



Station Performance Assessment Tools for the ILRS Stations


E. C. Pavlis, M. Kuzmich-Cieslak and K. Evans
GEST/UMBC, Baltimore, MD, USA

19th International Workshop on Laser Ranging
Celebrating 50 Years of SLR: Remembering the Past and Planning for the Future
October 27-31, 2014
Annapolis, MD , USA

- ◆ CRD-NP data content archived online, several parameters and flags are visualized by station over time for all available pass segments
- ◆ Data analysis for LAGEOS 1 & 2, ETALON 1 & 2 daily
 - QC report for past 7 days with pass-by-pass systematics
 - Report submitted to CDDIS and upon request to stations
 - Reports archived on CDDIS and JCET data base for visualization
- ◆ Weekly arc analysis with single set of weekly-averaged systematics (far more stable than the pass-by-pass QC)
 - Systematic measurement errors archived and visualized online
- ◆ AWG product results archived daily for QC analysis
 - AC offsets for positions and EOP from official TRF and IERS EOP series
 - Statistics of AC performance wrt ITRF and to the combined products
 - Station position and EOP evolution over time from ILRS products
- ◆ QC Viewer s/w package for all QC Reports

Monitoring of ILRS Analysis WG Products

geodesy.jcet.umbc.edu/ILRS_AWG_MONITORING/ Reader

 **International Laser Ranging Service**
Analysis Working Group



Monitoring of ILRS Analysis WG Products


- WEEKLY STATION POSITIONS & DAILY EOP SERIES
- EVALUATION OF WEEKLY AWG PRODUCTS
- MONITORING SYSTEMATIC ERRORS AT ILRS STATIONS
- NORMAL POINT DATA MONITORING (CDDIS)

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

 **UMBC**
AN HONORS UNIVERSITY IN MARYLAND

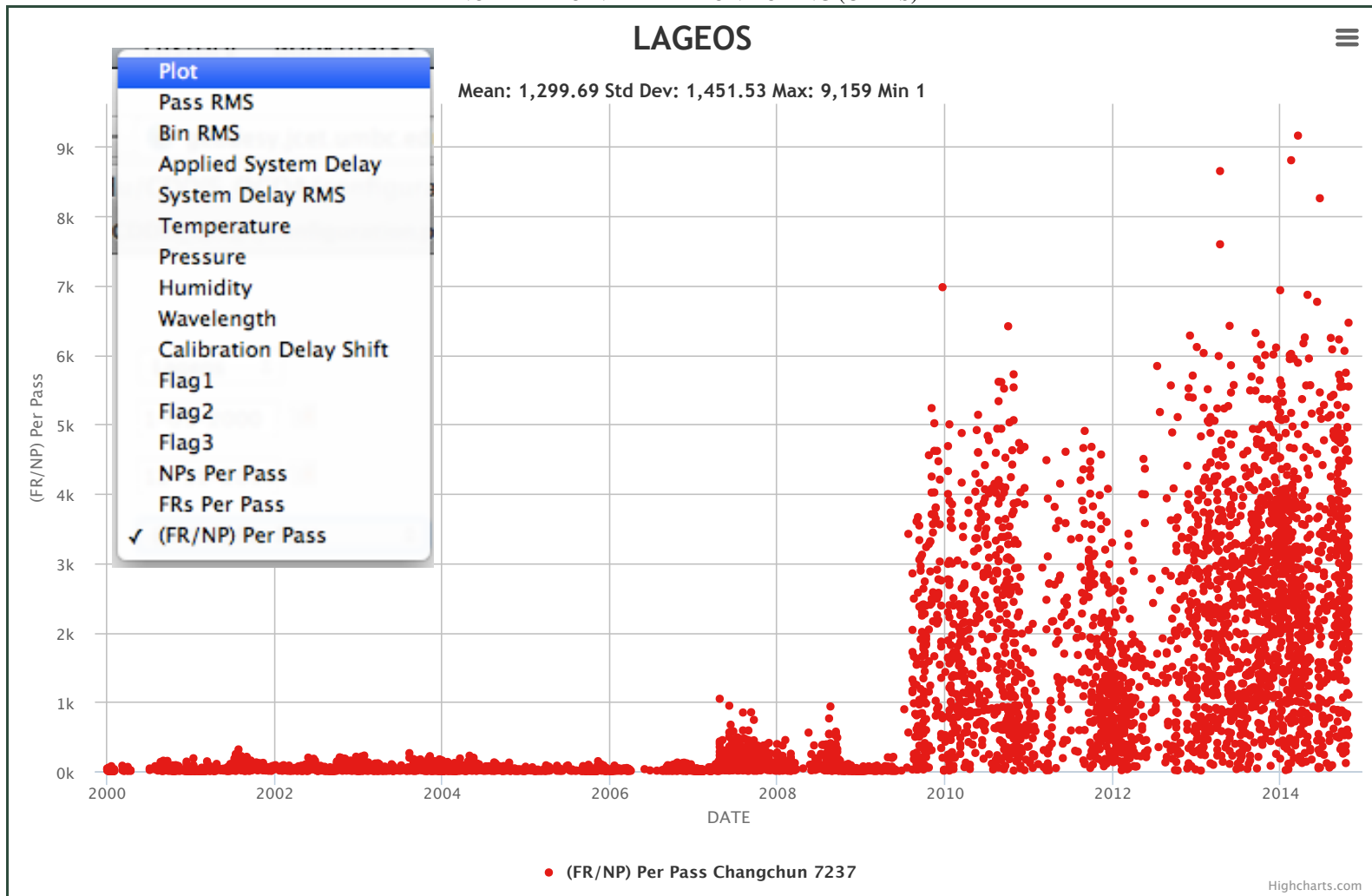
Responsible JCET Official: Dr. Ericos Pavlis
Web Curator: Magda Kuzmicz-Cieslak
Contact Us

Last Modified: 2014-10-27
Privacy Policy & Important Notice

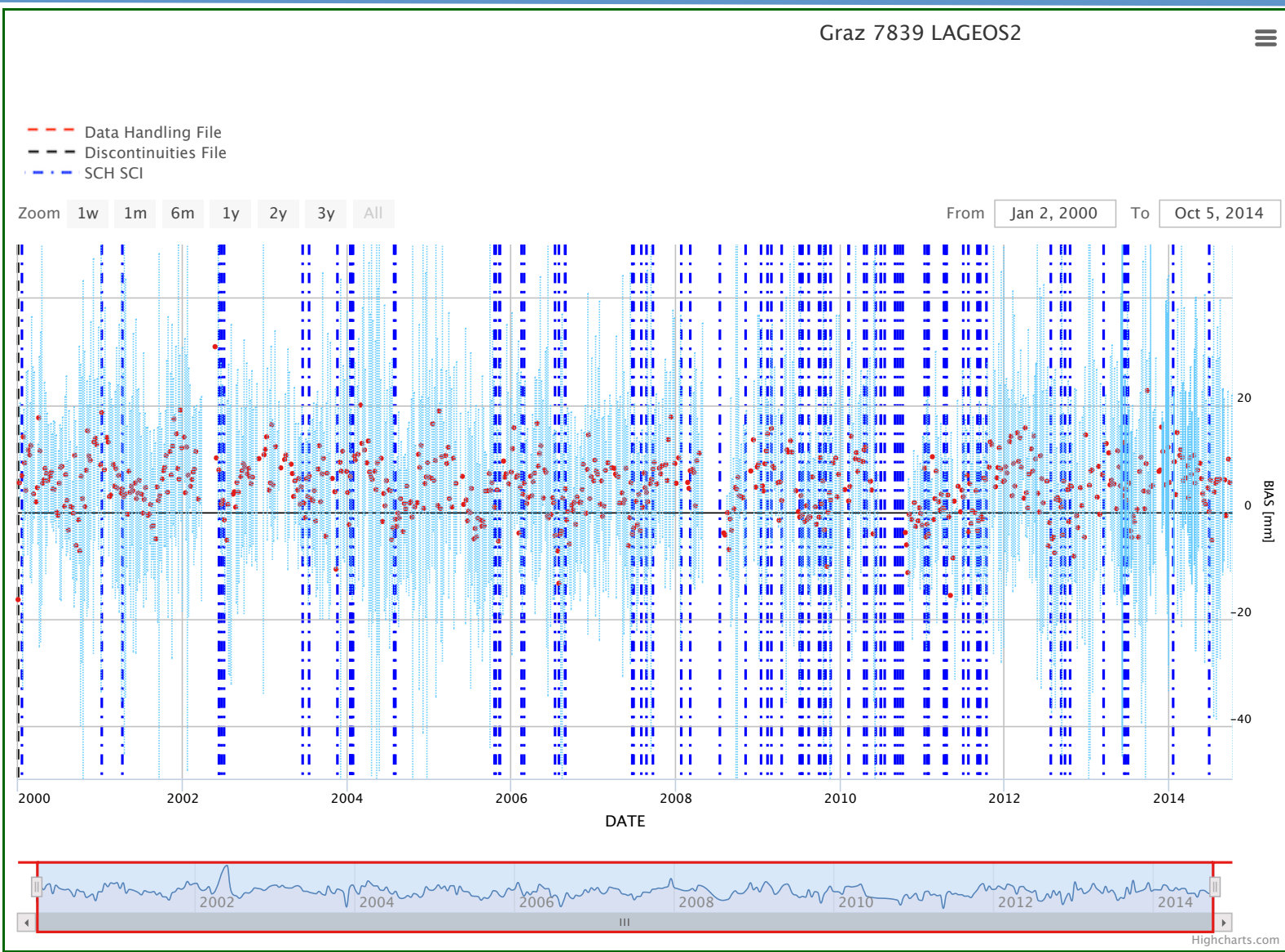


Number of FR Ranges in a NP Range

NORMAL POINT DATA MONITORING (CDDIS)



Systematic Range Error & SHC Events





Weekly/Daily ILRS Products – Position Offsets



DAILY PRODUCT

WEEKLY PRODUCT

7-day arc weekly solution
(one solution/week)

Combination Center: ILRSA ILRSB

Analysis Center: ASI

Start (MM-DD-YYYY): 1-01-2000

End (MM-DD-YYYY): 12-31-2014

Group of results: SITE COORDINATES

Quantities to display: N-E-U OFFSETS

Station: 7105 Greenbelt

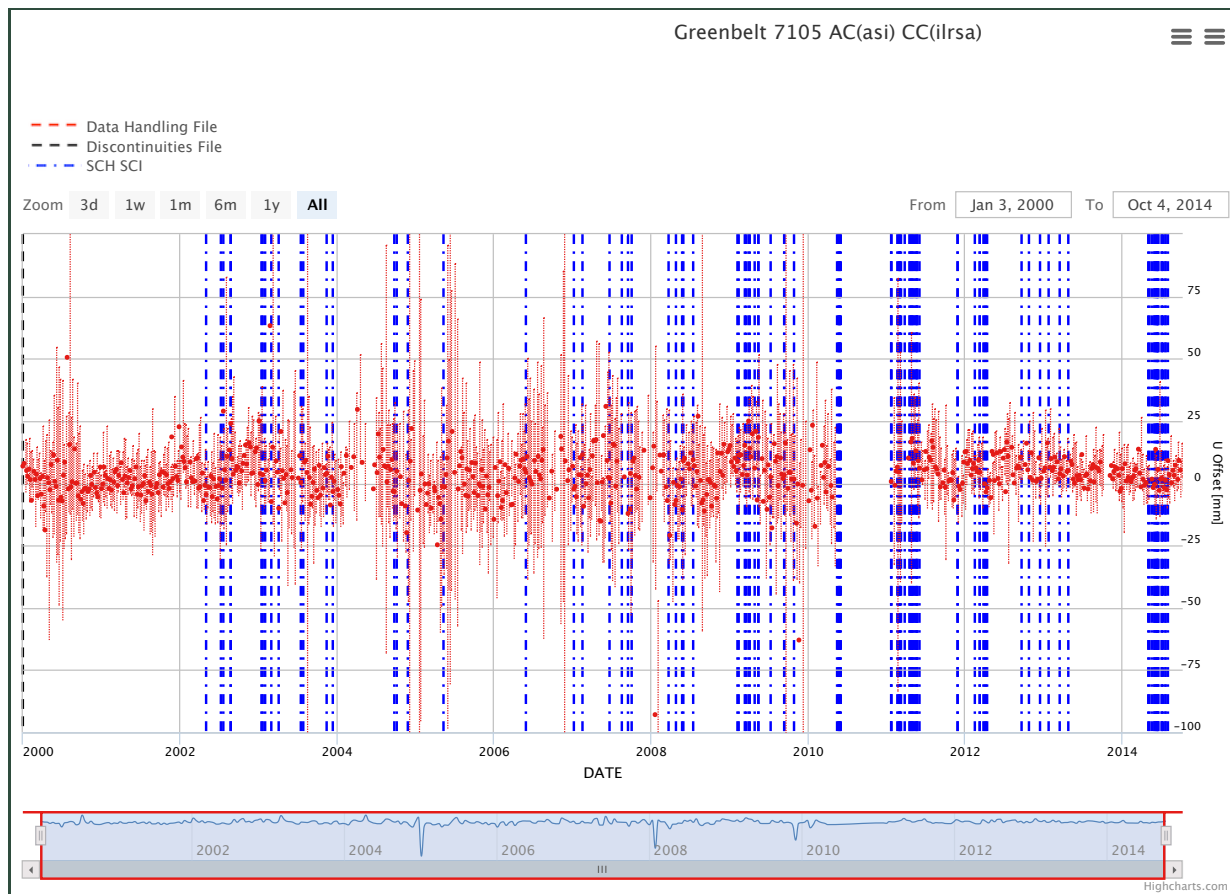
N E U

STATIONS EVENT

Plot Size Minimum Maximum

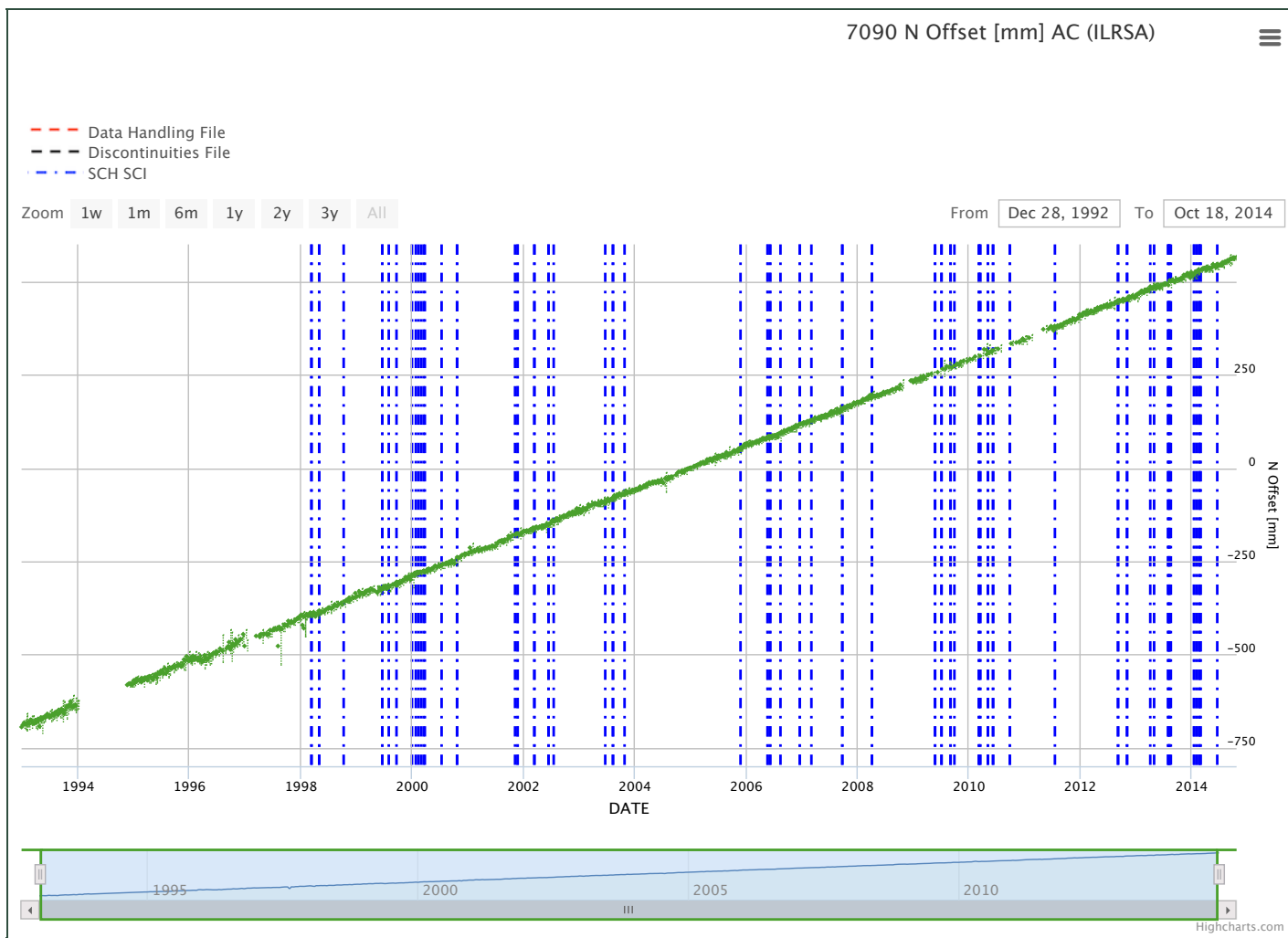
Y axis -100 100

Submit Reset form

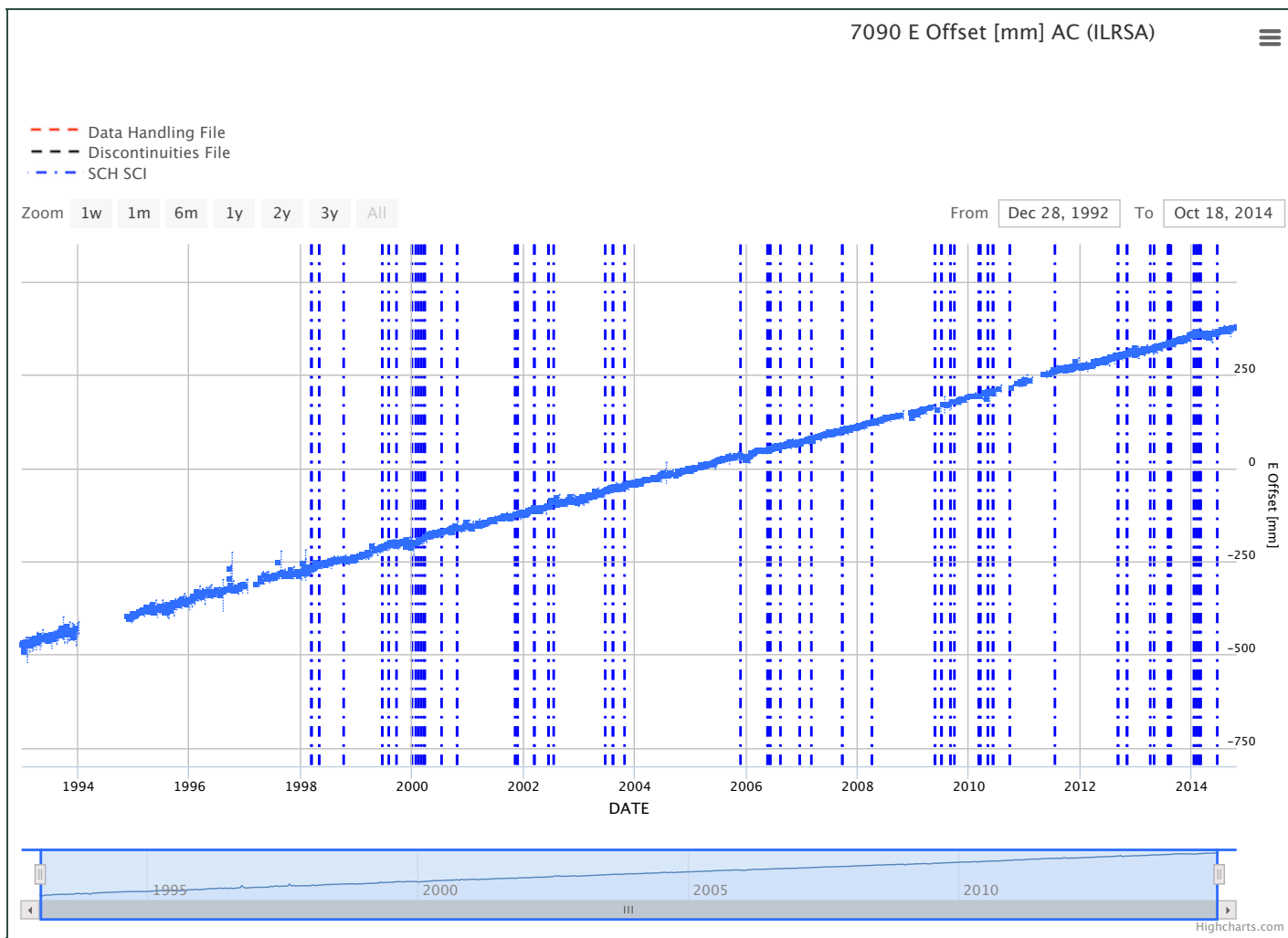


N Offset [mm] Greenbelt 7105 AC(asi) CC(ilrsa)	E Offset [mm] Greenbelt 7105 AC(asi) CC(ilrsa)	U Offset [mm] Greenbelt 7105 AC(asi) CC(ilrsa)
Mean/Std. Dev.: -1.01 ± 10.20 Count:623	Mean/Std. Dev.: 1.89 ± 11.92 Count:627	Mean/Std. Dev.: 3.14 ± 10.63 Count:622

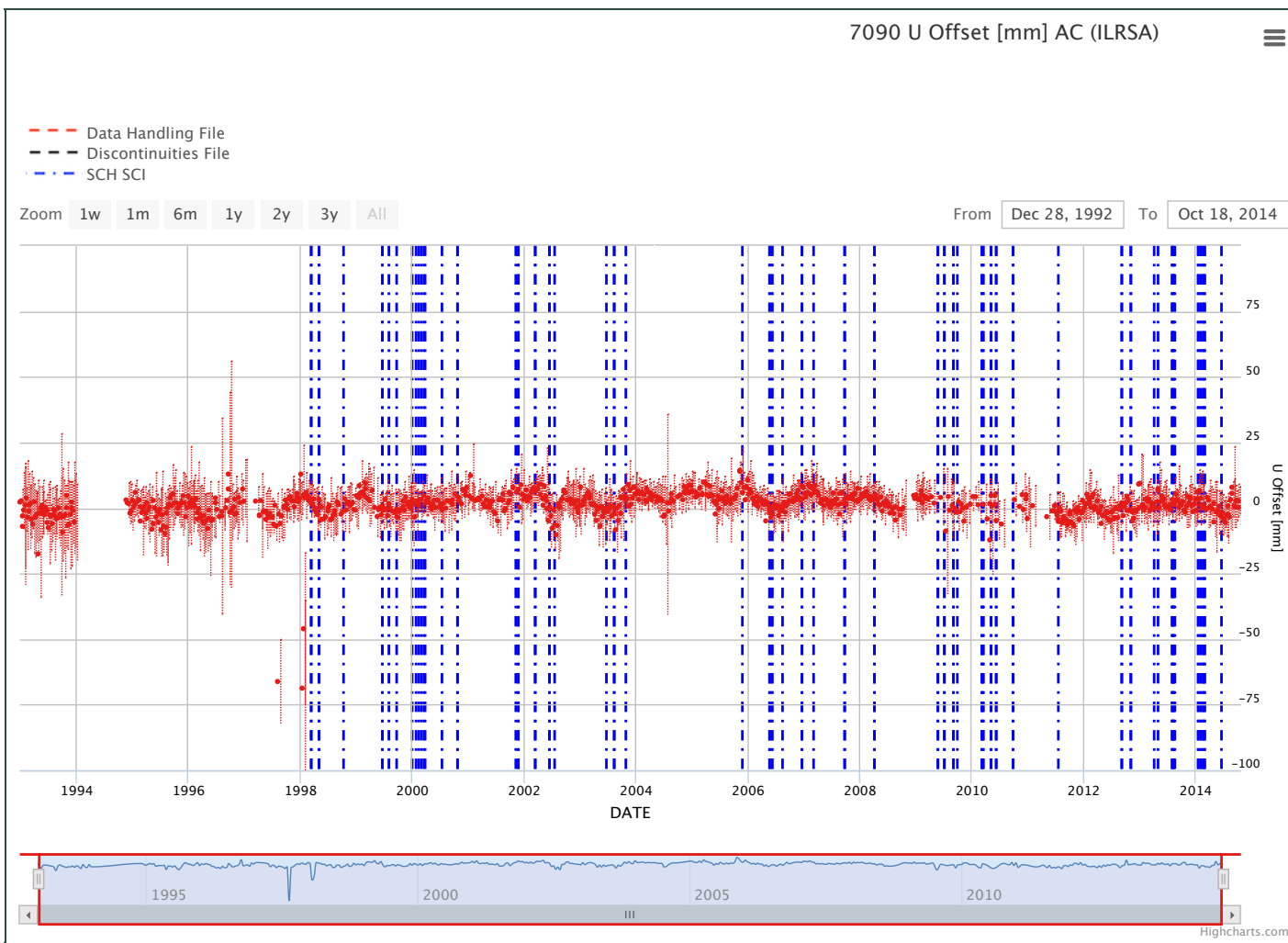
Yarragadee (7090) North



Yarragadee (7090) East



Yarragadee (7090) Up





QC Reports (HITU)



```

#
# @contact t.otsubo@r.hit-u.ac.jp (Toshimichi Otsubo)
# @website http://geo.science.hit-u.ac.jp/slr/bias/
# @version 0.16 (2012/08/16)
# @createdAt 2014/10/30 14:17:02
#
# each line contains:
# sat = 4-char satellite name
# site = 4-char site name (CDP ID)
# date/time = pass starting time
# dur = pass duration (min)
# rb = estimated range bias (mm) with 1-sigma error
# tb = estimated time bias (microsec) with 1-sigma error
# prec = post-fit scattering rms (mm)
# bad/total = number of bad/total normal-points
# rms = single-shot rms (mm)
# pres/temp/humi = pressure (hPa), temperature (K) and humidity (%)
# sdelay = applied system delay (mm)
# shft = system delay shift (mm)
# rms = calibration single-shot rms (mm)
# cfg = system configuration flag; SCH and SCI
# r = data release flag
# wlen = laser wavelength (nm)
#
# 1824 = KIEV
# sat site date time dur rb mm error tb us error prec bad total rms pres temp hum sdelay shft rms cfg r wlen
LAG1 1824 2014/10/18 16:38 3 13 ( 26 ) ----- ( ---- ) 5 0 / 3 24 1004.3 275.8 66 40120 0 11 0 0 0 532
AJI1 1824 2014/10/18 17:42 3 -28 ( 34 ) ----- ( ---- ) 6 1 / 4 22 1005.0 275.6 72 40120 0 11 0 0 0 532
AJI1 1824 2014/10/18 19:45 3 -1058 ( 0 ) ----- ( ---- ) 0 2 / 4 18 1007.0 274.6 72 40120 0 11 0 0 0 532
LAG1 1824 2014/10/18 20:03 11 27 ( 681 ) -16.0 ( 314.6 ) 32 0 / 5 30 1007.1 274.9 68 40120 0 11 0 0 0 532
AJI1 1824 2014/10/18 21:47 0 12 ( 89 ) ----- ( ---- ) 13 0 / 2 22 1007.8 273.8 67 40120 0 11 0 0 0 532
LAG1 1824 2014/10/18 23:35 31 46 ( 71 ) 24.6 ( 38.4 ) 13 1 / 6 28 1008.3 271.6 69 40110 0 10 0 0 0 532
AJI1 1824 2014/10/18 23:52 1 101 ( 175 ) ----- ( ---- ) 35 0 / 4 22 1008.2 271.7 69 40110 0 10 0 0 0 532
STRL 1824 2014/10/19 00:24 5 -22 ( 102 ) ----- ( ---- ) 18 1 / 4 23 1008.3 271.4 71 40110 0 10 0 0 0 532
LAG2 1824 2014/10/19 01:40 8 14 ( 389 ) ----- ( ---- ) 44 2 / 4 24 1009.1 270.7 73 40165 0 11 0 0 0 532
STRL 1824 2014/10/19 02:14 0 -39 ( 134 ) ----- ( ---- ) 23 0 / 3 26 1009.3 270.5 74 40165 0 11 0 0 0 532
LAG1 1824 2014/10/19 03:07 12 -29 ( 119 ) ----- ( ---- ) 21 0 / 3 23 1009.8 270.5 75 40165 0 11 0 0 0 532
AJI1 1824 2014/10/19 16:54 1 -79 ( 99 ) ----- ( ---- ) 20 0 / 4 24 1004.1 276.5 67 40156 0 11 0 0 0 532
AJI1 1824 2014/10/24 20:29 4 100 ( 66 ) ----- ( ---- ) 11 1 / 4 30 1015.6 269.4 83 40121 0 11 0 0 0 532
AJI1 1824 2014/10/24 22:27 7 88 ( 31 ) 2.4 ( 14.4 ) 7 2 / 10 22 1015.8 268.7 86 40121 0 11 0 0 0 532
STRL 1824 2014/10/24 22:45 0 -42 ( 42 ) ----- ( ---- ) 7 0 / 3 19 1015.8 268.6 86 40121 0 11 0 0 0 532
LAG1 1824 2014/10/24 22:53 6 50 ( 134 ) ----- ( ---- ) 27 1 / 5 27 1015.8 268.7 86 40121 0 11 0 0 0 532
STRL 1824 2014/10/25 00:35 1 27 ( 40 ) ----- ( ---- ) 8 0 / 4 26 1015.6 268.2 89 40121 0 11 0 0 0 532
STEL 1824 2014/10/25 01:00 0 72 ( ---- ) ----- ( ---- ) 0 1 / 2 22 1015.6 268.1 90 40121 0 11 0 0 0 532
LAG1 1824 2014/10/25 02:03 7 -109 ( 32 ) ----- ( ---- ) 6 0 / 4 36 1015.5 268.1 91 40121 0 11 0 0 0 532
LAG2 1824 2014/10/25 02:17 14 -2 ( 185 ) -35.3 ( 135.3 ) 22 0 / 5 21 1015.6 267.6 93 40121 0 11 0 0 0 532

```



QC Reports (JCET)



```
# @Data span 141023-141030
# @contact epavlis@umbc.edu
# @website http://geodesy.jcet.umbc.edu/
# ITRF used: SLRF2008 (http://ilrs.gsfc.nasa.gov/working_groups/awg/SLRF2008.html)
# @version 1.0
#
```

each line contains:

```
#
# STA ID = site name
# YY/MM/DD HH:MM = pass starting time
# SAT = satellite name (L1: LAGEOS1; L2: LAGEOS2; E1: ETAL01; E2:ETAL02; S1: STARLETTE; A1: AJISAI; LR: LARES)
# GOD OBS = number of good normal points
# RAW RMS = residual RMS before editing & bias application
# PREC EST = post-fit scattering rms
# RANGE BIAS = estimated range bias
# RANGE BIAS SIGMA = estimated range bias sigma
# TIME BIAS = estimated time bias
# TIME BIAS SIGMA = estimated time bias sigma
# PASS DUR = pass duration
# EDIT OBS = number of bad normal points
# CALIB+ MEAN = mean Applied System Delay (ILRS FR format cols 97-104)
# CALIB SDEV = mean System Calibration Method (ILRS FR format cols 126)
# CALIB SHIFT+ = mean Root Mean Square (ILRS FR format cols 111-114)
# STPASS RMS = mean Pass RMS (ILRS FR format cols 58-64)
# TEMP = mean surface temperature [K]
# HUM = mean relative humidity of surface %
# PRES = mean pressure [hPa]
# WLEN = walelength [nm]
# SCH = System Change Indicator (ILRS FR format cols 127)
# SCI = System Configuration (ILRS FR format cols 128)
# DRF = Data Release Flag (ILRS FR format cols 130)
# ELEVATION MAX = maximum elevation for pass [degrees]
# ELEVATION MIN = minimum elevation for pass [degrees]
#
```

```
#1824 Kiev 12356S001
```

#	GOOD	RAW	PREC	RANGE	RANGE	TIME	TIME	PASS	EDIT	CALIB+	CALIB	CALIB++	STPASS	TEMP	HUM	PRES	WLEN	S S D	ELEVATION						
#	OBS	RMS	EST	BIAS	BIAS	BIAS	BIAS	DUR	OBS	MEAN	SDEV	SHIFT	RMS	[K]	%	[hPa]	[nm]	C C R	MAX						
#	STA ID	YY/MM/DD	HH:MM	SAT	A	[mm]	[mm]	[mm]	[mm]	[us]	[MIN]	[mm]	[mm]	[mm]				H I F	[degrees]						
18248101	14/10/29	15:53	A1	17	39.8	23.0	32.5	9.6	61.0	2.6	0	0	40122	E	18	0	P	36	277.6	68.0	1007.9	532.0	1 1 0	65.8	20.8
18248101	14/10/29	17:54	A1	9	86.4	34.3	-79.3	25.8	21.4	6.7	0	0	40122	E	18	0	P	42	274.8	76.0	1007.5	532.0	6 5 0	70.9	31.0
18248101	14/10/29	19:55	A1	2	84.6	40.0	-74.6	49.2	0.2	8.7	0	0	40122	E	18	0	P	30	273.7	81.0	1007.4	532.0	0 1 0	22.9	21.9



Supported QC Reports



DGFI – Data files for the Deutsches Geodaetisches Forschungsinstitut Analysis Center (AC). The online source for these files is http://ilrs.dgfi.badw.de/fileadmin/quality/weekly_biases/ Last updated 8/14/2014

JCET – Data files for the Joint Center for Earth Systems Technology Analysis Center. The online source for these files is <ftp://cddis.gsfc.nasa.gov/pub/reports/slrjcet/> Last updated 8/14/2014

SLRCSR – Data files for the Center for Space Research Analysis Center. The online source for these files is <ftp://cddis.gsfc.nasa.gov/pub/reports/slrcsr/> Last updated 8/14/2014

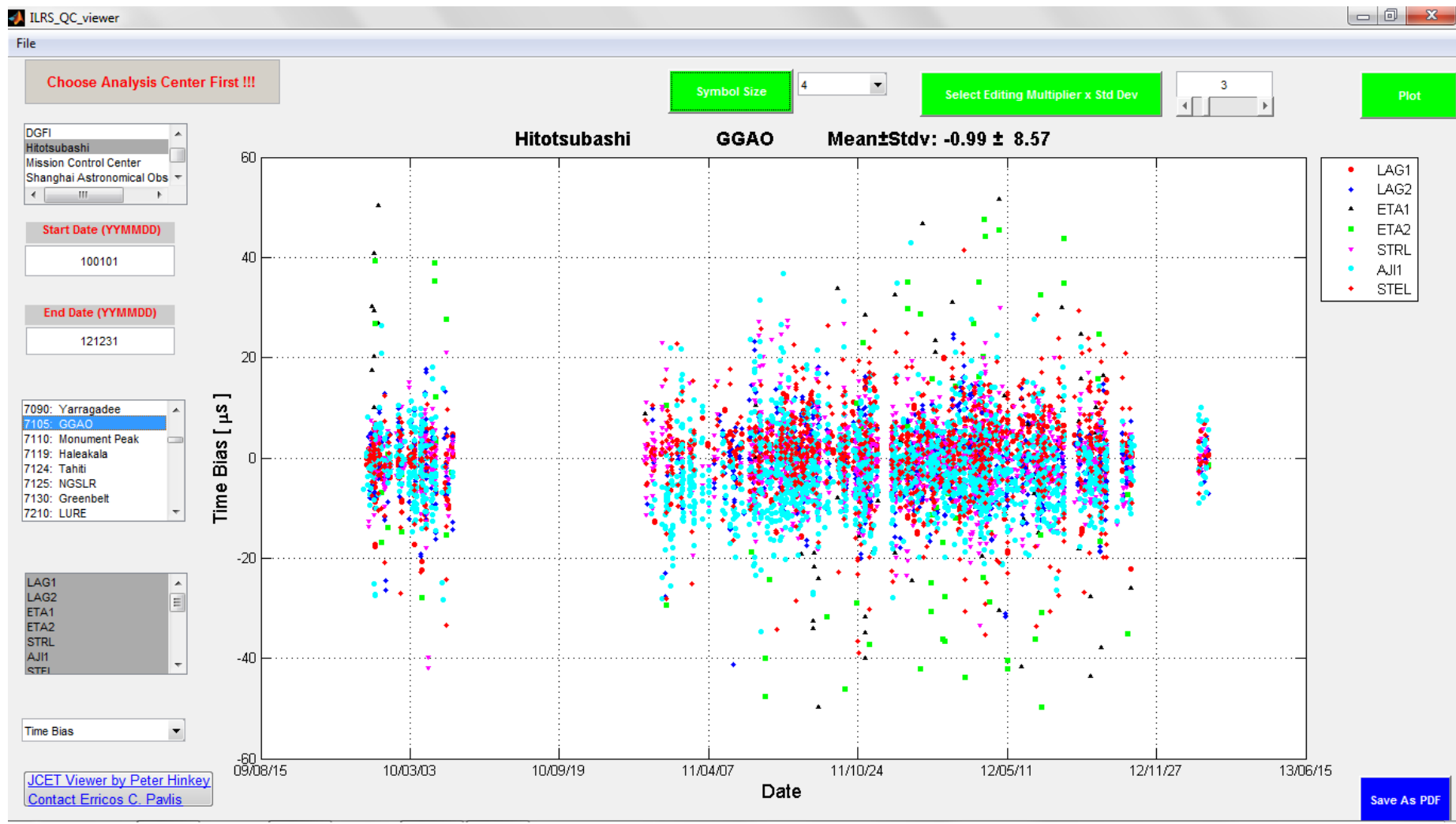
SLRSAO – Data files for the Shanghai Astronomical Observatory Analysis Center. The online source for these files is <ftp://cddis.gsfc.nasa.gov/pub/reports/slrsao/> Last updated 8/14/2014

SLRMCC – Data files for the Mission Control Center Analysis Center. The online source for these files is <ftp://cddis.gsfc.nasa.gov/pub/reports/slrmcc/> Last updated 8/14/2014

SLRHITU – Data files for the Hitotsubashi Analysis Center. The online source for these files is <ftp://cddis.gsfc.nasa.gov/pub/reports/slrhitu/> Last updated 8/14/2014

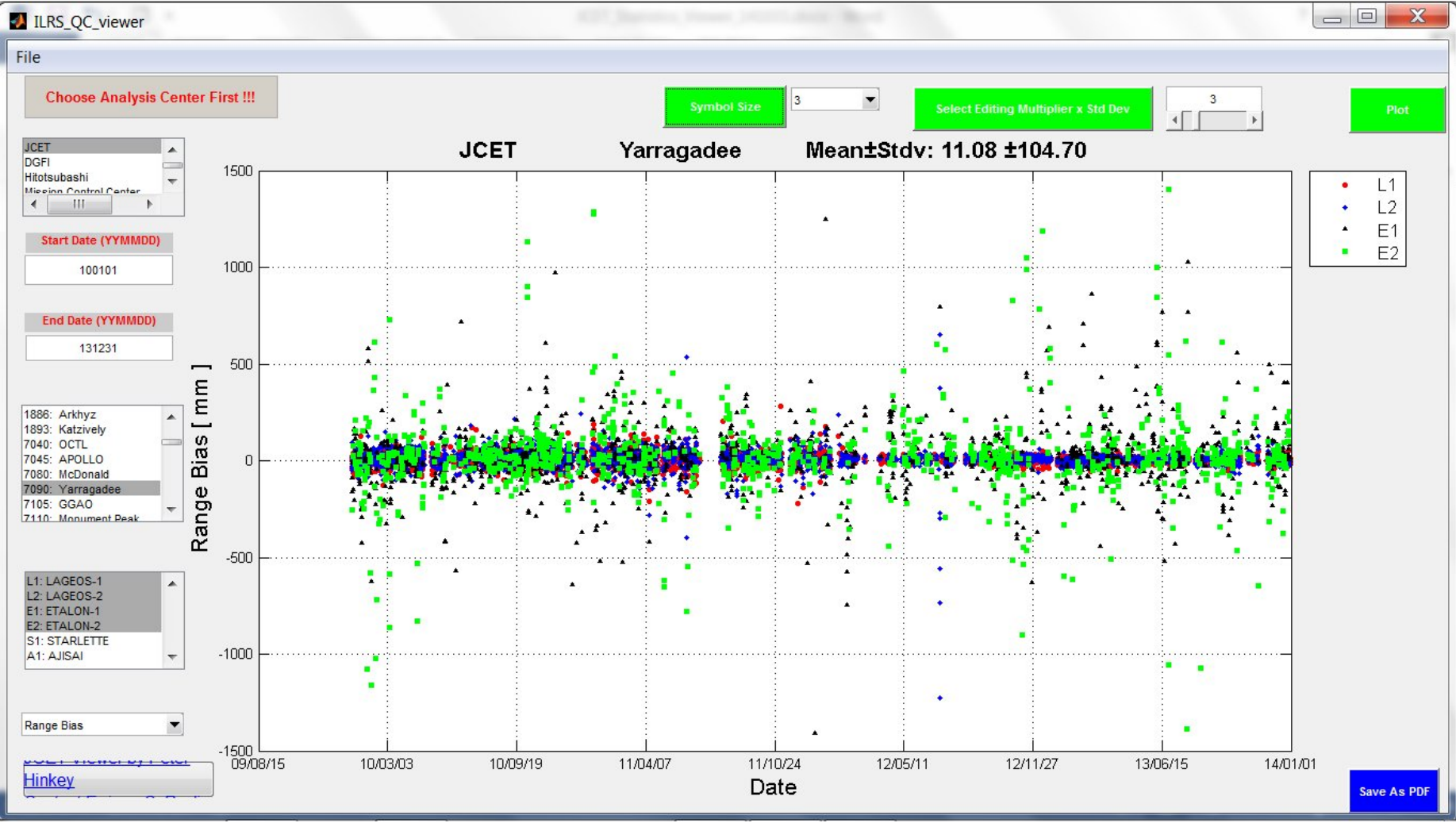


JCET QC Viewer s/w





JCET QC Viewer s/w



See you at Table 7!