

List of collated questions from Remote Sensing event 25th June.

Participants - 127

Question for: Tim

Question from: Piet

who actually does all this raw data processing Tim?
is this what is happening at geosciences aust??

Response from Claire:

Exactly. All the data collated and provided by Digital Earth Australia is analysis ready, so we have already done all the processing.

It means that you don't need to be a remote sensing scientist to use it.

Because the data is already pre-processed and stored in stacks, so you can track individual pixels over time, it means you can quickly analyse huge volumes of data very simply. We have a python API which allows you to programmatically play with the data. It makes it incredibly powerful.

Question for: Claire

Question from: Jo Owens - USQ

Claire, does GA do the calibration and ground truthing as well?

Response from Claire

Jo, yes, we have a team who specifically focus on calibration and validation. They go out into the field and take spectral measurements with a hand-held device, and compare this to the results we get from the satellites.

This calibration and validation work actually goes back to the data providers (e.g. USGS) to improve the quality of the products right from the source.

Question for: Tim

Question from: Alisa Starkey (Ozius)

At Ozius, we often find groups have been using Remote Sensing products that are not fit for their purpose - and sometimes this has sometimes resulted in a mistrust in the data.

Can you please provide an overview of use cases where these products would be ideal to incorporate?

Response from Claire: Alisa, metadata is a huge part of the ARD process. We make sure that the lineage of all products is captured in the product metadata, and we have actually helped to drive the refinement of some global metadata standards through the production of data across Australia (and we have a complementary product for Africa as well).

Response from Alisa: Thanks @Claire - definitely recommend highlighting this to users so expectations can be met, and limitations can be accounted for in the scientific community. Appreciate this clarification.

Response from Tim: Agree very much with the importance of metadata; the key is that the steps to process data are open and published and clearly recorded. Uncertainty layers are also important, in order to understand the relative errors in the data. The more we demand these of data providers the better! But, as in the use of other datasets there will always be the onus on the data user to understand the provenance of the data and the suitability of it for their purposes.

Comment from: Dipak Paudyal, Esri Australia

I guess something to keep in mind is that having an analysis ready data does not mean that we can extract information using variety of analytical methods just by itself - this is only a starting point and is a step of data prep; it is after this point that remote sensing scientist with physical understanding of the data come in and extract meaningful information from the data..

Question for: Claire

Question from: James Brinkhoff (AARSC-UNE)

Is the WOfS product designed to find water that is covered by emergent vegetation?

Response Claire - No. The WOfS product is specifically designed to identify open water only. If there is vegetation in the same pixel as water (like a tree overhanging a river, or emergent vegetation), then WOfS will not identify it as water.

There are different methods you can use to identify water and vegetation together. We are currently using the Tasseled Cap Wetness Index, which will pick up the spectrum from open water through to water and vegetation together. It's a little abstract in what it picks out, since it's a band ratio that you need to threshold to separate water, vegetation and water, and not water.

We are currently working on a project with the Australian Rivers Institute to develop a fractional cover of water product, which will provide a field validated indicator of the percentage of each pixel that's water and vegetation. COVID has unfortunately pushed out the field campaigns, so this product is still at least 12 months away.

Question for: Anyone

Question from: Piet Filet

to what stream order number can water from space confidently detect anyone??

Response from Claire: Piet, it's difficult to say simply what stream order WOfS can detect, but if you remember that the pixels are 25m x 25m, and if there is overhanging vegetation it obstructs the open water signal, then you need to have relatively wide rivers in order to be detected.

Response from Dipak Paudyal, Esri Australia:

I would perhaps use DEM to overlay with satellite imagery if we really wanted to get some sense of stream order..DEM is always going to provide the extra terrain info (valleys, ridges) you would need to get the order of streams.

Question for:

Question from: Rasitha Perera - Water Resources

Is there a publicly available source(s) of classified land-cover datasets (e.g. buildings, roads, grass) extracted from high-resolution aerial imagery such as Bing and Google aeriels?

Response from Claire: Geoscience Australia is currently working on a national product just like this. The land cover product we are developing is created using python in our DEA data cube. Basically it combines the various DEA datasets such as Water Observations from Space, Fractional Cover, Mangroves, and a few others (some still in development) to determine the cover of any point in Australia using the best data we can put our hands on.

The classification is assembled according to the UN FAO Land Cover Classification System <http://www.fao.org/3/y7220e/y7220e06.html>, which breaks down the complexity of classifying cover in a location, into a hierarchical decision tree. In the end we output close to 50 classes of vegetation cover and basic structure (woody vs non-woody), water extent and perenniality, natural and artificial bare areas, and cultivated vegetation.

We are currently at the beta release stage, and expect to have a public release by Christmas.

In the meantime, the state governments often have state-wide land cover datasets that might be suitable. (Sorry, you will have to speak to QLD gov to see what data they have available since I'm not sure).

Question for: Anyone

Question from: Martin O'Rourke - NSW DPIE

Do you use the Planet data?

Response from Claire: Planet data is a commercial satellite data provider, so unfortunately we can not make their data available through Digital Earth Australia, which only provides the free and open satellite data.

What we have found some of our users doing, is using the free Landsat and Sentinel 2 data to get a big picture view of what they're after, to refine the area that they want to look at in more detail. For example, they can use Landsat and Sentinel 2 to do catchment scale vegetation metrics, and then they purchase Planet data for just the areas of interest identified from

the courser resolution analysis. That way they save on the number of scenes they need to purchase.

Response from Tim: I understand that the Queensland Government has an agreement with Planet to access some of their high resolution datasets.

Question for:

Question from: Willem Vervoort, USYD

Is there any plan to push this data [Digital Earth Australia data] to Google Earth Engine?

Response from Claire: One of our industry collaborators was looking at uploading some of our Sentinel 2 data to Google Earth Engine. Unfortunately it seems that they haven't yet done this. All of our data is available to be downloaded from AWS (<https://data.dea.ga.gov.au/>), so if you're interested, there is nothing stopping you from doing this yourself.

Question for:

Question from: Santosh S. Palmate - New Delhi, IND

What is the minimum area of wetland (or water body) that this data able to cover? - I am asking this question because we have to work on very small to large wetlands.

Response from: Dipak Paudyal, Esri Australia

Hi Santosh I think it is better to start asking what is the range of sizes of water bodies you need to identify first and then work backwards from there to determine the appropriate spatial, spectral or even temporal resolution of the data required.

Response from Claire: It also depends on what you want to see in the wetland. If you use Landsat (with 25m x 25m pixels) or Sentinel 2 (with 10m x 10m pixels), but your wetland only takes up one or two pixels, then you may not actually get anything useful from these datasets.

Question for: Andrew

Question from: Jo Owens

Andrew, exciting to see GRACE total water storage vs AWRA soil moisture modelling. Would you know how much calibration or ground truthing is done against in site measurements of soil moisture for Australia (and Queensland)?

Response in the presentation

Question for:

Question from: Tri Dev Acharya UC Davis

Is GA is looking to support and develop similar products for developing countries through AUSAID?

Response from Danielle Baker - NSW DPIE Water:

DPIE Water has worked with Australian Water Partnerships and The Maharashtra government to role out water policy and modelling in the Upper Godavari Basin in India.

Response from Claire: Digital Earth Australia is Australia's operational instance of the Open Data Cube. The Open Data Cube is the underlying code base and platform that can be used to index and interrogate raster datasets. The ODG is completely open source and free, and so there are a number of other instances of ODCs across the world, many in developing countries. You can find out more here

<https://www.opendatacube.org/>.

Comment from: Ignacio Fuentes USYD:

There is a product that is like the WofS which was developed by the JRC (Pekel et al., 2015). It's available in Google Earth Engine, and takes into account the Landsat collection from 1984