Remote Sensing and GIS for Rural Development
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Week – 10
Lecture – 4
NDVI Data from NASA Platforms

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Hello everyone. Welcome to today's NPTEL course on Remote Sensing and GIS for Rural Development. This is Week 10, Lecture 4. In this week, we have been looking at online platforms and GIS platforms with remote sensing data that can help us to quickly download NDVI data and other crop vegetation index data.

Across the research literature, NDVI ranks number 1 for having a lot of remote sensing based studies for assessing the vegetation, health of vegetation area, acreage etcetera because it is very simple to use, very efficient and open source. We also have vegetation fraction which a lot of these platforms house. And before we get into the other indicators, I wanted to showcase the 4 different platforms that house NDVI the Bhuvan we saw in the previous lectures.

In the last lecture, we looked at Google Earth engine which keeps on updating. And today we will be looking at the NASA's data sets. Why NASA's data sets is it has high benefits on spatial and temporal resolutions when compared to the other data sets that we have discussed initially and because of the high global coverage and spatial and temporal resolutions, there is multiple scientific articles on it.

As students, whenever you want to collect data and form a hypothesis or if you would like to support an idea, the best way to do it is first do a literature review. In the literature review, you find papers, recent papers and look at what methods they have used. And you will find some technologies that everyone can use as example NDBI.

There are other higher indicators with better resolution so called or better analysis, however, they might be expensive. We need to make sure that everyone can map at least in the initial stages and that is what NDVI does for you. It is very simple. It is NIR minus visible red by NIR plus visible red. And almost all open source satellites nowadays have these bands and even the older satellites. So, let us move on.

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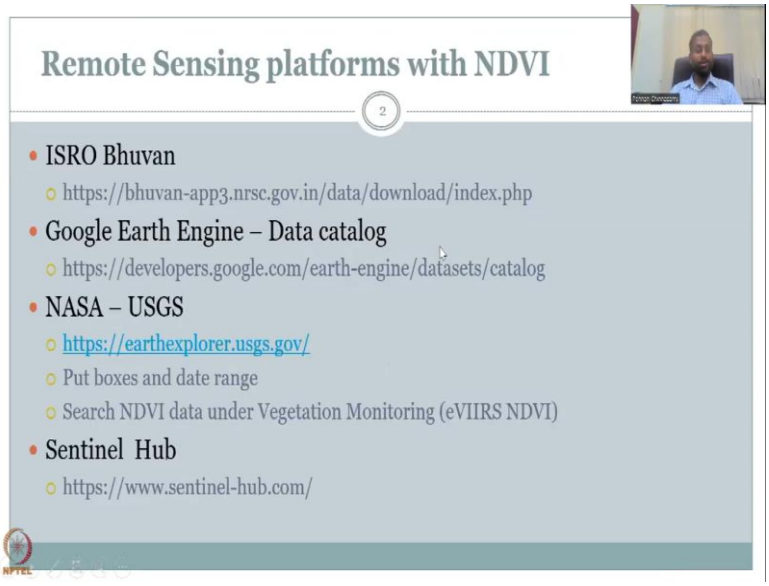

And we have actually looked at ISRO, Bhuvan in the previous lectures and then Google Earth engine. I had also indicated that there is some codings that you could do. As I said I will refrain from teaching how to code because that is not a part of the current exercise. Coding, there is a lot of forums that you could go and and find the codes.

You can just Google and say that Google Earth engine making charts and then you will find a lot of videos. What is missing is how does that relate to a particular topic because that is domain expertise. So, in this lecture series, the entire remote sensing and GIS for Rural Development, not only am I giving you the access to remote sensing tools but also making sure that you know where to use it.

Again, remote sensing tool and GIS is taught in civil engineering, earth science engineering, geography, remote sensing as a class by itself, satellite technologies, in our rural development courses I teach it. Now, even policy teaches it, law teaches it. But where we would be different?

This NPTEL course is very different is we align it to a particular objective which is rural development. And of the rural development, we assess that croppings have a very very high impact because most of the population depends on agriculture, so we had more focus on it. We will slowly look at other options also.

But, please remember that other rural development indicators and indices that we initially started with rural infrastructures, rural droughs, rural schools, rural hospitals, all these have very very less data and remote sensing is one of the best that can help. Still, there is much more to go. Whereas, agriculture, at least you can see the plants, you can see the the croppings, farming, harvest, etcetera.

Suppose, there is a building and it is covered on top with trees, for example, IIT Bombay, if you take a satellite or drone image, you will see a lot of trees. So, you cannot count how many buildings it is. Because the buildings are under the trees. So, the the aerial imagery will not be just enough. So, there is other data that is also needed. As I spoke about synergized data mapping.

So, after week 10, I hope to again revisit the synergize mapping and showcase some data that has been used widely for rural infrastructure mapping. So, let us start with the NASA data sets. I will explain the Earth Explorer and also go to GES DISC data set that we have already looked at in the previous lectures. Just for the vegetation fraction, we will look at. So, let me share the Earth Explorer website.

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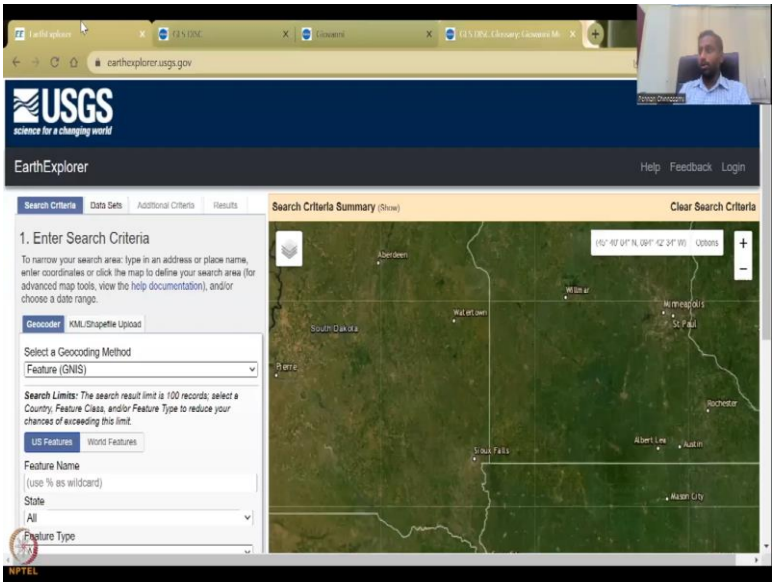

So, this is how the Earth Explorer website looks like and we have already used these in our hands-on exercise. I have not logged in. I will keep it unlogged for now. So, right now, you could see that we have multiple options. So, when you open Earth Explorer, I could open it again for you just in case. Let me open it again.

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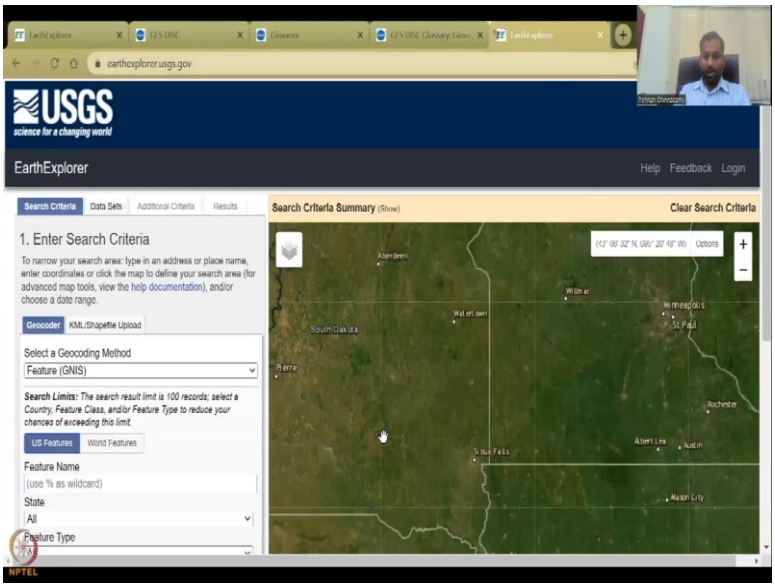

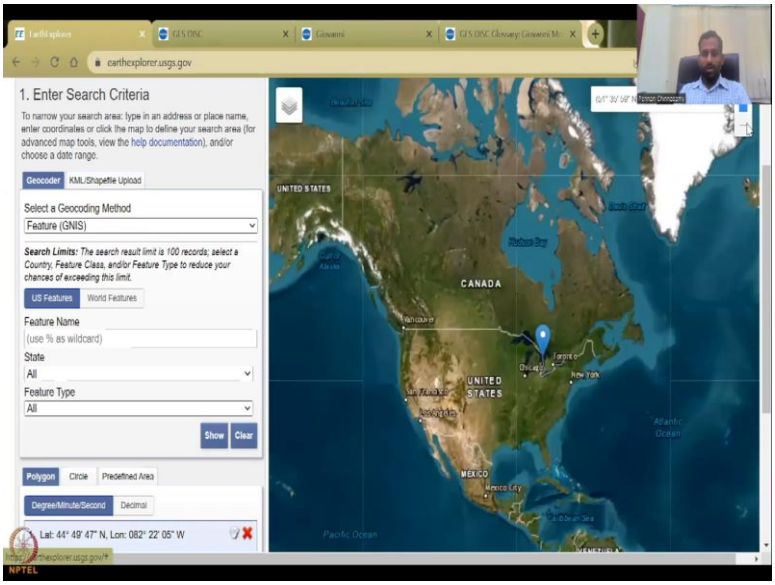
earthexplorer.usgs.gov
1. Enter Search Criteria
To narrow your search area: type in an address or place name, enter coordinates or click the map to define your search area (for advanced map tools, view the help documentation), and/or choose a date range.
Geocoder
KML/Shapefile Upload
Select a Geocoding Method
Feature (GNIS)
Search Limits: The search result limit is 100 records; select a Country, Feature Class, and/or Feature Type to reduce your chances of exceeding this limit.
US Features
World Features
Feature Name
(use % as wildcard)
State
All
Feature Type
All
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Clear
Polygon
Circle
Predefined Area
Degree/Minute/Second
Decimal
Lat: 44° 49' 47" N, Lon: 082° 22' 05" W
CANADA
UNITED STATES
MEXICO
Pacific Ocean
Atlantic Ocean
NPTEL

earthexplorer.usgs.gov
1. Enter Search Criteria
To narrow your search area: type in an address or place name, enter coordinates or click the map to define your search area (for advanced map tools, view the help documentation), and/or choose a date range.
Geocoder
KML/Shapefile Upload
Select a Geocoding Method
Feature (GNIS)
Search Limits: The search result limit is 100 records; select a Country, Feature Class, and/or Feature Type to reduce your chances of exceeding this limit.
US Features
World Features
Feature Name
(use % as wildcard)
State
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Feature Type
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Polygon
Circle
Predefined Area
Degree/Minute/Second
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Lat: 44° 49' 47" N, Lon: 082° 22' 05" W
KAZAKHSTAN
MONGOLIA
CHINA
INDIA
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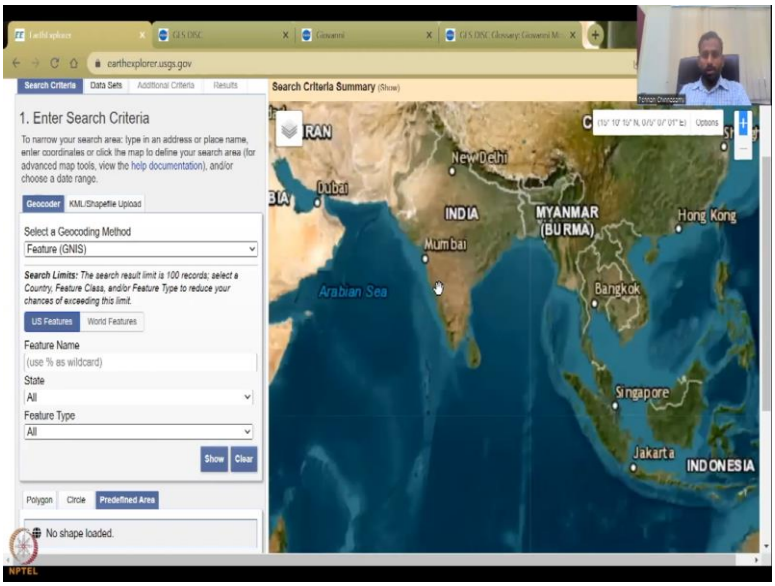
IRAN
SAUDI ARABIA
ETHIOPIA
TANZANIA
INDONESIA
AUSTRALIA
Indian Ocean
NPTEL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Search Criteria
Data Sets
Additional Criteria
Results
Search Criteria Summary (Show)
1. Enter Search Criteria
To narrow your search area: type in an address or place name, enter coordinates or click the map to define your search area (for advanced map tools, view the help documentation), and/or choose a date range.
Geocoder
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Select a Geocoding Method
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US Features
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Feature Name
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MYANMAR (BURMA)
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Mumbai
Arabian Sea
Bangkok
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Jakarta
INDONESIA
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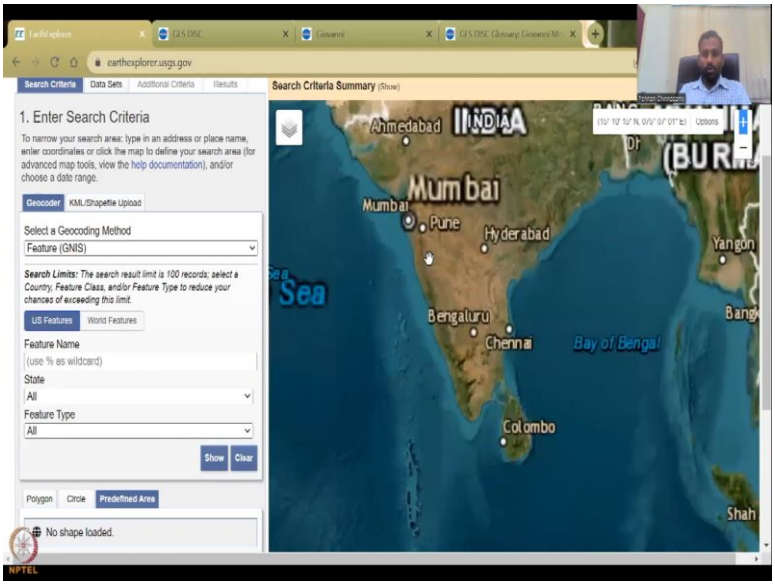

So, if I open the Earth Explorer again, it is the same link that I have shared. You will see that it opens on a particular location and in South Dakota. So, because they want to center it in the US. So, all you can do is if you move your mouse on the frame, you will see a hand. You click it, it will hold it. It is called pinch and then you pinch and then you move.

So, or you can the best way to zoom out to a particular location, zoom out as much as possible and then just drag it. It is easier to go to India like this. So, what happens here is we need to show where we would like to work on. So, here we can zoom in by moving the mouse in front.

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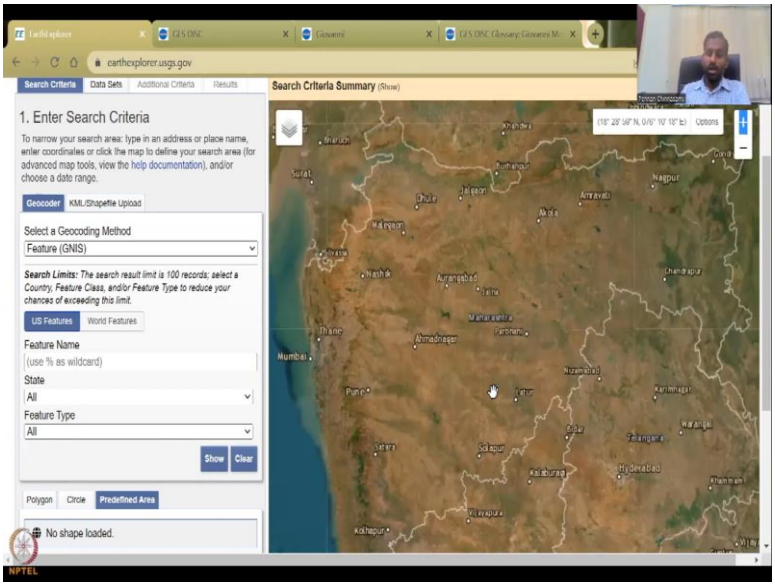

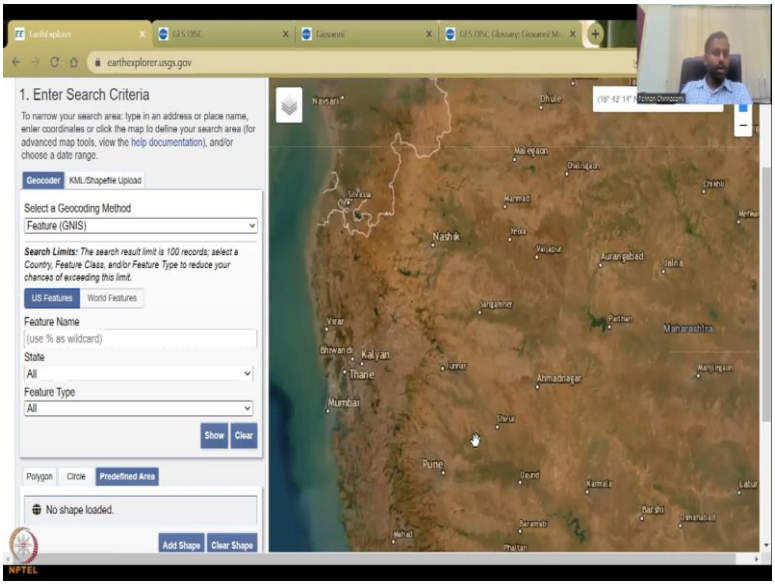

So, let me just put it back on Maharashtra because we have used Maharashtra for the other NDVI indicators. So, you can zoom in more if you need and then, yeah. So, let us keep it at Pune region, Nasik region. So, good. So, we have this Pune, Nasik region and then as I said what we will be doing is there is a lat long that has already been given. We will be using that.

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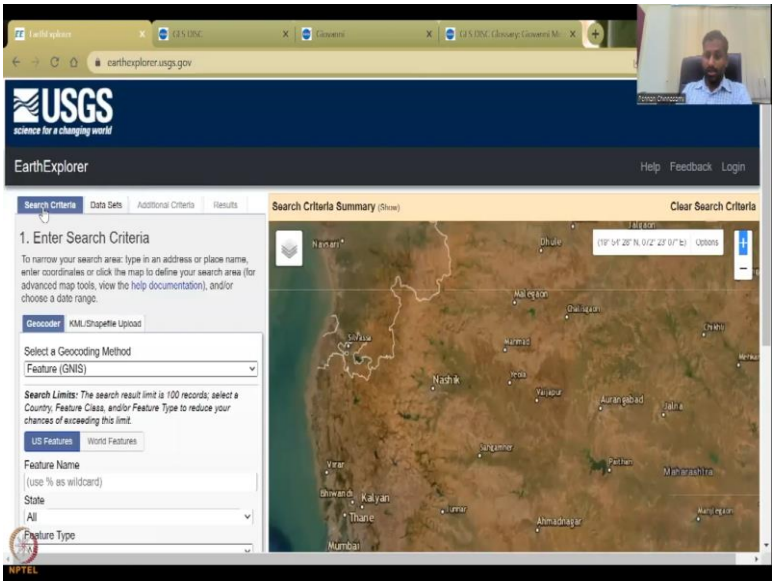

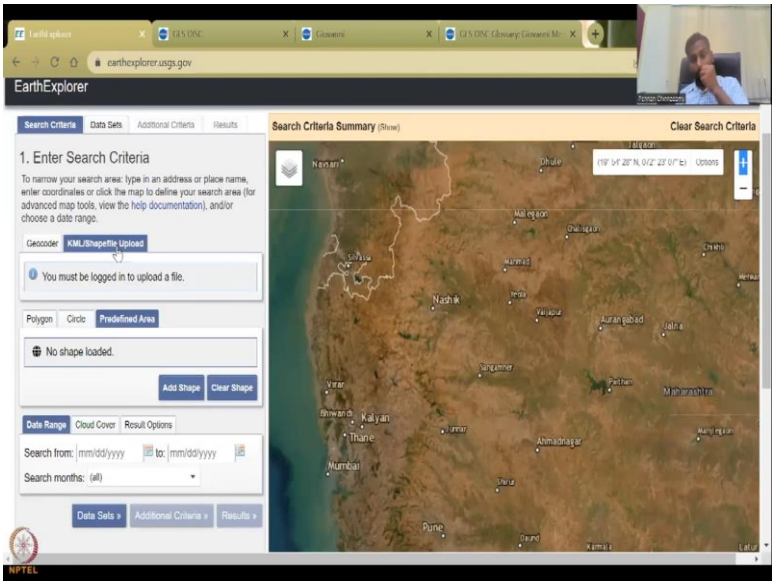

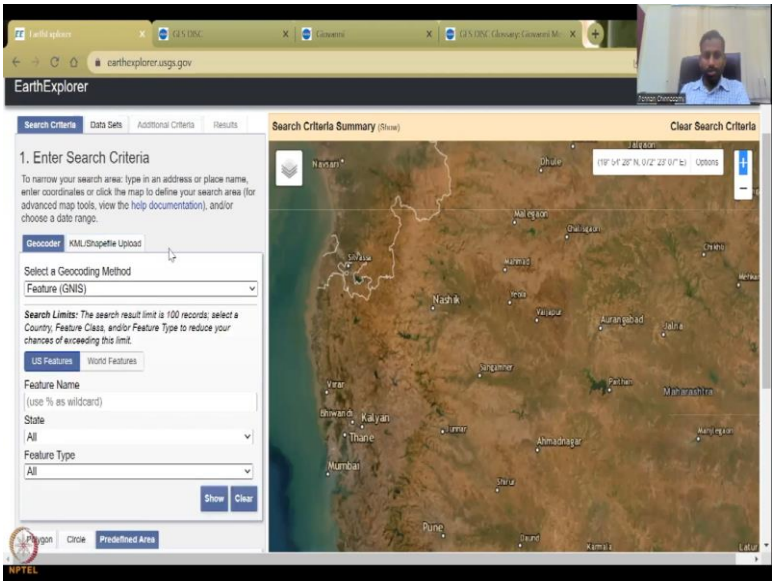

But more importantly, on the top, it is the search criteria. You can use a shape file that you have already used. You can download it and put it on the system and then use it. But also go to geocoder which is kind of a little bit advanced. So, let us skip that part.

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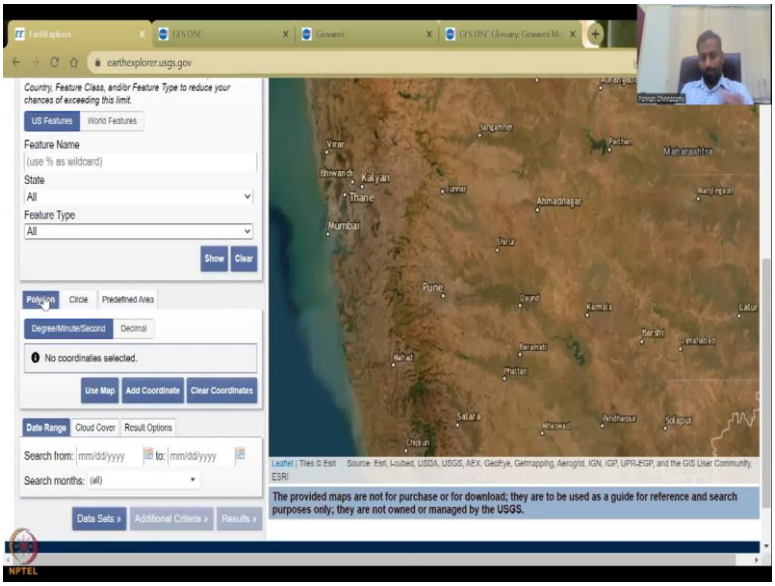

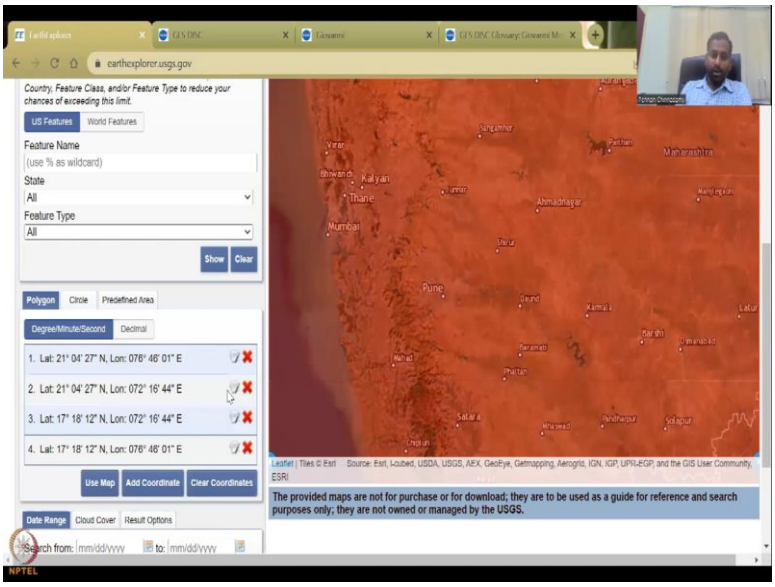

We will go to polygon. So, you will draw the polygon where you want the area to be disclosed. So, when I use this, you can use a map by clicking the previous map that we selected. But again we will use a new coordinates.

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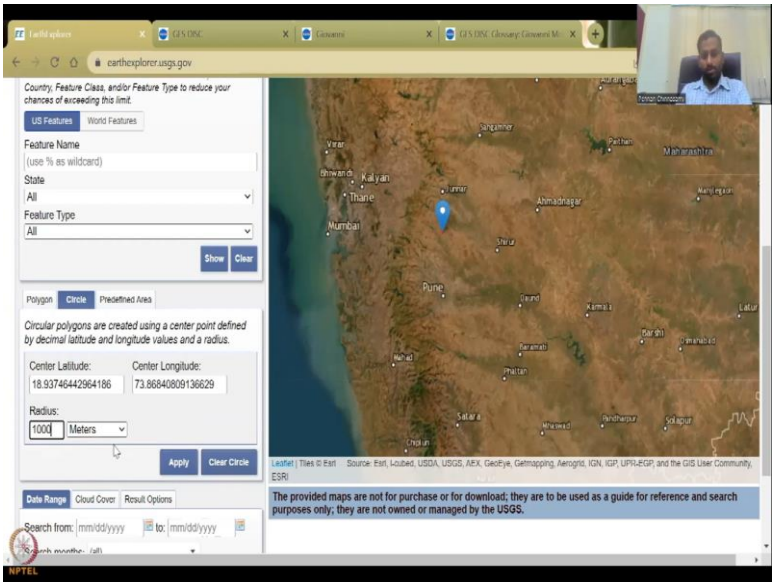

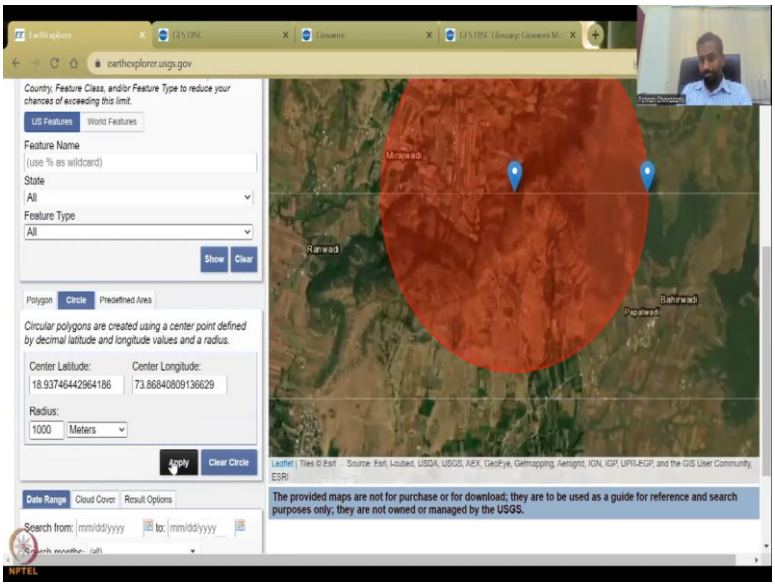

Or you can do a circle, you can click on top and then zoom out and zoom in like for example like this and then you can put a radius and then the circle is created. Let us say 1000 meters that is one kilometer. So, you can see a big circle coming up. Or you can clear the circle and then back. I am going to clear all my polygons coordinates.

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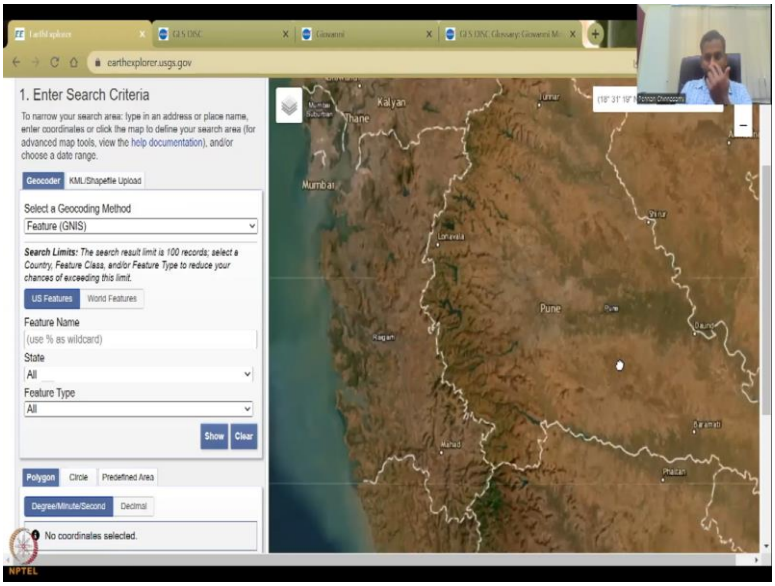

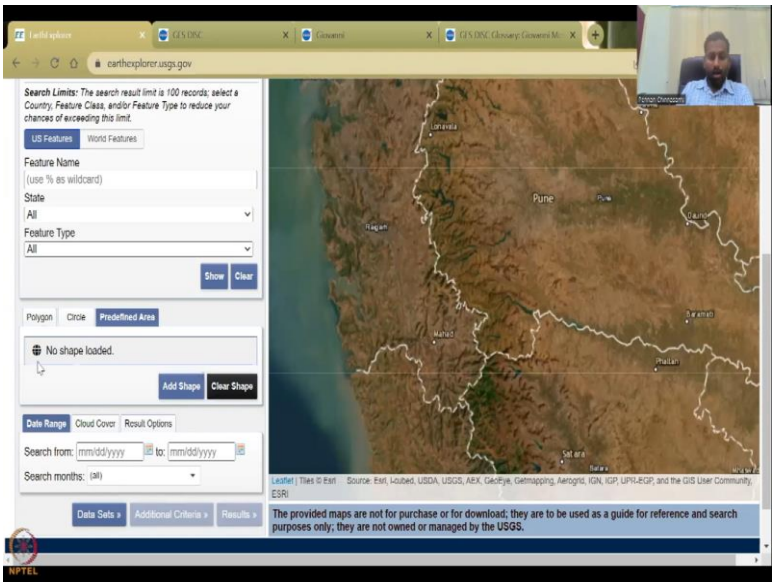

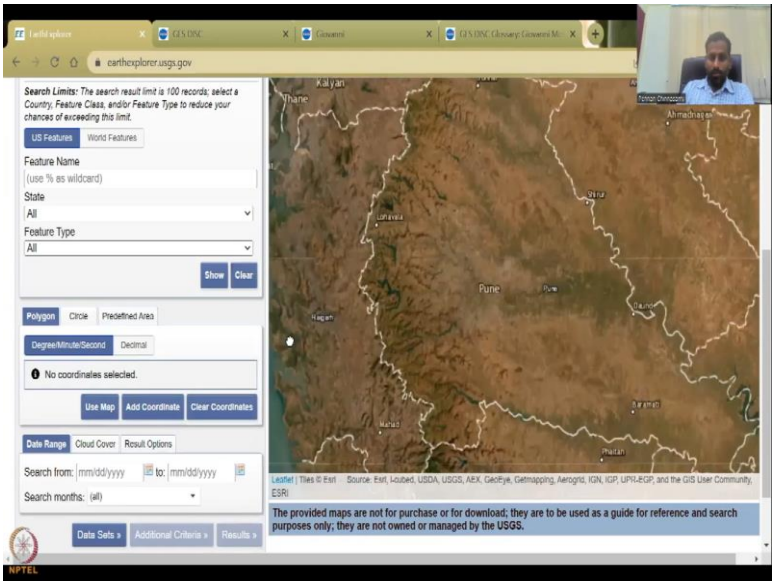

Again putting it back to Pune region. And then you can have a circle predefined area, you can add a shape file after you log in but we will use a polygon.

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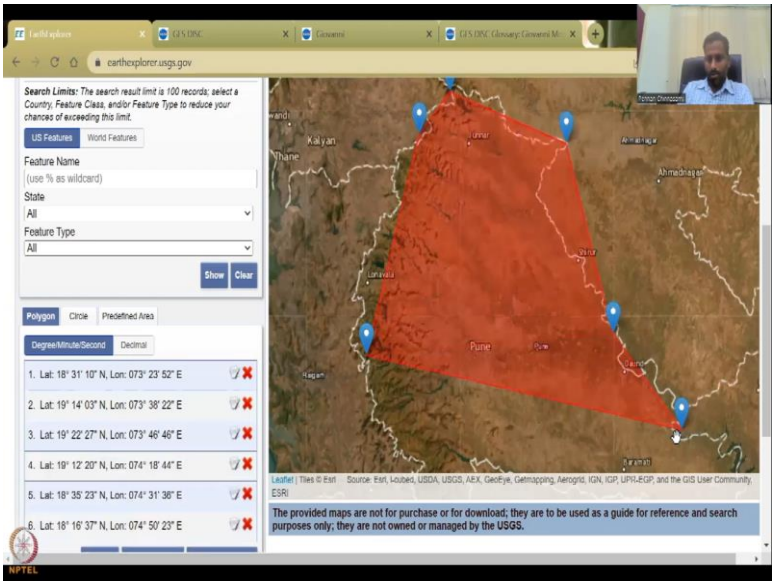

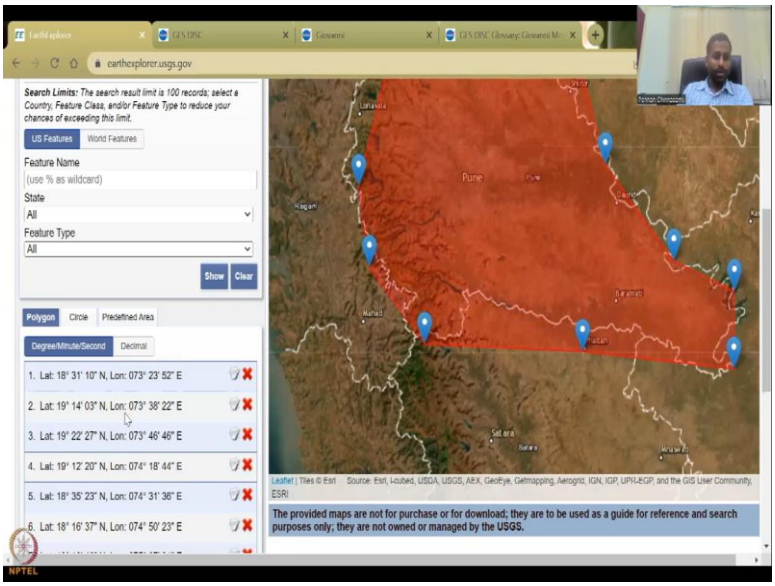

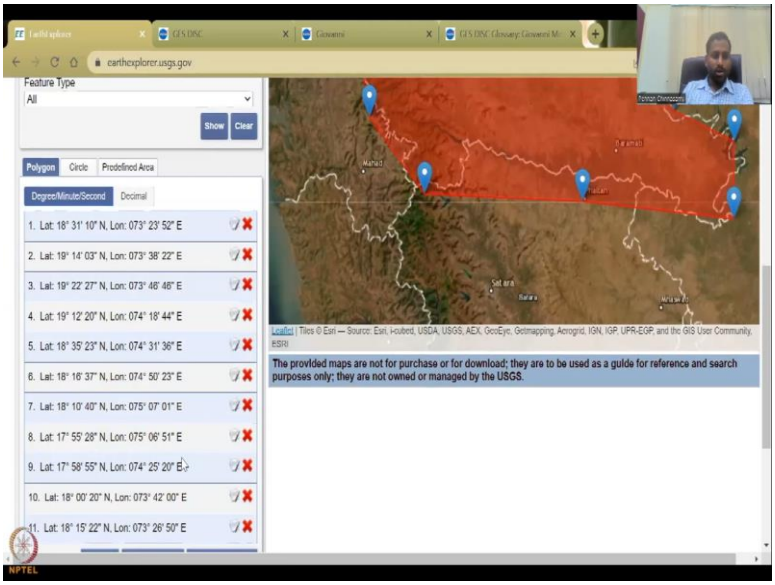

So, once you click the polygon, you will have to click coordinate. So, this is one coordinate, let us say we can just use Pune. You can also see the grids. So, you can see these lines. These are each tiles of the data and it will be used for searching the data if needed. That will be enough. And then this is the coordinate system we have.

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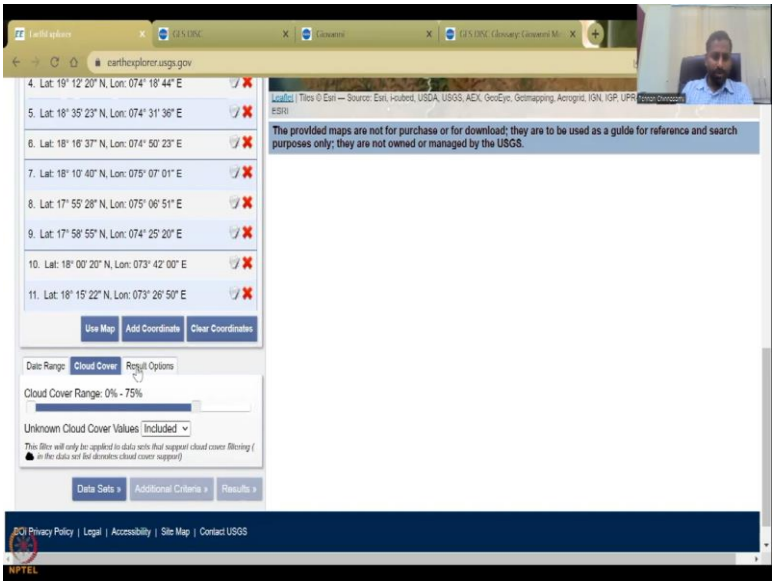

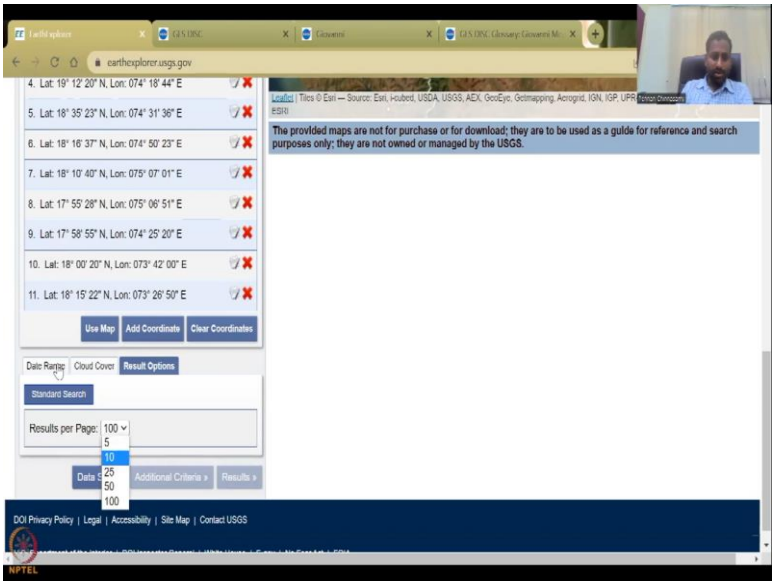
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5. Lat: 18° 35' 23" N, Lon: 074° 31' 36" E
6. Lat: 18° 16' 37" N, Lon: 074° 50' 23" E
7. Lat: 18° 10' 40" N, Lon: 075° 07' 01" E
8. Lat: 17° 55' 28" N, Lon: 075° 06' 51" E
9. Lat: 17° 58' 55" N, Lon: 074° 25' 20" E
10. Lat: 18° 00' 20" N, Lon: 073° 42' 00" E
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Additional Criteria »
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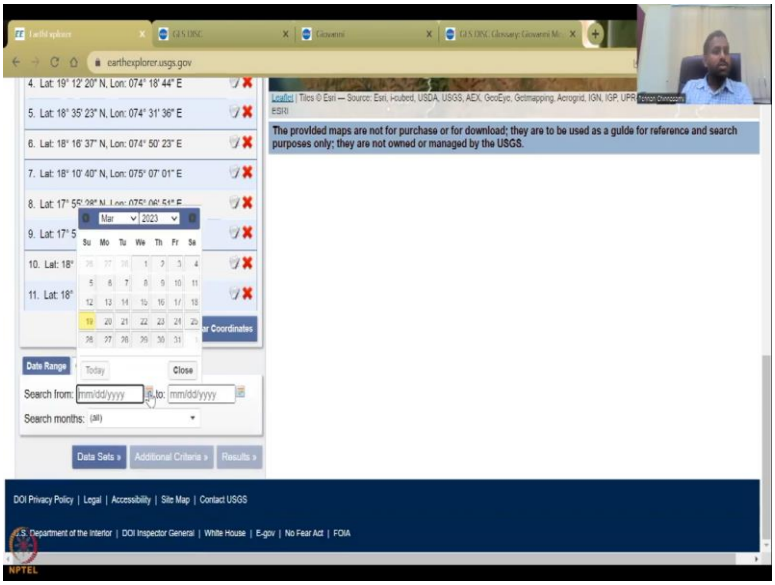
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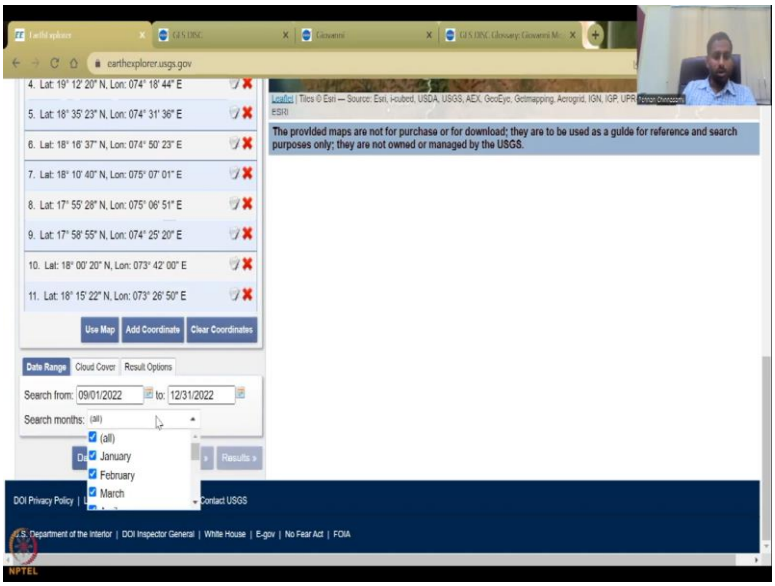
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March
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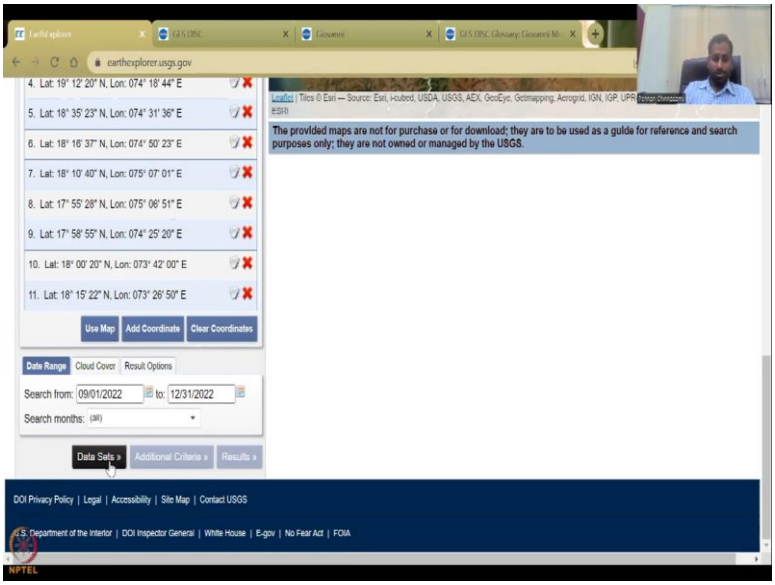

Then you can come down here to say that what is the cloud cover you are okay with? 100 cloud cover does not make sense. So, let us keep it at 75 percent and then result options you can see how many results you want to see. Let us say 10 is enough. And then the date range is we will go just for this recent year.

So, or December because we use December 2021 in the Bhuvan but we will use December 2022 and then we will say actually we can go to September also. September 1 to December 2022. End. And then we can say search all months, you can say search all months and then click on the result options. You can click all, if needed and it is also good. This is good. Now we can go to data sets.

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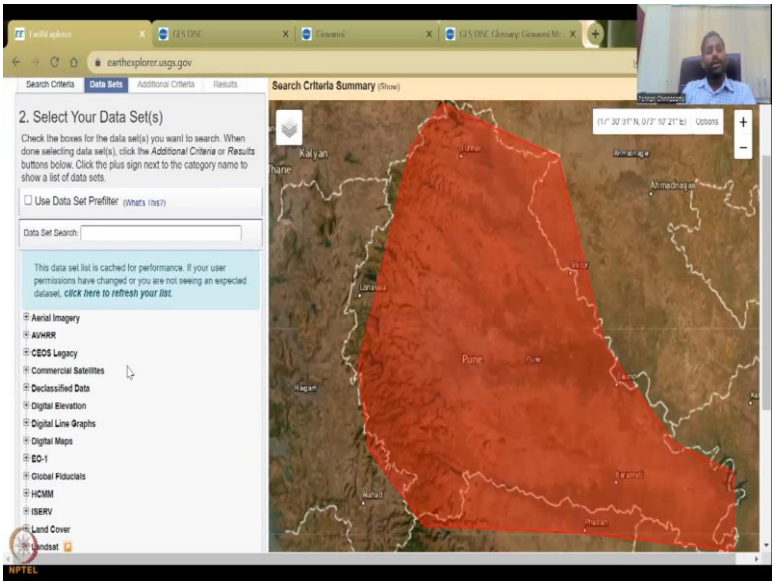

We will just pick what data set you want. So, this is on the top also. And here you will have plethora of satellite remote sensing data that you could use. I will just show you some of it because just for NDVI will come straight to NDVI but I also wanted to explain this slide.

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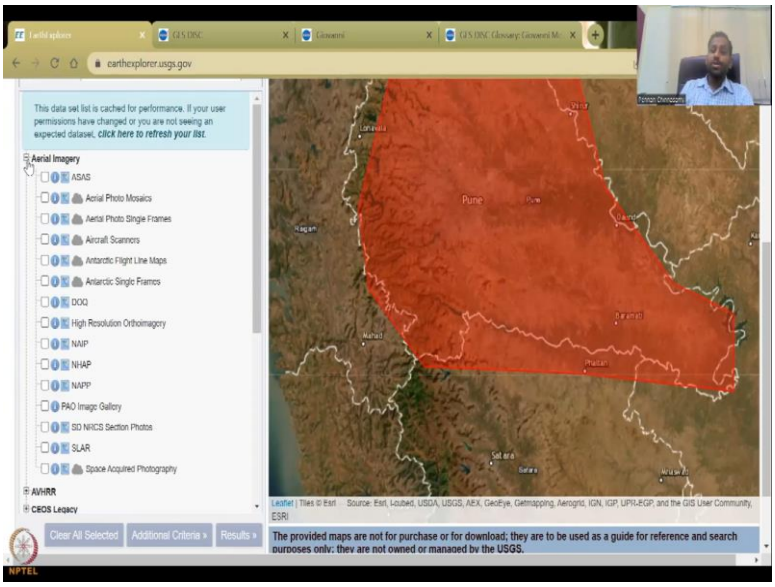

Aerial imagery is just a photograph picture of the location. For example, you are looking at a post flood analysis and you want to see the impact, the damage of buildings and all, which is not an indicator based approach. So, for that you can use these high resolution images just as aerial images. These are aerial images, not only taken by satellites, most of it is flights. So, you can see here flight imagery, Antarctic flight line maps. And then most most importantly, these are all flights whereas this is space photography from clouds.

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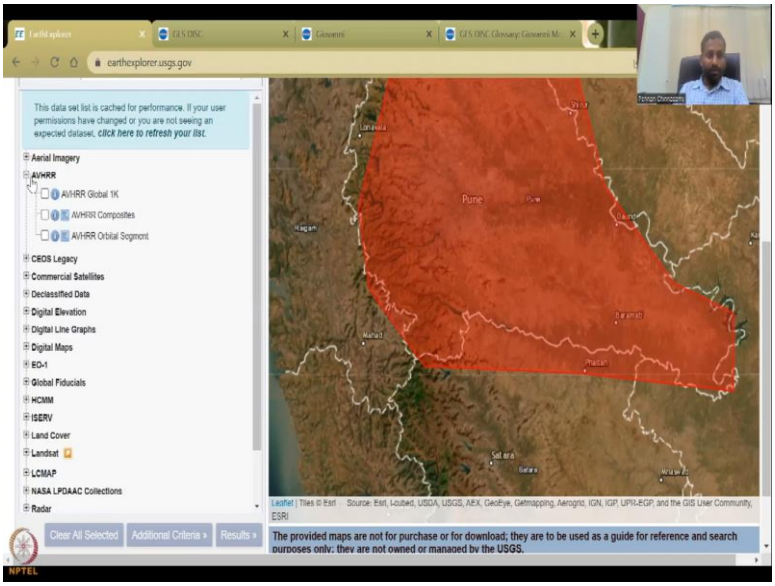

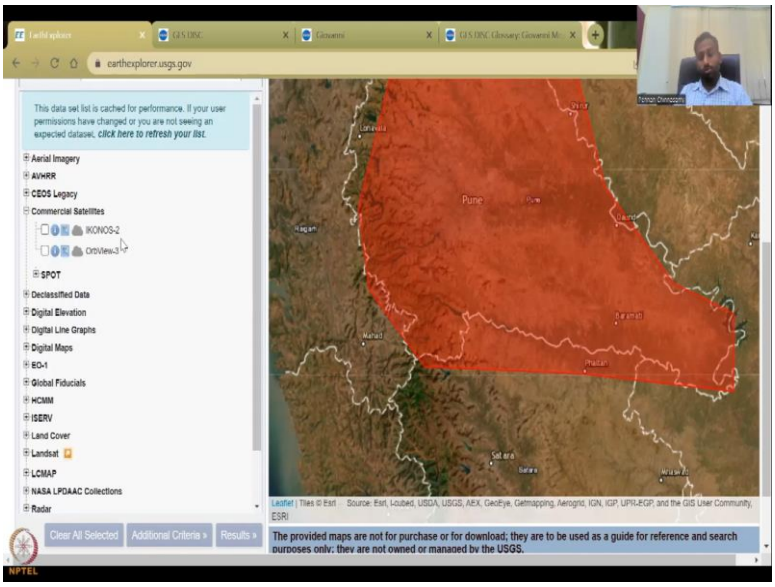

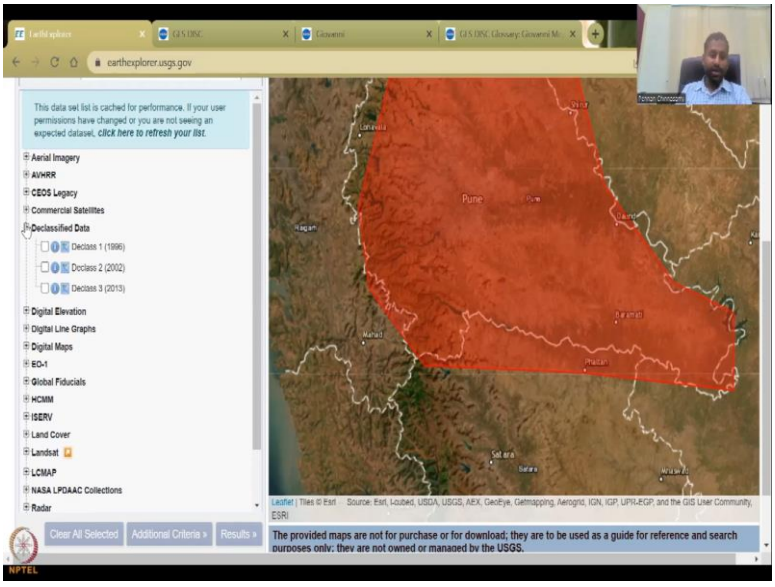

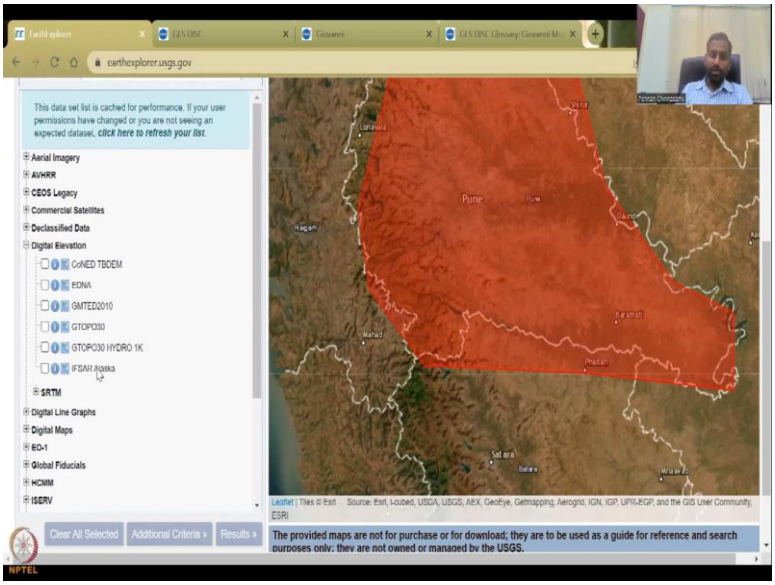

And then we have AVHRR is also a different sensor placed on satellites CEOs Legacy is there. Legacy means is kind of outdated also commercial satellites. These are two commercial satellites that Earth Explorer has bought for you or have a subscription. It is not the real real high-end satellites. They have now IKONOS and orbital view.

For example, high-end as in, they will not give it for free. So, the freeier versions and other Meta versions or the lower resolution versions. And then there is a declassified data which is something that it was classified once and now it has been declassified some data on the borders and etcetera. These are DEMs. So, we have all these DEMs we do not have the Indian satellites.

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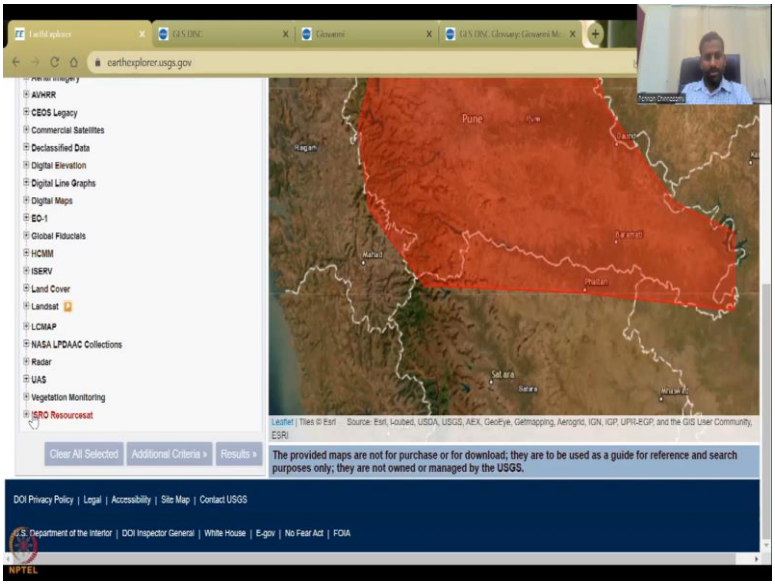

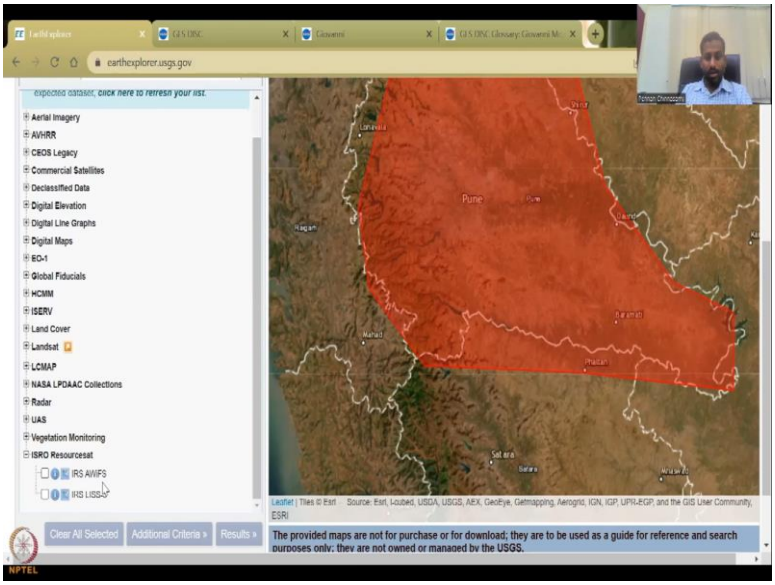
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EO-1
Global Fiducials
HCMM
ISERV
Land Cover
Landsat
LCMAP
NASA LPDAAC Collections
Radar
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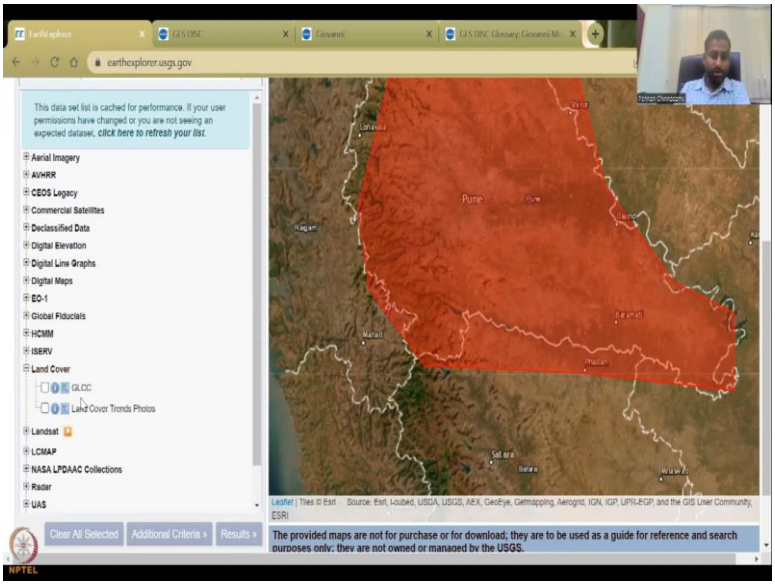
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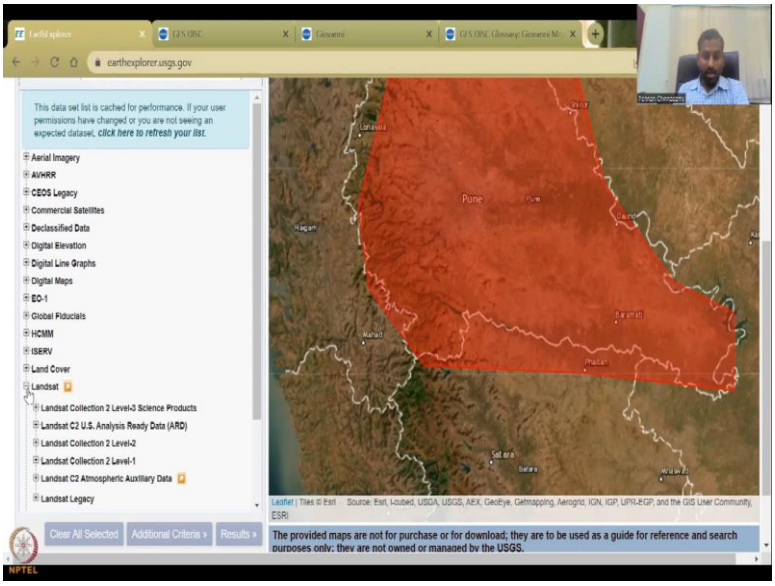
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ISERV
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Landsat Collection 2 Level-3 Science Products
Landsat C2 U.S. Analysis Ready Data (ARD)
Landsat Collection 2 Level-2
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Landsat C2 Atmospheric Auxiliary Data
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But if you come down you have ISRO satellite. So, no other big satellite name is there except NASA and the European satellite regions, explicitly here. So, you have resourcesat, both the AWIFS and LISS-3. These are good aerial imagery and a lot of analysis can be done using this.

So, you have digital maps, the national atlas maps and then digital line graphs are there. Earth observation systems and then fiducials, Global fiducials maps, HCM, ISERV, all these are sensors, then the land use land cover. You can have a global land use cover, land cover trends, photos, et cetera. Landsat is the really important one because it has been a legacy, 1960s till date it has been taking images. Now we are at landsat 8 and 9 and you can get all these landsat images.

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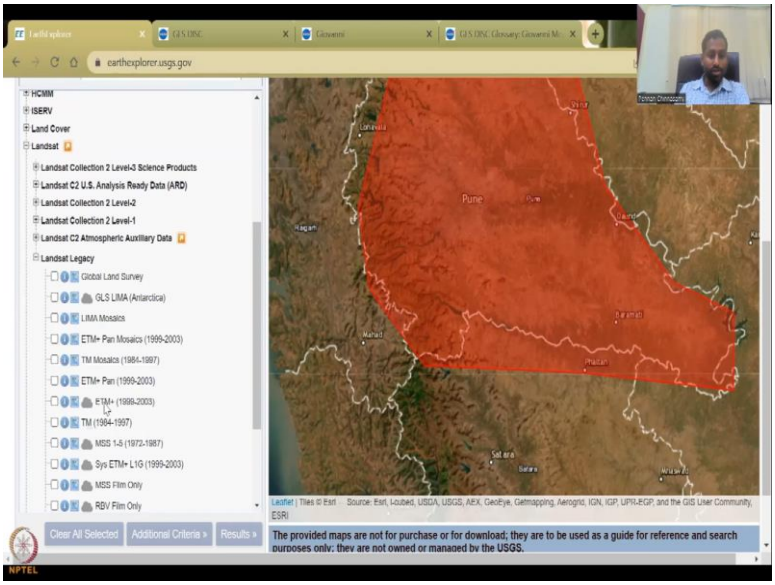

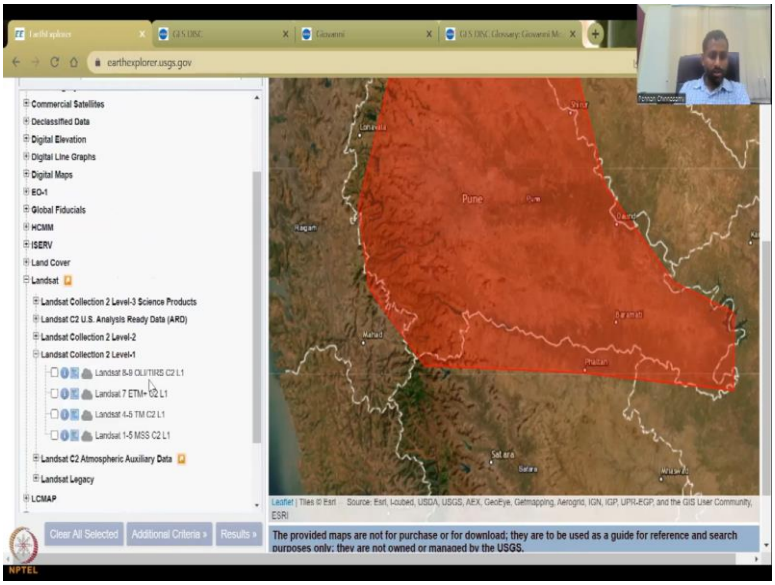

As I said Legacy is the older versions, you can see from 1984, 1960s, 1972s, etcetera, etcetera, you have data. 1960s you will not get much of India but you will get across the other regions. So, there is a collection level 1. You can see that these are the collection level 1s, landsat 1 to 5, 4 to 5, 7, 8, 9. So, the 1 to 5 is the older versions. You can click on this to get the collection info.

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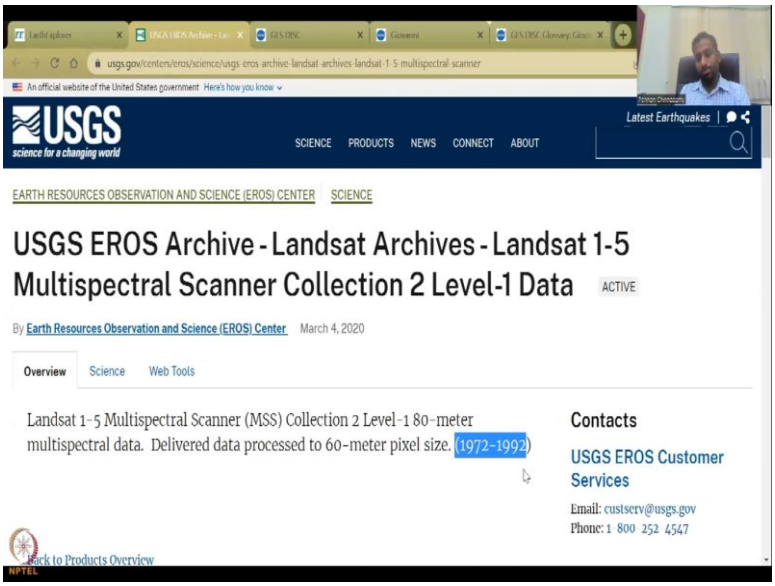

It will open on a different page and tell you what these data landsat 1 includes and it says 1972 to 1992. So, it is 20 years of data at 16 meters resolution. This is the oldest versions, very good versions I would say. And 1960s is kind of reconstructed data it is not actual data but still there. So, that is 1972.

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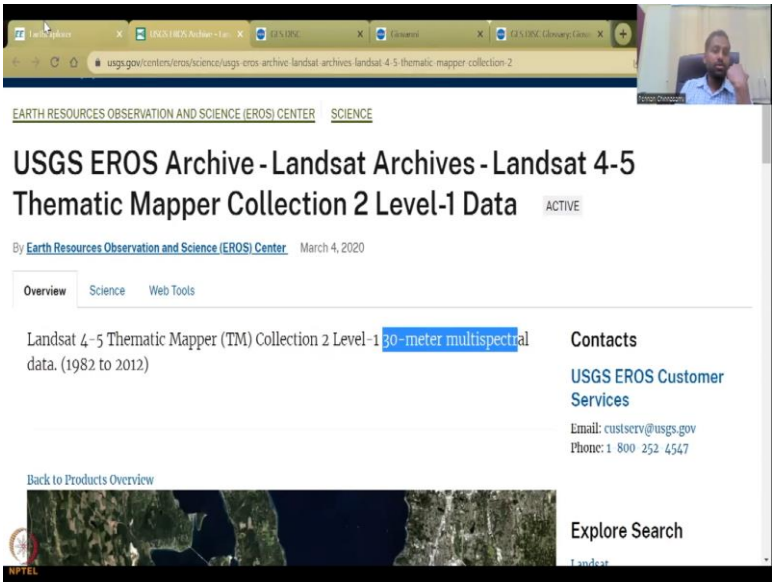

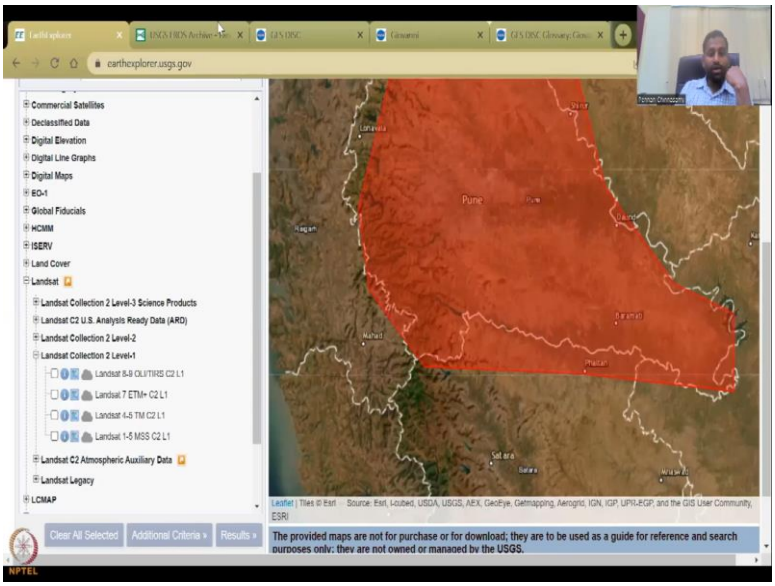

So, just let us look at how a resolution has changed in these Earth Explorer data sets. Now you will see the level collection 2, landsat 4 TO 5. So, the previous one was 1 to 4, 1 to 2. It is asking me to take a survey of life but not now, later I do it. So, then we have the level collection 2 which is landsat 4 to 5 at 30 meter resolutions. So, the previous one was at 16 meter resolutions which was landsat 1 to 5 then the 4 to 5 is at 30 meter resolution. This is the 4 and 5 versions are 30 meter resolutions.

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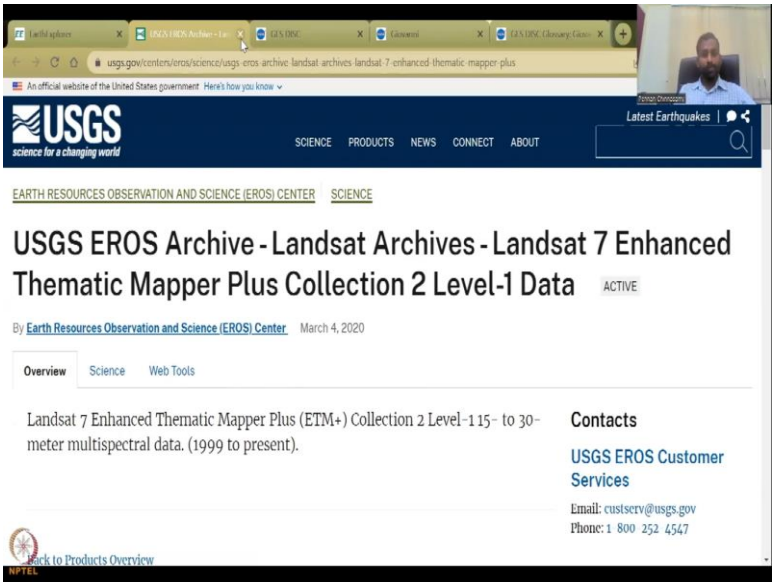

And then this is also going to be the landsat 7 collection which is really really successful at 30 meter data but it is multi-spectral. So, the previous ones were just normally red, green and blue, whereas the multi-spectral data came into existence much later.

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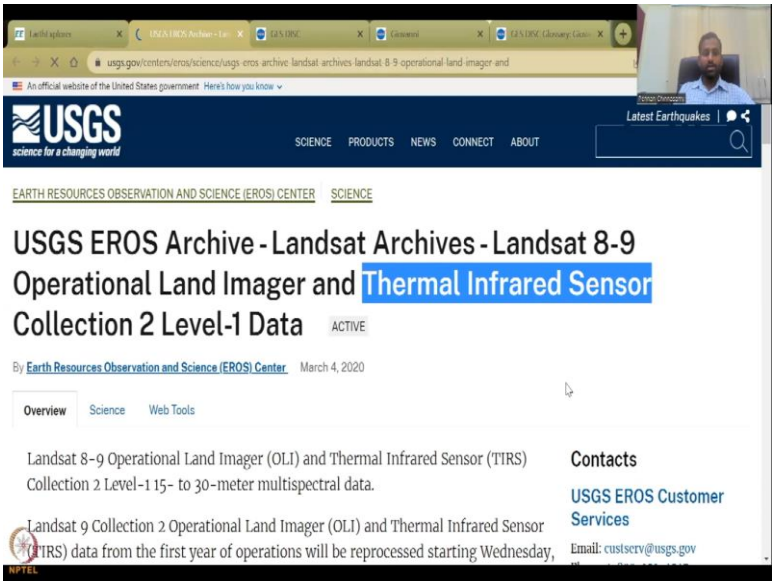

And then we have the 8 and 9, the recent ones. You can see the metadata for it. These are in some locations very very high resolution and it has also the thermal infrared sensors and at 30 meter resolution. So, the landsat goes best for 30 meter resolutions but the sensor has been updated. So, now we have thermal infrared sensors and actually somewhere around bi-weekly

to monthly you get the data. So, again landsat we will not be using for this part because we want products. We want products that are being taken from landsat models whatever it is.

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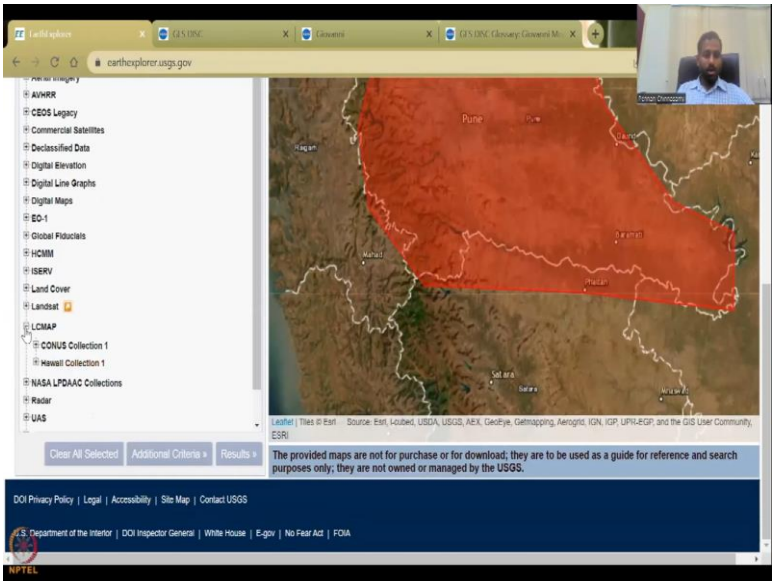

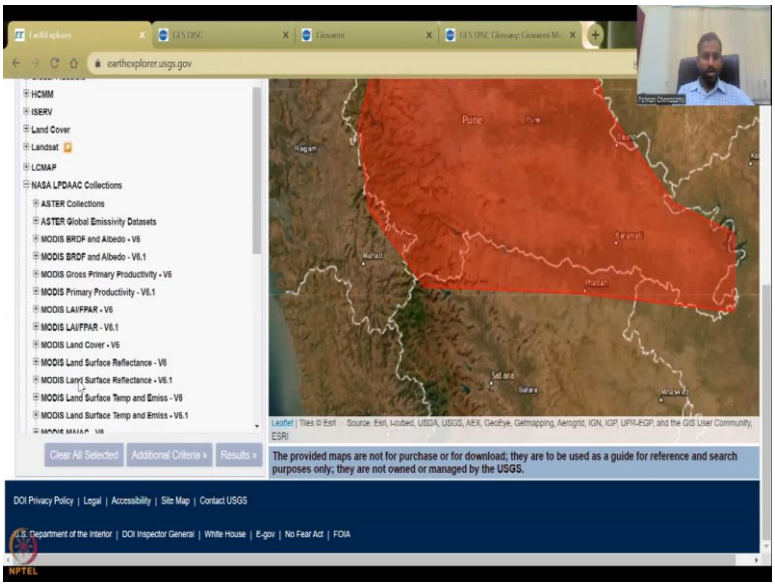

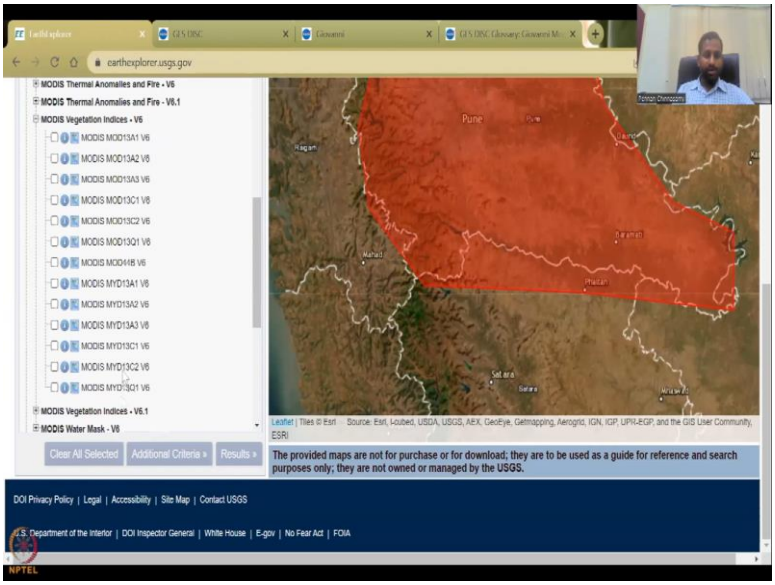

So, we will go to the LCMAP. So, these are 2 specialized maps and the NASA collections of DEM models and then we have vegetation indices. If you will click on the vegetation indices, you have the MODIS derived in the indicators for vegetation and then we have the water, water reservoir area, etcetera, etcetera, ecostress, all these are related to rural entities, NASA DEM vegetation indices phenology.

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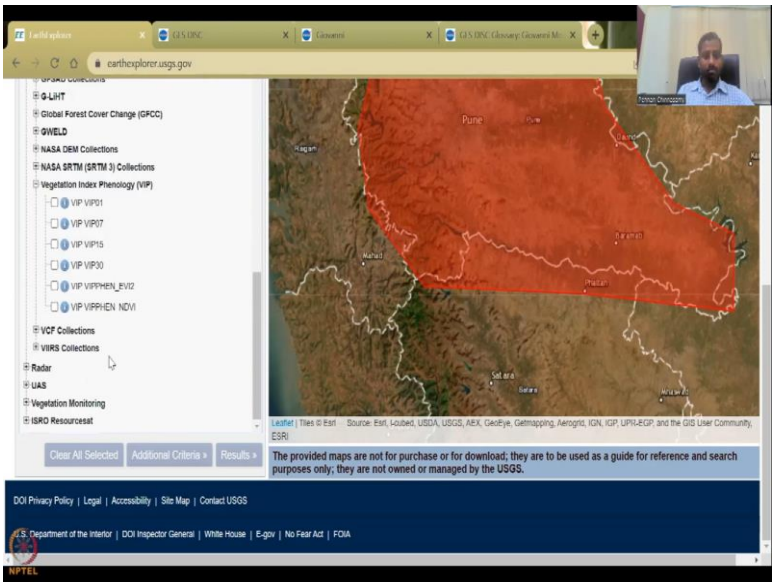

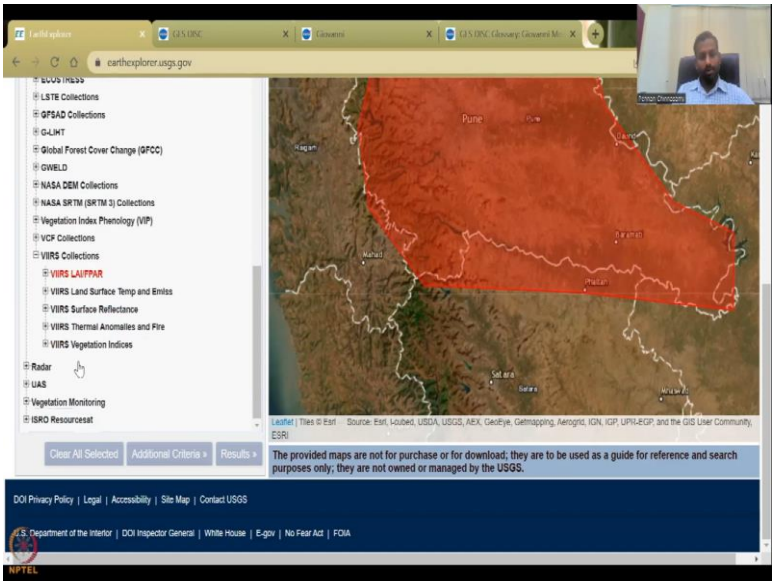

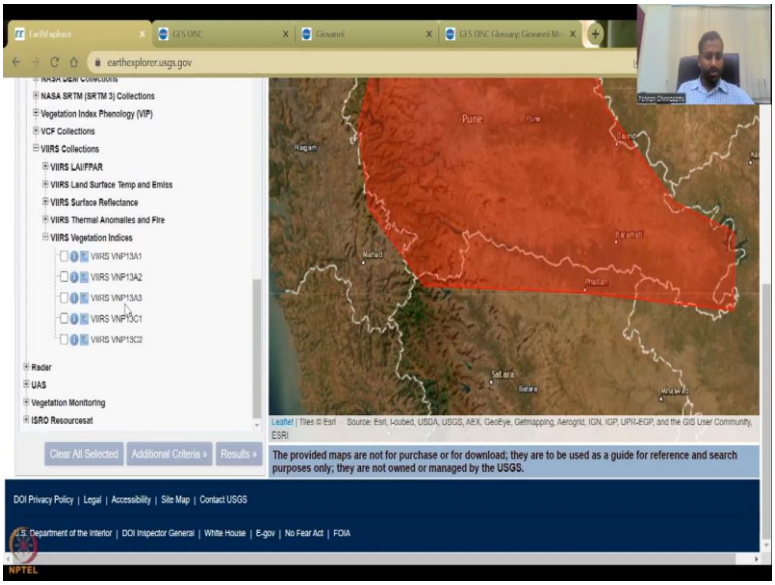

Phenology is mostly on the plant types and those kind of things. And then we do have the VIIRS collections which also we will be using for our vegetation indexes. So, you can see here these are the vegetation indexes.

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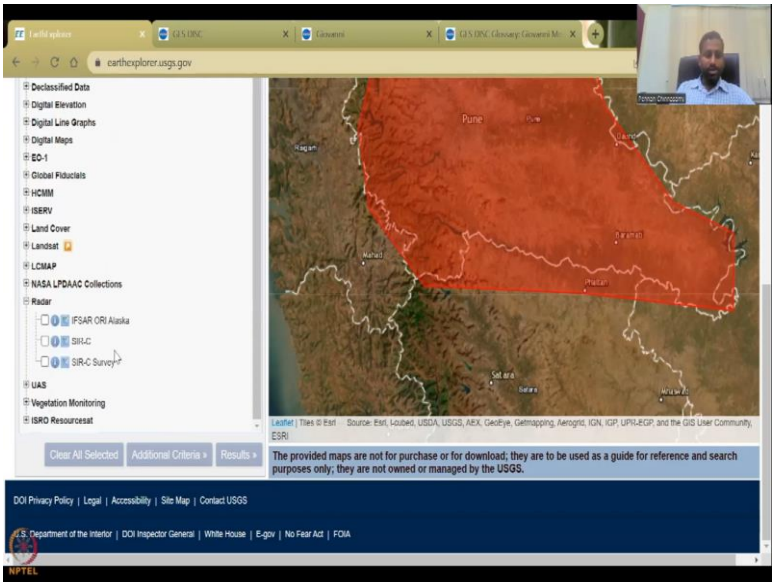

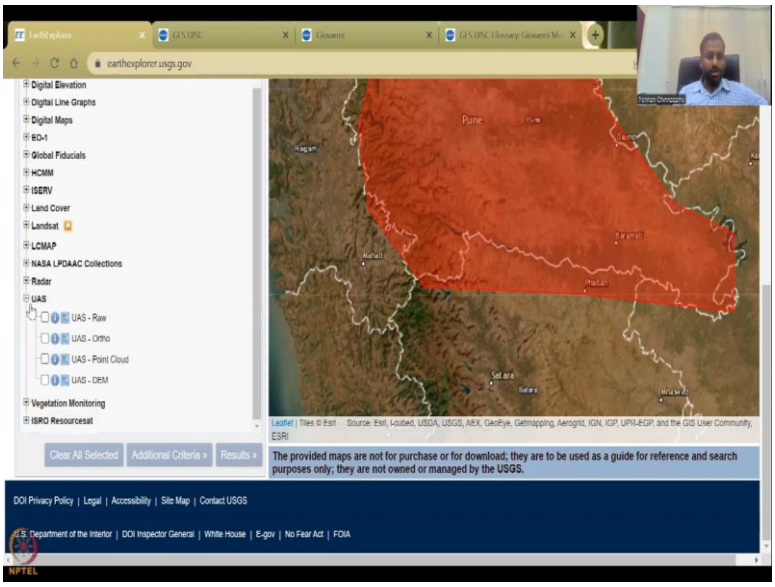

And then the radar is more important for penetrations. So, these have, it penetrates to the ground. So, these mostly will have the soil moisture and land elevation data much much higher resolutions. UAS, unmanned systems are there. DEMs. So, these are drone kind of images and then we can see point cloud, ortho. Let us click this one.

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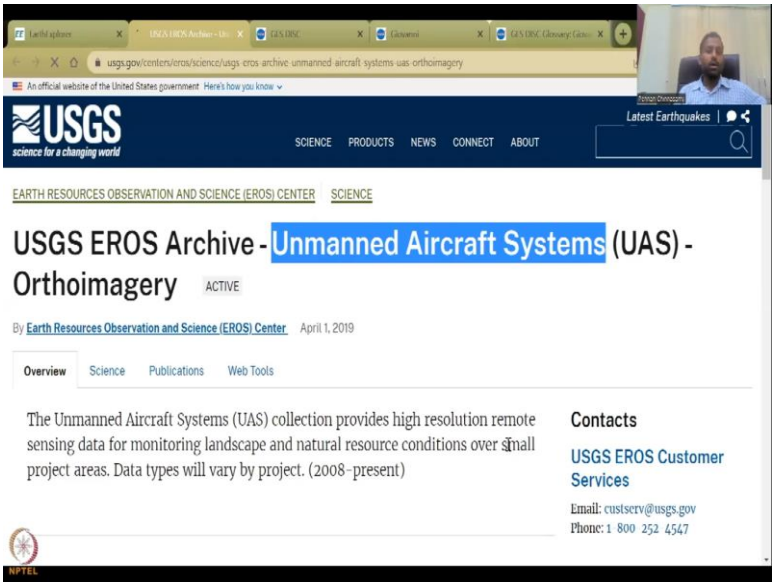

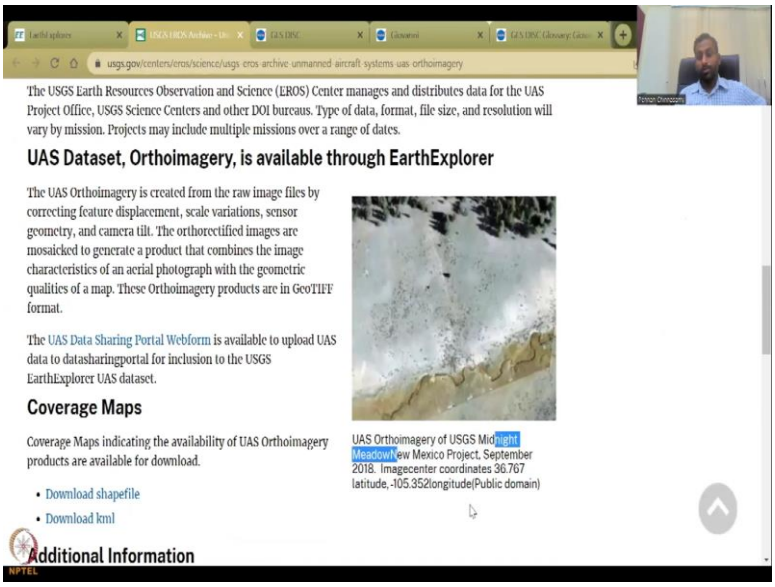

You could see that the unmanned systems also will carry drones, unmanned aircraft systems. So, we have these are high high resolution and we have 2008 to present but only small areas. Again, you cannot fly drones across the entire region. So, you can see here, there are some taken in the New Mexico which is, New Mexico is not in Mexico it is the United States. So, you will have some of these data here. And these are the unmanned aerial vehicles we call them or UAS and then we have aircraft vehicles, so systems also they would say. So, the aid differs in how you use it.

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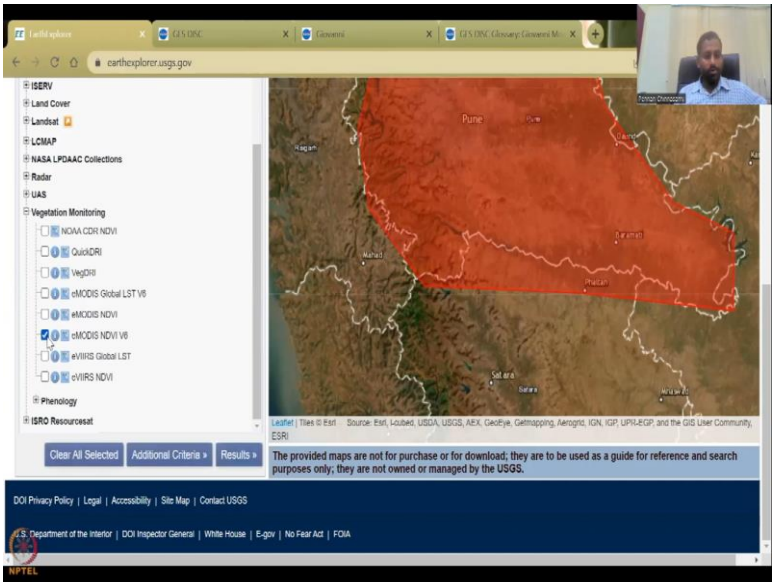

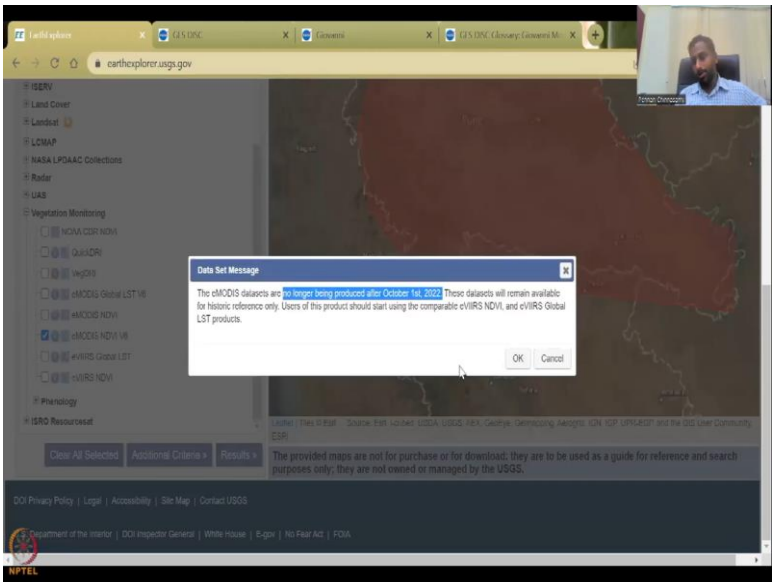

And then we have the vegetation monitoring which we will be using now. And we will be using the eVIIRS NDVI because we want NDVI. I will just show you what is happening. So, if you click on let us say, yeah, NDVI this one, it will say that it does not get updated or no longer produced after October 2022.

So, until then you can use it. So, if you want to use the recent ones, do not use NDVIs data set, but you can build a legacy of data. For example, from 1972, you can use landsat data and then from 1999s, 2000s models and then from until 2022, you can use a particular models and then jump into landsat again. So, it is okay because the sensor is actually sensing the data. So, we will close this.

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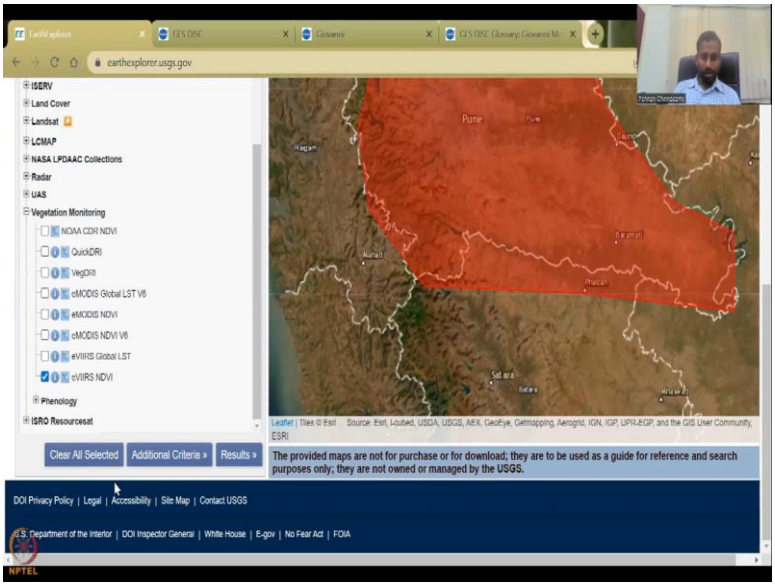

All these are kind of outdated except this one. So, I will just click that one. LSD is land surface temperature which is important to show the stress on plants and land. So, we have this and then I am just going to click result. So, we picked a date. We picked a date range and we also pick the type of satellite that we want.

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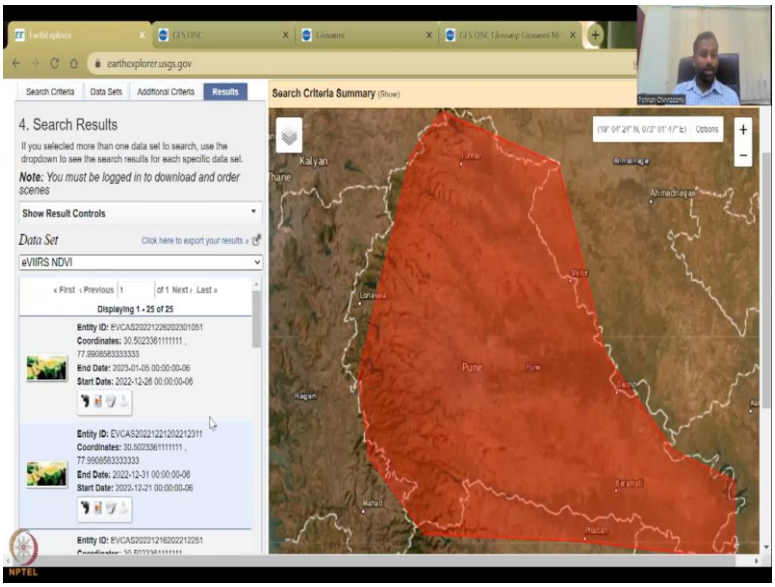

And here is what we get. So, we get 25 images for this particular area for one month. I am sorry, September to December. So, it is around 15 15 days a data set. So, what are these is?

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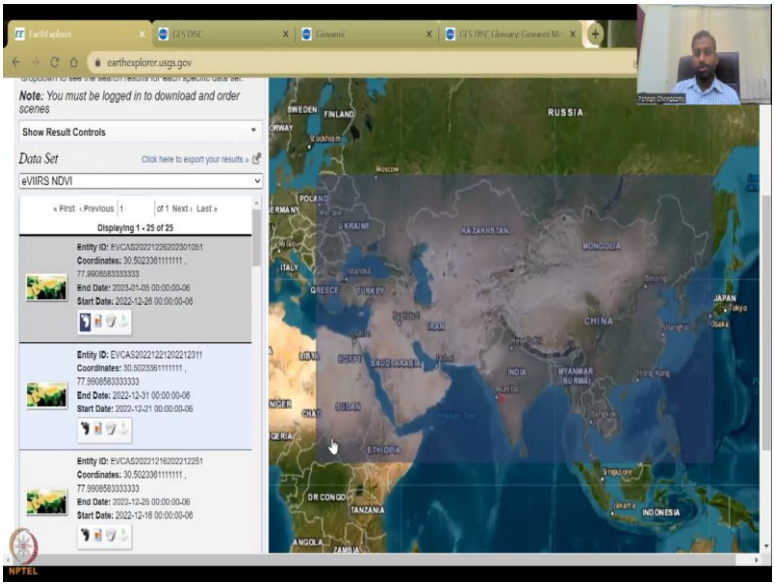

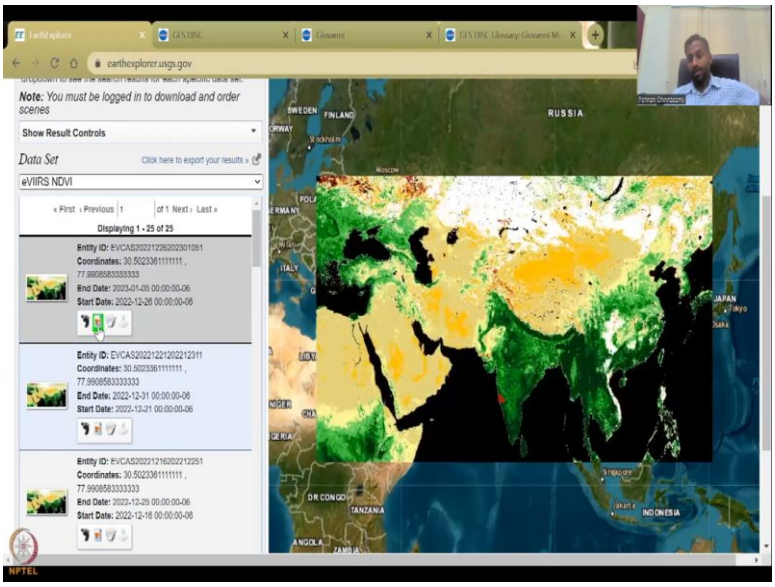

This is a thumbnail to show the footprint of the data. So, if you click it, it will show you that the tile, the tile, entire tile where the data has been collected. You can take it out and then go to this one to show the data set for that region.

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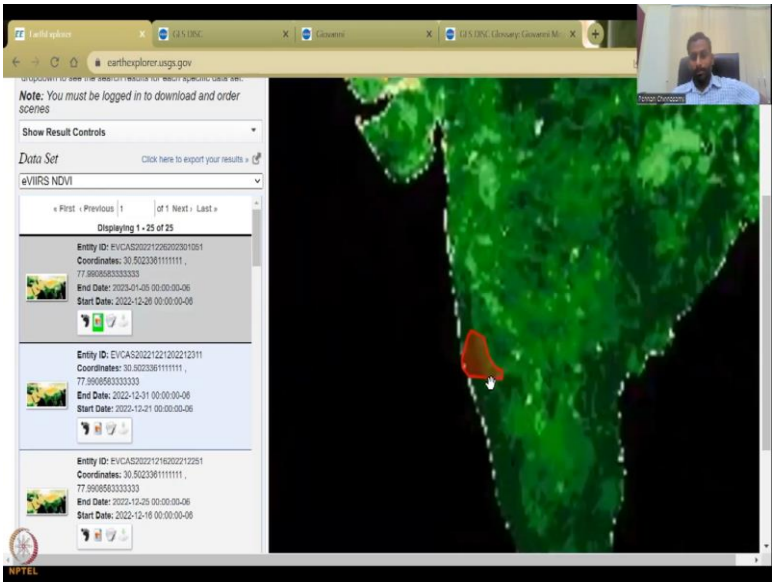

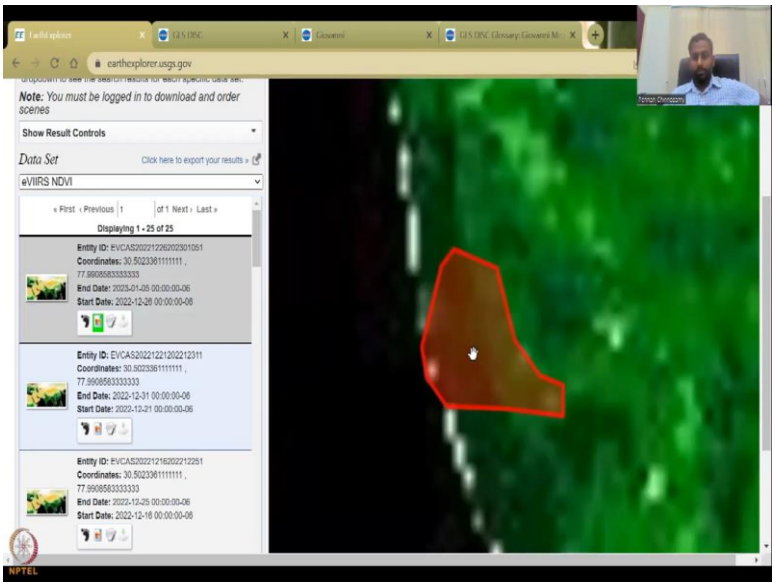

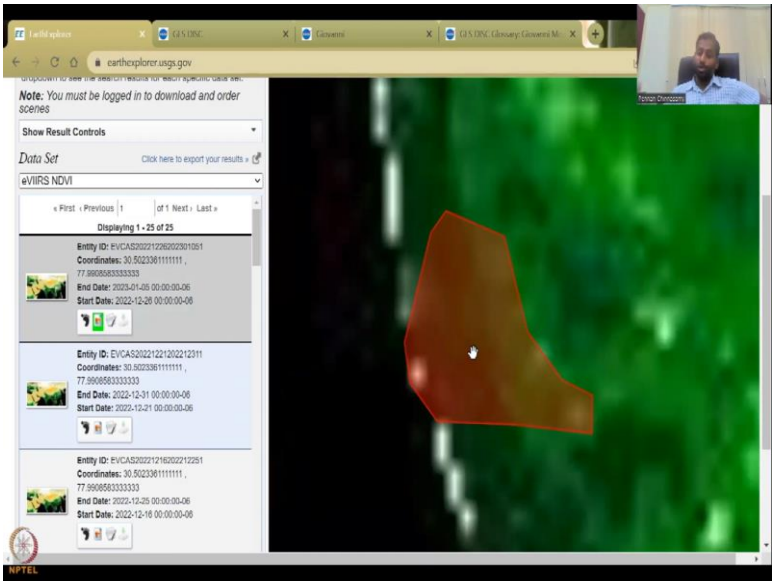

So, I am going to zoom in. So, this is a previsualization, so that you can look at the data before you download the data to make sure that it does not have errors or it does not have any issues with the resolutions as well, too much cloud cover, for example. It is still downloading. So, that is why you would see the blurry image, yeah.

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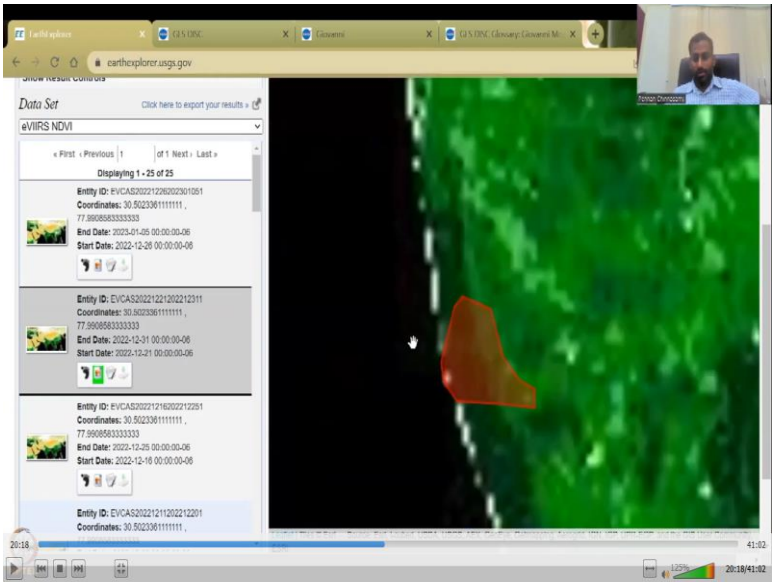

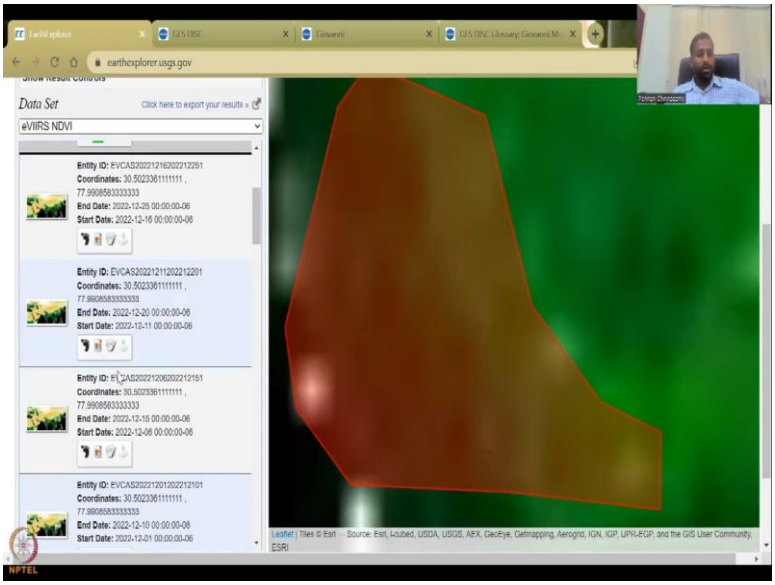

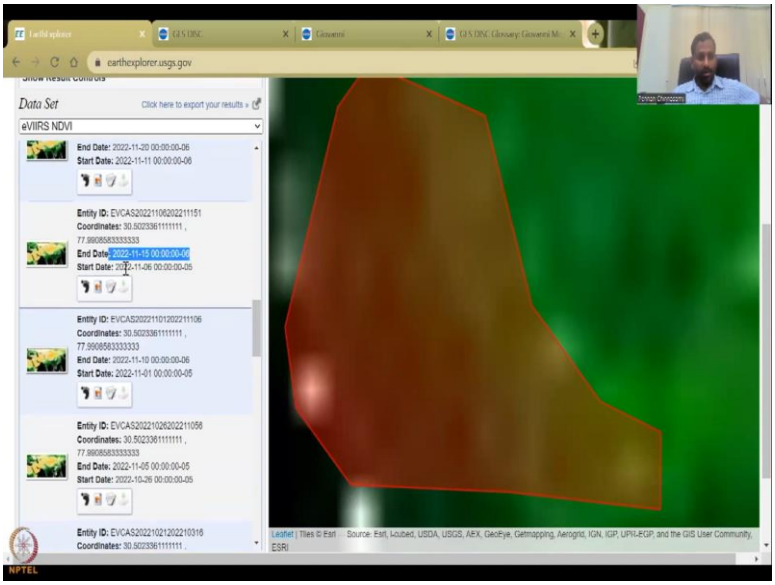

So, this is also good in terms of the satellite data. You can see that a lot of satellite data is there. And all these dates are there. So, the end date, start date is there. So, this is somewhere 6 to 15. So, as I said within every 15 days the data comes in. So, the start date was in September, it was November 6 to November 15.

So, this is the November month of data. So, you can compare between, not readily here, but you can compare in the previous region. So, this is 2023. We did not give 2023 but it also populates it just for our need and then here it is 2022 9, 8 and 9.

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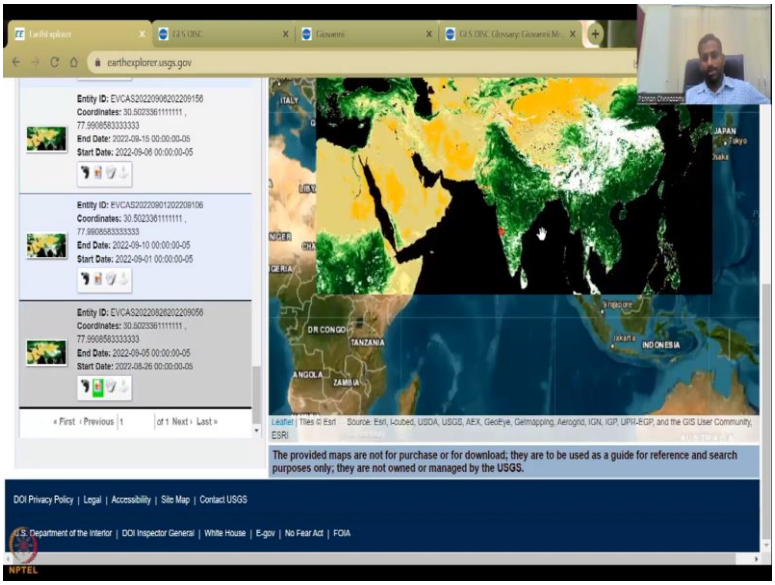
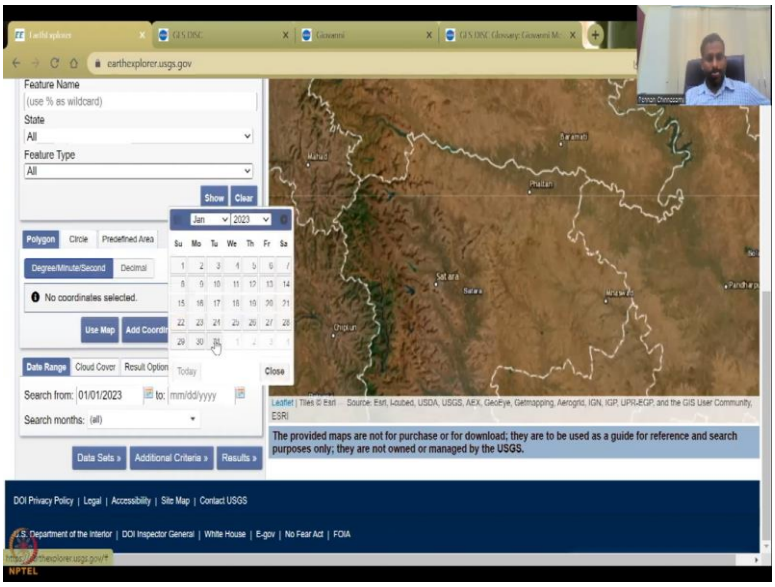
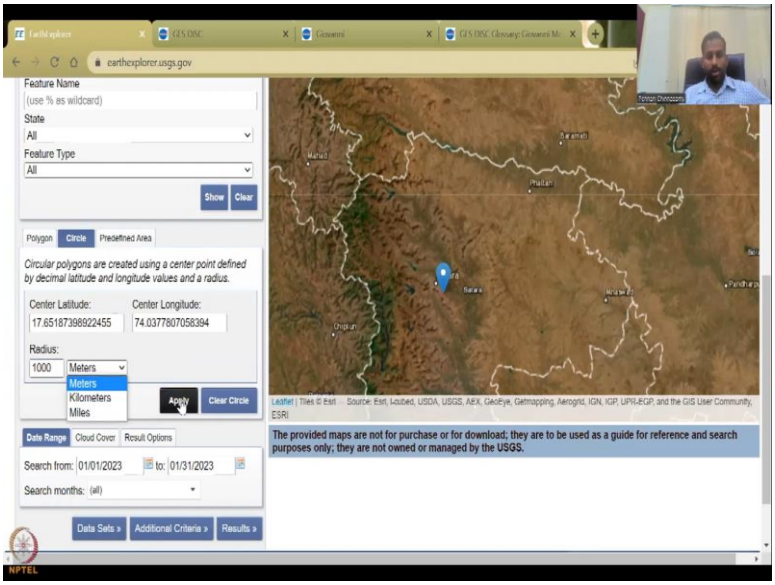


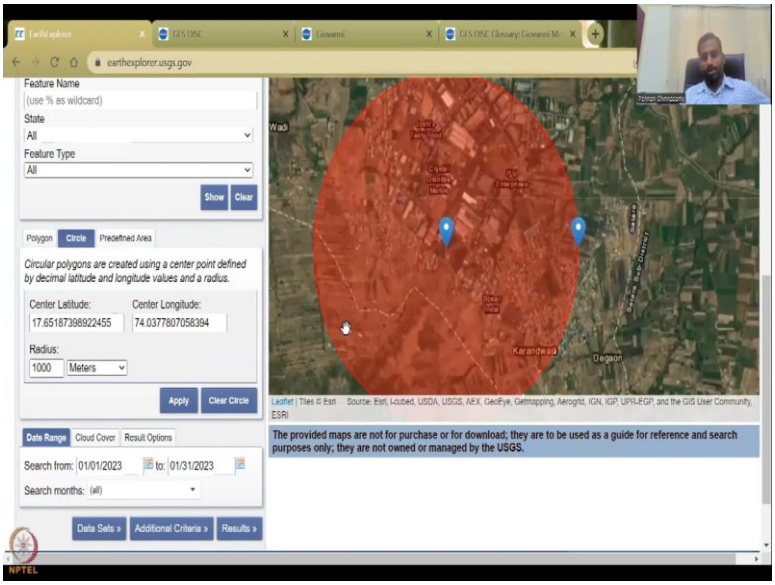
So, this is the last week of the analysis that we wanted to see we have 25 images here. So, the entire map cannot be downloaded that is what this is saying but you can download only the

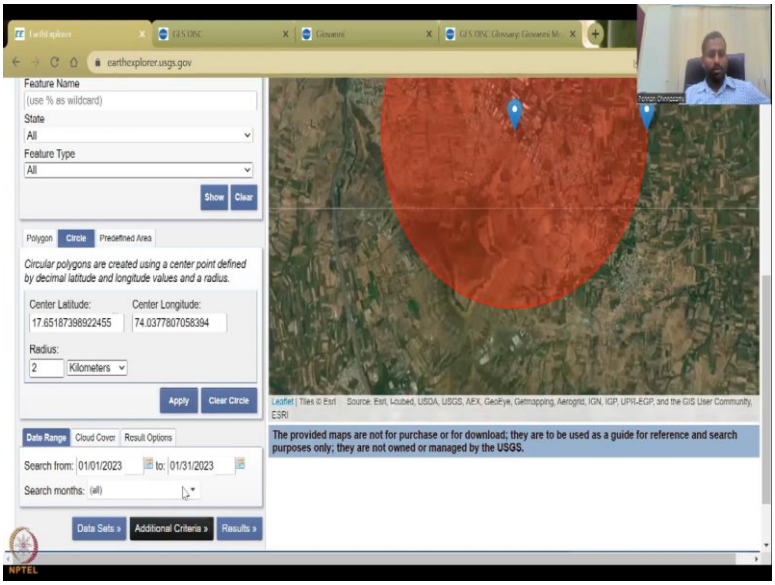
maps that are available with this link. So, if you want to download you have to login. So, It will ask you to log in and then you can download this data. We have already showed you how to login and download the data.

(Refer Slide Time: 21:39)



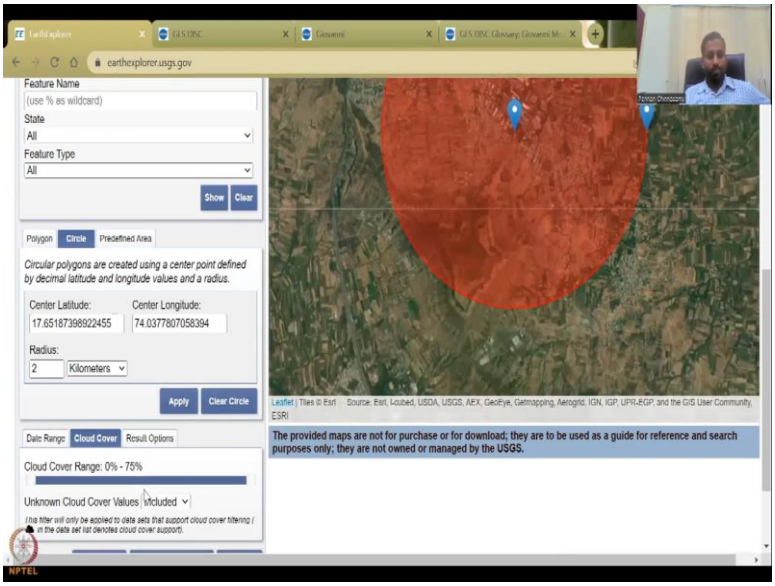


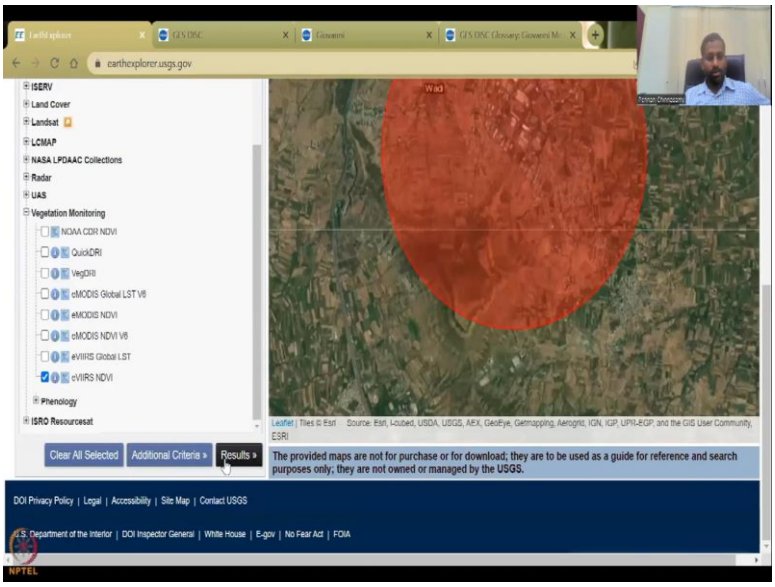




So, while it is getting resolution increased and stuff, let me just pick one month. Let us see if we do have January. So, let us do January to Jan end and then I am just going to do the circle, apply. Let us say 1000 meters or one kilometre. You can change the units here, kilometres, miles etcetera. So, it applies that to the region. Now you see there is a lot of housing there. So, I do not want just the housing. So, let us say 2 kilometers radius and then I apply. So, it gets bigger.

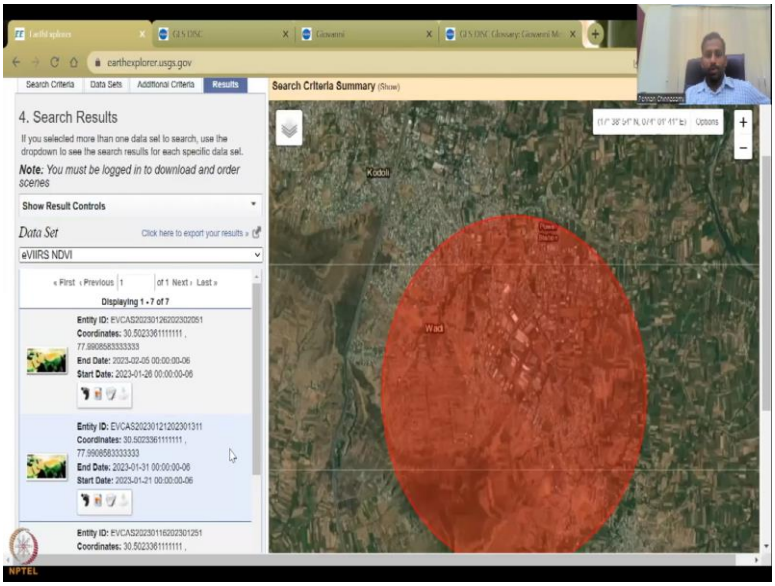
(Refer Slide Time: 22:12)

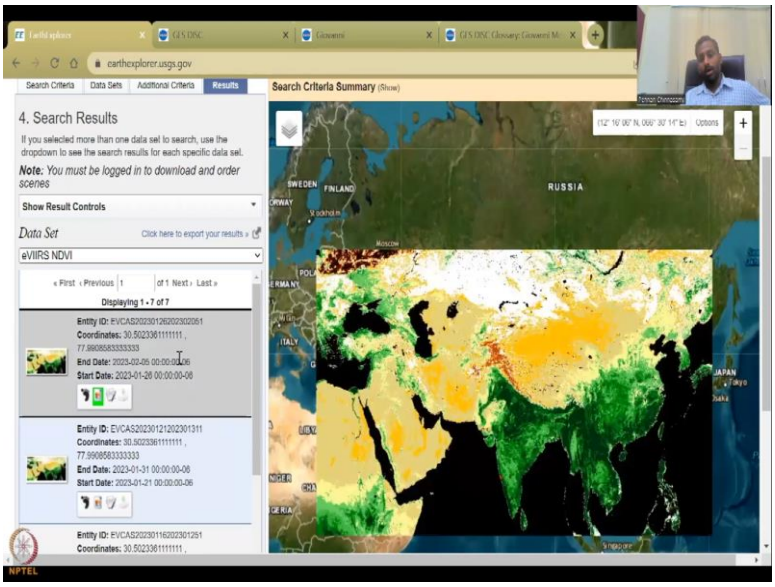




And then I have this cloud cover is okay for now and then we can go to the results. We have to see the data set of eVIIRS is clicked and then results. Here we go.

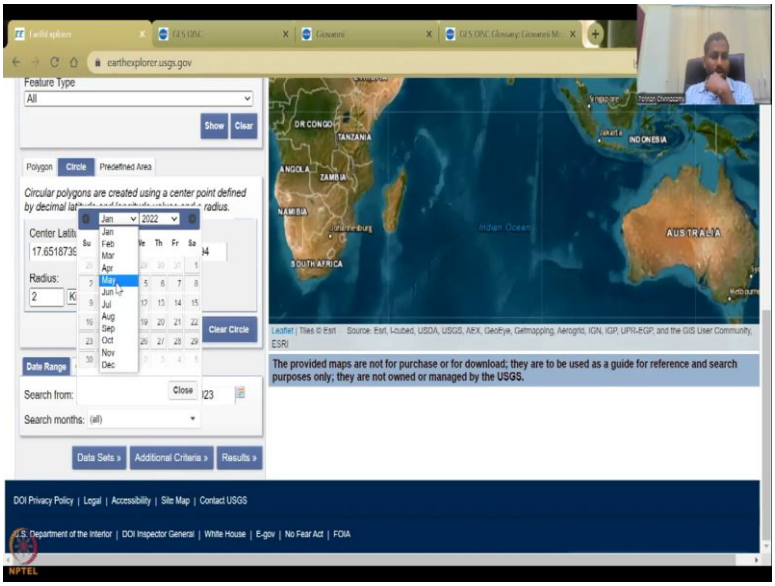
(Refer Slide Time: 22:30)

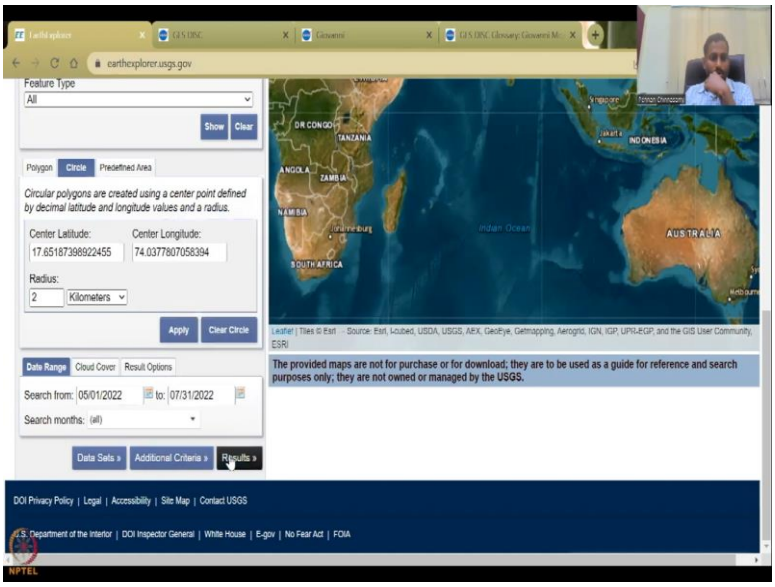


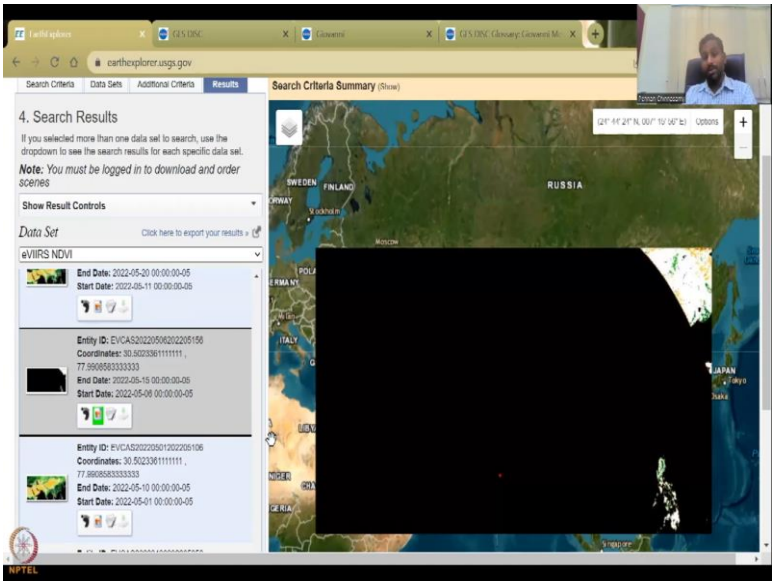


You have all these results and you can actually see them as a full tile. So, you can see how, if you want to quickly look at it, we can look at within the month how it has changed. So, from 1 to 2nd February month we have. So, you see that the entire India is almost green with NDVI high. NDVI in this Basin. And then we can also see the previous results. So, you can download this and if you need you can go back to the clear the results or go to search criteria again.

(Refer Slide Time: 23:05)



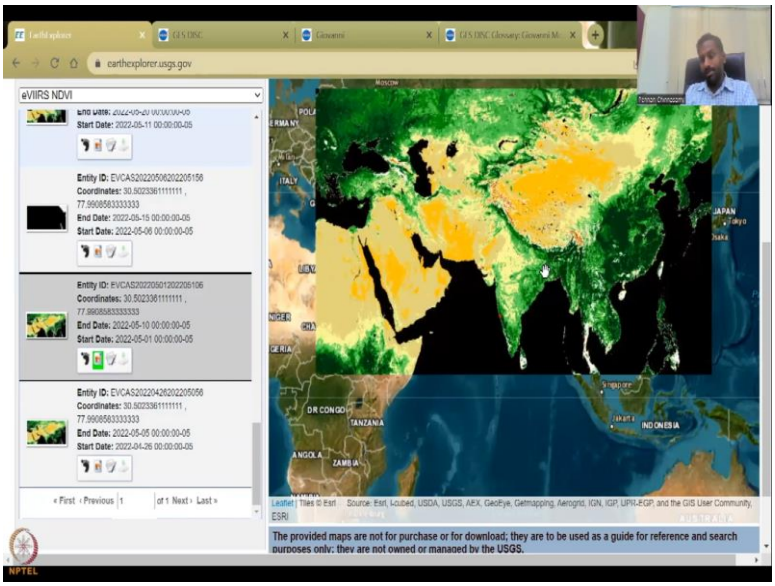




Let us just take the summer month, the previous summer which is May. May 1 to July end and then the data set results. We could see that now we have pushed the date to June, July, August are those those terms. So, if you look at May which is the fifth month, these are the fifth month and then you put the NDVI on. So, like this.

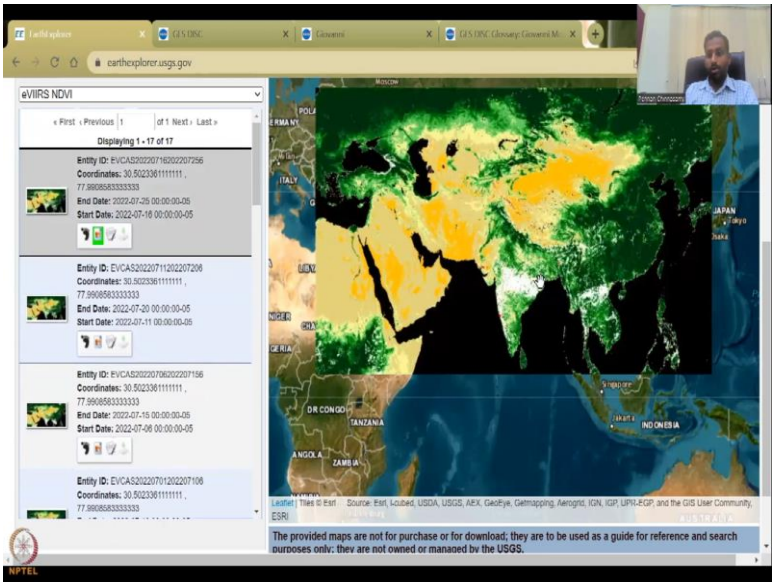
So, this one should have been capturing the image but there is a lot of black space. Which means the data is not good. So, please, look at the data before you download it. So, this one we can remove, saying, I do not want to do it. Because you will spend your memory and taking all the data.

(Refer Slide Time: 24:03)



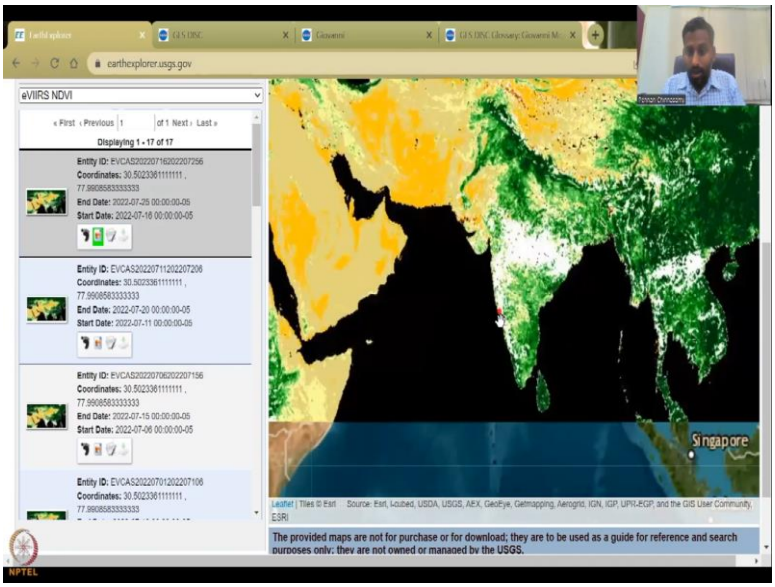
So, now you can see here, all these yellow spots are not growing and the Ganges region is also not growing. So, NDVI is very very less.

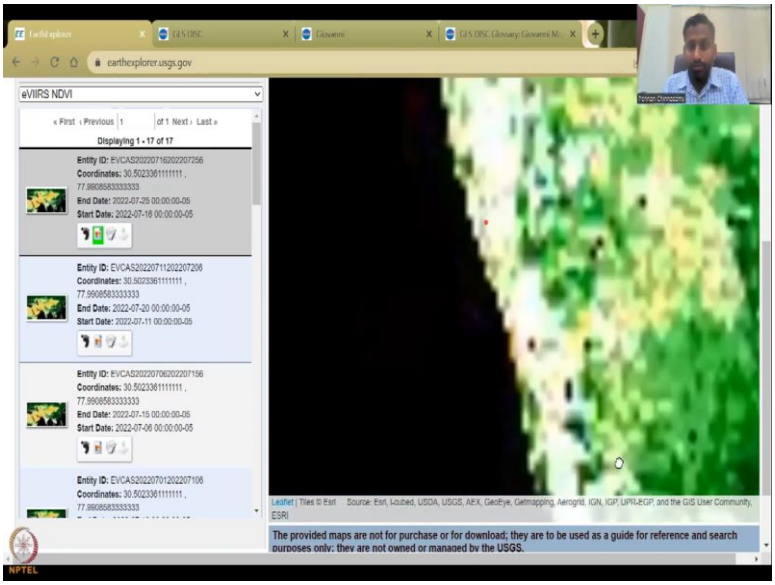
(Refer Slide Time: 24:18)



But when we go to the monsoon months, I am just going to click this one and now you can see all the green. What is the white? It is the cloud. So, the cloud cover if we have increased and said above 50 cloud cover do not show then the data, this tile will not come, because in my region Pune, there is a lot of cloud cover.

(Refer Slide Time: 24:33)




earthexplorer.usgs.gov
eVIIRS NDVI
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Start Date: 2022-07-11 00:00:00-05
Entity ID: EVCAS2022070622022715
Coordinates: 30.5023361111111 , 77.9908583333333
End Date: 2022-07-15 00:00:00-05
Start Date: 2022-07-06 00:00:00-05
Entity ID: EVCAS2022070122022710
Coordinates: 30.5023361111111 , 77.9908583333333
Leaflet | Tiles © Esri — Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, UPR-EGP, and the GIS User Community, ESRI
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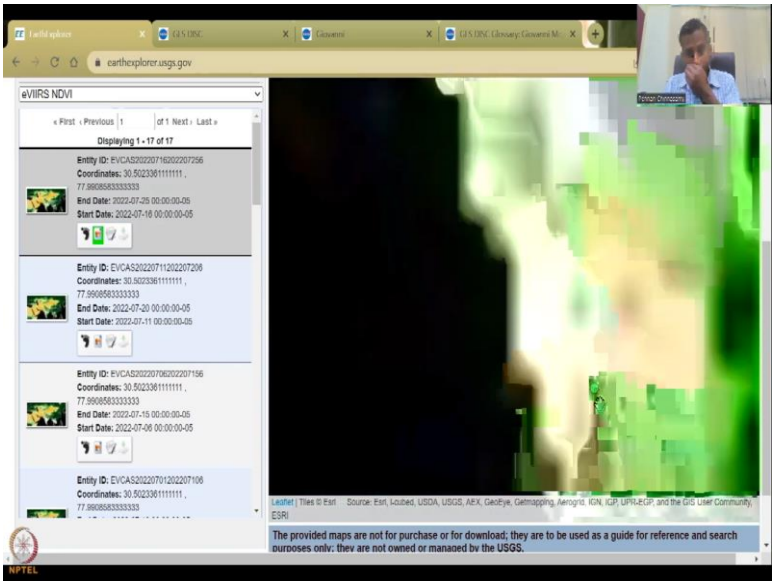
NPTEL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eVIIRS NDVI
« First ‹ Previous 1 of 1 Next › Last »
Displaying 1 - 17 of 17
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Leaflet | Tiles © Esri — Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, UPR-EGP, and the GIS User Community, ESRI
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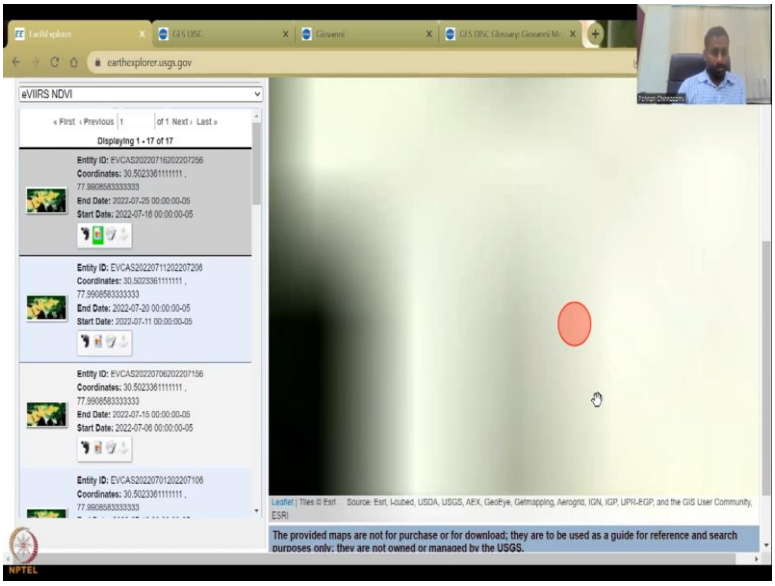
NPTEL


earthexplorer.usgs.gov
eVIIRS NDVI
« First ‹ Previous 1 of 1 Next › Last »
Displaying 1 - 17 of 17
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Leaflet | Tiles © Esri — Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, UPR-EGP, and the GIS User Community, ESRI
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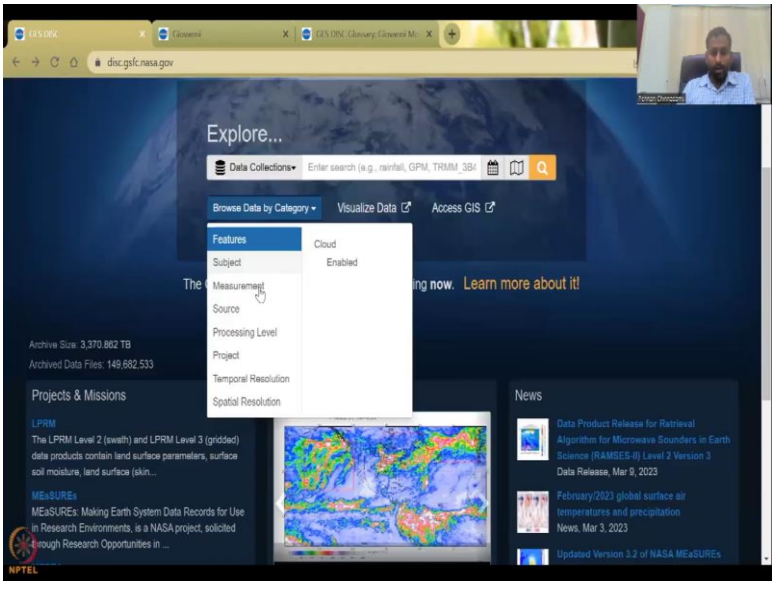
NPTEL

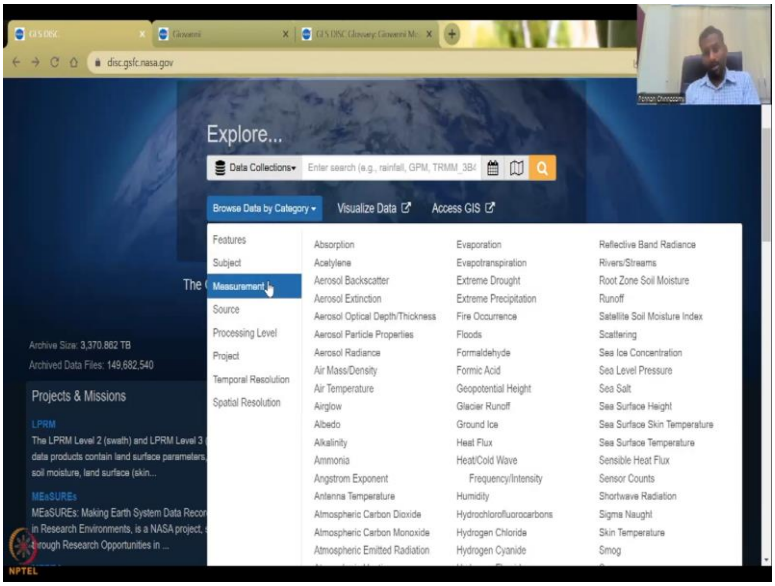
You can see here. If I zoom in and if it is full of cloud cover, it will not take this image. So, this particular image will not be showcased here. So, you do not have to download this image and then work on it. So, this is the above the Earth Explorer and NDVI, readymade NDVI products.

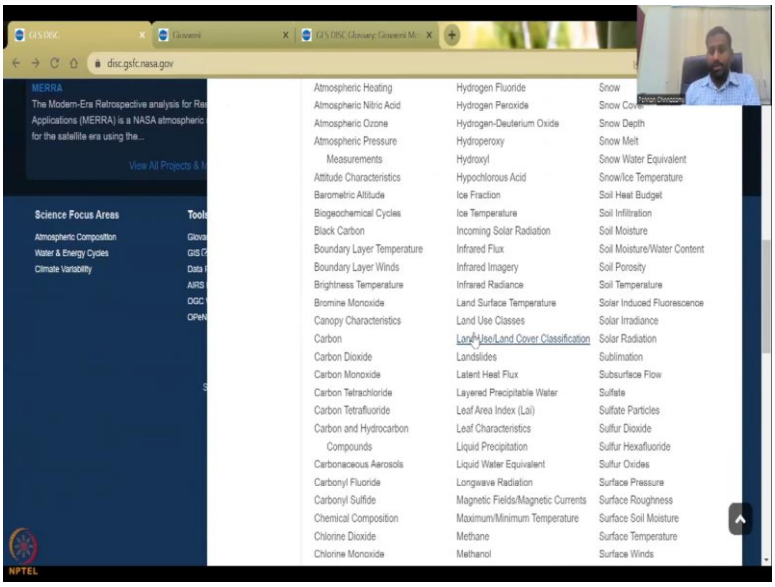
(Refer Slide Time: 24:54)

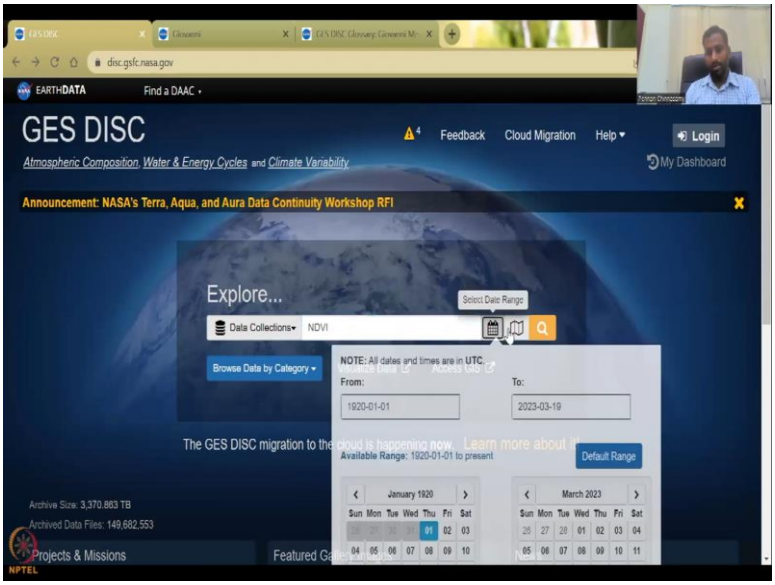


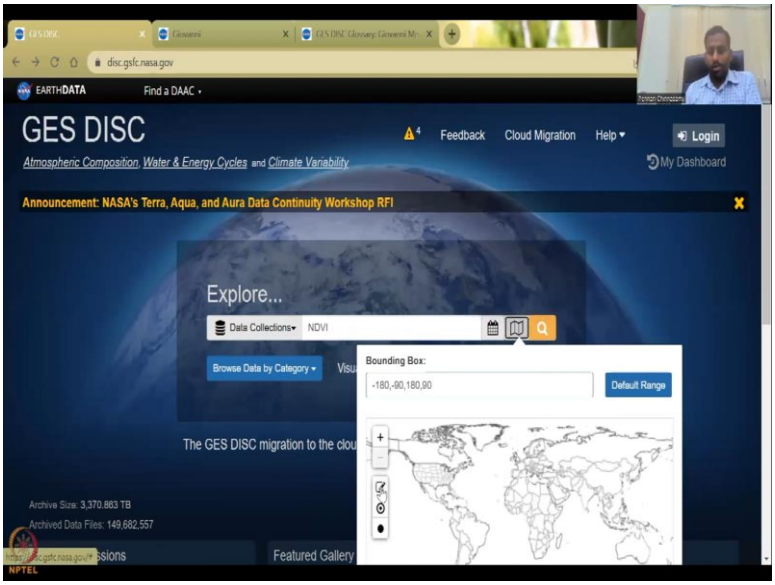
I also wanted to show you the other NASA product which is GES DISC. So, GES DISC is is also used for a lot of other data sets as we have seen in the rainfall, grace data can be taken from here etcetera. But you can do the same as browse by catalog. So, you can say browse by catalog and say what data you want to use, measurement, temporal resolution. You will just see how big this database is.

(Refer Slide Time: 25:22)



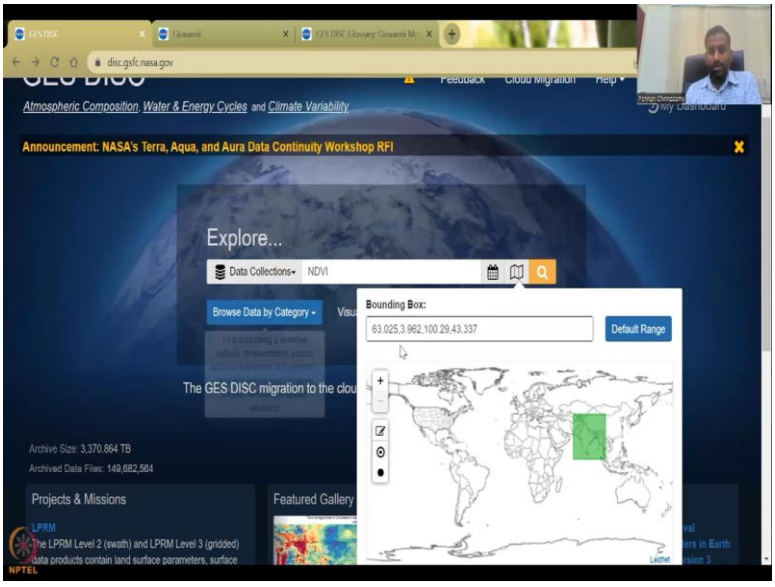






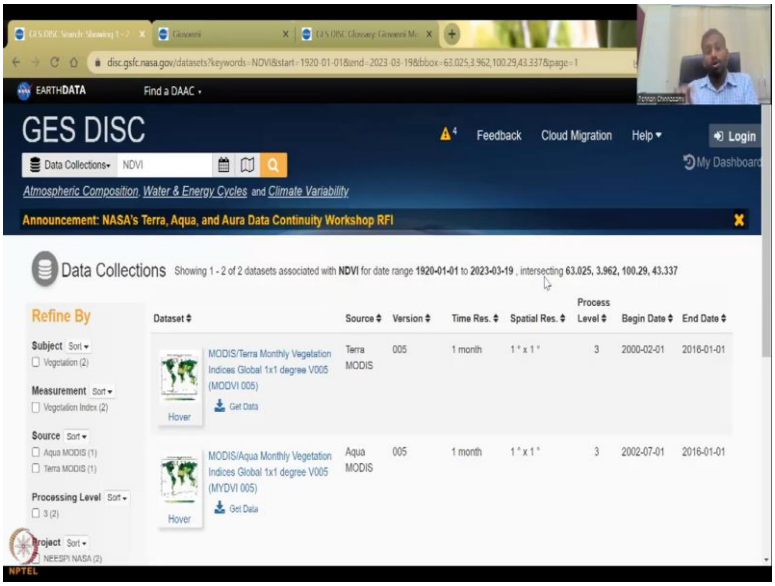
So, let us see measurement and see how many variables are coming. So, all these can be taken from this database. You can take carbon monoxide landside, land use land cover classifications. It just goes on and on. It is really really big extensive data set. But if you already know what you want, you can click NDVI and then you can pick a date range. So, you can pick a date or just leave it and you can pick a bounding box. Why is this important? So that you have an area of interest rather than downloading for the entire world.

(Refer Slide Time: 25:55)



So, I am just going to click on the pencil and then draw a box. So, I am going to draw a box along India and then there it is the bounding box for India has been kept and then you just click it back and then say search.

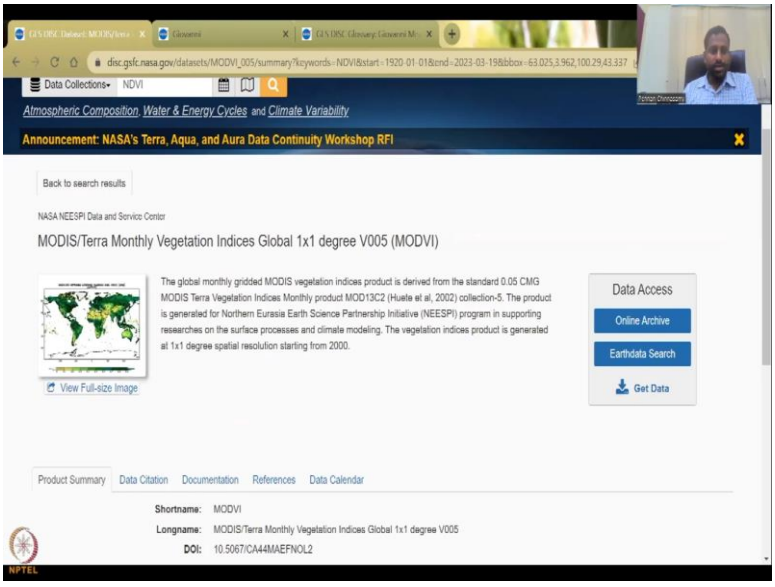
(Refer Slide Time: 26:08)

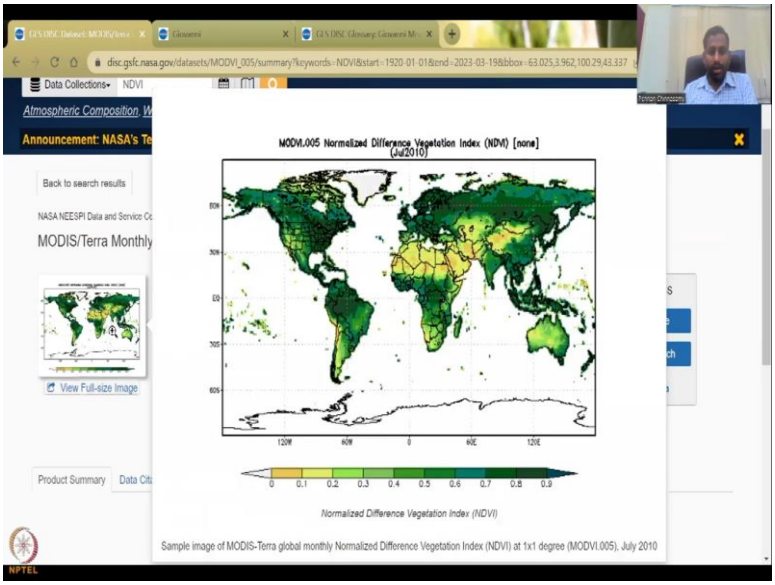


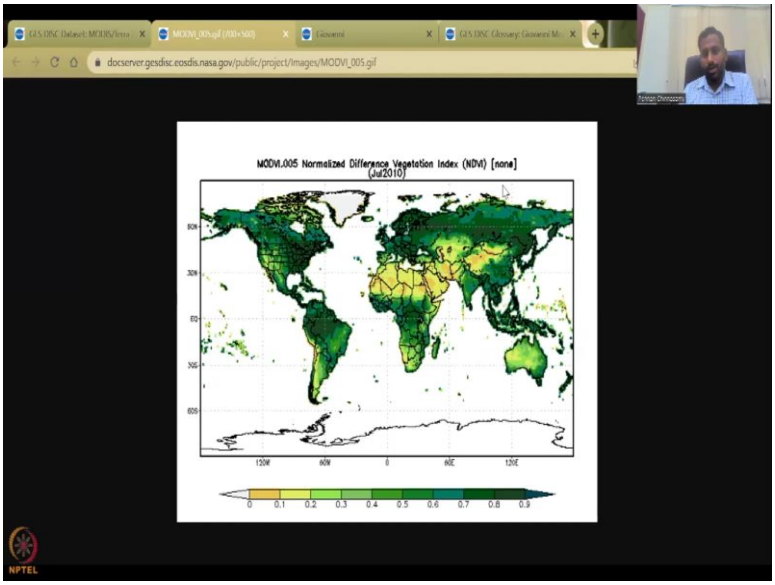
So, when you do search, it will search and give you for your bounded region which is India, the box I clicked, and then I drew a box. You just have to click on the pointer and then draw the box and then you will get these values. So, here what you could see is 2 data sets are there.

In this data collection, there is only 2 data sets for NDVI as marked as NDVI. It is the NASA's modest images and you could see the resolution is monthly and spatial is one by one degree. So, which is around 100 kilometers resolution. It is not that great but it has a long long time series from 2000 to date. And a lot of people have been using these indicators.

(Refer Slide Time: 26:53)

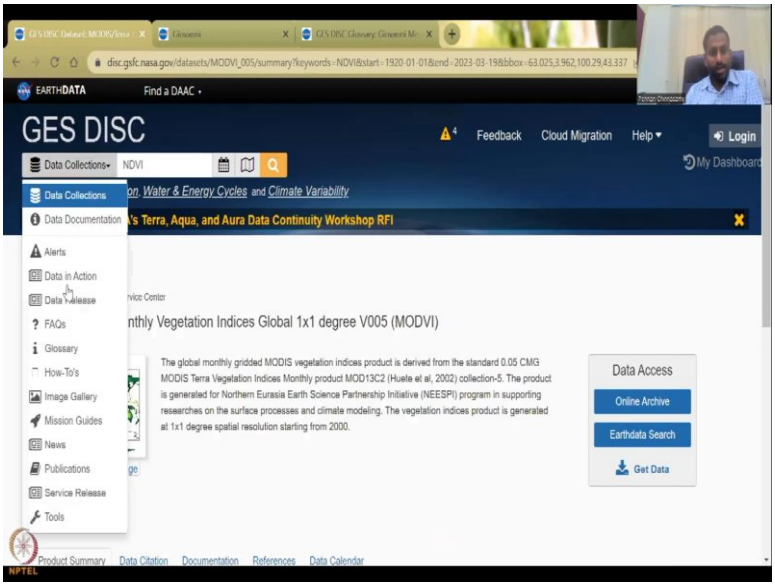


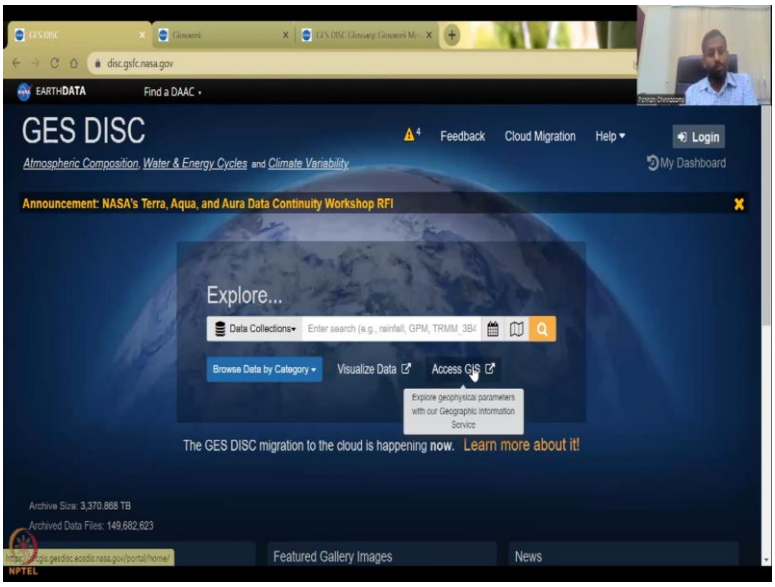


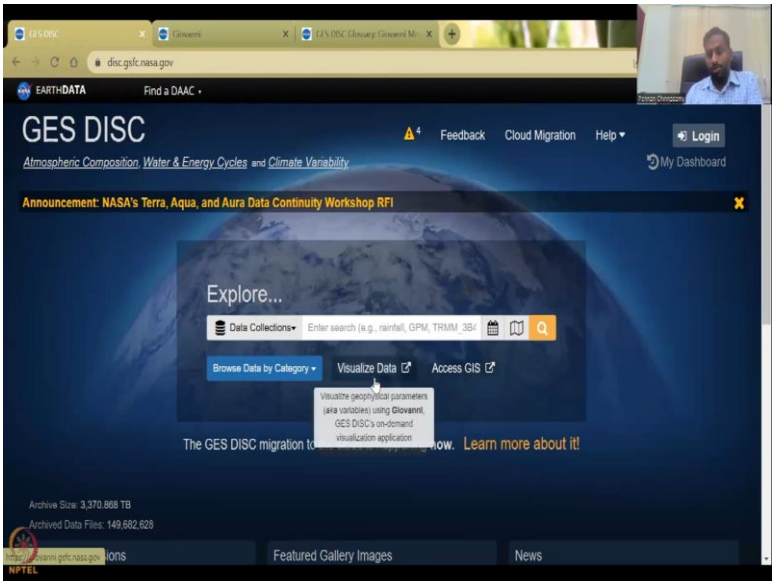


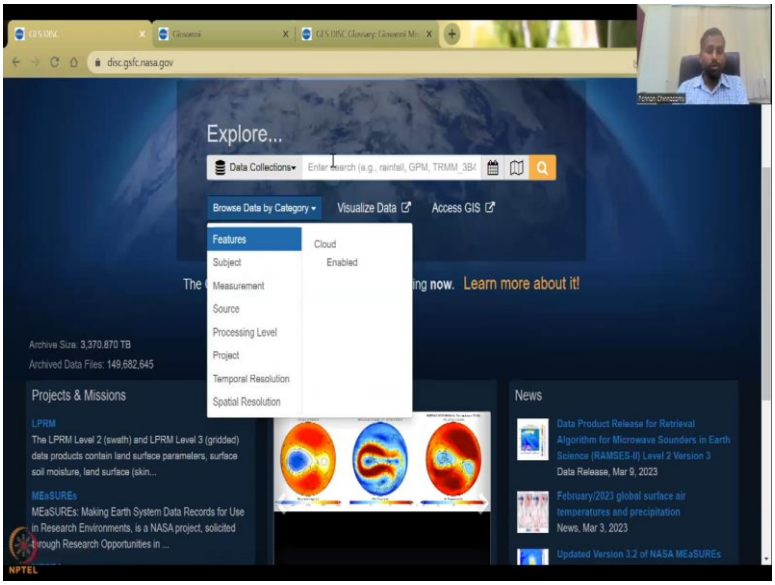
So, you can see here that the image you can just click on this to see the full image just for for a verification process. It gives you the date time you can also download this image, save this image for your reports, if you want, if you are working on a preliminary report quickly. Just took what, 2 seconds to download this image. So, from here you just said I want to see this image and take it for this particular month also July 2010. So, these can be used as a proposal writing those kind of images.

(Refer Slide Time: 27:28)



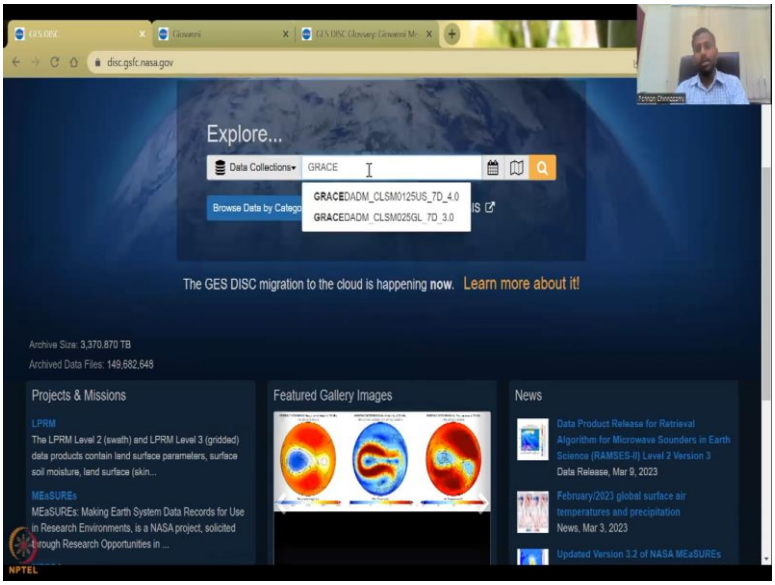


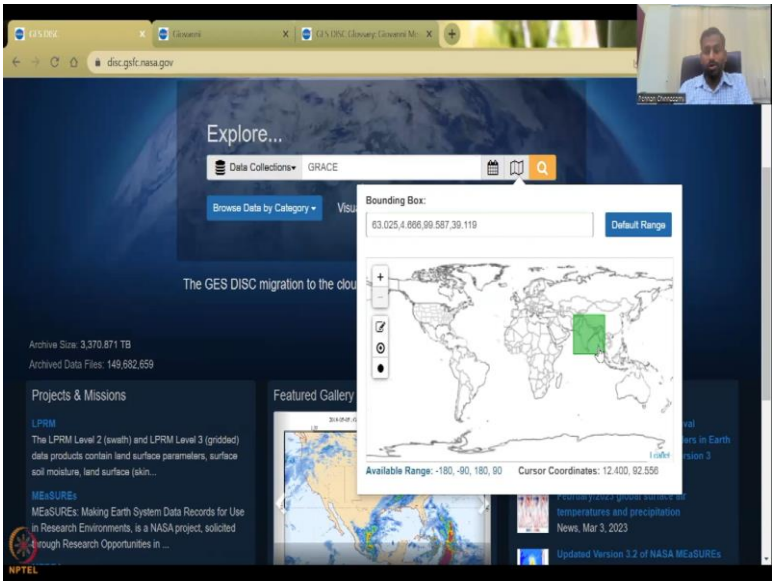


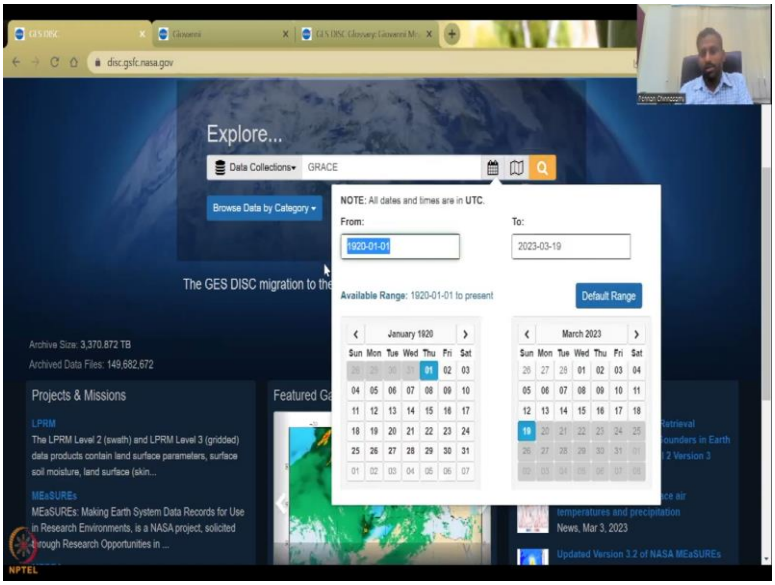


So, if you go back to data collections and then see what data is available, let us go back to GES DISC, the full website. These 2 also I will give access GIS is mostly to use it with a proprietary software, visualized data will go to Giovanni. Giovanni is another dashboard within the Earth data explorer that is only used for visualizing the data and then making real time analysis. So, we will get into that pretty soon. And then we will have browse data at different spatial, temporal resolutions, project, et cetera.

(Refer Slide Time: 28:09)



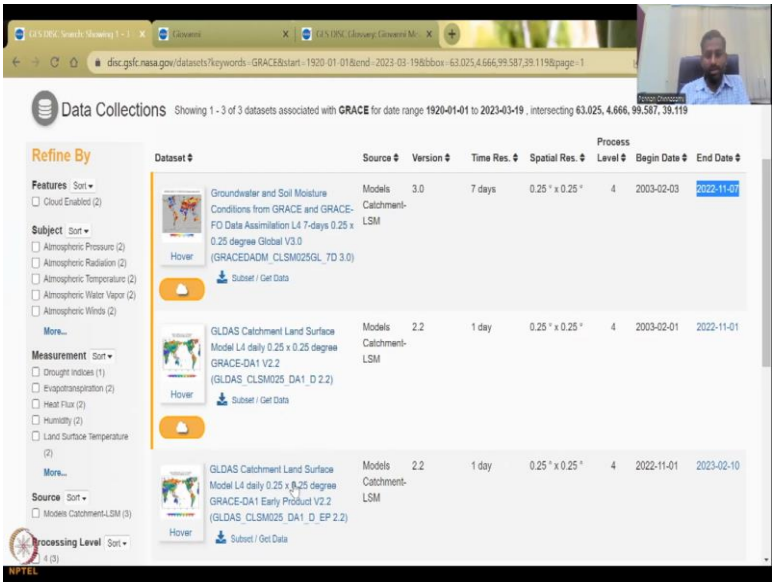




So, if you also wanted to, as I said, I also in order to say grace. So, you have the grace data, you have different versions of grace. Let us see if the bounding box is the same. The bounding box has gone. You can actually type in the values here or you can draw the box again. So, click on the box symbol and then say like this. It can only be as box, you cannot put a India boundary and take it out.

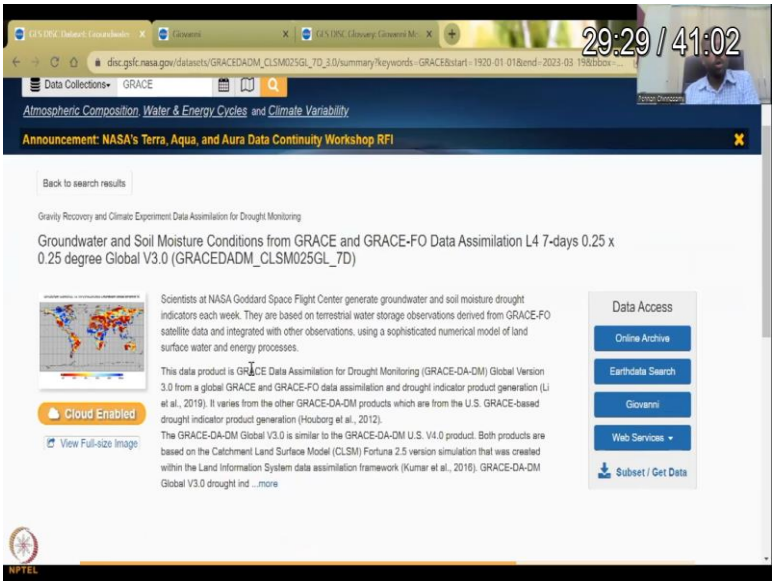
So, it is normally 63 4 5 87 and 40. So, it is 100 actually. Normally I use 63 500 and then 40 and then you can just say this one and then grace data is available. So, you can see here, the earliest data available on this is 1920. It is reconstructed data but it is still good and then you can see grace data available.

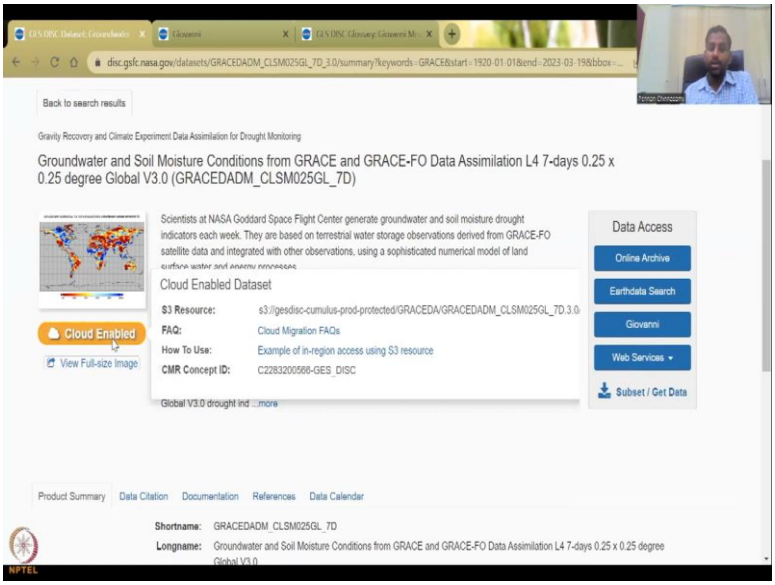
(Refer Slide Time: 28:58)

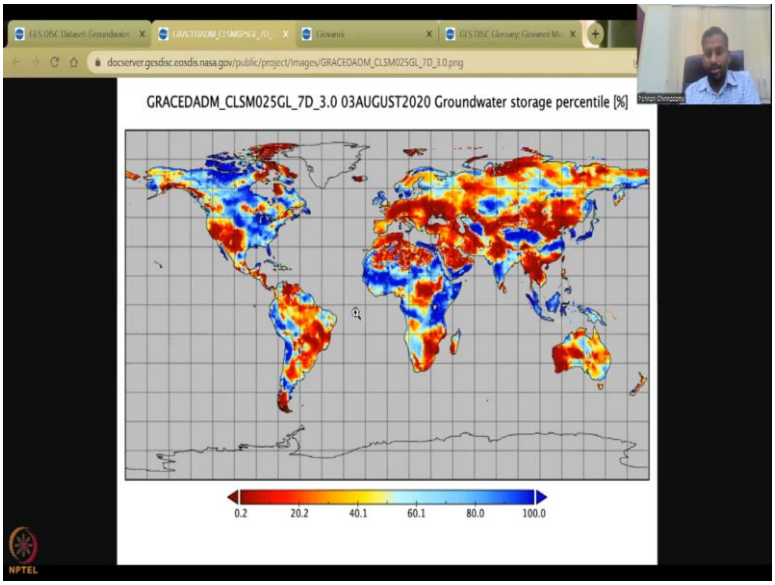


So, ground water and soil moisture conditions from grace is available. Time reservation 7 days from 2003 to 2022, November. And there is a lag, basically, it is a model data and then you also have per day GLDAS estimates and Grace estimates of data.

(Refer Slide Time: 29:29)

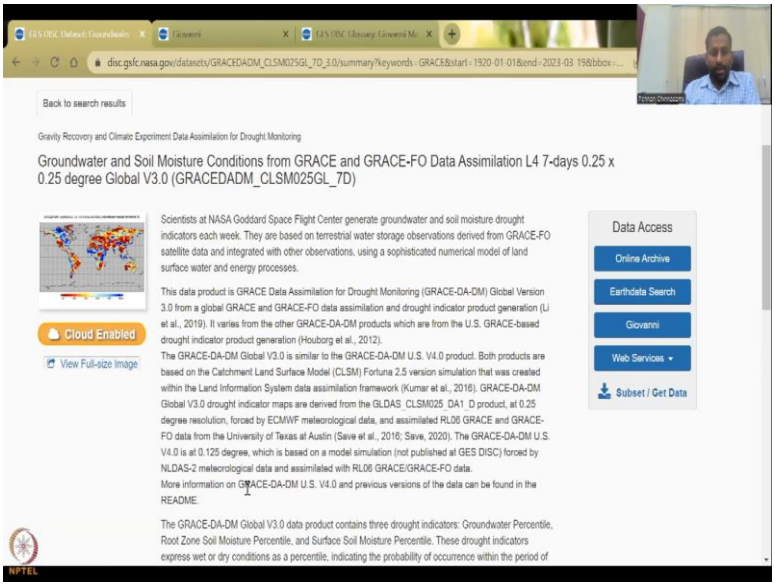


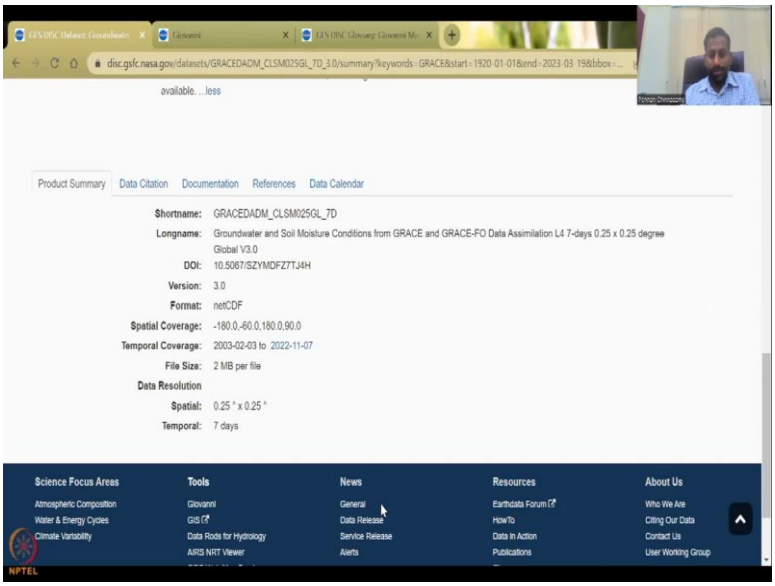




So, I can also click and showcase one of this data set and then show you how to access it. So, or since, we we started with NDVI also will do but since we have this. So, the cloud enabled is where the data is stored. You can also have an online storage for your images and then you have this Grace data set, just a thumbnail to see how the data, the grids are present. And then groundwater storage percentile for August. So, you have 100 percentile or 0.2, based on the average values.

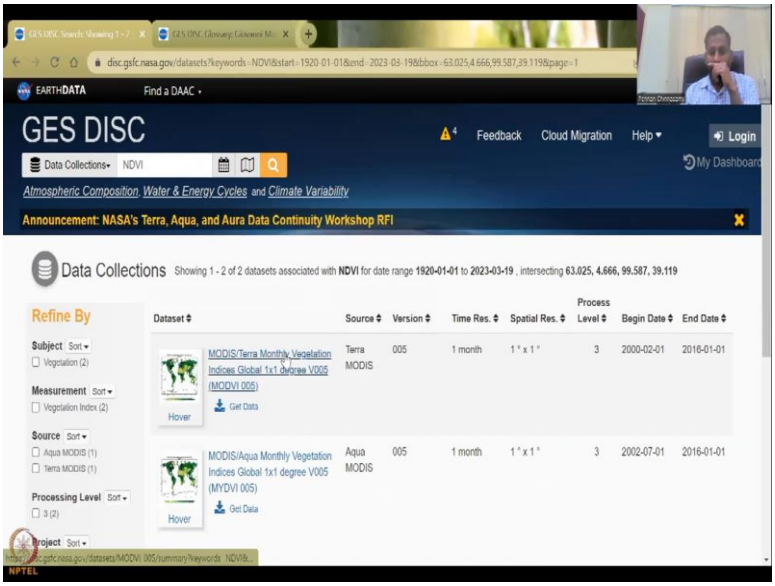
(Refer Slide Time: 30:02)





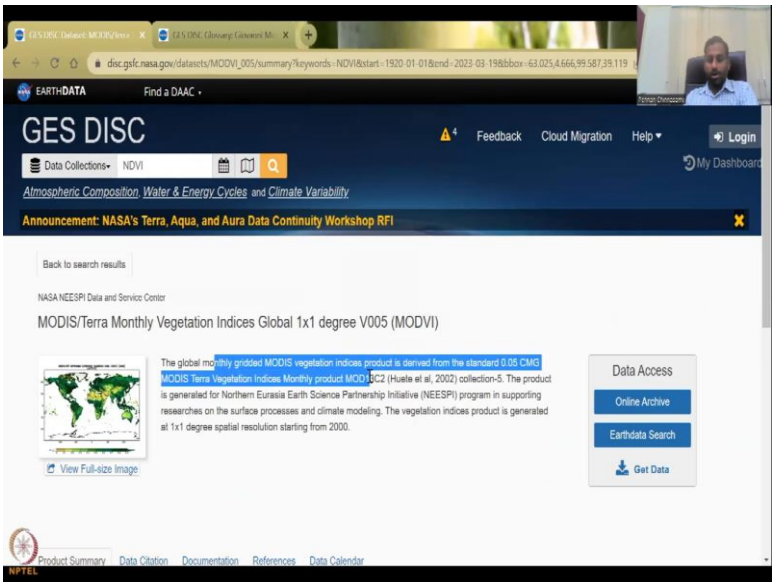
So, you can see more on the metadata here and then documentation data citations, etcetera. So, this grace, we did not see all these, but I will be showing now for the NDVI.

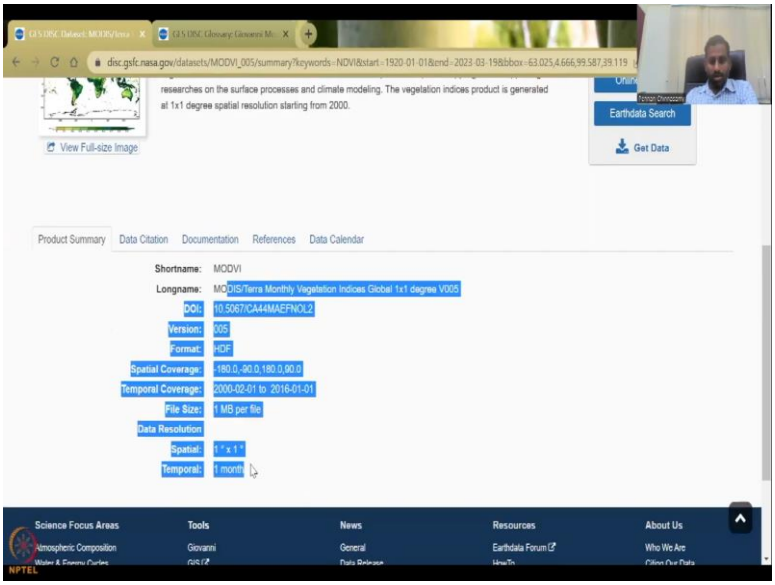
(Refer Slide Time: 30:23)

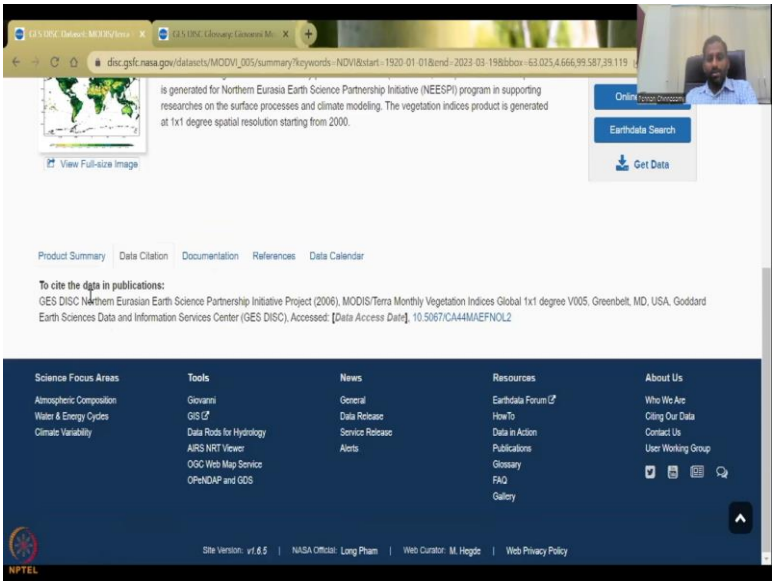


So, we are going to do the NDVI again for the same box range. Date is fine, whatever date is fine. So, we will say okay, do you want one of these. I will say Terra Modis I will be using.

(Refer Slide Time: 30:30)



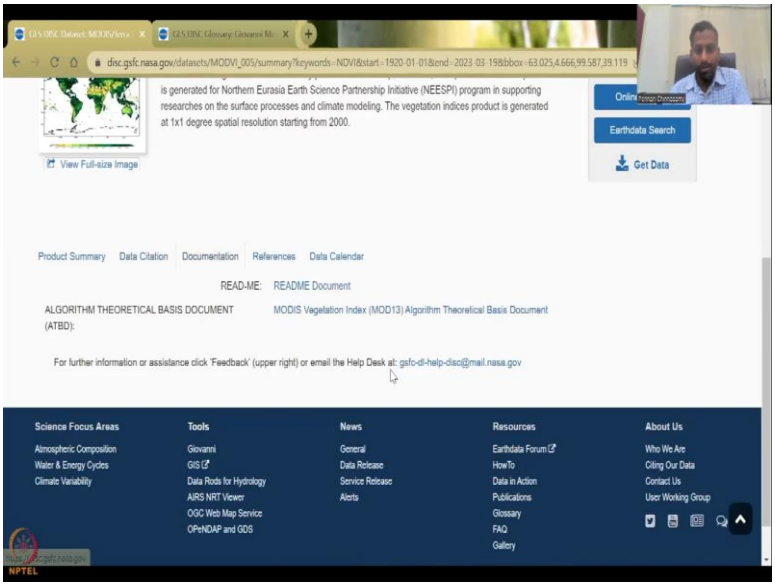


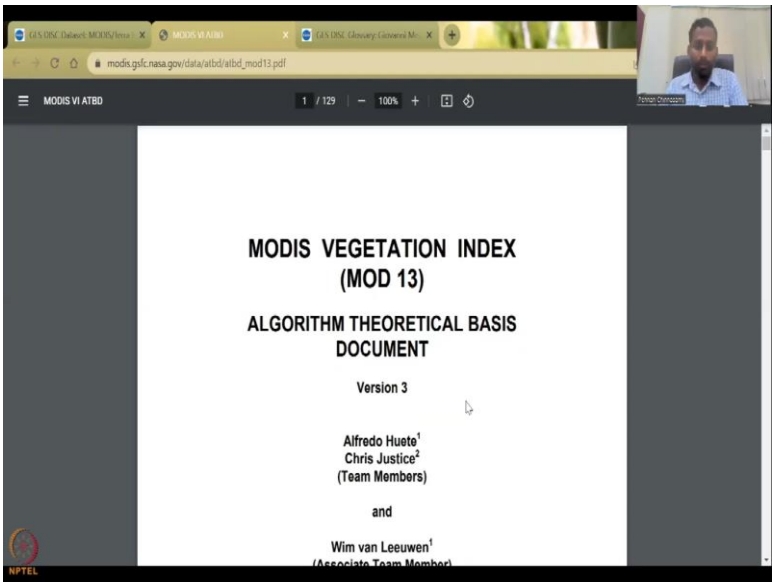


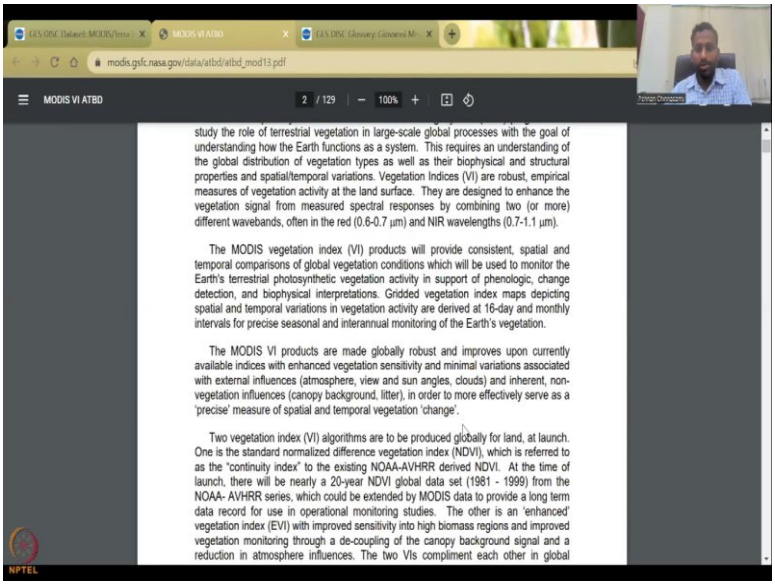
So, here we have the global monthly gridded data for models, a vegetation devices using these products. And then there is a resolution given here, monthly, temporal is monthly, spatial is one degree by one degree which is good. And then we have data citations, who you have the cite, if you use the data. There is no pay. Most of people do not even cite these in the publications. It is good to cite it or at least cite the NASA team because they have processed this data; put this up and they are running it.

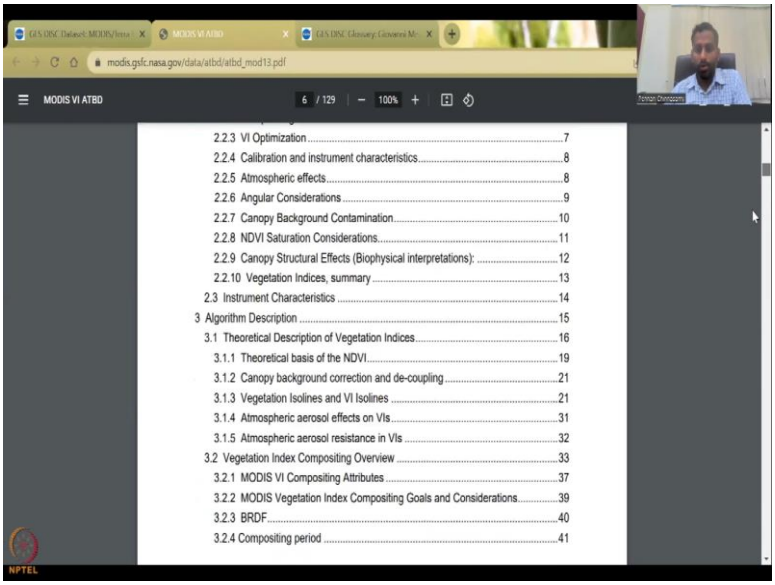
So, at the end of the day they are not asking for money for using it but if people use it then the publications, they can show that so many people are using it, so that this program can continue. The government looks at how many people are using it and the only proof they can show is publications. So, if I can write a letter saying that I use it but I do not publish it then what is the use. So, please, cite it in your work, your citations. You can hear you have it here.

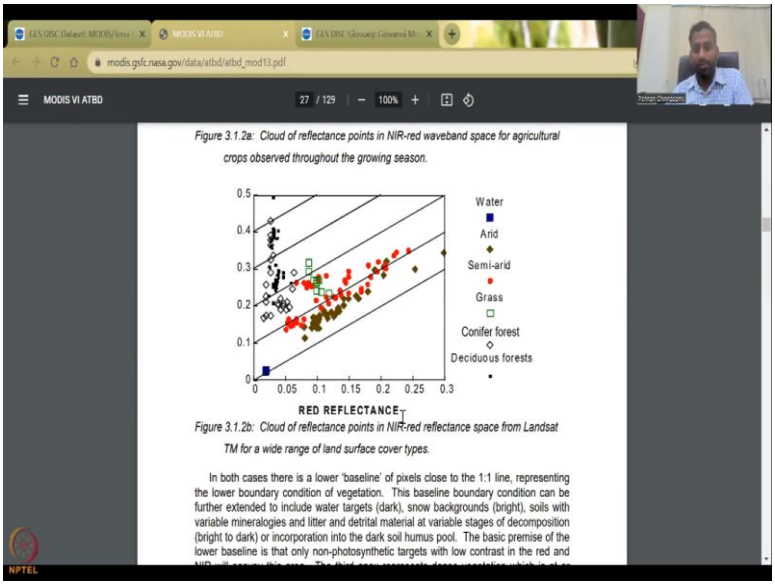
(Refer Slide Time: 31:33)







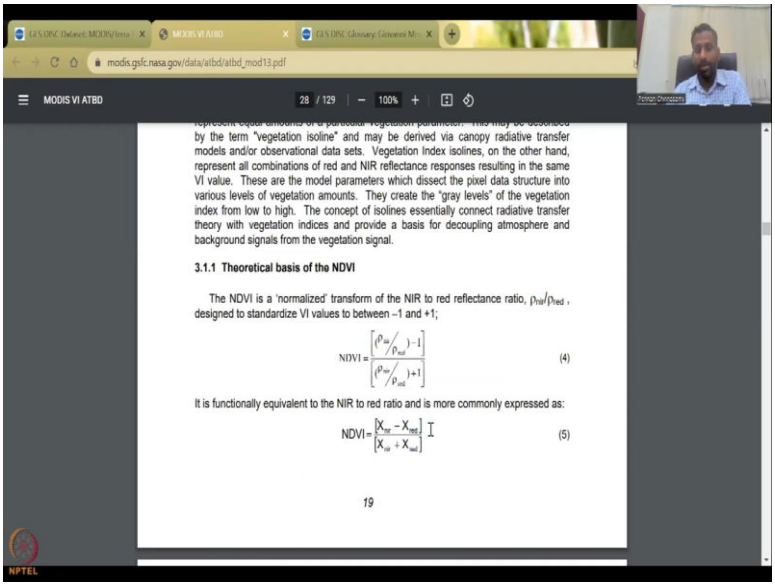


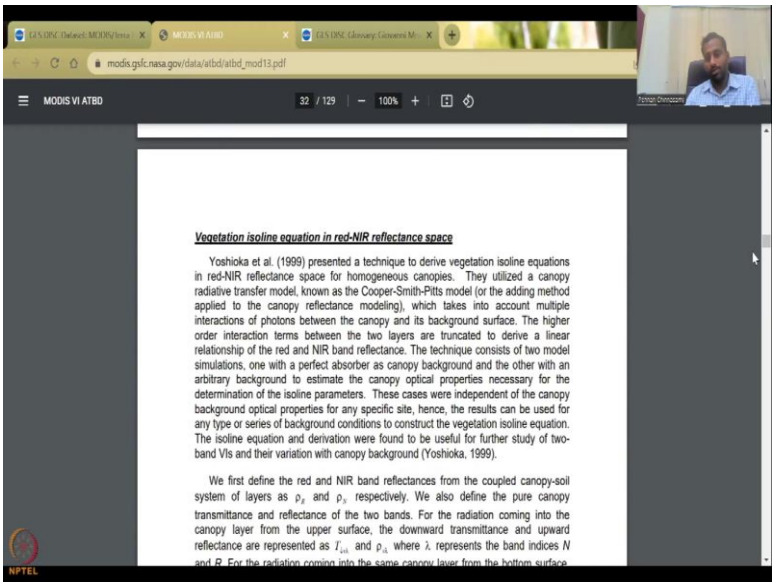


So, some documentation of this indicators same like ISRO we did. You click it, there is a PDF which opens up, about the satellite, about how it is being used, etcetera. There you go. So, we have all the resolutions and then a big report on how this data was taken, the reflectance of red, percentage of reflectance and what it means.

So, if it is water, how much reflectance it is and then grass, how much reflectance it is. So, you have cloud reflectance points in an IR spectrum from landsat and different land use land cover types. So, you have different reflectances based on the land use land cover types. So, a lot of lot of these are done.

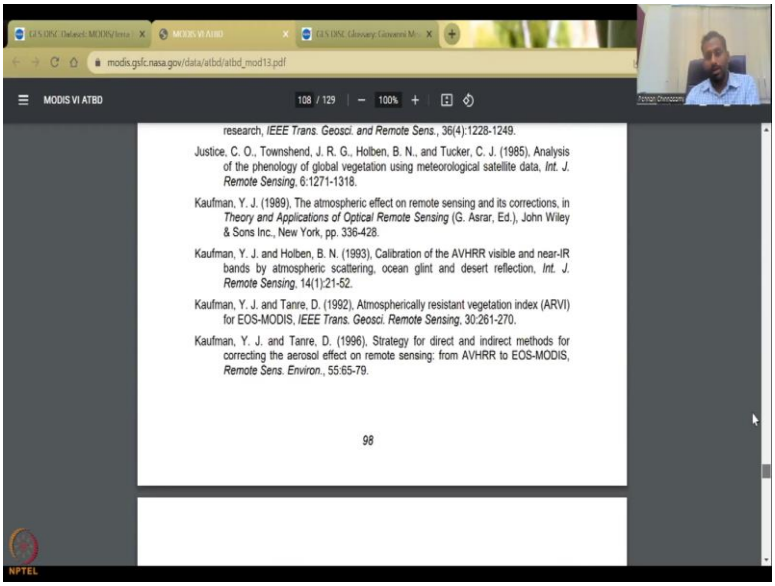
(Refer Slide Time: 32:27)





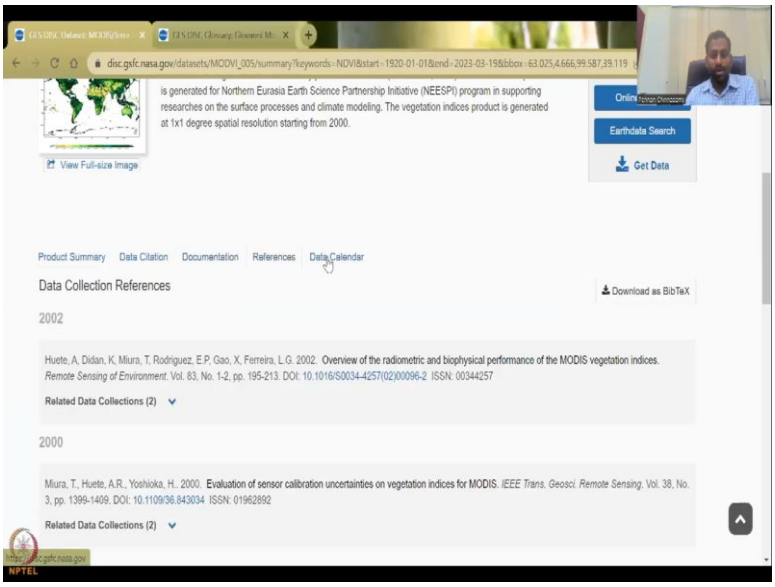
And NDVI has been taken as this one, same thing NIR minus red by NIR plus red, basically, from the following equations. So, if you want to theoretical knowledge about NDVI, you can look at this also.

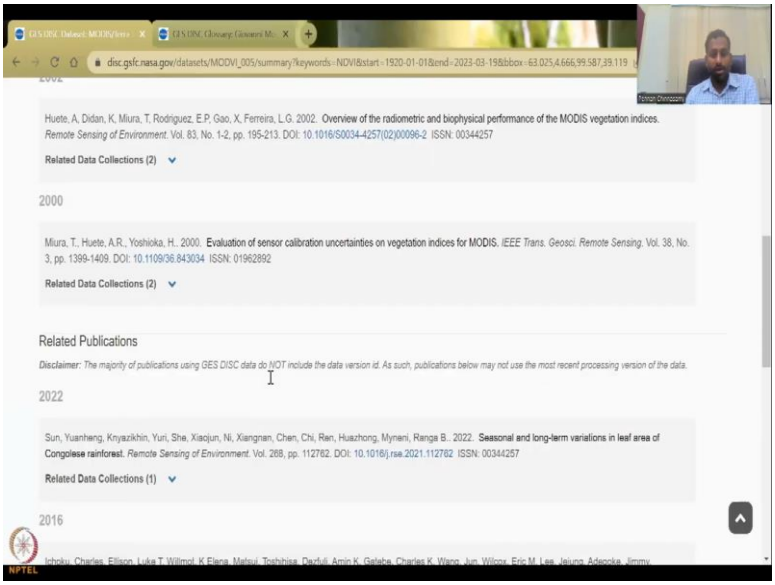
(Refer Slide Time: 32:39)

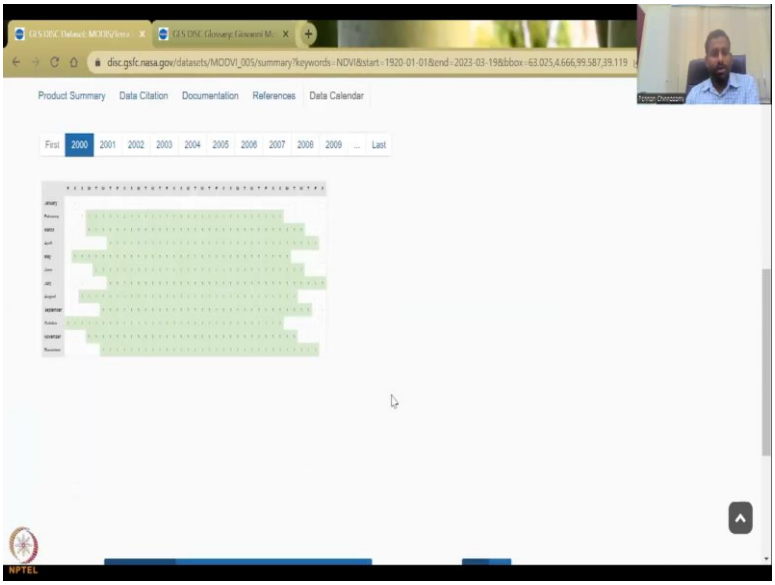


Then when you do it, please, cite it. There is a lot of information that has been used about the satellites where it has been placed, data calculations, estimations, those kind of things.

(Refer Slide Time: 32:52)




disc.gsfc.nasa.gov/datasets/MODVI_005/summary?keywords=NDVI&start=1920-01-01&end=2023-03-19&bbox=-63.025,4.666,99.587,39.119
Huete, A, Didan, K, Miura, T, Rodriguez, E.P, Gao, X, Ferreira, L.G. 2002. Overview of the radiometric and biophysical performance of the MODIS vegetation indices. Remote Sensing of Environment. Vol. 83, No. 1-2, pp. 195-213. DOI: 10.1016/S0034-4257(02)00096-2 ISSN: 00344257
Related Data Collections (2)
2000
Miura, T., Huete, A.R., Yoshioka, H.. 2000. Evaluation of sensor calibration uncertainties on vegetation indices for MODIS. IEEE Trans. Geosci. Remote Sensing. Vol. 38, No. 3, pp. 1399-1409. DOI: 10.1109/36.843034 ISSN: 01962892
Related Data Collections (2)
Related Publications
Disclaimer: The majority of publications using GES DISC data do NOT include the data version id. As such, publications below may not use the most recent processing version of the data.
2022
Sun, Yuanheng, Knyazikhin, Yuri, She, Xiaojun, Ni, Xiangnan, Chen, Chi, Ran, Huazhong, Myneni, Ranga B.. 2022. Seasonal and long-term variations in leaf area of Congolese rainforest. Remote Sensing of Environment. Vol. 268, pp. 112782. DOI: 10.1016/j.rse.2021.112782 ISSN: 00344257
Related Data Collections (1)
2016
NPTEL


disc.gsfc.nasa.gov/datasets/MODVI_005/summary?keywords=NDVI&start=1920-01-01&end=2023-03-19&bbox=-63.025,4.666,99.587,39.119
Product Summary
Data Citation
Documentation
References
Data Calendar
First
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
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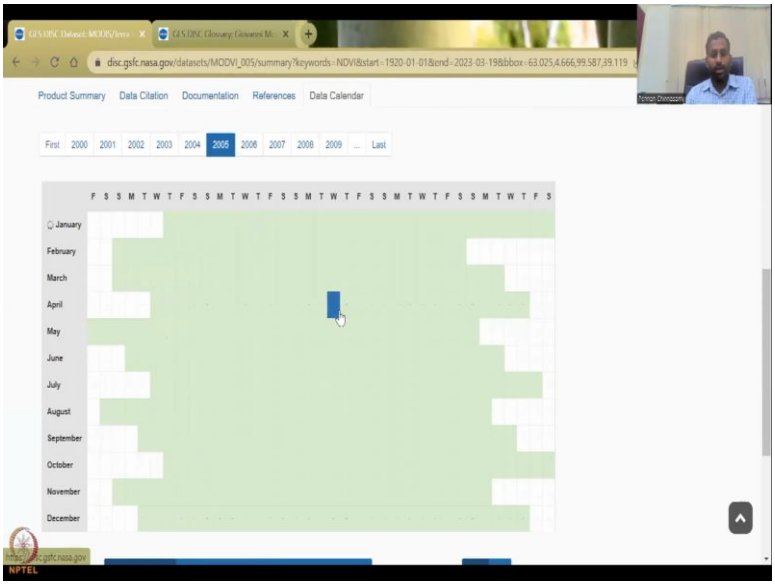
Last
NPTEL


disc.gsfc.nasa.gov/datasets/MODVI_005/summary?keywords=NDVI&start=1920-01-01&end=2023-03-19&bbox=-63.025,4.666,99.587,39.119
Product Summary
Data Citation
Documentation
References
Data Calendar
First
2000
2001
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2003
2004
2005
2006
2007
2008
2009
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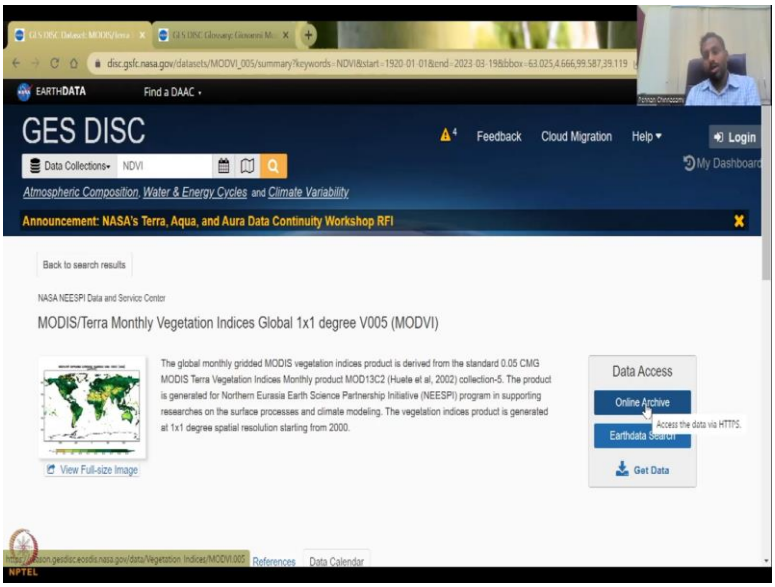
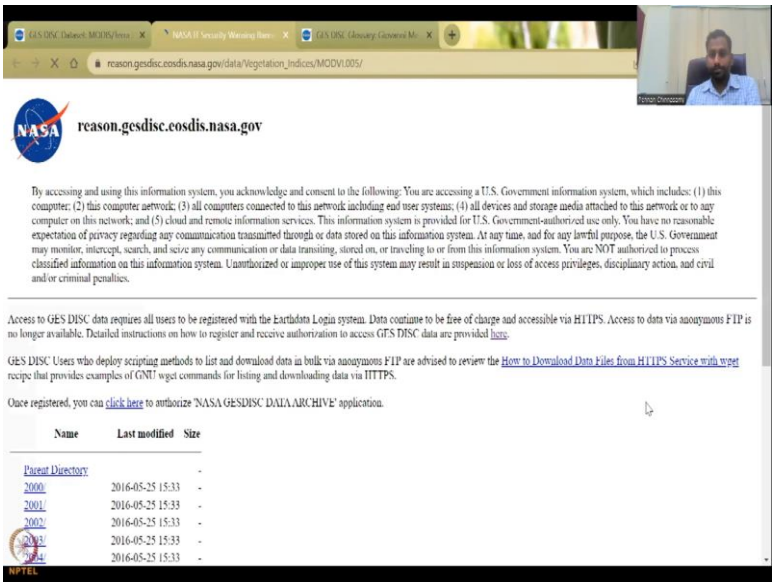
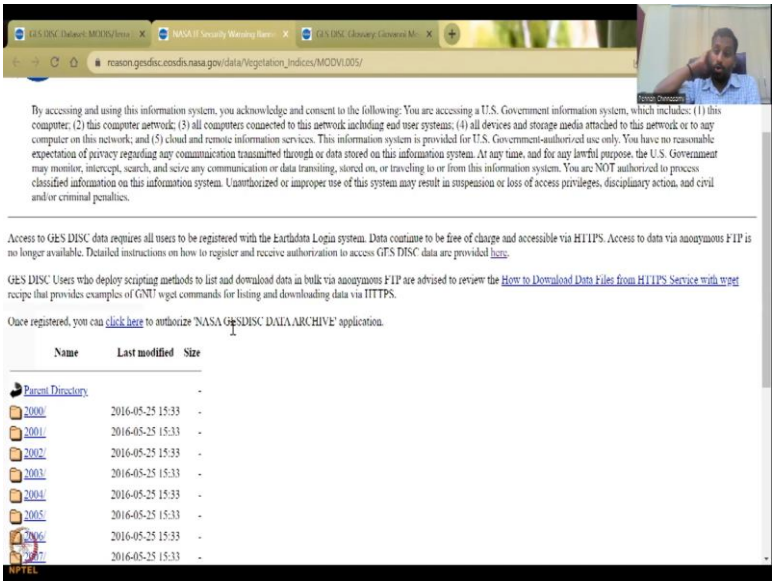
Last
January
February
March
April
May
June
July
August
September
October
November
December
NPTEL

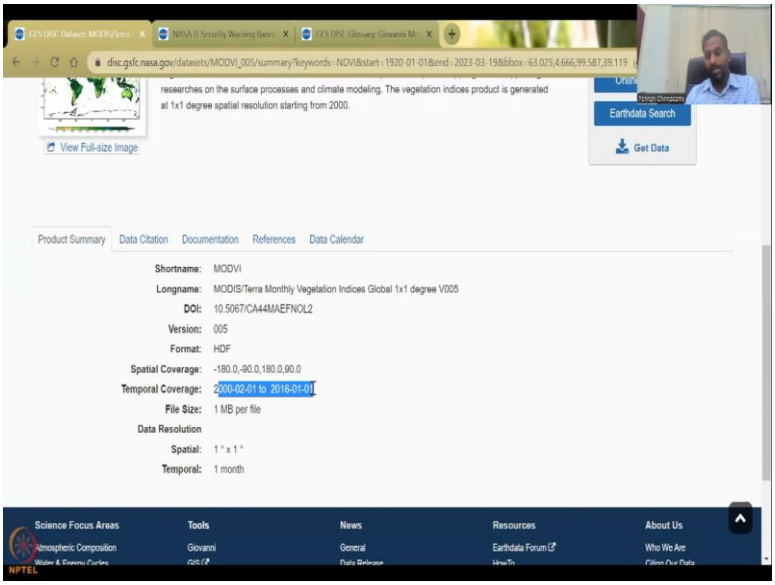
References, again you will have multiple references for this data set and then data calendar. So, the data calendar gives you on which month, which date the the mission was taking data and then it also shows you that there are, if there is any data gap because of instrumentation etcetera, they will show you that in the data gaps, if needed. So, how do you access this data that is another question people need to ask.

(Refer Slide Time: 33:21)





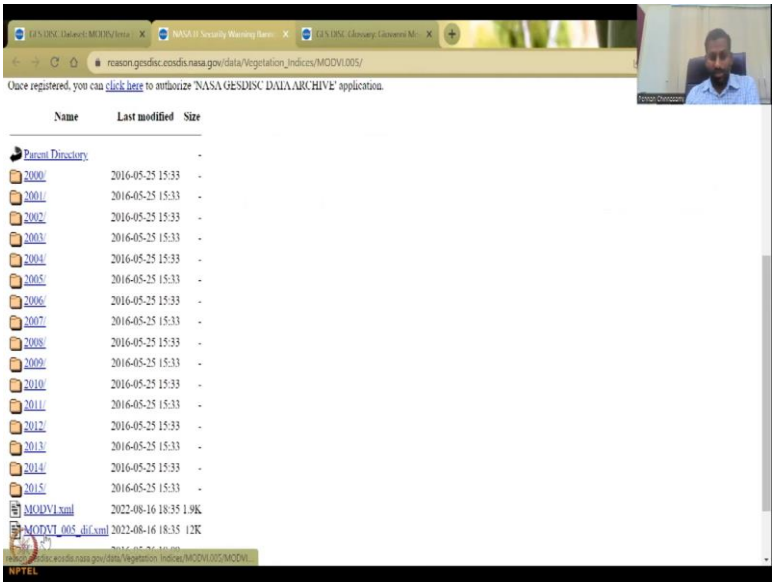


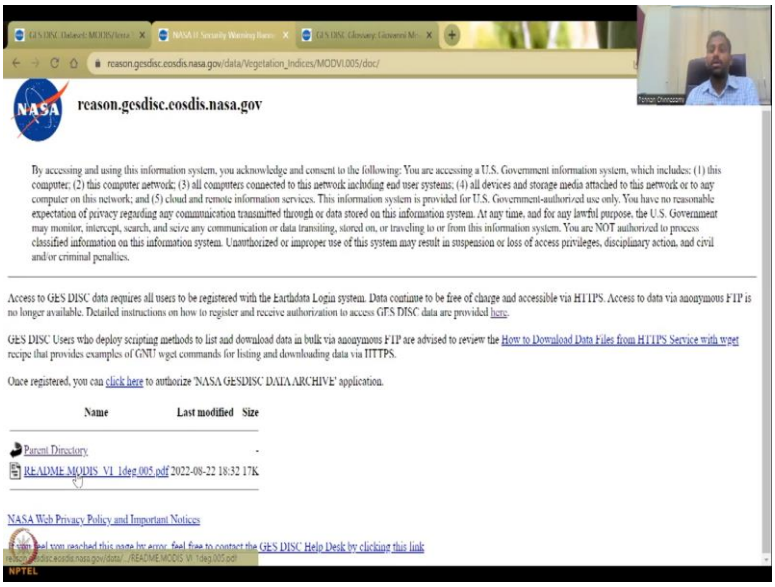


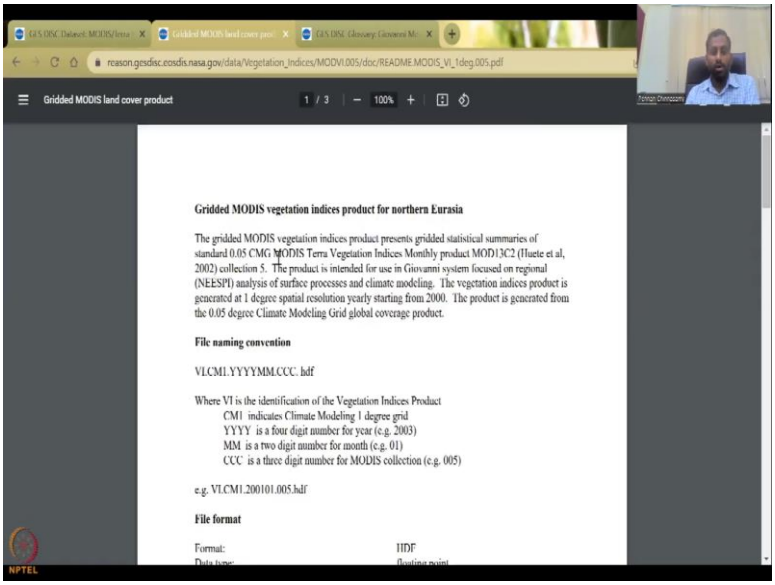
So, there are 2 types given in this particular data set. Not a all data set have 2, some may have 4 or 1, depending on the storage. You can click on first open archive data. This is a folder kind of data, which means you will go here and just click, click and then take the images out.

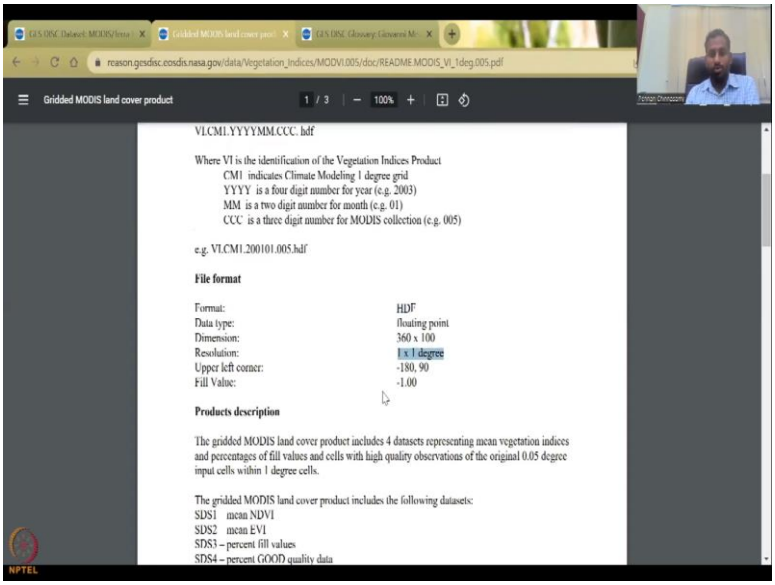
Instead of downloading it from the drawing, the box and then taking it out, you can just go to the data set. So, for example here, we know that this data is from 2000 to 2016. So, when you did online archive, this comes up. And it is open source. It is secure system, anyone can download it. How to download files from this https service, you can read and understand. I will just show you a quick demo.

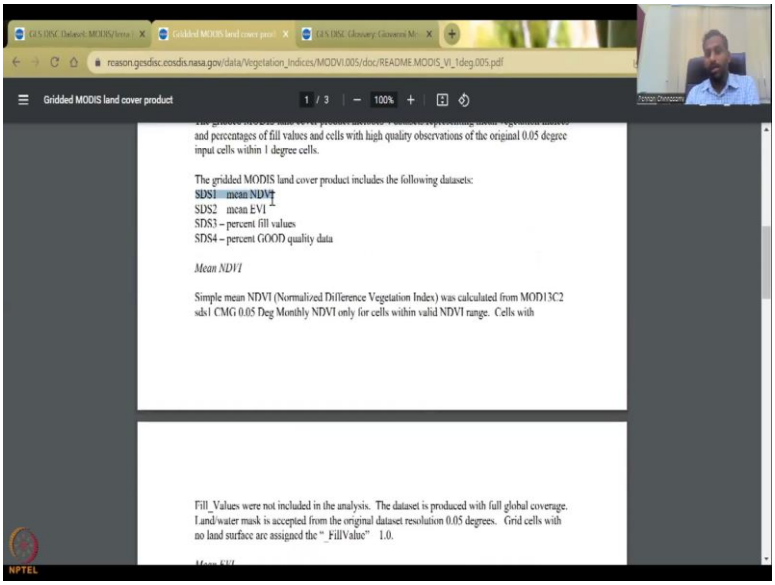
(Refer Slide Time: 34:09)











Here, there is no login needed much, you can see. So, from 2000 to 2015, 2016, there is folders. So, folders are kept for the data and you just click on a particular year. So, let us say, I am going to go 2009 and when you click 2009, what happens is there is a readme file. Before I will just show you, there is a readme file, these things, to show what this data is about.

Read me. So, readme means it is a metadata about the data. So, you can just click on this. It will open the Modis, what these products are, file format, resolution, everything is given which is like the metadata for you. And then it says sds1 means NDVI. So, the product, if you want to download.

So, when you download this data all of it will come out but you want to only use the NDVI. So, for which you say I just want SDS1. So, all these are included. So, if you go back. I accidentally closed entire thing but I will open it. Open online data archive and then you can see all the folders.

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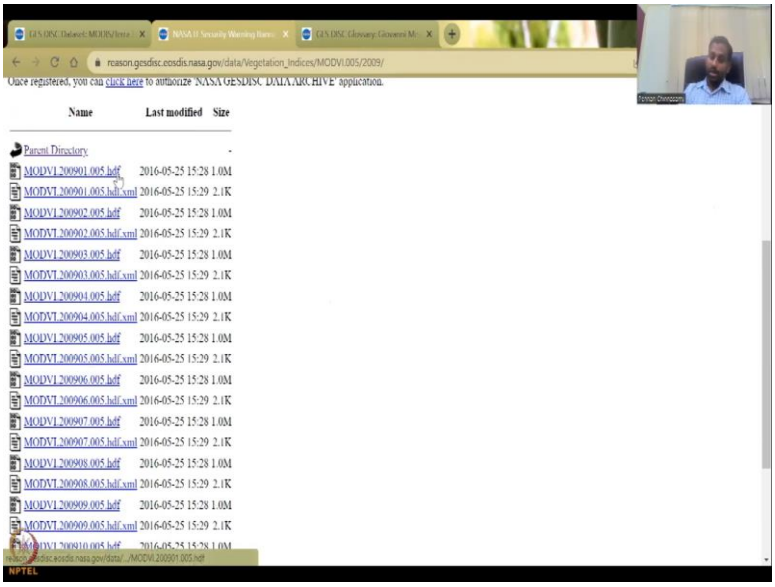

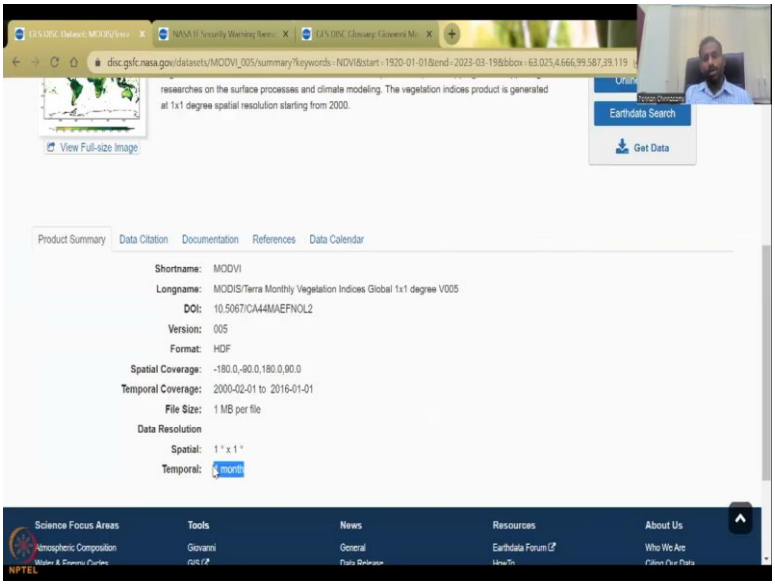

I have clicked on 2009 and you can do the hdf. So, that is the format, file format, grided format which is available. You can just download all of it if you want, but I will just show you the convention how it is given MODVI is the name MOD VI. And in the MOD VI, we have a 2009 01 00 01 is the month. So, you have the month given as January and then 005 is the level of the version, the version of the data.

So, maybe they would have added multiple criteria to clean the data, new algorithms, improvement. Because they do not stop with version 1. So, they make it better every year. So, we have version 5. So, all you could see is they go year, month and date. Since, Modis is a monthly data, as we could see here, it is at monthly resolution, there is no point of putting a date. So, they do not put a date.

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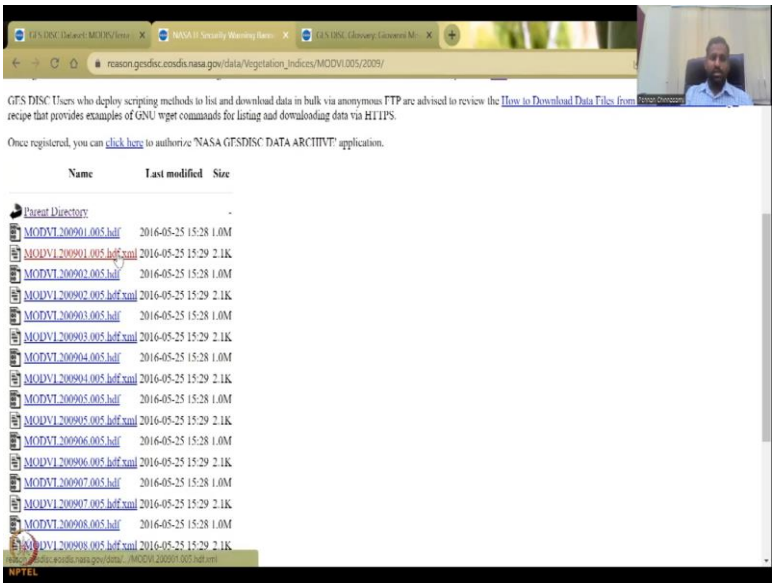

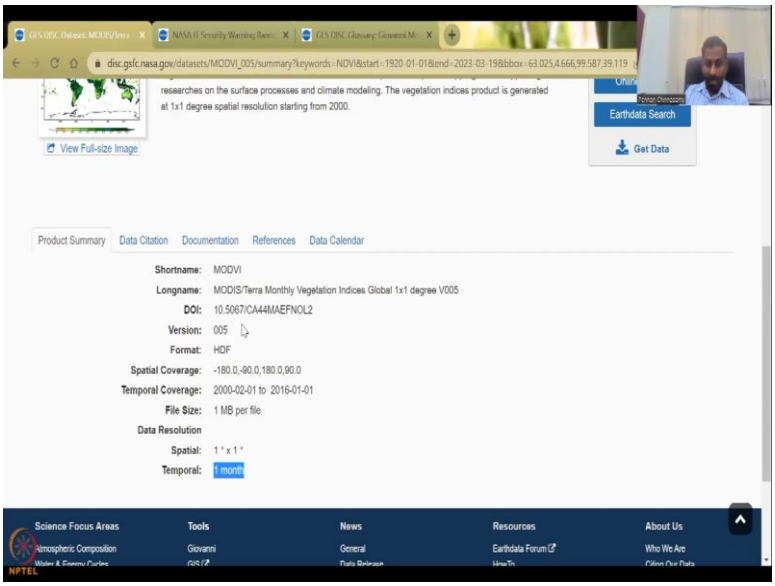

So, this is just the XML file. It will just populate here the XML file if you need it, but if you want this, just click on it. It will ask you to download. First you have to sign, in login and then you download. So, and then you can just put it on your GIS database platform and then you can model it. So, this is the raw data that comes out and in the raw data, they have also made these documentation for NDVI data.

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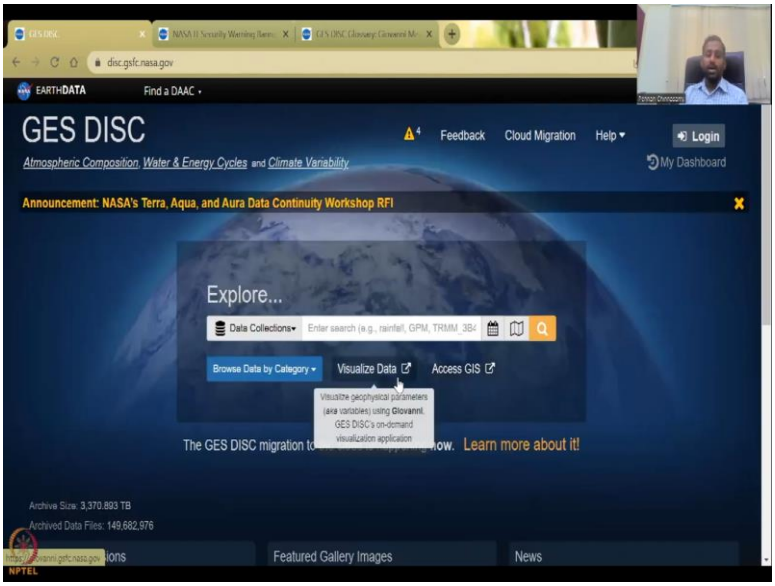

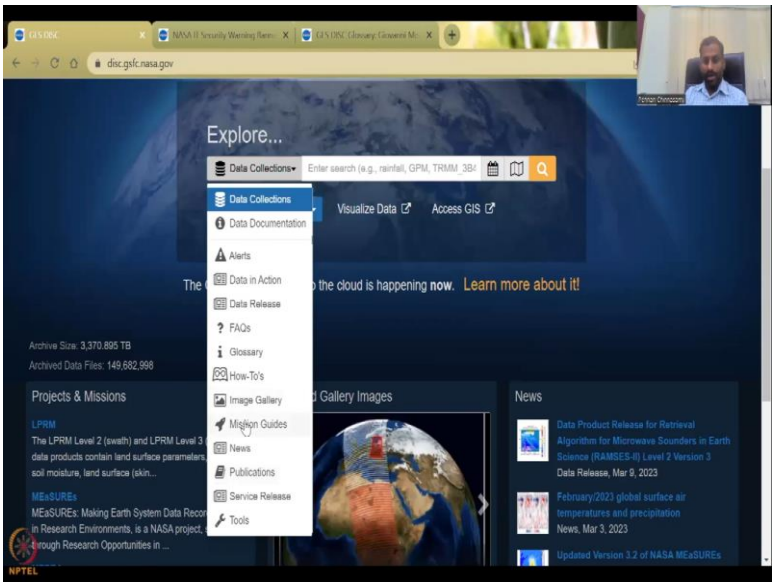

In the next lecture, I will start with the visualization of GES DISC. So, I will just keep it here ready for you. You can also play with these 2 links. But we will start with the visualize data and then we will also clarify on Sentinel Hub which is also a good beautiful data set platform that we can use but mostly for European satellites. They do have NASA satellites but they want to promote the COPERNICUS system. The COPERNICUS is a database for European satellites.

So, with this I will see you in the next lecture but feel free to go and look at these different data collection, how to do it, image gallery and then Mission guidelines. Mission is the satellites and then see the recent news on how these data sets have been used widely, globally, etcetera.

So, we are talking about the highest downloaded data set in the world. The most used data sets in the world are from NASA and it is for all. So, a lot of collaborations are there between this data set and a lot of countries including India and so, please, feel free to use it and I do like the catalog level.

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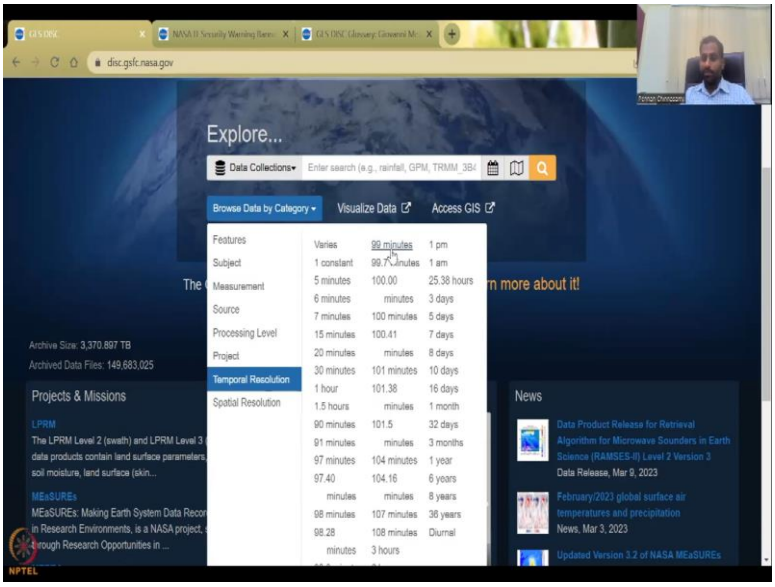

And then also you can limit to what temporal resolution you want. If you do, if you want temporal resolution at even 99 minutes, these are model versions, do not worry about it. 3 hours are there, 1 day. So, I would say 7 days onwards is really good because every day taking and data set is not important for rural development. 7 days to 15 days is good and then 15 days, monthly, annually, seasonally is there. So, you can see from here. So, you have a monthly, these 2 are also monthly. Then you have quarterly, then annual, 6 years, 8 years, 36 years, diumal.

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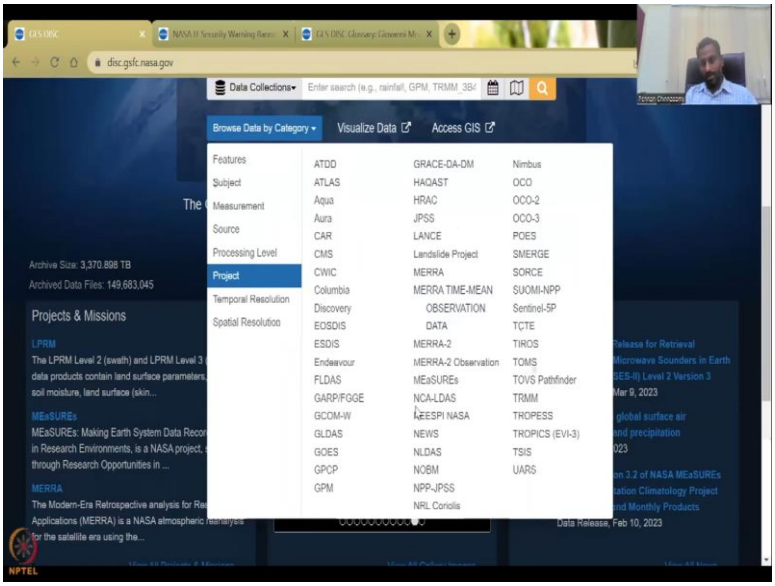

So, you also have the project which satellite you want to use. You can pick from satellite missions that are there landsat, aqua, Discovery Satellite Systems, etcetera, GLDAS. These are projects.

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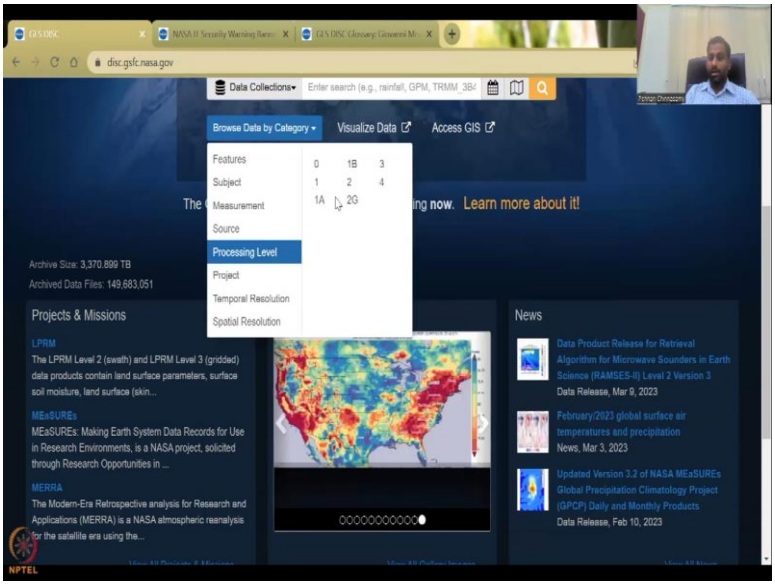

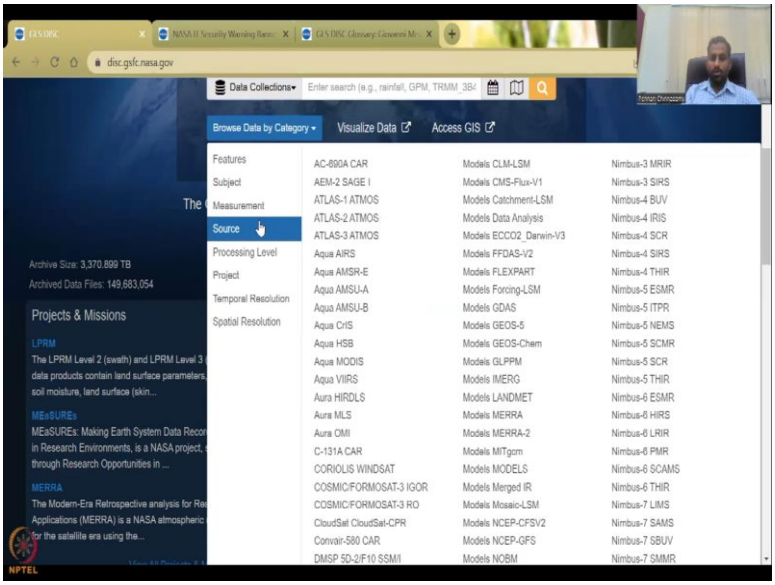

And then the processing level. As I said there are multiple versions and levels. The source of the data. These are the satellites themselves. So, you have NASA drove, NASA and then resourcesat would not be here but it was not the other NASA webpage.

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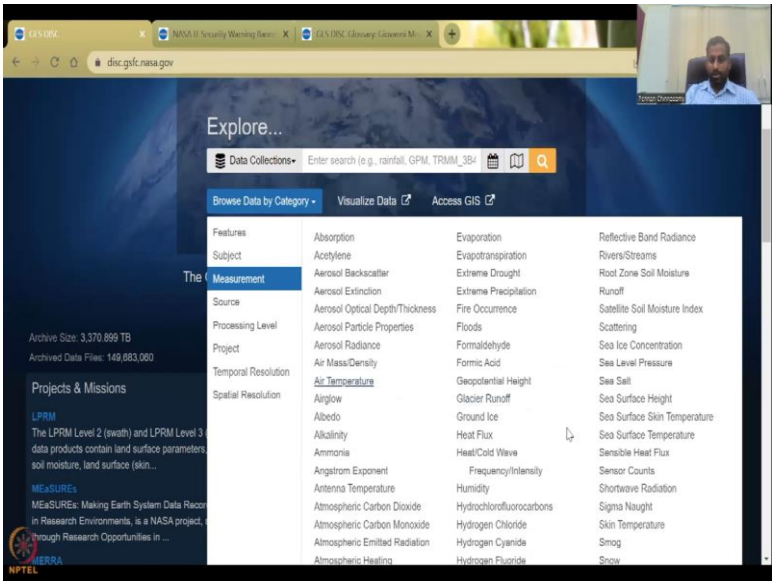

And then we have the measurement. As I said, you can take the measurements, what you want to measure. Soil, infiltration is also part of your soils that we use or subjects.

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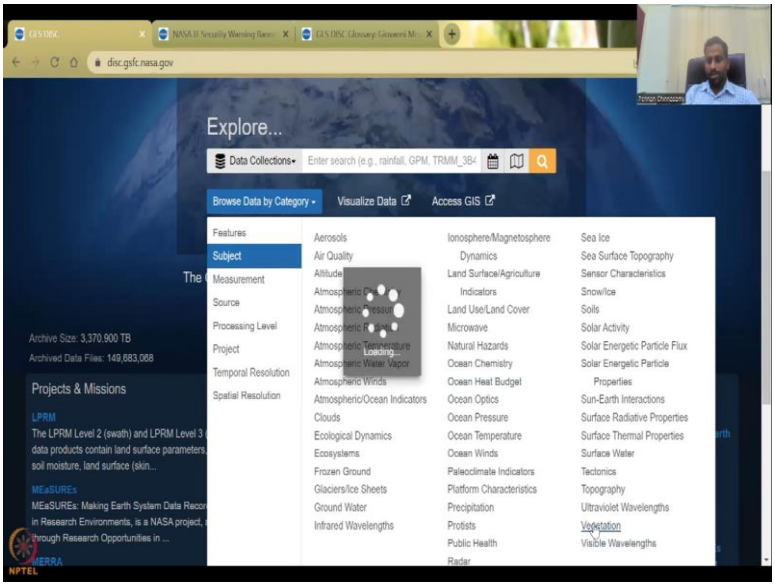

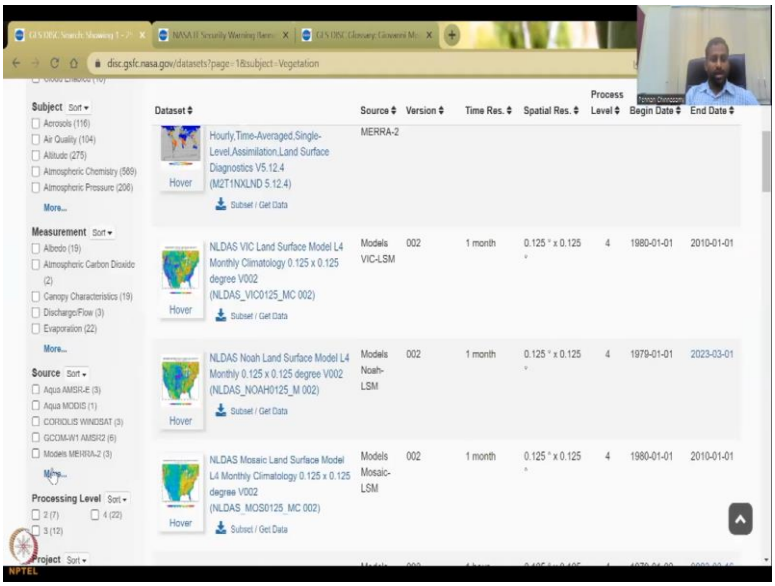

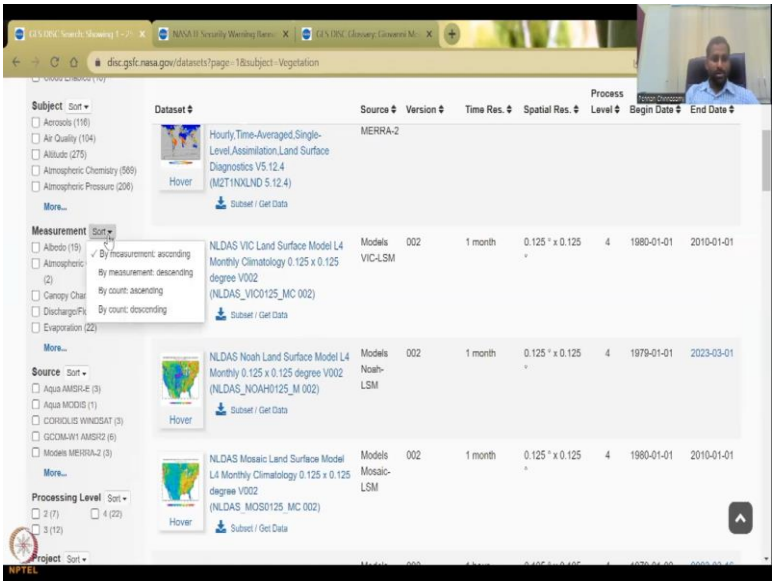

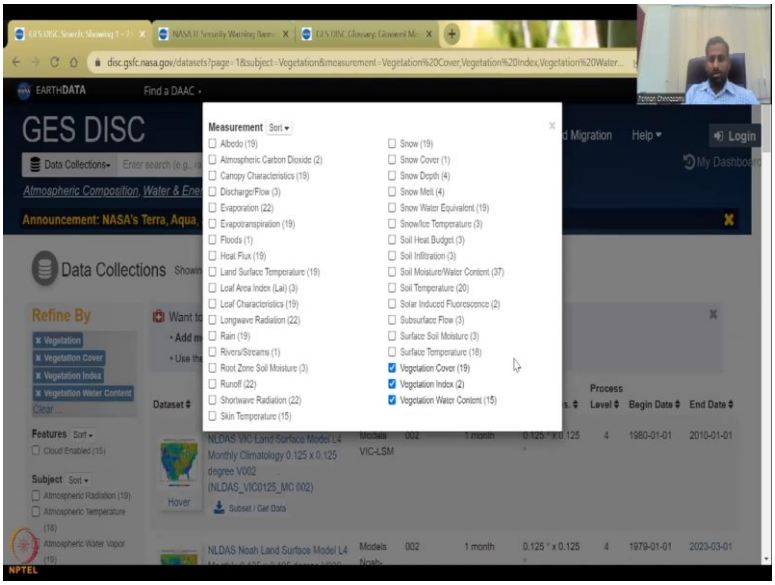

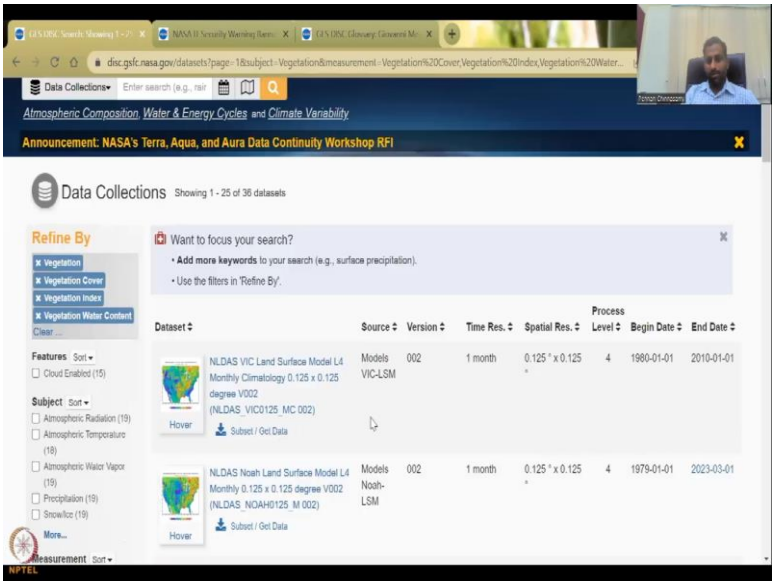

Subjects. If you click vegetation, you see what vegetations they have and in the vegetation index you will have here. So, what measurements they have also here. All these are vegetation. And then you can see, you can find find, sort them here by for example, let us say, you can click on more, all the measurements come up.

So, I will say vegetation cover, vegetation index, vegetation water content is what I need and then I close this. Then now only these are filtered. Initially, there was 36 more interesting data sets. Now it is reduced. Let me reduce it further by saying that resolution.

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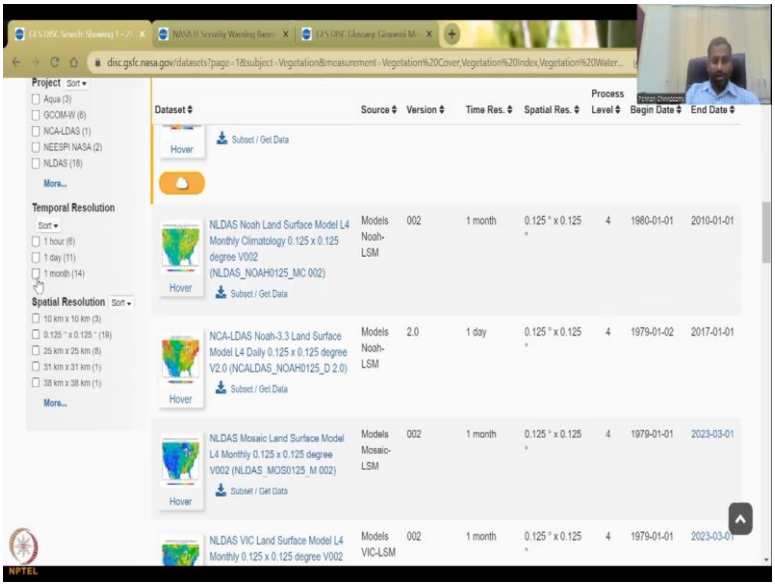

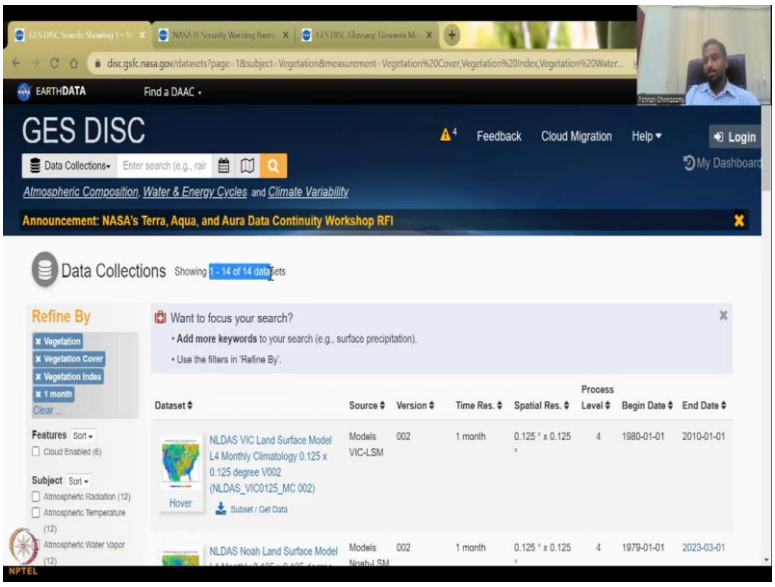

Come down, here you have resolution. And I want only monthly. So, if I click monthly, only 14 datasets will come. So, this is how you could reduce the number of data sets you want and then filter it and use it for your analysis. So, this I will stop here I have given you an introduction of this website and how it could be used what type of data, I will see you in the next class. Thank you.