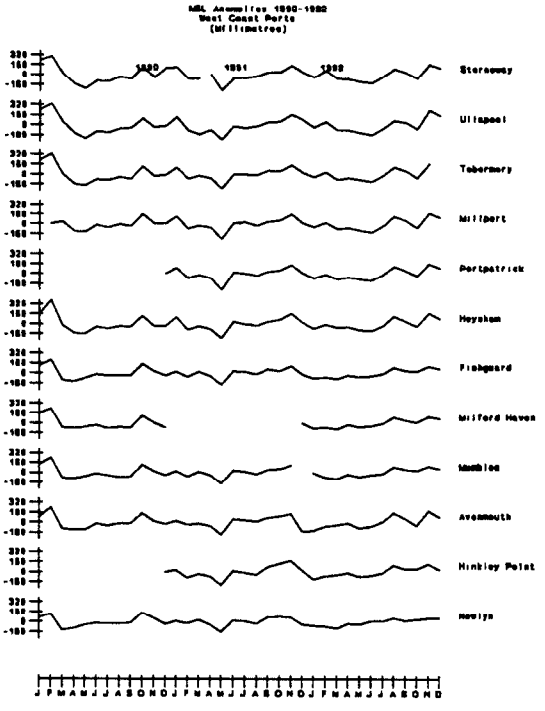
Workington Extreme Levels to Chart Datum
(Records begin 5 February)

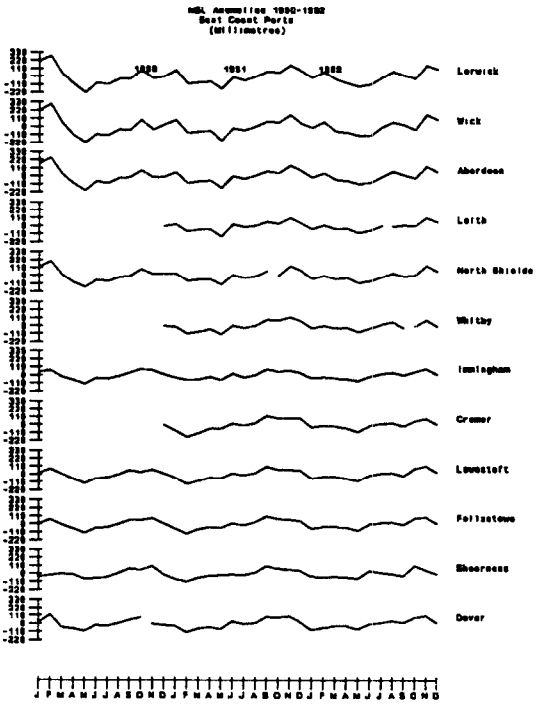
Max	Hr	Mon	Day	Min	Hr	Mon	Day
8.991	13.	Feb	20	**-.129**	18.	Feb	18
8.829	12.	Mar	20	.420	06.	Mar	19
8.463	12.	Apr	18	.475	17.	Apr	16
8.042	00.	May	04	.744	07.	May	05
8.240	12.	Jun	02	.742	08.	Jun	04
8.648	01.	Jul	03	.348	07.	Jul	31
9.414	01.	Aug	31	.399	06.	Aug	29
9.011	00.	Sep	28	.282	06.	Sep	27
8.927	12.	Oct	27	.605	05.	Oct	26
8.769	12.	Nov	25	1.093	07.	Nov	13
8.327	14.	Dec	14	.963	19.	Dec	12

3.2 Mean Sea Level Values

Monthly values to Chart Datum calculated using the Doodson x0 filter are presented for 1992 with suffixes denoting missing days in each month. In accordance with the rules of the Permanent Service for Mean Sea Level (PSMSL), publishers of figures worldwide and based at POL, no monthly mean value is given where the number of days missing exceeds 15 in any one month. Similarly no annual mean value is given where the number of days missing exceeds one month.

Plots of relative anomalies (monthly-annual) ordered geographically are shown below for the three years 1990 to 1992 for ports where sufficient modernised data has been collated.





MEAN SEA LEVEL VALUES TO CHART DATUM
millimetres

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
ABERDEEN	2514	2577	2493	2477	2425	2442	2522	2609	2552	2512	2673	2594	2532
AVONMOUTH	6782 07	6857	6871	6902	6825	6847	6928	7066	6978	6863 07	7102 13	6998 10	6913
BARMOUTH	2535	2617 03	2551	2595	2529	30	2621 05	31	2691 13	2604	2757	2682	
CROMER	2770	2793	2789	2764	2711	2793	2820	2829	2785	2862	2896	2813	2802
DEVONPORT	3315	3319	3301	3360	3331	3388	3387	3442	3396	3417	3464	3446	3380
DOVER	3627	3659	3679	3678	3633	3712	3724	3757	3723	3800	3819	3722	3711
FELIXSTOWE	1983	2011	2009	1997	1961	2045	2062	2073	2034	2123	2140	2058	2041
FISHGUARD	2562	2585	2552	2615	2579	2603	2634	2737	2683	2670	2754	2717	2641
HEYSHAM	5045	5116	5065	5079	5030	5010	5096	5248	5174	5084	5305	5207	5121
HINKLEY	6074	6127	6141	6176	6109	6130	6174	6298	6237	6237	6318	6222	6187
ILFRACOMBE	4767	4785	4743	4795	4755	4768 05	4814 03	4921	4899 05	4954	5022 02	4972 01	4849
IMMINGHAM	4125	4146	4124	4120	4091	4155	4189	4212	4169	4218	4261	4182	4166

MEAN SEA LEVEL VALUES TO CHART DATUM
millimetres

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
KINLOCHBERVIE	2748 08	2946	2788	2782	2751	2714	2824	2943	2911	2786	3056	2982	2854
LEITH	3120	3170	3119	3126	3071	3106	3163	31	3174	3164	3282	3218	3157
LERWICK	1268	1343	1245	1198	1150	1177	1263	1357	1297	1255	1447	1390	1282
LIVERPOOL	5090	5166	5162	5187	5130	5127	5175	5270 08	5183 09	5194	5371	5263	5192
LOWESTOFT	1545	1570	1570	1548	1510	1593	1618	1627	1584	1684	1722	1631	1600
MILFORD HAVEN	3681	3703	3669	3740	3705	3725	3759	3863	3809	3782	3873	3841	3763
MILLPORT	1933	2006 02	1911	1928	1884	1851	1958	2107	2040	1931	2159	2089	1983
MUMBLES	31	5108	5092	5157	5123	5151	5171	5287	5240	5226	5294	5251	5185
NEWHAVEN	3408 12	3516	3532	3553	3507	3575	3591	31	3620	3695 10	3702	3624	
NEWLYN	3068	3061	3034	3103	3093	3147 02	3146	3197	3155	3172	3200	3196	3131
NORTH SHIELDS	2883	2926	2878	2898	2821	2854	2908	2959	2917	2930	3061	2986	2918
PORT ELLEN	354	423	323	358	320 02	288	386	519	458	359	571	501	405

MEAN SEA LEVEL VALUES TO CHART DATUM
millimetres

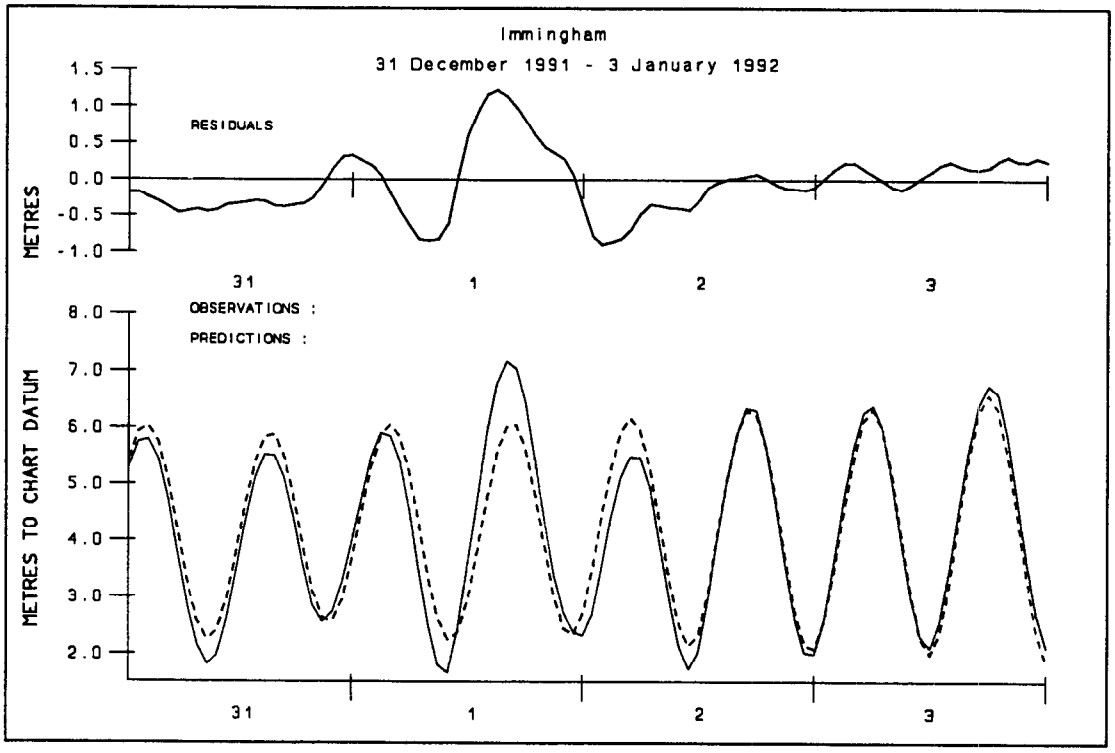
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
PORT ERIN						2815	2894	3019	2959	2892	3066	2993	
	31	29	31	30	31							03	
PORTPATRICK	2057	2117	2047	2083	2045	2026	2114	2249	2185	2095	2291	2227	2128
PORTSMOUTH	2673		2734	2769	2726	2792	2806	2889	2839	2863	2911		
	13	29										31	
SHEERNESS	2938	2934	2939	2928	2914	3021	2997	2971	2951	3090	3026	2977	2974
STORNOWAY	2811	2923	2788	2787	2747	2732	2838	2957	2898	2803	3034	2964	2856
	05											02	
TOBERMORY	2657	2742	2625	2648	2617	2584	2690	2821	2766	2645	2876		2703
												31	
ULLAPOOL	3043	3138	2999	2995	2963	2927	3036	3159	3121	3016	3320	3237	3079
WEYMOUTH	998	1018	1016	1062	1025	1091	1100	1185	1133	1158	1201	1158	1096
WHITBY	3261	3298	3267	3275	3211	3265	3316	3350	3260	3288	3374	3290	3288
WICK	2005	2087	1962	1943	1898	1896	2015	2087	2050	1976	2197	2121	2018
							04	05					
WORKINGTON		4493	4420	4457	4413	4396	4475	4611	4533	4421	4657	4576	
	31	05											

4. Storm Surge Residuals

On the following pages, monthly plots of the differences between observed and predicted levels are presented for each of the west and east coasts and the south-west approaches with the English Channel ports for all ports where relevant data are available. West coast ports include Kinlochbervie in the north to Fishguard in the south including Scottish islands. The south-west approaches and English Channel include ports from Milford Haven in the west to Dover in the east. The remaining east coast port plots cover Lerwick in the north to Sheerness. Plots for each coast are displayed in monthly order.

The larger anomalies of 1 metre or more above or below predicted levels, during 1992 were:-

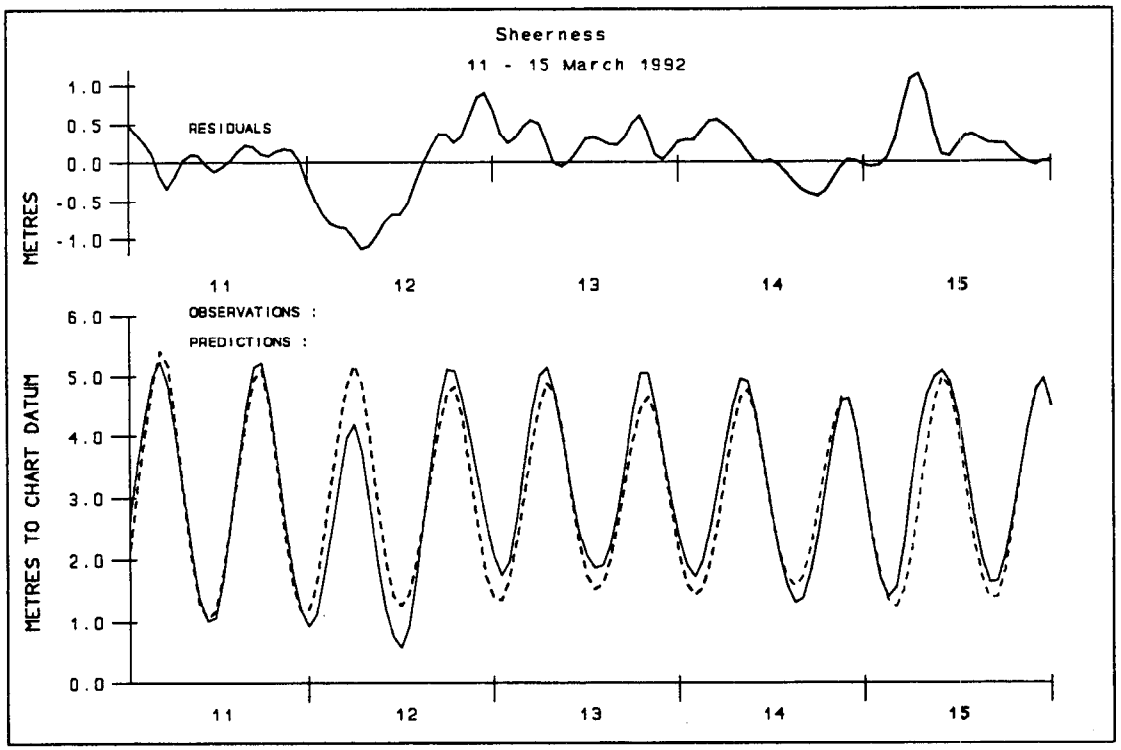
January 1/2
Maximum positive surge of 1.228m at Immingham on 1st, followed by a negative minimum of -1.008m at Sheerness on 2nd. All east coast records affected.



February 22-27
Minima of -1.036m at Sheerness on 22nd, -1.018m at Cromer on 24th, -1.00m at Sheerness on 27th.

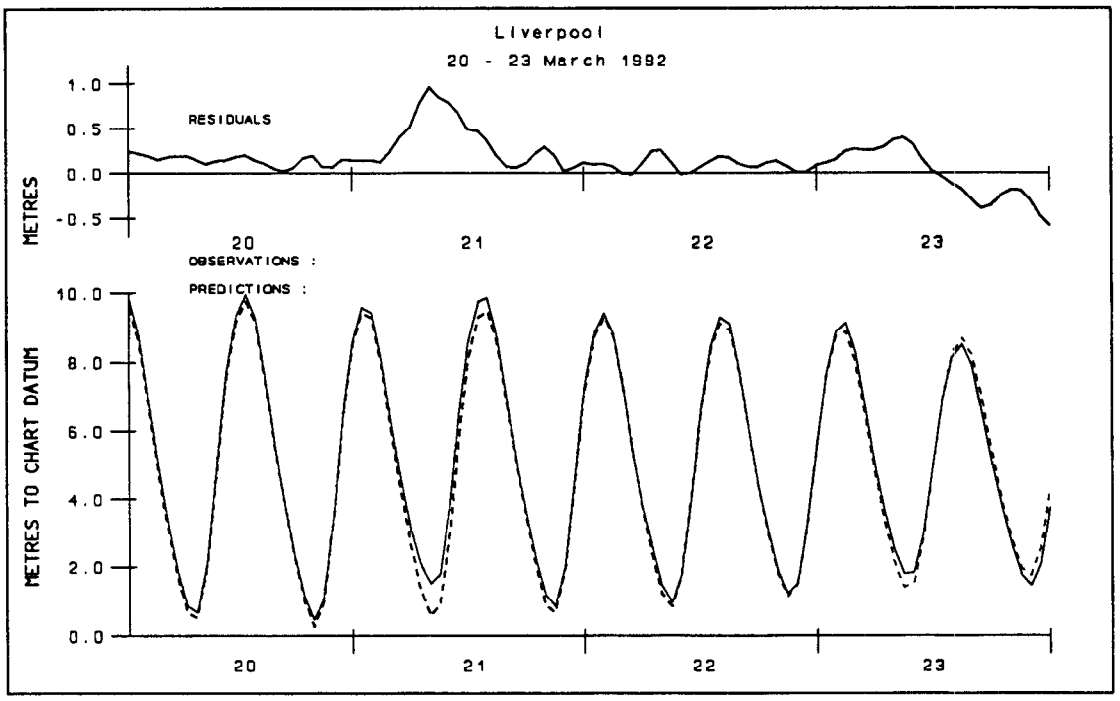
Lesser positive and negative recordings at all sites bar Lerwick in the Shetlands as a large complex depression with many secondary centres and fronts tracked very slowly across the north-east. Storm force winds in the north-west were reported on the morning of the 27th. with gusts up to 76kts. in the Outer Hebrides.

March 12
-1.127 at Sheerness

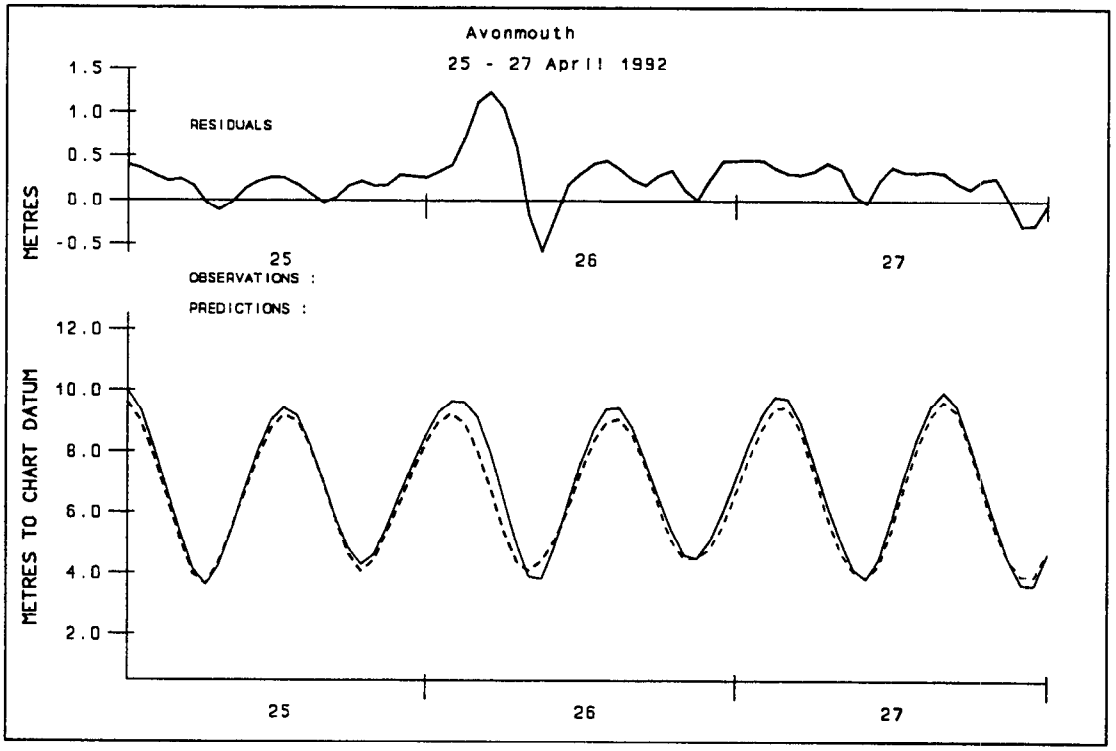


March 15
1.140m at Sheerness
Over a metre at Cromer and Lowestoft.

March 21
1.032m at Liverpool.

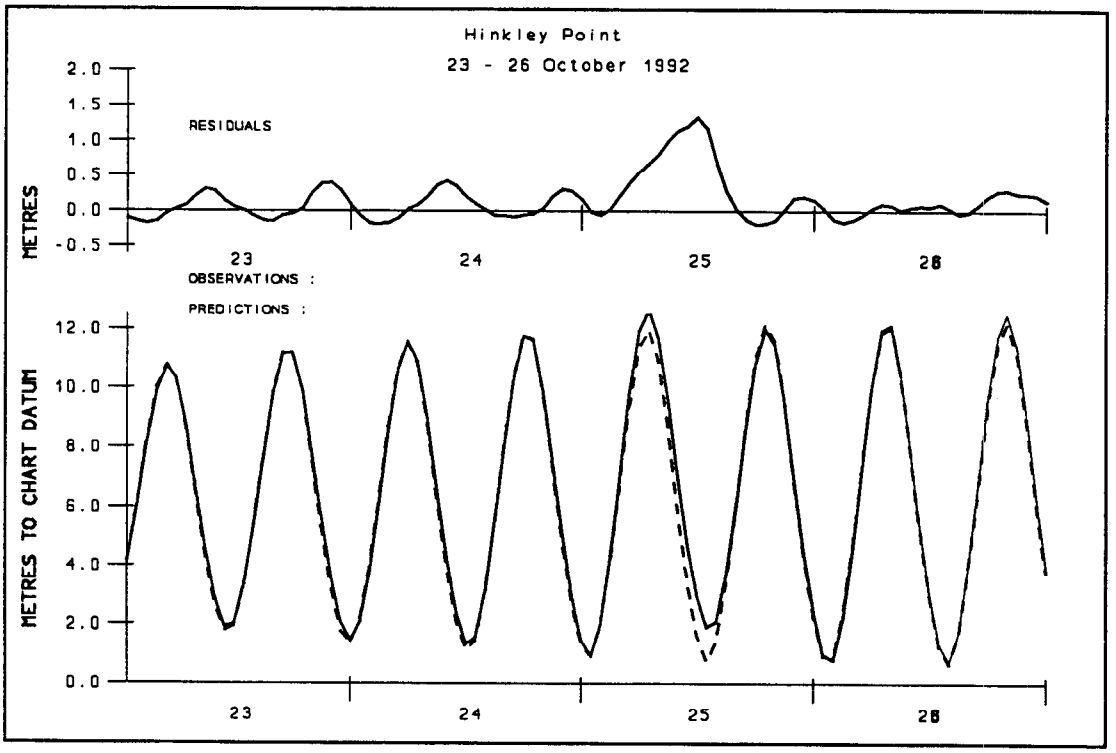


April 26
1.211m at Hinkley Point.
1.113m at Avonmouth, over a metre at Barmouth.

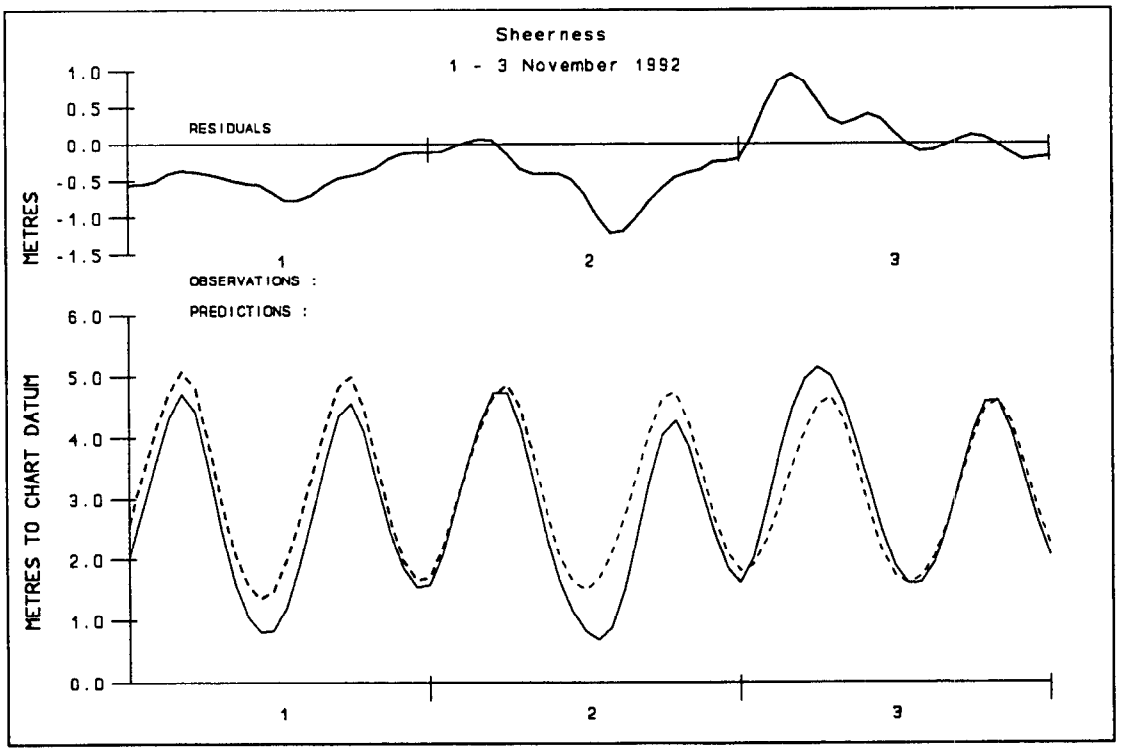


August 30
1.300m at Hinkley Point.

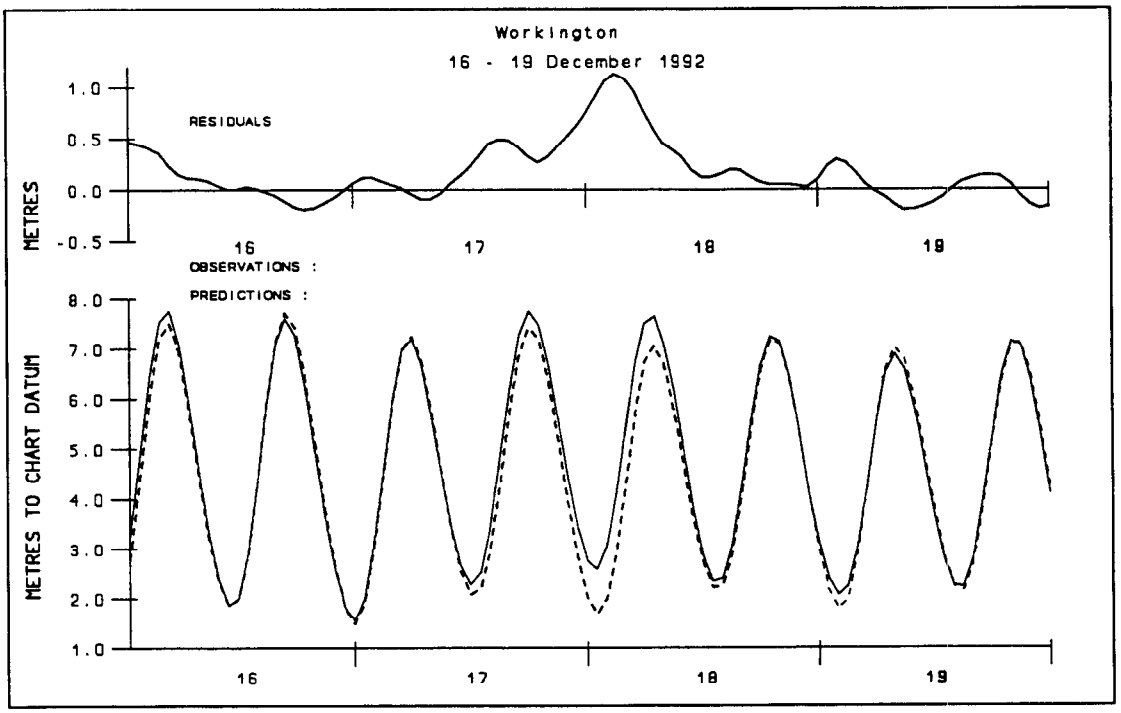
October 25
1.597m at Hinkley Point.
Over a metre at Mumbles,Avonmouth and Barmouth.

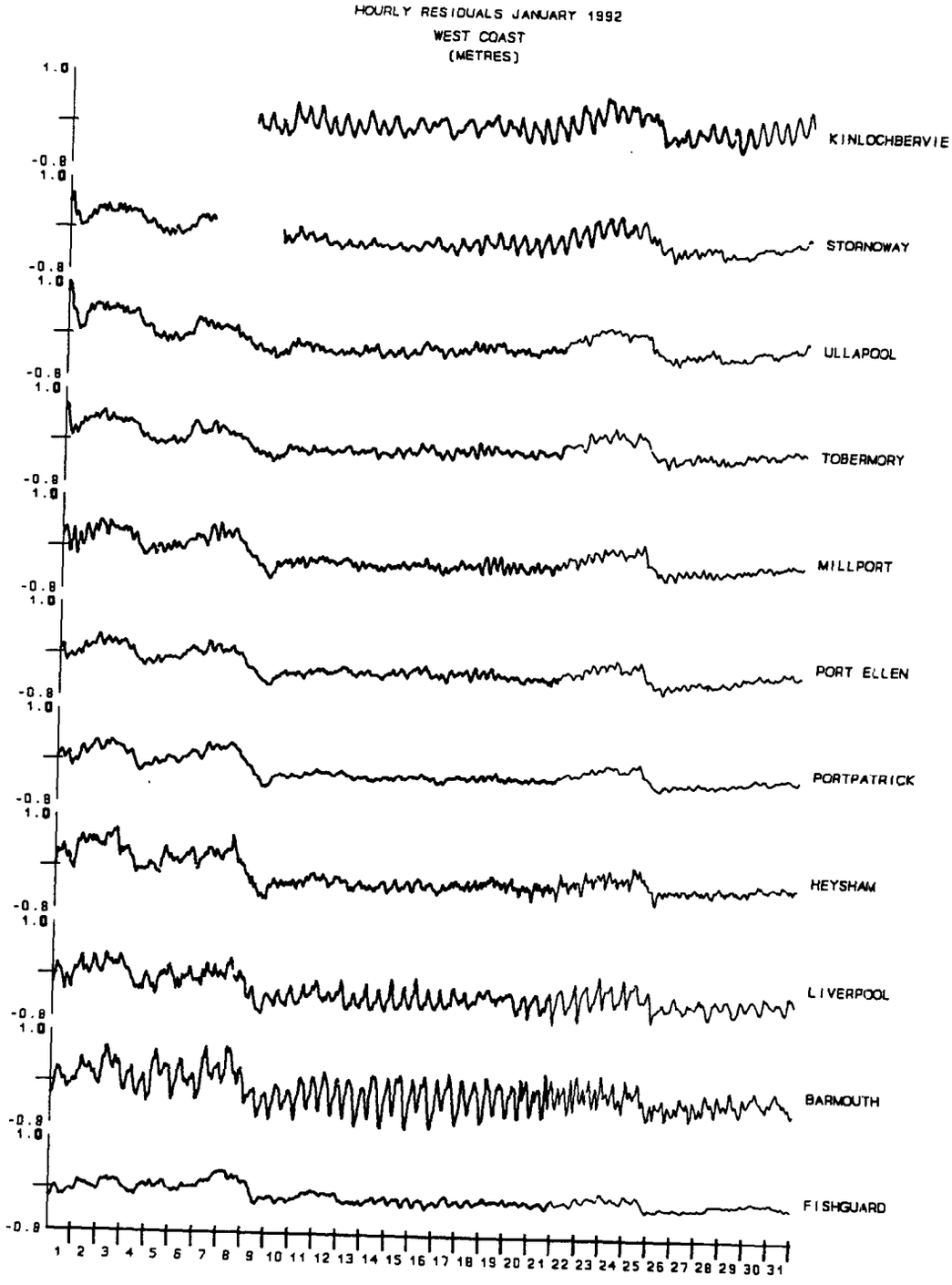


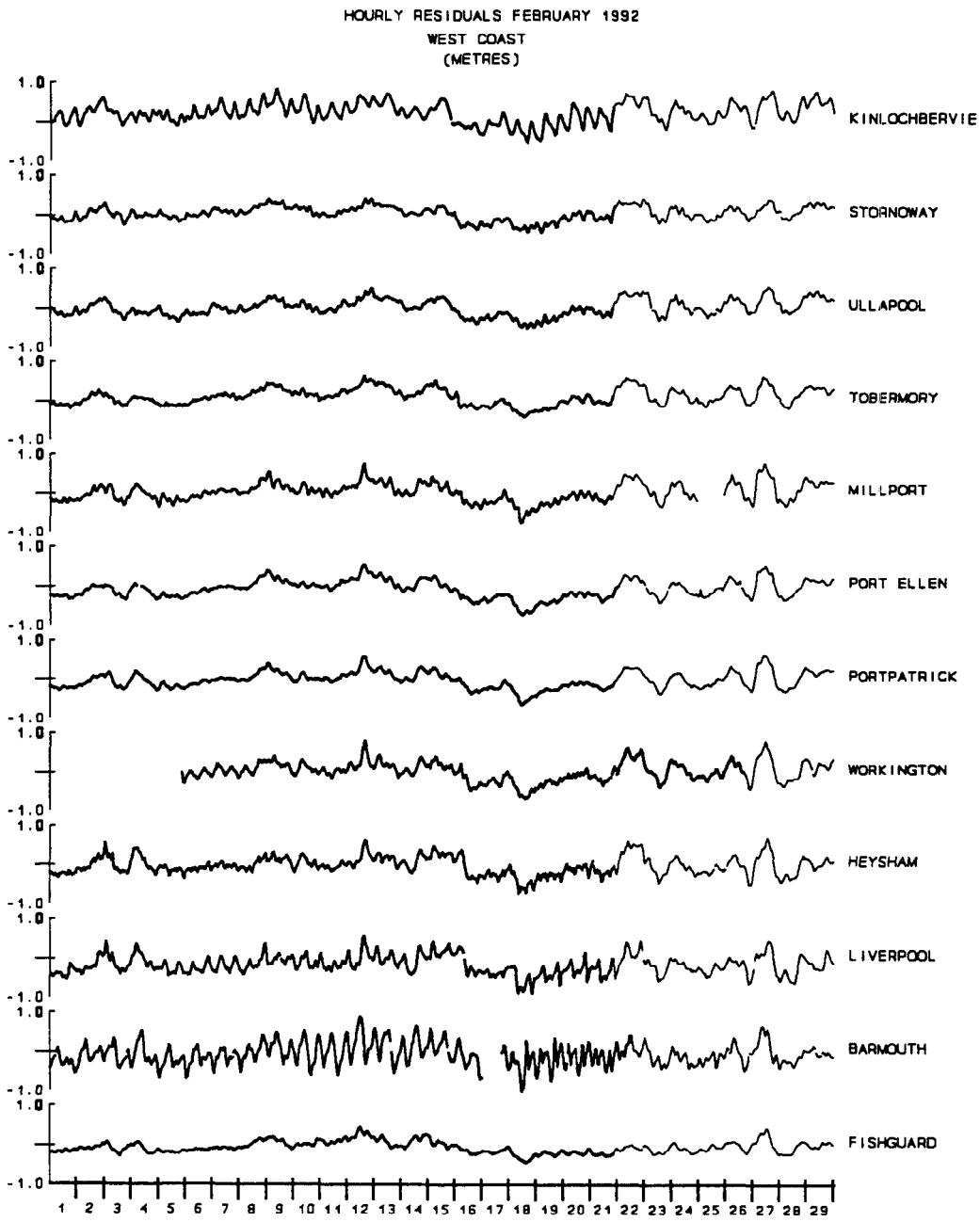
November 2
-1.221m at Sheerness.

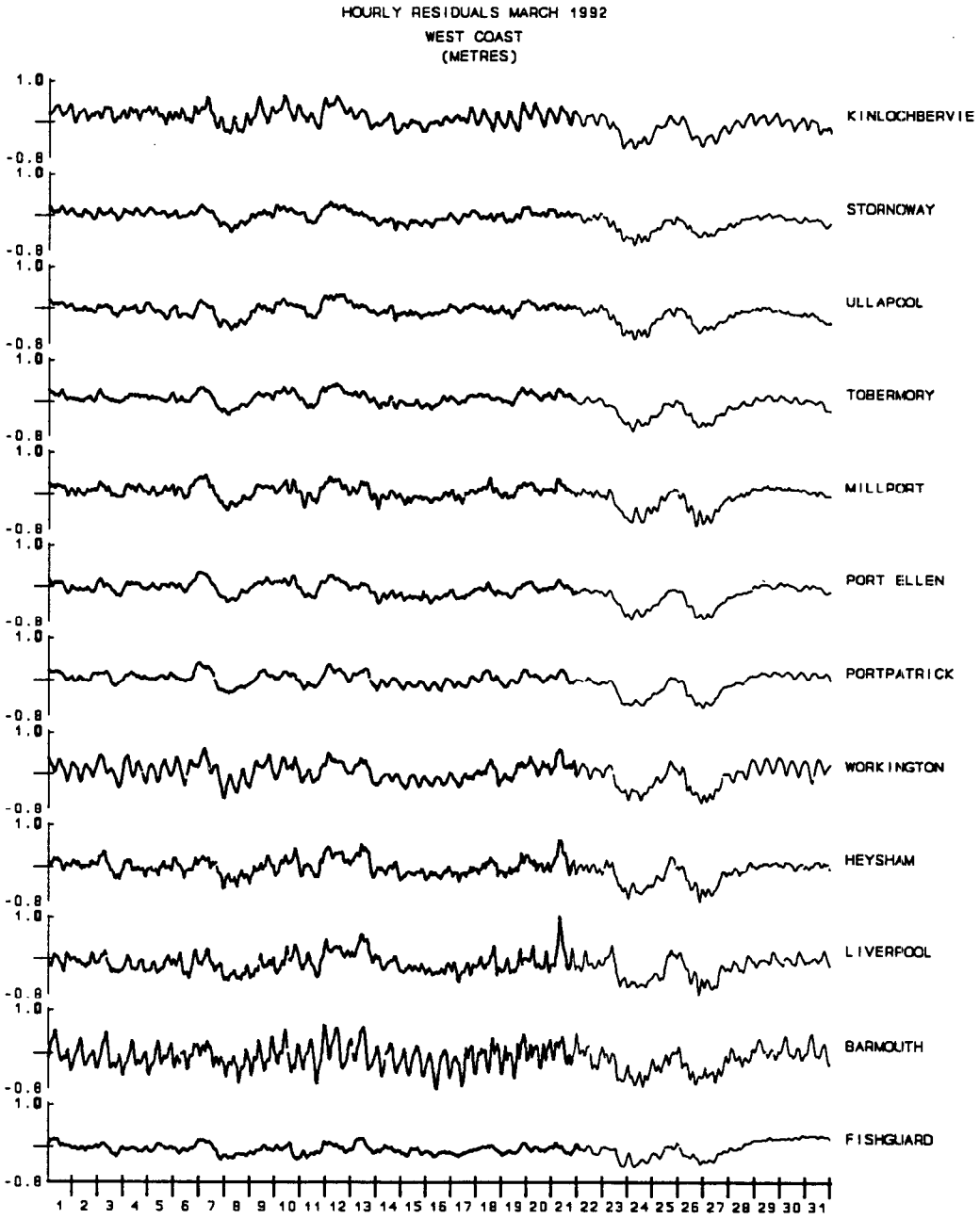


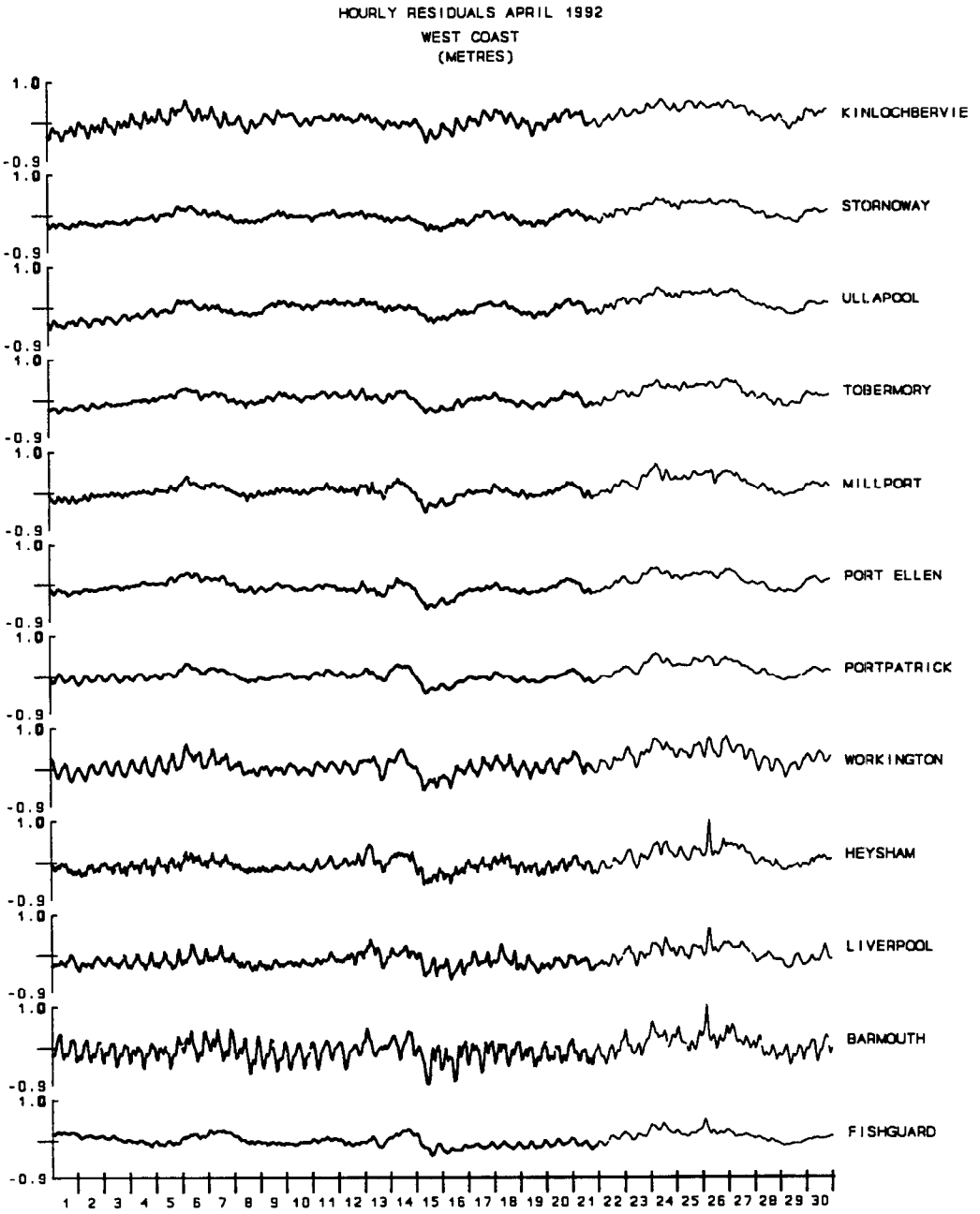
December 18-19
Negative surge of -1.109m pm 18th, followed by positive surge of 1.174m am 19th at Sheerness.
1.13m at Workington on the west coast in the early hours of 18th and over a metre at Millport and Barmouth. Positive surges of over a metre at Cromer and Immingham on the east coast late pm the same day.

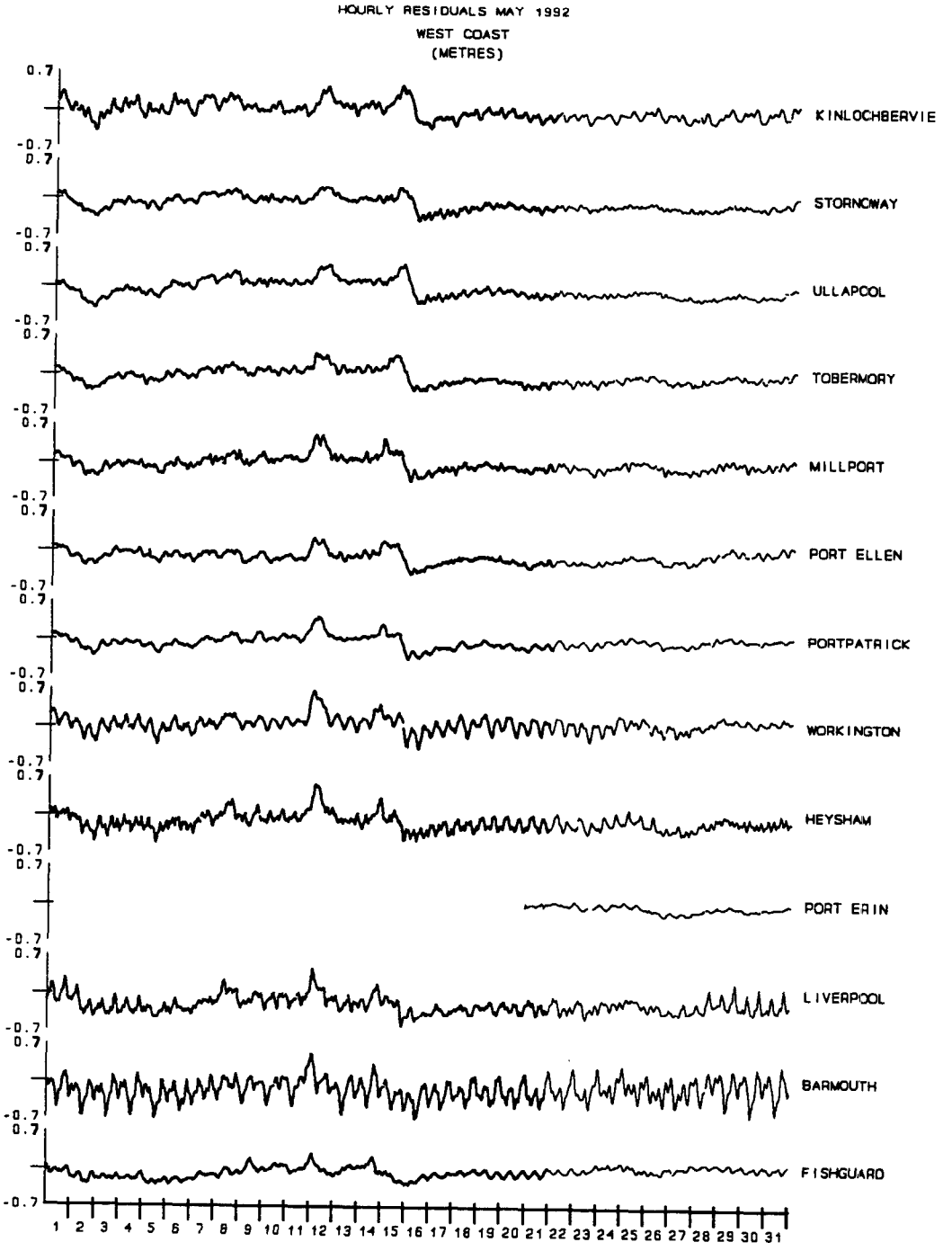


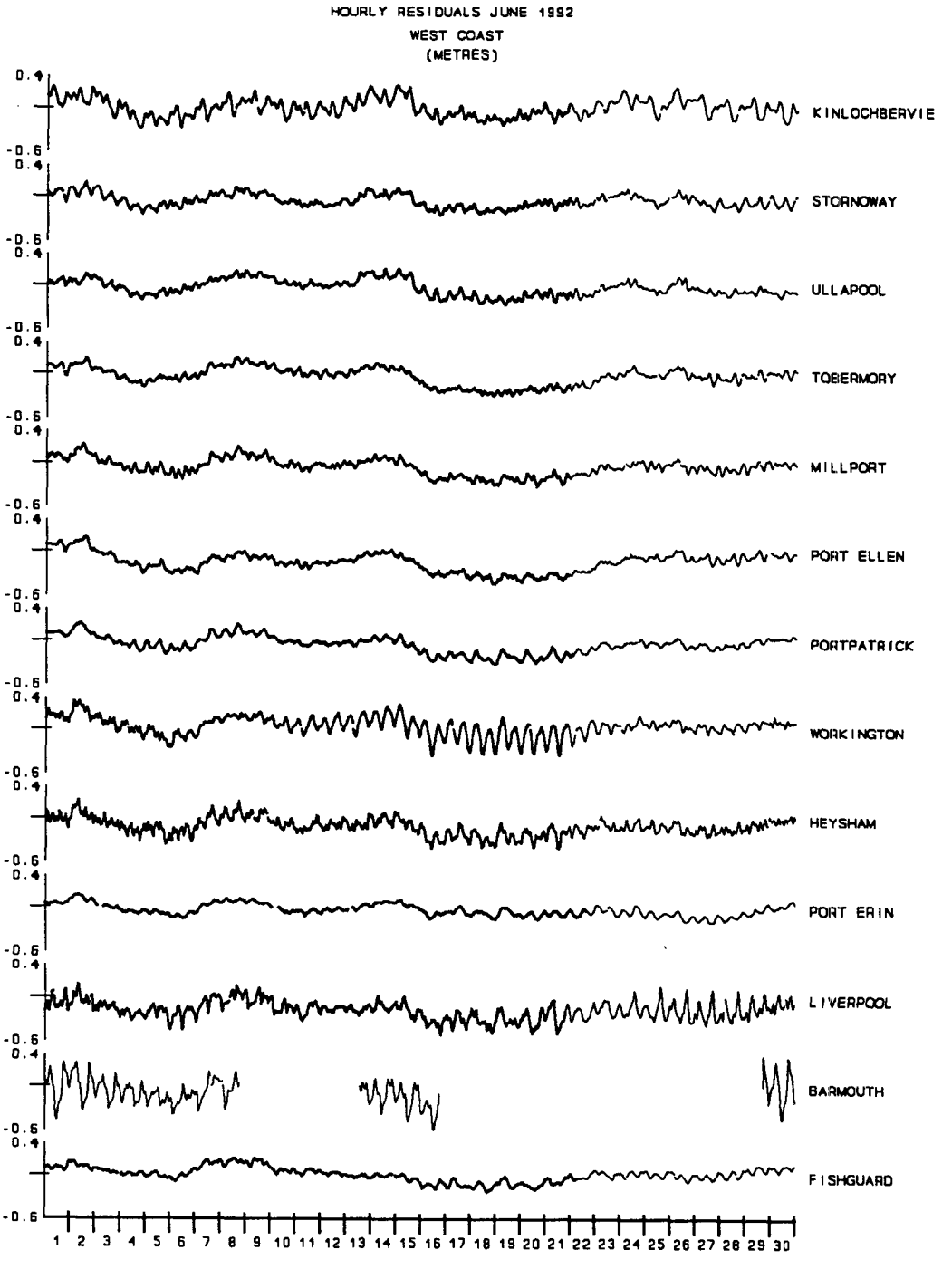

HOURLY RESIDUALS JANUARY 1992
WEST COAST
(METRES)
1.0
-0.8
KINLOCHBERVIE
STORNOWAY
ULLAPOOL
TOBERMORY
MILLPORT
PORT ELLEN
PORTPATRICK
HEYSHAM
LIVERPOOL
BARMOUTH
FISHGUARD
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

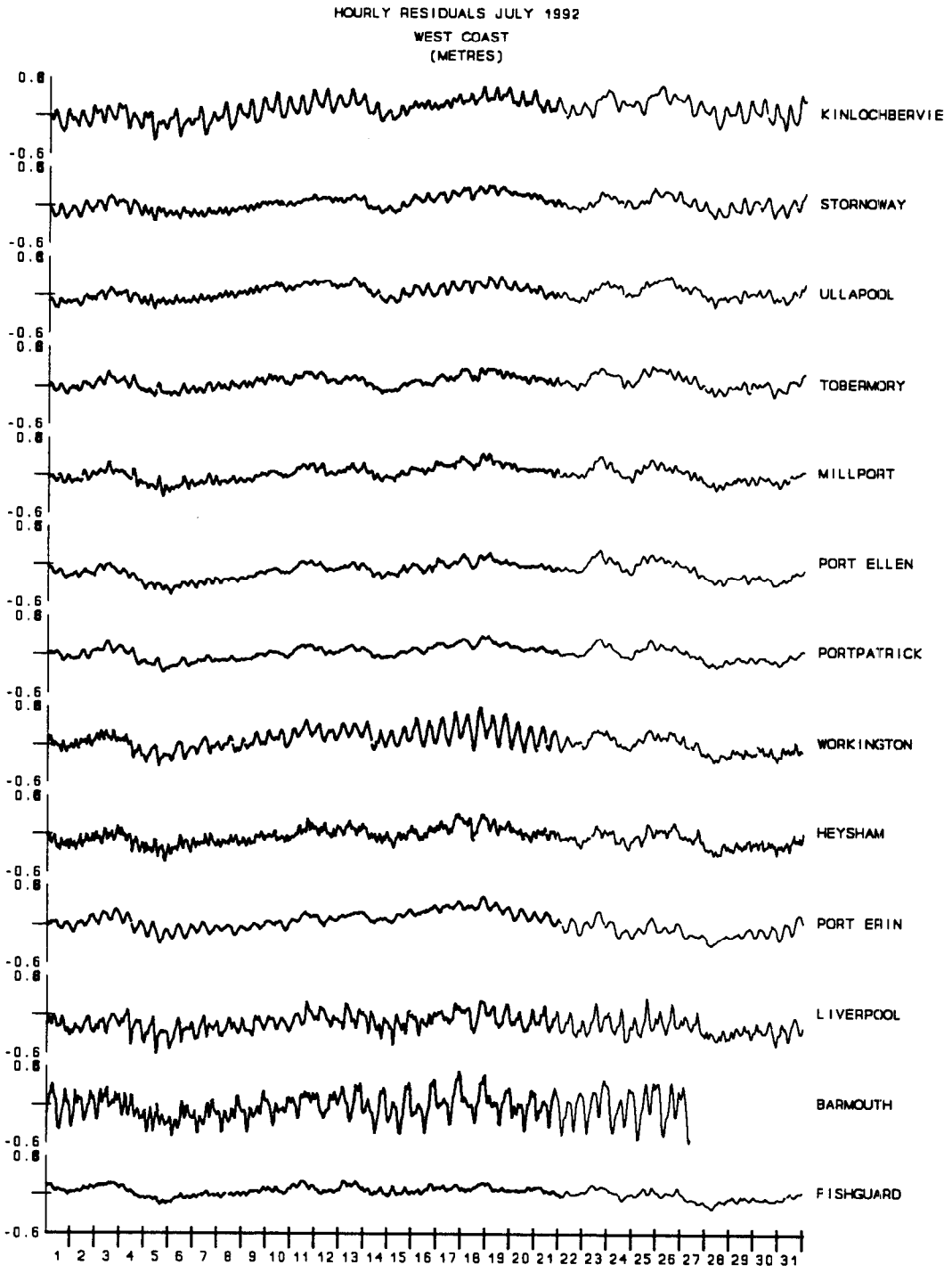

HOURLY RESIDUALS FEBRUARY 1992
WEST COAST
(METRES)
1.0
-1.0
KINLOCHBERVIE
STORNOWAY
ULLAPOOL
TOBERMORY
MILLPORT
PORT ELLEN
PORTPATRICK
WORKINGTON
HEYSHAM
LIVERPOOL
BARMOUTH
FISHGUARD
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

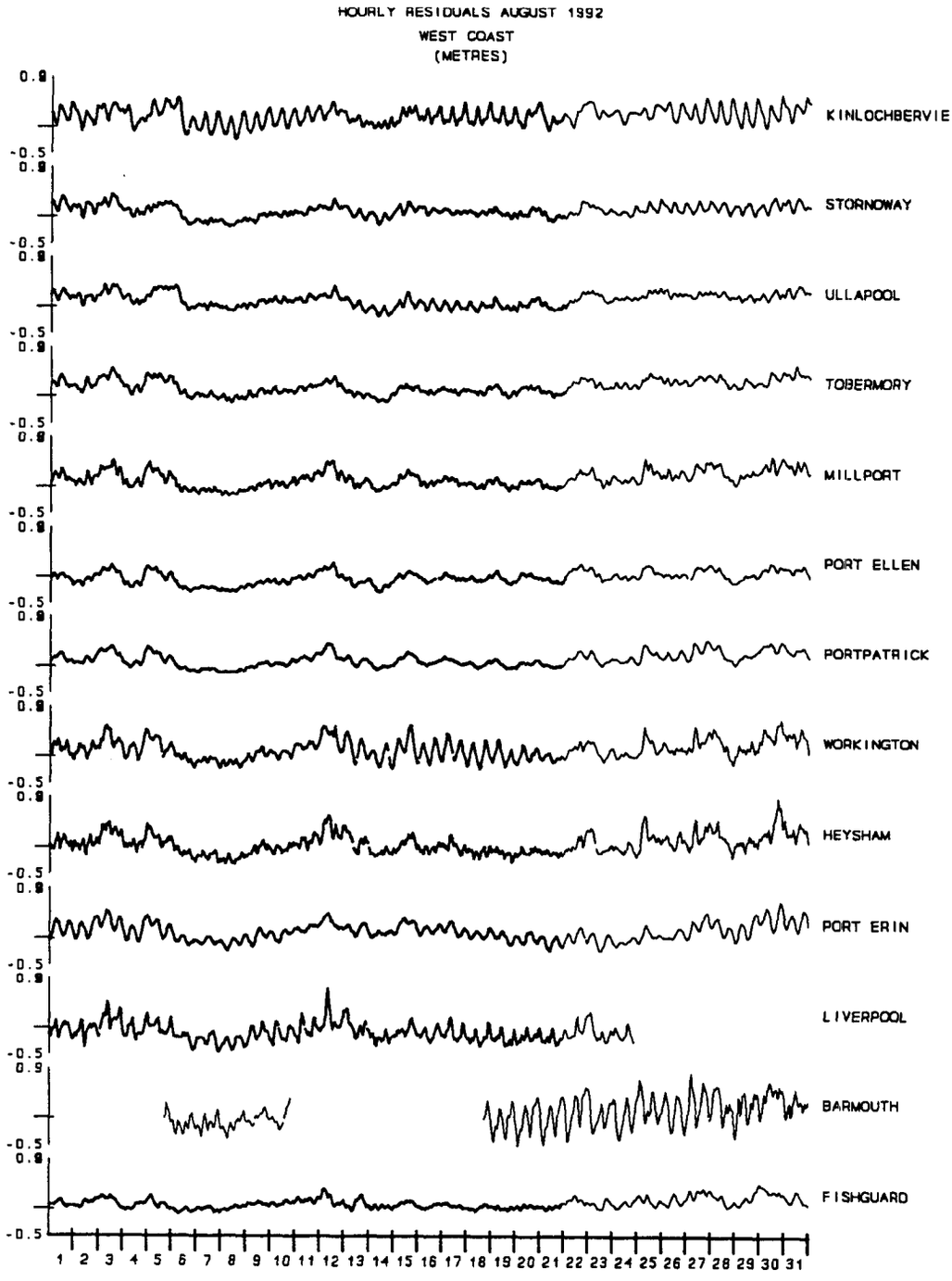

HOURLY RESIDUALS MARCH 1992
WEST COAST
(METRES)
1.0
-0.8
KINLOCHBERVIE
STORNOWAY
ULLAPOOL
TOBERMORY
MILLPORT
PORT ELLEN
PORTPATRICK
WORKINGTON
HEYSHAM
LIVERPOOL
BARMOUTH
FISHGUARD
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

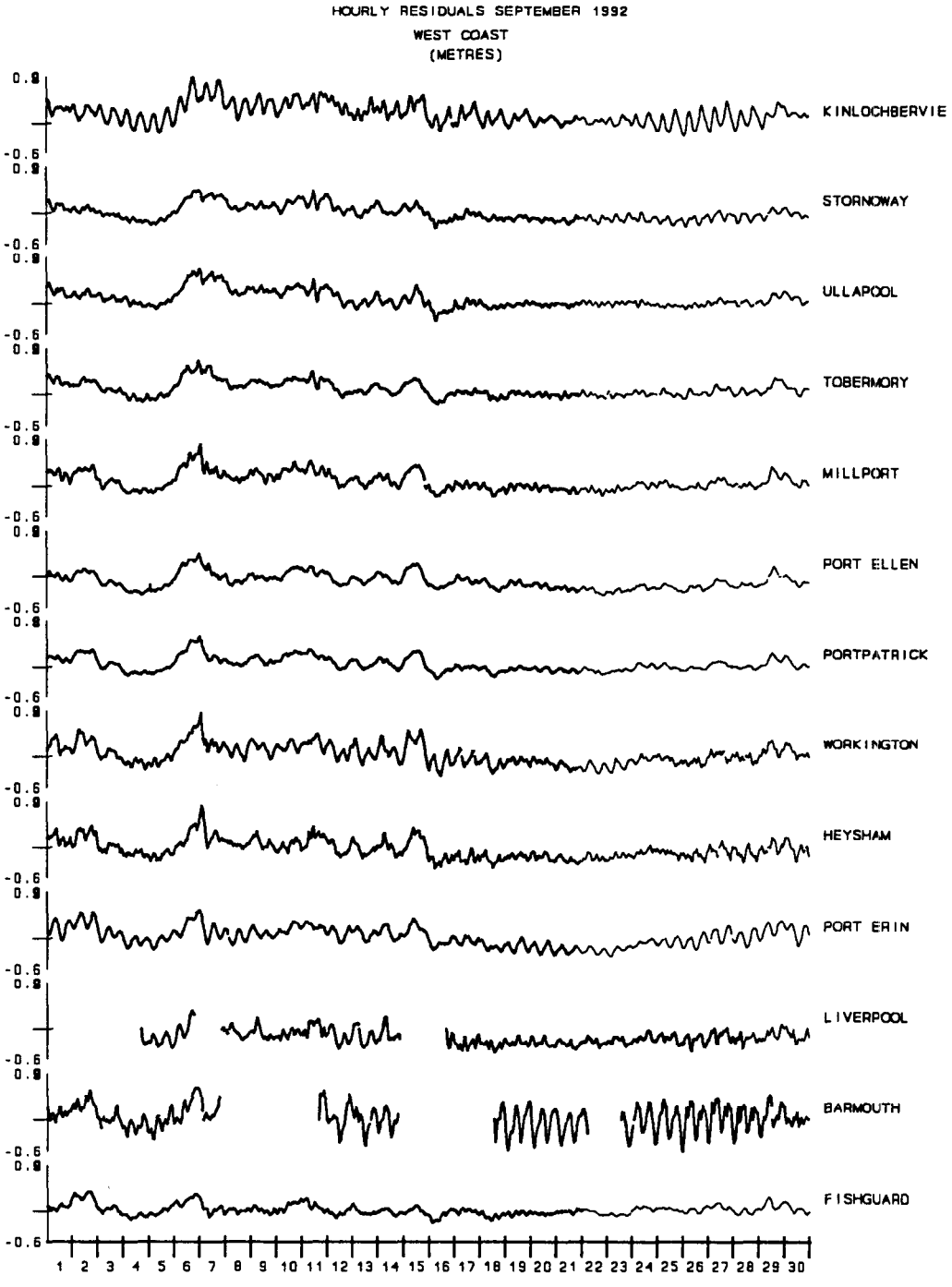

HOURLY RESIDUALS APRIL 1992
WEST COAST
(METRES)
1.0
-0.9
KINLOCHBERVIE
STORNOWAY
ULLAPOOL
TOBERMORY
MILLPORT
PORT ELLEN
PORTPATRICK
WORKINGTON
HEYSHAM
LIVERPOOL
BARMOUTH
FISHGUARD
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

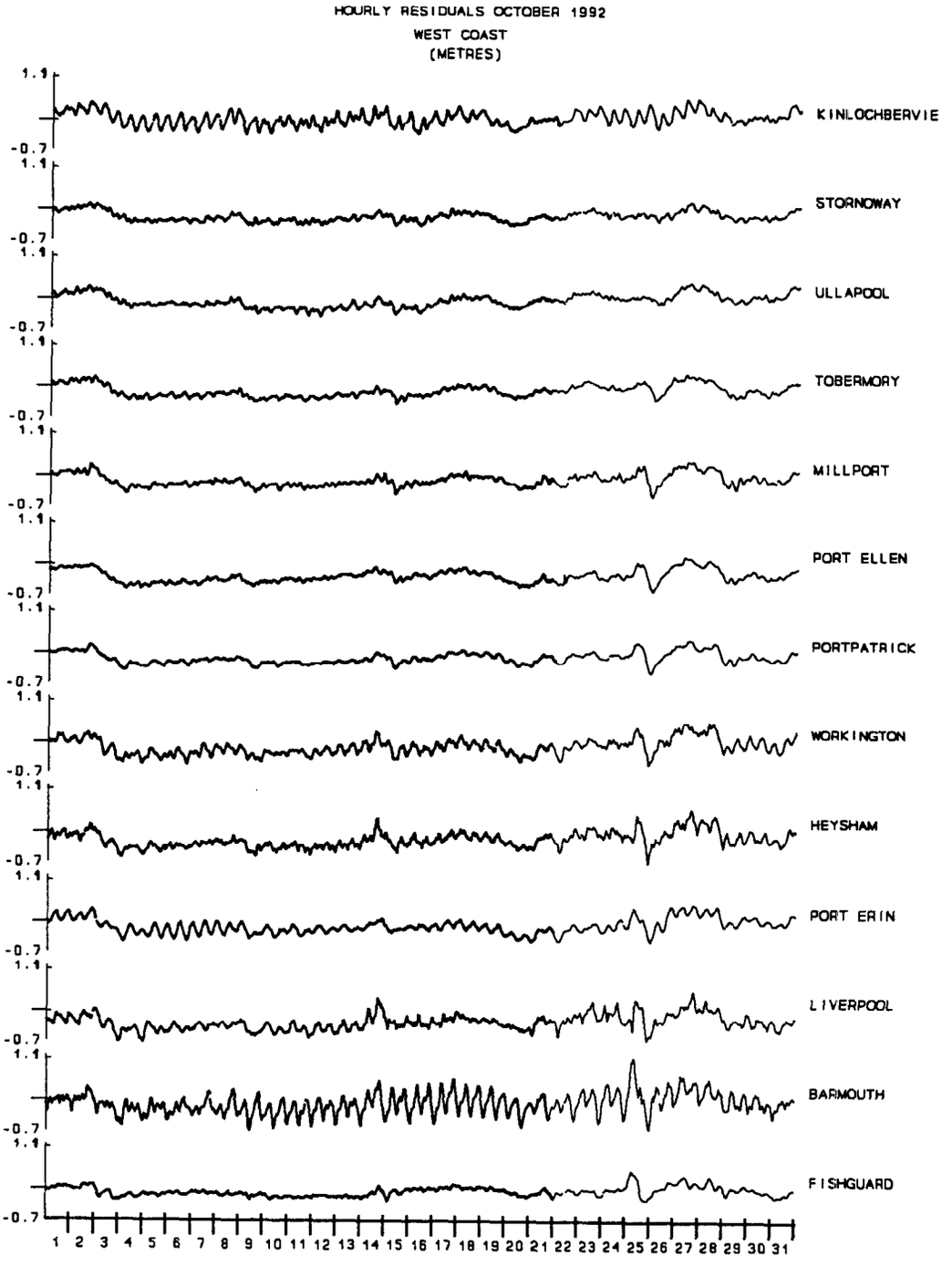

HOURLY RESIDUALS MAY 1992
WEST COAST
(METRES)
0.7
-0.7
KINLOCHBERVIE
STORNOWAY
ULLAPOOL
TOBERMORY
MILLPORT
PORT ELLEN
PORTPATRICK
WORKINGTON
HEYSHAM
PORT ERIN
LIVERPOOL
BARMOUTH
FISHGUARD
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

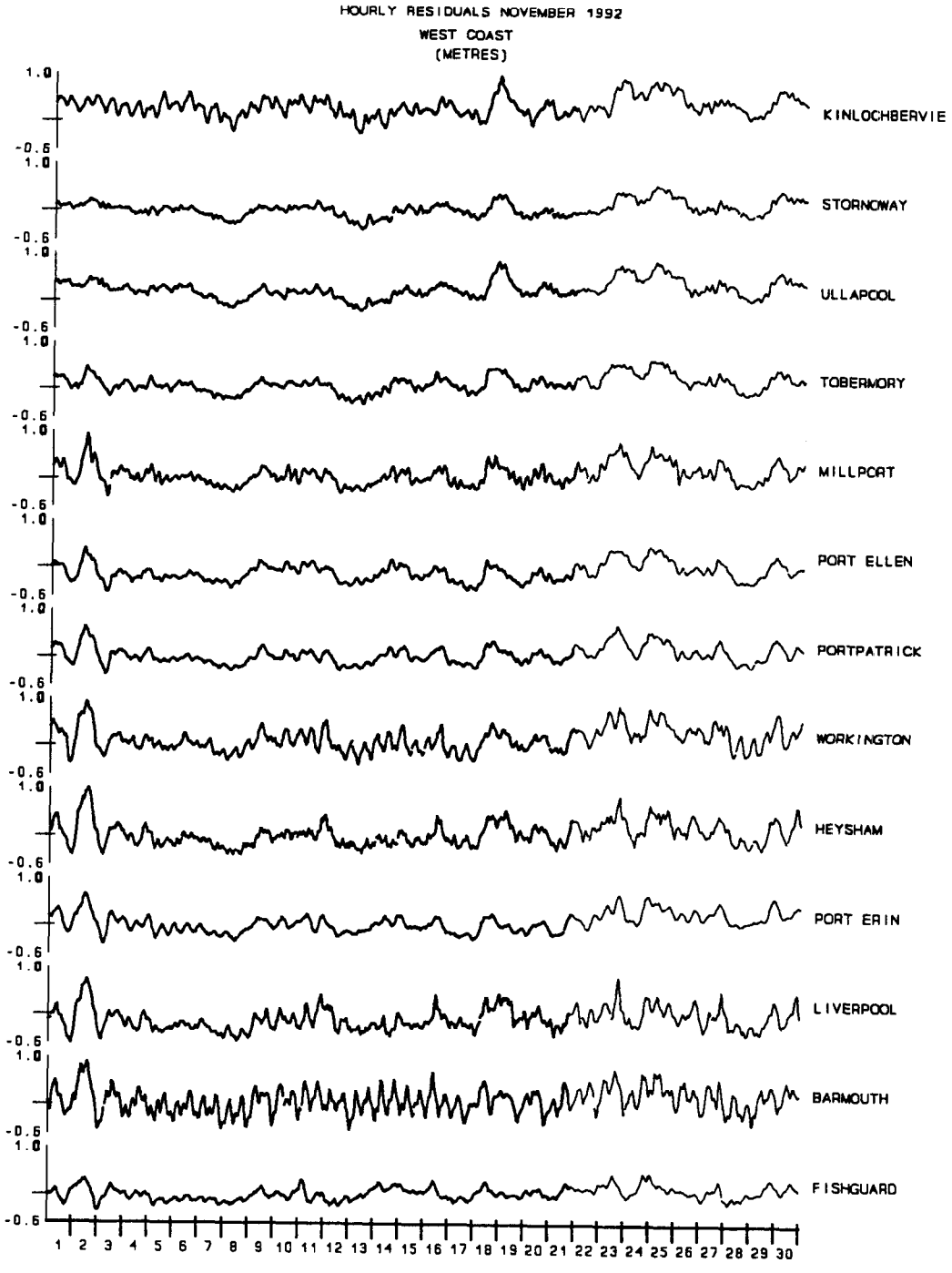

HOURLY RESIDUALS JUNE 1992
WEST COAST
(METRES)
0.4
-0.6
KINLOCHBERVIE
STORNOWAY
ULLAPOOL
TOBERMORY
MILLPORT
PORT ELLEN
PORTPATRICK
WORKINGTON
HEYSHAM
PORT ERIN
LIVERPOOL
BARMOUTH
FISHGUARD
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

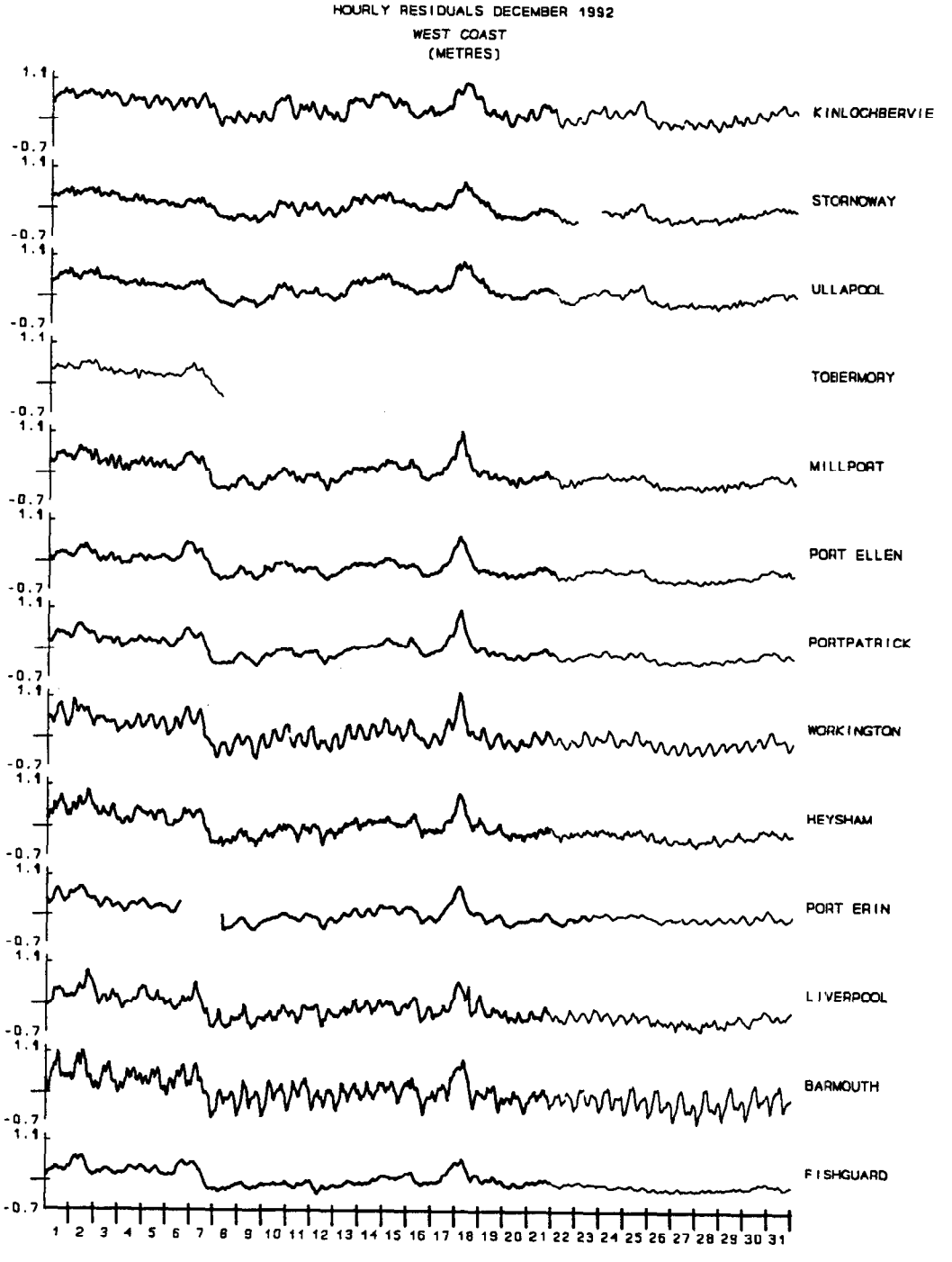

HOURLY RESIDUALS JULY 1992
WEST COAST
(METRES)
0.6
-0.6
KINLOCHBERVIE
STORNOWAY
ULLAPOOL
TOBERMORY
MILLPORT
PORT ELLEN
PORTPATRICK
WORKINGTON
HEYSHAM
PORT ERIN
LIVERPOOL
BARMOUTH
FISHGUARD
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

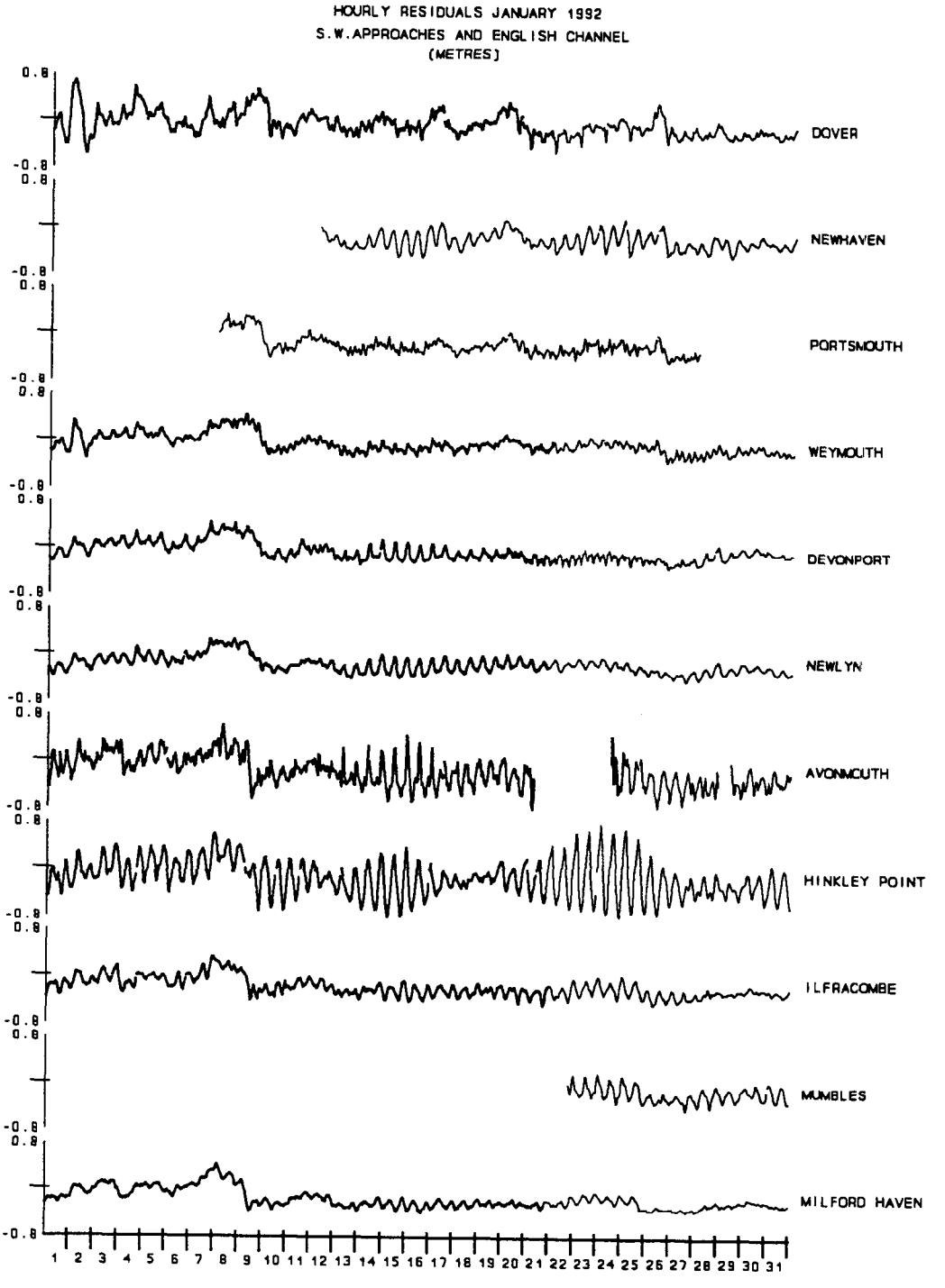

HOURLY RESIDUALS AUGUST 1992
WEST COAST
(METRES)
KINLOCHBERVIE
STORNOWAY
ULLAPOOL
TOBERMORY
MILLPORT
PORT ELLEN
PORTPATRICK
WORKINGTON
HEYSHAM
PORT ERIN
LIVERPOOL
BARMOUTH
FISHGUARD
0.5
-0.5
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

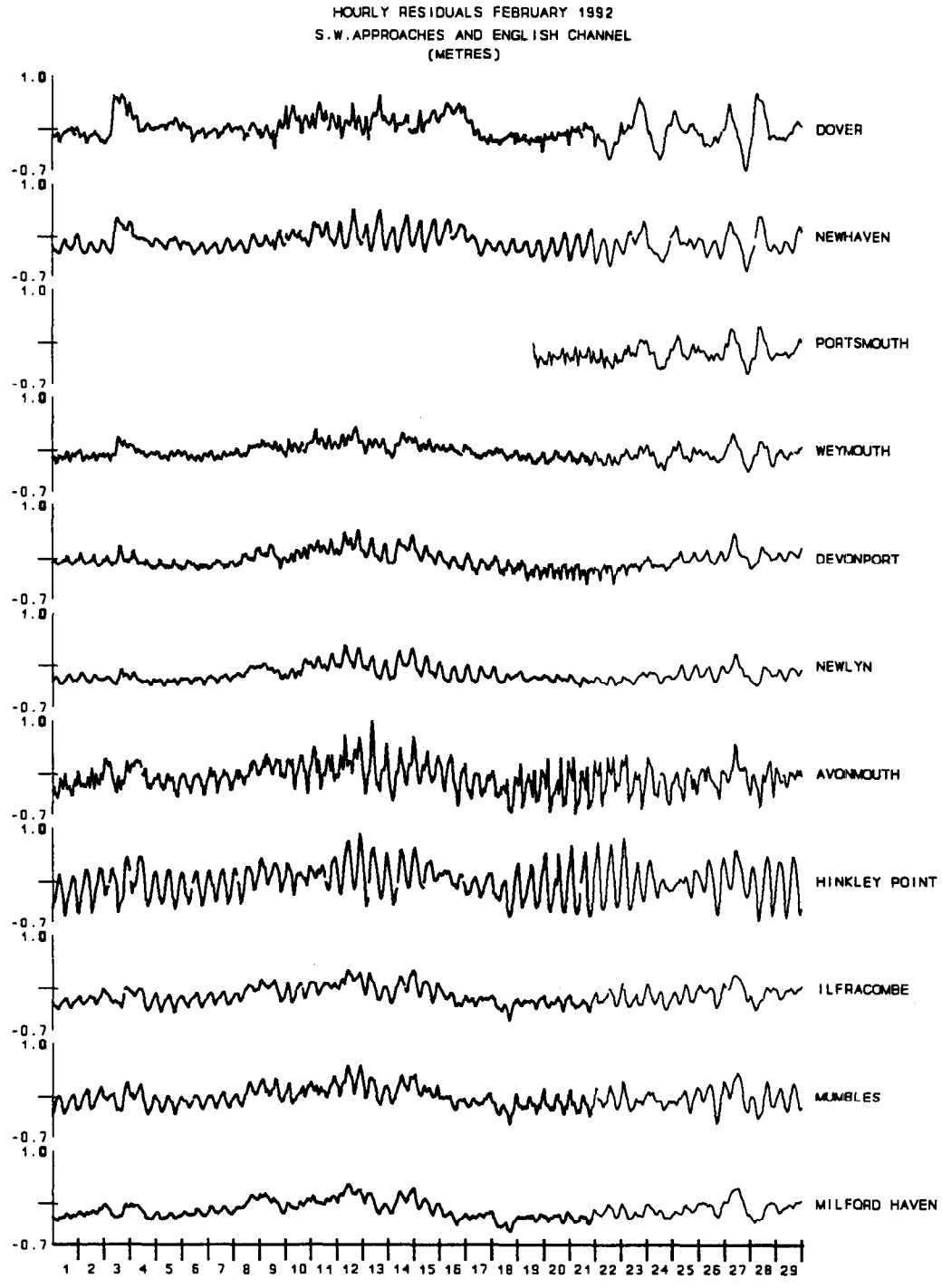

HOURLY RESIDUALS SEPTEMBER 1992
WEST COAST
(METRES)
0.9
-0.6
KINLOCHBERVIE
STORNOWAY
ULLAPOOL
TOBERMORY
MILLPORT
PORT ELLEN
PORTPATRICK
WORKINGTON
HEYSHAM
PORT ERIN
LIVERPOOL
BARMOUTH
FISHGUARD
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

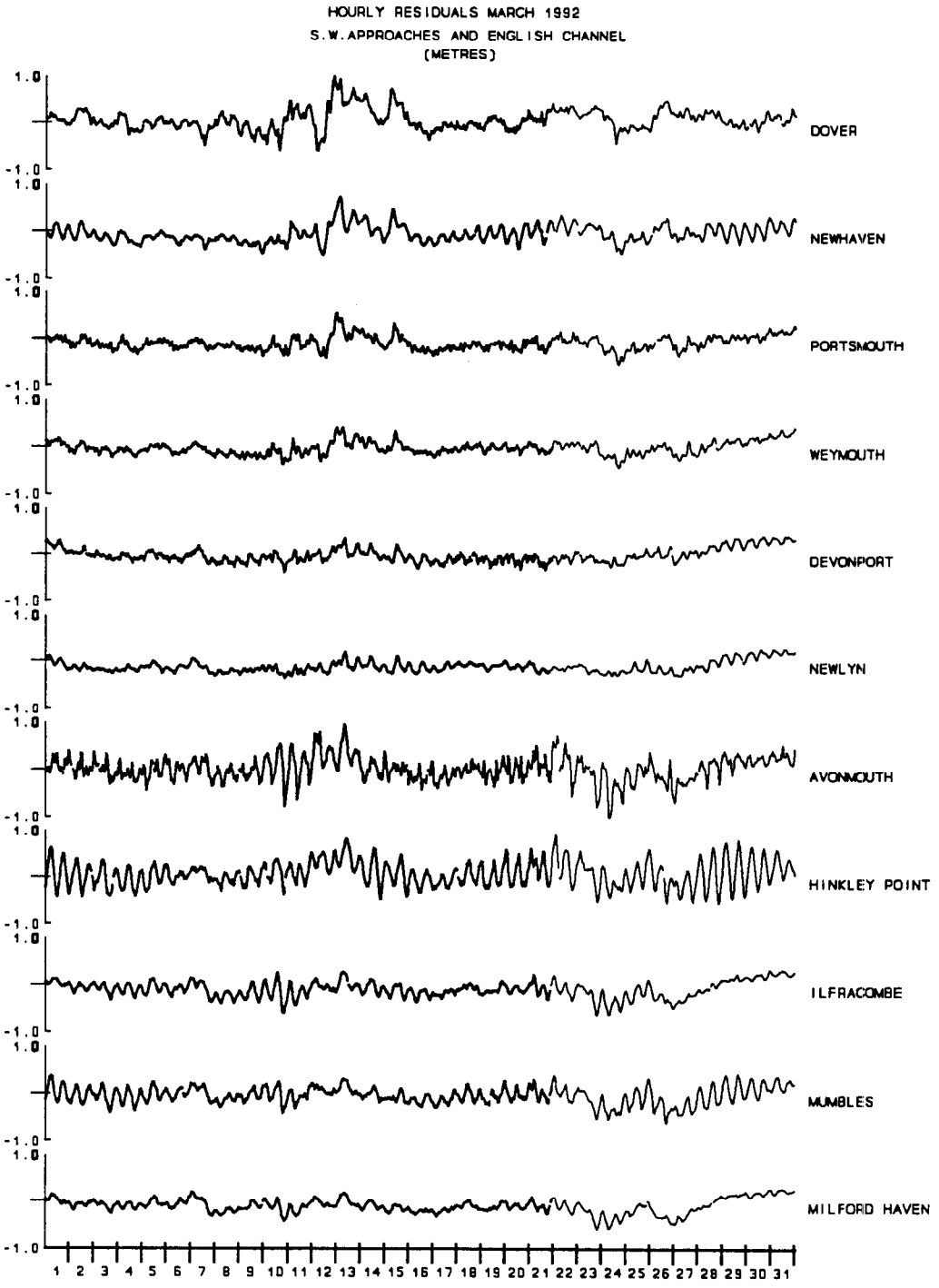

HOURLY RESIDUALS OCTOBER 1992
WEST COAST
(METRES)
1.1
-0.7
KINLOCHBERVIE
STORNOWAY
ULLAPOOL
TOBERMORY
MILLPORT
PORT ELLEN
PORTPATRICK
WORKINGTON
HEYSHAM
PORT ERIN
LIVERPOOL
BARMOUTH
FISHGUARD
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

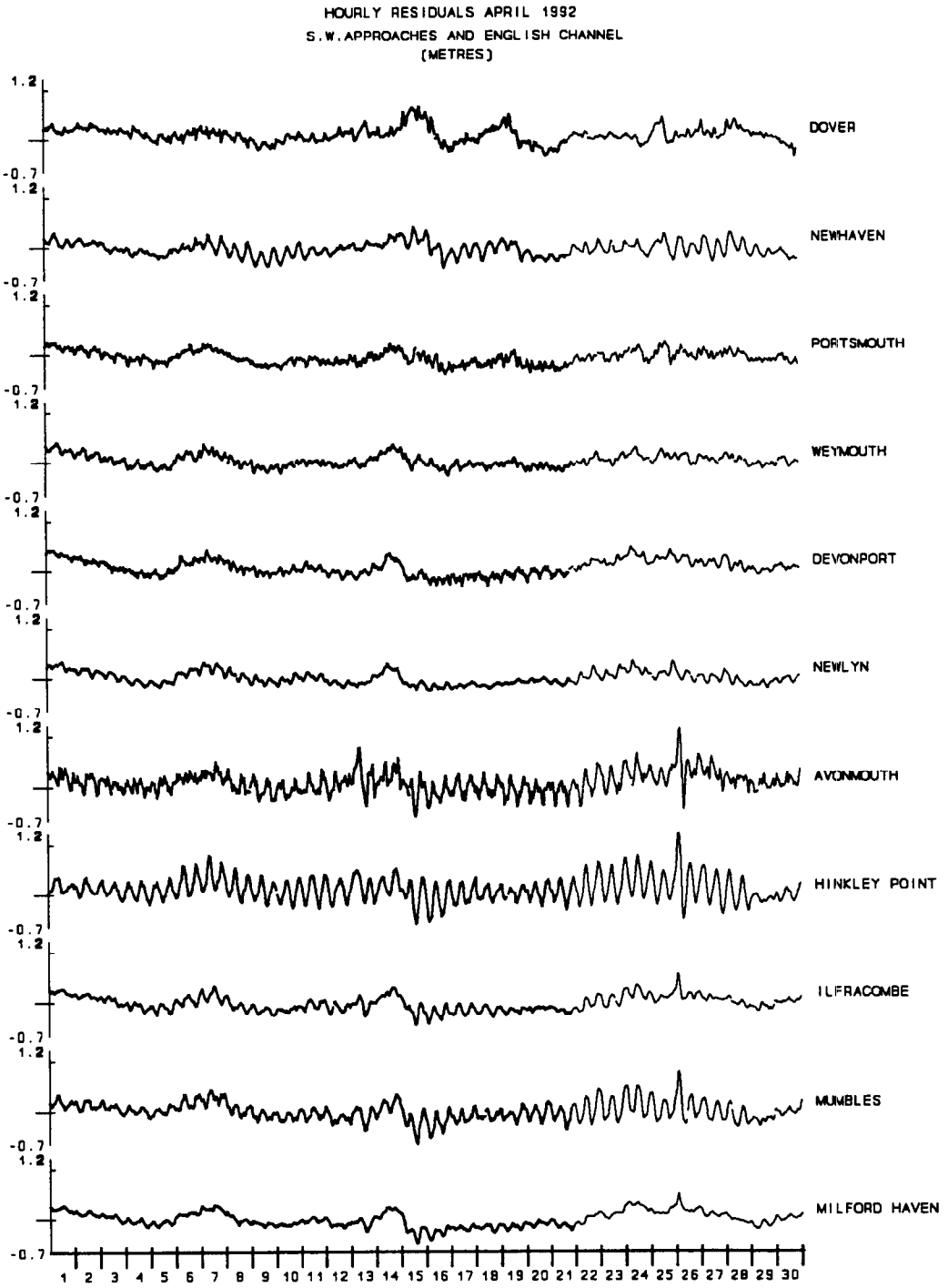

HOURLY RESIDUALS NOVEMBER 1992
WEST COAST
(METRES)
1.0
-0.6
KINLOCHBERVIE
STORNOWAY
ULLAPOOL
TOBERMORY
MILLPORT
PORT ELLEN
PORTPATRICK
WORKINGTON
HEYSHAM
PORT ERIN
LIVERPOOL
BARMOUTH
FISHGUARD
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

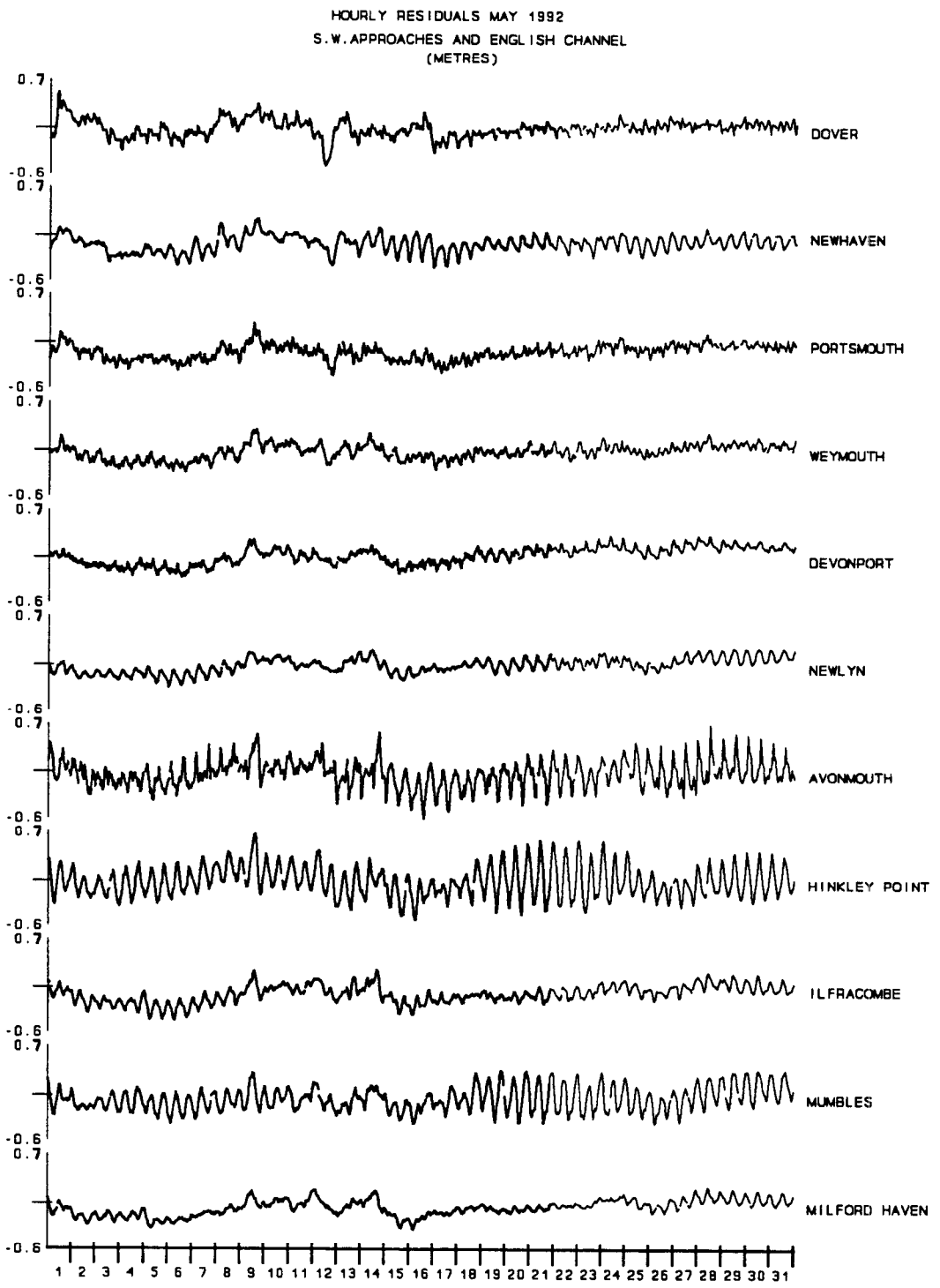

HOURLY RESIDUALS DECEMBER 1992
WEST COAST
(METRES)
1.1
-0.7
KINLOCHBERVIE
STORNOWAY
ULLAPOOL
TOBERMORY
MILLPORT
PORT ELLEN
PORTPATRICK
WORKINGTON
HEYSHAM
PORT ERIN
LIVERPOOL
BARMOUTH
FISHGUARD
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

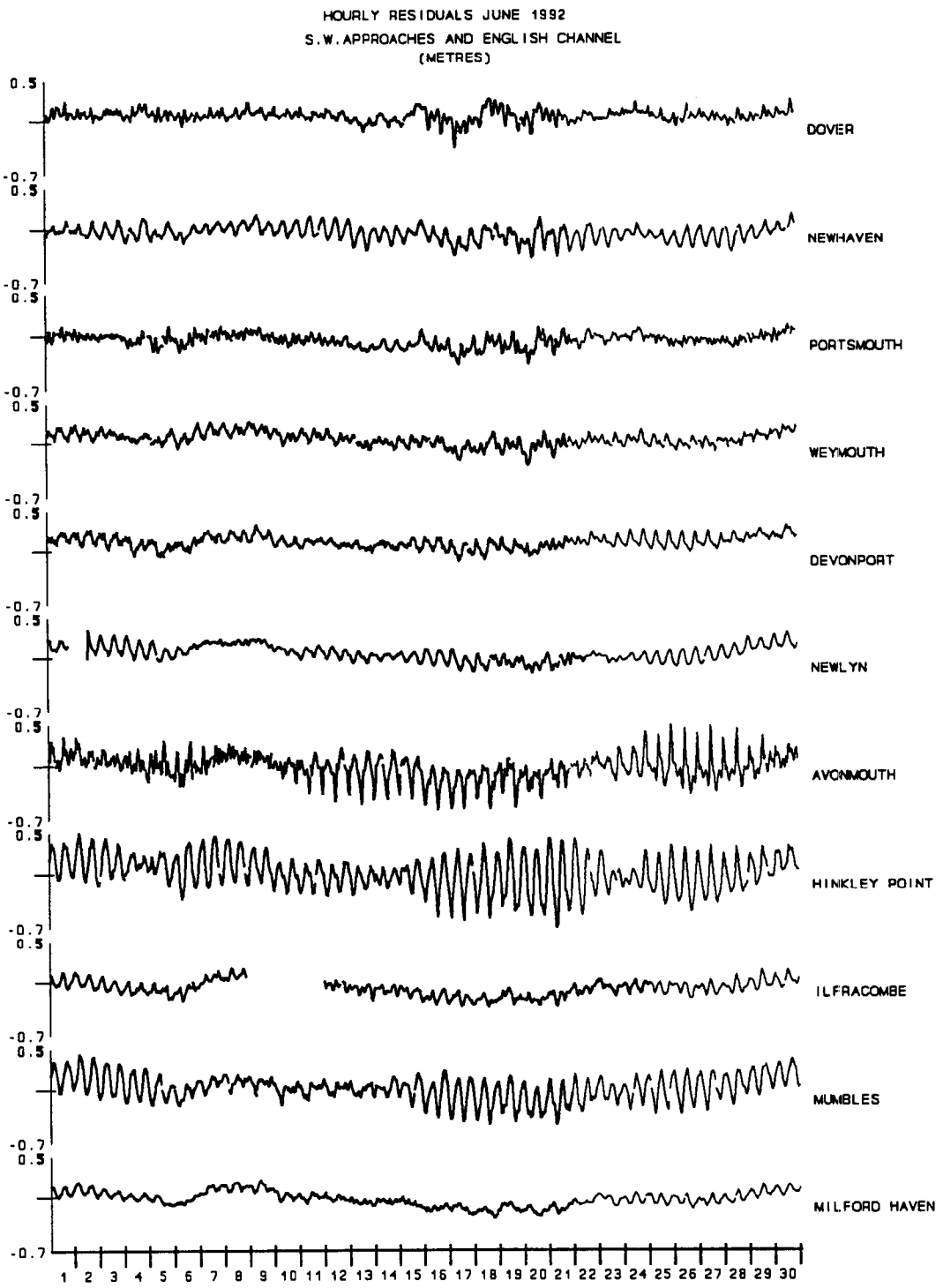

HOURLY RESIDUALS JANUARY 1992
S.W.APPROACHES AND ENGLISH CHANNEL
(METRES)
0.8
-0.8
DOVER
NEWHAVEN
PORTSMOUTH
WEYMOUTH
DEVONPORT
NEWLYN
AVONMOUTH
HINKLEY POINT
ILFRACOMBE
MUMBLES
MILFORD HAVEN
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

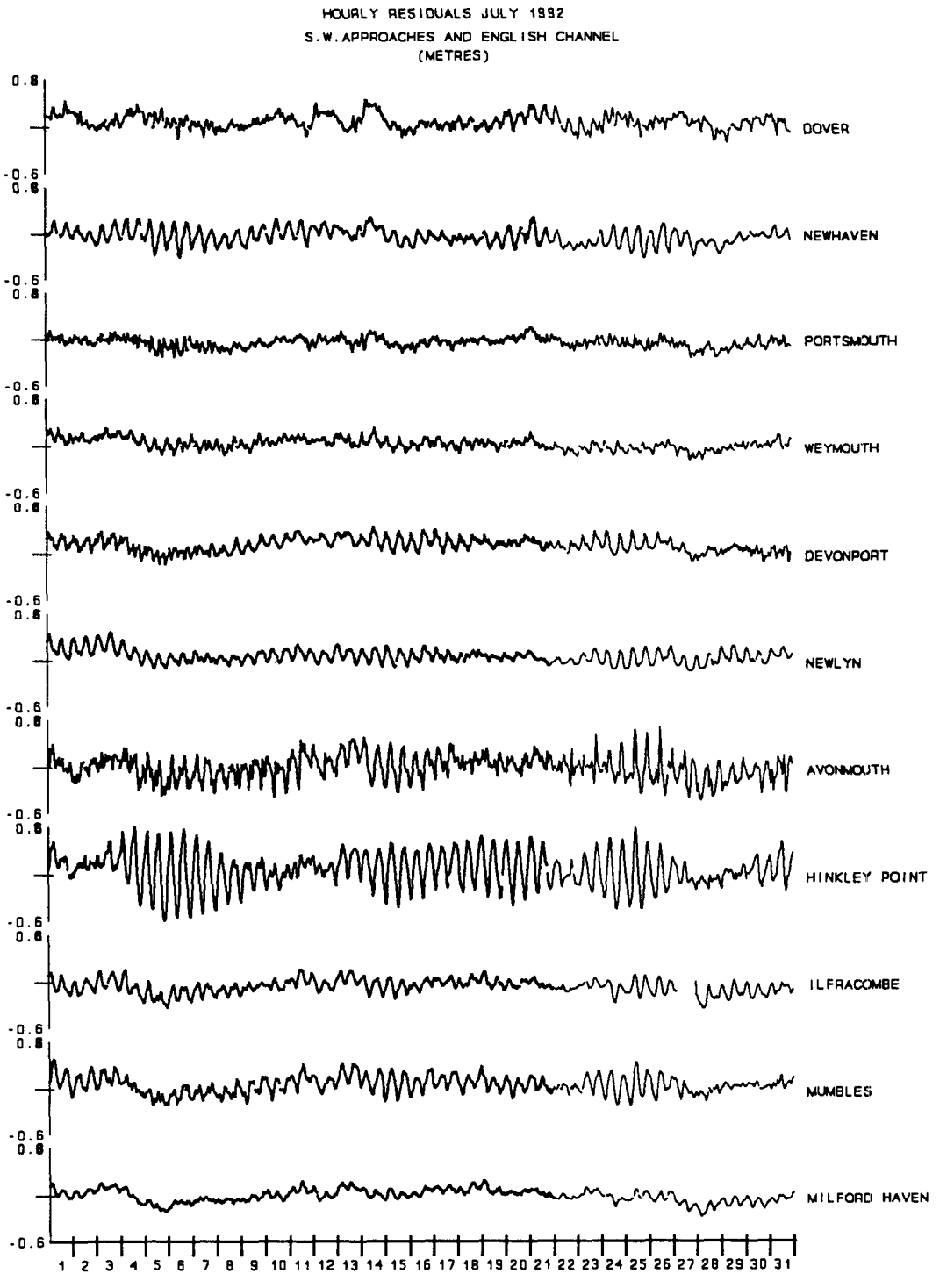

HOURLY RESIDUALS FEBRUARY 1992
S.W.APPROACHES AND ENGLISH CHANNEL
(METRES)
1.0
-0.7
DOVER
NEWHAVEN
PORTSMOUTH
WEYMOUTH
DEVONPORT
NEWLYN
AVONMOUTH
HINKLEY POINT
ILFRACOMBE
MUMBLES
MILFORD HAVEN
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

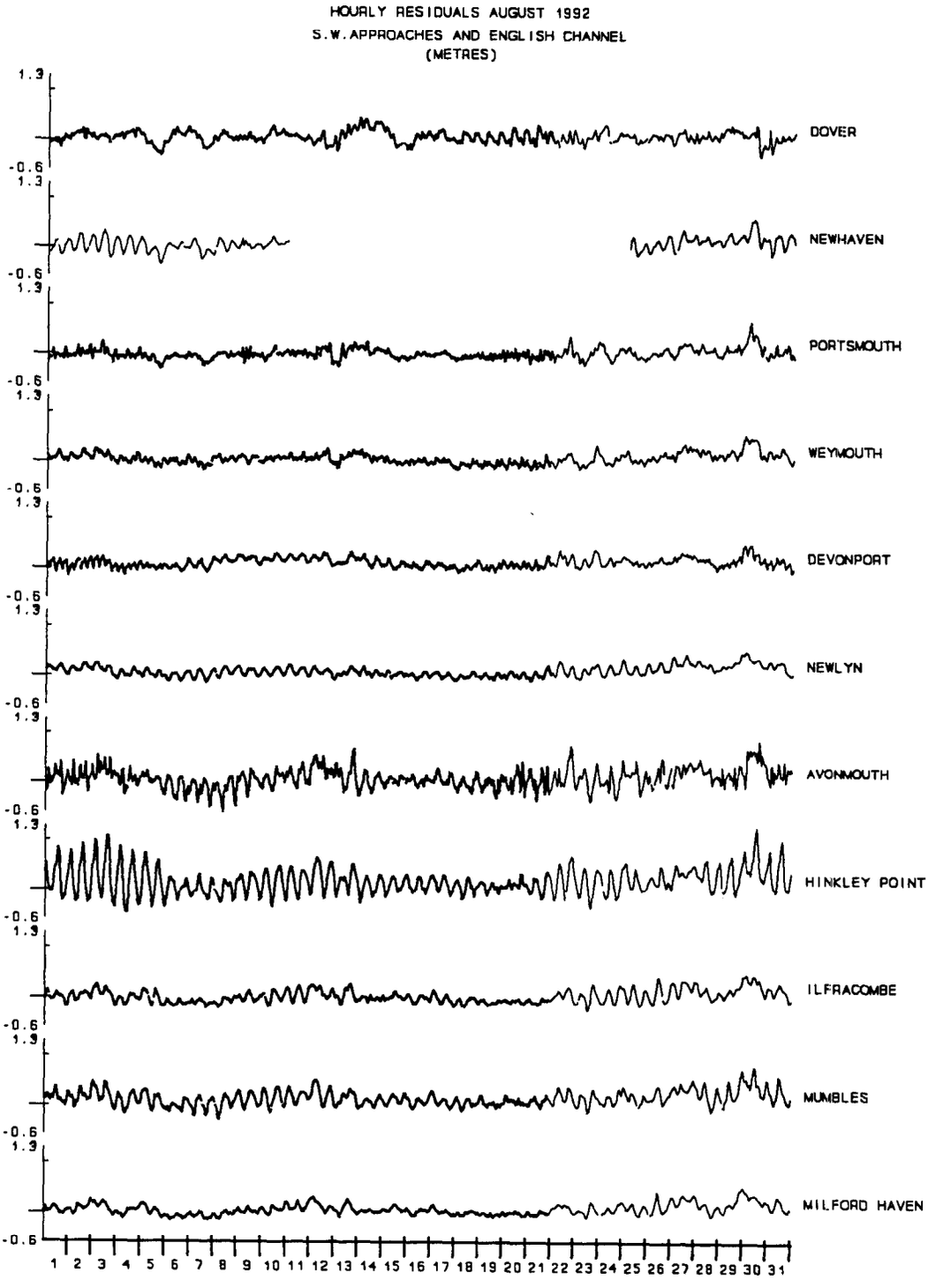

HOURLY RESIDUALS MARCH 1992
S.W. APPROACHES AND ENGLISH CHANNEL
(METRES)
1.0
-1.0
DOVER
NEWHAVEN
PORTSMOUTH
WEYMOUTH
DEVONPORT
NEWLYN
AVONMOUTH
HINKLEY POINT
ILFRACOMBE
MUMBLES
MILFORD HAVEN
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

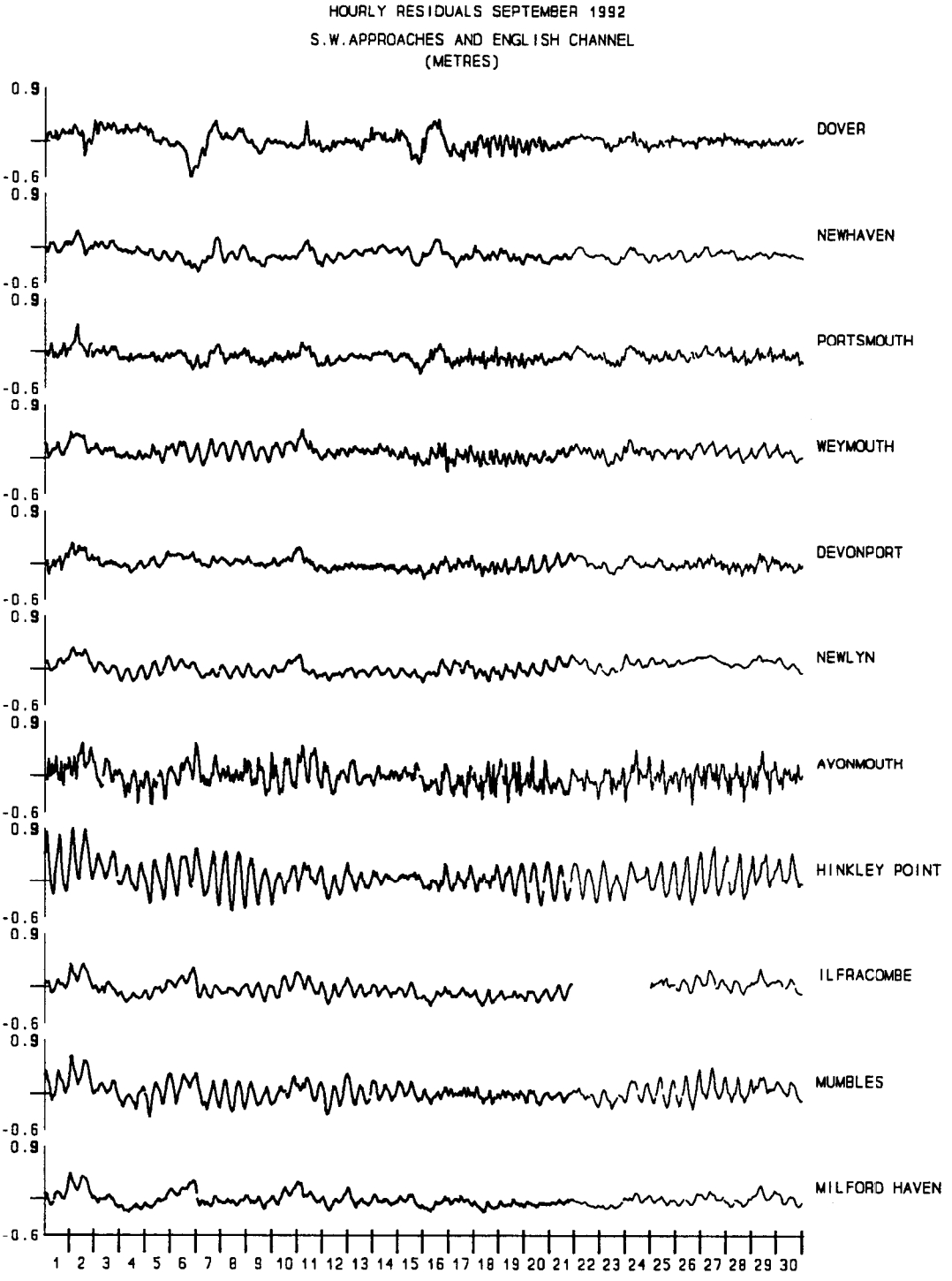

HOURLY RESIDUALS APRIL 1992
S.W.APPROACHES AND ENGLISH CHANNEL
(METRES)
1.2
-0.7
DOVER
NEWHAVEN
PORTSMOUTH
WEYMOUTH
DEVONPORT
NEWLYN
AVONMOUTH
HINKLEY POINT
ILFRACOMBE
MUMBLES
MILFORD HAVEN
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

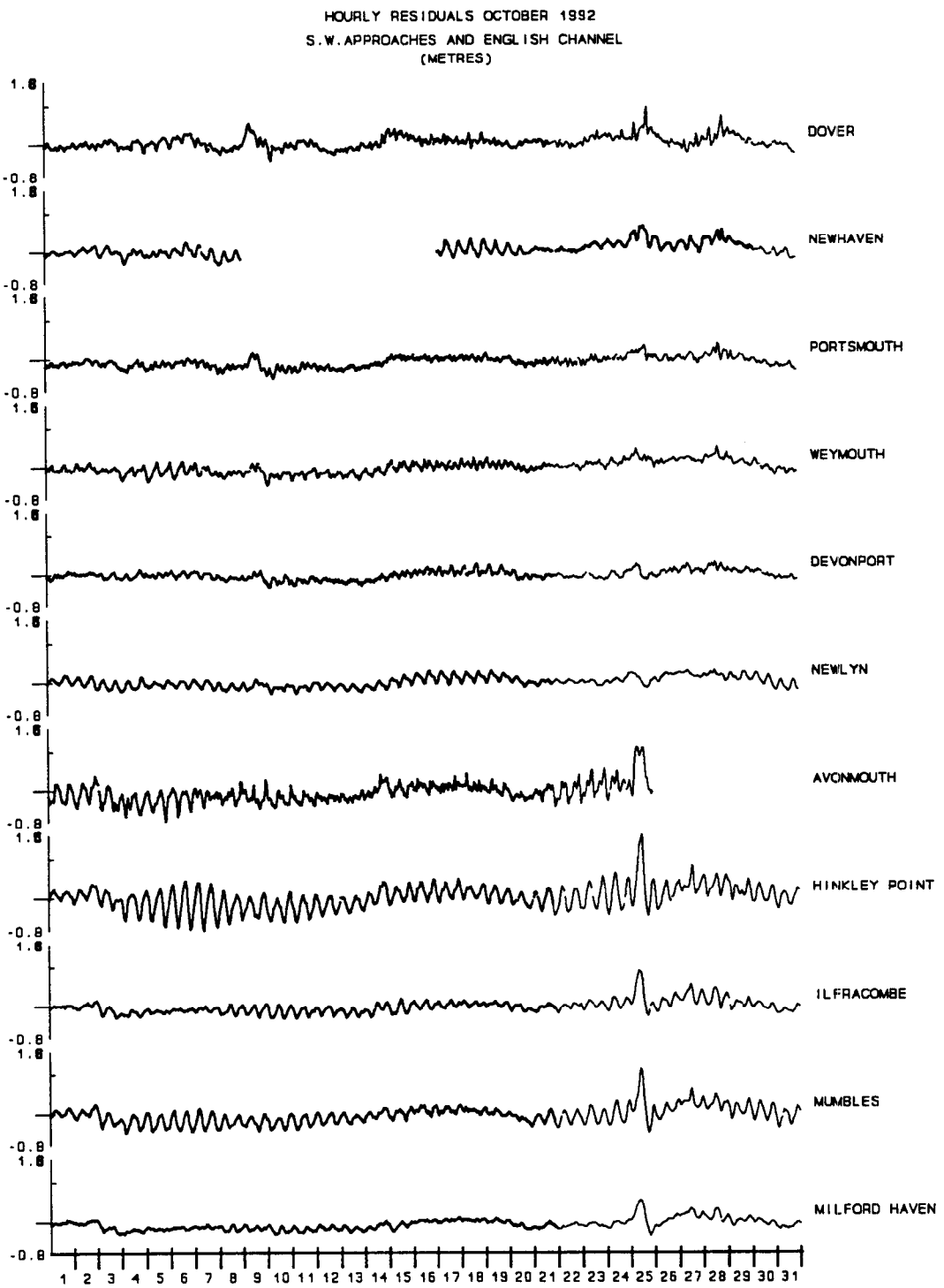

HOURLY RESIDUALS MAY 1992
S.W.APPROACHES AND ENGLISH CHANNEL
(METRES)
0.7
-0.6
DOVER
NEWHAVEN
PORTSMOUTH
WEYMOUTH
DEVONPORT
NEWLYN
AVONMOUTH
HINKLEY POINT
ILFRACOMBE
MUMBLES
MILFORD HAVEN
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

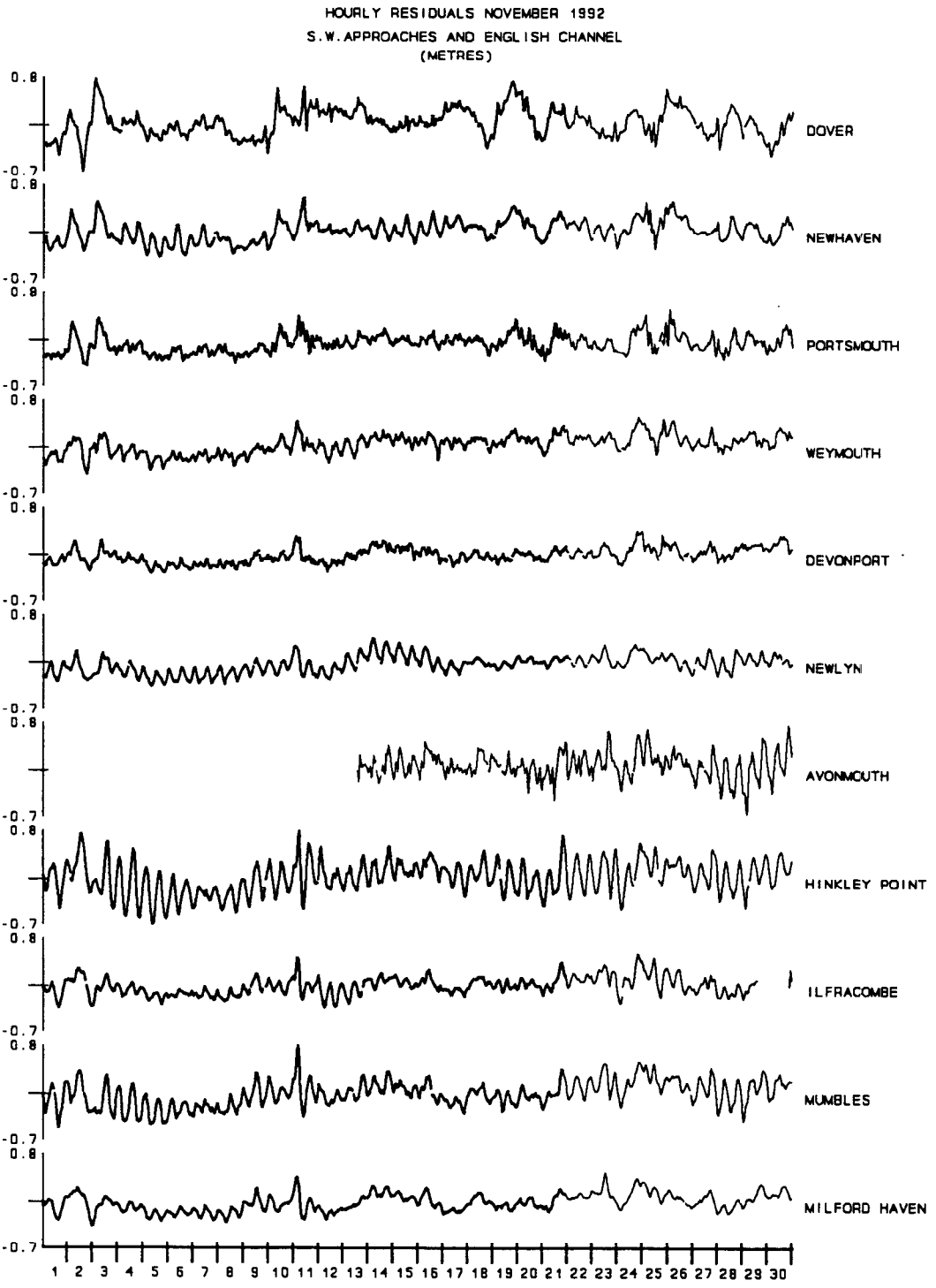

HOURLY RESIDUALS JUNE 1992
S.W. APPROACHES AND ENGLISH CHANNEL
(METRES)
0.5
-0.7
DOVER
NEWHAVEN
PORTSMOUTH
WEYMOUTH
DEVONPORT
NEWLYN
AVONMOUTH
HINKLEY POINT
ILFRACOMBE
MUMBLES
MILFORD HAVEN
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30


HOURLY RESIDUALS JULY 1992
S.W. APPROACHES AND ENGLISH CHANNEL
(METRES)
0.6
-0.6
DOVER
NEWHAVEN
PORTSMOUTH
WEYMOUTH
DEVONPORT
NEWLYN
AVONMOUTH
HINKLEY POINT
ILFRACOMBE
MUMBLES
MILFORD HAVEN
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31


HOURLY RESIDUALS AUGUST 1992
S.W. APPROACHES AND ENGLISH CHANNEL
(METRES)
1.3
-0.6
DOVER
NEWHAVEN
PORTSMOUTH
WEYMOUTH
DEVONPORT
NEWLYN
AVONMOUTH
HINKLEY POINT
ILFRACOMBE
MUMBLES
MILFORD HAVEN
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31


HOURLY RESIDUALS SEPTEMBER 1992
S.W.APPROACHES AND ENGLISH CHANNEL
(METRES)
0.9
-0.6
DOVER
NEWHAVEN
PORTSMOUTH
WEYMOUTH
DEVONPORT
NEWLYN
AVONMOUTH
HINKLEY POINT
ILFRACOMBE
MUMBLES
MILFORD HAVEN
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30


HOURLY RESIDUALS OCTOBER 1992
S.W.APPROACHES AND ENGLISH CHANNEL
(METRES)
1.6
-0.8
DOVER
NEWHAVEN
PORTSMOUTH
WEYMOUTH
DEVONPORT
NEWLYN
AVONMOUTH
HINKLEY POINT
ILFRACOMBE
MUMBLES
MILFORD HAVEN
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31


HOURLY RESIDUALS NOVEMBER 1992
S.W. APPROACHES AND ENGLISH CHANNEL
(METRES)
0.8
-0.7
DOVER
NEWHAVEN
PORTSMOUTH
WEYMOUTH
DEVONPORT
NEWLYN
AVONMOUTH
HINKLEY POINT
ILFRACOMBE
MUMBLES
MILFORD HAVEN
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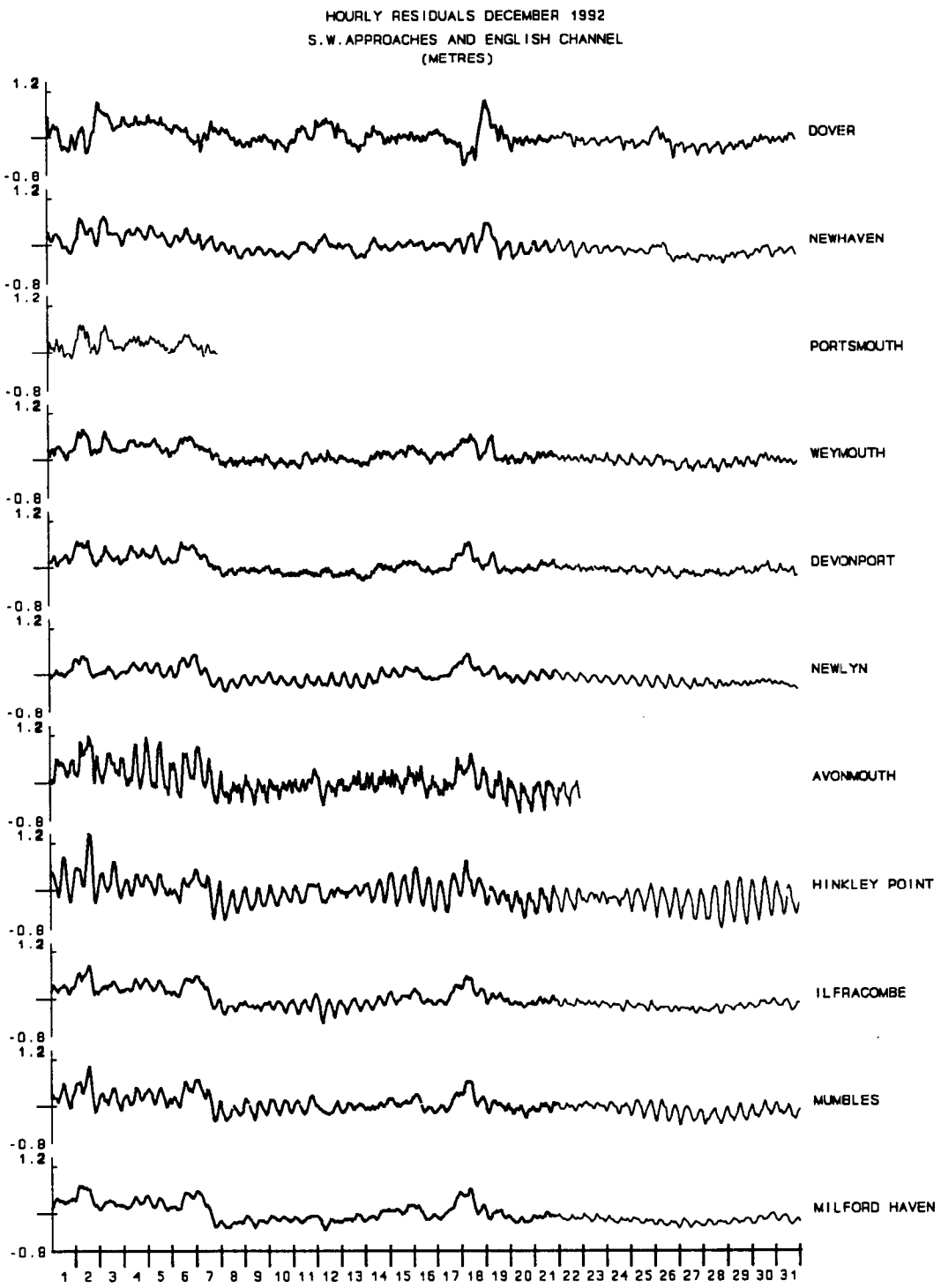
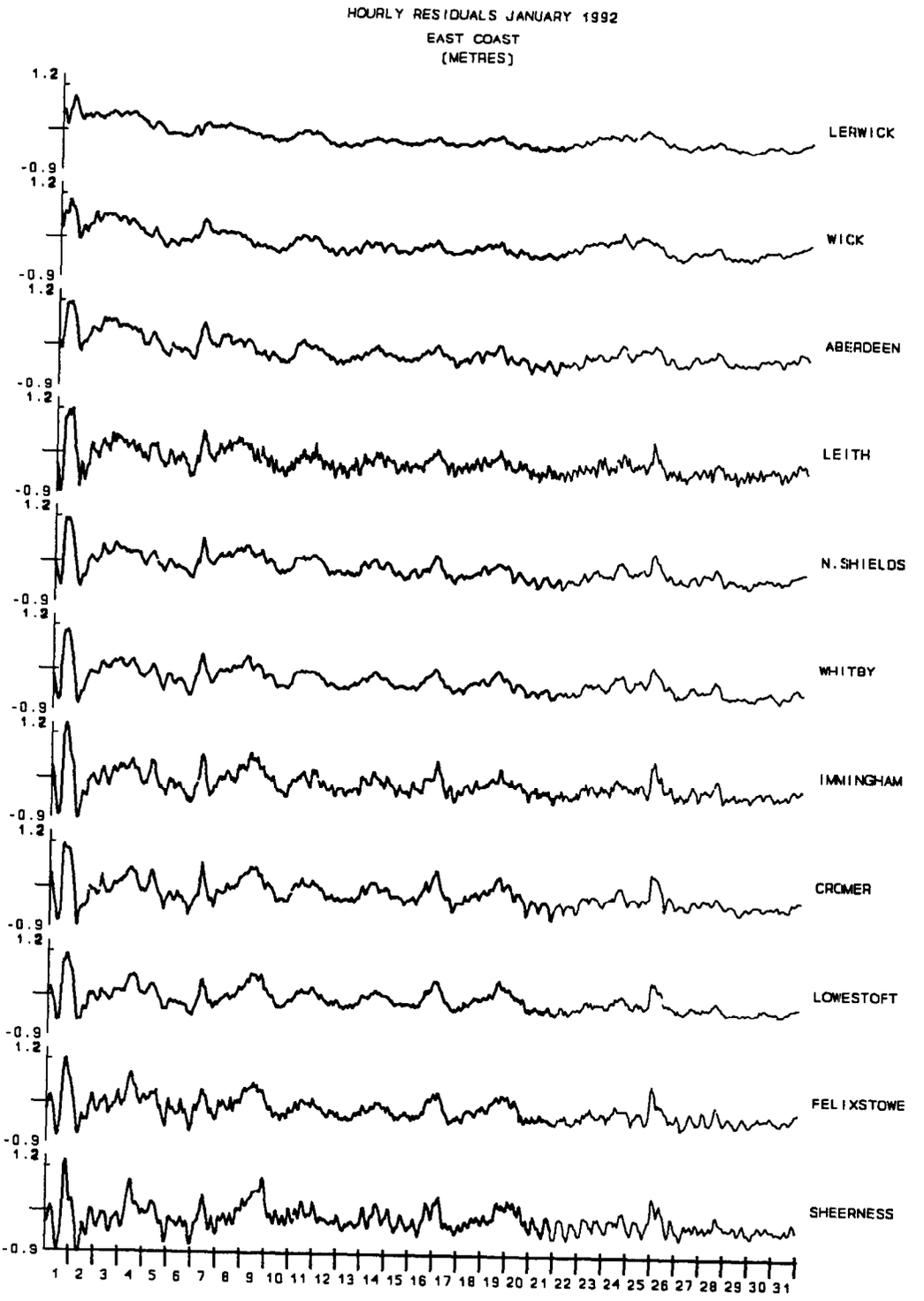
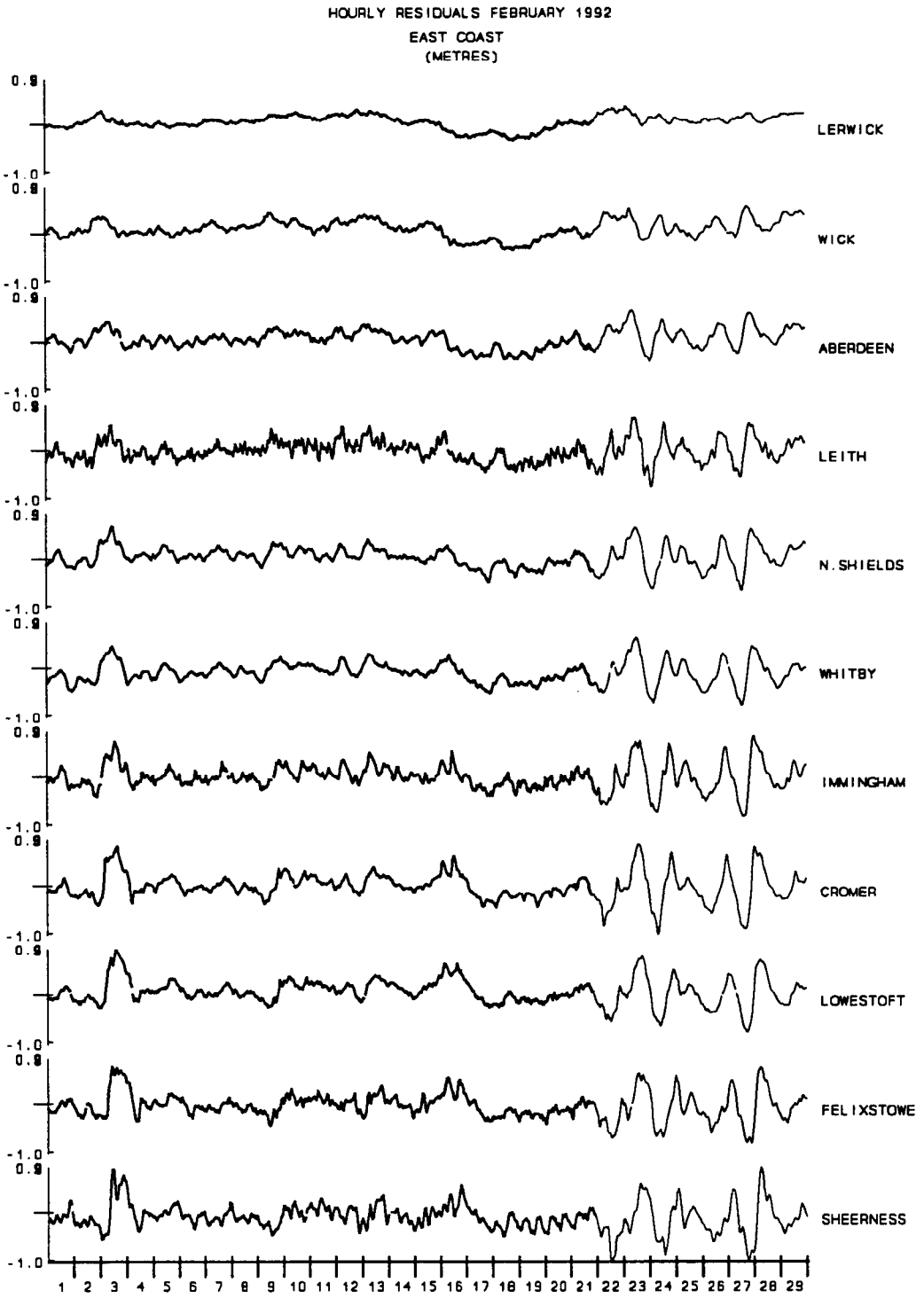
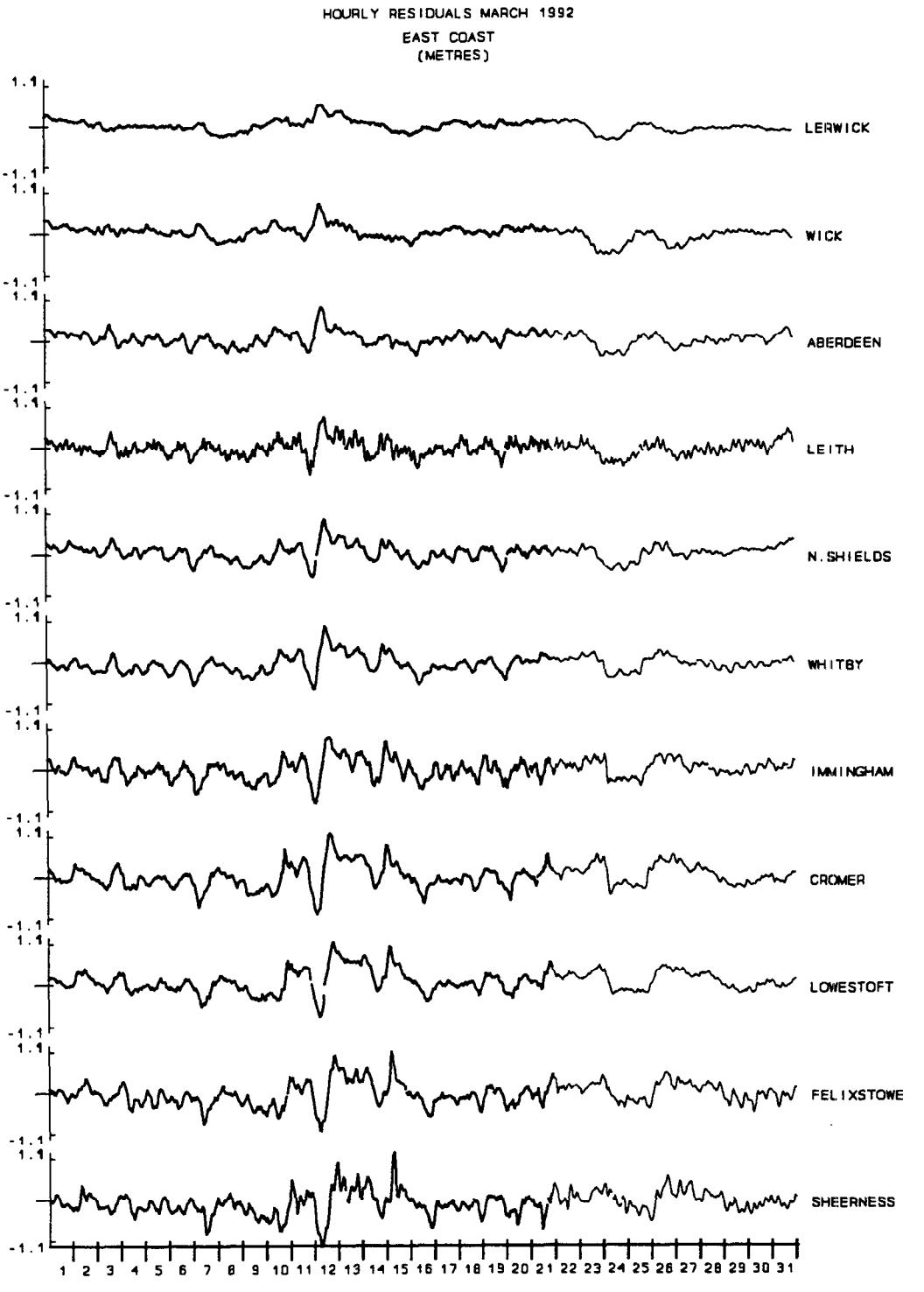
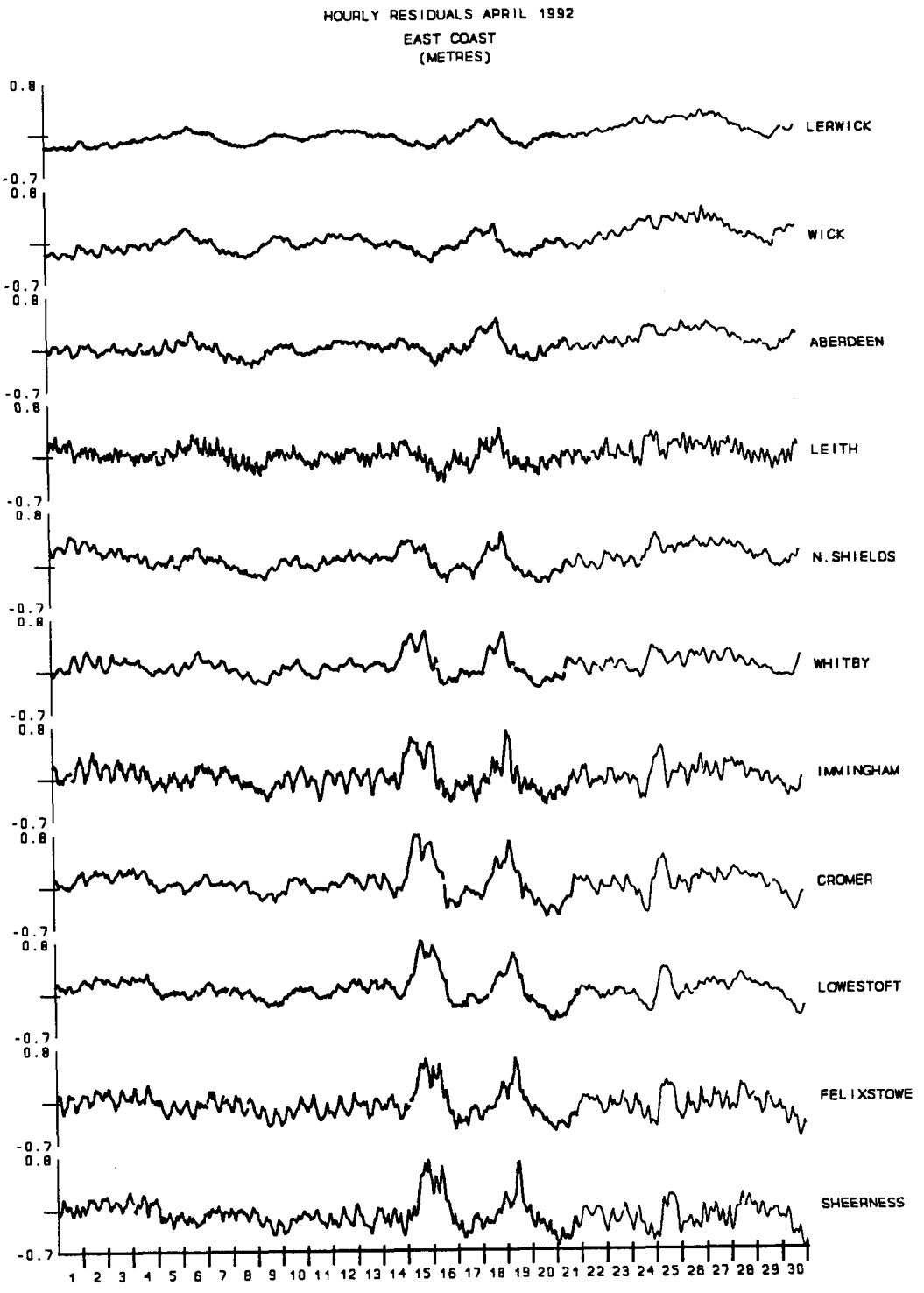
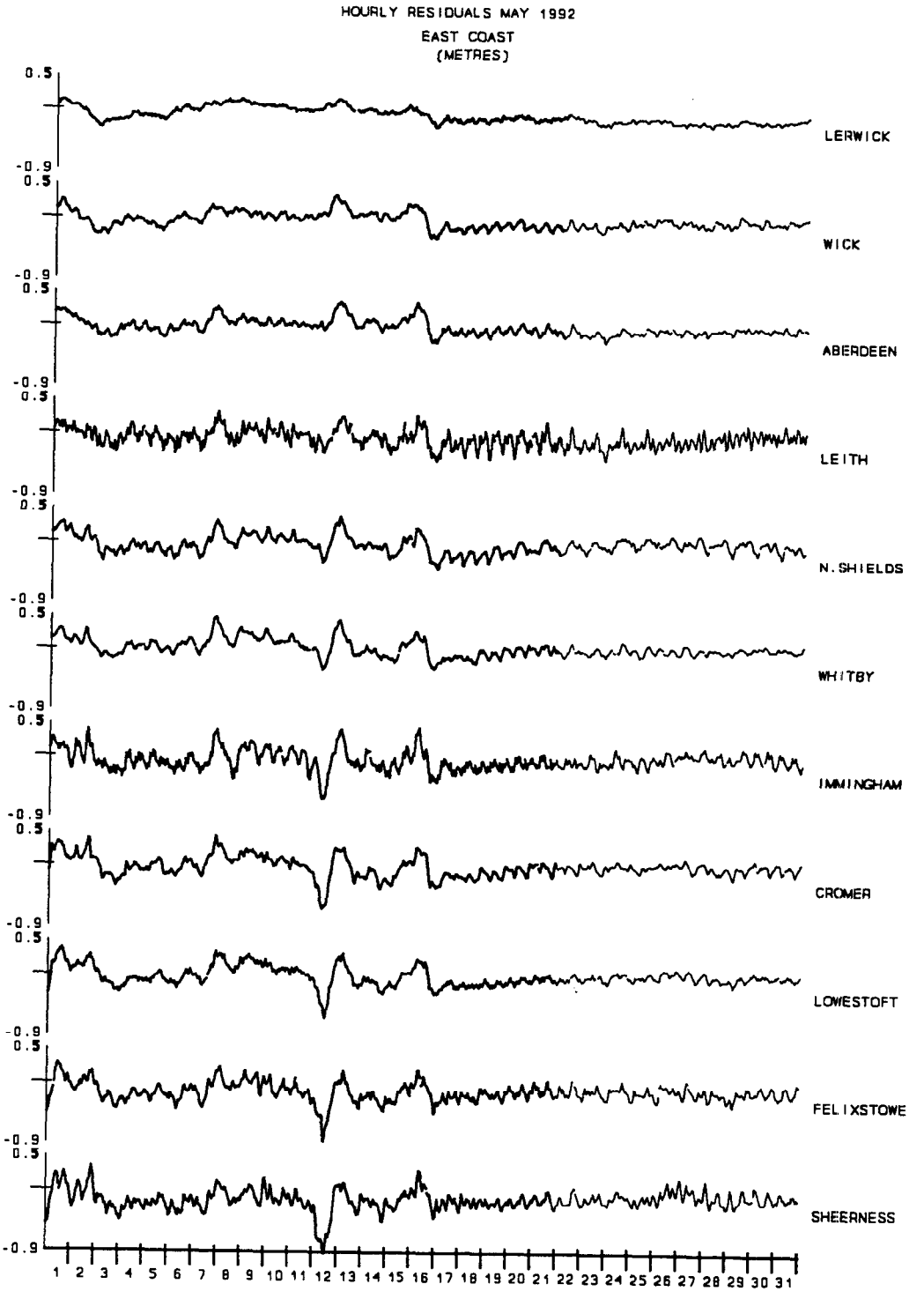

HOURLY RESIDUALS DECEMBER 1992
S.W. APPROACHES AND ENGLISH CHANNEL
(METRES)
1.2
-0.8
DOVER
NEWHAVEN
PORTSMOUTH
WEYMOUTH
DEVONPORT
NEWLYN
AVONMOUTH
HINKLEY POINT
ILFRACOMBE
MUMBLES
MILFORD HAVEN
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

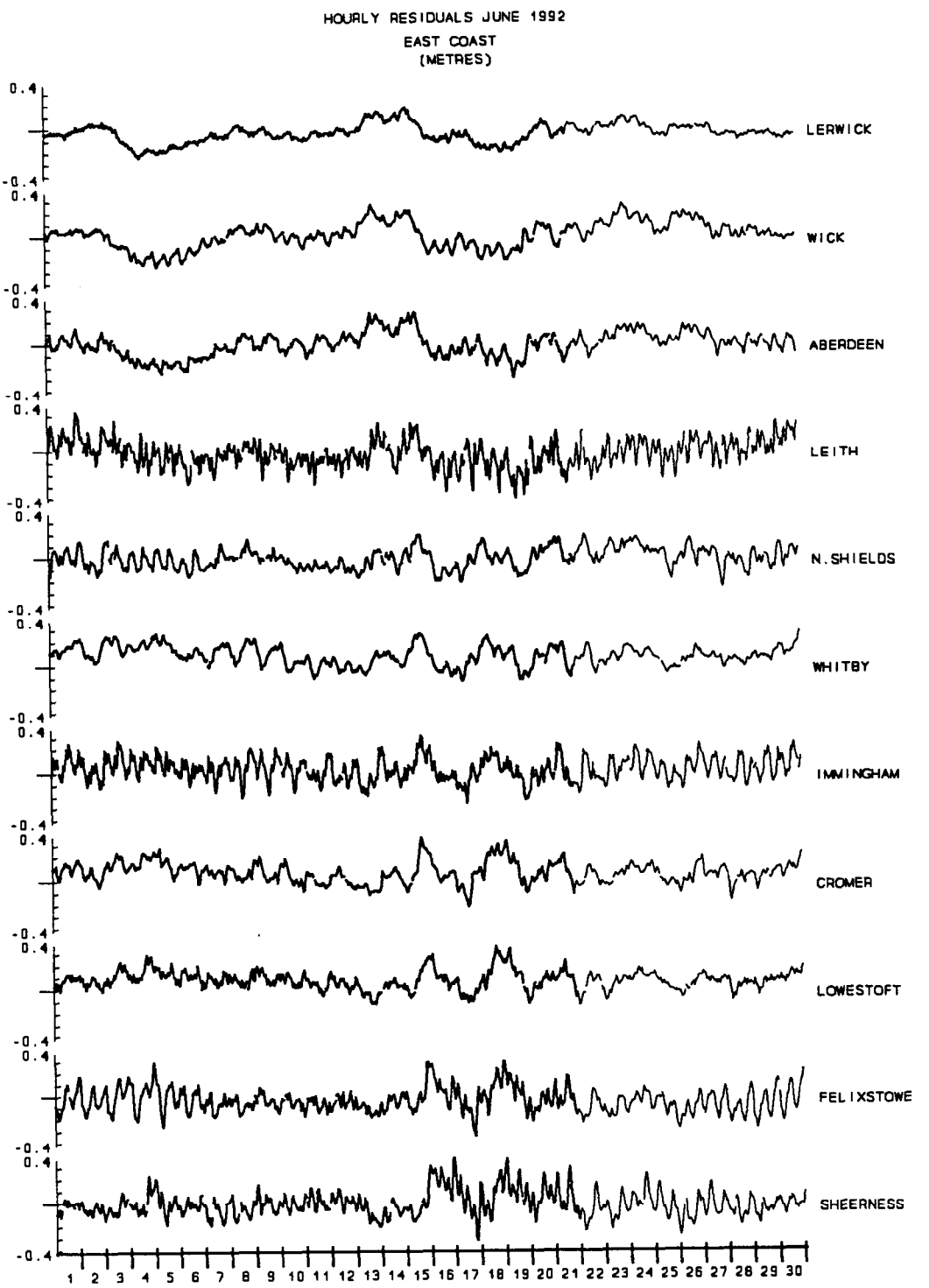

HOURLY RESIDUALS JANUARY 1992
EAST COAST
(METRES)
1.2
-0.9
LERWICK
WICK
ABERDEEN
LEITH
N.SHIELDS
WHITBY
IMMINGHAM
CROMER
LOWESTOFT
FELIXSTOWE
SHEERNESS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

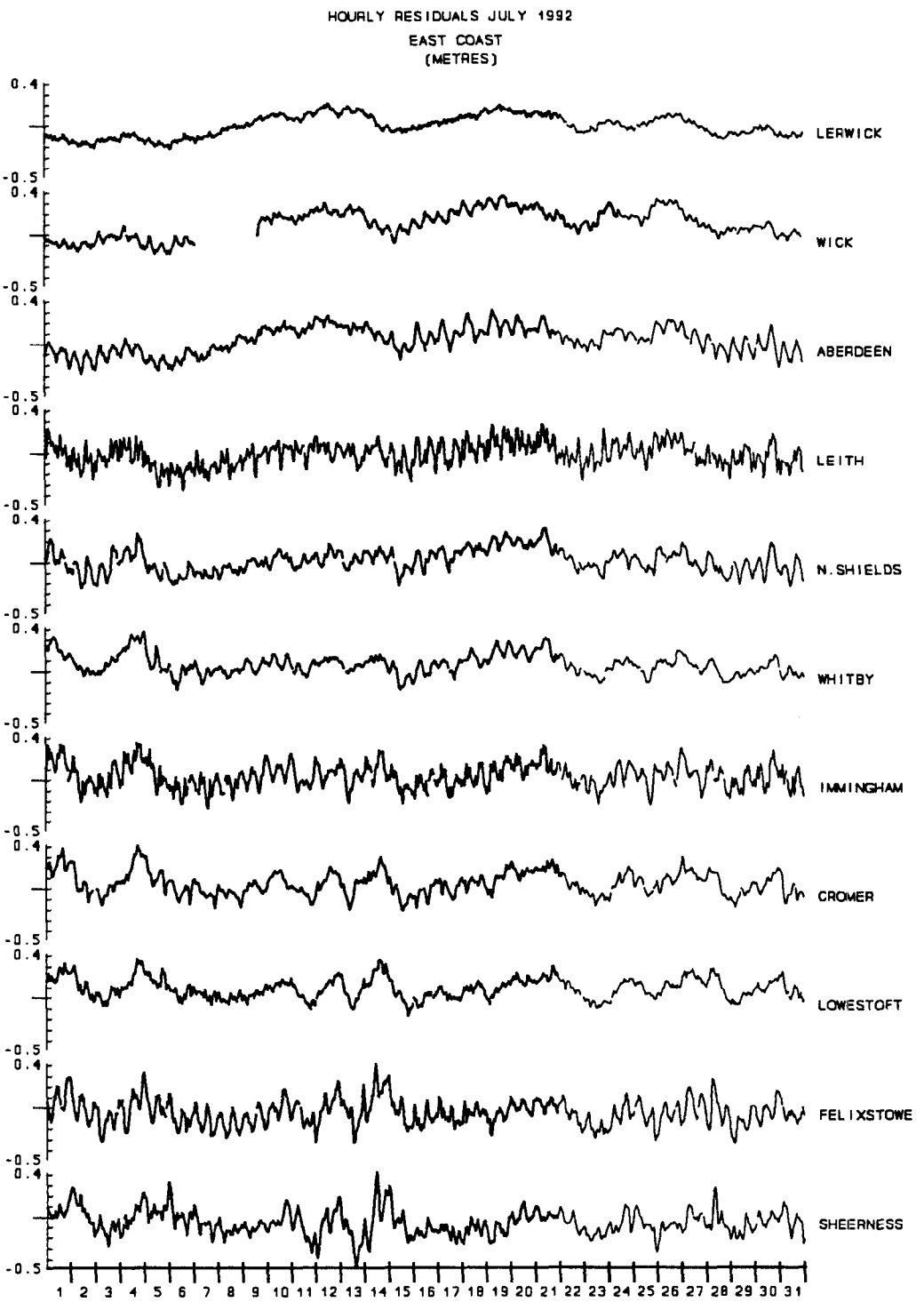

HOURLY RESIDUALS FEBRUARY 1992
EAST COAST
(METRES)
0.9
-1.0
LERWICK
WICK
ABERDEEN
LEITH
N.SHIELDS
WHITBY
IMMINGHAM
CROMER
LOWESTOFT
FELIXSTOWE
SHEERNESS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

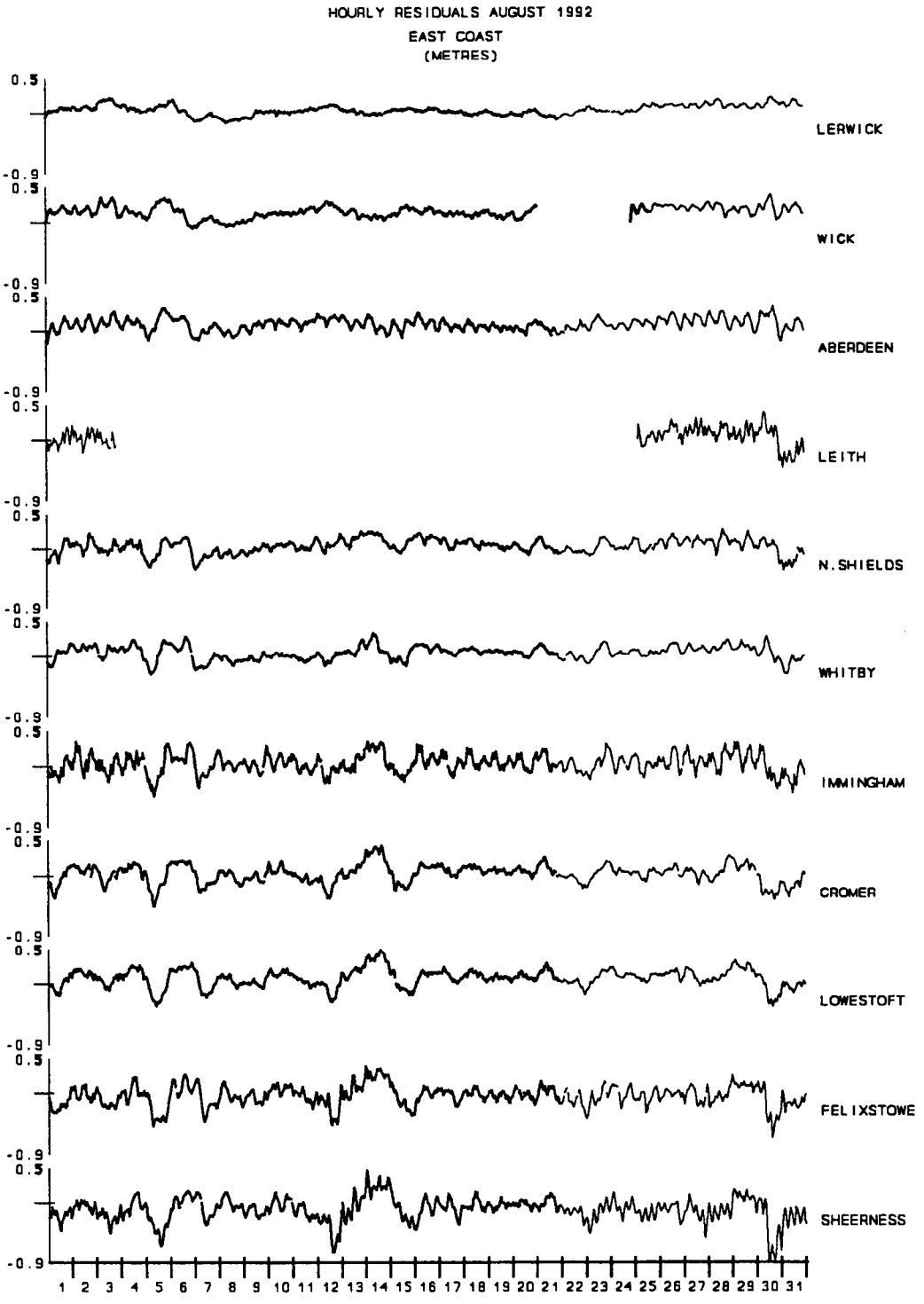

HOURLY RESIDUALS MARCH 1992
EAST COAST
(METRES)
1.1
-1.1
LERWICK
WICK
ABERDEEN
LEITH
N.SHIELDS
WHITBY
IMMINGHAM
CROMER
LOWESTOFT
FELIXSTOWE
SHEERNESS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

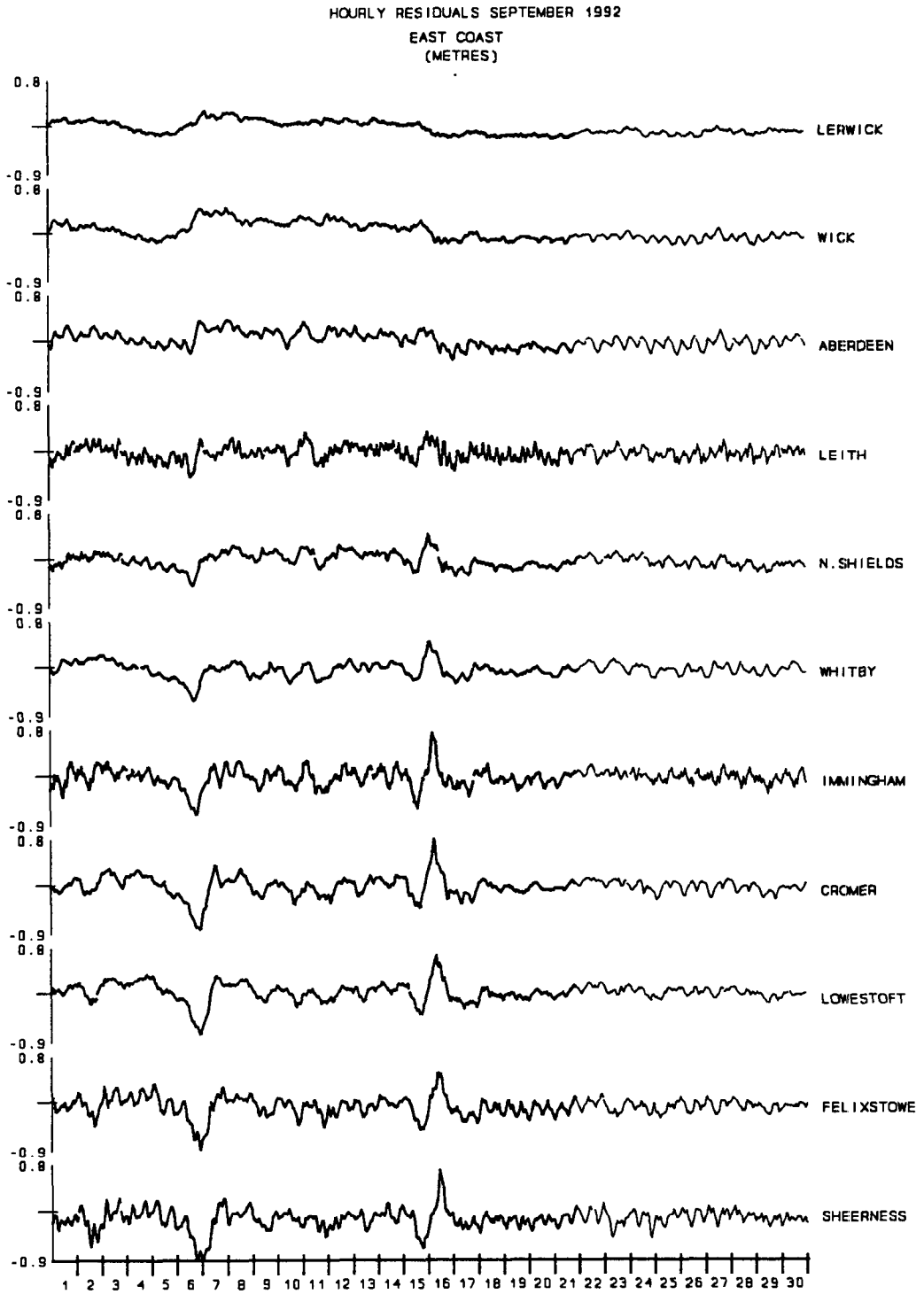

HOURLY RESIDUALS APRIL 1992
EAST COAST
(METRES)
0.8
-0.7
LERWICK
WICK
ABERDEEN
LEITH
N.SHIELDS
WHITBY
IMMINGHAM
CROMER
LOWESTOFT
FELIXSTOWE
SHEERNESS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

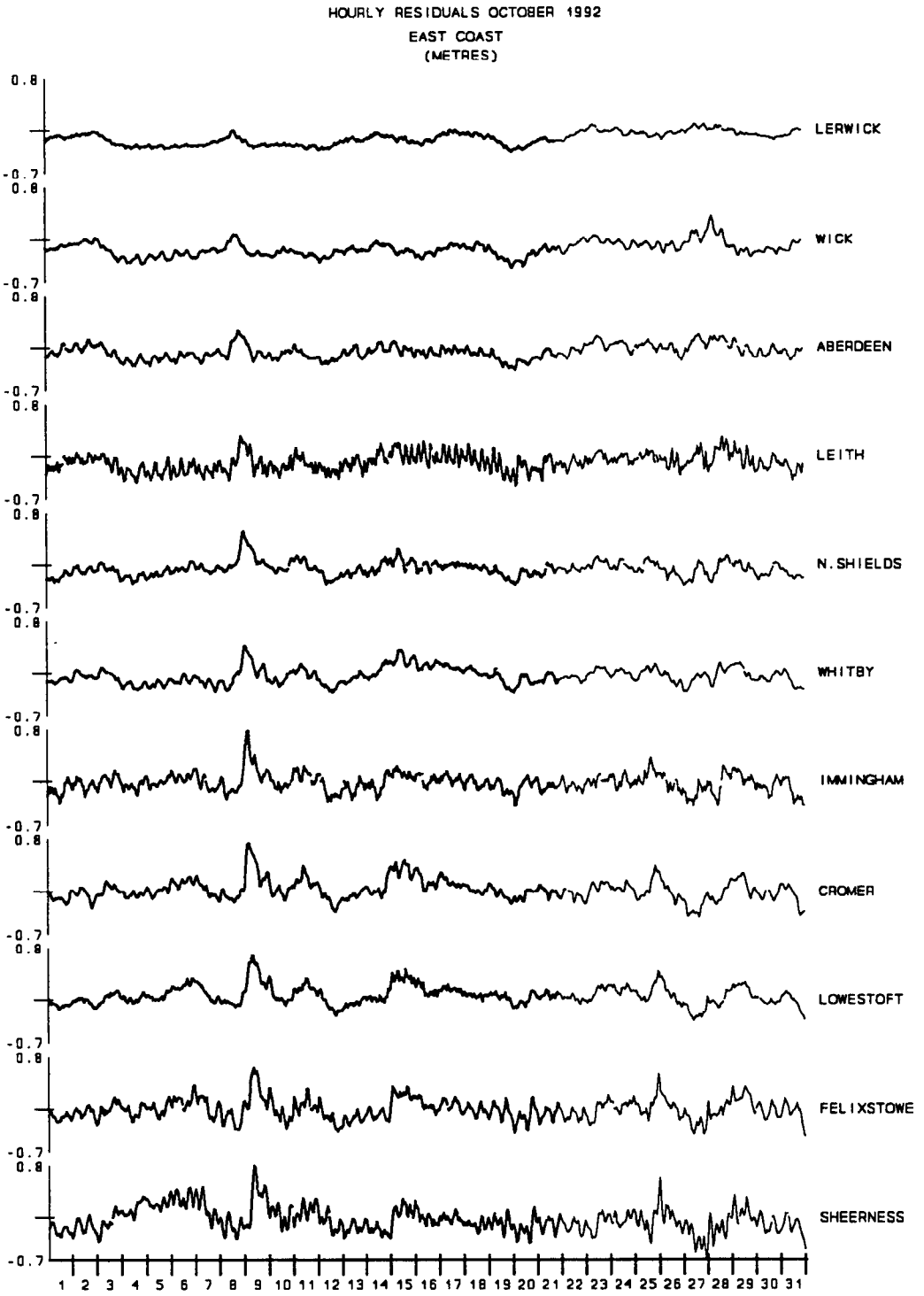

HOURLY RESIDUALS MAY 1992
EAST COAST
(METRES)
0.5
-0.9
LERWICK
WICK
ABERDEEN
LEITH
N.SHIELDS
WHITBY
IMMINGHAM
CROMER
LOWESTOFT
FELIXSTOWE
SHEERNESS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

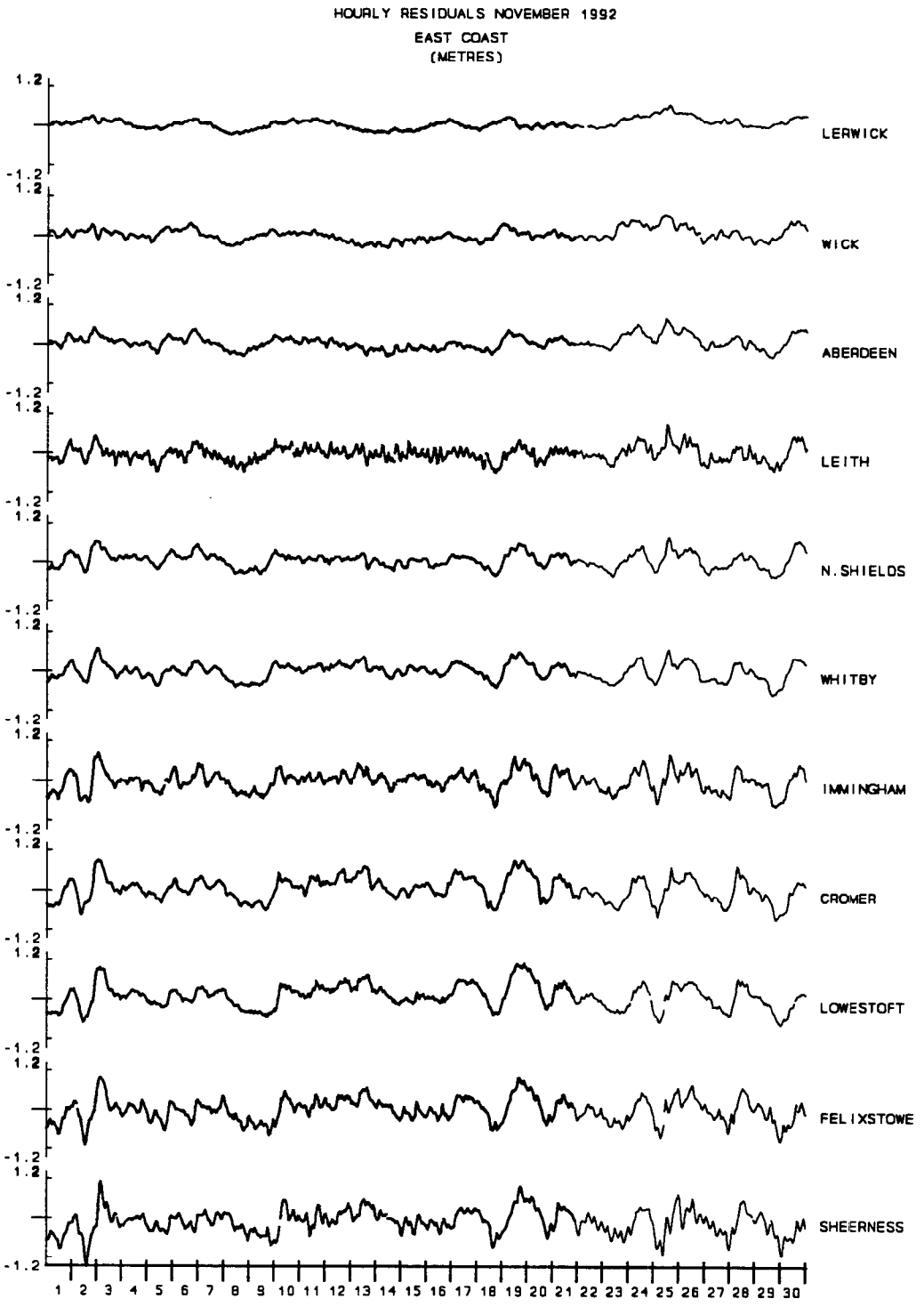

HOURLY RESIDUALS JUNE 1992
EAST COAST
(METRES)
0.4
-0.4
LERWICK
WICK
ABERDEEN
LEITH
N.SHIELDS
WHITBY
IMMINGHAM
CROMER
LOWESTOFT
FELIXSTOWE
SHEERNESS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

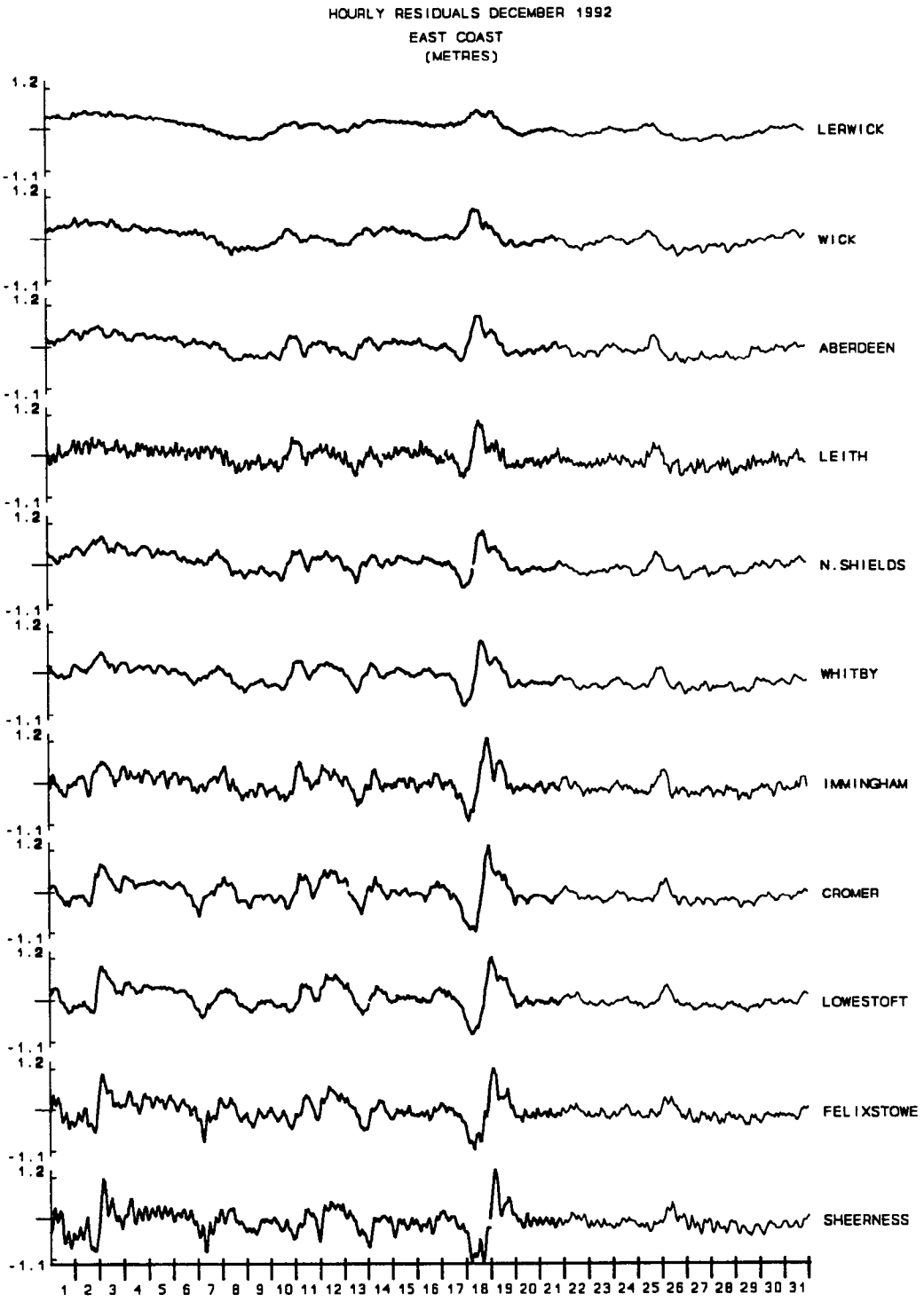

HOURLY RESIDUALS JULY 1992
EAST COAST
(METRES)
0.4
-0.5
LERWICK
WICK
ABERDEEN
LEITH
N.SHIELDS
WHITBY
IMMINGHAM
CROMER
LOWESTOFT
FELIXSTOWE
SHEERNESS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31


HOURLY RESIDUALS AUGUST 1992
EAST COAST
(METRES)
0.5
-0.9
LERWICK
WICK
ABERDEEN
LEITH
N.SHIELDS
WHITBY
IMMINGHAM
CROMER
LOWESTOFT
FELIXSTOWE
SHEERNESS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31


HOURLY RESIDUALS SEPTEMBER 1992
EAST COAST
(METRES)
0.8
-0.9
LERWICK
WICK
ABERDEEN
LEITH
N.SHIELDS
WHITBY
IMMINGHAM
CROMER
LOWESTOFT
FELIXSTOWE
SHEERNESS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30


HOURLY RESIDUALS OCTOBER 1992
EAST COAST
(METRES)
0.8
-0.7
LERWICK
WICK
ABERDEEN
LEITH
N.SHIELDS
WHITBY
IMMINGHAM
CROMER
LOWESTOFT
FELIXSTOWE
SHEERNESS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31


HOURLY RESIDUALS NOVEMBER 1992
EAST COAST
(METRES)
1.2
-1.2
LERWICK
WICK
ABERDEEN
LEITH
N.SHIELDS
WHITBY
IMMINGHAM
CROMER
LOWESTOFT
FELIXSTOWE
SHEERNESS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30


HOURLY RESIDUALS DECEMBER 1992
EAST COAST
(METRES)
1.2
-1.1
LERWICK
WICK
ABERDEEN
LEITH
N.SHIELDS
WHITBY
IMMINGHAM
CROMER
LOWESTOFT
FELIXSTOWE
SHEERNESS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

MAXIMUM RESIDUALS 1992
WEST COAST PORTS

PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
KINLOCHBERVIE	.610	.842	.660	.553	.521	.331	.511	.640	.937	.563	.975	.923	.975
STORNOWAY	.616	.441	.326	.386	.260	.195	.326	.424	.491	.231	.609	.652	.652
ULLAPOOL	.959	.559	.372	.470	.473	.242	.319	.436	.706	.437	.864	.878	.959
TOBERMORY	.672	.650	.443	.469	.446	.238	.339	.629	.695	.365	.683	.547	.695
MILLPORT	.498	.812	.471	.673	.562	.259	.371	.604	.825	.424	.886	1.052	1.052
PORT ELLEN	.358	.563	.352	.393	.277	.205	.245	.288	.479	.239	.497	.633	.633
PORTPATRICK	.372	.659	.420	.535	.462	.236	.306	.514	.623	.368	.710	.991	.991
WORKINGTON		.822	.596	.768	.736	.402	.610	.729	.889	.525	.909	1.127	1.127
PORT ERIN					.107	.179	.447	.720	.580	.458	.721	.721	.721
HEYSHAM	.722	.713	.651	.989	.622	.247	.327	.939	.846	.579	.975	.860	.989
LIVERPOOL	.398	.578	1.032	.633	.495	.172	.287	.755	.377	.520	.827	.783	1.032
BARMOUTH	.697	.896	.660	1.006	.580	.447	.537	.878	.663	1.069	.878	1.007	1.069
FISHGUARD	.367	.471	.284	.497	.315	.236	.217	.495	.389	.494	.481	.618	.618

MINIMUM RESIDUALS 1992
WEST COAST PORTS

PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
KINLOCHBERVIE	-.370	-.477	-.586	-.466	-.388	-.292	-.376	-.234	-.267	-.324	-.219	-.202	-.586
STORNOWAY	-.473	-.424	-.690	-.380	-.372	-.254	-.238	-.171	-.287	-.360	-.346	-.318	-.690
ULLAPOOL	-.419	-.473	-.715	-.498	-.422	-.274	-.208	-.169	-.347	-.402	-.194	-.262	-.715
TOBERMORY	-.347	-.383	-.702	-.323	-.308	-.311	-.153	-.102	-.188	-.350	-.278	-.284	-.702
MILLPORT	-.542	-.715	-.728	-.468	-.317	-.338	-.340	-.152	-.204	-.427	-.383	-.390	-.728
PORT ELLEN	-.598	-.695	-.759	-.585	-.391	-.462	-.477	-.286	-.379	-.581	-.505	-.484	-.759
PORTPATRICK	-.479	-.615	-.618	-.415	-.337	-.335	-.274	-.123	-.233	-.424	-.359	-.383	-.618
WORKINGTON		-.647	-.668	-.500	-.374	-.365	-.342	-.213	-.378	-.484	-.363	-.474	-.668
PORT ERIN					-.159	-.215	-.318	-.220	-.356	-.445	-.366	-.351	-.445
HEYSHAM	-.570	-.692	-.821	-.541	-.524	-.425	-.432	-.298	-.417	-.687	-.390	-.435	-.821
LIVERPOOL	-.797	-.847	-.825	-.569	-.592	-.529	-.611	-.450	-.480	-.710	-.598	-.599	-.847
BARMOUTH	-.825	-.973	-.826	-.886	-.703	-.631	-.597	-.510	-.620	-.669	-.513	-.690	-.973
FISHGUARD	-.302	-.419	-.463	-.350	-.281	-.224	-.209	-.067	-.211	-.235	-.324	-.282	-.463

MAXIMUM RESIDUALS 1992

S.W. APPROACHES AND ENGLISH CHANNEL PORTS

PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
NEWLYN	.239	.374	.293	.327	.244	.384	.375	.544	.356	.288	.419	.423	.544
MILFORD HAVEN	.421	.351	.284	.510	.235	.218	.194	.544	.436	.531	.499	.583	.583
DEVONPORT	.432	.507	.399	.453	.319	.353	.337	.522	.353	.297	.406	.555	.555
ILFRACOMBE	.319	.341	.316	.543	.238	.184	.160	.488	.382	.890	.532	.704	.890
MUMBLES	.193	.562	.441	.775	.352	.472	.412	.800	.646	1.119	.786	.847	1.119
HINKLEY POINT	.779	.849	.914	1.211	.646	.528	.625	1.300	.910	1.597	.781	1.196	1.597
AVONMOUTH	.602	.952	.941	1.133	.672	.508	.519	.863	.553	1.098	.749	.979	1.133
WEYMOUTH	.437	.421	.401	.412	.291	.284	.252	.562	.447	.501	.508	.634	.634
PORTSMOUTH	.327	.300	.544	.273	.261	.126	.150	.675	.467	.376	.508	.604	.675
NEWHAVEN	.022	.357	.515	.159	.115	.139	.192	.420	.269	.383	.521	.438	.521
DOVER	.672	.661	.978	.622	.510	.284	.346	.447	.356	.935	.755	.782	.978

MINIMUM RESIDUALS 1992

S.W. APPROACHES AND ENGLISH CHANNEL PORTS

PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
NEWLYN	-.456	-.355	-.352	-.248	-.309	-.212	-.145	-.139	-.206	-.271	-.369	-.347	-.456
MILFORD HAVEN	-.391	-.476	-.591	-.475	-.343	-.276	-.281	-.128	-.214	-.338	-.384	-.338	-.591
DEVONPORT	-.336	-.450	-.377	-.323	-.270	-.130	-.137	-.146	-.226	-.322	-.281	-.259	-.450
ILFRACOMBE	-.482	-.528	-.652	-.436	-.457	-.346	-.355	-.233	-.311	-.302	-.359	-.527	-.652
MUMBLES	-.453	-.479	-.601	-.654	-.389	-.462	-.219	-.268	-.366	-.510	-.555	-.438	-.654
HINKLEY POINT	-.822	-.695	-.554	-.592	-.543	-.710	-.591	-.456	-.494	-.800	-.740	-.809	-.822
AVONMOUTH	-.797	-.715	-1.011	-.579	-.626	-.583	-.448	-.587	-.472	-.788	-.697	-.652	-1.011
WEYMOUTH	-.348	-.360	-.445	-.270	-.298	-.294	-.193	-.176	-.469	-.461	-.428	-.318	-.469
PORTSMOUTH	-.470	-.536	-.562	-.376	-.453	-.394	-.254	-.281	-.361	-.495	-.420	-.133	-.562
NEWHAVEN	-.512	-.693	-.609	-.518	-.605	-.481	-.302	-.320	-.411	-.502	-.556	-.555	-.693
DOVER	-.592	-.729	-.581	-.376	-.508	-.364	-.208	-.314	-.622	-.400	-.748	-.590	-.748

MAXIMUM RESIDUALS 1992

EAST COAST PORTS

PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
LERWICK	.741	.367	.506	.307	.170	.171	.224	.245	.272	.089	.546	.460	.741
WICK	.849	.539	.734	.494	.356	.261	.367	.416	.466	.366	.549	.681	.849
ABERDEEN	.957	.657	.811	.446	.374	.256	.316	.383	.391	.273	.680	.721	.957
LEITH	.980	.683	.736	.398	.316	.332	.274	.430	.324	.321	.735	.813	.980
NORTH SHIELDS	.954	.703	.854	.461	.393	.183	.319	.314	.423	.546	.680	.799	.954
WHITBY	.867	.650	.848	.586	.497	.268	.382	.367	.437	.440	.578	.736	.867
IMMINGHAM	1.228	.837	.803	.712	.460	.303	.356	.383	.771	.811	.697	1.040	1.228
CROMER	.945	.840	1.067	.791	.447	.353	.412	.462	.830	.769	.754	1.083	1.083
LOWESTOFT	.930	.944	1.041	.819	.395	.338	.372	.541	.687	.699	.910	.995	1.041
FELIXSTOWE	1.003	.792	.990	.643	.287	.290	.409	.430	.529	.653	.828	.994	1.003
SHEERNESS	1.123	.950	1.140	.745	.358	.373	.417	.508	.721	.827	.940	1.174	1.174

MINIMUM RESIDUALS 1992

EAST COAST PORTS

PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
LERWICK	-.310	-.338	-.381	-.256	-.272	-.237	-.208	-.149	-.256	-.336	-.224	-.362	-.381
WICK	-.346	-.353	-.542	-.336	-.286	-.249	-.173	-.082	-.271	-.451	-.305	-.476	-.542
ABERDEEN	-.488	-.422	-.419	-.283	-.248	-.298	-.269	-.185	-.346	-.366	-.315	-.447	-.488
LEITH	-.878	-.782	-.660	-.416	-.391	-.418	-.343	-.445	-.482	-.478	-.457	-.552	-.878
NORTH SHIELDS	-.539	-.675	-.539	-.338	-.391	-.281	-.243	-.346	-.499	-.327	-.356	-.575	-.675
WHITBY	-.755	-.799	-.655	-.304	-.277	-.144	-.158	-.305	-.620	-.302	-.591	-.786	-.799
IMMINGHAM	-.901	-.848	-.806	-.441	-.610	-.269	-.258	-.457	-.691	-.392	-.640	-.909	-.909
CROMER	-.843	-1.018	-.887	-.501	-.610	-.217	-.202	-.481	-.797	-.417	-.741	-.973	-1.018
LOWESTOFT	-.573	-.800	-.736	-.444	-.635	-.146	-.169	-.372	-.731	-.339	-.640	-.824	-.824
FELIXSTOWE	-.728	-.818	-.916	-.615	-.867	-.349	-.344	-.715	-.859	-.447	-.890	-.965	-.965
SHEERNESS	-1.008	-1.036	-1.127	-.651	-.917	-.317	-.478	-.948	-.899	-.684	-1.221	-1.109	-1.221

5.Acknowledgements

The author gratefully acknowledges the efforts of Tide Gauge Inspectorate of the Proudman Laboratory, who endeavour to maintain all the installations on the network, and those in Tidal Computations Section, now part of the British Oceanographic Data Centre (BODC), involved with the collection and processing of the data.

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