

## Swanage Pier Tide Gauge

### Location

OS: 403692E 78849N

WGS84 Latitude: 50° 36.5598' N Longitude: 01° 56.9510' W

Seaward end of Swanage Pier

### Instrument

Rosemount WaveRadar Rex  
(inst. No. 47735)

TGZ



### Benchmarks

TGBM 6.262m OD Top of S/S horizontal frame  
 TGZ = 6.337m above Ordnance Datum Newlyn  
 TGZ = 7.737m above Admiralty Chart Datum  
 TGZ = 0.075m above TGBM

### Datum information

All data are to Ordnance Datum Newlyn. The height of Chart Datum relative to Ordnance Datum at Swanage is -1.40m (Admiralty Tide Tables, Supplementary Table III).

### Survey information

The site was last surveyed on 16 July 2008.

### Site Characteristics

The Pier is on open coast, with no nearby estuaries, but leeward of a headland. Spring tidal range is approx. 1.1m.

### Deployment and service history

The tide gauge was first deployed on 07 March 2007. No re-calibration of the instrument is required. All data prior to the full survey on 16 July 2008 were adjusted to the correct elevation.

### Measurements

The Rex is a Frequency Modulated Continuous Wave radar, sampling at 4Hz. Tidal elevations are derived, every 10 minutes, as the one minute average of the 4Hz readings. The time stamp is the start of the measuring burst.

### Data Quality

C1 (%)	Sample interval	Missing data
90	10 minutes	03-06 Apr, 10, 29 Nov, 06 Dec

### Residuals and Elevations

Residuals and Elevations (OD and CD) for the whole year are shown in Figures 1 to 3 respectively. It should be noted that, given the small tidal range and double High Waters, tidal predictions are particularly difficult at this site, both for elevation and especially for timing. Accordingly, there may be instances of apparent tidal surge and/or periodicity in the surge which are, in reality, an artefact of the predictions.

### Statistics

All times GMT

Month	Surge maxima		Surge minima	
	Value (m)	Date/Time	Value (m)	Date/Time
January	0.80	19-Jan-2009 05:20	-0.39	06-Jan-2009 02:10
February	0.61	09-Feb-2009 21:40	-0.42	01-Feb-2009 05:40
March	0.56	03-Mar-2009 20:20	-0.36	18-Mar-2009 07:30
April	0.33	27-Apr-2009 05:30	-0.34	22-Apr-2009 00:30
May	0.35	17-May-2009 11:20	-0.42	12-May-2009 00:10
June	0.25	10-Jun-2009 19:00	-0.26	22-Jun-2009 13:30
July	0.35	21-Jul-2009 15:30	-0.25	12-Jul-2009 17:00
August	0.32	26-Aug-2009 15:40	-0.29	12-Aug-2009 05:10
September	0.46	02-Sep-2009 17:40	-0.38	10-Sep-2009 05:10
October	0.55	07-Oct-2009 13:30	-0.21	31-Oct-2009 12:30
November	0.67	14-Nov-2009 11:30	-0.34	14-Nov-2009 23:10
December	0.55	30-Dec-2009 10:20	-0.45	18-Dec-2009 11:40

Month	Extreme maxima		Extreme minima	
	Elevation (OD)	Date/Time	Elevation (OD)	Date/Time
January	1.32	19-Jan-2009 06:30	-1.05	13-Jan-2009 16:50
February	1.33	09-Feb-2009 20:50	-1.21	11-Feb-2009 16:50
March	0.88	10-Mar-2009 06:20	-1.18	11-Mar-2009 15:40
April	1.03	09-Apr-2009 20:40	-0.90	08-Apr-2009 14:40
May	0.94	25-May-2009 21:10	-0.97	27-May-2009 05:00
June	0.84	08-Jun-2009 19:30	-1.03	24-Jun-2009 04:00
July	1.14	23-Jul-2009 21:50	-1.13	25-Jul-2009 05:20
August	1.16	22-Aug-2009 22:00	-1.19	22-Aug-2009 04:10
September	1.09	19-Sep-2009 20:30	-1.15	20-Sep-2009 03:50
October	1.20	20-Oct-2009 09:30	-0.93	17-Oct-2009 02:10
November	1.17	04-Nov-2009 10:00	-0.63	08-Nov-2009 19:20
December	1.05	31-Dec-2009 07:30	-0.89	18-Dec-2009 16:40

Month	Mean Level	
	No. of days	Elevation (OD)
January	31	0.278
February	28	0.206
March	31	0.175
April	26	0.223
May	31	0.178
June	30	0.239
July	31	0.296
August	31	0.257
September	30	0.213
October	31	0.312
November	28	0.459
December	30	0.377

Highest values in 2009			
Surge		Extreme	
Value (m)	Date/Time	Elevation (OD) (surge component)	Date/Time
0.80	19-Jan-2009 05:20	1.33 (0.53)	09-Feb-2009 20:50
0.67	14-Nov-2009 11:30	1.32 (0.79)	19-Jan-2009 06:30
0.64	23-Jan-2009 07:20	1.20 (0.32)	20-Oct-2009 09:30
0.61	09-Feb-2009 21:40	1.17 (0.36)	04-Nov-2009 10:00
0.56	03-Mar-2009 20:20	1.17 (0.45)	16-Nov-2009 08:40
0.55	30-Dec-2009 10:20	1.17 (0.64)	23-Jan-2009 07:20
0.55	07-Oct-2009 13:30	1.16 (0.14)	22-Aug-2009 22:00
0.54	04-Nov-2009 12:30	1.16 (0.30)	03-Nov-2009 08:40
0.53	29-Dec-2009 21:50	1.14 (0.11)	23-Jul-2009 21:50
-	-	1.12 (0.08)	13-Jan-2009 09:50

Year	Annual surge maxima		Annual extreme maxima		Z <sub>0</sub> (OD)	Annual recovery rate (C1)
	Value (m)	Date	Elevation (OD) (surge component)	Date		
2008	0.91	10-Mar-2008 05:40	1.66 (0.64)	10-Mar-2008 10:10	-	94%
2009	0.80	19-Jan-2009 05:20	1.33 (0.53)	09-Feb-2009 20:50	0.242	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.

The monthly Mean Level is calculated as the average of all readings for the given month. The annual Z<sub>0</sub> 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 by EMU Limited. The Rex is installed on Swanage Pier by kind permission of the Swanage Pier Trust.

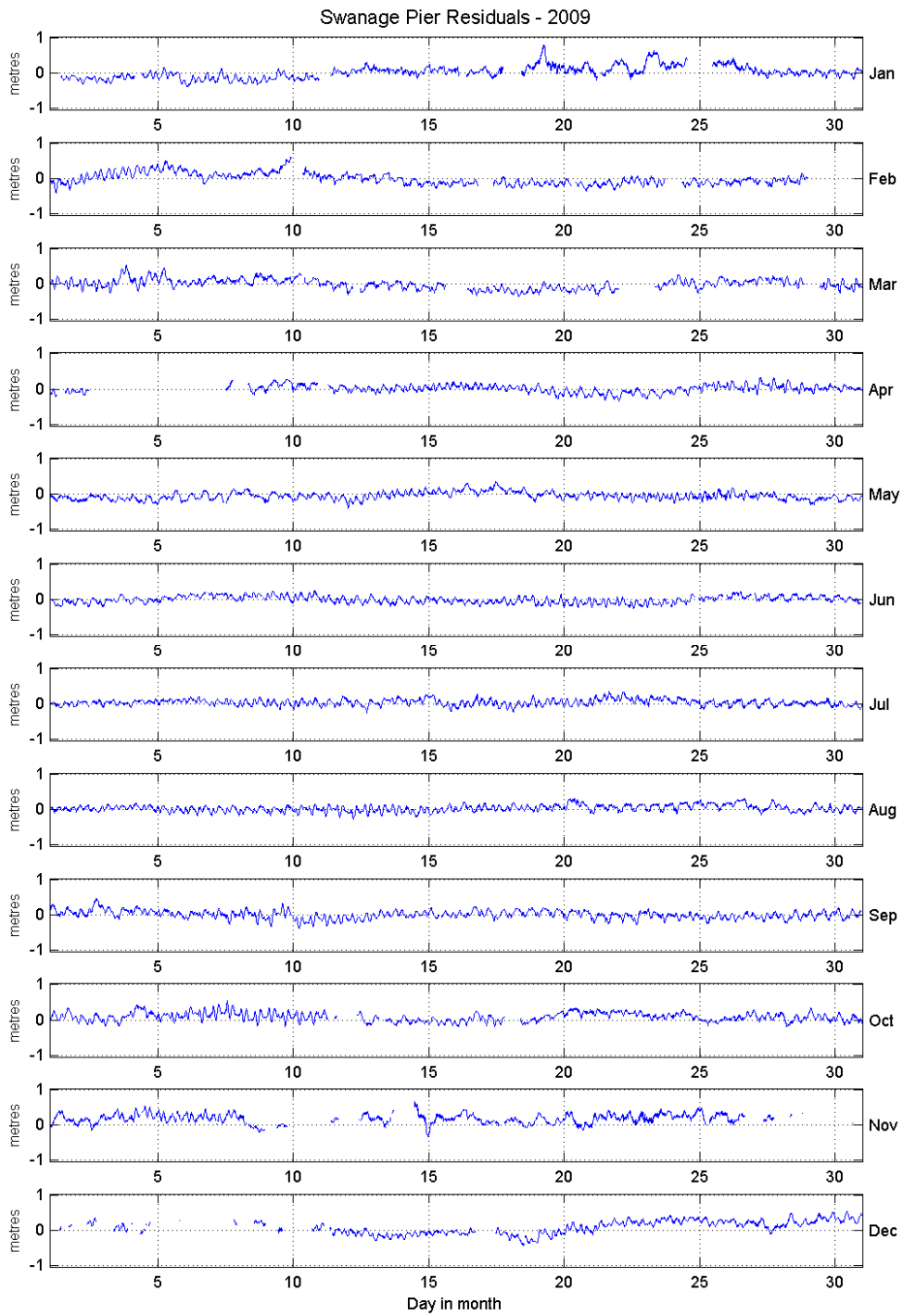


Figure 1 Residuals for 2009

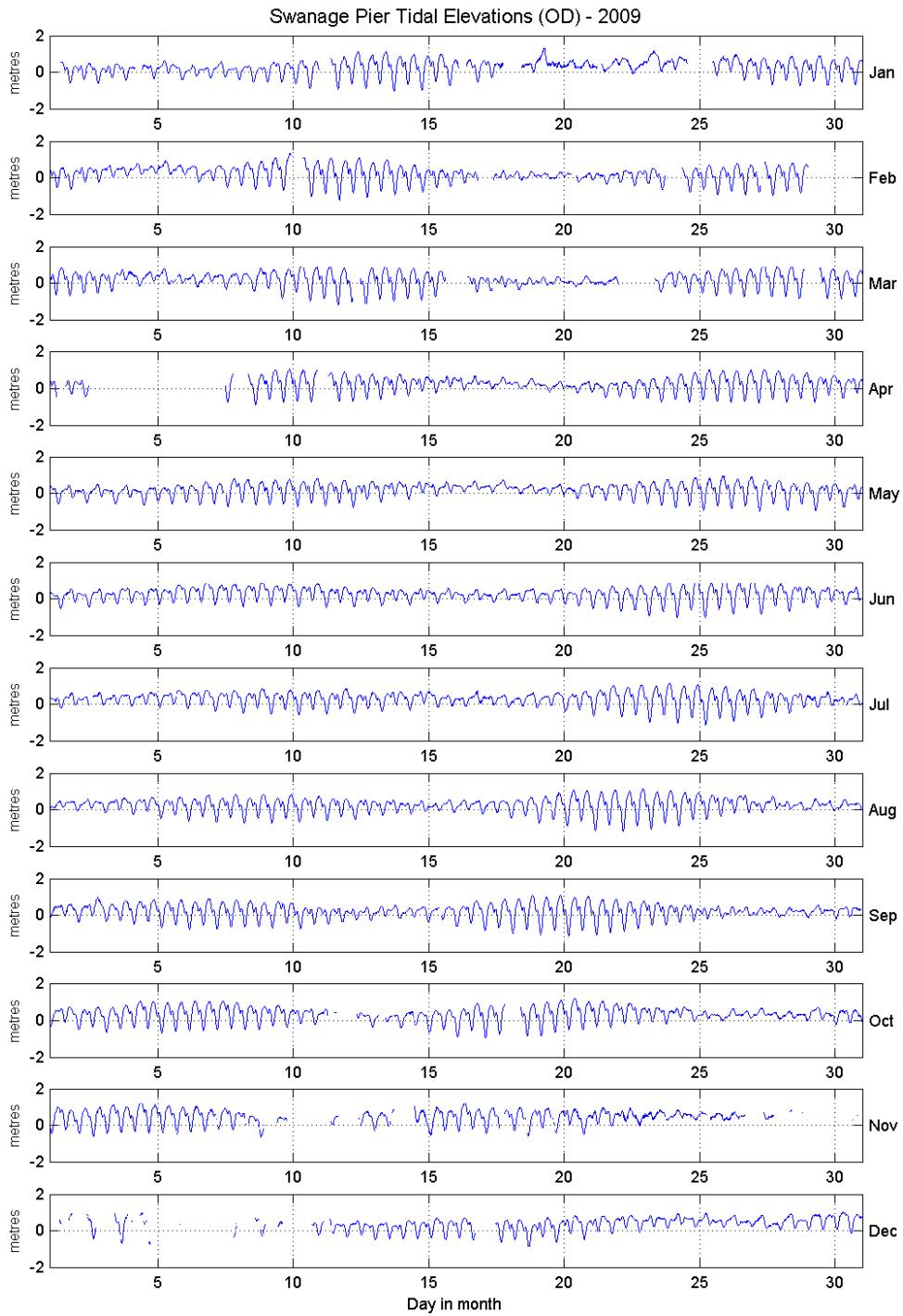


Figure 2 Tidal elevations relative to Ordnance Datum for 2009

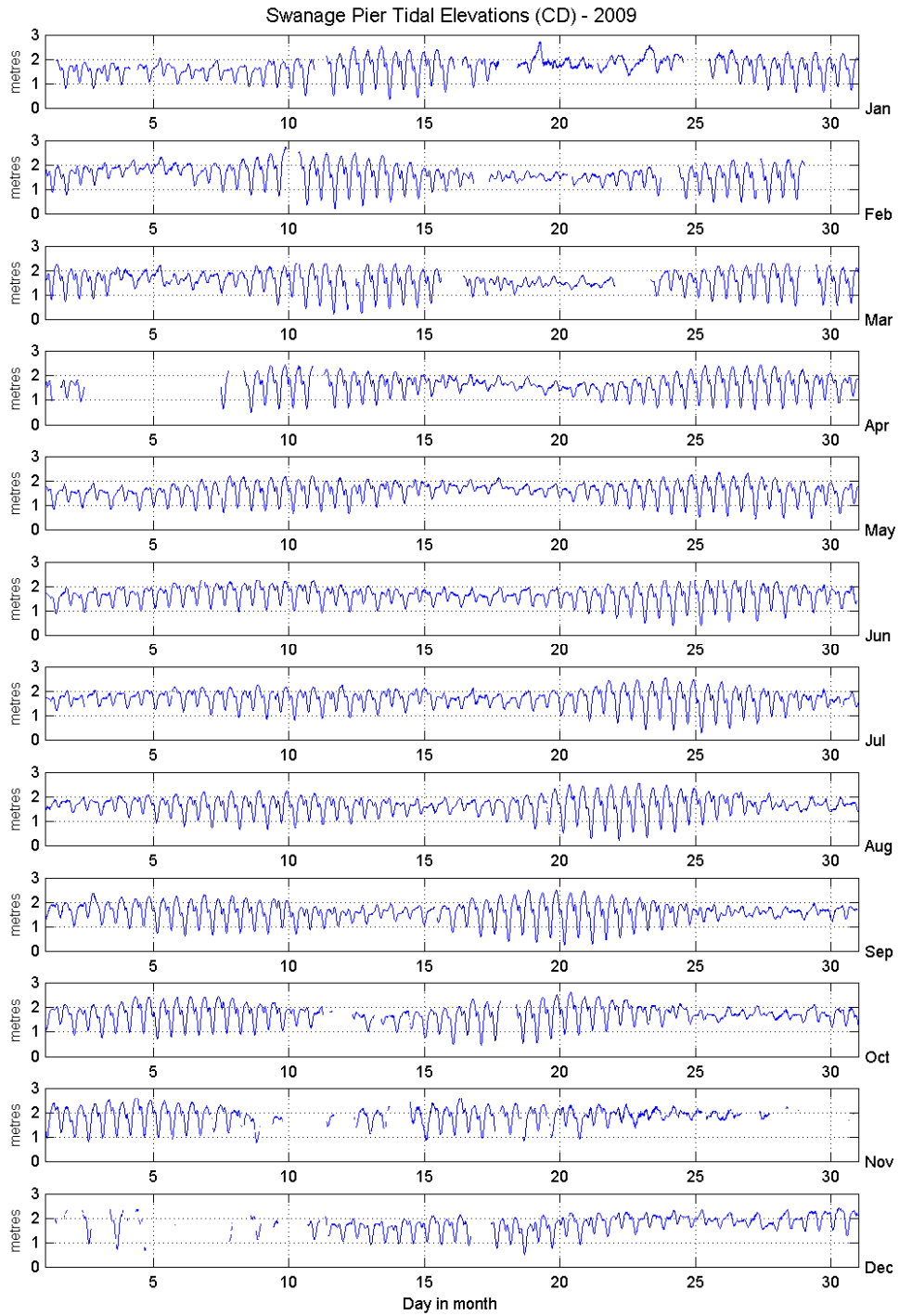


Figure 3 Tidal elevations relative to Chart Datum for 2009