ILWIS 3.6 Open GEONETCast Toolbox Plug-in User Manual

Part 1

Version 1.

Ben Maathuis

ITC-Enschede

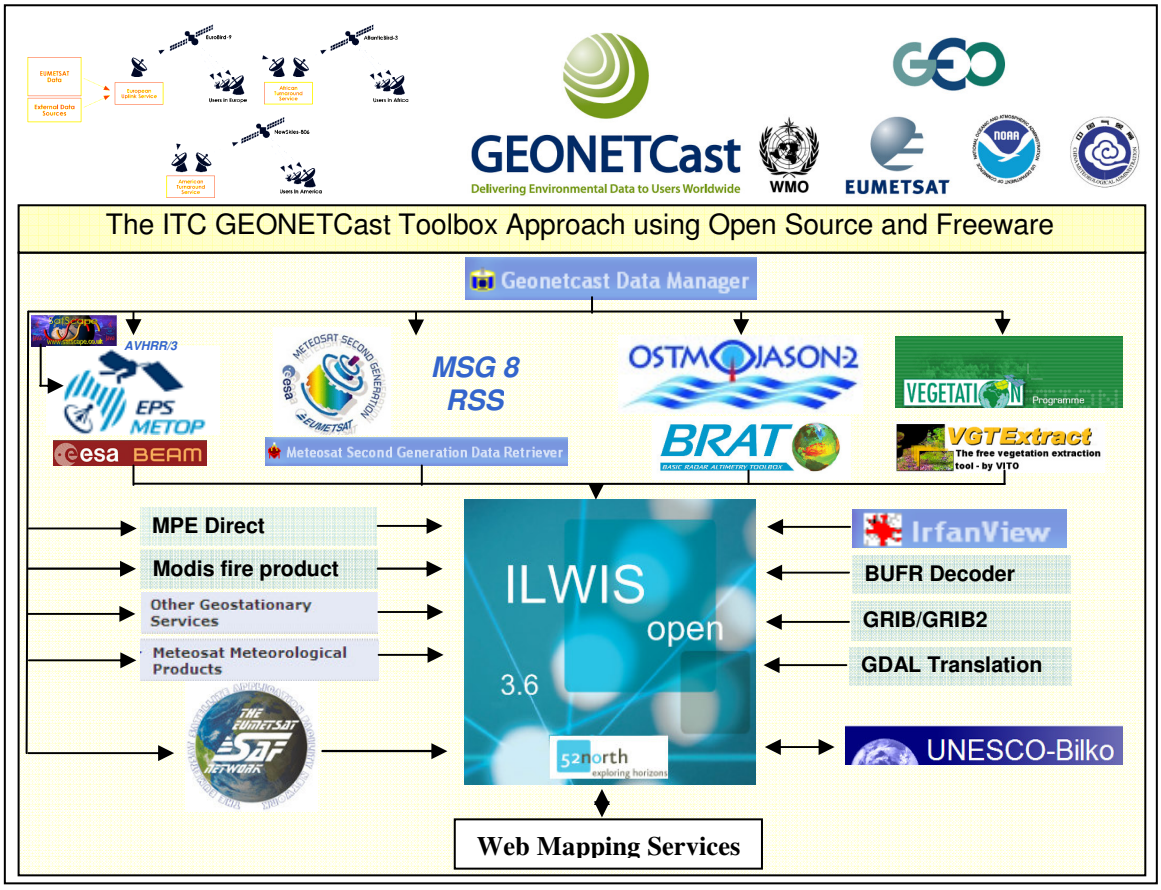
May 2009

Working with the ILWIS3.6 GEONETCast-Toolbox plug-in

Introduction

The GEONETCast-toolbox is making use of open source GIS and other freeware tools, coupled to off the shelf hardware to capture the environmental data delivered to the Global User Community by GEONETCast. The figure below is providing a general overview of the system design.

The Geonetcast-toolbox approach



The GEONETCast Toolbox Key features are: Geonetcast data management system for storage and retrieval of data, 64 import routines for various satellites, MPEF-SAF and VGT products, export routines to BILKO (2) for other Marine applications , MSG-9 real time visualization (for various predefined windows) and a calculator to obtain solar and MSG zenith and azimuth angles (for a specific UTC time).

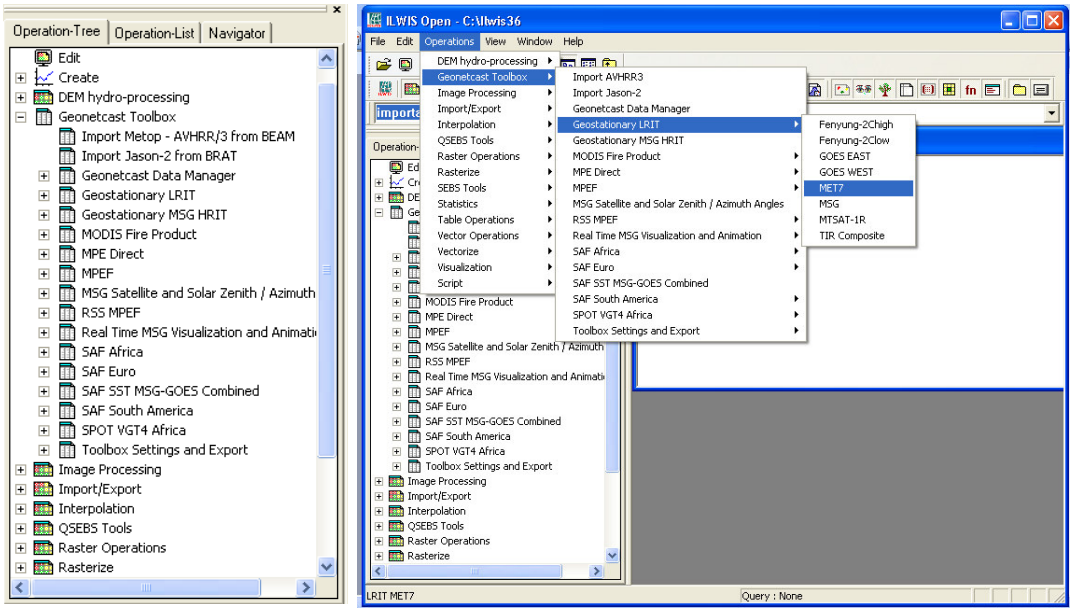
The document is a kind of user manual demonstrating the use of the toolbox to capture the data delivered by GEONETCast. This document assumes a general knowledge on GEONETCast and the way the data is delivered via Digital Video Broadcast (DVB). More detailed information on installation and configuration of ILWIS 3.6 Open and the Geonetcast Toolbox plug-in are provided in the "*Step by Step Installation Guide*" and the document "*First steps, Configuring the Geonetcast toolbox under ILWIS*" (see:

http://www.itc.nl/departments/wrs/geonetcast/default.aspx). At this website also the links to the other freeware tools are provided that can be used. Export routines of VISAT-BEAM and BRAT allow import into ILWIS, see the link under: “Other useful software tools”.

The GEONETCast Toolbox plug-in menu

Install ILWIS3.6 on your system and copy the file: “toolbox.zip” into the ILWIS3.6 subdirectory \Extensions. Do not unzip the file. Start ILWIS. Once ILWIS is started the toolbox.zip file is unzipped and the toolbox is installed as a plug-in under ILWIS, therefore the first startup sequence will take slightly more time. Once ILWIS has started the GEONETCast-toolbox menu can be observed, an entry is created under the “Operation Tree” and it can be accessed through the context sensitive menu under “Operations” from the main ILWIS menu. See the two figures below.

Geonetcast toolbox menu, from Operation Tree and from the main ILWIS menu



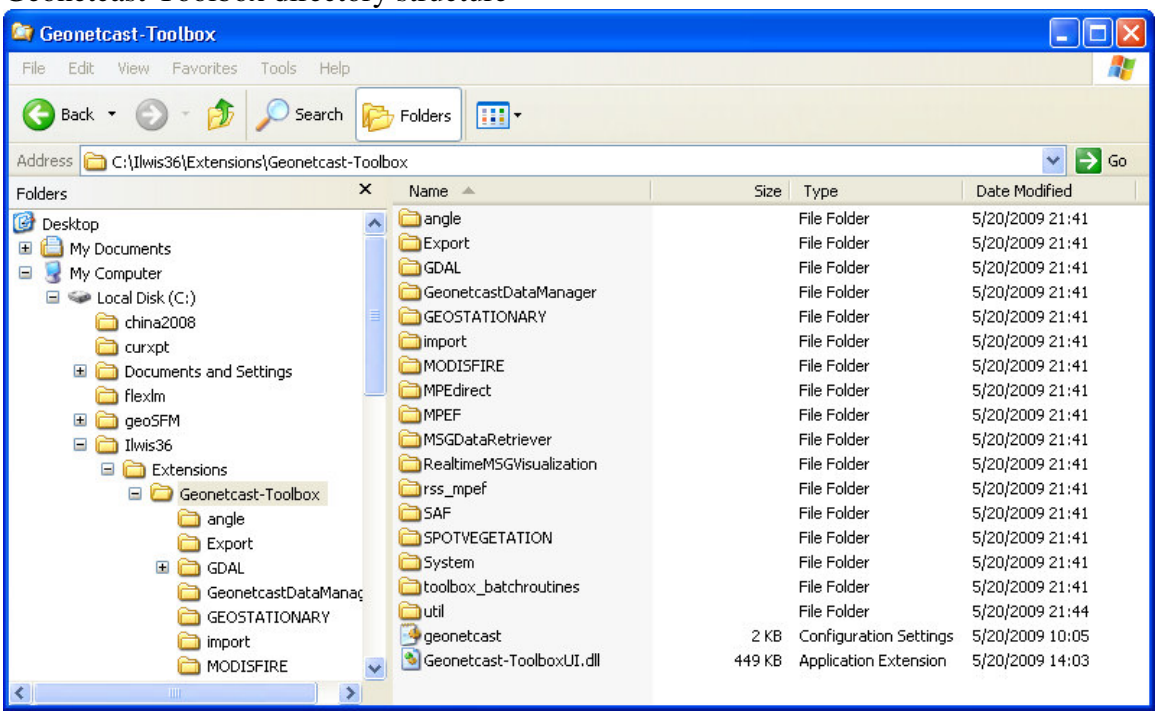
From the main ILWIS menu, select “Operation”, select “Geonetcast toolbox” and continue to select the various options available under this menu, the arrow at the right hand indicates that there are various other options under this menu. The Toolbox also appears under the “Operation-Tree”, double click the “Geonetcast toolbox” menu, here the ⊞ sign indicates that there are various functions available in these sub-menu’s. Browse through the various options that have become available upon installation of the toolbox and make yourself familiar with the structure of the toolbox menu.

GEONETCast Toolbox plug-in Source Directory

When the toolbox plug-in is installed a new sub-directory is created under the main ILWIS\Extension directory, called “Geonetcast-Toolbox”. Use the Windows Explorer and browse to this directory, e.g. C:\Ilwis36\Extensions\Geonetcast-Toolbox (note that

C:\Ilwis36 is the harddisk:\Ilwis-directory). The directory structure that appears in theWindows Explorer should be similar to the figure that is given below.

Geonetcast-Toolbox directory structure



Under the Geonetcast-Toolbox directory two files can be found. The file “Geonetcast-ToolboxUI.dll” is containing the User-Interface / menu structure of the toolbox and is creating the command syntax that is executed by ILWIS when performing a certain operation. The file “Geonetcast” is containing the settings that are created when configuring the in – and output directories for the various categories of data delivered by GEONETCast and stored on the archiving system. See also the document “*First steps, Configuring the Geonetcast toolbox under ILWIS*” (see: http://intranet.itc.nl/departments/wrs/geonetcast/default.aspx) for a more detailed discussion on the configuration of the “Directory Structure”. The advantage of this configuration option is that the directory structure, which is mostly fixed at the server side only needs to be configured once and the output directory can be set according to the local user preferences. These settings are used to generate the directory specification used in the command syntax so the user does not need to specify the in – and output directories each time when applying the toolbox utilities. Therefore the user does not need to specify in - and output directories, which saves not only time but also the frustration of typing errors (especially when addressing data source locations at servers).

The various sub-directories are containing the utilities that are used by the toolbox to perform the various operations that are offered (see the introduction above for the overview). Details of these sub-directories are provided below:

Angle: is containing the Java application that is calculating the MSG and solar azimuth and zenith angles, a batch file, ilwis scripts and eventually some of the raw angle data

files (e.g.: sataz_2009_04_25_12, which read like the satellite azimuth angle for year_month_day_ timeUTC).
Export: Still empty, will be used to store the utilities needed to implement the Web Mapping Services, currently under development.

GDAL: in the sub-directory \BIN the Geospatial Data Library routines are stored, used for import and export of the various data sources available in GEONETCast.

GeonetcastDataManager: The Java application and the configuration file (*.txt) used to capture the data delivered by GEONETCast and dumped onto the harddisk of the ground receiving station. It stores the data in a structured manner on a storage device, according to "rules" defined in the datamanager. For further details see also the document "*First steps, Configuring the Geonetcast toolbox under ILWIS*" (see: http://intranet.itc.nl/departments/wrs/ geonetcast/default.aspx).

Geostationary: A set of Ilwis scripts that initialize the relevant batch routines that are provided under the sub-directory \toolbox_batchroutines.

Import: Ilwis script to import Jason data that initializes the relevant batch routine that is provided under the sub-directory \toolbox_batchroutines.

Modisfire: Ilwis script to import the MODIS Fire product that initialize the relevant batch routines that are provided under the sub-directory \toolbox_batchroutines (using a batch loop routine procedure).

MPEdirect: ILWIS script files that initiate a Java application that extracts the Multi Sensor Precipitation Estimate (MPE) from the EUMETSAT website, available there for the most recent 24 hours, derived from Meteosat-7 and Meteosat-9. The raw grib files are transferred to the local output directory and subsequently the batch routines are importing the data in ILWIS format. To run this application no ground receiving station is required, but a network connection is needed. For Meteosat-7 MPE 48 files are retrieved and processed (rainfall at a temporal resolution every half hour), for MSG-9 96 files are retrieved and imported (rainfall at a temporal resolution every 15 minutes) (using a batch loop routine procedure).

MPEF: Ilwis script to import data produced by the Meteorological Product Extraction Facility (MPEF), initialize the relevant batch routine that are provided under the sub-directory \toolbox_batchroutines.

MSGDataRetriever: A utility that is used to extract the compressed HRIT MSG-9 and MSG-8 Rapid Scanning Service Level 1.5 data. Has a separate option to define the data source directory, for further details see also the document "*First steps, Configuring the Geonetcast toolbox under ILWIS*" (see: http://intranet.itc.nl/departments/wrs/geonetcast/default.aspx).

RealtimeMSGVisualization: This sub-directory contains as set of utilities that are used to extract from MSG, based on a selected window, in near real-time, automatically the MSG images delivered by GEONETCast and displays these on the screen. Based upon a Windows Task, this operation is performed every 15 minutes. Currently a number of standard windows are available, covering Europe, Northern Africa, Southern Africa and Latin America. The area of interest that is extracted can be easily modified to suit the user needs. Automatically the import of the first three channels of MSG is performed, based upon a time stamp that is adjusted for the time zone offset with respect to UTC and the fact that the time stamp of the MSG HRIT data is provided with reference to the start time of scanning. After import, a natural colour transform is performed, the country boundaries are integrated, a time stamp, according to local time is added, the colour composite image is exported and finally visualized using IrfanView.

RSS_MPEF: Ilwis script to import data produced by the Meteorological Product Extraction Facility (MPEF) based on recordings from Meteosat-8 (which scans the northen part of the field of view of MSG, approximately from 15 to 70 degree North latitude with a temporal resolution of 5 minutes), initialize the relevant batch routine that is provided under the sub-directory \toolbox_batchroutines.

SAF: Ilwis script to import data produced by the various Satellite Application Facilities (SAF's), initialize the relevant batch routine that are provided under the sub-directory \toolbox_batchroutines.

SPOTVEGETATION: Ilwis script to import the routinely produced decadal data (aggregated 10 day composites) from the SPOT Vegetation, initializes the relevant batch routines that are provided under the sub-directory \toolbox_batchroutines.

System: This sub-directory contains the necessary service objects that are used by ILWIS, like georeferences, domains, colour lookup tables. The content of this sub-directory is copied to the main ILWIS\System Directory when a new instance of ILWIS is started with the toolbox plug-in installed.

Toolbox_batchroutines: This sub-directory contains a large number of batch files that are the backbone of the import, export routines that are offered by the Toolbox. Mostly, these batch routines are called from ILWIS scripts. The progress of the batch routines can be followed by a command window that appears on the screen when a batch file is being executed, providing the user with a good overview of the progress of a routine that is executed. Users that are familiar with batch files can adapt these files to suit their specific needs and fine tune the procedures even further.

The batch file mostly starts with setting of the required environment variables (derived from the parameters that are entered when opening the program menu and those which are generated from the "Geonetcast-ToolboxUI.dll" and the settings specified in the "Directory Settings", in stored in the file "Geonetcast".

An example is given below (from Africa_albedoimport.bat):

Setting the environment

set longfilename=%1	From the menu user interface, mostly specified as: yearmonthdayhourminute(in UTC time)
set shortfilename1=%longfilename:~0,12%	Takes the first 12 characters from the start of the string, e.g. when entering Date (yyyymmddhhmm): 200905221200
set InputDrive=%2	From Directory Structure (file=Geonetcast), Input Drive
set InputDir=%3	From Directory Structure (file=Geonetcast), Input Directory
set OutputDrive=%4	From Directory Structure (file=Geonetcast), Output Drive
set OutputDir=%5	From Directory Structure (file=Geonetcast), Output Directory
set gdalDir=%6	Location of GDAL Directory, from ToolboxUI.dll
set IlwDir=%7	Location of ILWIS Directory, from ToolboxUI.dll
set UtilDir=%8	Location of Utility Directory, from ToolboxUI.dll

These environment variables are subsequently used in the batch file (those between the % signs, e.g. %InputDrive%\%InputDir%\ refer to the selected input drive and input directory respectively.

The Echo command which is mostly used at the start of a batch routine can be used to display or hide the commands that are executed by the batch routine, echo on: displays the messages and echo off, turns the command echoing off. The sequence of processes resulting from the listing of batch commands are displayed in a separate Windows Command window when the echo is turned on.

In the batch routine use is made of routines that are provided in the sub-directories \Util (%UtilDir%), \GDAL (%gdalDir%) and ILWIS (ilwis.exe) is called from the main ILWIS directory (%IlwDir%).

Most of the file name locations and executable are given between double quotes ,e.g. "%IlwDir%\ilwis.exe" to circumvent problems with spaces in directory file names, etc. The flag –C calls ILWIS, executes the command and terminates ILWIS. The commands that are executed under ILWIS are identical as those you will find on the ILWIS command line.

Most of the batch routines have options to remove the temporary files created and is also deleting the original GEONETCast data that was retrieved from the input drive\directory.

Util: This sub-directory is providing additional applications that are used for import of the GEONETCast original data and service objects. Furthermore a few sub-directories exist, the directory \Maps contains a few vector files with the country boundaries and mapviews, the directory \MSG_time is providing the 15 minutes time stamps used for the real time visualization. In this directory also the Bufrtool decoder and the directory \Tables should be available. The procedure how to obtain the decoder and the tables is provided in the document "*Step by Step Installation Guide*" (see: http://intranet.itc.nl/departments/wrs/geonetcast/default.aspx), under Bufrtool.

After you have studied the content of the various sub-directories and have opened some of the batch routines (e.g. using notepad or wordpad) in the sub-directory \toolbox_batchroutines, close the Windows Explorer and any file that is still open.

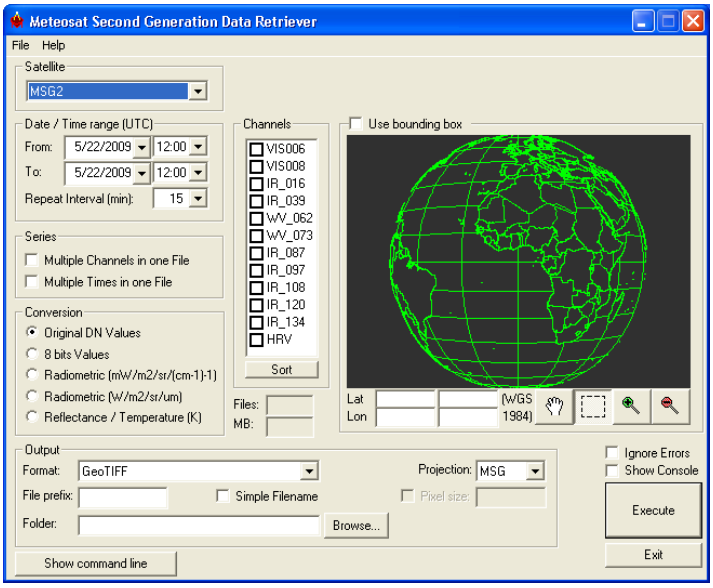
Import of GEONETCast data using the Toolbox

The backbone of the GEONETCast system currently is the data recorded by geostationary satellites, the derived secondary meteorological products (MPEF) and the derived environmental parameters produces by the Satellite Application Facilities (SAF). The toolbox is offering various routines to import these data sets in a GIS and you can use the generic GIS and RS functionality for further analysis. The data disseminated by GEONETCast encompass more than those that can be imported by the toolbox, during development of this utility most attention has been given to those data sets that have the highest relevance for environmental and water resources applications.

The description of the import routines that follows for the geostationary satellites, the derived secondary meteorological products (MPEF) and the derived environmental parameters produces by the Satellite Application Facilities (SAF) will also provide further information on the file name patterns used, type of compression applied, availability of first data set or product on a daily basis, temporal frequency and number of data segments to reconstruct the image / product. Furthermore, if relevant, details of the output map(s) that are generated will be described, like output filename, geometric and radiometric characteristics.

Import of Meteosat Second Generation, MSG-9 (MSG-2) and MSG-8 RSS (MSG-1)

From the Geonetcast Toolbox, select the option "Geostationary MSG HRIT" and then the sub menu "MSG HRIT", double click this icon twice to activate the Meteosat Second Generation Data Retriever. From the menu, select the option "File" and the "Data Sources" and check if the link to the data sources is correct. For selection details of these Data Sources further information is provided in the document "*First steps, Configuring the Geonetcast toolbox under ILWIS*" (see: http://intranet.itc.nl/departments/wrs/geonetcast/default.aspx). The MSG Data Retriever allows for interactive setting of the various parameters to facilitate the import according to the need of the User, both for MSG-8 Rapid Scanning Service (RSS) and MSG-9, which can be defined under the context sensitive option "Satellite". See also the figure below of the MSG Data Retriever.



Select for "Satellite" MSG2, as "Date / Time range (UTC)" select for date the previous day and for time: 12.00 UTC. As "Repeat Interval (min)", select 15 minutes. Select from "Series" Multiple channels in one file and as "Conversion" use Original DN Values. For "Output" select for Format: Ilwis Raster Map, for File prefix: CC and select for Folder: your working directory.

For "Channels", activate VIS006, VIS008 and IR_016.

Press the “Execute” button to start the import. If the import is completed move to the ILWIS main menu, select “Window” and from the dropdown menu, select “Refresh”. The newly imported files should now appear, with the prefix: CC.

Given the import option “Multiple Channels in one file” in Ilwis also a maplist icon  is available, next to the imported bands. Double click the map list icon and from the menu select the Open as Colour Composite option  and in the Display Option window press OK (the strech values can be kept default). The imported image will be displayed as a colour composite (band 3 in red, band 2 in green and band 1 in blue). Move the mouse over the image and press the left mouse button. What do these values represent?

Before discussing the other settings that can be applied to import the HRIT data from MSG-8 RSS and MSG-9 first a more detailed inventory is presented on the data that is disseminated by GEONETCast. Please note that this full spatial and spectral resolution data is subject to copyright, applicable to the data recorded less than 24 hours before present. Terms and conditions are specified in the license that is signed by the organization that receives GEONETCast. For details on the license check it with the local system administrator.

Details of HRIT MSG-8 RSS and MSG-9 data transmitted by GEONETCast

HRIT-MSG-8 RSS from 9.5 degree East – SEVIRI instrument	
Temporal Resolution	5 minutes
Start of recording / day	Image available from 00:00 UTC
No. of bands	12 in total, 11 low resolution (3 km), 1 broadband high resolution (1 km)
No. of segments/band	3 segments for low resolution channel (segments 6 – 8), 9 segments high resolution channel (segments 16-24)
Geographic coverage	MSG field of view, covering area 15-70 degree North
Compression used	Wavelet compression of HRIT data
File name pattern	H-000-MSG1__-MSG1_RSS____-*channel*___-000006[1]___- *datetimeUTC* -C_
Output generated	Based on user settings in the MSG Data Retriever

HRIT-MSG-9 from 0 degree – SEVIRI instrument	
Temporal Resolution	15 minutes
Start of recording / day	Image available from 00:00 UTC
No. of bands	12 in total, 11 low resolution (3 km), 1 broadband high resolution (1 km)
No. of segments/band	8 segments for low resolution channel, 24 segments high resolution channel
Geographic coverage	Full MSG field of view
Compression used	Wavelet compression of HRIT data
File name pattern	H-000-MSG2__-MSG2_____-*channel*___-000001___- *datetimeUTC* -C_
Output generated	Based on user settings in the MSG Data Retriever

For the whole field of view, as recorded by the SEVIRI instrument onboard of MSG-9, on a daily basis 96 images are available and for the northern hemisphere, as recorded by MSG-8, a total of 288 images are recorded and disseminated. Each set of images of a specific temporal interval is accompanied by a PRO and EPI file, describing further recording details, like geometry and radiometry. The MSG Data Retriever is using the

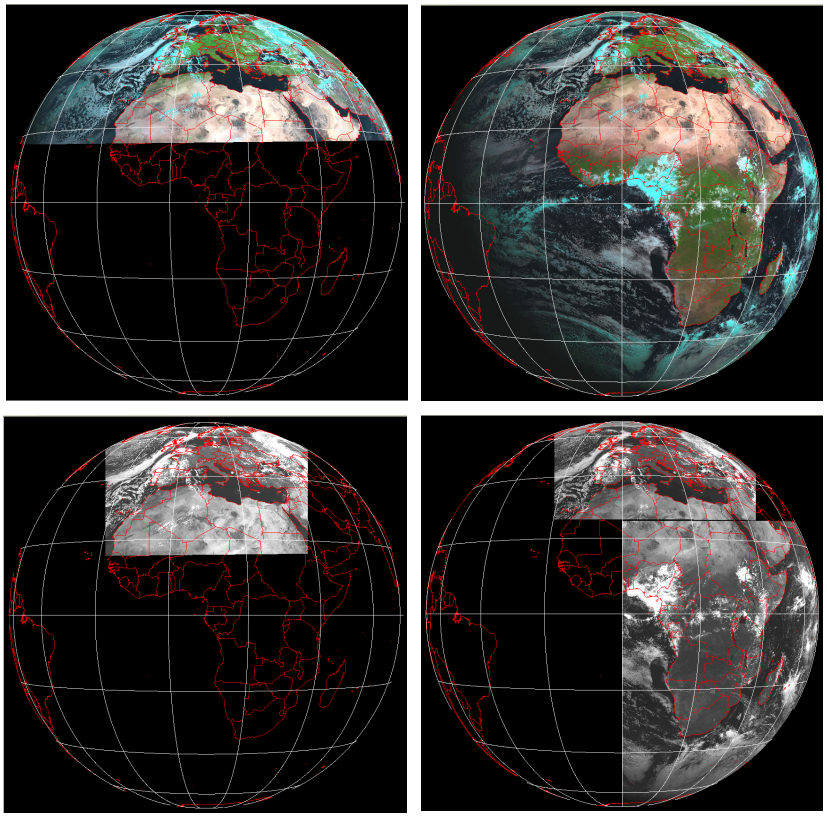
[1] Note that 6 is referring to the starting segment number, this number increases for other segments, same convention is used for file name pattern in the other tables

coefficients from these files to apply the radiometric transformations and to obtain the geometric information.

Continue with the import of the various multi spectral channels of MSG-8 RSS and MSG-9. You have already imported the 12:00 UTC image (bands 1,2 and 3) during the previous exercise (the image with the CC prefix). Use the same settings, but uncheck the for the “Channels” the VIS006, VIS008 and IR_016, but now activate the “Channel” HRV. Specify an new output name (e.g. with prefix HRV) and display the image when the import is complete. Use as Representation “Gray”. Browse the mouse over the image, keeping the left mouse button pressed and check the values.

Repeat the procedure, but now select as “Satellite” the MSG1-RSS. Also import of the same time a multi spectral image (Bands VIS006, VIS008 and IR_016) and a HRV image (HRV). Display all of the images and note the differences in geometry of the MSG1-RSS and MSG-2. The results should be identical to those given in the figure below.

Different field of views of MSG-1 (left) and MSG-2 (right), Multispectral at the top, HRV at bottom



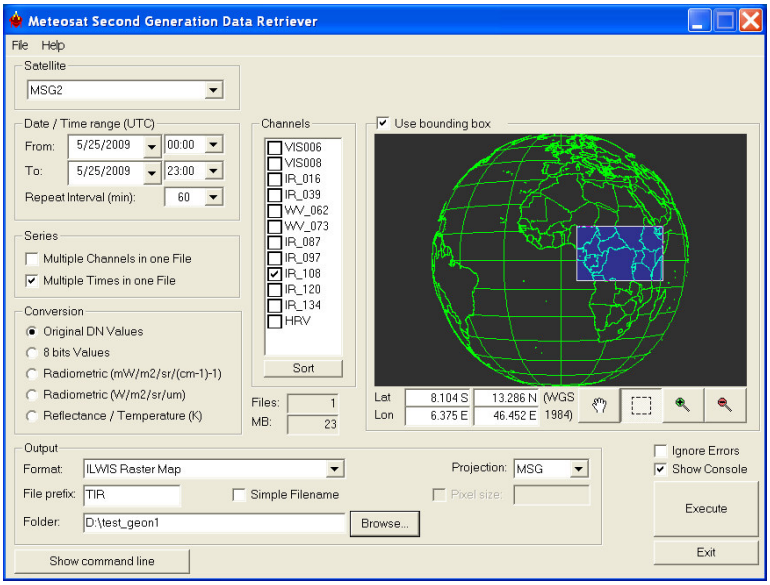
Now select a thermal channel from the “Satellite” MSG2, e.g. the IR_108 (make sure that all other channels are unchecked, specify an appropriate output map name, e.g. with the prefix TIR, use as “Conversion” the option Reflectance / Temperature (K) and as “Output” format select Ilwis Raster Map. Use the whole field of view. Perform the import and display the resulting map, using a Representation called Pseudo. Browse with the left

mouse button, while keeping it pressed, over the map. Note the values, what do they represent?

In a similar way also the other channels can be imported. Note that for the visible channels (VIS006 and VIS008) the data will be transformed to reflectance if "Conversion" option Reflectance / Temperature (K) is used. Now you are going to continue and import a time series.

Uncheck now in the Data Retriever, under "Series" the option: Multiple channels in one file, and check the option: Multiple times in one file. As "Conversion" use the option Original DN values, as "Output" format specify Ilwis Raster Map. For the "Satellite" select MSG2 and for the given day (e.g. the previous day) select the "Time rang (UTC) from 00:00 to 23:00, and as "Repeat Interval (min), select 60. Select in the map window a region covering the central part of Africa. Now for every hour an image is imported and stored as a stack of images in an ILWIS map list. For the settings, see also the figure below.

MSG Data Retriever settings for multi-temporal import.



Press refresh (from Ilwis main menu, select Window). Note the sequence of files that has been created. In this case the band number is referring to the time, e.g. band_1 is from 00:00 hr and band_24 is from 23:00 UTC. To display the map list as an animated sequence of images, double click the created map list icon  , and select the option  in the map display window. Select as Representation: Gray, use the other settings as default and press OK. Move the mouse, while keeping the left button pressed, over the map window. Note the values, what do they represent?

Repeat the above procedure, but now uncheck the "Conversion" Original DN values and activate the "Conversion" option Reflectance / Temperature (K). Specify a new output map, e.g. with the "Prefix": MultiTIR and press "Execute in the Data Retriever. Display this new sequence of images also as an animated sequence and check the map values. What do they represent now?

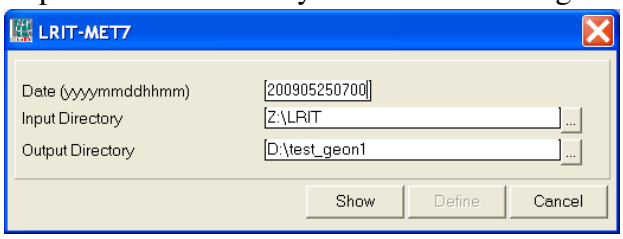
Another set of exercises is available at a later stage providing a more in depth introduction to the MSG Data Retriever and the various options that exist to import the data according to the need of the user.

Import of Foreign Satellites, Geostationary LRIT

Next to the MSG HRIT data disseminated, other recordings from geostationary satellites is also provided. The satellites available are: GOES East (currently GOES 12), GOES West (currently GOES 11), MTSAT1R, Fenyung-2C, Meteosat-7 and also MSG-2 (Meteosat-9). To import the various LRIT geostationary satellite images, select from the Geonetcast Toolbox menu, the option: "Geostationary LRIT". Select one of the satellites that appear in the drop down list. In the import menu that appears the date-time (in UTC) of the specific satellite needs to be entered. Check the settings for the Input and Output Directory, these are most likely already correctly specified, if this is not the case, close the menu and open the "Toolbox Settings and Export menu" and select the "Set Directory Structure" option and specify the correct "Input and Output Directories" for the Geostationary LRIT and Fenyung satellites.

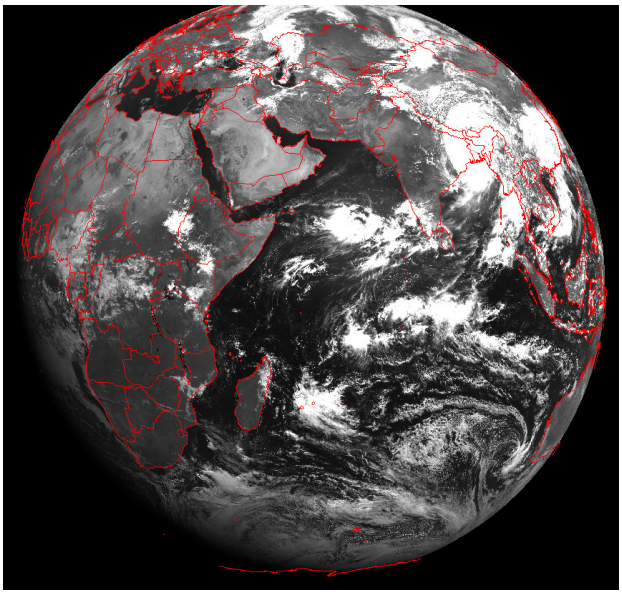
An example of an import routine is provided in the figure below using Meteosat-7. The Input and Output Directories are properly specified, the time should be entered as year-month-day-hour-minutes (yyyymmddhhmm), e.g. in this example: 200905250700.

Import of Geostationary LRIT satellite images



After entering the correct "Date", press OK. A separate Windows Command screen will appear showing the status of the import. The data will be imported as byte maps, in the case of Meteosat-7, three output images will be created, called: Met7007_yyyymmddhhmm, Met7064_yyyymmddhhmm and Met7115_yyyymmddhhmm. These three channel represent the visible, water vapour and TIR channels respectively. Each of these images can be displayed using a Gray Representation. Note that the images are imported as byte images. You might need to refresh the ILWIS catalog, select from the main ILWIS menu, the option "Window" and "Refresh".

Import of the 007 channel of Meteosat-7



For the other Geostationary-LRIT options the same procedure is followed and the same output name convention is used (satellitenamesatellitechannel_ date) with the exception of GOES East and West. Here the output file name syntax is: satellitenamesatellitechannel_ a_date or satellitenamesatellitechannel_ t_date; "a" refers to a conversion to Albedo (in percentage, from 0-100%) and "t" indicates a

transformation to temperature (in Kelvin). Upon import the temperature background is having a value of 160, this can be subsequently corrected if required.

More details about the availability of the LRIT data disseminated by GEONETCast and file name conventions used are provided in the tables below. Study the tables and import a few images from these other geostationary satellites. Refresh the catalog after the import has been completed. Note that for MSG-2 the spectral and temporal resolution is quite different than with respect to the HRIT data imported before! The time stamp needed for import can be obtained using the temporal resolution and start of recording /day in the tables below. Note that for the visible channels the time of the day (in UTC) in relation to the position of the sun should be considered!

LRIT-Meteosat-7 from 57 degree East	
Temporal Resolution	30 minutes
Start of recording / day	Image available from 00:00 UTC
No. of bands	3 in total, VIS-007, WV-064 and TIR-115 (micron)
No. of segments/band	10 segments / 007, 5 segments /064 and 5 segments / 115, all channels have accompanied Pro files
Geographic coverage	Full Meteosat-7 field of view, from 57 degree East
Compression used	Wavelet compression of LRIT data
File name pattern	L-000-MTP___-MET7_____-*channel*_057E-000001___-*datetimeUTC*-C_
Output generated	Byte images are having a georeference
Toolbox batch routine	\toolbox_batchroutines\importmet7.bat

LRIT-MTSAT1R from 140 degree East	
Temporal Resolution	1 hour
Start of recording / day	Image available from 00:00 UTC
No. of bands	4 in total, VIS-007, SWIR-038, WV-068 and TIR-108 (micron)
No. of segments/band	7 segments / 007, 6 segments / 038, 6 segments / 068, 6 segments / 108, all channels have accompanied Pro files
Geographic coverage	Full MTSAT1R field of view, from 140 degree East
Compression used	Wavelet compression of LRIT data
File name pattern	L-000-MSG2__-MTSAT1R_____-*channel*_140E-000001___- *datetimeUTC* -C_
Output generated	Byte images are having a georeference
Toolbox batch routine	\toolbox_batchroutines\importmtsat1r.bat

LRIT-GOES-West from 135 degree West (GOES-11)	
Temporal Resolution	1 hour
Start of recording / day	Image available from 00:00 UTC
No. of bands	4 in total, VIS-007, SWIR-039, WV-068 and TIR-107 (micron)
No. of segments/band	7 segments / 007, 7 segments / 039, 4 segments / 068, 7 segments / 107, all channels have accompanied Pro files
Geographic coverage	Full / Partial GOES-11 field of view, from 135 degree West
Compression used	Wavelet compression of LRIT data
File name pattern	L-000-MSG2__-GOES11_____- *channel*_135W-000001___- *datetimeUTC* -C_
Output generated	007 converted to Albedo, other channels to Temperature (K) Albedo conversion: 100*(band_007/1023) Temperature conversion: ((330.5-160)/1023)*temperature_band+160 All imported images are having a georeference
Toolbox batch routine	\toolbox_batchroutines\importgoes11.bat

LRIT-GOES-East from 75 degree West (GOES-12)	
Temporal Resolution	1 hour
Start of recording / day	Image available from 00:00 UTC
No. of bands	4 in total, VIS-007, SWIR-039, WV-066 and TIR-107 (micron)
No. of segments/band	7 segments / 007, 7 segments / 039, 7 segments / 066, 7 segments / 107, all channels have accompanied Pro files
Geographic coverage	Full / Partial GOES-12 field of view, from 75 degree West
Compression used	Wavelet compression of LRIT data
File name pattern	L-000-MSG2__-GOES12_____- *channel*_135W-000001___- *datetimeUTC* -C_
Output generated	007 converted to Albedo, other channels to Temperature (K) Albedo conversion: 100*(band_007/1023) Temperature conversion: ((330.5-160)/1023)*temperature_band+160 All imported images are having a georeference
Toolbox batch routine	\toolbox_batchroutines\importgoes12.bat

LRIT-MSG-2 from 0 degree	
Temporal Resolution	30 minutes
Start of recording / day	Image available from 00:15 UTC
No. of bands	5 in total, VIS-006, NIR-016, SWIR-039, WV-062 and TIR-108 (micron)
No. of segments/band	8 segments / for all channels, all channels have accompanied Pro and Epi files
Geographic coverage	Full MSG-2 field of view, from 0 degree
Compression used	Wavelet compression of LRIT data
File name pattern	L-000-MSG2__-MSG2________- *channel* ___-000001___- *datetimeUTC* -C_
Output generated	Byte images are having a georeference
Toolbox batch routine	\toolbox_batchroutines\importmsglrit.bat

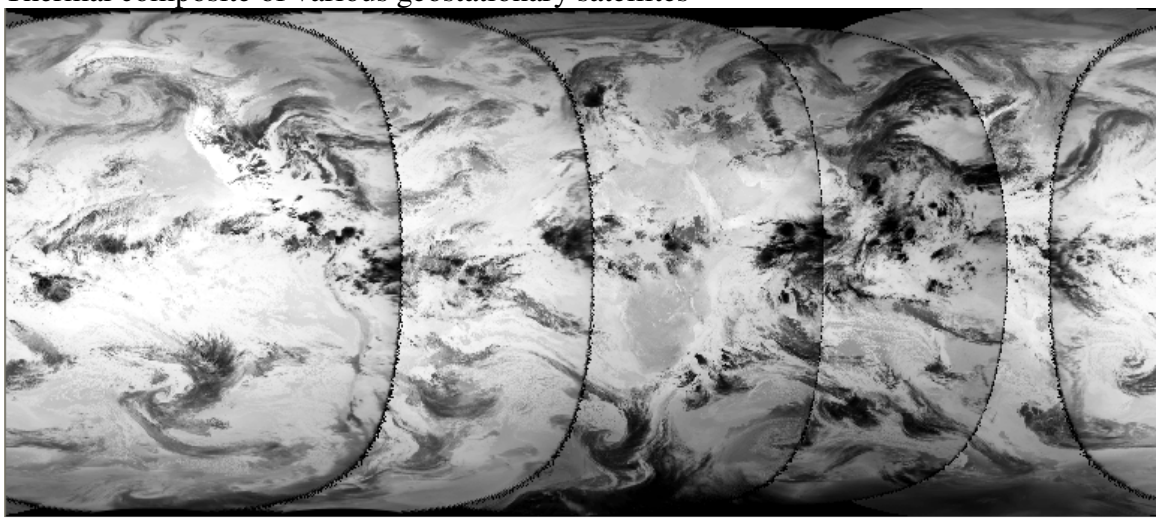
LRIT-Fenyung-2C High Resolution (1.25 km) from approx 104.5 degree East	
Temporal Resolution	1 hours
Start of recording / day	Image available from 00:00 UTC
No. of bands	1 in total, VIS
No. of segments/band	Single file, compressed, in HDF-5 format
Geographic coverage	Full Fenyung-2C field of view, from 130 degree East
Compression used	WinZip archive of LRIT data
File name pattern	Z_SATE_C_BABJ_*datetimeUTC*_O_FY2C_FDI_VIS1KM_001_NOM.HDF.gz
Output generated	Byte image are having a georeference
Toolbox batch routine	\toolbox_batchroutines\importfy2chigh.bat

LRIT-Fenyung-2C Low Resolution (5km) from approx 104.5 degree East	
Temporal Resolution	1 hours
Start of recording / day	Image available from 00:00 UTC
No. of bands	5 in total, VIS, IR_1, IR_2, IR_3 and IR_4
No. of segments/band	Single files per band, compressed, in HDF-5 format
Geographic coverage	Full Fenyung-2C field of view, from 130 degree East
Compression used	WinZip archive of LRIT data
File name pattern	Z_SATE_C_BABJ_ *datetimeUTC* _O_FY2C_FDI_*band*_001_NOM.HDF.gz
Output generated	Byte image are having a georeference
Toolbox batch routine	\toolbox_batchroutines\importfy2clow.bat

From the tables it can be observed that MSG LRIT availability is not in sync with the other satellites, note that the temporal resolution is ½ hour with a shift of 15 minutes. In order to construct a global thermal composite, therefore this shift for MSG has been

incorporated in the batch routine (available at \toolbox_batchroutines\ createTIR_ mosaic.bat) and therefore in this routine only a "yyyymmddhh" entry is required. From the tables above it is clear that every hour a global thermal composite can be constructed. Select from "Geostationary LRIT" the option "LRIT TIR Composite" and enter the relevant timestamp (for yyyymmdd take the current day and to make a midnight composite select for the hh:00). The batch routine will import the geostationary observations from GOES-West, GOES-East, MSG-9, Meteosat-7 and MTSAT1R, transform these images into a global geographic projection and finally merges the images into a single composite. The output file name will have the following format: TIRyyyymmddhhmm. When the processing is completed display the resulting composite using a Gray Representation. Note that the output image is of a byte format, the dark toned areas are the cold areas. The bright toned regions are the warm areas, see also the figure below. Note the coordinates given in the lower right hand corner of the map display window, optionally a vector file can be added to the map display. Note that sometimes for GOES-West and GOES-East only partial images are available.

Thermal composite of various geostationary satellites



Import of secondary meteorological products, MPEF

At EUMETSAT, through the Meteorological Product Extraction Facility, automatically other relevant meteorological products are extracted. Open from the Geonetcast Toolbox, the option "MPEF". The sub menu is providing 7 import routines of various products that are generated by MPEF and disseminated through GEONETCast. Double click the option "MPEF AMV" (Atmospheric Motion Vector). Note that in the "MPEF AMV import window" the "Input Directory" might need to be adjusted, as the data (at least at ITC) is stored in a year/month/day sub directory structure. If this is the case close the import window, open the "Toolbox Settings and Export" option and select the current day sub directory as the "Input Directory" in the "Directory Structure" settings and save these by pressing OK.

Once more open the "MPEF AMV" after adjusting the sub directory structure, now note once more the specifications given for the Input Directory. This should be the current

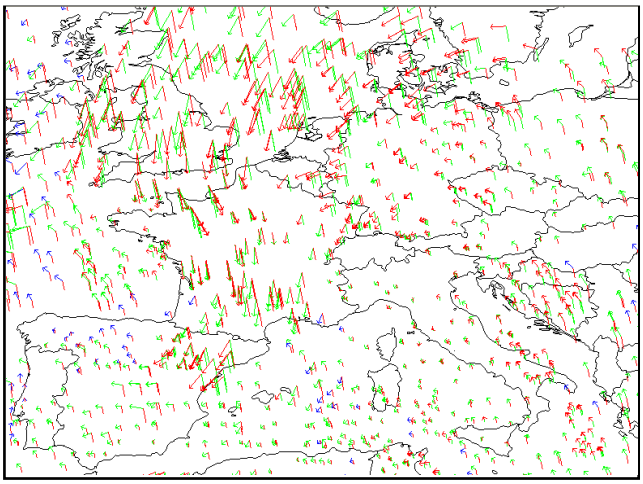
day! To specify the “Date”, in yearmonthdayhourminute format details should be known about the availability of this product. Further specifications of the MPEF products are subsequently provided in the tables below.

MPEF-Atmospheric Motion Vectors (AMV)	
Temporal Resolution	1 hours
Start of recording / day	Image available from 00:45 UTC
No. of segments/band	Single segment, in BUFR format
Geographic coverage	Full MSG field of view, from 0 degree
File name pattern	L-000-MSG2__-MPEF_____-AMV_____-000001___-*datetimeUTC*-__
Output generated	Map view having a georeference
Toolbox batch routine	\toolbox_batchroutines\amvimport.bat

Select for the “Date” in the “MPEF AMV” import window the current year, month, day for yyyymmdd and for hhmm: 0045 and press show to execute the import.

Upon import an ILWIS table is generated and a few calculations are performed in this table, this process takes some time. The output is a so called mapview, shown in the Ilwis catalog by the following icon: . If not shown directly, double click the mapview icon with the filename: amvyyyymmddhhmm. The imported map shows the direction of the wind, the arrow length is scaled with respect to windspeed and the colours are representing the classified height of the wind vector: blue = low, green = moderately high and red = high. The result of the import should resemble the figure provided below.

Import of the MPEF-AMV



From the ILWIS Catalog open the table that is created, called: amv_impyyyymmddhhmm
Note that the data given for the columns: X, Y, Pressure_pa, WindDirection, WindSpeed and Temperature are extracted from the original file. The other columns are calculated using the batch import routine. In the table click the name of the column “low1”, the whole column will now appear blue and the formula used to obtain the column is given in lower left hand corner of the table window. For the last column calculated the normal pressure at sea level is assumed to get an idea of the elevation above mean sea level of each of the wind vectors.

Close both the AMV mapview and the associated table window before you continue. Select from the Geonetcast Toolbox menu, the option “MPEF” and continue to select “MPEF CLAI”. This is the so called Cloud Analysis Image. In order to produce this Image also previous recordings are used and therefore the temporal resolution is different

from the other products. Details of the MPEF CLAI product are specified in the table that is given below.

MPEF-Cloud Analysis Image (CLAI)	
Temporal Resolution	3 hours
Start of recording / day	Image available from 02:45 UTC
No. of segments/band	3 segments, in GRIB format
Geographic coverage	Full MSG field of view, from 0 degree
File name pattern	L-000-MSG2__-MPEF_____-CLAI_____-000001___-*datetimeUTC* -__
Output generated	Class map, using the CLAI domain and representation, having a georeference
Toolbox batch routine	\toolbox_batchroutines\claiimport.bat

In the "MPEF CLAI" import window, specify an appropriate "Date": the current year, month, day for yyyymmdd and for hhmm: 0245 and press show to execute the import. Upon completion of the import select the map called: CLAIyyymmddhhmm and press OK in the "Display Options" window to show the map. Roam with the left mouse button pressed over the map to see the various classes that have been defined. Note that the spatial resolution of this product is 9 km. Move the mouse to the filename in the ILWIS catalog, right click the mouse button, move in the context sensitive menu to: "Properties", click it to open the Properties Dialogue box to get the information about pixel size and number of lines / columns.

Repeat the import procedure for the 0545 and 0845 CLAI products. Upon completion of these import routines, select from the ILWIS main menu, the option "File", "Create", "Maplist". Add the 3 CLAI images to the maplist (select the images in the left hand window and use the greater than symbol to drop them in the right hand file listing), specify an appropriate output file name, e.g. CLAI. Double click the CLAI maplist Icon in the Catalog and display the images as an animated sequence  , all other display options can be kept default, press OK to see the results.

The other MPEF products, apart from the CTH, come with a temporal resolution of 15 minutes. Details are provided in the tables below. The CLM is the Cloud Mask. Import a CLM of the present day, at midnight (at 00:00UTC). Two output files are created, a file called cCLMyyyymmddhhmm and a file called vCLMyyyymmddhhmm. The "c" CLM is as class map which can be used for (multi temporal) visualization and the "v" CLM is a value map, useful when you want to calculate using a cloud mask. Display both maps, for the class map use the default display options and for the value map select as "Representation" Pseudo. Roam the mouse, while keeping the left mouse button pressed over the maps to see the result of the import. Take a look at the table provided below specifying the details of the Cloud Top Height product. In ILWIS close any open maps or tables before you continue. Select from the Geonetcast Toolbox menu, the option "MPEF" and continue to select "MPEF CTH". Select for the "Date" the current year, month, day for yyyymmdd and for hhmm: 0245 and press show to execute the import. Two output files are created, a file called cCTHyyyymmddhhmm and a file called vCTHyyyymmddhhmm. The "c" CTH is as class map which can be used for (multi temporal) visualization and the "v" CTH is a value map, useful when you want to

calculate using the cloud top heights. Display both maps, using the default display settings for the class map and a pseudo Representation for the value map and check with the mouse the values, classes. Note that this product also has a spatial resolution of 9 km, you can check the properties of the maps.

Close any open maps. Continue with the import of the Active Fire Product. Select for the present day a FIRA product that has been received through GEONETCast using the Windows Explorer. Note the file size; if the files are very small, e.g. 1 or 2 KB there are hardly any fires. Before you import a FIRA product, open it in Wordpad or Notepad and check the content. You can omit the first couple of header lines.

MPEF-Cloud Mask (CLM)	
Temporal Resolution	15 minutes
Start of recording / day	Image available from 00:00 UTC
No. of segments/band	6 segments, in GRIB format
Geographic coverage	Full MSG field of view, from 0 degree
File name pattern	L-000-MSG2__-MPEF_____-CLM_____-000001___-*datetimeUTC* -__
Output generated	Class map, using the CLM domain and representation, and Value map having a georeference
Toolbox batch routine	\toolbox_batchroutines\clmimport.bat

MPEF-Cloud Top Height (CTH)	
Temporal Resolution	15 minutes
Start of recording / day	Image available from 02:45 UTC
No. of segments/band	2 segments, in GRIB format
Geographic coverage	Full MSG field of view, from 0 degree
File name pattern	L-000-MSG2__-MPEF_____-CTH_____-000001___-*datetimeUTC* -__
Output generated	Class map, using the Elevclass domain and representation, and Value map having a georeference
Toolbox batch routine	\toolbox_batchroutines\cthimport.bat

MPEF-Active Fire, Ascii (FIRA)	
Temporal Resolution	15 minutes
Start of recording / day	Image available from 00:00 UTC
No. of segments/band	1 segment, Table in ASCII format, non compressed
Geographic coverage	Full MSG field of view, from 0 degree
File name pattern	L-000-MSG2__-MPEF_____-FIRA_____-000001___-*datetimeUTC* -__
Output generated	Map view with point map, showing locations of possible and probable fires, having a georeference
Toolbox batch routine	\toolbox_batchroutines\fira_import.bat

MPEF-Global Instability Index (GII)	
Temporal Resolution	15 minutes
Start of recording / day	Image available from 00:00 UTC
No. of segments/band	1 segment, in BUFR format
Geographic coverage	Full MSG field of view, from 0 degree
File name pattern	L-000-MSG2__-MPEF_____-GII_____-000001___-*datetimeUTC* -__
Output generated	Map view with several point maps, showing index values, having a georeference
Toolbox batch routine	\toolbox_batchroutines\giiimport.bat

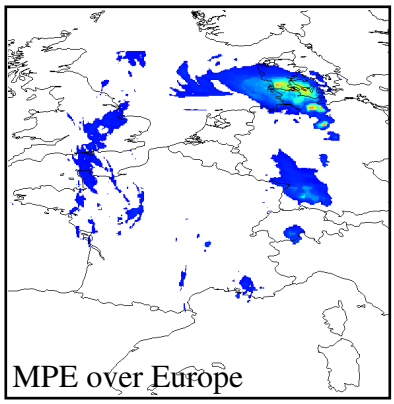
MPEF-Multi Sensor Precipitation Estimate (MPEG)	
Temporal Resolution	15 minutes
Start of recording / day	Image available from 00:00 UTC
No. of segments/band	4 segments, in GRIB format
Geographic coverage	Full MSG field of view, from 0 degree
File name pattern	L-000-MSG2__-MPEF_____-MPEG_____-000001___-*-datetimeUTC* -__
Output generated	Value map, rain intensity per 15 minutes, having a georeference
Toolbox batch routine	\toolbox_batchroutines\mpegimport.bat

In the FIRA import window, specify the appropriate "Date" stamp in accordance with the file that was opened before and execute the import. Refresh the ILWIS catalog and open the map view fire_fira. Also open the newly created table, called: fire. The last column in this table is used to classify the fires: 1 = Possible and 2 = Probable fire.

Close any open maps or tables before you continue, you can also select a number of maps and tables from the ILWIS Catalog and delete these: select the relevant files, right click the mouse button and select "delete" from the context sensitive menu.

Continue with the import of the "MPEF GII", specify an appropriate "Date": the current year, month, day for yyyymmdd and for hhmm: 0700 and press show to execute the import. This import routine is taking slightly more time as a number of raster maps are generated from tables that are transformed to point maps. Once the import is complete open the map view called: GI_indexmapsyyyymmddhhmm. From the map view window, select "File" and "Open Pixel Information". Move the mouse cursor over the map and look at the values that appear in the Pixel Information window. Also open the newly created table called: GIIyyyymmddhhmm. The following columns appear: x, y, k_index, parcel lifted index (to 500 hPa), precipitable water (kg m-2), KO_index and maximum buoyancy. The values in this table are used to create the output maps that are visualized in the map view. In the map view legend the various layers can be unchecked to visualize the map that is situated at a lower position in the legend.

Close any open maps and tables before you continue. Select the option "MPEF MPEG", specify an appropriate "Date": the current year, month, day for yyyymmdd and for hhmm: 0700 and press show to execute the import. The output map created is called: MPEGyyyymmddhhmm. Display this map, use as "Representation" mpe_single.


MPE over Europe

In your working directory there should also be a vector file (used to show the country boundaries in the previous map views) called country_samecode. To add this vector file to the map display window, press the icon, situated on the menu bar of the map display window and select the vector file: country_samecode, in the "Display Options", select "single Color" and take the black colour and press OK. Browse, keeping the left mouse button pressed the mouse over the map and have a look at the values. The rain rates are rainfall intensities for 15 minutes only (mm/15 minutes).

Import of secondary meteorological products, RSS MPEF

Unlike the previous MPEF products, which all require input from recordings based upon MSG-9, the RSS MPEF is providing also MPEF products, but at a higher temporal frequency but only for the northern part of the hemisphere as seen from geostationary perspective at 9.5 degree East recorded by MSG-8. Have a look again at the picture that is showing the field of view of Meteosat-8 RSS provided before in this document. The import routines and the output generated are similar to the operations that have been conducted as described under: Import of secondary meteorological products (MPEF), before. A separate option is available to import the K-index only as provided by the GII product. Below a number of tables are provided showing the details of these products as distributed via GEONETCast.

RSS MPEF-Atmospheric Motion Vectors (AMV)	
Temporal Resolution	20 minutes
Start of recording / day	Image available from 00:15 UTC
No. of segments/band	Single segment, in BUFR format
Geographic coverage	Partial MSG field of view from 15-70 North, from 9.5 degree East
File name pattern	L-000-MSG1__-MPEF_RSS____-AMV_____-000001___-*datetimeUTC* -__
Output generated	Map view having a georeference
Toolbox batch routine	\toolbox_batchroutines\rss_amvimport.bat

RSS MPEF-Active Fire, Ascii (FIRA)	
Temporal Resolution	5 minutes
Start of recording / day	Image available from 00:00 UTC
No. of segments/band	1 segment, Table in ASCII format, non compressed
Geographic coverage	Partial MSG field of view from 15-70 North, from 9.5 degree East
File name pattern	L-000-MSG1__-MPEF_RSS____-FIRA_____-000001___-*datetimeUTC* -__
Output generated	Map view with point map, showing locations of possible and probable fires, having a georeference
Toolbox batch routine	\toolbox_batchroutines\rss_fira_import.bat

RSS MPEF-Global Instability Index (GII) and K-index import	
Temporal Resolution	5 minutes
Start of recording / day	Image available from 00:00 UTC
No. of segments/band	1 segment, in BUFR format
Geographic coverage	Partial MSG field of view from 15-70 North, from 9.5 degree East
File name pattern	L-000-MSG1__-MPEF_RSS____-GII_____-000001___-*datetimeUTC* -__
Output generated	Map view with several point maps, showing index values, having a georeference
Toolbox batch routine	\toolbox_batchroutines\rss_giiimport.bat and \toolbox_batchroutines\rss_Kindeximport.bat

RSS MPEF-Multi Sensor Precipitation Estimate (MPEG)	
Temporal Resolution	5 minutes
Start of recording / day	Image available from 00:00 UTC
No. of segments/band	4 segments, in GRIB format
Geographic coverage	Partial MSG field of view from 15-70 North, from 9.5 degree East
File name pattern	L-000-MSG1__-MPEF_RSS____-MPEG_____-000004___-*datetimeUTC* -__
Output generated	Value map, rain intensity per 5 minutes, having a georeference
Toolbox batch routine	\toolbox_batchroutines\rss_mpegimport.bat

Before you continue delete the files that appear in the ILWIS Catalog. Use the various import routines provided under "RSS MPEF" and display the results of the imported AMV, FIRA, GII, K-Index map views and MPEG map. Note that for the FIRA the file size is mostly very small, indicating that there is no fire detected for the area situated between 15 to 70 degree North latitude. Before you specify a "Date" stamp for the FIRA import, check the original file using Wordpad or Notepad. If a FIRA import is executed and there are no fires listed in the import file an error message will appear. Note that the output mapviews use the same naming convention as those generated by from MPEF, the MPEG files have as name prefix: RSS!

Import of Products from the Satellite Application Facilities for Africa, Europe and South America

Satellite Application Facilities (SAFs) are specialised development and processing centres within the EUMETSAT Applications Ground Segment. Utilising specialised expertise in Member States, they complement the production of standard meteorological products as provided by MPEF. Each SAF is led by the National Meteorological Service of a EUMETSAT Member State, working with a consortium of cooperating entities, such as other Meteorological Services, government bodies and research institutes of Member and Cooperating States.

In the Geonetcast Toolbox you will find four menu items: "SAF Africa", "SAF Euro", "SAF South America" and "SAF SST MSG-GOES Combined". Using the first three menu options you are able to import products that are produced by the Land Surface Analysis SAF (LSA), the Sea Surface Temperature (SST) is produced by the Ocean and Sea Ice SAF (OSI).

As the LSA SAF import routines for Africa, Europe and South America offer the same functionality here attention is given to the import routines as provided under "SAF Africa". Originally the data for this continent are split into two regions, Northern and Southern Africa respectively. Upon import of the various products these two windows are merged and a new output map is created covering the whole African continent. For Europe and South America a single file per product is disseminated via GEONETCast. Details of the product as disseminated via GEONETCast is given in the various tables provided below. The current set of import routines are based on products generated from MSG. New pre-operational products based on METOP - EPS will also become available. The Albedo product is still in pre-operational phase and at the moment of writing is not disseminated via GEONETCast. Before you continue check the current operational status of the products that are produced by the LSA SAF (available at: http://landsaf.meteo.pt/).

LSA SAF, Down-welling Surface Short-wave Radiation Flux (DSSF)	
Temporal Resolution	30 minutes
Start of recording / day	Image available from 00:00 UTC
No. of files	1 file Europe and S.America, 2 files Africa. Compressed in HDF5 format
Geographic coverage	Euro, North and South Africa, South America
File name pattern	S-LSA_-HDF5_LSASAF_MSG_DSSF_*Region_ datetimeUTC*.bz2
Output generated	Value map (W/m2), having a georeference
Toolbox batch routine	\toolbox_batchroutines\africa_, same_ or euro_dssfimport.bat

LSA SAF, Down-welling Surface Long-wave Radiation Flux (DSLF)	
Temporal Resolution	30 minutes
Start of recording / day	Image available from 00:00 UTC
No. of files	1 file Europe and S.America, 2 files Africa. Compressed in HDF5 format
Geographic coverage	Euro, North and South Africa, South America
File name pattern	S-LSA_-HDF5_LSASAF_MSG_DSLF_*Region_ datetimeUTC*.bz2
Output generated	Value map (W/m2), having a georeference
Toolbox batch routine	\toolbox_batchroutines\africa_, same_ or euro_dslfimport.bat

LSA SAF, Land Surface Temperature (LST)	
Temporal Resolution	15 minutes
Start of recording / day	Image available from 00:00 UTC
No. of files	1 file Europe and S.America, 2 files Africa. Compressed in HDF5 format
Geographic coverage	Euro, North and South Africa, South America
File name pattern	S-LSA_-HDF5_LSASAF_MSG_LST_ *Region_ datetimeUTC*.bz2
Output generated	Value map (degree Celsius), having a georeference
Toolbox batch routine	\toolbox_batchroutines\africa_, same_ or euro_lstimport.bat

LSA SAF, Albedo	
Temporal Resolution	Once a day
Start of recording / day	Image available from 00:00 UTC
No. of files	1 file Europe and S.America, 2 files Africa. Compressed in HDF5 format
Geographic coverage	Euro, North and South Africa, South America
File name pattern	S-LSA_-HDF5_LSASAF_MSG_ALBEDO_ *Region _date*0000.bz2
Output generated	Value map (0-100 %), having a georeference
Toolbox batch routine	\toolbox_batchroutines\africa_, same_ or euro_albedoimport.bat

LSA SAF, Fraction of Vegetation Cover (FVC)	
Temporal Resolution	Once a day
Start of recording / day	Image available from 00:00 UTC
No. of files	1 file Europe and S.America, 2 files Africa. Compressed in HDF5 format
Geographic coverage	Euro, North and South Africa, South America
File name pattern	S-LSA_-HDF5_LSASAF_MSG_FVC_ *Region _date*0000.bz2
Output generated	Value map (0-100 %), having a georeference
Toolbox batch routine	\toolbox_batchroutines\africa_, same_ or euro_fvcimport.bat

LSA SAF, Fraction of Absorbed Photosynthetic Active Radiation (FAPAR)	
Temporal Resolution	Once a day
Start of recording / day	Image available from 00:00 UTC
No. of files	1 file Europe and S.America, 2 files Africa. Compressed in HDF5 format
Geographic coverage	Euro, North and South Africa, South America
File name pattern	S-LSA_-HDF5_LSASAF_MSG_FAPAR_ *Region _date*0000.bz2
Output generated	Value map (0-100 %), having a georeference
Toolbox batch routine	\toolbox_batchroutines\africa_, same_ or euro_faparimport.bat

LSA SAF, Leaf Area Index (LAI)	
Temporal Resolution	Once a day
Start of recording / day	Image available from 00:00 UTC
No. of files	1 file Europe and S.America, 2 files Africa. Compressed in HDF5 format
Geographic coverage	Euro, North and South Africa, South America
File name pattern	S-LSA_-HDF5_LSASAF_MSG_LAI_ *Region* _*date*0000.bz2
Output generated	Value map (m2/m2), having a georeference
Toolbox batch routine	\toolbox_batchroutines\africa_, same_ or euro_laiimport.bat

Check in the archive, in the respective directory, if the Albedo product of the LSA SAF is available, see for the file name convention the table above. If available open from the Geonetcast Toolbox, "SAF Africa", the option "SAF Albedo", select the appropriate "Date" stamp, note that for hhmm the specification is: 0000, as the product is only available once a day (see the file name pattern from the table above). Execute the import and check the resulting map with the file prefix: albedo_africayyyymmddhhmm.

Repeat the procedure above also for the other import routines as given under the option "SAF Africa". Note that the DSLF, DSSF and LST products are available at 30 minutes intervals and the LAI, FAPAR and FVC are only available once a day. Take for the DSLF, DSSF and LST products a mid day product (eventually of the previous day), for the vegetation products select for the hhmm time stamp: 0000. Execute the import, refresh the ILWIS catalog as well upon completion of the import. The output file name convention used is identical as described above: product_regionyyyymmddhhmm. When displaying the various products, look within the "Display option" window for the appropriate "Representation". For the LAI, FVC, FAPAR, LST standard lookup tables are available, the DSSF and the DSLF can be visualized using a Pseudo "Representation". Check the values of the imported products.

Check also the import routines as given in the Geonetcast Toolbox under the options "SAF Euro" and "SAF South America". The import of these products is conducted much faster as only a single input file needs to be processed. Also import a product from one of these regions, so you have an idea of the area covered by these products.

The next product that will be imported is the Sea Surface Temperature (SST) that is produced by the Ocean and Sea Ice SAF (OSI) covering the Atlantic Ocean. GEONECast dissemination details of this product are presented in the table below.

OSI SAF, Sea Surface Temperature (SST)	
Temporal Resolution	twice a day
Start of recording / day	Image available from 00:00 and 12:00 UTC
No. of files	1 file, Compressed and in GRIB format
Geographic coverage	Combined GOES and MSG window
File name pattern	S-OSI_-FRA_-MULT-MAPSST_FIELD-200905271200Z.grb.gz
Output generated	Value map (degree Celcius), having a georeference
Toolbox batch routine	\toolbox_batchroutines\sstimport.bat

Select from the Geonetcast Toolbox menu, the option "SAF SST MSG-GOES Combined" twice and select for the "Date" stamp the previous day, for the hhmm portion

of the time stamp either midnight or midday (0000 or 1200 respectively). Press OK to execute the import, the output file name convention is: sstyyyymmddhhmm. Display the imported SST image using for “Display option” the “Representation” called: sst. Add also a vector layer showing the country boundaries, using for the “Display options” the option boundaries only and select a black boundary colour. Note that the water temperatures are given in degree Celcius.

Further information on all Satellite Application Facilities is provided at the website from EUMETSAT: http://www.eumetsat.int/Home/Main/What_We_Do/SAFs/Products/List_by_SAF/?l=en