



Questions & Answers Session 1

Please type your questions in the Question Box. We will try our best to get to all your questions. If we don't, feel free to email Cindy Schmidt (cynthia.l.schmidt@nasa.gov) or Amber McCullum (amberjean.mccullum@nasa.gov).

Question 1: In that Google Earth pro there is a time slider but we can only visualize past images on specific dates? Can't we visualize images according to our requirement?

Answer 1: No, you can only visualize images that are already in Google Earth. We will not review it, but if you use Google Earth Engine (GEE), you can code in JavaScript or Python to display images for very specific dates if those images are already in the GEE archive. We can't upload our own images to Google Earth - it's only what's already in there. There's a lot of imagery available through GEE that isn't available in Google Earth Pro.

Question 2: Does the "good quality" filter account for cloud coverage?

Answer 2: Yes it does. We have quite a few questions that relate to the QA filter for MODIS. The good quality filter does account for cloud coverage, along with a lot of other things. Sometimes with MODIS you just get bad pixels - there's no data or a lot of clouds or lots of other things. We've given you some references (above) to see the processing that goes into what's a good quality and not good quality for MODIS data. There's a lot of info out there on that. Hopefully these websites will help you with that. For more information on the MODIS QA data, please go to these websites:

- <https://lpdaac.usgs.gov/news/modis-land-products-and-their-quality-assurance-information/>
- <https://lpdaac.usgs.gov/resources/e-learning/decoding-modis-version-6-quality-science-datasets-using-modis-python-toolbox-arcgis/>
- https://landweb.modaps.eosdis.nasa.gov/cgi-bin/QA_WWW/newPage.cgi

Question 3: Apropos AppEEARS usage, is there a limit of number of polygons and total area used for analysis?

Answer 3: You can use as many polygons as you want as long as your polygons are in one shapefile. Within that shapefile you can have a lot of polygons.



Question 4: What determines a "low quality" pixel?

Answer 4: See answer to Q2

Question 5: Is there a more robust way to identify when the change occurred, rather than just looking at the chart?

Answer 5: You can download the actual data and conduct a change detection to visualize the change. On Wednesday, we'll be demo-ing a web-based tool that will allow you to do that. We've done a change detection webinar in the past (link: <https://arset.gsfc.nasa.gov/land/webinars/adv-change18>) and you can look at that as a way to visualize change.

Question 6: Are multiple polygons within a shapefile allowed when extracting a sample?

Answer 6: Yes, see the answer to Q 3

Question 7: Does that falling menu of layers consist of only layers available for the requested coordinates?

Answer 7: The falling menu is based on the type of data that you selected to download for your points or polygons.

Question 8: Is there any time series analysis on marine application - or shoreline change analysis or habitat mapping?

Answer 8: There is satellite imagery available for all those areas, so you can conduct your own time series analysis using those data. What this webinar is doing is showing you how you can conduct your own analysis using those data.

Question 9: Is there a resource available that gives an idea of what layers are best for what type of project? Like, quick recommendation document/website that includes what product(s) to search for and use depending on your project focus.

Answer 9: No, we don't have anything like that because it really varies by application and by location. However, we have thought about doing something very general like that for our ARSET web page. Really great question! Stay tuned!



Question 10: Is there a limit to the size of the polygon AppEEARS can analyze? I am interested in analyzing an area with the size of 11,500 km². Can this program handle this large size?

Answer 10: There is no limit to the size of the polygon. If it's only 1 polygon, that is that size, that's fine. But remember when you download data, the results from that polygon - you may get an average of values within that entire polygon.

Question 11: what constitutes high quality data in AppEEARS?

Answer 11: Low quality usually includes high cloud cover, bad pixels, etc. For more information see the answer to Q2.

Question 12: why there is no dominant LC class in my experiment?

Answer 12: I will probably need more information to answer this question. Can you send me an email so I can figure out what the problem might be? Provide more details about what you have done, what your results are - so we can figure out what your problem might be.

Question 13: Why do we need to calculate Cof Variation for elevation?

Answer 13: Because variability of elevation is a characteristic that's important to bird species. It may not be something you're interested in. This was just based on some work that had been done previously, and they had already determined that variation in elevation was important for bird behavior.

Question 14: How do you interpret reliability and validity when it comes to the quality of pixels?

Answer 14: (Refer to Question 2)

Question 15: is there a limit of number of polygons and total area used for analysis?

Answer 15: (Refer to Question 10)

Question 16: can raster file be used for extract area instead of vector?

Answer 16: I don't think so - I think that you can either upload a shapefile or the points. You can also use a JSON file.

Question 17: Can we have a higher frequency for NPP data, as the one than it was showed today?



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Answer 17: Absolutely - today's exercise was just an example. There's many different ways you can do the analysis. You can have higher frequency NPP data. MODIS has different Levels of NPP data - sometimes there's 8 day composites or 16 day composites or monthly composites. It depends on what your study needs.

Question 18: Are EO and Landviewer equivalent?

Answer 18: Not sure - if EO refers to Earthdata Search - they are both ways to visualize, select, and download data. Earthdata available through LPDAAC has access to a lot more types of data. It has Landsat, but also Landsat. Landlook now has Landsat and Sentinel data.

Question 19: Do you plan to generate data in AppEEARS with Landsat or Sentinel, creating products with higher spatial resolution, for example for NDVI?

Answer 19: Yes - Landsat data will be available in AppEEARS - not sure when. We can talk with the LPDAAC and find out when Landsat will be available. Sentinel - not sure either. We can find that out and get back to you.

Question 20: how we can analyze statistically significant trends in vegetation indexes?

Answer 20: That question would probably require a whole other webinar to answer. Maybe what we can do is find some relevant papers for statistical analysis of vegetation indices and refer you to those papers.

Question 21: Is there any limitation on the amount of points or area size to be requested to AppEARS?

Answer 21: (Refer above) Check if there's a limit on the number of *points*. Don't believe there is, but we can ask the LPDAAC and get back to you on that.

Question 22: Is there any predefined length of data? Or we can perform time series on any no. of data?

Answer 22: Yes - you can perform time series on any number of data. But, of course, only when that data is available. MODIS data is only available from 2001-now. You couldn't do an analysis on MODIS data prior to 2001.

Question 23: The exercise which we did for MODIS data, can we do similar stuff with Sentinel 2?



Answer 23: Yes - you can do the same type of analysis with any raster data. The AppEEARS tool right now, though, only works for MODIS data. It may allow you to do some analysis with Landsat and/or Sentinel in the future, but it doesn't at this moment.

Question 24: Is there a way to automate the data access to AppEEARS, such that the data can be automatically download as and when available?

Answer 24: I'll have to ask the LPDAAC that question. But I believe that it will only notify you when the data are available for download and you have to download it yourself.

Question 25: Is the extraction of point/polygon data for other archived datasets within (e.g. SEDAC) conducted in a similar way as demonstrated for LP DAAC?

Answer 25: Assume you're asking if AppEEARS includes other data than MODIS. Yes, it does. SEDAC doesn't have the same type of tools, but AppEEARS has SEDAC data in it. So you can use AppEEARS to download the SEDAC data.

Question 26: When we use AppEEARS to build time series with Landsat data does it take into account the differences between sensors in spectral ranges and radiometric resolutions?

Answer 26: So - right now you can't use AppEEARS to download Landsat data. That's going to be sometime in the future. And there will probably be a tutorial on that and how to deal with the different spectral ranges, say, between Landsat 8 and Landsat 5. Stay tuned for that.

Question 27: Can we get level 2 data for MODIS on AppERS because the spatial resolution is different if we using level 3?

Answer 27: Yes - if you remember when you choose MODIS data, there are different data types available. Different spatial resolutions - sometimes it can be 250 m sometimes 500 m sometimes 1 km. Those types of data are available when choosing what data you want to use for analysis.

Question 29: Can I analyze the multiple Landsat images to identify and/or detect the shoreline changes in terms of two classes (land and water) by the AppEEARS?

Answer 29: So, to repeat again -the Landsat imagery is not available in AppEEARS yet. You can't do this kind of detection at the moment. But we will be showing you how to use LandTrendr - another web-based tool on Wednesday. You can use Landsat to do



your change detection, looking at both the visual change and graphs. Be sure to tune in to the webinar on Wednesday.

Question 30: Could you briefly summarize the differences (merits/demerits) between using AppEEARS, BFAST and Open Data Cub for time-series analyses?

Answer 30: Recommend take a look at all three of them. All very different approaches to looking at change and looking at time series. There isn't enough time to analyze, even briefly, the differences between all of those.

Question 31: Is there any helping tool integrated in AppEEARS to fill up the missing values?

Answer 31: Going to answer this question a little different than I think you're asking. First of all, AppEEARS has a really great help tool available for anything you want. They have tutorials available, if you have specific questions about specific things in AppEEARS, the LPDAAC are very good about answering those questions. I encourage you all to ask them questions if I haven't answered them or you have additional questions - or very specific questions - about what they have at the DAAC. To fill in the missing values - I think what you're asking is how do we fill in the values where there's bad data, and there really isn't any good way to do that with MODIS data. You just have to be sure to exclude the bad pixels in your analysis.

Question 32: Can AppEEARS handle batch processing?

Answer 32: We'll have to check into that. It depends on what you want to do with your batch processing. It can handle doing one request, but for several different datasets - I'm not entirely sure. We'll need more info on what you mean by batch processing.

Question 33: For comparative analysis for vegetation indices using sentinel2 and Landsat 8. Can I use the AppEEARS for this?

Answer 33: Landsat data is not currently available in AppEEARS. On Wednesday we will review LandTrendr in GEE, which we will use Landsat in that example.

Question 34: Which software would you suggest to integrate MODIS image data with MODIS Aqua or Terra data values of SST or Chl for example?

Answer 34: You can use AppEEARS to combine SST and Chl and look at time series. All of those are available in AppEEARS. There are some other tools available for looking at ocean data (check out our upcoming ARSET webinar:



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<https://arset.gsfc.nasa.gov/water/webinars/water-quality-2019>). I'll check with my colleague and post an answer.

Question 35: for this webinar, we analyzed NDVI. What are the top five (5) vegetation indices that we could analyze?

Answer 35: You can also use the Normalized Burn Ratio (NBR), we will show this on Wednesday. You can also use Enhanced Vegetation Index (EVI), and the Normalized Difference Moisture Index (NDMI) that highlights moisture in vegetation.

Question 36: Only MODIS data is available for the application AppEEARS?

Answer 36: There are other data in addition to MODIS.

Question 37: Can you run the area analysis on multiple polygons simultaneously?

Answer 37: You can use as many polygons as you want as long as your polygons are in one shapefile.

Question 38: I know we didn't get to see the rest of the polygon section... but how do you feel about relying on point data (single pixels) for understanding vegetation.

Specifically, how representative of the surrounding pixels do you think the pixel from the point data is? Is there a way to generate a comparison to the surrounding pixels?

Answer 38: One response to that: some of the requests in the past to LPDAAC have been: Is there the ability to put buffers around pixels? They are considering it, stay tuned. In terms of generating a comparison: you can get the MODIS data from surrounding pixels, but you would first need to identify what those surrounding pixels are. You would need to choose the pixels yourself and add them to the csv file.

Question 39: Is the information processed at AppEEARS with polygons an average value?

Answer 39: Yes, you get a mean value inside the polygon. This is something to think about when considering the size of the polygons.

Question 40: Are there data available through AppEEARS suitable for coastal water applications?

Answer 40: There is satellite imagery available for all those areas, so you can conduct your own time series analysis using those data. MODIS could be part of that, Landsat may be better, depending on what you are interested in.