



Questions & Answers Session 2

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Question 1: Is it possible to use SeaDAS on Windows OS ?

Answer 1: Yes, in a limited form. You may use it for most image processing tools available, except for processing using the OCSSW processors. It is now possible in SeaDAS version 7.5 to install a client/server approach to running the processors. We point you to the SeaDAS-OCSSW Client Server Configuration link (https://seadas.gsfc.nasa.gov/client_server/) for information on how to do this.

Question 2: If we found the difference between field data and RS data analysis. what the best solution for it?

Answer 3: I'm so glad to see this question. We will be covering this in Amita's exercise in Part 3, using *in situ* data from Dr. Gurlin and remote sensing data from Landsat OLI. So please hold on until next week and we will cover this then.

Questions 3 - 11 were a part of our short interview with Dr. Daniela Gurlin of the Wisconsin Department of Natural Resources during the live Q & A

Question 3: To Dr. Gurlin - What was the motivation for the water quality monitoring program?

Answer 3: There are almost 18,000 lakes in Wisconsin and it is practically impossible to monitor all these lakes with traditional water quality monitoring techniques. The remote sensing data supplements traditional measurements, is used for the identification of trends in water quality, and is used to plan future monitoring activities.

Question 4: To Dr. Gurlin - How long has the Wisconsin Department of Natural Resources monitoring program been going?

Answer 4: The remote sensing activities started with a research project at the University of Wisconsin-Madison from 1999 to 2001.



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Question 5: To Dr. Gurlin - What other WQM with remote sensing activities do you and your group do?

Answer 5: We mainly concentrate on chlorophyll-a and TSS concentrations. These projects are research projects for specific lakes instead of the full state though. We plan to use more remote sensing products in the future and currently try to integrate the products provided by the CyAN project in our work.

Question 6: To Dr. Gurlin - We had a guest speaker from the US EPA's CyAN project in 2017's HAB webinar series. Is your program affiliated with the work done with CyAN? Do you work with them in some way?

Answer 6: We tested their cell phone app and try to integrate the products provided by the CyAN project in our work. We collected some radiometric data in summer 2018 which we will share with the CyAN project when I finish to process it.

Citizen scientists are a valuable resource for our program.

Question 7: To Dr. Gurlin - Do you use hyperspectral data in your work?

Answer 7: I currently don't use hyperspectral data in my work. I used AISA Eagle data in my work for my PhD. I recommend to use it if you have access to it.

Question 8: To Dr. Gurlin - Do you use drones/UAS in your work?

Answer 8: I currently don't use drones/UAS in my work. I haven't looked at their use for a while and I'll have to check the status of the official Wisconsin DNR policies for this. I'd recommend to use them if they work for your area of interest in terms of the spatial coverage required for your project.

Question 9: To Dr. Gurlin from Participant: What is the purpose for "Building of mosaic rasters for images from the same image acquisition dates"? Thanks!

Answer 9: I try to retrieve only one water clarity data value for each pixel of a specific path and date. The weather systems in Wisconsin typically move from West to East and there are only small differences in the atmospheric conditions from North to South.

Question 10: To Dr. Gurlin from Participant: What are the main variables that are taken in a body of water to apply an adjustment and the correlation with the images of Oli?

Answer 10: I'm not entirely sure about the term "adjustment". We would typically collect radiometric measurements and water samples at each station. We use the radiometric measurements to compare them to atmospherically corrected satellite data



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for some of our research efforts. If you want to keep it simple you can only collect Secchi depth data to start out with and add some constituents of interest at a later point in time. I recommend to use Landsat 8 OLI data for TSS and to move on to Sentinel-2 MSI data for additional constituents like chlorophyll-a.

Question 11: To Dr. Gurlin - What wisdom would you like to impart to our participants if they are considering integrating remote sensing observations into their water quality monitoring program?

Answer 11: I would keep it simple to start out with. Encourage the engagement of citizen scientists to help with *in situ* samples. You can coordinate their work with satellite image acquisition dates. I recommend to look at open source software packages if there are cost limitations to commercial software. Also, I recommend to look at scientific articles which present research for comparable types of lakes to your lakes of interest. There are many articles from studies in the U.S. state of Minnesota and the Baltic nations in Europe which are relevant for Wisconsin in our example. I would specifically look for articles with algorithm comparisons to see what might work for your region.

Question 12: When I click on OCSSW, I get a message that says “Remote server is down. OCSSW is not accessible. Please start OCSSW remote server”.

Answer 12: We are aware of this warning and we will contact the SeaDAS team to get a progress update on this. The demo from Amita today, we will provide that data for you.

Question 13: Would like to know about the applicability of SeaDAS to the analysis of high resolution spatial images by UAV to analyze algal blooms.

Answer 13: SeaDAS can open and work with a number of file formats collected from satellite and airborne sensors. We refer the questioner to the [help pages](#) SeaDAS > File I/O & Sessions > Import Tools > Raster Data for details related to the different raster file times that may be used. If the questioner is asking about SeaDAS and processing hyperspectral (Imaging Spectrometry data), it is possible to use SeaDAS, in command line mode, for the atmospheric correction of hyperspectral imagery from the HICO sensor.

Question 14: Is Landsat Collection 1 Level-2 data available from USGS Earth Explorer considered inappropriate for water quality monitoring?



Answer 14: The USGS collection of Landsat Level-2 data are valid more for land surface -- atmospheric correction for water surface is done differently in OCSSW and better for water quality monitoring. Coastal systems may have different corrections versus over land.

Question 15: Can we calculate bathymetry using seaDAS tools

Answer 15: Please see <http://www.youtube.com/watch?v=gZp7z1zU-eQ>

Question 16: How Can we validate the results of satellite data when we don't have in situ measurements?

Answer 16: *In situ* data are essential not only for validation but for deriving accurate algorithm in a particular lake. If you do not have any in situ data you may have to use other indicators (e.g. fish production, health data, eco system indicators) to come up with qualitative relationship with satellite-derived data. You can qualitatively/relatively assess satellite-derived water quality parameters as 'low,' 'middle', 'high' compared to long-term mean of satellite-derived data.

Question 17: How to setup OCSSW in SeaDas?

Answer 17: Please follow the demonstration today - please click on the OCSSW on the top bar and you will see an option for installation. This function works for users on Linux, Unix, and Mac operating systems. It should run for those on Windows systems running the Client-Server Configuration, though we've encountered some issues with the functionality of that feature and we have contacted the SeaDAS team.

Question 18: Can you process Landsat 7 Level 1 data to level 2 in SeaDAS?

Answer 18: We don't think Landsat 7 data conversion available through the GUI -- but will check with the SeaDAS team.

Question 19: All of those remote sensing data and tools are available for Africa?

Answer 19: Yes, they are.

Question 20: Which remote sensing data products are relevant for the quality of drinking water?

Answer 20: For issues related to cyanobacteria in drinking water the Cyanobacteria Index (CI), chlorophyll concentration, and chlorophyll anomaly are potential data products to aid in monitoring water quality. For issues related to E. coli or other pathogens that co-vary with sediment load, Kd_490 can be used as a proxy. For issues related to organic pollutants, adg_443_giop may be used as a proxy. In all uses of data



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products for measures of water quality, it is important to simultaneously collect in-water samples to validate the remote sensing observations.