The current status and future plans of GOP AC

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Solutions - current status

- Operational solutions GOPwd68
  - ➢ GOPwd68 = GOPwd67 + Sentinel-6A + HY-2C + HY-2D
  - ➢ „alias" stations removed from NEQ system
  - ➢ DPOD2020 v01 as a priori for processing data from 2023.0
  - ➢ Weekly SINEX files delivered until 2Q/2023

- Solution for ITRF2020 update GOPwd69
  - ➢ Differs from GOPwd68 in gravity field model
    - ➢ GOPwd68   EIGEN RL04
    - ➢ GOPwd69   GRGS RL05
  - ➢ 2021.0-2023.0 delivered
  - ➢ 2023.0-2023.75 to be delivered by December 15.

Project proposals

Proposed Sentinel project with TUM Munich (prof. Urs Hugentobler)
- Proposal submitted in September 2023 (decision still unknown)
- Title: ***Breaking the DORIS System Accuracy Limitations Caused by Clocks***
- GACR/DFG (joint program of Czech and German national grant agencies)
- Aprox. mid 2024-mid 2027
- DORIS USO observation by GNSS (continue previous work)
- Stochastic USO model
- DORIS phase processing experiment
- Sentinel-3 tandem phase
- Simulation of DORIS system with all clocks linked to GNSS

Proposed DORIS project to Czech ministry of Education, Youth and Sports
- Title (translated from Czech): ***Determination of Geodetic and Geophysical parameters using DORIS satellite measurement processing***
- Improving DORIS solutions, various aspects
- Supporting letter of Intent from Frank G. Lemoine
- Proposal submitted in July 2023
- Decision will be known by December 15
- March 2024 –December 2028

Other activities

- Merging DORIS version of DORIS/Bernese and official version of Bernese GNSS software
  - ➢ after 8 years of independent evolution
  - ➢ About 1500 files of modified source code
  - ➢ Big task
  - ➢ Not finished before end of 2023 (realistic expectation: spring 2024)

- PhD Student from IIT Kanpur (India) Vikash Kumar DORIS training stay at GOP.
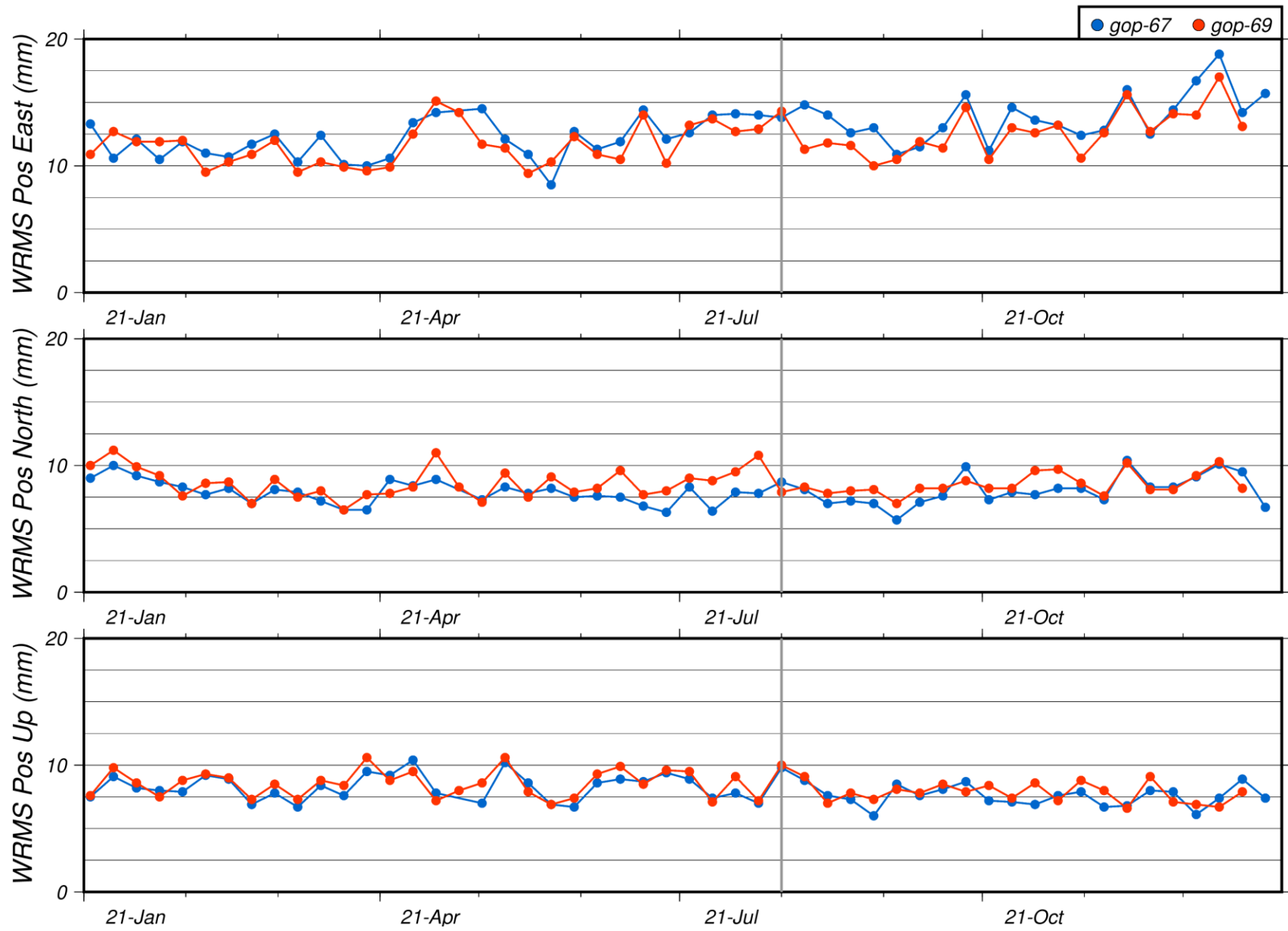 - ➢ 3 months stay (November 2023 – January 2024)

GOPwd69 vs GOPwd67
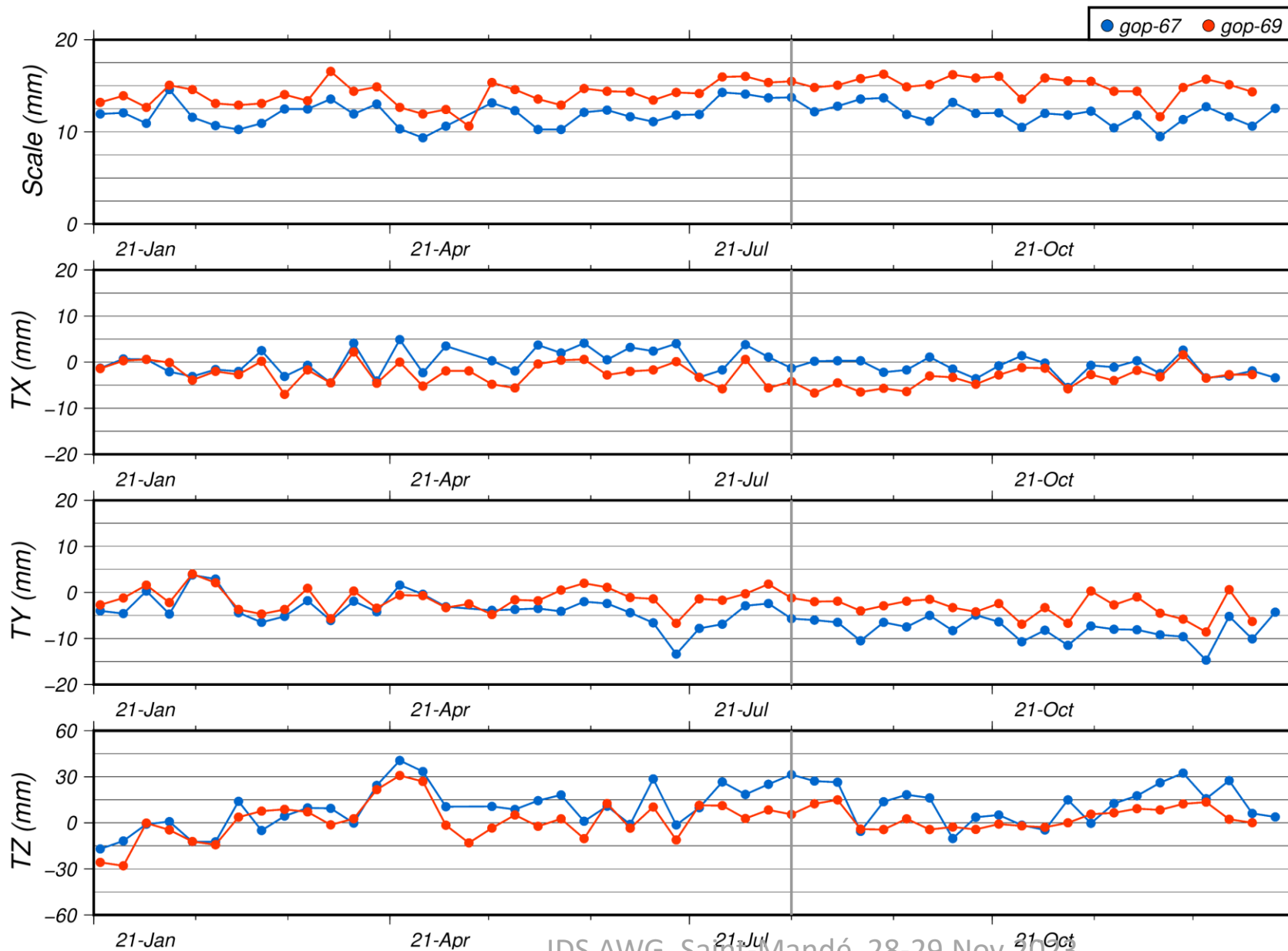
Comparison &Plots by IDS combination center (Guilhem Moreaux)

Differences: Sentinel-6A, Hy-2C and Hy-2D are included in GOPwd69. Also GRGS RL05 is used in GOPwd69 instead of EIGEN RL04.

GOPwd69 vs GOPwd67 (2)

Comparison &Plots by IDS combination center (Guilhem Moreaux)

Gravity field EIGEN RL04 and GRGS RL05

- Data from 2022.0-2023.0
- Minor improvement in orbit residuals (each of 8 satellites) when using GRGS RL05

Satellite	Residuals reduction (%)
Cryosat-2	0.06
Saral	0.10
Jason-3	0.04
Sentinel-3A	0.04
Sentinel-3B	0.04
Sentinel-6A	0.08
HY-2C	0.03
HY-2D	0.09

Gravity field EIGEN RL04 and GRGS RL05 (2)

- Some minor improvements with GRGS RL05
  - Improvement in pole estimation
  - Reduction in Tx, Ty variations (but only 1 year of data is too short time span)
  - Slightly better positioning RMS in North and Up component

Gravity model	North (mm)	East (mm)	Up (mm)
EIGEN RL4	9.6	14.2	11.3
GRGS RL05	9.2	14.3	11.1

Station position RMS w.r.t. DPOD2020

Gravity model	Tx (mm)	Ty(mm)	Tz (.mm)	Scale (ppb)
EIGEN RL4	-3.8±3.3	-2.1±3.0	9.1±9.2	2.51±0.24
GRGS RL05	-4.3±2.8	0.4±2.8	-0.6±9.3	2.51±0.23

Transformation to DPOD2020

Gravity model	X-Pole Mean (µas)	X-Pole Std. dev. (µas)	Y-Pole Mean (µas)	Y-Pole Std. dev. (µas)
EIGEN RL4	-187	438	112	383
GRGS RL05	-179	417	61	375

Pole w.r.t. IERS C04

Thanks for your attention !