Time series of PFTs in Celebes-Sulawesi Sea

Contents

1 Introduction

This tutorial applies the methods described in https://wimsoft.com/Course/3/Time_series_SE_Asia.pdf to PFT data in the Celebes-Sulawesi Sea.

2 Data source

PFT data derived according to Xi et al (2020, 2021) are available in directory *cmems_obs-oc_glo_bgc-plankton_my_l4-multi-4km_P1M* at https://data.marine.copernicus.eu/product/OCEANCOLOUR_GLO_BGC_L4_MY_009_108/description

As an example, I downloaded the monthly data only for 2022 into *C:\Sat\PFT\tmp\2022*. You can follow the same procedure for all the years 1998-2023 by changing the *set YEAR=XXXX* command.

I am using the WIM/WAM software that can be downloaded from *https://wimsoft.com/Course/wam64.msi* (install using option *Typical*; run WIM, enter the license number – get it by emailing wim@wimsoft.com).

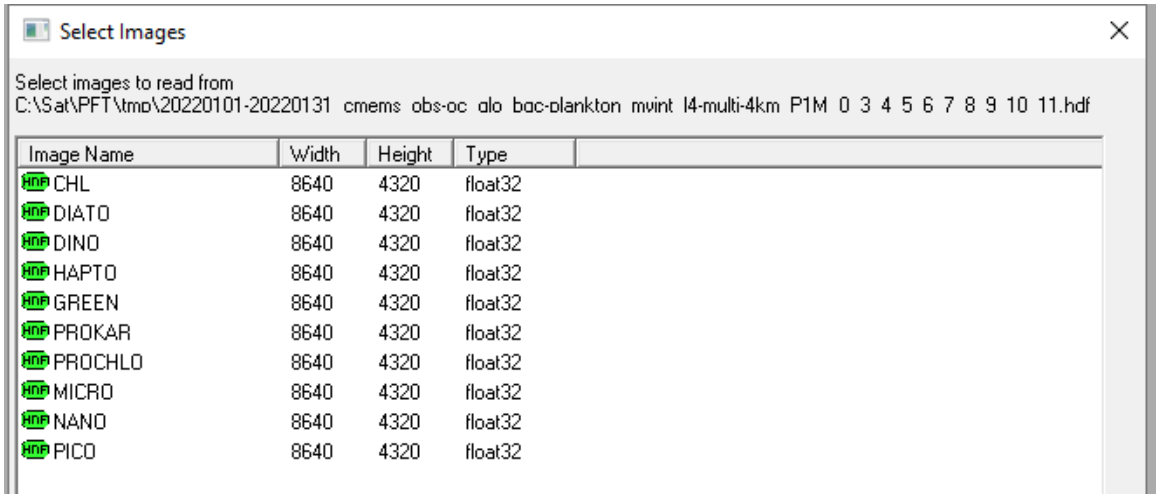
I open command prompt in *C:\Sat\PFT\tmp* and extract only selected datasets like CHL, DIATO, etc and move the extracted datasets in HDF files to a new directory *2022* under *C:\Sat\PFT*.

```
wam_extract_sds 2022\%YEAR%*.nc 0 3 4 5 6 7 8 9 10 11

mkdir ..\Monthly

move *.hdf ..\Monthly
```

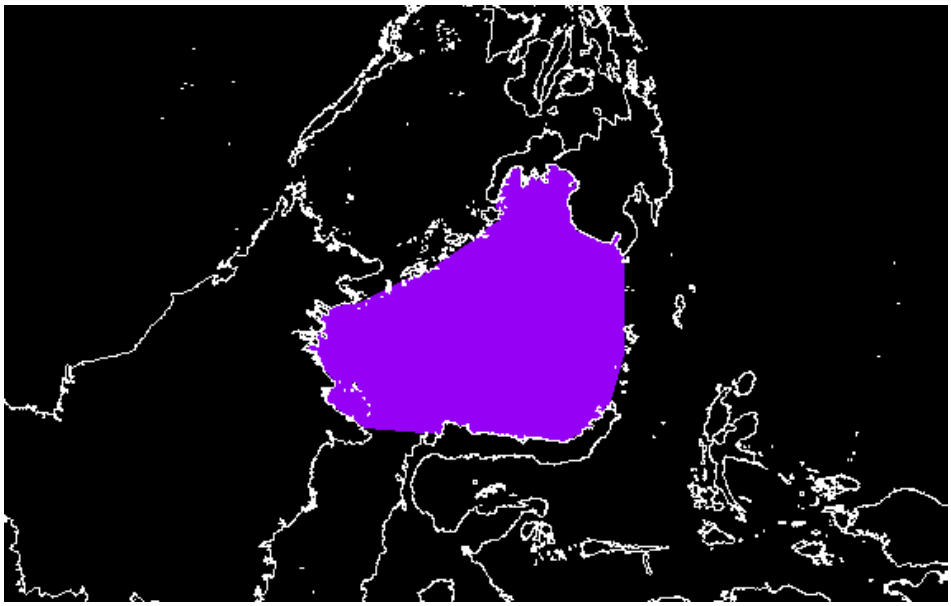
The monthly files have the following datasets (shown in WIM):



I can now delete the *nc* files in *C:\Sat\PFT\tmp\2022*.

3 Creating areal statistics with *wam_statist_mask*

I created the areal mask (filled with pixel value 1) for the Celebes Sea (below) and saved it in *C:\Sat\Masks\celebes_8640x4320.hdf*. (The white coastlines were removed before saving).



We have 10 datasets (0 to 9) in the same file and the time series can be created separately for each. We start from CHL (sds=0):

```
cd Sat\PFT

set MASK=Masks\celebes_8640x4320.hdf
```

wam_statist_mask monthly*.hdf mask=%MASK% sds=0

The same for DIATO (sds=1):

wam_statist_mask monthly*.hdf mask=%MASK% sds=1

The same for DINO (sds=2):

wam_statist_mask monthly*.hdf mask=%MASK% sds=2

The same for HAPTO (sds=3):

wam_statist_mask monthly*.hdf mask=%MASK% sds=3

…….

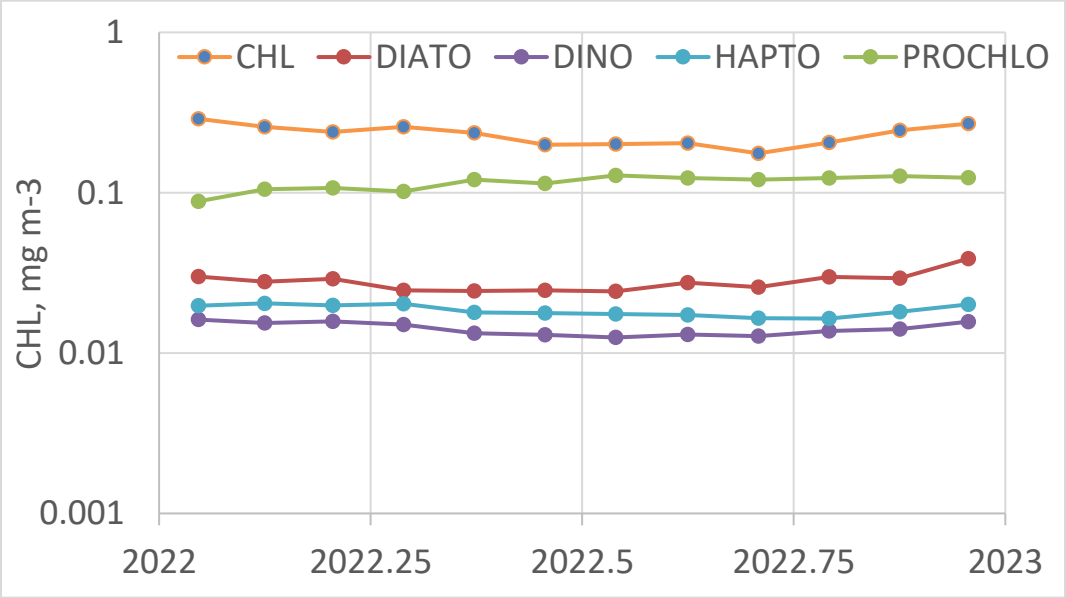
For PROCHLO (sds=6):

wam_statist_mask monthly*.hdf mask=%MASK% sds=6

…. until PICO (sds=10):

wam_statist_mask monthly*.hdf mask=%MASK% sds=9

You can plot the various statistics. Below are the monthly Means for CHL, DIATO, DINO, PROCHLO for the Celebes Sea mask.



You can access my Google Drive *Sat* disk at
https://drive.google.com/drive/folders/1i3R2GEsaMHqICbeeFQJZ0FyAD1In1jMx?usp=sharing

The PFT projects is in subdirectory *PFT*.

4 References

Xi H., Losa S. N., Mangin A., Soppa M. A., Garnesson P., Demaria J., Liu Y., Hembise Fanton d'Andon O., Bracher A. (2020) Global retrieval of phytoplankton functional types based on empirical orthogonal functions using CMEMS GlobColour merged products and further extension to OLCI data. Remote Sensing of Environment, 240, 111704, doi: 10.1016/j.rse.2020.111704

Xi, H., Losa, S. N., Mangin, A., Garnesson, P., Bretagnon, M., Demaria, J., Soppa, M. A., Hembise Faton d'Andon, O., Bracher, A. (2021). Global chlorophyll a concentrations of phytoplankton functional types with detailed uncertainty assessment using multisensor ocean color and sea surface temperature satellite products. Journal of Geophysical Research: Oceans, 126(5), e2020JC017127, doi: 10.1029/2020JC017127

WORK IN PROGRESS! TO BE UPDATED!

Questions? Ask Mati at mkahru@ucsd.edu !