

UNIVERSITY OF TWENTE.



## GEONETCAST (AT ITC)

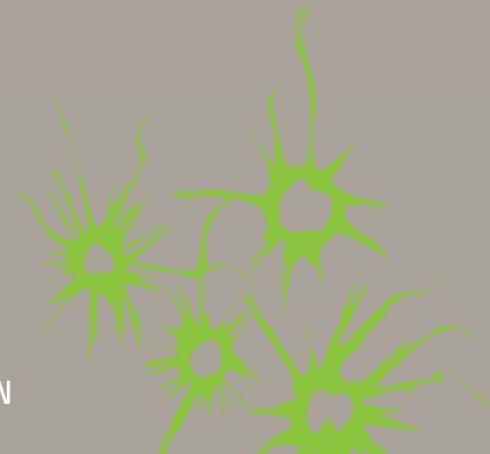
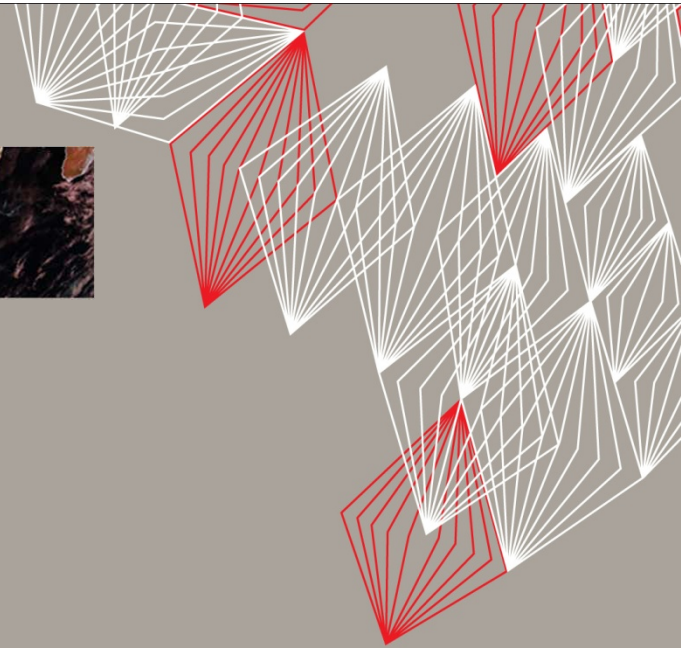
BEN MAATHUIS / BAS RETSIOS

DECEMBER 2021

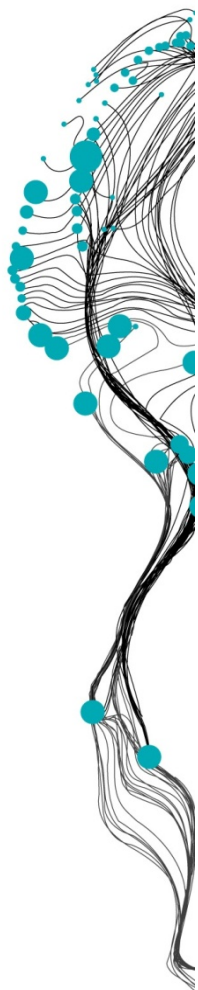
<https://www.itc.nl/about-itc/scientific-departments/water-resources/software-tools-models/ilwis3-and-toolbox-plugins/>



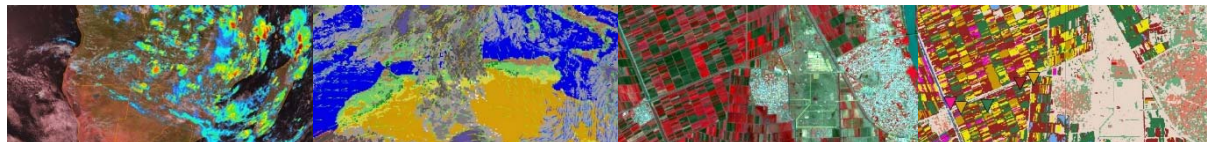
FACULTY OF GEO-INFORMATION SCIENCE AND EARTH OBSERVATION

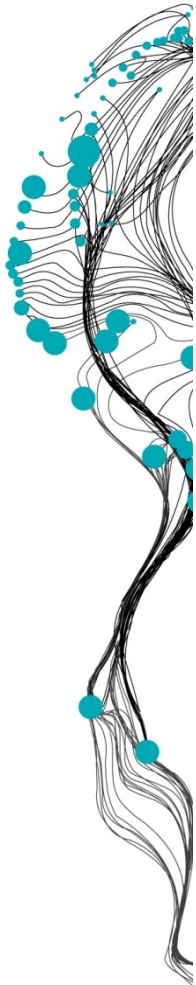


# GEONETCAST OVERVIEW



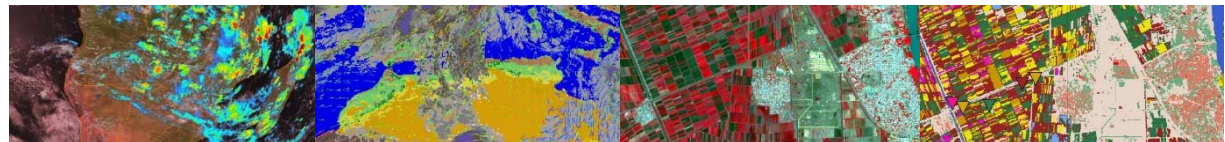
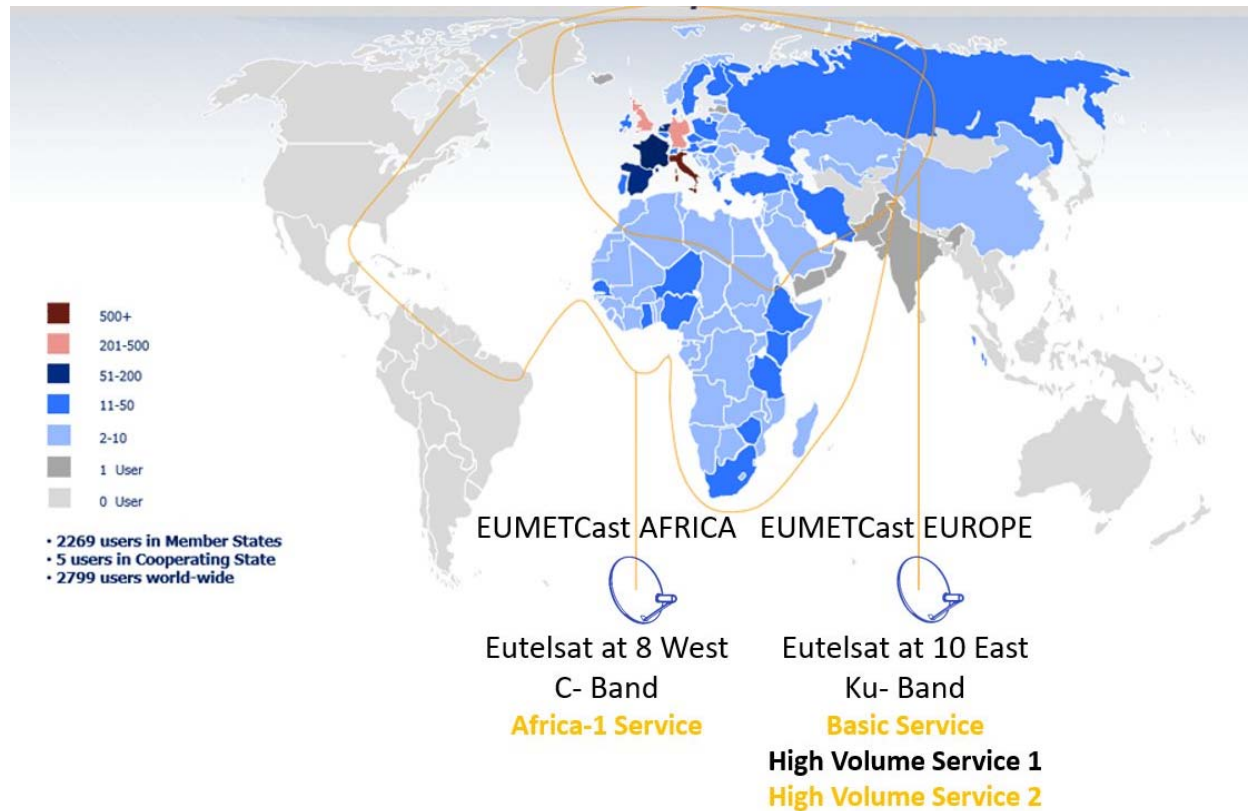
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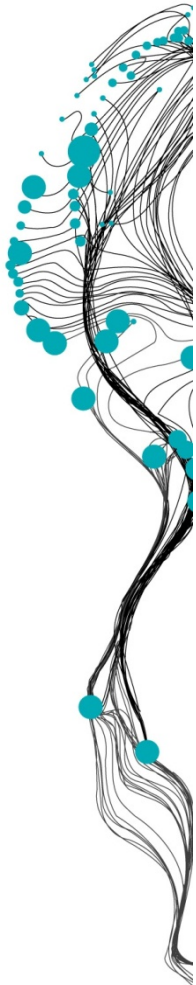




# DATA RECEPTION

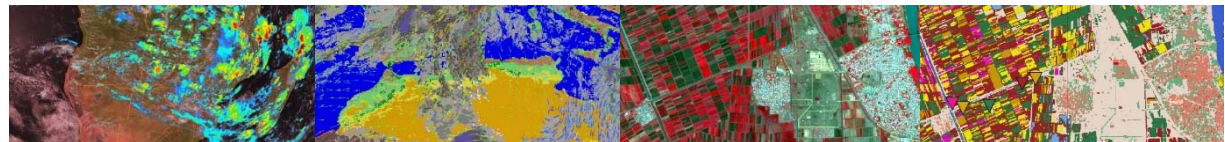
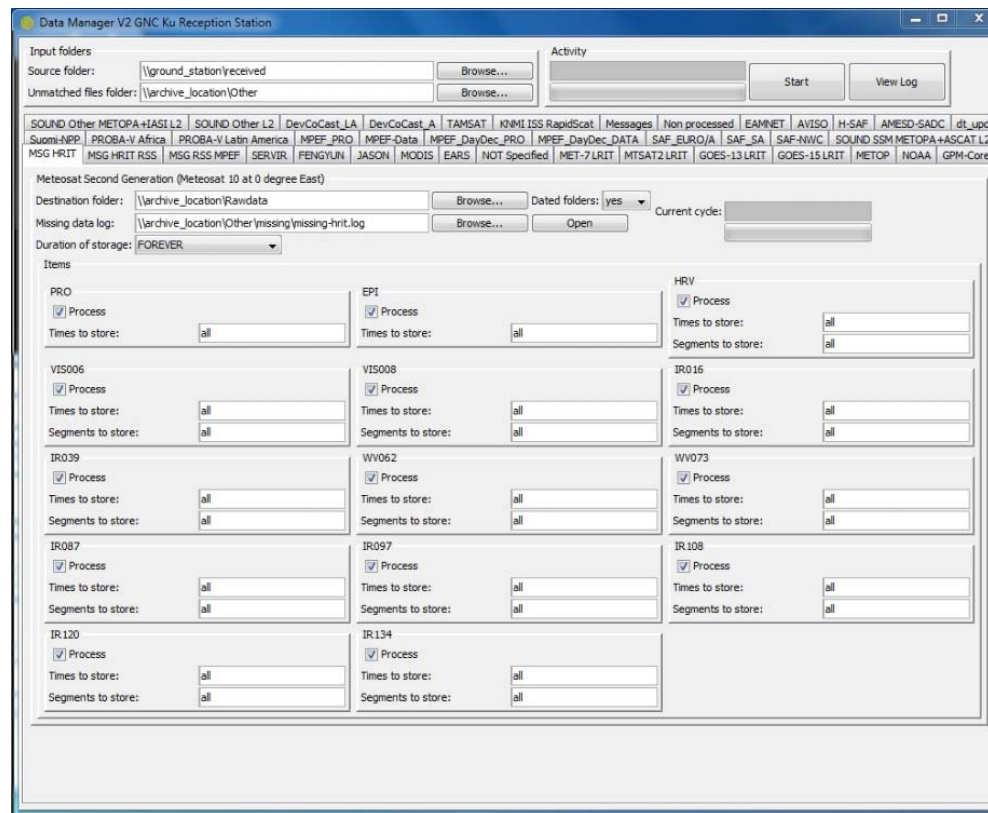
- GEONETCast as backbone for (real-time) data provision
- Multiple GEONETCast services (Europe - BAS + HVS1 & 2 / Africa)

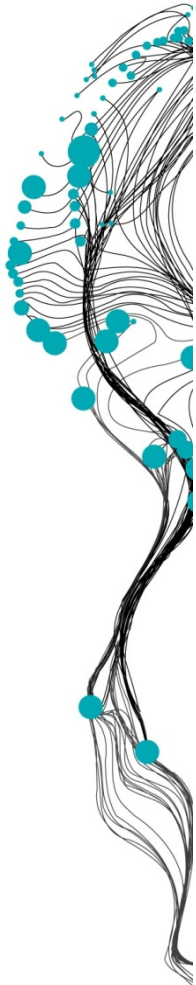




# DATA MANAGEMENT


- **Continuous management of newly received data and available from server**





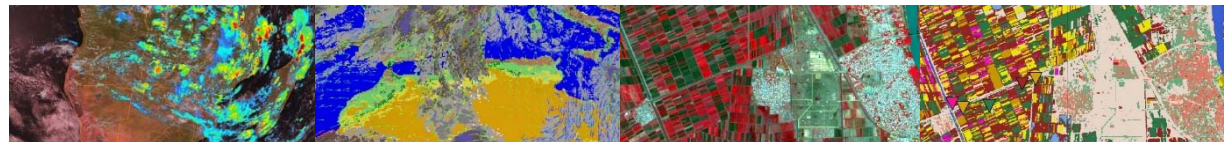
## DATA ACCESS

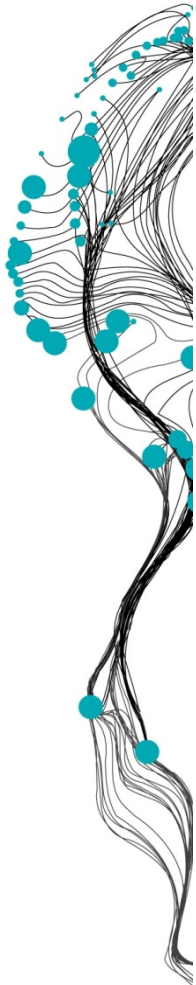
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- Through 'EDUROAM' from within the University network
- Through VPN using 'eduVPN' 
- **Manual:**
  - <https://www.utwente.nl/en/lisa/ict/manuals/network/eduvpn/eduvpnwds/#before-you-start>
- **Software:**
  - <https://ut.eduvpn.nl>

After installation and connection to the network, make 3 network mapping:

- drive Z: \\ad.utwente.nl\ITC\Geonetcast\RawData (this folder is having a dated format)
- drive Y: \\ad.utwente.nl\ITC\Geonetcast\Other (containing many data folders)
- drive X: \\ad.utwente.nl\ITC\Geonetcast\RawData\_IODC (this folder is having a dated format)





# DATA PROCESSING

## ILWIS 386 and the GEONETCast Toolbox plug-in



ILWIS Open - C:\gncV2

File Edit Operations View Window Help

Geonetcas

Operation-Tree Navigator Finder

- Edit
- Create
- DEM hydro-processing
- FAO-Frame
- GEONETCast
- Toolbox
- ISOD
- Image Processing
- Import/Export
- Interpolation
- Point Operations
- Polygon Operations
- Raster Operations
- Rasterize
- SEBS Tools
- Segment Operations
- Spatial Reference Operations
- Statistics
- Table Operations
- Vectorize
- Visualization
- Script

C:\gncV2

- GPM\_20200420\_12
- GPM\_20200420\_123139\_123637
- SWL\_001\_20200420

GEONETCast Toolbox

Geonetcas

- GEONETCast Toolbox General
- Geostationary Satellites - Level 1.5 Data
  - Link to online resources
  - MSG4(Prime) at 0, MSG3(RSS) at 9, MSG1(IODC) at 41.5 Deg East
  - Electro-L2 at 77 Deg East
  - Fengyun 2G at 99 and 2H at 79 Deg East
  - Himawari-8 at 140 Deg East
  - GOES-16(East) at 75 and GOES-17(West) at 137 Deg West
- Real Time MSG Visualization
- Polar - Level 1.5 Data
- Meteorological Products
  - Link to online resources
  - MSG 0-degree based
  - MSG 41.5-degree based
  - MSG-RSS based
  - Fengyun based
  - Lightning Detection
  - NCEP GFS Africa
- Satellite Application Facilities Products
- Other Selected Products - Global
- Other Selected Products - Regional
- Other Routines-some require online access

Configuration

- Folders

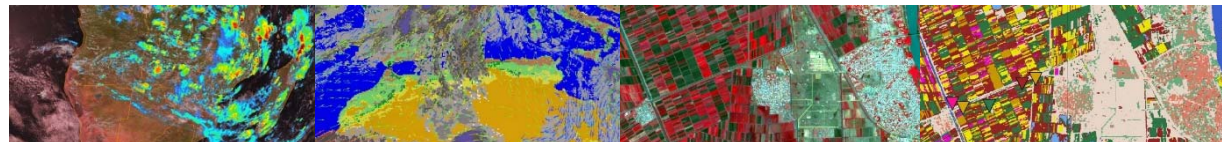
Type an expression on the command line

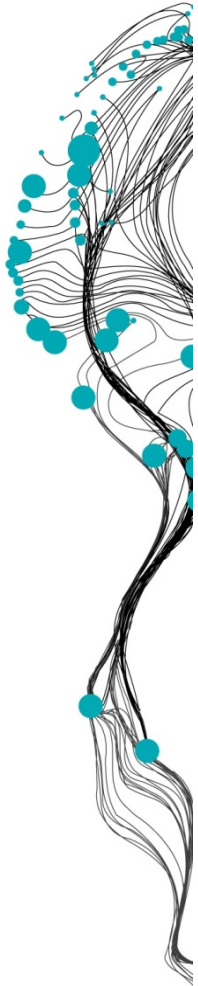
Config>ML version 2.1-beta

Cancel



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## GEONETCAST TOOLBOX CAPABILITY

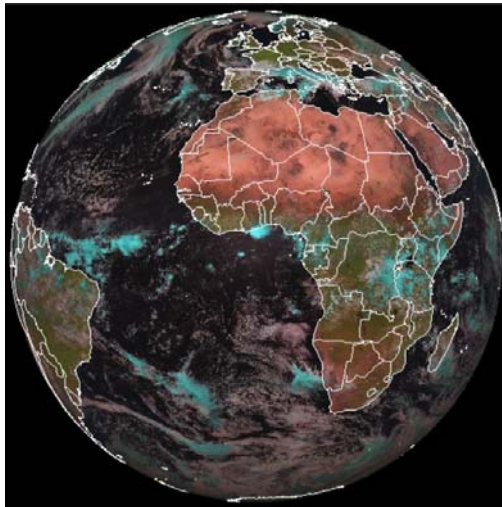
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- **Following main functionality to derive images and products relevant for land, ocean and atmosphere studies / research:**
  - **Data management**
  - **Import and pre-processing of:**
    - **various geostationary satellites and real time visualization for MSG for different regions**
    - **various polar orbiting satellites**
    - **various meteorological products**
    - **various products provided through the Satellite Application Facilities, like LSA-SAF, H-SAF, NWC-SAF, OSI-SAF and CM-SAF**
    - **various global and regional products**
  - **Other relevant (external) routines and links to resources**

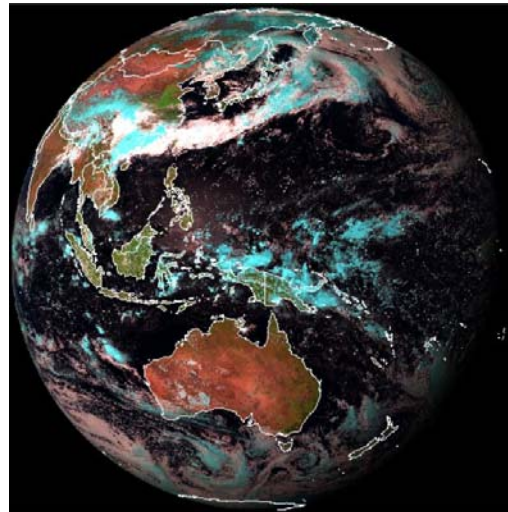


## SOME EXAMPLES: GEOSTATIONARY

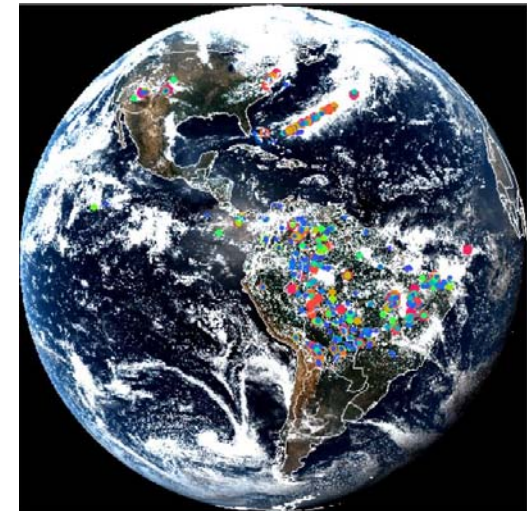
- **MSG, Electro-L, Fengyun, Himawari, GOES**



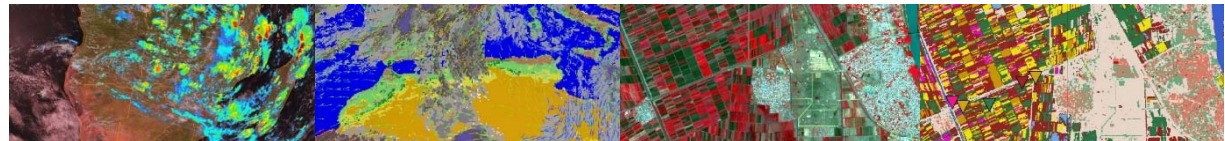
All operational MSG satellites



Himawari-8



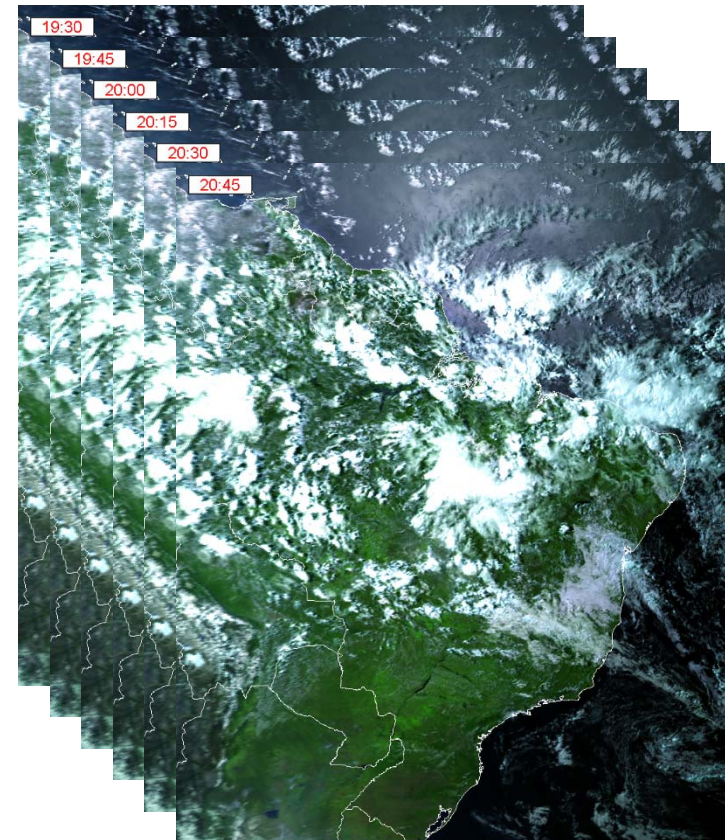
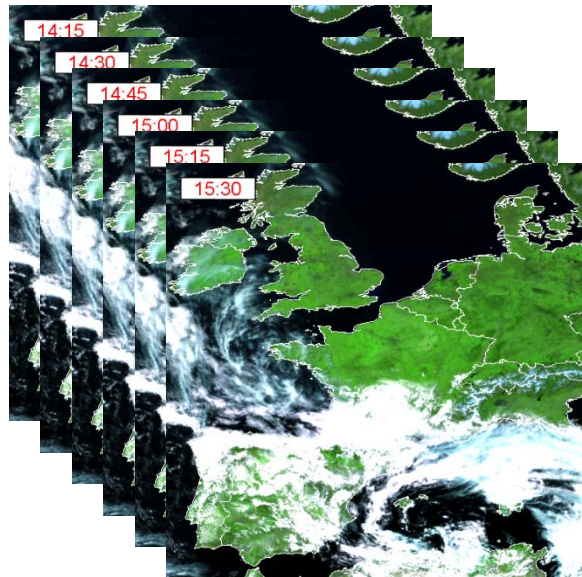
GOES and GLM



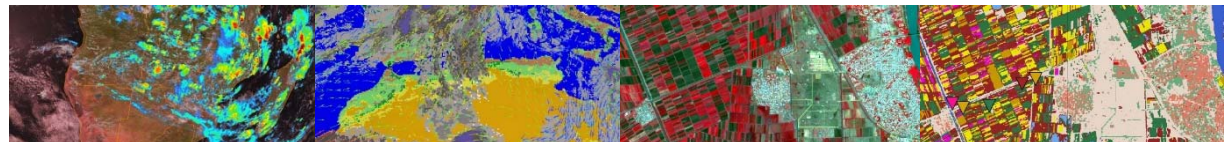


## SOME EXAMPLES: GEOSTATIONARY

- Real time visualization of MSG (for different windows)

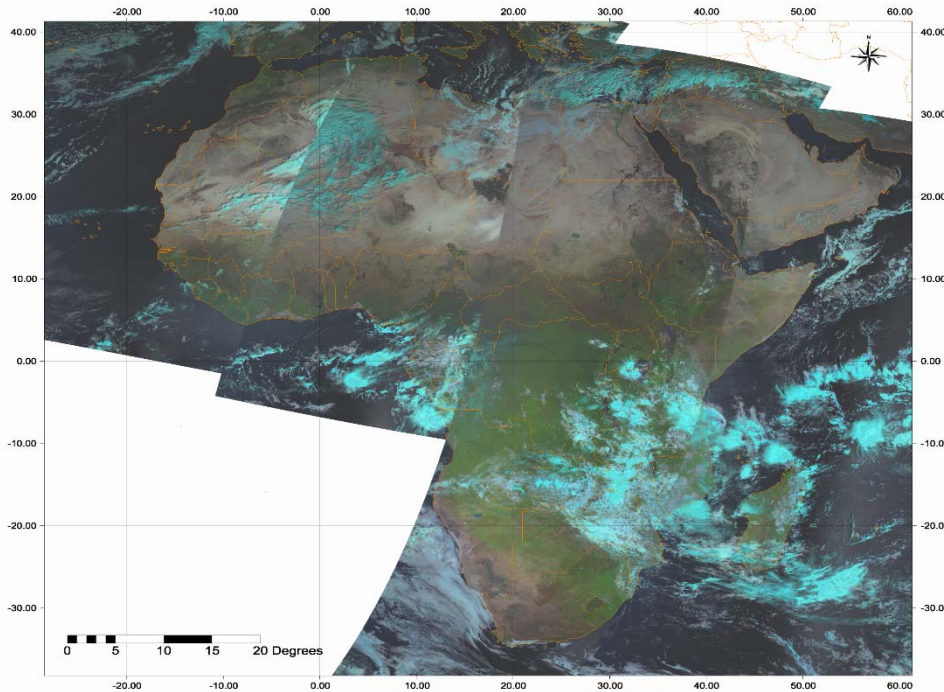
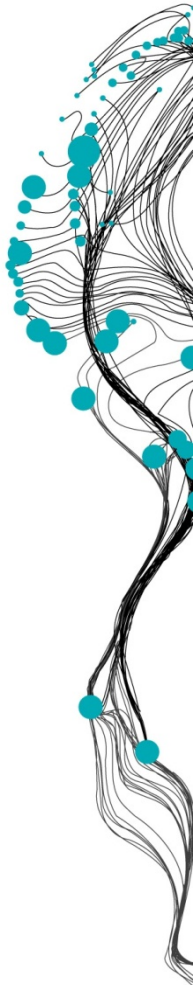


Automated visualization every 15 minutes, examples are European and Latin American windows



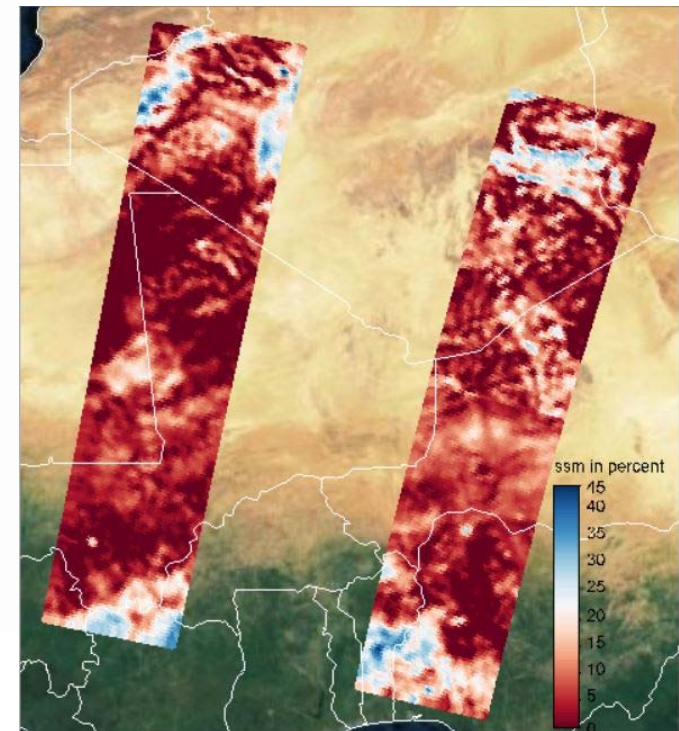
# SOME EXAMPLES: POLAR ORBITING

## ■ METOP A/B/C AVHRR/3 – ASCAT and NOAA 19

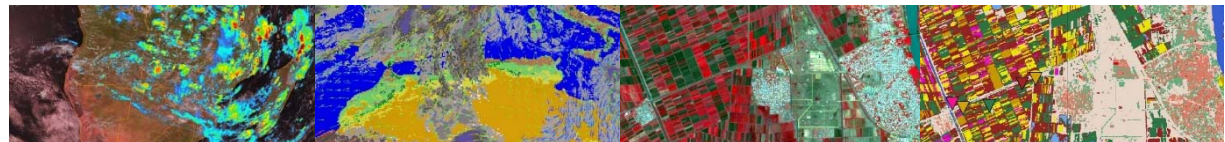


Import 3 minutes segments of  
METOP A/B/C AVHRR

## METOP A/B/C ASCAT

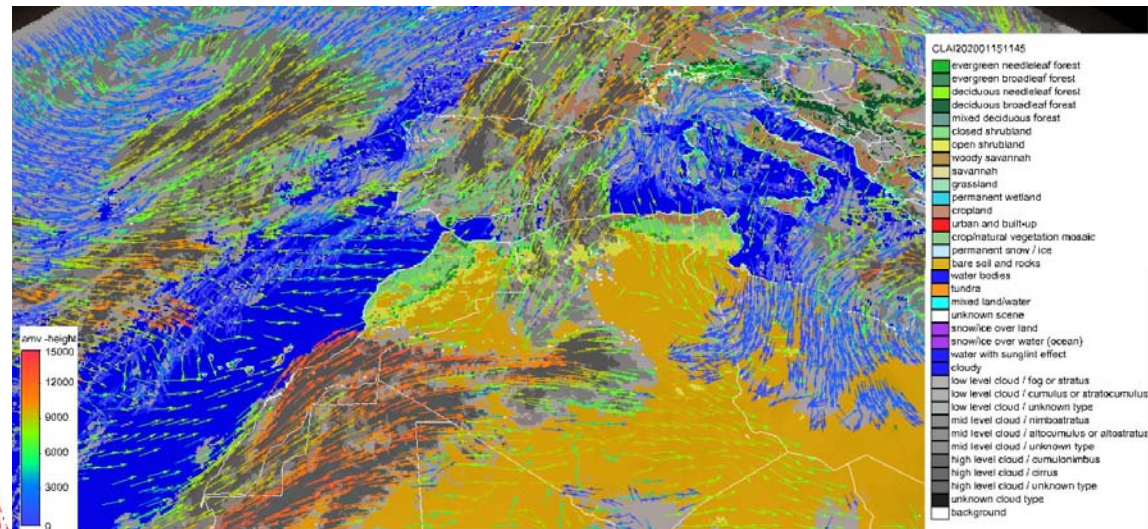
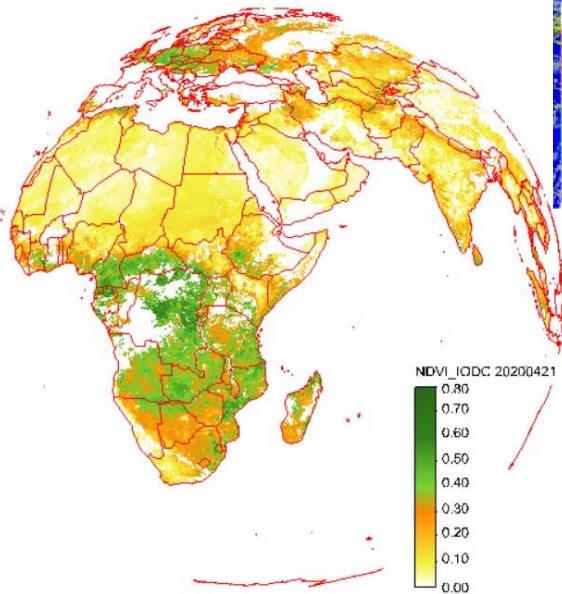
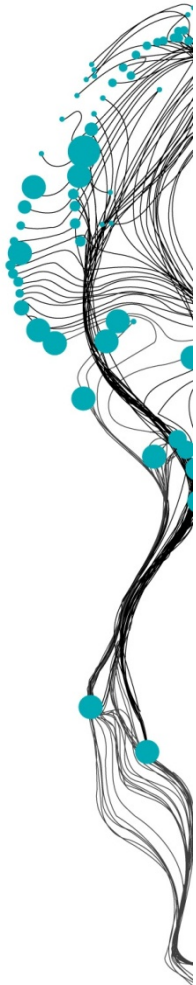


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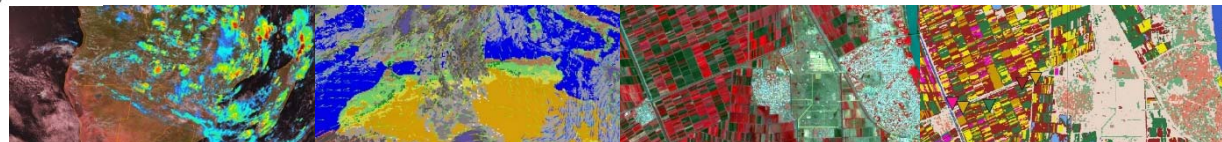


# SOME EXAMPLES: METEOROLOGICAL PRODUCTS

- MPEF products from various geostationary satellites



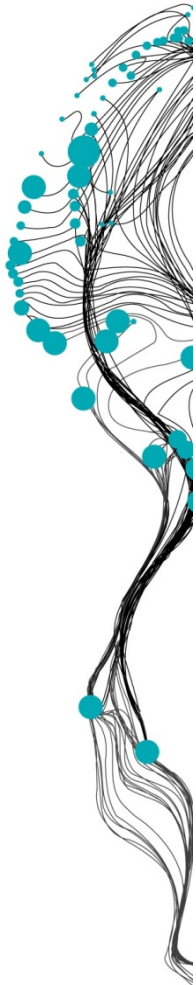
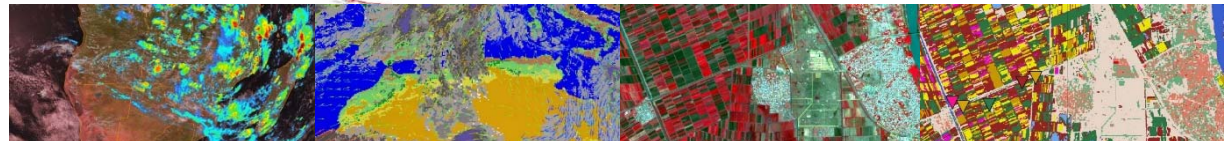
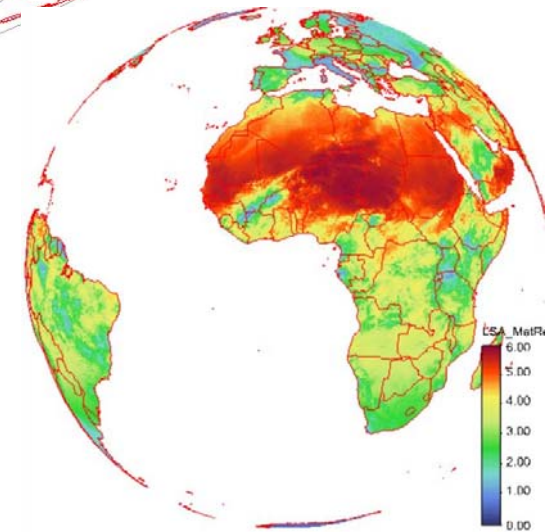
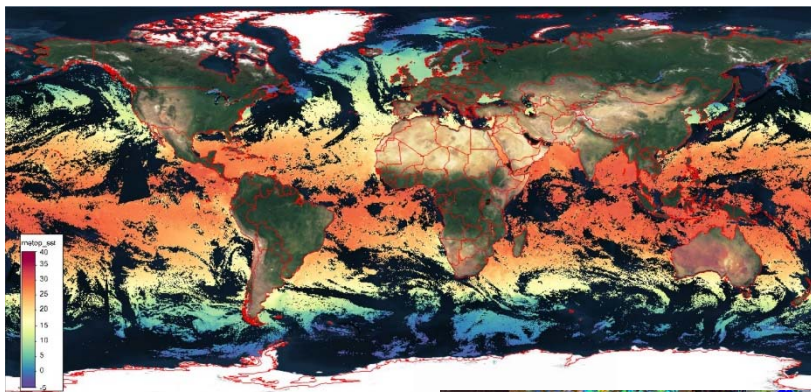
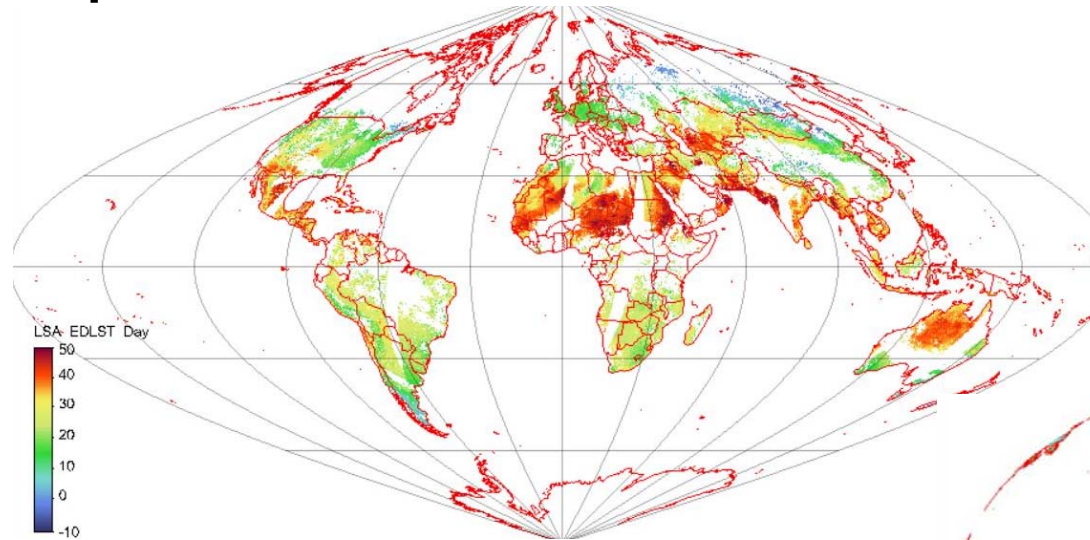
Various products from the Meteorological Extraction Facilities, examples here are Cloud Analysis Image and Atmospheric Motion Vectors and NDVI



# SOME EXAMPLES: SAF PRODUCTS

- **Various products from SAFs**

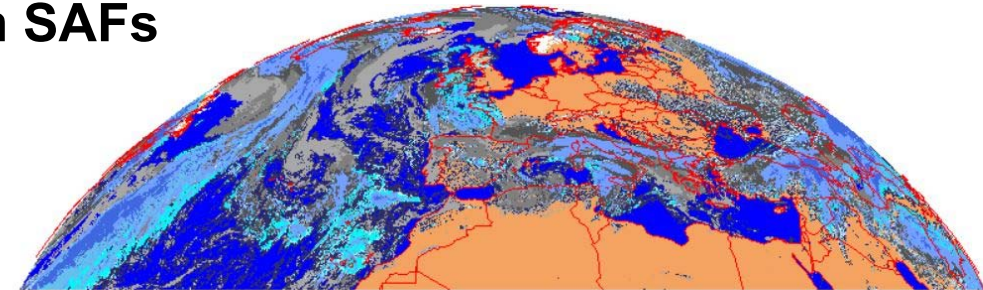
Examples from  
LSA SAF (LST  
and ETo) and  
OSI SAF  
(METOP-SST)



# SOME EXAMPLES: SAF PRODUCTS

## ■ Various products from SAFs

Examples from  
NWC SAF (Cloud  
Type and  
Convective Rain  
Rate) and LSA  
SAF (FAPAR)

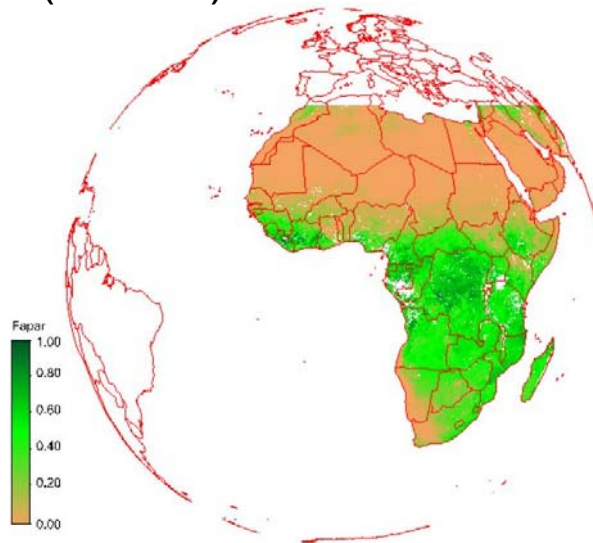


Cloud Types

- Cloud-free land
- Cloud-free sea
- Snow over land
- Sea ice
- Very low clouds

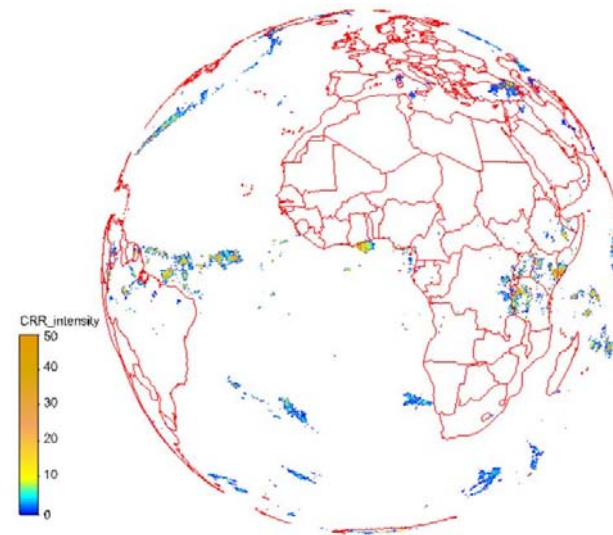
- Low clouds
- Mid-level clouds
- High opaque clouds
- Very high opaque clouds
- Fractional clouds

- High semitransparent thin clouds
- High semitransparent mostly thick clouds
- High semitransparent thick clouds
- High semitransparent above low or medium clouds
- High semitransparent above snow/ice



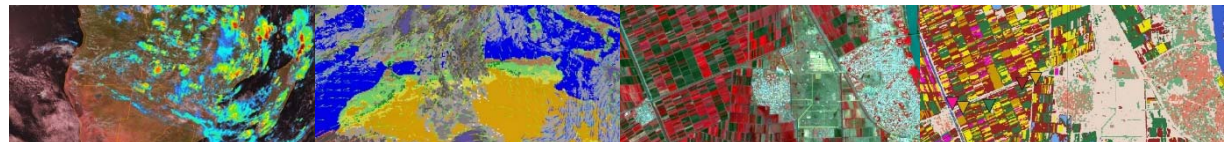
Fapar

1.00  
0.80  
0.60  
0.40  
0.20  
0.00



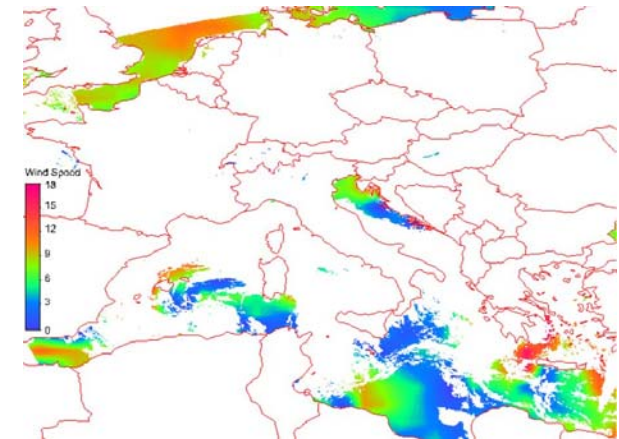
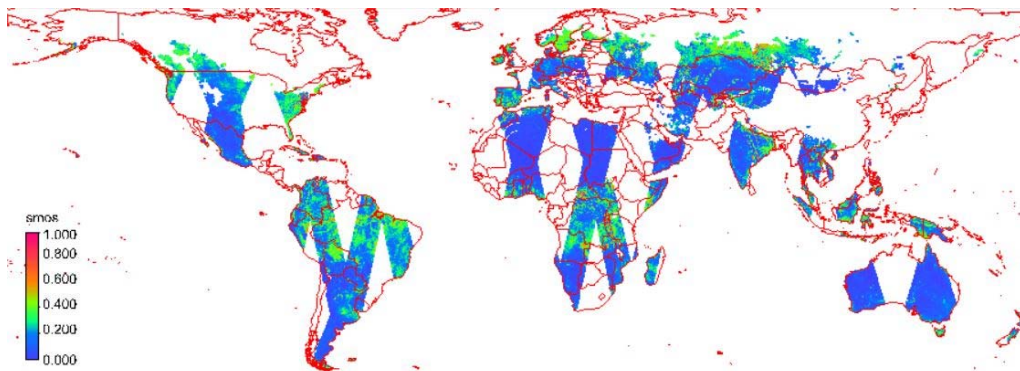
CRR\_intensity

60  
40  
30  
20  
10  
0

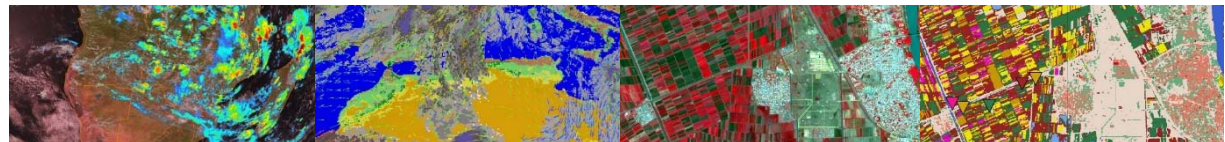


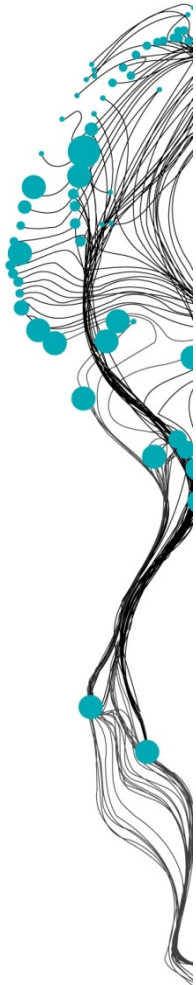
# SOME EXAMPLES: SELECTED GLOBAL PRODUCTS

- Marine products from MODIS, NPP, GPM and SMOS



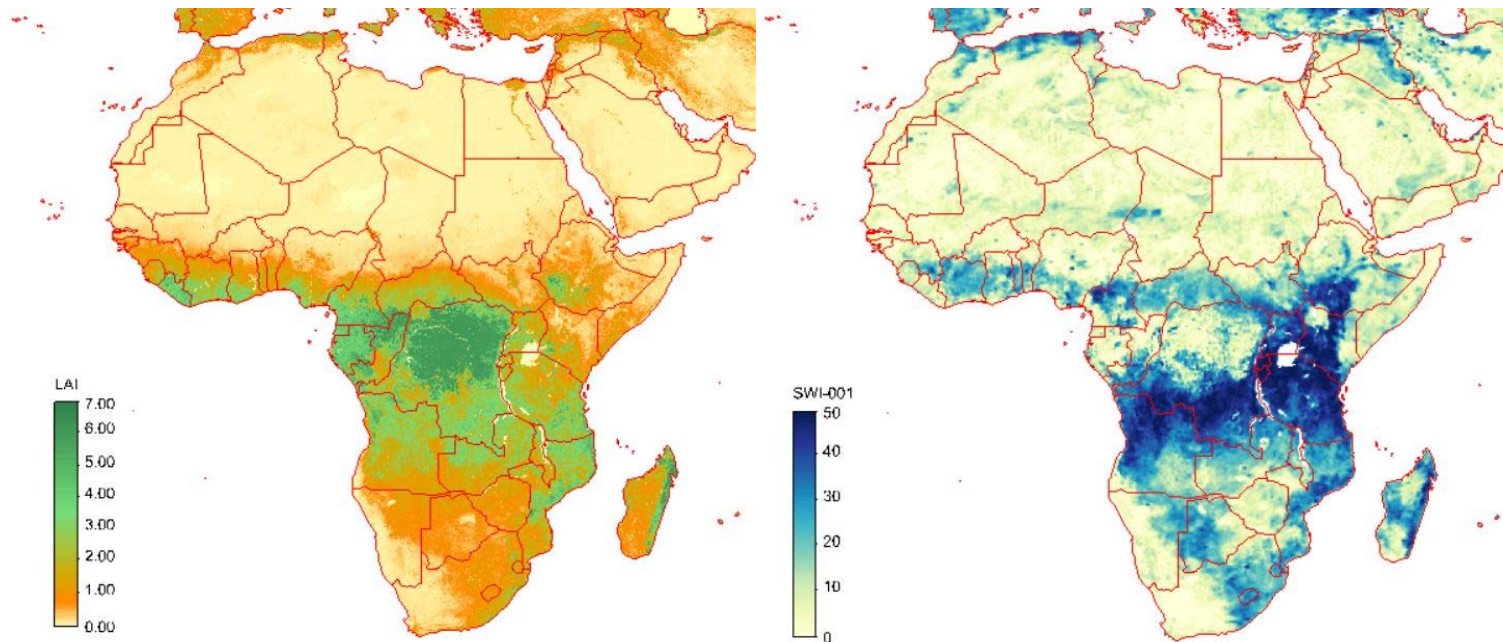
Examples from SMOS (SSM), GPM (orbit period of 1 hour) and NPP (wind Speed over the ocean)



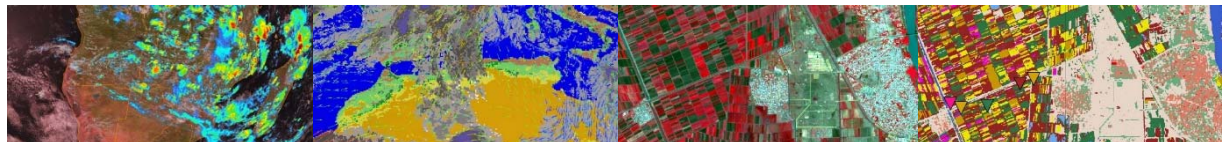


## SOME EXAMPLES: SELECTED REGIONAL PRODUCTS

- **TAMSAT, Sentinel, Proba-V, Copernicus, AEMET, PML and EAMNET products**



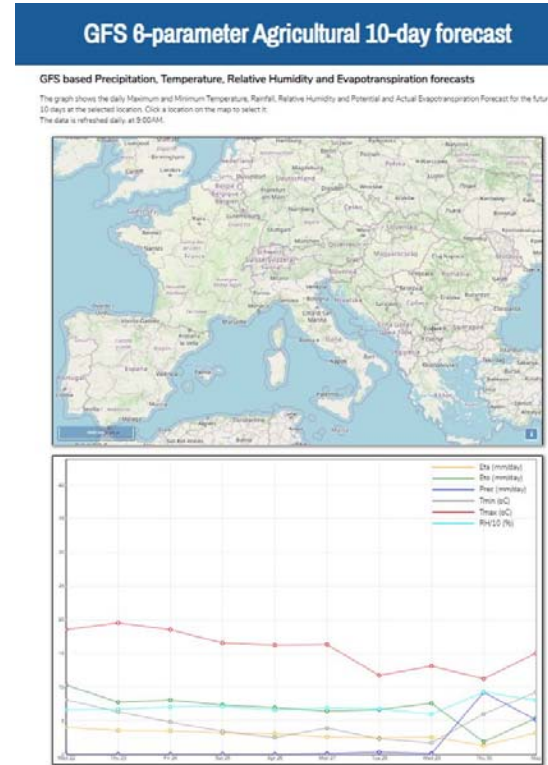
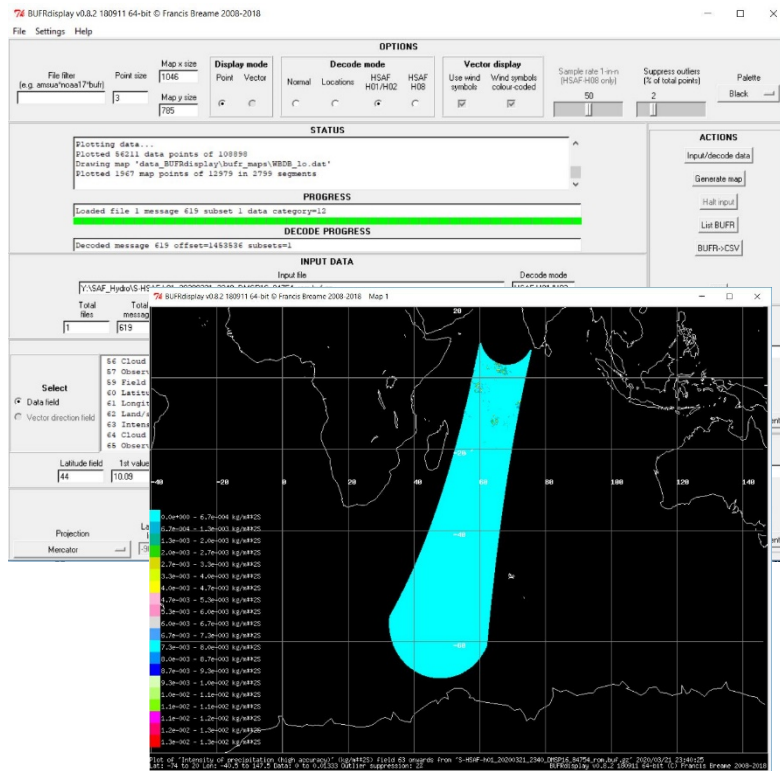
Examples from Proba-V (LAI) and Copernicus (Uppermost layer for SWI)





# SOME EXAMPLES: EXTERNAL RESOURCES

- **Buf-decoder, Panoply, GFS-Agricultural forecast, etc.**

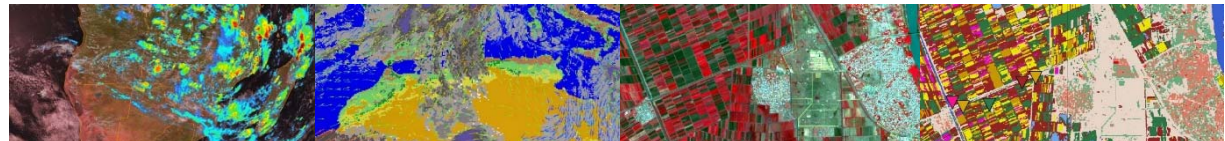


**Panoply**  
Version 4.10.3  
Build #6100310  
2018-12-20

**NASA/GISS**  
NASA Goddard Institute for Space Studies  
2890 Broadway, New York, NY 10025 USA  
Panoply uses several third-party, open-source Java libraries. See the 'Credits & Acknowledgments' help window for more information.  
Windows 10 64-bit - Java 1.8.0\_231  
Max memory 12413 MB



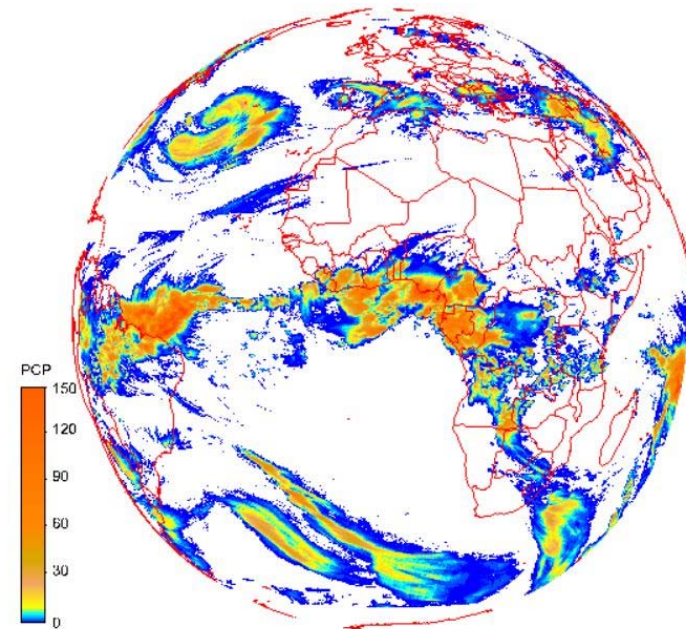
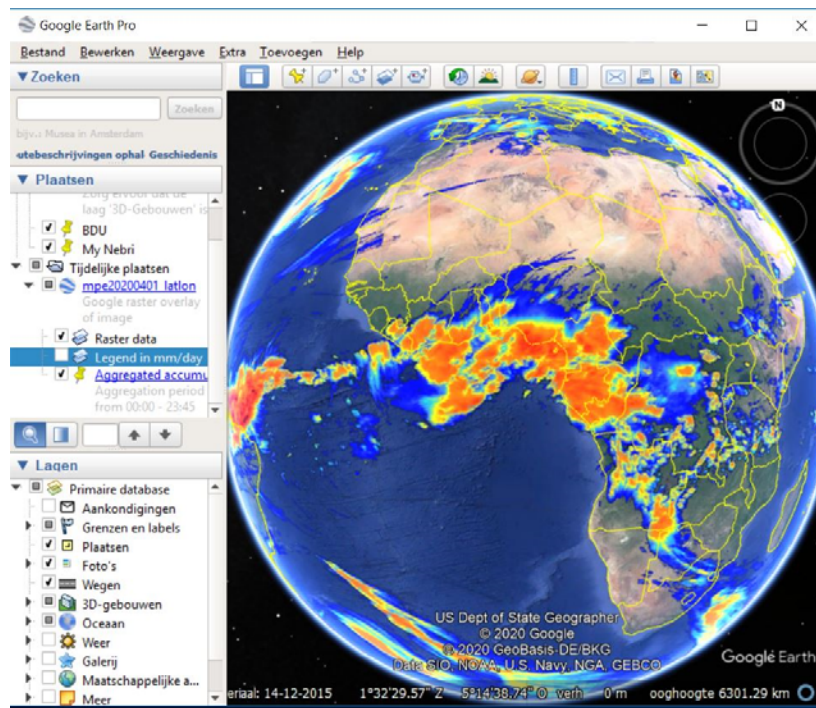
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# SOME EXAMPLES: EXTERNAL RESOURCES

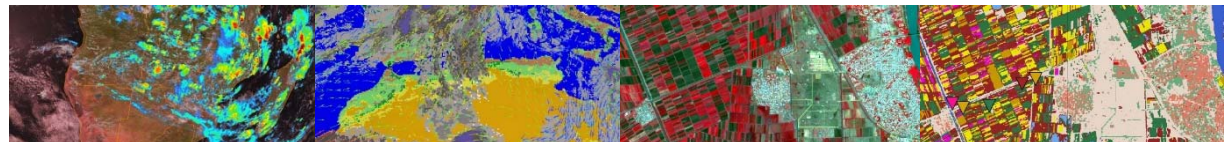
- **Daily aggregated satellite derived rainfall – H05B**

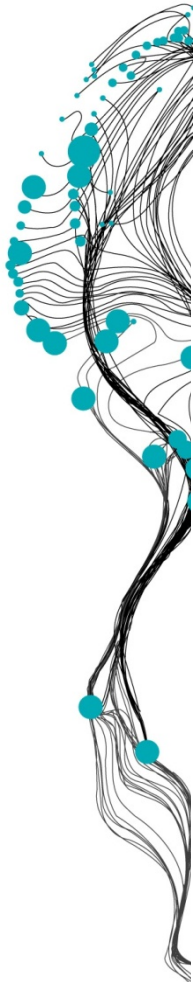


Google Maps Overlay of H05B (for visualization) and same data set in ILWIS (for analysis)



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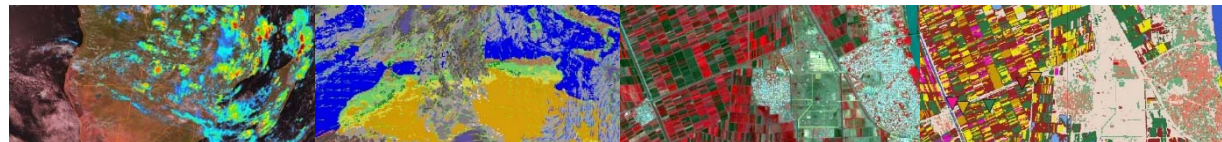


# META DATA

- Integration of (links to) Product Navigator for all products

## Link to Polar - Level 1.5 Data Resources

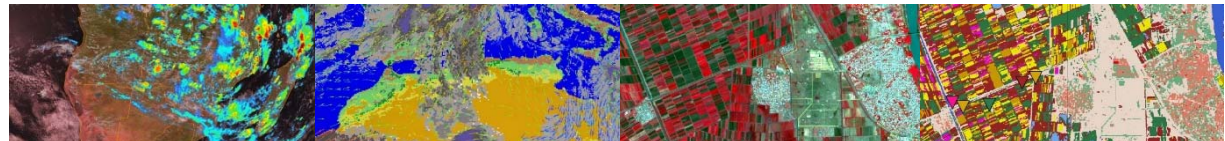
GNC- Main Menu	GNC- Sub Menu	Menu Item	META Data from Product Navigator ( <a href="https://navigator.eumetsat.int/">https://navigator.eumetsat.int/</a> )
"Polar- Level 1.5 Data"	"METOP A/B/C"	"METOP AVHRR Retriever" (for AVHRR on Metop A, B and C)	<a href="https://navigator.eumetsat.int/product/EO:EUM:DAT:METOP:AVHRR1?query=AVHRR%20GDS%20Level%201B%20-%20Metop&amp;s=simple">https://navigator.eumetsat.int/product/EO:EUM:DAT:METOP:AVHRR1?query=AVHRR%20GDS%20Level%201B%20-%20Metop&amp;s=simple</a>
		"METOP AVHRR/3 daytime FCC" (for AVHRR on Metop A, B and C)	<a href="https://navigator.eumetsat.int/product/EO:EUM:DAT:METOP:AVHRR1?query=AVHRR%20GDS%20Level%201B%20-%20Metop&amp;s=simple">https://navigator.eumetsat.int/product/EO:EUM:DAT:METOP:AVHRR1?query=AVHRR%20GDS%20Level%201B%20-%20Metop&amp;s=simple</a>
		"METOP-A/B/C ASCAT - Ocean Vector Winds (12.5 km)"	ASCAT Coastal Winds at 12.5 km Swath Grid – Metop: <a href="https://navigator.eumetsat.int/product/EO:EUM:DAT:METOP:OSI-104?query=%09ASCAT%20Coastal%20Winds%20at%2012.5%20km%20Swath%20Grid%20-%20Metop&amp;s=simple">https://navigator.eumetsat.int/product/EO:EUM:DAT:METOP:OSI-104?query=%09ASCAT%20Coastal%20Winds%20at%2012.5%20km%20Swath%20Grid%20-%20Metop&amp;s=simple</a>
		"METOP-A/B/C ASCAT - Surface Soil Moisture (12.5 km)"	ASCAT Soil Moisture at 12.5 km Swath Grid – Metop: <a href="https://navigator.eumetsat.int/product/EO:EUM:DAT:METOP:SOMO12?query=soil%20moisture&amp;s=simple">https://navigator.eumetsat.int/product/EO:EUM:DAT:METOP:SOMO12?query=soil%20moisture&amp;s=simple</a>
	"EARS"	"METOP-A (M02) quicklook" "METOP-B (M01) quicklook" "METOP-C (M03) quicklook"	AVHRR Level 0 - Multimission - Regional Data Service <a href="https://navigator.eumetsat.int/product/EO:EUM:DAT:MULT:EARS-AVHRR?query=ears&amp;results=15&amp;s=simple">https://navigator.eumetsat.int/product/EO:EUM:DAT:MULT:EARS-AVHRR?query=ears&amp;results=15&amp;s=simple</a>
"NOAA 19 AVHRR/3"		"NOAA19 GAC quicklook"	AVHRR GDS Level 1B - NOAA <a href="https://navigator.eumetsat.int/product/EO:EUM:DAT:NOAA:NOAAAVHRR?query=AVHRR%20GDS%20Level%201B%20-%20NOAA&amp;s=simple">https://navigator.eumetsat.int/product/EO:EUM:DAT:NOAA:NOAAAVHRR?query=AVHRR%20GDS%20Level%201B%20-%20NOAA&amp;s=simple</a>
		"NOAA19 LAC quicklook"	AVHRR Level 0 - Multimission - Regional Data Service <a href="https://navigator.eumetsat.int/product/EO:EUM:DAT:MULT:EARS-AVHRR?query=%09AVHEAR00.%20EARS-AVHRR&amp;s=simple">https://navigator.eumetsat.int/product/EO:EUM:DAT:MULT:EARS-AVHRR?query=%09AVHEAR00.%20EARS-AVHRR&amp;s=simple</a>

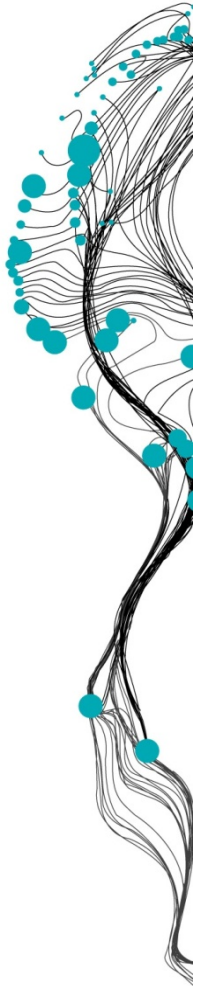


## REMARKS

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- **Continuous changes of newly received data: some satellites have reached end of life-time, new satellites are launched, etc.**
- **This is reflecting changes in products, also intermediate product updates**
- **New products are introduced, others are terminated**
- **Toolbox is reflecting current capability as much as possible**
- **Toolbox is now fully integrated with ILWIS-386 (version as of 16 November 2020)**
- **Toolbox capability is based on data received through EUMETCast using the Europe Basic and High Volume Services 1 and 2, as well as the Africa Service**

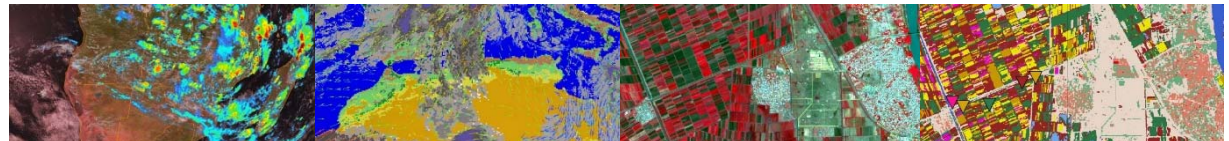


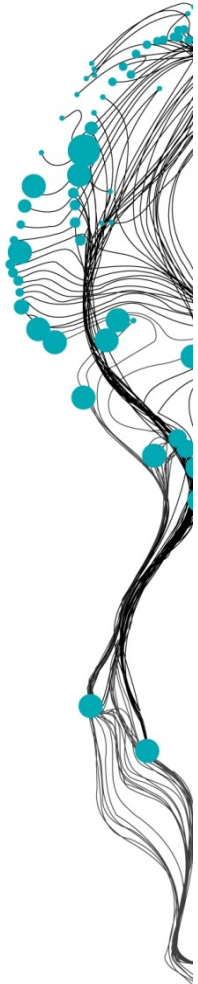


## CONCLUDING REMARKS

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- Effort is given to data and products relevant for land, ocean and atmosphere in the domain of Water and Food Security
- Toolbox (XML 2.1) reflects capabilities as of November 2020
- External utilities are now all integrated, apart from JAVA
- Known issues:
  - If MSG Data Retriever does not start:
    - Run “vcredist\_1\_x86.exe” and “vcredist\_2\_x86.exe”, available from ... \Geonetcast-Toolbox\MSGDataRetriever
  - Faster display / refresh of toolbox menu:
    - Click with the mouse on the Windows Taskbar

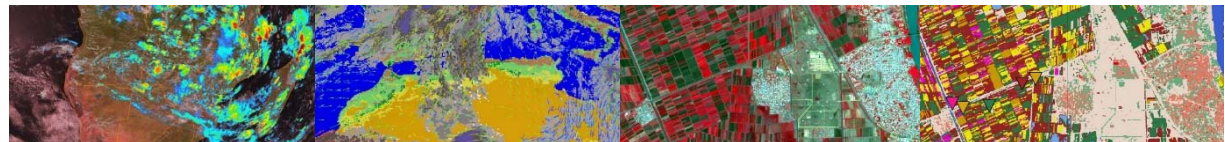




## LINK TO RESOURCES

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- **ILWIS-386:**
  - <http://filetransfer.itc.nl/pub/52n/ILWIS386/Software/>
    - ILWIS386\_20211103.zip (Software)
  - <http://filetransfer.itc.nl/pub/52n/ILWIS386/Tutorial/>
    - ILWIS\_Installation\_instructions.pdf (installation instructions)
- **GEONETCast Toolbox Plug-in:**
  - [http://filetransfer.itc.nl/pub/52n/ILWIS386/Toolbox\\_plugin/](http://filetransfer.itc.nl/pub/52n/ILWIS386/Toolbox_plugin/)
    - GEONETCast-Toolbox.zip (Software)
    - GEONETCast\_TB\_Install.pdf (installation instructions)
- **GEONETCast Sample Data:**
  - [http://filetransfer.itc.nl/pub/52n/gnc\\_exercisedata/gnc\\_data/](http://filetransfer.itc.nl/pub/52n/gnc_exercisedata/gnc_data/)



# ASSIGNMENT

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- **If not installed, install ILWIS-386 and install the GEONETCast Toolbox Plug-in**
- **Download sample data, unzip files and create a folder structure according to Appendix 2 from “*GNC-Toolbox Install / User Manual*”**
- **Review Chapter 2 from “*GNC-Toolbox Install / User Manual*”**
- **Apply GNC toolbox:**
  - **before you retrieve a new image or product first check the information provided from the Product Navigator, see “Link to online resources” in toolbox**
  - **Conduct GNC-Exercise II**

