

**STEP BY STEP INSTALLATION GUIDE of
ILWIS 3.7, the GEONETCAST TOOLBOX and additional ILWIS
files for the practical exercises**

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Introduction.

Follow the instructions provided below to install ILWIS37, the GEONETCast Toolbox, developed as a plug-in from ILWIS36 onwards, and a number of other free software utilities, in order to work with the data provided via GEONETCast. Read the instructions carefully and proceed with the installation of the various utilities. Some of these are provided on your DVD, others have to be obtained using the links provided as these are developed by others.

Install ILWIS:

From the directory “\software” on your DVD copy the “ilwis37b_GNC” directory to your harddisk. Select as your “drive:\” a location where you have the proper administrative rights (e.g. “D:\ilwis37b_gnc”). *Do not install ILWIS37 under the default installation directory “c:\program files”* as this might cause problems with respect to administration rights (especially under Windows 7) and because the toolbox is utilizing DOS batch routines, which can be affected by the space in the directory file name “program files”. In the ilwis37b_gnc directory a shortcut to ILWIS is created, you can copy this shortcut to your desktop.

Note that you can also download ILWIS from: <http://52north.org/index.php>

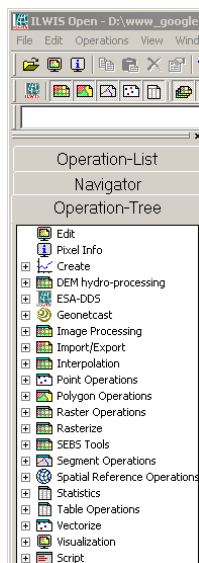
In that case select the navigation tab: “Downloads” and select “ILWIS”
Select the latest (multiple file) ILWIS version and download the ZIP file(s), save the file(s) in a temporary directory on your hard disk. Unzip the file and run the setup.

Two other golden rules when using ILWIS:

Don't use spaces in file names, instead use underscores

Do not use numbers as file names

Install GEONETCast Toolbox:



Copy the file: “Toolbox.zip” (from the sub-directory \software on your DVD) and copy this ZIP file in the ILWIS sub-directory “\Extensions” (note: there is no need to unzip the file! ILWIS automatically detects the ZIP file in this directory then unzips the file and installs the application when a new instance of ILWIS is started).

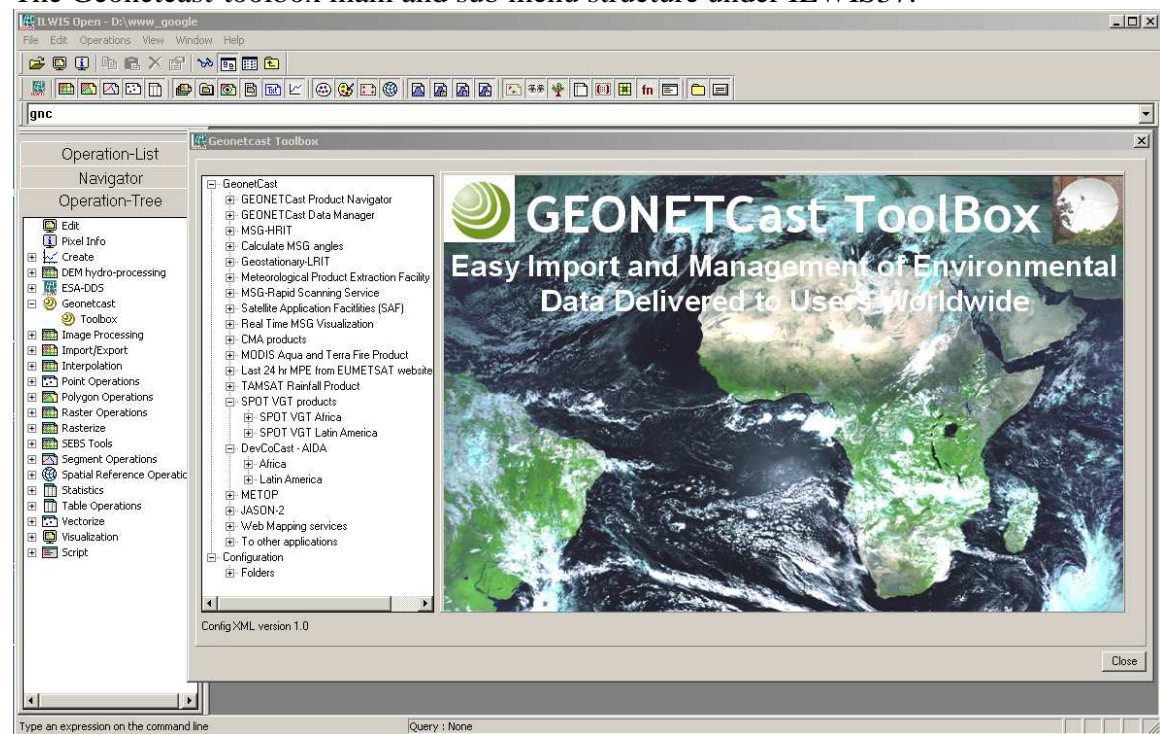
Note that you can also download GEONETCAST TOOLBOX from: <http://www.itc.nl/GEONETCast-General-information>

Start ILWIS and in the Operation-Tree of ILWIS the Geonetcast Tab will appear. Double click the “Geonetcast” tab and the subsequent toolbox tab and inspect the content of the various menus. These options can be used to import several image and data sources that are disseminated via EUMETCast-GEONETCast, a system that uses digital video broadcast (DVB) to deliver environmental data worldwide. Note

that also import routines are available for data disseminated for regions outside Africa, like Latin America and South East Asia. A total of over 100 image and products disseminated is currently supported. As the system is constantly developing keep checking the ITC website indicated above or the “*Earth Observation*” Community at <http://52north.org>, for new toolbox developments.

For the main “Geonetcast Toolbox” menu check also the figure below. Also note the ESA-DDS menu item under the Operation tree in the left hand figure. This is another plug-in under development to import the Envisat data that is disseminated via the European Space Agencies Data Dissemination System (ESA-DDS). Also this plug-in will be made available via the link(s) provided above.

The Geonetcast-toolbox main and sub menu structure under ILWIS37.



Close ILWIS as you might need to install additional utilities. Check if you have already installed the Java runtime environment, Irfanview and BUFRtool. If this is not or partially the case, use the links below and follow the additional installation instructions.

To download Java Runtime Environment:

<http://www.java.com/en/download/index.jsp>

If the system does not have the JAVA Runtime Environment installed already, move to the website indicated above, select the “Free Java Download” and install it. Accept the License Agreement to start and complete installation (using default settings).

To download IrfanView:

<http://www.irfanview.com/>

Download the setup executable and save it in a temporary directory on your hard disk.

After the download has been completed run the setup, there is no need to create shortcuts, use the option: “For all users” and select the default Installation folder. Click “Next” three times, just use the default settings, “Don’t install Google Desktop Search”, click “Next” two times and after the installation has been completed, press “Done”.

An instance of IrfanView can be started to check if the installation has been successful, the program can be stopped.

To download BUFRtool:

<http://www.northern-lighthouse.com/cipher/bufrtool.html>

On this webpage, select: Note the conditions of use. After accepting conditions of use, select:

Download zipped MS Windows version of BUFRtool 4.1.0 (or newer version if available)

Download the zip file to a temporary directory and unzip the file in this directory.

Move to the directory created during the unzip procedure, e.g. bufrtool-4.1.0

Copy the file “bufrtool.exe” from the BUFRtool sub-directory “/BIN” to the ILWIS directory under:

Drive:\ilwis_dir\Extensions\Geonetcast-Toolbox\util

(note that “Drive:\” is the disk drive and the “\ilwis_dir\” is the ILWIS directory where ILWIS was installed during the first step).

Copy also from the BUFRtool directory the whole sub-directory “\Tables” into the ILWIS directory:

Drive:\ilwis_dir\Extensions\Geonetcast-Toolbox\util

The “\Util” directory now should have a sub-directory “\Tables” containing the so called Bufr tables (html files numbered 7-13, etc)

With ILWIS, the Geonetcast toolbox plug-in and the other necessary utility-software installed you are now ready to continue with the final configuration settings.

Note that also use can be made of other freeware utilities for pre or post processing of the data, such as BILKO, BRAT, satellite tracking software, VISAT-BEAM, etc. Links to these resources are provided in Appendix 1.

Copy additional ILWIS files needed for the exercises:

[DVD:\GNC_out](#)

On your DVD resides a directory “GNC_out. Copy the whole directory to your hard disk and use this directory as your active working directory when conducting the exercises for this Geonetcast Module. *Always use this directory as your active working directory when working on the lessons provided here.* For details on the directory structure on your DVD also consult appendix 3.

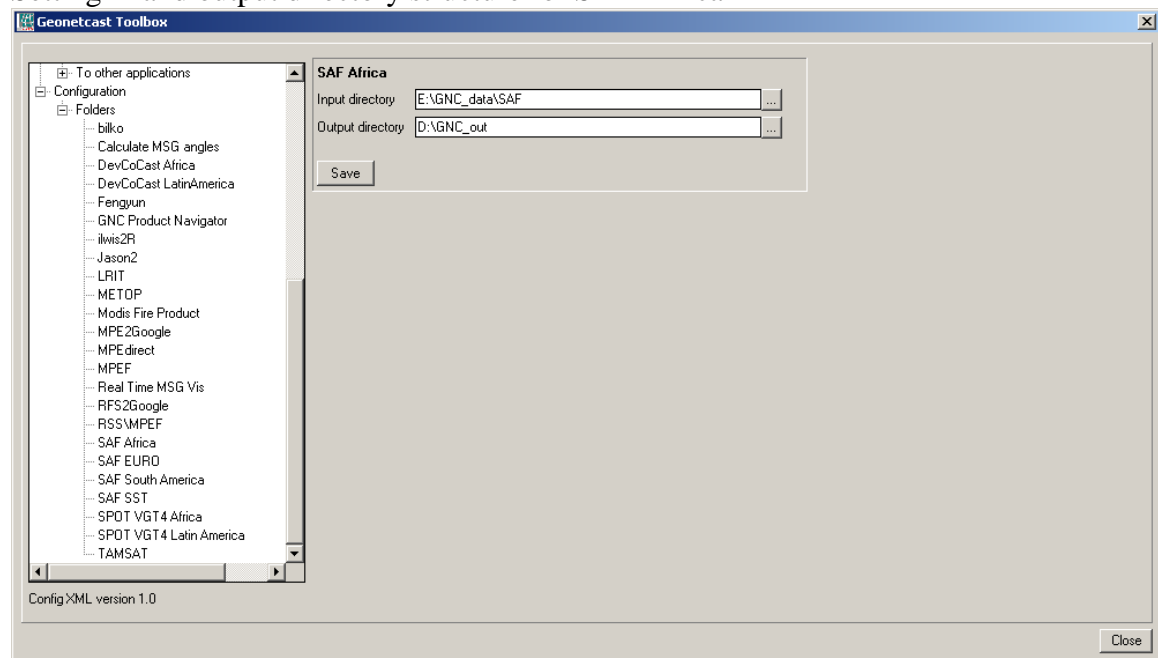
General GEONETCast Toolbox Configuration settings and configuring the MSG HRIT Data Retriever

Introduction.

Once having installed and configured a local GEONETCast ground receiving station the satellite and environmental data that is (re-) broadcasted via communication satellites can be received and stored on a storage device (server). As the data is received on a 24 hr – 7 days a week basis, the GEONETCast Data Manager, a data management system, has been developed that can be easily configured using a simple ascii text file. How to prepare this ascii configuration file and to run the Data Manager is described in Appendix 2. In your case sample GEONETCast data is provided on DVD, so this GEONETCast Data Manager configuration is not required at this stage. If you have time you can consult appendix 2 and run the GEONETCast Data Manager from the Toolbox main menu.

For you to conveniently work with the GEONETCast toolbox the data sources (on your DVD) and the local output (working) directorie(s) needs to be defined. From the main Geonetcast Toolbox menu, select “Configuration” and the sub-menu “Folders”. In the figure below the in- and output directory for the SAF Africa is used as example. The input data directory structure on the DVD is provided in appendix 3, note that in the figure below “E” is the DVD drive and “D” is your local hard disk.

Setting in and output directory structure for SAF Africa



Configure the “Folders” for DevCoCast Africa, LRIT, METOP, Modis Fire Product, MPEF, SAF Africa, TAMSAT and SPOT VGT4Africa. Check the input data directory structure on the DVD as provided in Appendix 3 and ensure that the output drive:\directory is available (e.g. d:\GNC_out).

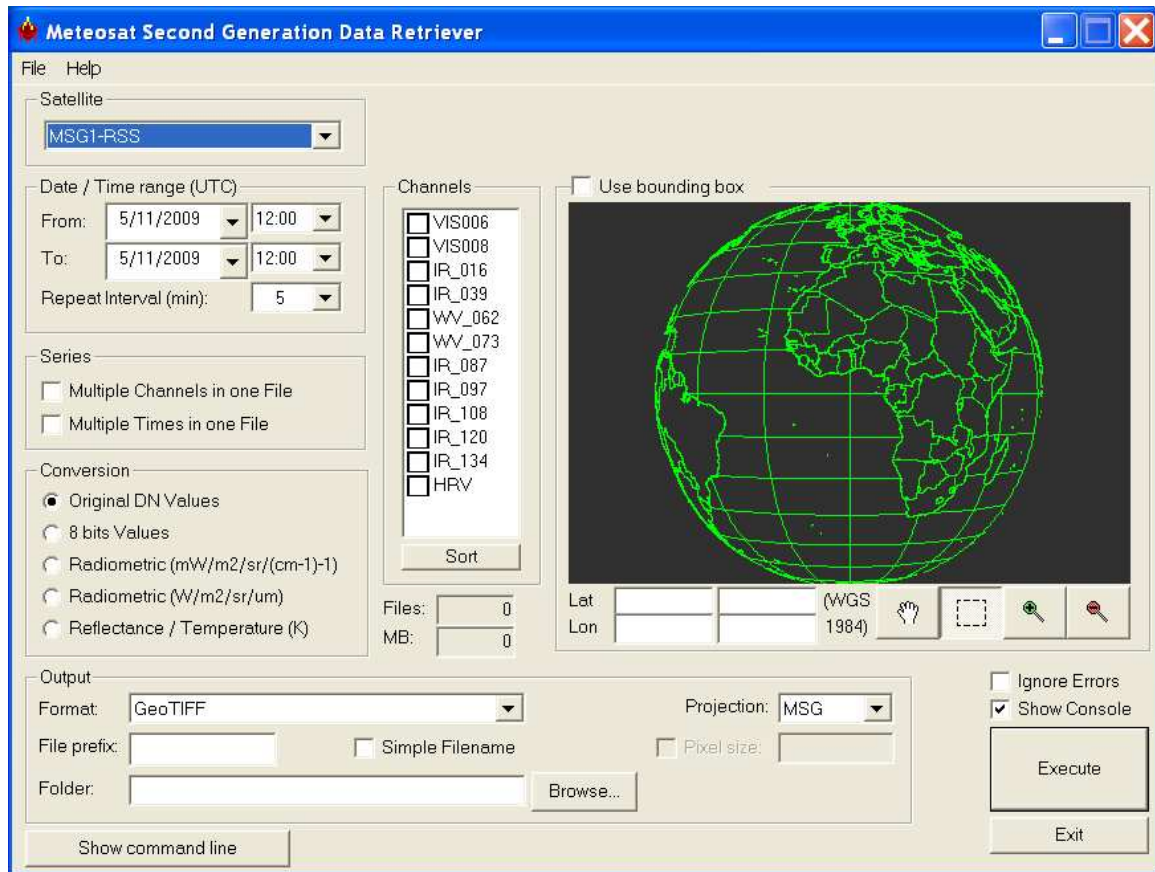
Configure the data source of the MSG Data Retriever

To complete the configuration settings open the “MSG HRIT” tab and activate the “MSG Data Retriever” option in the Geonetcast-Toolbox. The Meteosat Second Generation Data Retriever (MSG Data Retriever) window appears. This utility is a tool for converting raw Meteosat Second Generation (MSG) SERVIRI Level 1.5 files into a known raster-GIS or raster image file format. The MSG Data Retriever is used to extract the HRIT data recorded by MSG 8 and 9 (also referred to as MSG1 and MSG2 respectively prior to being declared operational).

Note that the MSG-HRIT data is licensed and therefore parts of MSG Data Retriever are licensed. Using the software means that you agree and comply to the conditions of use of the software as specified in the document provided in under the HELP function. See: Limitation of use of MSG Data Retriever.

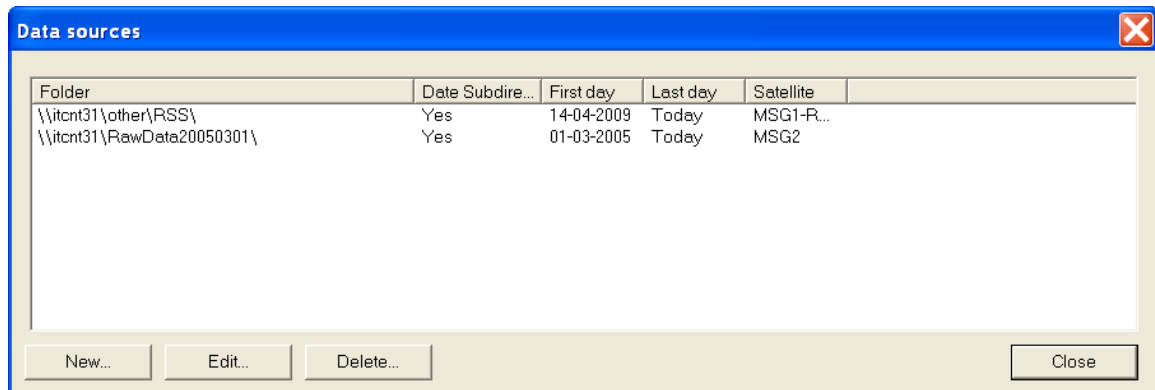
In the Satellite dropdown list, situated in the top left portion of the MSG Data Retriever window MSG1-RSS and MSG2 can be specified. These settings refer to MSG 8, the so-called Rapid Scanning Service (MSG1-RSS) situated at 9.5 degree East (scanning the northern 1/3 portion of the field of view of MSG at 5 minutes temporal intervals) and to the regular MSG 9 (MSG2) situated at 0 degree (scanning the whole field of view of MSG at 15 minutes temporal intervals). See also the figure below.

Meteosat Second Generation Data Retriever



The data sources of this HRIT data stream have to be configured separately. On your DVD this data stream is stored in another folder (see also Appendix 3). To configure the appropriate data source for the MSG2 satellite, select from the top left menu, the “File” Option and open the “Data Sources” menu.

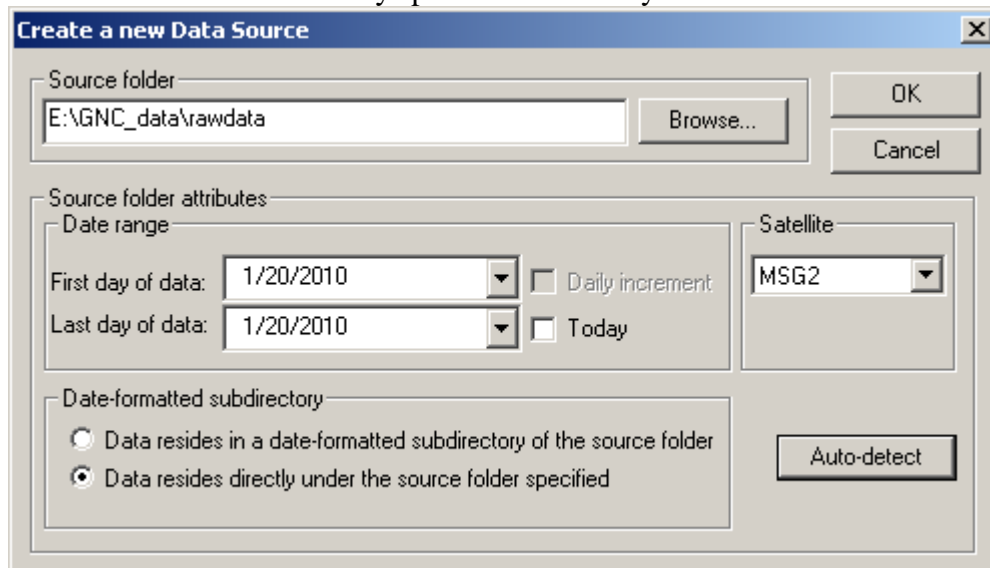
Data Sources Menu



In this submenu delete any folder that might appear, select “New”, in the “Create a new data source” menu, browse to your DVD drive:\GNC_data\rawdata (see also the figure below).

Note that you have to select as Satellite “MSG2” (see “Satellite” specification dropdown list from the figure below), note the source folder (your DVD drive and the directory GNC_data\rawdata) and specify the date of start of recording, here 20 January 2010. Activate the option “Data resides directly under source folder specified”. The “Last day of data” can be obtained using the option “Auto-detect” situated at the lower right portion of the “Create a new Data Source” Window. Your configuration results should resemble those as of the figure below. Press “OK” to complete the configuration of the MSG Data Retriever.

HRIT MSG2 source directory specification from your DVD



Appendix 1: Other freeware utilities that can be used in conjunction with ILWIS

For Jason-2 Data:

Basic Radar Altimetry Toolbox is available at:

http://www.altimetry.info/html/data/toolbox_en.html or
http://earth.esa.int/brat/html/data/toolbox_en.html

For SPOT-Vegetation data:

New version of the VGTEExtract software. This new version is 1.2, build/release 2. With additional output format: ILWIS (.mpr)

Windows, with JAVA integrated:

http://www.vgt4africa.org/VGTEExtract/Windows/VM/setupVGTEExtract_VM.exe

Windows version, without JAVA (JAVA should already be installed)

http://www.vgt4africa.org/VGTEExtract/Windows/NoVM/setupVGTEExtract_NoVM.exe

Linux, without JAVA

http://www.vgt4africa.org/VGTEExtract/Linux/NoVM/setupVGTEExtract_NoVM.bin

Linux, with JAVA

http://www.vgt4africa.org/VGTEExtract/Linux/VM/setupVGTEExtract_VM.bin

For METOP-AVHRR/3 Data:

VISAT-BEAM, with the Metop-AVHRR/3 import plug-in (version 1.3):

Home page BEAM:

<http://www.brockmann-consult.de/beam/>

Downloads of BEAM:

<http://www.brockmann-consult.de/beam/downloads.html>

Download of METOP AVHRR Level-1b Product Reader

<http://www.brockmann-consult.de/beam-wiki/display/BEAM/Plug-ins>

For Satellite Position Prediction software:

SATSCAPE is a satellite tracking program for Windows

<http://www.satscape.co.uk/main/modx/>

David Taylor: WXTRACK

<http://www.satsignal.eu/software/wxtrack.htm#DownloadWXtrack>

For more Marine Applications and Processing:

BILKO, supported by UNESCO, BILKO is available from homepage:

<http://www.noc.soton.ac.uk/bilko/>

Appendix 2. Optional. Geonetcast Data Manager, Application description for System Administrators - Managers

Here the “GEONETCast Data Manager” is described, a utility that is used to handle the incoming data stream, file location configurations options that can be set by the system manager for storage of specific data. The GEONETCast Data Manager is described into more detail and how an ascii configuration file can be created / adapted.

The Geonetcast Data Manager is a software application for Windows / Linux written in Java that - in short – examines computer files, and transfers them to a proper location, based on filename-patterns. It was developed by ITC (<http://www.itc.nl>).

The primary purpose for developing this application is to organize the large amount of data files received on a GEONETCast receiving station (a computer with a Digital Video Broadcast (DVB) card connected to a satellite dish, configured to receive the EUMETCast – GEONETCast data, which is EUMETSAT's satellite-based broadcast system for satellite and environmental data). The data that is received on the EUMETCast - GEONETCast receiving station must be transferred to computer storage that is independent of the receiving station's disk storage before users can access it. Users are not allowed to work directly with the data on the receiving station, because it should perform its primary task undisturbed, which is to be available all the time for storing the files captured by the (DVB) card.

Main objectives of the Geonetcast Data Manager application:

- To organize all files in the "incoming" folder of the EUMETCast – GEONETCast receiving station, according to “rules” defined by the local system administrator.
- To detect and log "missing files". The application can be fed with knowledge about the files that are expected from a certain category (e.g. for MSG-HRV this would be 24 strips every 15 minutes). The "missing files" log is very helpful when users need to check data consistency prior to time-series analysis.
- Be extremely reliable to work continuously, 24 hours per day, 7 days per week, preferably unattended for several months, because if the application stops working unexpectedly (and nobody is available to solve the problem), after a couple of days, the files accumulated in the "incoming" folder on the EUMETCast - GEONETCast receiving station is likely to reach the maximum available disk capacity.
- Cause as little as possible disturbance to the EUMETCast – GEONETCast receiving station (lightweight activity), or otherwise the station will be too busy and occasionally miss the reception of files (fail to store some of the files captured by the DVB card).
- It must be easy to restore the configuration of the Geonetcast Data Manager after a software or hardware crash or a power failure, even by non-experts, as the local system administrator may not be available at all times.
- The Geonetcast Data Manager must be able to process a large number of files in a single folder at one time, because it must be able to handle all files that have been

accumulated in the "incoming" folder, in case the application has not worked for a couple of days. This can be more than a million files!

- The type of the files that the Geonetcast Data Manager can process must not be fixed to a specific type (e.g. satellite images). Therefore the application will only depend on the fact that EUMETCast files have specific filename-patterns. With this, the process of detecting a file's category can be kept lightweight, as the file does not need to be opened.
- The “rules” with which files are organized are kept simple in the initial implementation (transfer files to a new location, delete after a certain time period, delete immediately or keep forever, ignore specific files, etc.), which is sufficient for the primary objective of the application. However, it is not difficult to extend their capability if such demand exists.
- The system administrator must be able to easily adapt the configuration file, so that new data that is broadcasted can be easily handled, as the EUMETCast-GEONETCast system is further developing and it is expected that in the future more data will be broadcasted.
- The system manager should be able to fine-tune the storage of the data that is received to be tailored for a specific organization. Given the data load it is impossible to store all of the data. Each organization will have its own specific data storage requirements!

The Geonetcast Data Manager can run without problems on the EUMETCast-GEONETCast receiving station, but can also run on another computer, as long as all necessary folders can be accessed through the network connection. *Note that the Directories assigned to store the various data files need to be created (manually) prior to starting the Data Manager.*

Geonetcast Data Manager: “Rules”

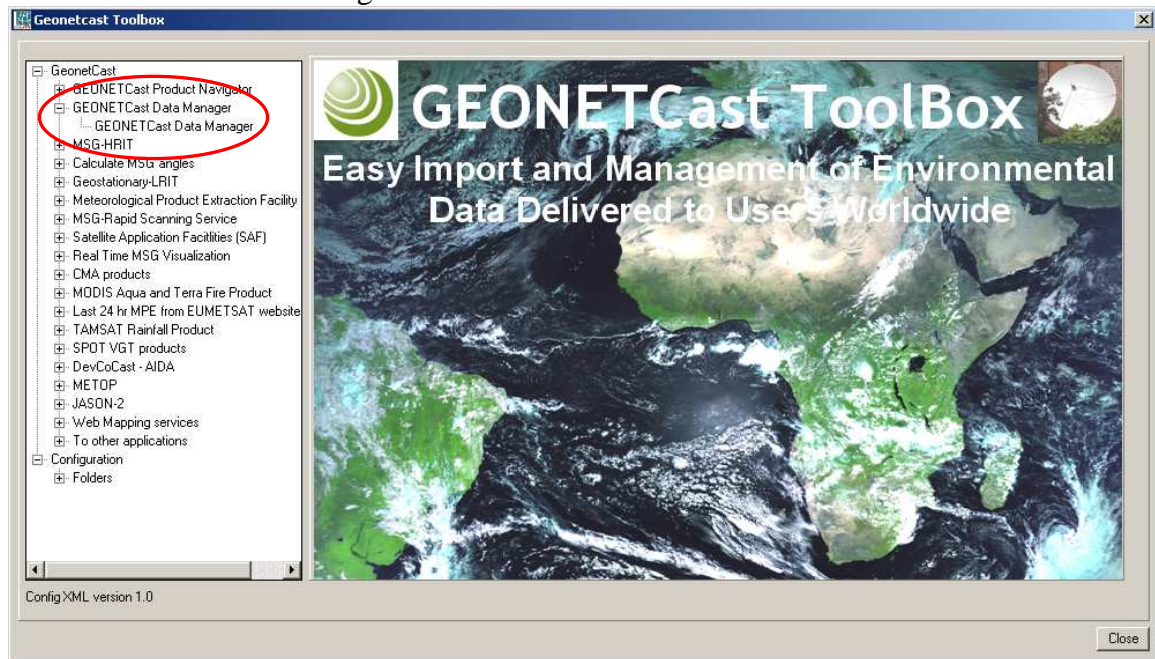
The local EUMETCast-GEONETCast system administrator creates the file-processing rules. This is initially done by editing a text-file (the configuration file that is used by the Geonetcast Data Manager). At a later stage, the rules are fine-tuned in the user-interface of the Geonetcast Data Manager. This was done to keep the user-interface simple and understandable. For example, file patterns or expected frequency of a category of files must be changed in the configuration file, using a text-editor. However, the destination location or the duration of storage of a category of files is changed in the user-interface, because it is considered a "last-minute" change: the administrator may frequently change his mind about this.

The user-interface of the Geonetcast Data Manager adapts itself to the rules that are defined. Rules are organized in “groups” and “items”. Each group becomes a tab, and each item becomes a box within a tab. Few rules will make a small user interface (a small window), and many rules will make a large one.

Configuring the GEONECAST DAT MANAGER

Open ILWIS, from the Operation-Tree select the “Geonetcast” and “Toolbox” tab and subsequently the option “Geonetcast Data Manager”, see also the figure below.

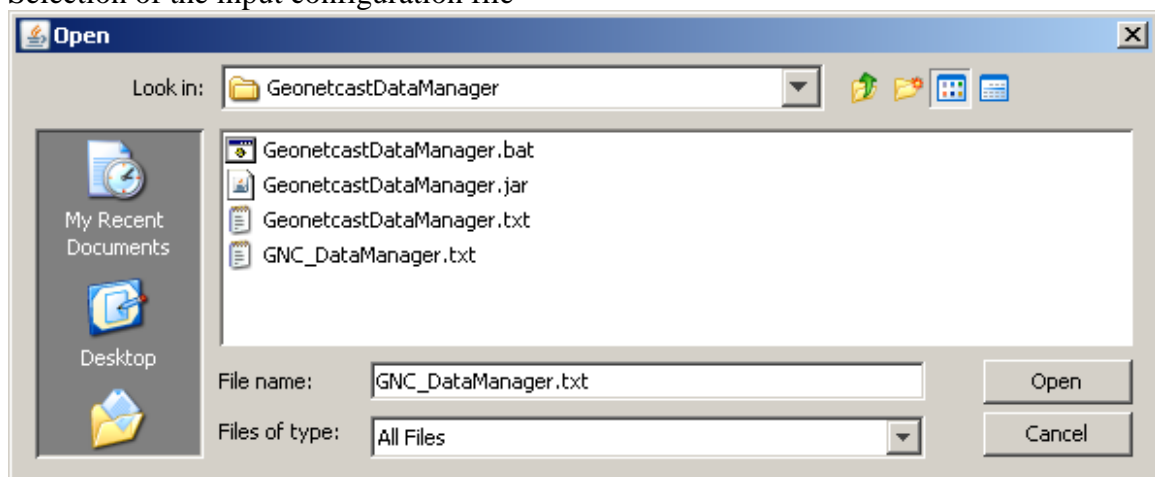
The Geonetcast Data Manager.



Note that this utility only needs to be configured by the system manager-administrator to ensure that the data which is required by the organization – institute is properly stored and can be accessed by the other users within the organization – institute!! (There is no need to start the application as an instance of the GEONETCast Data Manager might already be running).


Once the Geonetcast Data Manager is activated an input configuration file needs to be specified as indicated in the figure below. Double click the GEONETCast Data Manager and select the appropriate input configuration file.

Selection of the input configuration file

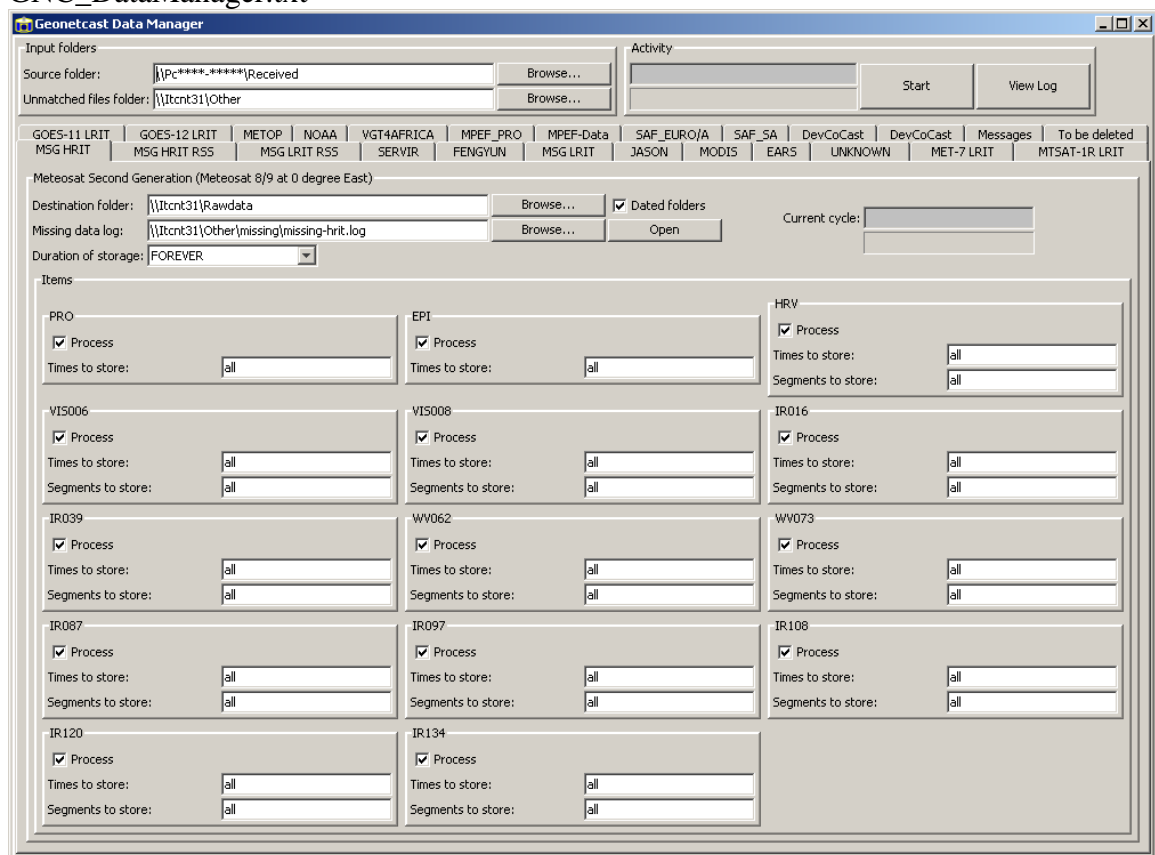


A sample configuration file that is used at ITC for the Ku-Band broadcasting is provided. This configuration file also incorporates all the services that are re-broadcasted via C-

Band (e.g. for Latin America, Africa and South-East Asia). Select the file “GNC_DataManager.txt” and a menu will appear on the screen (a sample is shown in the figure below).

The menu that is shown is based upon the settings that are provided in the GNC_DataManager-ITCnew.txt file. Examine the various tabs (“groups” and look at the “items” within each of these groups (once more: don’t start the application!). This configuration file can also be opened using a text editor and can be modified according to the specific need of the user. Close the Data Manager, click the closing button in the top-right corner 

The Geonetcast Data Manager, showing the menu as defined by the text file GNC_DataManager.txt



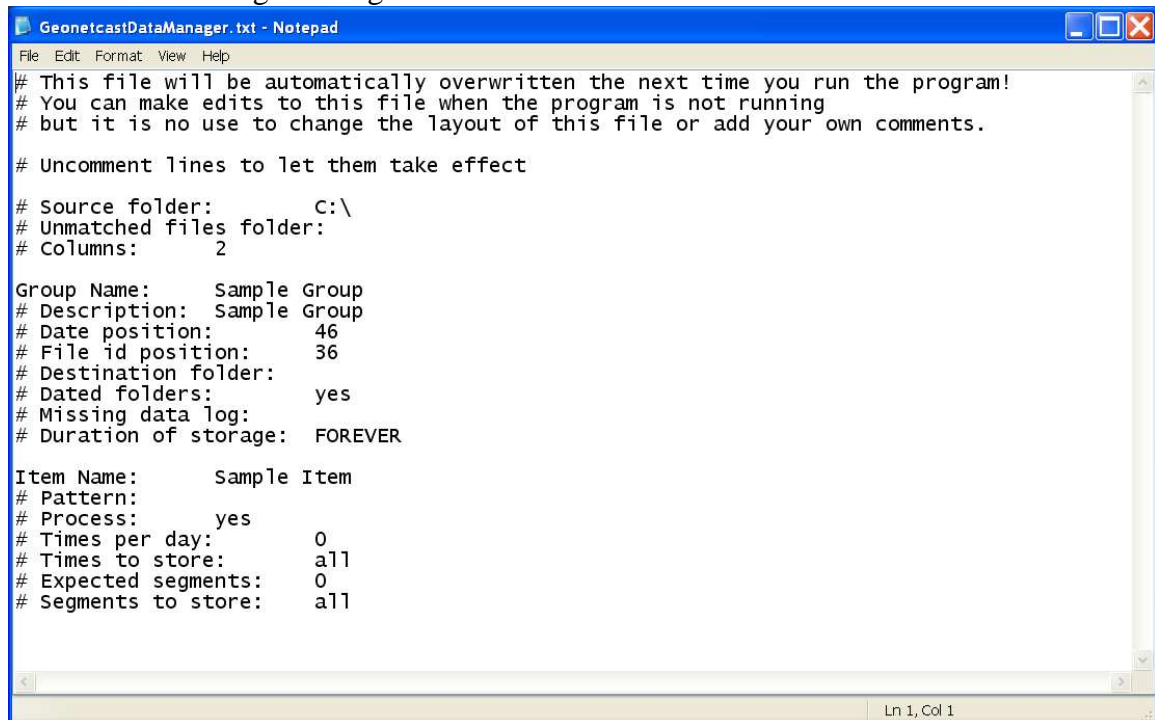
Use the Windows Explorer, move to the ILWIS directory and move to the following sub-directory:

Extensions\Geonetcast-Toolbox\GeonetcastDataManager

Now select the file: GeonetcastDataManager.txt, double click the file to open it using Notepad. This file is the default file that can be used to build your own data storage configuration file (this file is also given in the figure below).

As indicated in the application description before (Geonetcast Data Manager: “Rules”) you are able by adapting the “Group Name” and “Item Name” to modify the menu that will subsequently be generated when starting the application using the modified configuration file.

Default Data Manager configuration file



```
File Edit Format View Help
# This file will be automatically overwritten the next time you run the program!
# You can make edits to this file when the program is not running
# but it is no use to change the layout of this file or add your own comments.

# Uncomment lines to let them take effect

# Source folder:          C:\
# Unmatched files folder:
# Columns:                2


Group Name:      Sample Group
# Description:   Sample Group
# Date position: 46
# File id position: 36
# Destination folder:
# Dated folders:  yes
# Missing data log:
# Duration of storage:  FOREVER

Item Name:      Sample Item
# Pattern:
# Process:      yes
# Times per day: 0
# Times to store:  all
# Expected segments: 0
# Segments to store:  all

Ln 1, Col 1
```

Simulate an event that new data is being distributed via GEONETCast. In this case new Polar Orbiter satellite data is broadcasted having 5 spectral channels, temporal resolution is 2 times a day, and each of the spectral bands is consisting of 5 segments (Add a “Group” and 5 “Items”). Ensure that the changes are implemented when the system starts (“# Uncomment lines to let them take effect”). Adapt the configuration file and save the modified file (eventually use another output file name). Start the GeonetcastDataManager.jar given in the sub-directory (the actual JAVA application) or start the application from the ILWIS Operation-Tree once more using the adapted configuration text file as input file and browse through the menu and note the results of your modifications. Also adapt the settings that can be modified from the “User-Interface”, like “Duration of Storage”.

Having the capability to easily adapt the menu and therefore also the storage of the incoming data stream any new modifications resulting from adaptations of the GEONETCast system can be easily incorporated without the need to wait for software updates. This is important as the system will further develop and broadcast more satellite and environmental data. Using simple copy and paste options the text file can be configured according to the need of the user, the system manager-administrator does not need to have any programming experience to do these types of manipulations.

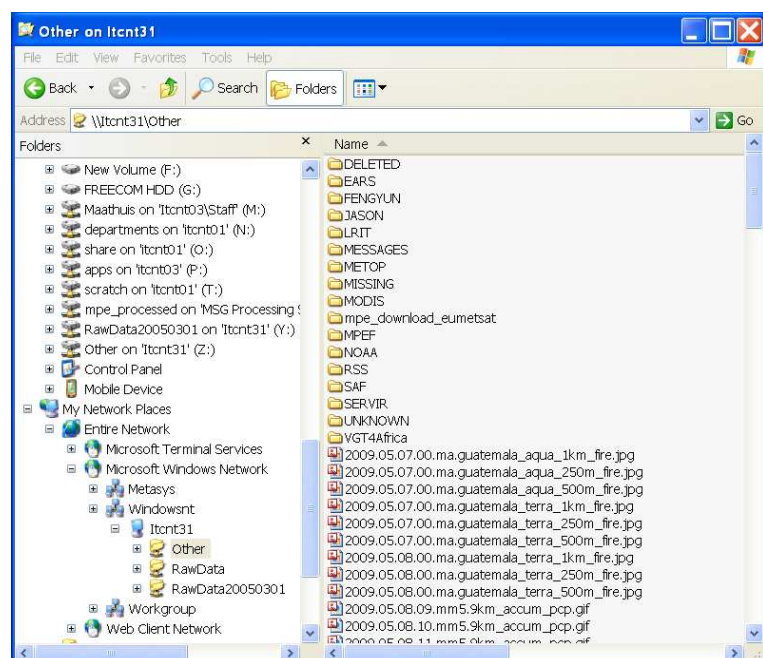
Note that any data which is not assigned by rules” specified is stored in the Directory assigned under the “Unmatched File Folder”. If this Directory is regularly checked the new data that has arrived can be easily captured in a set of new “rules” and stored if required relevant or deleted. Close the Geonetcast Data Manager, pressing 

Now open the text file “GNC_DataManager.txt” using Notepad to see how at ITC the full range of data broadcasted via GEONETCast is configured / handled and which data is stored (for various durations). Check the various “Group and Item names”, “Pattern” and “Source and Destination folder” and that is used within ITC.

If you have finished browsing through the file, close it. Note that new GEONETCast users can use this configuration file to get them going and adapt it to their local circumstances (using copy, paste and delete!). Once more open this configuration file with the GEONETCast Data Manager and check also the settings specified in the “User-Interface” for the various group items. DON’T START the application, you are not the system manager as there might already be an instance of the GEONETCast Data Manager running. When finished browsing through the menu, close the application.

At ITC the data that is received via EUMETCast-GEONETCast is stored on a file server that can be accessed by all users within the ITC building. Use the Windows Explorer and move to “My Network Place”, Entire Network, Microsoft Windows Network, Windowsnt and select: Itcnt31. (you can also type [\\itcnt31](http://itcnt31) as the address in Windows Explorer. Two directories are relevant:

- RawDATA20050301; a year, month, day formatted directory structure, which is storing the High Rate Image Transmitted data of Meteosat Second Generation (full spatial, spectral and temporal resolution data of MSG)
- Other; including a number of sub-directories as well as data in the root (see figure below)



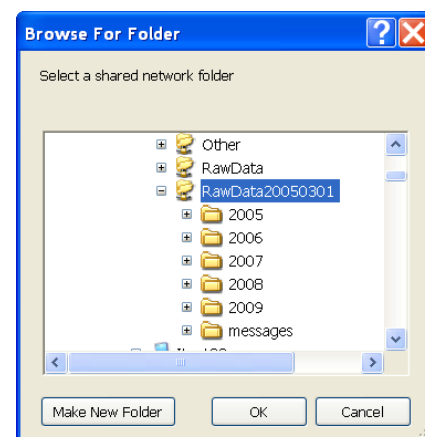
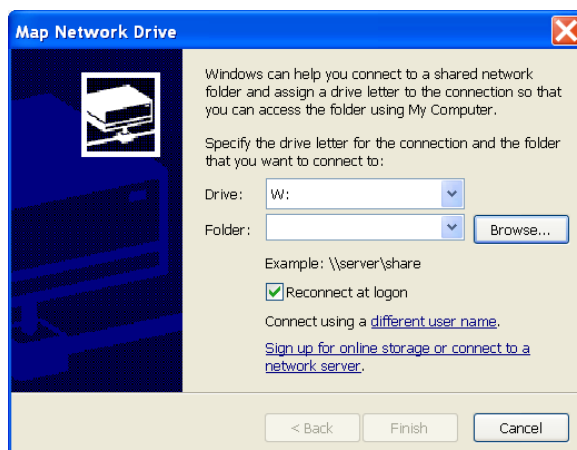
The other data from the receiving computer, using the settings as specified by the GEONETCast Data Manager's configuration file, are stored in various sub-directories in the archiving system folder [\\itcnt31\Other](#). Some relevant sub-directories in this folder are:

- FENYUN: Data from China Meteorological Agency, e.g. FY2-C
- JASON: data from Jason altimeter mission (sea surface height and sea level anomaly)
- LRIT: Low Rate Image Transmitted satellite image data from Geostationary satellites (MSG, Meteosat-7, MTSAT1R, GOES-East and GOES-West)
- METOP: data from the various instruments onboard of METOP
- Mpe_download_eumetsat: the mult sensor precipitation estimates, generated from MSG and Met-7. Note that this data is directly extracted from the EUMETSAT Website, it is NOT received via GEONETCast!
- MPEF: Secondary Meteorological Products (AMV, GII, CLM, CLAI)
- NOAA: NOAA based satellite (AVHRR-GAC) and sounder data (e.g. HIRS, GOME, etc)
- RSS: Rapid Scanning Service, 5 minutes recordings of the northern 1/3 portion of MSG-field of view and secondary products
- SAF: Satellite Application Facility data (e.g. surface radiation budget, biogeophysical parameters, sea surface temperature)
- SEVIR: data from regional visualization and monitoring system, e.g. Mesoamerica
- VGT4Africa: decadal processed data derived from SPOT Vegetation Instrument, like NDVI, VPI, etc.

Mapping of Network Drives

To get easy access to the data, as it is stored on a “distant” file server, it is convenient to map these directories as a Network Drive using the Windows Explorer Tools option.

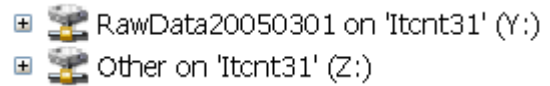
Open Windows Explorer, from the Menu, select Tools and Map Network Drive. Specify a Drive letter, select the shared network folder from Windowsnt and browse to the target folder, see also the sample figures below.



If you are configuring your system within ITC configure your network drive mappings from the ITCNT31 as follows:

- Z: Other
- Y: RawData20050301

When opening the Windows Explorer the Y and Z drives should appear like indicated in the figure shown here:



For various other places these settings will be different. You have to consult the system manager to get the details of how the data is stored in the archive. If you are within ITC, browse through the two directories to get an idea of the raw data that is available. If you are working at another organization-institute, consult the system manager – administrator for the relevant details and check the data that is stored there. Note that there are differences with respect to the type of data disseminated by Ku and C-Band services.

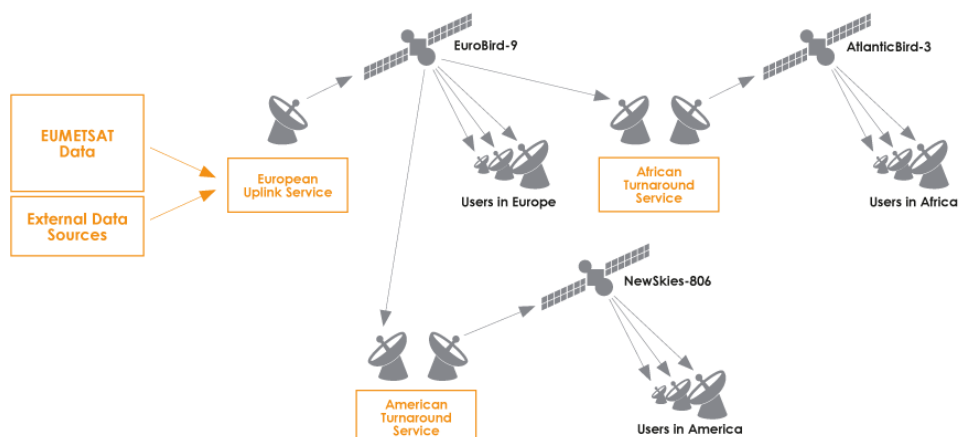
To get an idea of what is being disseminated using the various services browse to the Product Navigator from EUMETSAT, available at: <http://navigator.eumetsat.int/>.

From here select: Extended Search and under Dissemination, select EUMETCast Europe / Africa or Americas and press the Search button. Next to this button also the total number of products is indicated.

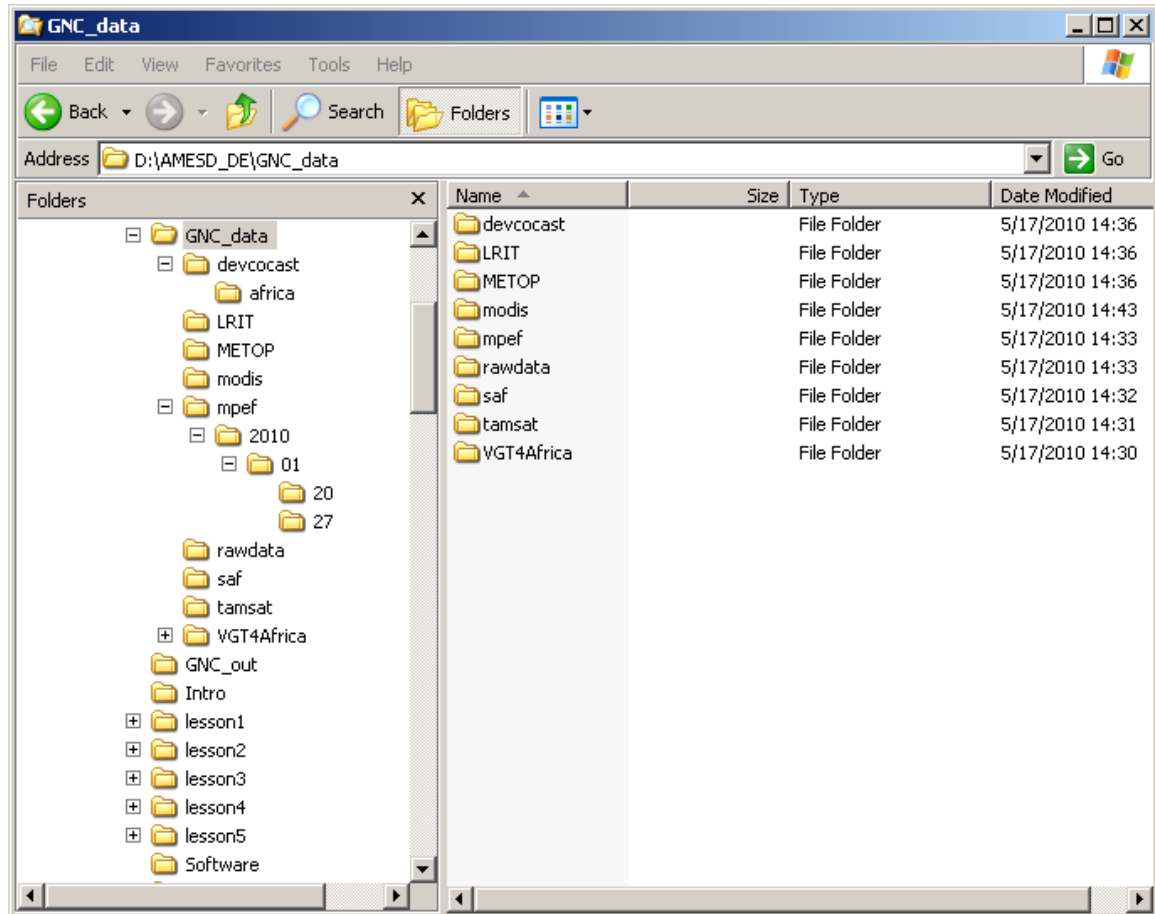
Concluding remark

With the settings provided you are now ready to utilize the GEONETCast Toolbox and explore the data that is delivered via DVB broadcast. The figure below provides a system overview. Note that services that are available in Europe (like the MSG1-RSS and some for METOP) are NOT available via the African and American turnaround services. The Geonetcast-toolbox under ILWIS is able to import and process data delivered via EUMETCast-GEONETCast, but it depends on the service channels activated which data is actually received at the various ground receiving stations located in the world.

EUMETCast-GEONETCast system overview



Appendix 3: GNC-Workshop DVD (data) directory structure



To conduct the lessons use can be made of the PDF: “*schedule_DE_GNC.pdf*”, situated in the root of your DVD. This file contains all the links to the lessons. The material is also provided in the various sub directories, called intro, lesson1 to lesson5. The necessary software utilities are provided in the sub directory \Software. The ancillary data for the exercises is given in the sub directory \GNC_out. Copy this whole directory to your hard disk and use this as your active working directory when doing the GNC-Toolbox exercises. The GNC data is given in the sub directory GNC_data, note that these might contain other directories, like in the case of the MPEF directory (is date formatted!). You can keep the data on DVD, but need to specify the appropriate locations using the “*Configuration*” tab and “*Folder*” option in the Toolbox.

Note that also a sub_directory “*product-navigator*” has been added, using the file “*indexer.html*” the “*geonetcast product navigator*” can be started from your DVD drive as well