Report from GRGS ILRS AC

on the ITRF2008 evaluation

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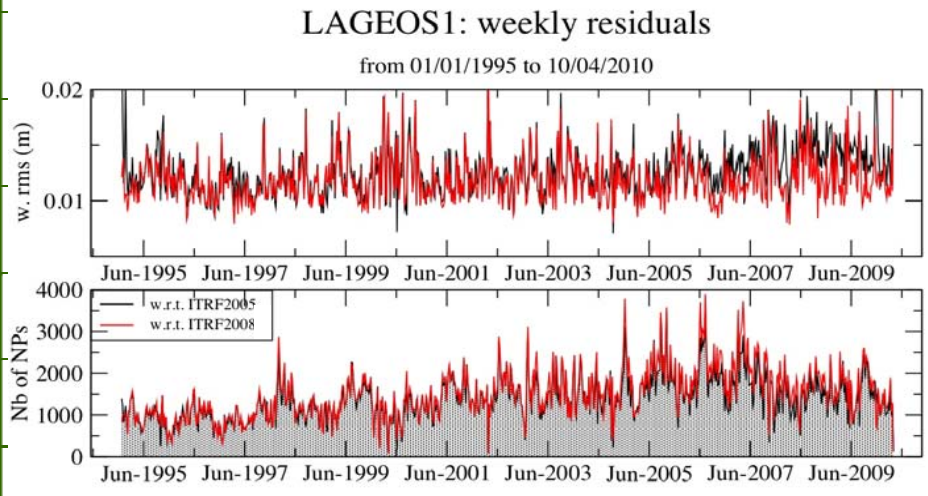
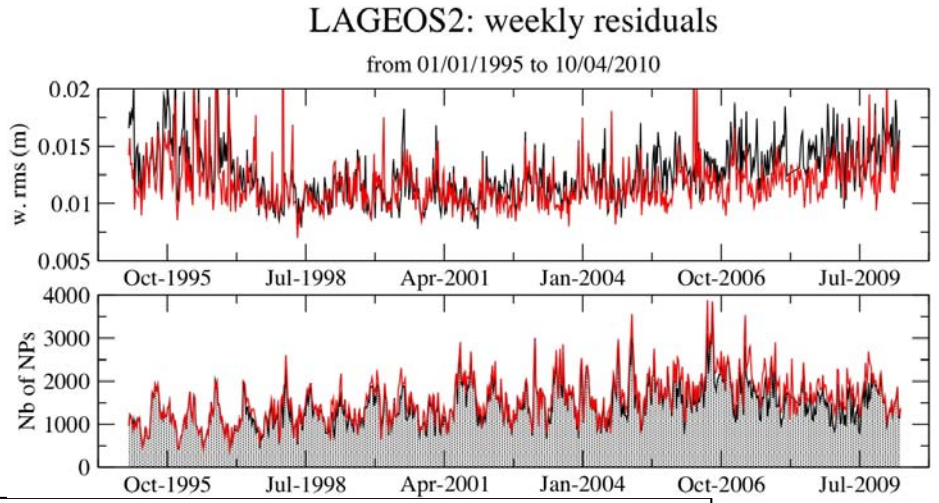
Order of magnitude of weekly residuals

- Orbital modelling:
  - Pole: IERS C04
  - Terrestrial frame :
    - *ITRF2005 SLR (rescaled) or ITRF2008*
    - *eccentricities and data corrections provided by ILRS AWG (release april 2010)*
  - Empirical parameters: Radial : 0, Tangential:bias + 1/rev., Normal : 1/rev, 1 SRP





- SLR residuals (without any station coordinates adjustment)
  - LA1:
    - **ITRF2005: mean 12.7 mm, std. dev. 2.47 mm**
    - **ITRF2008: mean 11.8 mm, std. Dev. 2.02 mm**
  - LA2:
    - **ITRF2005: mean 12.6 mm, std. Dev. 2.47 mm**
    - **ITRF2008: mean 11.7 mm; std. Dev. 2.16 mm**
- Slight improvement: 2007-2009

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Analysis of new GRGS AC solution, over the period 1995.0 - 2010-3

* Two computations are carried out :
  - LAGEOS orbits computed with ITRF2005 (SLRF2005) as a priori TRF
  - LAGEOS orbits computed with ITRF2008 as a priori TRF

* The first solution is called 'GRGS V05' and the second one 'GRGS V08'

* For both computations, only the TRF changes. All the models, the EOP a priori series, the measurement corrections (range biases, etc.) and the eccentricities are the same

Comparison between the GRGS V05 and V08 solutions

All stations (mm)

LAGEOS-1
Median values = 30.19 / 24.14

LAGEOS-2
Median values = 26.66 / 25.30

20 core stations (mm)

LAGEOS-1
Median values = 17.80 / 17.16

LAGEOS-2
Median values = 15.73 / 14.33

Improvement of a priori residuals with ITRF2008

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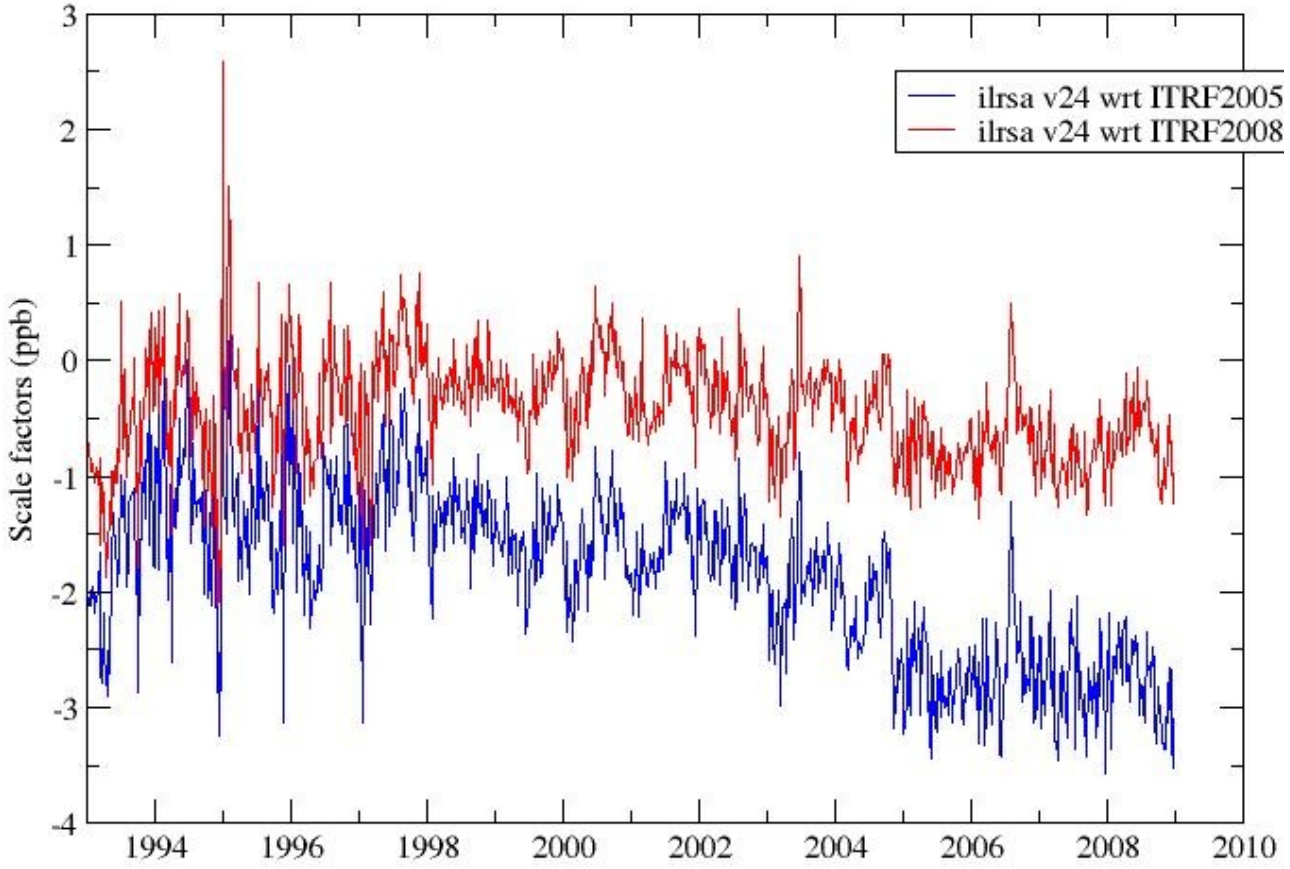
Analysis of the ILRS combined v24 solution: period 1993.0-2008.9

- Computation of transformations between ILRS solution and ITRF2005/ITRF2008
- For each computation:
  - Projection of the weekly variance-covariance matrices
  - Raw residuals rejected at 10 cm
  - Statistics after transformation account for all stations residuals (not only the core ones)



Weekly Helmert transformations

w.r.t. ITRF2005

Results for TX translation (mm)

Weighted mean = -0.83
Weighted standard deviation = 3.97

Results for TY translation (mm)

Weighted mean = -0.13
Weighted standard deviation = 3.76

Results for TZ translation (mm)

Weighted mean = 1.29
Weighted standard deviation = 7.35

Results for scale (ppb)

Weighted mean = -1.91
Weighted standard deviation = 0.69

w.r.t. ITRF2008

Results for TX translation (mm)

Weighted mean = -0.01
Weighted standard deviation = 3.53

Results for TY translation (mm)

Weighted mean = 0.06
Weighted standard deviation = 3.36

Results for TZ translation (mm)

Weighted mean = 0.76
Weighted standard deviation = 7.02

Results for scale (ppb)

Weighted mean = -0.47
Weighted standard deviation = 0.41

Reduction of all biases and WRMS → better consistency with ITRF2008

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Conclusions

- Same conclusions as other ILRS Acs
  - ITRF2008, evaluated on the ilrsa and grgs long term solution (1993-2009) shows a better performance of the quality parameters (WRMS, Helmert parameters) than the previous SLRF2005 (derived from ITRF2005)
  - According to weekly ASI evaluation: the scale slope appears to be negative of about -0.2 mm/yr
  - A dominant annual oscillation of small amplitude is visible in all the Helmert parameters series and also detectable in the scale parameter series (geophysic?).
- Evaluation from low satellites (STA, STE) still in progress

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