MTGProc.l.4 – processing software for MTG-FCI and GOES-ABI image data and generation of RGB products (linux version 3)

Setup and installation manual

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This software is successor of previously developed MSGProc for processing of image data from Meteosat Second Generation geostationary satellites. MTGProc cannot be considered as new version, as this new sotware is not devoted to process and visualise MSG SEVIRI data, but rather new FCI MTG data and in addition ABI GOES data. Set of standard RGB products in pre-defined cartographic projections is generated in effective fast-speed manner, without special requirements on third party software pre-requisities. Only HDF5/NetCDF/FCI-decompression software is required to read input satellite image data delivered in NetCDF format. Instructions how to install this software and manual for usage is also attached to the MTGProc package delivery. Please note that in case of necessity you can contact EUMETSAT Helpdesk to consult problems with installation of this software. The responsibility of this document is only to take care of MTGProc installation, configuration and usage.

When you have successfuly installed **FCIDECOMP_V1.0.2** (EUMETSAT) software, some modification are necessary to be done in MTGProc scripts, namely following lines:

```
setenv LD_LIBRARY_PATH
setenv HDF5_PLUGIN_PATH
set toolpath = "FCI_Decompression_Software_Prerequisites_PATH/hdf5-build/bin"
```

located inside the MTGProc scripts:

HDF5reader/HDF5reader-cmp.sh
GOES/G16_convert_data2bin-cal.sh
GOES/G17_convert_data2bin-cal.sh

The full list of scripts with short description we provide in Table 1 and full list of C-codes in Table 2.

Table 1: List of C-shell scripts

GEO_000_DOMAIN_generator.sh DDD	DDD is domain number; domain configurations are in ./config/domains/Proj_Domain-DDD.dat, where DDD can be 000, 001, 002 ... 999;
GEO_000_G16_list_domain-rgb.sh	User needs to edit this script to select list of domains and list of RGB-products which will be generated for Goes-16 satellite;
GEO_000_G17_list_domain-rgb.sh	User needs to edit this script to select list of domains and list of RGB-products which will be generated for Goes-17 satellite;

GEO_000_MTG_list_domain-rgb.sh	User needs to edit this script to select list of domains and list of RGB-products which will be generated for MTG satellite;
GEO_000_workdirs.sh	Will create data subdirectories tree. Run when you install the software package;
GEO_RUN_GOES.sh G16 | G17 [TEST] - ./GOES/G16|G17_copync_data.sh - ./GOES_LIST_image_projector.sh - ./GOES_LIST_image_difference.sh - ./GOES_MAIN_3.8reflectivity.sh - ./GOES_MAIN_TrueGreen.sh - ./GOES_LIST_rgb_generator.sh	Will run complete processing of ABI NetCDF image data (only fulldisk 2km resolution distributed via EUMETCast). Mandatory parameter is used to specify the satellite Goes-16 or Goes-17. When second parameter TEST is specified, test input data will be processed;
GEO_RUN_MTG.sh - ./MTG_LIST_channels.sh - ./MTG_LIST_image_compositor.sh - ./MTG_LIST_channels.sh - ./MTG_MAIN_sunheight_calculator.sh - ./MTG_LIST_image_projector.sh - ./MTG_LIST_image_difference.sh - ./MTG_MAIN_reflectivity-ir_38.sh - ./MTG_LIST_rgb_generator.sh	Will run complete processing of FCI NetCDF image data preprocessed already decoded by ./HDF5reader/ MTG_image_composer.sh; Until now only processing of FCI test data, not prepared for operations;
HDF5reader/ MTG_image_composer.sh - ./ HDF5reader-cmp.sh	Will read NetCDF FCI data and create binary image files for each FCI channel. Also create text files with parameter needed for calibration of counts into radiances, image size and position of scanned window
GOES/G16_copync_data.sh - G16_decode_data.sh ○ G16_convert_data2bin-cal.sh	Will copy input Goes-16 NetCDF files, decode and calibrate and prepare binary image data files;
GOES/G17_copync_data.sh - G17_decode_data.sh ○ G17_convert_data2bin-cal.sh	Will copy input Goes-17 NetCDF files, decode and calibrate and prepare binary image data files;
GOES_LIST_image_difference.sh	Will calculate predefined list of ABI channels differences;
GOES_LIST_image_projector.sh - ./GOES_MAIN_image_projector.sh	Will reproject set of listed ABI images from original Geosat view projection into projection defined in domain definition file;
GOES_LIST_rgb_generator.sh - GOES_MAIN_rgb_generator.sh	Will generate RGB imagery from ABI image data according predefined list of RGB products;
GOES_MAIN_3.8reflectivity.sh	Will calculate reflectivity (solar component) of 3.8 micron ABI channel;
GOES_MAIN_image_projector.sh	Reproject selected ABI image data from original Geosat view projection into projection defined in domain definition file;
GOES_MAIN_rgb_generator.sh	Will calculate RGB product based on ABI inage data specified in the list of all RGB products;
GOES_MAIN_TrueGreen.sh	Will calculate green component based on VIS ABI channels as input for True Color RGB;

MTG_LIST_channels.sh	Will analyze RGB predefined list and identify which FCI channels need to be processed;
MTG_LIST_image_compositor.sh - MTG_MAIN_image_compositor.sh	Will stick together set of FCI uncompressed image data chunks according list of channels;
MTG_LIST_image_difference.sh	Will calculate predefined list of FCI channels differences;
MTG_LIST_image_projector.sh - MTG_MAIN_image_projector.sh	Will reproject set of listed FCI images from original Geosat view projection into projection defined in domain definition file;
MTG_LIST_rgb_generator.sh - MTG_MAIN_rgb_generator.sh	Will generate RGB imagery from FCI image data according predefined list of RGB products;
MTG_MAIN_image_compositor.sh	Will stick together FCI uncompressed image data chunks, calculate calibration and create full disk binary file for certain channel;
MTG_MAIN_image_projector.sh	Will reproject FCI image from original Geosat view projection into projection defined in domain definition file for certain channel;
MTG_MAIN_reflectivity-ir_38.sh	Will calculate reflectivity (solar component) of 3.8 micron FCI channel;
MTG_MAIN_rgb_generator.sh	Will calculate RGB product based on FCI inage data specified in the list of all RGB products;
MTG_MAIN_sunheight_calculator.sh	Will calculate Sun elevation over domain area for current timeslot; necessary for calibration of VIS and NIR channels;

Table 2: List of C-programs

Goes_lat-lon.c	(GOES)	Pre-calculation of longitudes and latitudes for each GOES pixel centered to 75W longitude in 2km image resolution
projfun.c	(MTG & GOES)	Calculate longitude and latitude for certain X,Y in projection map, or vice versa for 5 available projections: Albers, regular lat/lon grid, Mercator, Geoview FCI, Geoview ABI
Goes_True.c	(GOES)	Calculates apparent green component for ABI True color RGB on the base of existing VIS channels
MTG_channel_composer.c	(MTG)	This procedure sticks together FCI image data chunks into full image
MTG_sunheight_calculation.c MTG_sunheight_calculation_parallel.c	(MTG)	Calculates sun height (elevation angle) for each FCI pixel; version for multi-core procesors with parallel calculations
prj_BG_world.c	(MTG & GOES)	Program is drawing land and sea surfaces and coastlines in projected map as underlay for satellite picture

prj_calibrated2projected.c	(MTG)	Program is remapping satellite pixels from original MTG FCI satellite view into background map
prj_calibrated2projected_GOES.c	(GOES)	Program is remapping satellite pixels from original GOES ABI satellite view into background map
prj_calibrated2projected_GOES_shmem.c	(GOES)	Program is remapping satellite pixels from original GOES ABI satellite view into background map, version using shared memory for reprojection data
prj_diff.c	(MTG & GOES)	Program calculates difference image from two images in defined projection
prj_genlonlatzenadr.c	(MTG)	Program generates longitudes, latitudes and satellite zenith angle for each pixel of map in defined projection
prj_pborders.c	(MTG & GOES)	Program plots political borders to the background map in defined projection
prj_REFLch4_parallel.c	(MTG & GOES)	Program calculates reflectivity of 3.8µm channel (solar component)
proj_adr_shmem_init.c	(GOES)	Load projection data (look-up table) into shared memory for speeding the reprojection of all channels images
proj_adr_shmem_delete.c	(GOES)	Remove projection data from shared memory (free memory)
readline.c	(MTG & GOES)	Read configuration files; used to setup values of various parameters and arguments
rgb2bmp_light_parallel_cor.c	(MTG & GOES)	Creates RGB-composits from single-channel images on the base of RGB configuration files
geo16_sunheight.c	(GOES)	Calculates Sun height (elevation angle) for each ABI pixel for GOES-16 longitude position
geo17_sunheight.c	(GOES)	Calculates Sun height (elevation angle) for each ABI pixel for GOES-17 longitude position
create_res.c	(GOES)	Generatess binary file containing ABI image size (in this version only size of 5424 pixels; needed additional development)
goes16_bin_cal.c	(GOES)	Calculates brightness temperatures for IR channels or radiances for VIS channels for GOES-16
goes16_bin_sun.c	(GOES)	Converts radiances of VIS channels to albedo corrected on Sun height for GOES-16
goes17_bin_cal.c	(GOES)	Calculates brightness temperatures for IR channels or radiances for VIS channels for GOES-17

goes17_bin_sun.c	(GOES)	Converts radiances of VIS channels to albedo corrected on Sun height for GOES-17
G_resize_raw_1.c	(GOES)	Converts image data in 1-byte representation (char) to 2-byte representation, just for VIS channels (historical reasons, required future development)
multitime.c	(MTG & GOES)	Calculates multiple timesteps from defined timeslot and defined step (e.g. 15, 10, 5 minutes)
suntime.c	(MTG & GOES)	Calculats apparent solar time for given timeslot based on day of the year - orbit of the earth around the sun)

Configuration and usage step by step instructions

1. **HDF5/NetCDF/FCI decompression software** is very important to have been installed properly in your computer.
2. Create home directory for installation of the package (***mkdir `home`; cd `home`***)
3. Copy file ***MTGProc.l.4.tar.gz*** to the home directory
4. Unzip and extract file with ***xzvf MTGProc.l.4.tar.gz***
5. Open file ***GEO_000_conf_paths.dat*** in editor and modify the working and data path
6. Run script ***GEO_000_workdirs.sh*** to control/create data subfolders tree with parameter 'Create': ***GEO_000_workdirs.sh Create***
7. Copy test data file ***netcdf.tar.gz*** to the folder ***GOES/netcdf***
8. Unzip and extract this test data file using ***tar xzvf netcdf.tar.gz*** (test data for GOES ABI)
9. Copy decoded FCI test data file ***act01_decoded.tar.gz*** to the folder ***data/MTG/act01_decoded***
10. Unzip and extract archived files with ***tar xzvf act01_decoded.tar*** (Decoded test data MTG FCI. Original NetCDF test data are available at EUMETSAT website for download and are not part of this package. Decoding procedures are attached, see next instructions in this document.)
11. Run compilation of C-programmes in folder ***C*** with ***compile.sh***
12. Run compilation of C-programmes in folder ***GOES/soft*** with ***compile.sh***
13. Check files ***GOES-LAT-yyyymmddhhmm.bin*** and ***GOES-LON-yyyymmddhhmm.bin*** in folder ***AuxiliaryData/GOES_Lat_Lon*** if they were correctly created
14. Generate domains/reprojection data with ***GEO_000_DOMAIN_generator.sh <ddd>***
    a. Number of domain ***<ddd>*** identifies the configuration file in folder ***config/domains***
    b. Numbers of domain lower then ***100*** (***000,001,002,003...***) are devoted to re-project **MTG-FCI** image data
    c. Numbers ***3xx*** (***311,312,...,315***) are devoted to re-project **GOES-16** image data
    d. Numbers ***4xx*** (***411,412,...,415***) are devoted to re-project **GOES-17** image data
    e. Numbers are optional, you can create your own domains or you can modify definitions of existing domain definitions (see chapter describing domains definitions)
15. Check results of domain generation proceses in folder ***data/ProjectionData/backgrounds/*.jpg***

16. Check RGB products tables and domains numbers in scripts stored in home directory:
    a. GEO_000_G16_list_domain-rgb.sh
    b. GEO_000_G17_list_domain-rgb.sh
    c. GEO_000_MTG_list_domain-rgb.sh
17. Edit these scripts and modify **“Y“** or **“N“** for each domain and each RGB product listed there and **run these scripts!**
18. Result you will see on the screen and will be stored in **config/runtime** folder in files:
    a. GEO_G16_list_domain-rgb.dat
    b. GEO_G17_list_domain-rgb.dat
    c. GEO_MTG_list_domain-rgb.dat
19. Structure and content of these files is following: Each line represents list of RGB products for certain domain; domain is specified at the beginning of each line as 3-digits number
20. Check and edit if necessary timeslots of test data inside configuration files in format `yyyymmddhhMM` located in folder ***config/runtime***:
    a. GEO_G16_conf_timeslot.dat
    b. GEO_MTG_conf_timeslot.dat
    c. GEO_MTG_conf_timeslot.dat
21. Check scripts ***GOES/G16_convert_data2bin-cal.sh***, ***GOES/G17_convert_data2bin-cal.sh*** and ***HDF5reader/HDF5reader-cmp.sh*** and modify appropriatelly linux environment variables related to pre-installed HDF5/NetCDF/FCI decompression software. Proper path to h5dump sotware tool is necessary to decode NetCDF files.
22. Now you can run processing script for GOES data with ***GEO_RUN_GOES.sh***:
    a. ./GEO_RUN_GOES.sh G16 TEST
    b. ./GEO_RUN_GOES.sh G17 TEST
23. If you have operationaly available EUMETCast data for Goes-16 and 17, omit parameter **TEST** and modify the path to these data inside the script ***GOES/G16_copync_data.sh*** and ***GOES/G17_copync_data.sh*** as follows: **set EUMETCastPath =** ***`data path to received files`***
24. If processing will be successful, final RGB products will be created in ***data/G16/jpg*** or ***data/G17/jpg*** folders
25. Processing of MTG FCI test data with running ***GEO_RUN_MTG.sh:***
26. In this software package delivery FCI decoded data are available for following timeslots:
    a. ***./data/MTG/act01_decoded/201308041200*** (old test data set from May 2020)
    b. ***./data/MTG/act01_decoded/202004051200*** (new test-data set from Nov 2021)
27. Timeslot devoted to processing should be specified in the first line of configuration file, which you can edit appropriately: ***config/runtime/GEO_MTG_conf_timeslot.dat***
28. If processing will be successful, final RGB products will be created in ***data/MTG/act04_jpg***
29. When you have downloaded FCI test data from EUMETSAT web site in NetCDF format, then pre-processing of FCI NetCDF data-set can be done in following steps:
30. Check the timeslot in ***./config/runtime/GEO_MTG_conf_timeslot.dat*** and be sure the timeslot in the first row is proper you want to process
31. Go to folder ***HDF5reader*** and open in editor script ***MTG_image_composer.sh***
32. Edit variable `***nc_dpath***` and set up the valid data path of FCI test-data stored in your computer
33. You can also download smaller FCI-testdata file from my site instead of huge Eumetsat testdata file. This is only one timeslot: ***MTG_FCI_testdata_201308041200.tar.gz***
34. Extract this file into folder specified by `***nc_dpath***`

35. Run ***MTG_image_composer.sh*** script which will decode NetCDF files and create binary files for all 16 channels and 40 chunks in ***./data/MTG/act01_decoded/yyyymmddhhMM/*** as follows (examples):
    a. ***MTG_201308041200-ir_38_-0001.bin***
    b. ***MTG_201308041200-ir_38_-0001.par***
36. Check line 9 in the script ***GEO_RUN_MTG.sh*** in main working folder. This line must be commented, if you have not NC files, only decoded files. If you have NC files, uncomment this line. Now run this script to calibrate, merge image data from chunks into single channels images, re-project images and create RGB products.
37. Parallelisation in C-shell scripts:
38. Some scripts are using parallel running of processes (image data processing,reprojection, RGB generation using "&" and "wait" controls. Editing scripts you can adapt/optimize processing to hardware capabilities of your computer.
39. Some C-programmes are using parallel calculations via ***pthread C-library***. In each parallelised C-code (*parallel.c) you can modify parameter ***#define NTHREADS 28*** where the value specifies the number of processors which will be used. Note that this is virtual parallelisation, which will be effective until the number of threads does not exceed real number of physical processors.
40. After editing programs ****parallel.c*** run script ***compile.sh***.

Domains definition and generation

Domain definitions are located in ***config/domains*** folder. Filename of configuration file containes 3-digits number as unique identifier of the projection devoted to certain region, over which user wish to display satellite images in selected projection, pixel resolution and image size. No special projection libraries are used in this software package. Projection equations are coded in simple C-file located in ***C*** folder and named **projfun.c**. There are five available projections:

1 Albers	(Figure 1)
2 Regular lat-lon grid	(Figure 2)
3 Mercator	(Figure 3)
4 Geoview (FCI)	(Figure 4 for MTG 0 degree position)
5 Geoview (ABI)	(Figure 5 for GOES-16, figure 6 for GOES-17)

Example of configuration file for Geoview projection:

```
Proj Domain-000.dat
Domain code <d000,d001,...>    Y: d000
Projection name         string Y: GeoView
Projection number <1,2,3,4,5>  Y: 4
Central longitude [deg] float  N:  0.0000
Central latitude  [deg] float  N:  0.0000
Scale factor                   N:  0.0000
Domain width      [deg] float  N:  0.0000
Domain height     [deg] float  N:  0.0000
Longitude grid    [deg] uint   Y: 10
Latitude grid     [deg] uint   Y: 10
Political border width <0,1,2> Y: 1
Column offset     [pixels]     Y: 0
Row offset        [pixels]     Y: 0
Domain pixel size [km]  float  Y: 2.0
Domain width      [pix] uint   Y: 5568
Domain height     [pix] uint   Y: 5568
```

```
Satellite position[deg] float  Y: 0.0
Scanner type      <FCI,ABI>    Y: FCI
```

Domain configuration files are self-explaining. The format must be strictly adhered to according to already existing files as templates. It is recommended to change only the values in the right column, namely those that are marked with a sign Y for the given type of projection, they are mandatory.

Next examples of configuration files demonstrate various options with different projections and for different satellite positions:

Proj_Domain-001.dat

```
Domain code <d00,d01,d02,...>  Y: d001
Projection name         string Y: Albers
Projection number <1,2,3,4,5>  Y: 1
Central longitude [deg] float  Y:  0.0000
Central latitude  [deg] float  Y: 48.0000
Scale factor                   Y:  1.3050
Domain width      [deg] float  N:  0.0000
Domain height     [deg] float  N:  0.0000
Longitude grid    [deg] uint   Y: 10
Latitude grid     [deg] uint   Y: 10
Political border width <0,1,2> Y: 1
Column offset     [pixels]     N: 0
Row offset        [pixels]     N: 0
Domain pixel size [km]  float  N: 0.0
Domain width      [pix] uint   Y: 4000
Domain height     [pix] uint   Y: 3000
Satellite position[deg] float  Y: 0.0
Scanner type      <FCI,ABI>    Y: FCI
```

Proj_Domain-002.dat

```
Domain code <d00,d01,d02,...>  Y: d002
Projection name         string Y: Regular_lafi
Projection number <1,2,3,4,5>  Y: 2
Central longitude [deg] float  Y: 15.500
Central latitude  [deg] float  Y: 50.500
Scale factor                   N:  0.0000
Domain width      [deg] float  Y: 40.0000
Domain height     [deg] float  Y: 30.0000
Longitude grid    [deg] uint   N: 2
Latitude grid     [deg] uint   N: 2
Political border width <0,1,2> Y: 1
Column offset     [pixels]     N: 0
Row offset        [pixels]     N: 0
Domain pixel size [km]  float  N: 0.0
Domain width      [pix] uint   Y: 4000
Domain height     [pix] uint   Y: 3000
Satellite position[deg] float  Y: 0.0
Scanner type      <FCI,ABI>    Y: FCI
```

Proj_Domain-030.dat

```
Domain code <d00,d01,d02,...>  Y: d030
Projection name         string Y: Mercator
Projection number <1,2,3,4,5>  Y: 3
Central longitude [deg] float  Y: 18.500
Central latitude  [deg] float  Y: 47.500
Scale factor                   N:  0.0000
Domain width      [deg] float  Y: 30.000
Domain height     [deg] float  Y: 20.000
Longitude grid    [deg] uint   Y: 2
Latitude grid     [deg] uint   Y: 2
Political border width <0,1,2> Y: 1
Column offset     [pixels]     N: 0
Row offset        [pixels]     N: 0
Domain pixel size [km]  float  N: 0.0
Domain width      [pix] uint   Y: 4000
Domain height     [pix] uint   Y: 3000
Satellite position[deg] float  Y: 0.0
Scanner type      <FCI,ABI>    Y: FCI
```

Proj Domain-000.dat

```
Domain code <d00,d01,d02,...>  Y: d000
Projection name         string Y: GeoView
Projection number <1,2,3,4,5>  Y: 4
Central longitude [deg] float  N:  0.0000
Central latitude  [deg] float  N:  0.0000
Scale factor                   N:  0.0000
Domain width      [deg] float  N:  0.0000
Domain height     [deg] float  N:  0.0000
Longitude grid    [deg] uint   Y: 10
Latitude grid     [deg] uint   Y: 10
Political border width <0,1,2> Y: 1
Column offset     [pixels]     Y: 0
Row offset        [pixels]     Y: 0
Domain pixel size [km]  float  Y: 2.0
Domain width      [pix] uint   Y: 5568
Domain height     [pix] uint   Y: 5568
Satellite position[deg] float  Y: 0.0
Scanner type      <FCI,ABI>    Y: FCI
```

Proj Domain-312.dat

```
Domain code <d00,d01,d02,...>  Y: d312
Projection name         string Y: GeoView
Projection number <1,2,3,4,5>  Y: 4
Central longitude [deg] float  N: 0.0000
Central latitude  [deg] float  N: 0.0000
Scale factor                   N: 0.0000
Domain width      [deg] float  N: 0.0000
Domain height     [deg] float  N: 0.000
Longitude grid    [deg] uint   Y: 10
Latitude grid     [deg] uint   Y: 10
Political border width <0,1,2> Y: 0
Column offset     [pixels]     Y: 0
Row offset        [pixels]     Y: 0
Domain pixel size [km]  float  Y: 2.0
Domain width      [pix] uint   Y: 5568
Domain height     [pix] uint   Y: 5568
Satellite position[deg] float  Y: -75.0
Scanner type      <FCI,ABI>    Y: ABI
```

Proj Domain-412.dat

```
Domain code <d00,d01,d02,...>  Y: d412
Projection name         string Y: GeoView
Projection number <1,2,3,4,5>  Y: 4
Central longitude [deg] float  N: -137.0000
Central latitude  [deg] float  N: 0.0000
Scale factor                   N: 0.0000
Domain width      [deg] float  N: 0.0000
Domain height     [deg] float  N: 0.000
Longitude grid    [deg] uint   Y: 10
Latitude grid     [deg] uint   Y: 10
Political border width <0,1,2> Y: 0
Column offset     [pixels]     Y: 0
Row offset        [pixels]     Y: 0
Domain pixel size [km]  float  Y: 2.0
Domain width      [pix] uint   Y: 5568
Domain height     [pix] uint   Y: 5568
Satellite position[deg] float  Y: -137.0
Scanner type      <FCI,ABI>    Y: ABI
```

More examples you will find in folder config/domain in the installation of MTGProc.

Graphical interpretation of domains defined by previous examples are shown on Figures 1 to 6.

Figure 1: Albers projection defined by ***Proj_Domain-001.dat*** file:

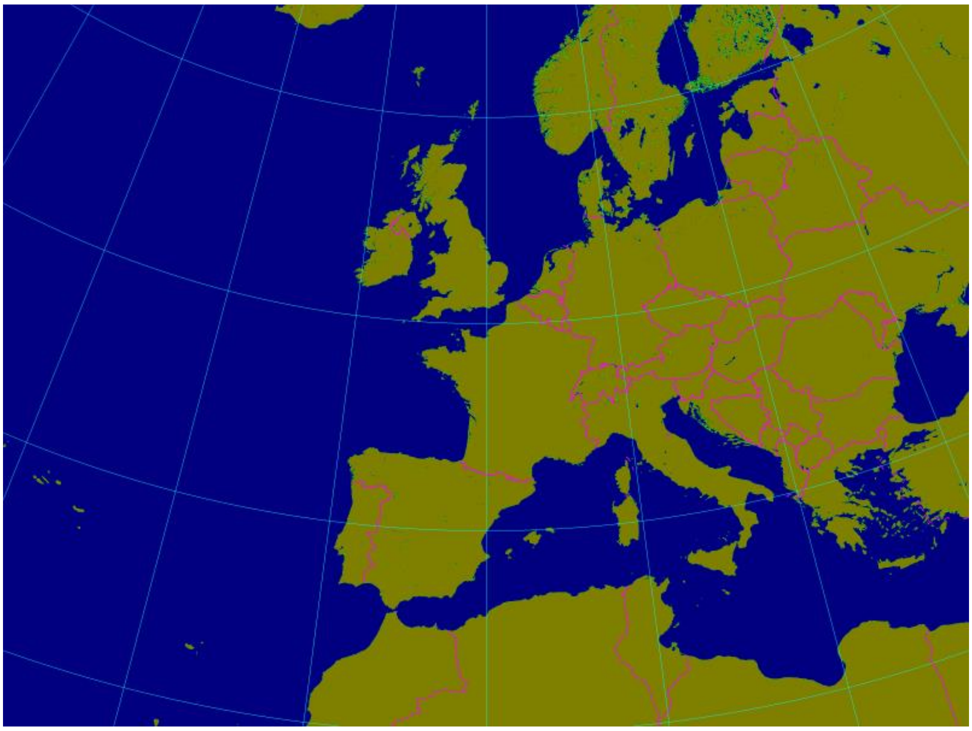


Figure 2: Regular longitude-latitude grid projection defined by ***Proj_Domain-002.dat*** file:

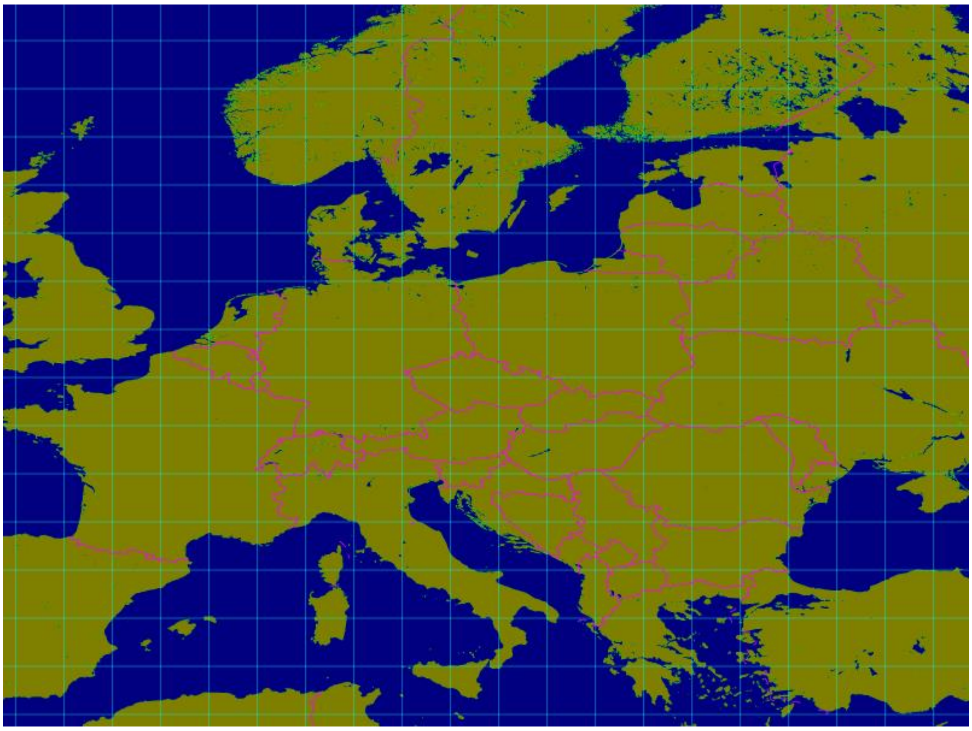


Figure 3: Mercator projection defined by ***Proj_Domain-030.dat*** file:

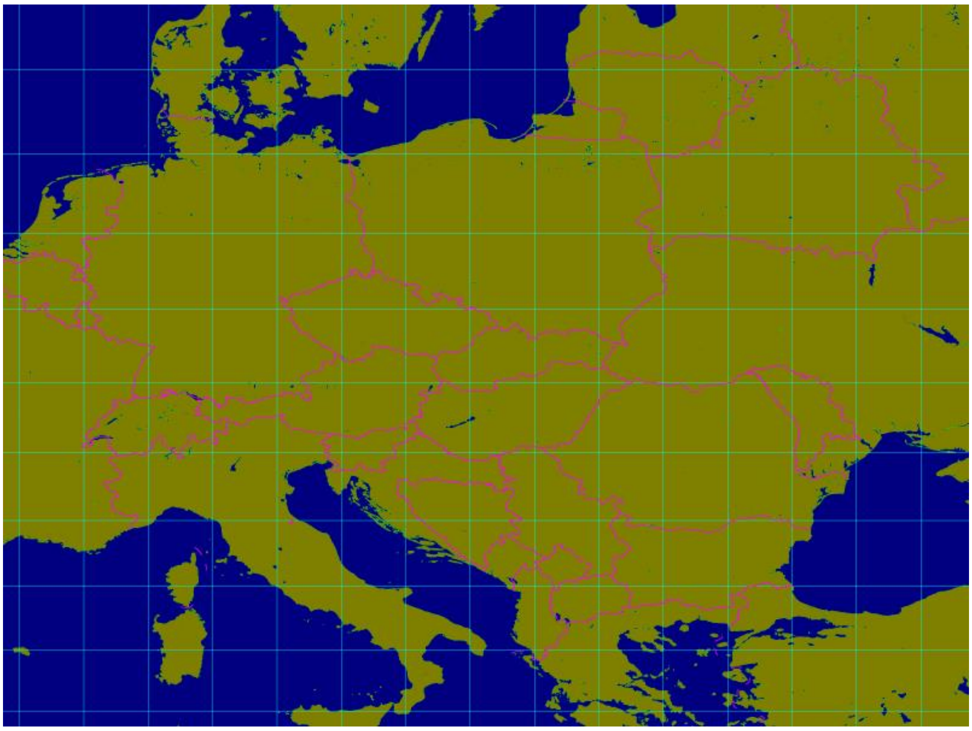


Figure 4: Geoview FCI projection defined by ***Proj_Domain-000.dat*** file:

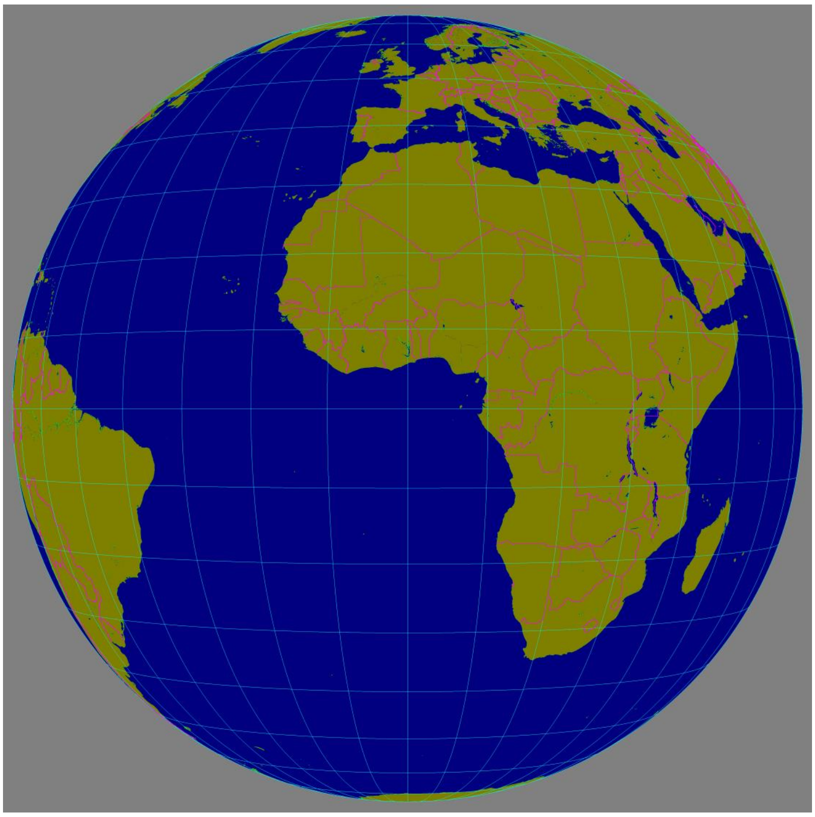


Figure 5: Geoview ABI -75˚ projection defined by ***Proj_Domain-312.dat*** file:

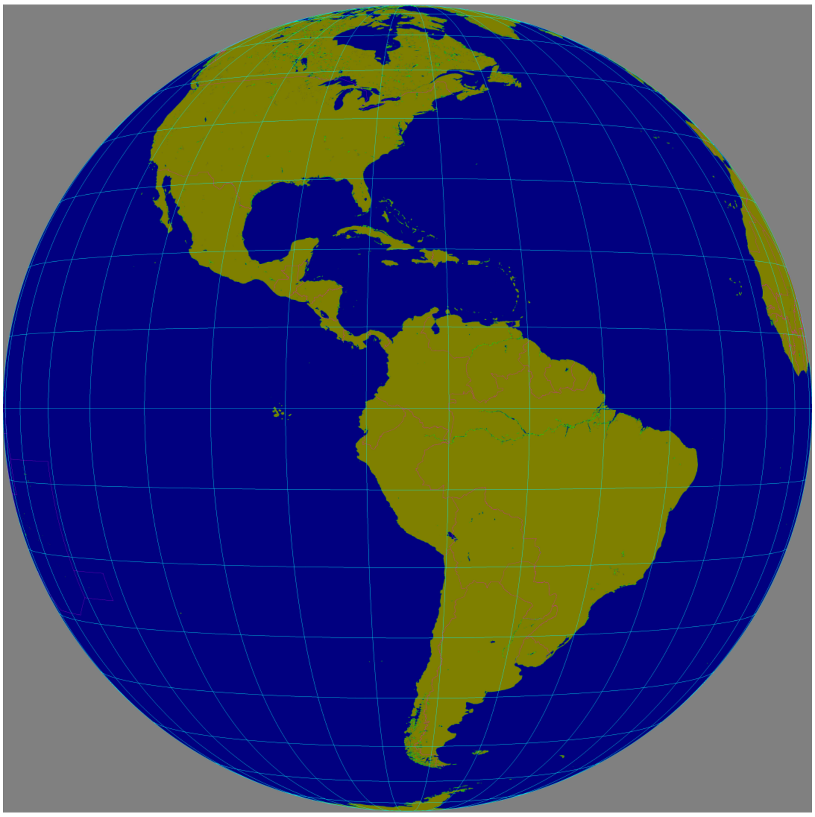
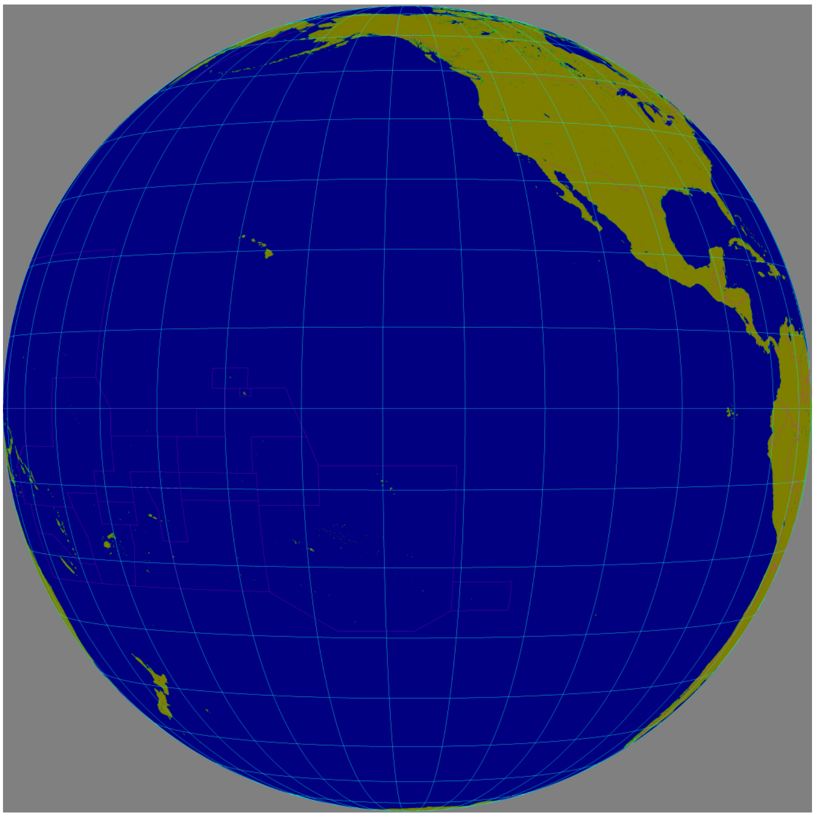


Figure 6: Geoview ABI -75˚ projection defined by ***Proj_Domain-412.dat*** file:



RGB products configuration files

Because GOES/ABI and MTG/FCI sets of spectral channels are not identical, definitions for the same standard RGB products can slightly differ. Also technically channel names for ABI and FCI differ. For these reasons RGB products configuration files are separatelly defined for each satellite. Names of configuration files are in the format:

<SAT>_rgb_configuration-<RGB_identification_name>.dat

Where <SAT> means satellite identificator (first line of Table 3) and <RGB_identification_name> value is listed in relevant columns of this table.

Table 3: List of pre-defined RGB products for FCI and ABI instruments pre-defined:

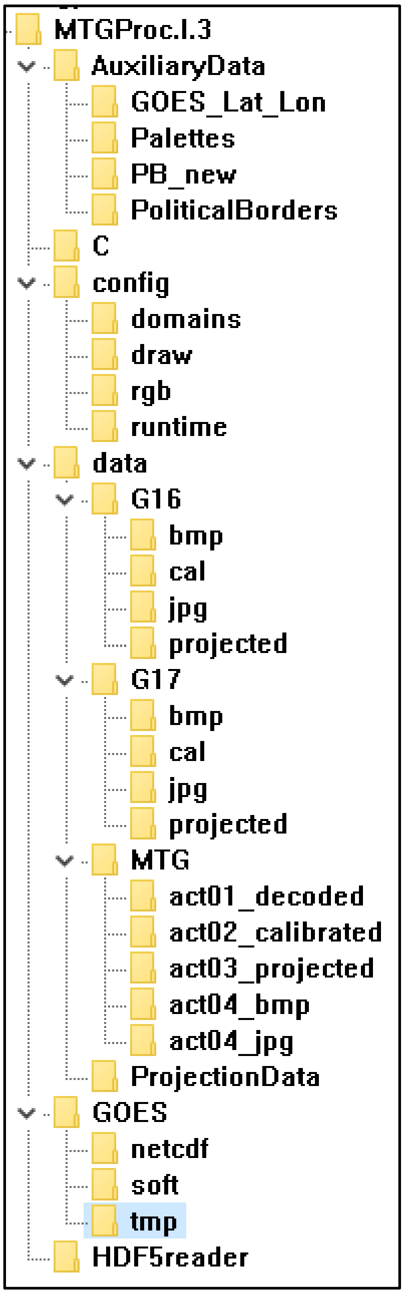
MTG	G16	G17
24hMicrophysics	24hMicrophysics	24hMicrophysics
Airmass	Airmass	Airmass
CloudTypes	CloudePhase	CloudePhase
ColorizedColdCloudTops	CloudTypes	CloudTypes
ConvectiveStorms	DailyCloudPhaseDistinction	DailyCloudPhaseDistinction
DailyCloudPhaseDistinction	DayMicrophysical	DayMicrophysical
DayMicrophysical	DaySolar	DaySolar
DaySolar	Dust	Dust
Dust	FireTemperature	FireTemperature
IR_105	NaturalColors	NaturalColors
IR_123	NaturalColorsWhite	NaturalColorsWhite
IR_123-IR_105	NaturalTrueColors	NaturalTrueColors
IR-WV	Night	Night
NaturalColors	NightLowClouds	NightLowClouds
NaturalColorsWhite	NightMicrophysical	NightMicrophysical
Night	VIS-IR	VIS-IR
NightLowClouds	VolcanicAsh	VolcanicAsh
NightMicrophysical		
SunHeight		
TrueColors		
VIS-IR		
VolcanicAsh		
WV6.3-enhance		

In this version of software MTGProc addition of new RGB products is possible, but I recommend to consult this step with software developer. For future development it is considered to add new RGB definitions in more general way. Currently it is necessary to do some more complicated modifications of scripts:

GEO_000_G16_list_domain-rgb.sh
GEO_000_G17_list_domain-rgb.sh
GEO_000_MTG_list_domain-rgb.sh
GOES_LIST_rgb_generator.sh
GOES_LIST_image_projector.sh
MTG_LIST_channels.sh
MTG_LIST_rgb_generator.sh
GOES/G16_decode_data.sh
GOES/G17_decode_data.sh

Complete directory-tree of MTGProc software is shown in Figure 7. Note that version number can change in future, but in principle name of installation folder can be specified by user.

Figure 7: Complete directory-tree of MTGProc software.



```
MTGProc.I.3
    AuxiliaryData
        GOES_Lat_Lon
        Palettes
        PB_new
        PoliticalBorders
    C
    config
        domains
        draw
        rgb
        runtime
    data
        G16
            bmp
            cal
            jpg
            projected
        G17
            bmp
            cal
            jpg
            projected
        MTG
            act01_decoded
            act02_calibrated
            act03_projected
            act04_bmp
            act04_jpg
        ProjectionData
    GOES
        netcdf
        soft
        tmp
    HDF5reader
```

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