

## Port Isaac Tide Gauge

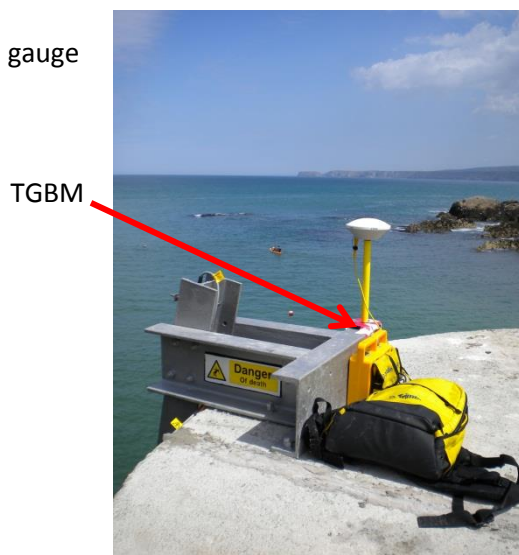
### Location

OS: 199490E 80998N

WGS84: Latitude: 50° 35' 39.083" N Longitude: 04° 50' 03.881" W

### Instrument

Etrometa step gauge



### Benchmarks

#### Benchmark

TGBM = 7.715 m above Ordnance Datum Newlyn

TGZ = -3.970 m above Ordnance Datum Newlyn

TGZ = -0.170 m above Chart Datum

TGZ = 11.685 m below TGBM

#### Description

Top of galvanised horizontal frame

### Datum

All data are to Ordnance Datum Newlyn. The height of Chart Datum relative to Ordnance Datum at Port Isaac is -3.80m (Admiralty Tide Tables, Supplementary Table III).

### Survey information

The site was first surveyed on 29 June 2010, using a ~25 hour occupation to account for tidal loading.

### Site characteristics

The breakwater is on open coast, although sheltered from the southwest by a headland. Some wave reflection from the breakwater can occur. There are no nearby estuaries. Spring tidal range is approx. 6.6m.

### Data quality

Recovery rate (%)	Sample interval
96	10 minutes

## Service history

The step gauge became operational on 26 July 2010 and is serviced at 9-monthly intervals. No re-calibration of the instrument is required.

## Measurements

Residuals and Elevations (OD and CD) for the whole year are shown in Figures 1 to 3 respectively.

## Statistics

*All times GMT*

Month	Extreme maxima		Extreme minima	
	Elevation (OD)	Date/Time	Elevation (OD)	Date/Time
January	4.22	11-Jan-2016 05:50	-3.00	13-Jan-2016 01:10
February	4.61	11-Feb-2016 07:10	-3.44	10-Feb-2016 12:40
March	4.44	11-Mar-2016 06:50	-3.87	11-Mar-2016 13:10
April	4.58	09-Apr-2016 06:30	-3.81	08-Apr-2016 12:00
May	4.54	08-May-2016 06:10	-3.55	07-May-2016 11:40
June	4.06	05-Jun-2016 17:30	-3.37	05-Jun-2016 23:50
July	3.88	04-Jul-2016 17:10	-3.20	06-Jul-2016 00:10
August	4.37	19-Aug-2016 18:10	-3.29	22-Aug-2016 01:50
September	4.49	18-Sep-2016 18:20	-3.70	19-Sep-2016 00:50
October	4.65	16-Oct-2016 17:20	-3.73	18-Oct-2016 00:20
November	4.38	15-Nov-2016 17:50	-3.67	15-Nov-2016 11:50
December	4.36	16-Dec-2016 06:50	-3.29	16-Dec-2016 13:00

Month	Surge maxima		Surge minima	
	Value (m)	Date/Time	Value (m)	Date/Time
January	0.72	01-Jan-2016 23:00	-0.26	23-Jan-2016 03:30
February	1.01	08-Feb-2016 07:30	-0.30	03-Feb-2016 16:10
March	0.64	28-Mar-2016 00:00	-0.40	09-Mar-2016 18:50
April	0.38	10-Apr-2016 15:00	-0.22	30-Apr-2016 23:40
May	0.31	08-May-2016 15:30	-0.26	01-May-2016 00:50
June	0.31	15-Jun-2016 13:30	-0.22	08-Jun-2016 11:00
July	0.28	10-Jul-2016 11:30	-0.21	16-Jul-2016 05:50
August	0.54	20-Aug-2016 00:30	-0.27	08-Aug-2016 04:40
September	0.24	14-Sep-2016 15:30	-0.29	27-Sep-2016 19:50
October	0.26	15-Oct-2016 20:40	-0.30	09-Oct-2016 14:10
November	0.39	20-Nov-2016 00:40	-0.31	29-Nov-2016 05:20
December	0.36	16-Dec-2016 03:00	-0.33	24-Dec-2016 11:30

Month	Mean Level	
	No. of days	Elevation (OD)
January	30	0.573
February	29	0.402
March	29	0.240
April	30	0.325
May	30	0.333
June	30	0.320
July	30	0.320
August	31	0.328
September	30	0.368
October	30	0.352
November	30	0.382
December	23	0.326

Highest values in 2016			
Extreme		Surge	
Elevation (OD) (Surge component)	Date/Time	Value (m)	Date/Time
4.65 (0.15)	16-Oct-2016 17:20	1.01	08-Feb-2016 07:30
4.61 (0.37)	11-Feb-2016 07:10	0.72	01-Jan-2016 23:00
4.58 (0.05)	09-Apr-2016 06:30	0.72	09-Jan-2016 15:20
4.56 (0.24)	10-Apr-2016 07:00	0.69	08-Feb-2016 01:20
4.54 (0.19)	08-May-2016 06:10	0.65	09-Feb-2016 10:40
4.53 (-0.08)	17-Oct-2016 18:00	0.64	28-Mar-2016 00:00
4.53 (0.06)	08-Apr-2016 05:50	0.60	06-Feb-2016 23:00
4.51 (0.22)	08-May-2016 18:30	0.60	26-Jan-2016 14:10
4.51 (0.41)	12-Feb-2016 08:00	0.60	07-Jan-2016 03:50
4.49 (-0.02)	18-Sep-2016 18:20	0.59	10-Jan-2016 02:20

Year	Annual extreme maxima		Annual surge maxima		Z <sub>0</sub> (OD)	Annual recovery rate
	Elevation (OD) (Surge)	Date/Time	Value (m)	Date/Time		
2010	4.66 (-)	08-Oct-2010 17:40	-	-	-	44%
2011	4.59 (0.09)	21-Feb-2011 07:20	0.70	13-Dec-2011 02:30	0.304	99%
2012	4.76 (0.53)	17-Oct-2012 18:30	0.77	17-Oct-2012 11:10	0.311	99%
2013	4.48 (0.06)	24-Jul-2013 18:30	1.12	27-Dec-2013 06:50	0.318	99%
2014	4.80 (0.46)	03-Jan-2014 06:50	1.09	12-Feb-2014 11:20	-	96%
2015	4.74 (0.17)	28-Oct-2015 17:50	0.84	14-Jan-2015 23:20	-	98%
2016	4.65 (0.15)	16-Oct-2016 17:20	1.01	08-Feb-2016 07:30	-	96%

Tidal levels		
Observation period	August 2010 to December 2012	
Tide Level	Elevation (OD)	Elevation (CD)
HAT	4.73	8.53
MHWS	3.64	7.44
MHWN	1.88	5.68
MSL	0.31	4.11
MLWN	-1.27	2.53
MLWS	-3.03	0.77
LAT	-4.01	-0.21

## 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

The step gauge is mounted on Port Isaac breakwater by kind permission of the Port Isaac Harbour Commissioners and the shore station is kindly hosted by Port Isaac Aquarium. Tidal predictions were

produced using the TASK windows edition software, kindly provided by the Marine Data Products team at the UK National Oceanography Centre (Liverpool). Tide levels were produced by Fugro EMU Limited.

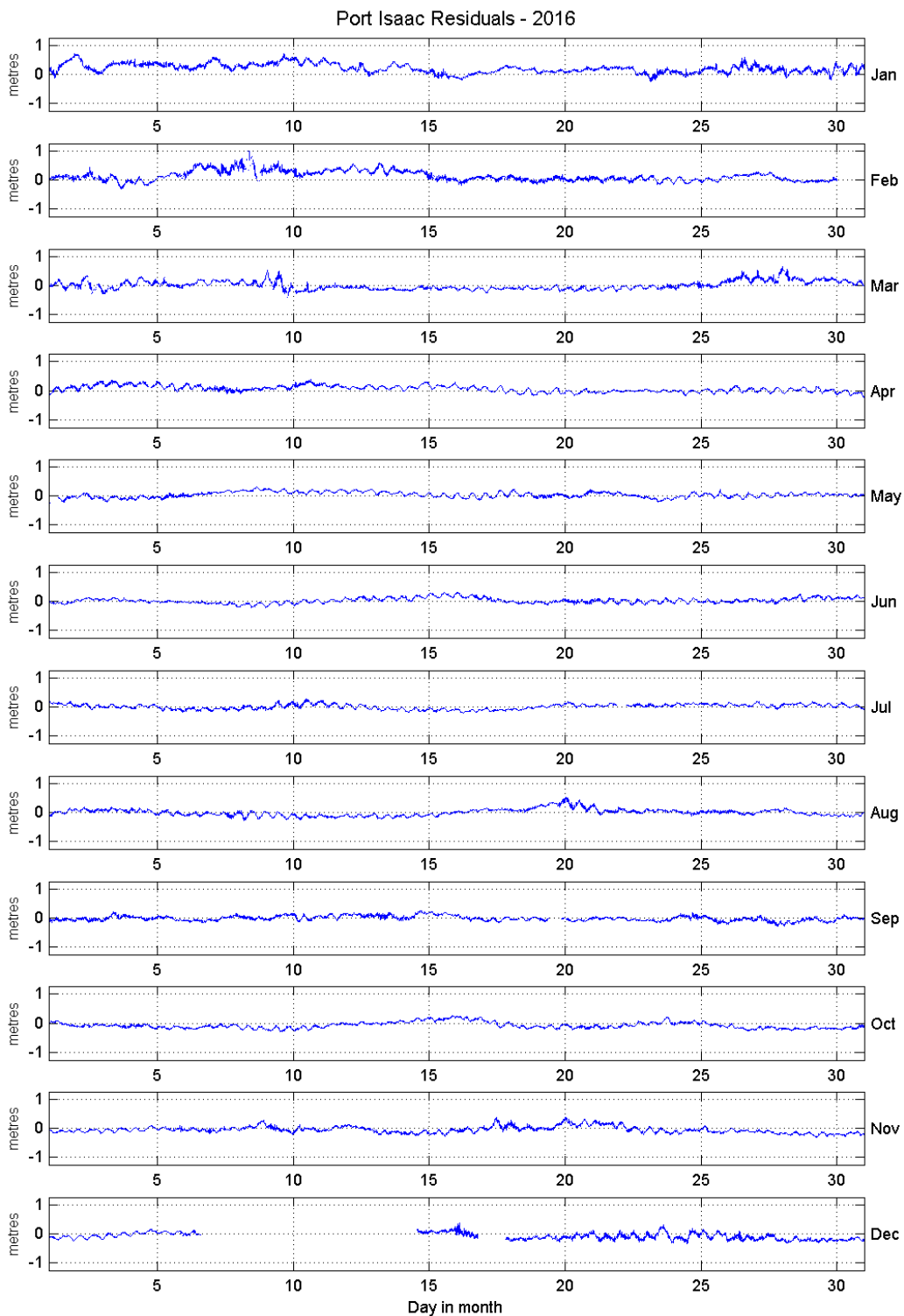


Figure 1: Port Isaac residuals for 2016

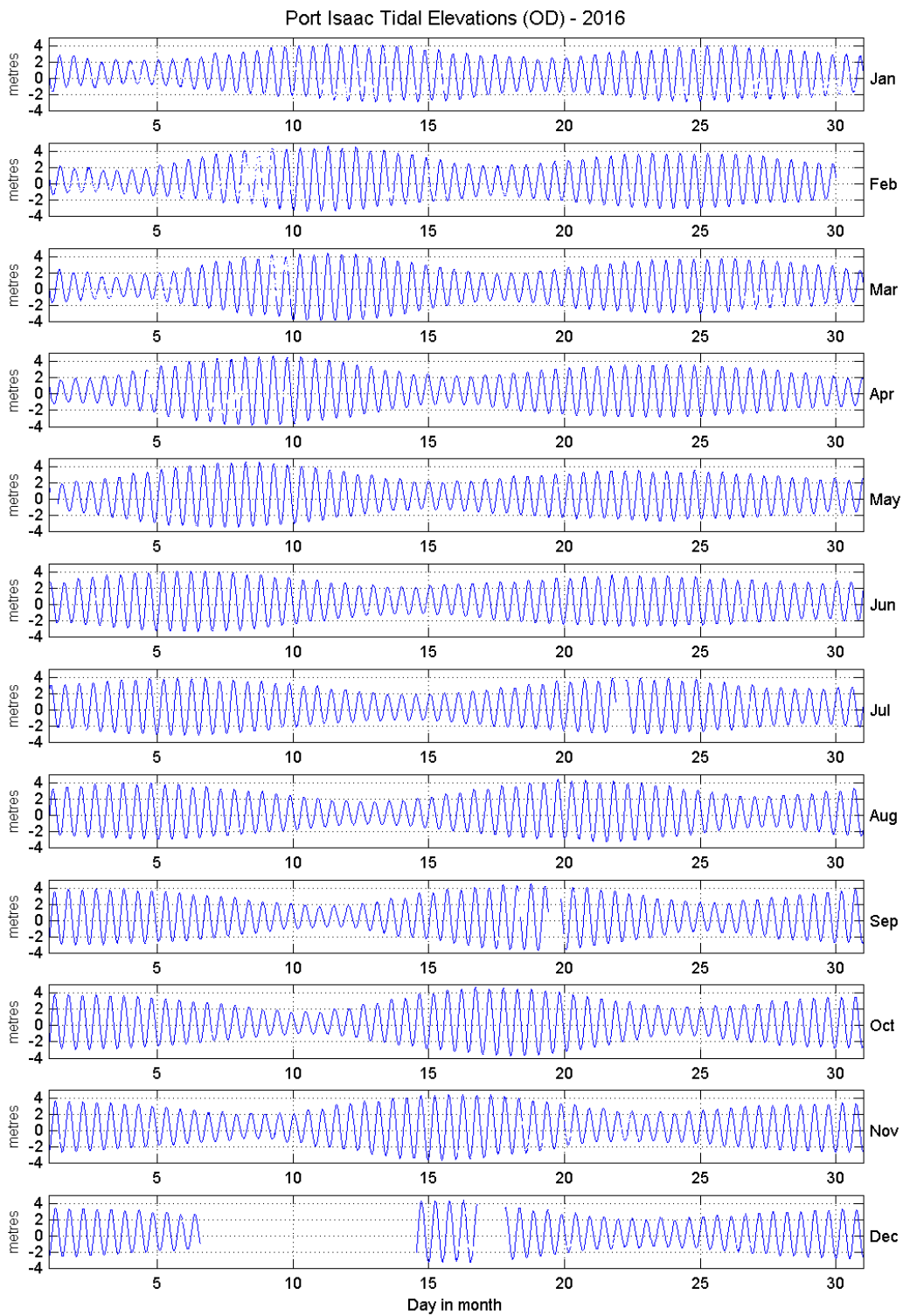


Figure 2: Port Isaac tidal elevations for 2016 relative to Ordnance Datum

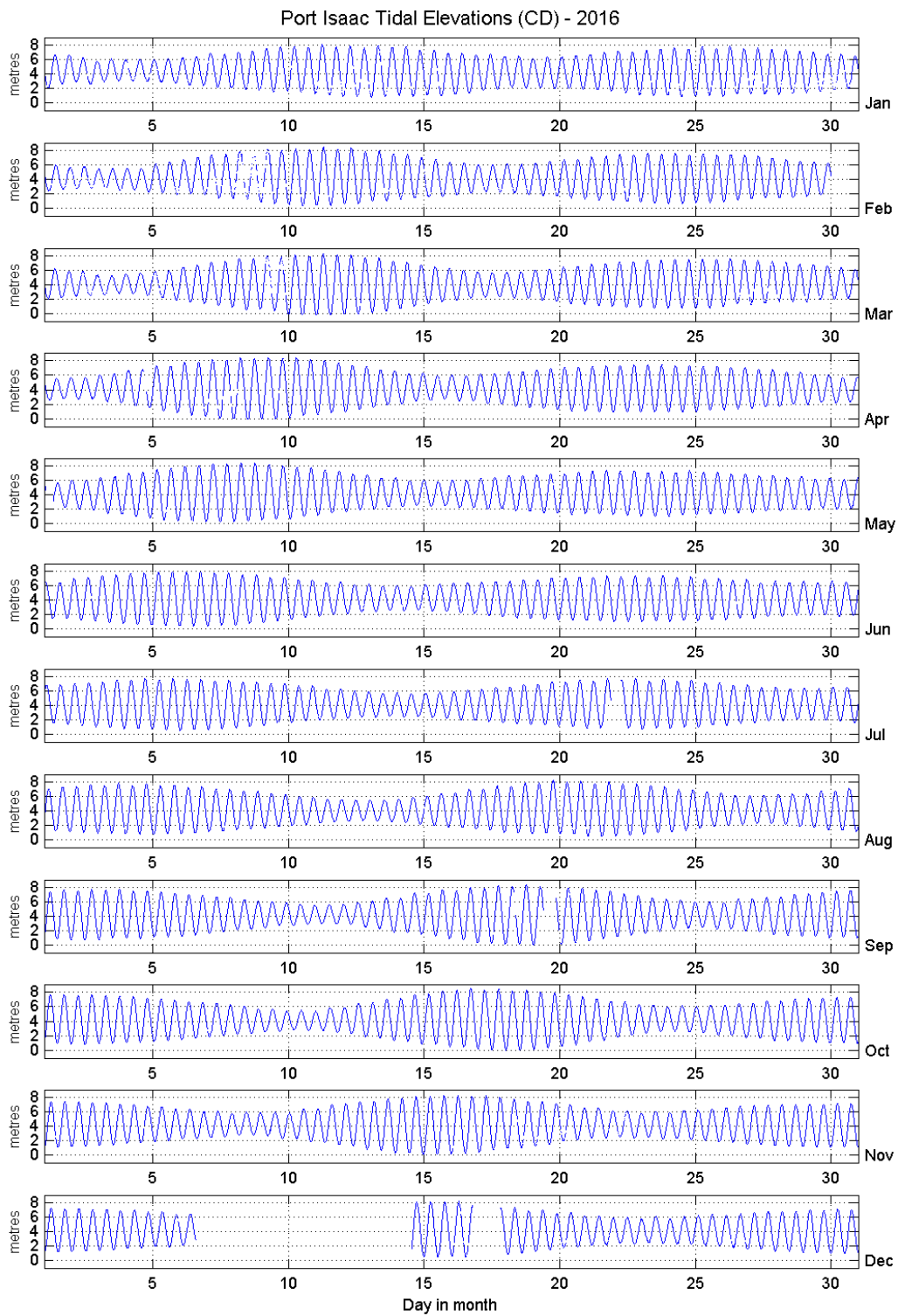


Figure 3: Port Isaac tidal elevations for 2016 relative to Chart Datum