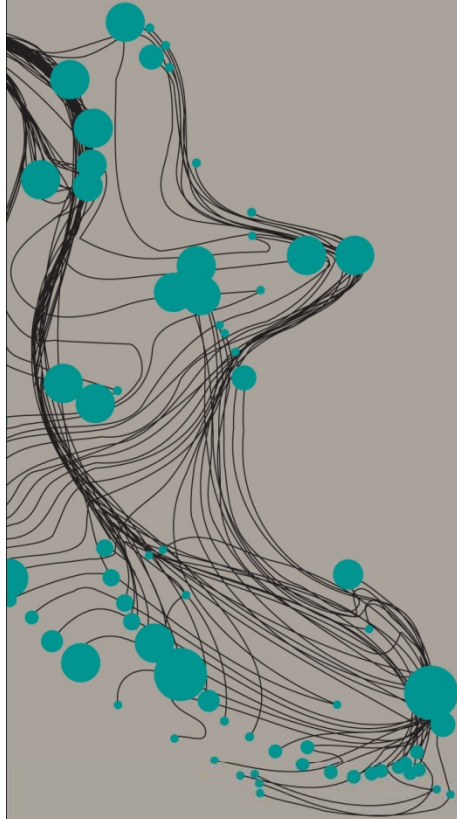
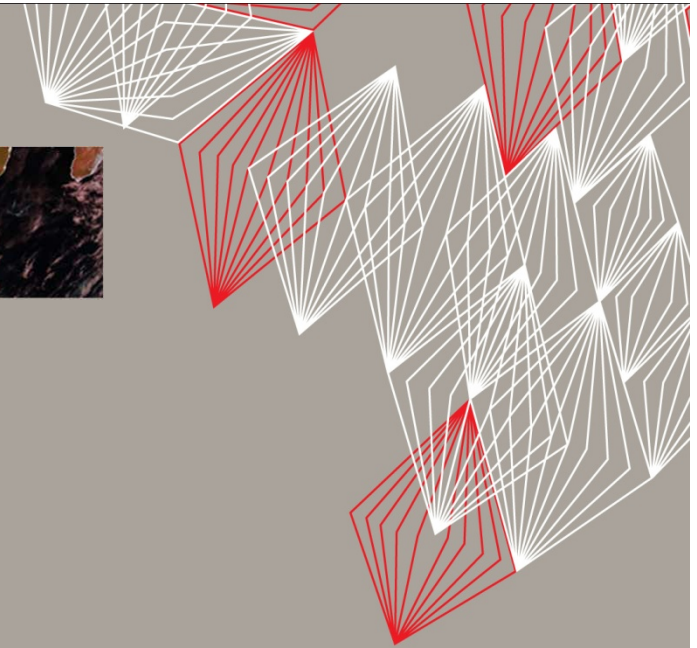


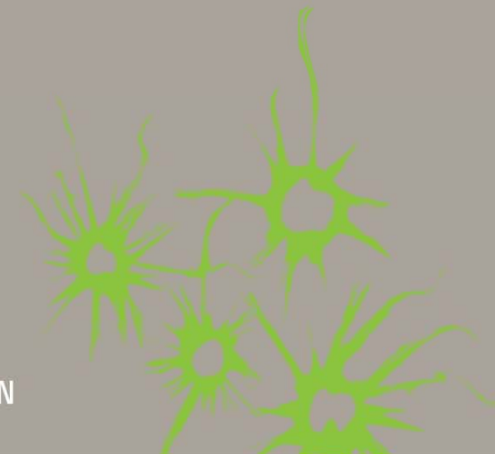
UNIVERSITY OF TWENTE.



GEONETCAST TOOLBOX

BEN MAATHUIS / CHRIS MANNAERTS / BAS RETSIOS

APRIL 2020

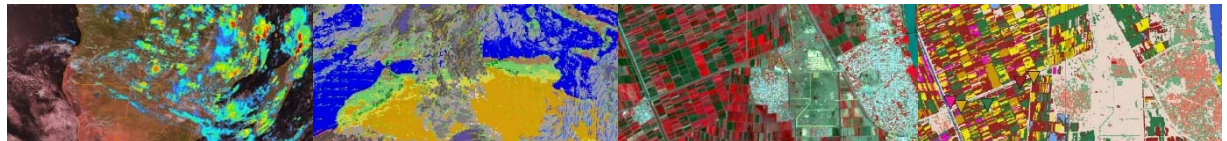


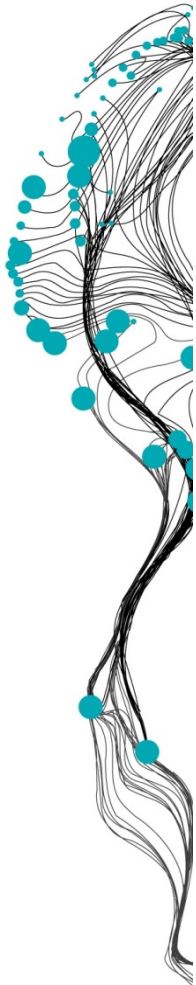
FACULTY OF GEO-INFORMATION SCIENCE AND EARTH OBSERVATION

GEONETCAST OVERVIEW



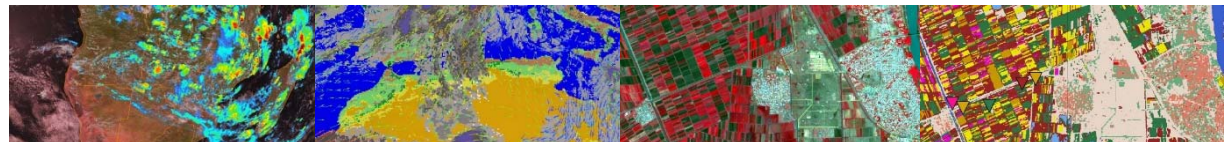
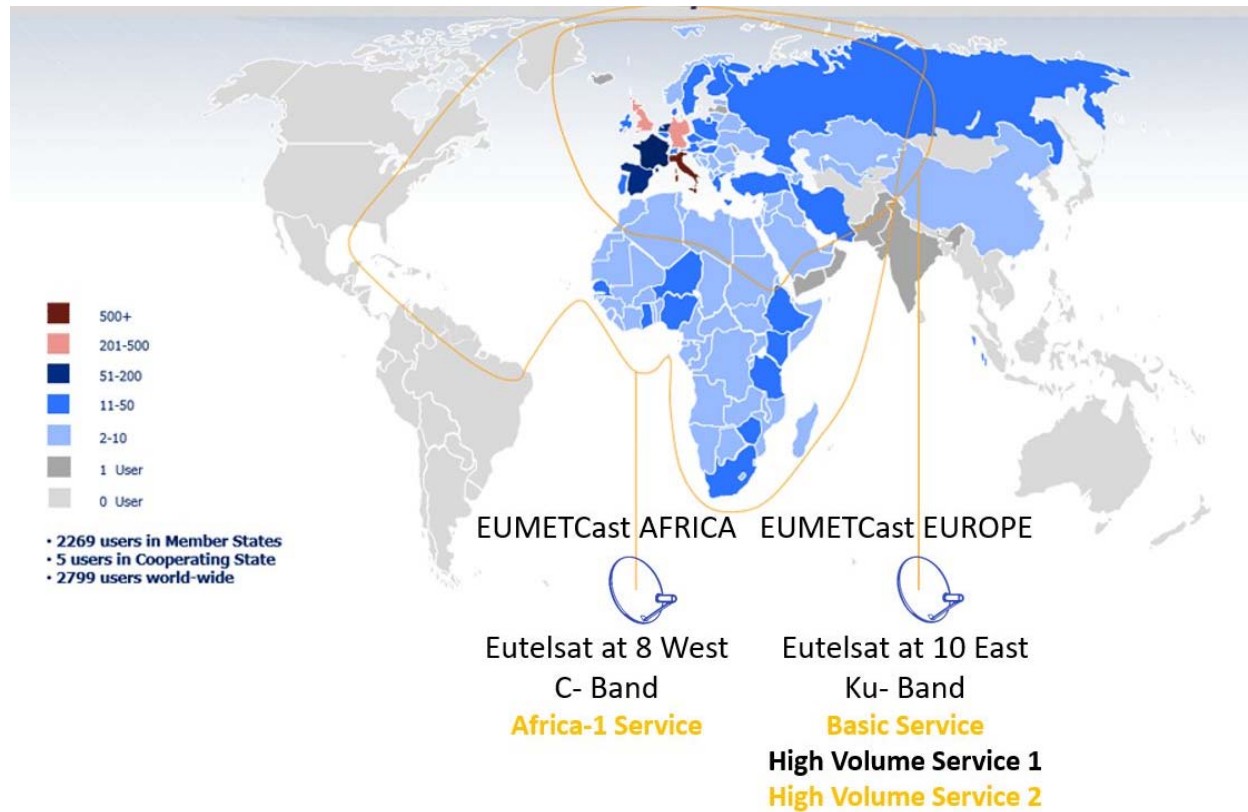
UNIVERSITY OF TWENTE.

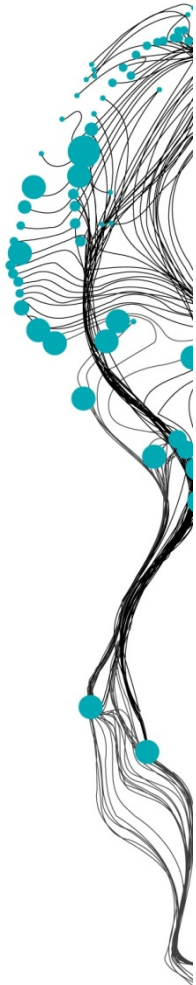




DATA RECEPTION

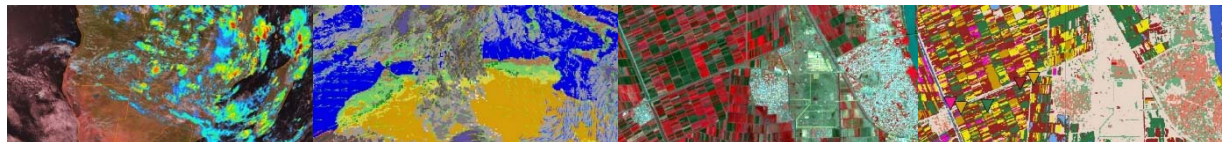
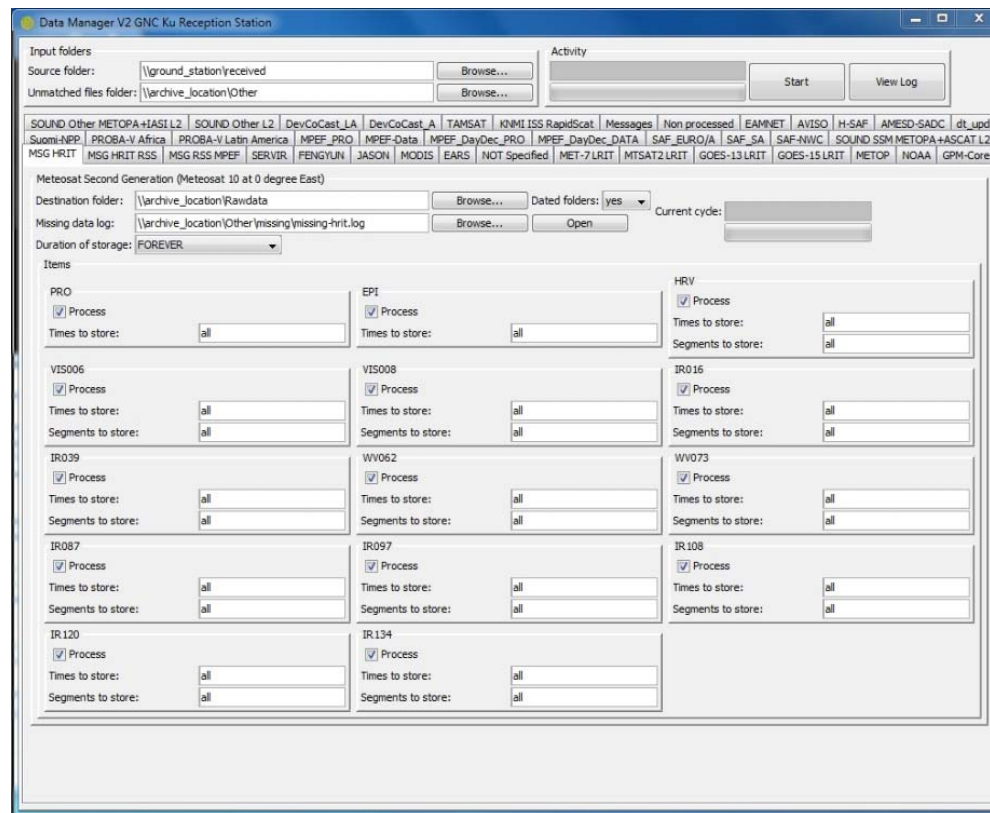
- GEONETCast as backbone for (real-time) data provision
- Multiple GEONETCast services (Europe - BAS + HVS1 & 2 / Africa)

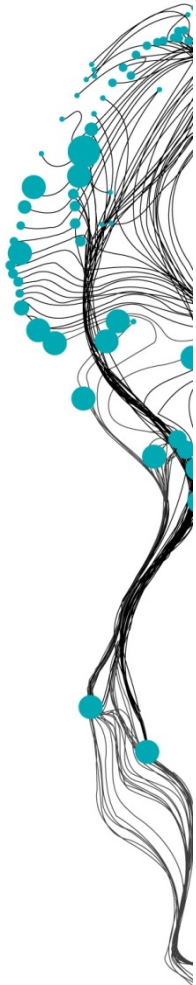




DATA MANAGEMENT

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





DATA 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

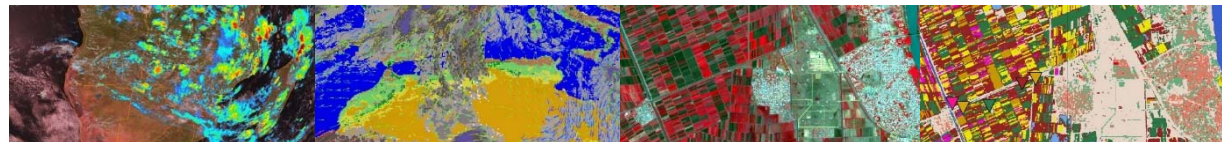
Type an expression on the command line

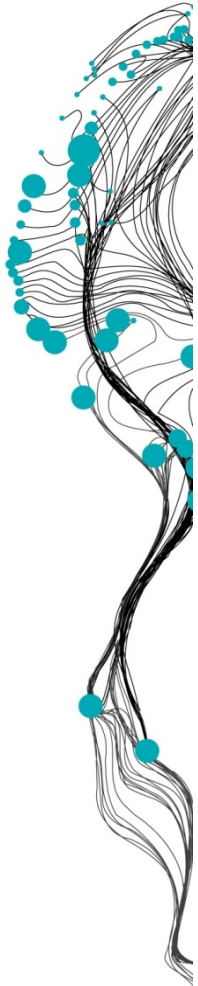
Config>ML version 2.1-beta

Cancel



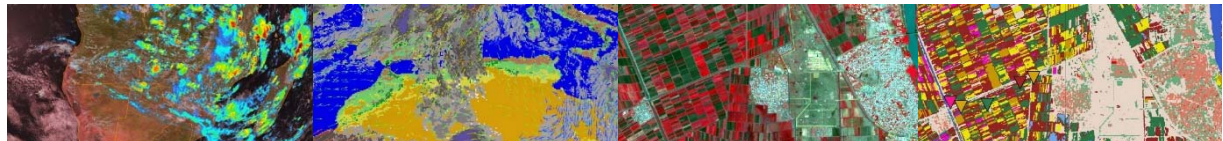
UNIVERSITY OF TWENTE.





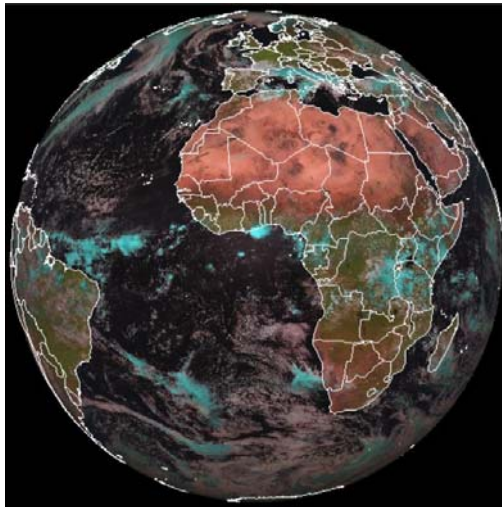
GEONETCAST TOOLBOX CAPABILITY

- **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**

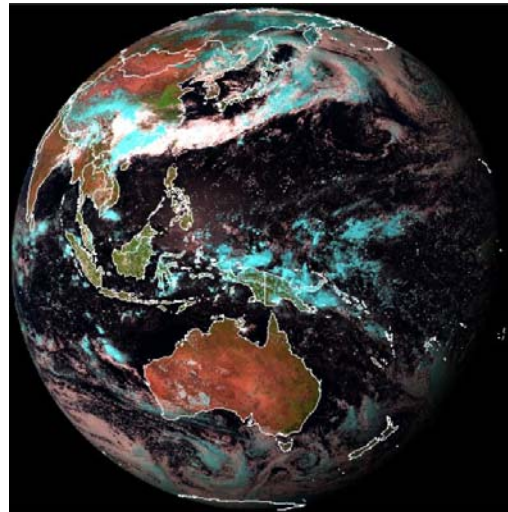


SOME EXAMPLES: GEOSTATIONARY

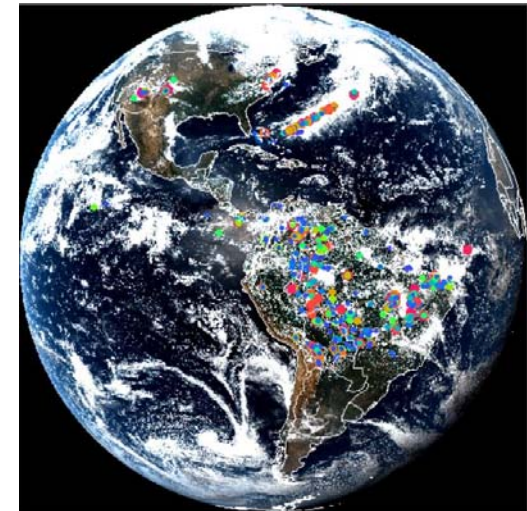
- **MSG, Electro-L, Fengyun, Himawari, GOES**



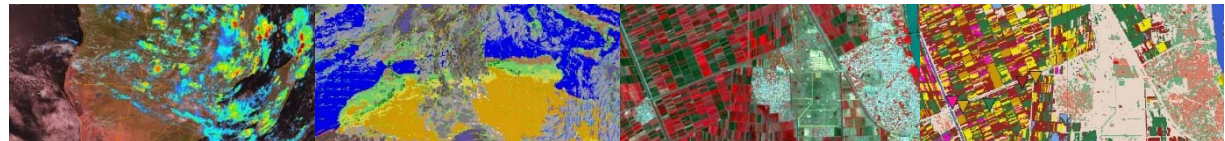
All operational MSG satellites



Himawari-8

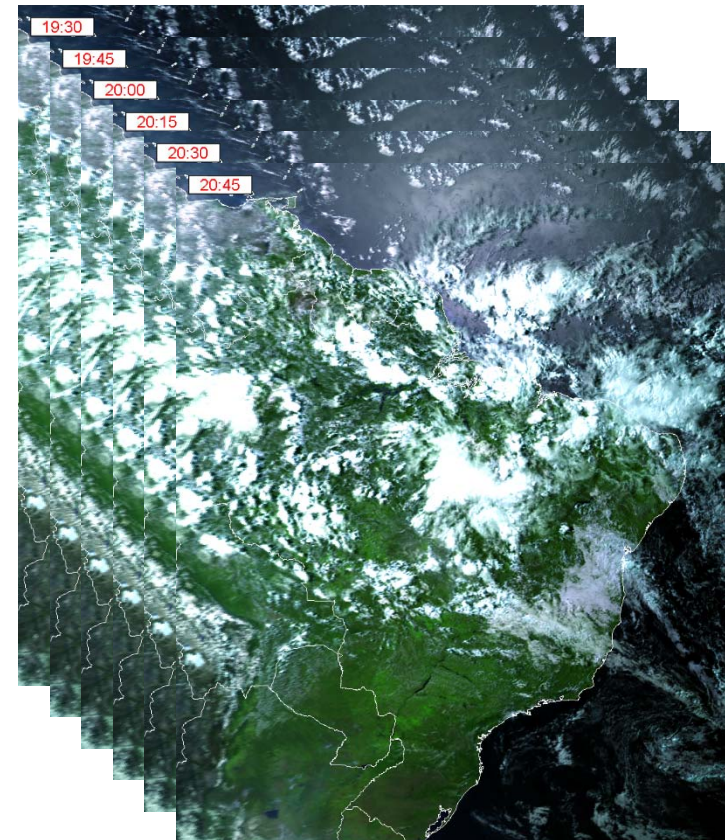
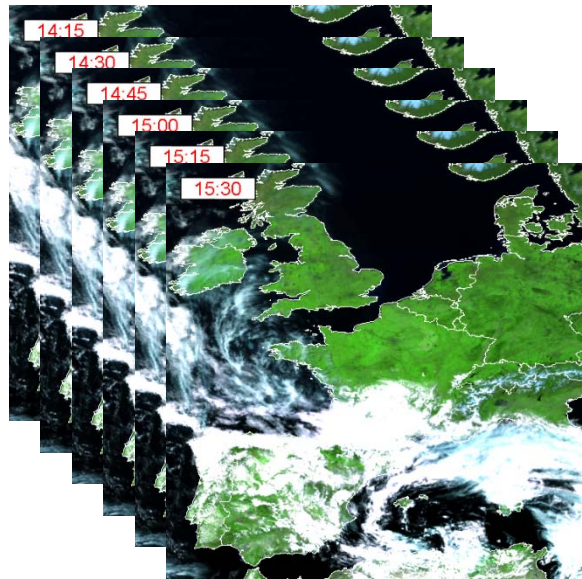


GOES and GLM

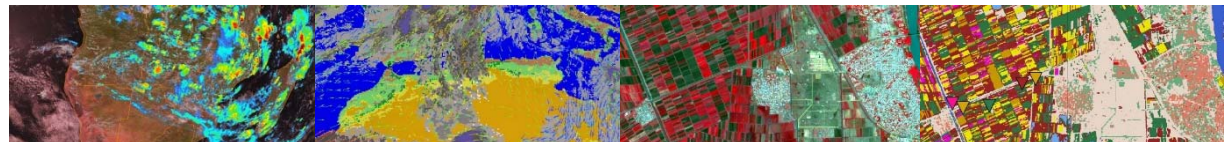


SOME EXAMPLES: GEOSTATIONARY

- Real time visualization of MSG (for different windows)

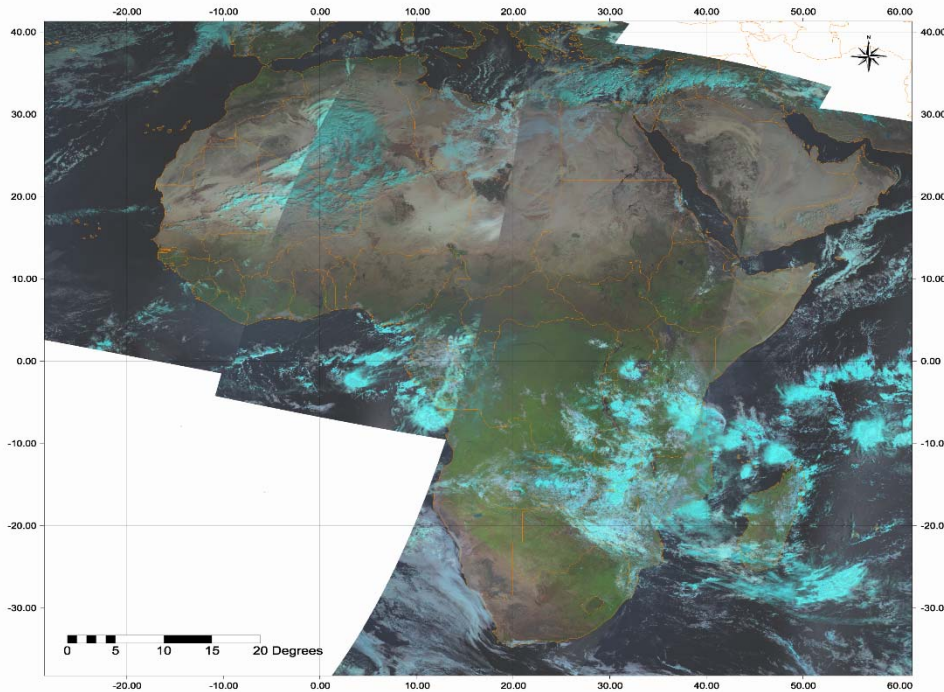
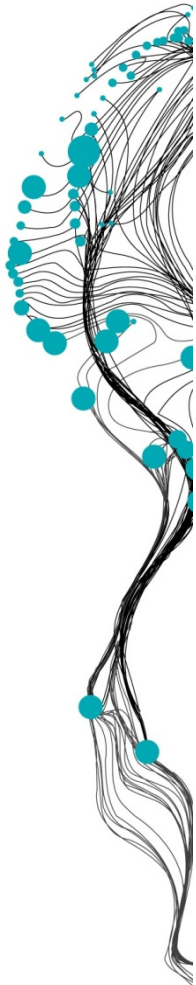


Automated visualization every 15 minutes, examples are European and Latin American windows



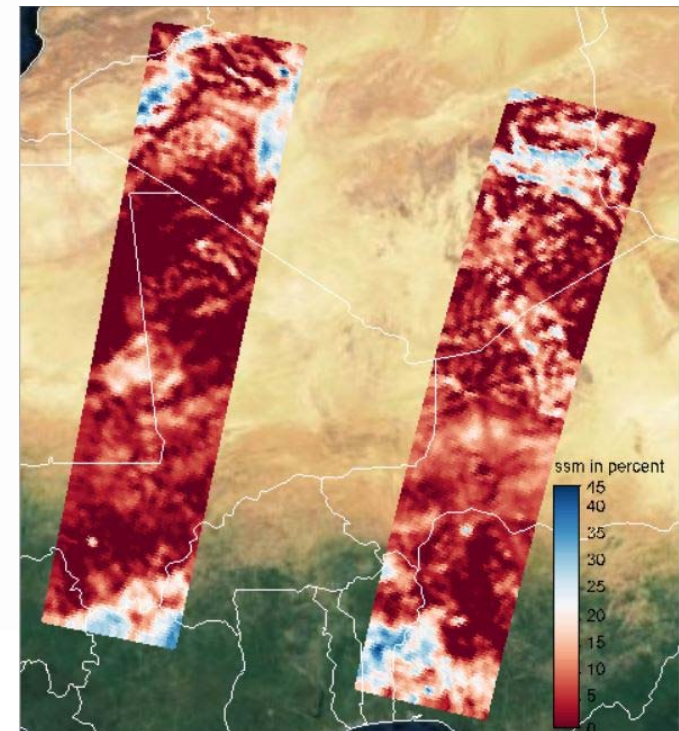
SOME EXAMPLES: POLAR ORBITING

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

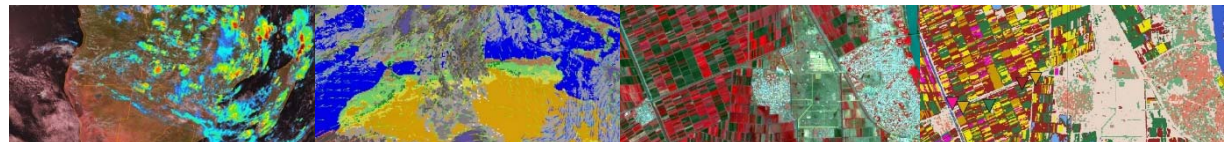


Import 3 minutes segments of
METOP A/B/C AVHRR

METOP A/B/C ASCAT

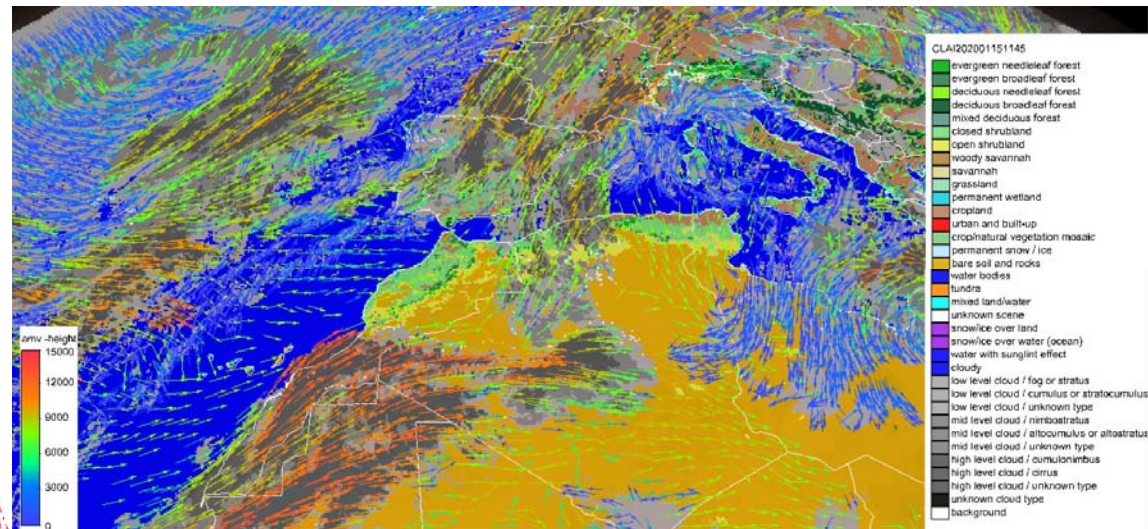
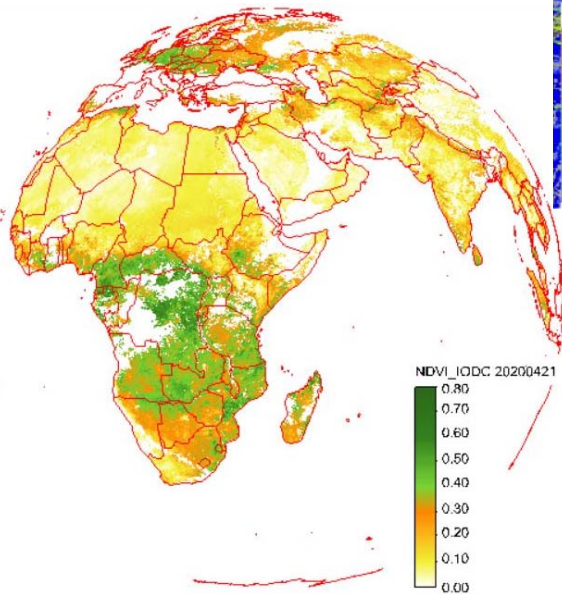
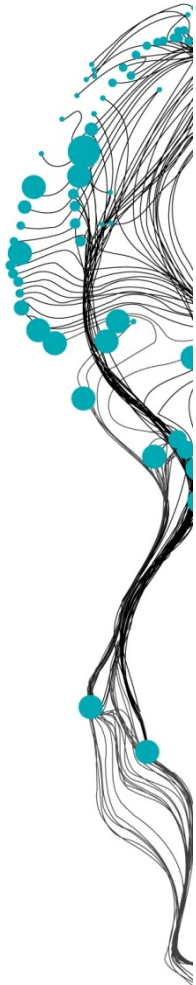


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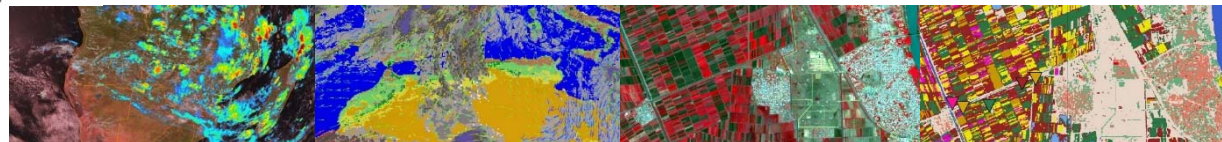


SOME EXAMPLES: METEOROLOGICAL PRODUCTS

- MPEF products from various geostationary satellites



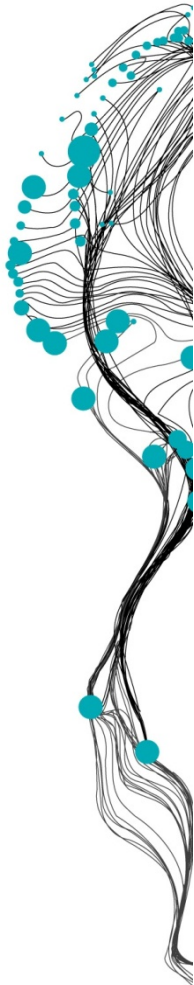
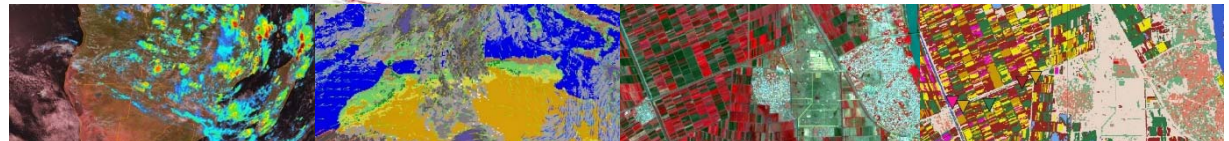
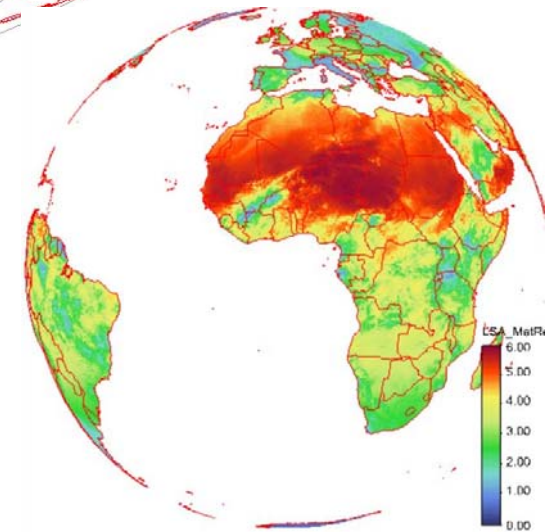
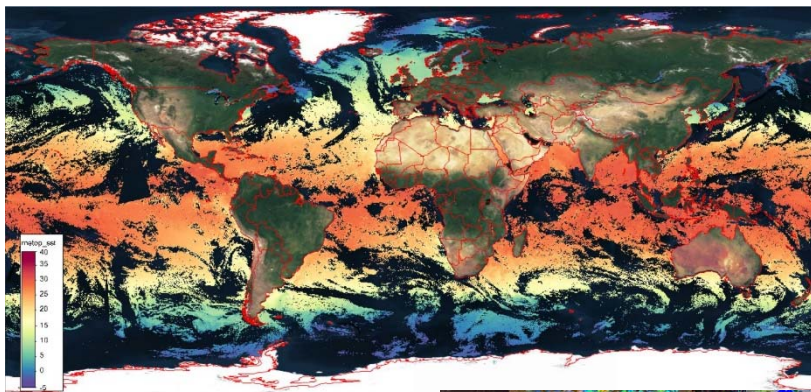
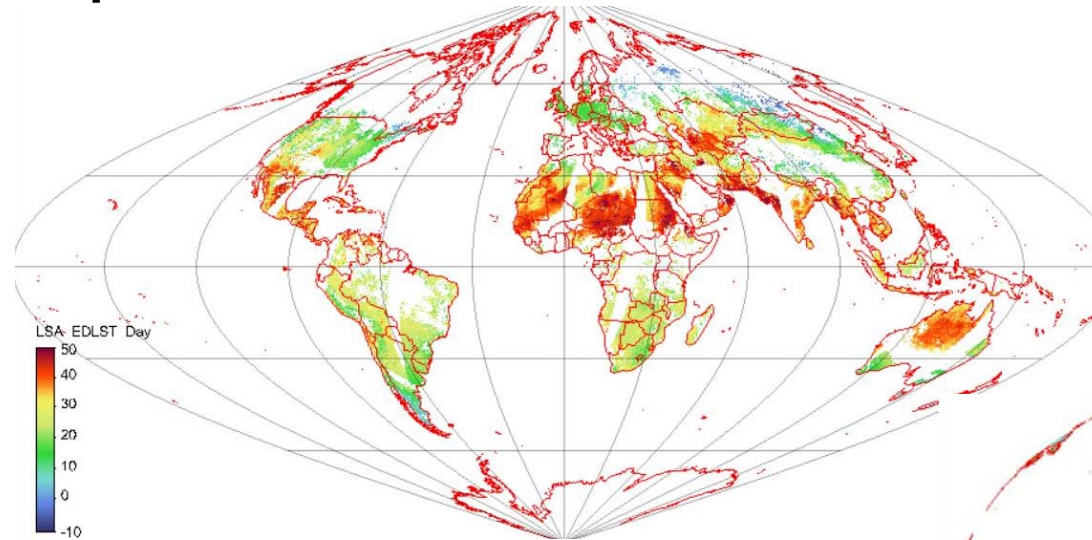
Various products from the Meteorological Extraction Facilities, examples here are Cloud Analysis Image and Atmospheric Motion Vectors and NDVI



SOME EXAMPLES: SAF PRODUCTS

- Various products from SAFs

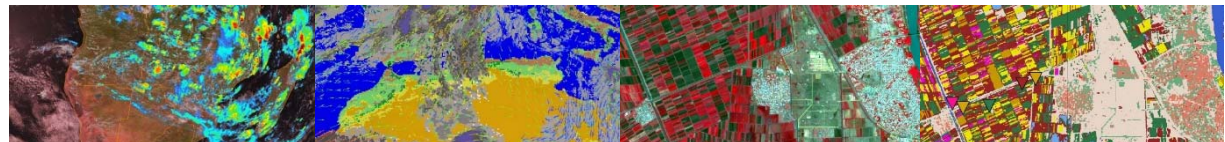
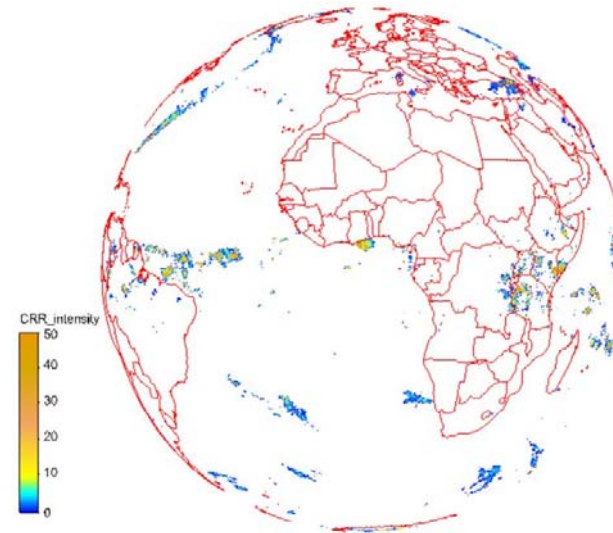
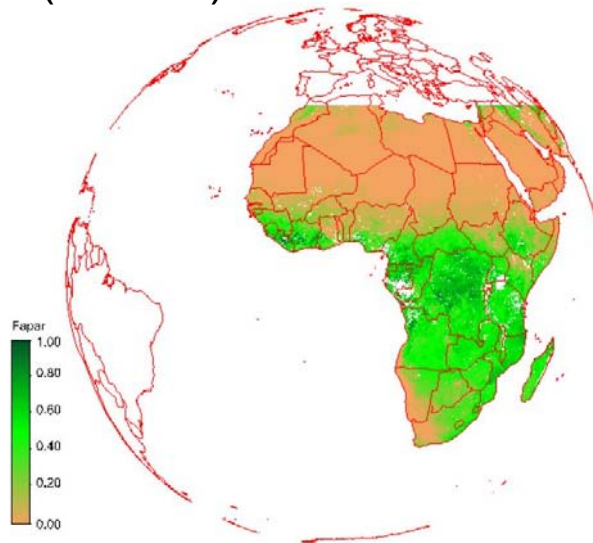
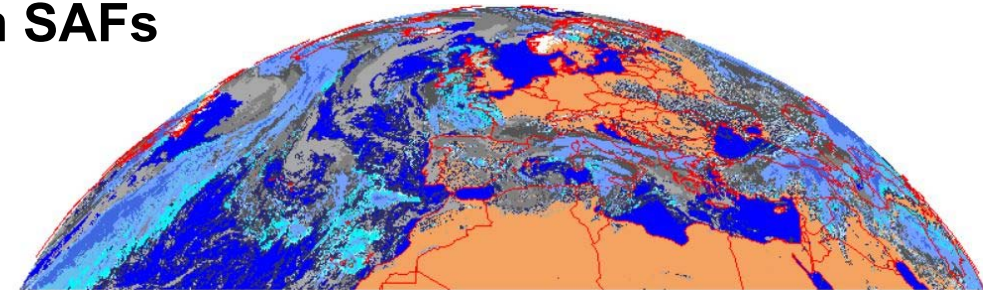
Examples from
LSA SAF (LST
and ETo) and
OSI SAF
(METOP-SST)



SOME EXAMPLES: SAF PRODUCTS

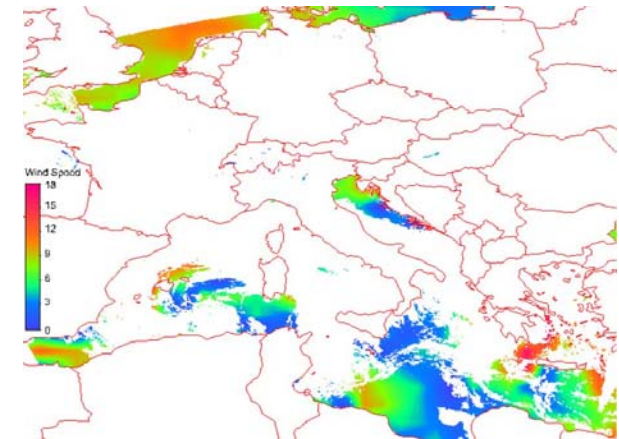
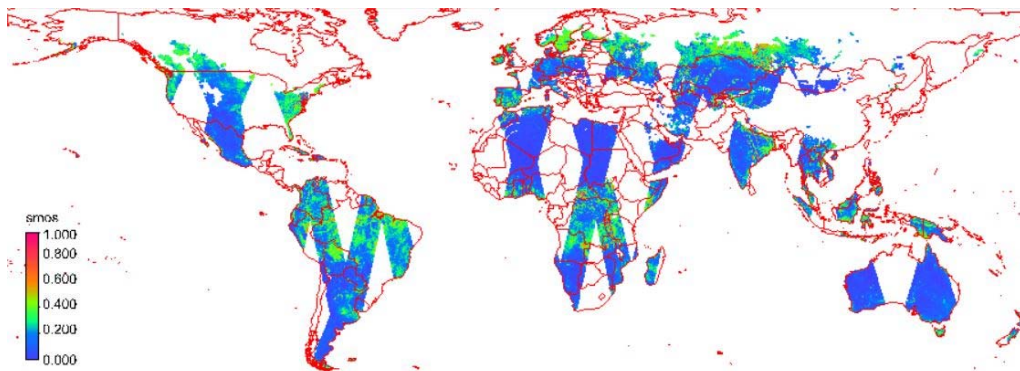
■ Various products from SAFs

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

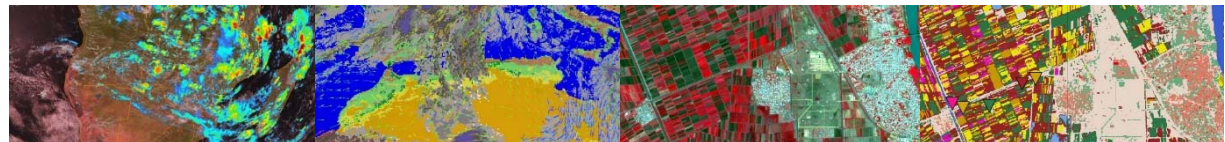


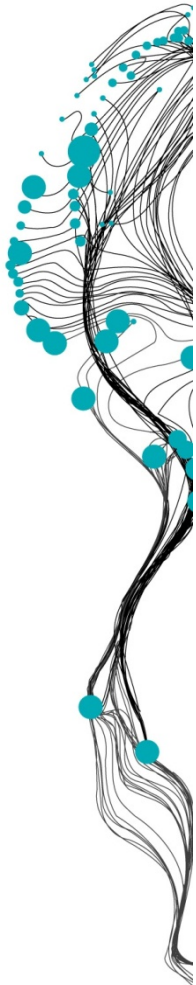
SOME EXAMPLES: SELECTED GLOBAL PRODUCTS

- Marine products from MODIS, NPP, GPM and SMOS



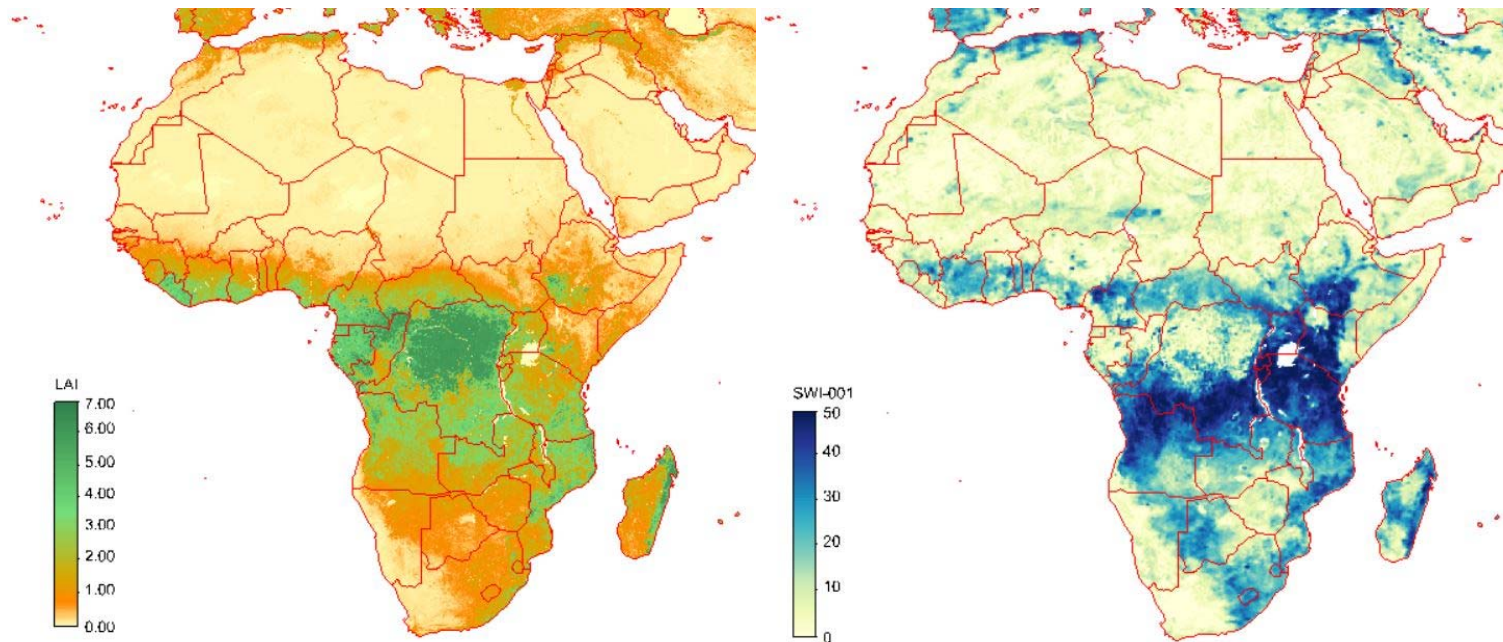
Examples from SMOS (SSM), GPM (orbit period of 1 hour) and NPP (wind Speed over the ocean)



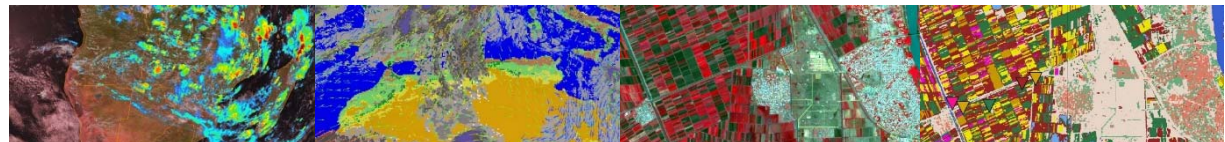


SOME EXAMPLES: SELECTED REGIONAL PRODUCTS

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



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



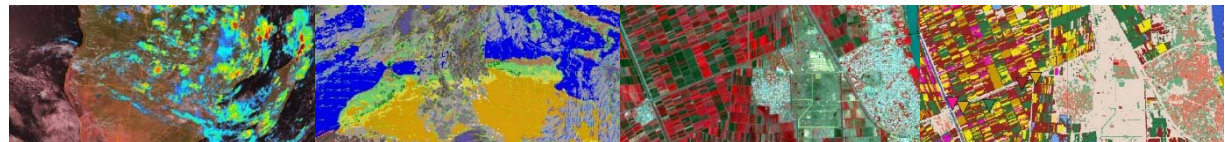


META DATA

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





SOME EXAMPLES: EXTERNAL RESOURCES

- Additional software tools like Bufr-decoder, Panoply, etc.

OPTIONS

File filter: [g:\anous\test7\bufr] Point size: 1046 Map size: 705
 Display mode: Point Vector Decode mode: Normal Locations HSAF H01/H02 HSAF H08
 Vector display: Use wind symbols: [x] Wind symbols: colour-coded: [x] Sample rate 1-min: [HSAF/H08 only] 50 Suppress outliers: [x] (2 of total points) 2 Palette: Black

STATUS

Plotting data...
 Plotted 8211 data points of 109899
 Drawing map "data_Bufrdisplay\bufr_map0\WB08_10.dat"
 Plotted 1267 map points of 12978 in 2759 segments

PROGRESS

Loaded file 1 message 419 subset 1 data category=12

DECODE PROGRESS

Decoded message 419 offset=1459336 subset=1

INPUT DATA

Input file: [Y:\SAF_HydroS-HSAF-H01_20200321_2340_DMSF16_84754_rom.bufr.gz] Decode mode: [HSAF/H01/H02]
 Total files: 1 Total messages: 619 Total subsets: 1 Total file size kB: 1422 Data compressed: [x] Multiple files: [x] BUFR edition: 4 Tables version: [14.80/G.0]

DATA SELECTION

Select: [Data field] Code table: [56 Cloud phase]
 [Vector direction field]
 56 Cloud phase
 57 Observation quality
 59 Field of view number
 60 Latitude (high accuracy)
 61 Longitude (high accuracy)
 62 Land/sea qualifier
 63 Intensity of precipitation (high accuracy)
 64 Cloud phase
 68 Observation quality

MAP PARAM

Projection: Mercator
 Latitude limit: -90.50 Longitude limit: -180.180 Central latitude: 0 Central longitude: 0 Height: 2000

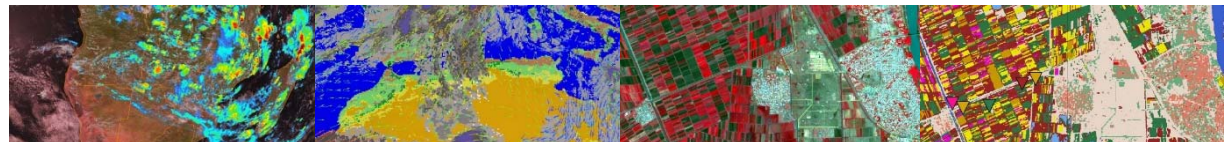
MAP 1

Legend for Intensity of precipitation (high accuracy):
 0.0e+00 - 6.7e+00 kg/m/m2
 6.7e+00 - 1.3e+01 kg/m/m2
 1.3e+01 - 2.0e+01 kg/m/m2
 2.0e+01 - 2.7e+01 kg/m/m2
 2.7e+01 - 3.3e+01 kg/m/m2
 3.3e+01 - 4.0e+01 kg/m/m2
 4.0e+01 - 4.7e+01 kg/m/m2
 4.7e+01 - 5.3e+01 kg/m/m2
 5.3e+01 - 6.0e+01 kg/m/m2
 6.0e+01 - 6.7e+01 kg/m/m2
 6.7e+01 - 7.3e+01 kg/m/m2
 7.3e+01 - 8.0e+01 kg/m/m2
 8.0e+01 - 8.7e+01 kg/m/m2
 8.7e+01 - 9.3e+01 kg/m/m2
 9.3e+01 - 1.0e+02 kg/m/m2
 1.0e+02 - 1.1e+02 kg/m/m2
 1.1e+02 - 1.2e+02 kg/m/m2
 1.2e+02 - 1.3e+02 kg/m/m2
 1.3e+02 - 1.4e+02 kg/m/m2

Panoply
 Version 4.10.3
 Build 64403.P1
 2018-12-31
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 18H2 - Java 1.8.0_271
 Max memory 12413 MB

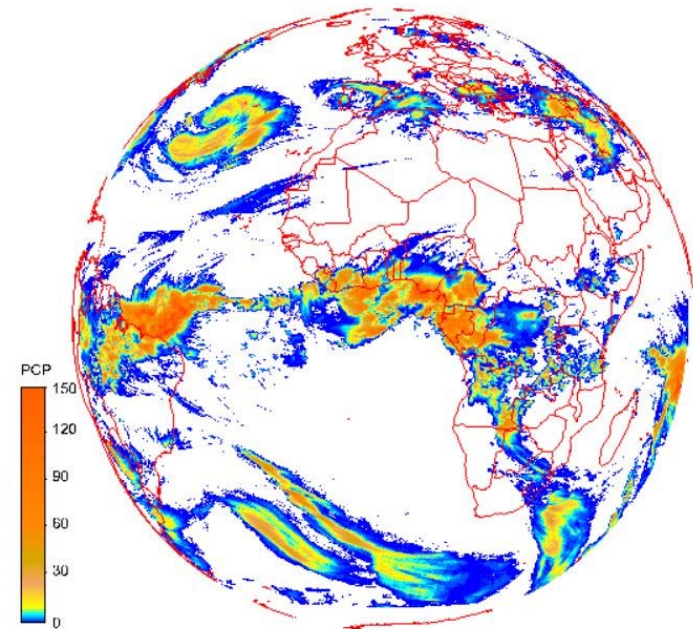
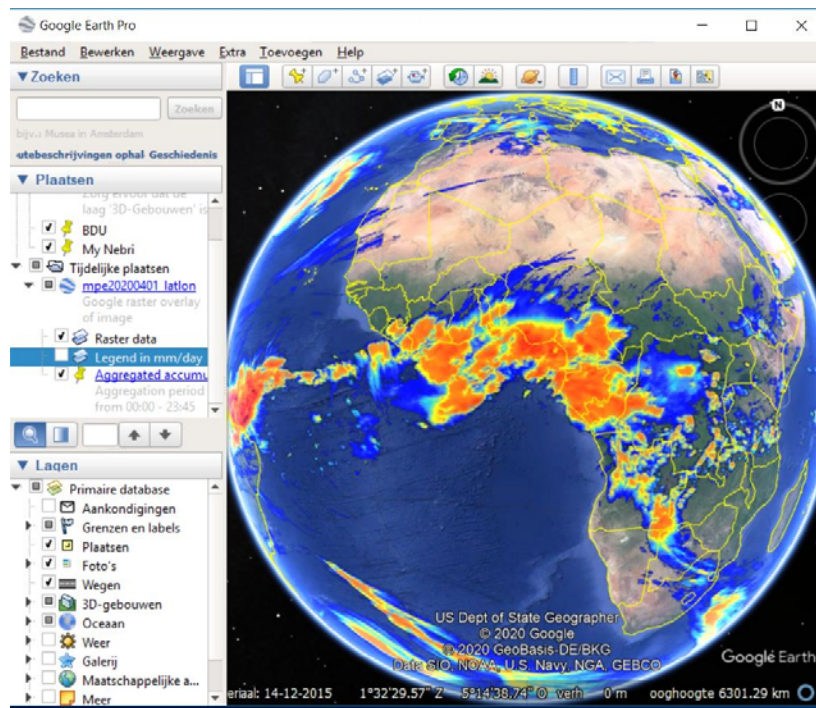


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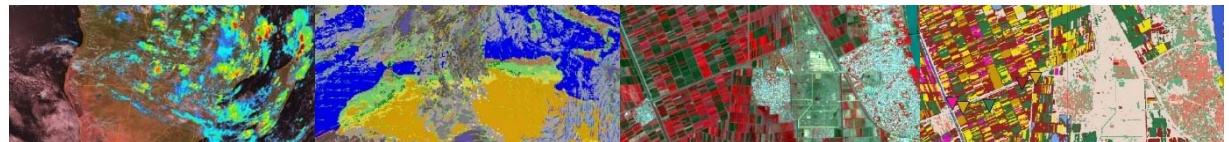


SOME EXAMPLES: EXTERNAL RESOURCES

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

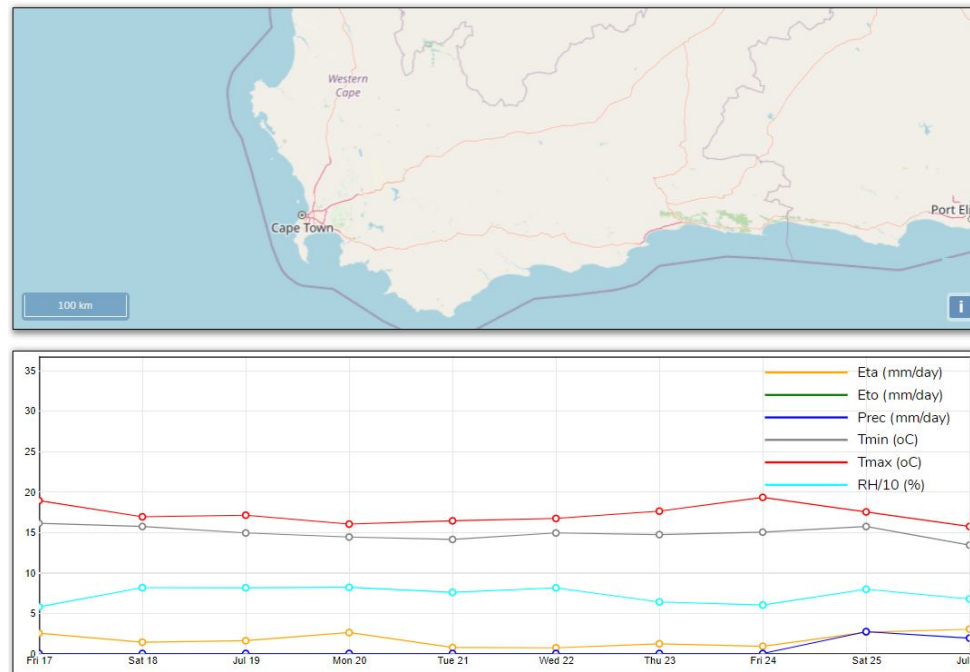


Google Maps Overlay of H05B (for visualization) and same data set in ILWIS (for analysis)

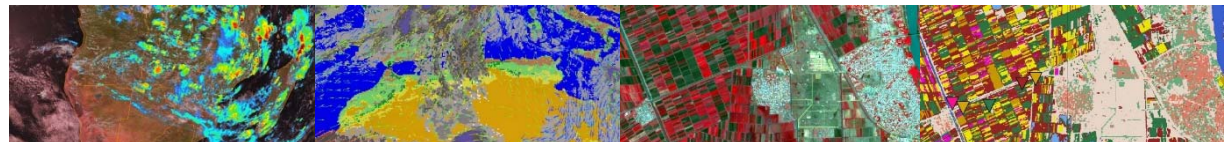


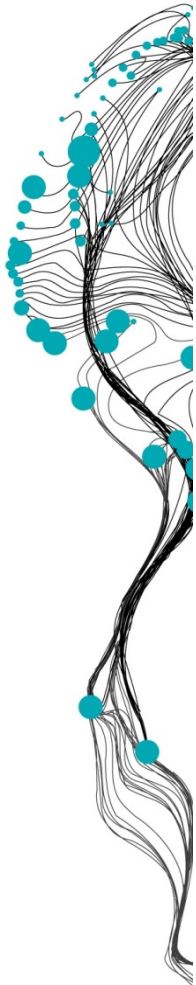
SOME EXAMPLES: EXTERNAL RESOURCES

- **GFS Daily aggregated forecast**



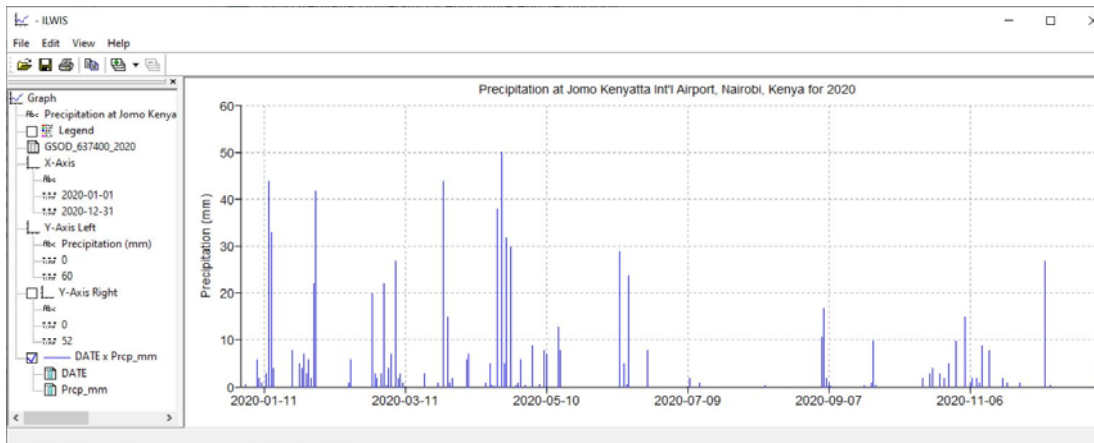
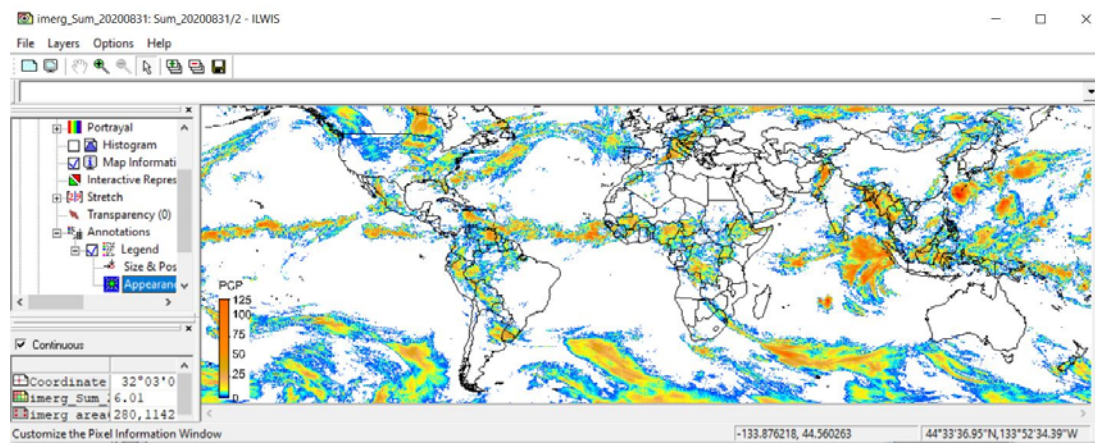
On a daily basis the data from GFS (Analysis from 00:00 UTC) is processed and the layers indicated above are extracted, aggregated at daily basis and the forecast for 10 days is derived.





SOME EXAMPLES: EXTERNAL RESOURCES

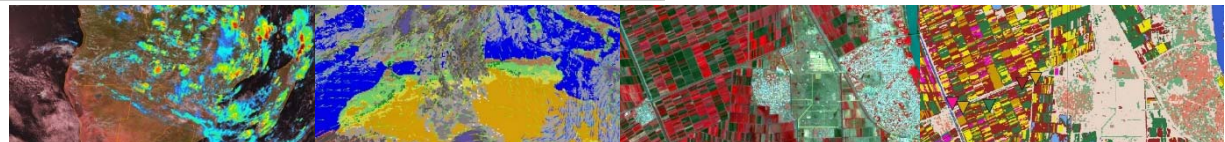
- **IMERG precipitation aggregated from half hourly to daily sum for 20200831**

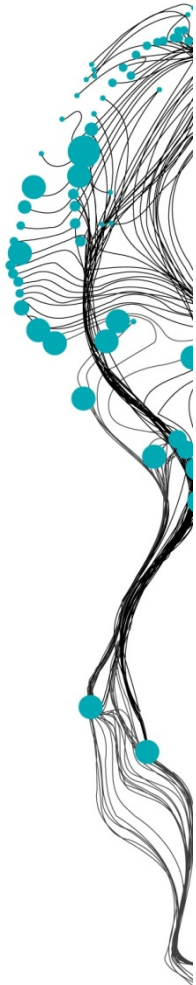


GSOD station data



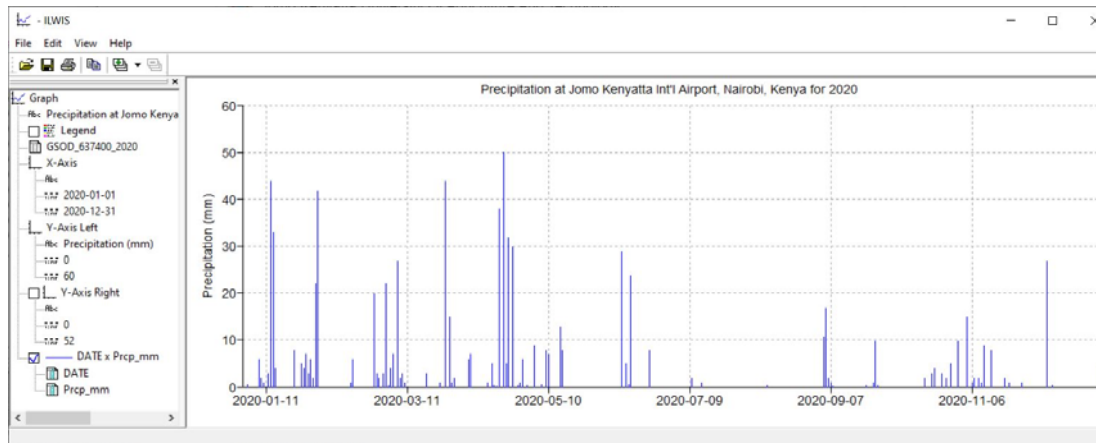
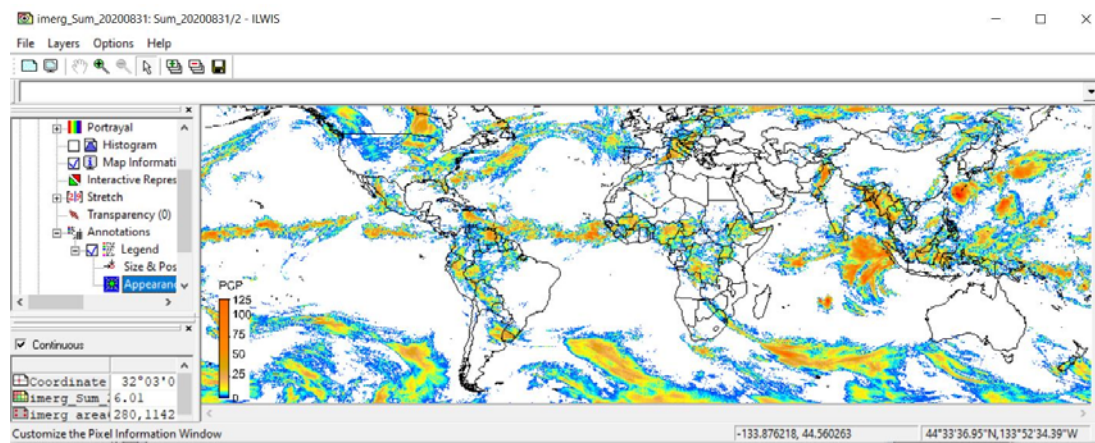
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SOME EXAMPLES: EXTERNAL RESOURCES

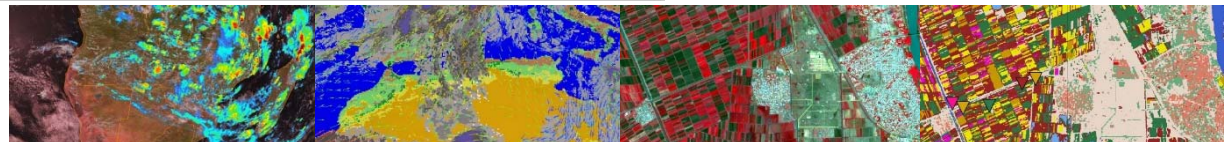
- **IMERG precipitation aggregated from half hourly to daily sum for 20200831**



GSOD station data

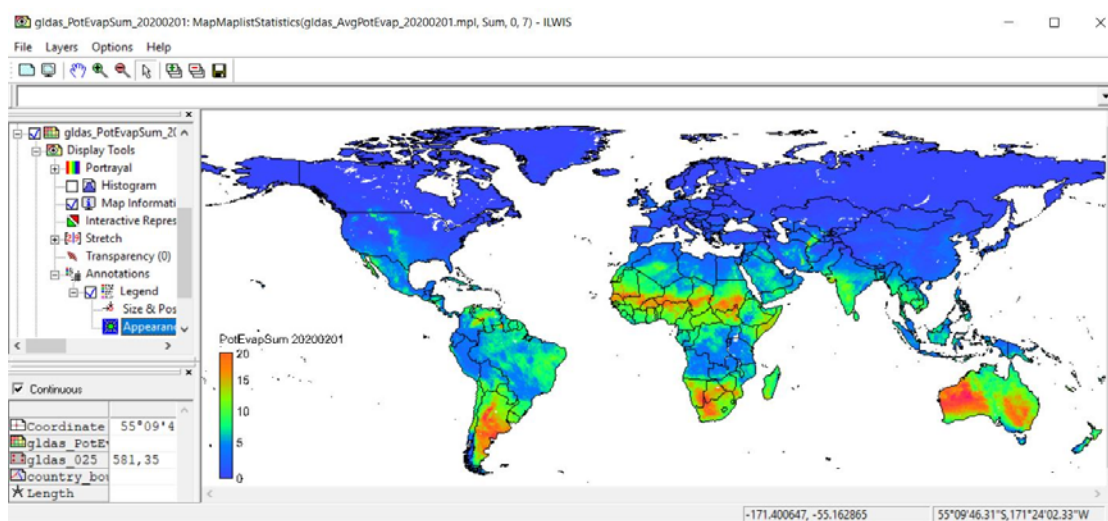


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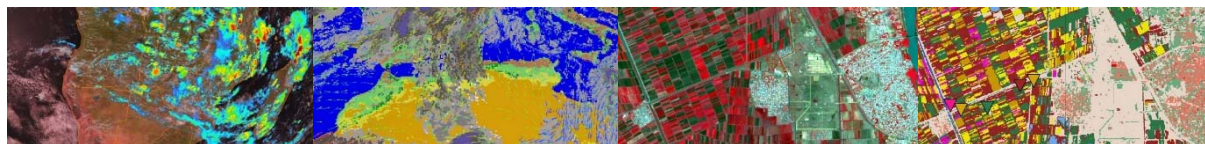
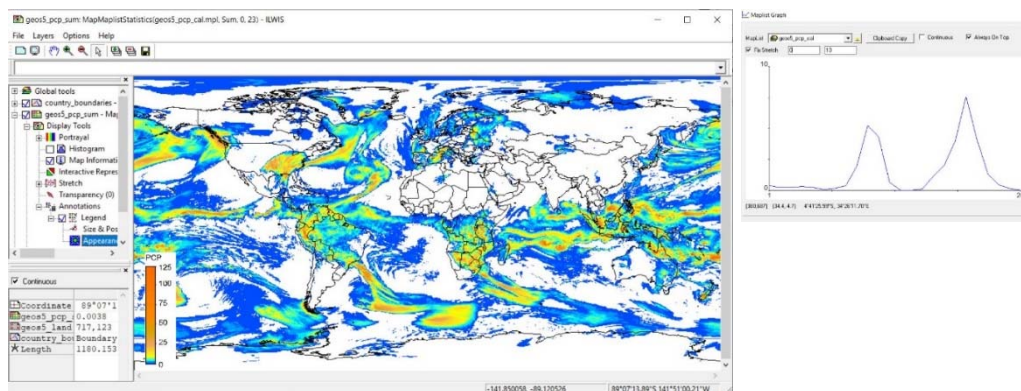


SOME EXAMPLES: EXTERNAL RESOURCES

GLDAS



GEOS5



REMARKS

- **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**
- **Other online products can be easily added**

