Consistency of MGEX products

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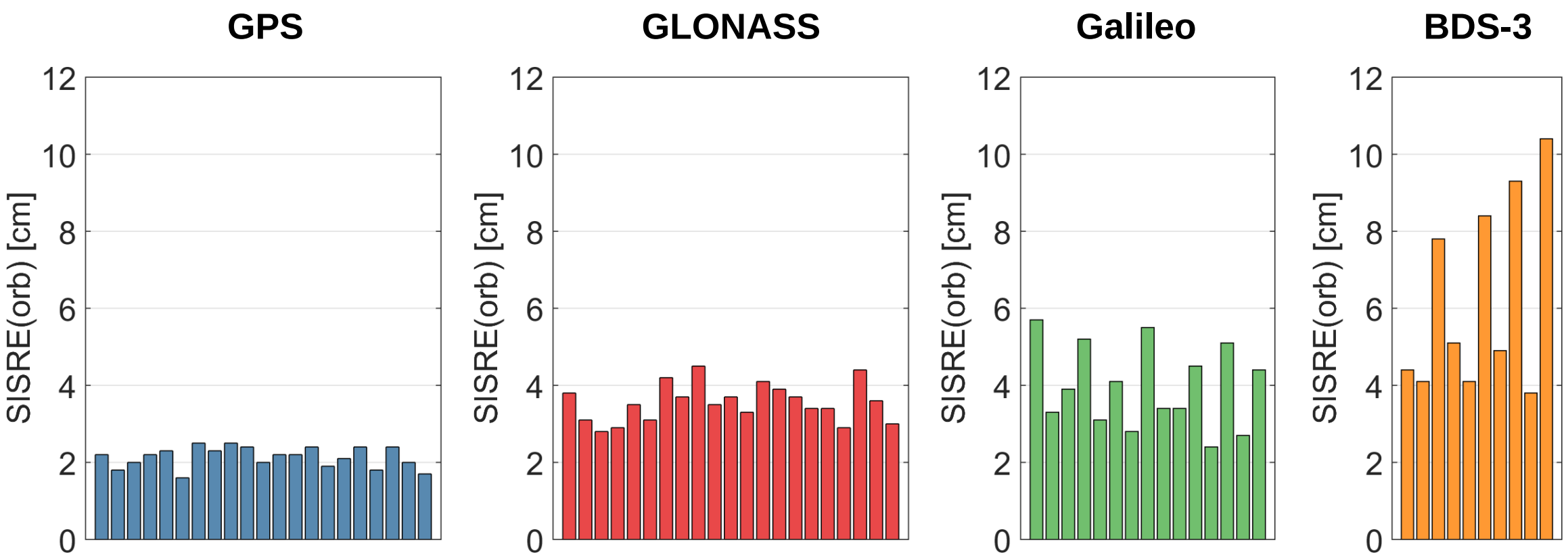
MGEX Orbit and Clock Products

Analysis Center	GPS	GLO	GAL	BDS-3	BDS-2	QZSS	Clocks
CNES/CLS	X	X	X				30 s
CODE	X	X	X	X	X	X	30 s
GFZ	X	X	X	X	X	X	30 s
IAC	X	X	X	X	X	X	30 s
JAXA	X	X				X	30 s
SHAO	X	X	X	X	X		5 min
WUM	X	X	X	X	X	X	30 s

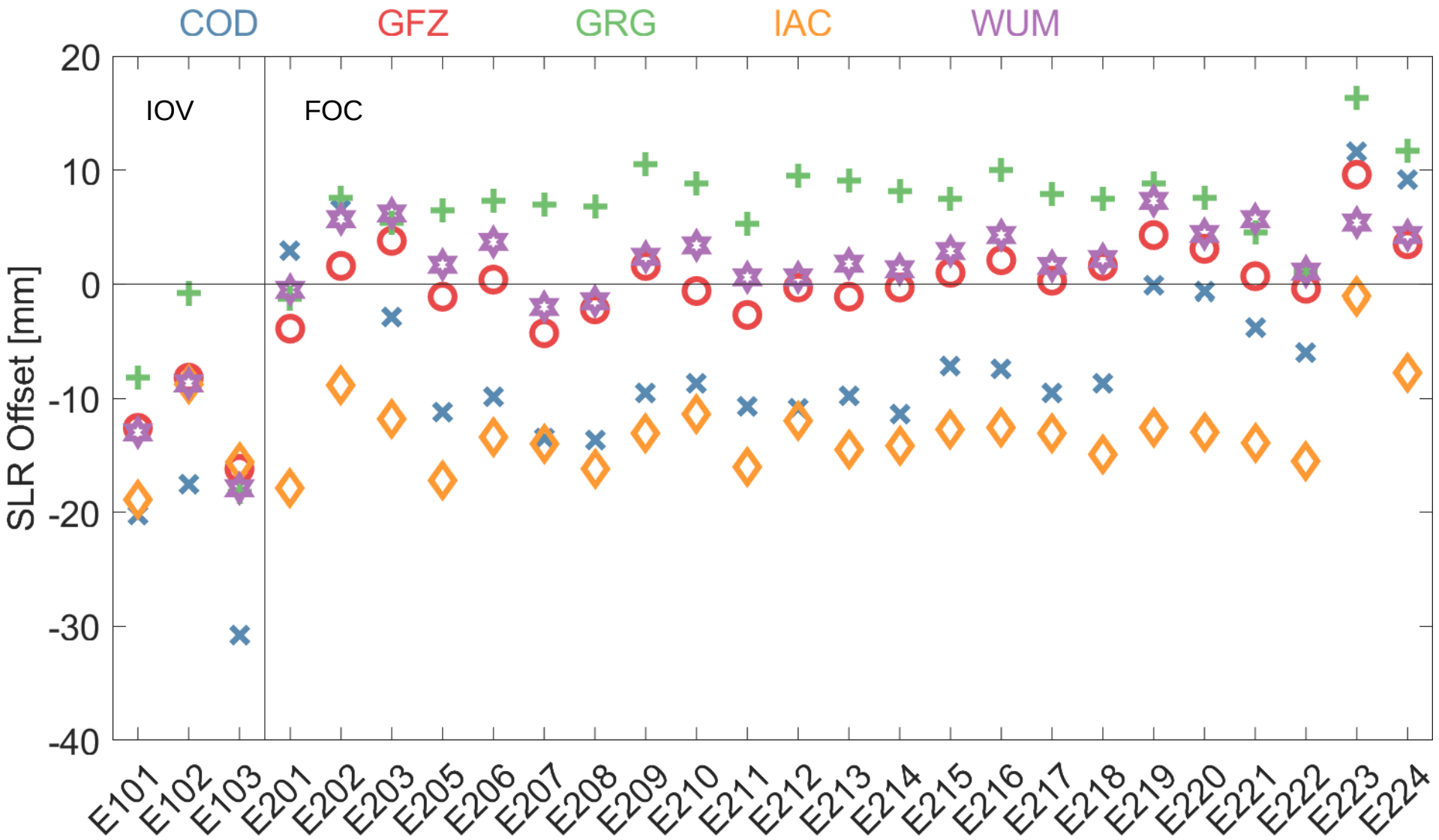
MGEX Orbit Consistency



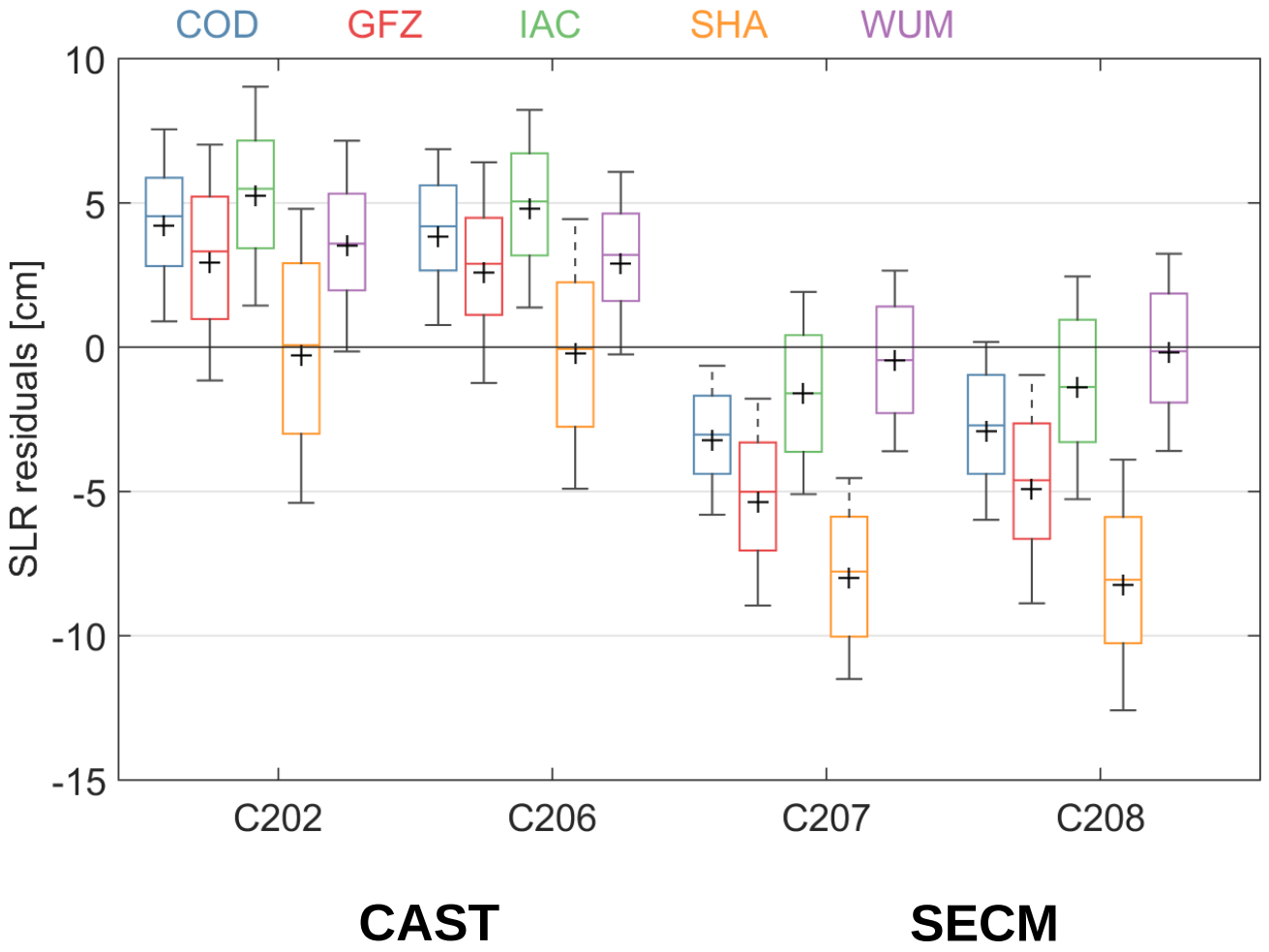
$$\mathrm{SISRE}_{\mathrm{orb}} = \sqrt{w_1^2 R^2 + w_2^2 \left(A^2 + C^2\right)}$$

May 2022, only MEO satellites for BDS-3

Galileo Satellite Laser Ranging Residuals



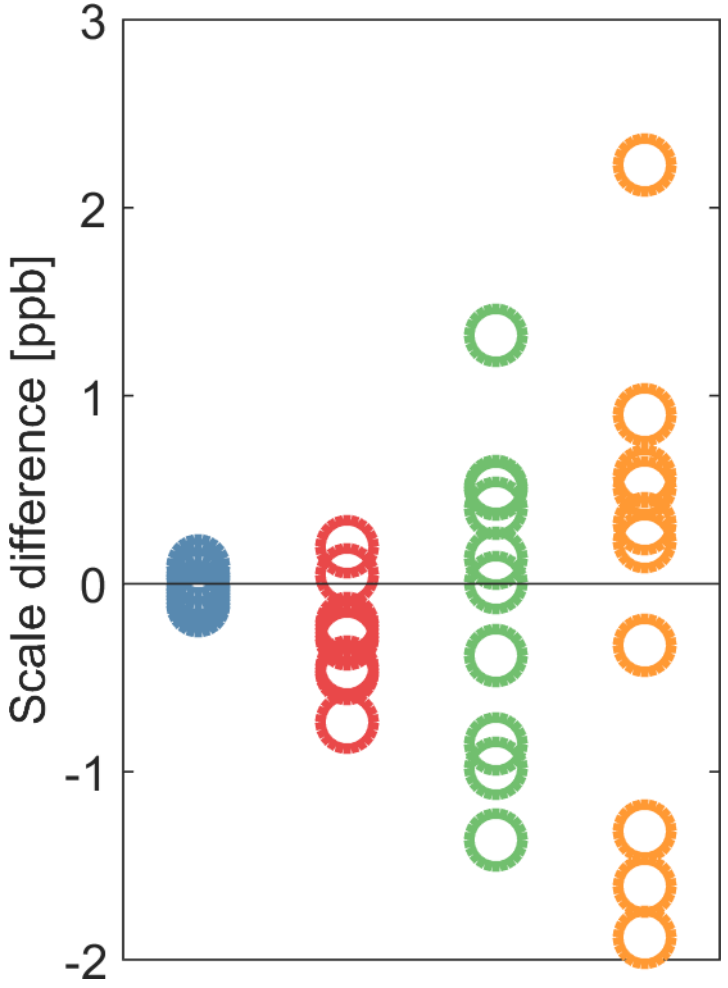
BDS-3 Satellite Laser Ranging Residuals

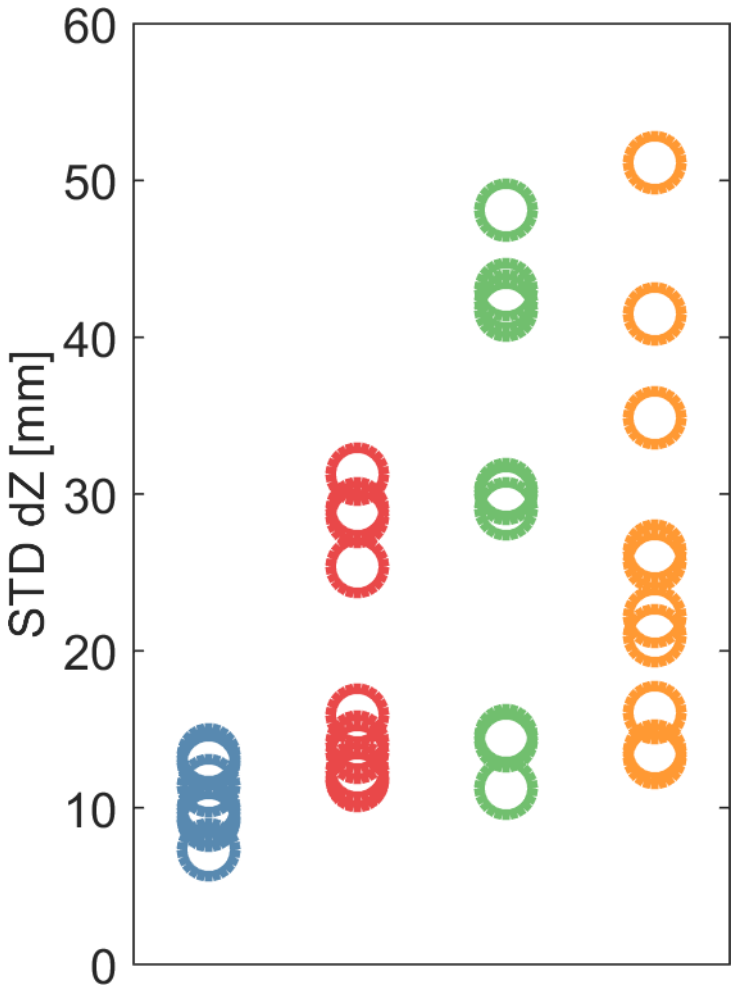


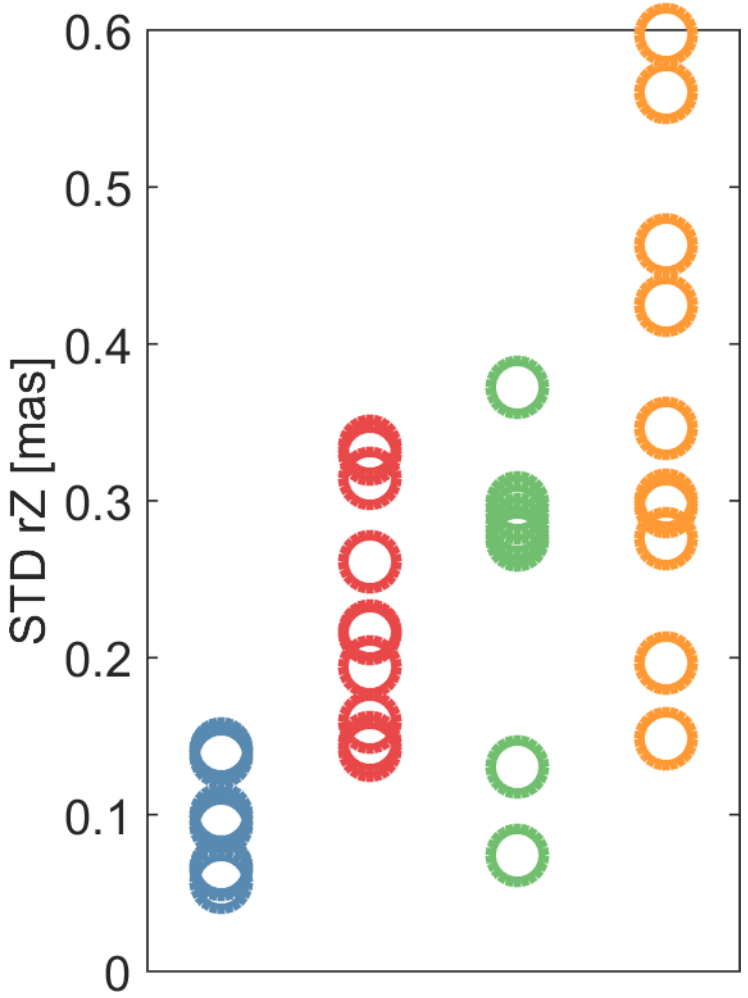
AC	Albedo/IR	Antenna Thrust		
		MEO CAST	MEO SECM	IGSO
COD	No	310 W	280 W	--
GFZ	No	310 W	280 W	100 W
IAC	Yes	200 W	200 W	200 W
SHA	No	--	--	--
WUM	Yes	310 W	280 W	100 W

AC modeling options not as homogeneous as for GPS

Orbit Scale; Translation and Rotation Stability



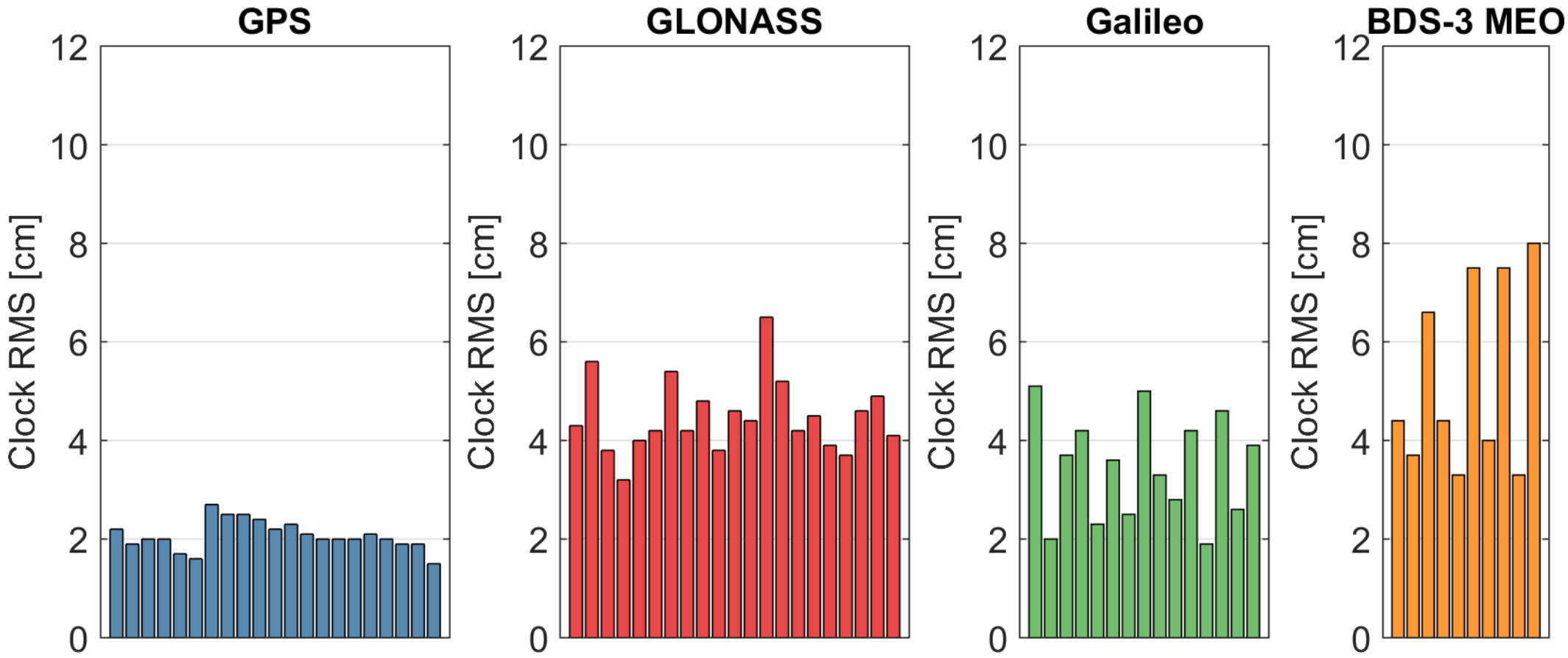




March 2021-February 2022, only MEO satellites for BDS-3, only ACs processing all 4 constellations

GPS GLO GAL BDS-3

MGEX Clock Consistency



RMS of inter-AC clock differences after removing a constellation mean bias per epoch and a daily satellite-specific bias for May 2022, only MEO satellites considered for BDS-3

Open Issues

- All IGS ACs are encouraged to process at least all global constellations (GPS, GLO, GAL, BDS-3)
- Analysis summaries not available for all MGEX ACs
- More diverse processing options for BDS-3 than for GPS resulting in degraded consistency
- Do we need detailed recommendations for GAL and BDS modeling as for GPS/GLO repro3?
- BDS-3 SRP modeling deficiencies
  - Incomplete metadata
    - Optical properties
    - Geometry (SAR-antenna, T-shape)
- Extended coverage of SLR tracking of the BDS-3 constellation is strongly encouraged
- How to handle reference frame consistency within and across individual MGEX products?