McIDAS-V Tutorial

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revised

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Table of Contents

Login to PC

use procedure pinned to the screen (EUMETSAT training PCs only)

kill Office Communicator (EUMETSAT training PCs only)

copy McVTutorial folder from flash memory to Desktop

Download site for McIDAS-V

McIDAS-V site: http://www.ssec.wisc.edu/mcidas/software/v/

most recent stable version for Windows XP/Vista/7

32-bit: McIDAS-V_1.2_windows_installer.exe

64-bit: McIDAS-V_1.2_windows64_installer.exe

PCs in this room: 2 gigabytes RAM, Windows XP (32-bit) → maximum RAM available for McIDAS-V:1 megabytes

(much improved performance with RAM>3.43 gigabytes and 64-bit OS)

Installation of version 1.3beta1

open Installer folder in McVTutorial folder

double-click McIDAS-V_1.3beta1_windows(64)_installer.exe (1.3beta1 is from 14 November 2012!)

start installation (including disinstallation of older version, if there):

[authorise installation]

Next

check *I accept agreement* – *Next*

Next

[*Browse* – OK choice (e.g. Desktop)* –] *Next*

Next

Next

wait

[authorise disinstallation of previous version]

wait

Next

Finish

start McIDAS-V using shortcut on Desktop

McIDAS-V creates a folder McIDAS-V in the home directory of the user – all changes/addons done by the user end up there, including a log file mcidasv.log.

The system modules and folders are saved in a folder called McIDAS-V-System in the

(default) path chosen during the installation*.

If McIDAS-V runs into severe problems or is blocking the PC, remove/rename folder McIDAS-V, restart and inspect file mcidasv.log.

Installation of de-compressing MSG HRIT reader

HRIT-coded data from the archive or EUMETCast/GEONETCast are wavelet-compressed. The HRIT reader iin the installation file is not de-compressing (i.e. de-compression would have to be done externally). The HRIT reader with integrated de-compression still is in prototype phase, but works fine (only available for Windows Oss).

open DecompressingMSG-HRIT folder in McVTutorial folder

copy msgtaget.exe to folder …/McIDAS-V-System/adde/bin

(depending on where the folder McIDAS-V-System is installed, administrative rights will be reuqested in order to overwrite the existing version of msgtaget.exe, caution: overwriting will have to be done after each update or new installation of McIDAS-V)

Starting McIDAS-V

start McIDAS-V using shortcut on Desktop

McIDAS-V creates a folder McIDAS-V in the home directory of the user account – all changes/add-ons done by the user end up in this folder, including a log file mcidasv.log.

Documentation

Help > User's Guide

more documents and tutorials at http://www.ssec.wisc.edu/mcidas/software/v/

post support requests from inside McIDAS-V

consult McIDAS-V Support Fora

McIDAS-V windows

By default McIDAS-V creates two windows at startup:
- **Data Explorer** handles the data requests and loading.
- a display window, called **McIDAS-V** by default, displaying processed data.

Additional display windows with single/multiple panels of different types may be created (File > New Display Window > [select] > [select]). More tabs of different types may be added to each display window (File > New Display Tab > [select] > [select]).

In the bottom left-hand corner of the display windows RAM usage is shown. Right-clicking toggles between RAM usage and wall clock.
RAM usage is 3 numbers:

right-hand number:	reserved RAM as per Preferences
middle number:	maximum RAM usage in current session
left-hand numbers:	current RAM usage

Middle number is only increasing. Left-hand number is changing continuously changing, increasing due to processing needs and decreasing due garbage collection (freeing RAM). Background of RAM information turns from white to pink when RAM usage is becoming critical. When going from pink to red problems might loom, i.e. system will slow down and, in the extreme, my get blocked.

Installation of plugins

EUMETSAT

Tools > Plugins > Manage

File > Install Plugin From File

browse to *Desktop > McVTutorial > Plugins*

open *EUM-McVplugin_Nov2012.jar*

click *OK*

plugins work only after a restart, but do not restart yet!

Panoply (needs internet access)

explore Available Plugins

click + in front of Color Tables (list of colour tables)

click + in front of Panoply Color Tables

now restart McIDAS-V

Settings

Edit > Preferences

General / General

items may be (un)checked at convenience (typically have nothing checked)

General / Layer Controls

check *Use fast rendering* (closes data gap along 0° longitude in non-native projections, but may create other spurious display anomalies)

General / When Opening a Bundle

from dropdown list select *Replace session*

Display Window / Panel Configuration

uncheck *Show Wireframe Box* (wireframe box may be helpful as reference in 3D displays)

uncheck *Reset Projection With New Data* (very important: does not reset display to native projection – awkward and time consuming when fusing data from different sources e.g. from different satellite orbits)

Display Window / Color Scheme

click colour box at *Background* and change colour to a **dark grey**

Display Window / Layer List Properties

change *Font* to **Arial** with size **14**

Display Window / Default Projection

select **Mercator** from dropdown list

Navigation Controls

check radio button *Custom*

interchange **Translate** and **Rotate** under *Right (MB3)* (preferred use of right-click is moving/panning an image, not rotating/tilting)

Formats & Data / Formats

delete **:ss** in *Date Format*

replace **GMT** by **UTC** from dropdown list in *Time Zone*

Formats & Data / Data

in *Sampling Mode* check radio button *Nearest Neighbour* (readout of native pixel values also when re-sampled in a non-native projection)

Advanced / Startup Options / Memory

(if use of 80%-option blocks McIDAS-V, try manual mode - increase stepwise starting from 512 megabytes)

Advanced / Startup Options / Defaults

uncheck *Specify default bundle* (otherwise might add another tab in *McIDAS-V* window

Advanced / Startup Options / Misc

check *Enable concurrent mark-sweep garbage collector* (improves garbage collection over standard procedure – better RAM management)

Advanced / Startup Options / VisAD

handling of *Enable access to geometry by reference*:

option checked – might create spider webs with certain (global) maps

option unchecked – no spider webs, but allowed size of datasets will decrease due to inefficient RAM use

we are done with Preferences

click *OK*

Change default layout of McIDAS-V window

Experience shows that white (also black) map outline match best with coloured imagery/charts, in particular with standard RGB composites (default map outline in blue/cyan is an inferior choice). Also, it has proven practical to have a Mercator-projected world map centred on 0° longitude at start-up.

at the top of the display click *Projections > Predefined > Mercator*

click *Default Background Maps* under *Legend* widget – *Data Explorer* window shows up

uncheck *North & Central America*

click colour box of *World Political Boundaries* and change colour to **white**

click colour box of *World Coastlines* and change colour to **white**

optionally create geographical grid and label grid:

click *Lat/Lon* tab above map list

for *Latitude* change *Intervsl* to **10**, *Style* to **...** and *Color* to **white**

(Longitude is automatically updated the same way)

click *McIDAS-V* window and inspect result

look at possibilities to ad/change labels of lat-lon grid and try them

resize *McDAS-V* window and/or displayed map to match screen dimensions if desired, finally make sure that the window content is complete out to the dust bin that is displayed at the extreme right in the Legend

click *File > Default Layout > Save*

click *Background Maps* in *Legend*

click *File > Default Maps > Save as the Default Map Set* in *Layer Controls*

restart

McIDAS-V window now shows white map outlines in Mercator projection on dark-grey background

Change of default map in case of criss-crossing map outlines

With certain video card/driver combinations (e.g. ATI Radeon with old driver) some maps produce criss-crossing lines - as a workaround another map may be selected:

double-click *Default Background Maps* in the *Legend* of the display

uncheck all maps on the Data Explorer

check *World Country Outlines* (less accurate than previously selected maps)

click colour box and select *white* colour

click *File > Save Favorite ...*

check *Save with relative paths* (always recommended when hitting this widget)

fill *Name* with **default**

click *OK*

click *File > Default Layout > Save*

Site configuration

McIDAS-V can be customised further in variety of ways through XML files and by setting paths. For details see *Help > User's Guide > Site Configuration*.

Installation of remote/local ADDE servers

ADDE (Abstract Data Dissemination Environment) servers are a generic tool for accessing local or remote data sets of any kind, typically satellite imagery or point data. We install one remote ADDE for accessing near-real-time SEVIRI data and some local ADDEs that give access to locally stored imagery from various imagers.

Tools > Manage ADDE Datasets

remote (near-real-time SEVIRI data)

(account is only enabled during the training event – otherwise access to SEVIRI data is through the local MSG HRIT ADDE server and HRIT data from the EUMETSAT Data Centre, see below)

File > New Remote Dataset

Server: adde.eumetsat.int

Dataset: EUM_AD

check *specify accounting information*

Username: THP

Project #: 1077

check *Image*

click *Verify and Add Server*

wait until widget disappears - installed

local (images from MODIS, MFG, AVHRR Metop, SEVIRI)

1

File > New Local Dataset

Dataset: MODIS

Image Type: MOD/MYD02

Format: MODIS MOD 02 - Level 1B ... (from dropdown list)

Directory: browse to ...McVTutorial/MODIS

click *Add Dataset*

2

File > New Local Dataset

Dataset: **AVHRR1B**

Image Type: **METOP**

Format: Metop AVHRR L 1b (from dropdown list)

Directory: browse to ...McVTutorial/Metop

click *Add Dataset*

3

File > New Local Dataset

Dataset: **MVIRI**

Image Type: **OpenMTP**

Format: Meteosat OpenMTP (from dropdown list)

Directory: browse to ...McVTutorial/MVIRI

click *Add Dataset*

4

File > New Local Dataset

Dataset: **SEVIRIFD**

Image Type: **HRIT**

Format: MSG HRIT FD (from dropdown list)

Directory: browse to ...McVTutorial/SEVIRIhrit

click *Add Dataset*

(server for HRV is similar)

we are done

check that *Local Servers are running.* is greyed, otherwise click *OK* to the right

cancel widget

Caution: some ADDE servers require that data files not be mixed with other files – it is good policy to store have in separate folders

Exercise 1: Standard RGB composites using SEVIRI HRIT data

Data selection

go to Data Explorer

select *Satellite > Imagery* in *Data Sources* tab

select *<LOCAL-DATA>* for *Server* and *SEVIRIFD* for *Dataset*

click *Connect*

select *HRIT* for *Image Type*

click *Absolute* tab

uncheck *Create preview image* (only useful when working with single-channel imagery)

explore timeline options (e.g. Interval, Sunrise/Sunset)

select all time slots

click *Add Source* and wait

Data Explorer jumps to *Field Selector* tab

Dust RGB – DUST

open *SEVIRI RGB* dropdown list under *Fields* (click on key symbol)

note listed RGBs

select *DUST*

in lower part under *Displays* click *Advanced* tab

under *Image Size* click "expand*" icon* in front of lock icon → full resolution – full disc

under *Location* change *Lat* to **-40** and *Lon* to **-40**

change *Image Size* to **1000** x **1000**

inspect selected region by clicking on *Region* tab (gives also alternative region selection with "shift/click" rectangle)

click *Create Display* at the bottom and wait

in display window go to *Projections > Predefined* dropdown list and select *SAmericaPS*

pan-zoom to display by shift/clicking a rectangle around it (other pan/zoom options available)

on top of image explore timeline and animation options

click *HRIT (All Bands)* … in *Legend* → *Layer Controls* tab → Data Explorer shows up

click "*i" icon* at the bottom → *Properties* window shows up

in *Layer Label* delete macro *%displayname%* and insert macro *%shortname%* by clicking

Add Macro > Field Short Name

click *Add Macro > Add for this type of display* → make changes permanent in *Layer Label*

click *Apply* and inspect *Data Explorer*

optionally do other changes

click *OK*

go *Edit > Preferences > Display Window > Panel Configuration*

check *Show Times in Panel* and click *Apply* at the bottom → observe date-time label in lower right-hand corner of display

click *Cancel* at the bottom → leave Preferences unchanged

right-click *HRIT (All Bands) …* in *Legend* → dropdown list appears

go from *View* to *Display List* to *Show Display List* and click it → layer label is deleted

repeat action → label re-appears

Save single frame

click *View > Capture > Image*

browse to Desktop for saving path and insert filename 1.png

click *Save* → image marked in blue on timeline is saved as 1.png on Desktop

Save frame sequence

click *View > Capture > Movie*

under *Image Files* check *Save Files To*

browse to Desktop and insert filename %time:yyyyMMddHHmm%_DUST.png
or other filename by using variation of construct above or simple text

click *Time Animation* under *Capture* → movie frames are saved to Desktop

widget appears for optionally saving movie

choose *Animated GIF (*.gif)* from dropdown list in *Files of Type*

browse to Desktop and insert filename 1.gif

save and inspect it

Save work – McIDAS-V zipped data bundle

click *File > Save Bundle* on Data Explorer

check *Save with relative paths* (recommended for portability)

browse to Desktop

insert filename ex1 and select file type **.mcvz*

check all check boxes that come up and click *OK*
(saves display template with the dataset used)

Generic cloud microphysics RGB – GCMP

go back to Data Explorer and *Field Selector*
click *GCMP* from *SEVIRI RGB* dropdown list
make sure that *RGB Composite* in *Displays* is highlighted
click *Create Display*
explore *Legend*
compare DUST and GCMP by toggling tick of *RGB Composite* in *Legend*
click *RGB Composite* → *Layer Controls* in *Data Explorer* appears
play with ranges (K) and gammas (1/gamma!):

1. red 4 / 2 (press *Enter* after each entry!)
2. green 0 / 15 gamma=.4
3. blue 261 / 289

compare DUST and GCMP by toggling between them
modify ranges:

1. red 0 / -
2. green 1000 / 1000
3. blue 1000 / 1000

compare again
modify ranges again:

1. red 1000 / 1000
2. green 0 / 15
3. blue 1000 / 1000

compare again

Measure displacement speed of plume head

activate DUST display only
select *Display > Add Range and Bearings*
in *Legend* under *General* click *Range and Bearings*
select *Edit > Selector Color > black* (colour of range bar)
click triangle on range bar and move bar over plume head
shorten bar by click-dragging square symbol close to plus symbol

zoom in

click-drag *plus* and *square* symbols to a prominent pattern in the plume head at 10:30 and 14:15, respectively

read distance in *Legend* and calculate speed

Specifying display with explicit image dimensions

click *View > Properties* on top of display

set *Width* and *Height* at bottom of *Properties* widget to appropriate pixel numbers, e.g. **520**/**320**

click *OK*

click *View > Full Screen* → new display window with defined image dimensions

note that, depending on graphic card/driver, one cannot return to the original display window, however the width/height might be changed to other values – try **600**/**600**

Discussion of implemented SEVIRI RGB composites

RGBs using the solar part of IR3.9 are not implemented. Considering the rather limited value of these RGB schemes, implementation of e.g. the Rosenfeld procedure for the separation of the solar signal in IR3.9 was not considered worth the effort up to now (volunteers are welcome, though!).

RGBs are implemented via procedures written in Jython and stored in the Jython Library:

Tools > Formulas > Jython Library > User Library

[discussion]

Jython code is called via formulas:

Tools > Formulas > Edit formula > SEVIRI RGB > DUST (...

[discussion]

(RGB procedures may be also used for AVHRR and MODIS by choosing SEVIRI proxy channels)

direct coding of a formula without using Jython code is possible (for simple one-line operations)

Tools > Formulas > Edit formula > SEVIRI Products > MPE (...

[discussion]

Exercise 2: MODIS Dust RGB composite (DUST)

click *File > Open File...* in Data Explorer

browse to *ex1.mcvz*

click *Open*

click *OK* in *Open bundle* widget

click *Remove all layers*

click *Remove all data*

click *OK* in *Zip file* data widget → DUST imagery of former exercise is back

in *Data Sources* tab of *Data Explorer* set *Server* to *<LOCAL-DATA>* and *Dataset* to *MODIS*

click *Connect*

select *MOD/MYD02* for *Image Type*

click *Absolute* tab and inspect available time slots

click *Add Source* and wait

under *Data Sources* click *Formulas*

under *Fields* open *SEVIRI RGB*

click *DUST...*

click *Create Display*

assign *MOD/MYD02 (All Bands) > 8.5288 µm Cirrus... > Temperature* to *IR87* (wait)

assign *MOD/MYD02 (All Bands) > 11.0186 µm Surface... > Temperature* to *IR108* (wait)

assign *MOD/MYD02 (All Bands) > 12.0385 µm Surface... > Temperature* to *IR120* (wait)

in bottom right-hand widget in *Advanced* tab click "*expansion" icon* → selects full resolution and whole area of dataset

click *OK* and wait

match MODIS with closest SEVRI slot

toggle between MODIS and SEVIRI image and observe differences/similarities

Exercise 3: NWP wind fields

go to Data Explorer
select *Gridded Data > Local* in *Data Sources* tab
inspect *Data Type* dropdown list – leave *I'm Feeling Lucky*
in *Look In* browse to ECMWF folder and select grib file
click *Add Source*
click *key icon* at *Derived*
click *Flow Vectors …*
click *Wind Barb Plan View* in *Displays*
click *Create Displays* → crowded wind field
click *ECMWF...* in *Legend*
adjust various parameters:
set *Size* to *6*
click *Autoscale*
set *Skip XY* to *4*
set *Color* to *black*
set *Line Width* to *2*
set *Levels* to *600*
inspect display by moving through time slots
check with wind speed measured earlier on
uncheck wind field
revert to *Field Selector*
click *Speed...* in *Fields*
click *key icon* at *3D Surface in Displays*
click *Isosurface*
click *Create Display*
set *Isosurface Value* to *50* in *Layer Controls*
tilt display with DUST image by right-click/CTRL/dragging mouse
revert to top view
draw speed contours and explore options

Exercise 4: AVHRR Natural Colour RGB Composite (NCOL)

click *scissor icon* to remove all displays and data

click *Memory* and click *Clear...* in lower left-hand corner of Display window → further clearing of Java heap

set *Server* to *<LOCAL-DATA>* and *Dataset* to *AVHRR1B*

click *Connect*

select *Metop* for *Image Type*

click *Absolute* tab and inspect available data

click *Add Source* and wait

under *Data Sources* click *Formulas*

under *Fields* open *SEVIRI RGB*

click *NCOG*

click *Create Display* → Field Selector window opens

assign *Metop (All Bands) > 0.63 µm VIS... > Reflectivity* to *VIS06* (wait)

assign *Metop (All Bands) > 0.86 µm VIS... > Reflectivity* to *VIS08* (wait)

assign *Metop (All Bands) > 1.61 µm Near... > Reflectivity* to *NIR16* (wait)

in bottom right-hand widget in *Advanced* tab click "*expansion" icon*

click *OK* and wait

click *Projections > Predefined > EuropePS-10W* on top of display and zoom in

play with gamma correction (below colour beams) in *Layer Controls* and try to enhance faint veil between Atlantic coast and cloud system to the west

Exercise 5: SEVIRI products

AMV (BUFR)

click *Data Sources > Gridded Data > Local*

browse to …/SEVIRIproducts/MSG2-SEVI-MSGAMVE-0100-0100-20110407114500.000000000Z-1002802.bfr

click *Add Source*

in *Fields* click *Point Data*

click *EUMETSAT > AMV...* in *Layout Model* tab

click *Create Display*

inspect plot with winds scaled to quality and coloured by pressure level

check station model by clicking the *double down-arrow* at *Layout Model* and *Edit*

CLA (BUFR)

CLAP: cloud layers with cloud type and coverage, height and temperature

click *Data Sources > Gridded Data > Local*

browse to …/SEVIRIproducts/MSG2-SEVI-MSGCLAP-0000-0000-20111030234500.000000000Z-1017702.bfr

click *Add Source*

in *Fields* click *Point Data*

click *EUMETSAT > CLA...* in *Layout Model* tab

click *Create Display*

inspect plot with coloured cloud amounts at low, medium and high level

check station model by clicking the *double down-arrow* at *Layout Model* and *Edit*

right-click symbols and inspect symbol shapes and colours

vary observation density using density slider or unchecking *Declutter*

CLA (GRIB)

CLAI: scenes type for each image segment

click *Data Sources > Gridded Data > Local*

browse to …/SEVIRIproducts/MSG2-SEVI-MSGCLAI-0000-0000-20110407114500.000000000Z-1003164.grb

click *Add Source*

click *Pixel scene...* in *Fields* and *Color-Shaded Plan View* in *Displays*

click *Create Display*

inspect cloud analysis image and compare with cloud layer display above

GII TPW (BUFR)

click *Data Sources > Gridded Data > Local*

browse to …/SEVIRIproducts/MSG2-SEVI-MSGGIIN-0101-0101-20110407110000.000000000Z-1002802.bfr

click *Add Source*

in *Fields* click *Point Data*

click *EUMETSAT > GII – Total...* in *Layout Model* tab

uncheck *Use Default in Region* tab

select an area over Europe by left-click/dragging mouse

click *Create Display*

inspect plot with coloured cloud amounts at low, medium and high level

check station model by clicking the *double down-arrow* at *Layout Model* and *Edit*

right-click symbols and inspect symbol shapes and colours

vary observation density using *density slider* or unchecking *Declutter*

open *Gridded Fields* and click *Precipitable_water* in *Fields*

click *Color-Shaded Plan View* in *Displays*

click *Create Display*

(other GII parameters available)

MPE (GRIB)

instantaneous rain rate is given in kg/m^2/s (~ mm/s for water) → very small numbers and common unit is mm/hr → conversion, i.e. write a formula

in Display window select *Tools > Formulas > Create Formulas*

Name: Rain rate

*Formula: a*3600*

click *Add Formula*

Data Sources > Gridded Data > Local

browse to …\SEVIRIproducts\MSG2-SEVI-MSGMPEG-0100-0100-20090830180000.000000000Z-1002820.grb

click *Add Source*

click *Formulas* in *Field Selector* under *Data Sources*

select *Rain rate* in *Fields*

select *Color-Shaded Plan View* in *Displays* under *Plan Views*

click *Create Display*

in *Field Selector* widget select *MSG2... > 2D_grid > proj1 > Instantaneous_Rain...*

click *OK* and wait

inspect precipitation fields

left-click *colour bar* in *Legend* and click *Change Range*

click U*ser Predefined > From Color Table*

click *OK*

explore different colour tables and yet another range by clicking *MSG2...MPEG...* in *Legend* and then changing adequate items in *Layer Controls* tab

MPE (GRIB)

Rainfall accumulation can be done by summing up a sequence of grib fields. However, this affords a rather powerful PC, even for only a couple of time slots. 6 grib files are in sub-folder RainAccumulation.

Using the same conversion formula as above the resulting amounts are 4 times too big – why?

Exercise 6: Metop products

ASCAT winds

Data Sources > Gridded Data > Local

browse to …Metop/ascat_20110407_103000_metopa_23168_eps_o_125_1019_ovw.l2.nc

click *Add Source*

in *Fields select 2D grid > Derived (Oceanographic... > Ocean...wind_speed...wind_dir)*

in *Displays* select *Wind Barb Plan View*

click *Create Display*

click *ascat...* under *Flow Displays* in *Legend*

in *Layer Controls* under *Wind Barbs* put *Size* to **2 [Enter]**, click *Autosize* (additionally thin data with *Skip* box)

zoom in on Cape Verde area

in *Fields* select *2D grid > Derived (Oceanographic... > Ocean...model_speed...model_dir)*

click *Create Display*

change wind barbs as done before

inspect difference between model winds and ASCAT-derived winds

delete displays

ASCAT surface soil moisture

browse to …Metop/M02-ASCA-ASCSMR02-NA-2.0-20110727092400.000000000Z-1010028.bfr

in dropdown list of *Data Type* select *netCDF/GEMPAK Point Data files*

use station model *EUMETSAT > SMR...*

select Subsahel region

in *Fields* click *Point Data*

click *Create Display*

press radio button *Multiple* in *Time* tab of *Layer Controls*

zoom in on Ivory Coast

slightly increase data density moving *Density* slider in *Layout* tab

with adequate density observe varying dot sizes reflecting data quality

inspect station model (*Tools > Station Model Template > Layout Models > EUMETSAT > SMR*)

right-click magenta dot and using *Properties* delete *Scale by Parameter* in *Scale Size* tab click *Apply*

inspect changes in display

Polar winds

load all 4 files *…Metop/M02-AVHR-AVHAMV02-NA-1.0-20111108…000000000Z-1019016.bfr* in one go
in dropdown list of *Data Type* select *netCDF/GEMPAK Point Data files*
in *Fields* click *Point Data* and first file (of 4)
use station model *EUMETSAT > AMV...*
click *Create Display*
press radio button *Multiple* in *Time* tab of *Layer Controls*
select adequate projection
animate

Exercise 7: Jason products

SWH (Significant Wave Height)

browse to …Jason/JA2_OPR_2PdS155_122_20120920_190312_20120920_205116.nc

click *Point Data*

use station model *SWH...*

select area from Gulf of Guinea Antarctica as *Region*

click *Create Display*

click *yes* to possible question about number of observations and wait

press radio button *Multiple in Time* tab of *Layer Controls*

zoom in and set adequate data density

inspect display

inspect station model and check how data display is suppressed over land

Exercise 8: Real-time SEVIRI and NCEP model data

Airmass RGB

in *Data Sources* tab of Data Explorer select *Satellite > Imagery*

set *Server* to *adde.eumetsat.int* from dropdown list

click *Connect*

set *Image Type* to *M9 - M9* from dropdown list

choose a synoptic time slot and, if possible, an area with much cold cloud

click *Add Source*

display *AIRM* (*Fields > SEVIRI RGB*) in full resolution (*Advanced*) over West Africa (*Region*)

click *Create Display* and wait

IR10.8 – semi-transparent cold-temperature overlay

display *IR10.8 temperature* (and change colour table and range)

go to *Layer Controls* of IR10.8 display and click button at *Color Table*

from dropdown list click *Satellite > Group 2 > Convection Transp*

inspect colour table (range, colouring, transparency) by clicking button again and selecting *Edit Color Table*

inspect display and correct temperature range if scene is warmer than expected by the default setting

display colour bar in image by clicking the "*i" icon* in *Layer Controls* and *Color Scale* tab in *Properties* window

click *Visible*

check colour bar on display and apply changes if desired

when done click *OK*

NCEP

in *Data Sources* tab of Data Explorer select *General > Catalogs*

in *Data SourceType* select *IDV catalog > Unidata IDD... > UCAR (motherlode) > Global Forecast… > NCEP GFS Global 2.5 degree > Latest...*

match time slot with time slot of imagery above

click *Add Source*

select *3D grid > Mass > Geopotential_height @ pressure*

select *50000Pa* in *Level* tab (500hPa)

select Africa area east of 0° in *Region* tab (area straddling 0° not possible, sorry)

click *Create Display*

go to *Layer Controls* tab in Data Explorer and modify chart to your liking using the options found under keywords *Contours*, *Color Tables, Smoothing* and *Levels*

go to *Field Selector* and display another model parameter

Exercise 9: SEVRI channel analysis

Data selection

in *Data Sources* tab of Data Explorer select *Satellite > Imagery*

set *Server* to *adde.eumetsat.int* from dropdown list

click *Connect*

set *Image Type* to *M9 - M9* from dropdown list

select 5 most recent in *Relative* tab

click *Add Source*

display IR10.8 temperature in full resolution (*Advanced*) over West Africa (*Region*)

with IR convection (*Settings*) as colour table

click *Create Display* and wait

Simple data probe

click *Projections > From Displays > Image (MSG...* → native projection of SEVIRI data (satellite projection)

if map outlines are broken click *Default Background Maps* in *Legend* and check *Fast rendering* boxes of checked maps

middle-click and hover over display – watch dynamic readout at the bottom of the window

Time series of data probe

go to *Field Selector* in Data Explorer

select *IR10.8 Temperature* and *Data Probe/Time Series* under *General* in *Displays*

click *Create Display*

go to Data Explorer

select *View > Undock* from Data Explorer

move coloured square over IR10.8-image and watch changes in time series

use timeline at bottom of time series and watch changes

when finished click *dustbin* on the right of *Data Probe...* in *Legend*

Data transect

go to *Field Selector* in Data Explorer

select I*R10.8 Temperature* and *Data Transect* under *General* in *Displays*

click *Create Display*

select *View > Undock* from Data Explorer

move transect line over IR10.8 image and watch changes in cross section

use timeline at top of cross section and watch changes

when finished click *dustbin* on the right of *Data Probe...* in *Legend*

Scatter plot

x-axis of plot:

Field Selector in Data Explorer

select WV6.2 *Temperature* and *Scatter Analysis* under *Imagery* in *Displays*

click *Create Display*

y-axis of plot:

click WV7.3 *Temperature* in *Field Selector* under *M9 – M9 (All Bands)*

uncheck *Use Default* and select *first time slot* in list

click *OK* and wait → 3 plots: image for x-axis – image for y-axis - scatterplot

select *View > Undock* from Data Explorer

analysis drawing boxes:

click *Box* radio button

click *magenta-coloured box*

use shift/left-click and drag to draw a box over a region of the scatter plot → corresponding points in both images are highlighted

select a region of interest in one of the images → corresponding points in scatter plot are highlighted

alternatively click *Curve* radio button and draw enclosed shape on either scatterplot or image → same result as with box

one box/curve per colour allowed

datasets from different time slots or different data sources may be compared

Exercise 10: IASI level 1C (EBBT)

load bundle …/Bundle/ex1.mcvz

in *Data Sources* tab of Data Explorer select *Satellite > Hydra*

browse to …/Metop/IASI_xxx_1C_M02_20110606104100Z_20110606105507Z_N_O_20110807155039Z.h5

click *Add Source*

select *Imagery > Multispectral Display* in *Displays*

click *Create Display*

move a probe over displayed data – note temperature indications

move one probe over Cirrus (black area in DUST) and the other one over the ash/SO2 plume (yellow streak in DUST)

go to *Layer Controls* in Data Explorer

select *View > Undock* from Data Explorer

inspect the 2 spectra corresponding to the position of the 2 data probes

move probes across image – observe changing spectra

move green line in spectra (or specify a wavenumber) – observe changing image

select *Imagery > Linear Combinations* in *Displays*

click *Create Display*

from list below patiently copy green commands and paste them line by line at the *>> >*mark

hit *Enter* key after each paste in order to execute command

watch what happens in the spectrum as you continue to execute commands

zoom to the spectrum in order to have a better view of the selected lines

IR7.3 - lo-wn

```
b71=selector(1407.25,'red')
s71=selector(1371.5,'orange')
combine(b71-s71,'SO2-71')
```

IR7.3 - hi-wn

```
b72=selector(1408.75,'magenta')
s72=selector(1371.75,'yellow')
combine(b72-s72,'SO2-72')
```

IR7.3 - average

```
combine(.5*(b71+b72-s71-s72),'SO2-7a')
```

go to *Field Selector* and click on *key icon* of *U-MARF/EPS.....*

click *SO2-71*

click *Create Display* (*Image Display* is preselected and is the correct display type)

click *Image Display* in *Legend* on the right side

Layer Controls tab in Data Explorer window is activated

change colour bar by clicking *Gray Scale > Miscellaneous > VisAD*

change temperature range by clicking *VisAD > Change Range*

reset range to 0 and *20*

click *information icon (i)* at the bottom of Data Explorer window

in *Properties* window change *Legend Label* and *Layer Label* to *SO2-71*

repeat yellow procedure accordingly for remaining images in drop-down list

inspect images

compare SEVIRI with IASI doing scatterplot of IR10.8 vs 926nm

Exercise 11: Setting screen dimensions (draft)

To save an image as a consistent size, it is easiest to use the Full Screen Mode found in the View menu of the main display.

1. Before selecting View Full Screen, set the desired screen dimension
   Click *View>Properties*
   Set the Full Screen Dimensions
2. Select View>Full Screen

It is best to construct the graphics in the full screen mode when using the set dimensions for proper placement of graphics.

When the bundle is saved, the graphic will be saved with the set dimensions. The bundle can be opened with any option except "Merge with Active Tabs" and the
Full Screen Size will be retained.

There is a bug which occasionally places the graphics incorrectly when the bundle is loaded and the user opens the full screen. The following workaround helps:

1.) For colorbars, open Edit>Properties>Color Scale of the layer, click Apply.
2.) For layers added using Display>Draw Freely
   When Draw Freely is used, make sure to select the option *View>Dock in Data Explorer* when first creating the graphic
When the bundle is reloaded, double-click on each glyph, click *Apply* in the resulting window

Exercise 12: Jython shell

display small image of IR10.8 temperature with IR convection colour table

click *Tools > Formulas > Jython Shell*

from file *text&colourbar-JS* in *…/JythonShellCommands* copy and paste *1st command line* into box at *Evaluate* button

edit absolute path

click *Evaluate*

inspect image 2.png that has been saved in the indicated path

from file t*ext&colourbar-JS* in *…/JythonShellCommands* copy and paste *2nd command* line into box at *Evaluate* button

edit absolute path

click *Evaluate*

inspect image 3.png

more in *Help > McIDAS-V Scripting* in Support Forums

Exercise 13: Jython libraries and code (not done yet)

Exercise 14: Globe Display

File > New Display Tab > Globe Display > One Panel

inspect display

load an image composite from free ADDE server

Server: *adde.ucar.edu*

Dataset: *GINICOMP*

Image Type: *GMC24KIR – GINI 24 km 10.7 um Multi-Composite*

Fields: *Temperature*

Settings: *IR convection*

globe viewpoint (vertical icon list to the left – 8th icon) for having Eurafrica upfront
Azimuth from North: *270*
Tilt down from top: *90*

alternatively click *Projections > Viewpoints > 0* (or other items in the list)

turn globe: ctrl/click and swipe mouse across display

globe display is 3D

Exercise 15: MVIRI imagery from IODC

use local ADDE server MFG to load file *OpenMTP_2008-08-09_28_712345_1_1_1.IR* from folder MVIRI and display IR channel

Notes:

- Data files have to be full-disk and in OpenMTP format
- Data files to be stored above 6th sub-directory level

Exercise 16: Importing pictures

Pictures in equilateral lat-lon projection (also "plate carree", in McIDAS-V "World") with known upper left-hand and lower right-hand corner coordinates may be imported into McIDAS-V using a simple XML file for navigation (extension: *.ximg)

click *General > Files > Directories* in *Data Sources*

browse to *.../EquilatPictures/20100530*-0605TCHP.ximg and open it

inspect display and *20100530-0605TCHP.ximg* file with e.g. Wordpad

Exercise 17: Annotations

Adding your own location labels

read *Help > Location XML Files*

in *Data Sources* tab of Data Explorer select *Display > Plot Location Labels > …*

Drawing freely

in *Data Sources* tab of Data Explorer select *Display > Draw freely…*

exercise drawing and annotation by using *Help > Drawing Controls*

Exercise 18: Google Earth overlay

Image needs to projected in World (procedure will do it)
save image with *View > Capture > Image* and specify file extension **.kmz*
with Google Earth installed on the system click *kmz* file

Exercise 19: Suomi-NPP VIIRS imagery (not done yet)

Fort Collins fire

Al Rusayl fire

DNB scene (Ontario aurora)

Appendix 1: Data sources for the exercises

The local datasets used in the exercises are retrieved from various archives. Orders for all archives can be made over the web and are free of charge. Some archives ask for registration (mostly simple procedures).

MVIRI OpenMTP

EUMETSAT Data Centre / GEO

https://eoportal.eumetsat.int/userMgmt/login.faces

SEVIRI HRIT and Products

EUMETSAT Data Centre / GEO

https://eoportal.eumetsat.int/userMgmt/login.faces

Notes:

xRIT datasets may be sub-sets channels and segments (including HRV).

xRIT data have to be wavelet de-compressed externally (e.g. with xRITDecompress from the EUMETSAT Tools website) before they can be read by the HRIT server in McIDAS-V. A wavelet de-compress procedure for Windows OSs is described in the Appendix (integration of decompression in local ADDE server coming soon).

Metop AVHRR Level 1b

NOAA CLASS

http://www.class.ngdc.noaa.gov/saa/products/search?datatype_family=AVHRR

Metop ASCAT

soil moisture - EUMETSAT Data Centre / LEO / SAF

https://eoportal.eumetsat.int/userMgmt/login.faces

wind

ftp://podaac-ftp.jpl.nasa.gov/allData/ascat/preview/L2/

Metop IASI Level 1c

EUMETSAT Data Centre / LEO

https://eoportal.eumetsat.int/userMgmt/login.faces

Terra MODIS

MODIS Rapid Response System

rapidfire.sci.gsfc.nasa.gov/realtime/

Appendix 2: xRIT wavelet de-compress procedure in Windows

Straightforward procedure to wavelet de-compress a list of xRIT files:

1. Have xRIT files in one directory
2. Open a Command Prompt window and set path to the directory with the xRIT files
3. List bare file names into a text file in the same directory: **dir *-C_ /b > list.bat**
4. Edit file list.bat by inserting string "xRITDecompress " at beginning of each file name
5. Copy **xRITDecompress.exe** and **cygwin1.dll** into same directory
6. Decompress all files by running the command **@list**
7. Delete compressed files: **del *-C_**