



Global Processing and Products
from MERIS Full Resolution Data
for the Coastal Zone


User Consultation Meeting
CC Product Demonstration

21.10.2011
Lisbon

CoastColour



CoastColour UCM3 * Lisbon* 19.-21.10.2011



Agenda

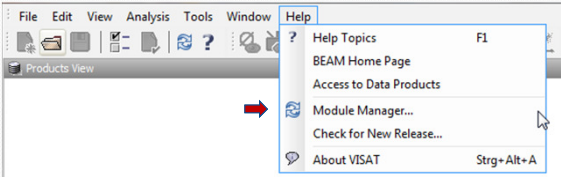
- 9:30 Technical set-up
- 10:00 Lecture and hands-on exercise 1
 - L1P, L2R bands and flags and meta data
 - VISAT basic visualisation tools: RGB, colour tables, linking, flags, bitmask manager
- 11:15 break
- 11:45 Lecture and hands-on exercise 2
 - Lat-lon, attach geocoding, projection, collocation
 - Layer manager, bitmask manager; histograms and scatter plots
- 12:30 Lecture and hands-on exercise 3
 - Validation example: pins transects, pixel extraction tool, working on time series of data; in-situ data;
- 13:30 – 14:00 Questions & Answers

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BEAM Installation

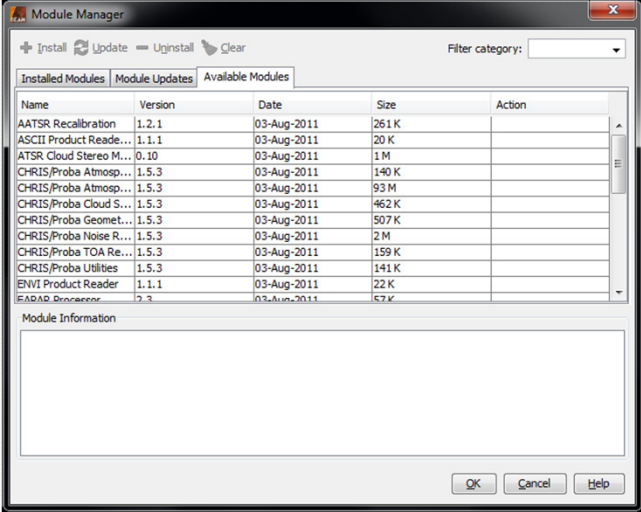
- Download 4.9.1
- Implement BEAM software and start VISAT
- Update with the newest modules
→ Module manager



The screenshot shows the VISAT software interface. The 'Help' menu is open, and the 'Module Manager...' option is highlighted with a red arrow. The menu items are: Help Topics (F1), BEAM Home Page, Access to Data Products, Module Manager..., Check for New Release..., and About VISAT (Strg+Alt+A).

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The screenshot shows the 'Module Manager' dialog box. It has tabs for 'Installed Modules', 'Module Updates', and 'Available Modules'. The 'Installed Modules' tab is active, displaying a table of modules. The table has columns for Name, Version, Date, Size, and Action. Below the table is a 'Module Information' section with a text area and 'OK', 'Cancel', and 'Help' buttons.

Name	Version	Date	Size	Action
AATSR Recalibration	1.2.1	03-Aug-2011	261 K	
ASCII Product Reade...	1.1.1	03-Aug-2011	20 K	
ATSR Cloud Stereo M...	0.10	03-Aug-2011	1 M	
CHRIS/Proba Atmosp...	1.5.3	03-Aug-2011	140 K	
CHRIS/Proba Atmosp...	1.5.3	03-Aug-2011	93 M	
CHRIS/Proba Cloud S...	1.5.3	03-Aug-2011	462 K	
CHRIS/Proba Geomet...	1.5.3	03-Aug-2011	507 K	
CHRIS/Proba Noise R...	1.5.3	03-Aug-2011	2 M	
CHRIS/Proba TOA Re...	1.5.3	03-Aug-2011	159 K	
CHRIS/Proba Utilities	1.5.3	03-Aug-2011	141 K	
ENVI Product Reader	1.1.1	03-Aug-2011	22 K	
EPAPAD Processor	2.3	03-Aug-2011	52 K	

Module Information

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Modules to be installed / updated

- Modules installation
 - QAA AOP processor
 - FUB WeW processor
- Modules update
 - BEAM Graph Processing Framework (GPF)
 - BEAM Processing Library
 - MERIS Case-2 Regional Processor
 - MERIS Lib Radiometry Processor
 - NetCDF Product Reader and Writer

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L1P Product - Metadata

[1] L2_of_MER_FSG_1PNMAP20060629_105233_000002022049_00037_22636_0001

Metadata

- Global_Attributes
- Variable_Attributes
- MPH
- SPH
- DSD
- history
- Processing_Graph
- Flag codings
- Tie-point grids
- Geometries
- Bands

Name	Value	Type	Unit	Description
product_type	MER_FSG_CCLIP	ascii		
metadata_profile	beam	ascii		
metadata_version	0.5	ascii		
Conventions	CF-1.4	ascii		
auto_grouping	radiance	ascii		
start_date	29-JUN-2006 10:52:34.939083	ascii		
stop_date	29-JUN-2006 10:55:56.445343	ascii		
title	MERIS Lib Radiometric Correction	ascii		

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L1P Product - Metadata

[1] L2_of_MER_FSG_IPNMAP20060629_105233_0

- Metadata
 - Global_Attributes
 - Variable_Attributes
 - MPH
 - SPH
 - DSD
 - history
 - Processing_Graph
 - Flag codings
 - Tie-point grids
 - Geometries
 - Bands

Name	Value	Type
node.0		
node.1		
id	Meris.CorrectRadiometry\$13038972D1	ascii
operator	Meris.CorrectRadiometry	ascii
purpose	Performs radiometric corrections on MERIS L1b data...	ascii
authors	Marc Bouvet (ESTEC); Marco Peters, Ralf Quast, Th...	ascii
version	1.0	ascii
copyright	(c) 2011 by Brodmann Consult	ascii
node.1		
sourceProduct	product:MER_FSG_IPNMAP20060918_151603_000...	ascii
doRadToRef	false	ascii
doCalibration	true	ascii
doSmile	true	ascii
doEqualization	true	ascii
reproVersion	REPROCESSING_3	ascii
node.2		
id	CoastColour.L1P\$130358ACA30	ascii
operator	CoastColour.L1P	ascii
node.2		
node.3		
id	Subset\$13042642E7	ascii
operator	Subset	ascii
purpose	Create a spatial and/or spectral subset of a data or...	ascii
authors	Marco Zuehlke, Norman Fonferra, Marco Peters	ascii
version	1.0	ascii
copyright	(c) 2011 by Brodmann Consult	ascii
node.3		
node.4		
id	Meris.GlintCorrection\$13042642621	ascii
operator	Meris.GlintCorrection	ascii
purpose	MERIS atmospheric correction using a neural net.	ascii
authors	Marco Peters, Roland Doerffer, Olaf Danne	ascii
version	1.2.2	ascii
copyright	(c) 2008 by Brodmann Consult	ascii
node.4		
mersProduct	product:MER_FSG_IPNMAP20060918_151603_000...	ascii
outputPath	false	ascii
useFlint	false	ascii
outputTosa	false	ascii
outputAutoTosa	false	ascii
deriveFromPath	false	ascii
cloudIceExpression	l1p_flags_CC_CLOUD l1p_flags_CC_SNOW_ICE	ascii
atmosNetMersFile	20x25x45_55990.1.net	ascii
outputReflec	true	ascii
landExpression	l1p_flags_CC_LAND	ascii
outputTransmittance	false	ascii
atmosNetFlntFile	25x30x40_6936.3.net	ascii
outputReflecAs	RADIANCE_REFLECTANCES	ascii
doSmileCorrection	false	ascii
outputNormReflec	true	ascii

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L1P Product

[1] L2_of_MER_FSG_IPNMAP20060629_105233_000002022049_00037_22636_0001

- Metadata
- Flag codings
- Tie-point grids
- Bands
 - radiance
 - ~~corr_latitude~~
 - ~~corr_longitude~~
 - altitude
 - detector_index
 - l1_flags
 - l1p_flags
 - lat
 - lon

- Bands
 - radiance
 - radiance_1
 - radiance_2
 - radiance_3
 - radiance_4
 - radiance_5
 - radiance_6
 - radiance_7
 - radiance_8
 - radiance_9
 - radiance_10
 - radiance_11
 - radiance_12
 - radiance_13
 - radiance_14
 - radiance_15

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L2R

[1] L2_of_L2_of_MER_FSG_IPNMAP20060514_095740_000002332047_00380_21977_001

- Metadata
- Flag codings
- Tie-point grids
- Bands
 - ~~corr_latitude~~
 - ~~corr_longitude~~
 - altitude
 - reflec
 - norm_refl
 - atm_tau
 - ang_443_865
 - detector_index
 - l1_flags
 - l1p_flags
 - l2r_flags
 - lat
 - lon

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L2W Product


[1] L2_of_L2_of_L2_of_MER_FSG_IPNMAP20060918_151603_000000872051_00197_23798_0001

- Metadata
- Flag codings
- Tie-point grids
- Geometries
- Bands
 - ~~corr_latitude~~
 - ~~corr_longitude~~
 - iop
 - conc
 - chiSquare
 - K_min
 - Kd
 - Z90_max
 - turbidity_index
 - altitude
 - l1_flags
 - l1p_flags
 - l2r_flags
 - l2w_flags
 - lat
 - lon

Naming translation


- L2_of_MER... → CCLiP
- L2_of_L2_of_MER... → CCL2R
- L2_of_L2_of_L2_of_MER → CCL2W

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Products for the Exercises

- CC Products
 - .../products/L1P/
L2_of_MER_FSG_1PNMAP20060918_151603_00000872051_00197_23798_0001.nc
 - .../products/L2R/
L2_of_L2_of_MER_FSG_1PNMAP20060918_151603_00000872051_00197_23798_0001.nc
 - .../products/L2W/
L2_of_L2_of_L2_of_MER_FSG_1PNMAP20060918_151603_00000872051_00197_23798_0001.nc
 - .../products/L2W/pixelexport/
L2_of_L2_of_L2_of_MER_FSG_1PNMAP20060510_153312_000001012047_00326_21923_0001.nc
L2_of_L2_of_L2_of_MER_FSG_1PNMAP20060513_153832_000001012047_00369_21966_0001.nc
L2_of_L2_of_L2_of_MER_FSG_1PNMAP20060516_154431_000001042047_00412_22009_0001.nc
L2_of_L2_of_L2_of_MER_FSG_1PNMAP20060520_151941_00000332047_00469_22066_0001.nc
L2_of_L2_of_L2_of_MER_FSG_1PNMAP20060522_155634_00000612047_00498_22095_0001.nc
L2_of_L2_of_L2_of_MER_FSG_1PNMAP20060523_152401_00000282048_00011_22109_0001.nc
L2_of_L2_of_L2_of_MER_FSG_1PNMAP20060529_153519_000001322048_00097_22195_0001.nc
L2_of_L2_of_L2_of_MER_FSG_1PNMAP20060601_154102_000001072048_00140_22238_0001.nc
L2_of_L2_of_L2_of_MER_FSG_1PNMAP20060604_154646_000001042048_00183_22281_0001.nc
L2_of_L2_of_L2_of_MER_FSG_1PNMAP20060605_151720_00000162048_00197_22295_0001.nc



Material for the Exercises

- Pre-defined Pins
 - ../pins/coord4stations.txt
 - ../pins/in-situ_May2006_site6.placemark
- Pre-defined Colour Palettes
 - ../colourpalettes/
- Pre-defined Colour Palettes in VISAT:
 - C:/Users/USERNAME/.beam/beam-ui/auxdata/color-palettes
- Slides
 - ../material/

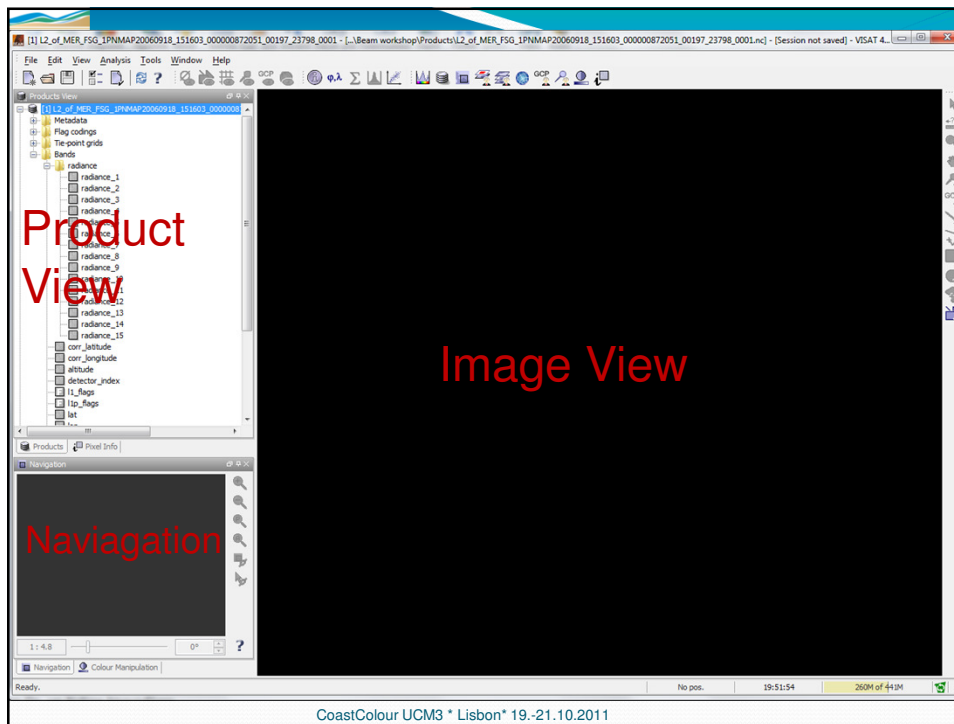
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VISAT - Basic Imaging

- Basic Imaging Tools
 - Colour manipulation
 - Spectrum View
 - Masks

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Display Bands

- Open single bands
 - Doubleclick on the band
- Open RGB image
 - Right mouse click on product name → Open RGB Image View...
 - Menu: View → Open RGB Image View
 - Choice of how to display
 - Single band allocation to the RGB colours
 - Combination of bands for the RGB colour

Profile: MERIS L2 - 13,5,1

Red: reflec_13

Green: reflec_5

Blue: reflec_1

Store RGB channels as virtual bands in current product

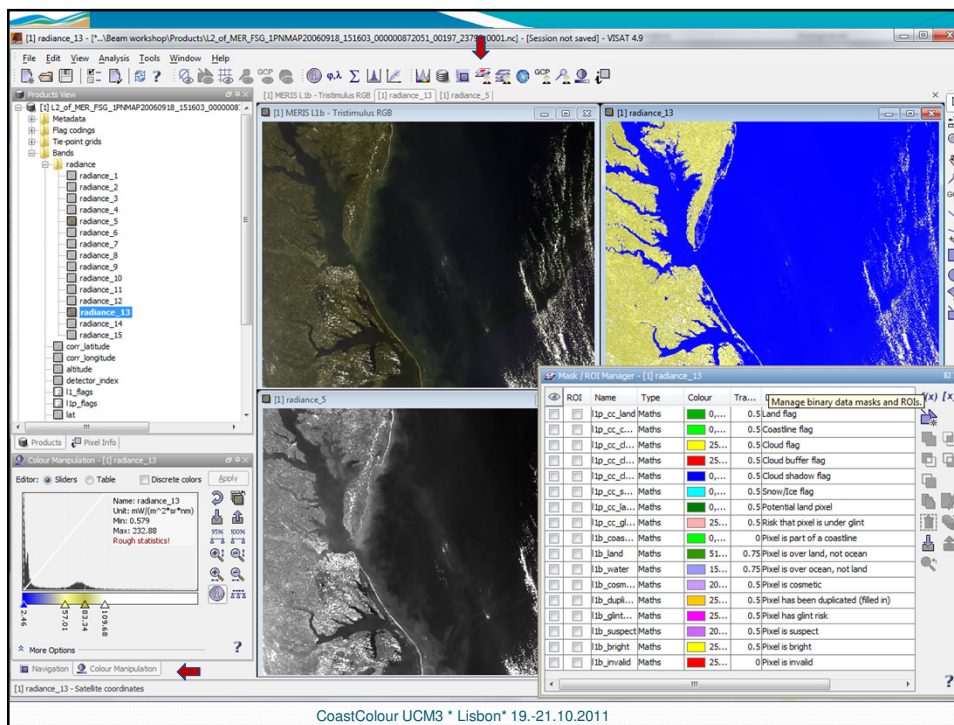
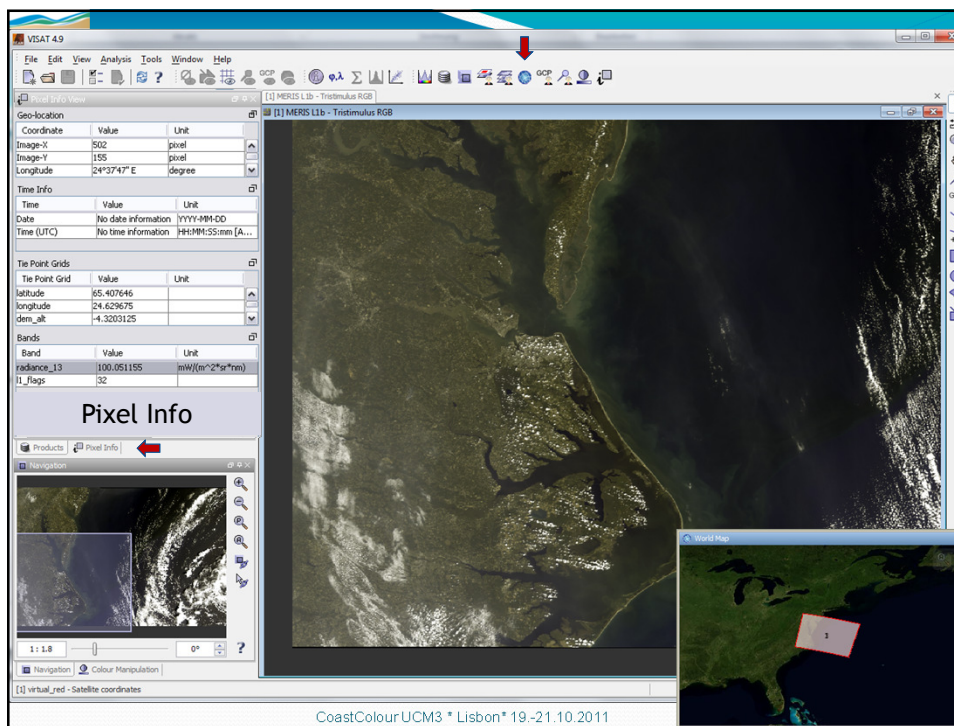
Profile: MERIS L2 - Tristimulus

Red: 0 * reflec_5 + reflec_6 + 0.13 * reflec_7

Green: 0 * reflec_4 + reflec_5 + 0.38 * reflec_6

Blue: lec_2 + 0.47 * reflec_3 + 0.16 * reflec_4

Store RGB channels as virtual bands in current product



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Flags

- Flags for all 3 CC Product levels
 - L1P Flags
 - Improved land/water mask, coastline
 - Improved Cloud flag
 - Cloud Buffer
 - Cloud Shadow
 - L2R Flags
 - atc_oor, toa_oor, tosa_oor
 - Sunglint, l2r_invalid
 - L2W Flags
 - wlr_oor, conc_oor
 - L2w_invalid

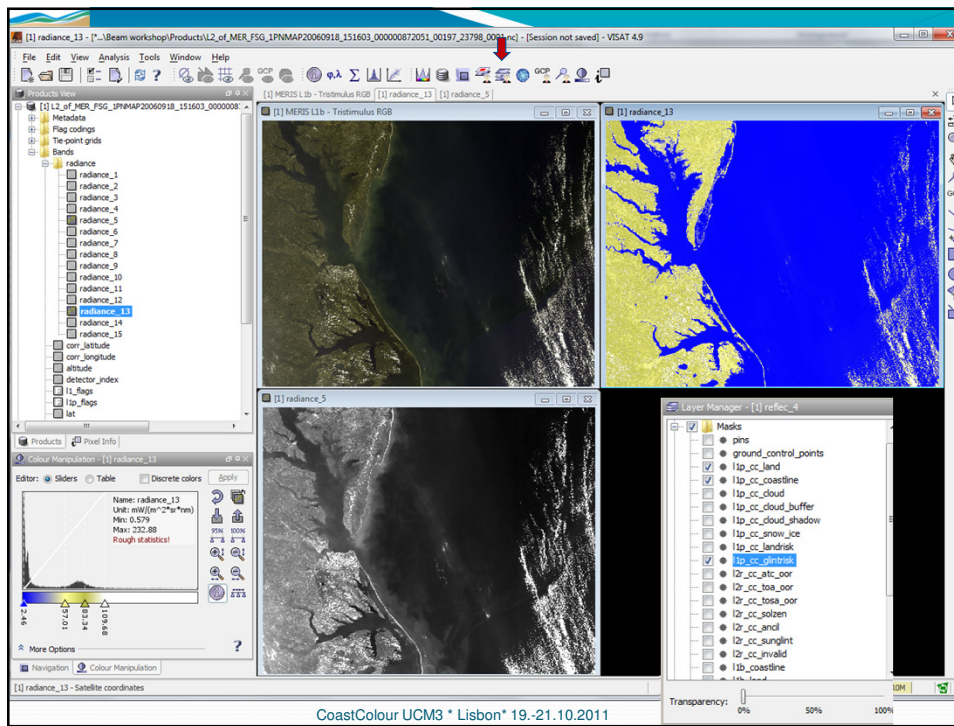
<input type="checkbox"/>	l2w_cc_wlr_oor	Maths	0,...	0.5	Water le
<input type="checkbox"/>	l2w_cc_conc_oor	Maths	64...	0.5	Water cc
<input type="checkbox"/>	l2w_cc_oor	Maths	25...	0.5	Spectrun
<input type="checkbox"/>	l2w_cc_whitecaps	Maths	25...	0.5	risk for i
<input type="checkbox"/>	l2w_cc_invalid	Maths	25...	0	invalid p
<input type="checkbox"/>	l1p_cc_land	Maths	19...	0.5	land fla
<input type="checkbox"/>	l1p_cc_coastline	Maths	19...	0	Coastline
<input type="checkbox"/>	l1p_cc_cloud	Maths	25...	0	Cloud fla
<input type="checkbox"/>	l1p_cc_cloud_spatial	Maths	17...	0.5	patial C
<input type="checkbox"/>	l1p_cc_cloud_buffer	Maths	25...	0.5	Cloud bu
<input type="checkbox"/>	l1p_cc_cloud_shadow	Maths	0,...	0.5	Cloud sh
<input type="checkbox"/>	l1p_cc_snow_ice	Maths	0,...	0.5	snow/Ice
<input type="checkbox"/>	l1p_cc_landrisk	Maths	0,...	0.5	Potential
<input type="checkbox"/>	l1p_cc_glnrisk	Maths	25...	0.5	risk that
<input type="checkbox"/>	l2r_cc_atc_oor	Maths	25...	0.5	Atmosph
<input type="checkbox"/>	l2r_cc_toa_oor	Maths	25...	0.5	OA refl
<input type="checkbox"/>	l2r_cc_tosa_oor	Maths	0,...	0.5	TOSA re
<input type="checkbox"/>	l2r_cc_solzen	Maths	25...	0.5	arge so
<input type="checkbox"/>	l2r_cc_ancil	Maths	0,...	0.5	Missing/K
<input type="checkbox"/>	l2r_cc_sunglint	Maths	25...	0.5	High sun
<input type="checkbox"/>	l2r_cc_invalid	Maths	25...	0.5	invalid p
<input type="checkbox"/>	l1b_coastline	Maths	0,...	0	Pixel is p
<input type="checkbox"/>	l1b_land	Maths	51...	0.75	Pixel is o
<input type="checkbox"/>	l1b_water	Maths	15...	0.75	Pixel is o
<input type="checkbox"/>	l1b_cosmetic	Maths	20...	0.5	Pixel is o

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ROI	Name	Type	Colour
<input checked="" type="checkbox"/>	l2w_cc_wlr_oor	Maths	0,...
<input type="checkbox"/>	l2w_cc_conc_oor	Maths	64...
<input checked="" type="checkbox"/>	l2w_cc_oor	Maths	25...
<input type="checkbox"/>	l2w_cc_whitecaps	Maths	25...
<input type="checkbox"/>	l2w_cc_invalid	Maths	25...
<input checked="" type="checkbox"/>	l1p_cc_land	Maths	0,...
<input checked="" type="checkbox"/>	l1p_cc_coastline	Maths	0,...
<input checked="" type="checkbox"/>	l1p_cc_cloud	Maths	20...
<input checked="" type="checkbox"/>	l1p_cc_cloud_buffer	Maths	51...
<input type="checkbox"/>	l1p_cc_cloud_shadow	Maths	0,...
<input type="checkbox"/>	l1p_cc_snow_ice	Maths	0,...
<input type="checkbox"/>	l1p_cc_landrisk	Maths	0,...
<input type="checkbox"/>	l1p_cc_glnrisk	Maths	25...
<input checked="" type="checkbox"/>	l2r_cc_atc_oor	Maths	25...
<input type="checkbox"/>	l2r_cc_toa_oor	Maths	25...
<input type="checkbox"/>	l2r_cc_tosa_oor	Maths	0,...
<input type="checkbox"/>	l2r_cc_solzen	Maths	25...
<input type="checkbox"/>	l2r_cc_ancil	Maths	0,...
<input type="checkbox"/>	l2r_cc_sunglint	Maths	25...
<input type="checkbox"/>	l2r_cc_invalid	Maths	25...
<input type="checkbox"/>	l1b_coastline	Maths	0,...
<input type="checkbox"/>	l1b_land	Maths	51...
<input type="checkbox"/>	l1b_water	Maths	15...

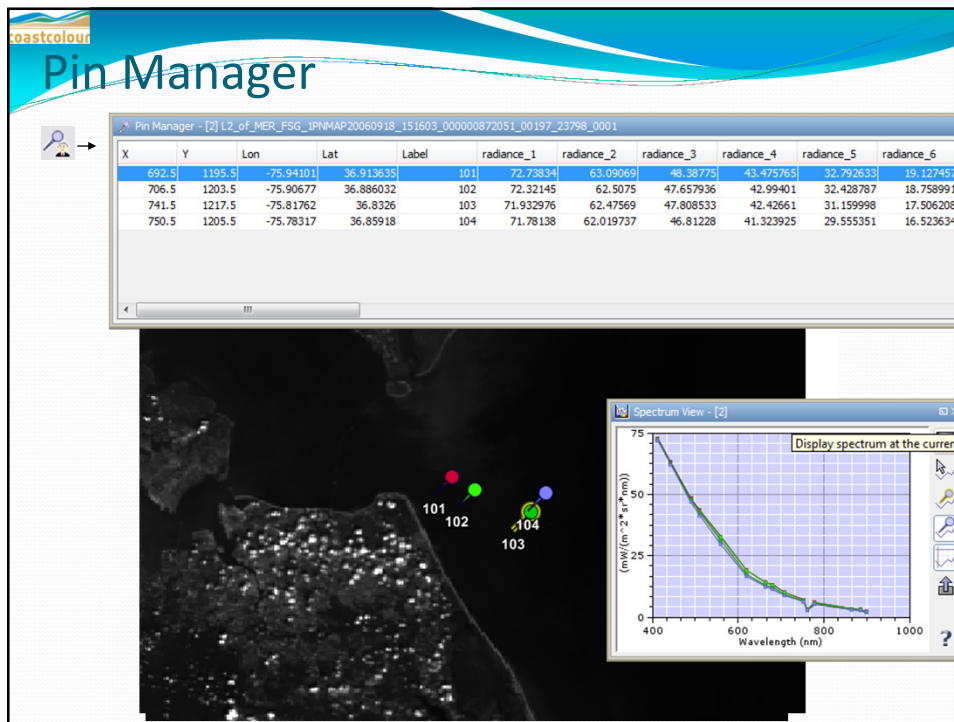
Coastcolour PM4b * Hamburg * 13.-14.07.2011



Spectrum View

- Radiance / Reflectance spectra at cursor position or at pins position
- Parallel display of several spectra (at pin positions)
- Export of spectra
- Selection of bands for display

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Exercise I

- Open L1P and L2R products and display different bands:
 - RGB image of L1P
 - RGB images of L2R
 - Reflectance band X
- Adjust colours for the RGBs and apply colour palette to the single band
- Display L1P flags over the single (!) band using mask manager
 - Note: flags in BEAM are working only on single band images, not on RGB. If you want to add flags on the RGB, please use the layer manager
- Investigate where the flags are raised
- Look into the different spectra (TOA, water leaving etc)
 - Add pins and allocate colours to the pins (spectra) using the edit tool () in the pin manager

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Geo-Processing

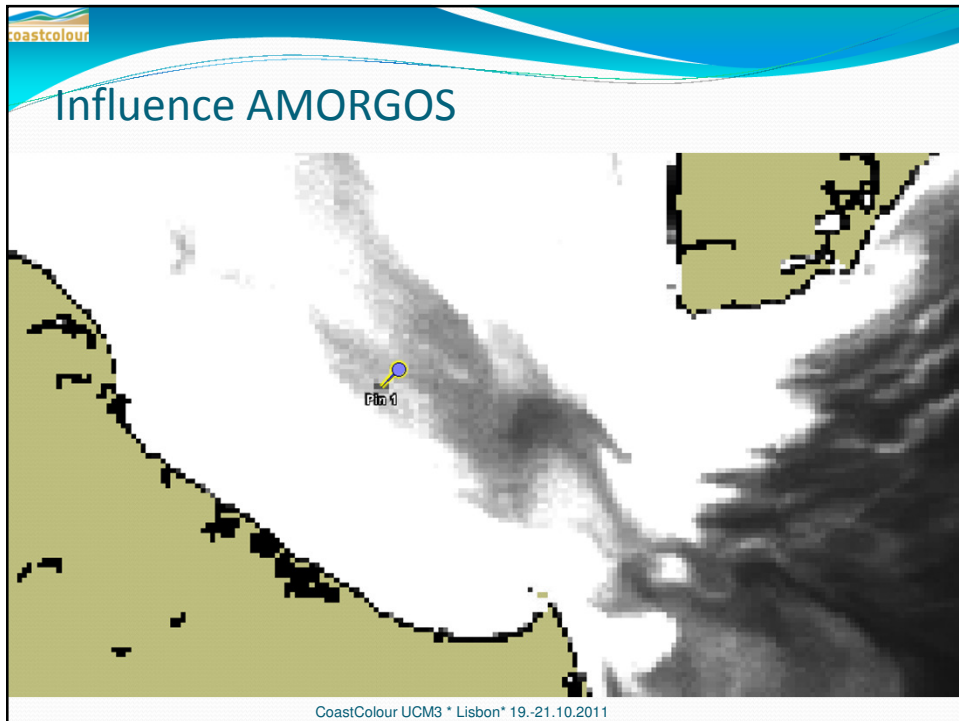
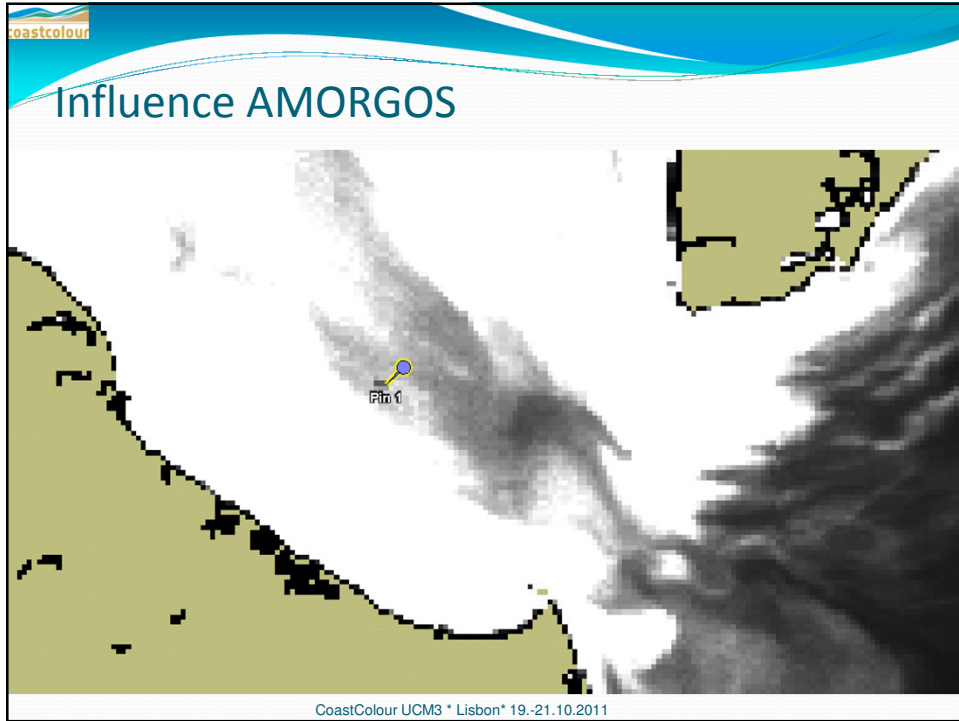
- Subsetting
- Data Flip
- Attach/Detach Geo-Coding
- Re-projection
- Orthorectification
- Collocation
- Mosaik processor
- L3-binning processor

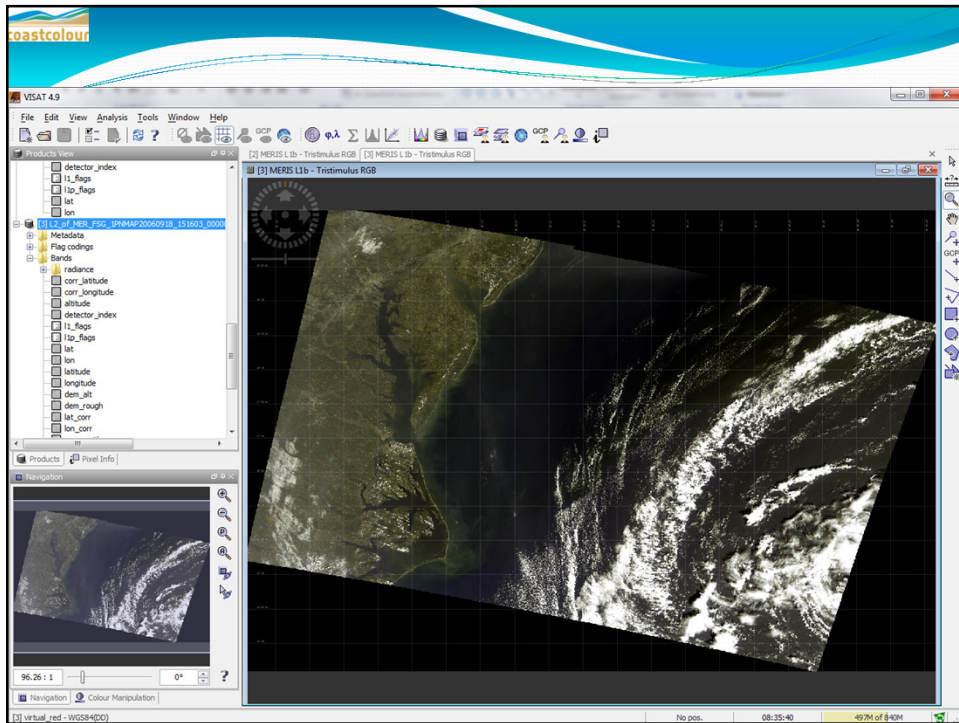
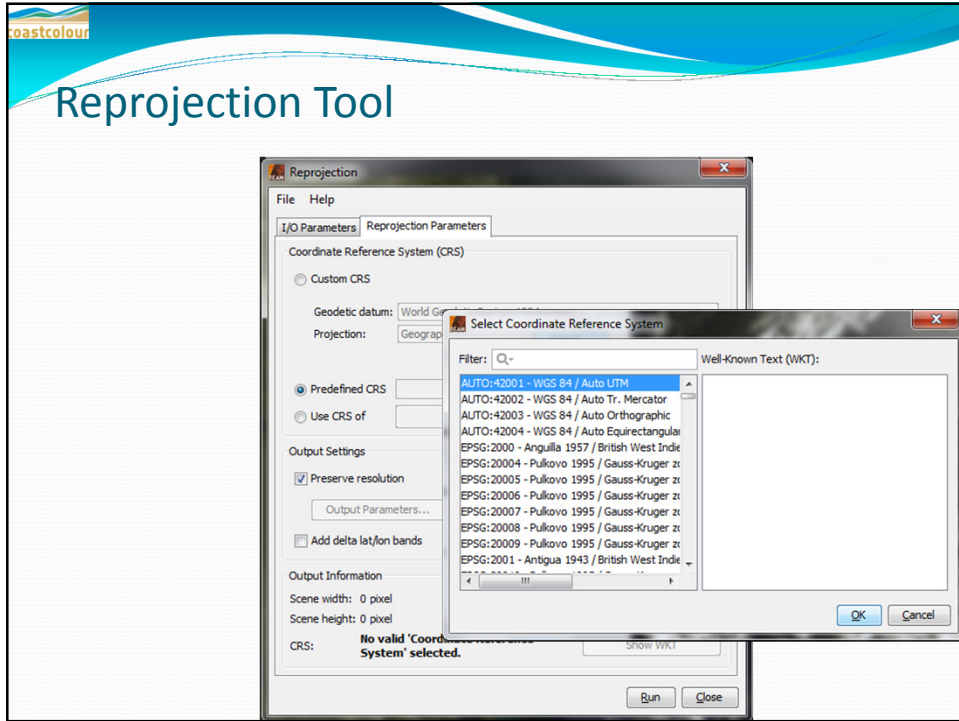
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Detach/Attach Geo-Coding

- Use Latitude and Longitude provided in bands
 - Standard L1b: tie point grid
 - CoastColour Products: additional lat lon bands derived from AMORGOS correction
 - FRS → FSG
- Bands are already attached to the CC products
- If working with AMORGOS on L1B: Geo-Coding must be attached before working with Reprojection or Geolocation Tools

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Collocation Tool

- Combine 2 products in one grid (of master product)
 - the base grid can be
 - a projected grid
 - the original grid of the master product
 - all bands are combined in one product
- Enables the combined analysis of several products
 - Band arithmetics
 - Scatter plots
 - Overlays

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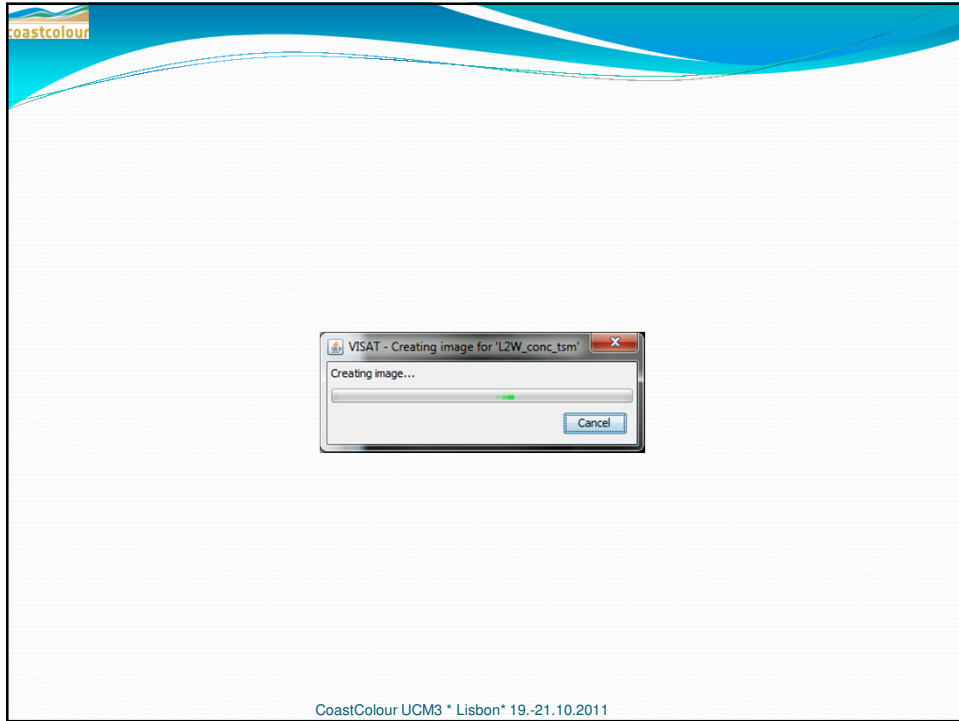
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The screenshot shows the 'Collocation' dialog box with the following settings:

- Source Products:** Master (pixel values are conserved): [2] L2_of_MER_FSG_IPNMAP20060918_151603_000000872051_00197_23...; Slave (pixel values are resampled onto the master grid): [1] L2_of_L2_of_L2_of_MER_FSG_IPNMAP20060918_151603_0000008720...
- Target Product:** Name: combined_L1P_L2W; Save as: BEAM-DIMAP; Directory: C:\Users\KerstinS
- Renaming of Source Product Components:** Rename master components: L1P_\${ORIGINAL_NAME}; Rename slave components: L2W_\${ORIGINAL_NAME}
- Resampling:** Method: Nearest neighbour resampling

A blue arrow points from the 'Save as' field to a list of bands on the right side of the interface, which includes: L1P_radiance_1 through L1P_radiance_15, L1P_corr_latitude, L1P_corr_longitude, L1P_altitude, L1P_detector_index, L1P_l1_flags, L1P_l1p_flags, L1P_lat, L1P_lon, L2W_corr_latitude, L2W_corr_longitude, L2W_iop_a_total_443, L2W_iop_a_vs_443, L2W_iop_a_pig_443, L2W_iop_bb_spm_443, L2W_conc_tsm, L2W_conc_chi, L2W_chsSquare, L2W_K_min, L2W_Kd_412, L2W_Kd_443, L2W_Kd_490, L2W_Kd_510, L2W_Kd_560, L2W_Kd_620, L2W_Kd_664, L2W_Kd_680, L2W_290_max, and L2W_hydroby_index.

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Band Math

- Band Math Tool is used to add new bands by using arithmetic expression
- Combination of bands from different products possible if they are on the same grid
 - Use Band Math Tool for copying bands from one product to the other

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Mask/ROI Concept

- Masks are used for masking image pixels
 - Masks for display: MASK
 - Masks for analysis: ROI
- Tool for organising Masks and ROIS:
Mask/ROI manager
- Flags are handled as masks

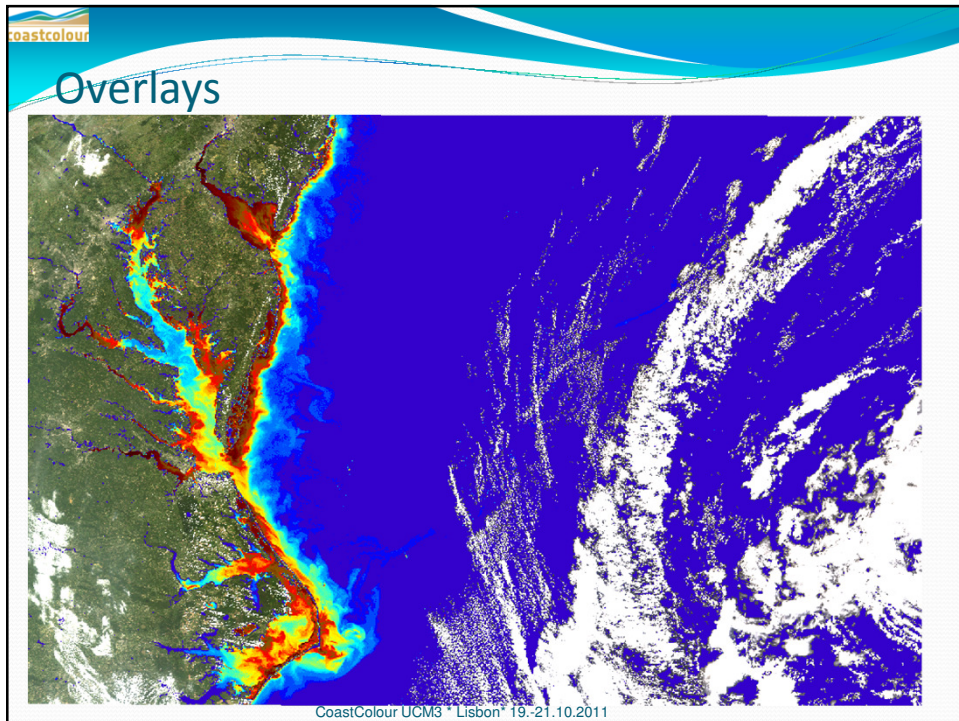
Definitions

- Geometry
 - A geometric shape (point, line, polyline or polygon). Geometries can be drawn on a scene view.
- Mask
 - Masks a regions of raster dataset. Masks can be derived from an expressions, a value range or a geometry.
- ROI
 - A ROI is a role of a Mask. Masks can be assigned to a band, so they can be used as a ROI. Statistical computation can be performed on a ROI.

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Layer Manager

- Elements
 - Geometries
 - Masks
 - Bands
- Functions
 - Visibility
 - Transparency
 - Re-order
 - Add new layers
 - Zoom to layers
- Add new layers/overlays
 - Shapefiles
 - Bands
 - Images



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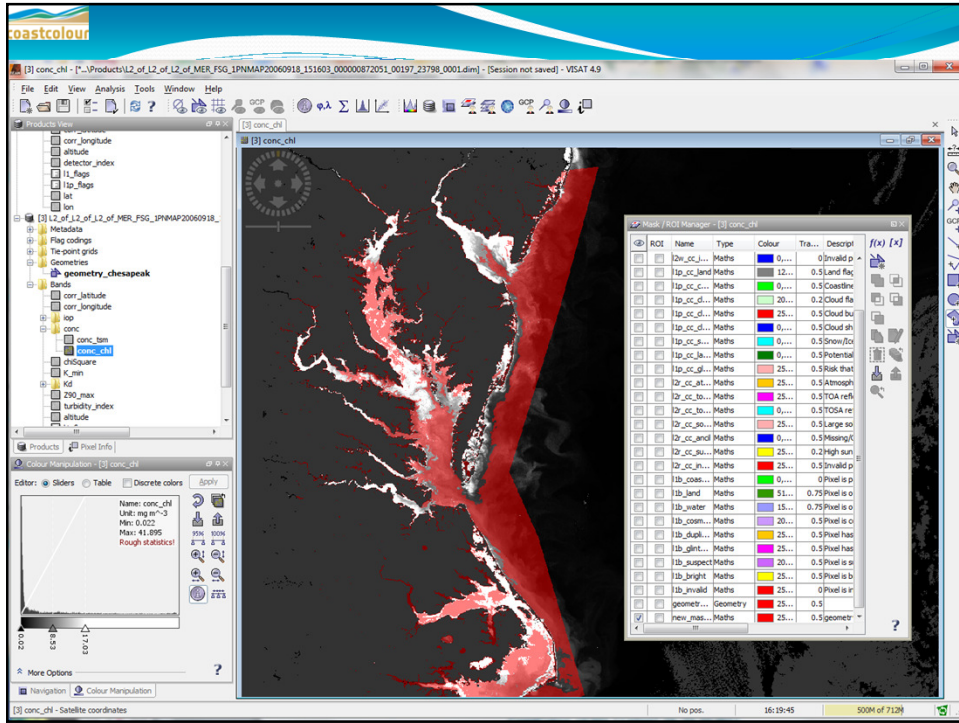
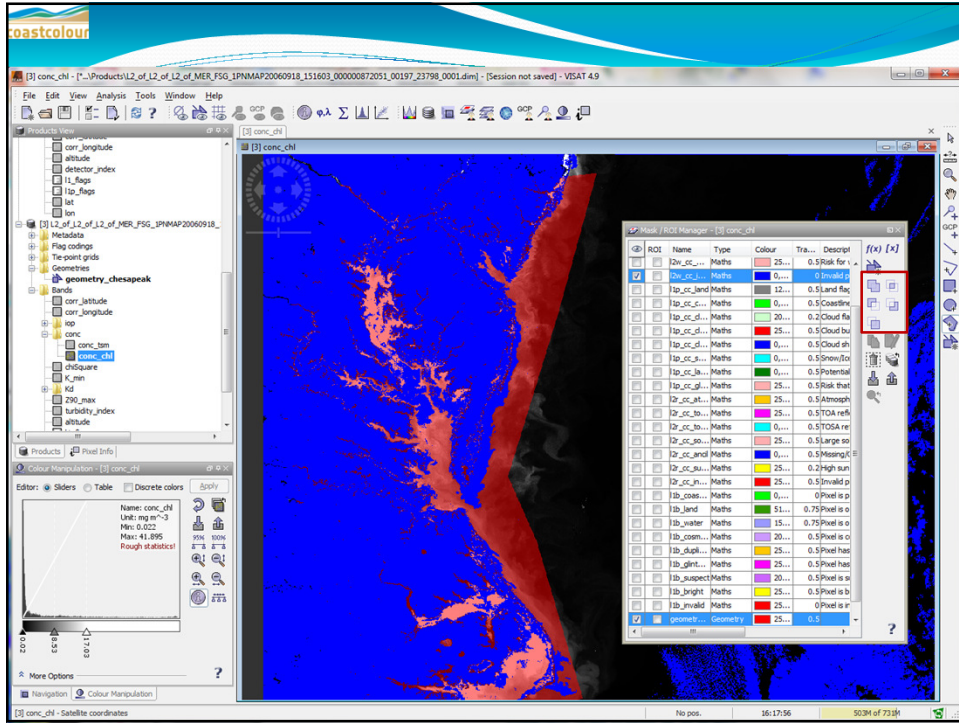
Definition of Masks

- Generation of Masks
 - $f(x)$ • Masks defined by a band maths expression
 - $[x]$ • Masks defined by a value range
 -  • Masks defined by a geometry such as lines and polygons
- Combination of Masks
 -  • Union
 -  • Intersection
 -  • Differences
 -  • Complement of Union

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17.02.2011

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RQI	Name	Type	Colour	f(x) [x]
<input type="checkbox"/>	11p_cc_snow_ice	Maths	0	
<input type="checkbox"/>	11p_cc_landrisk	Maths	0	
<input type="checkbox"/>	11p_cc_glnrisk	Maths	25	
<input type="checkbox"/>	12r_cc_atc_oor	Maths	25	
<input type="checkbox"/>	12r_cc_toa_oor	Maths	25	
<input type="checkbox"/>	12r_cc_tosa_oor	Maths	0	
<input type="checkbox"/>	12r_cc_solzen	Maths	25	
<input type="checkbox"/>	12r_cc_andi	Maths	0	
<input type="checkbox"/>	12r_cc_sunglint	Maths	25	
<input type="checkbox"/>	12r_cc_invalid	Maths	25	
<input type="checkbox"/>	11b_coastline	Maths	0	
<input type="checkbox"/>	11b_land	Maths	51	
<input type="checkbox"/>	11b_water	Maths	15	
<input type="checkbox"/>	11b_cosmetic	Maths	20	
<input type="checkbox"/>	11b_duplicated	Maths	25	
<input type="checkbox"/>	11b_glint_risk	Maths	25	
<input type="checkbox"/>	11b_suspect	Maths	20	
<input type="checkbox"/>	11b_bright	Maths	25	
<input type="checkbox"/>	11b_invalid	Maths	25	
<input checked="" type="checkbox"/>	geometry_chesapeake	Geometry	25	



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Analysis Tools

- Information
 - Band specific meta information
- Geocoding
 - of the product
- Statistics
 - of whole band or ROI
- Histograms
 - of whole band or ROI
- Scatterplots
 - of whole band or ROI
- Profile plots
 - of geometries
- Coordinate list
 - of geometries

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Exercise 2

- Produce a mask that contains all valid TSM pixels inside of the Chesapeak bay
- Apply as ROI
- Display statistics, scatterplots, histograms for the ROI with and without invalid flag set on inside of the Bay
- Draw TSM values along a transect

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How to get the information out of VISAT

- Saving as BEAM DIMAP Format
 - Name can be only changed in properties of product
→ File → Save as...
- Exporting displayed images
 - div. Image formats (geoTIFF, TIFF, png, jpg, etc.)
 - Export of subsets and full images possible
→ Right mouse click in the displayed image
- Exporting of colour palettes
 - as images → Right mouse click in the displayed image
 - as xml file → choose export button in colour manipulation dialog
- Exporting of pixel values
→ Right mouse click in the displayed image

Right mouse click in displayed image:

- Copy Pixel-Info to Clipboard
- Show ROI Overlay
- Export ROI Overlay...
- Show Graticule Overlay
- Band Arithmetic...
- Export Transect Pixels...
- GCP
- Show GCP Overlay
- Export Displayed Image...
- Export Colour Legend...
- Export ROI Pixels... Strg+Umschalt+P
- Delete Shape
- Show No-Data Overlay
- Export Pin Pixels...
- Export Google Earth KMZ...
- Show Shape Overlay
- Export Colour Palette...
- Show Pin Overlay
- Create Subset from View...

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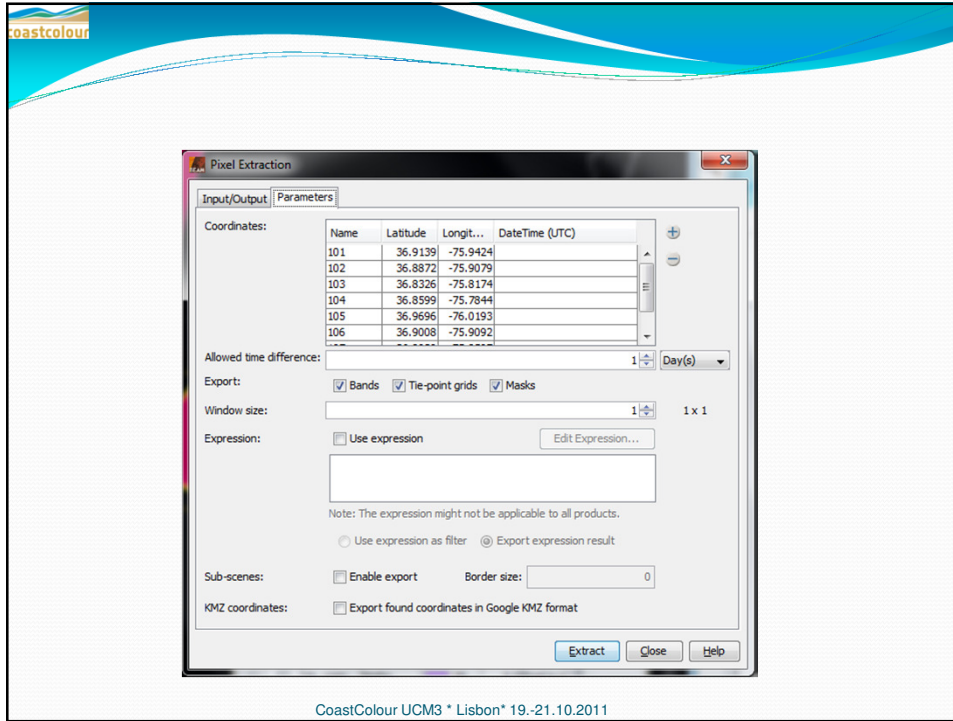
The screenshot shows the 'File' menu with the following options:

- New Product Strg+N
- Open Product... Strg+O
- Open Session... Strg+Umschalt+O
- Reopen
- Product Grabber Strg+Umschalt+P
- Close Product Strg+W
- Close Session Strg+Umschalt+W
- Save Product Strg+S
- Save Product As...
- Save Session Strg+Umschalt+S
- Save Session As...
- Import
- Export

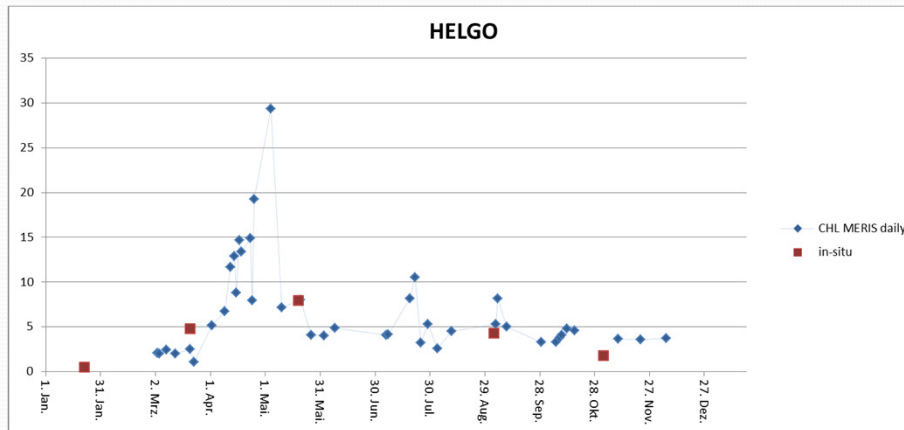
The 'Export' submenu is open, showing the following options:

- Export Geo-Coding as ENVI GCP File...
- Export Colour Palette as File...
- Export Transect Pixels...
- Export Product Metadata...
- Export HDF5 Product...
- Export GeoTIFF Product...
- Export Mask Pixels...
- Export Geometry as Shapefile...
- Export BEAM-DIMAP Product...
- Export NetCDF/CF Product...
- Export Pixels... (highlighted)
- Export NetCDF/BEAM Product...
- Export View as Google Earth KMZ...
- Export View as Image...
- Export Colour Legend as Image...

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Time series plot



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Exercise 3: Pixel Extraction

- Extract the pixels from May Products
 - .../products/L2W/pixelexport/
 - Add product folder to as input
- Investigate tables in Excel

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GPT – Graph Processing Tool

- GPT is used to execute BEAM raster data operators in batch-mode
- used stand-alone or combined as a directed acyclic graph (DAG)
- Processing graphs are represented using XML

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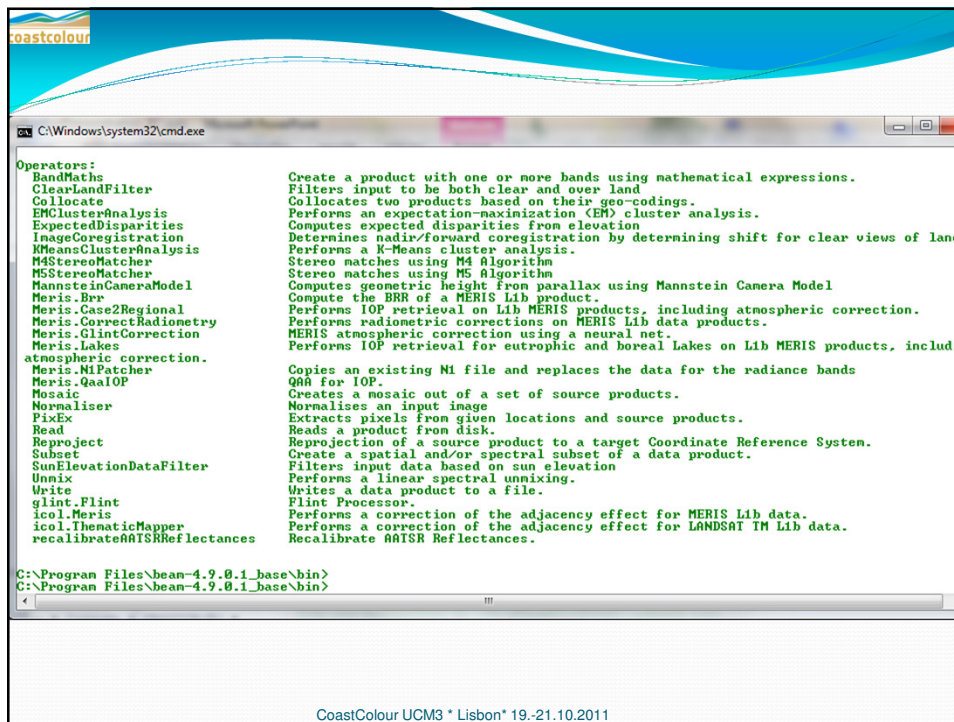
```

C:\Windows\system32\cmd.exe
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Description:
This tool is used to execute BEAM raster data operators in batch-mode. The
operators can be used stand-alone or combined as a directed acyclic graph
(DAG). Processing graphs are represented using XML. More info about
processing graphs, the operator API, and the graph XML format can be found
in the BEAM documentation.

Arguments:
  <op>           Name of an operator. See below for the list of <op>'s.
  <graph-file>   Operator graph file (XML format).
  <source-file-i> The i<sup>th</sup> source product file. The actual number of source
                 file arguments is specified by <op>. May be optional for
                 operators which use the -S option.

Options:
  -h             Displays command usage. If <op> is given, the specific
                 operator usage is displayed.
  -e             Displays more detailed error messages. Displays a stack
                 trace, if an exception occurs.
  -t <file>      The target file. Default value is './target.din'.
  -f <format>     Output file format, e.g. 'GeoTIFF', 'HDFS',
                 'BEAM-DIMP',. If not specified, format will be derived
                 from the target filename extension, if any, otherwise the
                 default format is 'BEAM-DIMP'. Only used, if the graph
                 in <graph-file> does not specify its own 'Write' operator.
  -p <file>      A (Java Properties) file containing processing
                 parameters in the form <name>=<value> or a XML file
                 containing a parameter DOM for the operator. Entries in this
                 file are overwritten by the -P<name>=<value> command-line
                 option (see below).
  -c <cache-size> Sets the tile cache size in bytes. Value can be suffixed
                 with 'K', 'M' and 'G'. Must be less than maximum
                 available heap space. If equal to or less than zero, tile
                 caching will be completely disabled. The default tile
                 cache size is '512M'.
  -q <parallelism> Sets the maximum parallelism used for the computation, i.e.
                 the maximum number of parallel <name>() threads.
                 The default parallelism is '4'.
  -x             Clears the interval tile cache after writing a complete
                 row of tiles to the target product file. This option may
                 be useful if you run into memory problems.
  -T<target>=<file> Defines a target product. Valid for graphs only. <target>
                 must be the identifier of a node in the graph. The node's
                 output will be written to <file>.
  -S<source>=<file> Defines a source product. <source> is specified by the
                 operator or the graph. In an XML graph, all occurrences of
                 S<source>() will be replaced with references to a source
                 product located at <file>.
  -P<name>=<value> Defines a processing parameter. <name> is specific for the
                 used operator or graph. In an XML graph, all occurrences of
                 S<name>() will be replaced with <value>. Overwrites
                 parameter values specified by the -p option.

Operators:
BandMaths           Create a product with one or more bands using mathematical expressions.
ClearLandFilter     Filters input to be both clear and over land
Collocate           Collocates two products based on their geo-codings.
EMClusterAnalysis  Performs an expectation-maximization (EM) cluster analysis.
ExpectedDisparities Computes expected disparities from elevation
ImageCoregistration Determines nadir/forward coregistration by determining shift for clear views of land
MeansClusterAnalysis Performs a K-Means cluster analysis.
MStereoMatcher     Stereo matches using M4 algorithm
MStereoMatcher     Stereo matches using M5 algorithm
MannsteinCameraModel Computes geometric height from parallax using Mannstein Camera Model
Meris.Brr           Compute the BRR of a MERIS Lib product.
Meris.Case2Regional Performs IOF retrieval on Lib MERIS products, including atmospheric correction.
Meris.CorrectRadiometry Performs radiometric corrections on MERIS Lib data products.
Meris.ClintCorrection MERIS atmospheric correction using a neural net.
Meris.Lakes         Performs IOF retrieval for eutrophic and boreal lakes on Lib MERIS products, including
atmospheric correction.
Meris.NiPatcher     Copies an existing NI file and replaces the data for the radiance bands
Meris.QuiLOP       QRR for IOF
  
```

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