

Singapore CDOM using OLCI

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1 Introduction

This is a follow-on to the Singapore CDOM time series tutorial at https://www.wimsoft.com/Course/2/2_Singapore_CDOM_time_series.pdf using OLCI-A and OLCI-B level-2 full resolution (300 m) data. Standard OLCI level-2 data have a dataset *ADG443_NN* (within *iop_nn.nc*) that we will be using. We build a time series for 2022 and compare it to the time series that we compiled for NASA-processed sensors.

This processing is done by using Windows batch files that call WIM/WAM command-line programs. The whole dataset in directory *Singapore3* including data files, map files, processing scripts and results are available at Google Drive at

<https://drive.google.com/drive/folders/1JItzErGwi8YqYQVsBS6E33IBV4P3XjbH?usp=sharing>

2 Ordering and downloading OLCI L2 data

We order the OLCI data at the Eumetsat data store at <https://data.eumetsat.int/search?query=> . Search for “OLCI level 2 full resolution”. You should get to <https://data.eumetsat.int/data/map/EO:EUM:DAT:0407> . You need to register and create an account. Select the time interval, Timeliness as NT, Area of interest as 103,0.5,104.6,2. You will see a set of products that you should add to Cart. You can then download the Cart – I do it with aria2. With a command like

```
aria2c --header="Authorization: Bearer 015e3070-942f-3328-ac7c-0ad17e26aa9a" -M cart-mkahru.xml
```

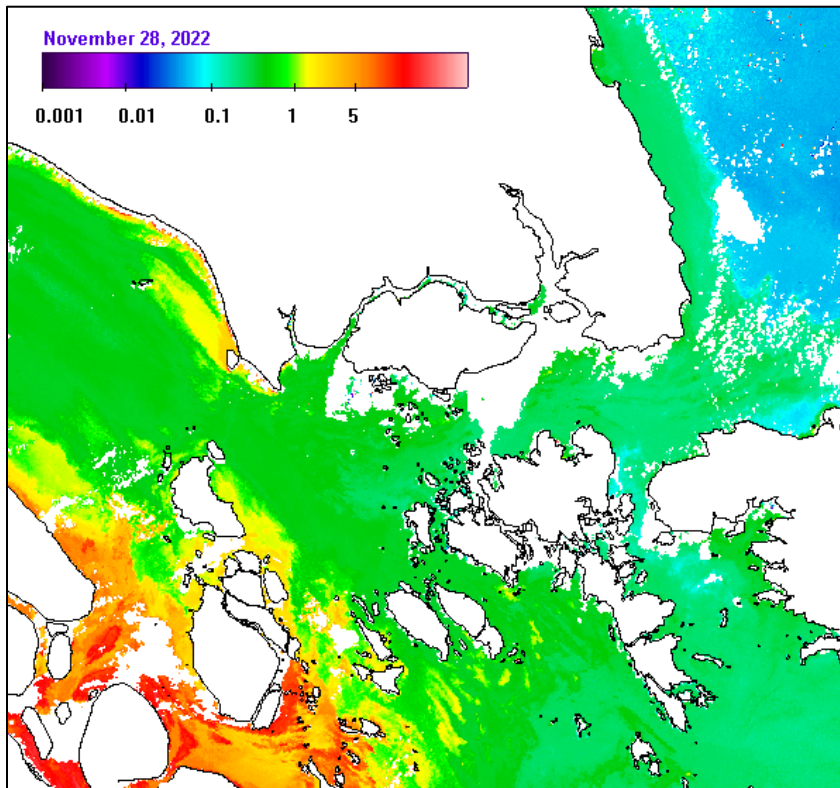
The first bold part is the Token that you need to get under your account and is valid only for 1 hour. The 2nd bold part shows my *user name* – obviously you need to have your user name instead. You can have only up to 100 products in your cart. I start the download in my OLCI directory (e.g. *Singapore3\2022\OLCI*).

3 Remapping L2 data to a standard map

When the order is downloaded, I run the following commands:

```
7z x S3*.zip  
mkdir S3A_OL_2_WFR* .\WFR_NT  
mkdir S3B_OL_2_WFR* .\WFR_NT  
del *.zip  
mapFR_adg
```

In the beginning you should run those one at a time. You should manually create *WFR_NT* directory for the directories files to be processed. Note that each product is a DIRECTORY of files, not a single file with datasets. The 1st command unzips the Zip files into directories. Next commands move directories to *WFR_NT* folder. If everything works, you can delete the Zip files. Finally, the batch file *mapFR_adg.bat* remaps all to our standard map. Remapped OLCI-A data will be in directory *adgA* and OLCI-B data in *adgB*. An example remapped image is below:



You can see that it has better spatial resolution than the MODIS-A 1 km datasets. The processed directories will be moved to *WFRA_NT0* (OLCI-A) and *WFRB_NT0* (OLCI-B). Note that the directories to be processed are in *WFR_NT*.

4 Compositing daily images

Batch files *compAdg443P.bat* and *compAdg443R.bat* use the mapped files to create composites of 5 days, 15 days and monthly. The starting letter for OLCI-A is P and for OLCI-B is R.

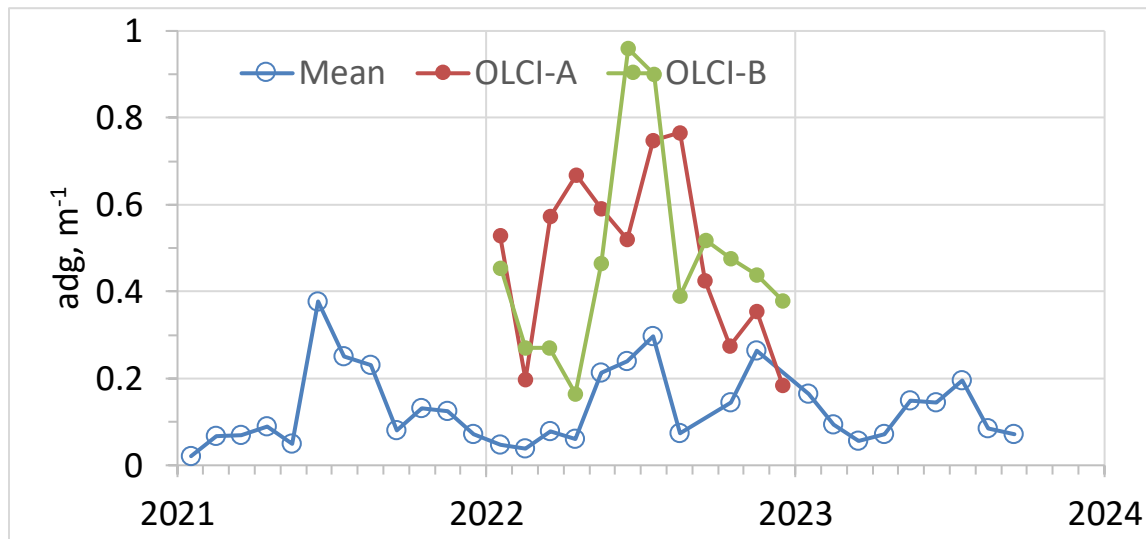
5 Areal time series in a selected area

To create areal time series of OLCI-A and OLCI-B monthly data I use the following commands:

```
wam_statist_mask 2022\OLCI\P2022_adg443_month\P2022*comp.hdf
mask=maps\sing300m_circles5km_joined.hdf
```

```
wam_statist_mask 2022\OLCI\R2022_adg443_month\R2022*comp.hdf
mask=maps\sing300m_circles5km_joined.hdf
```

After pasting into Excel and plotting relative to the NASA adg443 dataset we get:



Time series of adg443 from the merged NASA processing (blue like) and from OLCI-A and OLCI-B around the St. Johns and Raffles stations.

As you can see, there are significant differences not just between NASA and ESA processing but also between OLCI-A and OLCi-B.

6 Path forward

It is clear that satellite detection of *adg443* is problematic and needs further study. Essential part is validating with in situ data. With remapped data it is easy to create match-ups for validation with the *wam_match_nearest* command. We assume that the station list with Longitude, Latitude, Date and Time is in a CSV file *station_list_mk.csv*. Time is not relevant (can be set to 12:00) and is here only for compatibility.

```
wam_match_nearest station_list_mk.csv 2022\OLCI\adgA\P*.hdf maxDiffDays=5
```

```
move station_list_mk_ADG443.csv station_list_mk_ADG443_A.csv
```

```
wam_match_nearest station_list_mk.csv 2022\OLCI\adgB\R*.hdf maxDiffDays=5  
move station_list_mk_ADG443.csv station_list_mk_ADG443_B.csv
```