

18 YEAR OF QC ANALYSIS
AT
DELFT UNIVERSITY OF TECHNOLOGY

R. Noomen

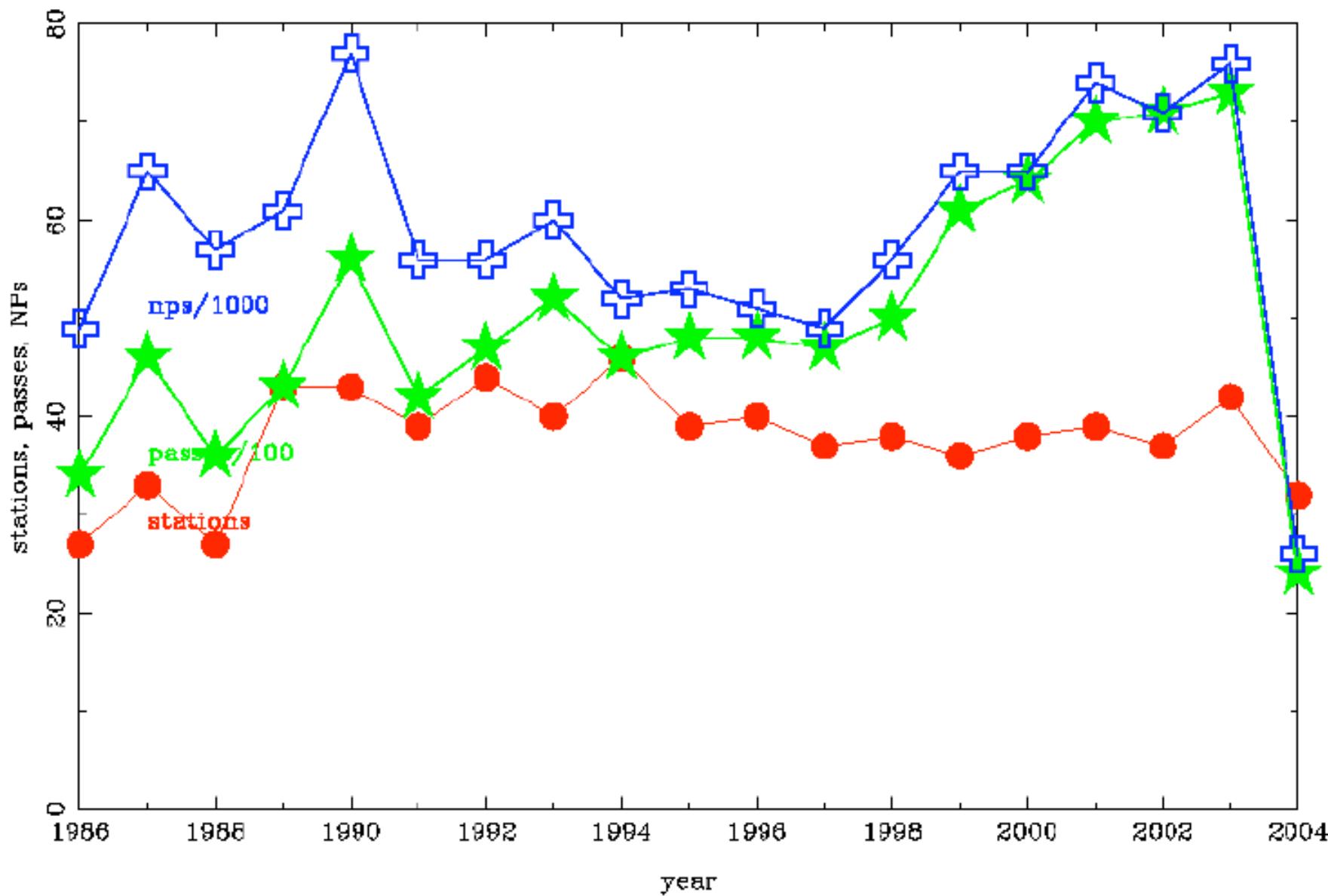
IWLR2004, San Fernando, June 9, 2004

Acknowledgements: Boudewijn Ambrosius, Dagmar Bock, Wim van Gaalen, Ernst Hesper, Hans Leenman, Robert de Muynck, Gert-Jan Ourensma, Wim Simons and Karel Wakker

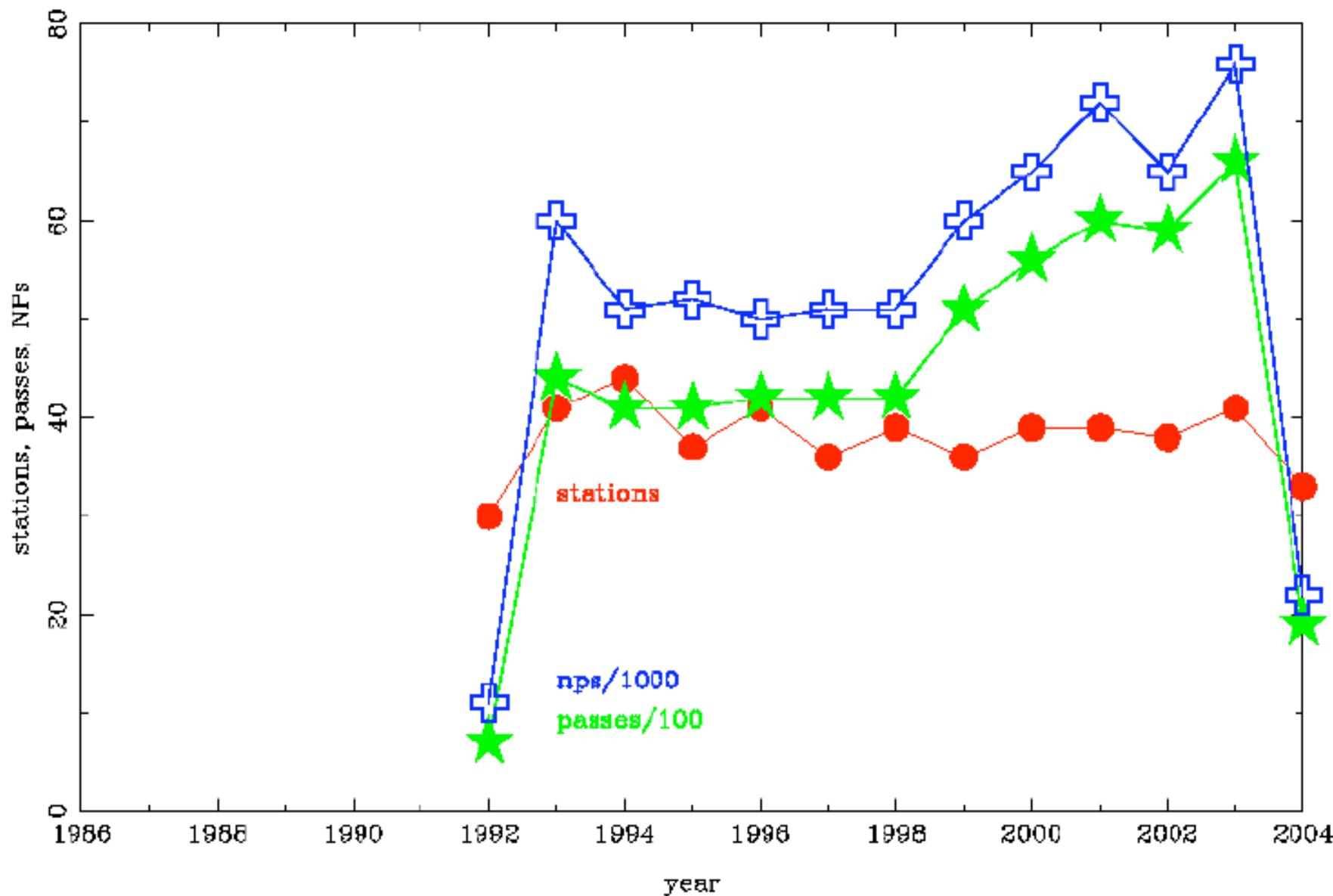
Quick-Look Data Analysis Center (QLDAC)

- Support of WEGENER/MEDLAS
- Semi real-time EOPs
- Semi real-time global network QC

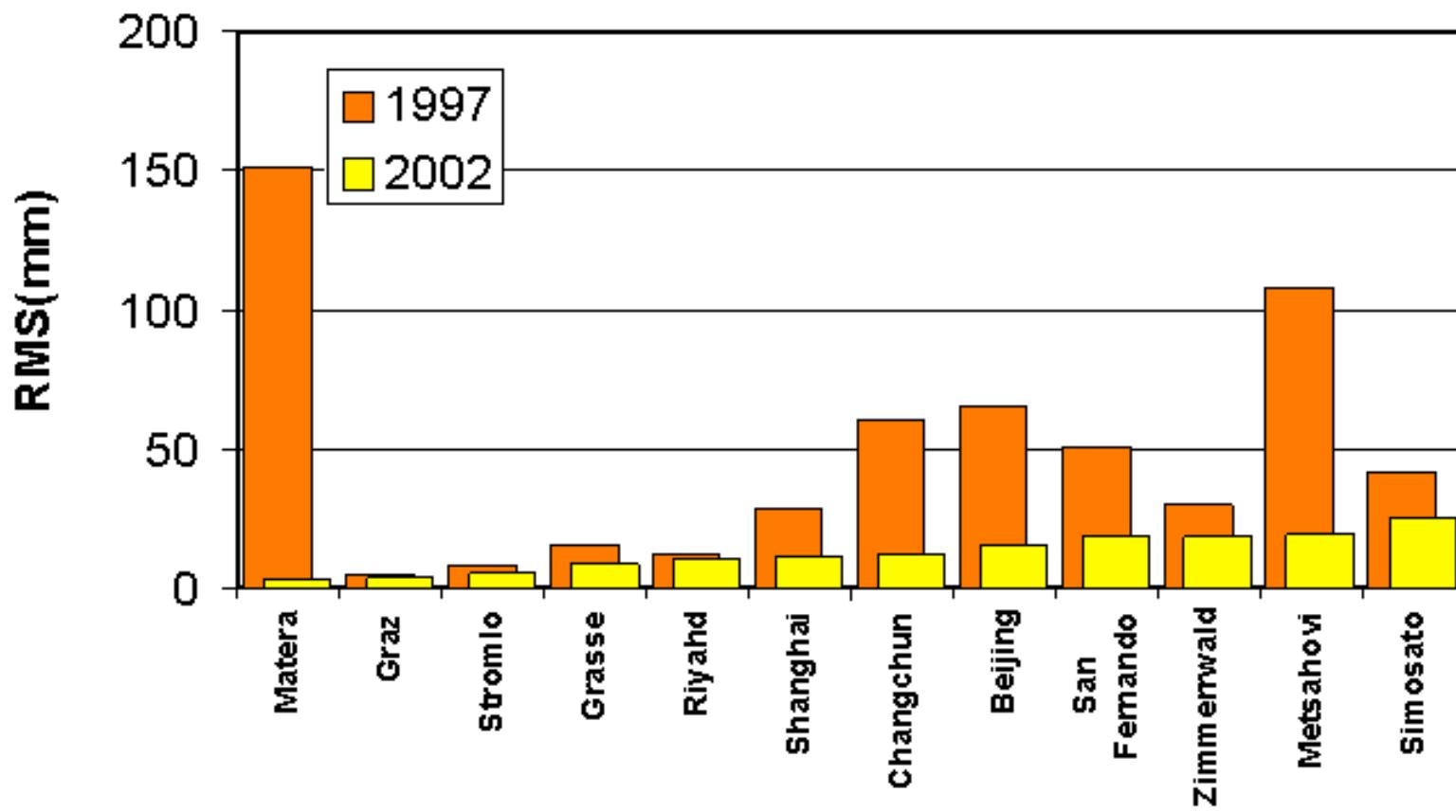
LAGEOS-1



LAGEOS-2



Improvements – Precision (Single Shot RMS)

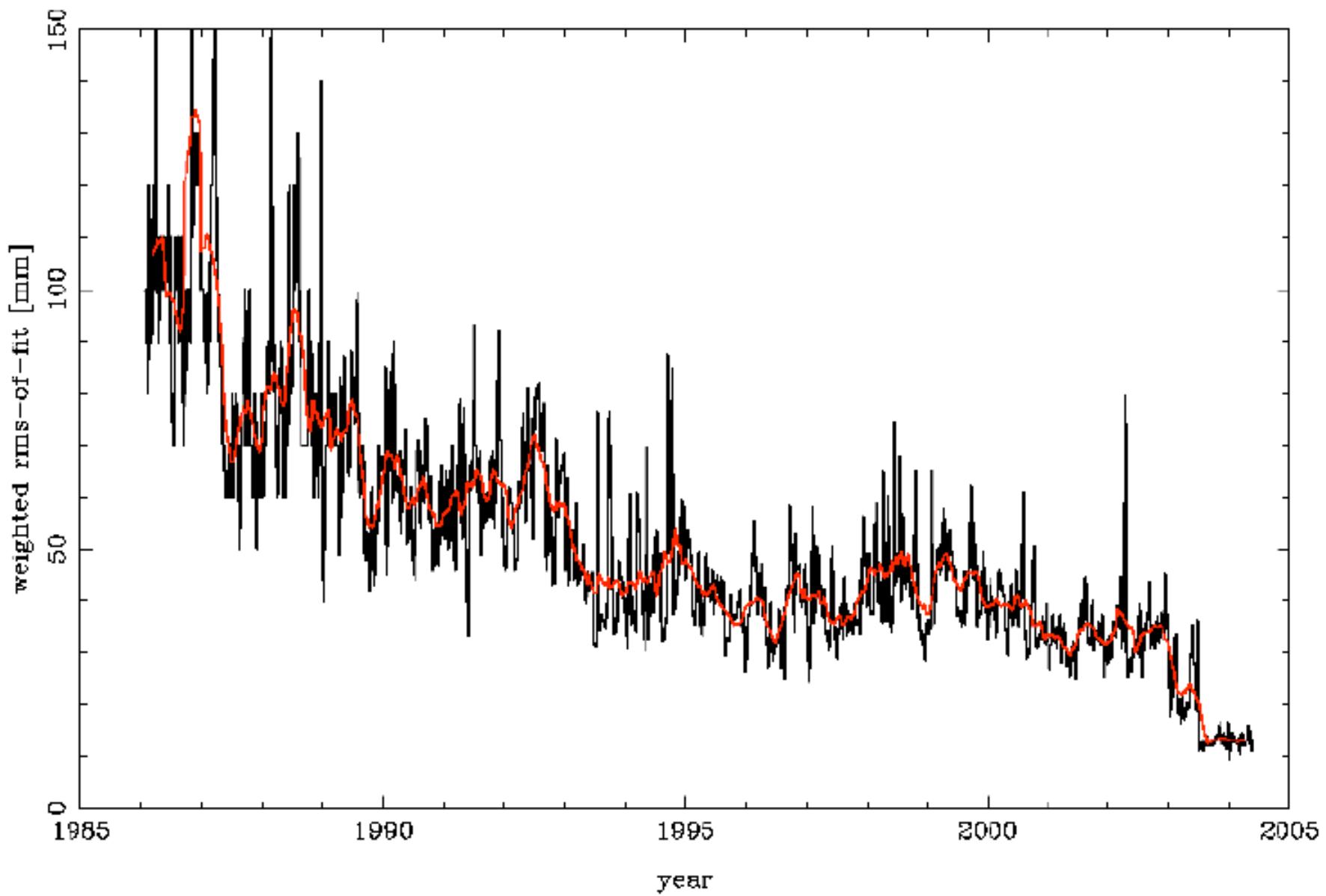


WEGENER/MEDLAS

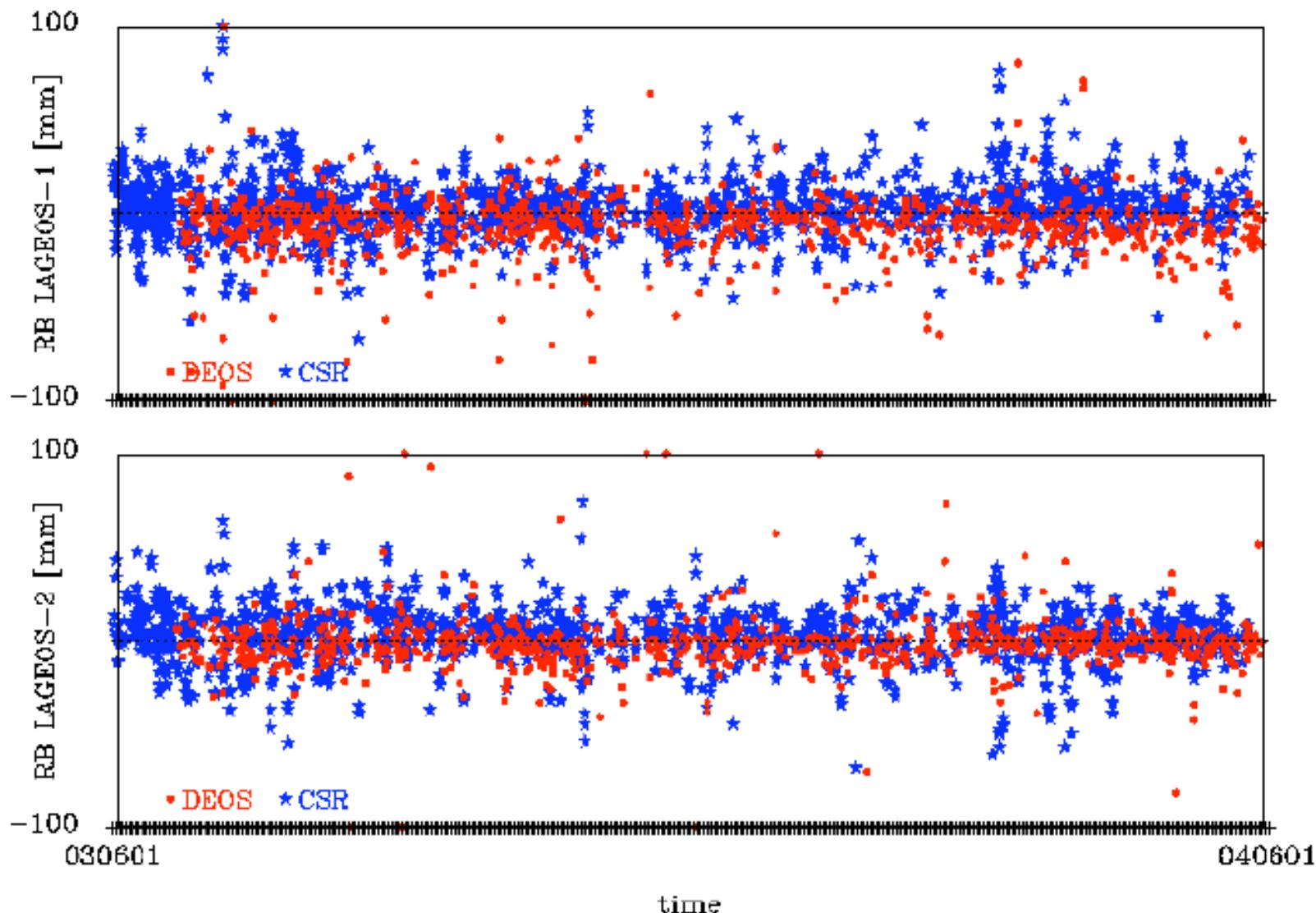
- determine crustal deformations in Mediterranean area
- MTLRS-1, MTLRS-2, TLRS-1
- 4 observation campaigns: 1986, 1987, 1989 and 1992
- Delft University:
 - MTLRS-2
 - QC + number of passes
 - science

OVERVIEW OF MAJOR DEVELOPMENTS IN QLDAC PROCESSING

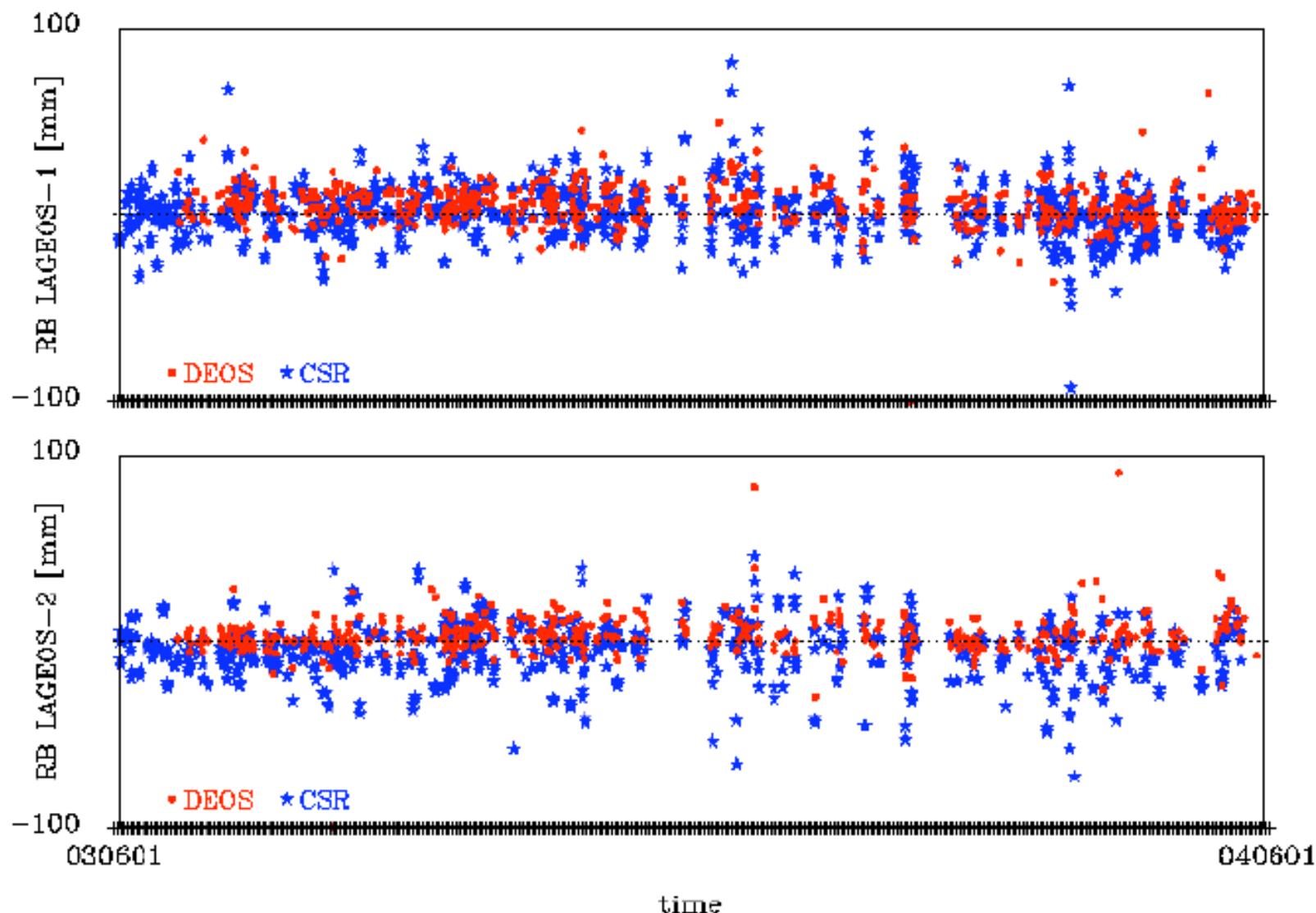
| date | model element | strategy |
|------------|--|--|
| Jan 1986 | <i>initial settings</i> | <i>initial settings</i> |
| May 1987 | DUT/SOM 87.1 station coordinates Wahr solid earth tides Schwiderski ocean tides | |
| April 1989 | GEM-T1 gravity and tides DUT/SOM 89.3 station coordinates | |
| July 1991 | GEM-T2 gravity and tides DUT/SOM ERS90 station coordinates | data weight rss 50 mm + station noise |
| Oct 1992 | LAGEOS-2 251 mm c.o.m., offset | 1-cpr radial accelerations estim. |
| Jan 1994 | JGM-2 gravity and tides DUT/SOM 93L05 station coordinates | data weight rss 30 mm + station noise 3-day EOPs estimated |
| Jan 2003 | EGM96 gravity and tides ITRF2000 station coordinates zero degree elevation cut-off | 1-cpr cross-track accelerations estim. data weight rss 15 mm + station noise full automation |
| July 2003 | ocean loading atmospheric pressure loading | 1-day EOPs estimated geocenter estimated estimation of 1-cpr terms twice per arc |



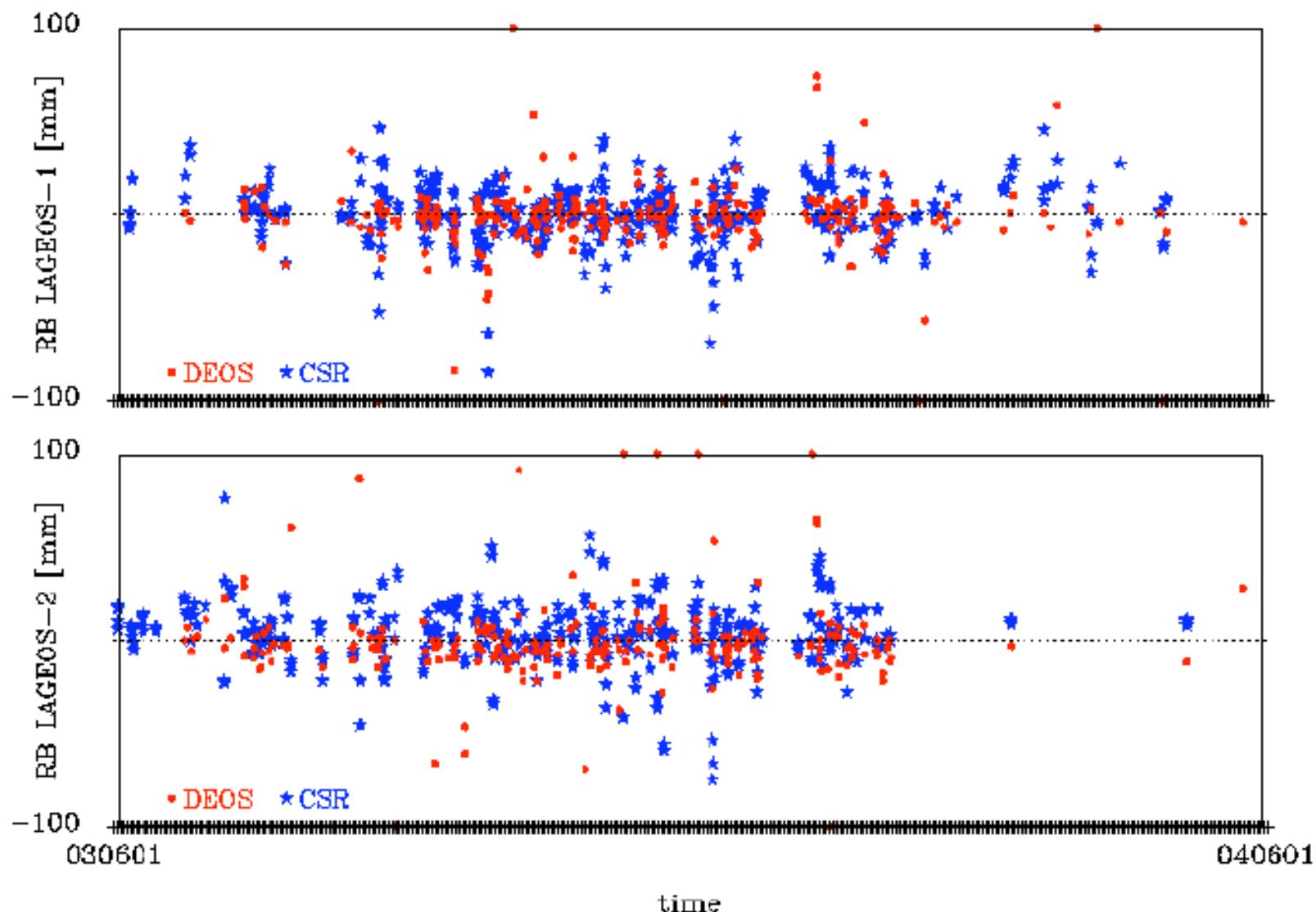
station 7090 (Yarragadee)



station 7840 (Herstmonceux)

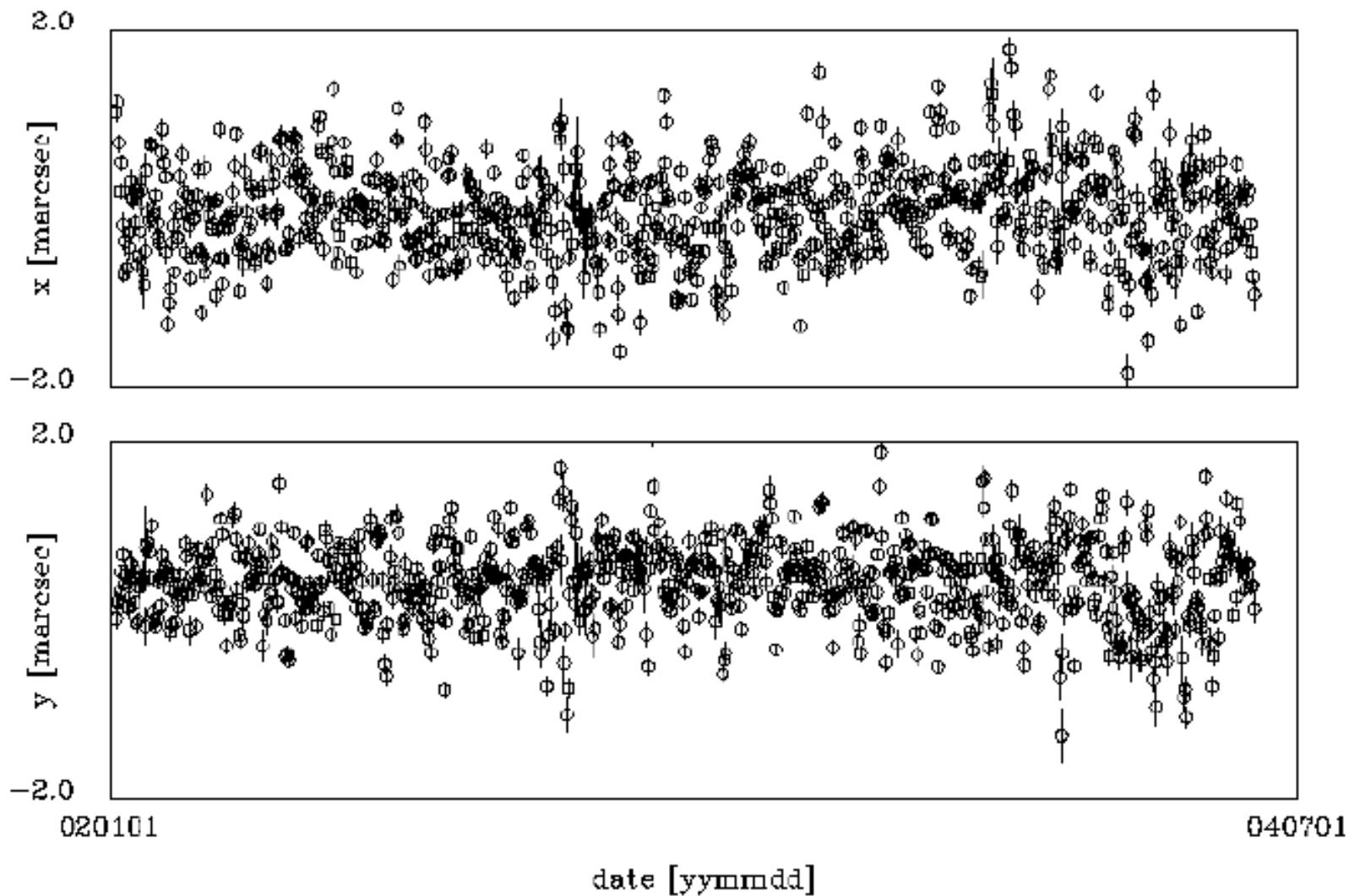


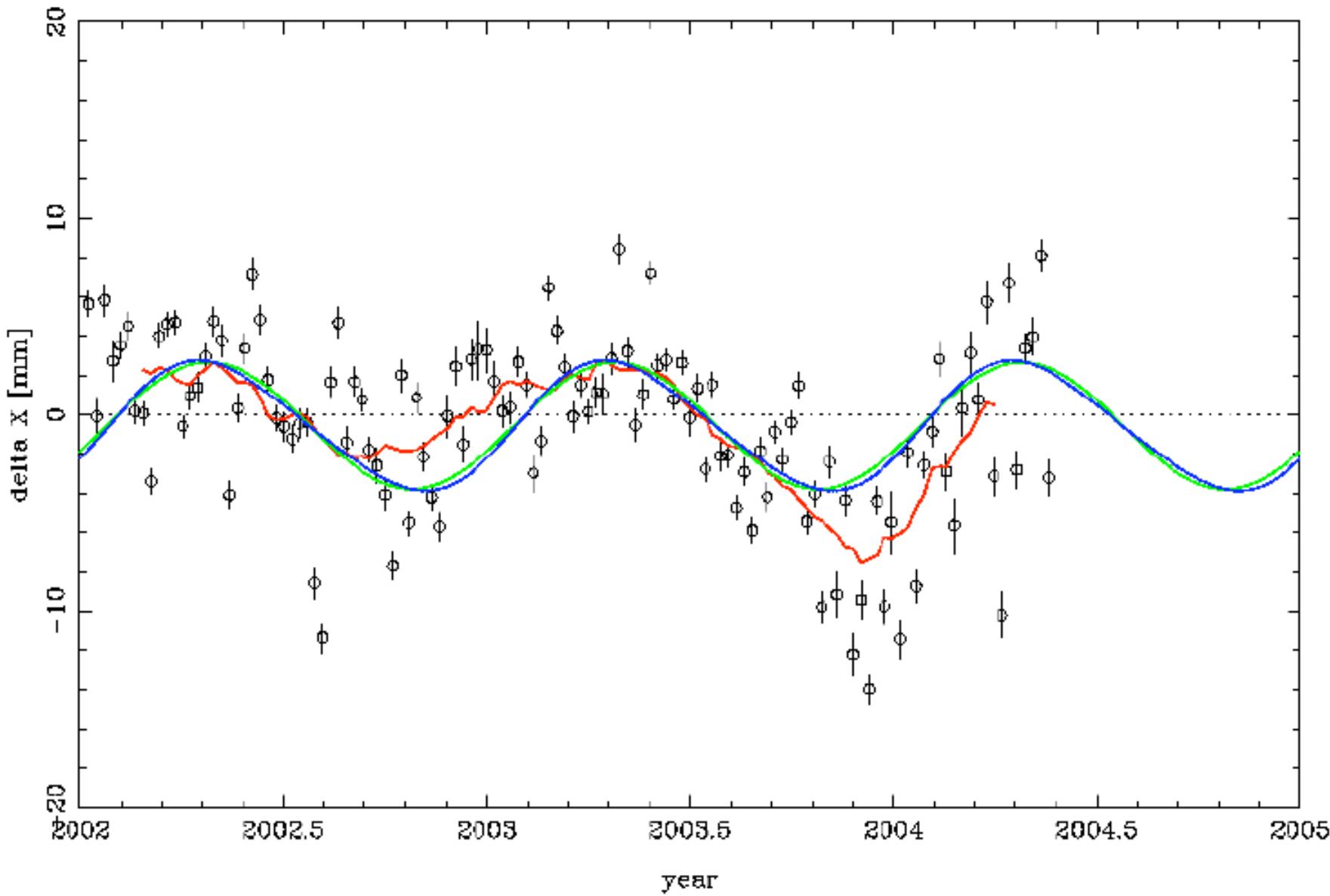
station 7105 (Greenbelt)

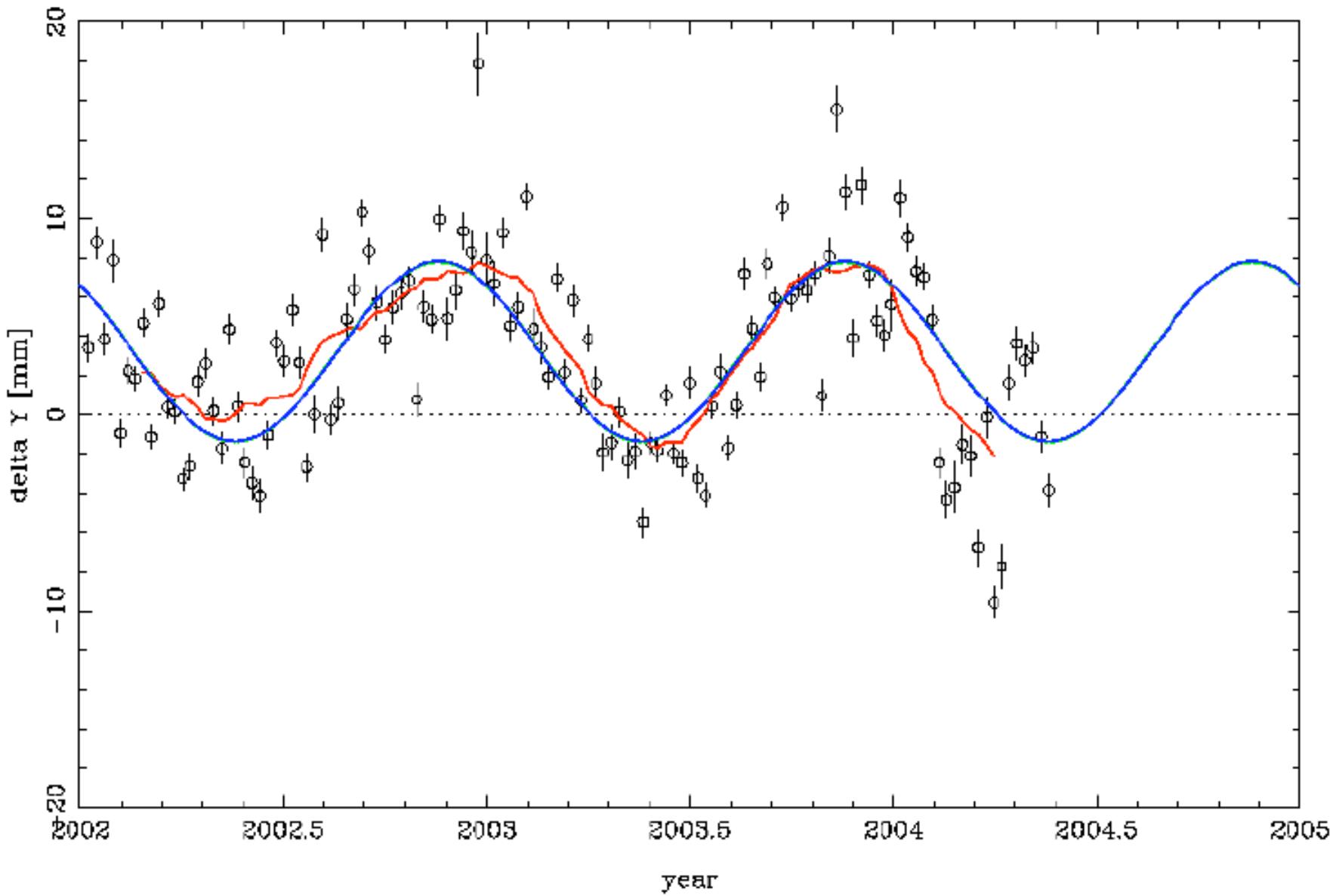


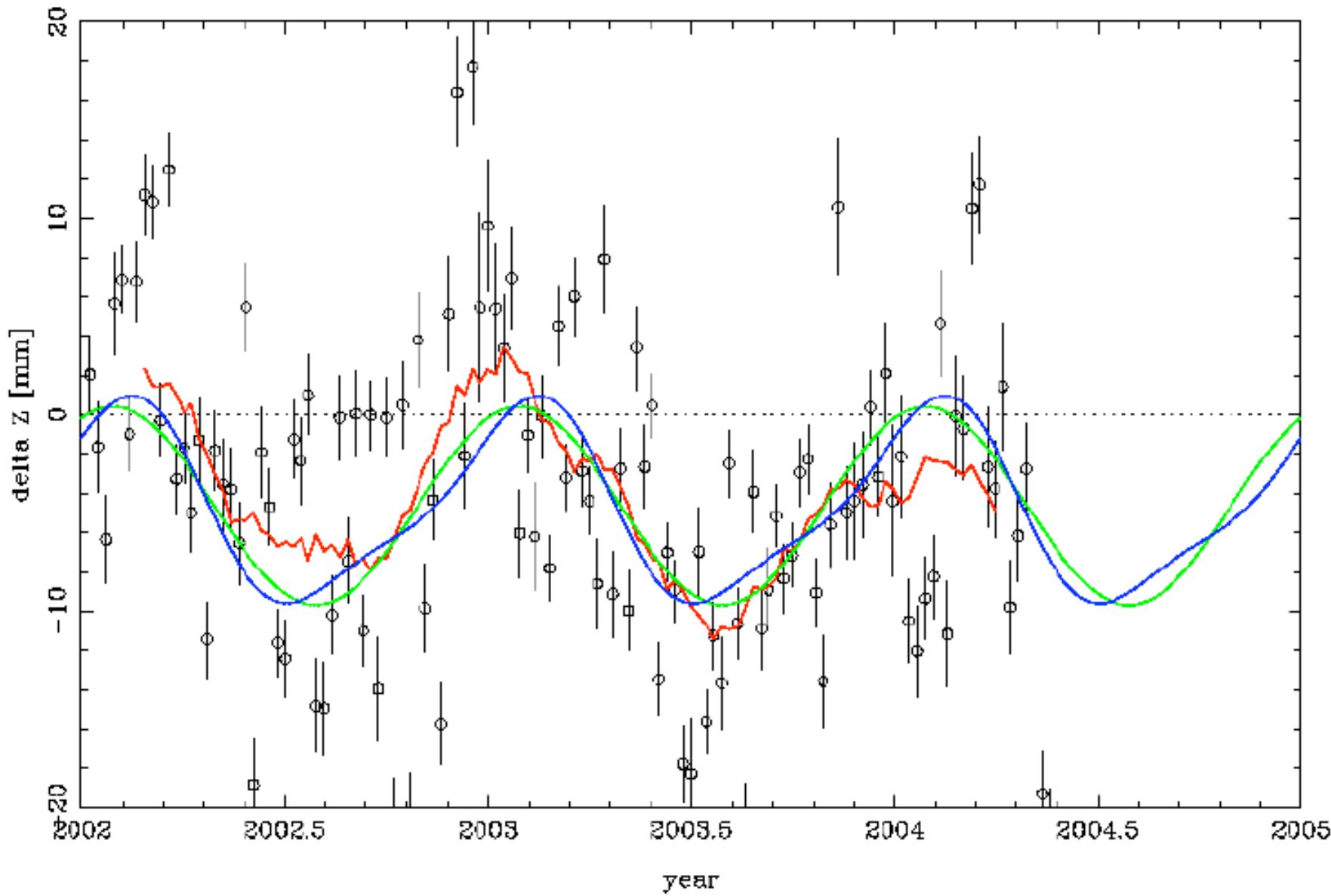
| | date | satellite | range bias [mns] | |
|------|--------------|-----------|------------------|------------|
| | | | QLDAC | CSR |
| 7331 | July 26 | 15:15 | LAGEOS-2 | 1331 ± 275 |
| 7838 | July 31 | 09:48 | LAGEOS-2 | -153 ± 50 |
| 7838 | August 4 | 10:13 | LAGEOS-2 | -109 ± 50 |
| 7838 | August 5 | 06:53 | LAGEOS-1 | -138 ± 32 |
| 7337 | August 13 | 19:01 | LAGEOS-1 | -1001 ± 44 |
| 7838 | August 22 | 12:21 | LAGEOS-2 | -110 ± 36 |
| 7810 | August 23 | 00:45 | LAGEOS-1 | 832 ± 55 |
| 7810 | August 23 | 04:13 | LAGEOS-1 | 878 ± 42 |
| 7838 | August 23 | 10:47 | LAGEOS-2 | -123 ± 43 |
| 7838 | August 23 | 14:41 | LAGEOS-2 | -156 ± 52 |
| 7838 | September 17 | 11:25 | LAGEOS-2 | -150 ± 27 |
| 8834 | September 18 | 08:37 | LAGEOS-2 | 277 ± 12 |
| 7838 | September 18 | 09:39 | LAGEOS-2 | -134 ± 22 |
| 8834 | September 18 | 11:08 | LAGEOS-1 | 270 ± 20 |
| 7838 | September 19 | 03:39 | LAGEOS-2 | -176 ± 31 |
| 7845 | September 19 | 10:53 | LAGEOS-2 | 1196 ± 43 |
| 7331 | September 23 | 12:09 | LAGEOS-2 | 1306 ± 63 |
| 7941 | December 6 | 02:03 | LAGEOS-1 | 1899 ± 21 |
| 6405 | December 19 | 03:27 | LAGEOS-1 | 933 ± 72 |
| 7337 | February 15 | 12:07 | LAGEOS-1 | 993 ± 54 |
| 7337 | March 4 | 10:33 | LAGEOS-2 | 952 ± 439 |
| 7337 | March 8 | 10:36 | LAGEOS-1 | -1140 ± 77 |
| 7337 | March 8 | 14:53 | LAGEOS-2 | -1116 ± 57 |
| 7337 | March 11 | 17:13 | LAGEOS-2 | 974 ± 77 |
| 1884 | March 12 | 18:37 | LAGEOS-2 | -222 ± 149 |
| 1884 | March 12 | 19:27 | LAGEOS-1 | -312 ± 109 |
| 1884 | March 12 | 22:48 | LAGEOS-1 | 165 ± 79 |
| 7337 | April 7 | 18:25 | LAGEOS-1 | 900 ± 33 |
| 7845 | April 7 | 21:23 | LAGEOS-2 | -1199 ± 14 |
| 7845 | April 7 | 22:35 | LAGEOS-1 | -1217 ± 15 |
| 7337 | April 9 | 12:49 | LAGEOS-1 | 1003 ± 174 |
| 7337 | April 10 | 12:43 | LAGEOS-2 | 1009 ± 184 |
| 7941 | May 21 | 19:13 | LAGEOS-1 | 1861 ± 13 |
| | | | | 1867 |

Table 1: Overview of the major data problems of the global network of SLR stations, as found in the period June 2003 - June 2004 by QLDAc and CSR.

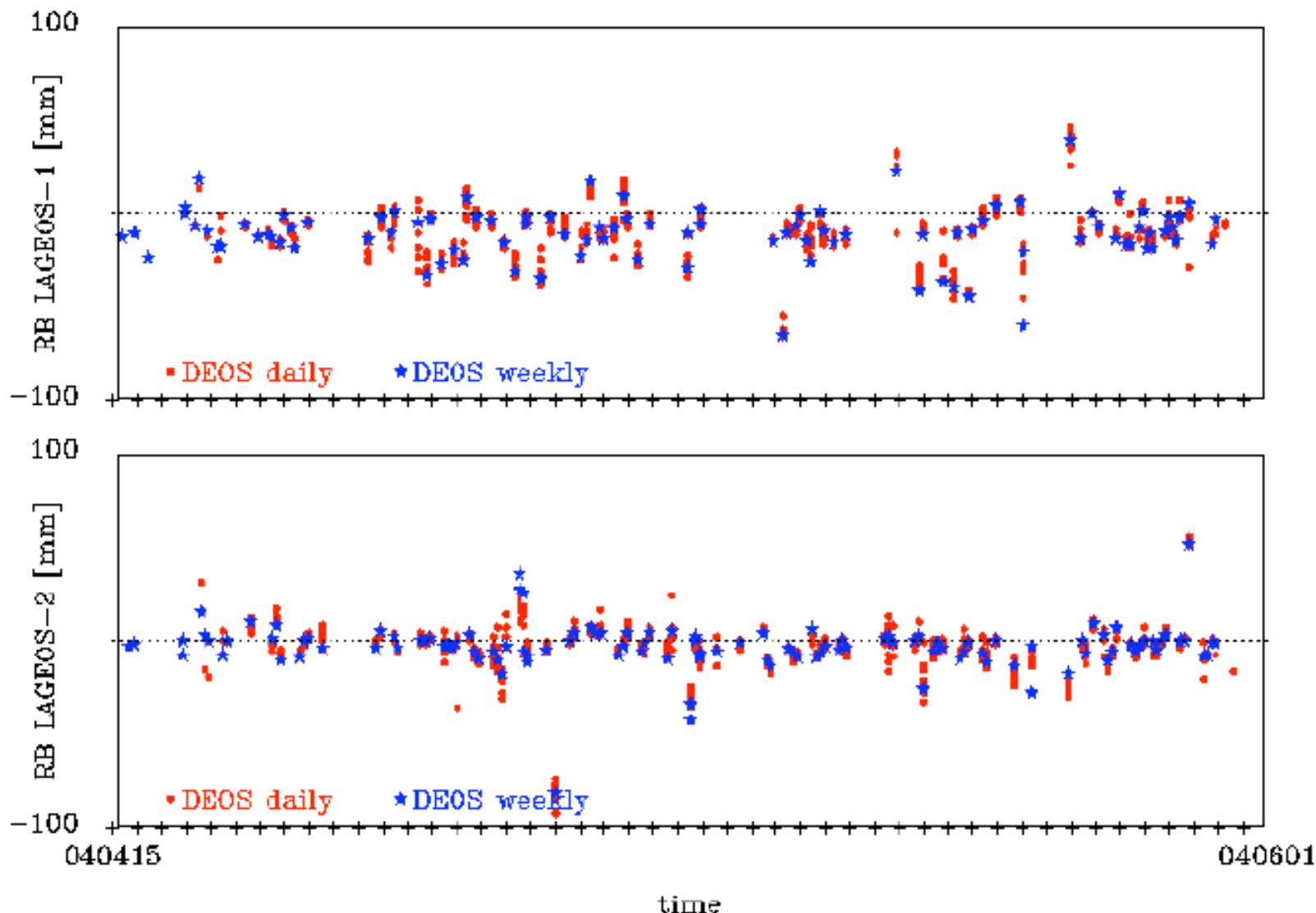








station 7090 (Yarragadee)



QC ANALYSES:

- weekly:
 - every Tuesday
 - 8-day arcs
 - average delay $0.5*8+2 = 6$ days
- daily:
 - every day
 - 8-day arcs
 - average delay $0.5+0.5 = 1$ day

SUMMARY

- operational 18 years
- 3 main goals

currently global QC most important

- significant progress

e.g. fit 10-12 cm -> 10-15 mm

- new products
- frequency, time-delay

“TO DO” LIST

- Etalon
- tropospheric delay
- satellite/station signature
- empirical forces