



Next meeting:

The next AWG meeting will be held in Matera, on Saturday, October 24th, 2015.

ITRF2014 RE-ANALYSIS REVIEW:

- ASI – CC: the resubmitted AC solutions were checked before the new v61 combination. The DGFI solution is better than the previous v60; it is included in the 1983-1992 combination without applying loosening in the rotations, loosening is applied in the rotation rate. The ESA solution has high rotation rate values and the LOD estimates are worse than before. Some issues were found in the SOLUTION/EPOCHS SINEX block: dates outside the arc limits (NSGF, BKG in the header only), nominal dates (ESA, BKG in the header only), stations in SITE ID without corresponding epoch in the SOLUTION/EPOCHS block. The combination ILRSA v61 is similar to the v60, the signature around 2010 is still present in the Y translation and in the scale. A strong quasi-annual signature is present in the GFZ and NSGF scale, while the scale is a bit higher for ESA.
- JCET – CC: Check of the bias estimation over the period, looseness, wrms of the core, translation & scale. Some SINEX file issues are present in the AC solutions. The analysis of the solutions is available at geodesy.jcet.umbc.edu/ITRF2014_REANALYSIS. The number of estimated stations per arc is lower for ESA and NSGF; the mean is 19: while ESA, NSGF have 16 stations. The time series of some stations were investigated: Yarragadee down around 2010, signature in the Herstmonceux UP, Monument Peak problems after 2008. Monument Peak has a deviation from linear motion in 2008, not seen in GPS (some equipment changes made in the period between 2008 and 2010) and an earthquake in 2010 with jumps similar to what would be expected. Mount Stromlo 7825 strange signature. The site change and configuration files can be queried at: geodesy.jcet.umbc.edu/sch_sci_query/.
- DGFI/TUM (ITRS) CC: Some results of the analysis made at DGFI in preparation of DTRF2014: many model improvements for SLR since DTRF2008, annual amplitudes in Tx and Tz agree well whereas the amplitude of Ty is smaller for DTRF2014 than for DTRF2008, annual amplitude of DTRF2014 scale (ca. 1.5 mm) is smaller than the DTRF2008 scale (ca. 2.1 mm), STDs of DTRF2014 LOD are smaller than STDs of DTRF2008 LOD, tidal frequencies (13.67d/14.34d) in all LOD time series, annual signal only in LOD of DTRF2008; semi-annual signal more prominent in DTRF2014 ILRS solutions, LOD of ILRSA-v61 solution shows smallest scatter. No discontinuities found in the Y translation and scale when comparing the ILRSA solution to DTRF2008 or DTRF2014.
- IGN: The translations and scale of the technique solutions are estimated with a set of core sites and then the annual and semi-annual signals are filtered in order to help identify discontinuities. The signatures in TY and scale are visible in the intrinsic estimation of origin and scale. The VLBI scale is

more scattered, the differences are similar to what found for ITRF2008. The trends for SLR and DORIS are similar. The ITRF2008 scale uncertainty is 1.05 ppb at 2005.0 and will most probably be the same for ITRF2014. Most probably the NTAL model will not be applied anymore preferring the estimation of a seasonal signal in the site coordinate time series so that the velocity estimation will improve and it will be easier to detect the discontinuities: tests still needed before taking a decision. The official products will have as usual coordinates and velocities, with discontinuities. The post-seismic model will be an additional delivery, almost one hundred sites affected by earthquakes in ITRF2014, a few for SLR. **IGN will give the format and the subroutines.**

AC Reports

BKG: BERN_SLR SW was updated several times to match the ITRF requirements. It is necessary to enforce the synchronization of ILRS data center files "allsat", but **EDC needs a formal request.**

DGFI: A v61 solution was delivered without considering Etalon data because the use of Etalon reduces the looseness; not clear why. The S/W used for v61 still had a problem in the application of the ocean loading and the reprocessing of the whole series is in progress: more stations and plans to include Etalon again. Comparisons with ITRF2008 don't show signatures in translations and scale.

GRGS: some effects in the UP component for Yarragadee, Mount Stromlo and Monument Peak are presented.

GFZ: Kunming was added in the analysis 2007-2013 for ITRF2014. Open issues: large variation of first and last EOP in the arc, long-period oscillation of the mean. Other relevant activities at GFZ: variations of degree 2 harmonics for GGFC, atmospheric loading for all ITRF2008 stations from ECMWF data for GGFC.

Ife: 100th anniversary of Einstein's theory of general relativity. The status and the perspectives of the LLR sites are presented. There are now 6 LLR analysis centers: JPL (USA); CfA (USA); POLAC (France); IfE (Germany); INFN (Italy); SOKENDAI (Japan). Comparison of LLR software is ongoing work between ACs. A simulation of impact of new LLR sites and/or reflectors with various options is ongoing with D. Currie.

NSGF: NSGF: Evaluation of the trial time series which for 2000-2014 used LAGEOS and LAGEOS-2 to solve for RB for all sites: Helmert transformation of weekly solutions carried out onto ITRF2008 with all sites instead of just core sites - the signature seen by the CCs in TY and scale is not visible in the NSGF results. Scatter in TZ is larger, there are significant offsets in TX and TY and the scale is 1.2ppb smaller than the equivalent series where only the "AWG-approved" sites had RB solved-for.

ITRF2014 EVALUATION PLANS:

The following ILRS ACs are ready to support a re-analysis of the entire or part of the SLR data set that went into the development of ITRF2014 using the released model and associated EOP series: ASI, BKG(?), DGFI, ESA, GFZ, GSFC (POD), GRGS, JCET (also LARES), NSGF (above all for biases).

Orbital Product Finalization and Release (PP):

Major actions:

- Identify the ACs that deliver orbits routinely now;
- Ensure that all ACs have submitted up-to-date Analysis Description files to ensure consistent modeling in developing the orbits;

By the end of April the two CCs will make a summary of the situation and then propose a plan to the ACs. Hopefully by the end of May. AI needs revision of target date.

Revision of analysis procedures and modeling standards:

- Need a plan how we will migrate the current operational series to the design used during our ITRF2014 reprocessing effort
- Steps needed to achieve the switch:
 - All ACs should be able to easily switch to the new approach, provided the required input is readily available;
 - We are in the process of developing a mechanism that would provide the ACs with gravitational coefficients for the lowest degrees as a substitute to the series provided by CSR for the reanalysis;
 - Once we include the estimation of low degree harmonics in our operational products, this will be a trivial step;
 - The mean pole will be produced by IERS and introduced in the IERS Convention 2013. **The new convention chapter will be sent by Erricos.**

It was agreed to postpone the switch until the low degree terms PP has been completed.

Routine estimation of systematic errors for all sites (PP):

The Pilot Project will be planned after the ITRF2014 evaluation.

The Analysis Center willing to start making some analysis should make its tests in the interval between 2000 and 2014 and, if limited to one year, 2013 is preferable.

Revisit NT Atm. Loading & Gravity implementation as an internal PP:

Results of the GGFC/ITRS-run PP were inconclusive and mixed, indicating possible errors in the development of the input loading data sets in various s/w compatible formats from the original release at GGFC. SLR suffers of the blue sky effect and adopting the correct application of NT Atm. Loading at the stations will improve our operational products. ITRS' reservations about the application of the models do not apply here since for TRF development purposes we always resort to a dedicated reanalysis in which case we can always forego the application of such models to conform with the ITRS rules

- **Erricos will check the GGFC call for participation to verify what they wanted to do and compare with the purpose of the AWG PP. Erricos will circulate a new call and then contact Van Dam or others to agree on the work to be done with the new time series from the ILRS ACs.**
- The zero solution is the repro modeling, to be compared with the time series including NTAL.

Estimation of low-degree SH of the gravity field (PP):

This PP needs to be completed before or in tandem with that of the addition of LARES to our target list, since this capability will be required for the optimal incorporation of the LARES data into our operational products. All analysis centers are ready to support this product except NSGF. **NSGF will be ready in one month (mid-May 2015).** ESA has implemented the update, except the SINEX formatting that will be done soon. GGFC, geophysicists and GRACE users are customers.

Task: test the SW estimating the coefficients for 1-2 months, compare with the CSR coefficients, deliver in SINEX format (2.02) as values of normalized coefficients. Once the mechanism is on, we will decide how to

proceed considering the models available.

Estimate 2x2 with LAGEOS in 2013. Deadline for ACs: end of July. 4 weeks delivered by the ACs asap for a quick check of the input solutions. The time series for 2013 should be ready by mid of July (version 40 will be used for the test products). The CC will make the combination by September 2015, at latest.

- De-aliasing in or out? The products delivered later (one month) will have all included.

Inclusion of LARES in the operational product development (PP):

LARES can add a lot of strength to our products and at the same time allow us to deliver low-degree harmonics (e.g. 5x5) on a weekly-arc basis routinely;

A PP following (as an extension) the PP for the validation of estimation of low degree SH would help iron out any modeling differences between ACs and ensure that everyone is on the same page;

Need to adopt state-of-the art gravitational and tidal models in order that higher degrees have negligible errors and those errors will not leak and corrupt our estimates;

- **LARES CoM values for LARES to be delivered by Graham.**
- The PP is postponed after the PP on low degree SH.

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