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JCET Station Performance Assessment Tools for the ILRS Stations

E. C. Pavlis, M. Kuzmicz-Cieslak, Daniel König, and K. Evans
JCET/UMBC, Baltimore, MD, USA

20th International Workshop on Laser Ranging

October 8-14, 2016

Potsdam, Germany



- ◆ All of our products are the result of automated processing on a daily and weekly basis
- ◆ Human intervention is only necessary in special occasions when there is a breakdown of the network or the processing CPUs

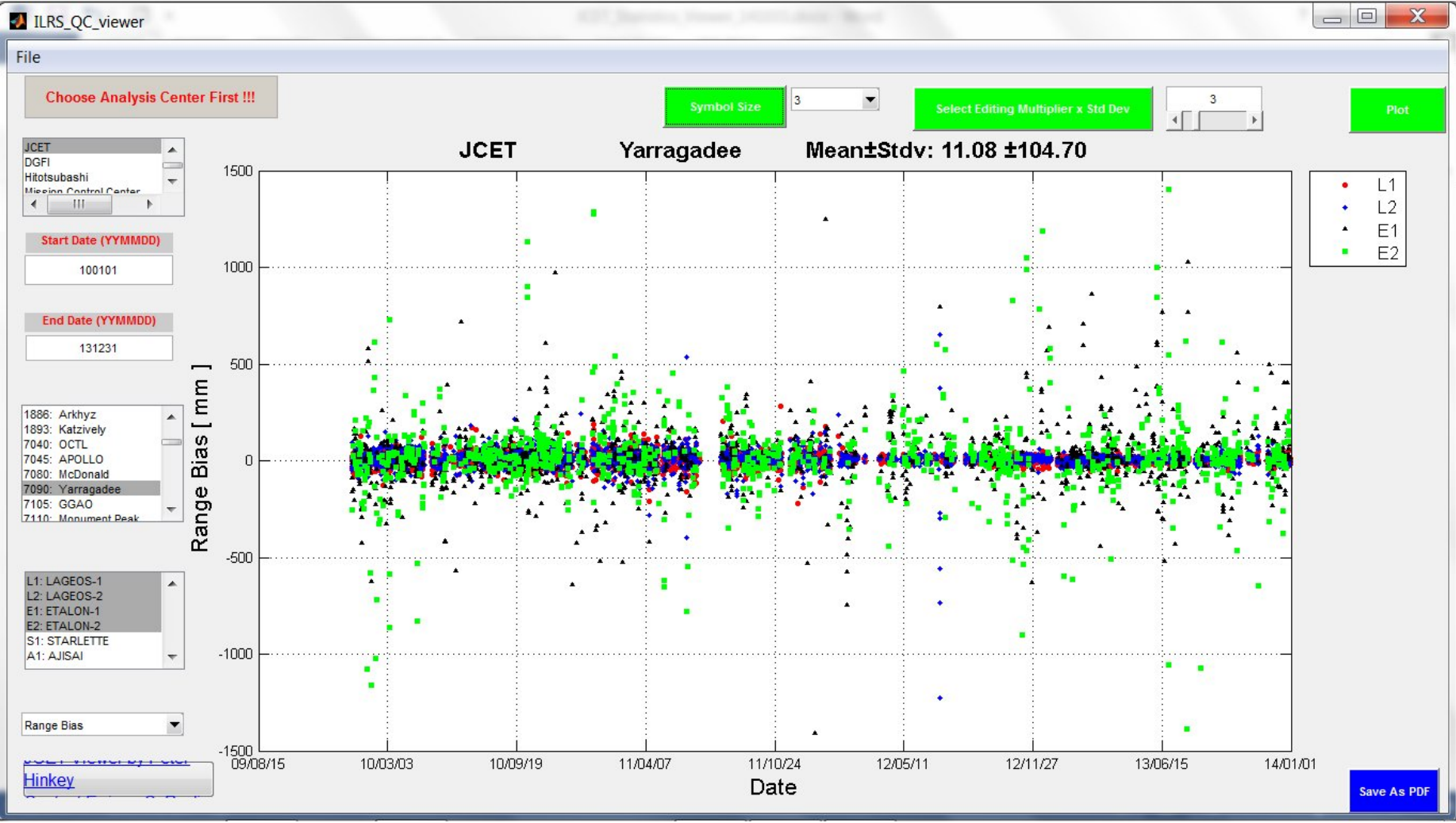


- ◆ We collect all SLR data for the entire year from CDDIS daily;
- ◆ We analyze on a daily basis all data from LAGEOS 1 & 2, LARES, ETALON 1 & 2, STARLETTE, and AJISAI in separate 7^d arcs;
- ◆ The LAGEOS 1 & 2, and ETALON 1 & 2 analysis generates our official DAILY products and a weekly average of the systematic errors for all stations;
- ◆ Through a subsequent reanalysis we generate the systematic error series adjusting for each station pass-by-pass estimate;
- ◆ A report is compiled with a leading section that provides general information, followed by sections, one per station, with one-line entries for each pass, with the estimated statistics (raw RMS, precision estimate, bias and std. dev. of the bias, timing bias and std. dev., etc.);
- ◆ The report is emailed to stations upon request and archived at CDDIS

- 1 ASC product results archived daily for QC of analysis products (for analysts)
 - Position and EOP offsets from official TRF and IERS EOP series for all AC/CC
 - Statistics of AC performance wrt ITRF and to the combined products
 - Station position and EOP evolution over time from ILRS standards
- 2 Weekly arc analysis with single set of weekly-averaged systematics (far more stable estimates compared to the pass-by-pass QC product)
 - Systematic measurement errors archived and visualized online
- 3 Data analysis for LAGEOS 1 & 2, ETALON 1 & 2 daily for rapid QC:
 - QC report for past 7 days with pass-by-pass systematics generated daily
 - Report submitted to CDDIS and upon request emailed to stations
 - Reports archived on CDDIS and JCET data base for visualization
 - QC Viewer s/w package for all QC Reports (**soon to be online!!!**)
- 4 **Data yield for all active sites in the GLTN**
- 5 **Station Systematic Error PP results online (preliminary version)**
- 6 Station History Change Logs online in data base (updated daily)
- 7 CRD-NP data content archived online, several parameters and flags are in the archive & can be visualized by station over time for all available pass segments

```
# @161011
# @Data span 161004-161011
# @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            = wavelength [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]
#
```


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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 **DISCONTINUED**

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/slrmmc/> 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/slrhиту/> Last updated 8/14/2014



JCET ASC Products Monitoring Portal



International Laser Ranging Service
Analysis Standing Committee

VISTA-Pro[®]



Monitoring of ILRS Analysis SC Products

WEEKLY STATION POSITIONS & DAILY EOP SERIES

EVALUATION OF WEEKLY ASC PRODUCTS

MONITORING SYSTEMATIC ERRORS AT ILRS STATIONS

NETWORK PERFORMANCE ON LAGEOS AND LAGEOS2

SYSTEMATIC ERROR ESTIMATION PILOT PROJECT

NORMAL POINT DATA MONITORING (CDDIS)

NEW!!!

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



UMBC
AN HONORS UNIVERSITY IN MARYLAND

Responsible JCET Official: Dr. Enricos Pavlis
Web Curator: Magda Kuzmich-Cieslak
Contact Us

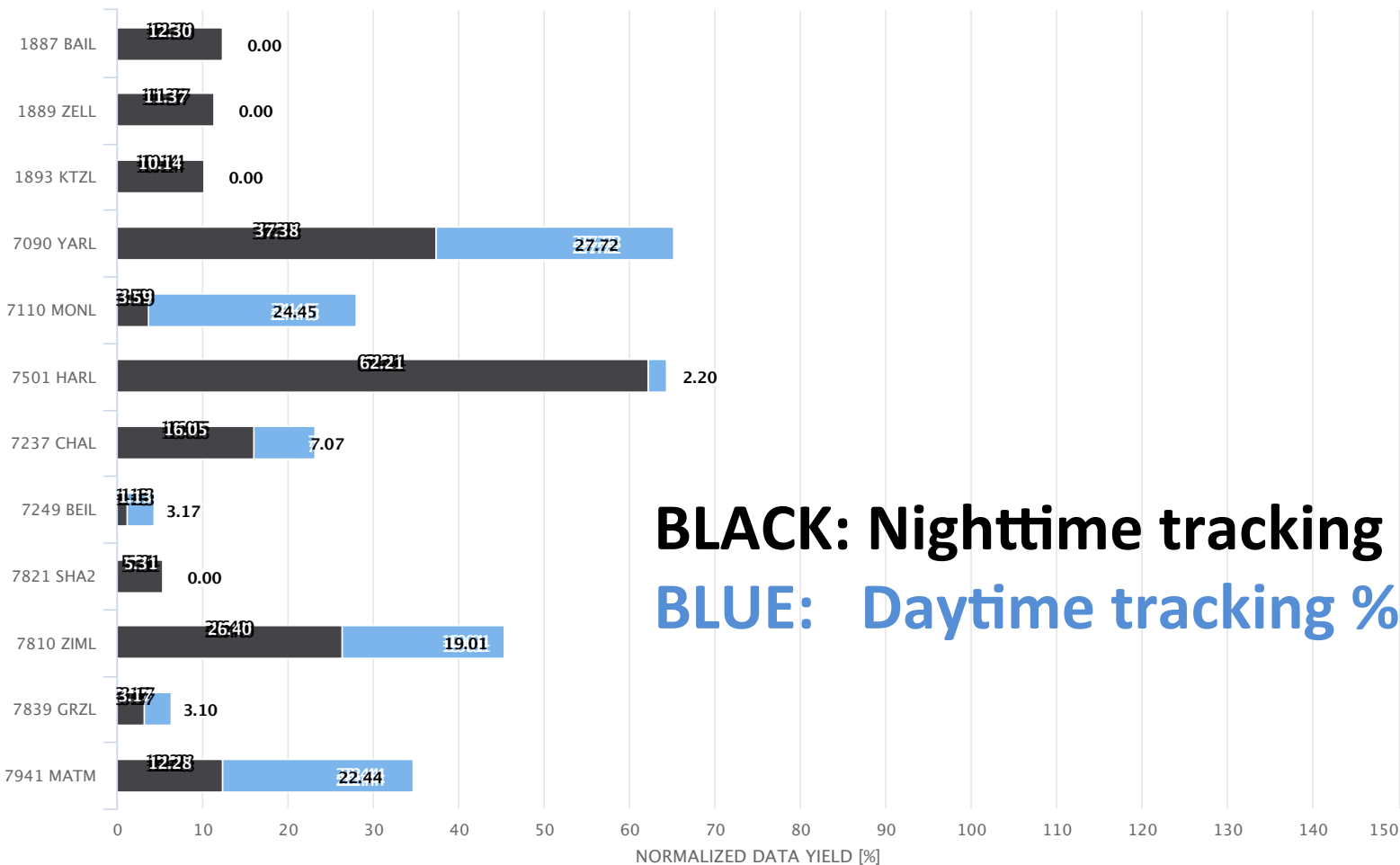
Last Modified: 2016-10-09
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Network Performance: % Efficiency (Day/night)

DATA YIELD PERCENTAGE DURING DAY & NIGHT for: LAGEOS

from 2016-10-03 to 2016-10-10
Minimum elevation [°] 20

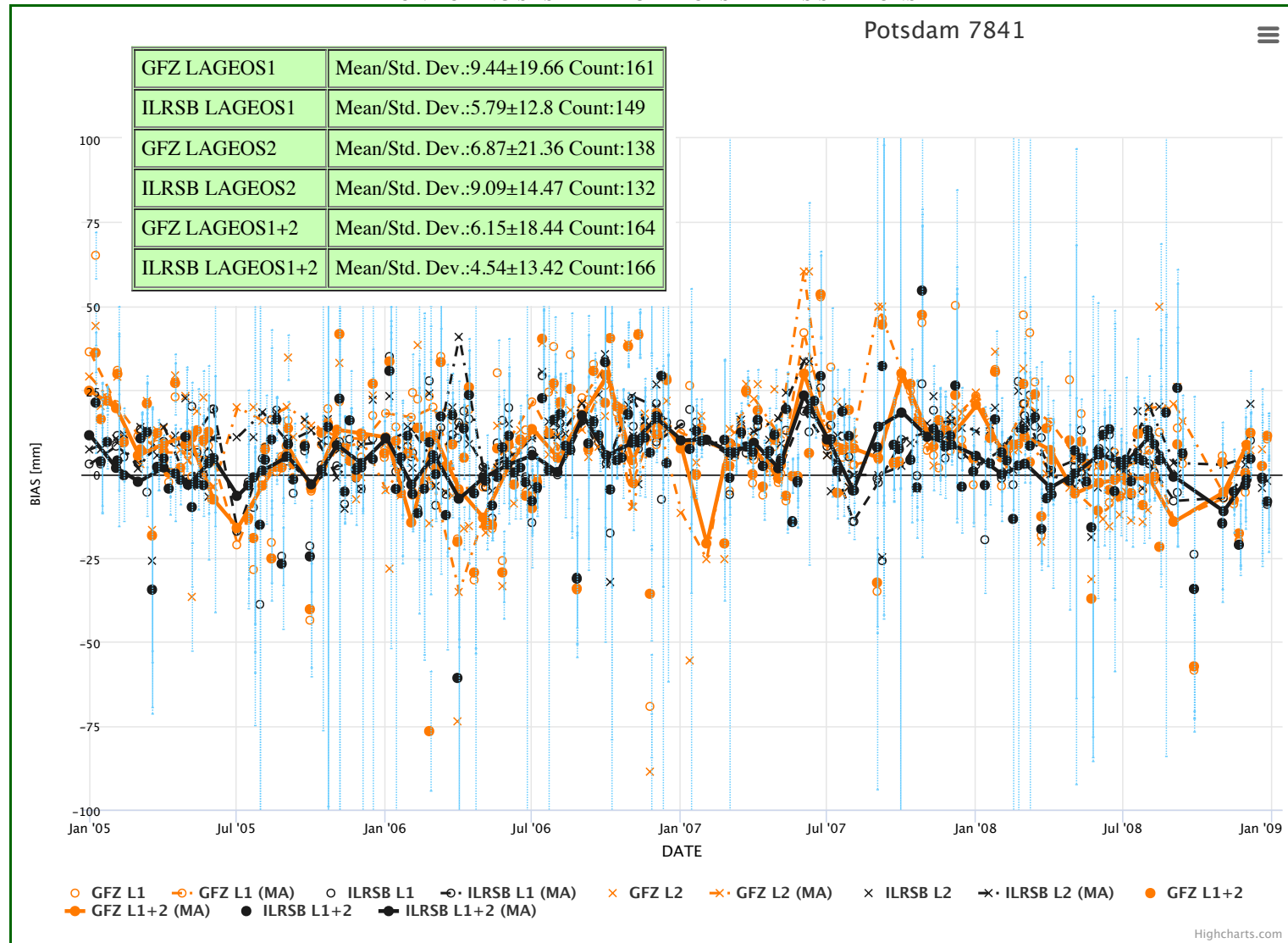


BLACK: Nighttime tracking %
BLUE: Daytime tracking %

● [ACTUAL/POSSIBLE] PASSES IN DAYLIGHT ● [ACTUAL/POSSIBLE] PASSES IN NIGHT

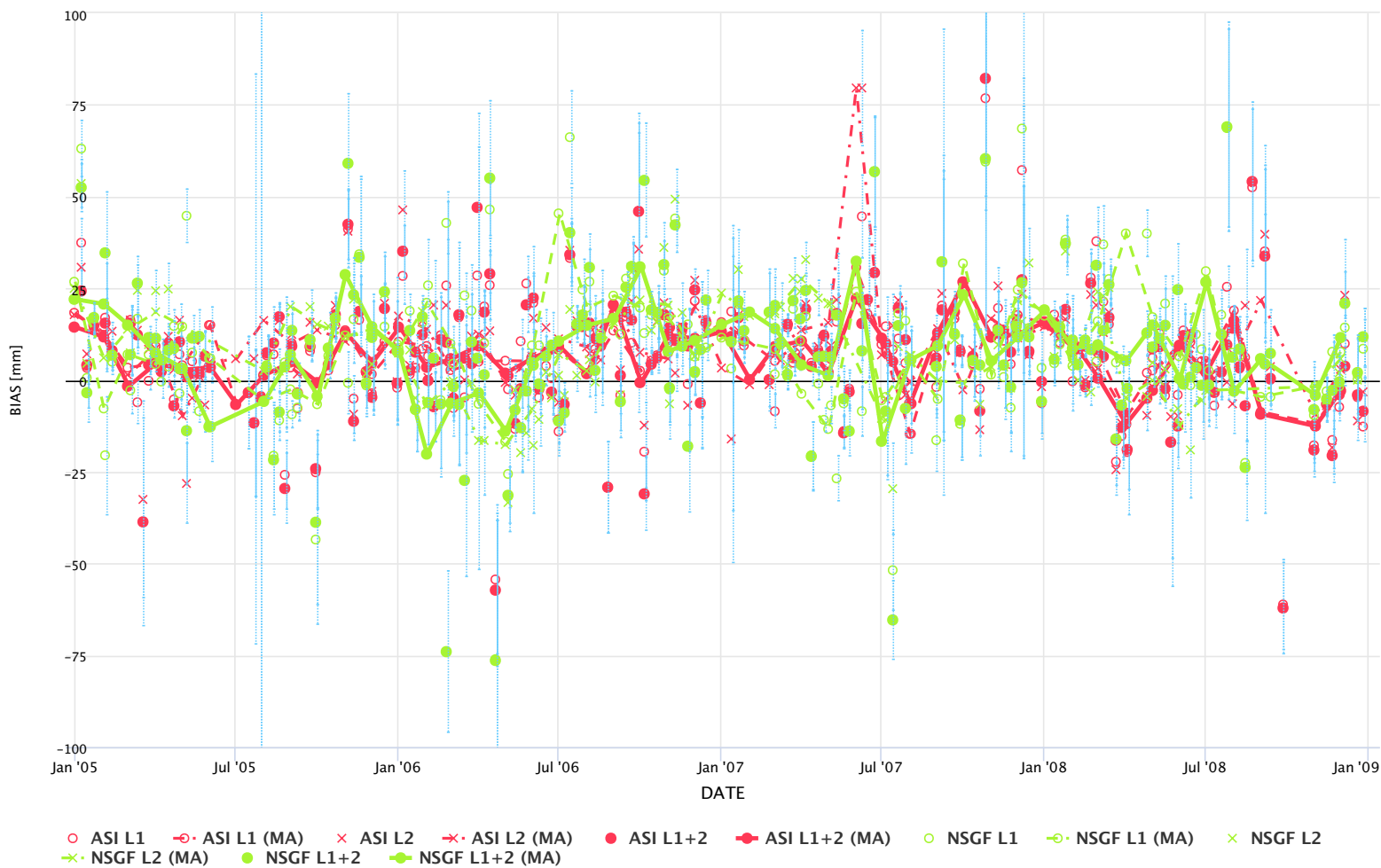
Station Systematic Error PP

MONITORING SYSTEMATIC ERRORS AT ILRS STATIONS



Station Systematic Error PP

Potsdam 7841



Highcharts.com

Station History Change Logs Query Engine

Query:

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

Query Result

[SELECT DISTINCT * FROM HST WHERE STATION_CDP_NO='7841' ORDER BY DATE, TIME]

[Get data file](#)

DATE	TIME	STATION_CDP_NO	SOD_NO	SCH	SCI	HST	DATA_IMPCT_FLG	SUBSYSTEM	DESCRIPTION
2003-01-01	0	7841	8701	1	0	0	0	0	Start configuration: PMT H 5023 Tennelec TC454 discriminator SR620 time interval counter 50 ps (FWHM) laser (532nm) GPS time receiver HP 58503A Vaisala PT 200 meteo sensors
2003-01-01	0	7841	8701	0	1	0	0	0	standard configuration with SR620(PMT H5023 @1.6kV, TC454, SR620,single pe)
2003-05-30	0	7841	8701	0	0	1	1	04.01	Daylight filter (0.4 nm FWHM) introduced
2003-05-30	0	7841	8701	2	0	0	0	0	daylight filter (0.4 nm FWHM) introduced
2004-02-19	0	7841	8701	0	0	1	2	06.01	A031 Event timer replacing SR620 time interval counter
2004-02-19	0	7841	8701	3	0	0	0	0	A031 Event Timer replacing SR620 time interval counter
2004-02-19	0	7841	8701	0	2	0	0	0	new standard configuration with Event Timer (PMT H5023 @1.6 kV, TC454, A031ET, single pe)
2004-09-06	0	7841	8701	0	3	0	0	0	configuration for high satellites (AD 230 SPAD, TC454, A031ET, Single pe in SPAD Geiger mode)
2004-09-06	0	7841	8701	0	4	0	0	0	secondary configuration for high satellites (AD230 SPAD, TC454, SR620, Single pe in SPAD Geiger mode)
2008-10-26	0	7841	8701	0	0	1	1	04.01	Daylight filter replaced by same type and FWHM
2011-05-01	0	7841	8701	0	5	0	0	0	kHz laser, Event Timer A032-ET, SPAD MPD-1CTC for secondary configuration
2016-03-23	12	7841	8701	0	0	1	1	05.02	Repaired pump diode for external amplifier and new coupling fibre installed, maximum output power 530 mW
2016-05-24	14	7841	8701	0	0	1	0	04.01	Optical components of telescopes cleaned (negative achromat Tx, entrance window and coupling mirror Rx)