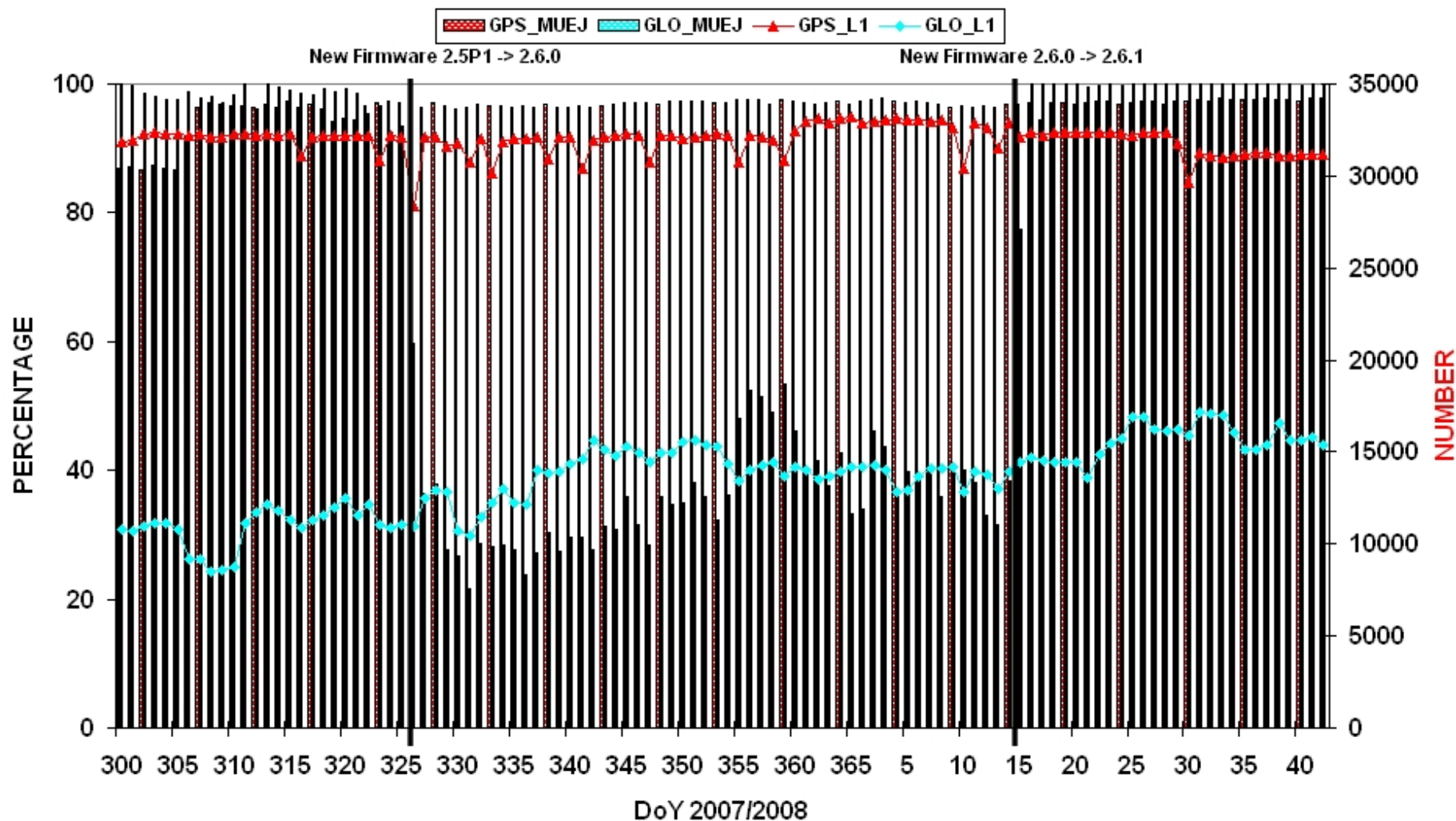


➤ At a glance

- Two launches of three at a time GLONASS satellites in 2007 (October (R17, R19, R20) and December (R09, R11, R13)) → 16 SVs available
- Two more launches scheduled for end of this year (→ ~ 18-20 SVs available)
- Use of zero and negative channel numbers (R11: „0“, R09&R13: „-2“)
- 55 (March, 10, 2008) EPN stations with combined GPS+GLONASS receivers
 - BOGO: GPS+GLONASS receiver since 01/07, GLONASS observations since 059/08
 - BZRG: GPS+GLONASS receiver since 12/07, GLONASS observations since 044/08

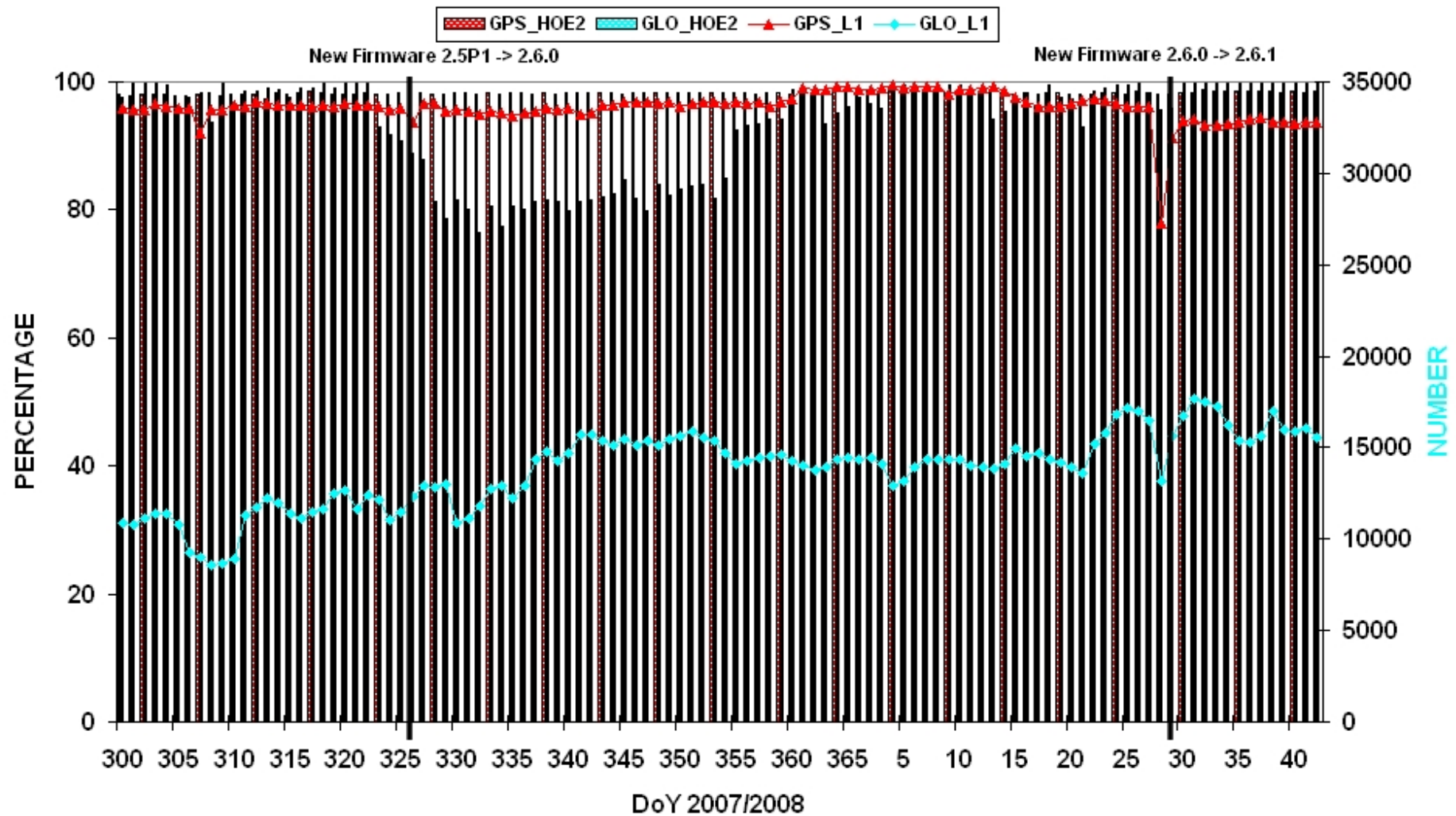
Anomaleous behaviour of GREF station MUEJ

GPS and GLONASS observations: ratio L2 to L1 and number L1 (from daily files, with BSW5.0, RXOBV3)



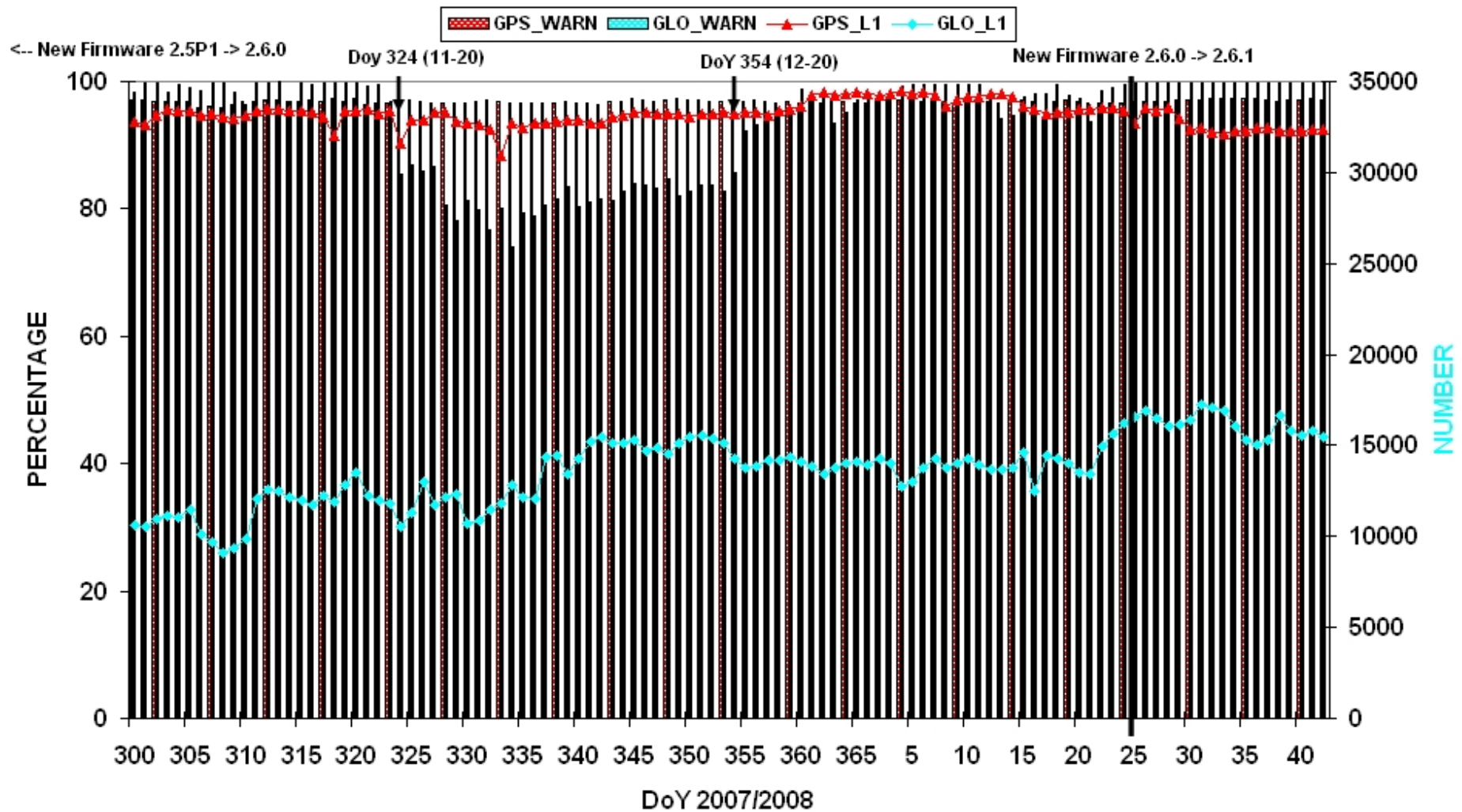


GPS and GLONASS observations: ratio L2 to L1 and number L1 (from daily files, with BSW5.0, RXOBV3)



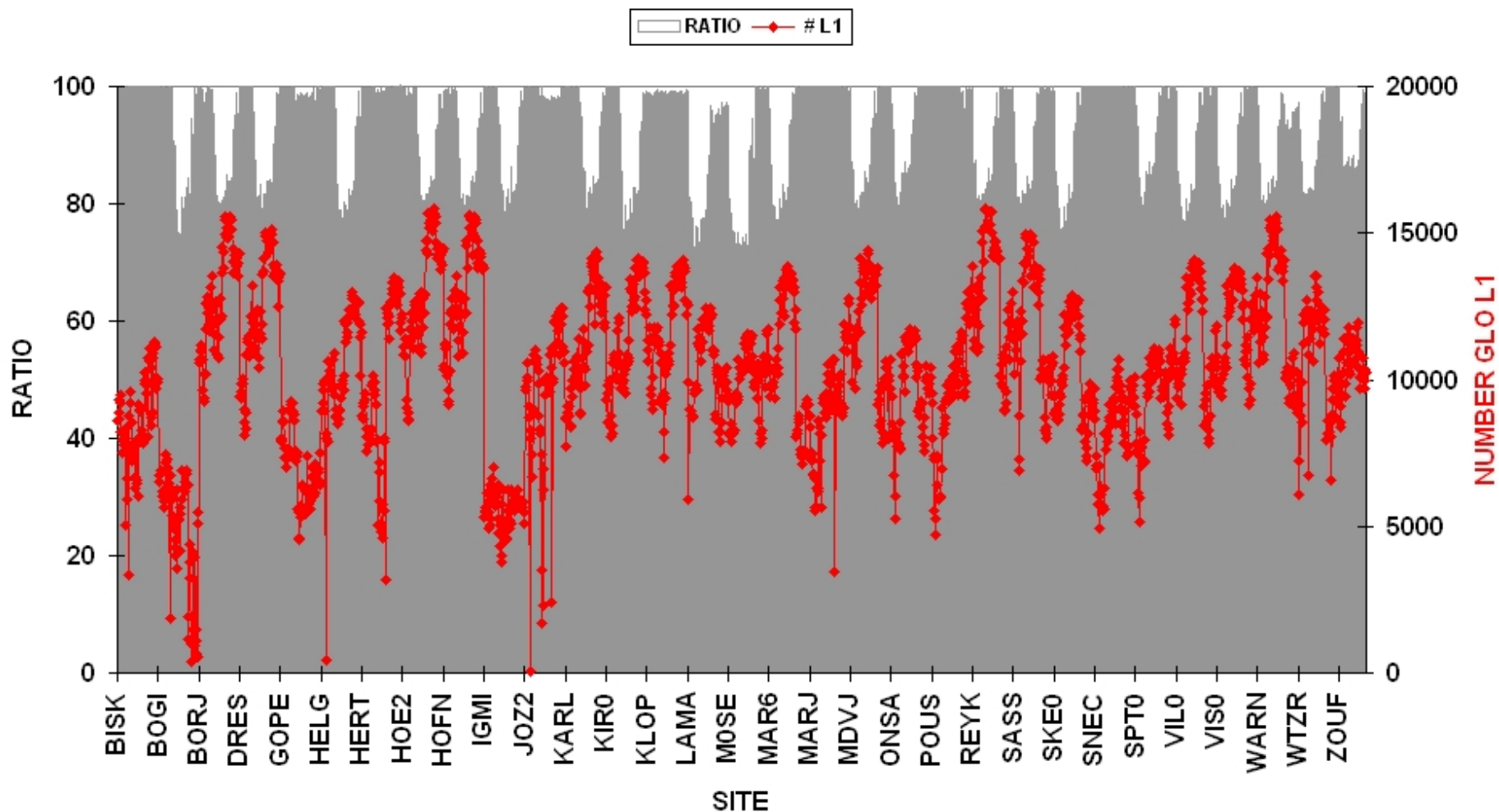


GPS and GLONASS observations: ratio L2 to L1 and number L1 (from 30 sec. daily files, BSW5.0, RXOBV3)



GLONASS observability: Nov-Dec 207

GLONASS observations: ratio L2 to L1 phase observations and number L1 for 31 EPN stations
 DoY 300-365 in 2007 (daily files, with BSW5.0, RXOBV3)





11 GLONASS-SVs ↓
R10, R14, R15 not
complete

```
RNXGRA.L06_2007335 - WordPad
Datei Bearbeiten Ansicht Einfügen Format ?

DATE : 2007 12 1 STATION : BORJ 14268M002

TYPES OF OBSERVATIONS : C1 P1 P2 L1 L2 S1 S2
CHECKED OBSERVATIONS : L1 L2

1 | *****-
2 | *****-
3 | *****-
4 | *****-
5 | *****-
6 | *****-
7 | *****-
8 | *****-
9 | *****-
10 | *****-
11 | *****-
12 | *****-
13 | *****-
14 | *****-
15 | *****-
16 | *****-
17 | *****-
18 | *****-
19 | *****-
20 | *****-
21 | *****-
22 | *****-
23 | *****-
24 | *****-
25 | *****-
26 | *****-
27 | *****-
28 | *****-
30 | *****-
31 | *****-
32 | *****-
101 | *****-
104 | *****-
106 | *****-
108 | *****-
110 | *****-
114 | *****-
115 | *****-
119 | *****-
120 | *****-
123 | *****-
124 | *****-
-----+-----+-----+-----+
0 12 24

DATE : 2007 12 1 STATION : BUTE 11209M001

Drücken Sie F1, um die Hilfe aufzurufen.
```

JPS LEGACY

TRIMBLE NETR5

15 GLONASS-SVs ↓
R23 not complete

The image shows a Windows WordPad window with a blue title bar. The title bar text is "RNXGRA.L08 - WordPad". Below the title bar is a menu bar with the following items: "Datei", "Bearbeiten", "Ansicht", "Einfügen", "Format", and "?". Below the menu bar is a toolbar with icons for file operations (New, Open, Save, Print, Find, Copy, Paste, Undo, Redo) and editing (Cut, Paste, Bold, Italic, Underline, Text Color, Background Color). The main text area contains the following content:

DATE : 2008 3 13 STATION : BUTE 11209M001

TYPES OF OBSERVATIONS : C1 P1 P2 C2 L1 L2 S1 S2 D1 D2

CHECKED OBSERVATIONS : L1 L2

The main part of the document is a large table of asterisks and dashes. The table has 12 columns, corresponding to the observation types C1, P1, P2, C2, L1, L2, S1, S2, D1, D2. The rows are numbered 1 through 124. The table contains a complex pattern of asterisks and dashes, representing a data matrix. The pattern is dense and covers most of the page area.

At the bottom of the window, there is a status bar with the text "Drücken Sie F1, um die Hilfe aufzurufen."



6 GLONASS-SVs ↓

```
RNXGRA.L06_2007335 - WordPad
Datei Bearbeiten Ansicht Einfügen Format ?

0 12 24

DATE : 2007 12 1 STATION : HERT 13212M010

TYPES OF OBSERVATIONS : L1 L2 C1 P1 P2 D1 D2
CHECKED OBSERVATIONS : L1 L2

1 | *****-
2 | *****-
3 | *****-
4 | *****-
5 | *****-
6 | *****-
7 | *****-
8 | *****-
9 | *****-
10 | *****-
11 | *****-
12 | *****-
13 | *****-
14 | *****-
15 | *****-
16 | *****-
17 | *****-
18 | *****-
19 | *****-
20 | *****-
21 | *****-
22 | *****-
23 | *****-
24 | *****-
25 | *****-
26 | *****-
27 | *****-
28 | *****-
30 | *****-
31 | *****-
101 | *****-
104 | *****-
106 | *****-
114 | *****-
123 | *****-
124 | *****-
-----+-----+-----+-----+
0 12 24

DATE : 2007 12 1 STATION : HOBV 14202M003

TYPES OF OBSERVATIONS : C1 P2 L1 L2 D1 D2 S1 S2
CHECKED OBSERVATIONS : L1 L2

1 | *****-
*****-
*****-
```

LEICA GRX1200GGPRO

7 GLONASS-SVs ↓

ASHTech Z18

RNXGRA.L06_2007335 - WordPad

Datei Bearbeiten Ansicht Einfügen Format ?

DATE : 2007 12 1 STATION : ZIM2 14001M008

TYPES OF OBSERVATIONS : C1 P1 P2 C2 L1 L2 S1 S2

CHECKED OBSERVATIONS : L1 L2

```

1 |          -*****-          -*****-
2 | *****-          -*****-          -*****-
3 |      ---          -*****-
4 | ***--          -*****-          -*****-
5 |          *****-
6 |          --*****-
7 |          --*****-
8 | *****-          ***--          -****
9 |          -*****-
10 | *****--          -*****--          -**
11 |          -*****-
12 |          -*****-
13 | *****-          -***-          -*****-
14 |          -*****--          -*****-
15 |      -*****-          -*****-
16 | --          -*****-          -*****-
17 |          -*****-          -*****-
18 |          -*****-          -*****-
19 |      -***--          -*****-
20 |          -*****-          -*****-
21 |      -***--          -*****-
22 |          -*****-          -*****-
23 | **--          -***--          -*****-
24 | -*****-          -*****-
25 | *****--          -*****-          -*****-
26 |      -*****-          -***--
27 | *****-          -*****-          -*****-
28 | -*****-          -*****-
30 |          -*****-
31 |          *****-          -*****-
32 |          -*****-          -*****-
101 |          -*****-          -*****-
104 |          -*****-          -*****-
106 | *****-          -*****-          -*****-
107 | *****-          -*****-          -*****-
108 |      -*****--          -*****-          -**
110 |      -*****-          -*****-          -**
114 |          -*****-          -*****-
115 | ****-          -*****-          -*****-
117 |      -*****-          *****-
119 |          -*****-          -*****-
120 |          -*****-          -*****-
121 |          -*****-          -*****-
123 | ***-          -*****-          -*****-
124 | -****-          -*****-          -**
-----+-----+-----+-----+-----+
  
```

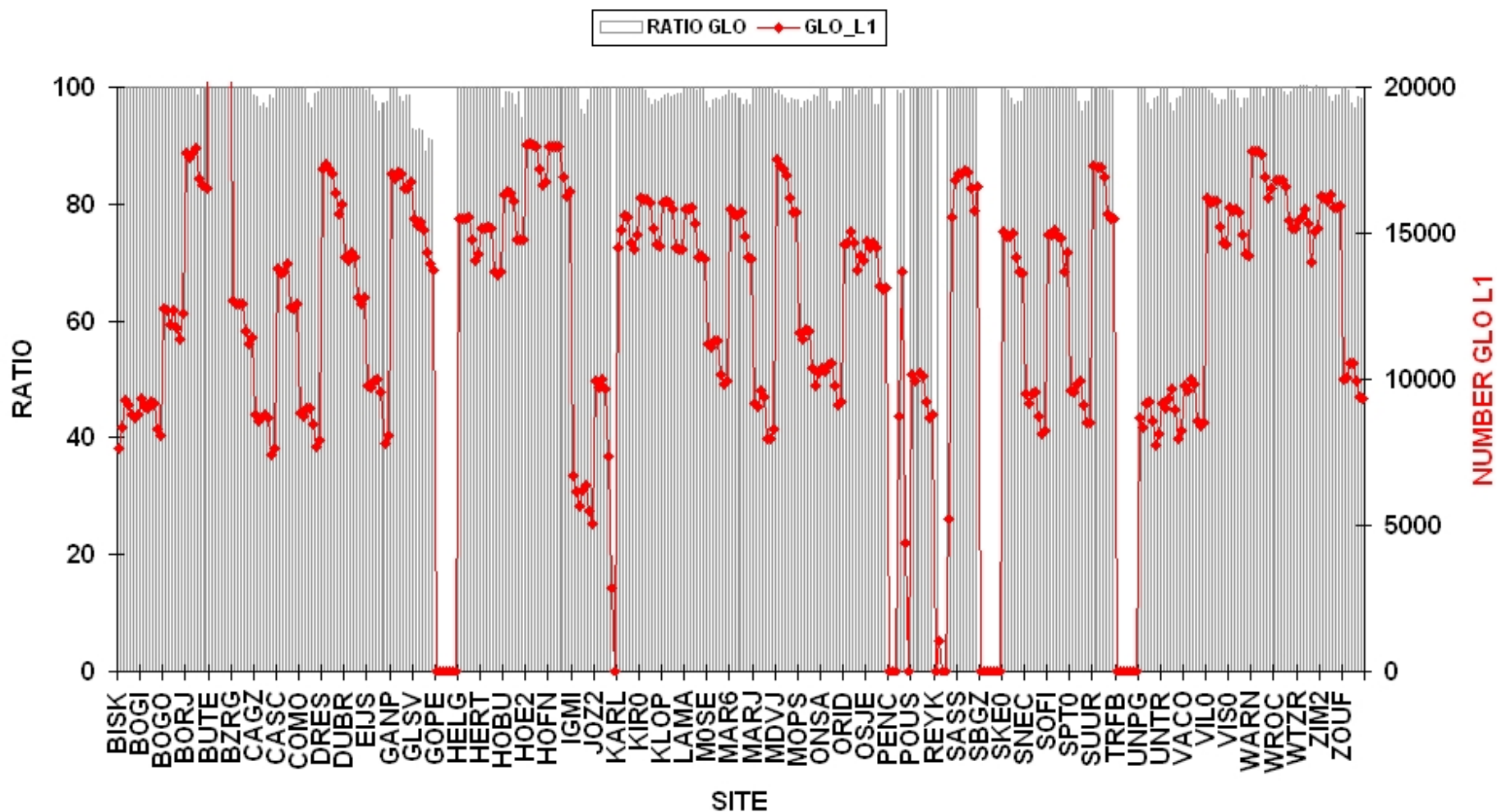
Drücken Sie F1, um die Hilfe aufzurufen.

TRIMBLE NETR5

14 GLONASS-SVs ↓

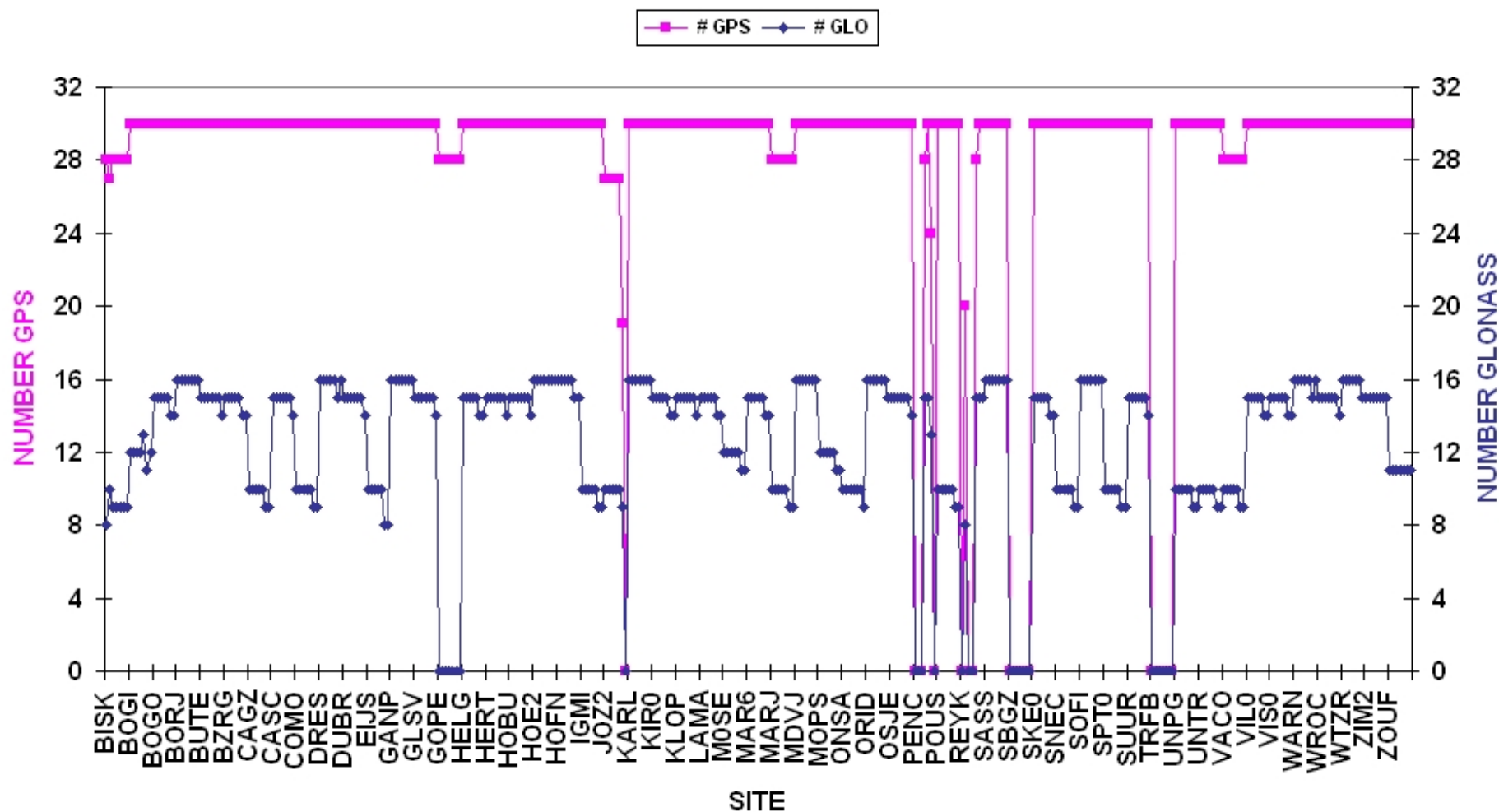
GLONASS observability: March 2008

GLONASS observations: ratio L2 to L1 phase observations and number L1 for 55 EPN stations
 DoY 069-075 in 2008 (30 sec. daily files, with BSW5.0, RXOBV3)



GLONASS observability: March 2008

GPS and GLONASS observations: number of satellites for 55 EPN stations
 GPS week 1470 (DoY 069-075) in 2008 (30 sec. daily files, with BSW5.0, RX0BV3)





10 GLONASS-SVs ↓

```
RNXGRA.L08 - WordPad
Datei Bearbeiten Ansicht Einfügen Format ?

123 | -*****-***-
124 | -*****-*****-*****-
-----+-----+-----+-----+
0 12 24

DATE : 2008 3 13 STATION : IGMI 12701M003

TYPES OF OBSERVATIONS : C1 P1 P2 L1 L2 D1 D2
CHECKED OBSERVATIONS : L1 L2

1 | -*****-*****-*****-
2 | *****-*****-*****-
3 | *****-*****-*****-
4 | *****-*****-*****-
5 | *****-*****-*****-
6 | *****-*****-*****-
8 | *****-*****-*****-
9 | *****-*****-*****-
10 | *****-*****-*****-
11 | *****-*****-*****-
12 | *****-*****-*****-
13 | *****-*****-*****-
14 | *****-*****-*****-
15 | *-*****-*****-
16 | *****-*****-*****-
17 | *-*****-*****-
18 | *****-*****-*****-
19 | *****-*****-*****-
20 | *****-*****-*****-
21 | *****-*****-*****-
22 | *****-*****-*****-
23 | *****-*****-*****-
24 | *****-*****-*****-
25 | *****-*****-*****-
26 | *****-*****-*****-
27 | *****-*****-*****-
28 | *****-*****-*****-
29 | *****-*****-*****-
30 | *****-*****-*****-
31 | *****-*****-*****-
32 | *****-*****-*****-
101 | *****-*****-*****-
104 | *****-*****-*****-
106 | *****-*****-*****-
108 | *****-*****-*****-
110 | *****-*****-*****-
114 | *****-*****-*****-
119 | *-*****-*****-
120 | *****-*****-*****-
123 | *****-*****-*****-
124 | *****-*****-*****-
-----+-----+-----+-----+
0 12 24

Drücken Sie F1, um die Hilfe aufzurufen.
```

TPS ODDYSSEY_E

16 GLONASS-SVs ↓

RNXGRA.L08 - WordPad

Datei Bearbeiten Ansicht Einfügen Format ?

DATE : 2008 3 13 STATION : SASS 14281M001

TYPES OF OBSERVATIONS : C1 P1 P2 L1 L2 S1 S2

CHECKED OBSERVATIONS : L1 L2

```

1 | -*****- -*****-
2 | *****- -*****-
3 | *****- *****- *****
4 | *****- -*****- -**
5 | *****- -*****-
6 | -*****-
8 | -***- *****-
9 | *****- -****- -*****-
10 | -*****- -*****-
11 | -*****- -*****-
12 | *****- - -*****-
13 | -*- -*****- -**
14 | *****- -*****- -**
15 | - -****- -*****-
16 | -*****- -*****-
17 | ***- -*****- -*****-
18 | *****- -*****-
19 | -*****- *****-
20 | -*****- -*****-
21 | -*****- -*-**
22 | *- -*****- *****
23 | -*- -*****-
24 | -*****- -*****-
25 | -*****- -*****-
26 | -*****- *****-
27 | *****- -*****-
28 | -*****- -*****-
29 | -*****- -
30 | *****- *- -**
31 | -*****- -*****-
32 | **- -*****- -**
101 | -*****- -*****-
104 | -*****- -*****-
106 | -*****- -*****-
107 | -*****- -*****-
108 | -*****- -*****-
109 | *- -*****-
110 | *****- *****-
111 | *****- *****-
113 | -*****- -*****-
114 | -*****- -*****-
115 | -*****- -*****-
117 | -*****- -*****-
119 | ***- -*****- -*****-
120 | *****- -*****-
123 | -*****- *- *-**
124 | -*****- -*****-

```

0 12 24

Drücken Sie F1, um die Hilfe aufzurufen.

JPS LEGACY



No PRN06 →

No PRN32 →
9 GLONASS-
SVs ↓

```
RNXGRA.L08 - WordPad
Datei Bearbeiten Ansicht Einfügen Format ?

SR R2RDOH: TOO MANY COMMENT
SR R2RDOH: TOO MANY COMMENT LINES
DATE : 2008  3  13  STATION : BISK 11520M001

TYPES OF OBSERVATIONS :  L1 L2  C1 P1 P2 D1 D2
CHECKED OBSERVATIONS  :  L1 L2

 1 | *****-
 2 | -*****-          -*****-
 3 |          -*****-
 4 | -*****-          -*****-
 5 | *****-
 6 |
 7 | *****-
 8 |          *****-
 9 | *****-          -*-          -*****-
10 |          -*-          -*-
11 |          -*****-          -*-
12 | *****-          -*****-
13 |          *****-
14 | *****-          -*****-
15 | -          -*-          *****-
16 |          -*****-          -*****-
17 | **-          *****-          -*****-
18 |          -*****-          -*****-
19 |          -*****-          -*-
20 |          -*****-
21 |          -*****-          -*-
22 | -          -*****-          -*****-
23 |          -*-          -*****-
24 |          -*****-          -*****-
25 |          -*****-          -*****-
26 |          -*****-          -*****-
27 |          -*****-          -*****-
28 |          -*****-          -*****-
29 | -*****-
30 | *****-          -*-
31 |          -*****-          -*****-
101 | -          -*****-          -*****-
104 | -***-          -*****-
106 |          -*****-          -*****-
108 |          -*****-          -*****-
110 | *****-          -*****-          *****-
114 |          -*****-          -*****-
119 | **-          -*****-          -
120 | *****-          -*****-          -*****-
124 |          -*****-          -*****-
-----+-----+-----+-----+
                        0                12                24

DATE : 2008  3  13  STATION : BOGI 12207M003

TYPES OF OBSERVATIONS :  C1 P1 P2 L1 L2 D1 D2 S1 S2
CHECKED OBSERVATIONS  :  L1 L2

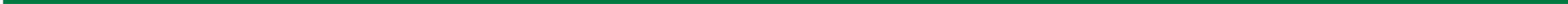
Drücken Sie F1, um die Hilfe aufzurufen.
```

ASHTech Z18

- **How to proceed with GLONASS in the EPN?**
 - **Monitoring the observability (currently „ratio observed/predicted number of observations“ only for GPS?)?**
 - **Analysis**
 - **GPS+GLONASS?**
 - **GLONASS only?**
 - **Topic for LAC workshop (possibly launch of CfP end of the year)?**



Bundesamt für
Kartographie und Geodäsie





http://www.epncb.oma.be/_trackingnetwork/siteinfo4onestation.php?station=ACOR_13434M001

Datei Bearbeiten Ansicht Favoriten Extras ?

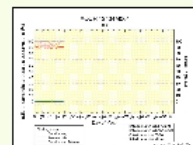
EUREF Permanent GNSS Network > Tracking Network >

Seite Extras

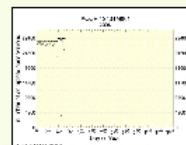
Data Processing

BY BEK, DEO, IGE, IGN, ROB

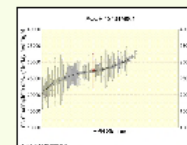
QUALITY PLOTS



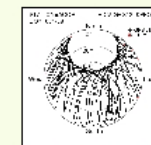
Ratio observed/predicted number of observations



Yearly tracking performance (TEQC)

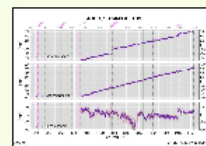


Tracking performance (TEQC) compared to other EPN stations

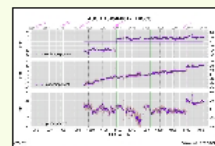


Snapshots of satellite tracking

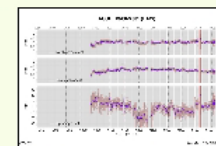
TIME SERIES



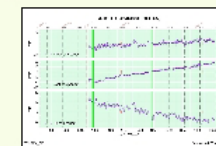
ITRF



ETRS89

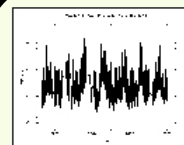


RAW

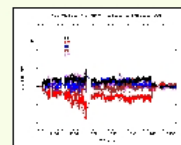


CLEANED

TROPOSPHERE



Zenith path delay time series



Daily ZTD biases from EUREF combination

COMBINED SOLUTIONS

EXCLUSION PERIODS

- 315/2001 (GPSweek No 1140) - 321/2001 (GPSweek No 1140) : EUREFMAIL No [1134](#).
- 329/2001 (GPSweek No 1142) - 349/2001 (GPSweek No 1144) : EUREFMAIL No [1134](#).
- 160/2002 (GPSweek No 1170) - 201/2002 (GPSweek No 1175) : EUREFMAIL No [1312](#).
- 300/2002 (GPSweek No 1190) - 306/2002 (GPSweek No 1190)
- 243/2003 (GPSweek No 1234) - 312/2003 (GPSweek No 1243) : EUREFMAIL No [1748](#).
- 362/2003 (GPSweek No 1251) - 010/2004 (GPSweek No 1252)
- 035/2007 (GPSweek No 1413) - 076/2007 (GPSweek No 1418) : EUREFMAIL No [3157](#), [3239](#) and [3249](#).

COORDINATES

from last weekly EPN solution, EPN cumulative and IERS in ITRS or ETRS89

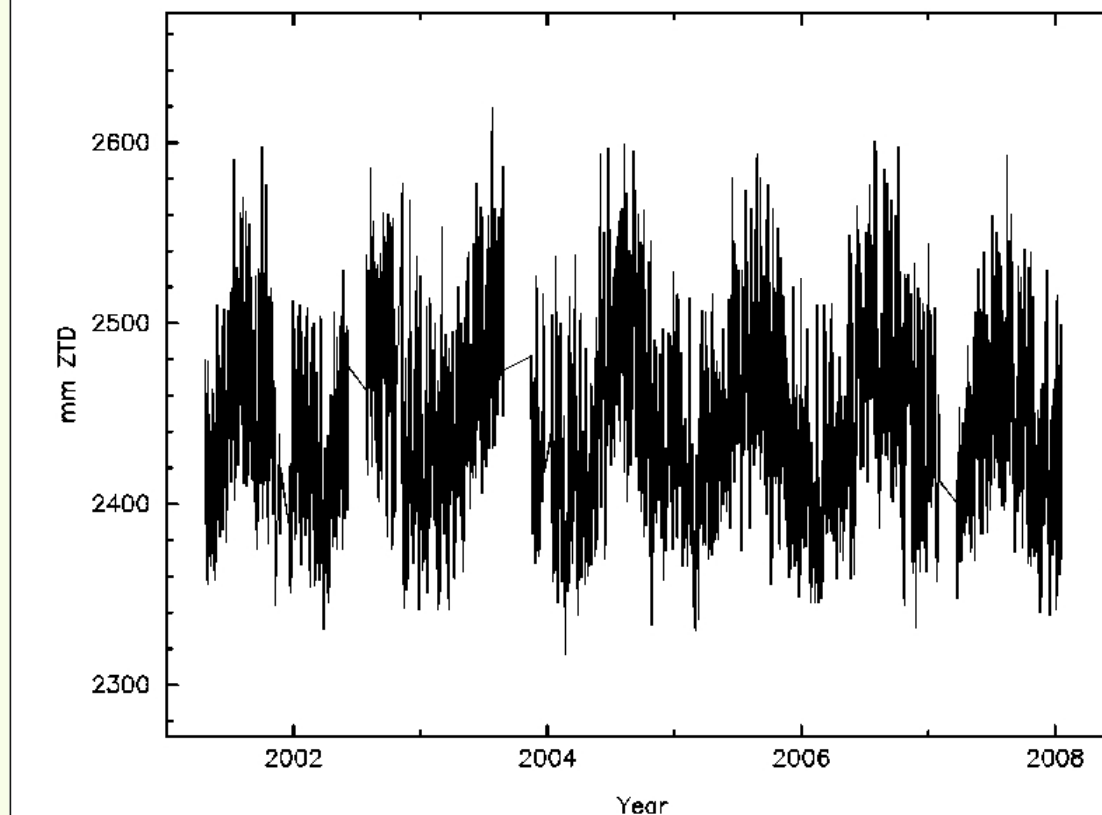
Mails and Remarks

EUREF MAILS



ZENITH PATH DELAY TIME SERIES

Zenith Path Delay time series for station ACOR



Explanations

Purpose

- › Show Time series of Zenith Total Delay (ZTD) parameters derived from the EPN combined solution
- › ZTD values exceeding a standard deviation of 20 mm were excluded.

Procedure

- ›
- ›