The Abdus Salam
International Centre for Theoretical Physics

United Nations
Educational, Scientific and
Cultural Organization

IAEA
International Atomic Energy Agency

2333-22

Workshop on Science Applications of GNSS in Developing Countries (11-27 April), followed by the: Seminar on Development and Use of the Ionospheric NeQuick Model (30 April-1 May)

11 April - 1 May, 2012

Introduction to RINEX

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INTRODUCTION TO RINEX

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Satellite Navigation Science and Technology for Africa
ICTP, Trieste, Italy
20 April 2012

OUTLINE

- History
- Raw Data Processing (BENON)
- RINEX data file format
- Useful Information
- LINUX Processing

  DATA NEEDED

HISTORY

RINEX (Receiver INdependent EXchange Format)

- Developed by the Astronomical Institute of the University of Berne by Werner Gurtner in 1989
- Standard format that allows management and disposal of the measures generated by a receiver.
- Evolves over time adapting to new types of measurements and new satellite systems
- Observables:
  - Carrier-phase (Carrier beat phase) measurement

    Measurement of received carrier phase relative to the phase of a sinusoidal signal generated by the receiver clock. Also defined as the beat frequency between received carrier of satellite signal and receiver generated reference frequency
  - Pseudorange (code) measurement

    Difference between time of reception and the time of transmission
  - Observation time

    Receiver time of the received signals

RINEX FILES

RINEX Observation File

```
 2           OBSERVATION DATA    M (MIXED)           RINEX VERSION / TYPE
CCRINEXO V2.3.1 LH  IMVP            19-NOV-04 06:10  PGM / RUN BY / DATE
JPS2RIN 1.05       IMVP             19-NOV-04 06:10  COMMENT
BUILD AUGUST 17, 2000                                COMMENT
KHAJ0153.JPS                                         COMMENT
KHAJ                                                 MARKER NAME
12361M001                                            MARKER NUMBER
                VNIIFTI, KHABAROVSK                  OBSERVER / AGENCY
2079             JPS LEGACY        2.3 APR,28,2004 P4 REC # / TYPE / VERS
RA0032           JPSREGANT_SD_E  NONE                 ANT # / TYPE
 -2995267.0389  2990444.2408  4755577.9936           APPROX POSITION XYZ
       0.0000        0.0000        0.0000           ANTENNA: DELTA H/E/N
    1     1                                          WAVELENGTH FACT L1/2
    7    L1    L2    C1    P1    P2    D1    D2     # / TYPES OF OBSERV
   30                                                INTERVAL
 2004    11    18     0     0    0.000000     GPS   TIME OF FIRST OBS
                                                     END OF HEADER
```

Header Section

```
04 11 18  0  0  0.0000000  1 14G01G05R04G22R24G09G14R23R22G20G25G30
                              R05G06
113329005.358    88308331.3824   21565790.849 7  21565790.23445  21565794.92345
    2339.585        1823.028
114521957.967    89237892.4264   21792800.154 7  21792799.51444  21792803.51544
   -2614.281       -2037.114
111923861.844    87051924.4554   20900991.912 7  20900993.15447  20900995.17346
   -1826.073       -1420.282
126730022.886    98750675.6684   24115924.940 4  24115924.87941  24115929.63541
   -3545.755       -2762.898
122952560.094    95629832.8484   22984682.208 6  22984683.20945  22984690.49145
    4409.189        3429.343
131929601.489   102802283.6724   25105362.824 4  25105361.12441  25105372.35941
   -3513.314       -2737.605
```

Data Section

RINEX Observation File: Header

```
2           OBSERVATION DATA    M (MIXED)           RINEX VERSION / TYPE
CCRINEXO V2.3.1 LH  IMVP            19-NOV-04 06:10 PGM / RUN BY / DATE
JPS2RIN 1.05        IMVP            19-NOV-04 06:10 COMMENT                    2079
BUILD AUGUST 17, 2000                               COMMENT
KHAJ0153.JPS                                        COMMENT
KHAJ                                                MARKER NAME
12361M001                                           MARKER NUMBER
                VNIIFTI, KHABAROVSK                 OBSERVER / AGENCY

RA0032              JPSREGANT_SD_E  NONE            REC # / TYPE / VERS
 -2995267.0389  2990444.2408  4755577.9936          ANT # / TYPE
       0.0000        0.0000        0.0000          APPROX POSITION XYZ
     1    1                                        ANTENNA: DELTA H/E/N
     7   L1    L2    C1    P1    P2    D1    D2    WAVELENGTH FACT L1/2
    30                                              # / TYPES OF OBSERV
  2004    11    18     0     0    0.000000     GPS  INTERVAL
                                                    TIME OF FIRST OBS
                                                    END OF HEADER
```

PGM/ RUN BY / DATE	Program, Agency, date of creating the file
REC # / TYPE / VERS	Receiver Number, type, version
ANT # / TYPE	Antenna Number, TYPE
APPROX POSITION XYZ	Approximation marker position (in WGS84)
ANTENNA: DELTA H/E/N	Antenna height, Eccentricities of antenna centre relative to marker in east and north (in meters)
WAVELENGTH FACT L1/2	Wavelength factors for L1 and L2
# / TYPES OF OBSERV	Number of observation types, observation types
TIME OF FIRST OBS	Time of first observation record

RINEX Observation File: Header

2 OBSERVATION DATA M (MIXED)

RINEX Format Version:

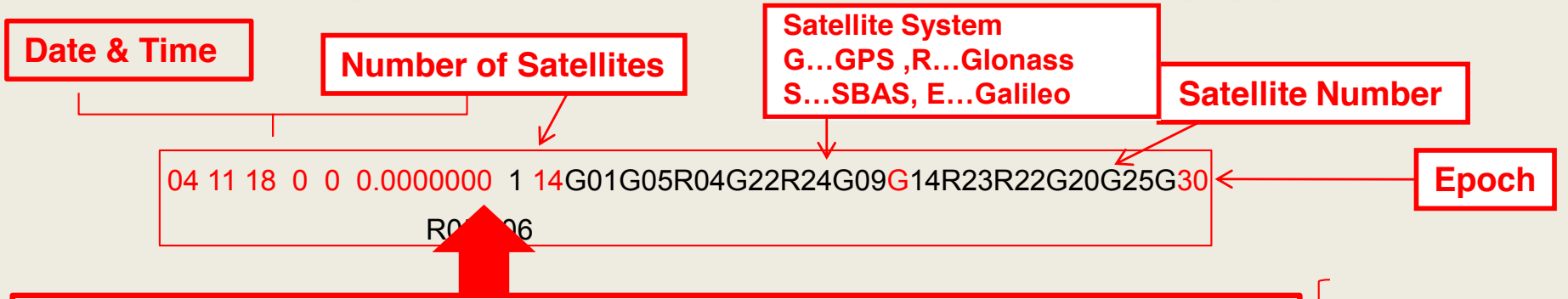
*** Description:**
This field shows the version of the RINEX. Version 2 has been prepared to contain GLONASS or other satellite systems observations apart from GPS satellites.

L1	: Phase measurements on L1
L2	: Phase measurements on L2
C1	: Pseudorange using C/A code on L1
P1	: Pseudorange using P-Code on L1
P2	: Pseudorange using P-Code on L2
D1	: Doppler frequency on L1
D2	: Doppler frequency on L2

RINEX Observation File: Data Section

```
04 11 18  0  0  0.0000000  1 14G01G05R04G22R24G09G14R23R22G20G25G30
                              R05G06
113329005.358   88308331.3824   21565790.849 7  21565790.23445  21565794.92345
   2339.585       1823.028
114521957.967   89237892.4264   21792800.154 7  21792799.51444  21792803.51544
  -2614.281      -2037.114
111923861.844   87051924.4554   20900991.912 7  20900993.15447  20900995.17346
  -1826.073      -1420.282
126730022.886   98750675.6684   24115924.940 4  24115924.87941  24115929.63541
  -3545.755      -2762.898
122952560.094   95629832.8484   22984682.208 6  22984683.20945  22984690.49145
   4409.189       3429.343
131929601.489  102802283.6724   25105362.824 4  25105361.12441  25105372.35941
  -3513.314      -2737.605
106887499.711   83288920.8524   20340001.027 8  20340000.29747  20340003.20047
   -706.717       -550.701
111622580.227   86817602.4344   20808263.776 8  20808263.45947  20808266.89346
   1903.013       1480.102
```

RINEX Observation File: Data Section



Epoch Flag: Description:

The Epoch flag contains the status of the observation set

0 : Means OK

1 : Power failure between previous and current epoch

3 : New site occupation (end of kinem. data, at least MARKER NAME record follows)

4 : Header information follows

5 : External event (epoch is significant,same time frame as observation time tags

6 : Cycle slip records follow to optionally report detected and repaired cycle slips

Same format as OBSERVATIONS records:

- Slip instead of observation;
- LLI and signal strength blank or zero;

Observation data for each satellite

RINEX Observation File: Data Section

L1	L2	C1	P1	P2
113329005.358	88308331.3824	21565790.849 7	21565790.23445	21565794.92345

LL1

IP

D1 D2

L2 Loss of Lock Indicator (LLI):

•Description:

This field can take values in the [0-7] range, meaning:

0 or Blank : Means OK or not known.

Bit 0 set : Lost lock between previous and current observation: cycle slip possible.

Bit 1 set : Opposite wavelength factor to the one defined for the satellite by a previous WAVELENGTH FACT L1/2 line . Valid for the current epoch only.

Bit 2 set : Observation under Antispoofing (may suffer from increased noise).

Interpret bitwise stored information as follows:

LLI Value	Binary conversion	Bit 0	Bit 1	Bit 2	Interpretation
0	$\mathbf{0}\cdot 2^0+\mathbf{0}\cdot 2^1+\mathbf{0}\cdot 2^2$	0	0	0	Ok or not known
1	$\mathbf{1}\cdot 2^0+\mathbf{0}\cdot 2^1+\mathbf{0}\cdot 2^2$	1	0	0	Lost of lock: possible CS
2	$\mathbf{0}\cdot 2^0+\mathbf{1}\cdot 2^1+\mathbf{0}\cdot 2^2$	0	1	0	Opposite wavelength factor
3	$\mathbf{1}\cdot 2^0+\mathbf{1}\cdot 2^1+\mathbf{0}\cdot 2^2$	1	1	0	Lost of lock + Opposite wavelength factor
4	$\mathbf{0}\cdot 2^0+\mathbf{0}\cdot 2^1+\mathbf{1}\cdot 2^2$	0	0	1	Observation under Antispoofing
5	$\mathbf{1}\cdot 2^0+\mathbf{0}\cdot 2^1+\mathbf{1}\cdot 2^2$	1	0	1	Lost of lock + Observation under Antispoofing
6	$\mathbf{0}\cdot 2^0+\mathbf{1}\cdot 2^1+\mathbf{1}\cdot 2^2$	0	1	1	Opposite wavelength factor + Observation under Antispoofing
7	$\mathbf{1}\cdot 2^0+\mathbf{1}\cdot 2^1+\mathbf{1}\cdot 2^2$	1	1	1	Lost of lock + Opposite wavelength factor + Observation under Antispoofing

RINEX Observation File: Data Section

L1	L2	C1	P1	P2
113329005.358	88308331.3824	21565790.849 7	21565790.23445	21565794.92345

LL1

IP

D1	D2
2339.585	1823.028

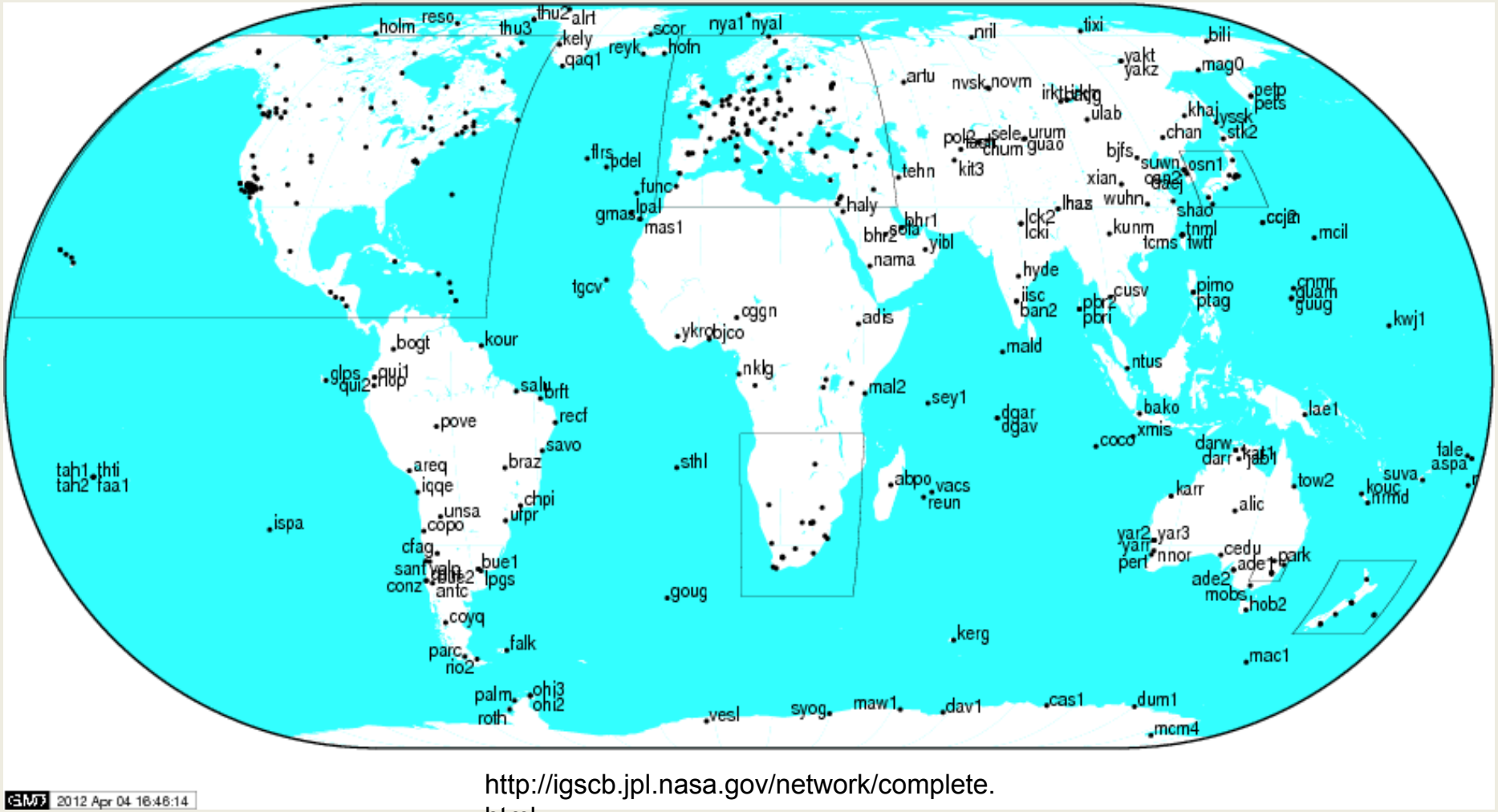
P1 Signal Strength Indicator: Description:

Signal strength projected into interval [1-9]:

0 or Blank : Means not known
1 : Minimum possible signal strength(S/N < 12 dbHz)
2 : S/N 12-17 dbHz
3 : S/N 18-23 dbHz
4 : S/N 24-29 dbHz
5 : Threshold for good S/N ratio (S/N 30-35 dbHz)
6 : S/N 36-41 dbHz
7 : S/N 42-47 dbHz
8 : S/N 48-53 dbHz
9 : Maximum possible signal strength (S/N ≥ 54 dbHz)

USEFUL INFORMATION

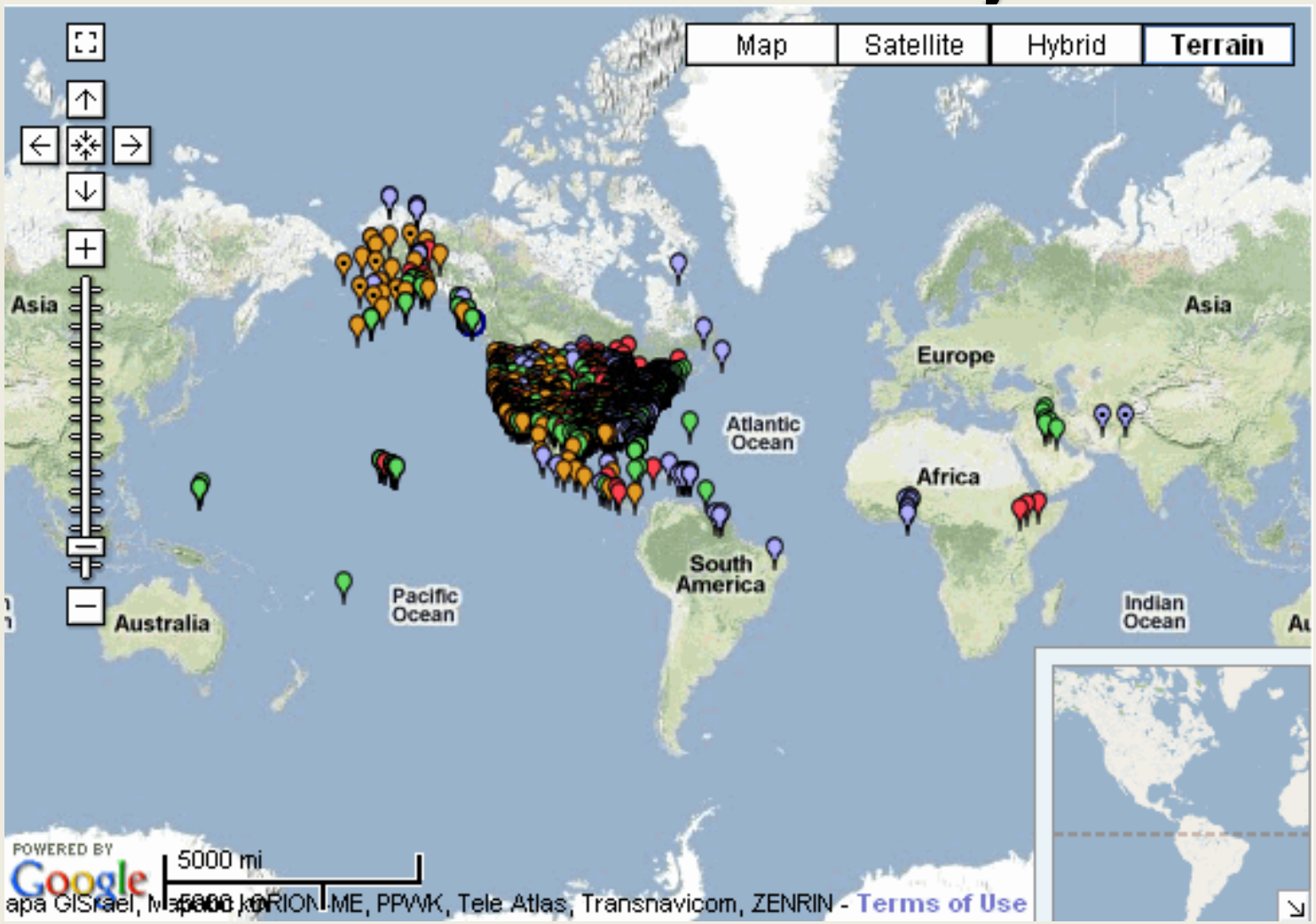
IGS Tracking Network
(370 active stations)



GMT 2012 Apr 04 16:46:14

http://igscb.jpl.nasa.gov/network/complete.html

Continuously Operating Reference Stations
National Geodetic Survey



http://www.ngs.noaa.gov/CORS/

Helpful URLS:

IGS Stations - global overview of stations; latitude and longitude of station

http://igscb.jpl.nasa.gov/network/netindex.html

CODE info – differential code bias info

http://www.aiub.unibe.ch/download/CODE/

P1C1yymm.DCB and P1P2yymm.DCB where yy=year, mm=month

Ap/Kp indices - planetary Kp indices and related Ap indices measure worldwide geomagnetic activity

ftp://ftp.ngdc.noaa.gov/STP/GEOMAGNETIC_DATA/INDICES/KP_AP/

GPS data – observation files

ftp://cddis.gsfc.nasa.gov/gps/data/daily/

CORS data – reference stations

http://www.ngs.noaa.gov/CORS/data.shtml

ACTUAL PROCESS ON LINUX OPERATING SYSTEM

Files needed: (*.info file)

rec_bias.rbias		
areq	-2.492	0.021
fair	-8.036	0.018
mkea	-2.703	0.032

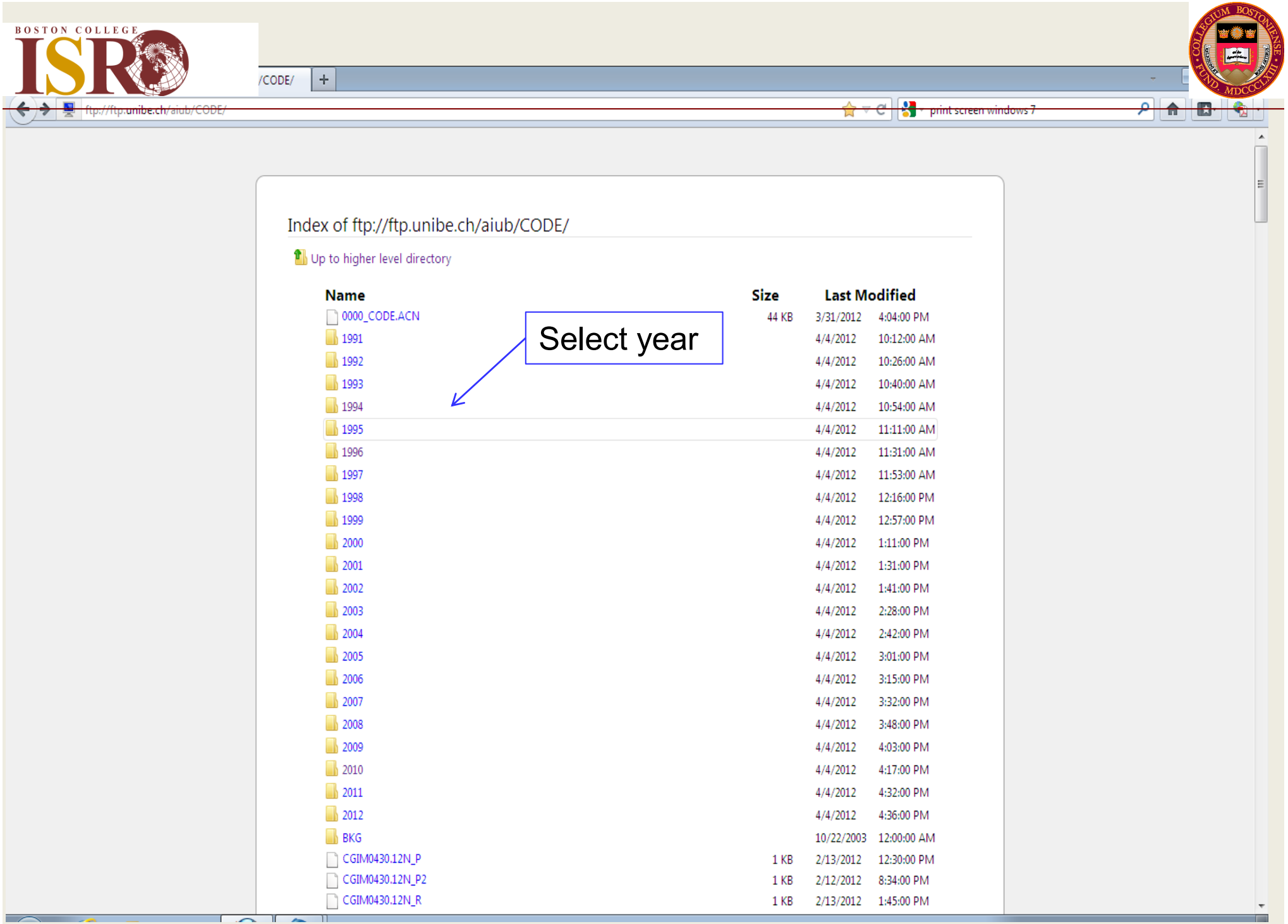
Receiver Bias value
P1P2 Bias file
P1C1 bias File
Navigation/Ephemeris file
Observation file

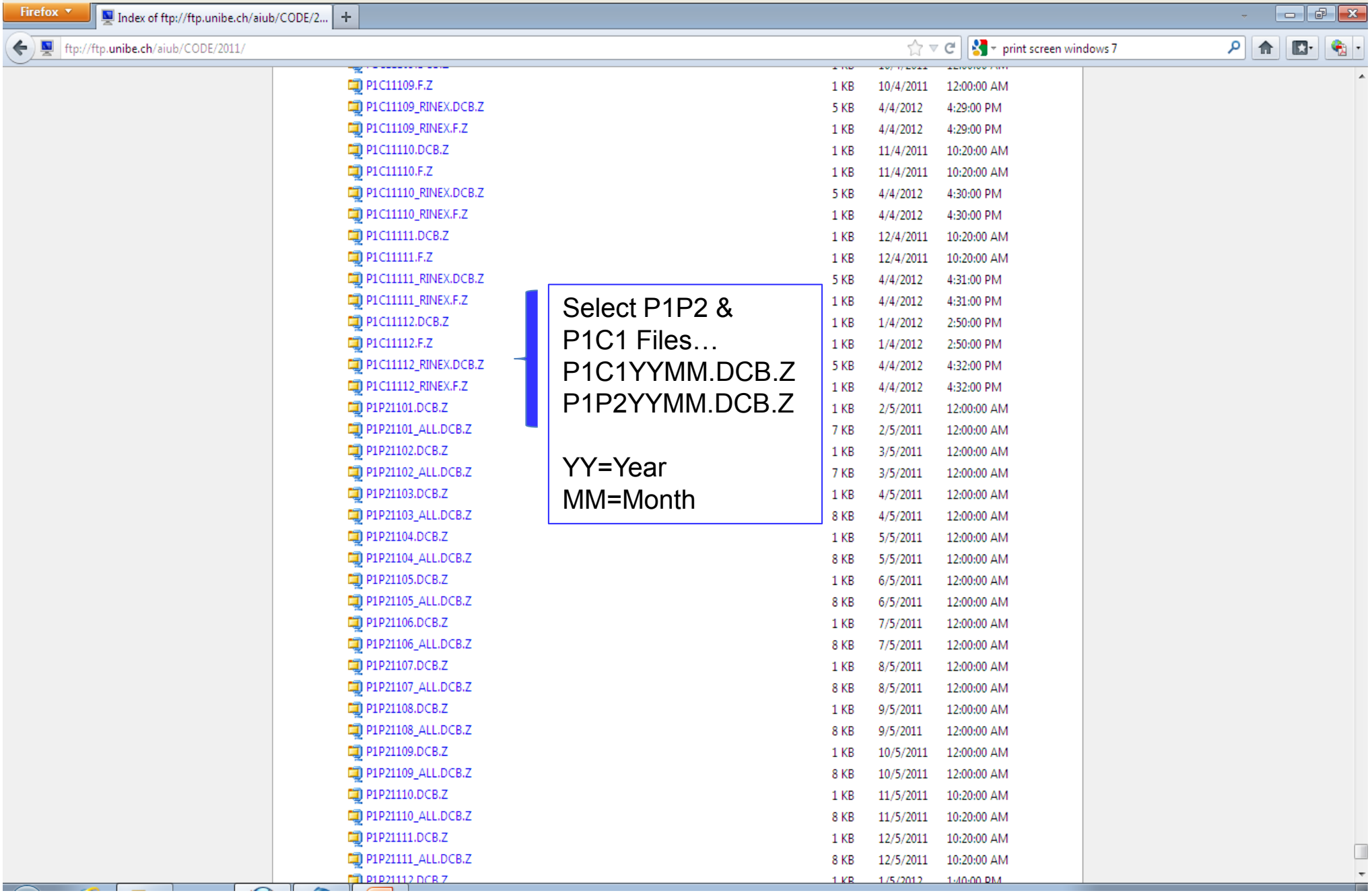
Example rinex_2012.info file:

rec_bias.rbias ……data fro JPL site
P1P21108.DCB.Z….from CODE site (program automatically unzips *.Z files)
P1C11108.DCB.Z….from CODE site
areq2420.11n.Z……from CDDIS navigation file
areq2420.11o.Z……from CDDIS
mkea2420.11d.Z…..double zipped file … needs crx2rnx program to get *.o file

.
.
.

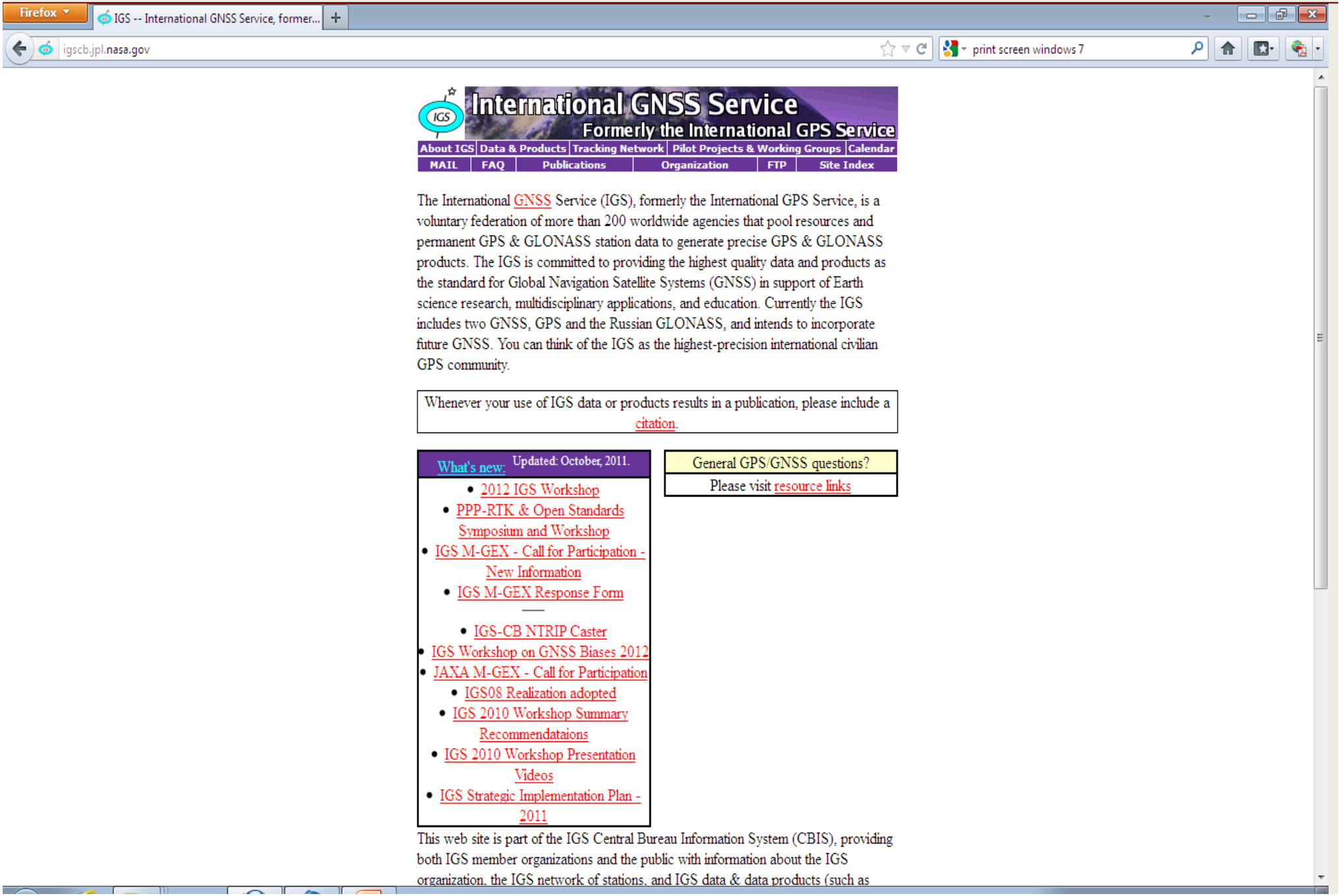
BIASES
P1P2 & P1C1


/CODE/
ftp://ftp.unibe.ch/aiub/CODE/
print screen windows 7
Index of ftp://ftp.unibe.ch/aiub/CODE/
Up to higher level directory
Name
Size
Last Modified
0000_CODE.ACN 44 KB 3/31/2012 4:04:00 PM
1991 4/4/2012 10:12:00 AM
1992 4/4/2012 10:26:00 AM
1993 4/4/2012 10:40:00 AM
1994 4/4/2012 10:54:00 AM
1995 4/4/2012 11:11:00 AM
1996 4/4/2012 11:31:00 AM
1997 4/4/2012 11:53:00 AM
1998 4/4/2012 12:16:00 PM
1999 4/4/2012 12:57:00 PM
2000 4/4/2012 1:11:00 PM
2001 4/4/2012 1:31:00 PM
2002 4/4/2012 1:41:00 PM
2003 4/4/2012 2:28:00 PM
2004 4/4/2012 2:42:00 PM
2005 4/4/2012 3:01:00 PM
2006 4/4/2012 3:15:00 PM
2007 4/4/2012 3:32:00 PM
2008 4/4/2012 3:48:00 PM
2009 4/4/2012 4:03:00 PM
2010 4/4/2012 4:17:00 PM
2011 4/4/2012 4:32:00 PM
2012 4/4/2012 4:36:00 PM
BKG 10/22/2003 12:00:00 AM
CGIM0430.12N_P 1 KB 2/13/2012 12:30:00 PM
CGIM0430.12N_P2 1 KB 2/12/2012 8:34:00 PM
CGIM0430.12N_R 1 KB 2/13/2012 1:45:00 PM
Select year


Firefox
Index of ftp://ftp.unibe.ch/aiub/CODE/2...
ftp://ftp.unibe.ch/aiub/CODE/2011/
print screen windows 7
P1C11109.F.Z 1 KB 10/4/2011 12:00:00 AM
P1C11109_RINEX.DCB.Z 5 KB 4/4/2012 4:29:00 PM
P1C11109_RINEX.F.Z 1 KB 4/4/2012 4:29:00 PM
P1C11110.DCB.Z 1 KB 11/4/2011 10:20:00 AM
P1C11110.F.Z 1 KB 11/4/2011 10:20:00 AM
P1C11110_RINEX.DCB.Z 5 KB 4/4/2012 4:30:00 PM
P1C11110_RINEX.F.Z 1 KB 4/4/2012 4:30:00 PM
P1C11111.DCB.Z 1 KB 12/4/2011 10:20:00 AM
P1C11111.F.Z 1 KB 12/4/2011 10:20:00 AM
P1C11111_RINEX.DCB.Z 5 KB 4/4/2012 4:31:00 PM
P1C11111_RINEX.F.Z 1 KB 4/4/2012 4:31:00 PM
P1C11112.DCB.Z 1 KB 1/4/2012 2:50:00 PM
P1C11112.F.Z 1 KB 1/4/2012 2:50:00 PM
P1C11112_RINEX.DCB.Z 5 KB 4/4/2012 4:32:00 PM
P1C11112_RINEX.F.Z 1 KB 4/4/2012 4:32:00 PM
P1P21101.DCB.Z 1 KB 2/5/2011 12:00:00 AM
P1P21101_ALL.DCB.Z 7 KB 2/5/2011 12:00:00 AM
P1P21102.DCB.Z 1 KB 3/5/2011 12:00:00 AM
P1P21102_ALL.DCB.Z 7 KB 3/5/2011 12:00:00 AM
P1P21103.DCB.Z 1 KB 4/5/2011 12:00:00 AM
P1P21103_ALL.DCB.Z 8 KB 4/5/2011 12:00:00 AM
P1P21104.DCB.Z 1 KB 5/5/2011 12:00:00 AM
P1P21104_ALL.DCB.Z 8 KB 5/5/2011 12:00:00 AM
P1P21105.DCB.Z 1 KB 6/5/2011 12:00:00 AM
P1P21105_ALL.DCB.Z 8 KB 6/5/2011 12:00:00 AM
P1P21106.DCB.Z 1 KB 7/5/2011 12:00:00 AM
P1P21106_ALL.DCB.Z 8 KB 7/5/2011 12:00:00 AM
P1P21107.DCB.Z 1 KB 8/5/2011 12:00:00 AM
P1P21107_ALL.DCB.Z 8 KB 8/5/2011 12:00:00 AM
P1P21108.DCB.Z 1 KB 9/5/2011 12:00:00 AM
P1P21108_ALL.DCB.Z 8 KB 9/5/2011 12:00:00 AM
P1P21109.DCB.Z 1 KB 10/5/2011 12:00:00 AM
P1P21109_ALL.DCB.Z 8 KB 10/5/2011 12:00:00 AM
P1P21110.DCB.Z 1 KB 11/5/2011 10:20:00 AM
P1P21110_ALL.DCB.Z 8 KB 11/5/2011 10:20:00 AM
P1P21111.DCB.Z 1 KB 12/5/2011 10:20:00 AM
P1P21111_ALL.DCB.Z 8 KB 12/5/2011 10:20:00 AM
Select P1P2 & P1C1 Files…
P1C1YYMM.DCB.Z
P1P2YYMM.DCB.Z
YY=Year
MM=Month

IGS SITE


BOSTON COLLEGE
ISR


Firefox
IGS -- International GNSS Service, former...
igscb.jpl.nasa.gov
print screen windows 7
International GNSS Service
Formerly the International GPS Service
About IGS
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Tracking Network
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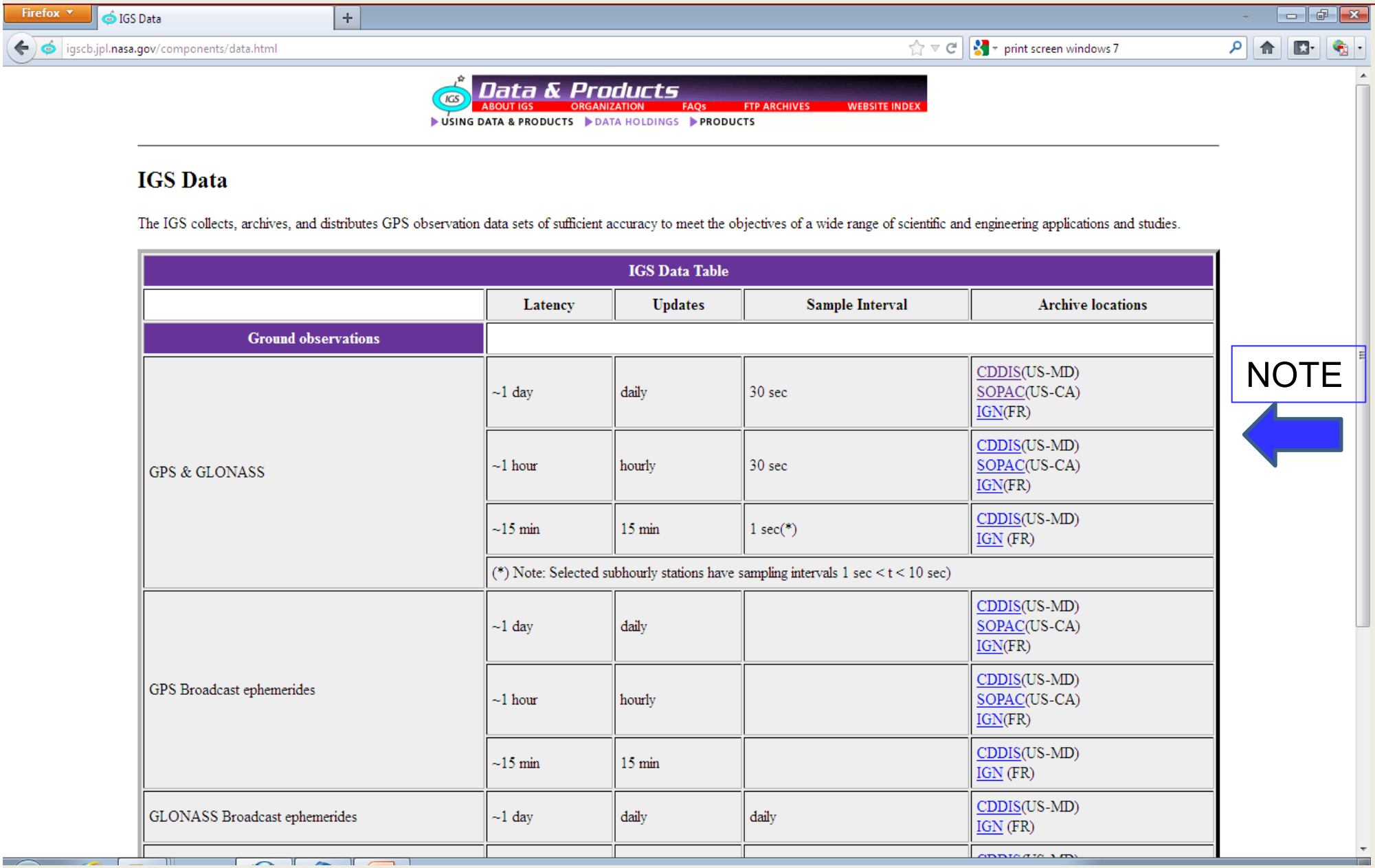
The International GNSS Service (IGS), formerly the International GPS Service, is a voluntary federation of more than 200 worldwide agencies that pool resources and permanent GPS & GLONASS station data to generate precise GPS & GLONASS products. The IGS is committed to providing the highest quality data and products as the standard for Global Navigation Satellite Systems (GNSS) in support of Earth science research, multidisciplinary applications, and education. Currently the IGS includes two GNSS, GPS and the Russian GLONASS, and intends to incorporate future GNSS. You can think of the IGS as the highest-precision international civilian GPS community.
Whenever your use of IGS data or products results in a publication, please include a citation.
What's new: Updated: October, 2011.
2012 IGS Workshop
PPP-RTK & Open Standards Symposium and Workshop
IGS M-GEX - Call for Participation - New Information
IGS M-GEX Response Form
IGS-CB NTRIP Caster
IGS Workshop on GNSS Biases 2012
JAXA M-GEX - Call for Participation
IGS08 Realization adopted
IGS 2010 Workshop Summary Recommendataions
IGS 2010 Workshop Presentation Videos
IGS Strategic Implementation Plan - 2011
General GPS/GNSS questions?
Please visit resource links
This web site is part of the IGS Central Bureau Information System (CBIS), providing both IGS member organizations and the public with information about the IGS organization, the IGS network of stations, and IGS data & data products (such as



Firefox | IGS Data | igscb.jpl.nasa.gov/components/data.html | print screen windows 7

Data & Products

ABOUT IGS | ORGANIZATION | FAQs | FTP ARCHIVES | WEBSITE INDEX

USING DATA & PRODUCTS | DATA HOLDINGS | PRODUCTS

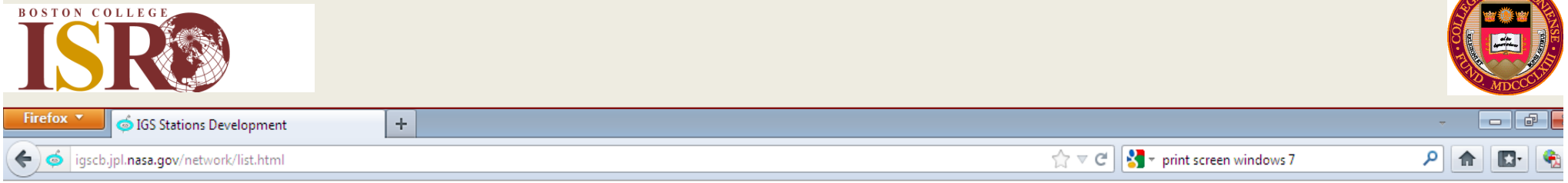
IGS Data

The IGS collects, archives, and distributes GPS observation data sets of sufficient accuracy to meet the objectives of a wide range of scientific and engineering applications and studies.

IGS Data Table

	Latency	Updates	Sample Interval	Archive locations
Ground observations				
GPS & GLONASS	~1 day	daily	30 sec	CDDIS(US-MD) SOPAC(US-CA) IGN(FR)
	~1 hour	hourly	30 sec	CDDIS(US-MD) SOPAC(US-CA) IGN(FR)
	~15 min	15 min	1 sec(*)	CDDIS(US-MD) IGN (FR)
	(*) Note: Selected subhourly stations have sampling intervals 1 sec < t < 10 sec)			
GPS Broadcast ephemerides	~1 day	daily		CDDIS(US-MD) SOPAC(US-CA) IGN(FR)
	~1 hour	hourly		CDDIS(US-MD) SOPAC(US-CA) IGN(FR)
	~15 min	15 min		CDDIS(US-MD) IGN (FR)
GLONASS Broadcast ephemerides	~1 day	daily	daily	CDDIS(US-MD) IGN (FR)

NOTE



Tracking Network

ABOUT IGS ORGANIZATION FAQs FTP ARCHIVES WEBSITE INDEX

IGS Stations

439 stations and 370 active stations as of 04 Apr 2012.

N Designates a site newer than 6 months to the IGS.

R Designates a Reference Frame station. Machine-readable list is available.

H Designates a site offering hourly data. Machine-readable list is available.

I Designates a site offering combined GPS/GLONASS data. Machine-readable list is available.

View a list of former IGS sites.

View a list of proposed sites.

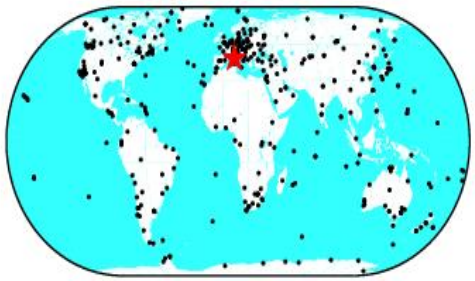
Click on any 4-character id for further information.

Dormant sites are ~~lined through~~

	id	City	Location	lon (E)	lat (N)	ht (m)	Agency	Clock
HI	abmf	LES ABYMES	France	298.4725	16.2623	-25.0000	IGN-SGN	INTERNAL
H	abpo	Antananarivo	Madagascar	47.2292	-19.0183	1552.9923	JPL	INTERNAL
R	~~adei~~	~~Salisbury~~	~~Australia~~	~~138.6479~~	~~-34.7200~~	~~38.2000~~	~~NGA~~	~~Cesium / Rcvr 1~~
	~~adel~~	~~Salisbury~~	~~Australia~~	~~138.6479~~	~~-34.7200~~	~~38.2000~~	~~NGA~~	~~Cesium / Rcvr 2~~
HI	adis	Addis Ababa	ETHIOPIA	38.7663	9.0351	2439.1540	BKG	
R	aira	Aira	Japan	130.5996	31.8241	314.6400	GSI	CESIUM
HI	ajac	Ajaccio	France	8.7626	41.9275	99.0000	IGNIGN-SGN	INTERNAL
RH	albh	Victoria	Canada	236.5126	48.3898	32.0000	GSC	Internal
RH	algo	Algonquin Park	Canada	281.9286	45.9588	202.0000	NRCan	H-MASER
RHI	alic	Alice Springs	Australia	133.8855	-23.6701	603.3581	GA	QUARTZ/INTERNAL
R	alrt	Alert (Ellesmere Island)	Canada	297.6595	82.4943	78.1100	NRCan/GSD	Internal
RH	amc2	Colorado Springs	U.S.A.	255.4754	38.8031	1912.4898	USNO	H-MASER
	~~amma~~	~~Amman~~	~~Jordan~~	~~35.8800~~	~~32.0000~~	~~1055.8000~~	~~RJGC~~	
RHI	ankr	Ankara	Turkey	32.7586	39.8875	974.8000	BKG and GCM	INTERNAL
R	antc	Los Angeles	Chile	288.4679	-37.3387	745.4000	G2	
H	areq	Arequipa	Peru	288.5072	-16.4655	2488.9226	JPL	XL-DC 151-358-108-2
RH	artu	Arti	Russian Federation	58.5605	56.4298	247.5110	RDAAC-IRIS	INTERNAL
R I	aspa	Pago Pago	U.S.A.	189.2776	-14.3261	53.6620	NOAA-NGS	INTERNAL
RHI	auck	Whangaparaoa Peninsula	New Zealand	174.8344	-36.6028	132.0000	GNS	INTERNAL
	azul	Azusa	USA	242.1000	34.1300	144.7500	UNAVCO	INTERNAL
HI	badg	Badary	Russian Federation	102.2350	51.7697	811.4000	IAA	EXTERNAL H-MASER CH1-80
H	baie	BAIE COMEAU	CANADA	291.7367	49.1868	27.5000	NRCan/GFZ	INTERNAL
RHI	bake	BAKER LAKE	Canada	263.9977	64.3178	4.4000	NRCan	INTERNAL
I	bako	Cibinong	Indonesia	106.8500	-6.4900	158.1800	BAKOSURTANAL	
H	bamf	Bamfield	Canada	234.8649	48.8353	11.1000	GSC	INTERNAL
RH	ban2	Bangalore	India	77.5116	13.0343	831.9000	GFZ	EXTERNAL RUBIDIUM
RHI	barh	Bar Harbor	USA	291.7783	44.3950	7.4000	NOAA-NGS	INTERNAL
HI	bdos	Bridgetown	Barbados	300.3909	13.0879	-38.6000	NOAA-NGS	INTERNAL
	~~bhe1~~	~~Manama~~	~~Bahrain~~	~~50.6081~~	~~26.2001~~	~~-10.0000~~	~~NGA~~	~~Cesium /Rcvr1~~
R	~~bhe2~~	~~Manama~~	~~Bahrain~~	~~50.6081~~	~~26.2001~~	~~-10.0000~~	~~NGA~~	~~Cesium /Rcvr2~~
R	~~bili~~	~~Bilibino~~	~~Russian Federation~~	~~166.4980~~	~~68.0761~~	~~466.2080~~	~~RDAAC-IRIS~~	~~INTERNAL~~
	bill	Temecula	USA	242.9400	33.5800	470.0500	UNAVCO	INTERNAL
HI	bjco	Cotonou	Benin	2.4500	6.3847	30.6000	MCA-Benin	
R I	bjfs	Fangshan	China	115.8925	39.6086	87.4130	NGCC	
	blyt	Blythe	United States	245.2900	33.6100	85.9000	USGS	INTERNAL
HI	bogi	Borowa Gora	Poland	21.0352	52.4750	139.9000	IGiK	EXTERNAL RUBIDIUM
RH	bogt	Bogota	Colombia	285.9191	4.6401	2576.7782	JPL	INTERNAL

IGS Station: ajac

Station Information



current site log
ajac_20110818.log
older site logs below

websites
http://rgp.ign.fr

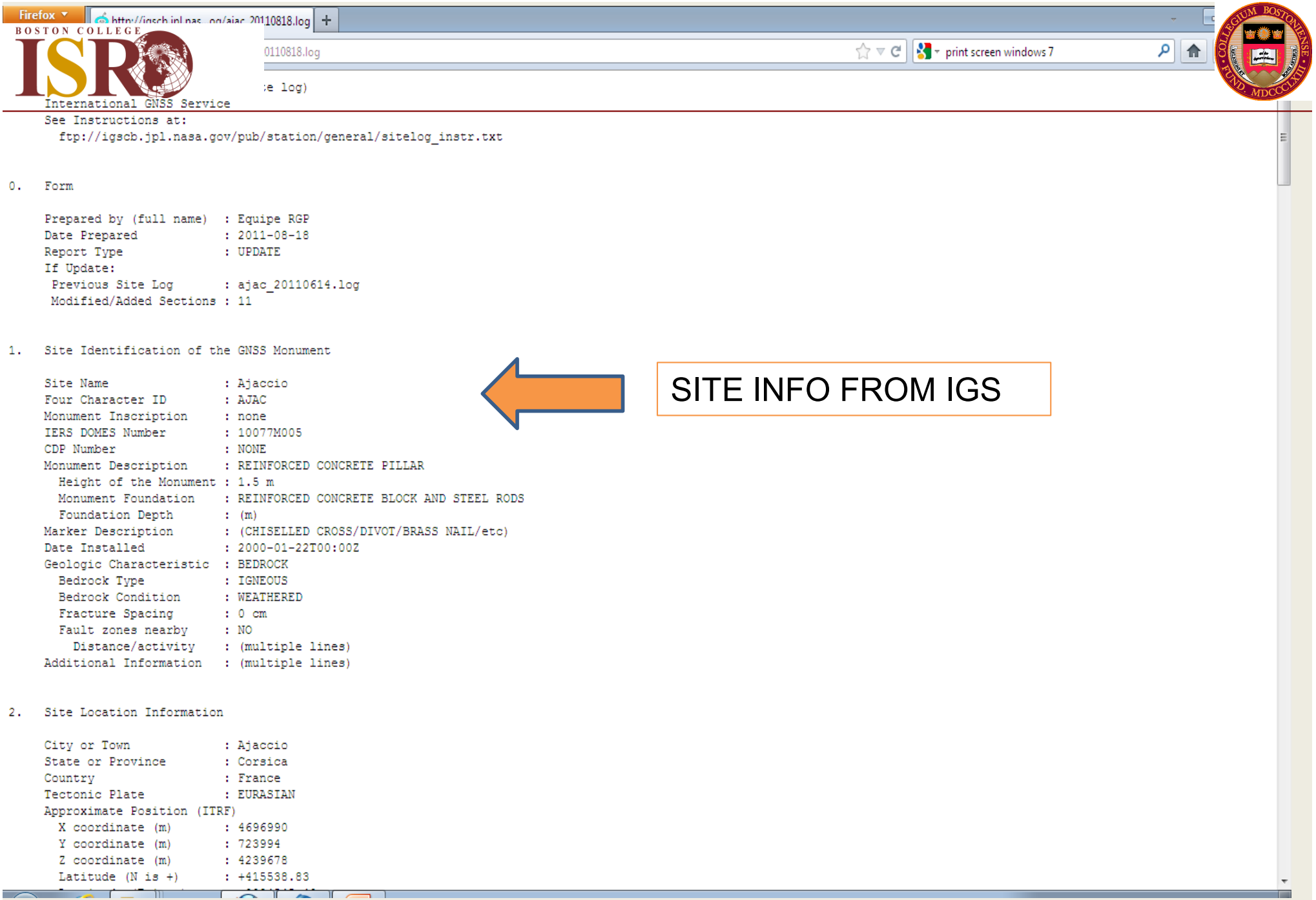
site photos

Most Recent Mail

003893 13Feb2012 Robert Khachikyan Subject: Stations ABMF, AJAC, BRST, GRAS, LMMF, LROC, MARS, OPMT, MARS, REUN, TLSE-missing data

Older Mail (below)

Recent data quality plots (documented here)	45 day averages and standard deviations ajac in blue all other IGS sites in red
Recent daily number of observations	Daily number of observations



```
International GNSS Service
See Instructions at:
  ftp://igscb.jpl.nasa.gov/pub/station/general/sitelog_instr.txt


0.   Form

     Prepared by (full name)  : Equipe RGP
     Date Prepared            : 2011-08-18
     Report Type              : UPDATE
     If Update:
      Previous Site Log       : ajac_20110614.log
      Modified/Added Sections : 11


1.   Site Identification of the GNSS Monument

     Site Name                : Ajaccio
     Four Character ID        : AJAC
     Monument Inscription     : none
     IERS DOMES Number        : 10077M005
     CDP Number               : NONE
     Monument Description     : REINFORCED CONCRETE PILLAR
       Height of the Monument : 1.5 m
       Monument Foundation    : REINFORCED CONCRETE BLOCK AND STEEL RODS
       Foundation Depth       : (m)
     Marker Description       : (CHISELLED CROSS/DIVOT/BRASS NAIL/etc)
     Date Installed           : 2000-01-22T00:00Z
     Geologic Characteristic  : BEDROCK
       Bedrock Type           : IGNEOUS
       Bedrock Condition      : WEATHERED
       Fracture Spacing       : 0 cm
       Fault zones nearby     : NO
         Distance/activity    : (multiple lines)
     Additional Information   : (multiple lines)


2.   Site Location Information

     City or Town             : Ajaccio
     State or Province        : Corsica
     Country                  : France
     Tectonic Plate           : EURASIAN
     Approximate Position (ITRF)
       X coordinate (m)       : 4696990
       Y coordinate (m)       : 723994
       Z coordinate (m)       : 4239678
       Latitude (N is +)      : +415538.83
```

Locating IGS data, products, and format definitions	Key to directory and file name variables			
	d	day of week (0-6)	*ssss*	4-character IGS site ID or 4-character LEO ID
	ddd	day of year (1-366)	*ww*	2-digit week of year(01-53)
	hh	2-digit hour of day (00-23)	*wwww*	4-digit GPS week
	h	single letter for hour of day (a-x = 0-23)	*yy*	2-digit year
	mm	minutes within hour	*yyyy*	4-digit year
	leo	name of low-earth orbiting satellite		
Software to uncompress files ending in .Z is available from http://www.gzip.org				
(This will assist you in locating and using IGS data and products. It is not an exhaustive compilation of all files and directories available at the Data Centers)				

Plain text data center guides are also available.

Dark Purple = the path you are examining | Buff = Files in this directory | Light Purple = Other directories on this server | Gray = other Data Centers

CDDIS: Greenbelt, MD, USA | SOPAC: San Diego, CA, USA | IGN: Paris, France ftp://igs.ensg.ign.fr/ | KASI: Daejon, Republic of Korea | IGS CB: Pasadena, CA, USA

pub/

igs/

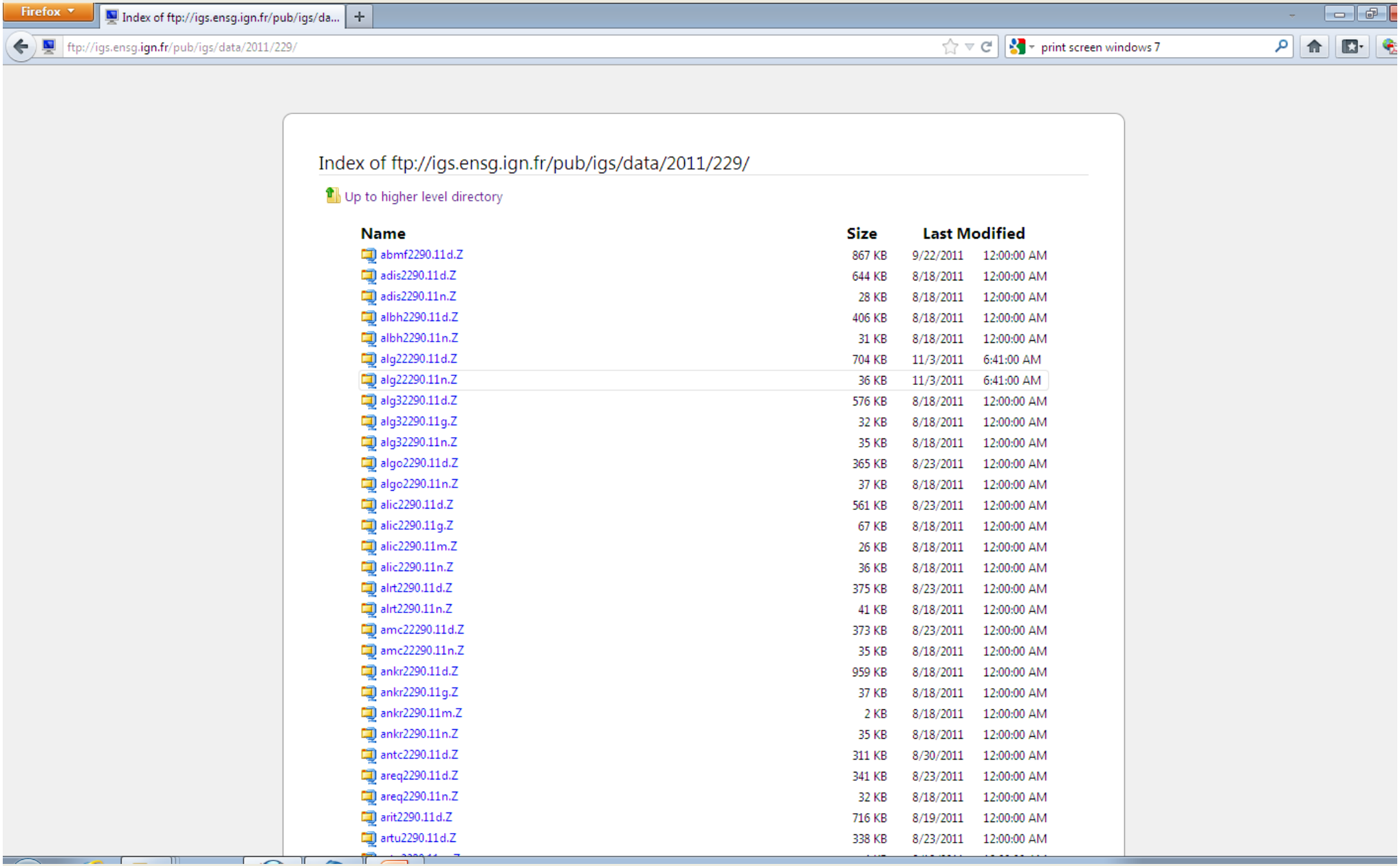
data/ | products/

highrate/ | hourly/ | *yyyy*/

ddd

Daily data	GPS & GLONASS observations	*ssssddd*0.*yy*d
	Daily broadcast ephemerides	*ssssddd*0.*yy*n
	Daily GLONASS observations	*ssssddd*0.*yy*g
	Meteorological observations	*ssssddd*0.*yy*m
	Quality check summaries	*ssssddd*0.*yy*s

ifn SITE


Firefox
Index of ftp://igs.ensg.ign.fr/pub/igs/da...
ftp://igs.ensg.ign.fr/pub/igs/data/2011/229/
print screen windows 7
Index of ftp://igs.ensg.ign.fr/pub/igs/data/2011/229/
Up to higher level directory
Name Size Last Modified
abmf2290.11d.Z 867 KB 9/22/2011 12:00:00 AM
adis2290.11d.Z 644 KB 8/18/2011 12:00:00 AM
adis2290.11n.Z 28 KB 8/18/2011 12:00:00 AM
albh2290.11d.Z 406 KB 8/18/2011 12:00:00 AM
albh2290.11n.Z 31 KB 8/18/2011 12:00:00 AM
alg22290.11d.Z 704 KB 11/3/2011 6:41:00 AM
alg22290.11n.Z 36 KB 11/3/2011 6:41:00 AM
alg32290.11d.Z 576 KB 8/18/2011 12:00:00 AM
alg32290.11g.Z 32 KB 8/18/2011 12:00:00 AM
alg32290.11n.Z 35 KB 8/18/2011 12:00:00 AM
algo2290.11d.Z 365 KB 8/23/2011 12:00:00 AM
algo2290.11n.Z 37 KB 8/18/2011 12:00:00 AM
alic2290.11d.Z 561 KB 8/23/2011 12:00:00 AM
alic2290.11g.Z 67 KB 8/18/2011 12:00:00 AM
alic2290.11m.Z 26 KB 8/18/2011 12:00:00 AM
alic2290.11n.Z 36 KB 8/18/2011 12:00:00 AM
alrt2290.11d.Z 375 KB 8/23/2011 12:00:00 AM
alrt2290.11n.Z 41 KB 8/18/2011 12:00:00 AM
amc22290.11d.Z 373 KB 8/23/2011 12:00:00 AM
amc22290.11n.Z 35 KB 8/18/2011 12:00:00 AM
ankr2290.11d.Z 959 KB 8/18/2011 12:00:00 AM
ankr2290.11g.Z 37 KB 8/18/2011 12:00:00 AM
ankr2290.11m.Z 2 KB 8/18/2011 12:00:00 AM
ankr2290.11n.Z 35 KB 8/18/2011 12:00:00 AM
antc2290.11d.Z 311 KB 8/30/2011 12:00:00 AM
areq2290.11d.Z 341 KB 8/23/2011 12:00:00 AM
areq2290.11n.Z 32 KB 8/18/2011 12:00:00 AM
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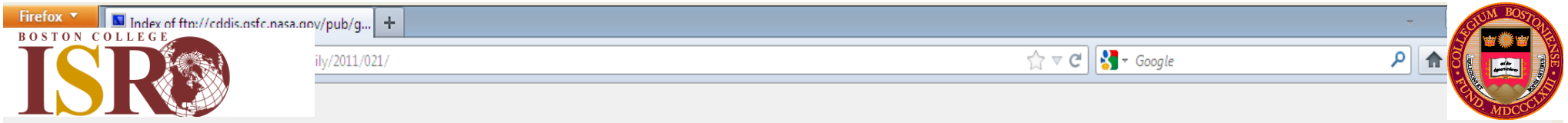
artu2290.11d.Z 338 KB 8/23/2011 12:00:00 AM

CDDIS SITE



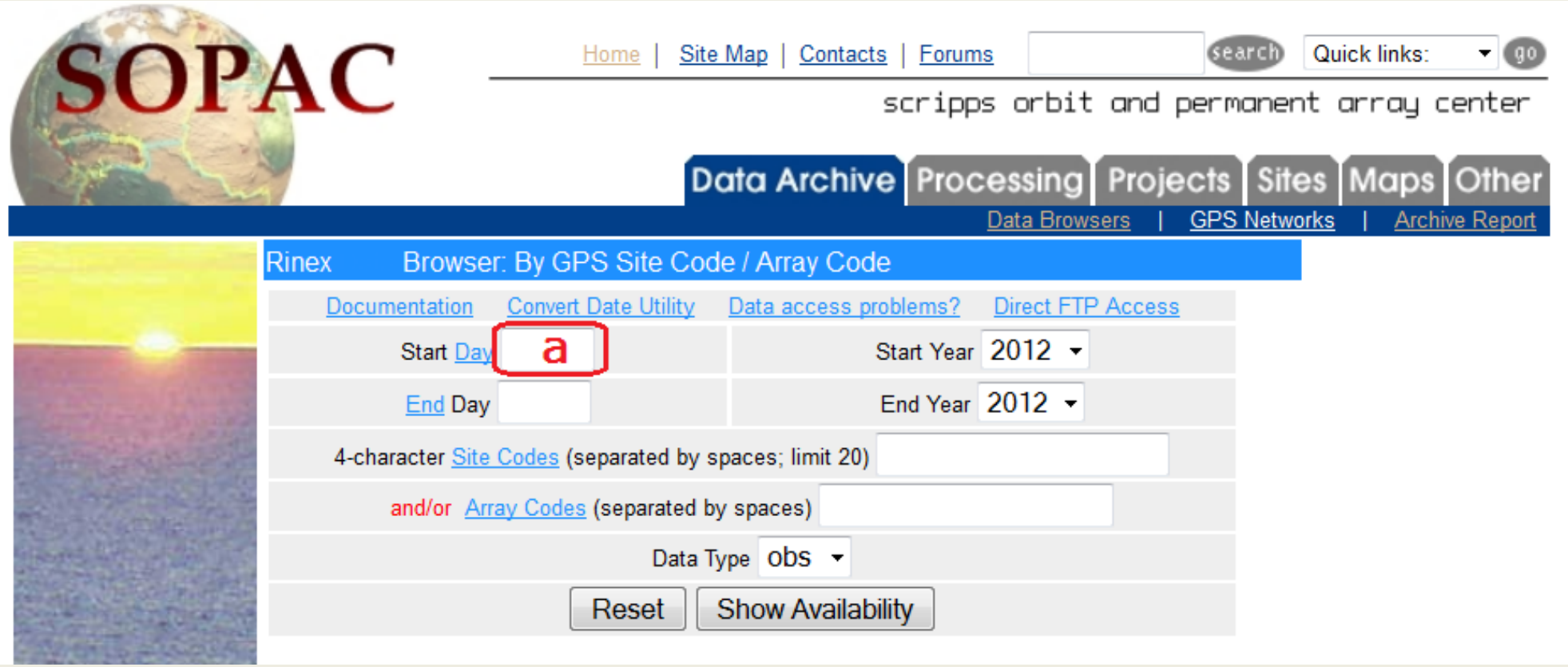
Index of ftp://cddis.gsfc.nasa.gov/pub/gps/data/daily/2011/021/

Up to higher level directory

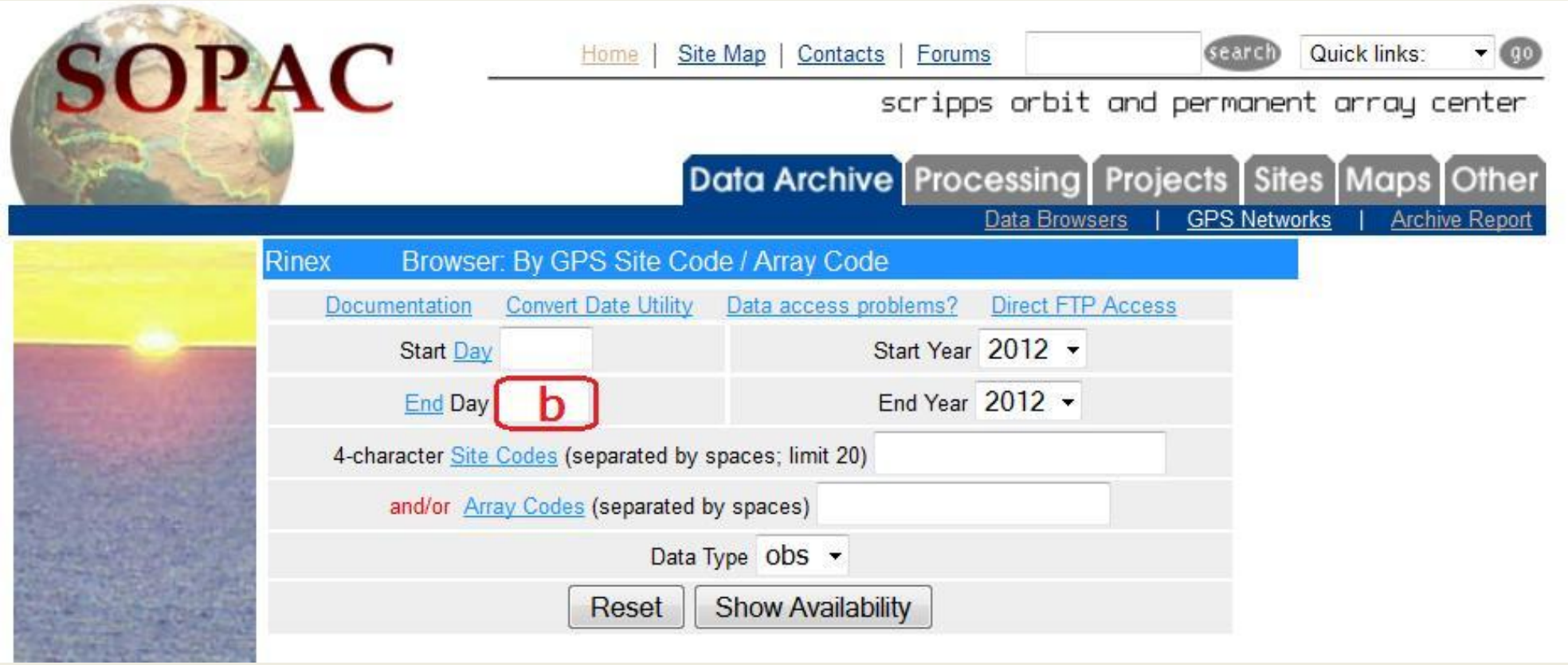
Name	Size	Last Modified
11021.status	72 KB	2/24/2011 12:00:00 AM
11d		3/2/2012 7:58:00 AM
11g		3/2/2012 7:58:00 AM
11m		3/2/2012 7:58:00 AM
11n		3/2/2012 7:58:00 AM
11o		3/2/2012 7:58:00 AM
11s		3/2/2012 7:58:00 AM

SOPAC OPTIONS

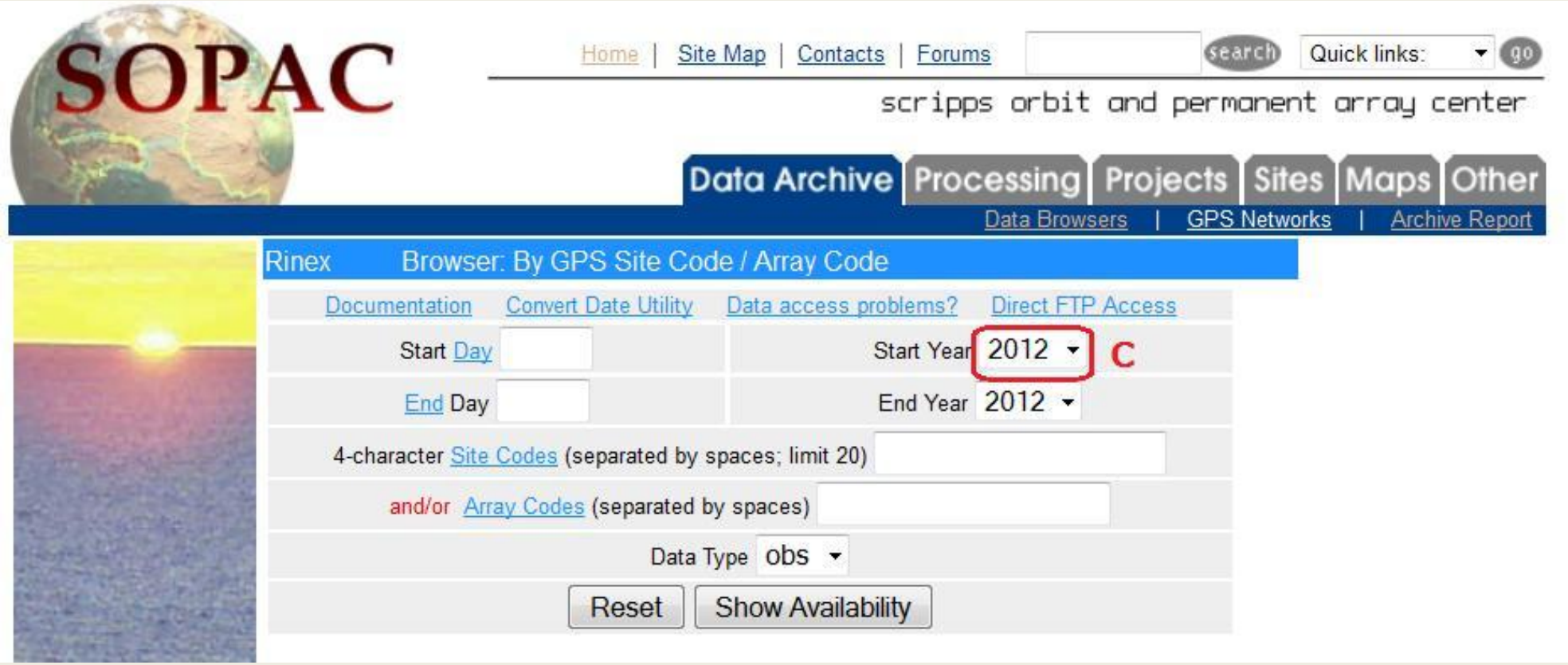
INSERT START DOY



INSERT END DOY



INSERT START YEAR

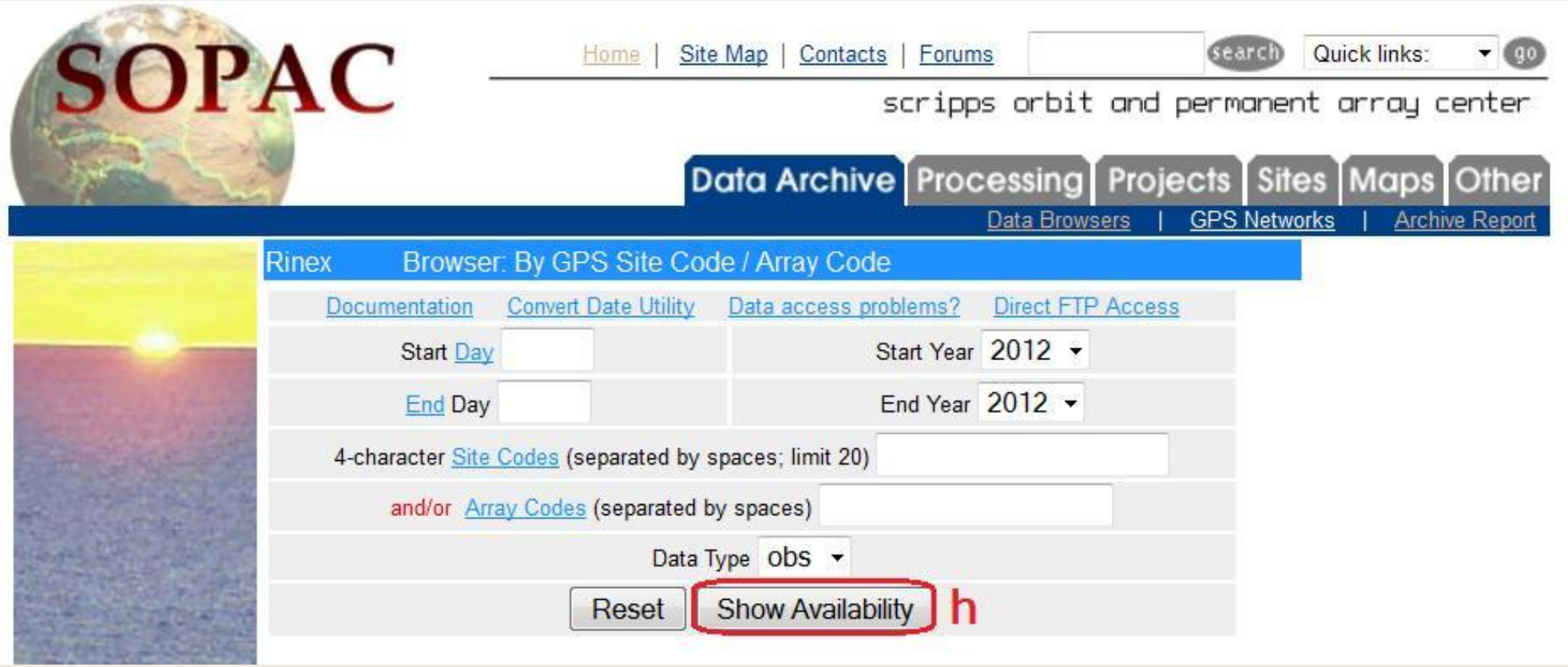


INSERT END YEAR

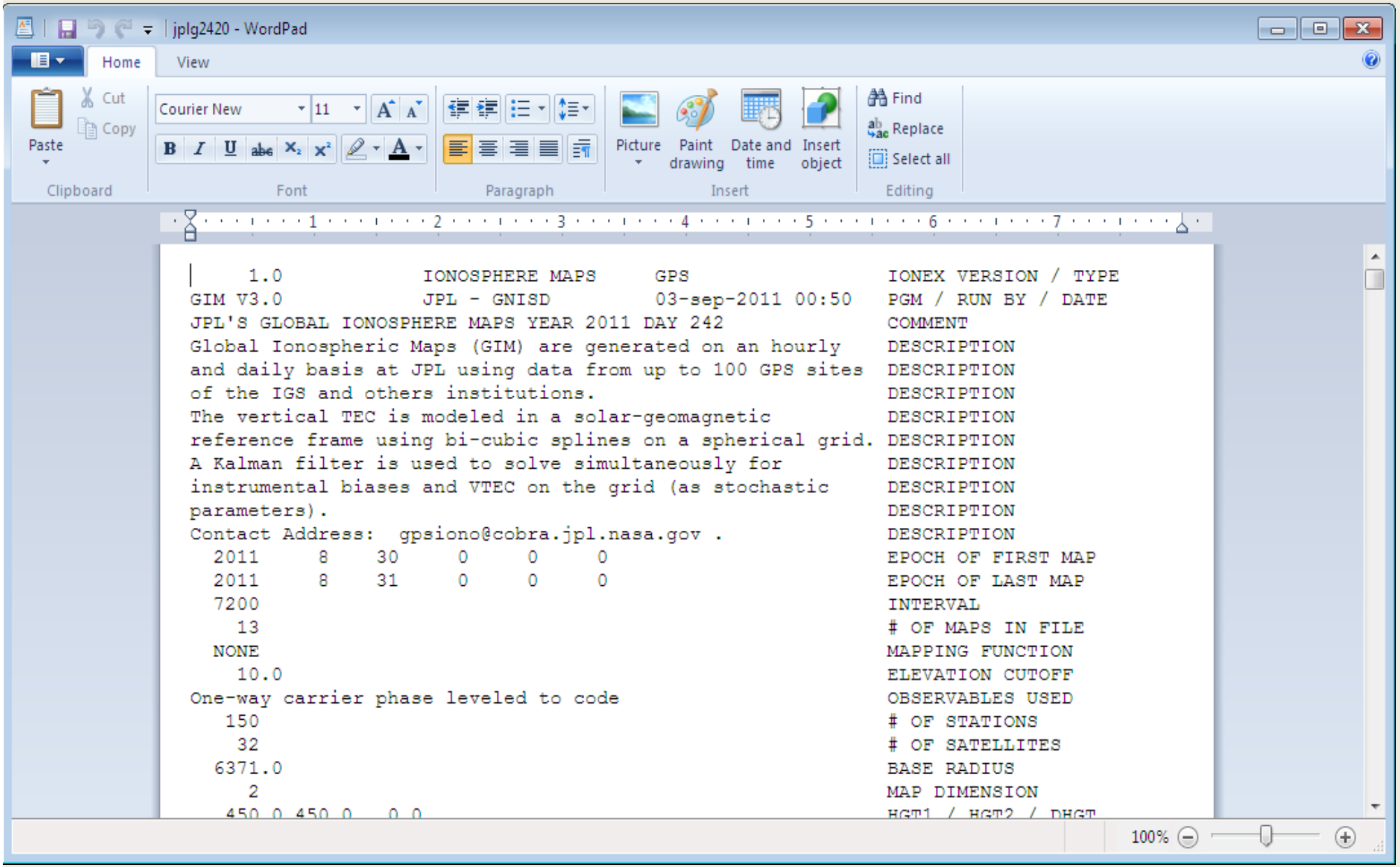
INSERT SITE OF INTEREST

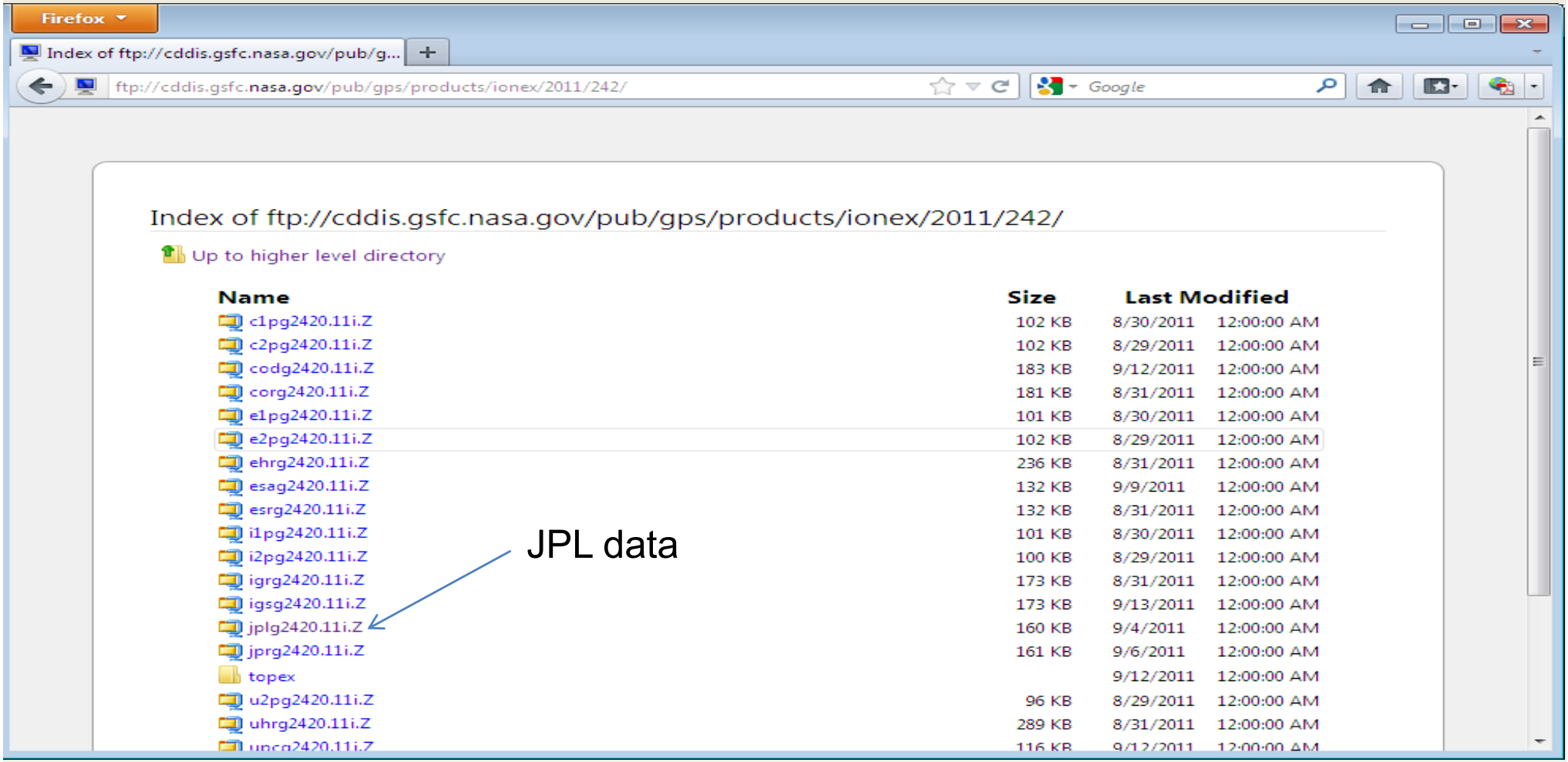
INSERT ARRAY CODES
Group of sites

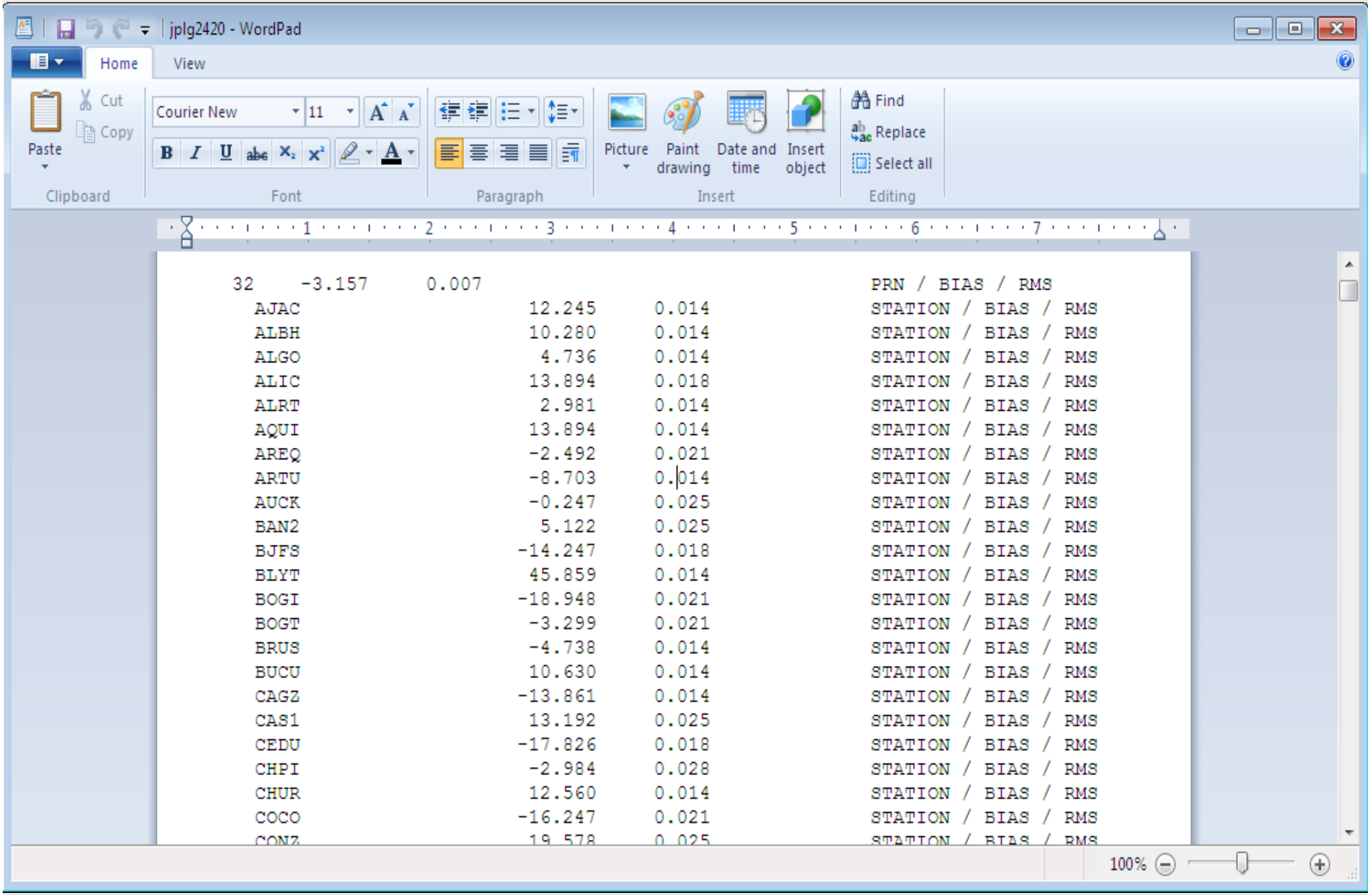
SHOW AVAILABILITY OF DESIRED DATA



RECEIVER BIASES


jplg2420 - WordPad
Home
View
Cut
Copy
Paste
Courier New
11
Clipboard
Font
Paragraph
Picture
Paint drawing
Date and time
Insert object
Insert
Find
Replace
Select all
Editing
1.0 IONOSPHERE MAPS GPS IONEX VERSION / TYPE
GIM V3.0 JPL - GNISD 03-sep-2011 00:50 PGM / RUN BY / DATE
JPL'S GLOBAL IONOSPHERE MAPS YEAR 2011 DAY 242 COMMENT
Global Ionospheric Maps (GIM) are generated on an hourly DESCRIPTION
and daily basis at JPL using data from up to 100 GPS sites DESCRIPTION
of the IGS and others institutions. DESCRIPTION
The vertical TEC is modeled in a solar-geomagnetic DESCRIPTION
reference frame using bi-cubic splines on a spherical grid. DESCRIPTION
A Kalman filter is used to solve simultaneously for DESCRIPTION
instrumental biases and VTEC on the grid (as stochastic DESCRIPTION
parameters). DESCRIPTION
Contact Address: gpsiono@cobra.jpl.nasa.gov . DESCRIPTION
2011 8 30 0 0 0 EPOCH OF FIRST MAP
2011 8 31 0 0 0 EPOCH OF LAST MAP
7200 INTERVAL
13 # OF MAPS IN FILE
NONE MAPPING FUNCTION
10.0 ELEVATION CUTOFF
One-way carrier phase leveled to code OBSERVABLES USED
150 # OF STATIONS
32 # OF SATELLITES
6371.0 BASE RADIUS
2 MAP DIMENSION
450.0 450.0 0.0 HGT1 / HGT2 / DHGT
100%


Firefox
Index of ftp://cddis.gsfc.nasa.gov/pub/g...
ftp://cddis.gsfc.nasa.gov/pub/gps/products/ionex/2011/242/
Google
Index of ftp://cddis.gsfc.nasa.gov/pub/gps/products/ionex/2011/242/
Up to higher level directory
Name
Size
Last Modified
c1pg2420.11i.Z 102 KB 8/30/2011 12:00:00 AM
c2pg2420.11i.Z 102 KB 8/29/2011 12:00:00 AM
codg2420.11i.Z 183 KB 9/12/2011 12:00:00 AM
corg2420.11i.Z 181 KB 8/31/2011 12:00:00 AM
e1pg2420.11i.Z 101 KB 8/30/2011 12:00:00 AM
e2pg2420.11i.Z 102 KB 8/29/2011 12:00:00 AM
ehrg2420.11i.Z 236 KB 8/31/2011 12:00:00 AM
esag2420.11i.Z 132 KB 9/9/2011 12:00:00 AM
esrg2420.11i.Z 132 KB 8/31/2011 12:00:00 AM
i1pg2420.11i.Z 101 KB 8/30/2011 12:00:00 AM
i2pg2420.11i.Z 100 KB 8/29/2011 12:00:00 AM
igrg2420.11i.Z 173 KB 8/31/2011 12:00:00 AM
igsg2420.11i.Z 173 KB 9/13/2011 12:00:00 AM
jplg2420.11i.Z 160 KB 9/4/2011 12:00:00 AM
jprg2420.11i.Z 161 KB 9/6/2011 12:00:00 AM
topex 9/12/2011 12:00:00 AM
u2pg2420.11i.Z 96 KB 8/29/2011 12:00:00 AM
uhrg2420.11i.Z 289 KB 8/31/2011 12:00:00 AM
JPL data


jplg2420 - WordPad
Home
View
Cut
Copy
Paste
Courier New
11
Clipboard
Font
Paragraph
Picture
Paint drawing
Date and time
Insert object
Insert
Find
Replace
Select all
Editing
32 -3.157 0.007 PRN / BIAS / RMS
AJAC 12.245 0.014 STATION / BIAS / RMS
ALBH 10.280 0.014 STATION / BIAS / RMS
ALGO 4.736 0.014 STATION / BIAS / RMS
ALIC 13.894 0.018 STATION / BIAS / RMS
ALRT 2.981 0.014 STATION / BIAS / RMS
AQUI 13.894 0.014 STATION / BIAS / RMS
AREQ -2.492 0.021 STATION / BIAS / RMS
ARTU -8.703 0.014 STATION / BIAS / RMS
AUCK -0.247 0.025 STATION / BIAS / RMS
BAN2 5.122 0.025 STATION / BIAS / RMS
BJFS -14.247 0.018 STATION / BIAS / RMS
BLYT 45.859 0.014 STATION / BIAS / RMS
BOGI -18.948 0.021 STATION / BIAS / RMS
BOGT -3.299 0.021 STATION / BIAS / RMS
BRUS -4.738 0.014 STATION / BIAS / RMS
BUCU 10.630 0.014 STATION / BIAS / RMS
CAGZ -13.861 0.014 STATION / BIAS / RMS
CAS1 13.192 0.025 STATION / BIAS / RMS
CEDU -17.826 0.018 STATION / BIAS / RMS
CHPI -2.984 0.028 STATION / BIAS / RMS
CHUR 12.560 0.014 STATION / BIAS / RMS
COCO -16.247 0.021 STATION / BIAS / RMS
100%

THANK YOU FOR YOUR ATTENTION……

BENON you are on!!!!!!!