



Federal Agency for
Cartography and Geodesy



Some Aspects of BKG's SLR Contribution to ITRF2020

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Solution Characteristics

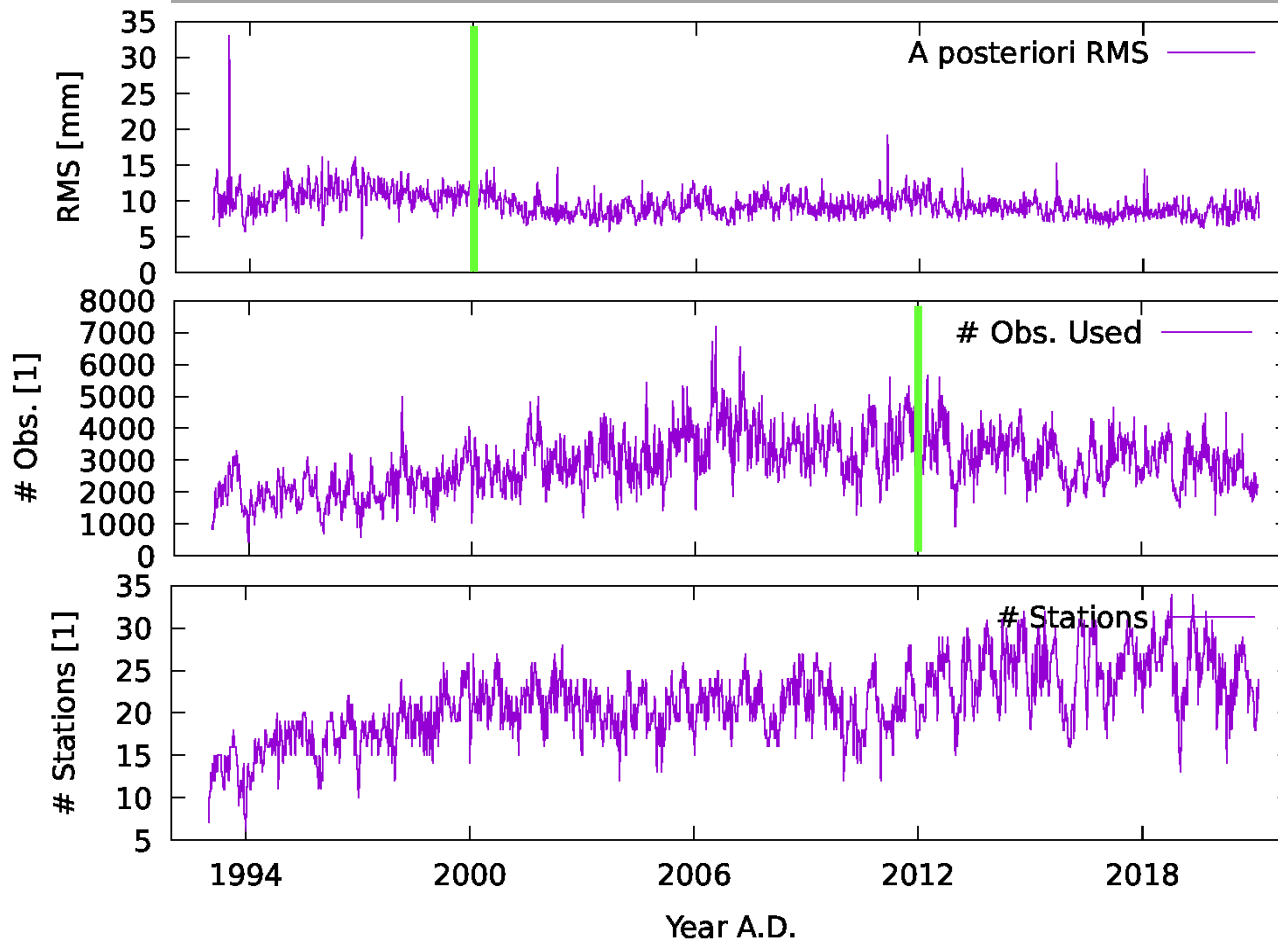
Setup

Time span	: 1993-2020
LAGEOS-only	: 1993-1999
LAGEOS+Etalon	: 2000-2020
Parametrisation	: as for ITRF2020 reprocessing
Modified Datum Definition:	NNR instead of Loose Constraints
Software used	: Bernese 5.3 (SLR version)
Output	: 1468 weekly solutions (time series)

Hereafter called „**BKG-SLR-2020**“

Results: Solution Statistics

A posteriori RMS: overall indicator of solution quality



Stable quality
as of 2000

... despite
decreasing amount
of observations
as of 2012

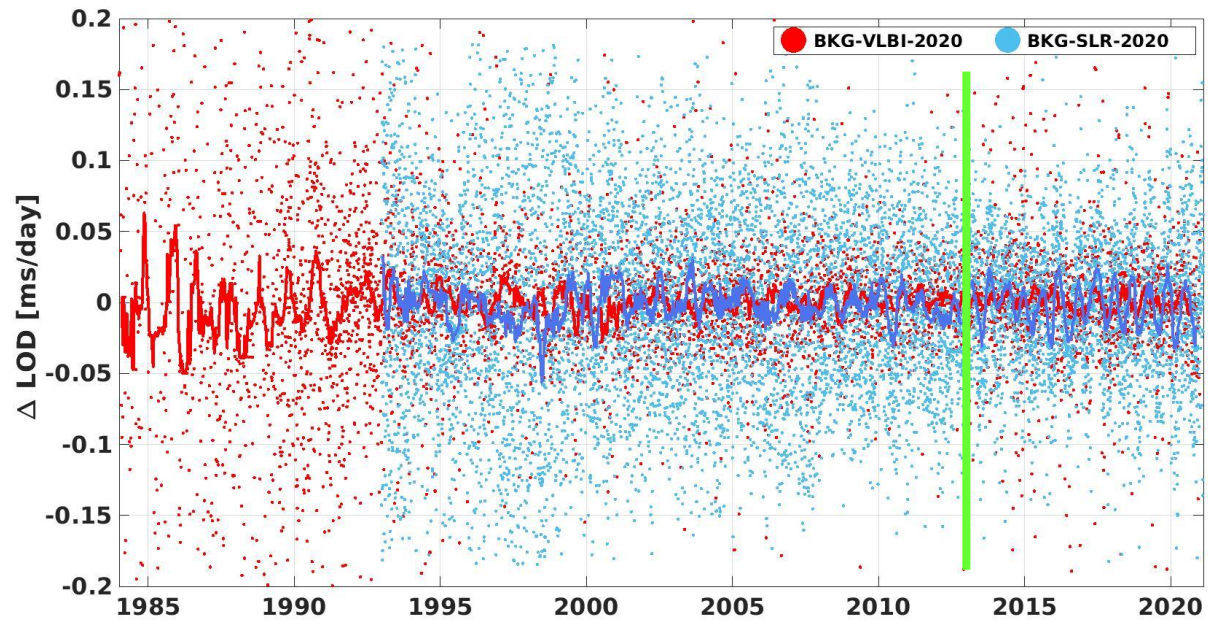
... supported by
increasing amount
of stations

Results: ERP / Length of Day (LOD)

solid lines:
moving median filter
(90 d)

VLBI	SLR
WRMS [ms/d]	
.028	.048

Difference wrt C04(2014)



- overall : **no bias, good agreement**
- 1993-2012: similar scatter / 2013-2022: higher scatter for SLR

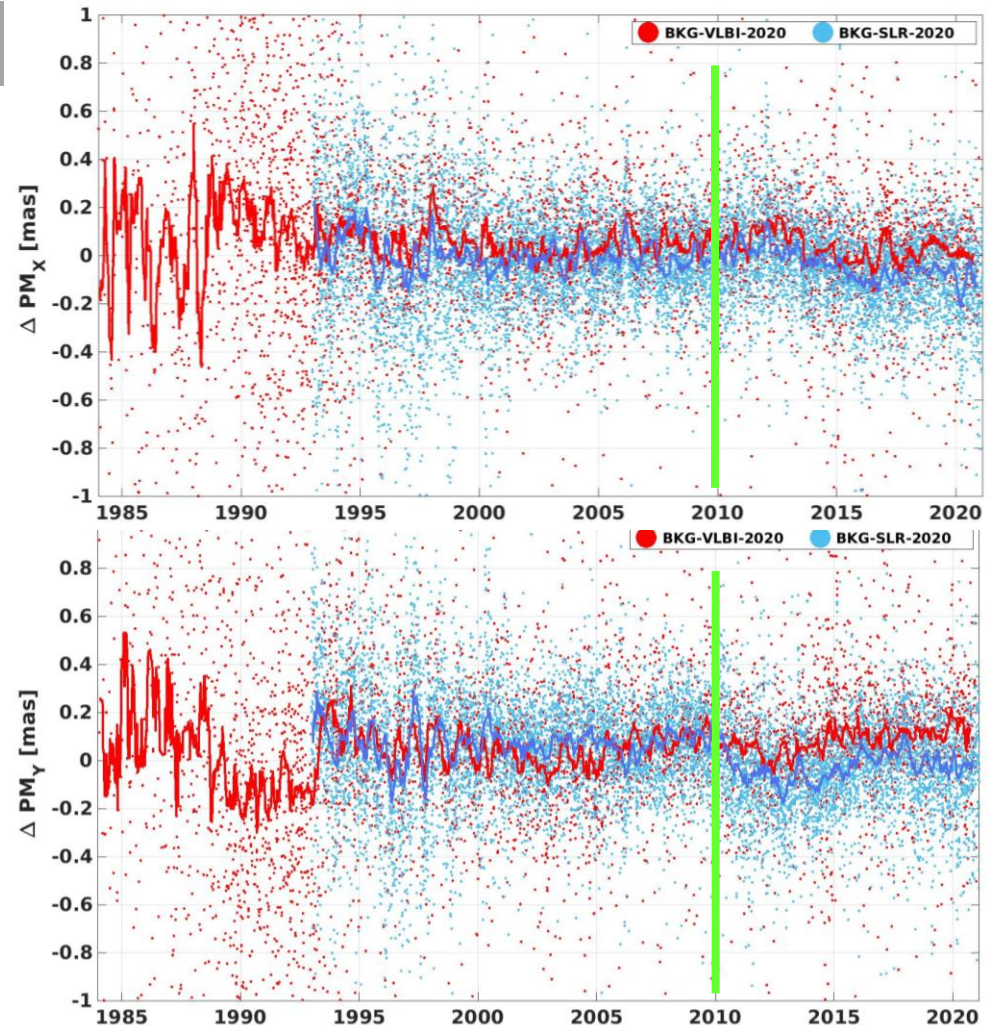
Results: ERP / Polar Motion

Difference wrt C04(2014)

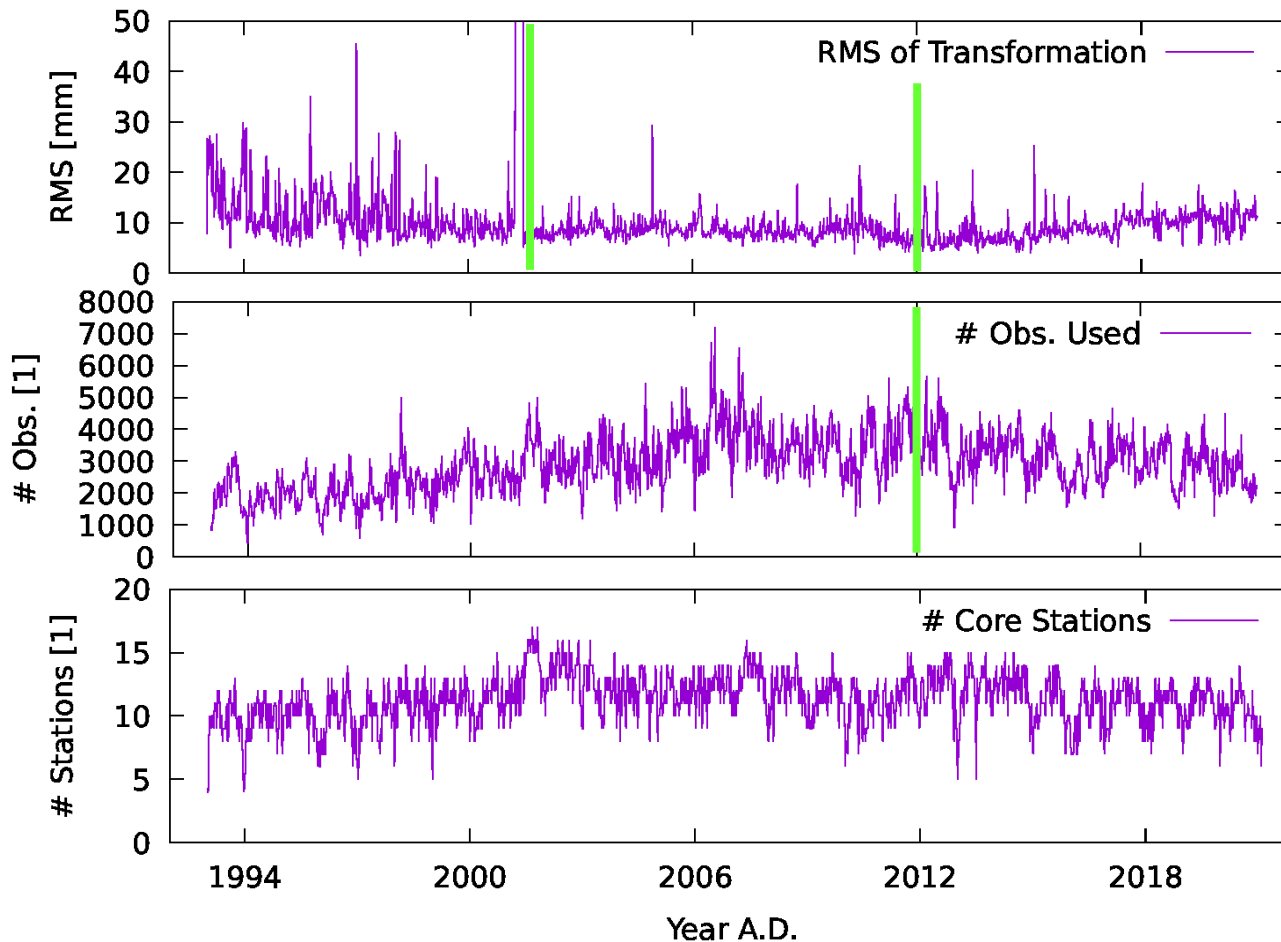
solid lines:
moving median filter (90 d)

	VLBI	SLR
	WRMS [mas]	
PM _x	.208	.185
PM _y	.266	.187

- **1993-2009:**
similar scatter, no bias
good agreement
- **2010-2022:**
similar scatter, bias!



Results: Helmert Transformations wrt ITRF2014 / Quality

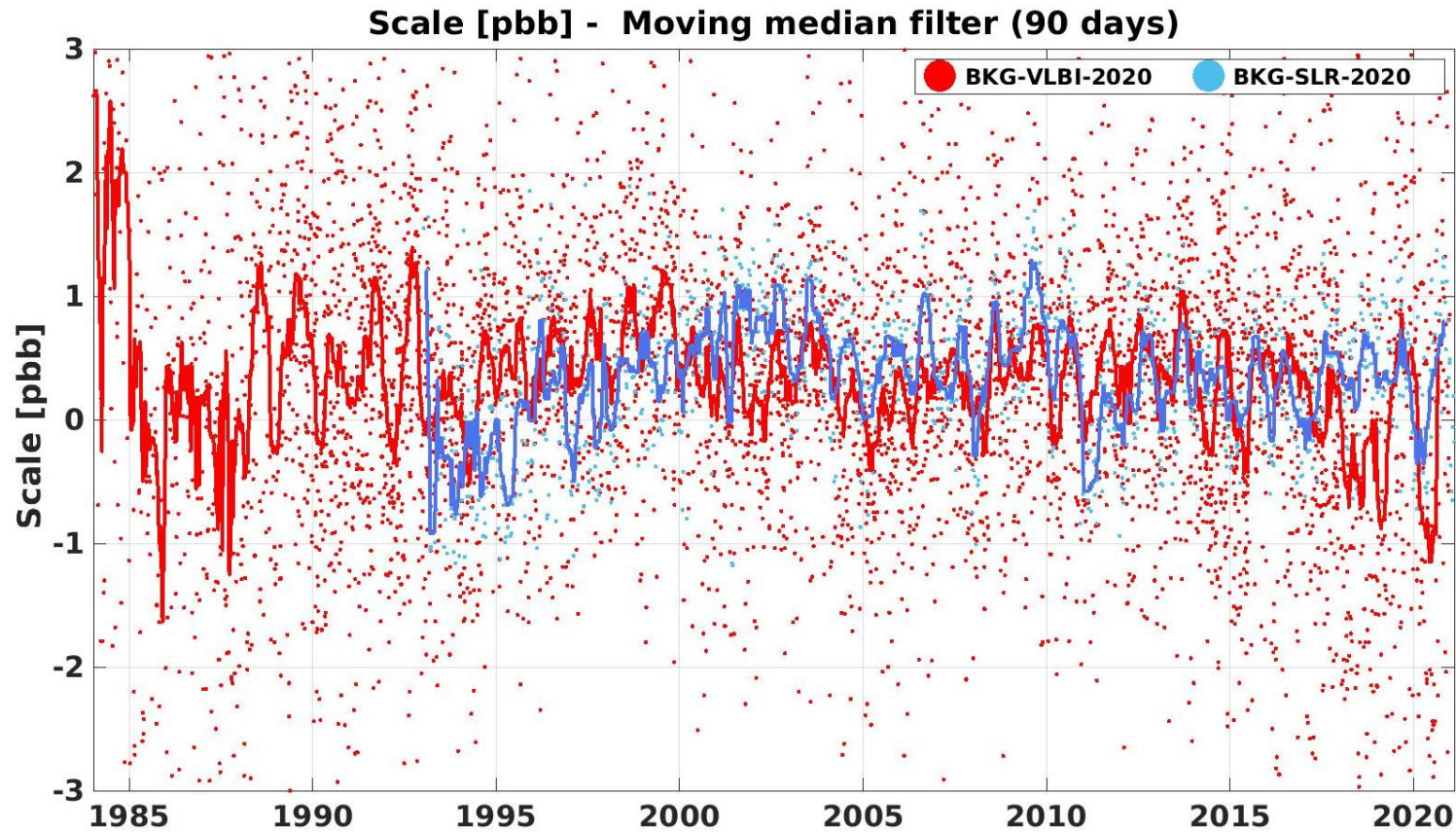


Stable quality
as of 2002,
Slightly degrading
as of 2012

... mainly related to
the amount of
observations

... supported by
stable amount of
core stations

Results: Helmert Transformations wrt ITRF2014 / Scale



VLBI	SLR
.97	.61

WRMS [ppb]

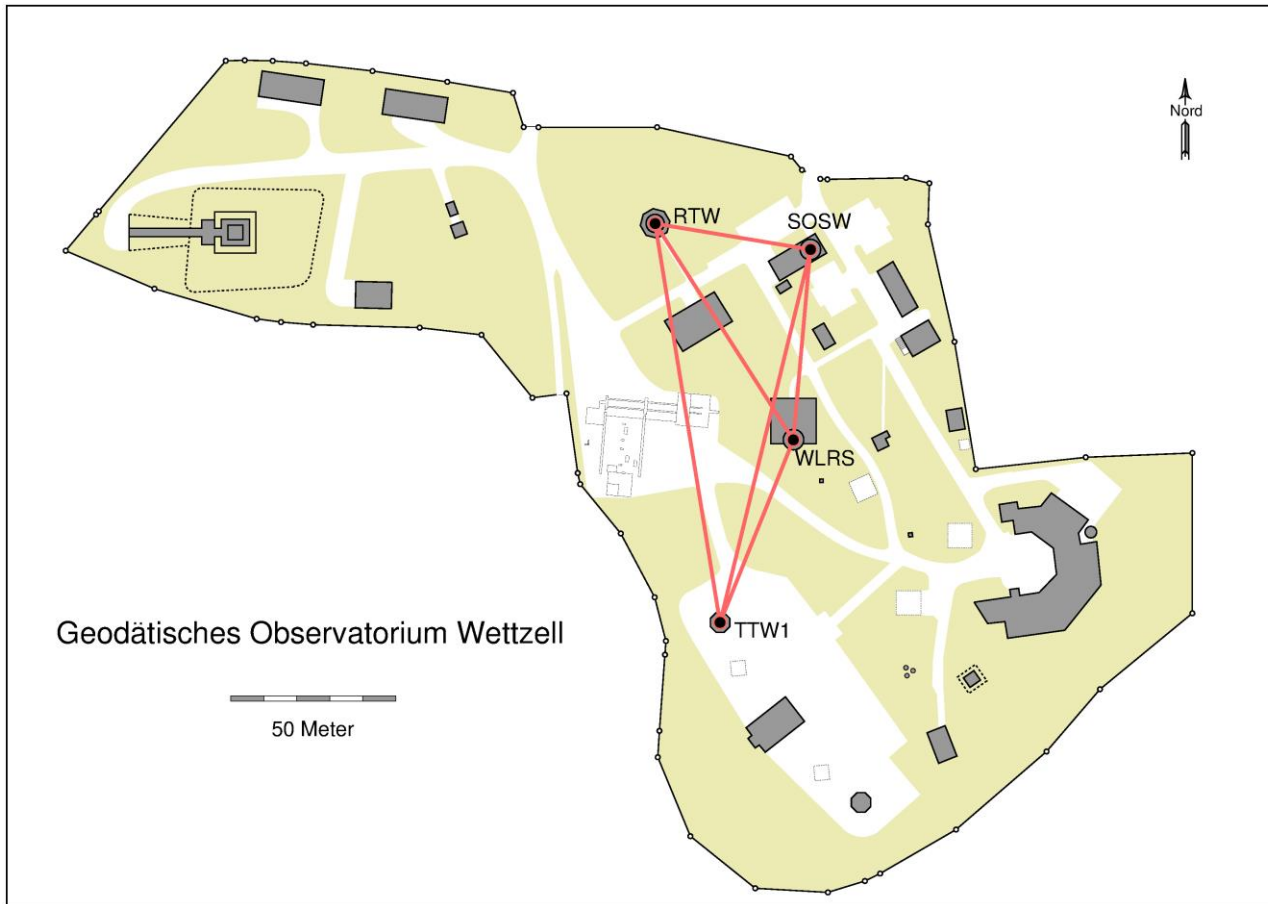
.97

.61

no significant bias, similar scatter -> **good agreement**

Wetzell: Local Ties

Local tie network between RTW, TTW1, WLRS, SOSW



Station	Technique
RTW	VLBI
TTW1	VLBI
WLRS	SLR
SOSW	SLR

Plot kindly provided
by Thomas Kluegel

Wetzell: Local Ties

Pair	Calculated from BKG-SLR-2020 BKG-VLBI-2020	Terrestrial Surveying	Difference 1-2
	Mean [m] ± STD [mm]		[mm]
	1	2	3
RTW-TTW1	123.309 ± 3.3	123.307 ± 0.8	2
RTW-WLRS	77.357 ± 10.0	77.358 ± 0.8	-1
RTW-SOSW	48.192 ± 6.4	48.191 ± 0.6	1
TTW1-WLRS	61.014 ± 9.8	61.010 ± 0.7	4
TTW1-SOSW	118.285 ± 10.1	118.283 ± 0.7	2
SOSW-WLRS	58.445 ± 5.9	58.445 ± 0.7	0

Max. difference: 4 mm (TTW1-WLRS)

Min. difference: 0 mm (SOSW-WLRS)

Conclusions

- Modified solution „BKG-SLR-2020“ (time series, w. NNR)
- Stable quality of solutions (a post. RMS 10 mm)
- Good agreement wrt BKG-VLBI submission (LOD, Scale)
- Good agreement of local ties at Wettzell (≤ 4 mm)

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Thank you for your kind attention!

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