

Galileo Terrestrial Reference Frame (GTRF)- Status

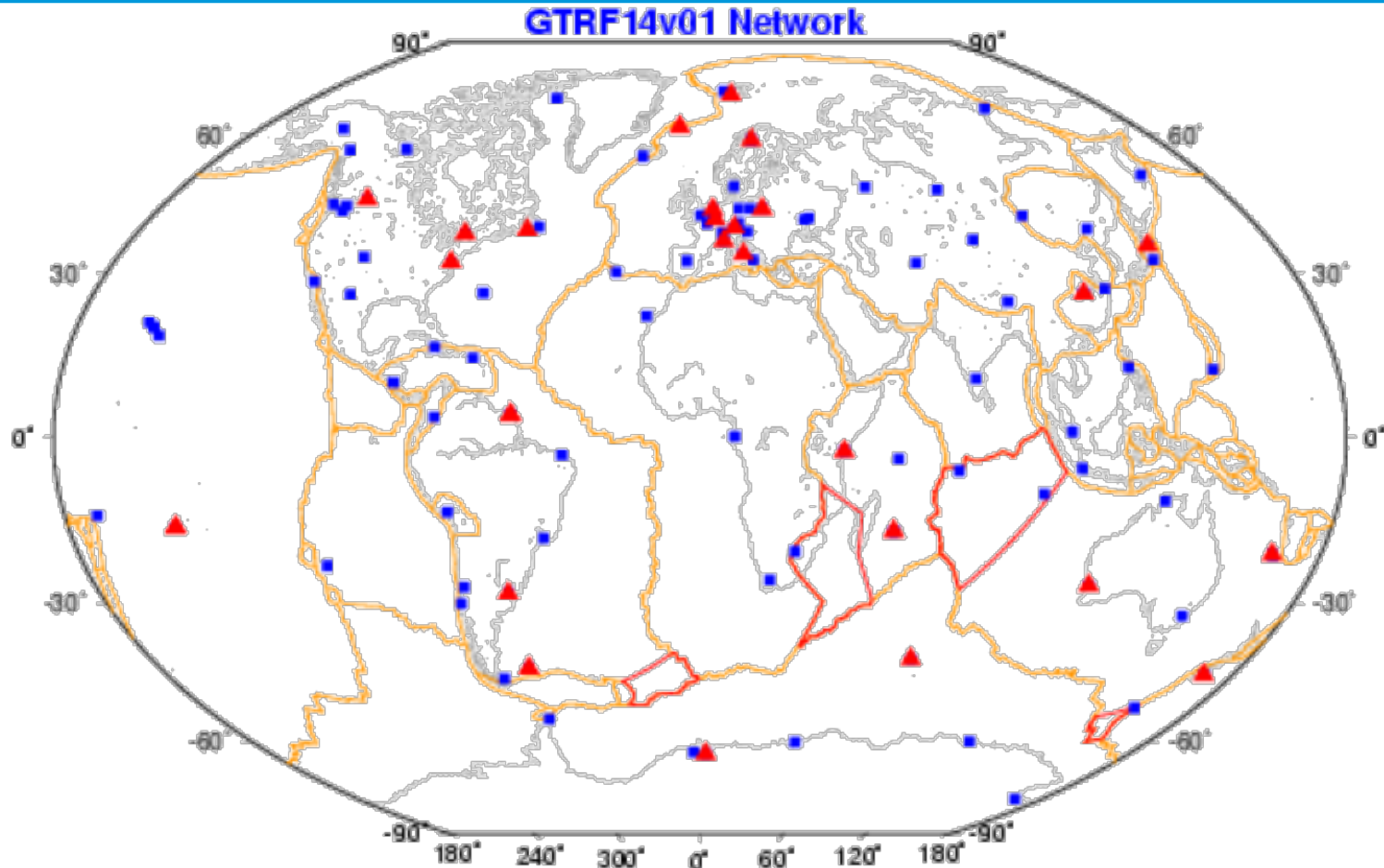
Werner Enderle
on behalf of the GGSP Consortium
ICG09 Meeting
Prague, Czech Republic
10-14 November 2014



The GTRF14v01 is obtained by:

- accumulating (rigorously stacking) the 182 weekly GTRF combined solutions
- Using minimum constraint approach
 - the GTRF14v01 solution is aligned to the IGB08 (ITRF2008) frame over a set of 84 IGS/ITRF stations
 - located in 60 sites
 - 41 in the northern hemisphere
 - 19 in the southern hemisphere

Tracking Network for the GTRF – All stations

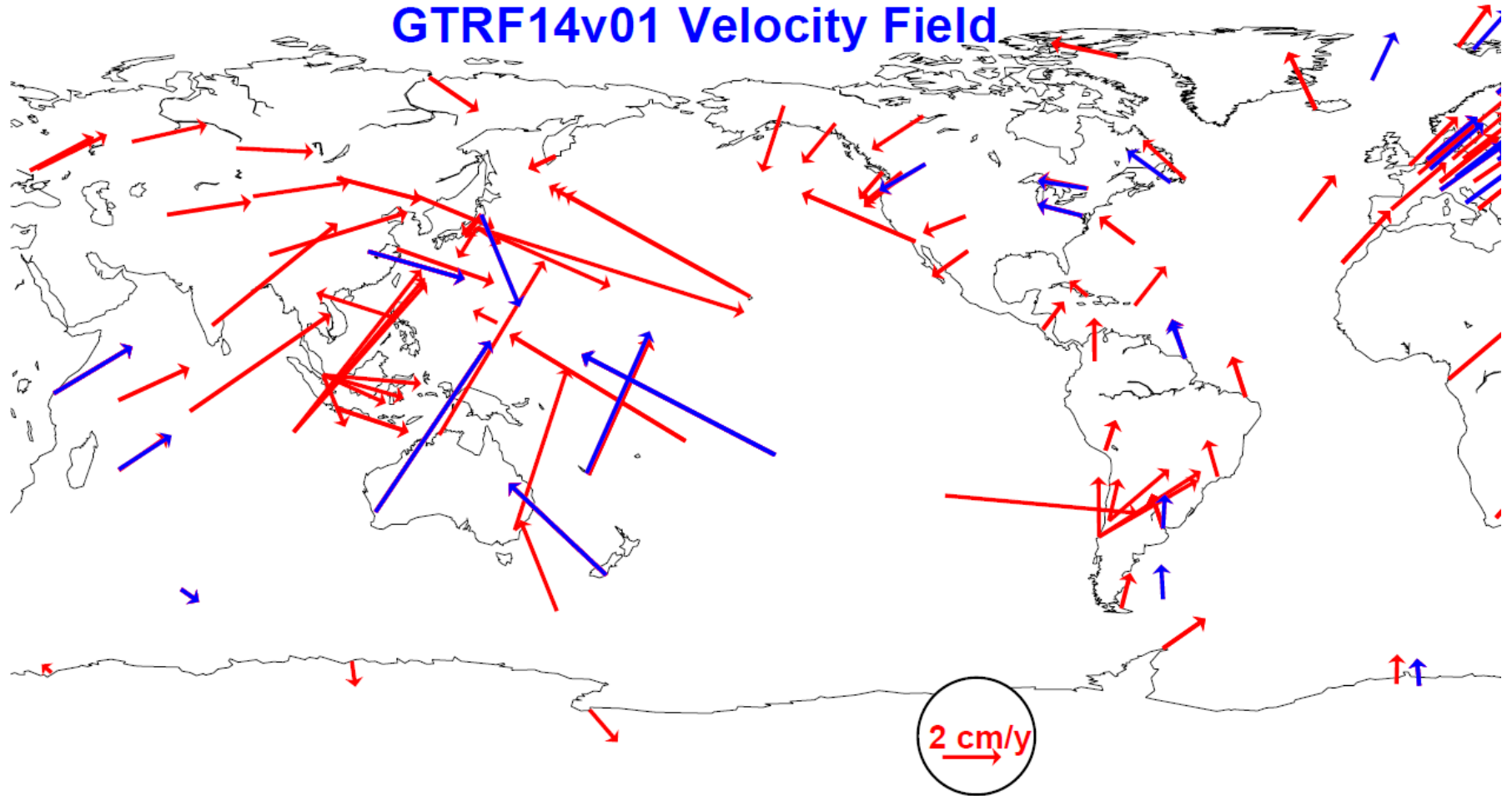


GTRF14v01 network.
blue squares: ITRF/IGS stations
red triangles: GESS/GSS sites

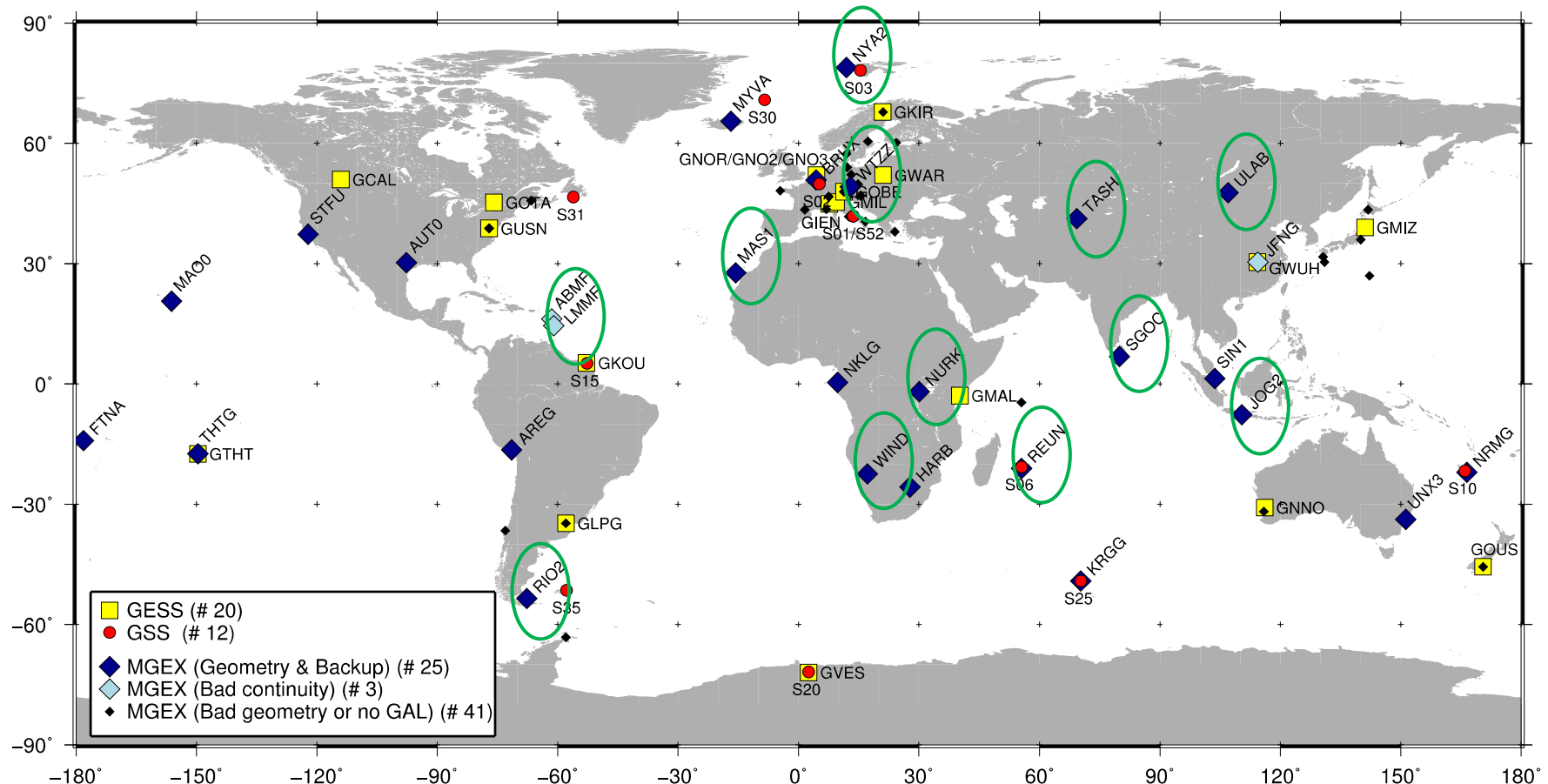
Tracking Network for the GTRF – All stations



GTRF14v01 Velocity Field



Galileo Tracking Network used for the GTRF

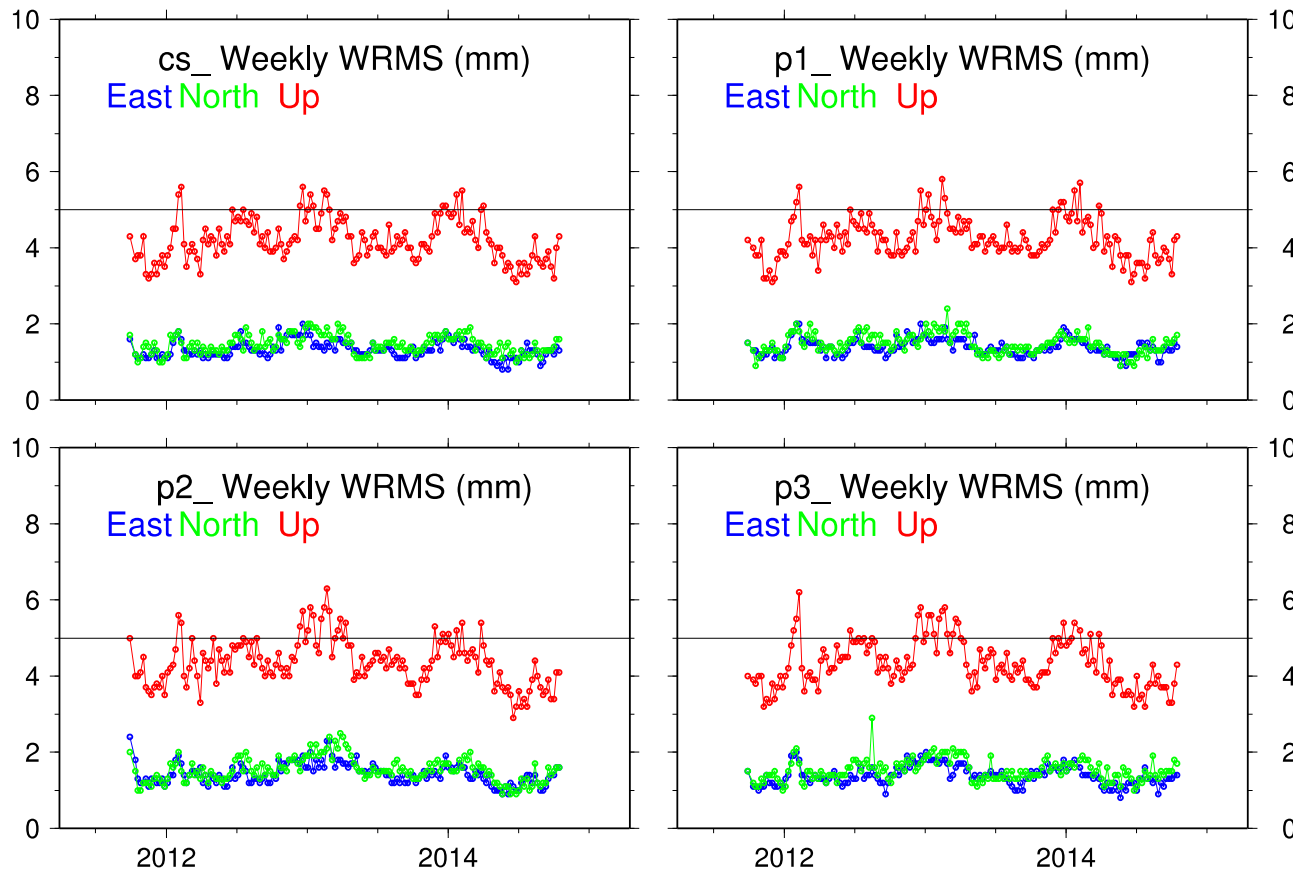


- M-GEX stations included since w1739
- Gap left in North America (GCAL and GOTA often no GAL data)
- 11 MGEX stations are operated by partners of the GGSP consortium

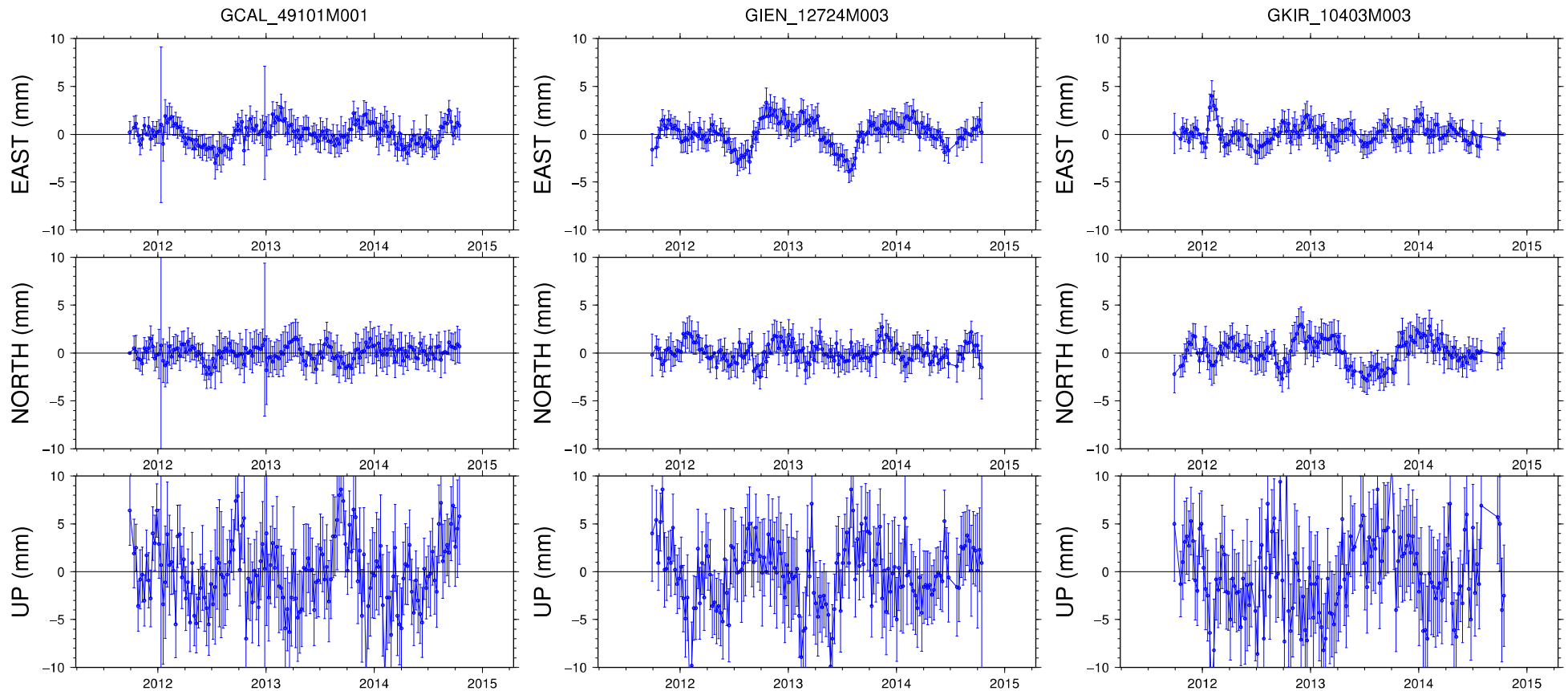
- GTRF14v01
 - Generated 11 April 2014
 - Delivered in April 2014
 - Rigorously aligned to ITRF2008
 - In use by Galileo system
 - Next update is expected in 2015 after inclusion of new stations

Weekly WRMS accuracy of all PF's and Combined Solutions station positions is in the level of

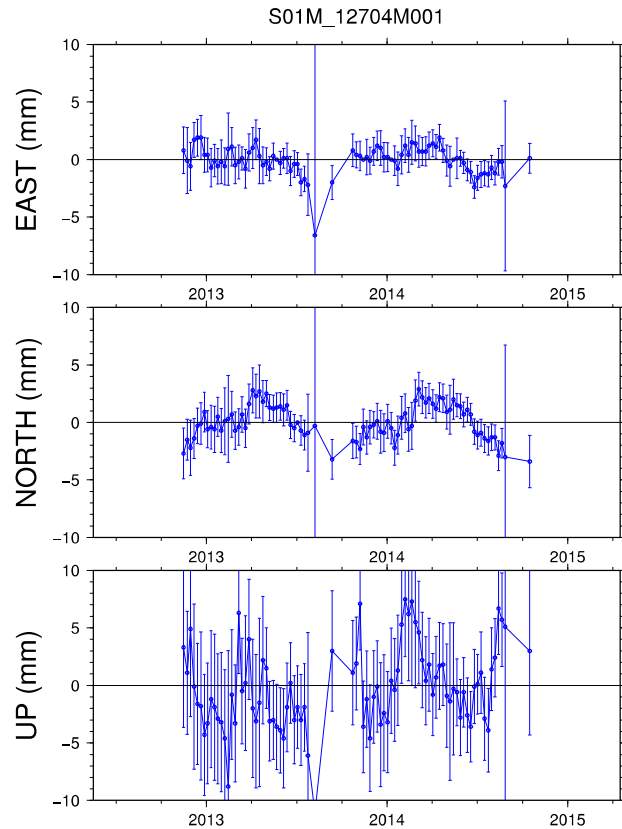
- 1 to 2 mm for horizontal components
- 3 to 6 mm for the height



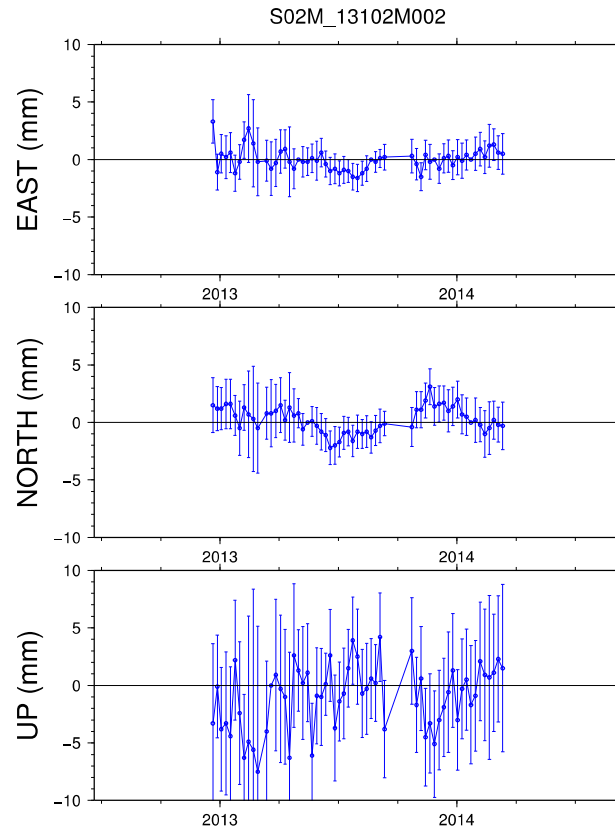
GESS station time series - Examples



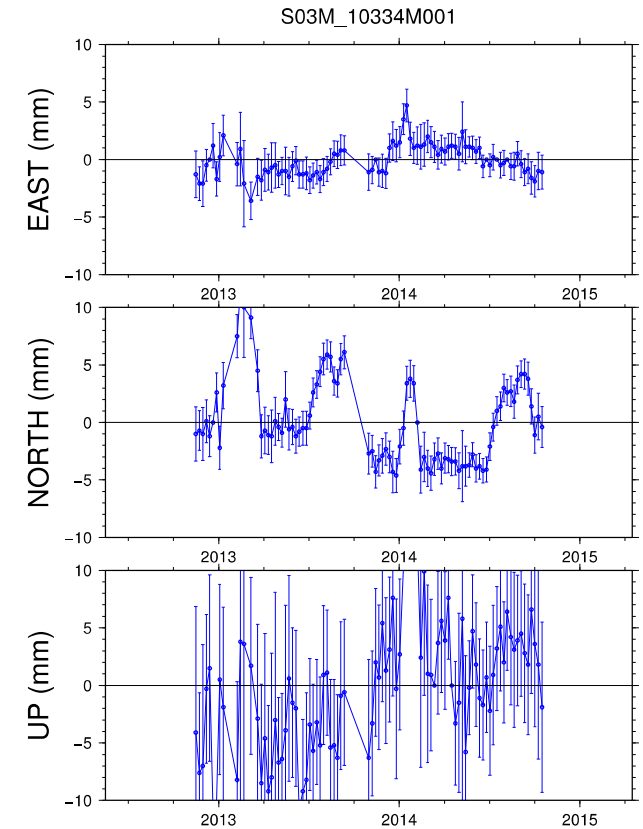
GSS station time series - Examples



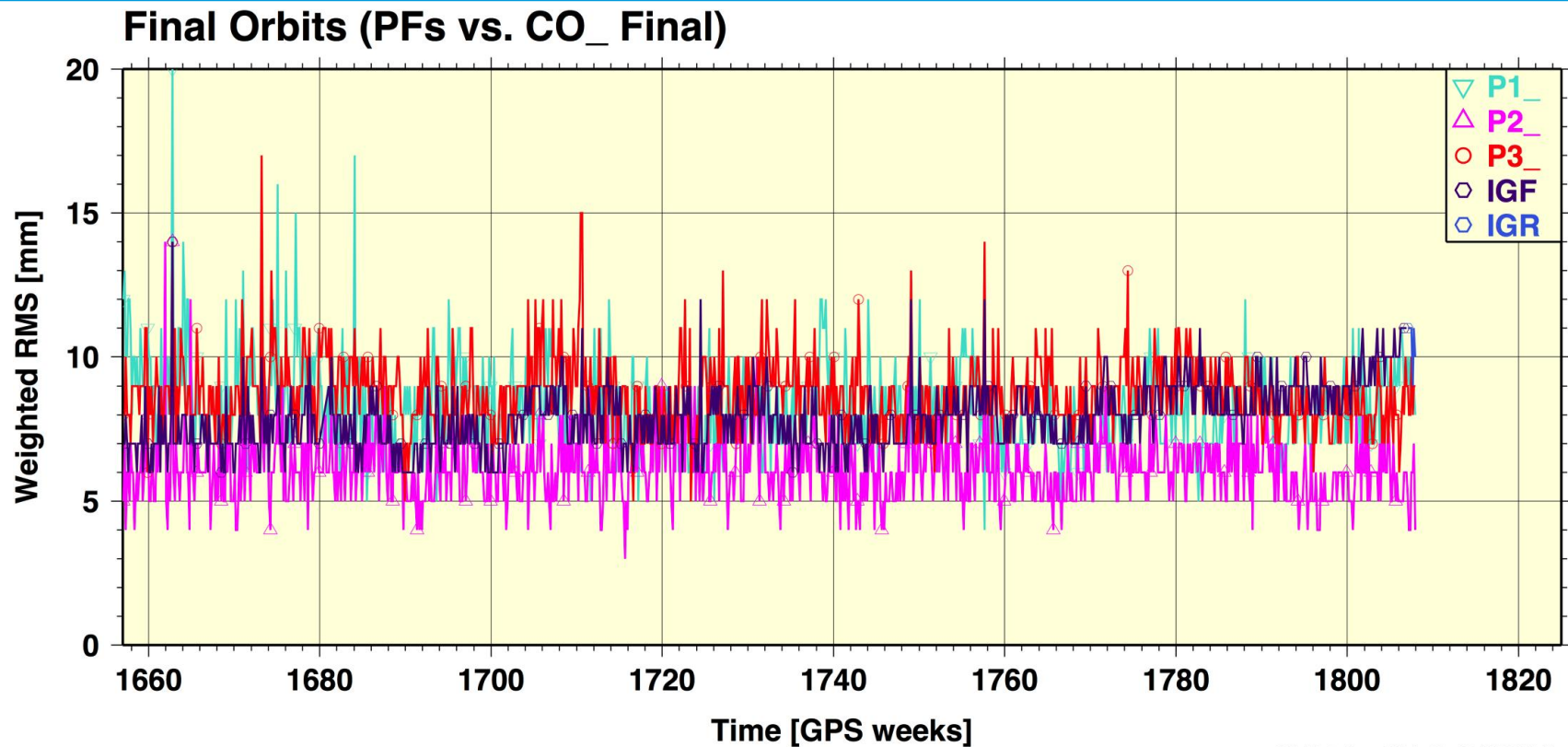
Fucino



Redu

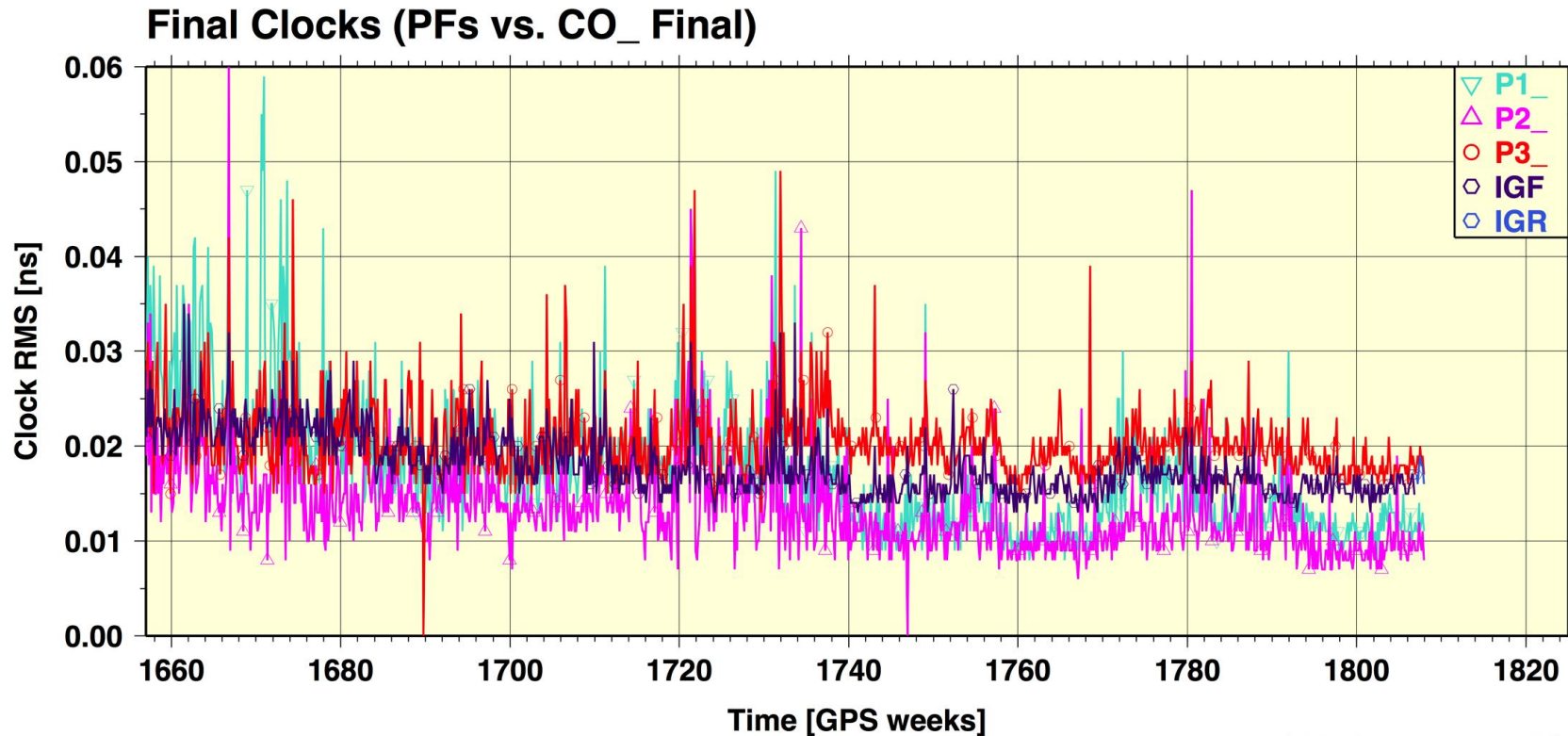


Svalbard



GFZ Potsdam, 2014-09-15 11:53 UTC

- Orbit RMS agreement btw PFs and combined (co_) orbits for GPS satellites
 - mostly in the level of 5-10 mm
 - Combination difference to the IGS Final is at the same level



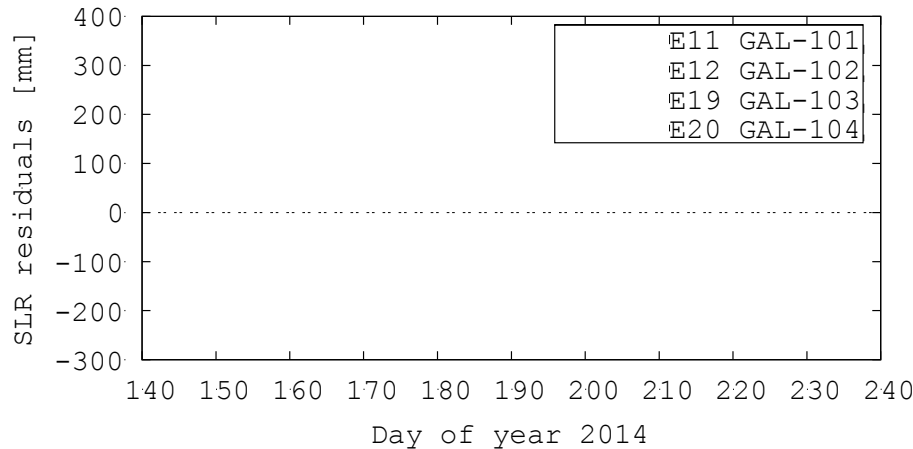
- Agreement for the clocks shows RMS of about 15 to 25 ps (all biases subtracted)

Independent SLR Validation

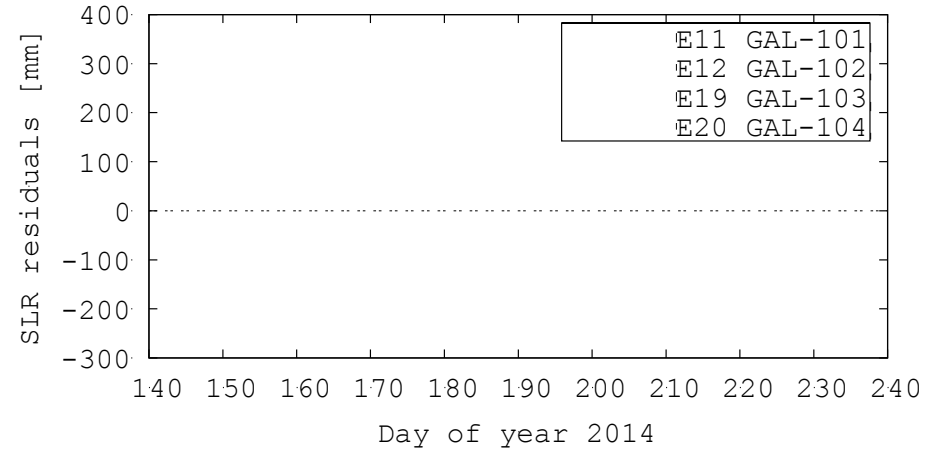


SLR RESIDUAL STATISTICS for GPS week 1791 in [mm] (04/05/2014 - 10/05/2014)										
SATELLITE		#OBS	MEAN	STD	MEAN	STD	MEAN	STD	MEAN	STD
			p1_		p2_		p3_		co_	
E11	GAL-101	104	-69	51	-16	47	-52	38	-61	89
E12	GAL-102	117	-57	40	-39	88	-54	27	-13	63
E19	GAL-103	73	-23	161	37	151	-25	111	10	144
E20	GAL-104	81	-33	108	-1	120	-45	106	-48	132

Yarragadee, Australia (7090)



Zimmerwald, Switzerland (7810)



The SLR residuals are confirming the overall orbit accuracy (3D – 1 Sigma) of 10 – 20 cm.

- Validation is carried out on a weekly basis when the last reference product is available (in general, the IGS troposphere solution)
- Validation result is a weekly summary file
- High quality, demonstrated by the RMS of Helmert-transformation (w1806)

		#sites	North [mm]	East [mm]	Up [mm]
GTRF14V01	RMS / COMPONENT	124	1.83	1.99	5.16
IGb08	RMS / COMPONENT	78	3.45	2.85	6.62
IGb08week	RMS / COMPONENT	113	2.08	2.08	4.76

- The latest GTRF (GTRF14v01) contains all active GSS and is valid
- Weekly IGS solution confirms the high quality of the OVF weekly combined solution, number of identical stations was improved due to additional sites (partly with Galileo observations)

THANK YOU

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