The current status and future plans of the GSC AC

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Summary of Current Modelling after ITRF2020

	ITRF2020
Gravity Modeling	New background gravity model: GOCO05s: (a) annual and secular terms for post 2003. (b) adapted model for pre 2003.0 (no secular terms).
AOD product	RL06 3hrly atmosphere-ocean dealiasing product (provided by GFZ for GRACE FO)
Troposphere	VMF1
Atmosphere density	MSIS86
TSI	1360.8 W/m^2 (Koop & Lean, 2011)
Satellite Attitude	Internal attitude laws (Sentinel-3A/3B, HY-2A) • Body & solar array quaternions for Jason 1,2,3 satellites. • Body quaternations for some TOPEX arcs.

	ITRF2020
GEODYN Versions	2106
Default arc length	7 days, except for data gaps or maneuvers.
Elevation cutoff	7°
Elevation-dep. weighting	Applied
Station coordinates: DORIS, SLR	DPOD2014_v05.5; SLRF2014 (v200428)
Data:	DORIS V2 for HY-2A, Cryosat-2, Saral

Updates Planned or in Progress (1)

		Status
Station Coordinates DORIS, SLR	Switch to DPOD2020/SLRF2020.	Waiting. **SLRF2020 still not available.**
Gravity Modelling	Update to new static & TVG gravity model	Evaluation in progress
Data	Replace V2 processing for DGXX Satellites (Cryosat-2, HY-2A, Saral) with RINEX processing.	In progress.
GEODYN	Adopt GEODYN III (old versions no longer supported).	In progress.
Jason-2	Replace solutions 2008-2016 with RINEX data & T2L2-based corrections.	After IDS AWG
S6A, S3A, S3B	Introduce GPS modelling of USO following Stepanek et al.	2023

Updates Planned or in Progress (2)

		Status
HY-2A	Adopt SAA strategy and create new background series. (gscwd53)	In progress. **(by next week)**
HY-2A	Assess application of geodetic vs. geocentric pointing, & improved macromodel	2023
HY-2C & HY-2D	Implement Attitude Laws & Process data	2023
SWOT	Devise plan for nonconservative modelling	2023. w/ AWG?
Weighting	Revisit weighting of data sets in weekly solutions.	TBD

Summary of Recent SINEX Submissions for ITRF2020

Series	Description	Comment
gscwd50	with adj radial z-offsets for Jason-1, adj radial z offsets for SPOT-2 after 2007/11/13, no SPOT-4 after 2013-01-11, start Envisat on 2004/11/07 with Jason-1	Implemented at request of IDSCC
gscwd51	gscwd50 + Add Sentinel-3A + Use NewCr's for SPOT-2 & SPOT-5, + a priori Macromodel for Jason-3 (per NPZ)	Final Deliveries to IDS Data Centers on Sept 28, 2021

Post ITRF2020

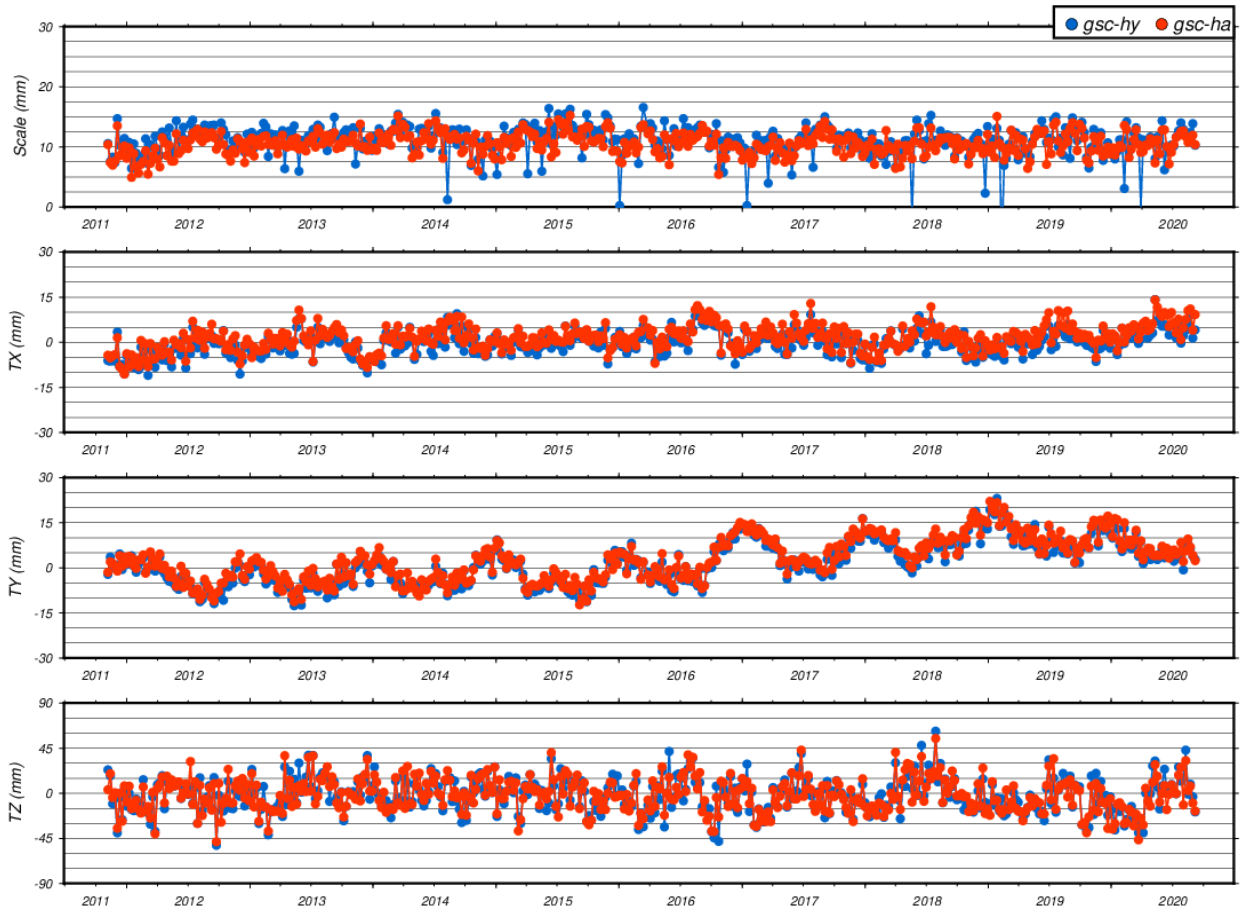
Series	Description	Comment
gscwd52	gscwd51 + Sentinel-3B starting 180610	Deliveries Started 2021-10-18. Current operational series.
gscwd53	gscwd52 + SAA-mitigated series for HY-2A	Goal: Deliver by April 30, 2023.

Assessment of HY-2A SAA Single Satellite Series.

Avg. SLR Fit for HY-2A arcs (2011-2019) *[Avg. of 596 SLR observations per arc]*		
Series (V2 Data)	**No. of Arcs**	**SLR RMS of fit (cm)**
Non-SAA	496	1.0208
SAA-mitigated	496	1.0096

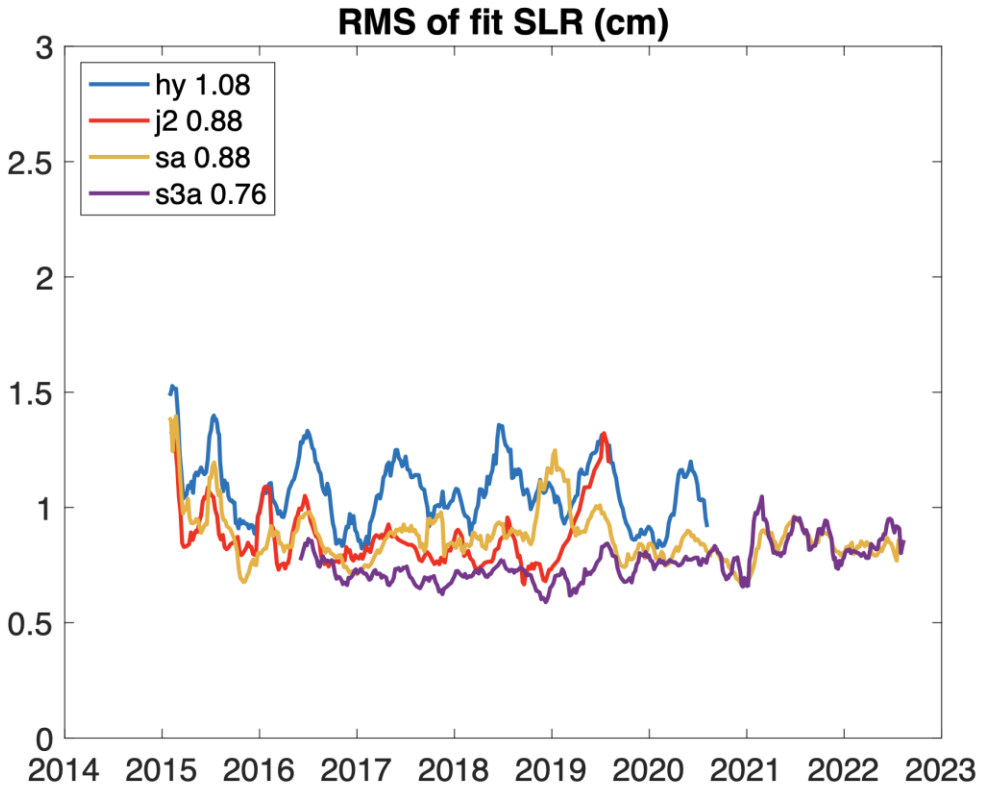
Hy-2A Mitigation strategy (for now).

1. **Downweight SAA stations in South America (ARFB, KRWB, SANB, CADB, SJUC) by 3X in POD.**
2. **Reduce these stations** (*remove from NEQ before adding to combined weekly matrix*)

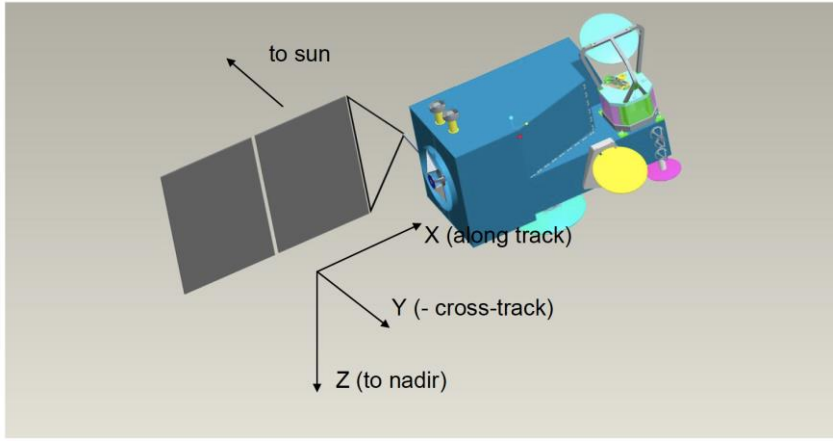


HY-2A Single Sat. Evaluation Provided by IDSCC

Update HY-2A modelling?



- Annual (beta-prime) signature in Hy-2A SLR fits?



Schematic of HY-2A satellite & s/c frames
(from DORISSatelliteModels.pdf)

- Macromodel in documentation is 6-plate.
- 8-plate (including Solar array) may be better approximation; -X face may be shadowed by solar array.

Summary

Top Priorities in the near-term:

1. **Update HY-2A modelling and operational combination.**
2. **Update Jason-2 to include Belli et al. (2021) frequency model.**
3. **Adopt updated geopotential model.**
4. **Adopt ITRF2020 for background station modelling.**

Questions:

1. **From whom or from where can web obtain USO-GNSS-derived solutions for S6A, S3A, S3B?**
   After a pilot project, would it be useful to create a new DORIS product (GNSS clock solutions for DORIS USO modelling?

2. **When should AC's switch to ITRF2020? Should this be coordinated?**

3. **The S6A POD Team has ascertained that there is a bias in the S6A quaternions. What action do we take on this subject? Should we wait until the POD team validates the new quaternions?**

4. **Can quaternions be made available for Hy-2C & Hy-2D, even if they are output from someone's software?**
   This would aid implementation in people's software. We would need ~8 day samples at different beta prime angles.