



## Questions & Answers Part 2

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 Juan Torres-Perez ([juan.i.torresperez@nasa.gov](mailto:juan.i.torresperez@nasa.gov)), Amber McCullum ([amberjean.mccullum@nasa.gov](mailto:amberjean.mccullum@nasa.gov)) or Britnay Beaudry ([britnay.beaudry@nasa.gov](mailto:britnay.beaudry@nasa.gov)).

### **Question 1: What kind of subsets are provided to citizens and how are citizens helpful for studying the area?**

Answer 1: I assume this refers to Floating Forests. The citizens are provided with 20x20 subsets of an image collected during a Landsat overpass. This is done to simplify things as the whole image is pretty big. As we showed, citizens can just say whether there is kelp or no kelps and in some instances delineate an area where kelp patches seem to occur. There is also a link to a publication included in the presentation as well. For FjordPhyto, we provide links to images via Google drive.

### **Question 2: How was the graphical interface for the Floating Forests project created? Did the involvement of citizens include designing the interface for visualizing the data?**

Answer 2: It was created by the project team. I believe citizens were not necessarily involved in the design but the contact info for the project leads is on the webpage and they can be contacted for additional details.

### **Question 3: Can we transfer these into Google Earth Engine? Or, download raster data for further analyses in a GIS system?**

Answer 3: This is a very good question. You may contact the researchers about the possibility of obtaining some of the data for further analysis. There's a similar project by the same team, it is called Kelp Watch ([Kelpwatch.org](http://Kelpwatch.org) ([codefornature.org](http://codefornature.org))) that we highlighted in the past Monitoring Aquatic Vegetation webinar. In this one, citizens can download csv files with the data from a specific site.

Many remote-sensing products are available in Google Earth Engine. In FjordPhyto, we used GEE to develop the machine learning algorithm for detecting meltwater content in surface seawater. Eventually, once this algorithm is peer-reviewed and accepted by the



scientific community we plan to make this algorithm and its products available through this platform. And yes, the data from GEE can be exported for use in a GIS system for further analysis.

**Question 4: Is this manual classification data used in Floating Forests to train Artificial Intelligence (AI) models? Anything similar to the RLHF model used by ChatGPT?**

Answer 4: Yes, the data is used to train models among other purposes. I am not familiar with the RLHF model. Will look into it to learn more. Using the example of NeMO-Net, it uses NASA's supercomputing power to help with its processing and is eventually used to train AI models to map coral reefs.

**Question 5: What does the global distribution of kelps look like and what informed the choice of areas currently under study?**

Answer 5: Kelps are temperate water organisms. In the case of Floating Forests for example, the main area of study is the west coast of the US mostly because the researchers have been working with kelp data for several decades already and with local government entities to monitor the health of this important ecosystem.

**Question 6: Can you describe some of the best practices to build into program design so that citizen science projects can financially support scientific research? I'm thinking of the FjordPhyto project, where I assume Ecotourists are paying something to participate.**

Answer 6: Citizen Scientists do not pay anything to participate in FjordPhyto. The travelers pay for the trip to Antarctica and while onboard, FjordPhyto is an activity offered as part of the overall Citizen Science Program. They are encouraged to engage during their journey and can volunteer to hop in a "science boat" on various days. The ship companies provide shiptime to scientists free of charge. The Expedition Guides that facilitate FjordPhyto during the season are paid employees by their operators, roles such as Education Coordinator, Citizen Science Coordinator, Specialists are hired to be the point-person running FjordPhyto with travelers. FjordPhyto obtains funding for the program (equipment, consumables, data analysis/processing, etc) and the science through federal grants (e.g., NSF OPP, NASA) and donation. We also have a Crowdfunding (donation-based) site through the University of California, San Diego (USA), many Antarctic travelers contribute through that venue.



**Question 7: How are the Landsat images used for community-based data enhanced for field data collection especially for people who are not remote sensing scientists?**

Answer 7: Usually (as in the case of Floating Forests) the images presented to the citizens are already processed and in most cases, only cloud-free images are used.

**Question 8: Is current research focused on the influence of human activities on the protection of kelps from degradation and extinction in certain areas of the world?**

Answer 8: Yes, there are numerous papers on this theme. Not only human activities but also effects of climate change on kelps, heat waves and how these affect the herbivory of sea urchins on kelps, etc.

**Question 9: Is the training of the algorithm for machine learning and the creation of visual maps in the Citizen Science and Remote Sensing project carried out by volunteers or is it the responsibility of the project founders?**

Answer 9: This is usually done by the researchers. Refer to the previous questions.

**Question 10: Could you please share if you see any positive attitudes or consequences after the tourists participated in the data collected at the Fjord project? They still tried to connect or engage with the project after?**

Answer 10: Due to company privacy policy we cannot have the personal information of the travelers that participate in FjordPhyto but they can follow up after on our social media and our website [www.fjordphyto.org](http://www.fjordphyto.org). We have a very important social media presence so everyone interested can still be connected to the project and know what we are up to, we can post new results, new funding, etc. We also provide annual reports to the operators we collaborate with so they can spread the word about what has been done by FjordPhyto to future participants. As for attitudinal changes in FjordPhyto participants, we cannot know what participants do after their trip to Antarctica, however, we collected anonymous questionnaires on board that allow us to know their wishes and their personal experience. In a first analysis of these questionnaires (soon to be published) we were able to see that a large percentage (97% respondents) of FjordPhyto participants felt that their participation in citizen science enriched their trip. When looking more into what “enriched” entailed, the categories that arose were educational, motivational, and enjoyable.



**Question 11: How do you validate the quality of the information that citizens provide to these projects?**

Answer 11: This was covered in the first session. Many of these projects have different ways of validating the information provided by citizens including experts who evaluate the data. Other times, the same data is presented to an X number of citizens and the agreement between them is compared. For FjordPhyto, since our citizen science focus starts in the field with in-water data and sample collection, we ask the participants to record the name of the Expedition Guide facilitating the project, if anything needs inquiry, we can contact the individuals directly to get more information. The scientists of FjordPhyto join operations every season, so we can make comparisons between samples collected by scientists and samples collected by volunteers. Additionally, for the genetics (DNA/RNA) samples for example, back in the lab we have ways of quality checking the degradation of genetic material before processing.

**Question 12: I have a group of students around 10-11 years old that are only Spanish-speaking. Is Nemo-Net available in Spanish?**

Answer 12: Yes! We are currently working on a Spanish version of NeMO-Net through another NASA-funded project called OCEANOS. Stay tuned!!

**Question 13: How can we encourage people to participate in activities without an immediate reward? For example, in the case of floating forests.**

Answer 13: For FjordPhyto, some rewards can be immediate in the sense of 'contributing to polar science', or some guilt-free travel, being part of the conservation solution - not only for the sake of travel. For those on board who are not sure if they want to participate, it is very helpful if the Expedition Guides gauge interest and inspire people to get involved for enjoyment.

Interesting papers if you want to read about this particular topic:

"A Framework for Classifying Participant Motivation that Considers the Typology of Citizen Science Projects" <https://www.mdpi.com/2220-9964/9/12/704>

"Understanding the Motivations and Satisfactions of Volunteers to Improve the Effectiveness of Citizen Science Programs"

<https://www.tandfonline.com/doi/full/10.1080/08941920.2015.1054976>



**Question 14: The EU has the Copernicus program for studying the environment, Using Sentinel satellites. Does NASA share data sets with the Copernicus program?**

Answer 14: NASA and ESA (European Space Agency) scientific satellite remote sensing datasets are freely available to everyone, and some datasets are hosted on each other's websites. There are also efforts to "merge" datasets from NASA and ESA sensors to produce single remote sensing data products (e.g. Globcolour, <https://hermes.acri.fr/>). Truly a global effort!

**Question 15: Can someone provide a list of "game-like" Citizen Science projects that would be appropriate for school-aged children? Sounds like a wonderful way to entice young people to spend their screen time contributing to science? / Could you please share similar initiatives in the urban domain?**

Answer 15: <https://science.nasa.gov/citizenscience>

**Question 16: Do we have access to Cloud computing power when developing projects supported by NASA or Zooniverse?**

Answer 16: If needed, when developing a project NASA researchers can request funds to utilize NASA supercomputers or other cloud computing resources.