The GOP analysis center report

Petr Štěpánek, Vratislav Filler
Geodetic Observatory Pecný, Research Institute of Geodesy, Topography and Cartography

GOP AC activities

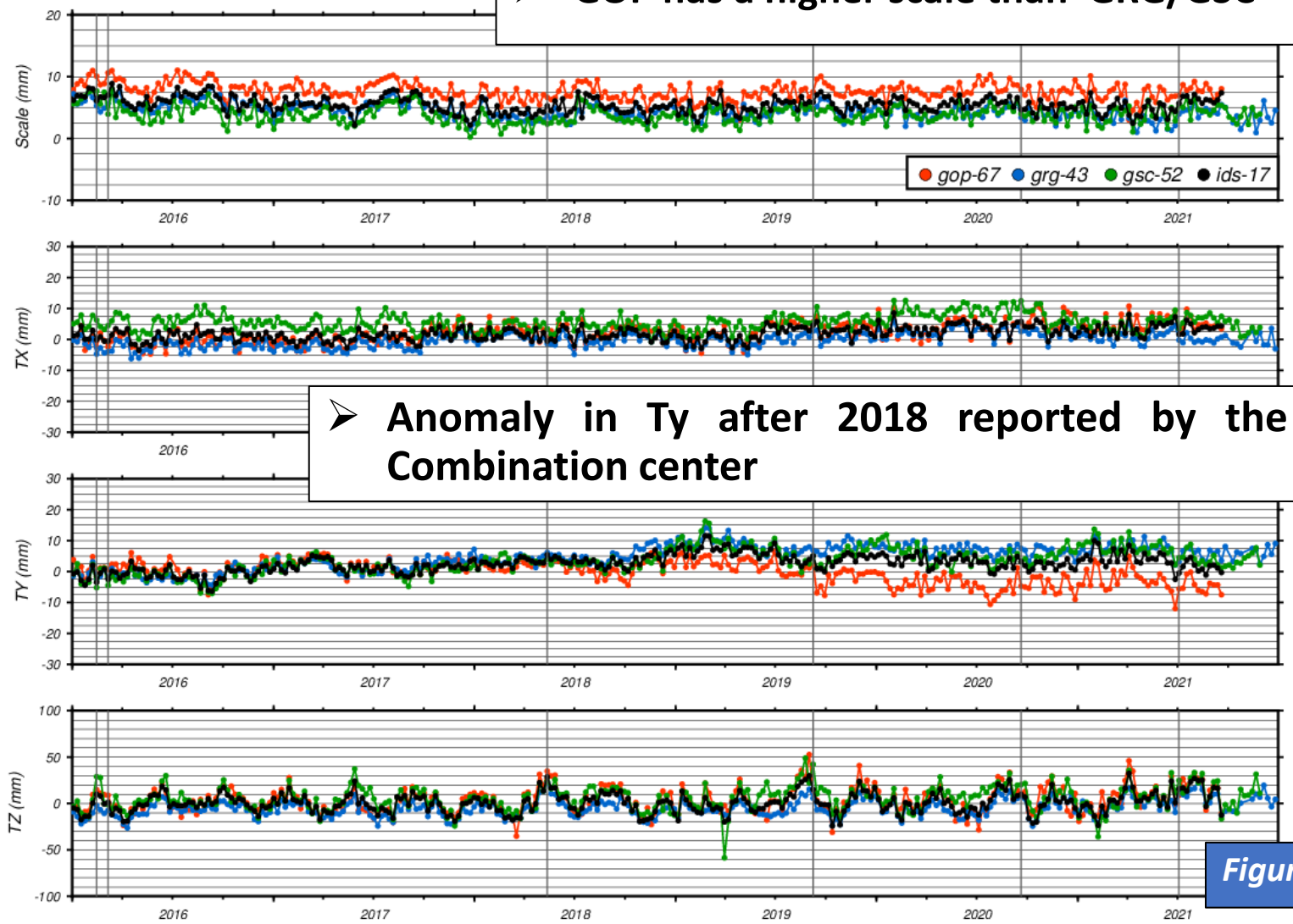
- **Recent standard GOPwd67**
- **ITRF 2020 reprocessing**
  - ***Štěpánek, P.; Moreaux, G,; Hugentobler, U.; Filler, V.*** **The GOP Analysis Center: DORIS contribution to ITRF2020.** ***Adv. Space Res., submitted.***
- **Study comparing the ground Alcatel antenna models**
  - ***Štěpánek, P.; Filler, V., 2022. DORIS Alcatel ground antenna: Evaluation of the phase center variation models, Adv. Space Res., DOI : 10.1016/j.asr.2022.02.024***
- **Routine processing**
- **Starting with Sentinel-6 data**

Sol.wd67 – corrected elevation cut off aplication

- **Elevation cutoff for Doppler (Range/rate) observations – should not be applied for the elevation of the count interval beginning (or end)**
  - ✓ Why? Because of the slight asymmetry in the ascending/descending observation editing
  - ✓ Our approach – use elevation in the middle of the time interval, was not correctly implemented and resulted as well to the asymmetry
  - ✓ This asymmetry resulted in the systematic effect on the station height of about 1.6 mm
  - ✓ Correction reduced GOP DORIS scale, which is still about ~ 4mm above other AC solutions
  - ✓ Not significant systematic effect on translations and station 2D positioning

GOP analysis center

- GOP has a higher scale than GRG/GSC



- Anomaly in Ty after 2018 reported by the IDS Combination center

Figure by Guilhem Moreaux

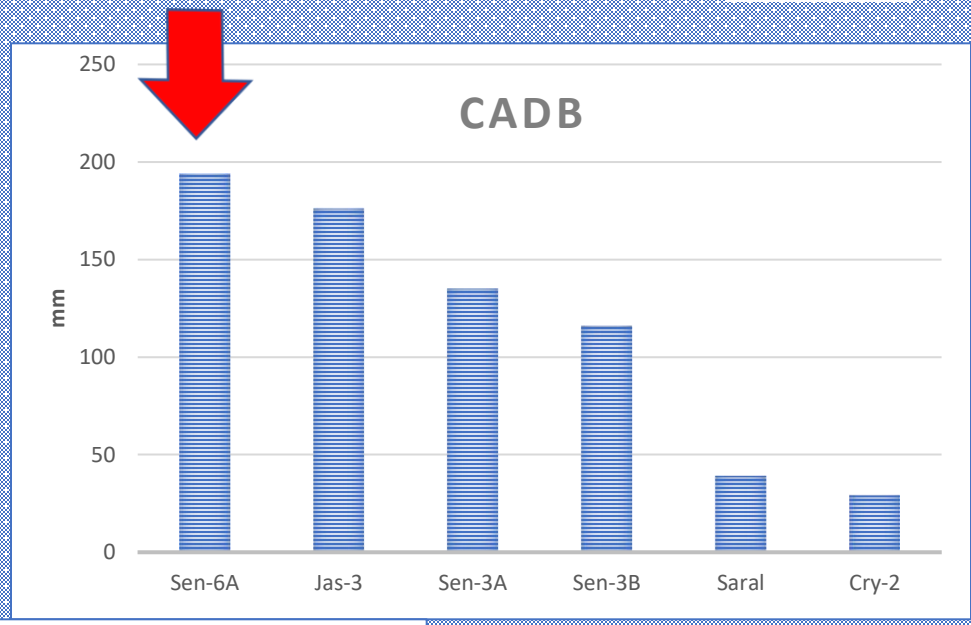
Sentinel-6A

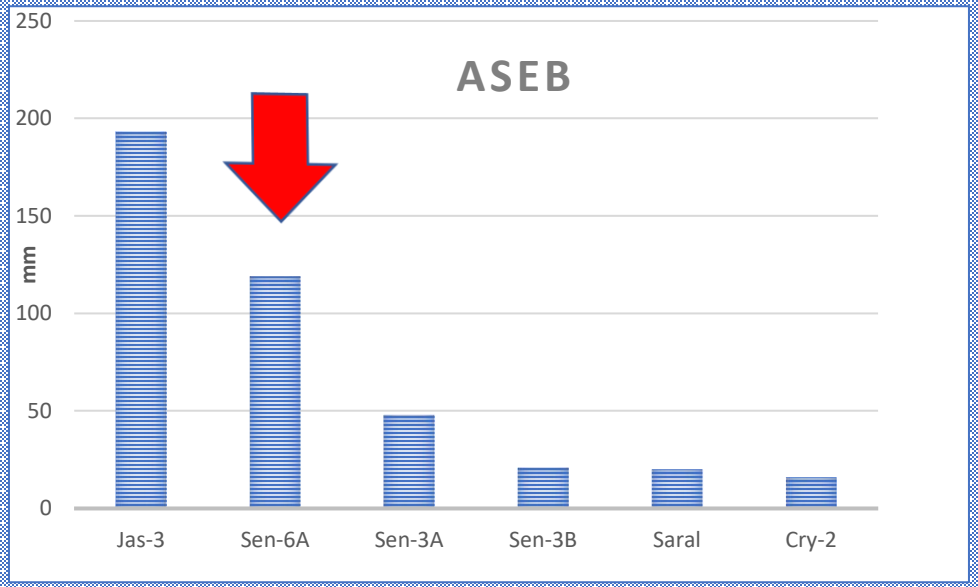
- Launched in late 2020, data from early 2021
- Tests based on 8 months of DORIS data
- Nominal attitude (quaternions not yet available for IDS)
- Orbit comparison w.r.t. CNES GNSS+DORIS orbit similar to other sats
- Strong SAA effect (the most affected sat. together with Jason-3)
- Special SAA mitigation strategy needed
- Single satellite positioning accuracy comparable to Jason-3
- Higher scale 1.9 ppb w.r.t. ITRF2014 (other sats 0.2-1.2 ppb)
- Station heights + 1.0 mm

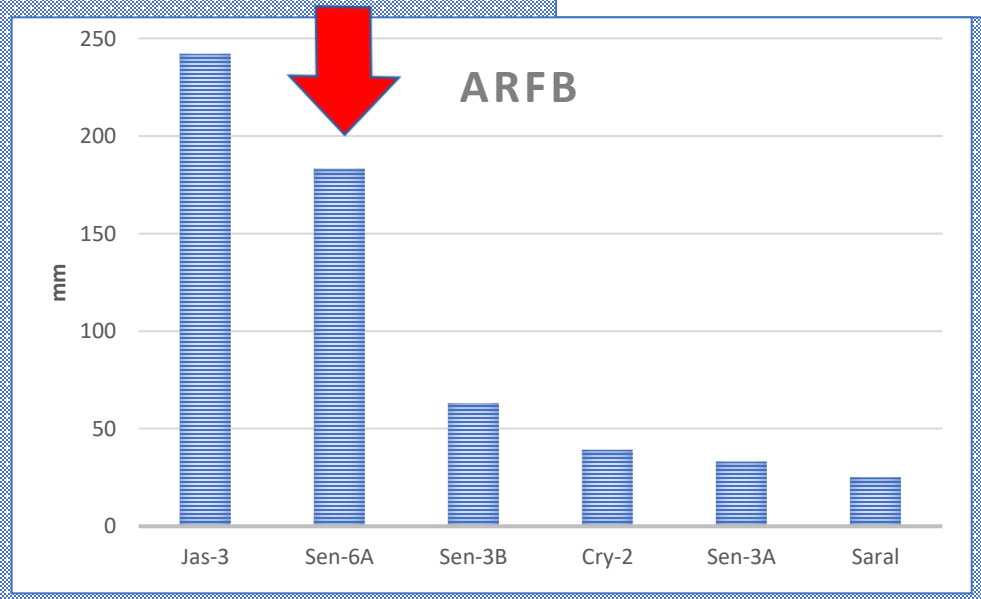
	Mean	RMS
Radial (mm)	-0.3	8.6
Tangential (mm)	-0.7	28.1
Normal (mm)	0.7	36.3

Sentinel-6A

- **Single-sat 3D positioning offset w.r.t. DPOD2014(v4). Solutions with All the satellites and excluding Sentinel-6 and Jason-3**
- **Jason-3 and Sentinel-6 highest offset for SAA stations**







Impact of Sentinel-6 on the combination

- **Solutions with All the satellites and excluding Sentinel-6 and Jason-3**
- **Station rename stratégy for Jason-3 and Sentinel-6**
- **No improvement adding Sentinel-64**

	All –J3,S6	All – S6	All – J3	All
RMS vs. DPOD2014 (3D)	15.3 mm	15.5 mm	15.5 mm	16.3 mm
Repeatability RMS (3D)	12.1 mm	12.4 mm	12.2 mm	12.0 mm
Tx	10.6 ± 2.9 mm	8.1 ± 2.8 mm	7.8 ± 2.6 mm	5.9 ± 2.8 mm
Ty	-1.3 ± 2.4 mm	-0.5 ± 2.3 mm	-0.8 ± 2.3 mm	-0.3 ± 2.5 mm
Tz	2.6 ± 12.9 mm	8.1 ± 11.3 mm	12.7 ±12.6 mm	12.3 ± 13.5 mm
Scale	4.8 ± 1.5 mm	5.8 ± 1.1 mm	5.0 ± 1.3 mm	6.0 ± 1.3 mm
Xp	7 ± 41 mas	-14 ± 44 mas	-16 ± 40 mas	-20 ± 45 mas
Yp	29 ± 38 mas	28 ± 36 mas	20 ± 36 mas	27 ± 40 mas

Future prospects

- **Single-satellite solution for all the satellites**
- **Understand Scale and Ty differences w.r.t. other ACs**
- **Start processing of HY-2C and HY-2D data**
- **Quaternions for Sentinel-6 when available**
- **SAA mitigation – new strategy?**
- **ITRF2020/DPOD2020 evaluation**
- **Geocenter estimation (IDS working group)**

Thanks for the attention !