ITRF2013 preparation - Jason-1 and phase laws

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Content

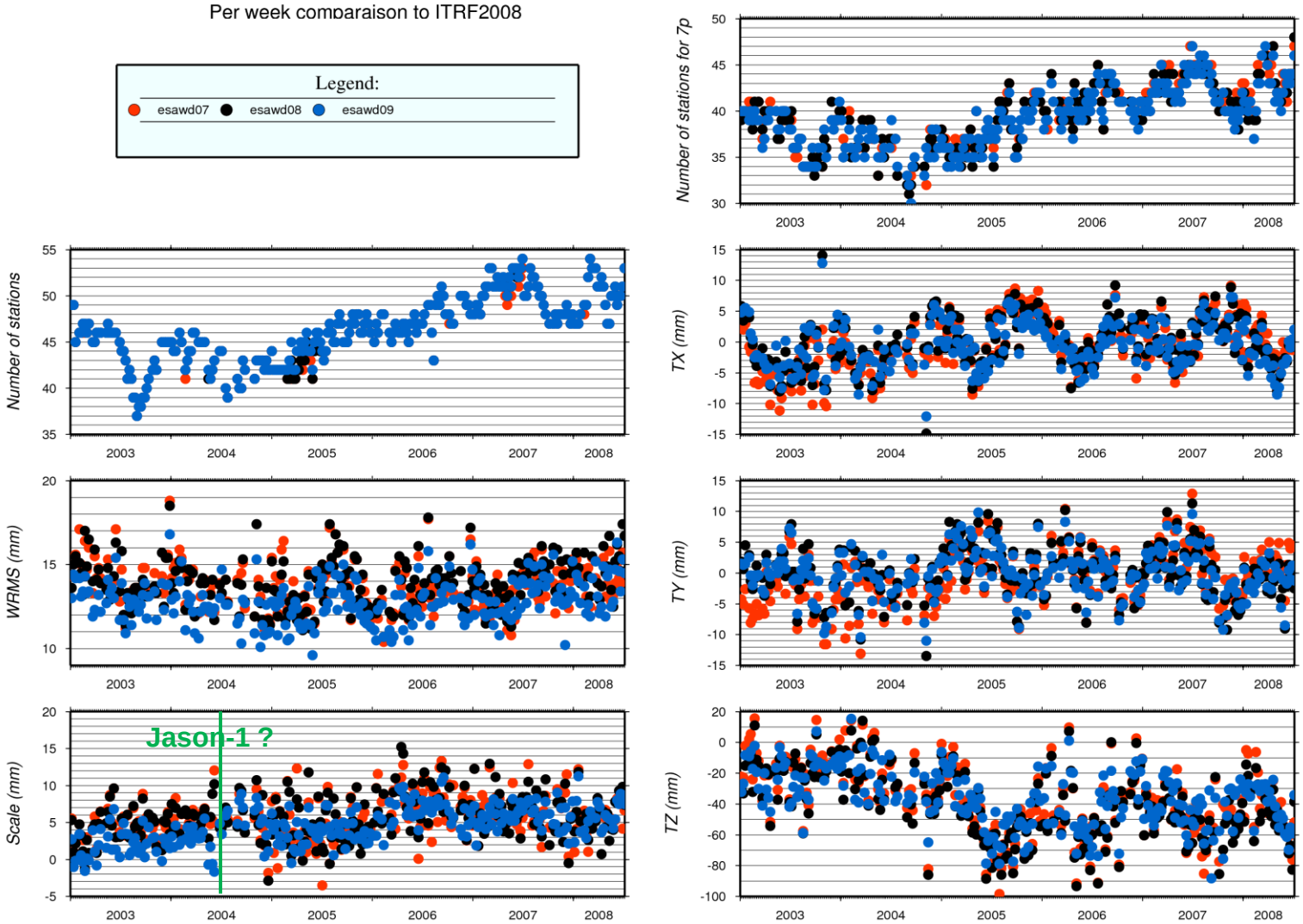
- Impact of including Jason-1 as seen by ESA, GSC and LCA
- Effects of using the phase laws from GOP, GSC and LCA

JASON-1 TESTS

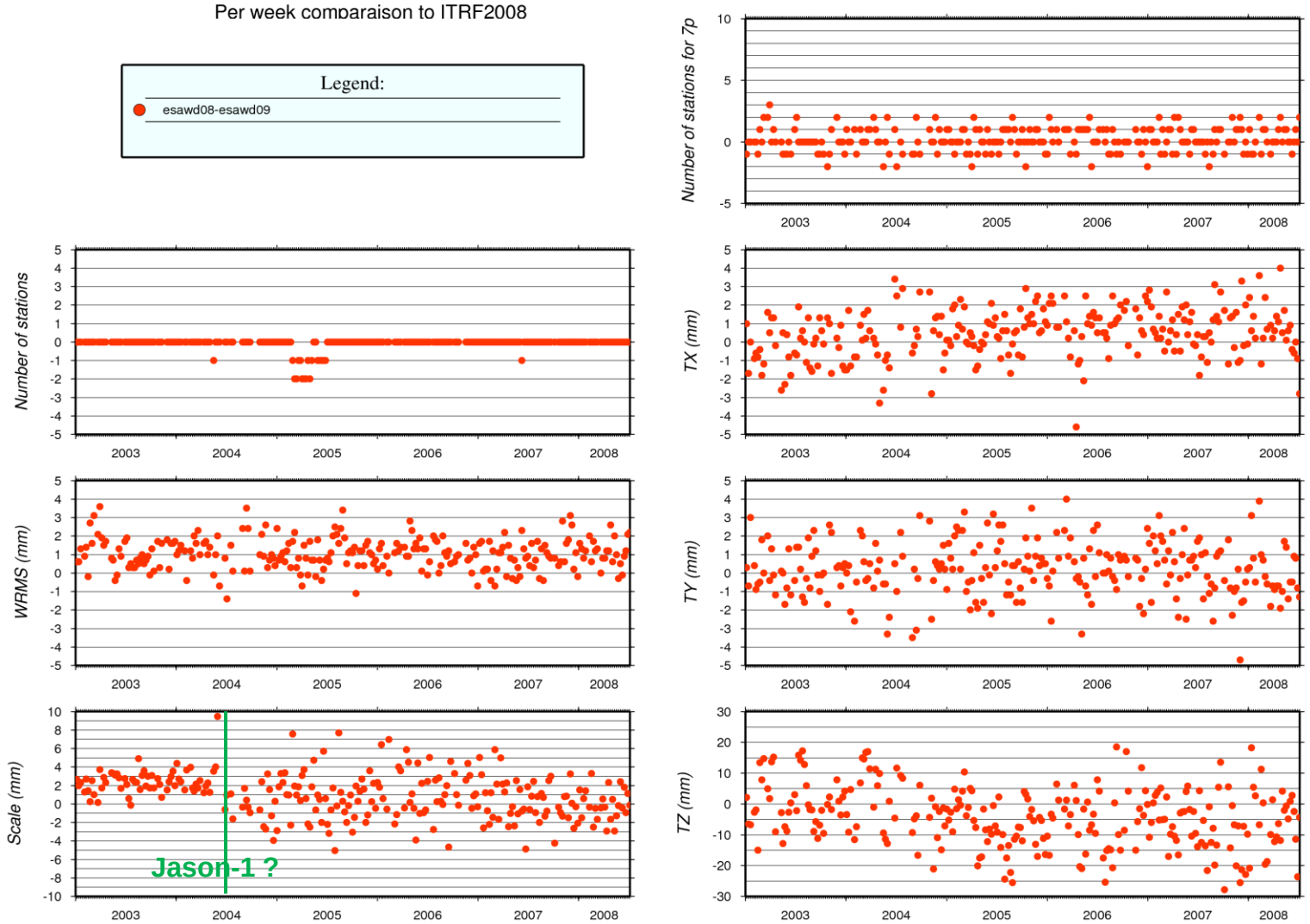
Jason-1 tests series

- ESA 08a (==08 + Jason-1) wrt ESA 08 from 2003 to 2008-188
- GSC 20_ja1 (==20 + Jason-1)/ GSC 20 from 2004-312 to 2008-188
- LCA 38 (==37 – Jason-1) / LCA 37 from 2006-001 to 2010-164

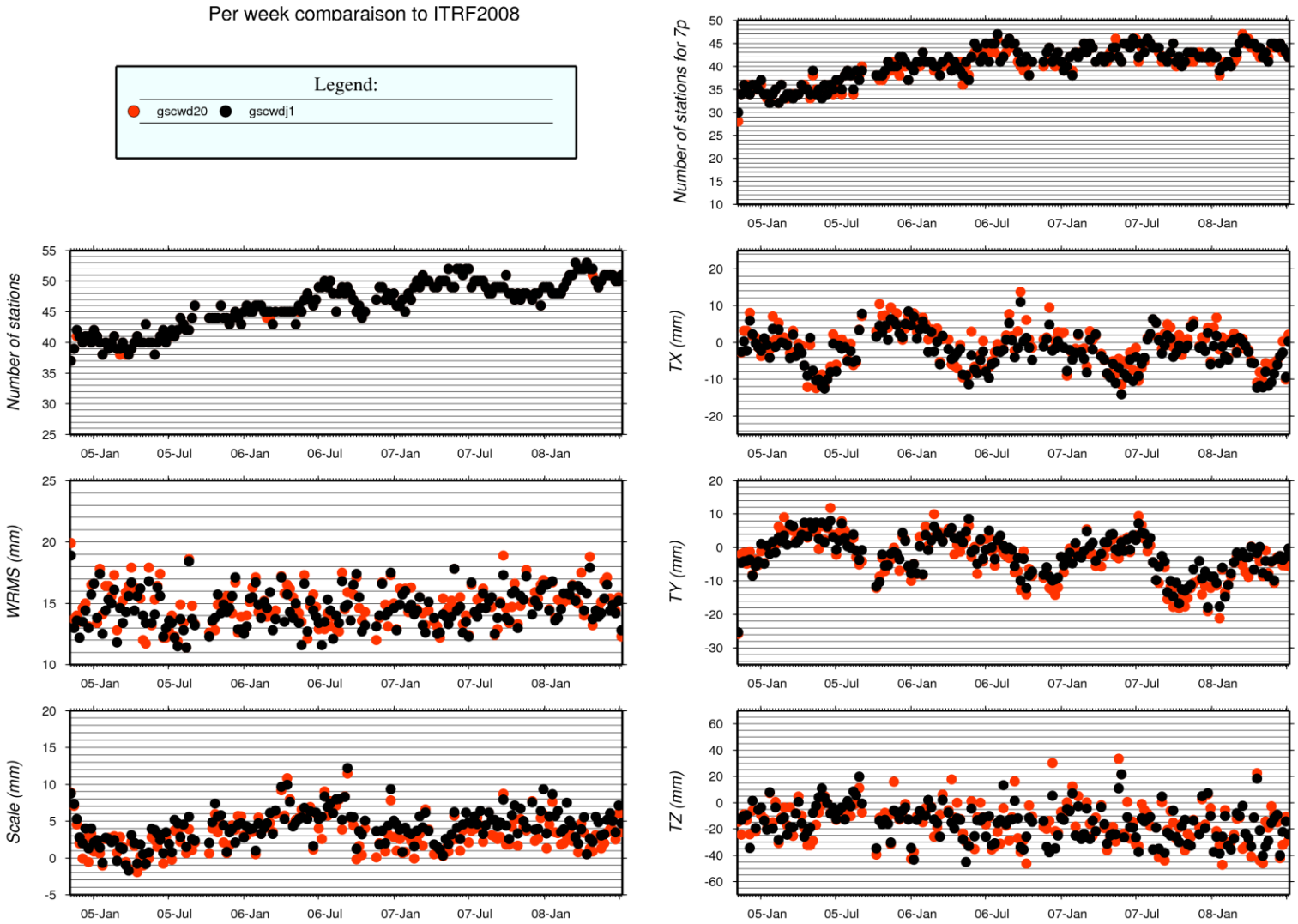
Jason-1 impact from ESA



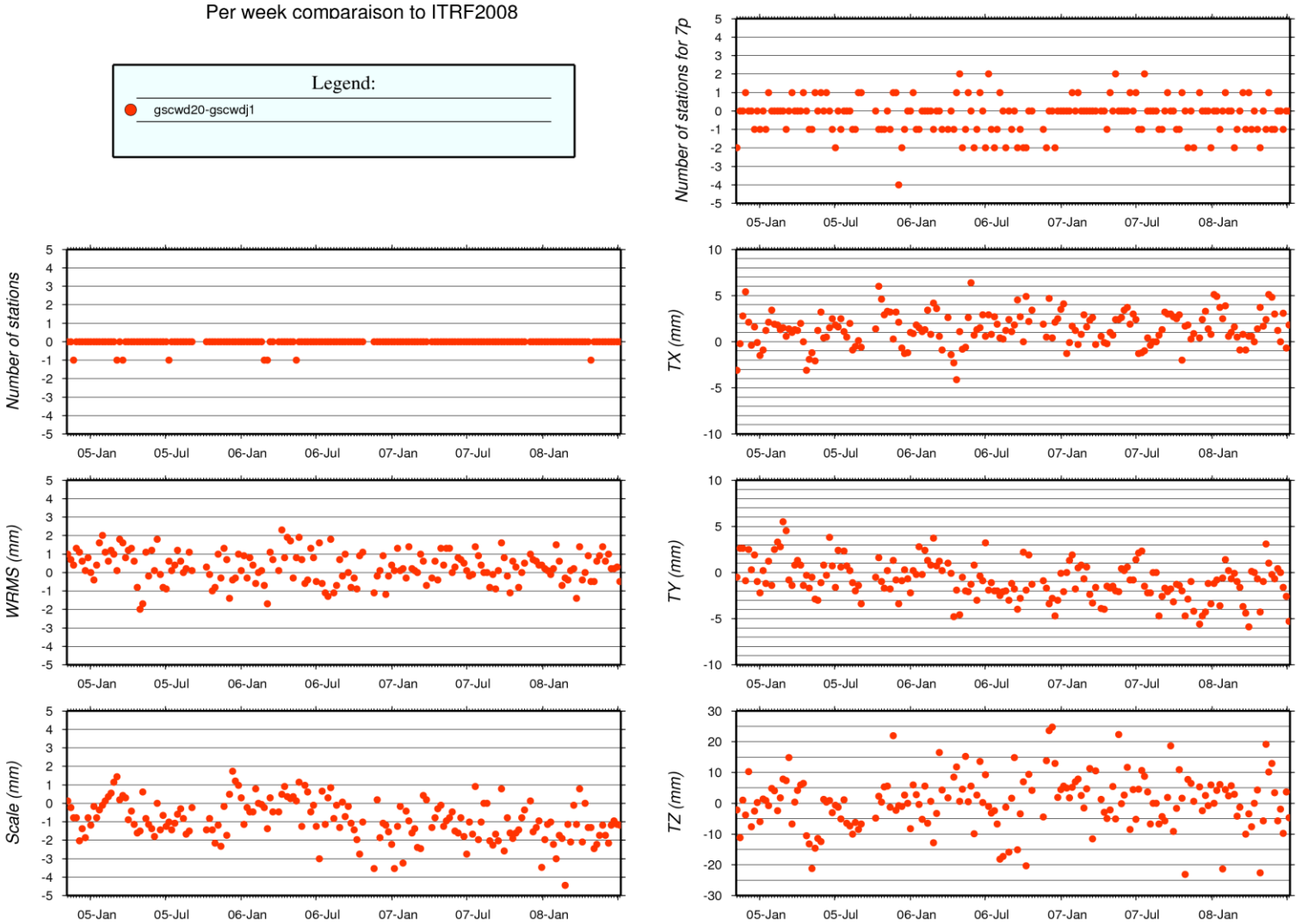
Jason-1 impact from ESA



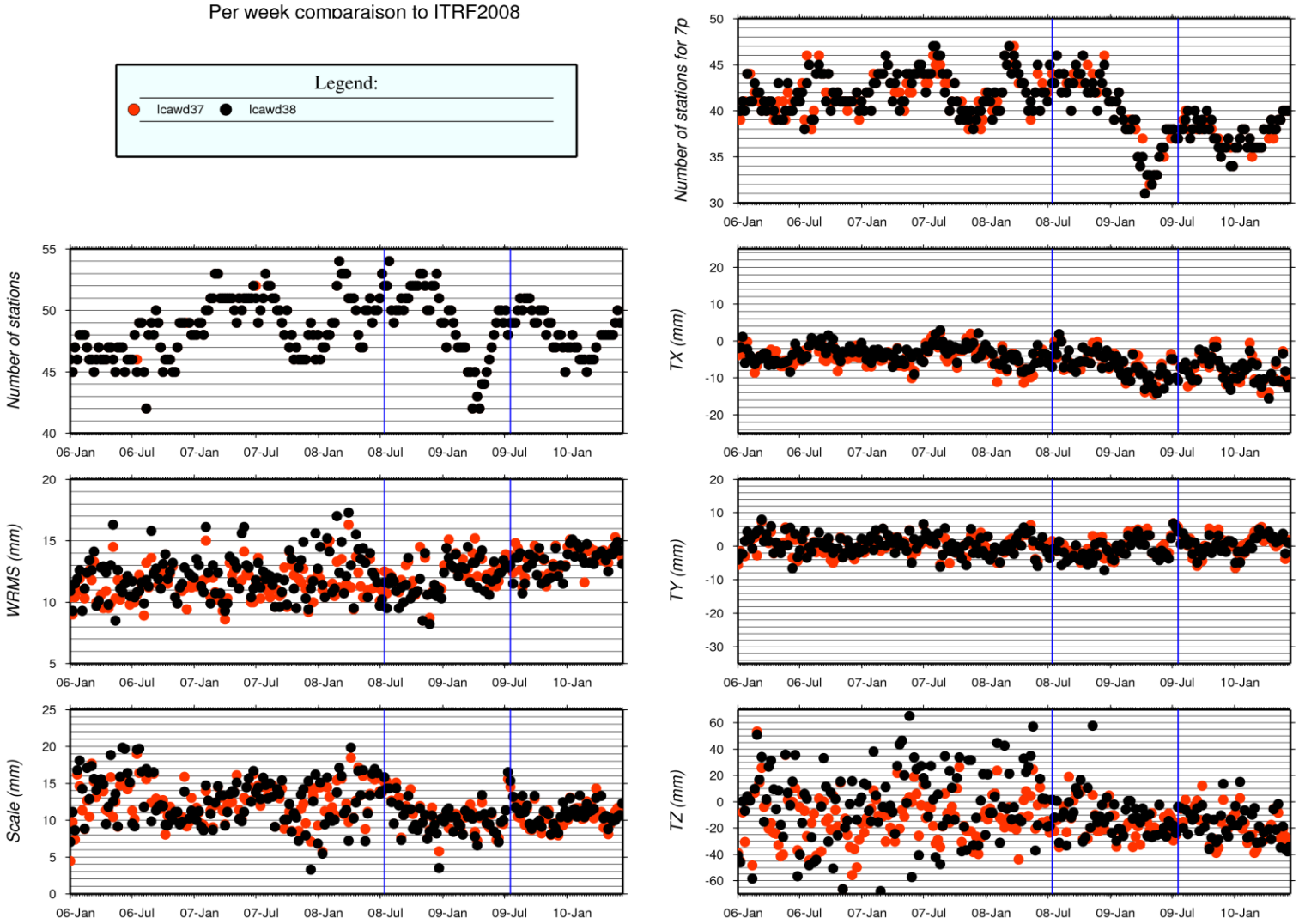
Jason-1 impact from GSC



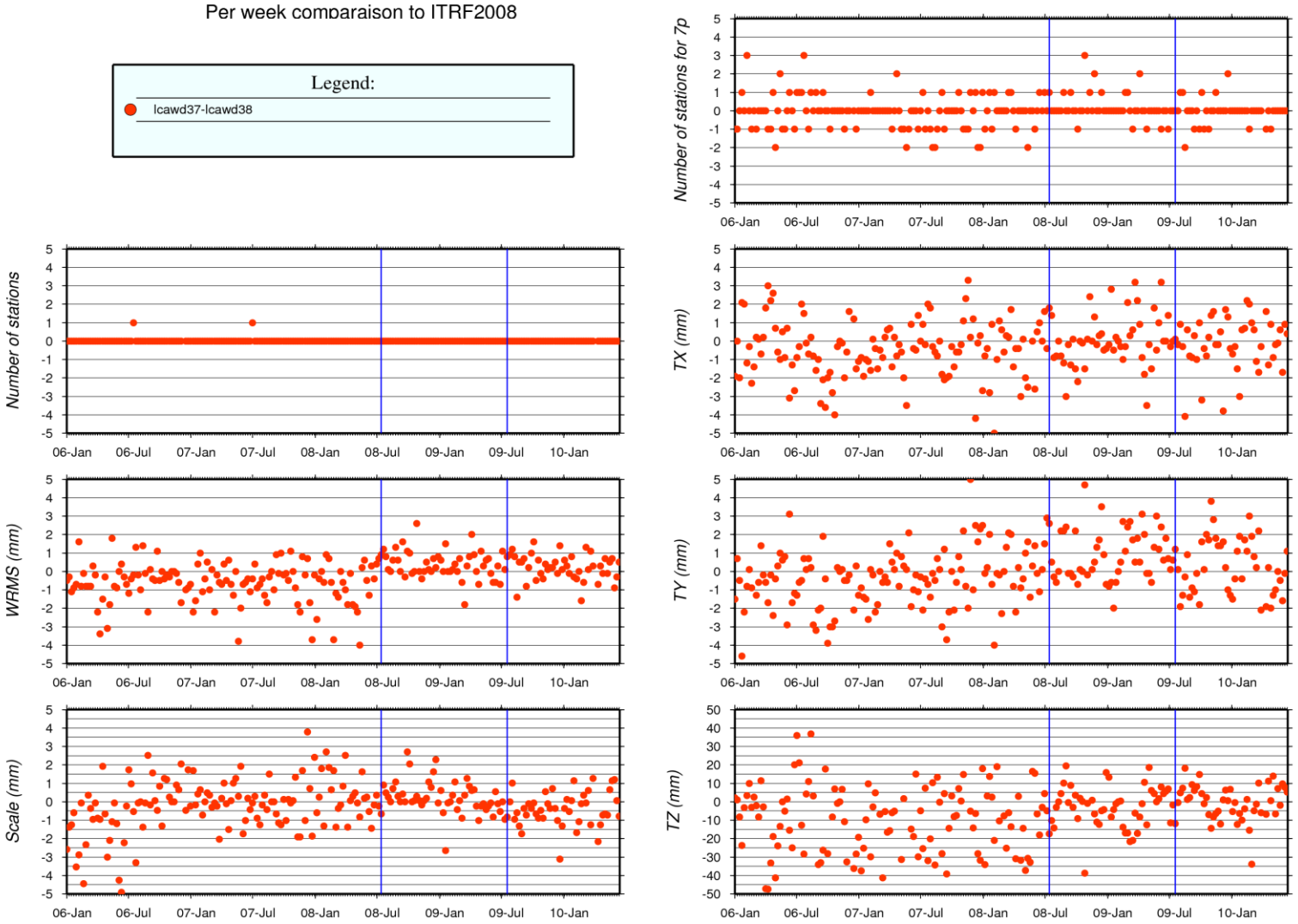
Jason-1 impact from GSC



Jason-1 impact from LCA



Jason-1 impact from LCA



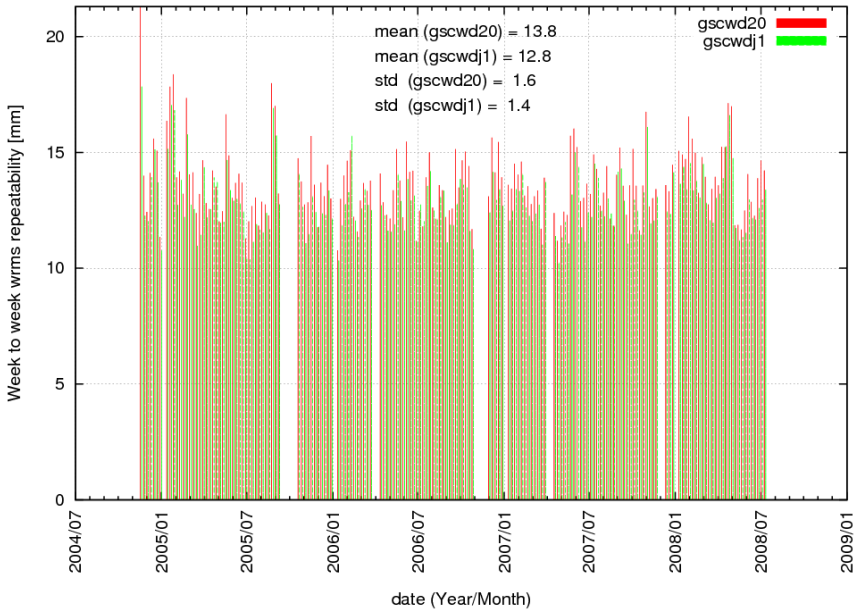
Jason-1 impact from ESA, GSC and LCA

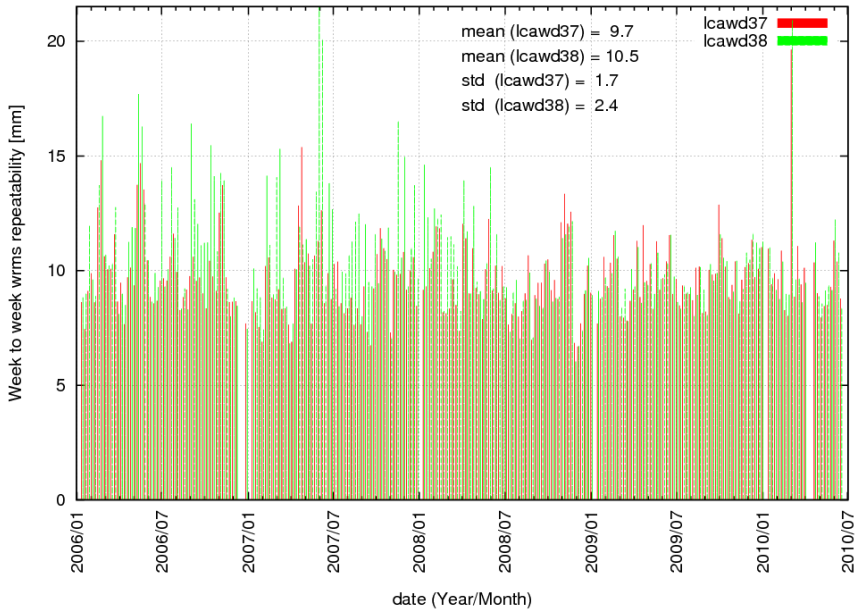
Series	Scale [mm]	Tx [mm]	Ty [mm]	Tz [mm]
ESA 08	5.71 (3.19)	-0.58 (4.37)	-0.77 (5.30)	-37.67 (23.66)
ESA 08a (w Ja1)	4.59 (**2.54**)	-0.57 (**3.68**)	-0.24 (**3.93**)	-36.78 (**18.66**)
GSC 20	3.25 (2.44)	-1.04 (5.63)	-3.09 (6.62)	-15.06 (14.99)
GSC 20_ja1	4.16 (**2.32**)	-2.44 (**5.19**)	-2.25 (**5.86**)	-15.43 (**13.25**)
LCA 37	11.69 (**2.56**)	-5.48 (**3.54**)	0.22 (**2.87**)	-14.02 (**16.56**)
LCA 38 (wo Ja1)	11.84 (2.99)	-5.12 (3.45)	0.19 (2.94)	-6.17 (24.83)

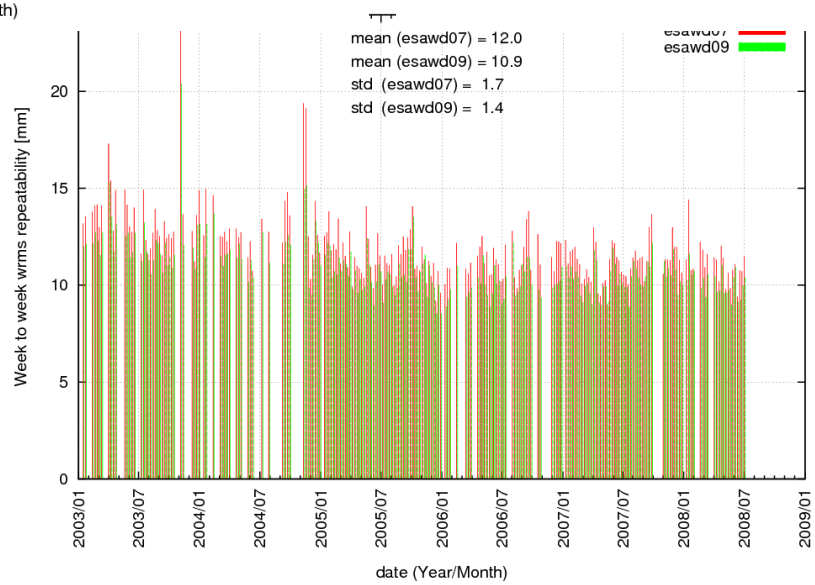
For each AC, statistics were estimated on the same samples

➔ Adding Jason-1 improves stability of almost all the Helmert parameters

Jason-1 impact from GSC and LCA







Conclusions on Jason-1 tests

- Including Jason-1 almost improve stability of all the Helmert parameters as well as week-to-week repeatability

- Excepted for LCA, adding Jason-1 improves stability of WRMS.

- Including Jason-1 also has no significant impact on EOPs

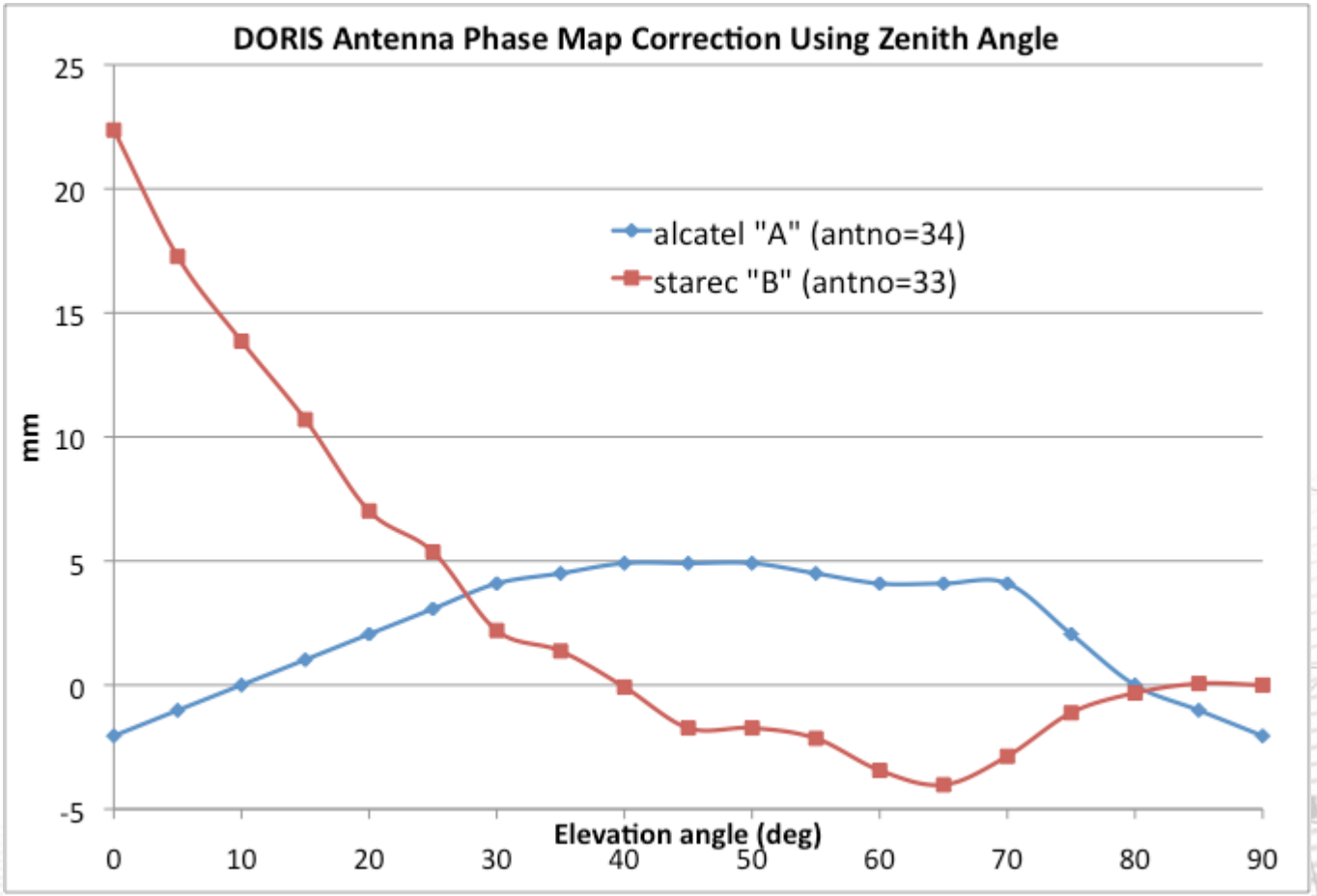
➔ What about including Jason-1 in ITRF2013 processing ?

PHASE LAWS TESTS

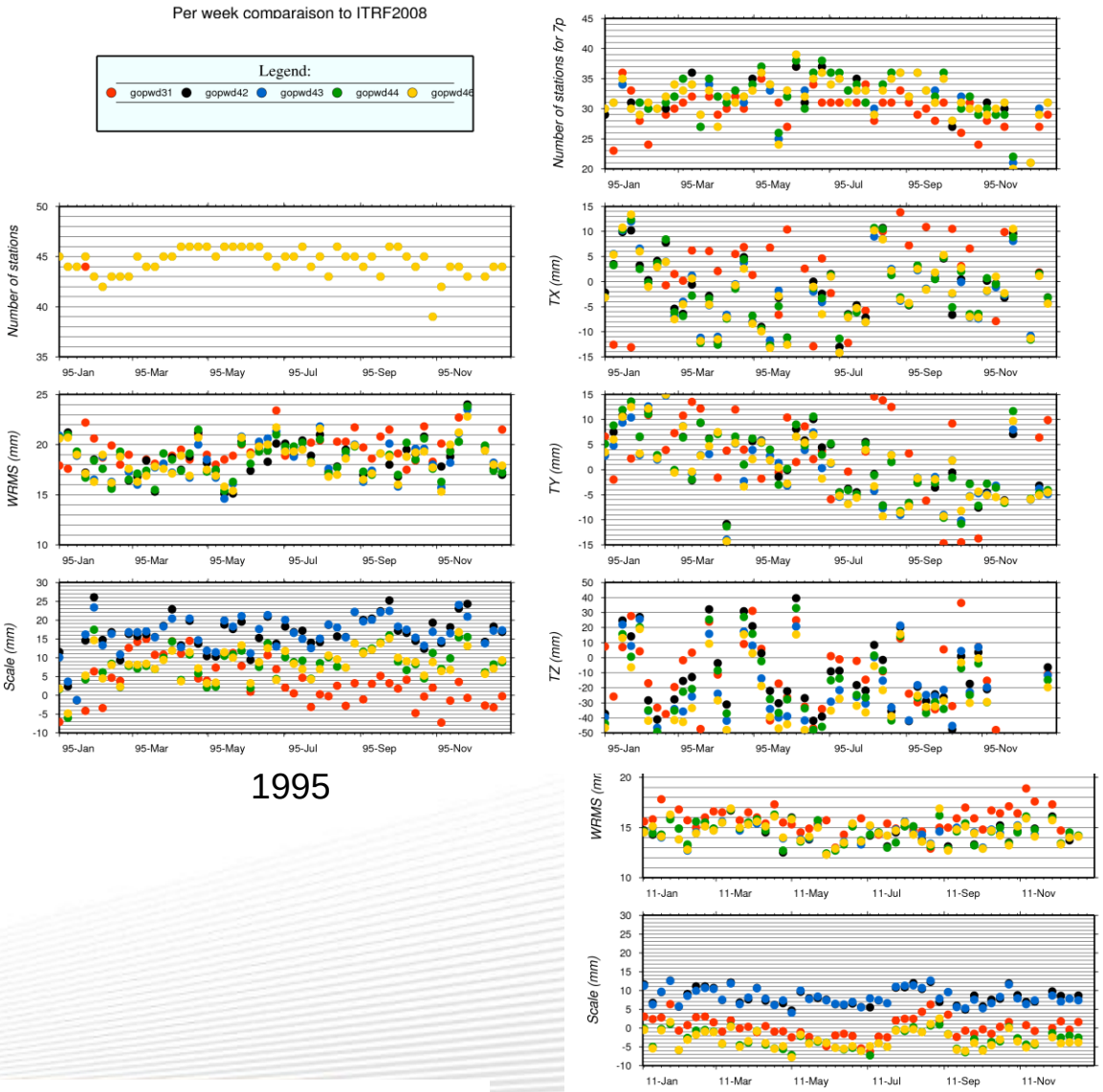
Phase law tests series

- GOP 42-46 in 1995 and 2011
  - 43 = 46 + phase law
  - 42 = 44 + phase law
- GSC 21 (==20+ phase laws) / GSC 20 from 1993 to 2012
- LCA 39 (==37 - phase law) / LCA 37 from 2009-001 to 2010-164

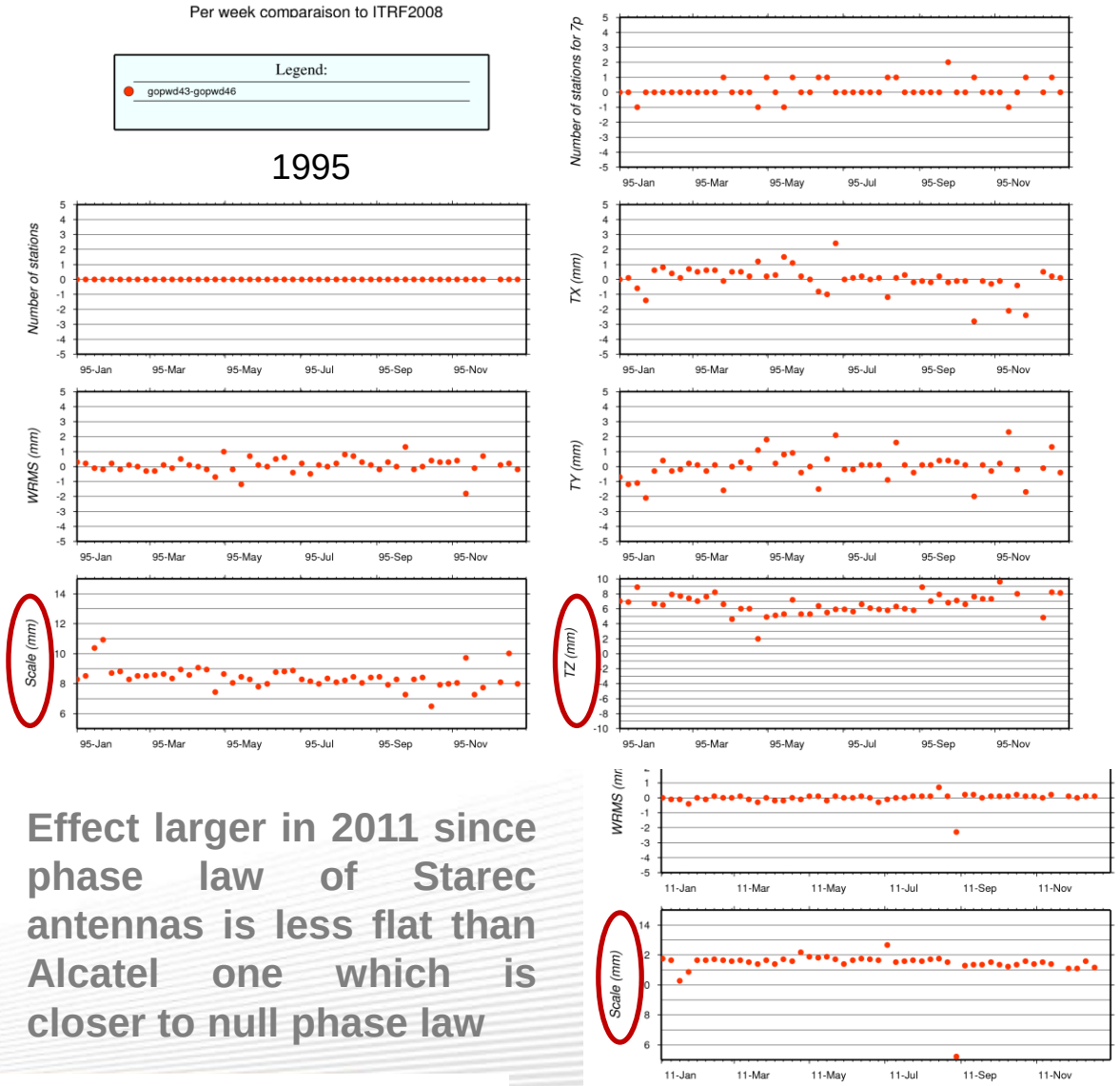
Phase laws (courtesy from Zelensky and Lemoine)



Phase laws effects from GOP

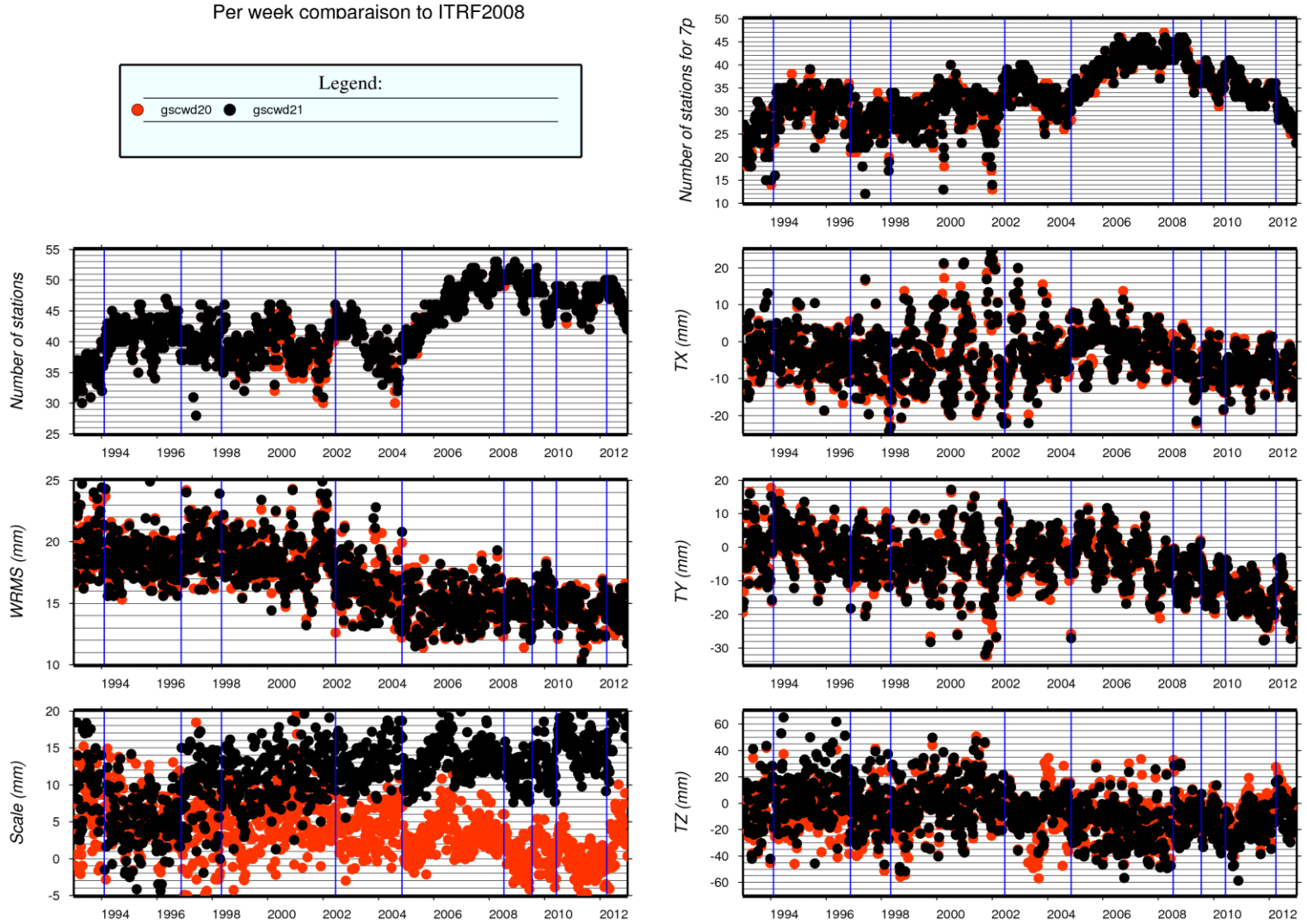


Phase laws effects from GOP

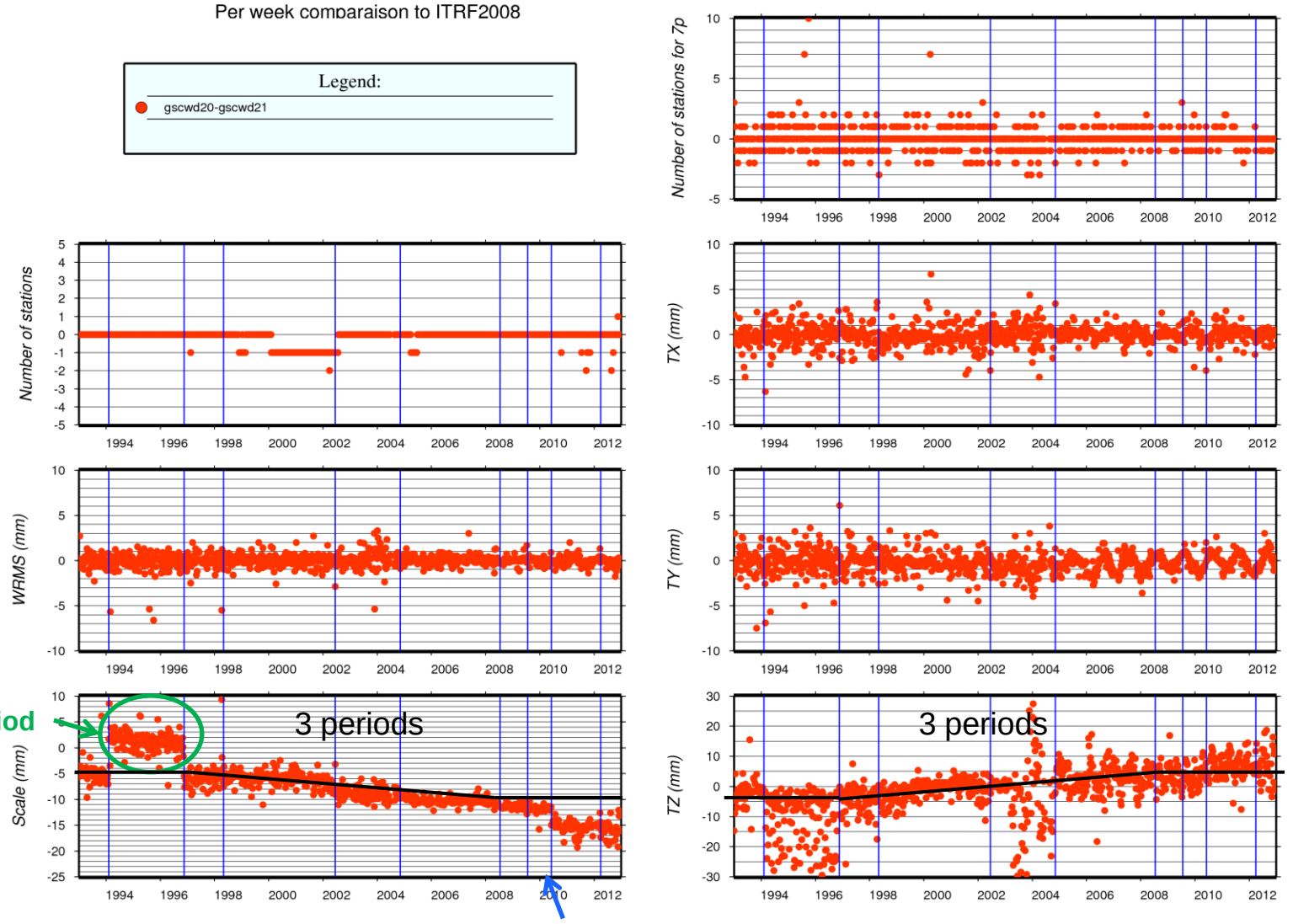


Effect larger in 2011 since phase law of Starec antennas is less flat than Alcatel one which is closer to null phase law

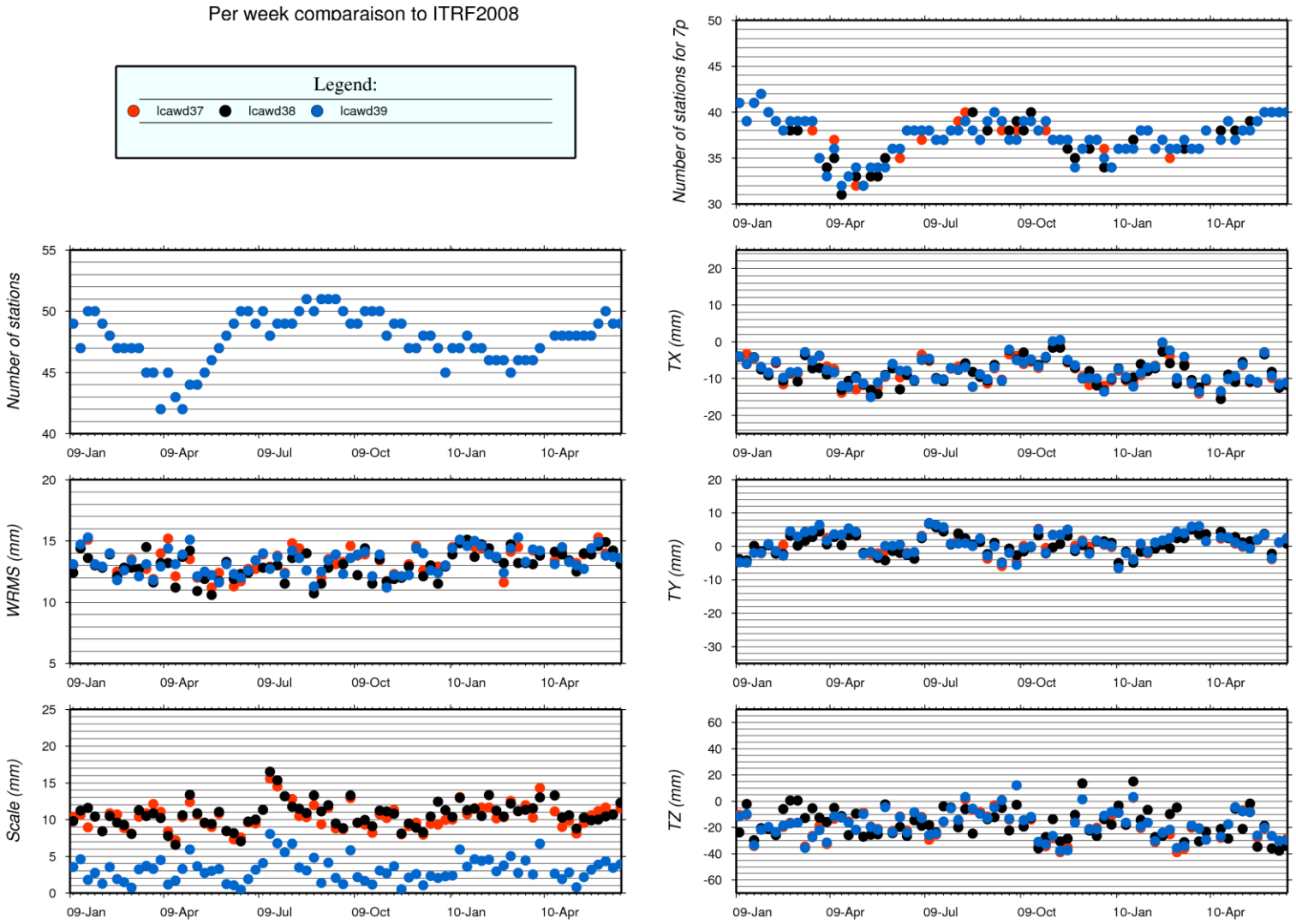
Phase laws effects from GSC



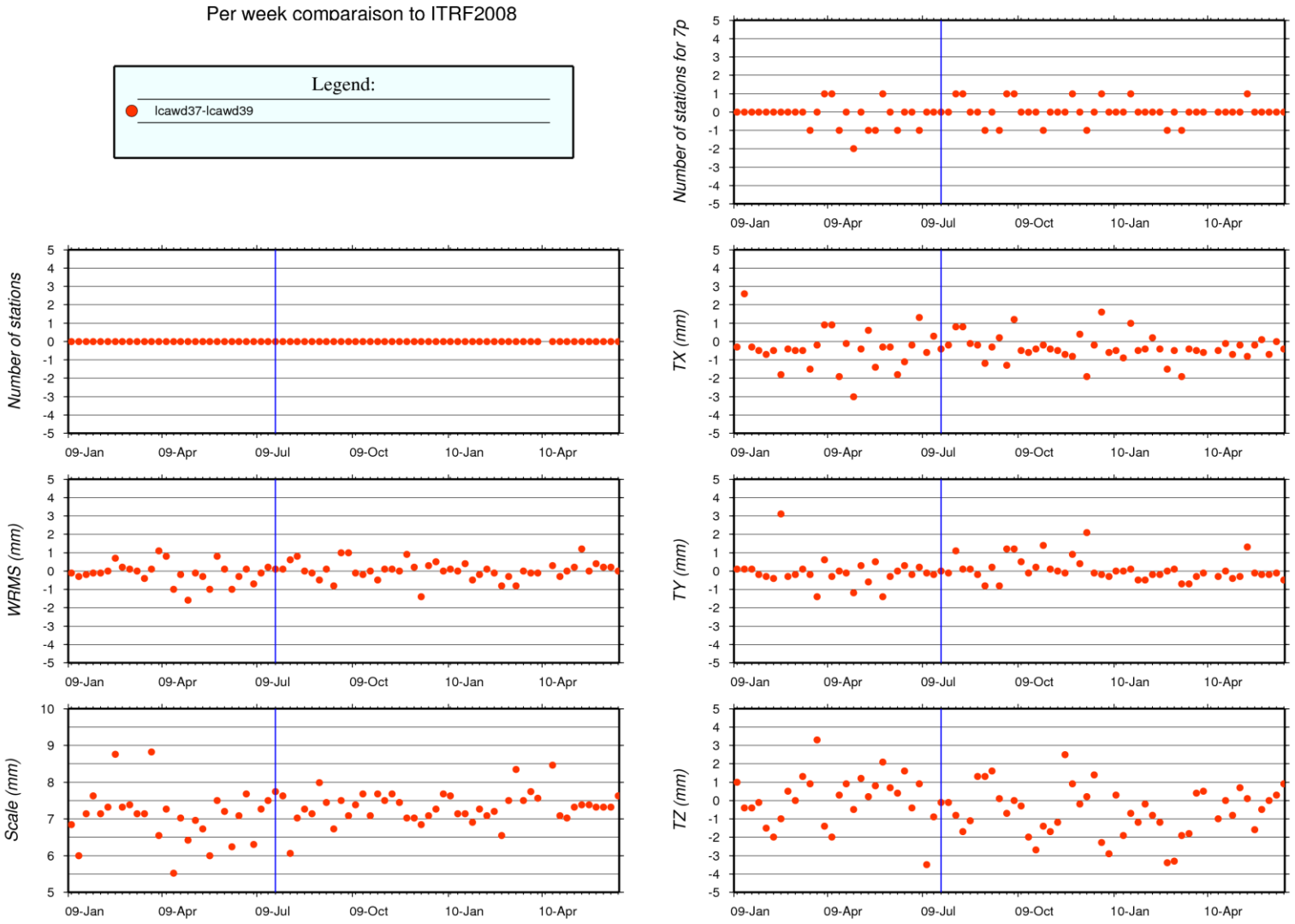
Phase laws effects from GSC



Phase laws effects from LCA (39/37)



Phase laws effects from LCA (39/37)



Phase laws effects from GOP, GSC and LCA

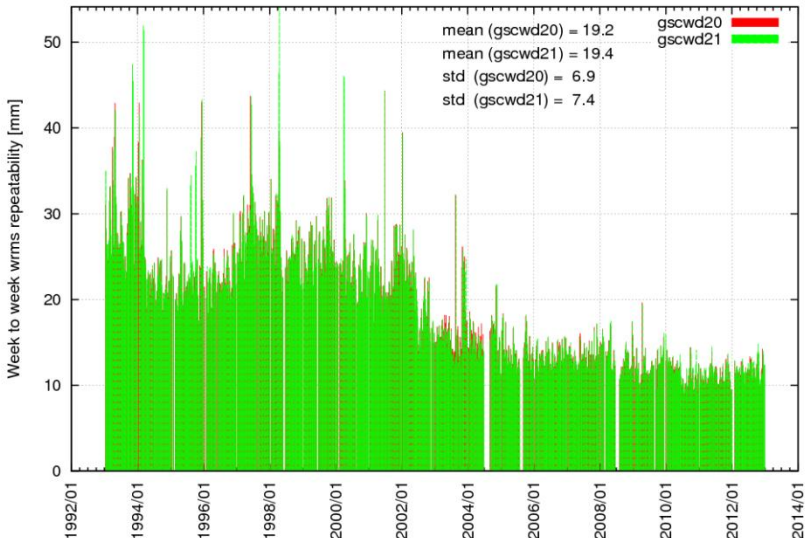
Series	Scale [mm]	Tx [mm]	Ty [mm]	Tz [mm]
GOP 43 – 1995	**16.34** (**4.64**)	-2.53 (**6.96**)	-0.27 (**7.06**)	-30.49 (**32.04**)
GOP 46 (-pl) - 1995	7.93 (4.89)	-2.53 (7.25)	-0.26 (7.28)	-37.46 (32.64)
	+8.41			
GOP 43 - 2011	5.67 (**2.96**)	-7.51 (**4.12**)	3.87 (**6.65**)	-9.00 (**11.65**)
GOP 46 (-pl) - 2011	-6.15 (2.97)	-6.86 (4.20)	4.34 (6.62)	-5.00 (11.50)
	+11.82			
GSC 20	4.47 (21.64)	-3.64 (7.71)	-4.79 (8.22)	-6.64 (17.00)
GSC 21 (+pl)	11.31 (**5.53**)	-3.58 (**7.63**)	-4.50 (**8.28**)	-5.99 (**20.53**)
	+6.84			
LCA 37	10.38 (**1.67**)	-8.25 (**3.45**)	0.94 (**3.03**)	-18.22 (**10.77**)
LCA 39 (-pl)	3.15 (1.62)	-7.88 (3.38)	0.92 (3.18)	-17.88 (10.53)
	+7.23			

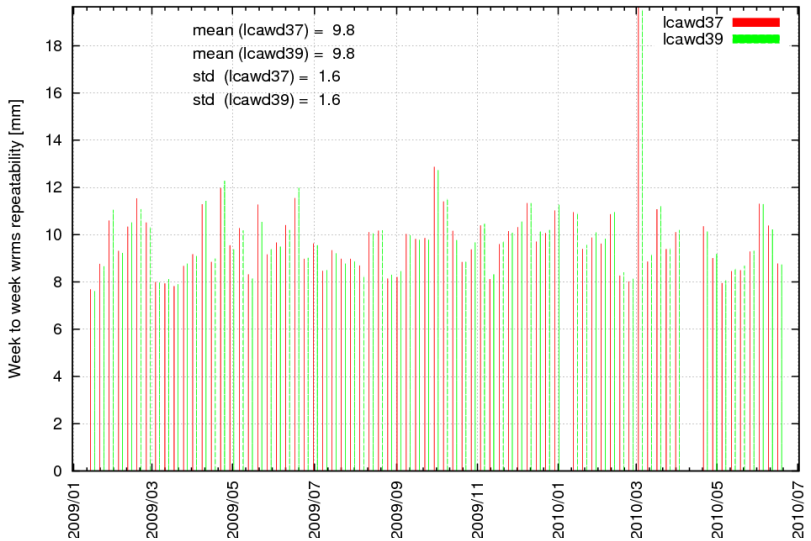
➔Using phase law positvely translate the scale

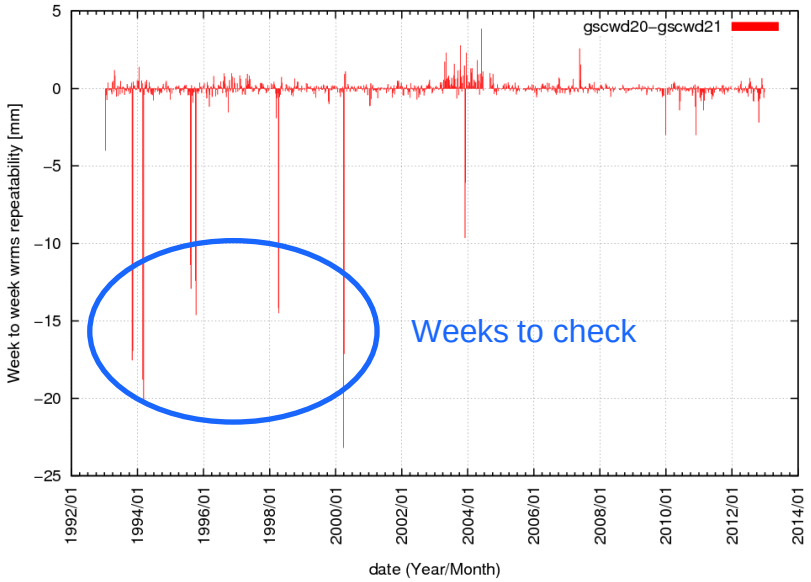
➔effects on the Helmert parameters are mitigated

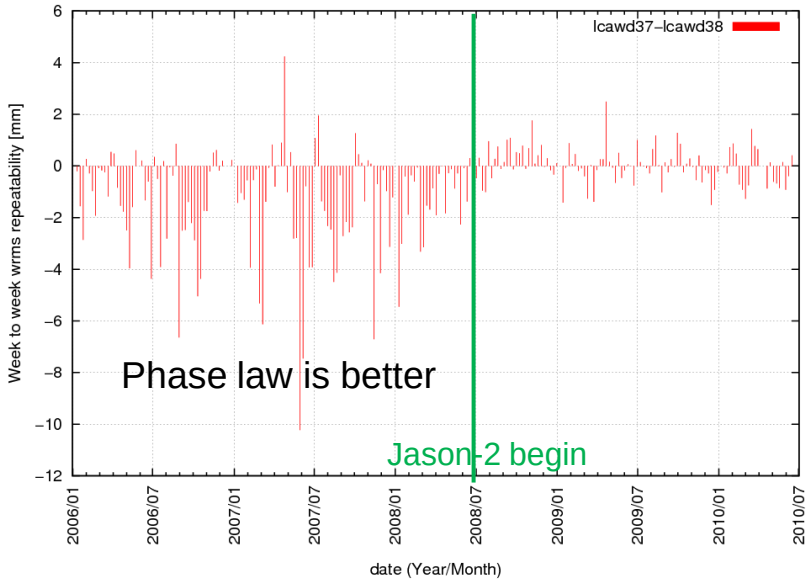
For each AC, statistics were estimated on the same samples

Phase laws effects from LCA (39/37)









Conclusions on phase laws tests

- Major impact of phase laws on the scale (around +7.5 mm in mean value)
- Impact on the scale should be correlated with the proportion of Starec antennas which present a phase law far from null phase law
- For GSC, we obswerve an anti-correlation between impact on scale and on Tz
- Effects on the other Helmert parameters are mitigated
- No significant impact on week-to-week repeatability as well as on EOPs

➔ What about using the phase laws in ITRF2013 processing ?