

中国科学院上海天文台天文地球动力学研究中心

Shanghai Astronomical Observatory, CAS

# Initial combination of our SLR weekly solutions with other Analysis Centers

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# Outline



**1、 SLR Post Processing**



**2、 precision of our weekly solutions**



**3、 Combination Of SINEX**



**4、 Conclusions and Future plans**

# 1、SLR Post Processing

## Tab1 SLR Post Processing strategy

Measurement models	Troposphere	Mendes mapping function and Mendes-Pavlis zenith delay model
	Satellite center of mass	station dependent in accordance with the official ILRS COM data
Orbit Models	Geopotential	EGM2008, 100×100degree
	Solid earth tides	IERS 2010 Conventions model
	Ocean tides	FES2004
	Ephemeris	JPL DE421
Reference Frames	Terrestrial	SLRF2014 (a priori station coordinates and station velocities)
	Tidal corrections	IERS 2010 Conventions
	Ocean loading	FES2004
	Earth Orientation Parameters	IERS 14 C04 a priori definition: SLR monument (eccentricities subtracted) at mean epoch of each arc
Estimated Parameters	Stations	a priori values: SLRF2014 a priori standard deviation: 1 m definition: x-pole, y-pole, UT1-UTC and LOD epoch: at noon of each day frequency: daily
	EOP	a priori values: IERS 14 C04 a priori standard deviation: 20 msec, 2 msec for some (non-core) stations
Range biases	Range biases	a priori value: 0 m a priori standard deviation: 1m

Introducing a modified Fuzzy C-Means (FCM) clustering algorithm into the determination of the weights of SLR station observations.

# 1、SLR Post Processing

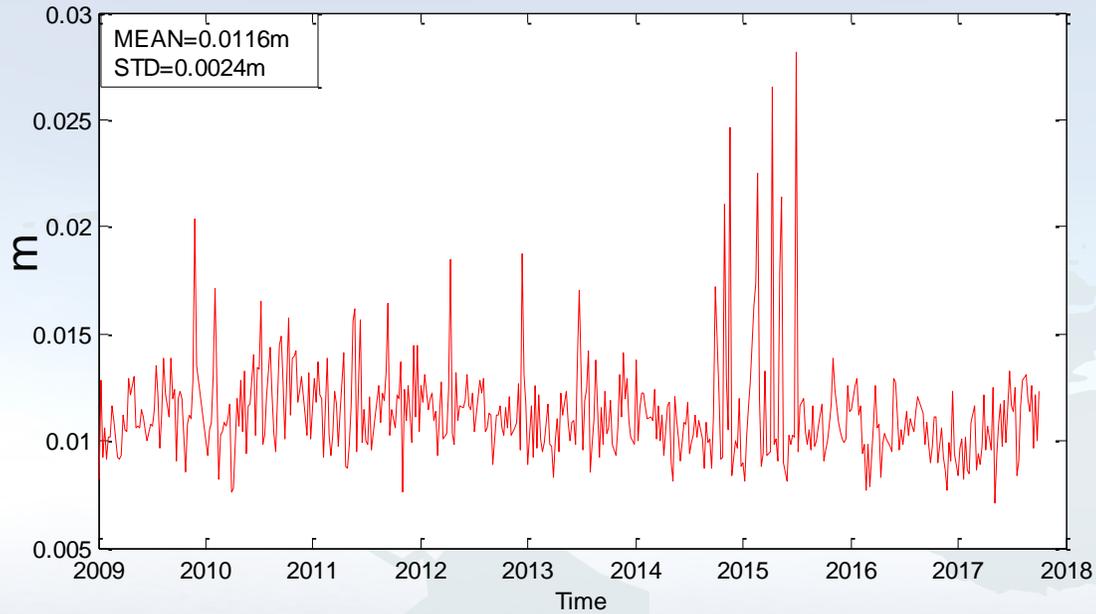


Fig1 Lageos1 Post processing RMS

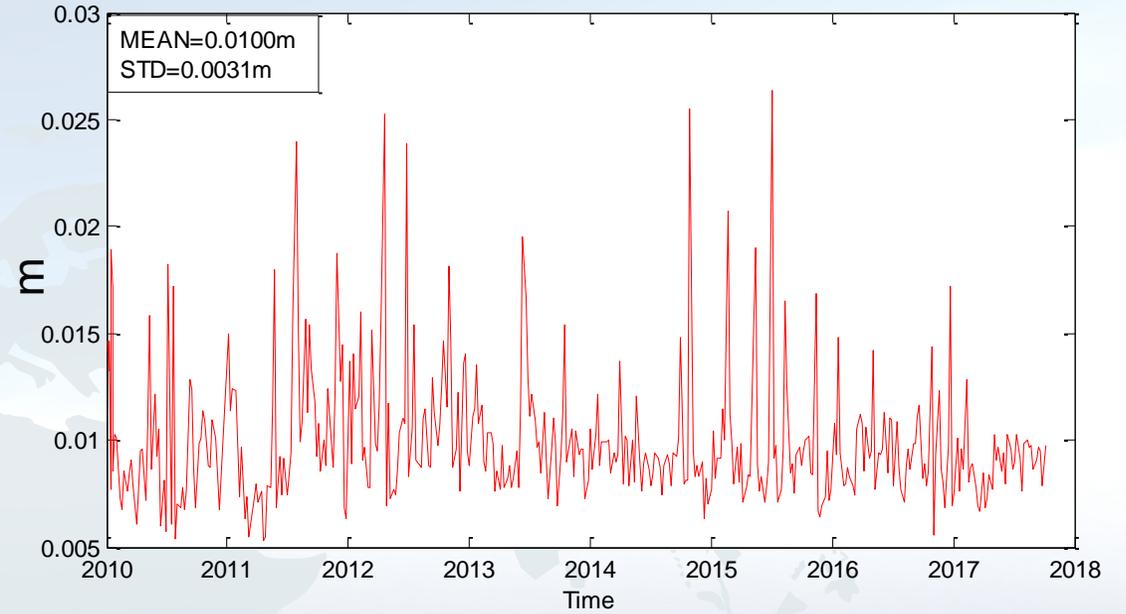


Fig2 Lageos2 Post processing RMS

# 1、SLR Post Processing

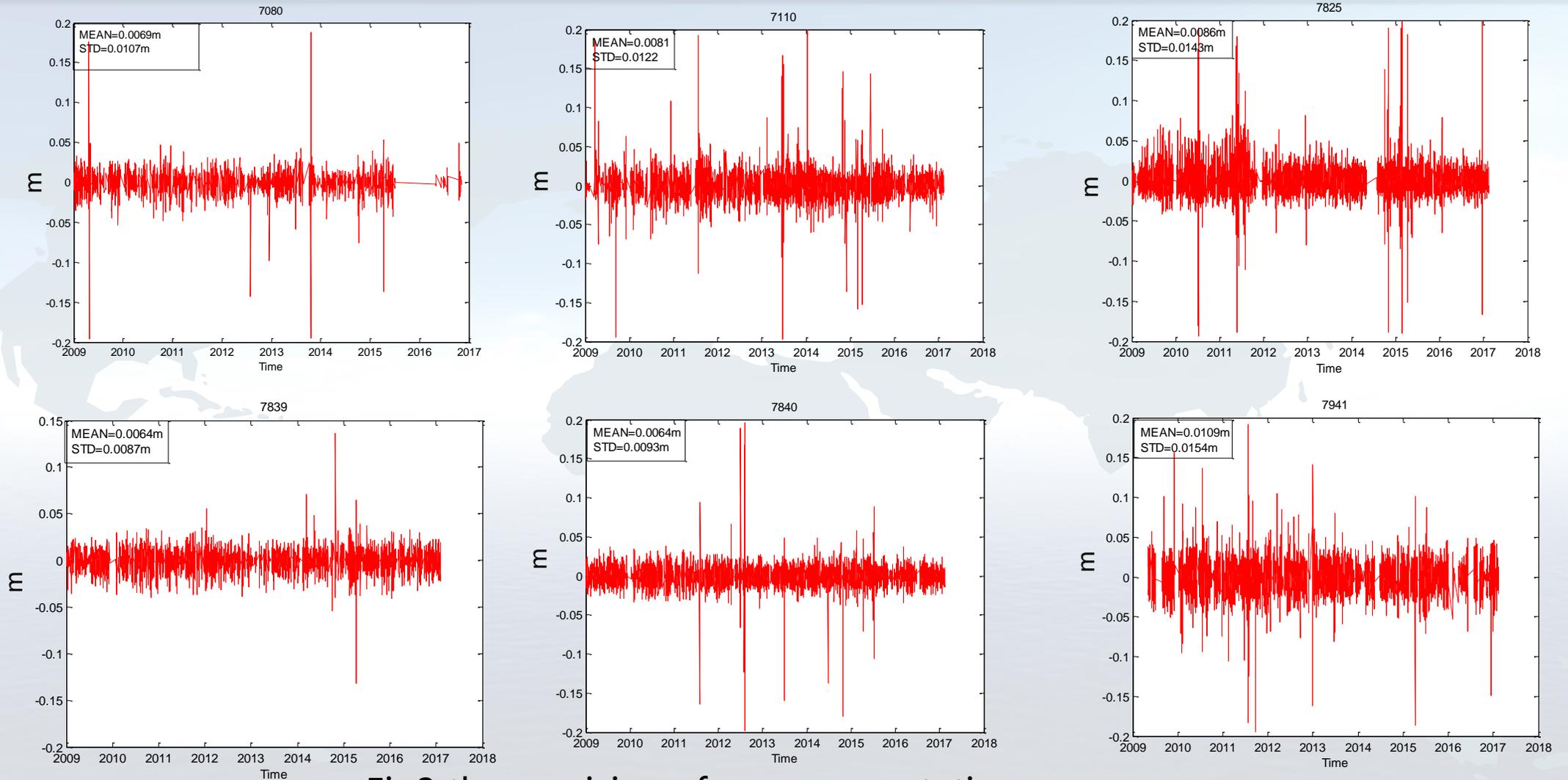


Fig3 the precision of some core station

## 2、 precision of our weekly solutions

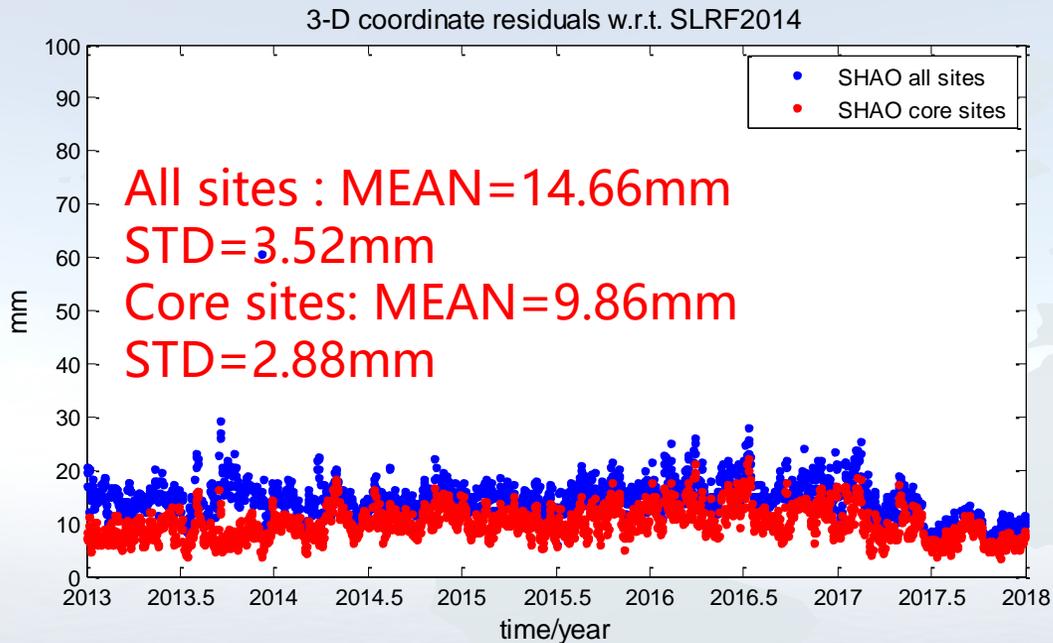


Fig4 Time series of SHAO 3-D coordinate residuals w.r.t.SLRF2014

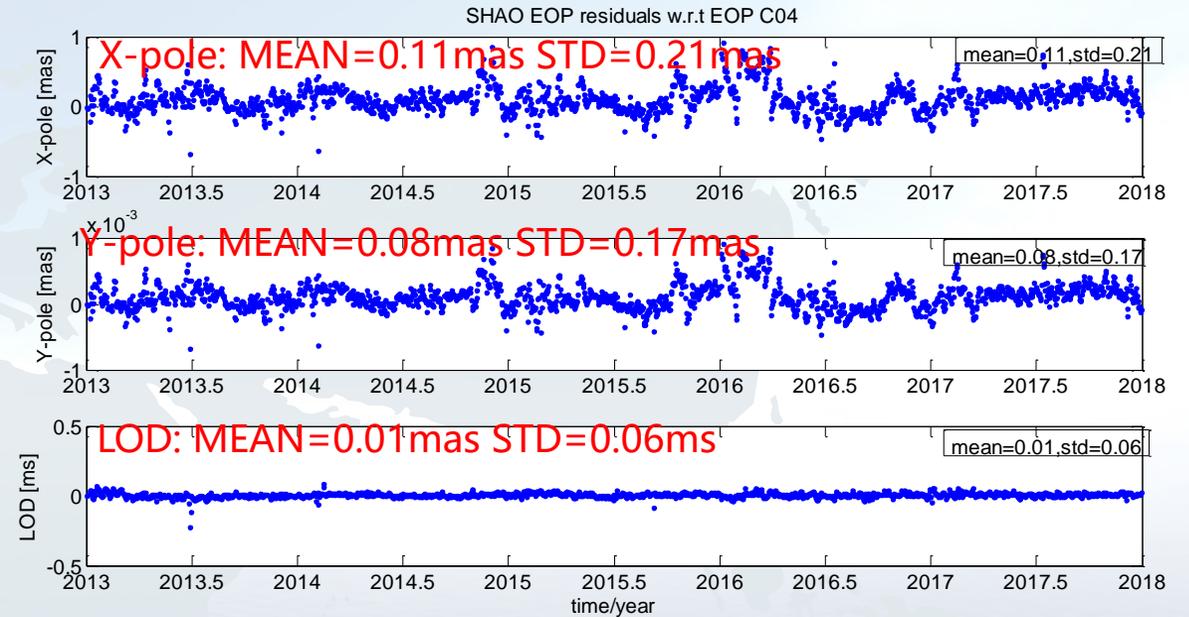


Fig5 Time series of EOP residuals w.r.t.C04

# 3、Combination of SINEX

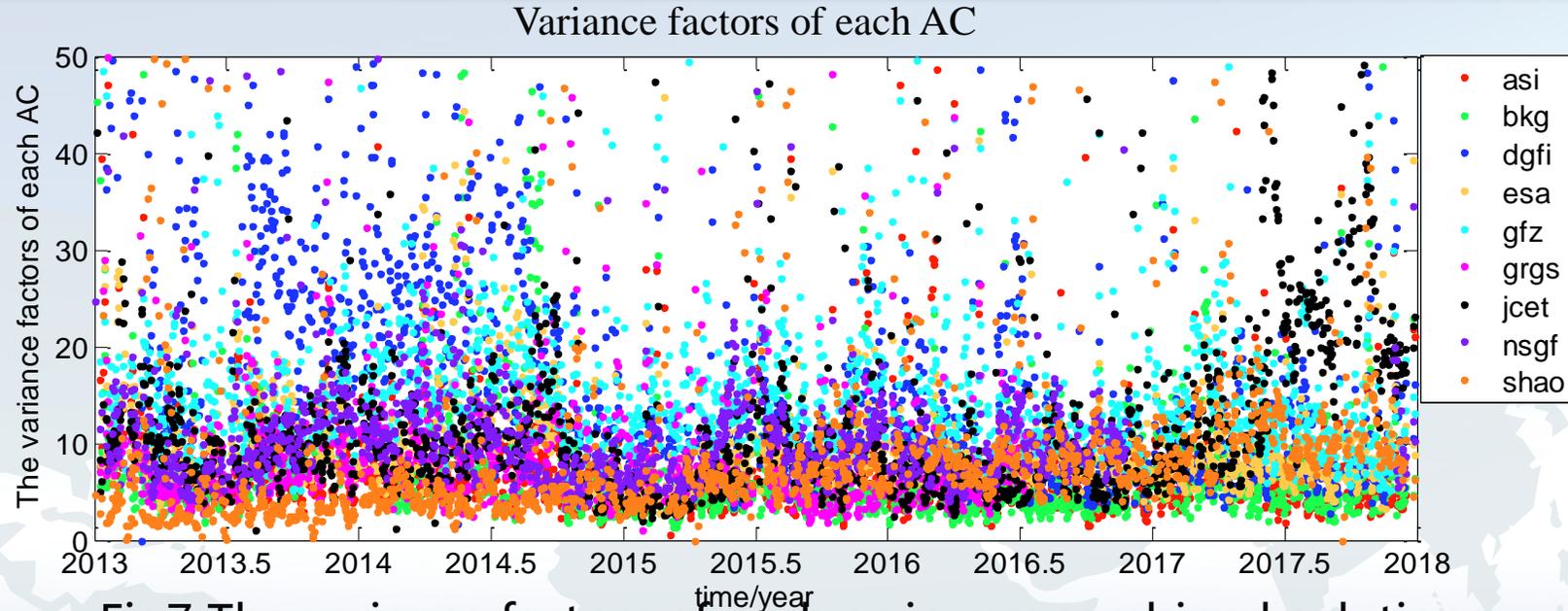


Fig7 The variance factors of each ac in our combined solutions

Tab2 Mean variance factors of each ac  
(ILRSC here represents our combined solutions)

Tab3 Mean scaling factors of each ac

ILRSC	ASI	BKG	DGFI	ESA	GFZ	GRGS	JCET	NSGF	SHAO
Mean	8.85	11.43	20.21	11.67	14.97	10.5	11.75	10.45	11.19
Std deviation	15.37	22.15	23.04	15.66	17.78	15.57	21.77	18.86	18.66
ILRSB	ASI	BKG	DGFI	ESA	GFZ	GRGS	JCET	NSGF	SHAO
Mean	2.87	3.2	17.5	4.16	7.04	4.92	10.87	7.93	*
Std deviation	15.9	4.2	75.74	2.3	4.21	4.46	21.45	10.05	*

ILRSA	ASI	BKG	DGFI	ESA	GFZ	GRGS	JCET	NSGF
Mean	7.59	8.03	19.68	8.48	8.75	14.61	8.83	10.53
Std deviation	49.5	18.0	62.31	19.43	15.44	40.51	30.88	17.00

# 3、Combination of SINEX

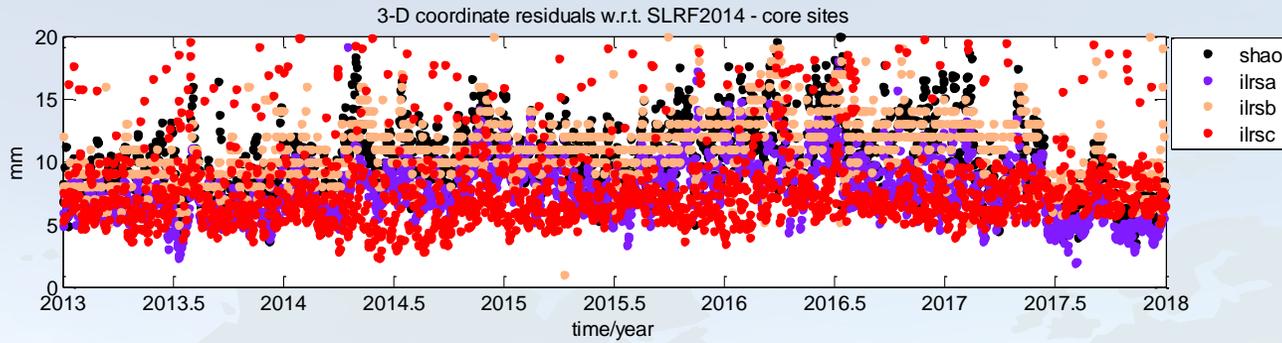


Fig8 3-D WRMS of the core site coordinates residuals with respect to SLRF2014

Tab4 3-D WRMS of the core site coordinates residuals with respect to SLRF2014 (mm)

	SHAO	ILRSA	ILRSB	ILRSC
Mean	10.86	7.73	10.71	8.63
Std	3.88	2.30	2.56	3.05

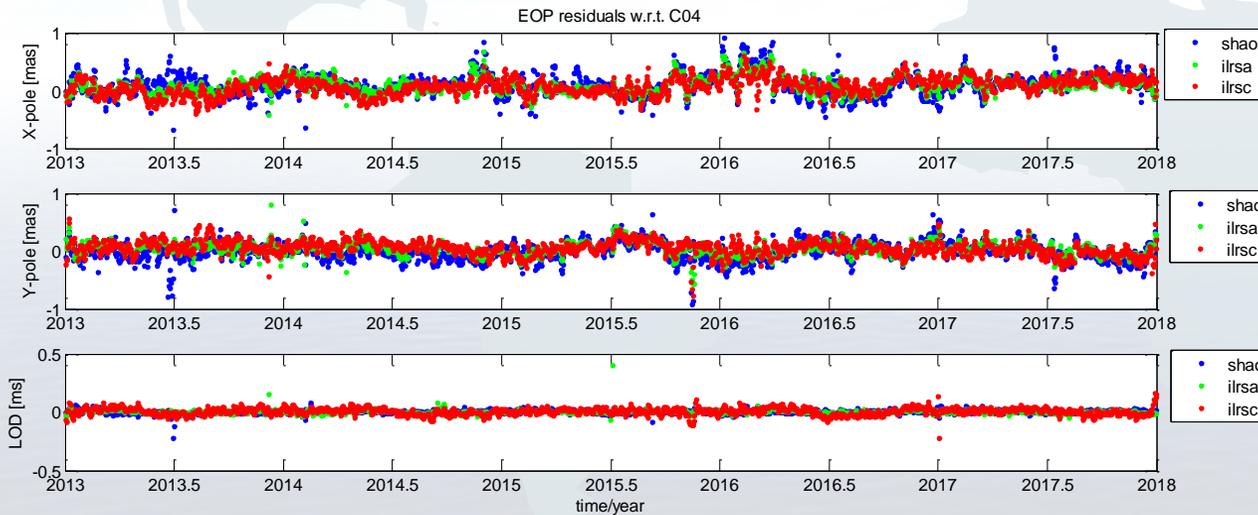


Fig9 EOP residuals with respect to C04

Tab5 EOP residuals with respect to C04 (mas, ms)

	SHAO			ILRSA		
	XP	YP	LOD	XP	YP	LOD
Mean	0.11	0.08	0.01	0.09	0.04	0.005
Std	0.21	0.17	0.06	0.14	0.11	0/02
	ILRSB			ILRSC		
	XP	YP	LOD	XP	YP	LOD
Mean	*	*	*	0.09	0.05	0.008
	*	*	*	0.14	0.12	0.03

# 3、Combination of SINEX

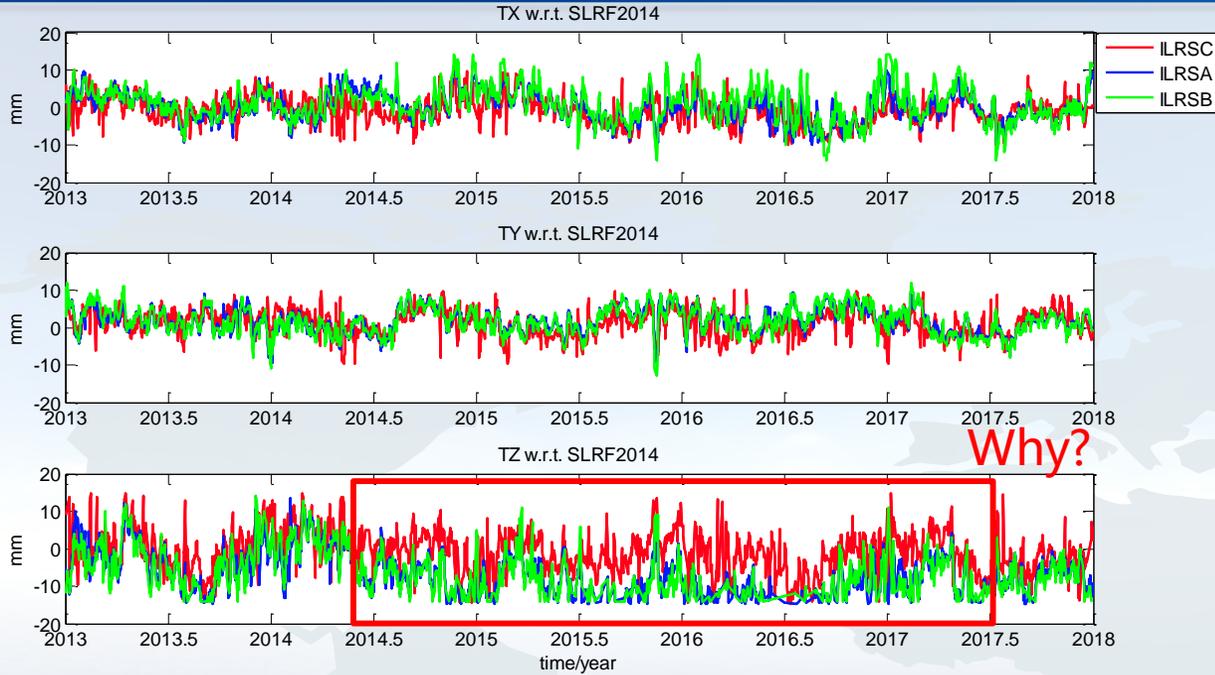


Fig10 The translation parameter with respect to SLRF2014

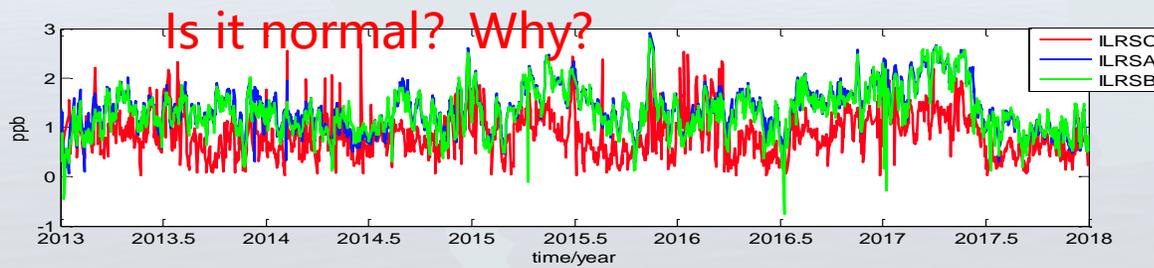


Fig11 The scale parameter with respect to SLRF2014

Tab6 The translation and scale parameter with respect to SLRF2014 (mm, ppb)

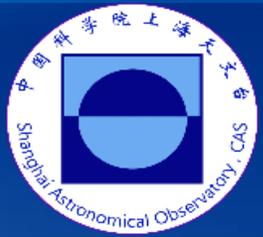
	ILRSA				ILRSB			
	TX	TY	TZ	scale	TX	TY	TZ	scale
Mean	0.01	1.89	-6.12	1.36	0.82	1.79	-8.46	1.30
Std	3.72	3.15	5.56	0.46	4.43	3.84	8.25	0.47
	SHAO				ILRSC			
	TX	TY	TZ	scale	TX	TY	TZ	scale
Mean	-1.90	1.65	-0.03	1.13	-0.84	1.25	-0.83	0.86
Std	3.40	3.76	6.66	0.51	3.49	3.36	5.44	0.44

## 4. Conclusions and Future plans

- ❑ The precision of our SHAO weekly solutions can meet the needs of ILRS, the mean value of 3-D coordinate residuals w.r.t. SLRF2014 for **all sites is 14.66mm**, for **core sites is 9.86mm**, and the mean value of EOP residuals w.r.t. CO4 for **XP is 0.11mas**, for **YP is 0.08mas** and for **LOD is 0.01ms**.
- ❑ The calculated variance factors show that our SHAO weekly solutions have a same precision with other ACs.
- ❑ 3-D coordinate residuals w.r.t. SLRF2014 and EOP residuals w.r.t. CO4 of our combined product show a good consistency with ILRSA and ILRSB
- ❑ **The trend of our translation parameter TZ and scale Parameter w.r.t. SLRF2014 are different from ILRSA and ILRSB. Why?**

## 4. Conclusions and Future plans

- ❑ Add satellite ETALON1 and ETALON2 to regenerate our SHAO weekly SINEX files and combined products.
- ❑ Comparing our translation parameters with dynamic geocenter motion.
- ❑ Comparing our scale parameters with the scale derived from VLBI.



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**Thank you for your attention!**

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