Status Report of the IDS AAC at GFZ

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IDS – AWG meeting 2024
Online – June 2, 2024

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1. SWOT
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1 SWOT

What was done:

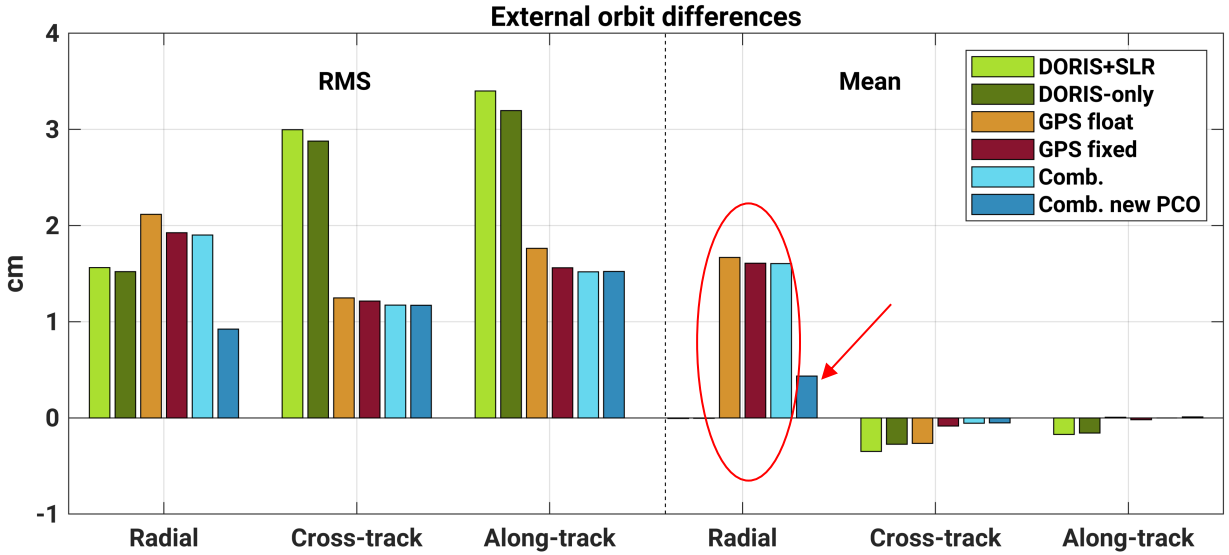
- SWOT was implemented to EPOS-OC after data release (2023)
    - First results presented during IDS AWG meeting Nov. 2023

- Reprocessed SWOT from mission start until end of 2023
    - DORIS orbits
    - GPS orbits
    - Multi-technique orbits
        - ➢ Estimation of technique reference points
    - Altimetry evaluation

1.1 External Orbit Comparison

Comparison against CNES-SSALTO POE-F

- Bias of about 1.5 cm visible in the GPS orbits
  - Improves to millimeter level with adjusted PCO



1.2 Reference Point Estimation

Can we replicate the manufacturer technique reference points in the POD?

- Estimate technique specific reference points in the multi-technique setup (DORIS+GPS+SLR)
  - Set up arc-wise normal equation
  - Accumulate normal equations over the entire time span

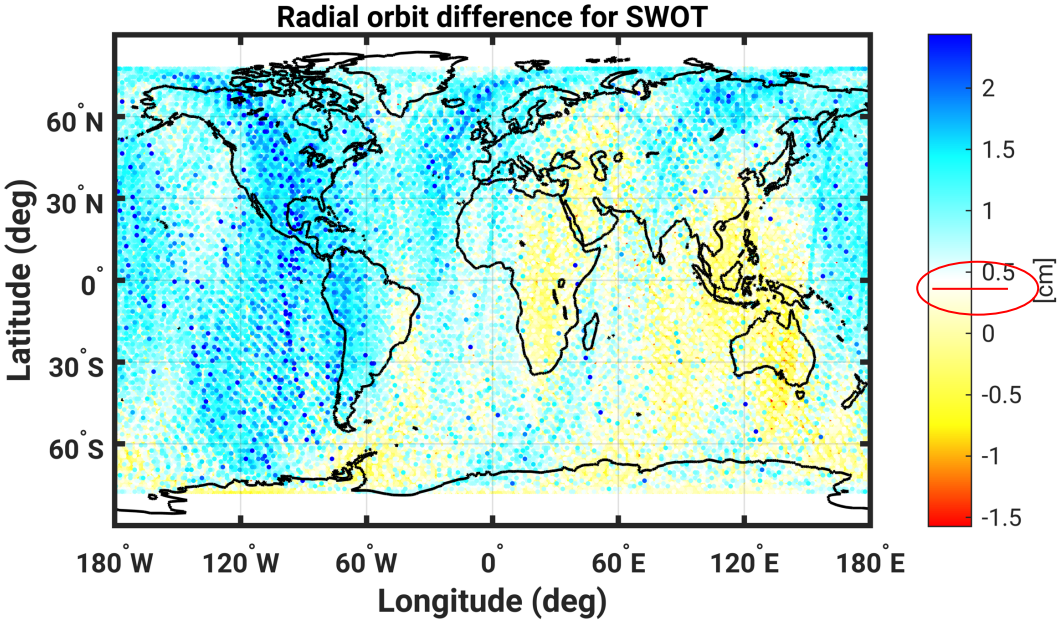
- Significant radial bias of about 11-13 mm visible for DORIS and GPS
- 4mm cross-track bias for SLR

		Manufacturer Values			Estimated Differences		
		Radial	**Transv.**	**Normal**	**Radial**	**Transv.**	**Normal**
DORIS	[mm]	-2412.7	-2784.4	2136.9	**10.6±0.5**	0.3±11.3	-1.4±8.5
GPS	[mm]	1.9	-0.2	-1.2	**13.4±0.1**	1.7±8.3	1.0±2.1
SLR	[mm]	-546.0	544.1	-0.2	1.9±5.0	-2.6±8.1	**4.3±0.1**

1.3 Geographical Orbit Comparison

Geographic radial orbit differences of the combined orbit using **adjusted** technique reference points in comparison to POE-F

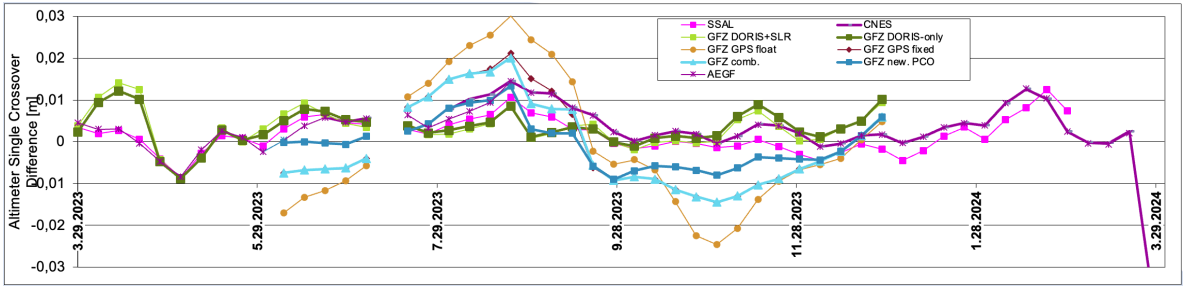
- 4 mm radial bias
- Slight West-East pattern visible



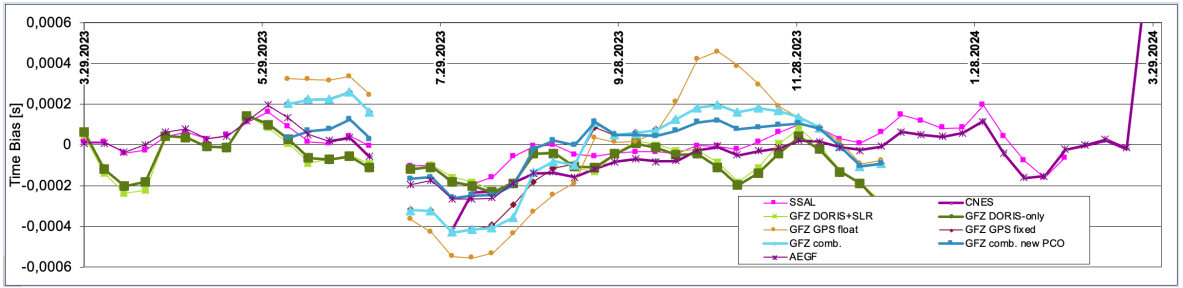
1.4 Altimetry Evaluation

- Comparable performance compared to internal orbit (AEGF)
- Orbits including GPS observations peak in August and November
- Re-estimated technique reference points show improvement

Mean of crossover differences



Time bias between the orbit and altimeter time system



SSAL
CNES
GFZ DORIS+SLR
GFZ DORIS-only
GFZ GPS float
GFZ GPS fixed
GFZ comb.
GFZ new. PCO
AEGF

2 AAC Outlook

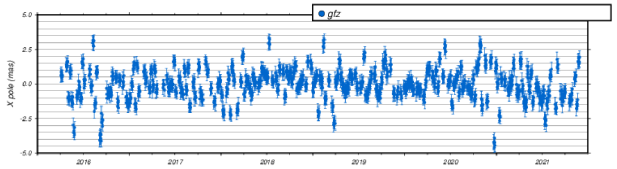
Route to AC – requested products

- Orbit
  - Extended the setup of satellites
    - All, except: SPOT-3,4,5 and HY-2A,C,D
  - Improved orbit modeling to reduce signatures in the estimated parameters
    - Done: Presented during IDS AWG meeting 2023
  - Orbit comparison against POE-F
  - ➢ Summary will be provided soon
- SINEX solutions
  - Provided single and multi satellite solutions
    - Problematic behavior in ERPs -> **Appendix**
    - Frequency shift stations showed unusual differences
      - ➢ First corrections showed improvement but still not solved
    - New SINEX NNR condition
      - ➢ Method to be clarified with IDS-CC

Appendix

ERP modeling and estimation in EPOS-OC

- Piecewise linear at 12:00 UTC
- Set of ERPs "jumps" from week to week



- Any constraints? datum?
- Arc alignment?