2016

PPP Manual

using RTKLIB

Supported by GNSS TUTOR

This manual consisted of following tasks.

A. Data acquisition part

Slide 3 – 7

B. Analyzing process part

Slide 8 - 12

A

Data Acquisition from Web

✓ We need the following data to do PPP. So please go to the URL which supported each data and download it.

Slide 4-5

・Observation file and Navigation message file (.16o and .16n)

Slide 6

・Final products file and Clock file (.sp3 and .clk) → **ftp://igs.bkg.bund.de/IGS/products/orbits/**

Slide 7

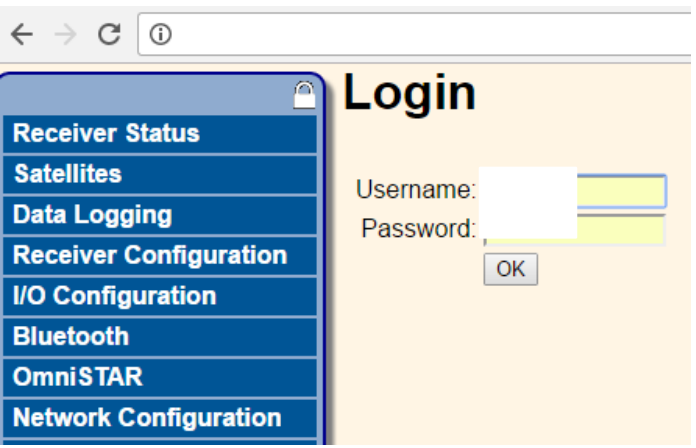
・DCB file (.DCB) → **ftp://ftp.unibe.ch/aiub/CODE/2016/**

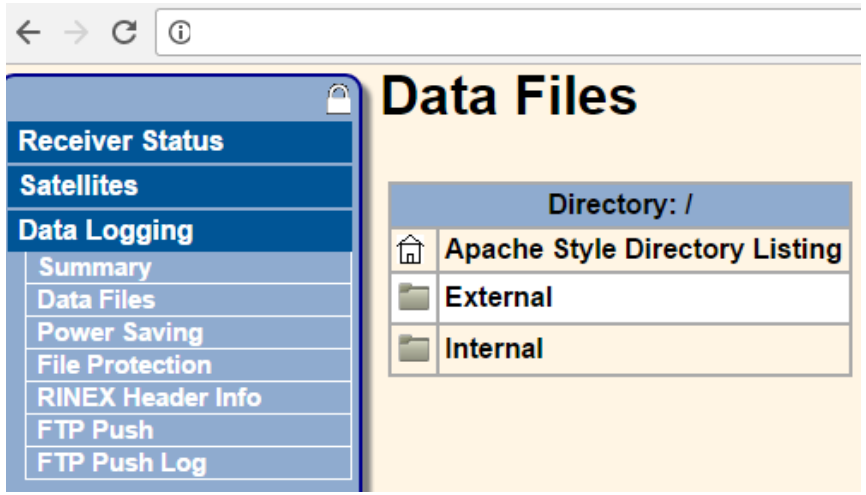
・Antenna file (.atx) → **ftp://igs.org/pub/station/general/**

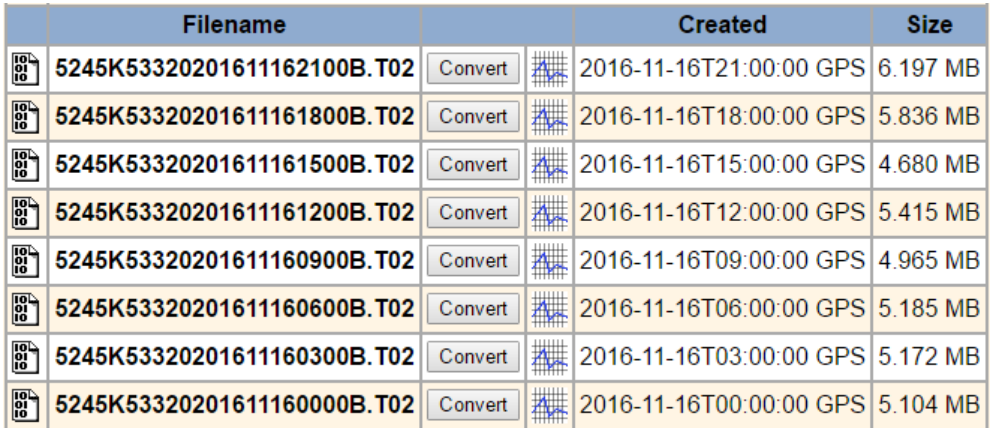
A

Observation File and Navigation Message File ①

✓ Please get the observation data.







Filename		Created	Size
5245K53202016111621 00B.T02	Convert	2016-11-16T21:00:00 GPS	6.197 MB
5245K53202016111618 00B.T02	Convert	2016-11-16T18:00:00 GPS	5.836 MB
5245K53202016111615 00B.T02	Convert	2016-11-16T15:00:00 GPS	4.680 MB
5245K53202016111612 00B.T02	Convert	2016-11-16T12:00:00 GPS	5.415 MB
5245K53202016111609 00B.T02	Convert	2016-11-16T09:00:00 GPS	4.965 MB
5245K53202016111606 00B.T02	Convert	2016-11-16T06:00:00 GPS	5.185 MB
5245K53202016111603 00B.T02	Convert	2016-11-16T03:00:00 GPS	5.172 MB
5245K53202016111600 00B.T02	Convert	2016-11-16T00:00:00 GPS	5.104 MB

In case of 3h_1hz of Internal on Nov. 16th

(i) Login

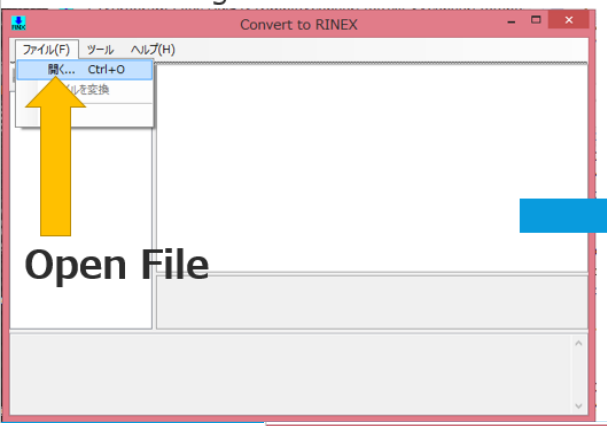
(ii) Go to “Data Files”.

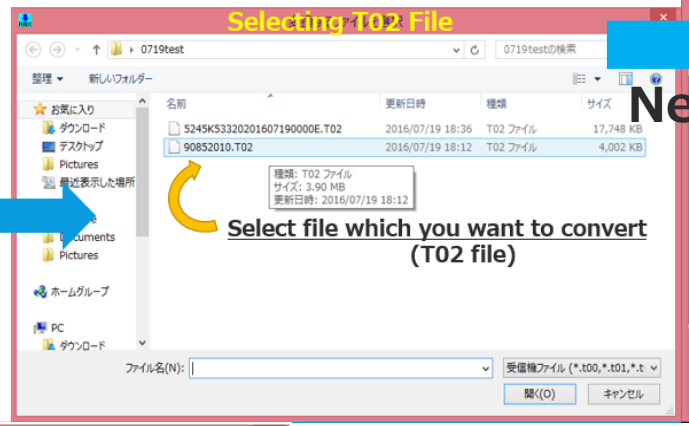
(iii) Internal or External → hour&hertz → year → month → day → Please select the time span which you want to analyze.
Click Filename, then starting to download T02 file.

A

Observation File and Navigation Message File ②

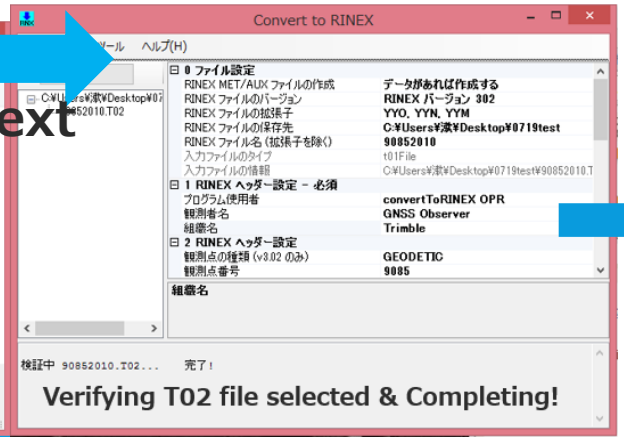
1. Start-up freeware; ”Convert To RINEX” →
2. Converting the T02 data to RINEX format



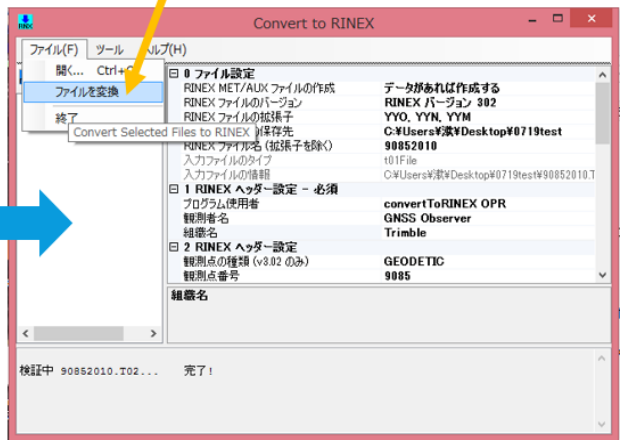


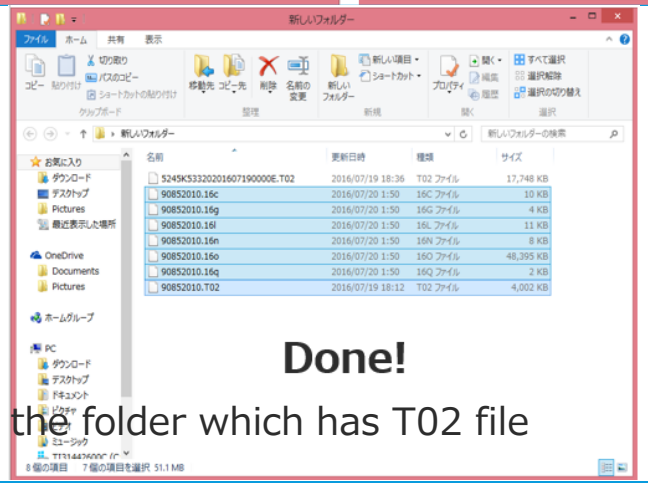
Next

2. Converting the T02 data to RINEX format



Select “Convert file”





3. Move to the folder which has T02 file

Then, Created .16o and .16n
These files are needed in the process of RTKPOST.

A

Final Products File and Clock File ①

✓ Please access the site “GPS Date Calendar”. → http://adn.agi.com/GNSSWeb/

Check the week number and the day number.

October		November 2016				December
Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1 1921:2 897:172800 306	2 1921:3 897:259200 307	3 1921:4 897:345600 308	4 1921:5 897:432000 309	5 1921:6 897:518400 310
6 1922:0 898:0 311	7 1922:1 898:86400 312	8 1922:2 898:172800 313	9 1922:3 898:259200 314	10 1922:4 898:345600 315	11 1922:5 898:432000 316	12 1922:6 898:518400 317
13 1923:0 899:0 318	14 1923:1 899:86400 319	15 1923:2 899:172800 320	16 1923:3 899:259200 321	17 1923:4 899:345600 322	18 1923:5 899:432000 323	19 1923:6 899:518400 324
20 1924:0 900:0 325	21 1924:1 900:86400 326	22 1924:2 900:172800 327	23 1924:3 900:259200 328	24 1924:4 900:345600 329	25 1924:5 900:432000 330	26 1924:6 900:518400 331
27 1925:0 901:0 332	28 1925:1 901:86400 333	29 1925:2 901:172800 334	30 1925:3 901:259200 335			

In case of Nov. 13rd

FTP site

1918/	2016/10/27 23:46:00
1919/	2016/11/03 11:46:00
1920/	2016/11/13 23:46:00
1921/	2016/11/11 17:37:00
1922/	2016/11/16 11:43:00
1923/	2016/11/17 3:13:00
BSW50/	2016/05/25 17:51:00
BSW52/	2016/05/11 0:00:00

Download “19*.clk.Z”**

[親ディレクトリ]		
igr19230.clk.Z	568 kB	2016/11/14 17:30:00
igr19230.erp.Z	396 B	2016/11/14 17:30:00
igr19230.sp3.Z	94.9 kB	2016/11/14 17:30:00
igr19231.clk.Z	568 kB	2016/11/15 17:30:00
igr19231.erp.Z	391 B	2016/11/15 17:30:00
igr19231.sp3.Z	94.8 kB	2016/11/15 17:30:00
igr19232.clk.Z	597 kB	2016/11/16 17:30:00
igr19232.erp.Z	393 B	2016/11/16 17:30:00
igr19232.sp3.Z	94.9 kB	2016/11/16 17:30:00

Download “19*_**.sp3.Z”**

igu19230_00.erp.Z	461 B	2016/11/13 3:13:00
igu19230_00.sp3.Z	185 kB	2016/11/13 3:13:00
igu19230_06.erp.Z	461 B	2016/11/13 9:13:00
igu19230_06.sp3.Z	185 kB	2016/11/13 9:13:00
igu19230_12.erp.Z	453 B	2016/11/13 15:13:00
igu19230_12.sp3.Z	186 kB	2016/11/13 15:13:00
igu19230_18.erp.Z	461 B	2016/11/13 21:13:00
igu19230_18.sp3.Z	185 kB	2016/11/13 21:13:00

And unzip these files. These files are needed in the process of RTKPOST.

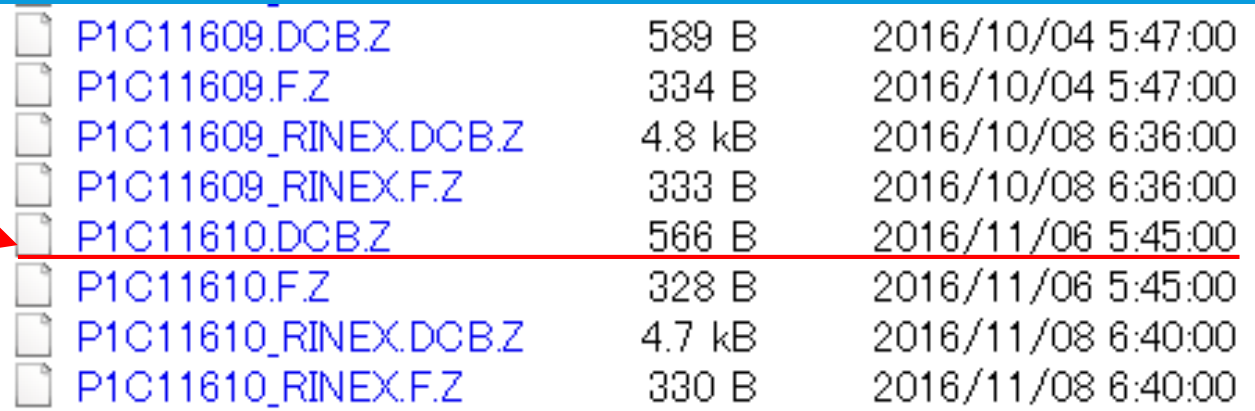
A

DCB File and Antenna File

✓ Please get the latest DCB file.

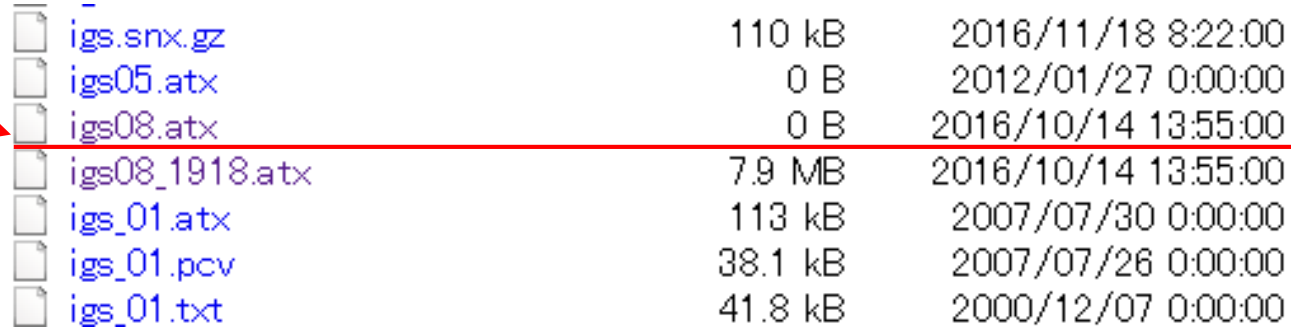
P1C1.DCB

And, unzip it.



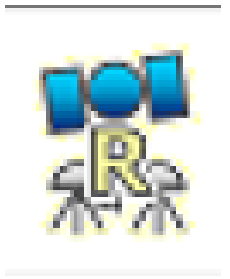
✓ Please get the latest Antenna file.

igs08.atx



B

Analyzing Method
Using RTKPOST in RTKLIB



RTKPOST: post processing analysis GUI App.

Input the RINEX observation and navigation message files.

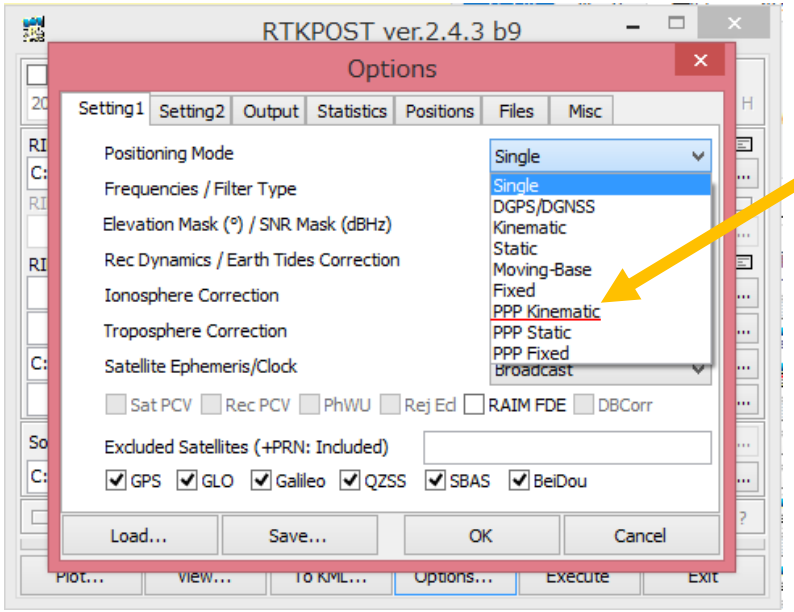
- Single frequency Point Positioning
- Differential GNSS
- Real Time Kinematic
- **Precise Point Positioning**

Download latest version (2.4.2) from here!↓

http://rtklib.com/ or

https://guthub.com/tomojitakasu/RTKLIB

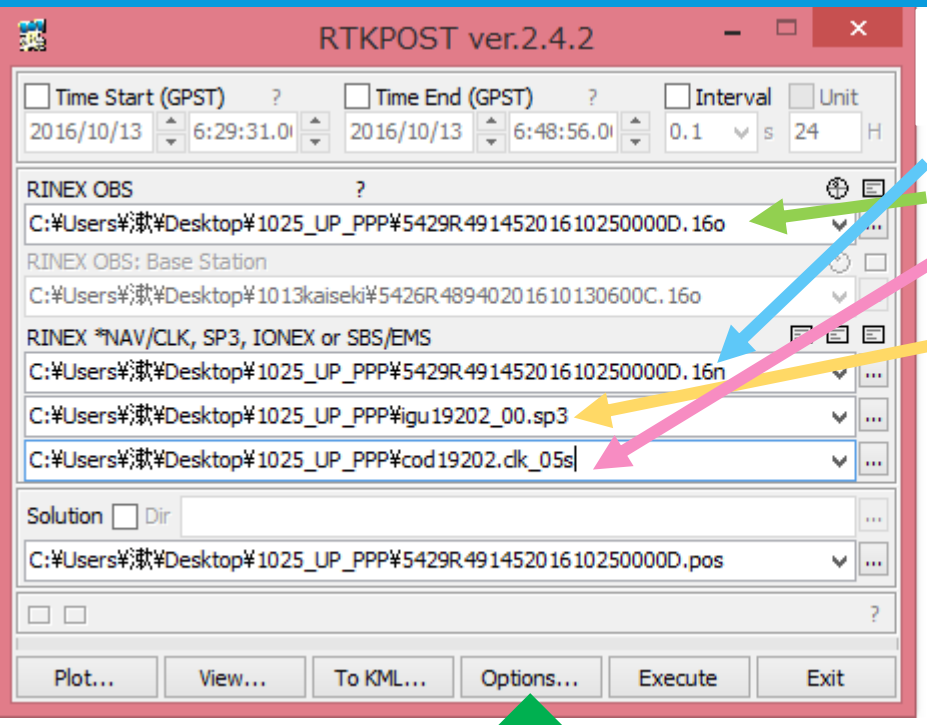
Manual: http://www.rtklib.com/prog/manual_2.4.2.pdf



Setting in Options…

B

Process of RTKPOST ①



Click here, then set up screen appears.

Input following files↓

5429R49145201610250000D.16n ← Navigation message file

5429R49145201610250000D.16o ← Observation file

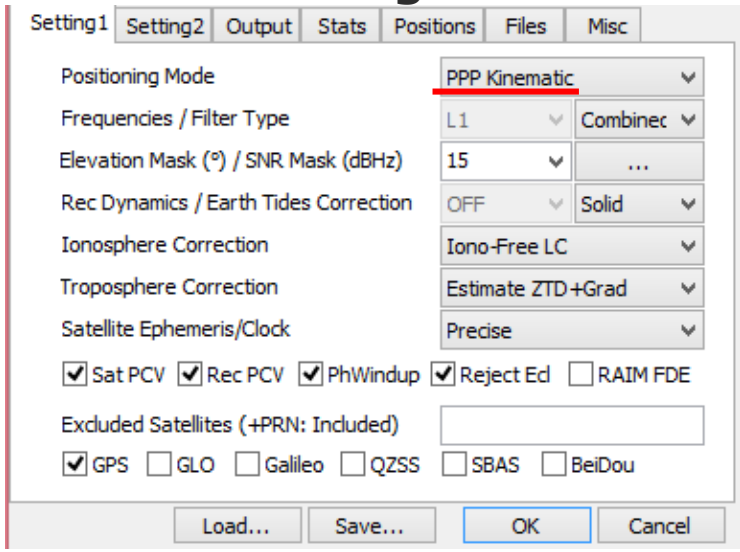
cod19202.clk_05s ← Clock file

igs08.atx

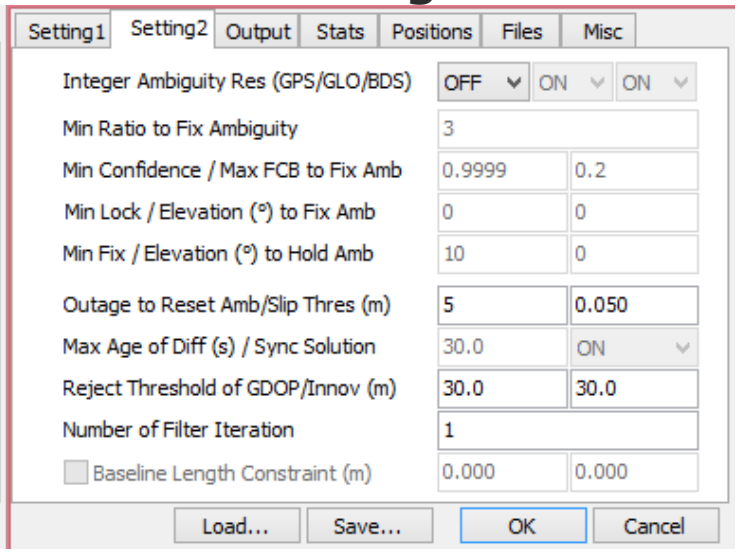
igu19202_00.sp3 ← Last Product file

P1C1_ALL.DCB

Setting 1



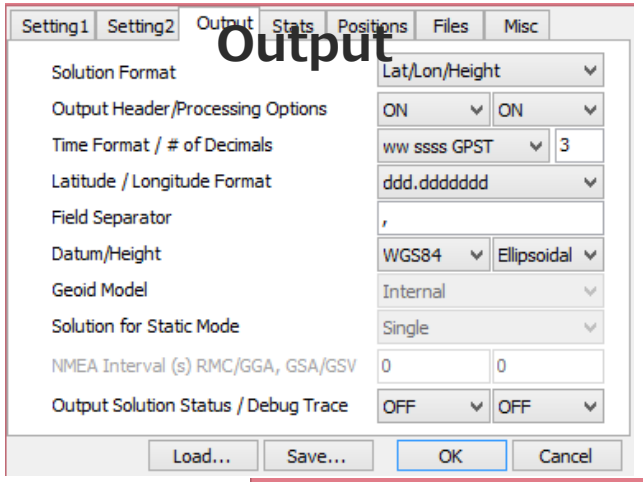
Setting 2

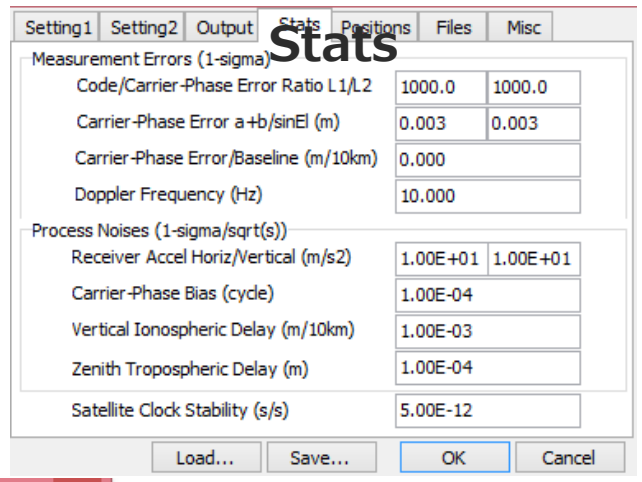


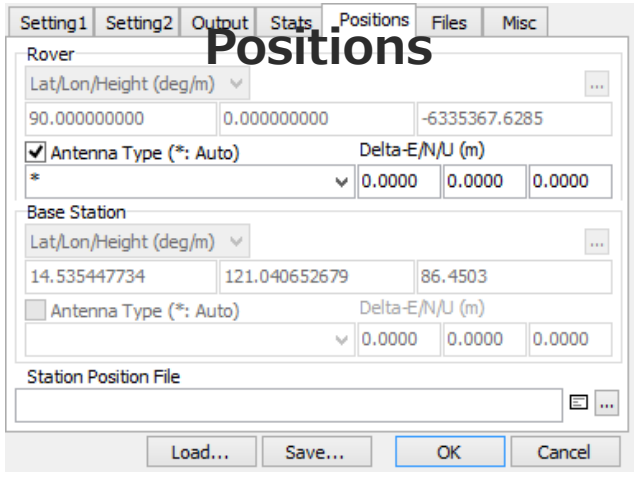
2016/11/18

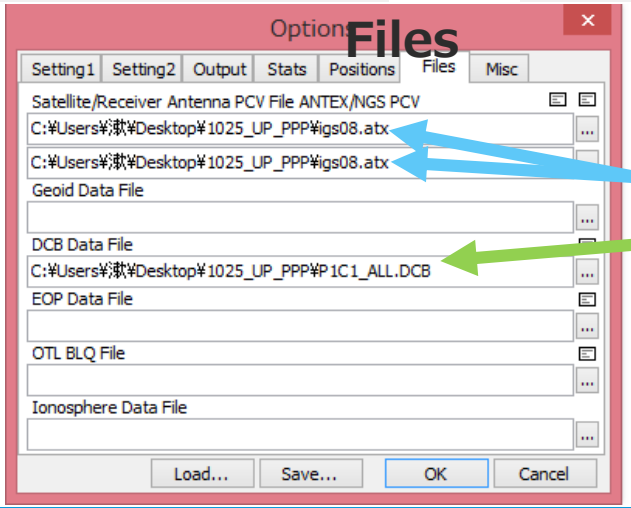
B

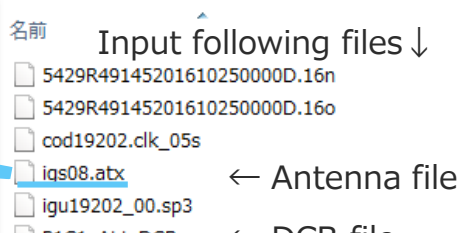
Process of RTKPOST ②

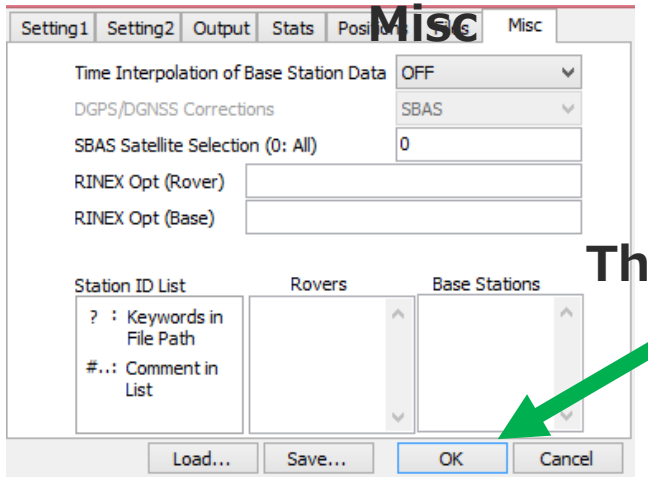








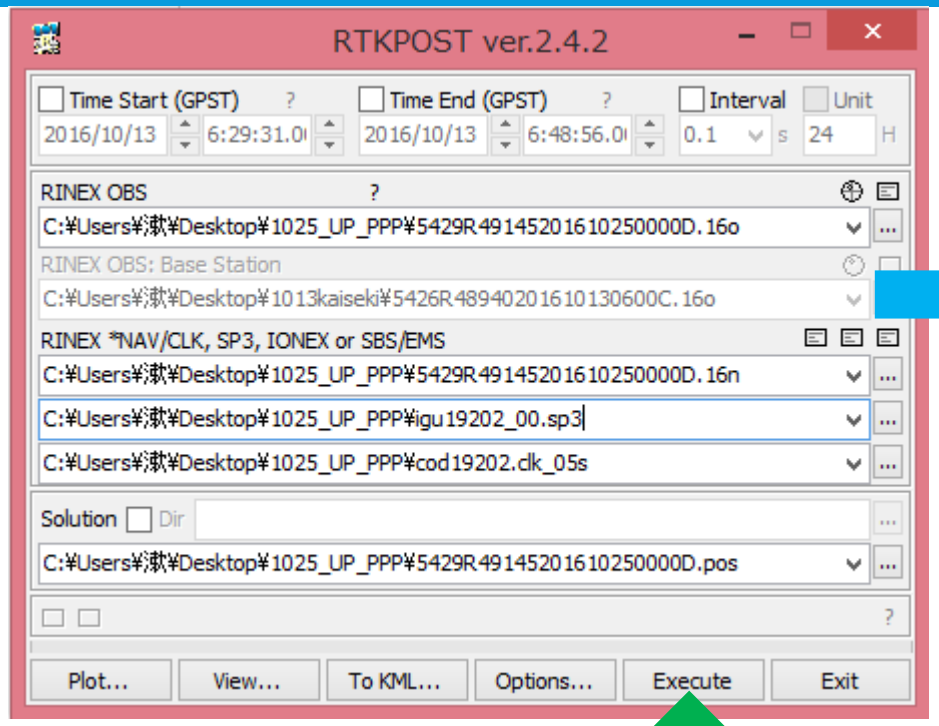


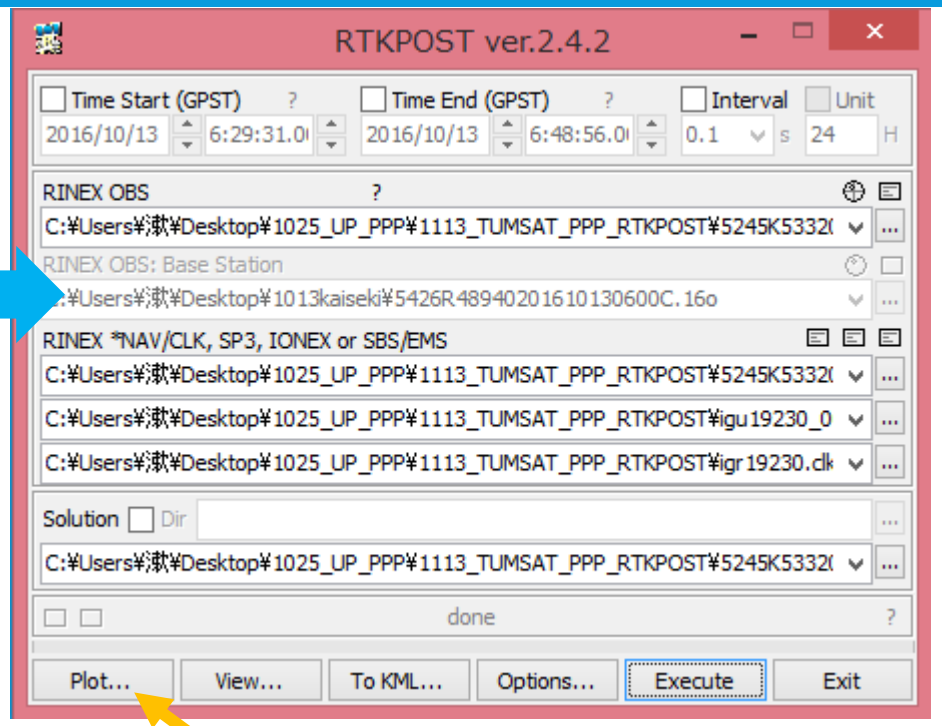


Then, Click “OK”.

B

Process of RTKPOST ③





Go to the folder...

- 5245K53320201611130000B.16c
- 5245K53320201611130000B.16g
- 5245K53320201611130000B.16l
- 5245K53320201611130000B.16n
- 5245K53320201611130000B.16o
- 5245K53320201611130000B.16q
- 5245K53320201611130000B.pos
- 5245K53320201611130000B.T02
- igr19230.clk
- igs08.atx
- igu19230_00.sp3
- P1C1_ALL.DCB

Done!

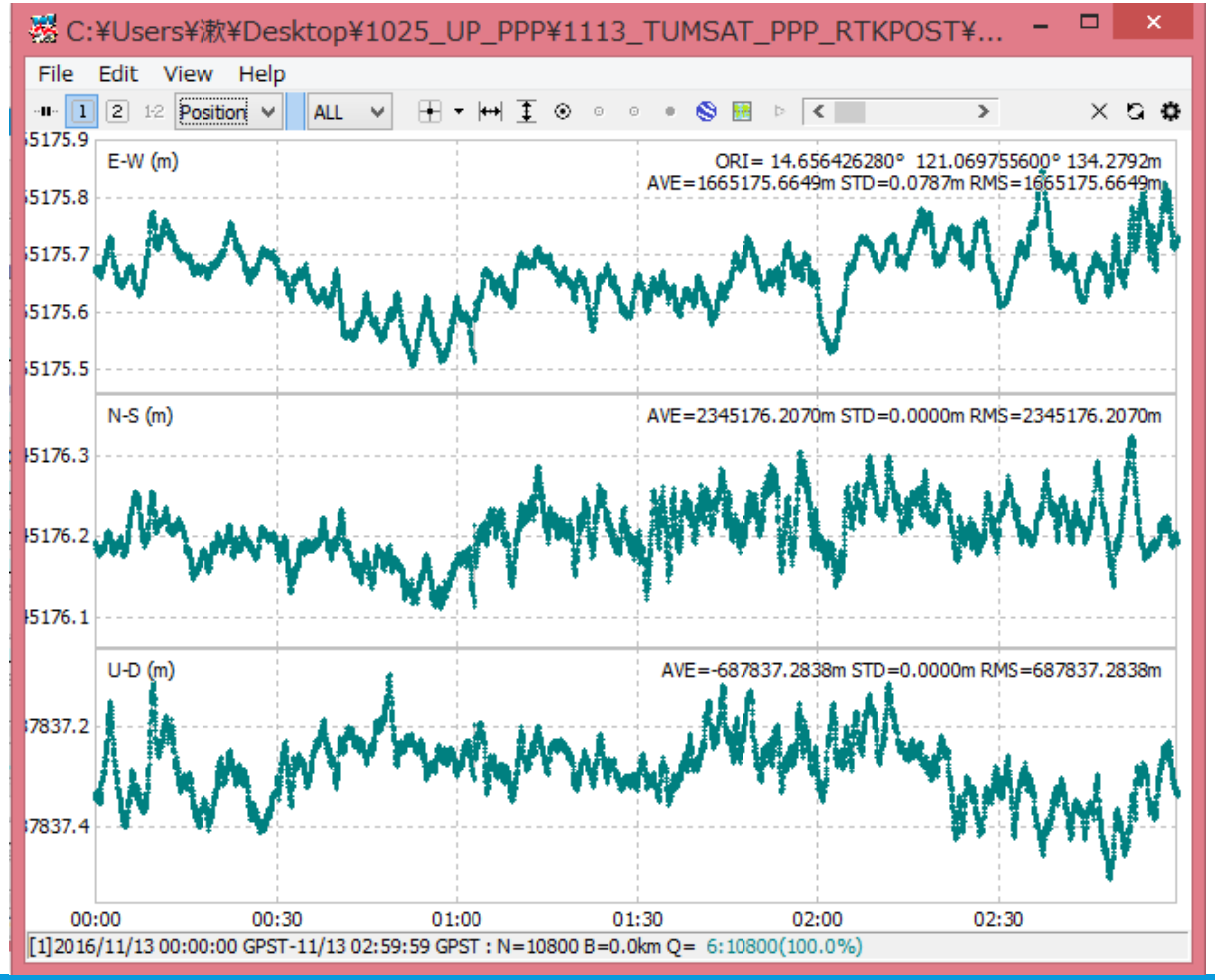
POS file generated!

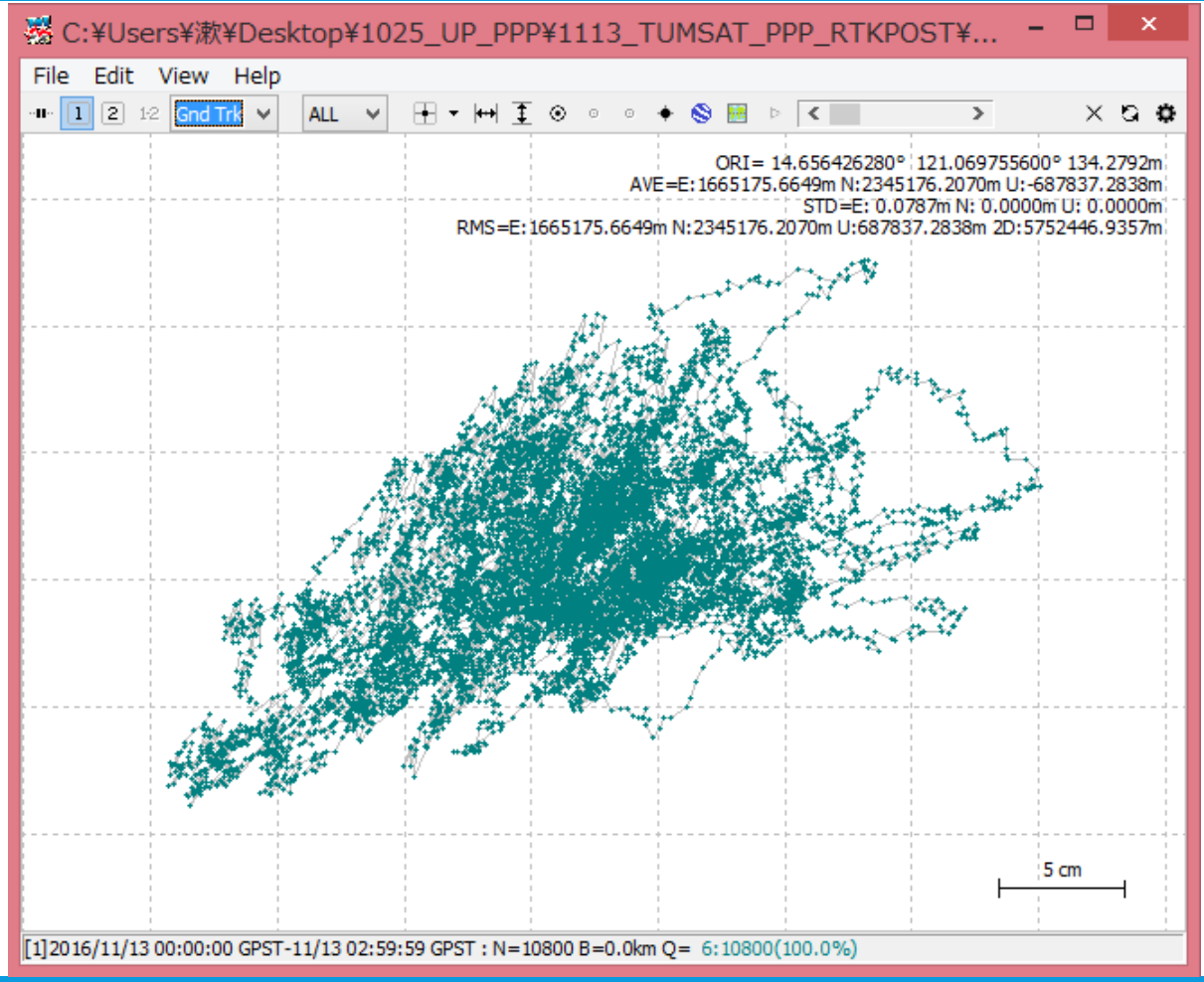
Click “Execute”, then starting to post-process.

Click “Plot...”, then the result appears.

B

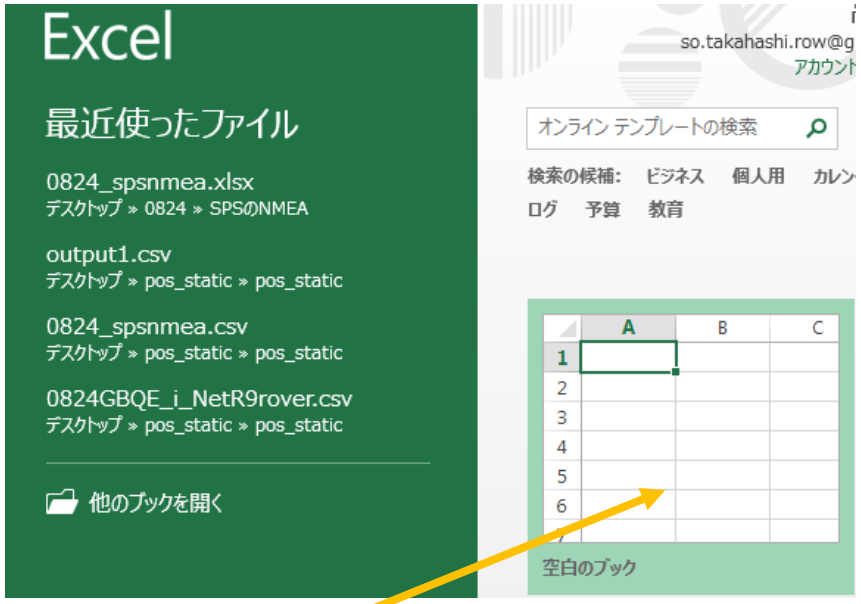
Process of RTKPOST ④





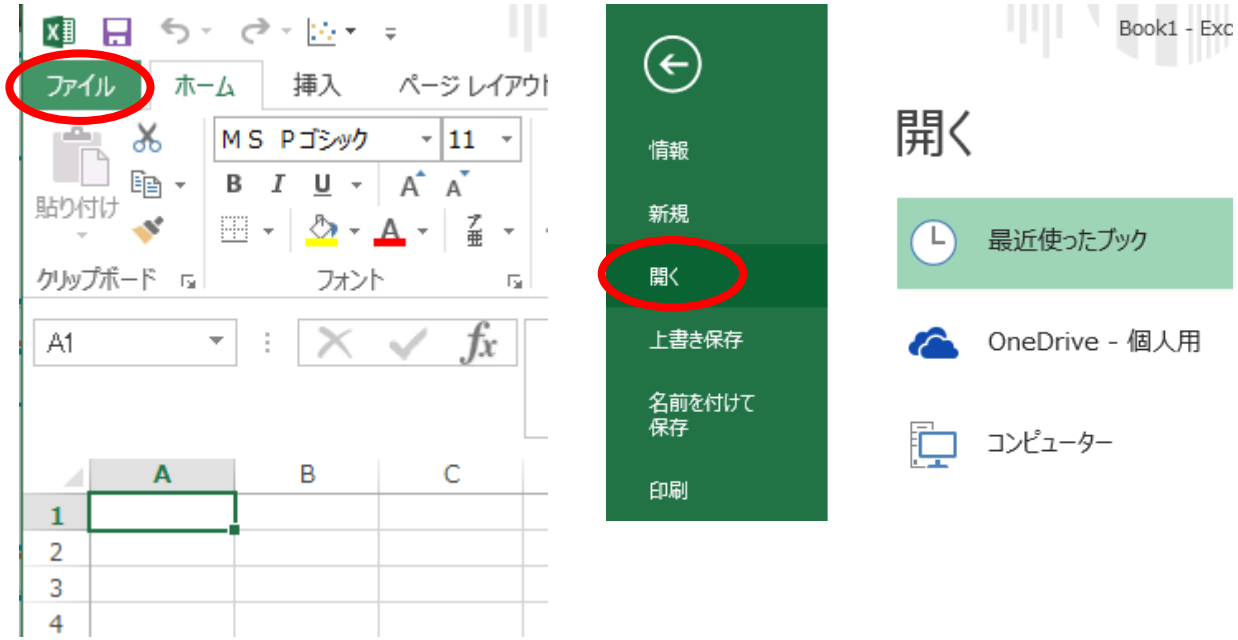
How to use ***.pos file ①

✓ **pos file → csv file**



Start-up Excel file

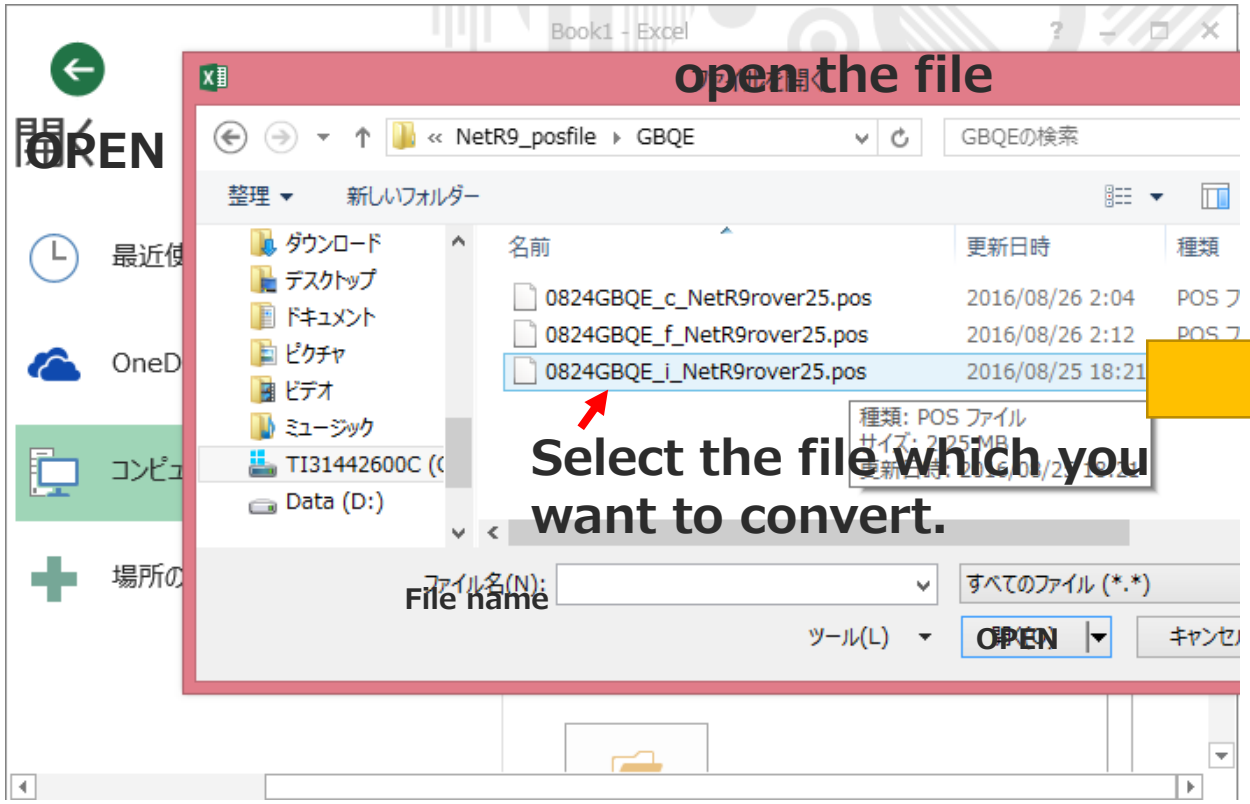
Click “File” & “Open”

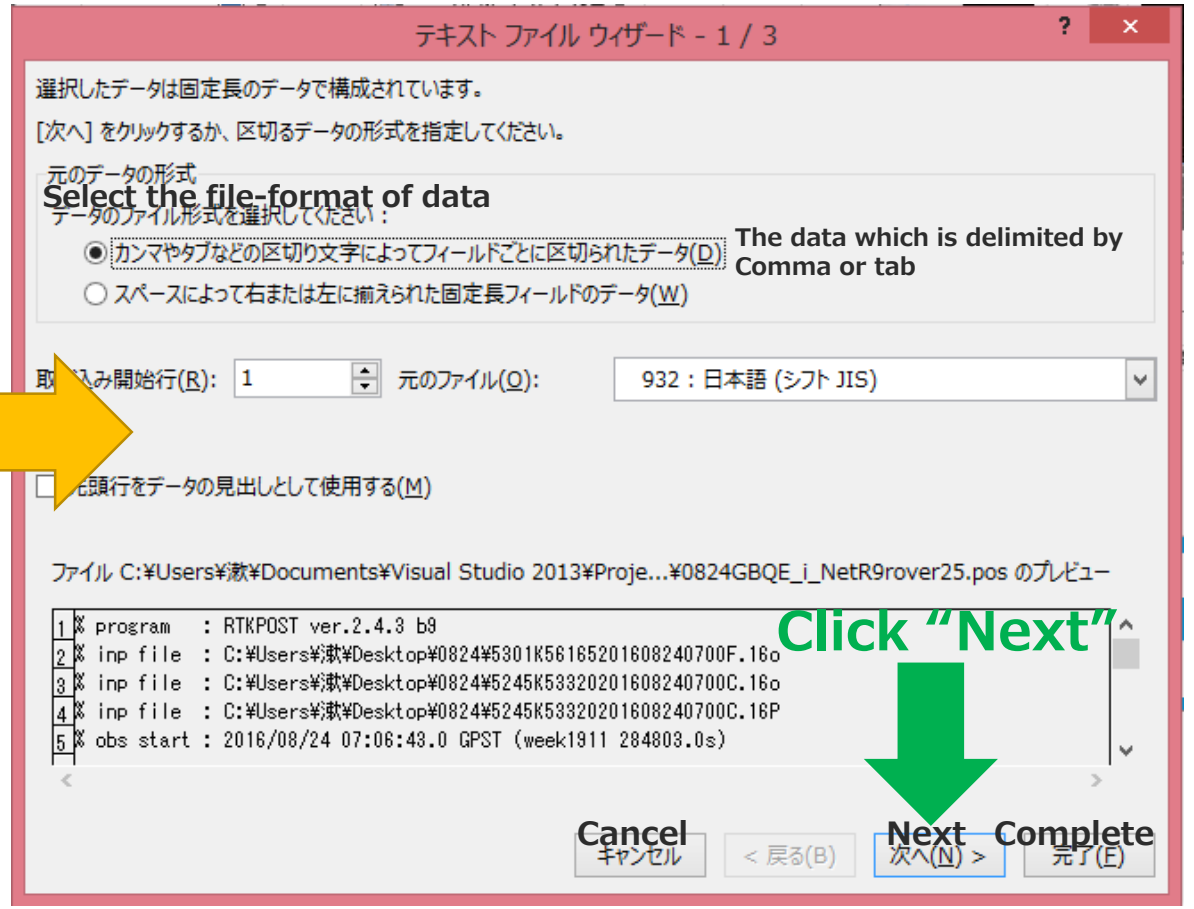


Open pos file & change the format (pos→csv)

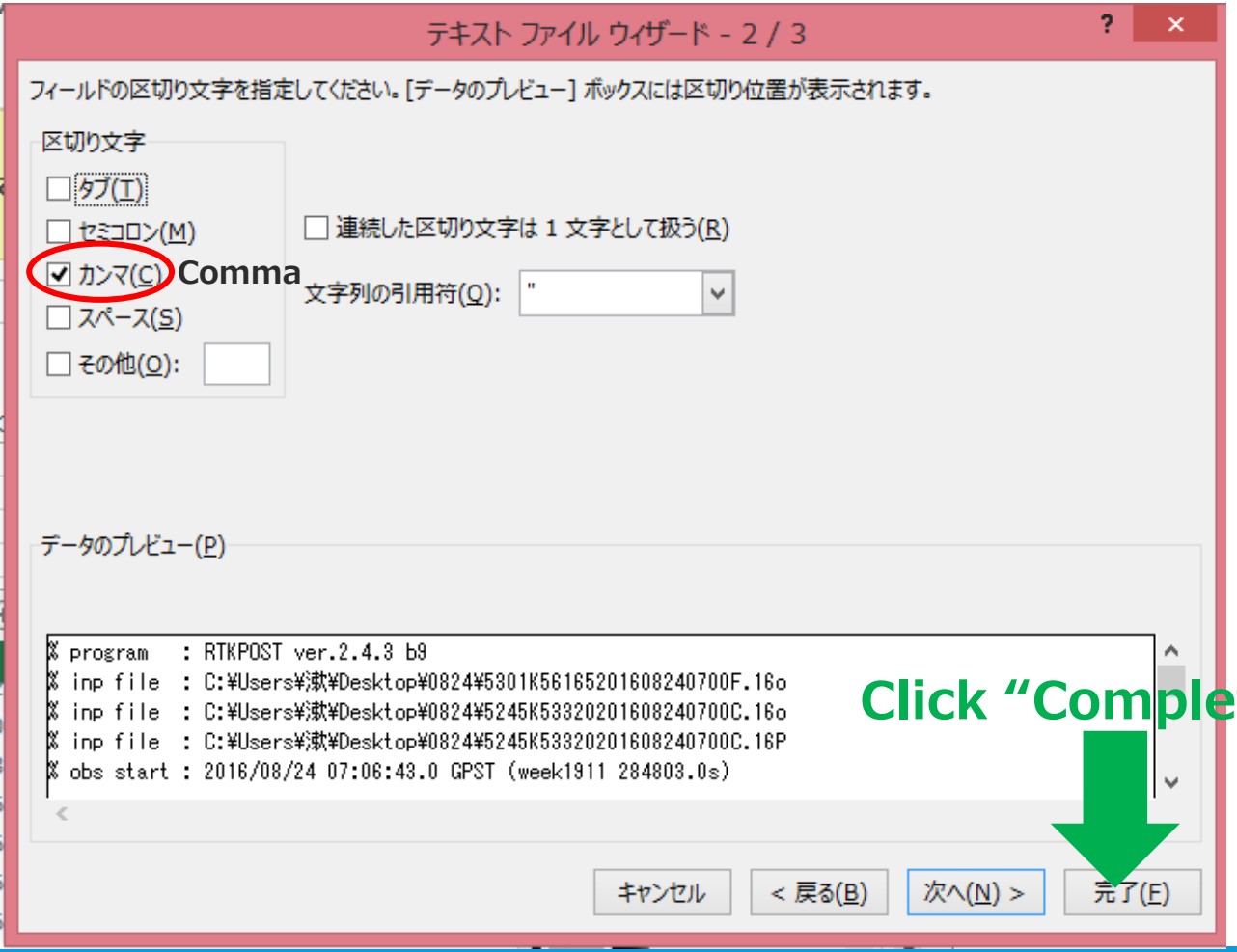
How to use ***.pos file ②

For example...





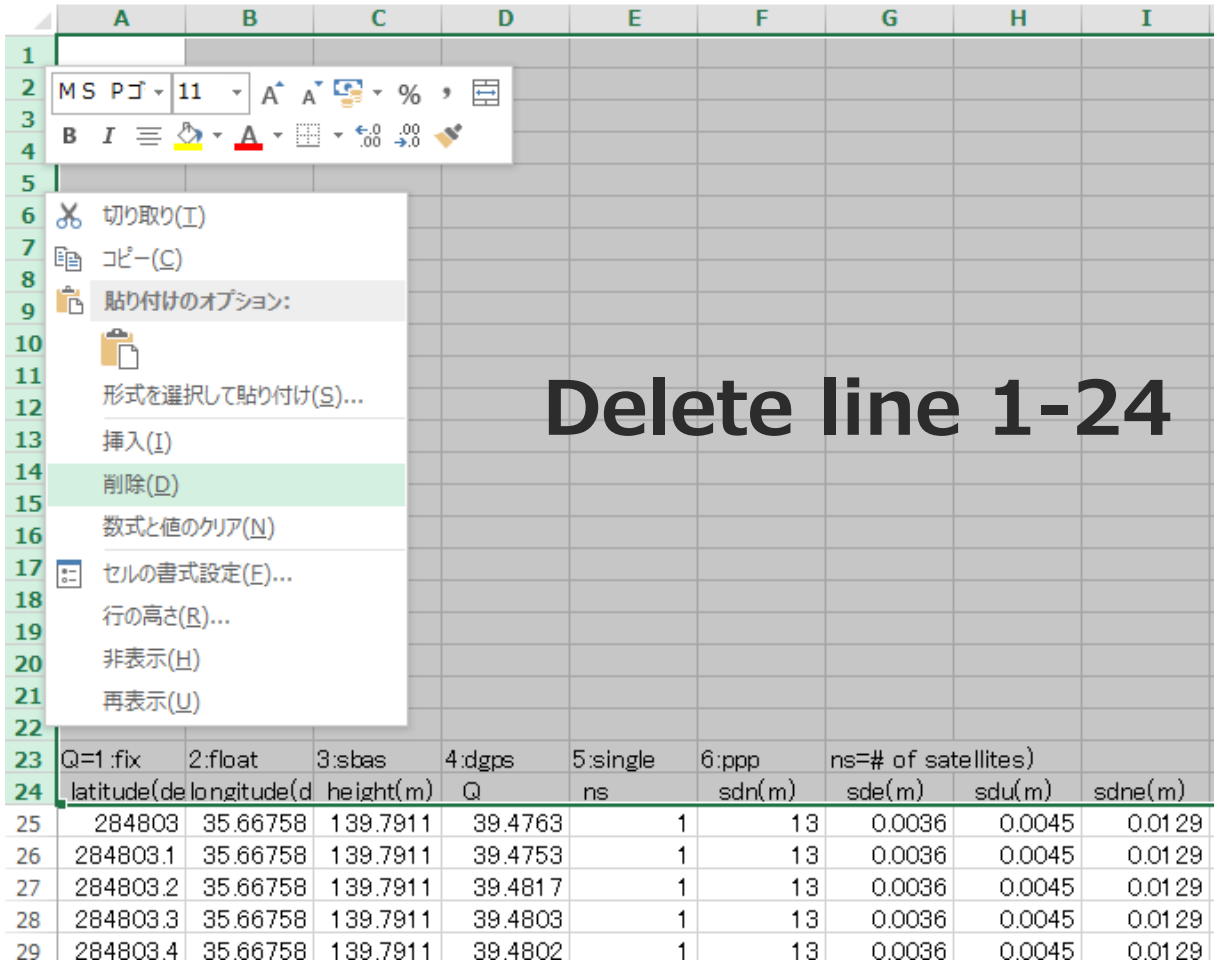
How to use ***.pos file ③



Delete column A

	A	B	C	D	E	F	G	H	I	J
1	% program	: RTKPOST ver.2.4.3 b9								
2	% inp file	: C:¥Users¥漱¥Desktop¥0824¥5301K56165201608240700F.16o								
3	% inp file	: C:¥Users¥漱¥Desktop¥0824¥5245K53320201608240700C.16o								
4	% inp file	: C:¥Users¥漱¥Desktop¥0824¥5245K53320201608240700C.16P								
5	% obs start	: 2016/08/24 07:06:43.0 GPST (week1911 284803.0s)								
6	% obs end	: 2016/08/24 07:37:17.0 GPST (week1911 286637.0s)								
7	% pos mode	: kinematic								
8	% freqs	: L1+L2								
9	% solution	: forward								
10	% elev mask	: 25.0 deg								
11	% dynamics	: off								
12	% tidecorr	: off								
13	% ionos opt	: broadcast								
14	% tropo opt	: saastamoinen								
15	% ephemeris	: broadcast								
16	% navi sys	: gps galileo qzss								
17	% amb res	: instantaneous								
18	% val thres	: 3.0								
19	% antenna1	:		(0.0000	0.0000	0.0000)				
20	% antenna2	:		(0.0000	0.0000	0.0000)				
21	% ref pos	139.7922	59.741							
22	%									
23	% (lat/lon/	Q=1:fix	2:float	3:sbas	4:dgps	5:single	6:ppp	ns=# of satellites)		
24	% GPST	latitude(de	longitude(d	height(m)	Q	ns	sdn(m)	sde(m)	sdu(m)	sdne(m)
25	1911	284803	35.66758	139.7911	39.4763	1	13	0.0036	0.0045	0.0129
26	1911	284803.1	35.66758	139.7911	39.4753	1	13	0.0036	0.0045	0.0129
27	1911	284803.2	35.66758	139.7911	39.4817	1	13	0.0036	0.0045	0.0129
28	1911	284803.3	35.66758	139.7911	39.4803	1	13	0.0036	0.0045	0.0129

How to use ***.pos file ④



	A	B	C	D	E	F	G	H	I
23	Q=1 :fix	2:float	3:sbas	4:dgps	5:single	6:ppp	ns=# of satellites)		
24	latitude(de	longitude(d	height(m)	Q	ns	sdn(m)	sde(m)	sdu(m)	sdne(m)
25	284803	35.66758	139.7911	39.4763	1	13	0.0036	0.0045	0.0129
26	284803.1	35.66758	139.7911	39.4753	1	13	0.0036	0.0045	0.0129
27	284803.2	35.66758	139.7911	39.4817	1	13	0.0036	0.0045	0.0129
28	284803.3	35.66758	139.7911	39.4803	1	13	0.0036	0.0045	0.0129
29	284803.4	35.66758	139.7911	39.4802	1	13	0.0036	0.0045	0.0129

Then, the remaining data is

A B C D E F …

GPST, latitude(deg), longitude(deg), height(m), Q, ns, …

↑

It is easy to analyze the data on IDE
(Integrated Development Environment)

You can use EXCEL or
your own program…