Processing of raw GNSS data

Automated Survey Systems

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CONTENT

- Get raw data of permanent GNSS stations
- Post-process with different scenarios
- Open-source software RTKLIB (install both of them)
  - *www.rtklib.com*,
  - *https://rtklibexplorer.wordpress.com/*
- Use GUI
- Use CLI

RAW DATA OF PERMANENT STATIONS

- Free data for scientific and educational purposes
- IGS: https://igs.org/
- EUREF: https://epncb.oma.be/
- …
- Task to do: find raw data of BUTE, BME1 and other stations in your country

BUTE PERMANENT STATION

- Download from web
  - *http://www.epncb.oma.be/_networkdata/siteinfo4onestation.php?station=BUTE00HUN*
  - *One-day session, in RINEX 3 format*
- Download directly from command prompt
  - *https://igs.bkg.bund.de/root_ftp/EUREF/obs/2022/033/BUTE00HUN_R_20220330000_01D_30S_MO.crx.gz*
  - *ftp client*
  - *wget*

NAVIGATION DATA

- Download directly from command prompt: ftp://igs.bkg.bund.de/EUREF/BRDC/2022/033/BRDC00WRD_R_20220330000_01D_MN.rnx.gz
- M = mixed (G = GPS, E = GAL, R = GLO, C = BDS)

UNCOMPRESSING

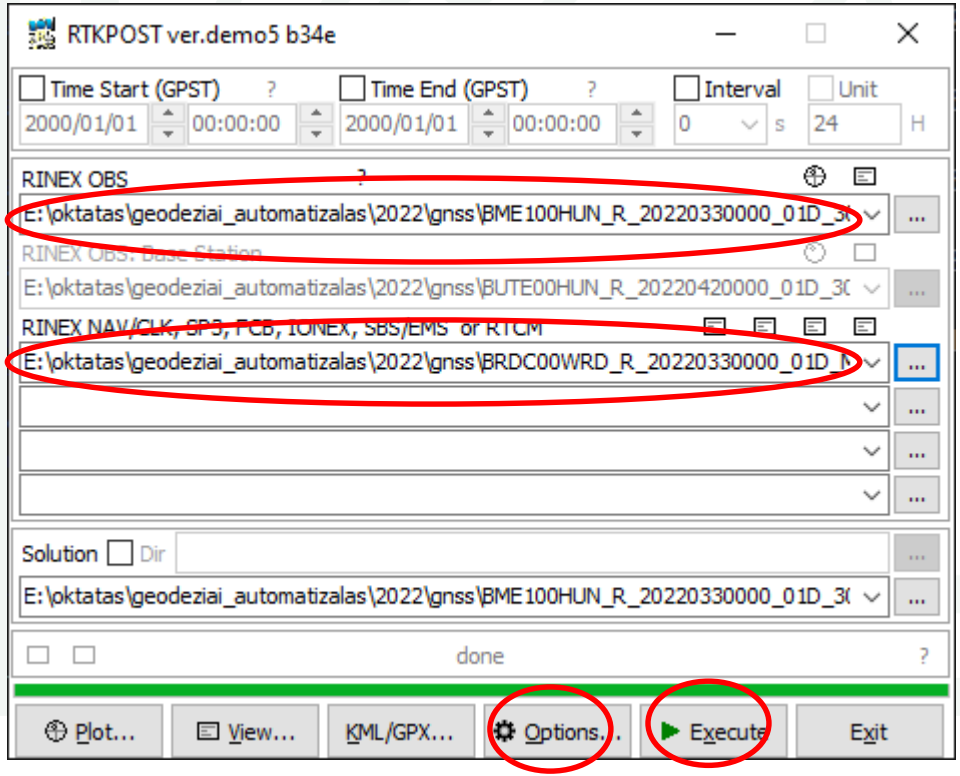
- Gzip (e.g. c:\rtklib\bin\gzip -d)
- Hatanaka decompression (e.g. in c:\rtklib\bin\crx2rnx)
- Use recent version of crx2rnx

Task to do (in command prompt if there is any way):

- download raw data from BUTE and BME1 for a specific day (e.g. yesterday)
- download navigational data for the same day
- develop a python script to do it (see the jupyter notebook in the moodle)

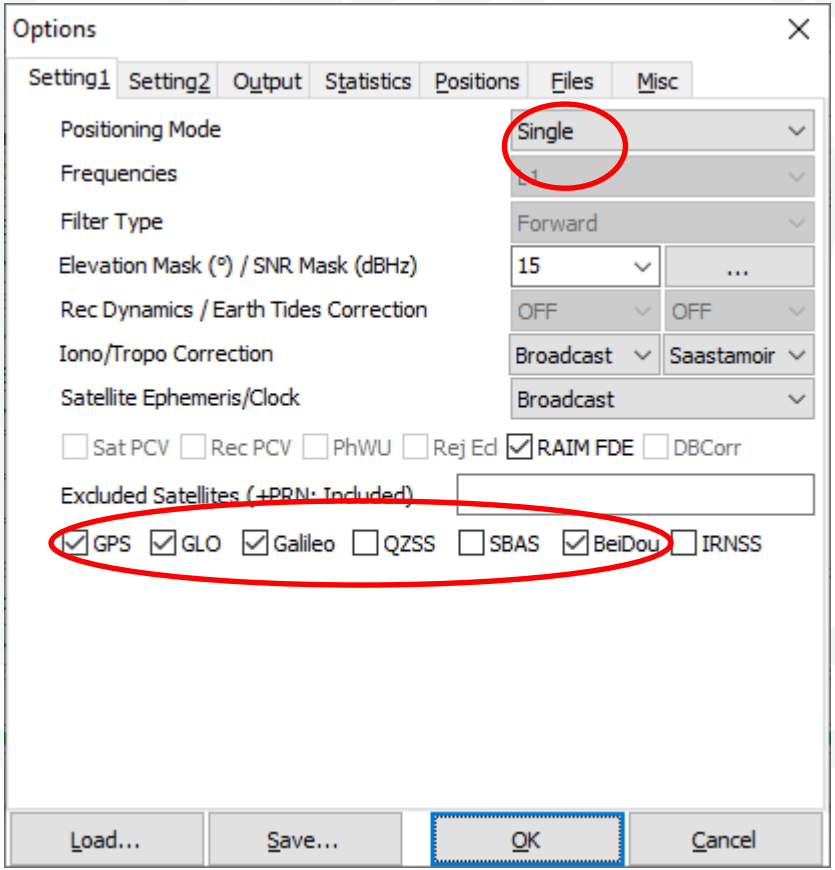
POST-PROCESS - SPP

- Launch RTKPOST
- BME1 as rover



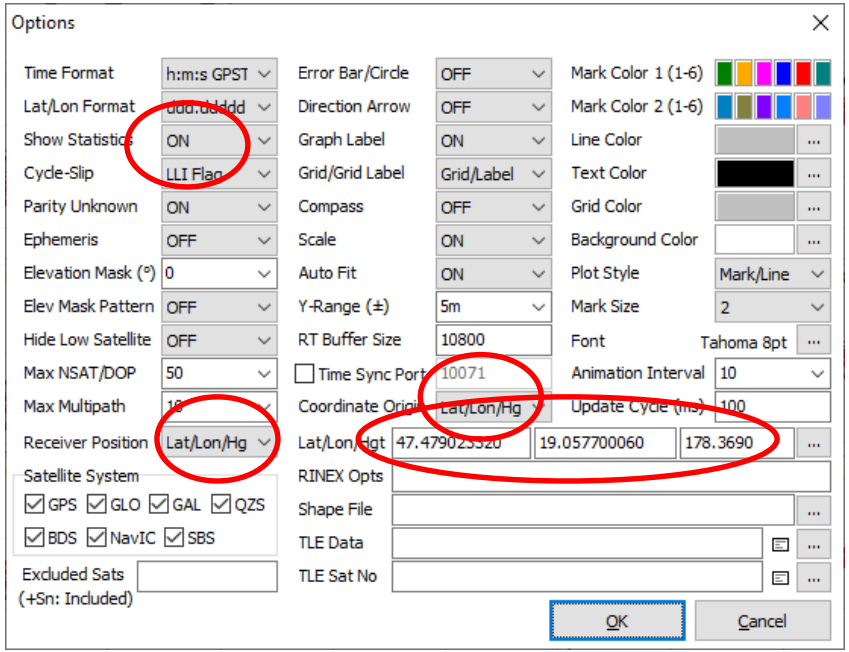
SPP - SETTINGS

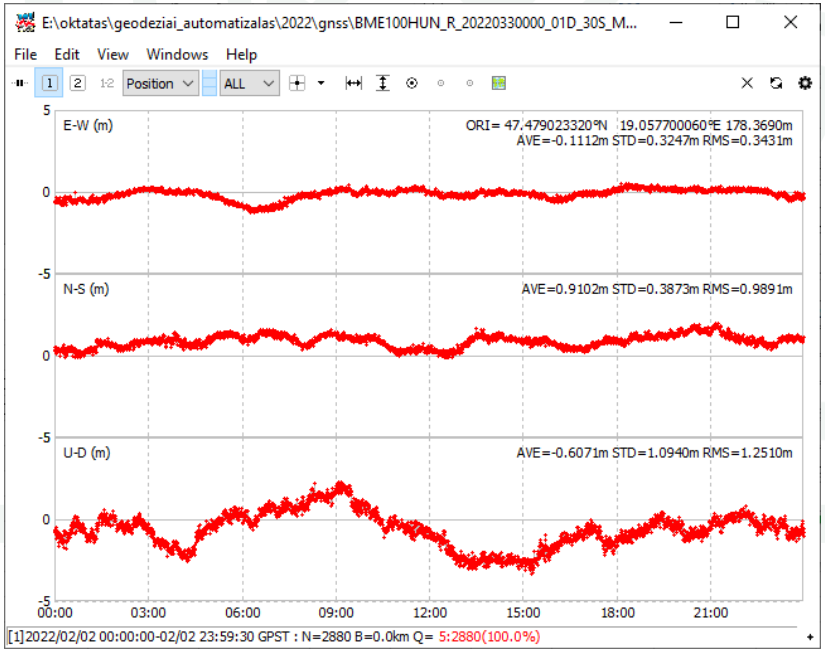
- Single
- GPS+GLO+GAL+BDS



PLOT THE RESULTS

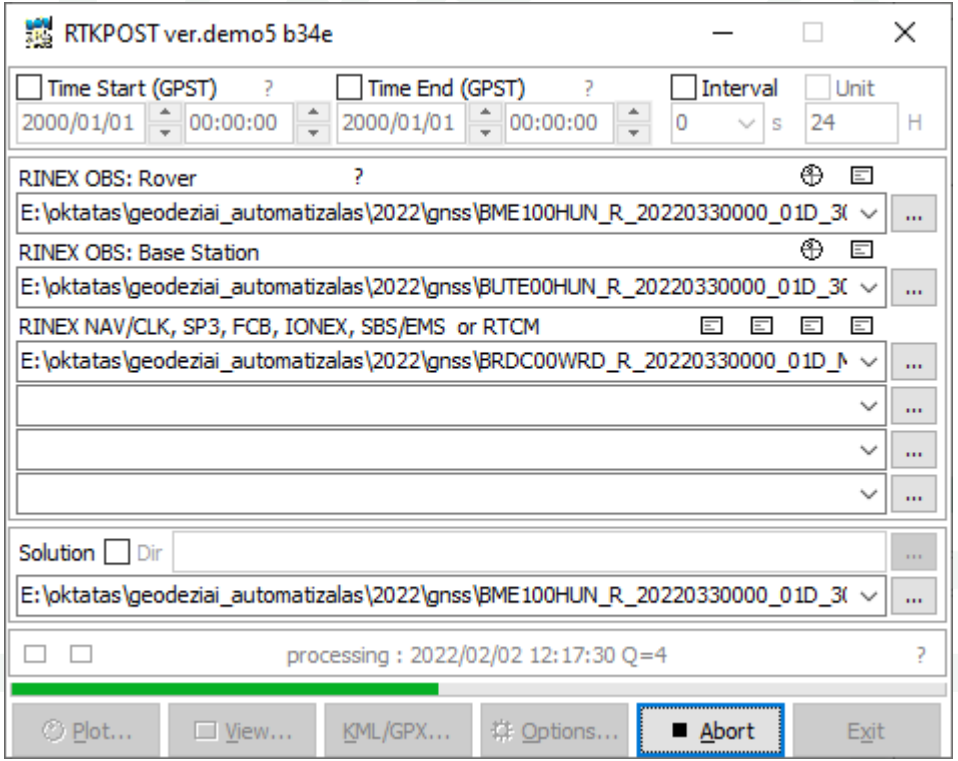
True position: 47.47902332 , 19.05770006 , 178.369
(IGb14, epocha 363/2021)



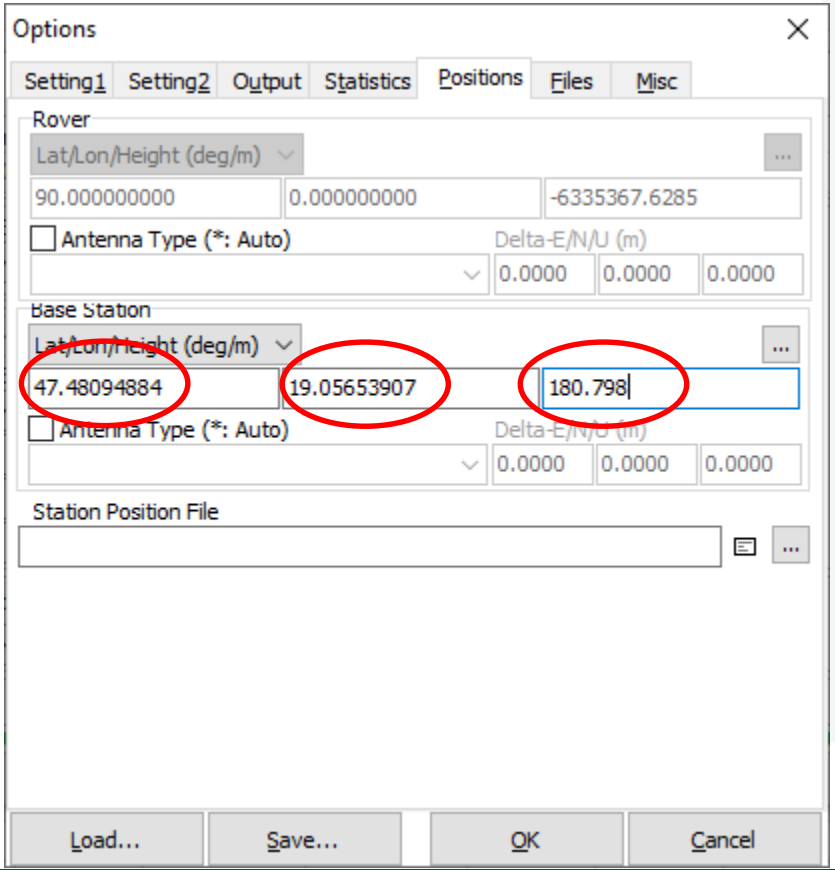


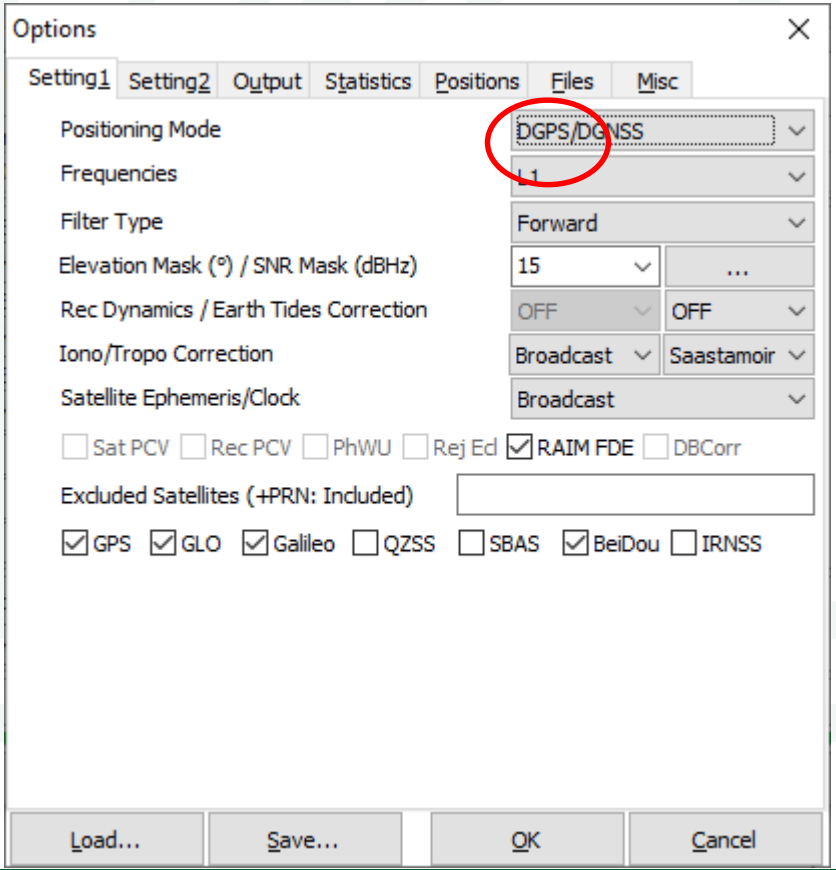
POST-PROCESS - DGPS

- Base: BUTE, rover: BME1
- Base station coordinates: 47.48094884, 19.05653907, 180.798
  (IGb14, epocha 363/2021)

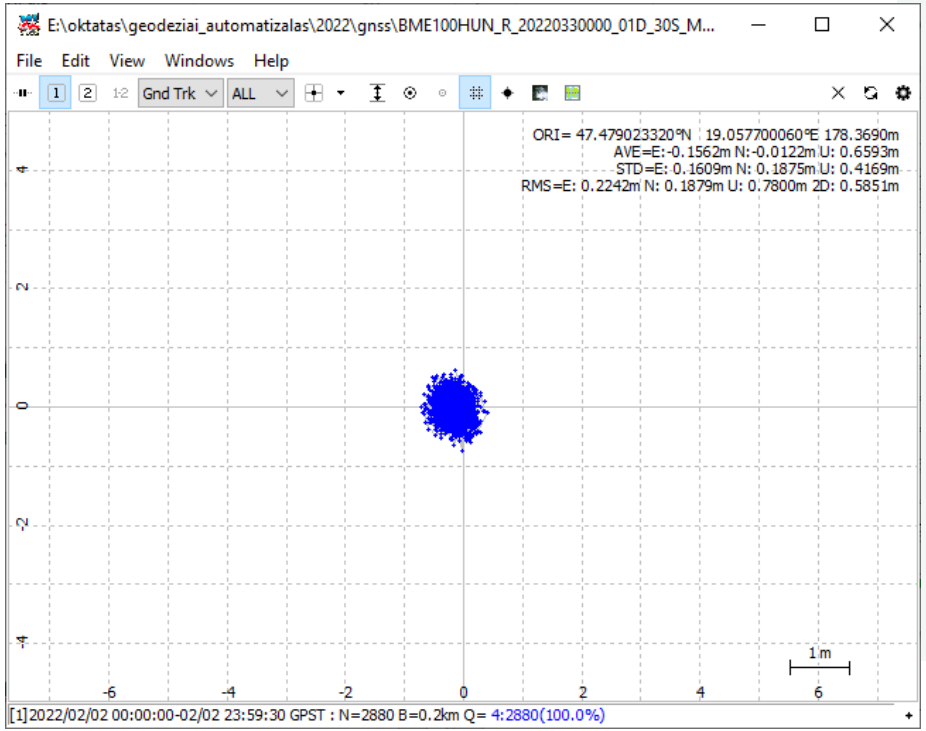


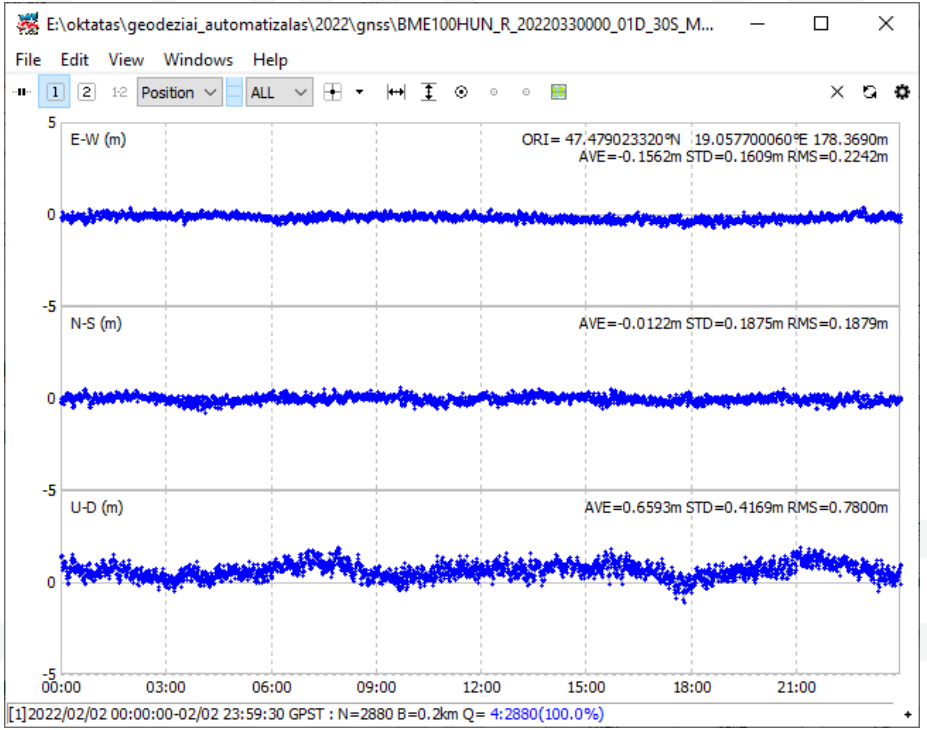
POST-PROCESS - DGPS





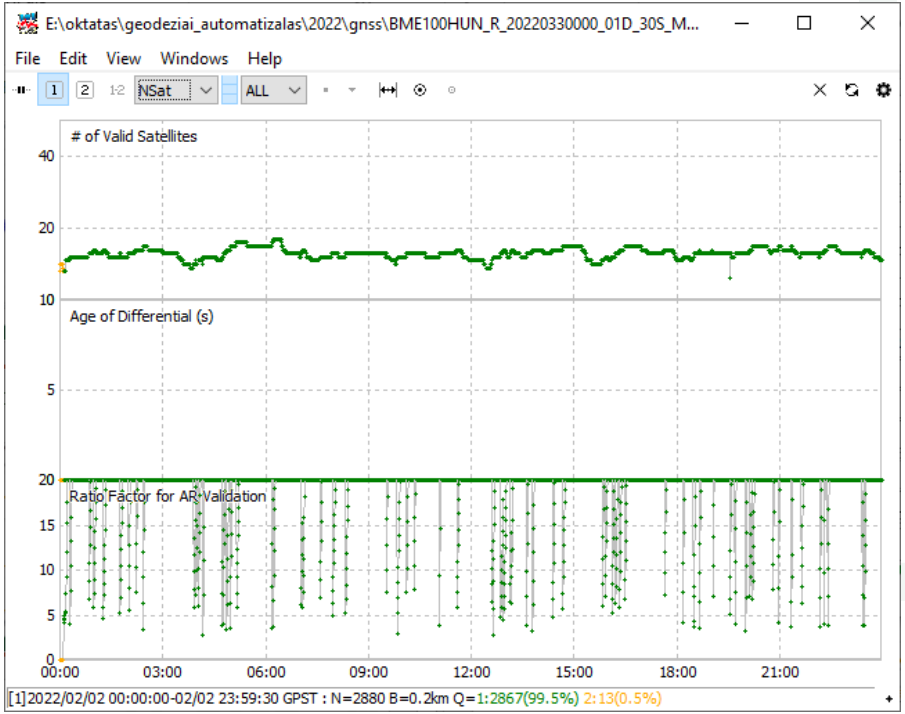
PLOT THE RESULTS

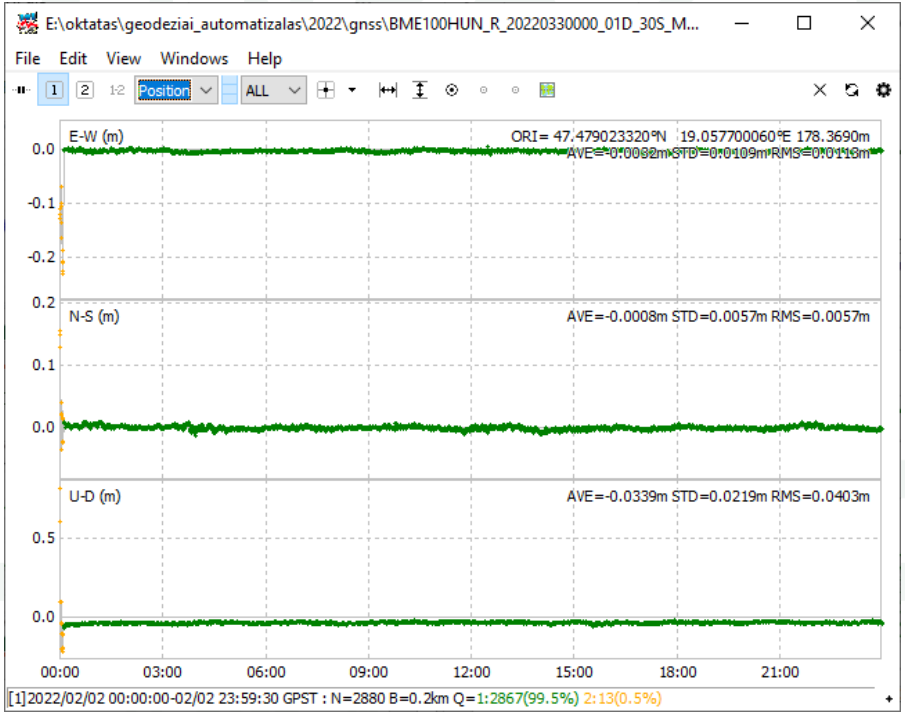




POST-PROCESS – KINEMATIC (RTK?)

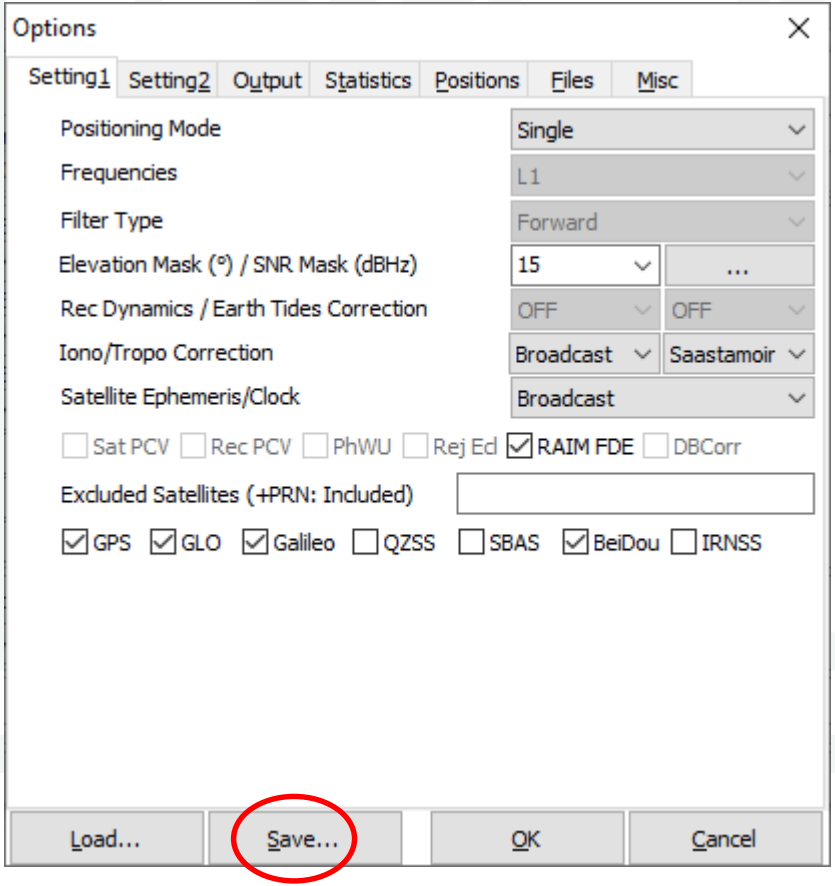
Turn off BDS





POST-PROCESS IN CLI

- In GUI save the settings into a config file (e.g. spp.conf)



POST-PROCESS IN CLI - SPP

- Open a command prompt
- Type: c:\rtklib\rnx2rtkp.exe -k spp.conf -o BME100HUN_R_20220330000_01D_30S_MO.pos BME100HUN_R_20220330000_01D_30S_MO.rnx BRDC00WRD_R_20220330000_01D_MN.rnx
- All the settings are in the conf file, all you need to give are the output file name, RINEX observation and navigation file names
- You can give the full path if the files are in different directories which is highly recommended
- Some parameters can be given in the command prompt, see the help

POSS-PROCESS IN CLI - DGPS

- c:\rtklib\rnx2rtkp -k dgps.conf -r 4081881.745 1410011.666 4678199.766 -o BME100HUN_R_20220330000_01D_30S_MO.pos BME100HUN_R_20220330000_01D_30S_MO.rnx BRDC00WRD_R_20220330000_01D_MN.rnx BUTE00HUN_R_20220330000_01D_30S_MO.rnx
- Give the rover observation file at first

TASKS TO DO

- plot the results (pos files) using rtkplot
- develop your own script to make the plots in python
- run rnx2rtkp in kinematic mode
- develop python scripts to run rnx2rtkp (see the handout in the moodle)