

**ILRS Quality Control Board (QCB)
Telecon
July 19, 2016**

Participants: Erricos Pavlis, Toshi Otsubo, Matt Wilkinson, Tom Varghese, Carey Noll, Horst Mueller, and Mike Pearlman.

General

Carey has put the Quality Control Board webpage on the ILRS site; it can be accessed under Science and Networks; it will include QCSC notes, files, and other documentation. **The web includes files from each of the contributing centers; separate files will be included for those submitted for the Report Card and those submitted for the QC and diagnostic process:**

<http://ilrs.gsfc.nasa.gov/science/qcb/index3.html>

ILRS Quality Control Board (QCB)

The Quality Control Board was organized at the 19th International Workshop on Laser Ranging to address SLR systems biases and other data issues that have degraded the ILRS data and data products. The formulation document listed below documents the discussions held at the Workshop and the impetus for organizing the Quality Control Board. The board is a joint activity under the ASC and the NESC. The board meets monthly by telecon or in person; notes from the meetings to date are included below.

- Formulation of the study group
- Activities and meetings
- Members and exploder
- NESC Forum

SLR Data Quality Control (QC) Analysis Reporting



Analysis/Associate Analysis Center	Reporting Website	Online Reports
DCFI	http://ilrs.dgfi.tum.de/quality/weekly_biases/stations/	http://ilrs.dgfi.tum.de/quality/weekly_biases/
Hitotsubashi University	http://geo.science.hit-u.ac.jp/slr/bias/	ftp://oddis.gsfc.nasa.gov/pub/reports/slrhitu
JCET	http://geodesy.jpel.lumbc.edu/ILRS_AWG_MONITORING/	ftp://oddis.gsfc.nasa.gov/pub/reports/slrjcet
MCC		ftp://oddis.gsfc.nasa.gov/pub/reports/slrmcc
NSGF	http://sgf.ngo.ac.uk/analysis/nporbit.html	
SHAO		ftp://oddis.gsfc.nasa.gov/pub/reports/slrsao

Related Links



- Monthly ILRS report cards
- Quarterly ILRS report cards

Quick Links

- > ILRS Products
- > ILRS Analysis Centers
- > Station Coordinates - SLRF2008
- > Lunar Science
- > Station Quarantine List



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Analysis Diagnostic Products

Erricos is updating his analysis diagnostic software to accommodate the new ITRF; transition from ITRF 2008 to 2014 when the Station Systematics PP is completed. So far, Pilot Project solutions for 2005 – 2009 have been received from ASI, DGFI, GFZ, JCET, and NSGF; Erricos will get after the delinquents GRGS and ESA. BKG will not be able to participate at this time. (Those ACs that consistently do not participate may no longer qualify for AC status). The newly submitted GFZ v210 solutions are now on line; weekly combinations solutions with L1 and L2 are in process. So far analysis diagnostic (comparison) results show some improvement in the metrics with the well performing stations; still some issues with the marginal stations. Erricos will be making his second combination for the pilot project shortly with recently received data.

Combination solutions for the pilot project will be done by JCET. The goal is to harmonize the results amongst ACs and develop a routine product on an accessible URL that will give one clear and useful report for each station that is based on inputs from all of the AC's.

The final combination data product is expected in the 3rd Q of 2016. The transition must wait the general adoption of the new post-seismic model (PSD). The IERS needs yet to adopt the new EOP series consistent with ITRF2014. Once the Pilot Project is demonstrated, the full data history on L1, L2, E1 and E2 will be reprocessed.

Erricos has posted several diagnostic tools on the ILRS website, accessible under either Network or Science; tools include Station Bias Histories, Network Performance based on LAGEOS, and JCET QC reports; See JCET Portal at:

http://geodesy.jcet.umbc.edu/ILRS_AWG_MONITORING/

For the “Systematics History from JCET” click on the button:

MONITORING SYSTEMATIC ERRORS AT ILRS STATIONS

for the “Systematic Error Pilot Project” results click on the button:

SYSTEMATIC ERROR ESTIMATION PILOT PROJECT

and for the network performance on LAGEOS and LAGEOS-2 click on the button:

NETWORK PERFORMANCE BASED ON LAGEOS and LAGEOS-2

The network performance data base spans the period 2010 to present only, but it can eventually be extended back to any date after 1983 if found useful. The JCET QC (daily and weekly) reports can be found at:

<ftp://cdis.gsfc.nasa.gov/pub/reports/slrjcet>

Everyone is urged to look at these tools and give feedback to Erricos.

Current Diagnostic Tools

Erricos continues to work on a web facility to display and compare quantities appearing on the QC reports from all groups participating in the report card generation (i.e. DGFI, HITO-Univ., JCET, MCC and SHAO), as well as historical reports from UT/CSR. The plan is to have this tool on line by the Potsdam laser Workshop and organize a clinic session in it.

It might be a good idea to keep track of the accesses to these and other QC sites to know if they are being used and by whom. Erricos will alert the stations on the on-line tools that he is developing.

Horst is in the process of updating his website using data from the past two years; he is improving the data smoothing and comparing results for L1 and L2, and ITRF2008 and 2014. Improved products should be available in the next few weeks. He also plans to add atmospheric loading to the analysis.

Toshi and Horst issue quick response diagnostics on incoming data to the stations; DGFI analysis is run twice per day with automatically triggered notice for 10 cm events; work continues on improving the analysis and diagnostic procedures. The Hit-U analysis is performed every 6 hours using a few months of data; error checking is at the 3 – 4 sigma level on the historical data; these QC reports are available at:

http://ilrs.dgfi.tum.de/quality/weekly_biases/stations/itrf2014/

All analysis centers involved in QC will switch to ITRF 2014 in at the same time to be decided by the Analysis Coordinator.

Toshi will lead the Workshop Oral Session on Station Systematic; this activity needs to be coordinated with the Clinic Sessions.

Additional Tools and Modeling

The diagnostic tools should include range dependent errors in the spherical passive satellites (Sarlette, Stella, LARES, LAGEOS (2), and Etalon. (I doubt Ajisai will be useful). Graham and Toshi are updating the station-dependent center-of-mass corrections, but we need to make sure we have the best values for the station parameters. This should lead to a function (plot) of range bias verses range to be posted it as part of the display in the diagnostic website.

ACTION Carey: Query the stations to make sure we have the latest/correct site log information; ask for confirmation of receipt to help validate that we have the latest contact point;

DELAYED Action CB: Query the stations in particular on pulse width and data clipping criteria;

The non-spherical satellites such as Jason certainly have bias issues, but we agreed to leave that diagnosis to the projects as they would have the best orbits and the best satellite models.

ACTION Matt and Tom: Provide a list of items that should be added to the feedback on the helpfulness of the Toshi's charts, including comments on what could be added to improve the

tool and how the charts should be annotated and commented so they might be made more useful to others.

Matt has provided some comments to Toshi on his diagnostic products;

ACTION Tom and Matt: Provide a list of parameters and displays from the analyses that would be useful diagnostic tools for the stations.

ACTION Tom: Check the Site logs for the NASA systems to see if the satellites center of mass parameters are correct and if all of the NASA systems are using the same system parameters.

TOPIC FOR DISCUSSION: We had some discussion on data discrimination: Should there be a minimum number of NP's for a pass to be acceptable? Should we weigh or exclude outlier NP's by the number of contained FR points?

Station Operations

Tosho has been estimating range and time biases for high satellites in an attempt to better isolate time and range biases, but the results are being hampered by poor pass coverage. We need to contact the stations to ask if they can better sample the GNSS passes. Some stations are taking only a few NP's per pass; one in particular is Changchun. Toshi will look at his a bit more closely.

ACTION Mike: Contact Changchun and Shanghai to ask for more coverage on the Lageos passes.

Although we do not get much low elevation (10 – 20 degrees) satellite data on LAGEOS, it could be a useful tool to better

ACTION Mike: Encourage selected stations to take more low elevation tracking on LARES and LAGEOS to better understand systems performance and to refine atmospheric refraction models.

We are obviously going to have to look at the trade-off between pass coverage and the number of satellites we are tracking – Maybe this is a Workshop item.

Networks and Engineering

We need define tools/procedures/suggestions to help the stations detect system problems and to address issues when diagnostics are received from the QC process. This would be a good topic for the Laser Workshop Clinic. Maybe an Action item for the Networks and Engineering Standing Committee?

Maybe Ivan Prochazka would be willing to lead an activity on a rigorous component-by-component approach to trying to understand all sources of error in the SLR measurements.

Communication with the Stations

ACTION Carey: Determine the proper point of contact and interface for each of the stations.

We have the contacts from the latest Site Forms; the mailing above will check the station contact points; those that do to respond will need follow-up.

A list of the Site Log updates and configuration change notifications has been provided by Erricos. Have all stations provided recent update?

Matt has established the on-line forum tool. He will vet it through the N&E SC and then the Board and the CB. Some messages have already been posted. Take a look.

Carey has also categorized stations on the ILRS website as Active, Engineering, Closed/Inactive, and Future Stations.

ACTION Carey: Correct site log issue with Zimmerwald

Next Meeting: TBD (September 6, 8, 13, or 15).

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