MCC ANALYSIS PROCEDURE OF THE SLR DATA QUALITY AND STATIONS PERFORMANCE.

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San-Fernando, 14th Workshop
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- Problem formulation
- MCC standard procedure for SLR data analysis
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- Recommendations

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Question from Kazimirs Lapushka to Van Husson and ACs: *"Is that a Stations errors?"*

Riga station RB LAGEOSes 1&2 2001-2002
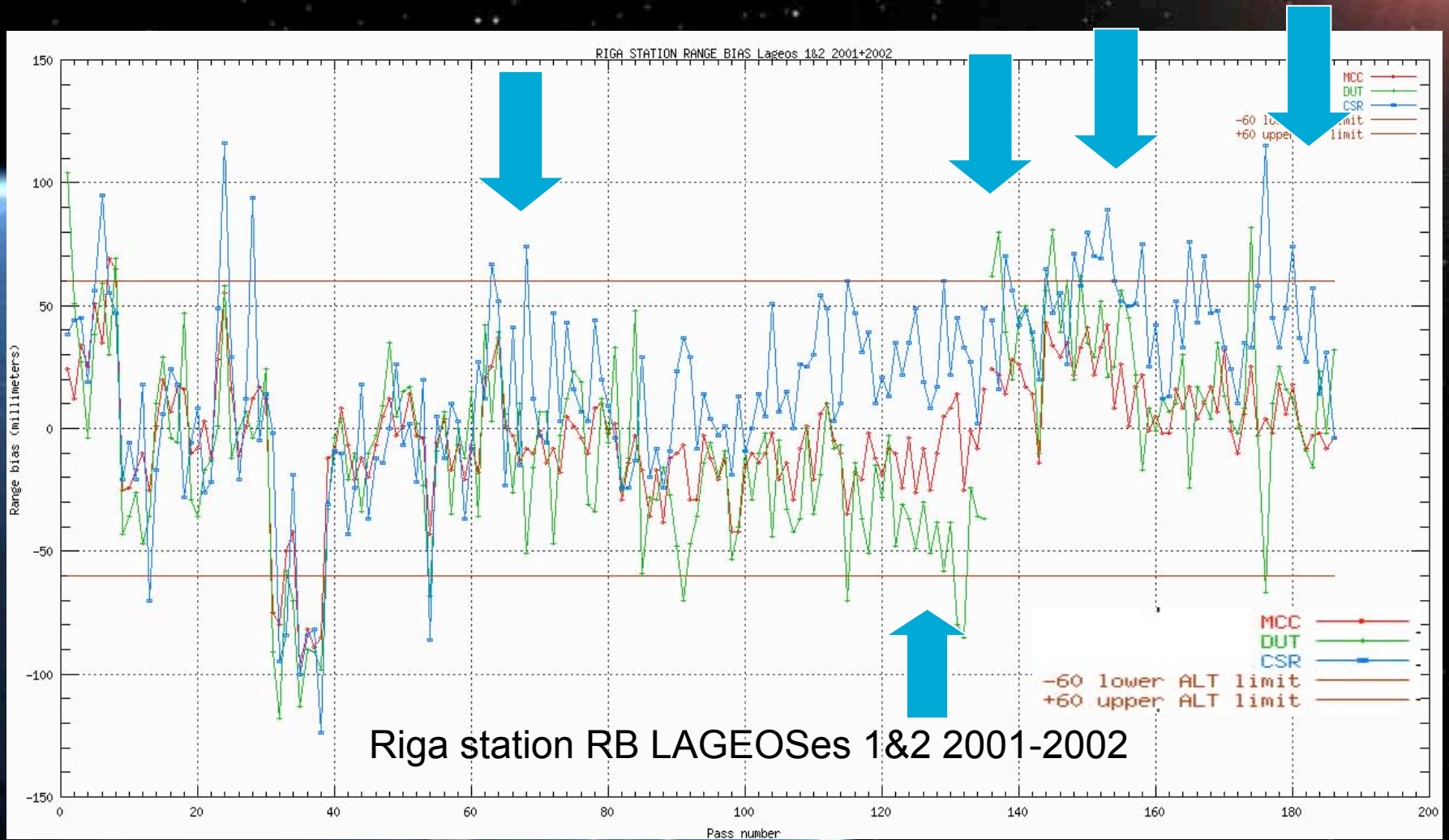
Combined Range Bias Report (1 part)
Compiled by: SLR Observatory Zimmerwald
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```
-------------------------------------------------------------------------
Station 7090                     CSR          NIC          SAO          MCC
                     sc     rb     pr     rb     pr     rb     pr     rb     pr
-------------------------------------------------------------------------
7090 2004-04-19 06:59 L1     10     2    -38     4                       *      *
7090 2004-04-19 10:44 L1    -10     2     17     1     -2     6     -7     1
7090 2004-04-19 12:30 L2      2     2     -4     1     -6     2      2     2
7090 2004-04-19 16:40 L2     -3     2    -10     2      3     2      0     3
7090 2004-04-20 09:18 L1      8     2    -11     2     -7     2     -3     2
7090 2004-04-20 14:44 L2     -3     1    -26     1    -20     1      *      *
7090 2004-04-20 21:49 L1      0     3    -16     2    -14     1      7     1
7090 2004-04-21 07:56 L1      2     3    -25     2     -5     2     -3     2
7090 2004-04-21 11:29 L1      2     1     30     1     10     2     -6     2
7090 2004-04-21 12:45 L2     -3     2    -25     1      0     1     -4     2
7090 2004-04-21 16:25 L2     -4     1    -12     1     18     0      *      *
7090 2004-04-21 20:22 L1     -1     1    -17     1     -5     1      0     2
7090 2004-04-21 21:15 L2     -4     2    -14     1      1     1     -6     3
```

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Combined Range Bias Report (2 part)
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```
------------------------------------------------------------------
Station 1864              CSR          NIC          SAO          MCC
                  sc     rb    pr     rb    pr     rb    pr     rb    pr
------------------------------------------------------------------
1864 2004-04-19 20:27 L1  -24     8     -9     9      9     9      6     5
1864 2004-04-22 19:53 L1  -92    12    -61    12      *     *    -28     7
------------------------------------------------------------------

------------------------------------------------------------------
Station 1893              CSR          NIC          SAO          MCC
                  sc     rb    pr     rb    pr     rb    pr     rb    pr
------------------------------------------------------------------
1893 2004-04-19 19:22 L2   60    14      3    40     23    22      5    21
1893 2004-04-19 20:34 L1  -40    30     18    30      *     *     18     4
1893 2004-04-20 17:38 L2   28     3     83     4      *     *      *     *
1893 2004-04-22 20:15 L1  -13    11    -26    15     26    10     -4    12
------------------------------------------------------------------
```

MCC analysis procedure of the LAGEOSes data :

➢ *"Bad" points rejection (automatic or manual)*

➢ *Precise orbits determination*

➢ *The measurements residuals calculation*

➢ *The different statistics calculation (ME, RMS, ORMS etc.)*

➢ *The* **<u>attempts (!!!)</u>** *to interpret the measurement residuals as function of the Range Bias and Time Bias*

➢ *"MCC Residual Analysis Report" preparation*

Comments to Residual Analysis Report

Russian Mission Control Center
Residual Analysis Report

Maidanak (1864   NP)

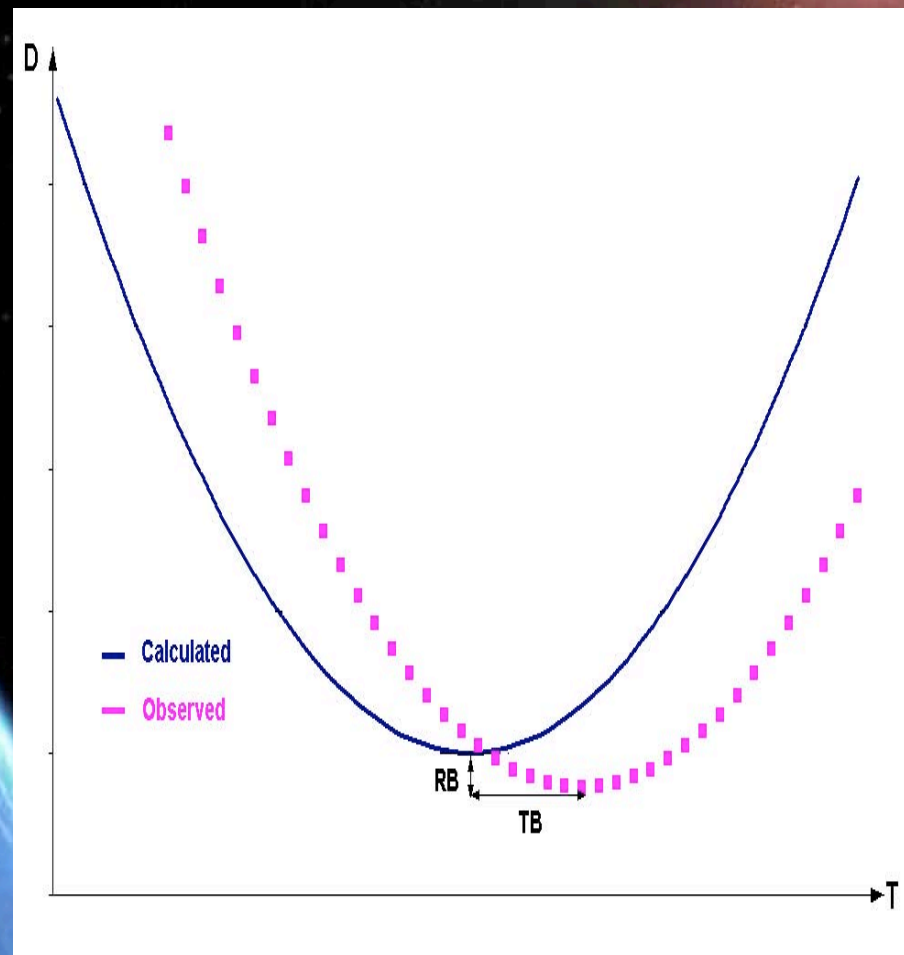|	TTL	INC	ME	RMS	ORMS		TB	RB	PRMS	SCI
			mm	mm	mm		us	mm	mm	
1864 …	06	05	8	16	17	…	17	22	4	0
1864 …	10	07	8	17	20	…	18	6	5	0
1864 …	10	07	−28	10	32	…	8	−28	7	0

━━━━ **From orbits**
━━━━ **From polynomial**

RB and TB estimation procedure
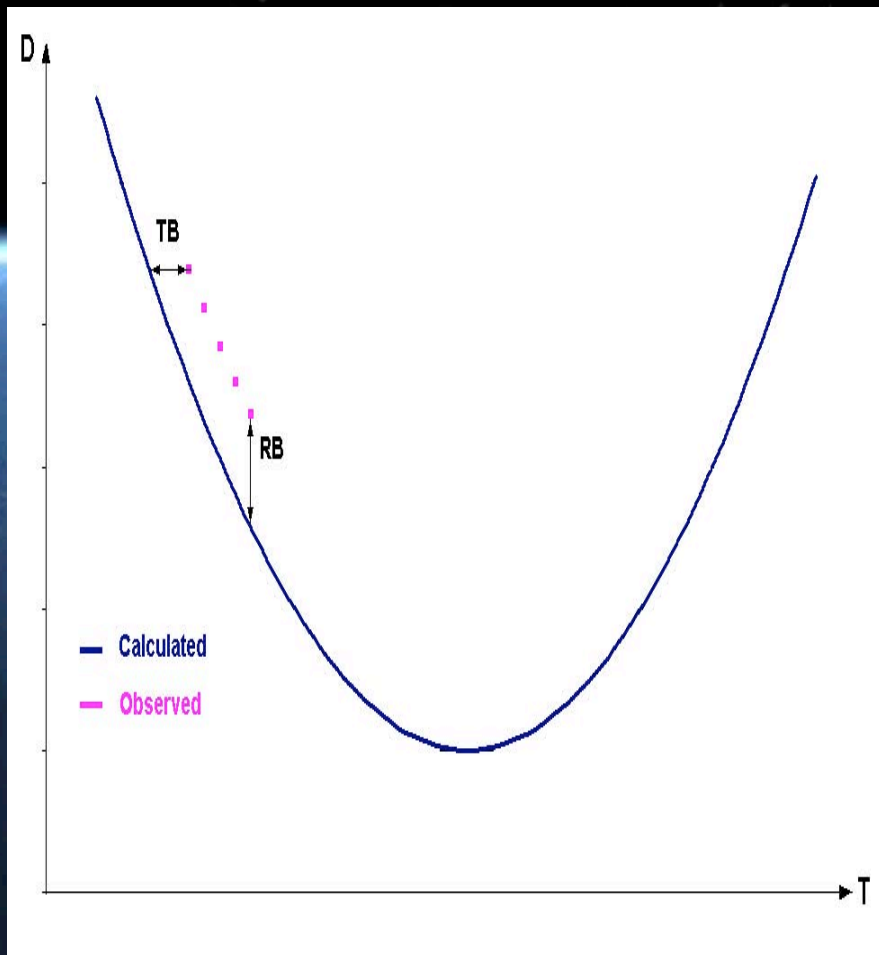
Ambiguous results for the short passes Precise results for the long passes

Differences in the final precise orbits

Residuals are summarized for the following 3-day arcs: wtd rms(cm)
LAG-1 LAG-2   3-DAY ARC   04/05/21 12.00 - 04/05/24 12.00   1.5
LAG-1 LAG-2   3-DAY ARC   04/05/22 12.00 - 04/05/25 12.00   1.4
LAG-1 LAG-2   3-DAY ARC   04/05/23 12.00 - 04/05/26 12.00   1.4

Mc Donald (7080 NP)

		TTL	INC	ME	RMS	ORMS		TB	RB	PRMS	
SCI											
				mm	mm	mm		us	mm	mm	
7080	…	05	04	-1	8	8	…	-20	-1	4	2
7080	…	05	04	-8	7	12	…	-14	-8	4	2
7080	…	05	04	-17	7	21	…	-14	-17	4	2
7080	…	04	03	-3	5	6	…	*	*	4	2
7080	…	04	03	2	5	6	…	*	*	4	2
7080	…	04	03	-10	6	14	…	*	*	4	2
7080	…	15	15	8	3	8	…	1	7	3	2
7080	…	15	15	7	8	10	…	6	-2	3	2
7080	…	15	15	8	8	12	…	7	-2	3	2

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Main reasons of the RB&TB differences:

- Different SLR stations coordinate sets
- Differences in the "bad" points rejection procedures
- Differences in the final precise orbits
- Incorrect attempts to interpret the measurement residuals as function of RB&TB

Tracking recommendations for stations:

- Both ascending and descending branches tracking (Especially for calibration);

- Min 10-minutes session duration for Lageoses and 5-minutes for low orbiters;

- Min 6 QLNP per one pass;

- Min 20 deg elevation;

- As much session duration as possible (especially for calibration and precise TB and RB estimation).

Recommendations for Analysis Centers:

- Coordination in the main methodology questions by the SLR data analysis;

- Agreement of the stations coordinates sets;

- Coordination in the RB&TB understanding for the both (long and short) passes;

- Separation of the short and long (calibrating) passes estimation;

- Timely and quickly contacts with other Analysis Centers in the case of necessity based on the concrete ILRS solution and recommendations