



Using MODIS Level-1B 250 m data

- Please see

\Course\2_Level_1B\Exercises_modis_250m.pdf for more details

http://www.wimsoft.com/Exercises_modis_250m.pdf

- **What is Level-1B?**



Processing Level of Satellite Data:

- **Level 0** - raw radiance counts from sensor, spacecraft and instrument telemetry data
- **Level 1A** - Level-0 data with appended calibration and navigation data, instrument and spacecraft telemetry
- **Level 1B – calibrated radiances at sensor level (TOA = top of atmosphere, i.e. not atmospherically corrected)**
- **Level 2** - geophysical values, derived from Level-1A by applying sensor calibration, atmospheric corrections, and bio-optical algorithms, downloadable from OC
- **Level 3** - Binned (time and space), **SMI** (Standard Mapped Image) mapped to Equidistant Cylindrical projection
- **Level 4** – After application of models (e.g. Net Primary Production, Export Flux of Carbon) to L3 data



Using MODIS L1B 250 m data

- Please see *\Course\2_Level_1B\Exercises_modis_250m.pdf* for more details http://www.wimsoft.com/Exercises_modis_250m.pdf
- Need >600 MB of disk space
- MODIS (both Terra and Aqua) **Level-1B** 250-m datasets can be obtained from <https://ladsweb.modaps.eosdis.nasa.gov/search/>
- You need to select 4 Products in search: 1 km (MOD021KM), 500 m (MOD02HKM), 250 m (MOD02QKM), geo-location (MOD03). MYD* for Aqua file names.





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File type	Sample name
1 KM	MYD021KM.A2008163.*.hdf
500 m (HKM)	MYD02HKM.A2008163.*.hdf
250 m (QKM)	MYD02QKM.A2008163.*.hdf
Geo-location	MYD03.A2008163.*.hdf

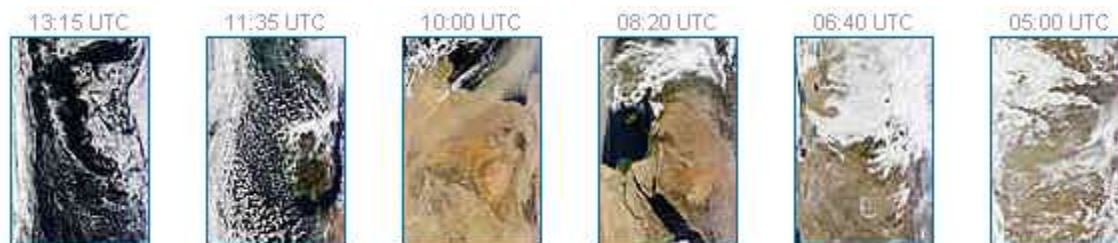
- Each granule (5-min data) has these 4 files (1KM, HKM, QKM, geo-location)
- File names MOD* for Terra, MYD* for Aqua
- Important to use a directory structure like
- ***C:\Sat\L1B\Dongsha\2005_133***
- Copy files to the data folder, e.g. ***C:\Sat\...***





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- 5-minute granules (images) are relatively small, sometimes straddle the area of interest
- How to find images?
- Several possibilities: browse through MODIS Rapid Response images (google: MODIS rapid response) <http://lance-modis.eosdis.nasa.gov/cgi-bin/imagery/realtime.cgi>



- This is VERY TIME CONSUMING!
- Better to use Ocean Color Level 1&2 Browser to find the exact start time of a good granule: <https://oceancolor.gsfc.nasa.gov/cgi/browse.pl?sen=am>
- When you know the date and time, create a text file with a list of file names and use **Filename Search with the list:**

MYD021KM.A2013044.1925*

MYD02HKM.A2013044.1925*

MYD02QKM.A2013044.1925*

MYD03.A2013044.1925*

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Secure | <https://ladsweb.modaps.eosdis.nasa.gov/search/order/4/MYD021KM--6,MYD02HKM--6,MYD02QKM--6,MYD03--6/20...>

Apps San Diego Homes for OceanColor Imported From IE Yahoo Pier Cam | Scripps Ins Postimees: Värsked u Other bookmarks

NASA LAADS DAAC About LAADS Find Data Data Discovery Quality Help Profile

1 PRODUCTS 2 TIME 3 LOCATION 4 FILES 5 REVIEW & ORDER

4 products selected 2013-02-13 W: -180°, N: 90°, E: 180°, S: -90° No files selected. reset

* Download query results as json or csv

Search: Select All Clear All Query Results Selected (0) Images

Filename		Product (collection)	Image	Date / Time	Download
MYD03.A2013044.1925.006.2013045160307.hdf	i	MYD03 (6)		2013-02-13 19:25:00	27 MB
MYD021KM.A2013044.1925.006.2013045162832.hdf	i	MYD021KM (6)		2013-02-13 19:25:00	156 MB
MYD02HKM.A2013044.1925.006.2013045162832.hdf	i	MYD02HKM (6)		2013-02-13 19:25:00	141 MB
MYD02QKM.A2013044.1925.006.2013045162832.hdf	i	MYD02QKM (6)		2013-02-13 19:25:00	163 MB

Showing 1 to 4 of 4 entries Previous 1 Next

Search by Product Online Archive Filename Search Image Viewer Load/Save Search Past Orders





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OLD (manual) procedure:

- Do atmospheric correction with *crefl.exe*
- Run *crefl* 3 times: separately for the 1KM, HKM and QKM bands using the control file (modify the control file for each band)
 - 1 ; output at 250 m resolution
 - 0 ; output at 500 m resolution
 - 0 ; output at 1 km resolution

crefl log_crefl_MY_2005_133.txt

- Create true-color from the red-green-blue bands with *wam_rgb_modis*

*wam_rgb_modis MYD021KM*cref.hdf*

(equivalent to *wam_rgb_modis *.1km_cref.hdf 0 255 0 255 0 255*)

wam_rgb_modis FilePattern RedLow RedHigh GreenLow GreenHigh BlueLow BlueHigh





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NEW (scripted) procedure: (first open command prompt in the folder with L1B files)

cd C:\Sat\L1B\Dongsha\2005_133

1. *makelistcrefl .* (makes 2 control text files)
2. *crefl_all* (runs crefl.exe for each of the control files)
3. *wam_rgb_modis*

wam_rgb_modis *1km_cref.hdf

(this produces a full scene in satellite view, i.e.
unmapped)

Batch file *rgb_modis_all.bat* does it all!

Open it in Notepad and examine its contents.





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```
wam_rgb_modis *250m_cref.hdf
```

(this produces a full scene in satellite view, i.e.
unmapped)

Remap to a `..\map250m.hdf` using color stretching 0-
180 for the *Red, Green, Blue* bands

```
wam_rgb_modis *250m_cref.hdf 0 180 0 180 0 180 yes  
..\map250m.hdf
```

(this produces a mapped image in specified projection)

Create a different map with WIM (File-New) and remap
to that map

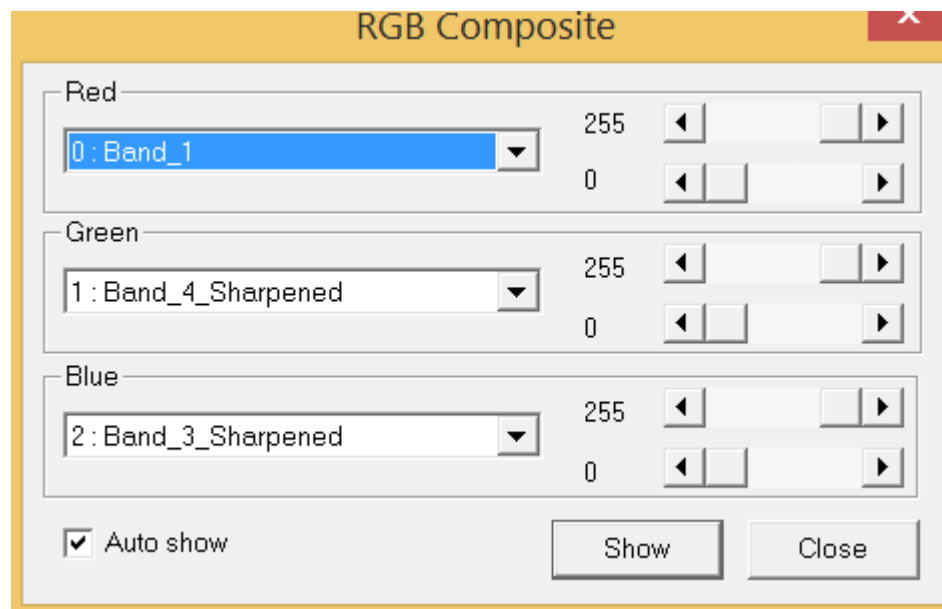
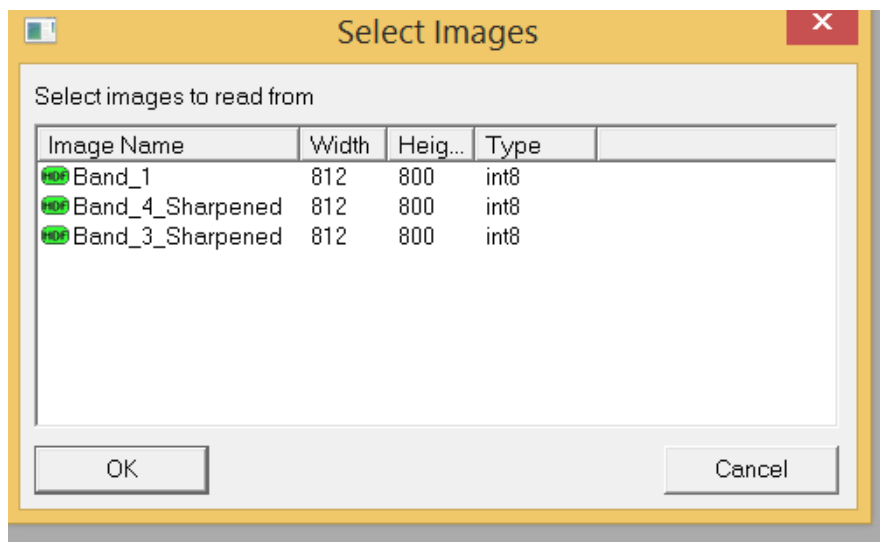




Using MODIS L1B 250 m data

```
wam_rgb_modis *250m_cref.hdf 0 180 0 180 0 180 yes  
..\map250m.hdf
```

The “yes” option saves a 3-band file: ***_cref_3bands.*** .to
tune the stretching of the RGB components to enhance
Load and use to find the best stretching to enhance
certain features! Use Examine-RGB Image:





Comparing MODIS 250m with ASTER 15m data

See *Course\2_Level_1B\Exercises_ASTER.pdf*

Load 3 images from

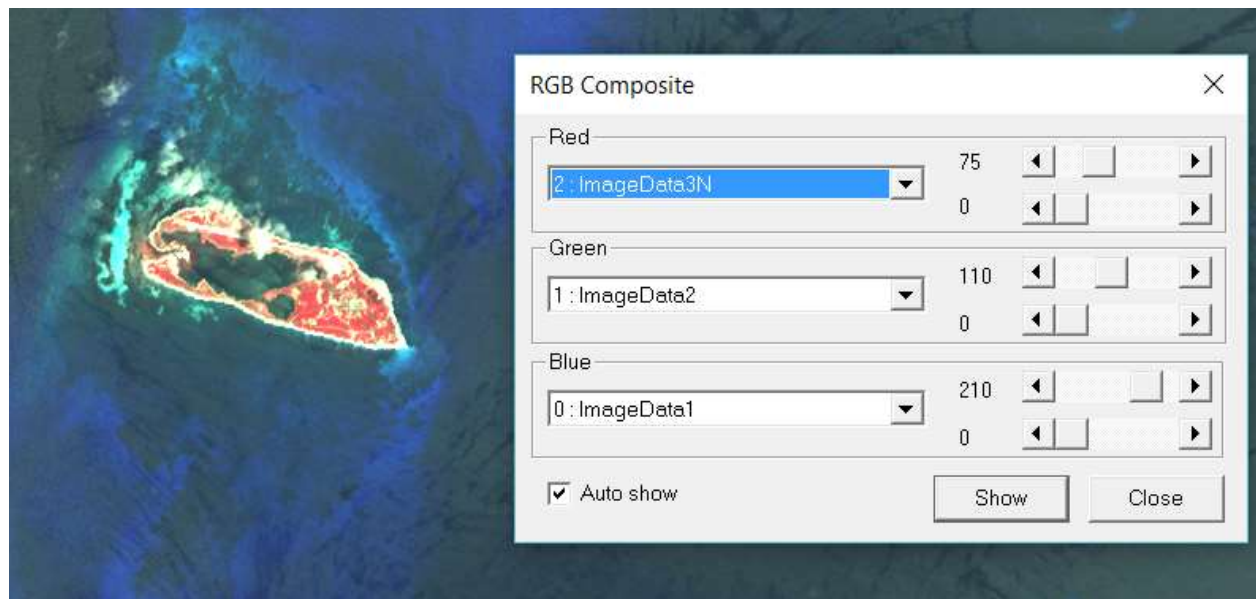
\Images\ASTER\Dongsha\2005.03.22\AST.hdf*

Find Dongsha atol, use *Examine-RGB Image* to find the best RGB combination:

Select Images

Select images to read from

Image Name	Width	Heig...	Type
 ImageData1	5580	4912	int8
 ImageData2	5580	4912	int8
 ImageData3N	5580	4912	int8

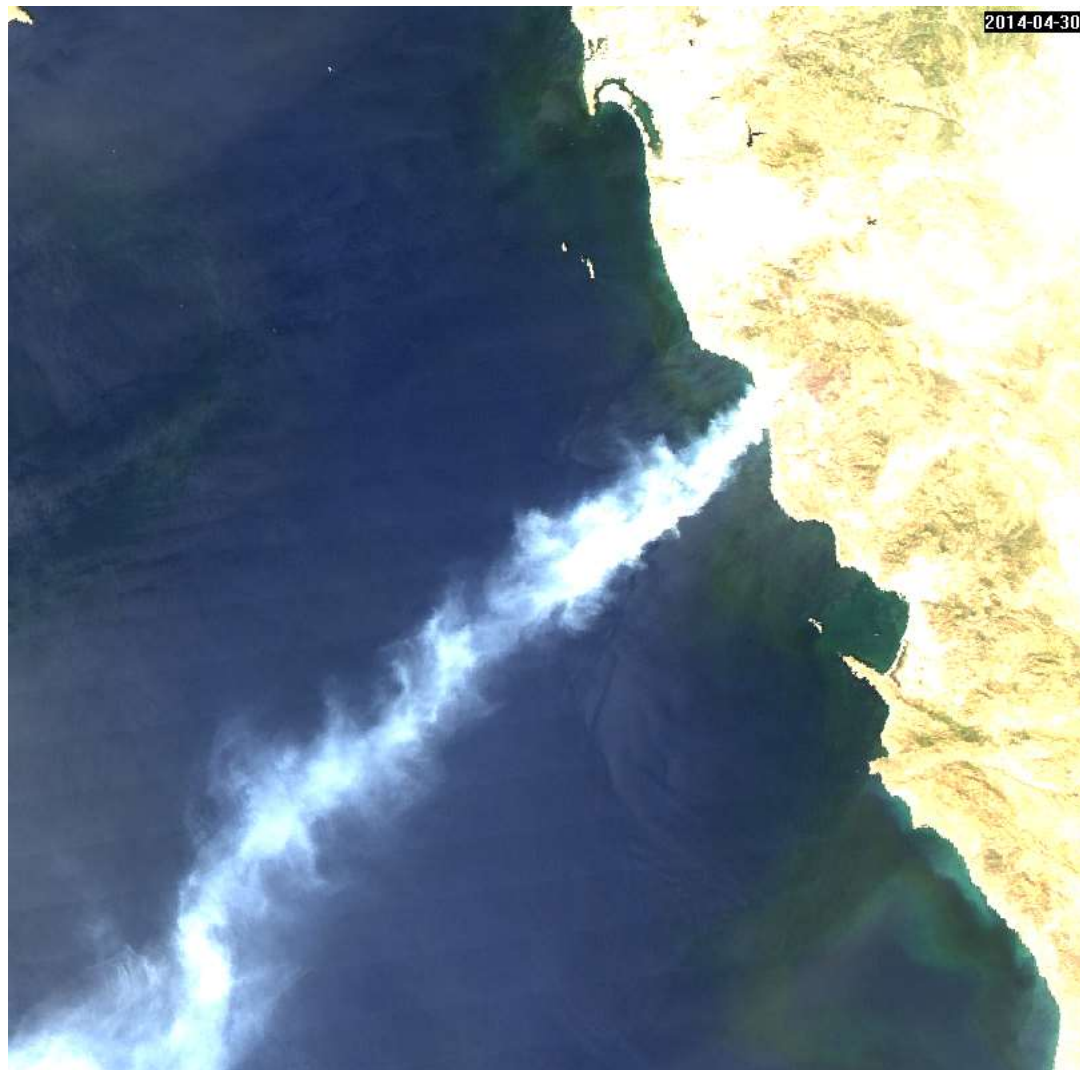




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Run with the “enhanced” ranges, e.g.:

```
wam_rgb_modis *250m_cref.hdf 0 88 0 88 0 88 no ..\  
SanEns250mCoast.hdf
```





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Automate with *wam_rgb_modis_all.bat*

```
makelistcrefl .\
```

```
call crefl_all
```

```
set MAP1000m="..\mapLin1km.hdf"
```

```
set MAP250m="..\mapLin250m.hdf"
```

```
wam_rgb_modis *1km_cref.hdf 0 100 0 100 0 100 no
```

```
wam_rgb_modis *250m_cref.hdf 0 100 0 100 0 100 no
```

```
wam_rgb_modis *250m_cref.hdf 0 100 0 100 0 100 no
```

```
%MAP250m%
```

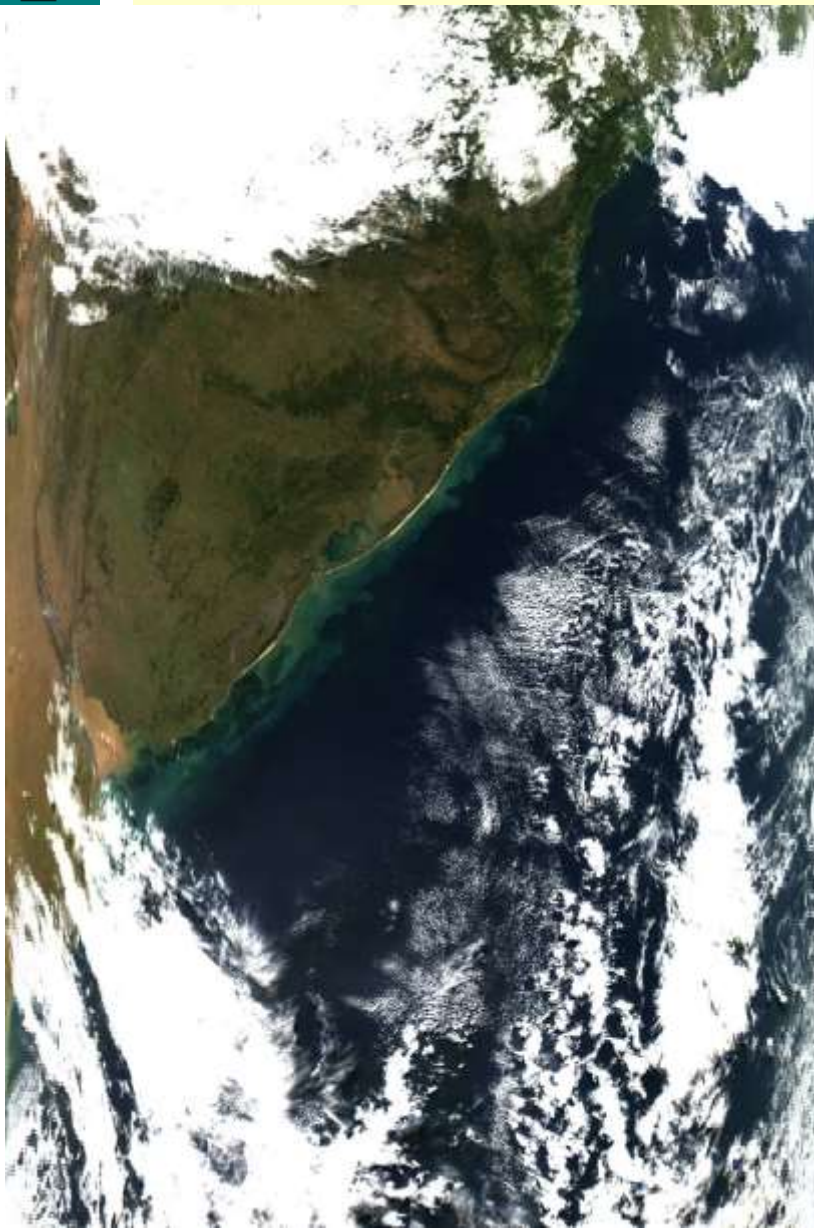
```
REM wam_overlay M*.250m_cref*.remap*250mCoast.hdf
```

```
%MAP250m%
```

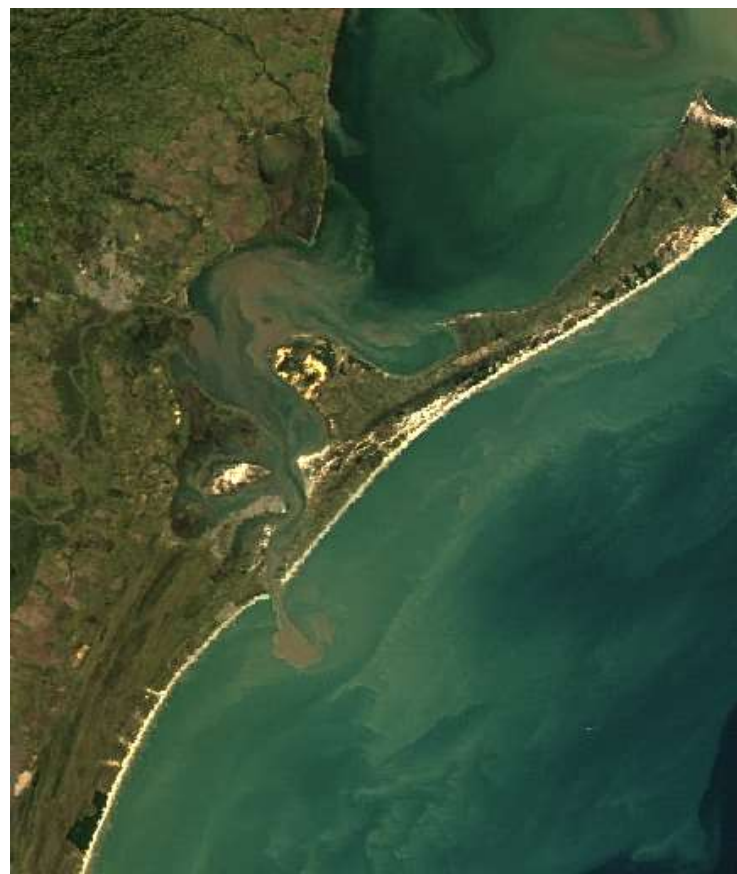




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Full granule remapped to a Linear map:
wam_rgb_modis *250m_cref.hdf 0 200 0
200 0 200 yes ..\
lagoons_lin_250m.hdf





Using MODIS L1B 250 m data

Calculate Turbidity using MODIS 250-m bands 1, 2

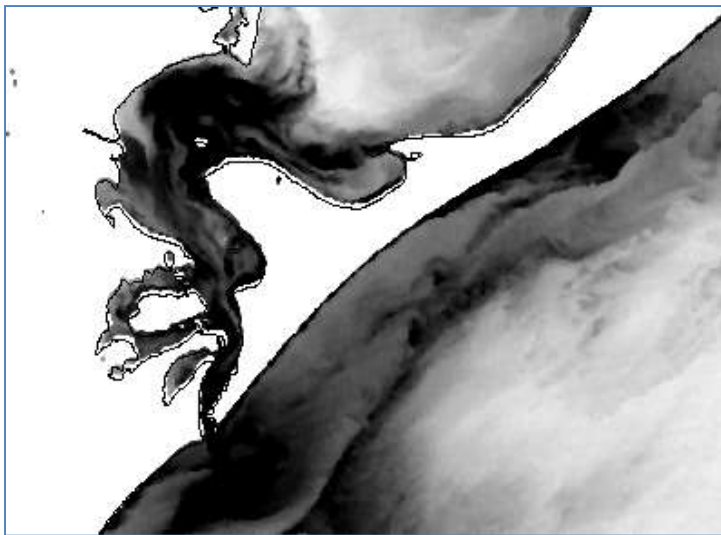
3. Do atmospheric correction with ***crefl.exe*** select bands 1, 2 at 250 m resolution bands using the control file

crefl log_crefl_MY_2008_163_12.txt

1100000 ; bands 1-7 to process

4. Calculate turbidity using map *lagoons_lin_250m.hdf*

wam_turbidity *250m_cref.hdf ..\lagoons_lin_250m.hdf





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Merge **RGB land** with **grayscale Turbidity** of the ocean using **land mask lagoons_lin_250m_land.hdf**

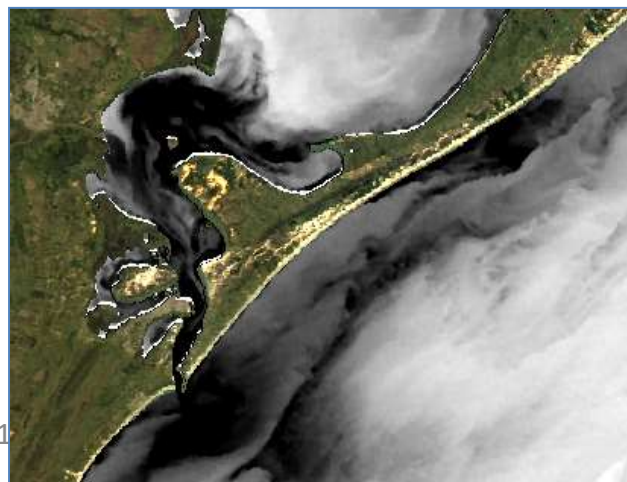
- *Convert the grayscale Turbidity image to RGB in WIM with Transf-Convert to 24bbp (RGB)*
- Save the RGB turbidity image as HDF, add ***_RGB.hdf*** to the name

Merge with *wam_mozaic_land_ocean*:

wam_mozaic_land_ocean

MYD02QKM.A2008163.1715.005.250m_cref_1minus2.remap_lagoons_lin_250m_RGB.hdf

MYD02QKM.A2008163.1715.005.250m_cref.RGB_0_200_0_200_0_200.remap_lagoons_lin_250m.hdf ..\lagoons_lin_250m_land.hdf





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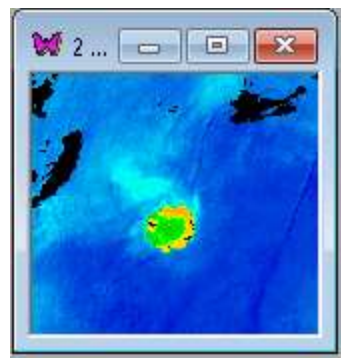
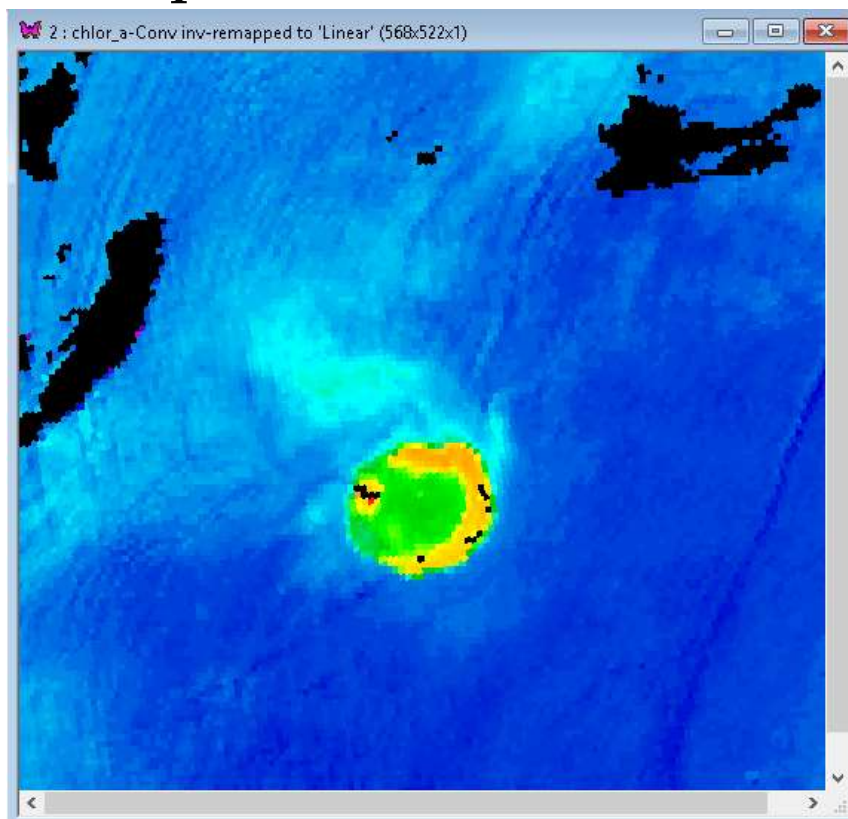
Using MODIS L1B 250 m data

Compare MODISA L2 data with the L1B data

Load *chlor_a* from *A2005133053500.L2_LAC.hdf*

Convert to byte image with *LogChl* scaling

Map to 250m and 1km maps





11 May 2010 MODIS-A
Plume of ash streaming southward from Iceland's
Eyjafjallajökull volcano
from <http://oceancolor.gsfc.nasa.gov/>

