



DORIS positioning: performance assessment from the last data processing at CNES/CLS Analysis Center

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- 1. About the data processing**
- 2. Positioning performances assessment**
- 3. Contribution of each generation of instruments**
- 4. Summary**

Reprocessing:

In the second half of 2011, the CNES/CLS Analysis Center (LCA) has entirely re-processed the whole DORIS data set for orbit determination and tracking station coordinate estimation.

Motivations:

- revised attitude laws for Topex/Jason-1/Jason-2, Envisat and Cryosat-2
- fixed bug related to the frequency bias
- new macro-model tuned by GRGS for Jason-2

Changes in standards (wrt previous processing set up for IDS-3):

- DPOD2008 as a priori instead of DPOD2005
- IERS EOP series aligned on ITRF2008
- GMF/GPT tropospheric model instead ECMWF + Guo&Langley MF
- EIGEN-6S gravity model instead of EIGEN-GL04S

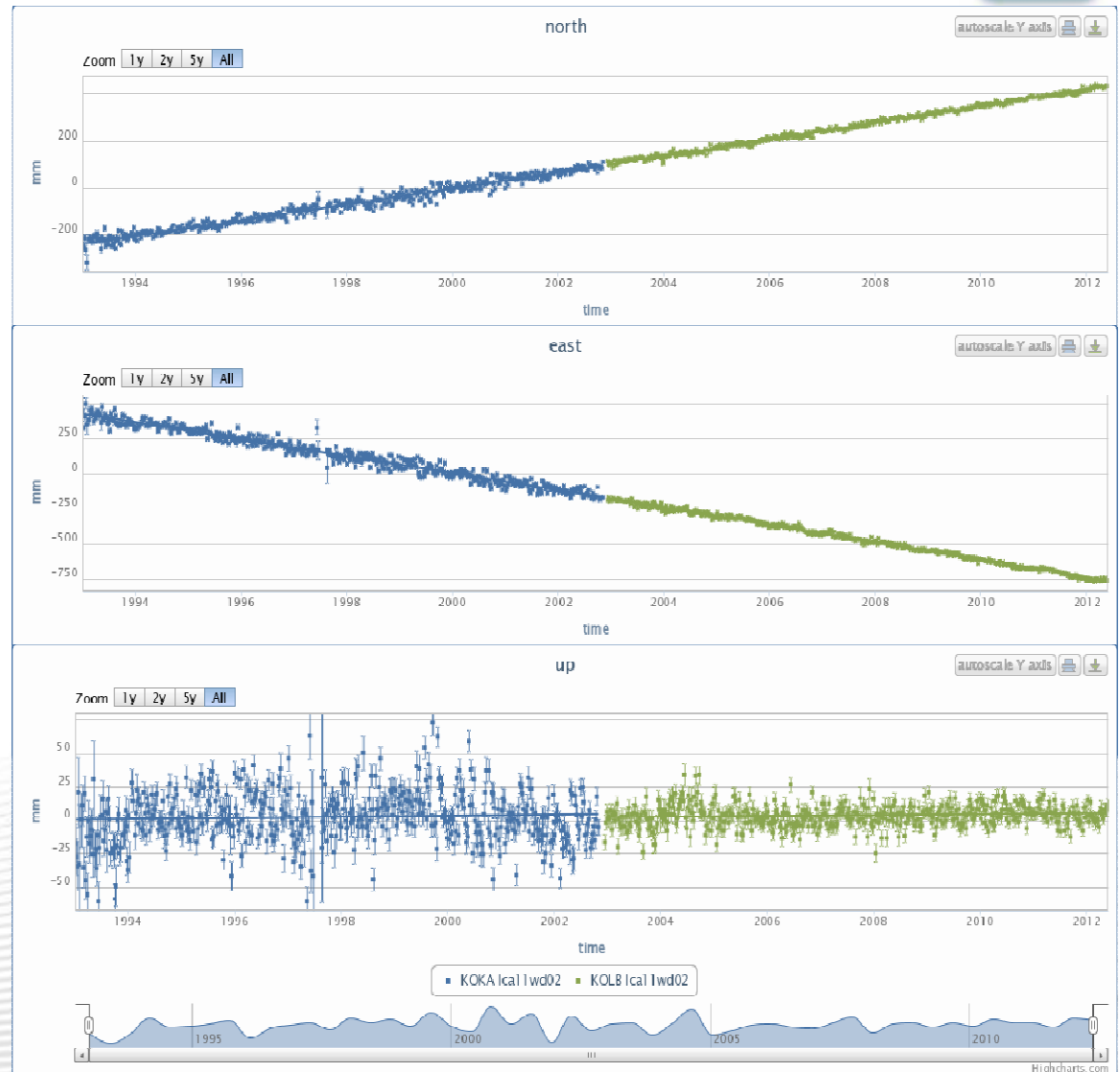
New SINEX series:

Icawd32 including Jason-2, Cryosat-2, HY-2A

Time series are available on IDS web site:
-files of data (STCD format) and plots (GIF format)

They can be displayed with STCDtool

Kokee Park : KOKA + KOLB



Statistics

north :

Station	Mean	WRSD	Slope	Period
KOKA lca11wd02	-72.06mm	14.82mm	33.54+/-0.25mm/year	1993/1/8-2002/11/7
KOLB lca11wd02	265.3mm	7.41mm	35.21+/-0.13mm/year	2002/12/18-2012/5/30

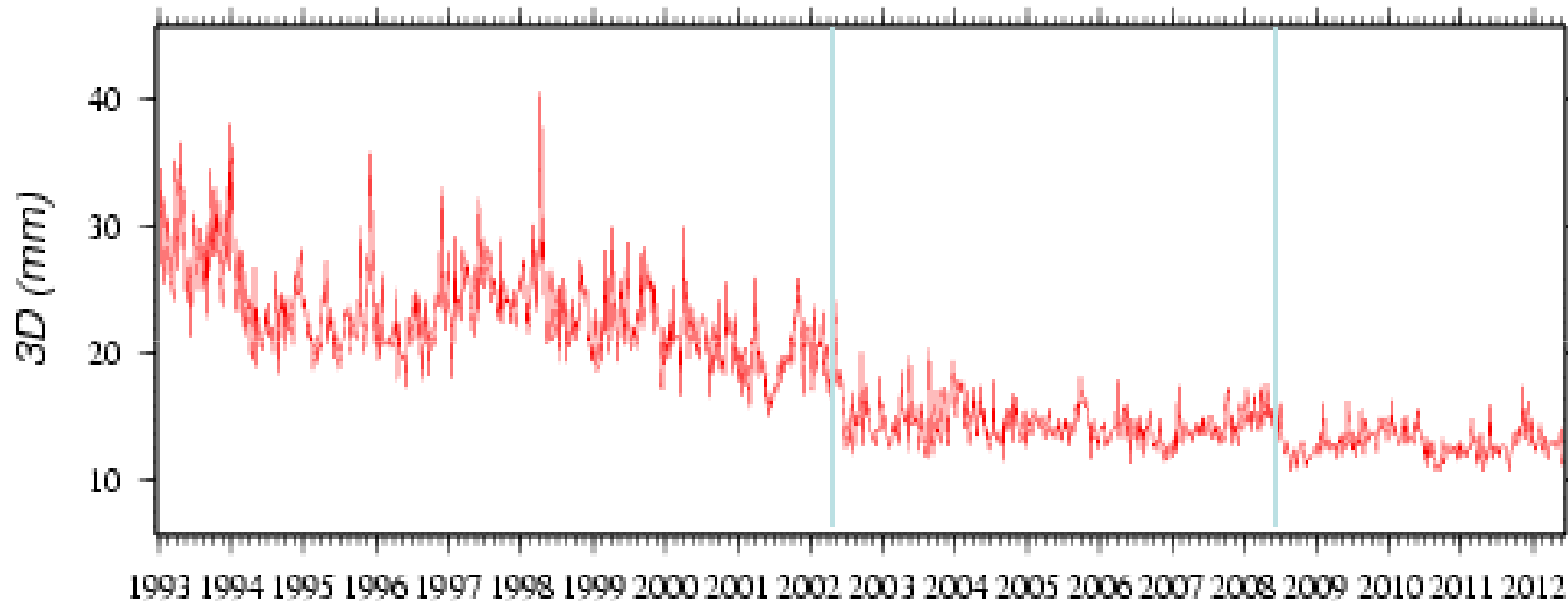
east :

Station	Mean	WRSD	Slope	Period
KOKA lca11wd02	130.4mm	28.02mm	-60.49+/-0.48mm/year	1993/1/8-2002/11/7
KOLB lca11wd02	-467.45mm	12.24mm	-62.68+/-0.21mm/year	2002/12/18-2012/5/30

up :

Station	Mean	WRSD	Slope	Period
KOKA lca11wd02	2.47mm	18.03mm	0.47+/-0.3mm/year	1993/1/8-2002/11/7
KOLB lca11wd02	3.57mm	7.55mm	0.36+/-0.13mm/year	2002/12/18-2012/5/30

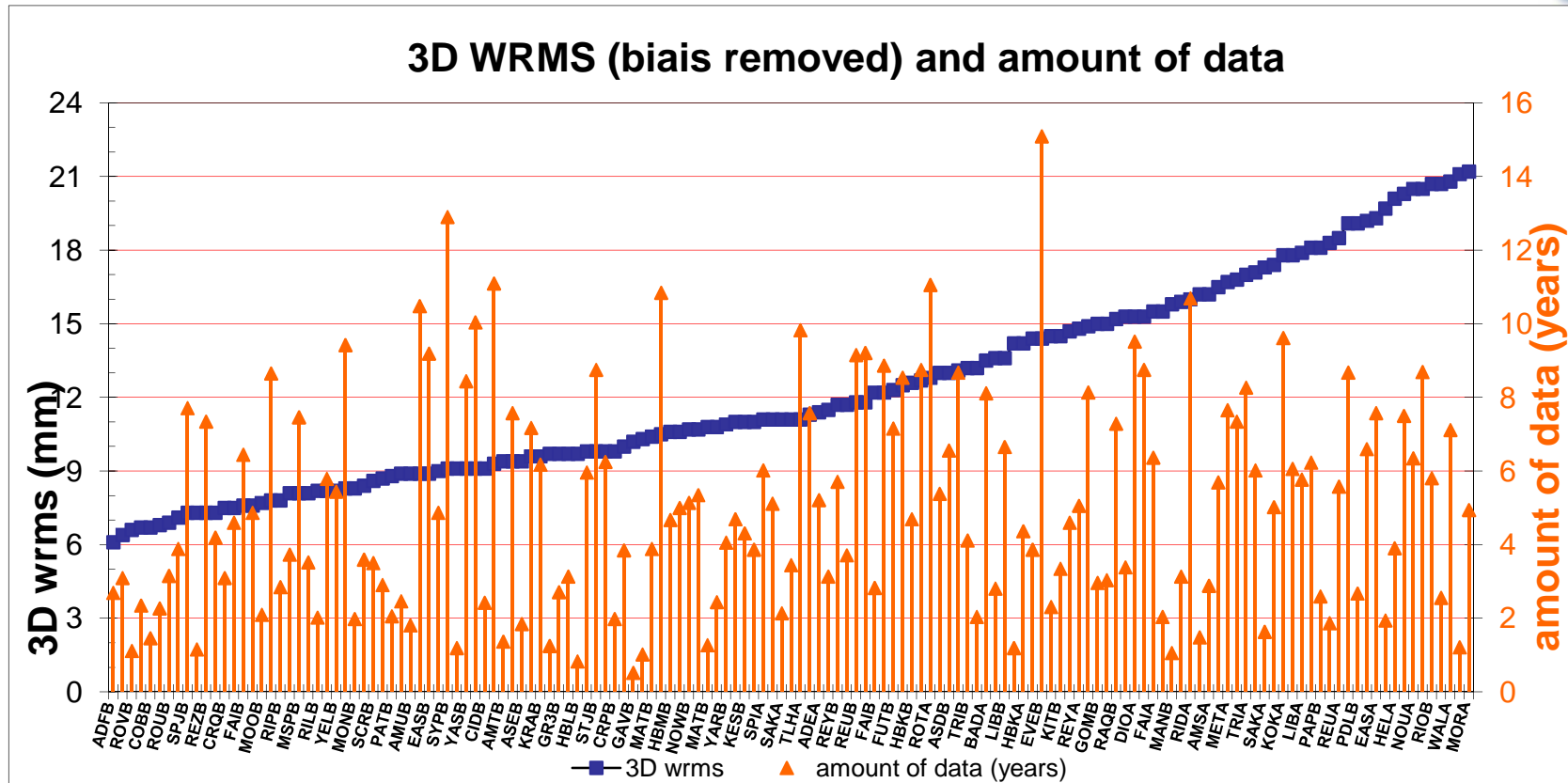
3D RMS of the weekly LCA solutions wrt DPOD2008 (1993-2012)



- 1008 weeks
(1993/01/03 – 2012/06/02)
- 44 stations by weekly solution
on average

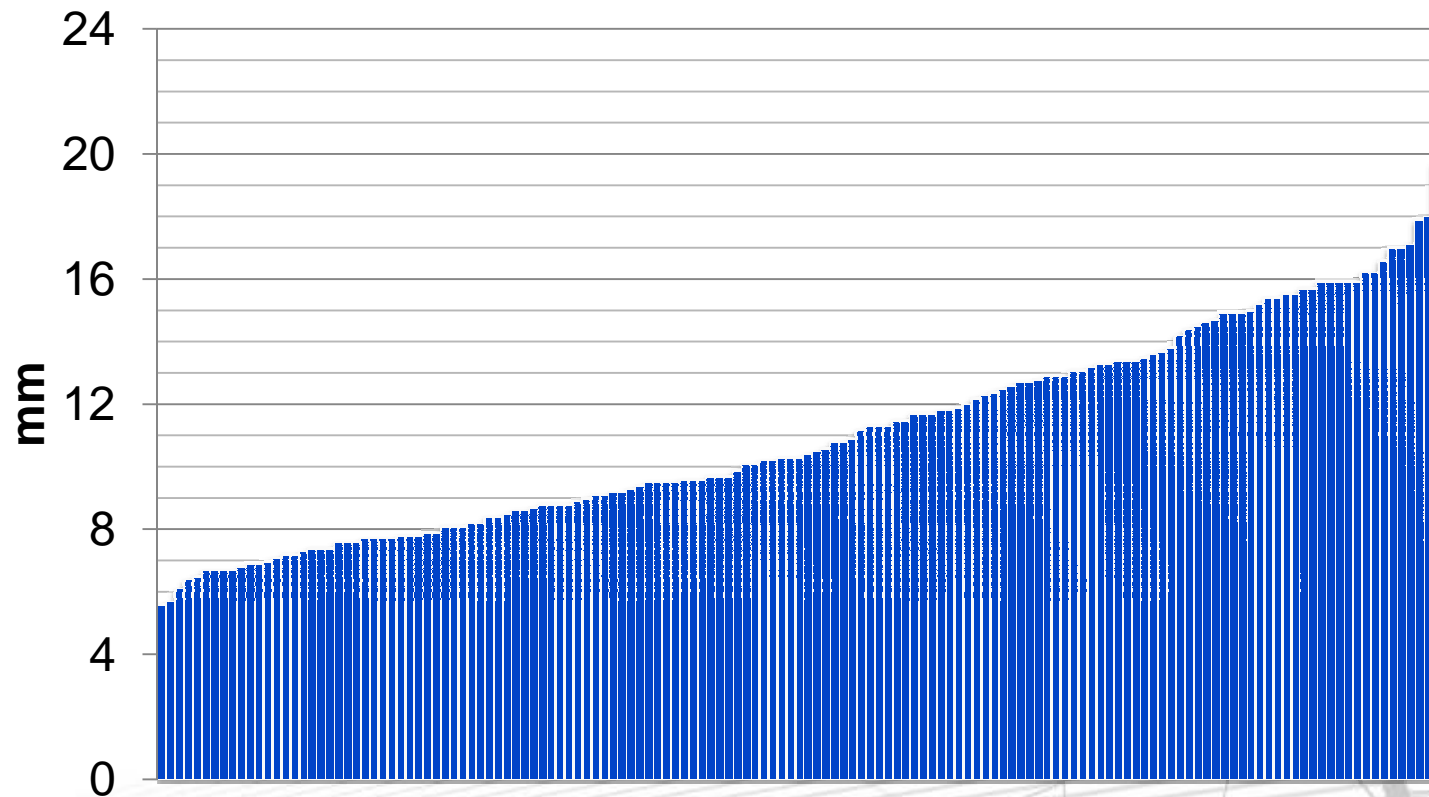
RMS average value (mm) →

	3D	N	E	U
whole period	18,4	14,3	22,9	16,4
1993-2002	23,0	17,6	29,0	20,6
2002-2008	14,4	11,3	18,3	12,5
2008-2012	12,9	11,1	15,1	12,1

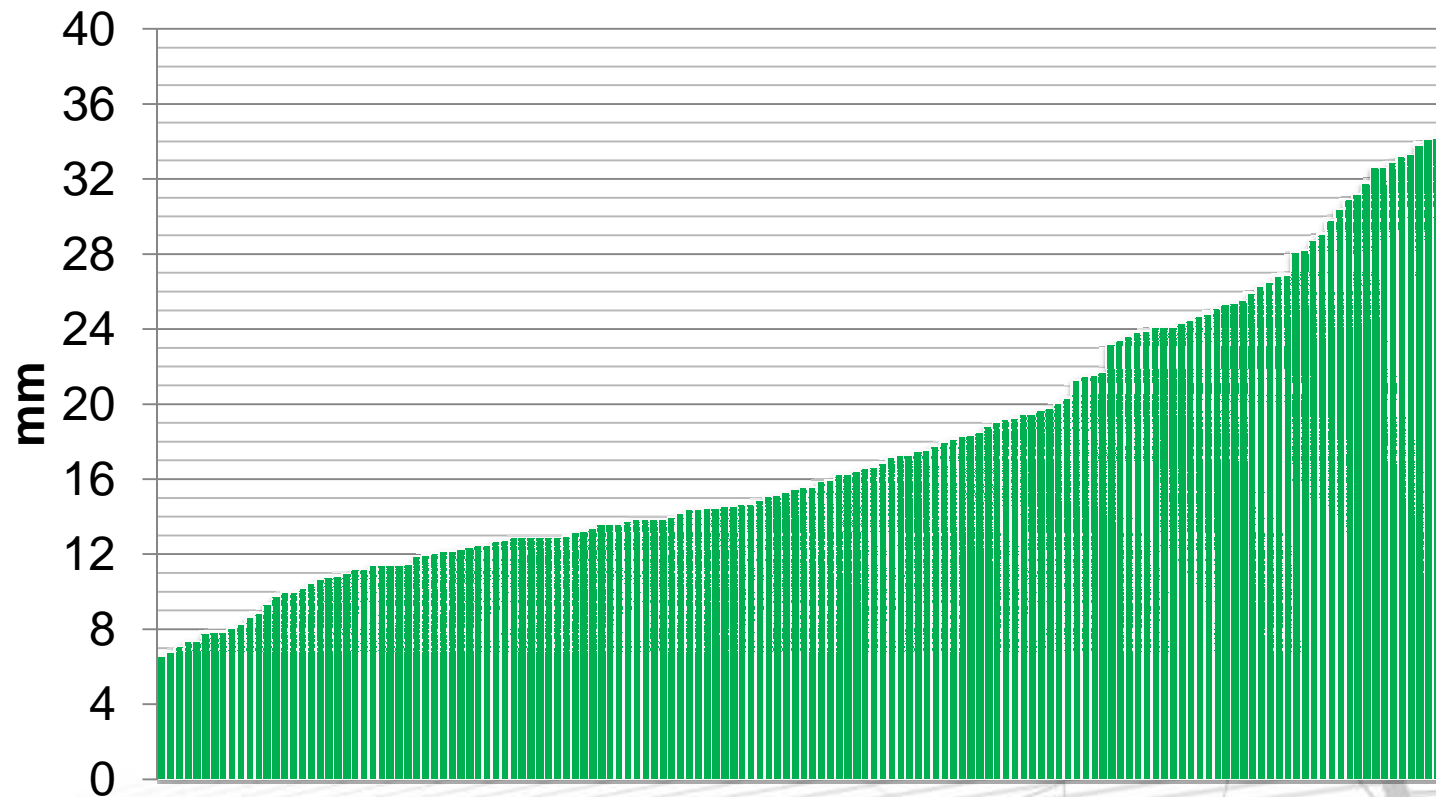


- 1008 weeks (1993/01/03 – 2012/06/02)
- 148 stations: from 6.1 mm (ADFB, 2.7 yrs) to 21.2 mm (MORA, 4.9 yrs)
- 3D wrms: mean value 12.3 mm / median value 11.1 mm
- amount of analyzed data: mean value 5.08 years / median values 4.69 years

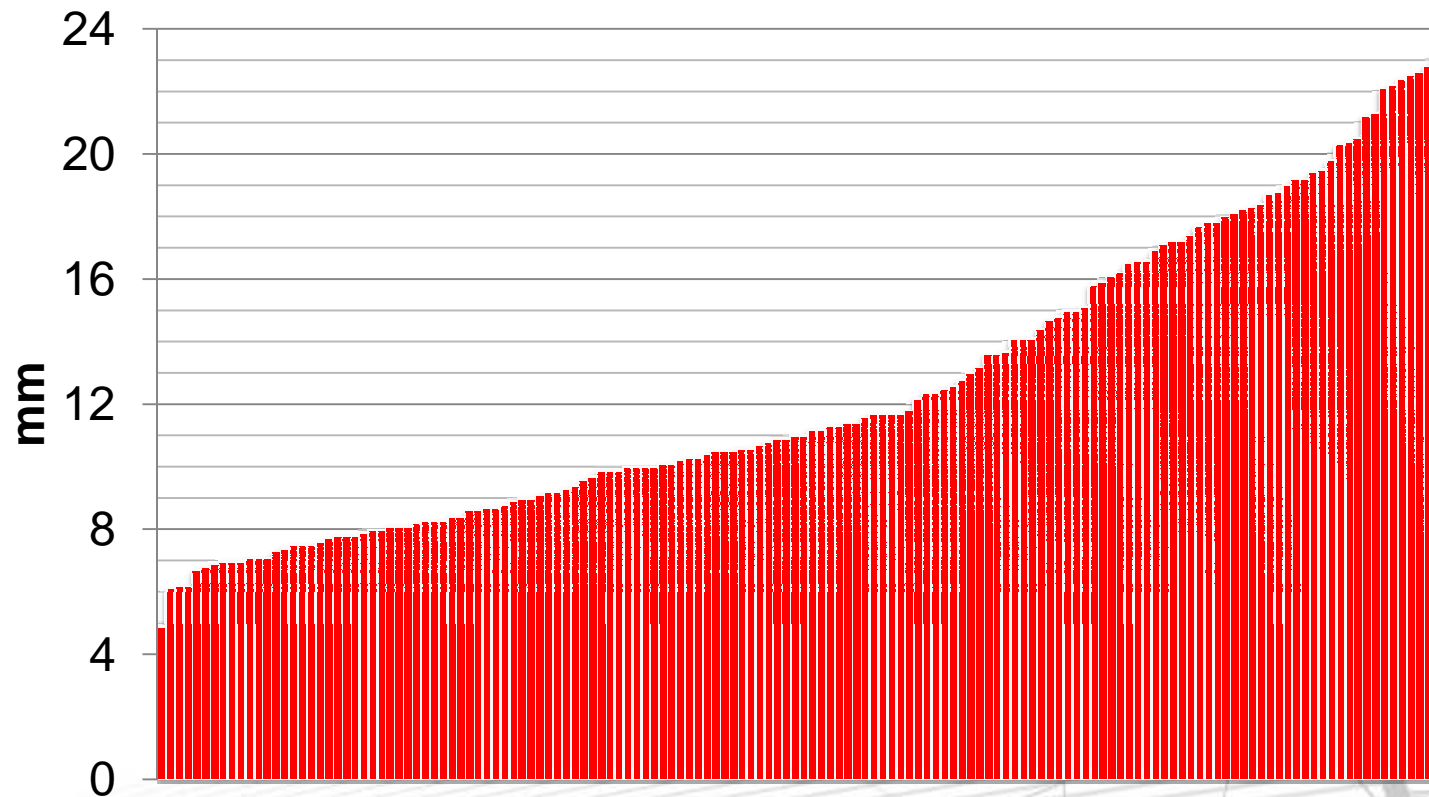
North residuals WRMS

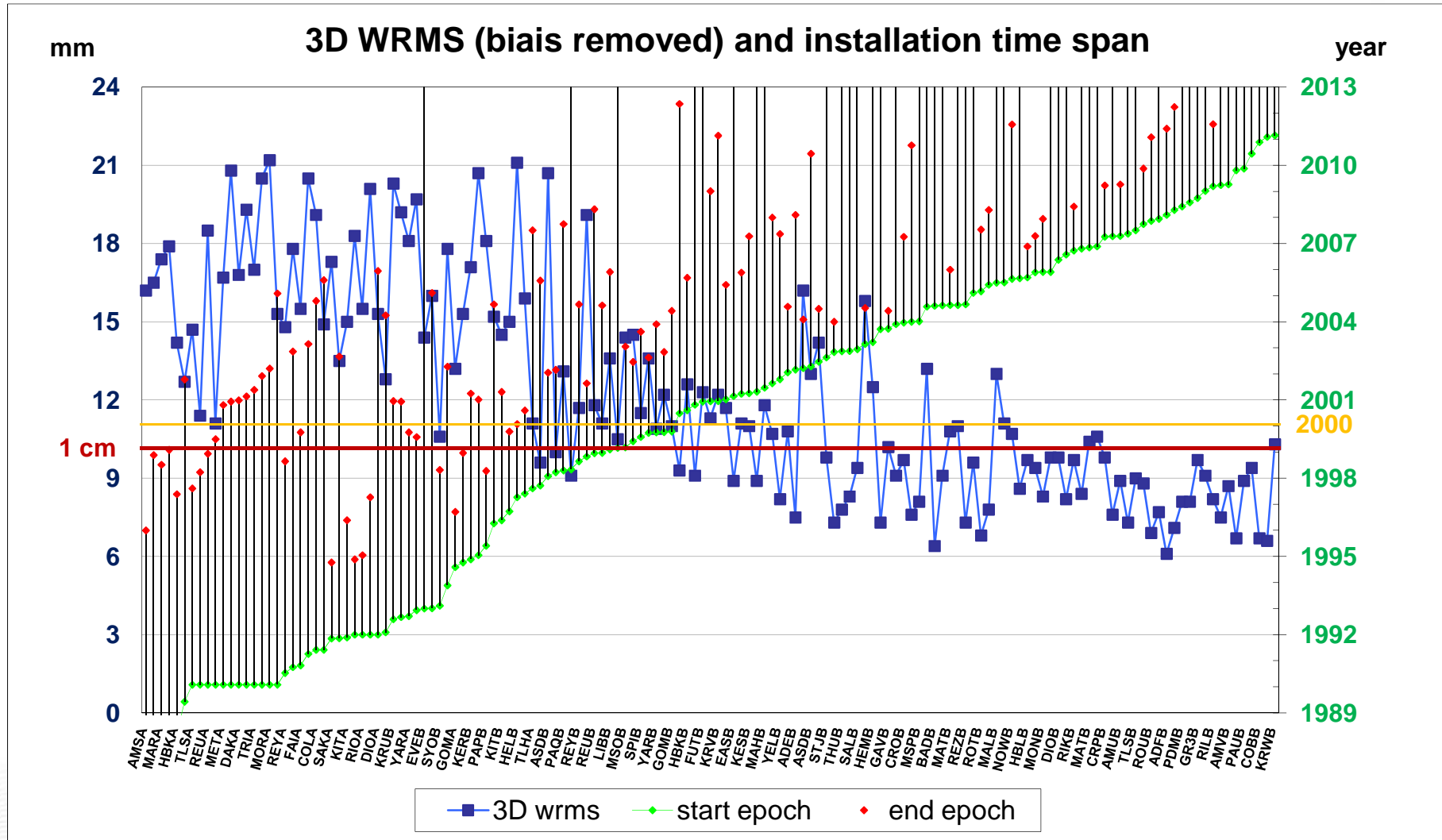


East residuals wrms

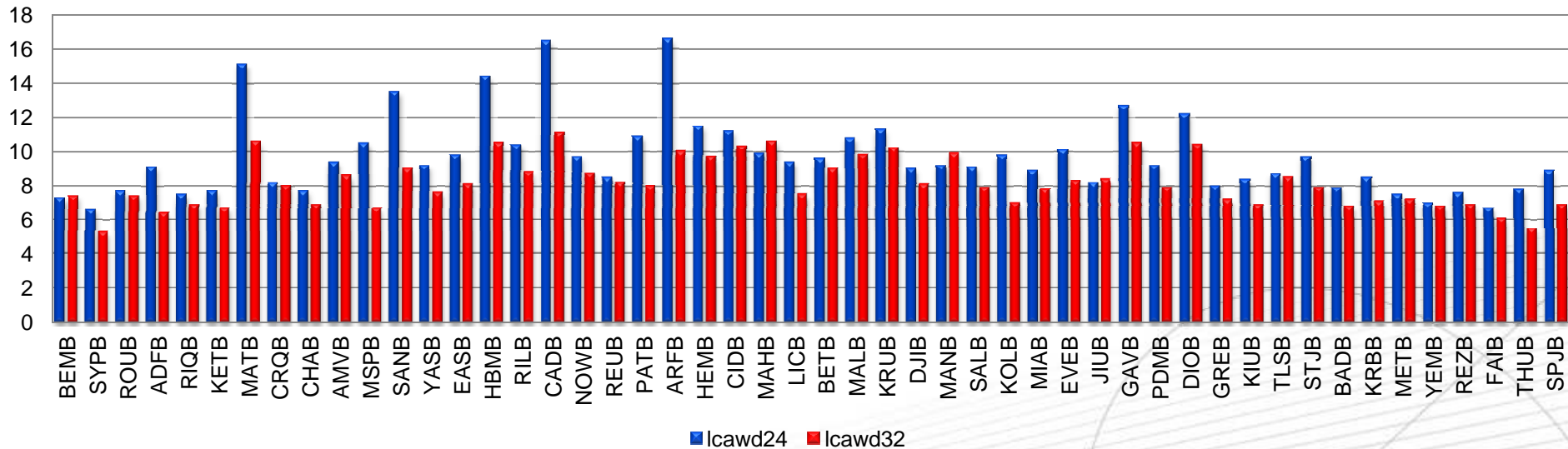


Up residuals WRMS





3D wrms (bias removed) Previous (lcawd24) vs Current processing (lcawd32)



2009/01-2010/07
50 stations

Decreasing of the residuals →

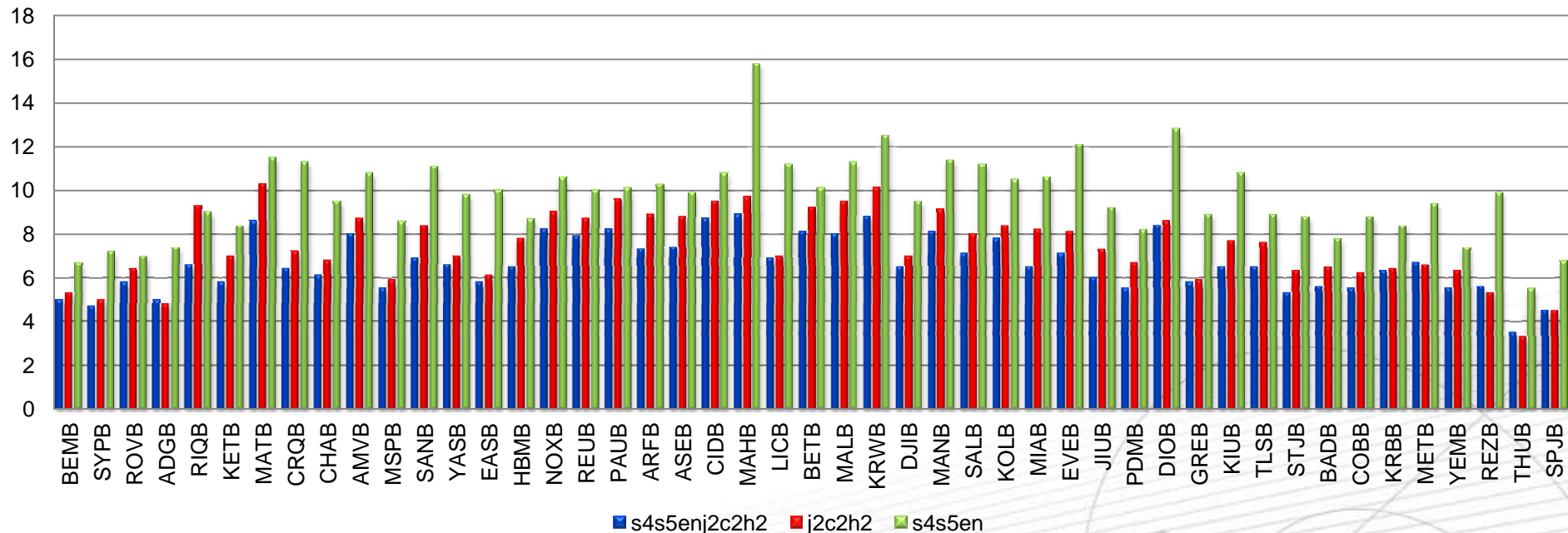
unit: mm	3D	North	East	Up
lcawd24 (1)	9,51	8,44	13,22	9,18
lcawd32 (2)	8,23	7,63	11,50	7,52
(2)-(1)/(1)	-13,52%	-9,66%	-13,04%	-18,11%

48 stations

27 weeks

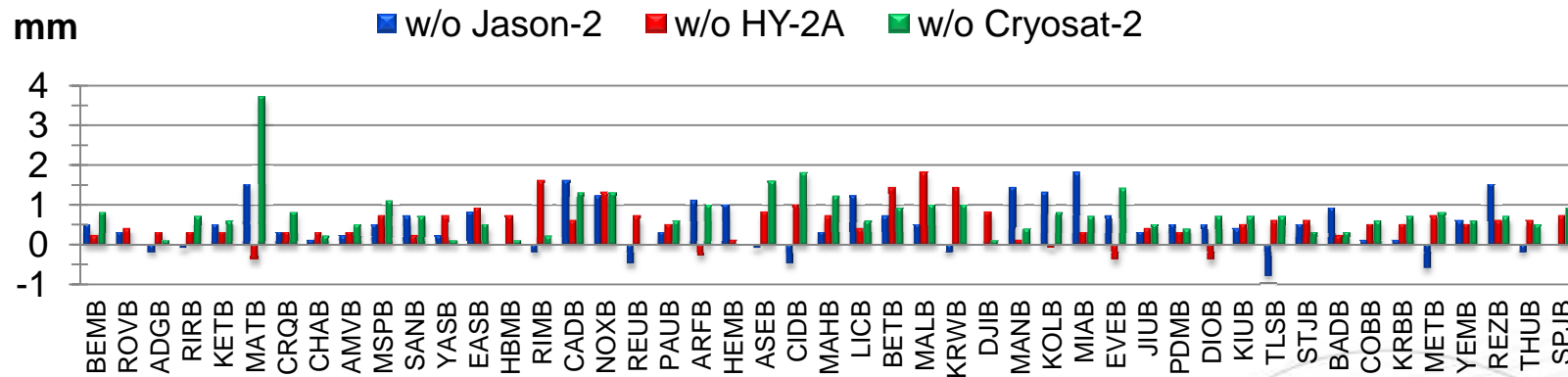
2011/10/02 – 2012/04/07

3D wrms (bias removed)



unit: mm	3D	North	East	Up
6 satellites	6,64	6,23	9,53	6,16
Spot4+ Spot5+Env = 1st & 2nd Gen.	9,71	9,18	15,56	8,47
Jason2+Cryosat2+HY-2A = DGXX	7,45	6,75	10,74	7,33

3D wrms
constellation 5 sat. -Jason-2 or -Cryosat-2 or -HY-2A
compared to Spot-4+Spot-5+Jason-2+Cryosat-2+HY-2A



48 stations
 15 weeks
 2012/04 – 2012/07

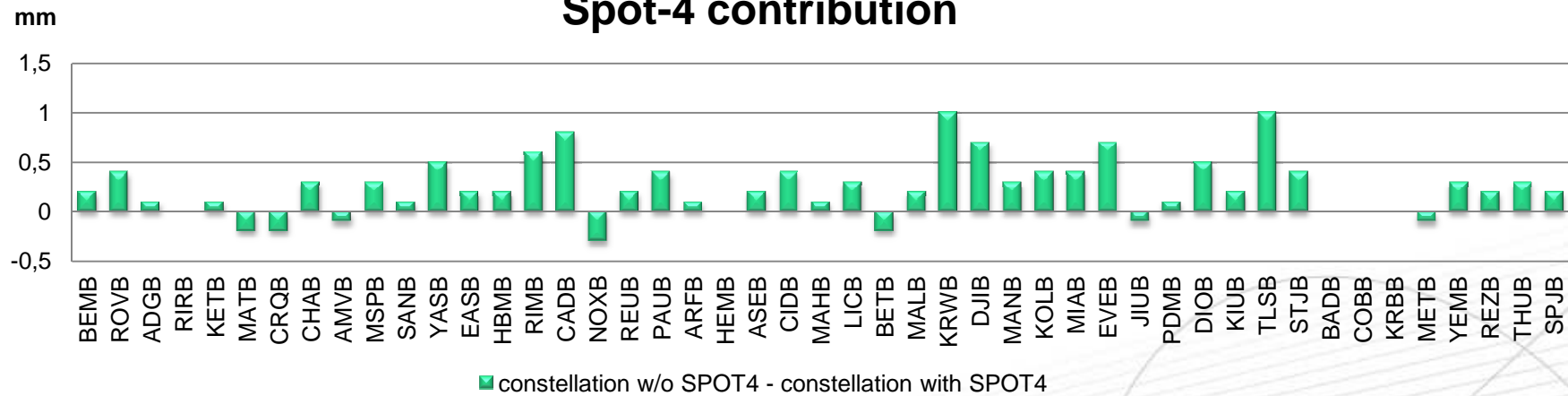
unit: mm	3D	North	East	Up
5 sat. constellation	6,07	5,33	8,95	6,01
w/o Jason-2	6,51	5,64	10,31	6,62
w/o HY-2A	6,59	5,84	9,80	6,44
w/o Cryosat-2	6,80	5,98	9,98	6,66

Most important DGXX contributors:

Cryosat-2 (717 km, 92°) for North and Up, Jason-2(1300km, 66°) for East

48 stations
 15 weeks
 2012/04/08 – 2012/07/21

3D wrms Spot-4 contribution



Small increasing of the residuals →

unit: mm	3D	North	East	Up
with Spot4	6,07	5,33	8,95	6,01
w/o Spot4	6,31	5,57	9,14	6,29
(2)-(1)/(1)	+3,92%	+4,51%	+2,16%	+4,64%

- Current LCA positioning solutions better by 10 to 18%(up) wrt to processing for ITRF2008
- Positioning < 1cm since DGXX
- Time series improved by DGXX data and installation renovation
- Most important DGXX contributor:
Cryosat-2 for North and Up, Jason-2 for East
- End of SPOT-4 mission will have a small impact. It will likely be largely balanced with SARAL (12/12/2012).