

Monitoring Vertical Land Movements at Tide Gauges

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Global sea level has risen by 10 to 20 cm during the 20th century. Much of the evidence for this rise came from mean sea level (MSL) measurements obtained at tide gauges, which measure MSL with respect to a local tide gauge bench mark (TGBM). However, it is impossible to distinguish between any 'true sea level variations' and any changes in the level of the land at a tide gauge using these measurements alone. Around Britain, sea levels have risen by different amounts over the last century, from a 7cm rise at Aberdeen to a 21cm rise at Sheerness. This is because different parts of the British Isles are rising and subsiding at different rates, due mainly to the removal of ice from the land at the end of the last ice age – so called glacial isostatic adjustment (GIA). Therefore, to measure the climate related component of changes in sea level using a tide gauge, the rate of any vertical land movements at the specific tide gauge must be determined.

In recent years, modern geodetic techniques have developed to the stage where they can be used to measure such vertical land movements, which are typically of the order of 1 to 2 mm/yr for the British Isles. The two most suitable techniques for this purpose are measurements using the Global Positioning System (GPS) and measurements of absolute gravity.

With funding from Defra and the Environment Agency, POL, together with the Institute of Engineering Surveying and Space Geodesy (IESSG) at the University of Nottingham, have been carrying out research on these geodetic techniques since 1990. By 2004, this had resulted in the establishment of a network of continuous GPS (CGPS) stations at, or close to, the tide gauges of Aberdeen, Liverpool, Lowestoft, Newlyn, North Shields, Portsmouth and Sheerness, and a network of absolute gravity stations close to the tide gauges of Aberdeen, Lerwick and Newlyn, some of which have been operational since 1996. During 2005, three new CGPS stations were established at, or close to, the tide gauges of Dover, Lerwick and Stornoway.

The data from the ten CGPS stations at, or close to, tide gauges are archived as part of the British Isles GPS archive Facility (BIGF), which is also operated by the IESSG at the University of Nottingham. By the end of 2006, BIGF contained data for a total of 120 CGPS stations, some of which are also used to help to understand vertical land movements at non-coastal locations in the British Isles.

Data from seven of the CGPS stations at, or close to, tide gauges (namely Aberdeen, Liverpool, Lowestoft, Newlyn, North Shields, Portsmouth and Sheerness) are contributed to European initiatives, notably the European Sea Level Service (ESEAS); data from four of the CGPS stations at, or close to, tide gauges (namely Newlyn, Sheerness, North Shields and Aberdeen) are contributed to international initiatives, notably the International GPS Service (IGS) Tide Gauge Pilot Project (TIGA); and data from Newlyn are also contributed to the EUREF Permanent Network (EPN).

This report includes copies of the log files for the ten CGPS stations at, or close to, tide gauges, along with a summary of their daily data availability and quality, based on the TEQC program available through the IGS. The plots show the time window length (taken as the period between the first and last epoch of data recorded on a single day), the number of observations (along with the maximum number of satellites available for a particular day), the multipath characteristics for the dual-frequency pseudo-range

observables (given as MP1 and MP2 values), and the number of cycle slips on the carrier phase observables (given as slips per thousand observations).

The data from the absolute gravity stations are processed and analysed by POL. The data from the CGPS stations are combined with data from other CGPS stations on a global scale that form part of the IGS network and processed by the IESSG, using both in-house and third party scientific GPS software. The resultant time series are then analysed by POL and IESSG using in-house software.

The trends in the CGPS and absolute gravity time series so far appear to support the idea that GIA is the main contribution to current vertical land movements in the British Isles, with stations in Scotland rising with respect to stations in Southern England.

In 2006, results from the research carried out were published in the Philosophical Transactions of the Royal Society (Teferle et. al. 2006) and presented at the 41st Defra Flood and Coastal Management conference (Bingley et. al. 2006). A full, formal scientific report on the results for the period up to the end of 2005 is currently in preparation. It will be published as R&D Technical Report FD2319/TR (Bingley et. al., 2007) and may be downloaded from the Defra/EA Joint R&D FCERM Programme website (www.defra.gov.uk/environ/fcd/research).

The results are still preliminary; more reliable estimates of vertical land movements will be obtained after an extended monitoring period. However, it is clear that such estimates of vertical land movements should enable 'true sea level variations' around the British Isles to be measured, to allow comparisons with predictions and observations of global sea levels and to enable a better understanding of the space- and time- variations.

References

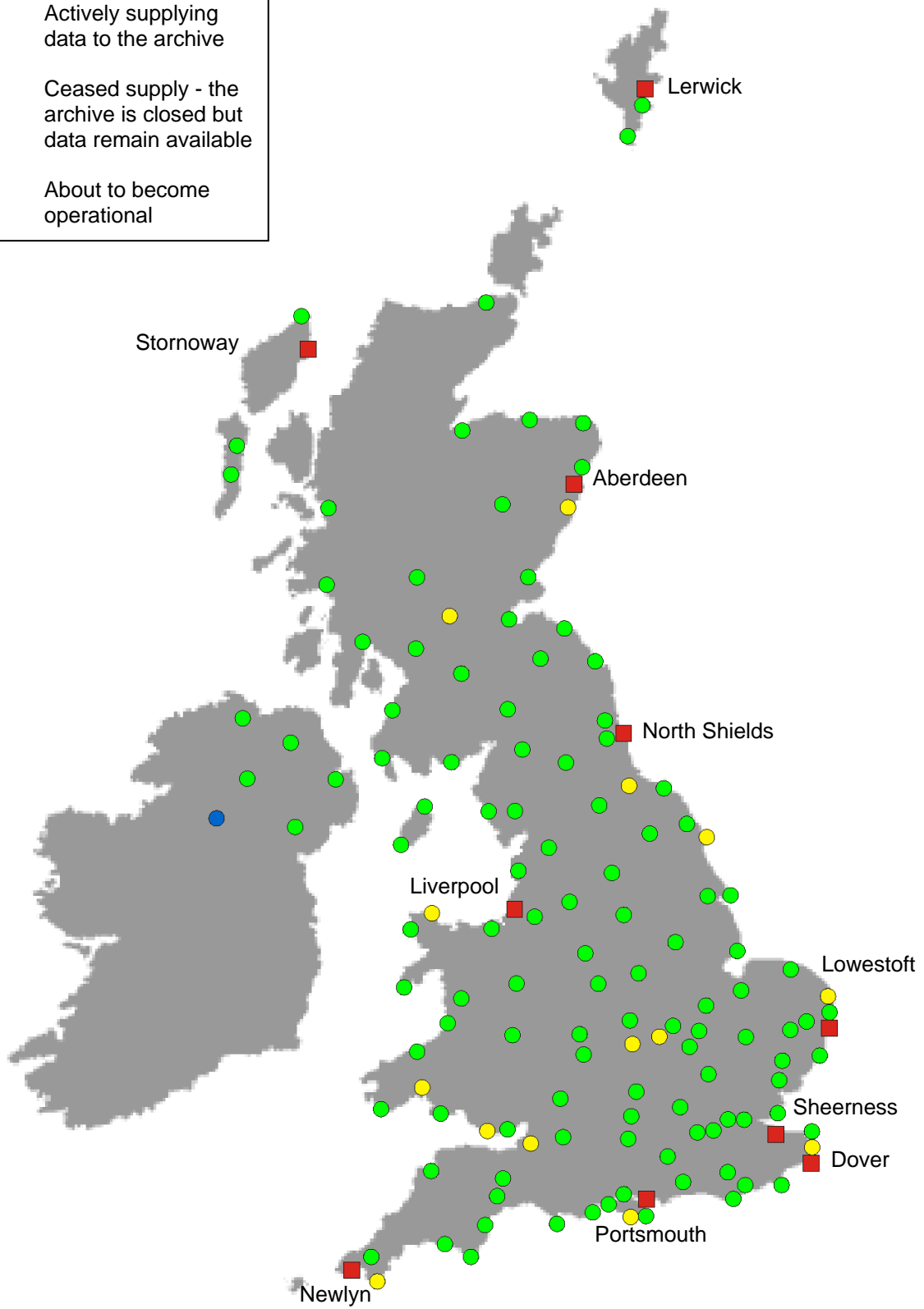
Bingley, R. M., Teferle, F. N., Dodson, A. H., Williams, S. D. P. and Baker, T. F., 2006. Measuring changes in ground level at tide gauges using continuous GPS and absolute gravimetry, to improve estimates of changes in sea level around Britain. Proceedings of the 41st Defra Flood and Coastal Management conference, York, UK, July 2006, 09.4.1 to 09.4.5.

Bingley, R. M., Teferle, F. N., Orliac, E. J., Dodson, A. H., Williams, S. D. P., Blackman, D. L., Baker, T. F., Riedmann, M., Haynes, M., Aldiss, D. T., Burke, H. C., Chacksfield, B. C. and Tragheim, D., 2007. Absolute fixing of tide gauge benchmarks and land levels: measuring changes in land and sea levels around the coast of Great Britain and along the Thames Estuary using GPS, absolute gravimetry, persistent scatterer interferometry and tide gauges. Defra/Environment Agency Joint R&D FCERM Programme R&D Technical Report FD2319/TR, May 2007.

Teferle, F. N., Bingley, R. M., Williams, S. D. P., Baker, T. F. and Dodson, A. H., 2006. Using continuous GPS and absolute gravity to separate vertical land movements and changes in sea level at tide gauges in the UK. Philosophical Transactions of the Royal Society Series A: Mathematical, Physical, and Engineering Sciences, **364**, 10.1098/rsta.2006.1746, 971-930.

CGPS stations in the British Isles GPS archive Facility (BIGF)

- CGPS at NTSLF Tide gauge
- Actively supplying data to the archive
- Ceased supply - the archive is closed but data remain available
- About to become operational



Aberdeen

ABER Site Information Form (site log)
 International GPS Service
 See Instructions at:
ftp://igsceb.jpl.nasa.gov/pub/station/general/sitelog_instr.txt

0. Form

Prepared by (full name) : Richard Bingley
 Date Prepared : 2001-12-12
 Report Type : NEW
 If Update:
 Previous Site Log :
 Modified/Added Sections :

1. Site Identification of the GNSS Monument

Site Name : Aberdeen Tide Gauge
 Four Character ID : ABER
 Monument Inscription :
 IERS DOMES Number : 13231M001
 CDP Number : (A4)
 Monument Description : STEEL PLATE AND CARBON FIBRE PIPE
 Height of the Monument : 4.0m
 Monument Foundation : QUAY
 Foundation Depth : (m)
 Marker Description : TOP OF 40mm DIA THREAD ON STEEL PLATE
 Date Installed : 1998-09-17T12:00Z
 Geologic Characteristic : GLACIAL SAND AND GRAVEL
 Bedrock Type : METAMORPHIC (QUARTZ-MICA-SCHIST)
 Bedrock Condition : (FRESH/JOINTED/WEATHERED)
 Fracture Spacing : (1-10 cm/11-50 cm/51-200 cm/over 200 cm)
 Fault zones nearby : (YES/NO/Name of the zone)
 Distance/activity : (multiple lines)
 Additional Information : The monument is mounted adjacent to the
 : tide gauge building, which is located on a
 : concrete quay, with piled foundations.
 : The GPS antenna is located on the monument
 : which consists of a 4m carbon fibre pipe mounted
 : on a steel plate, which is fixed to the concrete
 : quay.
 : The GPS antenna is attached to the carbon fibre
 : pipe using a 5/8" thread.
 : The carbon fibre pipe is attached to the steel
 : plate using a 40 mm diameter thread.
 : The male part of the 40mm diameter thread is on
 : the steel plate and has a domed head, which
 : serves as the survey marker.

2. Site Location Information

City or Town : Aberdeen
 State or Province :
 Country : Scotland
 Tectonic Plate : EURASIAN
 Approximate Position
 X coordinate (m) : 3466272.4
 Y coordinate (m) : -125904.3
 Z coordinate (m) : 5334662.3
 Latitude (N is +) : +570838.42
 Longitude (E is +) : -0020448.80
 Elevation (m,ellips.) : 53.4
 Additional Information : (multiple lines)

3. GNSS Receiver Information

3.1 Receiver Type : ASHTECH Z-XII3
 Satellite System : GPS
 Serial Number : 03140
 Firmware Version : 1F50
 Elevation Cutoff Setting : 5
 Date Installed : 1998-09-18T00:00Z
 Date Removed : 1999-08-15T23:59Z

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Temperature Stabiliz.      : NONE
Additional Information     : Full receiver serial number is LP 03140.
                          : Operation using a direct modem connection.
                          : Download using CGREMOTE v5.4.00 CGRS1F50 and
                          : CGHOSE v5.4.00 CGRS1F50.
                          : Conversion to RINEX using ASRINEXO v2.9.7
                          : (with PR SMOOTH FLAG 0).

3.2 Receiver Type         : ASHTECH Z-XII3
Satellite System          : GPS
Serial Number             : 03140
Firmware Version         : CD00
Elevation Cutoff Setting : 5
Date Installed            : 1999-08-17T00:00Z
Date Removed              : CCYY-MM-DDThh:mmZ
Temperature Stabiliz.    : NONE
Additional Information     : Full receiver serial number is LP 03140.
                          : Operation using a direct modem connection.
                          : Download using CGREMOTE v5.4.00 CGRSCD00 and
                          : CGHOSE v6.0.00 CGRSCD00.
                          : Conversion to RINEX using ASRINEXO v2.9.7
                          : (with PR SMOOTH FLAG 0).

3.x Receiver Type         : (A20, from rcvr_ant.tab; see instructions)
Satellite System          : (GPS/GLONASS/GPS+GLONASS)
Serial Number             : (A5)
Firmware Version         : (A11)
Elevation Cutoff Setting : (deg)
Date Installed            : (CCYY-MM-DDThh:mmZ)
Date Removed              : (CCYY-MM-DDThh:mmZ)
Temperature Stabiliz.    : (none or tolerance in degrees C)
Additional Information     : (multiple lines)

4. GNSS Antenna Information

4.1 Antenna Type          : ASH700936F_C      SNOW
Serial Number             : 14767
Antenna Reference Point  : BPA
Marker->ARP Up Ecc. (m)  : 3.9650
Marker->ARP North Ecc(m) : 0.0000
Marker->ARP East Ecc(m)  : 0.0000
Alignment from True N    : 0
Antenna Radome Type      : SNOW
Radome Serial Number     :
Antenna Cable Type       : ASHTECH 100914 REVA
Antenna Cable Length     : 30m
Date Installed            : 1998-09-17T00:00Z
Date Removed              : CCYY-MM-DDThh:mmZ
Additional Information     : Full antenna serial number is CR 14767.

4.x Antenna Type         : (A20 from rcvr_ant.tab; see instructions)
Serial Number             : (A*, but note the first A5 is used in SINEX)
Antenna Reference Point  : (BPA/BCR/XXX from "antenna.gra"; see instr.)
Marker->ARP Up Ecc. (m)  : (F8.4)
Marker->ARP North Ecc(m) : (F8.4)
Marker->ARP East Ecc(m)  : (F8.4)
Alignment from True N    : (deg; + is clockwise/east)
Antenna Radome Type      : (A4 from rcvr_ant.tab; see instructions)
Radome Serial Number     :
Antenna Cable Type       : (vendor & type number)
Antenna Cable Length     : (m)
Date Installed            : (CCYY-MM-DDThh:mmZ)
Date Removed              : (CCYY-MM-DDThh:mmZ)
Additional Information     : (multiple lines)

5. Surveyed Local Ties

5.x Tied Marker Name      :
Tied Marker Usage        : (SLR/VLBI/LOCAL CONTROL/FOOTPRINT/etc)
Tied Marker CDP Number   : (A4)
Tied Marker DOMES Number : (A9)
Differential Components from GNSS Marker to the tied monument (ITRS)
dx (m)                   : (m)
dy (m)                   : (m)
dz (m)                   : (m)
Accuracy (mm)            : (mm)
Survey method            : (GPS CAMPAIGN/TRILATERATION/TRIANGULATION/etc)
Date Measured            : (CCYY-MM-DDThh:mmZ)

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Additional Information : (multiple lines)

6. Frequency Standard

- 6.1 Standard Type : INTERNAL
 - Input Frequency : (if external)
 - Effective Dates : 1998-09-17/CCYY-MM-DD
 - Notes : (multiple lines)
- 6.x Standard Type : (INTERNAL or EXTERNAL H-MASER/CESIUM/etc)
 - Input Frequency : (if external)
 - Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 - Notes : (multiple lines)

7. Collocation Information

- 7.x Instrumentation Type : (GPS/GLONASS/DORIS/PRARE/SLR/VLBI/TIME/etc)
 - Status : (PERMANENT/MOBILE)
 - Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 - Notes : (multiple lines)

8. Meteorological Instrumentation

- 8.1.1 Humidity Sensor Model : NONE
 - Manufacturer :
 - Serial Number :
 - Data Sampling Interval : (sec)
 - Accuracy (% rel h) : (% rel h)
 - Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 - Height Diff to Ant : (m)
 - Calibration date : (CCYY-MM-DD)
 - Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 - Notes : (multiple lines)

- 8.1.x Humidity Sensor Model :
 - Manufacturer :
 - Serial Number :
 - Data Sampling Interval : (sec)
 - Accuracy (% rel h) : (% rel h)
 - Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 - Height Diff to Ant : (m)
 - Calibration date : (CCYY-MM-DD)
 - Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 - Notes : (multiple lines)

- 8.2.1 Pressure Sensor Model : NONE
 - Manufacturer :
 - Serial Number :
 - Data Sampling Interval : (sec)
 - Accuracy : (hPa)
 - Height Diff to Ant : (m)
 - Calibration date : (CCYY-MM-DD)
 - Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 - Notes : (multiple lines)

- 8.2.x Pressure Sensor Model :
 - Manufacturer :
 - Serial Number :
 - Data Sampling Interval : (sec)
 - Accuracy : (hPa)
 - Height Diff to Ant : (m)
 - Calibration date : (CCYY-MM-DD)
 - Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 - Notes : (multiple lines)

- 8.3.1 Temp. Sensor Model : NONE
 - Manufacturer :
 - Serial Number :
 - Data Sampling Interval : (sec)
 - Accuracy : (deg C)
 - Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 - Height Diff to Ant : (m)
 - Calibration date : (CCYY-MM-DD)
 - Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 - Notes : (multiple lines)

- 8.3.x Temp. Sensor Model :

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Manufacturer      :
Serial Number     :
Data Sampling Interval : (sec)
Accuracy          : (deg C)
Aspiration        : (UNASPIRATED/NATURAL/FAN/etc)
Height Diff to Ant : (m)
Calibration date  : (CCYY-MM-DD)
Effective Dates   : (CCYY-MM-DD/CCYY-MM-DD)
Notes             : (multiple lines)

8.4.1 Water Vapor Radiometer : NONE
Manufacturer      :
Serial Number     :
Distance to Antenna : (m)
Height Diff to Ant : (m)
Calibration date  : (CCYY-MM-DD)
Effective Dates   : (CCYY-MM-DD/CCYY-MM-DD)
Notes             : (multiple lines)

8.4.x Water Vapor Radiometer :
Manufacturer      :
Serial Number     :
Distance to Antenna : (m)
Height Diff to Ant : (m)
Calibration date  : (CCYY-MM-DD)
Effective Dates   : (CCYY-MM-DD/CCYY-MM-DD)
Notes             : (multiple lines)

8.5.x Other Instrumentation : (multiple lines)

9. Local Ongoing Conditions Possibly Affecting Computed Position

9.1.1 Radio Interferences : ANTENNA
Observed Degradations : SN RATIO/DATA GAPS
Effective Dates : 1998-09-17/2001-05-01
Additional Information : Harbour antenna transmitting DGPS corrections.
                       : Fault on antenna repaired on 2001-05-01.

9.1.x Radio Interferences : (TV/CELL PHONE ANTENNA/RADAR/etc)
Observed Degradations : (SN RATIO/DATA GAPS/etc)
Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
Additional Information : (multiple lines)

9.2.x Multipath Sources : (METAL ROOF/DOME/VLBI ANTENNA/etc)
Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
Additional Information : (multiple lines)

9.3.x Signal Obstructions : (TREES/BUILDINGS/etc)
Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
Additional Information : (multiple lines)

10. Local Episodic Effects Possibly Affecting Data Quality

10.1 Date : (CCYY-MM-DDThh:mmZ)
Event : (TREE CLEARING/CONSTRUCTION/etc)

10.x Date : (CCYY-MM-DDThh:mmZ)
Event : (TREE CLEARING/CONSTRUCTION/etc)

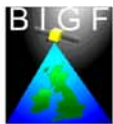
11. On-Site, Point of Contact Agency Information

Agency : Aberdeen Harbour Board
Preferred Abbreviation : (A10)
Mailing Address : 16 Regents Quay
               : Aberdeen AB511SS
               : UK

Primary Contact
Contact Name : Port Surveyor
Telephone (primary) :
Telephone (secondary) :
Fax :
E-mail :

Secondary Contact
Contact Name :
Telephone (primary) :
Telephone (secondary) :
Fax :

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TEQC Summary Plot

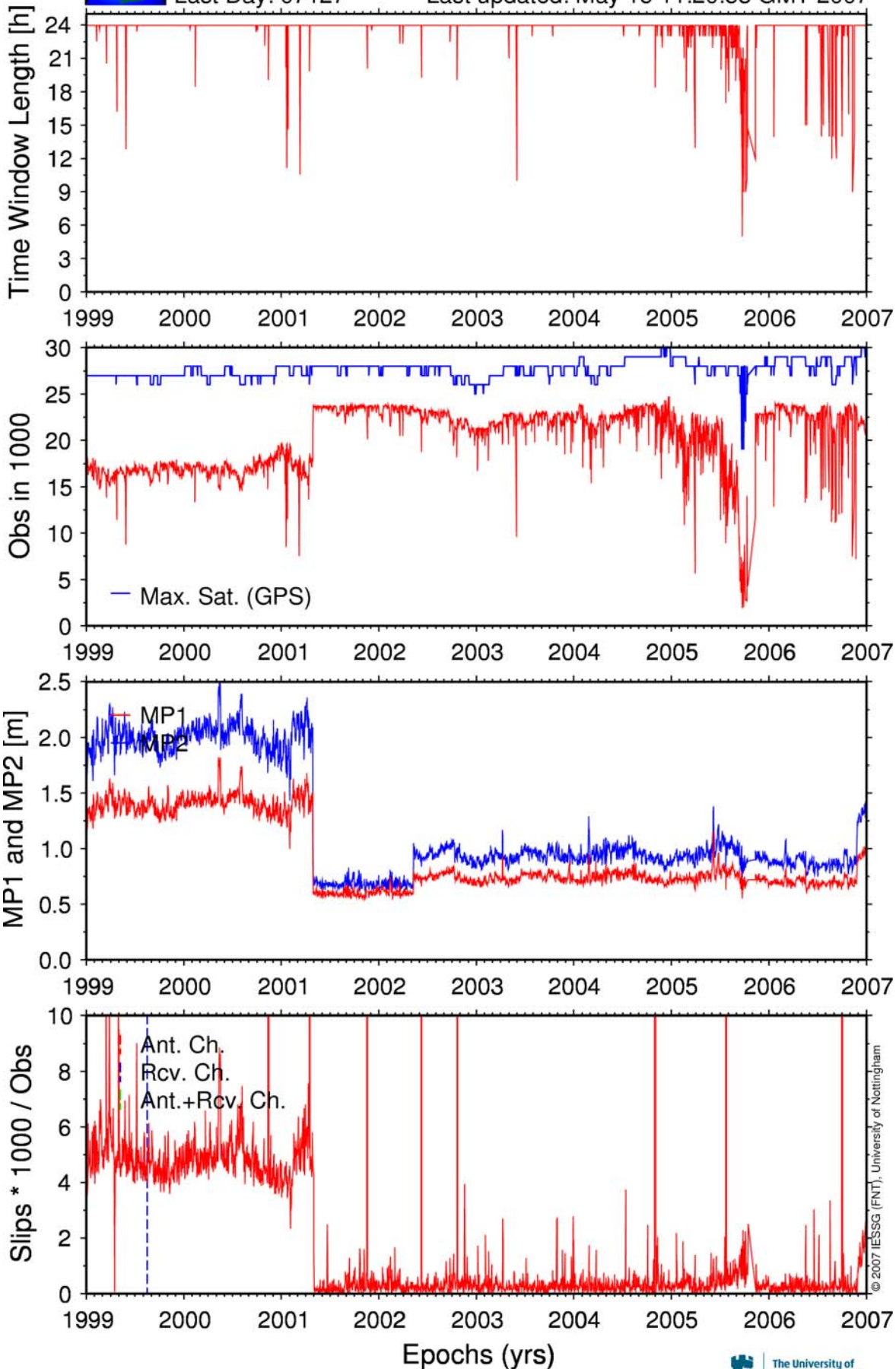
Station: ABER

RCV: ASHTECH Z-XII3

ANT: ASH700936F_C SNOW

Last Day: 07127

Last updated: May 15 11:20:53 GMT 2007



GM 2007 May 15 11:20:54



Dover

DVTG Site Information Form (site log)
 International GPS Service
 See Instructions at:
ftp://igsceb.jpl.nasa.gov/pub/station/general/sitelog_instr.txt

0. Form

Prepared by (full name) : Richard Bingley
 Date Prepared : 2005-11-24
 Report Type : NEW
 If Update:
 Previous Site Log :
 Modified/Added Sections :

1. Site Identification of the GNSS Monument

Site Name : Dover Tide Gauge
 Four Character ID : DVTG
 Monument Inscription :
 IERS DOMES Number : (A9)
 CDP Number : (A4)
 Monument Description : STEEL PLATE AND CARBON FIBRE PIPE
 Height of the Monument : 2.0m
 Monument Foundation : PIER
 Foundation Depth : (m)
 Marker Description : TOP OF 40mm DIA THREAD ON STEEL PLATE
 Date Installed : 2005-11-24T15:00Z
 Geologic Characteristic : BEDROCK
 Bedrock Type : SEDIMENTARY (CHALK)
 Bedrock Condition : (FRESH/JOINTED/WEATHERED)
 Fracture Spacing : (1-10 cm/11-50 cm/51-200 cm/over 200 cm)
 Fault zones nearby : (YES/NO/Name of the zone)
 Distance/activity : (multiple lines)
 Additional Information : The monument is mounted about 15m from the tide gauge
 : building, and located on the Prince of Wales Pier.
 : The GPS antenna is located on the monument
 : which consists of a 2m carbon fibre pipe mounted
 : on a steel plate, which is fixed to the stone wall
 : of the pier.
 : The GPS antenna is attached to the carbon fibre
 : pipe using a 5/8" thread.
 : The carbon fibre pipe is attached to the steel
 : plate using a 40 mm diameter thread.
 : The male part of the 40mm diameter thread is on
 : the steel plate and has a domed head, which
 : serves as the survey marker.

2. Site Location Information

City or Town : Dover
 State or Province : Kent
 Country : England
 Tectonic Plate : EURASIAN
 Approximate Position
 X coordinate (m) :
 Y coordinate (m) :
 Z coordinate (m) :
 Latitude (N is +) :
 Longitude (E is +) :
 Elevation (m,ellips.) :
 Additional Information : (multiple lines)

3. GNSS Receiver Information

3.1 Receiver Type : ASHTECH UZ-12
 Satellite System : GPS
 Serial Number : 10207
 Firmware Version : CJ00
 Elevation Cutoff Setting : 5
 Date Installed : 2005-11-24T15:00Z
 Date Removed : CCYY-MM-DDThh:mmZ
 Temperature Stabiliz. : NONE
 Additional Information : Receiver is an Ashtech Micro-Z.

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: Full receiver serial number is ZR 2001 0207.
: Operation using a direct modem connection.
: Download using MicroManager Pro v1.1.00 (2001).
: Conversion to RINEX using ASRINEXO v2.9.7
: (with PR SMOOTH FLAG 0).

3.x Receiver Type      : (A20, from rcvr_ant.tab; see instructions)
   Satellite System   : (GPS/GLONASS/GPS+GLONASS)
   Serial Number      : (A5)
   Firmware Version   : (A11)
   Elevation Cutoff Setting : (deg)
   Date Installed     : (CCYY-MM-DDThh:mmZ)
   Date Removed       : (CCYY-MM-DDThh:mmZ)
   Temperature Stabiliz. : (none or tolerance in degrees C)
   Additional Information : (multiple lines)

4. GNSS Antenna Information

4.1 Antenna Type      : ASH701945C_M    SNOW
   Serial Number      : 10215
   Antenna Reference Point : BPA
   Marker->ARP Up Ecc. (m) : 2.0000
   Marker->ARP North Ecc(m) : 0.0000
   Marker->ARP East Ecc(m) : 0.0000
   Alignment from True N : 0
   Antenna Radome Type  : SNOW
   Radome Serial Number :
   Antenna Cable Type   : ASHTECH 100914 REVA
   Antenna Cable Length : 30m
   Date Installed       : 2005-11-24T15:00Z
   Date Removed         : CCYY-MM-DDThh:mmZ
   Additional Information : Full antenna serial number is CR5 2001 0215.

4.x Antenna Type      : (A20 from rcvr_ant.tab; see instructions)
   Serial Number      : (A*, but note the first A5 is used in SINEX)
   Antenna Reference Point : (BPA/BCR/XXX from "antenna.gra"; see instr.)
   Marker->ARP Up Ecc. (m) : (F8.4)
   Marker->ARP North Ecc(m) : (F8.4)
   Marker->ARP East Ecc(m) : (F8.4)
   Alignment from True N : (deg; + is clockwise/east)
   Antenna Radome Type   : (A4 from rcvr_ant.tab; see instructions)
   Radome Serial Number  :
   Antenna Cable Type    : (vendor & type number)
   Antenna Cable Length  : (m)
   Date Installed        : (CCYY-MM-DDThh:mmZ)
   Date Removed          : (CCYY-MM-DDThh:mmZ)
   Additional Information : (multiple lines)

5. Surveyed Local Ties

5.x Tied Marker Name      :
   Tied Marker Usage      : (SLR/VLBI/LOCAL CONTROL/FOOTPRINT/etc)
   Tied Marker CDP Number : (A4)
   Tied Marker DOMES Number : (A9)
   Differential Components from GNSS Marker to the tied monument (ITRS)
     dx (m)                : (m)
     dy (m)                : (m)
     dz (m)                : (m)
   Accuracy (mm)          : (mm)
   Survey method          : (GPS CAMPAIGN/TRILATERATION/TRIANGULATION/etc)
   Date Measured          : (CCYY-MM-DDThh:mmZ)
   Additional Information : (multiple lines)

6. Frequency Standard

6.1 Standard Type        : INTERNAL
   Input Frequency       : (if external)
   Effective Dates       : 2005-11-24/CCYY-MM-DD
   Notes                 : (multiple lines)

6.x Standard Type        : (INTERNAL or EXTERNAL H-MASER/CESIUM/etc)
   Input Frequency       : (if external)
   Effective Dates       : (CCYY-MM-DD/CCYY-MM-DD)
   Notes                 : (multiple lines)

7. Collocation Information

```

7.x Instrumentation Type : (GPS/GLONASS/DORIS/PRARE/SLR/VLBI/TIME/etc)
 Status : (PERMANENT/MOBILE)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8. Meteorological Instrumentation

8.1.1 Humidity Sensor Model : NONE
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy (% rel h) : (% rel h)
 Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.1.x Humidity Sensor Model :
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy (% rel h) : (% rel h)
 Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.2.1 Pressure Sensor Model : NONE
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy : (hPa)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.2.x Pressure Sensor Model :
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy : (hPa)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.3.1 Temp. Sensor Model : NONE
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy : (deg C)
 Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.3.x Temp. Sensor Model :
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy : (deg C)
 Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.4.1 Water Vapor Radiometer : NONE
 Manufacturer :
 Serial Number :
 Distance to Antenna : (m)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)

```

Notes : (multiple lines)

8.4.x Water Vapor Radiometer :
Manufacturer :
Serial Number :
Distance to Antenna : (m)
Height Diff to Ant : (m)
Calibration date : (CCYY-MM-DD)
Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
Notes : (multiple lines)

8.5.x Other Instrumentation : (multiple lines)

9. Local Ongoing Conditions Possibly Affecting Computed Position

9.1.x Radio Interferences : (TV/CELL PHONE ANTENNA/RADAR/etc)
Observed Degradations : (SN RATIO/DATA GAPS/etc)
Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
Additional Information : (multiple lines)

9.2.x Multipath Sources : (METAL ROOF/DOME/VLBI ANTENNA/etc)
Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
Additional Information : (multiple lines)

9.3.x Signal Obstructions : (TREES/BUILDINGS/etc)
Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
Additional Information : (multiple lines)

10. Local Episodic Effects Possibly Affecting Data Quality

10.1 Date : (CCYY-MM-DDThh:mmZ)
Event : (TREE CLEARING/CONSTRUCTION/etc)

10.x Date : (CCYY-MM-DDThh:mmZ)
Event : (TREE CLEARING/CONSTRUCTION/etc)

11. On-Site, Point of Contact Agency Information

Agency : Port of Dover
Preferred Abbreviation :
Mailing Address : Harbour House
: Dover
: Kent CT17 9BU
: UK

Primary Contact
Contact Name : Marine Services Manager
Telephone (primary) :
Telephone (secondary) :
Fax :
E-mail :

Secondary Contact
Contact Name :
Telephone (primary) :
Telephone (secondary) :
Fax :
E-mail :
Additional Information : (multiple lines)

12. Responsible Agency (if different from 11.)

Agency : IESSG
Preferred Abbreviation : IESSG
Mailing Address : University of Nottingham
: University Park
: Nottingham NG72RD
: UK

Primary Contact
Contact Name : Richard Bingley
Telephone (primary) : +44 (0)115 9513932
Telephone (secondary) : +44 (0)115 9513880
Fax : +44 (0)115 9513881
E-mail : richard.bingley@nottingham.ac.uk

Secondary Contact
Contact Name : IESSG Experimental Officers
Telephone (primary) : +44 (0)115 9513921
Telephone (secondary) : +44 (0)115 9513880

```

```

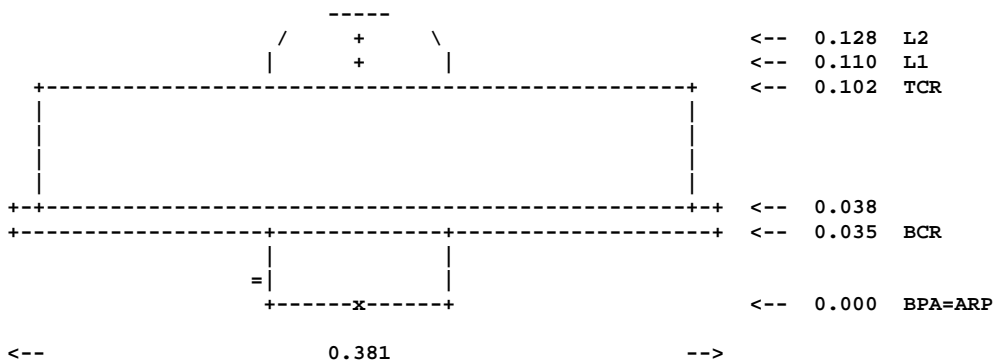
Fax : +44 (0)115 9513881
E-mail : iessg@nottingham.ac.uk
Additional Information : DVTG is operated by the IESSG for the
                       : Proudman Oceanographic Laboratory and
                       : the UK Department for the Environment, Food
                       : and Rural Affairs (DEFRA)
    
```

13. More Information

```

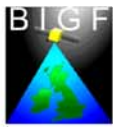
Primary Data Center :
Secondary Data Center :
URL for More Information : http://www.bigf.ac.uk
Hardcopy on File
Site Map : Y
Site Diagram : Y
Horizon Mask : Y
Monument Description : Y
Site Pictures : Y
Additional Information : (multiple lines)
Antenna Graphics with Dimensions
    
```

ASH701945C_M



ARP: Antenna Reference Point
L1 : L1 Phase Center
TCR: Top of Chokering

L2 : L2 Phase Center
BCR: Bottom of Chokering



TEQC Summary Plot

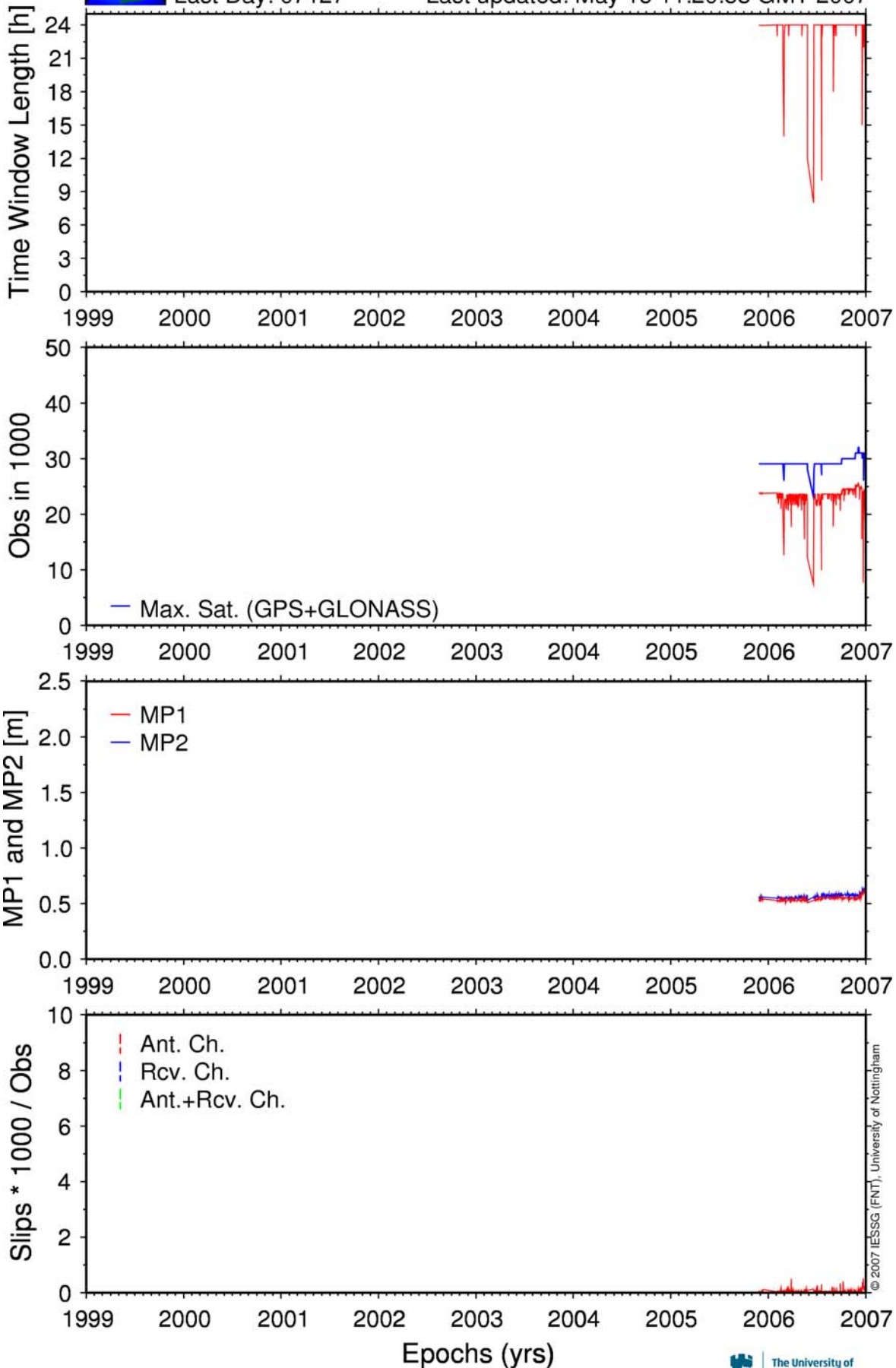
Station: DVTG

RCV: ASHTECH UZ-12

ANT: ASH701945C_M SNOW

Last Day: 07127

Last updated: May 15 11:20:53 GMT 2007



GM 2007 May 15 11:21:02



Liverpool

LIVE Site Information Form (site log)
 International GPS Service
 See Instructions at:
ftp://igsceb.jpl.nasa.gov/pub/station/general/sitelog_instr.txt

0. Form

Prepared by (full name) : Richard Bingley
 Date Prepared : 2005-03-15
 Report Type : UPDATE
 If Update:
 Previous Site Log : live_20011212.log
 Modified/Added Sections : 4.2

1. Site Identification of the GNSS Monument

Site Name : Liverpool Tide Gauge
 Four Character ID : LIVE
 Monument Inscription :
 IERS DOMES Number : 13233M001
 CDP Number : (A4)
 Monument Description : STEEL PLATE AND STEEL PIPE
 Height of the Monument : 0.07m
 Monument Foundation : CONCRETE PILLAR
 Foundation Depth : (m)
 Marker Description : TOP OF 40mm DIA THREAD ON STEEL PLATE
 Date Installed : 1999-02-03T12:00Z
 Geologic Characteristic : ALLUVIUM
 Bedrock Type : SEDIMENTARY (SANDSTONE)
 Bedrock Condition : (FRESH/JOINTED/WEATHERED)
 Fracture Spacing : (1-10 cm/11-50 cm/51-200 cm/over 200 cm)
 Fault zones nearby : (YES/NO/Name of the zone)
 Distance/activity : (multiple lines)
 Additional Information : The monument is mounted on a 5m high
 : concrete pillar which forms part of a
 : wind-break and is about 5m from the
 : tide gauge building, which is located
 : on a stone pier, with piled foundations.
 : The GPS antenna is located on the monument
 : which consists of a 0.07m steel pipe mounted on
 : a steel plate.
 : The GPS antenna is attached to the steel pipe
 : using a 5/8" thread.
 : The steel pipe is attached to the steel plate
 : using a 40 mm diameter thread.
 : The male part of the 40mm diameter thread is on
 : the steel plate and has a domed head, which
 : serves as the survey marker.

2. Site Location Information

City or Town : Liverpool
 State or Province : Merseyside
 Country : England
 Tectonic Plate : EURASIAN
 Approximate Position
 X coordinate (m) : 3801351.8
 Y coordinate (m) : -200433.1
 Z coordinate (m) : 5100558.2
 Latitude (N is +) : +532658.90
 Longitude (E is +) : -0030105.62
 Elevation (m,ellips.) : 66.0
 Additional Information : (multiple lines)

3. GNSS Receiver Information

3.1 Receiver Type : ASHTECH Z-XII3
 Satellite System : GPS
 Serial Number : 03145
 Firmware Version : 1F50
 Elevation Cutoff Setting : 5
 Date Installed : 1999-02-04T00:00Z
 Date Removed : 1999-08-15T23:59Z
 Temperature Stabiliz. : NONE

```

Additional Information      : Full receiver serial number is LP 03145.
                          : Operation using a direct modem connection.
                          : Download using CGREMOTE v5.4.00 CGRS1F50 and
                          : CGHOSE v5.4.00 CGRS1F50.
                          : Conversion to RINEX using ASRINEXO v2.9.7
                          : (with PR SMOOTH FLAG 0).

3.2 Receiver Type         : ASHTECH Z-XII3
Satellite System          : GPS
Serial Number             : 03145
Firmware Version         : CD00
Elevation Cutoff Setting : 5
Date Installed           : 1999-08-17T00:00Z
Date Removed            : CCYY-MM-DDThh:mmZ
Temperature Stabiliz.    : NONE
Additional Information     : Full receiver serial number is LP 03145.
                          : Operation using a direct modem connection.
                          : Download using CGREMOTE v5.4.00 CGRSCD00 and
                          : CGHOSE v6.0.00 CGRSCD00
                          : Conversion to RINEX using ASRINEXO v2.9.7
                          : (with PR SMOOTH FLAG 0)

3.x Receiver Type         : (A20, from rcvr_ant.tab; see instructions)
Satellite System          : (GPS/GLONASS/GPS+GLONASS)
Serial Number             : (A5)
Firmware Version         : (A11)
Elevation Cutoff Setting : (deg)
Date Installed           : (CCYY-MM-DDThh:mmZ)
Date Removed            : (CCYY-MM-DDThh:mmZ)
Temperature Stabiliz.    : (none or tolerance in degrees C)
Additional Information     : (multiple lines)

4. GNSS Antenna Information

4.1 Antenna Type         : ASH700936F_C      SNOW
Serial Number           : 14774
Antenna Reference Point : BPA
Marker->ARP Up Ecc. (m) : 0.0310
Marker->ARP North Ecc(m) : 0.0000
Marker->ARP East Ecc(m) : 0.0000
Alignment from True N   : 0
Antenna Radome Type     : SNOW
Radome Serial Number    :
Antenna Cable Type      : ASHTECH 100914 REVA
Antenna Cable Length    : 30m
Date Installed          : 1999-02-04T00:00Z
Date Removed           : 2005-02-22T12:00Z
Additional Information   : Full antenna serial number is CR 14774.

4.2 Antenna Type         : ASH700936D_M      SNOW
Serial Number           : 13141
Antenna Reference Point : BPA
Marker->ARP Up Ecc. (m) : 0.0310
Marker->ARP North Ecc(m) : 0.0000
Marker->ARP East Ecc(m) : 0.0000
Alignment from True N   : 0
Antenna Radome Type     : SNOW
Radome Serial Number    :
Antenna Cable Type      : ASHTECH 100914 REVA
Antenna Cable Length    : 30m
Date Installed          : 2005-03-15T09:00Z
Date Removed           : CCYY-MM-DDThh:mmZ
Additional Information   : Full antenna serial number is CR 13141.
                          The antenna cable was not replaced.

4.x Antenna Type         : (A20 from rcvr_ant.tab; see instructions)
Serial Number           : (A*, but note the first A5 is used in SINEX)
Antenna Reference Point : (BPA/BCR/XXX from "antenna.gra"; see instr.)
Marker->ARP Up Ecc. (m) : (F8.4)
Marker->ARP North Ecc(m) : (F8.4)
Marker->ARP East Ecc(m) : (F8.4)
Alignment from True N   : (deg; + is clockwise/east)
Antenna Radome Type     : (A4 from rcvr_ant.tab; see instructions)
Radome Serial Number    :
Antenna Cable Type      : (vendor & type number)
Antenna Cable Length    : (m)
Date Installed          : (CCYY-MM-DDThh:mmZ)
Date Removed           : (CCYY-MM-DDThh:mmZ)
Additional Information   : (multiple lines)
    
```

5. Surveyed Local Ties

5.x Tied Marker Name :
 Tied Marker Usage : (SLR/VLBI/LOCAL CONTROL/FOOTPRINT/etc)
 Tied Marker CDP Number : (A4)
 Tied Marker DOMES Number : (A9)
 Differential Components from GNSS Marker to the tied monument (ITRS)
 dx (m) : (m)
 dy (m) : (m)
 dz (m) : (m)
 Accuracy (mm) : (mm)
 Survey method : (GPS CAMPAIGN/TRILATERATION/TRIANGULATION/etc)
 Date Measured : (CCYY-MM-DDThh:mmZ)
 Additional Information : (multiple lines)

6. Frequency Standard

6.1 Standard Type : INTERNAL
 Input Frequency : (if external)
 Effective Dates : 1999-02-04/CCYY-MM-DD
 Notes : (multiple lines)

6.x Standard Type : (INTERNAL or EXTERNAL H-MASER/CESIUM/etc)
 Input Frequency : (if external)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

7. Collocation Information

7.x Instrumentation Type : (GPS/GLONASS/DORIS/PRARE/SLR/VLBI/TIME/etc)
 Status : (PERMANENT/MOBILE)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8. Meteorological Instrumentation

8.1.1 Humidity Sensor Model : NONE
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy (% rel h) : (% rel h)
 Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.1.x Humidity Sensor Model :
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy (% rel h) : (% rel h)
 Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.2.1 Pressure Sensor Model : NONE
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy : (hPa)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.2.x Pressure Sensor Model :
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy : (hPa)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)

```

Effective Dates      : (CCYY-MM-DD/CCYY-MM-DD)
Notes                : (multiple lines)

8.3.1 Temp. Sensor Model : NONE
Manufacturer         :
Serial Number        :
Data Sampling Interval : (sec)
Accuracy             : (deg C)
Aspiration           : (UNASPIRATED/NATURAL/FAN/etc)
Height Diff to Ant   : (m)
Calibration date     : (CCYY-MM-DD)
Effective Dates      : (CCYY-MM-DD/CCYY-MM-DD)
Notes                : (multiple lines)

8.3.x Temp. Sensor Model :
Manufacturer         :
Serial Number        :
Data Sampling Interval : (sec)
Accuracy             : (deg C)
Aspiration           : (UNASPIRATED/NATURAL/FAN/etc)
Height Diff to Ant   : (m)
Calibration date     : (CCYY-MM-DD)
Effective Dates      : (CCYY-MM-DD/CCYY-MM-DD)
Notes                : (multiple lines)

8.4.1 Water Vapor Radiometer : NONE
Manufacturer         :
Serial Number        :
Distance to Antenna  : (m)
Height Diff to Ant   : (m)
Calibration date     : (CCYY-MM-DD)
Effective Dates      : (CCYY-MM-DD/CCYY-MM-DD)
Notes                : (multiple lines)

8.4.x Water Vapor Radiometer :
Manufacturer         :
Serial Number        :
Distance to Antenna  : (m)
Height Diff to Ant   : (m)
Calibration date     : (CCYY-MM-DD)
Effective Dates      : (CCYY-MM-DD/CCYY-MM-DD)
Notes                : (multiple lines)

8.5.x Other Instrumentation : (multiple lines)

9. Local Ongoing Conditions Possibly Affecting Computed Position

9.1.x Radio Interferences : (TV/CELL PHONE ANTENNA/RADAR/etc)
Observed Degradations : (SN RATIO/DATA GAPS/etc)
Effective Dates        : (CCYY-MM-DD/CCYY-MM-DD)
Additional Information : (multiple lines)

9.2.1 Multipath Sources : SALT WATER CORROSION OF ANTENNA
Effective Dates        : 2003-09-15/2005-02-22
Additional Information : Apparent increase in MP1/2 values observed
                        and physical movement of antenna caused
                        by corrosion causing the pre-amp to detach
                        from the monument

9.2.x Multipath Sources : (METAL ROOF/DOME/VLBI ANTENNA/etc)
Effective Dates        : (CCYY-MM-DD/CCYY-MM-DD)
Additional Information : (multiple lines)

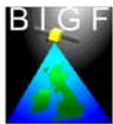
9.3.x Signal Obstructions : (TREES/BUILDINGS/etc)
Effective Dates        : (CCYY-MM-DD/CCYY-MM-DD)
Additional Information : (multiple lines)

10. Local Episodic Effects Possibly Affecting Data Quality

10.1 Date : (CCYY-MM-DDThh:mmZ)
Event     : (TREE CLEARING/CONSTRUCTION/etc)

10.x Date : (CCYY-MM-DDThh:mmZ)
Event     : (TREE CLEARING/CONSTRUCTION/etc)

11. On-Site, Point of Contact Agency Information
    
```

TEQC Summary Plot

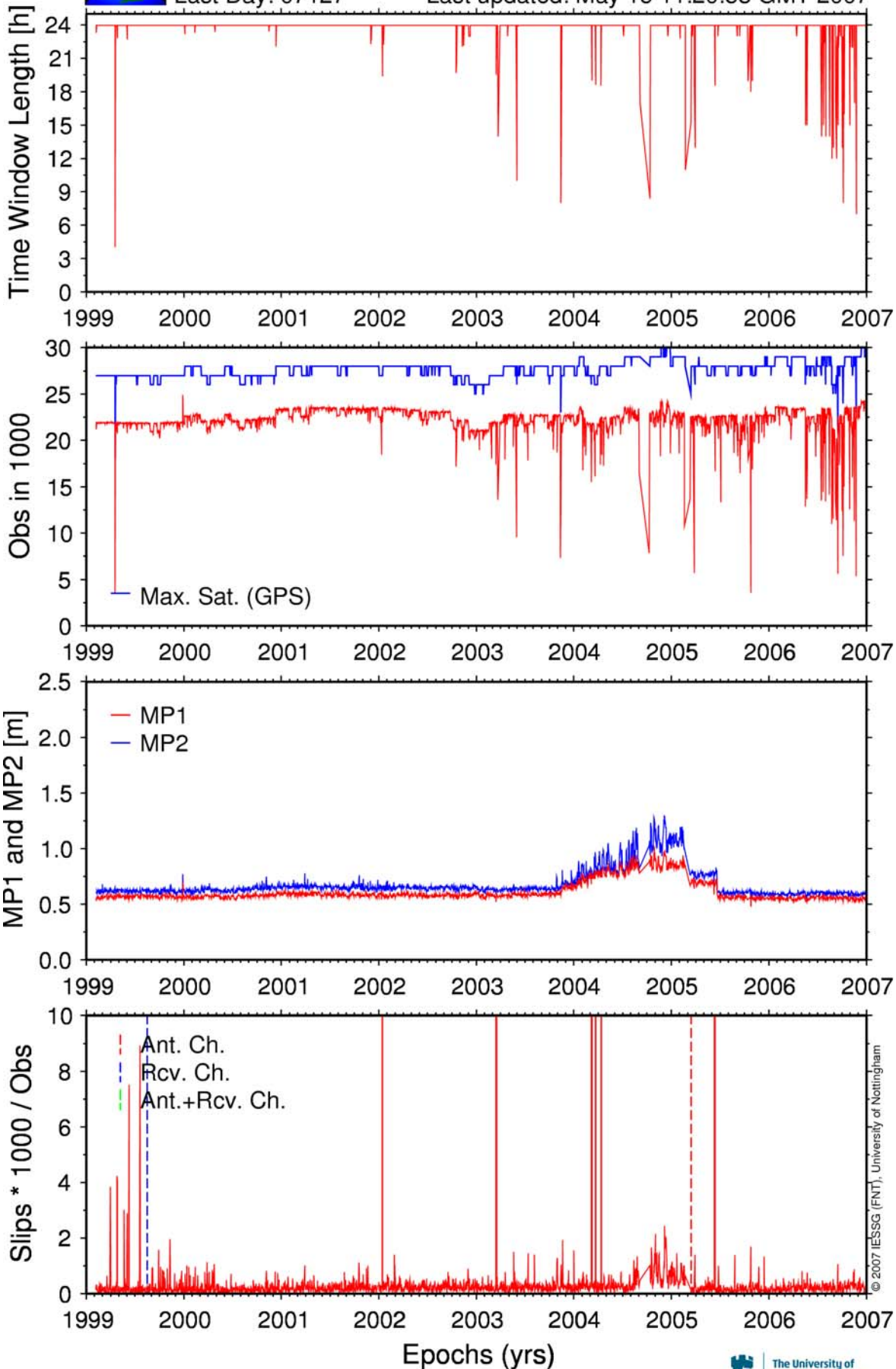
Station: LIVE

RCV: ASHTECH Z-XII3

ANT: ASH700936D_M SNOW

Last Day: 07127

Last updated: May 15 11:20:53 GMT 2007



GM 2007 May 15 11:21:07



Lowestoft

LOWE Site Information Form (site log)
 International GPS Service
 See Instructions at:
ftp://igsceb.jpl.nasa.gov/pub/station/general/sitelog_instr.txt

0. Form

Prepared by (full name) : Richard Bingley
 Date Prepared : 2001-12-12
 Report Type : NEW
 If Update:
 Previous Site Log :
 Modified/Added Sections :

1. Site Identification of the GNSS Monument

Site Name : Lowestoft Tide Gauge
 Four Character ID : LOWE
 Monument Inscription :
 IERS DOMES Number : 13232M001
 CDP Number : (A4)
 Monument Description : STEEL BRACKET AND CARBON FIBRE PIPE
 Height of the Monument : 0.80m
 Monument Foundation : BUILDING
 Foundation Depth : (m)
 Marker Description : TOP OF 40mm DIA THREAD ON STEEL BRACKET
 Date Installed : 1999-02-12T12:00Z
 Geologic Characteristic : ALLUVIUM
 Bedrock Type : SEDIMENTARY (CRAG)
 Bedrock Condition : (FRESH/JOINTED/WEATHERED)
 Fracture Spacing : (1-10 cm/11-50 cm/51-200 cm/over 200 cm)
 Fault zones nearby : (YES/NO/Name of the zone)
 Distance/activity : (multiple lines)
 Additional Information : The monument is mounted on the side
 : wall of a two storey brick office
 : building, adjacent to the tide gauge
 : building, so that the antenna is raised
 : above the roof
 : The GPS antenna is located on the monument
 : which consists of a 0.8m carbon fibre pipe
 : mounted on a steel bracket.
 : The GPS antenna is attached to the carbon fibre
 : pipe using a 5/8" thread.
 : The carbon fibre pipe is attached to the steel
 : bracket using a 40 mm diameter thread.
 : The male part of the 40mm diameter thread is on
 : the steel bracket and has a domed head, which
 : serves as the survey marker.

2. Site Location Information

City or Town : Lowestoft
 State or Province : Suffolk
 Country : England
 Tectonic Plate : EURASIAN
 Approximate Position
 X coordinate (m) : 3891549.7
 Y coordinate (m) : 118910.8
 Z coordinate (m) : 5035092.8
 Latitude (N is +) : +522823.60
 Longitude (E is +) : +0014500.70
 Elevation (m,ellips.) : 53.8
 Additional Information : (multiple lines)

3. GNSS Receiver Information

3.1 Receiver Type : ASHTECH Z-XII3
 Satellite System : GPS
 Serial Number : 03141
 Firmware Version : 1F50
 Elevation Cutoff Setting : 5
 Date Installed : 1999-02-13T00:00Z

```

Date Removed           : 1999-08-15T23:59Z
Temperature Stabiliz.  : NONE
Additional Information  : Full receiver serial number is LP 03141.
                        : Operation using a direct modem connection.
                        : Download using CGREMOTE v5.4.00 CGRS1F50 and
                        : CGHOSE v5.4.00 CGRS1F50.
                        : Conversion to RINEX using ASRINEXO v2.9.7
                        : (with PR SMOOTH FLAG 0).

3.2 Receiver Type      : ASHTECH Z-XII3
Satellite System       : GPS
Serial Number          : 03141
Firmware Version       : CD00
Elevation Cutoff Setting : 5
Date Installed         : 1999-08-17T00:00Z
Date Removed          : CCYY-MM-DDThh:mmZ
Temperature Stabiliz.  : NONE
Additional Information  : The full receiver serial number is LP 03141.
                        : Operation using a direct modem connection.
                        : Download using CGREMOTE v5.4.00 CGRSCD00 and
                        : CGHOSE v6.0.00 CGRSCD00.
                        : Conversion to RINEX using ASRINEXO v2.9.7
                        : (with PR SMOOTH FLAG 0).

3.x Receiver Type      : (A20, from rcvr_ant.tab; see instructions)
Satellite System       : (GPS/GLONASS/GPS+GLONASS)
Serial Number          : (A5)
Firmware Version       : (A11)
Elevation Cutoff Setting : (deg)
Date Installed         : (CCYY-MM-DDThh:mmZ)
Date Removed          : (CCYY-MM-DDThh:mmZ)
Temperature Stabiliz.  : (none or tolerance in degrees C)
Additional Information  : (multiple lines)

4. GNSS Antenna Information

4.1 Antenna Type       : ASH700936F_C      SNOW
Serial Number          : 14769
Antenna Reference Point : BPA
Marker->ARP Up Ecc. (m) : 0.7620
Marker->ARP North Ecc(m) : 0.0000
Marker->ARP East Ecc(m) : 0.0000
Alignment from True N  : 0
Antenna Radome Type    : SNOW
Radome Serial Number   :
Antenna Cable Type     : ASHTECH 100914 REVA
Antenna Cable Length   : 30m
Date Installed         : 1999-02-13T00:00Z
Date Removed          : CCYY-MM-DDThh:mmZ
Additional Information  : Full antenna serial number is CR 14769.

4.x Antenna Type       : (A20 from rcvr_ant.tab; see instructions)
Serial Number          : (A*, but note the first A5 is used in SINEX)
Antenna Reference Point : (BPA/BCR/XXX from "antenna.gra"; see instr.)
Marker->ARP Up Ecc. (m) : (F8.4)
Marker->ARP North Ecc(m) : (F8.4)
Marker->ARP East Ecc(m) : (F8.4)
Alignment from True N  : (deg; + is clockwise/east)
Antenna Radome Type    : (A4 from rcvr_ant.tab; see instructions)
Radome Serial Number   :
Antenna Cable Type     : (vendor & type number)
Antenna Cable Length   : (m)
Date Installed         : (CCYY-MM-DDThh:mmZ)
Date Removed          : (CCYY-MM-DDThh:mmZ)
Additional Information  : (multiple lines)

5. Surveyed Local Ties

5.x Tied Marker Name   :
Tied Marker Usage      : (SLR/VLBI/LOCAL CONTROL/FOOTPRINT/etc)
Tied Marker CDP Number : (A4)
Tied Marker DOMES Number : (A9)
Differential Components from GNSS Marker to the tied monument (ITRS)
  dx (m)                : (m)
  dy (m)                : (m)
  dz (m)                : (m)
Accuracy (mm)          : (mm)
Survey method          : (GPS CAMPAIGN/TRILATERATION/TRIANGULATION/etc)

```

Date Measured : (CCYY-MM-DDThh:mmZ)
 Additional Information : (multiple lines)

6. Frequency Standard

6.1 Standard Type : INTERNAL
 Input Frequency : (if external)
 Effective Dates : 1999-02-13/CCYY-MM-DD
 Notes : (multiple lines)

6.x Standard Type : (INTERNAL or EXTERNAL H-MASER/CESIUM/etc)
 Input Frequency : (if external)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

7. Collocation Information

7.x Instrumentation Type : (GPS/GLONASS/DORIS/PRARE/SLR/VLBI/TIME/etc)
 Status : (PERMANENT/MOBILE)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8. Meteorological Instrumentation

8.1.1 Humidity Sensor Model : NONE
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy (% rel h) : (% rel h)
 Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.1.x Humidity Sensor Model :
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy (% rel h) : (% rel h)
 Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.2.1 Pressure Sensor Model : NONE
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy : (hPa)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.2.x Pressure Sensor Model :
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy : (hPa)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.3.1 Temp. Sensor Model : NONE
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy : (deg C)
 Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

```

8.3.x Temp. Sensor Model      :
      Manufacturer           :
      Serial Number          :
      Data Sampling Interval  : (sec)
      Accuracy               : (deg C)
      Aspiration              : (UNASPIRATED/NATURAL/FAN/etc)
      Height Diff to Ant     : (m)
      Calibration date       : (CCYY-MM-DD)
      Effective Dates        : (CCYY-MM-DD/CCYY-MM-DD)
      Notes                   : (multiple lines)

8.4.1 Water Vapor Radiometer : NONE
      Manufacturer           :
      Serial Number          :
      Distance to Antenna    : (m)
      Height Diff to Ant     : (m)
      Calibration date       : (CCYY-MM-DD)
      Effective Dates        : (CCYY-MM-DD/CCYY-MM-DD)
      Notes                   : (multiple lines)

8.4.x Water Vapor Radiometer :
      Manufacturer           :
      Serial Number          :
      Distance to Antenna    : (m)
      Height Diff to Ant     : (m)
      Calibration date       : (CCYY-MM-DD)
      Effective Dates        : (CCYY-MM-DD/CCYY-MM-DD)
      Notes                   : (multiple lines)

8.5.x Other Instrumentation  : (multiple lines)

9. Local Ongoing Conditions Possibly Affecting Computed Position

9.1.x Radio Interferences    : (TV/CELL PHONE ANTENNA/RADAR/etc)
      Observed Degradations  : (SN RATIO/DATA GAPS/etc)
      Effective Dates        : (CCYY-MM-DD/CCYY-MM-DD)
      Additional Information  : (multiple lines)

9.2.x Multipath Sources      : (METAL ROOF/DOME/VLBI ANTENNA/etc)
      Effective Dates        : (CCYY-MM-DD/CCYY-MM-DD)
      Additional Information  : (multiple lines)

9.3.x Signal Obstructions    : (TREES/BUILDINGS/etc)
      Effective Dates        : (CCYY-MM-DD/CCYY-MM-DD)
      Additional Information  : (multiple lines)

10. Local Episodic Effects Possibly Affecting Data Quality

10.1 Date                    : (CCYY-MM-DDThh:mmZ)
      Event                   : (TREE CLEARING/CONSTRUCTION/etc)

10.x Date                    : (CCYY-MM-DDThh:mmZ)
      Event                   : (TREE CLEARING/CONSTRUCTION/etc)

11. On-Site, Point of Contact Agency Information

      Agency                  : Associated British Ports
      Preferred Abbreviation  : (A10)
      Mailing Address         : Port House
                              : Lowestoft
                              : Suffolk NR32 1BG
                              : UK

      Primary Contact
      Contact Name            : Harbour Master
      Telephone (primary)     :
      Telephone (secondary)  :
      Fax                     :
      E-mail                  :

      Secondary Contact
      Contact Name            :
      Telephone (primary)     :
      Telephone (secondary)  :
      Fax                     :
      E-mail                  :
      Additional Information  : (multiple lines)

```

12. Responsible Agency (if different from 11.)

```

Agency                : IESSG
Preferred Abbreviation : IESSG
Mailing Address        : University of Nottingham
                      : University Park
                      : Nottingham NG72RD
                      : UK

Primary Contact
Contact Name          : Richard Bingley
Telephone (primary)   : +44 (0)115 9513932
Telephone (secondary) : +44 (0)115 9513880
Fax                   : +44 (0)115 9513881
E-mail                : richard.bingley@nottingham.ac.uk

Secondary Contact
Contact Name          : IESSG Experimental Officers
Telephone (primary)   : +44 (0)115 9513921
Telephone (secondary) : +44 (0)115 9513880
Fax                   : +44 (0)115 9513881
E-mail                : iessg@nottingham.ac.uk

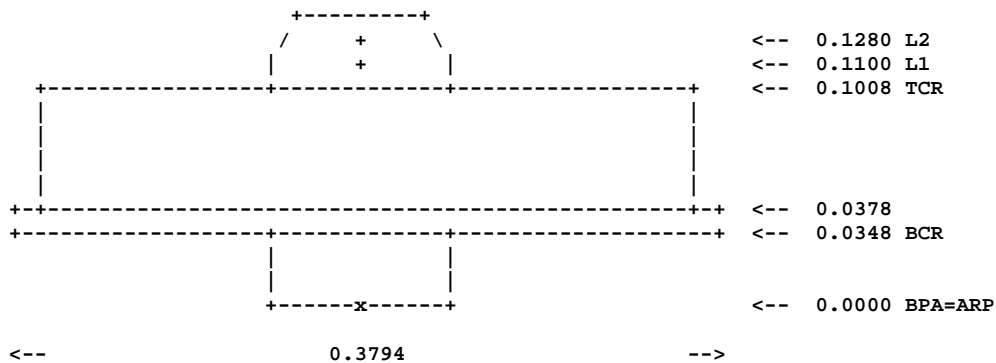
Additional Information : LOWE is operated by the IESSG for the
                      : Proudman Oceanographic Laboratory and
                      : the UK Department for the Environment, Food
                      : and Rural Affairs (DEFRA)
    
```

13. More Information

```

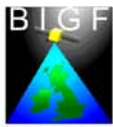
Primary Data Center    :
Secondary Data Center  :
URL for More Information : http://www.bigf.ac.uk
Hardcopy on File
Site Map               : Y
Site Diagram           : Y
Horizon Mask           : Y
Monument Description   : Y
Site Pictures          : Y
Additional Information : (multiple lines)
Antenna Graphics with Dimensions
    
```

ASH700936F_C



```

ARP: Antenna Reference Point
L1 : L1 Phase Center
TCR: Top of Chokering
L2 : L2 Phase Center
BCR: Bottom of Chokering
    
```



TEQC Summary Plot

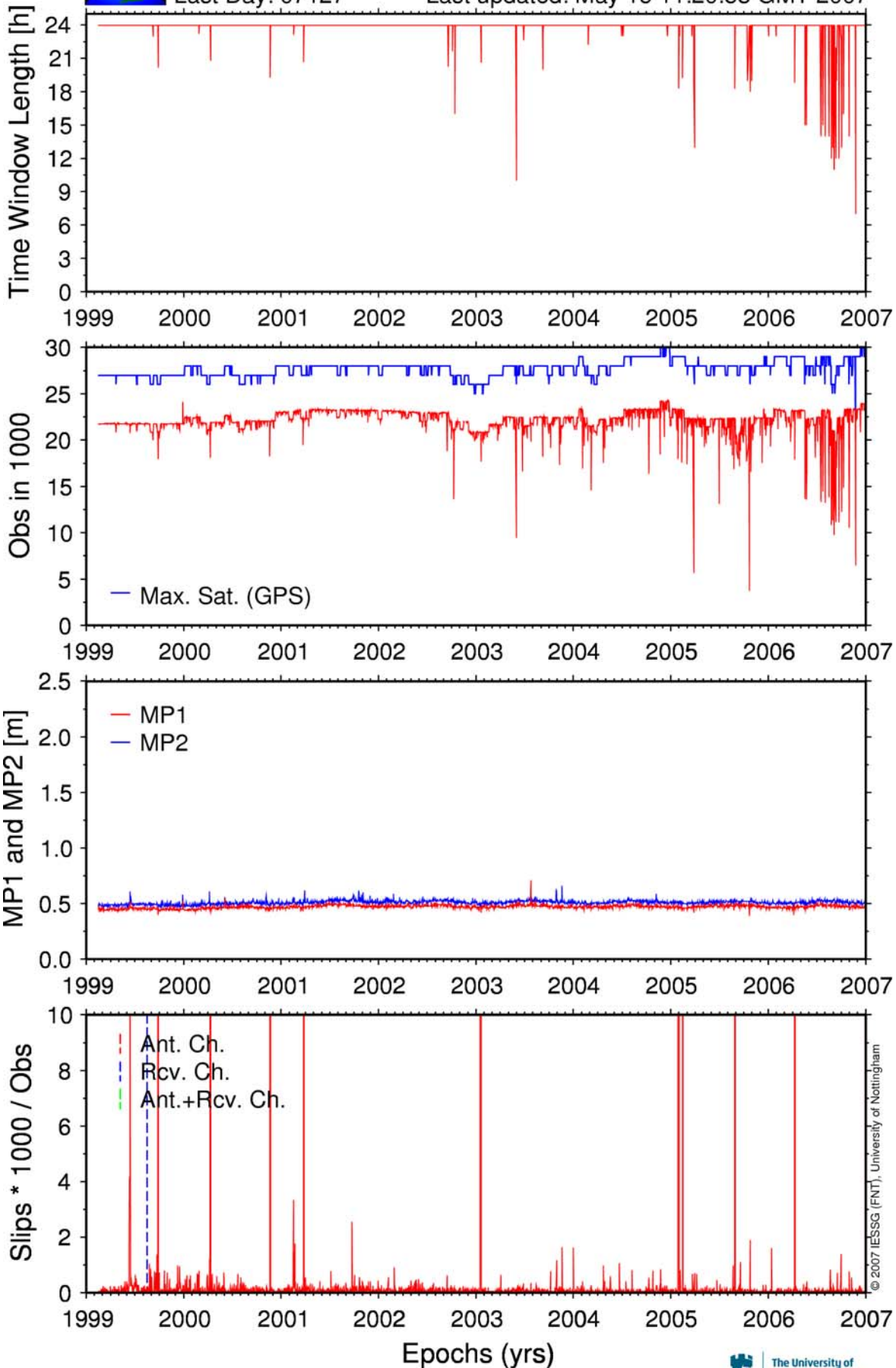
Station: **LOWE**

RCV: ASHTECH Z-XII3

ANT: ASH700936F_C SNOW

Last Day: 07127

Last updated: May 15 11:20:53 GMT 2007



GM 2007 May 15 11:21:17



Lerwick

LWTG Site Information Form (site log)
 International GPS Service
 See Instructions at:
ftp://igsceb.jpl.nasa.gov/pub/station/general/sitelog_instr.txt

0. Form

Prepared by (full name) : Richard Bingley
 Date Prepared : 2006-10-10
 Report Type : UPDATE
 If Update:
 Previous Site Log : lwtg_20050819
 Modified/Added Sections : 3.1, 3.2

1. Site Identification of the GNSS Monument

Site Name : Lerwick Tide Gauge
 Four Character ID : LWTG
 Monument Inscription :
 IERS DOMES Number : (A9)
 CDP Number : (A4)
 Monument Description : STEEL PLATE AND CARBON FIBRE PIPE
 Height of the Monument : 3.0m
 Monument Foundation : PIER/BREAKWATER
 Foundation Depth : (m)
 Marker Description : TOP OF 40mm DIA THREAD ON STEEL PLATE
 Date Installed : 2005-08-17T15:00Z
 Geologic Characteristic : BEDROCK
 Bedrock Type : SEDIMENTARY (SANDSTONE)
 Bedrock Condition : (FRESH/JOINTED/WEATHERED)
 Fracture Spacing : (1-10 cm/11-50 cm/51-200 cm/over 200 cm)
 Fault zones nearby : (YES/NO/Name of the zone)
 Distance/activity : (multiple lines)
 Additional Information : The monument is mounted adjacent to the
 : tide gauge building, which is located on a
 : stone pier/breakwater, built in 1913.
 : The GPS antenna is located on the monument
 : which consists of a 3m carbon fibre pipe mounted
 : on a steel plate, which is fixed to a concrete
 : plinth on top of the pier/breakwater stone wall.
 : The GPS antenna is attached to the carbon fibre
 : pipe using a 5/8" thread.
 : The carbon fibre pipe is attached to the steel
 : plate using a 40 mm diameter thread.
 : The male part of the 40mm diameter thread is on
 : the steel plate and has a domed head, which
 : serves as the survey marker.

2. Site Location Information

City or Town : Lerwick
 State or Province : Shetland
 Country : Scotland
 Tectonic Plate : EURASIAN
 Approximate Position
 X coordinate (m) :
 Y coordinate (m) :
 Z coordinate (m) :
 Latitude (N is +) :
 Longitude (E is +) :
 Elevation (m,ellips.) :
 Additional Information : (multiple lines)

3. GNSS Receiver Information

3.1 Receiver Type : ASHTECH UZ-12
 Satellite System : GPS
 Serial Number : 13838
 Firmware Version : CJ00
 Elevation Cutoff Setting : 5
 Date Installed : 2005-08-19T00:00Z
 Date Removed : 2006-09-19T23:59Z

```

Temperature Stabiliz.      : NONE
Additional Information     : Receiver is an Ashtech Micro-Z.
                          : Full receiver serial number is ZR2 2001 3838.
                          : Operation using a direct modem connection.
                          : Download using MicroManager Pro v1.1.00 (2001).
                          : Conversion to RINEX using ASRINEXO v2.9.7
                          : (with PR SMOOTH FLAG 0).

3.2 Receiver Type         : ASHTECH UZ-12
Satellite System          : GPS
Serial Number             : 13833
Firmware Version          : CK00
Elevation Cutoff Setting : 5
Date Installed            : 2006-10-10T11:00Z
Date Removed              : CCYY-MM-DDThh:mmZ
Temperature Stabiliz.     : NONE
Additional Information     : Receiver is an Ashtech Micro-Z.
                          : Full receiver serial number is ZR2 2001 3833.
                          : Operation using a direct modem connection.
                          : Download using MicroManager Pro v1.1.00 (2001).
                          : Conversion to RINEX using ASRINEXO v2.9.7
                          : (with PR SMOOTH FLAG 0).

3.x Receiver Type         : (A20, from rcvr_ant.tab; see instructions)
Satellite System          : (GPS/GLONASS/GPS+GLONASS)
Serial Number             : (A5)
Firmware Version          : (A11)
Elevation Cutoff Setting : (deg)
Date Installed            : (CCYY-MM-DDThh:mmZ)
Date Removed              : (CCYY-MM-DDThh:mmZ)
Temperature Stabiliz.     : (none or tolerance in degrees C)
Additional Information     : (multiple lines)

4. GNSS Antenna Information

4.1 Antenna Type          : ASH701945C_M    SNOW
Serial Number             : 14803
Antenna Reference Point  : BPA
Marker->ARP Up Ecc. (m)  : 3.0000
Marker->ARP North Ecc(m) : 0.0000
Marker->ARP East Ecc(m)  : 0.0000
Alignment from True N    : 0
Antenna Radome Type      : SNOW
Radome Serial Number     :
Antenna Cable Type       : ASHTECH 100914 REVA
Antenna Cable Length     : 30m
Date Installed            : 2005-08-19T00:00Z
Date Removed              : CCYY-MM-DDThh:mmZ
Additional Information     : Full antenna serial number is CR5 2001 4803.

4.x Antenna Type          : (A20 from rcvr_ant.tab; see instructions)
Serial Number             : (A*, but note the first A5 is used in SINEX)
Antenna Reference Point  : (BPA/BCR/XXX from "antenna.gra"; see instr.)
Marker->ARP Up Ecc. (m)  : (F8.4)
Marker->ARP North Ecc(m) : (F8.4)
Marker->ARP East Ecc(m)  : (F8.4)
Alignment from True N    : (deg; + is clockwise/east)
Antenna Radome Type      : (A4 from rcvr_ant.tab; see instructions)
Radome Serial Number     :
Antenna Cable Type       : (vendor & type number)
Antenna Cable Length     : (m)
Date Installed            : (CCYY-MM-DDThh:mmZ)
Date Removed              : (CCYY-MM-DDThh:mmZ)
Additional Information     : (multiple lines)

5. Surveyed Local Ties

5.x Tied Marker Name      :
Tied Marker Usage        : (SLR/VLBI/LOCAL CONTROL/FOOTPRINT/etc)
Tied Marker CDP Number   : (A4)
Tied Marker DOMES Number : (A9)
Differential Components from GNSS Marker to the tied monument (ITRS)
  dx (m)                  : (m)
  dy (m)                  : (m)
  dz (m)                  : (m)
Accuracy (mm)            : (mm)
Survey method             : (GPS CAMPAIGN/TRILATERATION/TRIANGULATION/etc)
Date Measured            : (CCYY-MM-DDThh:mmZ)

```

Additional Information : (multiple lines)

6. Frequency Standard

- 6.1 Standard Type : INTERNAL
 - Input Frequency : (if external)
 - Effective Dates : 2005-08-19/CCYY-MM-DD
 - Notes : (multiple lines)
- 6.x Standard Type : (INTERNAL or EXTERNAL H-MASER/CESIUM/etc)
 - Input Frequency : (if external)
 - Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 - Notes : (multiple lines)

7. Collocation Information

- 7.x Instrumentation Type : (GPS/GLONASS/DORIS/PRARE/SLR/VLBI/TIME/etc)
 - Status : (PERMANENT/MOBILE)
 - Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 - Notes : (multiple lines)

8. Meteorological Instrumentation

- 8.1.1 Humidity Sensor Model : NONE
 - Manufacturer :
 - Serial Number :
 - Data Sampling Interval : (sec)
 - Accuracy (% rel h) : (% rel h)
 - Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 - Height Diff to Ant : (m)
 - Calibration date : (CCYY-MM-DD)
 - Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 - Notes : (multiple lines)

- 8.1.x Humidity Sensor Model :
 - Manufacturer :
 - Serial Number :
 - Data Sampling Interval : (sec)
 - Accuracy (% rel h) : (% rel h)
 - Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 - Height Diff to Ant : (m)
 - Calibration date : (CCYY-MM-DD)
 - Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 - Notes : (multiple lines)

- 8.2.1 Pressure Sensor Model : NONE
 - Manufacturer :
 - Serial Number :
 - Data Sampling Interval : (sec)
 - Accuracy : (hPa)
 - Height Diff to Ant : (m)
 - Calibration date : (CCYY-MM-DD)
 - Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 - Notes : (multiple lines)

- 8.2.x Pressure Sensor Model :
 - Manufacturer :
 - Serial Number :
 - Data Sampling Interval : (sec)
 - Accuracy : (hPa)
 - Height Diff to Ant : (m)
 - Calibration date : (CCYY-MM-DD)
 - Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 - Notes : (multiple lines)

- 8.3.1 Temp. Sensor Model : NONE
 - Manufacturer :
 - Serial Number :
 - Data Sampling Interval : (sec)
 - Accuracy : (deg C)
 - Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 - Height Diff to Ant : (m)
 - Calibration date : (CCYY-MM-DD)
 - Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 - Notes : (multiple lines)

- 8.3.x Temp. Sensor Model :

```

Manufacturer      :
Serial Number     :
Data Sampling Interval : (sec)
Accuracy          : (deg C)
Aspiration        : (UNASPIRATED/NATURAL/FAN/etc)
Height Diff to Ant : (m)
Calibration date  : (CCYY-MM-DD)
Effective Dates   : (CCYY-MM-DD/CCYY-MM-DD)
Notes             : (multiple lines)

8.4.1 Water Vapor Radiometer : NONE
Manufacturer      :
Serial Number     :
Distance to Antenna : (m)
Height Diff to Ant : (m)
Calibration date  : (CCYY-MM-DD)
Effective Dates   : (CCYY-MM-DD/CCYY-MM-DD)
Notes             : (multiple lines)

8.4.x Water Vapor Radiometer :
Manufacturer      :
Serial Number     :
Distance to Antenna : (m)
Height Diff to Ant : (m)
Calibration date  : (CCYY-MM-DD)
Effective Dates   : (CCYY-MM-DD/CCYY-MM-DD)
Notes             : (multiple lines)

8.5.x Other Instrumentation : (multiple lines)

9. Local Ongoing Conditions Possibly Affecting Computed Position

9.1.x Radio Interferences      : (TV/CELL PHONE ANTENNA/RADAR/etc)
Observed Degradations        : (SN RATIO/DATA GAPS/etc)
Effective Dates                : (CCYY-MM-DD/CCYY-MM-DD)
Additional Information         : (multiple lines)

9.2.x Multipath Sources        : (METAL ROOF/DOME/VLBI ANTENNA/etc)
Effective Dates                : (CCYY-MM-DD/CCYY-MM-DD)
Additional Information         : (multiple lines)

9.3.x Signal Obstructions      : (TREES/BUILDINGS/etc)
Effective Dates                : (CCYY-MM-DD/CCYY-MM-DD)
Additional Information         : (multiple lines)

10. Local Episodic Effects Possibly Affecting Data Quality

10.1 Date                     : (CCYY-MM-DDThh:mmZ)
Event                         : (TREE CLEARING/CONSTRUCTION/etc)

10.x Date                     : (CCYY-MM-DDThh:mmZ)
Event                         : (TREE CLEARING/CONSTRUCTION/etc)

11. On-Site, Point of Contact Agency Information

Agency                      : Lerwick Port Authority
Preferred Abbreviation      :
Mailing Address              : Albert Building
                             : Lerwick
                             : Shetland ZE1 0LL
                             : UK

Primary Contact
Contact Name                 : Harbour Master
Telephone (primary)          :
Telephone (secondary)        :
Fax                           :
E-mail                       :

Secondary Contact
Contact Name                 :
Telephone (primary)          :
Telephone (secondary)        :
Fax                           :
E-mail                       :
Additional Information        : (multiple lines)

12. Responsible Agency (if different from 11.)

```

```

Agency                : IESSG
Preferred Abbreviation : IESSG
Mailing Address        : University of Nottingham
                       : University Park
                       : Nottingham NG72RD
                       : UK

Primary Contact
Contact Name           : Richard Bingley
Telephone (primary)    : +44 (0)115 9513932
Telephone (secondary) : +44 (0)115 9513880
Fax                    : +44 (0)115 9513881
E-mail                 : richard.bingley@nottingham.ac.uk

Secondary Contact
Contact Name           : IESSG Experimental Officers
Telephone (primary)    : +44 (0)115 9513921
Telephone (secondary) : +44 (0)115 9513880
Fax                    : +44 (0)115 9513881
E-mail                 : iessg@nottingham.ac.uk

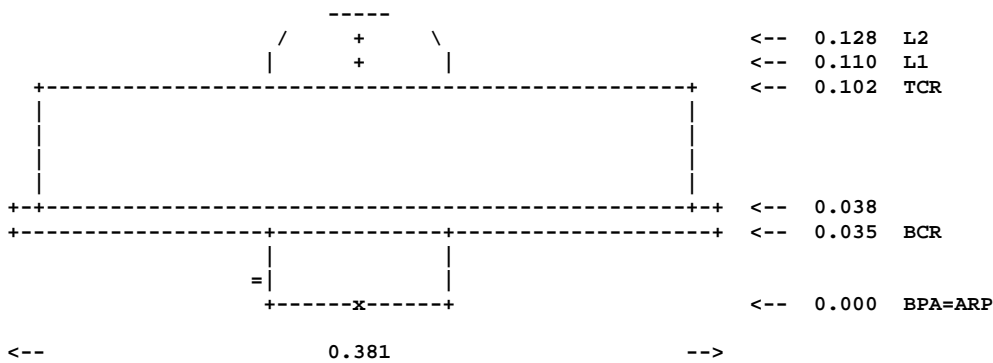
Additional Information  : LWTG is operated by the IESSG for the
                       : Proudman Oceanographic Laboratory and
                       : the UK Department for the Environment, Food
                       : and Rural Affairs (DEFRA)
    
```

13. More Information

```

Primary Data Center    :
Secondary Data Center  :
URL for More Information : http://www.bigf.ac.uk
Hardcopy on File
Site Map               : Y
Site Diagram           : Y
Horizon Mask          : Y
Monument Description   : Y
Site Pictures          : Y
Additional Information  : (multiple lines)
Antenna Graphics with Dimensions
    
```

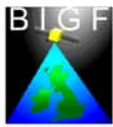
ASH701945C_M



```

ARP: Antenna Reference Point
L1 : L1 Phase Center
TCR: Top of Chokering

L2 : L2 Phase Center
BCR: Bottom of Chokering
    
```



TEQC Summary Plot

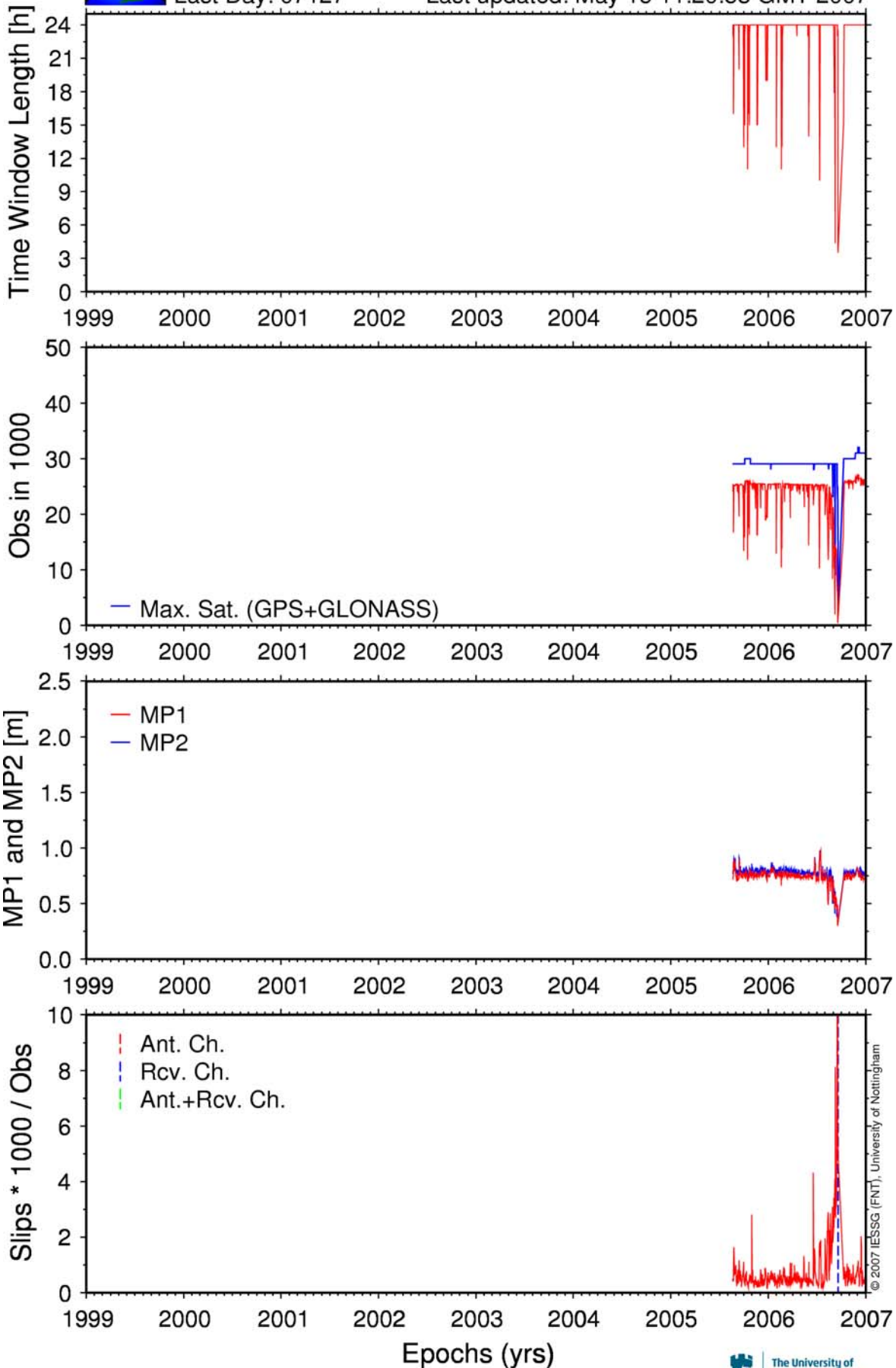
Station: LWTG

RCV: ASHTECH UZ-12

ANT: ASH701945C_M SNOW

Last Day: 07127

Last updated: May 15 11:20:53 GMT 2007



GM 2007 May 15 11:21:24



Newlyn

NEWL Site Information Form (site log)
 International GPS Service
 See Instructions at:
ftp://igsceb.jpl.nasa.gov/pub/station/general/sitelog_instr.txt

0. Form

Prepared by (full name) : Richard Bingley
 Date Prepared : 2003-12-12
 Report Type : NEW
 If Update:
 Previous Site Log :
 Modified/Added Sections :

1. Site Identification of the GNSS Monument

Site Name : Newlyn Tide Gauge
 Four Character ID : NEWL
 Monument Inscription :
 IERS DOMES Number : 13273M103
 CDP Number : (A4)
 Monument Description : STEEL PLATE AND CARBON FIBRE PIPE
 Height of the Monument : 3.0m
 Monument Foundation : LIGHTHOUSE
 Foundation Depth : (m)
 Marker Description : TOP OF 40mm DIA THREAD ON STEEL PLATE
 Date Installed : 1998-09-29T12:00Z
 Geologic Characteristic : BEDROCK
 Bedrock Type : SEDIMENTARY (SANDSTONE)
 Bedrock Condition : (FRESH/JOINTED/WEATHERED)
 Fracture Spacing : (1-10 cm/11-50 cm/51-200 cm/over 200 cm)
 Fault zones nearby : (YES/NO/Name of the zone)
 Distance/activity : (multiple lines)
 Additional Information : The monument is mounted on the
 : observation platform of a steel
 : lighthouse adjacent to the tide gauge
 : building, which is located at the end
 : of a stone pier, which is founded
 : on the Sandstone bedrock
 : The GPS antenna is located on the monument
 : which consists of a 3m carbon fibre pipe mounted
 : on a steel plate, which is fixed to the
 : observation platform.
 : The GPS antenna is attached to the carbon fibre
 : pipe using a 5/8" thread.
 : The carbon fibre pipe is attached to the steel
 : plate using a 40 mm diameter thread.
 : The male part of the 40mm diameter thread is on
 : the steel plate and has a domed head, which
 : serves as the survey marker.

2. Site Location Information

City or Town : Newlyn
 State or Province : Cornwall
 Country : England
 Tectonic Plate : EURASIAN
 Approximate Position
 X coordinate (m) : 4079954.1
 Y coordinate (m) : -395930.4
 Z coordinate (m) : 4870196.8
 Latitude (N is +) : +500610.90
 Longitude (E is +) : -0053234.04
 Elevation (m,ellips.) : 64.5
 Additional Information : (multiple lines)

3. GNSS Receiver Information

3.1 Receiver Type : ASHTECH Z-XII3
 Satellite System : GPS
 Serial Number : 02964
 Firmware Version : 1F50

Elevation Cutoff Setting : 5
 Date Installed : 1998-09-30T00:00Z
 Date Removed : 1999-08-15T23:59Z
 Temperature Stabiliz. : NONE
 Additional Information : Full receiver serial number is LP 02964.
 : Operation using a direct modem connection.
 : Download using CGREMOTE v5.4.00 CGRS1F50 and
 : CGHOSE v5.4.00 CGRS1F50
 : Conversion to RINEX using ASRINEXO v2.9.7
 : (with PR SMOOTH FLAG 0)

3.2 Receiver Type : ASHTECH Z-XII3
 Satellite System : GPS
 Serial Number : 02964
 Firmware Version : CD00
 Elevation Cutoff Setting : 5
 Date Installed : 1999-08-17T00:00Z
 Date Removed : CCYY-MM-DDThh:mmZ
 Temperature Stabiliz. : NONE
 Additional Information : Full receiver serial number is LP 02964.
 : Operation using a direct modem connection.
 : Download using CGREMOTE v5.4.00 CGRSCD00 and
 : CGHOSE v6.0.00 CGRSCD00.
 : Conversion to RINEX using ASRINEXO v2.9.7
 : (with PR SMOOTH FLAG 0).

3.x Receiver Type : (A20, from rcvr_ant.tab; see instructions)
 Satellite System : (GPS/GLONASS/GPS+GLONASS)
 Serial Number : (A5)
 Firmware Version : (A11)
 Elevation Cutoff Setting : (deg)
 Date Installed : (CCYY-MM-DDThh:mmZ)
 Date Removed : (CCYY-MM-DDThh:mmZ)
 Temperature Stabiliz. : (none or tolerance in degrees C)
 Additional Information : (multiple lines)

4. GNSS Antenna Information

4.1 Antenna Type : ASH700936D_M SNOW
 Serial Number : 15402
 Antenna Reference Point : BPA
 Marker->ARP Up Ecc. (m) : 2.9650
 Marker->ARP North Ecc(m) : 0.0000
 Marker->ARP East Ecc(m) : 0.0000
 Alignment from True N : 0
 Antenna Radome Type : SNOW
 Radome Serial Number :
 Antenna Cable Type : ASHTECH 100914 REVA
 Antenna Cable Length : 30m
 Date Installed : 1998-09-30T00:00Z
 Date Removed : 2001-01-17T23:59Z
 Additional Information : Full antenna serial number is CR 15042.
 : Antenna cable damaged in 2001-01

4.2 Antenna Type : ASH700936D_M SNOW
 Serial Number : 15402
 Antenna Reference Point : BPA
 Marker->ARP Up Ecc. (m) : 2.9650
 Marker->ARP North Ecc(m) : 0.0000
 Marker->ARP East Ecc(m) : 0.0000
 Alignment from True N : 0
 Antenna Radome Type : SNOW
 Radome Serial Number :
 Antenna Cable Type : ASHTECH 100914 REVA
 Antenna Cable Length : 30m
 Date Installed : 2001-02-09T00:00Z
 Date Removed : CCYY-MM-DDThh:mmZ
 Additional Information : Full antenna serial number is CR 15042.
 : New antenna cable installed

4.x Antenna Type : (A20 from rcvr_ant.tab; see instructions)
 Serial Number : (A*, but note the first A5 is used in SINEX)
 Antenna Reference Point : (BPA/BCR/XXX from "antenna.gra"; see instr.)
 Marker->ARP Up Ecc. (m) : (F8.4)
 Marker->ARP North Ecc(m) : (F8.4)
 Marker->ARP East Ecc(m) : (F8.4)
 Alignment from True N : (deg; + is clockwise/east)
 Antenna Radome Type : (A4 from rcvr_ant.tab; see instructions)
 Radome Serial Number :

Antenna Cable Type : (vendor & type number)
 Antenna Cable Length : (m)
 Date Installed : (CCYY-MM-DDThh:mmZ)
 Date Removed : (CCYY-MM-DDThh:mmZ)
 Additional Information : (multiple lines)

5. Surveyed Local Ties

5.x Tied Marker Name :
 Tied Marker Usage : (SLR/VLBI/LOCAL CONTROL/FOOTPRINT/etc)
 Tied Marker CDP Number : (A4)
 Tied Marker DOMES Number : (A9)
 Differential Components from GNSS Marker to the tied monument (ITRS)
 dx (m) : (m)
 dy (m) : (m)
 dz (m) : (m)
 Accuracy (mm) : (mm)
 Survey method : (GPS CAMPAIGN/TRILATERATION/TRIANGULATION/etc)
 Date Measured : (CCYY-MM-DDThh:mmZ)
 Additional Information : (multiple lines)

6. Frequency Standard

6.1 Standard Type : INTERNAL
 Input Frequency : (if external)
 Effective Dates : 1998-09-30/CCYY-MM-DD
 Notes : (multiple lines)

6.x Standard Type : (INTERNAL or EXTERNAL H-MASER/CESIUM/etc)
 Input Frequency : (if external)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

7. Collocation Information

7.x Instrumentation Type : (GPS/GLONASS/DORIS/PRARE/SLR/VLBI/TIME/etc)
 Status : (PERMANENT/MOBILE)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8. Meteorological Instrumentation

8.1.1 Humidity Sensor Model : NONE
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy (% rel h) : (% rel h)
 Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.1.x Humidity Sensor Model :
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy (% rel h) : (% rel h)
 Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.2.1 Pressure Sensor Model : NONE
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy : (hPa)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.2.x Pressure Sensor Model :
 Manufacturer :

```

Serial Number      :
Data Sampling Interval : (sec)
Accuracy           : (hPa)
Height Diff to Ant : (m)
Calibration date   : (CCYY-MM-DD)
Effective Dates    : (CCYY-MM-DD/CCYY-MM-DD)
Notes              : (multiple lines)

8.3.1 Temp. Sensor Model : NONE
Manufacturer        :
Serial Number       :
Data Sampling Interval : (sec)
Accuracy           : (deg C)
Aspiration          : (UNASPIRATED/NATURAL/FAN/etc)
Height Diff to Ant : (m)
Calibration date   : (CCYY-MM-DD)
Effective Dates    : (CCYY-MM-DD/CCYY-MM-DD)
Notes              : (multiple lines)

8.3.x Temp. Sensor Model :
Manufacturer        :
Serial Number       :
Data Sampling Interval : (sec)
Accuracy           : (deg C)
Aspiration          : (UNASPIRATED/NATURAL/FAN/etc)
Height Diff to Ant : (m)
Calibration date   : (CCYY-MM-DD)
Effective Dates    : (CCYY-MM-DD/CCYY-MM-DD)
Notes              : (multiple lines)

8.4.1 Water Vapor Radiometer : NONE
Manufacturer        :
Serial Number       :
Distance to Antenna : (m)
Height Diff to Ant : (m)
Calibration date   : (CCYY-MM-DD)
Effective Dates    : (CCYY-MM-DD/CCYY-MM-DD)
Notes              : (multiple lines)

8.4.x Water Vapor Radiometer :
Manufacturer        :
Serial Number       :
Distance to Antenna : (m)
Height Diff to Ant : (m)
Calibration date   : (CCYY-MM-DD)
Effective Dates    : (CCYY-MM-DD/CCYY-MM-DD)
Notes              : (multiple lines)

8.5.x Other Instrumentation : (multiple lines)

9. Local Ongoing Conditions Possibly Affecting Computed Position

9.1.x Radio Interferences : (TV/CELL PHONE ANTENNA/RADAR/etc)
Observed Degradations : (SN RATIO/DATA GAPS/etc)
Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
Additional Information : (multiple lines)

9.2.x Multipath Sources : (METAL ROOF/DOME/VLBI ANTENNA/etc)
Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
Additional Information : (multiple lines)

9.3.x Signal Obstructions : (TREES/BUILDINGS/etc)
Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
Additional Information : (multiple lines)

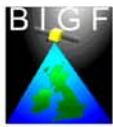
10. Local Episodic Effects Possibly Affecting Data Quality

10.1 Date : (CCYY-MM-DDThh:mmZ)
Event : (TREE CLEARING/CONSTRUCTION/etc)

10.x Date : (CCYY-MM-DDThh:mmZ)
Event : (TREE CLEARING/CONSTRUCTION/etc)

11. On-Site, Point of Contact Agency Information

Agency : Newlyn Pier and Harbour Commissioners
Preferred Abbreviation : NPHC
    
```

TEQC Summary Plot

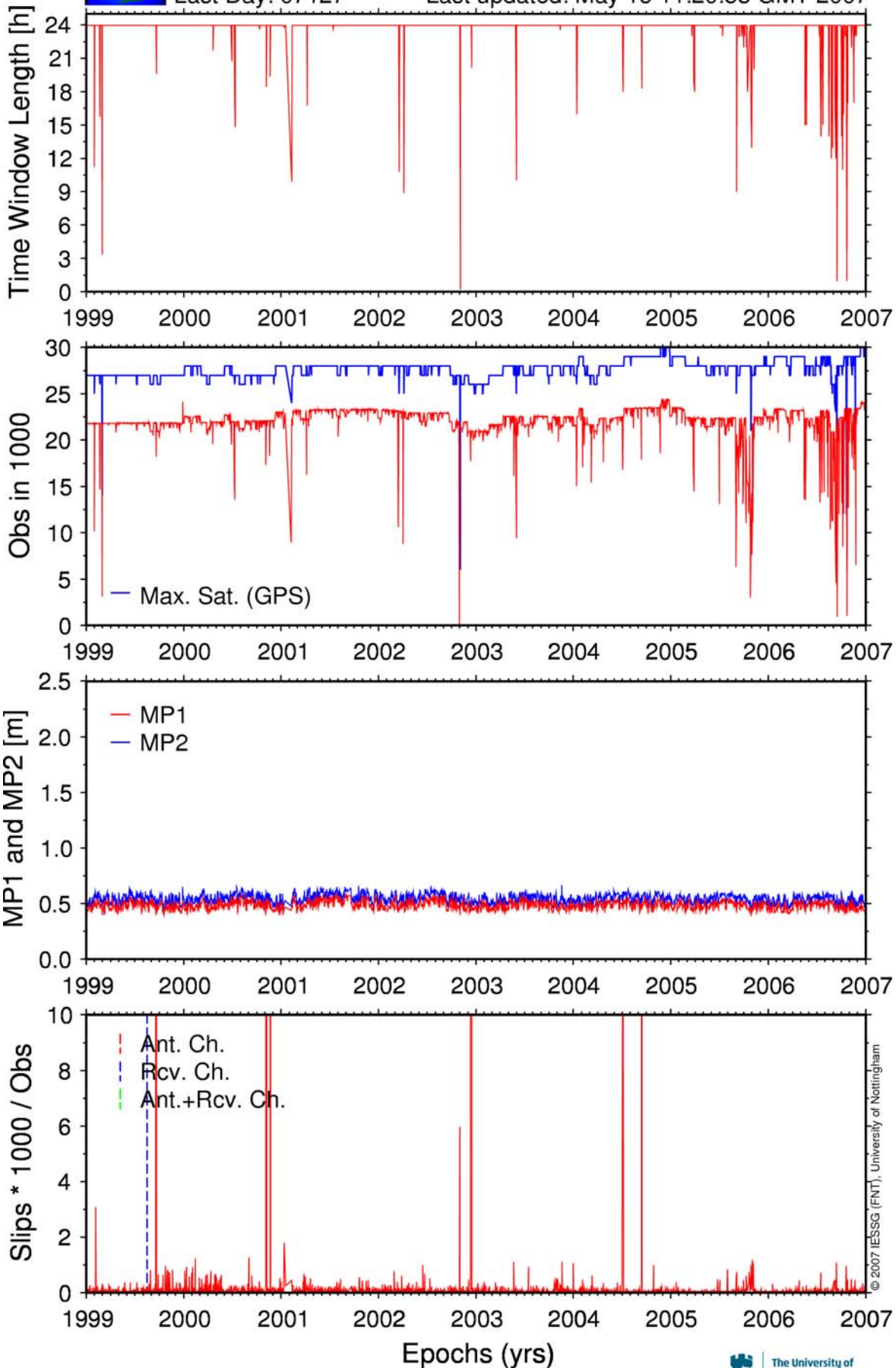
Station: NEWL

RCV: ASHTECH Z-XII3

ANT: ASH700936D_M SNOW

Last Day: 07127

Last updated: May 15 11:20:53 GMT 2007



GM 2007 May 15 11:21:30



North Shields

NSTG Site Information Form (site log)
 International GPS Service
 See Instructions at:
ftp://igsceb.jpl.nasa.gov/pub/station/general/sitelog_instr.txt

0. Form

Prepared by (full name) : Richard Bingley
 Date Prepared : 2003-11-??
 Report Type : UPDATE
 If Update:
 Previous Site Log : nstg_20031021.log
 Modified/Added Sections : 4.10

1. Site Identification of the GNSS Monument

Site Name : North Shields Tide Gauge
 Four Character ID : NSTG
 Monument Inscription :
 IERS DOMES Number : 13216M001
 CDP Number : (A4)
 Monument Description : ALUMINIUM POLE
 Height of the Monument : 4.00m
 Monument Foundation : QUAY
 Foundation Depth : 2.4m
 Marker Description : BOTTOM OF 5/8" THREAD ON 4m ALUMINIUM POLE
 Date Installed : 1998-03-07T12:00Z
 Geologic Characteristic : BOULDER CLAY
 Bedrock Type : SEDIMENTARY (WESTPHALIAN)
 Bedrock Condition : (FRESH/JOINTED/WEATHERED)
 Fracture Spacing : (1-10 cm/11-50 cm/51-200 cm/over 200 cm)
 Fault zones nearby : (YES/NO/Name of the zone)
 Distance/activity : (multiple lines)
 Additional Information : The monument is mounted in the
 : tide gauge building, which is located
 : on a concrete quay, with piled
 : foundations
 : The GPS antenna is located on the monument
 : which consists of a 4m aluminium pole, which is
 : fixed to the concrete quay, in the tide gauge
 : building.
 : The GPS antenna is attached to the aluminium
 : pole using a 5/8" thread.
 : The male part of the 5/8" thread is on the
 : aluminium pole and the bottom of the thread
 : serves as the survey marker.

2. Site Location Information

City or Town : North Shields
 State or Province : Northumbria
 Country : England
 Tectonic Plate : EURASIAN
 Approximate Position
 X coordinate (m) : 3664792.2
 Y coordinate (m) : -92117.3
 Z coordinate (m) : 5201903.7
 Latitude (N is +) : +550026.70
 Longitude (E is +) : -0012623.53
 Elevation (m,ellips.) : 56.9
 Additional Information : (multiple lines)

3. GNSS Receiver Information

3.1 Receiver Type : ASHTECH Z-XII3
 Satellite System : GPS
 Serial Number : ???????
 Firmware Version : 1I00
 Elevation Cutoff Setting : 5
 Date Installed : 1998-03-15T00:00Z
 Date Removed : 1998-08-23T23:59Z
 Temperature Stabiliz. : NONE

Additional Information : Full receiver serial number not known.
 : Not continuous operation.
 : Download using HOSE?
 : Conversion to RINEX using ASHTORIN
 : (with codephase smoothing).

3.2 Receiver Type : ASHTECH Z-XII3
 Satellite System : GPS
 Serial Number : 982
 Firmware Version : 1I00
 Elevation Cutoff Setting : 5
 Date Installed : 1999-08-10T00:00Z
 Date Removed : 1999-08-13T23:59Z
 Temperature Stabiliz. : NONE
 Additional Information : Full receiver serial number not known.
 : Not continuous operation.
 : Download using HOSE?
 : Conversion to RINEX using ASHTORIN
 : (with codephase smoothing).

3.3 Receiver Type : ASHTECH Z-XII3
 Satellite System : GPS
 Serial Number : ??????
 Firmware Version : 1L00
 Elevation Cutoff Setting : 5
 Date Installed : 1999-12-03T00:00Z
 Date Removed : 1999-12-09T23:59Z
 Temperature Stabiliz. : NONE
 Additional Information : Full receiver serial number not known.
 : Not continuous operation.
 : Download using HOSE?
 : Conversion to RINEX using ASHTORIN
 : (with codephase smoothing).

3.4 Receiver Type : ASHTECH Z-XII3
 Satellite System : GPS
 Serial Number : 00111
 Firmware Version : 1L00
 Elevation Cutoff Setting : 5
 Date Installed : 2000-02-12T00:00Z
 Date Removed : 2000-10-15T23:59Z
 Temperature Stabiliz. : NONE
 Additional Information : Full receiver serial number is LP 00111.

3.5 Receiver Type : ASHTECH Z-XII3
 Satellite System : GPS
 Serial Number : 00111
 Firmware Version : CD00
 Elevation Cutoff Setting : 5
 Date Installed : 2001-05-15T00:00Z
 Date Removed : 2002-04-03T23:59Z
 Temperature Stabiliz. : NONE
 Additional Information : Full receiver serial number is LP 00111.
 : Operation using a direct modem connection
 : Download using CGREMOTE v5.4.00 CGRSCD00 and
 : CGHOSE v6.0.00 CGRSCD00.
 : Conversion to RINEX using ASRINEXO v2.9.7
 : (with PR SMOOTH FLAG 0).

3.6 Receiver Type : ASHTECH Z-XII3
 Satellite System : GPS
 Serial Number : 01845
 Firmware Version : CD00
 Elevation Cutoff Setting : 5
 Date Installed : 2002-04-05T00:00Z
 Date Removed : 2002-05-16T23:59Z
 Temperature Stabiliz. : NONE
 Additional Information : Full receiver serial number is LP 01845.
 : Operation using a direct modem connection.
 : Download using CGREMOTE v5.4.00 CGRSCD00 and
 : CGHOSE v6.0.00 CGRSCD00.
 : Conversion to RINEX using ASRINEXO v2.9.7
 : (with PR SMOOTH FLAG 0).

3.7 Receiver Type : ASHTECH Z-XII3
 Satellite System : GPS
 Serial Number : 00111
 Firmware Version : CD00
 Elevation Cutoff Setting : 5
 Date Installed : 2002-05-18T00:00Z

Date Removed : CCYY-MM-DDThh:mmZ
 Temperature Stabiliz. : NONE
 Additional Information : Full receiver serial number is LP 00111.
 : Operation using a direct modem connection.
 : Download using CGREMOTE v5.4.00 CGRSCD00 and
 : CGHOSE v6.0.00 CGRSCD00.
 : Conversion to RINEX using ASRINEXO v2.9.7
 : (with PR SMOOTH FLAG 0).

3.x Receiver Type : (A20, from rcvr_ant.tab; see instructions)
 Satellite System : (GPS/GLONASS/GPS+GLONASS)
 Serial Number : (A5)
 Firmware Version : (A11)
 Elevation Cutoff Setting : (deg)
 Date Installed : (CCYY-MM-DDThh:mmZ)
 Date Removed : (CCYY-MM-DDThh:mmZ)
 Temperature Stabiliz. : (none or tolerance in degrees C)
 Additional Information : (multiple lines)

4. GNSS Antenna Information

4.1 Antenna Type : ASH700936B_M
 Serial Number : ??????
 Antenna Reference Point : BPA
 Marker->ARP Up Ecc. (m) : 0.0000
 Marker->ARP North Ecc(m) : 0.0000
 Marker->ARP East Ecc(m) : 0.0000
 Alignment from True N : 0
 Antenna Radome Type : NONE
 Radome Serial Number :
 Antenna Cable Type :
 Antenna Cable Length :
 Date Installed : 1998-03-15T00:00Z
 Date Removed : 1998-08-23T23:59Z
 Additional Information : Full antenna serial number is not known.

4.2 Antenna Type : ASH700936B_M SNOW
 Serial Number : 146
 Antenna Reference Point : BPA
 Marker->ARP Up Ecc. (m) : 0.0000
 Marker->ARP North Ecc(m) : 0.0000
 Marker->ARP East Ecc(m) : 0.0000
 Alignment from True N : 0
 Antenna Radome Type : SNOW
 Radome Serial Number :
 Antenna Cable Type :
 Antenna Cable Length :
 Date Installed : 1999-08-10T00:00Z
 Date Removed : 1999-08-13T23:59Z
 Additional Information : Full antenna serial number is not known.

4.3 Antenna Type : ASH700936B_M SNOW
 Serial Number : ??????
 Antenna Reference Point : BPA
 Marker->ARP Up Ecc. (m) : 0.0000
 Marker->ARP North Ecc(m) : 0.0000
 Marker->ARP East Ecc(m) : 0.0000
 Alignment from True N : 0
 Antenna Radome Type : SNOW
 Radome Serial Number :
 Antenna Cable Type :
 Antenna Cable Length :
 Date Installed : 1999-12-03T00:00Z
 Date Removed : 1999-12-09T23:59Z
 Additional Information : Full antenna serial number is not known.

4.4 Antenna Type : ASH700936B_M SNOW
 Serial Number : 13570
 Antenna Reference Point : BPA
 Marker->ARP Up Ecc. (m) : 0.0000
 Marker->ARP North Ecc(m) : 0.0000
 Marker->ARP East Ecc(m) : 0.0000
 Alignment from True N : 0
 Antenna Radome Type : SNOW
 Radome Serial Number :
 Antenna Cable Type :
 Antenna Cable Length :
 Date Installed : 2000-02-12T00:00Z
 Date Removed : 2000-10-15T23:59Z

Additional Information : Full antenna serial number is CR 13570.

4.5 Antenna Type : ASH700936B_M SNOW
 Serial Number : 13570
 Antenna Reference Point : BPA
 Marker->ARP Up Ecc. (m) : 0.0000
 Marker->ARP North Ecc(m) : 0.0000
 Marker->ARP East Ecc(m) : 0.0000
 Alignment from True N : 0
 Antenna Radome Type : SNOW
 Radome Serial Number :
 Antenna Cable Type :
 Antenna Cable Length : 10m
 Date Installed : 2001-05-15T00:00Z
 Date Removed : 2001-06-12T12:59Z
 Additional Information : Full antenna serial number is CR 13570.

4.6 Antenna Type : ASH700936B_M SNOW
 Serial Number : 13570
 Antenna Reference Point : BPA
 Marker->ARP Up Ecc. (m) : 0.0000
 Marker->ARP North Ecc(m) : 0.0000
 Marker->ARP East Ecc(m) : 0.0000
 Alignment from True N : 0
 Antenna Radome Type : SNOW
 Radome Serial Number :
 Antenna Cable Type :
 Antenna Cable Length : 30m
 Date Installed : 2001-06-12T13:00Z
 Date Removed : 2002-03-11T23:59Z
 Additional Information : Full antenna serial number is CR 13570.

4.7 Antenna Type : ASH701945C_M SNOW
 Serial Number : 10213
 Antenna Reference Point : BPA
 Marker->ARP Up Ecc. (m) : 0.0000
 Marker->ARP North Ecc(m) : 0.0000
 Marker->ARP East Ecc(m) : 0.0000
 Alignment from True N : 0
 Antenna Radome Type : SNOW
 Radome Serial Number :
 Antenna Cable Type :
 Antenna Cable Length : 30m
 Date Installed : 2002-03-13T00:00Z
 Date Removed : 2002-04-03T23:59Z
 Additional Information : Full antenna serial number is CR5 2001 0213.

4.8 Antenna Type : ASH700936B_M SNOW
 Serial Number : 13570
 Antenna Reference Point : BPA
 Marker->ARP Up Ecc. (m) : 0.0000
 Marker->ARP North Ecc(m) : 0.0000
 Marker->ARP East Ecc(m) : 0.0000
 Alignment from True N : 0
 Antenna Radome Type : SNOW
 Radome Serial Number :
 Antenna Cable Type :
 Antenna Cable Length : 30m
 Date Installed : 2002-04-05T00:00Z
 Date Removed : 2003-10-20T15:59Z
 Additional Information : Full antenna serial number is CR 13570.

4.9 Antenna Type : ASH700936B_M SNOW
 Serial Number : 13570
 Antenna Reference Point : BPA
 Marker->ARP Up Ecc. (m) : 0.0000
 Marker->ARP North Ecc(m) : 0.0000
 Marker->ARP East Ecc(m) : 0.0000
 Alignment from True N : 0
 Antenna Radome Type : SNOW
 Radome Serial Number :
 Antenna Cable Type :
 Antenna Cable Length : 30m
 Date Installed : 2003-10-20T16:00Z
 Date Removed : 2003-11-18T10:00Z
 Additional Information : Full antenna serial number is CR 13570.
 : Antenna cable replaced.

4.10 Antenna Type : ASH700936B_M SNOW
 Serial Number : 13570

Antenna Reference Point : BPA
 Marker->ARP Up Ecc. (m) : 0.0000
 Marker->ARP North Ecc(m) : 0.0000
 Marker->ARP East Ecc(m) : 0.0000
 Alignment from True N : 0
 Antenna Radome Type : SNOW
 Radome Serial Number :
 Antenna Cable Type :
 Antenna Cable Length : 30m
 Date Installed : 2003-11-18T11:00Z
 Date Removed : CCYY-MM-DDThh:mmZ
 Additional Information : Full antenna serial number is CR 13570.
 : Antenna cable replaced.

4.x Antenna Type : (A20 from rcvr_ant.tab; see instructions)
 Serial Number : (A*, but note the first A5 is used in SINEX)
 Antenna Reference Point : (BPA/BCR/XXX from "antenna.gra"; see instr.)
 Marker->ARP Up Ecc. (m) : (F8.4)
 Marker->ARP North Ecc(m) : (F8.4)
 Marker->ARP East Ecc(m) : (F8.4)
 Alignment from True N : (deg; + is clockwise/east)
 Antenna Radome Type : (A4 from rcvr_ant.tab; see instructions)
 Radome Serial Number :
 Antenna Cable Type : (vendor & type number)
 Antenna Cable Length : (m)
 Date Installed : (CCYY-MM-DDThh:mmZ)
 Date Removed : (CCYY-MM-DDThh:mmZ)
 Additional Information : (multiple lines)

5. Surveyed Local Ties

5.x Tied Marker Name :
 Tied Marker Usage : (SLR/VLBI/LOCAL CONTROL/FOOTPRINT/etc)
 Tied Marker CDP Number : (A4)
 Tied Marker DOMES Number : (A9)
 Differential Components from GNSS Marker to the tied monument (ITRS)
 dx (m) : (m)
 dy (m) : (m)
 dz (m) : (m)
 Accuracy (mm) : (mm)
 Survey method : (GPS CAMPAIGN/TRILATERATION/TRIANGULATION/etc)
 Date Measured : (CCYY-MM-DDThh:mmZ)
 Additional Information : (multiple lines)

6. Frequency Standard

6.1 Standard Type : INTERNAL
 Input Frequency : (if external)
 Effective Dates : 1998-03-22/CCYY-MM-DD
 Notes : (multiple lines)
 6.x Standard Type : (INTERNAL or EXTERNAL H-MASER/CESIUM/etc)
 Input Frequency : (if external)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

7. Collocation Information

7.x Instrumentation Type : (GPS/GLONASS/DORIS/PRARE/SLR/VLBI/TIME/etc)
 Status : (PERMANENT/MOBILE)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8. Meteorological Instrumentation

8.1.1 Humidity Sensor Model : NONE
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy (% rel h) : (% rel h)
 Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

```

8.1.x Humidity Sensor Model :
    Manufacturer :
    Serial Number :
    Data Sampling Interval : (sec)
    Accuracy (% rel h) : (% rel h)
    Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
    Height Diff to Ant : (m)
    Calibration date : (CCYY-MM-DD)
    Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
    Notes : (multiple lines)

8.2.1 Pressure Sensor Model : NONE
    Manufacturer :
    Serial Number :
    Data Sampling Interval : (sec)
    Accuracy : (hPa)
    Height Diff to Ant : (m)
    Calibration date : (CCYY-MM-DD)
    Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
    Notes : (multiple lines)

8.2.x Pressure Sensor Model :
    Manufacturer :
    Serial Number :
    Data Sampling Interval : (sec)
    Accuracy : (hPa)
    Height Diff to Ant : (m)
    Calibration date : (CCYY-MM-DD)
    Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
    Notes : (multiple lines)

8.3.1 Temp. Sensor Model : NONE
    Manufacturer :
    Serial Number :
    Data Sampling Interval : (sec)
    Accuracy : (deg C)
    Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
    Height Diff to Ant : (m)
    Calibration date : (CCYY-MM-DD)
    Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
    Notes : (multiple lines)

8.3.x Temp. Sensor Model :
    Manufacturer :
    Serial Number :
    Data Sampling Interval : (sec)
    Accuracy : (deg C)
    Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
    Height Diff to Ant : (m)
    Calibration date : (CCYY-MM-DD)
    Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
    Notes : (multiple lines)

8.4.1 Water Vapor Radiometer : NONE
    Manufacturer :
    Serial Number :
    Distance to Antenna : (m)
    Height Diff to Ant : (m)
    Calibration date : (CCYY-MM-DD)
    Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
    Notes : (multiple lines)

8.4.x Water Vapor Radiometer :
    Manufacturer :
    Serial Number :
    Distance to Antenna : (m)
    Height Diff to Ant : (m)
    Calibration date : (CCYY-MM-DD)
    Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
    Notes : (multiple lines)

8.5.x Other Instrumentation : (multiple lines)

9. Local Ongoing Conditions Possibly Affecting Computed Position

9.1.x Radio Interferences : (TV/CELL PHONE ANTENNA/RADAR/etc)
    Observed Degradations : (SN RATIO/DATA GAPS/etc)
    Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
    Additional Information : (multiple lines)

```

9.2.x Multipath Sources : (METAL ROOF/DOME/VLBI ANTENNA/etc)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Additional Information : (multiple lines)

9.3.x Signal Obstructions : (TREES/BUILDINGS/etc)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Additional Information : (multiple lines)

10. Local Episodic Effects Possibly Affecting Data Quality

10.1 Date : (CCYY-MM-DDThh:mmZ)
 Event : (TREE CLEARING/CONSTRUCTION/etc)

10.x Date : (CCYY-MM-DDThh:mmZ)
 Event : (TREE CLEARING/CONSTRUCTION/etc)

11. On-Site, Point of Contact Agency Information

Agency : Port of Tyne Authority
 Preferred Abbreviation :
 Mailing Address : Neville House
 : Bell Street
 : North Shields NE30 1LJ
 : UK

Primary Contact
 Contact Name : Port Control
 Telephone (primary) :
 Telephone (secondary) :
 Fax :
 E-mail :

Secondary Contact
 Contact Name : Martin Robertson
 Telephone (primary) : +44 (0)191 2227834
 Telephone (secondary) : +44 (0)191 2226445
 Fax : +44 (0)191 2228691
 E-mail : Martin.Robertson@newcastle.ac.uk
 Additional Information : (multiple lines)

12. Responsible Agency (if different from 11.)

Agency : IESSG
 Preferred Abbreviation : IESSG
 Mailing Address : University of Nottingham
 : University Park
 : Nottingham NG72RD
 : UK

Primary Contact
 Contact Name : Richard Bingley
 Telephone (primary) : +44 (0)115 9513932
 Telephone (secondary) : +44 (0)115 9513880
 Fax : +44 (0)115 9513881
 E-mail : richard.bingley@nottingham.ac.uk

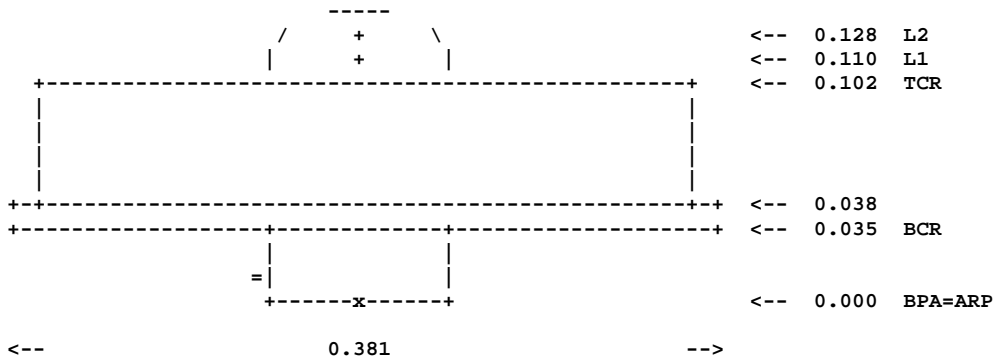
Secondary Contact
 Contact Name : IESSG Experimental Officers
 Telephone (primary) : +44 (0)115 9513921
 Telephone (secondary) : +44 (0)115 9513880
 Fax : +44 (0)115 9513881
 E-mail : iessg@nottingham.ac.uk
 Additional Information : NSTG is operated jointly by the
 : University of Newcastle-upon-Tyne and
 : the IESSG for the
 : Proudman Oceanographic Laboratory and
 : the UK Department for the Environment, Food
 : and Rural Affairs (DEFRA)

13. More Information

Primary Data Center :
 Secondary Data Center :
 URL for More Information : <http://www.bigf.ac.uk>
 Hardcopy on File
 Site Map : Y
 Site Diagram : Y
 Horizon Mask : Y
 Monument Description : Y
 Site Pictures : Y

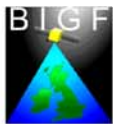
Additional Information : (multiple lines)
 Antenna Graphics with Dimensions

ASH700936B_M



ARP: Antenna Reference Point
 L1 : L1 Phase Center
 TCR: Top of Choking

L2 : L2 Phase Center
 BCR: Bottom of Choking



TEQC Summary Plot

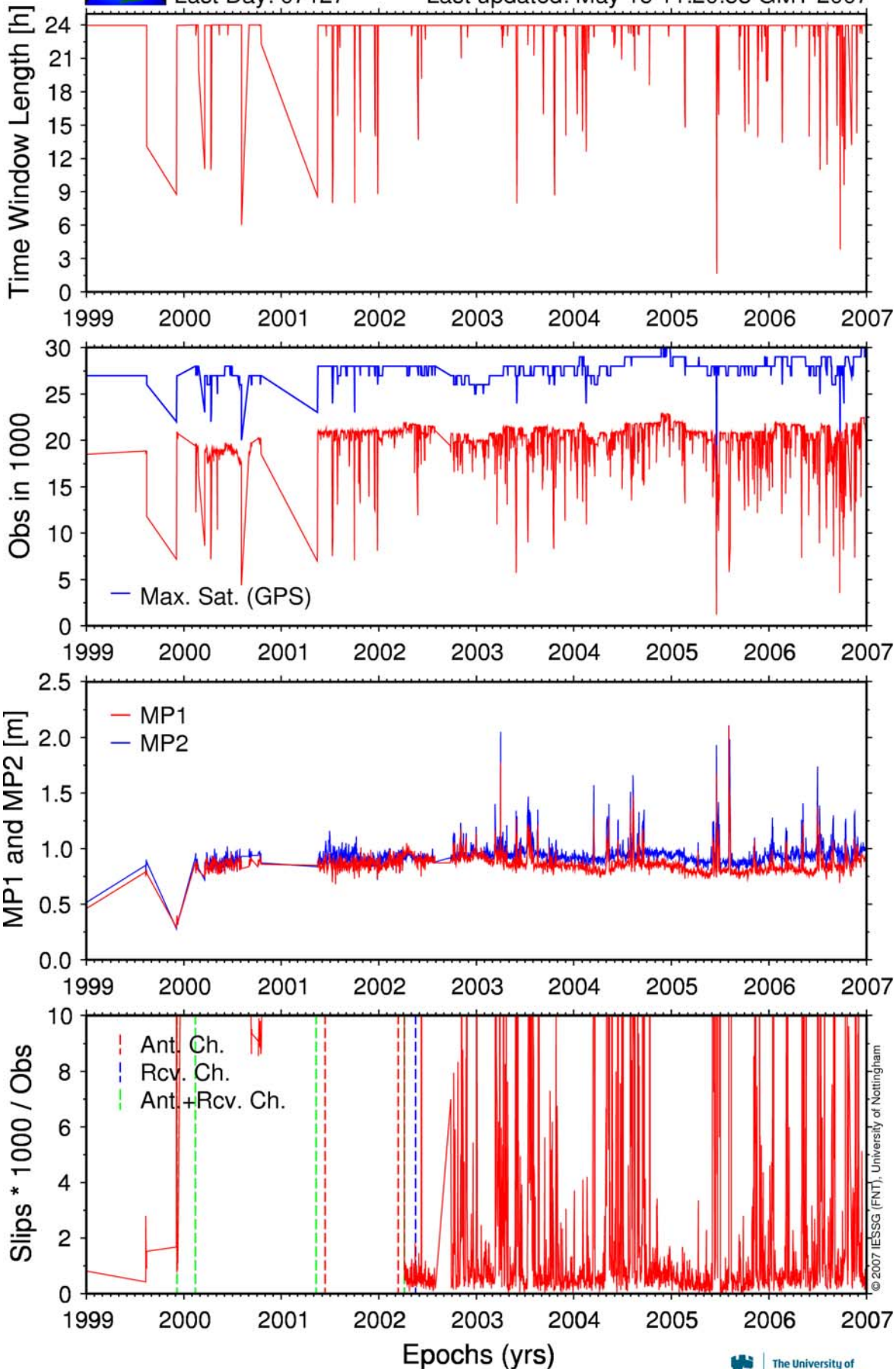
Station: NSTG

RCV: ASHTECH Z-XII3

ANT: ASH700936B_M SNOW

Last Day: 07127

Last updated: May 15 11:20:53 GMT 2007



GM 2007 May 15 11:21:39



Portsmouth

PMTG Site Information Form (site log)
 International GPS Service
 See Instructions at:
ftp://igsceb.jpl.nasa.gov/pub/station/general/sitelog_instr.txt

0. Form

Prepared by (full name) : Richard Bingley
 Date Prepared : 2001-09-25
 Report Type : UPDATE
 If Update:
 Previous Site Log : pmtg_20011212.log
 Modified/Added Sections : 3.1, 3.2

1. Site Identification of the GNSS Monument

Site Name : Portsmouth Tide Gauge
 Four Character ID : PMTG
 Monument Inscription :
 IERS DOMES Number : 13289M003
 CDP Number : (A4)
 Monument Description : STEEL BRACKET
 Height of the Monument : 1.5m
 Monument Foundation : BUILDING
 Foundation Depth : (m)
 Marker Description : TOP OF 5/8" THREAD ON 1.5m STEEL POLE/BRACKET
 Date Installed : 2001-09-25T12:00Z
 Geologic Characteristic : ALLUVIUM
 Bedrock Type : SEDIMENTARY (BAGSHOT BEDS)
 Bedrock Condition : (FRESH/JOINTED/WEATHERED)
 Fracture Spacing : (1-10 cm/11-50 cm/51-200 cm/over 200 cm)
 Fault zones nearby : (YES/NO/Name of the zone)
 Distance/activity : (multiple lines)
 Additional Information : The monument is mounted on the North end
 : wall of a single storey brick building,
 : which houses the tide gauge equipment,
 : so that the antenna is raised above the
 : roof apex.
 : The GPS antenna is located on the monument
 : which consists of a steel bracket with a 1.5m
 : pole.
 : The GPS antenna is attached to the steel pole
 : using a 5/8" thread.
 : The antenna height is taken as 0.000m (ie the
 : survey marker is on the pole and is coincident
 : with the GPS ARP).

2. Site Location Information

City or Town : Portsmouth
 State or Province : Hampshire
 Country : England
 Tectonic Plate : EURASIAN
 Approximate Position
 X coordinate (m) : 4038372.3
 Y coordinate (m) : -78330.6
 Z coordinate (m) : 4919718.8
 Latitude (N is +) : +504808.36
 Longitude (E is +) : -0010640.33
 Elevation (m,ellips.) : 55.4
 Additional Information : (multiple lines)

3. GNSS Receiver Information

3.1 Receiver Type : ASHTECH UZ-12
 Satellite System : GPS
 Serial Number : 10206
 Firmware Version : CJ00
 Elevation Cutoff Setting : 5
 Date Installed : 2001-09-25T00:00Z
 Date Removed : 2006-05-11T11:00Z
 Temperature Stabiliz. : NONE

```

Additional Information      : Receiver is an Ashtech Micro-Z.
                          : Full receiver serial number is ZR 2001 0206.
                          : Operation using a direct modem connection.
                          : Download using MicroManager Pro v1.1.00 (2001).
                          : Conversion to RINEX using ASRINEXO v2.9.7
                          : (with PR SMOOTH FLAG 0).

3.2 Receiver Type         : ASHTECH UZ-12
Satellite System          : GPS
Serial Number              : 39007
Firmware Version          : CQ00
Elevation Cutoff Setting  : 5
Date Installed             : 2006-05-11T12:00Z
Date Removed              : CCYY-MM-DDThh:mmZ
Temperature Stabiliz.     : NONE
Additional Information      : Receiver is an Ashtech Micro-Z.
                          : Full receiver serial number is UC1 2003 39007.
                          : Operation using a direct modem connection.
                          : Download using MicroManager Pro v1.2.00 (2002).
                          : Conversion to RINEX using ASRINEXO v2.9.7
                          : (with PR SMOOTH FLAG 0).

3.x Receiver Type         : (A20, from rcvr_ant.tab; see instructions)
Satellite System          : (GPS/GLONASS/GPS+GLONASS)
Serial Number              : (A5)
Firmware Version          : (A11)
Elevation Cutoff Setting  : (deg)
Date Installed             : (CCYY-MM-DDThh:mmZ)
Date Removed              : (CCYY-MM-DDThh:mmZ)
Temperature Stabiliz.     : (none or tolerance in degrees C)
Additional Information      : (multiple lines)

4. GNSS Antenna Information

4.1 Antenna Type          : ASH701945C_M    SNOW
Serial Number              : 10214
Antenna Reference Point   : BPA
Marker->ARP Up Ecc. (m)   : 0.0000
Marker->ARP North Ecc(m) : 0.0000
Marker->ARP East Ecc(m)  : 0.0000
Alignment from True N     : 0
Antenna Radome Type       : SNOW
Radome Serial Number      :
Antenna Cable Type        : ASHTECH 100914 REVA
Antenna Cable Length      : 30m
Date Installed             : 2001-09-25T00:00Z
Date Removed              : CCYY-MM-DDThh:mmZ
Additional Information      : Full antenna serial number is CR5 2001 0214.
                          : The antenna radome is painted black.

4.x Antenna Type          : (A20 from rcvr_ant.tab; see instructions)
Serial Number              : (A*, but note the first A5 is used in SINEX)
Antenna Reference Point   : (BPA/BCR/XXX from "antenna.gra"; see instr.)
Marker->ARP Up Ecc. (m)   : (F8.4)
Marker->ARP North Ecc(m) : (F8.4)
Marker->ARP East Ecc(m)  : (F8.4)
Alignment from True N     : (deg; + is clockwise/east)
Antenna Radome Type       : (A4 from rcvr_ant.tab; see instructions)
Radome Serial Number      :
Antenna Cable Type        : (vendor & type number)
Antenna Cable Length      : (m)
Date Installed             : (CCYY-MM-DDThh:mmZ)
Date Removed              : (CCYY-MM-DDThh:mmZ)
Additional Information      : (multiple lines)

5. Surveyed Local Ties

5.x Tied Marker Name      :
Tied Marker Usage         : (SLR/VLBI/LOCAL CONTROL/FOOTPRINT/etc)
Tied Marker CDP Number    : (A4)
Tied Marker DOMES Number  : (A9)
Differential Components from GNSS Marker to the tied monument (ITRS)
  dx (m)                  : (m)
  dy (m)                  : (m)
  dz (m)                  : (m)
Accuracy (mm)             : (mm)
Survey method             : (GPS CAMPAIGN/TRILATERATION/TRIANGULATION/etc)
Date Measured             : (CCYY-MM-DDThh:mmZ)

```

Additional Information : (multiple lines)

6. Frequency Standard

- 6.1 Standard Type : INTERNAL
 - Input Frequency : (if external)
 - Effective Dates : 2001-09-26/CCYY-MM-DD
 - Notes : (multiple lines)
- 6.x Standard Type : (INTERNAL or EXTERNAL H-MASER/CESIUM/etc)
 - Input Frequency : (if external)
 - Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 - Notes : (multiple lines)

7. Collocation Information

- 7.x Instrumentation Type : (GPS/GLONASS/DORIS/PRARE/SLR/VLBI/TIME/etc)
 - Status : (PERMANENT/MOBILE)
 - Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 - Notes : (multiple lines)

8. Meteorological Instrumentation

- 8.1.1 Humidity Sensor Model : NONE
 - Manufacturer :
 - Serial Number :
 - Data Sampling Interval : (sec)
 - Accuracy (% rel h) : (% rel h)
 - Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 - Height Diff to Ant : (m)
 - Calibration date : (CCYY-MM-DD)
 - Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 - Notes : (multiple lines)

- 8.1.x Humidity Sensor Model :
 - Manufacturer :
 - Serial Number :
 - Data Sampling Interval : (sec)
 - Accuracy (% rel h) : (% rel h)
 - Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 - Height Diff to Ant : (m)
 - Calibration date : (CCYY-MM-DD)
 - Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 - Notes : (multiple lines)

- 8.2.1 Pressure Sensor Model : NONE
 - Manufacturer :
 - Serial Number :
 - Data Sampling Interval : (sec)
 - Accuracy : (hPa)
 - Height Diff to Ant : (m)
 - Calibration date : (CCYY-MM-DD)
 - Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 - Notes : (multiple lines)

- 8.2.x Pressure Sensor Model :
 - Manufacturer :
 - Serial Number :
 - Data Sampling Interval : (sec)
 - Accuracy : (hPa)
 - Height Diff to Ant : (m)
 - Calibration date : (CCYY-MM-DD)
 - Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 - Notes : (multiple lines)

- 8.3.1 Temp. Sensor Model : NONE
 - Manufacturer :
 - Serial Number :
 - Data Sampling Interval : (sec)
 - Accuracy : (deg C)
 - Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 - Height Diff to Ant : (m)
 - Calibration date : (CCYY-MM-DD)
 - Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 - Notes : (multiple lines)

- 8.3.x Temp. Sensor Model :

```

Manufacturer      :
Serial Number     :
Data Sampling Interval : (sec)
Accuracy          : (deg C)
Aspiration        : (UNASPIRATED/NATURAL/FAN/etc)
Height Diff to Ant : (m)
Calibration date  : (CCYY-MM-DD)
Effective Dates   : (CCYY-MM-DD/CCYY-MM-DD)
Notes             : (multiple lines)

8.4.1 Water Vapor Radiometer : NONE
Manufacturer      :
Serial Number     :
Distance to Antenna : (m)
Height Diff to Ant : (m)
Calibration date  : (CCYY-MM-DD)
Effective Dates   : (CCYY-MM-DD/CCYY-MM-DD)
Notes             : (multiple lines)

8.4.x Water Vapor Radiometer :
Manufacturer      :
Serial Number     :
Distance to Antenna : (m)
Height Diff to Ant : (m)
Calibration date  : (CCYY-MM-DD)
Effective Dates   : (CCYY-MM-DD/CCYY-MM-DD)
Notes             : (multiple lines)

8.5.x Other Instrumentation : (multiple lines)

9. Local Ongoing Conditions Possibly Affecting Computed Position

9.1.x Radio Interferences : (TV/CELL PHONE ANTENNA/RADAR/etc)
Observed Degradations : (SN RATIO/DATA GAPS/etc)
Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
Additional Information : (multiple lines)

9.2.x Multipath Sources : (METAL ROOF/DOME/VLBI ANTENNA/etc)
Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
Additional Information : (multiple lines)

9.3.x Signal Obstructions : (TREES/BUILDINGS/etc)
Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
Additional Information : (multiple lines)

10. Local Episodic Effects Possibly Affecting Data Quality

10.1 Date : (CCYY-MM-DDThh:mmZ)
Event : (TREE CLEARING/CONSTRUCTION/etc)

10.x Date : (CCYY-MM-DDThh:mmZ)
Event : (TREE CLEARING/CONSTRUCTION/etc)

11. On-Site, Point of Contact Agency Information

Agency : Queen's Harbour Master
Preferred Abbreviation :
Mailing Address : HM Naval Base
: Portsmouth
: Hampshire
: UK

Primary Contact
Contact Name : CPO Surveyor for Queen's Harbour Master
Telephone (primary) :
Telephone (secondary) :
Fax :
E-mail :

Secondary Contact
Contact Name :
Telephone (primary) :
Telephone (secondary) :
Fax :
E-mail :
Additional Information : (multiple lines)

12. Responsible Agency (if different from 11.)

```

```

Agency                : IESSG
Preferred Abbreviation : IESSG
Mailing Address        : University of Nottingham
                      : University Park
                      : Nottingham NG72RD
                      : UK

Primary Contact
Contact Name           : Richard Bingley
Telephone (primary)    : +44 (0)115 9513932
Telephone (secondary) : +44 (0)115 9513880
Fax                    : +44 (0)115 9513881
E-mail                 : richard.bingley@nottingham.ac.uk

Secondary Contact
Contact Name           : IESSG Experimental Officers
Telephone (primary)    : +44 (0)115 9513921
Telephone (secondary) : +44 (0)115 9513880
Fax                    : +44 (0)115 9513881
E-mail                 : iessg@nottingham.ac.uk

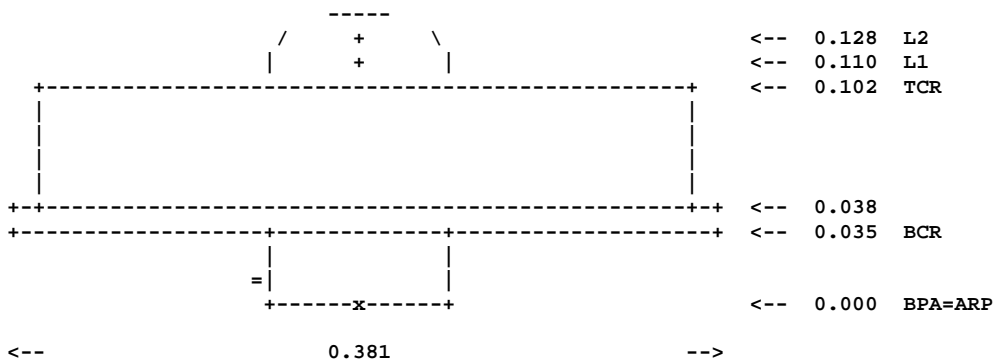
Additional Information  : PMTG is operated by the IESSG for the
                      : Proudman Oceanographic Laboratory and
                      : the UK Department for the Environment, Food
                      : and Rural Affairs (DEFRA)
    
```

13. More Information

```

Primary Data Center    :
Secondary Data Center  :
URL for More Information : http://www.bigf.ac.uk
Hardcopy on File
Site Map               : Y
Site Diagram           : Y
Horizon Mask           : Y
Monument Description   : Y
Site Pictures          : Y
Additional Information  : (multiple lines)
Antenna Graphics with Dimensions
    
```

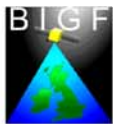
ASH701945C_M



```

ARP: Antenna Reference Point
L1 : L1 Phase Center
TCR: Top of Chokering

L2 : L2 Phase Center
BCR: Bottom of Chokering
    
```



TEQC Summary Plot

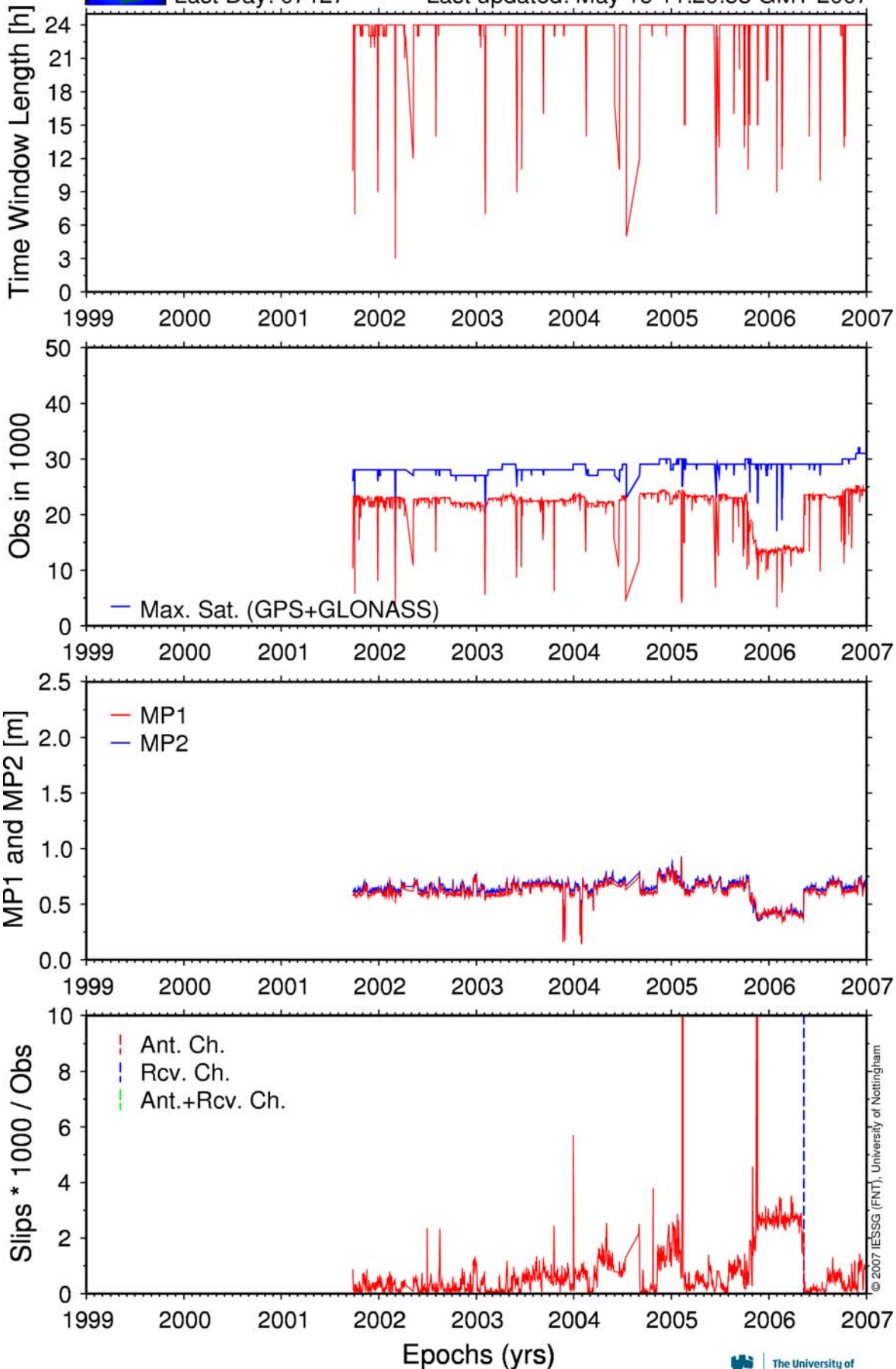
Station: PMTG

RCV: ASHTECH UZ-12

ANT: ASH701945C_M SNOW

Last Day: 07127

Last updated: May 15 11:20:53 GMT 2007



GM 2007 May 15 11:21:48



Sheerness

SHEE Site Information Form (site log)
 International GPS Service
 See Instructions at:
ftp://igsceb.jpl.nasa.gov/pub/station/general/sitelog_instr.txt

0. Form

Prepared by (full name) : Richard Bingley
 Date Prepared : 2001-06-01
 Report Type : NEW
 If Update:
 Previous Site Log :
 Modified/Added Sections :

1. Site Identification of the GNSS Monument

Site Name : Sheerness Tide Gauge
 Four Character ID : SHEE
 Monument Inscription :
 IERS DOMES Number : 13236M001
 CDP Number : (A4)
 Monument Description : STEEL BRACKET
 Height of the Monument : 0.16m
 Monument Foundation : ROOF
 Foundation Depth : (m)
 Marker Description : TOP OF 5/8" THREAD ON STEEL BRACKET
 Date Installed : 1997-03-05T12:00Z
 Geologic Characteristic : ALLUVIUM (CLAY, SILT, PEAT)
 Bedrock Type : SEDIMENTARY (CHALK)
 Bedrock Condition : (FRESH/JOINTED/WEATHERED)
 Fracture Spacing : (1-10 cm/11-50 cm/51-200 cm/over 200 cm)
 Fault zones nearby : (YES/NO/Name of the zone)
 Distance/activity : (multiple lines)
 Additional Information : The monument is mounted on the concrete
 : slab roof of the tide gauge building,
 : which is a single storey brick building
 : located on a jetty with piled foundations.
 : The GPS antenna is located on the monument
 : which consists of a 0.16m high steel bracket
 : fixed to the concrete roof of the tide gauge
 : building.
 : The GPS antenna is attached to the steel bracket
 : using a 5/8" thread.
 : The male part of the 5/8" thread is on the steel
 : bracket and has a domed top, which serves as the
 : survey marker.

2. Site Location Information

City or Town : Sheerness
 State or Province : Isle of Sheppey
 Country : England
 Tectonic Plate : EURASIAN
 Approximate Position (ITRF)
 X coordinate (m) : 3983074.5
 Y coordinate (m) : 51683.0
 Z coordinate (m) : 4964639.6
 Latitude (N is +) : +512644.44
 Longitude (E is +) : +0004436.27
 Elevation (m,ellips.) : 53.3
 Additional Information : (multiple lines)

3. GNSS Receiver Information

3.1 Receiver Type : TRIMBLE 4000SSI
 Satellite System : GPS
 Serial Number : 16407
 Firmware Version : 7.21
 Elevation Cutoff Setting : 15
 Date Installed : 1997-03-27T00:00Z
 Date Removed : 1999-08-19T23:59Z
 Temperature Stabiliz. : NONE

```

Additional Information      : Full receiver serial number is 3628A16407.
                          : Operation using a direct modem connection.
                          : Download using RFILE v2.31 [21-MAR-97 TEST].
                          : Conversion to RINEX using DAT2RIN v2.20b.

3.2 Receiver Type         : TRIMBLE 4000SSI
  Satellite System        : GPS
  Serial Number           : 16407
  Firmware Version        : 7.29
  Elevation Cutoff Setting : 15
  Date Installed          : 1999-08-21T00:00Z
  Date Removed            : CCYY-MM-DDThh:mmZ
  Temperature Stabiliz.   : NONE
  Additional Information   : Full receiver serial number is 3628A16407.
                          : Operation using a direct modem connection.
                          : Download using RFILE v2.35 (20 DEC 99).
                          : Conversion to RINEX using DAT2RIN v2.35a.

3.x Receiver Type         : (A20, from rcvr_ant.tab; see instructions)
  Satellite System        : (GPS/GLONASS/GPS+GLONASS)
  Serial Number           : (A5)
  Firmware Version        : (A11)
  Elevation Cutoff Setting : (deg)
  Date Installed          : (CCYY-MM-DDThh:mmZ)
  Date Removed            : (CCYY-MM-DDThh:mmZ)
  Temperature Stabiliz.   : (none or tolerance in degrees C)
  Additional Information   : (multiple lines)

4. GNSS Antenna Information

4.1 Antenna Type          : TRM29659.00      NONE
  Serial Number           : 66923
  Antenna Reference Point : BPA
  Marker->ARP Up Ecc. (m) : -0.0070
  Marker->ARP North Ecc(m) : 0.0000
  Marker->ARP East Ecc(m) : 0.0000
  Alignment from True N   : 0
  Antenna Radome Type     : NONE
  Radome Serial Number    :
  Antenna Cable Type      : TRIMBLE 14553-00
  Antenna Cable Length    : 10m
  Date Installed          : 1997-03-27T00:00Z
  Date Removed            : CCYY-MM-DDThh:mmZ
  Additional Information   : Full antenna serial number is 0220066923.

4.x Antenna Type         : (A20 from rcvr_ant.tab; see instructions)
  Serial Number           : (A*, but note the first A5 is used in SINEX)
  Antenna Reference Point : (BPA/BCR/XXX from "antenna.gra"; see instr.)
  Marker->ARP Up Ecc. (m) : (F8.4)
  Marker->ARP North Ecc(m) : (F8.4)
  Marker->ARP East Ecc(m) : (F8.4)
  Alignment from True N   : (deg; + is clockwise/east)
  Antenna Radome Type     : (A4 from rcvr_ant.tab; see instructions)
  Radome Serial Number    :
  Antenna Cable Type      : (vendor & type number)
  Antenna Cable Length    : (m)
  Date Installed          : (CCYY-MM-DDThh:mmZ)
  Date Removed            : (CCYY-MM-DDThh:mmZ)
  Additional Information   : (multiple lines)

5. Surveyed Local Ties

5.x Tied Marker Name      :
  Tied Marker Usage       : (SLR/VLBI/LOCAL CONTROL/FOOTPRINT/etc)
  Tied Marker CDP Number  : (A4)
  Tied Marker DOMES Number : (A9)
  Differential Components from GNSS Marker to the tied monument (ITRS)
    dx (m)                 : (m)
    dy (m)                 : (m)
    dz (m)                 : (m)
  Accuracy (mm)           : (mm)
  Survey method           : (GPS CAMPAIGN/TRILATERATION/TRIANGULATION/etc)
  Date Measured           : (CCYY-MM-DDThh:mmZ)
  Additional Information   : (multiple lines)

6. Frequency Standard
    
```

```

6.1 Standard Type      : INTERNAL
    Input Frequency    : (if external)
    Effective Dates     : 2001-03-27/CCYY-MM-DD
    Notes               : (multiple lines)

6.x Standard Type      : (INTERNAL or EXTERNAL H-MASER/CESIUM/etc)
    Input Frequency    : (if external)
    Effective Dates     : (CCYY-MM-DD/CCYY-MM-DD)
    Notes               : (multiple lines)

7. Collocation Information

7.x Instrumentation Type : (GPS/GLONASS/DORIS/PRARE/SLR/VLBI/TIME/etc)
    Status              : (PERMANENT/MOBILE)
    Effective Dates     : (CCYY-MM-DD/CCYY-MM-DD)
    Notes               : (multiple lines)

8. Meteorological Instrumentation

8.1.1 Humidity Sensor Model : NONE
    Manufacturer        :
    Serial Number       :
    Data Sampling Interval : (sec)
    Accuracy (% rel h)   : (% rel h)
    Aspiration          : (UNASPIRATED/NATURAL/FAN/etc)
    Height Diff to Ant   : (m)
    Calibration date     : (CCYY-MM-DD)
    Effective Dates      : (CCYY-MM-DD/CCYY-MM-DD)
    Notes               : (multiple lines)

8.1.x Humidity Sensor Model :
    Manufacturer        :
    Serial Number       :
    Data Sampling Interval : (sec)
    Accuracy (% rel h)   : (% rel h)
    Aspiration          : (UNASPIRATED/NATURAL/FAN/etc)
    Height Diff to Ant   : (m)
    Calibration date     : (CCYY-MM-DD)
    Effective Dates      : (CCYY-MM-DD/CCYY-MM-DD)
    Notes               : (multiple lines)

8.2.1 Pressure Sensor Model : NONE
    Manufacturer        :
    Serial Number       :
    Data Sampling Interval : (sec)
    Accuracy             : (hPa)
    Height Diff to Ant   : (m)
    Calibration date     : (CCYY-MM-DD)
    Effective Dates      : (CCYY-MM-DD/CCYY-MM-DD)
    Notes               : (multiple lines)

8.2.x Pressure Sensor Model :
    Manufacturer        :
    Serial Number       :
    Data Sampling Interval : (sec)
    Accuracy             : (hPa)
    Height Diff to Ant   : (m)
    Calibration date     : (CCYY-MM-DD)
    Effective Dates      : (CCYY-MM-DD/CCYY-MM-DD)
    Notes               : (multiple lines)

8.3.1 Temp. Sensor Model : NONE
    Manufacturer        :
    Serial Number       :
    Data Sampling Interval : (sec)
    Accuracy             : (deg C)
    Aspiration          : (UNASPIRATED/NATURAL/FAN/etc)
    Height Diff to Ant   : (m)
    Calibration date     : (CCYY-MM-DD)
    Effective Dates      : (CCYY-MM-DD/CCYY-MM-DD)
    Notes               : (multiple lines)

8.3.x Temp. Sensor Model :
    Manufacturer        :
    Serial Number       :
    Data Sampling Interval : (sec)
    Accuracy             : (deg C)
    Aspiration          : (UNASPIRATED/NATURAL/FAN/etc)
    
```

Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.4.1 Water Vapor Radiometer : NONE
 Manufacturer :
 Serial Number :
 Distance to Antenna : (m)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.4.x Water Vapor Radiometer :
 Manufacturer :
 Serial Number :
 Distance to Antenna : (m)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.5.x Other Instrumentation : (multiple lines)

9. Local Ongoing Conditions Possibly Affecting Computed Position

9.1.x Radio Interferences : (TV/CELL PHONE ANTENNA/RADAR/etc)
 Observed Degradations : (SN RATIO/DATA GAPS/etc)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Additional Information : (multiple lines)

9.2.x Multipath Sources : (METAL ROOF/DOME/VLBI ANTENNA/etc)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Additional Information : (multiple lines)

9.3.x Signal Obstructions : (TREES/BUILDINGS/etc)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Additional Information : (multiple lines)

10. Local Episodic Effects Possibly Affecting Data Quality

10.1 Date : (CCYY-MM-DDThh:mmZ)
 Event : (TREE CLEARING/CONSTRUCTION/etc)

10.x Date : (CCYY-MM-DDThh:mmZ)
 Event : (TREE CLEARING/CONSTRUCTION/etc)

11. On-Site, Point of Contact Agency Information

Agency : Medway Ports
 Preferred Abbreviation : (A10)
 Mailing Address : Sheerness Docks
 : Sheerness
 : Kent ME121RX
 : UK

Primary Contact
 Contact Name : Mike Hillier
 Telephone (primary) :
 Telephone (secondary) :
 Fax :
 E-mail :

Secondary Contact
 Contact Name : Phillip Woodgate
 Telephone (primary) :
 Telephone (secondary) :
 Fax :
 E-mail :
 Additional Information : (multiple lines)

12. Responsible Agency (if different from 11.)

Agency : IESSG
 Preferred Abbreviation : IESSG
 Mailing Address : University of Nottingham
 : University Park

```

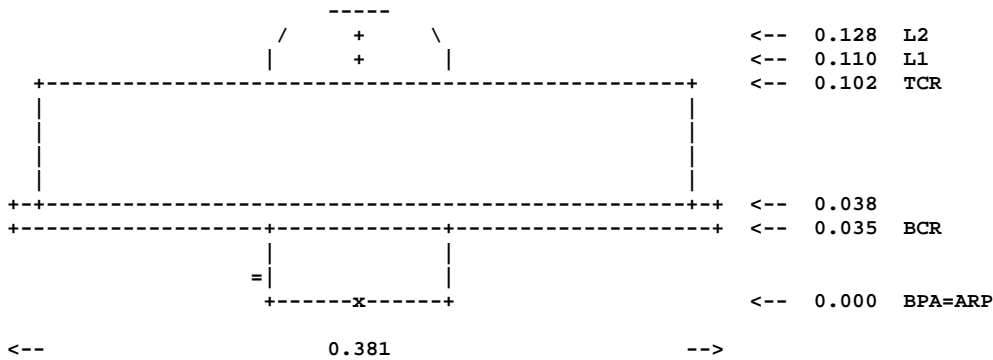
: Nottingham NG72RD
: UK
Primary Contact
Contact Name      : Richard Bingley
Telephone (primary) : +44 (0)115 9513932
Telephone (secondary) : +44 (0)115 9513880
Fax              : +44 (0)115 9513881
E-mail          : richard.bingley@nottingham.ac.uk
Secondary Contact
Contact Name      : IESSG Experimental Officers
Telephone (primary) : +44 (0)115 9513921
Telephone (secondary) : +44 (0)115 9513880
Fax              : +44 (0)115 9513881
E-mail          : iessg@nottingham.ac.uk
Additional Information : SHEE is operated by the IESSG for the
: Environment Agency of England and Wales
    
```

13. More Information

```

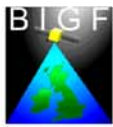
Primary Data Center      :
Secondary Data Center    :
URL for More Information : http://www.bigf.ac.uk
Hardcopy on File
Site Map                 : Y
Site Diagram             : Y
Horizon Mask            : Y
Monument Description     : Y
Site Pictures            : Y
Additional Information   : (multiple lines)
Antenna Graphics with Dimensions
    
```

TRM29659.00



```

ARP: Antenna Reference Point
L1 : L1 Phase Center          L2 : L2 Phase Center
TCR: Top of Chokering        BCR: Bottom of Chokering
    
```



TEQC Summary Plot

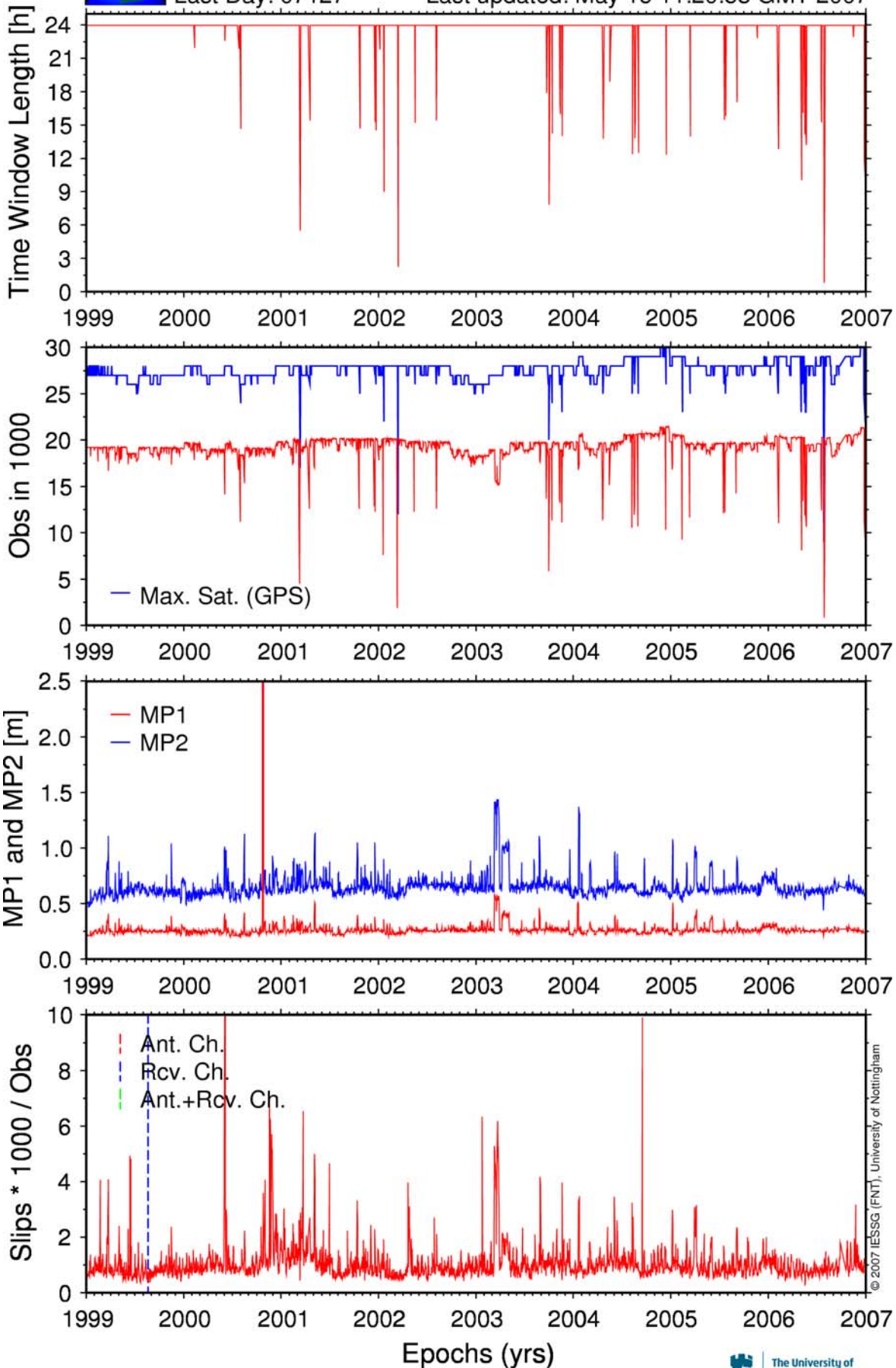
Station: SHEE

RCV:

ANT:

Last Day: 07127

Last updated: May 15 11:20:53 GMT 2007



GM 2007 May 15 11:21:54



Stornoway

SWTG Site Information Form (site log)
 International GPS Service
 See Instructions at:
ftp://igsceb.jpl.nasa.gov/pub/station/general/sitelog_instr.txt

0. Form

Prepared by (full name) : Richard Bingley
 Date Prepared : 2005-09-02
 Report Type : UPDATE
 If Update:
 Previous Site Log : swtg_20060902
 Modified/Added Sections : 3.1, 3.2

1. Site Identification of the GNSS Monument

Site Name : Stornoway Tide Gauge
 Four Character ID : SWTG
 Monument Inscription :
 IERS DOMES Number : (A9)
 CDP Number : (A4)
 Monument Description : STEEL PLATE AND CARBON FIBRE PIPE
 Height of the Monument : 2.0m
 Monument Foundation : WHARF
 Foundation Depth : (m)
 Marker Description : TOP OF 40mm DIA THREAD ON STEEL PLATE
 Date Installed : 2005-09-01T15:00Z
 Geologic Characteristic : BEDROCK
 Bedrock Type : SEDIMENTARY (SANDSTONE)
 Bedrock Condition : (FRESH/JOINTED/WEATHERED)
 Fracture Spacing : (1-10 cm/11-50 cm/51-200 cm/over 200 cm)
 Fault zones nearby : (YES/NO/Name of the zone)
 Distance/activity : (multiple lines)
 Additional Information : The monument is mounted about 20m from the
 : tide gauge building, and located on No 2 Wharf.
 : The GPS antenna is located on the monument
 : which consists of a 2m carbon fibre pipe mounted
 : on a steel plate, which is fixed to the concrete
 : of the Wharf.
 : The GPS antenna is attached to the carbon fibre
 : pipe using a 5/8" thread.
 : The carbon fibre pipe is attached to the steel
 : plate using a 40 mm diameter thread.
 : The male part of the 40mm diameter thread is on
 : the steel plate and has a domed head, which
 : serves as the survey marker.

2. Site Location Information

City or Town : Stornoway
 State or Province : Isle of Lewis
 Country : Scotland
 Tectonic Plate : EURASIAN
 Approximate Position
 X coordinate (m) :
 Y coordinate (m) :
 Z coordinate (m) :
 Latitude (N is +) :
 Longitude (E is +) :
 Elevation (m,ellips.) :
 Additional Information : (multiple lines)

3. GNSS Receiver Information

3.1 Receiver Type : ASHTECH UZ-12
 Satellite System : GPS
 Serial Number : 13830
 Firmware Version : CJ00
 Elevation Cutoff Setting : 5
 Date Installed : 2005-09-02T00:00Z
 Date Removed : 2006-10-25T23:59Z
 Temperature Stabiliz. : NONE
 Additional Information : Receiver is an Ashtech Micro-Z.

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: Full receiver serial number is ZR2 2001 3830.
: Operation using a direct modem connection.
: Download using MicroManager Pro v1.1.00 (2001).
: Conversion to RINEX using ASRINEXO v2.9.7
: (with PR SMOOTH FLAG 0).

3.2 Receiver Type      : ASHTECH UZ-12
Satellite System      : GPS
Serial Number         : 08002
Firmware Version      : CN00
Elevation Cutoff Setting : 5
Date Installed        : 2006-10-27T00:00Z
Date Removed          : CCYY-MM-DDThh:mmZ
Temperature Stabiliz. : NONE
Additional Information : Receiver is an Ashtech Micro-Z.
: Full receiver serial number is UC1 2004 08002.
: Operation using a direct modem connection.
: Download using MicroManager Pro v1.1.00 (2001).
: Conversion to RINEX using ASRINEXO v2.9.7
: (with PR SMOOTH FLAG 0).

3.x Receiver Type      : (A20, from rcvr_ant.tab; see instructions)
Satellite System      : (GPS/GLONASS/GPS+GLONASS)
Serial Number         : (A5)
Firmware Version      : (A11)
Elevation Cutoff Setting : (deg)
Date Installed        : (CCYY-MM-DDThh:mmZ)
Date Removed          : (CCYY-MM-DDThh:mmZ)
Temperature Stabiliz. : (none or tolerance in degrees C)
Additional Information : (multiple lines)

4. GNSS Antenna Information

4.1 Antenna Type      : ASH701945C_M    SNOW
Serial Number         : 14802
Antenna Reference Point : BPA
Marker->ARP Up Ecc. (m) : 2.0000
Marker->ARP North Ecc(m) : 0.0000
Marker->ARP East Ecc(m) : 0.0000
Alignment from True N : 0
Antenna Radome Type   : SNOW
Radome Serial Number  :
Antenna Cable Type    : ASHTECH 100914 REVA
Antenna Cable Length  : 30m
Date Installed        : 2005-09-02T00:00Z
Date Removed          : CCYY-MM-DDThh:mmZ
Additional Information : Full antenna serial number is CR5 2001 4802.

4.x Antenna Type      : (A20 from rcvr_ant.tab; see instructions)
Serial Number         : (A*, but note the first A5 is used in SINEX)
Antenna Reference Point : (BPA/BCR/XXX from "antenna.gra"; see instr.)
Marker->ARP Up Ecc. (m) : (F8.4)
Marker->ARP North Ecc(m) : (F8.4)
Marker->ARP East Ecc(m) : (F8.4)
Alignment from True N : (deg; + is clockwise/east)
Antenna Radome Type   : (A4 from rcvr_ant.tab; see instructions)
Radome Serial Number  :
Antenna Cable Type    : (vendor & type number)
Antenna Cable Length  : (m)
Date Installed        : (CCYY-MM-DDThh:mmZ)
Date Removed          : (CCYY-MM-DDThh:mmZ)
Additional Information : (multiple lines)

5. Surveyed Local Ties

5.x Tied Marker Name      :
Tied Marker Usage      : (SLR/VLBI/LOCAL CONTROL/FOOTPRINT/etc)
Tied Marker CDP Number : (A4)
Tied Marker DOMES Number : (A9)
Differential Components from GNSS Marker to the tied monument (ITRS)
  dx (m)                : (m)
  dy (m)                : (m)
  dz (m)                : (m)
Accuracy (mm)          : (mm)
Survey method          : (GPS CAMPAIGN/TRILATERATION/TRIANGULATION/etc)
Date Measured          : (CCYY-MM-DDThh:mmZ)
Additional Information  : (multiple lines)

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6. Frequency Standard

6.1 Standard Type : INTERNAL
 Input Frequency : (if external)
 Effective Dates : 2005-09-02/CCYY-MM-DD
 Notes : (multiple lines)

6.x Standard Type : (INTERNAL or EXTERNAL H-MASER/CESIUM/etc)
 Input Frequency : (if external)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

7. Collocation Information

7.x Instrumentation Type : (GPS/GLONASS/DORIS/PRARE/SLR/VLBI/TIME/etc)
 Status : (PERMANENT/MOBILE)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8. Meteorological Instrumentation

8.1.1 Humidity Sensor Model : NONE
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy (% rel h) : (% rel h)
 Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.1.x Humidity Sensor Model :
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy (% rel h) : (% rel h)
 Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.2.1 Pressure Sensor Model : NONE
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy : (hPa)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.2.x Pressure Sensor Model :
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy : (hPa)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.3.1 Temp. Sensor Model : NONE
 Manufacturer :
 Serial Number :
 Data Sampling Interval : (sec)
 Accuracy : (deg C)
 Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.3.x Temp. Sensor Model :
 Manufacturer :
 Serial Number :

Data Sampling Interval : (sec)
 Accuracy : (deg C)
 Aspiration : (UNASPIRATED/NATURAL/FAN/etc)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.4.1 Water Vapor Radiometer : NONE
 Manufacturer :
 Serial Number :
 Distance to Antenna : (m)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.4.x Water Vapor Radiometer :
 Manufacturer :
 Serial Number :
 Distance to Antenna : (m)
 Height Diff to Ant : (m)
 Calibration date : (CCYY-MM-DD)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Notes : (multiple lines)

8.5.x Other Instrumentation : (multiple lines)

9. Local Ongoing Conditions Possibly Affecting Computed Position

9.1.x Radio Interferences : (TV/CELL PHONE ANTENNA/RADAR/etc)
 Observed Degradations : (SN RATIO/DATA GAPS/etc)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Additional Information : (multiple lines)

9.2.x Multipath Sources : (METAL ROOF/DOME/VLBI ANTENNA/etc)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Additional Information : (multiple lines)

9.3.x Signal Obstructions : (TREES/BUILDINGS/etc)
 Effective Dates : (CCYY-MM-DD/CCYY-MM-DD)
 Additional Information : (multiple lines)

10. Local Episodic Effects Possibly Affecting Data Quality

10.1 Date : (CCYY-MM-DDThh:mmZ)
 Event : (TREE CLEARING/CONSTRUCTION/etc)

10.x Date : (CCYY-MM-DDThh:mmZ)
 Event : (TREE CLEARING/CONSTRUCTION/etc)

11. On-Site, Point of Contact Agency Information

Agency : Stornoway Port Authority
 Preferred Abbreviation :
 Mailing Address : Amity House, Esplanade Quay
 : Stornoway
 : Isle of Lewis HS1 2XS
 : UK

Primary Contact
 Contact Name : Deputy Harbour Master
 Telephone (primary) :
 Telephone (secondary) :
 Fax :
 E-mail :

Secondary Contact
 Contact Name :
 Telephone (primary) :
 Telephone (secondary) :
 Fax :
 E-mail :
 Additional Information : (multiple lines)

12. Responsible Agency (if different from 11.)

Agency : IESSG

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Preferred Abbreviation : IESSG
Mailing Address        : University of Nottingham
                      : University Park
                      : Nottingham NG72RD
                      : UK

Primary Contact
Contact Name          : Richard Bingley
Telephone (primary)   : +44 (0)115 9513932
Telephone (secondary) : +44 (0)115 9513880
Fax                   : +44 (0)115 9513881
E-mail                : richard.bingley@nottingham.ac.uk

Secondary Contact
Contact Name          : IESSG Experimental Officers
Telephone (primary)   : +44 (0)115 9513921
Telephone (secondary) : +44 (0)115 9513880
Fax                   : +44 (0)115 9513881
E-mail                : iessg@nottingham.ac.uk

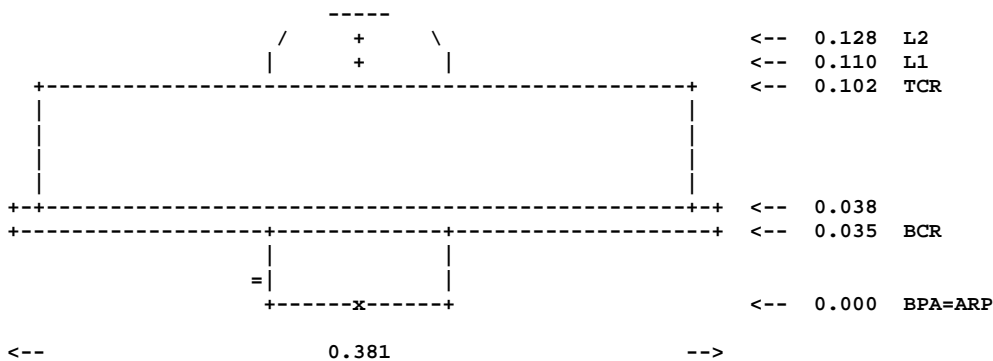
Additional Information : LWTG is operated by the IESSG for the
                      : Proudman Oceanographic Laboratory and
                      : the UK Department for the Environment, Food
                      : and Rural Affairs (DEFRA)
    
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13. More Information

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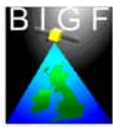
Primary Data Center :
Secondary Data Center :
URL for More Information : http://www.bigf.ac.uk
Hardcopy on File
Site Map : Y
Site Diagram : Y
Horizon Mask : Y
Monument Description : Y
Site Pictures : Y
Additional Information : (multiple lines)
Antenna Graphics with Dimensions
    
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ASH701945C_M



ARP: Antenna Reference Point
L1 : L1 Phase Center
TCR: Top of Chokering

L2 : L2 Phase Center
BCR: Bottom of Chokering



TEQC Summary Plot

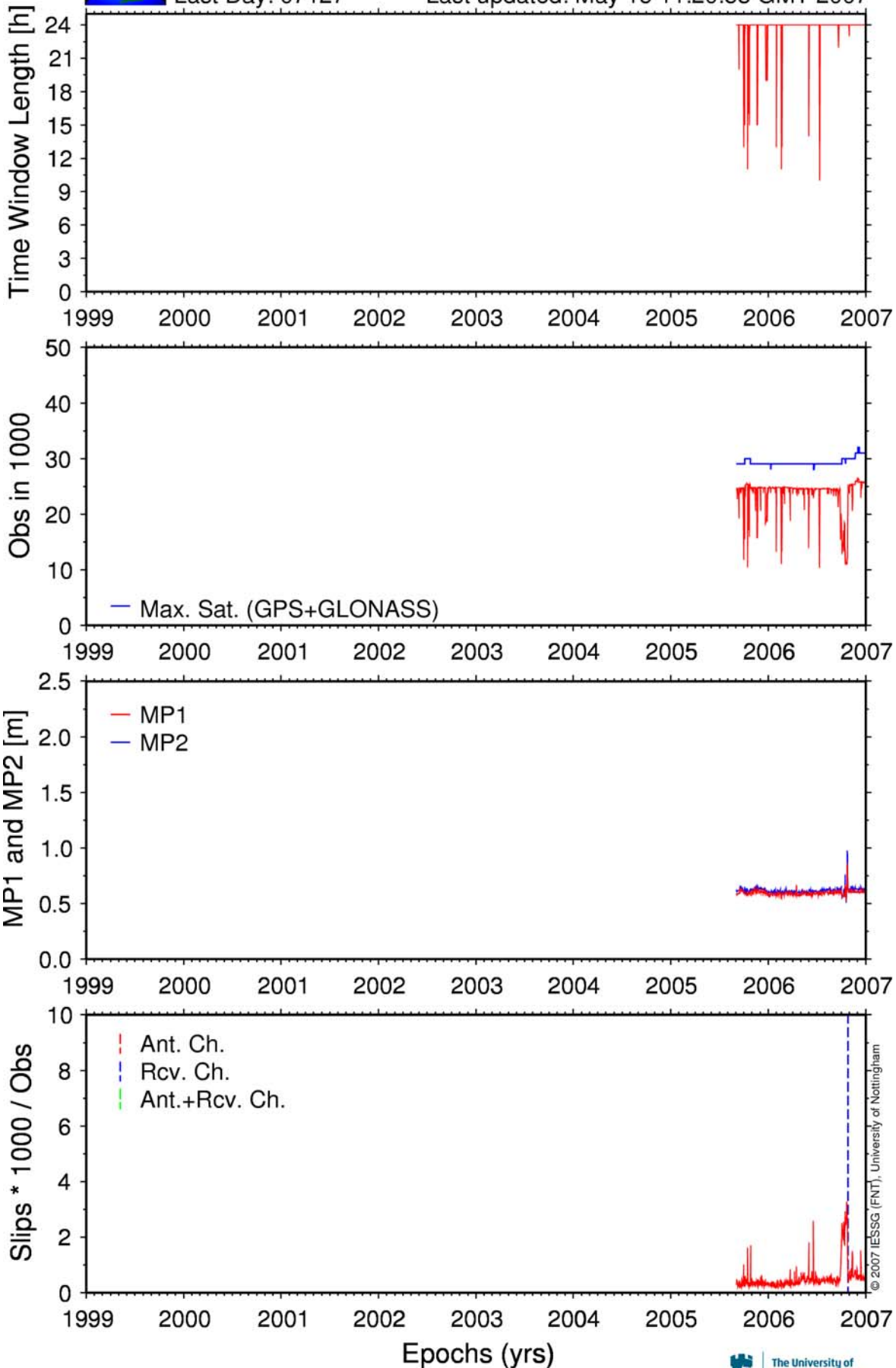
Station: SWTG

RCV: ASHTECH UZ-12

ANT: ASH701945C_M SNOW

Last Day: 07127

Last updated: May 15 11:20:53 GMT 2007



GM 2007 May 15 11:22:02

