GAMP II - GOOD Users Guide

Version 1.8

Feng Zhou

Email: zhouforme@163.com

Last modified: Sep 4, 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 1.8, which is more stable and powerful. Hence, we decide to make it available for global GNSS users, and we are convinced that more and more GNSS users will benefit from GAMP II - GOOD. **The source codes of GAMP II - GOOD is now available at GitHub (https://github.com/zhouforme0318/GAMPII-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.

Features

Main feature of GAMP II - GOOD are various GNSS observations and products downloading, i.e.,

- IGS observation (RINEX version 2.xx, short name 'd')
- MGEX observation (RINEX version 3.xx, long name 'crx')
- Curtin University of Technology (CUT) observation (RINEX version 3.xx, long name 'crx')
- Geoscience Australia (GA) observation (RINEX version 3.xx, long name 'crx')
- Hong Kong CORS observation (RINEX version 3.xx, long name 'crx')
- NGS/NOAA CORS observation (RINEX version 2.xx, short name 'd')
- EUREF Permanent Network (EPN) observation (RINEX version 3.xx, long name 'crx')
- various types of broadcast ephemeris
- various types of IGS and MGEX final precise orbit 'sp3' and precise clock 'clk' (i.e., "cod", "emr", "esa", "gfz", "grg", "igs", "jpl", "mit", "com", "gbm", "grm", "wum")
- various types of ultra-rapid (i.e., from ESA, GFZ, IGS, WHU) and rapid (i.e., from CODE, NRCan, ESA, GFZ, IGS) orbit and clock products
- earth rotation parameter
- IGS weekly SINEX solution
- CODE and/or MGEX differential code bias (DCB)
- global ionosphere map (GIM)
- rate of TEC index (ROTI)
- CODE and/or IGS tropospheric product
- real-time precise orbit and clock products from CNES offline files
- real-time code and phase bias products from CNES offline files
- ANTEX format antenna phase center correction

  But it is not limited to these, users can use the source code to expand its functionalities according to their needs.

Version

- Vers. 1.0

  2021/04/16   new (by Feng Zhou @ SDUST)

  2021/04/20   MGEX multi-GNSS precise products option added (by Feng Zhou @ SDUST)

- Vers. 1.1

  2021/04/23   IGN and WHU FPT archives added (by Feng Zhou @ SDUST)

  2021/04/30   the day before and after the current day for precise satellite orbit and clock products downloading is added (by Feng Zhou @ SDUST and Zan Liu @ CUMT)

- Vers. 1.2

2021/04/30　CNES real-time orbit, clock, bias files (in offline mode) option added (by Feng Zhou @ SDUST)

2021/05/01　from DOY 345/2020, 'brdcDDD0.YYn' was converted from '.Z' to '.gz' (by Feng Zhou @ SDUST and Zan Liu @ CUMT)

2021/05/01　added the full path of third-party softwares (by Feng Zhou @ SDUST and Yudan Yi)

- Vers. 1.3

2021/05/05　add 'GetRoti' for rate of TEC index (ROTI) file downloading (by Feng Zhou @ SDUST and Lei Liu @ WHU)

- Vers. 1.4

2021/05/06　add the compatibility for changing directory (chdir) in Windows and Linux OS (by Feng Zhou @ SDUST)

2021/05/07　add the option 'printInfoWget' in configure file for (not) printing the information of running 'wget' (by Feng Zhou @ SDUST and Hong Hu @ AHU)

2021/05/08　add IGS and MGEX hourly observation (30s) downloading (by Feng Zhou @ SDUST and Menghao Li @ HEU)

- Vers. 1.5

2021/05/10　modify some codes to make GOOD adaptable to different compression form (i.e., '.Z' or '.gz') (by Feng Zhou @ SDUST)

2021/05/12　add the option for IGR, IGU, GFU (from GFZ), and WUU (from WHU) products as well as the site-specific broadcast ephemeris files downloading (by Feng Zhou @ SDUST and Menghao Li @ HEU)

2021/05/15　sub-directory (i.e., daily, hourly, and highrate) creation for observation downloading (by Feng Zhou @ SDUST and Menghao Li @ HEU)

- Vers. 1.6

2021/05/18　modify some codes to make configuration file and program look more concise (by Feng Zhou @ SDUST and Menghao Li @ HEU)

2021/05/21　add the extraction and conversion for the 'all' option in IGS and MGEX observation downloading (by Feng Zhou @ SDUST)

- Vers. 1.7

2021/06/01　add 'getObc', 'getObg', and 'getObh' options for Curtin University of Technology (CUT), Geoscience Australia (GA), and Hong Kong CORS observation downloading (by Feng Zhou @ SDUST)

2021/07/16　modify "*_R_" to "*" for CRX file naming convention (by Feng Zhou @ SDUST)

- Vers. 1.8

2021/09/01　add various types of (i.e., ESA, GFZ, IGS, WHU) and rapid (i.e., CODE, NRCan, ESA, GFZ, IGS) orbit and clock products for downloading (by Feng Zhou @ SDUST and Sermet Ogutcu @ NEU)

2021/09/04　add the option for NGS/NOAA CORS (from Amazon Web Services (AWS)) and EUREF Permanent Network (EPN) observation downloading (by Feng Zhou @ SDUST)

2021/09/05　fix the bug of broadcast ephemeris downloading via WHU FTP before and after 2020 (by Feng Zhou @ SDUST and Zan Liu @ CUMT)

2021/09/06　modify the setting of directories of GNSS observations and products to make them

more elastic (by Feng Zhou @ SDUST and Caoming Fan @ SDU)

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 '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. For the options of 'getObc', observations of RINEX version 3.xx with long name 'crx' from the FTPs of Curtin University of Technology (CUT) (mainly for RTK study) will be downloaded. There are five items for 'getObc'. The 1st one is the switch (0: off, 1: on). The 2nd one can only be set to 'daily'. For the 3rd item, only the full path of site.list (observation files downloaded

site-by-site according to the 'site.list', i.e., cuaa, cubb, cucc, cut0, cut2, cut3, cuta, cutb, cutc, spa7, spa8, uwa0) is valid.

NOTE: The 4th and 5th items are NOT valid here.

7. For the options of 'getObg', observations of RINEX version 3.xx with long name 'crx' from the FTPs of Geoscience Australia (GA) (mainly for atmospheric augmented PPP-RTK study) will be downloaded. There are five items for 'getObg'. 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 '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.

8. For the options of 'getObh', observations of RINEX version 3.xx with long name 'crx' from the FTPs of Hong Kong CORS (mainly for GNSS remote sensing of troposphere and ionosphere study) will be downloaded. There are five items for 'getObh'. The 1st one is the switch (0: off, 1: on). The 2nd one can be '30s', '5s', or '1s'. For the 3rd item, only the full path of site.list (observation files downloaded site-by-site according to the 'site.list', i.e., hkcl, hkfn, hkks, hkkt, hklm, hklt, hkmw, hknp, hkoh, hkpc, hkqt, hksc, hksl, hkss, hkst, hktk, hkws, kyc1, t430) is valid. 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 '5s' or '1s' is set.

9. For the options of 'getObn', observations of RINEX version 2.xx with short name 'd' from the Amazon Web Services (AWS) of NGS/NOAA CORS (mainly for GNSS remote sensing of troposphere and ionosphere study, and/or PPP-RTK studies) will be downloaded. There are five items for 'getObn'. The 1st one is the switch (0: off, 1: on). The 2nd one can only be 'daily'. For the 3rd item, only the full path of site.list (observation files downloaded site-by-site according to the 'site.list', i.e., 1lsu, 1nsu, 1ulm, ...) is valid.

NOTE: The 4th and 5th items are NOT valid here.

10. For the options of 'getObe', observations of RINEX version 3.xx with long name 'crx' from the FTPs of EUREF Permanent Network (EPN) (mainly for GNSS remote sensing of troposphere and ionosphere study, and/or PPP-RTK studies) will be downloaded. There are five items for 'getObe'. The 1st one is the switch (0: off, 1: on). The 2nd one can be 'daily'. The 3rd one can be set to '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').

NOTE: The 4th and 5th items are NOT valid here.

11. There are also five items for 'getNav'. The 1st one is the switch (0: off, 1: on). The 2nd one can be 'daily', 'hourly', or 'RTNAV'. 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.

12. There are four items for 'getOrbClk'. The 1st one is the switch (0: off, 1: on). The 2nd one can be "cod", "emr", "esa", "gfz", "grg", "igs", "jpl", and/or "mit" for IGS final precise orbit and clock products, and "com", "gbm", "grm", and/or "wum" for MGEX final precise orbit and clock products, and "cor", "emp", "esr", "gfr", or "igr" for rapid orbit and clock products, and "esu", "gfu", "igu", 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 esu or igu, 00, 03, and 06 for gfu, while 00, 01, and 02 for wuu.

NOTE: The 4th and 5th items are valid only when 'esu', 'gfu', 'igu', or "wuu" is set.

```cpp
/* esu: ESA ultra-rapid orbit and clock products
   gfu: GFZ ultra-rapid orbit and clock products
   igu: IGS ultra-rapid orbit and clock products
   wuu: WHU ultra-rapid orbit and clock products
*/
std::vector<string> ultraAc = { "esu", "gfu", "igu", "wuu" };
bool isUltra = false;
for (int i = 0; i < ultraAc.size(); i++)
{
    if (ac == ultraAc[i]) isUltra = true;
}

/* cor: CODE rapid orbit and clock products
   emp: NRCan rapid orbit and clock products
   esr: ESA rapid orbit and clock products
   gfr: GFZ rapid orbit and clock products
   igr: IGS rapid orbit and clock products
*/
std::vector<string> rapidAc = { "cor", "emp", "esr", "gfr", "igr" };
bool isRapid = false;
for (int i = 0; i < rapidAc.size(); i++)
{
    if (ac == rapidAc[i]) isRapid = true;
}

/* cod: CODE final orbit and clock products
   emr: NRCan final orbit and clock products
   esa: ESA final orbit and clock products
   gfz: GFZ final orbit and clock products
   grg: CNES final orbit and clock products
   igs: IGS final orbit and clock products
   jpl: JPL final orbit and clock products
   mit: MIT final orbit and clock products
*/
std::vector<string> finalAcIGS = { "cod", "emr", "esa", "gfz", "grg", "igs", "jpl", "mit" };
bool isIGS = false;
for (int i = 0; i < finalAcIGS.size(); i++)
{
    if (ac == finalAcIGS[i]) isIGS = true;
}

/* com: CODE multi-GNSS final orbit and clock products
   gbm: GFZ multi-GNSS final orbit and clock products
   grm: CNES multi-GNSS final orbit and clock products
   wum: WHU multi-GNSS final orbit and clock products
*/
std::vector<string> acMGEX = { "com", "gbm", "grm", "wum" };
bool isMGEX = false;
for (int i = 0; i < acMGEX.size(); i++)
{
    if (ac == acMGEX[i]) isMGEX = true;
}
```

13. There are also four items for 'getEop'. The 1st one is the switch (0: off, 1: on). The 2nd one can be "cod", "emr", "esa", "gfz", "grg", "igs", "jpl", and/or "mit" for IGS final EOP, and "esu", "gfu", and/or "igu" for ultra-rapid EOP. The 3rd item denotes start hour, i.e., 00, 06, 12, or 18 for esu or igu; 00, 03, 06, ... for gfu. The 4th one gives the consecutive sessions. For example, '00   3' denotes 00, 06, and 12 for esu or igu, 00, 03, and 06 for gfu.

NOTE: The 4th and 5th items are valid only when 'esu', 'igu', or 'gfu' is set.

```
/* esu: ESA ultra-rapid EOP products
   gfu: GFZ ultra-rapid EOP products
   igu: IGS ultra-rapid EOP products
*/
std::vector<string> ultraAc = { "esu", "gfu", "igu" };
bool isUltra = false;
for (int i = 0; i < ultraAc.size(); i++)
{
    if (ac == ultraAc[i]) isUltra = true;
}

/* cod: CODE final EOP products
   emr: NRCan final EOP products
   esa: ESA final EOP products
   gfz: GFZ final EOP products
   grg: CNES final EOP products
   igs: IGS final EOP products
   jpl: JPL final EOP products
*/
std::vector<string> finalAcIGS = { "cod", "emr", "esa", "gfz", "grg", "igs", "jpl", "mit" };
bool isIGS = false;
for (int i = 0; i < finalAcIGS.size(); i++)
{
    if (ac == finalAcIGS[i]) isIGS = true;
}
```

14. For 'getSnx', it is only for IGS weekly SINEX solution files.
15. For 'getDcb', not only the CODE differential code bias (DCB) files but also the multi-GNSS DCB files generated by CAS will be downloaded.
16. For 'getIon', the 1st item is the switch (0: off, 1: on). The 2nd item denotes analysis center (i.e., igs, cod, cas, ...).
17. 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).
18. For 'getRtOrbClk', real-time precise orbit and clock products from CNES offline files will be downloaded.
19. For 'getRtBias', real-time code and phase bias products from CNES offline files will be downloaded.
20. For 'getAtx', ANTEX format antenna phase center correction file will be downloaded.

NOTE: If some GNSS data cannot be successfully downloaded, check your network first. Then, check if the file exists on the remote server. Finally, rerun 'run_GAMP_GOOD gamp_good.cfg' to try again. Don't worry, once the data has been downloaded, it will not be downloaded repeatedly.

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 Curtin University of Technology (CUT) observation files:
http://saegnss2.curtin.edu/ldc/rinex3/daily/

For Geoscience Australia (GA) observation files: ftp://ftp.data.gnss.ga.gov.au/

For Hong Kong CORS observation files: ftp://ftp.geodetic.gov.hk/rinex3/

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/

```cpp
/**
* @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");
```

```cpp
/* 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");
```

```cpp
/* 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");
```

```cpp
    /* 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 */
```