

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

UCM3

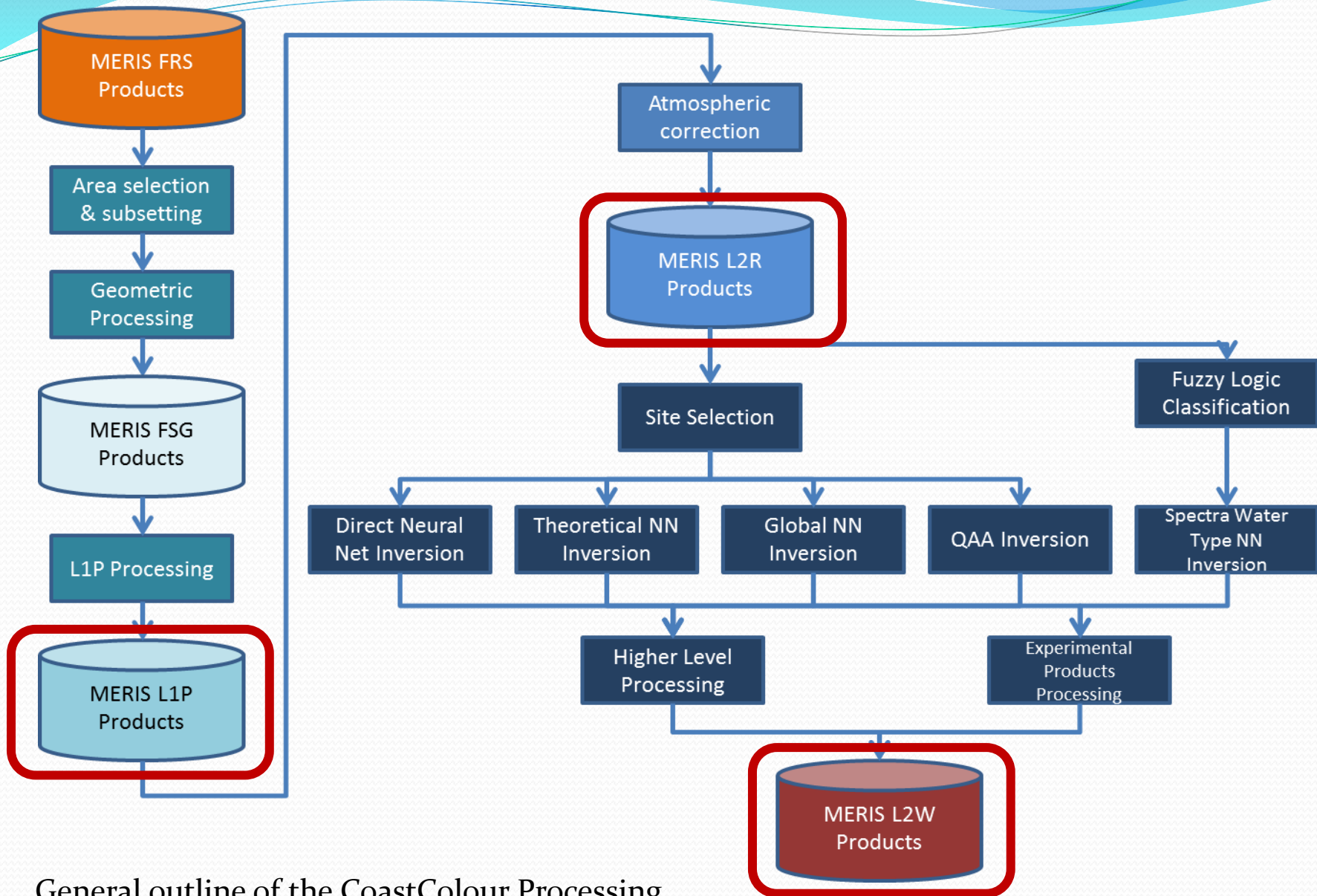
## Product Overview

19.-20.10.2011

Lisbon



CoastColour

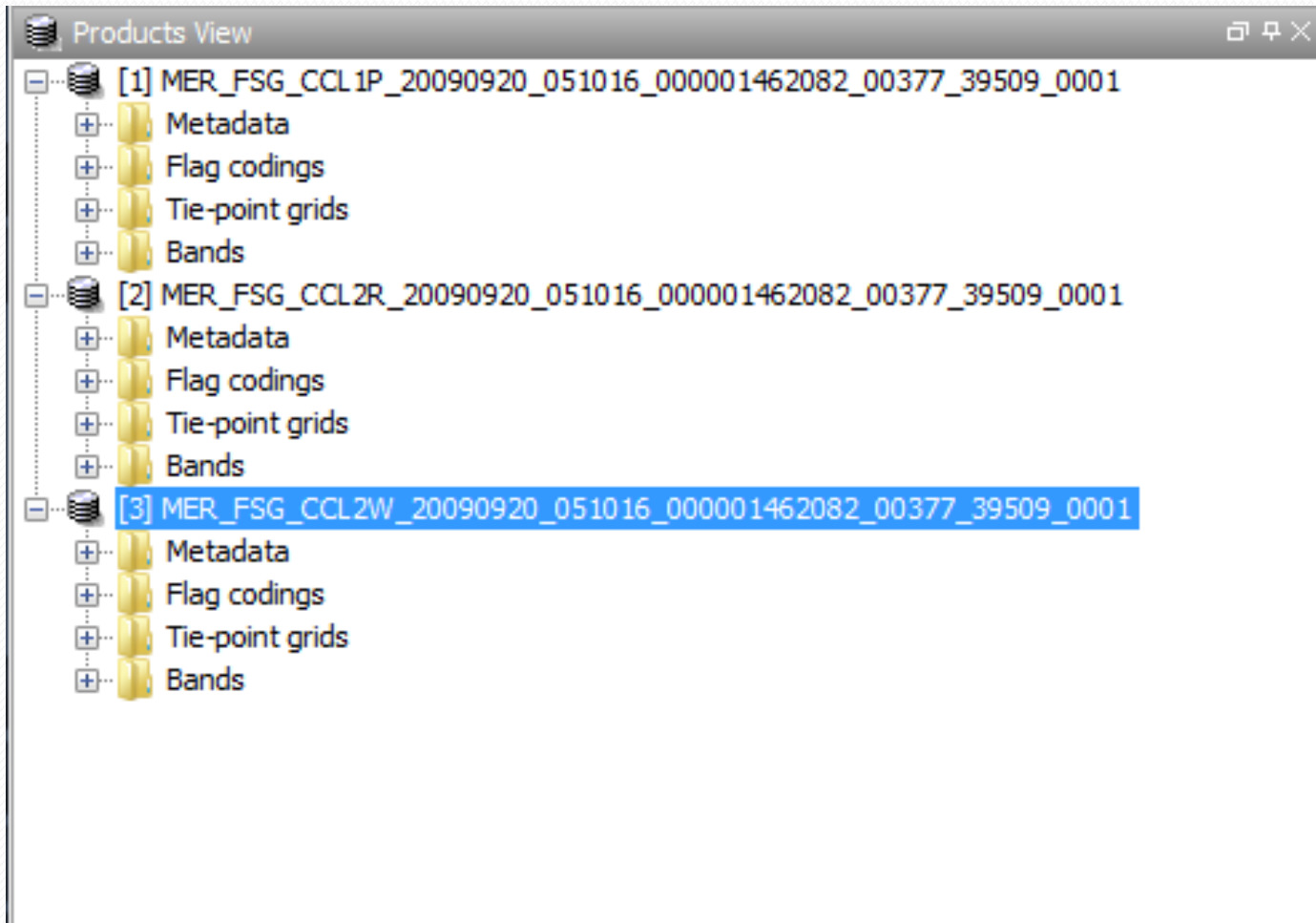


General outline of the CoastColour Processing

# Product Levels

Dataset	Group of Variables	Contents	Status (June 2011)
L1P	TOA	Pre-processed MERIS TOA radiances.	Available
	GEO	Ortho-corrected geo-coding.	Available
	FLAGS	Flags characterising pixels	Available
L2R	RSURF	Contains water leaving reflectances, normalised water leaving reflectances, aerosol optical depth and angstrom exponent. Using the BEAM CoastColour Processor the user can add other variables (currently not publicly available)	Available
	GEO	Ortho-corrected geo-coding.	Available
	FLAGS	Flags characterising pixels	Available
L2W	IOP	IOPs and optical water properties	Available
	CONC	Concentration retrieval products (CHL, TSM, CDOM).	Available
	OTH	Other water properties	Available
	PAR	Photosynthetic active radiation.	Not available
	FLH	Fluorescence line height.	Not available
	EXP	Experimental L2 products	Not available
	GEO	Ortho-corrected geo-coding.	Available
	FLAGS	Flags characterising pixels	Available

# General Product Structure



# General Product Structure

The screenshot shows the HDFView application window. The title bar reads "HDFView". The menu bar includes "File", "Window", "Tools", and "Help". The "Recent Files" list shows a file path: "C:\Users\carsten\BC\internal\IRS\_Products\Thematic\Product demonstration PM4b\2\_northsea\L2\_of\_MER\_FSG\_1PNMAP20060531\_110741\_000000982048\_".

The left sidebar displays a tree view of the file structure for "L2\_of\_MER\_FSG\_1PNMAP20060531\_110741\_000000982048":

- metadata
- 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
- corr\_latitude
- corr\_longitude
- altitude
- detector\_index
- l1\_flags

The central pane shows an "ImageView" window displaying a grayscale satellite image of a coastal region. To the right of the image is a vertical color scale legend with values ranging from -3,28E4 to 2,38E4.

The bottom panel displays the metadata for the selected file (570037042):

```

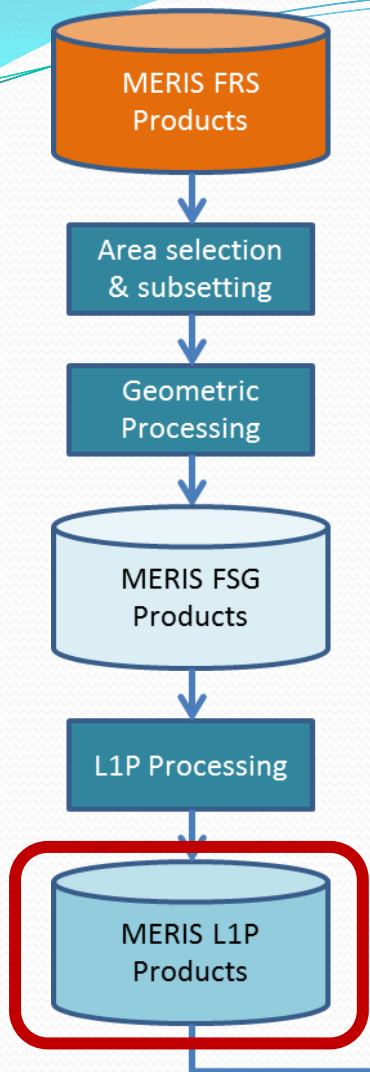
byte, 1
Number of attributes = 2320
:MPH:PRODUCT = MER_FSG_1PNMAP20060531_110741_000000982048_00123_22221_0001.N1
:MPH:PROC_STAGE = N
:MPH:REF_DOC = PO-RS-MDA-GS-2009_11_5A
:MPH:ACQUISITION_STATION = PDHS-K
:MPH:PROC_CENTER = UK-PAC
:MPH:PROC_TIME = 12-APR-2011 11:23:21.000000
:MPH:SOFTWARE_VER = MERIS/5.02
:MPH:SENSING_START = 31-MAY-2006 11:07:41.982534
:MPH:SENSING_STOP = 31-MAY-2006 11:09:20.535814
:MPH:PHASE = 2
:MPH:CYCLE = 48
:MPH:REL_ORBIT = 123
  
```

Buttons for "Log Info" and "Metadata" are visible at the bottom left of the metadata panel.

This panel shows a detailed tree view of the product structure, likely from a netCDF viewer. The root node is "1] L2\_of\_MER\_FSG\_1PNMAP20060918\_151603\_0000008".

- Metadata
  - Global\_Attributes
  - Variable\_Attributes
  - MPH
  - SPH
  - DSD
  - Quality\_ADS
  - Scaling\_Factor\_GADS
  - Tie\_points\_ADS
  - history
  - Processing\_Graph
- Flag codings
  - l1\_flags
  - l1p\_flags
- Tie-point grids
  - latitude
  - longitude
  - dem\_alt
  - dem\_rough
  - lat\_corr
  - lon\_corr
  - sun\_zenith
  - sun\_azimuth
  - view\_zenith
  - view\_azimuth
  - zonal\_wind
  - merid\_wind
  - atm\_press
  - ozone
  - rel\_hum
- Bands
  - radiance
    - corr\_latitude
    - corr\_longitude
    - altitude
    - detector\_index
    - l1\_flags
    - l1p\_flags
    - lat
    - lon

netCDF viewer (HDF\_View)



## L1P

- 15 bands with refined TOA radiance
- Improved geolocation and geometry (at per-pixel level)
- Improved calibration
- Equalization to reduce coherent noise
- Smile correction
- Pixel characterization information (cloud, snow, ...)
- Improved land-water mask and coastline
- Reformatting into NetCDF following Climate Forecast (CF) conventions
- ancillary information such as ECMWF data

# L1P Product - Metadata

[1] L2\_of\_MER\_FSG\_1PNMAP20060629\_105233\_000002022049\_00037\_22636\_0001

- [-] Metadata
  - [i] Global\_Attributes →
  - [+] [i] Variable\_Attributes
  - [i] MPH
  - [i] SPH
  - [+] [i] DSD
  - [+] [i] history
  - [+] [i] Processing\_Graph
- [+] Flag codings
- [+] Tie-point grids
- [+] Geometries
- [+] Bands

Name	Value	Type	Unit	Description
product_type	MER_FSG_CCL1P	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 L1b Radiometric Correction	ascii		

# L1P Product - Metadata

[1] L2\_of\_MER\_FSG\_1PNMAP20060629\_105233\_0

- [-] Metadata
  - [i] Global\_Attributes
  - [+] [i] Variable\_Attributes
  - [i] MPH
  - [i] SPH
  - [+] [i] DSD
  - [+] [i] history
  - [+] [i] Processing\_Graph
- [+] Flag codings
- [+] Tie-point grids
- [+] Geometries
- [+] Bands

CoastColour UCM3 \* List

Name	Value	Type
[-] node.0		
[-] node.1		
[id]	Meris.CorrectRadiometry\$13035B972D1	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 Brockmann Consult	ascii
[-] node.1		
[sourceProduct]	product:MER_FSG_1PNMAP20060918_151603_000...	ascii
[doRadToRefl]	false	ascii
[doCalibration]	true	ascii
[doSmile]	true	ascii
[doEqualization]	true	ascii
[reproVersion]	REPROCESSING_3	ascii
[-] node.2		
[id]	CoastColour.L1P\$13035BACA30	ascii
[operator]	CoastColour.L1P	ascii
[-] node.2		
[-] node.3		
[id]	Subset\$130426424E7	ascii
[operator]	Subset	ascii
[purpose]	Create a spatial and/or spectral subset of a data pr...	ascii
[authors]	Marco Zuehke, Norman Fomferra, Marco Peters	ascii
[version]	1.0	ascii
[copyright]	(c) 2011 by Brockmann 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 Brockmann Consult	ascii
[-] node.4		
[merisProduct]	product:MER_FSG_1PNMAP20060918_151603_000...	ascii
[outputPath]	false	ascii
[useFlint]	false	ascii
[outputTosa]	false	ascii
[outputAutoTosa]	false	ascii
[deriveRwFromPath]	false	ascii
[cloudIceExpression]	l1p_flags.CC_CLOUD     l1p_flags.CC_SNOW_ICE	ascii
[atmoNetMerisFile]	20x25x45_55990.1.net	ascii
[outputReflec]	true	ascii
[landExpression]	l1p_flags.CC_LAND	ascii
[outputTransmittance]	false	ascii
[atmoNetFlintFile]	25x30x40_6936.3.net	ascii
[outputReflecAs]	RADIANCE_REFLECTANCES	ascii
[doSmileCorrection]	false	ascii
[outputNormReflec]	true	ascii



# L1P Product - flag coding









[1] L2\_of\_MER\_FSG\_1PNMAP20060629\_105233\_000002022049\_00037\_22636\_0001

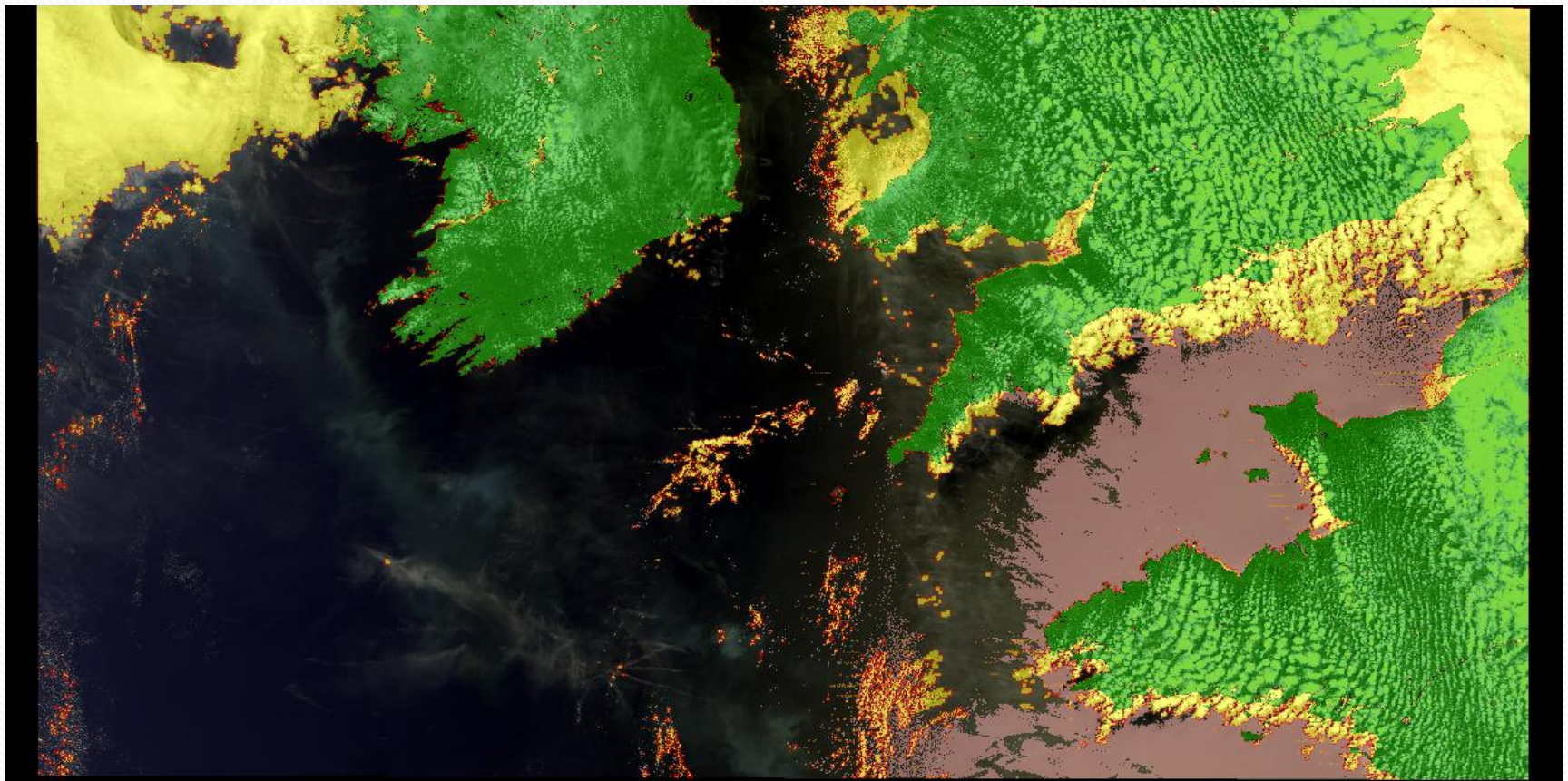
- + Metadata
- + Flag codings
  - + l1\_flags
  - + l1p\_flags →
- + Tie-point grids
- + Bands

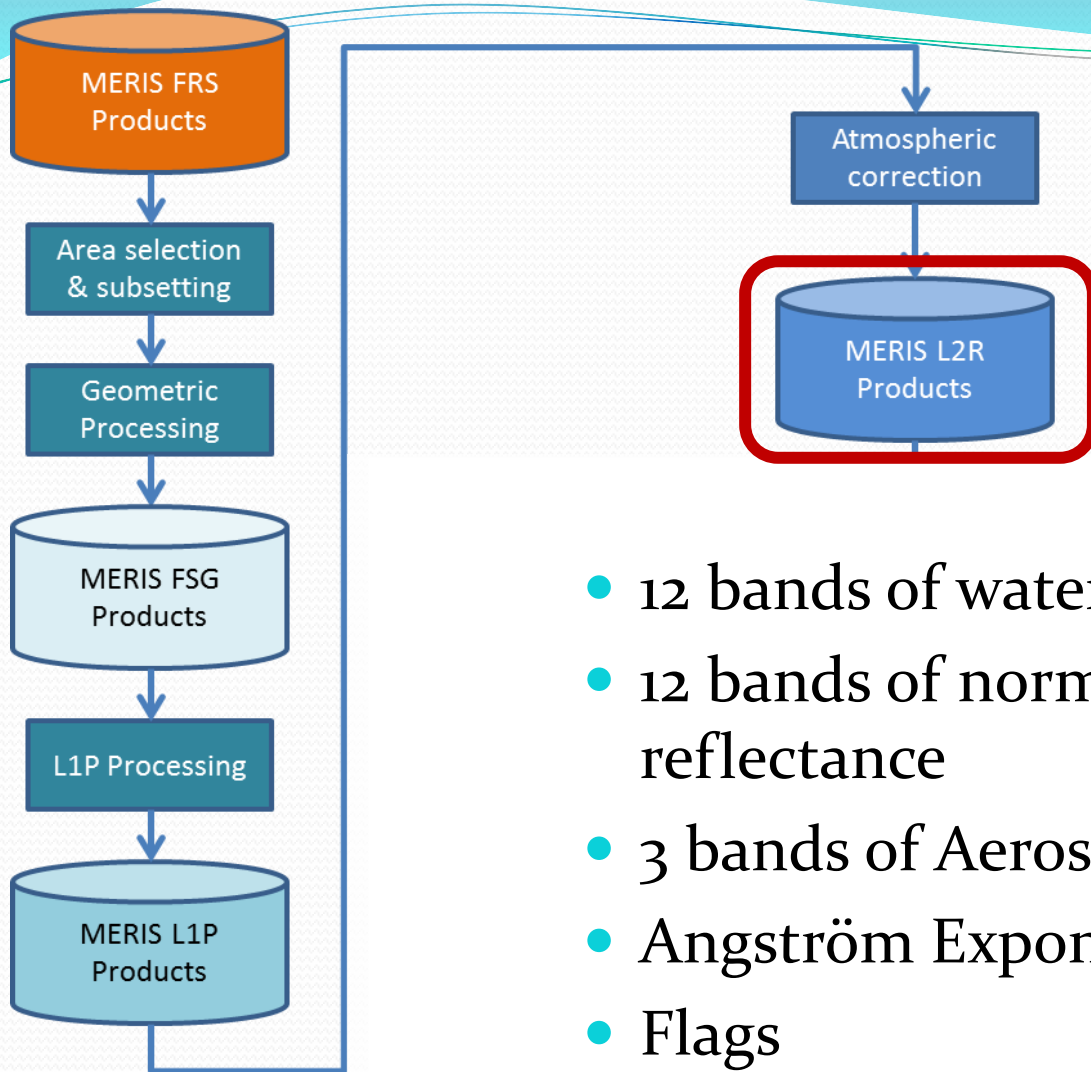
[3] l1p\_flags

Name	Value	Type	Unit	Description
CC_LAND	1	int32		Pixel masked as land
CC_COASTLINE	2	int32		Pixel masked as coastline
CC_CLOUD	4	int32		Pixel masked as cloud
CC_CLOUD_BUFFER	8	int32		Pixel masked as cloud buffer
CC_CLOUD_SHADOW	16	int32		Pixel masked as cloud shadow
CC_SNOW_ICE	32	int32		Pixel masked as snow/ice
CC_LANDRISK	64	int32		Potential land pixel
CC_GLINTRISK	128	int32		Risk that pixel is under glint

# L1P Pixel Classification

-  land
-  coastline
-  cloud
-  cloud border
-  cloud shadow (not in image)
-  snow / ice
-  land risk (not set)
-  glint risk





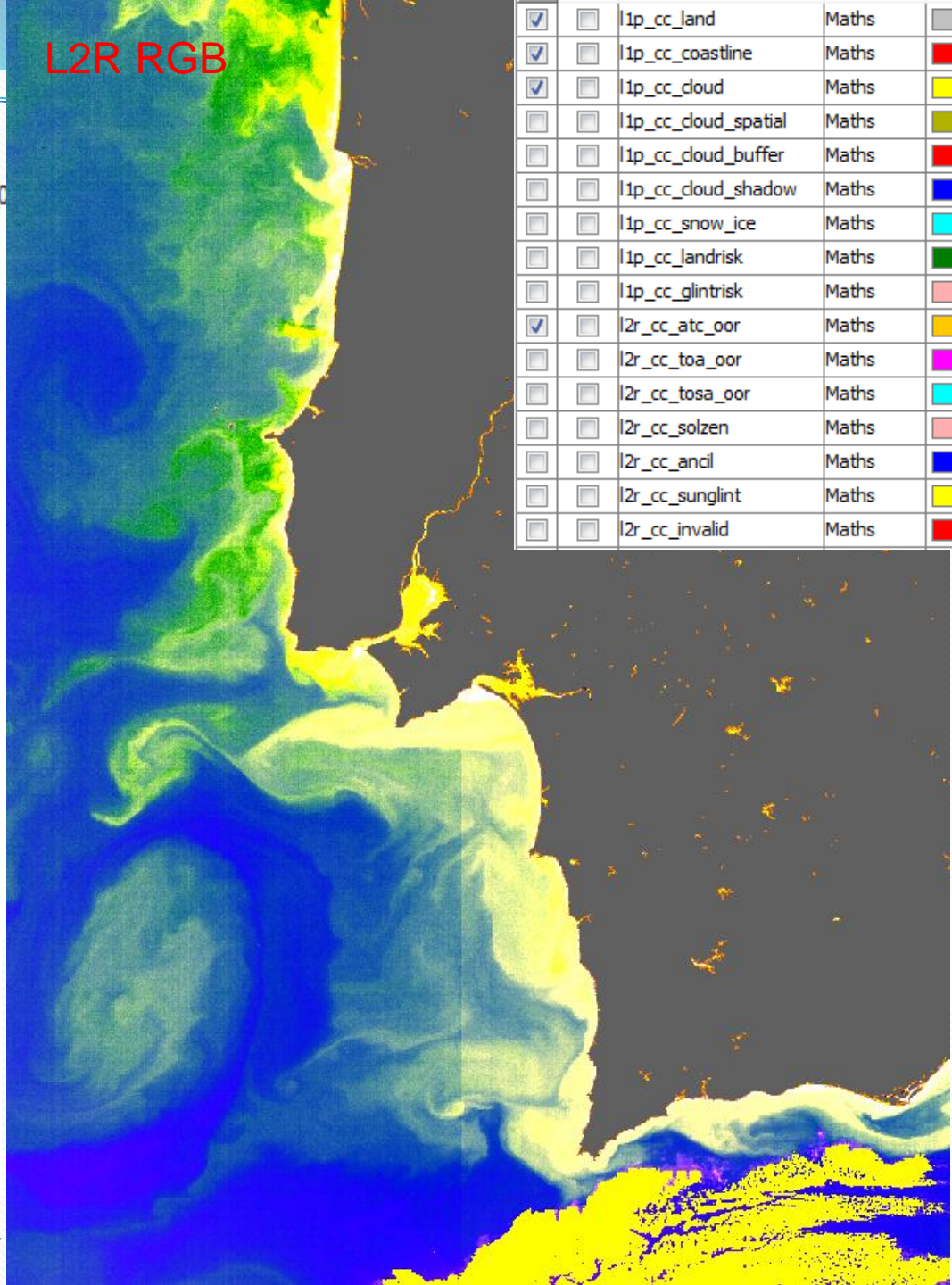
- 12 bands of water leaving reflectance
- 12 bands of normalised water leaving reflectance
- 3 bands of Aerosol Optical Depth
- Angström Exponent
- Flags

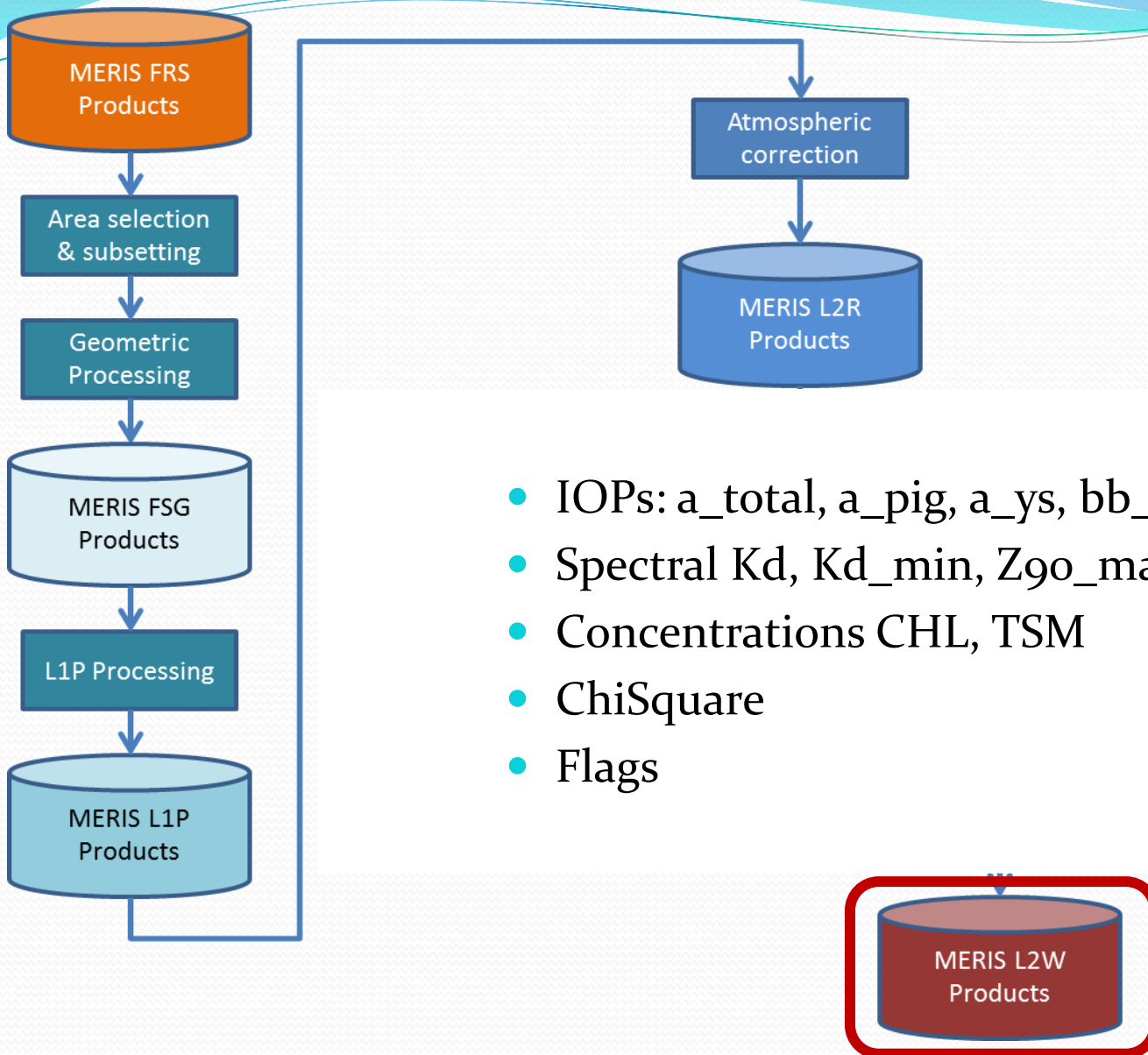
# L2R RGB

[5] MER\_FSG\_CCL2R\_20090920\_051016\_000001462082\_0

- Metadata
- Flag codings
- Tie-point grids
- Bands
  - reflec
  - norm\_refl
    - norm\_refl\_1
    - norm\_refl\_2
    - norm\_refl\_3
    - norm\_refl\_4
    - norm\_refl\_5
    - norm\_refl\_6
    - norm\_refl\_7
    - norm\_refl\_8
    - norm\_refl\_9
    - norm\_refl\_10
    - norm\_refl\_12
    - norm\_refl\_13
  - atm\_tau
    - ang\_443\_865
    - detector\_index
    - l1\_flags
    - l1p\_flags
    - l2r\_flags
    - lat
    - lon

<input checked="" type="checkbox"/>	<input type="checkbox"/>	l1p_cc_land	Maths	19...
<input checked="" type="checkbox"/>	<input type="checkbox"/>	l1p_cc_coastline	Maths	25...
<input checked="" type="checkbox"/>	<input type="checkbox"/>	l1p_cc_cloud	Maths	25...
<input type="checkbox"/>	<input type="checkbox"/>	l1p_cc_cloud_spatial	Maths	17...
<input type="checkbox"/>	<input type="checkbox"/>	l1p_cc_cloud_buffer	Maths	25...
<input type="checkbox"/>	<input type="checkbox"/>	l1p_cc_cloud_shadow	Maths	0,...
<input type="checkbox"/>	<input type="checkbox"/>	l1p_cc_snow_ice	Maths	0,...
<input type="checkbox"/>	<input type="checkbox"/>	l1p_cc_landrisk	Maths	0,...
<input type="checkbox"/>	<input type="checkbox"/>	l1p_cc_glinrisk	Maths	25...
<input checked="" type="checkbox"/>	<input type="checkbox"/>	l2r_cc_atc_oor	Maths	25...
<input type="checkbox"/>	<input type="checkbox"/>	l2r_cc_toa_oor	Maths	25...
<input type="checkbox"/>	<input type="checkbox"/>	l2r_cc_tosa_oor	Maths	0,...
<input type="checkbox"/>	<input type="checkbox"/>	l2r_cc_solzen	Maths	25...
<input type="checkbox"/>	<input type="checkbox"/>	l2r_cc_ancil	Maths	0,...
<input type="checkbox"/>	<input type="checkbox"/>	l2r_cc_sunlint	Maths	25...
<input type="checkbox"/>	<input type="checkbox"/>	l2r_cc_invalid	Maths	25...



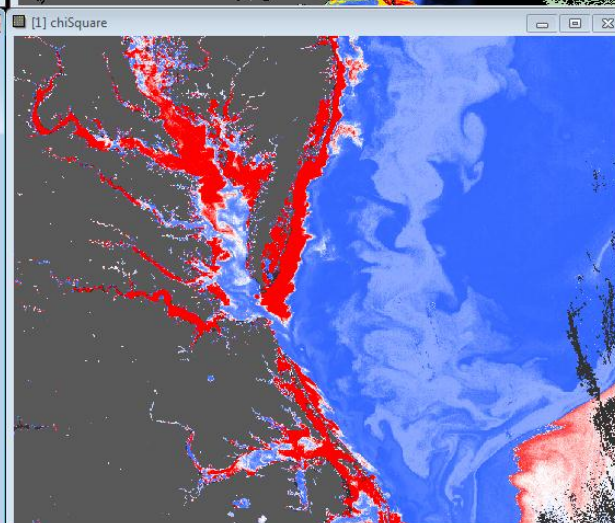
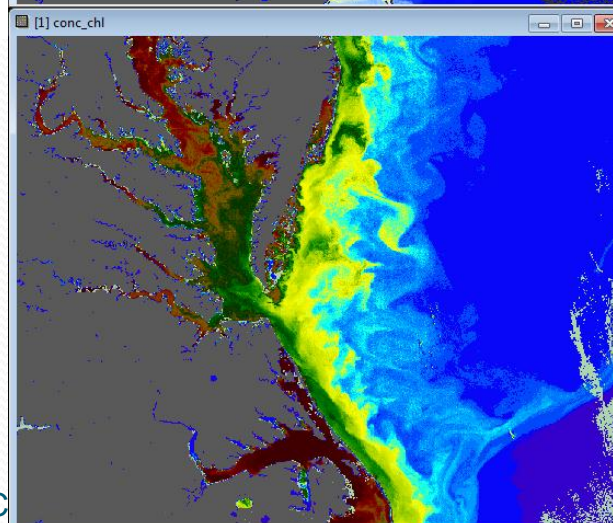
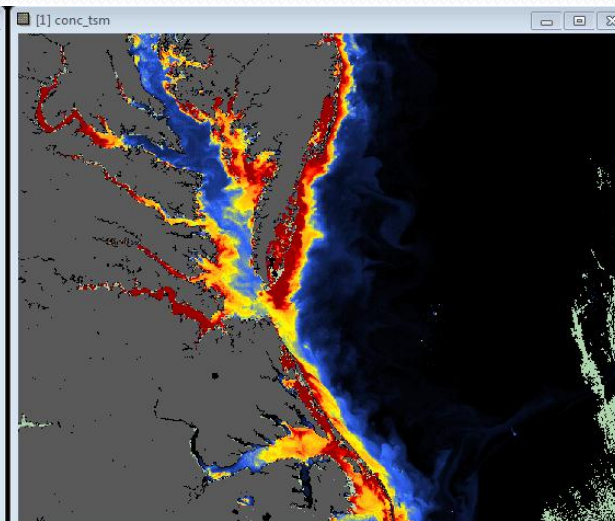
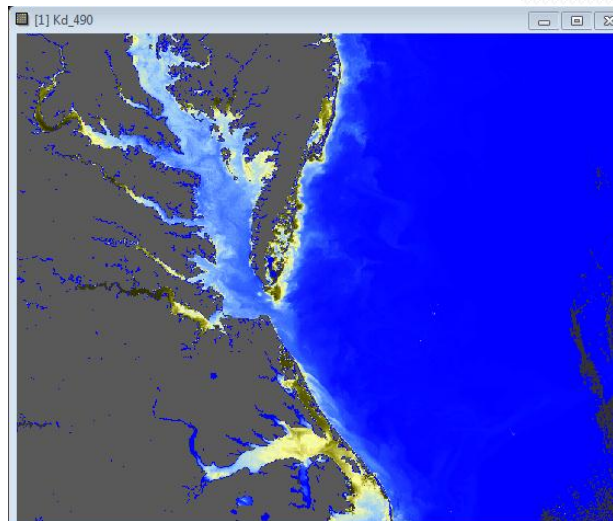


- IOPs:  $a_{total}$ ,  $a_{pig}$ ,  $a_{ys}$ ,  $bb_{tsm}$
- Spectral  $K_d$ ,  $K_d_{min}$ ,  $Z_{90_{max}}$ , Turbidity Index
- Concentrations CHL, TSM
- ChiSquare
- Flags

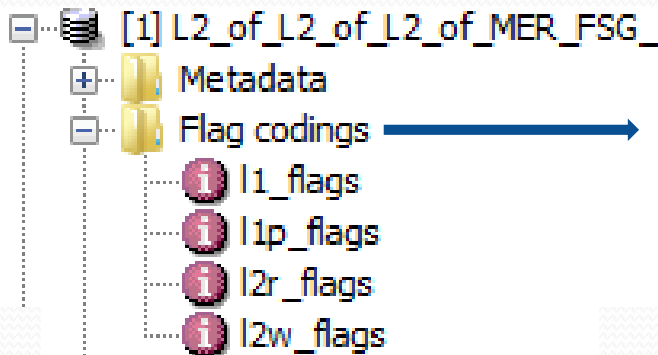
# L2W Structure

[7] L2\_of\_L2\_of\_L2\_of\_MER\_FSG\_1PNMAP20060918\_151603\_000000872051\_00197\_23798\_0001

- Metadata
- Flag codings
- Tie-point grids
- Bands
  - corr\_latitude
  - corr\_longitude
  - iop
    - iop\_a\_total\_443
    - iop\_a\_ys\_443
    - iop\_a\_pig\_443
    - iop\_bb\_spm\_443
  - conc
    - conc\_tsm ✘
    - conc\_chl ✘
  - chiSquare ✘
  - K\_min
  - Kd
    - Kd\_412
    - Kd\_443
    - Kd\_490 ✘
    - Kd\_510
    - Kd\_560
    - Kd\_620
    - Kd\_664
    - Kd\_680
  - Z90\_max
  - turbidity\_index
  - altitude
  - F1\_flags
  - F1p\_flags
  - F1r\_flags
  - F1w\_flags
  - lat
  - lon



# Flag Codings



[1] l1\_flags

Name	Value	Type	Unit	Description
COSMETIC	1	int32		Pixel is cosmetic
DUPLICATED	2	int32		Pixel has been duplicated (filled in)
GLINT_RISK	4	int32		Pixel has glint risk
SUSPECT	8	int32		Pixel is suspect
LAND_OCEAN	16	int32		Pixel is over land, not ocean
BRIGHT	32	int32		Pixel is bright
COASTLINE	64	int32		Pixel is part of a coastline
INVALID	128	int32		Pixel is invalid

[1] l1p\_flags

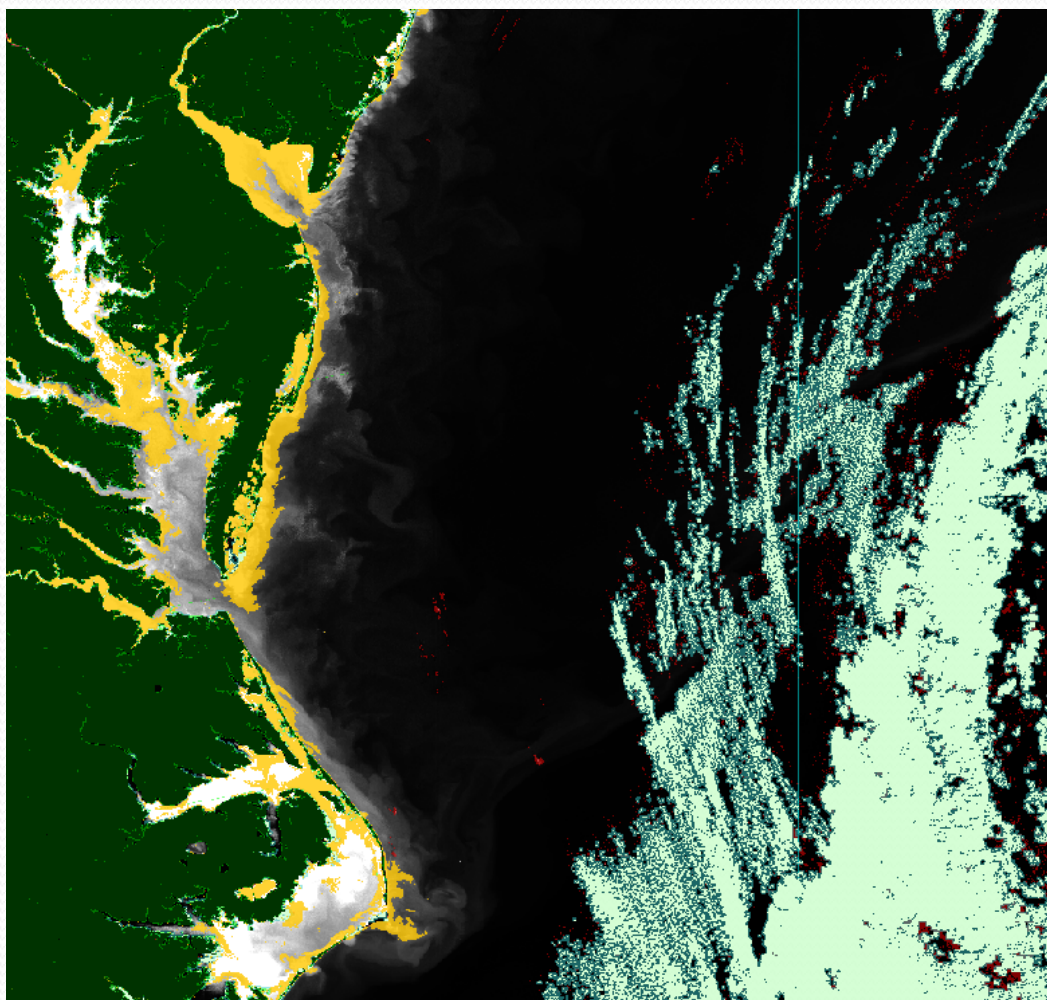
Name	Value	Type	Unit	Description
CC_LAND	1	int32		Pixel masked as land
CC_COASTLINE	2	int32		Pixel masked as coastline
CC_CLOUD	4	int32		Pixel masked as cloud
CC_CLOUD_BUFFER	8	int32		Pixel masked as cloud buffer
CC_CLOUD_SHADOW	16	int32		Pixel masked as cloud shadow
CC_SNOW_ICE	32	int32		Pixel masked as snow/ice
CC_LANDRISK	64	int32		Potential land pixel
CC_GLINTRISK	128	int32		Risk that pixel is under glint

[1] l2r\_flags

Name	Value	Type	Unit	Description
ATC_OOR	4	int32		Atmospheric correction out of range
TOA_OOR	8	int32		TOA reflectance out of range
TOSA_OOR	16	int32		TOSA reflectance out of range
SOLZEN	32	int32		Large solar zenith angle
ANCIL	64	int32		Missing/OOR auxiliary data
SUNGLINT	8	int32		High sun glint retrieved
INVALID	32768	int32		Invalid pixels (l1p_flags.CC_LAND ...

[1] l2w\_flags

Name	Value	Type	Unit	Description
WLR_OOR	1	int32		Water leaving reflectance out of t...
CONC_OOR	2	int32		Water constituents out of training ...
OOTR	4	int32		Spectrum out of training range (ch...
WHITECAPS	8	int32		Risk for white caps
INVALID	128	int32		Invalid pixels (l2r_flags.INVALID   ...



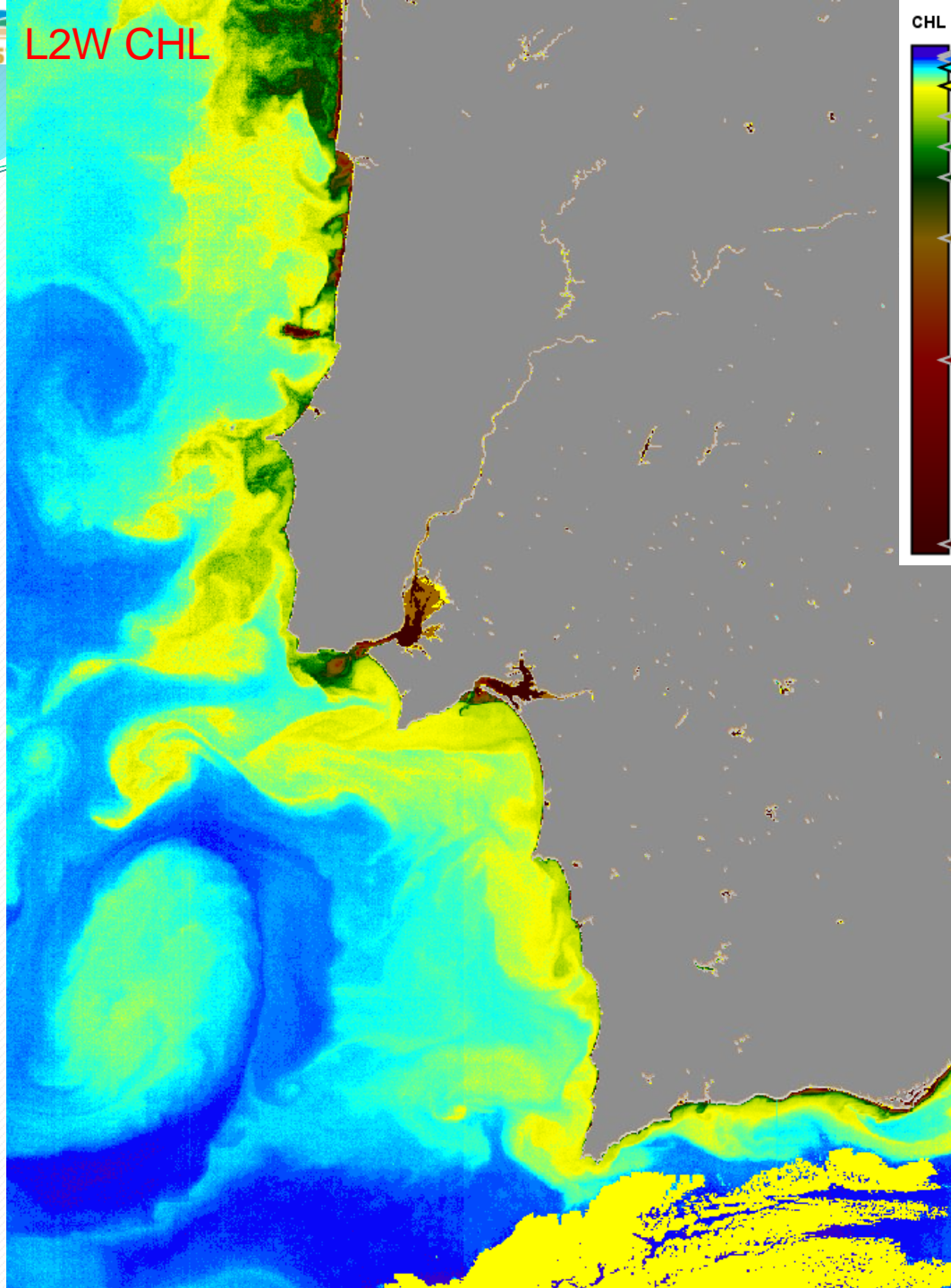
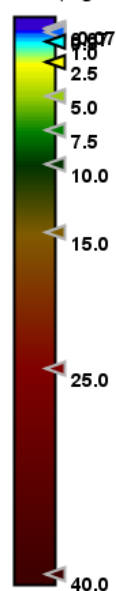
Mask / ROI Manager - [7] iop\_a\_total\_443

<input type="checkbox"/>	<input type="checkbox"/>	ROI Name	Type	Colour
<input checked="" type="checkbox"/>	<input type="checkbox"/>	l2w_cc_wlr_ootr	Maths	0,,
<input type="checkbox"/>	<input type="checkbox"/>	l2w_cc_conc_ootr	Maths	64.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	l2w_cc_ootr	Maths	25.
<input type="checkbox"/>	<input type="checkbox"/>	l2w_cc_whitecaps	Maths	25.
<input type="checkbox"/>	<input type="checkbox"/>	l2w_cc_invalid	Maths	25.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	l1p_cc_land	Maths	0,,
<input checked="" type="checkbox"/>	<input type="checkbox"/>	l1p_cc_coastline	Maths	0,,
<input checked="" type="checkbox"/>	<input type="checkbox"/>	l1p_cc_cloud	Maths	20.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	l1p_cc_cloud_buffer	Maths	51.
<input type="checkbox"/>	<input type="checkbox"/>	l1p_cc_cloud_shadow	Maths	0,,
<input type="checkbox"/>	<input type="checkbox"/>	l1p_cc_snow_ice	Maths	0,,
<input type="checkbox"/>	<input type="checkbox"/>	l1p_cc_landrisk	Maths	0,,
<input type="checkbox"/>	<input type="checkbox"/>	l1p_cc_glinrisk	Maths	25.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	l2r_cc_atc_oor	Maths	25.
<input type="checkbox"/>	<input type="checkbox"/>	l2r_cc_toa_oor	Maths	25.
<input type="checkbox"/>	<input type="checkbox"/>	l2r_cc_tosa_oor	Maths	0,,
<input type="checkbox"/>	<input type="checkbox"/>	l2r_cc_solzen	Maths	25.
<input type="checkbox"/>	<input type="checkbox"/>	l2r_cc_ancil	Maths	0,,
<input type="checkbox"/>	<input type="checkbox"/>	l2r_cc_sunglint	Maths	25.
<input type="checkbox"/>	<input type="checkbox"/>	l2r_cc_invalid	Maths	25.
<input type="checkbox"/>	<input type="checkbox"/>	l1b_coastline	Maths	0,,
<input type="checkbox"/>	<input type="checkbox"/>	l1b_land	Maths	51.
<input type="checkbox"/>	<input type="checkbox"/>	l1b_water	Maths	15.

f(x) [x]

?

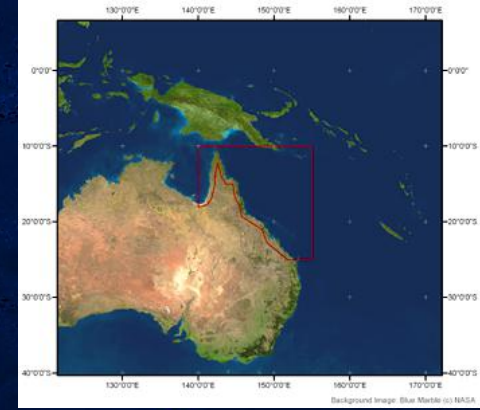
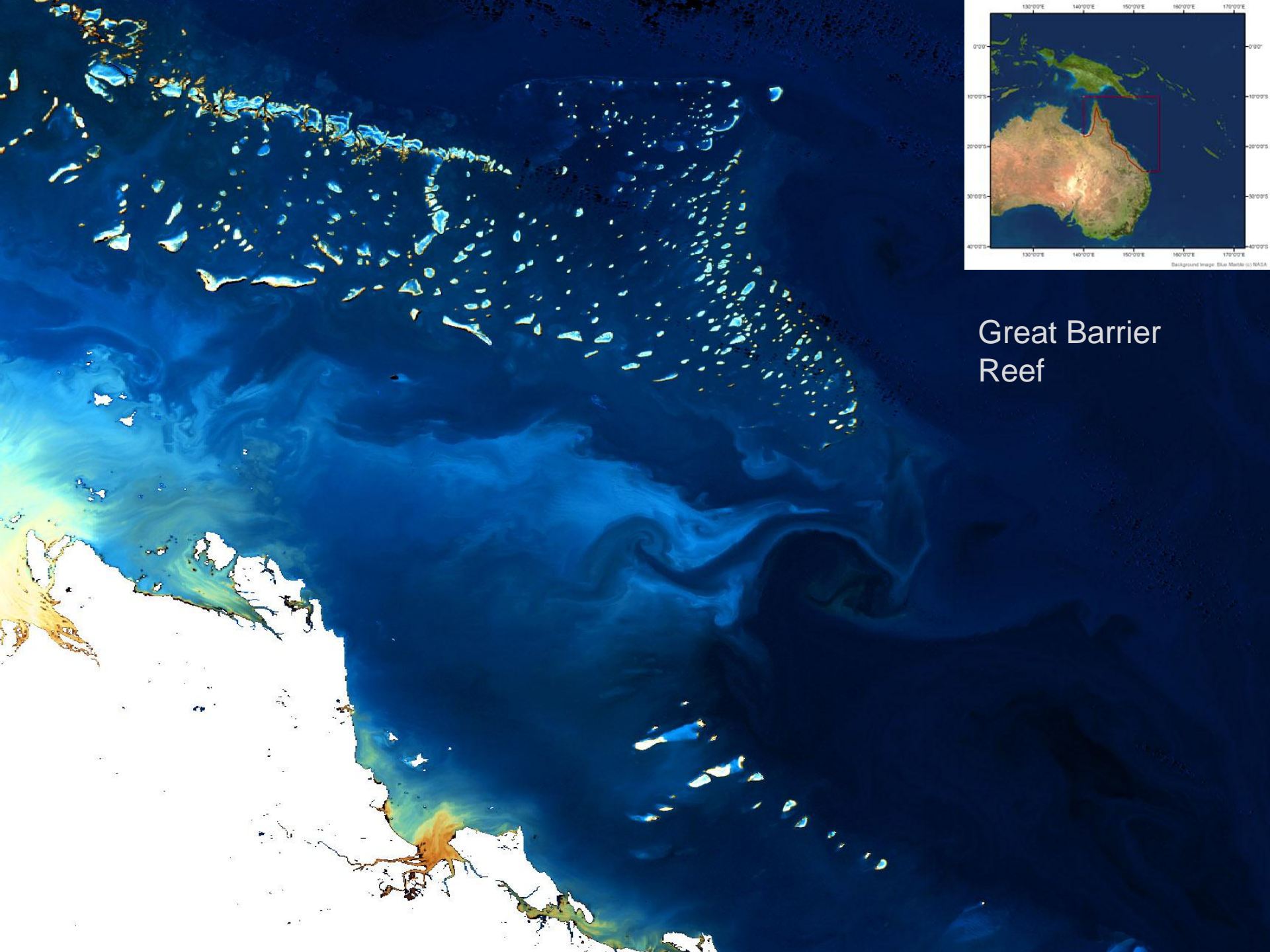


CHL (mg/m<sup>3</sup>)

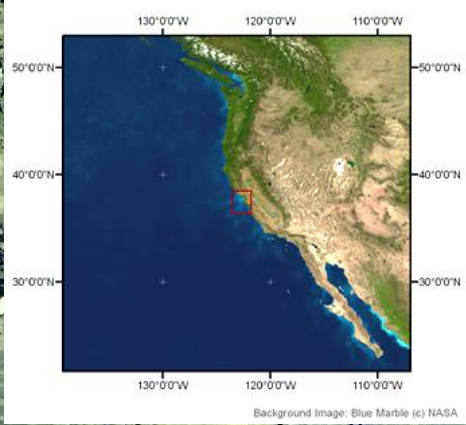
<input checked="" type="checkbox"/>	<input type="checkbox"/>	l2w_cc_wlr_ootr	Maths	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	l2w_cc_conc_ootr	Maths	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	l2w_cc_ootr	Maths	
<input type="checkbox"/>	<input type="checkbox"/>	l2w_cc_whitecaps	Maths	
<input type="checkbox"/>	<input type="checkbox"/>	l2w_cc_invalid	Maths	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	l1p_cc_land	Maths	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	l1p_cc_coastline	Maths	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	l1p_cc_cloud	Maths	
<input type="checkbox"/>	<input type="checkbox"/>	l1p_cc_cloud_spatial	Maths	
<input type="checkbox"/>	<input type="checkbox"/>	l1p_cc_cloud_buffer	Maths	
<input type="checkbox"/>	<input type="checkbox"/>	l1p_cc_cloud_shadow	Maths	
<input type="checkbox"/>	<input type="checkbox"/>	l1p_cc_snow_ice	Maths	
<input type="checkbox"/>	<input type="checkbox"/>	l1p_cc_landrisk	Maths	
<input type="checkbox"/>	<input type="checkbox"/>	l1p_cc_glinrisk	Maths	
<input type="checkbox"/>	<input type="checkbox"/>	l2r_cc_atc_oor	Maths	
<input type="checkbox"/>	<input type="checkbox"/>	l2r_cc_toa_oor	Maths	
<input type="checkbox"/>	<input type="checkbox"/>	l2r_cc_tosa_oor	Maths	
<input type="checkbox"/>	<input type="checkbox"/>	l2r_cc_solzen	Maths	
<input type="checkbox"/>	<input type="checkbox"/>	l2r_cc_ancil	Maths	
<input type="checkbox"/>	<input type="checkbox"/>	l2r_cc_sunglint	Maths	
<input type="checkbox"/>	<input type="checkbox"/>	l2r_cc_invalid	Maths	
<input type="checkbox"/>	<input type="checkbox"/>	l1b_coastline	Maths	
<input type="checkbox"/>	<input type="checkbox"/>	l1b_land	Maths	
<input type="checkbox"/>	<input type="checkbox"/>	l1b_water	Maths	
<input type="checkbox"/>	<input type="checkbox"/>	l1b_cosmetic	Maths	

# Product Status

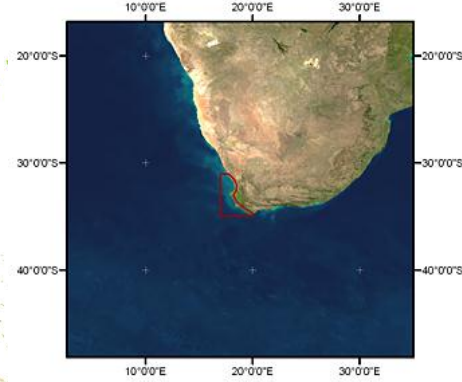
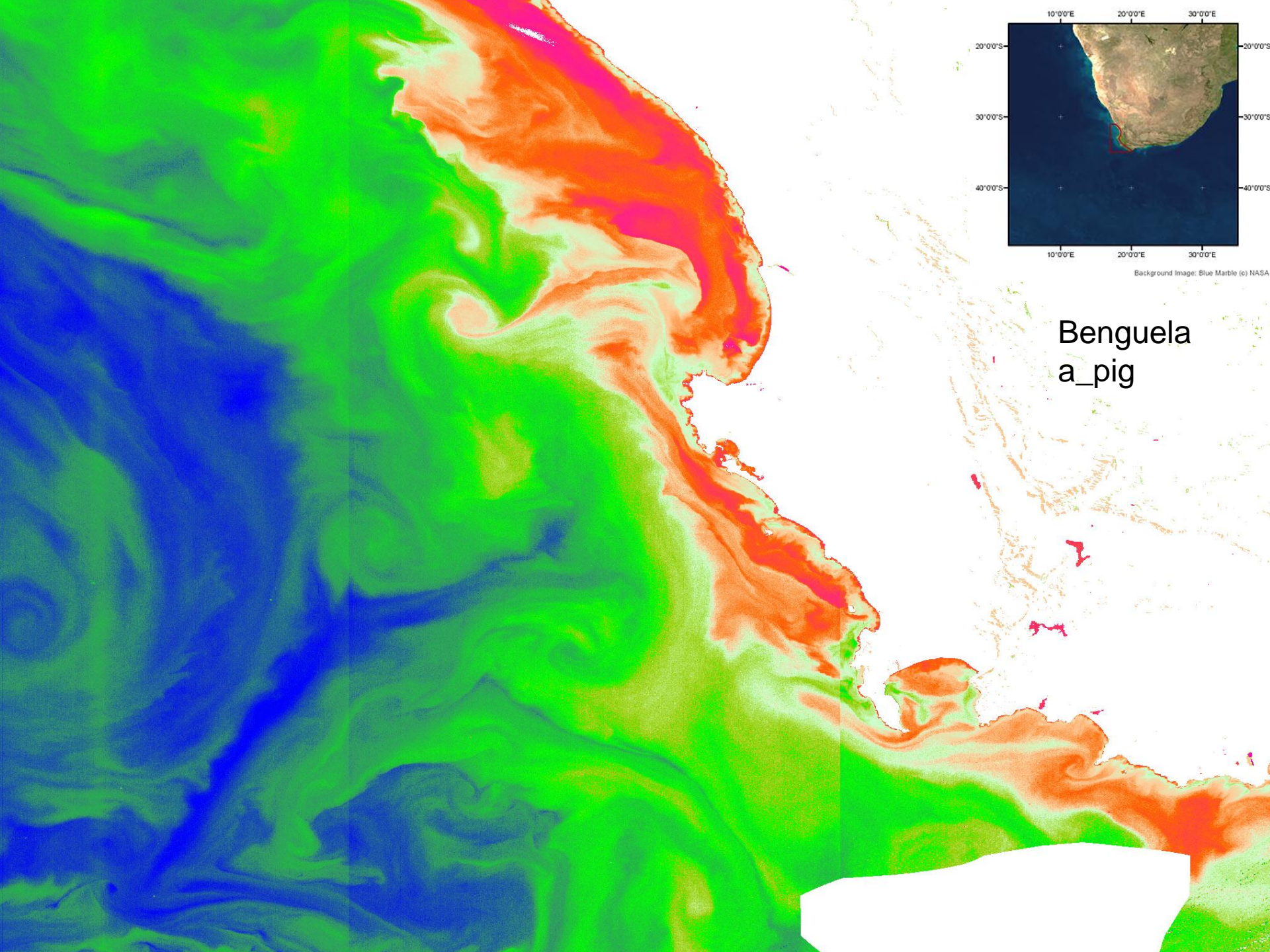
- L1P
  - Status: Consolidated Radiances
  - Reprocessing early 2012
    - Improved childproduct generation
    - Improved flag content
    - Erase of wrong bands
    - Naming of products
    - Additional 2010 data processed
- L2R + L2W
  - Status: Demonstration Products, available for 2006
  - March 2012:
    - Algorithm changes expected
    - Structural changes not foreseen, but not impossible



Great Barrier  
Reef

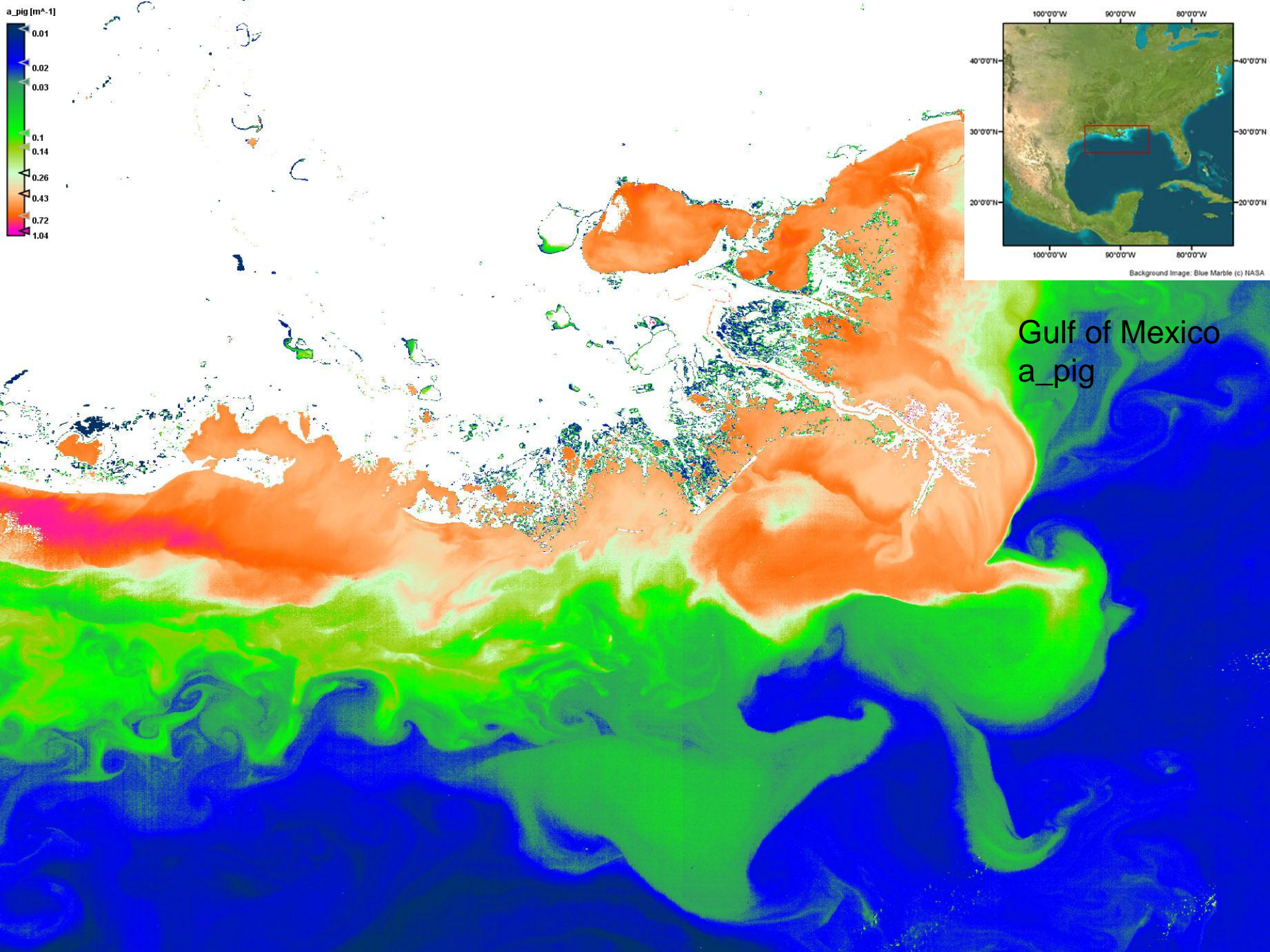


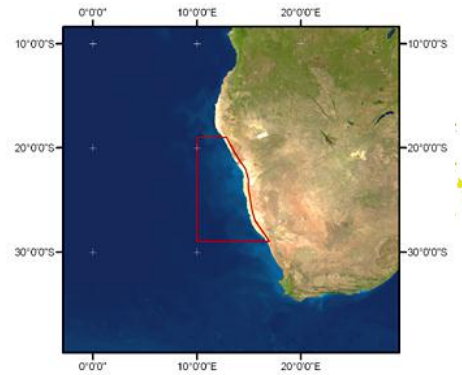
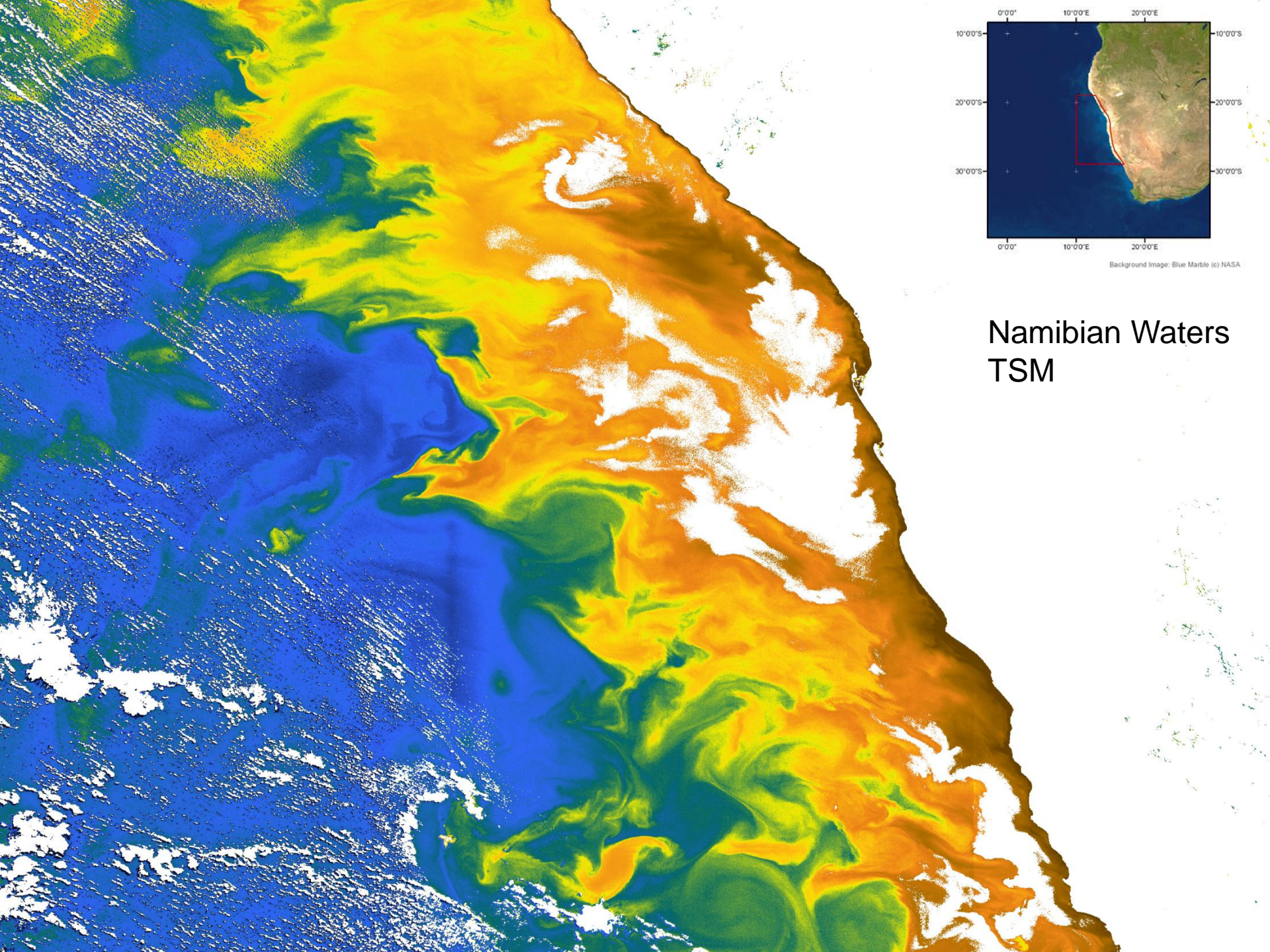
Central California



Background Image: Blue Marble (c) NASA

Benguela  
a\_pig





Namibian Waters  
TSM