

Session 13

Pilot Projects

Graham Appleby, Mark Torrence



Honeywell

Honeywell Technology Solutions Inc
Harmonization of QC Results
Wetzell, Germany, Oct 26-27, 2003

Harmonization of QC Results (Oct 2003)

Van Husson (HTSI)
ILRS Central Bureau





QC Harmonization Goals

1. Determine absolute station biases and any changes
2. Quick communication of a problem
3. Develop a consolidated bias report
4. Communicate/document a system performance problem



Terms

- QC – quality control based on weekly LAGEOS reports
- RB – range bias
- TB – time bias
- EOP/POS – 28-day EOP and coordinate solutions



What's New

- Added CRL and Delft QC Results to Global Report Card
- CSR, MCC, Delft, and CRL QC results stored in Oracle database (90% automated)
 - Monthly averages computed
 - By year's end, publish RB & TB time-series for each site on MyStationPerformance.COM
- Two-color analysis results (e.g. Zimmerwald and TIGO)

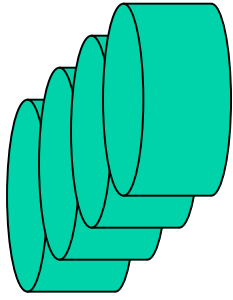


Bias Determination

AC provided

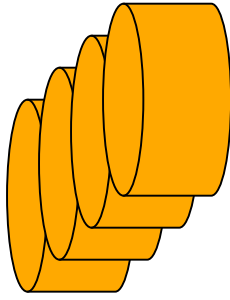
Weekly QC Reports

- Range Biases
- Time Biases



Coordinates Sets

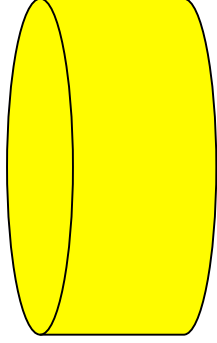
- Positions
- Velocities



Station provided

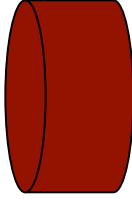
Normal Points

- Epochs and Range
- System Delay
- Cal. & Sat. RMSs
- Met. Data



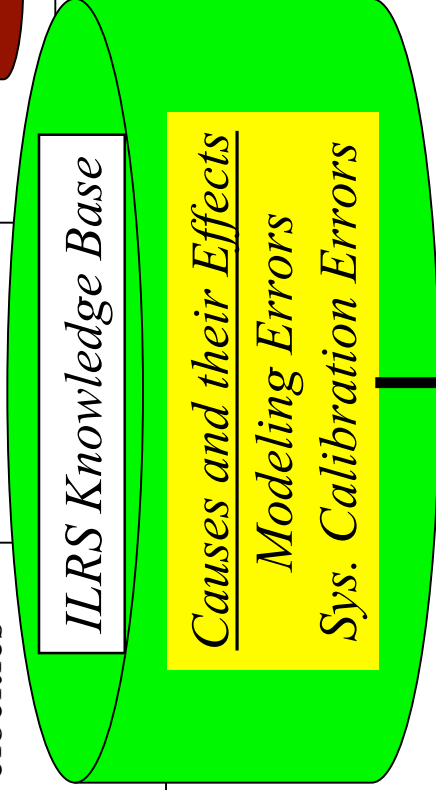
Site Logs

- Configurations
- Site Identifiers
- Eccs

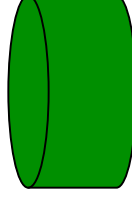


ILRS Knowledge Base

Causes and their Effects
Modeling Errors
Sys. Calibration Errors



Data Corrections File



Magnitude, duration and source of bias



Modeling Limitations in absolute RB Determination

- Prime
 - Station Positions
- Secondary
 - Station Biases
 - Geocenter
 - Troposphere
 - Atmospheric Pressure Loading
 - Satellite CoM
 - GM
 - Temporal and Spatial Data Distribution



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QC Results (Weekly Analysis)



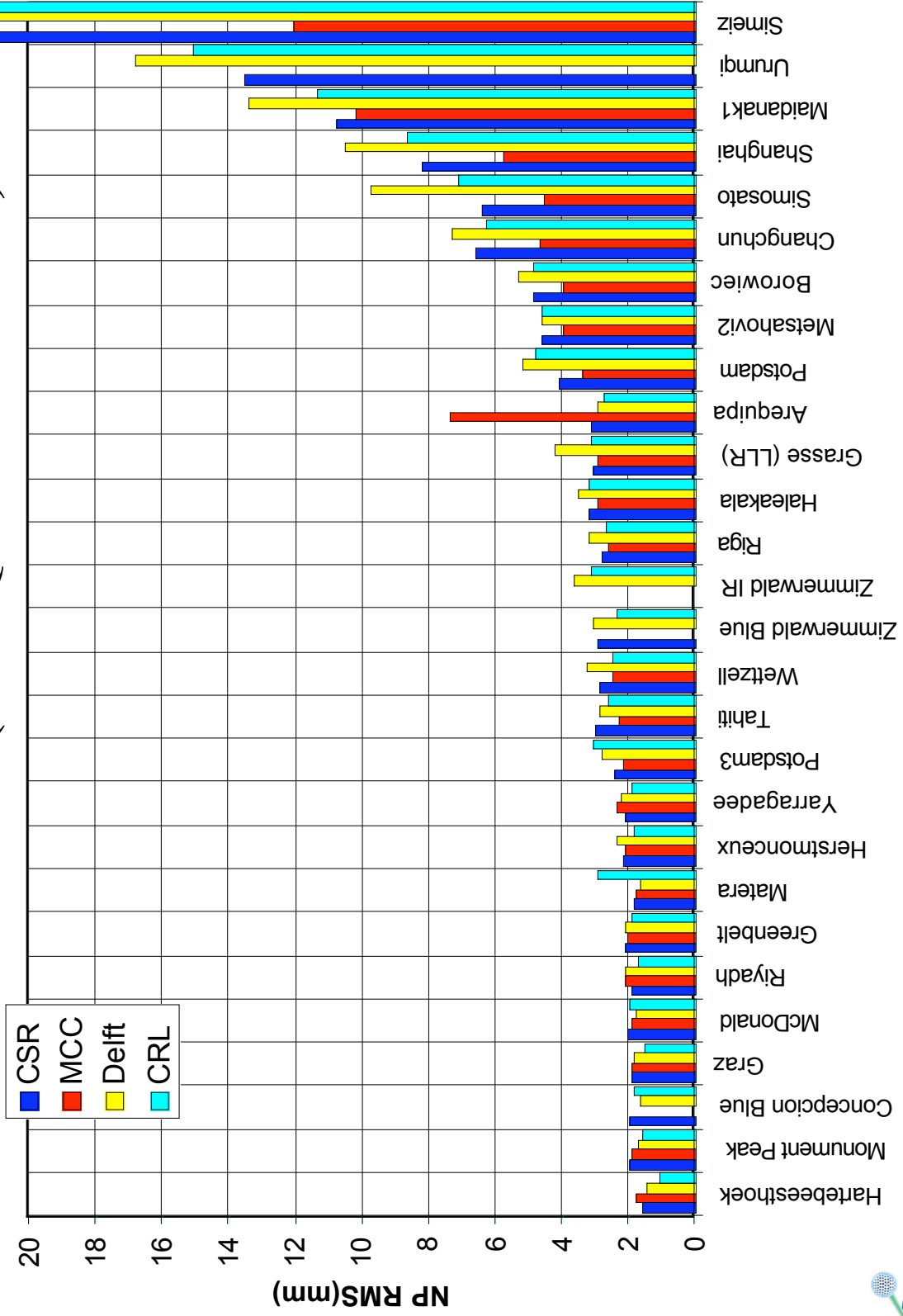


Coordinate Systems

| <u>Analysis Center</u> | <u>Coordinates</u> | <u>Implementation</u> |
|------------------------|--------------------|-----------------------|
| CRL | ITRF2000 | 2001 |
| CSR | <i>CSR 95L01</i> | <i>1995</i> |
| Delft | ITRF2000 | Jan 2002 |
| MCC | MCC 00L01 | March 2000 |



NP RMSs (3rd Quarter 2003)

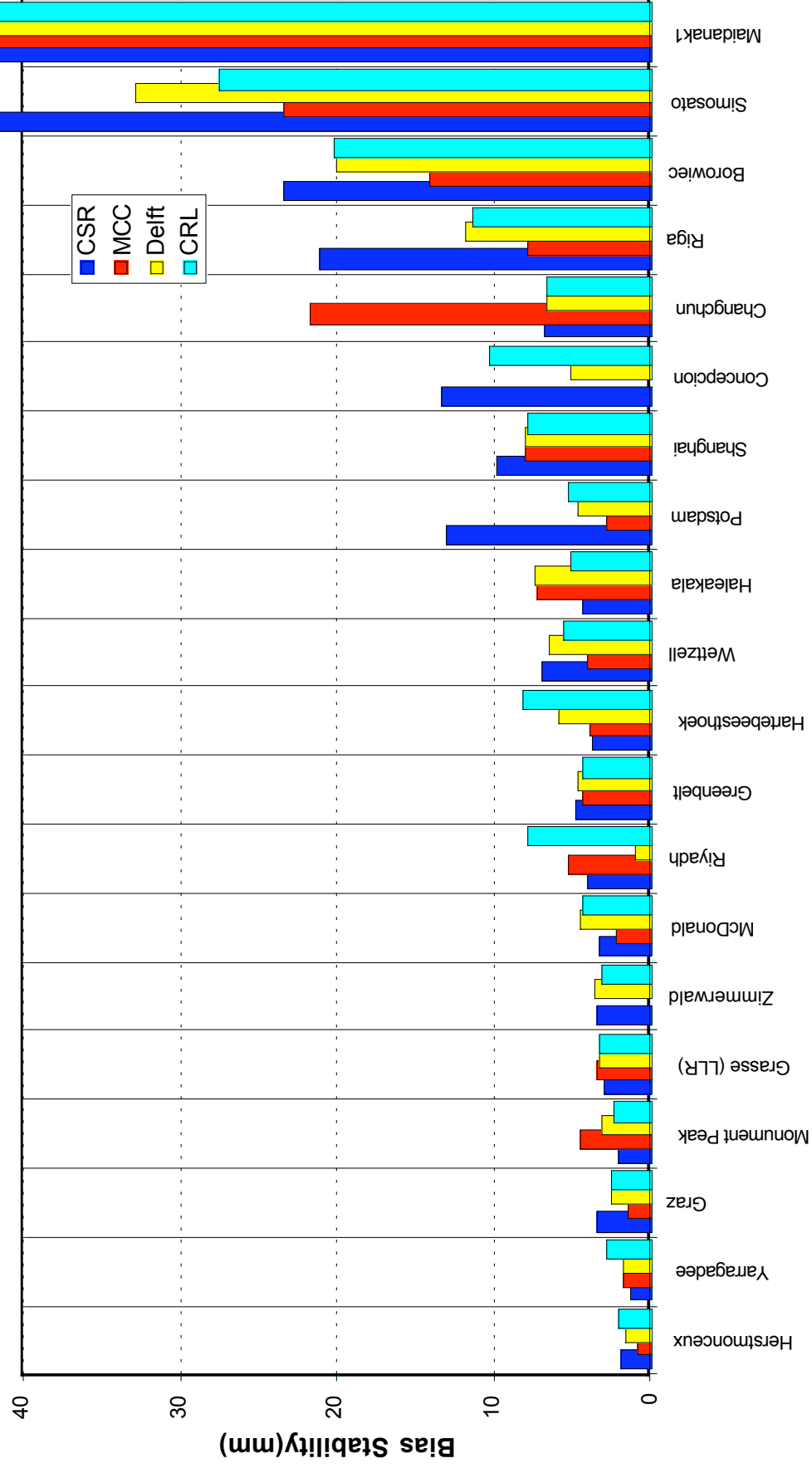




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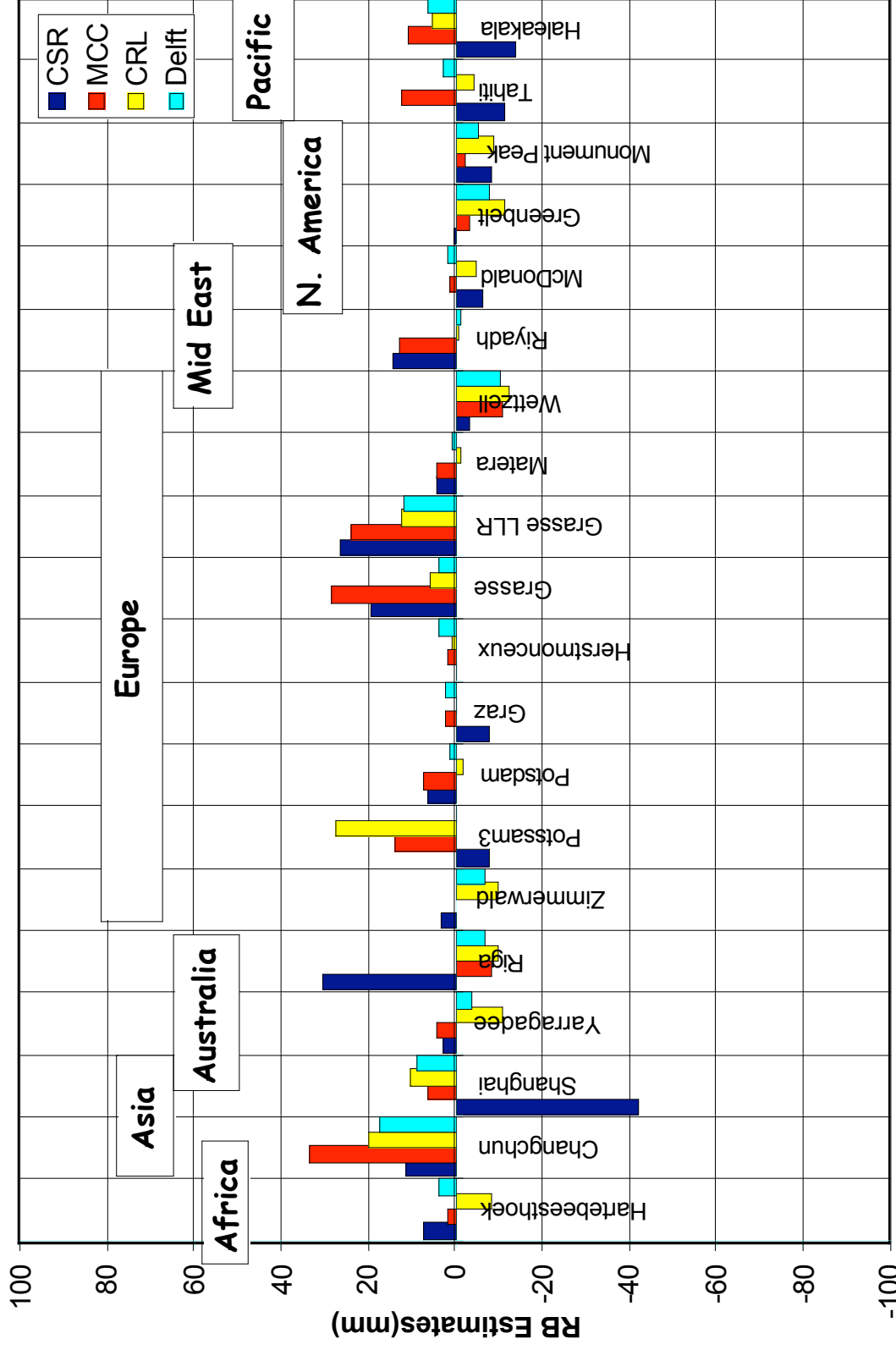
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2003 RB Stability





2003 RB Estimates



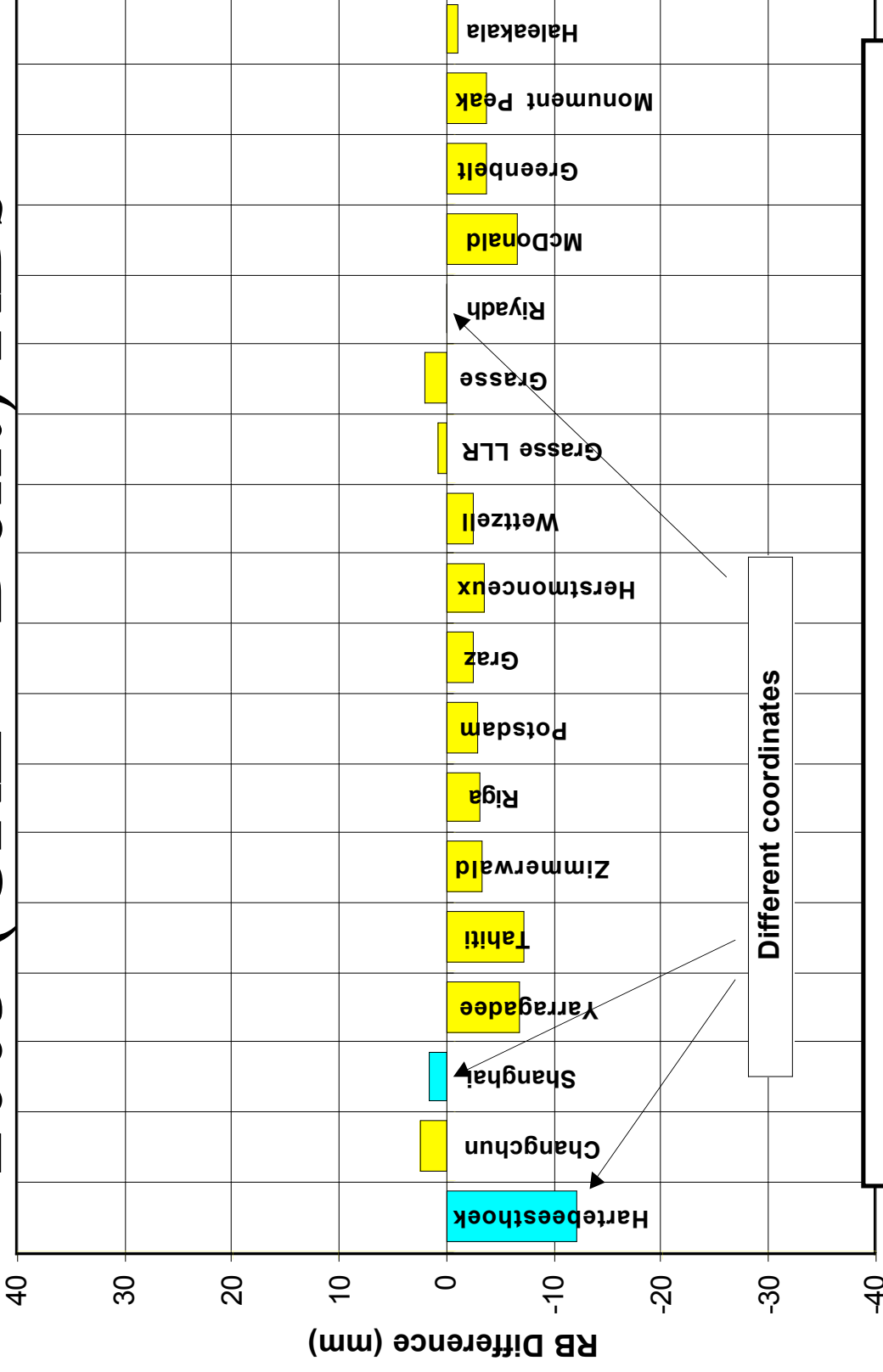


Delft vs CRL RB Comparison

- Since 2002, Delft and CRL have been using ITRF2000 coordinates with a few exceptions
 - Notable exceptions are:
 - Riyadh 7832 (both use their own)
 - Shanghai 7837 (Delft uses their own)
 - Hartebeesthoek 7501 (CRL uses their own)



2003 (CRL – Delft) RBS

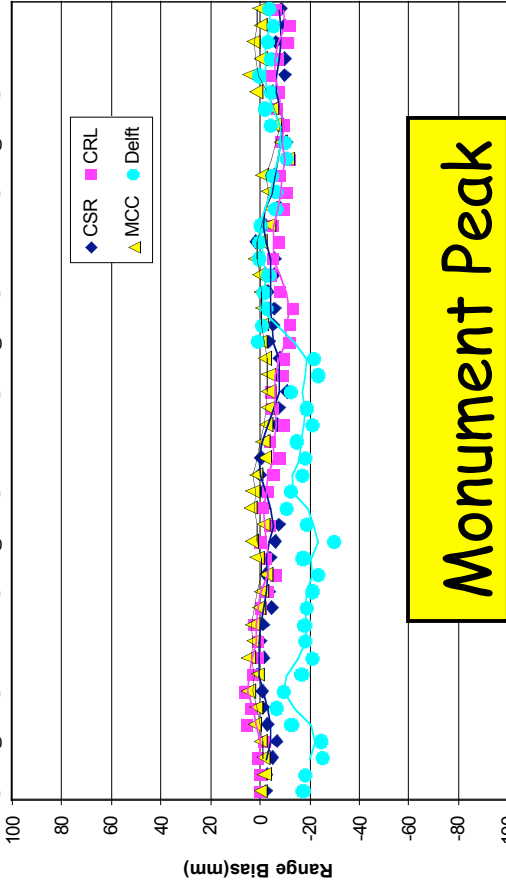
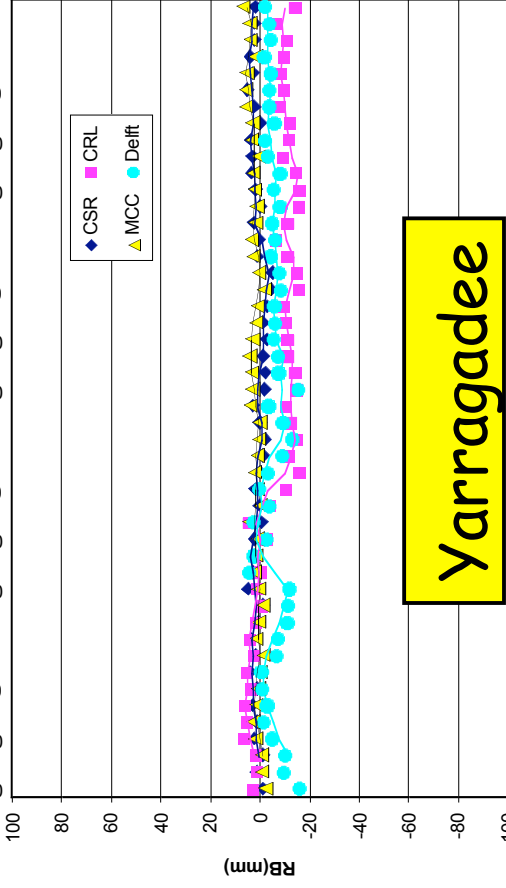
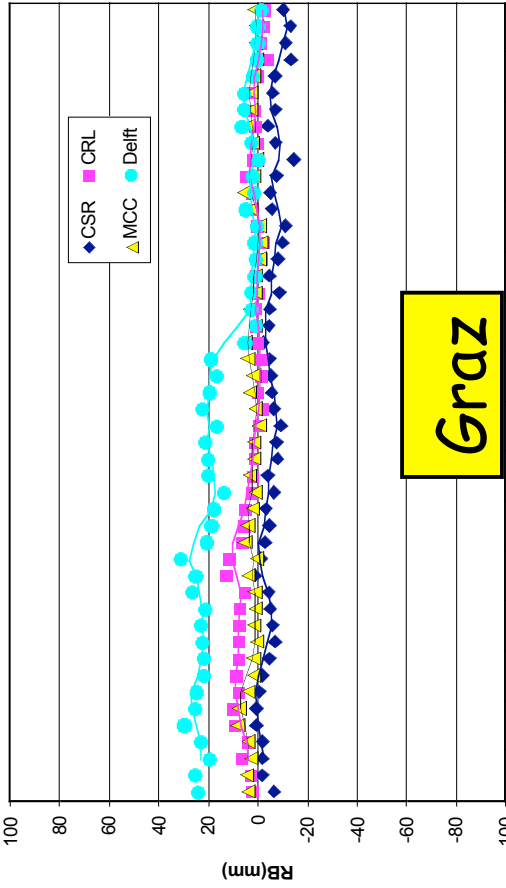
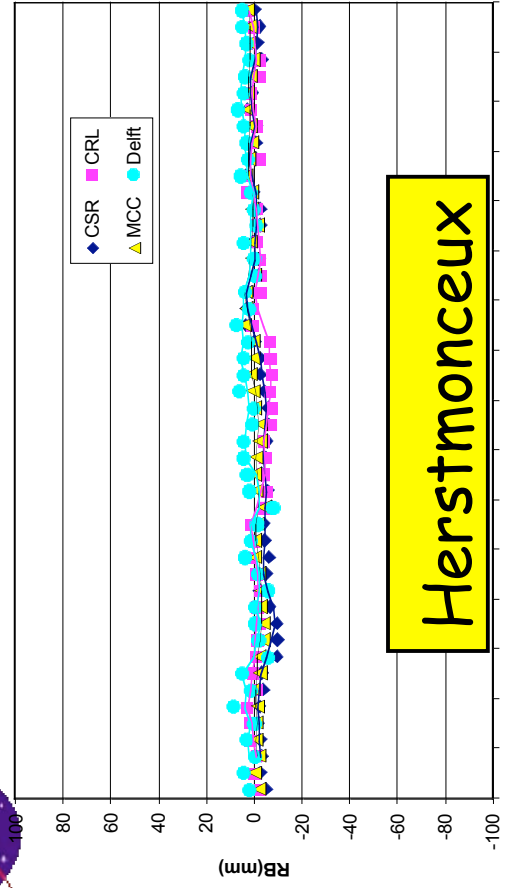


-2.7mm mean difference > Delft pressure truncation
some regional correlations in the differences



QC Results

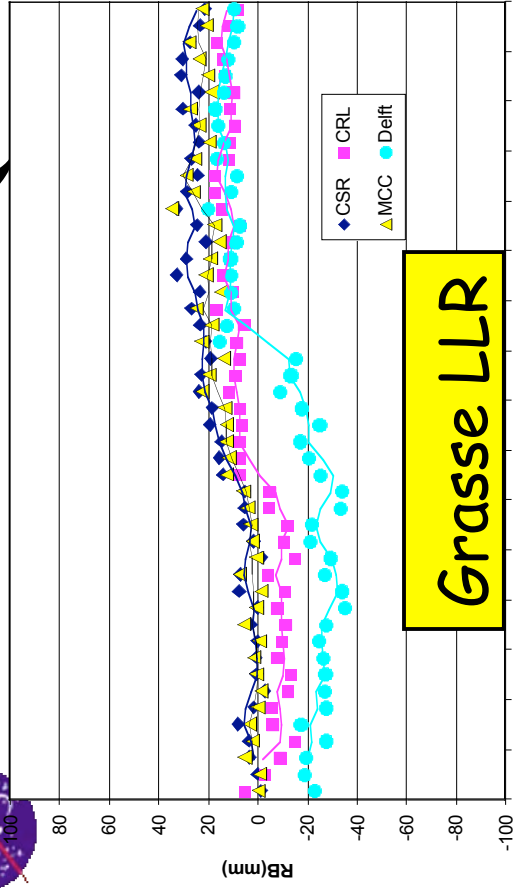
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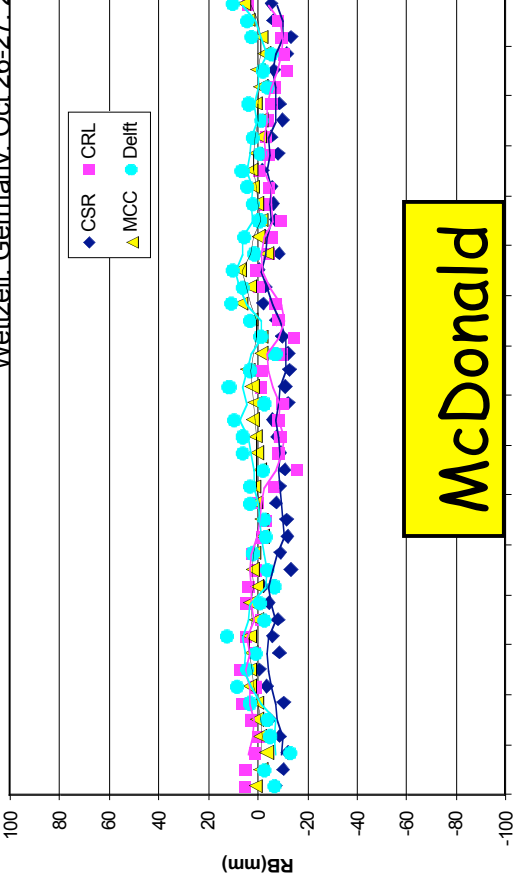


QC Results

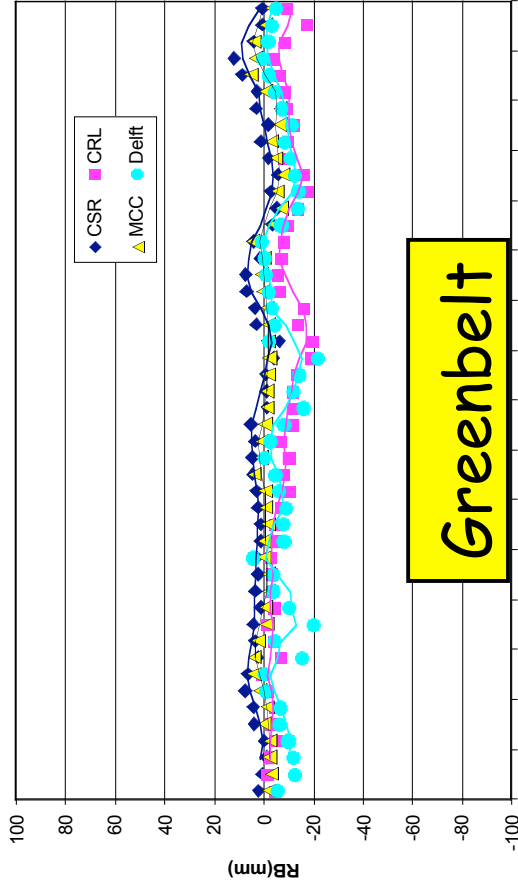
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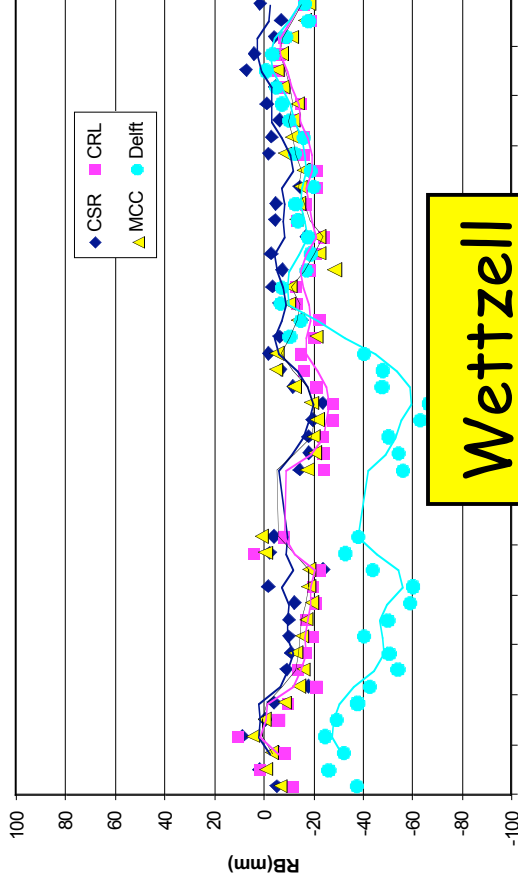
Grasse LLR



McDonald



Greenbelt



Wettzell

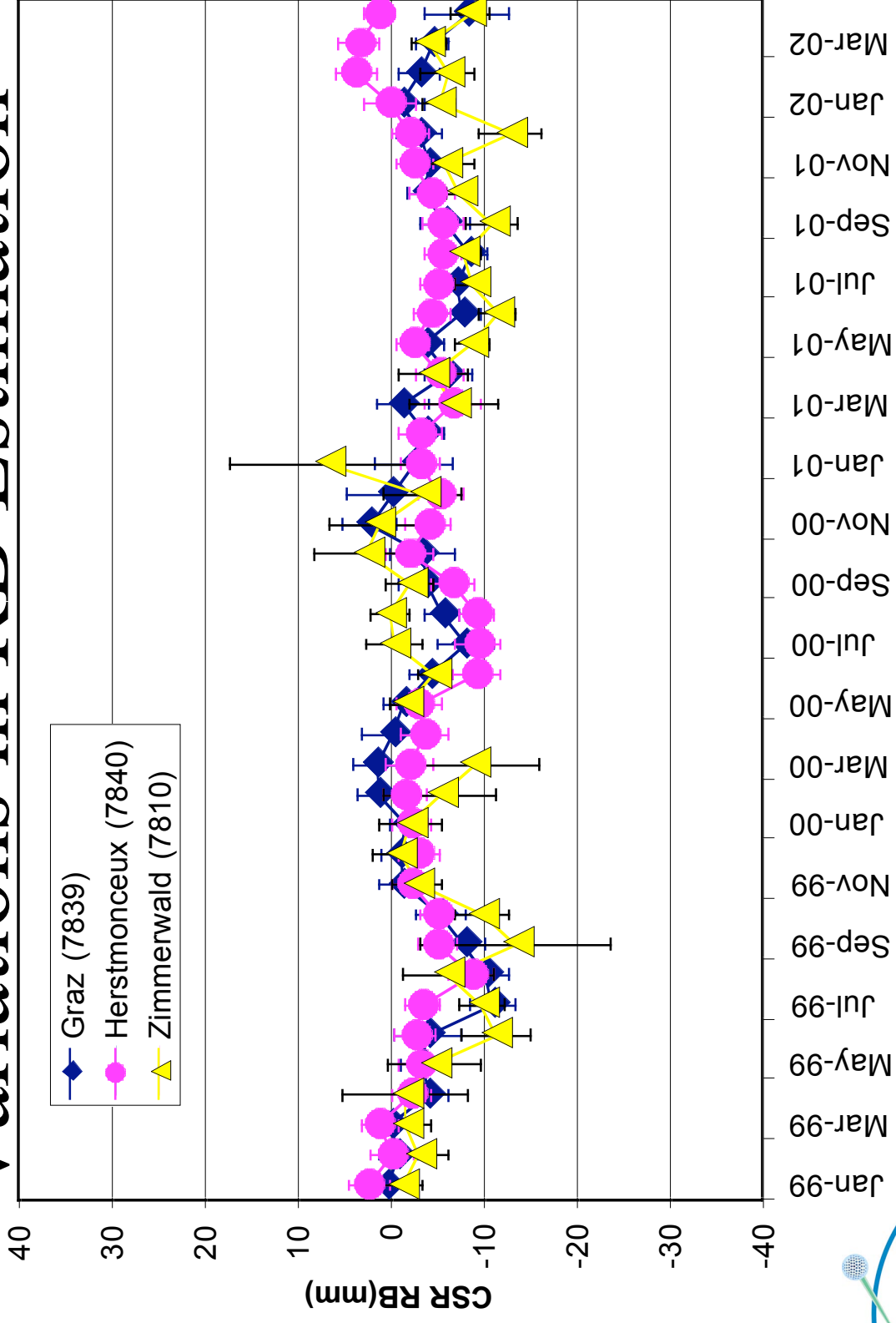


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10mm Seasonal

Variations in RB Estimation





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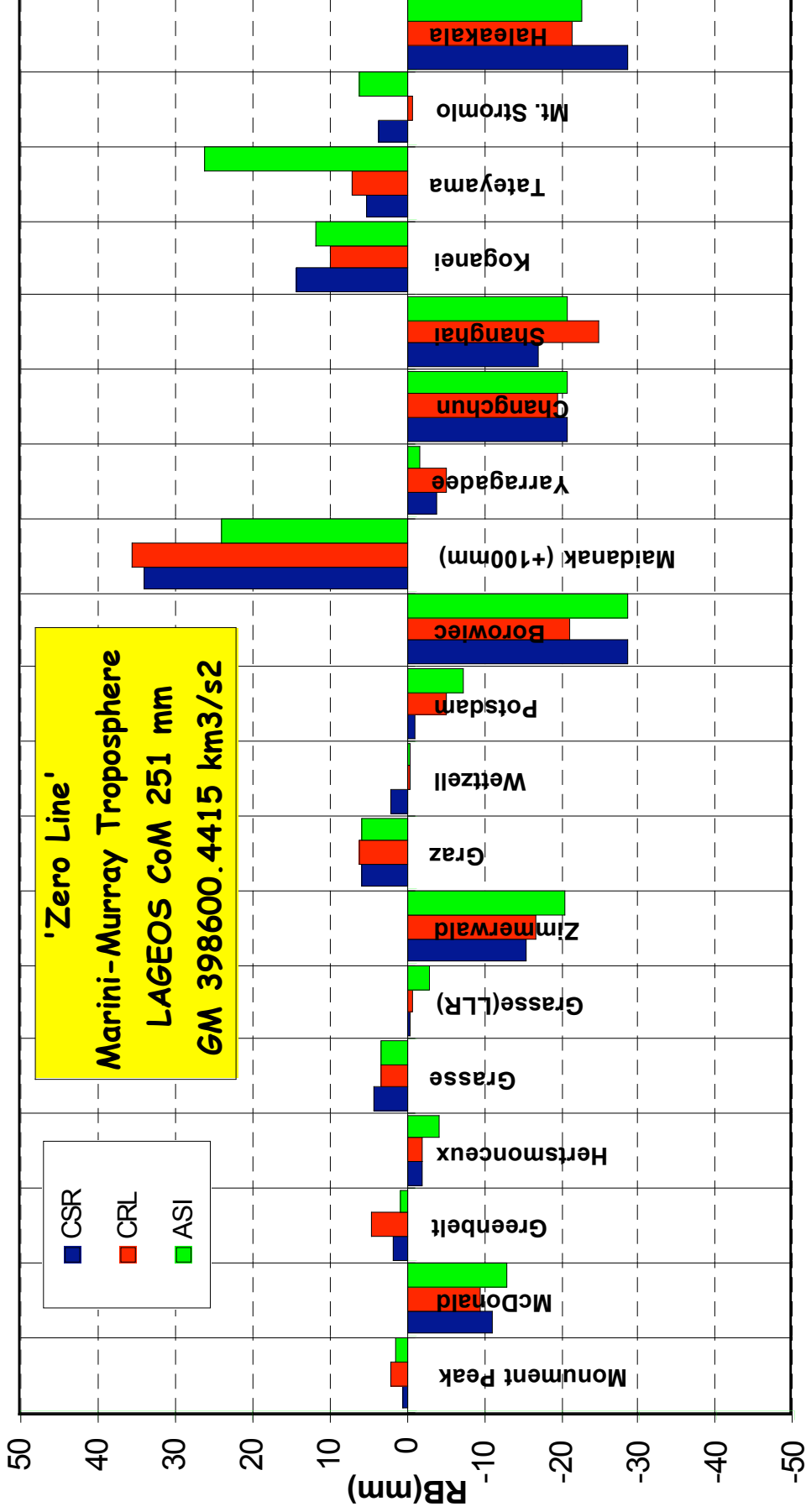
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EOP/POS Pilot Project 1999 Range Bias Estimation Results





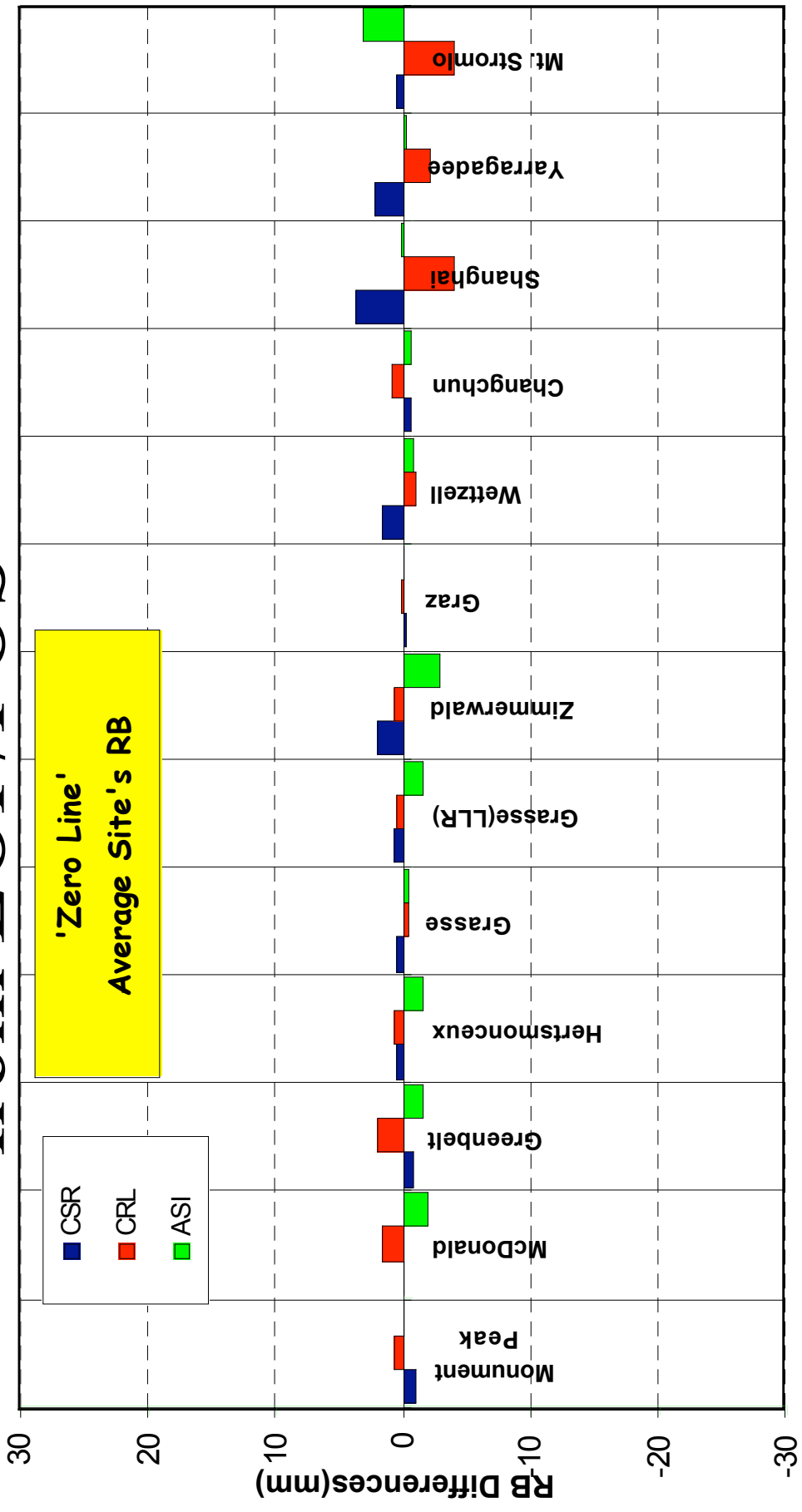
1999 EOP/POS RB Estimates





1999 RBs Differences from EOP/POS

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RB agreement to the few mm level.





QC Conclusions

- Action Items
 - Proper management of 2-color results
 - MCC (analysis and reporting)
 - CSR (add a wavelength flag)
 - Delft (reporting only, do not use FAKE CDP#)
 - Delft implement the new TDF program CSR's QC coordinates need to be refreshed
 - All centers need to document any updates in site coordinates
 - Investigate TB trends (Husson)
- Trend similarities are excellent
- Evidence of seasonal wiggles in the RBs
- Peak-to-peak variations have been minimized
 - Bias estimates since 2002 agree to better than 20mm



ILRS/ILRS CRC Project Contribution JCET/GSFC Report

Ericos C. Pavlis

**2003 ILRS Workshop
October 28-31, 2003**



CRC Contributions



- Four years of **weekly** ILRS SINEX files
- The files contain **POS+EOP only**
 - Modeling is similar to case D of ILRS PP
 - LAGEOS 1 & 2 ILRS NPs for 1999 - 2002 used
 - **Caveats**
 - The solutions were generated from linear shifting of the standard normal equations generated for our multi-year solutions, from the default epoch of 1997.0 to the middle of the week, using the *a priori*, ITRF2000 velocities
 - The “30 NPs or more” rule results in an average of ~23 sites per week
- **Generated SINEX files are on the web (version 4.0)**

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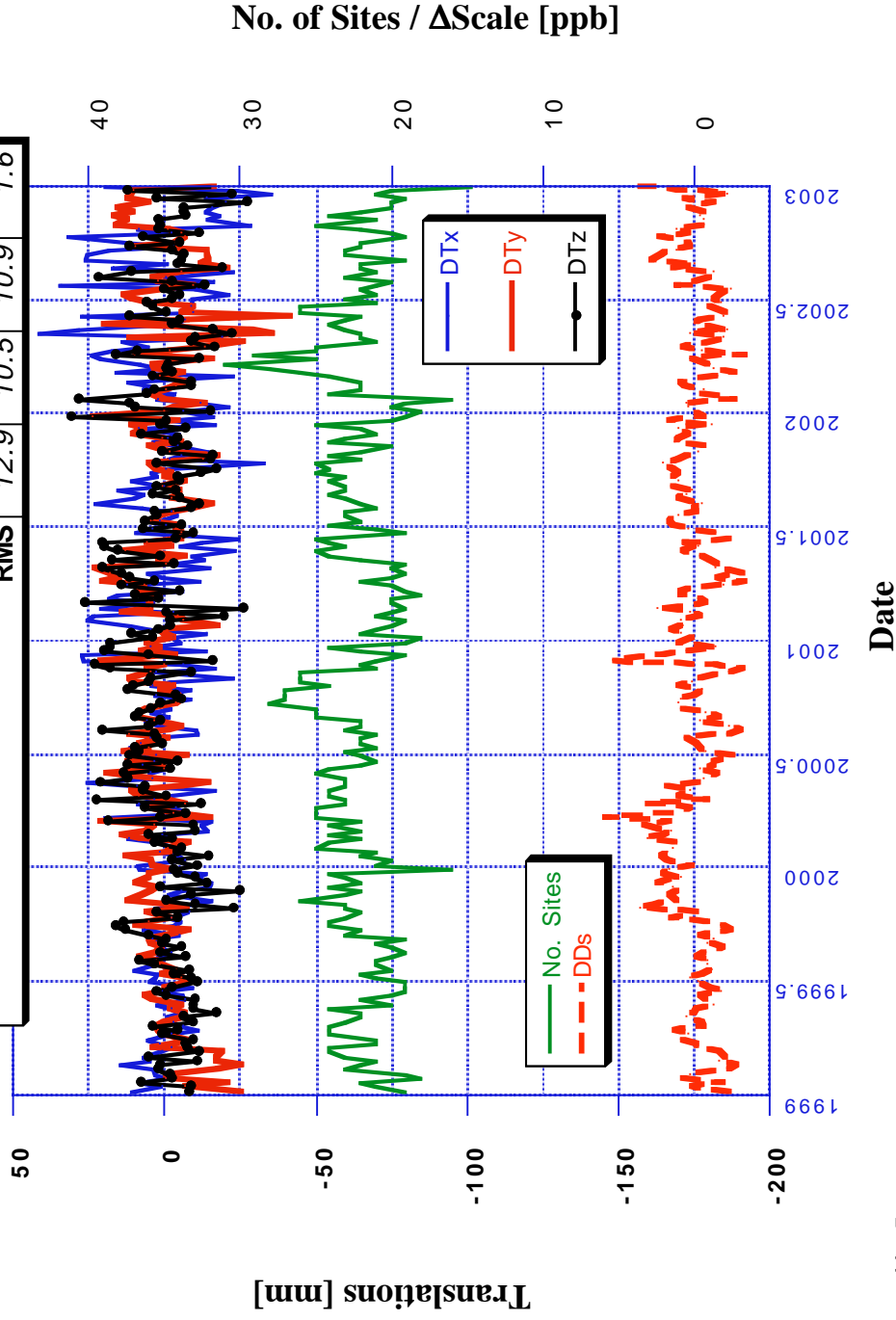
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Helmert Translation and Scale Results



| Detrended Translations [mm] & Scale [ppb] | | DT _x | DT _y | DT _z | DD _s |
|---|--|-----------------|-----------------|-----------------|-----------------|
| Points | | 209 | 209 | 209 | 209 |
| RMS | | 12.9 | 10.5 | 10.9 | 1.6 |

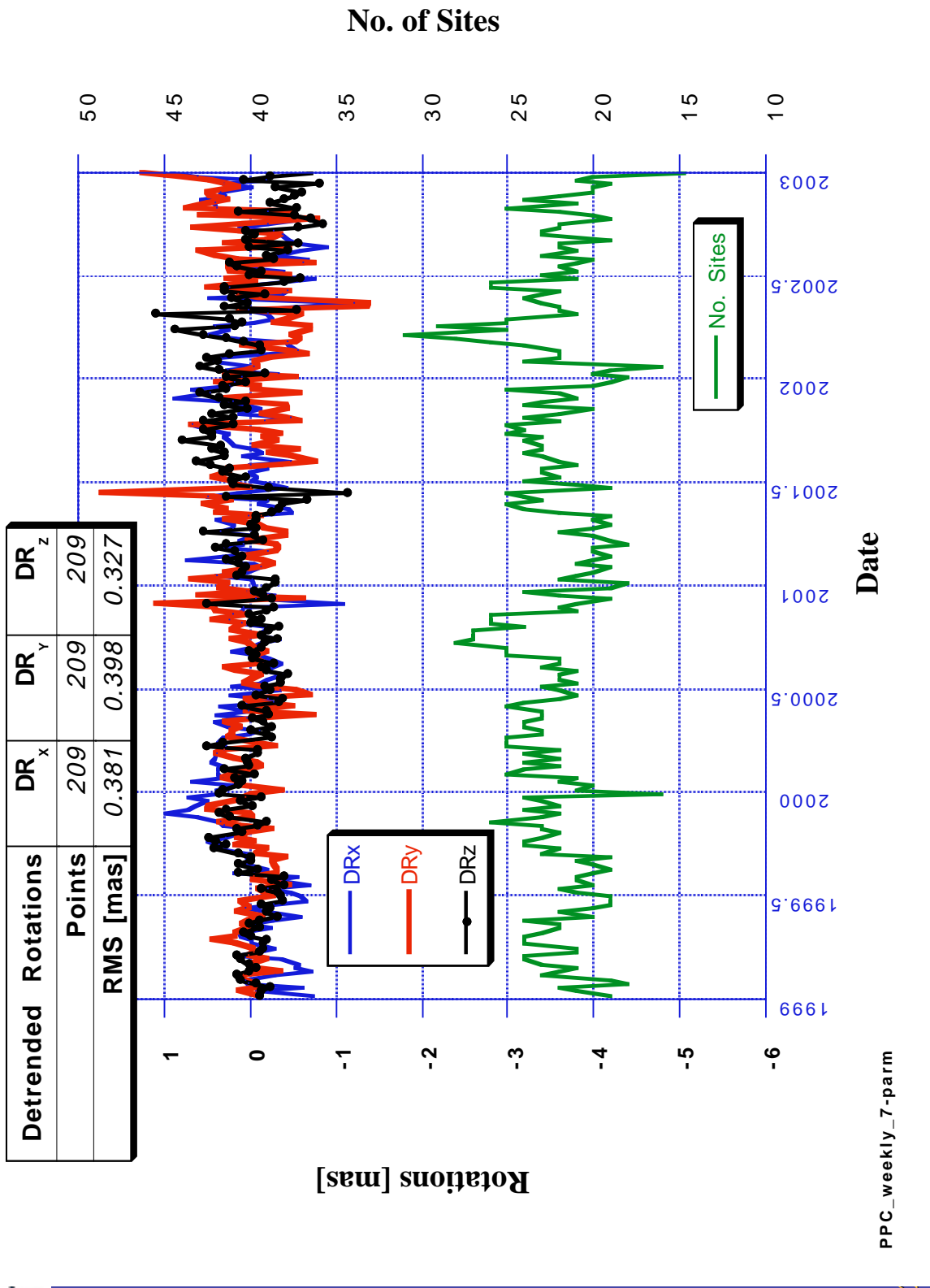


PPC_weekly_7-param

Oct. 2003

EC Pavlis

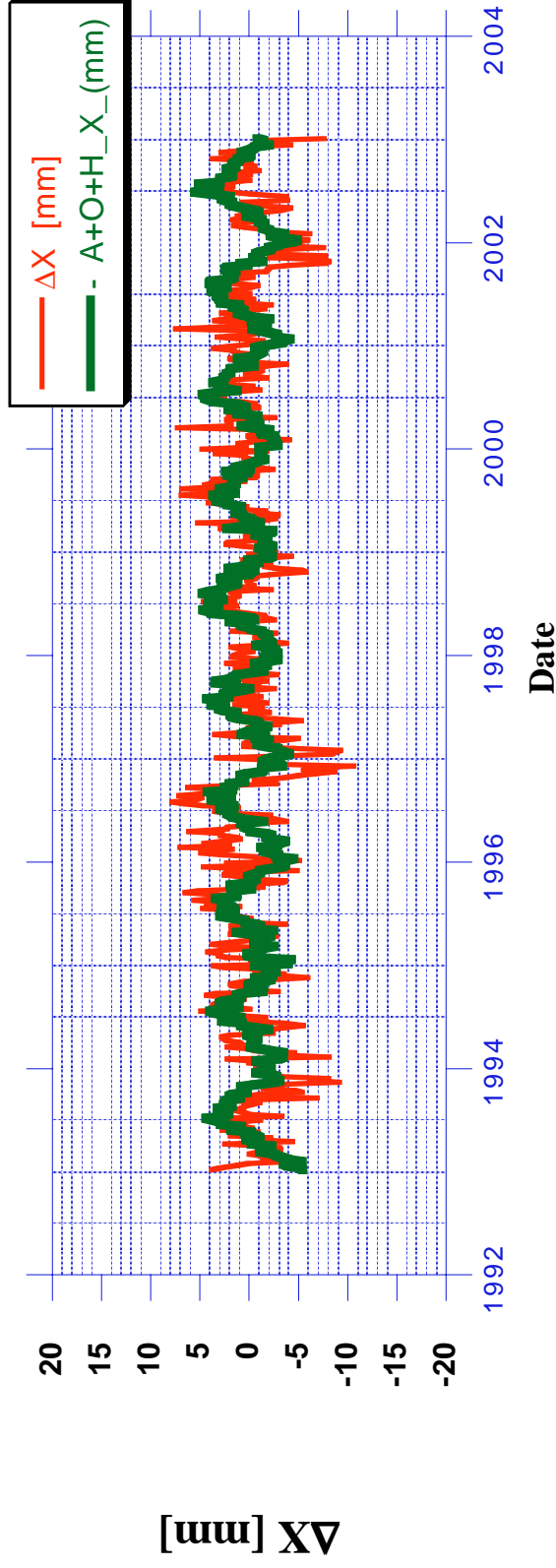
Helmert Rotation Results



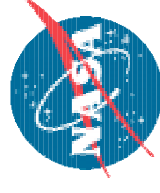
PPC_weekly_7-param

Oct. 2003

JCET SLR Center of Mass Weekly Series
Vs.
Atmosphere + Oceans + Hydrology
from Jianli Chen/CSR



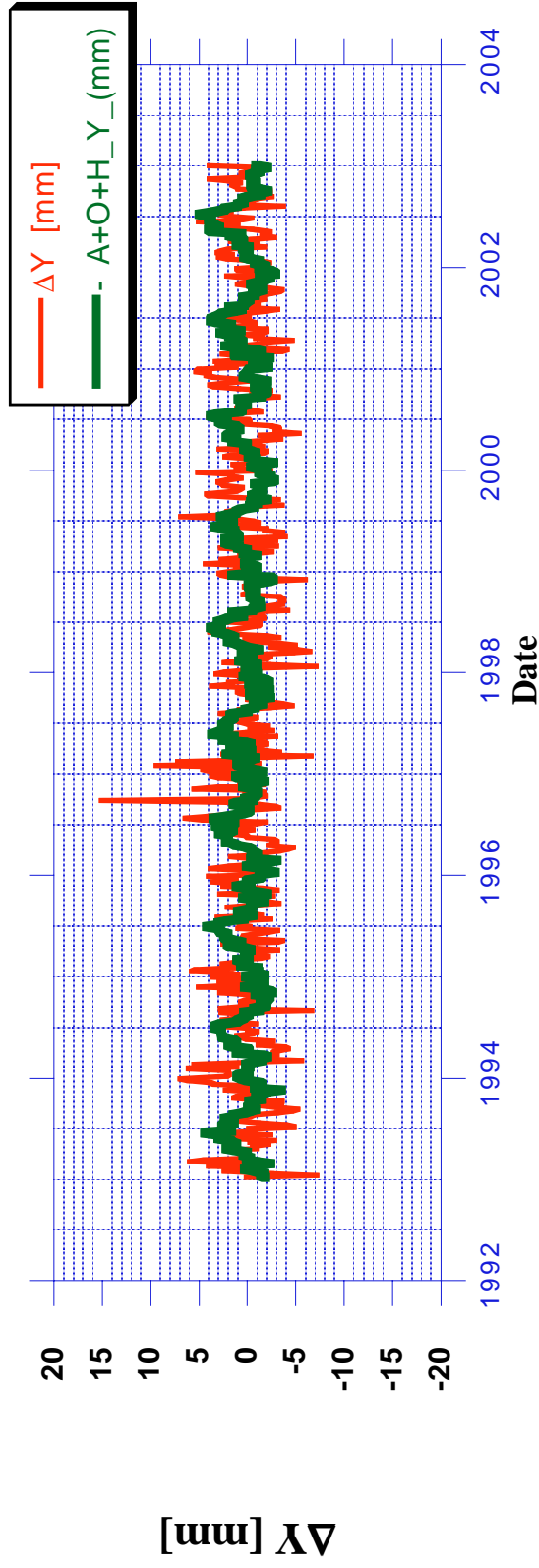
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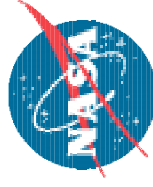
JCET SLR Center of Mass Weekly Series

vs.

Atmosphere + Oceans + Hydrology from Jianli Chen/CSR



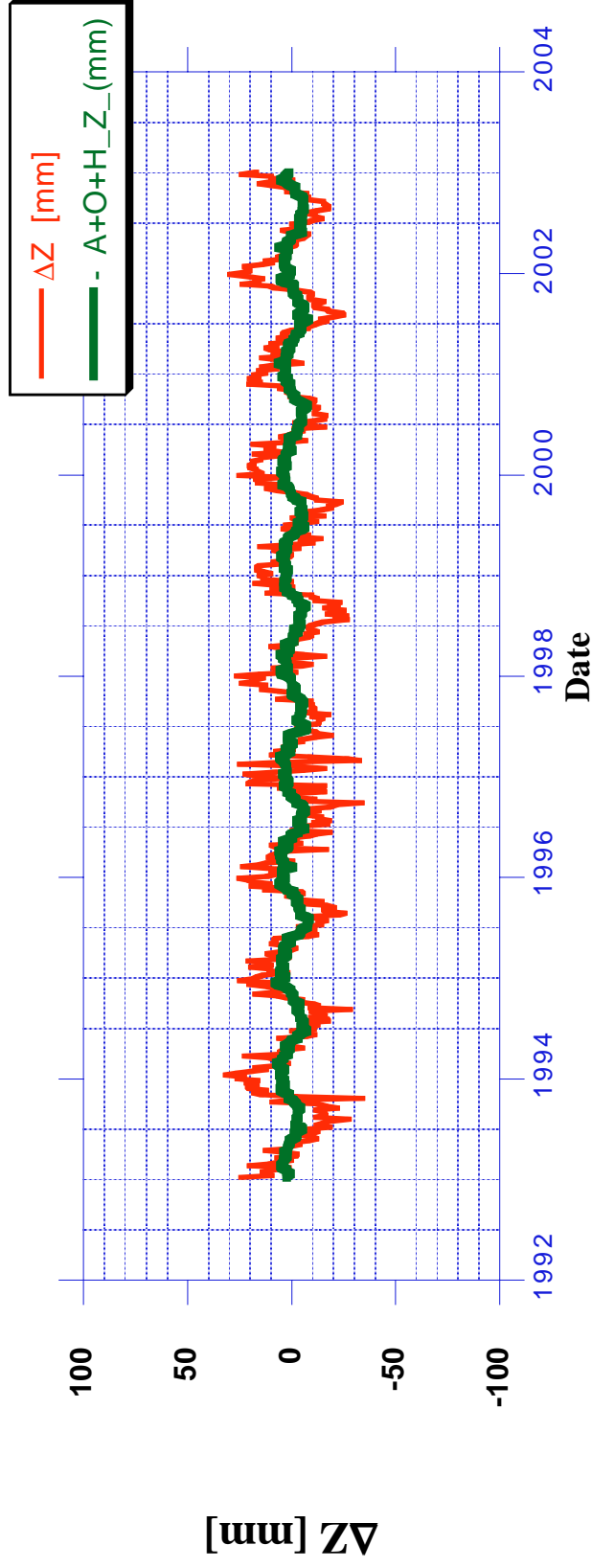
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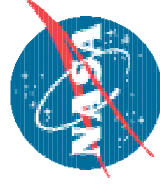
JCET SLR Center of Mass Weekly Series

Vs.

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Where to Download them From:



http://www.jcet.umbc.edu/~epavlis/interdisciplinary.html#SLR_SINEX

Oct. 26, 2003

E C Pavlis



CRC Summary



- Contributed *209 weekly SINEX* files from LAGEOS 1 & 2 for *1999 - 2002* to the IERS CRC PP
- Version 4.0 referenced to mid-week epoch, after it was originally generated with epoch *1997.0*
- **New version by early November (mid-week referenced)**
- **Optimal selection of sites, data thinning, and “loose” constraints for weekly solutions are still under investigation, along with the issue of EOP rates.**

Oct. 26, 2003

E C Pavlis