

Severn Bridge Tide Gauge

Location

OS: 351580E 185927N

WGS84: *Latitude: 51° 34.207' N Longitude: 02° 42.001' W*

Mid-span of Second Severn Crossing

Instrument

Rosemount WaveRadar REX

Security considerations mean that no photographs of the tide gauge installation on the Severn Bridge may be made public.

Benchmarks

TGBM = 50.459 m above Ordnance Datum Newlyn

TGZ = 47.984 m above Ordnance Datum Newlyn

TGZ = 54.484 m above Chart Datum

TGZ = 2.475 m below TGBM

Datum

All data are to Ordnance Datum Newlyn. The height of Chart Datum relative to Ordnance Datum at Avonmouth and Sudbury is -6.50m (Admiralty Tide Tables, Supplementary Table III).

Survey information

The site was surveyed on 29 May 2008, using a 25 hour occupation to account for tidal loading.

Site characteristics

The Bristol Channel/Severn estuary experiences large tides and strong tidal currents mid-stream. Spring tidal range is approx. 11.6m.

Data quality

Recovery rate (%)	Sample interval
93	10 minutes

Service history

The REX became operational on 01 August 2011 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. It should be noted that, given the very large tidal range at this site, tidal predictions are particularly difficult, 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	Extreme maxima		Extreme minima	
	Elevation (OD)	Date/Time	Elevation (OD)	Date/Time
January	7.40	14-Jan-2017 08:30	-5.87	14-Jan-2017 15:50
February	7.51	28-Feb-2017 20:50	-6.24	13-Feb-2017 04:00
March	7.78	30-Mar-2017 08:50	-6.25	29-Mar-2017 15:30
April	7.72	28-Apr-2017 08:40	-6.35	28-Apr-2017 03:30
May	7.52	27-May-2017 08:20	-6.18	27-May-2017 03:10
June	7.46	25-Jun-2017 20:20	-5.99	26-Jun-2017 03:40
July	7.31	25-Jul-2017 21:00	-5.89	26-Jul-2017 04:20
August	7.37	22-Aug-2017 20:00	-5.90	23-Aug-2017 03:20
September	7.36	08-Sep-2017 20:50	-5.86	22-Sep-2017 03:30
October	7.39	07-Oct-2017 08:10	-6.09	08-Oct-2017 03:50
November	7.53	04-Nov-2017 19:30	-6.27	06-Nov-2017 03:30
December	7.27	05-Dec-2017 20:40	-6.20	05-Dec-2017 03:10

Month	Surge maxima		Surge minima	
	Value (m)	Date/Time	Value (m)	Date/Time
January	0.59	04-Jan-2017 01:50	-1.04	16-Jan-2017 17:10
February	1.30	23-Feb-2017 08:30	-1.05	13-Feb-2017 04:10
March	1.26	05-Mar-2017 18:50	-1.29	24-Mar-2017 10:30
April	0.75	28-Apr-2017 15:00	-1.07	22-Apr-2017 22:30
May	0.74	12-May-2017 04:10	-0.80	05-May-2017 08:50
June	0.88	06-Jun-2017 09:10	-0.61	20-Jun-2017 09:50
July	0.76	15-Jul-2017 01:50	-0.64	14-Jul-2017 20:10
August	0.70	12-Aug-2017 13:00	-0.75	20-Aug-2017 13:10
September	1.23	13-Sep-2017 02:00	-0.75	02-Sep-2017 10:00
October	1.41	16-Oct-2017 12:30	-1.05	31-Oct-2017 10:10
November	1.10	23-Nov-2017 05:20	-0.95	17-Nov-2017 05:20
December	1.01	10-Dec-2017 09:40	-0.88	15-Dec-2017 12:20

Month	Mean Level	
	No. of days	Elevation (OD)
January	25	0.506
February	28	0.448
March	31	0.400
April	30	0.123
May	31	0.287
June	30	0.368
July	31	0.336
August	31	0.370
September	30	0.430
October	31	0.457
November	30	0.393
December	31	0.381

Highest values in 2017			
Extreme		Surge	
Elevation (OD) (Surge component)	Date/Time	Value (m)	Date/Time
7.78 (0.35)	30-Mar-2017 08:50	1.41	16-Oct-2017 12:30
7.72 (0.31)	28-Apr-2017 08:40	1.30	23-Feb-2017 08:30
7.68 (0.70)	01-Mar-2017 21:20	1.27	02-Feb-2017 18:30
7.64 (0.16)	29-Mar-2017 08:10	1.26	05-Mar-2017 18:50
7.61 (0.40)	01-Mar-2017 09:10	1.25	03-Feb-2017 19:10
7.59 (0.10)	27-Apr-2017 07:50	1.23	13-Sep-2017 02:00
7.57 (0.27)	28-Apr-2017 20:50	1.22	16-Oct-2017 13:20
7.57 (0.08)	27-Apr-2017 20:10	1.18	20-Oct-2017 03:30
7.55 (0.43)	31-Mar-2017 09:40	1.15	21-Oct-2017 14:10
7.53 (0.09)	29-Mar-2017 20:30	1.14	21-Oct-2017 04:10

Year	Annual extreme maxima		Annual surge maxima		Z ₀ (OD)	Annual recovery rate
	Elevation (OD) (Surge)	Date/Time	Value (m)	Date/Time		
2011	7.89 (-)	29-Sep-2011 20:40	-	-	-	59%
2012	8.15 (0.80)	17-Oct-2012 08:10	1.62	03-Jan-2012 05:40	0.340	99%
2013	7.80 (0.25)	22-Aug-2013 20:30	1.55	02-Nov-2013 14:20	-	98%
2014	8.50 (1.44)	03-Jan-2014 08:20	2.69	12-Feb-2014 16:20	-	98%
2015	8.12 (0.91)	21-Feb-2015 09:00	1.62	05-May-2015 16:20	-	99%
2016	8.16 (0.24)	09-Apr-2016 08:40	1.81	08-Feb-2016 14:00	-	91%
2017	7.78 (0.35)	30-Mar-2017 08:50	1.41	16-Oct-2017 12:30	-	93%

Tidal levels		
Observation period	August 2011 to December 2012	
Tide Level	Elevation (OD)	Elevation (CD)
HAT	8.07	14.57
MHWS	6.14	12.64
MHWN	3.11	9.61
MSL	0.34	6.84
MLWN	-2.44	4.06
MLWS	-5.46	1.04
LAT	-6.90	-0.40

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 Z₀ 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 tide levels were produced by Fugro GB Marine Limited. The WaveRadar REX is installed on the Severn Bridge by kind permission of Second Severn Crossing Partnership.

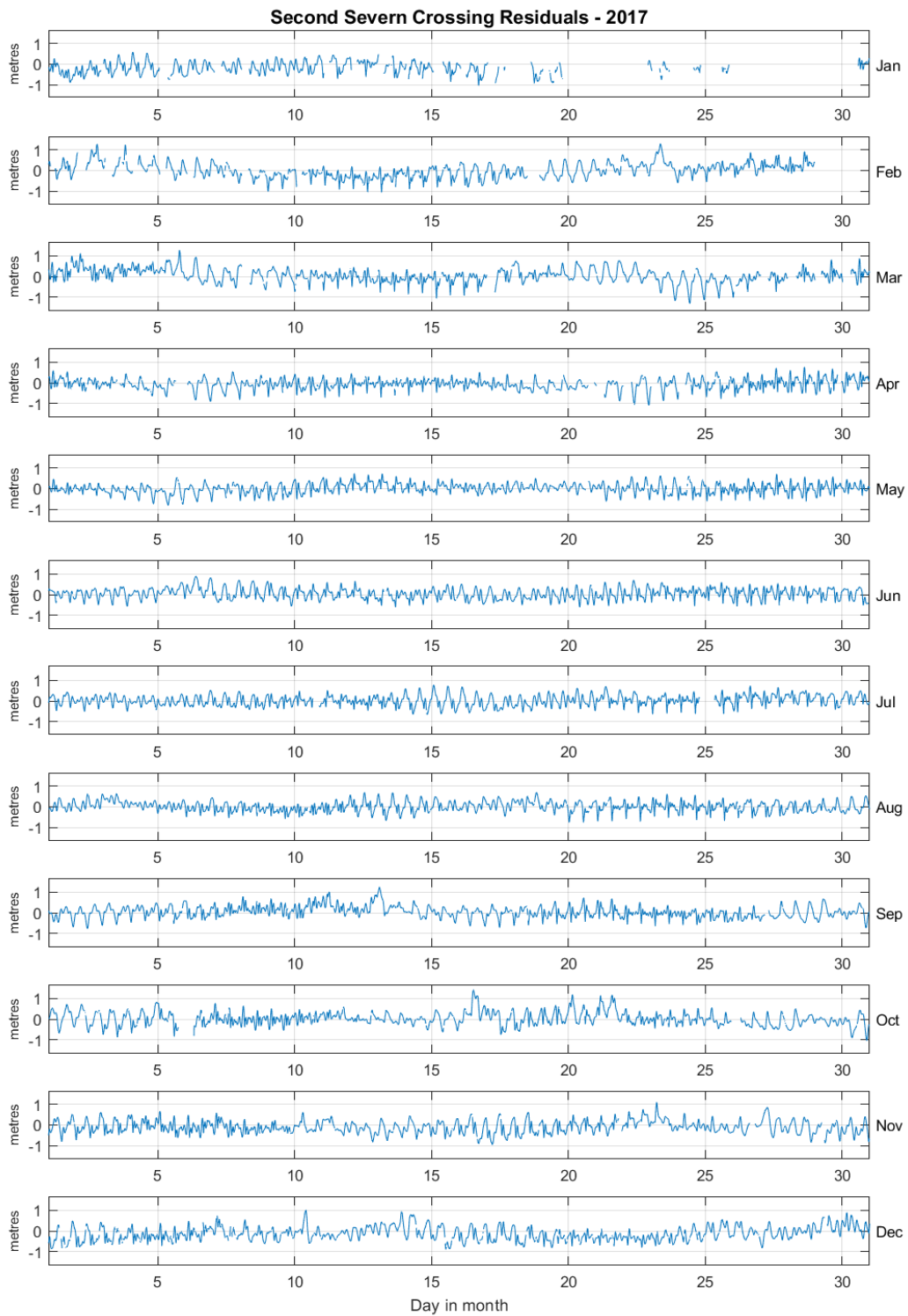


Figure 1: Severn Bridge residuals for 2017

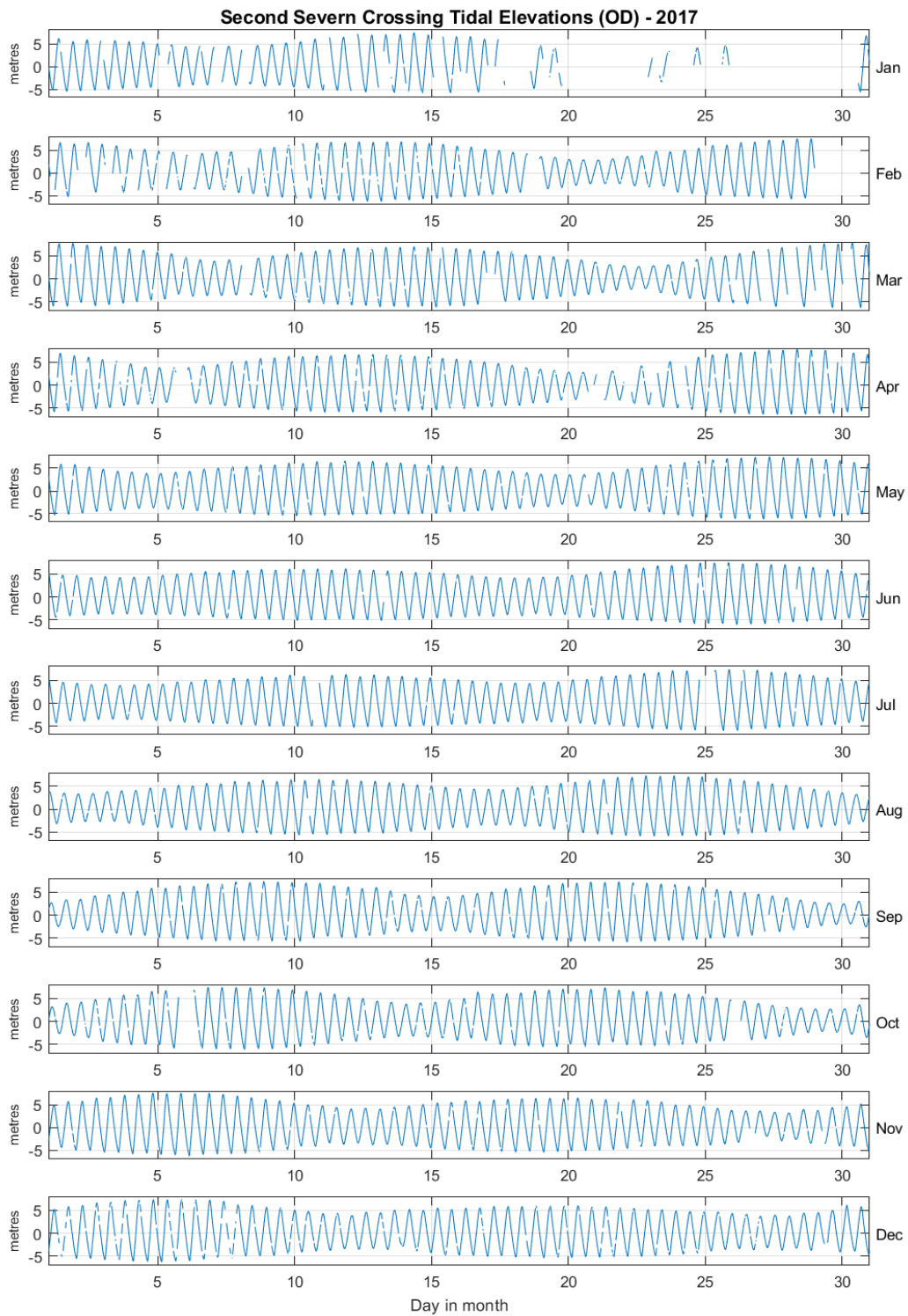


Figure 2: Severn Bridge tidal elevations for 2017 relative to Ordnance Datum

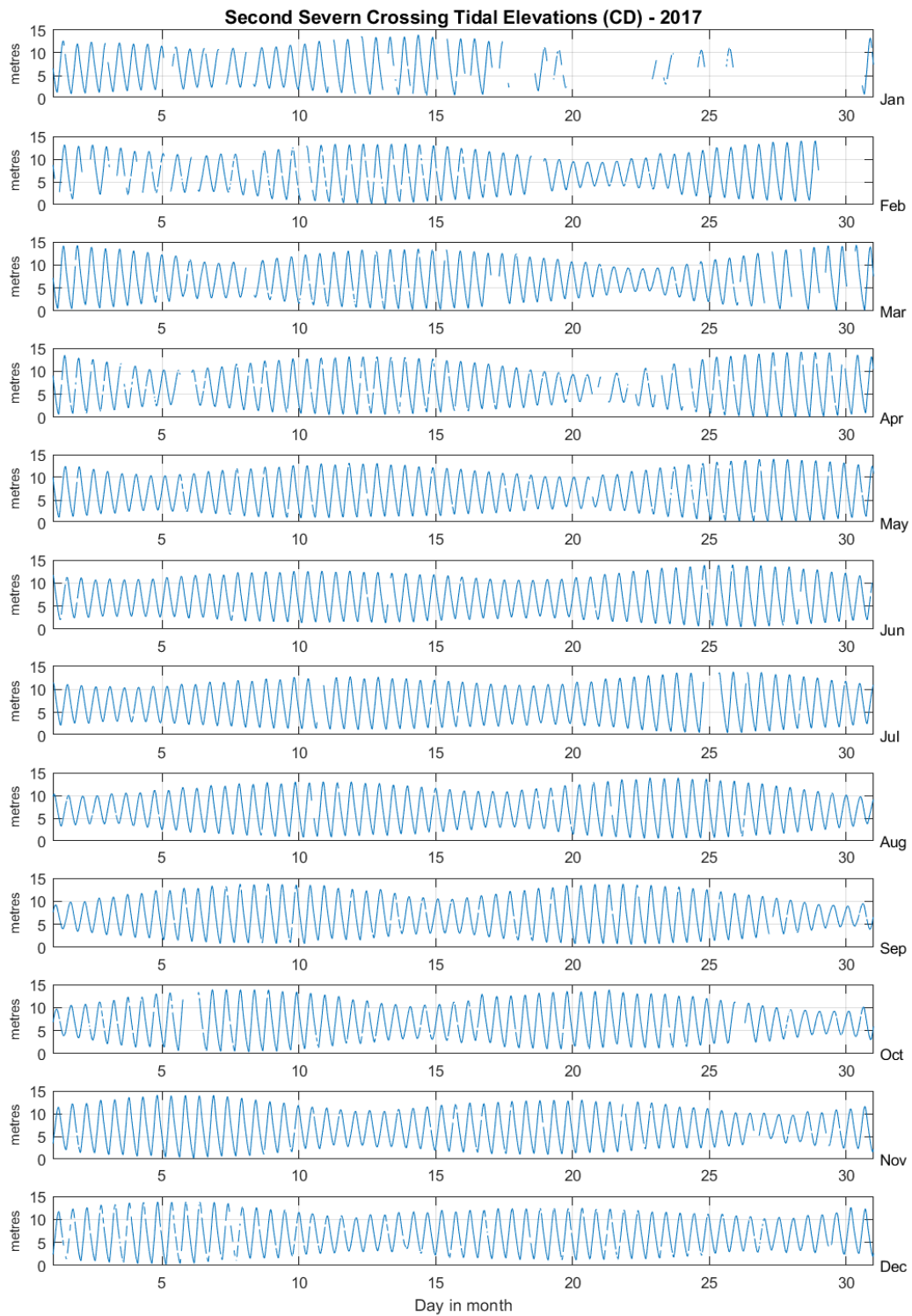


Figure 3: Severn Bridge tidal elevations for 2017 relative to Chart Datum