GAMP II - GOOD Users Guide

Feng Zhou

Email: zhouforme@163.com

Last modified: May 23, 2021

GAMP II - **GOOD (Gnss Observations and prOducts Downloader)** is a powerful and easy-to-use lightweight GNSS observations and product downloading toolkit, which is developed by the SASIN (SpAtial SurveyIng and Navigation) group at Shandong University of Science and Technology (SDUST). The current version is 1.6, while it is still being updated, iterated, and extended. **The source codes of GAMP II - GOOD is now available at GitHub (https://github.com/zhouforme0318/GAMP-II---GOOD)**. We dedicated to create a more powerful GNSS data downloading tool, which can allow every GNSSer to completely get rid of the trouble in GNSS data and product downloading.

1. For Windows OS, type 'Win + R' to open the running dialog box and '*cmd*' to open the terminal. For Linux/Mac OS, one need to open the terminal. After that, one need to enter into the directory where the executable GAMP II - GOOD is or give the full path of the executable GAMP II - GOOD through the terminal or set the environmental variable for GAMP II - GOOD. **NOTE: Double-clicking the executable program does not work for data downloading.**
2. Type 'run_GAMP_GOOD gamp_good.cfg', and one will get some scrolling information that '*wget*' gives if 'printInfoWget = 1' is set. The corresponding GNSS observations and products will be downloaded and saved in the directories according to the configure file 'gamp_good.cfg'.

Some useful information about the configure file 'gamp_good.cfg'

1. The block of 'GNSS data and products directory' is used for GNSS data and product storage. One can get the description of every sub-directory after the sign '%'. It is noted that one should only modified the component which is behind '=' and before '%'.
   For the setting of '3partyDir', it is for the third-party softwares (i.e., 'wget', 'gzip', 'crx2rnx' etc.). 0 means one should set the environmental path to get these softwares work, while 1 means these softwares should be put in the following directory.
2. The block of 'time settings' is used for time setting. There are two choices: one is year, month, day, while the other is year, day of year. The last parameter is number of consecutive days for data downloading.
3. When the option of 'minusAdd1day' is set to be '1', precise orbit and/or clock products on the current day as well as the day before and after the current day will be downloaded.
4. The block of 'handling of some data downloading for GNSS data processing' is the main options for GNSS observations and products downloading. The option of 'ftpDownloading' is the master switch for data downloading. Only when it is set to be '1', the data downloading can be performed. There are three FTP archives (i.e., CDDIS, IGN, and WHU) are enabled and selective. **NOTE: in the section of 'handling of FTP downloading', the 1st item of all options denotes the switch (0: off, 1: on).**
5. For the option of 'getObs', observations of RINEX version 2.xx with short name 'd' will be downloaded, while for 'getObm', observations of RINEX version 3.xx with long name 'crx' will be downloaded. There are five items for both 'getObs' and 'getObm'. The 1st one is the switch (0: off, 1: on). The 2nd one can be 'daily', 'hourly', or 'highrate'. The 3rd one can be set to be 'all' (observation files downloaded in the whole directory) or the full path of site.list (observation files downloaded site-by-site according to the 'site.list'). The 4th item denotes start hour, i.e., '00' or '0' corresponds to 00:00, '01' or '1' corresponds to 01:00, and so on. The 5th one gives the consecutive hours. For example, '01 3' for 4th and 5th item denotes 01:00, 02:00, and 03:00.

NOTE: The 4th and 5th items are valid only when 'hourly' or 'highrate' is set.

6. There are also five items for 'getNav'. The 1st one is the switch (0: off, 1: on). The 2nd one can be 'daily' or 'hourly'. If 'hourly' is set, the hourly broadcast ephemeris files will be downloaded site-by-site according to the setting of the 3rd item of 'getObm' (first priority) or 'getObs' (second priority). The 3rd item can be 'gps' for GPS-only broadcast ephemeris (i.e., brdcDDD0.YYn), 'glo' for GLONASS-only broadcast ephemeris (i.e., brdcDDD0.YYg), and 'mixed' is for multi-GNSS broadcast ephemeris file (i.e., brdmDDD0.YYp). The 4th item denotes start hour, i.e., '00' or '0' corresponds to 00:00, '01' or '1' corresponds to 01:00, and so on. The 5th one gives the consecutive hours. For example, '01 3' for 4th and 5th item denotes 01:00, 02:00, and 03:00. **NOTE: The 4th and 5th items are valid only when 'hourly' is set.**
7. There are four items for 'getOrbClk'. The 1st one is the switch (0: off, 1: on). The 2nd one can be 'igs', 'cod', 'esa', 'gfz', 'grg', 'jpl', or 'mit' etc for IGS final precise orbit and clock products, and 'com', 'gbm', 'grm', or 'wum' for MGEX final precise orbit and clock products, and 'igu', 'gfu', or 'wuu' for ultra-rapid orbit products. NOTE: 'igu' is for GPS-only, 'gfu' is for GPS + GLONASS, while 'wuu' is for multiple GNSS. The 3rd item denotes start hour, i.e., 00, 06, 12, or 18 for igu; 00, 03, 06, ... for gfu; 01, 02, 03, ... for wuu. The 4th one gives the consecutive sessions. For example, '00 3' denotes 00, 06, and 12 for igu, 00, 03, and 06 for gfu, while 00, 01, and 02 for wuu. **NOTE: The 4th and 5th items are valid only when 'igu', 'gfu', or "wuu" is set.**
8. There are also four items for 'getEop'. The 1st one is the switch (0: off, 1: on). The 2nd one can be 'igs', 'cod', 'esa', 'gfz', 'grg', 'jpl', or 'mit' etc for IGS final EOP, and 'igu' or 'gfu' for ultra-rapid EOP. The 3rd item denotes start hour, i.e., 00, 06, 12, or 18 for igu; 00, 03, 06, ... for gfu. The 4th one gives the consecutive sessions. For example, '00 3' denotes 00, 06, and 12 for igu, 00, 03, and 06 for gfu. **NOTE: The 4th and 5th items are valid only when 'igu' or 'gfu' is set.**
9. For 'getSnx', it is only for IGS weekly SINEX solution files.
10. For 'getDcb', not only the CODE differential code bias (DCB) files but also the multi-GNSS DCB files generated by CAS will be downloaded.
11. For 'getIon', the 1st item is the switch (0: off, 1: on). The 2nd item denotes analysis center (i.e., igs, cod, cas, ...).
12. For 'getTrp', the 1st item is the switch (0: off, 1: on). There are only two choices that can be selected for the 2nd option, i.e., 'igs' or 'cod'. If 'igs' is set, it will download all the ZPD files ('all') or the selected ZPD files (the full path of 'site.list') according to the setting of the 3rd item of 'getObm' (first priority) or 'getObs' (second priority).
13. For 'getRtOrbClk', real-time precise orbit and clock products from CNES offline files will be downloaded.
14. For 'getRtBias', real-time code and phase bias products from CNES offline files will be downloaded.
15. For 'getAtx', ANTEX format antenna phase center correction file will be downloaded.

Any suggestions, corrections, and comments about ***GAMP II - GOOD*** are sincerely welcomed and could be sent to:

Feng Zhou

Email: zhouforme@163.com

WeChat: zhouforme0318

It is recommended to acknowledge GAMP II - GOOD toolkit or the *GAMP* paper published in GPS Solutions (https://link.springer.com/article/10.1007/s10291-018-0699-9) when you find it useful!

Some FTP addresses are listed as follows:
For CODE DCB and tropospheric product files: ftp://ftp.aiub.unibe.ch/CODE/
For CNES real-time orbit and clock products in offline mode: http://www.ppp-wizard.net/products/REAL_TIME/
For IGS ANTEX file: https://files.igs.org/pub/station/general/

```
/**
* @brief   : init - Get FTP archive for CDDIS, IGN, or WHU
* @param[I]: none
* @param[O]: none
* @return  : none
* @note    :
**/
void FtpUtil::init()
{
    /* FTP archive for CDDIS */

_ftpArchive.CDDIS.push_back("ftps://gdc.cddis.eosdis.nasa.gov/pub/gnss/data/daily");
/* IGS daily observation (30s) files */

_ftpArchive.CDDIS.push_back("ftps://gdc.cddis.eosdis.nasa.gov/pub/gnss/data/hourly");
/* IGS hourly observation (30s) files */

_ftpArchive.CDDIS.push_back("ftps://gdc.cddis.eosdis.nasa.gov/pub/gnss/data/highrate");
/* IGS high-rate observation (1s) files */

_ftpArchive.CDDIS.push_back("ftps://gdc.cddis.eosdis.nasa.gov/pub/gnss/data/daily");
/* MGEX daily observation (30s) files */

_ftpArchive.CDDIS.push_back("ftps://gdc.cddis.eosdis.nasa.gov/pub/gnss/data/hourly");
/* MGEX hourly observation (30s) files */

_ftpArchive.CDDIS.push_back("ftps://gdc.cddis.eosdis.nasa.gov/pub/gnss/data/highrate");
/* MGEX high-rate observation (1s) files */
```

```
_ftpArchive.CDDIS.push_back("ftps://gdc.cddis.eosdis.nasa.gov/pub/gnss/data/daily");
/* broadcast ephemeris files */
    _ftpArchive.CDDIS.push_back("ftps://gdc.cddis.eosdis.nasa.gov/pub/gnss/products");
/* IGS SP3 files */
    _ftpArchive.CDDIS.push_back("ftps://gdc.cddis.eosdis.nasa.gov/pub/gnss/products");
/* IGS CLK files */
    _ftpArchive.CDDIS.push_back("ftps://gdc.cddis.eosdis.nasa.gov/pub/gnss/products");
/* IGS EOP files */
    _ftpArchive.CDDIS.push_back("ftps://gdc.cddis.eosdis.nasa.gov/pub/gnss/products");
/* IGS weekly SINEX files */

_ftpArchive.CDDIS.push_back("ftps://gdc.cddis.eosdis.nasa.gov/pub/gnss/products/mgex");
/* MGEX SP3 files */

_ftpArchive.CDDIS.push_back("ftps://gdc.cddis.eosdis.nasa.gov/pub/gnss/products/mgex");
/* MGEX CLK files */

_ftpArchive.CDDIS.push_back("ftps://gdc.cddis.eosdis.nasa.gov/pub/gnss/products/bias");
/* MGEX DCB files */

_ftpArchive.CDDIS.push_back("ftps://gdc.cddis.eosdis.nasa.gov/pub/gnss/products/ionex")
;            /* global ionosphere map (GIM) files */

_ftpArchive.CDDIS.push_back("ftps://gdc.cddis.eosdis.nasa.gov/pub/gnss/products/ionex")
;            /* Rate of TEC index (ROTI) files */

_ftpArchive.CDDIS.push_back("ftps://gdc.cddis.eosdis.nasa.gov/pub/gnss/products/troposp
here/zpd");  /* IGS final tropospheric product files */

    /* FTP archive for IGN */
    _ftpArchive.IGN.push_back("ftp://igs.ign.fr/pub/igs/data");
/* IGS daily observation (30s) files */
    _ftpArchive.IGN.push_back("ftp://igs.ign.fr/pub/igs/data/hourly");
/* IGS hourly observation (30s) files */
    _ftpArchive.IGN.push_back("ftp://igs.ign.fr/pub/igs/data/highrate");
/* IGS high-rate observation (1s) files */
    _ftpArchive.IGN.push_back("ftp://igs.ign.fr/pub/igs/data");
/* MGEX daily observation (30s) files */
    _ftpArchive.IGN.push_back("ftp://igs.ign.fr/pub/igs/data/hourly");
/* MGEX hourly observation (30s) files */
    _ftpArchive.IGN.push_back("ftp://igs.ign.fr/pub/igs/data/highrate");
/* MGEX high-rate observation (1s) files */
    _ftpArchive.IGN.push_back("ftp://igs.ign.fr/pub/igs/data");
/* broadcast ephemeris files */
```

```
    _ftpArchive.IGN.push_back("ftp://igs.ign.fr/pub/igs/products");
/* IGS SP3 files */
    _ftpArchive.IGN.push_back("ftp://igs.ign.fr/pub/igs/products");
/* IGS CLK files */
    _ftpArchive.IGN.push_back("ftp://igs.ign.fr/pub/igs/products");
/* IGS EOP files */
    _ftpArchive.IGN.push_back("ftp://igs.ign.fr/pub/igs/products");
/* IGS weekly SINEX files */
    _ftpArchive.IGN.push_back("ftp://igs.ign.fr/pub/igs/products/mgex");
/* MGEX SP3 files */
    _ftpArchive.IGN.push_back("ftp://igs.ign.fr/pub/igs/products/mgex");
/* MGEX CLK files */
    _ftpArchive.IGN.push_back("ftp://igs.ign.fr/pub/igs/products/mgex/dcb");
/* MGEX DCB files */
    _ftpArchive.IGN.push_back("ftp://igs.ign.fr/pub/igs/products/ionosphere");
/* global ionosphere map (GIM) files */
    _ftpArchive.IGN.push_back("ftp://igs.ign.fr/pub/igs/products/ionosphere");
/* Rate of TEC index (ROTI) files */
    _ftpArchive.IGN.push_back("ftp://igs.ign.fr/pub/igs/products/troposphere");
/* IGS final tropospheric product files */

    /* FTP archive for WHU */
    _ftpArchive.WHU.push_back("ftp://igs.gnsswhu.cn/pub/gps/data/daily");
/* IGS daily observation (30s) files */
    _ftpArchive.WHU.push_back("ftp://igs.gnsswhu.cn/pub/gps/data/hourly");
/* IGS hourly observation (30s) files */
    _ftpArchive.WHU.push_back("ftp://igs.gnsswhu.cn/pub/gps/data");
/* IGS high-rate observation (1s) files */
    _ftpArchive.WHU.push_back("ftp://igs.gnsswhu.cn/pub/gps/data/daily");
/* MGEX daily observation (30s) files */
    _ftpArchive.WHU.push_back("ftp://igs.gnsswhu.cn/pub/gps/data/hourly");
/* MGEX hourly observation (30s) files */
    _ftpArchive.WHU.push_back("ftp://igs.gnsswhu.cn/pub/gps/data");
/* MGEX high-rate observation (1s) files */
    _ftpArchive.WHU.push_back("ftp://igs.gnsswhu.cn/pub/gps/data/daily");
/* broadcast ephemeris files */
    _ftpArchive.WHU.push_back("ftp://igs.gnsswhu.cn/pub/gps/products");
/* IGS SP3 files */
    _ftpArchive.WHU.push_back("ftp://igs.gnsswhu.cn/pub/gps/products");
/* IGS CLK files */
    _ftpArchive.WHU.push_back("ftp://igs.gnsswhu.cn/pub/gps/products");
/* IGS EOP files */
    _ftpArchive.WHU.push_back("ftp://igs.gnsswhu.cn/pub/gps/products");
/* IGS weekly SINEX files */
```

```
    _ftpArchive.WHU.push_back("ftp://igs.gnsswhu.cn/pub/gps/products/mgex");
/* MGEX SP3 files */
    _ftpArchive.WHU.push_back("ftp://igs.gnsswhu.cn/pub/gps/products/mgex");
/* MGEX CLK files */
    _ftpArchive.WHU.push_back("ftp://igs.gnsswhu.cn/pub/gps/products/mgex/dcb");
/* MGEX DCB files */
    _ftpArchive.WHU.push_back("ftp://igs.gnsswhu.cn/pub/gps/products/ionex");
/* global ionosphere map (GIM) files */
    _ftpArchive.WHU.push_back("ftp://igs.gnsswhu.cn/pub/gps/products/ionex");
/* Rate of TEC index (ROTI) files */
    _ftpArchive.WHU.push_back("ftp://igs.gnsswhu.cn/pub/gps/products/troposphere/new");
/* IGS final tropospheric product files */
} /* end of init */
```