



Questions & Answers Session 3

Please type your questions in the Question Box. We will try our best to answer all your questions. If we don't, feel free to email Amita Mehta (amita.v.mehta@nasa.gov), Sean McCartney (sean.mccartney@nasa.gov) or Juan Torres-Pérez (juan.l.torres-perez@nasa.gov).

Question 1: Since the chlorophyll-a products from MODIS are derived within the visible channels which depend on the sunlight, do the daily chlorophyll-a products only represent the daytime measurement?

Answer 1: They do represent the daytime measurements.

Question 2: SeaDAS can be downloaded in Windows. To access OCSSW access to the log file directory is required. From where can I find help with such matters? Detailed help for window users required in this regard.

Answer 2: OCSSW does not work on Windows yet, but will be coming to Windows soon. (Reference our previous Q&A session for answers as well.)

Question 3: If we use these in-situ WQ parameters (i.e., Chl-a, TSS) with the remote sensing reflectance with machine learning, deep learning algorithm. at least how many sampling locations should be considered? I developed a ML model with a limited amount of data, but I couldn't apply those ML, DL prediction models to satellite images (to visualize these predicted images) because I am not very familiar with these python modules (netcdf4). Could you please arrange a webinar series related to how we can manipulate these satellite images with python modules or how machine learning, deep learning applications are used for satellite imagery for a regression problem?

Answer 3: Yes. There have been studies utilizing machine learning and in situ data. We also have advanced training series utilizing Google Earth Engine. We will include a link to a paper in reference to this question. Pahlevan et al 2020:

<https://www.sciencedirect.com/science/article/pii/S0034425719306248>



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Question 4: Can the collocated data and other future subproducts (i.e., the M-V diff) be saved as NetCDF files for analysis outside of SeaDAS?

Answer 4: Regionally, those differences have to be analyzed and it is better to do your own collocation if you can. On SeaDAS itself, there should be a link where you can export data into NetCDF format.

<https://seadas.gsfc.nasa.gov/help-7.4/>

Question 5: How can we download SeaDAS on Windows?

Answer 5: Here's the link for Windows, Mac and Linux:

<https://seadas.gsfc.nasa.gov/downloads/>

Question 6: What is the tool to download time-series data automatically? I have used PyMODIS earlier. And some functions of Graph Processing Unit tools don't work for time-series analysis, how would be in the future?

Answer 6: You can download a time series of imagery within SeaDAS through programming and through a toolbox on OCSSW.

Question 7: Do you have any plan to bring SeaDAS tools/library to process in a cloud data and processing platform like GEE? or like Open Data Cube?

Answer 7: Thanks for the suggestion! We will look further into this question and will share the idea with the SeaDAS team.

Question 8: How to do differencing techniques by using images more than 2 time span, e.g. Y1, Y2, Y3, Y4, Y5 ?

Answer 8: You can take the mean of all years and see how that compares to each individual year. You can also analyze the difference between one individual year in relation to the other years.

Question 9: Can I say the collocated image is an anomaly image? Or How can I produce an anomaly image?

Answer 9: The collocated images will produce an anomaly image when looking at differences.



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Question 10: What is the purpose of the water quality index used in the case study demonstration?

Answer 10: There is a paper within the summary that goes into further detail.

Question 11: Following up on Q4. What do you mean by own collocation? I am imagining collocation to be some kind of interpolation (e.g. regriding) tool that is most likely some triangulation. Is that correct?

Answer 11: We will look into this further.

Question 12: Colocation is synonymous to layer stacking?

Answer 12:

Question 13: Can we use SeaDAS software to visualize the water quality parameters in river/lakes also?

Answer 13: Yes. There are several factors to consider such as the extent of the water body, the type of data you're using and the spatial resolution of the data being utilized. Refer to Q3 for a link to a paper dealing with a similar question.

Question 14: Is there a way to have another webinar addressing how to use OCSSW tools programmatically?

Answer 14: We will keep this in mind for a future training series. Thank you for the suggestion!

Question 15: Please kindly share the paper that further explains the index.

Answer 15: The Pahlevan et al (2020) talks about the application of machine learning techniques to Sentinel data for water quality parameters.

<https://www.sciencedirect.com/science/article/pii/S0034425719306248>

Question 16: is there a kind of fast semi-automatic or automatic classification technique or tool for land-use and mapping using VIIRS / MODIS data ?

Answer 16: Land-use mapping tools using MODIS and VIIRS are available, but we will look into this further. Also refer to our Land use mapping webinars dealing with optical data and the Using Google Earth Engine for Land Monitoring Applications:



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<https://appliedsciences.nasa.gov/join-mission/training/english/arset-using-google-earth-engine-land-monitoring-applications>

Question 17: Could you please explain the calculated Chl-a and b in the SeaDAS summary table? some times the quantity of substances in water can change following the calculation method

Answer 17: Refer to Part 2 of this webinar series where we went into detail on calculating Chl-a. Frequently, the amount of substances in water can change depending on the physical conditions of the study area. VIIRS and MODIS are useful because of their high temporal resolution (1-2 days). There is a forum on NASA Ocean Color Web that can provide answers for you as well. We will post the link:

<https://oceancolor.gsfc.nasa.gov/>

Question 18: I was downloading to install SeaDAS 8.1.0 and was having problems, but I already have the 7.5.3 version, will that work fine too or the new one has more in depth knowledge?

Answer 18: For the water quality parameters, 7.5.3 is fine, but you will need version 8.1.0 for other advanced functionalities. After November of this year with MODIS data, you may experience errors.

Question 19: I have installed SeaDAS both in a Linux HPC system and my local Mac. In both I am experiencing long times for the software to load up at the beginning. Is there a known explanation for the slowness of the GUI?

Answer 19: When you first run the software it does take a while to load. This just may be a function of the software.

Question 20: Can you review the concepts of empirical, semi-empirical, semi-analytical models used for water quality estimation?

Answer 20: Here's a link to a paper by Gitelson et al (2008) on semi-analytical modeling of Chl-a in turbid waters:

<https://www.sciencedirect.com/science/article/pii/S0034425708001569>

This paper by Smyth et al (2006) provides another approach:

<https://www.osapublishing.org/ao/fulltext.cfm?uri=ao-45-31-8116&id=116241>



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Question 21: Is there a direct connection between a large rainfall event, agricultural runoff and when the impact of that can be observed in the downstream estuary?

Answer 21: It is true that rainfall and runoff from agriculture makes its way into estuaries. Sediment flow models use this information in their analysis. Slope of a watershed can also play a role as well. There are also many physical and topographical factors that affect the timing of river plumes arrival in coastal waters.

Question 22: Can there be large differences in values recorded between MODIS and VIIRS?

Answer 22: There are locations where these differences can be large. Refer to Part 2 of this webinar series for our example working with the Gulf of Mexico. Also, keep in mind that the bands for both sensors are not exactly the same and this may introduce additional errors when comparing the results.

Question 23: Is there open-source software to conduct ocean color remote sensing or benthic habitat mapping applications using semi-analytical or analytical approach / models?

Answer 23: You may want to try Google Earth Engine which at the very least can be used for some water quality analyses. It also has the advantage of having access to diverse satellite sensors freely available.