GOP Analysis center report

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Recent status and prospects

Feedback from ITRF reprocessing

- Good news: GOP solution was improved (WRMS, Geocenter, Pole)
- New goal: enable to calculate own CoM corrections instead of those from data files
- New goal: analyze a short periodic signal (14-days) in GOP Xp, Yp series (tides?)

Merging of Bernese/DORIS with Bernese 5.2

- ongoing development

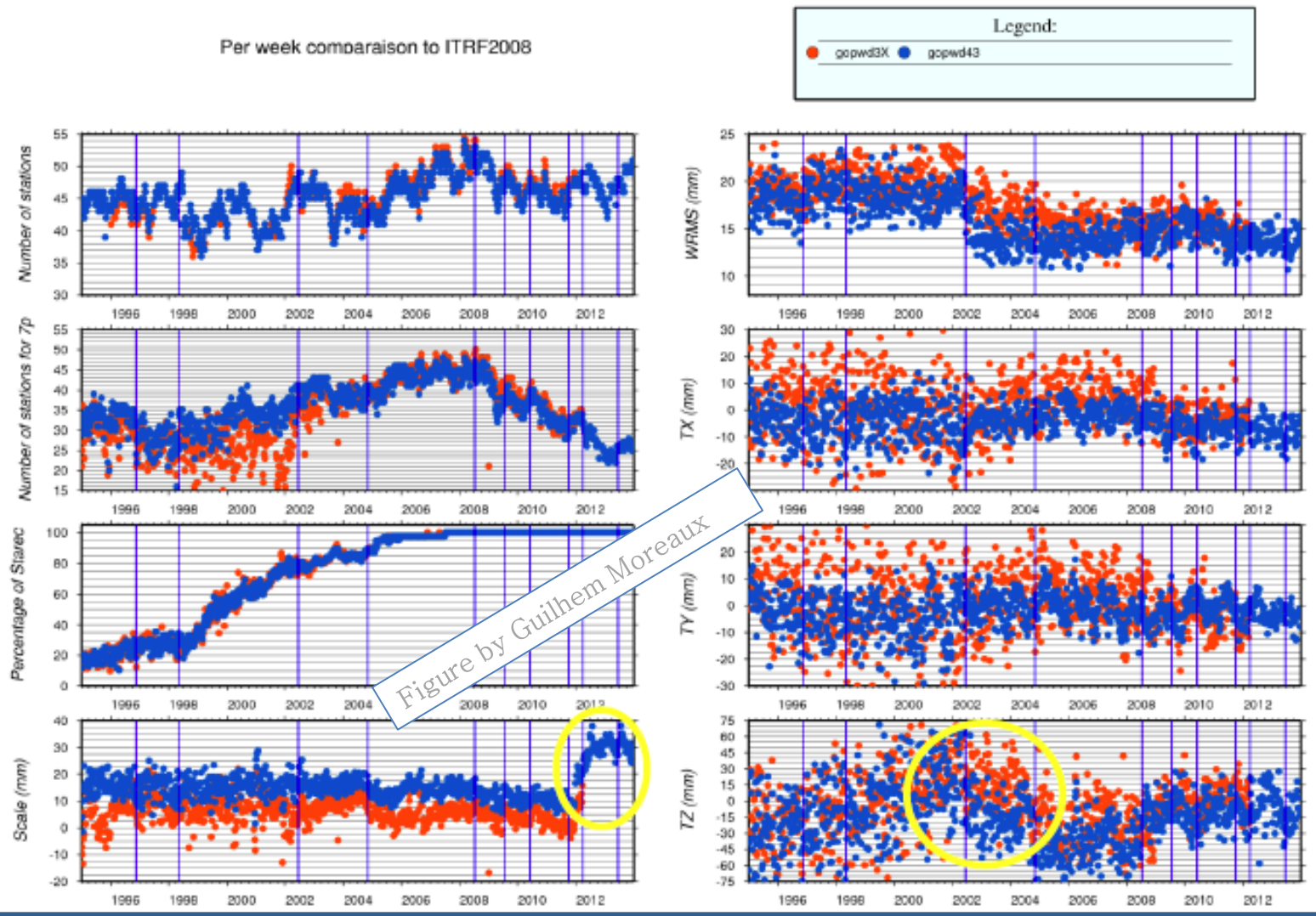
DORIS RINEX data processing

- after the software merging
- implementations planed for second half of 2015, in cooperation with TUM Munich

Other recent research activities

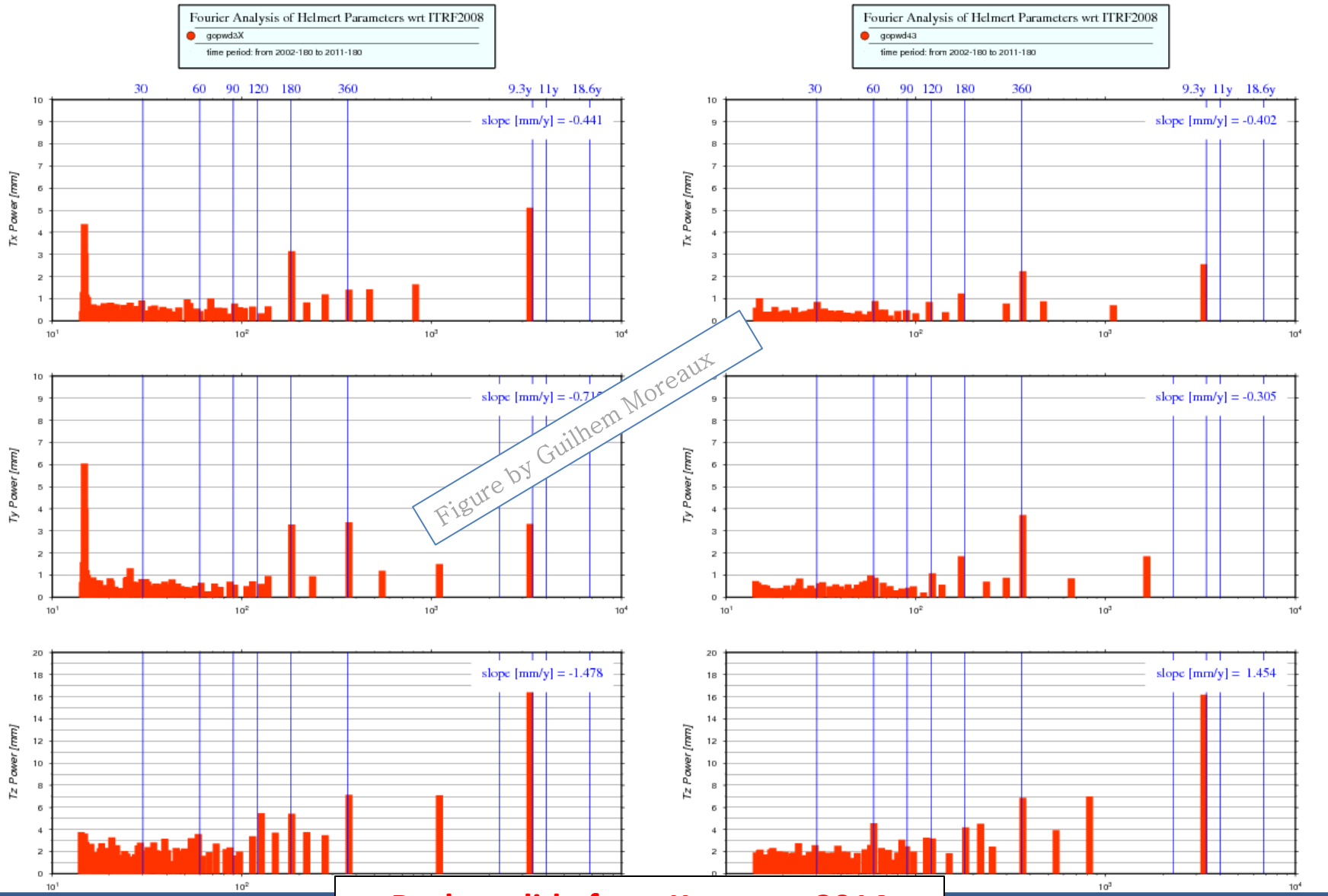
- LOD estimation experiment (individual presentation)
- Long term testing of SPOT-5 data corrective model (individual presentation)
- testing of Gravity field application including time-variations modeling (impact on the POD)

GOP43 vs. GOP3X



Backup slide from Konstanz 2014

GOP43 vs. GOP3X



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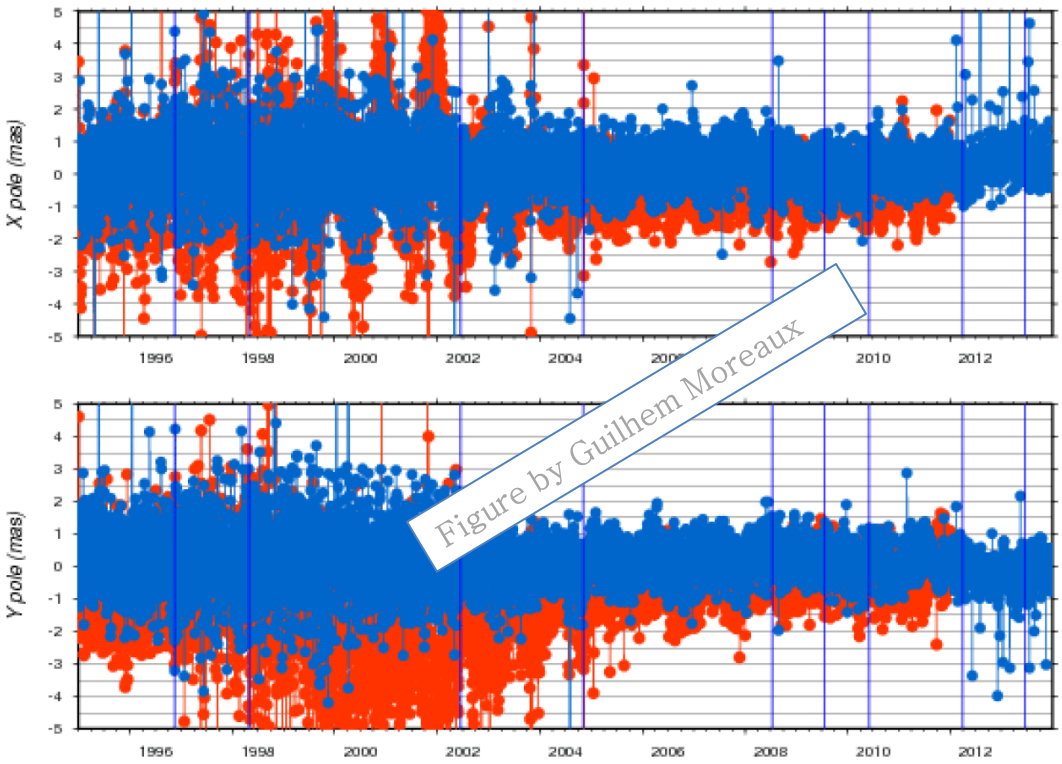
GOP43 vs. GOP3X



Comparison w.r.t. IERS C04 (mas)

Sol.	Xmean	Xrms	Ymean	Yrms
GOP3X	-0.291	1.167	-1.100	1.940
GOP43	0.231	0.689	0.155	0.694

Backup slide from Konstanz 2014

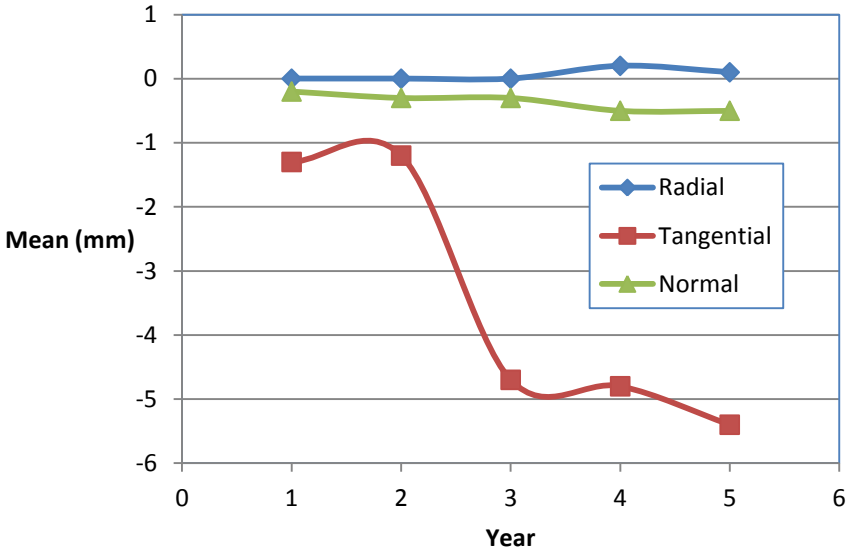
testing of Gravity field application impact on POD

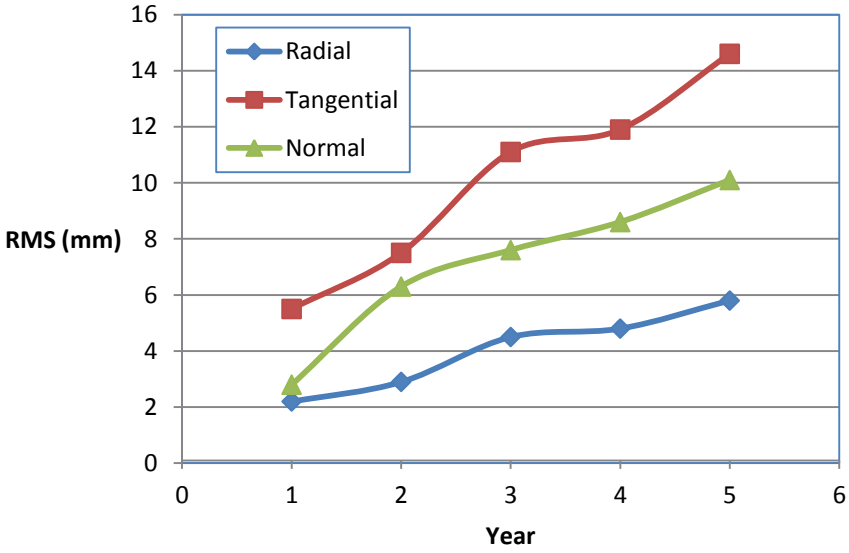
- all tests with EIGEN-6S2
- impact of time varying gravity (annual bias and drift)
- impact of the annual and semiannual terms
- reasonable coefficient cut off limit for gravity field application
- paper „Gravity field and ocean tides modeling for precise orbit determination of DORIS satellites“ after first review round in AGG journal

Arc length	1 day
Constant empirical parameters	N/A
Harmonic empirical parameters	4
Atmospheric drag	12 (6*)
Solar radiation pressure	1
Earth direct/indirect rad. pressure	a priori
Zenith total delay	wet part per path
Beacon frequency offset	per satellite path

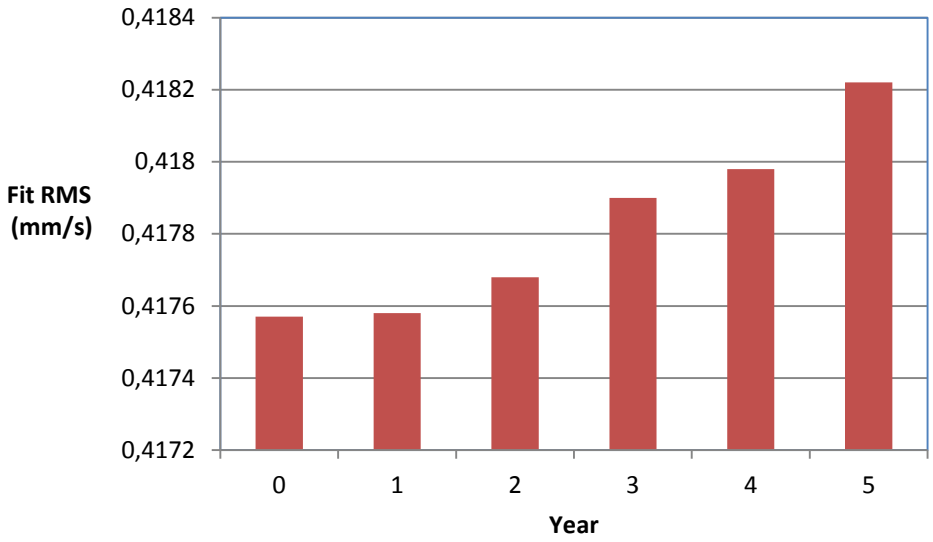
impact of time varying gravity (bias and drift)

- 3 month of SPOT-5 data (May-July 2011)
- Regularly estimated orbits as a reference
- Orbits re-estimated applying the geopotential coefficients interpolated for the epoch subsequently 1, 2, 3, 4 and 5 years before the observation epoch
- Comparison to reference orbit





RMS of the fit



„5 years“ also for Cryosat and Jason-2

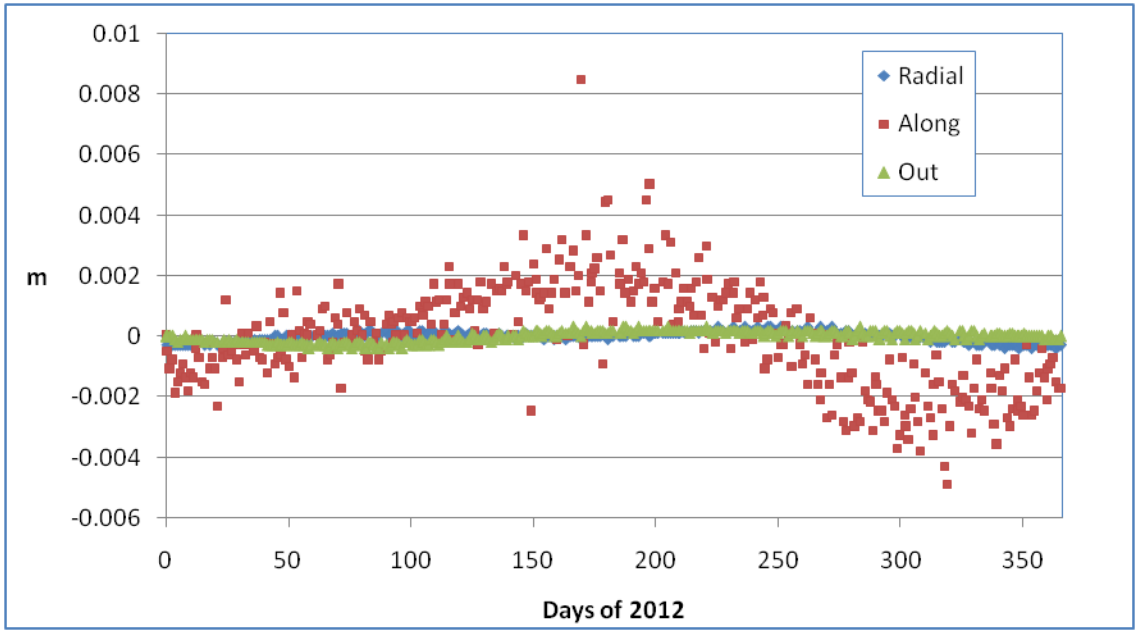
Sat.	Mean (mm)			RMS (mm)			RMS of fit(m/s)		
	Radial	Tang.	Normal	Radial	Tang.	Normal	static 0 Y.	static 5 Y.	diff.
SPOT-5	0.1	-5.4	-0.5	5.8	14.6	10.1	0.4176	0.4182	0.0006
Cryosat-2	0.2	-3.6	-0.4	7.1	17.2	11.8	0.4532	0.4545	0.0013
Jason-2	0.1	-2.8	0.1	2.2	7.6	6.4	0.4300	0.4300	0.0000

Periodical Gravity variations

- SPOT-5, Cryosat and Hy-2A data from 2012.0-2013.0
- Orbits estimated with and without periodical gravity
- both „types“of the orbit were compared
- Significant orbit improvement not found

	Mean (mm)			RMS (mm)		
Sat.	Radial	Along	Out	Radial	Along	Out
SPOT-5	0.0	-0.1	0.0	1.1	3.6	3.2
Cryosat-2	0.0	-0.2	0.0	1.1	3.7	3.3
HY-2A	0.0	0.5	0.0	1.8	6.9	3.6

SPOT-5 daily Mean difference



Coefficient cut off limit for gravity field application

- orbit with gravity cut off at degree 150 used as the reference
- max accepted RMS 1 mm in the radial and of 2 mm in the along-track and cross-track directions
- max accepted Mean difference 0.1 mm in the radial and 0.2 mm in the along-track and cross-track directions

- for SPOT-5 minimal cut off **75** (24 h arc)
- for Jason-2 minimal cut off **50** (24 h arc)

=> Relevant for the above defined orbit parameterization and 24 h arc

Thanks for the attention ……..