Deal Pier Tide Gauge

Location
OS: 638145E 152700N
WGS84 *Latitude:* 51° 13.427' N *Longitude:* 001° 24.550' E

Seaward end of Deal Pier, lower deck

Instrument
Rosemount WaveRadar Rex

Benchmarks

Benchmark	*Description*
TGBM = 3.893 OD	Top corner of NE leg of frame baseplate
Aux1 = 3.813 OD	Top of bolt

TGZ = 6.986m above Ordnance Datum Newlyn
TGZ = 10.386m above Admiralty Chart Datum
TGZ = 3.093m above TGBM

Datum information
All data are to Ordnance Datum Newlyn. The height of Chart Datum relative to Ordnance Datum at Deal is -3.40m (Admiralty Tide Tables, Supplementary Table III).

Survey information
The site was first surveyed on 25 August 2005 by levelling from a nearby surveyed benchmark. The re-survey of the TGBM on 08 December 2009 used an 8 hour GPS static survey on the frame. The result was 0.016m lower than the original survey. No change was made to the tide gauge datum.

Site characteristics
The Pier is on open coast, with no nearby estuaries. Spring tidal range is 5.4m. Some wave reflection from the Pier legs can occur.

Service history
The radar was serviced on 28 January 2009. No re-calibration of the instrument is required. Mains power to the Rex was cut off for periods during 2009 due to the refurbishment of the Pier.

Data Quality

C1 (%)	Sample interval	Missing days
90	10 minutes	13-14 Jan, 25 Feb-18 Mar, 17, 31 May, 01 Jun, 13 Sep

Residuals and Elevations

Residuals and Elevations (OD and CD) for the whole year are shown in Figures 1 to 3 respectively. Tidal elevations are derived as the one minute average of the 4Hz readings. The time stamp is the start of the measuring burst.

Statistics *All times GMT*

Month	Surge maxima		Surge minima	
	Value (m)	Date/Time	Value (m)	Date/Time
January	1.03	23-Jan-2009 07:30	-0.79	22-Jan-2009 09:20
February	0.64	10-Feb-2009 08:20	-0.69	01-Feb-2009 02:00
March	0.65	24-Mar-2009 01:50	-0.67	22-Mar-2009 16:40
April	0.24	28-Apr-2009 02:30	-0.62	19-Apr-2009 15:10
May	0.36	08-May-2009 05:30	-0.58	30-May-2009 13:20
June	0.32	09-Jun-2009 22:50	-0.40	13-Jun-2009 11:40
July	0.44	08-Jul-2009 22:40	-0.55	26-Jul-2009 12:00
August	0.64	29-Aug-2009 03:20	-0.56	23-Aug-2009 10:50
September	0.75	09-Sep-2009 10:00	-0.46	08-Sep-2009 20:10
October	0.93	04-Oct-2009 07:10	-0.49	28-Oct-2009 02:40
November	0.84	04-Nov-2009 09:40	-0.93	14-Nov-2009 21:00
December	0.50	28-Dec-2009 06:00	-0.48	06-Dec-2009 13:30

Month	Extreme maxima		Extreme minima	
	Elevation (OD)	Date/Time	Elevation (OD)	Date/Time
January	2.71	29-Jan-2009 00:40	-2.87	12-Jan-2009 06:50
February	3.28	10-Feb-2009 11:50	-2.85	11-Feb-2009 07:30
March	3.19	29-Mar-2009 00:20	-2.63	30-Mar-2009 08:30
April	2.95	10-Apr-2009 23:50	-2.72	10-Apr-2009 06:40
May	2.85	27-May-2009 00:40	-2.64	27-May-2009 20:20
June	2.96	26-Jun-2009 13:40	-2.71	25-Jun-2009 20:20
July	3.17	25-Jul-2009 13:30	-2.84	24-Jul-2009 20:20
August	3.18	22-Aug-2009 12:20	-2.97	23-Aug-2009 20:30
September	3.36	20-Sep-2009 11:50	-2.81	19-Sep-2009 18:50
October	3.33	04-Oct-2009 10:40	-2.71	18-Oct-2009 18:10
November	3.03	04-Nov-2009 11:40	-2.53	03-Nov-2009 18:20
December	2.92	03-Dec-2009 23:50	-2.45	05-Dec-2009 08:00

Month	Mean Level	
	No. of days	Elevation (OD)
January	29	0.097
February	24	0.146
March	13	0.098
April	30	0.091
May	29	0.090
June	29	0.149
July	31	0.190
August	31	0.157
September	29	0.190
October	31	0.186
November	30	0.274
December	31	0.263

Highest values in 2009			
Surge		Extreme	
Value (m)	Date/Time	Elevation (OD) (surge component)	Date/Time
1.03	23-Jan-2009 07:30	3.36 (0.03)	20-Sep-2009 11:50
0.93	04-Oct-2009 07:10	3.33 (0.59)	04-Oct-2009 10:40
0.89	19-Jan-2009 00:00	3.28 (0.38)	10-Feb-2009 11:50
0.84	04-Nov-2009 09:40	3.24 (0.40)	07-Oct-2009 12:30
0.80	12-Oct-2009 03:20	3.24 (0.10)	11-Feb-2009 00:00
0.78	23-Nov-2009 12:20	3.23 (-0.04)	12-Feb-2009 00:40
0.75	16-Oct-2009 16:30	3.21 (0.42)	09-Sep-2009 13:40
0.75	07-Oct-2009 09:00	3.19 (0.20)	29-Mar-2009 00:20
0.75	09-Sep-2009 10:00	3.18 (-0.13)	22-Aug-2009 12:20
-	-	3.17 (-0.03)	25-Jul-2009 13:30

Year	Annual surge maxima		Annual extreme maxima		Z_0 (OD)	Annual Recovery rate (C1)
	Value (m)	Date	Elevation (OD) (surge component)	Date		
2006	1.60	31-Oct-2006 22:10	3.58 (0.33)	07-Oct-2006 10:50	0.156	98%
2007	1.87	09-Nov-2007 06:00	3.83 (1.26)	09-Nov-2007 10:40	0.182	97%
2008	1.15	21-Nov-2008 12:20	3.34 (0.25)	16-Oct-2008 11:50	0.158	92%
2009	1.03	23-Jan-2009 07:30	3.36 (0.03)	20-Sep-2009 11:50	-	90%

General

The time series of 10 minute tidal elevations for one year is quality-checked in accordance with ESEAS guidelines, flagged and archived. The archived time series is continuous and monotonic, with missing data given as 9999. The missing data shown are days where the entire 24 hours of data are missing.

Monthly extreme maxima/minima are the maximum and minimum water levels from all measured data for that month. Monthly surge maxima/minima (residuals) are calculated in a similar manner from the time series of residuals. Residuals are derived as the measured tidal elevation minus the predicted tidal elevation.

Tidal predictions were produced using TASK2000. The monthly Mean Level is calculated as the average of all readings for the given month. The annual Z_0 is the value of Mean Sea Level derived by the harmonic analysis of the year's data. These values should not be used for any purpose without consideration of the recovery rate.

Acknowledgements

Tidal predictions were produced using the TASK2000 software, kindly provided by the Permanent Service for Mean Sea Level (PSMSL), Proudman Oceanographic Laboratory.

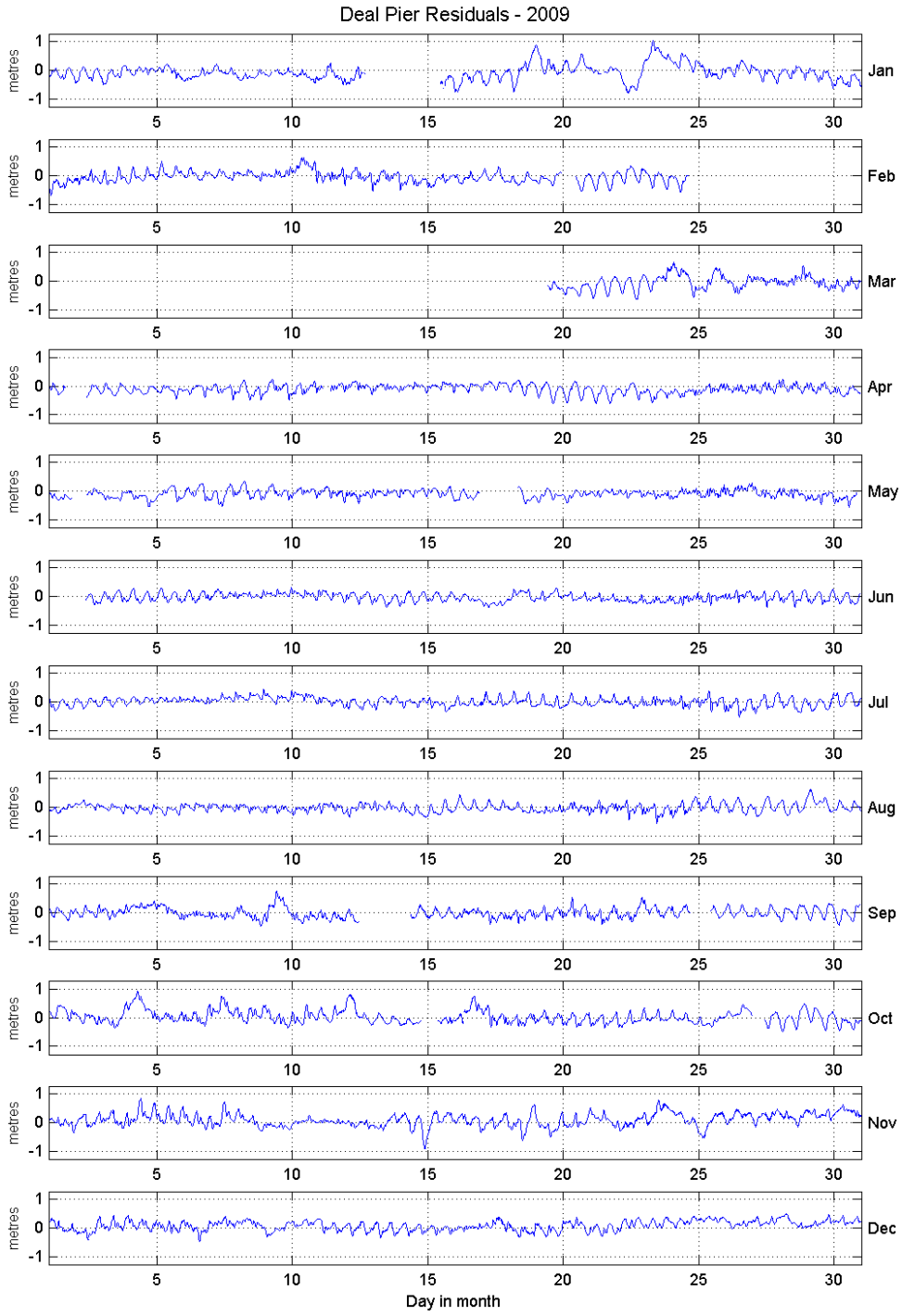

Figure 1: Residuals for 2009

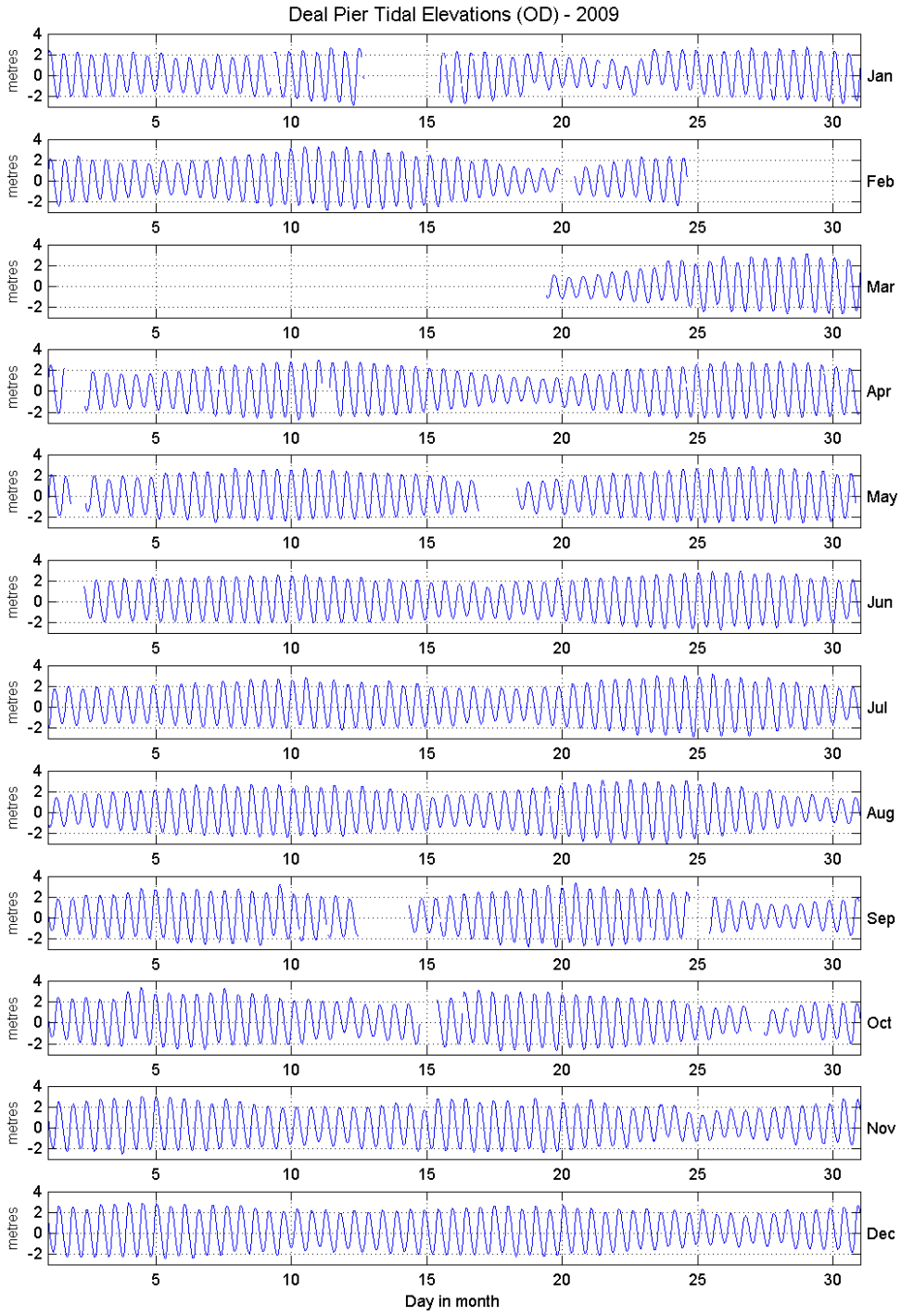

Figure 2 Tidal elevations relative to Ordnance Datum for 2009

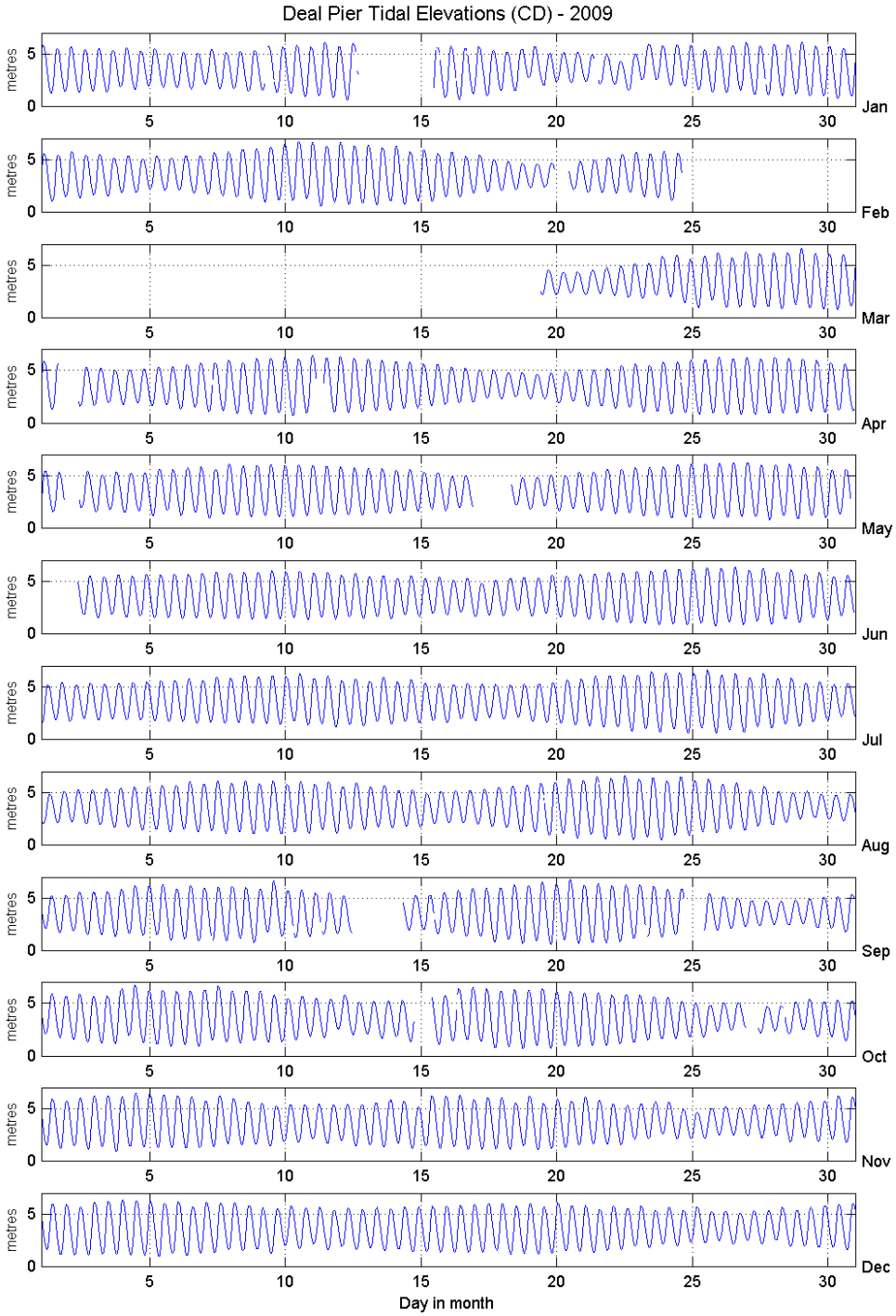

Figure 3 Tidal elevations relative to Chart Datum for 2009