DGFI's SLR contributions to the COL-WG

***Mathis Bloßfeld**, Horst Müller*

Deutsches Geodätisches Forschungsinstitut, DGFI
Centrum für Geodätische Erdsystemforschung, CGE

COL-WG requests

Test period:	
CONT08 (2008-08-10/30) CONT11 (2011-09-11/10-01)	

Data set:	
LAGEOS 1 & LAGEOS 2	
28 stations, defined by COL-WG	

A priori models to be implemented acc. to last COL-WG meeting:	
Station coordinates: ITRF2008	
EOP: IERS 08 C04 (new theory) @ 0h	

COL-WG requests & DGFI solution

Test period:	
CONT08 (2008-08-10/30) CONT11 (2011-09-11/10-01)	**OK**

Data set:	
LAGEOS 1 & LAGEOS 2	**OK**
28 stations, defined by COL-WG	**OK**

A priori models to be implemented acc. to last COL-WG meeting:	
Station coordinates: ITRF2008	**OK**
EOP: IERS 08 C04 (new theory) @ 0h	**Solutions computed with old software version. New version available!**

COL-WG requests

A priori models to be implemented acc. to last COL-WG meeting:	
Gravity field: EIGEN-GRGS RL02 (mean atmospherical gravitational effect and oceanic circulation effect are added)	
Atmospheric tide model: Ray-Ponte	
Ocean tide loading model: FES2004	
Optical tropospheric propagation delay: Mendes-Pavlis	

COL-WG requests & DGFI solution

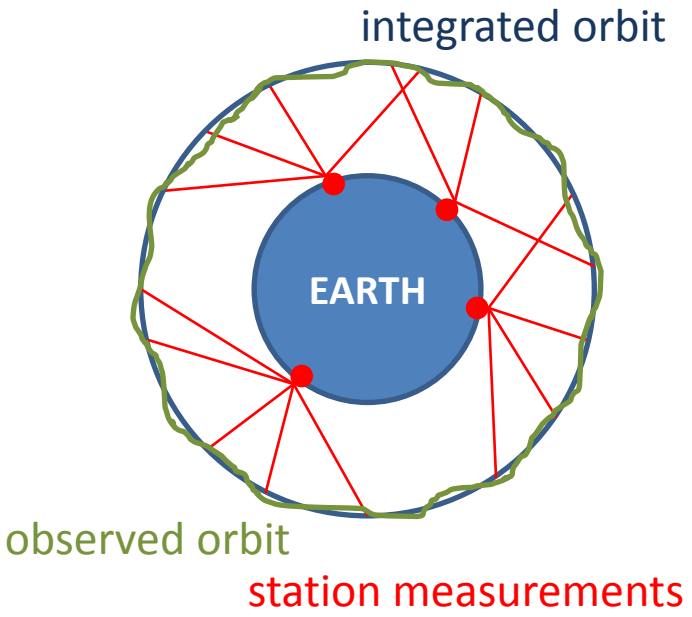
A priori models to be implemented acc. to last COL-WG meeting:	
Gravity field: EIGEN-GRGS RL02 (mean atmospherical gravitational effect and oceanic circulation effect are added)	**OK**
Atmospheric tide model: Ray-Ponte	**Implementation not yet finished.**
Ocean tide loading model: FES2004	**OK**
Optical tropospheric propagation delay: Mendes-Pavlis	**OK**

Reduced parameters in DGFI solution:
Osculating Keplerian Elements
Emp. Acc. T-, N-direction (opr) / T-direction (@ 0h)
Multiplier for solar radiation pressure (@ mid-arc)
Station biases

Validation of DGFI solution (internal)

- Orbit fit (mean RMS of difference between integrated and ‚observed' orbit):

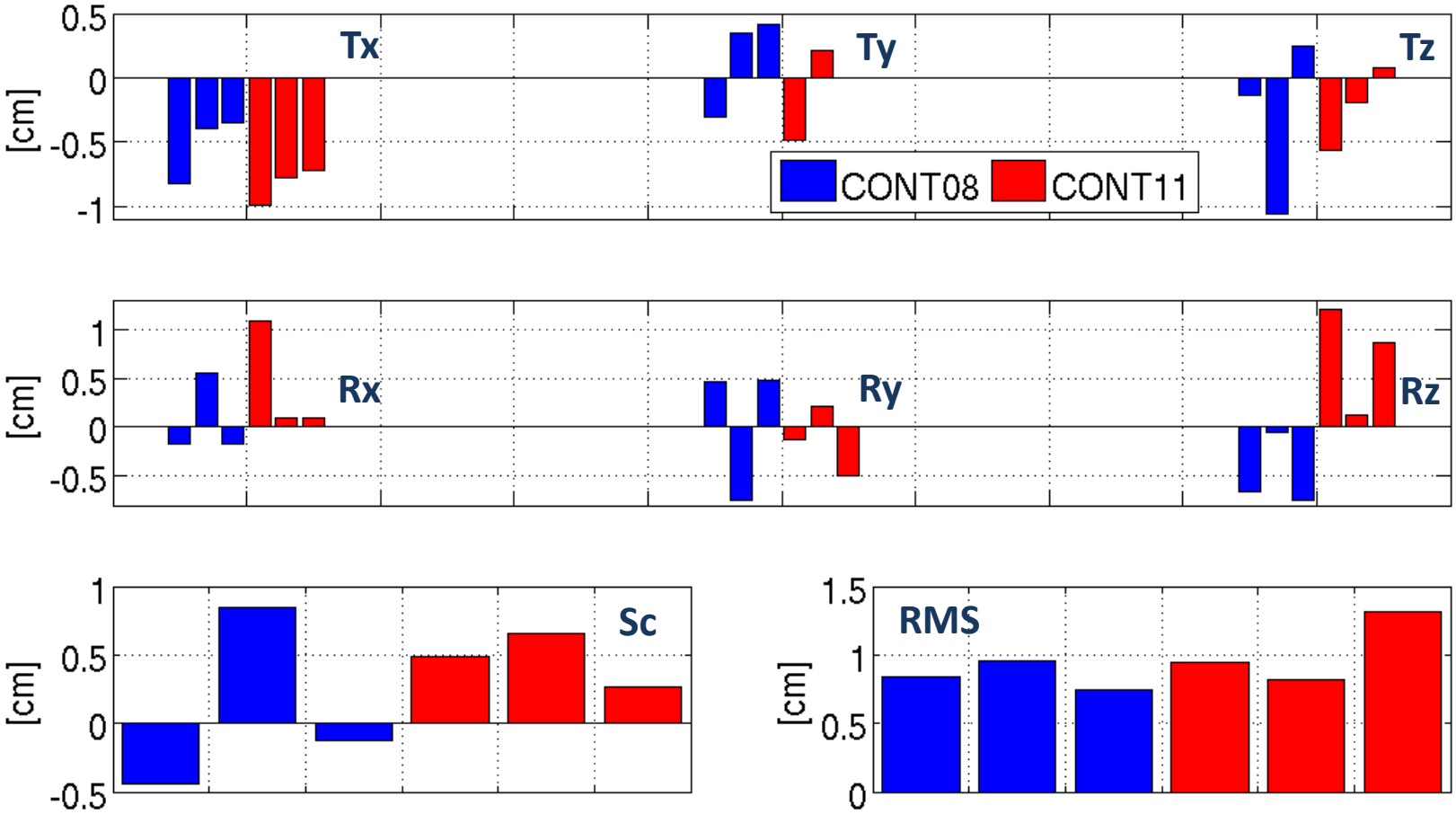
GPS week	LAGEOS 1 [cm]	LAGEOS 2 [cm]
1492	0.98	1.01
1493	1.36	1.06
1494	1.30	1.15
1653	1.17	1.28
1654	0.98	1.11
1655	1.34	1.36



→ Acceptable level of orbit fits.
Could be improved, if only ‚good' stations are considered.

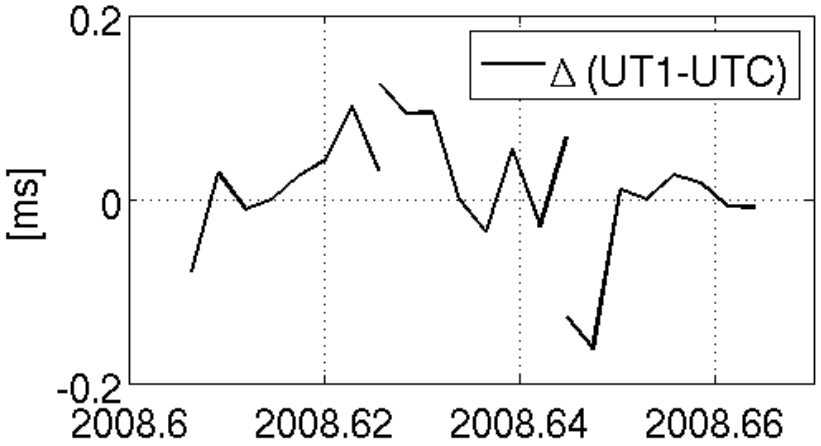
Validation of DGFI solution (external)

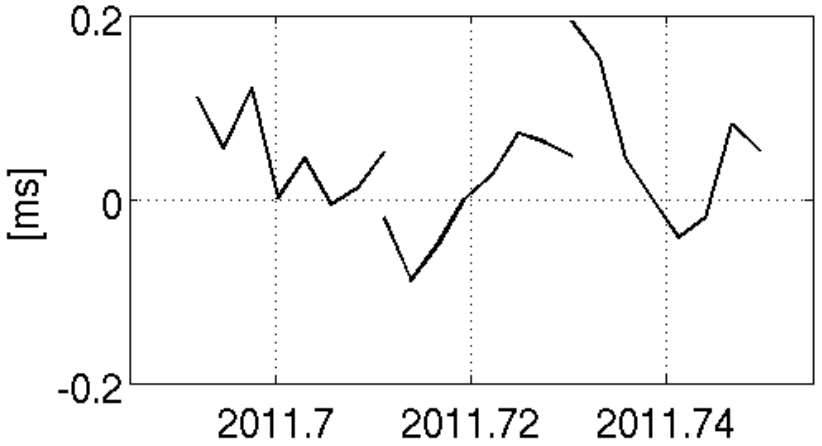
- 7 parameter similarity transformation on ITRF2008:



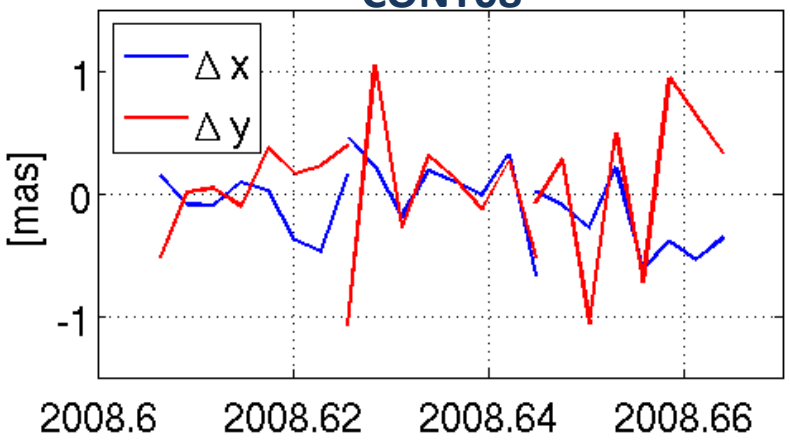
Validation of DGFI solution (external)

- ERP w.r.t. IERS 08 C04:

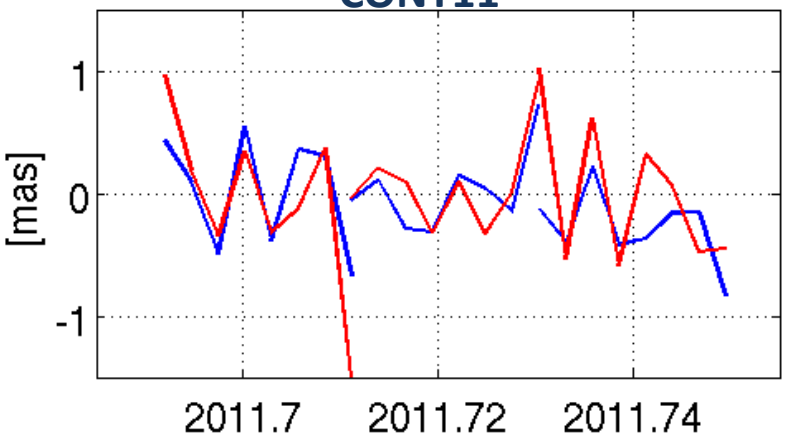




CONT08



CONT11



Conclusion

- DGFI SLR solution not yet achieving totally the Col-WG requests
  - → Release of DOGS-OC 5.2 already done
    - – New rotation theory implemented
    - – Implementation of corrections for atmospheric tides in progress
  - → Orbit fits are around 1 cm for all solutions
  - → Transformation parameters w.r.t. ITRF2008 are around 1 cm
  - → Offsets w.r.t. IERS 08 C04 are around ± 0.15 ms for UT1-UTC and ± 1 mas for the pole coordinates
  - → Should the list of neglected observations also be aligned as the list of used stations?

- DGFI VLBI solution
  - – Implementation of new nutation theory not yet finished